WORKSHOP MANUAL

ARIEL 3

BSA

INDEX

ENGINE

PISTON

Material	Aluminium alloy	
Compression ratio	7 : 1	
Clearance	·001"	(0·025 mm.)

PISTON RINGS

Material	Cast-iron	
Width	0·0589"	(1·5 mm.)
Fitted gap (minimum)	0·007"	(0·17 mm.)
Fitted gap (maximum)	0·019"	(0·5 mm.)
Axial groove clearance (minimum)	0·0008"	(0·0203 mm.)
Axial groove clearance (maximum)	0·0016"	(0·0406 mm.)

CYLINDER BARREL

Material	Perlitic cast-iron	
Bore size (standard)	40 mm.	
Stroke	38 mm.	
Oversizes	·25 and ·50 mm.	

IGNITION TIMING (Fixed)

Piston position (before top dead centre)	0·078—0·085"	(2—2·2 mm.)
Contact breaker gap setting	0·013—0·017"	(·35—0·45 mm.)

SPARKING PLUG

Type	Champion L81 or Bosch W175 T1	
Gap setting	0·025"	(0·65 mm.)
Thread size	8 mm.	

CARBURETTER

Type	Encarwi type S8	
Main jet size	58	
Normal choke size	14 mm.	

BEARING DIMENSIONS

Crankshaft bearings (left- and right-hand)	Ball journal 6302 (Hoffman 315)	
Small-end bearing	0·551"	(14 mm.)
Gudgeon pin diameter	0·472"	(12 mm.)

TRANSMISSION

CLUTCH

Type	Single friction plate, centrifugally operated Fully automatic	
Driving plates (plain)	2	
Driven plates (bonded)	1	
Thickness of driven plate	·149″	(3·8 mm.)
Centrifugal spring ball, diameter	9/32″	
Centrifugal spring ball, quantity	3	

SPROCKETS

Layshaft primary	12 teeth
Wheel spindle primary	46 teeth
Pedal crank	32 teeth
Freewheel	18 teeth

CHAIN SIZES

Final drive chain (56 pitches)		
Pitch	·375″	(9·53 mm.)
Roller diameter	·250″	(6·35 mm.)
Between plates	·225″	(5·7 mm.)
Pedal chain (115 pitches)		
Pitch	·5″	
Roller diameter	·305″	
Between plates	·130″	

BELT SIZE

Type	Toothed
Teeth	3/8″ pitch × 60 tooth

FRAME AND FITTINGS

FRONT FORKS

Type	Trailing link with rubber block springing	
Head bearings (top)	30 × 1/8″ dia.	(3·175 mm.)
Head bearings (bottom)	26 × 3/16″ dia.	(4·762 mm.)

WHEELS, BRAKES AND TYRES

WHEELS

Rim size	12″ diameter

WHEEL SPINDLE BEARINGS

Front (inner)	Torrington needle roller D.C. B126
Front (outer)	35 × 15 × 11 mm. (half seal)
Rear, right-hand, (inner)	32 × 12 × 10 mm. (half seal)
Rear, right-hand, (outer)	40 × 17 × 12 mm. (half seal)
Rear, left-hand, (inner)	Glacier bush No. MB 2025 DX
Rear, left-hand, (outer)	40 × 17 × 12 mm. (half seal)

LAYSHAFT BEARINGS

Size (left)	40 × 17 × 12 mm. (half seal)
Size (right)	40 × 17 × 12 mm. (half seal)

BRAKES

Front and rear (diameter)	4"	(101·6 mm.)

TYRES

Size (front)	12" × 2"	
Size (rear)	12" × 2"	
Pressure (front)	28 lbs./sq. in.	(2 Kg./sq. cm.)
Pressure (rear)	28 lbs./sq. in.	(2 Kg./sq. cm.)

ELECTRICAL EQUIPMENT

Flywheel magneto	Bosch 0/212/112/053
Bulbs (headlight)	C.E.V. 6 volt, 15 watt
Tail light	Alite A317, 6 volt, 6 watt

CAPACITIES

Petrol tank	6 pints	(3·4 litres)

BASIC DIMENSIONS

Wheelbase	46"	(116·8 cm.)
Overall length	63"	(160 cm.)
Ground clearance	4¾"	(11·9 cm.)
Seat height (adjustable)	28"½—36"	(83·9—91·4 cm.)
Handlebar height (adjustable)	38"—40"	(96·5—101·6 cm.)
Track (rear)	15"	(38 cm.)

WEIGHTS

Machine (unladen)	126 lbs.	(57·15 Kg.)
Engine unit	16½ lbs.	(7·5 Kg.)

INDEX

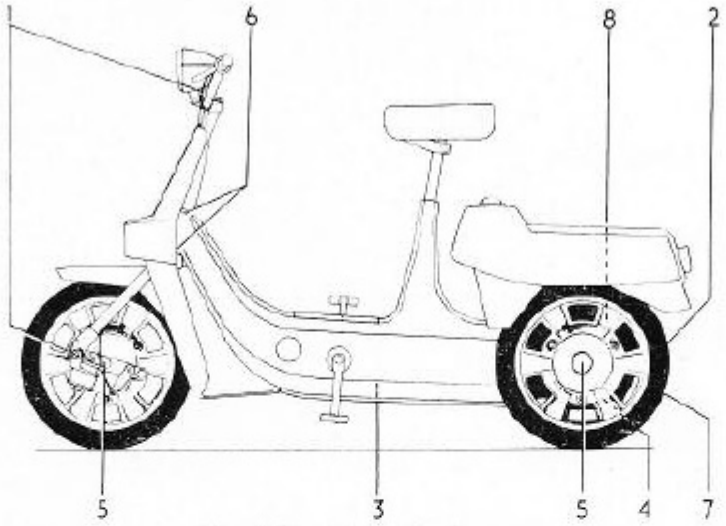


FIG. A1. *Lubrication diagram.*

So that the machine will provide trouble-free running and remain in good condition. Maintenance must be regularly carried out. The following list of items requiring regular attention will also serve as a guide to the periods of time between servicing. The method of carrying out each operation will be found under the appropriate headings in the lubrication section.

ROUTINE LUBRICATION

Ref. No.	**Weekly:**
1	Oil exposed cables.
	300 miles, 500 km (or 1 month)
2	Apply cycle oil sparingly to air cleaner element (see page C5).
	800 miles, 1,300 km (or 3 months)
3	Oil both pedal primary chains.
4	Lubricate free-wheel sleeve.
	3,000 miles, 5,000 km (or 12 months)
5	Grease wheel bearings.
6	Grease head race bearings.
7	Grease layshaft assembly.
8	Lubricate contact breaker felt wick.

RECOMMENDED LUBRICANTS

All the following engine oils are self-mixing and must be used in the proportion of 1 part oil to 24 parts petrol, equivalent to 1/3-pint of oil to 1 gallon of petrol (*i.e.*, 4 per cent mixture). For running-in purposes only (*i.e.*, for about 1 month or 300 miles) the proportion should be 1 part oil to 20 parts petrol, equivalent to 2/5-pint of oil to 1 gallon of petrol (*i.e.*, 5 per cent mixture).

BRAND	OIL	GREASE
CASTROL	Castrol two-stroke oil	Castrolease LM
SHELL	2T two-stroke oil	Retinax A
ESSO	Esso two-stroke (2T) motor oil	Esso Multipurpose grease M
MOBIL	Mobil-Mix TT	Mobilgrease MP
B.P.	Energol two-stroke oil	Energrease L2
TEXACO	Motor oil 2T	Marfak Multipurpose 2

The following oils are also approved for use in this engine: Filtrate plus 2-stroke oil; ¼-pint of oil to 1 gallon of petrol (1/3-pint of oil to 1 gallon of petrol for running-in purposes). Duckhams 2-stroke oil; ¼-pint of oil to 1 gallon of petrol. For non-self-mixing oils use an S.A.E. 40 grade in proportion of ¼-pint of oil to 1 gallon of petrol.

ENGINE LUBRICATION

Lubrication of the engine components is provided by oil dissolved in the petrol, forming a mixture commonly known as "petroil". The correct proportion of oil to petrol is given above and it is most important that the recommended oils should be used at all times.

For the most efficient running of the engine and for adequate lubrication, it is essential that the oil is completely dissolved in the petrol and it is preferable, therefore, to use the specially prepared self-mixing oils as detailed in the list of recommended lubricants above.

Alternatively, ready mixed oil and petrol can be obtained from most filling stations.

Because the engine is dependant solely on the intake of fuel mixture through the carburetter for lubrication, avoid coasting the machine downhill for long periods with the throttle shut as the engine may suffer seizure through lack of adequate lubrication.

IMPORTANT:—Never, under any circumstances, use petrol on its own.

CONTACT BREAKER

The contact breaker is mounted on the magneto base plate on the right-hand side of the engine. Periodical lubrication of the contact breaker cam is necessary. Provision is made for this in the form of a grease-soaked felt wick situated opposite the contact breaker points.

The grease (preferably of the high melting point type) should be applied sparingly to the wick every 3,000 miles (5,000 km). Avoid using the grease excessively, otherwise the contact points may become soaked, resulting in misfiring and difficult starting.

CHAINS

Both chains should be wiped clean and lubricated every three months or 800 miles (1,300 km). Remember the chain connecting link must be fitted with the closed end of the spring fastener pointing in the direction of chain travel (*i.e.*, on the lower run of the chain the closed end should be rearward).

STEERING HEAD

The steering head bearings are packed with grease on assembly and should only require repacking at intervals quoted on page A2. Full details of removing and replacing the steering assembly can be found on page E3 in the fork section.

Wipe out all the old grease from the bearing cups and clean the ball bearings by rolling them in a clean rag. After cleaning, carefully examine the bearings, cups and cones for pitting, corrosion or cracks, and renew if necessary. The fresh grease will hold the bearings in position during reassembly. Check that the grease is as quoted on page A2.

The correct number of ball bearings for each cup is 30 for the top cup, and 26 for the bottom cup.

WHEEL BEARINGS

The wheel bearings are packed with grease on assembly and should only need repacking at the intervals quoted on page A2.

The bearings should first be removed as detailed on pages F2 and F3 after which they must be washed thoroughly in paraffin, and if possible, an air line should be used to blow out any remaining foreign matter.

The front wheel has a needle roller bearing and one ball bearing. After fitting the needle roller the grease should be packed into the hub and then the ball bearing fitted.

The rear right-hand wheel has ball bearings in the axle beam. After fitting the first bearing, pack from the inside with correct grade of grease (see page A2).

The rear left-hand or drive wheel has a plain bush and a ball bearing in the axle beam housing. The housing should be packed with grease before the outer ball bearing is fitted.

AXLE BEAM

The axle beam pivot block bearing is greased on initial assembly and no further lubrication is necessary except in the event of a complete overhaul.

FRONT CRANK

There are two "Oilite" bushes for the pedal crank to run in and no lubrication whatsoever is necessary.

LAYSHAFT

The layshaft runs in two ballraces and both of these have an oil seal on their outside face. When greasing, refit one bearing and then pack the housing with grease before fitting the other bearing. See page A2 for recommended lubricants.

CONTROL CABLES

All control cables should be lubricated weekly.

INDEX

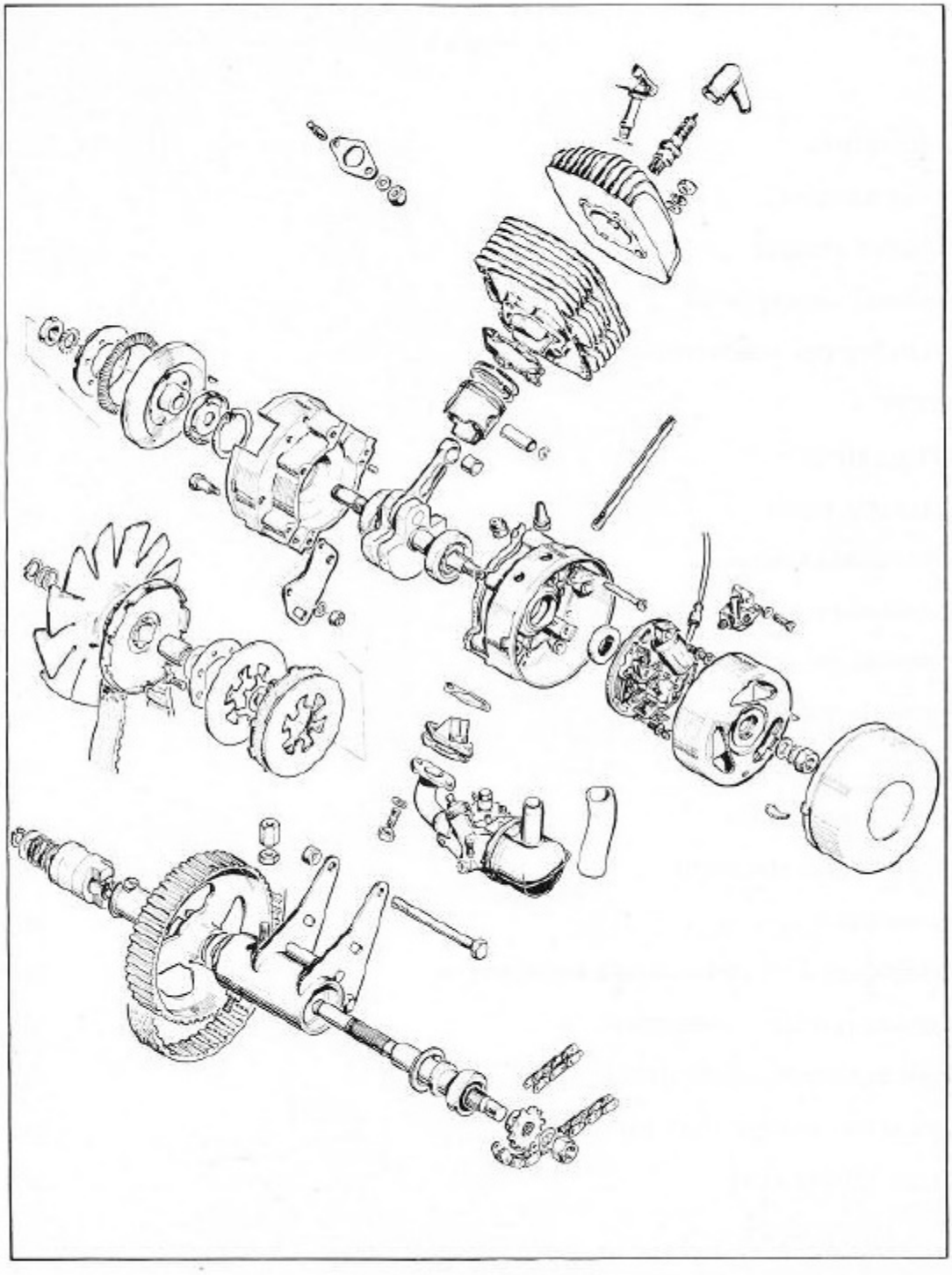


FIG. B1. *Engine exploded.*

DESCRIPTION

The 47 c.c. Anker Laura engine is of the two-stroke design and has a single-cylinder barrel of close grained Perlitic cast-iron with two integral scavenge ports. The domed light aluminium piston is "pegged" in the ring grooves to prevent the two piston rings from revolving about the piston. The piston is carried on an H-section steel connecting rod, employing a bronze little-end bush.

Housed between "bob-weight" type flywheels is the big-end bearing of the roller and bronze cage design.

Ignition is by "Bosch" flywheel magneto, incorporating an ignition coil, lighting coil, condenser and a contact breaker point set. The flywheel itself carries four magnet segments and a single-lobe cam, the flywheel is fitted on a taper on the right-hand side of the crankshaft and is locked in position with a Woodruff key and nut with a self-locking washer.

On the left-hand side of the crankshaft is the single-plate centrifugal automatic clutch. Drive is transmitted from the engine via a toothed rubber belt to a larger pulley on a secondary shaft below the engine, from here power is transmitted through a chain to the main rear wheel spindle.

DECARBONISING

Internal combustion of the petrol mixture in the engine produces normal carbon deposits on the piston crown, rings, cylinder head and ports. These deposits are not harmful providing they are not allowed to become too heavy and therefore cause pre-ignition and other such defects which will impair the engine performance.

The usual symptoms indicating an excessive build-up of carbon are an increased tendency for the engine to "pink" (metallic knocking sound) when under load, erratic running and a tendency for the engine to run much hotter than usual. A general decrease in power will also be apparent, this usually being caused by heavy carbon deposits in the exhaust port restricting the natural flow of exhaust gases. This interferes with the scavenging which takes place in the combustion chamber, making it impossible for an efficient transfer of combustible mixture from the crankcase.

Decarbonising is quite a simple task, so, to ensure constant efficiency from the engine, it is advised that the operation be carried out every 3,000 miles (5,000 km) or after twelve months whichever is the sooner.

EXHAUST SYSTEM

It should be noted that the exhaust system contributes a great deal to the efficient running of a two-stroke engine. When decarbonising an engine therefore, do not omit to clean the silencer baffles and exhaust pipe. As the exhaust system on this machine is an all-welded assembly (except for the small outlet pipe which can be removed after unscrewing the screw in the tail pipe) the only way to clean it is with a mild caustic soda solution. Block the one end of the silencer and pour the solution into the exhaust pipe and leave for a few minutes, then wash the system thoroughly in hot water and allow to dry. Great care should be taken not to let the caustic soda come in contact with the paint on the exhaust system or the hands.

REMOVAL OF CYLINDER

First remove the engine cover by releasing the two Rotolok fasteners at the front just behind the petrol tank, and the two Oddie clips on the side of the plastic panelling, this will allow the cover to be lifted backwards on two hinge pins situated just below the rear number plate. Release the spring retaining washers from the pins and hold the cover in position while the pins are taken out. The cover can now be withdrawn after first releasing the rear light cable from the plug in the harness.

Before removing the cylinder head the decompressor cable must be removed by pressing down the decompressor lever and at the same time pulling the cable outer cover up and out of the cable stop. The cable nipple can now be released from the assembly. Disconnect the high-tension lead and remove the sparking plug. To remove the exhaust system take out the two bolts securing the pipe to the cylinder barrel flange then unscrew the nut and bolt from the silencer bracket underneath the engine. The pipe and silencer can now be removed.

Before removing the cylinder head and barrel clean the cylinder base with a brush and petrol to prevent foreign matter from falling into the crankcase mouth.

Unscrew and take off the four cylinder head nuts, spring washers and plain washers, lift the cylinder head clear of the studs and it will be seen that no cylinder head gasket is employed. The head can now be laid to one side.

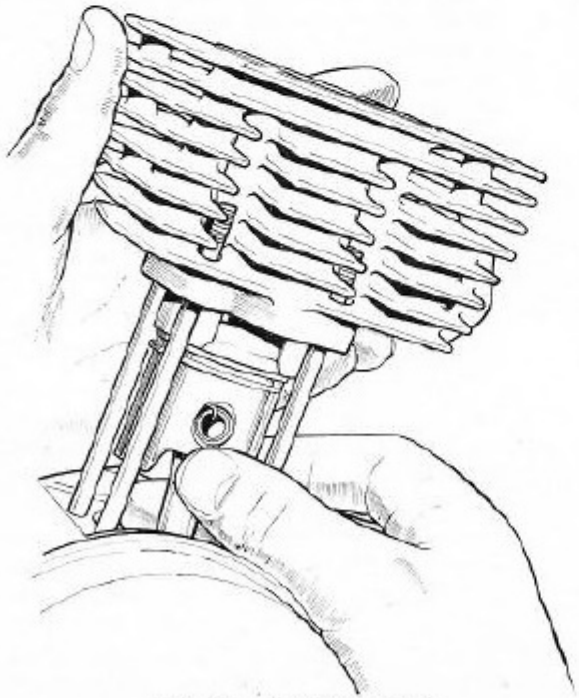


FIG. B2. *Removing barrel.*

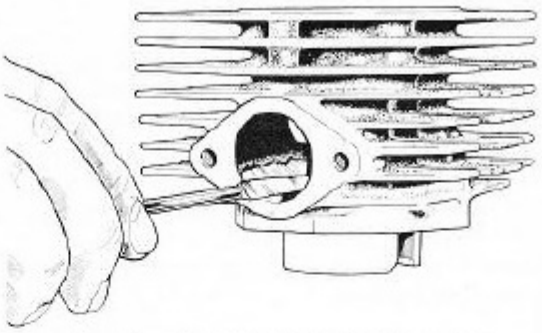


FIG. B3. *Decarbonising the exhaust port.*

Before removing the cylinder barrel the bore should be checked for wear. The best way to check the bore is with a cylinder bore dial gauge after the barrel has been removed.

Carefully lift the cylinder barrel vertically from its studs and place a piece of clean non-fluffy rag over the crankcase mouth to prevent dirt from entering the crankcase.

CYLINDER DECARBONISATION

Be careful during the whole of the decarbonising procedure not to scratch or damage the bore or joint faces in any way.

Protect the cylinder bore with rag before commencing with the decarbonisation of the exhaust port as shown in Fig. B3. Any scratches or burrs on the cylinder bore face which occur during decarbonisation must be smoothed out. Fine emery paper and paraffin will produce a good finish.

A half-round or three-cornered scraper should be used for cleaning the exhaust port.

PISTON

It should not be necessary to remove the piston unless there is any evidence of damage or excessive wear or, of course, if the little-end bush is worn.

To check for little-end bush wear hold the connecting rod firmly with one hand and with the other push and pull the piston up and down vertically. If any movement is detected then the bush will have to be replaced. Use service tool No. 61–6087 to remove and replace the new bush.

Before removing the piston its crown should be marked for guidance in reassembly. After removing both circlips with a pointed instrument (see Fig. B4) the gudgeon pin can be pushed from the piston.

Scrape off any carbon which has accumulated on the piston crown, being careful not to damage the surface. A stick of tinsmiths solder, flattened at one end, makes an ideal scraper tool and will not score the piston. After removing the carbon, wipe the piston with an oily rag.

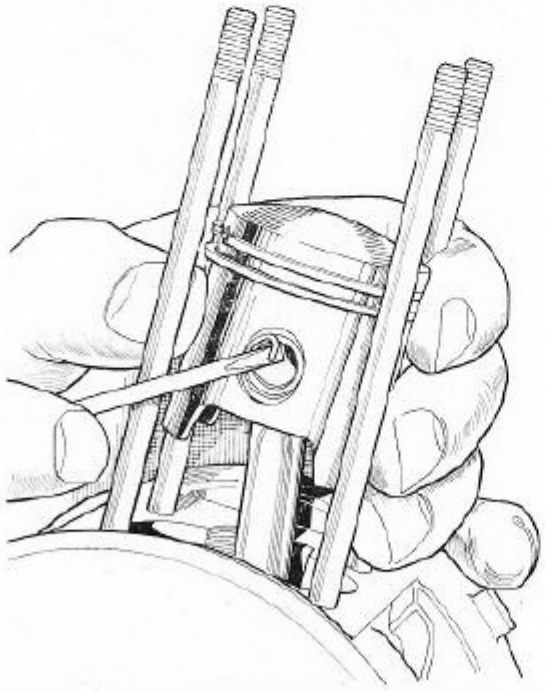


FIG. B4. *Removing gudgeon pin circlips.*

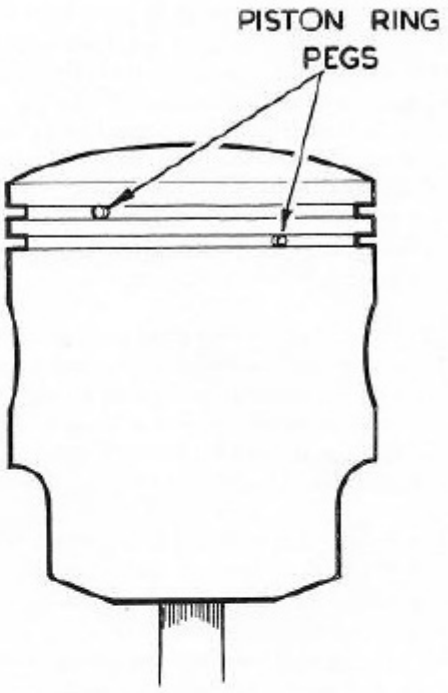


FIG. B5. *Piston ring pegs.*

PISTON RINGS

Examine the rings which are prevented from rotating by means of pegs located in the piston ring grooves.

The outside face of each piston ring should possess a smooth metallic surface and any signs of heat discolouration indicates that the rings are in need of replacement. The rings should also retain a certain amount of "springiness" so that when released, the free gap is considerably greater than the gap measured when the ring is in the bore.

Each ring should be free in its groove but with minimum side clearance. If the rings tend to stick in the grooves, remove all the carbon from the groove and the inside face of the ring. A piece of broken piston ring, ground as a chisel, will prove a useful tool for removing carbon deposits from the ring grooves. Care is necessary to permit only a minimum amount of movement when removing the rings as they are very brittle and can be easily broken.

To check the piston ring gaps, place each ring in turn in the least worn part of cylinder bore (usually at the bottom) and locate it with the top of the piston to ensure it is square in the bore. Measure the gap between the ends of the ring with a feeler gauge.

The correct gap should be between 0·007" —0·019" (0·18– 0·19 mm) and although an increase of a few thousandths of an inch is permissible any large increase to say ·030" (0·76 mm.) indicates the need for replacement rings. See also that there is sufficient clearance between the inner position of gap and the locating peg in the groove. This can be checked by closing the ring in the groove until the gap closes, proving that there is clearance at the peg below. If the gap cannot be closed, indicating that the steps are binding on the peg, use a smooth file to ease the steps down.

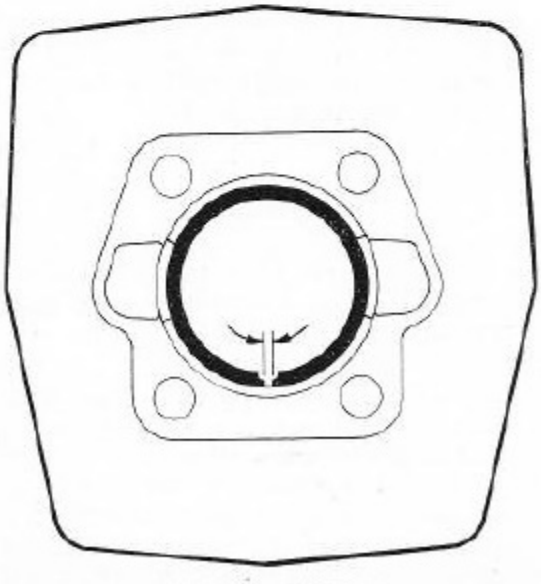


FIG. B6. *Ring gaps.*

It is advisable to check the gap of a new ring before fitting, and if the gap is found to be less than ·007" (0·18 mm) the ends of the ring must be carefully filed to the correct limit.

CYLINDER HEAD

Remove all carbon deposits from the cylinder head, again bearing in mind that the aluminium is soft and can easily be damaged if the decarbonising tool is carelessly applied, and carefully wipe away all loose particles.

It is advisable to remove the decompressor assembly from the cylinder head whilst decarbonising and to check the assembly for air leaks. If any leak is found the component should be dismantled and the valve reseated. A fine grade of grinding compound should be used when reseating and all parts cleaned thoroughly before reassembling.

BIG-END BEARING

While the cylinder is removed, opportunity should be taken to test the big-end bearing for wear. This can be achieved by taking hold of the connecting rod and pulling it upwards until the crank is at top dead centre. Whilst holding it in this position, try gently but firmly to pull and push the connecting rod in the direction of its travel, in order to detect any up and down movement. If the big-end is in good condition there should be no free play in this direction, although it may be possible to move the connecting rod sideways, *i.e.*, at right angles to the axis of the machine.

Should vertical play in the big-end be detected and you feel unqualified to assess whether the amount in evidence is permissible or not, then you should seek expert advice. This point how-

ever, is unlikely to give trouble providing that the engine has been carefully used and adequately lubricated, for the big-end bearing is of ample dimensions for the work it has to do. If the big-end has deteriorated as the result of neglect or abuse a new crankshaft assembly will have to be fitted.

REASSEMBLY AFTER DECARBONISATION

If the piston was removed from the connecting rod, replace it in its original position, remembering it was marked as a guide for correct assembly. If a new piston is being fitted it should have the ring pegs on the opposite side to the exhaust port.

Before fitting the gudgeon pin smear it with clean oil and do not forget to replace the circlips. Remember that if the circlips should come adrift or if one is omitted, the cylinder barrel and piston will be seriously damaged.

Before refitting cylinder barrel the jointing surface for the cylinder head should be lapped in on a piece of plate-glass or lapping plate coated with fine lapping paste.

Smear grease on a new gasket and stick it to the base of the cylinder barrel, first making sure that none of the old gasket is present. Support the piston on two pieces of wood across the crankcase mouth and smear clean engine oil on to the sides of the piston. Now place the barrel over the studs and piston and manipulate the rings into the base of the cylinder making sure that the pegs are in the ring gaps. Do not use force as the piston rings are brittle and easily broken. When the barrel is correctly fitted, bring the piston to top dead centre and wipe away any excess oil from the piston crown.

Refit the decompressor unit, then examine the sparking plug and refit if sound.

Before fitting the cylinder head its mating surface should be lapped on a piece of plate-glass or lapping plate. Place the head over the studs and replace the four plain washers, spring washers and nuts, tighten the nuts in diagonal order to avoid distortion.

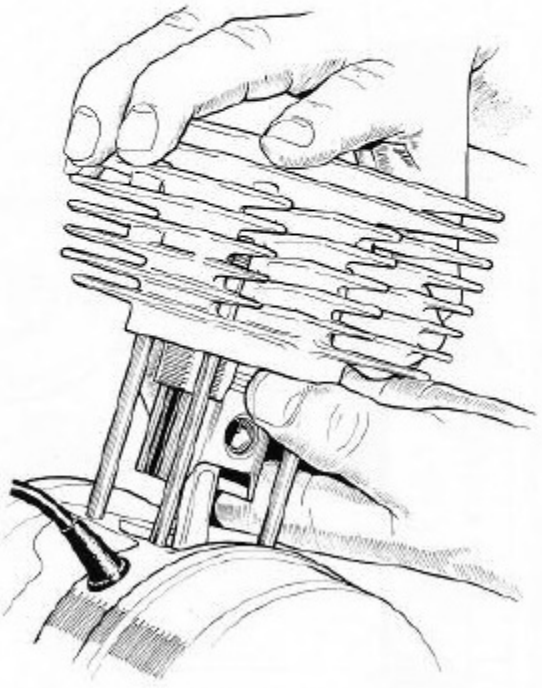


FIG. B7. *Replacing cylinder barrel.*

REMOVAL OF ENGINE

Remove the engine cover and compartment as detailed on pages B3 and D2.

Remove the exhaust system as detailed on page B4.

The carburetter need not be removed from the machine unless it is known to be faulty. Unscrew the slotted clamp pin below the induction pipe and pull off the carburetter complete with throttle and choke cables.

Slacken off the two main engine mounting bolts just in front of the engine and screw down the toothed belt adjuster nut directly below the engine on the left-hand side (see Fig. B8).

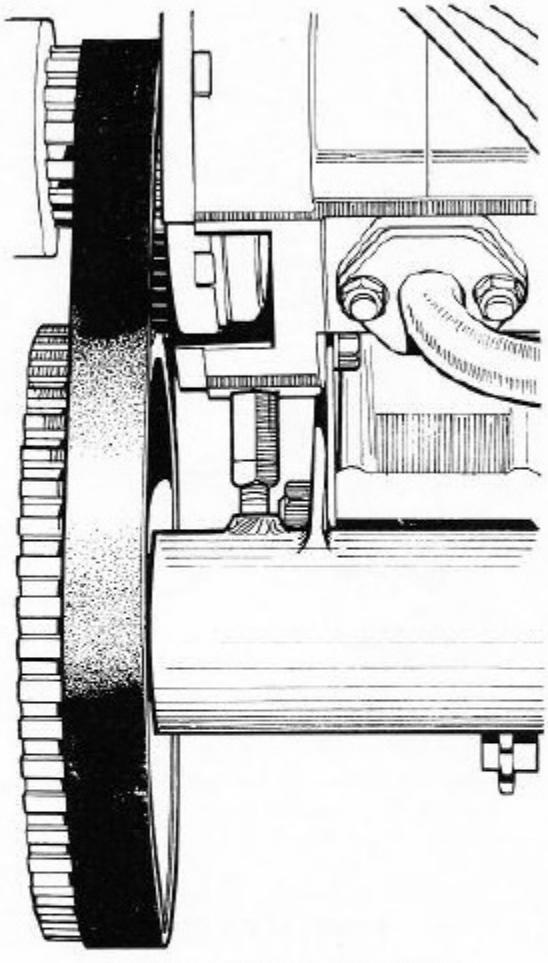


FIG. B8. *Engine drive belt adjuster.*

Disconnect the toothed belt from the two pulleys on the left-hand side of the engine.

Disconnect the yellow lead from its connector in the harness and remove the decompressor cable from the unit on the cylinder head.

The engine can be removed with or without the layshaft assembly. To remove the engine without the layshaft assembly, remove the two engine bolts and withdraw the engine leaving the layshaft complete with drive chain and chain cover.

To remove the engine and layshaft together, remove the nut and bolt at the front of the chaincase and also the screw in the centre of the chaincase. After removing the split-link in the primary chain the layshaft will be free for removal with the engine, after releasing the engine bolts.

The layshaft should be laid to one side until later (see page D8 for stripping instructions).

ENGINE DISMANTLING

The following notes give in detail, the correct procedure for dismantling the engine unit. It will be assumed that the engine has been removed from the frame and dismantled for decarbonising, as detailed in previous pages.

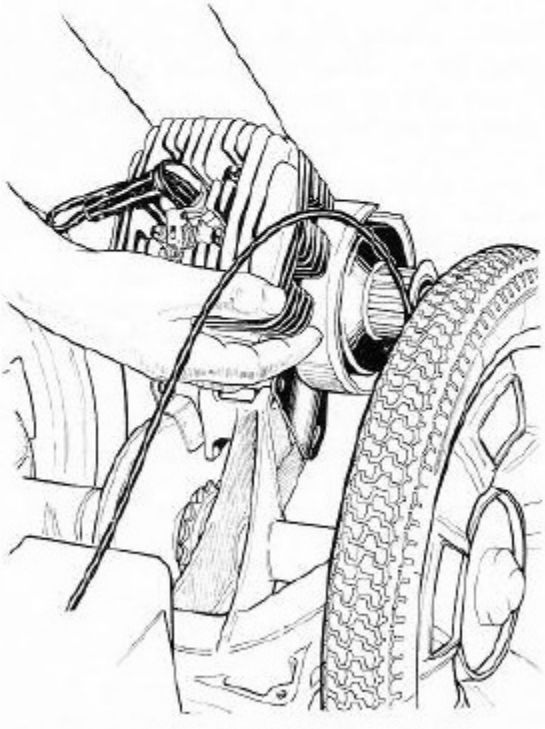


FIG. B9. *Removing the engine unit.*

CLUTCH

Remove the circlip from the crankshaft which retains the clutch housing and toothed pulley. To remove this housing, turn it in a clockwise direction and at the same time pull the housing off the shaft.

Behind this housing is the locking plate secured by six countersunk screws which should be removed using 3 mm hexagon key wrench, service tool No. 61–6110. Unscrew these a little at a time to avoid distortion of the pressure plates. After removing the locking plate and two pressure plates, the clutch friction plate and the star-shaped pressure spring can be withdrawn from the clutch hub.

All that now remains on the crankshaft is the clutch hub which is secured by a special nut, lockwasher, and Woodruff key. Inside the clutch hub is a special centrifugal spring which is joined together and has thirty-one 9/32" diameter ball bearings inside the coils of the spring. Unscrew the special retainer nut with service tool No. 61-6102. The crankshaft can be held by the magneto flywheel, using service tool number 61–6074, whilst carrying out this operation. The clutch hub can now be withdrawn and the Woodruff key removed from the engine shaft.

CLUTCH INSPECTION

Thoroughly clean the special Torrington locking needle roller bearing and apply fresh oil. This is the bearing pressed into the outer clutch housing and toothed pulley.

To check whether the bearing is still serviceable replace it on the crankshaft and try to turn it in an an anti-clockwise direction. If it does not lock immediately the bearing is faulty and a new one must be fitted. To remove this bearing place a drift (with its diameter slightly less than that of the bearing) against the lettered side of the bearing and press it from the housing. When replacing this bearing it should be replaced from the outside and pressure should only be applied on the lettered side otherwise the bearing will be destroyed. It is important to know that the starting of the engine relies solely on the good press-fit of this bearing. It is **essential** that this bearing is fitted with the lettered end outwards.

Check the fibre friction plate for wear by measuring its thickness which should be ·149" (3·8 mm), if this measurement is reduced by more than ·040" (1 mm) a new plate should be fitted.

Examine the centrifugal spring and check that the two ends are connected properly (at least four threads). If at any time the ends become disconnected replace the ball bearings and screw the ends back together.

To check the star spring, assemble the clutch housing starting with the first pressure plate followed by the friction plate, star spring and finally the other pressure plate. Now place the assembly on a flat surface and press the top pressure plate downwards with the fingers, if the two pressure plates bear against the friction plate, without having to apply pressure, then the star spring will have to be replaced.

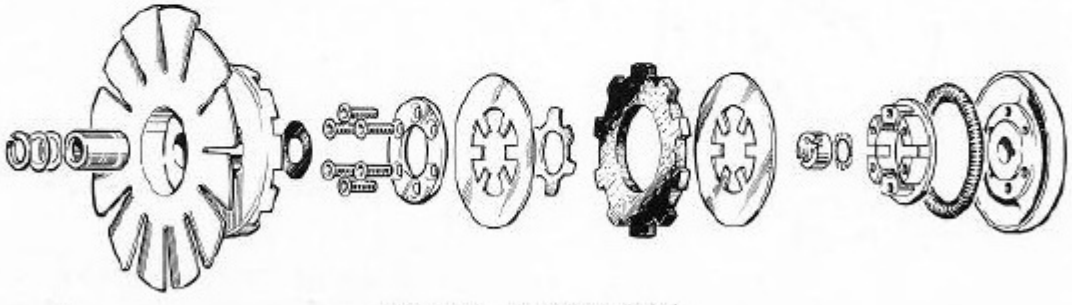


FIG. B10. *Clutch exploded.*

If no further work is to be done, the clutch can be reassembled in the reverse order to dismantling, noting that the six housing plate screws should be treated with red "Loctite" when reassembling.

DISMANTLING MAGNETO

Remove the plastic cover on the right-hand side of the engine by releasing the two spring clips on the outside of the cover, this will reveal the flywheel and behind that the points and coils.

To remove the flywheel a box-spanner with a very thin wall must be used. Undo the nut, at the same time holding the flywheel with service tool No. 61–6084. When nut is removed, screw in service tool No. 61–6086 and holding the nut with a spanner extract the flywheel by screwing in the bolt. When the flywheel is removed, prise out the Woodruff key from the crankshaft.

Disconnect the plug cover from the high-tension lead by prising out the white nylon sleeve from the end of the cover and unscrewing the cable. Apply a spot of oil to the lead where it enters the rubber grommet and pull cable through, never pull on lead by means of the high-tension coil as this could break the connections within the coil.

FIG. B11. *Releasing flywheel nut.*

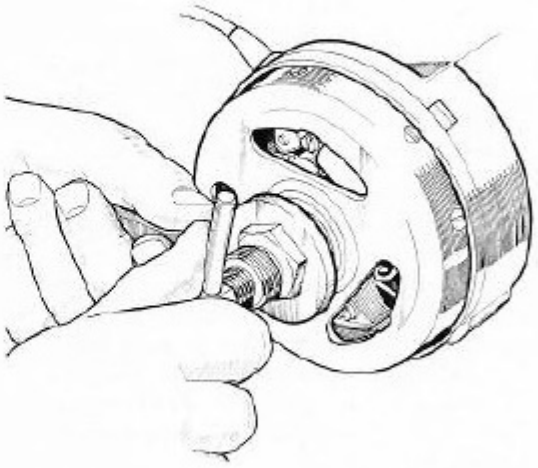


FIG. B12. *Extracting flywheel.*

Release the black and the yellow cables in the same way as the high-tension lead.

Unscrew and take out the three cheese-head screws securing the stator plate and withdraw the complete assembly.

If the magneto was removed to gain access to the crankcases and crankshafts, remember to fit the stator into the flywheel as a keeper until ready to reassemble. Should the stator plate have been removed because of an electrical fault, refer to the electrical section towards the back of this manual.

REASSEMBLY

Fit the stator plate, making sure that it rests properly inside the locating spigot and that no wires are trapped between plate and casting. Replace the three fixing screws but do not tighten them fully at this stage. Now replace Woodruff key in the crankshaft and turn the shaft so that the key is opposite the condenser, this will allow the cam on the centre boss of the flywheel to pass the contact breaker heel without fouling.

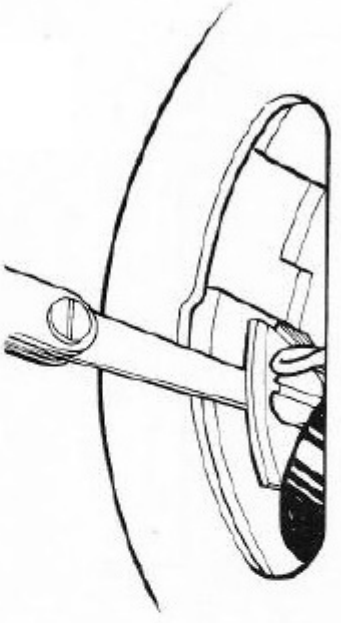


FIG. B13. *Air gap.*

If a new coil has been fitted, an air gap of ·007" (0·18 mm) should be present between the inner rim of the flywheel magnets and the core shoes (see Fig. B13). If this gap is too large or too small the two screws securing the coil should be slackened and the coil moved until gap is correct.

For contact breaker points gap setting and ignition timing turn to page B14.

CRANKCASE AND CRANKSHAFT DISMANTLING

The two halves of the crankcase are very nearly identical therefore before they are taken apart they should be marked to save any mistakes during reassembly.

First remove the two bolts securing the carburetter inlet tract to the crankcase and remove inlet tract and gasket, followed by the membrane inlet assembly and its gasket. Be careful not to damage the membrane, it should be placed in a safe place with pointed edge upwards.

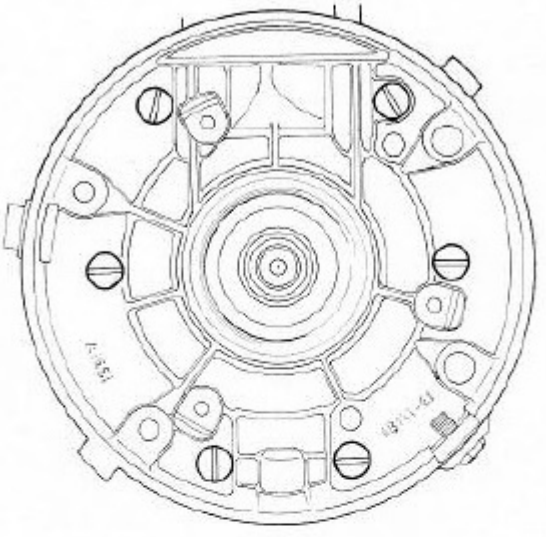


FIG. B14. *Crankcase bolts.*

Remove the six crankcase screws (see Fig. B14).

Using soft clamps, hold one end of the crankshaft in a vice, and cover the upper oil seal with a large diameter washer. Now with a blowtorch heat the crankcase locally around the bearing to a temperature of approximately 80°C. as shown in Fig. B15.

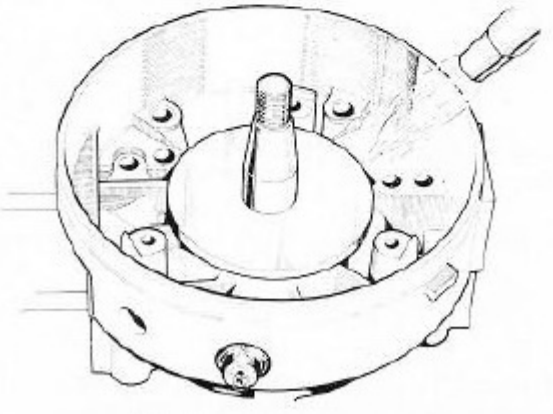


FIG. B15. *Heating crankcase.*

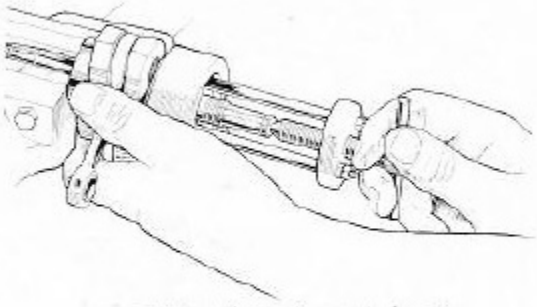


FIG. B16. *Extracting main bearing.*

With the aid of a hide mallet carefully separate both castings. The above procedure should be followed for the other side of the crankcase.

INSPECTION

Check the main bearings and if damaged or worn, they should be replaced. To remove the main bearings, service tool No. 61–6082 and adaptor No. 61–6090 should be used as shown in Fig. B16. Both bearings are of the 6302 type and have an external diameter of 42 mm. (1·653).

If the big-end bearing is faulty the crankshaft assembly will have to be replaced.

Check the feather-edge of both oil seals. If there is any sign of failure these should be replaced.

REBUILDING

If the main bearings were removed for renewal they should be fitted in the following manner.

Heat the bearings to a temperature of 80°C. using fluid or a hot plate but avoid the use of naked flame on the bearings.

Slip fitting plate (service tool No. 61–6091) between crankshaft bob-weights and lay it across an open vice, now with the aid of service tool No. 61–6083, which bears on the inner ring of the bearing only, drive bearing home. Repeat this operation on other side of crankshaft (see Fig. B17).

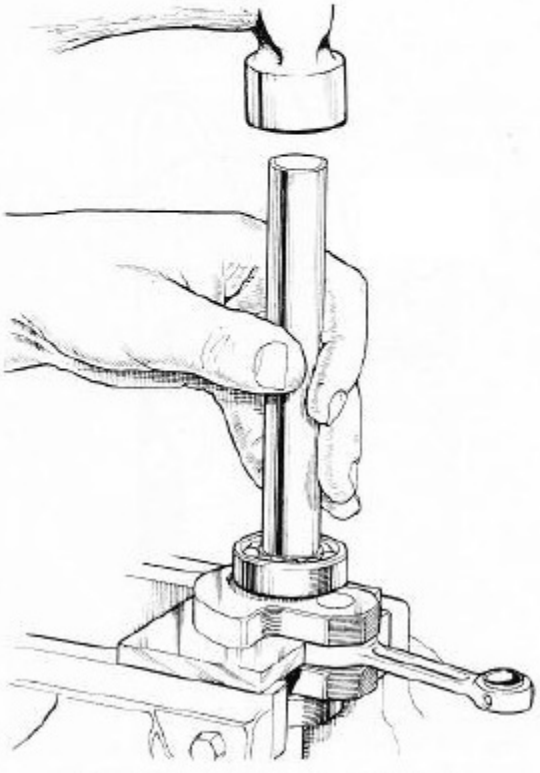


FIG. B17. *Replacing main bearings.*

After cleaning the crankcase bearings, and crankshaft apply some fresh engine oil to the main bearings and big-end. The crankshaft is now ready to be fitted into the crankcase halves.

New crankshafts will be supplied complete with main bearings fitted.

Firstly the left-hand crankcase should be heated to approximately 80°C. and as before, the oil seal must be protected from the flame. Insert the crankshaft into the casing remembering that it is the shaft with the plain ground portion on the end, this is the clutch shaft.

Place a new gasket, which must be smeared with grease, to the jointing face of the casing. The right-hand casing can now be fitted in the same way as the left-hand one.

The six crankcase screws can now be fitted and tightened evenly. Now with a hide mallet gently tap the casting around the bearing housings to settle the crankshaft and check whether the crankshaft can be turned easily by hand. Check security of crankcase screws.

Fit the induction membrane with gasket, followed by the induction pipe and gasket, this pipe should be blocked off with a cork to stop entry of foreign matter.

The head and barrel can now be fitted as described on page B7, followed by the clutch assembly, page B9, and flywheel magneto, page B10.

REPLACING ENGINE UNIT INTO FRAME

Before installing the engine unit back into the frame the ignition timing should be set as described on page B14.

Engine replacement is the reversal of removal. A thorough check should be made of the fixing bolts and new ones fitted where necessary.

CHAIN ADJUSTMENT

To adjust the drive chain, first remove the outer chaincase from the right-hand side of the engine. It is secured by a nut and bolt at the front and a bolt approximately in the centre of the chaincase.

With the chaincase removed, access is gained to the lower of the two engine bolts, located at the front of the unit. The top bolt serves as a pivot for the engine and layshaft plates, whilst the lower bolt is a security bolt passing through elongated holes in the engine plates and layshaft plates, providing the means of adjustment. Slacken these two bolts and also the locknut on the drive chain adjuster screw positioned between the engine plates beneath the unit.

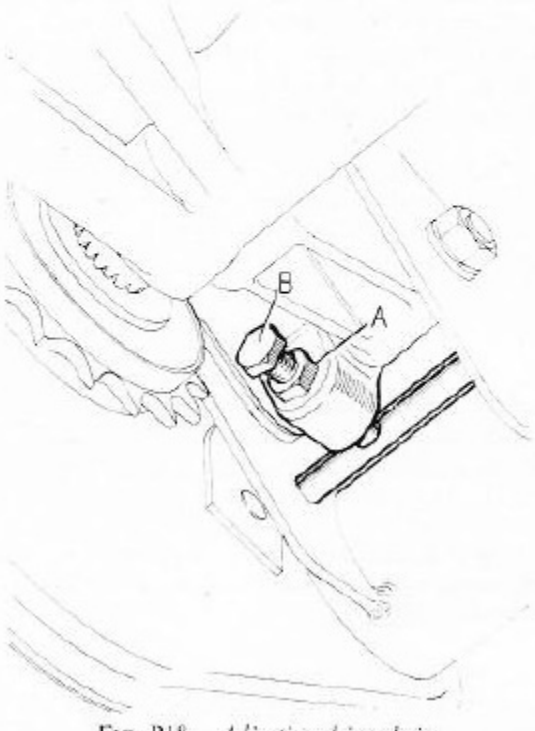


FIG. B18. *Adjusting drive chain.*

The engine unit can be moved by turning the adjuster screw inwards until the chain slackness is reduced to approximately $\frac{3}{8}$" (9·5 mm) total up and down play. When this is achieved, tighten the locknut on the adjuster screw and the two engine bolts. Finally replace the outer chaincase.

BELT ADJUSTMENT

Normally the toothed belt will not need to be adjusted, but in the event of fitting a new belt, proceed as detailed under "Chain Adjustment",

and after loosening the two engine bolts, slacken the locknut on the adjuster attached to the lay-shaft assembly immediately beneath the clutch housing. Adjust the toothed belt by turning the sleeve nut on this adjuster.

When correctly adjusted the belt should have $\frac{1}{4}$" (6 mm) total free play at a point between the pullies. Tighten the locknut, engine bolts and refit the outer chaincase.

IGNITION TIMING

Contact Breaker Gap

In order to maintain correct ignition timing, the contact points must be set to the specified gap when in the fully open position.

To gain access to the flywheel magneto, first remove the right road wheel and support machine beneath engine.

To set the contact breaker gap, the flywheel should be placed in the position shown in Fig. B20, this will open the points to their fullest extent. Now proceed as follows: slacken fixing screw (A) Fig. B19, half a turn and insert a screwdriver blade between notches (B) on the base plate and opening (C) in the fixed contact. Twisting the screwdriver will alter the gap. After obtaining the correct gap of 0·013—0·017" (0·35—0·45 mm) tighten screw (A) and recheck the gap.

Setting-up Ignition Timing

First set the contact breaker gap as detailed above and then remove the cylinder head. Distance pieces should be dropped over two of the cylinder barrel studs and the nuts refitted to hold the barrel firm.

Mount a dial test indicator gauge, on a magnetic stand, on the cylinder barrel face, bring the piston to top dead centre and set the clock at zero. Turn the engine backward about ·100" (2·5 mm) and slip a piece of cigarette paper between the contact breaker points. Now turn the engine forward and between ·078—·085" (2—2·2 mm.) the paper should be released. If release is not obtained between the figures specified, slacken the three screws securing the stator plate and turn it a few degrees, either way, until the required setting is reached. At this point, the rupture gap should be ·275—·433" (7—11 mm.) as dimension (A) in Fig. B20.

It is essential that the rupture gap falls between ·275—·433" (7—11 mm.) as any variation will seriously effect performance.

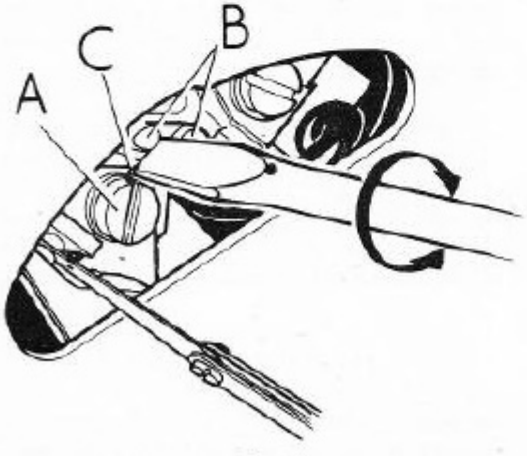


FIG. B19. *Setting points gap.*

FIG. B20. *Rupture gap.*

INDEX

DESCRIPTION

The carburetter, because of the size of its jets and choke bore, proportions and atomises just the right amount of petroil and air, providing a highly inflammable mixture for combustion in addition to an adequate lubricant.

The float chamber maintains a constant level of fuel at the jet and incorporates a valve which cuts off the fuel supply when the engine is stopped.

The throttle, being operated from the handlebar twist grip, controls the volume of mixture and therefore the power.

The carburetter also has an independently operated mixture control known as a shutter choke valve, for use when starting from cold. This valve when operated, partially blocks the passgae of air through the main choke, therefore enriching the mixture.

The main jet does not spray directly into the mixing chamber, but discharges through the jet into the primary air chamber and goes from there as a rich petroil/air mixture through the primary air choke, into the main air choke.

DISMANTLING AND REBUILDING

Unscrew the pinch screw on the carburetter body and remove from induction pipe.

Turn off the fuel supply at the tank and pull fuel pipe from banjo on top of the float chamber. To remove throttle cable, unscrew the knurled top from the carburetter body and withdraw the throttle slide, compress the spring and unhook the cable nipple from its register in the slide.

To remove the choke cable, first remove the clip securing the intake muffler, pull away the muffler and air filter to reveal the air choke.

Pull the return spring over the cable stop and disconnect the cable nipple. The cable can now be withdrawn from the carburetter.

The float chamber top is secured to the body of the carburetter by two screws. On removal of these, the float chamber top and plastic float can be removed.

With a magnifying glass examine the float needle point and its seating in the float needle jet for wear. If there is a groove in the needle point the float should be replaced. Check the float for leaks by shaking it, if any petroil is inside then the float should be replaced. Do not try to repair a leaky float.

Take out the bolt securing the banjo to the float chamber top and check the small domed filter for blockage, this should be cleaned in petrol and replaced.

The main jet and holder can now be unscrewed from the carburetter body. The size of the main jet should be checked and should be in accordance with the number quoted on page GD2.

Take out the throttle stop adjusting screw and spring.

Having dismantled the carburetter, carefully clean all parts in petrol. Hard deposits on the carburetter body are best removed with a light-grade wire brush. After washing all parts in clean petrol, allow to dry and ensure that all holes or drillings are free from dirt. A hand pump is ideal for "blowing through" any blockages in the drillings.

Reassembly is simply a reversal of the above instructions, but remember to replace any gaskets that appear unserviceable.

Refer to Fig. C1 for guidance.

The induction pipe and membrane inlet valve should not be removed as the veins on the membrane are very delicate and can be damaged very

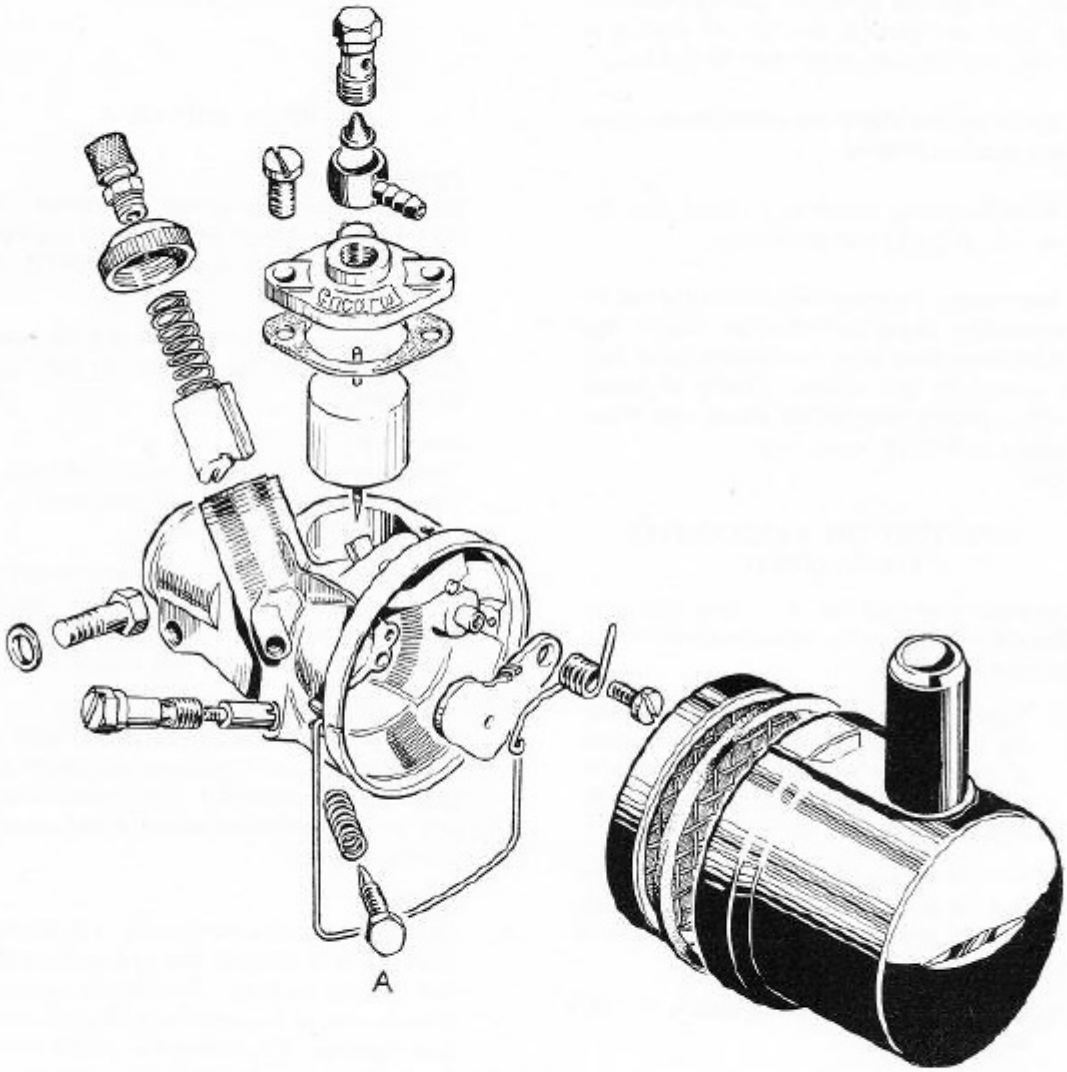


FIG. C1.

easily. If the efficiency of the membrane is suspect, it can be removed by unscrewing the two nuts and washers securing it and the induction tube to the crankcase. Check that none of the four veins are bent away from the body and that the rivets are tight. If any sign of damage is present the whole assembly must be replaced.

On no account should any repairs on the membrane vein be attempted.

When replacing membrane, ensure that the graphited gaskets are in good order.

Important:—In some cases, bad idling can be improved by tilting the carburetter slightly, but on the other hand other combustion faults may be caused by this action. Finally fit intake muffler, making sure that the plastic tube is not pinched or blocked in any way.

INSPECTING THE CARBURETTER COMPONENTS

The parts most liable to show wear after considerable mileage are the throttle valve slide and the mixing chamber.

(1) Inspect the throttle slide for excessive scoring of the front area and check the extent of wear on the rear slide face. If wear is apparent, the slide should be renewed; be sure to fit a slide of the same number.

(2) See that the choke butterfly is not worn or that the pivot screw is not loose, also check that the return spring and cable stop have not weakened.

(3) Check the throttle return spring for efficiency.

(4) Check the float needle for efficiency by inserting it into the float needle seating block, pouring a little petrol into the aperture surrounding the needle and checking for leakage.

(5) Ensure that the float is not punctured by shaking it to see if it contains any fuel. Do not attempt to repair a damaged float.

(6) Check the fuel filter that fits inside the banjo securing screw, for any possible damage to the mesh. If the filter has parted from its supporting ring it will allow the petroil mixture to pass through unfiltered.

HINTS AND TIPS

Throttle Cable

See that there is a minimum of backlash when the twist grip is turned back and that any movement of the handlebar does not cause the throttle to open.

Use adjuster on cable to obtain the correct setting and ensure that the throttle valve shuts down freely.

Fuel Feed

Unscrew the float chamber banjo bolt, and remove the small cone-shaped filter from in the end of the bolt.

Ensure that the filter gauze is undamaged and free from all foreign matter. To check fuel flow before replacing the banjo, turn on fuel tap momentarily and see that fuel gushes out.

On earlier models, the fuel supply can be improved by shortening the plastic pipe and routing it in a constant downward sweep from petrol tank to carburetter. It is essential that the pipe be fastened to the inside of the carrier to prevent chafing.

Flooding

This may be due to a worn needle or a punctured float, but is more likely due to impurities (grit, fluff, etc.) in the tank. This trouble can sometimes be cleared by periodically cleaning out the float chamber. If, however, the trouble persists, the fuel tank must be drained and swilled out.

Carburetter Air Leaks

Erratic slow-running is often caused by air leaks between the joints at the carburetter clamp or the induction pipe and membrane flange on the crankcase. An air leak can be detected by applying oil around the joints. Eliminate by fitting new gaskets to the induction pipe and membrane,

and tightening the bolts evenly. Eliminate leaks in the carburetter clamp by checking to see whether the carburetter is pushed on to the induction pipe all the way and seeing that the clamp pin is tight.

Excessive Fuel Consumption
If this cannot be corrected by normal adjustments, it may be due to flooding caused by impurities from the fuel tank lodging on the float needle seat, so preventing the valve from closing. The float needle should also be checked for wear or damage.

There are many other causes of high fuel consumption and it should not be assumed that the fault lies in the carburetter alone.

CARBURETTER ADJUSTMENTS

The tick-over engine speed is very important on this machine, because if it is too fast the centrifugal clutch will engage and cause the machine to move forward. This inflicts unnecessary wear on the clutch friction plate and it can also be dangerous. If the tick-over speed is set when the engine is cold, it will become too high when the engine has warmed up, therefore the following notes will be helpful.

Warm the engine up and then proceed to set the tick-over as follows.

Make sure that the throttle is fully closed and then turn the spring-loaded screw (A) Fig. C1, in or out until the engine is ticking-over slowly but smoothly, now see that the machine does not creep forward, and also see that it can be pushed backwards without any resistance.

When adjusting the choke cable there must be a slight amount of free play in the cable to ensure that the choke shutter does not obscure the air flow into the carburetter bore as this could cause the engine to four-stroke and use an excessive amount of fuel.

Note:—The air cleaner element should be thoroughly washed in neat petrol and allowed to dry, then add thin oil sparingly. This procedure should be carried out at intervals of not more than one month (300 miles or 800 km) otherwise the air supply to the carburetter will be reduced, causing heavy fuel consumption and poor performance.

To remove air cleaner push aside the wire clip, and lift off the air silencer body. The air filter and its sealing ring can then be withdrawn. After cleaning wash the silencer body in petrol and reassemble.

INDEX

The frame pressing should not need any maintenance whatsoever, but if the machine has been involved in an accident the frame may be distorted. If the damage is visible, a new frame will have to be fitted. However, if no damage is visible, but the handling of the machine is affected, the machine should be taken to a B.S.A. dealer where a thorough check can be made.

AXLE BEAM

Remove the engine cover as described on page B3.

Turn off the petrol tap and pull tube, from the banjo on the carburetter float chamber top.

To remove the engine compartment take off the two nuts and washers securing the compartment to the front of axle beam and the nut and washer from the left-hand side above the wheel spindle.

Some models were fitted with a fan cover which must be removed prior to the engine compartment. The rear brake cable runs between the two parts which cannot be removed as an assembly.

FIG. D1. *Removing chainwheel.*

Firstly, take off the drive wheel, to expose the Phillips-head screw at one o'clock in relation to the hub. Remove this and the other four self-tapping screws, two located above the mudguard and two at the rear of the carrier.

The compartment is secured by a bolt on the right-hand side above the wheel spindle housing, this should be removed allowing the compartment to be lifted off the axle beam complete with fuel tank.

If any trouble occurs while lifting the compartment past the saddle, undo the saddle clamp and tilt the saddle forward.

Remove the engine as described on page B7, making sure to check if any of the mounting bolts have worked loose. If any bolts have been loose during running, replace them and the nuts and washers, as they will probably be weakened.

Remove the pedal chain by disconnecting the spring connecting link. Remove the cotter pin from one of the pedal cranks with the aid of a soft aluminium drift.

Now remove the plastic cover from on top of the frame above the pedals (four screws) and remove the cotter from the sprocket in the same way as the pedal crank. While holding the sprocket, withdraw the spindle complete with the other pedal crank and then lift sprocket from the frame.

Remove the two circular plates at the front of the frame by unscrewing the single screw securing each plate. This will reveal the torsion bar adjusters and their fixing bolts (one each side) which can now be removed.

Disconnect the rear brake cable at the brake plate.

Unscrew the bolt on top of the axle beam swivel block and take a careful check of the positions of the rubbers and washers. Now unscrew and take off one of the nuts from the stud through the swivel block and pull the stud from the block and frame, leaving the axle free for removal.

Removal of wheels and brake is covered on page F3.

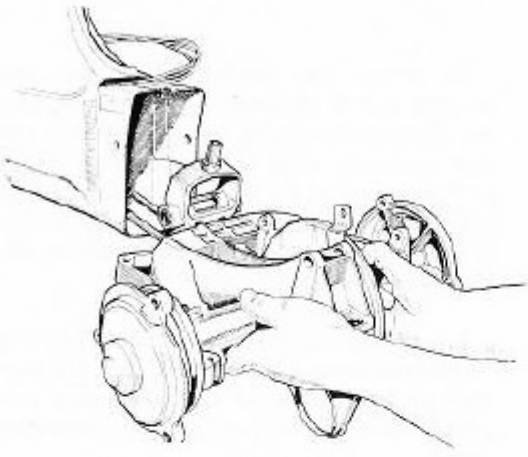


FIG. D2. *Removing axle beam.*

Support the frame and pull the axle beam complete with torsion bar assembly from the main frame section, which can now be laid to one side.

TORSION BAR REMOVAL

Turn the axle beam upside down and remove the two bolts securing the "jockey pulley" assembly, this can be placed aside until later. Remove the other two bolts securing the clamp plate which holds the torsion bars in position, also the mounting block.

All that is now left is the two torsion bars and the adjusting blocks connected at one end.

Unless there is any damage or wear to the torsion bars and/or blocks, it is advisable not to strip the assembly down any further, if however, there is damage such as a broken or bent torsion bar then the following notes will be helpful in the stripping process.

First pull out the two spring wire clips, and remove the swivel spindle.

With a small punch slightly less than $\frac{1}{8}$" diameter drive the roll pins from the blocks.

Gently tap the blocks down the torsion bars a few inches and then with a thin piece of aluminium drive the nylon bushes from the blocks, enabling the blocks to be taken off the torsion bars at the other end.

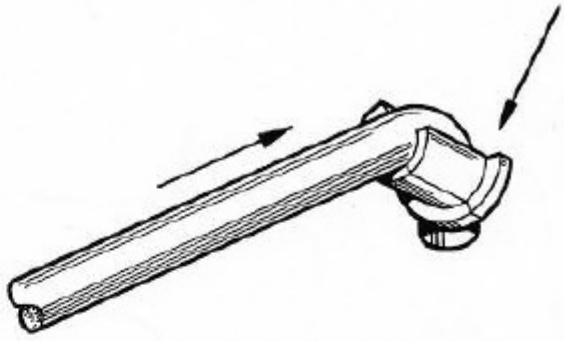


FIG. D3. *Slot upwards.*

If it is necessary to remove the nylon bushes from the torsion bars, the slot should be facing upwards (see Fig. D3) and gently pulled off the bars.

The adjuster and screws can be unscrewed from the adjuster blocks.

Reassembly of the torsion bar assembly is the reversal of the dismantling procedure, but any adjustment of the torsion bars should be left until the whole machine is rebuilt.

When the torsion bar blocks are reassembled, it is necessary to ensure that when completed, both adjuster screws face outwards. If assembled incorrectly it will not be possible to carry out adjustment of the torsion bars, *i.e.*, assemble blocks so that screw end of adjuster is visible when the cover plates (A) Fig. D1 are removed.

AXLE BEAM DISMANTLING

Trunnion Block Removal

Remove the circlip from the end of the pivot shaft (see Fig. D4) followed by the plain washer and thrust washer enabling the trunnion block to be withdrawn from the axle beam pivot bush, take care not to lose the thrust washer which will be revealed on removal of the trunnion block.

The two "silentbloc" bushes in the trunnion block cross hole should last the life of the machine, if however it becomes necessary to remove the bushes, it is a simple task to drive them out with a soft metal punch.

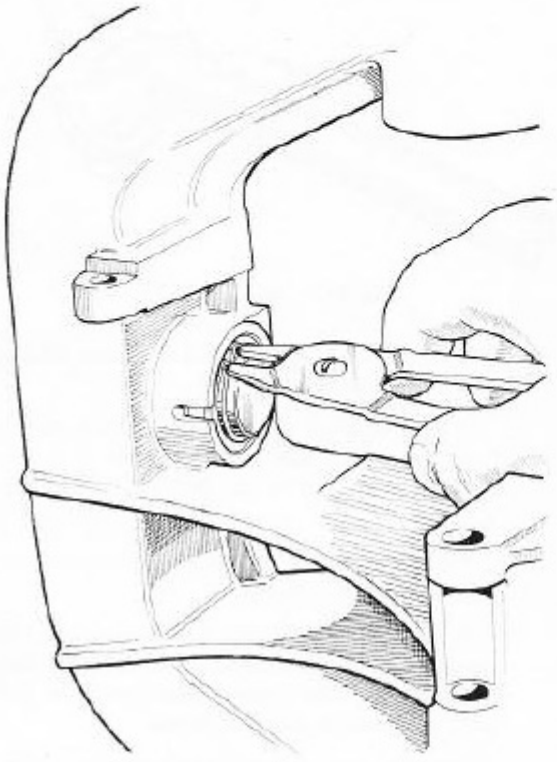


FIG. D4. *Removing circlip.*

The bush in the axle beam can be removed with service tool No. 61–6099.

Before reassembling the pivot block assembly, clean the nylon bush thoroughly in paraffin if it was not renewed. The shaft should be rubbed over with very fine emery paper and smeared with clean grease before inserting it into the bush making sure that it swivels freely and smoothly (see page A2 for recommended grade of grease). Make sure that the circlip is replaced in its groove correctly.

WHEEL SPINDLES

Removal (right-hand)

Having removed the wheel hub as described on page F3, the next job is to remove the large circlip retaining the outer bearing, a pair of circlip pliers will be needed to remove this circlip.

To extract the spindle, service tool No. 61–6108 will be required. Place the tube over the spindle followed by the large washer and then screw the wheel hub retaining nut on to its thread, and whilst holding the spindle, with a screwdriver in the slot provided, screw the nut in a clockwise direction so extracting the spindle and outer bearing.

Remove the inner bearing and plastic cap with a drift from inside the spindle housing. Replacement is the reversal of the dismantling procedure, referring to page A2 for lubrication details.

Left-hand Wheel Spindle and Drive Shaft Removal

First, remove the wheel and brake drum, as described on page F3. The bearing is retained by a circlip which should now be removed (see Fig. D6), followed by the brake shoes and springs.

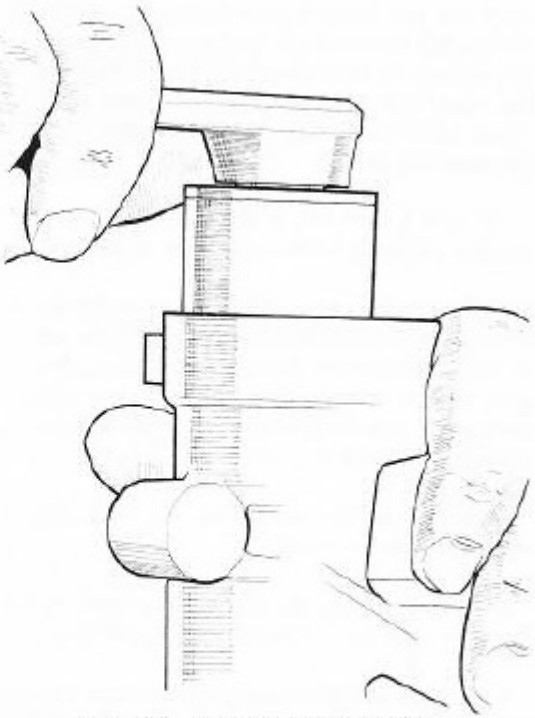


FIG. D5. *Removing spindle using service tool No.* 61–6108.

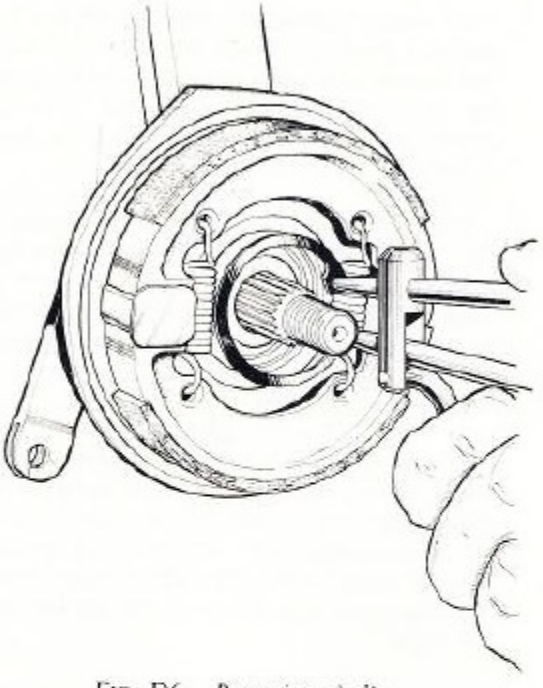


FIG. D6. *Removing circlip.*

Unscrew the nut securing the two sprockets and after removing nut and washer, withdraw the two sprockets from their spline.

Now drive the spindle out from the sprocket end together with the outer bearing with the aid of a hide-mallet.

When the spindle has been removed the next job is to remove the special bush at the inner end of the spindle housing, for this job service tool No. 61–6098 will be needed. Place the tool down the bore from the outer end and drive the bush from the housing, the oil seal may be pushed out with the bush, if not, it should be prised out with a screwdriver.

When replacing the bush, it is important that it is replaced with great care, as it is a split bush, and if not driven square the bush will twist, causing severe distortion of the bearing surface. For this reason, a special replacer tool has been designed (service tool No. 61–6109) which consists of a long punch reduced at one end, to locate inside the bush, and a separate collar which fits inside the bore of the right-hand wheel spindle housing. When the bush and punch are in position, the bush can be pressed into its housing, or driven in with a large hide-mallet.

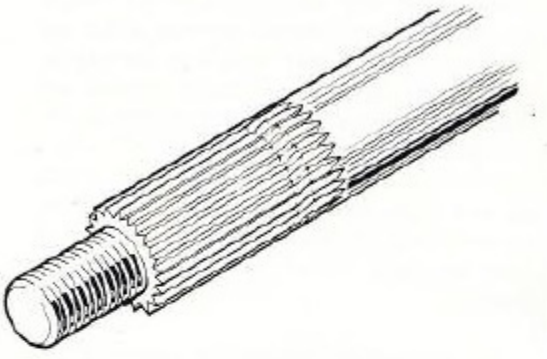


FIG. D7. *Worn spline.*

Before rebuilding the assembly check the splines on the shaft, sprocket and brake drum for wear or signs of twisting (see Fig. D7).

Replacement is the reverse of the dismantling procedure, referring to page A2 for details of lubrication.

AXLE BEAM ALIGNMENT

If, after an accident, it is feared that the axle beam has been twisted, and that one or both wheels are out of alignment then the axle beam should be taken to your nearest dealer, where expert advice will be given. It is not possible to straighten an axle beam; a new one should be fitted case of doubt.

JOCKEY PULLEY

Check to see if the pulleys revolve quite freely on their respective spindles, and that the spring clips are still in position on the outside of each

pulley. After long use, the pulleys and bracket will have collected a certain amount of dirt and one or both pulleys may be tight on the spindle. Prise the spring washers from the spindles and remove the pulleys. All the components should be washed in paraffin and "blown off" with a high-pressure air line. Reassemble with a little oil and make sure the spring clips are fitted correctly with the sharp edge of the teeth away from the pulley, check that the pulleys spin freely.

The return spring need not be removed unless it is fractured or has lost its springiness.

REASSEMBLING THE AXLE BEAM INTO FRAME

Rebuild the complete axle beam and torsion bar assembly in the reverse order to dismantling.

When this is done, support the frame and slide the torsion bars into the frame until the pivot block is about 2" (50 mm) away from the aperture in the frame. Now lower the axle beam and push the assembly into the frame and lift it until the location spigot on top of the pivot block enters the hole in the frame, whilst holding the axle beam in this position pass the long stud through the cross hole in the frame and through the silentbloc bushes in the pivot block.

Replace the rubber spacer on to the spigot on top of the frame followed by the washer and bolt which can now be tightened. Replace and tighten the nut on the cross stud.

Move to the front of the frame and replace the two bolts (one each side) into the torsion bar adjuster blocks, these bolts should be fully tightened. Do not attempt to adjust the torsion bars at this point.

FITTING PEDAL CHAIN

Place the chain round the rear sprocket and feed the top run through the hole in the pivot block. Feed enough through so that the end can be retrieved from underneath the block, pull this end through and feed it through the jockey pulley. The chain should pass underneath the lower pulley then between them and over the top pulley.

Connect the two ends of the chain together, with the closed end of the spring link pointing in the direction of chain travel. Now with a length of stiff wire, approximately 3 feet (1 m) long, hooked through the chain push it along the frame until it is visible through the aperture in the top of the frame.

Slip the chainwheel down into the frame with the boss to the right and replace the pedal crank and spindle into its bush so that it just locates in the chainwheel boss. Now push the spindle through whilst holding the chain in such a position that the spindle will pass inside the loop of the chain.

The cotter pin in the chainwheel can now be replaced (see Fig. D8 for correct fitting position) if the cotter is replaced the wrong way

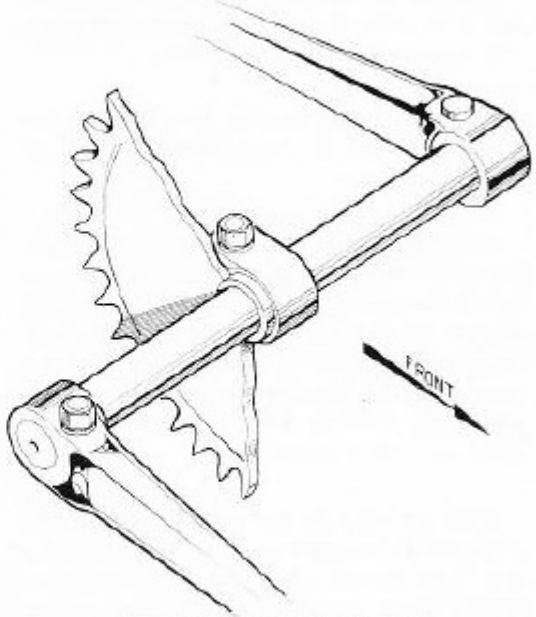


FIG. D8. *Cotter pin position.*

round most of the strain will be taken by the nut and washer and not by the taper on the cotter pin. When replacing a cotter pin it should be driven in with a drift and hammer and then the nut should be tightened. Do not attempt to draw a cotter pin through by using the nut, as the thread will be stripped.

Replace the other pedal crank and cotter pin making sure that the cotter is put in the correct way (see Fig. D8).

Lift the chain on to the first few teeth at the top of the chainwheel and then from the right-hand side of the machine turn the sprocket in a clockwise direction until the chain is completely fitted.

To fit a new chain or after repairing a broken one, remove the cover above the frame aperture and lift the front wheel up until the machine is standing vertical on its rear carrier, after placing some sort of protective covering on the ground to eliminate the possibility of scratching the paintwork on the rear carrier.

Place the end of the chain on top of the sprocket and turn the sprocket in the direction of travel and at the same time feed the chain on to it until the two ends are of equal length.

Reach underneath the frame and make sure that both ends of the chain pass through their respective apertures (*i.e.*, the bottom run through and between the pivot block and the bottom of the frame and the top run through the aperture in the pivot block). The top run of the chain should now be placed around the small sprocket. The lower run of the chain should be fed through the jockey pulley so that it first goes underneath pulley (A) Fig. D9, and over the top of pulley (B), the chain can then be connected together with the split-link with the closed end of the spring clip facing the direction of chain travel (*i.e.*, rearward on the bottom run).

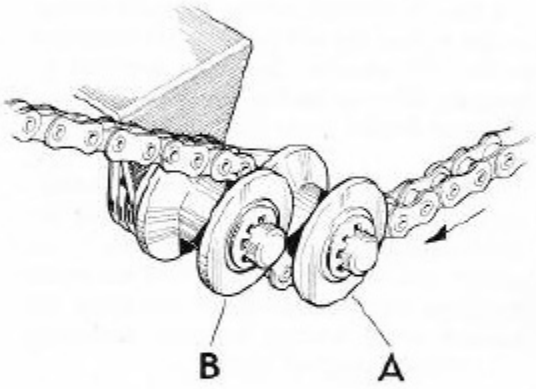


FIG. D9. *Jockey pulley.*

Check all nuts and bolts on the axle beam and torsion bars assembly and then proceed to replace the rear wheels, engine, layshaft and engine cover as described on pages F3, B13 and D8 respectively.

When the complete rear assembly of the machine is rebuilt the machine should be stood on its wheels ready for torsion bar adjustments.

TORSION BAR ADJUSTMENT

When assembling with new torsion bars, the adjuster bobbins should first be screwed inwards until contact is made with the torsion bars. Now screw each adjuster in three-quarters to one turn to equalise frame balance to within a 10° limit of vertical.

When a machine is set-up as described above a further one and a half turns of adjustment will be available at each bobbin for correction after prolonged use.

It must be remembered that excessive loading on one torsion bar will cause the frame to lean to one side and this should be corrected by removing the excess loading rather than applying additional tension to the other torsion bar.

When the torsion bars are correctly loaded, the right rear wheel should lift just before the frame reaches its stop when banked fully to tha left and vice versa. Under tensioning will result in contact with the limit stop before lifting the opposite wheel whereas excessive tensioning would lift the wheel too readily.

Important:—On no account should the machine be ridden with incorrect adjustment.

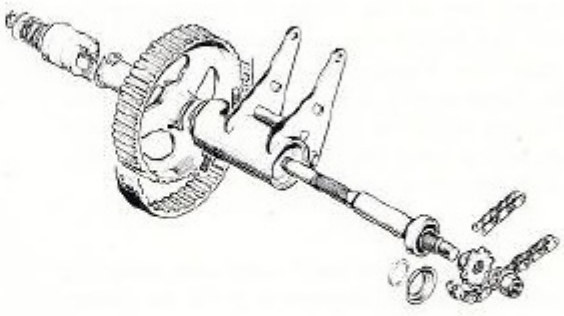


FIG. D10. *Exploded view of layshaft assembly.*

LAYSHAFT

This is the spindle housing directly under the engine. On the one side it carries the large pulley and on the other the small drive sprocket.

To dismantle, remove the small circlip from inside the sliding member which will release the spring retaining washer, spring, followed by another retaining washer and finally the sliding member itself. This will reveal the splined pulley sleeve circlip which should now be removed, the pulley and sleeve can now be pulled off the shaft followed by the thrust washer.

The spindle can be driven from the housing with a hide mallet. If the sprocket requires removal, hold the spindle in soft-jawed clamps and remove nut and sprocket from its spline.

Remove the bearing from the housing with a drift. Replacement is the reverse of the dismantling procedure (refer to Fig. D10 for correct positioning of parts).

Between the two bearings are two grease retainer cups and felt washers. Make sure they are fitted in the correct manner. Before fitting a bearing slide one of the retainer cups into the layshaft with the open side towards the bearing. Now soak the felt washer in grease and place it in the recess in the cup, the bearing can now be replaced into the layshaft housing, and the same procedure should be followed for the other bearing.

SADDLE ADJUSTMENTS

The seat tube telescopes into the frame pillar and can be adjusted for height after first slackening the clamping nut at the top of the frame pillar. It should be adjusted to a position comfortable when pedalling. Tighten the clamping nut securely after adjustment.

The saddle itself can be adjusted to tip forward or backwards by slackening the clamp nut underneath the seat pan. This nut should be tightened securely after adjustment.

HANDLEBAR ADJUSTMENTS

The handlebar stem telescopes into the steering head tube. It can be raised or lowered after slackening the expander bolt (A) Fig. D11, when it may also be necessary to tap the bolt head to release the expander cone (B). When tightening, pull the bolt head upwards and at the same time turning to make sure that the location tag on the expander cone is lined up with the slot in the handlebar stem.

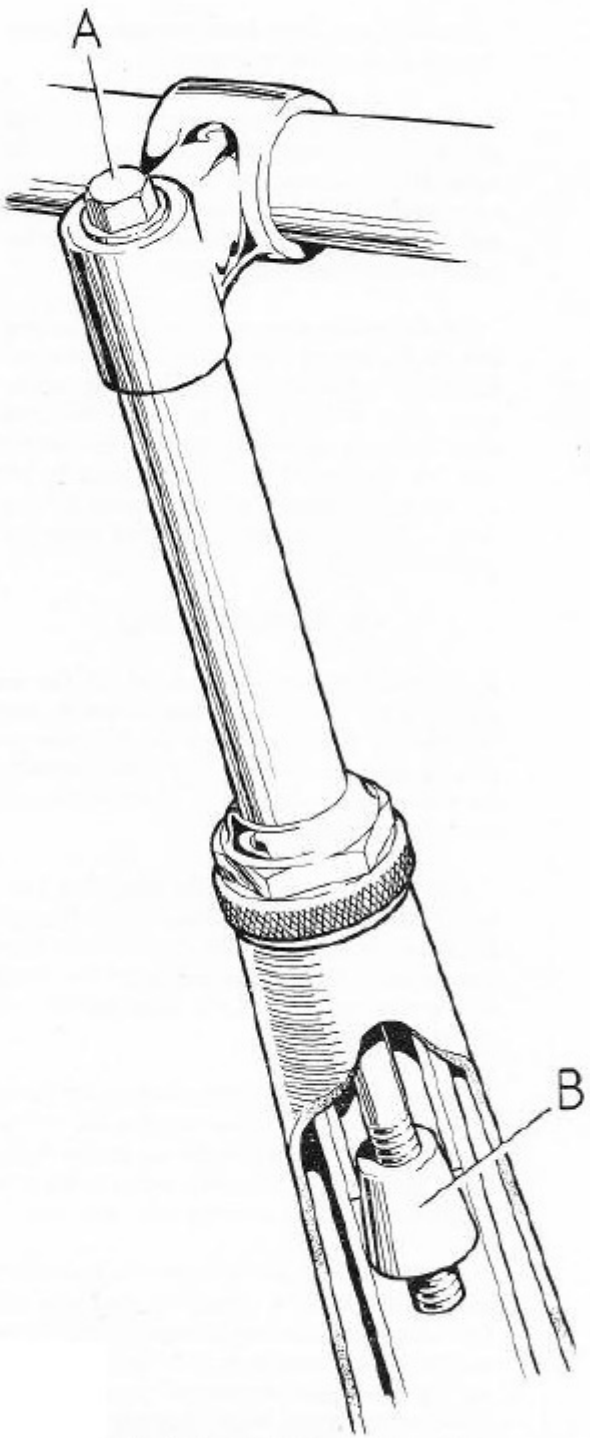


FIG. D11. *Handlebar adjustments.*

The handlebars can, if required, be revolved in the clamp by first slackening the clamp bolt underneath the headlight.

After achieving the required position the bolt should be tightened securely.

To remove the handlebars the clamp bolt should be removed from the clip, care being taken not to drop the headlamp unit and special nut from inside the headlamp bracket. Remove the twist grip (two screws) the left-hand dummy grip, the front and rear brake levers (one screw each lever) and the combined light and horn push switch (one screw and special clamp plate). The handlebar can now be withdrawn from its clamp.

FRONT APRON AND LEGSHIELDS

To remove front apron unscrew the four nuts and washers from around the fork leg, and the six self-tapping screws along the bottom edge of the apron. Now disconnect the front brake cable from the lever on the brake back-plate, and remove the cable cover on the fork stem (four screws) finally pulling the cable up through the hole in the apron. The apron can now be withdrawn from the machine.

To remove the legshields take out the four nuts and bolts securing it to the frame and remove by pushing downwards and backwards to give clearance at the fork leg.

Replacement is the reverse of the removal procedure, but do not over-tighten the fixing screws.

CONTROL CABLE REPLACEMENT

Adjuster for all cables, *i.e.*, brakes, decompressor, air and throttle, are grouped within a detachable box mounted on the steering column.

Although the cables are guided along inside the frame by a channel, it would be advisable

to tie a length of string to the end of the cable before pulling through the frame for replacement. When the new cable is ready for fitting, tie the string to the end of the new cable and pull it back through the frame channel. This does not apply to the front brake cable.

THROTTLE CABLE

First turn the twist grip to open the throttle then, whilst pulling the cable sleeve, release the grip to allow the cable ferrule to be removed. Now remove the two screws from the twist grip and take off the top half to expose the cable nipple. The cable can now be withdrawn from the twist grip.

Lift engine cover by releasing the fasteners (see page B3) and unscrew the top off the carburetter and withdraw the throttle slide. Now compress the throttle spring by squeezing the slide and carburetter top together so releasing the cable nipple which should be pushed to one side allowing the nipple to pass through the larger hole and out of the slide as the spring is released (see Fig. D12).

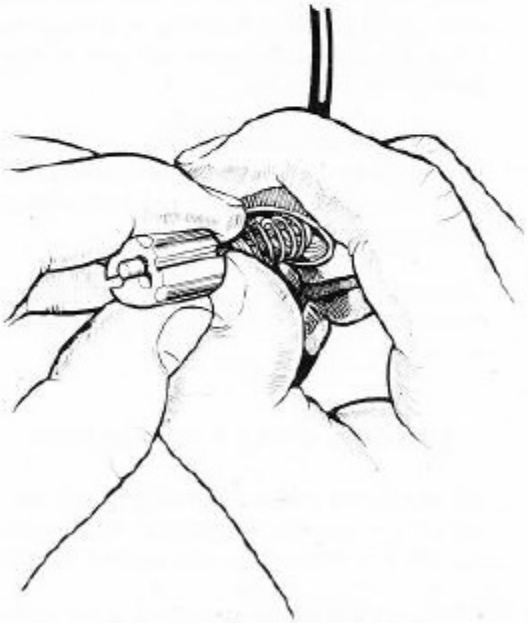


FIG. D12. *Throttle cable.*

Draw the new cable down through the frame channel as previously described.

Pass the cable nipple through the top cap and spring. Whilst compressing the spring, insert the cable nipple through the hole in the throttle valve and locate to one side, the throttle valve and top cap can now be replaced into the carburetter body and screwed up tight.

Fit the replacement cable at the twist grip end by locating the nipple on its seating and sliding the cable down its slot, pulling on the outer cable to locate the ferrule in the cable stop. If the decompressor cable is to be changed then the top half of the twist grip can be left off, otherwise replace it and secure with the two screws. For adjustment of throttle cable see pages C4 and C5.

AIR CONTROL CABLE

Push aside the wire clip, and lift off the air silencer body. The air filter and its sealing ring can then be withdrawn. Pull the air valve return spring from over the cable stop releasing the cable nipple allowing it to be withdrawn from the carburetter.

The cable is secured in the handlebar lever by a solderless nipple, the brass screw through the side of the nipple should be unscrewed allowing the cable to be withdrawn from the lever, taking care not to lose the brass nipple and screws from the lever.

Pass the replacement cable through the frame channel. Insert the nipple through the carburetter body and locate it in the tag on the choke valve, securing it by lifting the return spring and clipping it into place over the cable stop tag.

At the handlebar end the screw in the solderless nipple should be completely slackened off. Insert the inner cable end through the cable stop and through the small hole in the nipple, making sure there is a slight amount of free play before tightening the clamp screw. For adjustments to the air cable, see page C5.

DECOMPRESSOR CABLE

Remove the cable at the handlebar end by the same procedure as for removing the throttle cable.

Push the lever down on the decompressor unit whilst holding the outer cable which will now be free, the cable nipple can then be unhooked from the slotted stop tag.

To replace a decompressor cable, locate the nipple in the twist grip as for the throttle cable and feed the cable through the frame channel. Hook the nipple in the slotted tag on the body of the decompressor unit and press down on the lever on top, at the same time locating the outer cable into its recess.

When adjusting the cable make sure there is a slight amount of free play so ensuring that the decompressor closes when the twist grip is released. If the decompressor is leaking, starting will become difficult and in severe cases impossible.

FRONT BRAKE CABLE

To remove the front brake cable first slacken the adjuster by the fork stem.

Pull the handlebar lever up towards the bar and whilst pulling on the outer cable with the other hand, release the lever. The outer cover will now be free from the lever and the nipple can be removed from the lever blade.

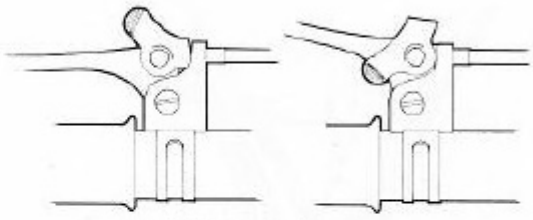


FIG. D13. *Parking clip.*

Pull the outer cable upwards and outwards away from the cable stop on the front brake plate and unhook the cable nipple from the lever.

Replacement of the front brake cable is the reversal of the removal procedure. Remember to readjust the brake cable and test the efficiency of the brake thoroughly before using the machine.

REAR BRAKE CABLE

Removal and replacement of the rear brake cable is the same as for the front brake except for the fact that the rear brake lever on the handlebar has a parking device which fits over the extended cable nipple. This clip should be sprung apart and removed from the lever to allow the nipple to be removed.

When replacing a cable make certain that the parking clip locates over the nipple. To use the parking clip pull the brake on and swing the clip into the gap between the lever blade and pillar, as shown in Fig. D13.

To release the clip, pull the lever in and swing the clip back on to the lever blade.

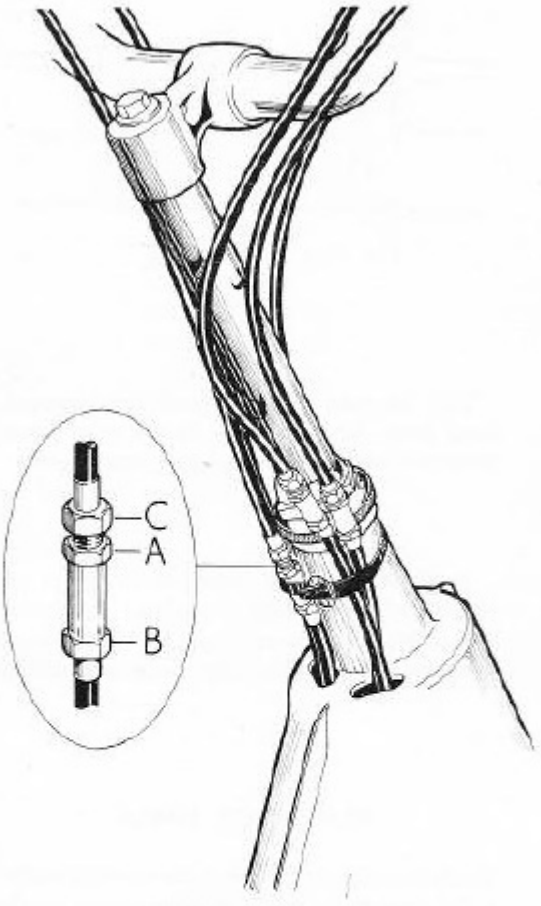


FIG. D14. *Cable adjuster.*

CABLE ADJUSTMENTS

As mentioned on page D9, the cable adjusters are all grouped together under a detachable box, which is secured to the front panel by four "Phillips-head" screws. After removal of these screws the box can be taken away revealing the five cable adjusters.

To reduce slackness in a cable, slacken the locknut (A) Fig. D18, hold the body (B) of the adjuster and unscrew the sleeve nut (C) until the adjustment is correct. Tighten the locknut securely.

For details of cable lubrication refer to page A4.

INDEX

FIG. E1.

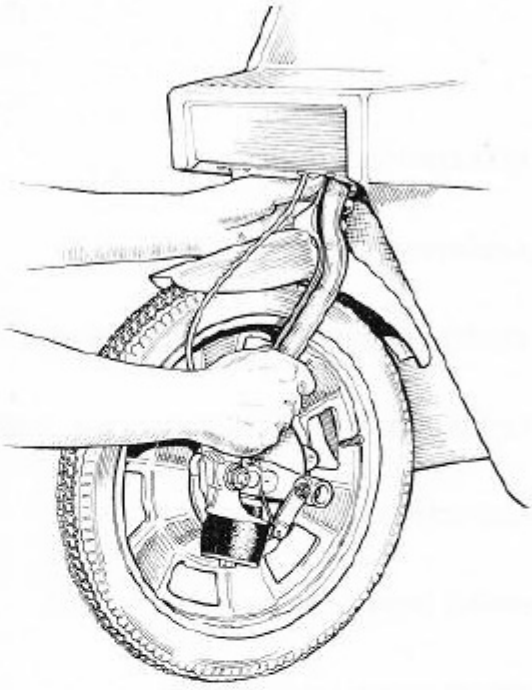


FIG. E2. *Testing for steering head slackness.*

DESCRIPTION

The front fork of the Ariel 3 is of the trailing link type and is controlled by two rubber buffers, one for the upward stroke and the smaller one controlling the downwards stroke to prevent "topping."

ADJUSTING STEERING HEAD RACES

It is most important that the steering is always correctly adjusted and a check should be made in the following way.

First remove the small plastic cover from over the head tube. Now place two boxes under the pedals so that the front wheel is clear of the floor (see Fig. E1).

Grasp the fork with one hand and try to push the fork backwards and forwards (as in Fig. E2). Place the fingers of the other hand against the bottom ballrace to feel for play.

If any free play is felt the head race bearings are in need of adjustment. To do this slacken off the locknut (A) in Fig. E3, now tighten the bearing nut (B) until any free play has been taken up. Avoid over-tightening the adjuster because the ball bearings will become indented into the races, making the steering difficult and dangerous.

When the correct adjustment has been made retighten the locknut whilst holding the lower nut with the spanner to prevent the nut from turning and altering the setting.

To check the setting, hold the handlebars lightly and move them round slowly, when the steering should be free and rotate smoothly.

If the movement feels "lumpy" indicating damaged races, the ball bearings, cups and cones

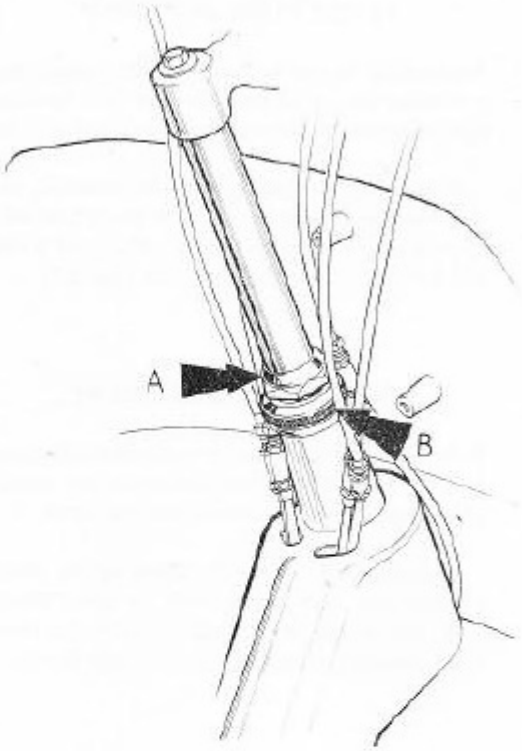


FIG. E3. *Adjusting steering head.*

must be removed for examination, as described in the following section, and replaced as necessary.

RENEWING STEERING HEAD BEARINGS

Unscrew the clamp bolt in the top of the handlebar stem about ¼" (6 mm) and with a hide-mallet strike the head of the bolt to release the tapered wedge nut from the bottom of the stem, the handlebar assembly can now be withdrawn from the fork stem. If, however, the headlamp cable or the control cables do not allow enough room for the stem to be withdrawn, unplug the headlamp cable noting its position and slacken the pinch bolts in the levers and twist grip and slide the controls from the handlebars after first removing the left-hand handle grip.

Now unscrew and remove the chromed locknut from the steering stem and disconnect the front brake cable from the lever on the back plate and remove the front wheel from its three studs.

Unscrew the bearing nut at the top of the fork stem and withdraw the front fork assembly, taking care not to lose the ball bearings, which will be released as the stem is withdrawn.

The bearings can now be examined. There should be 30 steel balls in the top bearing of ⅛" diameter and 26 of $\frac{3}{16}$" diameter in the bottom race. Care should be taken not to get these ball bearings mixed up. The lower cone can be prised off the column but, when fitting the replacement, care must be taken to see that the cone is seated squarely. For this purpose a length of heavy-gauge steel tubing, long enough to clear the column and 1¼" (31·75 mm) inside diameter is most useful for driving the cone on to its seating.

The bottom cup can be driven out of the steering head using a suitable bar from inside the head tube.

The special top cup is made from two parts, the top part carries the ball bearings and also has a radius machined on the underside, this seats in the radius in the bottom part which is pressed into the steering head tube. This arrangement is a self-centring device and also eliminates excessive force which may be applied to the ball bearings.

Remove the top part of the cup, but the bottom part can be left in the steering head tube unless it is damaged or worn.

When fitting a new bottom cup, see that it enters the housing squarely. Do not drive the cup in with a drift against the radius of the ballrace as this will impose undue strain and is liable to fracture the cup. Use a piece of steel bar or tube having a diameter slightly less than that of the cup sides.

Unless the steering stop assembly is damaged, it will not be necessary to remove it. If it is damaged, unscrew the four socket head screws underneath the plate and remove the assembly.

After replacing the cups and bottom cone, grease the cups and assemble the 26 $\frac{3}{16}$" diameter balls into the bottom cup, and 30 $\frac{1}{8}$" diameter balls in the top cup. Slide the column back into the head and screw on the special top cup followed by the locknut.

Reassembly from this point is simply a reversal of the procedure for dismantling. When complete, adjust the steering as detailed on page E2.

DISMANTLING THE TRAILING LINK ASSEMBLY

Remove the front wheel as described on page F2 and disconnect the front brake cable as described on page D11.

Unscrew the large nut at the bottom of the fork leg and remove nut and washer.

The brake drum and trailing link can now be taken from the two fork bushes.

To remove the suspension rubbers unscrew and take out the bolt beneath the large rubber block, the swivel link and top small rubber can be pulled up through the lug on the fork leg.

INSPECTION

Examine the suspension rubbers very carefully and make sure there are no cracks or signs of fatigue.

The nylon bushes in the bottom lug and eye bolt should be checked for wear and changed if necessary using service tool No. 61-6107.

FRONT FORK ASSEMBLY

Reassembly is the reversal of the dismantling procedure but make sure that the bolt securing and compressing the suspension rubbers is tight.

If the front mudguard is to be removed, unscrew the single bolt beneath the guard and take the mudguard from its bracket. The front wheel will have to be removed first (see page F2).

FRONT FORK ALIGNMENT

If the machine has been in an accident the front fork leg may be bent, but sometimes not noticeably. Therefore it is always wise to check.

Unfortunately, it is very difficult to check whether the fork leg is bent or not. Therefore the owner is advised to take the front fork assembly to the dealer for examination.

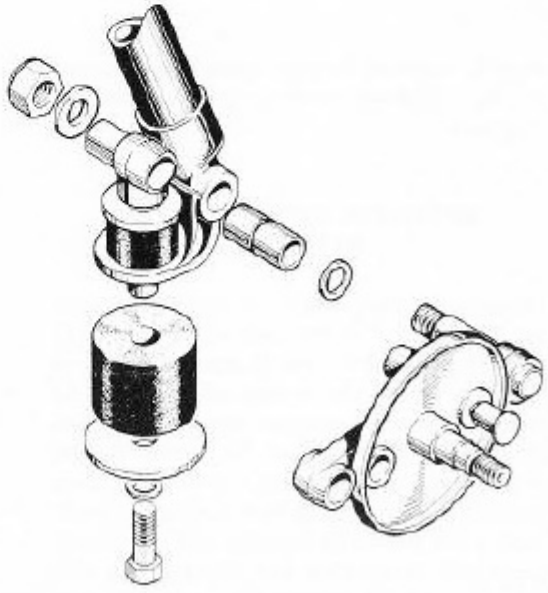


FIG. E4. *Front fork exploded.*

INDEX

FRONT WHEEL REMOVAL

Place two boxes or blocks of wood under the pedals so that the front wheel is clear of the ground.

Take off the three nuts and washers securing the wheel to the brake drum, and remove the wheel.

When replacing the wheel make sure that the centre is fitted on its register before tightening the nuts.

FRONT HUB DISMANTLING

Remove the hub and brake plate from the fork leg as described on page E4.

Prise out the plastic dust cover from the hub and take off the self-locking nut from the end of the spindle. Now with a hide mallet tap the spindle (complete with brake plate and shoes) from the hub, and place to one side.

To remove the bearings from the hub, first remove the circlip securing the outer ballrace. With the aid of a soft metal drift, drive the bearing out of the hub from inside. The left-hand needle bearing can be removed in the same manner after first prising off the dust seal cap and felt washer.

Before checking the bearings, wash thoroughly in paraffin and if possible, blow out with a high-pressure air line. Examine carefully for signs of roughness and excessive play, indicating broken balls or damaged tracks. In the case of the needle bearing, look for missing or broken rollers and roughness.

FITTING NEW BEARINGS

Place the new needle roller bearing in position, in the inside of the hub with a piece of bar just under the outside diameter of the bearing. Now replace the dust seal using a new felt washer.

From the other end pack the hub with the recommended grade of grease (see page A2) and fit the outer ballrace, using a piece of tubing. It is essential that the force applied is on the outer ring of the bearing. Replace the circlip.

FRONT BRAKE SHOES

Whilst the hub is stripped, opportunity should be taken to examine the brake shoes for wear or damage.

The shoes can be released by levering them outwards and upwards off the cam and fulcrum pin. The springs are very strong: take care not to trap the fingers behind the shoes.

Note:—Avoid handling brake linings with greasy hands.

As the linings are bonded to the brake shoes, it will be necessary to replace the complete shoe when the linings are worn out.

When replacing the brake shoes lightly grease the brake cam and fulcrum pin, but avoid greasing the brake lining material.

The shoes are interchangeable.

FRONT HUB REASSEMBLY

When the brake shoes have been fitted on to the back-plate, the hub can be fitted back on to the spindle.

Tap the hub over the bearings and secure with self-locking nut and washer, now fill the plastic cover with grease (see page A2 for recommended grades), and replace it into the hub.

REAR WHEEL REMOVAL
(Right-hand)

Place a box under the axle beam so that both rear wheels are clear of the ground.

Take off the three nuts and washers securing the wheel to the hub, and remove the wheel.

When replacing the wheel ensure that the centre is located on its register before tightening the nuts.

REAR WHEEL HUB DISMANTLING
(Right-hand)

The spindle runs in two ballraces in the axle beam, removal of these is covered on page D4. The only work to be done on the right-hand rear wheel hub is for general strip down purposes or to repair any damage incurred in an accident.

REAR WHEEL REMOVAL
(Left-hand)

Removal of the left-hand rear wheel, or drive wheel is the same as for the right-hand wheel.

REAR WHEEL HUB DISMANTLING
(Left-hand)

Remove the plastic dust cap, self-locking nut and washer, and withdraw the hub from the splines.

If either the splines in the hub, or the splines on the drive shaft, are worn badly, then the hub, or shaft, or both must be replaced.

BRAKE SHOES
(Left-hand Wheel)

To remove the brake shoes, lever them outwards and upwards away from the cam and fulcrum pin.

As the linings are bonded to the shoes, it will be necessary to replace the complete shoe when the linings are worn out.

If there is excessive play in the bore, through which the brake cam spindle is fitted, take off the nut, washer and brake lever and withdraw the cam. With a small drift drive the cam spindle bush from the casting and replace with a new one making sure that it enters the bore squarely.

Reassembly is the reverse of the dismantling procedure.

BRAKE ADJUSTMENTS

The brakes must be adjusted to give maximum efficiency at all times and for this to be maintained, the shoes should be just clear of the drum when the brake is off, but close enough for immediate contact when the brake is applied. The brakes must not be adjusted so closely, however, that they are in continual contact with the drum as excessive heat will be generated, resulting in deterioration of braking efficiency.

The front and rear brake adjusters are situated in the cables behind the small plastic cover fitted over the steering stem, below the handlebars. Remove the four screws securing this cover to gain access to the cable adjusters.

Rotation of the screwed sleeve alters the effective length of the cable, so adjusting the position of the shoes in the drum. The locknut should be tightened after each adjustment.

Note that if maximum efficiency is to be obtained, the angle between the brake cable and the brake cam lever should not exceed 90° when the brake is fully applied.

WHEEL ALIGNMENT

Steering will be affected if the wheels are even slightly out of alignment (out of track).

As it is impossible to adjust wheel alignment on these models, any misalignment found will have been caused by mishandling or damage. The machine should be taken to your B.S.A. dealer for expert advice.

To check the rear wheels for alignment, two straight-edges, of approximately 6 feet long, are required.

Lay the straight-edges on blocks about 4" (10 cm) from the ground, against the outside of the two rear wheels. Measure the gaps at (A) and (B) in Fig. F1. If measurements at (A) and (B) are different then it means that some component at the rear is misaligned, and the machine should be taken to your dealer for attention.

If of course these measurements (A) and (B) do not correspond it will be impossible to check the alignment of the front wheel in relation to the rear wheels. If the measurements do correspond then a check at the front wheel can be carried out as follows.

Move the straight-edges forward as in Fig. F2, and with the straight-edges touching the rear wheels at all four points, measure the distance at points (A), (B), (C) and (D) which should all be identical figures. If these measurements do not correspond, the machine should be taken to your dealer for attention.

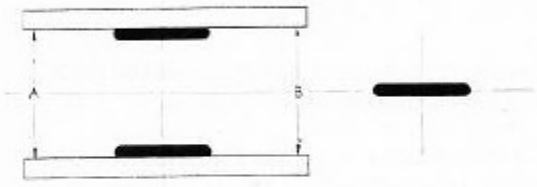


FIG. F1. *Wheel alignment.*

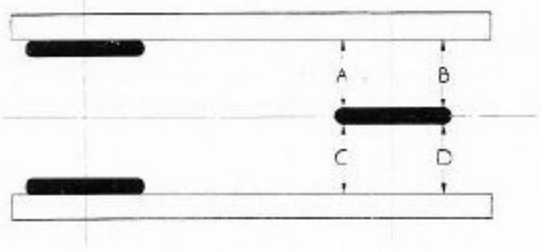


FIG. F2. *Front wheel alignment.*

INDEX

The current required to operate horn, lights and ignition is provided by a flywheel magneto consisting of two main parts, *i.e.*, stator plate and flywheel, located behind a plastic cover on the right-hand side of the engine unit when viewed from the rear.

FLYWHEEL

The flywheel has four permanent magnets fixed to its inside diameter. The hub has a tapered bore, to match the taper on the engine shaft upon which it is mounted, and a slot to engage the engine shaft key. The outside diameter of the hub is a ground cam to control the opening and closing of the contact breaker points. Flywheel rotation is clockwise.

STATOR PLATE

This is secured to the engine by three screws passing through elongated holes to provide stator plate adjustment. Adjustment is necessary to ensure the rupture gap is to within specified limits (see page B14).

IGNITION COIL

Mounted on the upper side of the stator plate is the ignition high-tension coil and it is held in position by two screws which, when slackened, permit the coil to be moved fractionally to establish the correct air gap of ·008" (0·2 mm.) between the inner face of the magnets and core shoes (see Fig. B13, page B11).

Two leads leave the ignition coil, the thin one with light coloured insulation is connected to the condenser, by means of a soldered joint, whilst the heavier lead, with black insulation is the high-tension lead which passes through the upper grommet in the rear of the right-hand crankcase on its route to the spark plug. The high-tension lead can be disconnected by unscrewing from the ignition coil, and renewed with a similar length of 5 mm. high-tension cable.

LIGHTING COIL

Located diametrically opposite the ignition coil lies the lighting coil. It is fixed to the stator plate by two screws which also provide sufficient adjustment for the coil to be moved to correct the air gap as explained above. There is only one lead leaving the lighting coil, it is covered with yellow coloured insulation, and leaves the crankcase via the lower grommet. This is the "live" lead for horn and lighting and is connected to the wiring harness lead with black insulation (see wiring diagram, page G4).

The lighting system is 6volt, and has a capacity of 17 watts.

CONDENSER

The condenser is pressed into its housing in the stator plate, on the forward side of the engine shaft between the lighting and ignition coils, and removal or refitting must be done from the rear of the stator plate using a drift of slightly smaller diameter than the condenser. In addition to the insulated lead from the high-tension coil, another lead, with black insulation, is connected to the condenser by means of a soldered joint. Should it become necessary to disconnect or remake this soldered connection, a well heated soldering iron should be used as too long a process will damage the condenser.

The black lead attached to the condenser is connected to the insulated side of the contact breaker and another black lead, also connected to the insulated side of the contact breaker, leaves the flywheel magneto housing via the lower grommet, alongside the "live" yellow lead from the lighting coil. This black lead was intended for connecting to an engine "cut-out" button but it was decided that a decompressor, as now fitted to the cylinder head and operated by cable from the twist grip, is more satisfactory. This lead must be kept insulated.

The electrical system is dependable and requires nothing in the way of maintenance except for periodical attention to the contact breaker points and lubrication of the contact breaker cam as explained in earlier pages.

The following tips should help in locating ignition faults:—

(1) **No spark at spark plug** — having removed the spark plug, prise out the nylon sleeve and unscrew the spark plug cap from the high-tension cable. With a support beneath the engine to keep the left wheel clear of the ground, rotate the left wheel in a forward direction with one hand and, with the other, hold the high-tension cable end close to the cylinder head ·013—·017" (·35—·45 mm). If still no spark, check the following.

(2) **Faulty connection between spark plug lead and coil** — cut off a little of the cable end and reconnect.

(3) **High-tension lead fractured or insulation damaged** — check lead and replace if necessary.

(4) **Contact breaker points do not open** — adjust points and fit new if necessary.

(5) **Loose connection at stator plate** — check connectors, re-solder if necessary.

(6) **Condenser leads shorting to earth** — check routing and insulate if necessary.

(7) **Faulty high-tension ignition coil** — fit new coil.

WEAK SPARK

(1) **Rupture gap incorrect** — set ignition and rupture gap as described on page B14, Fig. B20.

(2) **Contact breaker points burned or pitted** — reface and reset gap, if necessary fit new contact set.

(3) **Poor condenser** — fit new condenser.

(4) **Faulty ignition coil** — fit new coil.

LIGHTING COIL AND CIRCUIT CHECK

The following checks are conducted with the engine running at tick-over speed using an A.C. voltmeter with a 1 ohm load.

(1) If the lights fail and it is known that the bulbs are sound, disconnect the live lead, with the yellow insulation, from its connection with the black insulated lead in the wiring harness. This connection will be only a few inches from where the yellow lead leaves the flywheel magneto housing. Connect the red lead from the voltmeter to earth and the black lead to the yellow lead from the lighting coil. With the engine running as above, the voltmeter should read a minimum of 2·5 volts if the lighting coil is satisfactory. No reading indicates a faulty coil. Fit a new coil and retest.

(2) If the coil is satisfactory, reconnect the yellow lead from the lighting coil to the black lead in the wiring harness, and then disconnect the red lead from beneath the front lamp. Again, connect the voltmeter with the red lead to earth and the black lead to the red lead of the lamp. Again, the reading should be 2·5 volts minimum. (Light switch should be in "on" position for this test).

(3) If no reading is recorded in test number two, remove plastic cover from steering tube and connect voltmeter, with red lead to earth, black lead to the three black lead connections. Should a minimum reading of 2·5 volts be recorded it will be known that the harness, to this point, is good.

(4) Now disconnect the all red connections and establish which lead comes from the light switch. Connect the voltmeter, red lead to earth, black lead to the lead from the light switch (light switch to be in the "on" position). If, when the engine is started, no reading is recorded it will be known that the trouble lies in the switch or switch connections.

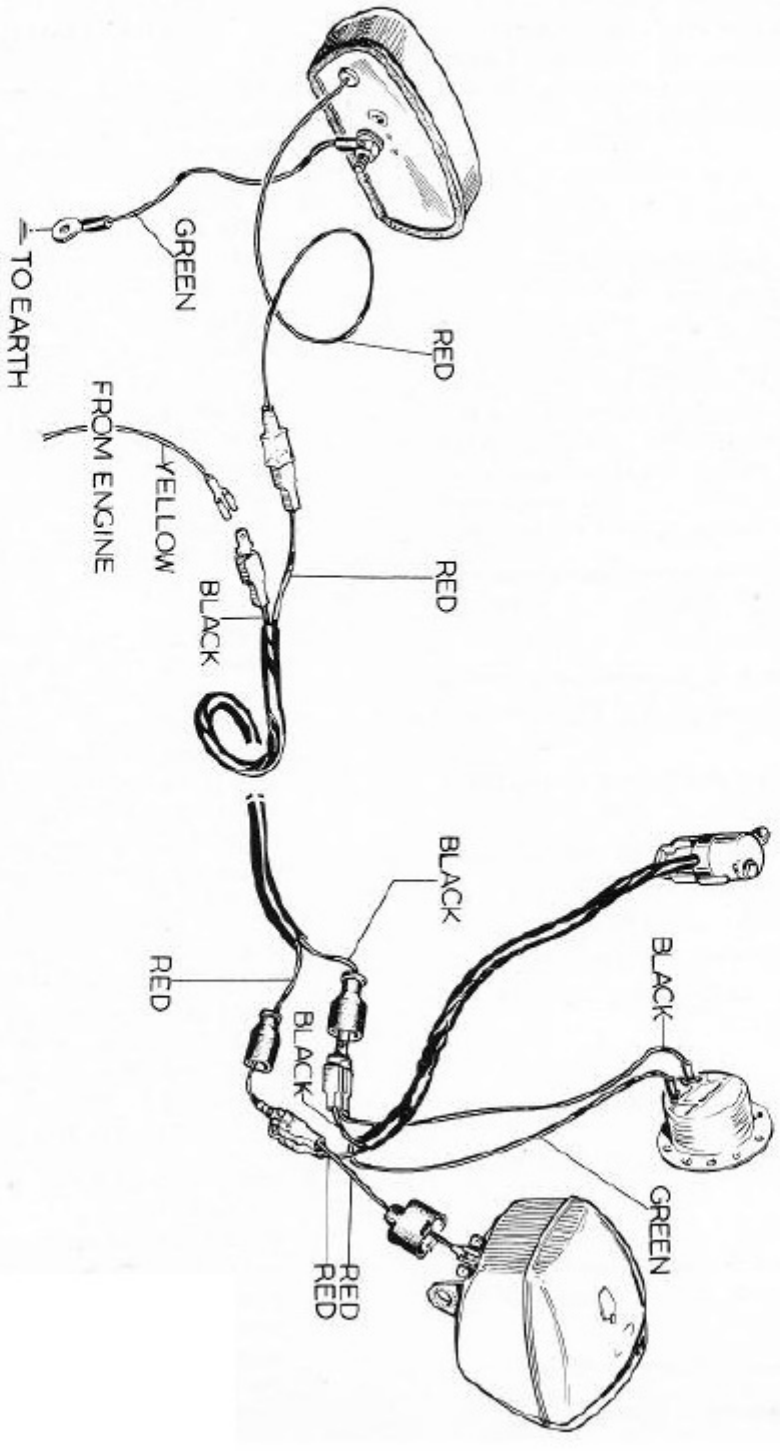


FIG. G1. *Wiring Diagram.*

INDEX

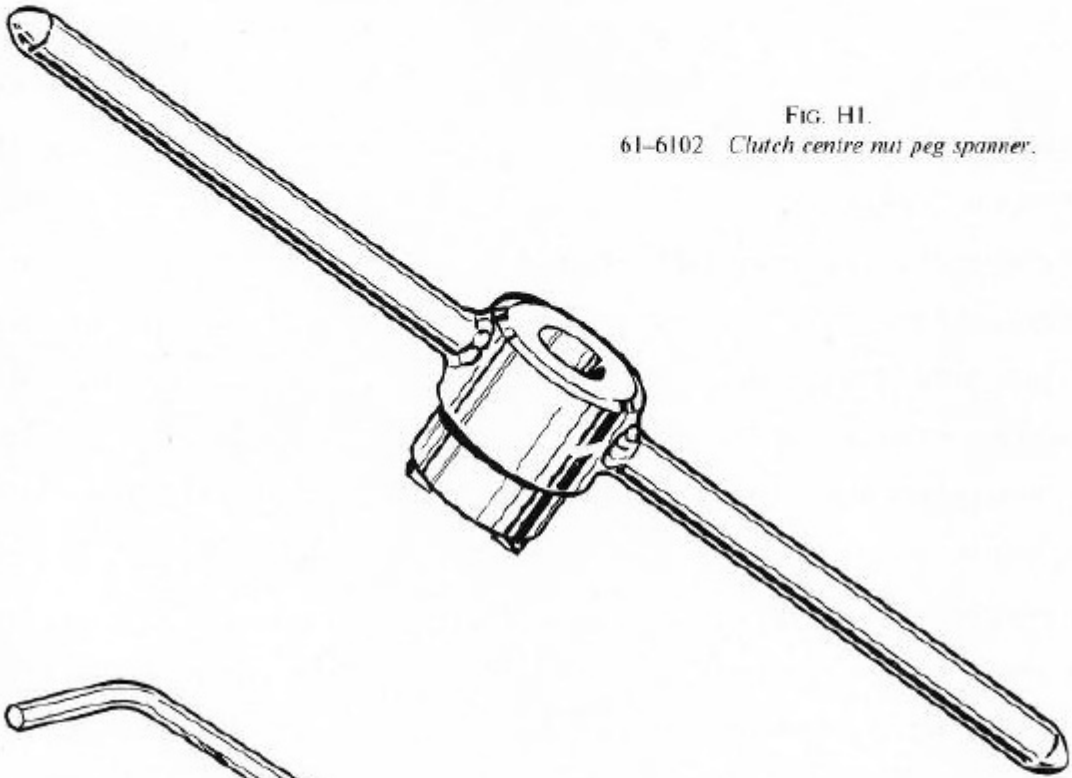


FIG. H1.
61–6102 *Clutch centre nut peg spanner.*

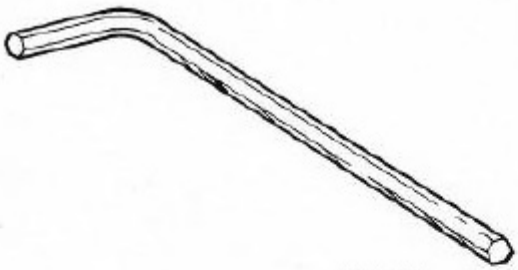


FIG. H2
61–6110 *3 mm Hexagon Key. (Clutch Screws)*

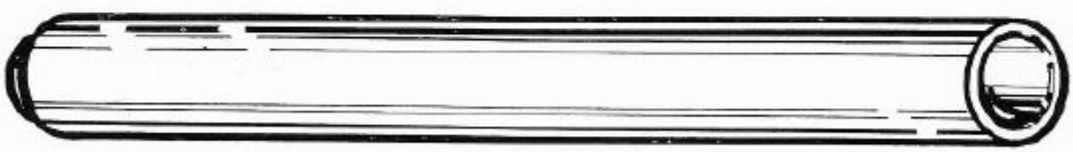


FIG. H.3
61–6083 *Bailrace dolly.*

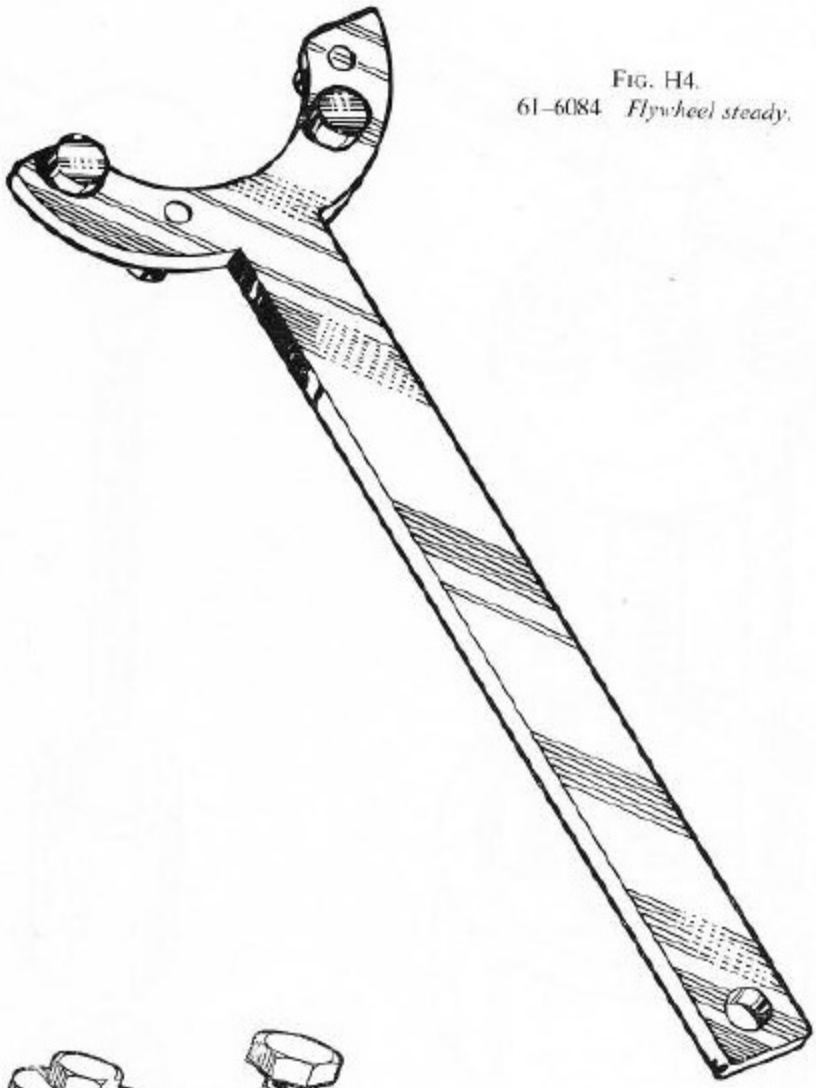


FIG. H4.
61–6084 *Flywheel steady.*

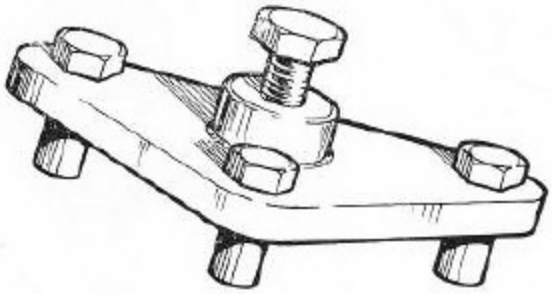


FIG. H5.
61-6111 *Whhel Hub Extractor*

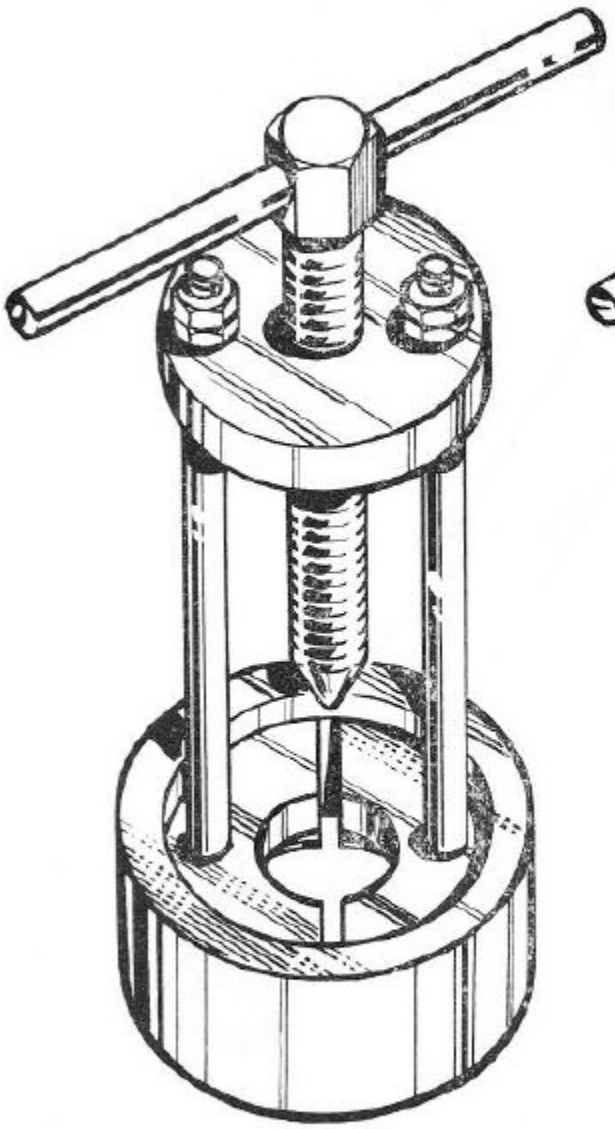


FIG. H6.
61–6082 *Ballrace extractor.*

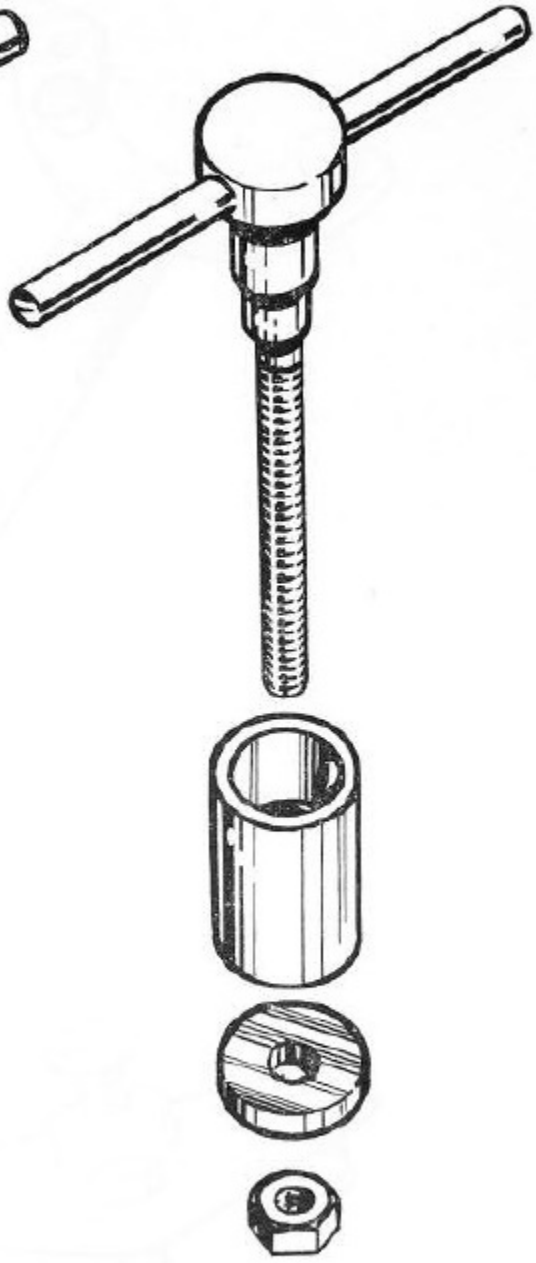


FIG. H7.
61–6087 *Gudgeon pin bush tool.*

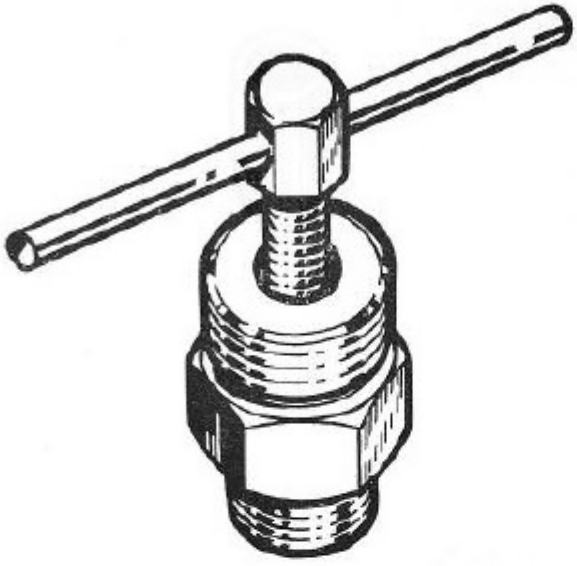


FIG. H8.
61-6086 *Flywheel extractor.*

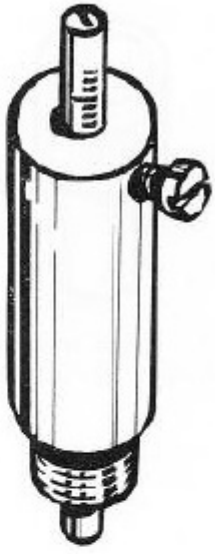


FIG. H9.
61-6088 *Ignition timing tool.*

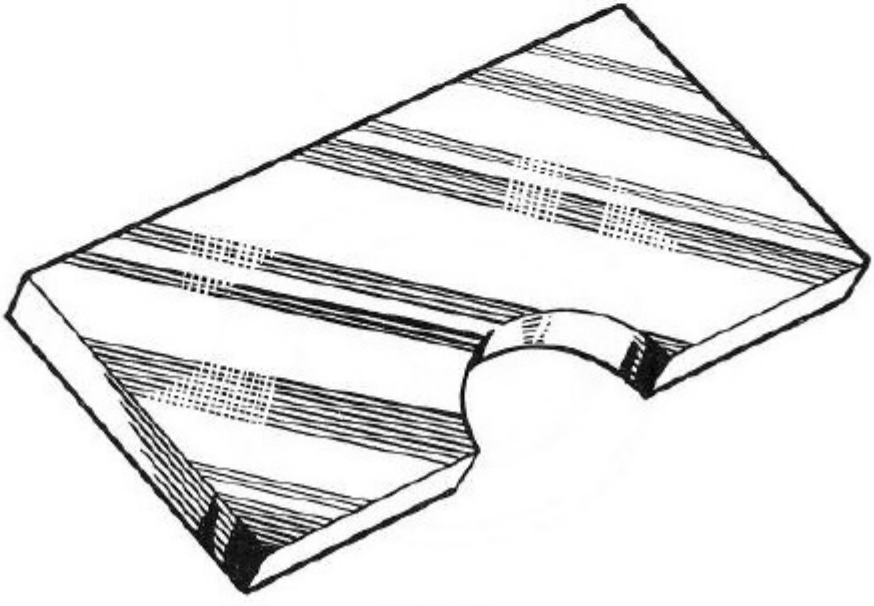
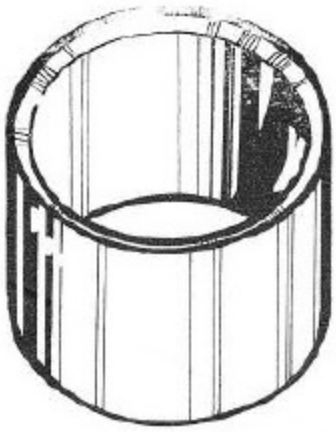


FIG. H.10
61-6091 *Support plate.*

FIG. H11.
61-6089 *Oil seal fitting.*

FIG. H12.
61-6090 *Adaptor.*



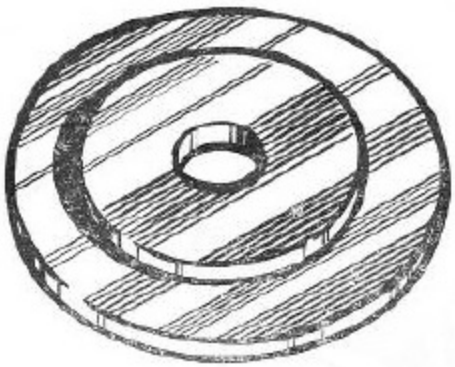


FIG. H13.
61-6108 *Spindle bearing extractor.*

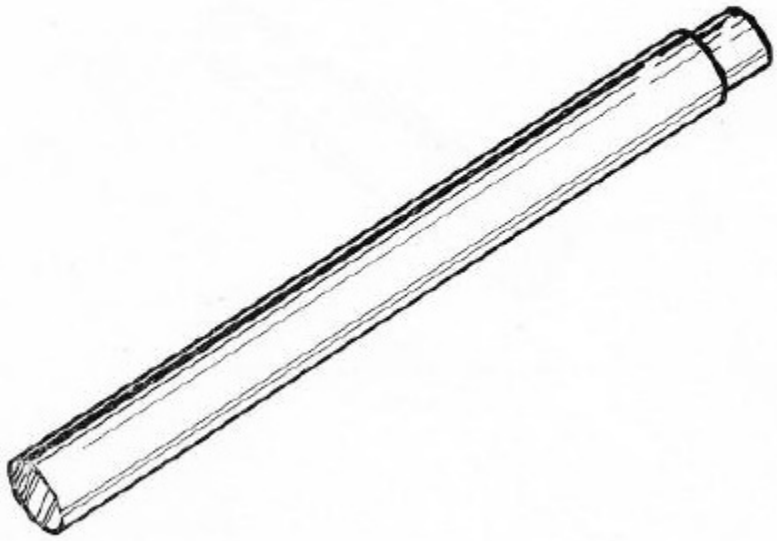


FIG. H14.
61–6098 *Drive-side spindle bush extractor.*

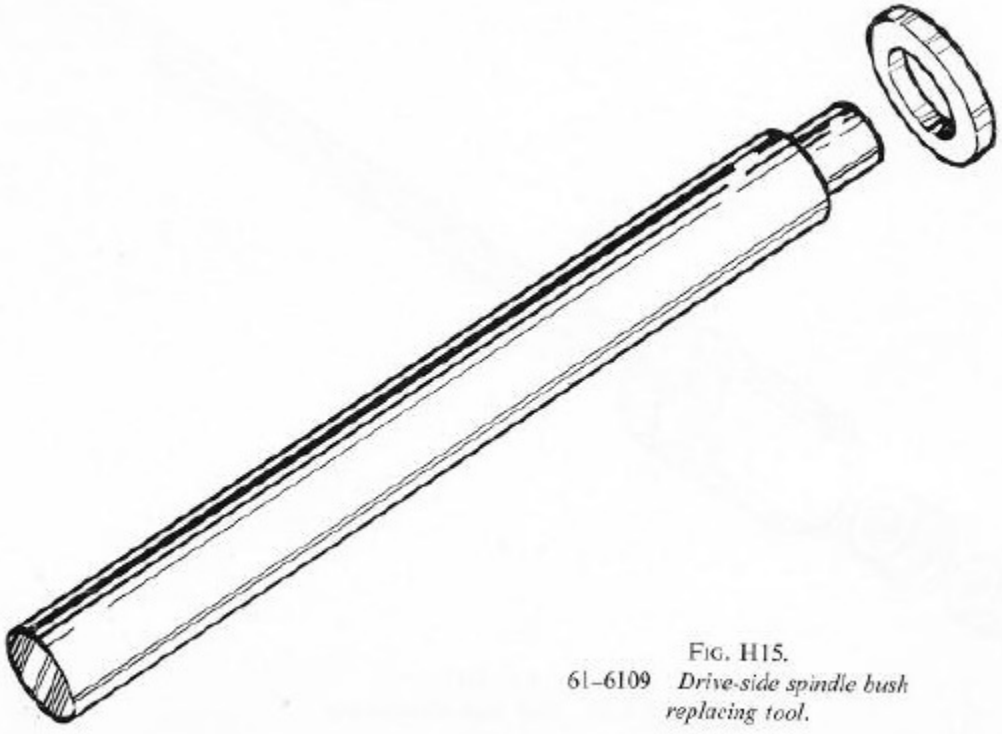


FIG. H15.
61–6109 *Drive-side spindle bush replacing tool.*

FIG. H16.
61–6099 *Axle beam pivot bush extractor.*

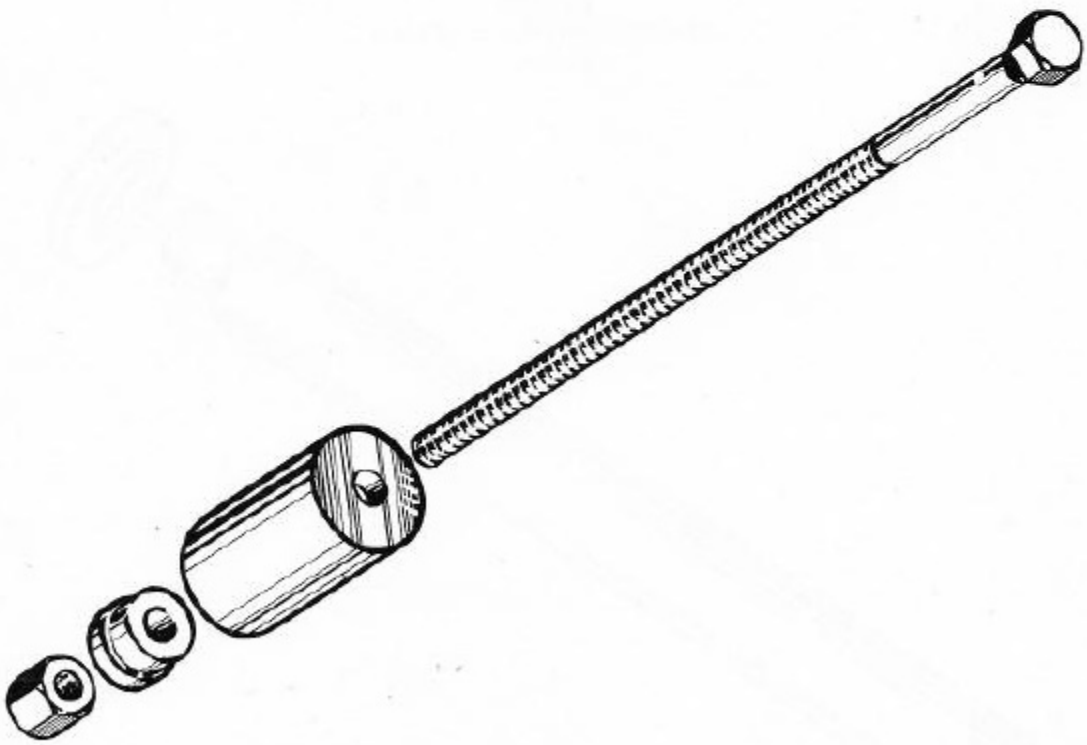


FIG. H17.
61–6107 *Fork bush removal tool.*