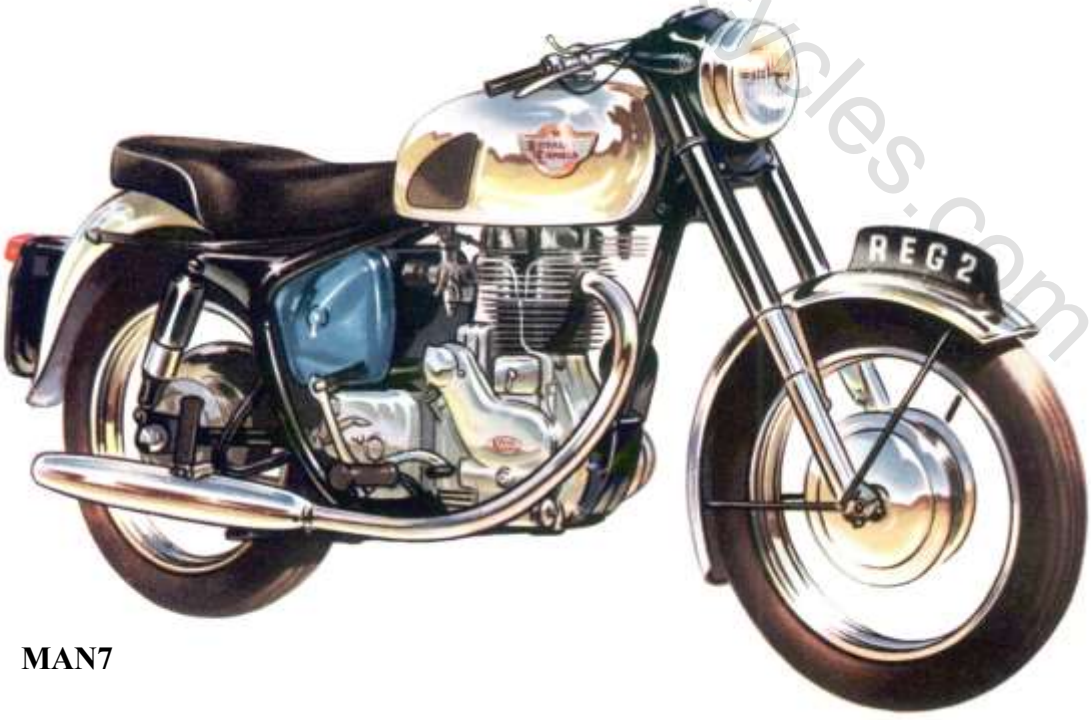
WORKSHOP
MAINTENANCE MANUAL
FOR THE

Royal Enfield

350 BULLET 1956 on
500 BULLET 1956 on
350 CLIPPER 1958 on
Including AIRFLOW models
And TRIALS WORKS REPLICA

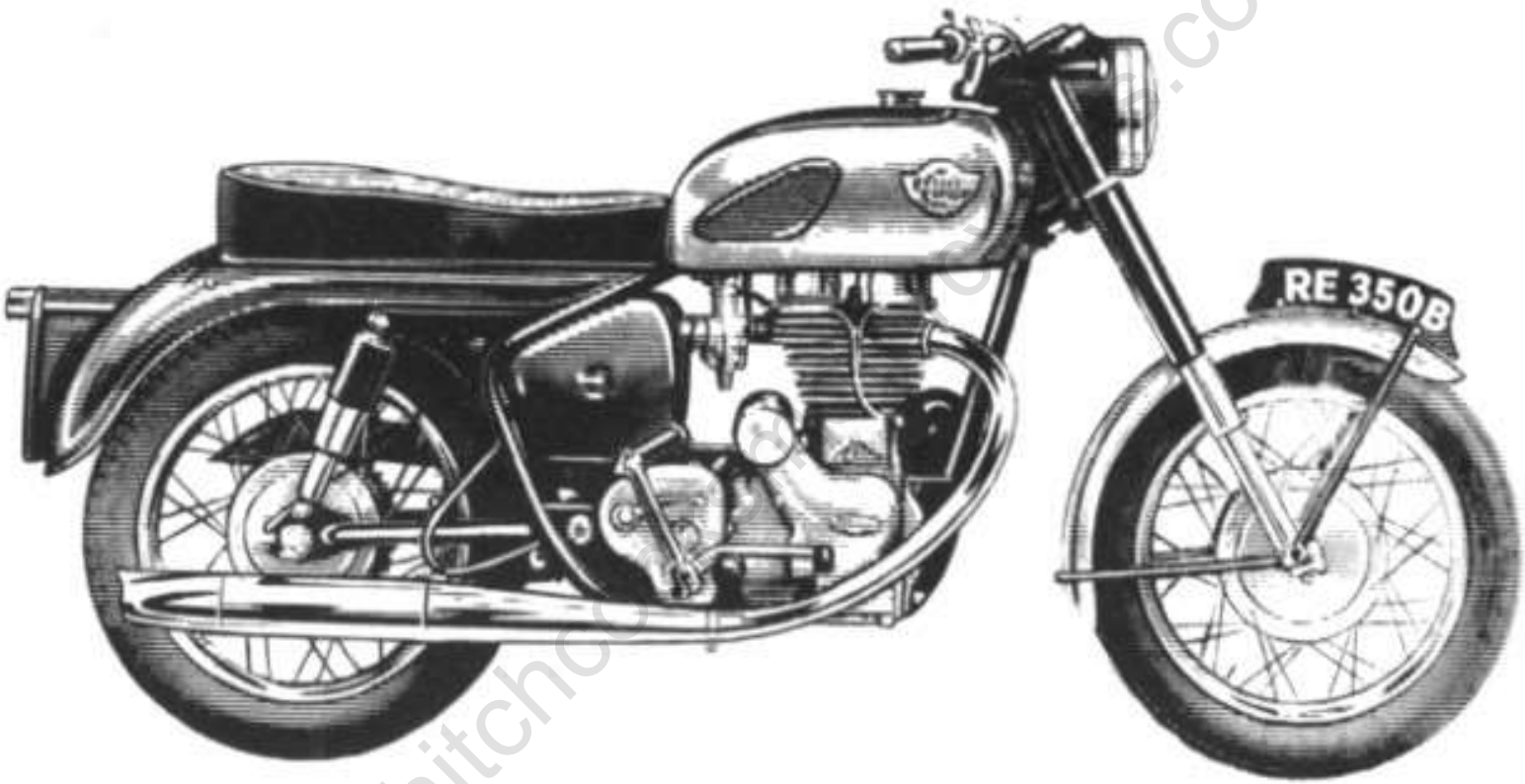


MAN7

ROYAL ENFIELD WORKSHOP MANUAL

Contents

1956-62 "350 Bullet" and "500 Bullet", 1958--61 "350 Clipper" (including "Airflow" models) and Trials "Works Replica" 1958 onwards



350 BULLET 1961

ROYAL ENFIELD WORKSHOP MANUAL

SECTION A14a

Technical Data

350 Bullet 1956-62, 350 Clipper and Trials Works Replica 1958-62

Cubic Capacity ... ... 346 c.c.
Stroke ... ... 90 mm.
Bore ... ... Nominal .. 70 mm.
Actual 69.874 mm./2.751 in.
(Rebore to .020 in. when wear exceeds .0065 in. and again to .040 in. after a further .0065 in. wear.)
Compression Ratios:
350 Bullet to 1958, 350 Clipper to 1959, and all Works Replica models 7.25 to 1
350 Bullet, 1959 onwards, and 350 Clipper, 1960 onwards ..... 7.75 to 1
Piston Diameter-
Bottom of Skirt-Fore and Aft 69.811/69.786 mm.
Top Lands ... 69.32/69.27 mm.
Piston Rings
Width-Plain Rings. (Two) .0635/.0625 in.
Scraper Ring. (One) .156/.155 in.
Radial Thickness ..... .3.085/2.833 mm.
Clearance in Grooves-Plain Rings .003/.001 in.
Scraper Ring .004/.002 in.
(Renew Piston Rings when gap exceeds 1/16 in.)
Oversize Pistons and Rings available up to +0.060 in.
Piston Boss Internal Diameter .7501/.7499 in.
Gudgeon Pin Diameter .... .7501/.7499 in.
Con. Rod Small End Diameter .7507/.7505 in.
Con. Rod Big End Diameter.....1.62625/1.62575 in.
Crank Pin Diameter .....1.24900/1.24875 in.
Con. Rod Floating Bush:
Outside Diameter ..... .1.6235/1.6230 in.
Inside Diameter ..... .1.2502/1.2498 in.
Width .983/.980 in.
Driving Side Main Ball and Roller Bearings
Later type 350 Bullet and Works Replica, and 350 Clipper, 1960 onwards, use SKF.CRL.8 and SKF.RLS.8. Up to 1959 350 Clipper, use two SKF.RLS.8 bearings.
Outside Diameter .... 2.25 in.
Inside Diameter .... 1 in.
Width .625 in.
Timing Side Main Roller Bearing-
Outside Diameter ....1.876/1.875 in.
Inside Diameter ....1.5002/1.4998 in.
Width ..... .750 in.
Size of Rollers:
Diameter .... .2500/.2490 in.
Length ..... .328/.327 in.
Graded rollers are available in steps of .0001 from .2490 to .2500 in.
Rocker Bearing Inside Diameter ... .626/.625 in.
Rocker Spindle Diameter ..... .6240/.6235 in.
Inlet Valve Stem Diameter ..... .3430/.3425 in.
Exhaust Valve Stem Diameter .3410/.3405 in.
Valve Guide Internal Diameter (All Bullets and Trials; Clipper, 1960 onwards only) ..... .3447/.3437 in.
Valve Guide External Diameter (All Bullets and Trials; Clipper, 1960 onwards only) .6275/.6270 in.
Valve Guide Internal Dia. (Clipper, up to 1959) .3452/.3442 in.
Valve Guide External Dia. (Clipper, up to 1959) ..... .625/.623 in.
Guide Hole in Cylinder Head (All Bullets and Trials; Clipper, 1960 onwards only) .622/.623 in.
Guide Hole in Cylinder Head (Clipper up to 1959) .... .622/ .623 in.
Tappet Stem Dia. (all models) .375/.374 in.
Tappet Guide Internal Dia. (all models) .3760/.3752 in.
Tappet Guide External Dia. (all models) .7510/.7505 in.
Guide Hole in Crankcase (all models) .750/.749 in.
Tappet Clearance with cold engine-
Inlet .... Nil
Exhaust .... Nil
Valve Spring Free Length-
Inner .... 2.02 in.
Outer .... 2.095 in.
(Renew when reduced by 3/16 in.)
Valve Timing with .012 in. clearance-
Exhaust Opens ....75° before B.D.C
Exhaust Closes ....35° after T.D.C.
Inlet Opens .... 30° before T.D.C.
Inlet Closes ....60° after B.D.C.
Cam Spindle External Diameter ... .6240/.6235 in.
Cam Bush Internal Diameter .... .6255/.6250 in.
Cam Lift .... .3125 in.
Valve Lift (approximately) .... .3125 in.
Contact Breaker (Coil Ignition)-
Speed .... 1/2 Engine Speed
Points .... .014/.016 in.
Timing .. .. 1/2 - 7/16 in. before T.D.C.
Magneto-
Speed .... 1/2 Engine Speed
Points .... .012/.015 in.
Timing ....1/2 - 7/16 in. before T.D.C.
Engine Sprocket (Bullet and Clipper) 25 teeth
Engine Sprocket (Trials) ....20 Teeth
Clutch Sprocket (all models) ....56 Teeth
Final Drive Sprocket (Bullet) .....20 Teeth
Final Drive Sprocket (Trials) .....17 Teeth
Final Drive Sprocket (Clipper up to 1959) ....15 Teeth
Final Drive Sprocket (Clipper, 1960 onwards) ....20 Teeth
Primary Chain-
Type ....Duplex No. 114038
....Endless
Length ....90 Pitches (Trials 88 Pitches)
Width .... .628 in.
Pitch .... .375 in.
Feed Oil Pump
Speed ....1/12 Engine Speed
Piston Diameter... .... .24975/.24950 in.
Stroke .... .5 in.
Return Oil Pump
Speed ....1/12 Engine Speed
Piston Diameter... .... .37475/.37450 in.
Stroke .... .5 in.
Sparking Plug-
Type ..... Lodge H.14, KLG F.70, Champion L10S, ... (Trials: Lodge HN)
Diameter ....14 mm.

500 BULLET 1956

ROYAL ENFIELD WORKSHOP MANUAL

SECTION A14b

Technical Data

" 500 Bullet Engine " 1956 onwards

Cubic Capacity	499 c.c.
Stroke	90 mm.
Bore ... Nominal	84 mm.
Actual	3.30725/3.30675 in.
(Rebore to .020 in. when wear exceeds .008 in. and again to .040 in. after a further .008 in. wear.)	
Compression Ratio	6.5 to 1
Compression Ratio, 1959 onwards	7.25 to 1
Piston Diameter.	
Bottom of Skirt.Fore and Aft	3.3047/3.3042 in.
Top Lands	3.284/3.281 in.
Piston Rings	
Width.Plain Rings (Two)	.063/ .062in.
Scraper Ring (One)	.156/.155 in.
Radial Thickness	.115/.108 in.
Clearance in Grooves.Plain Rings	.0035/.0015 in.
Scraper Ring	.0035/.0015 in.
(Renew Piston Rings when gap exceeds 1/16 in.)	
Oversize Pistons and Rings available	.020 in. and .040 in.
Piston Boss Internal Diameter	.7500/.7497 in.
Gudgeon Pin Diarreter	.7500/.7497 in.
Con. Rod Small End Diameter	.7507/.7505 in.
Con. Rod Big End Diameter	1.62625/ 1.62575 in.
Crank Pin Diameter	1.24900/1.24875 in.
Con. Rod Floating Bush.	
Outside Diameter	1.6235/1.6230 in.
Inside Diameter	1.2502/12498 in.
Width	.983/.980 in.

Driving Side Main Ball and Roller Bearings	
SKF.CRL.8 and SKF.RLS.8.	
Outside Diameter	2.25 in.
Inside Diameter	1 in.
Width	.625 in.

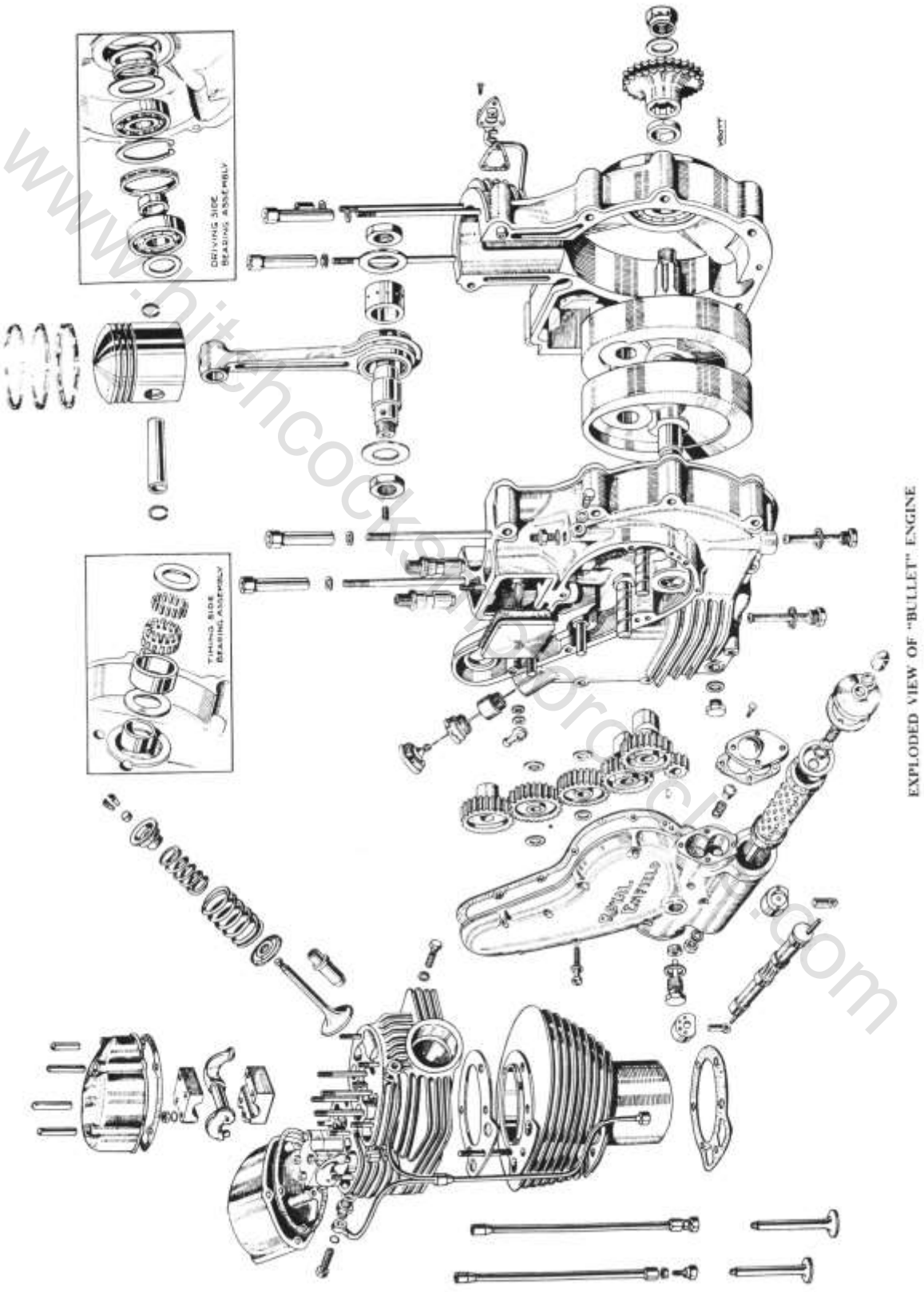
Timing Side Main Roller Bearing..	
Outside Diameter	1 .876/ 1 .875 in.
Inside Diameter	1.5002/1 4998 in.
Width	.750 in.

Size of Rollers.	
Nominal Size	1/4 in. dia. x 21/64 in. long
Diameter	.2500/.2490 in.
Length	.328/.327 in.

Rocker Bearing Inside Diameter	.626/.625 in.
Rocker Spindle Diameter	.6240/.6235 in.
Rocker Spindle Dia., 1959 onwards	.5617 .5615 in.
Rocker Bush Diameter, 1959 onward	.5627/.5622 in.
Inlet Valve Stem Diameter	.3430/.3425 in.
Exhaust Valve Stem Diameter	.3410/.3405 in.
Valve Guide Internal Diameter	.3447/.3437 in.
Valve Guide External Diameter	.6275/.6270 in.
Guide Hole in Cylinder Head	.626/.625 in.
Tappet Stem Diameter	.375/.374 in.
Tappet Guide Internal Diameter	.3760/.3752 in.
Tappet Guide External Diameter	.7510/.7505 in.
Guide Hole in Crankcase	.750/.749 in.
Tappet Clearance with cold engine	
Inlet	Nil
Exhaust	Nil
Valve Spring Free Length	
Inner (Earlier Type)	2 .032 in.
Outer (Earlier Type)	2.095 in.
Inner (1959 onwards)	1.5 in.
Outer (1959 onwards)	1.11/16 in.
(Renew when reduced by 3/16 in.)	
Valve Timing with 012 in. clearance.	
Exhaust Opens	.75° before B.D.C.
Exhaust Closes	35° after T.D.C.
Inlet Opens	40° before T.D.C
Inlet Closes	70° after B.D.C.

Cam Spindle External Diameter	.6240/.6230 in.
Cam Bush Internal Diameter	.6255/.6250 in.
Cam Lift	.3125 in.
Valve Lift (approximately)	.3125 in.
Contact Breaker (Coil Ignition)-	
Speed	1/2 Engine Speed
Points	.014/.016 in.
Timing	5/16 in. before T.D.C.
Magneto	
Speed	1/2 Engine Speed
Points	.012/.015 in.
Timing	5/16 in. before T.D.C.
Engine Sprocket	25 Teeth
Clutch Sprocket	56 Teeth
Final Drive Sprocket.	
Solo	21 Teeth
Sidecar	18 Teeth
Primary Chain..	
Type	Duplex No. 114038
	Endless
Length	90 Pitches
Width	.628 in.
Pitch	.375 in.
Feed Oil Pump	
Speed	1 /12 Engine Speed
Piston Diameter	.24975/.24950 in.
Stroke	.5 in.
Return Oil Pump	
Speed	1/12 Engine Speed
Piston Diameter	.37475/.37450 in.
Stroke	.5 in.
Sparking Plug	
Type	Lodge HLN, KLG FE80
	Champion NA8 (not 1959) Long Reach
Diameter	14 mm.

ROYAL ENFIELD WORKSHOP MANUAL



EXPLODED VIEW OF "BULLET" ENGINE
Fig. 1

ROYAL ENFIELD WORKSHOP MANUAL

SECTION C 14

Service Operations with Engine in Frame

" 350 and 500 Bullet," 1956 -62, " 350 Clipper " and Trials "Works Replica" 1958 -62

1. Removal of the Timing Cover

First place a tray under the engine to catch the oil which will escape when the cover is removed.

Remove the exhaust pipe and silencer.

Remove ten screws from the cover, taking care not to lose the sealing washers, one for each screw.

Draw off the timing cover, tapping it lightly if necessary.

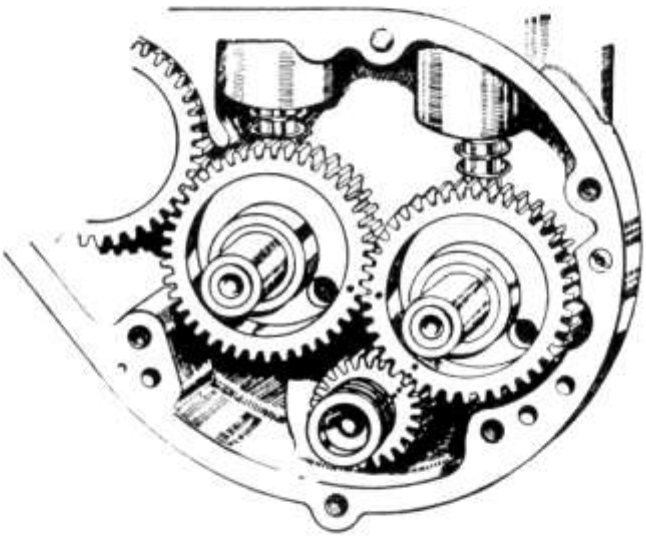
In refitting the timing cover see that the joint washer is correctly located over the oil holes, using a little grease (not compound) to hold it in position.

See that the cork plug is in position in the hole in the pump worm. If the plug is damaged it should be renewed to ensure oil pressure to the big end bearing.

When refitting the timing cover it is important that the engine is turned gently forwards while the cover is being put in place. This will help the engagement of the pump worm with the pump spindle and prevent damage to the gears.

The filter chamber should be filled with clean oil before the timing cover is refitted.

To verify that the oil pumps are working after replacing the timing cover, start the engine up and remove the oil filler cap so that the oil return through the relief valve can be seen. It may take several minutes before there is sufficient oil in the engine for the return flow through the relief valve to commence.



VALVE TIMING MARKS
Fig. 1

2. Valve Timing

The cams are integral with the cam pinions and the position for correct timing is marked on the pinions by small dots.

Rotate the engine to top dead centre and put the exhaust (or right-hand) cam pinion in position so that the pair of dots on it are opposite the pair of dots on the timing pinion on the crankshaft.

Put the inlet (or left-hand) cam pinion in position so that the single dot on it is opposite the single dot on the exhaust cam pinion.

The correct timing at .012 in. tappet clearance is as follows

"350 Bullet"

Exhaust opens 75° before bottom dead centre.
Exhaust closes 35° after top dead centre.
Inlet opens 30° before top dead centre.
Inlet closes 60° after bottom dead centre.

"500 Bullet"

Exhaust opens 75° before bottom dead centre.
Exhaust closes 35° after top dead centre.
Inlet opens 40° before top dead centre.
Inlet closes 70° after bottom dead centre.

3. Tappet Adjustment

The tappets are adjusted by the ball and socket joints which are located in a compartment at the side of the cylinder and access to which is obtained by removing the inspection cover.

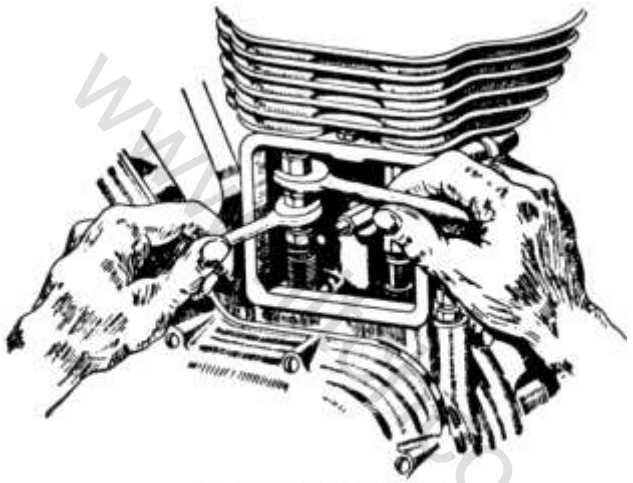
Before checking the clearance or making any adjustment, rotate the engine until the piston is at the top of the firing stroke. This will ensure that both valves are closed and that the tappets are well clear of the silencing ramps on the cams. If the cylinder head has been dismantled, make sure that the end caps have been put back on the valve stems.

Later type "350 and 500 Bullet" valves have hardened ends and are not fitted with detachable end caps.

Because of the ball and socket joints at the bottom of the push rods, the tappet clearance cannot be measured there, but between the valve

stems and rockers, with the rocker box covers removed. To remove the rocker box covers the petrol tank must be taken off. (See Subsection 5.)

The correct clearance is nil or as little as possible with the engine COLD.



ADJUSTING TAPPETS
Fig. 2

To make the adjustment hold the push rod bottom end (top hexagon) and turn the locknut (middle hexagon) to the left. Screw the push rod cup (bottom hexagon) to the left to take up clearance or to the right to increase the clearance, at the same time holding the push rod bottom end (top hexagon). Lock the adjustment by tightening the locknut against the push rod end and then recheck the clearance.

Owing to the initial bedding down of the wearing surfaces, the tappets on new engines may require adjustment after the first few hundred miles.

4. Ignition Timing

The setting of the ignition depends upon the position of the magneto or contact breaker drive pinion relative to the shaft.

To obtain access to the pinion it is necessary to remove the timing cover (see Subsection 1).

On engines fitted with magneto and autoadvance mechanism, the latter is in unit with the driving pinion, and is held to the shaft on a smooth taper and secured by a nut having a right-hand thread.

There is some difference in all "350 Clipper" (see subsection 18) and all "Trials" models, and in "350 and 500 Bullets" from 1960 onwards.

To remove the pinion and the auto-advance device, unscrew the nut and this will draw the pinion off.

Before setting the timing remove the magneto cover and adjust the contact breaker points to a clearance of .015 in. when fully opened.

Because of the auto-advance mechanism, the timing is normally in the "retard" position when the engine is stationary. Rotate the two halves of the coupling relatively to each other against the springs, i.e. into the "advance" position, and hold it in this position by a piece of wire.

To set the timing, turn the engine until the piston is 1/2-7/16 in. for the 350 c.c. Engine, or 3/8-5/16 in. for the 500 c.c. Engine, before top dead centre on the compression stroke, i.e. with both valves closed.

Insert a thin piece of paper between the point of the contact breaker and turn the magneto forwards (or clockwise looking on the contact breaker) until the paper can just be pulled out.

Tighten the pinion and auto-advance device on to the shaft, taking care that it does not slip. Remove the piece of wire holding the auto-advance mechanism.

The timing can be checked by removing the cap from the magneto and holding the rotor in the advanced position by means of a screwdriver, without the necessity of taking off the timing cover.

On no account must the cam be altered from its original position on the rotor shaft or the efficiency of the magneto will be affected.

For all "350 Clippers," the auto-advance mechanism used is of a different type from that on the "350 Bullet" up to 1959, and the engine must be checked and set in the fully retarded position. This and the following remarks apply to "350 and 500 Bullets," 1960 onwards.

Gap setting should be .015 in. to .018 in. and the engine should be timed so that the contact are on the point of opening when the piston is 1/16 in. before top dead centre.

The best way to check the opening point is to switch on the ignition and rotate the engine slowly until the ammeter needle returns to its central position.

To adjust the timing, slacken the clamping bolt on the contact breaker housing and rotate the housing. If the timing cover has been dismantled, start with the contact breaker housing so that the name on the cover is roughly horizontal.

"Works Replica." The contact breaker should be set so that the points are just breaking when the piston is 7/16 in. before top dead centre on the compression stroke, ignition fully advanced.

5. Removal of the Petrol Tank

Turn off the petrol tap.

Disconnect the petrol pipe.

Remove the bolt which holds the front of the tank to the frame, pull upward, to release the spring clip holding the tank at the rear.

6. Removal of the Cylinder Head

"350 Bullet," "350 Clipper," "Works Replica" and early "500 Bullet"

Remove the petrol tank (see Subsection 5).

Disconnect the engine steady.

Disconnect the plug lead and oil pipe.

Remove the exhaust pipe.

Push the carburettor back clear of the studs after removing the fixing nuts.

Remove the rocker box covers.

Remove the decompressor cable from the lever on the handlebar.

Turn the engine until both valves are closed.

Remove the rockers and bearings complete by undoing four 1/4 in. nuts on each.

Lift out the push rods.

Remove six nuts, taking care not to lose the washers.

Remove the 1/4 in. nut above the tappet chest to avoid possible damage to the crankcase.

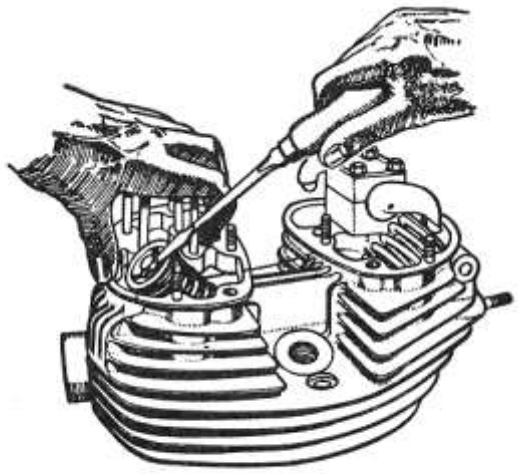
Lift the cylinder head off the barrel, tapping it gently beneath the exhaust and inlet ports with a hide hammer to break the carbon seal. Do not tap the fins.

When fitting the head again, apply jointing compound to both sides of the gasket, replace the six nuts and tighten them progressively and diagonally from one side to the other to prevent distortion.

Replace the 1/4 in. nut above the timing chest.

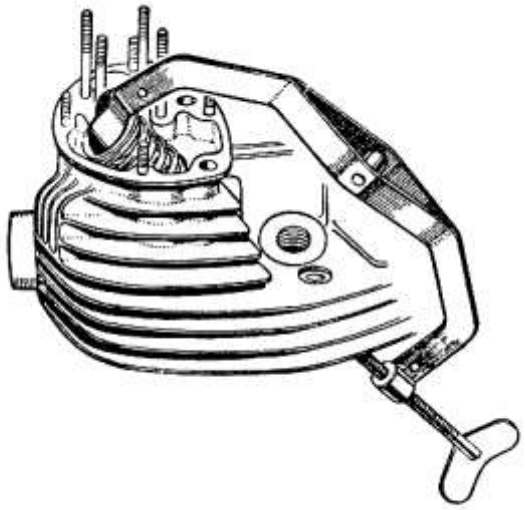
Replace the push rods with the adjustable parts downwards, remembering that the shorter rod is the inlet.

Replace the rockers and bearings, making sure that the oil feed holes are at the bottom and that the caps and bases are in line when tightened down. A sharp tap with a hammer on the end of



VALVE CAP REMOVAL

Fig. 3



VALVE SPRING COMPRESSOR

Fig. 4

the rocker will help to ensure this. See that the valve stem caps are in place.

After the engine has been run long enough to get thoroughly hot, the tightness of the nuts should be rechecked.

It will be found convenient for this purpose to use a small auxiliary petrol tank while the engine is being warmed up on the stand, because all the cylinder head nuts are not accessible with the proper tank in position.

See that the rocker box gaskets are intact and replace the rocker box covers.

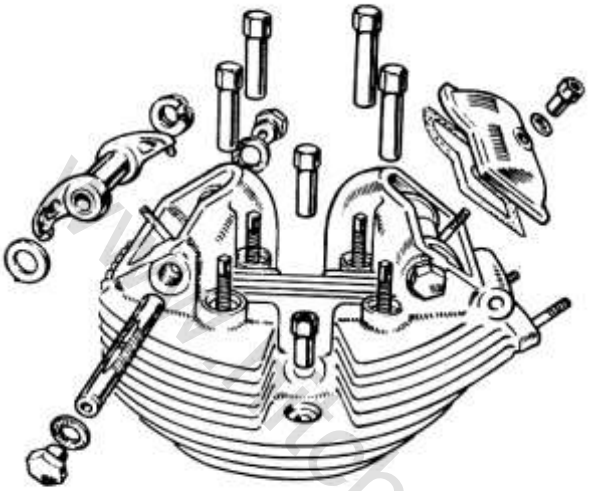
After tightening the cylinder head nuts with the engine hot, recheck the tappet clearance at some convenient time when the engine is cold.

"500 Bullet," 1959 onwards

Remove the cylinder head steady bar, exhaust pipe, carburettor, plug lead and the decompressor cable at the handlebar end. Disconnect the rocker oil feed pipes. Unscrew the five long nuts on the top of the head, the nut adjacent to the sparking plug and the sleeve nut by the decompressor. Withdraw the five studs from the crankcase the have squared ends to take a spanner.

Remove the rocker covers, rockers and push rods. The rockers are removed by undoing the nuts at either end; one of these nuts is bored and tapped to take the oil union. Slide out the spindle, taking care that the spring washer at the push rod end and the plain washer at the other end do not fall down the push rod tunnel. Withdraw the push rods and lift the head.

For replacement reverse the order of the above instructions. Make the joint between cylinder head and barrel carefully as described in



REMOVAL OF ROCKERS AND HEAD, "500 BULLET," 1959 ONWARDS
Fig. 5

the foregoing paragraph. Replace the push rods and the five long studs in the crankcase, tightening these very carefully. Replace all the securing nuts, tightening them progressively to avoid distortion.

Replace the rocker spindles, inserting them through the box, through the spring washer held at the push rod end, through the rocker and the plain washer at the valve end and through the other side of the rocker box. Put on the nuts, test the rockers for freedom, replace the oil unions and the rocker box covers. Deal with the sparking plug, carburettor, exhaust pipe, decompressor cable and head steady and so complete the assembly.

7. Removal of the Valves

Remove the cylinder head and rockers (see Subsection 6).

Prise away the hardened steel thimble or end cap where fitted. If this has stuck it can be removed by means of a screwdriver.

Using a suitable compressing tool, compress the valve springs and remove the split conical collets from the end of the valve stem.

Slacken back the compressing tool and release the springs.

Withdraw the valve and place its springs, top spring collar (and bottom collar if it is loose), the end cap and split conical collets together in order that they may be reassembled with the valve from which they were removed.

Deal similarly with the other valve in the head. If the valve will not slide easily through the valve guide, remove any slight burrs on the end of the valve stem with a carborundum stone. If the burrs are not removed and the valve is forced out, the guide may be damaged.

8. Removal of the Rockers

See Subsection 6.

9. Removal of the Valve Guides

To remove the valve guides from the head two special tools are required which can easily be made.

The first is a piece of tube with an internal bore of not less than 7/8 in.

The second is a mandrel about 4 in. long, made from 9/16 in. diameter bar with the end turned down to 11/32 in. diameter for 1/2 in.

Support the cylinder head on the tube which fits over the collar of the valve guide. Using the mandrel, force the guide out of the head with a hand press or by using a hammer.

To fit a new guide, support the head at the correct angle and use a hand press and the same mandrel. If a hand press is not available and the guide is replaced by a hammer, use the mandrel to prevent damage to the guide.

It is necessary to recut the valve seat to the correct profile and grind in the valve after a guide has been replaced.

10. Removal of the Cylinder Barrel

Remove the Cylinder Head (see Subsection 6).

Put the piston at bottom dead centre.

Remove the 1/4 in. nut above the tappet chest and lift the barrel off.

When replacing the cylinder barrel, clean off the joint faces and fit a new paper washer.

11. Removal of the Piston

Remove the cylinder head and cylinder barrel (see Subsections 6 and 10).

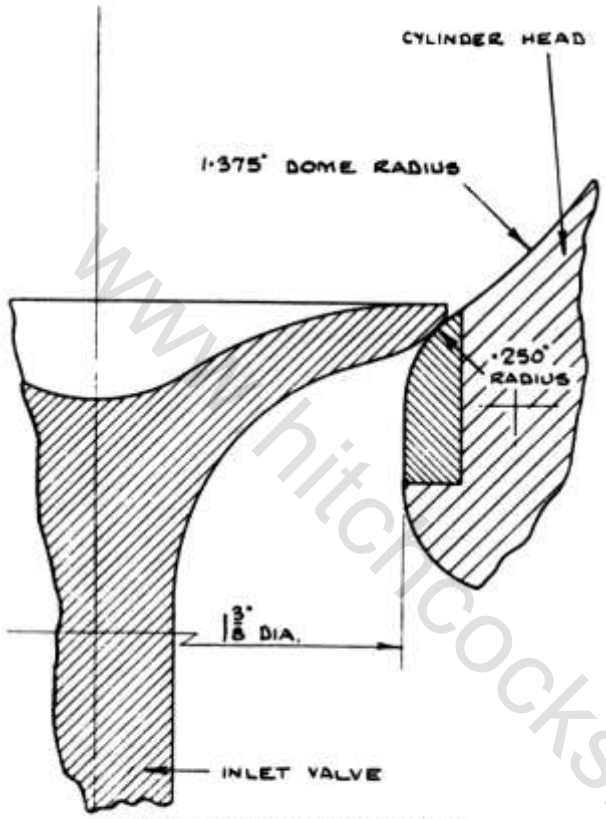
With the tang of a file remove the wire circlip retaining the gudgeon pin on the timing side.

Extract the gudgeon pin using Special Tool No. E.5477 (with adaptor if necessary), having first marked the pin so that it, and the piston, may be replaced the same way round, i.e. split skirt to the front.

During this operation put a piece of clean rag in the top of the crankcase to prevent foreign matter getting in. In particular, take care not to drop the circlip in the crankcase.

12. Decarbonising

Having removed the cylinder head as described in Subsection 6, scrape away all carbon, with a suitable tool, bearing in mind that you are dealing with aluminium which is easily damaged. Scrape gently to avoid scoring the combustion chamber or the valve



INLET VALVE SEAT PROFILE
Fig. 6

seats, which are of austenitic iron shrunk into the head. Be careful not to injure the joint face which beds down on to the head gasket.

Do not, in any circumstances, use caustic soda or potash for the removal of carbon from aluminium alloy.

Scrape away all carbon from the valve heads and beneath the heads, being careful not to cause any damage to the valve faces.

If the piston rings are removed, the grooves can be cleaned out and new ones fitted. For cleaning the grooves a suitable tool is a piece of broken ring thrust into a wooden handle and filed to a chisel point.

While the cylinder and piston are not in position, cover the crankcase with a clean cloth to prevent the ingress of dust and dirt of all kinds. Do not, of course, attempt to scrape the carbon from the piston when the mouth of the crankcase is open.

13. Grinding in the Valves

To grind a valve, smear the seating with a little grinding-in compound, place a light, short coil spring over the valve stem and beneath the head, insert the valve into its appropriate guide, press it on to the seat using a tool with a suction cup and with a backwards and forwards rotary motion, grind it on to its seat. Alternatively, a tool which pulls on the valve stem can be used. Frequently lift the valve and move it round so that an even and true seating is obtained. If no light spring is available, the lifting will have to be done by hand. Continue grinding until a bright ring is visible on both valve and seating.

The face and seat of the exhaust valve is cut at 45 degrees but the profile of the inlet valve is of a special streamlined design which eliminates pockets and sharp edges and allows a smooth flow of gas without eddies.

If the inlet valve or its seat is pitted and requires recutting, care must be taken to reproduce the correct profile as shown in Fig. 6.

The cylinder head should preferably be returned to the Works for the inlet valve seat to be recut, but if this is not possible a special tool consisting of an arbor and cutter is available. For the "350 Bullet" the arbor and cutter are No. T.2053 and T.1891; for the "500 Bullet," T.2053 and T.1892. Great care must be exercised in using, this tool, as it is located off the valve guide and this may be damaged if suitable apparatus is not employed.

The inlet valve face and seat can be cut at 45 degrees in case of expediency but this may have a deleterious effect on the performance of the engine.

14. Reassembly after Decarbonising

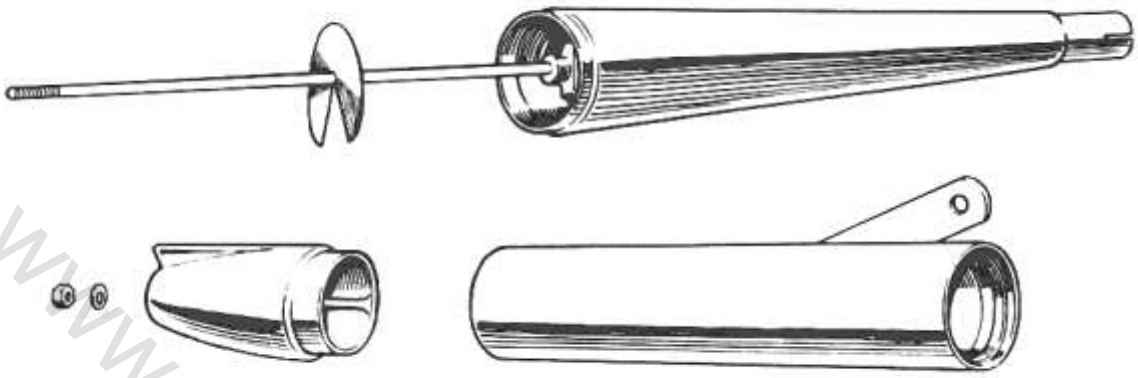
Before building up the engine, see that all parts are scrupulously clean and place them conveniently to hand on a clean sheet of brown paper.

When reassembling the engine, it is advisable to fit a new paper washer between the cylinder barrel and the crankcase.

Smear clean oil over the piston and space the ring gaps, having replaced the rings if these have been removed. The taper ring is marked "TOP" on the upper face. Lower the piston over the connecting rod and insert the gudgeon pin. Fit the circlip securing the gudgeon pin.

If the piston ring gaps exceed 1/16 in. when the rings are in position in the barrel, new rings should be fitted. The correct gap for new rings is .011 in. - 015 in. The gap should be measured in the least worn part of the cylinder, which will be found to be the extreme top or bottom of the bore.

Oil the cylinder bore and lower the barrel over the piston and seat it gently on the paper washer. Tighten down the nut above the tappet chest and replace the cylinder head and rockers as described in Subsection 4.



LATER TYPE SILENCER, DISMANTLED
Fig. 7

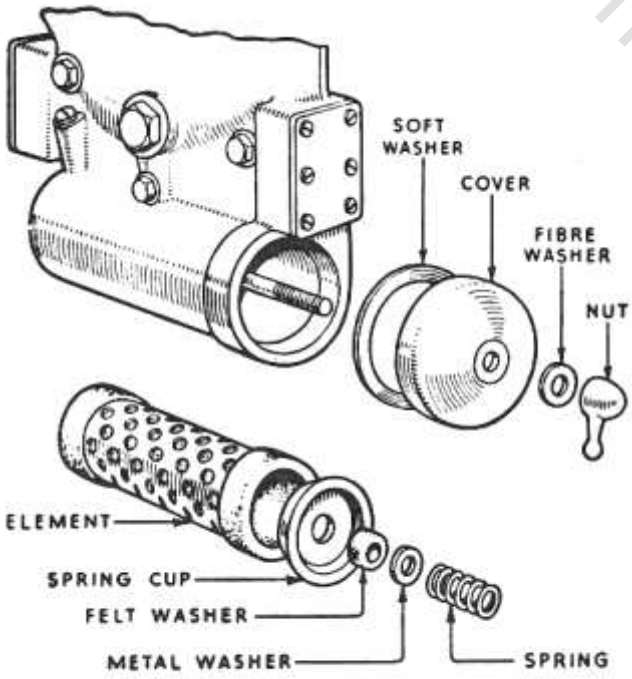
The silencer of the "350 and 500 Bullet" from 1961 onwards, may be dismantled for cleaning before refitting to the machine.

After removing the 5/16 in. nut and tab washer in the tail, the tail piece and central body may be drawn off the long central stud located in the front portion of the silencer.

15. Cleaning the Oil Filter

The oil filter is located in the timing cover immediately below the return oil pump. The felt element should be taken out and washed in petrol after the first 500 miles and every subsequent 2,000 miles. Fit a new element every 5,000 mile.

The filter element is removed by unscrewing the nut holding the end cap in position. When reassembling the filter after cleaning, take care that no grit or other foreign matter is sticking to it. After emptying the filter chamber it is essential to run the engine slowly for about five minutes to ensure that oil is reaching the big ends. If the timing cover has been removed, fill the filter chamber with clean oil before replacing the cover.



DETAIL OF FELT OIL CLEANER
Fig. 8

16. Overhaul of Oil Pumps

Remove the timing cover, as described in subsection 1.

Remove the end plates from both pumps,

Remove the pump discs and plungers.

Remove the pump spindle which can be pulled out from the front or return pump end.

Check the fit of the plungers in the pump disc, which should have a minimum of clearance but should be able to be moved in and out by hand.

If, when fitting a new disc or plunger, the plunger is found to be too tight a fit, carefully lap with metal polish until it is just free. If the pump disc is not seating properly or if a new pump disc is being fitted, it should be lapped to the seating with Special Tool No. E.5425, using carborundum 360 fine paste or liquid metal polish until an even grey surface is obtained.

Replacement pump discs have a lip left on the flat, at the opposite side to the lapped face. The purpose of this is to hold the disc central in the housing during lapping-in. It should be filed off before the pump is finally assembled, care being taken not to damage the lapped face.

Wash all passages, etc., thoroughly with petrol after lapping, to remove all trace, of grinding paste.

Check the pump disc springs for fatigue by assembling in the timing cover and placing the pump covers in position. The latter should be held 1/8 in. off the timing cover if the springs are correct.

In the case of the 500 c.c. engine see that the steel end pads are in position on the outer ends of the springs.

The pump spindle should be renewed if excessive wear has taken place on the teeth.

Reassemble the oil pumps, replacing the paper cover gaskets if necessary. Before fitting each cover fill the pump chamber with clean oil.

Having assembled the pumps, lay the timing cover flat and fill the oil ports by means of an oil can. Turn the pump spindle with a screwdriver in a clockwise direction looking on the front and it can then be seen whether the pumps are operating correctly.

Before replacing the timing cover on the engine, fill the filter chamber with clean oil.

The oil feed to the big end can be checked by partially unscrewing the feed plug in the timing cover between the oil pumps while the engine is running and the oil return to the tank can be checked by removing the oil filler cap.

17. Removal of Pump Worm and Timing Pinion

Remove the timing cover as described in Subsection 1.

Unscrew the worm shaft by a hexagon head behind the worm, using Special Tool No. E.5451. This is a left-hand thread.

Withdraw the timing pinion by means of a flat chisel placed behind the pinion and tapped gently.

When refitting the timing cover see that the cork or rubber plug is in position in the hole in the pump worm and is undamaged.

18. Removal of the Magneto or Contact Breaker Pinion Unit

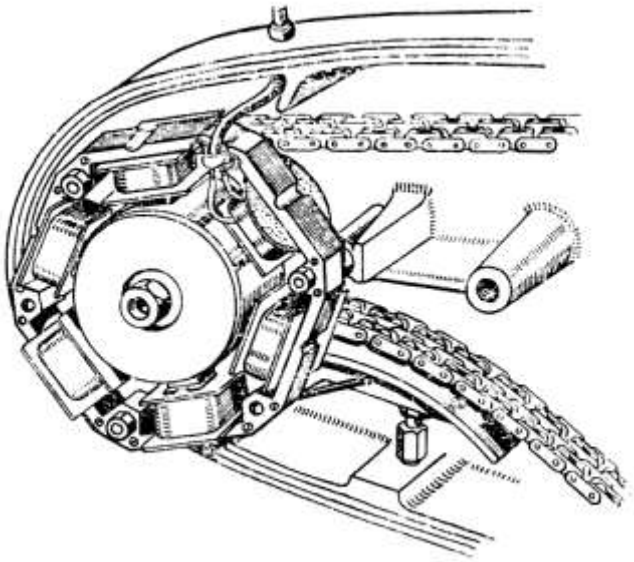
After first removing the timing cover of an engine having magneto ignition, the pinion of the type which incorporates an auto-advance unit is removed by unscrewing the centre nut. This will draw the pinion and auto-advance unit of the shaft.

Coil ignition models: The auto-advance mechanism in this case is in the contact breaker unit, and the pinion is drawn off by removing the securing nut and operating the extractor tool.

The "Works Replica," which employs magneto ignition, but no auto-advance mechanism, also follows this procedure.

19. Primary Chain Adjustment

Access to the primary chain adjuster is gained by removing the primary chain cover, which is held in position by a single nut. Before removing the nut, place a tray under the engine to catch the oil from the chaincase.



PRIMARY CHAIN ADJUSTMENT
Fig. 9

To take up slack in the primary chain, unscrew the locknut and turn the adjuster beneath the curved slipper until correct chain tension is obtained; retighten the locknut.

Beneath the bottom run of the chain is a curved slipper on which the chain rests and which may be raised or lowered by turning the adjusting screw after having first slackened the locknut.

The chain should be adjusted so that there: is ¼ in. up and down movement at the centre of the top run of the chain.

After replacing the chain cover remember to replenish the chaincase with oil.

20. Removal of the Engine and Clutch Sprockets

The primary chain is endless so that it is necessary to remove both the engine and clutch sprockets simultaneously.

Remove the alternator stator by undoing three fixing screws.

Remove the central hexagon nut securing the alternator rotor, which can then be drawn off, taking care not to lose the key.

Unscrew the engine sprocket nut using Special fool No. E.4877. The engine sprocket is mounted on splines and can then be removed with the clutch sprocket.

To remove the clutch sprocket unscrew tile clutch spring pins then lift away the spring cap, springs and distance pieces, clutch front plate, centre

retaining ring and the assembly of driving and driven clutch plates. The clutch sprocket can then be withdrawn from the centre after removal of the large circlip which secures it.

21. Removal of the Tappets and Guides

It is only necessary to remove the tappets and guides if they have become worn.

To remove the guides use Special Tool No. E.5410.

The guide should have an interference fit of .0015 in. to .0025 in. in the crankcase and can be driven in with a bronze drift, care being taken when the guide is nearly home to avoid damaging the collar. Excessive hammering may close up the bore of the guide which would necessitate removing the tappet and reaming again. In no circumstances should the guide be reamed in position on the 350 c.c. engine as swarf might get into the recess in the guide.

22. Dismantling the Breather

If the breather is not operating efficiently, it may cause pressure in the crankcase, instead of a partial vacuum, giving rise to smoking or overoiling. If the breather is of the disc type, see that the discs and backplate are clean and undamaged and that the discs are seating properly.

When reassembling the breather, apply jointing compound very sparingly to the back of the steel plate taking great care to keep it away from the discs or their seatings.

If the breather is of rubber tube type, there are no moving parts and it is only necessary to see that the tube is not damaged or distorted.

If the breather body is detached from the driving side crankcase by removing the three screws, see that the faces are clean when refitting and apply jointing compound to ensure that the seal is airtight.

23. Removal of the Clutch

Remove the engine sprocket and clutch sprocket together as described in Subsection 20.

To remove the clutch centre, hold the clutch with Special Tool No. E.4871, and remove the centre retaining nut and washer with a box spanner.

The clutch centre can then be withdrawn from the shaft with Special Tool No. E.5414.

If the circlip is not removed the sprocket and clutch centre can be removed together.

24. Removal of the Final Drive sprocket

Remove the clutch as described in Subsection 23.

Remove the primary chain tensioner

Remove the rear half of the primary chaincase by taking out three socket screws.

Remove the grub screw locking the final drive sprocket nut.

Hold the sprocket and remove the nut (right hand thread) The sprocket can then be withdrawn.

25 Pressure Relief Valve

There are two pressure feeds to the big end and to the rocker gear respectively. Their function is to prevent excessive pressure and their setting is not critical. The feed to the rocker gear comes from the return oil from the crankcase to the tank.

The pressure relief valves are set before leaving the Works and should not normally require to disturbed. If, however, it is found necessary to dismantle either of them, they can be reset as follows.

Rocker Feed Relief Valve. This is located on the outside of the crankcase immediately below the lower end of the external oil pipe. It has a hexagon head and can be removed complete by unscrewing it out of the case.

The valve itself cannot be dismantled and if found to be faulty, should be replaced by a new one.

Big End Relief Valve. This is located in the timingside crankshaft and can only be adjusted when the crankshaft has been dismantled. It consists of a 5/16 in. diameter steel ball and spring held in position by a screwed plug.

The valve is set to open when the oil pressure exceeds about 35 lb. per square inch and when set correctly there is a movement of about 3/32 in. of the ball off the seat. This can be measured without dismantling the crankshaft by pushing a thin rod through the hole in the pump worm with the oil feed plug in the timing cover removed.

If the crankshaft is dismantled for any reason, it is always advisable to fit a new spring to the relief valve in case the original one has become weak.

If the valve is set to give too high a pressure, the pump disc will be forced off its seating.

26. Removal of the Magneto or Contact Breaker Unit

The magneto of all but "Works Replica models" also the contact breaker unit fitted to the "350 Clipper" and later "Bullets," is removed taking off the timing cover (Subsection 1) and the driving pinion (Sub-section 18), behind which are located three screws which secure the spigotted magneto or contact breaker unit

The magneto on the "Works Replica" is held by a strap and when the nut securing this has been released, the magneto may be lifted from its locating dowels.

27. Fitting the Alternator

The alternator consists of two parts, the stator and the rotor. The stator of later models is mounted on to the three studs of the adaptor ring, which in turn is secured to the back half of the primary chaincase by three screws.

On earlier models the stator is of greater diameter and mounted on to the primary chaincase with three studs and distance pieces.

The rotor, which contains the permanent magnet, is mounted on the end of the crankshaft and is located by a key and secured by a nut and spring washer on 1960/62 models, and by a nut and tab washer on earlier models.

The radial air gap between the rotor and the poles of the stator should be .020 in. in all positions and care must be taken when refitting to see that it is not less than .010 in. at any point.

Fit the rotor first, making sure that it is located concentrically on the end of the crankshaft. Attention must be given to the seating of the key because a badly fitting key may cause the rotor to run unevenly. Finally secure the rotor with the appropriate bolt or nut and washer.

Having fitted the rotor, secure the adaptor ring on later models with the three cheese-headed screws, and shake-proof washers, or, in the case of earlier models, place the three distance pieces over the three chaincase studs. The stator may then be fitted with the coil connections facing outward, the leads on the inside at 12 o'clock.

Replace the nuts and shake-proof washers only fingertight, and insert six strips (preferably of non-magnetic material) .015 in. thick and about 1/8 in. wide between the rotor and each pole piece.

Tighten the stator nuts and withdraw the strip.

Check the air gap with narrow feelers and less than .010 in. at any point, remove the stator and file or grind the pole piece carefully until the correct gap is obtained.

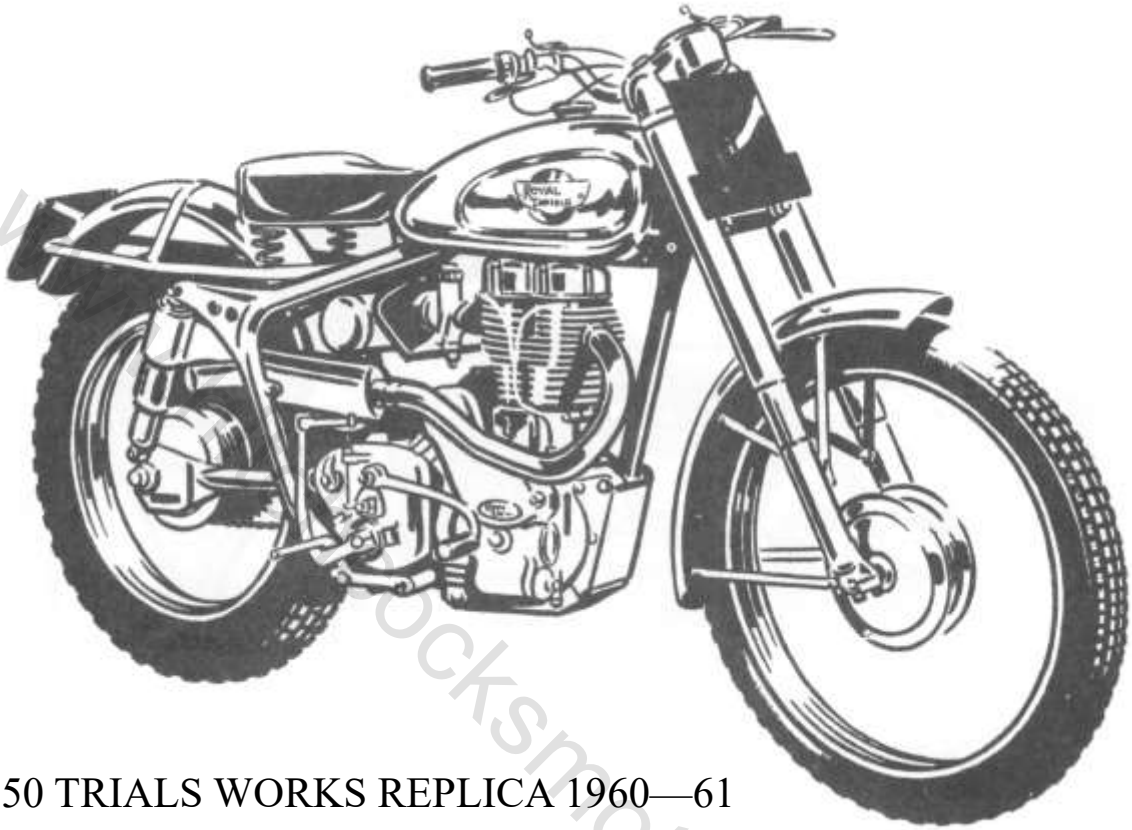
An alternative, and more satisfactory method of assembling the alternator requires the use of Special Tool No. T2055. This is a gauge .015 in. greater in radius than the rotor and fits over the adaptor on the end of the crankshaft in the rotor's place.

The stator is then put in position on the studs in the chaincase and the nuts tightened up.

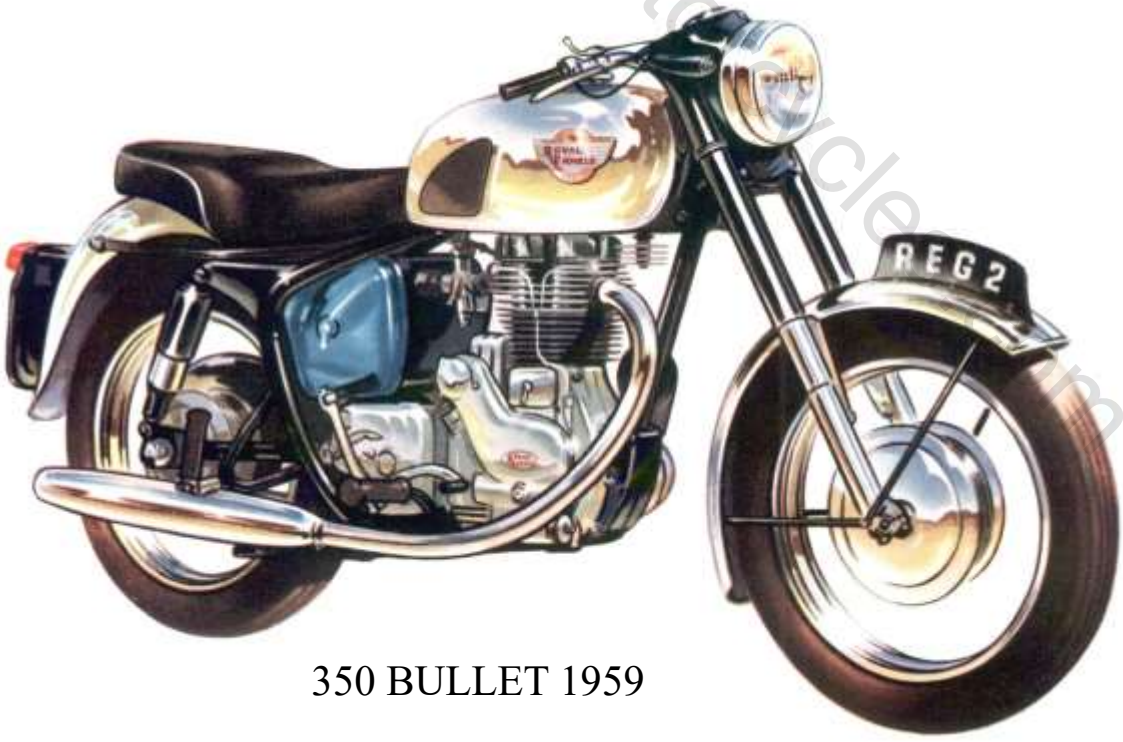
Remove the gauge and fit the rotor, then check the air gap.

When refitting, note that the shaft may have a large or a small keyway. The small keyway is the latest type of fitting and the large one for the old type. Do not fit a small key into the large keyway.

ROYAL ENFIELD WORKSHOP MANUAL



350 TRIALS WORKS REPLICA 1960—61



350 BULLET 1959

ROYAL ENFIELD WORKSHOP MANUAL

SECTION D2

Service Operations with Engine Removed

"350 and 500 Bullet" Engines

1. Removal of the Engine from the Frame

Disconnect the battery leads and remove the battery.
Turn off the petrol and disconnect the petrol pipe.
Take the slides out of the carburettor.
Remove the air cleaner.
Remove the exhaust pipe.
Disconnect the electric horn leads.
Disconnect the control cable from the magdyno.
Disconnect the engine steady.
Remove the rear chain.
Remove the footrest bar.
Support the engine on a suitable box or wood block.
Remove the centre stand and the stand stop.
Remove the front engine plates.
Remove the bolt securing the rear engine plate to the frame.
Lift out the engine.

2. Removal of the Gear Box

Remove the primary chain case, engine sprocket and clutch (see Section C.2, Subsection 24).

Remove four 3/8 in. nuts and the gearbox can then be withdrawn from the engine.

3. Dismantling the Crankcase

350 + 500 c.c. Engine. Drain the oil tank by removing the drain plug.

Having removed the engine from the frame as described in Subsection 1, dismantle the cylinder head, barrel, piston, timing gear, magdyno, etc., as described in Section C.2.

Remove the nuts on the driving side of the engine from four fixed studs at the rear of the crankcase.

Remove six studs passing through the crankcase.

The two halves of the crankcase can then be separated.

The timing side outer roller race and the bronze bush will remain in the timing side half of the crankcase.

The driving side ball race and the driving side outer roller race will remain in the driving side half of the crankcase.

The driving side inner roller race and the inner distance piece will remain on the engine shaft.

The flywheel assembly may be difficult to remove from the driving side of the crankcase owing to the shaft being a tight fit in the inner race of the ball bearings. This is particularly likely in the earlier engines with two ball bearings. In this case push the shaft out of the bearings using crankshaft extractor E.5121.

4. Main Bearings

To remove the Outer roller race(s) (or inner ball race on earlier 350 Bullet engines) from the crankcase halves, heat to 100°C or more and drop the half case sharply on a flat block of wood or bench, when the race(s) will drop out, together with the distance piece in the case of the driving side and the thrust washer in the case of the timing side.

Remove the circlip from the driving side crankcase and re-heat to remove the second ball race.

To replace the bearings, heat the crankcase and press in the races in the following order

Driving Side. Use Special Tool No. 4817.
Small steel washer.
Cork oil-retaining washer
Large steel washer.
Ball bearing complete.
Circlip.
Outer distance piece
Outer roller race

Timing Side. Use Special Tool No. 4816.
Steel thrust washer. Outer roller race(s).

Care must be taken to see that the lead on the outside of the outer roller race enters the case first to make sure that it is square with the housing.

5. Replacement of the Cam and Idler Spindles

To remove the cam spindles heat the crankcase and tap the spindles out from inside.

To remove the idler spindles heat the crankcase as before, hold the spindles in a vice and tap the crankcase lightly with a hide hammer.

To replace the spindles use Special Tool No. E.6462 which is a locating plate for all the spindles.

Start the spindles in the holes in the crankcase by tapping them lightly.

Offer the locating plate to the spindles, making sure that they are all upright. Tap the plate over the spindles until it touches the timing chest face, having first made sure that the latter is quite clean.

Drive the spindles home with a small hammer (not heavier than J lb.) and a drift.

Remove the locating plate.

6. Flywheel Assembly

350 c.c. Engine. The flywheel assembly consists of the crankshaft and the connecting rod.

To dismantle the crankshaft remove the set screws securing the crankpin nuts.

Holding the crankshaft in a Special Jig, No. E.2775, remove the crankpin nuts.

Using E.2775, with a pair of steel bars (about 1 in. x 3/8 in. x 9 in. long) placed across, press out the crankpin with a hand press.

The connecting rod can then be removed.

Turn the crankshaft over in the jig and repeat with the other side if necessary.

To remove the main shafts, remove the set screws from the shaft nuts and unscrew the nut. Drive the shafts out with a hammer and drift.

To replace the main shafts, reverse the above process, making sure that the keys are a good fit.

To re-assemble the crankshaft, press the crankpin into the timing side flywheel, making sure that the oil hole is in the correct position and that the thrust washer is facing the right way, i.e., with the chamfer away from the flywheel.

Test the oil passages with an air line or oil gun to make sure that they are clear.

Smear oil over crankpin and floating bush.

Put the floating bush over the crankpin.

Put the connecting rod over the floating bush.

Place the other thrust washer over the crankpin, also with the chamfer away from the flywheel.

Place the other thrust washer over the crankpin.

Press the driving side flywheel on.

Put the flywheel in the assembly jig E.2775, to ensure that the flywheels and shafts are in line and replace the nuts, tighten securely and refit the set screws.

Test the oil passages again to ensure that they are clear.

If the same crankpin has been put back, it will be necessary to drill out the grub screw, in order to clean the oil passages after which a new grub screw must be fitted.

Mount the crankshaft between centres and true up to .0005 in. on either side of the shafts.

If the readings for the two shafts are high on opposite sides, the error can be corrected by gently tapping either or both of the flywheels.

If the readings are high on the same side of the two shafts, it is probably due to dirt or foreign matter in the joints and the crankshaft should be dismantled again, carefully examined and cleaned and re-assembled.

500 c.c. Engine. The flywheel assembly consists of the crankshaft and the connecting rod.

To dismantle the crankshaft remove the set screws securing the crankpin nuts.

Holding the crankshaft in a special jig, No. E.2775, remove the crankpin nuts.

Using E.2775 with a pair of steel bars (about 1 in. x 3/8 in. x 9 in. long) placed across, press out the crankpin with a hand press.

The connecting rod can then be removed.

Turn the crankshaft over in the jig and repeat with the other side if necessary.

To remove the timing side main shaft, take the set screw from the shaft nut and unscrew the nut. Drive the shaft out with a hammer and drift. To replace the timing side shaft, reverse the above process, making sure that the key is a good fit and that the nut is tightened securely by means of a box spanner with a 12 in. tommy bar.

The driving shaft has no nut but is secured by tightening the sprocket nut after the assembly of the engine. It should be pressed in and out with a hand press or a hammer and drift. If the latter is used care must be taken not to damage the centre.

To re-assemble the crankshaft, press the crankpin into the timing side flywheel, making sure that the oil hole is in the correct position and that the thrust washer is facing the right way, i.e., with chamfer away from the flywheel.

Test the oil passages with an air line or oil gun to make sure that they are clear.

Put the floating bush over the crankpin.

Put the connecting rod over the floating bush.

Place the other thrust washer over the crankpin, also with the chamfer away from the flywheel.

Press the driving side flywheel on.

Put the flywheel in the assembly jig, E.2775, to ensure that the flywheels and shafts are in line and replace the nuts, tighten securely and refit the set screws.

Test the oil passages again to ensure that they are clear.

If the same crank pin has been put back, it will be necessary to drill out the grub screw, in order to clean the oil passages after which a new grub screw must be fitted.

Mount the crankshaft between centres and true up to .0005 in. on either side of the shafts.

If the readings for the two shafts are high on opposite sides, the error can be corrected by gently tapping either or both of the flywheels.

If the readings are high on the same side of the two shafts, it is probably due to dirt or foreign matter in the joints and the crankshaft should be dismantled again, carefully examined and cleaned and re-assembled.

7. Reassembly of the Crankcase

Replace the outer roller races, etc., in the crankcase halves as described in Subsection 4.

Fit the inner distance piece and the rollers and cage in the driving side crankcase.

Lay the thrust washer on the bearing.

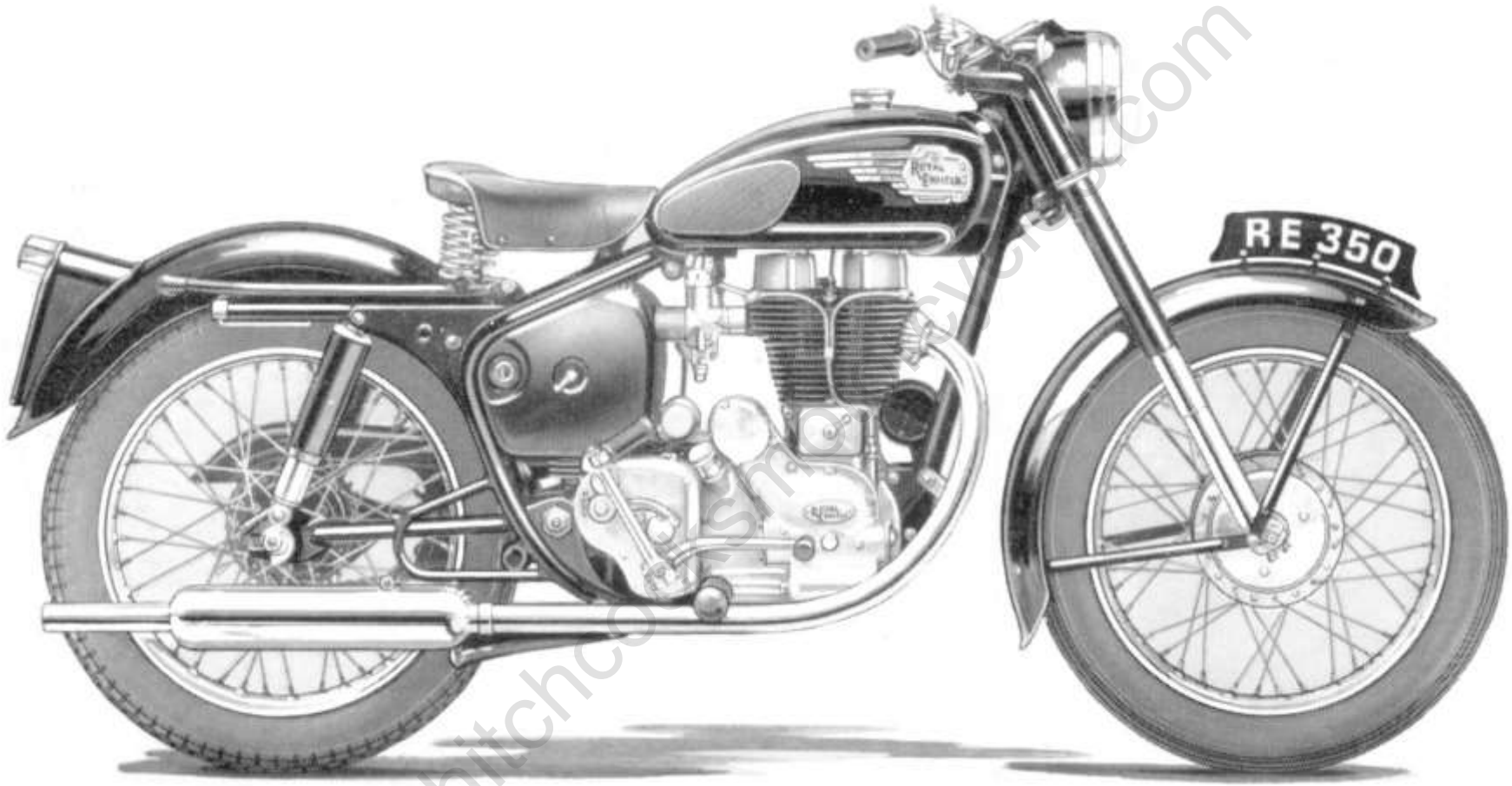
Assemble the flywheel into the bearing, if necessary using the sprocket nut with suitable packing piece to draw the driving shaft through the inner race(s) of the ball bearing(s).

Make sure that the crankcase face is clean and apply jointing compound to it.

Put the thrust washer on the timing side shaft and the rollers and cage.

Put the magdyno straps over the studs in the timing side crankcase and place the latter in position over the flywheel.

Bolt the two halves of the crankcase together, making sure that the joint matches correctly so that the cylinder base is flat.



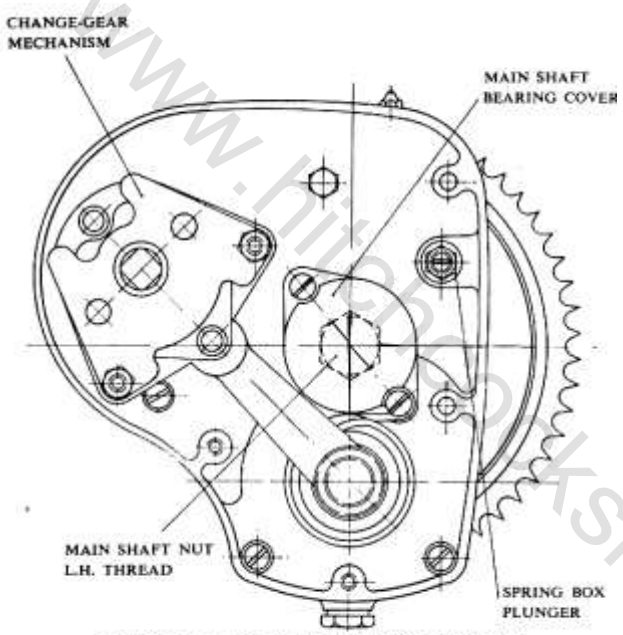
350 CLIPPER 1958

ROYAL ENFIELD WORKSHOP MANUAL

SECTION E1

Gearbox and Clutch

" Meteor 700" " 500 Twin " " 500 Bullet" " 350 Bullet"



GEARBOX WITH OUTER COVER REMOVED
Fig. 1

1. Removal of Gearbox

This is described in section DI or D2. The gearbox can, however, be completly dismantled with the engine in the frame except for removal of the inside operator and the bearings in the gearbox shell.

2. To Dismantle the Gearbox

First remove the kickstart crank, the gear changelever and the neutral finder and pointer.

Remove the top small inspection cover and disconnect the clutch cable.

Remove four screws and the gearbox outer cover can then be detached.

Remove the gear change mechanism by taking off the two nuts securing it.

Remove the main shaft bearing cover which is attached by two screws.

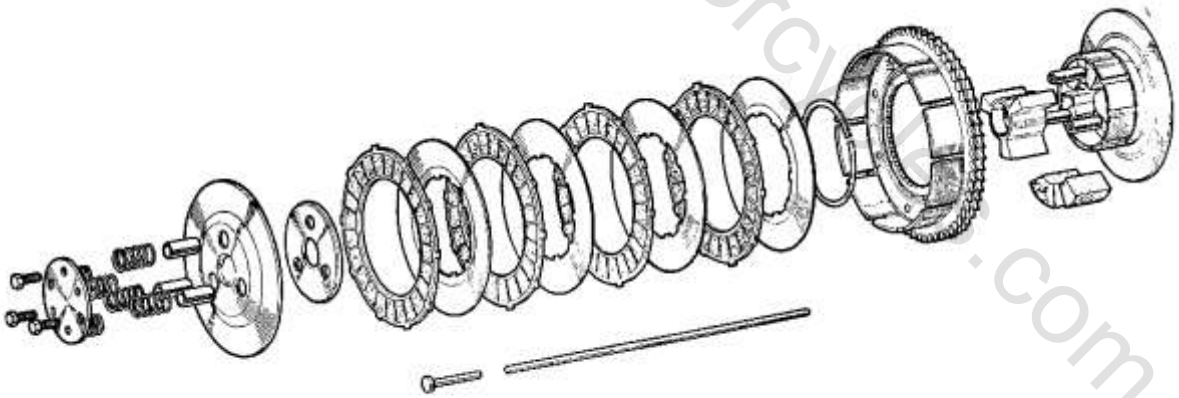
Remove four cheese-headed screws and hexagon bolt.

Remove the spring box locating plunger nut and washer.

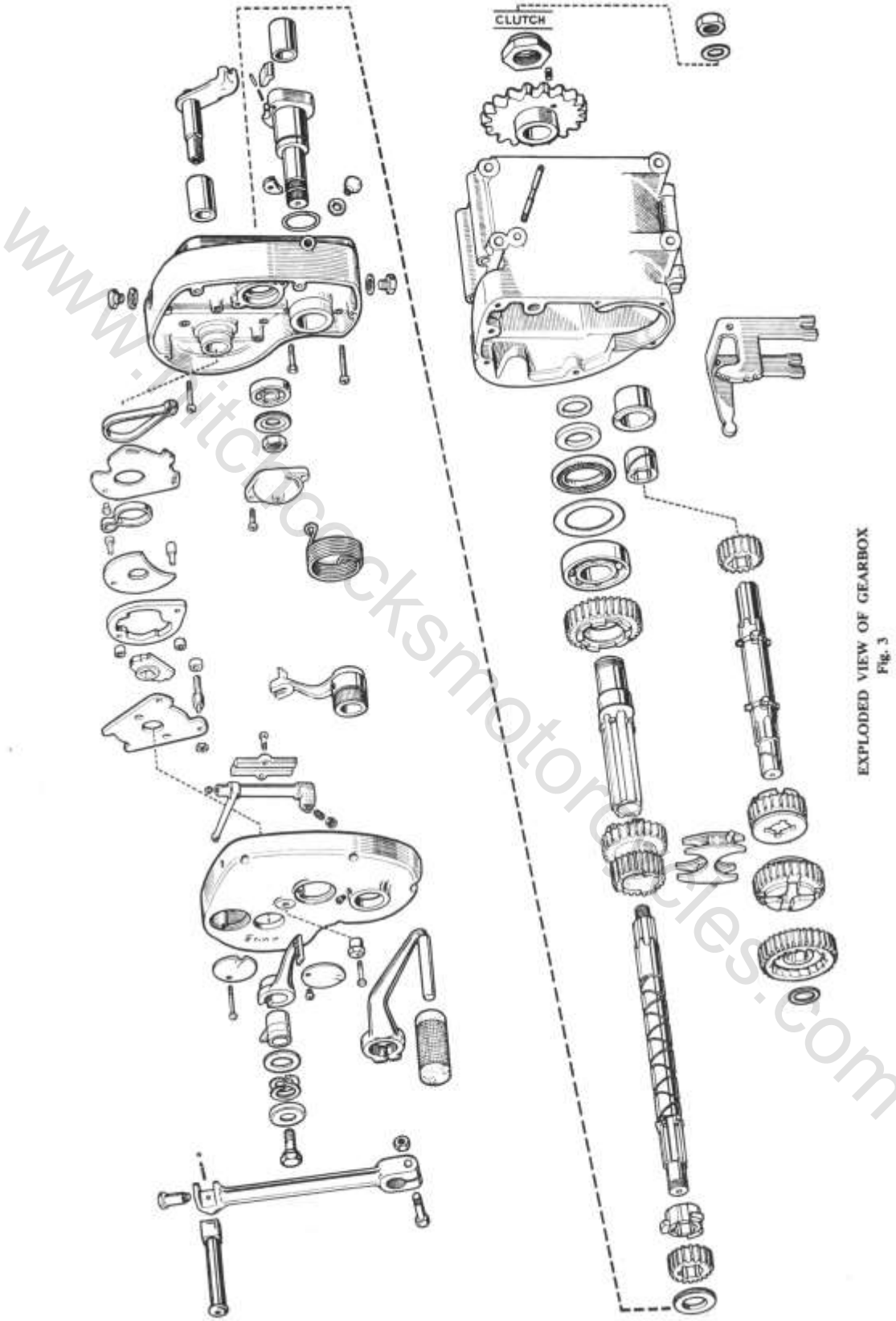
Remove the main shaft nut (Left Hand Thread).

The gearbox inner cover can then be removed

The mainshaft can be drawn straight out if the clutch has been removed, which, however, should be done before taking off the gearbox cover.



EXPLODED VIEW OF CLUTCH
Fig. 2



EXPLODED VIEW OF GEARBOX
Fig. 3

(See Section C1 or C2.) The top gear pinion and dog will come away with the mainshaft.

The layshaft can then be removed and the 2nd and 3rd gears drawn off the final drive sleeve together with the operator fork.

To take out the final drive sleeve, the final drive sprocket must be removed and this is preferably done before removing the inner cover. (See Section C1 or C2.)

3. Removal of the Ball Races

The mainshaft ball bearings can be removed by using a stepped drift 1.7/16 in.–1.11/64 in. diameter for the bearing in the box and 13/16 in.-39/64 in. diameter for the bearing in the cover.

When refitting the bearings stepped drifts of2.5/16 in.-1.11/64 in. diameter and 1.11/16 in.-39/64 in. diameter must be used for the bearings in the box and cover respectively.

Note the felt washer in the recess behind the larger main shaft bearing and the dished pen-steel washer between the bearing and the felt washer. The second dished pen-steel washer, if fitted, has a smaller central hole and is on the other side of the main shaft bearing and is nipped between the inner face of the bearing and the shoulder on the final drive sleeve. See that both of the dished pen-steel washers have their raised portions facing towards the clutch and final drive sprocket.

4. Gear Change Mechanism

If the two nuts securing the gear change ratchet mechanism are slackened, the adjuster plate can be set in the correct position. In this position the movement of the gear lever necessary to engage the ratchet teeth will be approximately the same in each direction.

If the plate is incorrectly adjusted, it may be found that, after moving from top to third or from bottom to second gear, the outer ratchets do not engage the teeth on the inner ratchets correctly.

If, when fitting new parts, it is found that the gears do not engage properly, ascertain whether a little more movement is required or whether there is too much movement so that the gear slips right through second or third gear into neutral. If more movement is required, this can be obtained by filing the adjuster plate very slightly at the points of contact with the pegs on the ratchet ring.

If too much movement is already present, a new adjuster plate giving less movement must be fitted.

5. Re-Assembling the Gearbox

The procedure is the reverse of that given in Subsection 2 but the following points should be noted:

If the main shaft top gear pinion and dog have been removed, make sure that the dog is replaced the right way round or third and top gears can be engaged simultaneously.

Make sure that the trunnions on the operator fork engage with the slots in the inside operator.

See that the main shaft is pushed right home (It may tighten in the felt washer inside the final drive shaft nut.)

The layshaft top gear and kickstarter pinion should be assembled on the layshaft and the kickstarter shaft and ratchet assembled on to it before fitting the end cover. Do not forget the washer on the layshaft between the kickstarter pinion and the kickstarter shaft.

The joint between the gearbox and the inner cover should be made with gold size, shellac or a similar jointing compound.

Make sure that all parts are clean before commencing assembly. In normal climates the recesses in the gearbox should be packed with soft grease and the box should be filled up to the correct level with gear oil. (See Subsection 9.) On no account must heavy yellow grease be used.

6. Dismantling and Re-assembly of the Clutch

The method of removing the clutch is described in Section C1 or C2.

When re-assembling, note that two of the steel plates are dished and that the other(s) are flat. The correct order of assembly is shown on the exploded drawing.

Do not forget to replace the cush rubber plate retaining cover before fitting the pressure plate.

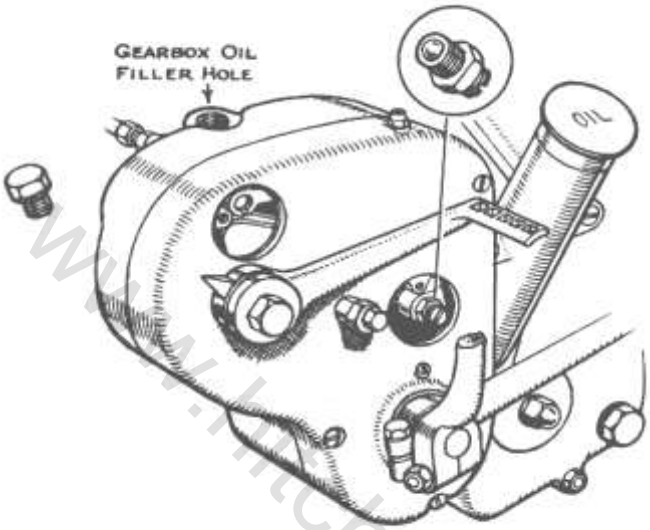
Make sure that the distance tubes inside three of the springs pass through the holes in the pressure plate. The other three springs are located by means of bosses on the clutch cap.

Tighten the spring pins as far as they will go If the clutch lifts unevenly it is probable that one of the springs has taken a set, in which case new springs should be fitted.

7. Adjustment of the Clutch Control

It is essential that there should be about 1/16 in. free movement in the clutch cable, to ensure that all the spring pressure is exerted on the plate.

There are two points of adjustment for the clutch cable. The first is at the top of the gearbox just behind the oil filler plug and is provided for taking up any stretch in the cable. The adjustment is made by screwing the collar in or out of the gearbox shell. The connection between the end of the cable and the horizontal lever can be seen if the top small inspection cover on the front of the gearbox is removed. Tighten the locknut on the screwed collar after adjustment has been made.



CLUTCH ADJUSTMENT ON CURRENT GEARBOXES
Fig. 4

The other point of adjustment is behind the lower inspection cover on the front of the gearbox and is for compensating for wear on the clutch plate inserts. To make the adjustment, remove the inspection cover, slacken the locknut and turn the central screw. Tighten the locknut after adjustment has been made.

The reason for the two points of adjustment is to enable the lever behind the cover to be kept in its proper position whether the need for adjustment is caused by plate wear or cable stretch.

Owing to initial bedding down of the clutch plate inserts, the clutch control may require adjustment after the first few hundred miles with a new machine. This point should therefore be examined soon after delivery and adjustment made if necessary.

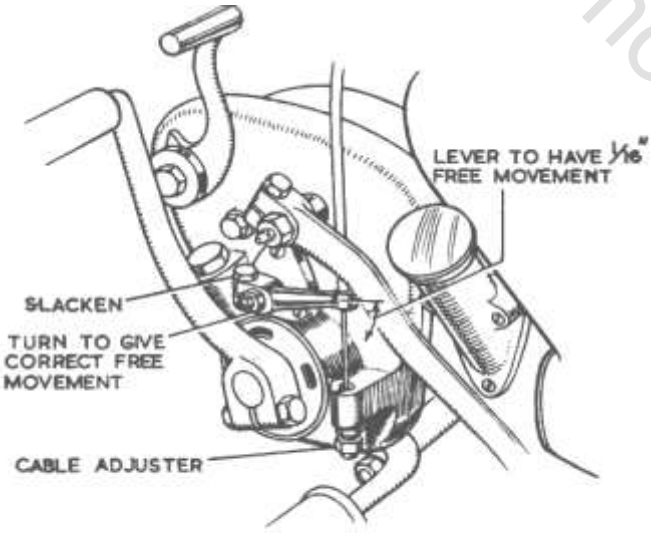
On earlier models the clutch operating mechanism is exposed on the front of the gearbox, but the adjustments are, however, the same in principle as those described above.

The cable adjustment is at the bottom of the front of the gearbox just in front of the kickstart lever. The collar is screwed in or out of a lug on the gearbox cover and is secured by a locknut as before.

The other adjustment is made by slackening the clamping bolt in the horizontal lever and turning the lever on its spindle, which is the end of the operating worm in the gearbox cover.

When correctly adjusted, the lever should be approximately square with the cable when the clutch is fully lifted.

The position of the lever endwise on the worm spindle is important and it should be positioned so that it does not foul the kickstart lever.



CLUTCH LEVER AND CABLE ADJUSTMENTS ON EARLY GEARBOXES
Fig. 5

8. Adjustment of the Neutral Finder

The neutral finder is adjusted by means of an eccentric stop secured to the front of the gearbox cover by a bolt which limits the travel of the operating pedal. Slacken the bolt and turn the eccentric until the correct movement of the pedal is obtained.

9. Gearbox Oil Level

The gearbox is replenished with oil by removing a plug in the top and the correct level can be checked by removing a second plug lower down on the right hand side looking at the cover.

On earlier models a dip-stick is attached to the filler plug for measuring the level of the oil or was provided loose in the tool kit.

On some models the filler plug is on the side of the gearbox and in such cases the oil should be level with the plug hole and no dip-stick is required. The oil will be found to run into the box more easily on these models if the engine is started up and allowed to tick over so that the gears and shafts rotate.

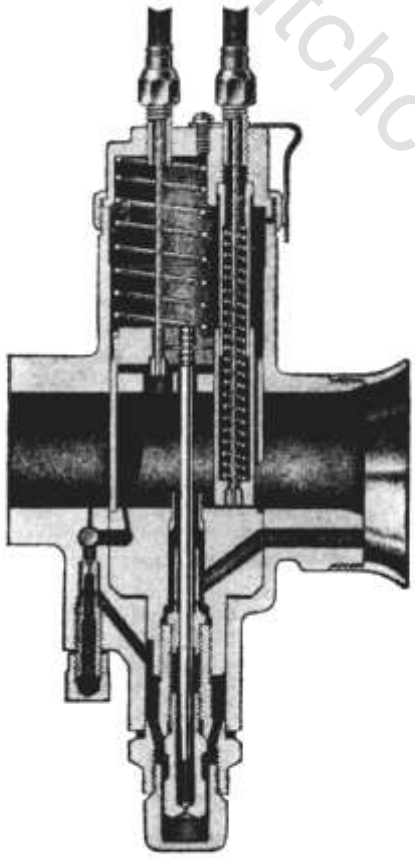
ROYAL ENFIELD WORKSHOP MANUAL

Amal Monobloc Carburetter

1. General Description

The Amal Monobloc Carburetter has been introduced as an improvement on the earlier standard needle type. In general it gives better petrol consumption, combined with improved starting and acceleration from low speeds and a small increase in maximum speed.

The float chamber is integral with the mixing chamber and contains a pivoted barrel-shaped float operating on a nylon fuel needle. There is a considerable leverage ratio between the float and the needle and, in consequence, flooding is rare unless there is dirt on the needle seating.



SECTION THROUGH MIXING CHAMBER, SHOWING AIR VALVE AND THROTTLE CLOSED

Fig. 1

The supply of air to the engine is controlled by a throttle slide which carries a taper needle operating in the needle jet. The needle is secured to the throttle slide by a spring clip fitting in one of five grooves and the mixture strength throughout a large proportion of the throttle range is controlled by the position of this needle in the slide and by the size of the jet in which it works. There is, however, a restricting or main jet at the bottom of the needle jet and the size of this controls the mixture strength at the largest throttle openings. At very small throttle openings petrol and air are fed to the engine through a separate pilot system, which has an outlet at the engine side of the throttle. The air supply to this pilot system is controlled by the pilot air screw and the slow running of the engine can be adjusted by means of this screw and a stop which holds the throttle open a very small amount. The throttle slide is cut away at the back and the shape of this cut-away controls the mixture at throttle openings slightly wider than that required for slow running. There is a compensating system to prevent undue enriching of the mixture with increasing engine speed, this system consisting of a primary choke surrounding the upper end of the needle jet through which air is drawn in increasing quantities as the depression in the main choke increases. This air supply and the supply to the pilot system are taken from two separate ducts in the main air intake to the carburetter so that all the air passing to the engine can be filtered by fitting an air cleaner to the main carburetter air intake.

Two small cross holes in the needle jet, at a level just below the static level in the float chamber, permit petrol to flow into the primary choke when the engine is not running or when it is running at very low speeds, thus forming a well of petrol which will be drawn into the engine on starting or accelerating from low speeds. At moderately high engine speeds the level of petrol in the float chamber falls slightly and in consequence no more fuel flows through the cross holes in the needle jet so that the petrol well remains empty until the engine slows down or stops.

A handlebar controlled air slide is provided to enrich the mixture temporarily when required.

2. Tuning the Carburetter(s)

The throttle opening at which each tuning point is most effective is shown in Fig. 2. It should be remembered, however, that a change of setting at

any point will have some effect on the setting required at other points; for instance, a change of main jet will have some effect on the mixture strength at half throttle which, however, is mainly controlled by the needle position. Similarly an alteration to the throttle cut-away may affect both the needle position required and the adjustment of the pilot air screw. For this reason it is necessary to tune the carburetter in a definite sequence, which is as follows:

First-Main Jet. The size should be chosen which gives maximum speed at full throttle with the air control wide open. If two different sizes of jet give the same speed the larger should be chosen for safety as it is dangerous to run with too weak a mixture at full throttle.

Second-The pilot air screw should be set to give good idling. Note that the pilot jet is detachable and two sizes are available, 25 c.c. and 30 c.c. If the pilot air adjusting screw requires to be screwed out less than half a turn the larger size pilot jet should be used; if the air screw requires to be screwed out more than 2-3 turns fit the smaller size of pilot jet.

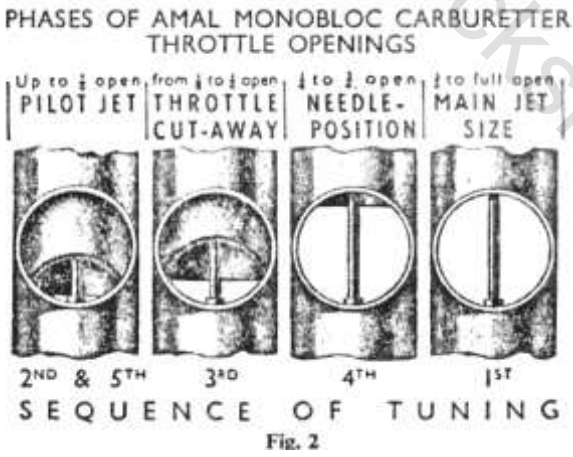


Fig. 2

Third-the throttle valve should be selected with the largest amount of cut-away which will prevent spitting or misfiring when opening the throttle slowly from the idling position.

Fourth-The lowest position of the taper needle should be found consistent with good acceleration with the air slide wide open.

Fifth-The pilot air screw should be checked to improve the idling if possible. When setting the adjustment of the pilot air screw this should be done in conjunction with the throttle stop. Note that the correct setting of the air screw is the one which gives the fastest idling speed for a given position of the throttle stop. If the idling speed is then undesirably fast it can be slowed down by unscrewing the throttle stop a fraction of a turn.

It will be noted that of the four points at which adjustments are normally made, i.e., pilot air screw, throttle cut-away, needle position and main jet size, the first and third do not require changing of any parts of the carburetter. Assuming that the carburetter has the standard setting to suit the particular type of engine any small adjustments occasioned by atmospheric conditions, changes in quality of fuel, etc., can usually be covered by adjustment of the pilot air screw and raising or lowering the taper needle one notch. If, however, the machine is used at very high altitudes or with a very restricted air cleaner a smaller main jet will be necessary. The following table gives the reduction in main jet size required at different altitudes:

Altitude, ft.	Reduction, %
3,000	5
6,000	9
9,000	13
12,000	17

In the case of carburetters for engine running on alcohol fuel considerably larger jets are needed. In most cases a No. 113 needle jet will be required and the main jet size will require to be increased by an amount varying from 50% to 150% according to the grade of fuel used.

If the engine is run on fuel containing a small proportion of alcohol added to the petrol, a rough and ready guide is that the main jet should be increased by 1 % for every 1 % of alcohol in the fuel. In most cases alcohol blends available from petrol pumps do not contain sufficient alcohol to require any alteration to the carburetter setting.

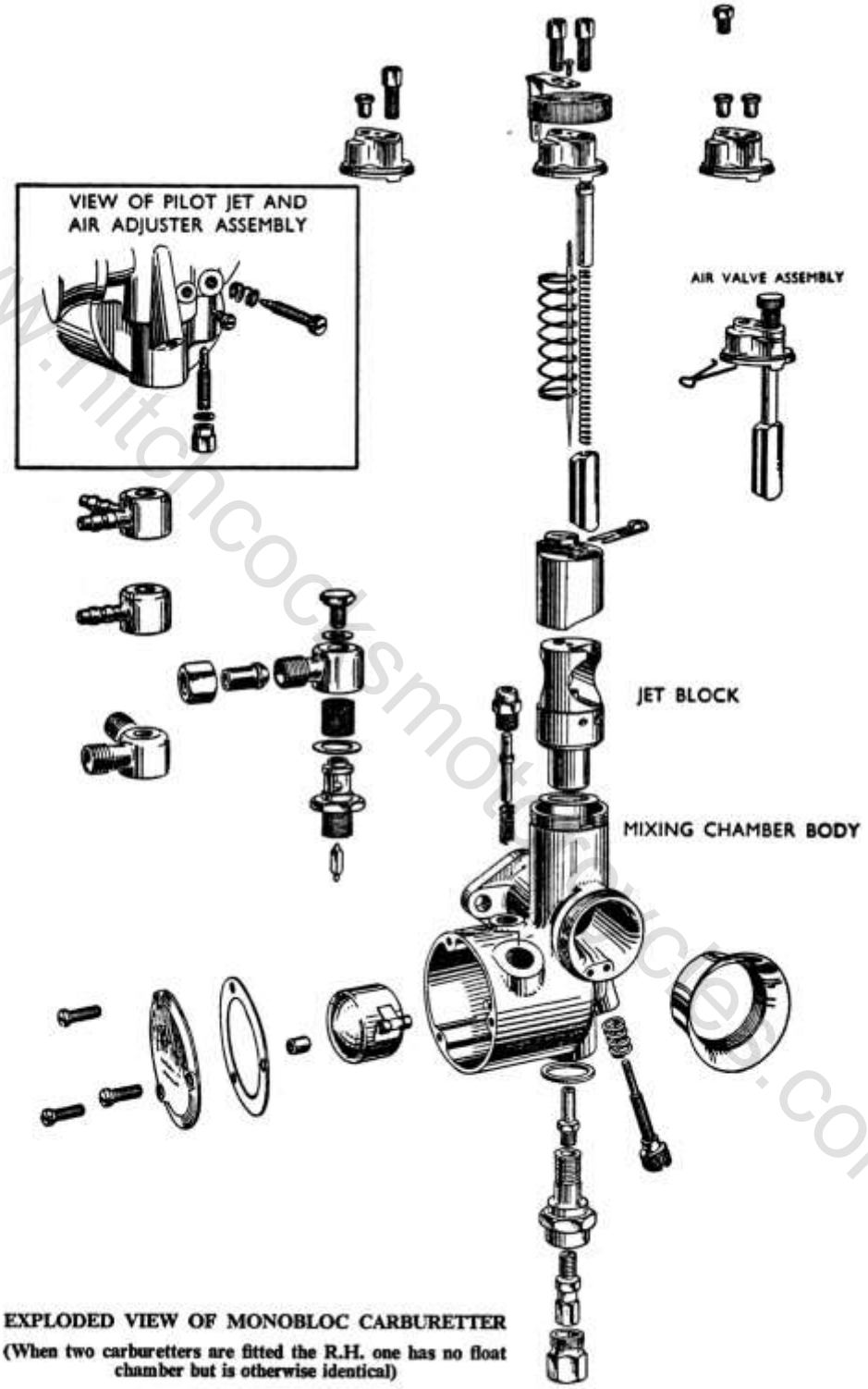
The range of adjustment of the taper needle and the pilot air screw are determined by the size of the needle jet and of the pilot outlet respectively. Standard needle jets have a bore at the smallest point of .1065 in. and are marked 106. Alternative needle jets .1055 in., .1075 in., .109 in. and .113 in. bore are available and are marked 105, 107, 109 and 113 respectively.

The standard pilot outlet bore is .025 in. but in some cases larger size pilot outlets are used. Since the pilot outlet is actually drilled in the body of the carburetter it is necessary to have a carburetter with the correct size pilot outlet if the best results are to be obtained.

The accompanying table shows the standard settings for Amal Monobloc Carburetters used on Royal Enfield motor cycles.

Both instruments used for the twin carburetter models are identical in all respects but for the float chamber arrangement, which is as follows:

The carburetter which supplies the left-hand cylinder has an integral float chamber which



EXPLODED VIEW OF MONOBLOC CARBURETTER

(When two carburetters are fitted the R.H. one has no float chamber but is otherwise identical)

Fig. 3

also controls the fuel supply via a connecting pipe to the right-hand instrument which does not have a float chamber in unit with it.

It is important that the pilot air screws of both carburetters are in identical positions, relative to one another, the same applying to the throttle valves when seated on their stops. This is essential for an even smooth tickover and low-speed running. The speed of the tickover is regulated by these four adjuster screws. For an instant pick-up, both throttle valves must commence to rise from their stops simultaneously, when the twist grip is rotated. This is obtained by adjusting the twin control cables. Each main jet needle must be in the third groove.

Both air slides, operated from a single handlebar lever, must open and close identically, as failure to do this may result in one slide not opening fully, with a resultant loss of power.

It is most important that all of these adjustments are carried out in a thorough and careful manner if the maximum power and smoothness is to be obtained.

The "ears" to be found on the leading edges of the battery and toolbox lids are to shield the carburetter air intakes and so prevent misfiring at maximum revs.

3. Dismantling Carburetter

The construction of the carburetter is clearly shown in Fig. 3.

If the float chamber floods, first make sure that there is no dirt on the fuel needle seating. Owing to the use of a nylon needle and the leverage ratio between float and needle, flooding is very unlikely with this type of carburetter unless dirt is present or, of course, the float is punctured.

If it is necessary to remove the jet block note that this is withdrawn from the upper end of the mixing chamber after unscrewing the jet holder. Be careful not to damage the jet block when removing or refitting it. Note that the large diameter of the jet block pulls down on to a thin washer.

A single strand of an inner control cable is useful for clearing the small passages in the jet block and care must be taken not to enlarge these by forcing the wire through them. Compressed air from a pipe line or a tyre pump is preferable. A choked main jet should be cleared only by blowing through it.

4. Causes of High Petrol Consumption

If the petrol consumption is excessive first look for leaks either from the carburetter, petrol pipe, petrol tap(s) or tank. If coloured petrol is in use this will readily indicate the presence of any small leaks which otherwise might pass unnoticed. If the petrol system is free from leaks, carefully set the pilot adjusting screw as described in Subsection 2 to give the correct mixture when idling. Running with the pilot adjusting screw too far in is a common cause of excessive petrol consumption. If the consumption is still heavy try the effect of lowering the taper needle in the throttle slide by one notch. Do not fit a smaller main jet as this will not affect consumption except when driving on nearly full throttle and may make the mixture too weak at large throttle openings, thus causing overheating. Remember that faults in other parts of the machine can have a marked effect on petrol consumption. Examples of this are binding brakes, chains too tight or out of line and, in particular, under-inflated tyres.

Settings of AMAL Monobloc carburetters on ROYAL ENFIELD motor cycles

Machine	Carburetter Type No.	Choke Bore in.	Main Jet c.c.	Needle Jet	Needle Position	Throttle Valve	Pilot Jet c.c.
"250 Clipper" 1955 (late), 1956, 1957 and 1958 (early)	375/10	11/32	120	105	3	375/4	25
"Crusader 250" 1957-1962 **"250 Clipper"** Late 1958 onwards	375/16	7/32	120	105	3	375/3½	25
"Crusader Sports" 1959 onwards and **"250 Trials"** 1962 onwards	376/216	15/64	150	106	3	376/3½	25
"Super 5" 1962 onwards and **"Continental"** 1963 onwards	376/283	1 1/32	180	106	4	376/3½	25
"350 Bullet" 1955 (late)-1958 **"350 Clipper"** 1958-1962 **"Works Replica"** 1958-1961	376/29	1	180	106	3	376/3½	25
"350 Bullet" 1959-1962	376/215	1 1/32	190	106	3	376/4	30
"350 Bullet" 1963 onwards	376/297	1 1/32	180	106	3	376/3½	25
"500 Bullet" 1956-1958	389/9	1⅛	200	106	2	389/3½	30
"500 Bullet" 1959-1961	389/34	1 3/32	*220	106	3	389/3½	30
"Meteor Minor" 1958-1961 **"Meteor Minor Sports"** 1960-1962 **"500 Sports Twin"** 1963 onwards	376/92	1 1/32	250	106	2	376/3½	30
"Super Meteor" 1956-1962 **"Constellation"** 1963 onwards	376/41	1 1/32	240	106	3	376/3½	30
"Constellation" 1960-1962	L/H 376/242 R/H 376/243	1 1/32	320	106	3	376/4	25
Continental GT	389/217	1.1/8	270	106	3	389/3½	25

***No 250 Main Jet if no Air Cleaner fitted.**

ROYAL ENFIELD WORKSHOP MANUAL

1961 350 CLIPPER

1956 350 BULLET

ROYAL ENFIELD WORKSHOP MANUAL

SECTION G I e

Lucas Rotating Magnet Magneto Model SR1

Used on 350 Bullet 1956-59; 500 Bullet 1956-59

1. General

The magneto rotor comprises a permanent magnet fitted with two laminated pole shoes. The stator consists of laminated pole pieces bridged by a laminated coil core. The coil has concentrically wound primary and secondary windings.

The rotor is driven by the engine through an automatic advance coupling and induces an alternating magnetic field in the laminated iron core of the coil. This field in turn induces alternating voltages in the primary and secondary windings of the coil. Magnetic flux due to current flowing in the primary winding tends to oppose any change in direction of the magnetic field in the laminated iron core. In this way, field reversals due to the rotating magnet are delayed until the contact breaker opens. This removes the restraining influence of the primary winding and the consequent rapid reversal of the magnetic flux linked with the coil causes a high voltage to be induced in the secondary winding.

The body of the magneto is formed of a single casting enclosed at the contact breaker end by a moulded cover. The cover is designed with the high tension cable outlet in a downward direction, thus preventing the retention of moisture at the terminal connection. The coil and capacitor are robustly constructed and specially treated to withstand very arduous condition.

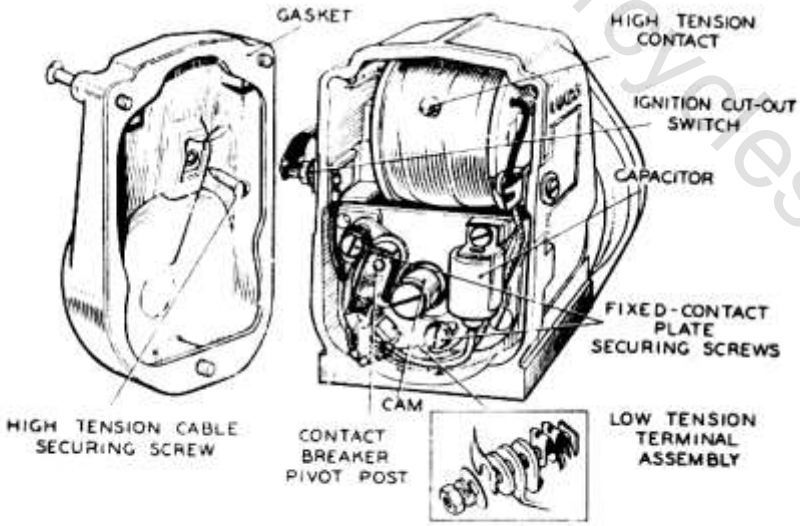
2. Routine Maintenance

(a) Lubrication:

TAKE GREAT CARE TO PREVENT OIL OR GREASE GETTING ON OR NEAR THE CONTACTS.

(i) After 1,000 running hours (say 30,000 mile.) remove the moulded cover, slacken the nut securing the end of the contact breaker spring and lift off the moving contact assembly. Smear the pivot pin with a small quantity of Mobilgrease No. 2 or its equivalent.

(ii) The magneto rotor is mounted on ball bearings. These bearings are packed with high melting point grease before leaving the factory and require no attention for a considerable time. About every two years, or when the engine is undergoing a general overhaul, the magneto should be dismantled by a Lucas Service Depot or Agent and the bearing repacked with high melting point grease.



MAGNETO MODEL SR1 WITH COVER REMOVED
Fig. 1

(b) Cleanings

(i) Occasionally remove the moulded cover and wipe the inside of the cover with a soft dry cloth. Clean the outside of the cover before replacing it.

(ii) Examine the contact breaker. If the contacts are burnt or dirty, clean them by polishing with a very fine carborundurn stone or fine emery cloth. The contacts may be cleaned more easily if the moving contact assembly is removed, as Sub-section 2 (a) (i).

(c) Adjusting Contact Breaker

After cleaning check the gap between the contacts. Turn the engine until the contacts show the maximum opening which should measure 0.010 in. to 0.012 in. If the setting is incorrect slacken the two screws securing the fixed-contact plate and move the plate until the correct gap is obtained. Tighten the securing screws and measure the gap again.

(d) Replacement of High Tension Cable

Use 7 mm. neoprene-covered rubber ignition cable for the high tension lead. When connecting a new cable to the magneto do not bare the cable but cut it off flush to the required length. Remove the moulded cover, slacken the cable retaining screw and pull out the old cable. Push the new cable fully home and secure by tightening the screw. The pointed end of this will pierce the insulation, make contact with the cable core and lock the cable in place. After fitting a high tension cable a continuity test should be made between the cover electrode and plug end of the cable.

3. Servicing

To locate cause of misfiring or failure of ignition, check as follows :

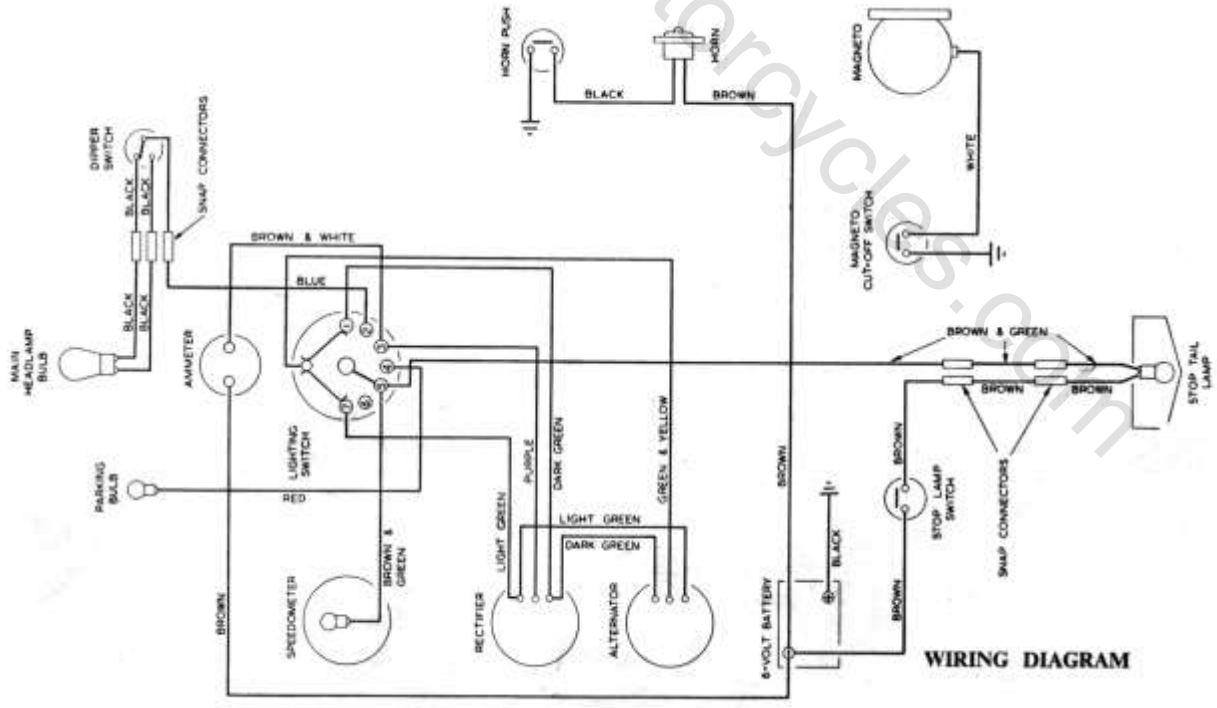
(i) Remove the sparking plug from the engine. Hold the end of the high tension cable about 1/8 in. from the cylinder block and operate the kickstarter. If strong and regular sparking is produced the sparking plug should be cleaned and adjusted.

(ii) If no sparking is produced, examine the high tension cable and if necessary renew it as described in Subsection 2 (d).

NOTE: In no circumstances must the contact breaker cam be removed from or turned on the spindle. The cam is correctly positioned when the magneto is built and the performance of the instrument depends on this position being maintained

4. Automatic Advance Mechanism

This is automatically lubricated and requires no attention beyond making sure that it operates freely and the springs are securely fastened. For timing instructions see Section C5, Subsection 4.



ROYAL ENFIELD WORKSHOP MANUAL

SECTION G2K

Lucas A.C. Lighting-Ignition System

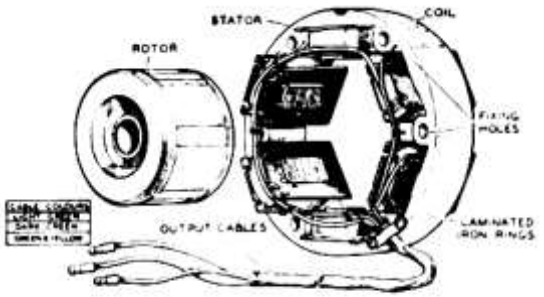
Used on 350 Bullet and 500 Bullet, 350 Clipper and Trials

1. General

The Lucas A.C. Lighting-Ignition System comprises seven main components

(1) Alternator with magnet rotor.
(2) Bridge-connected rectifier.
(3) Ignition coil.
(4) Contact breaker unit, and automatic timing control.
(5) Lighting switch.
(6) Ignition switch.
(7) 6-volt battery (see Section G4a).

Under normal running conditions, electrical energy in the form of rectified A.C. passes through the battery from the alternator, the rate of charge depending on the position of the lighting switch. When no lights are in use, the alternator output is sufficient only to trickle charge the battery. When the lighting switch is turned to the "Pilot" or "Head" positions the current increases proportionately.



STATOR AND ROTOR OF ALTERNATOR RM15
Fig. 1

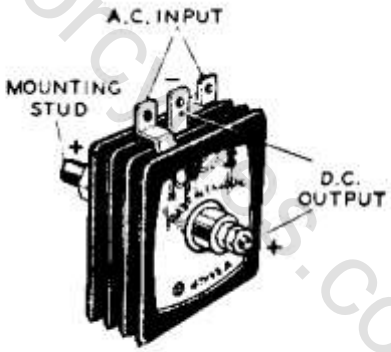
2. Alternator Models RM14 and RM15

Early models are fitted with type RM14 alternator, which has an outside diameter of' 5.7/8 in. Later models are fitted with type RM I 5 (see Fig. 1) with an outside diameter of 5 in. They give a high output at low r.p.m. The alternator comprises two main components, a stator and a rotor. The stator is built up from iron laminations and carries three pairs of series-connected coils insulated from the laminations. The rotor has a hexagonal steel core, each face of which carries a permanent magnet keyed to a laminated pole tip. The pole tips are riveted circumferentially to brass side plates, the assembly being cast in aluminium and machined to give a smooth external finish. The stator and rotor can be separated without the need to fit magnetic keepers to the rotor poles.

As the rotor turns, rapid and repeated reversals of flux take place in the coil cores. These lines cut through the turns of the coil and induce alternating voltages in that coil. External connections are taken to these coils from a bridge connected rectifier (see Fig. 2).

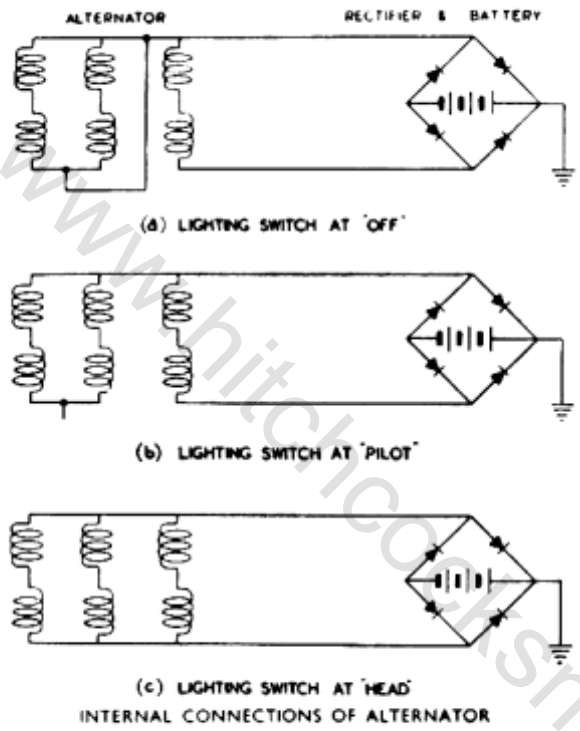
3. Circuit Detail

The alternator stator carries three pairs of series connected coils. One pair being permanently connected across the rectifier bridge network. The purpose of this latter pair is to provide some degree of charging current for the battery whenever the engine is running.



GENERAL VIEW OF RECTIFIER
Fig. 2

Connections to the remaining coils vary according to the position of the lighting and ignition switch controls, as shown schematically in Fig. 3.



CIRCUIT DIAGRAMS FOR POSITIONS OF LIGHTING SWITCH

Fig. 3

When no lights are in use the alternator output is regulated to its minimum value by interaction of the rotor flux and the flux set up by current flowing in the short-circuited coils.

In the "Pilot" position these coils are disconnected and the regulating fluxes are consequently reduced. The alternator output therefore increases and compensates for the additional parking light load.

In the "Head" position the alternator output is further increased by connecting all three pairs of coils in parallel.

4. Emergency Starting

An emergency starting position is provided on the ignition switch, for use if the battery has become discharged and a normal start cannot therefore be made. Under these conditions, the alternator is connected direct to the ignition coil, allowing the engine to be started independently of the battery. It should be noted that with the ignition switch at EMG and the engine running, the battery receives a charging current, so that its terminal voltage begins to rise. This rising voltage opposes the alternator voltage, and, on single cylinder machines in the event of a rider omitting to return the ignition key to IGN after an emergency start has been made, misfiring may occur. This will cease on turning the ignition key to the normal running position, IGN.

This system, which on a single cylinder machine could cause trouble through unwanted sparks on the compression stroke of the engine, does not do so on the twin, owing to the fact that the distributor permits the passage of a spark only when the engine is near the firing position.

5. Direct Operation

Short journeys without the battery can be made with the switch in the "EMG" position. To do this, the cable normally connected to the battery negative terminal must be connected to an earthed point on the machine. If lights are required when the battery is disconnected, use only the headlights and keep the engine speed low to prevent excessive voltage rise.

6. Routine Maintenance

The alternator and rectifier require no maintenance apart from ensuring that all connections are clean and tight.

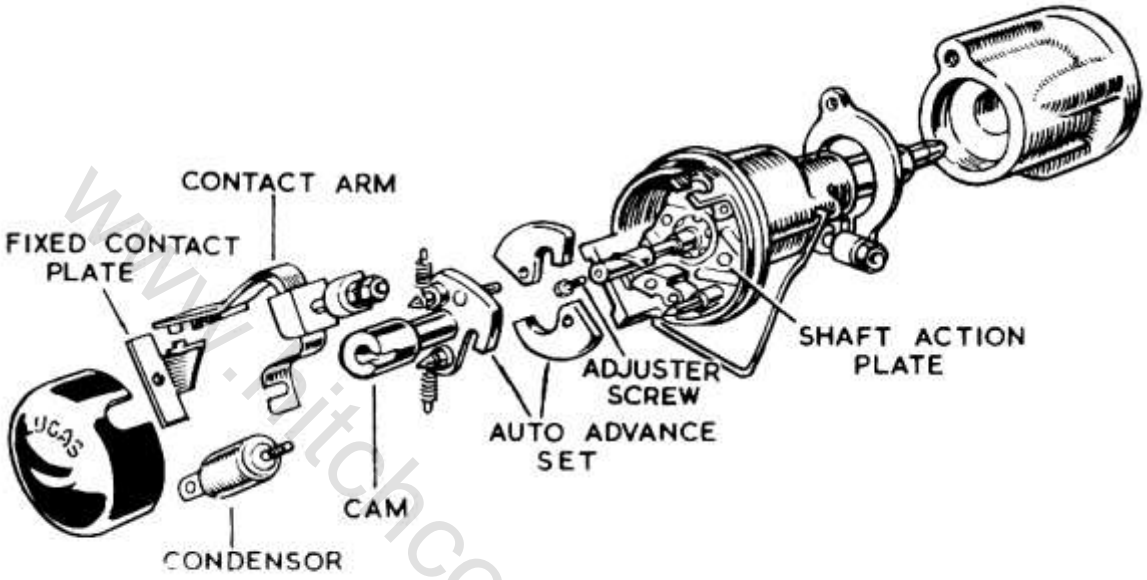
If the rotor, stator, engine crankshaft or rear half of the chaincase have been disturbed, the air gap between the rotor and stator should be checked. If a feeler gauge of at least .008 in. thick cannot be passed between the rotor and each of the stator poles the alignment should be checked.

If removal of the rotor becomes necessary for any purpose, there is no necessity to fit keepers to the rotor poles. When the rotor is removed wipe off any metal swarf which may have been attracted to the pole tips. Place the rotor in a clean place.

The nuts which clamp together the rectifier plate assembly must not under any circumstances be slackened. They have been carefully set during manufacture to give correct rectifier performance. A separate nut is used to secure the rectifier to the frame of the motor cycle.

7. Ignition Coil Model Q6 or MA6

The ignition coil should be kept clean and the terminals kept tight.



CONTACT BREAKER AND AUTOMATIC ADVANCE UNIT, MODEL 15D1

Fig. 4

8. Contact Breaker Unit

Early Models: Type CA1A
Later Models: Type 15D1

Lubrication every 3,000 miles. No grease or oil must be allowed to get on or near the contacts when carrying out the following procedure.

Smear the surface of the cam very lightly with Mobilgrease No. 2 non-creep oil or clean engine oil.

Place a spot of Ragosine oil or clean engine oil on the contact breaker pivot of type CA1A.

Contact Breaker Setting. The contact breaker setting should be checked after the first 500 mile, running and subsequently every 6,000 miles. To check the gap, turn the engine over slowly until the contacts are seen to be fully open and insert a 0014-0016 in. feeler gauge between the contacts.

If the gap width is correct the gauge will be a sliding fit. To adjust the setting, set the engine in the position giving maximum contact opening. Slacken the two screws securing the fixed contact plate fitted to early models, and the single screw in the case of later models. Adjust tile position of the plate until the gap is the thickness of the gauge, and tighten.

Automatic Timing Control

Early Models. Every 3,000 miles remove the central fixing bolt and inject a small amount of clean engine oil into the hole thus exposed. When the fixing bolt has been replaced and the engine run for a few minutes, the oil will be forced out over the automatic advance mechanism by centrifugal force.

To expose the automatic timing mechanism remove the two screws in the slotted holes of the C/B base plate.

Later Models. Remove the contact breaker cover and use clean engine oil to lubricate the automatic timing mechanism in the base of the unit. To obtain access, remove the contact breaker arm, contact plate, condenser and the screw in the end of the cam. The unit may then be lifted out.

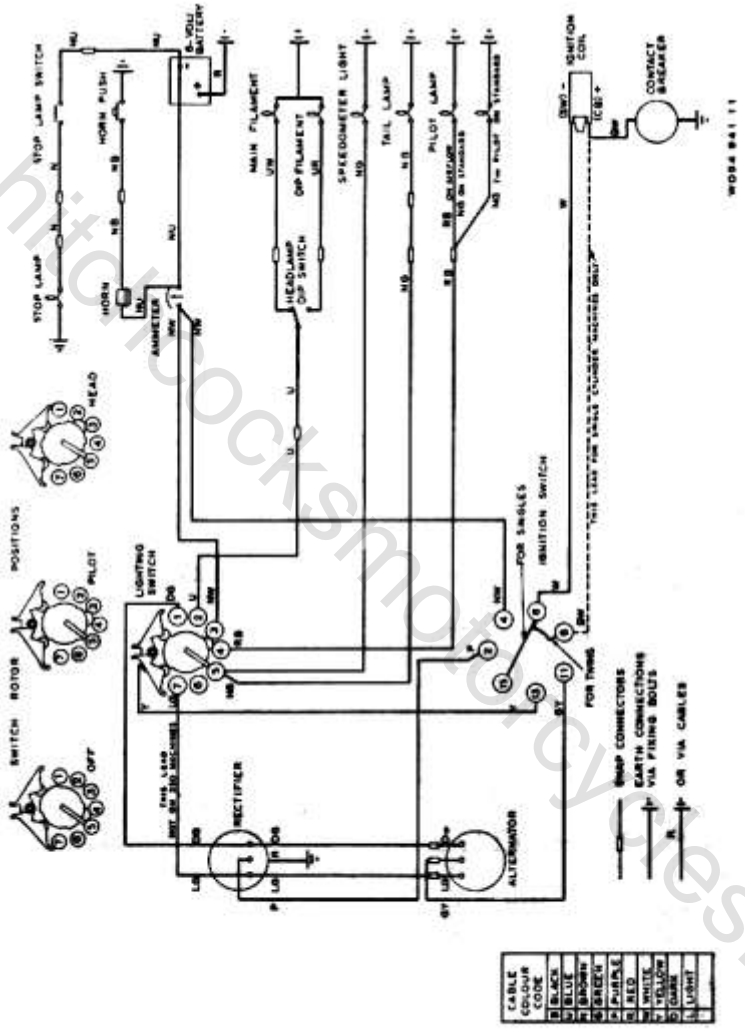
Cleaning every 6,000 miles. Examine the contact breaker; the contacts must be free from grease or oil. If they are burnt or blackened, clean with fine carborundum stone or very fine emery cloth, afterwards wiping away any trace of dirt or metal dust with a clean petrol moistened cloth. Cleaning of the contacts is made easier if the lever carrying the moving contact is removed.

9. Renewing High Tension Cables

If any of the high-tension cables show signs of perishing or cracking they must be replaced, using 7mm. neoprene-covered rubber ignition cable. To connect the cable to the distributor or ignition coil model Q6, remove the metal washer

and moulded terminal nut from the defective cable. Thread the new cable through the moulded terminal nut and cut back the insulation for about 1/4 in. Pass the exposed strands through the metal washer and bend them back radially. Screw the terminal into the pick-up moulding

To connect the cable to ignition coil model MA6, pass the cable through the rubber grommet, push the metal clip into the end of the cable (which should be cut off square), insert the cable and clip into the socket in the end of the coil, and slide the grommet into place to exclude water.



WIRING DIAGRAM

Fig. 5

ROYAL ENFIELD WORKSHOP MANUAL

Battery Model PUZ7E

1. General

The model PUZ7E (see Fig. 1) is a "drycharged" battery and is supplied without electrolyte but with its plates in a charged condition. When the battery is required for service it is only necessary to fill each cell with sulphuric acid of the correct specific gravity. No initial charging is required, but the battery must be left to stand at least one hour after filling before putting the machine into service and then adjusting the acid level if necessary.

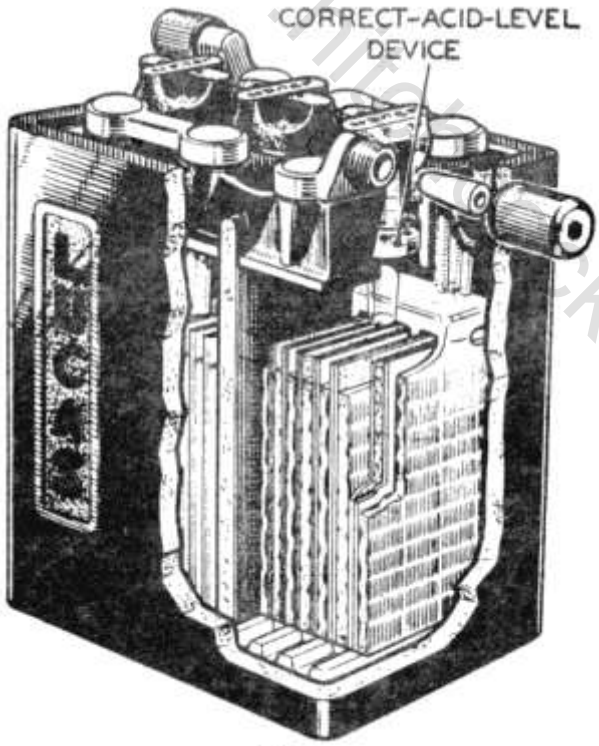


Fig. 1

2. Preparation for Service

The electrolyte is prepared by mixing together distilled water and concentrated sulphuric acid, using lead-lined tanks or suitable glass or earthenware vessels. Slowly add the acid to the water, stirring with a glass rod. Never add water to the acid, as this causes dangerous spurting of the concentrated acid. The specific gravity of the filling electrolyte depends on the climate in which the battery is to be used.

Specific gravity of electrolyte for filling "dry-charged" batteries :

Climates below 90°F. (32°C.)	Climates above 90°F. (32°C.)
Filling, 1·270	Filling, 1·210

The approximate proportions of acid and water to obtain these specific gravities :

To obtain specific gravity (corrected to 60°F.) of :	Add 1 vol. of 1·835 S.G. acid (corrected to 60°F.) to :
1·270	2·9 vols. of water.
1·210	4·0 vols. of water.

Heat is produced by the mixture of acid and water, the electrolyte should be allowed to cool before pouring it into the battery.

The specific gravity of the electrolyte varies with the temperature. For convenience in comparing specific gravities, they are always corrected to 60° F., which is adopted as a reference temperature.

The method of correction is as follows :

For every 5°F. below 60°F., deduct .002 from the observed reading to obtain the true specific gravity at 60°F. For every 5°F. above 60°F. add .002 to the observed reading to obtain the true specific gravity at 60°F.

The temperature must be that indicated by a thermometer having its bulb actually immersed in the electrolyte and not the ambient temperature.

Fill the cells to the tops of the separators, in *one operation.* The battery filled in this way is 90% charged. When time permits, a short freshening charge for no more than four hours at the normal recharge rate of 1.5 amp. should be made.

3. Routine Maintenance

Fortnightly (or more frequently in hot climates) examine the level of electrolyte in the cells and if necessary add distilled water to bring the level up to the tops of the separators. The use of a Lucas Battery Filler will be found helpful, as it ensures that the correct electrolyte level is automatically maintained and also prevents distilled water from being spilled on the top of the battery (see Fig. 2).

Occasionally examine the terminals, clean and coat them with petroleum jelly. Wipe away all

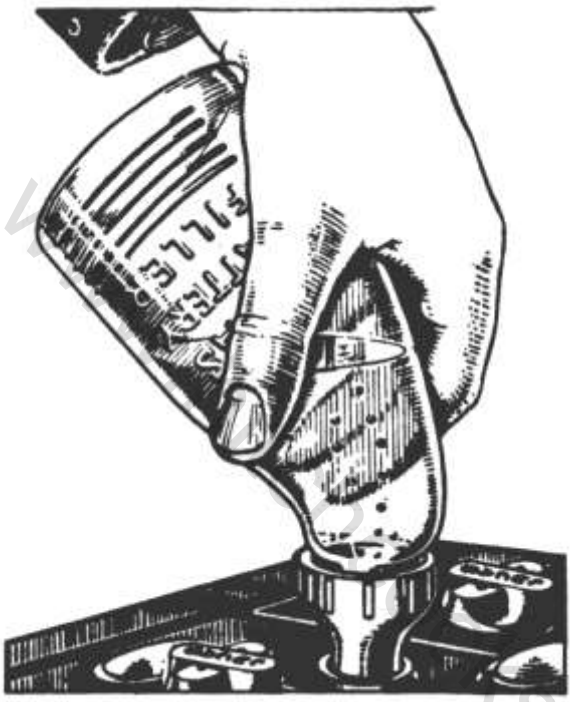


Fig. 2

dirt and moisture from the top of the battery and ensure that the connections are clean and tight.

4. Servicing

If the battery is subjected to long periods of night parking with the lights on, without suitable opportunities for recharging, a low state of charge is to be expected.

Measure the specific gravity of the acid of each cell in turn with a hydrometer (see Fig. 3).

The following table shows the state of charge at different values of specific gravities

State of Charge	Temperature under 90°F.	Temperature over 90°F.
Battery fully charged ...	1·270—1·290	1·210—1·230
Battery about half charged ...	1·190—1·210	1·130—1·150
Battery fully discharged ...	1·110—1·130	1·050—1·070

If the battery is discharged, it must be recharged, either on the motor cycle by a period of daytime running or from an external D.C. supply at the normal recharge rate of 1.5 amp.

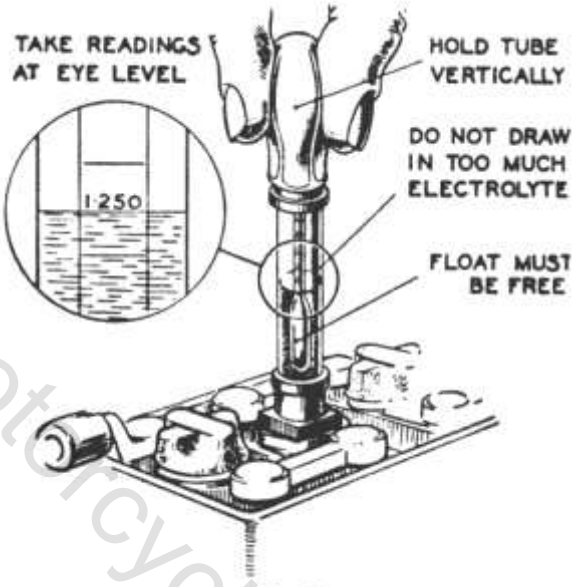


Fig. 3

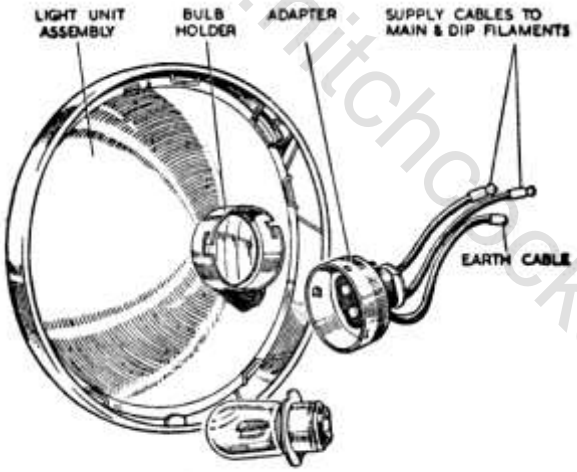
ROYAL ENFIELD WORKSHOP MANUAL

SECTION G5d

Head and Tail Lamps

1. Headlamp

In all models the headlamp incorporates the Lucas Light Unit MCF 700 built into the Casquette fork head which also contains twin parking lamps as well as the ammeter and headlight switch.



HEADLAMP MCF700
Fig. 1

2. Lucas Light Unit

The unit incorporates a combined reflector and front lens assembly (see Fig. 1). This construction ensures that the reflector and lenses are permanently protected, thus the unit keeps its high efficiency over a long period. A "prefocus"bulb is used, the filaments of which are accurately positioned with respect to the reflector, thus no focusing device is necessary.

The bulb has a large cap and a flange, which has been accurately positioned with relation to the bulb filaments during manufacture. A slot in the flange engages with a projection on the inside of the bulb holder positioned at the back of the reflector.

A bayonet-fitting adaptor with spring-loaded contacts secures the bulb firmly in position and carries the supply to the bulb contacts.

The outer surface of the lens is smooth to facilitate cleaning. The inner surface is formed of a series of lenses which determine the spread and pattern of the light beams.

In the event of damage to either the lens or the reflector a replacement light unit must be fitted.

3. Replacing the Light Unit and Bulb

Slacken the securing screw at the top of the headlamp rim. Remove the front rim and Light Unit assembly.

Withdraw the adaptor from the Light Unit by twisting it in an anti-clockwise direction and pulling it off. Remove the bulb from its locating sleeve at the rear of the reflector.

Disengage the Light Unit securing springs from the rim and lift out the Light Unit.

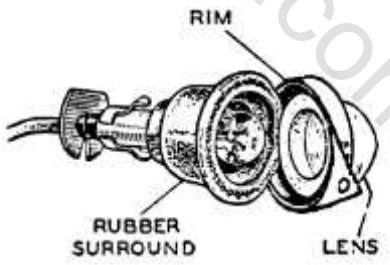
Position the new unit in the rim so that the word "TOP" on the lens is correctly located when the assembly is mounted on the headlamp. Refit the securing springs ensuring that they are equally spaced around the rim.

Replace the bulb and adaptor. The bulb must be the Lucas "prefocus" type-6 v. 30/24 watt Lucas No. 312.

Locate the bottom of the Light Unit and front rim assembly in the headlamp shell or in the fixing rim attached to the Casquette fork head. Press the front on and tighten the securing screw at the top of the headlamp.

4. Parking Lights

Access to the parking bulbs is obtained by removing the parking lamp rim (see Fig. 2). This is forced over the edge of the rubber lamp body and is additionally secured by means of a small fixing



PARKING LIGHT
Fig. 2

screw. After removal of the lamp rim the parking lamp lens can be pulled out of the rubber body, after which the bulb will be accessible.

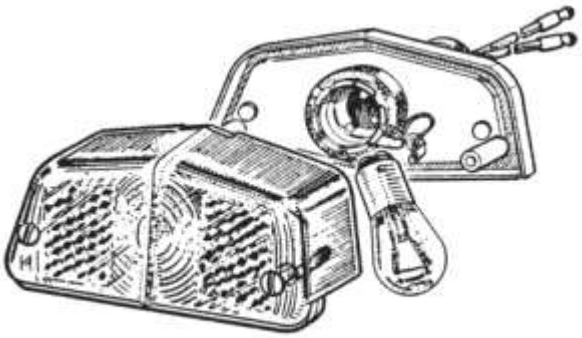
5. Tail Light

The Lucas lamp, Type 564 (Fig. 3) is a combined stop and tail light and also incorporates a reflector.

Access to the bulb is obtained by removing the two screws which secure the plastic cover.

The correct bulb is Lucas No. 352, 6 volt, 3/18 watt for machines up to 250 c.c., or Lucas No. 384, 6 volt, 6/18 watt for larger capacity machines. The 3 or 6 watt filament provides the normal tail light, while the 18 watt filament is illuminated on movement of the brake pedal.

Care must be taken that the leads to the stop tail lamp are correctly connected, as the use of the 18 watt filament on the normal tail light will not only discharge the battery but could cause trouble



STOP-TAIL LAMP L.564
Fig. 3

from excessive heat affecting the plastic cover. At the same time, the 6 watt filament, if used as a stop-tail light, will be ineffective in bright sunlight or at night when the tail light filament is illuminated.

ROYAL ENFIELD WORKSHOP MANUAL

SECTION H5

Frame

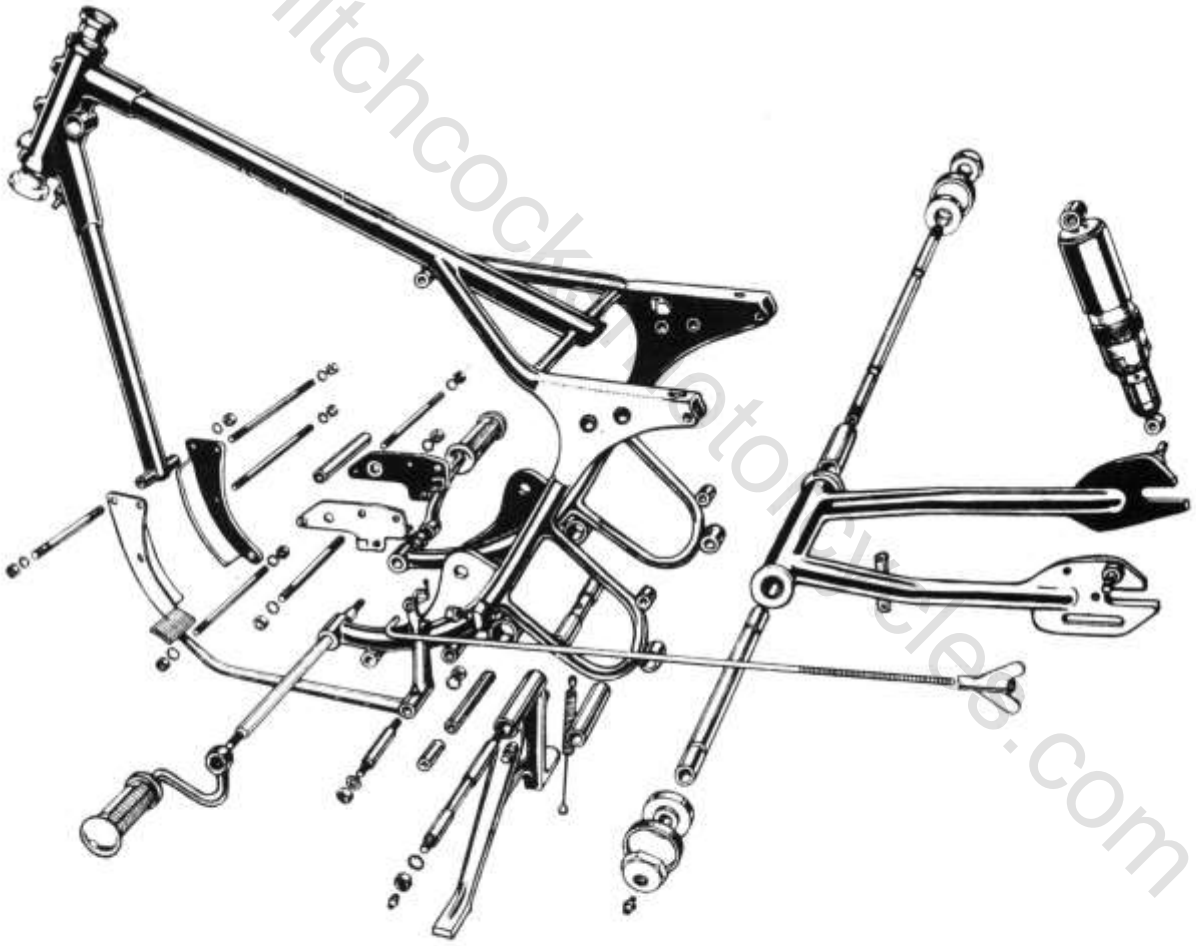


Fig. 1

ROYAL ENFIELD WORKSHOP MANUAL

1. Description of Frame

The frame is built throughout of cold drawn weldless steel tubing with brazed or welded joints, liners being fitted where necessary for extra strength. All the main frame members are made of chromemolybdenum alloy steel tubing which retains its strength and resistance to fatigue after brazing or welding.

The swinging arm unit which forms the chain stays is fitted with large diameter phosphor bronze bushes and pivots on a stout steel tube which is secured to the main frame by a long bolt passing through the pivot lugs. Hardened steel thrust washers are provided to deal with side thrust. The torsional rigidity of the swinging arm unit helps to maintain the rear wheel upright in the frame and thus relieves the wheel spindle of bending stresses to which it is subject with other types of rear suspension.

2. Steering Head Races

The steering head races, 34085, are the same at the top and bottom of the head lug and are the same for all models. They are easily removed by knocking them out with a hammer and drift and new races can be fitted either under a press or by means of a hammer and a wooden drift.

3. Removal of Rear Suspension unit

On the "Constellation" and "Super Meteor" from 1961 onwards, the valances on either side of the frame must be removed to gain access to thetop pivot pin. See Section C, paragraph 8.)

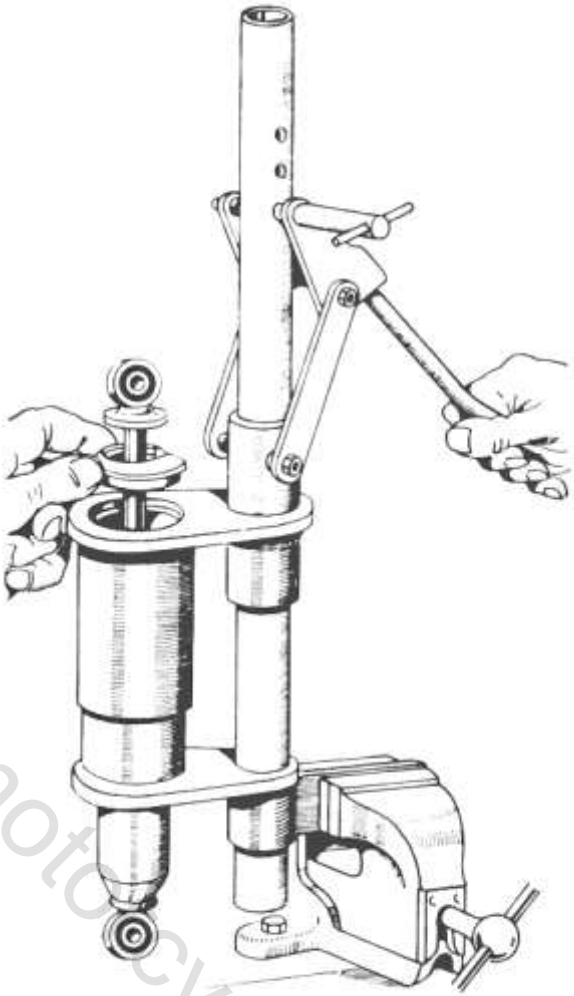
The procedure for all models is then as follows. Remove the top pivot pin nut, drive out the pivot pin, then hinge the suspension unit back on the lower pivot pin. After removing the lower nut, the unit may be pushed off the pivot pin welded to the fork end.

4. Servicing Rear Suspension Units

The proprietary units fitted are sealed and servicing of the internal mechanism can be carried out only by the manufacturers.

The rubber bushes in the top and bottom eyes can easily be renewed and the spring can be removed by pushing down on the top spring cover so as to release the split collar above it. After removal of the split collar the top cover and spring can be lifted off. When reassembling, the spring should be greased to prevent rust and squeaking if it should come into contact with either of the covers.

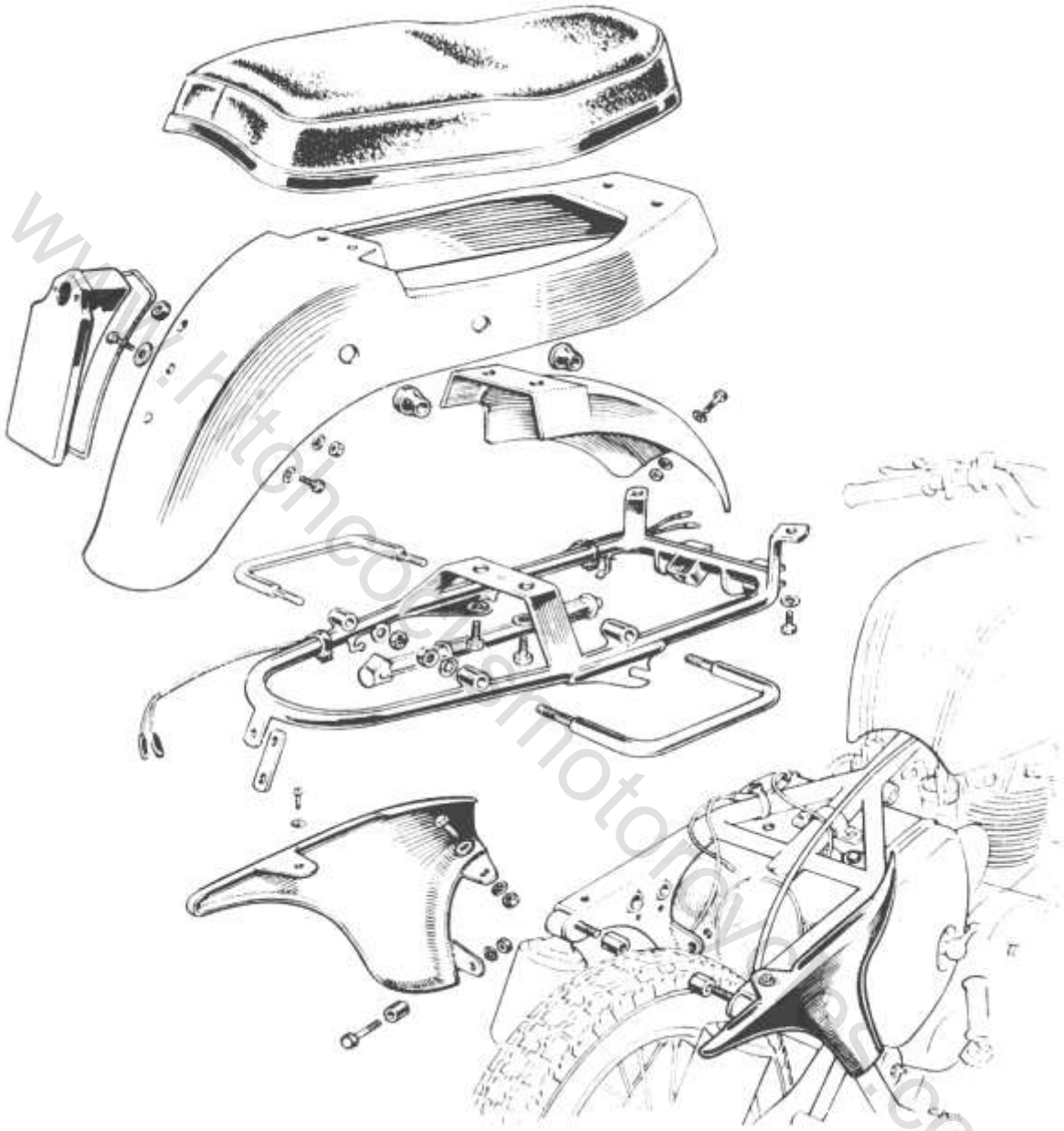
The standard solo springs have a rate of 100 105 lb. per inch and it is not difficult to compress these by hand. Heavier springs having a rate of 130 lb. per inch are available which may require the use of a spring compressor, as shown in Fig. 2.



REAR SPRING COMPRESSOR
Fig. 2

5. Removal of Swinging Arm Chain Stays

First remove one of the pivot pin nuts and pull the pivot pin out from the other end. To release the pivot bearing it is necessary to spread the rear portion of the frame, using the frame expander E.5431, which will spread the frame sufficiently to enable the spigots on the thrust washers to clear the recesses in the pivot lugs forming part of the frame.



DUAL SEAT – MUDGUARD ASSEMBLY 1961 ONWARDS

Fig. 3

If it is necessary to remove the bronze bushes these can be driven out by means of a hammer and a suitable drift and new bushes can be fitted under a press without difficulty. After fitting the bushes they must be reamed to .844/.843 in.

6. Centre Stand

To remove the centre stand unscrew the nut from one end of the stand spindle, knock out the latter and withdraw the stand complete with its bearing sleeve after disconnecting one end of the stand spring.

7. Wheel Alignment

Note that it is not possible to guarantee that the wheels are correctly aligned when the same notch position is used on both adjuster cams. It is therefore not sufficient to count the notches and use the same position on both sides of the machine. The only way to guarantee that the wheels are in line is to check the alignment from front wheel to back using either a straight edge or a piece of taut string. The alignment should be checked on both sides of the machine and if the front and rear tyres are of different section allowance must be made for this.

It is usual to check the alignment of the wheels at a point about six inches above the ground but, if the alignment is checked also towards the top of the wheels, it will be possible to ascertain whether or not the frame is twisted so as to cause one wheel to be leaning while the other is vertical. To do this it is always necessary to remove the mudguards and, unless a straight edge cut away in its centre portion is available, it will be necessary also to remove the cylinder, toolboxes, battery, etc., in order to allow an unbroken straight edge or a piece of taut string to contact the front and rear tyres.

8. Lubrication

The steering head races, swinging arm pivot bearing and stand pivot bearing should be well greased on assembly. The swinging arm pivot and stand pivot are provided with grease nipples but no nipples are provided for the steering head as experience has shown that the provision of nipples at this point causes trouble through chafing and cutting of control and lighting cables. If the steering head bearings are well packed they will last for several years or many thousands of miles.

Recommended greases are Castrolease (Heavy), Mobilgrease (No. 4), Esso Grease Energrease C. I or Shell Retinax A.

9. Dismantling the Rear Mudguard-dual Seat Assembly, 1961 onwards

Having removed the assembly front the frame as described in Section C, paragraph 8, dismantling for repair or replacement is a simple matter.

First remove the single, 3/16 in. bolt securing the number plate, and disconnect the rear light wire at the junctions. The lifting handles are next pulled out, after undoing the two 5/16 in. nuts on each handle. The grommets may be left in position in the mudguard.

Take out the two 3/16 in. bolts in the nose of the muduard. These screw into tapped holes in the dual seat. When replacing, the shakeproof washer must be next to the head of the bolt and the large plain washer must be against the underside of the mudguard.

Remove the single 3/16 in. nut and bolt attaching the rear of the mudguard to the carrier. Note the large plain washer, this must be under the bolt head, and bear against the top of the mudguard on assembly. Also the shakeproof washer and metal plate on the underside.

Lastly, the two 1/4 in. bolts attaching the front of the carrier to the mudguard, and the two 5/16 in. bolts in the carrier bridge piece, can be undone. They fit into tapped holes in the dual seat

Note that shakeproof washers are fitted to all bolts and studs. Plain washers must be placed as described above and shown in Fig. 3.

On some early 1961 "Constellation" models, this mudguard is made from glass-fibre and in the event of damage small repair kits, consisting of a quantity of resin, catalyst and glass fibre, are available from our Service Department. Instructions for carrying out minor repairs are issued with this kit. All other models have the mudguard of pressed steel.

ROYAL ENFIELD WORKSHOP MANUAL

SECTION J1

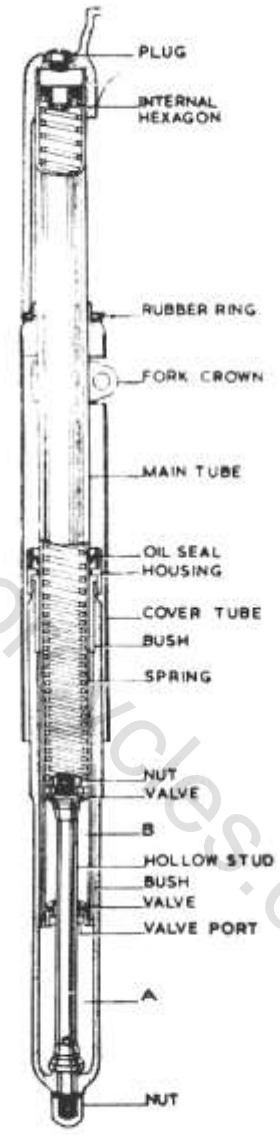
Front Fork

With Casquette and Aluminium Alloy Bottom Tubes

1. Description

The telescopic fork consists of two legs each of which comprises a main tube of chrome molybdenum alloy steel tubing which is screwed into the Casquette fork head at the upper end and securely clamped to the fork crown. Fitted over the lower end of the main tube is the bottom tube made of high strength aluminium alloy with an integral lug which carries the wheel spindle. Fitted on the lower end of the main tube is a steel bush which is a close fit in the bore of the bottom tube. The upper end of the bottom tube carries a bronze bush which is a close fit over the outside diameter of the main tube. The bush is secured to the bottom tube by means of a threaded housing which contains an oil seal. A stud known as the "spring stud" is fitted in the lower end of the bottom tube and a valve port is secured to the lower end of the main tube. As the fork operates oil is forced between the spring stud and the bore of the valve port forming a hydraulic damping system. A compression spring is fitted inside the main tube between the upper end of the spring stud and the upper end of the main tube. The lower end of the main tube and upper end of the bottom tube are protected by a cover secured to the fork crown.

A special fork is available for sidecar machines. This has bottom tubes with extended wheel lugs giving less trail and is fitted with stronger springs and a steering damper.



SECTION OF FORK LEG

Fig. 1

2. Operation of the Fork

The fork provides a range of movement of 6 in. from the fully extended to the fully compressed position. The movement is controlled by the compression spring and by the hydraulic damping system. The hydraulic damping is light on the bump stroke and heavier on the rebound stroke, thus damping out any tendency to pitching or oscillation without interfering unduly with the free movement of the fork when the wheel encounters an obstacle.

The fork is filled with S.A.E. 20 to a point above the lower end of the fork spring so that the damper chamber "B" is always kept

full of oil. Upward movement of the wheel spindle forces oil from the lower chamber "A" through the annular space between the spring stud (38067) and the bore of the main tube valve port (38138) into the damper chamber "B." During this stroke the pressure on the underside of the valve plate (38073) causes this to lift so that oil can also pass from "A" to "B" through the eight holes in the valve body. Since, however, the diameter of chamber "B" is less than that of chamber "A" there is not room in "B" to receive all the oil which must be displaced from "A" as the fork operates. The surplus oil passes through the cross hole in the spring stud and up the centre hole in the stud, spilling out through the nut (38076) which secures the upper end of the spring stud to the bronze guide at the lower end of the fork spring.

On the rebound stroke the oil in the damper chamber "B" is forced through the annular space between the spring stud and the bore of the main tube valve port. During this stroke pressure in chamber "B" closes the two disc valves at the upper and lower ends of the chamber so that the only path through which the oil can escape is the annular space between the spring stud and the port. Damping on the rebound stroke is therefore heavier than on the bump stroke. At the extreme end of either bump or rebound stroke a small taper portion on the spring stud enters the bore

MAIN TUBE SPANNER

Fig. 2

of the valve port, thus restricting the annular space and increasing the amount of damping. At the extreme end of the bump stroke the larger diameter taper on the oil control collar (38075) enters the main counterbore of the valve port thus forming a hydraulic cushion to prevent metal to metal contact.

3. Dismantling the Fork to Replace Spring, Oil Seal or Bearing Bushes

Place the machine on the centre stand, disconnect the front brake control and remove the front wheel and mudguard complete with stays. Unscrew the bottom spring stud nut (38080) which will allow oil to run out of the fork down

MAIN TUBE SEAL GUIDE

Fig. 3

to the level of the cross-hole in the spring stud. Now knock the spring stud upward into the fork with a soft mallet, thus allowing the remainder of the oil to escape. Pull the fork bottom tube down as far as possible, thus exposing the oil seal housing (38157). Unscrew this housing either by means of a spanner on the flats with which it is provided or by using the gland nut handgrips (E.5417). The bottom tube can now be withdrawn completely from the main tube, leaving the bottom tube bush, oil seal housing and oil seal in position on the main tube.

Now unscrew the main tube valve port using "C" spanner (E5418). The spring stud and spring can now be withdrawn from the lower end of the main tube.

The steel main tube bush (38156) can now be tapped off the lower end of the tube, if necessary using the bottom tube bush for this purpose. Before doing this, however, it is advisable to mark the position of the bush with a pencil line so as to ensure reassembling it in the same position on the main tube. The reason for this is that these steel bushes are finish ground to size after fitting on to the tubes so as to ensure concentricity to the main tube. After

removal of the main tube bush the bottom tube bush, oil seal housing and oil seal can be removed.In case of difficulty in removing the main tube bush it is possible to withdraw the oil seal housingafter loosening the crown clip bolt 39038, removing the plug screw 38968 and unscrewing the main tube from the fork-head by means of a hexagon bar .500 in. across flats (Unbrako wrench W. 11) or the special tool shown in Fig. 2.

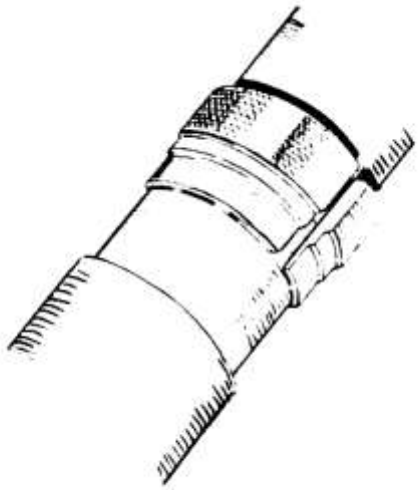
4. Spring

Solo and Sidecar springs are available. The free length of each is 20.1/2 ins. The spring should be replaced if it has closed by more than 1 inch.

5. Reassembly of Parts

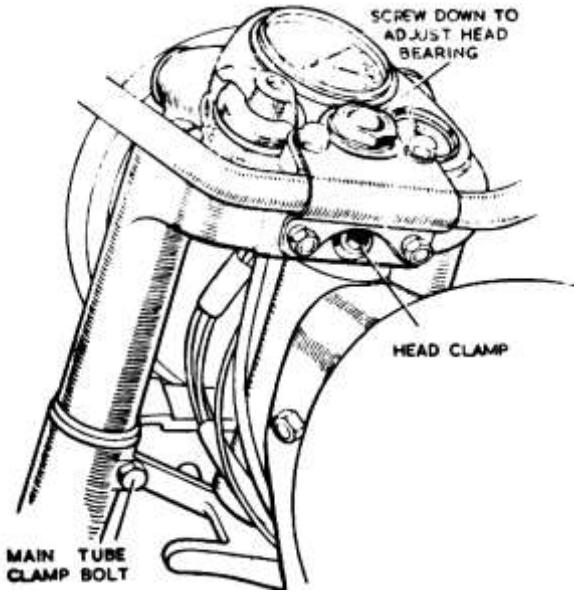
When refitting the oil seal, or fitting a new one, great care must be exercised not to damage the synthetic rubber lip which forms the actual seal. If the seal has been removed from the upper end of the main tube and is refitted from this end a special nose piece (Fig. 3) must be fitted over the end of the tube to prevent the thread from damaging the oil seal.

The spring stud is a tight fit in the hole at the lower end of the bottom tube. Once the stud has been entered in the hole push the bottom tube up sharply against the spring until two or three threads on the stud project beneath the end of the bottom tube. Now fit the nut and washer and pull the stud into position by tightening the nut. If necessary fit the nut first without the washer until sufficient thread is projecting to enable the washer to be fitted.



OUTER COVER CENTRALISING BUSHES

Fig. 5



SHOWING THE POSITIONS OF THE CLAMP BOLTS SECURING THE STEERING STEM AND FORK TUBES

Fig. 4

6. Steering Head Races

The steering head bearing consists of two deep groove thrust races each containing nineteen 1/4 in. diameter balls. The bearing is adjusted by tightening the steering stem locknut after loosening the ball head clip screw and both the fork crown clamp bolts. The head should be adjusted so that, when the front wheel is lifted clear of the ground, a light tap on the handlebars will cause the steering to swing to full lock in either direction, while at the same time there should be only the slightest trace of play in the bearings. When testing for freedom of movement the steering damper, if fitted, should be disconnected by unscrewing the anchor plate pin. Do not forget to tighten the ball head clip screw and fork crown clamp bolts. Before tightening the latter make sure that the cover tubes are located centrally round the main tubes so that the bottom tube does not rub inside the cover tube. A pair of split bushes (Fig. 5) is useful to ensure centralisation of the cover tubes.

7. Removal of Complete Fork

The fork complete with front wheel and mudguard can be removed from the machine if necessary by adopting the following procedure.

The leads to the lighting switch and ammeter should be disconnected from the battery, regulator, tail lamp, etc. at their lower ends or by means of the plug and socket connectors when these are provided. The switch and ammeter are push fits into the rubber bushes (LU/365408) in the fork head.

Disconnect the speedometer drive from the speedometer head and unscrew the steering damper knob and rod (if fitted) after removal of the split pin through the lower end of the rod. Undo the steering damper anchor plate pin so as to disconnect the damper from the frame of the machine.

Remove the two plug screws (38968) and loosen the steering head clip bolt and the two fork crown clamp bolts.

Now unscrew the fork main tubes from the fork head and the steering stem locknut from the top of the steering stem, turning each tube and the nut a turn or two at a time. When the nut has been removed from the steering stem and the main tubes have been completely unscrewed from the fork head the complete fork and wheel with steering stem can be lifted out of the head lug of the frame.

8. Lubrication

The lubrication of the fork bearings is effected by the oil which forms the hydraulic damping medium. All that is necessary is to keep sufficient oil in the fork to ensure that the top end of the bottom spring stud is never uncovered even in the full rebound position. The level of oil in the fork can be gauged by removing the top plug screw and inserting a long rod about 3/8 in. diameter. If slightly tilted this will ledge against the nut at the upper end of the bottom spring stud and indicate the level of oil above the stud. If the fork is empty to start with the quantity required is approximately 7.1/2 fluid ounces in each leg. Recommended grades of oil are Castrolite, Mobiloil Arctic, Essolube 20, B.P. Energol S.A.E. 20 and Shell X-100 20/20W.

9. Air Vents

The earlier forks of this type were provided with holes at the upper end of each main tube communicating with small vent holes in the Casquette head. Experience has shown that on rough roads oil may escape through these air vents which in consequence are now omitted. Escape of oil from the earlier forks can be largely eliminated by fitting specially long plug screws, which are available. The Part Number is 40118. If these are fitted and the final vent hole is stopped up with a wooden plug leakage at this point is impossible. Fitting the special plug screws alone is sufficient in most instances.

ROYAL ENFIELD WORKSHOP MANUAL

SECTION K6

Front Wheel
With Dual 6in. Brake

1. Removal from Fork

To remove the front wheel from the fork place the machine on the centre stand and front stand, if fitted, or alternatively with sufficient packing (about 2 in.) beneath each side of the stand to lift the wheel clear of the ground when tilted back on to the rear wheel. Slacken brake cable adjustments and disconnect cables from handlebar lever and from operating cam levers on hub. Unscrew the four nuts securing the fork bottom tube lug caps (Part No. 38593) and allow the wheel to drop forwards out of the front fork. Make sure that the machine stands securely on the rear wheel and centre stand-if necessary place a weight on the saddle or a strut beneath the fork to ensure this.

2. Removal of Brake Cover Plate Assemblies

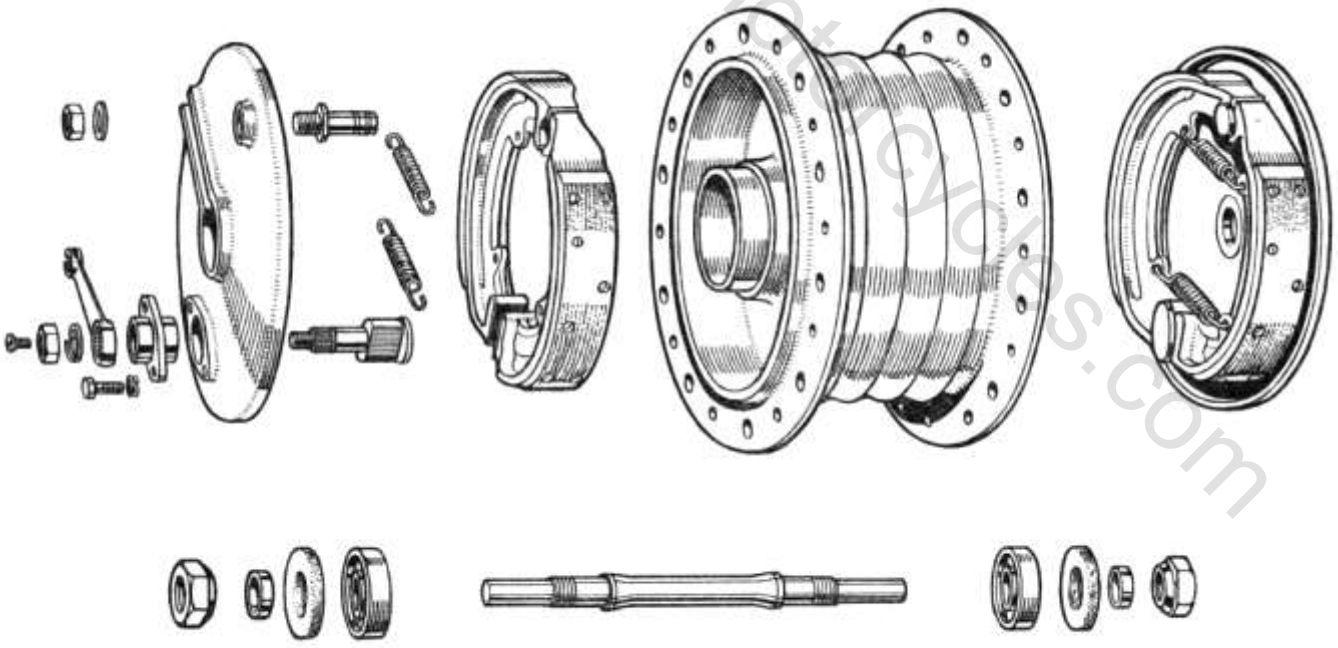
Lock the brake "on" by pressure on the operating lever, 38905 (R.H.) or 38906 (L.H.), and unscrew the cover plate nuts 31347. The right and left hand cover plate assemblies can then be withdrawn from the respective brake drums.

3. Removal of Brake Shoes and Springs

This is best done by unscrewing the pivot pin locknuts, 28715, and the operating lever nuts, 10314, after which the assembly of brake shoes, return springs, pivot pin and operating cam can be removed from the cover plate by light blows with a hammer and drift on the ends of the pivot pin and the operating cam, see Fig. 2. The return springs, 29236, can then be unhooked from the spring posts in the brake shoes thus allowing the whole assembly to fall apart.

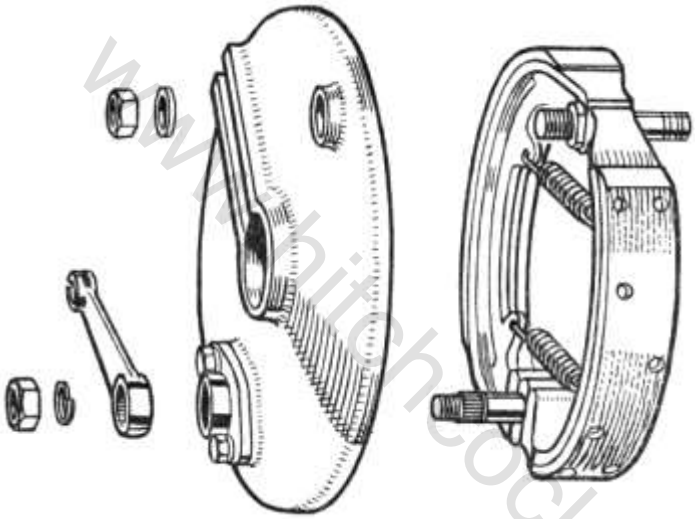
4. Replacing Brake Linings

Brake linings are supplied either in pairs ready drilled complete with rivets or ready fitted to service replacement brake shoes.



DUAL FRONT BRAKE
Fig. 1

When riveting linings to shoes secure the two centre rivets first so as to ensure that the lining lies flat against the shoe. Standard linings are Ferodo MR41, which are drilled to receive cheese headed rivets.



REMOVAL OF BRAKE SHOE ASSEMBLY
Fig. 2

5. Removal of Hub Spindle and Bearings

To remove the hub spindle and bearings having already removed the brake cover plate assemblies, lift out the felt washers, Part No. 21466, and distance washers, Part No. 30538. Now hit one end of the wheel spindle with a copper hammer or mallet, thus driving it out of the hub bringing one bearing with it and leaving the other in position in the hub. Drive the bearing off the spindle and insert the latter once more in the hub at the end from which it was removed. Now drive the spindle through the hub the other way, when it will bring out the remaining bearing.

6. Hub Bearings

These are deep groove single row journal ball bearings 5/8in. i/d by 1.9/16in. o/d by 7/16in. wide. The Skefko Part No. is RLS5. Equivalent bearings of other makes are Hoffmann LS7, Ransome and Marles LJ5/8in., Fischer LS7.

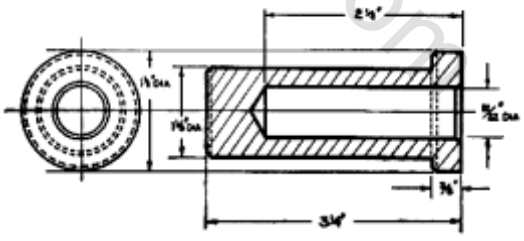
7. Fitting Limits for Bearings

The fit of the bearings in the hub barrel is important. The bearings are locked on the spindle between shoulders and the distance pieces, 30538, which in turn are held up by the cover plate nuts 31347. In order to prevent endways pre-loading of the bearings it is essential that there is a small clearance between the inner edge of the outer race of the bearing and the back of the recess in either end of the hub barrel. To prevent any possibility of sideways movement of the hub barrel on the bearings it is, therefore, necessary for the bearings to be a tight fit in the barrel but this fit must not be so tight as to close down the outer race of the bearing and thus overload the balls. The following are the manufacturing tolerances which control the fit of the bearings. The figures for the bearings themselves are for SKF bearing; but other manufacturers' tolerances are similar.

Bearing o/d	1.5622/1.5617 in.
Housing bore	1.5620/1.5616 in.
Bearing bore	0.6252/0.6247 in.
Shaft diameter	0.6252/0.6248 in.

8. Refitting Ball Bearings

To refit the bearings in the hub two hollow drifts are required, as shown in Fig. 3. One bearing is first fitted to one end of the spindle by means of the hollow drift; the spindle and bearing are then entered into one end of the hub barrel which is then supported on one of the hollow drifts. The other bearing is then threaded over the upper end of the spindle and driven home by means of the second hollow drift either under a press or by means of a hammer which will thus drive both bearings into position simultaneously. In order to make quite sure that there is clearance between the inner faces of the outer bearing races and the bottom of the recesses, fit the distance washer 30538, and the cover plate nuts, 31347, with either the cover plates themselves or additional packing washers behind the nuts. Tightening the nut should not have any effect on the ease with which the spindle can be turned. If tightening the nuts makes the spindle hard to turn this may be taken as proof that the bearings are bottoming in the recesses in the hub barrel before they are solid against the shoulders on the spindle. In this cage the bearing should be removed and a thin packing shim fitted between the inner race and the shoulder on the spindle.



DRIFT FOR REFITTING BEARINGS
Fig. 3

9. Reassembly of Brake Shoes to Cover Plates

Assemble each pair of shoes with their return springs on to the pivot pin and operating cam, putting a smear of grease in the grooves of the pivot pin and on the operating faces of the cam. Now fit the assembly into the cover plate, putting a smear of grease on to the cylindrical bearing surface of the operating cam and secure with the pivot pin locknut, 28715, and washer, 17551. Fit the operating lever, 38905 or 38906, on its splines in a position to suit the extent of wear on the linings and secure with the nut, 10314, and washer, 14613. Note that the position of the operating levers may have to be corrected when adjusting the brake after refitting the wheel. The range of adjustment can be extended by moving these levers on to different splines. Limit of wear is reached when the cam is turned through nearly 90° with the brake hard on so that there is a danger that the operating springs cannot return the brake to the off position.

10. Floating Cam Housings

Note that the cam housings, Part No. 26836, are intended to be left free to float. The bolt holes in the cam housings are slotted and the securing pins, Part No. 252, are provided with double coil spring washers beneath their heads to enable them to be tightened sufficiently to prevent the cam housings moving under the influence of road shocks, while at the same time they can be, and should be, left free enough to be capable of being moved by hand in the direction of the slots. The pins, 252, are secured by locknuts, 7916, which are centre punched as an additional precaution.

The leading shoes (i.e., those towards the rear of the machine) have a servo action which renders them more effective than the trailing shoes. This servo action causes the linings on the leading shoes to wear more quickly than those on the trailing shoes and at the same time tends to lift the leading shoes off the cams and press the trailing shoes harder on to the cams. With a fixed cam housing the result is that the majority of the cam pressure is applied to the less efficient trailing shoe. By leaving the housing free to float the cam can follow up the leading shoe thus maintaining equal pressure between the cam and the two shoes and so making full use of the more efficient leading shoe. Owing to the servo action the wear on the leading shoe with a floating cam housing is greater than that of the trailing shoe and in time the limit of float of the cam housing will be reached, after which the brake will continue to function as a fixed cam brake with some loss of efficiency. This can be restored by removing the shoes and fitting them in the opposite positions. Floating cam brakes are self-centering and there is no need to take any special precautions to see that the two linings are of equal thickness or that the brake shoe assembly is centred in the drum.

11. Refitting Brake Cover Plates

After assembling the brake shoe pivot pins and operating cams into the cover plates repack the hub bearings with grease. The recommended greases are Castrolease (Heavy), Mobilgrease (No. 4), Esso Grease, Energrease C3 or Shell Retinax A. These are all medium heavy lime soap or aluminium soap greases. The use of H.M.P. greases which have a soda soap base is not recommended as these tend to be slightly corrosive if any damp finds its way into the hubs.

Before fitting the distance washers and felt washers make sure that the inside of the brake drums are quite clean and free from oil or grease, damp, etc., and replace the brake cover plate assemblies. Securely tighten the cover plate nuts, 31347.

12. Wheel Rim

The rim is Type WM2-19 in. plunged and pierced with forty holes for spoke nipples. The spoke holes are symmetrical, i.e., the rim can be assembled to the hub either way round. Rim diameter after building is 19.062 in., tolerances on the circumference of the rim shoulders where the tyre fits being 59.930/59.870 in. The standard steel measuring tape for checking rims is 5/16in. wide, .011 in. thick and its length is 59.964/ 59.904 in.

13. Spokes

The spokes are of the single butted type 8-10 gauge with 90° countersunk heads, angle of bend 95°-100°, length $6\frac{5}{8}$ in., thread diameter .144 in., 40 threads per inch, thread form British Standard Cycle.

14. Wheel Building and Truing

The spokes are laced one over two and the wheel rim must be built central in relation to the nuts which secure the brake cover plates. The rim should be trued as accurately as possible, the maximum permissible run-out both sideways and radially being plus or minus 1/32in.

15. Tyre

The standard tyre is Dunlop 3.25-19in. Ribbed tread.

When removing the tyre always start close to the valve and see that the edge of the cover at the other side of the wheel is pushed down into the well in the rim.

When replacing the tyre fit the part by the valve last, also with the edge of the cover at the other side of the wheel pushed down into the well.

If the correct method of fitting and removal of the tyre is adopted it will be found that the covers can be manipulated quite easily with the small levers supplied in the toolkit. The use of long levers and/or excessive force is liable to damage the walls of the tyre. After inflation make sure that the tyre is fitting evenly all the way round the rim. A line moulded on the wall of the tyre indicates whether or not the tyre is correctly fitted. If the tyre has a white mark, indicating a balance point, this should be fitted near the valve.

16. Tyre Pressure

The recommended pressure for the front tyre is 18lb. per square inch for wheel loads up to 240lb.

17. Lubrication

No grease nipple is provided on later hubs. due to the tendency to over-grease, resulting in grease finding its way past the felt seal; on to the brake linings.

The correct method of lubrication is to pack the bearings with grease after dismantling the hub, as described above.

Note that the brake cams are drilled for grease passages but the ends of these are stopped up with countersunk screws instead of being fitted with grease nipples. This is done to prevent excessive greasing by over-enthusiastic owners. If the cams are smeared with grease on assembly they should require no further attention but in case of necessity it is possible to remove the screws, fit grease nipples in their place and grease the cams by this means.

ROYAL ENFIELD WORKSHOP MANUAL

SECTION K7

Front Wheel

With Single Brake

1959-60 "350 Bullet," 7-inch Brake

1958-60 "350 Clipper" and 1958-60 Trials "Works Replica." 6-inch Brake

1. Removal from Fork

To remove the front wheel from the fork place the machine on the centre stand with sufficient packing (about 2 in.) beneath each side of the stand to lift the wheel clear of the ground when tilted back on to the rear wheel. Slacken the brake cable adjustment and disconnect the cable from the handlebar lever and from the operating cam lever on the hub. Unscrew the four nuts securing the fork leg caps and allow the wheel to drop forward out of the front fork. Make sure that the machine stands securely on the rear wheel and centre stand, if necessary place a weight on the saddle or a strut beneath the fork to ensure this.

2. Removal of Brake Cover Plate Assembly

Lock the brake "on" by pressure on the operating lever and unscrew the cover plate nut. The cover plate assembly can then be withdrawn from the brake drum.

3. Removal of Brake Shoes for Replacement, etc.

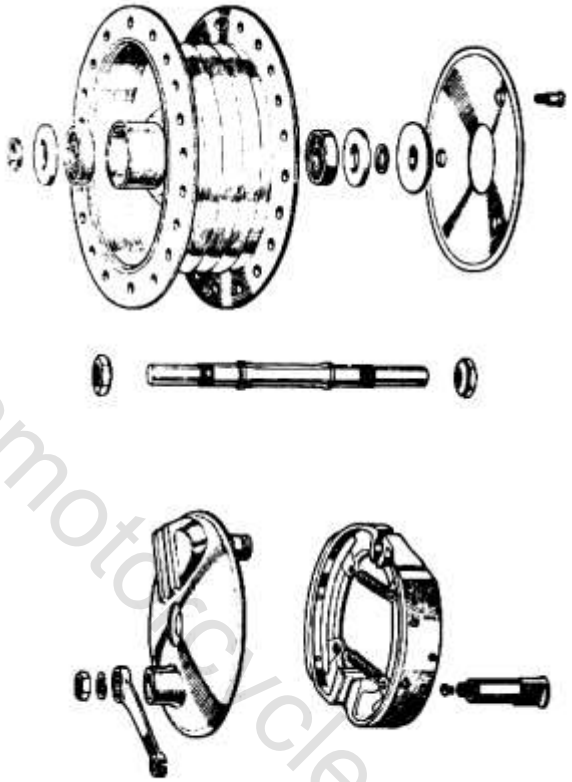
The brake shoes can be removed after detaching the return springs. The brake linings are bonded to the shoes and if requiring to be renewed should be sent for servicing.

4. Removal of Brake Operating Cam

To remove the operating cam unscrew the nut, 10314, which secures the operating lever to the splines on the cam. A sharp tap on the end of the cam spindle will now free the lever, after which the cam can be withdrawn from its housing. Do not try and remove the brake shoe pivot pin; it is cast into the brake cover plate and cannot be removed.

5. Removal of Hub Spindle and Bearings

To remove the hub spindle and bearings having first removed the brake cover plate, unscrew the retaining nut and remove the dust excluder from the non-brake side of the hub. Now remove the felt washers and the distance washer from the brake side and hit one end of the spindle with a copper hammer or mallet, thus driving it out of the hub, bringing one bearing with it and leaving the other in position in the hub. Drive the bearing off the spindle and insert the latter once more in the hub at the end from which it was removed. Now drive the spindle through the hub the other way, when it will bring out the remaining bearing.



FRONT HUB AND BRAKE
Fig. 1

1959/1960 "350 Bullet" machines with 7 in. brakes have no loose, pressed cover on the nonbrake side (see Fig. 1). Where this is fitted, the three screws holding it, and the cover plate, must be removed before attempting bearing removal.

6. Hub Bearings

These are deep-groove single-row journal ball bearings 5/8 in. i/d by 1.9/16 in. o/d by 7/16 in. wide. The Skefko Part No. is RLS5. Equivalent bearings of other makes are Hoffmann LS7, Ransome and Marles LJ 5/8 in., Fischer LS7.

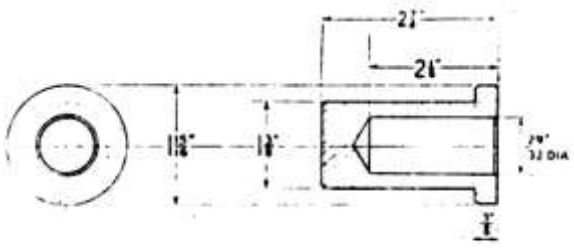
7. Fitting Limits for Bearings

The fit of the bearings in the hub barrel is important. The bearings are locked on the spindle between shoulders and the distance pieces, 30538, which in turn are held up by the nuts on the spindle. In order to prevent endways pre-loading of the bearings it is essential that there is a small clearance between the inner edge of the outer race of the bearing and the back of the recess in either end of the barrel. To prevent any possibility of sideways movement of the hub barrel on the bearings it is therefore. necessary for the bearings to be a tight fit in the barrel, but this fit must not be so tight as to close down the outer race of the bearing and thus overload the balls. The following are the manufacturing tolerances which control the fit of the bearings. The figures for the bearings themselves are for SKF. bearings, but other manufacturers tolerances are similar.

Bearing o/d, 1.5622/1.5617 in.
Housing bore, 1.5620/1.5616 in.
Bearing bore, .6252/.6247 in.
Shaft diameter, .6252/.6248 in.

8. Refitting Ball Bearings

To refit the bearings in the hub, two hollow drifts are required, as shown in Fig. 2. One bearing is first fitted to one end of the spindle by means of the hollow drift; the spindle and bearing are then entered into one end of the hub barrel, which is then supported on one of the hollow drifts. The other bearing is then threaded over the upper end of the spindle and driven home by means of the second hollow drift either under a press, or by means of a hammer, which will thus drive both bearings into position simultaneously. In order to make quite sure that there is clearance between the inner faces of the outer bearing race, and the bottom of the recesses, fit the distance washers, cover plate, dust excluder and the nut, on the spindle. Tightening the nuts should not have any effect on the ease with which the spindle can be turned. If tightening the nuts makes the spindle hard to turn this may be taken as proof that the bearings are bottoming in the recesses in the hub barrel before they are solid against the shoulders on the spindle. In this case, the bearing should be removed and a thin packing shim fitted between the inner race and the shoulder on the spindle.



DRIFT FOR REFITTING BEARINGS
Fig. 2

9. Reassembly of Brake Shoes and Operating Cam into the Cover Plate

No difficulty should be experienced in carrying out these operations. Put a smear of grease on the pivot pin and on the operating face of the cam: also on to the cylindrical bearing surface of the operating cam. Fit the operating lever, 38905 on its splines in a position to suit the extent of wear on the linings and secure with the nut and washer. Note that the position of the operating lever may have to be corrected when adjusting the brake after refitting the wheel. The range adjustment can be extended by moving this lever on to a different spline. Limit of wear is reached when the cam is turned through nearly 90° with the brake hard on, so that there is a danger that the operating springs, cannot return the brake to the off position.

10. Final Assembly of Hub before Replacing Wheel

Before replacing the felt washers which form the grease seals, pack all bearings with grease. Recommended greases are Castrolease (Heavy) Mobilgrease (No. 4), Esso Grease, Energrease C3 or Shell Retinax A. These are all medium heavy, lime soap or aluminium soap greases. The use of H.M.P. greases which have a soda soap base is not recommended, as these tend to be slighty corrosive if any damp finds its way into the hubs.

Make sure that the inside of the brake drum is quite free from oil or grease, damp, etc. Replace the felt washers, distance collars, dust excluder and brake cover plate and securely tighten the spindle nuts.

11. Wheel Rim

1959 and 1960 350 Bullet and 1960 Clipper:
The wheel rim is WM2-17 in., plunged and pierced with forty holes for spoke nipples. The spoke holes are symmetrical, i.e. the rim can be assembled to the hub either way round. The rim diameter after building is 17.062 in., the tolerance,

on the circumference of the rim shoulders where the tyre fits being 53.642/53.582 in. The standard steel measuring tape for checking rims is 5/16 in. wide, .011 in. thick, and its length is 53.676/ 53.616 in.

Up to 1959 "Clipper," up to 1962 "500 Bullet," up to 1958 "350 Bullet": The wheel rim is WM2-19 in. plunged and pierced with forty holes for spoke nipples. The spokes are symmetrical, i.e. the rim can be assembled either way round. The rim diameter after building is 19.062 in., the tolerances on the circumference of the rim shoulders where the tyre fits being 59.930/59.870 in. The standard steel measuring tape for checking rims is 5/16 in. wide, .011 in. thick and its length is 59.964/59.904 in.

12. Spokes

"350 Clipper," 1960: The spokes are of the singlebutted type, 8-10 gauge, with 90° countersunk heads, thread diameter .144 in., 40 threads per inch, thread form British Standard Cycle. The inner spokes are 5.5/8 in. long with an angle of bend 100', and the outer spokes 5.3/4 in. long with an angle of bend 80°.

The "Trials" model has a 6 in. brake, the front rim is WM1-21 in., there are forty spokes 7.9/16 in. long 10-8 gauge. On all "350 Bullets" up to 1958, "Clippers" up to 1959 and "500 Bullets" up to 1962, the inner and outer spokes are 6.5/8 in. long. "350 Bullets," 1959 to 1962 have spokes 6.5/16 in. long.

13. Wheel Building and Truing

The spokes are laced one over two, and the wheel rim must be built central in relation to the faces of the nuts on the spindle. The rim should be trued as accurately as possible, the maximum permissible run-out both sideways and radially being plus or minus 1/32 in.

14. Tyre

The standard tyre is Dunlop 3.25-17 in. Ribbed. "350 Bullet" up to 1958. "350 Clipper" up to 1959, "500 Bullet" up to 1962: use a 3.25-19 in. When removing the tyre always start close to the valve and see that the edge of the cover at the other side of the wheel is pushed down into the well in the rim.

When replacing the tyre fit the part by the valve last, also with the edge of the cover at the other side of the wheel pushed down into the well.

If the correct method of fitting and removal of the tyre is adopted it will be found that the covers can be manipulated quite easily with the small levers supplied in the tool-kit. The use of long levers and/or excessive force is liable to damage the walls of the tyre. After inflation, make sure that the tyre is fitting evenly all the way round the rim. A line moulded on the wall of the tyre indicates whether or not the tyre is correctly fitted. If the tyre has a white mark indicating, a balance point, this should be fitted near the valve.

15. Tyre Pressures

The recommended pressures for the front tyres are 16 lb. per square inch for wheel loads not exceeding 200 lb., 18 lb. per square inch for load up to 240 lb., 20 lb. per square inch for loads up to 280 lb., and 24 lb. per square inch up to 350 lb.

16. Lubrication

Grease the bearings by packing them with grease after dismantling the hub as described above.

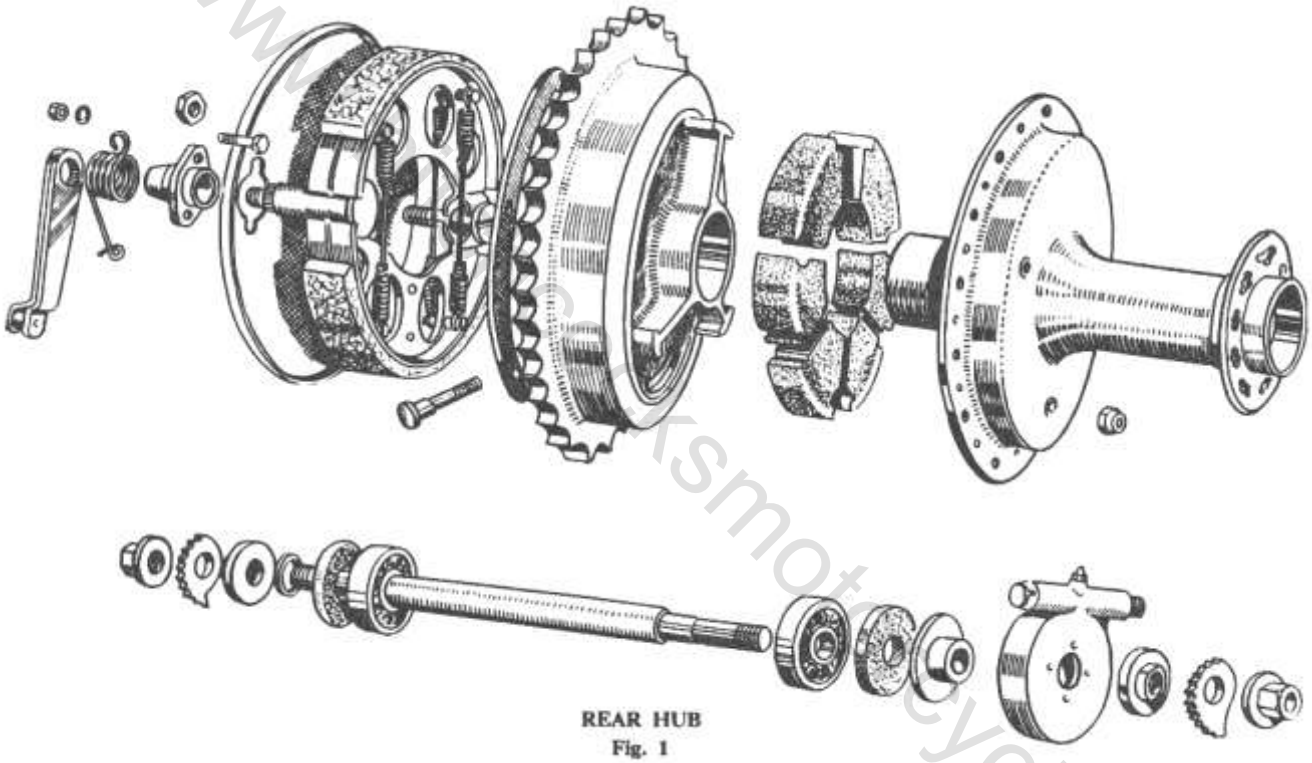
Note that the brake cam is drilled for a grease passage but the end of this is stopped up with a countersunk screw instead of being fitted with a grease nipple. This is done to present excessive greasing by over-enthusiastic owners. If the cam is smeared with grease on assembly it should require no further attention but in case of necessity, it is possible to remove the screw, fit a grease nipple in its place and grease the cam by this means.

ROYAL ENFIELD WORKSHOP MANUAL

SECTION L12

Rear Wheel (Non-Detachable Type)

1958-59 350 Clipper



REAR HUB
Fig. 1

1. Description

These instructions cover the servicing of two different rear wheels, both of the non-detachable type incorporating a rubber cush drive and an internal expanding brake. Both types have a solid spindle and give a 3 in. chain line.

The heavier type used on the "Meteor 700" and " 500 Bullet" has a 7 in. diameter brake drum while the lighter type used on the "500 Twin" and "350 Bullet" has a 6 in. diameter brake.

2. Removal and Replacement of Wheel

Place machine on the centre stand, if necessary putting packing pieces beneath the legs of the stand to lift the wheel clear of the ground. Remove the dual seat if fitted, and the detachable portion of the rear mudguard. Disconnect the rear driving chain at the spring link and remove the chain from the rear wheel sprocket, leaving it in position on the gearbox countershaft sprocket. Unscrew the rear brake rod adjusting nut completely and depress the brake pedal so as to disengage the rod from the trunnion in the brake operating lever. Unscrew the brake cover plate anchor nut and remove this together with the washer behind it. Disconnect the speedometer driving cable, loosen the spindle nuts and mark the chain adjuster cams to ensure replacing in the same position. Slide the wheel out of the fork ends, tilting it so as to disengage the end of the brake shoe pivot pin from the slot in the fork end.

When replacing the wheel make sure that the dogs on the speedometer drive gearbox are engaged with the slots in the end of the hub barrel. Make sure also that the speedometer drive gearbox is correctly positioned so that there is no sudden bend in the driving cable. Make sure that the closed end of the spring link points in the direction of travel of the chain. Replace the chain adjuster cams in their original positions or, if necessary, turn each of them the same number of notches to tension the chain and maintain correct wheel alignment. Do not forget to refit the brake rod and adjust the brake so that the wheel turns freely while the brake is off, while at the same time only a small travel of the brake pedal is necessary to put the brake on.

3. Removal of Brake Shoes for Replacement, Fitting New Linings, etc.

Remove the complete wheel as described above, then remove the left hand spindle nut, chain adjuster and distance collar, thus permitting the complete brake cover plate with operating cam, pivot pin, shoes and return springs to be lifted off the hub spindle.

In the case of the 7 in. brake fitted to the "Meteor 700" and "500 Bullet" Models the brake shoes can then be removed, after detaching the return springs.

In the case of the 6 in. brake fitted to the "500 Twin" and "350 Bullet" Models, unscrew the pivot pin locknut and the operating lever nut, after which the assembly of the brake shoes, return springs, pivot pin and operating cam can be removed from the cover plate by unscrewing the pivot pin and applying light blows with a hammer and drift on the end of the operating cam. The return springs can then be unhooked from the spring posts in the brake shoes, thus allowing the whole assembly to fall apart.

4. Replacing Brake Linings

Brake linings are supplied either in pairs ready drilled complete with rivets, Part No. 37786BX (6 in. shoes) or 37787BX (7 in. shoes), or ready fitted to service replacement brake shoes, Part No. 38042 (6 in. shoes) or 38043 (7 in. shoes). When riveting linings to shoes secure the two centre rivets first so as to ensure that the lining lies flat against the shoe. Standard linings are Ferodo MR41 which are drilled to receive cheese headed rivets.

5. Removal of Hub Spindle and Bearings

To remove the hub spindle and bearings, having already removed the brake cover plate assembly and speedometer drive gearbox, lift out the felt washers and distance pieces then hit one end of the spindle with a copper hammer or mallet thus driving it out of the hub, bringing one bearing with it and leaving the other in position in the hub. Drive the bearing off the spindle and insert the latter once more in the hub at the end from which it was removed. Now drive the spindle through the hub in the opposite direction, when it will bring out the remaining bearing.

6. Hub Bearings

These are deep groove single row journal ball bearings. The lighter bearings used in the "350 Bullet" and 500 Twin hubs are 5/8 in. i/d by 1.9/16 in. o/d by 7/16 in. wide. The Skefko Part No. is RLS5. Equivalent bearings of other makes are Hoffmann LS7, Ransome and Marles LJ 5/8 in., Fischer LS7.

The heavier bearings used in the "Meteor 700" and "500 Bullet" Models are 5/8 in. i/d by 1.13/16 in. o/d by 5/8 in. wide. The Skefko Part No. is RMS5. Equivalent bearings of other makes are Hoffmann MS7, Ransome and Marles MJ 5/8 in., Fischer MS7.

7. Fitting Limits for Bearings

The fit of the bearings in the hub barrel is important. The bearings are locked on the spindle between shoulders and the distance pieces, which in turn are held up by the cover plate nuts. In order to prevent endways pre-loading of the bearings it is essential that there is a small clearance between the inner edge of the outer race of the bearing and the back of the recess in either end of the hub barrel. To prevent any possibility of sideways movement of the hub barrel on the bearings it is, therefore, necessary for the bearings to be a tight fit in the barrel but this fit must not be so tight as to close down the outer race of the bearing and thus overload the balls. The following are the manufacturing tolerances which control the fit of the bearings. The figures for the bearings themselves are for SKF bearings but other manufacturers tolerances are similar.

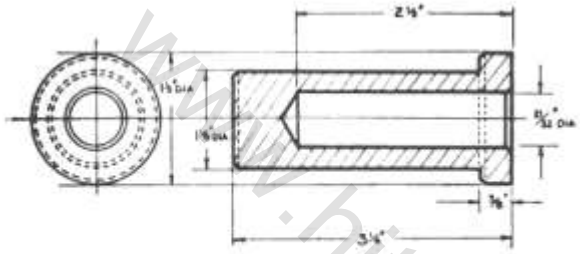
	350 Bullet and 500 Twin	Meteor 700 and 500Bullet
Bearing o/d	1.5622/1.5617 in.	1.8122/1.8117 in.
Housing bore	1.5620/1.5615 in.	1.8115/1.8110 in.
Bearing bore	.6252/.6247 in.	.6252/.6247 in.
Shaft diameter	.6252/.6248 in.	.6252/.6248 in.

8. Refitting Ball Bearings

Note that the two ends of the spindle are not identical. The end with the shorter plain portion between the thread and the shoulder must be fitted to the brake drum side of the wheel.

To refit the bearings in the hub two hollow drifts are required, as shown in Figs. 2 and 3. One bearing is first fitted to one end of the spindle by means of the hollow drift; the spindle and bearing

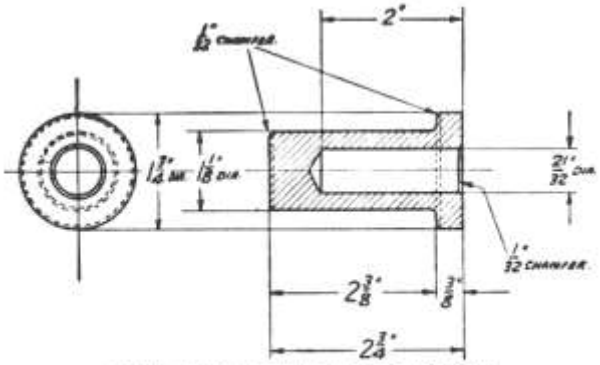
are then entered into one end of the hub barrel which is then supported on one of the hollow drifts. The other bearing is then threaded over the upper end of the spindle and driven home by means of the second hollow drift either under a press or by means of a hammer which will thus drive both bearings into position simultaneously.



DRIFT FOR REFITTING BEARINGS
"350 Bullet" "500 Twin"

Fig. 2

In order to make quite sure that there is clearance between the inner faces of the outer bearings and the bottom of the recesses fit the distance washers against the inner races of the bearings and either fit the assembly of brake cover plate, speedometer gearbox, etc., or make up this distance with tubular distance pieces. Fit and tighten the spindle nuts. Tightening the nuts



DRIFT FOR REFITTING BEARINGS
"Meteor 700" "500 Bullet"

Fig. 3

should not have any effect on the ease with which the spindle can be turned. If tightening the nuts makes the spindle hard to turn this may be taken as proof that the bearings are bottoming in the recesses in the hub barrel before they are solid against the shoulders on the spindle. In this case the bearing should be removed and a thin packing shim fitted between the inner race and the shoulder on the spindle.

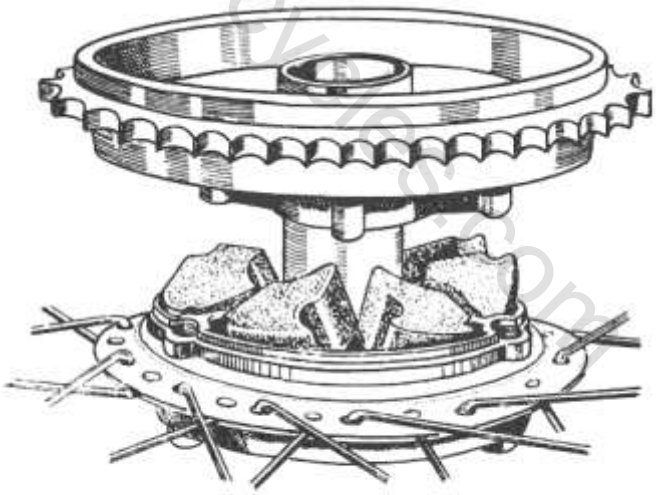
9. Removal of Brake Operating Cam and Brake Shoe Pivot Pin

The method of doing this has already been described in Paragraph 3 dealing with the 6 in. brake. The method is precisely the same for the 7 in. brake except that, owing to the different type of return springs used, it is, in this case, possible to remove the shoes from the pivot pin and operating cam before the latter are removed from the cover plate.

10. Cush Drive

The sprocket/brake drum is free to rotate on the hub barrel. Three radial vanes are formed on the back of the brake drum and three similar vanes are formed on the cush drive shell. Six rubber blocks are fitted between the vanes on the brake drum and those on the cush drive shell, thus permitting only a small amount of angular movement of the sprocket/brake drum relative to the hub barrel and transmitting both driving and braking torque and smoothing out harshness and irregularity in the former.

If the cush drive rubbers become worn so that the amount of free movement measured at the tyre exceeds 1/2 in. to 1 in., the rubbers should be replaced. To obtain access to them remove the complete wheel as described above, remove the brake cover plate complete with the brake shoe assembly, unscrew the three locknuts at the back of the cush drive shell-if necessary holding the studs, 32431, by means of the flats on the heads inside the brake drum. Drive out the three studs into the brake drum after which the sprocket/brake drum can be separated from



REASSEMBLY OF CUSH DRIVE

Fig. 4

the cush drive shell and the six cush drive rubbers can be lifted out.

When reassembling the cush drive the entry of the vanes between the rubbers will be facilitated if the latter are fitted into the driving shell first and then tilted. The rubbers should be liberally painted with soapsuds to facilitate entry of the vanes.

When reassembling the cush drive coat the inside of the bore of the sprocket/brake drum liberally with grease where it fits over the hub barrel and also put grease on the inner face of the lockring, 10097. The three Simmonds nuts should be tightened down solid as there is a shoulder on the stud which prevents tightening of the nuts from locking the operation of the cush drive.

11. Reassembly of Brake Shoes, Pivot Pin and Operating Cam into Cover Plate

No difficulty should be experienced in carrying out these operation. Make sure that the pivot pin is really tight in the cover plate and put a smear of grease in the grooves of the pivot pin and on the operating face of the cam; also on the cylinder al bearing surface of the operating cam if this has been removed. Fit the operating lever and trunnion on its splines in a position to suit the extent of wear on the linings and secure with the nut. The range of adjustment can be extended by moving the lever on to a different spline.

12. Centering Cam Housing

Note that the bolt holes in the cam housing are slotted, thus enabling the brake shoe assembly to be centered in the drum. It is not intended that on rear brakes the cam housing should be left free to float but the shoes should be centered by leaving tile screws just short of dead tight. The brake cover plate assembly with the shoes should then be fitted over the spindle into the brake drum and tyre brake applied as hard as possible by means of the operating lever. This will centre the shoe-in the drum. The screws should then be tightened dead tight and secured with the locknuts. If the shoes are not correctly centered the brake will be either ineffective or too fierce, depending on whether the trailing or leading shoe first makes contact with the drum. With the brake assembly correctly centered and the screws securing the cam housing correctly tightened wear on both linings should be approximately equal

13. Final Reassembly of Hub before Replacing Wheel

Before replacing the felt washers which form the grease seals, pack both bearings with grease Recommended greases are Castrolease (Heavy), Mobilgrease (No. 4), Esso Grease, Energrease C3; or Shell Retinax A. These are all medium heavy lime soap or aluminium soap greases. The use of H.M.P. greases which have a soda soap base is not recommended as these tend to be slighty corrosive if any damp finds its way into the hub

Make sure that the inside of the brake drum quite free from oil or grease, damp, etc. Replace the felt washers, distance collars, the brake cover plate assembly, speedometer drive gearbox, distance collars, chain adjuster cams, the loose section of the spindle and the spindle nut. The wheel is then ready for reassembly into the machine

14. Wheel Rim.

The rim fitted to both types of wheel is WM2-19 in. pierced with 40 holes for spoke nipple The internal width is 1.580 in. and the diameter after building 19.062 in., the tolerance on the circumference of the rim shoulders where the tyre fits being 59.930/59.870 in. The standard measuring tape for checking rims is 5/16 in. wide .011 in. thick and its length is 59.964/59.901.

Note that two makes of rim are used "Dunlop" and "Palmer Jointless." These differ in the positions of the pierced spoke holes. The Dunlop rims have a group of three holes on one side of the centre line, then a single hole on the other side, a further group of three and a single hole and so on. Palmer rims have the hole alternately spaced either side of the centre line. Both rims are interchangeable and both use the. same length spokes but the method of lacing the wheel is different (see paragraph 16). Neither type of rim is symmetrical and care must he taken that they are built the right way round into the wheel.

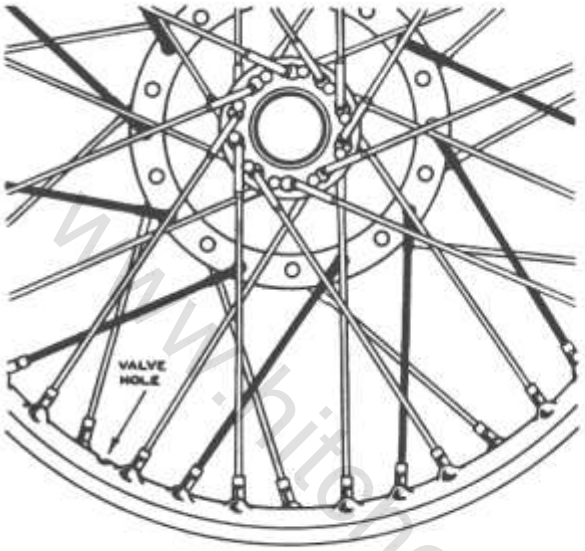
15. Spokes

The spokes are of the single butted type 8-10 gauge with 90° countersunk heads, angle of bend 95°-100`, thread diameter .144 in., 40 threads per inch, thread form British Standard Spoke lengths are as follows :

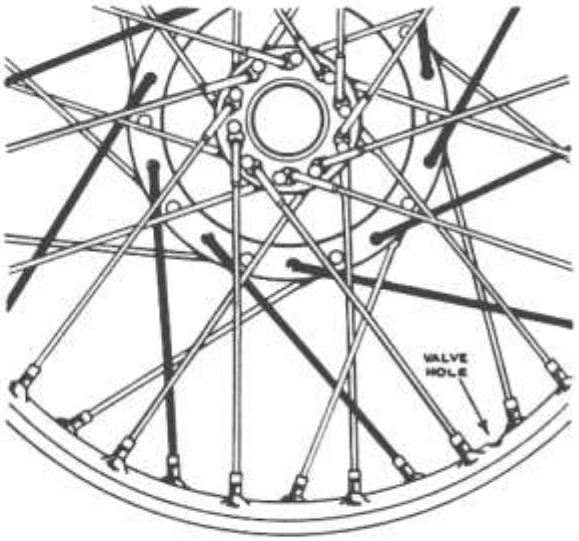
"350 Clipper" up to 1959, 8.5/8 in. and 7.3/4 in.

16. Wheel Building and truing

Spokes are laced one over three and the wheel must be built central in relation to the outer faces of the distance collars which fit between the



DUNLOP RIM
Fig. 5A



PALMER RIM
Fig. 5B

fork ends. The rim should be trued as accurately as possible, the maximum permissible run-out both sideways and radially being plus or minus 1/32 in.

Fig. 5 shows the difference between the lacing when using Dunlop and Palmer rims. The key to correct lacing is the inside spokes to the large flange on the cush drive shell which must slope in the direction shown in Fig. 5. With the Dunlop rim this spoke goes to the middle hole of one of the groups of three (see paragraph 14) and the rim must be built into the wheel so that these groups of three holes are on the right of the centre line when the cush drive is on the left, i.e. the inside spokes to the large flange cross from the left to the right of the centre line.

With the Palmer rim the spokes from the large flange on the cush drive shell go to the more steeply angled holes in the rim which must be on the left of the centre line when the cush drive is on the left, i.e. none of the spokes crosses from left to right of the centre line.

17. Tyres

Standard tyres are Dunlop 3.50-19 in. Universal tread except on the "350 Bullet" where a 3.25-19 in. Universal tyre is used.

When removing the tyre always start close to the valve and see that the edge of the cover at the other side of the wheel is pushed down into the well in the rim.

When replacing the tyre fit the part by the valve last, also with the edge of the cover at the other side of the wheel pushed down into the well.

If the correct method of fitting and removal of the tyre is adopted it will be found that the covers can be manipulated quite easily with the small levers supplied in the toolkit. The use of long levers and/or excessive force is liable to damage the walls of the tyre. After inflation make sure that the tyre is fitting evenly all the way round the rim. A line moulded on the wall of the tyre indicates whether or not the tyre is correctly fitted. If the tyre has a white mark, indicating a balance point, this should be fitted near the valve.

18. Tyre Pressures

The load which the tyre will carry at different inflation pressures is shown below:

Tyre Section Inches	Inflation Pressures—lb. per sq. in.					
	16	18	20	24	28	32
	Load per tyre—lb.					
3·25	200	240	280	350	400	440
3·50	280	320	350	400	450	500

19. Lubrication

A greasing point is provided in the centre of the hub barrel. Unless the barrel is packed full with grease on assembly (which is apt to lead to

trouble through grease finding its way past the felt seals on to the brake linings) this greasing point is of little value and the best way to grease the bearings is by packing them with grease after dismantling the hub as described above.

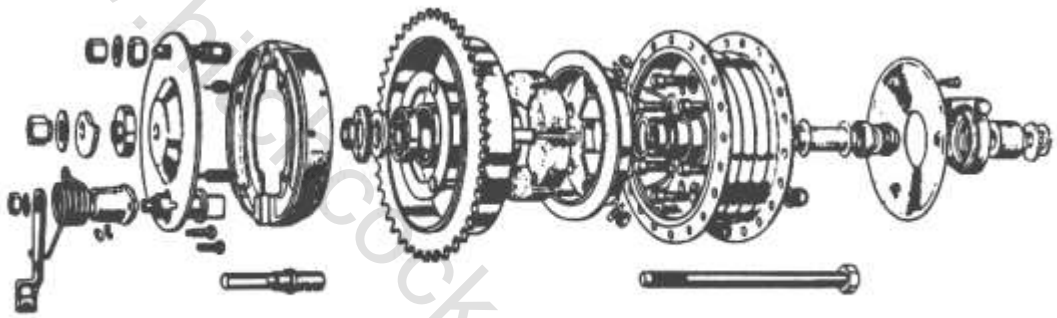
Note that the brake cam is drilled for a grease passage but the end of this is stopped up with a countersunk screw instead of being fitted with a grease nipple. This is done to prevent excessive greasing by over-enthusiastic owners. If the cam is smeared with grease on assembly it should require no further attention but in case of necessity it is possible to remove the screw, fit a grease nipple in its place and grease the cam by this means.

ROYAL ENFIELD WORKSHOP MANUAL

SECTION L13

Rear Wheel

(Quickly Detachable Type with 7 in. diameter Brake and Full-Width Hub)



EXPLODED VIEW OF QUICKLY DETACHABLE REAR HUB
Fig. 1

1. Description

This wheel is of the "detachable" type, which enables the main portion of the wheel to be removed from the machine without disturbing the chain or brake. The wheel incorporates the well-known Enfield cush drive and also a 7-in. internal expanding brake.

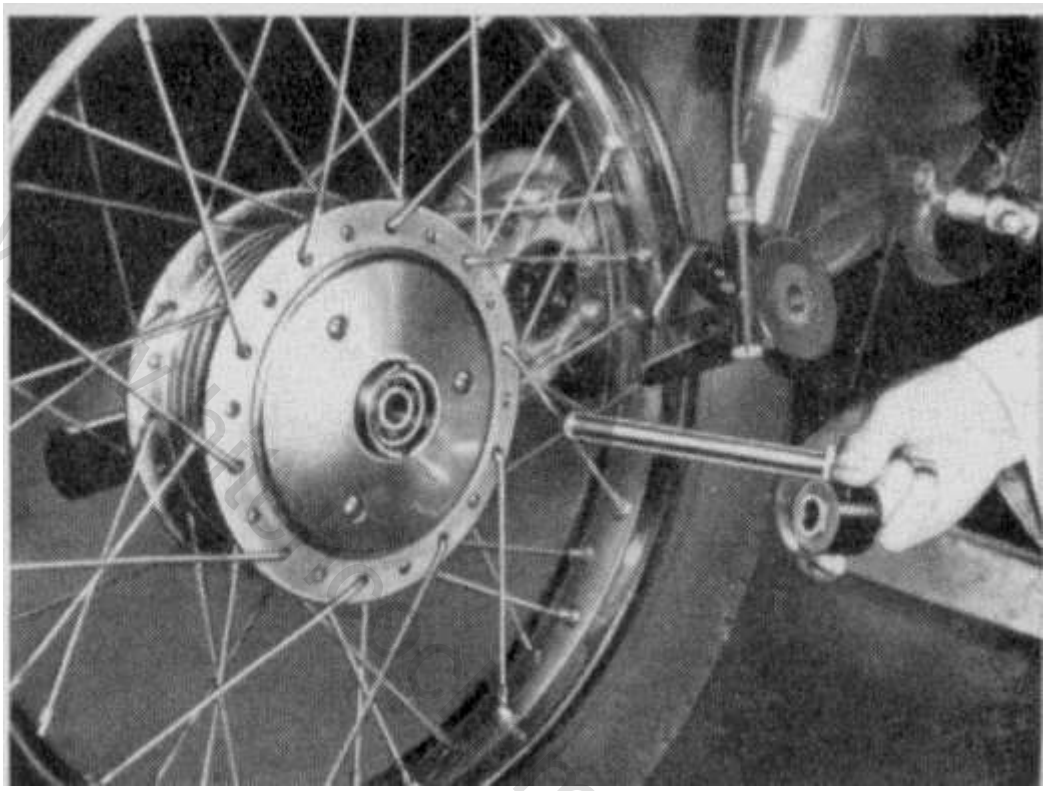
2. Removal and Replacement of Main Portion of Wheel for Tyre Repairs, etc.

Place the machine on the centre stand, if necessary putting packing pieces beneath the legs of the stand to lift the wheel clear of the ground. Remove the dual seat (if fitted) and the detachable portion of the rear mudguard. Unscrew the loose section of the spindle, 41369, and withdraw this, together with the chain adjuster cam, 36649, preferably marking this to ensure that it is replaced in the same position. Now slide the distance collar, 41372, out of the fork end and lift away the speedometer drive gearbox, which can be left attached to the driving cable. The spacing collar, 40989, and the felt washer behind it may now be removed to prevent risk of them falling out when manipulating the tyre. If, however, these are too tight a fit in the hub to come out easily they may be left in place. The main body of the wheel can now be pulled across to the right-hand side of the machine, thus disengaging the six driving pins from the cush drive shell and enabling the wheel to be lifted out of the machine.

When replacing the main portion of the wheel, reverse the foregoing procedure. The cush drive shell can be prevented from rotating when turning the wheel to engage the six driving pins, if the machine is placed in gear or the rear brake is operated, taking care, when replacing the speedometer drive gearbox, that the driving dogs inside the gearbox engage with the slots in the end of the hub barrel. Before tightening the centre spindle make sure that the speedometer drive gearbox is correctly positioned so that there is no sharp bend in the driving cable.

3. Removal and Replacement of Complete wheel for Access to Brake

Place the machine on the centre stand and remove the dual seat (if fitted) and detachable portion of the rear mudguard as if for removal of the main portion of the wheel only. Disconnect



REMOVAL OF WHEEL (OFFSIDE VIEW)
Fig. 2

the rear driving chain at the spring link and remove the chain from the rear wheel sprocket leaving it in position on the gearbox countershaft sprocket. Unscrew the rear brake rod adjusting nut completely and depress the brake pedal so as to disengage the rod from the trunnion in the brake operating lever. Unscrew the brake cover plate anchor nut, 7598, and remove this together with the washer behind it. Unscrew the loose section of the spindle, 41369, two or three turns and the spindle nut, 28832, by a similar amount. Mark the chain adjuster cams to ensure replacing in the same position.* Disconnect the speedometer driving cable and slide the wheel out

Note that the wheel is not necessarily correctly lined up when the same notch position is used on both adjuster cams. Once the position of the cams which gives correct alignment has been found this alignment will, however, be maintained if both cams are moved the same number of notches.

of the fork ends, tilting it so as to disengage the end of the brake shoe pivot pin from the slot in the fork end.

When replacing the wheel make sure that the dogs on the gear in the speedometer drive gearbox are engaged with the slots in the end of the hub barrel. Make sure also that the speedometer drive gearbox is correctly positioned so that there is no sudden bend in the driving cable. When replacing the connecting link in the driving chain make sure that the closed end of the spring link points in the direction of travel of the chair. Replace the chain adjuster cams in their original positions or, if necessary, turn each of them the same number of notches to tension the chain and maintain correct wheel alignment. Do not forget to refit the brake rod and adjust the brake so that the wheel turns freely when the brake is off, while at the same time only a light pressure on the brake pedal is necessary to put the brake on.

4. Removal of Brake Shoes for Replacement, etc.

Remove the complete wheel as described above, then remove the spindle nut, 28832, chain adjuster and the distance collar, 41373, thus permitting the complete brake cover plate with operating cam, pivot pin, shoes and return springs to be lifted off the hub spindle. The brake shoes can then be removed after detaching the return springs. The brake linings are bonded to the shoes and if requiring to be renewed, should be sent for servicing.

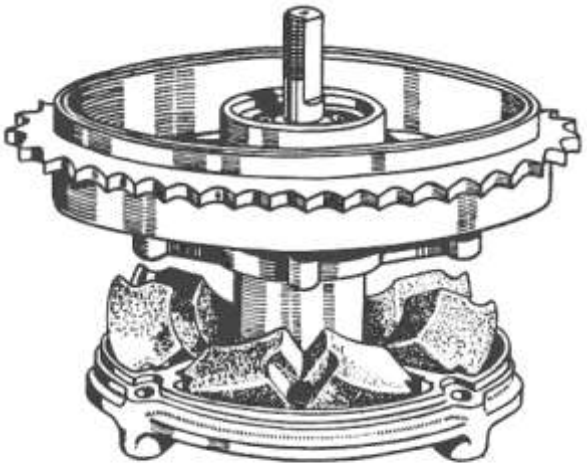
5. Removal of Brake Operating Cam and Brake Shoe Pivot Pin

The pivot pin is threaded into the torque plate, 41109, from which it can be unscrewed after removing the locknut, 41375.

To remove the operating cam unscrew the nut, 10314, which secures the operating lever to the splines on the cam. A sharp tap on the end of the cam spindle will now free the lever, after which the cam can be withdrawn from its housing.

6. Cush Drive

The sprocket/brake drum, 41233, is free to rotate on the hub barrel. Three radial vanes are formed on the back of the brake drum and three similar vanes are formed on the cush drive shell, 40967. Six rubber blocks are fitted between the vanes on the brake drum and those on the cush drive shell, thus permitting only a small amount of angular movement of the sprocket/brake drum relative to the hub barrel and transmitting both driving and braking torques and smoothing out harshness and irregularity in the former.



RE-ASSEMBLY OF CUSH DRIVE
Fig. 3

If the cush drive rubbers become worn so that the amount of free movement measured at the tyre exceeds 1/2 in. to 1 in the rubbers. should be replaced. To obtain access to them remove the complete wheel as described above ; then unscrew the loose section of the spindle, 41369, completely. The main portion of the wheel can then be lifted away from the assembly consisting of the fixed portion of the spindle, sprocket/brake drum complete with brake and the cush drive shell. Now remove the brake cover plate complete with brake shoes as described above, and unscrew the three nuts at the back of the cush drive shell after bending back the locking washers. The three studs, 41002, are brazed to the lockring, 10097, and should be driven out of the cush drive shell, each a little at a time to avoid distorting the lockring or bending the studs. The sprocket/brake drum can now be separated from the cush drive shell, and the six cush drive rubbers lifted out.

When reassembling the cush drive the entry of the vanes between the rubbers will be facilitated if the latter are fitted into the driving shell first and then tilted. The rubbers should be liberally smeared with soapsuds to facilitate entry of the vanes. Grease the inner face of the lockring, 10097, before assembling and tighten the three nuts down solid as there is a shoulder on the stud which prevents tightening of the nuts from locking the operation of the cush drive. Do not forget to bend up the tabs of the three locking washers.

When reassembling the cush drive, coat the inside of the bore of the sprocket/brake drum liberally with grease where it fits over the hub barrel.

7. Removal of Ball Bearings

To remove the ball bearings take the complete wheel out of the machine and separate the main portion of the wheel from the sprocket/brake drum, cush drive shell assembly, as described above. To remove the bearing from the sprocket/ brake drum, first remove the brake cover plate complete with brake shoe assembly ; then remove the distance collar, 41105, and unscrew the bearing retaining ring, 41108, with peg spanner. Now screw the loose section of the spindle into the fixed section and drive out the bearing by hitting the hexagon-headed end of the loose section of the spindle.

To remove the bearings from the loose half of the hub barrel, first lift away the distance collar, 41372, speedometer drive gearbox, the spacing collar, 40989, and the felt washer, 41006. Remove the bearing retaining circlip from the driving sprocket end of the barrel. Between the two bearings is a spacer, 40995, slotted at one end to enable a drift to be used on the bearing at that end.

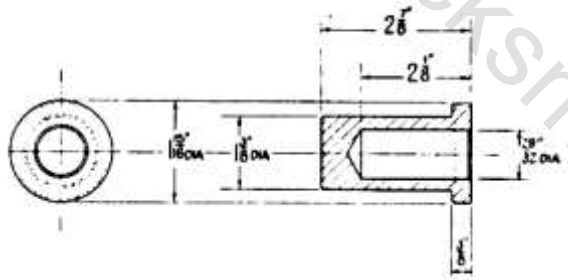
Remove this bearing first, then enter the loose section of the spindle into the spacer and drive out the remaining bearing by means of a hammer and drift applied to the hexagon-headed end of the spindle.

8. Hub Bearings

These are deep-groove single-row journal ball bearings. The sprocket/brake drum bearing is a Skefko RLS7, 7/8 in. i/d, by 2 in. o/d, by 9/16 in. wide. Equivalent bearings of other makes are Hoffmann LS9, Ransome & Marles LJ. 7/8 in., and Fischer LS9. The two bearings in the hub barrel are Skefko RLS5, 5/8 in. i/d, by 1.9/16 in. o/d, by 7/16 in. wide. Equivalent bearings of other makes are Hoffman LS7, Ransome & Marles LJ 5/8 in., and Fischer LS7.

9. Removal of Hub Driving Pins

To remove the six driving pins from the aluminium fullwidth hub, first remove the hub cap after unscrewing the three screws attaching it to the hub. Unscrew the six Simmonds nuts and drive out the pins.



DRIFT FOR RE-FITTING BEARING

Fig. 4

10. Refitting Ball Bearings

To refit the sprocket/brake drum bearing, use a hollow drift as shown in Fig. 4. The bearing is first fitted to the fixed section of the spindle ; the spindle and bearing are then entered into the sprocket/brake drum and driven home, preferably under a press or using light hammer blows.

The two bearings in the hub barrel are pressed in, using the drift part of E.4823. First assemble the bearing into the circlip grooved end of the barrel and fit the circlip. Replace the bearing spacer, the slot in the spacer can be at either end of the hubs, and assemble the second bearing, supporting the hub on the inner race of the other bearing. If the drift part of E.4823 is not available it is essential that the last bearing is assembled by applying pressure to both inner and outer races simultaneously to avoid pre-loading the two hub barrel bearings.

11. Reassembly of Brake Shoes, Pivot Pin and Operating Cam into Cover Plate

No difficulty should be experienced in carrying out these operations. Make sure that the pivot pin is really tight in the cover plate and put a smear of grease in the grooves of the pivot pin and on the operating face of the cam ; also on to the cylindrical bearing surface of the operating cam if this has been removed. Fit the operating lever and trunnion, 23371, on its splines in a position to suit the extent of wear on the linings and secure with the nut. The range of adjustment can be extended by moving the lever on to a different spline.

12. Centering Cam Housing

Note that the bolt holes in the cam housing, 26347, are slotted, thus enabling the brake shoe assembly to be centered in the drum. It is not intended that on rear brakes the cam housing should be left free to float but the shoes should be centred by leaving the screws, 26309 and 35140, just short of dead tight. The brake cover plate assembly with the shoes should then be fitted over the spindle into the brake drum and the brake applied as hard as possible by means of the operating lever. This will centre the shoes in the drum. The screws should then be tightened dead tight and secured with the locknuts. If the shoes are not correctly centered the brake will be either ineffective or too fierce, depending on whether the trailing or leading shoe first makes contact with the drum. With the brake assembly correctly centered and the screws securing the cam housing correctly tightened wear on both linings should be approximately equal.

13. Final Reassembly of Hub Before Replacing Wheel

Before replacing the felt washers which form the grease seals, pack all bearings with grease. Recommended greases are Castrolease LM, Mobilgrease MP, Esso Multipurpose Grease H, Energrease L2, Shell Retinax A or Marfak Multipurpose 2. These are all medium heavy lime soap or aluminium soap greases. The use of H.M.P. greases which have a soda soap base is not recommended as these tend to be slightly corrosive if any damp finds it way into the hubs.

Make sure that the inside of the brake drum is quite free from oil or grease, damp, etc. Replace the felt washers, distance collars, the brake cover plate assembly, speedometer drive gearbox,

distance collars, 41373 and 41372, chain adjuster cams, the loose section of the spindle and the spindle nut, 28832. The wheel is then ready for reassembly into the machine.

14. Wheel Rim

The wheel rim is type WM2-19 in. plunged and pierced with forty holes for spoke nipples. The spoke holes are symmetrical, i.e., the rim can be assembled to the hub either way round. The rim diameter after building is 19.062 in., the tolerances on the circumference of the rim shoulders where the tyre fits being 59.930/59.870 in. The standard steel measuring tape for checking rims is 5/16 in. wide, .011 in. thick, and its length is 59.964/59.904in.

The "350 Bullet" details are as given below:
The wheel rim is type WM2-17 in. plunged and pierced with forty holes for spoke nipples. The spoke holes are symmetrical, i.e. the rim can be assembled to the hub either way round. The rim diameter after building is 17.062 in., the tolerances on the circumference of the rim shoulders where the tyre fits being 53.642/53.582 in. The standard steel measuring tape for checking rims is 5/16 in. wide, .011 in. thick, and its length is 53.676/53.616 in.

The spokes are of the single-butted type, 8-10 gauge, with 90° countersunk heads, thread diameter .144 in., 40 threads per inch, thread form British Standard Cycle. The inner spokes are 5.5/8 in. long with an angle of bend 100°, and the outer spokes 5.3/4 in. long with an angle of bend 80°.

15. Spokes.

The spokes are of the single butted type, 8-10 gauge, with 90° countersunk heads, thread diameter, .144 in., 40 threads per inch, thread form British Standard Cycle. The inner spokes are 6.5/8 in. long with an angle of bend 100°, and the outer spokes 6.3/4 in. long with an angle of bend 80°. "Works Replica" up to 1960 and "500 Bullet" up to 1961: inner and outer spokes 6.5/8 in."350 Bullet" up to 1958: 6.5/8 in. and 6.3/4 in."350 Bullet" 1959 onwards, "350 Clipper" 1960 onwards: 5.3/4 in. and 5.5/8 in.

16. Wheel Building and Truing

The spokes are laced one over two and the wheel rim must be built central in relation to the outer faces of the distance collars 41373 and 41372. The rim should be trued as accurately as possible, the maximum permissible run-out both sideways and radially being plus or minus 1/32 in.

17. Tyre

Sizes are as follows:
"350 Clipper" 1960 onwards: 3.25-17 in.
"350 Bullet" 1959 onwards: 3.25-17 in.
"500 Bullet" up to 1959: 3.50-19 in.
"500 Bullet" 1960 onwards: 3.25-19 in.

When removing the tyre always start close to the valve and see that the edge of the cover at the other side of the wheel is pushed down into the well in the rim.

When replacing the tyre fit the part by the valve last, also with the edge of the cover at the other side of the wheel pushed down into the well.

If the correct method of fitting and removal of the tyre is adopted it will be found that the covers can be manipulated quite easily with the small levers supplied in the toolkit. The use of long levers and/or excessive force is liable to damage the walls of the tyre. After inflation make sure that the tyre is fitting evenly all the way round the rim. A line moulded on the wall of the tyre indicates whether or not the tyre is correctly fitted. If the tyre has a white mark indicating a balance point, this should be fitted near the valve.

18. Tyre Pressures

The recommended pressures for the rear tyre are 16 lb. per square inch for wheel loads not exceeding 280lb., 18 lb. per square inch for loads up to 320lb., 20 lb. per square inch for loads up to 350lb., 24 lb. per square inch for loads up to 400 lb., 28 lb. per square inch up to 450lb., and 32 lb. per square inch up to 500 lb.

19. Lubrication

Grease the bearings by packing them with grease after dismantling the hub as described above.

Note that the brake cam is drilled for a grease passage but the end of this is stopped up with a countersunk screw instead of being fitted with a grease nipple. This is done to prevent excessive greasing by over-enthusiastic owners. If the cam is smeared with grease on assembly it should require no further attention but in case of necessity it is possible to remove the screw, fit a grease nipple in its place and grease the cam by this means.

ROYAL ENFIELD WORKSHOP MANUAL

SECTION M2

Special Tools

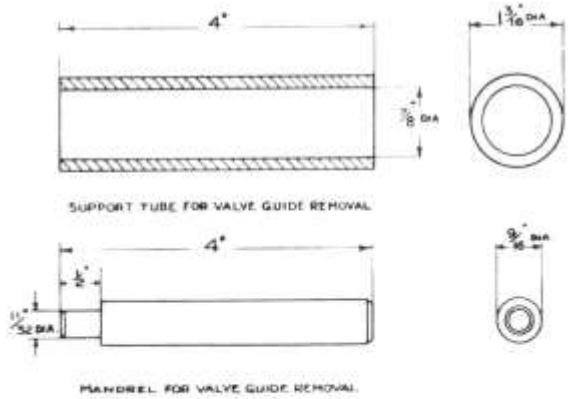
For "Bullet " Models

ROYAL ENFIELD WORKSHOP MANUAL

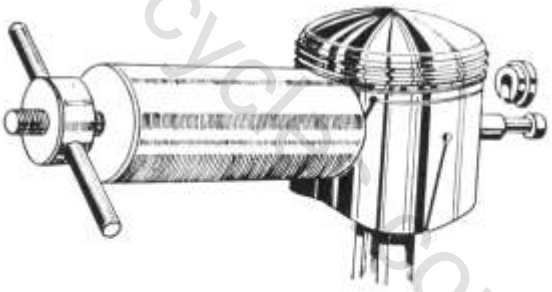
Special Tools for "Bullet" Engines

14835
MAGDYNO PINION EXTRACTOR

TE.1124
VALVE SPRING COMPRESSOR



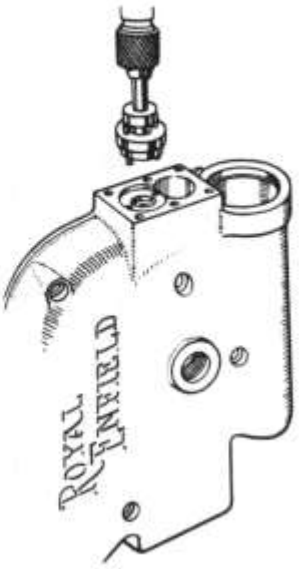
VALVE GUIDE MANDRELS



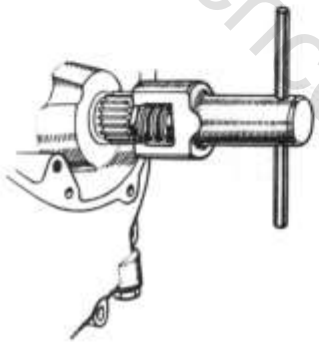
E.5477
GUDGEON PIN EXTRACTOR

Special Tools for "Bullet" Engines

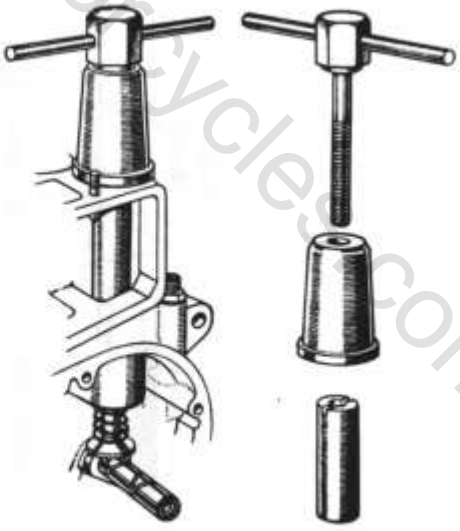
TE.1167
VALVE GRINDING TOOL



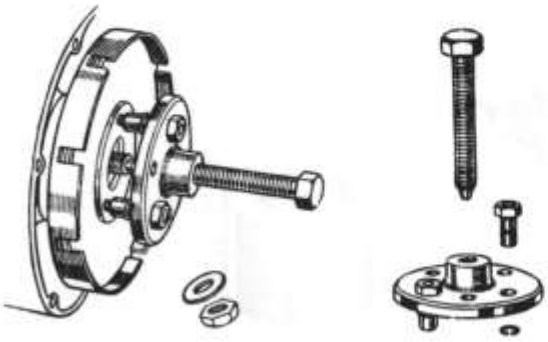
E.5425
PUMP DISC LAPPING TOOL



E.5451
PUMP WORM SHAFT SPANNER



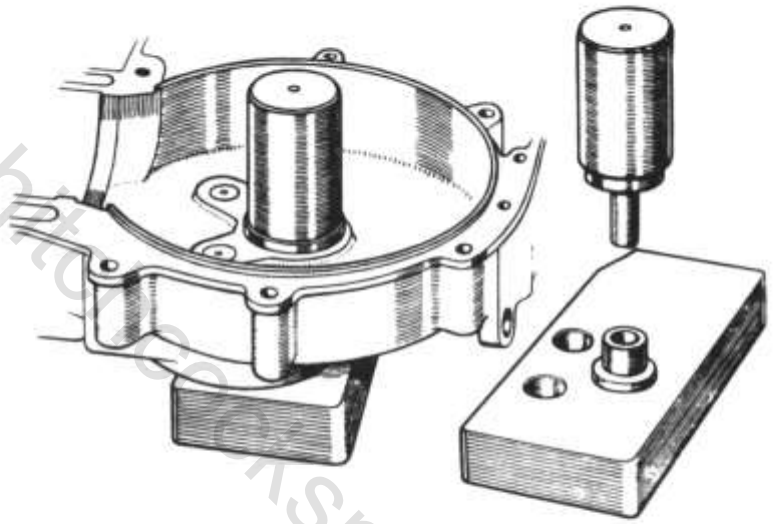
E.5410
TAPPET GUIDE EXTRACTOR



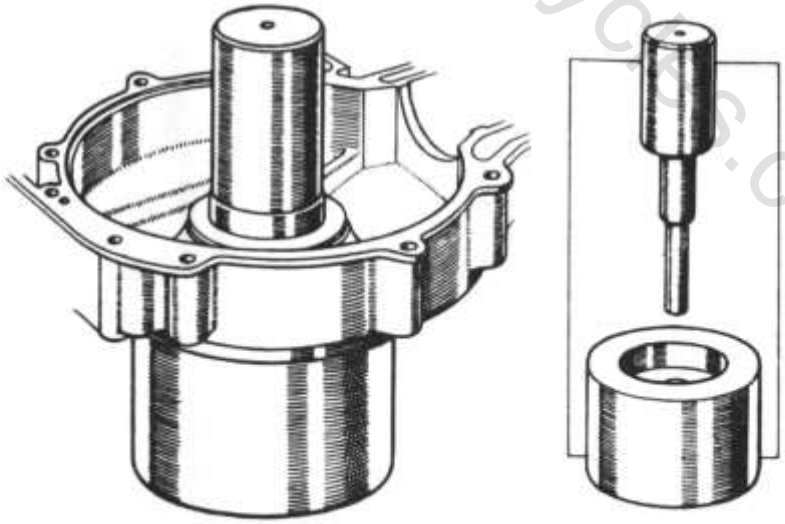
E.5414
CLUTCH CENTRE EXTRACTOR

Special Tools for "Bullet" Engines

TOOLS FOR FITTING BUSHES



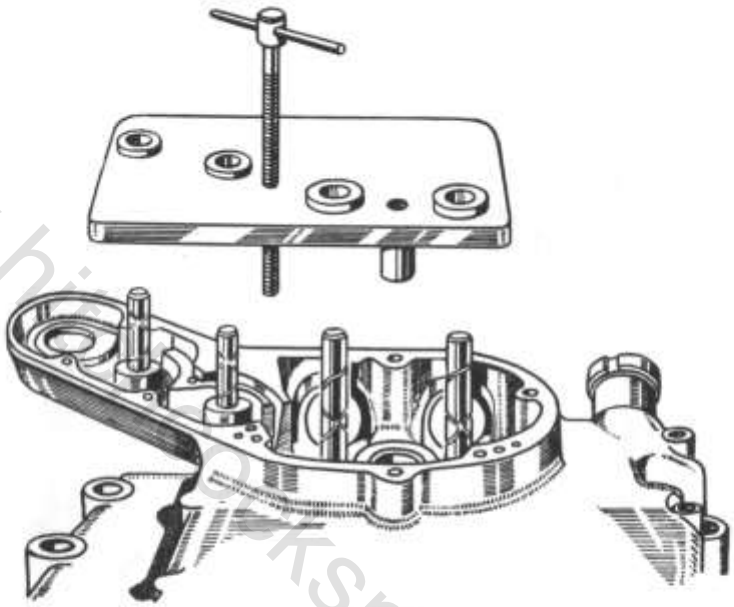
E.4816
ROLLER RACE ASSEMBLY, TIMING SIDE



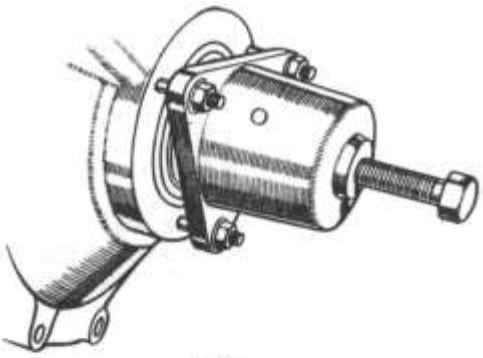
E.4817
BEARING ASSEMBLY, DRIVING SIDE

ROYAL ENFIELD WORKSHOP MANUAL

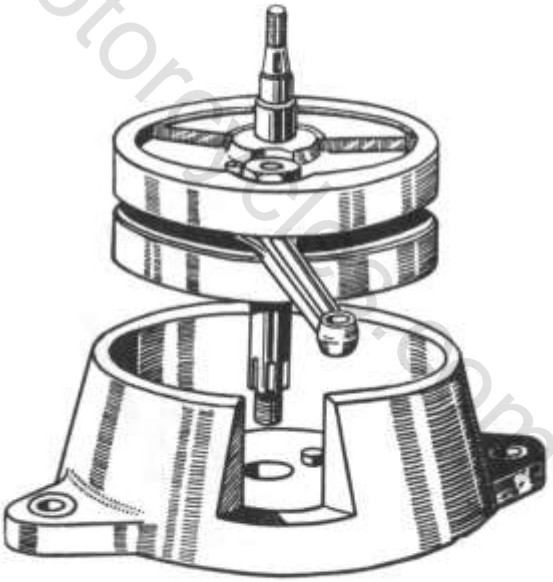
Special Tools for "Bullet" Engines



E.6462
LOCATING PLATE FOR ASSEMBLY OF CAM SPINDLES



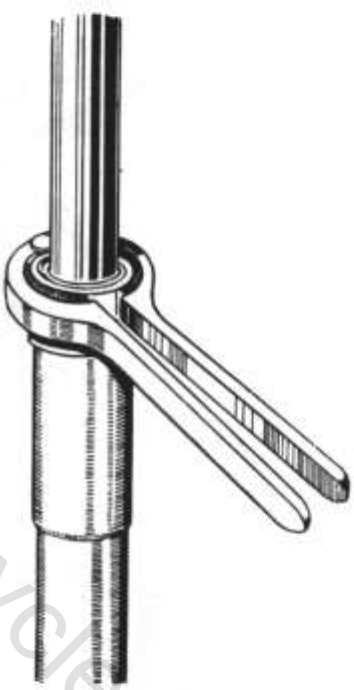
E.5121
CRANKSHAFT EXTRACTOR



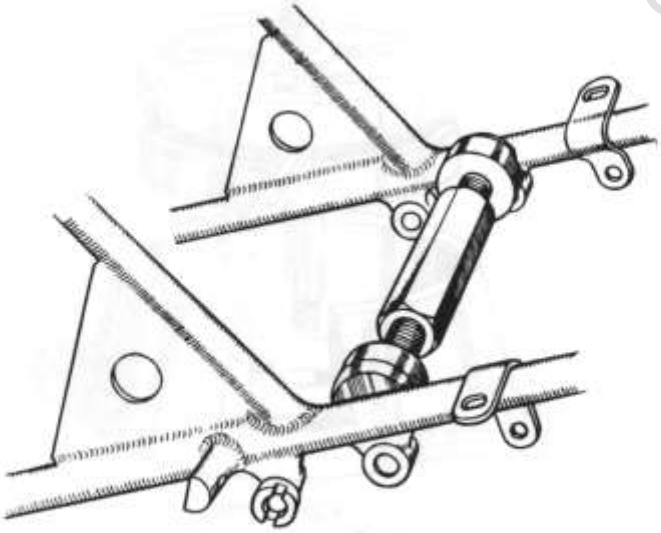
E.2774/E.2775
CRANKSHAFT POT OR JIG
for "350 Bullet" (E.2775) and "500 Bullet" (E.2774)

Special Tools for "Bullet" Frames and Forks

E.5418
LOCKRING SPANNER



E.4912
GLAND NUT AND OUTER TUBE
HAND GRIPS

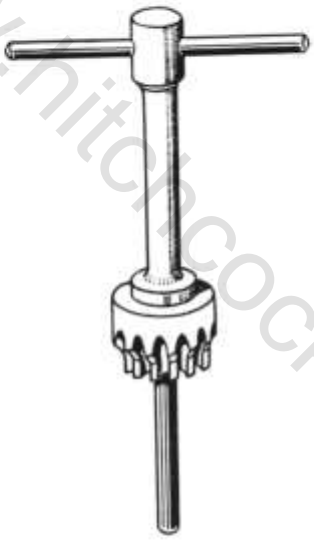


E.5431
FRAME EXPANDER

ROYAL ENFIELD WORKSHOP MANUAL

SECTION M4

Special Tools



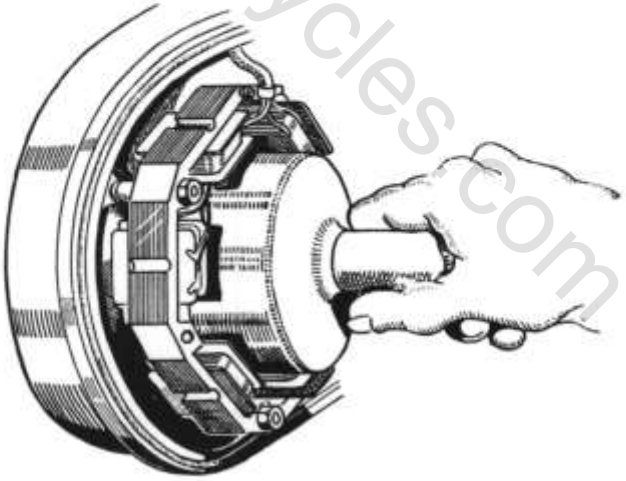
INLET VALVE SEAT ARBOR
T.2053 all models

INLET VALVE SEAT CUTTER
T.2054 Constellation, Super Meteor and Meteor Minor
T.2137 500 Twin
T.1892 500 Bullet
T.1891 350 Bullet

ASSEMBLY GAUGE IN USE TO CENTRALISE ROTOR

T.2055 Constellation, Super Meteor and Meteor Minor, also 350 Clipper, 350 Bullet and 500 Bullet

T.2138 1955-56 250 Clipper



ROYAL ENFIELD WORKSHOP MANUAL

SECTION PI
"Airflow" Fairing

1. Description of the Fairing

The "Airflow" fairing and front mudguard are fibre glass units and therefore very light, rigid and tough. The fairing, with the windscreen, provides full weather protection. It has two cubby holes and incorporates the headlamp, speedometer, ammeter and lighting switch.

On the rare occasions that it may be necessary to remove the mudguard and fairing from the machine, it will be found to present no difficulty if the following sequence is adopted:

2. Removal of the windscreen

Remove the two screws which attach the number plate to the fairing. Removal of the number plate will expose a screw in the centre of the fairing which may now be taken out, together with the screws at each corner of the screen. The screen and metal back plate may now be lifted clear, taking care not to lose the five female screws with their plain steel and rubber washers.

3. Removal of the Headlamp

Take out the small screw from the underside of the headlamp rim. Raise the rim to clear its spigot plate from the slot in the lamp body shell and remove. Next take off the rubber ring from the light unit. By slackening the three light unit adjuster screws and rotating the light unit in an anti-clockwise direction, the unit may then be withdrawn sufficiently to disconnect the four leads.

Should it be necessary to remove the lamp body shell this may be done by unscrewing the four screws spaced round its flange. This also releases the rubber washer. Care should be taken not to lose the four screw locking plates inside the fairing.

4. Removal of the Headlamp Switch, Speedometer and Ammeter

Undo the switch knob screw and remove the knob. Unscrew the switch plate nut and remove the switch plate. The switch body may now be pulled out from beneath the fairing. Do not lose the plain washer situated beneath the switch knob.

Disconnect the speedometer drive, and, after removing two nuts, the spring washers and the bridge piece from the bottom of the speedometer, it may be removed.

To remove the ammeter it is only necessary to take off the rubber band from the body of the ammeter, after disconnecting the leads, and press down the small metal tabs which will be found turned outwards. The ammeter will then pull out from the top of the fairing.

5. Removal of the Front Wheel and Fork Legs

To remove the front wheel from the fork, place the machine on the centre stand with sufficient packing (about 2 in.) beneath each side of the stand to lift the wheel clear off the ground when tilted back on to the rear wheel. Slacken the brake cable adjustment and disconnect the cable from the handlebar lever and from the operating cam lever on the hub. Unscrew the four nuts securing the fork leg caps and allow the wheel to drop forward out of the front fork. Make sure that the machine stands securely on the rear wheel and centre stand-if necessary place a weight on the saddle or a strut beneath the fork to ensure this.

Unscrew the plug screws in the fork head, when the sliding fork legs, complete with springs and spring distance tubes, can be withdrawn from the lower ends of the main tubes.

6. Removal of the Front Mudguard

From the top of the fairing the two clamp bolts holding the mudguard to the fork crown can be reached. Unscrew the nuts and push out the bolts.

On early models it is necessary to remove the centre pin securing the guard to the bottom of the steering stem. The mudguard may now be withdrawn.

7. Removal of the Fairing

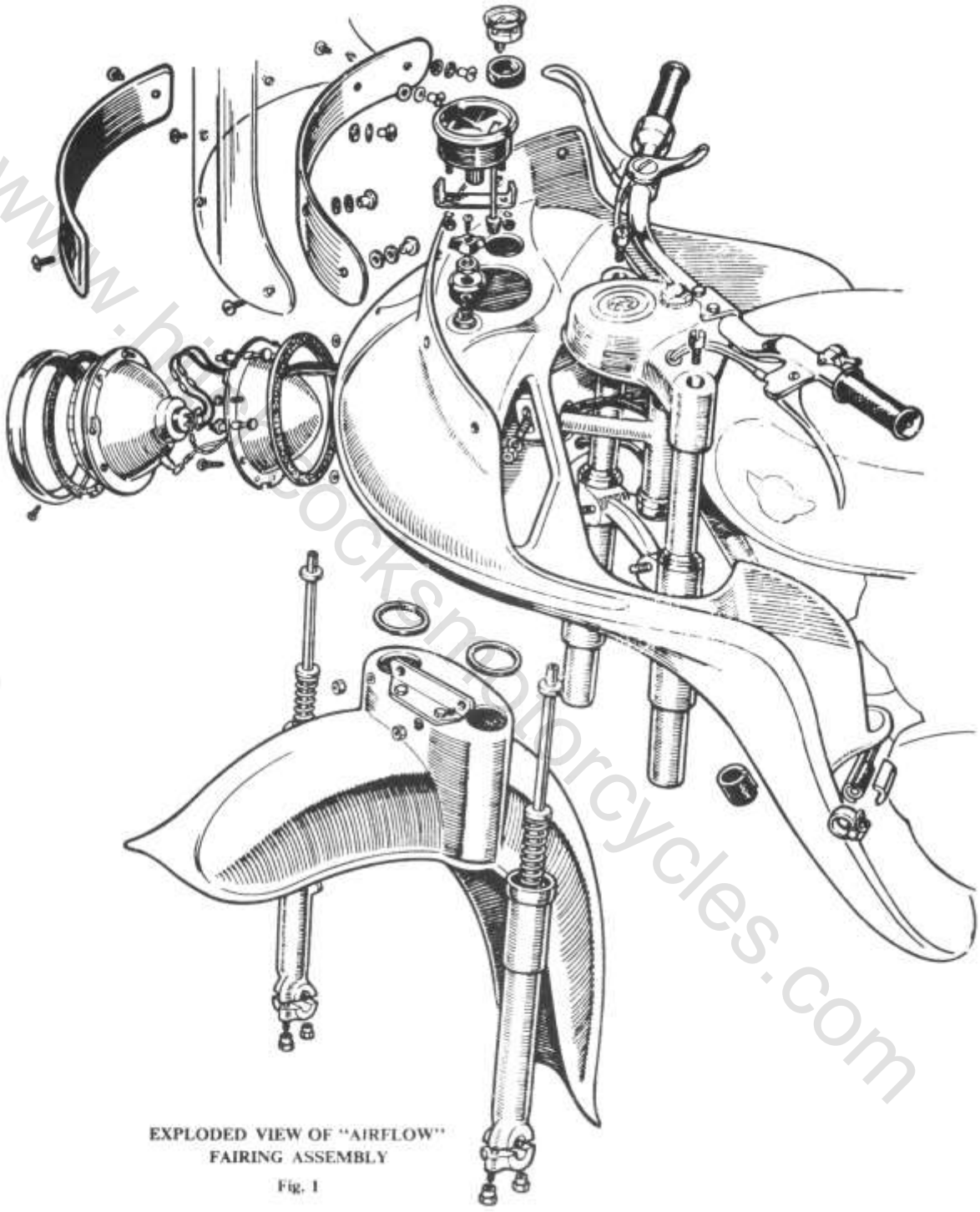
First take off the exhaust pipe. This is held to one of the front engine bearer bolts and to the pillion footrest stud at the rear.

Slacken the hose clips and remove the attachment caps from the ends of the attachment stud to which the lower part of the fairing is anchored.

Unscrew the nuts and push out the stud which secures the upper part of the fairing to the tube extending forward from the steering head.

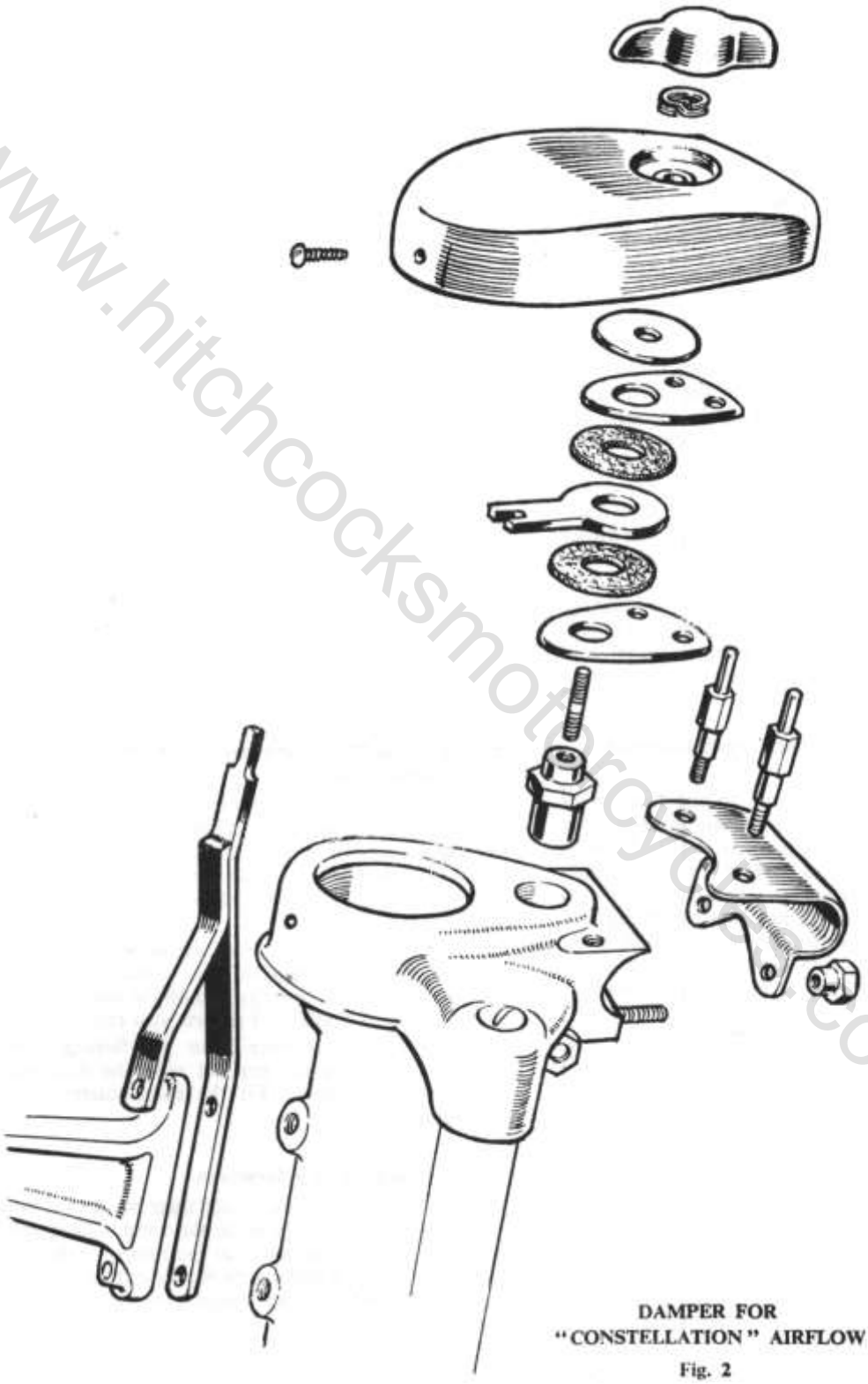
If required the two bottom attachment studs may be removed.

ROYAL ENFIELD WORKSHOP MANUAL



EXPLODED VIEW OF "AIRFLOW" FAIRING ASSEMBLY

Fig. 1



DAMPER FOR
"CONSTELLATION" AIRFLOW

Fig. 2

8. Repairs

In the event of damage to the fairing, small repair kits consisting of a quantity of resin, catalyst and glass fibre are available from our Service Department. Instructions for carrying out minor repairs are issued with this kit.

9. Reassembly of the Fairing

If these have been removed replace the two bottom fairing attachment studs, also fit the rubber sleeve to the down tube. Next raise the fairing over the fork cover tubes, locating the bottom attachment plates on each leg shield over the attachment studs.

Incline the fairing outwards and thread the light and switch leads through the strut tube aperture, and the speedometer cable through the smaller hole below it. The fairing can then be pushed towards the forks until the strut tube, complete with buffer assembly, has entered the aperture and is positioned between the strut tube attachment plates. Fit the stud through the buffer assembly and attachment plates and secure washers and nuts to either end.

Complete the fairing assembly to the machine by fixing the attachment cap over the attachment stud rubber. Compress these parts together and secure with the attachment clip. The exhaust system may now be fitted.

10. Reassembly of Mudguard, Fork Legs and Wheel

Fit the two sealing washers to the fork cover tubes, not forgetting the small sealing washer for the fork crown extension tube on Early Models. Raise the mudguard, and thread the cover tubes (and the fork crown extension when fitted) through their respective holes. Line up the mudguard bracket holes with the fork crown clip bolt holes and fit the bolts, washers and nuts finger tight. (On Early Models fit the fork crown extension stud and washer.)

Slide the fork legs up into the fork head. Centralise the fork leg top with the cover tube, and push up to the full extent. Fit and tighten the plug screws in the fork head.

The fork crown clip bolts may now be tightened.

Replace the wheel and connect up the brake cable at both ends. **Do not forget to readjust the brake.**

11. Reassembly of Headlamp

Thread the red earth wire, the blue and red, and the blue and white main bulb wires from the dipper switch, and one green and brown pilot lamp wire, through the hole in the lamp body shell. Fit the body shell rubber washer between the fairing and the lamp body shell rim, and line up the holes in the shell rim, the washer and the fairing aperture rim. Secure with the four screws and locking plates, keeping the threaded plate at the bottom.

Connect the blue and red and the blue and white wires to the main bulb wires in the back of the light unit. Push the green and brown lead into the pilot lamp socket and the single red earth wire from the main harness into the socket on the main bulb fitting.

The light unit may now be pushed over the three adjusters, after first slackening them. Turn the light unit in a clockwise direction to secure. Afterwards tighten all the adjusters as far as possible.

Place the rubber ring over the light unit, with the face marked "BACK" facing the light unit rim. Locate the spigot plate, situated on the top underside of the rim, with the slot in the lamp body shell. Press the rim downwards and screw in the pin at the bottom of the rim.

Finally, adjust the aim of the light beam by turning the adjuster screws in a clockwise direction from the rear as neccessary. Do not turn them further than required, not more than two screws will need adjusting.

12. Reassemble of Ammeter, Headlamp Switch and Speedometer

Insert the ammeter into the off-side hole in the fairing, turn up under the fairing the small tabs on the ammeter, and fit the rubber ring, pushing it up as far as possible. Connect up the two wires with the tab washer type connections to the ammeter terminals.

Push the switch up from the underside of the fairing, place in position the switch plate and secure with the nut. Finally, put on the small washer and the switch knob, and secure with the screw.

Push the speedometer into the fairing from above, and secure the bracket with the nuts and washers from below. Fit the speedometer drive and lamp.

13. Reassembly of Windscreen

Put the female screws, with their plain steel and rubber washers, into the back plate and windscreen, and line up with the holes in the fairing. Be sure to use the shortest male screw for the centre countersunk hole, and the two longest for attaching the number plate.

SPARES for ROYAL ENFIELD & AMAL

HITCHCOCK'S MOTORCYCLES
ROSEMARY COURT
OLDWICH LANE WEST
CHADWICK END
SOLIHULL
B93 0EY ENGLAND

TELEPHONE: 01564 783 192

E-MAIL: info@hitchcocksmotorcycles.com
WEB: hitchcocksmotorcycles.com