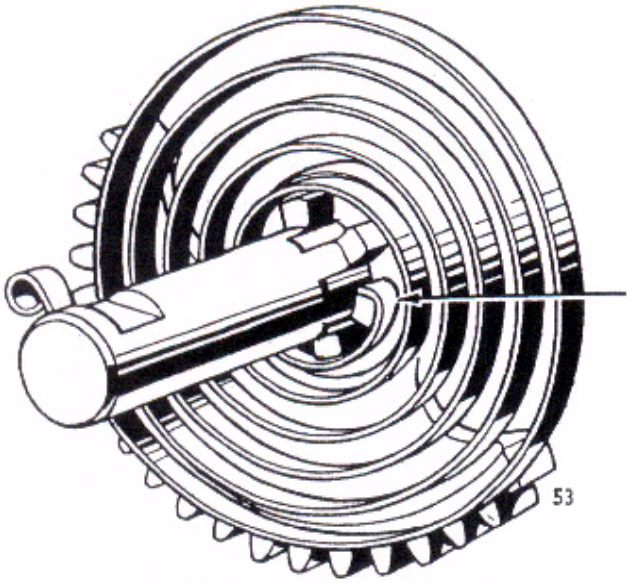


Fig. D4. Kickstart quadrant and spring. Arrow indicates correct spring location

To reassemble the mechanism, first refit the thin walled steel sleeve, spring, pinion and ratchet to the gearbox mainshaft and assemble the tab washer, then screw on the retaining nut to the torque figure given in "General Data". **Do not overtighten the retaining nut as this may result in failure of the thin walled inner steel sleeve.**

Fit the return spring to the kickstart quadrant as shown in Fig. D4. Offer the spindle into the kickstart bush and locate the return spring onto the anchor peg at the rear of the cover. Fit the oil seal over the spindle and assemble the kickstart crank, locking it into position with the cotter pin from the rear. Refit the outer cover as shown in Section D1. Do not forget to refit the oil seal. Refill the gearbox with the correct grade of lubricant (Section A2).

SECTION D3

DISMANTLING AND REASSEMBLING THE GEARCHANGE MECHANISM

Slacken off the gear change pedal locking bolt and withdraw the pedal from the serrated shaft. A little leverage between the pedal and the cover may be necessary. For this, choose a suitable tool to avoid damage to the cover.

Remove the four nuts and locking washers securing the guide plate. Withdraw the guide plate, plunger quadrant and curved return springs. Thoroughly clean the parts in paraffin (kerosene) and inspect them for wear etc., as shown in Section D4.

To reassemble the mechanism, first fit a **new** rubber "O" ring to the spindle and offer it to the outer cover bush using a smear of oil to assist assembly, then refit the two quadrant return springs and ensure that they locate correctly over the step in the cover. To facilitate assembly of the springs, first fit the gearchange pedal and clamp it in position, thus enabling the quadrant to be turned and the springs to be compressed (see Fig. D3).

Refit the retainer plate, not forgetting the locking washers which fit one under each of the four nuts. Finally, refit the springs and plungers, taking care that they are not suddenly ejected from their seats during assembly.

SECTION D4

INSPECTING THE GEARCHANGE AND KICKSTART COMPONENTS

GEARCHANGE:

(1) Inspect the gearchange plungers for wear and ensure that they are a clearance fit in the quadrant. Check the plunger springs by comparing their lengths with the figures given in "General Data".

(2) Examine the plunger guide plate for wear and grooving on the taper guide surfaces. Renew the plate if grooving has occurred.

(3) Inspect the footchange pedal return springs for fatigue and if they show signs of corrosion due to condensation, they should be renewed.

(4) Examine the gearchange quadrant bush for wear and possible ovality by inserting the quadrant into the bush and feeling the amount of play.

(5) Check the tips of the plungers and the teeth of the camplate operating quadrant for chipping and wear. To remove the camplate quadrant, first remove the inner cover as shown in Section D7, then remove the two split pins and withdraw the spindle.

KICKSTART:

(1) Examine the kickstart quadrant for chipped or broken teeth or looseness on the spindle and the kickstart return spring for fatigue cracks and signs of wear, particularly at the centre where it engages on the splines of the spindle.

(2) Examine the kickstart spindle bush for wear. If the required measuring instruments are not available, use the spindle as a gauge and feel the amount of play.

(3) Examine the kickstart ratchet mechanism for wear, giving particular attention to the ratchet teeth ensuring that they have not become chipped or rounded. Check that the thin walled steel bush is a clearance fit in the kick-start pinion and that the spring is not badly worn.

(4) Finally, check that the kickstart stop peg is firmly pressed into the inner cover and is not distorted.

SECTION D5

RENEWING KICKSTART AND GEARCHANGE SPINDLE BUSHES

If it is found necessary to renew the kickstart spindle bush this should be done by completely stripping the outer cover of its assembly parts and heating it to 100°C., then driving the bush out using a suitable shouldered drift. Press in the new bush while the cover is still hot.

Adopt a similar procedure for renewal of the outer cover gearchange spindle bush. The inner cover bush does not usually wear much, even after great mileage has been covered. However, if it is required to renew the bush, the inner cover should be removed (Section D7) and the camplate operating quadrant disconnected.

Using a suitable tap (e.g. $\frac{3}{4}$ in. dia. x 10 Whit.) cut a thread in the bush to a depth of $\frac{3}{4}$ in.; heat the cover to 100°C., then reinsert the tap, or, preferably, a suitable bolt. Grip the bolt (or tap) firmly in a vice, then drive the cover away using a hide mallet until the bush is free.

A press or suitably shouldered drift is required to drive in the new bush, which should be done whilst the cover is still hot.

SECTION D6

CLUTCH OPERATING MECHANISM

The clutch operating mechanism, which is situated in the gearbox outer cover, consists of two spring loaded plates held apart by three balls, which are seated in conical indentations in the plates.

Wear in this mechanism is negligible, even after excessive mileage has been covered, so long as the gearbox oil level is maintained at the recommended level. The mechanism is removed as a unit by unscrewing two slotted screws and is then easily dismantled. The parts are arranged as shown in Fig. D5, which should be referred to when re-assembling the mechanism.

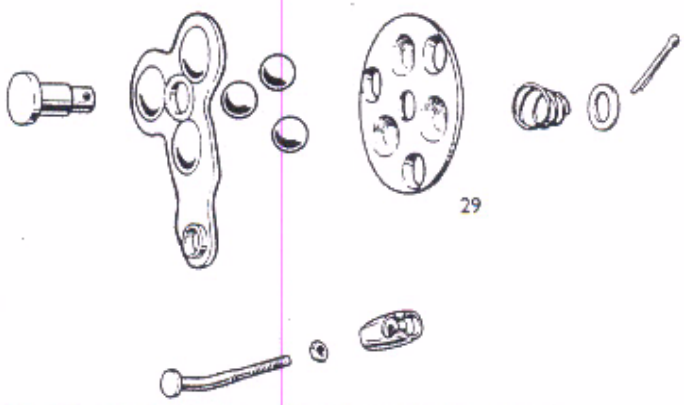


Fig. D5. Exploded view of clutch operating mechanism

SECTION D7

DISMANTLING THE GEARBOX

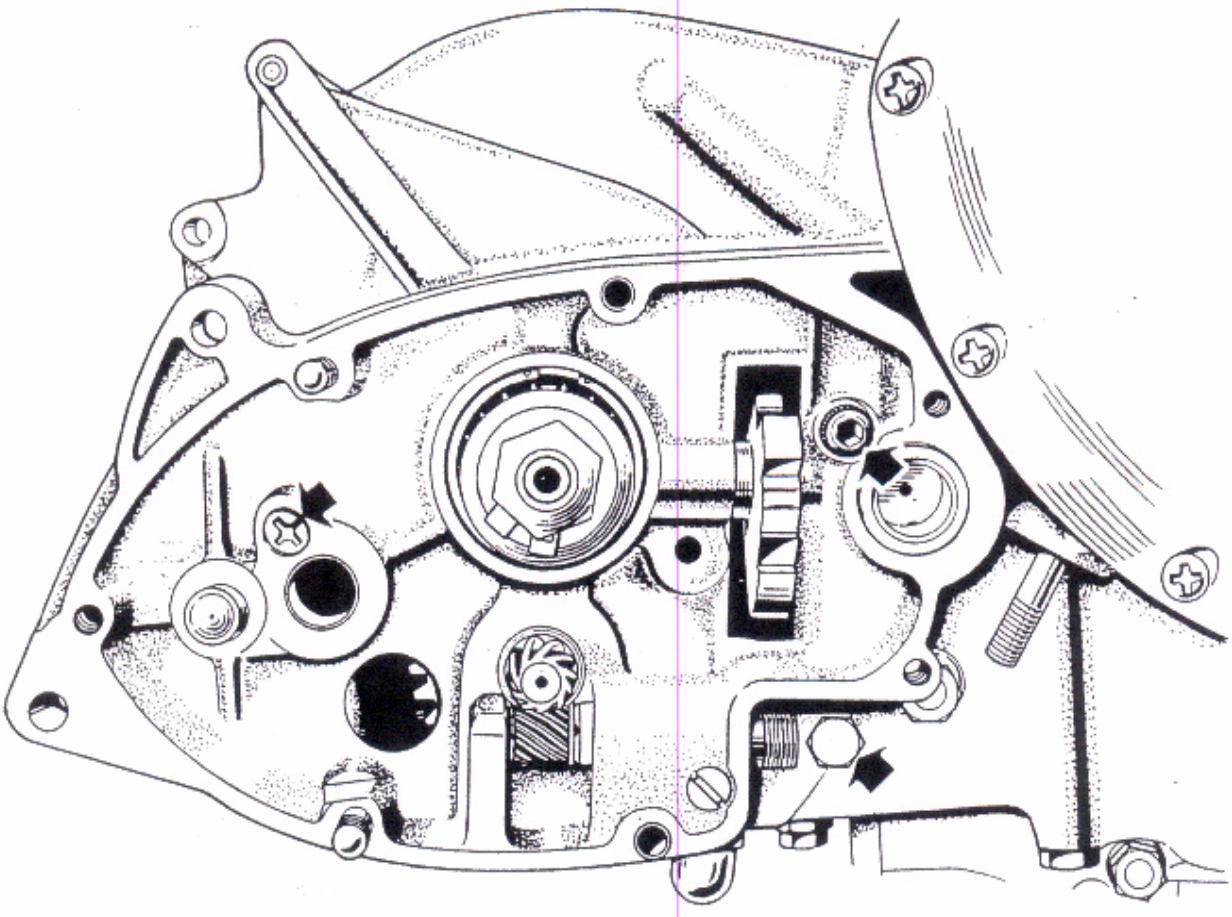


Fig. D6. Gearbox inner cover retaining screws 08

Remove the gearbox outer cover as shown in Section D1, leaving the gearbox with 4th (top) gear selected.

Remove the two short bolts, two long bolts and a centre nut which serves to retain the rear right engine mounting plate, then withdraw the plate.

Bend back the tags on the lock washer and unscrew the kickstart pinion ratchet retainer nut from the end of the gearbox mainshaft. This should be easily achieved with 4th (top) gear selected and the rear brake applied. Unscrew the speedometer cable union nut and disconnect the cable from the speedometer drive shaft.

Remove the outer primary cover and dismantle the transmission as shown in Section C, not forgetting, finally, to remove the key from the gearbox mainshaft.

Unscrew the large domed nut from underneath the gearbox and withdraw the camplate indexing plunger and spring. The gearbox inner cover is retained by a socket screw, a Phillips recessed screw and a hexagonal bolt (see Fig. D6). When these are removed the cover can be released by tapping it outwards with a hide mallet. The gearbox mainshaft can be withdrawn easily after the selector fork spindle has been removed. The layshaft and remaining gears can then be withdrawn. Remove the camplate and spindle assembly, then remove the two brass thrust washers which locate over the needle roller bearings.

The mainshaft high gear, in which the gearbox mainshaft runs, is locked through the main bearing and gearbox sprocket. The oil is prevented from leaving the gearbox through the main bearing by an oil seal which runs on a ground boss on the gearbox sprocket. To remove the mainshaft high gear

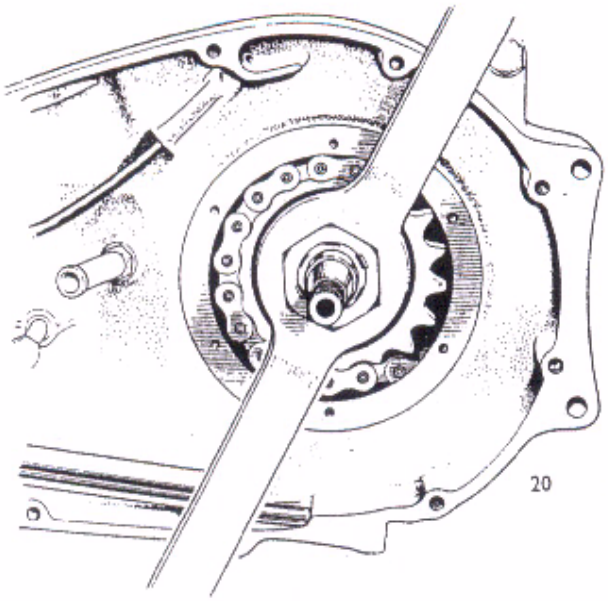


Fig. D7. Removing the gearbox sprocket with rear brake applied

and renew the oil seal it will be necessary to remove the sprocket. This can be done by removing the circular plate from the primary inner cover at the rear of the clutch and unscrewing the large hexagonal gearbox sprocket nut (1·66 in. across flats). To facilitate removal of the nut, spanner number Z63 is available.

When the nut is removed, drive the high gear through into the gearbox using a hammer with a soft metal drift.

To remove the sprocket, disconnect the rear chain and remove it from around the sprocket, which can then be easily withdrawn through the aperture.

Check the oil seal for cracking and wear. If there has been any signs of excessive oil leakage, renew it.

SECTION D8

INSPECTION OF THE GEARBOX COMPONENTS

Thoroughly clean all parts in paraffin (kerosene) and check them for wear and fatigue, as follows:—

(1) Inspect the gearbox housing and inner cover for signs of cracking and damage to the joint faces. Check that the location dowels are in position correctly in the gearbox and inner cover (2 dowels each). In preparation for reassembly, clean the junction surfaces of the gearbox, inner cover and outer cover of any old deposits of jointing compound.

(2) Examine both the mainshaft and layshaft for signs of fatigue, damaged threads and badly worn splines. Check the extent of wear to the bearing diameters of both shafts by comparing them with the figures given in "General Data". Examine the shafts carefully for signs of seizure. Excessive friction resistance and seizure will be indicated by local colouring on the shaft.

(3) Check the layshaft needle roller bearing by inserting the layshaft and feeling the amount of play.

(4) Inspect the gearbox mainshaft ball bearing races for roughness due to pitting or indentation of the ball tracks. An estimate can be made of ball wear by feeling the amount of side play of the centre track. It should not be possible to detect any movement by hand if the bearing is in good condition. The mainshaft should be a hand press fit in the inner cover bearing. Similarly the mainshaft high gear should be a good hand press fit in the opposite bearing.

(5) Examine the gears thoroughly, for chipped, fractured or worn teeth. Check the internal splines and bushes. Make sure that the splines are free on their respective shafts with no tendency to bind, and the bushes in the mainshaft high gear and layshaft low gear are not loose or excessively worn. Again, reference should be made to the dimensions given in "General Data".

(6) Check that the selector fork rod is not grooved and that it is a good fit in the gearbox casing and the inner cover. Inspect the selector fork running faces for wear. This will only have occurred if the gearbox is being continually

used with a badly worn mainshaft bearing. The camplate rollers which fit on the selector fork are of case hardened steel and consequently wear should be negligible.

(7) The gear selector camplate should be inspected for signs of wear in the roller tracks. Excessive wear will occur if the mainshaft main bearing has worn badly. Check the fit of the camplate spindle in its housing. Examine the camplate gear wheel for excessive wear. Difficulty will be encountered in gear selection, causing subsequent damage to the gears, if this gear is badly worn.

(8) Ensure that the camplate plunger works freely in the housing and that the moving parts are free from corrosion. To check if the spring has become inefficient, measure its length and compare it with "General Data".

(9) Examine the mainshaft high gear bush for wear by inserting the mainshaft into it and feeling the amount of play. It is advisable to take micrometer readings of the mainshaft and compare them with caliper readings of the bush. If the clearance is excessively greater than the figure given in "General Data" the bush should be renewed as shown in Section D9.

SECTION D9

RENEWING MAINSHAFT AND LAYSHAFT BEARINGS

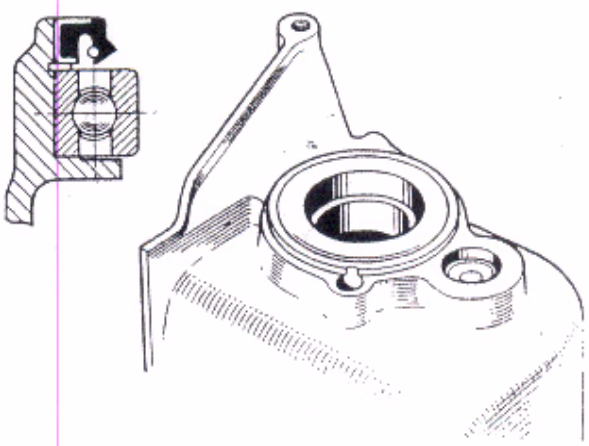
MAINSHAFT

The mainshaft ball bearings are a press fit into their respective housings and are retained by spring circlips to prevent sideways movement due to end thrust. To remove the right bearing, first lever out the circlip, then heat the cover to approximately 100°C. and drive out the bearing using a suitably shouldered drift. The new bearing should be pressed or drifted in whilst the cover is still hot using a suitable tubular drift onto the outer race (2¼ in. outside diameter x 6 in. long). Do not forget to refit the circlip.

To remove the high gear bearing on the left of the machine, first lever out the large oil seal (which must be renewed), then remove the retainer circlip. Carefully heat the casing locally to approximately 100°C. then drive out the bearing from the inside by means of service tool Z15 or a suitably shouldered drift. Whilst the casing is still hot, drive in the new bearing, using a suitable tubular drift onto the outer race, then refit the circlip and press in the new oil seal.

MAINSHAFT HIGH GEAR BUSH

If it is required to renew this bush, this can be done by pressing out the bush using a suitable drift, which can be made from a 5 in. x $\frac{7}{8}$ in. diameter piece of bar by machining a $1\frac{3}{16}$ in. dia. x $\frac{3}{4}$ in. long pilot at one end. The bush must be pressed out by inserting the drift at the teeth end of the gear. The new bush must be pressed in with the oil groove in the bore of the bush at the teeth end.



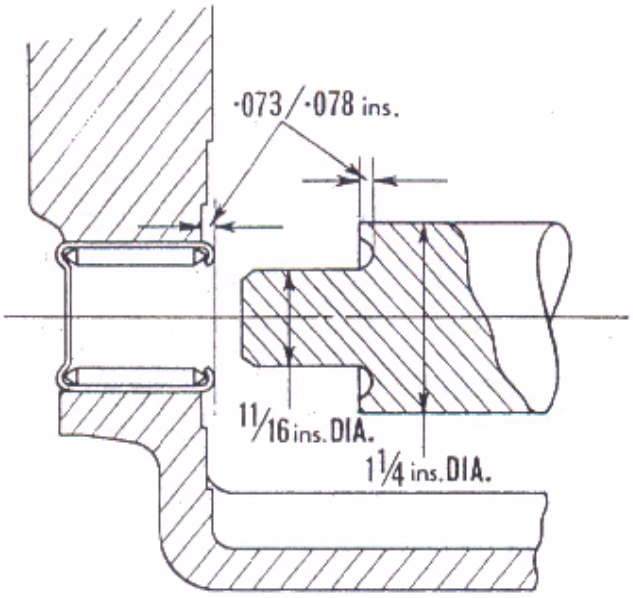
55

Fig. D8. Section through gearbox mainshaft oil seal

Finally, ream the bush to size using service tool reamer Z46. The pressed-in bore size is given in "General Data".

LAYSHAFT

The right needle roller bearing, which is a press fit into the inner cover, should be removed by first unscrewing the slotted screw which locates the speedometer driven shaft, then driving out the shaft, complete with bush, by means of a narrow soft metal drift. Heat the cover to approximately 100°C. then press or drift out the bearing using a tool similar to that shown in Fig. D9, overleaf.



65

Fig. D9. Sketch of needle roller and drift

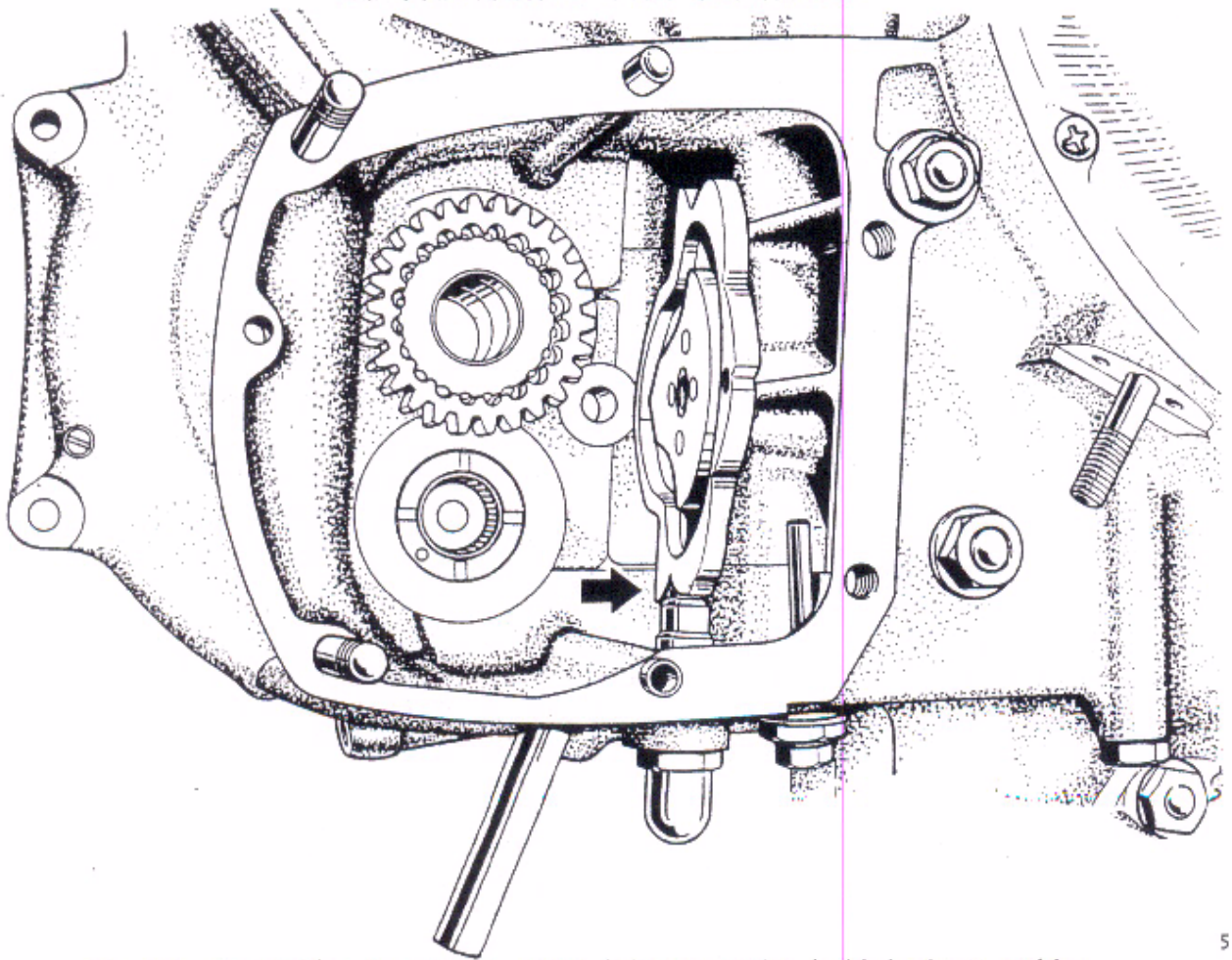
The new bearing should be pressed in, plain end first, whilst the cover is still hot, from the inside of the cover, until ·073/·078 in. of the bearing protrudes above the cover face (see Fig. D9).

The left needle roller bearing is of the closed-end type and is accessible from the left, through the sprocket cover plate aperture. The casing should be heated to approximately 100°C. and the bearing driven through into the gearbox using a soft metal drift, taking care not to damage the bore into which the bearing fits. The new bearing must be carefully pressed in whilst the casing is hot, until ·073/·078 in. protrudes above the spot face surface inside the gearbox. Do not use excessive force or the needle roller outer case may become damaged, resulting in the rollers seizing, or breaking up.

Finally, the outer portion of the bore into which the bearing fits, should be sealed with a suitable proprietary sealant.

SECTION D10

REASSEMBLING THE GEARBOX



5

Fig. D10. Reassembling the gearbox. Arrow indicates camplate in 4th (top) gear position

D10

Drive the new oil seal up to the main bearing with the lip and spring towards the bearing. Press the high gear into the bearing. Lubricate the ground tapered boss of the sprocket with oil and slide it onto the high gear. Screw on the securing nut finger tight.

Re-mesh the rear chain with the sprockets and replace the connecting link. Apply the rear brake and tighten the sprocket securing nut as tight as possible using service tool Z63. (See Fig. D7.)

Smear the bronze bush protruding from the mainshaft high gear with oil and replace the circular cover plate using a new paper gasket.

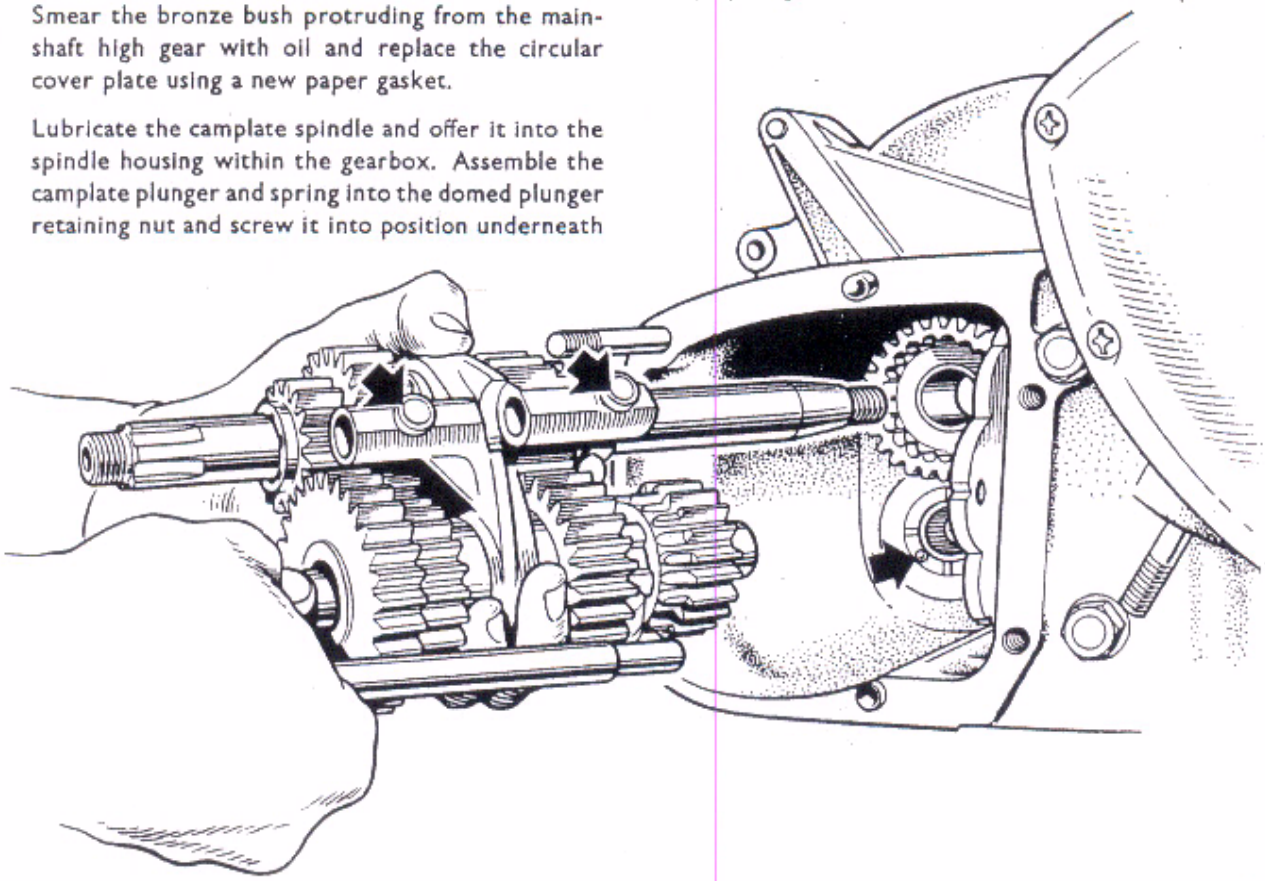
Lubricate the camplate spindle and offer it into the spindle housing within the gearbox. Assemble the camplate plunger and spring into the domed plunger retaining nut and screw it into position underneath the gearbox, but do not forget the fibre washer. Set the camplate in fourth gear position.

Locate the brass thrust washer over the inner needle roller bearing. The thrust washer can be held in position by smearing its rear surface with grease. Note that the grooved surface of the thrust washer is towards the layshaft. (See Fig. D11).

Lubricate the mainshaft and layshaft captive gears, then assemble the mainshaft and layshaft gear clusters as shown in Fig. D11.

Place the camplate rollers onto the selector forks and hold them in position with grease. Position the selector forks in their respective grooves in the gears as shown in Fig. D11. The assembly is now ready to be offered into the gearbox housing.

As the mainshaft and layshaft are being located in their respective bearings, the gears should be slid into position and aligned so that the selector fork rollers locate in the roller tracks in the camplate and the bores for the selector forks are approximately aligned. Smear the selector fork spindle with oil and slide it through the selector forks, shoulder end first, until it is fully engaged in the gearbox housing.



6

Fig. D11. Reassembling the gearbox components. Arrows indicate camplate rollers in position and thrust washer correctly located

Check the camplate operating quadrant is moving freely in the inner cover and position the brass layshaft thrust washer over the needle roller bearing in the inner cover. Again, use grease to hold the thrust washer in position during assembly.

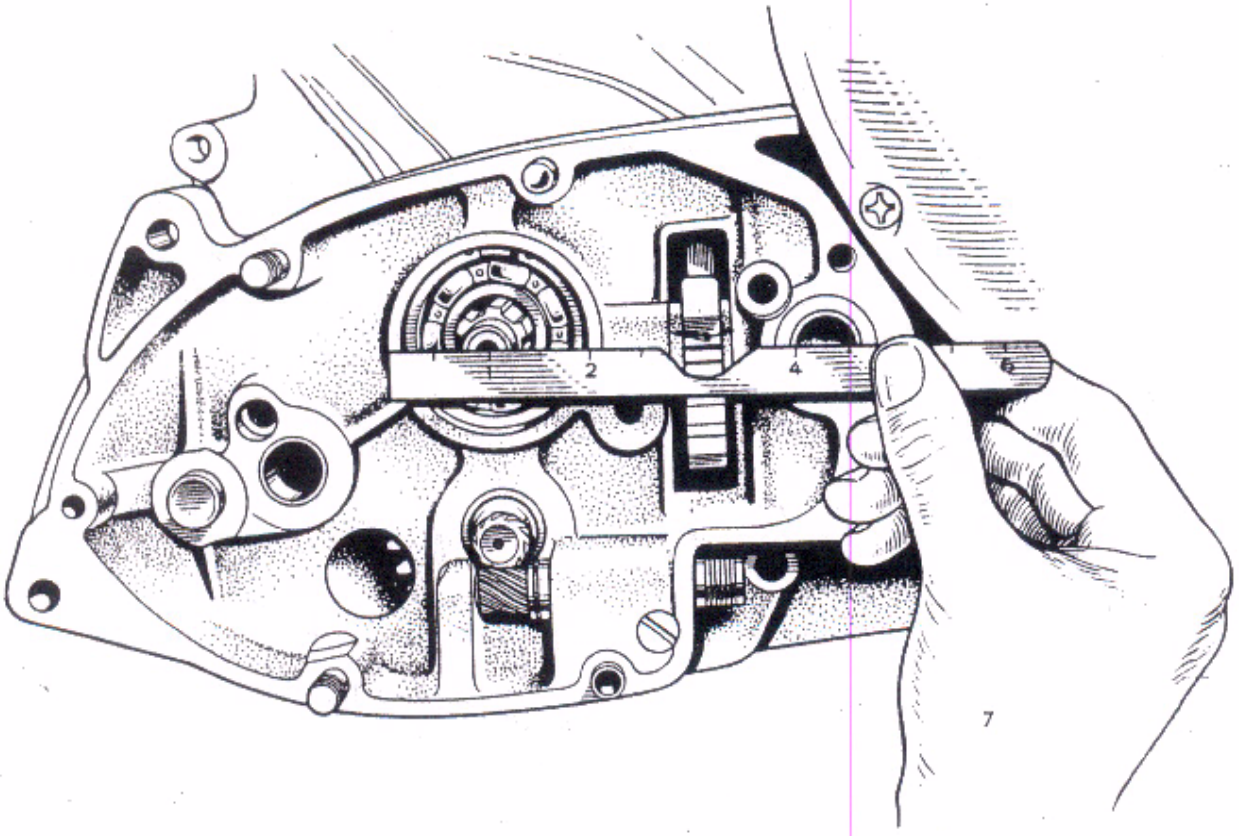


Fig. D12. Refitting the gearbox inner cover. Note top of first tooth aligned with centres shown for correct location of gearchange camplate and quadrant

Using a pressure oil can, lubricate all the moving parts in the gearbox, then apply a fresh coat of jointing compound to the gearbox junction surface.

Ensure that the two location dowels are in position and offer the inner cover assembly to the gearbox. When the cover is approximately $\frac{1}{4}$ in. (6 mm.) away from the gearbox junction face, lift the camplate slightly so that it occupies the position shown in Fig. D12, and then press the cover fully home.

Screw in the socket screw, recessed screw and the bolt, then temporarily assemble the outer cover and gearchange lever and check that the gearchanging sequence is correct by simultaneously operating the gearchange pedal and turning the rear wheel. In the event that either first or fourth gear only can be selected and then the gearchange mechanism ceases to operate, this will be due to the quadrant not being correctly meshed with the camplate gear. In effect the camplate has turned too far and the camplate plunger has over-sprung, thus stopping the camplate from returning.

To rectify this, remove the inner cover again, set the camplate in fourth gear position then re-locate the inner cover with the "alignment tooth" (see Fig. D12) on the mainshaft centre line. The object being to re-engage the quadrant accurately with the camplate pinion in the correct camplate position.

When correct gearchanging is established, re-assemble the kickstart pinion and ratchet, replace the tab washer and screw on the securing nut to the torque figure given in "General Data". To facilitate this, the rear brake should be applied with fourth gear selected.

Refit the gearbox outer cover as shown in section D1 then reassemble the transmission, referring to section A2 for the correct quantities and grades of lubricant for the primary chaincase and gearbox.

SECTION D11

CHANGING THE GEARBOX SPROCKET

If it is required to change the gearbox sprocket for one with a different number of teeth from that of standard, then it will also be necessary to change the speedometer drive gear and driven gear. For further details of this, see Section D12. To gain access to the gearbox sprocket, first remove the left footrest and exhaust pipe and then remove the outer primary cover as shown in Section C3.

Remove the pressure plate, clutch plates and withdraw the shock absorber unit and clutch sprocket as shown in Section C9. Remove the key from the gearbox mainshaft and unscrew the six screws which serve to retain the circular cover.

Apply the rear brake, then unscrew the gearbox sprocket securing nut using service tool number Z63. The rear chain may now be disconnected and the gearbox sprocket withdrawn through the aperture.

Before fitting the new sprocket check that the gearbox oil seal is in good condition and that the rear chain is not excessively worn. Check the extension as shown in Section A13. If the old chain is to be retained for further use it should be thoroughly cleaned in paraffin and lubricated in a grease bath.

Lubricate the ground boss with oil and slide the sprocket over the gearbox mainshaft and high gear. When the sprocket is located on the splines screw on the securing nut finger tight, then re-connect the chain. With the rear brake applied tighten the nut until it is as tight as possible.

When replacing the circular cover plate, use a new paper gasket. Ensure that the oil seal is correctly engaged over the protruding bronze bush. Reassembly then continues as a reversal of the above instructions.

SECTION D12

SPEEDOMETER DRIVE GEAR COMBINATIONS

The speedometer drive is taken from the right-hand end of the gearbox layshaft. As any overall gear ratio change is achieved by changing the gearbox sprocket and rear wheel sprocket, correction has to be made to this speedometer drive ratio, to preserve the correct speedometer drive cable speed.

The chart below gives the part numbers of the speedometer drive gears required for a change-over from the standard fitted gearbox sprocket to the recommended sprocket for use when fitting a sidecar.

For special purposes it may be necessary to calculate the speedometer drive gear combination requirement. If this is the case, reference should be made to Technical Information Bulletin No. 11 which is available on request from the TRIUMPH ENGINEERING CO. LTD., SERVICE DEPARTMENT.

Model		Gearbox Sprocket	Gears Required: Drive	Gears Required: Driven	Cable R.P. Mile	Var. %
6T	Std.	20	T1744 (10T)	T1745 (15T)	1590	—0·6
	S/Car	18	T1747 (9T)	T1748 (15T)	1600	Zero
TR6	Std.	19	T1744 (10T)	T1745 (15T)	1610	+0·6
	S/Car	17	T1747 (9T)	T1748 (15T)	1640	+2·5
T120	Std.	19	T1744 (10T)	T1745 (15T)	1670	+4·2
	S/Car	17	T1747 (9T)	T1748 (15T)	1695	+5·9

TABLE OF SPEEDOMETER DRIVE GEAR COMBINATIONS

Note: The above chart only applies if the gearbox ratios, the number of teeth on the rear sprocket and the rear tyre size are as specified in "General Data" for the particular model, and % variation is calculated on the standard 1600 drive cable revolutions per mile.

SECTION D13

GEARBOX SPROCKET AND MAINSHAFT HIGH GEAR

The splines on the gearbox sprocket and the mainshaft high gear have been altered on all models from DU13375 onwards. The old and new conditions are not interchangeable, and should either of the items require replacing ensure that the correct part number for the particular machine is obtained from the appropriate Replacement Parts Catalogue.

SECTION D11

CHANGING THE GEARBOX SPROCKET

If it is required to change the gearbox sprocket for one with a different number of teeth from that of standard, then it will also be necessary to change the speedometer drive gear and driven gear. For further details of this, see Section D12. To gain access to the gearbox sprocket, first remove the left footrest and exhaust pipe and then remove the outer primary cover as shown in Section C3.

Remove the pressure plate, clutch plates and withdraw the shock absorber unit and clutch sprocket as shown in Section C9. Remove the key from the gearbox mainshaft and unscrew the six screws which serve to retain the circular cover.

Apply the rear brake, then unscrew the gearbox sprocket securing nut using service tool number Z63. The rear chain may now be disconnected and the gearbox sprocket withdrawn through the aperture.

Before fitting the new sprocket check that the gearbox oil seal is in good condition and that the rear chain is not excessively worn. Check the extension as shown in Section A13. If the old chain is to be retained for further use it should be thoroughly cleaned in paraffin and lubricated in a grease bath.

Lubricate the ground boss with oil and slide the sprocket over the gearbox mainshaft and high gear. When the sprocket is located on the splines screw on the securing nut finger tight, then re-connect the chain. With the rear brake applied tighten the nut until it is as tight as possible.

When replacing the circular cover plate, use a new paper gasket. Ensure that the oil seal is correctly engaged over the protruding bronze bush. Reassembly then continues as a reversal of the above instructions.

SECTION D12

SPEEDOMETER DRIVE GEAR COMBINATIONS

The speedometer drive is taken from the right-hand end of the gearbox layshaft. As any overall gear ratio change is achieved by changing the gearbox sprocket and rear wheel sprocket, correction has to be made to this speedometer drive ratio, to preserve the correct speedometer drive cable speed.

The chart below gives the part numbers of the speedometer drive gears required for a change-over from the standard fitted gearbox sprocket to the recommended sprocket for use when fitting a sidecar.

For special purposes it may be necessary to calculate the speedometer drive gear combination requirement. If this is the case, reference should be made to Technical Information Bulletin No. 11 which is available on request from the TRIUMPH ENGINEERING CO. LTD., SERVICE DEPARTMENT.

Model		Gearbox Sprocket	Gears Required: Drive	Gears Required: Driven	Cable R.P. Mile	Var. %
6T	Std.	20	T1744 (10T)	T1745 (15T)	1590	—0·6
	S/Car	18	T1747 (9T)	T1748 (15T)	1600	Zero
TR6	Std.	19	T1744 (10T)	T1745 (15T)	1610	+0·6
	S/Car	17	T1747 (9T)	T1748 (15T)	1640	+2·5
T120	Std.	19	T1744 (10T)	T1745 (15T)	1670	+4·2
	S/Car	17	T1747 (9T)	T1748 (15T)	1695	+5·9

TABLE OF SPEEDOMETER DRIVE GEAR COMBINATIONS

Note: The above chart only applies if the gearbox ratios, the number of teeth on the rear sprocket and the rear tyre size are as specified in "General Data" for the particular model, and % variation is calculated on the standard 1600 drive cable revolutions per mile.

SECTION D13

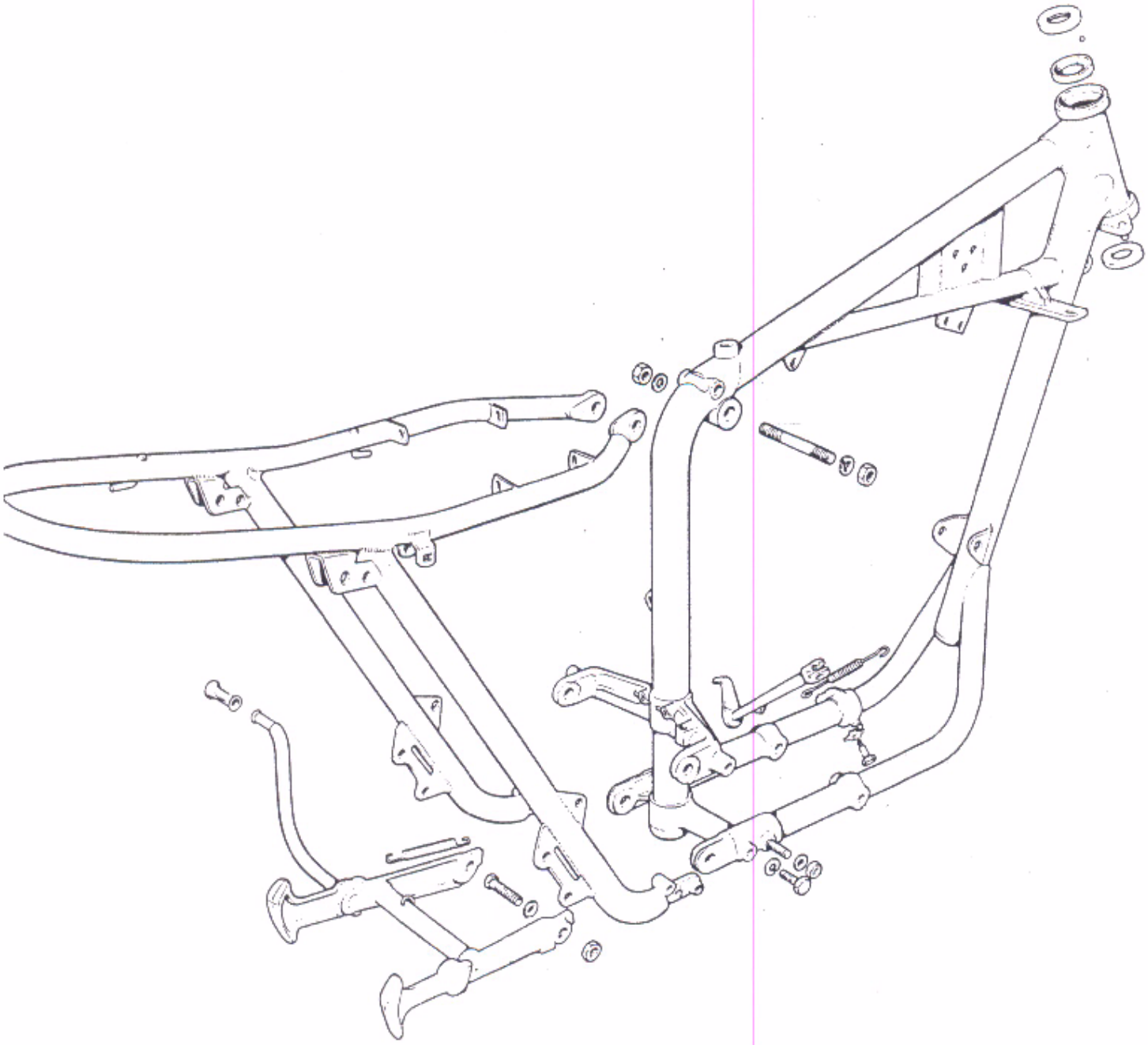
GEARBOX SPROCKET AND MAINSHAFT HIGH GEAR

The splines on the gearbox sprocket and the mainshaft high gear have been altered on all models from DU13375 onwards. The old and new conditions are not interchangeable, and should either of the items require replacing ensure that the correct part number for the particular machine is obtained from the appropriate Replacement Parts Catalogue.

SECTION E

FRAME AND ATTACHMENT DETAILS

	Section
REMOVING AND REFITTING THE FUEL TANK	E1
REMOVING AND REPLACING THE REAR PANELS (6T)	E2
REMOVING AND REPLACING THE SWITCH PANEL (TR6 AND T120)	E3
REMOVING AND REFITTING THE OIL TANK	E4
REMOVING AND REFITTING THE BATTERY CARRIER ASSEMBLY	E5
REMOVING AND REPLACING THE REAR MUDGUARD	E6
ADJUSTING THE REAR SUSPENSION	E7
REMOVING AND REFITTING THE REAR SUSPENSION UNITS	E8
STRIPPING AND REASSEMBLING THE SUSPENSION UNITS	E9
REMOVING AND REFITTING THE SWINGING FORK	E10
RENEWING THE SWINGING FORK BUSHES	E11
REMOVING AND REFITTING THE REAR FRAME	E12
FRAME ALIGNMENT	E13
REPAIRS	E14
PAINTWORK REFINISHING	E15
REMOVING AND REFITTING THE REAR SUSPENSION UNITS	E16



78

Fig. E1. General arrangement of front and rear frame assembly

SECTION E1

REMOVING AND REPLACING THE FUEL TANK

Turn both fuel taps to the "OFF" position then unscrew the union nuts and disconnect both feed pipes. Raise the twin seat then unscrew the rear fuel tank securing bolt. Detach the locking wire from the front tank bolts and unscrew them. The tank is then free to be removed. On machines fitted with the nacelle type headlamp unit the tank may foul the underside of the nacelle cover, in this case the two rear nacelle securing screws should be removed to give sufficient clearance.

Replacing the tank is the reversal of the above instructions, but do not forget to fit the mounting rubbers on the front and rear tank securing bolts.

Do not over-tighten the feed pipe union nuts as this may result in failure of this part with subsequent fuel leakage. Finally, rethread the locking wire through the heads of the two front securing bolts to prevent them unscrewing.

SECTION E2

REMOVING AND REPLACING THE PANELS (6T)

Removal of the left and right rear enclosure panels is achieved by unscrewing two domed nuts, a plain nut, (just below the rear of the fuel tank) from each panel and two front panel junction screws. The panels are then free to be removed.

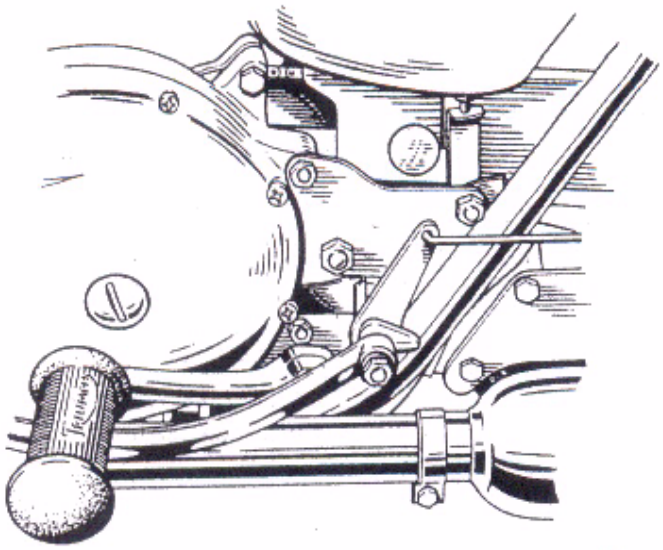
When replacing them, it is important that the distance pieces which fit over each of the engine mounting plate centre studs are in position otherwise the panel will become distorted when the domed nuts are tightened.

SECTION E3

REMOVING AND REPLACING THE SWITCH PANEL (TR6 & T120)

The switch panel on the left of the machine is secured by three point fixing on earlier models and four point fixing, on later models. To remove the panel, first disconnect the leads from the battery terminals, then remove the two top mounting bolts and front fixing bracket.

Lift the panel clear and detach the ignition and lighting switch socket plugs. On later models there is a rubber retaining band on each socket plug.



68

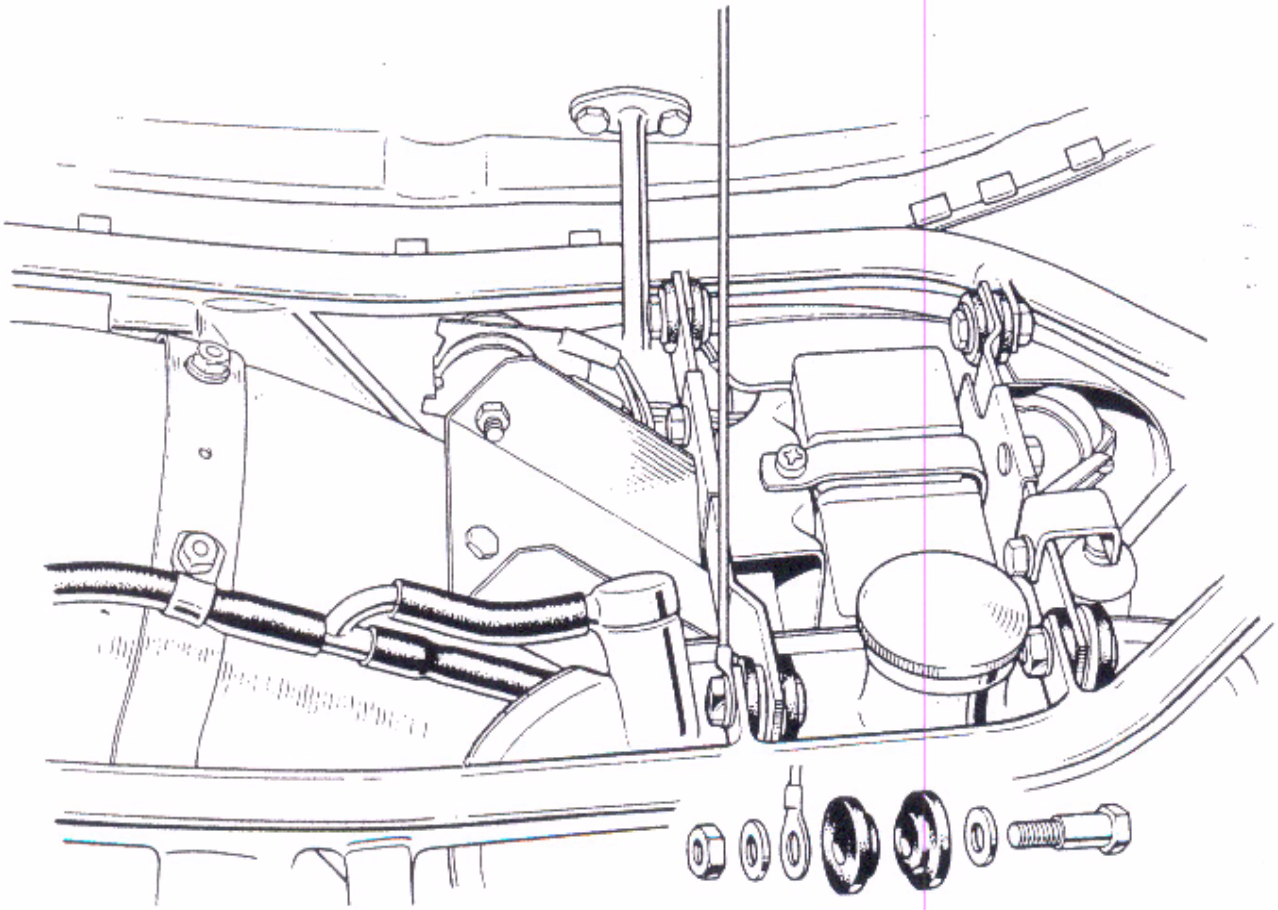
Fig. E2. Switch panel lower fixing bracket

When the panel is free, the lighting switch can be removed by unscrewing the central recessed screw, withdrawing the knob and unscrewing the switch retaining nut. To remove the ignition switch, carefully lever off the rubber switch cover, then unscrew the central retaining nut.

When replacing the panel, ensure that the sockets are fully engaged. The pins in the sockets are so arranged that they cannot be re-connected wrongly. On models where the lower fixing pillar is fitted check that the mating rubber grommet is correctly replaced in the panel (see Fig. E2).

SECTION E4

REMOVING AND REPLACING THE OIL TANK

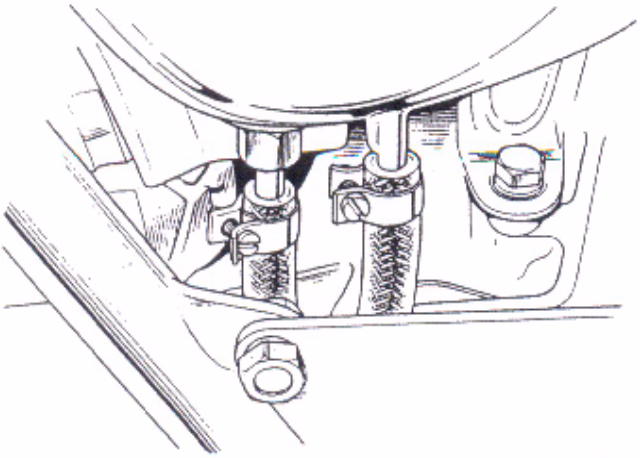


69

Fig. E3. Oil tank mounting bolt assembly

On machines with rear enclosure panels, remove the right panel, then unscrew the oil tank filler cap, place a drip tray underneath the oil tank and remove the drain plug, (where fitted) or, alternatively, unscrew the union nut and disconnect the oil feed pipe. Allow the oil to drain for approximately fifteen minutes. Unscrew the large hexagon-headed oil tank filter body from beneath the oil tank and thoroughly clean it in paraffin (kerosene).

Disconnect the oil return pipe and rocker feed pipe from beneath the oil tank and disconnect the oil breather pipe from the froth-tower on top of the oil tank. Remove the top mounting bolt complete with suspension rubbers and disconnect the twin-seat check wire. Unscrew the bottom mounting bolt and remove the oil tank. This is best achieved by allowing the bottom bracket to be lowered into the space behind the gearbox, then tilting the top of the oil tank outwards so that it can be lifted clear.



70

Fig. E4. Oil junction pipe securing clips

Thoroughly clean the tank in paraffin (kerosene) to remove all traces of sludge, metallic particles and debris, then allow it to drain.

Reassembly is the reversal of the above instructions but remember to fit the bottom mounting rubber and also to connect the seat check wire to the rear top mounting bolt. When connecting the oil feed pipe union nut take care to avoid over-tightening as this may result in failure of the union nut. When connecting the oil lines ensure that chafing of the rubber connections does not occur. Failure to observe this may result in rubber fragments entering the oil system and subsequently causing blockage.

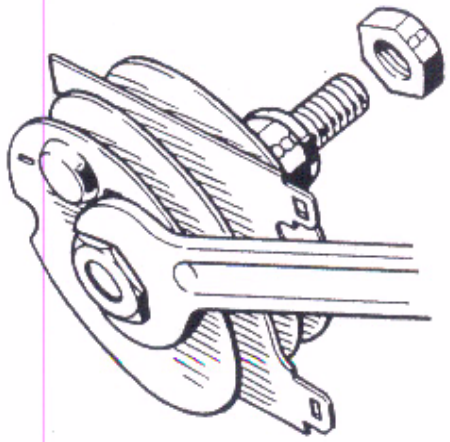
On later models where screw clips are fitted to prevent any possible oil leakage at the junction between the connecting rubber and oil tank tube, the clips should be carefully tightened. If oil leakage is experienced from one of these junctions on earlier models, it is advisable to purchase and fit new clips.

SECTION E5

REMOVING AND REPLACING THE BATTERY CARRIER ASSEMBLY

Disconnect the leads from the battery terminals and remove the battery then unscrew the rectifier securing nut as shown in Fig. E5. Remove the four battery strap fixing bolts complete with mounting rubbers then withdraw the battery carrier assembly complete.

To refit the battery carrier, first place it in position then align the switch panel bracket (if fitted) and insert the mounting rubbers into their correct positions as shown in Fig. E3. Refit the pillar bolts (not forgetting the plain washers) then screw on the securing nuts using a small amount of proprietary thread sealant. The rectifier must be refitted to the rear mounting strap with the red earthing lead fixed underneath its securing bolt.



71

Fig. E5. Removing the rectifier

SECTION E6

REMOVING AND REPLACING THE REAR MUDGUARD

Remove the split link and disconnect the rear chain from the rear wheel sprocket. Unscrew the rear brake operating rod adjuster nut and remove the nut securing the torque stay to the anchor plate. Unscrew the wheel spindle nuts and withdraw the wheel.

Slacken the rear number plate securing bolts and remove the two bolts securing the top clip, number plate and left and right valances (if fitted). Remove the left and right panels and remove the bottom bolt which secures the mudguard to the frame.

Disconnect the rear light lead (two snap connectors adjacent to the rear of the battery) and remove the two bolts securing the mudguard to the bridge. Carefully lower the mudguard at the same time allowing the lifting handle to pass underneath the number plate top bracket.

Replacement is a reversal of the above instructions but ensure that the electrical connections are coupled correctly and when re-connecting the rear chain, check that the nose of the spring connection link is facing in the direction of rotation.

SECTION E7

ADJUSTING THE REAR SUSPENSION

The movement is controlled by Girling combined coil spring and hydraulic damper units. The hydraulic damping mechanism is completely sealed but the static loading of the spring is adjustable.

There is a three position cam ring below the chromium plated dust cover and a "C" spanner is provided in the toolkit. To increase the static loading of the spring place the machine on the stand so that there is least load on the spring and use the "C" spanner to turn the cam; both units must be on the same notch whichever may be chosen.

The table below shows the spring rates and colour codes for the purposes designated.

	Rate lb./in.	Fitted Length (ins.)	Colour Code
Standard 6T, T120	145	8·0	Blue/Yellow
Standard TR6	100	8·4	Green/Green
Sidecar	150	8·4	Blue/Red

The standard lowest position is for solo riding, the second position is for heavier solo riders or when luggage is carried on the rear of the machine and the third or highest position is for use when a pillion passenger is being carried.

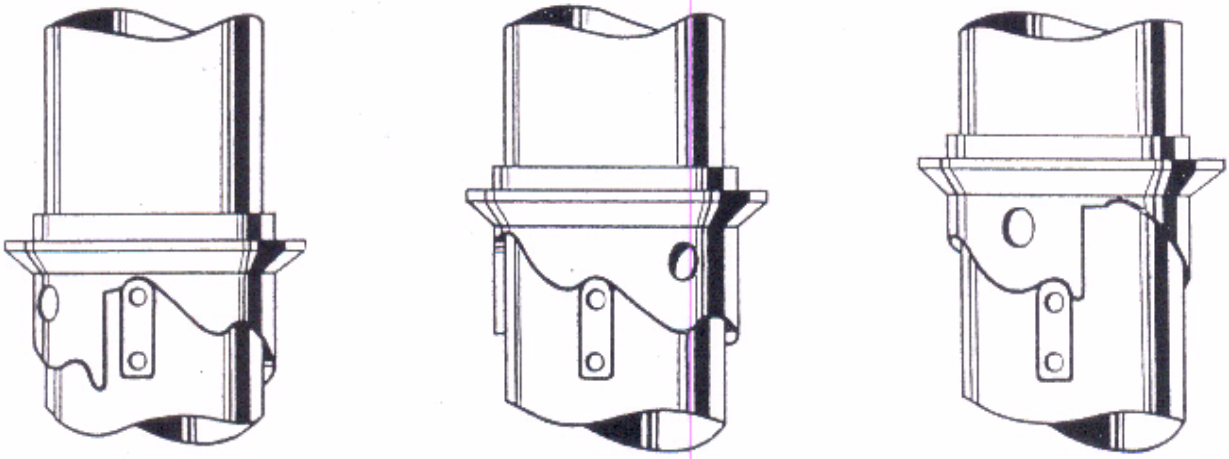


Fig. E6. Adjusting the rear suspension units

SECTION E8

REMOVING AND REFITTING THE REAR SUSPENSION UNITS

Removal of the suspension units on TR6 and T120 models is achieved by removing the top and bottom pivot bolts whilst the machine is suitably mounted so that the rear wheel is off the ground.

On the 6T the top pivot bolts are fitted from the inside and the rear wheel and mudguard require removing so that the pivot bolts can be withdrawn and the suspension units removed.

When refitting the units, ensure that the bridge bracket fits in-between the lifting handle and the frame prior to inserting the pivot bolts. It may be necessary to use an alignment bar to assist in bringing the holes into line.

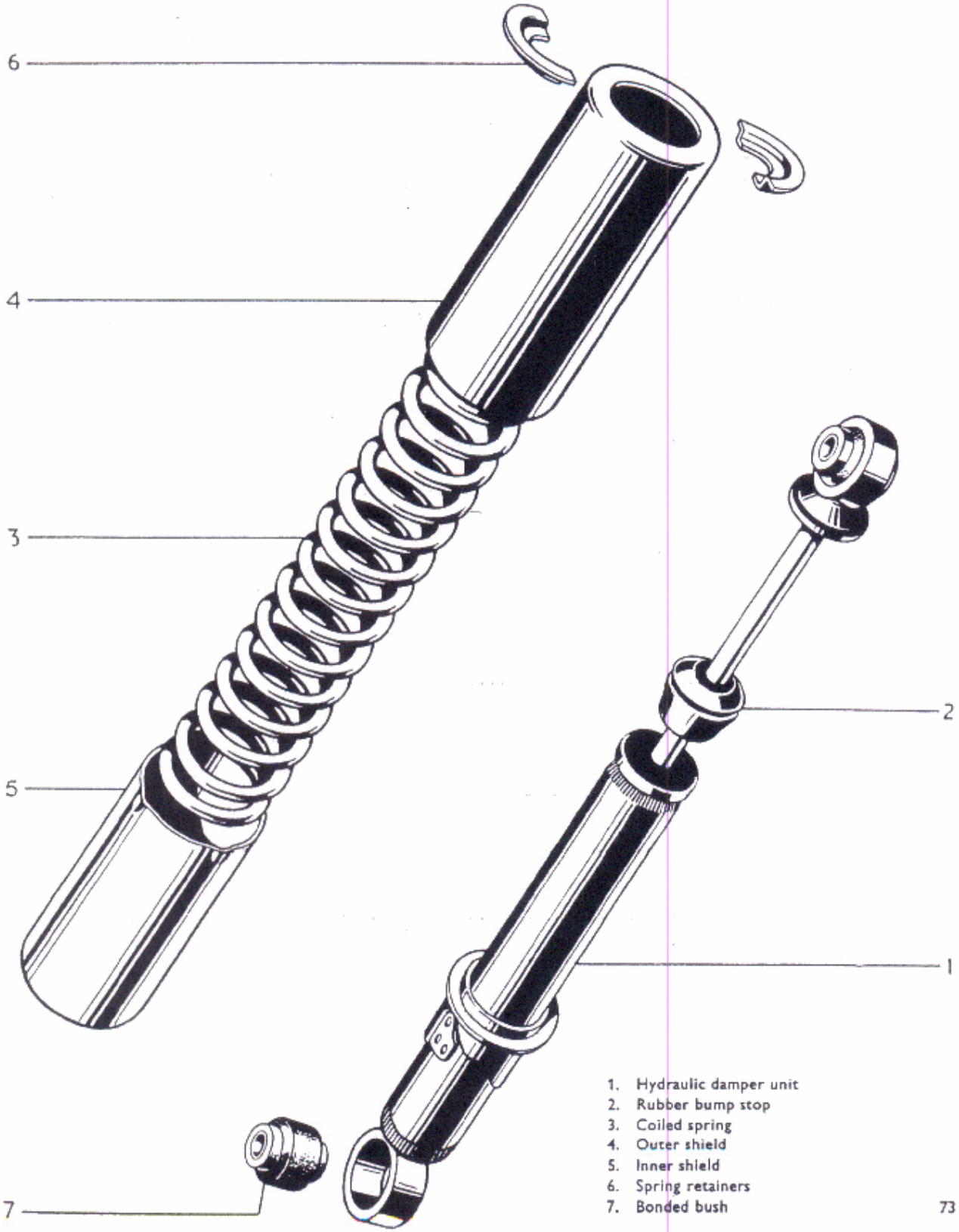


Fig. E7. Exploded view of the rear suspension unit

SECTION E9

STRIPPING AND REASSEMBLING THE SUSPENSION UNITS

The suspension unit consists of a sealed hydraulic damper unit, outer coiled spring and dirt shields. The static loading on the spring is adjustable and should be set according to the type of conditions under which the machine is to be used (see Section E7).

To dismantle the suspension unit and remove the spring, it is required to compress the spring whilst the two semi-circular spring retainer plates are removed. To do this first turn the cam until it is in the "LIGHT-LOAD" position, then carefully grip the bottom lug in a vice. Take firm hold of the outer dirt shield and pull it until the spring is sufficiently compressed to allow the spring retainers to be removed.

The damper unit should be checked for leakage, bending of the plunger rod and damping action. Check the bonded pivot bushes for wear and ensure that the sleeve is not loose in the rubber bush. The bushes can be easily renewed by driving out the old one and pressing in the new one using a smear of soapy water to assist assembly.

Squeaking coming from a suspension unit will probably be due to the spring rubbing on the bottom shield. To overcome this, smear some high-melting point grease on the inside of the shield. Under no circumstances should the plunger rod be lubricated.

The springs required for sidecar use are the 150 lbs./in. rate (Blue/Red). If a change-over is to be made ensure that these springs are fitted.

Note.—For information concerning suspension units or spare parts, the local Girling agent should be consulted.

Reassembly is a reversal of dismantling. Check that the cam is in the light load position before compressing the spring.

SECTION E10

REMOVING AND REFITTING THE SWINGING FORK

Disconnect the chain and remove the front anchor stay securing bolt, then unscrew the brake operating rod adjuster nut. Slacken the wheel spindle nuts and withdraw the rear wheel.

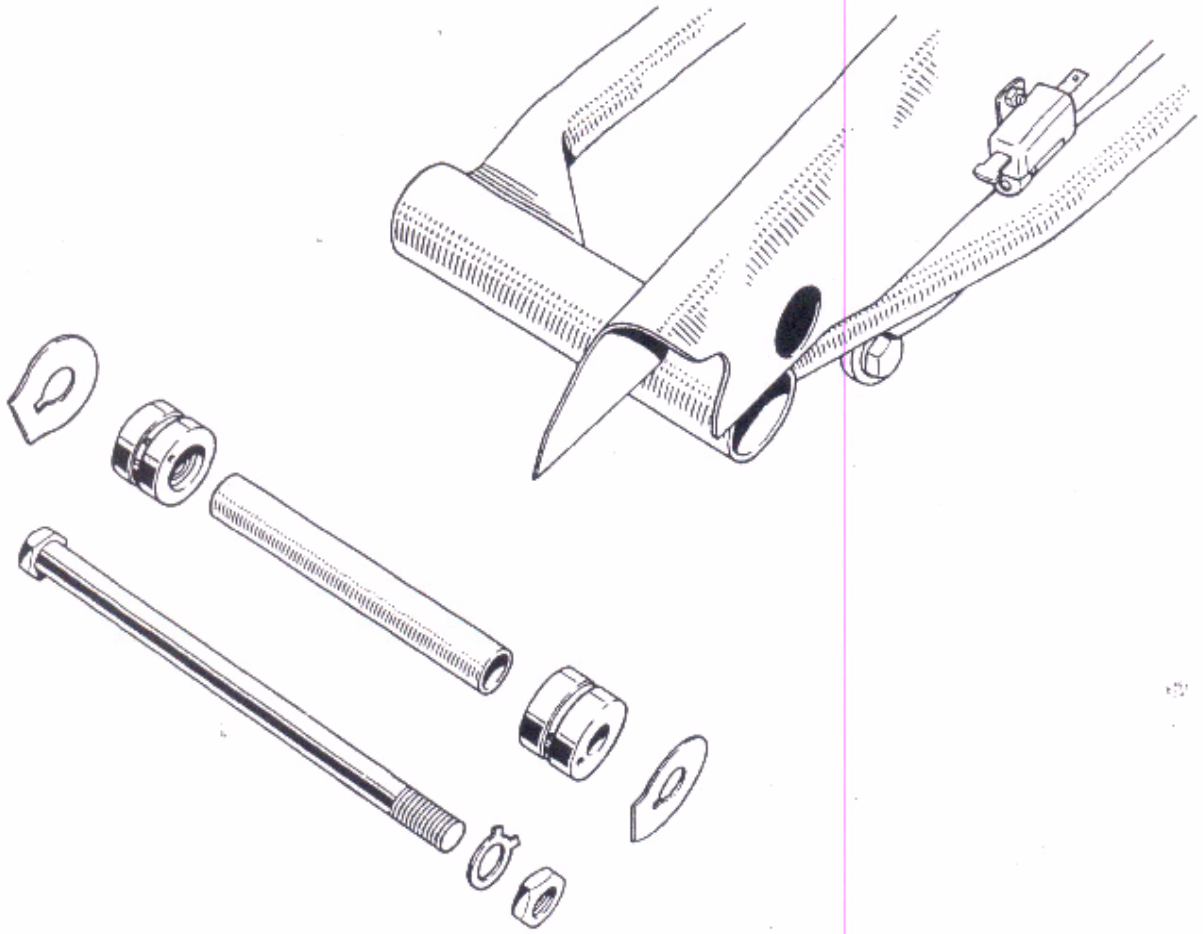
On machines where rear enclosure panels are fitted these must be removed. To do this unscrew two domed nuts, two front panel junction screws and a nut just below the rear of the petrol tank. The panels are then free to be removed.

Remove two long and two short bolts which serve to retain each of the left and right rear engine mounting plates and withdraw the plates. On panel-less models there is also a nut fitted centrally which must be removed.

Slacken off the rear chainguard bolt and remove the front chainguard securing bolt. Disconnect the leads from the stop lamp switch and remove the chainguard.

Remove the two bolts which secure the suspension units to the swinging fork.

On machines where the swinging fork pivot spindle nut is on the right of the machine the oil scavenge pipe should be disconnected from the oil tank to give spanner clearance for removing the pivot spindle. On earlier models the spindle was fitted from the left of the machine. To remove the spindle, first unscrew the locking nut, then unscrew the spindle until it is free to be withdrawn. The swinging fork can then be removed and the end plates, outer sleeves and distance tube withdrawn.

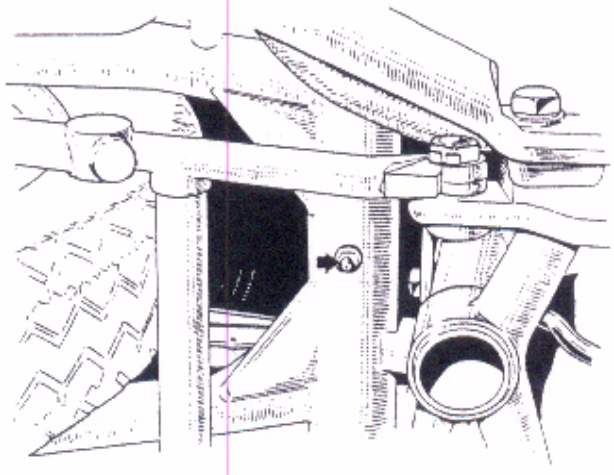


30

Fig. E8. Exploded view of swinging fork assembly

All parts should be thoroughly cleaned in paraffin (kerosine) and inspected for wear giving particular attention to the fit of the two outer sleeves in the swinging fork bushes. The working clearance between sleeve and bush should not be excessive. If excessive wear is in evidence, the bushes will require renewing, for details of this see Section E11.

The parts should be reassembled in the order shown in Fig. E8 with the addition of a sufficient quantity of the recommended grade of grease to fill the space surrounding the distance tube. Also, the sleeves and bushes should be well greased. The end plates will require holding in position with their flat edges forward whilst the swinging fork is offered to the pivot lug and the spindle inserted. The spindle should be tightened till the fork can just be moved upwards and downwards with little effort. The lock nut and tab washer should then be fitted and the nut tightened. Reassembly then continues as the reversal of the above instructions.



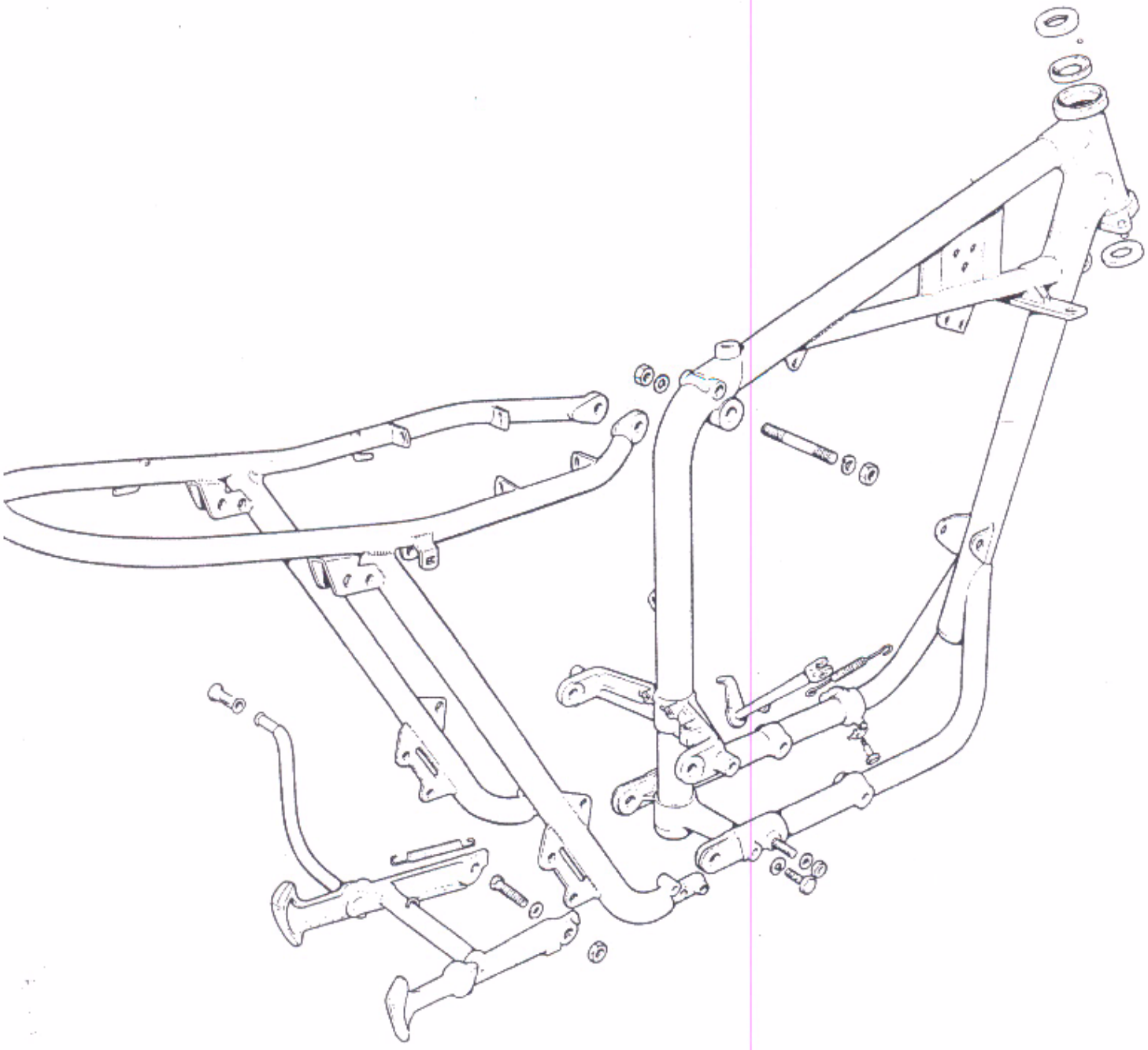
24

Fig. E9. Swinging fork lubrication nipple

SECTION E

FRAME AND ATTACHMENT DETAILS

	Section
REMOVING AND REFITTING THE FUEL TANK	E1
REMOVING AND REPLACING THE REAR PANELS (6T)	E2
REMOVING AND REPLACING THE SWITCH PANEL (TR6 AND T120)	E3
REMOVING AND REFITTING THE OIL TANK	E4
REMOVING AND REFITTING THE BATTERY CARRIER ASSEMBLY	E5
REMOVING AND REPLACING THE REAR MUDGUARD	E6
ADJUSTING THE REAR SUSPENSION	E7
REMOVING AND REFITTING THE REAR SUSPENSION UNITS	E8
STRIPPING AND REASSEMBLING THE SUSPENSION UNITS	E9
REMOVING AND REFITTING THE SWINGING FORK	E10
RENEWING THE SWINGING FORK BUSHES	E11
REMOVING AND REFITTING THE REAR FRAME	E12
FRAME ALIGNMENT	E13
REPAIRS	E14
PAINTWORK REFINISHING	E15
REMOVING AND REFITTING THE REAR SUSPENSION UNITS	E16



78

Fig. E1. General arrangement of front and rear frame assembly

SECTION E11

RENEWING THE SWINGING FORK BUSHES

If the swinging fork bushes require renewing they should be removed by means of a suitable soft metal drift inserted in the tubular housing at an angle and located onto the far side bush. By dexterous use of a hammer and a drift moving it round the edge of the bush a little at a time the bush should be easily removed with no resultant damage to the bore of the housing (see Fig. E10).

New bushes are of the steel backed pre-sized type and when carefully pressed in, using a smear of grease to assist assembly, they will give the correct diametral working clearance. If a press is not available the bush can be fitted by using a suitably turned drift and hammer. Ensure that the bush enters squarely and that no burr is set up due to misalignment. Bore sizes and working clearances are given in "General Data".

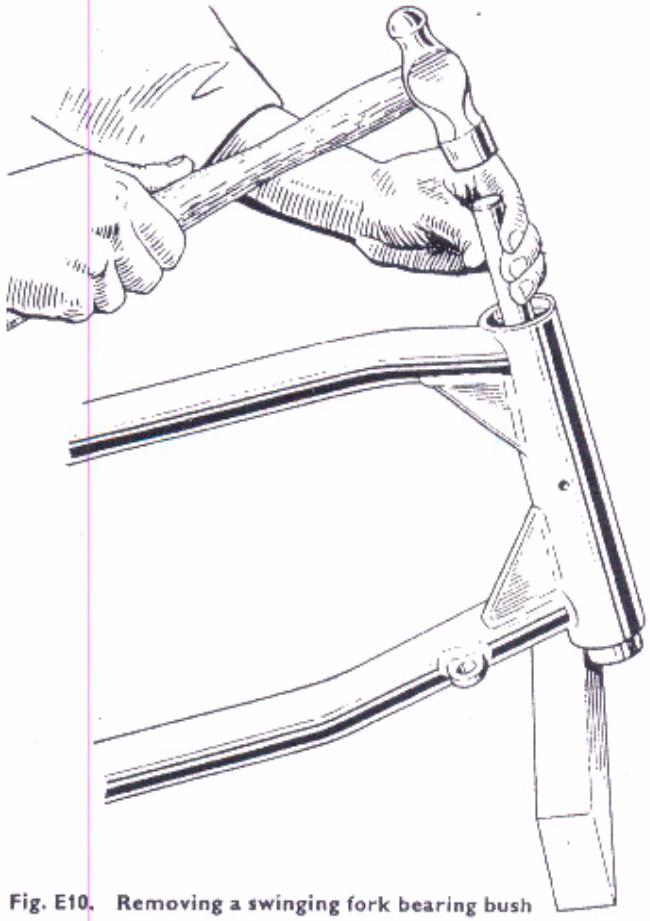


Fig. E10. Removing a swinging fork bearing bush

74

SECTION E12

REMOVING AND REPLACING THE REAR FRAME

Disconnect the leads from the battery terminals and remove the battery. Unscrew the four bolts which serve to secure the twinseat hinges, then disconnect the check wire and remove the twinseat. Remove the panels (6T) or switch panel, (TR6 and T120) oil tank, and rear mudguard as described in Section E3 to E6 inclusive.

Slacken the finned clip bolts, silencer clip bolts and two nuts which serve to secure the exhaust pipes underneath the engine, then remove the exhaust pipes by tapping them in a forward direction with a hide or rubber mallet. Remove the left and right silencers, then remove two short bolts, two long bolts and a central nut which serve to retain each of the left and right rear engine mounting plates. Remove the plates complete with footrests.

On models where the footrests are secured underneath the engine they should be removed by slackening their securing bolts and giving each footrest a sharp tap in a downward direction to release it from its locking taper.

Remove all frame clips which connect the wiring harness to the rear frame portion and unscrew the bottom left and right bolts which serve to secure the rear frame to the front frame, then remove the top securing stud. The rear frame is now free to be removed, this is best achieved by lifting it vertically upwards over the swinging fork.

Replacement is the reversal of the above instructions, but refer to the relevant wiring diagram in Section H11 when reconnecting the electrical units and wiring harness.

SECTION E13

FRAME ALIGNMENT

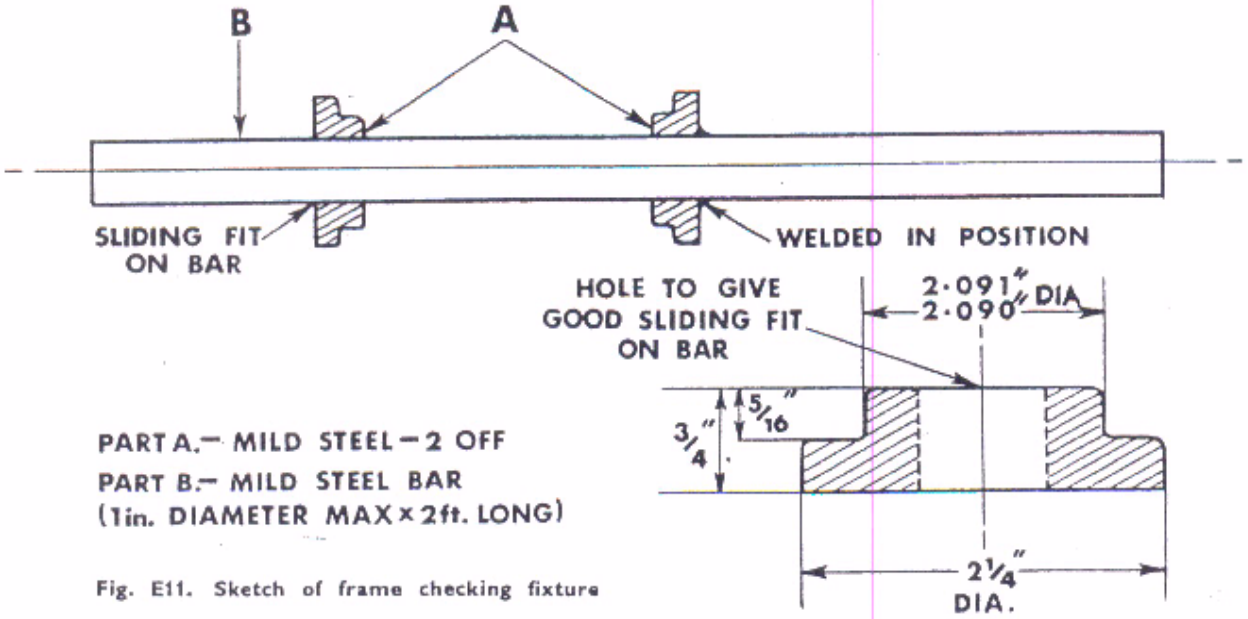


Fig. E11. Sketch of frame checking fixture

75

If the machine has been damaged in an accident the frame portions must be checked for correct alignment. In the following paragraph details are given of alignment checking for all parts of the frame (excepting the telescopic fork which is dealt with in Section G).

Basic requirements for alignment checking are a engineers checking table (surface area approximately 3 feet × 5 feet), adjustable height gauge (Vernier type preferable) two suitable "V" blocks, several adjustable height pillars, a set-square and a suitable jig as shown in the sketch (Fig. E11).

FRONT FRAME

It is essential that after setting, or checking the front frame lug centre line is in a plane perpendicular to the plane of the swinging fork pivot lug centre line. It is also essential, that the remaining tubes and lugs are in their relative positions within the stated limits of accuracy.

The method of checking the front frame is that of securely fitting an adaptor spindle of the type shown in Fig. E11 to the head lug. It is then required to support the spindle and head lug on a plane parallel to, and approx. 6 ins. (15 cm.) from, the checking table surface. For this purpose two "V" blocks, packing pieces and two suitable "G" clamps will be required. At the other end of the frame (swinging fork and rear frame removed) an adjustable pillar should be placed under the down tube adjacent to the swinging fork pivot lug (see Fig. E12). The height of the pillar can be determined by measuring the diameter of the tube which is to rest on it, halving the diameter and then subtracting it from the dimension between the head lug centre line and table surface.

The frame centre line should now lie parallel to the checking table surface if the frame alignment is correct.

To verify this take height readings on the front down tube, top tube and rear down tube. See Figs E12 and E13. Permissible maximum variation is $\frac{1}{32}$ in. (0·75 mm.).

Fit the swinging fork pivot spindle with the two outer sleeves and distance tube attached and check the pivot lug for squareness using a set square at the two location points as shown in Figs. E12 and E13.

Then, using a set square, check that the bottom tubes are aligned by bringing the set square to bear on them at the front and rear.

Using a steel rule or suitable instrument measure the hole centres and compare the figures obtained with those given in Fig. E14.

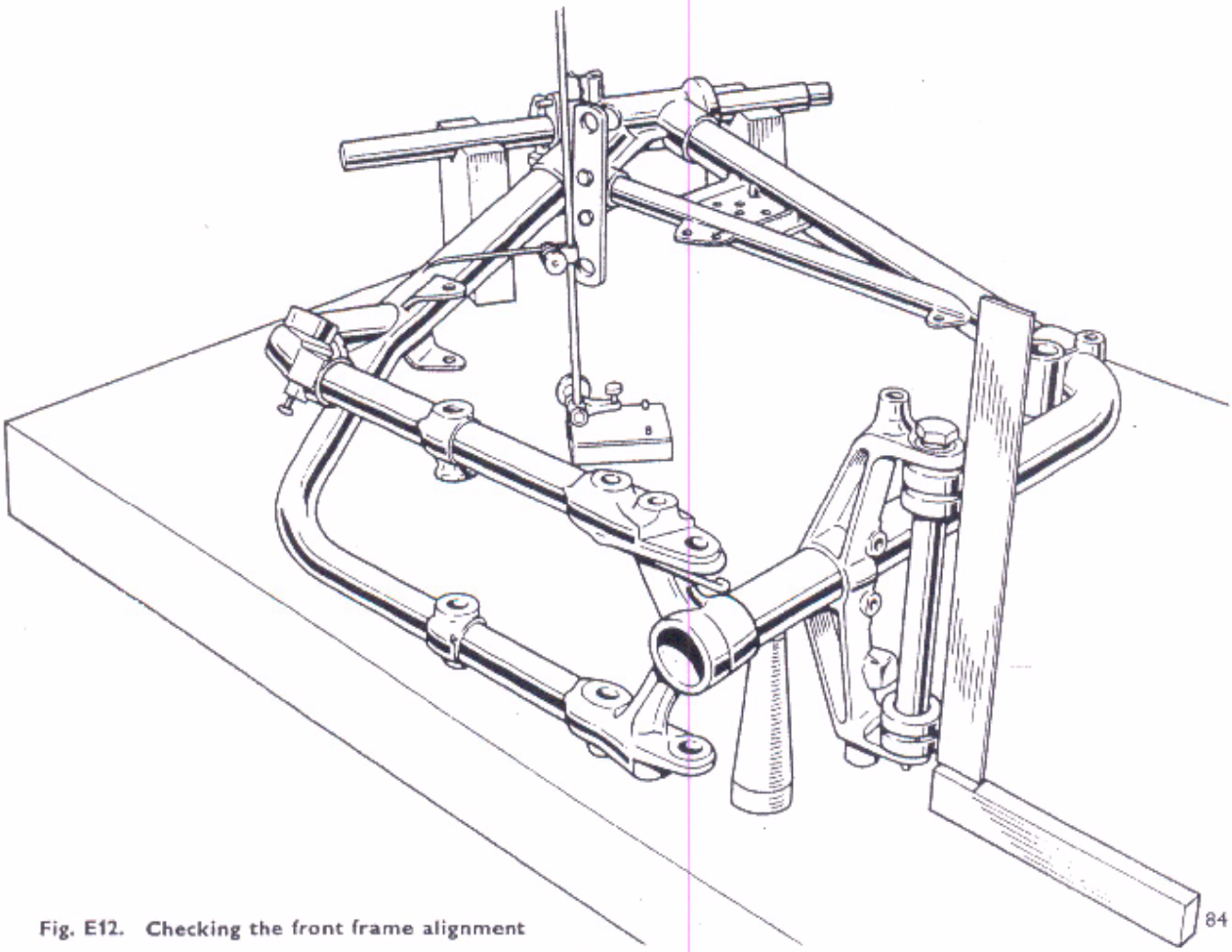


Fig. E12. Checking the front frame alignment

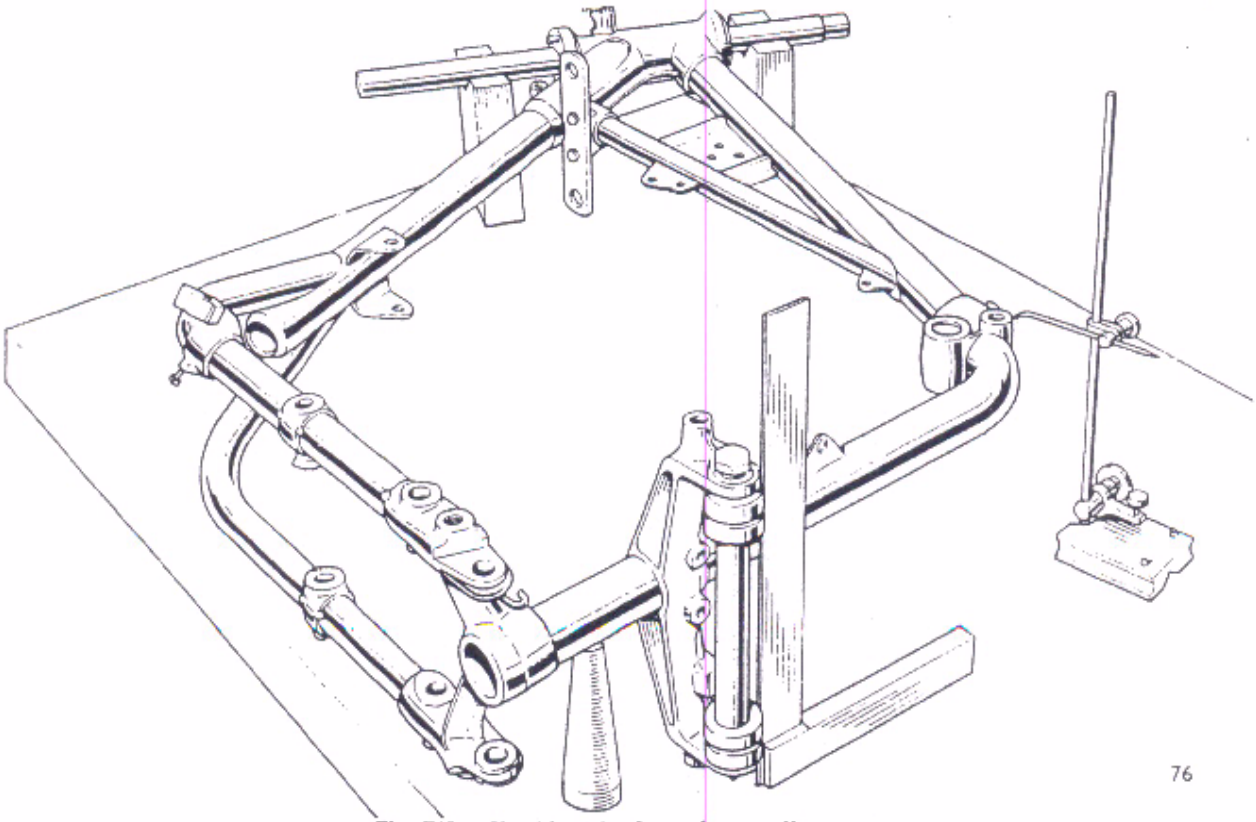
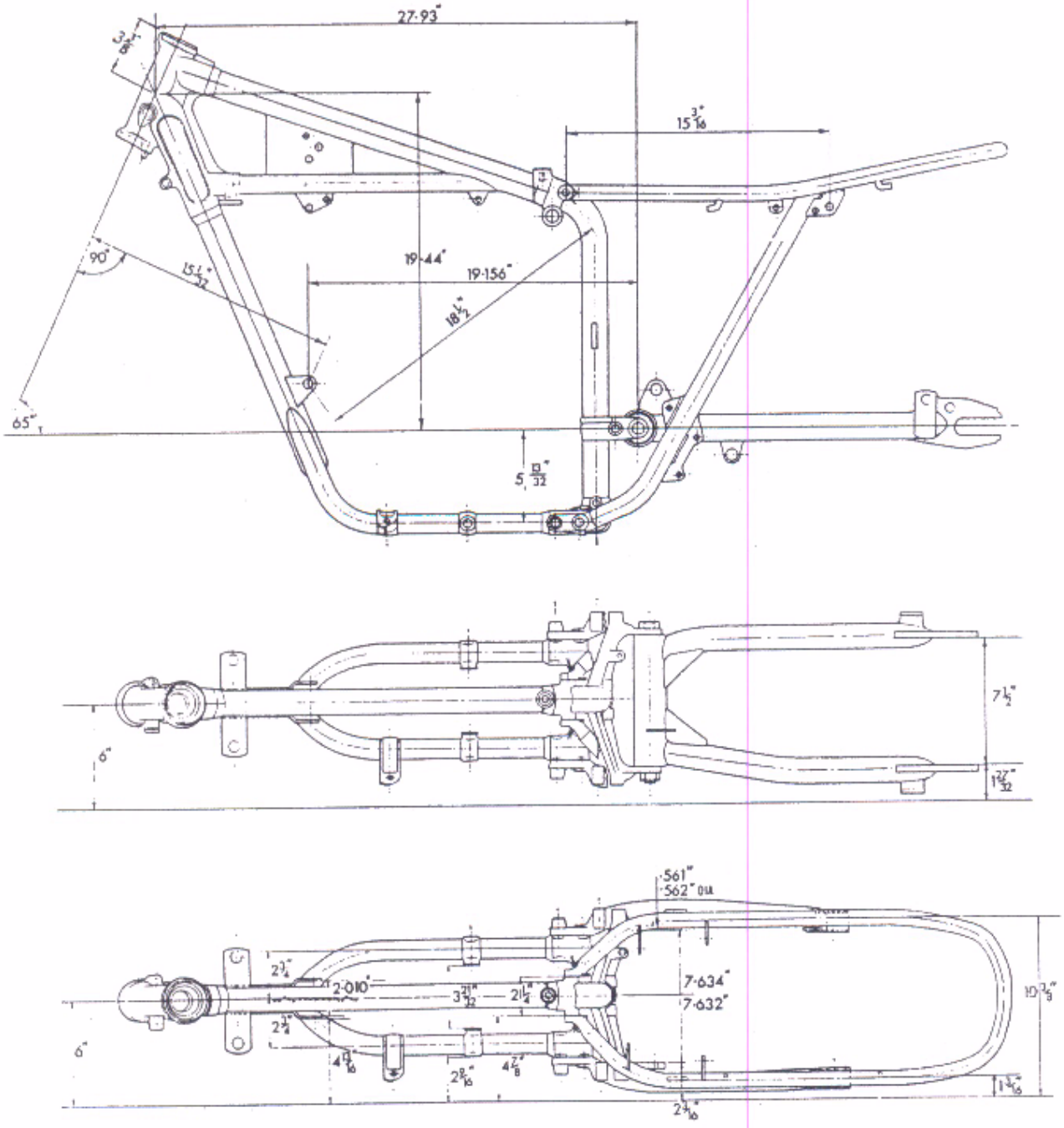


Fig. E13. Checking the front frame alignment

E13



77

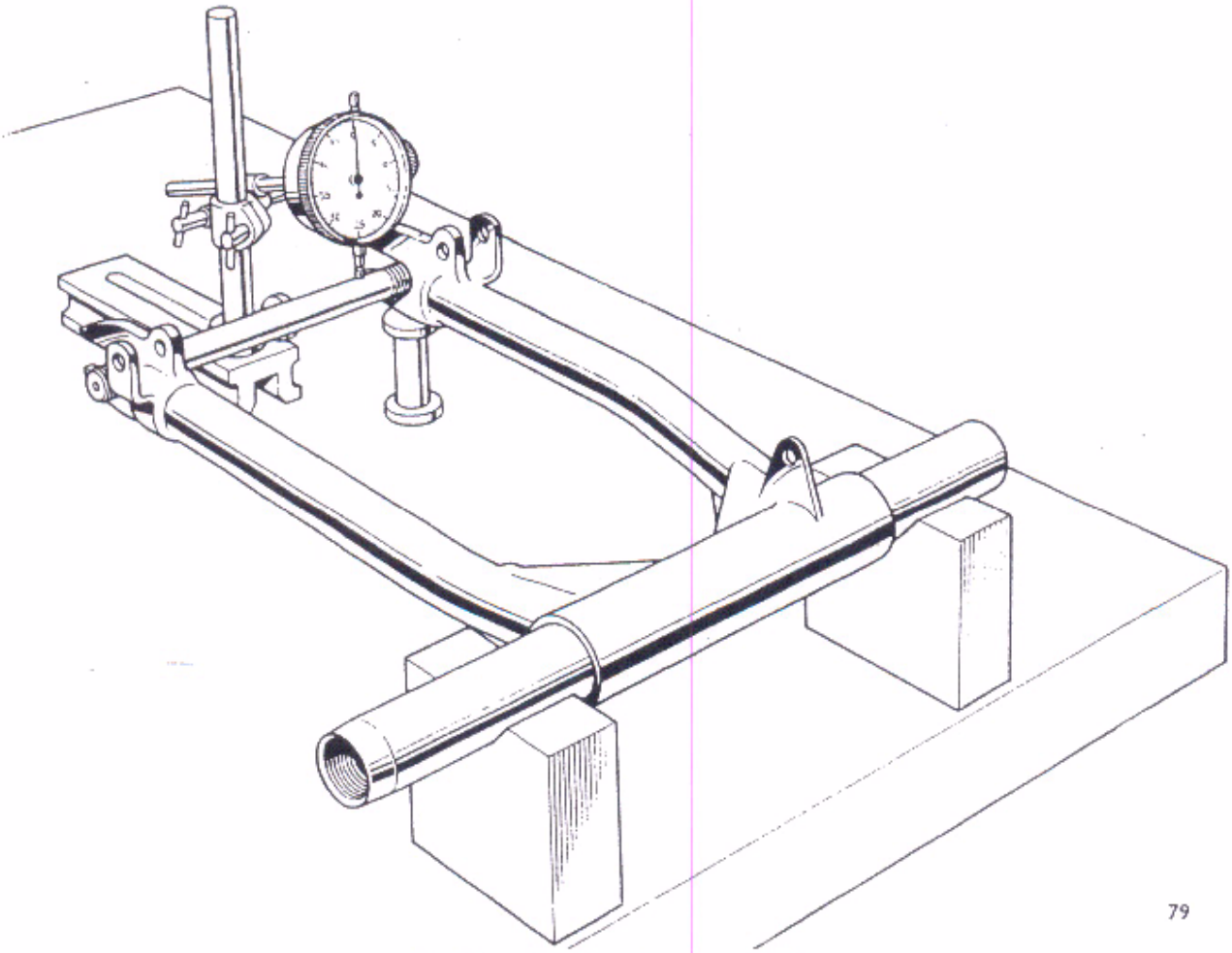
Fig. E14. Basic dimensions of the frame assembly

REAR FRAME

The rear frame basically serves to mount the rear suspension units and twinseat etc., and it is only alignment between the top suspension unit support brackets with those on the swinging fork that is of most importance. The best means of checking rear frame alignment is that of fitting it to the front frame and taking readings as indicated in the following paragraph.

FRAME ASSEMBLY

Securely bolt the rear frame to the front frame and fit the swinging fork so that it can just be rotated by slight hand pressure. Mount the complete assembly horizontally on the checking table as described above, then take height readings at the swinging fork ends and top and bottom suspension unit mounting brackets, referring to Fig. E14 for dimensions. These brackets should not be more



79

Fig. E15. Checking the swinging fork

than $\frac{1}{16}$ in. (1·5 mm.), out of line otherwise the suspension units will be working under excessive stress.

If, when frame alignment is completed, the amount of discrepancy is excessive and rectification is needed, then it is advisable to return the damaged part to the Service Department of Triumph Engineering Company. However, in the case of the swinging fork where the misalignment is not more than $\frac{1}{4}$ in. (6 mm.), measured at the tips of the fork ends, it may be possible to rectify this by the following means.

SWINGING FORK

It is required to check that the centre line of the pivot spindle is in the same plane as the centre line of the rear spindle. To do this, first place a tube or bar of suitable diameter into the swinging fork bearing bushes, then mount the swinging fork on two "V" blocks, one either side, and clamp it lightly to the edge of the checking table. Fit the rear wheel spindle into the fork end slots or, alternatively, use a straight bar of similar diameter, then support a fork end so that the swinging fork is approximately horizontal. Height readings should then be taken at both ends of the wheel spindle to establish any mis-alignment. (Fig. E15).

Next, check that the distance between the fork ends is as given in "General Data".

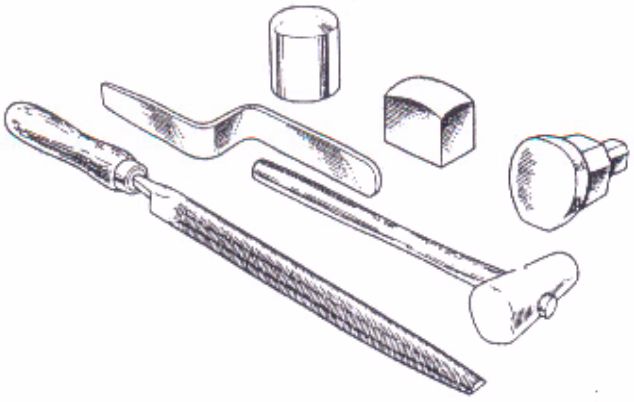
It is now necessary to lever the fork ends in the correcting direction until the wheel spindle can be inserted and found to be parallel with the pivot bush centre line. To do this, a bar of 4 ft. length by $1\frac{1}{4}$ ins. diameter is required. It is now that great care is required. Insert the bar at the end of the swinging fork adjacent to the suspension unit mounting brackets so that it is over the "high" fork leg and under the "low" fork leg. Exert gentle pressure at the end of the bar then insert the spindle and re-check the alignment. Repeat this procedure using increased loads until the spindle height readings shows that the swinging arm is now misaligned in the opposite sense. A small leverage now applied from the other side will bring the wheel back to parallel.

Note: Apply the leverage bar as near as possible to the suspension unit brackets, otherwise the tubes may become damaged. DO NOT USE THE FORK ENDS.

SECTION E14

REPAIRS

Repairs covered in this section are simple operations requiring only a minimum of special tools. The type of repairs possible with these tools are those such as small dents to mudguards, panels etc., caused by flying stones or slight grooves which have not affected a large area or torn the metal. The tools required are shown below in Fig. E16.



80

Fig. E16. Tools used for panel repairs

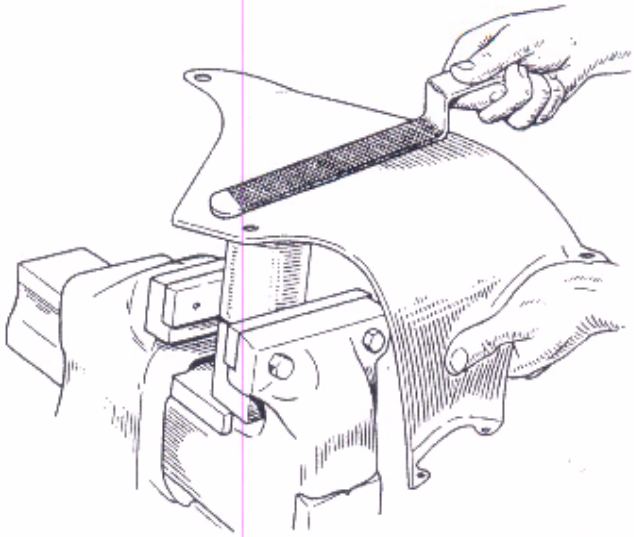
REMOVAL OF DENTS

To remove small dents a spoon and suitably shaped dolly block are required. A suitable spoon can be made from a file by removing the teeth and polishing the surface then cranking it as shown in Fig. E16.

Place the dolly block underneath the panel then hammer the dent(s) carefully with the spoon until something like the original contour is achieved. Lightly file the surface to show any high spots there may be and use the dolly and spoon to remove them.

Note.—Do not file more than is necessary to show up the high spots. Care should be taken to keep filing to a minimum otherwise serious thinning of the metal will occur.

Where denting has occured without resultant damage to the paint-work the dent(s) may be removed whilst the paintwork is preserved by careful use of a polished spoon and dolly block. Dents which are comparatively larger may be removed whilst the paintwork is preserved by placing a "sandbag" against the outer surface and hammering the inside of the panel with a suitably shaped wooden mallet. A "sandbag" can be made from a piece of 18 in. square leather by folding it and packing it tightly with sand. Finally, finish off using a suitable dolly block and polished spoon as required.



101

Fig. E17. Removing a dent with dolly block and spoon

Note.—It is not advisable to use a hammer as hammer-blows tend to stretch the surrounding metal, giving rise to further complications. Also, unless the aim is true, damage of a more serious nature may result.

Where a fuel tank has become damaged the repair work should only be entrusted to a competent panel beater, or preferably, return the tank to the Service Department—Triumph Engineering Company Ltd.

SECTION E15

PAINTWORK REFINISHING

PAINT STRIPPING

Except in cases where a "touch-up" is to be attempted, it is strongly recommended that the old finish is completely stripped and the refinish is carried out from the bare metal. A suitable paint stripper can be obtained from most paint stores and accessory dealers.

The stripper should be applied with a brush and allowed approximately 10 minutes to react. A suitable scraper should be used to remove the old finish, then the surface cleaned with water using a piece of wire wool. Ensure that all traces of paint stripper are removed. If possible, blow out crevices with compressed air.

It is advisable to strip a small area at a time to avoid the stripper drying and also to enable easier neutralizing of the stripper.

Finally, the surface should be rubbed with a grade 270 or 280 emery cloth to give a satisfactory finish then washed off with white spirits or a suitable cleaner solvent.

PRIMING

A thin coat of cellulose primer must be sprayed onto the surface prior to application of an undercoat or stopper. Undercoat and stopper will not adhere satisfactorily to bare metal. It is advisable to thin the primer by adding 1 part cellulose thinners to 1 part primer. Ensure that the primer is dry before advancing further.

APPLYING STOPPER

Imperfections and slight dents in the surface may be filled with stopper, but rubbing down with "wet and dry" should not be attempted until the undercoat or surfacer has been applied.

Apply the stopper with a glazing knife in thin layers, allowing approximately 20 minutes for drying between each layer. After the last layer, allow the stopper about 6 hours (or over-night if possible) to dry. Heavy layers or insufficient drying time will result in risk of surface cracking.

UNDERCOAT (SURFACER)

Most cellulose undercoats also called surfacers, will suffice for a base for TRIUMPH finishes. About two or three coats are required and should be sprayed on in a thinned condition using 1 part cellulose thinners to 1 part undercoat. Allow approximately 20 minutes between each coat.

If stopper has been applied the final layer of undercoat should be sprayed on after smoothing the surface with "wet and dry" abrasive as shown below.

WET AND DRY SANDING

After application of the undercoat, the surface should be rubbed down with 270 or 280 grade abrasive paper used wet. An ideal method is to have a rubber block approximately 3in. $\times$2 in. $\times$1 in. around which to wrap the emery paper. However, this is only recommendable for flat surfaces; where rapid change of sections occur, a thin felt pad is more useful.

The abrasive paper should be allowed to soak in cold water for at least 15 minutes before use. A useful tip is to smear the abrasive surface of the paper with soap prior to rubbing down. This will prevent clogging and should at least treble the useful life of the paper if it is washed thoroughly after each rub-down.

When the surface is smooth enough, wash it thoroughly with water and dry off with a clean sponge.

If smoother surface than this is required it can be given another layer of undercoat and then the rubbing down procedure repeated using 320 or 400 grade of paper depending upon conditions.

FINISHING

Before spraying on the finishing coats the surface must be quite smooth, dry and clean. It is important that conditions are right when finish spraying is to be carried out otherwise complications may occur. Best conditions for outdoor spraying are those on a dry sunny day without wind. Moisture in the atmosphere is detrimental to paint spraying.

SECTION F1

REMOVING AND REFITTING THE FRONT WHEEL

Place the machine with the front wheel approximately six inches off the ground. First, unscrew the handlebar front brake adjuster then disconnect the cable at the actuating lever on the brake plate. Unscrew the two wheel spindle cap bolts from the base of each fork leg and remove the wheel.

Refitting the wheel is the reversal of the above instructions but care should be taken to ensure that the anchor plate locates correctly over the peg on the inside of the right fork leg. Tighten the spindle cap bolts evenly a turn at a time.

SECTION F2

REMOVING AND REFITTING THE REAR WHEEL

First unscrew the rear brake adjuster, then disconnect the rear chain. Slacken the bolt at the rear of the chainguard so that the chainguard can be swung upwards. Remove the nut securing the rear brake torque stay to the anchor plate, then slacken the left and right wheel spindle securing nuts. The rear wheel is now free to be removed.

To refit the rear wheel first ensure that the spindle nuts are sufficiently unscrewed then offer the wheel to the swinging fork. Locate the adjuster caps over the fork ends then lightly tighten the wheel spindle nuts. Place the chain around the rear wheel sprocket and connect up the brake anchor plate torque stay. Refitting the chain may necessitate slackening off both the left and right adjusters. It is now necessary to ensure that the front and rear wheels are aligned. This is shown in Section F4 below. Finally, lock up the two spindle nuts and ensure the torque stay securing nut is tight.

SECTION F3

REMOVING AND REFITTING THE QUICKLY DETACHABLE REAR WHEEL

The Q.D. wheel is mounted on three bearings, two taper roller bearings being situated in the hub and one ball journal bearing in the brake drum. The wheel is quickly detachable by the simple method of splining the hub into the brake drum thereby eliminating the necessity of removing the rear chain etc., when required to remove the wheel.

To remove the quickly detachable rear wheel first unscrew the wheel spindle from the right side of the machine and drop out the distance piece between the wheel and the fork end. Pull the wheel clear of the spline and the brake drum when the wheel can then be removed.

When replacing the wheel slight variations may be felt in the fit of the splines at various points. Select the tightest position and mark with a small spot of paint on the brake drum and corresponding spot on the hub to facilitate replacement on future occasions. In addition there is a rubber ring which is assembled over the splines on the wheel and is in compression when the spindle is tight. This ring seals the spline joint and prevents abrasive wear at the joint. If it is perished or damaged fit a new one.

Replacement of the wheel is a reversal of the above instructions and if the chain adjuster is not altered it will not be necessary to re-check the rear wheel alignment. However if this is necessary full details are given in Section F4 opposite.

SECTION F4

FRONT AND REAR WHEEL ALIGNMENT

When the rear wheel has been fitted into the frame it should be aligned correctly by using two straight edges or "battens", about 7 feet long. With the machine off the stand the battens should be placed along-side the wheel, one either side of the machine and each about four inches from the ground. When both are touching the rear tyre on both sides of the wheel the front wheel should be midway between and parallel to both battens. Turn the front wheel slightly until this can be seen. Any necessary adjustments must be made by first slackening the rear wheel spindle nuts, then turning the spindle adjuster nuts as required ensuring that rear chain adjustment is maintained. Refer to Fig. F1 for illustration of correct alignment. Note that the arrows indicate the adjustment required.

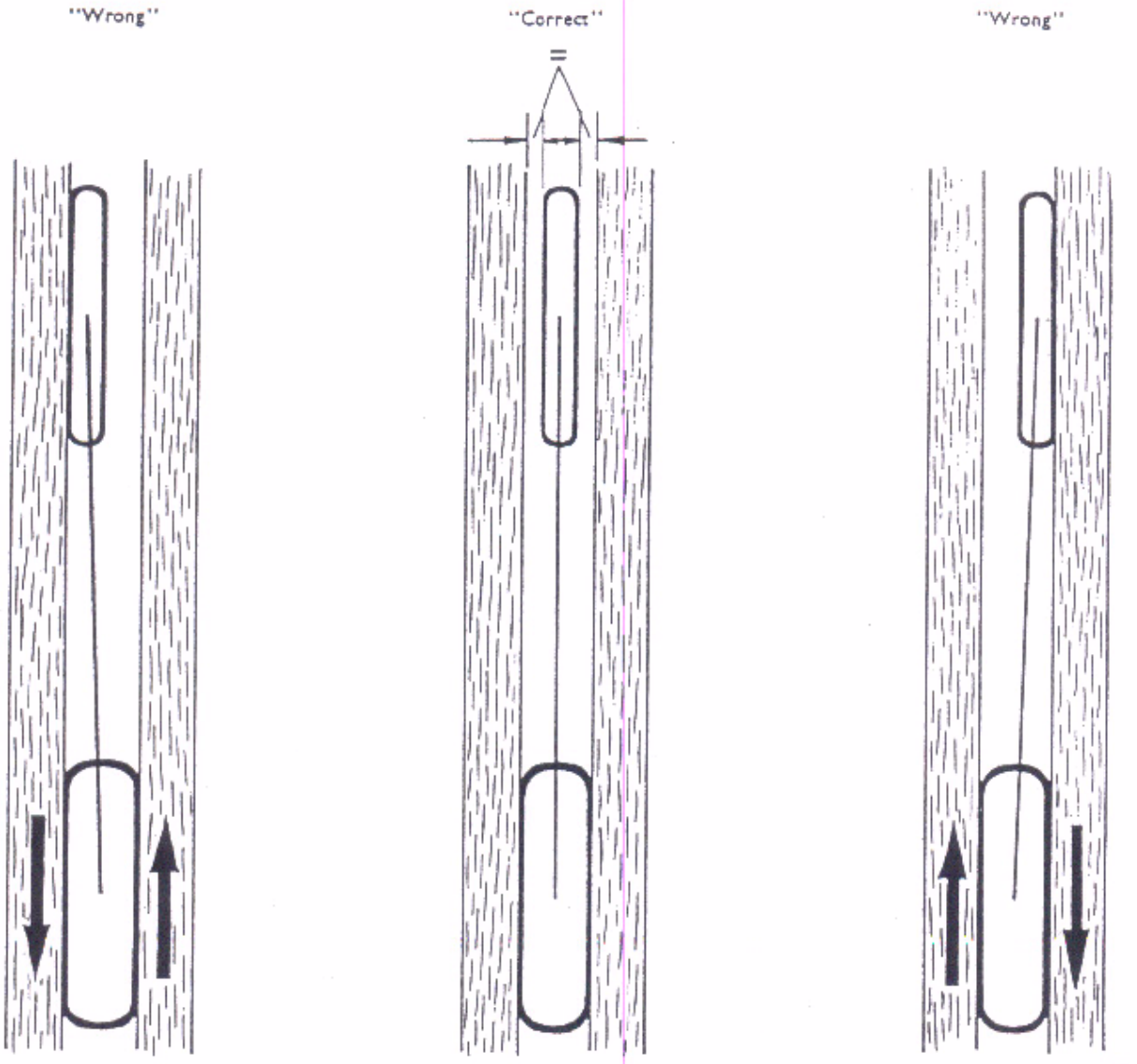


Fig. F1. Aligning the front and rear wheels

SECTION F7

RENEWING THE BRAKE LININGS

The old linings can be removed by either drilling through the rivets with a suitable sized drill (No. 23, .154 in. dia.) or chiselling the lining off at the same time shearing through the brass rivet. Drilling is of course preferred and is best undertaken from the inside of the shoe to remove the peened over portion of the rivet.

New linings are supplied ready drilled, counter bored and the correct shape. If no jig is available for riveting, a simple method of spreading the rivet is shown in Fig. F5.

Rivet the linings in the centre holes first, working towards each end: great care must be taken to ensure that the rivets are tight and that the linings do not lift between the rivets. After fitting, all sharp edges of the lining should be chamfered and the leading and trailing edges tapered off to the extent of $\frac{1}{8}$ in. deep × $\frac{1}{2}$ in. long.

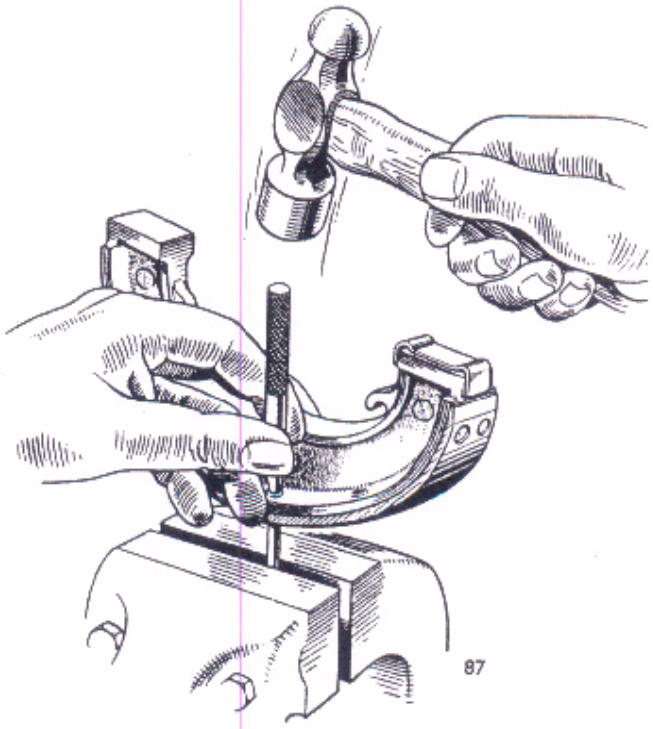


Fig. F5. Riveting lining onto brake shoe

SECTION F8

REMOVING AND REFITTING THE WHEEL BEARINGS

Access to the wheel bearings differs in front and rear wheels and therefore each wheel is dealt with separately in this section.

FRONT WHEEL

Remove the front wheel from the fork and withdraw the brake anchor plate from the brake drum. Unscrew the retainer ring (left hand thread) using service tool Z76.

The right bearing can be removed by using the spindle and driving through from the left hand side. Withdraw the backing ring and inner retaining disc. To remove the left bearing, spring out the circlip and insert the spindle from the right side driving the bearing out complete with inner and outer grease retainer plates.

Fully clean all parts in paraffin (kerosene). Clean and dry the bearings thoroughly. Compressed air should be used for drying out the ball races. Test for end float and inspect the balls and races for any signs of pitting. If there is any doubt about their condition, the bearings should be renewed.

To refit the bearings, first insert the left inner grease retainer, bearing, and outer dust cap using a liberal amount of grease (see Section A2). Refit the spring circlip and insert the shouldered end of the wheel spindle from the right, using it as a drift to drive the bearing and grease retainer until they come up to the circlip. Re-insert the spindle the opposite way round and re-fit the right hand grease retainer disc and backing ring. Drive the right bearing into position well smeared with grease, then screw in the retainer ring (left hand thread) until tight.

Finally, tap the spindle from the left to bring the spindle shoulder up against the right bearing. Refer to Fig. F6 for correct layout. Reassembly then continues as the reversal of the above instructions.

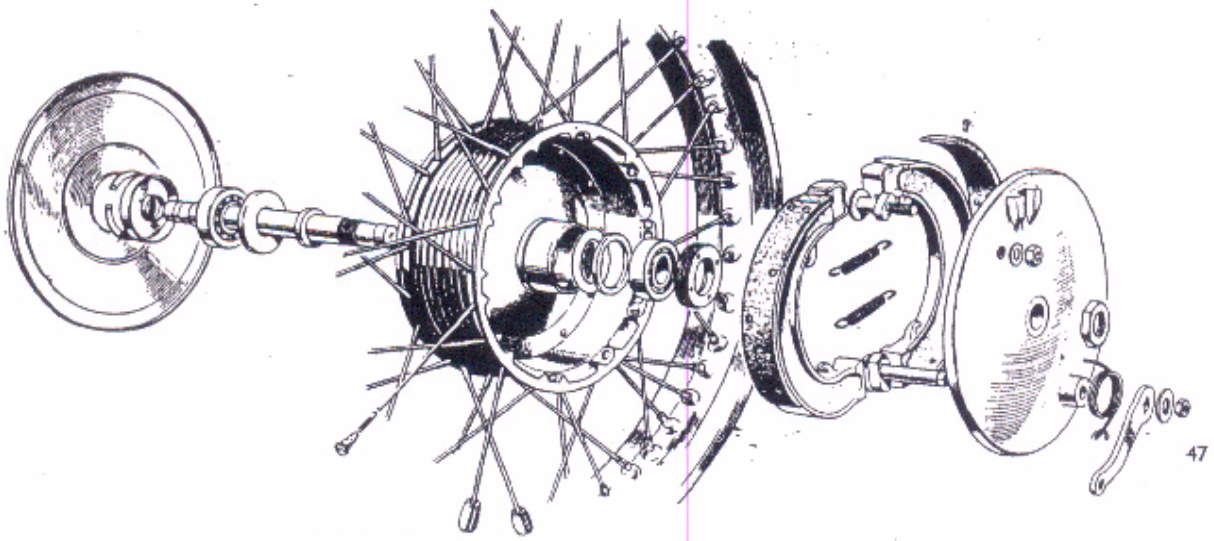


Fig. F6. Exploded view of front wheel bearing arrangement

REAR WHEEL (STANDARD)

Remove the rear wheel then unscrew the anchor plate retainer nut and withdraw the brake anchor plate assembly. Withdraw the wheel spindle then unscrew the slotted screw which serves to lock the bearing retainer ring. The retainer ring can then be unscrewed using service tool Z76. So that the left bearing can be removed the central distance piece must be displaced to one side to allow a drift to be located on the inner ring of the left bearing. To do this, first insert a drift from the left and move the distance piece to one side so that the grease retainer shim collapses, as shown in Fig. F8. A soft metal drift should then be inserted from the right and the left bearing driven out. When this is done, withdraw the backing ring, damaged grease retainer and distance piece then drive out the right bearing and dust cap using a drift of approximately $1\frac{5}{8}$ in. diameter.

Fully clean all parts in paraffin (kerosine) and clean and dry the bearing thoroughly. Compressed air should be used for drying out if possible. Test the end float and inspect the ball races for any signs of indentation or pitting. If the condition of the bearing is in doubt it should be renewed.

The damaged grease retainer shim usually can be reclaimed for further service by carefully hammering it flat to restore its original shape.

To refit the bearings first drive in the right inner grease retainer disc, the bearing and then press on the outer dust cap ensuring that the bearing and both cavities are well filled with grease. From the left, insert the distance piece, grease retainer shim, backing ring and having packed the bearing with grease, press it in the hub and bring the distance piece into line with the spindle. Screw in the retainer ring and tighten it with service tool Z76

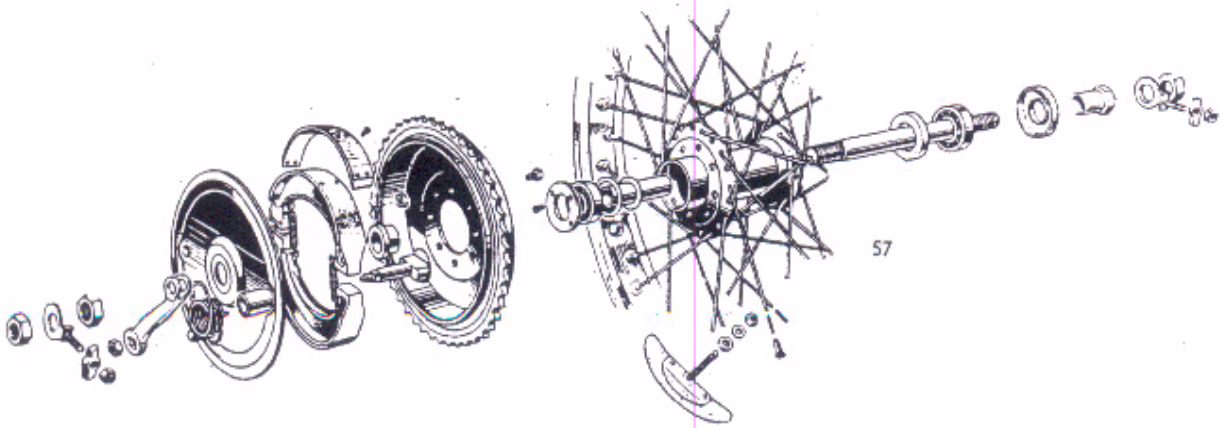


Fig. F7. Exploded view of rear wheel bearing arrangement

Finally, tighten the locking screw to ensure that the bearing retainer ring is locked in position. Reassembly then continues as a reversal to the above instructions, but do not forget to refit the outer distance piece before assembling the anchor plate and brake shoe assembly.

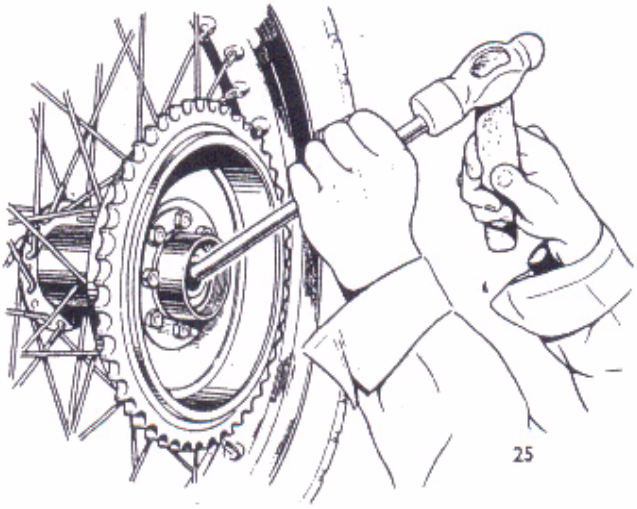


Fig. F8. Collapsing the left bearing grease retainer shim

REAR WHEEL (QUICKLY DETACHABLE)

Remove the wheel from the swinging fork as described in Section F3 and then unscrew the two locknuts on the right side of the spindle sleeve and push the sleeve out of the bearings from the right. Extract the inner roller races and dust cover. The outer races are a press fit and should be driven out from the opposite side with a soft metal drift. Care should be taken not to damage the bearing backing rings, and inner grease retaining shims. Thoroughly clean all parts in paraffin (kerosene) and fully dry the bearings. Check the roller bearing surfaces for pitting and pocketing. Renew the bearings if there is any indication of this.

To reassemble the wheel bearings, first press the left and right backing rings and grease retainers into the wheel hub and then press the left and right outer races into the hub. Smear the rollers and inner races with grease (see Section A2) and refit them to their respective outer races. Offer the threaded end of the spindle sleeve to the roller bearings and then fit the right dust excluder cap with felt washer and left dust excluder cap. (Refer to Fig. F9).

Refit the right side distance piece and inner and outer locknuts to the spindle sleeve, then tighten the inner locknut, slacken it off one flat ($\frac{1}{6}$) turn and lock it in position by tightening the outer locknut. The sleeve and inner races should then rotate freely without any "play" in the rollers being in evidence.

Removal of the brake drum and sprocket assembly from the swinging fork is achieved by first disconnecting the rear chain, torque stay and brake operating rod, and then unscrewing the large nut from the spindle sleeve.

Remove the brake shoes and anchor plate assembly as described in Section F6. To remove the ball bearing from the brake drum, first press out the spindle sleeve and then remove the circlip from the brake drum. The retainer and felt washer can then be levered out to enable the bearing to be driven out. Care should be taken to avoid damage to the inner grease retainer when removing the bearing.

Clean the bearing in paraffin (kerosene) and check that there is not excessive play or that the race tracks are not indented or pitted. If in doubt, renew the bearing.

Reassembly is a reversal of the above procedure referring to Fig. F9 for order of assembly and Section F3 for refitting the wheel to the swinging fork.

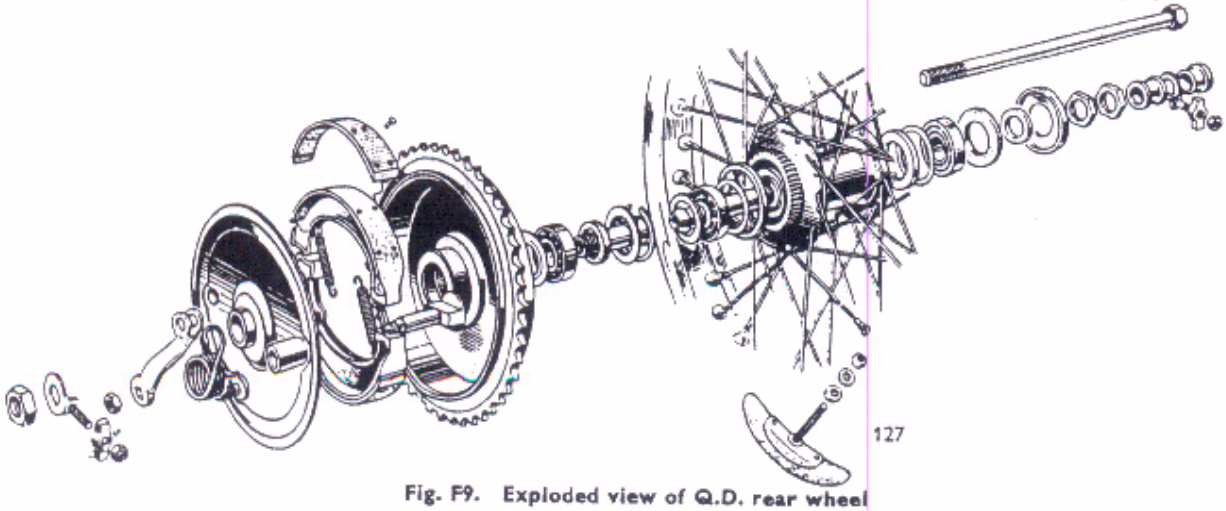


Fig. F9. Exploded view of Q.D. rear wheel

SECTION F9

WHEEL BUILDING

Wheel building, or adjustment to the spokes to realign the wheel rim should only be undertaken by a specialist and these notes are for the specialist, to enable him to follow Triumph practice. The main point to remember is that all Triumph wheels are built with the inside spokes on the brake drum side taking the braking strain. This means the inside spokes on the drum side are in tension when the brake is applied in the direction of forward motion.

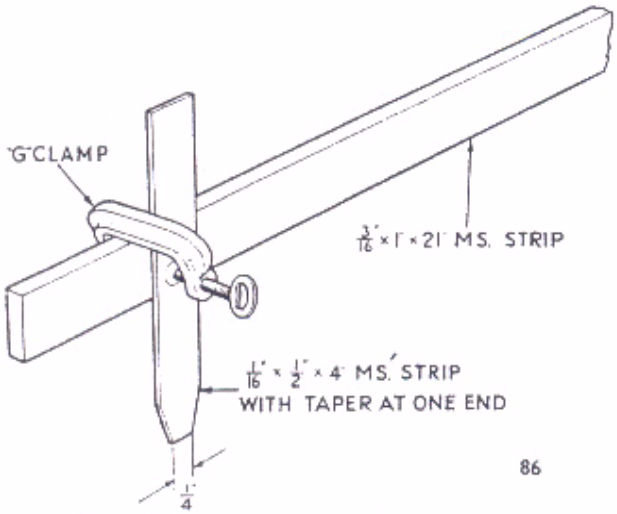


Fig. F10. Sketch of wheel building gauge

The front wheel has 40 straight 8/10 gauge butted spokes and is single cross-laced, whilst the rear wheel has 40 8/10 gauge butted spokes, and is double cross-laced.

A checking gauge suitable for Triumph wheels can be made from two pieces of mild steel bar as shown in Fig. F10 and this should be used to register from the edge of the hub or brake drum onto the wheel rim edge giving the relation indicated in the table.

This ensures the correct relation between the hub and rim centre lines.

Wheel	Rim type	Location	Dimensions	
			Inches	m.m.
Front:				
Standard	WM2	Drum	$-\frac{1}{64}$	−0·4
Rear:				
Standard	WM2	Hub	$1\frac{7}{8}$	47·6
	WM3	Hub	$1\frac{3}{4}$	44·4
Q.D.	WM2	Hub	$1\frac{1}{16}$	27
	WM3	Hub	$\frac{7}{8}$	22·2

Table of "Dish" Dimensional Settings for Front and Rear Wheels

SECTION F10

WHEEL BALANCING

Wheel balancing can be achieved by fitting standard one ounce and half ounce weights which are readily available, as required. All front wheels are balanced complete with tyre and tube before leaving the factory and if for any reason the tyre is removed it should be replaced with the white balancing "spot" level with the valve. If a new tyre is fitted, existing weights should be removed and the wheel re-balanced, adding weights as necessary until it will remain in any position at rest. Make sure that the brake is not binding while the balancing operation is being carried out.

For normal road use it is not found necessary for the rear wheel to be balanced in this way.

SECTION F11

REMOVING AND REPAIRING TYRES

To remove the tyre first remove the valve cap and valve core, using the valve cap itself to unscrew the core. Unscrew the knurled valve securing nut and then place all parts where they will be free from dirt and grit. It is recommended that the cover beads are lubricated with a little soapy water before attempting to remove the tyre. The tyre lever should be dipped in this solution before each application. First, insert a lever at the valve position and whilst carefully pulling on this lever, press the tyre bead into the well of the rim diametrally opposite the valve position (see Fig. F11). Insert a

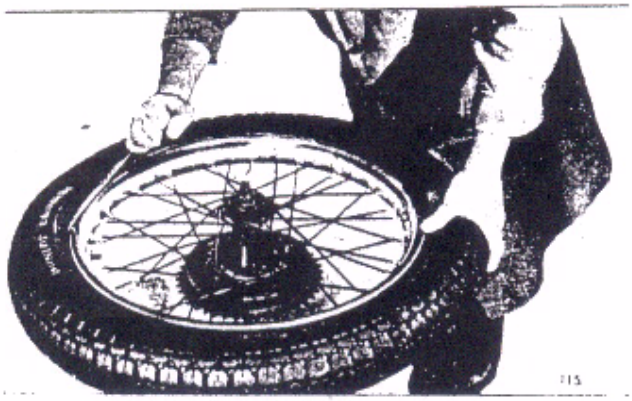


Fig. F11. Removing the first bead of the tyre—Lever inserted close to valve whilst bead is pressed into well on opposite side of wheel

second lever close to the first and prise the bead over the rim flange. Remove the first lever and reinsert a little further round the rim from the second lever. Continue round the bead in steps of two to three inches until the bead is completely away from the rim. Push the valve out of the rim and then withdraw the inner tube. To completely remove the tyre first stand the wheel upright and then insert a lever between the remaining bead and the rim. The tyre should be easily removed from the rim as shown in Fig. F12.

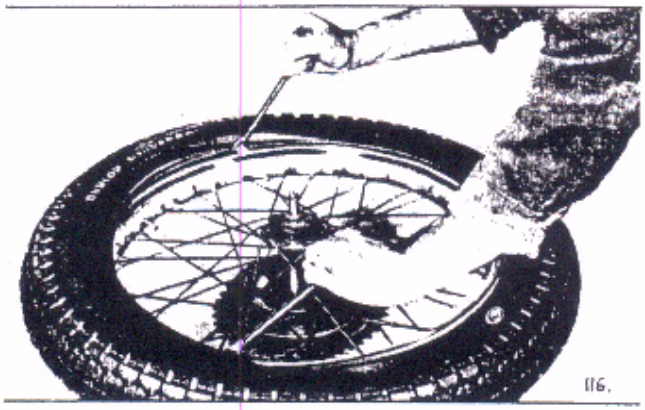


Fig. F12. Removing the first bead of the tyre, using two tyre levers

REFITTING THE TYRE

First place the rubber rim band into the well of the rim and make sure that the rough side of the rubber band is fitted against the rim and that the band is central in the well. Replace the valve core and inflate the inner tube sufficiently to round it out without stretch, dust it with french chalk and insert it into the cover with the valve located at the white "balancing spot" leaving it protruding outside the beads for about four inches either side of the valve. At this stage it is advisable to lubricate the beads and levers with soapy water (see Fig. F13).

Fig. F13. Cover and tube assembled ready for refitting to the wheel

Squeeze the beads together at the valve position to prevent the tube from slipping back inside the tyre and offer the cover to the rim, as shown in Fig. F14, at the same time threading the valve through the valve holes in the rim band and rim. Allow the first bead to go into the well of the rim and the other bead to lie above the level of the rim flange.

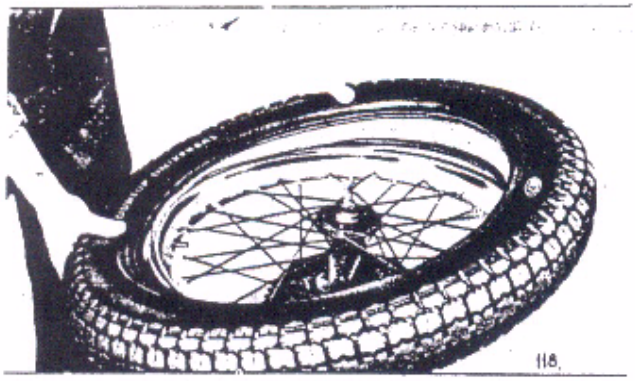


Fig. F14. Refitting the tyre to the wheel. Note valve engaged in rim hole

Working from the valve, press the first bead over the rim flange by hand, moving forward in small steps and making sure that the part of the bead already dealt with, lies in the well of the rim. If necessary use a tyre lever for the last few inches, as shown in Fig. F15. During this operation continually check that the inner tube is not trapped by the cover bead.

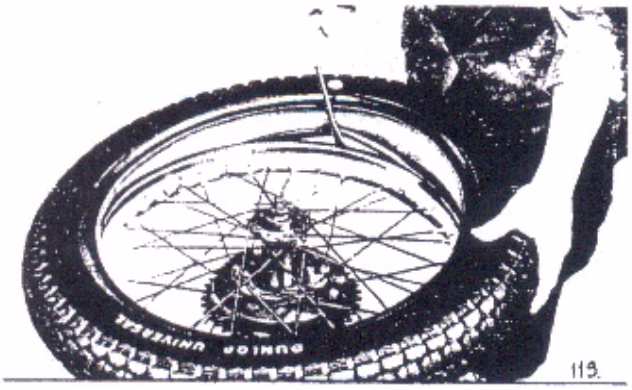


Fig. F15. Levering the first bead onto the rim

Press the second bead into the well of the rim diametrally opposite the valve. Insert a lever as close as possible to the point where the bead passes over the flange and lever the bead into the flange, at the same time pressing the fitted part of the bead into the well of the rim. Repeat until the bead is completely over the flange, finishing at the valve position (see Fig. F16).

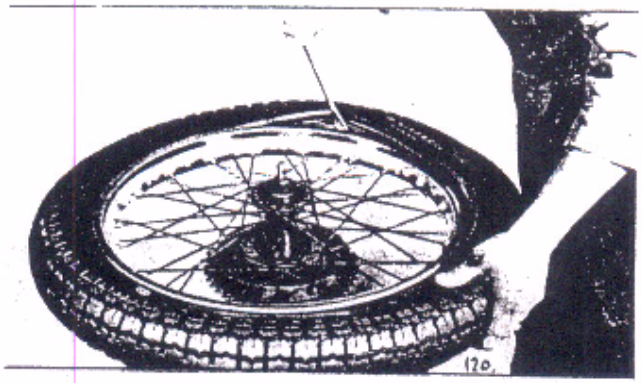


Fig. F16. Refitting the second bead over the wheel rim. Care must be taken not to trap inner tube

Push the valve inwards to ensure that the tube near the valve is not trapped under the bead. Pull the valve back and inflate the tyre. Check that the fitting line on the cover is concentric with the top of the rim flange and that the valve protrudes squarely through the valve hole. Fit the knurled rim nut and valve cap. The tyre pressure should then be set to the figure given in General Data.

SECTION F12

SECURITY BOLTS

Security bolts are fitted to the rear wheel to prevent the tyre "creeping" on the rim when it is subjected to excessive acceleration or braking. Such movement would ultimately result in the valve being torn from the inner tube. There are two security bolts fitted to the rear wheel, which are equally spaced either side of the valve and thereby do not affect the balance of the wheel.

Note: The security bolt nuts must not be overtightened, otherwise excessive distortion may occur.

Where a security bolt is fitted the basic procedure for fitting and removing the type is the same, but the following instruction should be followed:—

(1) Remove the valve cap and core as described.

(2) Unscrew the security bolt nut and push the bolt inside the cover.

(3) Remove the first bead as described.

(4) Remove the security bolt from the rim.

(5) Remove the inner tube as described.

(6) Remove the second bead and tyre.

For refitting the tyre and inner tube:—

(1) Fit the rim band.

(2) Fit the first bead to the rim without the inner tube inside.

(3) Assemble the security bolt into the rim, putting the nut onto the first few threads (see Fig. F17).

(4) Partly inflate the inner tube and fit it into the the tyre.

(5) Fit the second bead but keep the security bolt pressed well into the tyre, as shown in Fig. F18, and ensure that the inner tube does not become trapped at the edges.

(6) Fit the valve stem nut and inflate the tyre.

(7) Bounce the wheel several times at the point where the security bolt is fitted and then tighten the security bolt nut.

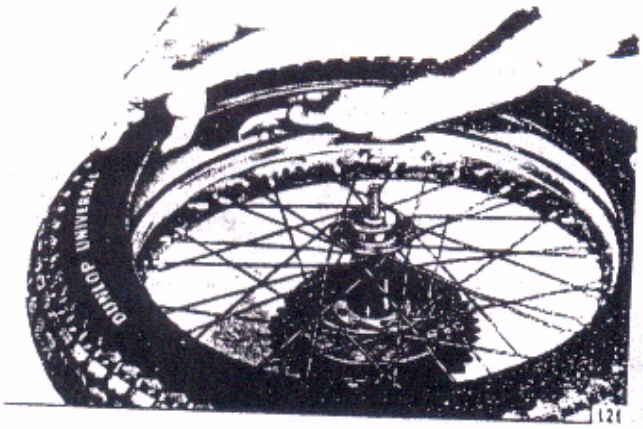


Fig. F17. Placing the security bolt in position

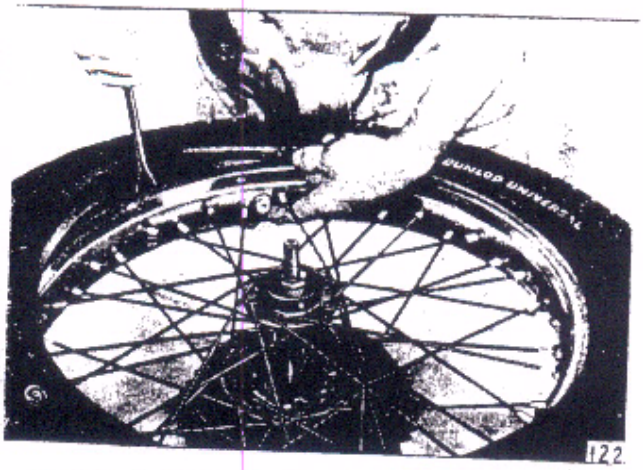


Fig. F18. Refitting the second bead with the security bolt in position

SECTION F13
TYRE MAINTENANCE

To obtain optimum tyre mileage and to eliminate irregular wear on the tyres it is essential that the recommendations governing tyre pressures and general maintenance are followed. The following points are laid out with this in mind.

(1) Maintain the correct inflation pressure as shown in "General Data". Use a pressure gauge frequently. It is advisable to check and restore tyre pressures at least once per week. Pressures should always be checked when tyres are cold and not when they have reached normal running temperatures.

(2) When a pillion passenger or additional load is carried, the rear tyre pressure should be increased appropriately to cater for the extra load.

(3) Unnecessary rapid acceleration and fierce braking should always be avoided. This treatment invariably results in rapid tyre wear.

(4) Regular checks should be made for flints, nails, small stones etc, which should be removed from the tread or they may ultimately penetrate and damage the casing and puncture the tube.

(5) Tyres and spokes should be kept free of oil, grease and paraffin. Regular cleaning should be carried out with a cloth and a little petrol (gasoline).

(6) If tyres develope irregular wear, this may be corrected by reversing the tyre to reverse its direction of rotation.

(7) If a sidecar is fitted then correct alignment should be maintained. The method for testing sidecar alignment is given in Section F14.

SECTION F14

SIDECAR ALIGNMENT

In order that the tyres of a motorcycle and sidecar combination are not subject to rapid tread wear and to provide the best steering characteristics they should be aligned as shown in the diagrams below.

First, align the front and rear wheels of the motorcycle as described in Section F4, and then, when it is ascertained that this alignment is correct, the sidecar wheel should be set using two straight test bars to the figure given in Fig. F19. Two battens about 6 feet long, 5 inches wide and 1 inch thick with one edge on each of the boards planed perfectly straight and square, would be suitable.

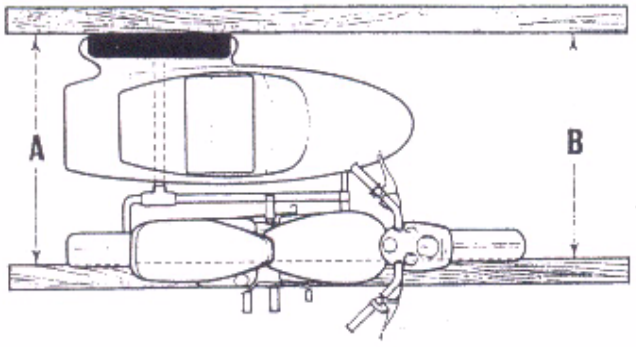


Fig. F19. Aligning the sidecar wheel to the correct amount of "toe-in"

With the combination standing on a flat, smooth floor place one of the long boards about 4 inches from the floor (i.e. using spacers), alongside the rear tyre with its straight edge touching the sides of the tyres. Straighten the front wheel until the board is parallel with the sides of the front tyre, an equal distance from both sides of the front wheel centre line. Place the other long board also about 4 inches from the floor level with its straight edge touching the sides of the sidecar tyre. Front and rear dimensions should then be measured, and the sidecar fixings adjusted until the front distance B is between $\frac{3}{8}$ inch (10 mm.) to $\frac{3}{4}$ inch (20 mm.) smaller than the rear distance A. This distance is referred to as the amount of "toe-in".

The motorcycle itself should also "lean out" and the method for making this adjustment is shown clearly in Fig. F20. To do this, attach a plumb line to the handlebar and measure the distances at the top and bottom as shown. On the inner side of the handlebar (i.e. nearer the sidecar) the plumb line should be approximately 1 inch nearer the wheel centre line at the bottom than at the top.

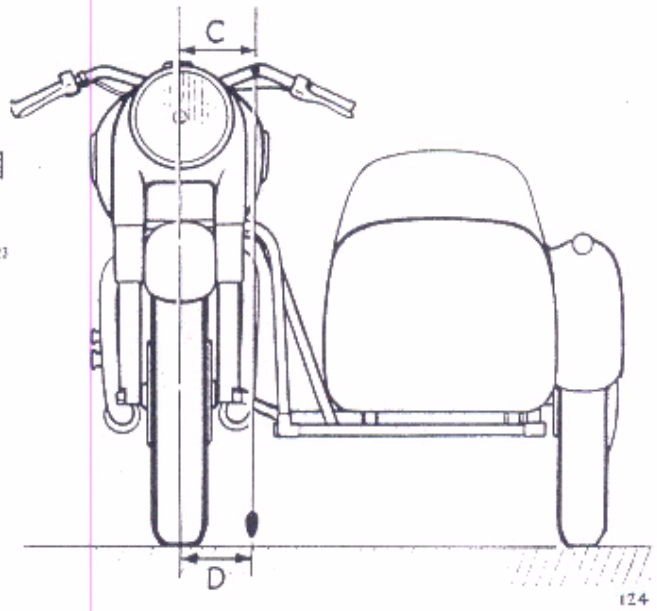


Fig. F20. Setting the amount of "lean-out" by using a plumbline

SECTION F15

WHEEL BEARINGS FOR QUICKLY DETACHABLE REAR WHEEL

All models from engine number DU13375 featuring a quickly detachable rear wheel are fitted with two ball races instead of the two taper roller bearings used on earlier models (see Fig. F21).

Having removed the wheel from the swinging fork as described in Section F3, the wheel hub can then be dismantled. Hold the bearing sleeve by the slot at the tapered end and unscrew the nut on the right side. Use service tool Z76 (left hand thread) to unscrew the locking ring and then lift off the distance piece, felt washer and locating disc. The bearing sleeve is a sliding fit and is easily withdrawn. In order to remove the right bearing the central distance piece has to be displaced radially to allow a drift to be located on the inner ring of the right bearing. This is done by inserting a drift from the right and moving the centre distance piece radially so that the grease retainer shim collapses. Then insert a soft metal drift from the left and drive out the right bearing. Withdraw the backing ring, damaged grease retainer and distance piece; then using a drift, drive out the left bearing and withdraw the other grease retainer. Thoroughly clean all parts in paraffin (kerosene) and fully dry the bearings. Inspect the ball races for any signs of indentation or pitting and renew if necessary.

On reassembly of the hub, pack the bearings with grease and fit a new grease retainer; also do not forget to dip the felt washer in oil. Reassembly is now carried out in the reverse manner described above.

The removal of the bearing from the brake drum is carried out as described in Section F8.

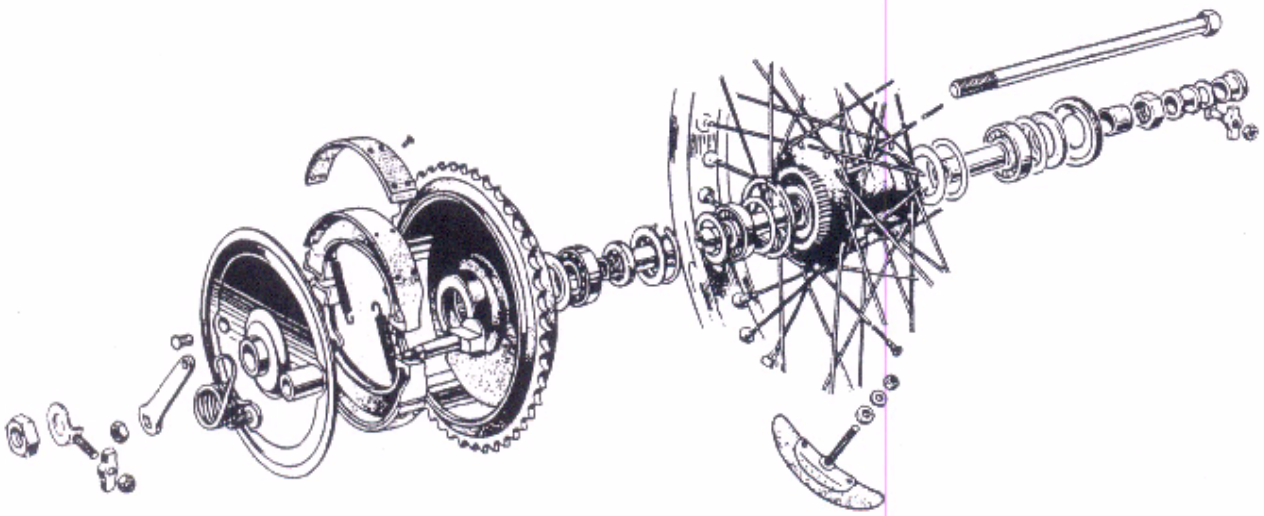


Fig. F21. Exploded view of Q.D. rear wheel

SECTION G

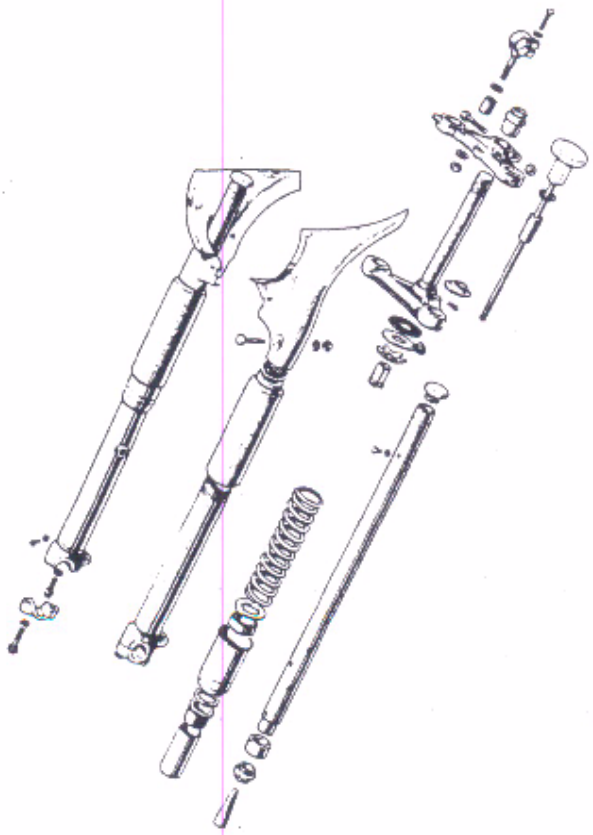
TELESCOPIC FORKS

DESCRIPTION	Section
REMOVING AND REFITTING THE NACELLE TOP COVER (6T)	G1
REMOVING AND REFITTING THE HEADLAMP (TR6 AND T120)	G2
REMOVING THE TELESCOPIC FORK UNIT	G3
DISMANTLING THE TELESCOPIC FORK	G4
INSPECTION AND REPAIR OF FORK COMPONENTS	G5
RENEWING THE STEERING HEAD RACES	G6
RENEWING THE FRONT FORK OIL SEALS	G7
REASSEMBLING AND REFITTING THE FORK UNIT	G8
TELESCOPIC FORK ALIGNMENT	G9
ADJUSTING THE STEERING HEAD RACES	G10
CHANGING THE FRONT FORK MAIN SPRINGS	G11
THE HYDRAULIC DAMPER UNIT...	G12
DISMANTLING AND REASSEMBLING THE TELESCOPIC FORK	G13

DESCRIPTION

The Triumph telescopic hydraulically controlled front forks requires little attention other than an occasional check of the external nut and bolts etc. and the routine oil changes given in Section A1.

Prior to frame number DU 5825 the type of front fork fitted was that with inside main springs, but subsequent to this engine number a re-designed fork was introduced incorporating a modified hydraulic damping system and having shorter main springs fitted externally. The capacity differs between the two types of fork, so that it is essential that the appropriate quantity of oil is poured into each fork leg when an oil change is to be carried out.



126

Fig. G1. Exploded view of telescopic fork

SECTION GI

REMOVING AND REFITTING THE NACELLE TOP COVER (6T)

Disconnect the leads at the battery terminals.

Unscrew and remove the steering damper knob.

Slacken the headlamp securing screw adjacent to the speedometer dial and lever off the headlamp. Disconnect the lead from the main bulb, pilot bulb and dip-switch (four snap connectors) and disconnect the headlamp earthing lead.

Remove the two adaptor rim securing screws and square nuts and withdraw the rims. Unscrew the two front and two rear top cover securing bolts and unscrew the left and right flash rear mounting screws.

Disconnect the front brake cable at the handlebar and thread it through the nacelle cover. Slacken off the clutch cable adjuster at the handlebar and lift the rubber sleeve at the gearbox and remove the slotted cable adaptor, then disconnect the clutch cable at the handlebar and thread it through the nacelle top cover. The nacelle cover can then be lifted to allow the drive cable and bulbholder to be disconnected from the speedometer.
Disconnect the ammeter terminal leads and detach the lighting switch and the ignition switch bakelite connection plugs. The nacelle top cover is then free to be removed.

Refitting the cover is the reversal of the above instructions but reference must be made to the relevant wiring diagram in Section H11 to avoid incorrect connections being made. The blue/brown lead from the battery —ve terminal should be connected to the ammeter +ve terminal. To check that the ammeter is correctly connected, turn the ignition switch to "IGN". The ammeter needle should deflect to disharge (—). If it does not, reverse the ammeter terminal connections.

Finally, when the headlamp adaptor rim and light unit are refitted the head main beam should be set as described in Section H8 Part A.

SECTION G2

REMOVING AND REFITTING THE HEADLAMP (TR6 AND T120)

Disconnect the leads from the battery terminals then slacken the light unit securing screw at the top of the headlamp until the light unit is released.

Disconnect the snap connector blocks from the wiring harness and then thread the dip switch leads and main harness leads through the grommet at the rear of the headlamp shell.

To remove the headlamp shell unscrew the left and right pivot bolts which secure the shell to the fork covers.

Refitting is the reversal of the above instruction but reference should be made to the wiring diagram in Section H11. Finally, set the head lamp main beam as shown in Section H8 Part A.

Do not tighten the headlamp pivot bolts over the torque setting given in "General Data".

SECTION G3

REMOVING THE TELESCOPIC FORK UNIT

Removal of the front forks is best achieved by detaching the fork as a unit, removing the top lug only whilst the stanchions and middle lug assembly is lowered from the frame.

First, unscrew the small drain plugs at the bottom of the fork adjacent to the wheel spindle lug and drain the oil out by pumping the fork up and down a few times.

Place a strong wooden box underneath the engine so that the front wheel is about six inches clear of the ground, then remove the wheel and mudguard as shown in Section F1. Detach the nacelle top unit (or headlamp unit if fitted) and then detach the throttle cable and air control cable. The handlebar can be removed by unscrewing the two self locking nuts which secure the eye bolts underneath the top lug.

Remove the steering damper plate pivot bolt and then slacken the top lug pinch bolt and unscrew the sleeve nut with a suitable tommy bar. Unscrew the left and right stanchion cap nuts using spanner No. D220 (1½ in. (3·81 cm.) across flats) and withdraw the two cap-nut-and-guide-tube assemblies.

Support the fork and then give the top lug a sharp tap on the under-side until it is released from the stanchion locking tapers. The stanchion and middle lug assembly can then be lowered from the frame headlug. If care is taken, the top ball race can be left un-disturbed and the lower race balls collected when the clearance is sufficient.

ALTERNATIVE METHOD

Alternatively the fork stanchions can be removed whilst the middle lug, top lug and head races are left un-disturbed. To facilitate extraction of the stanchions from the top and middle lugs in this case service tool Z19 will be required. Remove the cap nuts, slacken the middle lug pinch bolts and then unscrew the two small hexagonal headed oil filler plugs (if fitted) from the stanchion. Screw in the adaptor plug (Z19) and drive the stanchion until it is free to be withdrawn from the middle lug, as shown in Fig. G2. It should be noted that if the stanchions are removed this way on the later models (frame No. DU 5825 onwards) a special service tool will be required to refit them (see Section G8 Part 2).

SECTION G4

DISMANTLING THE TELESCOPIC FORK

There have been two types of forks fitted to unit construction models, the earlier of the inside main spring type and the more recent redesigned outer main spring type. To avoid confusion between the two basic types this section is divided into two parts, with frame number DU 5825 as the change point.

PART 1. FRAME DU 101 TO DU 5824

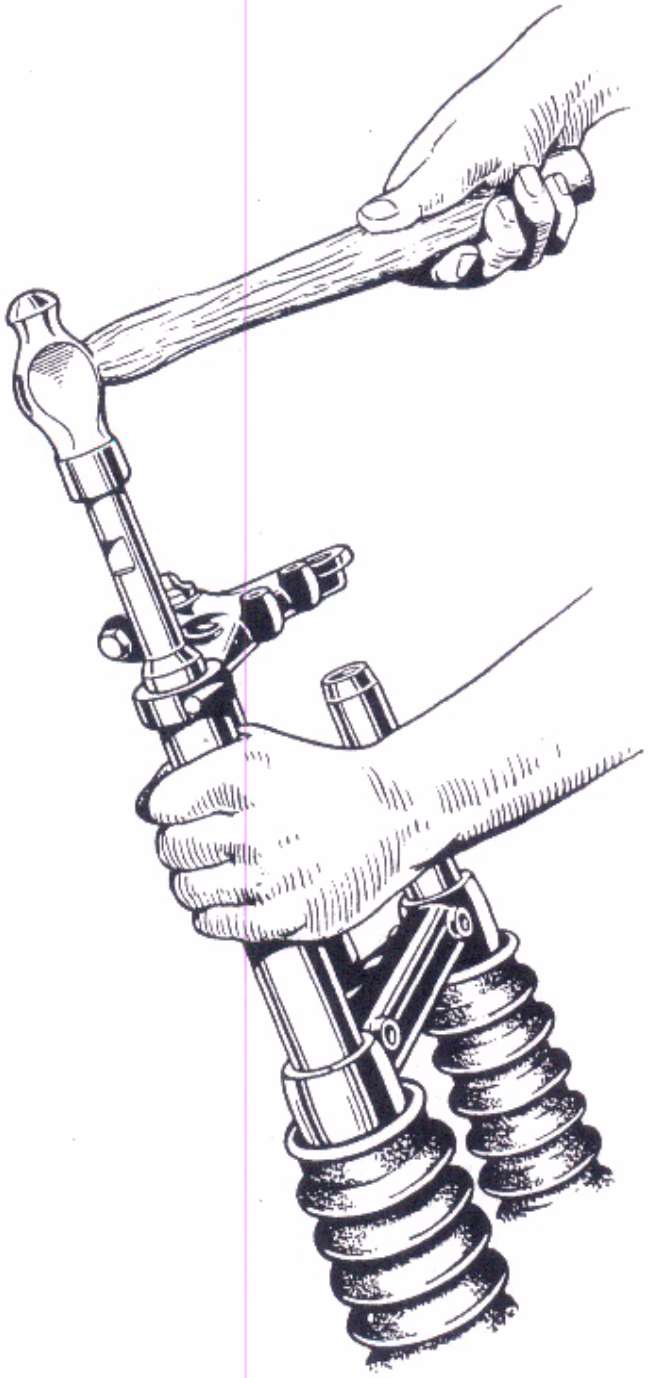
Remove the front fork as shown in Section G3 then firmly grip the middle lug stem horizontally in a vice and unscrew the hexagon headed oil filler plugs and stanchion pinch bolts. Screw service tool Z19 into the stanchion and drive it out of the middle lug assembly. Alternatively, refit the stanchion cap nuts and use a hide mallet. When the stanchions are removed withdraw the nacelle bottom covers and collect the two spring sealing washers. On models fitted with gaiters slacken the top and bottom gaiter securing clips and withdraw them.

Removal of the dust excluder sleeve nuts is facilitated by spanner D 220 which should be used when the stanchion and bottom member assembly is firmly gripped in a vice by means of the wheel spindle lug. The sleeve nut will be easily unscrewed when it has been slackened initially by giving the spanner a sharp knock with a hide or copper mallet. Withdraw the stanchion, top bush and damping sleeve from the bottom member, if necessary, by giving the stanchion a few sharp pulls to release the bush. If the stanchion cannot be freed from the bottom member due to some form of damage, service tool No. Z127 will be required to extract the stanchion. The tool should be attached to the stanchion as shown in Fig. G3 ensuring that maximum thread engagement of the adaptor cap nut is achieved.

The oil restrictor rod assembly is secured within the bottom member by means of a hexagonal headed bolt counter-bored into the wheel spindle lug. When this bolt is unscrewed the restrictor rod assembly can be withdrawn.

The bolt is sealed by means of an aluminium washer which should be removed from the counter bore and placed in safe keeping.

The bottom fork bearing bush is secured to the stanchion by means of a special slotted nut. Removal of this nut is facilitated by spanner D 220.



98

Fig. G2. Dismantling the telescopic fork using service tool Z19. (Fork covers not illustrated for clarity)

PART 2. FRAME NO. DU 5825 ONWARDS

Remove the front fork from the frame headlug by the method shown in Section G3 and then grip the middle lug stem firmly in a vice and unscrew the two small hexagon headed oil filler plugs (if fitted) from the stanchion. Unscrew the two middle lug pinch bolts, withdraw the bottom nacelle covers, and remove the top and bottom gaiter securing clips if fitted.

Screw in service tool Z19 or an old cap nut and drive the stanchions out of the middle lug. When the stanchions are removed, detach the spring covers, springs and top and bottom washers. It is advisable to renew the felt sealing washer when reassembling the forks.

Removal of the dust excluder sleeve nut is facilitated by service tool D527 which should be attached to the sleeve nut whilst the wheel spindle lug is held firmly in a vice. The sleeve nut has a right hand thread and should unscrew easily once the nut has been initially loosened by giving the spanner a sharp tap with a hide mallet.

Note: If the hydraulic damping units shown in Fig. G 14 are fitted, it will be necessary to remove them before the stanchions can be withdrawn from the bottom members. To do this, unscrew the hexagon headed bolt which can be seen counter bored into the wheel spindle lugs.

When the dust excluder nut is removed, a few sharp pulls should release the stanchion, bush and damper sleeve assembly from the bottom member.

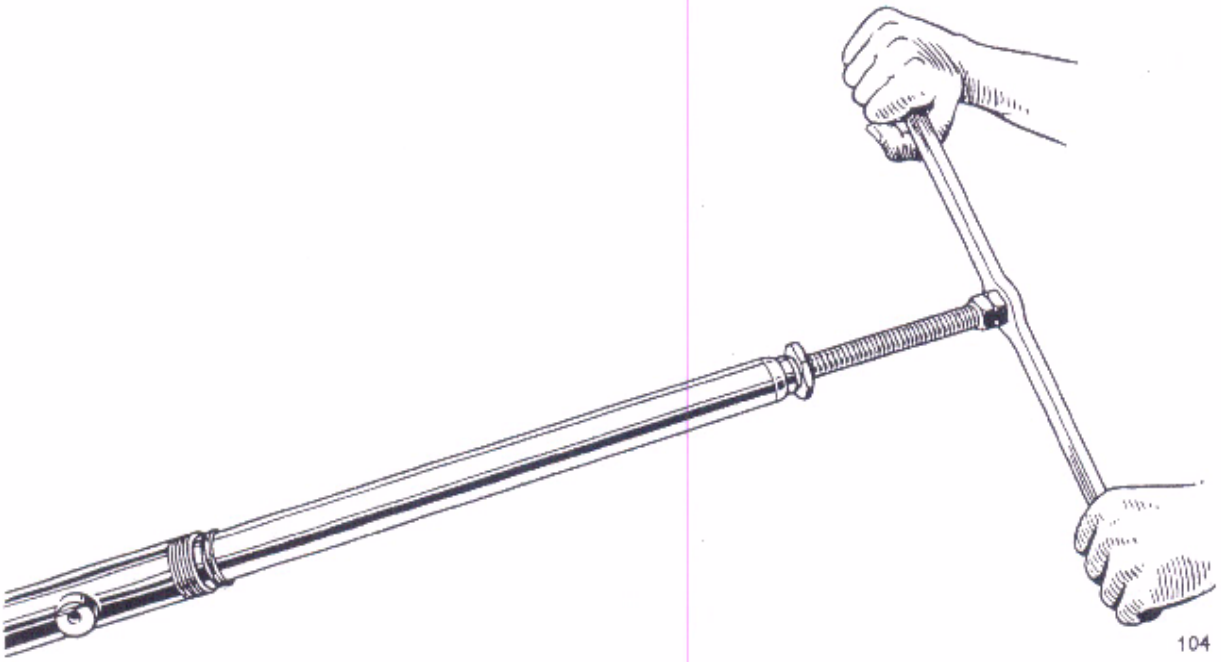


Fig. G3. Extracting the stanchion from the bottom member using service tool Z127

The restrictor rod securing bolt, the hexagon headed restrictor securing bolt, seen counter-bored into the wheel spindle lug, is sealed by means of an aluminium washer which should be withdrawn from the counter bore when the bolt is removed and placed in storage and refitted on assembly.

SECTION G5

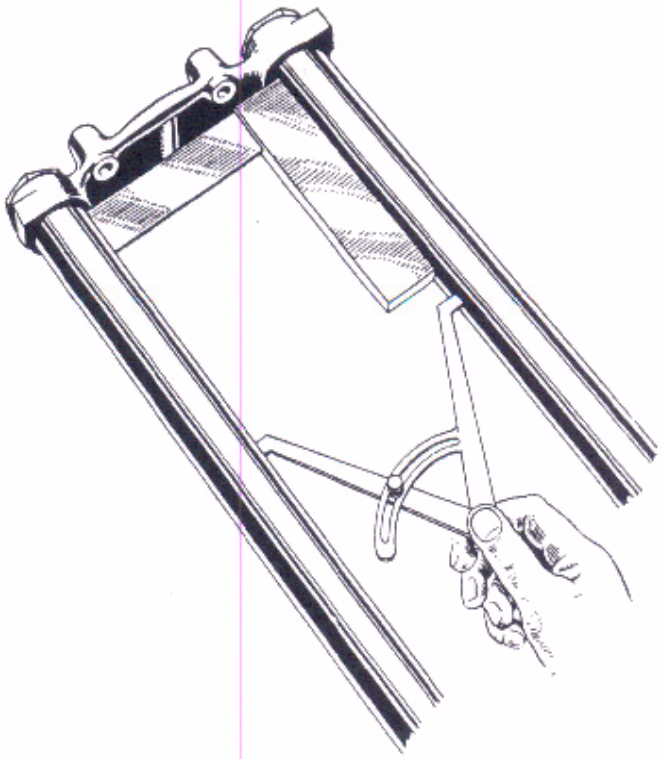
INSPECTION AND REPAIR OF FORK COMPONENTS

Telescopic fork components which have received minor damage may possibly be repaired without the need of new parts. The stanchions are the most vulnerable part to damage and correction is often possible if the damage is within the limits described below. The top lug and middle lug are malleable stampings and slight misalignment can be corrected as described in the paragraphs below. The tools required in order that a thorough check of the various alignments can be made are an engineer's checking table, set square, adjustable calipers and a height gauge.

(1) Check the stanchions for truth by rolling them slowly on a flat checking table. A bent stanchion may be realigned if the bow does not exceed $\frac{5}{32}$ in. maximum. To realign the stanchion, a hand press is required. Place the stanchion on two swage "V" blocks at either end and apply pressure to the raised portion of the stanchion. By means of alternately pressing in this way and checking the stanchion on a flat table the amount of bow can be reduced until it is finally removed.

(2) Inspect the top lug by fitting both stanchions (if true) with the cap nuts tightened in position as shown in Fig. G4. Check that the stanchions are parallel to each other in both planes by laying the assembly on a checking table and taking caliper readings as shown. Using a set square, check that the stanchions are at right angles to the top lug.

Check the middle lug and stem for alignment by inserting the stanchions until $6\frac{1}{2}$ in. (16·5 cm.) of the top of the stanchion protrudes above the top surface of the middle lug as shown in Fig. G5. Fit and tighten the pinch bolts in position and then lay the assembly on the checking table and with calipers check that the stanchions lie parallel in the middle lug.



106

Fig. G4. Checking the top lug for alignment

The stanchions should also be checked for being parallel in the other plane by sighting along the checking table top. A set square should be used to check that the stanchions are at right angles to the middle lug.

The middle lug stamping is malleable and provided that the lug is not excessively disorted, it can be trued quite easily. Each time a distortion correction is carried out check that the assembly is true in both planes.

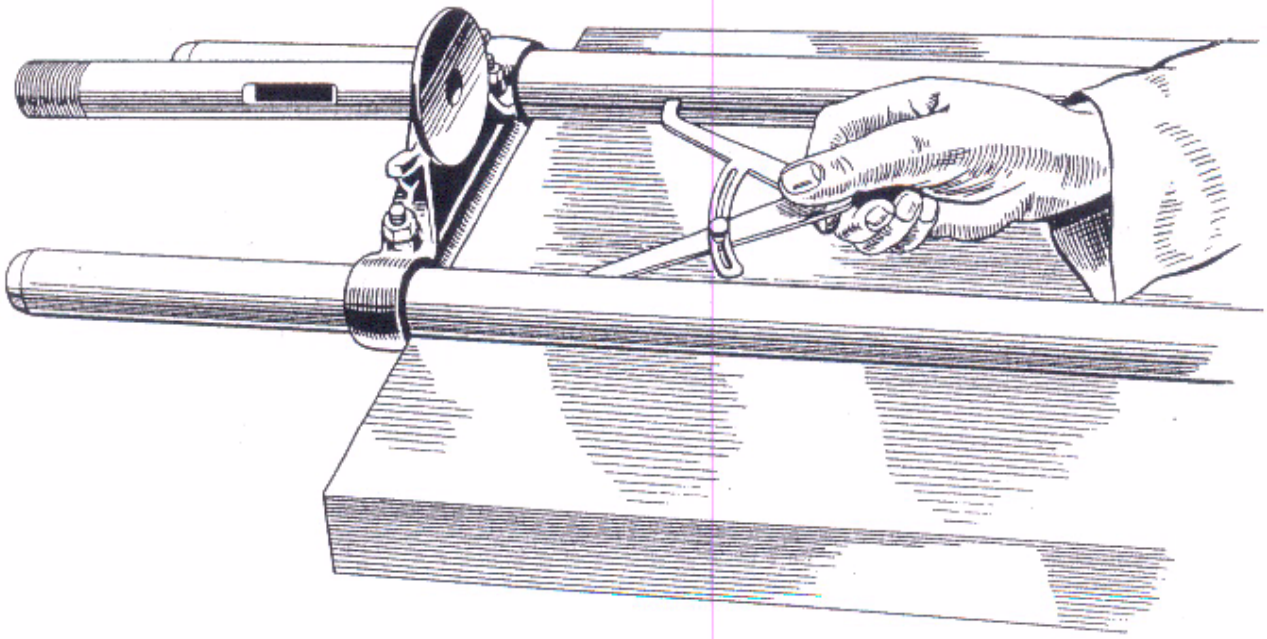


Fig. G5. Checking the stanchions and middle lug for alignment 105

(3) When the stanchions and middle lug assembly has been trued, the top lug can be used to check the position of the stem relative to the middle lug. For this purpose, the distance between the middle lug and top lug should be the same on either side and to achieve this the stanchions should be set in the middle lug to the figure given in Fig. G6. When the top lug is fitted the stem should be central in the top lug hole. If it is not a long tube can be placed over the stem and used to press the stem in the correcting direction. When this is achieved, re-check the fork assembly to ensure that the original alignment has not been adversely effected.

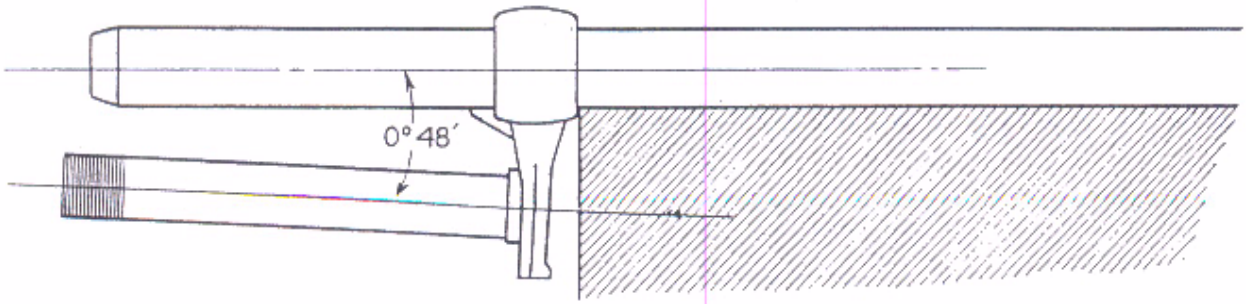
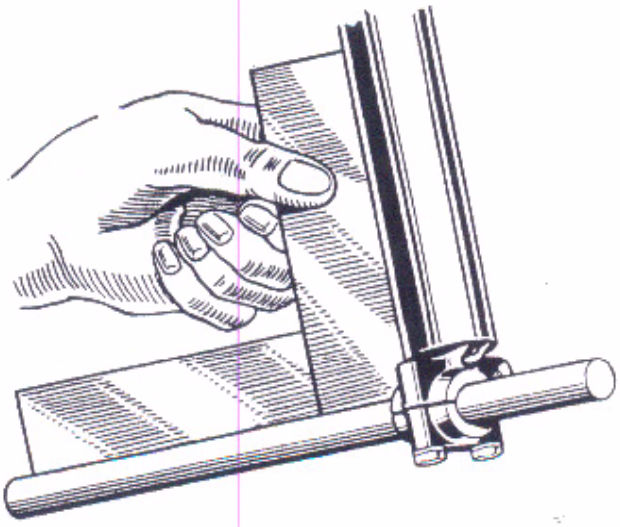


Fig. G6. Showing the correct angle between stanchion and stem centre lines 95

(4) Check that the bottom members are not dented or damaged in any way by inserting the stanchion and bottom bush assembly and feeling the amount of clearance of the bush within the bore of the bottom member. Any restriction on movement indicates that the bottom member is damaged and requires renewing. The wheel spindle lug can be checked for being at right angles to the bottom member by machining a one $\frac{1}{4}$ in. wide groove in a $\frac{11}{16}$ inch diameter bar and bolting it in position in the wheel spindle lug. A square may then be used to check that the bar is perpendicular to the bottom member. If the degree of error is excessive, no attempt should be made to realign the wheel spindle lug, the bottom member should be renewed.



102

Fig. G7. Checking the bottom member wheel spindle lug for truth

(5) Examine the top and bottom bushes for wear by measuring the bore diameter of the top bush and the outside diameter of the bottom bush and comparing them with the figures given in General Data. Also, the bushes can be checked against their respective mating surfaces: put the top bush over the stanchion and at about eight inches from the bottom of the stanchion check the diametral clearance at the bush. An excessive clearance indicates that the bush requires renewing. As described above, the bottom bush can only be checked by fitting it to the stanchion and inserting the stanchion into the bottom member to a depth of about eight inches whilst the diametral clearance is estimated from the amount of "play".

(6) Examine the main springs for fatigue and cracks and check that both springs are of approximate equal length and within $\frac{1}{4}$ in. (1·3 cm.) of the original length on the earlier long type main spring, and within $\frac{1}{4}$ in. of the original length in the case of the later short main spring. The figures for the original length are given in "General Data".

(7) Inspect the cups and cones for wear in the form of pitting or pocketing. This will appear as a series of small indentations in the ball tracks and indicates that both the races and the balls require renewing.

The cups should be a tight interference fit into the frame headlug. Slackness there usually indicates that the headlug cup seatings are distorted. The bottom cone should be a tight fit onto the middle lug stem and the top cone and dust cap assembly should be a close sliding fit over the stem. Slackness of the cone on the stem indicates that the steering races have not been in correct adjustment. In this case, if the new cone is not a tight fit over the stem, then either the stem and middle lug assembly should be renewed or in certain cases a proprietary sealant may be used to secure the cone in position.

SECTION G6

RENEWING THE STEERING HEAD RACES

The cups can be driven out of the headlug from the inside by inserting a long narrow drift and locating it on the inner edge of the cups. When the cups are removed the bore of the headlug should be cleaned thoroughly and the new cups driven in by using a hammer and aluminium drift or a piece of hard wood interposed to check the blow. Care should be taken to ensure that the cup enters into the headlug squarely and that no burrs are set up due to misalignment.

The bottom cone can easily be removed from the stem by inserting levers on either side and prising the cone upwards. When it has been removed, clean the stem and remove any burrs with a fine grade file before fitting the new cones. To ensure that the new cone is driven on squarely service tool number Z24 should be used. To assist in the assembly of the cone a small amount of grease may be smeared on the middle lug stem. If the service tool is not available a suitable drift can be made from a piece of $1\frac{1}{16}$ in. (2·7 cm.) inside diameter tube 9 inches long. Note that when new cups and cones are fitted, new balls must also be used. The correct quantity is 40 off $\frac{1}{4}$ in. diameter balls—20 top race and 20 bottom race.

SECTION G7

RENEWING THE FRONT FORK OIL SEALS

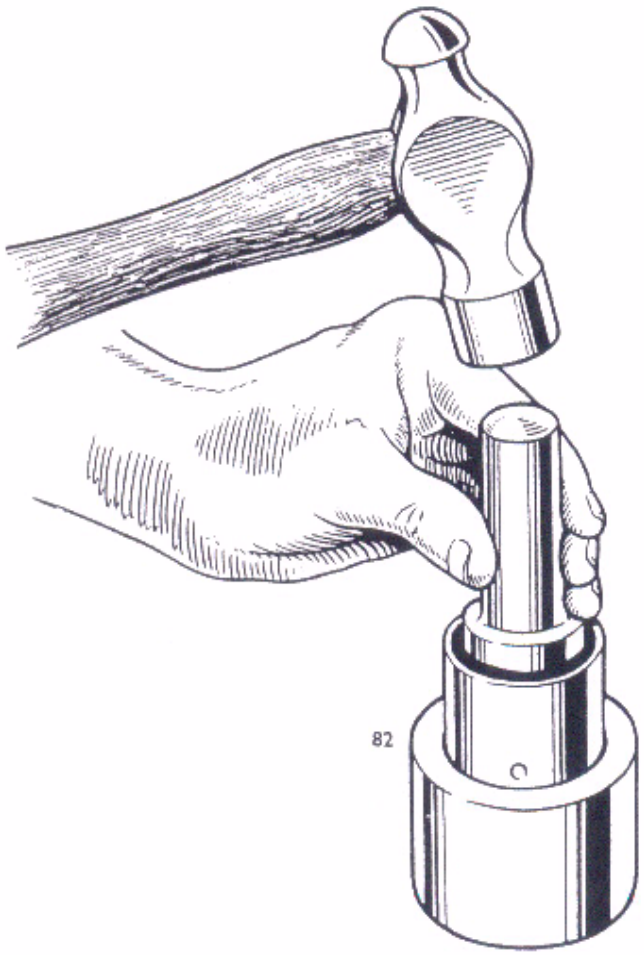


Fig. G8. Removing the oil seal from the dust excluder sleeve assembly using service tool Z137

Removal of the oil seal from the dust excluder sleeve assembly on the earlier type front fork is achieved by means of service tool Z137. The dust excluder nut should be fitted to the holder as shown in Fig. G8 and the drift inserted and used to drive the sleeve out. This will enable the oil seal to be driven out in the same direction.

When fitting the new oil seal, ensure that it is pressed in with the spring and lip side towards the threaded end of the bore and press the sleeve in until it is flush with the rear face of the oil seal.

On the later type front fork the oil seal is pressed into the dust excluder sleeve nut and is freely accessible from both sides. The oil seal can be driven out by inserting a suitable drift and locating it on the oil seal at one of the peripheral slots.

The new oil seal should be pressed in with the lip and spring side facing the threaded end of the sleeve nut and a check should be made to ensure that it is fully and squarely engaged.

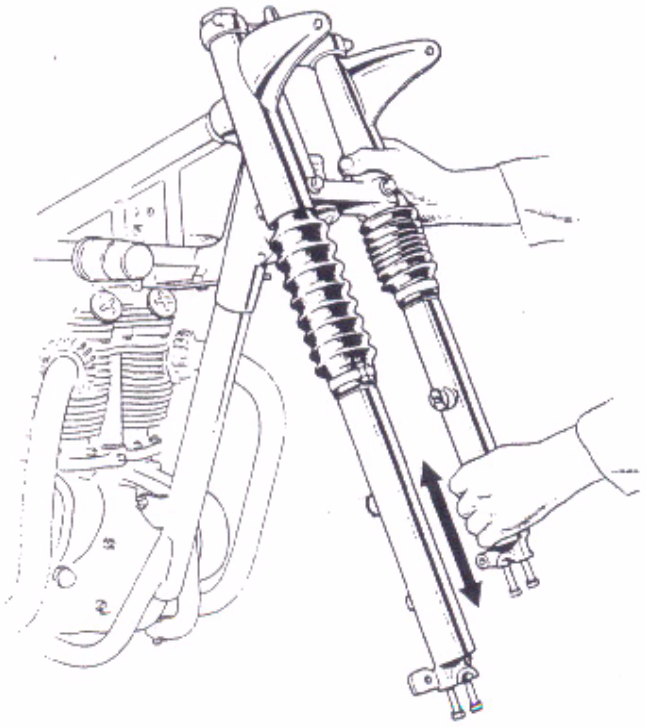
SECTION G8

REASSEMBLING AND REFITTING THE TELESCOPIC FORK UNIT

To cater for the two basic types of telescopic forks fitted to Triumph machines this section is divided into two parts—part one deals with the earlier type front fork and the second part deals with the more recent type front fork, the assembly of which requires service tool Z161.

PART 1. FRAME NO. DU 101 TO DU 5824

First, offer the stanchion and bottom bush assembly into the bottom member and refit the damper sleeve and top bush. Offer the dust excluder sleeve nut and oil seal assembly over the stanchion using a smear of oil to assist assembly, and then tighten the sleeve nut in position using spanner D220. With the stanchion in its lowest position offer the restrictor rod assembly to the stanchion and refit the hexagonal restrictor rod securing bolt and aluminium washer until all but a few threads are engaged in the restrictor rod.



128

Fig. G9. Reassembling the telescopic fork

Work the restrictor rod round until the location slot in its base is level with the location plug hole then refitting the plug, tighten the restrictor rod securing bolts. Do not forget that a fibre washer is fitted under each of the location plugs.

Thoroughly clean the head race cups and cones and smear the ball tracks with the recommended grease (see Section A2). Place the ball bearings in the cups (20 top, 20 bottom) using grease to hold them in position. Offer the middle lug and stem assembly to the headlug and lower the top cone and dust cover assembly into position. Refit the top lug and sleeve nut, tighten the sleeve nut until all the slack is taken up. Refit the sleeve nut pinch bolt finger tight and align the middle lug and top lug. Assemble the left and right bottom nacelle covers to the middle lug and insert the pinch bolts, but only screw on the nuts finger tight.

Offer the right stanchion (with brake anchor plate locating boss fitted) to the middle lug and rotate it until the oil filler plug hole is accessible to the headlamp aperture. Force the stanchion upwards using the bottom member as an impulse driver (see Fig. 9). When the taper is engaged in the top lug, temporarily tighten the pinch bolt then repeat the procedure for the left stanchion. Finally, pour ½ pint (150 c.c.) of the recommended grade of oil into each fork leg and then refit the main springs. Screw in the left and right cap nuts and guide tube assemblies until several threads are engaged, then slacken the middle lug pinch bolts and then return to fully tighten the cap nuts using spanner No. D220. When this is achieved, adjust the steering head races as described in Section G10 and retighten the middle lug pinch bolts and sleeve nut pinch bolts Refit the oil filler plugs (if fitted) not forgetting the two sealing fibre washers. Reposition the handlebar but do not forget to refit the washers and self-locking nuts where the handlebars are rubber mounted.

Reassembly then carries on as a reversal of the removal instructions but reference should be made to the relevant wiring diagram in Section H11 when refitting the nacelle unit.

PART 2. FRAME NO. DU 5825 ONWARDS

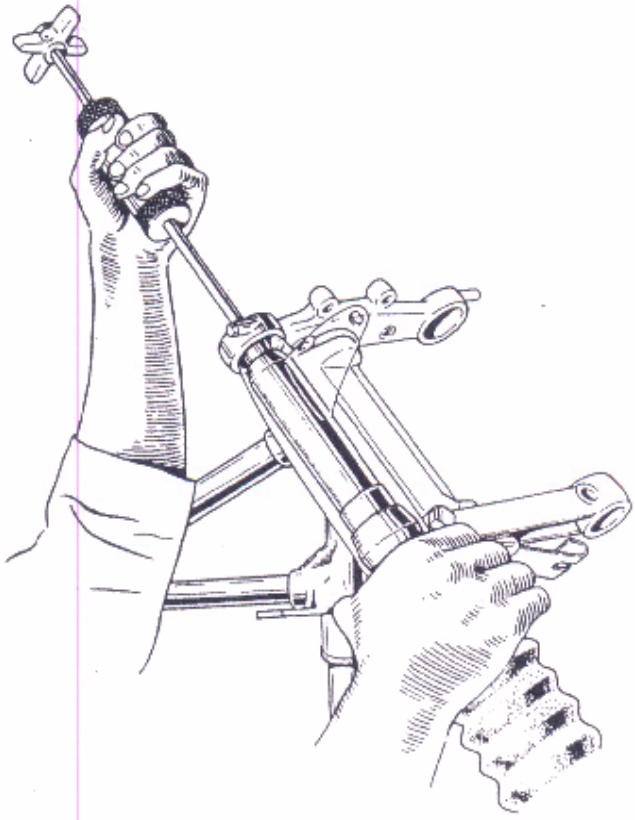
Assemble the stanchion to the bottom member and fit the damper sleeve and top bush. Then screw on the dust excluder sleeve nut and oil seal assembly having used jointing compound on the outer member threads and hold the bottom member in a vice by means of the wheel spindle lug whilst the sleeve nut is tightened using service tool D527.

To refit the oil restrictor rod first slide the rod down inside the stanchion and then use a piece of tubing about 2 feet long and ¼ in. (1·3 cm.) inside diameter, to grip the restrictor rod whilst several threads of the hexagon headed securing bolt are engaged. Do not forget to replace the aluminium sealing washer which fits over the securing bolt.

Screw in the small location plug and with the tubing rotate the restrictor rod until the location slot is aligned with the plug, then tighten the securing bolt. Do not forget to fit new fibre washers under each of the two location plugs. When both stanchions are assembled in this way, fit the plain thrust washer, main spring, cover and felt washer over each stanchion. On models fitted with nacelle type headlamp there is also a plain steel washer fitted underneath the felt washer to give additional clearance. On models fitted with a headlamp unit the gaiters should be fitted over the springs and clamped up top and bottom on to the thrust washer and sleeve nut respectively.

Align the middle lug and top lug and position the left and right lower nacelle cover and then insert the middle lug pinch bolt and fit the nuts finger tight.

Offer the right stanchion assembly (with welded boss for front brake anchor plate location) and engage as much of the stanchion as possible in the middle lug. To pull the stanchion up to the top lug, service tool Z161 is required which should be inserted into the top lug and the plug adaptor screwed into the stanchion top. The stanchion can then be easily drawn up to the required level and when this is achieved temporarily tighten the pinch bolt, remove the tool and screw in the cap nut until several threads are engaged. Repeat this procedure for the left stanchion assembly and then remove both cap nuts and pour ½ pint (190 c.c.) of the recommended grade of oil (see Section A2) into each fork leg.



81

Fig. G10. Reassembling the telescopic fork, using service tool No. Z161

Refit the cap nuts until several threads are engaged then slacken off the middle lug pinch bolt and fully tighten the cap nuts. On models with nacelle type front forks the stanchions will require turning prior to tightening the cap nuts so that the oil filler plug holes are accessible through the headlamp aperture. When this is achieved, adjust the steering head races as described in Section G10 and then tighten the sleeve nut pinch bolt and two middle lug pinch bolts, to the torque figures given in "General Data"

Reassembly continues as the reversal of the dismantling procedure, referring to section H11 for the relevant wiring diagram and Section H8 to set the headlamp main beam.

SECTION G9

TELESCOPIC FORK ALIGNMENT

To facilitate checking the alignment of the telescopic fork legs there is available service tool Z103 the dimensions of which are shown in Fig. G11.

To check the front fork alignment, the front wheel and mudguard must be removed and a spare wheel spindle bolted in position. If a spare wheel spindle is not available a suitable bar for this purpose can be made from mild steel to the dimensions given in Fig. G12.

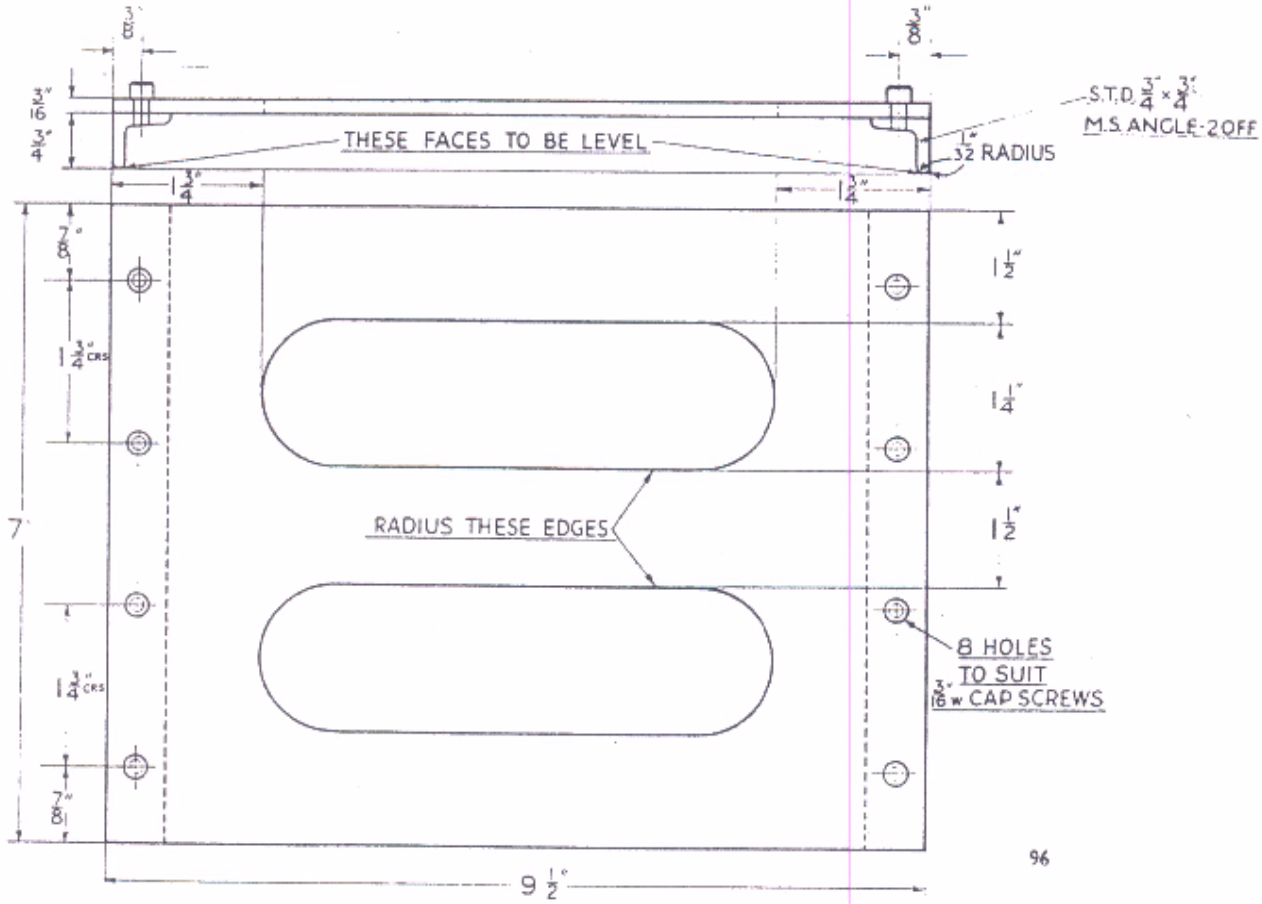
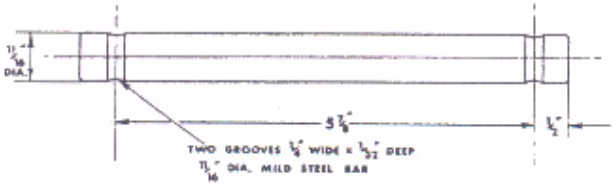


Fig. G11. Telescopic fork leg alignment gauge service tool Z103

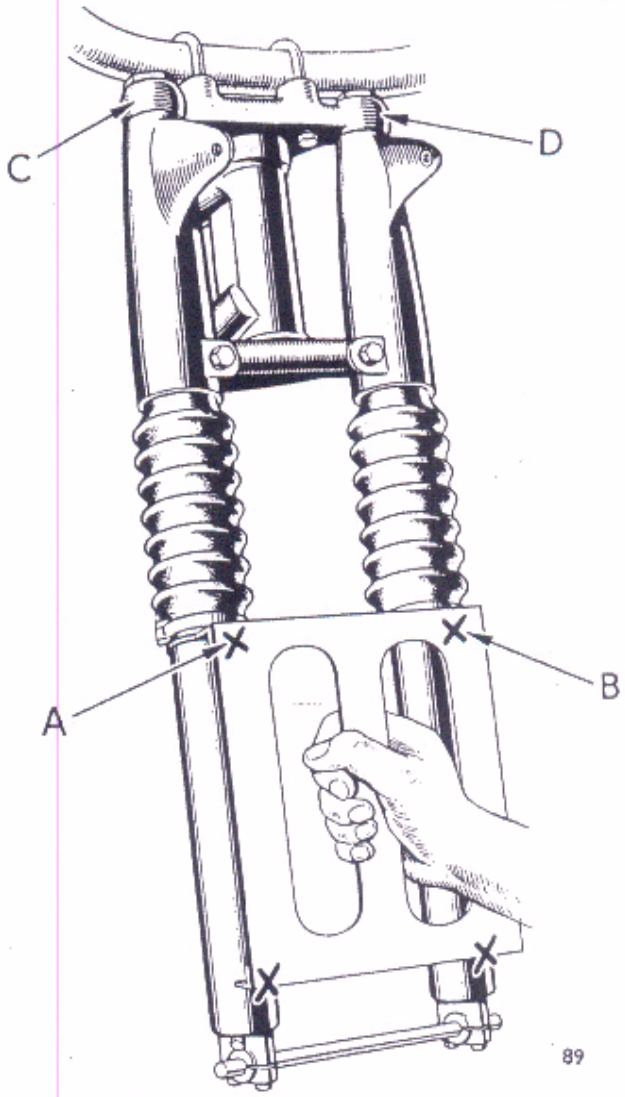
Hold the alignment gauge firmly against the fork legs as shown in Fig. G13 and check that the gauge contacts at all four corners. If the gauge does not make contact at point A then this indicates that point B is too far forward. To remedy this, slacken off the two middle lug pinch bolts and the stem sleeve nut pinch bolt and give point C a sharp blow using a hide mallet or a hammer used in conjunction with a soft metal drift.



149

Fig. G12. Sketch of wheel spindle tool for use with service tool Z103

Check the alignment again with the gauge and again give correcting blows in the above mentioned manner until the amount of rock at any one corner does not exceed $\frac{1}{64}$ inch. When this is achieved, tighten all three pinch bolts and then finally apply the gauge to check that tightening has not caused distortion.



89

Fig. G13. Checking the telescopic fork leg alignment with service tool Z103

SECTION G10

ADJUSTING THE STEERING HEAD RACES

When a new machine has covered the 500 miles (running-in period) it will be necessary to check the steering head races for excessive play due to the balls, cups and cones bedding down.

Also, after long periods, the head races may require adjusting to compensate for any wear that may have taken place. The working clearance of the balls in the tracks of the cups and cones is controlled by the fork stem sleeve nut which is locked in position by means of a pinch bolt at the rear of the top lug. When the pinch bolt is slackened the sleeve nut can be turned to increase or decrease the head race working clearance.

Mount the machine with the front wheel clear of the ground and balance the front fork so that both the front and rear wheels are aligned. When the fork is tilted to either side of its central position it should just fall to its full lock position. If the fork will do this then the head races are not over tight and conversely to check that they are not too loose, hold the top lug with the left hand (with the headlamp unit removed on models fitted with nacelle type front forks) and hold the top portion of the front mudguard in the right hand and then attempt to "rock" the fork. If there is any "rock" in evidence, then tighten the stem sleeve nut $\frac{1}{4}$ turn and check again. Continuing this way until the fork will not rock but will turn from lock to lock easily. When this is achieved, re-tighten the stem sleeve nut pinch bolt.

SECTION G11

CHANGING THE FRONT FORK MAIN SPRINGS

Removing the main springs on models fitted with the inside-spring type front fork i.e. frame No. DU101 to DU5824) necessitates removal of the nacelle top cover (if fitted) and handlebars. (*To change the mainsprings on the later type telescopic fork (Frame No. DU5825 onwards) necessitates removal of the complete fork unit, and for details of this see Section G4*).

First, place a strong box underneath the engine so that the motorcycle is mounted with the front wheel off the ground.

Removal of the cap nuts is facilitated by spanner number D220. When the cap nut-and-guide-tube assemblies are removed the mainsprings can be withdrawn and the new ones fitted.

When the cap nuts are refitted, they must be fully retightened. If necessary use a piece of tubing which will increase the leverage to about 12 in. to finally tighten the nuts. Reassembly then continues as a reversal of the dismantling procedure.

The table below shows the spring rates and colour codes for the purposes designated.

ENGINE No. DU101 to DU5824			
MODEL	SPRING RATE lb./in.	LOAD at FITTED LENGTH lbs.	COLOUR CODE
6T/T120 Solo	32	85	Black/Green
6T/T120 Sidecar*	37	98	Red/White
TR6 Solo	30	46	Black/White
TR6 Sidecar	37	56	Black/Red
All models DU5825 to DU13374			
Solo	30	50	Unpainted
Sidecar	37	60	Yellow/ White

* With longer sidecar outer members

All models after DU13374			
Solo	26½	22	Yellow/Blue
Sidecar	32½	26½	Yellow/ Green

SECTION G12

THE HYDRAULIC DAMPING UNIT

Fig. G14 shows an exploded view of the damping unit which may be fitted to certain types of telescopic front forks. To fit these units, two alternative stanchion cap nuts are required with a threaded hole into which the top of the damper unit rod screws. Locknuts are provided to secure the cap nut to the rod. Note that on a machine fitted with these damper units, if the rod should become detached from the cap nut for any reason, it must be remembered that it will fall back into the stanchion. Therefore when fitting the fork to the frame a check should be made to ensure that the operation of fitting the damper unit rod to the cap nut has not been forgotten.

The bottom of the damper unit is secured in the same way as the restrictor rod on standard machines (Section G8), i.e. by means of a hexagon headed bolt countersunk into the wheel spindle recess.

To dismantle the unit, first grip the body carefully in a vice, then unscrew the adaptor nut (two flats) and withdraw the rod assembly. The cap is removed by unscrewing the locknut from the end of the rod and withdrawing the sliding fit oil restrictor cup.

When reassembling the damper, ensure that the pin is in position and when the locknut is tight, use a centre punch to prevent the nut subsequently unscrewing.

Ensure that the oil holes in the stem are free from blockage and refit the rod assembly to the body.

After assembly, test the unit for damping efficiency by immersing the lower end of the unit into oil and pumping the centre rod a few times. There should be little or no resistance on the down stroke and a good resistance on the up stroke.

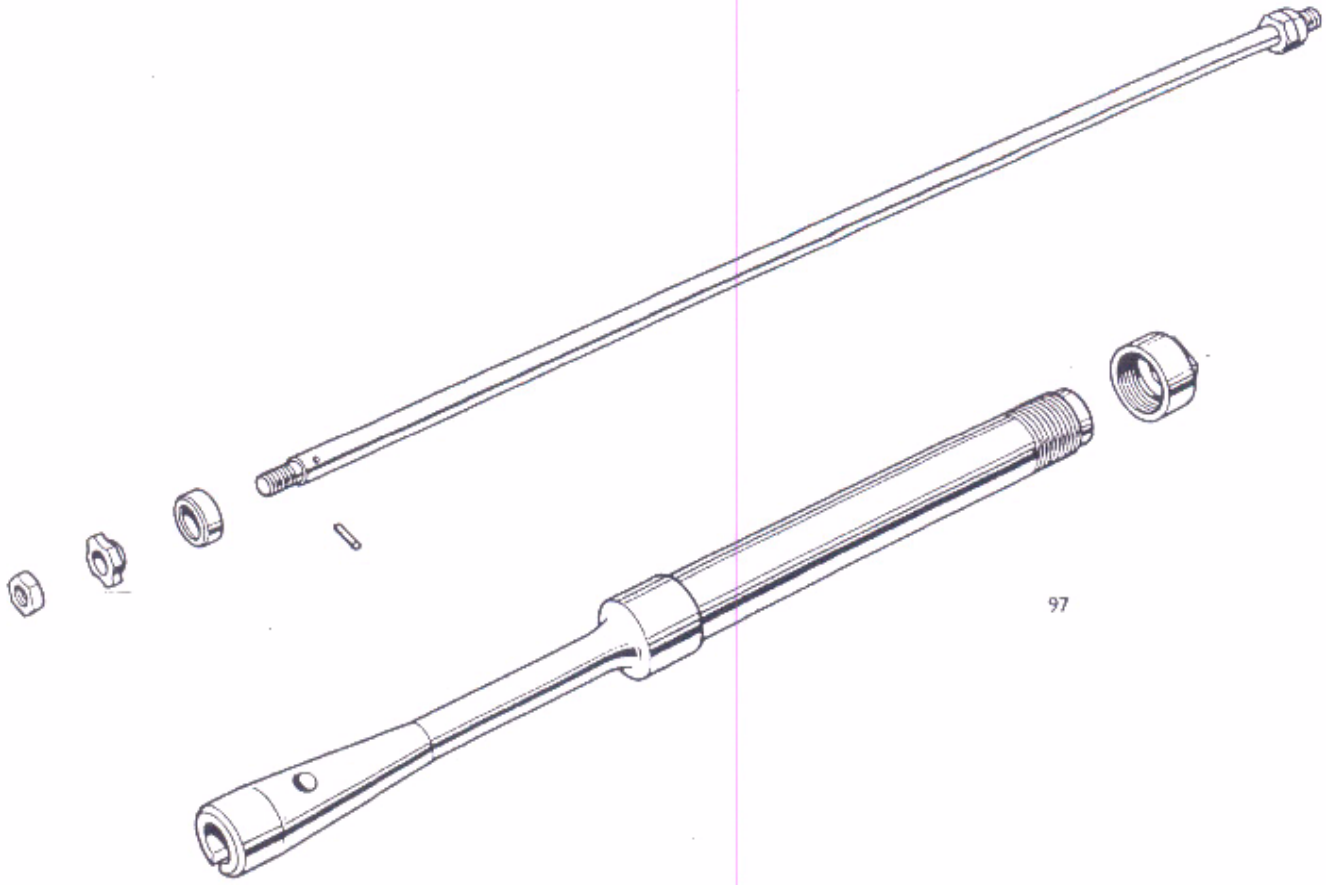


Fig. G14. Exploded view of telescopic fork internal hydraulic damper unit assembly

SECTION G13

DISMANTLING AND REASSEMBLING THE TELESCOPIC FORK

From engine No. DU13375 the damper sleeve is stepped and when reassembling the fork unit the damper sleeve is pressed in with the thick end pointing downwards.

SECTION H

ELECTRICAL SYSTEM

INTRODUCTION

BATTERY INSPECTION AND MAINTENANCE ... H1
- DESCRIPTION
- (a) DRY CHARGED BATTERIES
- (b) ROUTINE MAINTENANCE

COIL IGNITION SYSTEM ... H2
- DESCRIPTION
- (a) CHECKING THE LOW TENSION CIRCUIT FOR CONTINUITY
- (b) FAULT FINDING IN THE LOW TENSION CIRCUIT
- (c) IGNITION COILS
- (d) CONTACT BREAKER
- (e) CHECKING THE HIGH TENSION CIRCUIT
- (f) CHECKING THE EMERGENCY STARTING CIRCUIT

SPARKING PLUGS ... H3

CHARGING SYSTEM ... H4
- DESCRIPTION
- (a) CHECKING THE D.C. INPUT TO BATTERY
- (b) CHECKING THE ALTERNATOR OUTPUT
- (c) RECTIFIER MAINTENANCE AND TESTING
- (d) CHECKING THE CHARGING CIRCUIT FOR CONTINUITY
- (e) MAKING A 1 OHM LOAD RESISTOR

ZENER DIODE CHARGE CONTROL ... H5

A.C. IGNITION (E.T.) AND A.C. LIGHTING SYSTEMS ... H6
- DESCRIPTION
- (a) A.C. IGNITION
- (b) TESTING THE A.C. IGNITION SYSTEM
- (c) CHECKING THE A.C. ALTERNATOR OUTPUT
- (d) DIRECT LIGHTING SYSTEM

ELECTRIC HORN ... H7

HEADLAMP ... H8
- DESCRIPTION
- BEAM ADJUSTMENTS

TAIL AND STOPLAMP UNIT ... H9

FUSES ... H10

WIRING DIAGRAMS ... H11
- COIL IGNITION MACHINES (6V)
- POLICE 6V WITH BOOSTER SWITCH
- COIL IGNITION MACHINES (12V)
- A.C. IGNITION (E.T.) MACHINES

ALTERNATOR AND STATOR DETAILS (Specifications and Output Figures) ... H12

ZENER DIODE—CHARGING REGULATOR ... H13
- PROCEDURE FOR TESTING ON THE MACHINE

INTRODUCTION

The electrical system is supplied from an alternating current generator contained in the primary chain-case and driven from the crankshaft. The generator output is selected by the respective positions of the lighting and ignition switches and is then converted into direct current by a silicon diode rectifier. The direct current is supplied to the 12 ampere/hour battery equipment on 6 volt machines, or on 12 volt machines to two 6 volt 8 ampere/hour batteries connected in series, with a Zener diode in circuit to regulate the battery current.

The current is then supplied to the ignition system which is controlled by a double contact breaker driven direct from the exhaust camshaft. The contact breaker feeds two ignition coils, one for each cylinder.

In case of a discharged battery the emergency position of the ignition switch supplies output direct from the generator through one pair of contacts and one ignition coil to enable the engine to be started. As soon as the engine has been started the ignition switch must be returned to the normal position or burning of the contact breaker points will take place.

The routine maintenance needed by the various components is set out in the following sections. All electrical components and connections including the earthing points to the frame of the machine must be clean and tight.

SECTION H1

BATTERY INSPECTION AND MAINTENANCE

DESCRIPTION

Battery models ML9E, MLZ9E and MK9E, MKZ9E are six volt units and two of the latter type are connected in series on later 6T models, to give 12 volts. The battery containers are moulded in translucent polystyrene through which the acid can be seen. The tops of the containers are so designed that when the covers are in position, the special anti-spill filler plugs are sealed in a common venting chamber. Gas from the filler plugs leaves this chamber through an elbow-shaped vent pipe union which can be inserted into one of four alternative sealed outlets. Polythene tubing may be attached to the vent pipe union to lead the corrosive fumes away from any parts of the machine where they might cause damage.

H1. PART A. DRY CHARGED BATTERIES

Battery models ML9E and MK9E are supplied either dry and uncharged or filled and charged, while model MLZ9E and MKZ9E are supplied dry-charged. To prepare one of the above types of battery for service, first discard the vent hole sealing tapes and then pour into each cell pure dilute sulphuric acid of appropriate specific gravity to THE COLOURED LINE. (See table a). Allow the battery to stand for at least one hour for the electrolyte to settle down, thereafter maintain the acid level at the coloured line by adding distilled water.

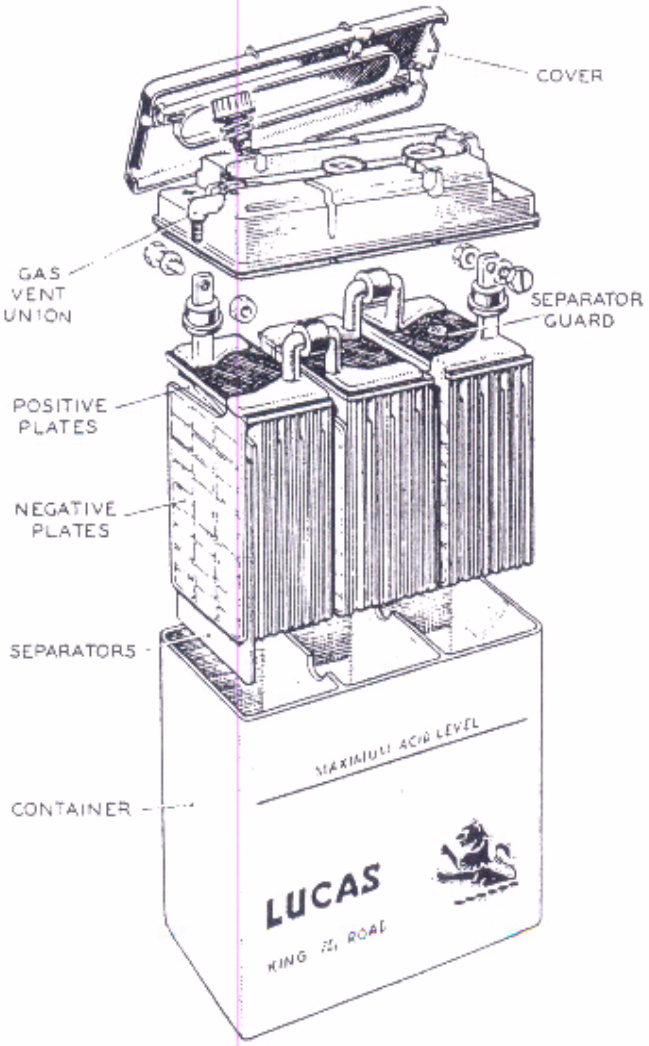


Fig. H1. Exploded view of battery

H1. PART B. ROUTINE MAINTENANCE

Every week examine the level of the electrolyte in each cell. Lift the battery out of the carrier so that the coloured filling line can be seen. Add distilled water until the electrolyte level reaches this line.

Note. On NO account should the ML9E or MLZ9E batteries be topped up to the separator guard but only to the COLOURED LINE.

With this type of battery, the acid can only be reached by a miniature hydrometer, which would indicate the state of charge.

Great care should be taken when carrying out these operations not to spill any acid or allow a naked flame near the electrolyte. The mixture of oxygen and hydrogen given off by a battery on charge, and to a lesser extent when standing idle, can be dangerously explosive.

The readings obtained from the battery electrolyte should be compared with those given in table (a). If a battery is suspected to be faulty it is advisable to have it checked by a Lucas Depot or Agent.

(a) SPECIFIC GRAVITY OF ELECTROLYTE FOR FILLING BATTERIES ML9E, MLZ9E, MK9E AND MKZ9E

U.K. and Climates normally below 90°F (32·2°C)		Tropical Climates over 90°F (32·2°C)	
Filling	Fully charged	Filling	Fully charged
1·260	1·280/1·300	1·210	1·220/1·240

Every 1,000 miles (1,500 k.m.) or monthly, or more regularly in hot climates the battery should be cleaned as follows. Remove the battery cover and clean the battery top. Examine the terminals: if they are corroded scrape them clean and smear them with a film of petroleum jelly, such as vaseline. Remove the vent plugs and check that the vent holes are clear and that the rubber washer fitted under each plug is in good condition.

(b) MAXIMUM PERMISSABLE ELECTROLYTE TEMPERATURE DURING CHARGE

Climates normally Below 80°F (27°C)	Climates between 80–100°F (27–38°C)	Climates frequently above 100°F (38°C)
100°F (38°C)	110°F (43°C)	120°F (49°C)

Notes.

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 ·020 from the observed reading to obtain the true specific gravity at 60°F. For every 5°F. above 60°F., add ·020 to the observed reading to obtain the true specific gravity at 60°F.

The temperature must be indicated by a thermometer having its bulb actually immersed in the electrolyte and not the ambient temperature. To take a temperature reading tilt the battery sideways and then insert into the electrolyte.

SECTION H2
COIL IGNITION SYSTEM

DESCRIPTION

The coil ignition system comprises two ignition coils and a contact breaker fitted in the timing cover and driven by the exhaust camshaft. The ignition coils are mounted underneath the petrol tank one either side of the main tank tube. Access to the coils is achieved by removing the fuel tank as shown in Section E1. Apart from cleaning the coils, in between the terminals and checking the low tension and high tension connections, the coils will not require any other attention. Testing the ignition coils is amply covered in H2 Part C below whilst testing the contact breaker is described in H2 Part D.

The best method of approach to a faulty ignition system, is that of first checking the low tension circuit for continuity as shown in H2 Part A, and then following the procedure laid out in H2 Part B to locate the fault(s).

Failure to locate a fault in the low tension circuit indicates that the high tension circuit or sparking plugs are faulty, and the procedure detailed in H2 Part E must be followed. Before commencing any of the following tests, however, the contact breaker and sparking plugs must be cleaned and adjusted to eliminate this possible source of fault.

H2 PART A. CHECKING THE LOW TENSION CIRCUIT FOR CONTINUITY

To check whether there is a fault in the low tension circuit and to locate its position, the following tests should be carried out:—

Disconnect and remove the fuel tank (Section E1) removing the white lead which connects the "SW" terminals of the left and right ignition coils. Then, with the wiring harness white lead connected to the SW terminal of the left ignition coil only, turn the ignition switch to the "IGN" position. Slowly crank the engine and at the same time observe the ammeter needle, which should fluctuate between zero and a slight discharge, as the contacts open and close respectively.

Disconnect the wiring harness white lead from the left ignition coil and connect it to the S.W. terminal of the right ignition coil and then repeat the test. If the ammeter needle does not fluctuate in the described way then a fault in the low tension circuit is indicated.

First, examine the contact breaker contacts for pitting, piling or presence of oxidation, oil or dirt etc. Clean and ensure that the gap is set correctly to ·014 in.–·016 in. (·35–·40 m.m.) as described in Section B31.

H2 PART B. FAULT FINDING IN THE LOW TENSION CIRCUIT

To trace a fault in the low tension wiring, turn the ignition switch to "IGN" position and then crank the engine until both sets of contacts are opened, or alternatively, place a piece of insulating material between both sets of contacts whilst the following test is carried out.

For this test, it is assumed that the fuel tank is removed and the wiring is fully connected as shown in the appropriate wiring diagram, Section H11. With the aid of a D.C. volt meter and 2 test-prods (Voltmeter 0–10 volts for 6 volt machines, and 0–15 volts for 12 volt electrical systems), make a point to point check along the low tension circuit starting at the battery and working right through to the ignition coils, stage by stage, in the following manner, referring to the relevant wiring diagram in Section H11.

Note. On 12V machines it will be necessary to disconnect the Zener Diode before the test is carried out. To do this remove the white lead from the Diode centre terminal.

(1) First, establish that the battery is earthed correctly by connecting the volt meter across the battery negative terminal and the machine frame earth. No voltage reading indicates that the red earthing lead is faulty (or the fuse blown, where fitted). Also, a low reading would indicate a poor battery earth connection.

(2) Connect the volt meter between the left ignition coil S.W. terminal and earth and then the right ignition coil S.W. terminal and earth. No voltage reading indicates a breakdown between the battery and the coil S.W. terminal, or that the switch connections or ammeter connections are faulty.

(3) Connect the volt meter between both of the ammeter terminals in turn and earth. No reading on the "feed" side indicates that either the ammeter is faulty or there is a bad connection along the brown and blue lead from the battery, and a reading on the "battery" side only indicates a faulty ammeter.

(4) Connect the volt meter between ignition switch terminal 12A and earth. No reading indicates that the brown and white lead has faulty connections. Check for voltage at the brown/white lead connections at rectifier, ammeter and lighting switch terminals No's 2 and 10.

(5) Connect the volt meter across ignition switch No. 13 terminal and earth. No reading indicates that the ignition switch is faulty and should be replaced. Battery voltage reading at this point but not at the ignition coil S.W. terminals indicates that the white lead has become "open circuit" or become disconnected.

(6) Disconnect the black/white, and black/yellow leads from the C.B. terminals of each ignition coil. Connect the volt meter across the C.B. terminal of the left coil and earth and then the C.B. terminal of the right coil and earth. No reading on the volt meter in either case indicates that the coil primary winding is faulty and a replacement ignition coil should be fitted.

(7) With both sets of contacts open reconnect the ignition coil leads and then connect the volt meter across both sets of contacts in turn. No reading in either case indicates that there is a faulty connection or the internal insulation has broken down in one of the condensers (capacitors).

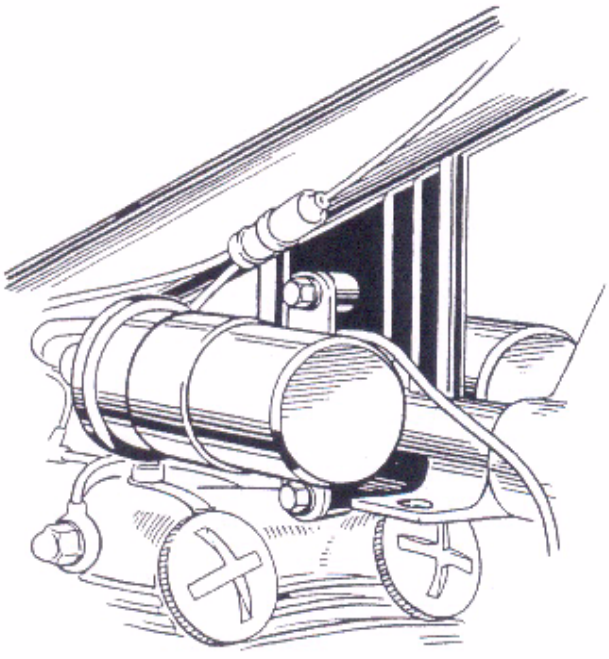
If a capacitor is suspected then a substitution should be made and a re-test carried out.

(8) Finally, on machines with 12V electrical systems, reconnect the Zener Diode white lead and then connect the volt meter between the Zener Diode centre terminal and earth (with ignition "ON"). The volt meter should read battery volts. If it does not the Zener Diode is faulty and a substitution should be made.

H2 PART C. IGNITION COILS

The ignition coils consist of primary and secondary windings wound concentrically about a laminated soft iron core, the secondary winding being next to the core. The primary winding usually consists of some 300 turns of enamel covered wire and the secondary some 17,000–26,000 turns of much finer wire—also enamel covered. Each layer is paper insulated from the next in both primary and secondary windings.

To test the ignition coil on the machine, first ensure that the low tension circuit is in order as described in H2 Part A above then disconnect the high tension leads from the left and right sparking plugs. Turn the ignition switch to the "IGN" position and crank the engine until the contacts (those with the black/yellow lead from the ignition coil) for the right cylinder are closed. Flick the contact breaker lever open a number of times whilst the high tension lead from the right ignition coil is held about $\frac{3}{16}$ in. away from the cylinder head. If the ignition coil is in good condition a strong spark should be obtained. if no spark occurs this indicates the ignition coil to be faulty.



133

Fig. H2. Ignition coils in position on machine

Repeat this test for the left high tension lead and coil by cranking the engine until the contacts with the black/white lead from the left ignition coil are closed.

Before a fault can be attributed to an ignition coil it must be ascertained that the high tension cables are not cracked or showing signs of deterioration, as this may often be the cause of mis-firing etc. It should also be checked that the ignition points are actually making good electrical contact when closed and that the moving contact is insulated from earth (ground) when open. It is advisable to remove the ignition coils and test them by the method described below.

BENCH TESTING AN IGNITION COIL

Connect the ignition coil into the circuit shown in Fig. H3 and set the adjustable gap to 8 mm. for MA6 coils and 9 mm. for MA12 types. With the contact breaker running at 100 r.p.m. and the coil in good condition, not more than 5% missing should occur at the spark gap over a period of 15 seconds. The primary winding can be checked for short-circuit coils by connecting an ohmeter across the low tension terminals. The reading obtained should be within the figures quoted below (at 20°C).

Coil	Primary Resistance	
	Min.	Max.
MA6	1·8 ohms.	2·4 ohms.
MA12	3·0 ohms.	3·4 ohms.

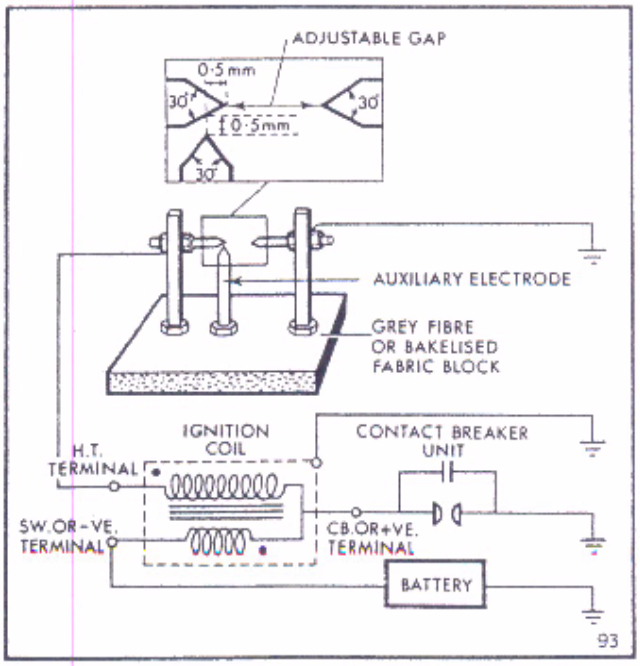


Fig. H3. Ignition coil test rig

H2 PART D. CONTACT BREAKER

Faults occurring at the contact breaker are in the main due to, incorrect adjustment of the contacts or the efficiency being impaired by piling, pitting or oxidation of the contacts due to oil etc. Therefore, always ensure that the points are clean and that the gap is adjusted to the correct working clearance as described in Section B31.

To test for a faulty condenser, first turn the ignition switch to "IGN" position and then take voltage readings across each set of contacts with the contacts open. No reading indicates that the condenser internal insulation has broken down. Should the fault be due to a condenser having a reduction in capacity, indicated by excessive arcing when in use, and overheating of the contact faces, a check should be made by substitution.

Particular attention is called to the periodic lubrication procedure for the contact breaker which is given in section A10. When lubricating the parts ensure that no oil or grease gets onto the contacts.

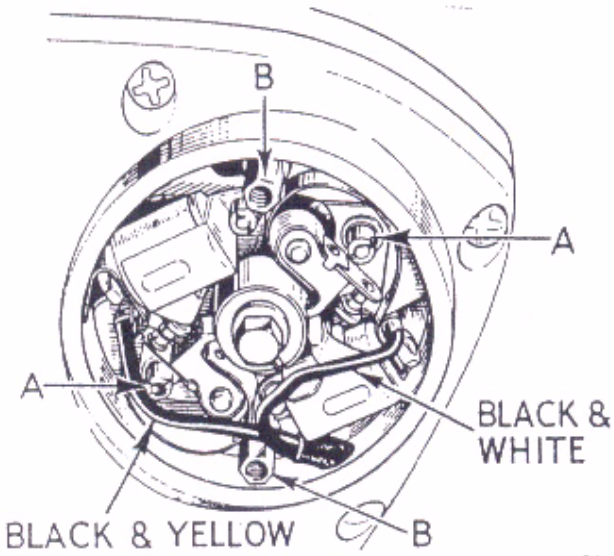


Fig. H4. Contact breaker and condenser assembly

If it is felt that the contacts require surface grinding then the complete contact breaker unit should be removed as described in Section B25 and the moving contacts disconnected by unscrewing the securing nuts from the condenser terminals. Grinding is best achieved by using a fine carborundum stone or very fine emery cloth, afterwards wiping away any trace of dirt or metal dust with a clean petrol (gasoline) moistened cloth. The contact faces should be slightly domed to ensure point contact. There is no need to remove the pitting from the fixed contact. When re-fitting the moving contacts do not forget to refit the insulating shields to the condenser terminals and apply a smear of grease to the C.B. cam and moving contact pivot post. Lubricate the one felt pad.

H2 PART E. CHECKING THE HIGH TENSION CIRCUIT

If ignition failure or mis-firing occurs, and the fault is not in the low tension circuit, then check the ignition coils as described in Part C. If the coils prove satisfactory, ensure that the high tension cables are not the cause of the fault.

If a good spark is available at the high tension cable, then the sparking plug suppressor cap or the sparking plug itself may be the cause of the fault. Clean the sparking plug and adjust the electrodes to the required setting as described in Section H3 below and then re-test the engine for running performance. If the fault recurs then it is likely the suppressor caps are faulty and these should be renewed.

H2 PART F. CHECKING THE EMERGENCY STARTING CIRCUIT

First, ensure that the contact breaker and sparking plug gap settings are satisfactory and then remove the contact breaker cover and place a small piece of insulating card between each set of contacts.

Connect a D.C. voltmeter (0-15V) with the positive lead to earth and negative lead to the moving contact spring of the front set of contacts. A resistor is not required for this test.

Turn the ignition switch to "IGN" position. The voltmeter should indicate battery voltage. Repeat the test with the voltmeter negative lead connected to the rear moving contact spring.

Disconnect the green/yellow (green/black on 12V models) lead from the alternator (underneath the engine) and connect the voltmeter positive to green/yellow harness lead (green/black on 12V) and negative lead to frame. Turn the ignition switch to "EMG" position. The voltmeter should indicate battery voltage. If it does not the green/yellow lead (green/black on 12V) to No. 17 ignition switch terminal, and black/white lead connecting ignition coil C.B. (+) terminal to ignition switch terminal No. 15 should be checked. Reconnect alternator lead.

Finally, disconnect the battery, and then connect an A.C. voltmeter (0–15V) between the front moving contact spring and frame. With ignition switch in "EMG" position, (both contacts still insulated with card) attempt to kickstart the engine. The A.C. voltmeter should deflect to about 7 to 10 volts. If it does not, the alternator should be checked as shown in Section H4 Part B.

SECTION H3

SPARKING PLUGS

It is recommended that the sparking plugs be inspected, cleaned and tested every 3,000 miles (4,800 k.m.) and new ones fitted every 12,000 miles (20,000 k.m.).

To remove the sparking plugs a box spanner ($\frac{13}{16}$ in. (19·5 m.m.) across flats) should be used and if any difficulty is encountered a small amount of penetrating oil (see lubrication chart Section A2) should be placed at the base of the sparking plug and time allowed for penetration. When removing the sparking plugs identify each plug with the cylinder from which it was removed so that any faults revealed on examination can be traced back to the cylinder concerned.

Due to certain features of engine design the sparking plugs will probably show slightly differing deposits and colouring characteristics. For this purpose it is recommended that any adjustments to carburation etc., which may be carried out to gain the required colour characteristics should always be referred to the left cylinder.

Examine both plugs for signs of oil fouling. This will be indicated by a wet, shiny, black deposit on the central insulator. This is caused by excessive oil in the combustion chamber during combustion and indicates that the piston rings or cylinder bores are worn.

Next examine the plugs for signs of petrol (gasoline) fouling. This is indicated by a dry, sooty, black deposit which is usually caused by over-rich carburation, although ignition system defects such as a discharged battery, faulty contact breaker, coil or condenser defects, or a broken or worn out cable may be additional causes. To rectify this type of fault the above mentioned items should be checked with special attention given to carburation system. Again, the left plug should be used as the indicator. The right plug will almost always have a darker characteristic.

Over-heating of the sparking plug electrodes is indicated by severely eroded electrodes and a white, burned or blistered insulator. This type of fault is usually caused by weak carburation, although plugs which have been operating whilst not being screwed down sufficiently can easily become overheated due to heat that is normally dissipated through to the cylinder head not having an adequate conducting path. Over-heating is normally symptomised by pre-ignition, short plug life, and "pinking" which can ultimately result in piston crown failure. Unecessary damage can result from over-tightening the plugs and to achieve a good seal between the plug and cylinder head a torque wrench should be used to tighten the plugs to the figure quoted in "General Data".

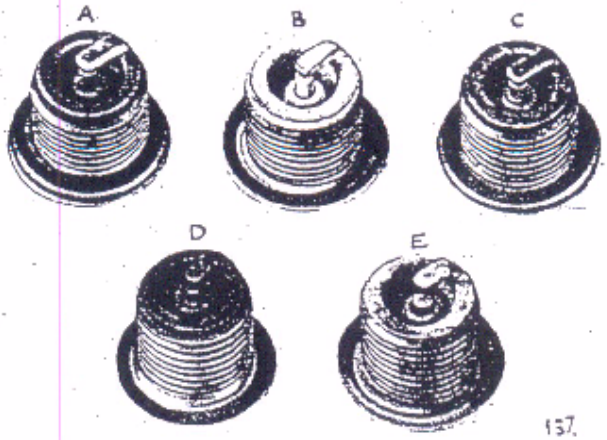


Fig. H4. Sparking plug diagnosis

A plug of the correct grade will bear a light flaky deposit on the outer rim and earth electrode, and these and the base of the insulator will be light chocolate brown in colour. A correct choice of plug is marked A. B shows a plug which appears bleached, with a deposit like cigarette ash; this is too 'hot-running' for the performance of the engine and a cooler-running type should be substituted. A plug which has been running too 'cold' and has not reached the self-cleaning temperature is shown at C. This has oil on the base of the insulator and electrodes, and should be replaced by a plug that will burn off deposits and remove the possibility of a short-circuit. The plug marked D is heavily sooted, indicating that the mixture has been too rich, and a further carburation check should be made. At illustration E is seen a plug which is completely worn out and badly in need of replacement.

To clean the plugs it is preferable to make use of a properly designed proprietary plug cleaner. The maker's instructions for using the cleaner should be followed carefully.

When the plugs have been carefully cleaned, examine the central insulators for cracking and the centre electrode for excessive wear. In such cases the plugs have completed their useful life and new ones should be fitted.

Finally, before re-fitting the sparking plugs the electrodes should be adjusted to the correct gap setting of ·020 in. (·5 mm.). Before refitting sparking plugs the threads should be cleaned by means of a wire brush and a minute amount of graphite grease smeared onto the threads. This will prevent any possibility of thread seizure occurring.

If the ignition timing and carburation settings are correct and the plugs have been correctly fitted, but over-heating still occurs then it is possible that carburation is being adversely affected by an air leak between the carburetter, manifold and the cylinder head. This possibility must be checked thoroughly before taking any further action. When it is certain that none of the above mentioned faults are the cause of over-heating then the plug type and grade should be considered.
Normally the type of plugs quoted in "General Data" are satisfactory for general use of the machine, but in special isolated cases, conditions may demand a plug of a different heat range. Advice is readily available to solve these problems from the plug manufacturer who should be consulted.

Note.—If the machine is of the type fitted with an air filter or cleaner and this has been removed it will affect the carburation of the machine and hence may adversely affect the grade of sparking plugs fitted.

SECTION H4

CHARGING SYSTEM

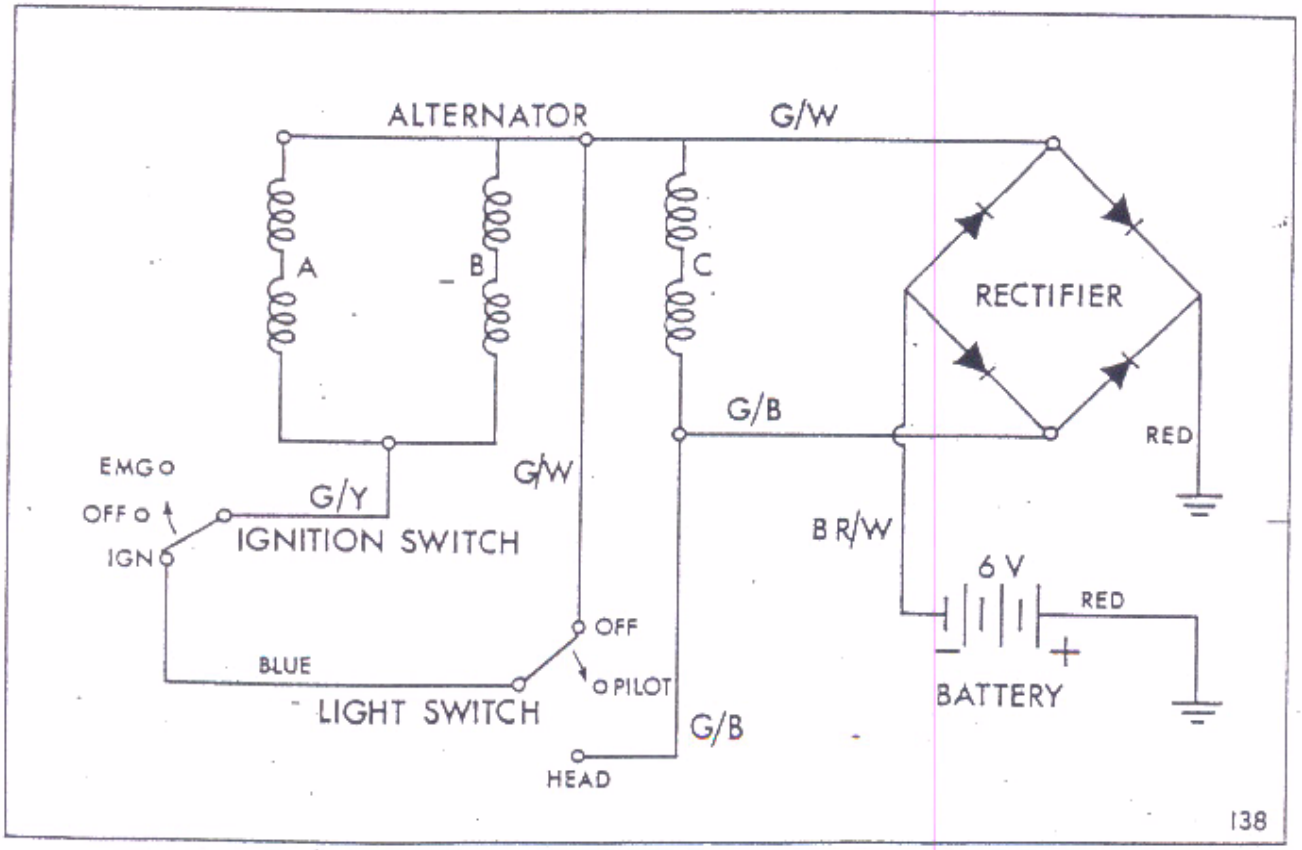
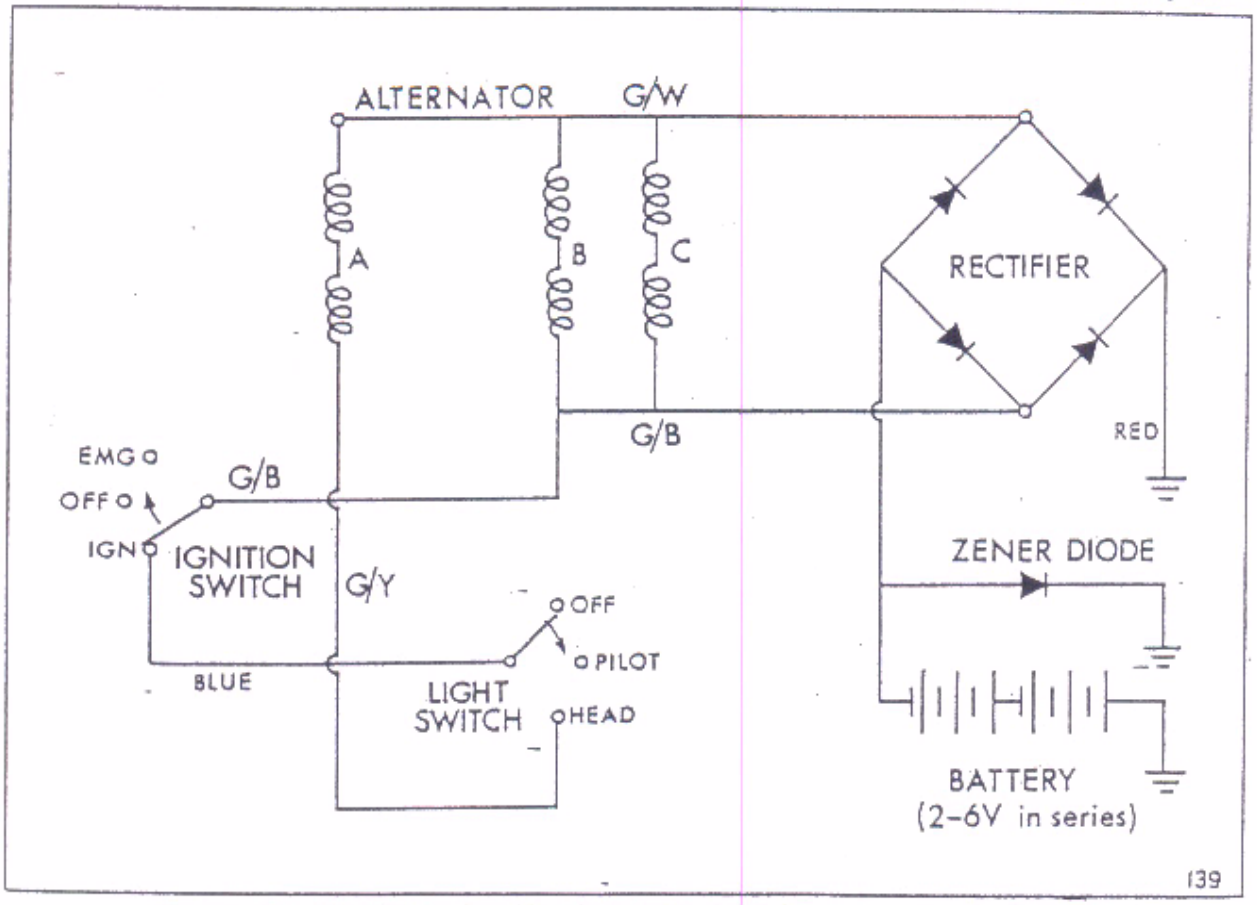


Fig. H5. Schematic illustration of 6 volt charging circuit
6T up to engine No. DU.5824
TR6 and T120 up to engine No. DU.24874

DESCRIPTION

The charging current is supplied by the alternator, but due to the characteristics of alternating current the battery cannot be charged direct from the alternator. To convert the alternating current to direct current a full wave bridge rectifier is connected into the circuit. However, it is not satisfactory to have just this arrangement for battery charging, due to the varying applied load on the alternator, i.e. lights, state-of-charge of battery, etc. Hence to overcome the problem of variations in load, the output from the alternator has to be governed to meet requirements. This is achieved by interconnecting the generating coils and switch terminals as shown in the diagram below in Fig. H5. With the lighting switch in "OFF" position the coils A and B are short circuited and flux induced interacts with the rotor flux maintaining minimum output. With the switch in PILOT position the coils A and B are open circuited and the flux interaction is thereby reduced causing coil C to give increased "medium" out-put. With the switch in HEAD position the coils A, B and C are connected in parallel, giving maximum output.

On models with a 12V electrical system and Zener Diode charge control, the alternator leads are connected differently in the low out-put connection (i.e. lighting switch in "OFF" position). The alternator gives "medium" out-put for the lighting switch in both the "OFF" and PILOT positions, the four coils B and C being permanently connected across the rectifier. Switching to "HEAD" position connects the two remaining coils, A. (See Fig. H6). Excessive charge is absorbed by the Zener Diode which is connected across the battery. To ensure that back-leakage does not occur, the Zener Diode is connected to the battery, through the ignition switch so that there is no possibility of the battery discharging through the Diode. Always ensure that the ignition switch is in the "OFF" position whilst the machine is not in use.



—Fig. H6. Schematic illustration of 12 volt charging circuit (6T up to engine No. DU.24874)

To locate a fault in the charging circuit, first check the charging rate in the three switch position as shown in Part A. Proceed then to test the alternator as described in Part B. If the alternator is satisfactory, the fault must lie in the charging circuit, hence the rectifier must be checked as given in Part C and then the wiring and connections as shown in Part D.

H4 PART A. CHECKING THE D.C. INPUT TO BATTERY

For this test the battery must be in good condition and a good state of charge, therefore before conducting the test ensure that the battery is up to the required standard, or alternatively fit a good replacement battery.

Connect D.C. ammeter (0–15 amp.) in series between the battery main lead (brown/blue) and battery negative terminal and then start the engine and run it at approximately 3,000 r.p.m. (equivalent to 45 m.p.h. in top gear).

Note.—Ensure that the ammeter is well insulated from the surrounding earth points otherwise a short circuit may occur.

Operate the lighting switch and observe the ammeter readings, for each position of the switch. The observed figures should not be less than those tabulated in Fig. H22 for the particular model. If the readings are equal to or higher than those given, then the alternator and charging circuit are satisfactory. If the readings are lower than those quoted, then the alternator must be tested as described in Part B below.

H4 PART B. CHECKING THE ALTERNATOR OUTPUT

Disconnect the three alternator output cables underneath the engine and run the engine at 3,000 r.p.m. (equivalent to 45 m.p.h. in top gear).

Connect an A.C. voltmeter (0–15 volts) with 1 ohm load resistor in parallel with each of the alternator leads in turn as shown in the table, Fig. H22, and observe the voltmeter readings. A suitable 1 ohm load resistor can be made from a piece of nichrome wire as shown in Section H4 Part E.

From the results obtained, the following deductions can be made:—

(i) If the readings are all equal to or higher than those quoted for the particular model then the alternator is satisfactory.

(ii) A low reading on any group of coils indicates either that the leads concerned are chafed or damaged due to rubbing on the chains or that some turns of the coils are short circuited.

(iii) Low readings for all parts of the test indicates either that the green/white lead has become chafed or damaged due to rubbing on the chain(s) or that the rotor has become partially demagnetised. If the latter case applies, check that this has not been caused by a faulty rectifier or that the battery is of correct polarity, and only then fit a new rotor.

(iv) A zero reading for any group of coils indicates that a coil has become disconnected, is open circuit, or is earthed.

(v) A reading obtained between any one lead and earth indicates that coil windings or connections have become earthed.

If any of the above mentioned faults occur, always check the stator leads for possible chain damage before attempting repairs or renewing the stator.

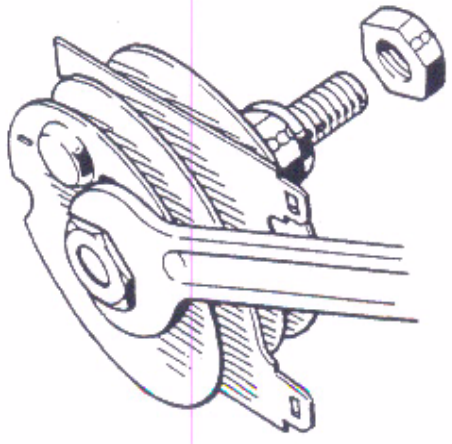
It is beyond the scope of this manual to give instruction for the repair of faulty stator windings. However, the winding specification is given in the table, Fig. H22 for those obliged to attempt repair work.

H4 PART C. RECTIFIER MAINTENANCE AND TESTING

The silicon bridge rectifier requires no maintenance beyond checking that the connections are clean and tight, and that the nut securing the rectifier to the frame is tight. It should always be kept clean and dry to ensure good cooling, and spilt oil washed off immediately with hot water.

Note.—The nuts clamping the rectifier plates together must not be disturbed or slackened in any way.

When tightening the rectifier securing nut, hold the spanners as shown in Fig. H7, for if the plates are twisted, the internal connections will be broken. Note that the circles marked on the fixing bolt and nut indicate that the thread form is $\frac{1}{4}$ in. U.N.F.



71

Fig. H7. Refitting the rectifier

TESTING THE RECTIFIER

To test the rectifier, first disconnect the brown/white lead from the rectifier centre terminal and insulate the end of the lead to prevent any possibility of a short circuit occurring, and then connect a D.C. voltmeter (with 1 ohm load resistor in parallel) between the rectifier centre terminal and earth.

Disconnect the alternator green/yellow lead (green/black on 12V) and reconnect to rectifier green/black terminal (green/yellow on 12V) by means of a jumper lead.

Note. Voltmeter positive terminal to frame earth (ground) and negative terminal to centre terminal on rectifier.

Ensure that all the temporary connections are well insulated to prevent a short circuit occurring then turn the ignition switch to "IGN" position and start the engine.

With the engine running at approximately 3,000 r.p.m. (approximately 45 m.p.h. in top gear) observe the voltmeter readings. The reading obtained should be at least 7·5V minimum on 12V and 6V machines.

(i) If the reading is equal to or slightly greater than that quoted, then the rectifier elements in the forward direction are satisfactory.

(ii) If the reading is excessively higher than the figures given, then check the rectifier earthing bolt connection. If the connection is good then a replacement rectifier should be fitted.

(iii) If the reading is lower than the figures quoted or zero readings are obtained, then the rectifier or the charging circuit wiring is faulty and the rectifier should be disconnected and bench tested so that the fault can be located.

Note that all of the above conclusions assume that that alternator A.C. output figures were satisfactory. Any fault at the alternator will, of course, reflect on the rectifier test results. Similarly any fault in the charging circuit wiring may indicate that the rectifier is faulty. The best method of locating a fault is to disconnect the rectifier and bench-test it as shown below:

BENCH TESTING THE RECTIFIER

For this test the rectifier should be disconnected and removed. Before removing the rectifier, disconnect the leads from the battery terminals to avoid the possibility of a short circuit occurring.

Connect the rectifier to a 12 volt battery and 1ohm load resistor, and then connect the D.C. voltmeter in the V2 position, as shown in Fig. H8. Note the battery voltage (should be 12V) and then connect the voltmeter in V1 position whilst the following tests are conducted.

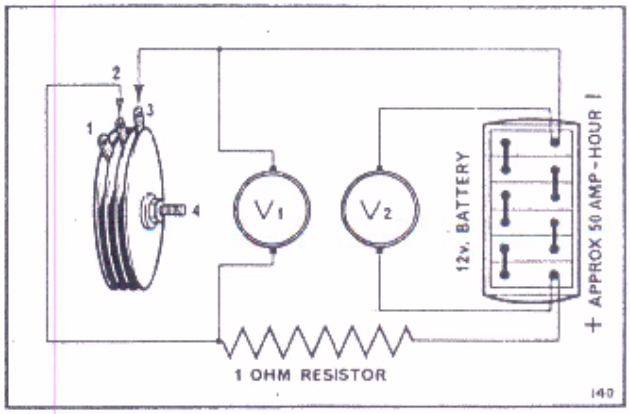


Fig. H8. Bench testing the rectifier

A voltmeter in position V1 will measure the volt drop across the rectifier plate. In position V2 it will measure the supply voltage to check that it is the recommended 12 volts on load.

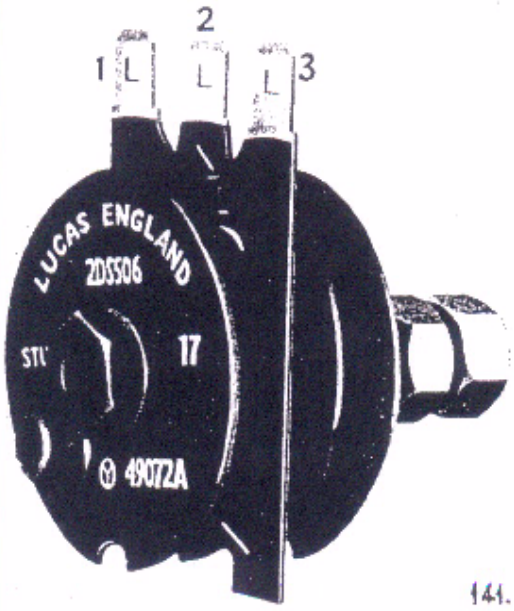


Fig. H9. Rectifier—showing terminal connections for bench tests 1 and 2

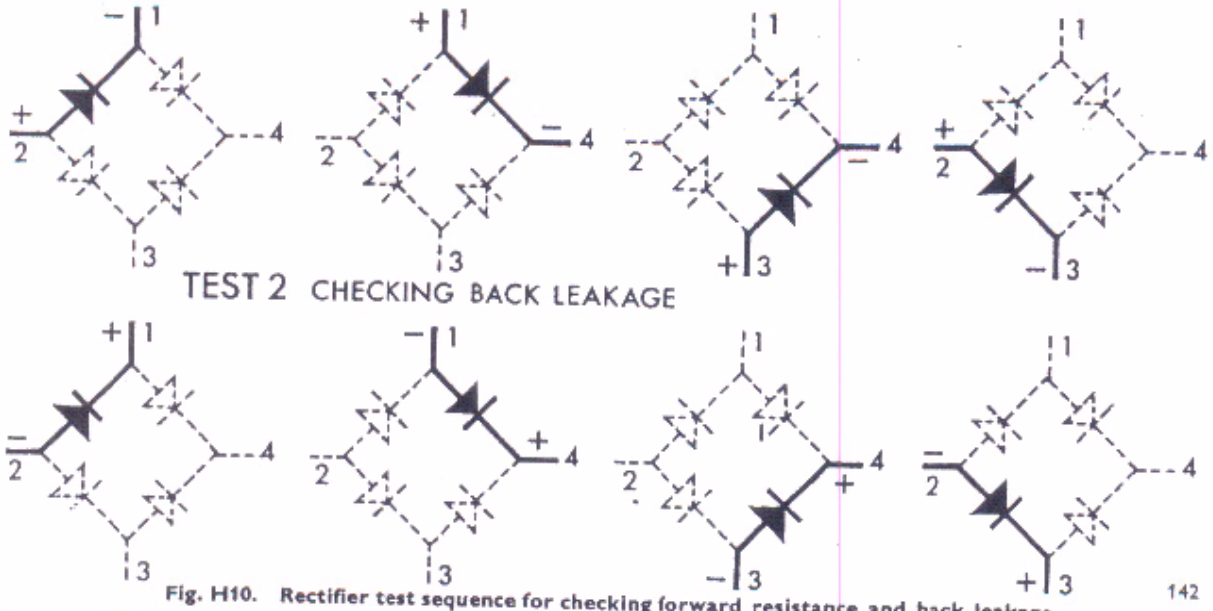


Fig. H10. Rectifier test sequence for checking forward resistance and back leakage

Test 1. With the test leads, make the following connectings but keep the testing time as short as possible to avoid overheating the rectifier cell: (a) 1 and 2, (b) 1 and 4, (c) 3 and 4, (d) 3 and 2. Each reading should not be greater than 2·5 volts with the battery polarity as shown.

Test 2. Reverse the leads or battery polarity and repeat Test 1. The readings obtained should not be more than 1·5 volts below battery voltage (V_2) (i.e. 10·5 volts minimum.)

If the readings obtained are not within the figures given, then the rectifier internal connections are shorting or aged and the rectifier should be renewed.

H4 PART D. CHECKING THE CHARGING CIRCUIT FOR CONTINUITY

These three tests utilise the machines' own battery to test for continuity or breakdown in the A.C. section of the charging system.

For this series of tests, the battery must be in a good state of charge and the **ALTERNATOR LEADS MUST BE DISCONNECTED** at the snap connectors underneath the engine, so that there is no possibility of demagnetising the rotor.

(i) First, check that there is voltage at the rectifier centre terminal by connecting a D.C. voltmeter, with 1 ohm load resistor in parallel, between the rectifier centre terminal and earth (remember (+ve)positive earth (ground). The voltmeter should read battery volts. If it does not, there is a faulty connection in the wiring and tests 1, 3 and 4 in H2 Part B should be carried out to locate the fault.

(ii) *This test does not apply to machines with 12 volt systems.* Connect the green/yellow lead from the wiring harness (underneath the engine) to the rectifier centre terminal lead (brown/white), by means of a jumper lead, and turn the ignition switch to "IGN" position. Connect a D.C. voltmeter with load resistor in parallel between the green/white lead at the rectifier and earth (frame). With the lighting switch at "OFF" position, the voltmeter should read battery volts. If it does not the leads to ignition switch terminals 16 and 18 should be checked and also the leads to lighting switch terminals 4 and 5 must be checked.

(iii) Connect the green/yellow lead (green/black lead for 12 volt system) from the wiring harness (underneath the engine) to the rectifier centre terminal, by means of a jumper lead, as in test (ii). Turn the ignition switch to "IGN" position and the lighting switch to HEAD position, and connect a D.C. voltmeter (with 1 ohm resistor in parallel) between green/black lead (green/yellow lead on 12 volt models) at rectifier and earth. The voltmeter should read battery voltage. If it does not, the leads to ignition switch terminals 16 and 17 should be checked and the leads to the lighting switch terminals 5 and 7 should also be checked. With the lighting switch in 'Pilot' position no reading should be obtained between green/black (green/yellow on 12 volt models) and earth or green/white and earth at the rectifier.

H4 PART E. CONSTRUCTING A ONE-OHM LOAD RESISTOR

The resistor used in the following tests must be accurate and constructed so that it will not overheat otherwise the correct values of current or voltage will not be obtained.

A suitable resistor can be made from 4 yards (3¾ metres) of 18 S.W.G. (·048 in. (i.e. 1·2 m.m.) dia.) NICHROME wire by bending it into two equal parts and calibrating it as follows:—

(1) Fix a heavy gauge flexible lead to the folded end of the wire and connect this lead to the positive terminal of a 6 volt battery.

(2) Connect a D.C. voltmeter (0–10V) across the battery terminals and an ammeter (0–10 amp) between the battery negative terminal and the free ends of the wire resistance, using a crocodile clip to make the connection.

(3) Move the clip along the wires, making contact with both wires until the ammeter reading is numerically equal to the number of volts shown in the voltmeter. The resistance is then 1 ohm. Cut the wire at this point, twist the the two ends together and wind the wire on an asbestos former approximately 2 inches (5 cm.) dia. so that each turn does not contact the one next to it.

SECTION H5

ZENER DIODE CHARGE CONTROL (12 VOLT MACHINES ONLY)

DESCRIPTION

The Zener Diode output regulating system which uses four coils of the 6-coil alternator connected permanently across the rectifier, provides automatic control of the charging current. It will only operate successfully on a 12 volt system where it is connected in parallel with the battery as shown in the wiring diagram (Section H11 Fig. H19). The Diode is connected through the ignition switch to prevent any leakage when the motor cycle is not in use.

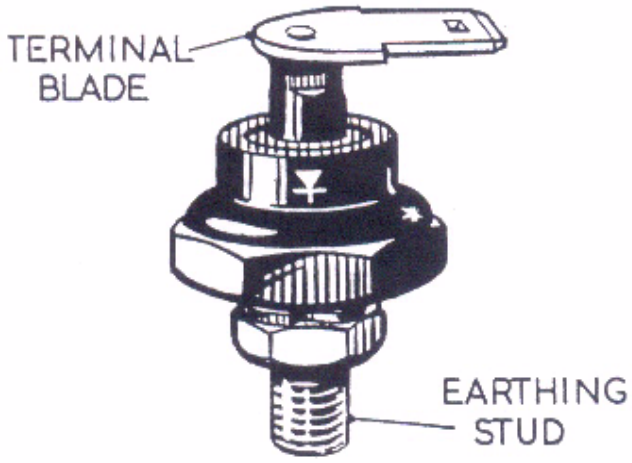


Fig. H11. Zener Diode

Assuming the battery is in a low state of charge its terminal voltage (the same voltage is across the Diode) will also be low, therefore the maximum charging current will flow into the battery from the alternator. At first none of the current is by-passed by the Diode because of it being non-conducting due to the low battery terminal volts. However, as the battery is quickly restored to a full state of charge, the system voltage rises until at 14 volts the Zener Diode becomes partially conducting, thereby providing an alternative path for a small part of the charging current. Small increases in battery voltage result in large increases in Zener conductivity until, at approximately 15 volts about 5 amperes of the alternator output is by-passing the battery. The battery will continue to receive only a portion of the alternator output as long as the system voltage is relatively high.

Depression of the system voltage, due to the use of headlamp or other lighting equipment, causes the Zener Diode current to decrease and the balance to be diverted and consumed by the component in use.

If the electrical loading is sufficient to cause the system voltage to fall to 14 volts, the Zener Diode will revert to a high resistance state of non-conductivity and the full generated output will go to meet the demands of the battery.

The Zener Diode is however unable to absorb the full output of the alternator. It is therefore necessary to retain some form of charge control through the lighting switch. This is achieved by permanently connecting four charging coils across the rectifier (green/white — green/yellow) and bringing in the other two coils (green/black) in the lighting switch head lamp position (Fig. H6).

MAINTENANCE

The Zener Diode is mounted on an aluminium heat sink with an area of approximately 25 square inches. Providing the Diode and the heat sink are kept clean, and provided with an adequate airflow, to ensure maximum efficiency, no maintenance will be necessary.

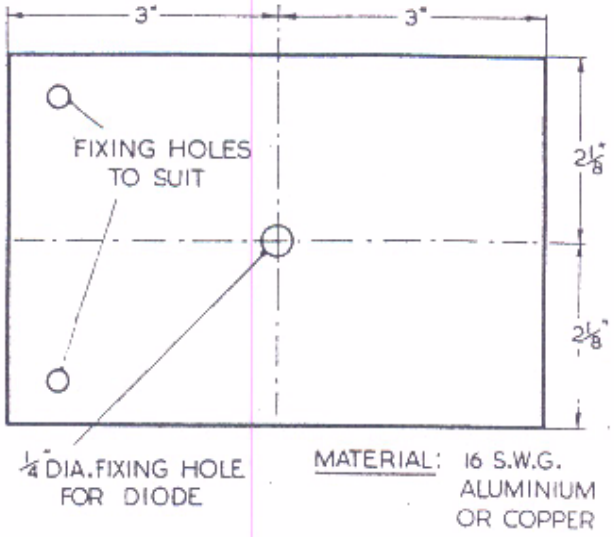


Fig. H12. Zener Diode heat sink

SECTION H6

A.C. IGNITION (E.T.) AND A.C. LIGHTING SYSTEMS

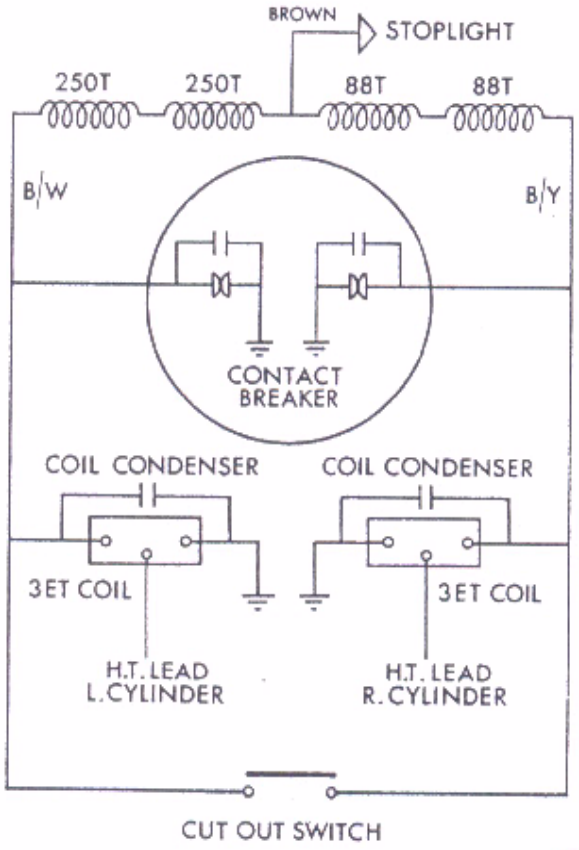


Fig. H13. Schematic illustration of A.C. ignition (E.T.) system

DESCRIPTION

The A.C. magneto (energy transfer) system consists of two 3 E.T. ignition coils, a contact breaker and an alternator specially wound for A.C. ignition and lighting. There are five leads from the alternator, two for ignition purposes and three for direct lighting purposes. The circuit diagram, Fig. 20 in Section H11 illustrates the stator oil connections.

The main features of the A.C. ignition system for twin cylinder machines is that the ignition coil and contact breaker points are connected in parallel. In practice this means that when the contacts are closed the current can flow directly to earth. When one set of contacts open, the current has to pass through the ignition coil primary winding to earth through the second set of contacts which are arranged to be closed at the same instant. From this it can be seen that the availability of a spark at either cylinder is dependent upon both contacts being clean and adjusted correctly (see Fig. H13).

Another feature is that the E.T. system operates on a rising current in the ignition coil primary winding and not falling primary current as in the conventional coil ignition system.

H6 PART A. A.C. IGNITION

The accurate and efficient working of the A.C. ignition system is dependent not only upon the piston/spark relationship that is involved but also the rotor/stator relationship at the instant of ignition. The stator is fixed to the left crankcase and requires no maintenance other than to check that the leads are not rubbing on either of the chains. The rotor is located on the crankshaft by means of a dowel fitted to the engine sprocket. When the rotor is removed care should be taken to refit it in the appropriate position with the rotor hole located as shown in the tabel below, in accordance with ignition timing requirements.

Dowel Location	Ignition Timing Full-Advanced	Dowel Remarks
"S"	37° B.T.C.	Standard
"R"	41° B.T.C.	Racing
"M"	39° B.T.C.	"Mid" position

It is beyond the scope of this Manual to advise on a deviation from the standard setting, as so many factors are involved. If it is required to alter the settings from standard, then advice should be sought from a local Triumph Dealer or the Triumph Engineering Co. Ltd., Service Department.

The 3 E.T. coil, condensers (capacitors), and high tension leads must be kept clean and free from dirt or water. Also, it is important that the sparking plug is maintained at the correct gap setting and that the centre electrode is kept clean.

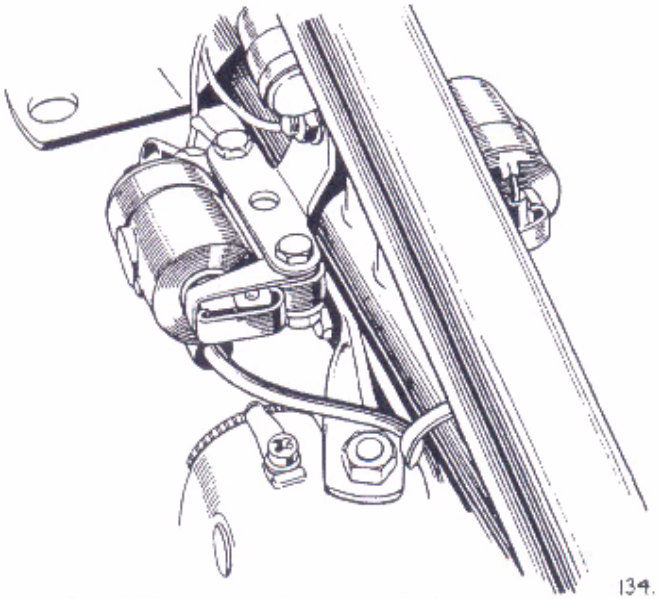


Fig. H14. A.C. ignition coils fitted on machine

Both sets of contact breaker contacts must be kept clean and adjusted correctly to the gap setting given in General Data. A fault at either set of contacts will adversely affect the ignition spark at BOTH cylinders.

H6 PART B. TESTING THE A.C. IGNITION SYSTEM

First, ensure that the timing, contact breaker and plug gaps are satisfactory, and then disconnect both H.T. leads and check that a spark is available by holding each of the cables about $\frac{3}{16}$ inches (4 mm.) from the cylinder head in turn and operate the kickstarter. A good spark should be produced. If it is not, then the 3 E.T. coil and alternator ignition supply are suspect.

As it is not possible to test the 3 E.T. coils accurately on the machine, the following test procedure should be adopted.

Two 6 volt external batteries are used for the next two tests, in conjunction with the A.C. ignition coils on the machine.

A.C. ignition coils are not designed to run under such conditions, overheating occurring in the primary windings.

Each test should be undertaken in as short a time as possible, and the batteries connected in circuit only when actually necessary to run the test.

(1) Disconnect the five alternator leads under the engine.

(2) Unplug the black/yellow lead from the condenser at the right hand side coil (under the petrol (gasolene) tank.

(3) Connect the black/yellow lead to the positive (+ve) terminal of a (6V) test battery.

(4) Connect the negative (—ve) battery lead to the condenser terminal.

(5) Unplug the black/white lead from the condenser at the left hand side coil (under the petrol (gasolene) tank).

(6) Connect the black/white lead to the positive (+ve) terminal of a second (6V) test battery.

(7) Connect the negative (—ve) terminal of the second test battery to the left hand condenser terminal.

(8) Remove the sparking plug wire from each plug in turn and with battery wires connected, open and close the contact breaker points. If the coils and condensers are satisfactory, a good spark will jump from the plug lead to earth (ground).

(9) If a poor spark (or no spark) is noted, check all wiring connections, and repeat (8) above. If the system still does not spark, instal new condensers and repeat (8). If still there is no spark, check the ignition coils by substitution.

H6 PART C. CHECKING THE ALTERNATOR OUTPUT (A.C. Ignition Models)

To facilitate a check to be made on the alternator output, a separate ignition circuit must be used as given in Section H6 Part B above, so that the engine can be run at 3,000 r.p.m. (approximately 45 m.p.h. in top gear).

Pay careful regard to the warning given in the previous section (H6 part B) concerning the possible overheating of the A.C. ignition coil primary windings.

The preferred alternative method is to use two MA6 ignition coils, bolted together, with the machines C.B. leads, BLACK/WHITE, BLACK/YELLOW connected to the appropriate C.B. terminals on the test ignition coils. The test coil S.W. terminals are linked together and fed to a test battery (—ve) negative terminal and the battery (+ve) positive connected to the ignition coils cases. A jumper lead is also required between battery (+ve) positive, and motorcycle frame earth (ground. The H.T. leads are connected to the appropriate sparking plugs.

With all five alternator leads disconnected under the engine start up the engine and run at 3,000 r.p.m. (equivalent to approximately 45 m.p.h. in top gear). Connect an A.C. voltmeter (0–10V) with a 1 ohm resistor in parallel between the pairs of alternator leads given in table, Fig. H22 Section H12.

(i) If the readings are equal to or higher than the figures quoted for the particular model, then the alternator is satisfactory.

(ii) A low reading on any group of coils indicates either that the leads concerned are chafed through or damaged due to rubbing on the chains or that some of the coil turns are short circuited.

(iii) Low readings from all parts of the test indicates a partially demagnetized rotor. In this case the rotor must be renewed.

(iv) A zero reading for any group of coils indicates that a coil has become disconnected and is open circuit, in which case the stator should be replaced.

(v) A reading obtained between any one stator lead and earth (ground) indicates that some coil turns have become earthed (grounded) to the engine. In this case, brush the stator with paraffin (kerosene) or petrol (gasoline). DO NOT LEAVE TO SOAK. Retest on the machine. If still faulty, replace the stator.

If any fault does occur always check the stator leads for possible chain damage before attempting repair or renewing the stator. It is beyond the scope of this manual to give instruction for repair of faulty stator windings. However the winding specification is given in table, Fig. H22 to provide the required information for local repair work, should a correct replacement stator not be immediately available.

H6 PART D DIRECT LIGHTING SYSTEM

The electrical power for the direct lighting system is supplied by three of the five alternator leads, namely the red, brown and brown/blue. The leads are connected as shown in the wiring diagram (Fig. H20 in Section H11). In order that no one pair of coils is overloaded, the electrical loads are connected as shown and no deviation from the standard arrangement shown should be made.

An apparant loss or reduction of power at any of the lights may well be due to a high resistance caused by a loose or faulty connection. In the event of a fault occuring, always check the wiring connections, giving particular attention to the red earth (ground) lead from the alternator and headlamp. Note that a short circuit in the brown stop lamp lead will result in the ignition system failing, hence the stop lamp switch connections should be always kept clean and dry.

In the event of a fault occuring which cannot be traced to the circuit connections the alternator should be checked as described in Section H6, Part C above.

SECTION H7
ELECTRIC HORN

DESCRIPTION

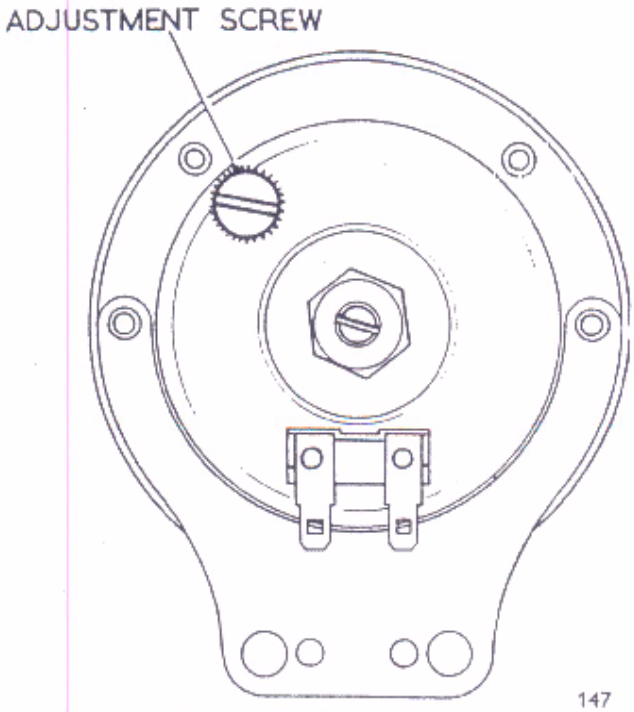
The horn is of a high frequency single note type and is operated by direct current from the battery. (On A.C. models a similar horn specifically designed for A.C. current is fitted.) The method of operation is that of a magnetically operated armature, which impacts on the cone face, and causes the tone disc of the horn to vibrate. The magnetic circuit is made self interupting by contacts which can be adjusted externally.

If the horn fails to work, check the mounting bolts etc., and horn connection wiring. Check the battery for state of charge. A low supply voltage at the horn will adversely effect horn performance. If the above checks are made and the fault is not remedied, then adjust the horn as follows.

HORN ADJUSTMENT

When adjusting and testing the horn, do not depress the horn push for more than a fraction of a second or the circuit wiring may be overloaded.

A small serrated adjustment screw situated near the terminals (see Fig. H15), is provided to take up wear in the internal moving parts of the horn. To adjust, turn this screw anticlockwise until the horn just fails to sound, and then turn it back (clockwise) about one quarter to half a turn.



147

Fig. H15. Horn adjustment screw

SECTION H8
HEADLAMP

DESCRIPTION

The headlamp is of the sealed beam unit type and access is gained to the bulb and bulb holder by withdrawing the rim and beam unit assembly. To do this on the 6T Thunderbird model, slacken the screw at the top of the nacelle cover adjacent to the speedometer and prise off the rim and beam unit assembly. Slacken the screw at the top of the headlamp on the TR6 and T120 to remove the light unit. The bulb can be removed by first pressing the cylindrical cap inwards and turning it anticlockwise. The cap can then be withdrawn and the bulb is free to be removed.

When fitting a new bulb, note that it locates by means of a cutaway and projection arrangement, also note that the cap can only be replaced one way, the tabs being staggered to prevent incorrect reassembly. Check the replacement bulb voltage and wattage specification and type before fitting.

Focusing with this type of beam unit is unnecessary and there is no provision for such.

BEAM ADJUSTMENTS

The beam must in all cases be adjusted as specified by local lighting regulations. In the United Kingdom the Transport Lighting Regulations reads as follows:—

A lighting system must be arranged so that it can give a light which is incapable of dazzling any person standing on the same horizontal plane as the vehicle at a greater distance than twenty five feet from the lamp, whose eye level is not less than three feet—six inches above that plane.

The headlamp must therefore be set so that the main beam is directed straight ahead and parallel with the road when the motorcycle is fully loaded. To achieve this, place the machine on a level road pointing towards a wall at a distance of 25 feet away, with a rider and passenger, on the machine, slacken the two small screws on the adaptor rim at either side and tilt the beam unit until the beam is focused at approximately two feet six inches from the base of the wall. Do not forget that the headlamp should be on " full beam" lighting during this operation.

SECTION H9
TAIL AND STOP LAMP UNIT

Access to the bulbs in the tail and stop lamp unit is achieved by unscrewing the two slotted screws which secure the lens. The bulb is of the double-filament offset pin type and when a replacement is carried out, ensure that the bulb is fitted correctly. Check that the two supply leads are connected correctly and check the earth (ground) lead to the bulb holder is in satisfactory condition.

When refitting the lens, do not overtighten the fixing screws or the lens may fracture as a result.

SECTION H10
FUSES

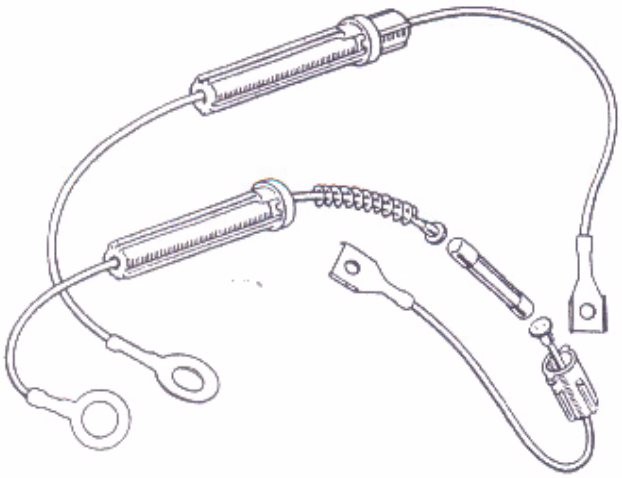


Fig. H16. Exploded view of fuseholder assembly

The fuse is to be found on the earth lead from the battery positive terminal on later models. It is housed in a quickly detachable shell and is of 25 amp fuse rating.

Before following any fault location procedure always check that the fuse is not the source of the fault. A new fuse-cartridge should be fitted if there is any doubt about the old one.

A fuse can be fitted to any Triumph coil ignition model and all that is required is a small proprietary fuse holder obtainable from most Triumph Dealers. In all cases the fuse rating must not under any circumstances be below 25 amp. rating and must be fitted on the earth lead between earth (ground) and the battery positive terminal.

SECTION H11
WIRING DIAGRAMS

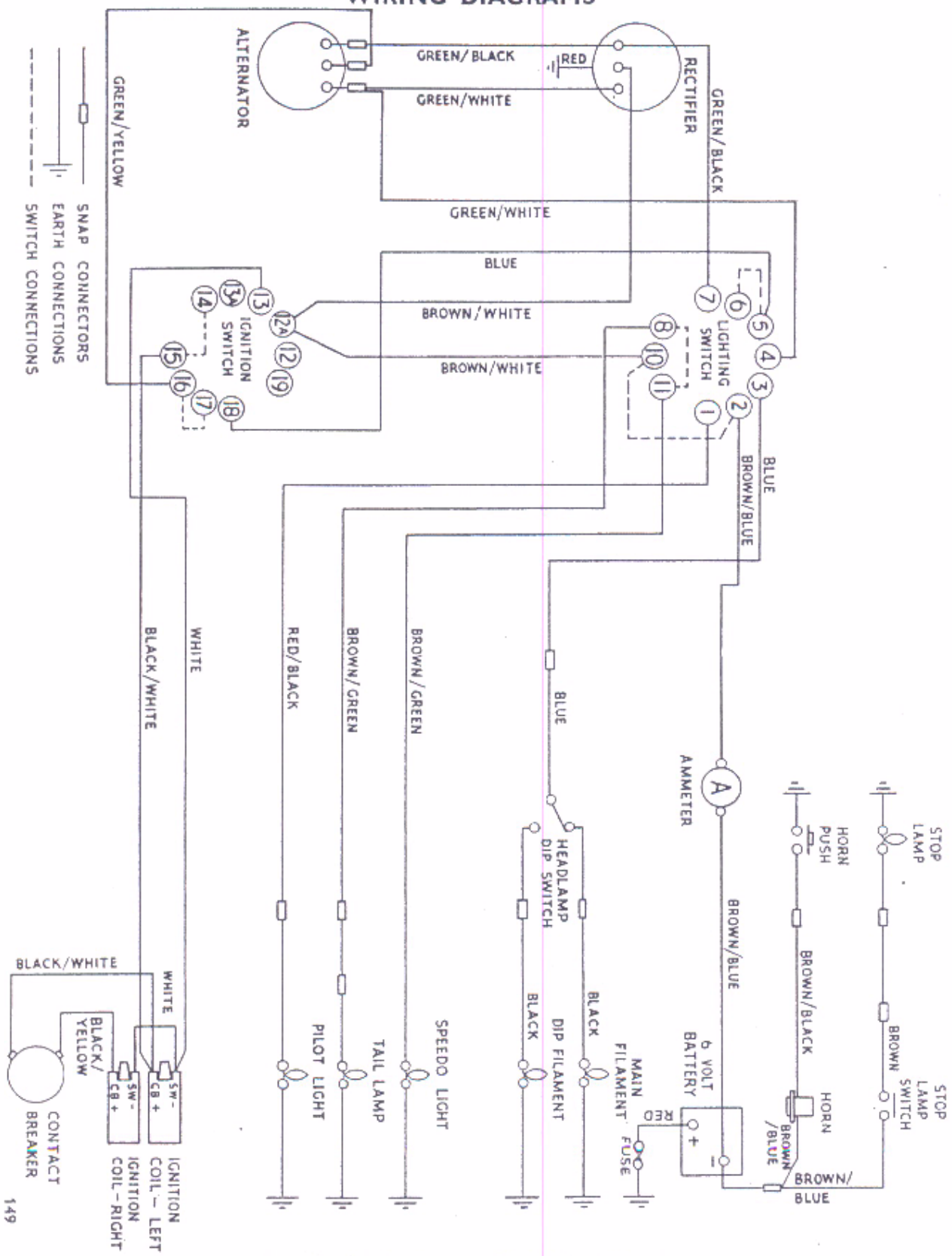


Fig. H17. Wiring diagram—Coil ignition 6V models

H19

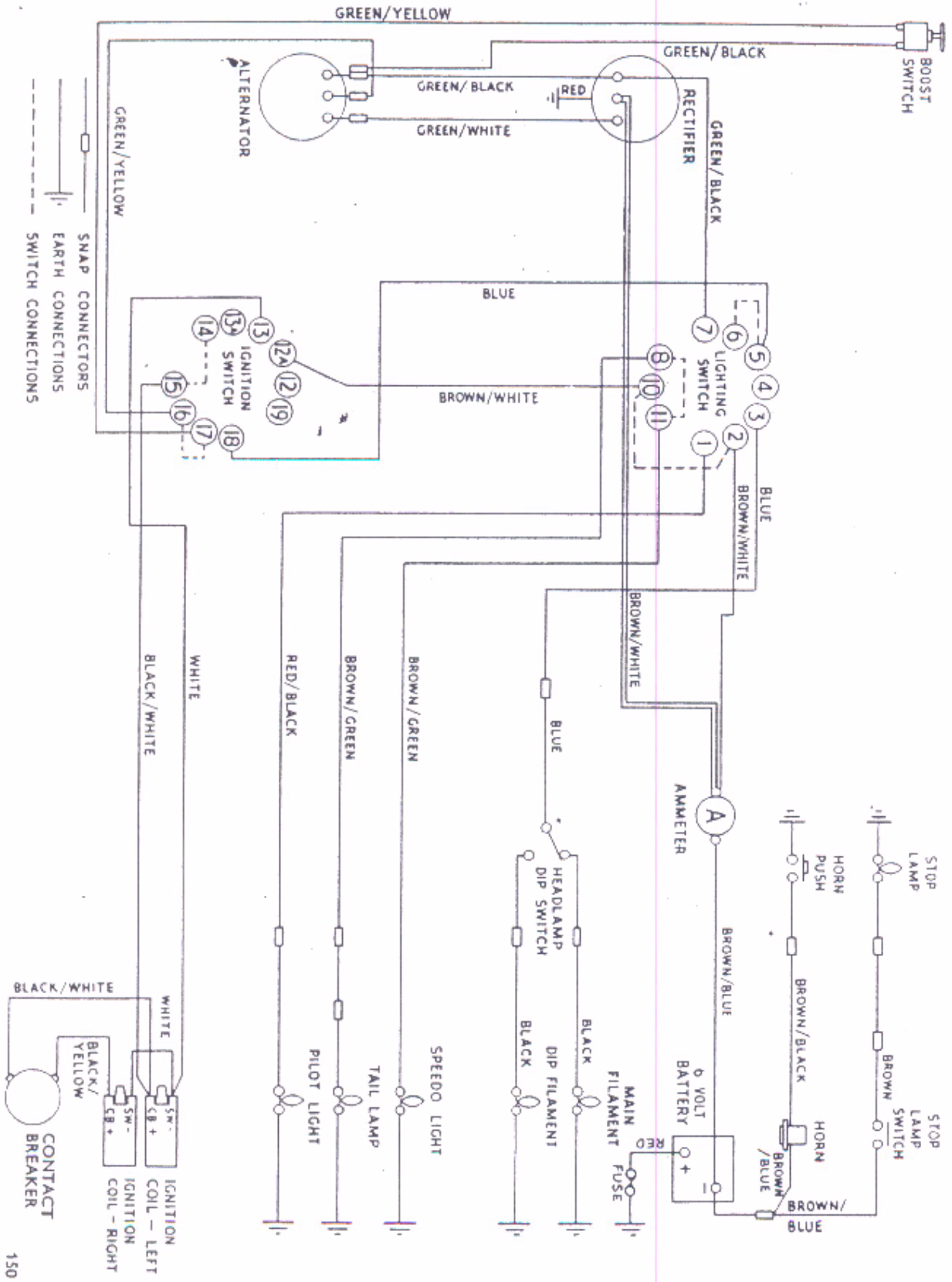


Fig. H18. Wiring diagram—Coil ignition 6V Police models with boost-switch

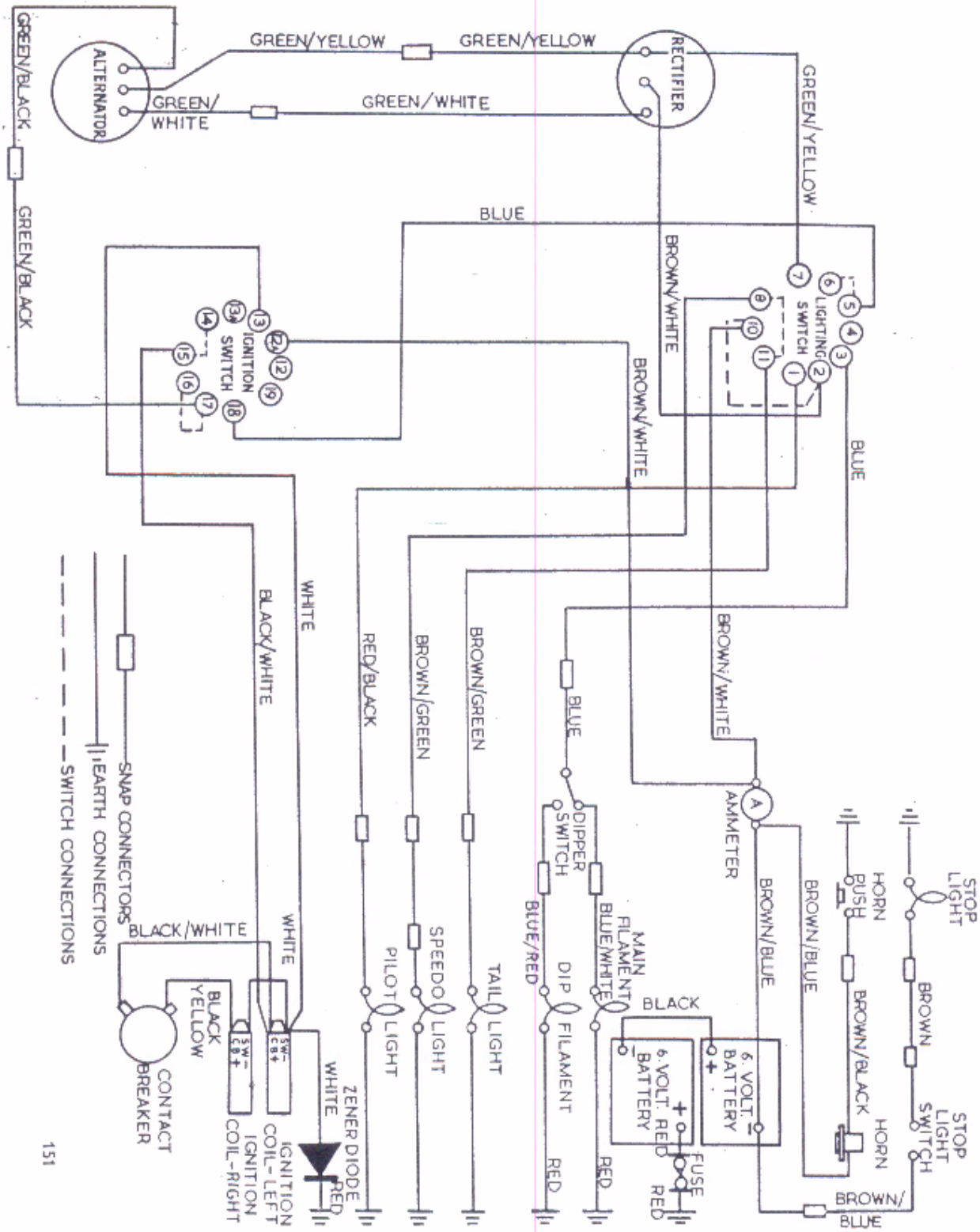


Fig. 19. Wiring diagram—Coil ignition 12V models with Zener Diode charge control

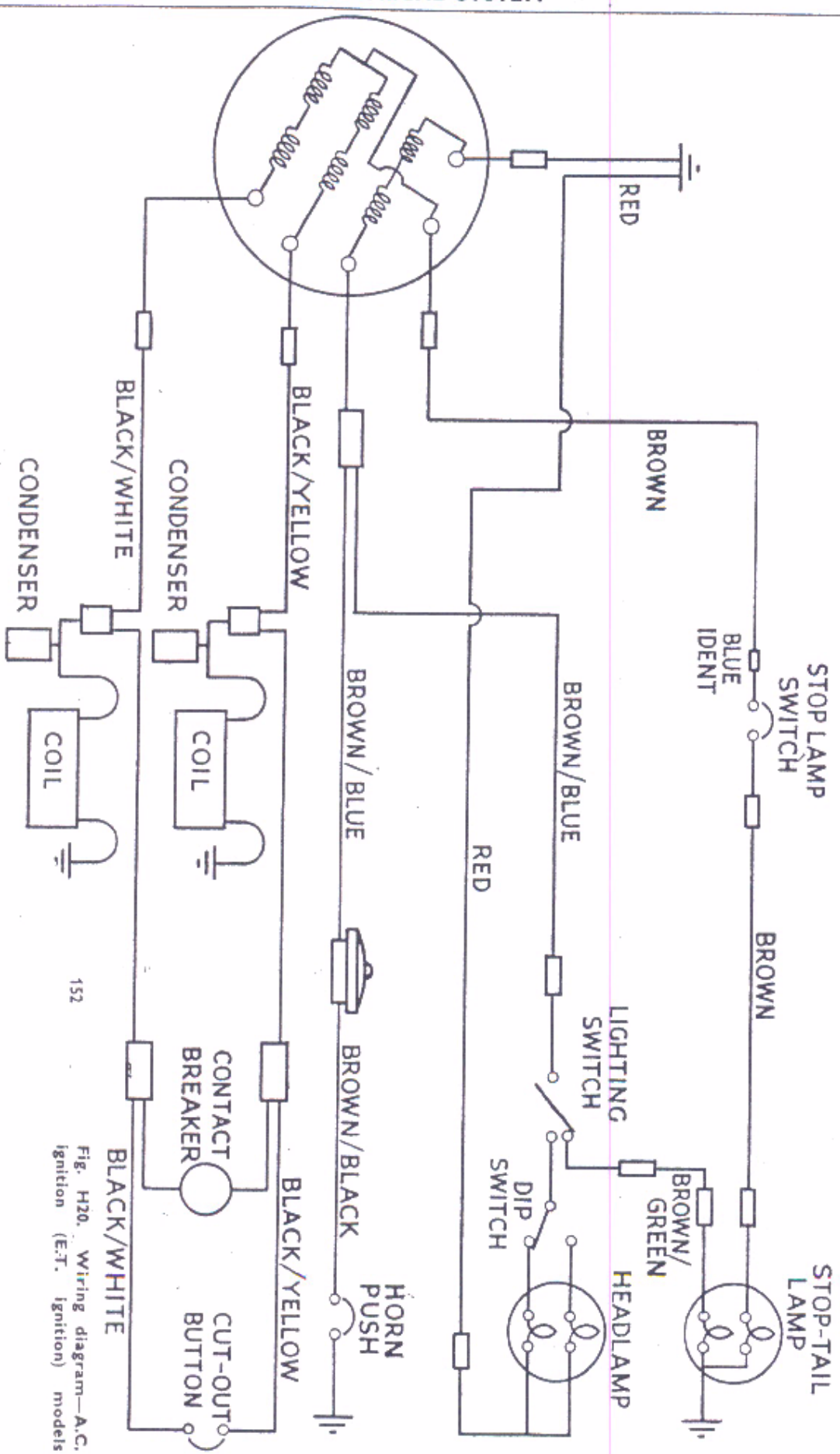


Fig. H20. Wiring diagram—A.C. ignition (E.T. ignition) models

H22

SECTION H12

ALTERNATOR AND STATOR DETAILS— SPECIFICATIONS AND OUTPUT FIGURES

MODELS	System voltage	Ignition type	Alternator type	Stator No.
6T	12 V.	Coil	RM.19	47162
TR6SR, T120R, T120C, 6T.U.S.A	6 V.			
6T, TR6, T120	6 V.	Coil	RM.19	47164
6T (Police)	6 V.	Coil	RM19/20	47167
TR6SC, T12OTT Special	6 V.	A.C. IGN	RM.19	47188

Fig. H21. Electrical system details

Stator number	System voltage	D.C. input to battery amp. @ 3,000 r.p.m.			Alternator Output **minimum** A.C. volts @ 3,000 r.p.m.			Stator coil details			
		Off	Pilot	Head (Main beam)	A	B	C	No of coils	Turns per coil	S.W.G.	
47162	6 V.	2·75	2·0	2·0	4·0	6·5	8·5	6	140	22	
	12 V.	2·0*	2·1*	1·5*							
		4·8†	3·8†	1·8†							
47164	6 V	2·7	0·9	1·6	4·5	7·0	9·5	6	122	21	
47167	6 V.	6·6‡	6·6‡	13·6‡	7·7	11·6	13·2	6	74	19	
47188	6 V.	Not applicable			5·0	1·5	3·5	2	250	25	IGN.
								2	88	20	
								1	88	20	LIGHT
								1	98	21	

Coil Ignition Machines

A = Green/White and Green/Black
B = Green/White and Green/Yellow
C = Green/White and { Green/Black / Green/Yellow } connected

* Zener in Circuit
† Zener disconnected
‡ With Boost Switch in Circuit

A.C. Ignition Machines

A = Red and Brown/Blue
B = Black/Yellow and Black/White
C = Black/Yellow and Brown

Fig. H22. Alternator—Minimum output and stator details

SECTION H13

ZENER DIODE—CHARGING REGULATOR

REPRINT FROM JOSEPH LUCAS LTD. SERVICE BULLETIN SB/RG/28

(Procedure for Testing on the Machine)

The test procedure given below can be used when it is required to check the performance of the Zener Diode type ZD715 (supplied for 12-volt originally equipped and 12-volt converted motorcycles), whilst it is in position on the machine.

Good quality moving coil meters should be used when testing. The voltmeter should have a scale 0–18, and the ammeter 0–5 amps min. The test procedure is as follows:-

(A) Disconnect the cable from the zener diode and connect ammeter (in series) between the diode Lucar terminal and cable previously disconnected. The ammeter red or positive lead must connect to the diode Lucar terminal.

(B) Connect voltmeter across zener diode and heat sink. The red or positive lead must connect to the heat sink which is earthed to the frame of the machine by its fixing bolts and a separate earth lead. The black lead connects to the zener Lucar terminal.

(C) Start the engine, ensure that all lights are off, and gradually increase engine speed while at the same time observing both meters:—

(i) the series connected ammeter must indicate zero amps, up to 13·0 volts, which will be indicated on the shunt connected voltmeter as engine speed is slowly increased.

(ii) increase engine speed still further, until zener current indicated on ammeter is 1·0 amp. At this value the zener voltage should be 13·5 volts to 15·3 volts.

(iii) disconnect the battery while the engine is running, and slowly increase engine speed until zener current indicated on the ammeter is 5·0 amps. At this value the voltmeter should indicate a zener voltage of 12·0 to 15·0 volts.

Note.—Test (iii) should be carried out as quickly as possible to avoid overheating the zener diode.

TEST CONCLUSIONS:—

If the ammeter in test (i) registers any current at all before the voltmeter indicates 13·0 volts, then a replacement zener diode must be fitted.

If test (i) is satisfactory but in test (ii) a higher voltage than that stated is registered on the voltmeter, before the ammeter indicates 1·0 amp, then a replacement zener diode must be fitted.

If in test (iii) the zener diode does not pass 5·0 amps within the stated voltage limits it should be replaced.

SECTION J

WORKSHOP SERVICE TOOLS

INTRODUCTION

This section of the Workshop Manual illustrates pictorially the workshop service tools that are available for carrying out the major dismantling and re-assembly operations on the UNIT CONSTRUCTION 650 c.c. Triumph Motorcycle.

The section is divided into sub-sections relating to the main section headings in this manual, illustrating those tools mentioned and used in the appropriate section text.

	Section
ENGINE ...	J1
TRANSMISSION	J2
GEARBOX	J3
WHEELS	J4
FRONT FORKS	J5
MOTORCYCLE TOOLKIT	J6

SECTION J1

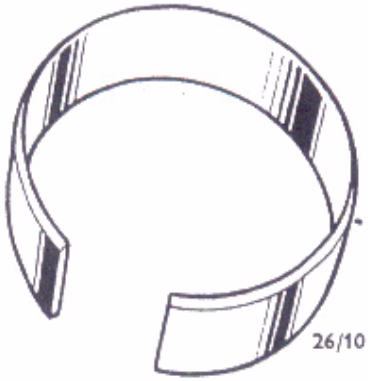
ENGINE

103/2

Z16. Valve guide punch

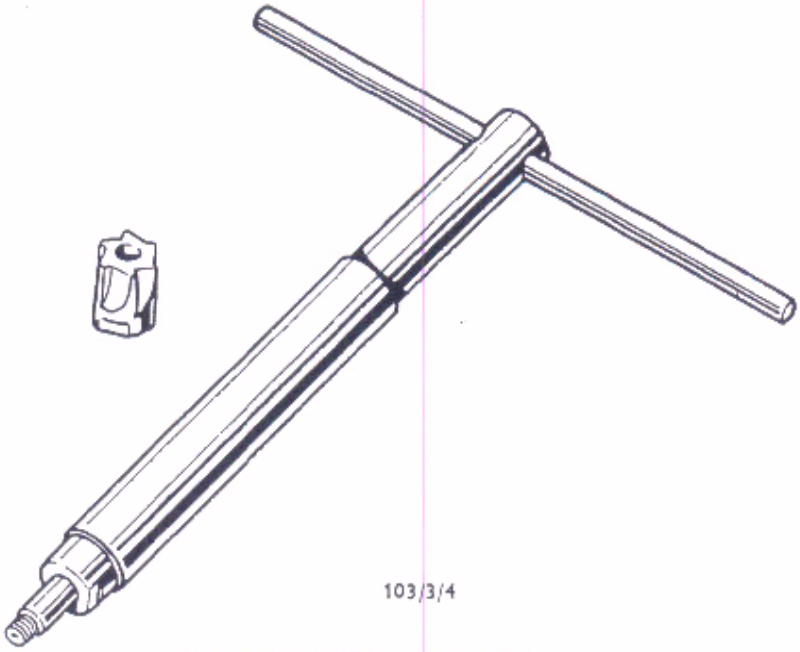
26/8

Z23. Tappet guide block punch



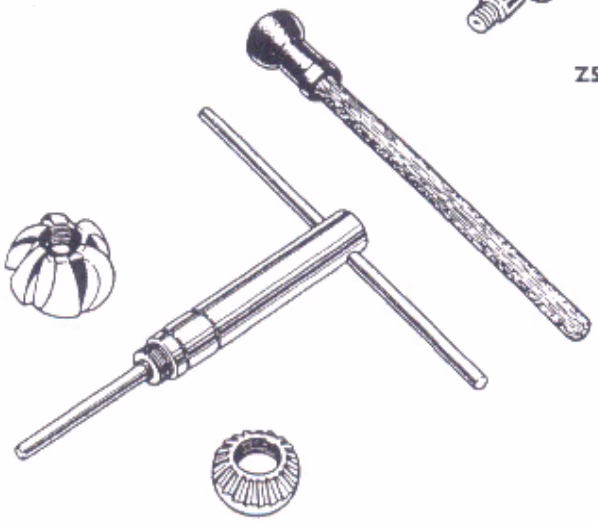
26/10

Z22. Piston ring collar

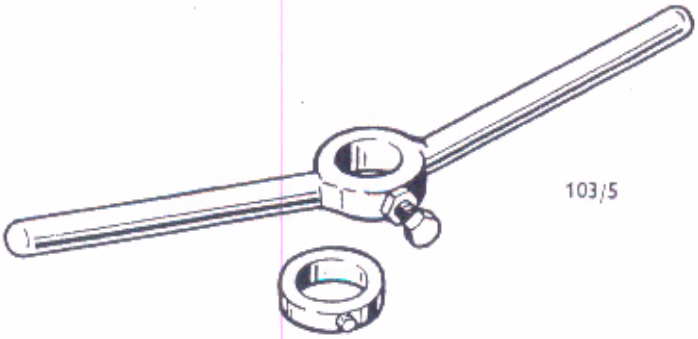


103/3/4

Z55. Left side reamer, camshaft bushes
Z56. Arbor for left side reamer, camshaft bushes



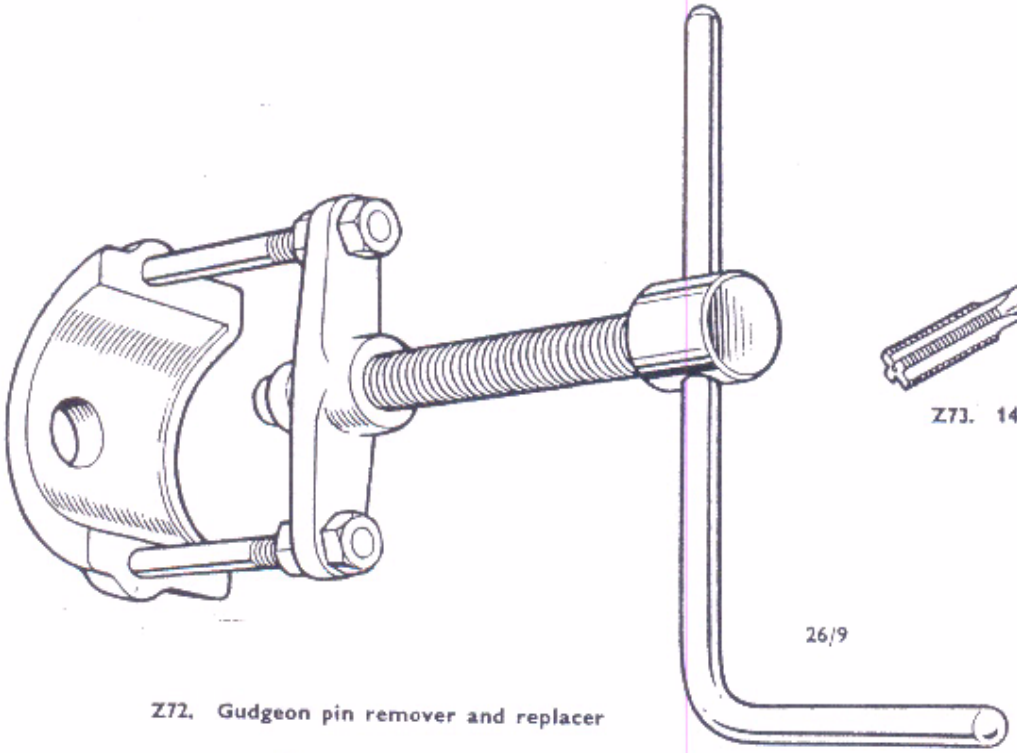
Z50. Spherical form blending cutter
Z54. Arbor and Pilot
Z117. 45° valve seat cutter
Also illustrating a popular type valve holder



103/5

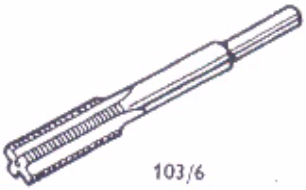
Z69. Die holder

ENGINE (CONTINUED) J1



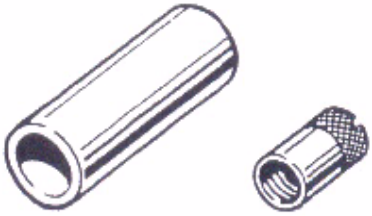
26/9

Z72. Gudgeon pin remover and replacer



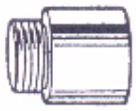
103/6

Z73. 14 mm. tap



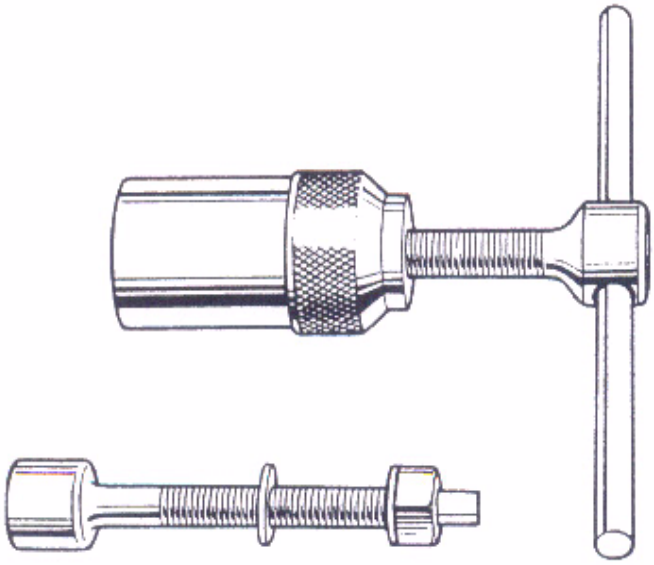
103/7

Z79. Crankshaft pinion punch and guide



26/7

Z144. Replacer adaptor
(Used with Z89)



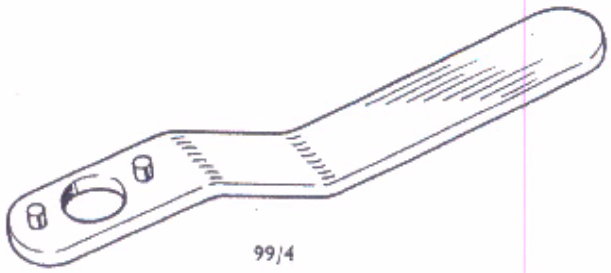
26/5

Z89. Camshaft pinion remover and replacer

26/6

Z145. Extractor adaptor
(Used with Z89)

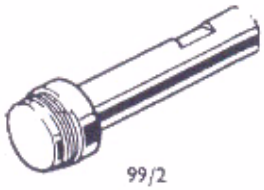
SECTION J4
WHEELS



99/4

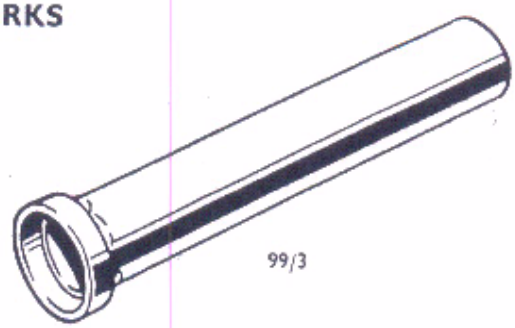
Z76. Wheel bearing locking ring spanner

SECTION J5
FRONT FORKS



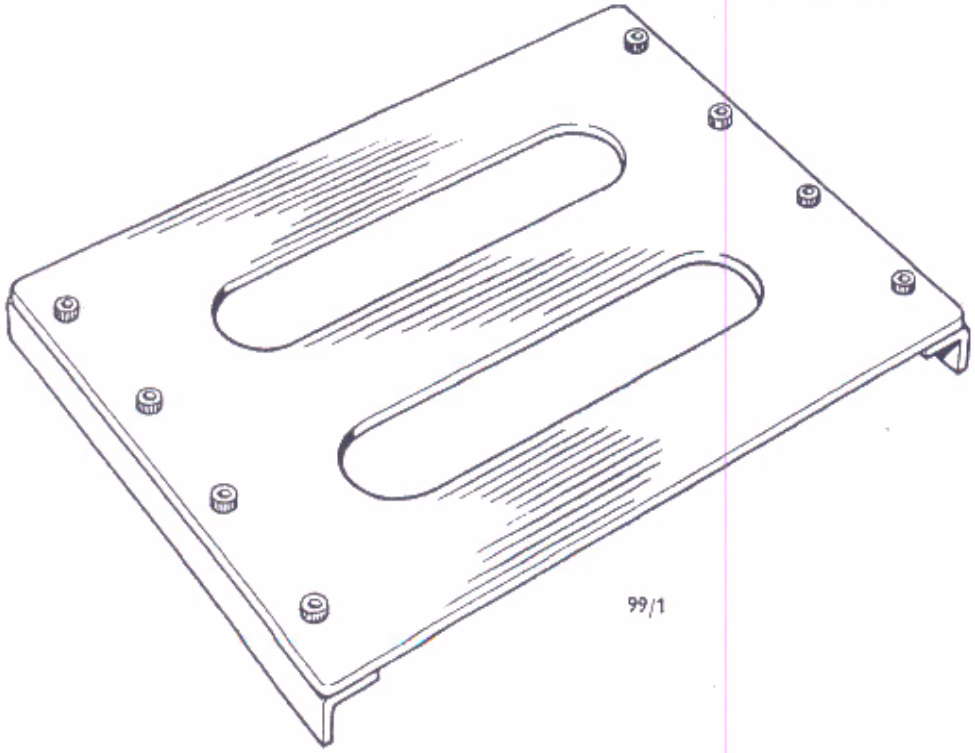
99/2

Z19. Fork stanchion plug and drift



99/3

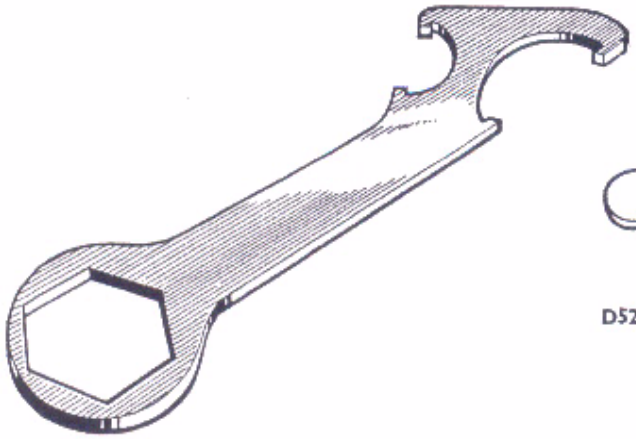
Z24. Drift for fork crown and stem bottom steering race



99/1

Z103. Front fork alignment gauge

FRONT FORK (CONTINUED) J5

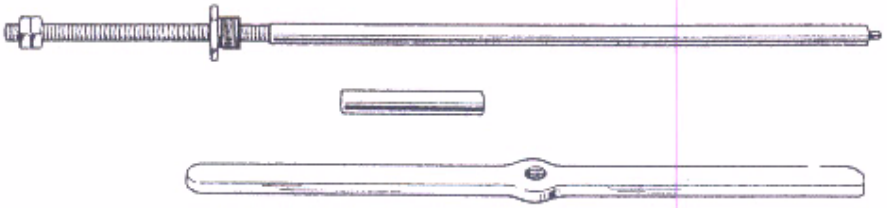


153

D220. Fork sleeve nut and stanchion cap nut spanner

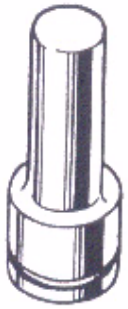
158

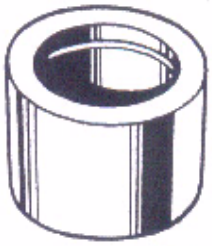
D527. Fork sleeve nut spanner (1964 models onwards)



100

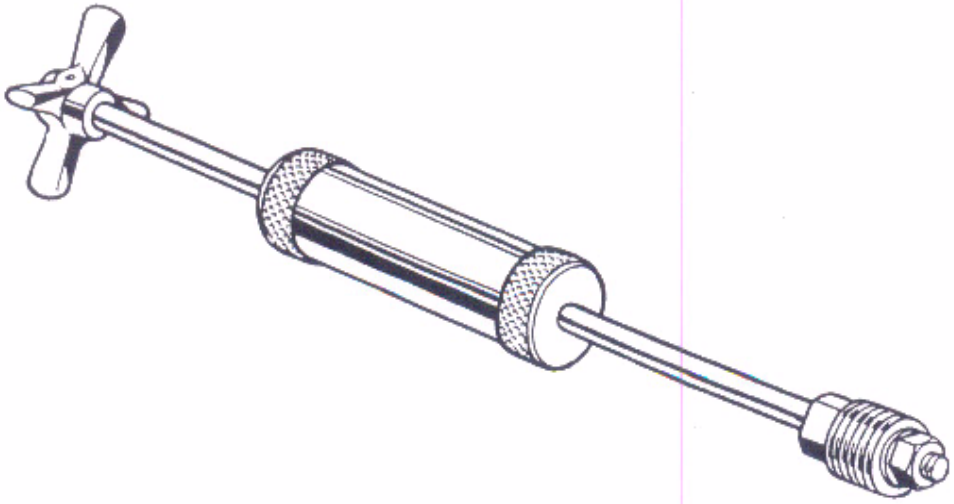
Z127. Tool for extracting fork stanchion from bottom member





67/2

Z137. Punch and holder for removing earlier type oil seal



67/3

Z161. Impulse tool for assembling later type forks.

1963

TRIUMPH

TECHNICAL INFORMATION

for

Workshop Use

SERVICE TIPS
GEAR RATIO CHARTS
TECHNICAL DATA
TUNING INFORMATION
CAM TIMING
COMPETITION TIPS

'B' RANGE - TUNING PROCEDURES

CARBURETOR SETTINGS	6T	TR6	T120	T120C
Type (Amal Monobloc)	376	376	(2)376	(2)389
Venturi Size	1-1/16"	1-1/16"	1-1/16"	1-3/16"
Main Jet	300	300	270	310
Needle Jet	.106	.106	.106	.106
Needle	'C'	'C'	'C'	'C'
Needle Position	Center	Center	Center	Center
Throttle Valve	376/4	376/3-1/2	376/3-1/2	389/3-1/2
Pilot Jet	25	25	25	30

NOTE: Increase Main Jet size when "Jomo Cams" are fitted to Engine!

TIMING 'B' RANGE ENGINES

REMOVING THE C/B ASSEMBLY AND OIL PUMP: The Ignition Contact Breaker is located in the Timing Cover and is driven by the Exhaust Camshaft. The Contact Breaker Cam is attached to the Exhaust Camshaft by means of an Internal Taper in the Exhaust Camshaft and secured by a Center Bolt. TO RELEASE THE CONTACT BREAKER ASSEMBLY, remove the Center Bolt, and screw in the Extractor Tool (D484). An Extractor Tool may be made in your shop by using (5/16" x 24) Bolt (1-1/4" Long) and drilling a 7/32" hole in the center of the Threaded End, 5/8" deep. Cut a piece of (3/16") Clutch Rod, 2-3/4" long and fit into Center Hole... This completes your 'B' Range Extractor Tool.

TO REMOVE THE OIL PUMP: After the Contact Breaker is loose in the Taper, the Timing Cover may be removed. Be careful not to disturb the two wires attached to the C/B Assembly as the Oil Pump is being removed!

REMOVING THE CONTACT POINTS & CONDENSERS: Remove the two long hex Sleeve Nuts which secure the Contact Breaker Plate. The Plate may now be removed, complete with the Contact Points and Condensers for easy maintenance.

IGNITION TIMING: Set C/B Base Plate at Center of Slots... Tighten the two hex Sleeve Nuts... Rotate Crankshaft forward until the right hand Piston is nearing top dead center and both Valves are closed... Set the Piston accurately to the figure shown for the Model (@ Degrees or Inches B.T.C.)... Turn C/B Cam in Clockwise Rotation, holding C/B Cam in full advance position, until rear contacts just open.. Tighten Center Bolt.

BEFORE FINAL IGNITION TIMING, set rear contact gap at .014"... Mark the C/B Cam and rotate Engine forward till front Contacts are open and the mark on the C/B Cam is in the same relative location... Set front Contacts at .014"... This will insure the proper gap on each set of Contacts.

FINAL TIMING: Again rotate crankshaft forward until the right hand piston is at the proper location before top dead center. . . loosen the two hex sleeve nuts. . . hold C/B cam in advance position and rotate C/B base plate for desired timing. . . tighten hex sleeve nuts.

ON BATTERY IGNITION MODELS with ignition switch in "on" position, the opening of the C/B points will be shown by the ammeter needle returning to zero.

WHEN TIMED ON THE RIGHT HAND CYLINDER and the rear contact breaker points with the black and yellow lead to the rear condenser. . . the black and yellow lead from the harness must be connected to the right hand ignition coil.

TIMING THE CAMS FOR COMPETITION: This job is best accomplished with the cylinder head removed. Attach degree wheel to drive side crankshaft. . . locate top dead center and set pointer at 0° (top) on degree wheel . . . set dial indicator to take readings directly from right inlet tappet and short push rod. . . zero indicator with cam rotated to heal position. . . YOU ARE NOW READY TO TIME CAMS!

ROTATE ENGINE TO DESIRED DEGREE READING Before top dead center . . . Rotate cam in clockwise direction until dial indicator reads .020". . . select proper keyway and install cam wheel on inlet cam, maintaining proper degree reading for inlet opening @ .020" on dial indicator. . . check inlet closing @ .020" on dial indicator. . . set dial indicator on right exhaust tappet. . . rotate engine until piston is in the proper location before bottom center. . . repeat procedure in setting exhaust cam. . . NOTE: When cams are in proper location with pistons on top dead center, camshaft keyways should both be pointing towards the center of the pinion gear. . . if they do not, the cams are not timed at the proper degree wheel reading, or they are 180° out of time! If high-lift cams have been installed, be sure that the top collar does not strike the guide, and the valve clears the piston domes!

EXHAUST PIPES FOR COMPETITION

The diameter, length and shape of an exhaust pipe is very critical for maximum performance. These dimensions also go "hand-in-hand" with the induction system, carburetors, valve size, bore and stroke, compression ratio, R. P. M. s, torque and desired horsepower range. Therefore, it is not possible to list an exhaust system for every type of application.

THE FOLLOWING EXHAUST SYSTEMS ARE RECOMMENDED to give the best all around performance.

1st Choice: 1-1/2" diameter pipe. . . 32-1/2" to 33-1/2" long (measured inside pipe at inside bend). . . fitted with standard Triumph inverted cone megaphones (open megaphone not recommended)

2nd Choice: 1-1/2" diameter pipe. . . 32-1/2" to 33-1/2" long. . . fitted with 1-3/4" diameter extensions, 14" in length.

3rd Choice: 1-3/4" diameter pipe. . . 27-1/2" long. . . no megaphone or extension.

NOTE: Shorter or longer exhaust pipes will change torque range and carburetor settings. A loss of R. P. M. s will also be noted.