Headlamp. Replace as instructed on page 169.

TO CHANGE THE MAIN SPRINGS

Rest the crankcase on a suitable box so that the front wheel is clear of the ground. Lift the nacelle top unit as described on page 168, the slack in the electrical cables will be sufficient, but it will be necessary to disconnect the speedometer cable. Undo the handlebar "U" bolts and raise the handlebar sufficiently to unscrew the cap nuts. Lift out the old springs and insert the new. Insert the cap nuts carefully so that the guide tubes engage with each other and tighten. Replace the handlebars and nacelle top.

FORK SPRING IDENTIFICATION

		Free Length (New)	*Colour*
6T/T110 ...	SOLO ...	... 18$\frac{5}{16}$ in. (46.5 cm.)	Black
6T/T110 ...	SIDECAR ...	... 18$\frac{5}{16}$ in. (46.5 cm.)	Red/White
TR6/T120 ...	SOLO ...	... 19$\frac{1}{16}$ in. (48.4 cm.)	Black/White
TR6/T120 ...	SIDECAR ...	... 19$\frac{1}{16}$ in. (48.4 cm.)	Black/Red

TRIUMPH TELESCOPIC FORKS
(EARLIER TYPE)

MAINTENANCE

The Triumph telescopic hydraulically controlled fork will require little attention other than an occasional check of the external nuts, screws and washers. At no time during normal service will the forks need topping up with oil; slight leakage that may have taken place will not affect the fork action.
Periodic draining and re-filling every 5,000 miles (8,000 kms.) should be carried out and if the leakage has become excessive, it will be necessary to drain and re-fill the forks before this distance.

Draining. To drain the oil from the fork, remove the two drain plugs at the base of the bottom cover tubes and compress the forks two or three times. This causes the oil to be expelled at a greater rate.

Re-filling. Replace the drain plugs. Remove the headlamp rim assembly from the nacelle, exposing the upper part of the stanchions. Unscrew the two screwed oil plugs in the stanchion and pump 1/6 Pint (100c.c.) oil (See Lubrication Chart, page 180) into each fork leg by means of a pressure can or gun.

Re-filling the Trophy Forks. To re-fill the forks on the Trophy, unscrew the two large cap nuts, securing the stanchions to the fork head lug and pour in the oil past the springs.
It is estimated that, under normal conditions, the time between fork overhauls should be about 20,000 miles (30,000 kms.). This work should be carried out by a dealer or by the Triumph Service Department.

ADJUSTING THE STEERING HEAD RACES

Lower the central stand and raise the front wheel clear of the ground by placing a box of suitable height under the crankcase. To test the play in the steering head, slacken off the damper and grip the fork lower tubes; rock the fork in a fore and aft direction. Care must be taken however, to observe that the play felt is in the steering head and not in the fork bushes. By watching the lower portion of the fork crown, any movement in the races will be easily seen. If play is detected, adjust the races in the following manner.

Top Lug Clip Bolt. Slacken off the nut.

Fork Stem Sleeve Nut. By swinging the fork to the left or right a spanner can be placed on the nut hexagon. The spanner should be turned clockwise to eliminate play, but only two finger pressure should be applied. Now ease the pressure off by lightly turning the spanner in the opposite direction and then test.

Testing. The fork should move to the full lock position in both directions under its own weight. If the movement is sluggish slacken off the adjuster nut slightly more and test again. Finally, check the steering when riding the machine on the road.

REMOVING THE FORK FROM THE FRAME

The following refers to all models with the exception of the Trophy. For these models, the operator should disconnect the lighting plug at the headlamp, remove the headlamp, handlebars and steering damper knob and proceed from "Stanchion Cap Nuts". First remove the front wheel, mudguard, headlamp assembly and nacelle top unit as described on pages 115, 166 and 168 and proceed as follows:-

Handlebar. Detach control levers and loosen the twistgrip retaining screw. Unscrew four nuts from the handlebar retaining "U" bolts. Slide the handlebar out of the twistgrip sleeve and through the rubber grommets.

Stanchion Cap Nuts. Using a ring spanner to avoid damage to the nut heads, unscrew the two large stanchion cap nuts. A suitable spanner is available under Part Number D.220.

Top Lug. Remove the crown and stem sleeve nut, undo the top lug pinch bolt, and, using a soft metal drift, give the top lug a sharp blow from underneath to loosen it from the taper of the stanchions. Remove the damper anchor plate bolt and raise the top lug lifting with it the two stanchion nuts which in turn carry the pressure tube and spring assembly, and the lower fork crown is eased downwards from the frame. The complete fork assembly can be withdrawn from the frame as there is sufficient clearance between the top of the fork crown stem and the underside of the top lug. If care is taken, the top ball race can be left undisturbed and the balls collected from the lower race as the clearance becomes sufficient.
If the mechanic does not wish to disturb the steering column, carry out the first two operations and proceed as follows:—

Middle Lug Pinch Bolts. Remove both bolts.

Trophy Models. Slacken the gaiter clips.

Top Lug. Undo the top lug pinch bolt and loosen the top lug with a sharp blow as described.

Oil. Remove the drain plugs at the bottom tube covers and let the oil drain out.

Pressure Tube Body Bolt. Remove these bolts from the base of the bottom cover tube.

Pressure Tube Assembly and Spring. Withdraw from the forks by lifting the stanchion cap nuts.

Fork Legs. Remove from the middle lug by pulling downwards.

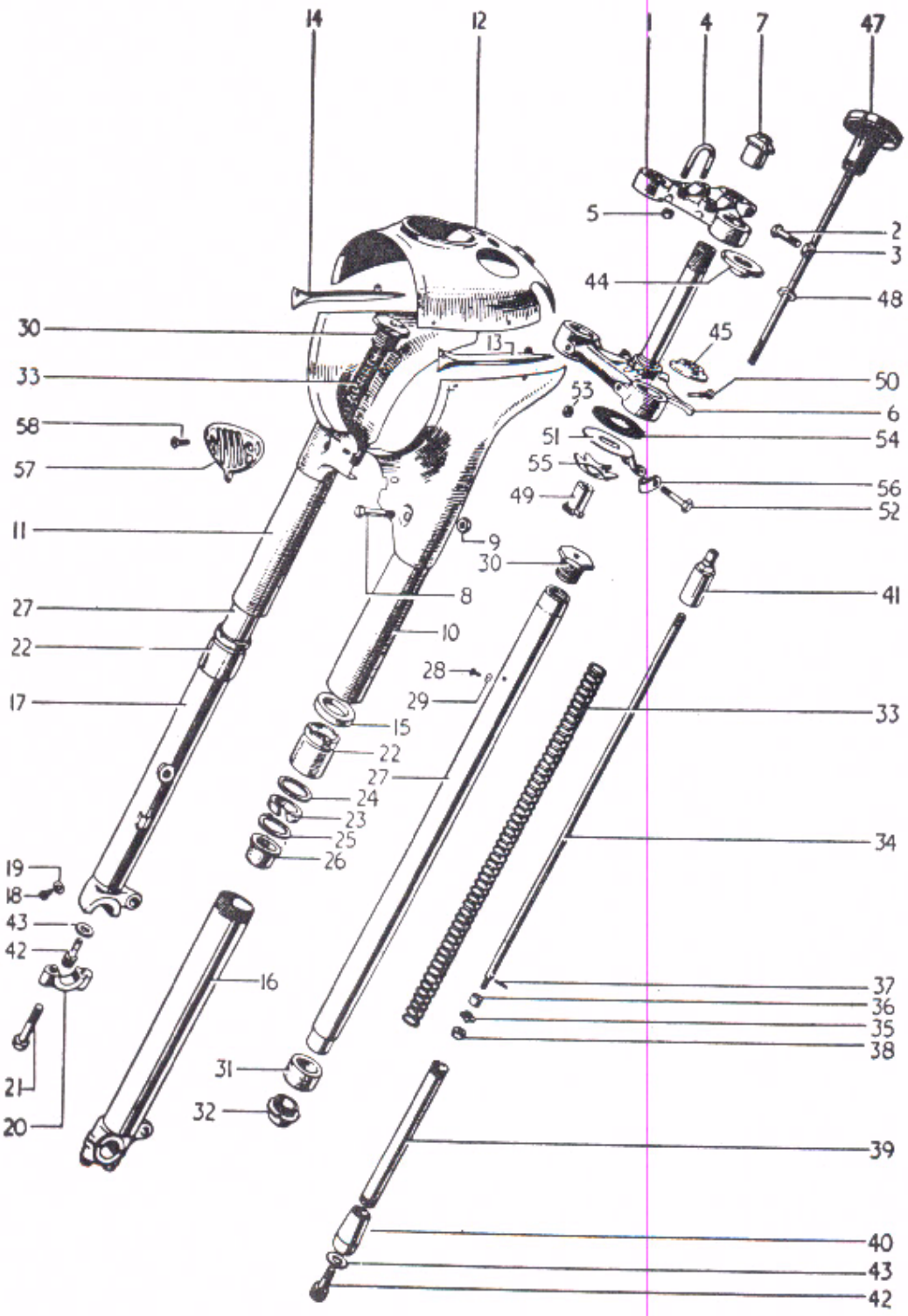


Fig. 38. TELESCOPIC FORK (Earlier Type)

INDEX TO FIG. 38. TELESCOPIC FORK.

Index No.	Description.
1	Lug, fork head.
2	Bolt, pinch.
3	Nut.
4	"U" bolt.
5	Nut.
6	Crown and stem.
7	Nut, sleeve.
8	Bolt, pinch.
9	Nut, stop.
10	Cover, nacelle, N.S.
11	Cover, nacelle, O.S.
12	Nacelle, top.
13	Motif, N.S.
14	Motif, O.S.
15	Washer, rubber.
16	Cover, bottom tube, N.S.
17	Cover, bottom tube, O.S.
18	Plug, drain.
19	Washer.
20	Cap, wheel spindle.
21	Bolt, spindle cap.
22	Sleeve, dust excluder.
23	Washer, felt.
24	Washer.
25	Washer.
26	Bearing, upper.
27	Stanchion.
28	Plug, oil filler.
29	Washer.
30	Nut, cap.
31	Bearing, stanchion, lower.
32	Nut, hydraulic stop.
33	Spring, fork.
34	Rod, oil restrictor.
35	Restrictor, oil.
36	Cup.
37	Pin, cup.
38	Nut.
39	Tube, pressure.
40	Body, pressure tube.
41	Sleeve, pressure tube.
42	Socket, screw.
43	Washer, aluminium.
44	Cone and dust cover.
45	Cone.
47	Knob, damper assy.
48	Washer, damper.
49	Sleeve.
50	Pin, securing.
51	Plate, damper anchor.
52	Bolt, anchor plate.
53	Nut.
54	Disc, friction.
55	Plate, friction.
56	Clip, speedometer cable.
57	Horn grille.
58	Screw.

DISMANTLING THE FORK

Pressure Tube Assembly. Unscrew the two pressure tube securing screws and withdraw the pressure tube assemblies and top lug.

Trophy Models. Slacken the gaiter clips.

Lower Nacelle Covers. Remove the two middle lug pinch bolts and take off the lower nacelle covers.

Bottom Cover Tubes. Unscrew the dust excluder sleeves from the bottom cover tubes and pull the cover tubes downwards sharply, this will remove the bushes at the same time.

Dust Excluder Sleeves. Remove the two steel rings and the felt strip.

Stanchion Lower Bearing. Grip the stanchion above the bearing surface and remove the hydraulic stop nut and the stanchion lower bearing.

DISMANTLING THE PRESSURE TUBE ASSEMBLY

Main Spring. Compress the main spring and grip the oil restrictor rod in a pair of pliers. Remove the large cap nut and release the spring.

Pressure Tube Sleeve. Grip the pressure tube and unscrew the pressure tube sleeves.

Restrictor Rod Assembly. Remove the restrictor rod from the pressure tube, unscrew the oil restrictor nut and remove the restrictor, restrictor cup and pin.

DISMANTLING, PREPARATION AND ASSEMBLY OF UNITS

First thoroughly degrease all parts and lay out for inspection. If the mileage covered is more than 20,000 (30,000 kms.) it is recommended that all bushes and seals are changed.

Stanchions. Check that the stanchion is true by laying a straight edge along it to find out if there is any distortion. If the stanchion is to be used again after straightening, the bow should not exceed $\frac{3}{16}$ in. (4.8 mm.). The owner is not advised to undertake the servicing of a fork in this condition; it should be returned to a Triumph Dealer for an exchange service replacement.

Head Lugs and Middle Lug. If the motorcycle has been involved in an accident the lug will require expert attention. No attempt should be made to carry out the work without jigs.

Bottom Cover Tubes. Examine for indentation and scrap if defective.

Springs. If the coils are not unduly compressed, the springs are fit for further service. The free length of the spring should be within $\frac{1}{2}$ in. (12.7 mm.) of the original length which is 20 in. (51 cm.).

Ball Races. Cups, cones and balls should be examined for indentation and pitting and changed if necessary.

All Models ... 20 ¼in. (6.35 mm.) diam. balls. Top and Bottom.

Friction Damper. Examine the friction damper assembly for traces of oil, grease rust, etc. Renew the friction disc if at all worn and the spring plate if weak or broken.

PRESSURE TUBE ASSEMBLY

Restrictor Rod. Fit the pin to the restrictor rod, then the cup, restrictor, and finally the locking nut.

Pressure Tube. Screw the lower valve body to the pressure tube and insert the restrictor rod assembly. Slide the top support sleeve over the restrictor rod and screw onto the pressure tube.

Checking. To ensure correct operation of the valve, place the assembly in a tin of oil and pump the rod up and down. When the pressure tube is filled, the upward movement of the rod should be restricted and the downward movement unrestricted.

Spring and Cap Nut. Fit the spring over the restrictor rod and compress until the rod can be gripped with a pair of pliers. Screw the cap nut into position and release the spring.

ASSEMBLING AND INSTALLING THE FORK (NACELLE TYPE)

Before commencing to assemble the fork, lubricate all parts.

Stanchion Bearing. Fit the bearings to the stanchions and lock with the hydraulic stop nut. Check the bearings for freedom of movement.

Drain Plugs. Screw the drain plugs into the bottom cover tube, ensuring tightness.

Dust Excluder. Fit a new felt washer to each dust excluder cap making sure that the two thin metal washers are on either side of the felt.

Bottom Cover Tube Assembly. Assemble the stanchion to the bottom cover tube and fit the top bearing. Screw on the dust excluder and check the movement of the stanchions which should be free and smooth.

Steering Races. If the steering column assembly has been dismantled, grease the cups in the frame and press the balls onto them.

Fork Crown and Stem and Top Lug. Assemble the fork crown and stem and top lug to the steering column and tighten down the sleeve nut until the steering moves freely from side to side with no up and down movement. Fit and tighten the pinch bolts and lower damper parts.

Horn. Fit the horn to the fork crown and stem.

Lower Nacelle Covers. Assemble the lower nacelle covers and position the pinch bolts and nuts, but do not tighten.

Stanchion and Bottom Cover Tube Assembly. Fit the felt washers into the nacelle covers and slide the stanchions through the fork crown lug into the tapers of the top lug. Lightly tighten the fork crown pinch bolts.

Pressure Tube Assembly. Make sure the drain plugs are in position. There is a slot in the pressure tube valve body, which must be engaged with the spigot on the drain plug by turning the pressure tube assembly until the parts are felt to engage. Fit the socket screw with a new aluminium washer and tighten securely.

Lubrication. Push the bottom cover tube into the upper cover and pour 100 c.c. ($\frac{1}{8}$ pint) oil past the springs and into the top of each stanchion.

Cap Nut. Force the bottom cover tubes down and screw the cap nut into the stanchion, ensuring that it is well tightened. If this precaution is not taken, the stanchion taper will not be drawn into the top lug and excessive strain will be put on the crown and stem.

Fork Crown Pinch Bolts. Tighten up the pinch bolts. (See Fig. 37 and text describing fork alignment).

Handlebars. Fit the handlebars to the top lug and connect the horn together with all controls and cables.

Nacelle Top Unit. Replace the top unit and connect all wires, speedometer cables, etc., as described on page 169.

Steering Damper Knob. Replace the damper knob, making sure that the steel thrust washer is in position.

Headlamp Assembly. Replace as described on page 169.

Mudguard. Replace to the fork and secure all fastenings.

Front Wheel. Replace the front wheel (see page 121).

ASSEMBLING THE FORK (TROPHY)

When fitting the Trophy, the operator should complete the first six operations listed in the previous paragraph and proceed as follows:—

Fork Top Covers. Fit in the same way as the lower nacelle covers.

Stanchion and Bottom Cover Tube Assembly. Place the gaiters in position and proceed as above.

Pressure Tube Assembly. Assemble as described.

Lubrication. Fill the forks as described.

Cap Nut. Tighten the cap nuts as described.

Fork Crown Pinch Bolt. Tighten the bolts.

Gaiter Clips. Fit and tighten.

Handlebars. Fit the handlebars to the top lug and connect all levers and cables.

Headlamp. Fit the headlamp to the forks and connect the lighting plug.

Speedometer. Re-fit speedometer and cable.

Steering Damper. Re-fit the steering damper knob making sure that the steel thrust washer is in position.

Mudguard. Replace to the fork and secure all fastenings.

Wheel. Replace as described.

CHANGING THE MAIN SPRINGS

In order to change the main springs, or to fit stronger ones for sidecar purposes, the operator should remove the headlamp and nacelle cover as described on page 168 and the handlebars as described on page 107 and proceed as follows:—

Cap Nuts. Unscrew the two cap nuts in the top lug.

Spring. Grip the spring which should now be showing, and force it down until the restrictor rod can be gripped with a pair of pliers.

Restrictor Rod. Unscrew the cap nuts from the restrictor rod and secure a piece of soft wire to the rod before releasing the spring. This enables the operator to retain control of the restrictor rod during removal and replacement of the spring. Repeat the operation on the other fork leg and re-assemble the forks in exactly the reverse procedure. The fork springs have a colour identification as follows:—

Solo	**Red**
Sidecar	**Blue**
Extra-Heavy Sidecar	**Purple**

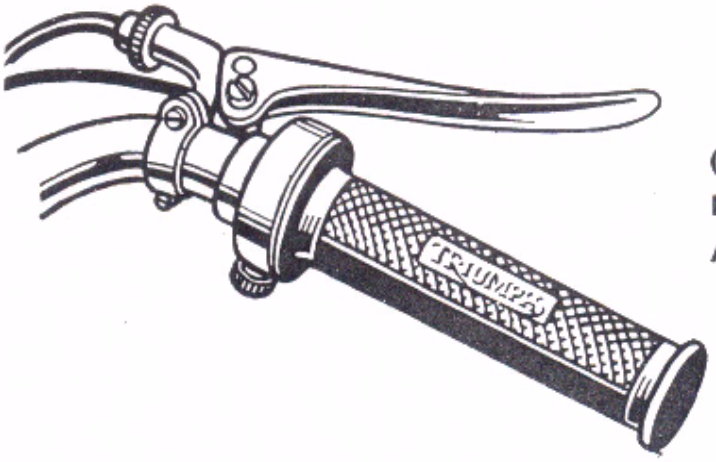
WHEELS

ADJUSTING THE BRAKES

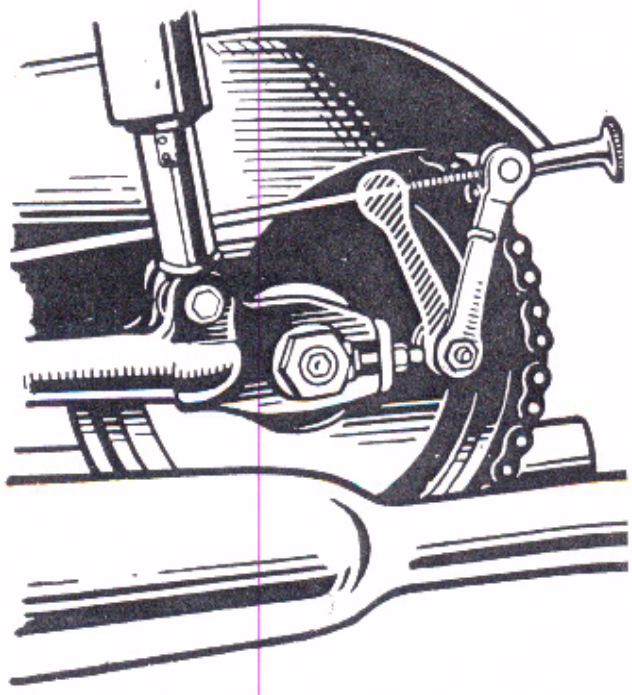
Before attempting to make an adjustment, the wheels must be raised clear of the ground by placing the machine on its stand or stands as the case may be.

Front Brake. To adjust the brake shoes closer to the brake drum, turn the knurled thumb nut (See Fig. 39) in a clockwise direction. The brake should be set so that when it is fully applied the lever is just clear of the handlebar. By this adjustment, the rider will be able to exert the maximum amount of grip on the lever. After making an adjustment, spin the wheel to ensure that the brake shoes are not binding on the brake drum.

Rear Brake. The adjustment is made by turning the knurled thumb nut (See Fig. 39) at the rear end of the brake operating rod in a clockwise direction. After adjusting, spin the wheel to ensure that the brake is not binding.



(Left)
Front Brake
Adjustment



(Right)
Rear Brake
Adjustment
The "Ghost" lines show the lever position when the linings are badly worn.

Fig. 39. ADJUSTING THE BRAKES.

FRONT WHEEL

The front wheel as fitted to all models requires very little maintenance beyond re-packing the hub with clean grease every 10,000 miles (15,000 kms.). The wheel bearings are of the ball journal type and therefore require no adjustment. The rim is 19 in. diam. (WM2-19) fitted with a 3.25 × 19 in tyre. The 5T, 6T and TR5 models have a full width hub containing a 7 in. (17.78 cm.) diam. brake. The hub is built into the rim with 40 identical, straight-pull spokes. The TR6, T100 and T110 models have an 8 in. (20.32 cm.) diam. brake drum bolted to the hub, and two lengths of spoke are used each with two different head angles. Later TR6, T100, T110 and all T120 Models have a full width hub containing an 8 in. (20.32 cm.) diameter brake. Except for its greater diameter it is identical to the full width hub fitted to the 5T, 6T and TR5.

TO REMOVE THE FRONT WHEEL FROM THE FORKS

Brake Cable. Remove the split pin and pivot pin from the lower end of cable.

Anchor Plate Bolt (Earlier TR6, T100 & T110 only). Unscrew the nut and remove the bolt securing the anchor plate to the fork leg.

Spindle Cap Bolts. Unscrew the spindle cap bolts (two on each fork leg).

Front Stand. Lower the front stand by loosening the retaining nut at the rear of the mudguard and swing the stand forward. The front wheel can now be withdrawn from the forks.

TO DISMANTLE THE FRONT WHEEL

Anchor Plate Nut. Hold the spindle in a vice with soft jaws, or alternatively hold the spindle by clamping it in one fork leg with the wheel outwards, and unscrew the anchor plate retaining nut.

Anchor Plate. Hold the brake lever slightly on and lift out the anchor plate assembly.

Left Wheel Bearing. Remove the circlip and drive out the bearing and dust cover by means of a hide mallet on the wheel spindle.

Bearing Retaining Ring. Remove the right wheel bearing retaining ring with a peg spanner. **N.B.**—This ring has a L.H. thread.

Right Wheel Bearing. Use the wheel spindle and hide mallet to drive out the remaining wheel bearing. There is a backing ring fitted only in the full width hub.

TO DISMANTLE THE FRONT BRAKE ANCHOR PLATE

Brake Shoes. Remove the return springs and the brake shoes will be released from the anchor plate.

Brake Operating Lever and Cam Spindle. Unscrew the retaining nut and take off the brake operating lever. Withdraw the cam spindle from the anchor plate. It is unnecessary to remove the brake shoe fulcrum pin.

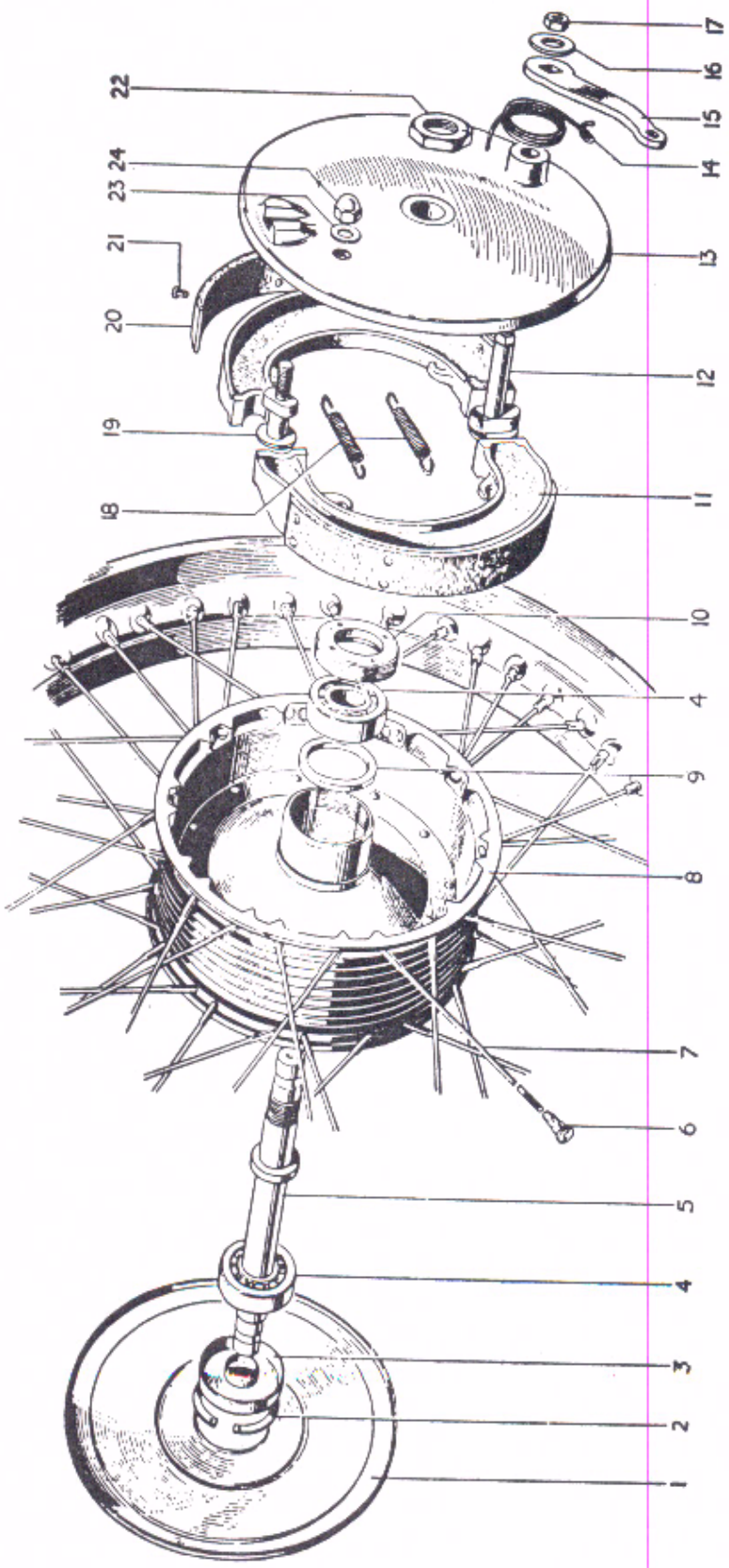


Fig. 40. FRONT WHEEL WITH FULL WIDTH HUB.

INDEX TO FIG. 40. FRONT WHEEL

Index No.	Description.	Index No.	Description.
1	Cover plate.	13	Plate, brake anchor.
2	Circlip, L.H. bearing.	14	Spring, lever return.
3	Dust cover.	15	Lever, brake operating.
4	Bearing, ball journal.	16	Washer.
5	Spindle.	17	Nut, brake lever.
6	Nipple, spoke.	18	Spring, shoe return.
7	Spoke.	19	Pin, shoe fulcrum.
8	Hub and brake drum.	20	Lining, brake.
9	Backing ring.	21	Rivet, brake lining.
10	Ring, bearing securing.	22	Nut, anchor plate.
11	Brake shoe c/w lining.	23	Washer.
12	Cam, brake operating.	24	Nut, fulcrum pin.

INSPECTION AND REPLACEMENT OF WORN PARTS

Washing. All parts with the exception of the brake shoes, should be thoroughly washed with petrol or paraffin.

Anchor Plate. This should be examined for cracks and distortion and excessive wear in the brake cam housing.

Brake Cam. Clean out the greaseways and remove any rust. Re-fill the greaseways with clean grease.

Ball Bearings. Clean and dry the bearings thoroughly. Compressed air should be used for drying out if possible. Test the end float and inspect the balls for any signs of indentation or pitting. Change the bearings if they are not up to the required standard. Pack the bearing with grease before replacing in the hub.

Return Springs. Inspect for signs of fatigue and renew if necessary.

Brake Drum. Inspect the brake drum for wear, ovality or scoring. If there is ovality or score marks, the drum will have to be detached from the wheel and skimmed. If it is necessary to skim more than .010 in. (0.254 mm.) from the drum it should be scrapped. After skimming the brake drum, the wheel will have to be re-built and trued up.

Brake Shoes. If the brake adjuster has been fully taken up, the brake shoe linings must be changed. Do not pack the heel of the shoe in an endeavour to make an adjustment. New linings and rivets can be purchased from a Triumph Dealer, but if the owner wishes, he can exchange the brake shoes for a re-conditioned set at very little extra cost. If the old brake shoes are to be used for further service, inspect the rivet heads as these must be below the surface of the lining. Rivets which show signs of contact with the brake drum can be lowered by using a suitable round punch. Support the shoe at the point where the rivet is to be knocked down.

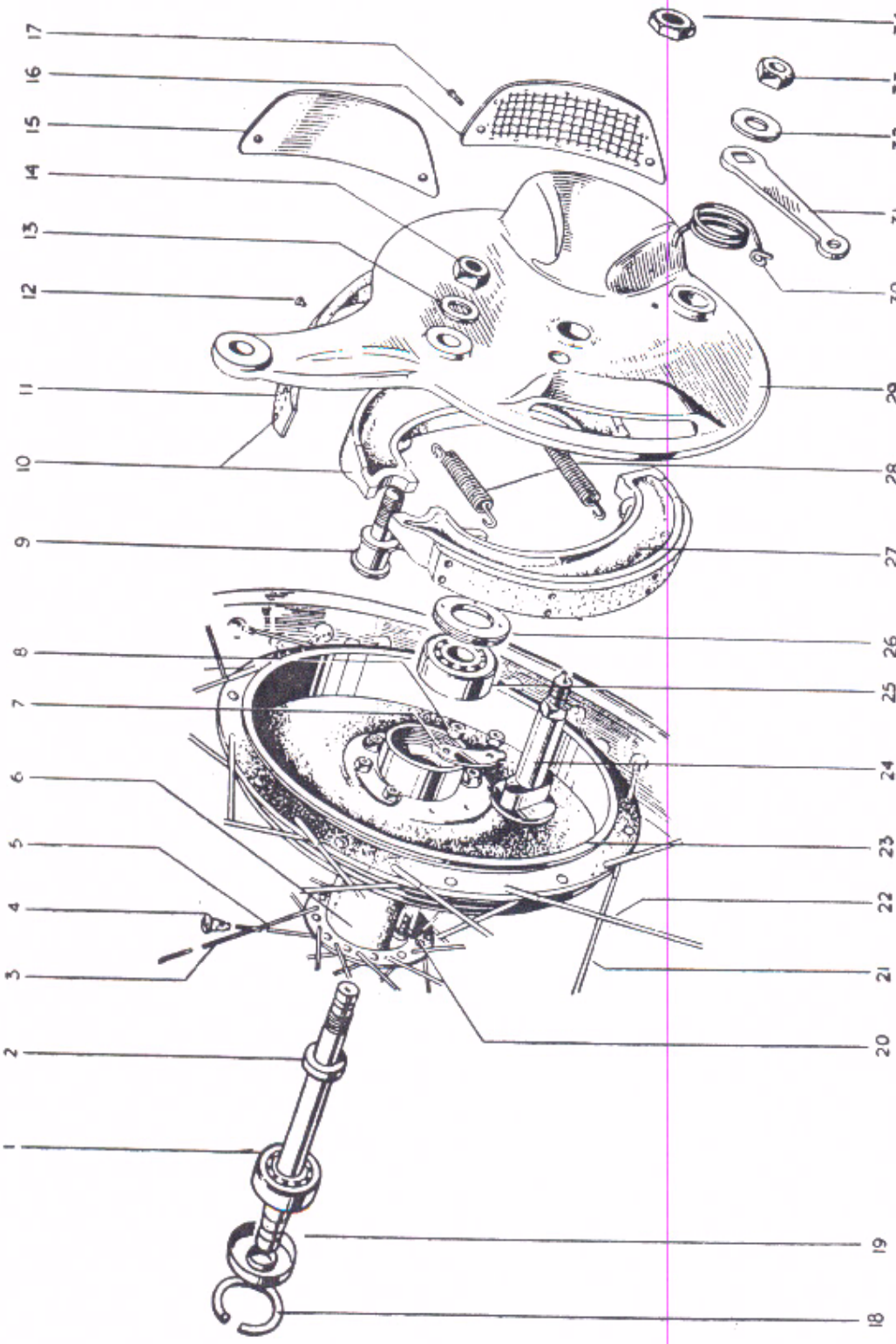


Fig. 41. FRONT WHEEL (Earlier TR6, T100 & T110).

INDEX TO FIG. 41. FRONT WHEEL (Earlier TR6, T100 & T110)

Index No.	Description.	Index No.	Description.
1	Bearing, ball journal.	18	Circlip, L.H. bearing.
2	Spindle.	19	Dust cover.
3	Spoke, 90° head.	20	Bolt, drum to hub.
4	Nipple, spoke.	21	Spoke, short 95° head.
5	Spoke, 88° head.	22	Spoke, short 80° head.
6	Hub.	23	Drum, brake.
7	Lockplate.	24	Cam, brake operating.
8	Nut.	25	Bearing, ball journal.
9	Pin, shoe fulcrum.	26	Ring, bearing securing.
10	Shoe, brake trailing.	27	Shoe, brake leading.
11	Lining, brake shoe.	28	Spring, shoe return.
12	Rivet, brake lining.	29	Plate, brake anchor.
13	Washer.	30	Spring, lever return.
14	Nut, fulcrum pin.	31	Lever, brake operating.
15	Cover plate (alternative).	32	Washer.
16	Gauze, anchor plate.	33	Nut, brake lever.
17	Screw, gauze securing.	34	Nut, anchor plate.

TO ASSEMBLE THE FRONT BRAKE ANCHOR PLATE

Brake Cam. Grease the spindle of the brake cam and insert it into the housing on the brake anchor plate. Fit the return spring over the spindle (long end away from the anchor plate) and tap the lever arm on to the square shoulder with the lever arm in the same line as the cam. Fit the washer and nut and tighten.

Brake Shoes. Place the two shoes on the bench in their relative positions. Fit the return springs to the retaining hooks, then, taking a shoe in each hand and at the same time holding the springs in tension, position the shoes to the anchor plate. By turning the top of the shoes inwards the assembly can be placed over the cam and fulcrum pin and snapped down into position by pressing on the outsides of the shoes. Floating brake shoes must have the steel thrust pads next to the fulcrum pin and the linings at the trailing end of the shoe relative to the direction of rotation (See page 120).

ASSEMBLING THE FRONT WHEEL

Preparation. Thoroughly clean the inside of the hub and brake drum. Pack the ball races with grease.

Right Wheel Bearing. A backing ring must first be placed in the full width hub. Press the bearing into the hub and secure it with the L.H. threaded bearing retaining ring.

Spindle. Turn over the wheel and insert the spindle and pack about one eggcupful of clean grease into the hub.

Left Wheel Bearing. Press the remaining bearing in position, followed by the dust cap and circlip. Lightly tap the wheel spindle from the right side, to press the bearing close up against the dust cap and circlip.

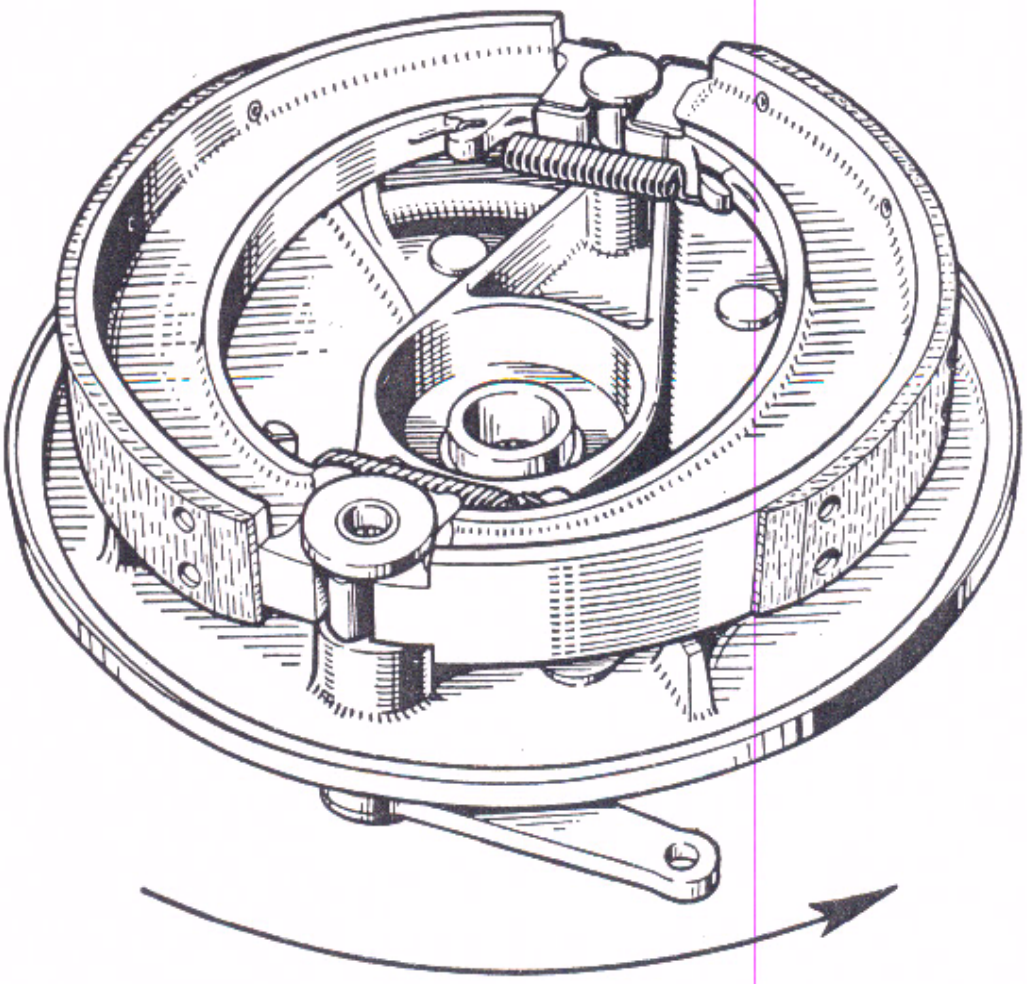


Fig. 42. REPLACING FLOATING BRAKE SHOES.
(Arrow shows direction of rotation of wheel)

Brake Anchor Plate. Hold the left end of the wheel spindle in a vice and then holding the brake lever slightly on, place the anchor plate assembly in position and secure with the retaining nut.

TO REPLACE THE FRONT WHEEL

Place the wheel in position in the forks and swing the front stand backward. If available add a small weight in front of the parcel grid so that the fork legs rest on the wheel spindle.

Spindle Caps. Hold the spindle caps in position and screw the bolts a few turns into the fork legs. The spindle is recessed at the bolt positions and it may be necessary to move the wheel a little from side to side before the bolts can be inserted. Do not tighten the bolts yet.

Brake Anchorage. On the full width hub models make sure the anchor peg on the fork leg engages with the channel on the anchor plate. On the earlier TR6, T100 and T110 models insert the brake anchor bolt and tighten it securely.

Spindle Cap Bolts. Tighten the bolt evenly, keeping the space between the cap and fork leg equal, in front of, and behind the wheel spindle.

Brake Cable. Refit the brake cable to the abutment and insert the pivot pin and split pin. Check the cable adjustment.

Front Stand. Tighten the front stand securing nut.

IMPORTANT: ALL MODELS

SLACKEN THE BRAKE SHOE FULCRUM PIN NUT AND APPLY THE BRAKE HARD, KEEPING THE PRESSURE ON THE LEVER WHILE THE NUT IS RE-TIGHTENED, IN ORDER TO CENTRALISE THE BRAKE SHOES.

REAR CHAINGUARD

The rear chainguard extends round the rear sprocket and to remove the complete rear wheel it is necessary to slacken the securing nut and bolt near the bottom of the left suspension unit and swing the chainguard upwards. There is one additional bolt on the TR5 and TR6 models which must be removed, securing the guard to a clip on the brake torque stay.

The Quickly Detachable rear wheel may be removed from all models without disturbing the chainguard, leaving the brake drum and sprocket in position.

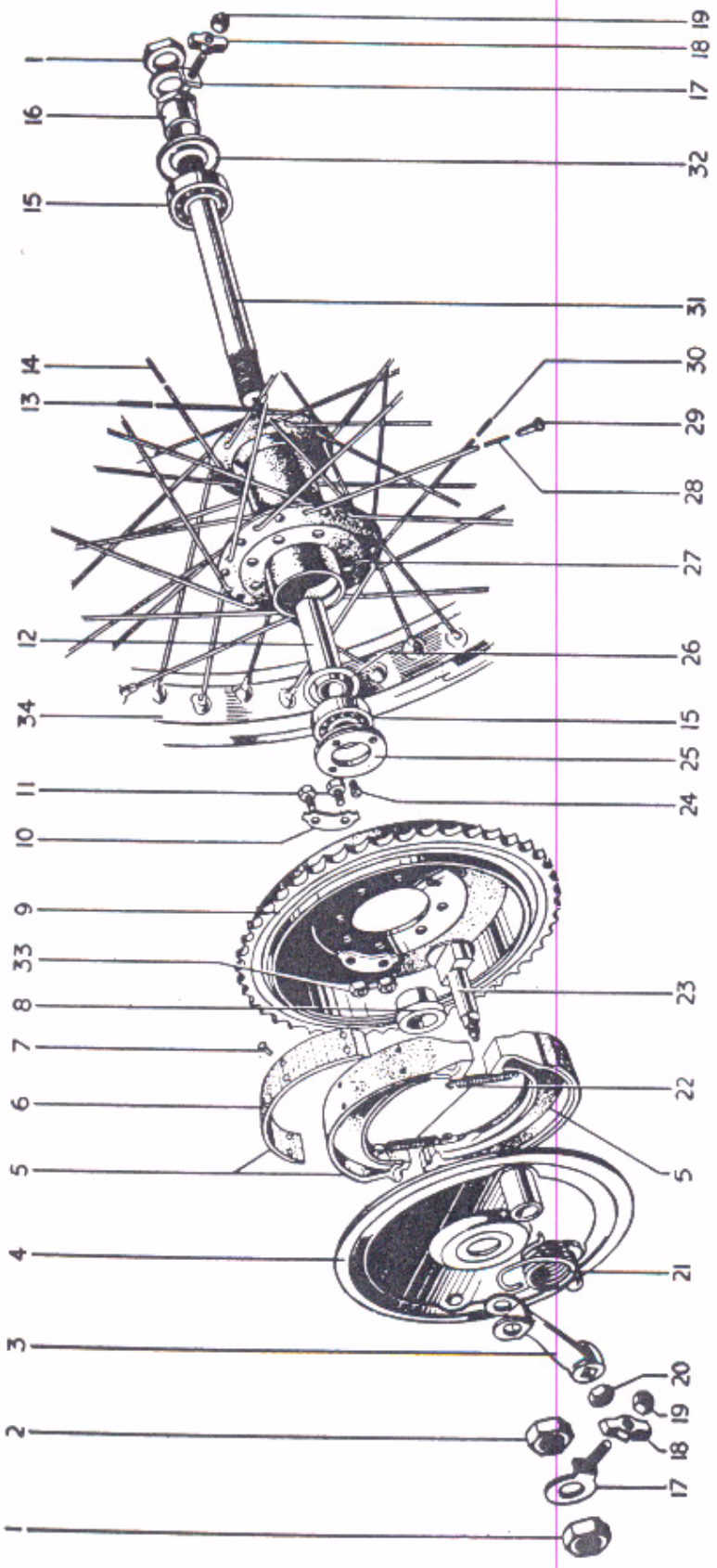


Fig. 43. REAR WHEEL.

REAR WHEEL

This wheel is mounted on journal ball bearings and therefore requires no adjustment. Slackness in the bearing can be checked by first placing the machine on the central stand and then testing the lateral movement which should be hardly perceptible if the bearings are in good condition.

REMOVING THE REAR WHEEL FROM THE FRAME

Rear Chain. Depress the gear lever to make sure that the gearbox is not in neutral. This prevents the chain rotating on the gearbox sprocket and falling off when the spring link is removed. Remove the spring link and clear the chain from the sprocket.

Brake Torque Stay. Remove the rear nut and loosen the front nut and bolt.

Brake Adjusting Nut. Unscrew this nut and remove the brake rod from the lever arm.

Spindle Nuts. Unscrew the two spindle nuts and remove from the spindle.

Chain Adjuster Assembly. Pull the wheel back in the frame a short distance and disconnect the adjuster assembly from the spindle.

DISMANTLING THE REAR WHEEL

Brake Anchor Plate. Unscrew the anchor plate nut and hold the brake lever against the spring tension just sufficiently to permit the removal of the anchor plate.

Spindle. Remove the anchor plate distance piece and knock out the spindles, taking care not to damage the thread.

INDEX TO FIG. 43. REAR WHEEL

Index No.	*Description.*	*Index No.*	*Description.*
1	Nut, spindle.	18	End plate, adjuster.
2	Locknut, anchor plate.	19	Nut.
3	Lever, cam operating.	20	Nut, cam lever.
4	Plate, anchor.	21	Spring, cam lever return.
5	Shoe, c/w lining.	22	Spring, shoe return.
6	Lining, shoe.	23	Cam, operating.
7	Rivet, lining.	24	Locking screw, bearing retaining ring.
8	Distance piece, L.H. bearing.	25	Ring, bearing retaining.
9	Brake drum and sprocket.	26	Ring, L.H. bearing backing.
10	Lockplate.	27	Hub.
11	Bolt, drum to hub.	28	Spoke, 76° head.
12	Distance piece.	29	Nipple, spoke.
13	Spoke, 80° head.	30	Spoke, 100° head.
14	Spoke, 97° head.	31	Spindle.
15	Bearing.	32	Cap, dust.
16	Nut, R.H. bearing retaining.	33	Distance piece.
17	Adjuster, chain.	34	Rim, wheel.

Bearing Retaining Ring Nut. Slacken off the ring nut grub screw and unscrew the ring nut. If a suitable peg spanner is not available, the nut can be tapped round with a pin punch.

Bearings and Backing Rings. Remove both bearings by knocking out of the hub from opposite sides with a suitable metal drift. The bearing distance tube and backing rings will now be released.

Brake Drum and Sprocket. This part need not be detached from the hub if the drum does not require attention and the sprocket teeth are not hooked or worn. If removal is necessary, bend back the locking tabs and remove the eight bolts and nuts when the drum can be released.

DISMANTLING THE REAR BRAKE ANCHOR PLATE

Brake Shoes. Take off both brake shoe return springs and remove the brake shoes.

Brake Shoe Cam. Remove the nut and washer securing the lever arm to the cam spindle and take off the lever arm. Withdraw the cam from the plate.

INSPECTION AND REPLACEMENT OF WORN PARTS

Cleaning. All parts with the exception of the brake shoes, should be thoroughly washed in petrol or paraffin.

Anchor Plate. Examine the anchor plate for distortion and wear, particularly in the brake cam housing. Check that the locating stud is secure.

Brake Cam. Clean out the greaseways and remove any rust with a fine emery cloth. Re-fill the greaseways with clean grease.

Bearings. Clean and dry the bearings thoroughly. Test the end float and inspect the balls for any signs of indentation or pitting. Change the bearings if they are not up to the required standard. Pack the bearings with grease before replacing to the hub.

Bearing Backing Rings. These rings should be examined carefully as they are very liable to damage when the bearings are withdrawn from the hub and will probably require replacing.

Anchor Plate and Bearing Locking Nuts. Examine these nuts for damage to the threads and hexagons.

Spindle. The rear wheel spindle should be checked for bends and signs of the wheel nuts having been overtightened. Do not replace a wheel spindle which shows any sign of damage or distortion.

Return Springs. Inspect for signs of fatigue and renew if necessary.

ASSEMBLING THE REAR BRAKE ANCHOR PLATE

Brake Shoe Cam. Grease the spindle of the cam and insert it into the housing from the inside of the brake anchor plate. Place the return spring in position (long end away from the anchor plate) and tap the lever arm onto the square shoulder at right angles to the flat side of the cam. Fit the lever nut and tighten.

Brake Shoes. Place the two shoes side by side in the positions which they will occupy in the drum. Fit the return springs to the retaining hooks, then, taking a shoe in each hand and at the same time holding the springs in tension, position the shoes to the anchor plate. With floating brake shoes see page 120. By turning the top of the shoes inwards, the assembly can be placed over the cam and the fulcrum pin and snapped down into position by pressing on the outside of the shoes.

ASSEMBLING THE REAR WHEEL

Brake Drum. If the brake drum and sprocket has been removed for rectification, it should be secured in position with the eight locking nuts. Ensure that four locking washers are used both on the inside and the outside of the brake drum. Tap the locking tabs up the sides of the bolts to lock them.

Bearing, Brake Drum Side. Place the locking ring into the hub from the brake drum side until it contacts the small shoulder inside the hub. Press the bearing in, up to the backing ring, and secure in position by tightening the ring nut. Lock the nut with the grub screw.

Bearing, R.H. Side. Turn the wheel brake drum downwards and insert the bearing distance piece into the hub until it contacts the brake drum side bearing. Press the R.H. side bearing into the hub, followed by the dust cover.

Spindle. Insert the spindle through the bearings and secure the spindle (opposite brake drum) in the vice. Do not forget to protect the spindle threads against damage by fitting soft clamps over the vice jaws.

Anchor Plate Assembly. Fit the distance piece (shouldered end towards the operator) and, holding the brake lever slightly towards the "ON" position to overcome the tension of the return spring, fit the anchor plate over the spindle and to the brake drum. Replace the anchor plate securing nut to the spindle and securely tighten.

Shouldered Spindle Nut. Remove the wheel from the vice and replace with the brake anchor plate downwards, this time holding the spindle nut. Fit and screw down the shouldered nut until it is hard against the bearing.
The wheel is now ready for assembly to the frame.

FITTING THE REAR WHEEL TO THE FRAME

Wheel. Tilt the machine to the left as in dismantling and position the wheel between the swinging fork. Ensure that the anchor plate stud is correctly located in the brake torque stay hole.

Brake Rod. Re-position to the brake lever.

Chain Adjusters. Fit the adjusters to the spindle and position the end plates.

Chain. Re-fit the chain to the sprocket and replace the connecting link. Check the chain tension and adjust if necessary.

Spindle Nuts. Screw the nuts onto the spindle and securely tighten.

Brake Torque Stay. Fit the rear nut and securely tighten both nuts.

Brake Adjustment. Spin the wheel and check the operation of the brake pedal. Adjust if necessary.

REAR WHEEL (QUICKLY DETACHABLE)

This wheel is mounted on three bearings, two roller bearings being situated in the hub and one journal ball bearing in the brake drum centre. The wheel is made quickly detachable by the simple method of splining the hub into the brake drum thus eliminating the necessity of removing the rear chain and disconnecting the rear brake. All other details are as the rigid frame rear wheel.

REMOVING THE Q.D. REAR WHEEL FROM THE FRAME

Spindle. Fit a spanner on, or insert a suitable bar through the hexagon shaped spindle end (right hand side) and unscrew until the spindle can be withdrawn.

Distance Piece. Remove from between the right hand fork end and the wheel.

Wheel. Ease the wheel to the right hand side until the hub splines are clear of the brake drum splines. Tilt the machine to the left (if a prop. stand is fitted, pull out and use as a steady) when the wheel can be removed from the right hand side.

DISMANTLING THE Q.D. REAR WHEEL

Spindle Sleeve. Unscrew the two locknuts on the right hand side of the spindle sleeve and push the sleeve out of the hub from the right hand side.

Bearings. Extract the inner roller races and dust cover. The outer races are a press fit in the hub and should be tapped out from the opposite side with a soft drift. Care should be taken not to damage the bearing backing rings if there are no replacement rings available.

REMOVAL OF BRAKE DRUM AND SPROCKET

Chain. Engage a gear and remove the spring link; clear the chain from the sprocket.

Brake Adjusting Nut. Unscrew this nut and remove the brake rod from the lever arm.

Brake Torque Stay. Remove the rear nut.

Spindle Sleeve Nut. Unscrew this nut and remove the brake drum assembly from the frame.

DISMANTLING THE BRAKE DRUM AND SPROCKET ASSEMBLY

Anchor Plate Assembly. Hold the lever arm against the tension of the spring to prevent the brake shoes from binding and lift the anchor plate assembly away from the brake drum.

Brake Drum Spindle Sleeve. Push this sleeve out of the brake drum, applying pressure on the threaded end.

Bearing. Remove the bearing retaining circlip with a pair of thin nosed circlip pliers and tap out the bearing, dust cap and felt washer.

DISMANTLING THE ANCHOR PLATE ASSEMBLY

Brake Shoes. Take off both brake shoe return springs and remove the brake shoes.

Brake Shoe Cam. Remove the nut and washer securing the lever arm to the cam spindle and take off the lever arm. Withdraw the cam from the plate.

INSPECTION AND REPLACEMENT OF WORN PARTS

The examination of the wheel parts is exactly as described on page 124, for the non Q.D. standard rear wheel, except for the following differences:-

Brake Drum and Hub Splines. These should be a push fit into one another.

Brake Drum Bearing. Wash in petrol and when dry, check for pitting and indentation of the balls or race tracks and end float. Scrap if this is in evidence.

Sleeves. Examine the threads and the cone fittings on both. Also check the fit of the bearings as any slackness would cause a certain amount of wheel shake.

Felt Washer and Hub to Brake Drum Rubber Seal. When overhauling the wheel, the washers and seal should be replaced to ensure against loss of grease and grease penetration into the brake drum.

ASSEMBLING THE REAR BRAKE ANCHOR PLATE

Brake Shoe Cam. Grease the spindle of the cam and insert it into the housing from the inside of the brake anchor plate. Place the return spring in position (long end away from the anchor plate) and tap the lever arm onto the square shoulder at right angles to the flat side of the cam. Fit the lower nut and tighten.

Brake Shoes. Place the two shoes side by side in the positions which they will occupy in the drum. Fit the return springs to the retaining hooks, then, taking a shoe in each hand and at the same time holding the springs in tension, position the shoes to the anchor plate. By turning the top of the shoe inwards the assembly

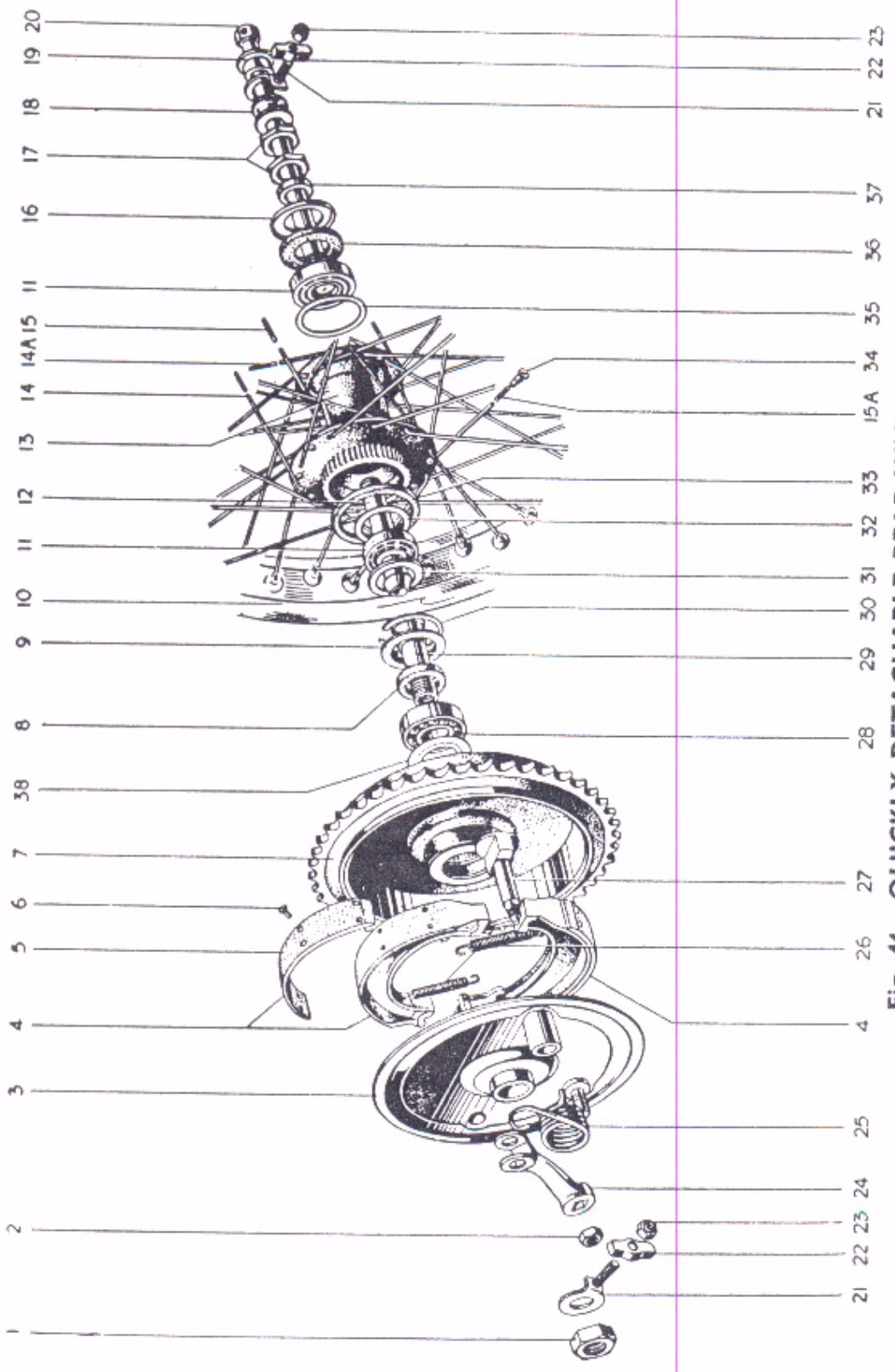


Fig. 44. QUICKLY DETACHABLE REAR WHEEL.

can be placed over the cam and the fulcrum pin and snapped down into position by pressing on the outside of the shoe. With floating shoes see Page 120. Wind the brake lever arm anti-clockwise to engage the return spring.

ASSEMBLING THE BRAKE DRUM AND SPROCKET ASSEMBLY

Bearing. Insert the shim steel grease retainer. Pack the bearing with High Melting Point Grease (see page 180). Press the bearing into the brake drum and fit the felt dust excluder and washer on top. Secure in position with the circlip.

Spindle Sleeve (Short). Slide the spindle sleeve, threaded end first, through the dust cover, bearing and brake drum.

Anchor Plate Assembly. Hold the brake lever arm towards the "ON" position and slide the anchor plate assembly over the spindle sleeve and into the brake drum.

REPLACING THE BRAKE DRUM AND SPROCKET IN THE FRAME

Brake Drum and Sprocket. Position to the swinging fork and ensure that the stud on the anchor plate is located in the brake torque stay hole and screw the nut in position.

Rear Brake Rod. Engage the rod in the lever trunnion and screw on the adjuster nut.

Chain Adjuster. Fit over the sleeve and engage the end plate to the fork end. Screw on the adjuster nut to hold the adjuster in position.

INDEX TO FIG. 44. QUICKLY DETACHABLE REAR WHEEL

Index No.	*Description.*	*Index No.*	*Description.*
1	Nut, L.H. side sleeve.	20	Spindle.
2	Nut, cam lever,	21	Adjuster, chain.
3	Plate, anchor.	22	End plate, adjuster.
4	Shoe c/w lining.	23	Nut.
5	Lining, shoe.	24	Lever, brake cam.
6	Rivet, lining.	25	Spring, cam lever return.
7	Brake drum and sprocket.	26	Spring, shoe return.
8	Felt washer.	27	Cam, brake operating.
9	Retainer, brake drum bearing.	28	Bearing, brake drum.
10	Rim, wheel.	29	Sleeve, brake drum.
11	Bearing, taper roller.	30	Circlip, bearing retaining.
12	Sleeve, bearing.	31	Cap, dust.
13	Hub.	32	Ring, bearing backing.
14	Spoke, 14A. Spoke.	33	Seal, hub to drum dust.
15	Spoke, 15A. Spoke.	34	Nipple, spoke.
16	Cap, dust.	35	Ring, bearing backing.
17	Locknut, bearing.	36	Felt washer.
18	Collar, spindle distance.	37	Distance piece, R.H. bearing.
19	Collar, spindle.	38	Grease retainer.

Sleeve Nut. Screw onto the spindle sleeve and lightly tighten.

Chain. Fit the chain to the sprocket and fit the connecting link.
Do not make any adjustments or tighten the wheel nut until the wheel is fitted.

ASSEMBLING THE Q.D. REAR WHEEL

Bearings. Press the backing rings into the hub up to the small shoulder and press in the outer races up to them. Smear the bearings with grease and place the inner roller races in position.

Spindle Sleeve. Enter the threaded end of the spindle sleeve into the hub at the splined side and press the sleeve through both bearings.

Dust Covers. The brake drum side dust cover is a press fit and should be pushed in up to the bearing. The dust cover on the opposite side has a felt washer insert which should be fitted before the cover is pressed into the hub.

Locking Nuts. Place the small spacing washer over the threaded end of the spindle sleeve and press it into the space between the dust cover and the spindle sleeve. Screw one of the locknuts onto the sleeve until a "nip" is felt, and then slacken back a ¼ of a turn so that the sleeve will rotate freely. Tighten the other nut up to it and lock into position. Again test the rotation of the sleeve.

FITTING THE WHEEL TO THE FRAME AND BRAKE DRUM

Hub Rubber Seal. Fit the new rubber seal over the hub splines.

Wheel. Tilt the machine over as in dismantling and enter the wheel between the forks. Right the machine and then locate the hub splines into the brake drum splines.

Spindle. To the spindle, first fit the collar with the cone shaped end towards the hexagon, then the chain adjuster with the stud inwards. Fit the distance piece between the fork and wheel and insert the spindle through the wheel; screw into the hub sleeve.

Chain Adjuster End Plate. Fit to the R.H. adjuster stud and fork end and secure with the nut.

Adjustments. Check the chain and brake adjustments, and finally the wheel alignment. When correct, tighten the L.H. wheel nut and then place a bar or spanner to the spindle hexagon and turn until the spindle is tight. Check the brake torque stay nuts for tightness.

TYRES

The Dunlop Motorcycle Tyres as fitted to all models, are of the wire bead type and are fitted into a well-base rim. The wire bead ensures that there will be no stretch in the tyre and in combination with the well-base rim, provides for easy fitting and removal of the tyres and the safe use of air pressures.

TYRE PRESSURE

Tyre pressure should always be carefully maintained as an insufficiently inflated tyre is a prevalent cause of failure of the tyre walls. The actual pressure at which the tyres should be maintained, is a matter for experiment and depends on the rider's weight and also the weight of a passenger and luggage if carried.

DUNLOP RECOMMENDED TYRE PRESSURES (SOLO)

MODEL.		TYRE SIZE.	INFLATION. PRESSURE. P.S.I.	Kgms/sq.cm.
5T, 6T, T110 & T120	FRONT	3.25	20	1.4
	REAR	3.50	20	1.4
T100	FRONT	3.25	20	1.4
	REAR	3.50	20	1.4
TR5 & TR6	FRONT	3.25	20	1.4
	REAR	4.00	18	1.3

These inflation pressures are based on a rider's weight of 170 lb.

When additional weight is added, reference should be made to the Dunlop Booklet which advises the necessary increased inflation pressure.

EXAMINATION

Especially during the period when the roads are being tarred and gritted, the tyres should be examined periodically and any sharp pieces of stone removed from the treads. If they are allowed to remain, no immediate damage may be done, but they will later work right through the cover and puncture the tube.

REMOVING THE TYRE

Valve Cap and Core. Unscrew the valve cap and use the specially shaped end to unscrew the valve core and deflate the tyre. Unscrew the knurled nut and with the valve cap and core, place the parts where they will be free from dirt and grit.

Preparation of Tyre and Levers. It is advisable to lubricate the cover beads with a little soapy water before commencing to remove the tyre. Levers should be dipped in this solution before each insertion.

Removing the First Bead. Insert a lever AT THE VALVE POSITION and while pulling on this lever, press the bead into the well of the rim diametrically opposite the valve position. Insert a second lever close to the first and prise the bead over the rim flange. Remove the first lever and insert a little further away from the second lever. Continue round the bead in steps of 2-3 inches (5 to 8 cm.) until the bead is away from the rim.

Inner Tube. Push the valve out of the rim and remove the inner tube.

Removing the Second Bead. Stand the wheel upright and insert a lever between the remaining bead and the rim. Pull the cover away from the rim.

FITTING THE TYRE

Rim Band. Make sure that the rough side of the rubber rim band is fitted against the rim and that the band is central in the well.

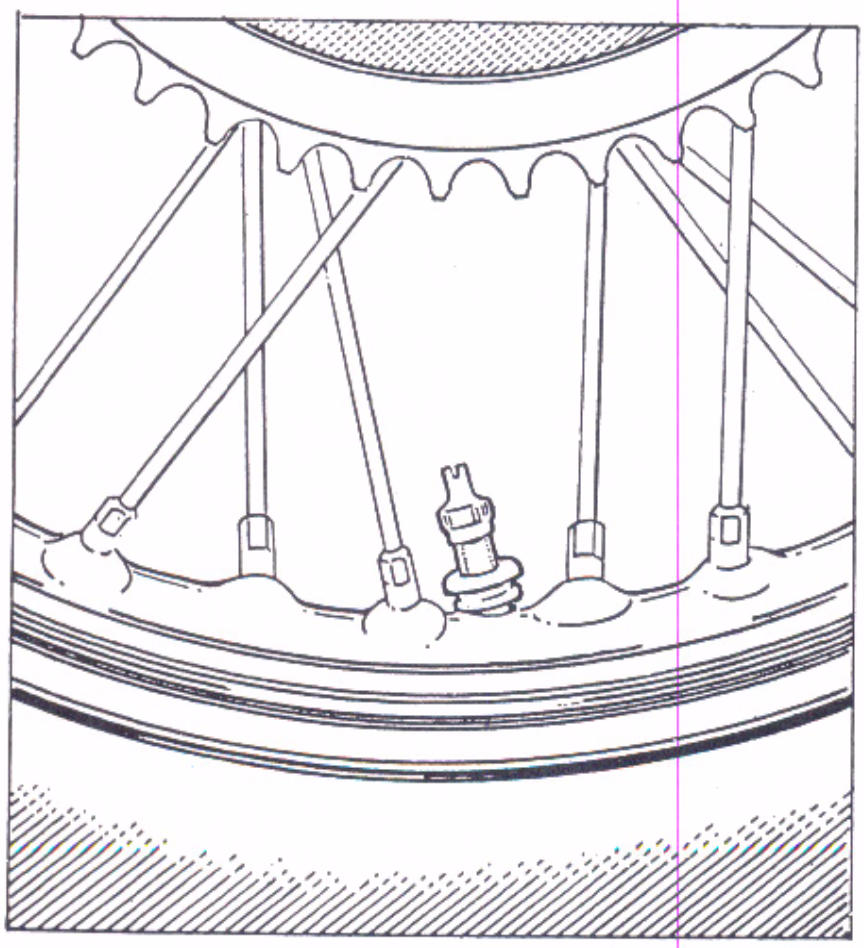


Fig. 45. ILLUSTRATION SHOWING THE POSITION OF THE VALVE IF THE TYRE HAS CREPT ROUND ON THE RIM

Inner Tube. Inflate the inner tube just sufficiently to round it out without stretch, dust it with french chalk and insert it into the cover, leaving it protruding beyond the beads for about 4 inches either side of the valve.

Lubrication. Here again it is a wise precaution to lubricate the beads and levers with soapy water.

First Bead. Squeeze the beads together at the valve position to prevent the tube from slipping back inside the cover and push the cover towards the rim, threading the valve through the valve holes in the rim band and rim. Allow the first bead to enter the well of the rim and the other bead to lie above the level of the rim flange. 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.

Second Bead. Press the second bead into the well of the rim diametrically 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.

Valve. Push the valve inwards to make sure 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.

SECURITY BOLT

The rear tyre is fitted with a security bolt and although the basic procedure for fitting and removing the tyre is the same, the following additional instructions should be followed:-

REMOVING THE TYRE

Valve Cap and Core. Remove as described and deflate the tyre.

Security Bolt and Nut. Unscrew the nut and push the bolt through the inside of the cover.

First Bead. Remove as described.

Security Bolt. Remove from rim.

Inner Tube. Remove as described.

Second Bead. Remove as described.

FITTING THE TYRE

Rim Band. Fit as described.

First Bead. Fit as described but without the inner tube inside.

Security Bolt. Fit to the rim.

Inner Tube. Inflate as described and fit into the cover.

Second Bead. Fit as described but as the security bolt and valve position is reached, push the security bolt well into the cover and make sure that the inner tube is resting on the canvas flap of the security bolt and not overlapping the sides.

Valve. Fit the valve and inflate the tyre. Bounce the wheel at the point where the security bolt is fitted and tighten the security bolt nut.

FRAME

SWINGING FORK

The swinging fork is pivoted to the main frame by a ground, hollow spindle. Two phosphor bronze bushes are pressed into the fork bridge lug to provide a bearing surface for the fork to swing on. The spindle is a drive fit into the frame lug and a working fit in the fork bushes. To retain the spindle in position, a rod is passed through the hollow in the spindle and at each end a retainer cap is made captive, by a nut screwed on the rod end. Between the bridge lug and frame lug on the R.H. side, a spacing washer is fitted in order to control the clearance which may be up to 0.015 in. (0.375 mm.) when new. Shims of 0.003 in. (0.075 mm.) and 0.005 in. (0.125 mm.) thickness are available to reduce the clearance, which may increase after a large mileage. A grease nipple is fitted to the frame to provide access for grease to the bearing by means of a grease gun.
(See Routine Maintenance).

Under average conditions the life of the bearing bushes is approximately 20,000 miles (30,000 kms.). The operation required to replace the bushes is of a major type which calls for the removal of the primary chaincase assembly, gearbox covers, rear wheel and mudguard assembly. If the private owner attempts this work, he should ensure that he has sufficient tools available to complete the work. Details of removing the above mentioned parts will be found by referring to the index on page 189.

GIRLING SUSPENSION UNITS

The Girling suspension units, type SB4, are sealed on assembly and cannot be adjusted. All servicing arrangements are carried out through Girling service agents. The address of the nearest agent may be obtained from Messrs. Girling Ltd., or your local Triumph dealer.

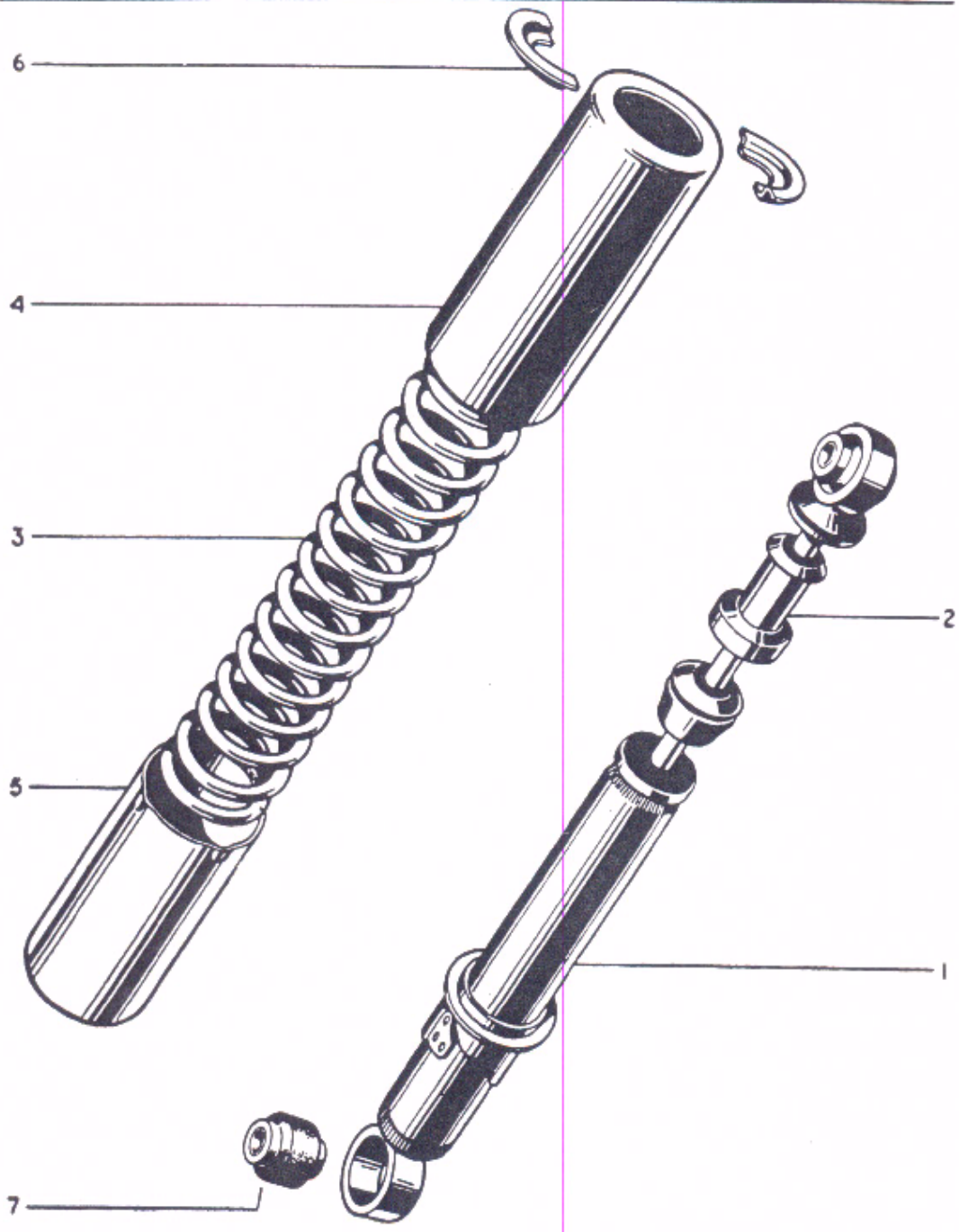


Fig. 46. GIRLING HYDRAULIC SUSPENSION UNIT

INDEX TO FIG. 46. GIRLING HYDRAULIC SUSPENSION UNIT.

Index No.	Description.	Index No.	Description.
1	Damper unit.	5	Dust cover, inner.
2	Bump stop.	6	Spring retainer.
3	Main spring.		
4	Dust cover, outer.	7	Bonded bush and sleeve.

TO INCREASE THE STATIC SPRING RATE

If additional weight is added to the rear of the machine such as a heavy pillion passenger and pannier equipment with luggage, the swinging fork member will position itself above the horizontal. This condition will reduce the springing effect and to overcome it, the main spring poundage in the damper unit can be increased by turning the spring abutment cam (see Fig. 46) with the 'C' spanner (supplied in the toolkit) to engage the second position, or, if necessary the third position. This operation is more easily carried out with the machine on the stand.

CHANGING THE MAIN SPRINGS

DISMANTLING

Unit Fixing Bolts. Remove top and bottom bolts when the unit can be detached.

Dust Cover. Secure the bottom eye between vice jaws on the side faces (protect the jaws with aluminium clamps). Grip and depress the cover sufficiently to enable the removal of the split spring retainer collars.

Spring. Remove the dust cover and spring.

ASSEMBLY

The assembly is carried out in exactly the reverse order to the dismantling sequence but the following observations should be carefully noted.

Springs. Before replacing, lubricate with high melting point grease.

Dust Covers. Ensure that these are not damaged and are completely free from any foreign matter. Either would cause noisy operation of the unit.

Unit Piston Rod. Do not lubricate with either oil or grease but ensure that the rod is perfectly clean.

Checking the Damper Unit Operation. If the handling of the machine is suspect or at least every 2,000 miles (3,000 kms.) check the damping of the movement. If the rear of the machine is depressed several times in quick succession, the units should not extend immediately but should return slowly. If in doubt, remove the units from the machine and take off the main springs. Hold the units vertically, when it should be possible to depress the piston rods quickly but distinct resistance should be felt when lifting the piston rods. The units should be carefully compared, as one faulty unit will cause "rolling" or "weaving".

MAXIMUM MOVEMENT

The stroke of the units is 2½in. (6.35 cm.), Trophy 3½in. (8.89 cm.), and this allows for approximately $\frac{5}{16}$in. (8.0 mm.) compression of the bump rubber.

TWISTGRIP CONTROL

A quick-action twistgrip throttle control is fitted. The damping of the rotor is controlled by a knurled adjuster nut fitted in the twistgrip. To increase the damping, screw in the adjuster until the friction is sufficient to hold the rotor sleeve in any position. Remember that the twistgrip will close immediately the hand is removed to give a road signal if the damping device is not sufficiently adjusted. Maintenance of the twistgrip calls only for light grease lubrication when assembled.

DISMANTLING

Cable Thimble. Unscrew the thimble from the twistgrip head. This is usually made easier by pulling on the cable adjacent to the twistgrip. When unscrewed, the cable simply pulls out of the twistgrip.

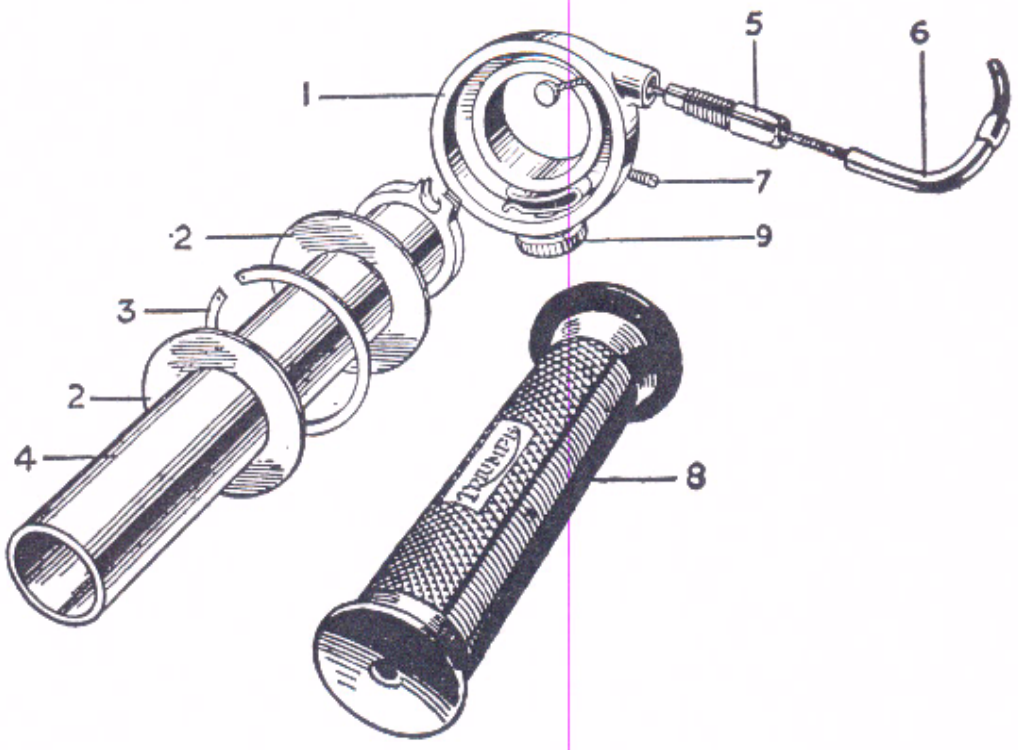


Fig. 47. TWISTGRIP.

Index No.	*Description.*	*Index No.*	*Description.*
1	**Head assembly.**	6	**Guide tube.**
2	**Plate, retaining.**	7	**Grub screw.**
3	**Circlip.**	8	**Grip, rubber.**
4	**Sleeve assembly.**	9	**Screw, friction adjuster.**
5	**Thimble, cable.**		

Rotor Sleeve. Pull back the twistgrip rubber and insert a thin blade behind the first retaining plate. Remove the circlip, when the rotor sleeve assembly can be withdrawn.

Head. Slacken the grub screw which secures the head to the handlebar and withdraw the head.

ASSEMBLING

Rotor Sleeve to Head. These can be replaced before assembling to the handlebar. Lightly grease rotor end ring and fit the rotor sleeve into the head with the nipple housing adjacent to the cable hole.

Slide the retaining plate into position and assemble the circlip to the head. Fit the second retaining plate. Roll back the rubber grip. If a new rubber is to be fitted, first wet the inside with petrol and then push it smartly over the sleeve. This job is done better after the twistgrip has been fitted to the handlebar.

Twistgrip to Handlebar. Grease the swaged portion of the handlebar and slide on the twistgrip; lock in the desired position with the grub screw.

Throttle Cable. Holding the outer casing, pull the inner wire, gripping it close to the cable ferrule with a pair of soft nosed pliers. With the other hand rotate the twistgrip sleeve to the closed position, thread the nipple end of the wire into the head and slowly rotate the sleeve when the nipple housing will locate the nipple. When located, replace the cable thimble over the wire and screw into the head.

PETROL TAP ADJUSTMENT

To make an adjustment, replacement or repair to either type of petrol tap the petrol must be drained from the tank.

Push-pull Type. To adjust a leaking tap, first remove the grub screw locking the plunger to the body, when the plunger assembly can be removed. Grip the plunger end in a suitable tool and turn the plunger knob in a clockwise direction; this expands the cork washer and will make a petrol tight fit when replaced in the petrol tap body. If the cork has deteriorated to any degree, a new cork can be fitted at a very low cost.

Taper Type. Remove the faulty tap and dismantle; take out the split pin, remove the washer, spring back plate and withdraw the spindle and lever assembly. Clean the body and spindle and then apply a smear of rouge to the spindle; add a little oil and rotate the spindle in the tap body using the same motion as when grinding-in the valves. When a true surface is obtained, wash the parts thoroughly in petrol and apply tallow fat to the spindle before assembly. Check the tension of the spring and if insufficient stretch slightly.

FITTING A SIDECAR

First prepare the motorcycle. Fit an engine sprocket having 2 or 3 teeth less than the solo sprocket. Replace the springs in the rear suspension units with 150 lb. rate springs. The appropriate front fork springs (see pages 105 and 113) should be fitted and additionally if a machine with rear panels is being converted, fit longer fork legs available under part number CP.183.

There are fixing points on the frame of the motorcycle at the top and bottom of the seat tube. For frames with the single front down tube a lug is also available for fixing to the front engine plates. Any other connections are provided by the sidecar manufacturers. Fittings on the front down tube should be fitted as high as possible with the smaller part projecting in front of the tubes.

THE CONNECTION MUST BE CLEAR OF THE MUDGUARD WHEN THE FORKS ARE FULLY COMPRESSED, OR THE STEERING MAY JAM WHEN BRAKING HEAVILY.

The following settings give good results although many experienced sidecar drivers may have their own preferences. The sidecar wheel should be 6 in. ahead of the rear wheel and toe-in $\frac{3}{8}$ in. measured at the front wheel. The motorcycle should be upright when the outfit is carrying its normal load, that is it will probably lean towards the sidecar when unladen.

With most makes of sidecar it is necessary to remove the centre stand to allow for the bottom connection, but a light jack and bracket are available for 1954-59 models under part number CP.153.

THE AMAL MONOBLOC CARBURETTER

HOW IT OPERATES

When the engine is idling, mixture is supplied from the pilot jet system, then as the throttle slide is raised, via the pilot by-pass. The mixture is then controlled by the tapered needle working in the needle jet and finally by the size of the main jet. The pilot system is supplied by a pilot jet, which is detachable, for cleaning purposes and which when assembled into the carburetter body is sealed by a cover. The main jet does not spray directly into the mixing chamber, but discharges through the needle jet into the primary air chamber, and the fuel goes from there as a rich petrol-air mixture through the primary air choke into the main air choke.

This primary air choke has a compensating action in conjunction with bleed holes in the needle jet, which serve the double purpose of air-compensating the mixture from the needle jet and allowing the fuel to provide a well, outside and around the needle jet, which is available for snap acceleration.
The carburetter is provided with an air control lever for use when starting from cold or experimenting. At all other times the control should be kept fully opened.

OPERATION OF CARBURETTER PARTS

Throttle Stop Screw. This screw should be set to open the throttle sufficiently to keep the engine running at a low tick over when the twistgrip is shut off.

Pilot Air Screw. To set the idling mixture, this screw should be set in or out to enrich or weaken, normal number of turns out is about 2½. The screw controls the suction on the pilot petrol jet by metering the amount of air which mixes with the petrol.

Needle and Needle Jet. A tapered needle is attached to the throttle and allows more or less petrol to pass through the needle jet as the throttle is opened or closed throughout the range, except when idling or nearly full throttle.

The taper needle position in relation to the throttle opening can be set according to the mixture required by fixing it to the throttle with the needle clip spring in a certain groove, thus either raising or lowering it. Raising the needle enriches the mixture; lowering it weakens the mixture at throttle openings from a quarter to three quarters open. Machines are delivered from the factory with the needle in the fourth notch from the top, and the needle should be lowered to the middle notch after 1,000 miles (1,500 kms.).

Throttle Valve Cut-Away. The atmospheric side of the throttle is cut away to influence the depression on the main fuel supply and thus gives a means of tuning between the pilot and needle jet range of throttle opening. The amount of cut-away is recorded by a number marked on the throttle, viz. 376/3 means throttle type 376 with No. 3 cut-away; larger cut aways, say 4 and 5 give weaker mixture and 2 and 1 richer mixtures.

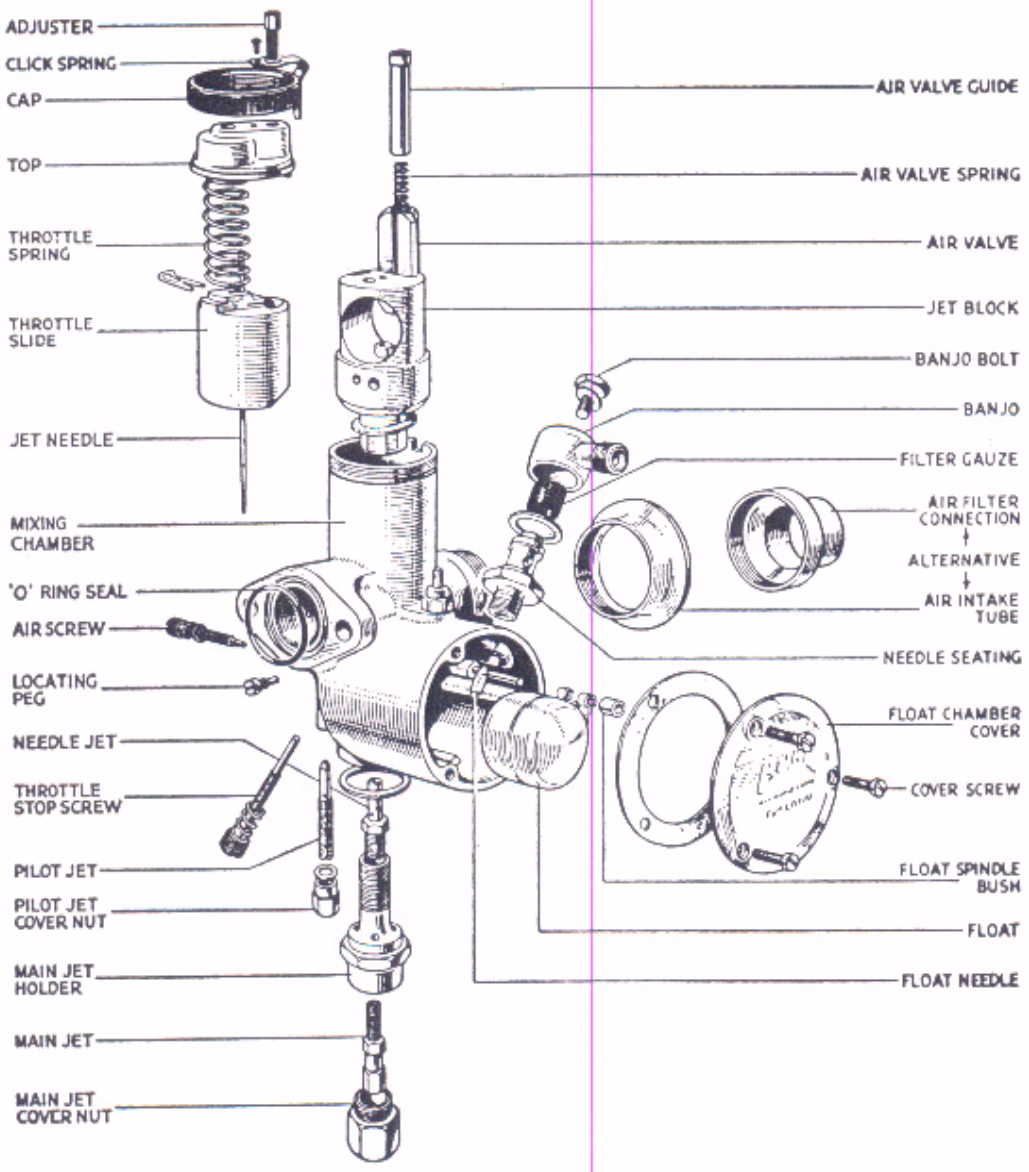


Fig. 48. AMAL MONOBLOC CARBURETTER.

Air Valve. Is only used for starting and running when cold, and for experimenting with, otherwise, run with it wide open.

Tickler. A small plunger spring loaded in the float chamber lid. When pressed down on the float, the needle valve is dislodged from its seat and so "flooding" is achieved. Flooding temporarily enriches the mixture until the level of the petrol subsides to normal.

FAULT FINDING AND MAINTENANCE

Occasionally remove and clean the petrol filter gauze from inside the banjo connection. If flooding occurs check this gauze to see that it is in good condition and then remove the float chamber cover, float and float needle. Examine for dirt or damage on the needle and the needle seating. When replacing the float see that the narrow hinge leg is uppermost, as this operates the needle, and do not forget to replace the float spindle bush. Make sure that the cover plate and washer are clean and in good condition before re-assembling.

GENERAL

Erratic running at low speeds can be due to distortion of the carburetter flange; this fault is generally caused by uneven tightening of the flange nuts. To rectify, first place a straight edge across the flange face to ascertain the amount of bow; if the bow is only slight, rub the flange surfaces over with a piece of emery cloth which has been tacked to a flat surface. If the flange cannot be trued up in this way it should be filed with a 6 in. (15 cm.) flat smooth file, and then finished off as stated above. Always use a new "O" ring seal, Part No. 244/765 when refitting the carburetter.

For more detailed instructions on tuning see the Amal leaflet number 502.

BONNEVILLE 120

The twin carburetters fitted to the Bonneville 120 may require synchronisation and a simple method is as follows:—First adjust the cables from the junction box so that they have the minimum of free play. Now start the motor and take off one plug lead and then adjust the pilot air screw and throttle stop screw in the OPPOSITE carburetter until the motor runs regularly. Replace the plug lead and repeat the process similarly for the other carburetter. With both plug leads replaced the tickover will be too fast and the stop screws should be lowered simultaneously until correct. It is most important the throttle slides lift simultaneously or the motor will run roughly, particularly when accelerating.

The initial setting height of the Bonneville float chamber is with the top face of the float chamber $1\frac{5}{16}$ in. (3.34 cm.) above the central "pip" on the carburetter side covers. This figure may require adjustment on individual machines and should be altered $\frac{1}{16}$ in. (1.6 mm.) at a time and the result tested before further adjustment. A low setting will cause starvation and loss of power and a high setting will cause "lumpy" running with an erratic tickover.

AIR FILTER

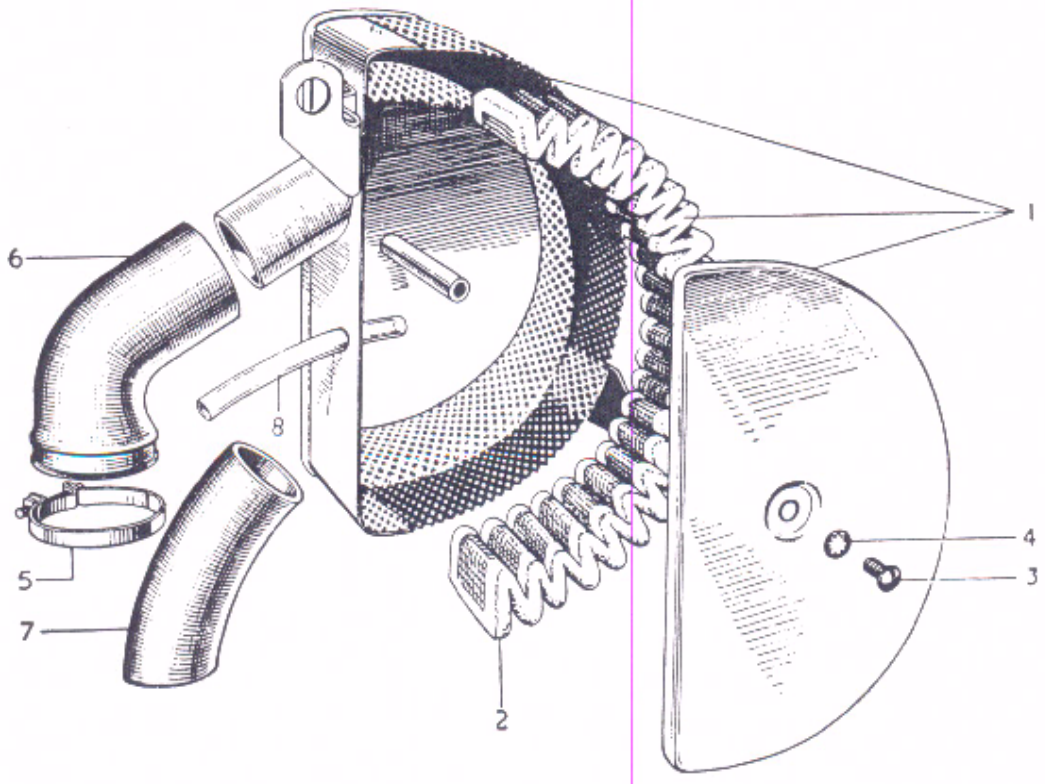


Fig. 49. AIR FILTER.

INDEX TO FIG. 49. AIR FILTER

Index No.	Description.	Index No.	Description.
1	Filter assembly.	6	Connection, Amal carburetter to filter (rubber).
2	Element, filter.	7	Connection, S.U. carburetter to filter (rubber) 6T.
3	Screw, cover.	8	Vent pipe, carburetter to filter, 6T.
4	Washer, shakeproof.		
5	Clip, connection to carburetter.		

SERVICING THE FILTER

To service the filter, the oil tank must first be detached. This operation necessitates the removal of the three fixing bolts and disconnection of the oil pipes. Disconnect the rubber sleeve and remove the air filter.

To remove the filter element, unscrew the screw securing the cover, when the latter can be removed and the element extracted.

The air filter on the 6T and T110 models with rear panels is detached by first removing the battery and battery carrier. In this type of filter the element is sealed in and must be cleaned in situ as detailed below.

Every 2,000 miles (3,000 kms.), the filter element should be removed and washed in petrol until all road dust is extracted. Put the element in a convenient place to dry off. In extreme conditions (dust, sand, etc.) this servicing should be at more frequent intervals. When dry, re-oil the element with "Vokes Trifiltrene" filter oil. If this is unobtainable SAE.20 grade oil may be used.

The filter element should be changed every 10,000 miles (15,000 kms.) and in countries where dusty conditions prevail the change should be made at more frequent intervals. This procedure is most important as a choked filter will cause loss of performance and heavy petrol consumption.

The maximum power output with the air filter attached, is very little affected, but if the absolute maximum is required, remove the rubber sleeve and increase the main jet size by 20 c.c. and fit air intake tube, Part No. 376/066.

PETROL TANK MOUNTING

The following instructions refer to earlier models only; for the current strap fixing see page 63.

The petrol tank rear bracket is rubber-mounted to the frame and the assembly procedure is as follows:—

1. Place the petrol tank on the machine and insert two thick rubber washers under the front. Secure with a rubber washer, steel washer and bolt each side. Fully tighten the bolts and wire them together.

2. Fit the rear bracket to the frame with the spigoted washers in the lower cups and the thin rubbers in the upper cups. Adjust the bolts until one of the thick rubber washers will just slide between the bracket and tank each side. Now wire the bolts together.

3. Secure the tank to the rear bracket with a flat rubber washer between the bracket and the tank and a spigoted rubber washer, cup and fixing bolt below the bracket. Tighten the bolts up to the shoulder and finally wire them together.

THE S.U. M.C.2 CARBURETTER*

ADJUSTMENT AND TUNING

The S.U. Carburetter is of the automatically expanding type in which the cross sectional area of the air passage, and the effective orifice of the jet are variable. The choice of the needle which governs the effective orifice of the jet is settled for a particular engine after considerable testing, both on the engine test bed and afterwards on Road Test, with Premium Grade Petrols, and it is not, therefore, a common requirement that the needle type should be changed from the maker's original specification. Low grade and alcohol blended petrols may require the substitution of a richer than standard needle.

The standard needle is M9, but sidecar machines are sometimes improved by fitting M7. If any doubt arises as to the correctness of the type fitted, this can be checked by first removing the suction chamber and then slackening the side needle screw when the needle can be pulled out and its markings by numbers or letters checked. These identifying letters and numbers may be rolled round the shank, or stamped on the flat end of it. If, therefore, an alteration to mixture strength is required this needle alone should be changed, as all jets are of standard size and as THE JET ADJUSTING NUT IS FOR SETTING THE IDLING ONLY.

It is most important that the needle is fitted with its shoulder FLUSH WITH THE FACE OF THE PISTON, as shown in the diagram.

When detaching the suction chamber and piston assembly from the main carburetter body (necessary when checking or changing the needle) it will be necessary to remove the OIL CAP. After the two side screws have been removed lift the assembly off the carburetter body. This will call for a certain amount of manual dexterity, as the suction chamber can only be lifted a limited amount. One hand is required to lift the suction piston upwards inside the chamber against the piston spring, whilst the other steadies the suction chamber. The complete unit can then be moved sideways, clear of the main instrument, but great care must be taken to see that the JET NEEDLE IS NOT BENT.

When re-fitting the suction chamber and piston the procedure is, of course, reversed, and the piston should be held as high up as possible inside the suction chamber whilst the assembly is guided carefully into the piston bore and jet in the main body. A slot in the small piston diameter registers with a riveted brass guide in the body.

Tuning the carburetter, which should only be carried out after the engine has reached its normal running temperature, is confined to correct idling adjustment by means of the throttle stop screw, which governs the amount of throttle opening for IDLING SPEED, and the jet adjusting nut (18) which controls the IDLING MIXTURE. Screwing this nut up weakens the mixture and down enriches it.

NOTE. This nut must not be forced, as this may set the jet off centre.

**All references to numbers in the script apply to Fig. 51 only.*

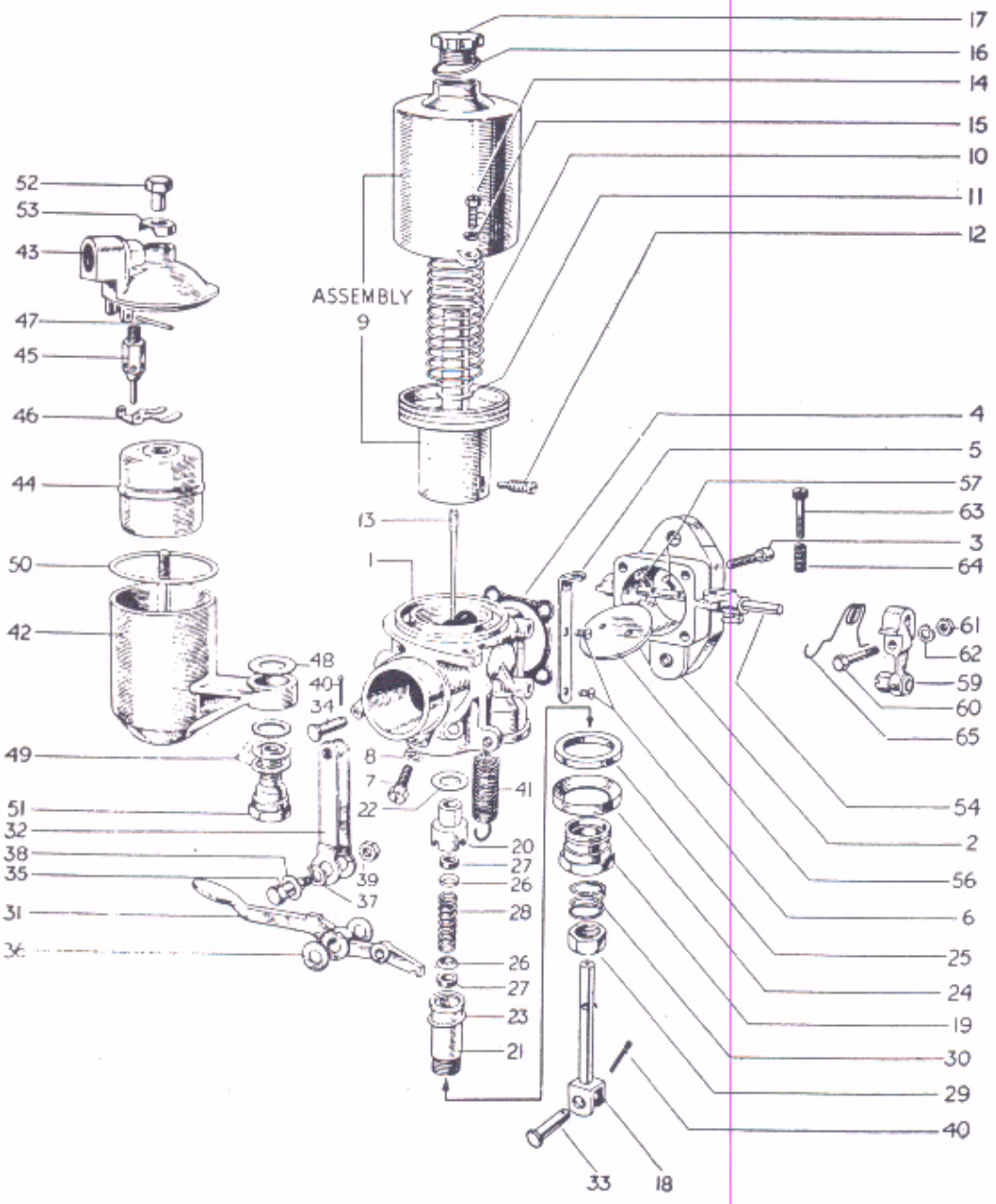


Fig. 50. S.U. CARBURETTER (COMPONENT PARTS).

INDEX TO FIG. 50. S.U. CARBURETTER (COMPONENT PARTS)

Index No.	Description.	Index No.	Description.
1	Body.	33	Pivot pin, long.
2	Adaptor, throttle barrel.	34	Pivot pin, short.
3	Screw, adaptor to body.	35	Bolt.
4	Gasket, adaptor to body.	36	Washer, fibre.
5	Abutment, throttle cable.	37	Washer, spring.
6	Screw.	38	Washer.
7	Screw, plug 2 B.A.	39	Nut.
8	Washer.	40	Split pin.
9	Chamber, suction complete.	41	Spring, return.
10	Spring, piston.	42	Chamber, float.
11	Washer, thrust.	43	Lid, float chamber.
12	Screw, needle.	44	Float.
13	Needle, jet.	45	Needle and seat.
14	Screw.	46	Lever, hinged.
15	Washer, spring.	47	Pin, hinge.
16	Washer, oil cap.	48	Washer, fibre.
17	Oil cap, octagonal.	49	Washers, 2-fibre, 1-brass.
18	Jet.	50	Washer, float chamber lid.
19	Screw, jet.	51	Bolt, holding.
20	Bearing, jet top half.	52	Nut, float chamber lid.
21	Bearing, jet bottom half.	53	Cap, brass.
22	Washer, copper.	54	Throttle spindle.
23	Washer, copper.	56	Disc throttle.
24	Ring, sealing (Brass).	57	Screw.
25	Ring, sealing (Cork).	59	Lever, throttle.
26	Washer, gland (Brass).	60	Bolt.
27	Washer, gland (Cork).	61	Nut.
28	Spring.	62	Washer.
29	Nut, adjusting.	63	Screw, adjusting.
30	Spring.	64	Spring, adjusting screw lock.
31	Lever, jet.	65	Spring, lever return.
32	Link, jet.		

WARNING. Move one "flat" of the nut round at a time and remember to apply slight downward pressure on the jet lever to ensure that the jet follows the adjusting nut, as the jet lever spring (Pt. No. 4872/1) is not strong enough to do this of itself (as in car practice), its sole purpose being to retain the jet against vibration in the position set by the rider. Three "flats" in either direction should be sufficient to identify progress; excess movement would indicate an air leak in the induction system or an ignition fault. A correct idling mixture gives an even beat with a colourless exhaust—too rich a mixture gives a trace of black in the exhaust with a rhythmical or regular misfire—too weak a mixture gives a splashy irregular type of misfire with a marked tendence to stop. To test remove the plug (29) and lift the piston $\frac{1}{16}$ in. (1.5 mm.) with a thin rod. If the mixture is correct the engine will stop, but if it is too rich the engine will speed up.

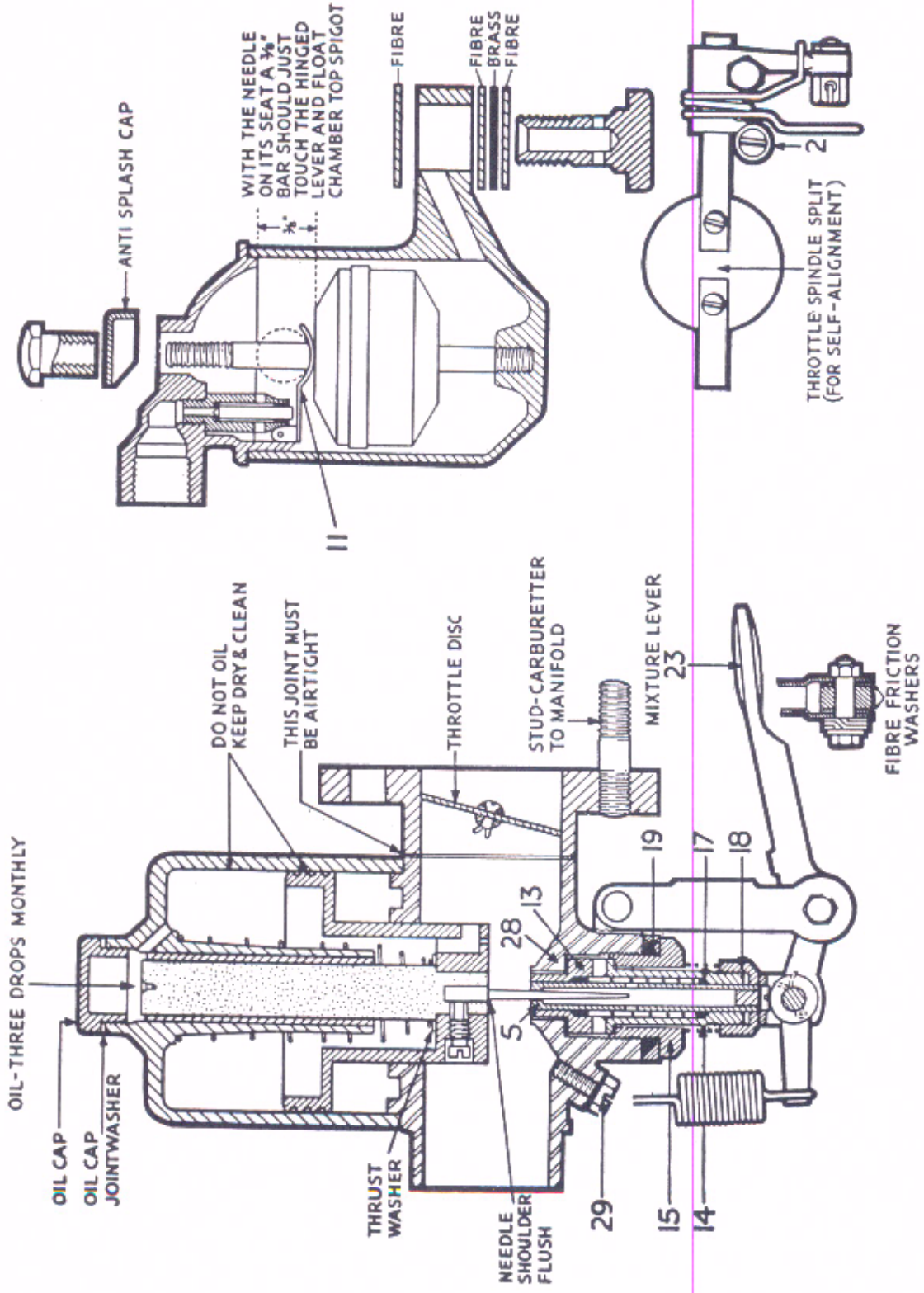


Fig. 51. S.U. CARBURETTER (DIAGRAM).

DEFECTS IN OPERATION

When an engine runs erratically, faults other than carburation can be contributory causes. Before interfering with the carburetter, the following possibilities should be considered:—

(*a*) Compression—Equal pressure in both cylinders; check tappet clearances.
(*b*) Moisture condensation (water)—Examine float chamber and H.T. cables.
(*c*) Ignition System—Inspect the distributor points, clean and adjust if necessary.

Contact breaker and condenser condition is most important. Sparking plugs should be cleaned and re-gapped (See Technical Data) and pressure tested. Correct timing is vital to good idling, in particular excessive advance and faulty operation of the automatic mechanism must be rectified.

(*d*) Check for air leaks:—

(i) Between the MANIFOLD and CYLINDER HEAD.
(ii) Between the MANIFOLD and CARBURETTER.
(iii) Between the TWO HALVES of the CARBURETTER.
(iv) at the SUCTION CHAMBER CAP.

If, however, the engine and ignition are found to be faultless the following points should be checked on the carburetter:—

STICKING OF PISTON

The symptoms here are either stalling and a refusal of the engine to run slowly or, alternatively, lack of power accompanied by excessive fuel consumption. This defect is easily detectable. When the engine is not running the piston should rest upon the bridge (28). When raised by the hand through the air intake, the piston should drop freely and strike the bridge sharply and distinctly. To do this the filter rubber connection must first be removed.

If it becomes prematurely arrested in its downward movement, or appears unduly reluctant to break away from its position of rest on the bridge when an attempt is made to raise it from this position, the jet should be lowered by means of its lever, and the test repeated.

If the symptoms persist, it can be assumed that either the large diameter of the piston is making contact with the bore of the suction chamber, or the small diameter with the carburetter body, or that the piston rod is not sliding freely within its bush.

When, on the other hand, sticking has been eliminated by the act of lowering the jet, the indication is that the needle is binding on the jet either due to its being bent or to the latter being out of centre. Normally the needle should never touch the jet orifice when correctly assembled.

(If visual evidence clearly indicates needle wear and jet ovality, both should be renewed).

Rectification should be conducted as follows according to the diagnosis:—
Dirt or contact between the piston and suction chamber, or sticking of the piston rod in its bush.

If dirt or corrosion of the suction chamber, piston or piston rod is responsible then the parts should be cleaned with a solvent such as petrol, thinners, degreasing fluid or alcohol, but no abrasive material should be used. They should be re-assembled dry and clean with OIL ON THE PISTON ROD ONLY. If, on the other hand, there is metallic contact the high spot may be removed with a scraper PROVIDED THAT THE GREATEST CARE IS TAKEN; INDISCRIMINATE SCRAPING WILL RENDER THE PARTS SCRAP.

Bent Needle or incorrectly centred Jet

A bent needle should be replaced as straightening is seldom satisfactory, and an incorrectly centred jet should be re-centred according to the instructions given below. In either case contact between these two parts is likely to have caused wear and both may have to be replaced.

LUBRICATION

EVERY MONTH, or as frequently as may be found necessary, remove the plastic oil cap from the top of the suction chamber and thoroughly oil the piston rod and guide bush assembly with thin machine oil.

When the oil cap and joint washer have been replaced, ensure that the cap is FIRMLY SCREWED DOWN. An air leak at this point would upset the automatic operation of the piston in the suction chamber, causing a rich setting and loss of speed.

ECCENTRICITY

Re-centring of the jet in relation to the needle will be necessary should the jet have become laterally displaced in service due to inadequate tightening of the locking screw (15), or any other cause. This operation will of course, also be necessary if the jet and its associated parts have been removed for any reason. Before proceeding as described in the next paragraph, first try turning the jet round 180° as, if the jet head has been connected to the mixture lever in a different place to that at which it was originally "centred" the action of the piston will be restricted.

The procedure for re-centring the jet is as follows:—
The jet adjusting nut (18) should first be screwed upwards to its fullest extent. THE JET HEAD THEN BEING RAISED TO CONTACT IT so that the jet assumes its highest possible position. The locking screw (15) should now be loosened sufficiently to release the jet and the jet bush assembly (5), (13), (14), etc., and permit this to be moved laterally.

A moderate side loading applied to the lower protruding part of the lower jet bush (14) will indicate whether or not the assembly has been sufficiently freed. The piston should now be raised and, maintaining the jet in its highest position, allowed to drop. This will cause the needle to move the jet gradually but positively into position, and thus bring about the required centralisation.

The locking screw should now be tightened and the jet returned to its former position. Should any indication of contact between the needle and the jet persist, which may sometimes occur due to further displacement of the assembly on finally tightening the locking screw, this must again be slackened off and the operation repeated.

FLOODING FROM FLOAT CHAMBER OR MOUTH OF JET

Flooding may occur due to a punctured float, or to dirt between the float chamber needle valve and its seating. To remedy either defect, the float chamber lid should be removed and the necessary cleaning, float replacement or repair effected. The needle and seating unit number is T2, to identify which two ring grooves are machined around the seating.

Flooding may also occur if the original manufacturer's setting of the hinged fork lever (11) in the top of the float chamber has been disturbed, possibly causing the petrol level to be higher than normal, this higher level giving a slow petrol bleed over the jet bridge. The setting figure for this fork is that with the fork pressing the needle home on its seating, a $\frac{3}{8}$in. (9.5 mm.) diameter test bar should just slide easily between the curve of the fork and the circular facing of the float lid casting.

Flooding may also be caused by a bad seal between the float needle and its seating, and which may sometimes be restored by giving the needle a few light taps with a delicate instrument such as the handle of a screwdriver:

ROUGH HANDLING WILL RENDER THE PARTS SCRAP.

Leakage from bottom of Jet

If persistent slow leakage is observed in the neighbourhood of the jet head, it is probable that the jet gland washer (7) and its lower counterpart, together with the locking screw washer (19) require replacement. The jet lever (23) should first be detached from the jet head, the locking screw (15) removed, and the entire jet and jet bush assembly withdrawn. On re-assembly, great care should be taken to replace all parts in their correct situations, as shown in the diagram. Re-centring of the jet, as previously described, will of course be necessary after this operation.

HINTS AND TIPS

These are a few of the points to which the Owner should pay particular attention in order to maintain minimum fuel consumption and maximum power.

1. The Float Chamber. If rough running and poor idling are suddenly experienced, the internal float chamber condition is usually responsible. To overcome this trouble remove the float chamber every two months and thoroughly clean. When replacing, do not overtighten the lid sleeve nut as this will cause distortion and leakage of fuel at the joint between lid and float chamber.

2. Air Leaks. Leakage at the manifold to engine and carburetter to manifold will completely upset the smooth performance of the engine.

3. Sticking Piston. Dirt, corrosion or malalignment of the jet will cause the piston to stick. Make sure that the suction chamber and piston are perfectly dry and clean, and that the PISTON ROD, which must move freely in its bush, IS OILED. Before attempting to re-centre the jet try the effect of turning it through 180°. It may have been replaced in the opposite position, in the mixture lever.

4. Throttle Spindle. Overstressing the throttle spindle torsion return spring is a common fault. This causes the coils to bind before full throttle is attained, and may disturb the whole mechanism. Incorrect positioning of the movable throttle lever may do the same.

LUBRICATE THROTTLE CABLE TO ENSURE SMOOTH AND POSITIVE THROTTLE OPERATION.

5. Plastic Cap. Do not forget to fit the washer, as the spindle can foul the cap before full lift occurs, resulting in restricted power. Always use the correct part, a car type (with a hole in) will **NOT** do.

6. Piston Spring. Do not mutilate the spring by stretching, otherwise the performance and fuel consumption of the motorcycle will be adversely affected. If in doubt regarding the spring pressure a new one of the correct type should be fitted.

Make sure that the ignition control is working properly, that the timing is correct and, in particular, that it is not advanced—**especially** at idling.

AIR FILTER

THE AIR FILTER SHOULD NOT BE DISCONNECTED IN AN ATTEMPT TO INCREASE THE MAXIMUM SPEED OF THE MACHINE. THE CARBURETTER AND AIR FILTER ARE DESIGNED TO GIVE MAXIMUM EFFICIENCY AND, IN FACT, THE REMOVAL OF THE FILTER WILL IMPAIR GENERAL PERFORMANCE AS THE CARBURETTER IS EXPOSED TO ROAD DUST AND OTHER FOREIGN MATTER. IF THE AIR FILTER IS NOT CONNECTED THERE IS A LIKELIHOOD THAT THE FREEDOM OF THE PISTON IN THE SUCTION CHAMBER WILL BE RESTRICTED. **ITS FREE MOVEMENT IS VITAL TO THE SATISFACTORY OPERATION OF THE CARBURETTER, OF THE ENGINE AND, THEREFORE, OF THE WHOLE MOTORCYCLE.**

LUCAS ELECTRICAL EQUIPMENT

DYNAMO LIGHTING AND MAGNETO IGNITION

DYNAMO

Output Control. The dynamo works in conjunction with a regulator unit to give compensated voltage control. Although combined structurally, the regulator and cut-out are electrically separate. Both are accurately adjusted during manufacture and should not be tampered with.

The regulator provides a completely automatic control. It causes the dynamo to give an output which varies according to the load on the battery and its state of charge. When the battery is discharged, the dynamo gives a high output, but if the battery is fully charged then the dynamo gives only a trickle charge so as to keep the battery in good condition. In addition to controlling the output of the dynamo according to the condition of the battery, the regulator provides for an increase of output to balance the current taken by the lamps when in use.

The cut-out is an automatic switch which connects the dynamo to the battery only when the dynamo voltage exceeds the battery voltage, or conversely, which disconnects to prevent the battery discharging through the dynamo windings.

The dynamo output is accurately set to suit the requirements of the motorcycle and in normal service the battery will be kept in a good condition. If due to special running conditions it is found that the battery is not kept in a charged condition or is being overcharged, the regulator should be re-set by a Lucas Service Depot or Agent. Accurate measuring equipment is required to set the regulator correctly.

Ammeter Readings. Normally, during day time running when the battery is in good condition, the dynamo gives only a trickle charge so that the ammeter needle should show only a small deflection to the "+" side of the scale.

A discharge reading should be observed immediately after switching on the headlamp. This usually happens after a long run when the battery voltage is high. After a short time the battery voltage will drop and the regulator will respond, causing the dynamo output to balance the lamp load.

Lubrication. No lubrication is required to these models as ball bearings are fitted at both ends. These bearings are packed with grease during assembly and will last until the machine is taken down for a general overhaul.

Inspection of Brushgear and Commutator. Every six months, remove the commutator cover and inspect the brushgear and commutator. The brushes, which are held in boxes by means of springs, must make firm contact with the commutator. Move each brush to see that it is free to slide in its holder; if it sticks, remove it and clean with a cloth moistened with petrol. Care must be taken to replace the brushes in their original position, otherwise they will not "bed" properly on the commutator. If after long service the brushes have become worn to such an extent that they will not bear properly on the commutator they must be replaced. Always use genuine Lucas brushes, which should be fitted by a Service Agent so that they can be properly bedded to the commutator.

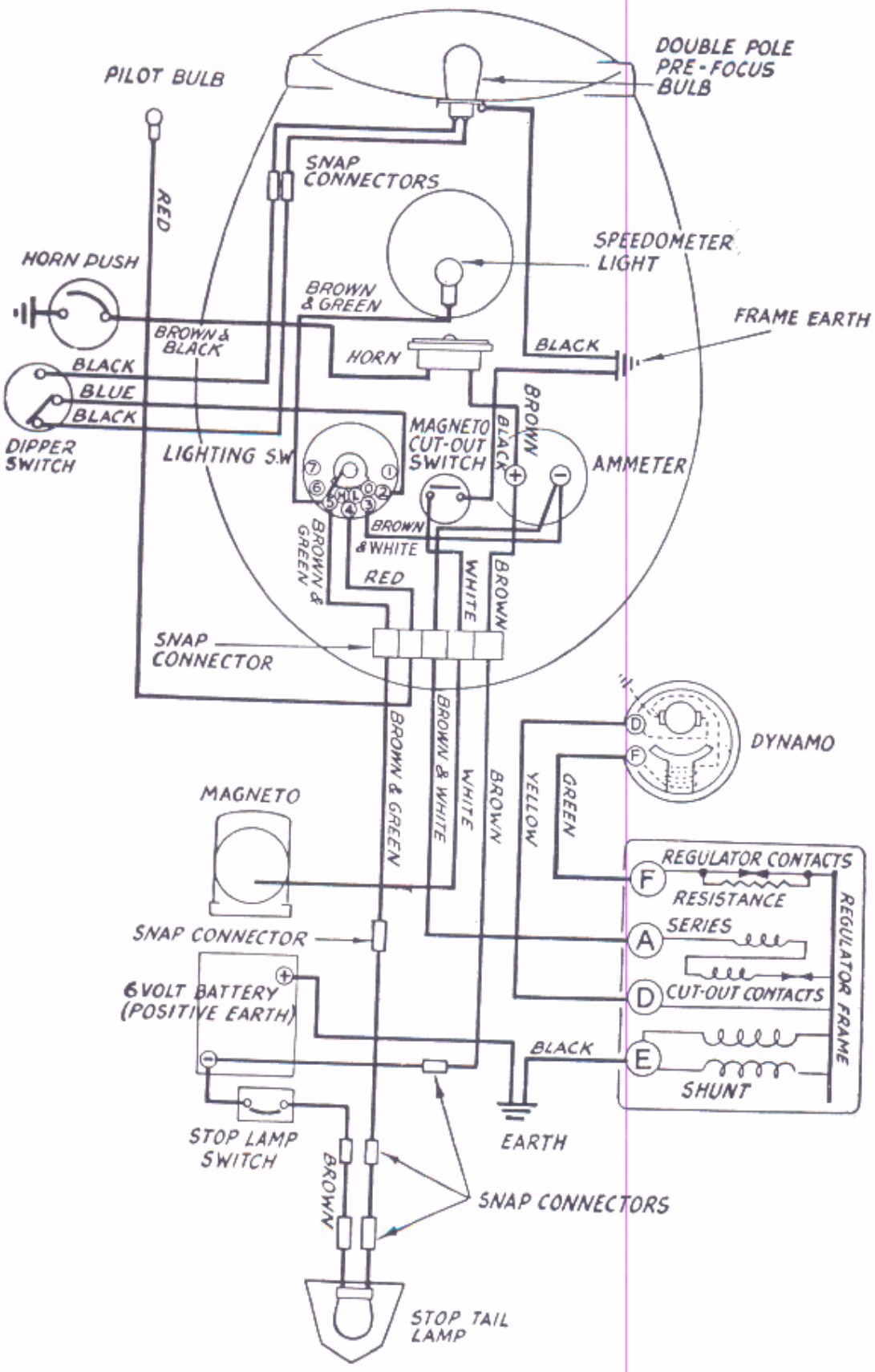


Fig. 52. WIRING DIAGRAM (Models with Dynamo).

Examine the commutator, which should be free from any trace of oil or dirt and should have a highly polished appearance. Clean a dirty or blackened commutator by pressing a clean dry cloth against it whilst the engine is slowly turned over by means of the kickstarter crank. (It is an advantage to remove the sparking plugs before doing this). If the commutator is very dirty, moisten the cloth with petrol.

MAGNETO

The magneto is of rotating armature pattern, having its magnet cast into the body, so eliminating joints and improving the weatherproof properties of the magneto. The ignition timing is controlled by a manual lever situated on the handlebar.

Lubrication—Every 3,000 miles (5,000 kms.). The cam is supplied with lubricant from a felt pad contained in a pocket in the contact breaker housing. A small hole in the cam fitted with a wick, enables the oil to find its way to the surface of the cam. Remove the contact breaker cover, turn the engine over until the hole in the cam can be clearly seen and then carefully add a few drops of thin machine oil. Do not allow any oil to get on or near the contacts. If the cam ring is removed, the wick should be taken out and soaked in thin machine oil. Wipe the wick to remove surplus oil, before replacing.

The contact breaker rocker arm pivot also requires lubrication and the complete contact breaker must be removed for this purpose. Take out the hexagon-headed screw from the centre of the contact breaker and carefully lever the contact breaker off the tapered shaft on which it fits. Push aside the rocker arm retaining spring, lift off the rocker arm and lightly smear the pivot with Mobilgrease No. 2 or an equivalent grease.

Remove the cam ring, which is a sliding fit in its housing, and lightly smear inside and outside surfaces with Mobilgrease No. 2. Removal and re-fitting of the cam can be made easier if the handlebar control lever is half retarded, thus taking the cam away from its stop pin. Allow one or two drops of thin machine oil to the felt cam lubricator in the housing. Re-fit the cam, taking care that the stop peg in the housing and the timing control plunger engage with their respective slots.

If an earthing brush is fitted at the back of the contact breaker base, see that it is clean and can move freely in its holder, before re-fitting to the contact breaker. When replacing the contact breaker, take care to ensure that the projecting key on the tapered portion of the contact breaker base engages with the keyway cut in the magneto spindle, otherwise the timing of the magneto will be affected. Replace the contact breaker securing screw and tighten with care.

The armature bearings are packed with grease during assembly, and will not need attention until the motorcycle is dismantled for general overhaul, when it is advisable to have the magneto inspected by a Lucas Service Depot or Agent.

Adjustment of Contact Breaker Setting. The setting of the contact breaker must be checked every 3,000 miles (5,000 kms.). To do this, remove the contact breaker cover and turn the engine until the contacts are seen to be fully open. Check the gap with a feeler gauge having a thickness of 0.012in.-0.015in. (0.30-0.40 mm.). A gauge for this purpose is provided on the spanner usually supplied with each magneto. If the setting is correct, the gauge should be a sliding fit, but if the gap width varies appreciably from the gauge thickness it must be adjusted. Keep the engine in the position giving maximum separation of the contacts, slacken the locknut and turn the contact screw by its hexagon head until the gap is set to the gauge.

Cleaning Contacts. Every 6,000 miles (10,000 kms.), take off the contact breaker cover and examine the contact breaker. Dirty or pitted contacts can be cleaned with a fine carborundum stone, or, if this is not available, very fine emery cloth can be used.

Wipe away any dirt or metal dust with a cloth moistened with petrol. Contact breaker springs should be examined and any rust removed. To render contacts accessible for cleaning, proceed as outlined below.

After cleaning, check the contact breaker setting.

Removal of Contacts for Cleaning. Unscrew the contact breaker securing screw. Carefully lever the contact breaker off the tapered shaft on which it fits. Push aside the locating spring and lift the rocker arm off its pivot, when it will be possible to clean the contacts. When replacing the contact breaker, check that the projecting key, on the tapered portion of the contact breaker base, engages with the keyway cut in the armature spindle, otherwise the timing of the magneto wil lbe affected. Replace the contact breaker securing screw and tighten with care.

High Tension Pick-up. About every 6,000 miles (10,000 kms.), remove the high tension pick-up. Wipe the moulding with a clean dry cloth. Check that the carbon brush moves freely in its holder, but take care not to stretch the brush spring unduly. If the brush is dirty, clean it with a cloth moistened with petrol. If the brush is worn to within $\frac{1}{8}$ in. (3.0 mm.) of the shoulder it must be renewed.

Before re-fitting the high tension pick-up, clean the slip ring track and flanges by pressing a soft dry cloth on the ring with a suitably shaped piece of wood, while the engine is slowly turned.

Renewing High Tension Cables. When high tension cables show signs of cracking or perishing, they must be replaced, using 7 mm. rubber covered ignition cable.

To replace a high tension cable proceed as follows:—

Remove the metal washer and moulded terminal from the defective cable. Thread the new cable through the moulded terminal and cut back the insulation for about $\frac{1}{4}$in. (6.0 mm.). Pass the exposed strands through the metal washer and bend them back radially. Screw the terminal into the pick-up moulding.

LUCAS RM 14, RM 13/15 AND RM 15

A.C./D.C. LIGHTING AND IGNITION

GENERAL DESCRIPTION

Under NORMAL running conditions, electrical energy in the form of rectified A.C. passes through the battery from the alternator—the rate of charge depending on the position of the lighting switch. When no lights are in use, the alternator output is sufficient only to supply the ignition coil and to trickle-charge the battery. When the lighting switch is turned to the "PILOT" or "HEAD" positions, the output increases proportionately.

Under EMERGENCY starting conditions, trickle-charging continues whilst an ignition performance similar to that from a magneto is obtained. AFTER THE ENGINE HAS BEEN STARTED, NORMAL RUNNING IS RESUMED BY TURNING THE IGNITION KEY FROM "EMG" to "IGN". IF THE BATTERY MUST BE REMOVED, THE ENGINE CAN BE RUN TEMPORARILY WITH THE IGNITION SWITCH IN THE "EMG" POSITION PROVIDING THAT THE BATTERY NEGATIVE INPUT CABLE (BROWN) IS EARTHED TO THE FRAME. UNDER THESE CONDITIONS NO LIGHTS ARE AVAILABLE.

CIRCUIT DETAILS

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

Connections to the remaining coils vary according to the positions of the lighting and ignition switch controls. When no lights are in use, the alternator output from the battery charging coil is regulated to a minimum by interaction of the rotor flux set up by current flowing in the short circuited coils.

In the "PILOT" position these latter coils are disconnected and the regulating fluxes are consequently reduced. The alternator output therefore increases and compensates for the additional parking light load. In the "HEAD" position, the alternator output is further increased by the connection of all three pairs of coils in parallel.

EMERGENCY STARTING (IGNITION SWITCH AT EMG.)

With this circuit the contact breaker is arranged to open when the alternating current in the windings reaches a maximum. The ignition coil primary winding and the contact breaker are connected in series. When the contacts separate H.T. current is induced in the coil secondary windings, thus producing a spark at the plug.

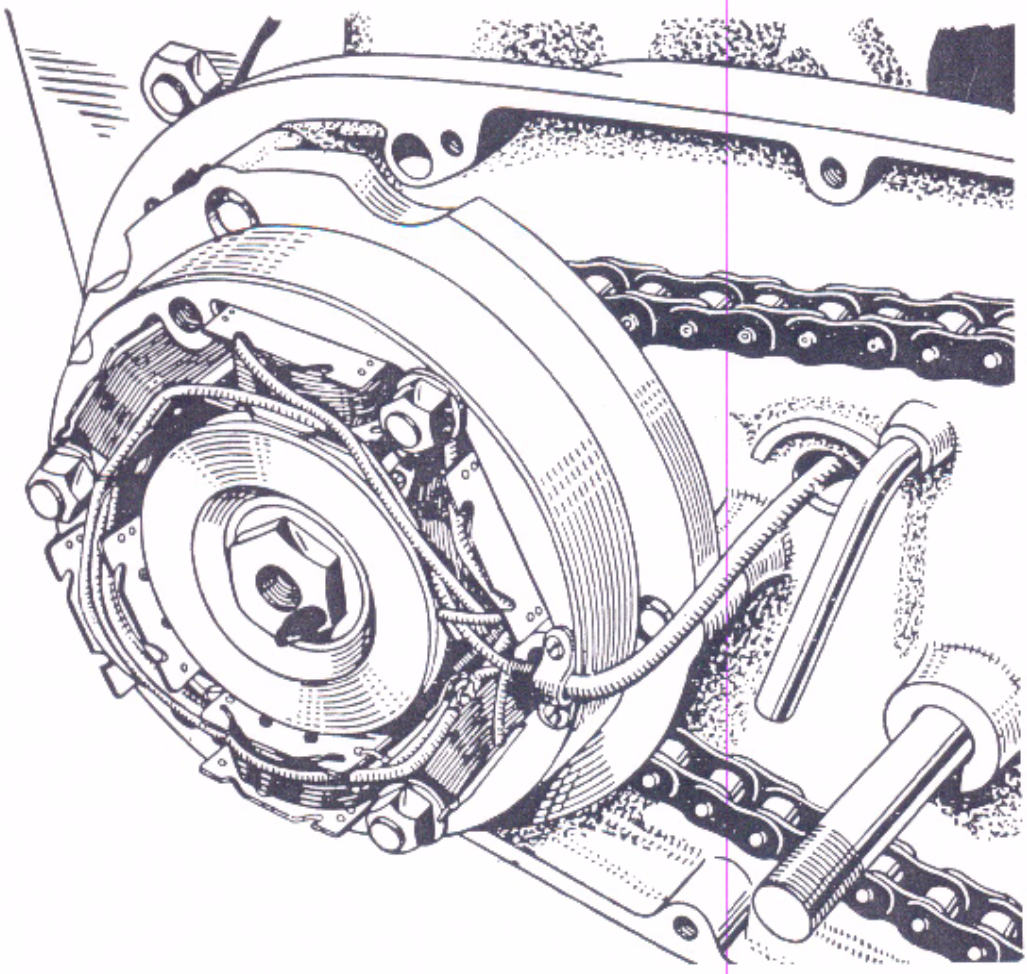


Fig. 53. PRIMARY CHAINCASE COVER REMOVED TO SHOW ROTOR AND STATOR.

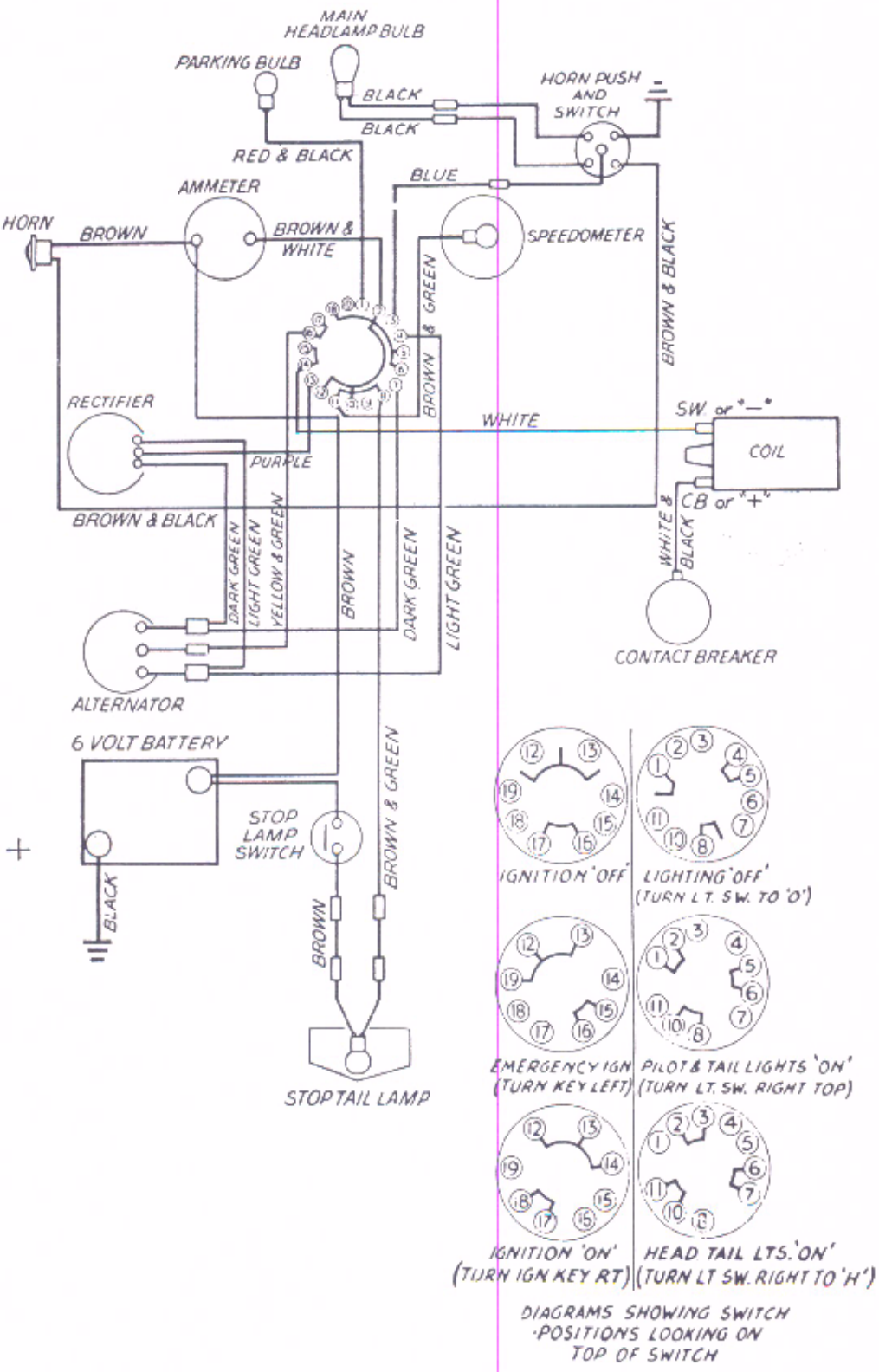


Fig. 54. WIRING DIAGRAM (5T & 6T).

Since, with the ignition switch at "EMG" and the engine running, the battery receives a charging current, the battery voltage soon begins to rise. The rising voltage opposes the alternator voltage, gradually effecting a reduction in the energy available for transfer to the coil. In the event of a rider omitting to return the ignition key from position "EMG" to position "IGN" this reduction in spark energy will cause misfiring to occur and will remind the rider to switch over to normal running.
As previously mentioned, continuous running without a battery is temporarily arranged by earthing the cable normally connected to the battery negative terminal.

CONSTRUCTION

The alternator consists essentially of a spigot-mounted and bolted 6-coil laminated stator with the centre-bored rotor carried on, and driven by, an extension to the crankshaft. The rotor has an hexagonal steel core, each face of which carries a high energy permanent magnet keyed to a laminated pole tip. The pole tips are riveted circumferentially to brass side plates, the assembly being cast in aluminium and machined to give a smooth external finish. The stator and rotor can be separated without any need to fit magnet keepers to the rotor poles.

RATING

The alternator is designed for use with headlamp bulbs not exceeding 30-watts rating (or equivalent Continental touring bulbs which, although of higher wattage rating, are yet suitable due to the generally higher average road speeds encountered abroad).

THE ALTERNATOR

Except for an occasional inspection of the snap-connectors in the three green output cables—these connectors must be clean and tight—the alternator requires no maintenance.

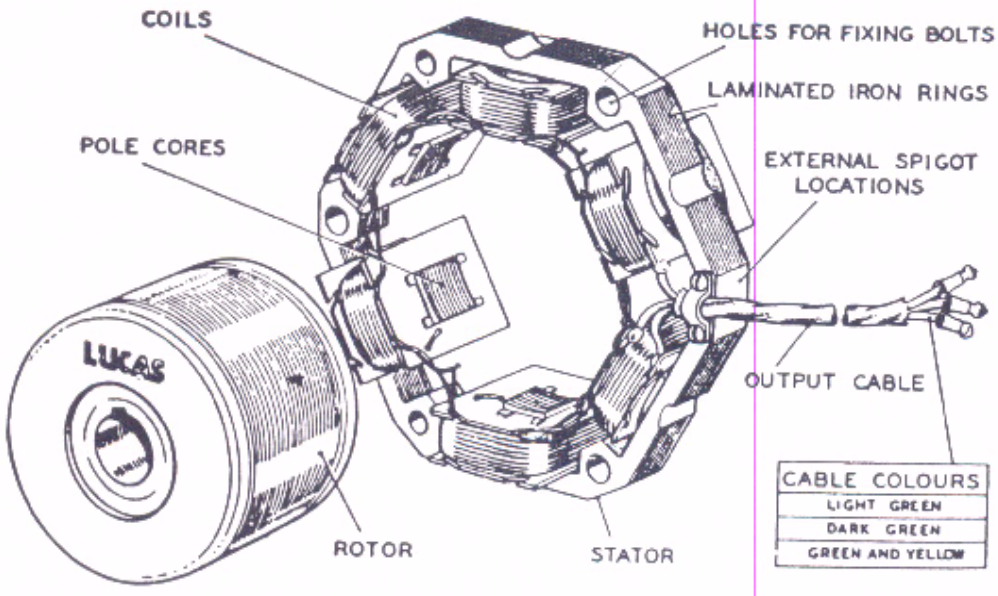


Fig. 55. ALTERNATOR (Model RM14).

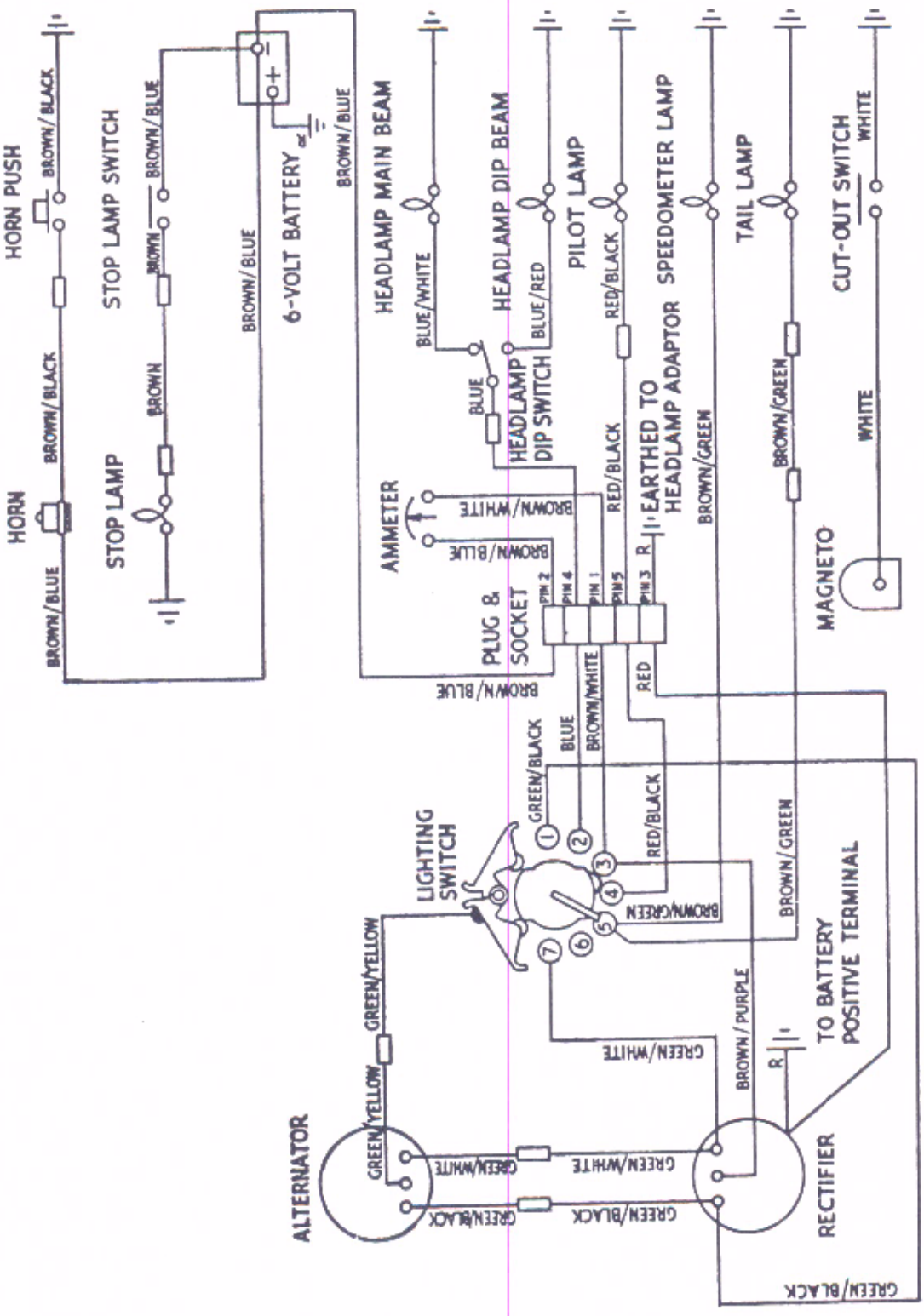


Fig. 56. WIRING DIAGRAM (LATER T110, TR6 & T120).

CONTACT BREAKER UNIT

Lubrication every 3,000 miles (5,000 kms.)

(i) Remove the metal cover and lightly smear the face of the cam with one of the greases recommended for the grease gun use in the "Recommended Lubricants" chart in the Instruction book. If this is not available, clean engine oil may be used.

WARNING

When carrying out the above lubrication, no oil or grease must be allowed to get onto or near the contacts.

(ii) Lubricate the automatic timing control mechanism, using thin machine oil.

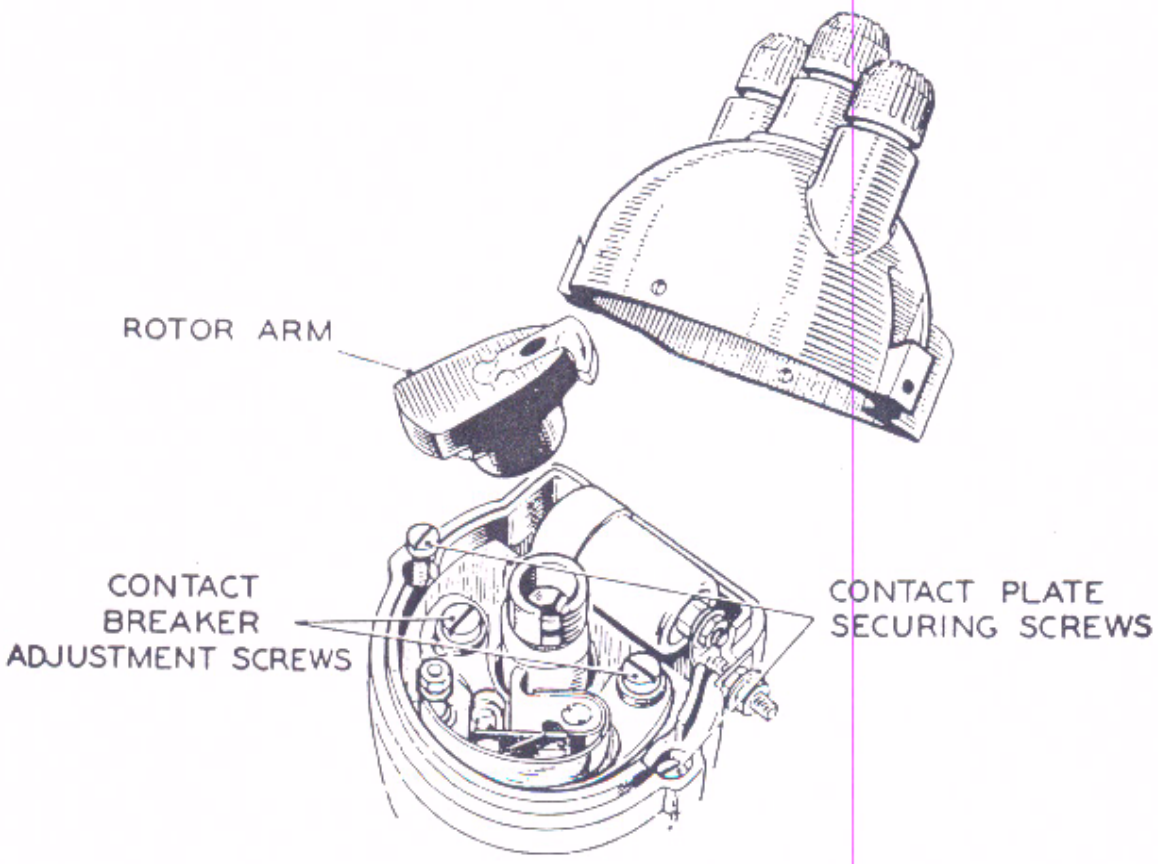


Fig. 57. DISTRIBUTOR MODEL DKX2A

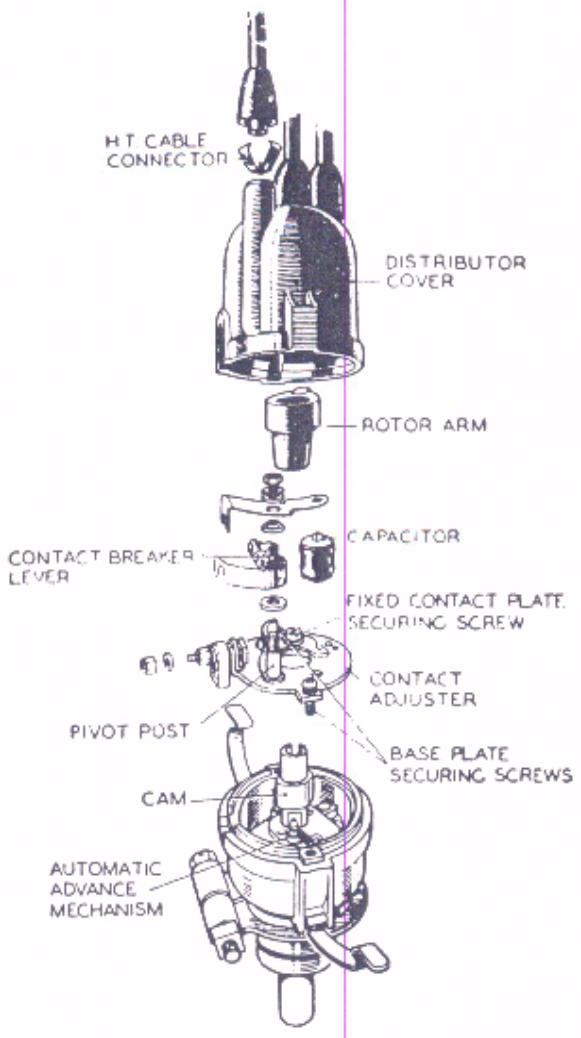


Fig. 58. DISTRIBUTOR, MODEL 18 D2.

Cleaning: Every 6,000 miles (10,000 kms.)

Remove the distributor cover and wipe it inside and outside with a clean, dry, fluffless cloth.

Examine the contact breaker. The contacts must be free from grease or oil. If they are burned or blackened, clean with fine carborundum stone or very fine emery cloth, afterwards wiping away any dirt or metal dust with a clean petrol-moistened cloth.

The easiest way to clean the contacts is to first take off the moving contact, by unscrewing the nut securing the end of the spring and lifting off the spring washer, spring and bush. Clean the pivot pin and smear it very lightly with clean engine oil before replacing the moving contact and spring.

CONTACT BREAKER SETTING

The contact breaker setting should be checked after the first 500 miles (800 kms.) running and subsequently every 6,000 miles (10,000 kms.). To check the gap, turn the engine over slowly until the contacts are seen to be fully open and insert a 0.014 in.-0.016 in. (0.36-0.4 mm.) feeler gauge between the contacts.

If the gap width is correct, the gauge will be a sliding fit. If the gap width varies appreciably from the gauge thickness, the setting must be adjusted. To do this, keep the engine in the position giving the maximum contact opening and slacken the screw at the side of the unit body. Slide the fixed contact carrier into its slotted hole until the correct gap is obtained. Re-tighten the screw.

HIGH TENSION CABLES

If the high tension cables show signs of perishing or cracking, they should be replaced using a 7 mm. rubber covered ignition cable. To do this, remove the metal washer and moulded nut from the defective cable. Thread the new cable through the moulded nut and bare the conductor for about $\frac{1}{4}$ inch (6 mm.). Pass the exposed strands through the metal washer and bend back the strands radially. Re-fit the moulded nut into the H.T. terminal. The H.T. cable from the coil to distributor should also be treated in a similar manner.

The 18D2 distributor and also the latest type of coil use a clip-type connector on the H.T. cable. To replace a connector the end of the cable must be cut square and the centre prong of the connector pushed into the wires. The jaws can now be closed on rubber covered cable, but with hard plastic covers it is necessary to pierce the cover each side. The rubber grommets should be tight fitting and in good condition.

IGNITION COIL

The ignition coil should be kept clean, particularly between the terminals, and the terminal connections kept tight.

RECTIFIER

The connections at the rectifier must be clean and tight, including the central post which must be earthed to the frame.

BEFORE SEARCHING FOR AN IGNITION FAULT, ALWAYS CHECK OVER ALL ELECTRICAL CONNECTIONS; CLEAN AND TIGHTEN IF NECESSARY.

ENGINE WILL NOT START. NO SPARK AT PLUGS

Note. To check, remove the plugs and place them on the cylinder head after re-fitting the connector. Turn the ignition switch to "IGN" (clockwise) and kick over the engine. The plugs should fire with a blue spark. If there is no spark, turn switch to "EMG" (anti-clockwise) and test again.

Plug Oily, Fouled or Faulty. Clean thoroughly, preferably in a plug cleaning machine, re-set the points gap to 0.020 in. (0.50 mm.) and re-fit. Replace with correct grade plug if faulty.

Distributor, Coil or Condenser Faulty

Distributor. See that the cover is properly fitted and the clips secure. Check the gap of the contact breaker points and clean and adjust if necessary (see page 162).

Coil. First clean the coil, particularly between the cable connections. To check the low tension circuit, connect a voltmeter between the coil terminal marked "SW" or "—" and earth. If there is no reading with the ignition switched on there is a fault in the switch or the lead to the coil. Next connect the voltmeter between the coil terminal marked "C.B." or "+" and earth. No reading here with the ignition switched on indicates a fault in the coil primary winding. If these tests show that the low tension primary circuit is in order, remove the coil H.T. lead from the distributor cover. Remove the cover and rotate the engine until the contact points are closed. Switch on the ignition and hold the end of the coil H.T. lead about ¼ in. (6 mm.) from the cylinder block. Flick the contact points open with the finger and a spark should pass to the cylinder block. No spark indicates a fault in the coil H.T. winding. Any fault in a coil can only be corrected by fitting a new unit.

Condenser. To test the condenser, switch on the ignition and connect a volt meter across the open contacts. If there is no reading, remove the condenser and re-test. If a reading on the meter is then obtained, the condenser is faulty and should be changed.

ENGINE WILL NOT START WITH SWITCH ON "IGN" BUT STARTS ON "EMG".

Battery discharged due to short circuit, poor condition due to age or damage, prolonged use for parking or low rate or charge from alternator. Have battery charged from external source and equipment checked by an authorised Lucas Agent or Triumph Dealer as soon as possible.

ENGINE RUNS WITH SWITCH ON "IGN" BUT NOT ON "EMG"

Examine leads and connections from ignition switch to coil, and from coil to distributor. Check distributor contacts and ignition timing (See pages 70 and 162). If the machine will still not run in "EMG" switch position, have the equipment checked by an authorised Lucas Agent or Triumph Dealer.

ROUGH RUNNING AND MISFIRING WITH SWITCH AT "IGN".

Check earth connection for battery and rectifier and wiring of switch and rectifier.

LAMPS

HEADLAMPS FITTED TO MACHINES INTENDED FOR THE HOME MARKET AND FOR EXPORT, EXCLUDING EUROPE

These lamps have a double filament pre-focus Left Hand Dipping 6 volt 30/24 watt Lucas No. 373 main bulb and 6 volt 3 watt Lucas No. 988 pilot bulb.

HEADLAMPS FITTED TO MACHINES INTENDED FOR EXPORT TO EUROPE

These lamps have a double filament pre-focus 6 volt 35/35 watt Lucas No. 403 bulb.

HEADLAMPS FITTED TO MACHINES INTENDED FOR EXPORT TO FRANCE ONLY

These lamps have a double filament pre-focus 6 volt 36/36 watt bulb (yellow) with a three point connection to the lamp.

Basically the above lamps are identical, the difference occurring only with the method of attachment of the bulb in the French type headlamp and in the power of the bulbs.

HEADLAMPS FITTED TO THE TROPHY MODELS

These lamps have a double filament pre focus 6 volt 30/24 watt Lucas No. 312 bulb and a pilot bulb 6 volt 3 watt Lucas No. 988.

REPLACING THE HEADLAMP BULB

To gain access to the headlamp bulb, slacken the front rim retaining screw situated at the top of the lamp fixing ring. Disengage and withdraw the front rim and light unit assembly, removing the upper edge first. With the exception of the French headlamp, press the moulded adaptor inwards and turn it to the left. Lift off the adaptor and withdraw the defective bulb. When inserting a replacement bulb, locate the slot in the bulb flange with the projection in the bulb holder. Re-fit the adaptor, engaging its moulded recesses with corresponding projections on the bulb holder. Press inwards and secure by turning the adaptor to the right.

On the French headlamp, release the two clips securing the adaptor and remove the adaptor. Take out the defective bulb by pressing it in and turning to the left. When replacing the bulb, engage the three points on the bulb in the slots of the adaptor, press in and turn to the right to secure. Replace the adaptor with the projection on the adaptor engaging in the slot on the headlamp and secure by re-fastening the clips. Re-fit the rim to the nacelle, locating the bottom of the rim first. Tighten the securing screw and check the beam setting.

SETTING THE HEADLAMP BEAM

To check the headlamp beam setting, place the motorcycle in front of a light coloured wall at a distance of about 25 feet (8 metres). The machine should be carrying its normal load during this check, since the weight of the rider (and pillion passenger) may affect the setting. Switch on the main beam. This should be directed straight ahead and parallel with the ground. The beam is adjusted on the Trophy models by slackening the two headlamp securing bolts and tilting the lamp to the correct angle. On the models with the nacelle headlamp, loosen the two small screws on either side of the lamp fixing ring, and raise or lower the beam by pulling out or pressing in, the bottom of the ring. When the required adjustment has been obtained, re-tighten the two screws.

With the Lucas pre-focus type bulb fitted in these lamps, the filament is correctly positioned during manufacture in relation to the focal point of the reflector. No further focusing is necessary.

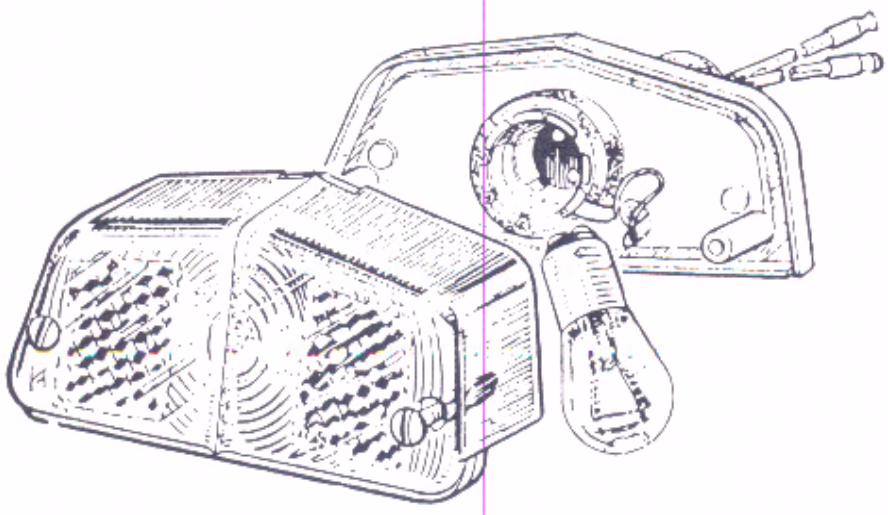


Fig. 59. Stop-Tail Lamp Model 564 incorporating Reflex Reflectors.

PARKING LIGHT

The parking light is simply pushed into the main light unit and is fitted with a 6 volt 3 watt Lucas No. 988 bulb, for all markets.

REAR LAMP

Access to rear light bulbs is gained by removing the two moulded cover retaining screws. The correct replacement for the stop tail lamp is Lucas No. 384 6 volt 6/18 watt bulb. This bulb has offset securing pins to prevent incorrect insertion into the bulb holder and to ensure that the higher wattage filament is illuminated when the brake pedal is depressed. In the event of failure of the 6 watt filament do not change the cables over to obtain rear lighting from the 18 watt filament as the heat generated will probably burn the plastic lens.

NACELLE TOP UNIT

REMOVAL (Dynamo Equipped Models)

Battery. Disconnect the battery positive lead.

Steering Damper. Unscrew and remove.

Headlamp. Unscrew the retaining screw at the top of the headlamp retaining ring and ease the headlamp away from the ring, pulling from the top. Disconnect the earth wire (black) from the bulb holder frame, and the two headlight leads (black) at the snap connectors.

Retaining Ring. Remove by unscrewing the two small screws at the sides of the ring.

Motifs. Unscrew the four screws and two nuts securing the motifs and remove.

Rear Nacelle Retaining Screws. Remove the two small screws and nuts holding the rear of the top unit to the fork covers, being careful not to lose the nuts.

Five Point Connector. Disconnect all leads at the connector. If the top unit only is being removed, leave the connector in position on the stanchion. If however, it is intended to remove the fork assembly, remove the connector from the stanchion and disconnect the leads so that the connector remains with the top unit.

Speedometer. Unscrew the speedometer drive cable at the head.

Horn. Disconnect both leads.

Dipswitch Lead to Light Switch. Disconnect at the light switch (No. 2 position).

Assembly. Re-assemble in the reverse manner.

REMOVAL (A.C. Equipped Models)

Dismantle as for T100 & T110 to "Rear Nacelle Retaining Screws" and proceed as follows:—

Lighting and Ignition Switch. Unscrew the small grub screw at the side of the plastic switch lever and pull the lever away from the switch. Unscrew the brass nut around the switch body, remove the name disc and push the switch through into the nacelle.

Horn. Disconnect the black lead from the horn terminal.

Speedometer. Unscrew the speedometer drive cable at the head and detach the speedometer light.

Ammeter. Disconnect the brown leads at the ammeter: one from the L.H. terminal and two from the R.H. terminal.

NOTE

If it is intended to remove the top unit only, it is unnecessary to proceed any further. If the forks are to be removed however, it will be necessary to disconnect the blue lead from the dipper switch to switch position number 3 and also the red and black pilot light lead. Both these leads are fitted with snap connectors.

Assembly. Re-assemble in the reverse manner.

BATTERY

Topping Up

During charging, water is lost by gassing and evaporation and this must be replaced to maintain the battery in a healthy condition. Once a month or more often in warm climates, the level of the electrolyte in the cells of the battery must be examined; if necessary, distilled water must be added to bring the electrolyte just level with the top of the separators.

Never use a naked light when examining the condition of the cells, as there is a danger of igniting the gas coming from the active materials.

The MLZ 7E battery with the translucent casing must not be filled to the top of the separators. The battery must be lifted and distilled water added up to the line moulded in the casing.

Checking the Condition of the Battery

Occasionally check the condition of the battery by taking measurements of the specific gravity of the electrolyte in each of the cells. A small volume hydrometer is required for this purpose—this instrument resembles a syringe containing a graduated float which indicates the specific gravity of the acid in the cell from which the sample has been taken.

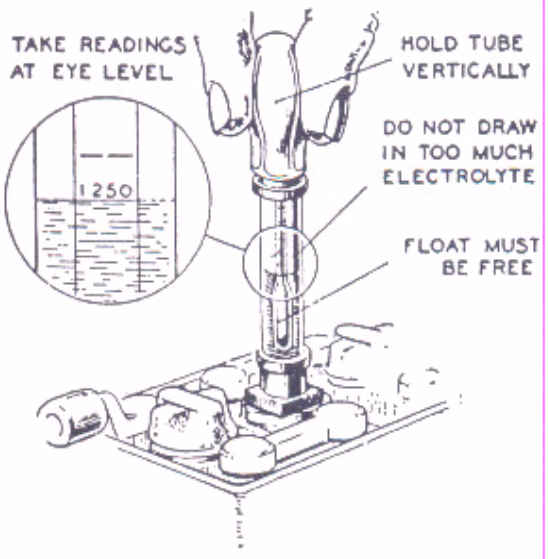


Fig. 60. TAKING HYDROMETER READINGS.

Measurements should not be taken immediately after the cells have been "topped-up" as the electrolyte will not be thoroughly mixed.

The space between each separator is not wide enough to permit the nozzle of a hydrometer to be inserted. Before taking a sample, tilt the battery to bring sufficient electrolyte above the separators.

Specific gravity readings and their indications are as follows:—

1.280-1.300	Cell fully charged.
About 1.210	Cell about half discharged.
Below 1.150	Cell fully discharged.

The reading for each of the cells should be approximately the same.

If one cell gives a value very different from the rest, it may be that acid has spilled or has leaked from that particular cell, or there may be a short circuit between the plates. In this case the battery should be examined by a Lucas Service Depot or Agent.

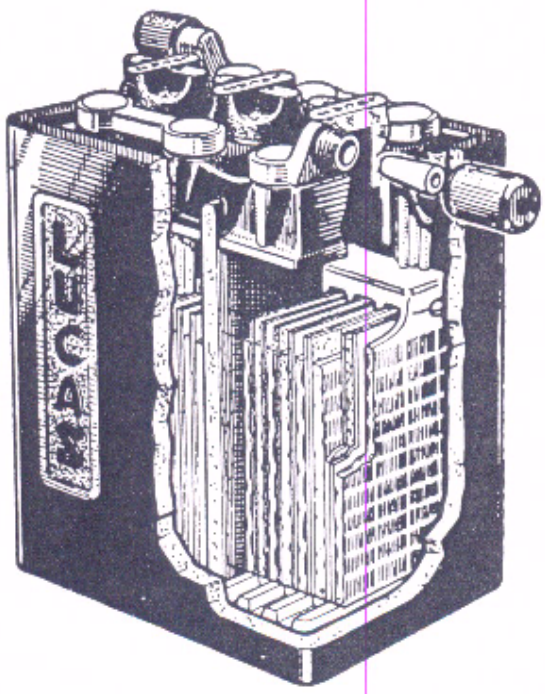
Never leave the battery in a discharged condition. If the motorcycle is to be out of use for any length of time have the battery fully charged and every fortnight, give it a short refreshing charge to prevent any tendency for the plates to become permanently sulphated.

Detachable Cable Connectors

When connecting the battery, unscrew the knurled nut and withdraw the collet or cone shaped insert, noting that it is not interchangeable with the collet in the other terminal. Bare the end of the cable for about one inch and thread one bared end through the knurled nut and collet. Bend back the cable strands over the narrow end of the collet and insert the collet and cable into the terminal block. Secure the connection by tightening the knurled nut.

Battery Earth

The A.C. Lighting-Ignition Unit and dynamo unit have been designed for positive (+ve) earth systems. If the battery connections are reversed the equipment will be damaged.



Battery model PU7E/9, showing correct-acid-level device and detachable cable connectors.

Fig. 61. BATTERY MODEL PU7E/9.

ELECTRIC HORNS

These horns, before being passed out of the Works, are adjusted to give their best performance, and will give a long period of service without any attention.

If the horn becomes uncertain in its action, giving only a choking sound, or does not vibrate, it does not follow that the horn has broken down. First ascertain that the trouble is not due to some outside source, e.g. a discharged battery, a loose connection, or short circuit in the wiring of the horn. In particular, ascertain that the horn push bracket is in good electrical contact with the handlebars.

It is also possible that the performance of a horn may be upset by its mounting becoming loose.

Adjustment

The following adjustment will not alter the tone of the horn. It will take up any wear of the moving parts which, if not corrected, may result in loss of power and roughness of note.

Accurate adjustment requires the use of a 0-10 amp. D.C. ammeter—the maximum permissible current consumption being 6 amperes at 6 volts—but the owner rider, who may not possess one of these instruments can carry out the following procedure if the horn note is considered to have deteriorated:—

Operate the horn push and turn the adjustment screw anti-clockwise until the horn just fails to sound. Release the horn push and turn the adjustment screw clockwise for six notches i.e. a quarter of a turn, when the original performance should be restored. If further adjustment is necessary, turn the screw one notch at a time.

If the original performance cannot be restored by adjustment do not attempt to dismantle the horn, but return it to a Lucas Service Depot for examination.

SPARKING PLUGS

The sparking plug is of great importance in satisfactory engine performance and every care should be taken to fit the correct type when replacements are necessary.

There is little to be gained by experimenting with different types of plugs as the type fitted to standard equipment, are best suited to your particular engine. (See Technical Data for your Machine). Sparking plugs required for racing purposes are much "harder" and advice on such matters should be obtained from the manufacturers. The correct gap setting of the sparking plug is 0.020 in. (0.50 mm.). Do not guess this distance but use a feeler gauge. When re-setting, bend the side electrode only. Never bend the centre electrode as this may split the insulator tip.

The alloy head models are fitted with long reach plugs. If either plug indicates tightness when removing, pour a little penetrating oil around the base of the plug and allow it to seep around the threads. By doing this the plug will be more easily removed and the cylinder head plug threads will not be damaged. Smear the threads with graphite grease before replacing.

When the sparking plug is removed for examination, the insulator will show one of the following conditions:—

ASH WHITE. This is a sign that the plug is over-heating. Usual cause is the mixture strength too weak (a common cause being a faulty carburetter to manifold or manifold to cylinder head joint washer) or the ignition too far retarded.

DULL BLACK. This indicates that the plug is running too cold or, in other words the insulator is insufficiently hot to burn off the carbon. This is caused by too rich a mixture or the engine left running with a generous slow running setting (pilot air adjusting screw).

LIGHT BROWN. This shows that the mixture strength is correct and the engine is running at the right temperature.

Before re-fitting the plugs, make sure that the copper washers are not defective in any way. If they have become worn and flattened, fit new ones to ensure that a gastight joint is obtained.

When installing plugs, first screw the plugs down by hand as far as possible, then use spanner for tightening only. Always use a tubular box spanner to avoid possible fracture to the insulator, but do not under any circumstances use a movable wrench. Paint splashes, accumulation of grime dust etc., on the top half of the insulator are often responsible for poor plug performance. Plugs should be wiped frequently with a clean rag.

To save petrol and prevent difficult starting, plugs should be cleaned and tested at regular intervals, and it is suggested that this service be performed at your garage on a special "Air Blast" service unit. Plugs which are allowed to remain oily and dirty with corroded electrodes will seriously impair the efficient running of the motor and waste precious petrol.

To obtain maximum efficiency from the engine and also to maintain good petrol consumption which the motorcycle has when new, plugs should be changed at regular intervals as old plugs are wasteful and cause poor and sluggish running. We recommend inspection, cleaning and testing every 3,000 miles (5,000 kms.), and it will be found economical to replace with new ones annually.

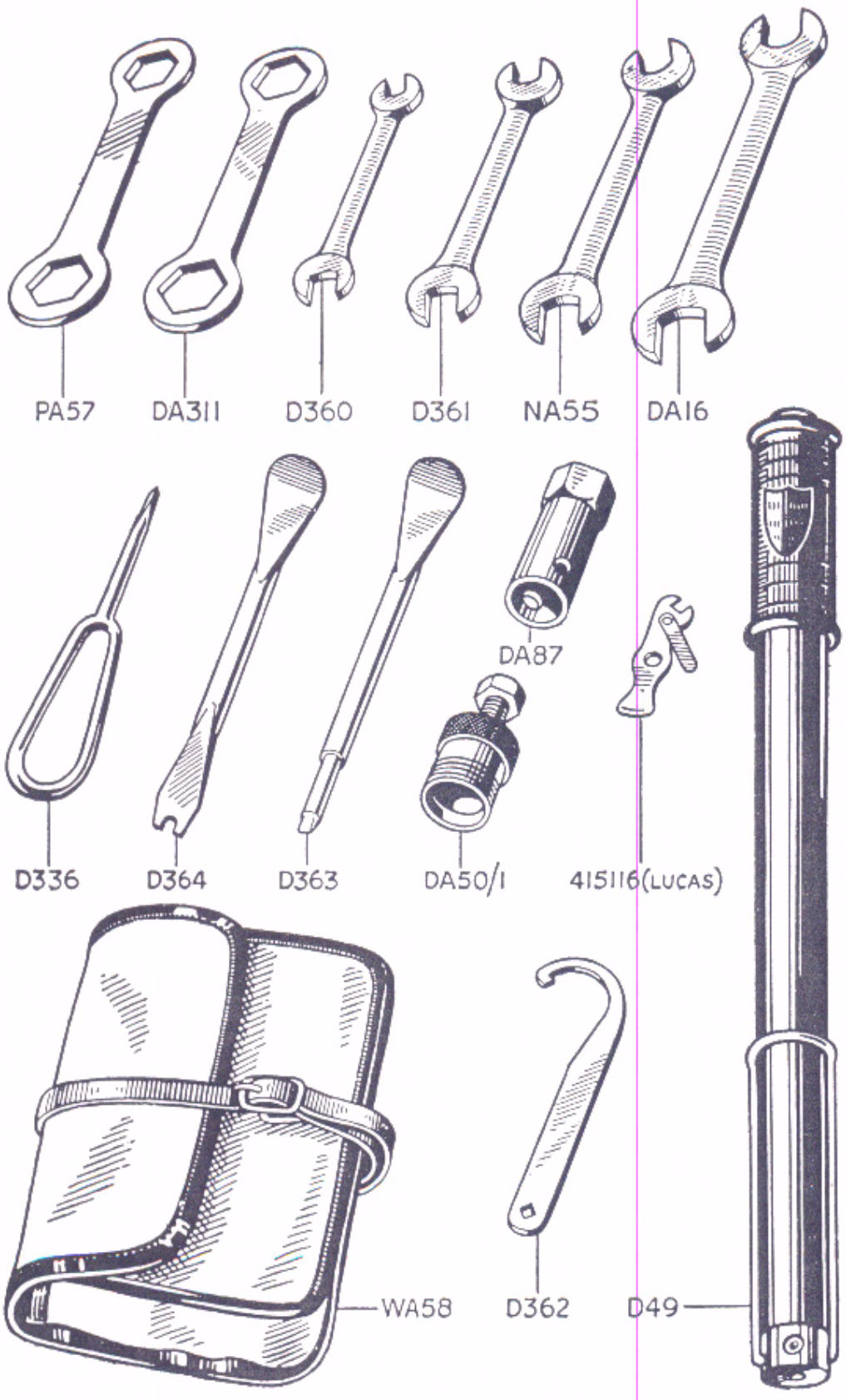


Fig. 62. **TOOLKIT.**

TOOLKIT

Part No.	*Description.*	*Purpose.*
D.360	Spanner, open ended $\frac{1}{8}$ in. × $\frac{5}{32}$ in. Whit.	General
D.361	Spanner, open-ended $\frac{3}{16}$ in. × $\frac{1}{4}$ in. Whit.	,,
NA.55	Spanner, open-ended $\frac{1}{4}$ in. × $\frac{5}{16}$ in. Whit.	,,
DA.16	Spanner, open-ended $\frac{3}{8}$ in. × $\frac{7}{16}$ in. Whit.	,,
PA.57	Spanner, closed $\frac{1}{2}$ in. × $\frac{9}{16}$ in. Whit.	Wheel nuts
D.311	Spanner, closed $\frac{5}{8}$ in. × $\frac{11}{16}$ in. Whit.	Wheel nuts
D.362	'C' Spanner and Tappet Key	Suspension units
D.87	Spanner, box	Sparking plugs
D.336	Screwdriver, Phillips head	General
D.363	Tyre lever—screwdriver	,,
D.364	Tyre lever—clutch key	Clutch adjustment
DA.50/1	Extractor	Clutch hub
415116	Spanner	Contact breaker points
WA.58	Tool roll	
D.49	Tyre inflator (15¼ in. long)	
D.296	Tyre inflator (12 in. long)	

MODEL	5T	6T	T100	T110 & TR6	TR5	T120
ENGINE. Bore & Stroke mm.	63 × 80	71 × 82	63 × 80	71 × 82	63 × 80	71 × 82
Capacity—c.c.	498	649	498	649	498	649
Compression Ratio ...	7 : 1	7 : 1	8 : 1	8 : 1	8 : 1	8.5 : 1
Power Output-b.h.p.@r.p.m.	27 at 6,300	34 at 6,300	32 at 6,500	40 at 6,500	33 at 6,500	46 at 6,500
Tappet Clearance—in. ...	0.010	0.010	0.010	0.002 In. 0.004 Ex.	0.002 In. 0.004 Ex.	0.002 In. 0.004 Ex.
Valve Timing in Degrees with 0.020 in. (0.50 mm.) tappet clearance for checking	26½ 69½ 61½ 35½	26½ 69½ 61½ 35½	26½ 69½ 61½ 35½	27 48 48 27	27 48 48 27	34 55 48 27
IGNITION. Type ...	Coil	Coil	Magneto	Magneto	Magneto	Magneto
Contact Gap—in. ...	0.014-016	0.014-016	0.012	0.012	0.012	0.012
Timing (fully advanced) ...	Ret'd. $\frac{1}{32}$ in.	Ret'd. $\frac{1}{32}$ in.	$\frac{3}{8}$ in.	$\frac{11}{64}$ in.	$\frac{15}{32}$ in.	$\frac{7}{16}$ in.
SPARKING PLUG Champion, K.L.G., Lodge	L.7, F.80, H.14	L.7, F.80, H.14	N.4, FE.100, HLN	N.4, FE.100, HLN	N.4, FE.100, HLN	N.4, FE.100, HLN
Plug Gap—in.	.020	.020	.020	.020	.020	.020
CAPACITY. Petrol (galls.)	4	4	4	T110 4; TR6 3	3	4
Oil—pints	5	5	5	5	5	5
Gearbox—pints	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
Primary Chaincase—pints	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Fork Leg—pints	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

MODEL	5T	6T	T100	T110 & TR6	TR5	T120
CARBURETTER. Type ...	376	S.U. MC2	376	376	376	376 (2)
Main Jet	200	0.090 in.	220	250	220	240
Needle Jet	.1065	—	.1065	.1065	.1065	.1065
Needle Type	C	M9	C	C	C	C
Needle Position	3rd	—	3rd	3rd	3rd	3rd
Throttle Valve	376/3½	—	376/3½	376/3½	376/3½	376/3½
Pilot Jet	30	—	25	25	25	25
GEAR RATIOS. Top ...	5.0	4.57	5.0	4.57	5.24	4.57
3rd	5.95	5.45	5.95	5.45	6.24	5.45
2nd	8.45	7.75	8.45	7.75	8.85	7.75
Bottom	12.20	11.20	12.20	11.20	12.80	11.20
ENGINE SPROCKETS Solo	22	24	22	24	21	24
Sidecar	19	21	19	21	—	—
CHAIN LENGTH Primary ½ in. × .305 in. ...	70	70	70	70	70	70
Rear ⅝ in. × ⅜ in. ...	100	101	100	101	100	101
TYRE SIZE. Front ...	3.25 × 19	3.25 × 19	3.25 × 19	3.25 × 19	3.25 × 19	3.25 × 19
Rear ...	3.50 × 19	3.50 × 19	3.50 × 19	T110 3.50×19 TR6 4.00×18	4.00 × 18	3.50 × 19
BRAKE SIZE. Front—in.	7	7	8	8	7	8
Rear—in.	7	7	7	7	7	7

TECHNICAL DATA 1960

MODEL	6T	T110	TR6	T120
ENGINE. Bore and Stroke—mm.	71 × 82	71 × 82	71 × 82	71 × 82
Capacity—c.c.	649	649	649	649
Compression Ratio	7 : 1	8 : 1	8 : 1	8.5 : 1
Power Output—b.h.p. at r.p.m.	34 at 6,300	40 at 6,500	40 at 6,500	46 at 6,500
Tappet Clearance—in.	0.010	0.002 In. 0.004 Ex.	0.002 In. 0.004 Ex.	0.002 In. 0.004 Ex.
Valve Timing, in Degrees, with 0.020 in. (0.50 mm.) tappet clearance for checking	26½ 69½ 61½ 35½	27 48 48 27	27 48 48 27	34 55 48 27
IGNITION. Type	Coil	Magneto	Magneto	Magneto
Contact Gap—in.	0.014-016	0.012	0.012	0.012
Timing (fully advanced)	Ret'd. $\frac{1}{32}$ in.	## in.	## in.	$\frac{7}{16}$ in.
SPARKING PLUG. Champion, K.L.G., Lodge	L7, F.80, H14	N.4, FE.100, HLN	N.4, FE.100, HLN	N.4, FE.100, HLN
Plug Gap—in.	0.020	0.020	0.020	0.020
CAPACITY. Petrol (galls.)	4	4	3	4
Oil—pints	5	5	5	5
Gearbox—pints	¾	¾	¾	¾
Primary Chaincase—pints	¼	¼	¼	¼
Fork Leg—pints	¼	¼	¼	¼

MODEL	6T	T110	TR6	T120
CARBURETTER. Type	376	376	376	376 (2)
Main Jet	270	250	250	240
Needle Jet	.1065	.1065	.1065	.1065
Needle Type	C	C	C	C
Needle Position	3rd	3rd	3rd	3rd
Throttle Valve	376/3½	376/3½	376/3½	376/3½
Pilot Jet	25	25	25	25
GEAR RATIOS. Top	4.46	4.46	4.66	4.66
3rd	5.30	5.30	5.55	5.55
2nd	7.55	7.55	7.88	7.88
Bottom	10.9	10.9	11.38	11.38
ENGINE SPROCKET. Solo	23	23	22	22
Sidecar	20	20	—	—
CHAIN LENGTH. Primary ½ in. × 305 in.	70	70	70	70
Rear ⅝ in. × ⅜ in. ...	99	99	99	99
TYRE SIZE. Front	3.25 × 18	3.25 × 18	3.25 × 19	3.25 × 19
Rear	3.50 × 18	3.50 × 18	4.00 × 18	3.50 × 19
BRAKE SIZE. Front—in.	7	8	8	8
Rear—in.	7	7	7	7

RECOMMENDED LUBRICANTS

UNITED KINGDOM

UNIT	REGENT	MOBIL	B.P.	CASTROL	ESSO	SHELL
Engine—Summer	Havoline SAE.30	Mobiloil A	Energol SAE.30	Castrol XL	Esso Extra	Shell X-100 30
Winter	Havoline SAE.20W	Mobiloil Arctic	Energol SAE.20	Castrolite	Motor Oil 20W/30	Shell X-100 20-20W
Gearbox	Havoline SAE.50	Mobiloil D	Energol SAE.50	Castrol Grand Prix	Esso Extra Motor Oil 40/50	Shell X-100 50
Primary Chaincase	Havoline SAE.20W	Mobiloil Arctic	Energol SAE.20	Castrolite	Esso Extra Motor Oil 20W/30	Shell X-100 20-20W
Telescopic Fork—Summer ...	Havoline SAE.30	Mobiloil A	Energol SAE.30	Castrol XL	Esso Extra	Shell X-100 30
Winter ...	Havoline SAE.20W	Mobiloil Arctic	Energol SAE.20	Castrolite	Motor Oil 20W/30	Shell X-100 20-20W
Wheel Bearings	Marfak	Mobilgrease	Energrease	Castrolease	Multipurpose	Shell
Swinging Fork	Multipurpose 2	M.P.	L2	L.M.	Grease H	Retinax A
Easing Rusted Parts	Graphited Penetrating Oil	Mobil Spring Oil	Energol Penetrating Oil	Castrol Penetrating Oil	Esso Penetrating Oil	Shell Donax P

RECOMMENDED LUBRICANTS

OVERSEAS

UNIT	CALTEX	MOBIL	B.P.	CASTROL	ESSO	SHELL
Engine—Above 90°F.	Caltex SAE.40	Mobiloil AF	Energol SAE.40	Castrol XXL	Esso Extra	Shell X-100 40
32°—90°F.	Caltex SAE.30	Mobiloil A	Energol SAE.30	Castrol XL	Motor Oil	Shell X-100 30
Below 32°F.	Caltex SAE.20W	Mobiloil Arctic	Energol SAE.20W	Castrolite	20W/40	Shell X-100 20-20W
Gearbox	Caltex SAE.50	Mobiloil D	Energol SAE.50	Castrol Grand Prix	Esso Extra Motor Oil 50	Shell X-100 50
Primary Chaincase	Caltex SAE.20W	Mobiloil Arctic	Energol SAE.20W	Castrolite	Esso Extra Motor Oil 20W/40	Shell X-100 20-20W
Telescopic Fork						
Above 90°F.	Caltex SAE.50	Mobiloil D	Energol SAE.50	Castrol Grand Prix	Esso Extra Motor Oil 20W/40	Shell X-100 50
60°—90°F.	Caltex SAE.30	Mobiloil A	Energol SAE.30	Castrol XL		Shell X-100 30
Below 60°F.	Caltex SAE.20W	Mobiloil Arctic	Energol SAE.20	Castrolite		Shell X-100 20-20W
Wheel Bearings, Swinging Forks, Steering Races	Marfak Multipurpose 2	Mobilgrease M.P.	Energrease L2	Castrolease L.M.	Multipurpose Grease H	Shell Retinax A
Easing Rusted Parts	Caltex Penetrating Oil	Mobil Spring Oil	Energol Penetrating Oil	Castrol Penetrating Oil	Esso Penetrating Oil	Shell Donax P

ENGINE REVOLUTIONS PER MINUTE

M.P.H. \ GEAR RATIO	4.4	4.57	4.78	5.0	5.24	5.5	5.7	5.8	6.0	6.25	6.5	6.9	7.06	7.14	7.5	8.0	8.85	9.8	10.6	11.58	12.2	13.9	14.3	15.25	16.0	17.8	18.85
20	1144	1188	1244	1300	1364	1428	1480	1508	1560	1624	1688	1796	1836	1856	1948	2080	2300	2548	2756	3012	3172	3612	3720	3964	4160	4628	4900
25	1430	1485	1555	1625	1705	1785	1850	1885	1950	2030	2110	2245	2295	2320	2435	2600	2875	3185	3445	3765	3965	4515	4650	4955	5200	5785	6125
30	1716	1782	1866	1950	2046	2142	2220	2262	2340	2436	2532	2694	2754	2784	2922	3120	3450	3822	4134	4518	4758	5418	5580	5946	6240	6942	—
35	2002	2079	2177	2275	2387	2499	2590	2639	2730	2842	2954	3143	3213	3248	3409	3640	4025	4459	4823	5271	5551	6321	6510	6937	—	—	
40	2288	2376	2488	2600	2728	2856	2960	3016	3120	3248	3376	3592	3672	3712	3896	4160	4600	5096	5512	6024	6344						
45	2574	2673	2799	2925	3069	3213	3330	3393	3510	3654	3798	4041	4131	4176	4383	4680	5175	5733	6201	6777	7137						
50	2860	2970	3110	3250	3410	3570	3700	3770	3900	4060	4220	4490	4590	4640	4870	5200	5750	6370	6890								
55	3146	3267	3421	3575	3751	3927	4070	4147	4290	4466	4642	4939	5049	5104	5357	5720	6325	7007									
60	3432	3564	3732	3900	4092	4284	4440	4524	4680	4872	5064	5388	5508	5568	5844	6240	6900										
70	4004	4158	4354	4550	4774	4998	5180	5278	5460	5684	5908	6286	6426	6496	6818	7280											
80	4576	4752	4976	5200	5456	5712	5920	6032	6240	6496	6752	7184	7344	7424													
90	5148	5346	5598	5850	6138	6426	6660	6786	7020	7308																	
100	5720	5940	6220	6500	6820	7140	7400	7540																			
110	6292	6534	6842	7150	7502	7854																					

NOTE.—Engine R-P-M are calculated in conjunction with 3.50 × 19 Rear tyre equipment—780 R-P-Mile—and will deviate slightly from above figures for models not so equipped.
4.00 × 18 Rear Tyre 785 R-P-Mile. 3.50 × 18 Rear Tyre 803 R-P-Mile. 4.00 × 19 Rear Tyre 756 R-P-Mile.

GEAR RATIOS WITH 46T WHEEL SPROCKET

FOR 43T SPROCKET SEE PAGE 192

GEARS	STANDARD RATIO				WIDE RATIO				CLOSE RATIO			
Engine Sprocket	Top	3rd	2nd	1st	Top	3rd	2nd	1st	Top	3rd	2nd	1st
17	6.46	7.7	10.94	15.8	6.46	9.22	14.30	18.85	6.46	7.06	8.42	11.00
18	6.10	7.28	10.32	14.9	6.10	8.70	13.50	17.80	6.10	6.66	7.95	10.40
19	5.80	6.9	9.8	14.15	5.80	8.25	12.80	16.85	5.80	6.32	7.54	9.84
20	5.50	6.55	9.3	13.4	5.50	7.84	12.18	16.0	5.50	6.00	7.15	9.35
21	5.24	6.24	8.85	12.8	5.24	7.46	11.58	15.25	5.24	5.72	6.81	8.90
22	5.00	5.95	8.45	12.2	5.00	7.13	11.05	14.55	5.00	5.45	6.50	8.50
23	4.78	5.69	8.09	11.69	4.78	6.82	10.60	13.90	4.78	5.23	6.23	8.12
24	4.57	5.45	7.75	11.2	4.57	6.54	10.14	13.35	4.57	5.00	5.96	7.78
25	4.40	5.24	7.45	10.75	4.40	6.26	9.73	12.80	4.40	4.80	5.73	7.46
Gearbox Reduction	1.0	1.19	1.69	2.44	1.00	1.425	2.21	2.915	1.00	1.09	1.30	1.695

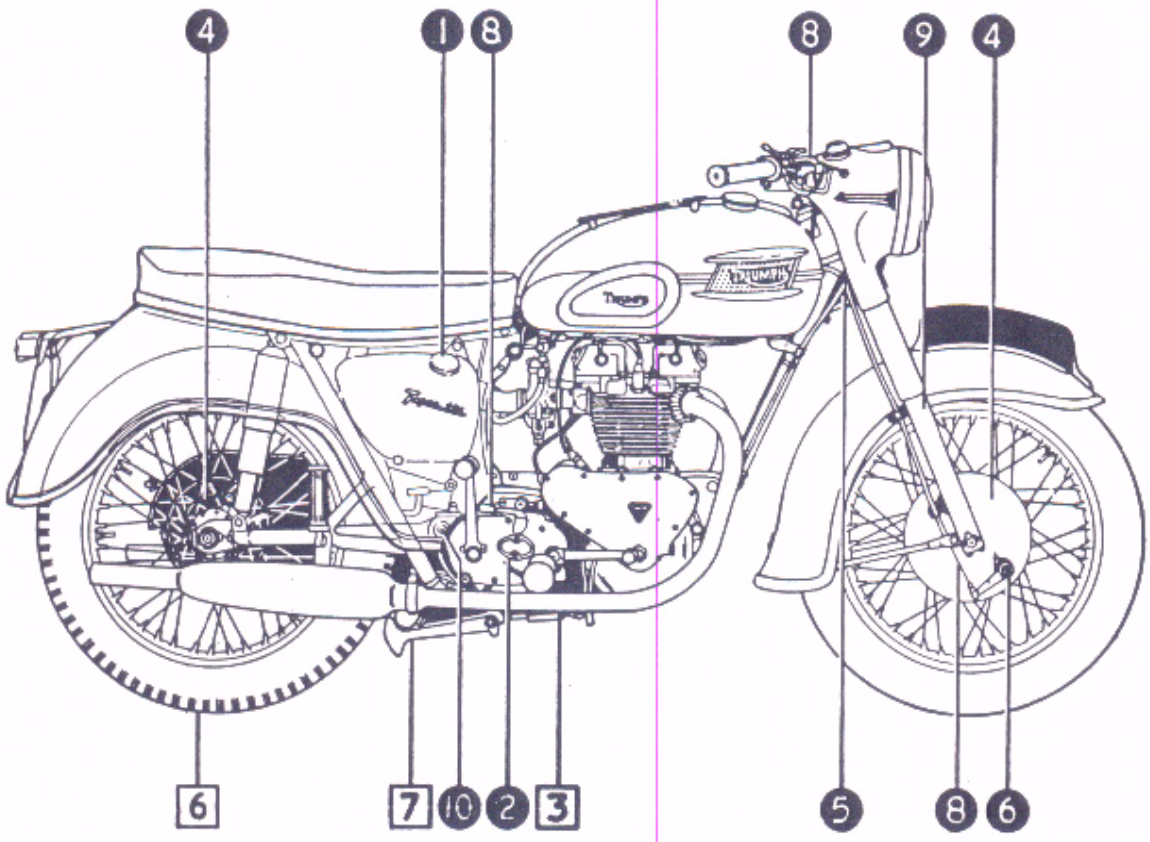


Fig. 63. LUBRICATION CHART.

No.	Part	S.A.E.	No.	Part	S.A.E.
1	Engine Oil Tank	20 or 30	7	Footbrake Pedal Spindle	Grease
2	Gearbox	50	8	Exposed Cables	20
3	Primary Chaincase	20	9	Fork (Hydraulic)	20
4	Wheel Hubs	Grease	10	Swinging Fork Spindle	Grease
5	Steering Head	Grease		OIL-CAN LUBRICATION All Brake Rod Joints and Pins	
6	Brake Cam Spindle	Grease			

FAULT FINDING

The following paragraphs have been drawn up to enable the rider to diagnose trouble which may arise during normal service. For each failure, the faults and antidotes are arranged in order or probability. In each case the rider should always look for the obvious, such as no petrol, oil, controls incorrectly set, cut-out wire shorting, and, before searching for an "A.C." ignition fault, always check over all electrical connections and clean and tighten if necessary; then follow with the process of elimination.

ENGINE WILL NOT START

Lack of Fuel	Tank empty, obstruction in Petrol Pipes or Tank Filters choked.
Excessive Flooding	Dirt under Float Needle Seating (See Page 142).
Oiled up or fouled, Sparking Plug	Remove, clean off carbon and wash in petrol. Allow to dry.
Engine Valve stuck open	See Page 35 for Valve Removal.
Exhaust Valve seatings burned	See Page 35 for Valve Removal.
Magneto Cut-out shorting	Disconnect Terminal at Magneto and check spark at Plug.
No Spark at Plugs (Coil ignition)	See Page 165.
Contact Points dirty	Clean with Carborundum Stone, wash with Petrol and re-gap.
Incorrect Contact Point Gap	Re-gap to 0.012 in.-0.015 in. (Magneto) 0.014 in.-0.016 in. (Coil) (0.3-0.4 mm.) ,, (0.36-0.40 mm.) ,,
Contact Breaker Arm Sticking	Remove Arm and clean Pivot with fine emery, grease lightly and replace Arm. Check gap.
H.T. Collector shorting to body	Remove Pick-ups and thoroughly clean; replace if cracked or damaged.
Condensation on Sparking Plugs	Remove Plugs and heat up.

FAULT FINDING

ENGINE STOPS

No Petrol or Fuel obstruction	Check Fuel in Tank. Supply at Carburetter if no supply. Remove Pipes and Tank Filters if necessary.
Choked Main Jet	See Page 142.
Water on H.T. Leads, Pick-ups or Sparking Plug	Dry Ignition System.
Water in Float Chamber	Remove Carburetter and clean out.
Vent Hole in Petrol Tank Filler Cap choked ...	Clean out Vent Hole.
Battery lead off (Coil)	Re-connect.

ENGINE MISFIRES

Defective or oiled Sparking Plug	Clean and test Plugs.
Water fouling Main Jet	Clean Carburetter.
Incorrect Contact Breaker Gap	Check and adjust to 0.012 in.-0.015 in. (Magneto) 0.014 in.-0.016 in. (Coil) (0.30-0.40 mm.) ,, (0.36-0.40 mm.) ,,
Contact Points burned and arcing	Remove Points and true with a Carborundum Stone. Replace and re-gap; change Condenser if trouble persists. This fault can be caused by continuous running in the "EMG" position (Coil).
Weak or broken Valve Spring	See Page 35 for Replacement.
Partial obstruction of Petrol Supply	Clean out Carburetter and check Petrol supply at Carburetter end.
Slow Running Orifice choked	See Page 142.
H.T. Cable perished and shorting to frame ...	Replace H.T. Cable.
Sparking Plug insulation cracked	Replace Sparking Plug.
Condenser failing	See Page 165.
H.T. Cable on Coil faulty (Coil Ignition) ...	Replace.

FAULT FINDING

LOSS OF POWER

Faulty Sparking Plugs	Change.
Incorrect Tappet adjustment	See Page 34.
Lack of Lubrication	See that Oil Indicator Button is working (See Page 26). Check Supply in Oil Tank.
Weak or broken Valve Spring	Remove Cylinder Head (See Page 35).
Sticky Valve	Remove Cylinder Head (See Page 35).
Valves not seating	See Page 35.
Broken or gummed up Piston Ring	See Page 35.
Brakes binding	Place Machine on the Stands and re-adjust Brakes.
Engine requires Decarbonising	See Page 35.
Head Gasket blowing	Change Gasket.
Air Filter choked	Remove, wash in Petrol, re-oil and replace (See Page 144).
Dirty Carburetter	Remove and Clean.

ENGINE OVERHEATS

Lack of Lubrication	Check supply of Oil, see that the Indicator Button is operating when the engine is running; if not, refer to Page 26. Ensure that the correct Oil is used.
Faulty Sparking Plugs	Can cause pre-ignition; change and test.
Engine requires Decarbonising	See Page 35.
Ignition Timing too late	Check Timing (See Pages 73 and 74).
Exhaust Valve burned, or pitted Valve Seats ...	See Page 35.
Silencer choked	Remove and clean in a solution of caustic soda.
Piston Ring worn or seized in Piston Groove ...	Dismantle Engine, See Page 35.
Weak Mixture	Partly choked Jet, worn Throttle Slide, check by closing Air Lever.

ILLUSTRATION INDEX

ILLUSTRATION INDEX

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GEAR RATIOS (USING 18T G/BOX SPROCKET 43T REAR WHEEL SPROCKET)

GEARS	STANDARD RATIO				WIDE RATIO				CLOSE RATIO			
Engine Sprocket	Top	3rd	2nd	1st	Top	3rd	2nd	1st	Top	3rd	2nd	1st
17	6.02	7.18	10.18	14.78	6.02	8.62	13.35	17.6	6.02	6.60	7.87	10.30
18	5.71	6.78	9.60	13.92	5.71	8.12	12.60	16.65	5.71	6.24	7.44	9.70
19	5.40	6.42	9.13	13.2	5.40	7.71	11.97	15.75	5.40	5.90	7.05	9.20
20	5.12	6.1	8.65	12.50	5.12	7.32	11.38	14.95	5.12	5.60	6.68	8.75
21	4.89	5.82	8.25	11.98	4.89	6.97	10.81	14.22	4.89	5.35	6.36	8.32
22	4.66	5.55	7.88	11.38	4.66	6.66	10.32	13.6	4.66	5.10	6.07	7.94
23	4.46	5.31	7.55	10.9	4.46	6.38	9.90	13.00	4.46	4.88	5.82	7.60
24	4.28	5.10	7.21	10.5	4.28	6.10	9.50	12.45	4.28	4.66	5.56	7.26
25	4.10	4.90	6.92	10.0	4.10	5.85	9.10	11.95	4.10	4.48	5.35	6.98
Gearbox Reduction	1.00	1.19	1.69	2.44	1.0	1.425	2.21	2.915	1.00	1.09	1.30	1.695

SEE PAGE 182 FOR ENGINE R.P.M. CHART.