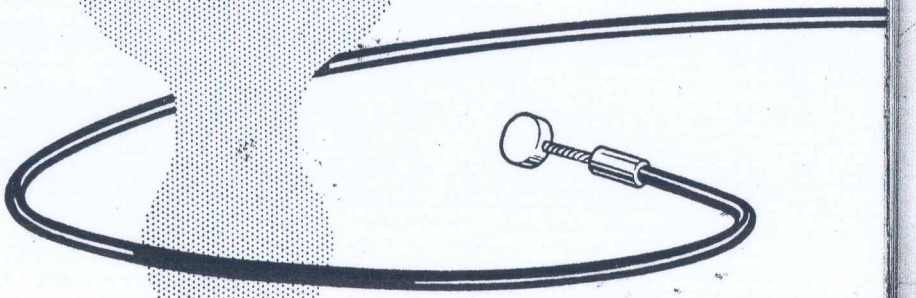
TRIUMPH



WORKSHOP INSTRUCTION MANUAL

TIGER CUB

MODELS

WORKSHOP INSTRUCTION MANUAL

No. 8

FOR THE

TRIUMPH TIGER CUB

MODELS

T15 T20 T20C T20S

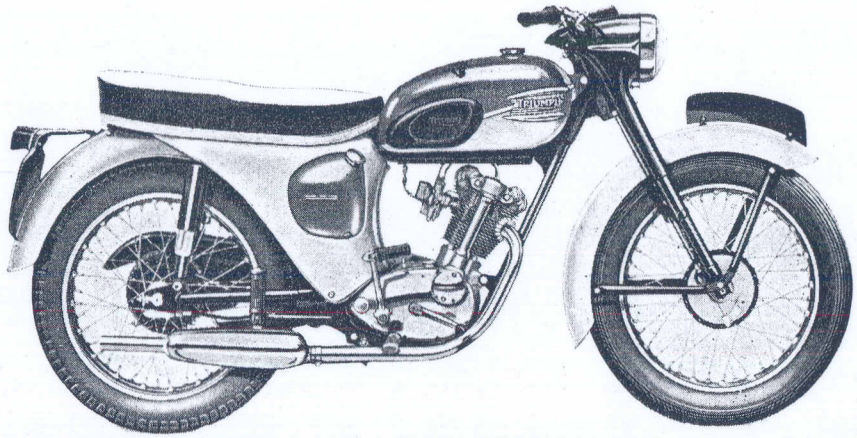
TRIUMPH ENGINEERING CO LTD

MERIDEN WORKS . ALLESLEY . COVENTRY . ENGLAND

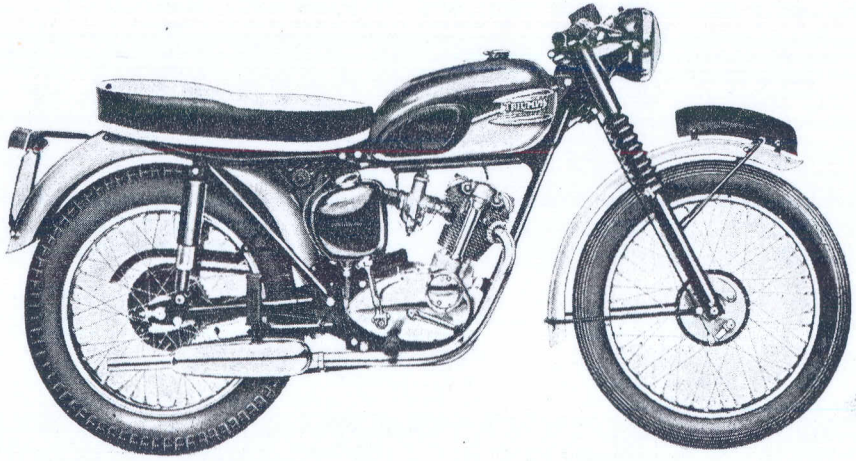
TELEPHONE MERIDEN 331 **TELEGRAMS "TRUSTY COVENTRY"**

Ref. 906/64

Published August 1964



200c.c. TIGER CUB (T20)



200c.c. TIGER CUB (T20S/S)

INTRODUCTION

The Triumph "Tiger Cub" has been so designed that the average owner or mechanic will have no difficulty in servicing it if full use is made of this book. The book is written on a purely practical basis and no attempt has been made to introduce the theoretical side.

To the uninitiated we advise that major repairs such as engine and gearbox unit and telescopic fork overhauls are entrusted to a Triumph Dealer who will have the necessary facilities to carry out this type of work.

Each section of the book is headed by a general description. It is then followed by a complete account of the dismantling, examination of the parts and the re-assembly procedure of the unit concerned. We have endeavoured to do this in the most simple form to obviate any difficulties on the part of the operator, who may be a newcomer to motorcycling or not conversant with repair procedure. Each chapter deals with a specific operation (i.e. Dismantling the Engine) which is then broken down into paragraphs and sub-paragraphs. The sequence in which they are broken down is the correct dismantling or assembly procedure. In order not to confuse the operator, sub-assemblies (i.e. cylinder head or flywheel assembly) are dealt with as separate units.

The book is well illustrated with "exploded" and assembled illustrations of the main units which will give the operator a comprehensive view of the internal parts before commencing an operation, and also greatly assist during assembly.

Remember that if essential adjustments are neglected and only casual attention paid to the lubrication and periodical maintenance, the reliability will be affected and in time the servicing costs may be very high.

If additional information is required, first consult the Distributor or Dealer who will always be pleased to assist. Should any difficulty then arise, write to the Triumph Service Department quoting the model type and engine number. These are stamped on the left-hand cylinder base flange or front engine lug as shown in the example below.

T20 — 17101

SERVICE ARRANGEMENTS

In all communications the full engine number complete with all prefix letters and figures should be stated. This number will be found on the L.H. side of the crankcase just below the cylinder flange or on the front engine fixing lug.

CORRESPONDENCE

Technical Advice, Guarantee Claims and Repairs.

Communications dealing with any of these subjects should be addressed to the **SERVICE MANAGER.**

Replacement Parts.

Orders for replacement parts should be addressed to the **SPARES MANAGER.**

ORDERS

We do not supply parts direct to private owners, but we have a comprehensive network of stockists. A list of these stockists is included in the current Spares Lists or is available from the factory on request.

TECHNICAL ADVICE

Owners will appreciate how very difficult it is to diagnose trouble by correspondence and this is made impossible in many cases because the information sent to us is so scanty. Every possible point which may have some bearing on the matter should be stated so that we can send a useful and detailed reply.

REPAIRS

Before a motorcycle is sent to our Works an appointment must be made. This can be done by letter or telephone. When an owner wishes to return his machine for guarantee repairs, he should first consult his Dealer as we do not normally accept machines in our Repair Shop until the Dealer has inspected them. Frequently the Dealer can overcome the trouble without the delay and expense of sending the machine to the Works. This avoids the machine being out of use for some days when it could be on the road. Where

parts such as cylinders, petrol tanks, etc., are forwarded for repair, they should be packed securely so as to avoid damage in transit. The owner's name and address should be enclosed together with full instructions. In the case of complete motorcycles, a label showing the owner's name and address should always be attached and all accessories such as tools, inflator, handlebar mirrors and other parts removed.

PROPRIETARY FITTINGS

Ancillary equipment which is fitted to our motorcycles is of the highest quality and is guaranteed by the manufacturers and not by ourselves. Any repairs or claims should be sent to the actual maker, or one of their accredited agents who will always give owners every possible assistance. The following are the addresses of the various manufacturers.

Carburetters

Amal Ltd.,
Holdford Road,
Witton,
Birmingham, 6.

Zenith Carburetter Co. Ltd.,
Honeypot Lane,
Stanmore,
Middlesex.

Chains

Renold Chains Ltd.,
Wythenshawe,
Manchester.

Electrical Equipment

Joseph Lucas Ltd.,
Gt. Hampton Street,
Birmingham, 18.

Electric Horn

Clear Hooters Ltd.,
Leicester Road,
Bedworth, Nuneaton,
Warwickshire.

Sparking Plugs

Champion Sparking Plugs Co. Ltd.,
Feltham,
Middlesex.

K.L.G. Sparking Plugs Ltd.,
50, Oxgate Lane,
Cricklewood,
London, N.W.2.

Lodge Plugs Ltd.,
St. Peter's Road,
Rugby,
Warwickshire.

Speedometers

Smith's Motor Accessories Ltd.,
50, Oxgate Lane,
Cricklewood,
London, N.W.2.

Suspension Units

Girling Ltd.,
Kings Road,
Tyseley,
Birmingham, 11.

TECHNICAL DATA

T20 from Engine No. 56360

See Pages 128-131 for other models

ENGINE

Type	Overhead Valve
Number of Cylinders	One
B.H.P.	10 at 6000 R.P.M.
Bore	2.48" (63 mm.)
Stroke	2.52" (64 mm.)
Capacity	12 cu. ins. (199 c.cm.)
Compression Ratio	7 : 1
Valve Clearance (COLD)	0.010" (0.25 mm.)
Valve Timing:—	
Inlet opens B.T.C.	30°
Inlet closes A.B.C.	50°
Exhaust opens B.B.C.	55°
Exhaust closes A.T.C.	25°

(Set tappet clearance at 0.015" (0.380 mm.) when timing valves)

IGNITION

Distributor Contact Point Gap	0.014" to 0.016" (0.35 to 0.40 mm.)
Distributor Range	10° (20° crankshaft)
Sparking Plug Gap	0.020" (0.50 mm.)
Sparking Plug Reach	½" (12.7 mm.)
Ignition Timing Static (crankshaft position)	4° B.T.C.
(piston position)	at T.D.C.

CARBURETTER

Type	ZENITH
Choke Size	18 mm.
Main Jet	84
Slow Running Jet	45
Starter Slide	200/65

TRANSMISSION

Gearbox Ratios:—	
4th—Top	1
3rd—Third	1.3
2nd—Second	2.0
1st—Bottom	3.0
Overall Gear Ratios:—	
4th—Top	6.84
3rd—Third	9.0
2nd—Second	14.0
1st—Bottom	20.3

SPROCKETS

Engine	19
Clutch	48
Gearbox	17
Rear Wheel	46

CHAINS

Primary (Front)	$\frac{3}{8}" \times \frac{7}{32}"$ Duplex × 62 Links
Secondary (Rear)	$\frac{1}{2}" \times \frac{3}{16}"$ 112 Links

CAPACITIES

Fuel Tank	galls/litres 3 (13.5)
Oil Tank	pints/litres 2¾ (1.55)
Gearbox	pints/c.c. ⅓ (200)
Primary Chaincase	pints/c.c. ⅓ (200)
Telescopic Forks (each leg)	pints/c.c. ⅛ (75)

TYRE SIZE

Front	3.25 × 17
Rear	3.25 × 17

BRAKES

Type and Diameter	Internal Expanding 5½" (13.97 cm.)

SUSPENSION

Front	Telescopic
Rear	Swinging Fork

OVERALL DIMENSIONS

Seat Height	ins/cms.	29 (73.7)
Wheelbase	ins/cms.	49 (125.5)
Length	ins/cms.	77 (195.5)
Width	ins/cms.	25 (63.5)
Ground Clearance	ins/cms.	5 (12.7)
Weight	lbs/kilos	220 (99.7)

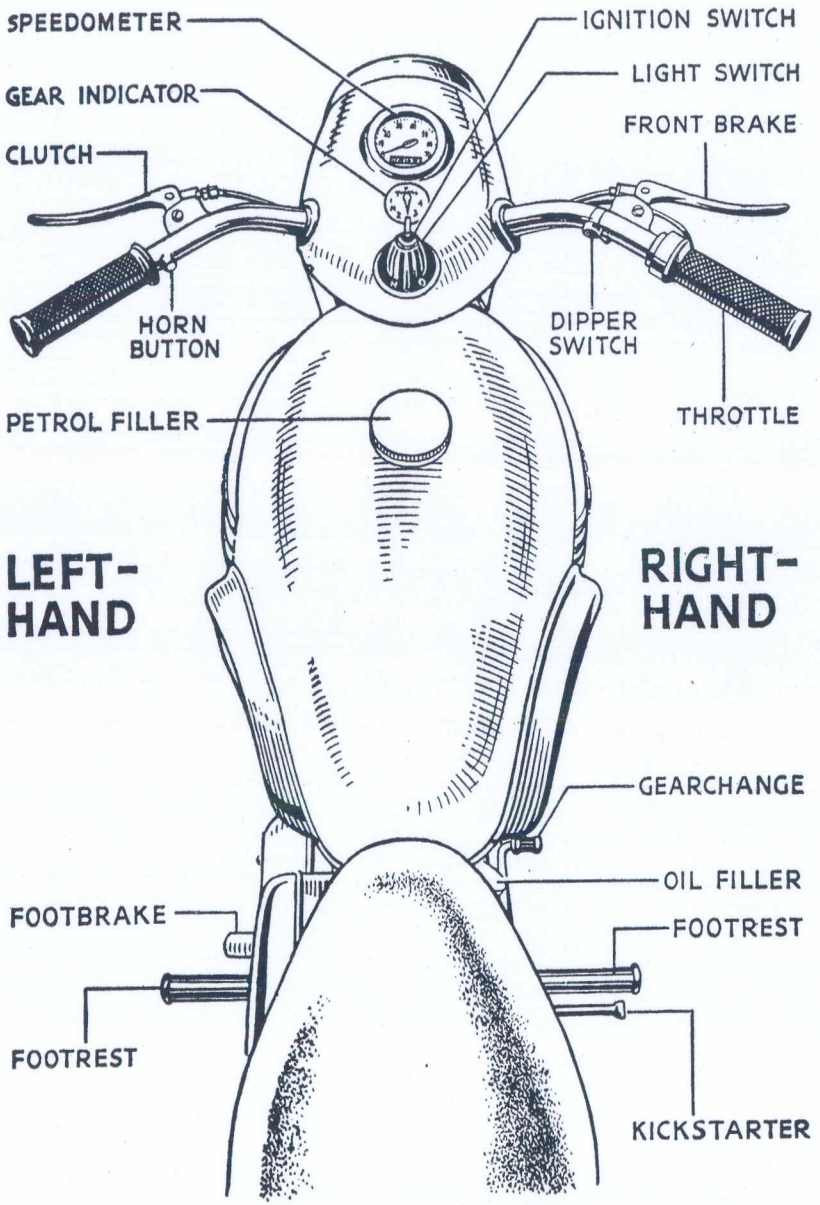


Fig. 1. CONTROL LAYOUT

CONTROLS

The position and application of the controls is explained by assuming that the rider is sitting on the machine.

HANDLEBAR

Clutch Lever. On the left side of the handlebar. The clutch lever should not be operated when the machine is in motion except to change gear and when bringing the machine to a halt.

Front Brake Lever. On the right side of the handlebar. Always apply gentle pressure to the lever and use in conjunction with the rear brake.

Throttle Control. This is twistgrip operated by the right hand. Twist the grip towards you to open and away from you to close.

Horn Button. Fitted in the left side of the handlebar. Push to operate.

Head Lamp Dipper Switch. Clipped to the right handlebar. Depress or raise switch lever to operate.

NACELLE PANEL

Speedometer. Registers speed and total mileage.

Lighting Switch. Turn the lever to operate. Switch positions :—

OFF	...	ALL LIGHTS OFF
L	...	TAIL AND PARKING LIGHTS ON
H	...	TAIL AND HEADLIGHT ON

Ignition Switch. Operated by a key. Switch positions :—

CENTRAL	... ...	IGNITION OFF
"IGN"	... ...	IGNITION NORMAL
"EMG"	... ...	IGNITION EMERGENCY

Gear Indicator. The indicator is positioned centrally and shows the gear selected by the rider when the gear change pedal is depressed or raised.

FOOT CONTROLS

Foot Brake. A flat pedal in front of the left footrest. Depress to operate. The first application should be made gently and then the pressure increased as the road speed decreases.

Gearchange. A small foot lever in front of the right footrest. The lever is moved DOWN to select a low gear and UP to select a higher gear. The gear selected is shown by the indicator on the nacelle.

Kickstarter. This pedal is behind the right footrest. (See below for starting the engine.)

For T20S and T20T Lighting and Ignition System see Page 118.

TAKING OVER THE MACHINE

After taking delivery of the machine and before taking it on the road, carefully check that the oil tank, primary chaincase and gearbox oil levels are correct (see page 18). The tyres should be checked with a pressure gauge and if necessary adjusted in accordance with the instructions on page 99. Replenish the petrol tank with 80-octane fuel and the machine is ready for starting.

Although each machine is thoroughly checked before leaving the works for the security of all nuts and bolts, it is advisable after the first 100 miles to re-check, and again at 500 miles. This is a necessary precaution due to the bedding down of the engine and motorcycle parts.

STARTING THE ENGINE (COLD)

1. Select the neutral gear position "N". Indication is by the gear indicator on the nacelle.

2. Lift the clutch lever and depress the kickstarter two or three times to separate the clutch plates.

3. Turn on the petrol by moving the petrol tap lever into the vertical position. There is no tickler on the 17 mm. Zenith carburetter but the petrol level can be raised by leaning the machine to the left for a few seconds. Press down the brass starter plunger to the limit of its travel.

4. Fit the ignition key to the nacelle switch and turn clockwise to position "IGN", this being the normal IGNITION position.

5. Depress the kickstarter when the engine should fire immediately.

6. If, due to a flat battery there is insufficient spark to start the engine, turn the ignition key anti-clockwise to position "EMG" which is the EMERGENCY start position.

7. Again depress the kickstarter when the engine will fire.

8. Once the engine is running, the ignition key must be returned to position "IGN" (IGNITION). The engine should not be run in the "EMERGENCY" position longer than is absolutely necessary unless the negative lead to the battery is earthed to the frame (see page 110).

9. When the engine has been running about 30 seconds, open the throttle once to its full extent to return the starter plunger to its normal position. Lift the bakelite knob on the 18 mm. carburetter.

PARKING

Always remove the key from the ignition switch and turn off the petrol when parking the machine. On later machines there is a lock housing on the frame head lug. Turn the wheel to the left, insert the lock body and turn and withdraw the key.

RUNNING-IN

These machines, although of small engine capacity, have an exceptional performance and therefore the rider must curb his natural desire to test its capabilities during early life. Previously, motorcyclists have been advised not to exceed certain speeds on the various gears, but with the modern machine this type of running-in is entirely useless, and at the end of the first 1,000 miles very little improvement will have been effected on the bearing surfaces of engine and gearbox unit.

Running-in should be carried out progressively; the main essential is to avoid large throttle openings. Never at any time stress the engine by overloading in the higher gears or overdriving in the lower gears. The engine has ample power to cope with all conditions if the gearbox is correctly used.

chine should be run-in for 1,000 miles ; during the first half running-in period, do not exceed ⅓ throttle opening for more limited time. Occasional bursts of speed will greatly assist lding down process but if sustained can only result in disaster. his period the throttle opening can be increased gradually ıe maximum power output can be put into operation.

the early period of the machine's life the owner is advised ıge the engine and gearbox oil at the periods stated on page 25.

running-in it is advisable to clean the sparking plug once or as the piston rings allow more oil to pass them before they edded down.

nber that if these instructions are carried out intelligently, chine will be mechanically quieter, wear longer and maximum will be available.

LUBRICATION SYSTEM

INE

ump lubrication is employed. The system is operated by a plunger reciprocating oil pump driven by an eccentric spindle e distributor shaft. The plungers are of different diameters, naller being the pressure side, the larger the scavenge. As avenge side has the larger capacity, the crankcase is kept free . The feed to the oil pump is from a gravity oil tank via a and oil pipe. The oil pump is provided with non-return to prevent crankcase flooding. The scavenge pipe is located e base of the crankcase and can be observed after removal of rankcase base plug. The excess oil filters through a gauze and urned to the oil tank via the crankcase pipe, oil pump and nal pipe.

sitive oil feed to the crankcase timing side plain bearing and nd is maintained and, with the exception of the rocker spindles, emainder of the engine is lubricated by oil splash. The rocker le feed is from the scavenge side of the system. The rocker pipe is tapped into the scavenge pipe at the bottom of the oil and the oil is then forced (scavenge pressure) through the pipe o the hollow rocker spindles. The surplus oil then lubricates alves, push rods and rocker ball pins and finally drains through in the cylinder head and barrel to the crankcase.

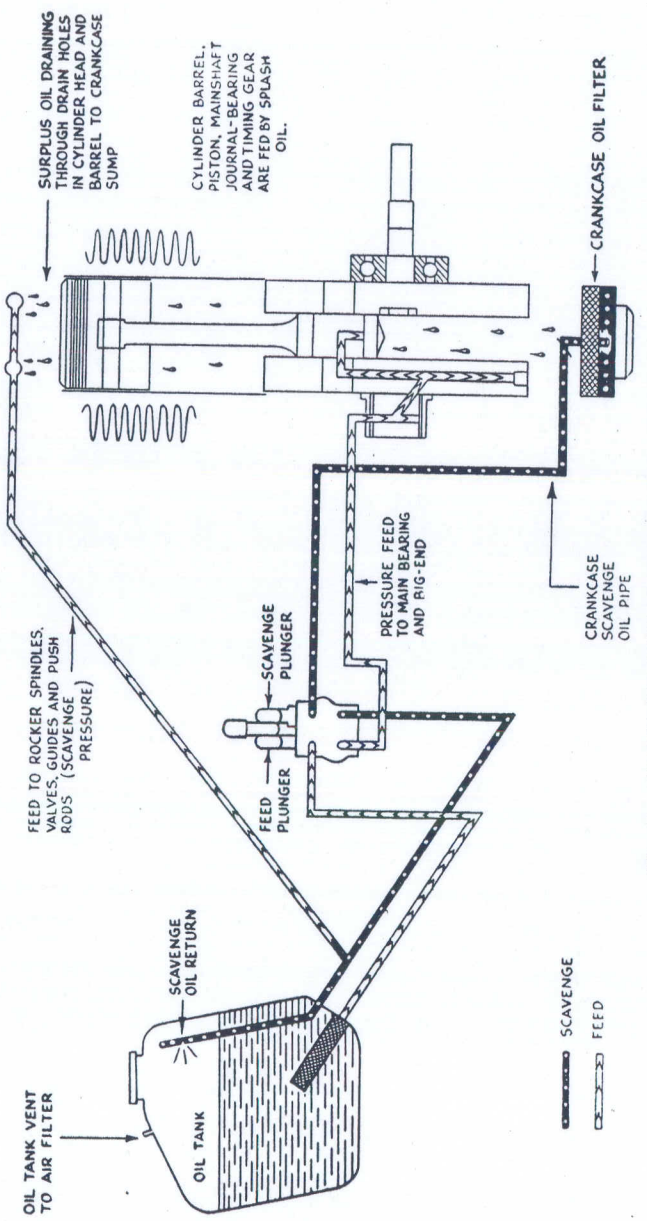


Fig. 2. ENGINE LUBRICATION DIAGRAM

GEARBOX

Although the engine and gearbox are one unit, each have their separate oiling systems. Oil is fed into the gearbox casing via the filler plug and all gears, bushes and bearings are lubricated by splash.

PRIMARY CHAINCASE

The clutch and alternator are both designed to operate in oil and the case must therefore always contain an adequate amount of lubricant.

MAINTENANCE OF LUBRICATION SYSTEM

ENGINE

The lubrication system is extremely simple and gives long service without attention. Precautions such as changing the oil at the right time should be observed, cleaning the oil filters and using the recommended lubricants. Proof of the oil system working is to remove the oil tank filler cap, then start the engine and observe the return of oil to the oil tank. This should be intermittent due to the fact that the scavenge side of the pump has more capacity than the feed. The oil will spurt for a few minutes and then be followed by air bubbles.

In the event of a lubrication fault the following causes have been listed to assist in diagnosing the trouble :—

Oil Tank. The amount of oil in the tank should be within 1½" (3.8cm.) of the filler cap. Further addition of oil will cause excessive venting through the oil tank vent to the air filter, due to lack of air space. Always ensure that the oil tank vent hole is clear, otherwise the air pressure will build up in the tank and prevent adequate scavenging by the oil pump resulting in an oil flooded crankcase.

Complete Lack of Scavenge. There are various reasons for this and the explanations are divided under the following headings in the order in which they may arise.

(a) **Stoppage in the External Scavenge Pipe.** This can be caused by a piece of rubber detaching itself from the rubber connector or a piece of foreign matter lodged in the oil block. To remedy, remove the oil pipe assembly and blow through with a tyre pump or if available an air line. Also check the stack pipe in the oil tank. If all is in good order suspect the oil pump.

(b) **Oil Pump.** To remove this unit for inspection, the outer and inner timing covers will have to be removed (See Engine Dismantling, page 33). Remove the two oil pump securing bolts and withdraw the assembly from the housing. Collect the two balls and springs from behind the pump. Dismantle the pump by taking out the plungers and unscrewing the two base plugs. Under the plugs are the springs and balls. If any foreign matter gets between the ball and seating, the pressure feed or scavenge as the case may be, will, of course, be affected. After making sure that the pump is clear of foreign matter, wash all parts thoroughly and then make the following inspection.

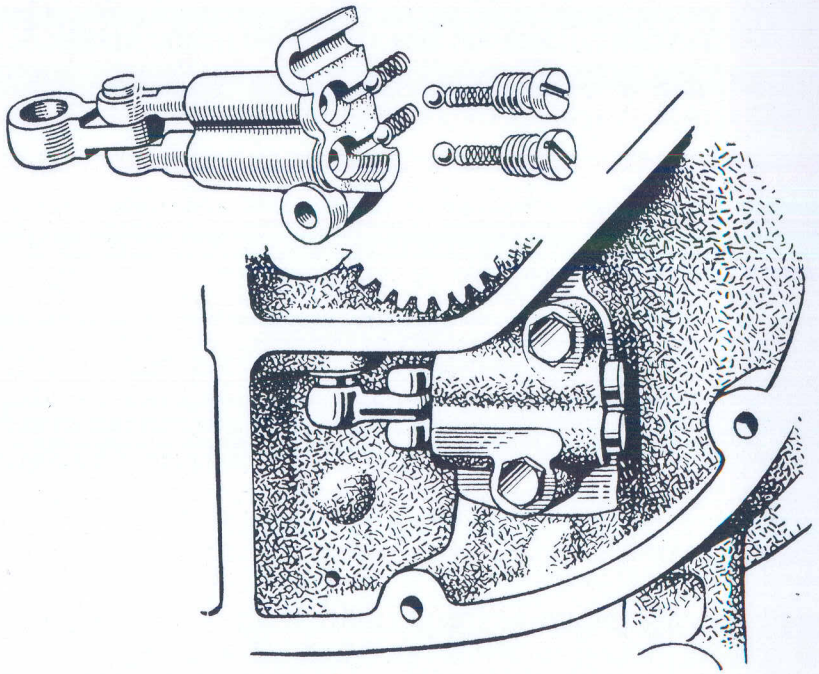


Fig. 3. OIL PUMP IN POSITION AND AUXILIARY BALL VALVES

(b1) **Connecting Link.** Inspect the drive hole for ovality as this will affect the stroke of the plungers resulting in inadequate feed and scavenge.

(b2) **Connecting Link Pin.** This should be a tight fit in the connecting link and a working fit in the plunger.

(b3) **Plungers.** Normally the plungers will show negligible signs of wear. If wear is in evidence the engine will have been starved of oil, resulting in excessive wear and overheating, and maybe inadequate scavenging.

(b4) **Pump Body.** The seatings of the non-return balls should be examined and if there is any signs of indentation on the seats they should be re-cut with a 45° cutter. Only a minimum amount of metal should be removed.

(b5) **Balls.** These should be inspected before replacing and if any sign of pitting is in evidence, replace with new balls.

(b6) **Ball Valve Springs.** If these are unduly fatigued they should be discarded and replaced with new ones.

(c) **Oil Pump Assembly.** When fitting the ball valves into the pump body it is advisable to give them a sharp tap onto the seatings, using an aluminium punch as a medium. When this is done, replace the springs and screw in the base plugs. Oil the plungers and attach the connecting pin (circlip in the bottom position) and drive rod, then assemble to the body. To check the action of the pump, submerge in oil and operate the plungers carefully ; oil should be expelled from the pressure side with considerable force. Stick the auxiliary balls to the pump body with a smear of vaseline. The pump is now ready for assembly to the engine. Always ensure the correct fitting of the joint washer, i.e. matching the oil holes.

(d) **Crankcase Scavenge Pipe.** In the unlikely event of this cracking, or an air leak between the pipe and the crankcase, the oil will not scavenge from the crankcase. Trouble of this kind would only make itself known when the engine is hot. A simple test is to fit a piece of rubber tubing over the scavenge pipe, then place

the rubber tube in the mouth and suck. If the rubber tubing collapses this proves the scavenge pipe joints etc. are air tight ; on the other hand if the tube does not collapse, a leakage is evident.

Engine Overheating due to Lack of Oil. The following reasons are listed in the order in which they may arise.

(a) **Oil Tank.** Check oil level and top up if the oil is below the minimum level. Correct level is 1½ ins. (3.8 cm.) below filler cap. Remove the filter and clean. If the oil has a heavy deposit of sludge, remove the oil tank and thoroughly clean out.

(b) **Stoppage in the External Feed Pipe.** Remove and clean out (See page 15, paragraph (a)).

(c) **Oil Pump.** See page 15, paragraph (b).

NOTE.—Always use the correct grade of oil as recommended on pages 123 and 124. Cheap, inferior, or the incorrect grade of oil will shorten the life of the engine.

CHANGING THE OIL

When the machine is new the oil should be changed frequently during the running-in period. The best time to do this is after a run when the oil is hot, then any foreign matter which the oil picks up in the course of its circulation is expelled during the draining.

Engine and Gearbox Unit. Change the oil at 250, 500 and 1,000 miles during the running-in period and thereafter as laid down on page 25, "Routine Maintenance". The following procedure should be adopted: (See pages 84-85 for removing and replacing the rear panels):

(a) **Engine.** Remove the sump plug, filter and light spring, and drain the oil into a receptacle.

(b) **Oil Tank.** Pull the oil pipes out of the rubber connections beneath the oil tank.

(c) **Oil Tank Filter.** Unscrew from oil tank and inspect the inside of the tank. If not thoroughly clean, wash out with flushing oil.

(d) **Cleaning.** Wash all parts and blow out with air to ensure that all oil ways are clean. Re-assemble the parts to the oil tank and replenish with fresh oil.

(e) **Gearbox.** Remove the drain and level plug assembly and allow the oil to drain. With machine off the stand and the drain plug replaced, replenish with fresh oil until the oil seeps out of the drain plug, when the oil level will be correct. Replace the level plug into the body of the drain plug.

(f) **Primary Chaincase.** Remove the drain (bottom) plug and allow the oil to drain. Replace the plug and then remove the level (front) and filler plugs in the chaincase. Pour oil into the chaincase until it seeps from the level plug. Replace both plugs.

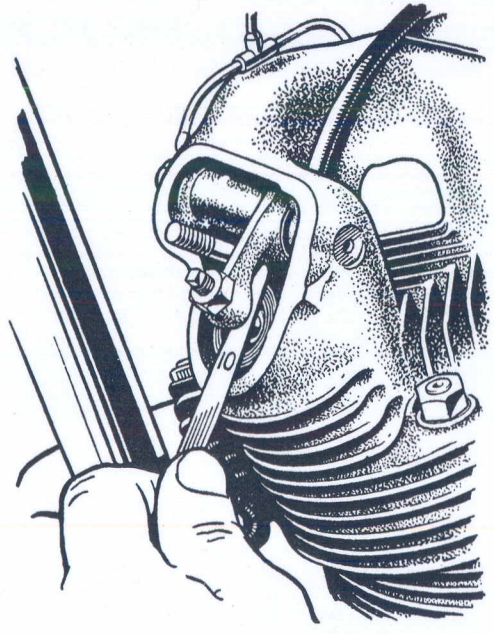


Fig. 4. CHECKING TAPPET CLEARANCE

TAPPET ADJUSTMENT

Tappet adjustment is made on the rocker arms after removing the inspection covers (See Fig. 4). The adjustment must always be carried out when the engine is COLD, never at any time make an adjustment immediately after using the machine.

Before making an adjustment, it must be ascertained that the tappet is NOT resting on the cam ramp. To do this and make the adjustment, proceed as follows :—

(a) Place the machine on the central stand and then engage TOP gear.

(b) **Sparking Plug.** Remove from the cylinder head.

(c) **Inspection Covers.** Remove both inlet and exhaust covers.

(d) **Piston and Valve Positioning.** To position these parts correctly, turn the engine by rotating the rear wheel until the INLET VALVE CLOSES and the piston reaches the TOP of its stroke. The true top dead centre can be ascertained by just moving the rear wheel in both directions and feeling the top of the piston with a wire rod.

(e) **Making the Adjustment.** Slacken off the adjuster pin locknut, then turn the adjuster until a 0.010" (0.25 mm.) feeler can be inserted between the tip of the valve and the adjuster head. Tighten up the locknut and re-check the clearance. When the locknut is tightened the clearance is sometimes affected, therefore a second adjustment may have to be made. The feeler gauge must slide freely between the two parts. Carry out the same procedure for the other valve.

Certain T20S models may be fitted with a sports camshaft and the correct clearances are 0.002 in. (0.05 mm.) inlet and 0.004 (0.10 mm.) exhaust. Do not vary the clearance from the standard for your particular model. Technical Data page 128.

ADJUSTING THE BRAKES

Place the machine on the stand and test the front brake first.

Front Brake. The brake shoe adjustment is made by turning the adjuster in the brake cable which is situated in the clip on the right hand telescopic fork member. Slacken the locknut and turn the adjuster anti-clockwise to bring the brake shoes into closer contact with the brake drum. Spin the wheel after making the adjustment to ensure that the brake shoes are not binding. The illustration below shows the adjuster and the correct lever position.

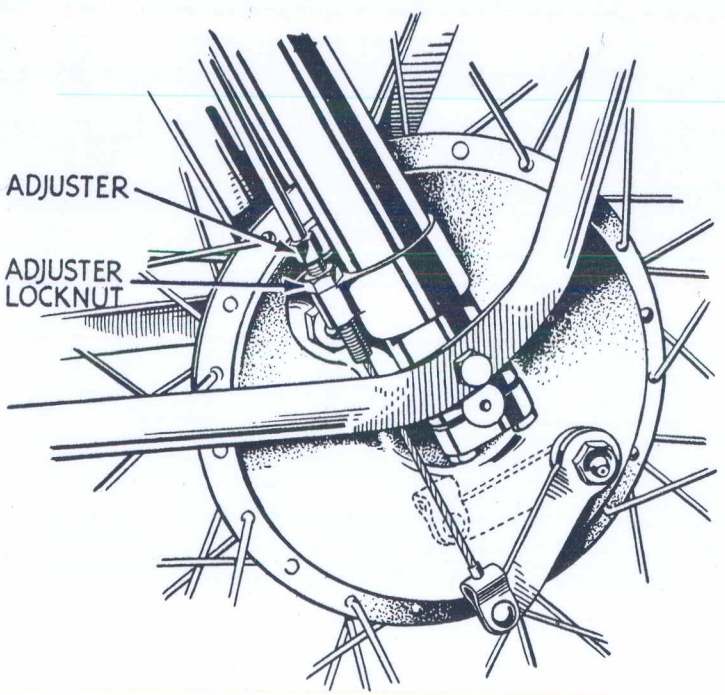


Fig. 5. FRONT BRAKE ADJUSTMENT

The shadow lined brake lever indicates the position when the brake linings are worn badly. The normal position shows that the linings are in good order.

Rear Brake. The brake shoe adjustment is made by turning the thumb nut at the rear end of the brake operating rod. To take up wear, turn the nut in a clockwise direction. Spin the wheel after making the adjustment to check freedom of movement. See the illustration below for further details.

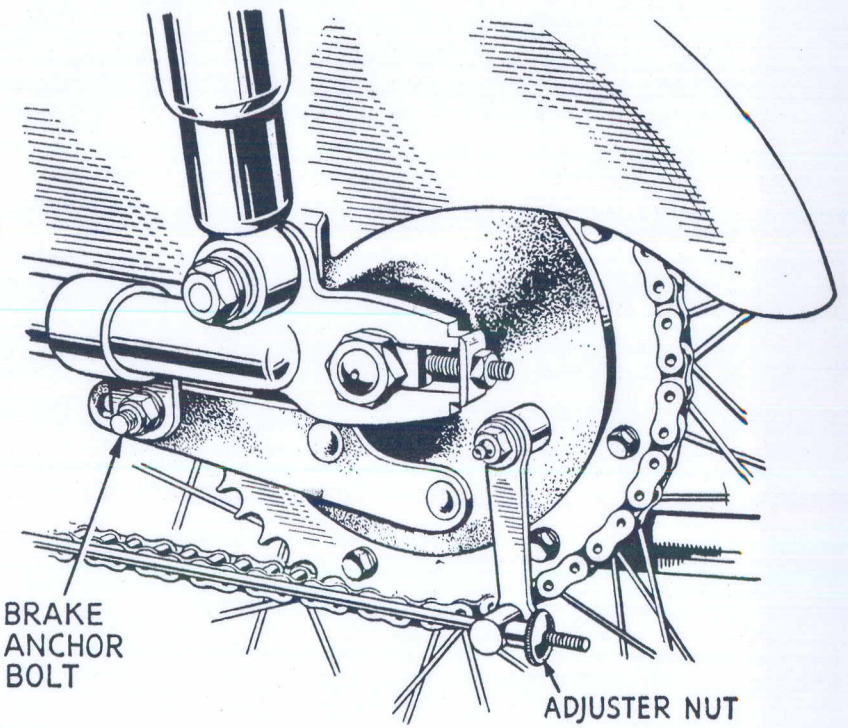


Fig. 6. REAR BRAKE ADJUSTMENT

CHAIN ADJUSTMENT

PRIMARY CHAIN

The primary chain is on fixed centres and therefore requires no adjustment. The chain runs in a fully enclosed oil bath and under these circumstances it is not subjected to road conditions and therefore its life is greatly lengthened.

REAR CHAIN

This chain is adjusted by the two adjusters fitted to the rear wheel spindle and fork ends. Adjustment is made by first slackening off the wheel spindle nuts and brake anchor bolt and then turning the adjuster nuts. Particular care should be taken when carrying out this operation not to disturb the alignment of the wheels ; always ensure an equal number of turns each side when making the adjustment.

After making an adjustment, check the chain whip midway between the two sprockets, this should be at least $1\frac{1}{2}$" (3.8 cm.) with the machine on the centre stand. Turn the rear wheel and check the chain at several points until the chain has made one revolution. This operation is necessary as the chain wear is sometimes not even and there is usually a position in the chain which is tighter than elsewhere.

There is an automatic oil feed to the rear chain from the crankcase breather, but it is recommended that the chain is removed for cleaning and re-lubricating at the periods shown on page 25.

Successive baths of clean paraffin should be used until the chain is quite clean and free from grit. The chain should be allowed to drain and then placed in a bath of molten graphite grease. The chain should be allowed to remain in the grease until it has cooled off and become solid again, as, if it is just dipped in and removed, the grease may not penetrate underneath the rollers and much of it will drain away. When the chain is removed, surplus grease should be wiped off it and it should be re-fitted and adjusted. When fitting the spring fastener on the removable link, care should be taken to place it in the correct position. The spring fastener is roughly the shape of a fish, and if it is remembered that a fish swims nose first, and the fastener fitted so that the nose is always proceeding

in the forward direction when the machine is running, the fitter will have an easy aid to memory. Chains give very large mileages if carefully used, but no part of a motorcycle shows more quickly the result of neglect and abuse. As chains are comparatively expensive, proper maintenance will assist in the economical operation of the machine.

ALTERATION AND REPAIRS

If the chains have been correctly serviced, very few repairs should be necessary. Should the occasion arise to repair, lengthen or shorten a chain, a rivet extractor and a few spare parts will cover all requirements.

Fig. 7

To SHORTEN a chain containing AN EVEN NUMBER OF PITCHES remove the dark parts shown in Fig. 7 and replace by cranked double link and single connecting link as Fig. 8.

Fig. 8

To SHORTEN a chain containing an ODD NUMBER OF PITCHES, remove the dark parts shown in Fig. 9 and replace by single connecting link and inner link as Fig. 10.

Fig. 9

Fig. 10

To REPAIR a chain with a broken roller or inside link, remove the dark parts in Fig. 11 and replace by two single connecting links and one inner link as Fig. 12.

Fig. 11

Fig. 12

RIVET EXTRACTOR

The rivet extractor can be used on all motorcycle chains up to ¾" pitch, whether the chains are on or off the wheels. When using the extractor :—

1. Turn screw anti-clockwise to permit the punch end to clear the chain rivet.
2. Open the jaws by gripping tommy bar and handle together (see Fig. 13).
3. Pass jaws over chain and release grip. Jaws should rest on a chain roller free of chain link plates (see Fig. 14).
4. Turn screw clockwise until punch contacts with and pushes out rivet end through chain outer link plate. Unscrew punch, withdraw extractor and repeat complete operation on adjacent rivet in the same chain outer link plate.

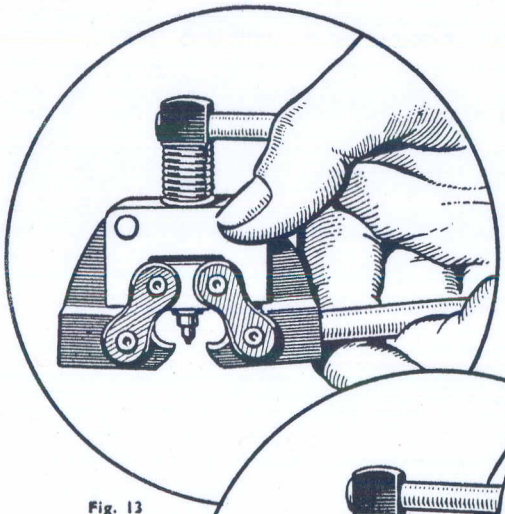


Fig. 13

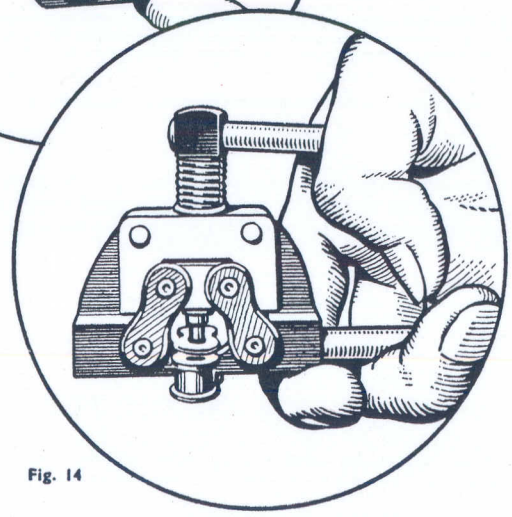


Fig. 14

ROUTINE MAINTENANCE AFTER RUNNING-IN PERIOD

	Miles.	Kilom.
ENGINE		
Check oil and replenish if necessary ...	250	400
Drain oil tank (oil hot) and re-fill ...	1,500	2,400
Clean oil filters	1,500	2,400
Tappets—Check and adjust if necessary...	3,000	4,800
Sparking plugs—Clean and adjust ...	3,000	4,800
Decarbonise	8,000-10,000	12,800-16,000
GEARBOX		
Check oil and replenish if necessary ...	1,000	1,600
Drain oil (oil hot) and re-fill	5,000	8,000
PRIMARY CHAINCASE		
Drain oil (oil hot) and re-fill	1,000	1,600
Check cover security screws	1,000	1,600
FORKS		
Drain and refill	5,000	8,000
Renew bushes	20,000	32,000
Grease headraces	10,000	16,000
Check headrace adjustment	5,000	8,000
REAR SUSPENSION		
Grease	1,000	1,600
WHEELS		
Re-pack with grease	10,000	16,000
Brake cam spindle (do not over grease) ...	2,000	3,200
CHAIN (Rear)		
Adjust	1,500	2,400
Lubricate (Winter) see Page 22	1,000	1,600
Lubricate (Summer) see Page 22 ...	1,500	2,400
BRAKES		
Grease cable and rod mechanism ...	1,000	1,600
Adjust (normal)	1,000	1,600

	Miles.	Kilom.
OPERATING CABLES		
Lubricate with oil	2,500	4,000
DISTRIBUTOR		
Lubricate with thin oil	5,000	8,000
Adjust contact points	5,000	8,000
BATTERY		
Check electrolyte level fortnightly.		
TYRE PRESSURES		
Check and correct weekly (see Page 99)		
CARBURETTER		
Dismantle and clean	1,500	2,400
AIR FILTER		
Clean and re-oil element	2,000	3,200
(When the machine is in use on extremely dusty conditions, the servicing period should be at more frequent intervals.)		
GENERAL		
Check cable wire for fraying, nuts and bolts, cables etc. for security ...	1,000	1,600

SEE PAGES 123 AND 124 FOR RECOMMENDED LUBRICANTS AND PAGES 125 AND 126 FOR LUBRICANT CHART

DECARBONISING

DISMANTLING

Before commencing this operation, first clean the engine and gear-box unit with paraffin or a suitable degreasing agent. Secondly, obtain two boxes, one large enough to take the cylinder barrel, cylinder head etc., and the other need only be a small container for the nuts, washers, etc. By doing this the operator will not have to search the four corners of the garage for the vital nut to complete the job.

Now set out the requisite tools necessary to dismantle the engine on a clean sheet of brown paper. Finally, obtain a Gasket Set before dismantling. Commence to dismantle in the following manner :—

1. **Exhaust System.** Slacken the bolt in the exhaust pipe to cylinder head clip and remove the silencer to frame bolt ; take away the exhaust system.

2. **Engine to Frame Bolts** (Prior to Engine No. 57617). Remove the two front bolts and slacken the rear engine to frame bolt to obtain sufficient clearance to detach the cylinder head.

3. **Rocker Oil Feed Pipe.** Disconnect by removing the rocker spindle nuts and easing the pipe banjo unions over the spindles.

4. **Carburetter.** Unscrew the petrol feed pipe at the tap, remove air cleaner rubber connection (where fitted) and slacken the clamping bolt. Withdraw the carburetter from the adaptor. Should the carburetter require cleaning, remove the screw securing the mixing chamber top. The carburetter can then be removed leaving the slide attached to the cable. Tie the slide safely out of the way.

5. **Cylinder Head.** Unscrew the "Simmonds" nuts securing valve tappet covers to cylinder head and remove covers. Remove the sparking plug and the four cylinder head holding nuts and ease the head away from the cylinder barrel. Do not attempt to prise the head from the barrel by placing a screwdriver between the fins,

as damage to the finning is almost sure to occur. Should the separating of these parts prove difficult, gently tap the area round the rocker box with a hide hammer when the joint will be broken.

6. **Push Rods and Cover.** Withdraw the push rods and raise the cylinder barrel to remove the cover tube.

7. **Cylinder Barrel.** This simply lifts over the long studs but should the operator suspect piston ring failure, it is advantageous partially to lift the barrel only and then fill the crankcase aperture with clean cloth to avoid any broken rings falling into the crankcase.

8. **Piston.** Remove a circlip and press the gudgeon pin out from the opposite end, the piston assembly can now be removed from the connecting rod. Mark the inside of the piston in order to identify the front and rear when replacing.

REMOVING THE CARBON AND PREPARATION OF UNITS FOR RE-ASSEMBLY

A fully detailed account will be found on page 39, which explains the method of dismantling, rectifying and re-assembly of the units.

RE-ASSEMBLY

Piston. To assemble the piston, first replace one circlip and ensure that it fits well into the gudgeon pin boss groove, then assemble the piston rings, first the scraper ring then the taper ring in the middle groove with the marking "TOP" upwards and finally the plain ring in the top groove. Well oil the piston rings and make sure that they revolve freely in the grooves. Oil the gudgeon pin and assemble to the piston so that it just protrudes through the boss opposite to the one already fitted with the circlip. It is now ready for assembly to the connecting rod. Identify the front of the piston and then place it over the rod and enter the gudgeon pin through the small end bush and into the piston boss until the pin contacts the circlip. Fit the remaining circlip, making sure of the fit in the groove.

Cylinder Barrel. Clean and oil the bore and fit the base washer to the flange, grease to hold in position. Place the piston in the position shown in Fig. 15, and assemble the cylinder barrel to the crankcase. Fit the copper gasket to the cylinder barrel top flange.

Push Rods and Cover. Fit the sealing washers to the cover tubes, top—SILICONE RUBBER (CREAM), bottom—RUBBER. Raise the cylinder barrel sufficiently to enable the fitting of the cover tube to the crankcase. Make sure the cutaway in the tube is fully engaged with the peg on the crankcase. (Later models: see overleaf). Replace the push rods and engage to the tappets ; check the action by turning the engine mainshaft.

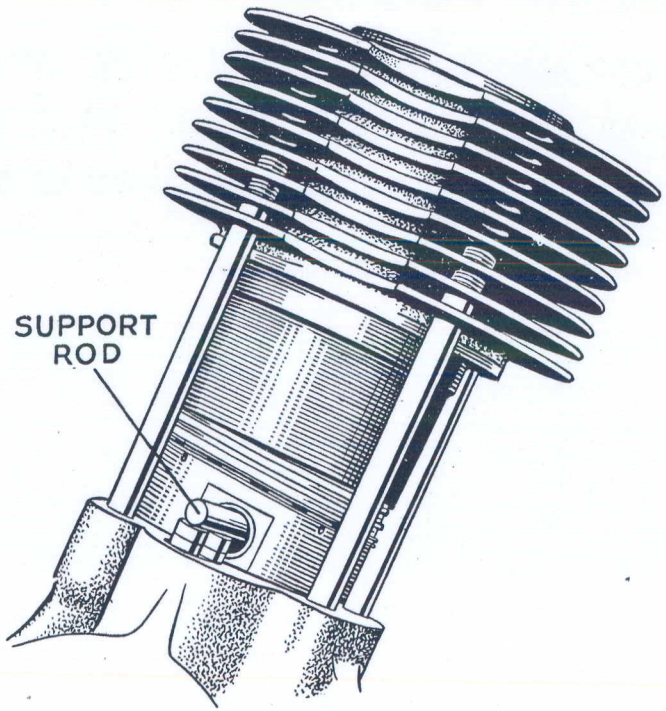
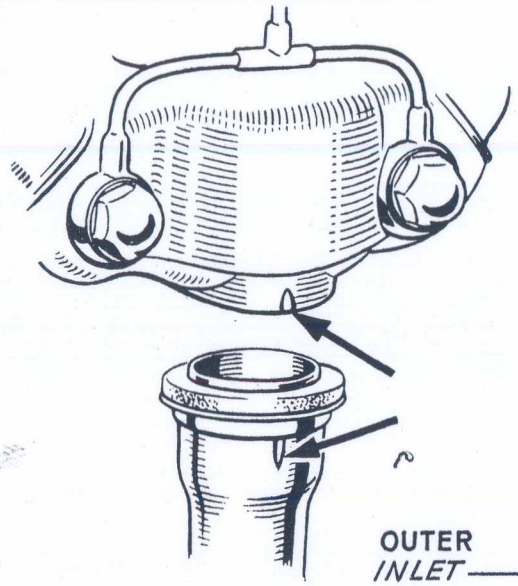


Fig. 15

Replacing the cylinder barrel.



The peg is no longer fitted at the crankcase and the push rod cover tube is correctly fitted when the mark on the tube is aligned with the "pip" on the cylinder head.

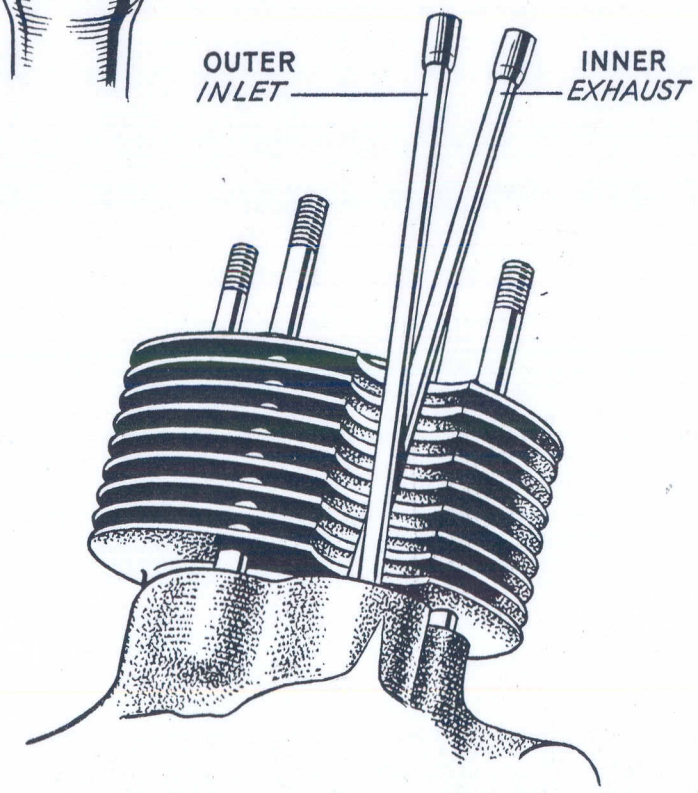


Fig. 16. Positioning the Push Rods and Cover Tube

Cylinder Head Assembly. First correctly position the push rods in relation to the cylinder head rocker gear. The INLET push rod is the OUTER and the EXHAUST push rod is the INNER, (looking at the engine from the RIGHT HAND side). Lower the cylinder head complete with finned clip onto the cylinder barrel engaging the push rods to the respective rocker ball ends. Fit the four sleeve nuts and before finally tightening, check the valve action by turning the engine. Tighten down the nuts evenly.

Engine to Frame Bolts. Replace the bolts and ensure the nuts are well tightened.

Rocker Feed Pipe. Fit a copper washer to each rocker spindle and then replace the feed pipe, followed by a further two copper washers and two dome nuts. Care should be taken not to over-tighten the nuts, otherwise the pipe may turn and break at the banjo unions.

Carburetter. Replace this unit in the reverse manner to the dismantling procedure and should the air cleaner rubber connection seem perished in any way it should be replaced by a new one. Check operation of throttle control after assembly, the action should be free and the throttle valve should fall to the fully closed position.

Exhaust System. Replace the pipe and silencer and tighten the finned clip and silencer bolt.

Rocker Covers. First turn to page 19, where adjustment of the valve tappet is fully described, then adjust the tappets. Lubricate the valve gear by applying oil with an oil gun or if not available, bend a piece of tin and pour the oil in. Replace the rocker covers with the new joint washers and finally tighten down the nuts.

Sparking Plug. Replace and attach the H.T. lead. It is advisable to graphite grease the threads of the plug before fitting ; do not overtighten.

The engine is now ready for starting. After running for a short period stop the engine and re-check and tighten, if necessary, all engine nuts.

OVERHAULING THE ENGINE AND GEARBOX UNIT

Removing the Engine from the Frame

Before commencing this operation the operator is advised to remove the petrol tank. This operation is not entirely necessary as the engine can be removed without disturbing the tank, but on the other hand it simplifies the removal of control cables and prevents possible damage to the tank.

Rear Panels. Remove as described on Page 84.

Front Chainguard. Remove the two bolts, guard to crankcase and mudguard stay. Withdraw the chainguard.

Exhaust System. Slacken the bolt in the exhaust pipe clip, remove the silencer bolt and take off the exhaust system.

Control Cables. Disconnect all engine and gearbox cables at the handlebar. Free them from the frame cable clips.

Brake Pedal and L.H. Footrest. Remove the nuts securing these parts and withdraw from the spindles.

Oil Feed and Scavenge Pipes. Place an oil tray under the engine. Remove the lower front engine to frame bolt and detach the oil pipe junction block. To drain the oil more quickly, disconnect the pipe from the oil tank.

Rocker Oil Feed Pipe. Remove the two rocker spindle nuts, and ease the banjos off the spindles.

Electrical Connections. Disconnect cables to distributor and sparking plug.

Engine Bolts. Remove the two remaining engine to frame bolts. Drop the engine at the rear and raise at the front, then remove the unit from the L.H. side (drive side) of the machine.

DISMANTLING THE ENGINE AND GEARBOX UNIT

Distributor. Slacken the distributor clamp and withdraw the unit from the crankcase.

Carburetter. Remove the two securing nuts and withdraw carburetter and insulating block.

L.H. Outer Cover. Remove the two domed nuts (where fitted) from the rear of the middle pair of securing screws, unscrew the 7 remaining screws and pull off the cover.

Clutch, Engine Sprocket and Rotor. First unscrew the three clutch nuts and remove pressure plate. Bend back the clutch locking plate tab and undo clutch to mainshaft locknut. Remove the engine mainshaft locknut and withdraw the rotor and distance piece. Screw into the clutch centre the extractor (Part No. D.400) and tighten the extractor bolt to release the clutch from the taper mainshaft. Remove the rotor key and then withdraw the clutch, engine sprocket and chain as one unit. Tap the clutch key out of the gearbox mainshaft.

Kickstarter and Gearchange Pedal. Remove the nut from the kickstarter cotter, turn the pedal to the horizontal position and drive the cotter out. One good sharp blow with a hammer will usually free it. Remove the pedal from the shaft. Unscrew and remove the gearchange pedal screw and withdraw the pedal from the splined shaft.

R.H. Outer Cover. Take out the securing screws and lift the cover away from the inner cover.

Kickstarter Spring and Anchor Plate. Carefully ease the anchor plate off the spindle. To prevent any injury, hold a piece of rag over the plate. Remove the spring from the casing.

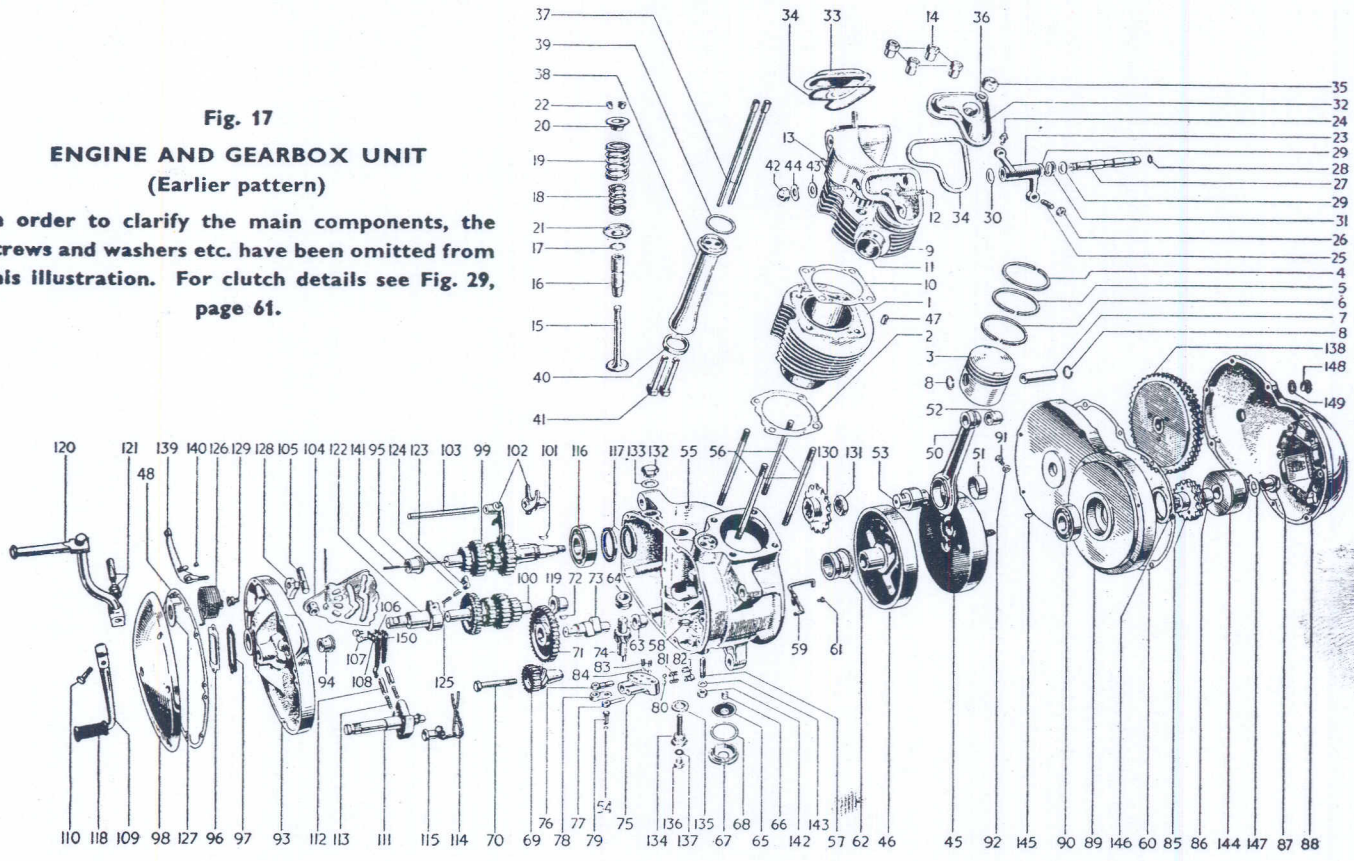
R.H. Inner Cover. First remove the small metal plate held by two screws, then take out the split pin which secures the camplate to the spindle and take out the spindle. Remove the four screws and withdraw the cover. To prevent any misalignment of the distributor-oil pump shaft bush, replace the appropriate screw.

Fig. 17

ENGINE AND GEARBOX UNIT

(Earlier pattern)

In order to clarify the main components, the screws and washers etc. have been omitted from this illustration. For clutch details see Fig. 29, page 61.

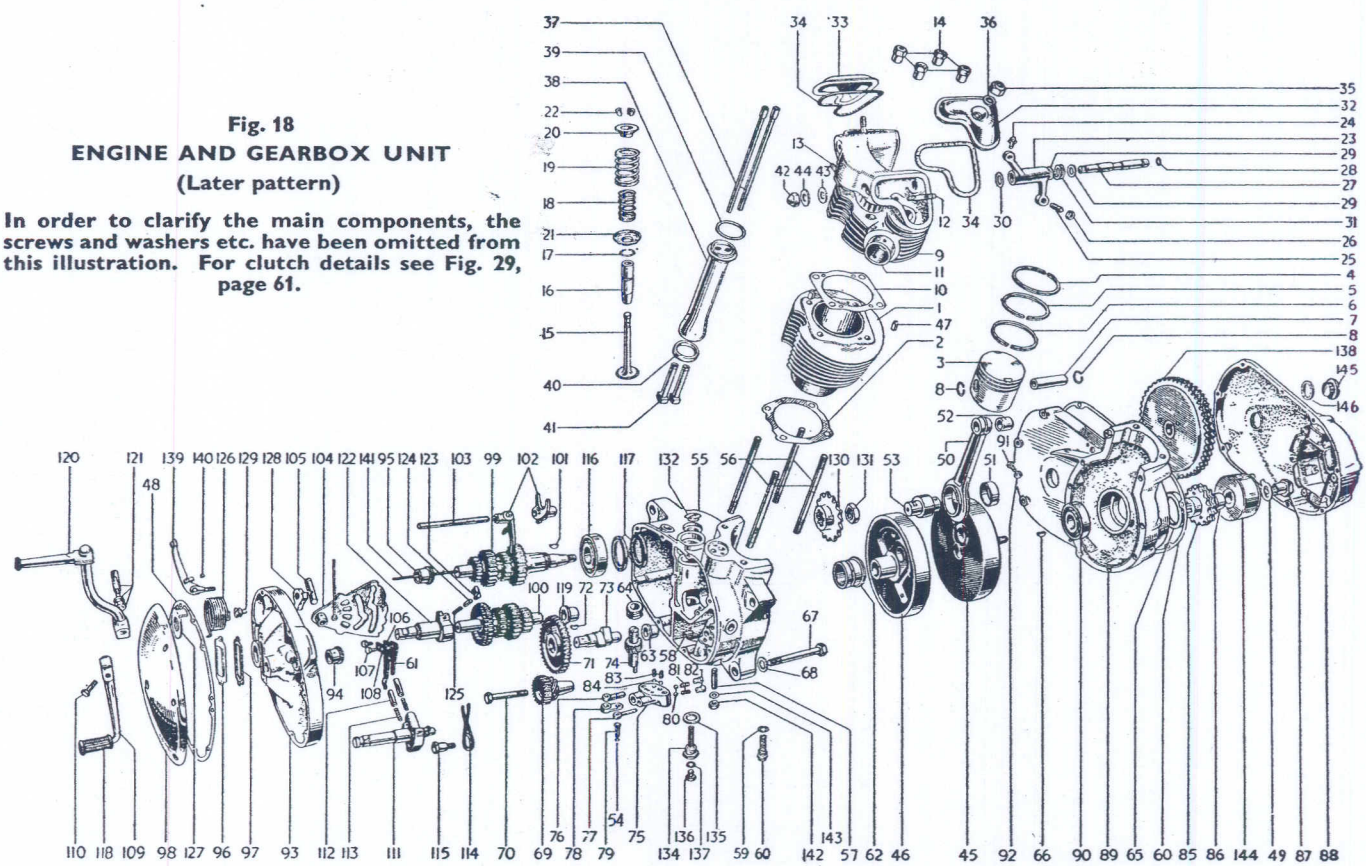


INDEX TO FIG. 17

Index No.	Description
1	Barrel, cylinder.
2	Washer, cylinder base.
3	Piston.
4	Ring, top compression.
5	Ring, middle taper.
6	Ring, scraper.
7	Pin, gudgeon.
8	Circlip.
9	Head, cylinder.
10	Gasket, cylinder head.
11	Adaptor, exhaust pipe.
12	Stud, rocker cover.
13	Stud, carburetter.
14	Nut, head to barrel.
15	Valve.
16	Guide, valve.
17	Circlip, valve guide.
18	Spring, valve inner.
19	Spring, valve outer.
20	Collar, valve spring top.
21	Collar, valve spring bottom.
22	Cotter, valve split.
23	Rocker, valve.
24	Ball, pin rocker.
25	Adjuster, rocker.
26	Locknut, rocker adjuster.
27	Spindle, valve rocker.
28	Sealing ring, rocker spindle.
29	Thrust washer, rocker spindle.
30	Thrust washer, rocker spindle.
31	Thackeray (spring) washer, rocker spindle.
32	Cover, rocker inspection.
33	Cover, rocker inspection.
34	Washer, cover joint.
35	Nut, cover securing.
36	Washer, cover nut.
37	Push rod.
38	Cover, push rod.
39	Washer, cover joint (upper).
40	Washer, cover joint (lower).
41	Tappet.
42	Nut, oil pipe to rocker spindle.
43	Washer, oil pipe nut.
44	Washer, oil pipe nut.
45	Flywheel assembly, L.H.
46	Flywheel assembly, R.H.
47	Dowel, head to barrel.
48	Joint washer.
50	Rod, connecting.
51	Bush, big end.
52	Bush, small end.
53	Crankpin.
54	Circlip, drive pin.
55	Crankcase assembly.
56	Stud, head to crankcase.
57	Stud, oil pipe junction block.
58	Dowel, inner cover to crankcase.
59	Pipe, crankcase oil return.
60	Washer, L.H. outer cover joint.
61	Bolt, oil return pipe.
62	Bearing, R.H. (plain).
63	Bush, camshaft inner.
64	Bush, distributor and oil pump shaft.
65	Filter, crankcase.
66	Spring, crankcase filter.
67	Cap, crankcase filter.
68	Washer, filter cap joint.
69	Pinion, timing and distributor drive.
70	Bolt, timing pinion.
71	Pinion, camshaft.
72	Key, camshaft pinion.
73	Camshaft, inlet and exhaust.
74	Pinion, oil pump and distributor drive.
75	Body, oil pump.
76	Plunger, oil scavenge.
77	Plunger, oil feed.
78	Rod, oil pump drive.
79	Pin, oil pump drive.
80	Ball, oil pump valve.
81	Spring, oil pump valve.
82	Plug, oil pump body.
83	Spring, auxiliary valve.
84	Ball, auxiliary valve.
85	Sprocket, engine.
86	Distance piece, sprocket and rotor.
87	Nut, sprocket and rotor.
88	Cover, L.H. inner.
89	Cover, L.H. outer.
90	Bearing, L.H. main (ball).
91	Plug, oil level.
92	Washer, level plug.
93	Cover, R.H. inner.
94	Bush, camshaft outer.
95	Bush, gearbox mainshaft.
96	Plate, gearbox inner cover.
97	Washer, inspection plate joint.
98	Cover, R.H. outer.
99	Mainshaft gear cluster.
100	Layshaft gear cluster.
101	Key, clutch to mainshaft.
102	Fork, gear selector.
103	Spindle, selector fork.
104	Camplate, gearbox.
105	Spindle, camplate.
106	Spring, camplate locating.
107	Screw, spring.
108	Lockplate, screw.
109	Pedal, gearchange.
110	Bolt, gearchange pedal.
111	Spindle and quadrant gear-change.
112	Plunger, gear selector.
113	Spring, gear selector plunger.
114	Spring, pedal return.
115	Pin, return spring anchor.
116	Bearing, gearbox sprocket (ball).
117	Oil seal sprocket bearing.
118	Rubber, gearchange.
119	Bush, gearbox layshaft L.H.
120	Kickstarter, folding.
121	Cotter, kickstarter.
122	Spindle, kickstarter.
123	Pawl, kickstarter.
124	Plunger, kickstarter.
125	Spring, kickstarter plunger.
126	Spring, kickstarter return.
127	Plate, kickstarter return.
128	Plate, kickstarter stop.
129	Screw, kickstarter stop plate.
130	Sprocket, gearbox.
131	Nut, gearbox sprocket.
132	Plug, gearbox filter.
133	Washer, filter plug.
134	Plug, gearbox drain.
135	Washer, drain plug.
136	Plug, gearbox level.
137	Washer, level plug.
138	Clutch.
139	Lever, clutch operating.
140	Ball, cup to rod.
141	Rod, clutch operating.
142	Nut, oil pipes to crankcase.
143	Washer, oil pipe nut.
144	Rotor, alternator.
145	Key, rotor to shaft.
146	Oil seal, L.H. engine mainshaft.
147	Washer, rotor fixing nut.
148	Plug, chaincase filler.
149	Washer, filler plug.
150	Spring, camplate locating.

Fig. 18
ENGINE AND GEARBOX UNIT
(Later pattern)

In order to clarify the main components, the screws and washers etc. have been omitted from this illustration. For clutch details see Fig. 29, page 61.



INDEX TO FIG. 18.

Index No.	Description
1	Barrel, cylinder.
2	Washer, cylinder base.
3	Piston.
4	Ring, taper.
5	Ring, taper.
6	Ring, oil control.
7	Pin, gudgeon.
8	Circlip.
9	Head, cylinder.
10	Gasket, cylinder head.
11	Adaptor, exhaust pipe.
12	Stud, rocker cover.
13	Stud, carburetter.
14	Nut, head to barrel.
15	Valve.
16	Guide, valve.
17	Circlip, valve guide.
18	Spring, valve inner.
19	Spring, valve outer.
20	Collar, top.
21	Cup, bottom.
22	Cotter, split.
23	Rocker, valve.
24	Ball pin, rocker.
25	Adjuster, rocker.
26	Nut, adjuster lock.
27	Spindle, rocker.
28	Sealing ring, spindle.
29	Thrust washer.
30	Thrust washer.
31	Thackeray (spring) washer.
32	Cover, rocker.
33	Cover, rocker.
34	Washer, cover joint.
35	Nut, cover retaining.
36	Washer, copper.
37	Push rod.
38	Cover, push rod.
39	Washer, cover joint.
40	Washer, cover joint.
41	Tappet.
42	Nut, domed.
43	Washer, copper.
44	Washer, copper.
45	Left flywheel.
46	Right flywheel.
47	Dowel.
48	Joint washer.
49	Tab washer.
50	Rod, connecting.
51	Bush, big end.
52	Bush, small end.
53	Crankpin.
54	Circlip, drive pin.
55	Right crankcase.
56	Stud, cylinder head.
57	Stud, oil pipe.
58	Dowel, inner cover.
59	Washer, fibre.
60	Oil filter.
61	Spring, camplate index.
62	Main bearing (plain).
63	Bush, camshaft.
64	Bush, distributor shaft.
65	Oil seal.
66	Key, rotor.
67	Bolt, crankcase.
68	Washer, plain.
69	Pinion, timing.
70	Bolt, timing pinion.
71	Pinion, camshaft.
72	Key, camshaft.
73	Camshaft.
74	Pinion, distributor drive.
75	Body, oil pump.
76	Plunger, scavenge.
77	Plunger, feed.
78	Rod, pump drive.
79	Pin, connecting.
80	Ball, pump valve.
81	Spring, pump valve.
82	Plug, pump body.
83	Spring, auxiliary valve.
84	Ball, auxiliary valve.
85	Sprocket, engine.
86	Distance piece.
87	Nut, sprocket and rotor.
88	Cover, left outer.
89	Left crankcase.
90	Main bearing (ball).
91	Plug, oil level.
92	Washer, fibre.
93	Cover, right inner.
94	Bush, camshaft.
95	Bush, mainshaft.
96	Plate, gearbox cover.
97	Washer, cover joint.
98	Cover, right outer.
99	Mainshaft gear cluster.
100	Layshaft gear cluster.
101	Key, clutch.
102	Fork, gear selector.
103	Spindle, selector fork.
104	Camplate, gearchange.
105	Spindle, camplate.
106	Spring, camplate index.
107	Screw.
108	Lockplate.
109	Pedal, gearchange.
110	Bolt, gearchange pedal.
111	Quadrant, gearchange.
112	Plunger, gear selector.
113	Spring, plunger.
114	Spring, pedal return.
115	Bolt, spring anchor.
116	Bearing, high gear.
117	Oil seal.
118	Rubber, gear pedal.
119	Bush, layshaft.
120	Kickstarter.
121	Cotter, kickstarter.
122	Quadrant, kickstarter.
123	Pawl, kickstarter.
124	Plunger, kickstarter.
125	Spring, kickstarter plunger
126	Spring, kickstarter return.
127	Plate, kickstarter return.
128	Plate, kickstarter stop.
129	Screw, stop plate.
130	Sprocket, gearbox.
131	Nut, gearbox sprocket.
132	Plug, gearbox filler.
134	Plug, gearbox drain.
135	Washer, fibre.
136	Plug, gearbox level.
137	Washer, fibre.
138	Clutch.
139	Lever, clutch operating.
140	Ball, cup to rod.
141	Rod, clutch operating.
142	Nut, oil pipes.
143	Joint washer.
144	Rotor, alternator
145	Filler plug.
146	Fibre washer.

Gearchange Spindle and Quadrant Assembly. Remove the spring anchorage bolt and withdraw the assembly from the case.

Gear Indicator Cable. Disconnect the nipple at the camplate and unscrew adjuster to remove.

Camplate. Remove from the case.

Selector Forks and Spindle. Withdraw the spindle and remove the forks.

Kickstarter Shaft and Low Gear. Remove both of these units from the gearbox layshaft.

Mainshaft and Layshaft Gear Cluster. Take out of the casing as a complete assembly.

Cylinder Head. Unscrew the four sleeve nuts and lift off the head assembly.

Push Rods and Cover. Ease up the cylinder barrel enough to enable removal.

Camwheel and Camshaft Assembly. Withdraw from the timing chest. (The camwheel is marked for replacement purposes).

Tappets. Remove from the crankcase.

Timing Pinion. Slacken off the centre bolt one complete turn, then screw the extractor (Part No. D.398) into the pinion internal thread. Tighten the extractor bolt to withdraw pinion from the shaft taper. Remove extractor and unscrew pinion bolt to remove the pinion.

Oil Pump. Unscrew the two securing bolts and remove the assembly.

Distributor and Oil Pump Drive Shaft. If the driven gear shows no signs of wear and the shaft fit in the bush is good, the assembly should not be disturbed. To prevent the bush turning in the casing, replace the cover screw. If it is desirable to replace the parts, drive out the shaft complete with bush from inside of the casing.

Cylinder Barrel and Piston. Lift off the cylinder barrel. Remove one circlip from the piston gudgeon pin boss. Press out the gudgeon pin from the opposite end to remove piston.

L.H. Inner Cover. Remove the three securing screws. Use two extractors Part No. Z.129 in the top and bottom holes which are threaded for this purpose. On the later models (see Fig. 18), unscrew the 9 bolts and tap one side of the case with a hide hammer to free the joint which is made with jointing compound.

Flywheel Assembly. Turn the flywheels until the connecting rod is in the lowest position, and withdraw the assembly from the casing.

Mainshaft High Gear and Rear Drive Sprocket. Lock the sprocket to prevent it turning and unscrew the locknut. Press the gear into the casing to release sprocket.

The Engine and Gearbox is now completely broken down into units, and it is proposed to deal with these units separately in such a manner that the fitter can dismantle, overhaul and re-assemble the major unit assemblies. By doing the work in this manner the assembly of engine and gearbox is simplified inasmuch as there is no sub-assembly to bother with whilst concentrating on the correct assembly of the unit.

PREPARATION

CYLINDER HEAD

Rockers and Spindles. Remove the rockers by knocking out the spindles from the threaded end. To prevent damage to the threads use a hide hammer or soft metal tool for this operation. After removing the spindles, the rockers and thrust washers can be taken out of the valve chambers. When inspecting for wear, check the ball ends and the adjuster pins. The spindle and rocker bore which is fully lubricated normally shows very little wear even after a considerable mileage.

Valves and Springs. Compress the valve springs sufficiently with a compressor tool, when the split cotters can be eased away with a narrow screwdriver or similar tool. Release the tool and withdraw springs and valve. Repeat the operation to the other valve. Inspect the valve springs for signs of fatigue (Free length : Outer $1\frac{5}{8}$" (4.13 cms.), Inner $1\frac{9}{16}$" (4.0 cms.) ; if in doubt, a new set of springs should be obtained. Clean the valves and remove any burnt oil from the stems ; if the valve faces are pitted they can be re-ground but excessive grinding by machine is not advisable, as the heat transference properties of the valve will be adversely affected ; the stem of the valve should be inspected for wear and scuffing, and if either is pronounced it should be replaced.

Removing Carbon from Cylinder Head. Remove the carbon, with a round flat headed scraper from the head sphere and ports. Take particular care when cleaning around the valve seatings to avoid damaging the faces. Inspect the valve seats for pitting or pocketing, and valve guides for ovality. Remember, if the valve guides are changed the valve seatings must be re-cut. The same applies to a valve replacement or a valve which has had the seat face re-ground.

Replacing the Valve Guides. To replace the valve guide, use a shouldered drift and knock out from the inside of the combustion chamber. When fitting the new guide, assemble the circlip, lubricating the outer diameter and drift into the cylinder head from the rocker box end until the circlip just contacts the housing.

Grinding in the Valves. This should be done with a fine carborundum grinding-in paste. First smear a little paste around the valve face and insert the stem into the new valve guide. Attach the valve grinding tool to the stem tip and commence to grind the valve face to the valve seating, using a semi-rotary motion, occasionally turning the valve through 180°. Continue the process until a uniform seat results. Remove the valve and wash thoroughly in petrol or paraffin and examine the seating. A surer method is to apply a light even smear of "Engineers' marking blue" to the face of the valve. Rotate the valve one complete revolution and then remove

it for inspection. A thin uniform line free from pit marks or other surface blemishes on valve face and valve seat indicates that the seating is satisfactory. After completion, the part must be thoroughly washed to remove all traces of the grinding-in compound.

Assembling the Cylinder Head. First ensure that all parts are perfectly clean, then oil the stem of the valve marked "IN" and insert into the inlet valve guide. Turn the head over ; holding the valve in position, slide the spring bottom cup over the guide, followed by the inner and outer valve springs and the top collar. Compress the springs with the spring compressor and assemble the two cotters to the valve stem. Release the compressor and finally give the valve stem tip a sharp rap with a hammer to ensure correct seating of the cotters. Repeat the operation for the exhaust side. The next operation is to replace the rockers. To do this grease the shim washer with the smaller hole and affix to the rocker end nearest the ball pin. Insert the rocker into the cylinder head and to replace the shim washers and spring washers to the opposite end, place the three together (spring washer in the middle) and grip the edge with a pair of round nose pliers. Now insert the washers between the rocker end and the valve chamber. Oil the spindle and push in from the sparking plug side. Carefully locate the rubber sealing washer on the spindle and tap the spindle through until the end is flush with the housing. Repeat the operation for the other rocker.

CYLINDER BARREL

Removing the Carbon. Remove all traces of carbon from the upper wall of the bore and then wash the cylinder barrel thoroughly. Check the amount of wear in the upper part of the bore by comparing it to the measurements in the lower. Anything over +0.005" (0.127 mm.) will denote re-boring is necessary. A rough check can be made by checking the piston ring gap in various sections of the cylinder barrel bore. Normally the wear at the bottom of the bore is very light.

Piston. First remove the scraper and compression rings. Now clean away the carbon deposit from the piston crown by carefully scraping off. Any light deposit of burnt oil on the piston skirt should be removed by rubbing with a rag which has been dipped

into a cleaning solvent (petrol-paraffin). Never, in any circumstances use emery cloth. To clean the ring grooves it is advantageous to use an old broken ring, by inserting the broken end into the groove and working it around the circumference. Clean out the drain holes in the scraper ring groove and then thoroughly wash the piston. If it is proposed to fit new rings, they must first be correctly gapped in the cylinder bore.

		T15	T20
Minimum gap ...	...	.006 in (0.15 mm.)	.008 in. (0.2 mm.)
Maximum gap	...	.008 in. (0.2 mm.)	.010 in. (0.25 mm.)

When making this check the ring must be fitted into the un-worn part of the cylinder bore, i.e. the lowest point.

Oil Pump. See Lubrication System, page 15.

CRANKCASE

In the flywheel compartment are the R.H. Mainshaft plain bearing, the distributor shaft bush, and the camshaft bush. The latter two are fairly easily replaced but we do not recommend the owner to disturb the plain bearing. This is a job which should be delegated to a Triumph Dealer who will have the necessary equipment to line ream it in position. Faulty fitting of this bush will result in lack of oil to the big end. In the gear compartment will be found the high gear journal bearing, the layshaft bush and the cam-plate index spring. To remove the journal bearing, simply press into the case. The oil seal may then be pressed outwards. Where twin seals are fitted, the spring loaded side of each must face towards the bearing. The index spring is removed by unscrewing the two securing screws, an operation which need not be undertaken if the plate shows no signs of wear. The layshaft bush is removed by first pressing out the sealing washer and then the bush. Replacement is made in the reverse manner but before replacing the sealing washer, check the layshaft fit in the bush.

Note.—The removal and replacement of all bearings is simplified by heating the crankcase to 100° C. (approximately boiling point).

CRANKCASE COVERS

R.H. Inner. This cover houses three bushes and the clutch operating arm. The bushes may be replaced by pressing the old bushes out and the new bushes in. The clutch arm pivot anchorage is screwed into the crankcase ; to remove turn arm anti-clockwise (R.H. thread). Check joint faces and remove any burrs.

L.H. Outer. In the cover is housed the alternator stator. Care must be taken not to damage the winding. Clean and check the cover faces.

L.H. Inner. The flywheel mainshaft journal bearing is housed in this cover. To remove it, warm the casing when the bearing can be pressed out complete with oil seal. The new bearing should be replaced in the reverse manner and a new seal must be fitted with the spring side of the seal towards the sprocket.

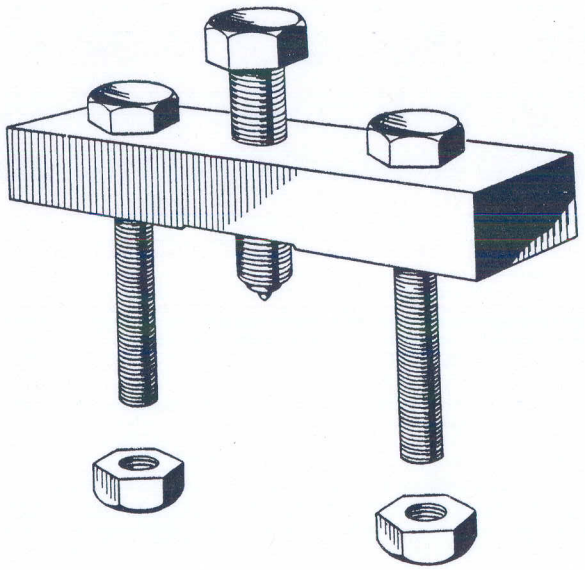


Fig. 19.
Flywheel Parting and Assembly Tool Part No. Z101.

FLYWHEEL ASSEMBLY

The owner who is without workshop facilities is not advised to attempt the overhaul of the flywheel assembly ; such work as this is far better entrusted to a Triumph Dealer who has a fully equipped workshop. For those owners who have the facilities and for others who are in outlandish places, a special tool, Part No. Z101 is required, together with a fitter's vice fitted with lead clamps.

DISMANTLING

Before attempting to split the assembly, carefully scribe two parallel lines at any point across the rims of the flywheels, using a fitter's square to ensure that the lines are at 90°. This procedure aids alignment during the re-assembly. On pages 45 and 47 are illustrated the four operations necessary to dismantle and assemble the flywheels. If a careful note is made of these, no difficulty should be encountered during the operation.

Left Flywheel. Place the tool in position as in Fig. 20 and tighten the two $\frac{3}{8}$" bolts into the threaded holes of the flywheel. Screw in the centre bolt and the left flywheel will be drawn off the crankpin. Remove the tool and lift off the connecting rod.

Right Side Flywheel. Position the tool as in Fig. 21 and this time the two $\frac{3}{8}$" bolts are secured by nuts at the rear of the flywheel. Screw in the centre bolt and the crankpin will be pressed out.

EXAMINATION

The right main bearing controls the oil pressure at the big end, and if the main bearing journal is worn, the right flywheel must be replaced. The new right main bearing should be line reamed in position.

Unscrew the plug in the rim of the right flywheel and clean out the sludge trap. Replace the plug and peen the metal into the screw slot to lock the plug in position. Make sure that the other plug in the centre of the wheel is also secure.

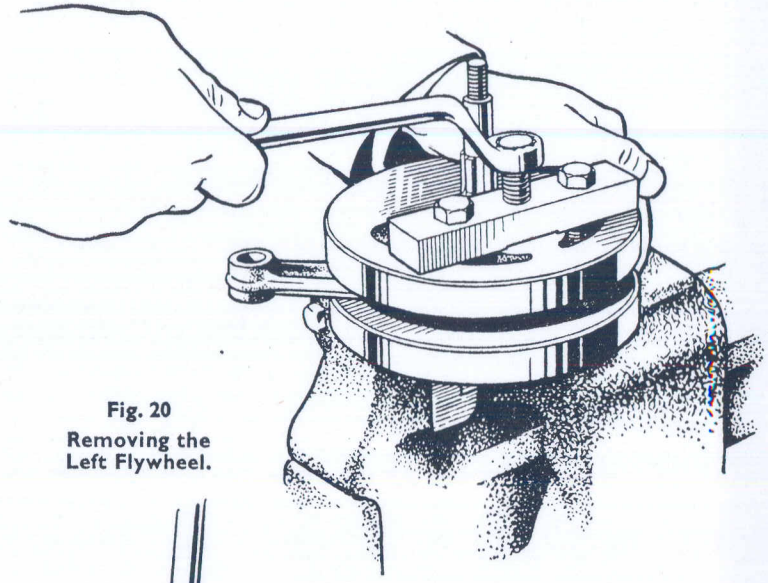


Fig. 20
Removing the Left Flywheel.

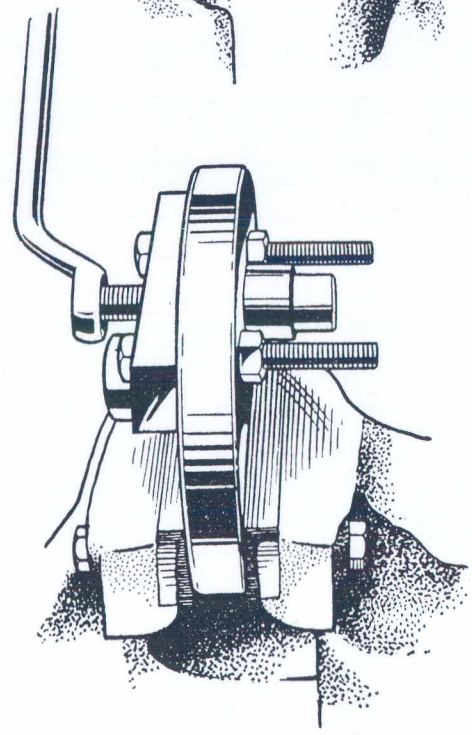


Fig. 21. Removing the Crankpin.

ASSEMBLING

Before commencing this work, clean all parts thoroughly with petrol or a degreasing agent. It is most essential that the oilways are clear and the flywheel crankpin bores free from oil. The Z101 tool used for dismantling can now be used for assembling.

Right Flywheel. The crankpin must be pressed into the flywheel first and great care must be taken to ensure that the OIL HOLE in the CRANKPIN lines up with the OIL HOLE in the FLYWHEEL. Fit the tool as shown in Fig. 22, clamping the bolts to the outer face of the flywheel, with the two nuts. Tighten down the centre bolt and the crankpin will be pressed into the flywheel. Test the alignment of the crankpin to flywheel by blocking one hole in the crankpin and applying oil through a pressure oil gun into the opposite hole. If the alignment is correct the oil will flow through the crankpin and into the mainshaft.

Big-End Bearing. Lubricate the crankpin and the connecting rod big-end with clean engine oil. Wipe surplus oil from that portion of the crankpin which is inserted into the left flywheel.

Left Flywheel. Assemble the flywheel to the crankpin and fit the tool as shown in Fig. 23 to the right wheel. The two bolts are threaded through the right wheel and screwed into the left wheel. The bolts must be equally tightened down. Support the connecting rod in the up position and tighten down the centre bolt when the top assembly will be pressed into the left flywheel.

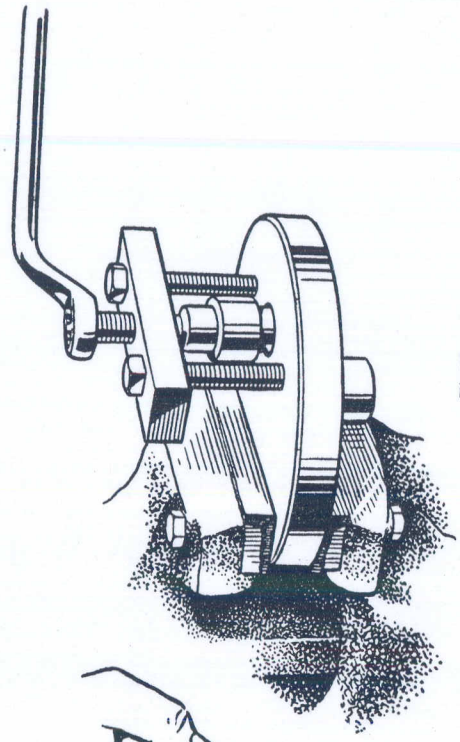


Fig. 22
Replacing the Crankpin into the Right Flywheel.

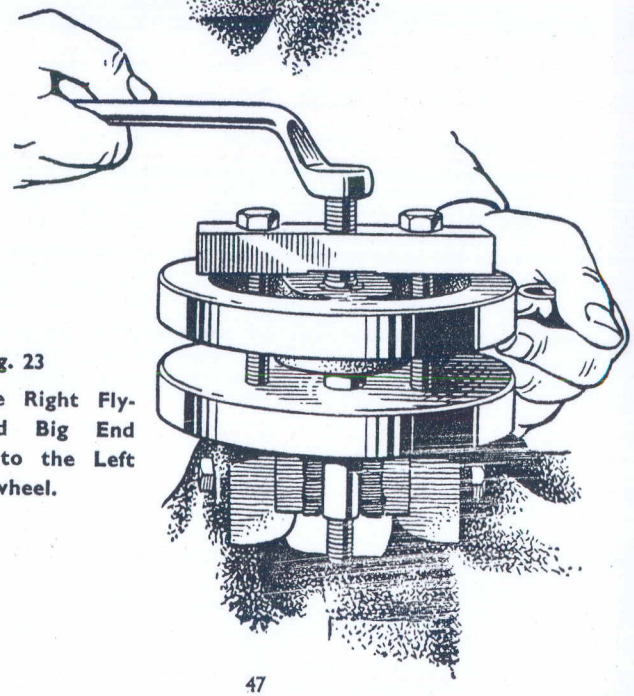


Fig. 23
Fitting the Right Flywheel and Big End Assembly to the Left Flywheel.

Truing the Assembly. First check the flywheel alignment by placing a straight edge across the rims. This will indicate the highest wheel in that particular position. Mark the position with a piece of chalk and then place the assembly on the bench with the mark uppermost and towards the operator. Tilt the assembly to rest on the rear flywheel and then strike the marked flywheel rim a smart blow with a lead or hide hammer (see Fig. 24). Re-check the alignment with the straight edge and the fitter's square to see that the scribed lines are in alignment. If possible the assembly should be mounted in a jig on ball races and the flywheels and shafts tested for concentricity.

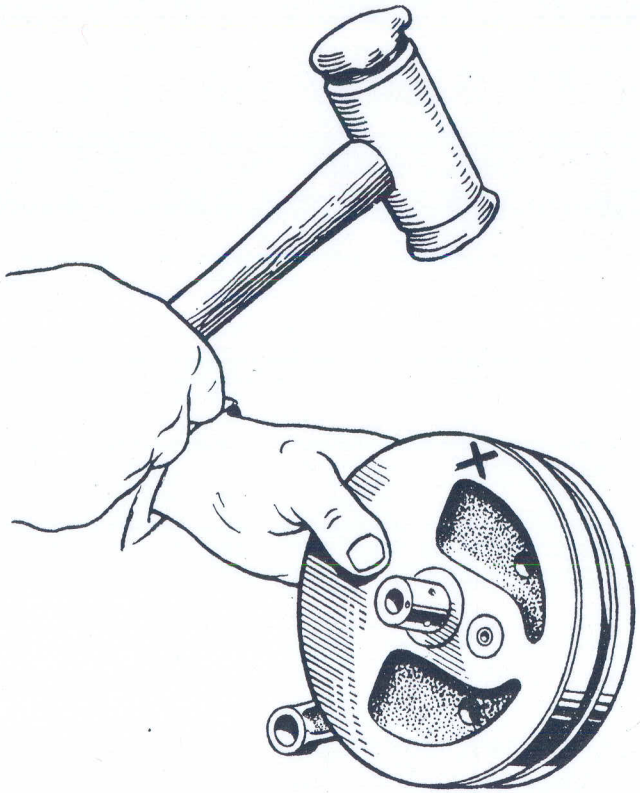


Fig. 24. Aligning the Flywheels.

RE-ASSEMBLY OF ENGINE AND GEARBOX UNIT

Before attempting to erect the engine first lay out all the parts in some order of assembly on a clean bench or if not available on a clean sheet of paper. Check that all unit assemblies are built up and that the various other parts including nuts, washers, split pins and gaskets, etc., are all available. Also required is an oil gun (or failing this a can of clean engine oil and a paint brush). All the working parts should be liberally oiled before assembly.

Rear Drive Sprocket. Oil the gearbox high gear bearing and fit the mainshaft high gear. Assemble the rear drive chain sprocket to the gear and tighten up with gear nut. Care should be taken to avoid damaging the oil seal when assembling the sprocket. Lock the sprocket to prevent it turning whilst tightening the nut. Lock the nut by centre punching in two places around the periphery of the thread.

Flywheel Assembly. Place the connecting rod in the lowest position and thread the assembly into the crankcase, entering the connecting rod through the cylinder aperture first.

L.H. Inner Cover. Smear jointing cement round the crankcase joint face and assemble to crankcase. Replace and tighten the two hexagon-headed screws, and one screw at top front. Later models have 9 bolts and washers securing the crankcase halves.

Crankcase Filter. Place the short spring over the scavenge pipe, followed by the filter and cap with washer. Later models have the filter attached to the cap. Pour a small quantity (about 50 c.c.) of oil into the crankcase.

Piston Assembly. Position the piston over the connecting rod ; enter the gudgeon pin into the small end from the opposite end to which the circlip is already fitted. Fit the remaining circlip and ensure correct positioning.

Cylinder Barrel. First put a rod through the gudgeon pin centre and turn the flywheel drive shaft until the rod rests on the crankcase cylinder base (see Fig. 15). Grease the base gasket and fit to the cylinder base flange. Place the cylinder barrel over the crankcase stud and gently lower until the cylinder spigot contacts the first ring. Ease each ring into the cylinder bore separately, and then correctly position the cylinder flange to crankcase.

Oil Pump. Fit the paper gasket to the pump, ensuring that all holes are matched. Assemble to crankcase and eccentric shaft (see Fig. 3) ; well tighten the bolts.

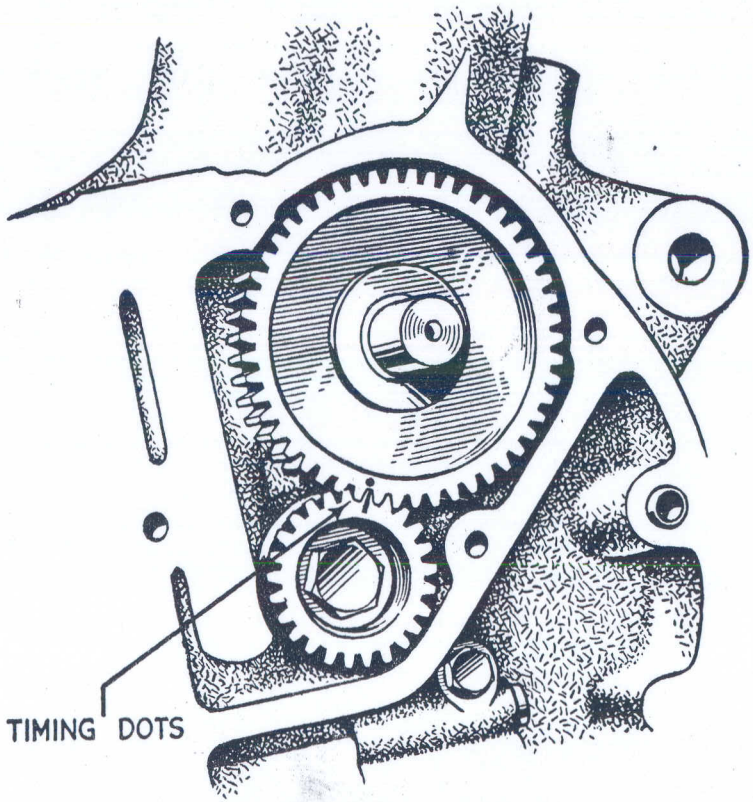


Fig. 25. Valve Timing Marks.

Timing Pinion. Turn the engine until the piston is at top dead centre and then set the distributor drive shaft so that the driving slot is in line across the frame. Assemble the timing pinion to the flywheel mainshaft and engage the worm drive to the shaft driven gear and the pinion locating peg to the mainshaft. Check the length of the timing pinion bolt. This must not be longer than 1 $\frac{3}{32}$" U.H. or the oil supply to the big end bearing may be cut off. *Do not over-tighten the bolt or the bearing journal may be spread by the taper.*

Tappets. Replace into the guides ; check for freedom of action.

Camshaft and Wheel. Turn the flywheel assembly until the DOT on the timing pinion is uppermost and aligned with the tappet centres. Place the camshaft into the crankcase bush with the engaged key-way in the downward position. Now mesh the gears together so that the DOTS on camshaft wheel and pinion coincide. (See Fig. 25.)

Gear Cluster. Fit the layshaft and mainshaft gears together as shown in Fig. 26 and place into the gearbox casing as a complete assembly.

Selector Forks. Assemble the forks back to back onto the selector rod. Fit the assembly into the casing engaging the forks to the gear selector grooves, then locate the rod into its housing. Do not oil the rod end or housing as a hydraulic lock may occur causing difficulty in final assembly.

Camplate. Put the camplate into the casing with the bush pointing towards the unit front and the indicator rod in the guide. Position the grooves over the selector rollers.

Plunger Guide Assembly. Fit the gearchange pedal return spring. To do this hold the plunger spindle in the left hand and the eye end of the spring in the right hand. Push the open end of the spring over the groove in the back half of the spindle. Then holding the spring in this position, turn the eye completely over (180°) at the same time forcing the spring forward to engage the upper peg. Fit the assembly to the gearbox engaging the plungers into the camplate. Replace the shouldered bolt through the spring eye with a serrated washer and tighten into the casing.

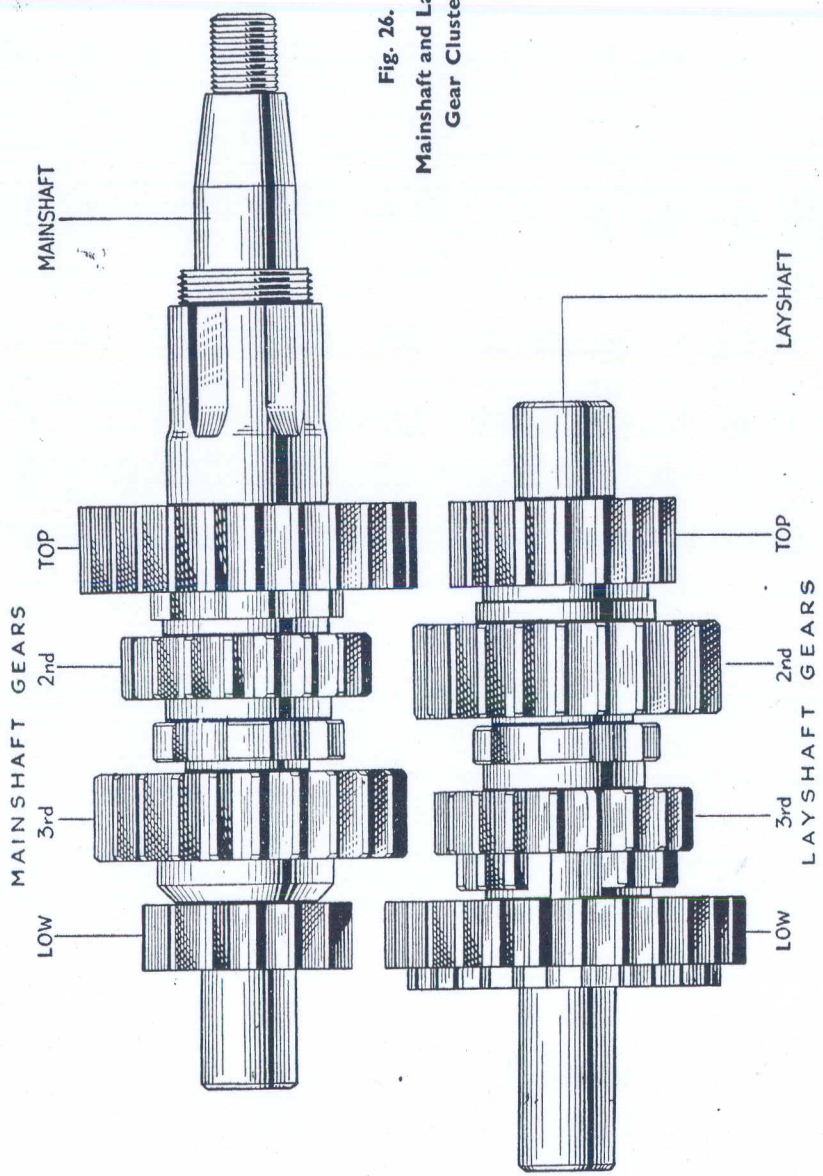


Fig. 26.
Mainshaft and Layshaft Gear Clusters.

Kickstarter Shaft. Place the pen steel washer in the layshaft low gear, and then place the shaft in position engaging the pawl into the ratchet. Position as shown in Fig. 27.

R.H. Inner Cover. Smear jointing compound on the inner joint face. On later models insert the distributor split clamp with the threaded end inwards.

Remove the screw from the distributor oil pump drive shaft which has held the shaft bush in position and fit the inner cover to the unit casing. Replace the bush locating screw and the other three remaining screws.

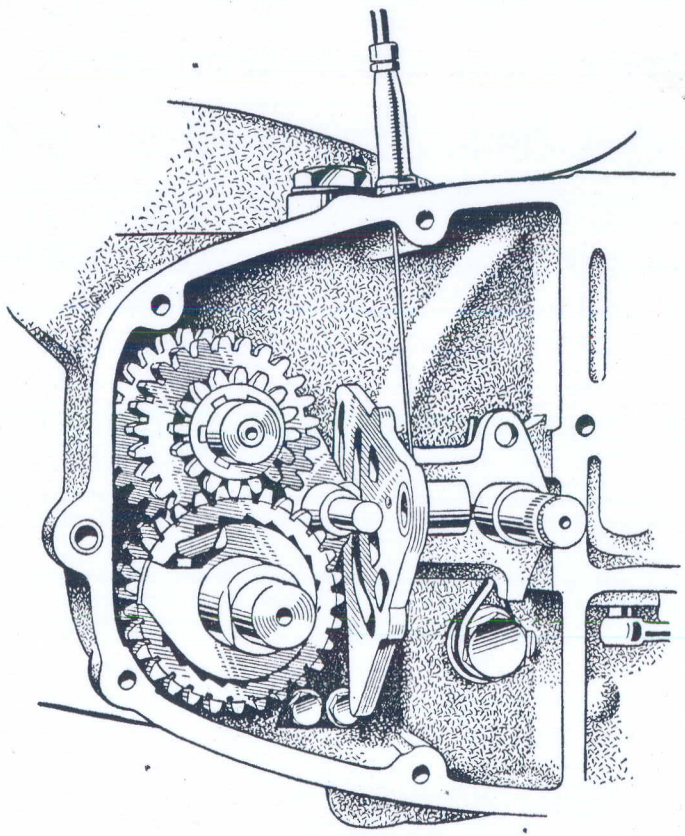


Fig. 27
Gears and Selector Mechanism in position.

Camplate Spindle. If the camplate bush will not align with the inner cover boss, fit the gearchange pedal and depress it or raise it as necessary to align the holes. Enter the spindle so that the split pin hole aligns with the bush hole and fit a $\frac{1}{8}$" (3 mm.) split pin.

Camplate Spindle Cover. Fit the cover and cork washer to the inner cover and tighten the two screws.

Kickstarter Spring and Stop Plate. Fit the spring and engage the lockplate tab into the spring loop. Turn plate against the spring tension (anti-clockwise) and fit the plate to the spindle as per Fig. 28.

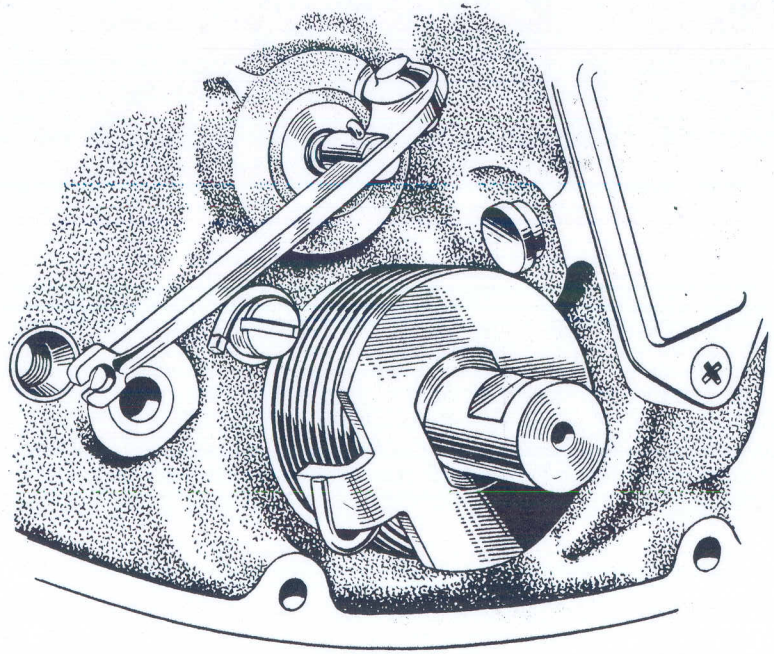


Fig. 28

Kickstart Spring in the fully wound position.

Clutch Cable. Thread the cable wire through the inner cover. Connect the nipple to the clutch arm and then coil the cable to prevent the nipple disengaging.

R.H. Outer Cover. Smear the joint washer with grease, and place it in position on the outer cover. Fit the outer cover and tighten the screws securely, as the screws also retain the inner cover.

Gearchange and Kickstarter Pedals. Replace to the shafts.

Distributor. Replace this unit and time the ignition. (See page 56.)

Push Rods and Cover Tube. On the bottom of the cover tube there will be noted a small slot in the centre tube which mates with the peg in the crankcase when fitted. Fit the rubber washer to the lower end of the tube and the cream silicone rubber washer to the upper part. Sufficiently raise the cylinder barrel to enable the fitting of the cover tube and then lower it. Position the push rods to the tappets, INNER push rod to the EXHAUST ROCKER and OUTER push rod to INLET ROCKER. (See Fig. 16.)

Cylinder Head. Grease the copper gasket and fit to the cylinder barrel top flange. Assemble the head *complete with exhaust flange clip*, carefully locating the push rods to their respective rockers. (See Fig. 16.) Finally tighten down with the four sleeve nuts.

Valve Clearance. Re-set the clearance to 0.010" (0.25 mm.). See page 19 for further information.

Clutch, Engine Sprocket and Rotor. See Clutch, page 60.

L.H. Outer Cover. Grease the joint washer and place it on the cover. Make sure the "D" grommet on the alternator cable is in position, and insert the screws. Fit a domed nut and washer to each of the two long middle screws and tighten all the screws working diagonally. Pull the alternator cable tight.

Drain, Level and Filler Plugs. Replace these plugs and DO NOT forget to replenish the gearbox and primary chaincase with oil after fitting the unit to the frame. N.B. A small amount of oil will always be held in the level tube. Remember this when checking the level.

REFITTING ENGINE AND GEARBOX UNIT TO FRAME

Assemble in the reverse manner to that described on page 32.

IGNITION TIMING

FITTING THE DISTRIBUTOR

Before the distributor can be replaced the piston must be correctly positioned in relation to the opening and closing of the valves. To do this, rotate the engine until the inlet valve closes (if the cylinder head is not fitted, check the movement of the inlet tappet), and the piston ascends to the top of its stroke. The piston position is now at T.D.C. (top dead centre) on compression stroke. The slot in the distributor drive shaft will be in line across the frame.

There is a rubber "O" ring seal fitted to the top of the distributor shank and it should be replaced by a new one if broken or damaged. Remove the cover from the distributor head and rotate the shaft anti-clockwise until the peak of the cam is just on the contact breaker heel. Assemble the distributor to the crankcase and driving shaft with the contact breaker points in the 7 o'clock position (operator facing the timing side of the engine). Lock the distributor clamp to crankcase and tighten up the clamp bolt. The engine is now ready for timing.

TIMING DRILL

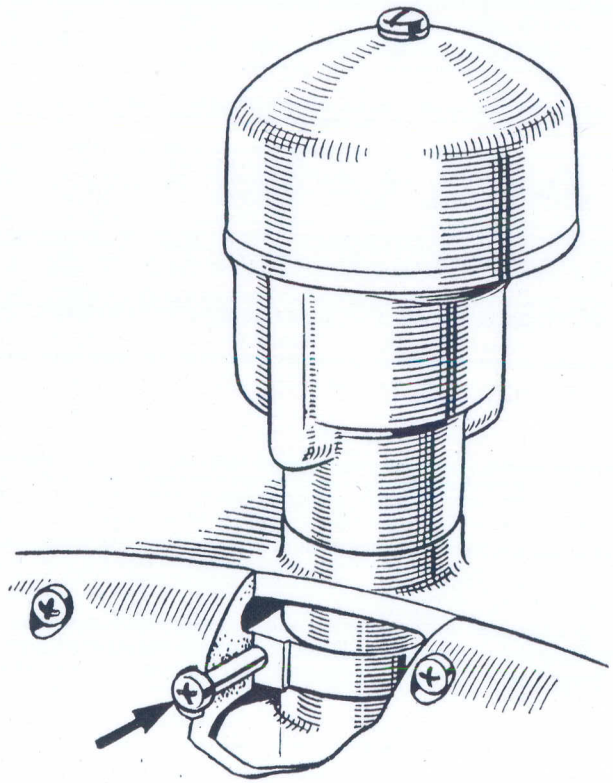
To find the true T.D.C. when the cylinder head is fitted, it will be necessary to use a timing stick through the sparking plug hole. First engage TOP gear and then place the timing stick through the plug hole and allow it to rest on the crown of the piston. Now rock the rear wheel to and fro until T.D.C. can be accurately felt. Consult the Technical Data, page 128, and position the piston accordingly.

Positioning the Distributor. Slacken off the clamp bolt and rotate the distributor housing slightly (contact breaker points at 7 o'clock) until the points just open. In order to ascertain accurately the exact point of opening, slip a .0015" (0.04 mm.) feeler gauge or a piece of tissue paper between the points. Rotate the distributor housing and the gauge will be released as soon as the points start to open. Press down on the distributor cap to compress the "O" ring and tighten the clamp bolt.

Checking the Timing. Rotate the engine backwards and insert the feeler gauge between the contact points, then reverse the rotation and turn until the feeler gauge is just released from the points. Place the timing stick into the sparking plug hole or depth gauge on

the piston, as the case may be, and check the piston position. If correct, re-check the clamp bolt for tightness and replace the sparking plug and connect up the lead.

For the owner who wishes to use a more accurate means of detecting the opening of the contact points, a lamp and battery should be employed. The lamp and battery are joined together in series with the two contact points which act as a switch in the circuit. To operate, join one of the two leads from the battery and bulb to the terminal on the distributor, and the other lead to the frame earth. The bulb remains alight until the points open.



The above drawing shows the latest method of clamping the distributor. To adjust the distributor, slacken the clamping screw but make sure that the distributor does not move as the screw is being tightened.

CLUTCH

The clutch is the three plate type incorporating a transmission shock absorber, and employing Langite friction material, which is bonded to the steel plates. The pressure on the plates is maintained by three springs which can be varied by screwing in or out the three slotted nuts which secure them. The clutch is designed to operate in oil and it is therefore essential that the oil level in the primary chaincase is maintained, otherwise the inserts may burn and disintegrate when the clutch is slipped or when a heavy load is transmitted. Always use the recommended oil (20 S.A.E. viscosity) as if a heavy grade of oil is used, the clutch will not separate when disengaged, which will cause noisy engagement when selecting a gear. Even with the thinner grades of oil in use, the kickstarter should always be operated a few times with the clutch extracted before starting the engine. This procedure ensures that the plates will operate freely when a gear selection is made.

The following paragraphs deal with the removal and replacement of the clutch plates and sprocket. If the clutch is to be completely broken down, the shock absorber information will be found in subsequent paragraphs.

REMOVING THE CLUTCH SPROCKET AND PLATES

Place the machine on the central stand and put an oil drip tray under the primary chaincase, then proceed as follows.

Footbrake Pedal. Remove the split pin from the brake rod and withdraw the rod. The pedal will now fall clear of the chaincase.

Left Footrest. Unscrew the securing nut and remove the footrest.

L.H. Outer Cover. Remove the two domed nuts from the rear of the middle pair of securing screws, unscrew the 7 remaining screws and pull off the cover.

Clutch Slotted Nuts. Unscrew these by using the special key provided in the toolkit. On the underside of the head of the screw is a small "pip" to prevent the nut from unscrewing. To facilitate removal, insert a knife blade under the head of the nut, in order to hold the spring away from the "pip" while the nut is turned.

Pressure Spring. Withdraw from the cups.

Pressure Plate. Remove complete with the cups.

Clutch Plates. Withdraw the bonded and plain plates from the housing.

Sprocket. As the primary chain is of the endless type, the engine sprocket, clutch sprocket and chain must be withdrawn as an assembly. To do this, remove the alternator rotor locknut, and withdraw the rotor. The sprockets and chain can now be removed.

This completes the dismantling for this particular operation, the shock absorber assembly being left intact with the backplate.

INSPECTION OF PARTS

Clutch Springs. The free length of the spring should be $1\frac{21}{32}$" (42 mm.) ; if a spring measures less than $1\frac{17}{32}$" (39 mm.), a new one should be employed.

Bonded Plates. The bonded plates and sprocket and housing must not be placed in a "trike" vat as boiling trichlorethylene attacks the bonding. The linings are not affected by petrol, oil or paraffin. The thickness of the bonded driving plates over the lining is $\frac{1}{8}$", the thickness of the lining being $\frac{1}{32}$". Provided that the linings are not charred or peeling from the plate and there is no metal-to-metal contact due to wear, the plates are suitable for further use.

Plain Plates. These should move freely on the clutch centre ; any signs of sticking should be investigated and the offending high spots removed. To ensure a good clutch action, the plates must be perfectly flat and there must be no evidence of scoring, as this will cause rapid wear of the inserts.

ASSEMBLING THE SPROCKET AND PLATES

Before commencing to assemble the parts, the clutch sprocket and bonded plates should be wiped clean and the clutch operating rod correctly positioned. Do not oil the plates during assembly.

Sprocket.
Fit the chain to the clutch and engine sprocket. Fit the assembly to the clutch centre and engine shaft, replace the distance piece and rotor. Fit and tighten the nut and washer.

Plain Plates. Fit to the clutch centre and check for freedom of movement.

Bonded Plate. Engage the locating tabs into the sprocket slots and ensure that the part assembles freely. Then assemble the remaining plain plate and bonded plates alternately.

Pressure Plate. Fit the plate complete with cups to the clutch.

Pressure Springs. Insert the springs into the cups and over the studs.

Slotted Nuts. Start each nut on the three studs and screw them down until the stud end is almost flush with outer face of the nut.

TERRIER AND CUB CORKED CLUTCH

The earlier clutch with corked plates is similar in construction and the only point to watch when assembling is that the recessed side of the sprocket faces towards the gearbox. The driving tongues on the outer corked plate fit between the tongues and projections on the plate which has been engaged with the sprocket.

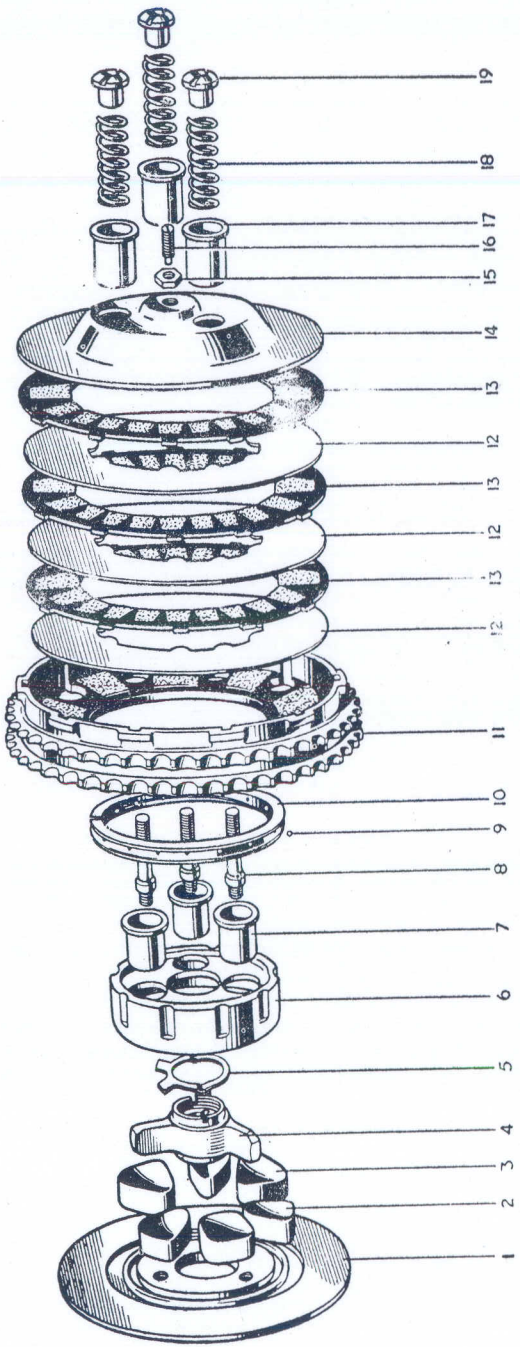


Fig. 29. CLUTCH COMPONENTS

Index No.	Description.
1	Plate, backing.
2	Rubber, rebound.
3	Rubber, drive.
4	Spider.
5	Lock washer.
6	Centre.
7	Cup, centre driving.
8	Pin, backing plate.
9	Ball, sprocket bearing.
10	Ring, sprocket bearing.
11	Sprocket and housing.
12	Plate, driven (plain).
13	Plate, driving (bonded).
14	Plate, pressure.
15	Locknut, adjuster.
16	Adjuster, pressure plate.
17	Cup, spring.
18	Spring, pressure.
19	Nut, pressure spring.

Final Adjustment. Lift the clutch lever and depress the kick-starter, at the same time observing the clutch pressure plate. The plate must spin true without any sign of "wobble". If the plate does not spin true, rectify by screwing in the screw adjacent to the part of the plate which is the furthest away from the sprocket. Spin the clutch again and re-check. It is most important that this adjustment is made correctly, otherwise the rider will experience trouble when making a gear selection, due to a "dragging" clutch.

Clutch Cable Adjustment. Disconnect the cable at the handlebar lever. Slacken the locknut in the centre of the pressure plate and screw in the adjuster until the operating lever is felt to contact the inside of the R.H. outer cover. Slacken the adjuster one half turn and secure with the locknut. Fit the cable to the handlebar lever and adjust the cable adjuster at the handlebar end to give $\frac{1}{16}$" (1.5 mm.) free movement.

L.H. Outer Cover. Grease the joint washer and place it on the cover. Make sure the "D" grommet on the alternator cable is in position, and insert the screws. Fit a domed nut and washer to each of the two long middle screws and tighten all the screws working diagonally. Pull the alternator cable tight.

Footbrake Pedal and Footrest. Re-position the pedal and replace the split-pin in the rod. Fit the footrest to the rod and replace and tighten the nut.

To Change the Clutch Cable. Remove the gearchange and kick-start levers and right hand outer cover. Detach the clutch cable from the operating arm and handlebar lever. Remove the cable clips and take away the old cable. Fit the new cable to the machine making sure the cable will not be trapped when the handlebars are turned to full lock and then clip it into position. Connect the cable to the operating arm and replace the cover and levers and then proceed to adjust the cable as described in the paragraph above.

CLUTCH SHAFT SHOCK ABSORBER

As previously stated, the private owner is advised to obtain a service replacement unit rather than endeavour to overhaul the unit in use. To those who wish to carry out the overhaul it is essential first to obtain the new rubbers, studs, extractor, and, if possible a discarded gearbox mainshaft. Proceed as follows :—

DISMANTLING

Clutch to Mainshaft Nut. First remove the clutch operating rod and then bend back the tab on the lock washer and unscrew the nut. The nut can be shocked loose by applying a hammer blow to the box spanner tommy bar at the same time engaging top gear and applying the rear brake.

Shock Absorber Unit and Backplate. This is removed as a complete unit by screwing in the extractor Part No. D.400, and tightening the extractor bolt. The whole assembly will be drawn off the gearbox mainshaft taper.

Splitting the Assembly. The shouldered studs which hold the assembly together are locked to the backplate by peening over the end thread. The studs can be removed by screwing on two $\frac{1}{4}$" × 26 B.S.F. nuts as locknuts and then turning on the lower nut when the studs will be screwed out of the backplate.

Shock Absorber Unit. Press the spider out of the centre, when the rubber inserts and cups can be removed.

ASSEMBLY

Before assembling the unit, follow carefully the illustration on page 64 (Fig. 30) when reading the following instructions :—

Cups. Insert the cups (large diameter) into the clutch centre.

Spider. Put the spider into the clutch centre with threaded end downwards.

Rubbers. Before attempting to replace these, examine carefully Fig. 30 below which shows the rubbers in position when looking from the back of the clutch, this being the view the operator will have when replacing them. Insert the drive (large) rubber first and then assemble the spider unit to a mainshaft (this should be held horizontally in a vice). Fit a suitable "C" spanner to the clutch centre using the slots as a medium for turning. Turn the spanner to apply pressure against the drive rubbers, when the rebound rubbers can be easily inserted.

Shock Absorber Unit to Backplate. Place the unit on the backplate and assemble the studs through the cups ; screw them into the backplate, using two locknuts to tighten (as in dismantling), if a stud driver is not available. Lock the studs to the backplate by riveting over. Replace the lockwasher and shaft nut and tighten. Position the clutch operating rod.

To assemble the remainder of the clutch, turn to page 60.

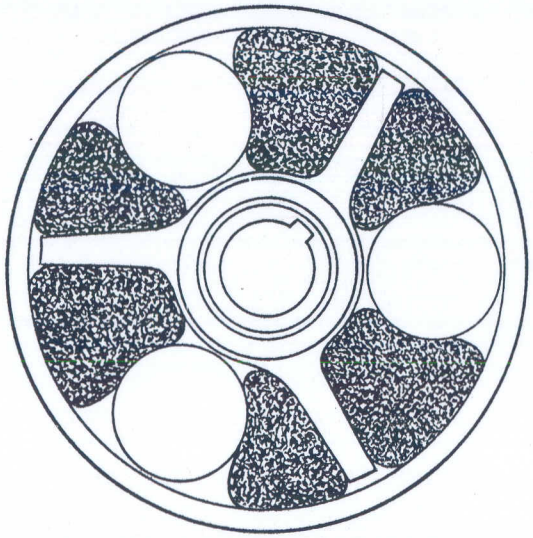


Fig. 30. SHOCK ABSORBER UNIT

This shows the rubbers in position when viewed from the back of the Clutch.

TELESCOPIC FORKS

T20 and T20C only

MAINTENANCE

The fork will require only a periodical oil change at 5,000 miles (8,000 Km.) intervals. To drain the forks remove the double ended studs securing the mudguard stays to the fork legs. Replace the studs and remove the headlamp assembly to gain access to the filler plugs, one in each fork stanchion tube. Use an oil gun to insert $\frac{1}{8}$ pint (75 c.c.) of S.A.E. 30 grade oil in each leg.

It is estimated that, under normal conditions the fork should be dismantled and new bushes fitted at 20,000 miles. Prior to Engine No. 26276 the forks were lubricated with light grease and due to slight mechanical differences, the earlier forks must continue to be lubricated with grease.

ADJUSTING STEERING HEAD RACES

Lower the central stand and to ensure that the front wheel does not contact the ground, place a box of suitable height under the crankcase. Test the amount of play in the steering races by gripping the fork members and rocking them in a fore and aft direction. Remove the headlamp and fixing ring and nacelle unit instrument assembly when access can be gained to the adjusting nut.

Pinch Bolt. Slacken off the nut.

Adjusting Nut. Tighten down this nut as far as it will go, but do not apply more than two finger pressure on the spanner.

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 adjusting nut slightly and test again. When the final adjustment has been made, tighten up the pinch bolt, remove the box from underneath the crankcase and re-fit nacelle unit and headlamp assembly. Finally check the steering when riding the machine on the road.

CHANGING THE FORK SPRINGS

It is not necessary completely to dismantle the fork assembly to carry out this operation. Before commencing the work the operator should have available two new oil seals which fit in the lower member sleeve nut and, of course, the two new springs.

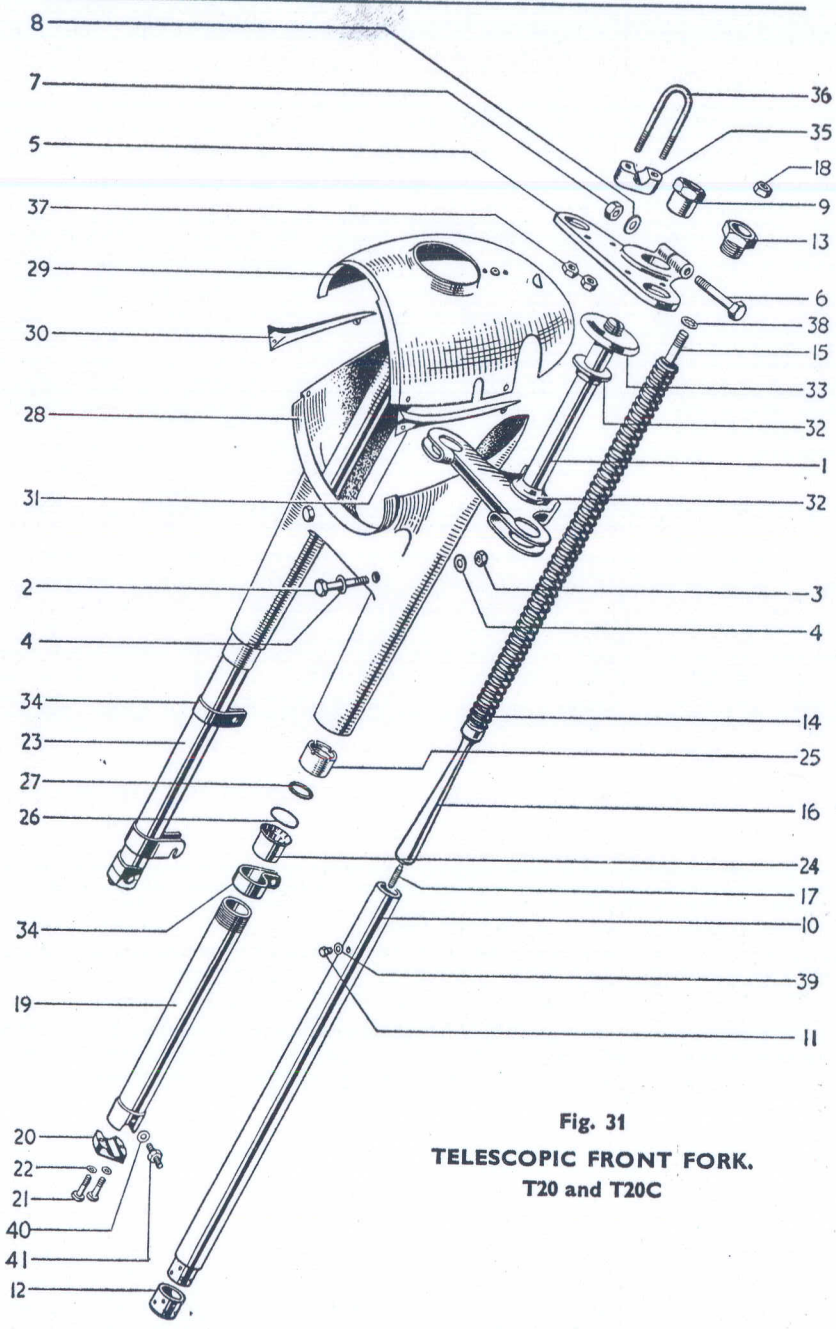


Fig. 31

TELESCOPIC FRONT FORK.
T20 and T20C

DISMANTLING

Headlamp and Nacelle Top Unit. Remove in the manner explained on page 114.

Front Wheel. Remove (see page 89).

Lower Member Sleeve Nuts. Unscrew until completely released from member. A suitable spanner for the sleeve nuts and stanchion cap nuts is available under Part No. Z104.

Spring Stud Top Nuts. These are located in the centres of the large nuts which secure the top lug to the stanchions. Unscrew and remove.

INDEX TO FIG. 31

Index No.	Description.	Index No.	Description.
1	Lug, middle and stem.	21	Bolt, spindle cap.
2	Bolt, middle lug pinch.	22	Washer.
3	Nut.	23	Member, outer c/w cap, R.H.
4	Washer.	24	Bush, fork top.
5	Lug, top.	25	Nut, dust excluder sleeve.
6	Bolt, top lug pinch.	26	Washer, sleeve nut.
7	Nut.	27	Oil seal, rubber.
8	Washer.	28	Nacelle, bottom unit.
9	Sleeve nut, fork stem.	29	Nacelle, top unit.
10	Stanchion.	30	Flash, R.H. chrome.
11	Plug, oil filler.	31	Flash, L.H. chrome.
12	Bush, stanchion bottom.	32	Cone, steering race.
13	Nut, stanchion to lug.	33	Cover, dust.
14	Spring.	34	Clip, mudguard to fork.
15	Stud, spring top.	35	Support, handlebar.
16	Rod, restrictor.	36	"U" bolt, handlebar.
17	Stud, restrictor rod.	37	Nut.
18	Nut, top stud.	38	Washer, spring top stud.
19	Member, outer c/w cap, L.H.	39	Washer, fibre.
20	Cap, spindle fixing.	40	Washer, fibre.
		41	Stud, oil drain.

Lower Members. These can now be withdrawn complete with springs after removal of the filler plugs from the stanchions.

Springs. Secure the wheel lug of the lower member in the vice ; grip and turn the spring anti-clockwise to release the restrictor rods. If the spring is withdrawn without the restrictor rod, use a large screwdriver to unscrew the restrictor rod.

PREPARATION

Remove all traces of oil and dirt from dismantled parts and examine the sleeve nut oil seal. If the seal has not been disturbed, replacement will not be necessary. If on the other hand it shows signs of uneven seating, replace with the new seal. To do this it will be necessary to remove the stanchion from the lugs or remove the bottom bearing from the stanchion.

ASSEMBLY

Springs. Oil the springs and enter into the lower member (restrictor rod first). Screw the studs into the wheel lugs by turning the springs (clockwise). Replace the shakeproof washer on the top spring stud.

Lower Member Assembly. Oil the stanchions, lower and upper bearings, then enter the spring into the stanchion and slide the lower member over the stanchion. Enter the top bush into the member and press into place, with the steel washer on top.

Sleeve Nut. Tighten to the lower member.

Top Stud Nut. Force the lower member up until the top stud enters the larger nut, then replace the stud nut and tighten.

Wheel. Replace (see page 93).

Headlamp and Nacelle Unit. Replace (see page 114).

REMOVING FORKS FROM THE FRAME

First remove the front wheel, mudguard, headlamp assembly and nacelle top unit as described on pages 89 and 114, then proceed as follows:—

Handlebar. Detach control cables from levers and twist-grip. Remove the dipper switch. Unscrew the four nuts off the "U" bolts, when the horn will be released and the "U" bolts can be removed. Remove the handlebar and distance pieces.

Top Lug Pinch Bolt. Slacken off the nut only.

Headrace Adjuster Nut. Unscrew off the fork stem.

Spring Stud Nuts. These are located in the large top lug to stanchion nuts ; remove by unscrewing in the normal manner.

Top Lug to Stanchion Nuts. Slacken off three or four turns and then break the taper joint between stanchion and lug by striking the head of the nuts smartly with a hide or lead hammer.

Top Lug. Supporting the lower lug, remove the two large nuts and tap the lug off the fork stem.

Fork. Lower the remainder of the assembly taking care not to lose the ball bearings in the lower race.

Top Race. Remove the dust cover and take away the top cone when the ball bearings can be removed from the headrace cup.

DISMANTLING THE FORK

Middle Lug Pinch Bolt. Slacken the nuts.

Lower Member Assemblies. Remove the filler plugs and then withdraw the stanchions through the middle lug.

Lower Nacelle. Remove the two pinch bolts when the middle lug can be detached from the nacelle cover.

Sleeve Nuts. Unscrew the nut from the lower member and remove.

Stanchions. Place the wheel lug of the lower member in the vice and sharply pull the stanchion out of the member. By doing this the upper bearing will be extracted with the stanchion, the lower bearing being captive.

Springs. Whilst the lower member is in the vice the spring can be removed by gripping the exposed coils and turning the spring anti-clockwise (R.H. thread).

Restrictor Rods. If the restrictor rod has not been removed with the spring, use a large screwdriver to remove the restrictor rod.

INSPECTION AND PREPARATION

First thoroughly degrease all parts and lay out for inspection. If the mileage covered is in excess of 20,000 miles it is recommended that all bushes and seals are changed.

Stanchion. First ensure that the stanchion is true by laying a straight edge along it, or by rolling it on a surface plate or piece of plate glass to ascertain if there is any distortion. The maximum amount should not exceed $\frac{5}{16}$" (8 mm.) if the stanchion is to be put into further service after straightening. 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.

Stanchion Bottom Bearing. To remove, drill out the holes in the bearing with a $\frac{5}{32}$" (4 mm.) drill when the bearing can be withdrawn from the stanchion. To fit the new bearing, a metal bar of suitable diameter to fit the inside of the stanchion and a wide shallow pointed centre punch is needed. Secure the bar in the vice and then fit the new bearing to the stanchion, aligning the holes in the bearing to those in the stanchion. Place the bearing end of the stanchion over the metal bar and fit the centre punch point into the bearing oil holes. Gently tap the punch with a hammer to lock the bearing to the stanchion. Repeat the operation with the other holes.

Sleeve Nut Oil Seal. Take out the seal. Apply a smear of oil to the new seal and replace in the sleeve nut. Prior to Engine No. 34214 a 0.010" (0.25 mm.) shim should be fitted before replacing the seal.

Lower Member. 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 $\frac{1}{2}$" (12.7 mm.) of the original length which is $17\frac{1}{4}$" (43.9 cms.).

Fork Lugs. If the motorcycle has been involved in an accident the lugs will require expert attention. No attempt should be made to carry out this work without jigs.

Nacelle. Examine for indentation and distortion and rectify.

Top Bearing. Slide the bearing onto the stanchion and estimate the wear by moving the bearing from side to side. Any appreciable movement will denote wear and the bearing must be changed.

Steering Races. Remove all traces of grease from the cups, cones and balls and examine for indentations, pitting and wear. If there is any sign of these defects, the parts should be changed to ensure good steering.

ASSEMBLING THE FORK

Before commencing to assemble the fork, oil all working parts liberally.

Restrictor Rods. Screw the restrictor rod into the lower end of the spring.

Springs. Enter the restrictor rod into the lower member, screw the stud into the wheel lug and tighten. Replace the shakeproof washer over the top spring stud.

Stanchion. Thread the stanchion (bearing end) over the spring and enter into the lower member. Test the stanchion movement in the member, this should be quite free.

Top Bearing. Fit the bearing over the stanchion and into the lower member, with the steel washer on top.

Sleeve Nut. The nut complete with seal is now fitted over the stanchion and screwed onto the lower member. Pour $\frac{1}{8}$ pint (75 c.c.) of S.A.E. 30 grade oil into each leg.

Middle and Top Lugs. Fill the frame top and bottom steering races with grease and assemble 15 balls $\frac{1}{4}$" (6.35 mm.) dia. into each cup. Enter the middle lug stem into the bottom race and holding it in position, slide the top cone over the stem, followed by the dust cover, top lug and finally screw on the adjusting sleeve nut finger tight. Fit the pinch bolt and nut but do not tighten.

Lower Nacelle. Assemble to the middle lug and hold in position by fitting the pinch bolts and lightly tightening up the nuts. The two screws which secure the nacelle to the top lug should be temporarily fitted at this stage.

Lower Member Assemblies. Enter the stanchion through the middle lug and into the taper in the top lug. Secure the stanchion to the top lug with the large nut and fork spring stud with the small nut. Well tighten the large nut with a ring spanner and then the small centre nut. Do not tighten up the middle lug to stanchion bolts at this stage.

Mudguard. Replace to the forks and secure all fastenings.

Front Wheel. Fit the wheel to the forks and ensure that the spindle ends protrude equally through the fork spindle lugs (see page 93).

Handlebars. Fit the two distance pieces to the top lug, then the handlebar and secure with the two "U" bolts. Turn the handlebar to the desired position and tighten up the four "U" bolt nuts. DO NOT FORGET TO REPLACE THE HORN AT THIS STAGE.

Pinch Bolts (Middle Lug to Stanchions). The pinch bolts may now be fully tightened.

Pinch Bolt (Top Lug). See page 65, "Adjusting the steering head races".

Nacelle Top Unit. Thread the control cables through the respective handlebar rubber grommets and position the grommets to the lower nacelle. Replace the top unit connecting the electrical and speedometer cables as described on page 114.

Control Cables. Replace to the levers and gear indicator control.

Headlamp. Replace the headlamp after connecting the electrical cables to the bulb connections.

TELESCOPIC FORK T20S

The telescopic fork fitted to T20S machines is of heavier construction and is recognisable immediately by its separate headlamp and larger diameter legs. The oil in the forks should be changed at least every 5,000 miles (8,000 kms.) and for best results should be changed for summer and winter using the same grades as the recommended engine oil. The capacity is ¼ pint (150 c.c.) in each leg.

The adjustment of the steering head races is carried out in exactly the same way as for the standard T20 forks. A suitable spanner for the sleeve nuts and stanchion cap nuts is available under part number D.220.

TO REMOVE THE FORK FROM THE FRAME

First remove the front wheel, mudguard and headlamp as described on pages 89 and 114.

Handlebar. Place a cloth over the petrol tank to protect the finish and unscrew the four nuts from the handlebar "U" bolts. Rest the handlebars on the tank. Disconnect the speedometer head and horn which have been released by unscrewing the nuts.

Stanchion Cap Nuts. Using a ring spanner to avoid damage, unscrew the two large stanchion cap nuts. Lift out the nuts complete with inner guide tubes.

Fork Springs. Push the fork legs upwards to raise the springs and lift them out from the top.

Top Lug. Slacken the top lug pinch bolt and with a soft metal drift strike the top lug a sharp blow from underneath to free the lug from the stanchion tapers. Support the fork assembly and unscrew the fork stem sleeve nut. Lower the fork assembly and collect the balls from the top and bottom steering races.

Alternatively the fork legs may be removed leaving the lugs and steering races undisturbed. After removing the handlebars, slacken the middle lug pinch bolts and unscrew the stanchion cap nuts a few turns. Strike the cap nuts a hard blow with a hide hammer to release the stanchions. Unscrew the cap nuts completely and pull the leg assemblies downwards.

TO DISMANTLE THE FORK

Middle Lug. Invert the fork and pour the oil into an oil tray. Hold the stem horizontally in a vice and remove the middle lug pinch bolts. Pull out the fork leg assemblies.

Fork Leg Assemblies. Hold the assembly in a vice by means of the wheel spindle lug and unscrew the restrictor rod bolts, also remove the drain plugs. Invert the leg and collect the restrictor rod assembly. Replace the leg in the vice and unscrew the dust excluder sleeve nut. Special tool No. Z.127 may be needed to extract the stanchion which will come out carrying with it the sleeve nut, top bearing, damping sleeve and bottom bearing. Undo the hydraulic stop nut and pull off the various parts.

TO DISMANTLE, PREPARE AND ASSEMBLE THE UNITS

First thoroughly degrease all parts and lay them 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 rotating it between centres or by rolling it on a flat surface, preferably a surface plate. 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 a service replacement assembly.

Top Lug and Middle Lug. If the machine has been involved in an

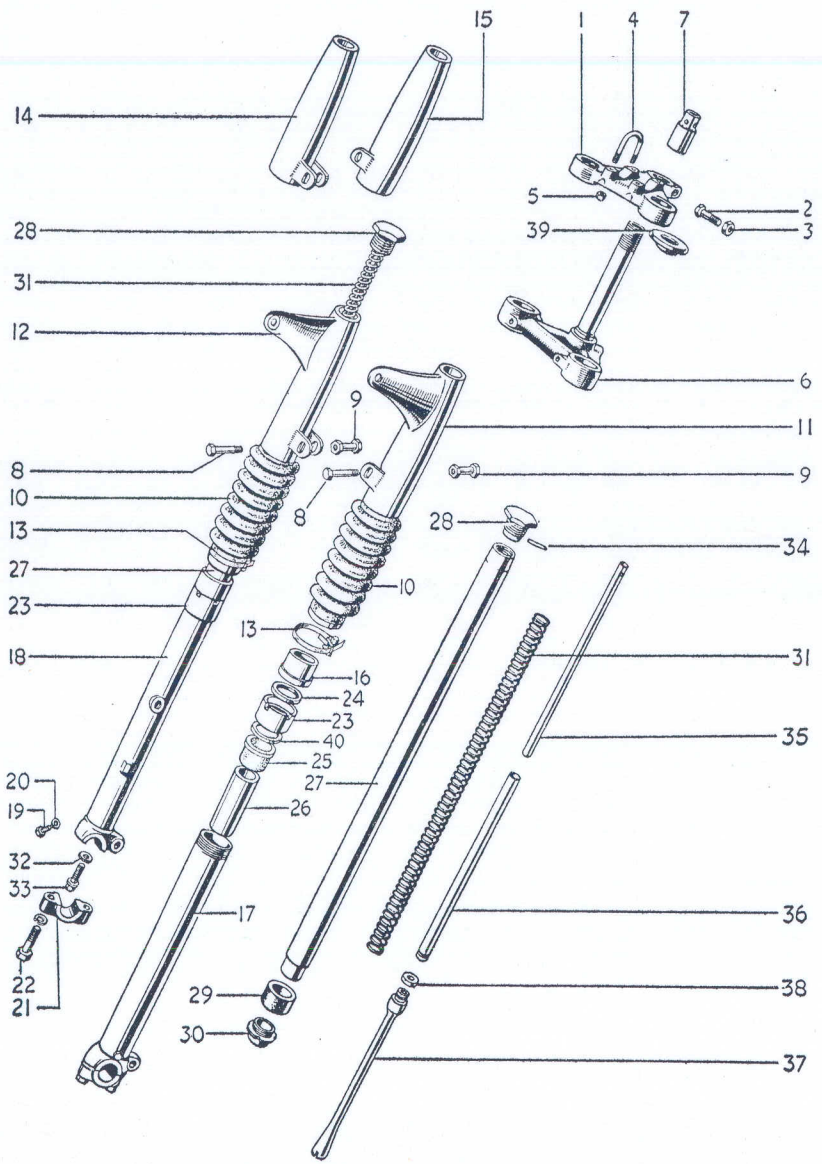


Fig. 32. TELESCOPIC FRONT FORK—T20S and T20T.

INDEX TO FIG. 32

Index No.	Description.
1	Top lug.
2	Pinch bolt.
3	Nut.
4	"U" bolt.
5	Nut.
6	Middle lug and stem.
7	Sleeve nut.
8	Pinch bolt.
9	Nut.
10	Gaiter.
11	Top cover.
12	Top cover.
13	Clip.
14	Top cover (alternative).
15	Top cover (alternative).
16	Dust excluder.
17	Bottom member.
18	Bottom member.
19	Drain plug.
20	Washer.
21	Spindle cap.
22	Bolt.
23	Sleeve nut.
24	Oil seal.
25	Top bush.
26	Damping sleeve.
27	Stanchion.
28	Cap nut.
29	Bottom bush.
30	Stop nut.
31	Main spring.
32	Washer.
33	Restrictor rod bolt
34	Pin.
35	Guide tube.
36	Guide tube.
37	Restrictor rod.
38	Washer.
39	Top cone.
40	Steel washer.

accident these lugs will require expert attention. No attempt should be made to carry out this work without the necessary jigs.

Bottom Cover Tubes. Examine the tubes for distortion or indentations and scrap them if defective. Check that all threads are in good condition.

Springs. The free length of the spring is 17¾ in. (45.1 cm.) when new, and provided that the springs are within ½ in. (1.2 cm.) of this length and are not otherwise damaged they are fit for further use.

Steering Races. The cups, cones and balls should be examined for pitting or wear, and if any are found to be defective the complete set should be changed.

Top and Bottom Race. 15 ¼ in. (6.35 mm.) diameter balls each.

Sleeve Nut. Press out the oil seal and dust shroud. The oil seal will be damaged and a new one must be fitted with the loaded side downwards. Replace the dust shroud.

Inner Guide Tubes. Check that the inner guide tubes telescope freely and are securely, but not rigidly, attached to their respective fixings.

TO ASSEMBLE AND INSTALL THE FORK

Fork Leg Assemblies. Insert the spigoted drain plug in the bottom cover tube and tighten securely. Place the restrictor rod assembly in position and engage the slot in the base with the drain plug spigot. Fit a new aluminium washer to the bolt and tighten securely. Now place the dust excluder sleeve nut on the stanchion from the bottom, followed by the steel washer, top bush, damping sleeve, bottom bush and finally the hydraulic stop nut which must be tightened securely. Smear the stanchion with clean oil and press the assembly into the bottom cover, tighten the sleeve nut and check that the stanchion moves freely to the limit of its travel in both directions. Place a gaiter over the stanchion with the large end downwards, and secure it over the sleeve nut with a clip.

Middle Lug and Stem. Grease the steering cups in the frame and place 15 ¼ in. (6.35 mm.) diameter balls in each. Place the top cone and dust cover in position and carefully insert the middle lug and stem. Screw down the fork stem sleeve nut until it allows the minimum of free play in the bearing, but do not tighten it so hard that all play is removed. Place the top covers in position and insert the pinch bolts but do not tighten them.

Top Lug. Place the top lug complete with pinch bolt over the sleeve nut.

Leg Assemblies. Insert the leg assembly through the middle lug until the taper fits into the top lug. Tighten the pinch bolt to retain it. Pour ¼ pint (150 c.c.) of the correct grade of oil into the leg and then insert the spring and cap nut so that the guide tubes engage with each other. Screw the cap nut tight so that the stanchion taper is drawn into the top lug. Follow the same procedure with the other leg.

To Align the Forks. If an alignment jig is available, proceed as follows:—

A suitable jig is available from the Triumph Spares Department under Part No. Z.103.

Fit the wheel spindle in position and place the jig on the lower fork members as indicated in the illustration. To avoid scratching the enamel finish on the fork members, apply a smear of grease at the four points. Hold it firmly and if the alignment is correct, contact will be made at all four points marked "X". If the jig does not make contact at "A" or "B" it will be necessary to make an adjustment. Slacken off the top lug and middle lug pinch bolts. If the jig can be rocked at "A" this indicates that "D" is too far forward. To remedy, strike the top lug at point "D" a sharp blow with a hide mallet and then make a further check with the jig. If the error is at "B" the application is the same, only at point "C". When the adjustment is satisfactory tighten the pinch bolts and make another check.

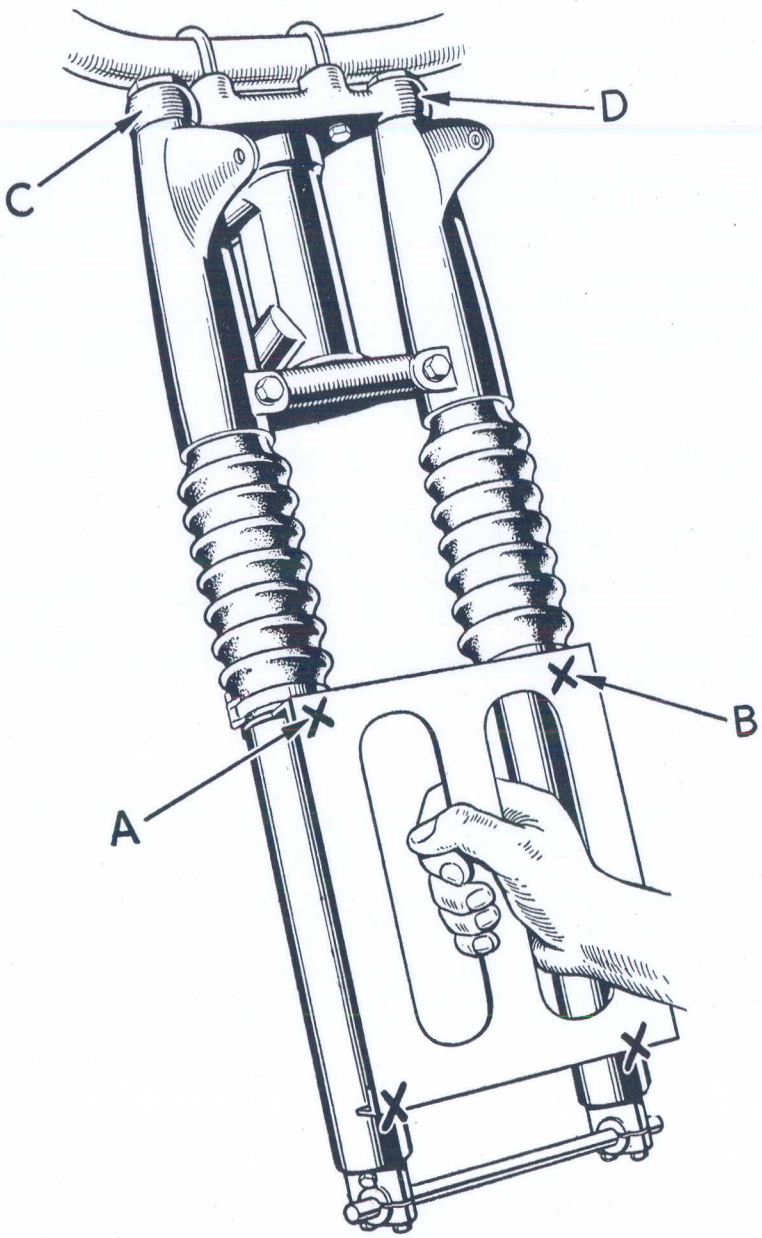


Fig. 33. TO ALIGN THE FRONT FORKS.

If no jig is available continue to assemble the forks and after fitting the mudguard, wheel and handlebars, tighten the top lug pinch bolt but leave the middle lug pinch bolts loose. Now grasp the handlebars and pump the fork up and down until it moves freely without binding or sticking. Tighten the middle lug pinch bolts.

Handlebars. Replace the handlebars and "U" bolts. Remember the speedometer and horn brackets are secured by the front "U" bolt nuts.

Headlamp. Replace the headlamp and connect the cables colour-to-colour.

Mudguard and Front Wheel. Replace as described on Page 93.

SWINGING FORK REAR SUSPENSION

The swinging fork pivots on a ground, hollow spindle which is a light drive fit in the frame lug. The spindle is further supported by outrigger plates bolted to each end. Renewable phosphor-bronze bushes are pressed into the fork bridge lug and are lubricated by grease from a central nipple on the frame lug. A high pressure grease gun should be applied at 1,000 mile (1,600 Km.) intervals until grease is extruded through each bush.

The movement is controlled by Girling Suspension Units. These units are non-adjustable and all service is carried out by Girling Service Agents, a list of whom is obtainable at your local Triumph dealer.

TO DISMANTLE THE REAR SUSPENSION

Rear Wheel. See page 94 for removal.

Twinseat. Slacken the two top suspension unit bolts, remove the front fixing bolt and lift off the twinseat.

INDEX TO FIG. 34

Index No.	Description.	Index No.	Description.
1	Frame, front.	19	Nut.
2	Frame, rear.	20	Distance piece.
3	Stud, seat stays.	21	Stand, centre.
4	Washer, spring.	22	Spring, centre stand.
5	Nut.	23	Bolt, stand pivot.
6	Swinging fork.	24	Nut.
7	Bolt, fork spindle.	25	Stand, prop.
8	Washer, spring.	26	Bolt, prop. stand.
9	Suspension unit.	27	Lockwasher.
10	Support, pillion footrest, L.H	28	Spring, prop. stand.
11	Support, pillion footrest, R.H.	29	Cup, steering race.
12	Stud, support to frame.	30	Bolt, petrol tank fixing.
13	Washer, spring.	31	Nut.
14	Nut.	32	Bolt, twinseat front.
15	Bolt, suspension unit top.	33	Nut.
16	Washer, plain.	34	Spindle, brake pedal.
17	Nut.	35	Washer, spring.
18	Bolt, engine fixing.	36	Nut.

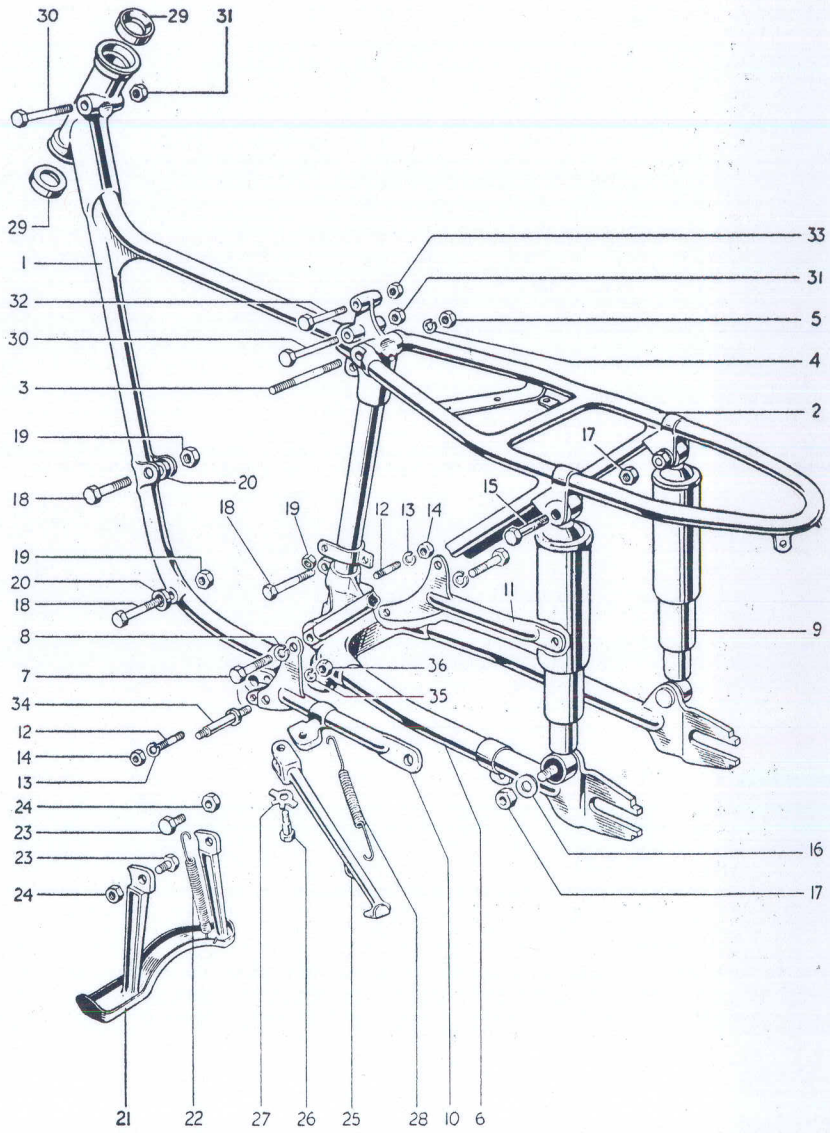


Fig. 34. FRAME AND REAR SUSPENSION.

Rear Panels. Remove the two small nuts and bolts securing the front joint between the panels. They are now attached at three points and may be removed by unscrewing the nut at the top front fixing and screws at the top rear and bottom front. Do not lose the rubber washers at the top rear fixing.

Suspension Units. Remove the top bolts and the bottom nuts and lift off the units.

Mudshield. Remove the two nuts and bolts securing the mudshield to the short front fixing stays.

Silencer. Remove the silencer securing bolt.

Frame. Slacken the top rear frame to seat tube stud and remove the two spindle end bolts. Swing the rear frame upwards, slacken the two support plate studs and swing both support plates downwards. The spindle may now be driven out with a flat ended drift, and the swinging fork detached.

INSPECTION AND PREPARATION

Wash all parts in a cleaning solvent. Make sure the grease nipple and the hollow spindle are clear.

Spindle. Check for wear on the bearing portions. Slight pitting or rusting may be removed with fine emery, but any appreciable wear means the spindle should be renewed.

Fork Bushes. If badly worn, the old bushes may be pressed out and new bushes must be bored or line-reamed to size after pressing in. A suitable line reamer is available under Part No. Z.126.

TO ASSEMBLE THE REAR SUSPENSION

Frame. Drive in the spindle with the spacing washer between the pivot lug and the fork on the right-hand side. Swing the rear frame and support plates into position and tighten the spindle end bolts. Tighten the support plate studs and the rear frame to seat tube stud.

Mudshield. Secure with the two nuts and bolts to the short front stays.

Suspension Units. Replace the units and tighten the top and bottom fixings.

Silencer. Replace the silencer fixing bolt and tighten securely.

Rear Wheel. See page 98 for replacement instructions.
Apply a grease gun to the nipple and lubricate until grease shows at each bush.

Rear Panels. Place the panels in position and attach the five fixing points (note the rubber washer behind the top rear fixing). When all the fixings are in position, tighten them a few turns at a time until all are secure.

Twinseat. Fit the twinseat to the frame and tighten the bolts.

(PLUNGER) REAR SUSPENSION

Provision for greasing the suspension is made by pressure grease gun through the fork end nipples. The assembly should be greased every 1,000 miles. The construction of the suspension is simple as will be seen in Fig. 35 and wear on the moving parts is negligible. If after a period of time the springs settle down or the gaiters require renewing, the parts can be replaced at small cost. This job can be done without special tools but the task of compressing the springs sufficiently is a fairly difficult operation. In view of this, a compressor tool, Part No. Z100, has been designed and will be in the hands of most Triumph Dealers. It will be more economical, therefore, to entrust this work to your dealer who will be able to carry it out efficiently and quickly. For those who wish to carry out their own maintenance, proceed as follows:—

DISMANTLING

Rear Wheel. See page 94 for removal.

Locknut. Remove the locknut from the plunger guide rod.

Clamp Bolt. Unscrew the nut and tap out the bolt.

Plunger Guide Rod. Place a good screwdriver into the slotted head of the rod and turn in an anti-clockwise (right hand thread) direction. Continue to turn until the rod is free in the lower lug and then withdraw the rod.

Fork End and Springs Assembly. Great care will have to be exercised when removing this assembly as the springs are under considerable tension. To prevent injury, place an old sack or similar material over the frame end and then ease the assembly away with a screwdriver. The sacking will prevent the parts flying in all directions immediately they are free. Repeat the operation to the opposite assembly.

INSPECTION AND PREPARATION

First wash all parts in a cleaning solvent.

Plunger Guide Rods. Inspect for pitting, wear and rusting. If the pitting is light, ease down with a fine emery cloth. A worn rod will have to be replaced, but in the case of rust (due to lack of lubricant) rubbing down with fine emery cloth is permitted.

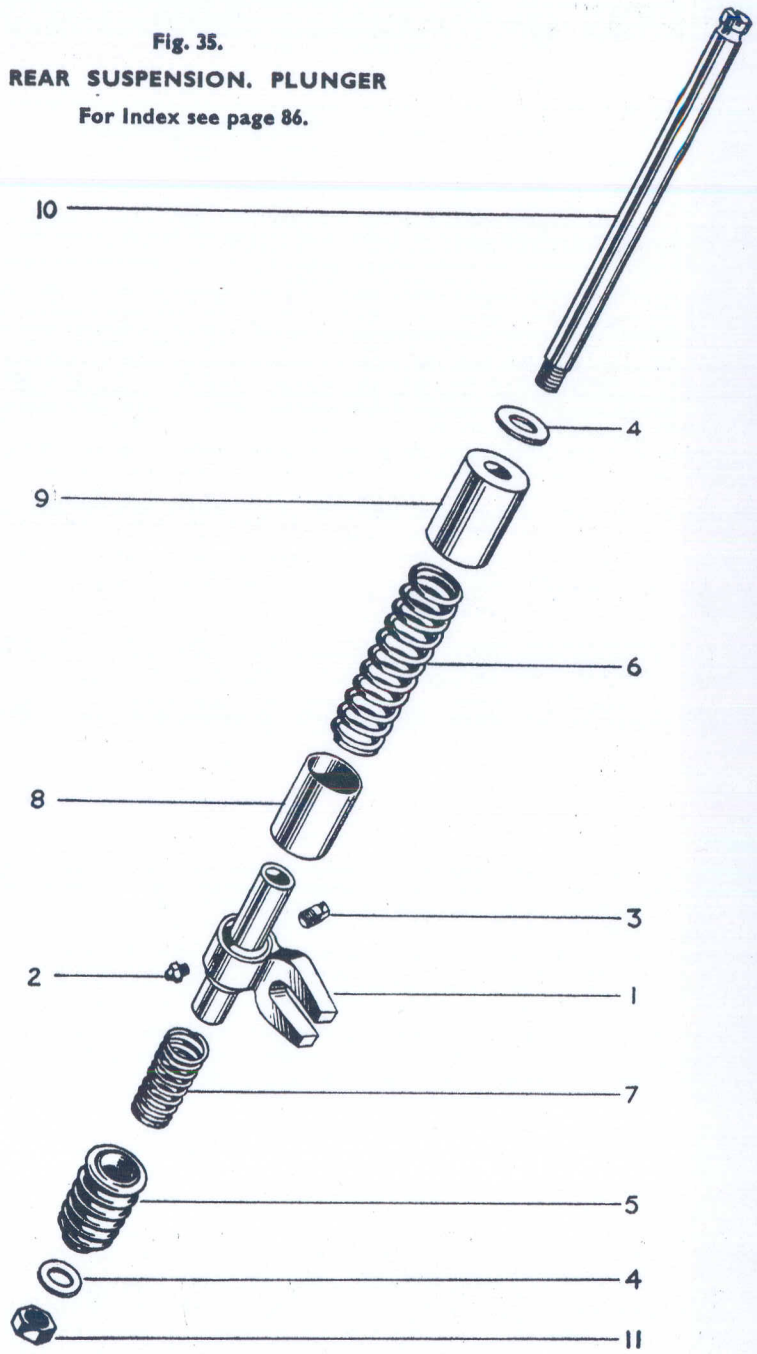
INDEX TO FIG. 35.

Index No.	*Description*
1	**Fork end, R.H.** **Fork end, L.H.**
2	**Nipple, grease.**
3	**Pin, fork end brake anchorage.**
4	**Backing washer, plunger lug.**
5	**Gaiter, plunger rubber.**
6	**Spring, suspension main.**
7	**Spring, suspension rebound.**
8	**Cover, suspension spring (lower)**
9	**Cover, suspension spring (upper).**
10	**Rod, plunger guide.**
11	**Locknut, plunger guide rod.**

Fig. 35.

REAR SUSPENSION. PLUNGER

For Index see page 86.



Spring Covers. These must be free from indentations.

Fork Ends. Fit to the plunger guide rods and check wear. Apply a grease gun to the grease nipples to ensure the free entry of grease when the gun is operated.

Spring. The free length of the springs when new is $4\frac{7}{8}$" (12.4 cms.) main, and $2\frac{3}{4}$" (7 cms.) rebound.

ASSEMBLY

Before commencing to assemble the parts, carefully view Fig. 35. This illustration shows the left hand assembly (Brake side), which has the anchorage pin fitted to the fork end. The right hand fork end has no anchorage pin fitted.

Fork End and Spring Assembly. Grease all the parts and assemble items 1 to 9 (Fig. 35) and if available place in the compressor tool and compress sufficiently to enter the frame rear lug. Without this tool, a rod should be inserted into the lower hole of the lug and the assembly threaded over it. Pressure will now have to be exerted on the top cover of the assembly in order to position it between the lugs. When in position, do not forget to replace the washer between the top cover and lug.

Plunger Guide Rod. Remove the rod used to assist during assembly and insert the guide rod through the top lug and screw into the bottom lug.

Clamp Bolt. Fit the bolt into the top split lug, replace the nut and tighten to clamp the guide rod.

Locknut. Fit and tighten the locknut on the plunger guide rod.

Repeat the operation to the opposite assembly and then replace the wheel (see page 98).

WHEELS

Maintenance such as greasing the wheel bearings is unnecessary until the machine has covered at least 10,000 miles. Cases may arise where conditions are extremely severe when an inspection of the internal parts is advisable prior to this mileage.

No grease nipples are fitted to the hubs, as the bearings, etc., are sufficiently well greased during assembly to cover the above mentioned period.

The bearings are of the heavy duty ball journal type and cannot be adjusted. Excessive play at the wheel rim will denote bearing wear, a condition which can only be remedied by replacing the worn parts.

The design of the wheel is extremely simple and will not in any way prove difficult to the owner who wishes to carry out his own maintenance if he follows these instructions.

FRONT WHEEL

REMOVAL

Brake Cable. Disconnect at cam lever and detach from anchor clip.

Anchor Plate Nut. Remove.

Spindle to Fork Leg Caps. Remove the four bolts securing the caps to the fork legs when the wheel will be released. Raise the front of the machine and withdraw the wheel assembly.

DISMANTLING

If a vice is available, soft clamps should be fitted to the vice jaws to prevent damage to the wheel spindle when the latter is clamped in position.

Wheel. Place in the vice, holding by the wheel spindle opposite to the brake drum end.

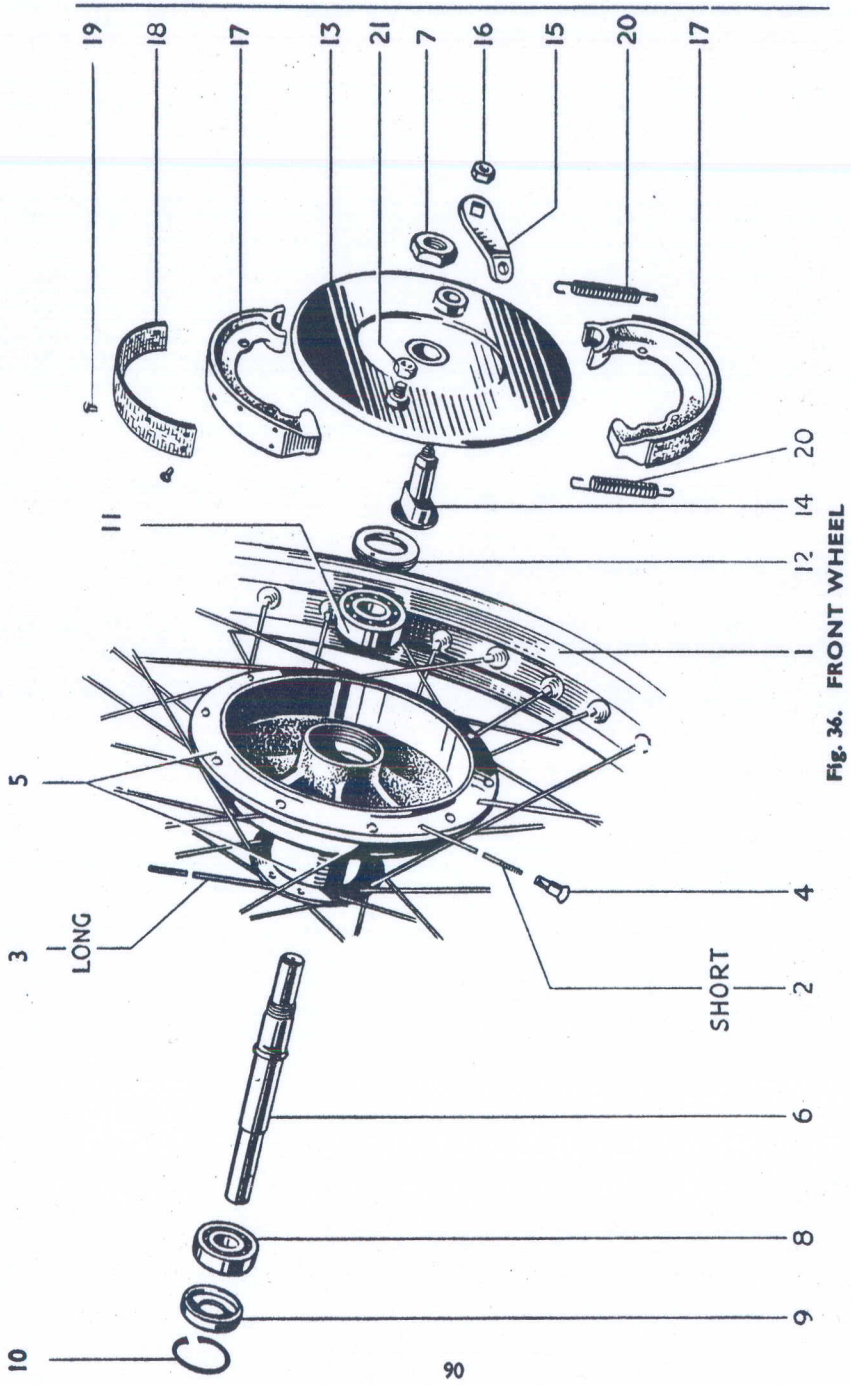


Fig. 36. FRONT WHEEL

Anchor Plate. Unscrew the central nut and then easing the brake lever slightly towards the "on" position, withdraw the anchor plate assembly away from the brake drum.

Brake Shoes. Release the "pull-off" springs when the shoes can be removed from the anchor plate. Avoid grease contact with the linings if they are to be used for further service.

Bearing Retaining Ring. This ring has a LEFT-HAND thread and to remove place a peg spanner (Z.125) into the diametrically opposed holes and unscrew from the hub.

Bearing (Brake Drum Side). To remove, first take the wheel out of the vice and bump the spindle end (the end opposite the brake drum) on a piece of hard wood. This will push the bearing out of the hub and also release the spindle.

Bearing (Opposite Brake Drum). Turn the wheel over so that the brake drum rests on the bench. Remove the circlip securing the bearing dust cover. Now hold the wheel in a vertical position and place a drift of either metal tubing or wood through the hub until it rests against the bearing outer race. Tap the opposite end with a hammer and the bearing and dust cover will be driven out of the hub.

The wheel is now ready for examination (see page 93) and rectification.

INDEX TO FIG. 36

Index No.	Description.	Index No.	Description.
1	Rim, front wheel.	12	Ring, front wheel R.H. locking.
2	Spoke, right hand (short).	13	Plate, front brake anchor.
3	Spoke, left hand (long).	14	Cam, front brake.
4	Nipple, spoke.	15	Lever, front brake.
5	Hub and brake drum assembly.	16	Nut, front brake lever.
6	Spindle, front wheel.	17	Shoe, front brake c/w lining.
7	Nut, front wheel spindle.	18	Lining, front brake.
8	Bearing, front wheel L.H.	19	Rivets, front brake lining.
9	Dustcap, front wheel L.H.	20	Spring, front brake shoe.
10	Circlip, front wheel L.H.	21	Nut, front brake anchor.
11	Bearing, front wheel R.H.		

ASSEMBLY OF WHEEL

Bearing (Brake Drum Side). Grease the larger bearing and place into the hub. Drive the bearing in until it contacts the machined ledge.

Bearing Retaining Ring. Screw into the hub, remembering that the thread is left hand. Tighten with a peg spanner (Z.125).

Spindle. Insert the spindle from the opposite end, the shoulder contacting the bearing now in position.

Bearing (Opposite Brake Drum). Over the spindle place the smaller bearing (well pack with grease before fitting) and press into position.

Dust Cover. Place the open end downmost over the spindle and press or drive into the hub until the circlip groove is visible.

Circlip. Enter into the hub groove and ensure that it is correctly positioned.

Anchor Plate. Grease the brake shoes operating cam spindle and place lever correct to the relative operating position, i.e. cam flats in line with the pivot point and lever facing rearwards and downwards.

Brake Shoes. First ensure that the hands are completely free from grease before handling the brake shoes, otherwise their efficiency will be impaired in use. Pair the shoes together and fit the springs ; take a shoe in each hand, holding them sufficiently apart to keep the springs in position. Now turn the shoes towards the body until they can be placed in position over the cam and pivot point ; then press them down and both will snap into position.

Anchor Plate Assembly. Slide the distance piece over the spindle and then the anchor plate assembly. Finally tighten down with the locking nut.

The wheel is now ready for assembly to the forks.

ASSEMBLY OF WHEEL TO FORKS

First raise the front of the machine and then place the wheel between the fork legs.

Wheel. Position the wheel spindle to the fork bottom lugs and engage the anchor plate stud into the fork leg clip. Loosely assemble the nut and washer to this stud.

Spindle Caps. Screw these caps into position, but before finally tightening make sure that the spindle just protrudes at each end and then tighten up the bolts.

Anchor Plate Nut. Well tighten up this nut.

Brake Cable. Engage the cable at the adjuster point and connect up the clevis to the lever. Suitably adjust the brake cable.

INSPECTION OF FRONT AND REAR WHEEL

Wash all the parts in a cleaning solvent then carry out the following inspection.

Bearings. Check for wear by holding the centre race and moving the outer race across its axis ; spin the outer race to check for roughness. Finally hold the bearing to the light and inspect both upper and lower track and balls for pitting or indentation. If found to be faulty the bearings must be replaced.

Sprocket. Inspect the teeth for hooking, chipping and wear. Remember a worn sprocket means early replacement of the driving chain which is an expensive item ; the sprocket should be changed if wear is evident.

Brake Shoes. If the operating cable or rod adjustments have not been fully taken up, the brake shoe linings will be fit for further service. On the other hand, if the adjustment is completely taken up the linings must be changed ; do not pack the heel of the shoe in

an endeavour to make adjustment. New linings and rivets can be purchased from your 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 that 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.

Brake Drum. The working area should be smooth. If in rough condition due to high rivets or foreign matter, the part will have to be replaced.

Spokes. Check for slackness. If more than two or three spokes are in this condition, the wheel should be put into the hands of a competent wheel builder.

Wheel Spindles. These should spin true when placed between lathe centres or on "V" blocks.

Hub. The bearings must be a snug fit in the hub housing.

REAR WHEEL

REMOVAL FROM FRAME

Chain. Remove spring link and rotate the wheel until the chain is clear of the sprocket. Place a piece of rag or paper under the chain to prevent it contacting the ground.

Speedometer Cable. Disconnect at speedometer drive gearbox.

Brake Rod. Unscrew the thumb nut and detach from the brake lever.

Wheel Nuts. Slacken off nuts and remove the brake anchor bolt. Withdraw the wheel from the fork ends.

Wheel. Tilt the machine to the left when the wheel can be withdrawn from the frame on the right-hand side.

DISMANTLING

Wheel Nuts. Unscrew from the spindle.

Distance Piece (Speedometer End). Remove.

Speedometer Gearbox. Withdraw over spindle and remove the distance collar.

Anchor Plate. Hold the wheel in the vice by gripping the spindle (speedometer end) ; do not forget to use lead clamps to avoid damage to the thread. Ease the brake lever slightly towards the "on" position and lift anchor plate assembly complete with distance collar over the spindle.

Brake Shoes. Release the "pull off" springs when the shoes can be removed from the anchor plate. Avoid grease contact with the linings if they are to be used for further service.

Bearing Retaining Ring. This ring has a RIGHT-HAND thread and to remove place a peg spanner (Z.125) into the diametrically opposed holes and unscrew from the hub.

Bearing (Speedometer End). Bump the opposite end of the spindle on a piece of hard wood when the bearing will be forced out of its housing complete with spindle and backing ring.

Bearing (Brake End). Drift this bearing out from the speedometer end.

Sprocket. If the teeth are not "hooked" or worn, the sprocket should be left in position and the securing bolts tested for tightness. On the other hand, if it is to be replaced, remove the bolts.

The wheel is now completely dismantled for examination and rectification (see page 93).

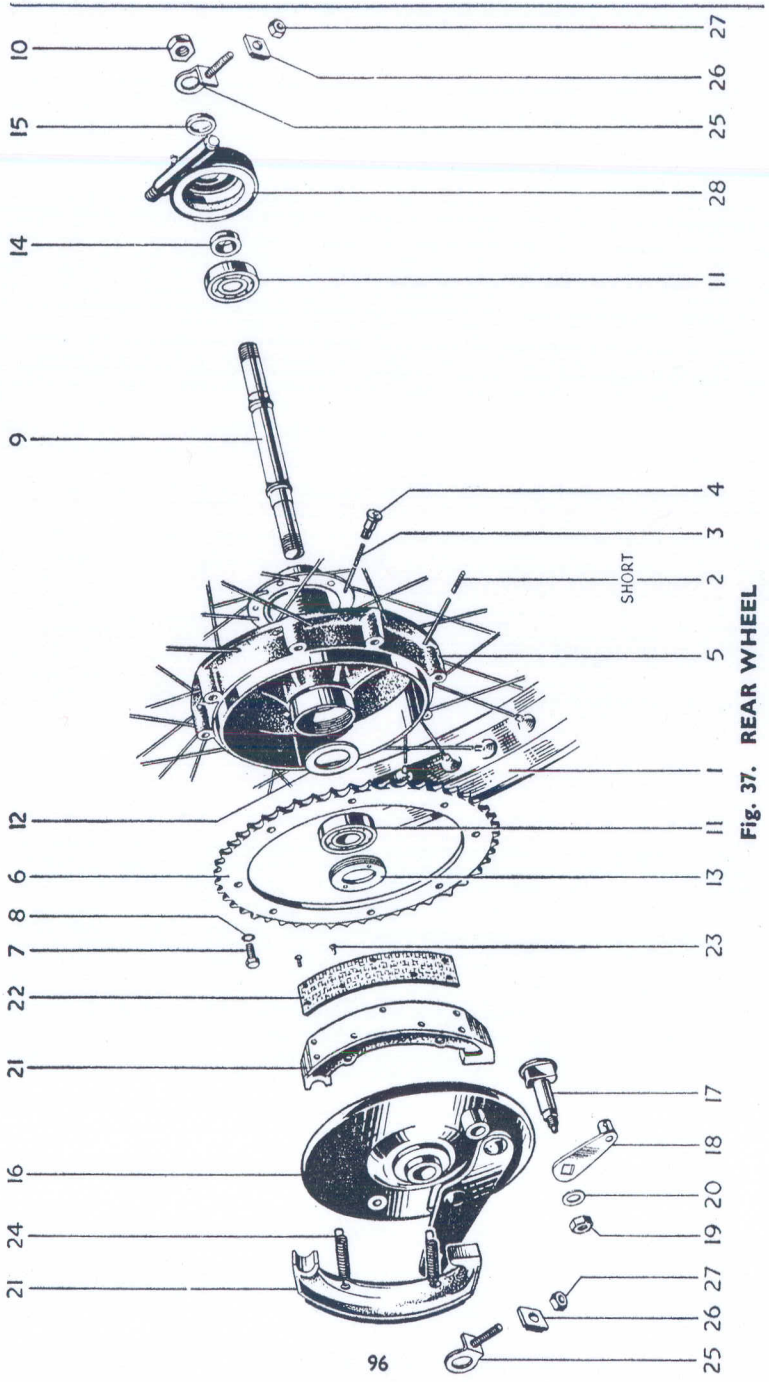


Fig. 37. REAR WHEEL

RE-ASSEMBLY OF THE WHEEL

Bearing (Brake End). Place the backing ring in the hub and then drift the bearing (well loaded with grease) into position. Screw the locking ring to the hub and well tighten with a peg spanner (Z.125).

Spindle. Enter the spindle from the opposite end and ensure that the shoulder contacts the bearing now in position.

Bearing (Speedometer End). Lubricate the bearing and drift into position.

Sprocket. If a new sprocket is to be fitted, fit the new unit to the brake drum and ensure that the 8 screws are well tightened.

Anchor Plate. Grease the operating cam spindle and correctly position cam and lever. DO NOT be over-lavish with the grease.

Brake Shoes. Assemble these to the anchor plate in the same manner as described in page 92, "Front Wheel Assembly".

Anchor Plate Assembly. Ease brake lever towards the "on" position and then enter the brake shoes into the drum. Replace distance piece and loosely screw on the wheel retaining nut.

INDEX TO FIG. 37

Index No.	Description.	Index No.	Description.
1	Rim.	15	Distance piece, R.H. outer.
2	Spoke, L.H. (short).	16	Plate, brake anchor.
3	Spoke, R.H. (long).	17	Cam, brake operating.
4	Nipple, spoke.	18	Lever, brake operating.
5	Hub and brake drum.	19	Nut.
6	Sprocket (54 teeth).	20	Washer.
7	Bolt, sprocket fixing.	21	Shoe, rear brake c/w lining.
8	Washer, spring.	22	Lining, brake.
9	Spindle.	23	Rivet, brake lining.
10	Nut, spindle.	24	Spring, shoe return.
11	Bearing.	25	Adjuster, chain.
12	Ring, bearing backing.	26	Cap, chain adjuster.
13	Ring nut, L.H. bearing.	27	Nut.
14	Distance piece, R.H. inner.	28	Gearbox, speedometer drive.

Speedometer Gearbox. First lubricate the gears by using a grease gun on the nipple provided. Slide over the wheel spindle the larger of the two distance pieces, then the speedometer gearbox and finally the smaller distance piece. Loosely screw on the wheel retaining nut.

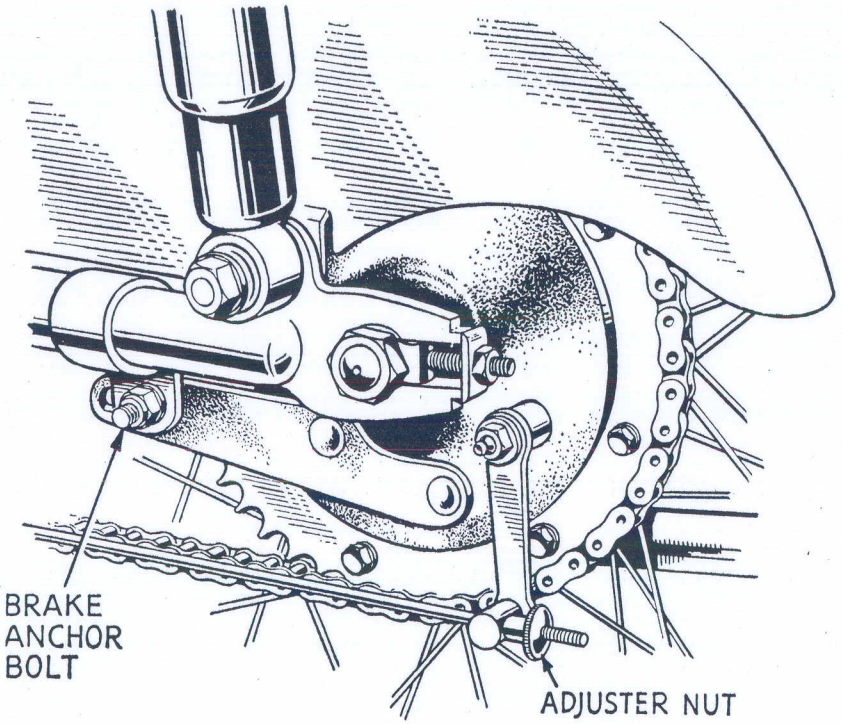


Fig. 38. REPLACING THE REAR WHEEL

ASSEMBLING WHEEL TO FRAME

Wheel. Tilt the machine to the left and position the wheel between the fork ends, chain wheel sprocket to the left.

Brake Anchorage. Insert the brake anchor bolt and screw on the nut finger tight.

Wheel Nuts. Position the chain adjusters and tighten up the wheel nuts by hand.

Chain. Replace the chain to the sprocket—remember the closed end of the spring clip faces the direction of forward motion. Check chain tension (see page 22).

Speedometer Gearbox. Fit the cable to the gearbox and screw up the cable nut.

Brake Rod. Re-connect and test brake action (see page 21).

Wheel Nuts. Screw up tightly, and tighten brake anchor bolt.

TYRES

Tyre pressure should always be maintained to obtain the maximum mileage and it is advisable to make a thorough check weekly. The actual pressure at which the tyres should be maintained is more or less a matter for the rider to decide, the main factor being the weight the machine is going to carry. After inflating a tyre, always re-fit the valve cap. The cap prevents entry of dirt through the valve mechanism and forms a positive seal on the valve.

RECOMMENDED TYRE PRESSURE

TYRE SIZE—	3.25 in.	3.00 in.	3.50 in.
	P.S.I.	P.S.I.	P.S.I.
Inflation Pressure—Front (minimum)	16	16	—
Rear (minimum)	18	—	16

(P.S.I.—pounds per square inch)

When correcting the tyre pressure, an examination should also be made for cuts or flints and nails, etc, which may have become embedded in the cover. If they are allowed to remain, no immediate damage may occur but they may at a later period, work through the cover and puncture the tube.

If the front tyre develops irregular or "stepped" wear, the tyre should be removed and the direction reversed, thereby restoring maximum resistance to tyre slip.

TWISTGRIP CONTROL

The twistgrip will require little attention other than an occasional greasing. The rotor is spring loaded in order to obtain a certain amount of frictional drag and will thus prevent the throttle closing when the hand is taken off the twistgrip to make a signal. The pressure on the friction spring is controlled by the small screw beneath the twistgrip head and may be adjusted to choice. To dismantle the twistgrip, proceed as follows:—

DISMANTLING

Remove the two screws which clamp the halves of the twistgrip head. The top half of the head may be now lifted off and the cable nipple disengaged from the rotor. Slide the rotor off the handlebar and collect the lower half of the head and the abutment into which fits the outer casing of the cable.

ASSEMBLING

Oil or grease the end of the handlebar where the rotor is fitted but do not oil the portion where the head is clamped. Place the abutment and lower half of the head over the end of the cable and engage the nipple with the rotor. Fit the top half and the two screws and tighten with the twistgrip on the handlebar. Finally test the action for freedom of movement throughout the range and adjust the backlash in the cable to not more than $\frac{1}{16}$ in. by means of the adjuster at the carburetter.

LUBRICATING CONTROL CABLES

The control cables require lubricating at intervals, as if they become dry, stiffness in operation will result. A good plan is to remove the Bowden wire connection from the lever at its top end and make a funnel with brown paper round the casing, securing it with a rubber band. Then if thin machine oil is fed into the funnel and allowed to remain over night, it will trickle down the casing and lubricate the cable. Control cables should always be kept clear of the engine as far as possible, as if they become over-heated the lubricant will be dried up.

SPARKING PLUG

The recommended gap for the type of sparking plug used in these machines is 0.020″ to 0.025″ (0.50 to 0.64 mm.). The plug should be cleaned periodically with a wire brush, or better still taken into a service station where it can be thoroughly cleaned in a special sparking plug cleaner. After cleaning, always check the points gap and replace the copper joint washer if it shows signs of hardness.

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 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 (quality screw).

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

Sparking Plugs recommended for normal use:—CHAMPION L. 7 K.L.G. F.80 or LODGE HN.

PETROL TAP

The tap employed is the taper type and should it leak, a remedy can be made in the following manner.

Petrol Pipe. Disconnect the union nut.

Petrol Tap. Unscrew from the tank (right-hand thread).

Tap Lever. Remove the split-pin, washer, spring and back plate with the lever and spindle assembly.

Wash all the parts and smear a small quantity of rouge (metal polish can be used as a substitute) on the spindle. Replace the spindle into the tap body and rotate it a few times ; remove the spindle and check the continuity of the contact surface, if unbroken, the parts should be thoroughly washed in petrol and re-assembled in the reverse manner to the dismantling sequence. Before replacing the spindle, rub the surface over with a petrol resisting grease or, if not available use tallow fat.

SPEEDOMETER DRIVE

The cable is driven by a speedometer gearbox which is attached to the rear wheel nut. If it should become necessary to replace the cable due to failure, remove the headlamp assembly and disconnect the cable at the speedometer head and then unscrew the union nut at the gearbox when the cable can be detached. The inner and outer cable can be replaced as separate items. When replacing the cable assembly to the machine, always ensure that the drive is correctly meshed before tightening the union nut.

AIR FILTER

The air filter on the Tiger Cub (T20) is now attached by two screws to the carburetter. The filter should be washed in petrol until clean and allowed to dry. Before replacing the element should be lightly oiled with S.A.E.20 grade oil.

Under normal conditions this attention is required every 2,000 miles (3,200 Kiloms.) but if the machine shows signs of a choked air filter which is indicated by poor performance, sooty sparking plug and black smoke from the exhaust, the filter should be cleaned more often.

On earlier T20 and all T20C models, the air filter is housed in the toolbox and battery cover unit. To remove the air filter element for cleaning or replacement the unit must be detached as a whole. To do this dismantle as follows:—

Toolbox and Battery Carrier Lid. Unscrew the knurled thumb nut and withdraw the lid.

Tools. Remove from the container.

Battery. Unscrew the strap nut and remove the strap when the battery can be withdrawn from the casing and the battery leads disconnected.

Air Filter and Casing. Remove the upper and lower nuts and withdraw the assembly. At the same time withdraw the breather pipe and carburetter rubber connection.

Air Filter Element. To remove the element unscrew the nut in the back of the casing and take off the air filter cover. Wash the element (steel gauze) in petrol until it is thoroughly clean and allow to dry. The container should also be cleaned in a similar manner.

Assembly. First oil the element using only a thin grade of oil (S.A.E.20) and then re-assemble in exactly the reverse manner described in the dismantling sequence.

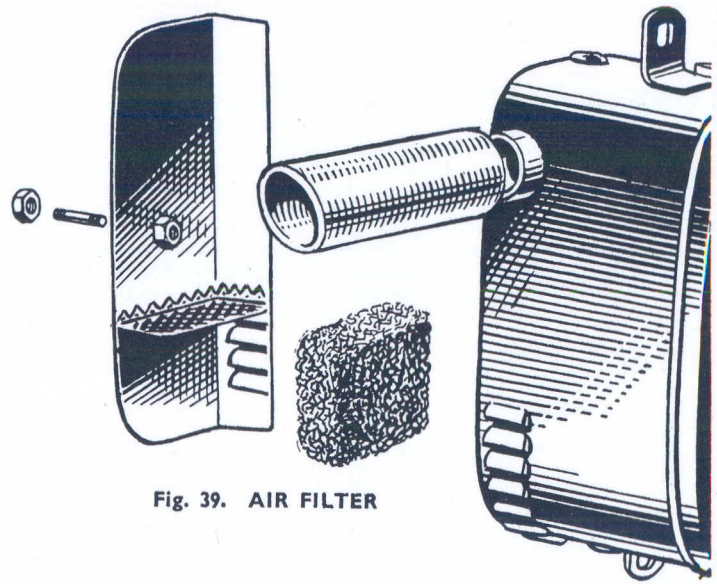


Fig. 39. AIR FILTER

AMAL CARBURETTER

The Amal needle jet carburetter is fitted to these motorcycles and unless the machine is to be used for some special purpose, the standard settings should not be interfered with. These settings have been arrived at after careful experiment in order to ensure maximum efficiency and minimum fuel consumption for normal use.

During the early period of the machine's life, the carburetter should be occasionally dismantled and cleaned to remove any foreign matter which may have found its way into the float bowl or around the main and slow running jets.

Fig. 40 clearly illustrates the dismantling procedure and the adjacent index identifies the parts.

For further information see Amal leaflet D.485.

INDEX TO FIG. 40

Index No.	Description.	Index No.	Description.
1	Cable, throttle.	18	Jet, pilot.
2	Body, mixing chamber.	19	Screw, mixing chamber plug.
3	Cap, mixing chamber.	20	Washer, plug screw.
4	Spring, mixing chamber cap.	21	Holding bolt.
5	Screw, cap spring.	22	Washer, holding bolt.
6	Top, mixing chamber.	23	Body, float chamber.
7	Adjuster, throttle cable.	24	Cover, float chamber.
8	Valve, throttle.	25	Screw, float chamber cover.
9	Spring, throttle valve.	26	Float.
10	Screw, throttle adjusting.	27	Needle, float.
11	Nut, throttle adjusting screw.	28	Tickler.
12	Screw, air adjusting.	29	Spring, tickler.
13	Spring, air adjusting screw.	30	Screw, tickler spring fixing.
14	Jet, needle.	31	Locknut, needle seating.
15	Needle, jet.	32	Washer, locknut.
16	Clip, jet needle.	33	Cover nut, pilot jet.
17	Jet, main.	34	Washer, cover nut.

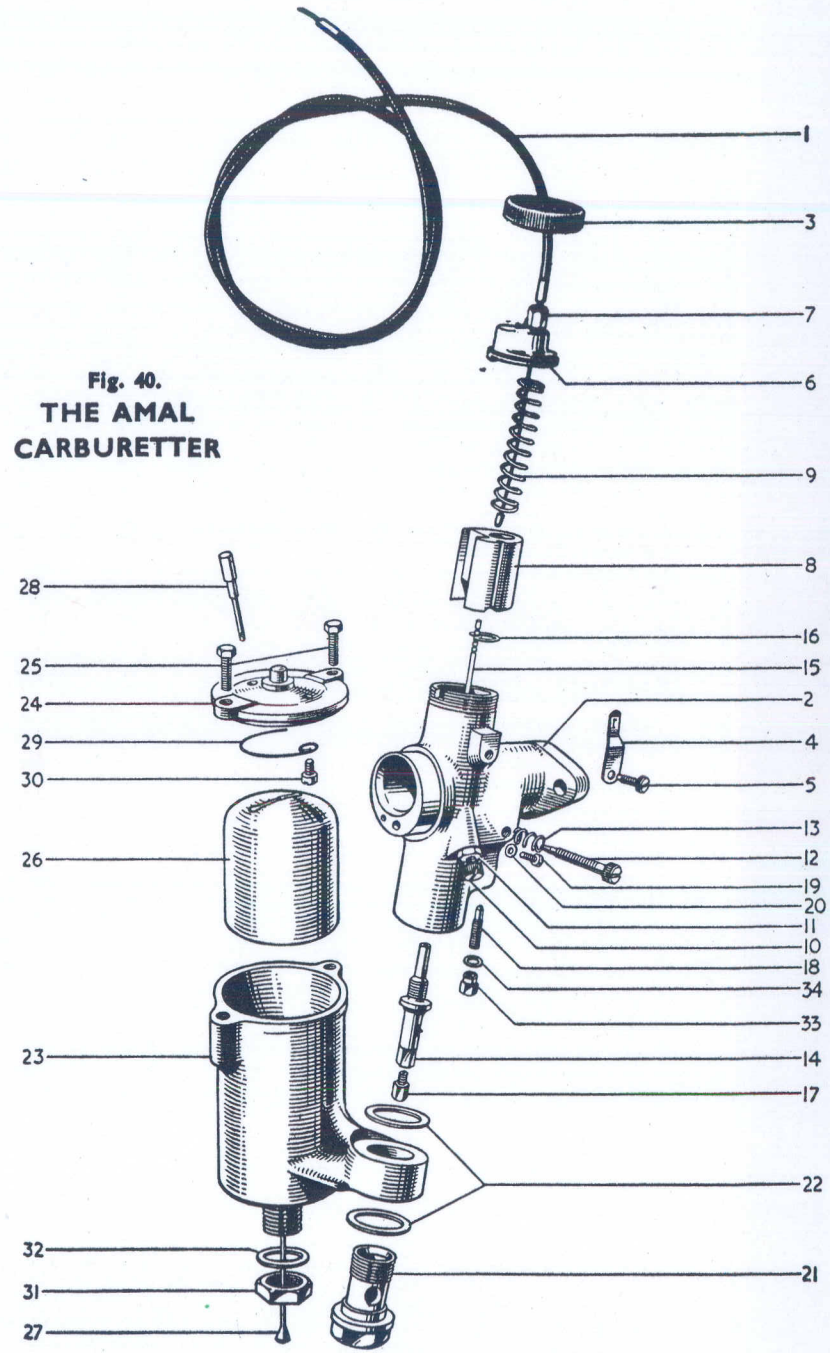


Fig. 40.
THE AMAL CARBURETTER

ZENITH MX CARBURETTER

DESCRIPTION

The Zenith MX Carburetter is a compact instrument designed for trouble free operation. The jet sizes have been chosen only after extensive testing and for normal purposes no improvement can be made by fitting alternative jets. When cleaning the jets swill them thoroughly in clean petrol and blow out with compressed air; never poke wire or needles through the jets.

OPERATING INSTRUCTIONS

There is no tickler provided on the float chamber, and after turning on the petrol it is advisable to lean the machine to the left for a few seconds. When starting from cold press down the brass plunger 8 to the limit of its travel. The metering hole in the plunger mates with an air passage in the carburetter body and petrol is drawn through the slow running jet 15 and mixed with air drawn through a small fixed air-bleed hole. This provides a rich mixture for starting. After about 30 seconds, open the throttle once to its full extent to return the brass plunger to its normal position.

INDEX TO FIG. 41. ZENITH CARBURETTER

Index No.	Description.	Index No.	Description.
1	Body, carburetter.	17	Pin, float hinge.
2	Top, mixing chamber.	18	Washer, joint.
3	Adjuster, cable.	19	Bowl, float.
4	Locknut, adjuster.	20	Screw, float bowl.
5	Slide, throttle.	21	Pipe, petrol feed.
6	Spring, slide.	22	Bolt, union.
7	Screw, top to body.	23	Washer, fibre.
8	Slide, starter.	24	Washer, fibre.
9	Screw, throttle stop.	25	Gauze, filter.
10	Spring, stop screw.	26	Adaptor, intake.
11	Nut and bolt, clamp.	27	Screw, adaptor.
12	Screw, plug.	28	Washer, shakeproof.
13	Tube, emulsion.	29	Connection, rubber.
14	Jet, main.	30	Cable, throttle.
15	Jet, slow running.	31	Adaptor, to head.
16	Float.	32	"O" ring.
		33	Air filter.

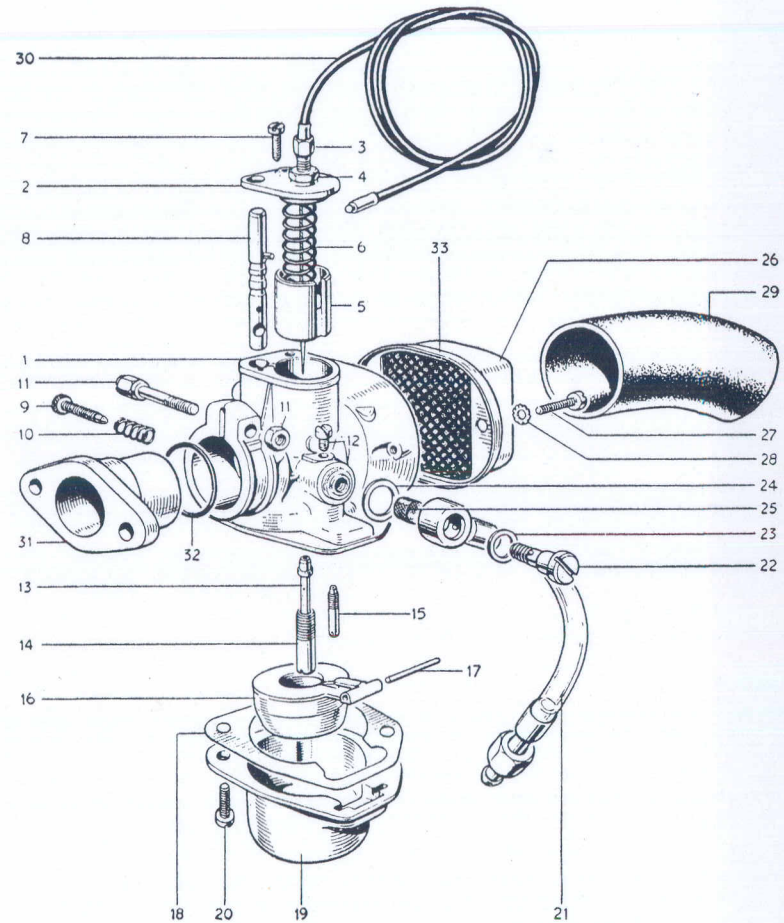


Fig. 41. ZENITH CARBURETTER

In this position a smaller metering hole connects with the air passage in the body and provides the correct volume of mixture for normal slow running. The slow running speed is adjusted by the throttle stop screw 9, turn clockwise to increase the speed and anti-clockwise to reduce the speed.

When the carburetter is used at larger throttle openings, the tapered needle portion of the slide 5 will progressively withdraw from the top of the emulsion tube 13 and consequently the depression from the inlet manifold will draw a correspondingly greater volume of petrol through the main jet 14. This mixes with air drawn through the small hole in the side of the emulsion tube and is drawn into the main carburetter choke tube and thence to the engine. When parking the machine always turn off the petrol tap.

MAINTENANCE

The carburetter should be dismantled and cleaned at regular intervals paying particular attention to the filter gauze in the inlet union and various jets. The float needle and seating unit is pressed into the body and cannot be removed. When replacing the carburetter make sure that the body is pressed on to the adaptor as far as possible before the clip is tightened. Particular attention should be paid to cleanliness at this point, as an air leak will cause very poor slow running.

JET SIZES

17 mm. Choke

Main jet	78
Slow running jet	50
Starter slide	200/65

18 mm. Choke

Main jet	84
Slow running jet	45
Starter slide	200/65

LUCAS RM13 A.C. LIGHTING AND IGNITION EQUIPMENT

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 HEAD position, 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 WITH THE IGNITION SWITCH IN THE "EMG" POSITION PROVIDED THAT THE BATTERY NEGATIVE CABLE (BROWN) IS EARTHED TO THE FRAME. UNDER THESE CONDITIONS NO LIGHTS ARE AVAILABLE. PROLONGED RUNNING WITHOUT BATTERY WILL HARM THE RECTIFIER.

CIRCUIT DETAILS

The alternator stator carries three pairs of coils, one pair being permanently connected across the rectifier bridge network. The purpose of this latter pair is to provide charging current for the battery whenever the engine is running, with the lighting switch in the OFF or PILOT position.

With the switch in the HEAD position, the alternator output is at a maximum with all three pairs of coils connected 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.

When current flows and the contacts are closed, the main return circuit to the alternator is through one arm of the rectifier bridge. At the instant of contact separation, the built-up energy of the alternator windings quickly discharges through an alternative circuit provided by the battery and the ignition coil primary winding. This rapid transfer of energy from alternator to coil, causes H.T. to be induced in the ignition coil secondary winding and a spark to occur at the plug.

Since, with the ignition switch at "EMG" and the engine running, the battery receives a charging current, the battery voltage soon begins to rise. This rising voltage opposes the alternator voltage and gradually effects 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.

CONSTRUCTION

The alternator consists essentially of a spigot-mounted and bolted 6-coil laminated stator with a 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).

MAINTENANCE OF ELECTRICAL EQUIPMENT

THE ALTERNATOR

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

IGNITION COIL

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

CONTACT BREAKER UNIT

Lubrication : every 3,000 miles

(i) Remove the metal cover and lightly smear the surface of the cam with one of the greases recommended for 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.

Cleaning : every 6,000 miles

Remove the metal 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.

Cleaning of the contacts should be carried out with the moving contact removed. To do this, unscrew the capacitor securing screw, remove the terminal nut and withdraw the nylon washer. The assembly, comprising capacitor, terminal and contact breaker spring arm, can now be lifted out of the unit body.

Note : When refitting this assembly, see that the widest edge of the nylon terminal block is at the top.

CONTACT BREAKER SETTING

The contact breaker setting should be checked after the first 500 miles running and subsequently every 6,000 miles. To check the gap, turn the engine over slowly until the contacts are seen to be fully open and insert a 0.014-0.016 in. 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 maximum contact opening and slacken the screw at the side of the unit body.

Slide the fixed contact carrier in its slotted hole, until the correct gap is obtained. Re-tighten the screw.

HIGH TENSION

If the high tension cable shows signs of perishing or cracking it should be replaced, using 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 $\frac{1}{4}$ in. Pass the exposed strands through the metal washer and bend the strands back radially. Refit the moulded nut into the h.t. terminal.

Later coils have a clip-type H.T. connector and in order to fit it to the cable, first trim the cable end square. Place the centre prong of the clip up the cable and mark the casing where the two jaws touch. Pierce the casing at these points and then close the jaws.

LIGHTING EQUIPMENT

HEADLAMPS

Headlamps fitted to machines intended for the Home Market and for Export excluding Europe and the U.S.A.

These lamps have a main double filament prefocus 6-volt 30/24-watt Lucas No. 312 bulb, together with a parking light 6-volt 3-watt Lucas No. 988 bulb. A window inserted in the main reflector provides illumination for the speedometer.

Headlamps fitted to machines intended for Export to Europe. These lamps have a main double filament prefocus 6-volt 35/35-watt Lucas No. 403 bulb, together with one parking light bulb and one speedometer light bulb, each of the latter being Lucas No. 988 6-volt 3-watt bulbs.

Headlamps fitted to machines intended for Export to the U.S.A. These lamps have a main double filament prefocus 6-volt 30/24-watt Lucas No. 312 bulb, together with a speedometer light 6-volt 3-watt Lucas No. 988 bulb.

Basically, the above lamps are identical, the differences occurring only in connection with the method of speedometer and parking light illumination. The following notes apply to all headlamps.

REPLACING THE HEADLAMP BULB

To gain access to the headlamp bulb, slacken the front rim retaining screw, situated at the bottom of the rim. Disengage and withdraw the front rim and Light Unit assembly, removing the lower edge first. 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.

Refit the adaptor, engaging its moulded recesses with corresponding projections on the bulb holder. Press inwards and secure by turning the adaptor to the right. Refit the outer rim to the nacelle, locating the top of the rim first. After replacing, check the setting.

SETTING THE HEADLAMP BEAM

To check the headlamp beam setting, stand the motorcycle in front of a light coloured wall at a distance of about 25 feet. 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. If it is not, adjust the rim securing screw, turning the screw to the right to lower the beam, and vice versa. With the Lucas prefocus type bulbs 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.

REPLACING THE PARKING LIGHT BULB (when fitted)

Disengage and withdraw the front rim and Light Unit assembly. The parking light bulb holder and bulb can then be withdrawn from the reflector in which it is a push-fit.

REPLACING THE SPEEDOMETER LIGHT BULB (when fitted)

Disengage and withdraw the front rim and Light Unit assembly. The speedometer light bulb can then be withdrawn from its holder which is built on to the main bulb adaptor.

INSTRUMENT NACELLE

This unit is held to the lower nacelle by 6 screws and nuts which must first be removed before disconnecting the various cables which are attached. When the screws have been removed, disconnect the lighting cables at the connectors, then detach the speedometer cable. The unit can now be left attached to the gear indicator control cable. If the operator wishes to remove the complete unit, detach the indicator cable wire from the indicator rack and pinion. Refit in reverse manner.

REAR LIGHTING

Access to rear light bulbs is gained by removing the two moulded cover retaining screws. The correct replacements are as follows :—

Rear Lights only : Lucas No. 988 6-volt 3-watt bulb.

Stop Tail Lights : Lucas No. 384 6/18-watt bulb (offset pin).

THE BATTERY

Once a month, or more often in hot climates, check the level of the electrolyte in the cells. If necessary, add distilled water to bring the electrolyte level with the top edges of the separators. Keep the battery top clean and dry, and the vent holes in the filler plugs clear. Naked light should not be brought near to the battery, as the gas given off is explosive. Occasionally check the battery condition with an hydrometer. These checks should not be made immediately after topping up, as the electrolyte will not be thoroughly mixed.

Specific gravity readings and their indication :—

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

IGNITION FAULT FINDING

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

ENGINE WILL NOT START NO SPARK AT PLUG

Note : To check, remove the plug and place it on the cylinder head after re-fitting the connector. Turn the ignition switch to "IGN" (clockwise) and kick over the engine. The plug 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 .020"-.025" 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 clip secure. Check the gap of the contact breaker points and clean and adjust if necessary (see pages 111 and 112).

COIL. First clean the coil, particularly between the cable connections. To check the low tension circuit, connect a volt meter between the coil terminal marked "CB" or "+" and earth. If there is no reading with the ignition switched on there is a fault in the coil primary winding. If this test shows that the low tension primary circuit is in order, remove the H.T. lead from the plug and take off the connector. Take off the distributor cap and rotate the engine until the contact points are closed. Switch on the ignition and hold the end of the H.T. lead about a $\frac{1}{4}$" from the cylinder block. Flick the contact points open with the finger and a spark should pass from the H.T. lead. No spark indicates a fault in the 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 contact. 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 AT "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 of 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 AT "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 page 56). The alternator stator inter-coil connections must face towards the engine.

ROUGH RUNNING AND MISFIRING WITH SWITCH AT "IGN".

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

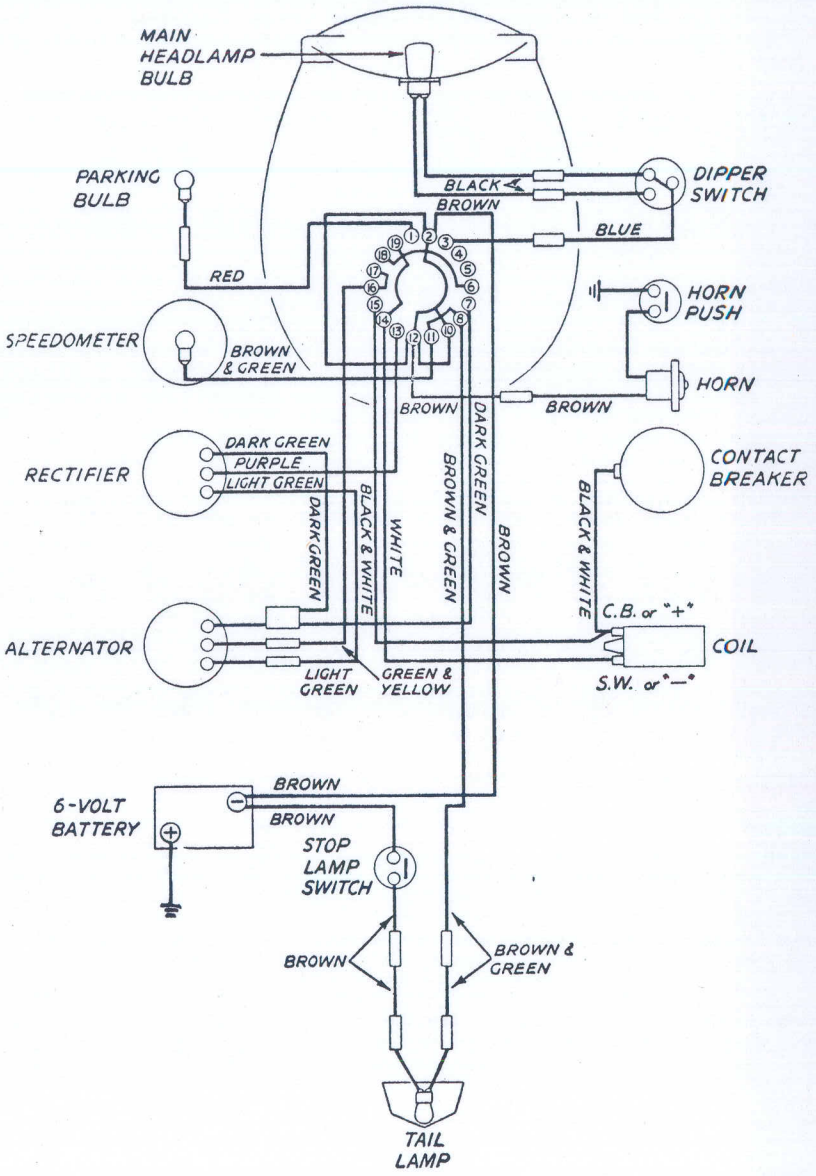


Fig. 42

WIRING DIAGRAM FOR LUCAS RM13 LIGHTING AND IGNITION

T20 and T20C Machines.

T20S AND T20T ENERGY-TRANSFER IGNITION SYSTEM

These models are fitted with an ignition and lighting system which allows the machine to be run without lighting or battery if desired. The ignition circuit comprises a specially wound alternator stator and coil and a short open-period contact breaker. The lighting circuit comprises direct lighting coils which provide current only when the engine is running.

The output from the stator ignition coils flows to earth through the closed contact breaker points, but when the points open the output is suddenly switched to the parallel path provided by the ignition coil primary windings. This induces the necessary high-tension pulse in the secondary windings sufficient to cause a spark at the plug. As the output of the stator is alternating current it is most important that the rotor is timed relative to the crankshaft in order that the maximum pulse occurs as the contacts open.

The alternator rotor timing is controlled by the crankshaft keyways, which must be used as shown in Fig. 43. In order to obtain the optimum performance especially at kickstarting speed the contact breaker timing, contact breaker gap and spark plug gap must be accurately set. Remember that any alteration of the contact breaker gap from the original setting will change the contact opening point.

The settings are as follows:—

T20T Low compression and standard camshaft	Rotor No. 2 keyway	Contact breaker opens 8° (0.016in.) 0.4 mm. B.T.C.
T20S High compression and high-lift camshaft	Rotor No. 1 keyway	Contact breaker opens 16° (0.063in.) 1.6 mm. B.T.C.

All models.	Contact breaker gap	0.014-0.016 in. (0.35-0.4 mm.).
	Spark plug gap	0.018-0.020 in. (0.45-0.5 mm.).

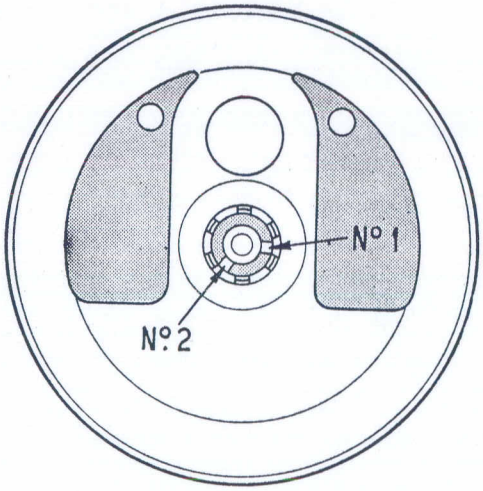


Fig. 43. ROTOR KEYWAY POSITIONS

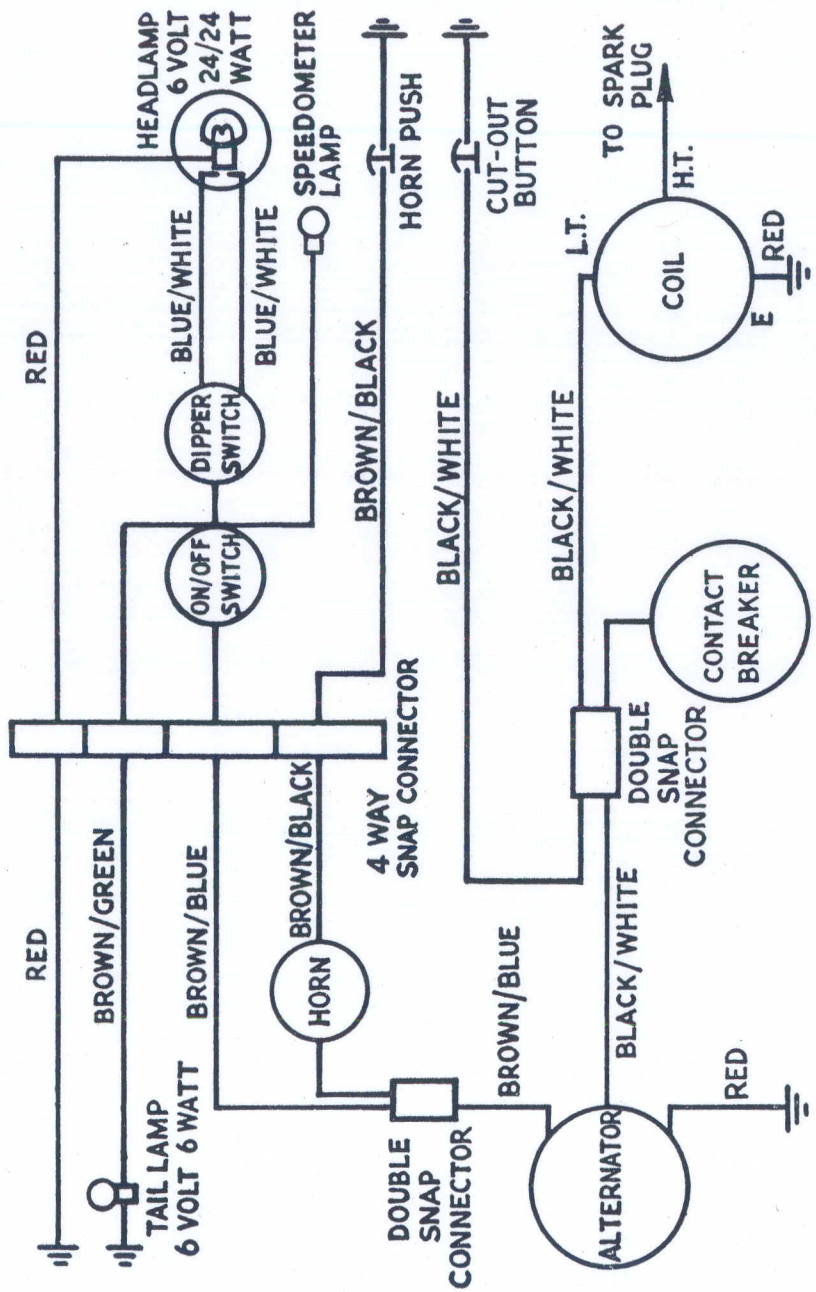


Fig. 44. WIRING DIAGRAM FOR T20S AND T20T WITH ENERGY-TRANSFER IGNITION SYSTEM.

CLEANING THE MOTORCYCLE

A clean motorcycle not only gives pride of ownership, but also assists the owner in maintaining the machine in first-class condition.

Never at any time attempt to remove road dirt when the machine is dry, this should always be washed off with water. There are on the market at present, a number of extremely good cleaning solvents for removing oil and road dirt from the exterior of the machine, and they can be obtained through most accessory dealers. The preparation should be applied with a 1" paint brush to the machine and a little time allowed to elapse in order that the solution can penetrate the oily surfaces. The machine should be in a dry condition before commencing this operation. Now wash off the solution with water from a watering can ; the reason the latter is advised is so that the operator can direct a controlled stream of water, thus avoiding trouble such as water in the brakes, ignition system and fuel system. After completion, dry off the machine with a chamois leather and when completely dry, finish off with a good polish, of which there are numerous makes available.

TOOLKIT

The toolkit supplied with the machine will enable the owner to carry out minor adjustments and replacements. Special tools for dismantling such units as the cylinder head, rear suspension and timing gear, etc., can be made available on application to the nearest Triumph Dealer.

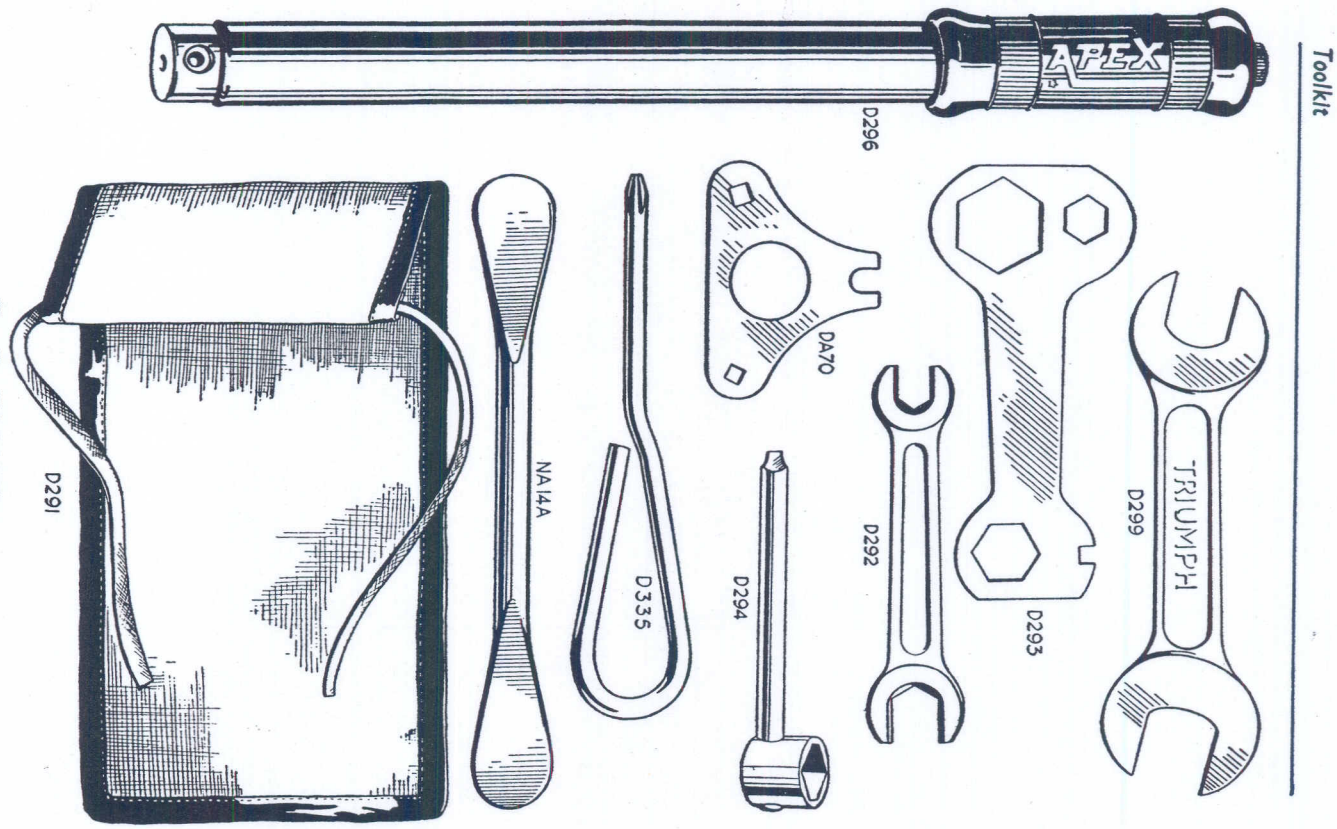


Fig. 45. TOOLKIT

RECOMMENDED LUBRICANTS

UNITED KINGDOM

UNIT	REGENT	MOBIL	SHELL	BP ENERGOL	CASTROL	ESSO	CODE
Engine—Summer ... **Winter ...** **T20S Front Fork ...**	Havoline SAE 30 Havoline SAE 20W	Mobiloil A Mobiloil Arctic	Shell X-100 30 Shell X-100 20/20W	Energol SAE 30 Energol SAE 20	Castrol XL Castrolite	Esso Extra Motor Oil 20W/30	A
Gearbox ... ... **Telescopic Fork ...**	Havoline SAE 30	Mobiloil A	Shell X-100 30	Energol SAE 30	Castrol XL	Esso Extra Motor Oil 20W/30	B
Primary Chaincase	Havoline SAE 20W	Mobiloil Arctic	Shell X-100 20/20W	Energol SAE 20	Castrolite	Esso Extra Motor Oil 20W/30	C
Rear Suspension ... **Wheels ... ...** **Steering Races ...**	Marfak Multi-Purpose 2	Mobilgrease MP	Shell Retinax A	Energrease L2	Castrolease LM	Esso Grease H	D
Easing Rusted Parts	Graphited Penetrating Oil	Mobil Spring Oil	Shell Donax P	Energol Penetrating Oil	Castrol Penetrating Oil	Esso Penetrating Oil	

The above lubricants have been carefully tested and found to give satisfactory results with the Tiger Cub.

RECOMMENDED LUBRICANTS

OVERSEAS

UNIT	CALTEX	MOBIL	SHELL	BP ENERGOL	CASTROL	ESSO	CODE
Engine Above 90° F.	Caltex SAE 40	Mobiloil A.F.	Shell X-100 40	Energol Motor Oil SAE 40	Castrol XXL	Esso Extra Motor Oil 20W/40	A
32°-90° F. ...	Caltex SAE 30	Mobiloil A	Shell X-100 30	Energol Motor Oil SAE 30	Castrol XL		
Below 32° F.	Caltex SAE 20W	Mobiloil Arctic	Shell X-100 20/20W	Energol Motor Oil SAE 20W	Castrolite		
T20S Front Fork ...							
Gearbox	Caltex SAE 30	Mobiloil A	Shell X-100 30	Energol Motor Oil SAE 30	Castrol XL	Esso Extra Motor Oil 20W/40	B
Telescopic Fork ...							
Primary Chaincase	Caltex SAE 20W	Mobiloil Arctic	Shell X-100 20/20W	Energol Motor Oil SAE 20W	Castrolite	Esso Extra Motor Oil 20W/40	C
Rear Suspension ...	Marfak Multi-Purpose 2	Mobilgrease MP	Shell Retinax A	Energrease L2	Castrolease LM	Esso Grease H	D
Wheels							
Steering Races ...							
Easing Rusted Parts	Caltex Penetrating Oil	Mobil Spring Oil	Shell Donax P.	Energol Penetrating Oil	Castrol Penetrating Oil	Esso Penetrating Oil	

The above lubricants have been carefully tested and found to give satisfactory results with the Tiger Cub.

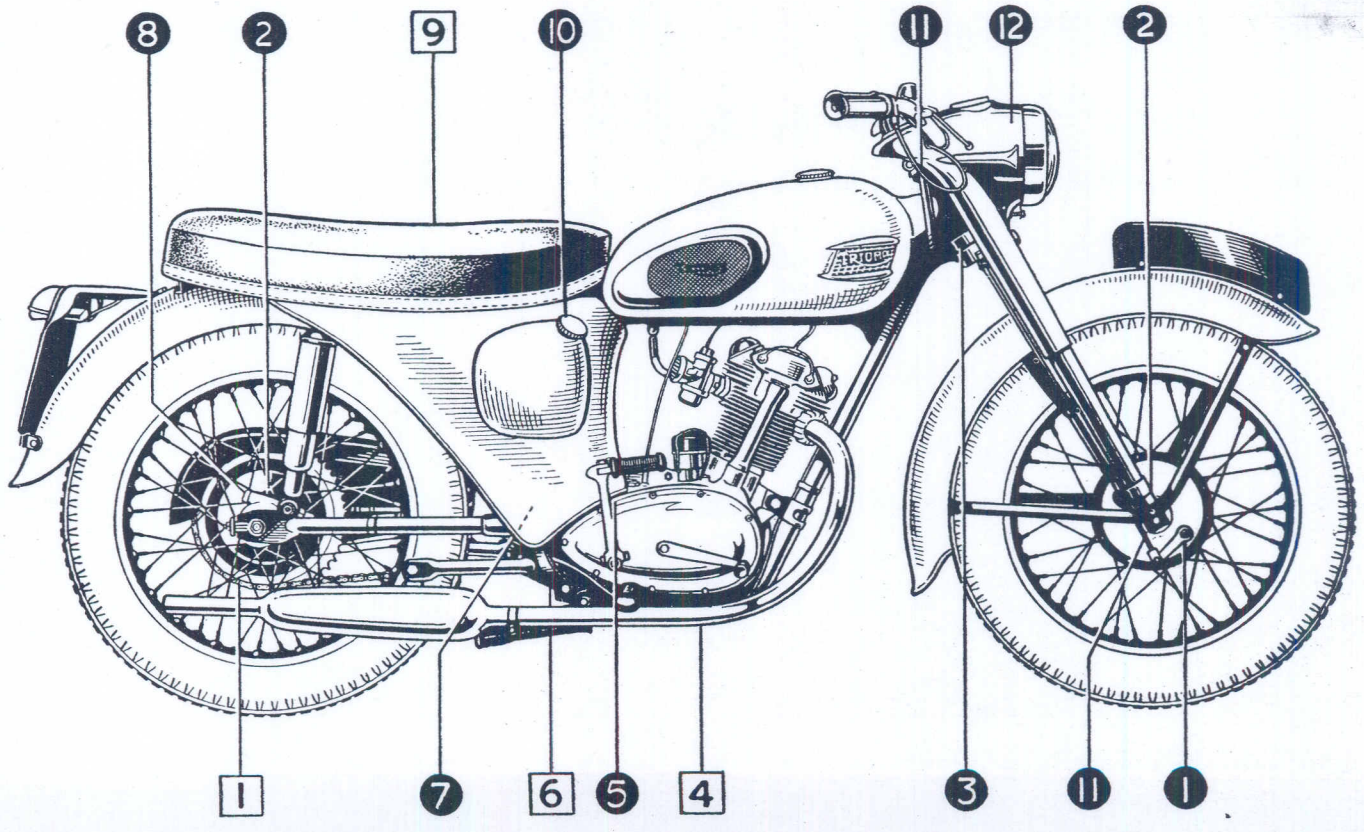


Fig. 46. LUBRICATION CHART

Figures in circles refer to right-hand side of machine and those in squares to the left-hand side not visible in the illustration.

The Lubricant Code Reference is on Pages 123 and 124

No.	Part	Lubrication Code
1	Brake Cam	D
2	Wheel Hubs	D
3	Steering Races	D
4	Primary Chaincase	C
5	Gearbox	B
6	Brake Pedal Spindle	D
7	Rear Suspension	D
8	Speedometer Gearbox	D
9	Air Filter	C
10	Engine Oil Tank	A
11	Cables (Exposed)	D
	,, (Internal)	C
12	Telescopic Front Fork	B

ILLUSTRATION INDEX

TECHNICAL DATA

MODEL	T15	T20 up to 17388	T20 from 17388 to 35846	T20 from 35846 to 56360	T20C up to 35846
ENGINE. Bore and stroke mm. ...	57 × 58.5	63 × 64	63 × 64	63 × 64	63 × 64
Capacity—c.c.	149	199	199	199	199
Compression Ratio	7 : 1	7 : 1	7 : 1	7 : 1	7 : 1
Power Output—b.h.p. at r.p.m.	8 at 6,000	10 at 6,000	10 at 6,000	10 at 6,000	10 at 6,000
Tappet Clearance—ins.	0.010	0.010	0.010	0.010	0.010
Valve Timing at 0.015 in. tappet clearance for checking ...	30° 50° 55° 25°	30° 50° 55° 25°	30° 50° 55° 25°	30° 50° 55° 25°	30° 50° 55° 25°
IGNITION TIMING—Static Crankshaft deg. or Piston ins. ...	8° 1/64"	8° 1/64"	4° at T.D.C.	4° at T.D.C.	4° at T.D.C.
SPARKING PLUG Champion	L7	L7	L7	L7	L7
K.L.G.	F80	F80	F80	F80	F80
Lodge	HN	HN	HN	HN	HN
CAPACITIES. Petrol—Galls/Litres	2⅝ (11.9)	2⅝ (11.9)	3⅛ (14.2)	3 (13.5)	2⅝ (11.9)
Oil—Pints/Litres	2¼ (1.4)	2¼ (1.4)	2¾ (1.56)	2¾ (1.56)	2¾ (1.56)
Gearbox—Pint/c.c.	⅓ (200)	⅓ (200)	⅓ (200)	⅓ (200)	⅓ (200)
Chaincase—Pint/c.c.	½ (300)	½ (300)	½ (300)	½ (300)	½ (300)
Fork Leg—Pint/c.c.	—	—	⅛ (75)	⅛ (75)	⅛ (75)

MODEL	T15	T20 up to 17388	T20 from 17388 to 35846	T20 from 35846 to 56360	T20C up to 35846
CARBURETTER. Type	Amal 332	Amal 332	Amal 332	Zenith 17 MX	Amal 332
Main Jet	90	100	100	78	100
Needle Jet	0.086 in.	0.086 in.	0.086 in.	Slow Run 50	0.086 in.
Needle Position	3rd	3rd	3rd	—	3rd
Throttle Valve	4	4	4	—	4
Pilot Jet	20	20	20	Starter 200/65	20
Choke—ins.	11/16	¾	¾	17 mm.	¾
GEAR RATIOS 4th—Top	7.1	6.7	6.35	6.45	6.7
3rd—Third	9.5	8.8	8.3	8.5	8.8
2nd—Second	14.8	13.8	13.1	13.3	13.8
1st—Bottom	21.1	20.0	19.0	19.4	20.0
SPROCKETS Engine	19	19	18	19	18
Clutch	48	48	36	48	36
Gearbox	17	18	17	18	16
Rear Wheel	48	48	54	46	54
CHAIN LENGTH. Front ...	⅜" × 7/32" × 62L	⅜" × 7/32" × 62L	½" × 3/16" × 48L	⅜" Duplex × 62L	½" × 3/16" × 48L
Rear	½" × 3/16" × 112L	½" × 3/16" × 112L	½" × 3/16" × 116L	½" × 3/16" × 112L	½" × 3/16" × 116L
TYRE SIZE. Front	2.75 × 19	3.00 × 19	3.25 × 16	3.25 × 16	3.00 × 19
Rear	2.75 × 19	3.00 × 19	3.25 × 16	3.25 × 16	3.50 × 18

TECHNICAL DATA

	T20C from 35847	T20 from 56360	T20T	T20S
ENGINE. Bore and stroke mm.	63 × 64	63 × 64	63 × 64	63 × 64
Capacity c.c.	199	199	199	199
Compression Ratio	7 : 1	7 : 1	7 : 1	9 : 1
Power Output b.h.p. at r.p.m.	10 at 6,000	10 at 6,000	10 at 6,000	14.5 at 6,500
Tappet Clearance	0.010	0.010	0.010	Inlet 0.002 Exhaust 0.004
Valve Timing at 0.015 in. tappet clearance for checking	30° 50° 55° 25°	30° 50° 55° 25°	30° 50° 55° 25°	39° 61° (at 0.020 in. 65° tappet 35° clearance)
IGNITION TIMING—Static. Crankshaft deg. or Piston ins.	4° at T.D.C.	4° at T.D.C.	8° 1/64"	16° $\frac{1}{16}$"
SPARKING PLUG Champion	L7	L7	L7	LA11
K.L.G.	F80	F80	F80	F100
Lodge	HN	HN	HN	HN3
CAPACITIES. Petrol—Galls/Litres	2⅝ (11.9)	3 (13.5)	2⅝ (11.9)	2⅝ (11.9)
Oil—Pints/Litres	2¾ (1.56)	2¾ (1.56)	2¾ (1.56)	2¾ (1.56)
Gearbox—Pint/c.c.	⅓ (200)	⅓ (200)	⅓ (200)	⅓ (200)
Chaincase—Pint/c.c.	½ (300)	⅓ (200)	⅓ (200)	⅓ (200)
Fork Leg—Pint/c.c.	⅛ (75)	⅛ (75)	¼ (150)	¼ (150)

CARBURETTER—Type	Zenith 17 MX	Zenith 18 MX	Zenith 18 MX	Amal 376
Main Jet	78	84	84	140
Needle Jet	Slow run 50	Slow run 45	Slow run 45	.106
Needle Position	—	—	—	3rd
Throttle Valve	—	—	—	3
Pilot Jet	Starter 200/65	Starter 200/65	Starter 200/65	20
Choke	17 mm.	18 mm.	18 mm.	$\frac{15}{16}$"
GEAR RATIOS 4th—Top	7.26	6.84	8.55	7.13
3rd—Third	9.5	9.0	12.4	8.6
2nd—Second	14.8	14.0	19.4	13.4
1st—Bottom	21.5	20.3	28.1	19.8
SPROCKETS Engine	19	19	19	19
Clutch	48	48	48	48
Gearbox	16	17	16	17
Rear Wheel	46	46	54	48
CHAIN LENGTH. Front	⅜" Duplex × 62L	⅜" Duplex × 62L	⅜" Duplex × 62L	⅜" Duplex × 62L
Rear	½" × $\frac{3}{16}$" × 112L	½" × $\frac{3}{16}$" × 112L	½" × $\frac{3}{16}$" × 116L	½" × $\frac{3}{16}$" × 113L
TYRE SIZE. Front	3.00 × 19	3.25 × 17	3.00 × 19	3.00 × 19
Rear	3.50 × 18	3.25 × 17	3.50 × 18	3.50 × 18

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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.

OPERATION OF CARBURETTER PARTS

Throttle Stop Screw. This screw should be set to open the throttle sufficiently to keep the engine running at a slow 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 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.).

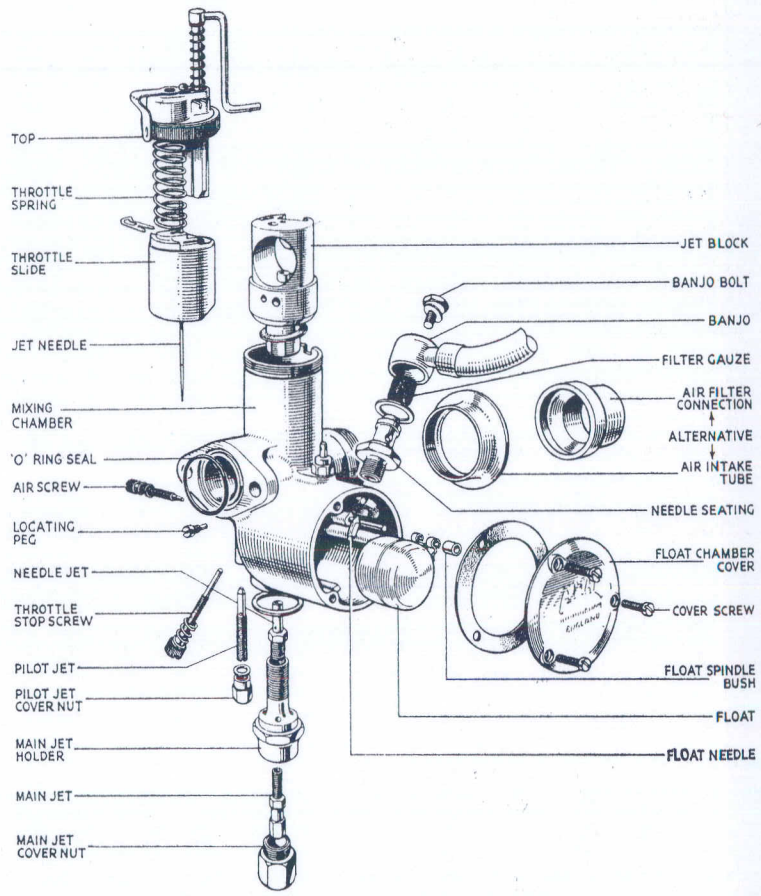

Fig. 47. AMAL MONOBLOC CARBURETTER

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. 6/3 means throttle type 6 with No. 3 cut-away ; larger cut-aways, say 4 and 5 give weaker mixture and 2 and 1 richer mixtures.

Tickler. A small plunger spring-loaded in the top of float chamber. 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 cms.) 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.

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