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## TECHNICAL HANDBOOK

# TRIUMPH

MOTORCYCLE 500 c.c.  
MODEL T.R.W.

Engine No's.  
14401 N to 25764 NA

Published June 1956

TRIUMPH ENGINEERING COMPANY LIMITED,  
MERIDEN WORKS, ALLESLEY,  
COVENTRY.

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**ADMIRALTY**  
MTB/4900/1B

**E M E R**  
WHEELED VEHICLES  
B722

**AIR PUBLICATION**  
4344 Vol. 1 and Vol. 6

Issued Apr 56

**MOTOR CYCLE, 500cc, TRIUMPH—TRW**

**TECHNICAL HANDBOOK**



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ADMIRALTY  
MTP/4900/1B

ELECTRICAL AND MECHANICAL  
ENGINEERING REGULATIONS  
(By Command of the Army Council)  
WHEELED VEHICLES - B 722

AIR PUBLICATION  
4344  
Vol.1 and Vol.6

MOTOR CYCLE, 500 CC, TRIUMPH-TRW

TECHNICAL HANDBOOK

Amendment No.2

March, 1958

- NOTES: 1. THIS IS NOT A NEW REGULATION.  
 2. This page will be filed immediately in front of the title page.  
 3. When making the following handwritten amendments write (Amdt.2) in the margin against each amendment.

Page 3 ENGINE

Against	Maximum b.h.p. at clutch
Amend	168
To read	16.8

Page 32 PISTONS

After	2nd land			
Add	and 3rd land			
Delete	3rd land ... .. o/dia.	2.450		
		2.455		
Substitute	Top of skirt (90° to gudgeon pin) ... .. o/dia.		2.4735	
			2.4740	

PISTON RINGS

	Compression ring - width
Amend	0.0715
To read	0.0615

Page 42 FAULT DIAGNOSIS

Delete para 2(5)  
 Substitute

(5) Drain oil from gearbox and replenish with 1/2 pt of oil only. Do not fill to level of filler plug hole or leaks may occur.

Page 53 GEARBOX OUTER COVER

Delete para 29(7)  
 Substitute

(7) replenish gearbox with 1/2 pt of oil (see Section 3, para 2(5)).

Record the incorporation of this amendment in the record sheet on the reverse side of the title page

Distribution - Class 110. Code No.5 Special

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## NOTES TO READERS

The subject of this publication may be affected by Admiralty Fleet Orders, Army Council Instructions, Air Ministry Orders or Air Ministry "General Orders and Modifications" leaflets. If possible, amendments are issued to correct this publication accordingly. When an Order, Instruction or leaflet contradicts any portion of this publication the Instruction, Order or leaflet is to be taken as the overriding authority.

### LIST OF ASSOCIATED PUBLICATIONS

#### ADMIRALTY

Publication	No.
User Handbook ... ..	MTP/4900/2
Parts List ... ..	MTP/4900/3

#### WAR OFFICE

Publication	W.O. Code No.
Parts List ... ..	18560
Servicing Schedule ... ..	11067
User Handbook ... ..	17855
Table of Tools and Equipment (Table No. 1000) ... ..	18470

#### AIR MINISTRY

Publication	A.P. No.
Data Book of R.A.F. Vehicles ... ..	782 A
R.A.F. Engineering—Mechanical Transport ... ..	1464 E
Manual of M.T. Servicing ... ..	3260 Vol. I
M.T. Wheels, Tyres and Associated Equipment ... ..	3000 Vol. I
User Handbook ... ..	4344 C (UH)
Electrical Manual—M.T. and Marine Craft ... ..	4343 M
Motor Cycles—General Orders and Modifications ... ..	4545 K
R.A.F. Fire Manual ... ..	957 Part I

Where the terms "driving side" and "timing side" are used in the text they may be read as L.H. and R.H. side respectively.

Where thread sizes are given as C.E.I. (Cycle Engineers Institute) in the text, it may also be accepted as B.S.C. (British Standard Cycle) thread.



# CONTENTS

Section No.	Title.	Page No.
1	ENGINE ... ..	7
2	CARBURETTER ... ..	37
3	GEARBOX ... ..	41
4	TELESCOPIC FRONT FORK ... ..	63
5	WHEELS ... ..	77
6	B.T.H. EQUIPMENT ... .. (Mk. 1 & 2 Machines only)	91
7	LUCAS EQUIPMENT ... .. (Mk. 2B Machines)	103

## TECHNICAL DATA

### WEIGHTS

	Qtr.	lb.	lb.	Kg.
Unladen (with petrol, oil, toolkit and panniers).				
Front ... ..	6	00	168	76
Rear ... ..	7	20	216	98
Total ... ..	13	20	384	174
Laden (gross with rider).				
Front ... ..	7	14	210	95
Rear ... ..	12	14	350	159
Total ... ..	20	00	560	254

**SHIPPING TONNAGE (not dismantled)** ... .. 1.45 tons 58 cu. ft.

### CAPACITIES

	Imperial	U.S.	Metric
Fuel ... ..	3 galls.	3½ galls.	13 litres
Oil ... ..	4 pints	5 pints	2½ litres
Gearbox ... ..	½ pint	¾ pint	300 c.c.
Chaincase ... ..	½ pint	0.4 pints	200 c.c.
Telescopic forks ... ..	½ pint	0.2 pints	100 c.c.

### ENGINE

Type ... ..	Vertical, parallel twin-cylinder, air-cooled
Maximum b.h.p. at clutch ... ..	168.
Loss of efficiency at altitudes of:	
5,000 ft. ... ..	22%
10,000 ft. ... ..	40%
Bore ... ..	63 mm. (2.48 in.)
Stroke ... ..	80 mm. (3.15 in.)
Capacity ... ..	499 c.c. (30.5 cu. in.)
Piston ring gap: Compression Ring ... ..	Min. .010 in. (0.25 mm.)
	Max. .014 in. (0.35 mm.)
Scraper Ring ... ..	Min. .007 in. (0.18 mm.)
	Max. .011 in. (0.28 mm.)

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**ENGINE—continued**

Compression Ratio ... ..	6 : 1
Valve Tappet Clearance (cold):	
Inlet ... ..	.004 in. (0.10 mm.)
Exhaust ... ..	.006 in. (0.15 mm.)
Distributor: Type ... ..	Lucas DKX2A
Point Gap ... ..	Min. .010 in. (0.25 mm.)
	Max. .012 in. (0.30 mm.)
Magneto: Mk. 1 and 2: Type ... ..	B.T.H. K.C.2
Contact Breaker Gap ... ..	.012 in. (0.30 mm.)
Ignition Timing ... ..	$\frac{1}{2}$ in. B.T.D.C. fully advanced
Coil ... ..	Lucas Q.6
Sparkling Plug: Type ... ..	Champion L.11.5
Point Gap ... ..	Min. .018 in. (0.45 mm.)
	Max. .020 in (0.50 mm.)
Engine Lubrication System: Type	Dry Sump
Oil Pump ... ..	...Twin Plunger

**FUEL SYSTEM**

Carburetter: Type ... ..	Solex 26 WH2
Choke ... ..	No. 22
Main Jet ... ..	110
Correction Jet ... ..	190
Pilot Air Jet ... ..	2.10
Pilot Fuel Jet ... ..	45
Starter Air Jet ... ..	3
Starter Fuel Jet ... ..	65
Air Filter ... ..	Vokes: oil-wetted felt

**CLUTCH**

Type ... ..	Four Plate, cork in oil
Clutch cable free movement ... ..	$\frac{1}{2}$ in.

**GEARBOX**

Type ... ..	Four Speeds, foot operated
Ratios: 1st ... ..	2.91 : 1
2nd ... ..	2.21 : 1
3rd ... ..	1.42 : 1
Top ... ..	1.00 : 1
Sprocket ratio ... ..	5.80 : 1

**OVERALL RATIOS (Engine to Rear Wheel)**

1st ... ..	16.85 : 1
2nd ... ..	12.80 : 1
3rd ... ..	8.25 : 1
Top ... ..	5.80 : 1

**CHAINS**

Primary: $\frac{1}{2} \times .335 \times .305$ in.	} ... ..	74 links
$12.7 \times 8.51 \times 7.75$ mm.		
Rear: $\frac{3}{8} \times .400 \times \frac{3}{8}$ in.	} ... ..	90 links
$15.875 \times 10.16 \times 9.65$ mm.		

**BRAKES**

Type ... ..	Mechanically Operated. Internal Expanding
Size (Front and Rear) ... ..	7 in. diameter $\times$ $1\frac{1}{8}$ in. wide
Pedal Clearance (Rear) ... ..	$\frac{1}{2}$ in.
Lever Clearance (Front) ... ..	$\frac{1}{16}$ in.

**TURNING CIRCLE**

Left and Right Lock ... ..	8 ft. 6 ins.	2.7 metres
----------------------------	--------------	------------

**WHEELS AND TYRES**

	<i>Front</i>	<i>Rear</i>
Rim Size ... ..	WM2. 19 in.	WM3. 19 in.
Tyre Size ... ..	3.25 $\times$ 19	4.00 $\times$ 19

**TYRE PRESSURES**

Road ... ..	18 lb./sq. in.	16 lb./sq. in.
Cross-country ... ..	12 lb./sq. in.	10 lb./sq. in.
Road ... ..	1.265 kg./sq. cm.	1.124 kg./sq. cm.
Cross-country ... ..	0.843 kg./sq. cm.	0.703 kg./sq. cm.

**BATTERY**

Type ... ..	6 Volt Varley MC.7/12
Capacity ... ..	12 ampere/hours

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<b>BULBS Mk. 1</b>										<b>Volts</b>	<b>Watts</b>	<b>Type</b>	
Head	...	...	...	...	...	...	...	...	...	6	36/36	S.B.C.	Lucas No. 170
Pilot	...	...	...	...	...	...	...	...	...	6	3	S.C.C.	Lucas No. 200
Tail	...	...	...	...	...	...	...	...	...	6	3	S.C.C.	Lucas No. 200
Speedometer	...	...	...	...	...	...	...	...	...	6	2	Special	Smiths No. P.52305
<b>BULBS Mk. 2</b>													
Head	...	...	...	...	...	...	...	...	...	6	30/24	Prefocus	Lucas No. 312
Pilot	...	...	...	...	...	...	...	...	...	6	3	M.B.C.	Lucas No. 988
Tail	...	...	...	...	...	...	...	...	...	6	3	S.C.C.	Lucas No. 200
Speedometer	...	...	...	...	...	...	...	...	...	6	2	Special	Smiths No. P.52305
<b>BULBS Mk. 2B</b>										<b>Volts</b>	<b>Watts</b>	<b>Type</b>	
Head	...	...	...	...	...	...	...	...	...	6	30/24	Prefocus	Lucas No. 312
Pilot	...	...	...	...	...	...	...	...	...	6	3	M.B.C.	Lucas No. 988
Tail	...	...	...	...	...	...	...	...	...	6	6/18	Offset pin	Lucas No. 384
Speedometer	...	...	...	...	...	...	...	...	...	6	2	Special	Smiths No. P.52305

**LUBRICANTS**

COMPONENT	NORMAL 20°F TO 90°F		TROPICAL ABOVE 90°F		SEVERE WINTER 0°F TO 20°F	
	U.K.	U.S.A.	U.K.	U.S.A.	U.K.	U.S.A.
	Engine crankcase Air filter Front brake cable Throttle cable and twistgrip Clutch cable, lever and adjuster Exhaust valve lifter cable and lever Front brake cable adjuster and lever Front brake clevis pin Rear stand pivot bolts Prop stand pivot bolt Kickstarter pedal pivot Rear brake clevis pin	OMD-110	MIL-0-2104 AM. 1 (GD30)	OMD-330	MIL-0-2104 AM. 1 (GD50)	OMD-40
Gearbox	OMD-330	MIL-0-2104 AM. 1 (GD50)	OMD-330	MIL-0-2104 AM. 1 (GD50)	OMD-40	MIL-0-2104 AM. 1 (GD10)
Primary chaincase Telescopic forks	OMD-40	MIL-0-2104 AM. 1 (GD10)	OMD-110	MIL-0-2104 AM. 1 (GD30)	OMD-40	MIL-0-2104 AM. 1 (GD10)
Front brake cam spindle Rear brake cam spindle Rear brake pedal fulcrum Steering head bearings Packing front wheel bearings Packing rear wheel bearings	LG-280	MIL-G-10924	LG-280	MIL-G-10924	LG-380	MIL-G-10924

(Am't. 3)

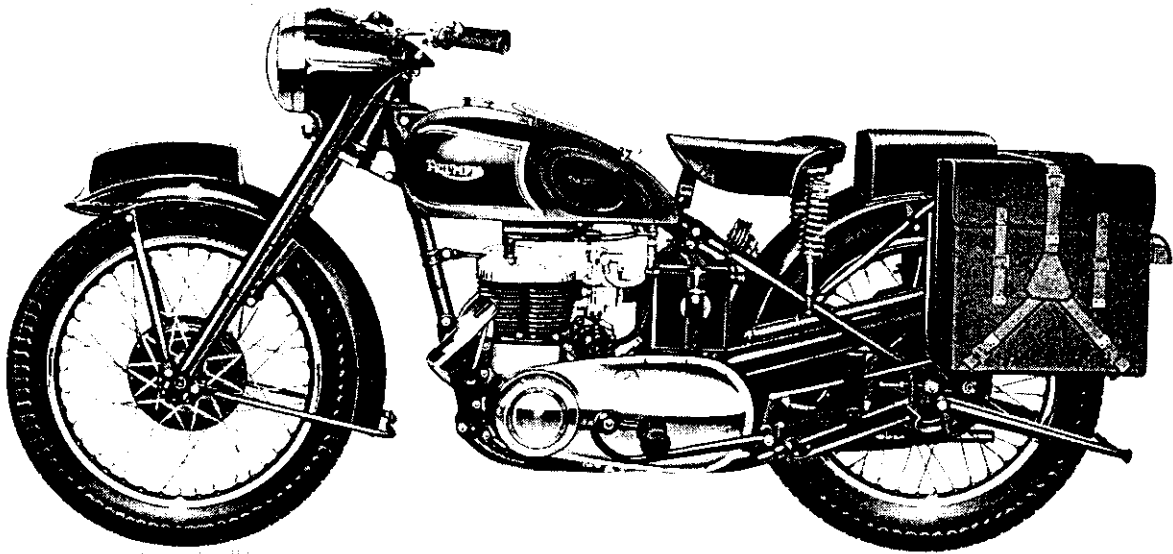


Fig. 1 LEFT SIDE OF MACHINE

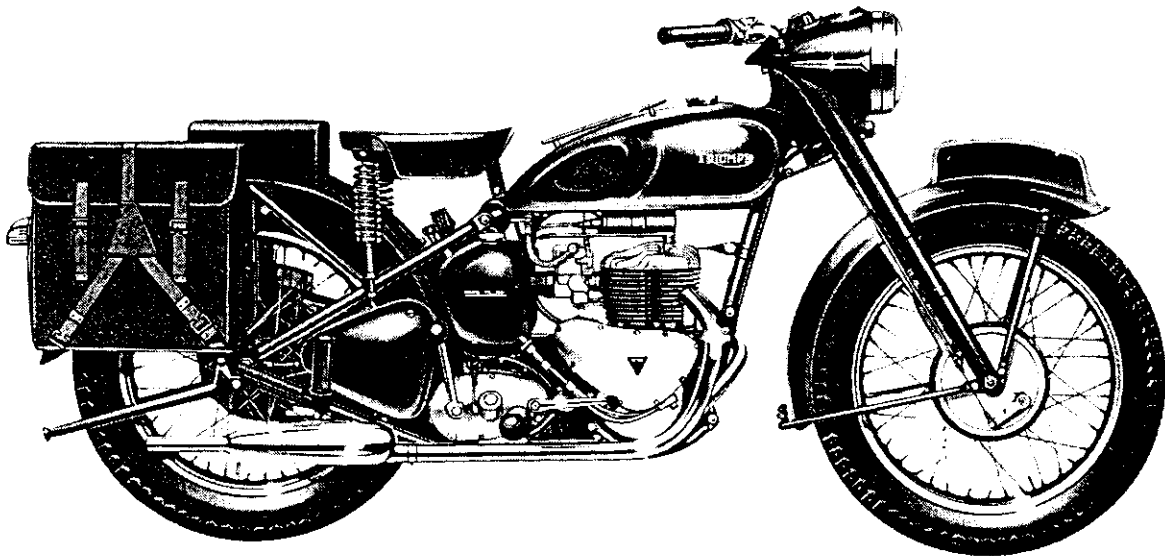


Fig. 2 RIGHT SIDE OF MACHINE

# SECTION ONE

# ENGINE

## LIST OF CONTENTS

<i>Paragraph</i>	<i>Title</i>	<i>Page</i>
1	Description ... ..	9
10	Lubrication Fault Finding ... ..	11
11	To Remove the Engine from the Frame ... ..	12
19	To Dismantle the Engine ... ..	14
24	To Dismantle and Re-condition the Sub-Assemblies ... ..	16
25	Crankcase ... ..	16
28	Crankshaft Assembly ... ..	17
32	Cylinder Block ... ..	19
36	Pistons ... ..	21
39	Oil Pump ... ..	22
42	Oil Release Valve and Pressure Indicator ... ..	23
45	Cylinder Head ... ..	23
46	To Assemble the Engine ... ..	23
54	To Install the Engine in the Frame ... ..	29
62	To Prepare for the Road ... ..	31
	Basic Plan Dimensions ... ..	32
	Approved Special Tools ... ..	35

## LIST OF ILLUSTRATIONS

<i>Fig.</i>	<i>Title</i>	<i>Page</i>
1	Crankshaft Assembly ... ..	8
2	Crankcase and Cylinder Block ... ..	10
3	Lubrication System ... ..	12
4	Alternator in Chaincase ... ..	13
5	To Remove Clutch Spring Nuts ... ..	13
6	To Remove the Clutch ... ..	14
7	Engine Securing Studs ... ..	14
8	To Hold the Engine ... ..	14
9	To Remove the Crankshaft Pinion ... ..	15
10	To Line Ream the Timing Side Main Bearing ... ..	17
11	Crankshaft Assembly in Vice ... ..	18
12	Crankshaft Alignment Jig ... ..	19
13	Valve Spring Compressor Tool ... ..	19
14	To Replace the Valve Guides ... ..	20
15	To Recut the Valve Seats ... ..	20
16	To Grind-in the Valves ... ..	21
17	Taper-faced Piston Ring Position ... ..	22
18	Oil Pump ... ..	22
19	Oil Pressure Release Valve ... ..	23
20	To Replace the Camwheel ... ..	25
21	Timing Gear Markings ... ..	25
22	To Replace the Cylinder Block ... ..	26
23	B.T.H. Automatic Timing Device ... ..	26
24	To Adjust the Tappets ... ..	27
25	To Tighten the Cylinder Head Nuts ... ..	28
26	Engine Timing Diagram ... ..	28
27	Power Curve ... ..	28
28	Fuel Consumption Curve ... ..	29
29	Approved Special Tools ... ..	36

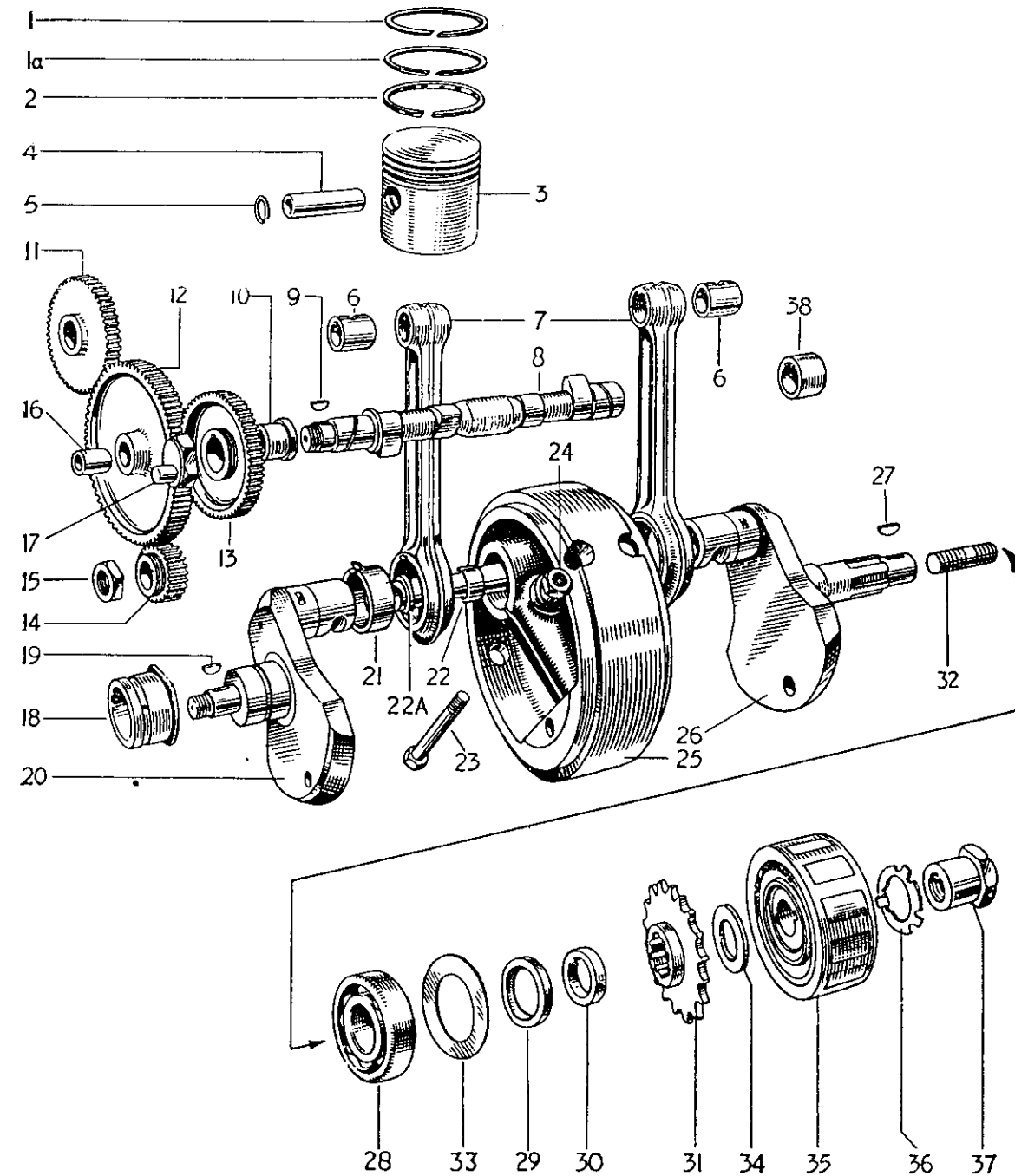


Fig. 1. Crankshaft Assembly.

INDEX TO FIG. 1.

- |                                 |                                      |                                       |
|---------------------------------|--------------------------------------|---------------------------------------|
| 1 Ring, piston compression.     | 13 Pinion, camshaft.                 | 25 Flywheel.                          |
| 1a Ring, piston (taper).        | 14 Pinion, timing.                   | 26 Crankshaft, driving side L.H.      |
| 2 Ring, piston scraper.         | 15 Nut, timing pinion.               | 27 Key, generator to crankshaft.      |
| 3 Piston.                       | 16 Bush, intermediate wheel.         | 28 Bearing, drive side main L.H.      |
| 4 Pin, Piston gudgeon.          | 17 Nut, camshaft, eccentric.         | 29 Oil seal, drive side main bearing. |
| 5 Circlip, piston gudgeon, pin. | 18 Bearing, crankcase R.H.           | 30 Collar, bearing.                   |
| 6 Bush, con-rod small end.      | 19 Key, timing pinion.               | 31 Sprocket, engine 19T.              |
| 7 Connecting rod assembly.      | 20 Crankshaft, timing side R.H.      | 32 Stud, Crankshaft R.H.              |
| 8 Camshaft.                     | 21 Bush, con-rod, big end.           | 33 Disc, Bearing R.H.                 |
| 9 Key, camshaft pinion.         | 22 Crankshaft, oil tube.             | 34 Washer, A.C. rotor.                |
| 10 Bush, camshaft R.H.          | 22a Rubber, oil tube sealing.        | 35 Rotor, A.C. generator.             |
| 11 Wheel, distributor.          | 23 Bolt, crankshaft to flywheel.     | 36 Washer, rotor tab.                 |
| 12 Wheel, intermediate.         | 24 Nut, crankshaft to flywheel bolt. | 37 Nut, drive side crank.             |
|                                 |                                      | 38 Camshaft bearing L.H.              |

## DESCRIPTION

1. The Triumph T.R.W. is fitted with a 500 c.c. Vertical Twin Cylinder side valve engine.
2. The crankcase is cast in two halves from aluminium alloy DTD.424 and is designed to provide maximum rigidity. The crankshaft is supported by a plain white metal bearing on the timing side and a heavy duty ballrace on the driving side. The camshaft is housed in the front of the case and runs in phosphor bronze bushes. Located also in the timing side crankcase are the timing gears, distributor or magneto drive gear, and the oil pump driven by the cam wheel retaining nut which has an eccentric spindle.
3. The balanced two throw crankshaft and flywheel assembly is built up complete with connecting rods. The "H" section connecting rods are forged from RR.56 Hiduminium alloy and have separate pressed in bearings:—steel shells lined with white metal in the big ends and phosphor bronze bushes in the small ends. The crankshafts are 3% nickel steel case hardened stampings, and are pressed into the flywheel which is a mild steel stamping, with the connecting rods in position. The whole assembly is bolted together with two 55 ton heat treated alloy steel bolts. (See Fig. 1).
4. (1) The cylinder block of the Mk. 1 and 2 is made of aluminium alloy DTD.324 and has high expansion cast iron valve seats, cast in position. The special cast iron cylinder liners are a press fit in the block. This cylinder block is interchangeable with the cast iron block.  
(2) Later Mk. 2 machines and all Mk. 2B have cast iron cylinder blocks.  
(3) In all marks the valves and tappets are housed in two chambers cast in the block, the chamber cover incorporating the exhaust valve lifters and engine breather.
5. The cylinder head is detachable. It is cast from aluminium alloy DTD.324 which gives it maximum cooling efficiency combined with lightness, and is common to all machines.
6. The pistons are die cast "Lo-Ex" aluminium alloy, each fitted with two compression and one scraper ring. To assist the oil control the LOWER compression ring is tapered and to ensure correct fitting, one surface of the ring is clearly marked "TOP", and should be fitted with the marking towards the top of the piston (See Fig. 17). The gudgeon pins are a push fit in the pistons and are held in position by spring steel circlips.
7. Dry sump lubrication is employed. The lubrication system is operated by a twin plunger, reciprocating oil pump, driven by the cam wheel retaining nut eccentric spindle. The plungers are of different diameters, the smaller being the pressure feed and the larger the scavenge. As the scavenge side has the greater capacity, the crankcase is kept free of oil. The feed is positive to the big ends, the pressure of the supply being regulated and visually shown by the oil release valve pressure indicator. The pistons and timing gears are splash (mist) lubricated. The excess oil supply from the pump is returned to the sump by the oil release valve via the timing chest.
8. The carburetter is a Solex Horizontal Type 26 WH2, which feeds through an induction manifold cast in the cylinder block. The carburetter has a two position choke for cold starting and warming up. Air is fed to the carburetter through an air cleaner situated at the rear of the battery carrier.
9. (1) **The Mk. 1 & 2 machine** electrical equipment consists of a B.T.H. Generator, Lucas Headlamp and Varley Dry Battery. The generator supplies alternating current to the headlamp and metal rectifier. When the headlamp is not in use the load is balanced by a resistance switched in to maintain the charging rate. The switch incorporates a thermostatic cut-out to isolate the battery circuit when the generator is stationery. The rectifier supplies direct current to the battery, which feeds the "tail" and "dim" lights. Mk. 1 lighting system has negative (—ve) earth wiring and Mk. 2 lighting system has positive (+ve) earth wiring. The ignition is provided by a B.T.H. magneto type KC.2-S4 "clockwise rotation". The remote "cut-out" button is on the headlamp instrument nacelle, and the automatic timing device is situated in the timing chest. The H.T. terminals on the magneto are marked to show the appropriate cylinder to which the lead must go.

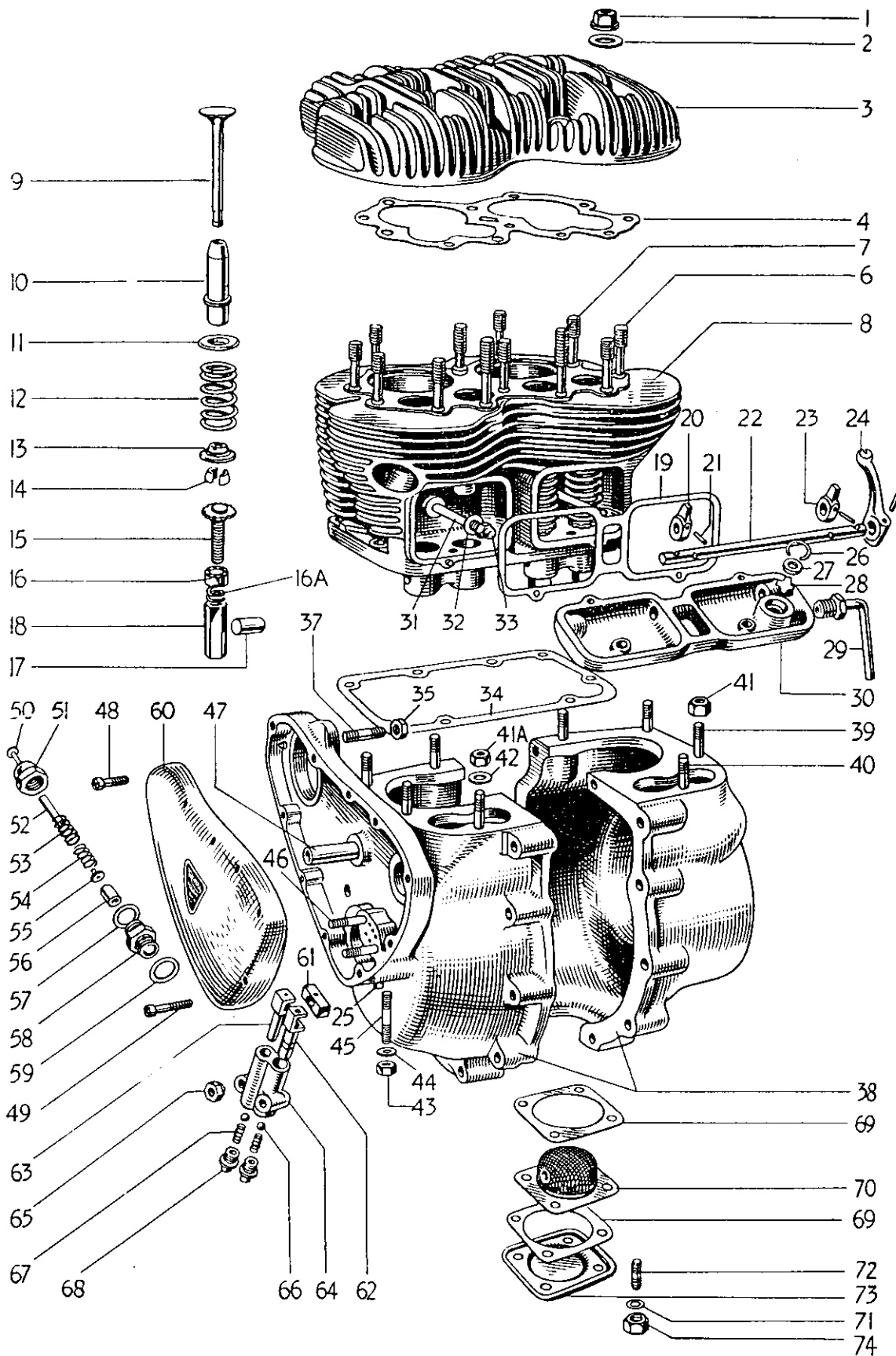


Fig. 2. Crankcase and Cylinder Block.

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## INDEX TO FIG. 2.

1	Nut, cylinder head.	25	Dowel, oil pipe block.	50	Button shaft, indicator.
2	Washer, cylinder head nut.	26	Circlip, diaphragm plate.	51	Cap, oil release.
3	Head, cylinder.	27	Plate, diaphragm retaining.	52	Rubber tube, oil release.
4	Gasket, cylinder head.	28	Diaphragm, breather.	53	Spring, oil release main.
6	Stud, cylinder head (9 off).	29	Pipe, breather.	54	Spring, oil release auxiliary.
7	Stud, cylinder head (2 off).	30	Cover, valve chamber.	55	Nut, oil release button shaft.
8	Block, cylinder.	31	Stud, valve chamber cover.	56	Piston, oil release.
9	Valve, inlet.	32	Washer, valve chamber cover stud.	57	Joint washer, cap.
	Valve, exhaust. (Not shown).	33	Nut, valve chamber cover stud.	58	Body, oil release.
10	Guide, valve (In. and Ex.)	34	Joint washer, cylinder base.	59	Joint washer, body.
11	Collar, valve spring top.	35	Nut, distributor stud.	60	Cover, timing gear.
12	Spring, valve (In. and Ex.)	37	Stud, distributor fixing.	61	Block, oil pump sliding.
13	Collar, valve spring bottom.	38	Crankcase.	62	Plunger, oil pump scavenge.
14	Split cotter, valve.	39	Stud, cylinder base (6 off).	63	Plunger, oil pump feed.
15	Adjuster, valve tappet.	40	Stud, cylinder base (2 off).	64	Body, oil pump.
16	Cap, tappet adjuster.	41	Nut, cylinder base studs (6 off).	65	Nut, oil pump fixing.
16a	Spring, tappet adjuster.	41a	Nut, cylinder base studs (2 off).	66	Ball, oil pump.
17	Distance piece, tappet.	42	Washer, cylinder base nuts.	67	Spring, oil pump.
18	Tappet, valve.	43	Nut, oil pipe junction block.	68	Plug, oil pump.
19	Joint washer, valve chamber.	44	Washer, pipe junction block.	69	Joint washer, crankcase filter.
20	Lever, exhaust valve lifter (Int.)	45	Stud, pipe junction block.	70	Filter, crankcase.
21	Taper pin, lever to spindle.	46	Stud, oil pump.	71	Washer, spring, crankcase filter.
22	Spindle, exhaust valve lifter.	47	Spindle, intermediate wheel.	72	Stud, crankcase filter.
23	Lever, exhaust valve lifter (Int.)	48	Screw, timing cover (short, 9 off).	73	Cover, crankcase filter.
24	Lever, exhaust valve lifter (Ext.)	49	Screw, timing cover (long, 1 off).	74	Nut, crankcase filter.

- (2) The Mk. 2B machines have coil ignition and the electrical equipment is Lucas throughout, the distributor being housed in the position otherwise occupied by the magnet. All the current supplied by the generator is rectified to direct current, and the system supplied in the normal manner. If at any time the battery becomes discharged the ignition switch may be turned to the emergency position and the full output of the generator is directed to the ignition system, and this is sufficient for starting the machine, when the switch should be returned to the normal position and the battery charged. The rectifier acts in the same way as the normal D.C. "cut-out", in that it allows the current to pass in one direction only, i.e. from the generator to the electrical system. The Mk. 2B system has positive (+ve) earth wiring.

## LUBRICATION FAULT FINDING

10. (1) Should any trouble be experienced with the lubrication system it will be possible to trace the source of the trouble by following the sequence of testing described here.
- (2) Lack of oil pressure.  
*Symptoms.*  
The oil pressure indicator button on the rear of the timing side crankcase fails to protrude on starting the engine. Immediately stop the engine.

### Action.

- (a) Inspect the level of oil in the tank. It should be within 2 in. of the filler cap.
- (b) Slacken the oil feed pipe at the junction block on the front of the timing side crankcase. Oil should flow freely from the pipes.
- (c) Remove the oil pressure indicator and release valve assembly complete. Carefully dismantle and inspect. It is most important to assemble this release valve correctly (See Fig. 19). Incorrect assembly may well cause total engine failure.
- (d) Remove the oil pump and inspect for blocked ports, worn drive block, worn plungers, worn pump body, balls not seating correctly or faulty springs.
- (3) Oil drains into sump when stationary.  
*Symptoms.*  
Engine difficult to start due to oil drag, blows excessive amounts of oil from crankcase breather and produces thick blue smoke from exhaust pipe.  
*Action.*  
Inspect the pump ball valves for correct operation by removing the pump (Para. 20) and operating the plungers by hand. The resistance of the ball valves should be felt.
- (4) Lack of scavenge.  
*Symptoms.*  
Oil failing to return to tank (N.B. The return from crankcase is normally intermittent since the scavenged side has a

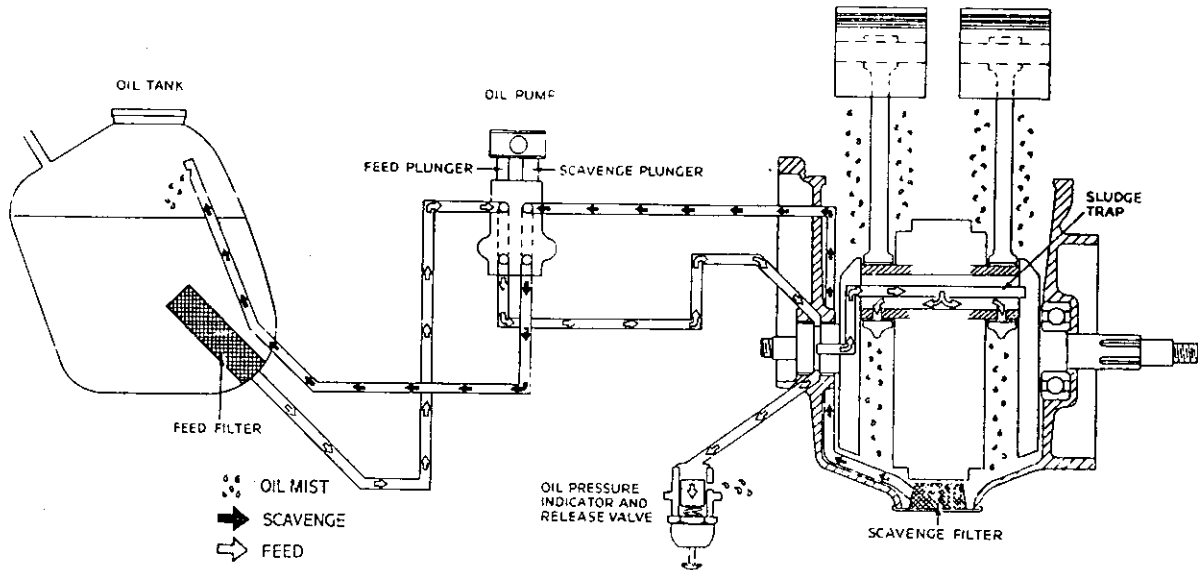


Fig. 3. Lubrication System.

larger capacity than the feed side of the pump) oil continually being blown through crankcase breather in large quantities.

*Action.*

- (a) Check the oil tank breather for obstructions.
- (b) Check the oil return pipe.
- (c) Check the pump (See Para. 40).
- (d) Check the crankcase scavenge pipe by removing sump filter cover complete with filter and fitting length of thin rubber tubing on the end of the pipe. With the oil pump removed place the finger over the port on the oil pump mounting face and apply suction by mouth. The tubing should collapse, if it does not do so, strip engine to examine scavenge pipe and rectify.

## TO REMOVE THE ENGINE FROM THE FRAME

11. Before commencing any work on the machine it should be thoroughly cleaned—careful cleaning will enable the work to be carried out much more quickly and efficiently.

## FUEL SYSTEM

12. It is recommended that the petrol tank is disconnected and removed when work is being carried out on the engine of the Mk. 1 and 2 models (such as decarbonising or engine removal); although it is not absolutely necessary, it makes the dismantling

more accessible. In the case of the Mk. 2B where the ignition coil is mounted under the petrol tank, the tank and coil must be removed before there is sufficient clearance for the cylinder head or engine to be removed.

- (1) To remove the petrol tank, turn off the petrol taps and unscrew the petrol feed union nuts at the tank. Cut and remove locking wire between the two rear tank bolts and remove the bolts. Remove the saddle nose bolt and push the saddle to the rear. Remove the tank front nut and bolt and lift the tank away from the frame.
- (2) Disconnect the throttle cable at the carburetter. Unscrew the carburetter fixing nuts and remove the carburetter.

## BATTERY AND CARRIER ASSEMBLY

13. (1) Disconnect the cables and remove the battery.
- (2) Remove the two base screws and strap nut and take away the battery carrier.
- (3) Remove the air filter.

## IGNITION WIRING

14. (1) Mk. 1 and 2 (magneto ignition)—disconnect the wire to the terminal on the magneto contact breaker cover.
- (2) Mk. 2B (coil ignition)—disconnect the ignition switch lead (white) and the contact breaker lead (black) from the ignition coil and remove the coil from the frame tube.

Unclip the distributor cap, disconnect the sparking plug leads from the plugs and remove the H.T. wiring complete. Disconnect the three generator leads from the connectors on the down tube, under the saddle (dark green, green and yellow, and light green).

### EXHAUST SYSTEM

15. Exhaust pipes and silencer—slacken off the branch pipe clip. Unscrew the front connection and silencer hanger bolt and take away the exhaust system complete.

### BRAKE PEDAL & FOOTREST ASSEMBLY

16. (1) Remove the spindle nut and slide the foot-brake pedal off the spindle.
- (2) Unscrew the left hand footrest securing nut. Remove the footrest. Withdraw the other footrest complete with rod. Do not lose the distance piece between the primary chaincase and engine plate.

### PRIMARY DRIVE

17. (1) Chaincase cover: Mk. 1 and 2, disconnect the generator wire, take out the securing screws and remove the primary chaincase cover.

Chaincase cover: Mk. 2B, free the generator cable from the frame to allow removal of the chaincase cover.

Unscrew the securing screws and withdraw the cover carefully from the inner cover. (Note:—On all marks the outer cover

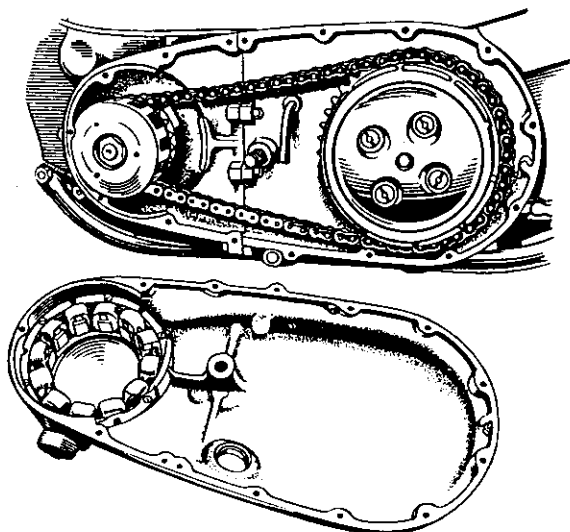


Fig. 4. Alternator in Chaincase

houses the generator stator windings which can be damaged if roughly handled.

- (2) Unscrew the nut securing the generator rotor-engine sprocket assembly, and carefully ease the rotor off the shaft. Mk. 1 and 2 have an engine shock absorber on the drive shaft.
- (3) Remove the four slotted clutch nuts with the special screwdriver provided in the tool kit, at the same time depressing the spring underneath with a thin screwdriver (Fig. 5), to prevent the "pip" on the underside of the clutch nut locking in the spring.

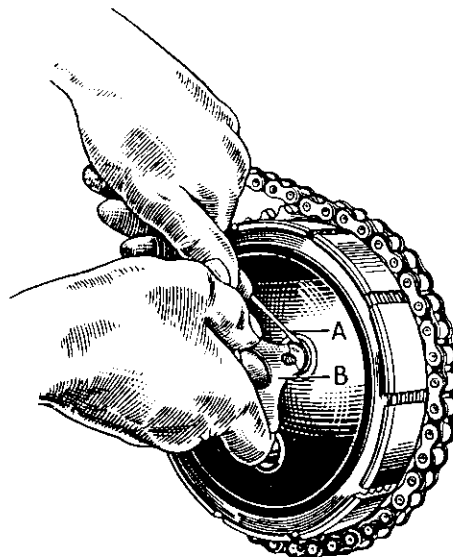


Fig. 5. To Remove Clutch Spring Nuts.

Withdraw springs, pressure plate, clutch plates and clutch push rod. Tap back the lock washer tab from the mainshaft nut and insert the clutch locking tool (see Fig. 6, page 14), then unscrew the mainshaft nut. If the locking tool is not available several sharp blows applied to the tommy bar may be necessary to loosen the nut. To facilitate removal of the clutch housing a special extractor tool is used, which screws into the clutch hub. Tightening up the extractor bolt draws the assembly off the shaft.

- (4) Withdraw the engine sprocket, primary chain and clutch housing as one unit.
- (5) Remove the inner primary chaincase by unscrewing the four bolts securing the chaincase to the crankcase, and the upper chainguard fixing bolt, and remove the inner chaincase.

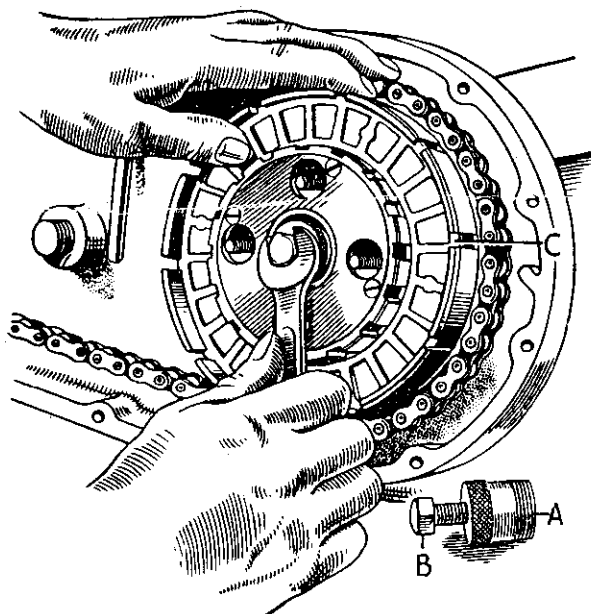


Fig. 6. To Remove the Clutch.

### ENGINE REMOVAL

18. (1) Unscrew the drain plug and drain the oil tank.
- (2) Remove the oil pipe junction block from the engine. Unscrew the feed pipe union nut at the oil tank. To remove the oil pipe, slide the rubber connector off the return pipe.
- (3) Remove the two nuts securing the torque stays to the engine. Slacken off the bolt at the clip and lift the stays off the engine studs.
- (4) Release the cable from the exhaust valve lifter lever and unscrew the adjuster from the abutment.
- (5) To remove the engine from the frame, support the engine at sufficient height to allow the sump bolts to rest on the support. Remove the plug from the drive side crankcase inner chaincase to allow removal of stud No. 10 (Fig. 7). Now remove studs 11 and 14 and slacken off 10, 12, and 13 in the rear engine plates. Take out studs 1, 2, 3, 4, 5 and 7 and slacken off No. 6. Tilt the engine backwards and swing the front engine plates forward. Lift the engine out of the frame from the left-hand side, when the front engine plates and crankcase shield will be left in position ready for re-assembly.

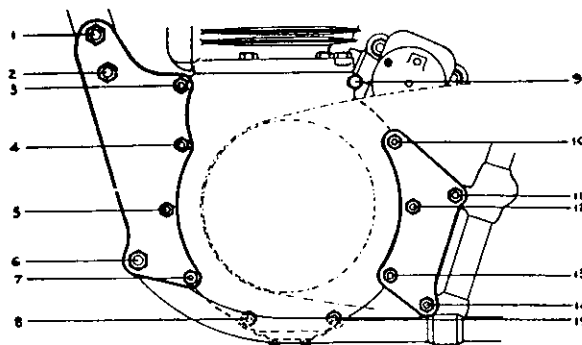


Fig. 7. Engine Securing Studs.

### TO DISMANTLE THE ENGINE

19. If a jig is not available, the illustration shows a useful and simple method of holding the engine firmly so that dismantling can be conveniently carried out as follows.

### TIMING CHEST

20. (1) Remove the timing cover screws. Tap around the edge with a hide hammer to break the cover joint (originally sealed with compound) and withdraw the cover.

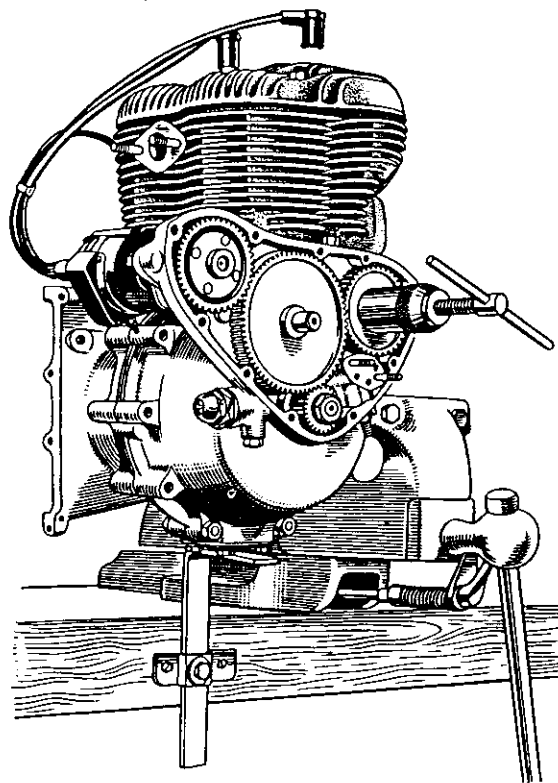


Fig. 8. To Hold the Engine.

- (2) Take off the two securing nuts and slide the oil pump off its studs.
- (3) Unscrew the crankshaft and camshaft nuts. Note that the camshaft nut has a L.H. thread and the crankshaft nut a R.H. thread.
- (4) Magneto automatic timing device (A.T.D.) (Mk. 1 and 2). The magneto pinion has a special self-withdrawing nut with a right-hand thread. First, loosen the nut until the inner shoulder comes up against the outer face. If the nut is now turned further with a slow firm movement, the A.T.D. gear-wheel will be drawn off the taper. Distributor drive pinion (Mk. 2B coil ignition). Remove the circlip from the drive pinion boss groove, which retains the pin locking the drive pinion on the shaft. Remove the pin and the drive pinion and the steel thrust washer.
- (5) The camwheel is keyed on to a parallel shaft and an extractor is required to draw it off the shaft (Fig. 8). Screw the extractor on to the external thread on the camwheel and then screw in the extractor handle to withdraw camwheel.
- (6) Slide the intermediate wheel off the spindle.
- (7) Using the crankshaft pinion extractor remove the pinion in the same manner as instructed for the camwheel. See approved Special Tools, page 35).

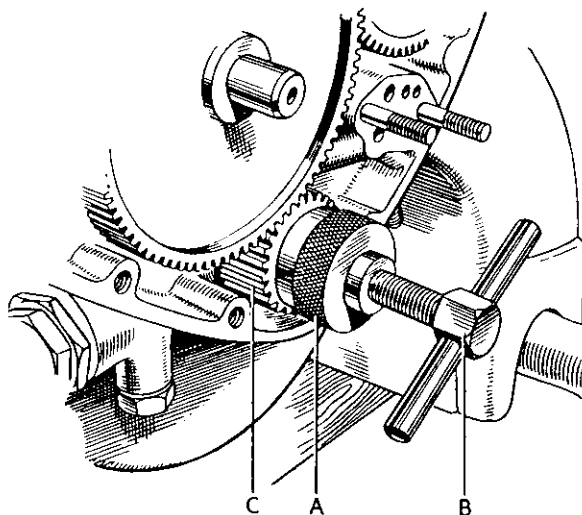


Fig. 9. To Remove the Crankshaft Pinion.

- A = Extractor Body
- B = Extractor Handle.
- C = Crankshaft Pinion

**CYLINDER HEAD**

21. (1) Disconnect the sparking plug leads and unscrew the plugs from the head.
- (2) Remove the 12 nuts and washers and ease the cylinder head off the studs. Do not use force or the head will be distorted or damaged.

**CYLINDER BLOCK**

22. (1) Unscrew the two domed nuts and remove the valve chamber cover complete with valve lifter mechanism.
- (2) Remove the eight cylinder block holding down nuts.  
Note:—two nuts are inside the valve chambers. Raise the block clear of the pistons.
- (3) Remove the pistons by releasing the circlips and extracting the gudgeon pins. Old circlips must be discarded and new ones fitted. Mark each piston with the cylinder number as it is removed, to ensure correct replacement. No. 1 timing side and No. 2 driving side.

**CRANKCASE**

23. (1) Ignition (Mk. 1 & 2 magneto)—remove the magneto by unscrewing the three retaining nuts.  
Ignition (Mk. 2B coil)—remove the distributor and adaptor by unscrewing the three retaining nuts.
- (2) Remove the remaining studs which hold the crankcase halves together. Inside the forward end of the crankcase will be found an internal screw, joining the bosses above the camshaft, which *must* be removed before attempting to split the crankcase. Lift the assembly from the jig and remove the sump plate and filter.
- (3) To separate the two halves of the crankcase, take the crankcase in both hands and bump the drive shaft down vertically on to a piece of hard wood. This action forces the two halves apart and allows the crankshaft assembly and camshaft to be withdrawn. It also disengages the engine shock absorber spacing collar from inside the oil seal. Care is needed to prevent damage to the plain bearing on the timing

side when parting the flywheel assembly from the case.

Remove the oil release valve from the timing side crankcase. The plain bearing in the timing side should not be disturbed unless it is found necessary, after inspection.

### TO DISMANTLE & RECONDITION THE SUB-ASSEMBLIES

24. The instructions are given in the same sequence for each component, i.e. from the dismantling to re-assembly, in preparation for the complete rebuilding of the engine. Each sub-assembly is dealt with as under.

- (1) Dismantling for inspection.
- (2) Inspection of the separate components, whose dimensions should be checked against the Data Sheets given at the end of the section to ascertain whether they are still serviceable.
- (3) Replacement, including recommended methods of removal and replacement of components such as bearings, guides and liners, etc.
- (4) Assembly of the sub-assemblies preparatory to rebuilding the engine which includes instructions for re-alignment and sequence of assembly, etc.

### CRANKCASE—TO DISMANTLE.

25. (1) The oil seal should be eased gently from the case, care being taken not to damage the crankcase face. The engine shock absorber spacing collar should have come away from the oil seal when the crankcase halves were parted, but if not, it can easily be lifted from the oil seal at this stage before the oil seal is removed. The oil seal should be discarded and a new one fitted.
- (2) The ball bearing should be pressed out from the outside of the case, and it is advisable to heat the case to aid the removal of the bearing.

### CRANKCASE—INSPECTION.

26. (1) Inspect the crankcase for cracks and signs of distortion. If one crankcase half is damaged beyond repair, both halves must be replaced, as new crankcases are only supplied in pairs.

- (2) Clean and dry the ball bearing thoroughly. Dry out with compressed air if possible. Test the outer race for roughness by spinning. Check the end float and inspect the balls and tracks for any signs of indentation or pitting. Change the bearing if it does not fulfil the required standard.

- (3) Inspect the timing side main bearing for signs of fatigue, overheating and wear. The replacement bearings are supplied in two sizes, ref. para. 29 "Crankshaft Assembly—Inspection".

- (4) Carefully inspect the camshaft for signs of wear on the flanks and the nose of the cams. If wear has occurred the camshaft should not be used again. Failure to observe this will result in wear on the face of the tappets.

- (5) Inspect the camshaft bushes for wear. If the correct gauges are not available the camshaft can be used as a gauge and a good estimate given as to the amount of wear. Wear in these bushes is normally very slight.

- (6) Wash the camwheel and driving pinion thoroughly in kerosine and inspect for chipped or worn teeth. If a gear is discarded for any reason the new gear should be selectively fitted where possible, to obviate gear whine or rattle.

- (7) In addition to the above checks, inspect the intermediate gear phosphor bronze bush for wear. This should be replaced if worn.

- (8) Check the oil scavenge pipe for fracture and leaks, particularly at the elbow where it enters the aluminium casting. Check also that it is perfectly clear of foreign matter.

### CRANKCASE—REPLACEMENT OF WORN COMPONENTS

27. (1) The crankcase halves are supplied only in pairs, complete with bushes and white metal bearing.
- (2) To remove the plain white metal bearing heat (100°C.) the crankcase around the housing. Press or drift the bearing out towards the inside of the case, using a suitably shouldered tool.

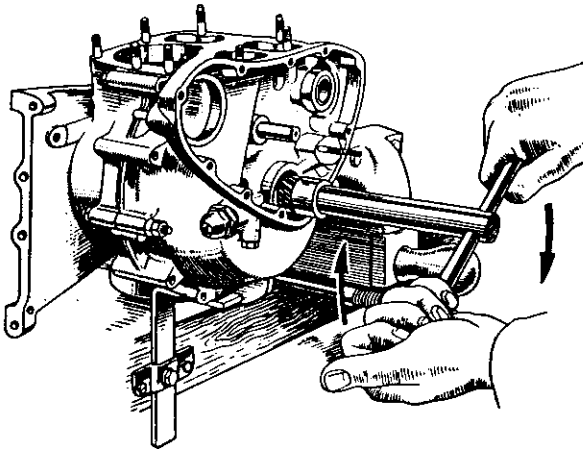


Fig. 10. To Line Ream the Timing Side Main Bearing.

- (3) To replace the white metal bearing, ensure the bearing is correctly lined up before pressing, and that the tool used for pressing is a perfect fit, otherwise the bearing will be damaged.
- (4) To line ream the white metal bearing, bolt up the two halves of the crankcase firmly and line ream as shown in Fig. 10. Only a very slight amount of metal will be removed, as the bearings are machined to size before fitting.
- (5) To remove the camshaft bush (timing side), heat (100°C.) the crankcase around the bush housing. Press or drift the bush out from the gear side, using a suitably shouldered tool.
- (6) To replace the camshaft bush (timing side), the new bush should be pressed into the housing while the case is still hot after the removal of the worn bush. Ensure that the oil hole in the bush is lined up correctly with the oil way in the housing.
- (7) To remove the camshaft bush (drive side), a thread should be tapped into the bush before the housing is heated. When this is done, re-insert the tap, hold the squared end in the vice and gently tap the case away from the bush with a hide hammer.
- (8) To replace the camshaft bush (drive side), the bush should be pressed in while the crankcase is hot. Check that the oil hole in the bush coincides with the oilway in the housing.
- (9) The phosphor bronze camshaft bushes are machined to size before pressing in, only

the smallest amount of metal will need to be removed when reamed. When reaming is completed, the crankcase must be thoroughly washed and blown dry with high pressure air, to ensure that no particles of swarf remain, particularly in the oilways, scavenge pipe, etc.

- (10) To remove and replace the intermediate gearwheel bush can be accomplished in one operation, if the new bush is positioned accurately over the old bush and sufficient clearance given underneath the wheel boss for the worn bush to be pressed out. It is not necessary to heat the wheel.

### CRANKSHAFT ASSEMBLY— TO DISMANTLE

28. To remove the connecting rods, the complete flywheel assembly must be dismantled as follows:—

- (1) Place the flywheel in the vice so that it is convenient to remove the pinch bolt nuts. Drift out the pinch bolts.
- (2) To remove the crankshafts, use a 9" long copper drift, place it through the flywheel, directing it against the inside of the web, just above the connecting rod, and, using a heavy hammer, give the drift a few sharp blows. The crankshaft will separate from the flywheel, and it is then possible to drift out the remaining crank, taking particular care to avoid damage to the oil seal tube assembly. Alternatively the remaining crank can be pressed out under a hand press.
- (3) Remove the connecting rods from the journal. Wash all the dismantled parts thoroughly for inspection, making sure to remove the deposits which inevitably collect in the crankshaft oil tube. Mark each connecting rod with the appropriate cylinder number to ensure correct reassembly.

### CRANKSHAFT ASSEMBLY—INSPECTION

29. (1) The flywheel requires thorough cleaning and inspection to ensure that the internal bore, which mates the cranks, is not burred or scored in any way.
- (2) If the crankshaft journals are slightly scored they may be eased down by the use of fine emery cloth. If one or both journals are oval beyond the limits, it will be necessary

to regrind and fit undersize big end bushes. The big end bush is made in two sizes:-

1. Standard
2. -0.010 in. U.S.

No attempt should be made to grind the journals beyond the maximum limits. The L.H. main bearing journal should be a good push fit in a new ballrace. Any slackness will encourage engine roughness. The R.H. bearing journal must be to size. This is very important, for it is at this point the crankshaft oil supply and pressure is maintained. If there is ovality here the shaft must be reground and an undersize plain bearing fitted. The plain bearing is made in two sizes:-

1. Standard
2. -0.010 in. U.S.

- (3) Examine the connecting rod big ends for signs of fatigue, overheating of the white metal, and wear. Check the small end bushes for ovality. If the crankshaft journals are to be ground, undersize big end bushes will have to be fitted. Replacement bushes are supplied in two sizes. (See para 29(2)).

#### CRANKSHAFT ASSEMBLY - REPLACEMENT OF WORN COMPONENTS

30. (1) To remove a worn big end bush, heat the connecting rod to 100°C (approx) and with a mandrel located on the side opposite to the bush locking tab, press out the bush.
- (2) To fit a new big end bush, heat the connecting rod (see sub-para (1)), set the split in the bush at 90° to the locking tab groove in the rod and press in the bush. Ensure that the bush is fitted without projecting on either side of the rod then drift the tab into its groove in the rod.
- (3) Machine the big end bush to the finished size (see page 33) and form a 0.070 to 0.075 in. radius on the locking tab side of the bush. It is essential to ensure that the bush is bored at 90° to the rod and if both rods are to be rebushed to mount and bore them as a pair. If new small end bushes are to be fitted they should be reamed to size as a pair at the same setting.
- (4) To remove a worn small end bush and fit a new one, heat the connecting rod (see sub-para (1)). The small end bush can be removed and the new one fitted in one operation if the new bush is carefully positioned over the one in the rod as pressing commences. When in position, slot and drill the bush for oil lubrication and ream to size (see page 33 and sub-para (3) above).

#### CRANKSHAFT ASSEMBLY - ASSEMBLING AND ALIGNING

31. Ensure that all parts are thoroughly degreased and all the oilways cleaned out. The hollow journals must be free from dirty oil

and other foreign matter. The flywheel assembly can now be built up as follows:-

- (1) Fit the oil tube assembly with new rubber washers into the drive side crank hollow journal, with the hole in the middle of the tube pointing to the centre of the flywheel. Apply a light film of oil to the crank journals. Do not oil the mating part of the journals which enter the flywheel.
- (2) Fit the connecting rods to their respective journals with the locking tabs facing the crank webs.
- (3) Press the driving side crank into the flywheel until it just pinches the connecting rod. Reverse the assembly and press in the timing side crank. Align the cranks to the flywheel by the datum holes and enter the pinch bolts and lightly tighten up. The connecting rods must now be checked for lateral movement which should be between 0.015 in. and 0.020 in. The crank which

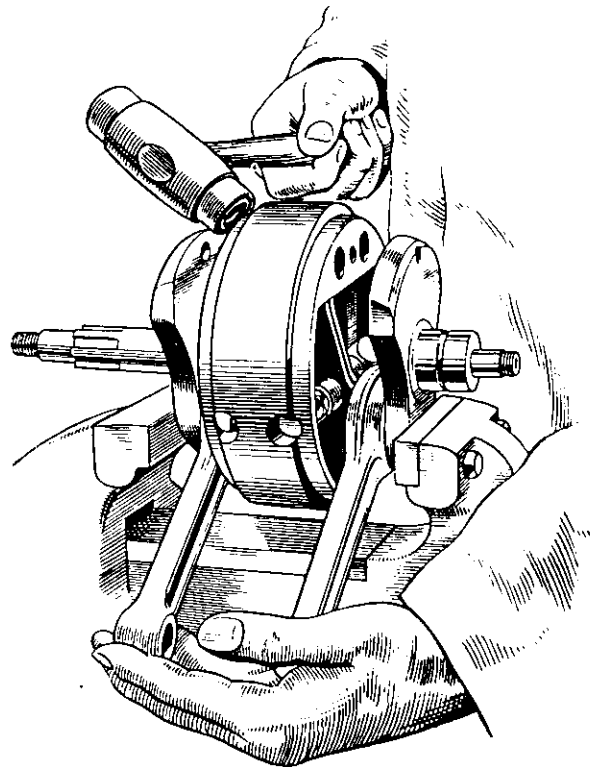


Fig. 11. Crankshaft Assembly in Vice.

shows the greatest clearance can be pressed further into the flywheel until both sides are equalised. An alternative method of doing this is to place the crankshaft assembly in

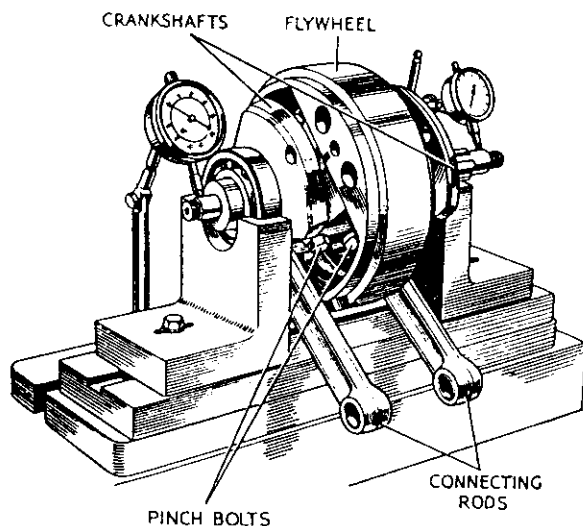


Fig. 12. Crankshaft Alignment Jig.

the vice, so that the jaws grip the outside of the web and the flywheel is free to move. Care should be taken not to damage the machined bearing faces. By using a lead or hide hammer the flywheel can be moved until the clearance on both sides is equalised and the datum lined up. The assembly is now ready for final alignment.

- (4) Alignment of the crankshaft assembly is carried out in a jig as illustrated. Ballraces are fitted to both main bearings and the crankshaft assembly rotated, any misalignment being indicated on the Dial Test Indicators. The D.T.I. clock should be applied to three separate places (on each

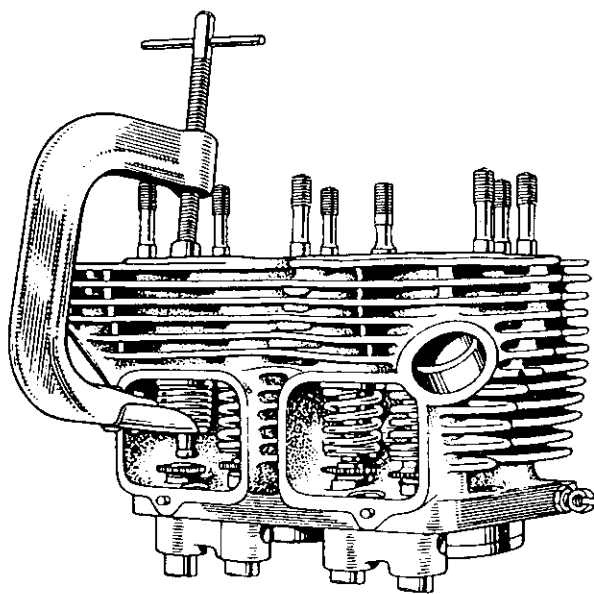


Fig. 13. Valve Spring Compressor Tool.

shaft (see Fig 12) and the flywheel) and a true reading taken on each side. If the cranks do not spin true, the assembly should be taken out of the jig, and the offending crank web should be tapped smartly with a lead hammer in the correcting direction and a further test made. This procedure must be continued until the maximum run-out does not exceed 0.0005 in. on the R.H. shaft and 0.001 in. on the L.H. shaft. The maximum run-out of the flywheel must not exceed 0.005 in. Finally tighten the pinch bolts and recheck the assembly for run-out.

### CYLINDER BLOCK—TO DISMANTLE

32. (1) Use the valve spring compressor as shown in Figure 13. When the spring has been compressed sufficiently, the split cotters can be eased away with a narrow screwdriver, and the valve spring withdrawn on release of the compressor. As each valve is removed, mark the cylinder number on it clearly to indicate correct repositioning when assembling.
- (2) Unscrew the tappet adjusters until the tappets are free of the guides. Between each pair of tappets a hardened steel distance piece is located. These are removed by pushing them out through the horizontal holes in the base of the tappet block.

### CYLINDER BLOCK INSPECTION

33. (1) Inspect the cylinder bores to ascertain whether they are worn beyond the limits. Check the dimensions against those given in the data page 32. The aluminium alloy cylinder block cannot be rebored and must have the worn liners pressed out and replaced by new ones. The cast iron cylinder block can be rebored in the usual manner and oversize pistons are supplied in the following oversizes:—

+ 0.020 in. O.S.

+ 0.040 in. O.S.

- (2) Inspect the valve guides for ovality. If the correct plug gauge is not available, test the fit with a new valve stem.
- (3) It must be emphasized that it is useless to recut valve seatings if the valve guides are worn.

(Amdt. 1)

If the valve seats show any signs of pitting, they should be refaced with a valve seat tool (Fig. 15). If new valve guides have been fitted, the valve seats must be refaced.

- (4) Examine the face of the valve to see if it is pitted, scored or damaged. The face can be reground, but excessive grinding by machine is not advisable or 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.
- (5) Inspect the valve springs for fatigue and cracks. Check the springs against a new one, or check against the dimensions given in the Data Page 34. If any appreciable shortening has occurred it should be replaced.
- (6) Inspect the adjuster heads and tappet bases for wear and replace if worn. If the tappets are badly worn, particular attention must be paid to the state of the camshaft, for it is useless replacing the tappets if the cam lobes are worn.

### CYLINDER BLOCK—REPLACEMENT OF WORN COMPONENTS

34. (1) The aluminium cylinder block liners cannot be rebored but must be replaced when worn beyond the limits. To remove the worn liners, place the cylinder block in an oven and raise the temperature to 200°C. and allow the block to soak at this temperature for half an hour. The liners may then be

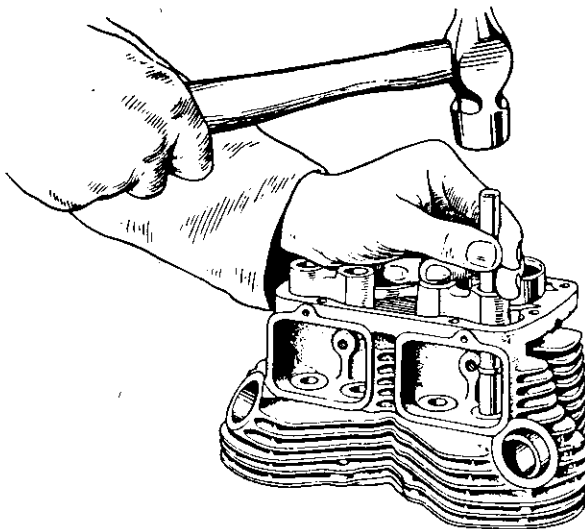
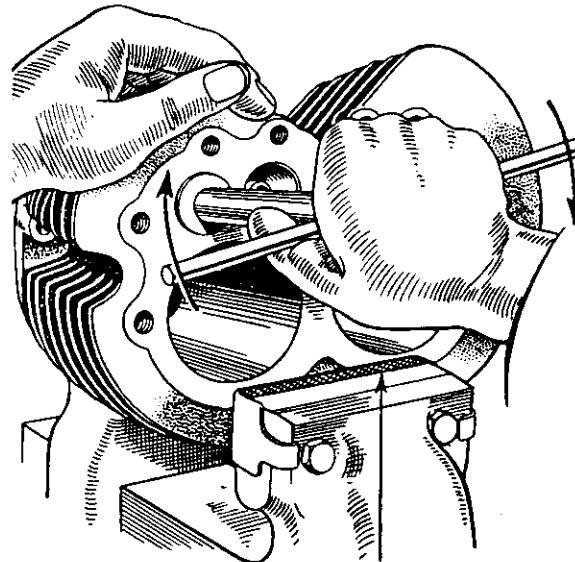


Fig. 14. To Replace the Valve Guides.

pressed out in a heavy hand press. Before the new liners are pressed in, reference should be made to the Data Page 32 and the block measured to ensure that the expansion gain on the bores is 0.004 in. in the heated state. This procedure is adopted to ensure correct replacement. After pressing in, the liners, must be bored to the correct size.



USE PROTECTORS

Fig. 15. To Recut the Valve Seats.

- (2) Reboring of the cast iron cylinder block should be undertaken in accordance with normal practice. Pistons are obtainable in the two following sizes.
  - + 0.020 in. O.S.
  - + 0.040 in. O.S.
- (3) The valve guides can easily be pressed or tapped out using a shoulder drift in the top of the guide. A suitable drift is made by obtaining a 5 in. length of  $\frac{1}{2}$  in. diam. M.S. (E.N.8) and turning one end to .307 in. diam. for 1 in. length.
- (4) The same method may be employed to fit the new guide, though pressing is recommended. In either case lightly grease the external surface of the guide to assist assembly. Ensure the guide is in the correct position, the shoulder being flush with the block face. Recut the valve seats if new valve guides are fitted.
- (5) When re-cutting the valve seats, make sure that the cutter angle is correct (i.e. 45°).

This operation should be carried out with the greatest of care, and only the bare minimum of metal removed.

- (6) If the face of the valve is pitted or damaged it should be recut on a valve grinding machine. If the valve head has warped, no attempt should be made to reface as it must be replaced with a new valve.
- (7) To grind in the valve use a fine carborundum grinding-in paste. Use a semi-rotary motion, occasionally lifting the valve and turning it through 180°. Continue the process until a uniform seat results. Remove the valve and wash thoroughly in spirit or Kerosine, and examine the seating. A true unbroken ring should be visible around the seating. A surer method is to apply a light even smear of "Engineers' marking blue" to the seat 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 both seats, i.e. seat on valve and seat in the cylinder block, indicates that the seatings are satisfactory. After completion of the grinding process all the parts must be thoroughly washed to ensure that no particules of grinding-in compound remain.

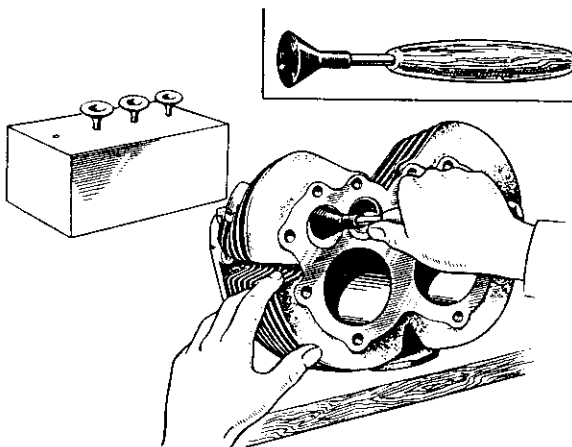


Fig. 16. To Grind in the Valves.

#### CYLINDER BLOCK—TO ASSEMBLE

35. Before attempting to rebuild the cylinder block assembly, it is very important to make sure that it is perfectly free from dirt, grinding compound, swarf, etc. The block should be degreased, and all parts, stud holes, manifolds, etc. blown clear with compressed air to ensure perfect cleanliness.

- (1) The assembly of the tappet components should be in the following sequence:—  
Lubricate and fit the tappets into the guides with the distance piece inserted between them. Screw in the tappet adjusters. Do not omit the springs and spring caps. Each adjuster should be screwed down to enable the next operation to be carried out.
- (2) Fit the valve spring, complete with top and bottom collars, over the valve guide. To prevent the tappets and adjusters from obstructing this operation, place an elastic band around the pairs of tappets to retain them in position. Lubricate the valve stem with graphited oil (Ox-320) and insert into the guide. Insert the claw of the valve spring compressor between the tappet adjuster head and the valve spring bottom collar. Tighten the compressor until there is sufficient clearance between the bottom collar and the valve stem cotter grooves to fit the cotters in place. This can be done quite easily if a little grease is applied to the inside of the cotters, and each cotter placed in position by greasing to the blade of a screwdriver to enable it to be manoeuvred into position. When both cotters are correctly seated, with the taper towards the head of the valve, unscrew the compressor, guiding the bottom collar over the cotters. Repeat for the remaining three valves. To seat the cotters give each of the tappets a smart tap with a hide hammer. The block is now ready for assembly.

#### PISTONS—TO DISMANTLE

36. Remove the piston rings, circlips and gudgeon pins. Before removing the carbon deposits from the top of the piston, clean out the ring grooves (preferably with an old ring) and wipe the skirt with a gasoline-soaked rag to remove any carbon. Do not under any condition use emery cloth or other abrasive to clean carbon deposits from the skirt of the piston.

#### PISTONS—INSPECTION

37. Examine the pistons carefully and compare their measurements with those shown in the Data Page 32. The rings should coil freely around the grooves and have the specified clearances. If the clearances are too great, the ring will have a

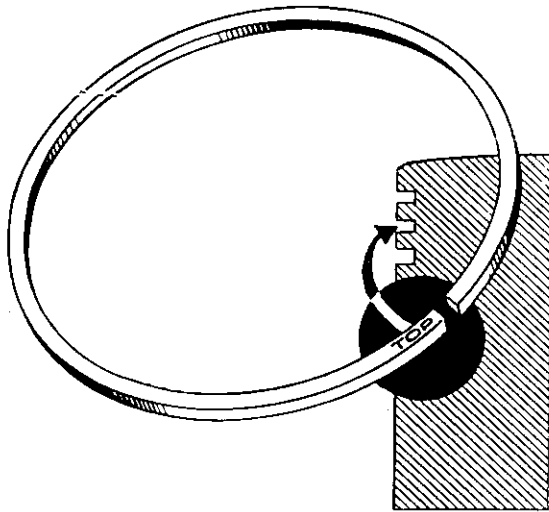


Fig. 17. Taper Faced Piston Ring Position.

pumping action when working, resulting in excessive oil consumption, etc. If the specified dimensions are not satisfied then the piston must be discarded. If the dimensions are within the limits the carbon should be removed from the crown and it should then be polished, preferably by buffing.

#### PISTONS—TO ASSEMBLE

38. First gap the piston rings to conform with the clearances given on the Data Page 32. If the block has not been rebored, the rings should always be gapped at the bottom of the cylinder bore and not in the working area.

- (1) Fit the scraper ring first.
- (2) The lower compression ring (centre ring) has a  $1^\circ$  taper and must be fitted with the tapered face in the correct position. To assist correct fitting, this ring has one face plainly marked "TOP" (see Fig. 17) and this should be fitted facing the top of the piston.
- (3) Fit the top compression ring.
- (4) Fit one circlip in the gudgeon pin boss.
- (5) Oil the gudgeon pin and enter in the opposite boss until it just protrudes inside the piston. The piston is now ready for assembly to the connecting rods.

#### OIL PUMP—TO DISMANTLE

39. (1) Remove the aluminium block held in position by the plungers and withdraw the plungers.

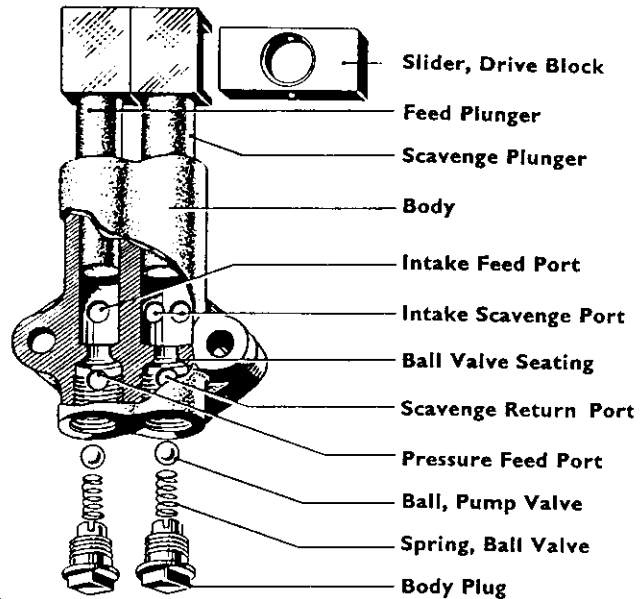


Fig. 18. Oil Pump.

- (2) In the lower part of the pump two non-return ball valves are fitted. To remove these, unscrew the square plugs at the base of the body, taking care not to lose the springs which are held in compression. Remove the balls from the seatings.

#### OIL PUMP INSPECTION

40. (1) Inspect the drive hole in the aluminium driving block for ovality, as this will affect the length of stroke of the pump. If it is worn, it should be discarded.
- (2) Normally the plungers and pump body will show negligible signs of wear. If there is considerable wear, the result will be insufficient feed of oil to the engine, resulting in excessive wear and heating, and inadequate scavenging.
- (3) The seatings of the non-return ball valves should be inspected and if there are any signs of indentation on the seats they should be recut with a  $45^\circ$  cutter. Only the minimum amount of metal necessary to cut a new seat should be removed.
- (4) Inspect the balls before replacing and if they show signs of pitting they should be renewed.
- (5) Check the free length of the ball valve springs and replace if they are unduly fatigued.

**OIL PUMP—TO ASSEMBLE**

41. (1) It is necessary to give the steel balls a sharp tap on to their seatings, using an aluminium rod as a punch. Replace the springs and plugs.
- (2) Oil the plungers and fit into the body.
- (3) If the pump is submerged in oil, the pumping action can be carefully checked by operating the plungers. Oil the aluminium driving block and place it in the plunger heads. The pump is now ready for assembly.

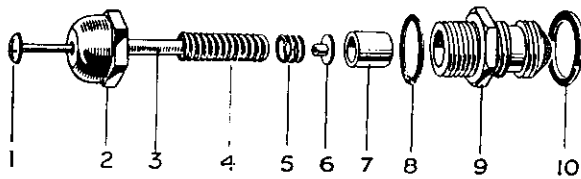


Fig. 19. Oil Pressure Release Valve.

1 Indicator Shaft	6 Shaft Nut
2 Valve Rubber	7 Piston
3 Rubber Seal	8 Cap Washer
4 Main Spring	9 Body
5 Auxiliary Spring	10 Washer

**OIL RELEASE VALVE AND PRESSURE INDICATOR—TO DISMANTLE**

42. The illustration (Fig. 19) indicates the construction of the valve. Dismantle as follows:
  - (1) Unscrew and remove the valve cap. The indicator button and spring assembly will come away still attached to the cap.
  - (2) Unscrew the indicator button from the shaft nut. Lift off the springs and withdraw the indicator button from the cap.
  - (3) Remove the piston from the valve body by an air blast through the gauze. Do not disturb the gauze in any way.

**OIL RELEASE VALVE AND PRESSURE INDICATOR—INSPECTION**

43. (1) Examine the body for distortion and freedom of movement of the piston.
- (2) Examine the piston for wear and any score marks.
- (3) Measure the free lengths of the main and auxiliary springs and replace if they are less than specified in the Data Sheet.
- (4) Check the indicator button shaft to see that it is perfectly straight and does not bind in the cap.
- (5) A new length of rubber tube should be used on re-assembly.

**OIL RELEASE VALVE AND PRESSURE INDICATOR—TO ASSEMBLE**

44. (1) Insert the indicator button shaft into the valve cap to its fullest extent.
- (2) Slide the oil resisting synthetic rubber tube over the shaft.
- (3) Fit in the main spring followed by the auxiliary spring. (The auxiliary spring indicates the first 10 lbs. per square inch pressure before oil release main spring comes into operation).
- (4) Screw on the shaft nut sleeve end towards the valve cap and the cap assembly is complete.
- (5) Lubricate the inside of the valve body and insert the piston crown first.
- (6) Place the cap washer on the valve body and screw on the valve cap sub-assembly. *Do not over-tighten, as this distorts the valve body and the piston release valve is not allowed to function properly.* The oil release valve assembly is now complete.

**CYLINDER HEAD**

45. The carbon deposits should be scraped from the combustion chamber. Avoid the use of a sharp tool for this operation as damage to the head and particularly the gasket may result. Any deposits of mud, etc. can be removed from between the finning by using a wire brush. The head should now be washed free of any signs of carbon and oil deposits. Screw a 14 m/m plug tap into the plug hole to remove any carbon deposits on the lower threads.

**TO ASSEMBLE THE ENGINE—CRANKCASE**

46. Thoroughly clean all parts to be assembled and set them out in assembly order on a clean bench. Also required is an oil gun (or failing this, a can of engine oil and a paint brush). All the working parts should be liberally oiled before assembly. Build up the engine as set out below.

- (1) Lightly smear jointing compound on to the inner face of the timing side crankcase. Ensure that the plain bearing is liberally oiled.
- (2) Enter the crankshaft into the ball race in the drive side crankcase. Ensure that the shaft is fully home in the bearing. (It is an

advantage to allow the shaft to protrude vertically through a convenient hole in the bench and then the outer face of the drive side crankcase will take the weight on the flat surface of the bench. This saves building a jig and leaves the assembly quite rigid).

- (3) Fit the camshaft into the driveside bush, after oiling the bush. (It is advisable to proceed as specified in para. 47 (2) with regard to the camshaft if the special camwheel press on tool is not available).
- (4) Thread the timing side case over the crankshaft and camshaft and bolt the two halves together, using the bolt at the top rear of the crankcase and the two short studs with two nuts, either side of the sump orifice. An internal screw is located above the camshaft inside the top front of the crankcase. Make sure it is well tightened when replacing.
- (5) Ensure the two crankcase halves present a perfectly flat face to the cylinder base. There must be no step or ridge. If there is a step, a sharp tap on the stud boss nearest the proud face with a hide hammer, will bring it flush. Do not, on any account, attempt to bring the faces flush by tapping on the faces themselves. When the two faces are properly mated, the two studs and two screws can be finally tightened. Check the crankshaft for freedom of movement.
- (6) Refit the sump filter with new joint washers. The two sump washers go between the crankcase and the filter and the cover plate. Make sure that the scavenge pipe goes through the appropriate hole in the filter gauze when offering up the filter. Replace the four sump bolts (Nuts Mk. 2B) taking care not to overtighten them, as the bolts are made of SOFT METAL to avoid stripping the crankcase threads. Pour an egg-cup-full of oil into the crankcase.
- (7) Replace the oil release valve and pressure indicator, using a new joint washer.
- (8) Fit the oil seal to the drive side crankcase with the leather "appearing to roll in towards the centre of the crankcase".

#### TIMING CHEST

47. (1) Place the crankcase in a jig for assembling the engine (see Fig. 8 dismantling).

Position the Woodruff key in the crankshaft. Fit the crankshaft pinion with the threaded portion away from the engine and tap on to the shaft with a hollow punch. Tighten up the pinion locking nut. Place a tommy bar through the small end bushes, and prevent the flywheel from rotating by inserting two blocks between the ends of the bar and the crankcase face.

- (2) The camwheel must be fitted with a special press-on tool (Fig. 20). Place the Woodruff key in the camshaft keyway. Then screw on the centre tool (E). Place the camwheel (A) on the camshaft and engage the keyway with the key. Screw the press-on tool outer sleeve (B) to the camwheel, and then place the thrust washer (C) and the left hand threaded nut (D) on to the inner rod. Screw up the nut, which has a left-hand thread, and the outer sleeve which carries the camwheel, will be driven forward, forcing the camwheel into its position. Do not dislodge the key. Prevent the camshaft from rotating by holding the inner threaded rod firmly at the end. When the camwheel is home, remove the press on tool and replace with the camwheel eccentric nut.

When the special tool is not available, the camwheel may be pressed on to the camshaft before the two halves of the crankcase are joined together. (See para.46 (3).) In this case, place the camshaft vertically, threads uppermost, in a vice with lead covered (or similarly protected jaws). Lubricate the bush in the timing side crankcase and drop the crankcase over the camshaft. Place the Woodruff key into the keyway on the camshaft and place the camwheel on to the camshaft, threads away from the crankcase. Now extreme care must be used, or both camshaft and wheel may be damaged. Gently tap on the camwheel with a hollow punch until the camwheel is home, taking care not to dislodge the key, or the bush will be damaged. Screw up the eccentric nut, remembering that the thread is L.H.

- (3) Prime the oil pump and fit to the crankcase with a new joint washer. Ensure that the washer is positioned correctly and not covering any oilways.

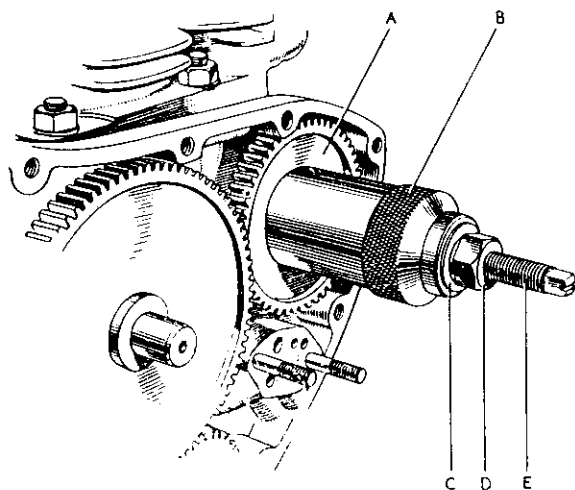


Fig. 20. To Replace the Camwheel.

- (4) Insert the intermediate timing wheel so that the timing dots coincide. When this is done the valve timing is correct.
- (5) (a) **Fitting the magneto (Mk. 1 & 2)**—assemble the magneto to the crankcase and secure with the three nuts.  
 (b) **Fitting the distributor (Mk. 2B)**—assemble the distributor complete with clamping lever to the adaptor and tighten the lever retaining bolt. Fit the adaptor to the crankcase with the clamping nut and bolt towards the crankcase, and the slotted head pointing downwards. Tighten up the three retaining nuts. The clamp nut and bolt should be loose enough to allow rotation of the distributor for final positioning.
- (6) (a) **Magneto drive (Mk. 1 & 2)**—the A.T.D. mechanism should now be placed on the magneto shaft and screwed up lightly on the first few threads only.

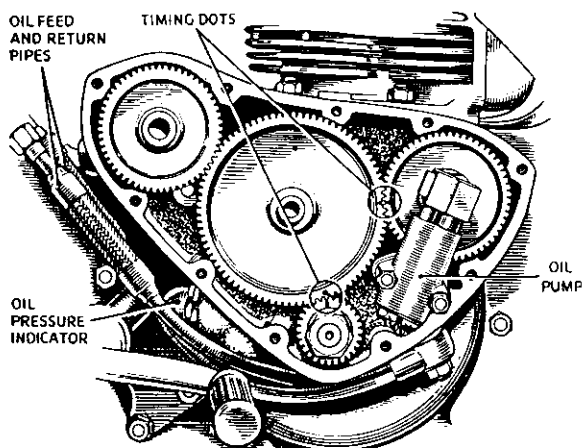


Fig. 21. Timing Gear Markings.

(b) **Distributor drive (Mk. 2B)**—the position of the distributor should be adjusted to give the easiest position for timing the ignition, and subsequent maintenance when the engine is in the frame. Rotate the distributor body until the contact breaker points are at 11 o'clock when looking from the left-hand side of the machine. Tighten the lever clamping bolt sufficiently to retain the distributor in this position. If a long screwdriver is held against the slotted head of the clamping bolt from the underside of the engine, the nut can be tightened more easily. Make sure that the distributor is correctly positioned. With No. 1 cylinder (timing side) at T.D.C. on compression stroke (both valves closed) rotate the rotor arm anti-clockwise until the contact breaker points are just beginning to open when the rotor arm is pointing towards the rear of the machine. Holding the rotor arm in this position slide the thrust washer, followed by the drive pinion, on to the distributor shaft so that the hole in the wheel boss lines up with the hole in the distributor drive shaft. Mesh the drive pinion into the nearest position on the intermediate wheel and slide the locking pin through the wheel and shaft. Retain the pin in position with the circlip in the groove round the wheel boss. The distributor is now in the best position for final timing and adjustment of the contact breaker points.

## PISTONS

48. Fit the pistons to their appropriate connecting rods. Check carefully that each circlip is properly seated in the boss grooves. Lubricate the piston rings and skirts and turn the rings so that the gaps do not coincide. Place the piston ring clips over the rings and allow the base of the pistons to rest on the forward top face of the crankcase.

## CYLINDER BLOCK

49. Grease the cylinder base face and the crankcase face and fit the paper cylinder base joint washer over the studs on the crankcase. Liberally lubricate the cylinder bores, pistons and cams, and assemble the piston ring clips to the pistons. Lower the block over the pistons until the piston rings enter the bores. Support the block (see Fig. 22), and carefully

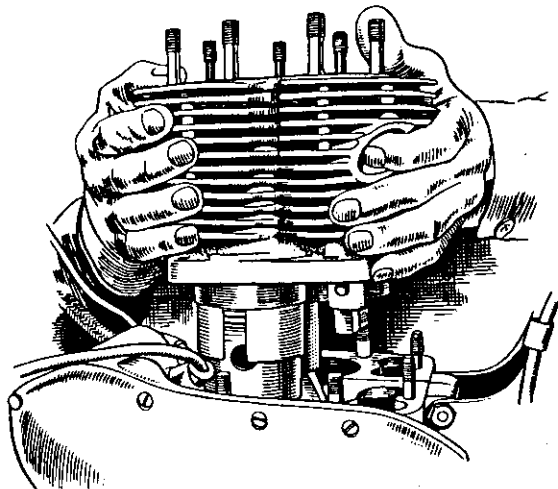


Fig. 22. To Replace the Cylinder Block

turn the crankshaft so that the pistons enter the bores and the piston ring clips fall clear. The clips can now be withdrawn from the connecting rods. Guide the block over the cylinder base studs and tighten up the cylinder base nuts.

#### IGNITION TIMING—MAGNETO CONDITION (Mk. 1 & 2)

50. Final timing of the magneto can be carried out at this stage, using a depth gauge to measure the exact position of the pistons. Alternatively the timing may be undertaken when the cylinder head is in position, using a graduated timing stick through the timing plug hole specially provided in the cylinder head. If a timing disc is available, time the points to open at  $23^{\circ}$  B.T.D.C. In either method the following procedure should be adopted:—

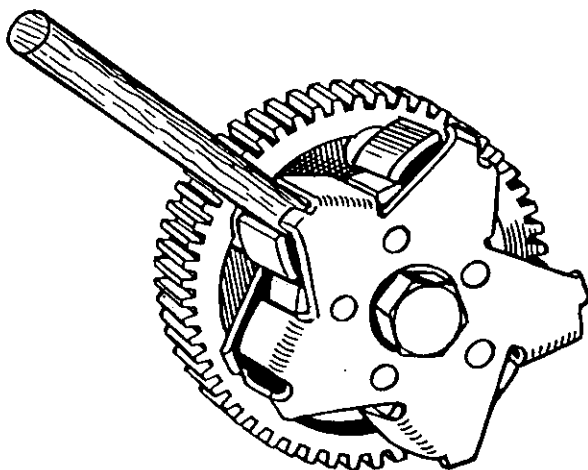


Fig. 23. B.T.H. Automatic Timing Device.

- (1) Rotate the engine for forward travel (anti-clockwise viewed from the drive side) until No. 1 piston (timing side) is coming to compression stroke. This is indicated when No. 1 cylinder inlet valve is just closing.
- (2) Wedge the automatic timing device in the fully advanced position, as shown in the illustration (Fig. 23).
- (3) Turn the engine in the forward direction (anti-clockwise) until the pistons reach T.D.C. If a timing stick is being used the through cylinder head, a mark should be made on it at this point. A further mark should also be made exactly  $\frac{1}{8}$  in. above.
- (4) The engine should now be rotated backwards (clockwise viewed from drive side)  $\frac{1}{4}$  in., then the rotation reversed, bringing up very slowly to the  $\frac{1}{8}$  in. timing mark.
- (5) In the case where timing is being carried out direct on to the top of the pistons, the same procedure should be adopted on the depth gauge—i.e. turning back below the required amount of advance and coming up to the  $\frac{1}{8}$  in. mark to take up any backlash in the timing gears.
- (6) Turn the magneto so that the points are just opening on the bottom cam—i.e. the contact points are pointing upwards. The setting should be made with a 0.0015 in. feeler gauge (or if not available, a cigarette paper or tissue paper). A battery and lamp timing set is even more accurate.
- (7) The contact breaker must be held in the correct position (6) and the A.T.D. nut tightened until a grip is felt. Lightly tighten the nut. Recheck the timing in the manner of the original timing. Make sure the contact breaker is timed  $\frac{1}{8}$  in. early and not  $\frac{1}{8}$  in. late. If timing is satisfactory, fully tighten the A.T.D. nut. Make a final check.
- (8) Clean off any jointing compound from the timing cover and smear on fresh compound. When tightening the cover, use a large screwdriver which is a good fit in the screw slots. This ensures good even tightening of the cover and minimises damage to the heads of the screws.

### IGNITION TIMING—COIL CONDITION (Mk. 2B)

51. (1) Slacken off the distributor lever clamp bolt and rotate the distributor slowly so that the contact breaker arm is on the peak of the cam lobe when the points should be separated. To adjust the points, slacken off the two screws securing the fixed contact plate and move the plate to give a 0.012 in. gap between the contact points. Tighten up the screws and re-check the gap adjustment.
- (2) Rotate the engine until No. 1 cylinder (timing side) is at T.D.C. with both valves closed. If a timing stick is being used through the cylinder head a mark should be made on it at this point. Make a further mark on the stick  $\frac{1}{8}$  in. above this mark.
- (3) The engine should now be rotated backwards (clockwise when viewed from the drive side)  $\frac{1}{4}$  in., then the rotation reversed, bring up very slowly to the  $\frac{1}{8}$  in. timing mark.
- (4) In the case where the timing is being carried out direct on top of the pistons, the same method should be used with a depth gauge, i.e. turning back below the required amount of advance and coming up to the  $\frac{1}{8}$  in. mark to take up any backlash in the timing gears.
- (5) Hold the rotor arm with the right hand and rotate it anti-clockwise to the position of full advance. This will require some pressure, as it forces out the bob weights against the return springs, (a slight movement to the left should be felt, if the return springs are working correctly). With the rotor arm held in the fully advanced position, revolve the distributor housing slightly (contact breaker points nearly vertical), until the points just visibly open. Tighten the distributor lever clamp bolt to retain the distributor in this position.
- (6) Check the setting by placing a 0.0015 in. feeler gauge (or if not available a cigarette paper or tissue paper) between the points. Rotate the rotor arm anti-clockwise against the springs, to the fully advanced position, when the feeler gauge should just be released. If a battery and lamp timing set is used the setting can be made much more accurately.
- (7) When the timing is satisfactory replace the timing cover. Clean off any jointing com-

pound and smear on fresh compound. When tightening the cover, use a large screwdriver which is a good fit in the screw slots. This ensures good even tightening of the cover and minimised distortion of the slot. Finally, check that the distributor lever clamp bolt is fully tightened. A long screwdriver should be held against the slotted head of the clamping bolt from the underside of the engine to prevent it from rotating when the nut is being tightened.

### TO ADJUST THE TAPPETS

52. Tappet adjustments are made with the tappet on the back of the cam. Before adjusting note that the inlet valves are on the inside and the exhaust valves on the outside. To adjust the timing-side exhaust valve clearance turn the engine until the driving-side exhaust valve is on full lift. Then adjust the tappet clearance. Now turn the engine until the timing-side exhaust valve is on full lift and adjust the driving-side exhaust tappet clearance. Follow a similar sequence for the inlet valves.

- (1) To make an adjustment a special spanner is provided in the tool kit. By placing the spanner over the stud spigot between the valves so that the spanner teeth engage with the adjuster, the clearance can be

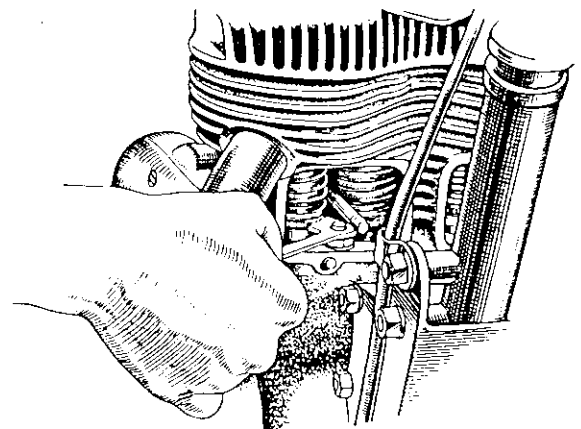


Fig. 24. To Adjust the Tappets.

increased or decreased by turning the spanner clockwise or anti-clockwise. The movement of the adjuster is arrested by a spring, engaging in segments on the underside of the adjuster, each segment representing approximately 0.0025 in. (for adjustment see Data Sheets).

- (2) Place the joint washer and cover in position. Make sure that the two internal levers are under the exhaust tappet adjuster heads. Place two fibre washers over the cover studs and replace the two domed nuts. Tighten evenly.

**CYLINDER HEAD**

53. Thread the cylinder head gasket over the cylinder head studs. Place the cylinder head in position. Screw down all the nuts finger tight and then tighten down in the sequence shown in Fig. 25. Replace the spark plugs. The engine is now ready for fitting into the frame.

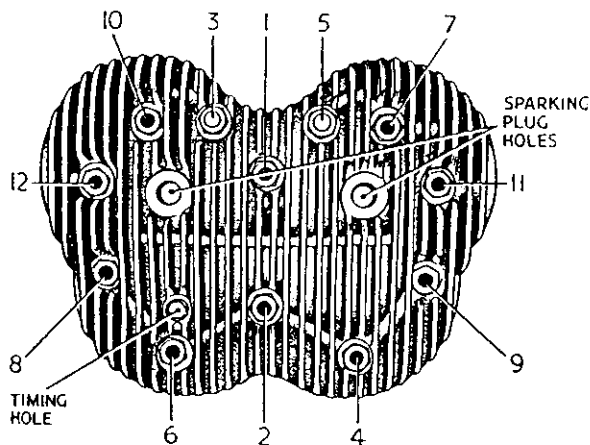


Fig. 25. To Tighten the Cylinder Head Nuts.

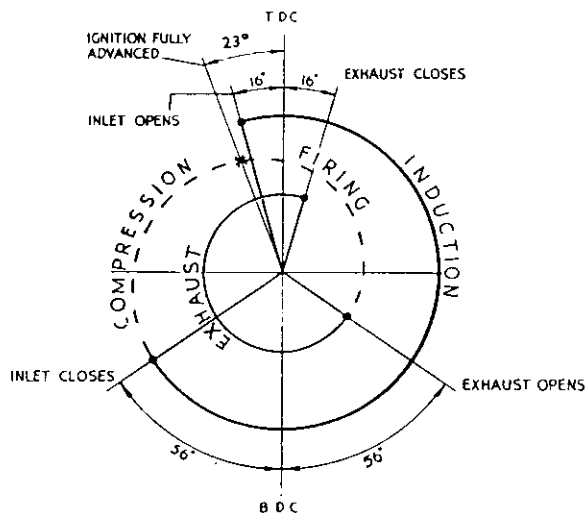


Fig. 26. Engine Timing Diagram.

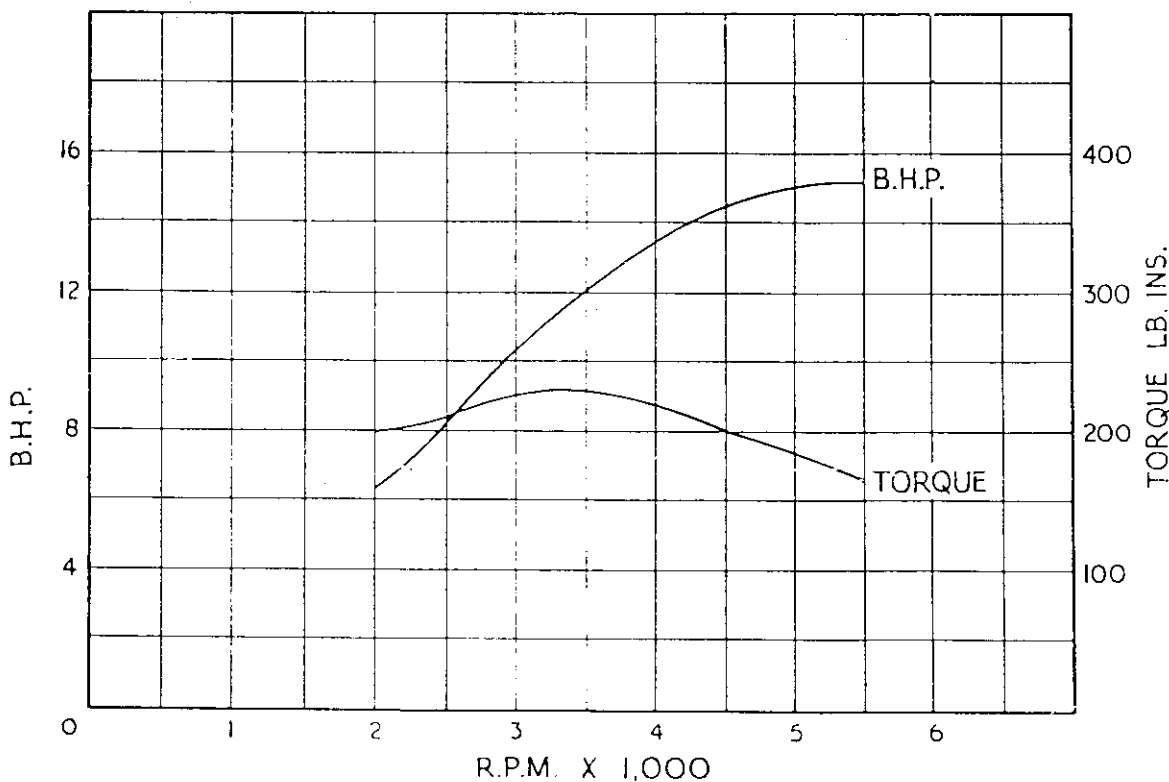


Fig. 27. Power Curve.

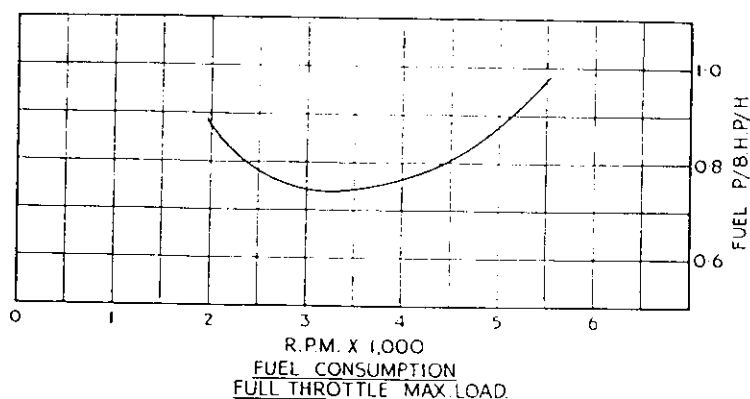


Fig. 28. Fuel Consumption Curve.

### TO INSTALL THE ENGINE IN THE FRAME

54. Before installing the engine, ensure that all the parts are clean and in good condition. Examine all the studs and remove burrs and damage to the threads by using a die (the engine studs are 26 C.E.I.) Assemble the rear engine plate to the engine. Fit the engine plate with the footrest dowels to the timing side. Leave the nuts slack to allow movement of the plates. Place the footrest distance tube between the plates and retain in position with a suitable rod.

### FITTING THE ENGINE INTO THE FRAME

55. (1) Support the engine as mentioned in para. 18 "Removing engine from the frame". The engine should be placed in position from the left-hand side. Tilt the engine backwards and swing the front engine plates into position. Allow the engine to reposition itself. Replace the remaining eight studs. This should be done carefully to avoid damage to the threads. Do not use a hammer to drive the studs home; they will go easily if the engine is rocked slightly. It is better to insert the studs from the right-hand side, and as each stud is positioned, to screw the nut on loosely on the opposite side. Tighten up the drive side crankcase inner chaincase plug which gives access to the top rear engine plate stud. When all the studs and nuts are fitted, tighten them all up fully.

(2) Refit the torque stays to the cylinder head studs and tighten the frame clip.

(3) Screw the exhaust lifter cable adjuster fully into the abutment. Slide the return spring over the cable, and fit the nipple into the claw on the lever arm. Unscrew the cable adjuster to take up the slack in the cable and tighten the adjuster lock nut.

(4) Fit the two rubber connections to the engine oil pipes and oil junction block assembly. The oil feed pipe has a short length of tube complete with union and nut which has to be inserted into the end of the feed pipe rubber connector (the shorter assembly of the two). Connect the assembly to the oil tank, then to the engine. Use a new paper washer. Great care must be taken when fitting the rubber hose connectors, not to detach a small piece of rubber from the hose, as the detached portion will cause stoppage of the oil feed or scavenge, and complete breakdown of the lubrication system.

### PRIMARY DRIVE

56. (1) Slide the oil retaining plate under the inner primary chaincase spring plate. Smear a thin film of jointing compound on to the mating faces of the crankcase and inner primary chaincase. Slide the footrest hanger rod complete with right-hand side footrest through the rear engine plates, at the same time pushing out the locating rod, which held the foot-rest distance tube in position. Check that the footrest rod has actually passed through the distance tube. Thread the small distance piece on to the footrest rod which protrudes through the

left-hand side of the engine plate. Place the inner chaincase over the gearbox mainshaft and bolt the case to the crankcase. Push the footrest rod through the boss in the inner primary chaincase to retain the distance piece. Bolt the upper chainguard to the inner chaincase. It must be emphasized that unless the correct distance piece is replaced, the generator rotor will not run free, which will result in subsequent damage to the stator.

- (2) Enter the bearing collar carefully into the oil seal, chamfer first. Mk. 2B has a machined groove which must face outwards.
- (3) Replace the engine drive shaft and gearbox mainshaft keys.
- (4) The engine sprocket, clutch housing and primary chain should be assembled in one operation. Holding the engine drive sprocket in one hand, the clutch in the other, and the chain held taut in position between them, slide the sprockets on to their respective shafts. Secure the clutch assembly with a lock washer, plain washer and sleeve nut, Mk. 1 and 2, and plain washer, lock washer and nut Mk. 2B, in that order. Tighten up the nut, using the clutch locking tool (Fig. 6) to prevent the gearbox mainshaft from rotating. If the tool is not available, leave the tightening until the engine shaft assembly is completed.
- (5) Fit the engine shock absorber slider, spring cup and generator rotor, in the case of Mk. 1 and 2, and the sprocket with the ground shoulder facing outwards, plain washer and the generator rotor on the case of Mk. 2B. Place on the lock washer and tighten up the nut with a box spanner. Give the tommy bar a number of sharp blows with a hammer to ensure that the nut is firmly home. Lock the nut with the washer. Tighten the clutch nut in the same way if the clutch locking tool is not available.
- (6) Assemble the clutch plates in the following order. First, a plain plate followed by a friction plate and so on, leaving a plain plate to be fitted last. Check that the push rod is in position down the centre of the mainshaft. Place on pressure plate, the push rod engaging in the centre button. Place the

four clutch springs in the cups and locate them over the clutch pins and through the four holes in the pressure plate nuts. (For full details of clutch assembly, Mk. 1 and 2 and 2B, and adjustments, see Section 3, para. 32 "Clutch Adjustments").

- (7) Smear the primary chaincase cover mating faces with jointing compound. Check that the spigot at the front is perfectly clean, as this ensures alignment of the stator with the rotor. Fit the cover over the footrest rod and tighten up the screws with a well fitting screwdriver. Wipe away the surplus compound from the joint edges.

**Note.**—If the stator has been replaced, the location should be checked to ensure the stator is concentric with the rotor. Remove the generator cover by unscrewing the three screws, and check the clearance between the rotor and stator by inserting a feeler gauge at the pole pieces. (For further details see Electrical System—sect. 6, para 6, or sect. 7, para. 8).

#### TO FIT THE BRAKE PEDAL AND FOOTREST

57. (1) Assemble the left-hand footrest to the rod and tighten up.
- (2) Replace the brake pedal on the spindle, fit the spring washer, plain washer and nut. Tighten up.

#### EXHAUST SYSTEM

58. Replace the branch pipe, exhaust pipe and silencer. Make sure that the pipes are pushed well into the exhaust ports before tightening up the bolts.

#### IGNITION WIRING

59. (1) (a) Harness wiring—magneto condition (Mk. 1 & 2)—fit the "cut-out" lead to the terminal on the end of the magneto and tighten the knurled nut.
- (b) Harness wiring—coil condition (Mk. 2B)—fit the black lead to the contact breaker connection on the distributor body and ensure the nut is tight. Connect the three generator coloured leads to the three connectors beneath the saddle.

- (2) If the ignition timing instructions have been carried out correctly connect the plug leads as follows.

(a) Magneto—Take the leads coming from the H.T. pick-up nearest the engine to No. 1 plug timing side, and the rearward pick-up lead to No. 2 plug drive side. The cylinder to which each plug should go is marked on the magneto.

(b) Coil—clip the ignition coil to the lower tank rail, with the coil underslung. Connect the white ignition switch lead to the SW terminal on the coil, and the black contact breaker lead to the CB terminal. Fit the distributor cap, making sure that the rotor arm is seated properly. The lead nearest to the engine goes to No. 2 cylinder and the opposite lead to No. 1 cylinder, timing side.

#### FUEL SYSTEM

60. (1) Refit the carburetter to the cylinder block using new paper washers. Fit the two petrol pipe banjo unions and connect up the throttle control cable.
- (2) Replace the petrol tank, nose first with the rubbers in position. Place the tank rubbers under the rear of the tank and replace the bolts. Fit the nose bolt and nut and tighten up. Tighten the rear tank bolts (do not overtighten) and prevent them from coming loose by threading locking wire between them.
- (3) Join the feed pipe unions to the petrol taps and tighten up.

#### TO FIT THE BATTERY AND CARRIER

61. (1) Fit the air filter to the frame and connect

to the carburetter with the rubber connection.

- (2) Fit the battery carrier and chaincase, tightening up the air filter in the process.
- (3) Replace battery—Mk. 1—connect positive (+ve) battery lead to the wiring harness and **negative (-ve) to the battery carrier earthing point.** (Mk. 2 and 2B—connect negative (-ve) battery lead to the wiring harness and **positive (+ve) to the carrier earthing point.** Do not overtighten the battery carrier strap screw, otherwise the battery will be subject to undue strain.

#### TO PREPARE FOR THE ROAD

62. (1) Replenish the oil tank using the correct grade of oil as shown in the lubrication chart.
- (2) Pour 1/3 pint of light oil (as recommended in the lubrication chart) into the primary chaincase. Do not use engine oil, or difficulty in changing gear will be encountered due to sticking plates.
- (3) Depress the kickstarter a number of times to ensure that the running parts are adequately lubricated and free. Turn the petrol on, set the carburetter and start the engine. First and most important, check that the oil pressure is correct. If there is no oil pressure, immediately stop the engine or damage to the bearings will result. (See para. 10 on lubrication faults). Make any necessary adjustments and road test the machine. Finally re-tighten all the nuts and bolts, particularly the cylinder head nuts, which should be done when the engine has cooled down.

ENGINE—BASIC PLAN DIMENSIONS

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
<b>CYLINDER BLOCK—(Alloy)</b>			
Cylinder block—Bore before liners are fitted ... ..	2.6690 2.6695	Cylinder liner ... o/dia.	2.6715 2.6720
<b>CYLINDER BLOCK</b>			
Cylinder block—tappet housing i/dia.	0.624 0.625	Tappet ... .. o/dia.	0.6225 0.6235
Cylinder block—valve guide housing ... .. i/dia.	0.5308 0.5313	Valve guide ... o/dia.	0.5323 0.5333
		Cylinder liner (alloy block) i/dia.	2.4788
		Cylinder bore (cast-iron block) ...	2.4793
<b>PISTONS</b>			
Top land ... .. o/dia.	2.465 2.468		
2nd land ... .. o/dia.	2.468 2.470		
3rd land ... .. o/dia.	2.450 2.455		
Bottom of skirt ... .. o/dia.	2.4755 2.4760		
Gudgeon pin boss ... i/dia.	0.6260 0.6267	Gudgeon pin ... .. o/dia.	0.6260 0.6267
Groove width—comp. ring ...	0.0635 0.0645	<b>PISTON RINGS</b>	
		Compression ring—width ...	0.0625 0.0715
		Compression ring—gap (in bore)	0.010 0.014
Groove width—scraper ring ...	0.1255 0.1265	Scraper ring—width ... ..	0.124 0.125
		Scraper ring—gap (in bore)	0.007 0.011
<b>VALVES</b>			
Valve stem, inlet ... .. o/dia.	0.3095 0.3100	Valve guide ... .. i/dia.	0.3120 0.3130
Valve stem, exhaust ... o/dia.	0.3090 0.3095		
Inlet & exhaust valve head dia.	1.1406		
.. .. seat dia.	1.0469		

## ENGINE

## Section 1

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
<b>CRANKCASE, CRANKSHAFT AND CAMSHAFT, ETC.</b>			
<b>CRANKCASE BEARING HOUSINGS</b>		<b>CRANKCASE MAIN BEARINGS</b>	
For Main bearing LH ... i/dia.	2.8110 2.8105	Bearing LH ... o/dia.	2.8120
		1½ in. bore × 2½ in. o/dia. × 1½ in. (ball journal)	2.8115
For Main bearing RH ... i/dia.	1.7495 1.7500	Bearing RH ... o/dia.	1.7515
		White metal ...	1.7510
<b>CAMSHAFTS</b>		<b>CAMSHAFT BUSHES</b>	
For Camshaft bush LH ... i/dia.	1.0645 1.0640	Camshaft bush LH ... o/dia.	1.0645 1.0640
For Camshaft bush RH ... i/dia.	1.002 1.0015	Camshaft bush RH ... o/dia.	1.002 1.0015
Camshaft LH ... o/dia.	0.8725 0.8730	Camshaft bush LH ... i/dia.	0.874
Camshaft RH ... o/dia.	0.8100 0.8105	Camshaft bush RH ... i/dia.	0.8125 0.8115
<b>CRANKSHAFT ASSEMBLY</b>		<b>CRANKSHAFT MAIN BEARINGS</b>	
Crankshaft LH ... o/dia.	1.1250 1.1245	Bearing LH ... i/dia.	1.1252 1.1247
Crankshaft ... o/dia.	1.3735 1.3740	Bearing RH ... i/dia.	1.3745 1.3750
Crankshaft to flywheel spigot ... o/dia.	1.4770 1.4775	<b>FLYWHEEL</b>	
		Flywheel—cranks't spigot housing i/dia.	1.4765 1.4770
<b>CRANKSHAFT</b>		<b>CONNECTING ROD BUSHES</b>	
Crankpin LH & RH ... o/dia.	1.4980 1.4985	Big end bearing ... i/dia.	1.4990 1.4995
<b>CONNECTING ROD</b>		Big end bearing ... o/dia.	1.6268 1.6283
Connecting rod big-end i/dia.	1.6227 1.6237	Small end bush ... o/dia.	0.7180 0.7185
Connecting rod small-end i/dia.	0.7160 0.7165	Small end bush ... i/dia.	0.6260 0.6265
<b>GUDGEON PIN</b>			
Gudgeon pin ... o/dia.	0.6260 0.6251		

Section 1

ENGINE

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
<b>INTERMEDIATE TIMING GEAR WHEEL AND SPINDLE</b>			
<b>CRANKCASE SPINDLE HOUSING</b>		<b>GEAR SPINDLE</b>	
Spindle housing ... .. i/dia.	.5595 .5600	Spindle ... .. o/dia.	.5605 .5610
<b>GEAR</b>		<b>BUSH</b>	
Gear ... .. i/dia.	.6245 .6255	Gear bush ... .. o/dia.	.6265 .6260
		" " ... .. i/dia.	.5617 .5727
<b>OIL PUMP</b>			
<b>OIL PUMP BODY</b>		<b>OIL PUMP PLUNGERS</b>	
Bore for feed plunger ... i/dia.	0.3127 0.3122	Feed plunger ... .. o/dia.	0.3124 0.3121
Bore for scavenge plunger i/dia.	0.4377 0.4372	Scavenge plunger ... o/dia.	0.4374 0.4371
<b>BALL VALVE SEATING</b>		<b>BALL VALVES</b>	
Angle 90° inc. (45°) ... ..	—	Ball size ... .. dia.	$\frac{7}{32}$
<b>OIL PUMP DRIVE BLOCK</b>		<b>CAMWHEEL NUT PEG</b>	
Width ... ..	0.499 0.498	... .. o/dia.	0.3735 0.3725
Hole ... .. i/dia.	0.3755 0.3745		
<b>OIL RELEASE VALVE BODY</b>		<b>OIL RELEASE VALVE PISTON</b>	
Body, release valve ... i/dia.	0.5620 0.5625	Piston ... .. o/dia.	0.5610 0.5605
<b>SPRINGS FREE LENGTH</b>			
<b>VALVE SPRINGS</b>		<b>ENGINE SHAFT SHOCK ABSORBER (Mk. 1 &amp; 2 only)</b>	
Inlet and exhaust ... ..	$1\frac{11}{16}$	... ..	$1\frac{1}{8}$
<b>OIL PUMP</b>		<b>OIL RELEASE VALVE</b>	
Spring, ball valves ... ..	$\frac{1}{2}$	Main spring ... ..	$\frac{31}{32}$
		Auxiliary ... ..	$\frac{9}{32}$

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ENGINE

Section 1

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
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CONTROL CABLES

Exhaust lifter inner wire o/all length	38 $\frac{1}{2}$	Exhaust lifter casing length	32 $\frac{1}{8}$
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APPROVED SPECIAL TOOLS

ENGINE

Ref. Nos. Fig. 29  
Page 36

Part  
Numbers.

- |   |                                   |        |           |
|---|-----------------------------------|--------|-----------|
| 1 | Extractor for c/shaft pinion      | ...    | ST/1940   |
| 2 | Camwheel remover and replacer     |        | D178/183  |
| 3 | Lock plate for clutch             | ... .. | Z/13      |
| 4 | Line reamer for T.S. main bearing |        | ST.1052.W |
| 5 | Clutch hub extractor              | ... .. | D.50      |

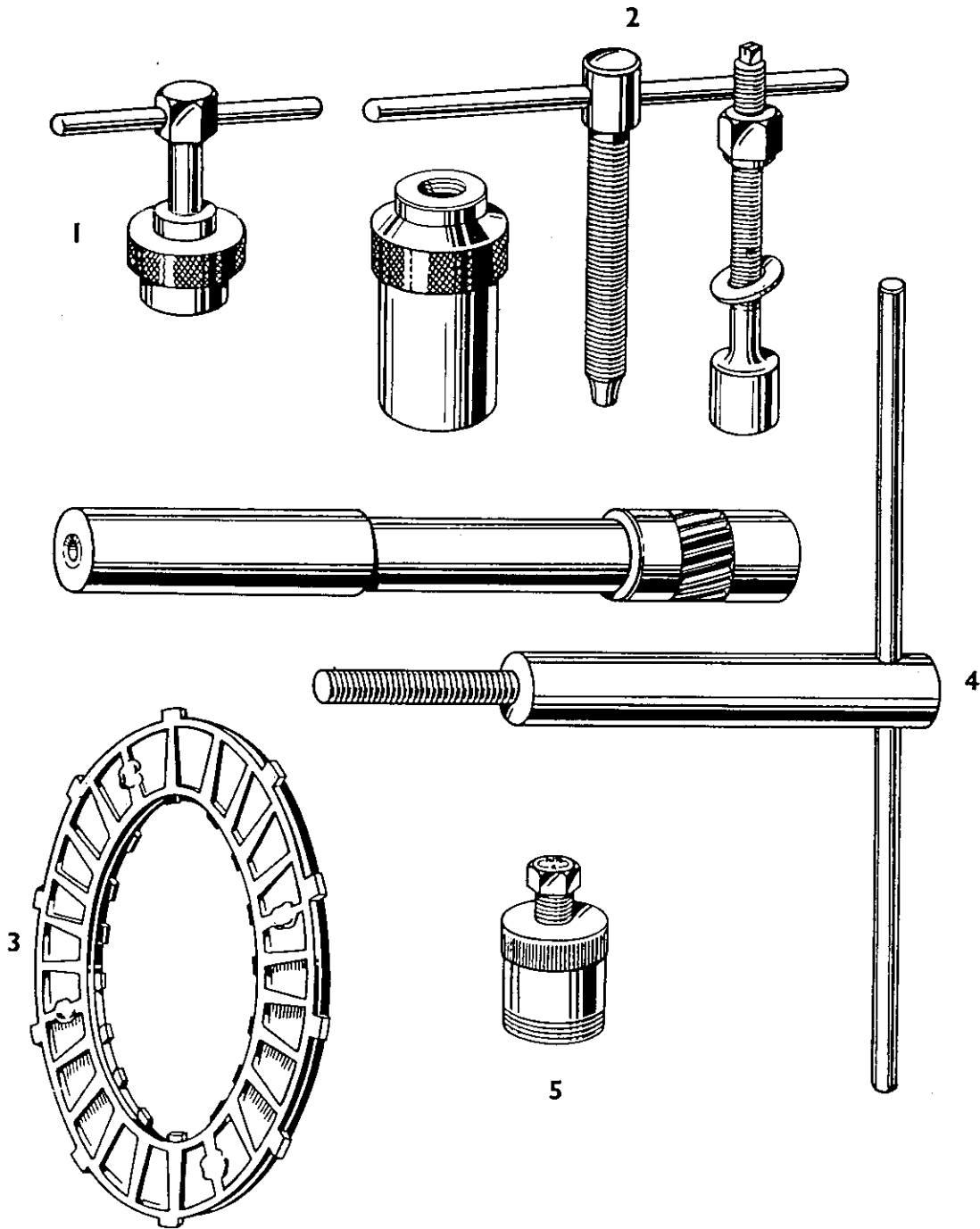


Fig. 29. Approved Special Tools.

## SECTION TWO

# CARBURETTER

### LIST OF CONTENTS

Paragraph	Title	Page
1	Description ... ..	37
6	To Remove the Carburetter ... ..	38
7	To Dismantle the Carburetter ... ..	38
9	To Inspect the Carburetter ... ..	39
10	To Assemble the Carburetter ... ..	39
13	To Replace the Carburetter ... ..	39
15	Air Filter ... ..	40
	Basic Plan Dimensions ... ..	40

### LIST OF ILLUSTRATIONS

Fig. 1	Carburetter: Side and End Elevation ... ..	38
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#### DESCRIPTION

1. The horizontal Solex carburetter Type 26 WH2 follows the general design of the Solex series known as the "22 assembly" range of carburetters. The main jet (G) is located in the float chamber, and meters petrol to the spraying assembly comprised of an emulsion tube (S) surmounted by the air correction jet (a) with a final outlet in the choke tube waist at (DN). When the throttle butterfly (V) is progressively opened, air passes from right to left through the choke tube creating a progressively increasing depression of the end of the tube (DN) thus drawing downwards an emulsified mixture which is drawn in by the engine.

#### SLOW RUNNING

2. The pilot jet (g) is so situated that with the throttle butterfly nearly closed and the engine turning over, the depression at the orifice controlled by the "volume control screw" (W) lifts the petrol from the float chamber, through the calibrated hole in the end of the pilot jet, upwards, then horizontally and finally downwards to emerge via the volume control screw orifice. The small hole

in the choke tube near the edge of the throttle butterfly acts as an air bleed to assist the control of the pilot mixture strength. The orifice (b) is a fixed air bleed assisting the emulsification of the pilot jet output.

#### PILOT MIXTURE STRENGTH ADJUSTMENT

3. As the throttle commences to open, the small hole in the choke tube near the edge of the throttle butterfly assumes a different function, for it will be seen that as the edge of the throttle recedes, a depression occurs and the air bleed is transformed into an additional petrol supply. The control of the pilot mixture strength is therefore by adjustment of the screw (W). Screwing it in weakens the mixture and vice-versa. The slow running speed of the engine is controlled in the usual way by adjustment of the spring loaded screw mounted on the abutment plate of the throttle lever (L) assembly. After the slow running speed has been adjusted, the free play in the throttle cable should be adjusted to not more than  $\frac{1}{8}$  in. by means of the adjuster at the abutment bracket on the top of the carburetter

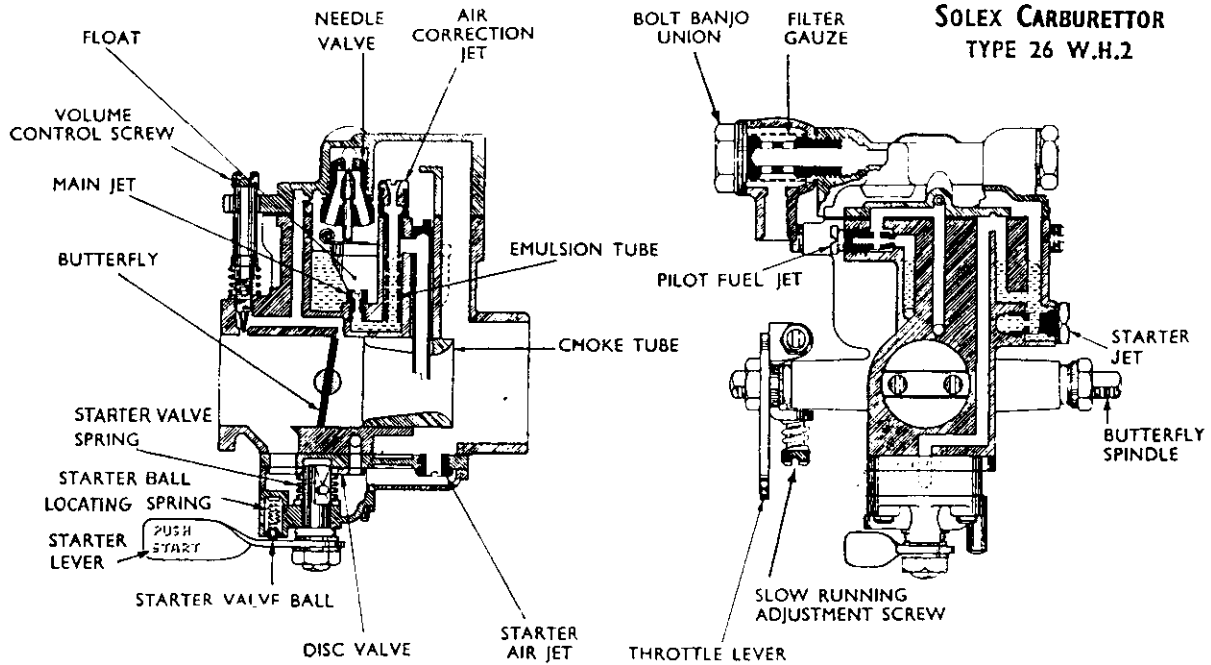


Fig. 1. Carburettor: Side and End Elevation.

### SOLEX "BI-STARTER"

4. Close the throttle to the idling position and put the Solex "Bi-starter" in action by moving the lever (SL) to the "ON" position, i.e. so that the disc valve (C) rotates allowing holes in it to register with the channels (D) and (d) in the face of the carburettor body. When the engine is turned over, intense suction occurs on the channel (d) and is transmitted via the interior of the starter to channel (D), thereby lifting petrol from the float chamber, through the starter petrol jet (GS) to supplement the supply already discharged from the well above it to the starter and thence to the engine.

5. The petrol thus provided is mixed en route to the engine with air admitted by the starter air jet (GA), the sizes GA and GS have been selected to suit the capacity of the engine, so that in addition to correct mixture strength for starting from cold, the volume is sufficient to ensure continuity of running. When the engine is started, the lever (SL) is rotated over approximately half its arc, determined by the spring loaded ball registering with a hole in the lever (SL) and the small hole in the disc (c) registers with the inlet (D) reducing the mixture strength. Thus the engine can be warmed up without fear of "over-dosing". Nevertheless, since the mixture is necessarily very rich for starting and warming up purposes, the starter must be put out of action as soon as possible.

### TO REMOVE THE CARBURETTOR

6. Detach the throttle cable nipple from the throttle lever and detach the cable from the carburettor by pulling the nipple through the adjuster. Disconnect the fuel pipes by unscrewing the union nuts at the taps and the banjo bolts at the carburettor, do not lose the fibre washers and gauze filters from the carburettor banjos. Remove the rubber air filter connection from between the carburettor and air cleaner. Unscrew the two nuts securing the carburettor to the cylinder block and slide the instrument off the studs.

### TO DISMANTLE THE CARBURETTOR

7. Remove the three hexagon headed screws securing the float chamber lid. Remove the two screws at the sides of the float chamber securing the float. The correction jet is situated in the upper part of the float chamber and may now be unscrewed and the main jet is submerged in the lower part of the float chamber and may be unscrewed after the removal of the float. Remove the pilot jet stamped No. 45 and the starter petrol jet stamped No. 65 from the outside of the float chamber. Unscrew the pilot mixture adjusting screw. Remove the four screws securing the starter outer cover, and lift off the cover complete with lever. Dismantle the starter outer cover assembly by removing the nut securing the lever, and then the

washer, lever, copper washer and rubber sealing ring; the starter valve and spindle may then be pulled away from the inside of the starter cover. Remove the starter inner cover and body by unscrewing the two remaining screws. Remove the nut on the opposite end of the throttle spindle to the throttle lever. Lift off the washer and then disconnect the end of the spring from the throttle return lever, lift off the lever and then disconnect the spring from the locating hole in its abutment piece. Lift off the rubber sealing washer.

8. Now remove the two screws securing the throttle disc to the throttle spindle, from the engine end of the carburetter choke. Turn the throttle spindle and pull the throttle disc out towards the engine end of the choke. Now slide the spindle and lever out of the carburetter body, and remove the second rubber washer from the spindle. It is not necessary to detach the lever from the spindle unless measurement of the spindle shows that it should be replaced.

### TO INSPECT THE CARBURETTER

9. Thoroughly wash all parts of the carburetter in clean gasoline or kerosine, and blow all passages and jets with compressed air. Do not use wire or similar tools in an attempt to poke the jets clear. Check all threads and joint faces for damage or distortion and replace any unserviceable parts. Examine the operating cable for sharp bends or breaks in the casing and frayed strands in the inner cable, and replace or repair as necessary.

### TO ASSEMBLE THE CARBURETTER

10. Place a new rubber washer over the throttle spindle and lever assembly with the smaller diameter up against the lever. Insert the spindle through the carburetter from left to right viewed from the engine side of the carburetter with the operating portion of the lever nearest the engine. Pass the throttle disc through the spindle from the engine end of the choke, with the chamfer on the edge nearest the engine side being greater on the lower side of the disc. This is so that the disc is a snug fit in the choke when the throttle is fully closed. Centralise the holes in the disc with the screw holes in the spindle and insert the screws. Check that the disc is a good fit in the choke by holding the carburetter up to the light with the disc in the closed position; there should be no

leakages of light round the edges of the disc. If satisfactory tighten the screws.

11. Place a rubber washer over the other end of the operating spindle and then place the spindle return spring in position. Then fit the spindle return lever and finally engage the spring before pushing the lever right home and securing with the washer and nut. Place the starter valve body and the starter inner cover in position and secure lightly with the two end screws. Place the starter valve and spindle in position in the starter outer cover and place the rubber washer and copper washer in position on the spindle. The two small holes in the starter valve should be beneath the lever locating spring and ball. Place the spring and ball into position and fit the lever to the starter spindle and secure with the nut and washer. Place the outer cover assembly in position and insert the remaining four screws. Now tighten evenly all six screws, which secure the starter to the carburetter body.

12. Replace the pilot jet and starter jet in their respective positions on the outside of the float chamber. Replace the main jet in the lower part of the float chamber and the correction jet in the top of the emulsion tube. Hold the float in position and insert the two hinge pins, complete with washers, from the outside of the chamber so that they engage in the hinges of the float. Place the float chamber cover in position and secure with the three hexagon headed screws. Replace the pilot mixture adjusting screw.

### TO REPLACE THE CARBURETTER

13. Smear two paper joint washers with oil and place one washer over the manifold studs on the cylinder block, then the Tufnol insulating block and the second paper washer. Place the carburetter in position and tighten evenly the nut and washer on each stud. Place the rubber air filter connection in position. Replace the fuel pipes making sure that the gauze filters are in position at the banjo bolts and the fibre washers are in good condition. Pass the throttle cable nipple through the adjuster and engage it with the throttle lever.

14. Start the engine and set the spring-loaded throttle stop screw, on the lever, to give a reliable tick-over with the engine warm. Adjust the pilot mixture strength by means of the adjusting screw (W) and then reset the tick-over if necessary. Adjust the free play in the throttle cable to  $\frac{1}{8}$  in. at the abutment on top of the carburetter.

**AIR FILTER—DESCRIPTION**

15. The Vokes air filter is placed between the battery and the oil tank, and is of the oil wetted, felt element type. At regular intervals the element should be removed, washed in kerosene, allowed to dry and then soaked in oil before replacing in order to maintain its efficiency.

**TO REMOVE THE AIR FILTER ELEMENT**

16. Disconnect both battery leads and unscrew the battery carrier clip bolt. Lift off the battery and then unscrew the two bolts securing the carrier to the chaincase and the nut securing the carrier to the stud on the seat lug. Lift off the carrier, when the lid may be pulled off the air filter. The element is attached to the lid and no attempt should be made to separate them.

**TO CLEAN THE AIR FILTER ELEMENT**

17. Swill the element in successive baths of clean kerosene until no more dirt can be removed. Allow the element to drain or blow dry with compressed air, if available. Dip the element in light oil (see Servicing Schedule for recommended grade), and allow the excess to drain.

**TO REPLACE THE AIR FILTER ELEMENT**

18. Place the element in position and press the lid back on the filter casing, starting from the bottom and finishing at the top. Place the battery carrier in position and secure with the two bolts to the chaincase and the nut to the seat lug stud. Connect up the battery (**Negative earth Mk. 1. Positive earth Mk. 2 and 2B**) and tighten the battery clip bolt.

**CARBURETTER—BASIC PLAN DIMENSIONS**

DESCRIPTION	SIZE	DESCRIPTION	SIZE
<b>THROTTLE SPINDLE</b> Throttle spindle ... .. o/dia.	8.00 mm. 8.02 mm.	<b>SPINDLE HOUSING</b> Spindle housing ... .. i/dia.	8.08 mm. 8.10 mm.
<b>THROTTLE CABLE</b> Throttle inner wire o/all length	43 $\frac{1}{8}$ ins.	Throttle casing ... .. length	37 ins.

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## SECTION THREE

# GEARBOX

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### LIST OF CONTENTS

<i>Paragraph</i>	<i>Title</i>	<i>Page</i>
1	Description ... ..	42
2	Fault Diagnosis ... ..	42
3	To Remove the Gearbox from the Frame ... ..	42
8	To Dismantle the Gearbox ... ..	45
13	Dismantling and Reconditioning the Sub-Assemblies ... ..	46
14	Gearbox Casing ... ..	46
16	Gearbox Inner Cover ... ..	47
18	Gearbox Outer Cover ... ..	48
20	Clutch (Mk. 1 & 2) ... ..	48
23	Clutch (Mk. 2B) ... ..	49
26	To Assemble the Gearbox ... ..	51
30	To Install the Gearbox in the Frame ... ..	53
31	To Assemble the Clutch to the Gearbox ... ..	54
39	Chains ... ..	55
47	To Adjust the Primary Chain ... ..	56
49	To Adjust the Rear Chain ... ..	57
50	To Check the Wheel Alignment ... ..	57
	Basic Plan Dimensions ... ..	58
	Approved Special Tools ... ..	61

---

### LIST OF ILLUSTRATIONS

<i>Fig.</i>	<i>Title</i>	<i>Page</i>
1	Gearbox ... ..	43
2	Clutch ... ..	49
3	To Replace Clutch Shock Absorber Rubbers on the machine ... ..	50
4	To Replace Clutch Shock Absorber Rubbers ... ..	50
5	Gearbox Camplate in High (4th) Gear Position ... ..	51
6	Kickstarter Return Spring and Spindle ... ..	52
7	Chain Rivet Extractor ... ..	55
8	To Repair Chains ... ..	56
9	Primary Chain Adjustment Points ... ..	56
10	Wheel Alignment ... ..	57
11	Approved Special Tools ... ..	61

## Section 3

## GEARBOX

## DESCRIPTION

1. The Triumph Model TRW is fitted with a 4 speed gearbox, having gear ratios specially selected to meet with the varied conditions encountered when the motor cycle is used on active service. The gearbox is made up of the three sub-assemblies, namely:—

- (1) **Main Casing**—containing the gear control camplate, selector forks, main and layshafts and gear clusters.
- (2) **Inner Cover**—housing the gear selector quadrant, speedometer drive and kickstarter ratchet and pinion.
- (3) **Outer Cover**—containing the kickstarter quadrant, gear selector plungers and clutch operating mechanism.

The gearbox casing and covers are made of aluminium alloy DTD.424 which gives the utmost rigidity and strength. The gears are manufactured from high quality nickel steel and subsequently case hardened and are designed to withstand heavy loading. The mainshaft is supported by heavy duty ball races at each end, and the layshaft by bronze bushes which are pressed into the casing and inner cover. The speedometer drive, which is enclosed in the inner cover, is taken from the layshaft by means of spiral drive gears. The kickstart lever is of the folding type, enabling it to be folded away when not in use. The footchange lever faces forward, and by either depressing or raising it fully, positive selection of all gears is made. An indicator quadrant at the front of the inner cover shows the gear selected. Keyed to the gearbox mainshaft is the multi-plate cork clutch, which runs in oil and is operated by a rod which acts through the centre of the mainshaft. The clutch of the Mk. 2B has a transmission shock absorber incorporated in the clutch housing, whereas Mk. 1 and Mk. 2 machines have a shock absorber fitted to the engine mainshaft.

## FAULT DIAGNOSIS

2. Always free the clutch plates before starting the engine by lifting the clutch lever and operating the kickstarter. If it is difficult to select bottom gear from neutral, check the following points.

- (1) Clutch cable adjustment.  $\frac{1}{2}$  in. free play (Para. 32).

- (2) Engine Speed. Have tick-over as slow as is reasonably possible. (Sect. 2, Para. 3).

- (3) Primary chain adjustment. Not less than  $\frac{1}{2}$  in. vertical play (Para. 47).

- (4) Correct grade and quantity of oil in primary chaincase,  $\frac{1}{3}$  pint light oil.

- (5) Oil level in gearbox. Top up to level plug hole in rear of inner cover with engine oil.

- (6) Balance of clutch pressure plate springs (Para. 32). If it is difficult to change gear when on the move, check the above points and also:—

- (7) Footchange pedal return springs. The pedal should be returned to the central position, by the springs after each gear change. Check for fouling or breakage. (Para. 18 (4)).

- (8) Footchange plungers. If these are defective the pedal will meet no resistance, except the pedal return spring pressure, when moved away from the central position. Check the plungers for freedom in the quadrant and plunger springs for weakness or breakage. (Para. 18 (12)).

- (9) Tightness of kickstart ratchet nut. This locates the mainshaft by drawing it up against the T.S. bearing and if the nut is slack the mainshaft may wander (Para. 28 (5)).

- (10) Camplate plunger. The camplate plunger is housed in the acorn nut vertically beneath the gearbox and if it is defective the indexing will be poor, i.e. there will be a tendency to miss gear changes. Check the plunger for freedom in the nut and the spring for weakness or breakage. (Para. 14 (11)).

## TO REMOVE THE GEARBOX FROM THE FRAME

The terms "Left-Hand" or "Right-Hand" (abbreviated form "L.H." or "R.H." respectively) are assumed from the riding position.

3. (1) Disconnect the cables and remove the battery.

- (2) Remove the two base screws and strap nut to take away the carrier.

- (3) Remove the air filter.

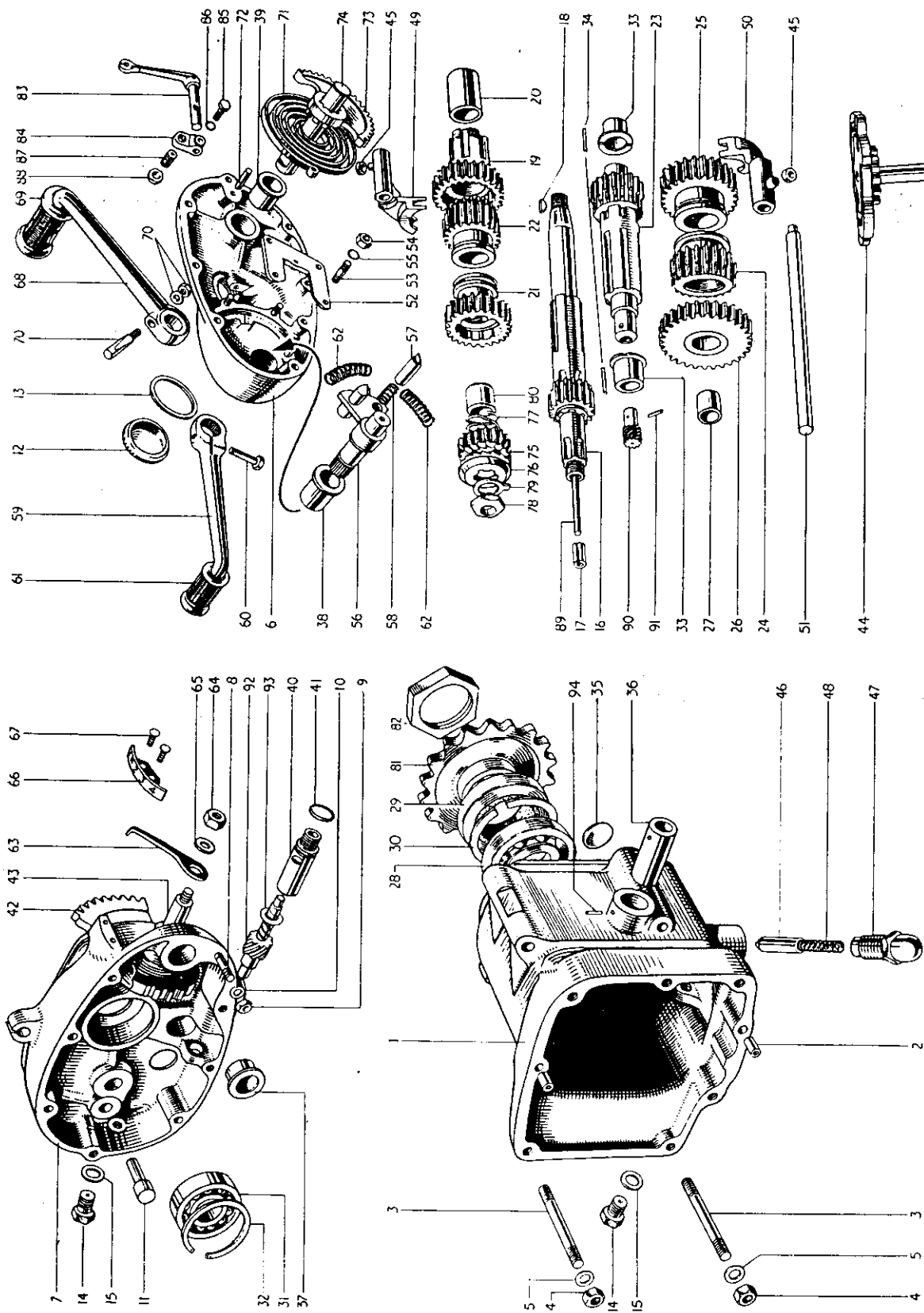


Fig. 1. Gearbox Casing and Gears.

## INDEX TO FIG. 1.

1	Casing.	32	Circlip.	64	Nut.
2	Dowel, inner cover.	33	Bush, layshaft.	65	Washer.
3	Stud.	34	Peg, layshaft bush.	66	Quadrant, gear indicator.
4	Nut.	35	Disc, layshaft bush.	67	Pin, quadrant fixing.
5	Washer.	36	Bush, gear selector camplate.	68	Crank, kickstarter.
6	Cover, gearbox outer.	37	Bush, footchange spindle inner.	69	Rubber, kickstarter crank.
7	Cover, gearbox inner.	38	Bush, footchange spindle outer.	70	Cotter pin with nut and washer.
8	Stud.	39	Bush, kickstart outer.	71	Spring, crank return.
9	Nut.	40	Bush, speedo drive gear.	72	Peg, spring anchor.
10	Washer.	41	Washer.	73	Quadrant, kickstarter.
11	Stop, kickstart quadrant.	42	Quadrant, gear operating.	74	Shaft, kickstarter axle.
12	Cap, oil filler.	43	Spindle, gear operating quadrant.	75	Pinion, kickstarter.
13	Washer.	44	Camplate, gear control	76	Ratchet, kickstarter.
14	Plug, oil level and drain.	45	Roller, gear control camplate.	77	Sleeve and spring, pinion.
15	Washer.	46	Plunger, gear control camplate.	78	Nut, kickstarter ratchet.
16	Mainshaft and low gear.	47	Bush, plunger.	79	Washer, lock.
17	Bush.	48	Spring, plunger.	80	Washer, plain.
18	Key.	49	Fork, gear selector mainshaft.	81	Sprocket, gearbox.
19	Gear, mainshaft high.	50	Fork, gear selector layshaft.	82	Nut, sprocket locking.
20	Bush, mainshaft high gear.	51	Rod, gear selector fork.	83	Lever, clutch operating.
21	Gear, mainshaft third.	52	Plate, footchange guide.	84	Arm, clutch operating.
22	Gear, mainshaft second.	53	Stud.	85	Peg, clutch operating lever.
23	Layshaft with high gear.	54	Nut.	86	Washer.
24	Gear, layshaft third.	55	Washer.	87	Pin, clutch lever adjusting.
25	Gear, layshaft second.	56	Plunger assy. gear quadrant.	88	Nut, lock.
26	Gear, layshaft low.	57	Plunger, gear quadrant.	89	Rod, clutch operating.
27	Bush, layshaft low gear.	58	Spring, plunger.	90	Pinion, speedo drive.
28	Bearing, high gear.	59	Pedal, footchange.	91	Peg, pinion to layshaft.
29	Oil seal.	60	Set screw.	92	Gear, speedo driving.
30	Circlip.	61	Rubber.	93	Washer, gear thrust.
31	Bearing, mainshaft.	62	Spring, pedal return.	94	Peg, camplate bush.
		63	Finger, gear indicator.		

4. Slacken off the exhaust branch pipe clip. Unscrew the front connection and silencer hanger bolt and remove the exhaust system complete.

5. (1) Remove the spindle nut and slide the foot-brake pedal off the spindle.

(2) Unscrew the left-hand footrest securing nut. Remove the footrest. Withdraw the other footrest complete with rod. Do not lose the distance piece between the primary chaincase and engine plate.

6. (1) Chaincase Cover —Mk. 1 and 2—disconnect the generator wire and remove the primary chaincase outer cover.

Mk. 2B—free the generator cable from the frame to allow the removal of the chaincase cover. Unscrew the drain plug and drain the oil from the chaincase. Remove the securing screws and withdraw the cover carefully from the inner. (**Note.**—On all Marks the outer cover houses the generator stator windings which can be damaged if roughly handled).

(2) Removal of the clutch should be proceeded with as follows. Unscrew the four slotted

clutch nuts with the special screwdriver provided in the tool kit, at the same time depressing the spring underneath with a knife blade to prevent the "pip" on the underside of the clutch nut locking in the spring (Fig. 5, Page 13). Withdraw the springs, pressure plate, clutch plates and push rod. Remove the clutch housing by first tapping back the locking washer tab and unscrewing the mainshaft nut. This may require a number of sharp blows on the box spanner tommy bar if the clutch locking tool is not available (see Fig. 6, Page 14). To facilitate removal of the clutch housing a special extractor tool is provided in the tool kit, which screws into the clutch hub. Tightening up the extractor bolt draws the assembly off the shaft. When the housing is free on the shaft, remove the spring link from the primary chain and complete the withdrawal.

(3) Unscrew the four bolts securing the chaincase to the crankcase and the chainguard fixing bolt and remove the inner chaincase.

7. (1) Take out the spring link and remove the rear chain from the drive sprocket.

- (2) Disconnect the cable nipple from the gearbox clutch lever and unscrew the adjuster completely from the inner cover to release the clutch cable.
  - (3) Unscrew the speedometer cable nut at the gearbox end and withdraw the cable.
  - (4) Unscrew the nut which secures the primary chain adjuster to the frame.
  - (5) Remove the gearbox clamp bolt nut by using the special spanner (Fig. 11) and tap the bolt through the frame lug. An ordinary open-ended spanner may be used if the right footrest is removed.
  - (6) Remove the nut and withdraw the gearbox pivot bolt. The gearbox may now be removed from the right side of the machine.
  - (7) Remove the two gearbox clamp plates.
- (5) Remove the four nuts and slide the foot-change guide plate off the studs.
  - (6) Withdraw the plunger quadrant from the bush.
  - (7) Remove the clutch lever arm peg screw. Press the kickstarter bush in sufficiently to allow the clutch lever to be withdrawn past it.
11. (1) Bend back the tab on the lock washer and undo the kickstarter ratchet and pinion securing nut. Withdraw the complete assembly.
  - (2) Take out the four screws, one of which is located inside the cover adjacent to the selector quadrant. Tap the cover to break the joint seal and remove the inner cover. To prevent the contents of the gearbox from coming away with the inner cover as it is removed, it is advisable to remove the gearbox from the vice and place it, cover uppermost, on the bench, when the joint seal between the inner cover and the main casing has been broken.
  - (3) Remove the split pin from the spindle and withdraw the spindle to release the gear operating quadrant.
  - (4) The speedometer drive gear and bush are removed as one unit. Place a soft metal drift against the spindle gear and by tapping gently, the assembly will be forced out of its housing.
  - (5) Remove the retaining circlip and press the ball race out from the opposite side.

### TO DISMANTLE THE GEARBOX

8. Before attempting to dismantle the gearbox, remove all road dirt, oil etc. from the exterior by washing in kerosine. Drain off the oil by removing the plug in the rear of the casing. Place the gearbox in the vice, with the pivot lug gripped between the vice jaws.
  9. Place a small metal bar or block between a sprocket tooth and the vice, to prevent the sprocket from rotating when the spanner is used on the sprocket nut. It may be necessary to tap the end of the spanner once or twice with a heavy hammer to free the nut (the thread is R.H.)
  10. (1) Unscrew the five screws and three nuts securing the outer cover to the inner cover. Tap the cover joint with a hide hammer to break the seal originally formed by the use of jointing compound. Grip the footchange lever and kickstarter crank and withdraw the cover from the gearbox.
  - (2) Remove the kickstarter cotter pin and nut and washer and tap out the pin. Slide the pedal off the shaft and withdraw the quadrant and spring assembly from the bush.
  - (3) Release the footchange quadrant plungers complete with springs by depressing and raising the footchange pedal.
  - (4) Slacken off the footchange pedal set screw
12. (1) Remove the selector fork rod.
  - (2) Slide the mainshaft from the case until the clutch end comes free from the high gear. The whole gear cluster can now be removed from the gearbox as one assembly. Care should be taken not to lose the rollers from the selector forks.
  - (3) Unscrew the acorn nut at the base of the main casing and withdraw the camplate plunger and spring. Remove the camplate from the bush.

- (4) Remove the two long casing to outer cover studs and the two dowels, casing to inner cover, and press out the high gear through the chain sprocket into the casing.
- (5) Ease the oil seal from the housing and discard.
- (6) Remove the bearing circlip and press the bearing out of the housing.

### DISMANTLING AND RECONDITIONING THE SUB-ASSEMBLIES

13. This chapter deals with the reconditioning of the sub-assemblies preparatory to reassembly. Each sub-assembly is dealt with as under.

- (1) Dismantling for inspection, where necessary.
- (2) inspection of the separate components, whose dimensions should be checked against the Data Sheets given at the beginning of the section to ascertain whether they are still serviceable.
- (3) Replacement, including recommended methods of removal and replacement of components such as bearings, bushes, etc.
- (4) Assembly of the sub-assemblies in preparation for complete rebuilding of the gearbox.

### GEARBOX CASING—INSPECTION

14. (1) Inspect for cracks and signs of damage to the joint faces. Check the pivot bolt lug for fracture, as this may have occurred if the primary chain has been adjusted at any time without first slackening off the pivot bolt.
- (2) Examine the two shafts carefully for signs of cracks, damaged threads, damaged splines and wear.
- (3) Check the layshaft bush for wear against the dimensions given in the Data Page 59. If the appropriate gauges are not available, use the end of the layshaft to estimate the amount of wear.
- (4) Wash the mainshaft and high gear bearings in kerosene and dry thoroughly with compressed air if possible. Test the outer race for roughness by spinning and check the end float. Inspect the balls and tracks for signs of pitting or indentation. Check that the mainshaft high gear is a good fit in the inner race.
- (5) Examine all the gears thoroughly for chipped, fractured or worn teeth. Check the internal splines and bushes. Make sure that the splines are free on their respective shafts with no tendency to bind, and the bushes in the mainshaft high gear and layshaft low gear are not worn or loose in the gear. Examine the kickstart ratchet mechanism for wear.
- (6) Check that the selector fork rod is not worn and is a good fit in the gearbox casing and the inner cover.
- (7) Inspect the selector fork running faces for wear. This will only have occurred if the gearbox has been continually used with a badly worn mainshaft bearing.
- (8) The camplate rollers are of case hardened steel and wear will be negligible.
- (9) The gear selector camplate should be inspected carefully for signs of wear in the roller tracks. (Wear will occur if the mainshaft main bearing has worn badly). Examine the spindle and gear wheel for wear. If wear is present, difficulty will be encountered in gear selection, causing subsequent damage to the gears. The early type camplates were of die-cast zinc-based alloy, and replacements should be made with the later pattern steel type.
- (10) Check the selector camplate bush for wear and location. The distance between the outer end of the bush and the machine boss is  $\frac{29}{24}$  in. (0.457in.), (0.449in.). The inner face of the bush will then protrude approximately  $\frac{1}{32}$  in. inside the case. These limits must be adhered to if ease of gear selection is to be ensured.
- (11) Ensure that the camplate plunger works freely in the housing and that the moving parts are free from rust. Compare the plunger spring length with that specified in the Data Sheets.
- (12) Examine the chain sprocket teeth for wear. If the teeth are sharp and slightly hooked, the sprocket should be replaced or serious chain trouble will result.
- (13) Check that the clutch rod is free from bends or wear.

### GEARBOX CASING RECONDITIONING AND REPLACEMENT OF WORN PARTS

15. (1) Minor cracks and fractures in the casing can be welded up, but this must be undertaken only by a specialist. Damage to the joint face may be relieved by using a flat scraper, or by rubbing the face against fine emery cloth on a surface plate. It is extremely important that these faces should be true to avoid leaks.
- (2) Remove the layshaft bush by first pressing out the aluminium disc from the inside and then press out the bush from the outside of the case.
- (3) To fit the layshaft bush is exactly the reverse of the removal. Take care to line the bush cut away with the steel peg in the casing boss. To facilitate fitting, the case should be heated before pressing the bush into or out of the casing.
- (4) The selector camplate bush is pegged, and the peg should be driven out into the bore with a fine pointed punch. The bush may then be pressed into the casing with a bolt and distance piece.
- (5) Support the casing under the bush housing and press the new bush in from the outside, chamfered end first. The distance between the end of the bush and the machined face of the boss should be  $\frac{29}{64}$  in. (0.457 in. to 0.449 in.).  
The bush should then be drilled through the hole in the housing with a No. 47 drill (.0785 in.), a  $\frac{1}{2}$  in. diameter mandrel inserted in the bush and the peg driven home.
- (6) To remove the mainshaft clutch rod bush, screw a tap into it and pull the mainshaft away from the tap.
- (7) The new clutch rod bush can be tapped into the mainshaft by hand and requires no special equipment.
- (8) Heat the mainshaft high gear wheel until it is possible to press out the old bush, using the new one as the driver. The bush must be pressed into the gear with the oil groove at the teeth end. Ream or broach (preferably broach) the bush to size.
- (9) Place the layshaft low gear over a suitable jig which holds the wheel firmly, but allows

the old bush to drop through. Press out the old bush, using the new bush as follows: one face of the gearwheel has internal teeth, and the bush should be pressed in with the internally chamfered end flush with this face. Broach the bush to size; if a broach is not available, the bush may be reamed to size.

### GEARBOX INNER COVER—INSPECTION

16. (1) Inspect for signs of damage to the joint faces, cracks, or fractures, particularly at the clutch cable adjuster lug, and kickstart quadrant stop.
- (2) Check the layshaft bush for wear against the dimensions given in the Data Page 59. If the appropriate gauges are not available, use the layshaft to estimate the amount of wear.
- (3) Wash the mainshaft bearing in kerosene and dry with compressed air if possible. Test the outer race for roughness by spinning and check the endfloat. Inspect the balls and tracks for signs of pitting or indentation, and check that the inner race is a tight push fit on the layshaft.
- (4) Examine the gear operating quadrant for wear on the teeth which engage with the camplate pinion also on the ratchet teeth which are actuated by the plungers. Check the freedom of the spindle in the housing.
- (5) Test the plunger quadrant bush for wear, using the quadrant if necessary.
- (6) Test the kickstarter quadrant bush for wear in the same method as described above.
- (7) Check that the kickstart stop peg is firmly pressed into the inner cover and not distorted.
- (8) Examine the speedometer gear for worn teeth and spindle. Check the fit in both the bush and the sleeve.

### GEARBOX INNER COVER REPLACEMENT OF WORN COMPONENTS

17. (1) Casing—see Para. 15 (1).
- (2) To remove the layshaft bush, heat the case and press the bush away from the housing, using a suitably shouldered tool.

- (3) To replace the layshaft bush, press in the new bush while the case is still hot. Make sure that the cut-away in the bush lines up with the peg in the inner cover.
- (4) To remove the footchange quadrant bush, screw a tap of suitable size into the bush to form a thread. Remove the tap and heat the cover locally round the bush. Reinsert the tap and hold the shank of the tap in the vice, and, using a hide hammer, tap the cover away from the bush.
- (5) To replace the footchange quadrant bush, press it straight into the housing, preferably whilst the cover is still warm. Support the cover directly underneath the housing to ensure that the bush is lined correctly with the housing, and is pressed firmly home.

#### GEARBOX OUTER COVER—INSPECTION

- 18. (1) Inspect the casing for signs of fracture, cracks and damage to the joint faces.
- (2) Check the freedom of action of the gear change plungers in the quadrant and the efficiency of the springs against the specifications laid down in the Data Page 60. Replace the springs if rusting has occurred.
- (3) Examine the plunger guide plate for wear.
- (4) Examine the footchange pedal return springs for fatigue and if they show signs of rusting due to condensation, they must be replaced.
- (5) Examine the kickstarter quadrant for chipped or broken teeth, looseness on the spindle and spindle wear.
- (6) Inspect the kickstarter return spring for fatigue cracks and signs of wear, particularly at the centre, where it engages on the splines on the spindle shaft.
- (7) Examine the gear change quadrant bush for ovality and wear.
- (8) Examine the kickstarter spindle bush for wear. Use the kickstarter spindle for a gauge if the correct plug gauge is not available.
- (9) The clutch lever arm should be a tight fit on the lever spindle. Examine the peg screw for wear and damage, and check the hole in the lever spindle to ensure that it has not become oval. Inspect the clutch lever adjusting pin to ensure that the ball bearing is securely peened into the end.
- (10) Inspect kickstart and gear change pedals to check that the arms are straight.

#### GEARBOX OUTER COVER—RECONDITIONING AND FITTING NEW COMPONENTS

- 19. (1) Casing—see Para. 15 (1).
- (2) Any high spots or rust on the gear change plungers should be eased down with fine emery cloth until they work freely in the housings. The plungers should present a good straight edge to the gear selector quadrant ratchet teeth and any burrs should be removed.
- (3) Any rust on the plunger guide plate should be removed and any high spots relieved with fine emery cloth. If the knife edges are worn, the plate should be replaced.
- (4) Heat the outer cover and press out the kickstarter spindle bush. If the cover is placed on a jig giving sufficient clearance for the bush to fall clear when pressed out, the need for removing the kickstart spring anchor will be obviated.
- (5) Use a jig to support the cover while pressing in the kickstarter spindle bush. If necessary, reheat the cover before the operation.
- (6) The gear change quadrant is changed in exactly the same manner, and may be pressed out and in at the same time as the kickstarter spindle bush.

#### CLUTCH (Mk. 1 and 2)

##### TO DISMANTLE

20. Place the clutch housing assembly on the bench with the open end upwards. Lift off the clutch centre and withdraw the four square headed pins. Push the clutch hub from the sprocket housing, taking care to retain the rollers. Wash all the parts prior to inspection.

##### INSPECTION

- 21. (1) Examine the sprocket teeth and the driving slots in the housing. Test the drive plates for freedom in the housing.

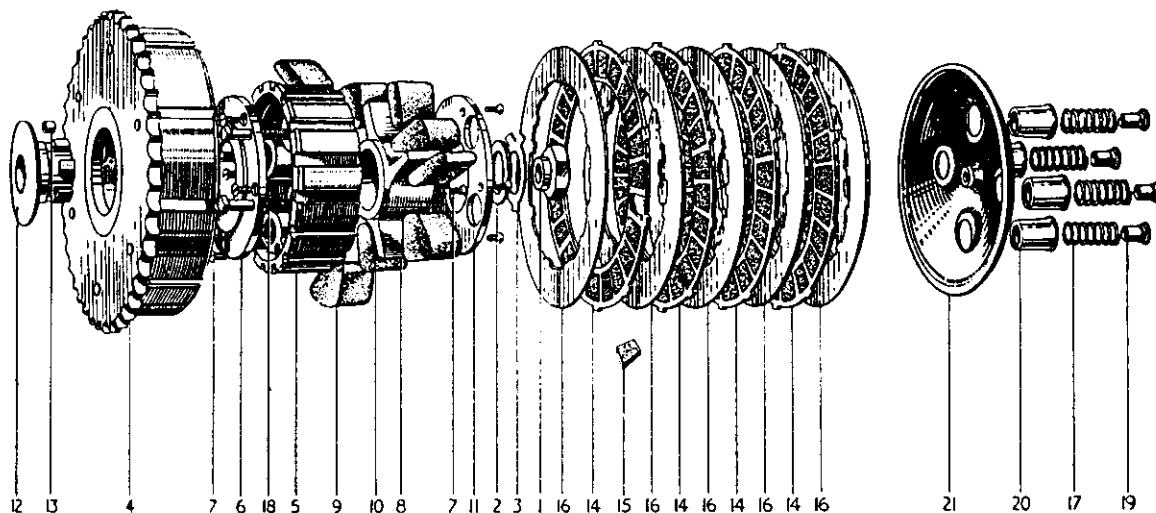


Fig. 2. CLUTCH AND SHOCK ABSORBER.

## INDEX TO FIG. 2.

1 Nut, clutch to mainshaft.	8 Spider, shock absorber.	15 Insert (cork).
2 Washer, plain.	9 Rubber insert, driving.	16 Plate, driven.
3 Washer, lock.	10 Rubber insert, rebound.	17 Spring, clutch pressure.
4 Housing, clutch sprocket.	11 Plate, outer shock absorber.	18 Pin, clutch pressure spring.
5 Centre, clutch.	12 Hub, clutch.	19 Nut, clutch pressure spring pin.
6 Plate, inner shock absorber retaining.	13 Roller, housing to hub.	20 Cup, clutch pressure spring.
7 Screw.	14 Plate, driving.	21 Plate, clutch pressure.

- (2) Examine the internal and external clutch centre splines for wear and check that there are no burrs to hinder the freedom of action of the plates. Slide the driven (plain steel) plates over the housing to check this.
- (3) Check the driven plates for score marks and distortion. Measure the thickness of the clutch plate inserts and fit new plates if necessary. Inspect all the plates for wear on the tabs, wear will be evidenced by steps.
- (4) Examine the springs for length and compare with the figures given in the Data Page 60.
- (5) Examine the rollers (20 off) and the inner and outer rolling surfaces on the housing and the hub for wear and pitting. Assemble together and check for freedom.
- (6) Inspect the clutch pins for damaged threads and bending. Fit new pins if bent or threads are damaged.

## TO ASSEMBLE

22. Place the clutch hub, splined end uppermost, on the bench and grease the roller race. Place the 20 rollers in position and place the sprocket and housing assembly over the rollers. Fit the four

clutch pins into the clutch centre and slide the centre on to the splines on the clutch hub. The clutch is now ready for assembling to the gearbox mainshaft.

CLUTCH (Mk. 2B MODEL)  
TO DISMANTLE

23. This clutch is of the shock absorber type and dismantling procedure is the same as for Mk. 1 and 2, except that in addition the clutch centre requires dismantling.

**Note.**—The removal and replacement of rubbers can be carried out on the machine if the drive-shaft adaptor is used to apply the torque to compress the drive rubbers, the clutch centre being locked in the same way. Select top gear and lock the back wheel by applying the brake (see Fig. 3 which clearly shows the operation).

Proceed as follows:—

- (1) The shock absorber unit is housed inside the clutch centre and is inspected by first unscrewing the four 2 B.A. countersunk screws from the outer retaining plate and removing the plate. If the rubbers do not require renewal, the plate should be refitted and screwed home tightly.

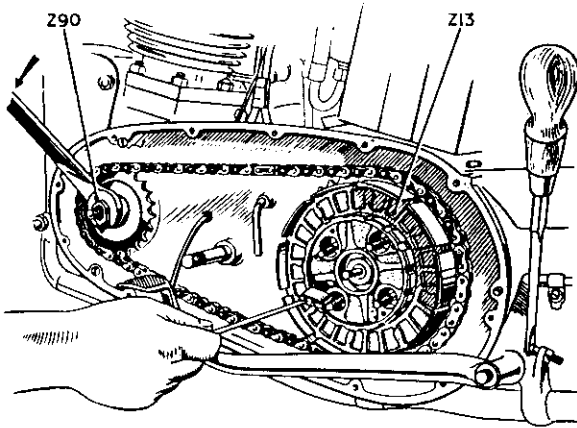


Fig. 3. To replace Clutch Shock Absorber Rubbers on the Machine.

- (2) If new rubbers are required, the old rubbers can be removed by building up the clutch housing, hub and centre assembly on a gearbox mainshaft, held vertically, keyway uppermost, in a vice. Using the clutch locking tool (Fig. 4) to lock the housing to the centre, apply a chain whip and turn the housing anti-clockwise to compress the drive rubbers sufficiently to be able to withdraw the rebound rubbers (the smaller size) (Fig. 4). Lift out the drive rubbers. If a gearbox mainshaft is not available, some means must be devised of holding the hub horizontal and to prevent it from rotating whilst torque is applied to the housing.
- (3) To dismantle the clutch centre lift out the spider and unscrew the four countersunk 2 B.A. screws securing the inner retaining plate to the clutch centre.

### INSPECTION Mk. 2B

24. Inspect all the clutch working parts as paragraph 20 in addition check the shock absorber clutch centre as follows.

- (i) Examine the spider carefully for signs of cracks, and check that it revolves freely in the inner and outer retaining plates and that it is not loose on the clutch hub. Screw up the two retaining plates and check that the spider is free between them.
- (2) At a major overhaul the rubbers should always be replaced.
- (3) Inspect the inner surfaces of the retaining plates for wear and replace if there is any tendency for the spider to bind.

- (4) Examine the 2 B.A. screws and fit new if necessary.

### TO ASSEMBLE

25. (1) Place the hub on the gearbox mainshaft (still held in the vice). Replace the rollers, greasing the inner and outer race to retain them and then fit the clutch housing to the hub.
- (2) Screw up the inner retaining plate and seat the spider in the clutch centre with the splines towards the plate. Fit the four square headed pins through the inner retaining plate and slide the centre over the hub splines. Place the washer over the mainshaft and tighten the nut to hold the assembly together. Place the clutch locking tool between the centre and housing, to lock the housing relative to the centre.
- (3) Turn the housing round clockwise and drop the drive rubbers into position.
- (4) Place the chain whip round the housing and force the sprocket anti-clockwise to compress the drive rubbers sufficiently to be able to drop the rebound rubbers in, taper towards the centre. Release the chain whip and fit the outer retaining cover and screw, and tighten securely. The clutch is now ready for assembly to the gearbox mainshaft.

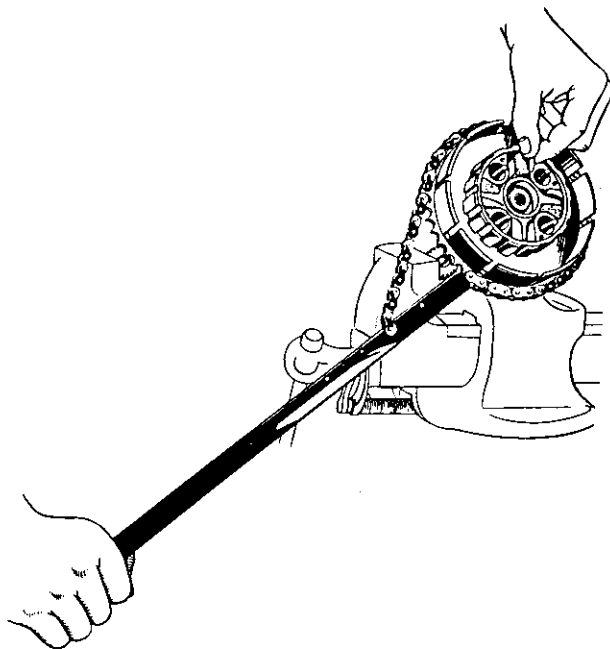


Fig. 4. To replace Clutch Shock Absorber Rubbers.

**TO ASSEMBLE THE GEARBOX**

26. Before commencing assembly all parts must be thoroughly clean. After inspection the parts must be laid out on the bench and oiled ready for final assembly. The following new parts must be fitted, irrespective of the condition of the originals.

- High gear bearing oil seal.
- Speedometer bush oil seal.
- Drain plug and level plug fibre washers.
- Filler cap oil seal washer.

**GEARBOX CASING**

27. (1) Press the ball race into the housing and secure with a circlip.
- (2) Press the oil seal into the race housing with the part number on the outside, and the leather "Rolling" towards the inside of the case.

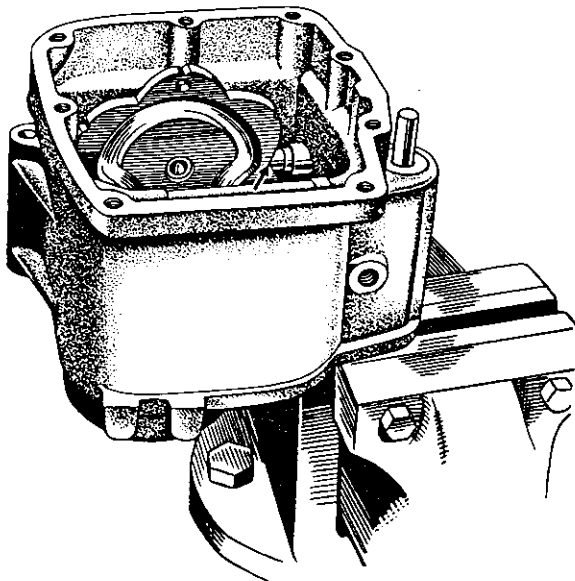


Fig. 5. Gearbox Camplate in (High) 4th gear position.

- (3) Turn the casing over and insert the high gear into the bearing and press it fully home.
- (4) Invert the casing, and, supporting the high gear from the inside, press the drive sprocket on to the high gear splines.
- (5) Secure the gearbox in the vice by clamping the pivot bolt lug between the jaws. Place a block between the sprocket teeth and vice to prevent rotation when the sprocket lock nut is tightened.
- (6) Slide the camplate spindle into the bush and then fit the camplate plunger assembly.
- (7) Fit the plunger spring inside the plunger and the plunger into the dome nut. Secure the camplate in high (4th) gear position (see Fig. 5).
- (8) Remove the gearbox casing from the vice, and with the open end facing upwards place a  $\frac{3}{8}$  in. diameter bar through the pivot bolt lug. Secure the bar vertically in the vice. Slide the mainshaft third gear over the mainshaft, followed by the mainshaft second gear, with their selector grooves towards the centre. Grease the camplate roller and place it on the peg of the smaller selector fork. Place the selector fork over the second and third gear, with the shaft of the selector fork below the mainshaft and the roller towards the clutch end of the casing. Lower the assembly into the case. With the gear cluster correctly located, press the selector fork until the camplate roller rests in the selector camplate track. Withdraw the mainshaft slowly, leaving the second and third gears and selector fork in position, to assist assembly of the layshaft gears.
- (9) Ensure that the layshaft high gear is pressed home on the layshaft. Assemble to the layshaft the second gear and third gear with the selector fork grooves facing. Fit the selector fork into the grooves, with the shaft of the selector above the layshaft and the camplate roller towards the open end of the gearbox. Apply grease to the roller and fit to the selector fork peg. Do not oil the layshaft bush, but very lightly smear the shaft with oil—if the bush is oiled an air lock is formed thus preventing correct location of the shaft. Lower the layshaft assembly into the gearbox, small gear first, until the camplate roller engages in the camplate track.
- (10) Oil the selector rod and thread it very carefully through the selector forks, shoulder end first, and engage it in the locating hole in the clutch end of the casing.
- (11) Check that the mainshaft low gear is pressed firmly home on the mainshaft. Oil the mainshaft and thread it through the mainshaft gears.
- (12) Place the layshaft low gear over the layshaft end with the internal teeth facing inwards. Place a straight edge over the gearbox end and test the clearance between the running

face of the layshaft low gear and the outer face of the inner casing. Minimum allowable clearance is 0.005 in. When carrying out this measurement it must be remembered that an excess of oil in the casing layshaft bush may have caused an air lock, causing the layshaft to "float" and giving a false reading. If the clearance is less than specified the layshaft bush cannot have been fully located, or, if it has, the face of the bush must be cleaned up. Remember that a layshaft seizure means a locked rear wheel.

- (13) Fit the hollow dowels in the casing end before assembling the inner cover.
- (14) Fit the two long casing studs. The casing is now ready to receive the gearbox inner cover.

### GEARBOX INNER COVER

28. (1) Press the ball race into the housing and secure with a circlip.
- (2) Place the gear operating quadrant in position in its housing, with the longer arm away from the cover. Replace the spindle, screwed end facing outwards. Line up the split pin holes, insert the split pin and turn over both ends. Fit the indicator, washer and nut.
- (3) Fit the speedometer gear thrust washer over the gear spindle and thread the spindle into the speedometer gear bush. Enter the assembly into the inner cover, gear first. Fit the oil seal into the annular groove in the bush and press the bush home until the keyway in the bush lines up with the screw hole. If difficulty is encountered in locating the bush, due to the oil seal washer not entering the housing, a clip should be used to compress the washer radially in the same manner as the piston rings are compressed before entering the piston into the barrel.
- (4) Lightly smear jointing compound on to the outer face of the casing. With the selector quadrant held in the high (4th) gear position, assemble the inner cover to the casing. Tighten the casing screws, remembering the screw adjacent to the selector quadrant inside the cover. The action of the selector assembly can be checked if the quadrant is operated by a screwdriver and the high gear and main-

shaft are rotated at the same time. Gear selection should be correct if these instructions have been carried out correctly.

- (5) Assemble on to the mainshaft with the selector still in high (4th) gear, in the following order:—Plain washer, sleeve, spring, pinion with the ratchet face facing outwards, ratchet, lock washer and nut. Position the gearbox in the vice, so that the jaws are gripping the pivot bolt boss (as in dismantling procedure—Para. 8). Lock the gears by placing a short tommy bar or block between the chain sprocket and the vice, and tighten up the ratchet nut. Bend the locking washer tab over when the nut is fully tightened. The gearbox is now ready to receive the outer cover.

### GEARBOX OUTER COVER

29. (1) Slide the clutch lever into its housing, which may require the kickstarter quadrant spindle bush to be pressed inwards slightly, at the same time threading the clutch operating arm over the shaft, making sure that the adjusting nut is facing outwards. Fit the peg screw and locate it in the hole in the clutch lever. Fully tighten up. The clutch lever adjusting pin, which has the steel ball fixed in the end; should point towards the inside of the case. Press the kickstarter bush fully home after this operation.

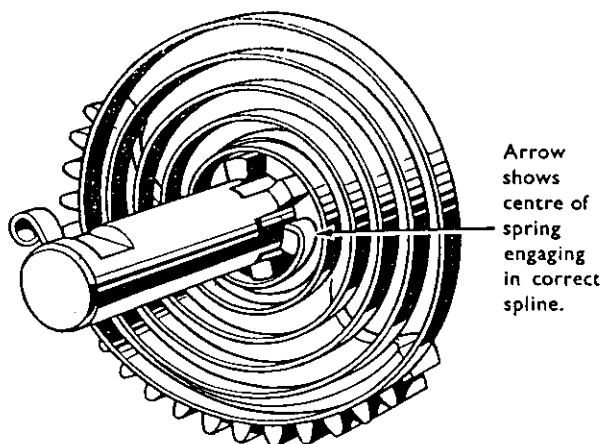


Fig. 6. Kickstarter Return Spring and Spindle.

- (2) Fit the splined end of the plunger quadrant through the footchange spindle bush; fit the footchange lever in the required position and tighten up the set screw.

- (3) Assemble the two footchange pedal return springs, allowing them to lie in their natural curve. It will be found easier to fit the second spring if the footchange pedal is used to compress the first. When the two springs are in position, place the guide plate over the four studs with the open end facing forward and the chamfers facing inwards. Fit the nuts and shakeproof washers to the studs and tighten down the guide plate. It will be found advantageous to fit the plungers and springs after the assembly of the kickstart mechanism.
- (4) Fit the return spring to the kickstart quadrant (see Fig. 6). Enter the spindle, cotter end first, into the kickstart bush from the inside of the cover. Fix the "eye" the return spring anchor peg at the rear of the cover. Wind the quadrant round in a clockwise direction (viewed from inside the gearbox) to tension the spring. This can be done easily by placing the kickstart quadrant inner spindle in a vice and turning the cover in a clockwise direction. Do this carefully with the cover located correctly to avoid the return spring coming off the peg. The cover should be wound one turn clockwise from the original position. Assemble the kickstart pedal and fit the cotter pin and nut. Turn the clutch lever outwards and allow the kickstart pedal to rest against it, thus preventing the return spring from unwinding.
- (5) Enter the springs into the plungers and depress the footchange pedal. The first plunger can be inserted into its housing with the knife edge inwards and the chamfer conforming with that of the guide plate. Ease the plunger into position, at the same time raising the footchange pedal until the upper plunger housing is exposed. Fit the other plunger in the same way. Gently return the pedal to its neutral position, where both the plungers will be retained by the guide plate. Any subsequent movement of the footchange lever will allow the plungers to spring out, therefore care must be taken when the outer cover is assembled to the inner cover.
- (6) Smear jointing compound on to the face of the inner cover. Grasp the footchange pedal in one hand and the kickstart lever in the other. Wind the kickstart pedal anti-

clockwise so that the quadrant will not foul the stop on the inner cover, when the outer cover is slid into position. Slide on the outer cover and tighten up the nuts and screws. Test the action of the kickstart pedal, making sure that there is sufficient action in the spring to return the pedal smartly, or, that it is not becoming "coil bound" when the pedal is depressed fully. Check that the gear selection is correct.

- (7) Fill to level plug in rear of inner cover with oil (see chart for correct grade of lubricant).

### TO INSTALL THE GEARBOX IN THE FRAME

30. (1) Fit the clamp plates and the adjuster to the gearbox. The two chamfered nuts are fitted to the upper stud. Tighten up fully.
- (2) Drop the gearbox into the frame, locate and slide the pivot bolt and clamp bolt into position. Fit the nuts and tighten slightly. Screw the primary chain adjuster bolt end nut into the frame and tighten fully.
- (3) Fit the speedometer cable to the drive and tighten up the securing nut.
- (4) Replace the rear chain over the drive sprocket and fit the spring link. Remember that the closed end of the link faces the direction of the travel of the chain.
- (5) Slide the footrest rod through the engine plates from the timing (right hand) side, making sure that the rod passes through the short distance tube between the rear engine plates. If the removal procedure (Para. 5 (2) ) was followed, the rod and right-hand footrest nut should have remained as one assembly.
- (6) Screw the clutch cable adjuster into the lug on the inner cover and fit the nipple into the lever.
- (7) Slide the oil retaining plate under the inner primary chaincase spring plate. Smear a thin film of jointing compound on to the mating faces of the crankcase and the inner primary chaincase. Thread the small distance piece on to the footrest rod which protrudes through the left engine plate. Place the chaincase over the gearbox mainshaft and bolt the chaincase to crankcase,

and the upper chainguard to the chaincase. Push the footrest rod through the boss in the inner primary chaincase to retain the distance piece. The correct distance piece must be used or damage to the stator will result.

### TO ASSEMBLE THE CLUTCH TO THE GEARBOX

31. (1) Fit the key to the gearbox mainshaft and slide the clutch assembly on to the shaft.
  - (i) **Mk. 1 & 2** assemble the lock washer, plain washer and sleeve nut in that order.
  - (ii) **Mk. 2B**—assemble the plain washer, lock washer and nut in that order.
- (2) Replace the primary chain round the drive and clutch sprockets and fit the spring link remembering that the closed end faces in the direction of travel.
- (3) Place a box spanner over the clutch nut and tighten fully, preventing the assembly from rotating by using the clutch locking tool. (Fig. 6, Page 14). If this tool is not available, strike the tommy bar a few sharp blows with a hammer and the clutch nut will be driven home. The lock washer should be set to lock the nut.
- (4) Assemble the clutch plates in the following order:—first a plain plate, followed by a corked plate and so on, leaving a plain plate to be fitted last. (Five plain plates, four corked plates).
- (5) Fit the push rod through the centre of the gearbox mainshaft and fit the pressure plate, the push rod engaging in the centre button.
- (6) Place the four springs in the cups and insert over the clutch pins, and through the four holes in the pressure plate. Screw on the nuts until the pins are flush with the outer face of the nuts. Depress the clutch lever at the handlebar to test the action.

### CLUTCH—ADJUSTMENT

32. (1) There should be about  $\frac{1}{32}$  in. free movement on the clutch rod and about  $\frac{1}{16}$  in. free movement on the handlebar lever. Adjustments are made at the clutch cable adjuster on the top of the gearbox inner cover. If sufficient adjustment is not provided by the cable adjuster, unscrew the oil filler cap,

when the clutch lever adjusting pin can be adjusted as required. Tighten the lock nuts fully after any adjustments.

- (2) The clutch pressure plate must spin true. If, when the kickstarter lever is depressed, there is a tendency for the pressure plate to spin out of true, it is an indication that the clutch springs are unevenly tensioned. If the clutch does "Wobble" depress the clutch lever and revolve the pressure plate by means of the kickstart, the part of the pressure plate which touches or scrapes the outer driven (plain) plate is easily spotted if viewed from above, and can be rectified if the clutch nut diametrically opposite is screwed in. The amount to be screwed in is found by trial and error until the plate runs true. Do not attempt to unscrew a clutch nut unless a screwdriver or similar tool is used (see Fig. 5, Page 13) to prevent damage to the underside of the nut. If the adjustment is not made correctly, the clutch will not free properly, which would cause difficulty in gear changing, particularly when selecting bottom gear from neutral.
33. (1) Adjust the primary chain to allow  $\frac{1}{2}$  in. vertical play at the tightest spot as instructed in paragraph 49.
  - (2) Smear the mating faces of the chaincase with jointing compound. Check that the spigot at the front is perfectly clean, as this ensures alignment of the rotor with the stator.
 

**Mk. 1 & 2** Primary chaincase covers have the generator terminal on the cover, whereas the Mk. 2B alternator lead is threaded through the inner cover.

**Mk. 1 & 2**—Fit the cover over the footrest spindle.

**Mk. 2B**—Thread the lead through the primary chaincase inner and fit the cover, keeping the lead taut so that no loops or kinks form inside the case for the primary chain to damage. Thread the rubber grommet over the leads and push it on to the boss on the inner cover. Tighten up the screws with a well fitting screwdriver and wipe away the surplus jointing compound.
34. (a) **Mk. 1 & 2**—Replace the generator lead and connect up at the terminal block on the chaincase cover.

- Mk. 2B**—Replace the three way lead along the frame and connect to the snap connectors under the saddle, matching the colours.
35. (1) Assemble the footrest to the spindle and tighten up the nut.
  - (2) Replace the brake pedal on the spindle, fit the spring washer and plain washer and tighten up the nut.
36. Replace the exhaust system. Fit the silencer hanger bolt and the front connection. Tighten up the branch pipe clip, making sure that the pipes are seated well into the ports.
37. (1) Fit the air filter to the frame and connect to the carburetter with the rubber connections.
  - (2) Fit the battery carrier to the frame and chaincase, tightening up the air filter in the process.
  - (3) **Mk. 1**—Connect battery (+ve) to wiring harness and (—ve) to battery carrier earthing point. **Mk. 2 & 2B** connect (—ve) to wiring harness and (+ve) to battery carrier earthing point. Do not overtighten battery carrier strap screw, otherwise the battery will be subject to undue strain.
38. (1) Pour 1/3 pint of light oil (as recommended in the lubrication chart) into the primary chaincase. Do not use engine oil, or difficulty in changing gear will be encountered due to sticking plates.
  - (2) Adjust the rear chain so that there is half an inch of free up and down movement at its tightest point. (See Para. 48).

### CHAINS

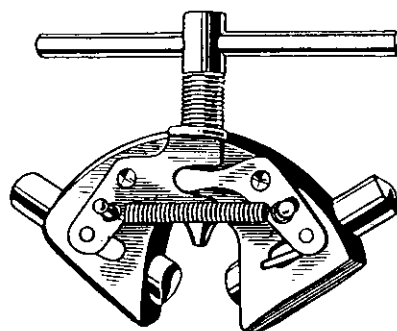
#### 39. To Remove the Primary Chain

- (1) It is necessary to remove the outer primary chaincase to gain access to the primary chain. First remove the nut from the rear brake spindle, and pull the pedal off the spindle. Unscrew the nut securing the footrest and pull off the footrest, taking care not to lose the dowels.
- (2) On the Mk. 1 and Mk. 2 machines first disconnect the generator wire and then remove the outer chaincase securing screws. On the Mk. 2B machine the screws should be removed and the generator cable disconnected at the triple snap connector under the saddle and the cable carefully pulled through the hole in the inner chaincase as the outer chaincase is removed.

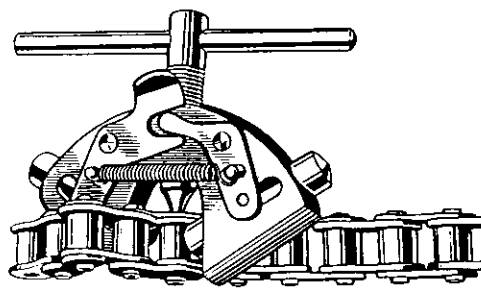
- (3) Now turn the engine by means of the kick-starter until the connecting link is in a convenient position. Use a pair of pliers to remove the spring clip on the connecting link, followed by the side plate and link. The chain may now be removed.

#### 40. To Remove the Rear Chain

It is possible to remove the rear chain, by removing the connecting link and pulling the chain off the gearbox sprocket. As it is rather difficult to replace the rear chain it is recommended that a length of approximately 90 links of  $\frac{5}{8}$  in.  $\times$   $\frac{3}{8}$  in. chain is obtained and the end of this is joined to the end of the chain on the machine and the sprockets turned so that the "slave" chain is drawn into position on the machine. With the "slave" chain in position on the machine, first gear should be selected to prevent the chain coming off the gearbox sprocket and the original chain detached for inspection and cleaning.



RIVET EXTRACTOR WITH JAWS OPEN



RIVET EXTRACTOR IN POSITION

Fig. 7. Chain Rivet Extractor.

#### 41. To Clean the Rear Chain

Remove all the external dirt by brushing vigorously with a wire brush. Set the chain in a bath of kerosine and move it about or brush it until all the joints are washed clean. If compressed air is available, blow dry. Alternatively hang the chain up to dry.

**42. To Inspect a Chain**

To determine whether a chain is fit for further use it should be laid flat on a smooth surface i.e. a linoleum covered bench top, and the links pushed together. A note should be made of the overall length of the chain and the chain should then be gripped by the ends and pulled to its full extent. If the extension in length exceeds  $\frac{1}{4}$  in. per foot length of chain, the chain should be discarded.

**43. Alterations and Repairs**

- (1) If the chains have been correctly serviced, a very few repairs should be necessary. Should the occasion arise to lengthen or shorten a chain, a rivet extractor and a few spare parts will cover all requirements.
- (2) To shorten a chain containing an even number of pitches remove the dark parts shown in Fig. 8 (1) and replace by cranked double link and single connecting link, Fig. 8 (2).



- (3) To shorten a chain containing an odd number of pitches remove the dark parts shown in Fig. 8 (3) and replace by single connecting link as Fig. 8 (4).



- (4) To repair a chain with a broken roller or inside link, remove the dark parts in Fig. 8 (5), and replace by two single connecting links and one inner link as Fig. 8 (6).



Fig. 8. To Repair Chains.

44. The rivet extractor can be used on all motorcycle chains up to  $\frac{3}{4}$  in. pitch, whether the chains are on or off the wheels. When using the Extractor:—

- (1) Turn the screw anti-clockwise to permit the punch and to clear the chain rivet.
- (2) Open the jaws by gripping the tommy bar and handle together (See Fig. 7).
- (3) Pass jaws over chain and release grip. Jaws should rest on a chain roller free of link plates. (See Fig. 7).
- (4) Turn screw clock-wise until punch contacts with and pushes out rivet end through chain outer link plate. Unscrew punch, withdraw extractor and repeat complete operation on the adjacent rivet in the same chain outer link plate. The outer plate is then free and the two rivets can be withdrawn from opposite sides with the opposite plate in position. Do not use the removed part again.

**45. To Lubricate the Rear Chain**

The rear chain is lubricated by immersing it in a bath of molten grease. (Grease should not be melted over an open flame, a pan of boiling water is a convenient source of heat). The chain must remain in the bath until the grease is cool. It is then taken out and the surplus wiped off.

**46. To Replace the Chain**

To fit the chains to the machine is simply the reverse of the removal procedure. It should be noted that the spring clip on the connecting links must have its closed end pointing in the direction of travel of the chain.

**47. To Adjust the Primary Chain**

To adjust the primary chain first find the tightest spot, then slacken the gearbox pivot bolt which

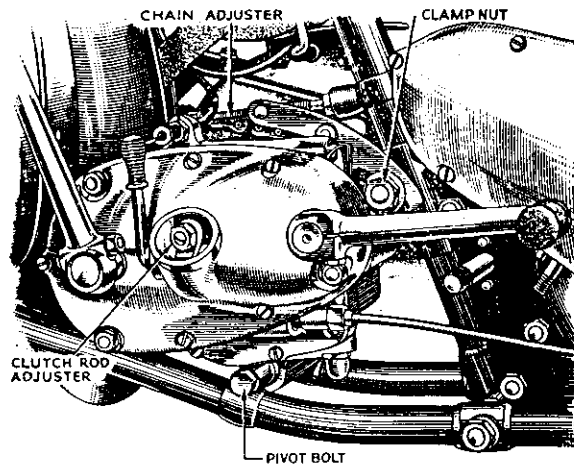


Fig. 9. Primary Chain Adjustment Points.

passes through the frame lugs beneath the middle of the gearbox from right to left. Next remove the right footrest and taper ended distance tube and push the footrest spindle through until flush with the engine plate. Slacken the gearbox clamp nut, which is the nut clamping on the curved slot in the gearbox plates in front of the gearbox and is accessible after removing the footrest. Before moving the gearbox slacken the rear chain if necessary. (See Para. 49).

48. The adjuster bolt is above the gearbox and should be screwed in to tighten the chain until there is  $\frac{1}{8}$  in. vertical play and then screwed out to slacken the chain to the correct  $\frac{1}{2}$  in. vertical play. By this method the adjuster is set in the correct position to resist the greater pull of the rear chain. When correctly adjusted, tighten the clamp nut and pivot bolt. Replace the footrest and tighten. Check the vertical play at the mid-point of the rear chain with the machine in neutral on the stand (See Para. 49).

49. **To Adjust the Rear Chain**

Slacken off the rear wheel spindle nut and the

two lock nuts on the adjusters, which are located in the rear fork ends. Screw the adjusters in to tighten the chain or out to slacken it. When carrying out this operation particular care should be taken to avoid disturbing the alignment of the wheel (see below).

A simple method of preserving the original alignment is to turn each adjuster an equal number of turns. When the chain tension is correct, i.e.  $\frac{1}{2}$  in. vertical play, tighten up the wheel spindle nuts, and the adjuster lock nuts. Finally check the wheel alignment.

50. **To Check the Wheel Alignment**

The wheels should be fitted up with two straight wooden battens about seven feet long. With the machine off the stand the battens should be placed alongside the wheels on both sides of the machine about four inches from the ground. When both the battens are touching the rear tyre on both sides of the wheel centre, the front wheel should be midway between and parallel to both battens. Any alteration necessary must be made by adjusting the rear chain adjuster screws after loosening the wheel spindle nuts.

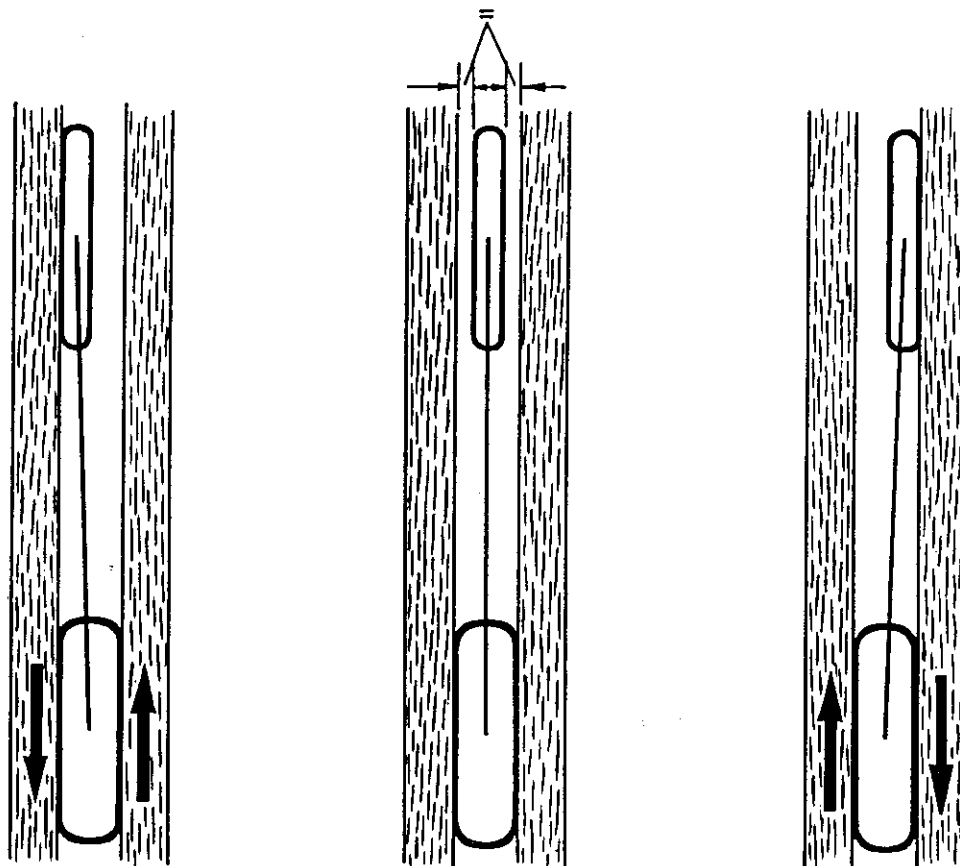


Fig. 10. Wheel Alignment.

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**GEARBOX AND CLUTCH—BASIC PLAN DIMENSIONS**

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
-------------	-------------	-------------	-------------

**GEARBOX OUTER COVER**

**BEARING HOUSINGS**

Footchange spindle bush	i/dia.	0.8745 0.8755
Kickstarter shaft bush ...	i/dia.	0.8745 0.8755
Speedometer drive bush	i/dia.	0.6100 0.6105

**FOOTCHANGE SPINDLE**

Spindle LH ... .. dia.	0.6238 0.6223
Spindle RH ... .. dia.	0.7488 0.7473

**KICKSTARTER SHAFT**

Shaft LH ... .. dia.	0.6205 0.6215
Shaft RH ... .. dia.	0.747 0.748

**BUSHES**

Bush, footchange spindle	o/dia.	0.8765 0.8755
Bush, kickstarter shaft ...	o/dia.	0.8755 0.8765
Bush, speedometer drive	o/dia.	0.6100 0.6095
Bush, spindle LH ... i/dia.		0.6255 0.6245
Bush, spindle RH ... i/dia.		0.7505 0.7495
Inner cover bearing ... i/dia.		0.624 0.623
Bush, shaft RH ... .. i/dia.		0.751 0.752

**GEARBOX INNER COVER**

**GEARBOX INNER COVER BEARING HOUSINGS**

Mainshaft bearing ... i/dia.	1.8733 1.8738	
Layshaft bush ... .. i/dia.	0.874 0.875	
Footchange spindle bush	i/dia.	0.8745 0.8755

**GEARBOX INNER COVER BEARINGS AND BUSHES**

Bearing, mainshaft ... o/dia.	1.8747	
1 $\frac{1}{8}$ in. o/dia. $\times$ $\frac{3}{4}$ in. bore $\times$ $\frac{9}{16}$ in. wide	1.8742	
Bush, Layshaft ... .. o/dia.	0.8755 0.8760	
Bush, footchange spindle	o/dia.	0.8765 0.8755

For other Dimensions see Footchange Spindle and Kickstarter Shaft

## GEARBOX

## Section 3

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
-------------	-------------	-------------	-------------

## GEARBOX CASING

## GEARBOX CASING BEARING HOUSINGS

High gear bearing ... i/dia.	2.4993 2.4998
Camplate bush ... i/dia.	0.6873 0.6880
Layshaft bush ... i/dia.	0.874 0.875

## GEARBOX CASING BEARINGS AND BUSHES

Bearing, high gear ... o/dia.	2.4990
2½ in. o/dia. × ⅝ in. × 1¼ in. bore	2.4995
Bush, camplate ... o/dia.	0.6882 0.6887
Bush, layshaft ... o/dia.	0.8755 0.8760

## SHAFTS AND GEARS

## SHAFTS AND GEARS

Gear, mainshaft high ... i/dia.	0.907 0.908
Mainshaft LH ... o/dia.	0.8098 0.8103
Mainshaft RH ... o/dia.	0.7496 0.7498
Layshaft ... o/dia.	0.6845 0.6850
Spindle, camplate ... o/dia.	0.5000 0.4985

## BEARING AND BUSHES

Bush, high gear ... o/dia.	0.9085 0.9095
Bush, high gear ... i/dia.	0.8135 0.8145
Bearing, mainshaft RH ... i/dia.	0.7497 0.7502
Bush, layshaft ... i/dia.	0.6865 0.6885
Bush, camplate ... i/dia.	0.5005 0.4998

## CLUTCH

## CLUTCH PUSH-ROD

Push-rod ... o/dia. $\frac{7}{32}$ in.	0.21875
Mainshaft bore ... i/dia.	0.377 0.379
Push-rod ... length	12.185 12.200

## BUSH—MAINSHAFT LH

Bush, split ... i/dia.	0.288
Bush, split ... o/dia.	0.380 0.384

Section 3

GEARBOX

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
<b>CLUTCH HUB BEARING</b>		<b>CLUTCH HUB BEARING</b>	
Bearing, hub ... o/dia.	1.3735 1.3745	Bearing housing ... i/dia.	1.8775 1.8760
Bearing, hub ... width	0.243 0.244	Bearing housing ... width	0.240 0.241
Roller, bearing (20 off) ... dia. width	0.250 0.236		

CLUTCH FRICTION PLATE

<b>CLUTCH PLATE (CORKED)</b>		<b>CLUTCH PLATE (BONDED)</b>	
Cork (finished thickness in plate) $\frac{5}{32}$ in.	0.1562	Finished thickness... o/all	.1425

CLUTCH OPERATING CABLE

<b>CLUTCH CABLE</b>		<b>CLUTCH CABLE</b>	
Clutch inner wire o/all length	$54\frac{1}{8}$	Clutch casing ... length	$50\frac{5}{8}$

SPRINGS—FREE LENGTH

Gear camplate plunger ... length	2.50	Footchange quadrant plunger length	1.25
Footchange pedal return length	1.78	Clutch pressure spring ... length	1.05

CHAINS

PRIMARY CHAIN

$\frac{1}{2}$  in.  $\times$  .335 in.  $\times$  .305 in. ... length 74 links

REAR CHAIN

$\frac{5}{8}$  in.  $\times$  .400 in.  $\times$   $\frac{3}{8}$  in. ... length 90 links

Permissible wear  $\frac{1}{4}$  in. per ft. length

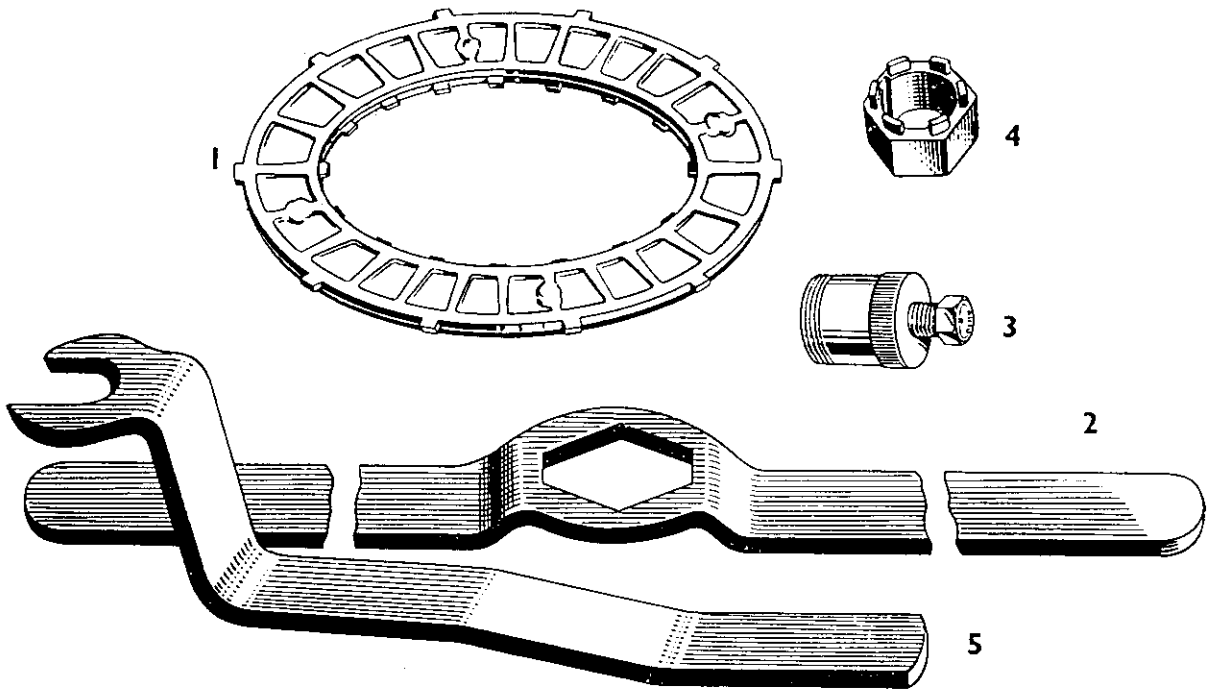


Fig. 11. Approved Special Tools.

APPROVED SPECIAL TOOLS

Reference No. Fig. 11		Part Number
1	Lock plate for clutch ... ..	Z.13
2	Gearbox sprocket nut spanner...	Z.63
3	Clutch hub extractor ... ..	D.50
4	Drive shaft adaptor ... ..	Z.90
5	Gearbox spanner ... ..	Z.62



SECTION FOUR

# TELESCOPIC FRONT FORK

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## LIST OF CONTENTS

<i>Paragraph</i>	<i>Title</i>	<i>Page</i>
1	Description ... ..	64
2	To Remove the Fork from the Frame ... ..	64
3	To Dismantle the Fork ... ..	64
6	Inspection and Repair of Fork Components ... ..	67
10	To Assemble the Fork ... ..	70
14	To Fit the Front Fork to the Frame ... ..	72
15	To Change the Pressure Tube Units ... ..	74
17	To Change the Fork Springs ... ..	74
	Basic Plan Dimensions ... ..	75
	Approved Special Tools ... ..	76

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## LIST OF ILLUSTRATIONS

<i>Fig</i>	<i>Title</i>	<i>Page</i>
1	Telescopic Front Fork ... ..	65
2	Front Fork held in Vice ... ..	66
3	To Check the Head Lug ... ..	67
4	To Check the Crown Lug ... ..	68
5	To Check the Cover Tubes ... ..	69
6	Pressure Tube Unit ... ..	70
7	Use of Front Fork Alignment Gauge ... ..	73
8	Approved Special Tools ... ..	76

**DESCRIPTION**

1. Apart from any repair work and major overhauls, the Triumph telescopic fork requires little attention other than periodically draining and re-filling with oil. This chapter is written with major overhauls in mind, but mention is also made of the action required for repairing and re-aligning damaged forks. No special equipment is required, though a number of special tools will make the task of overhauling simpler. Do not attempt to straighten badly bent stanchions, head and stem lugs etc., as the internal structure of the metal may have been damaged, and this will have grave results when the forks are again subjected to road conditions.

**TO REMOVE THE FORK FROM THE FRAME**

2. Place the machine on the rear stand and place a box under the crankcase so that the front wheel is 3 or 4 inches from the ground. Proceed as follows:—

- (1) Disconnect the positive and negative leads at the battery, by unscrewing the connectors.
- (2) Remove the headlamp rim. Disconnect and remove the reflector Mk. 1 or pre-focus unit Mk. 2 and Mk. 2B and unscrew the three screws securing the lamp fixing ring and remove from the nacelle.
- (3) Remove the steering damper knob and rod by unscrewing the knob and lifting up. Do not lose the steel washer between the knob and the fork stem sleeve nut.
- (4) Unscrew the four screws securing the motif flashes and remove.
- (5) Disconnect the earthing wire terminal at the steering damper anchor bolt, but leave the bolt in position until later.
- (6) Unscrew the two nuts and bolts at the rear of the nacelle top cover. Turn the handlebars to the right, and disconnect the brown wire from the horn through the rear opening of the nacelle. Unscrew the dipper switch and remove the mechanism. Raise the cover, disconnect the 5-way connector and disconnect the speedometer cable from the speedometer head and remove the cover complete with electrical gear and speedometer.
- (7) Unscrew the 4 nuts from the handlebar

“U” bolts and rest the handlebars on a piece of cloth over the petrol tank. The cloth protects the paint from scratches.

- (8) Mk. 2 and 2B only: Disconnect the parking light (red and black) lead at the bottom of the 5-way connector. (N.B.—Parking light in headlamp Mk. 1).
- (9) Remove the cable clip which holds the 5-way connector to the fork stanchion and withdraw the wiring harness from the rear of the nacelle.
- (10) Take off the spindle nut at the base of the right fork member and slacken off the pinch bolt at the base of the left fork member. Remove the brake pivot pin by withdrawing the split pin. Remove the brake cable assembly. Unscrew the anchor plate securing nut and bolt; knock out the wheel spindle and remove the wheel.
- (11) Remove the mudguard and front stand from the forks by removing the remaining bolt at the centre bridge and 4 bolts at the wheel spindle lugs.
- (12) Unscrew the two large stanchion cap nuts. A ring spanner should be employed for this operation in order to avoid damage to the nut head.
- (13) Remove the crown and stem sleeve nut, undo the top lug pinch bolt, and, using a soft metal drift, give the top lug a sharp blow from underneath to loosen it from the taper of the stanchions. Remove the steering damper anchor bolt and raise the top lug lifting with it the two stanchion cap nuts which carry the pressure tube and spring assemblies. Ease the fork crown and the stem downwards from the frame head lug. The complete fork assembly may now be withdrawn from the frame. If care is taken, the top ball race can be left undisturbed and the balls collected from the lower race as the clearance becomes sufficient.

**TO DISMANTLE THE FORK**

3. It is assumed that the fork has been removed as one complete assembly from the frame as described in paragraph 2. Proceed with the dismantling in the following manner.

- (1) Unscrew the drain plugs in the bottom cover tube and pump the tube up and down to force out the oil.



## INDEX TO FIG. 1.

1 Lug, fork head.	20 Bolt, wheel lug pinch.	39 Tube, pressure.
2 Bolt, pinch.	21 Nut.	40 Body, pressure tube valve.
3 Nut.	22 Sleeve, dust excluder.	41 Sleeve, pressure tube.
4 "U" bolt.	23 Washer, felt.	42 Bolt.
5 Nut.	24 Washer.	43 Washer, copper.
6 Crown and stem.	25 Washer.	44 Cone.
7 Nut, sleeve.	26 Bearing, upper.	45 Cone.
8 Bolt, pinch.	27 Stanchion.	46 Cover, dust.
9 Nut, stop.	28 Plug, oil filler.	47 Knob, damper assy.
10 Cover, nacelle, LH.	29 Washer.	48 Washer, damper.
11 Cover, nacelle, RH.	30 Nut, cap.	49 Sleeve.
12 Nacelle top.	31 Bearing, stanchion lower.	50 Pin, securing.
13 Motif, LH.	32 Nut, hydraulic stop.	51 Plate, damper anchor.
14 Motif, RH.	33 Spring, fork.	52 Bolt, anchor plate.
15 Washer, felt.	34 Rod, oil restrictor.	53 Nut.
16 Cover, bottom tube, LH.	35 Restrictor, oil.	54 Disc, friction.
17 Cover, bottom tube, RH.	36 Cup, oil restrictor.	55 Plate, friction.
18 Plug, drain.	37 Pin, cup.	56 Clip, mudguard.
19 Washer.	38 Nut.	57 Clip, speedometer cable.

- (2) Hold the fork horizontally with the nacelle uppermost and grip the stem between the jaws of a vice. (See Fig. 2).
- (3) Unscrew the pressure tube valve body bolts and withdraw the pressure tube assemblies (pressure tube, rod, fork, spring and cap nut).
- (4) Remove the fork top lug from the fork stem.
- (5) Remove both fork crown pinch bolts.
- (6) Unscrew the small filler plug in the upper part of each stanchion.
- (7) Drive out the stanchions from the fork crown. Difficulty may be encountered here if the stanchions have become corroded. In such cases it is advisable to screw a threaded drift ( $1\frac{1}{16}$  in.  $\times$  26 C.E.I.) (Fig. 2) into the stanchion top to prevent damage to the taper or the threads. Alternatively, if the hexagon is ground off a spare stanchion cap nut, and a rod  $\frac{3}{4}$  in. diameter and 12 ins. long is welded to the top, it provides an excellent drift. (The nut is centre tapped  $\frac{5}{16}$  in.  $\times$  26 C.E.I. and one end of the rod may be turned and screwed to this thread to provide a pilot fixing before welding).
- (8) Mk. 1—Lift off the nacelle covers. Mk. 2 and 2B—Remove one nut from the parking light fixing bolts and remove the nacelle covers. The parking light will come away with one of the covers.

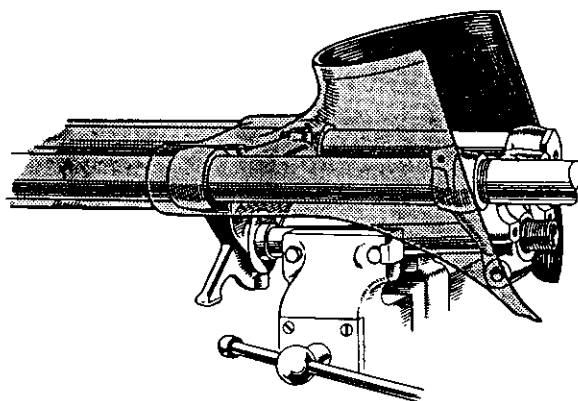


Fig. 2. Front Fork held in Vice.

- (9) Remove the top cover tube felt washers from the inside of the cover tubes, if they did not come away when the stanchions were removed.
- (10) Remove the horn and bracket assembly from the fork crown lug, by unscrewing the two bolts.

## DISMANTLING THE COVER TUBE ASSEMBLIES

4. (1) Place the cover tube assembly in a vice and grip it by the bottom spindle lug.
- (2) Using the combination spanner, unscrew the cover tube dust excluder and take it off the stanchion.

- (3) Pull the stanchion smartly away from the cover when the top bearing will come away with the stanchion.
- (4) Grip the stanchion in the vice (not on the bearing surface) and undo the hydraulic stop nut. Drive off the bearing.
- (5) Remove the steel retaining ring, felt washer and top retaining ring from the dust excluder sleeve.

### DISMANTLING THE PRESSURE TUBE UNIT

5. (1) Compress the main spring sufficiently to grip the pressure tube rod and unscrew the cap nut. Lift off the main spring.
- (2) Grip the pressure tube body between circular clamps and unscrew the pressure tube support sleeve.
- (3) Withdraw the pressure rod assembly from the pressure tube.
- (4) Unscrew the pressure valve tube body from the pressure tube.

### INSPECTION AND REPAIR OF FORK COMPONENTS

6. Telescopic forks which have received minor damage may possibly be repaired without the need of new parts. The stanchions suffer most damage in a crash and it is essential that new stanchions are fitted if the damage is greater than the allowance shown in paragraph 7(2). In addition, the fork crown may be out of alignment, but as this is made from a mild steel stamping it is possible to re-align it. If a bottom cover is damaged it must be replaced, for the inner face is the bearing surface for the stanchion bottom bearing. To check the moving parts of the fork for truth, an engineers surface table is needed, or if not available, a piece of flat plate glass makes a good substitute.

7. (1) Check the nacelle covers for dents and splits. Tap out any dents, particularly those which have occurred on the cover sleeves. Hold a round steel bar,  $1\frac{1}{8}$  in. dia. firmly in a horizontal position. Place the sleeve over this bar and tap the dent with a 1 lb. hammer, until the dent is brought level with its surroundings. Weld any cracks or splits.

- (2) A damaged stanchion can be trued if the bow does not exceed  $\frac{1}{32}$  in. If the stanchion shows a sharp bend or indentation at the fork crown position, it must be discarded. To true the stanchion, place it between two suitable swage blocks and apply pressure by a hand press to the highest position. Re-check by rolling the stanchion on a surface table and finally place in a lathe and check for concentricity.
- (3) Place the head lug in a vice and fit and tighten the stanchions with the cap nuts. Check that the stanchions are parallel to each other at right angles to the under face of the lug and parallel to the centre line of the fork stem (i.e. viewed from the front of the machine). To check the latter, place a  $1\frac{1}{2}$  in. diameter bar into the top lug sleeve nut position and tighten the pinch bolt. The angle of the lug sleeve nut hole in relationship to the stanchions can also be verified at this stage, this should be  $3^{\circ} 48'$ .
- (4) Remove the steering damper assembly, straighten the handlebar stops if necessary and check the crown lug for out of truth. Insert two stanchions into the lug (See Fig. 4) and tighten up the pinch bolts. Lay the assembly on to the setting out table.

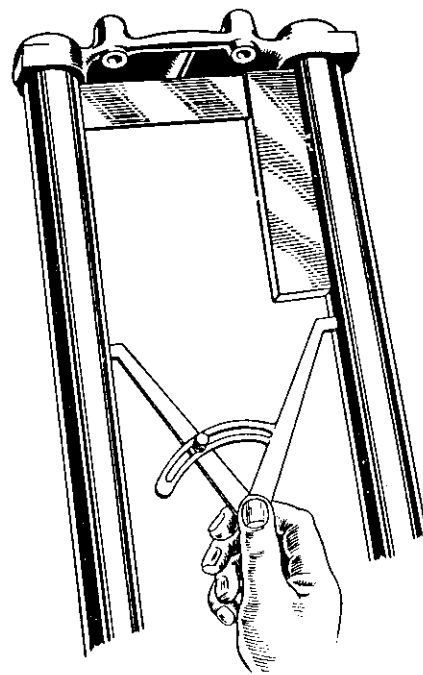


Fig. 3. To Check the Head Lug.

Any twist will be readily visible. Check also that the stanchions are at right angles to the machined upper surfaces of the lug. If the corners of the setting out table are known to be accurate right angles, the forks can be mounted up on them. If the fork legs are out of true, secure the crown lug in a vice, insert a bar into the stanchion and exert a pull in the correcting direction. The stamping is malleable and provided that the lug is not excessively distorted, it can usually be trued quite easily. Each time a stanchion is pulled, check the assembly for truth in both planes.

- (5) When the fork crown lug has been trued in relation to the stanchions, the stem also must be trued in relation to the stanchions. Place the top lug on to the stanchion tapers

and note the position of the stem in the top lug. Any out of truth can be rectified by placing a long tube over the stem and pressing in the correcting direction. After this has been done, check the stanchions for truth again, as truing of the fork stem may affect the original lining up.

- (6) Inspect the steering races for wear or pitting. The cups should be a tight press fit into the frame head lug; slackness here usually denotes distortion of the head lug. The cones should also be a press fit on to the fork crown stem; wear on the crown stem indicates badly adjusted races. If there is very slight working in the tracks of the cups and cones it may be taken out by light application of fine emery cloth and a new set of ball bearings should be fitted. Heavy

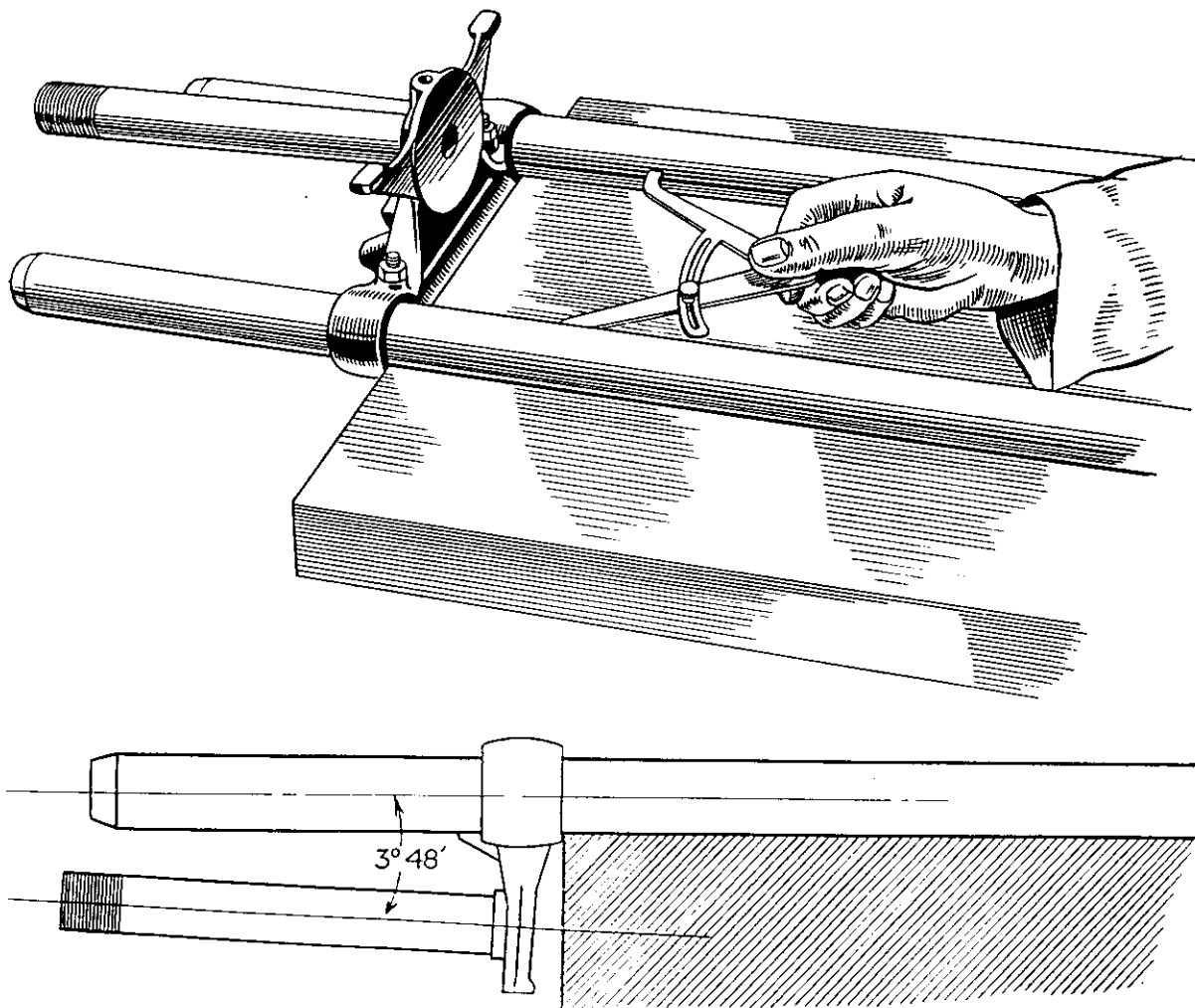


Fig. 4. To Check the Crown Lug.

pitting of either the cups or cones requires replacement of the complete race and balls.

TOP RACE—22 off  $\frac{1}{16}$  in. balls.

BOTTOM RACE—20 off  $\frac{1}{4}$  in. balls.

- (7) Examine the components of the steering friction damper assembly for wear, traces of oil, grease, rust or burrs. Fit a new friction disc if worn down to  $\frac{3}{8}$  in. thick and a new spring plate if weak or broken. Check the peg bolt and adjusting sleeve for freedom of action.
- (8) Check the stanchion cap nuts to ensure that the threads are in good condition.
- (9) Examine the handlebar clamp "U" bolts for damaged threads.
- (10) Ensure that the steering damper rod is straight, and that the threads are not damaged.

#### BOTTOM TUBE ASSEMBLY

8. (1) Check the bottom tube cover for dents and broken or bent bottom lugs. If the cover shows the slightest sign of denting, it is not fit for further use as the freedom of movement of the stanchion bush must not be impaired. If the tube is sound, the bottom lug must be checked for alignment. To check alignment place a  $\frac{29}{32}$  in. rod in the nearside lug and a  $\frac{9}{16}$  in. rod in the offside lug, and check the tubes with a square. The quickest way of checking the alignment of the lugs is by comparison with a new cover tube, threading them both on to the same test rod against one another. In the case of the LH cover, the pinch bolt can be tightened on to the test rod but not so on the RH. The test rod for the right-hand cover must be a good push fit in the lug. Do not use the wheel spindle as a test rod, as it may have been bent, particularly at the neck.
- (2) If the lugs are found to be out of true, the lug must be gripped firmly in the vice and pressure applied to the tube to correct it. This is best carried out in the following manner. The lug should be held in the vice by placing a distance piece or dolly into the axle hole so that the lug can be held firmly between the webs. The lug can then be straightened without fear of distorting the

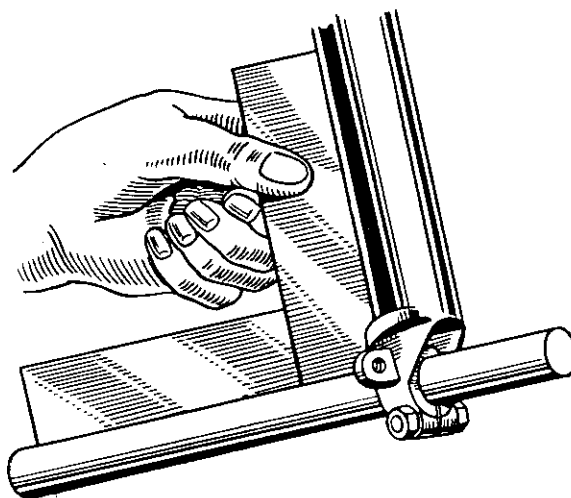
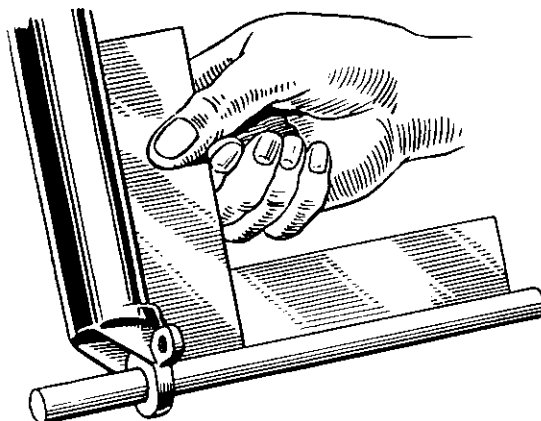


Fig. 5. To Check the Cover Tubes.

spindle bore, or damaging the machined face. The actual straightening is best done by lowering the stanchion, complete with the lower bearing, into the tube to its fullest extent. Then thread a cover tube top bearing over the stanchion and into the tube. The tube may now be pressed by hand sufficiently to rectify any mis-alignment of the lug, without any damage to the working surface of the cover tube.

- (3) The cover tube top bearing and the lower stanchion bearing should be inspected for wear. Compare dimensions obtained from the worn parts with plan figures given on page 75. The lower stanchion bearing can be removed by unscrewing the stanchion hydraulic stop nut. Do not grip the stanchion on the bearing surface for this operation. When replacing the hydraulic stop nut, ensure that it is fully tightened.

## PRESSURE TUBE UNIT

9. (1) It is extremely important that the oil pressure rod is straight. If there is any sign of a bend or kink in that part of the rod which works in the pressure tube support sleeve, it must be replaced. If the bend is above the pressure tube assembly when the rod is fully home, it may be straightened. All rough marks and any signs of "pick up" or burrs, must be removed with emery cloth. Check the oil restrictor, oil restrictor cup, restrictor pin and nut for signs of wear and fit new parts as necessary.
- (2) Check the support sleeve bore for ovality or "pick up".
- (3) Check that the pressure tube is screwed firmly into the body, that the drillways are clear and that the locating peg is in position. Inspect the thread in the valve body for damage.
- (4) Examine the fork springs for fatigue cracks and check that both springs are of equal length and within  $\frac{1}{4}$  in. of the original measurements. See data page 75.

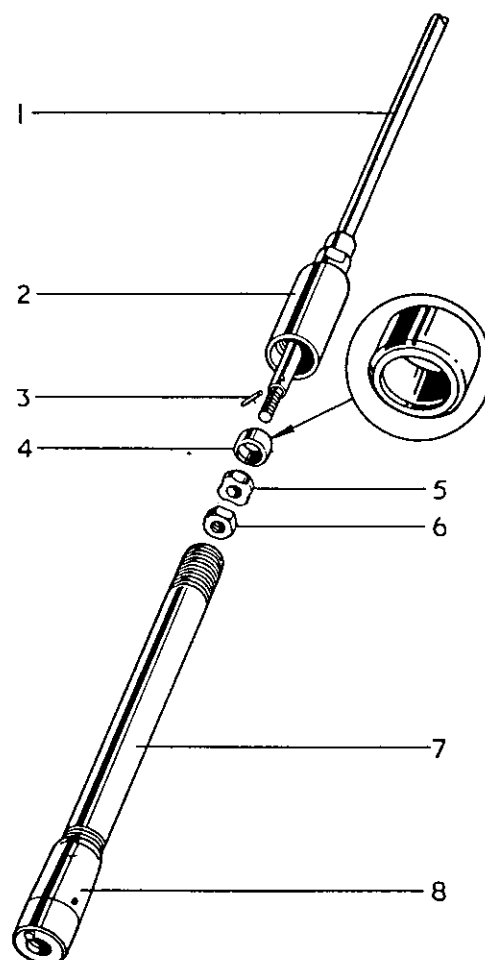


Fig. 6. Pressure Tube Unit.

1. Oil restrictor rod.
2. Pressure tube support sleeve.
3. Oil restrictor cup pin.
4. Oil restrictor cup.
5. Oil restrictor.
6. Nut.
7. Pressure tube.
8. Valve body.

## TO ASSEMBLE THE FORK

10. There are two methods of assembling the telescopic fork to the frame. It is recommended that the following method is used: Assemble the front fork unit on the bench and install it as a complete unit to the frame as described in the following paragraphs. The fork may also be built on to the frame by assembling the crown and top lugs, followed by the covers, stanchions and bottom cover tubes.

## TO ASSEMBLE THE PRESSURE TUBE UNIT

11. (1) Push the pin into the hole in the pressure rod and fit the cup so that the pin is inside, and the flat face of the cup is towards that end of the rod with the smaller thread. Slide on the restrictor so that the shoulder fits inside the cup with the flat face towards the thread of the rod. Screw on the nut, tighten fully and lock by centre punching the periphery of the thread. Check that the cup is free to move up and down.

- (2) Ensure that the locating pin is fixed into the valve body and tighten the pressure tube in the valve body. Insert the pressure rod restrictor assembly into the pressure tube. Lower the pressure tube support sleeve over the pressure rod and tighten on to the pressure tube. Check the rod for complete freedom of action. The rod must move freely in the tube throughout its length of travel. Drop the pressure tube into a clean can of oil and test the action. The rod should be free to move in a downward direction but the damping effect should be felt when the rod is raised from the tube.

- (3) Lift the pressure rod out of the tube to its fullest extent. Thread the main spring over the rod and compress the spring sufficiently to be able to grip the rod below the thread with pliers or grips, and screw on the stanchion cap nuts. To prevent the pressure rod from dropping back into the tube, it will be found advantageous to use a bar  $\frac{1}{2}$  in. dia. and 9 in. long. Grip the bar horizontally in the vice and place the pressure tube valve body over it, so that the end of the bar presses on to the end of the pressure rod, which then projects to its full extent, whilst the main spring is sufficiently compressed to enable the stanchion cap nut to be screwed on.

### TO ASSEMBLE THE BOTTOM TUBE UNITS

12. (1) Lubricate the inner surfaces of the bottom cover tube with oil and hold in a vice by gripping the wheel lug. Check that the hydraulic stop nut which secures the bearing on the lower end of the stanchion is tight and then enter the stanchion into the cover tube. Thread the top bearing over the stanchion and enter it into the cover tube. Tap into position with a lead or hide hammer. Ease the stanchion outwards and lubricate the working area with oil. Now operate the stanchion up and down a few times to ensure that it is evenly lubricated and free to move in all sections.
- (2) Place the thin steel washer in the dust excluder sleeve, followed by a new felt washer previously soaked in engine oil and the thick steel washer. Slide the dust excluder sleeve over the stanchion and screw tight on the bottom cover tube. Place the cover tube felt washer on the stanchion above the dust excluder sleeve. The assembly is now ready for fitting to the crown lug. Repeat operation to the opposite member.

### TO ASSEMBLE THE FORK

13. (1) Place the fork stem horizontally in the vice, lug facing upwards. Fit the horn and bracket.

#### (2) Mk. 1 Nacelle Covers

Fit the two nacelle covers. Drop in the pinch bolts and screw on the nuts finger tight only.

#### Mk. 2 and Mk. 2B Nacelle Covers

Fit the parking light to one nacelle cover and screw on the retaining nut. Place the two covers on the crown fork lug. Slip the other parking light stud into the appropriate hole in the other nacelle cover and tighten both nuts. It may be found advantageous to remove the fork crown lug temporarily from the vice for this operation. Fit the pinch bolts and screw on the nuts finger tight.

- (3) Enter the stanchions into the crown lug and tap the assemblies into their approximate positions with a fibre or hide hammer. Screw on the crown stem and sleeve nut. Fit the top lug and tap on to the stanchion tapers.
- (4) Enter the pressure tube assembly into the stanchion. Raise the bottom tube towards the nacelle. With hand pressure force the tube fully home by the cap nut. Revolve the nut until the "Peg" on the tube valve body drops into the peg hole in the bottom of the cover tube. Insert the valve body securing bolt through the lug of the bottom cover and, still applying pressure to the cap nut, screw the bolt into the valve body and tighten up. Repeat for the other leg.
- (5) Test the fork action for full freedom of both legs and check that there is no binding whatsoever. Enter the cap nuts into the stanchions and tighten up.
- (6) Tap the stanchions until the 2 B.A. screw holes in the top lug are lined up with the corresponding holes in the nacelle cover. Fully tighten the pinch bolts.
- (7) Fit the steering damper assembly to the crown lug. First fit the spring plate washer on to the sleeve, "claws" upwards, followed by the anchor plate, arm downwards. Place the friction disc on the sleeve and push the sleeve up into the fork stem. Anchor with the sleeve securing pin, making sure that it enters the slot in the adjuster nut.

## TO FIT THE FRONT FORK TO THE FRAME

14. (1) Grease the upper and lower cups in the frame in order that the balls may be retained when pressed into position. The upper race should be fitted with 22  $\frac{1}{8}$  in. dia. balls and the lower, 20  $\frac{1}{4}$  in. dia. balls. Place the upper bearing cone and dust cover in position, bevelled edge facing downwards.
- (2) Remove the fork stem sleeve nut and undo both stanchion cap nuts. Give the top lug a smart blow upwards to free it from the stanchion tapers.
- (3) Raise the fork top lug to its maximum height with the left hand and support the fork assembly with the right hand. Insert the fork crown stem into the frame head lug, taking care not to disturb the balls in the upper cup. Raise the fork until the stem comes through the frame head lug and the bottom race is fully home. Support the fork under the crown lug and lower the top lug into position and screw on the sleeve nut until it takes the weight of the forks.
- (4) Pour 100 c.c. (1/6 pint) of the correct grade of oil into each leg.
- (5) Tighten both stanchion cap nuts and to ensure absolute tightness use extra leverage on the spanner.
- (6) Carefully screw down the fork stem sleeve nut, one quarter turn at a time, and try to rock the fork assembly fore and aft in the bearing, placing the fingers of one hand on the top bearing dust cover. The correct adjustment should allow the forks to rotate freely with no fore and aft rock. When correct tighten the pinch bolt on the top lug.
- (7) The two holes, tapped 2 B.A., in the top head lug should be central in the clearance holes in the nacelle side portions. To adjust their positions slacken the two middle lug and one top lug pinch bolts and tap the top lug down or the bottom cover tubes up. When the screw holes are in line tighten up the pinch bolts again.
- (8) Fit the wheel spindle in position and place the fork alignment gauge on the lower fork members as indicated in Fig. 7. To avoid scratching the enamel finish on the fork members, apply a smear of grease at the four points. Hold it firmly against the fork legs and if the alignment is correct, contact will be made at all four points, marked "X". If the gauge does not make contact at "A" or "B", slacken off the top lug and middle lug pinch bolts. If the gauge can be rocked at "A" this indicates "D" is too far forward. To remedy, strike the top lug at point "D" a sharp blow with a hide hammer and then make a further check with the gauge. If the error is at "B" the application is similar only at point "C". When the adjustment is satisfactory, tighten the pinch bolts and make another check.
- (9) Assemble the front mudguard and stand to the forks and centralise the mudguard to prevent it rubbing the nacelle covers.
- (10) Fit the handlebar and tighten up the "U" bolts.
- (11) Place the wheel between the forks and insert the wheel spindle from the LH side. Tap the spindle until it protrudes through the opposite fork lug. Fit the brake anchor plate nut and the wheel spindle nut and fully tighten both. Grip the handlebar and work the fork up and down for half a dozen times. This centralises the LH fork leg on the wheel spindle. This must be done, otherwise the fork will be out of alignment. Tighten the LH bottom lug pinch bolt. (See section 5, para. 7 for further instructions).
- (12) Fit the brake lever arm pivot pin and retain with a split pin.
- (13) The 5-way connector must be firmly secured to the right stanchion with a cable clip. Fit the horn lead from the handlebar to one terminal on the horn. (Mk. 2 and 2B only:—Press the red and black parking light into the empty position on the lower end of the 5-way connector).
- (14) Fit the five wires into the connector, matching the colours, and join up the brown horn wire to the remaining terminal on the horn. Pass the wire with the earthing tag through the rear of the nacelle ready to connect to the steering damper anchor bolt. Fit the dip switch assembly to the handlebar. Fit the nacelle top. Ensure that all the

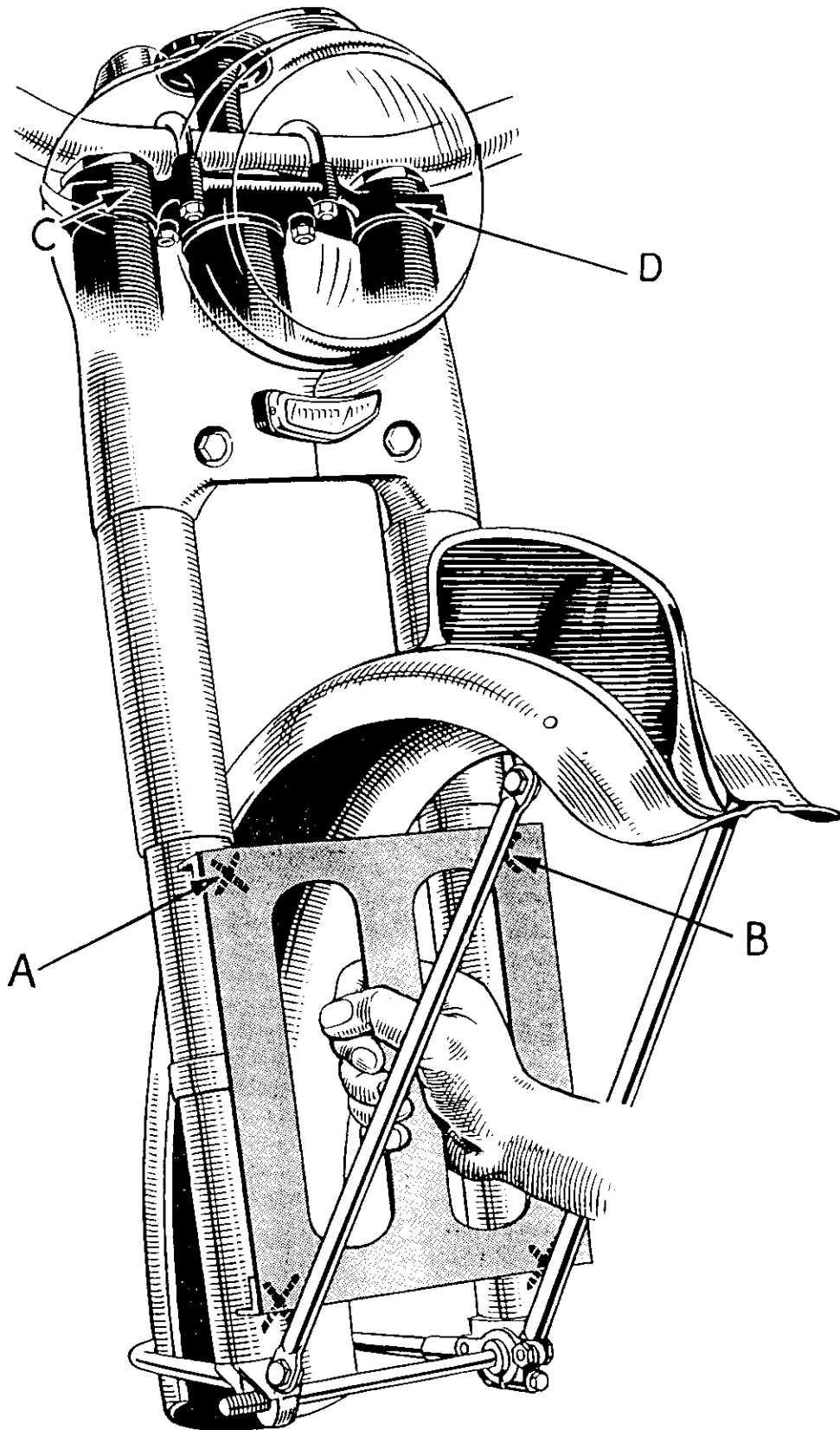


Fig. 7. Use of Front Fork Alignment Gauge.

control wires go through the handlebar grommets. Fit the chromed motifs ("flashes"). Fit the two small nuts and bolts, which join the top and bottom portions of the nacelle at the rear of the nacelle behind the handlebar.

- (15) Connect the speedometer drive cable to the speedometer.
- (16) Make sure that the speedometer cable retaining clip and the electrical system earthing tag are held by the steering damper anchor bolt. Place the forked end of the damper anchor plate over the lug on the frame and insert the bolt, then fit the washer and nut and tighten.
- (17) Next place the plain steel washer between the nacelle top and the fork stem sleeve nut and thread the steering damper knob and rod assembly through the washer and into the screwed sleeve. Screw the knob down until the forks begin to feel stiff when rotated.
- (18) Fit the headlamp fixing ring to the nacelle with the three screws and plates. Connect and fit the reflector unit Mk. 1 and headlamp rim and glass, or Prefocus Unit, Mk. 2 and 2B.
- (19) Connect the battery to the wiring harness.
  - Mk. 1. **Negative terminal earthed.**
  - Mk. 2 & 2B. **Positive terminal earthed.**

### TO CHANGE THE PRESSURE TUBE UNITS

15. To carry out the operation without removing the forks from the frame, proceed as instructed in Para. 2 (1) to (6) and (10).

Unscrew the two drain plugs in the lower tube covers. Unscrew both cap nuts from the stanchions. To expel the oil at a greater rate, pump the fork legs up and down.

The pressure tube body bolts are situated in the underside of the wheel lugs. Unscrew both bolts, and lift away the pressure tube assemblies complete with springs and cap nuts.

Compress the fork springs sufficiently so that the restrictor rod can be held with a pair of pliers or in

the corner of the vice jaws. Unscrew the cap nut and withdraw the spring from the restrictor rod.

16. Assemble the springs and cap nuts to the new pressure tube assemblies and fit the units to the fork in the reverse manner to the dismantling procedure. Before entering the units into the stanchions ensure that the pegs are fitted to the pressure tube bodies. The pressure tube body pegs must locate in the holes in the base of the cover tubes. To do this raise the cover tube slightly and then enter the pressure tube assembly, rotating the assembly until the peg drops into the locating hole. Keeping the peg in position, fit the securing bolt through the base of the wheel lug and tighten up. Pour 100 c.c. of oil into each leg and complete the assembly.

### TO CHANGE THE FORK SPRINGS

17. This operation can be done without completely dismantling the forks. First turn to Para. 2 "To Remove the Fork from the Frame" and follow the instructions in paragraphs (1) to (6). Proceed with the dismantling as follows:—

18. (1) Unscrew both stanchion cap nuts using a suitable ring spanner in order to avoid damage to the nut head. At this stage, remove the box from underneath the crankcase. The springs will now be well exposed, enabling the operator to carry out the next operation.
- (2) Force the spring down until sufficient of the restrictor rod is visible to enable it to be gripped with a pair of pliers or grips. Holding the gripping tool firmly, unscrew the cap nut from the restrictor rod. Still retaining a hold on the restrictor rod, take a length of thin copper wire and wrap one end of it around the thread of the rod. The rod can now be released and the spring withdrawn. Repeat the operation to remove the opposite spring.
19. (1) Thread the new fork springs over the copper wire and enter them into the stanchion tubes.
- (2) Lift the restrictor rod to the top position by pulling up the copper wire and compress the spring until the rod can be gripped below the thread. Replace the cap nuts and securely tighten. Repeat the operation for the opposite spring.

(3) Raise the front of the machine sufficiently to enable the box to be replaced under the crankcase. The cap nuts will now be resting on the top lug, thus enabling the operator to screw them into the stanchions without having to compress the springs. Tighten

the nuts with a ring spanner using approximately 18 in. leverage.

(4) Replace the nacelle unit in the opposite manner to the dismantling procedure, para. 2 (6) to (1).

TELESCOPIC FRONT FORK—BASIC PLAN DIMENSIONS

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
<b>STANCHIONS</b>		<b>BEARINGS</b>	
Stanchion (upper) ... o/dia.	1.3025 1.3030	Bearing (upper) ... i/dia.	1.3065 1.3075
Stanchion (lower) ... o/dia.	1.2495 1.2500	Bearing (lower) ... i/dia.	1.2485 1.2495
<b>BOTTOM COVER TUBE</b>		<b>BEARINGS</b>	
Cover tube ... i/dia.	1.498 1.500	Bearing (upper) ... o/dia.	1.498 1.499
<b>HEAD RACES</b>		<b>BEARINGS</b>	
Ball size (top) ... dia.	0.1875	Bearing (lower) ... o/dia.	1.4935 1.4945
Ball size (bottom) ... dia.	0.250	<b>HEAD RACES</b>	
		Ball (top) ... Quantity 22	—
		Ball (bottom) ... 20	—

SPRING—FREE LENGTH

Fork spring ...	19½	
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APPROVED SPECIAL TOOLS

TELESCOPIC FRONT FORK

	Part Number
Fork Alignment Gauge	Z.85
Combination Spanner	D.220

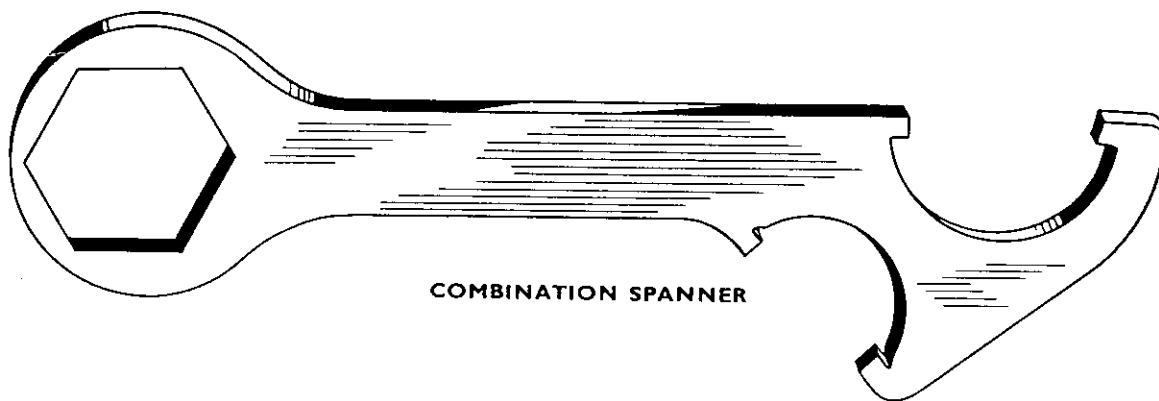
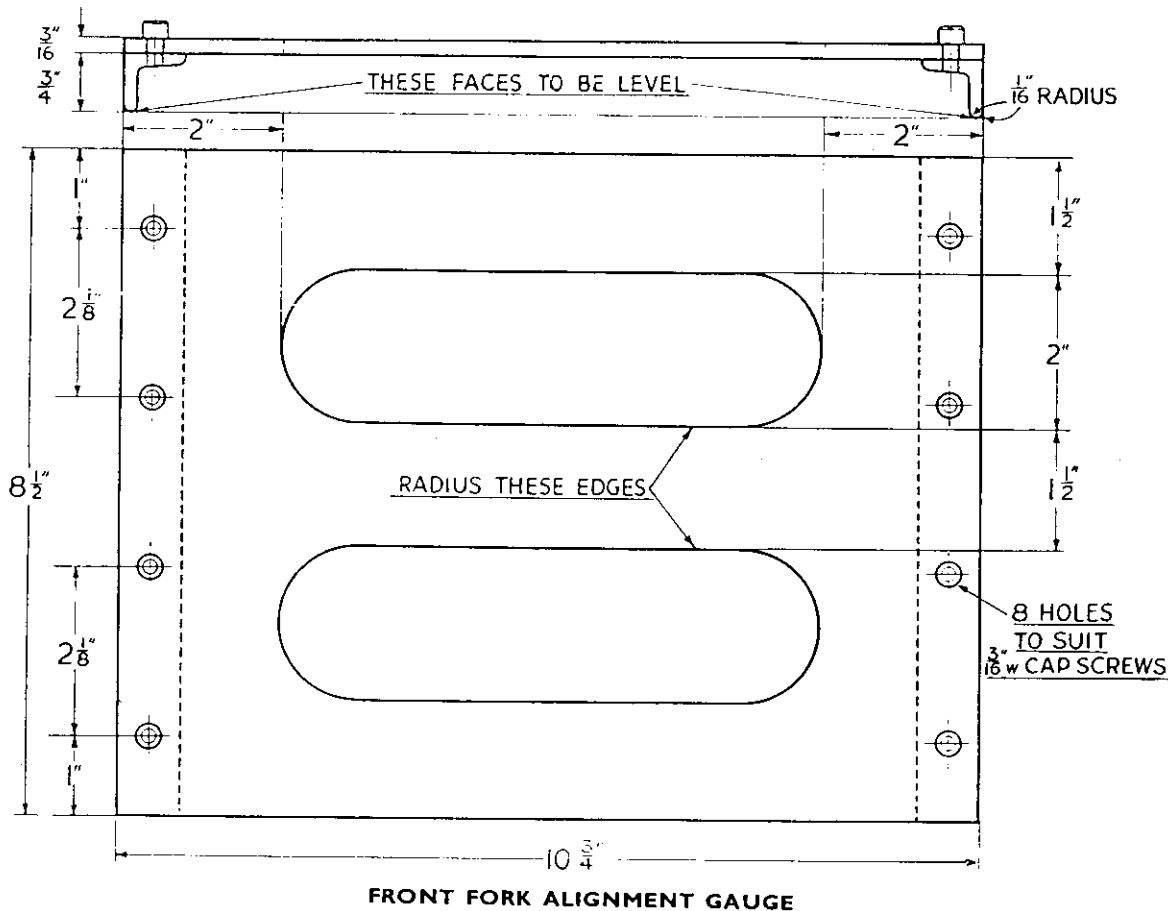


Fig. 8. Approved Special Tools.

## SECTION FIVE

# WHEELS

### LIST OF CONTENTS

<i>Paragraph</i>	<i>Title</i>	<i>Page</i>
1	Description—Front Wheel ... ..	78
2	To Remove the Front Wheel from the Forks ... ..	78
3	To Dismantle the Front Wheel ... ..	78
7	To Assemble the Front Wheel ... ..	79
8	To Fit the Front Wheel in the Fork ... ..	79
9	Description—Rear Wheel ... ..	81
10	To Remove the Rear Wheel from the Frame ... ..	81
11	To Dismantle the Rear Wheel ... ..	82
15	To Assemble the Rear Wheel ... ..	83
16	To Fit the Rear Wheel in the Frame ... ..	84
17	Wheel Building ... ..	85
20	Wheel Alignment ... ..	85
21	Description—Tyres ... ..	87
22	To Remove the Front Tyre ... ..	87
23	To Fit the Front Tyre ... ..	87
24	To Remove the Rear Tyre ... ..	88
25	To Fit the Rear Tyre ... ..	89
	Basic Plan Dimensions ... ..	89

### LIST OF ILLUSTRATIONS

<i>Fig.</i>	<i>Title</i>	<i>Page</i>
1	To Rivet the Brake Linings to the Shoes ... ..	79
2	Front Wheel ... ..	80
3	Correct Alignment of Front Wheel in Forks ... ..	81
4	Rear Wheel ... ..	83
5	To Fit the Shoes to the Brake Anchor Plate ... ..	84
6	Brake Anchor Peg ... ..	84
7	To Fit the Front Brake Drum to the Hub ... ..	85
8	Wheel Building Gauge ... ..	86
9	Use of Wheel Building Gauge ... ..	86
10	Rear Wheel Alignment ... ..	86
11	Commencing to Remove the First Bead ... ..	87
12	Removing the First Bead ... ..	87
13	Removing the Cover ... ..	87
14	Cover and Tube assembled ready for Fitting ... ..	87
15	Commencing to Fit the Tyre ... ..	88
16	Fitting the First Bead ... ..	88
17	Completing the Fitting of the First Bead ... ..	88
18	Completing the Fitting of the Second Bead ... ..	88
19	Placing the Security Bolt in Position ... ..	88
20	Completing the Fitting of the Second Bead ... ..	89

## Section 5

**DESCRIPTION—FRONT WHEEL**

1. The front wheel requires very little maintenance beyond re-packing the hub with grease every 10,000 miles. The wheel bearings are of the ball journal type and therefore require no adjustment. The rim is 19 in. in diameter (WM2-19) fitted with 3.25 x 19 in. tyre, and the hub consists of two parts, the hub itself and the brake drum. It should be noted that the spokes have specially angled heads, ensuring sturdy wheel construction. Four different head shapes are used, and when new spokes are fitted they must be the same as the originals. The brake is internally expanding to a 7 inch brake drum and is mounted on an aluminium alloy (DTD.424) anchor plate as a complete unit.

**TO REMOVE THE FRONT WHEEL FROM THE FORKS**

2. (1) Remove the split pin from the pivot pin connecting the brake operating lever and the cable. Withdraw the pivot pin.
- (2) Unscrew the nut and remove the bolt connecting the brake anchor plate to the fork leg.
- (3) Remove the nut from the right side of the wheel spindle.
- (4) Lower the front stand by loosening the retaining nut at the rear of the mudguard and pivot the stand downwards.
- (5) Slacken the spindle pinch bolt on the left fork member and drive out the spindle. The wheel may then be withdrawn from the forks. Do not damage the spindle threads.

**TO DISMANTLE THE FRONT WHEEL**

3. (1) Hold the operating lever towards the "On" position so that the brake shoes do not bind on the drum and lift the anchor plate from the brake drum.
- (2) The bearing retaining ring nut has a left-hand thread. Remove by turning in a clockwise direction.
- (3) Push out the sleeve and collar from the brake drum side.
- (4) Drive or press out the left bearing complete with dust cover, using a  $\frac{3}{8}$ " diameter bar inserted through the brake drum side bearing. Remove the bearing distance piece.

- (5) Drive out the right bearing towards the brake drum.

**TO DISMANTLE THE FRONT BRAKE ANCHOR PLATE**

4. (1) Remove the two return springs to release the brake shoes from the anchor plate.
- (2) Unscrew the retaining nut and take off the brake operating lever. Withdraw the cam spindle from the anchor plate. It is unnecessary to remove the brake shoe fulcrum pin.

**INSPECTION AND REPLACEMENT OF WORN PARTS**

5. (1) All parts with the exception of the brake shoes should be thoroughly washed in kerosene.
- (2) Examine the anchor plates for cracks and distortion and excessive wear in the brake cam housing.
- (3) Clean out the greaseways in the brake cam spindle and remove any rust.
- (4) Clean and dry the bearings thoroughly. Compressed air should be used for drying out if possible. Test the end float and inspect the balls for any signs of indentation or pitting. Change the bearings if they are not up to the required standard.
- (5) Inspect for signs of fatigue and renew if necessary.
- (6) Inspect the brake drum for wear, ovality or scoring. If there is ovality or score marks, the drum will have to be detached from the wheel hub and skimmed. If it is necessary to skim more than .010 in. from the drum, it should be scrapped. After skimming the brake drum, the wheel will have to be re-built and trued up (see para. 17).
- (7) Brake Linings should be replaced immediately the rivets show signs of becoming level with the lining face, or the linings show uneven wear. Knock out the rivets and strip the old linings from the shoes.  
New linings are supplied ready drilled, countersunk and the correct shape. If no jig is available for rivetting, a simple method of spreading the rivets is shown in Fig. 1.  
Rivet the lining to the shoe starting from the centre, working alternately towards each end; great care must be taken to

ensure that the rivets are tight and that the linings do not lift between the rivets. After fitting, all sharp edges of the linings should be chamfered, and the leading and trailing edges tapered off ( $\frac{1}{4}$  in. deep  $\times$   $\frac{1}{16}$  in. back).

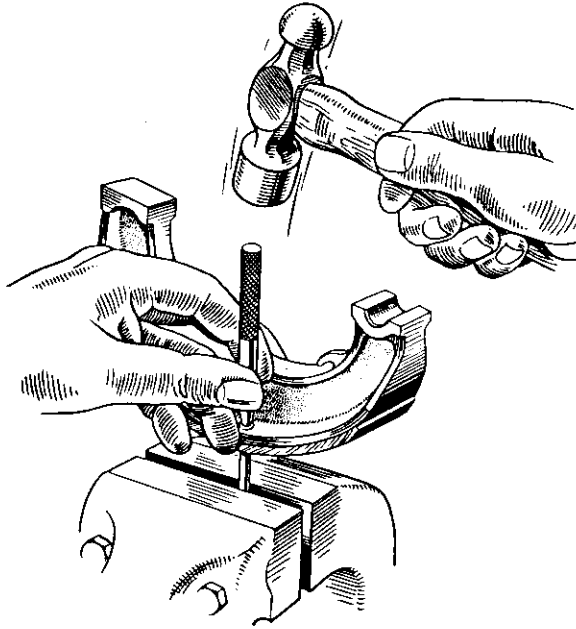


Fig. 1. To Rivet the Brake Linings to the Shoes.

#### TO ASSEMBLE THE FRONT BRAKE ANCHOR PLATE

6. (1) Fill the greaseway and grease the spindle of the brake cam and insert it into the housing on the brake anchor plate. Fit the lever return torsion spring over the spindle (the end with the long fixing ear away from the anchor plate) and tap the lever arm on to the square shoulder with the lever arm in the same line as the cam. Fit the washer and nut and tighten.
- (2) Place the two brake shoes on the bench in their relative positions. Fit the return springs to the retaining hooks, then, taking a shoe in each hand and at the same time holding the springs in tension, position the shoes to the anchor plate. By turning the top of the shoes inwards the assembly can be placed over the cam and fulcrum pin and snapped down into position by pressing on the outsides of the shoes. Wind the brake lever arm anti-clockwise to engage the return spring.

#### TO ASSEMBLE THE FRONT WHEEL

7. (1) Thoroughly clean the inside of the hub and brake drum. Pack the ball races with grease.
- (2) Press the bearings into the hub from the brake drum side until it engages on the shoulder in the hub.
- (3) Screw up and tighten the bearing retaining ring nut (L.H. thread) using a peg spanner.
- (4) Pack one ounce of grease into the hub.
- (5) Place the wheel with the brake drum, downwards on the bench. Enter the bearing distance piece into the hub and press the remaining bearing into the hub until the distance piece is held firmly between the bearings.
- (6) Slide the spindle sleeve into the bearing, up to the collar.
- (7) Press the bearing dust cap into the hub end as far as possible.

#### TO FIT THE FRONT WHEEL IN THE FRONT FORK

8. The front wheel must be fitted carefully, otherwise the efficient working of the front fork will be impaired. The left fork member split lug, which has the pinch bolt, will align itself correctly on the spindle if the following instructions are adhered to.

- (1) Check that the spindle is a good push fit in the left fork member split lug. If the spindle is too tight, clean out the lug and remove any burrs or enamel. If this is not effective, carefully expand the split lug gap. This procedure must be carried out to ensure that the left fork member aligns itself on the spindle sleeve.
- (2) Position the wheel in the fork and secure it by passing the spindle through the split lug, into the wheel and through the opposite lug. Do not use undue force, otherwise both the spindle and the lugs will be damaged.
- (3) Position the anchor plate and secure the mudguard bridge support clip with the anchor bolt.
- (4) Fit the wheel spindle nut and plain washer and tighten up, leaving the pinch bolt on the opposite for leg slack.
- (5) Re-fit the brake cable adjuster to the abutment on the anchor plate and assemble the pivot pin to the cable fork and brake lever

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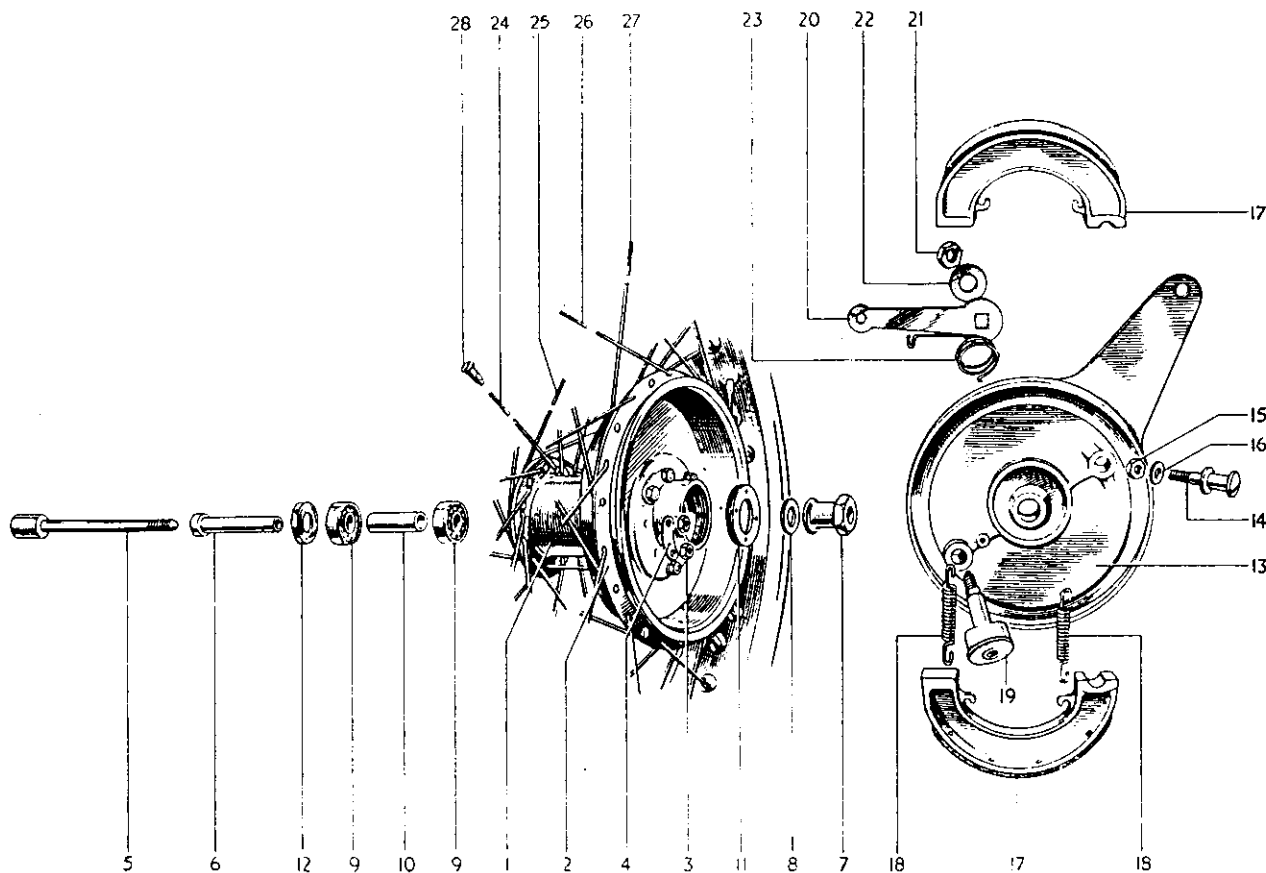


Fig. 2. Front Wheel (Exploded View).

INDEX TO FIG. 2.

- |                      |                                 |                              |
|----------------------|---------------------------------|------------------------------|
| 1 Hub.               | 10 Distance piece.              | 20 Lever, brake cam.         |
| 2 Drum, brake.       | 11 Ring nut, bearing retaining. | 21 Nut.                      |
| 3 Nut, drum to hub.  | 12 Cap, dust.                   | 22 Washer.                   |
| 4 Lockplate, nut.    | 13 Plate, brake anchor.         | 23 Spring, cam lever return. |
| 5 Spindle.           | 14 Pin, shoe fulcrum.           | 24 Spoke, long, 90° head.    |
| 6 Sleeve and collar. | 15 Nut.                         | 25 Spoke, long 88° head.     |
| 7 Nut, spindle.      | 16 Washer.                      | 26 Spoke, short, 83° head.   |
| 8 Washer.            | 17 Shoe with lining.            | 27 Spoke, short, 94° head.   |
| 9 Bearing.           | 18 Cam, brake operating.        | 28 Nipple, spoke.            |

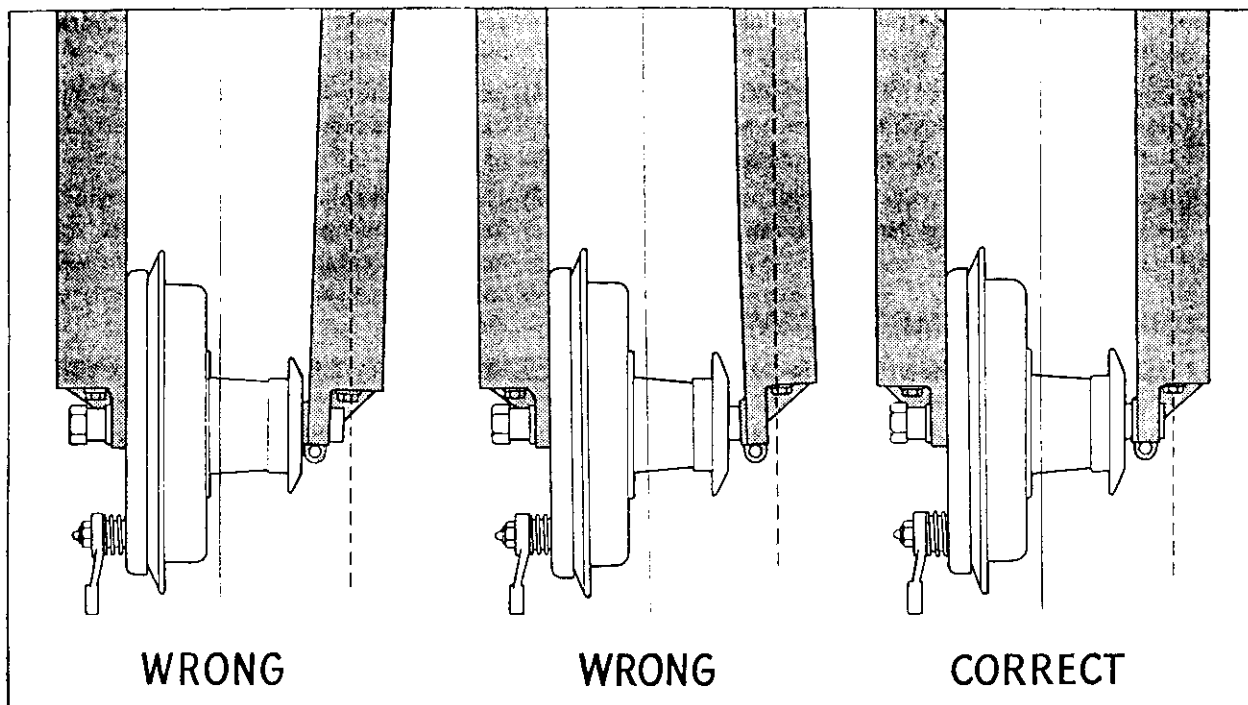


Fig. 3. Correct Alignment of Front Wheel in Forks.

arm. Push a split pin through the pivot pin and retain it by bending the ends over.

- (6) Swing the stand back into position and tighten the securing nut.
- (7) With the pinch bolt loose ensure that the left-hand fork leg can slide on the spindle sleeve. Sit astride the machine, apply the front brake and work the fork up and down five or six times. This positions the fork leg on the spindle, and prevents any binding between the stanchions and the cover tubes. Tighten up the spindle pinch bolt. If this procedure is not adopted, the fork action will be stiff and the members distorted. (See Fig. 3).

#### DESCRIPTION—REAR WHEEL

9. The rear wheel has taper roller bearings and may occasionally require adjustment. The bearings are held in adjustment by locknuts and the lateral movement should always be checked after the locknuts have been tightened. The hub is packed with grease and requires re-packing at regular intervals. The rim is 19 in. in diameter (WM3-19) and has a 4.00 × 19 in. tyre fitted. The spokes are of four different head shapes as in the front wheel and this

should be noted when making replacements. The brake is 7 inch internally expanding and is located on a mild steel anchor plate, having a strong external peg which locates in a channel in the frame, to withstand the braking torque. The brake drum and integral sprocket are of cast iron and are attached to the left spoke flange by six bolts and nuts. The final drive is by  $\frac{3}{8}$  in. ×  $\frac{3}{8}$  in. chain.

#### TO REMOVE THE REAR WHEEL FROM THE FRAME

10. (1) Remove the two nuts and bolts securing the pannier frames to the tailguard.
- (2) Slacken the two nuts securing the tailguard stays to the frame and remove the two hexagon headed screws securing the tailguard to the mudguard. Pull the tailguard away from the mudguard and place it on the pannier grid. It is not necessary to detach the rear lamp cable as there is sufficient slack to allow the removal of the tailguard.
- (3) Depress the gear lever to make sure that the gearbox is not in neutral. This prevents the rear chain rotating the gearbox sprocket

and falling off when the spring link is removed. Remove the spring link and clear the chain from the rear sprocket.

- (4) Unscrew the brake rod thumb nut and disengage the brake rod from the lever arm.
- (5) Slacken the two wheel spindle nuts and withdraw the wheel from the frame.

### TO DISMANTLE THE REAR WHEEL

11. (1) Remove both spindle nuts and the chain adjuster thrust collars.
- (2) Unscrew the anchor plate locknut and remove the brake anchor plate.
- (3) Turn the wheel over and remove both bearing adjusting locknuts to withdraw the rear wheel spindle.
- (4) Remove both bearing inner races. The cages will be retained by the dust caps. The outer races are a press fit in the hub and can be removed by pressing or tapping out from opposite sides with a suitable drift.

### TO DISMANTLE THE REAR BRAKE ANCHOR PLATE

12. (1) Take off both brake shoe return springs and remove the brake shoes.
- (2) Remove the nut and washer securing the brake lever to the cam spindle and take off the lever. Withdraw the cam from the plate.

### INSPECTION AND REPLACEMENT OF WORN PARTS

13. (1) All parts with the exception of the brake shoes, should be thoroughly washed in kerosene.
- (2) Examine the anchor plate for distortion and wear, particularly in the brake cam housing. Check that the locating lug is secure.
- (3) Clean out the greaseways in the brake cam spindle and remove any rust with a fine emery cloth.
- (4) Thoroughly clean and dry the roller races and cages. Inspect the rollers and tracks for pitting and scoring.
- (5) The bearing backing rings should be examined carefully as they are very liable to

damage when the bearings are withdrawn from the hub.

- (6) Examine the anchor plate and bearing locking nuts for damage to the threads and hexagons.
- (7) The rear wheel spindle should be checked for bends and signs of the wheel nuts having been overtightened. Do not fit a wheel spindle which shows any sign of damage or distortion.
- (8) Inspect the return springs for signs of fatigue and renew if necessary.
- (9) Examine the brake drum for scoring or ovality. If the drum needs skimming it can be removed from the wheel by bending back the tabs on the locking plates and removing the eight fixing bolts. Replacement is the reverse procedure. If it should be necessary to skim more than .010 in. from the drum, it should be replaced with a new drum.
- (10) Examine the sprocket teeth for wear. The top of the tooth should be flat and  $\frac{1}{16}$  in. across. When the teeth become worn, the profile becomes pointed and sharp. This condition is dangerous and damage to the chain is likely to follow. The sprocket (Mk. 1) or sprocket and brake drum (Mk. 2) and 2B) must be replaced if in this condition.
- (11) Fitting new brake linings is described fully in paragraph 5 (7).

### TO ASSEMBLE THE REAR BRAKE ANCHOR PLATE

14. (1) Fill the greaseway and grease the spindle of the brake operating cam and insert it into the housing from the inside of the brake anchor plate. Fit the lever return torsion spring (the end with the long fixing ear away from the anchor plate) and tap the lever arm on to the square shoulder, with the lever cranked away from the anchor plate and at right angles to the flat side of the cam. Place on the lever nut and tighten up.
- (2) Place the two shoes on the bench in their relative positions. Fit the return springs to the retaining hooks, then, taking a shoe in each hand and at the same time holding the springs in tension, position the shoes to the anchor plate. By turning the top of the shoes inwards, the assembly can be placed

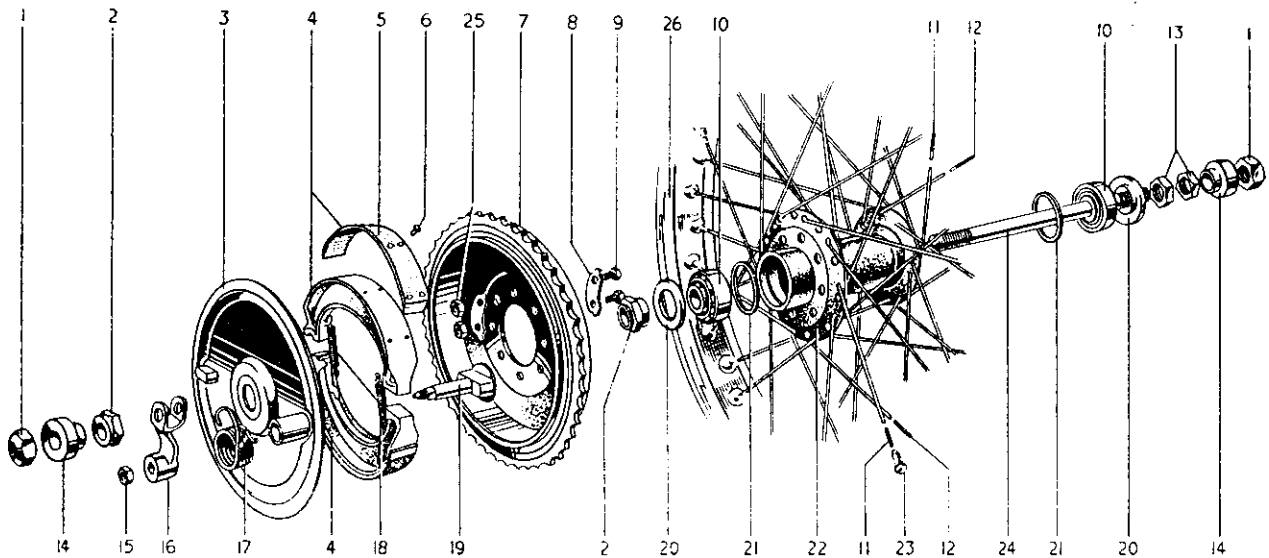


Fig. 4. Rear Wheel.

## INDEX TO FIG. 4.

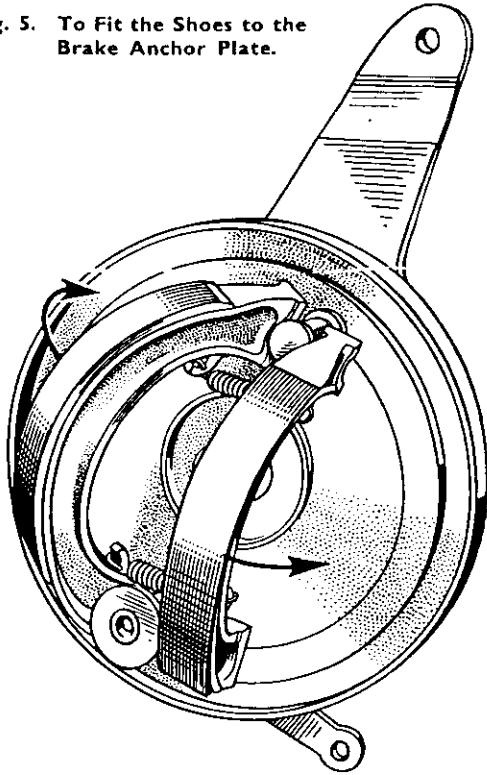
- |                             |                                   |                              |
|-----------------------------|-----------------------------------|------------------------------|
| 1 Nut, spindle.             | 9 Bolt, drum to hub.              | 17 Spring, cam lever return. |
| 2 Nut, brake plate locking. | 10 Bearing.                       | 18 Spring, shoe return.      |
| 3 Anchor plate.             | 11 Spoke, 76° head.               | 19 Cam, brake operating.     |
| 4 Shoe c/w lining.          | 12 Spoke, 100° head.              | 20 Cap, dust.                |
| 5 Lining, brake shoe.       | 13 Nut, bearing adjusting.        | 21 Ring, bearing backing.    |
| 6 Rivet, lining.            | 14 Collar, chain adjuster thrust. | 22 Hub.                      |
| 7 Brake drum and sprocket.  | 15 Nut.                           | 23 Nipple, spoke.            |
| 8 Lockplate.                | 16 Lever, brake cam.              | 24 Spindle, wheel.           |

over the cam and fulcrum pin and snapped down into position by pressing on the out-sides of the shoes (see Fig. 5). Wind the brake lever arm anti-clockwise to engage the return spring.

**TO ASSEMBLE THE REAR WHEEL**

15. (1) Assemble the brake drum to the hub. Enter the fixing bolts from the hub side with the four locking plates already in position and place the four locking plates inside the brake drum. Fit the fixing bolt nuts; when fully tightened lock by bending all the lockplate tabs.
- (2) Place the backing ring in the brake drum side of the hub and insert the bearing cup. The cup should be a press fit into the hub. Repeat the operation on the opposite side.
- (3) Smear the bearing with grease, insert into the cup. Place the dust cover over the bearing and press into position. Turn the wheel over and pack into the hub, a small quantity of grease (egg-cupfull). Fit the remaining race and dust cover in the same manner.
- (4) If the shoulder nut has been removed from the spindle, it should now be replaced and screwed down to the end of the spindle thread (the smaller shoulder of the nut must be in the outer position). Enter the spindle into the hub from the brake side.
- (5) Turn the wheel over and place the spindle between the jaws of the vice (brake drum downwards) taking care to protect the thread with lead vice clamps. Screw both bearing adjusting locknuts on to the spindle

Fig. 5. To Fit the Shoes to the Brake Anchor Plate.



and tighten the lower until it contacts the bearing but leaves the wheel free to rotate. Lock the upper nut to the lower, then remove the wheel from the vice. Check that the spindle will rotate freely by hand. Replace the wheel into the vice for the next operation (brake drum uppermost).

- (6) Turn the brake lever slightly towards the "ON" position; by doing this the backward pressure of the return spring on the brake cam is released. The brake shoes are now in the "OFF" position and the anchor plate can be placed into the brake drum. Screw the shouldered locknut (small shoulder towards the brake drum) on to the spindle and tighten fully. Ease the brake lever towards the "ON" position and spin the wheel to check for binding of the brake shoes on to the brake drum.
- (7) Place the thrust collar on to the spindle with the shoulder inwards and screw the spindle nut on loosely. Repeat for the opposite side.

### TO FIT THE REAR WHEEL IN THE FRAME

16. (1) Lift the rear wheel into the frame with the brake drum to the left-hand side. Engage

the anchor plate peg in the locating channel on the inside of the left-hand fork lug. Push the wheel up to the chain adjuster screws and tighten the spindle nuts.

- (2) Test the wheel bearings for adjustment with the wheel in the frame. Final adjustment should be made before further assembly. The right spindle nut should be released before any adjustment is made.

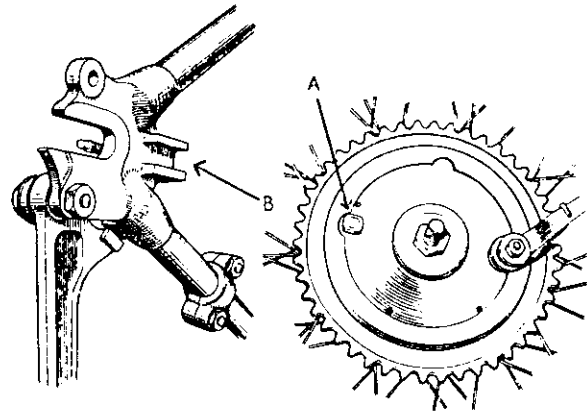


Fig. 6. Brake Anchor Peg.

Slacken the outer locknut on the right side and then adjust the inner locknut with a thin spanner. The wheel must be free to rotate, with not more than  $\frac{1}{32}$  in. side play at the wheel rim when the outer spindle to frame nuts are tight. After the adjustment keep the inner locknut in the same position while the outer locknut is tightened. Finally tighten the right spindle nut.

- (3) Pull the brake lever back, thread the brake rod through the pivot roller in the lever arm and screw on the brake adjusting thumb nut until the wheel can just turn freely without the brakes binding. If new linings have been fitted, it may be necessary to bed in the brakes, by using the machine on the road, before adjustment can be made allowing the wheel to run perfectly freely.
- (4) Fit the chain round the sprocket, couple the two ends together and secure with the spring link so that the closed end of the fastener is facing the direction of chain travel.
- (5) Fit the tailguard to the mudguard, tightening the nuts and bolts connecting it with the mudguard, the rear stays and the pannier frames.

- (6) Draw the extra length of rear lamp cable through the mudguard grommet, so that it does not foul the wheel and tyre, and stow it neatly behind the number plate. Check the action of the rear light and stop light.
- (7) After road testing, make the final adjustment to the brakes.

### WHEEL BUILDING

17. Wheel building should only be undertaken by a specialist, and these few notes will enable the wheel builder to follow Triumph practice. The main point to remember is, that all Triumph wheels are built with the inside spokes on the brake drum side taking the braking strain. That is, the spokes are in tension when the brake is on and the rim is turned in the direction of the forward motion. It is also pointed out, that to give the wheels greater strength and rigidity, the spokes used have specially angled heads. If it is remembered that the spokes that are on the outside of the wheel have more acute angle heads, and those on the inside have the larger angle, no trouble will be encountered. The front wheel has 10 gauge spokes, 40 in number, and the rear wheel has 40, 9 gauge spokes. Note that the front wheel has two lengths of spoke, and each spoke length has two head angles, whereas the rear wheel has one size of spoke with two head angles.

### FRONT WHEEL

18. If the spokes are to be correctly laced, the drum must be bolted to the hub in the appropriate position. Place the drum, open end down on the bench and find the two opposite countersunk spoke holes in the outer edge which are exactly in line with two of the hub bolt holes. It will be noticed that one of the bolt holes on the hub is marked with one of the letters of the alphabet on the face which is bolted against the brake drum. This marked hole (See Fig. 7), should be lined up with either of the bolt holes on the drum described above and the hub and the brake drum bolted together in this position with the four locking plates beneath the nuts. If the rim is held vertically and the nipple depression on the part of the rim farthest away, are examined, it will be seen that the holes biased to one side of the rim are more offset and nearer the well of the rim than those on the other side. Those at the greater angle are for the shorter, drum side, spokes. Build up the

drum side first. The front wheel is built up so that the rim is central in the forks. Details of a testing jig. (See Fig. 8).

### REAR WHEEL

19. The rear wheel is built up with equal length spokes and the drum fitted after the wheel is built, but before the wheel is trued. The centre of the rim is offset and is exactly 3 in. from the centre line of the chain sprocket. Details are given overleaf of a jig used to set the centre line of the rim relative to the hub, correctly.

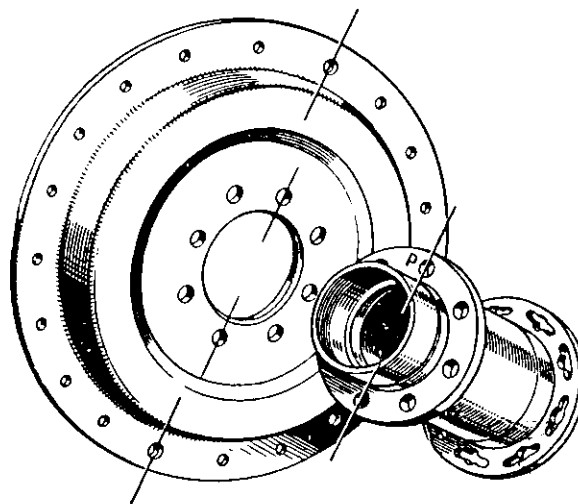


Fig. 7. To Fit the Front Brake Drum to the Hub.

### WHEEL ALIGNMENT

20. When both wheels have been fitted into the frame they should be fitted up with two straight wooden battens about seven feet long. With the machine off the stand the battens should be placed alongside the wheels on both sides of the machine about four inches from the ground. When both the battens are touching the rear tyre on both sides of the wheel centre, the front wheel should be midway between and parallel to both battens. Any alteration necessary must be made by adjusting the rear chain adjuster screws after loosening the wheel spindle nuts. (See Fig. 10).

### DESCRIPTION—TYRES

21. The tyres fitted to the TRW are of the wire bead type and are fitted into a well-base rim. The wire bead ensures that there will be no stretch in the tyre and in combination with the well-base rim, provides for easy fitting and removal of the tyre.

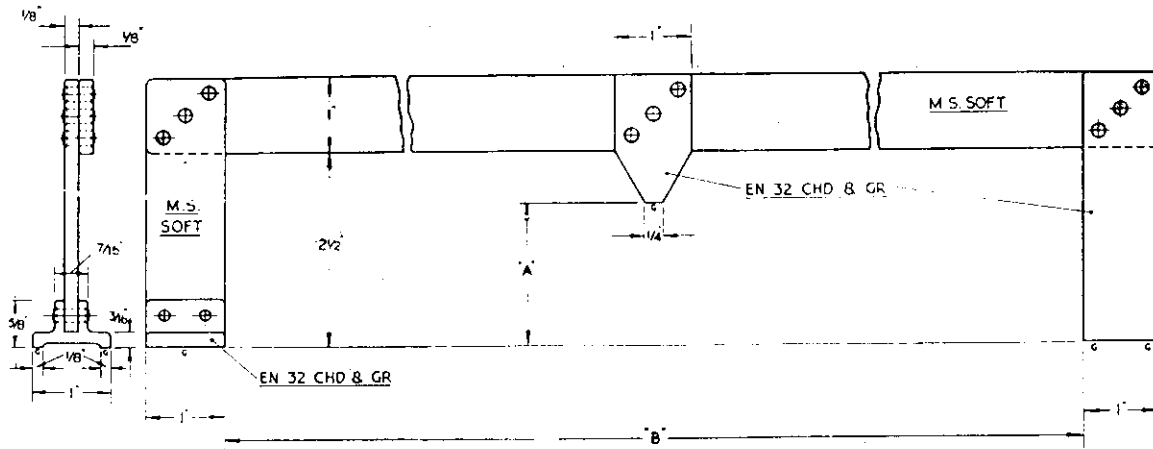


Fig. 8. Wheel Building Gauge.

A = 27.32" B = 17" FOR WM 2-19 FRONT  
 A = 1.679" B = 17" FOR WM 3-19 REAR.

Fig. 9. Use of Wheel Building Gauge.

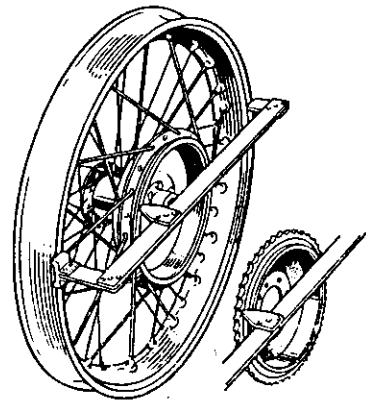
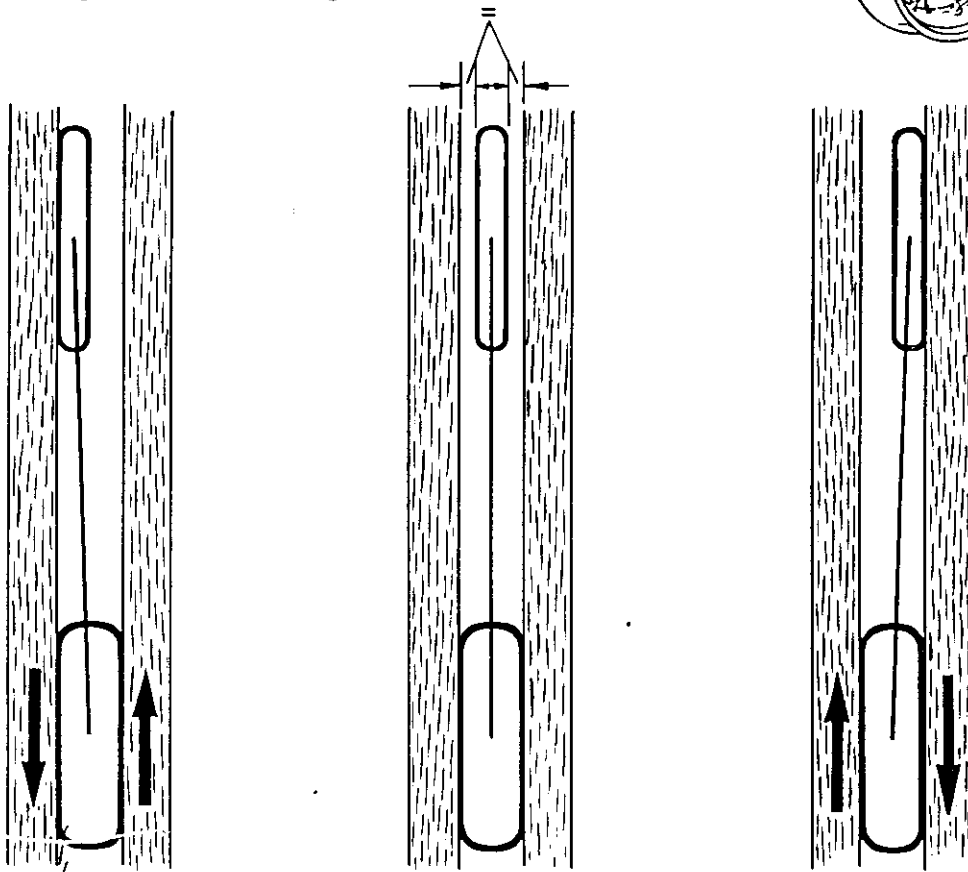


Fig. 10. Rear Wheel Alignment.



**TO REMOVE THE FRONT TYRE**

22. (1) Unscrew the valve cap and use the specially shaped end to unscrew the valve core and deflate the tyre. Unscrew the knurled nut and together with the valve cap and core, place the parts where they will be free from dirt and grit.
- (2) It is advisable to lubricate the cover beads with a little soapy water before commencing to remove the tyre. Levers should be dipped in this solution before each insertion.
- (3) Insert a lever AT THE VALVE POSITION and while pulling on this lever press the bead into the well of the rim diametrically opposite the valve position. Insert a second lever close to the first and prise the bead over the rim flange. Remove the first lever and re-insert a little further away from the second lever. Continue round the bead in steps of 2-3 inches until the bead is away from the rim.

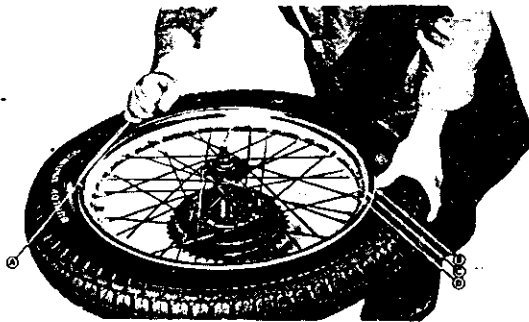


Fig. 11. Commencing to Remove the First Bead.

- (4) Push the valve out of the rim and remove the inner tube.
- (5) Stand the wheel upright and insert a lever between the remaining bead and the rim. Pull the cover away from the rim.

**TO FIT THE FRONT TYRE**

23. (1) Make sure that the rough side of the rubber rim band is fitted against the rim and that the band is central in the well.
- (2) Inflate the inner tube just sufficiently to round it out without stretch, dust it with French chalk and insert it into the cover, leaving it protruding beyond the beads for about four inches either side of the valve. It is again a wise precaution to lubricate the beads and levers with soapy water.

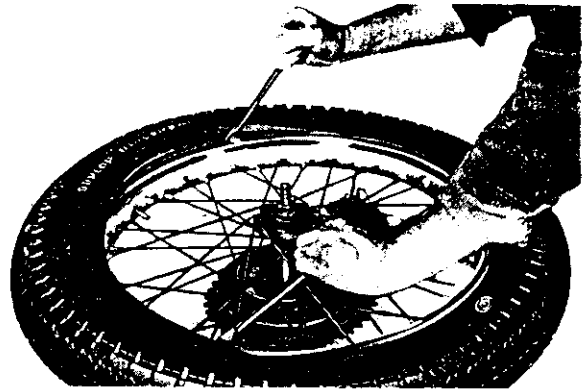


Fig. 12. Removing the First Bead.

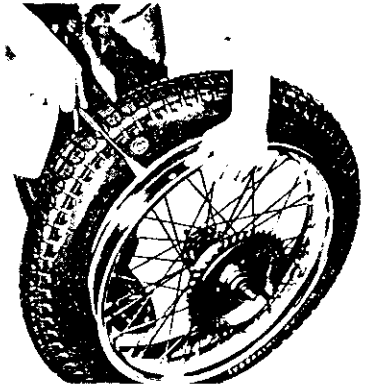


Fig. 13. Removing the Cover.

- (3) Squeeze the beads together at the valve position to prevent the tube from slipping back inside the cover and push the cover towards the rim, threading the valve through the valve holes in the rim band and rim. Allow the first bead to go into the well of the rim and the other bead to lie above the level of the rim flange. Working from the valve, press the first bead over the rim flange by hand, moving forward in small steps and making sure that the part of the bead already dealt with lies in the well of the rim. If necessary, use a tyre lever for the last few inches.



Fig. 14. Cover and Tube Assembled Ready for Fitting.

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

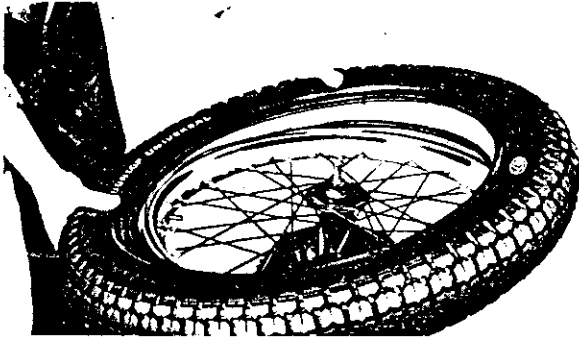


Fig. 15. Commencing to Fit the Tyre.

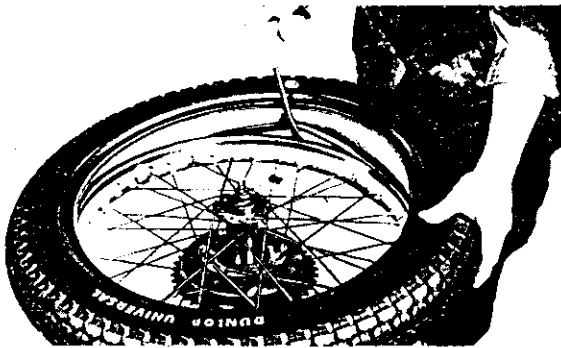


Fig. 16. Fitting the First Bead.

- (5) Push the valve inwards to make sure that the tube near the valve is not trapped under the bead. Pull the valve back and inflate the tyre. Check that the fitting line on the cover is concentric with the top of the rim

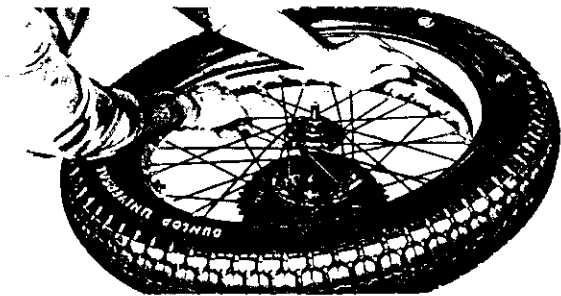


Fig. 17. Completing the Fitting of the First Bead.

flange and that the valve protrudes squarely through the valve hole. Fit the knurled rim nut and valve cap.

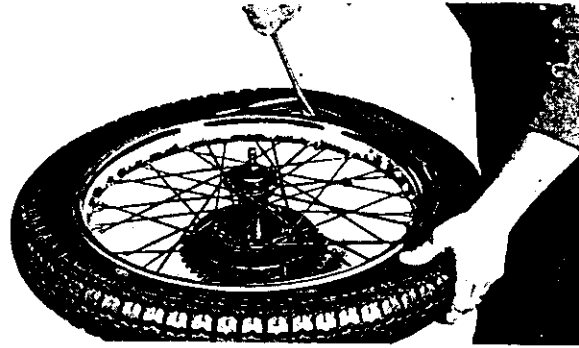


Fig. 18. Completing the Fitting of the Second Bead.

**REAR TYRE**

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

**TO REMOVE THE REAR TYRE**

- (1) Remove the valve cap and core as described and deflate the tyre.
- (2) Unscrew the security bolt nut and push the bolt inside the cover.
- (3) Remove the first bead as described.
- (4) Remove the security bolt from the rim.
- (5) Remove the inner tube as described.
- (6) Finally remove the second bead.

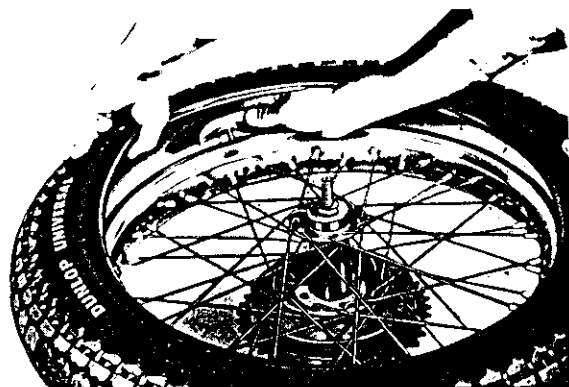


Fig. 19. Placing the Security Bolt in Position.

**TO FIT THE REAR TYRE**

25. (1) Fit the rim band.
- (2) Fit the first bead without the inner tube inside.
- (3) Fit the security bolt to the rim.
- (4) Partly inflate the inner tube (see para. 23 (2) and fit into the cover.
- (5) Fit the second bead but as the security bolt and valve position is reached, push the security bolt well into the cover and make sure that the inner tube is resting on the canvas flap of the security bolt and not overlapping the sides.
- (6) Fit the valve stem nut and inflate the tyre.
- (7) Bounce the wheel at the point where the

security bolt is fitted and tighten the security bolt nut.

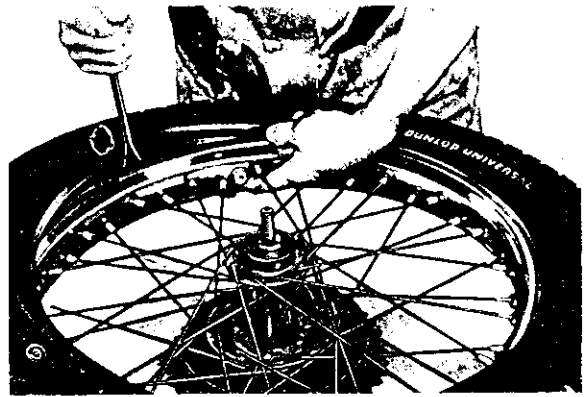


Fig. 20. Completing the Fitting of the Second Bead.

**FRONT WHEEL—BASIC PLAN DIMENSIONS**

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
<b>FRONT WHEEL BEARING</b>		<b>HUB SHELL</b>	
Bearing ... .. o/dia.	1.8499	Hub, bearing housing RH i/dia.	1.8499
47 m/m o/dia. × 20 m/m bore ×	1.8504		1.8504
14 m/m wide ... ..		Hub, bearing housing LH i/dia.	1.8495
			1.8500
Bearing ... .. i/dia.	0.7871	Spindle sleeve ... .. o/dia.	0.7868
	0.7876		0.7873
Spoke, LH outside ... ..	8 $\frac{11}{32}$	Spoke RH outside ... length	6 $\frac{3}{8}$
head angle	88°	head angle	83°
Spoke LH inside ... length	8 $\frac{11}{32}$	Spoke RH inside ... length	6 $\frac{3}{8}$
head angle	90°	head angle	94°
Brake drum ... .. i/dia.	7.002		
	6.998		
<b>BRAKE ANCHOR PLATE</b>			
Cam spindle bush ... i/dia.	.501	Brake cam spindle ... o/dia.	.498
	.499		.496
Brake lining chamfer ... ..		Brake cam spindle ... o/dia.	.498
			.496
Brake shoe return spring length (inside ears)...		Brake lining chamfer ... ..	¼ in. deep × $\frac{3}{16}$ in. back
		Brake shoe return spring length (inside ears)...	... .. 2 $\frac{3}{16}$ in.

Section 5

WHEELS

DESCRIPTION	SIZE INCHES	DESCRIPTION	SIZE INCHES
-------------	-------------	-------------	-------------

CONTROL CABLES

Front brake inner wire o/all length	39 $\frac{3}{4}$	Front brake casing ... length	18 $\frac{3}{8}$
--	------------------	-------------------------------	------------------

REAR WHEEL

REAR WHEEL BEARING

Bearing, taper roller ... o/dia.	1.7500 1.7506
Bearing, taper roller ... i/dia.	0.5625 0.5631
Spoke LH and RH outside length head angle	8 $\frac{1}{2}$ 76°
Brake drum ... i/dia.	7.002 6.998

BRAKE ANCHOR PLATE

Cam spindle bush ... i/dia.	.501 .499
-----------------------------	--------------

HUB SHELL

Hub, bearing housing ... o/dia.	1.7484 1.7491
Spindle, wheel ... o/dia.	0.5615 0.5623
Spoke, LH and RH inside length head angle	8 $\frac{1}{2}$ 100°
Brake cam spindle ... o/dia.	.498 .496

Brake lining chamfer ...  $\frac{1}{8}$  in. deep  $\times$   $\frac{3}{16}$  in. back

Brake shoe return spring length (inside ears) ...  $2\frac{3}{16}$  in.

## SECTION SIX

**B.T.H. EQUIPMENT**

(Mks. 1 and 2 Machines only)

**LIST OF CONTENTS**

<i>Paragraph</i>	<i>Title</i>	<i>Page</i>
	Fault Finding Chart ... ..	92
1	Description—Lighting Equipment ... ..	93
10	Headlamp Switch ... ..	94
14	Rectifier ... ..	95
17	Description—Ignition Equipment ... ..	95
18	To Adjust the Contact Breaker ... ..	95
20	To Remove the Magneto ... ..	98
21	To Dismantle the Magneto ... ..	98
22	To Assemble the Magneto ... ..	98
23	To Replace the Magneto and Time the Ignition ... ..	98
24	Varley Battery—Initial Filling and First Charge Instructions ... ..	99
27	Maintenance Instructions ... ..	99
28	Re-charging on the Bench ... ..	99

**LIST OF ILLUSTRATIONS**

<i>Fig.</i>	<i>Title</i>	<i>Page</i>
1	Headlamp Switch ... ..	94
2	Magneto Housing and Automatic Timing Device ... ..	96
3	Magneto Armature ... ..	96
4	Magneto Contact Breaker ... ..	97
5	Mk. 1 Nacelle Wiring Diagram ... ..	100
6	Mk. 1 Machine Wiring Diagram ... ..	100
7	Mk. 2 Nacelle Wiring Diagram ... ..	101
8	Mk. 2 Machine Wiring Diagram ... ..	101

FAULT FINDING CHART

SYMPTOMS										DEFECT	REMEDY	
Engine will not start or run	Starting difficult and poor low speed running	Irregular firing	Misfiring at high speed only	Misfiring on hills	Loss of engine power	Pre-ignition or back-firing	Failure of dim or tail lights	Failure of headlamp bulb	Battery completely discharged	Fluctuating headlight		
	X		X			X					<b>SPARKING PLUGS</b> Unsuitable type	Replace
	X			X							Oversize gap	Re-set to 0.018"
X	X			X							Dirt or moisture on insulator	Clean
X	X	X		X		X					Oiled or badly sooted	Clean
X	X			X							Cracked or faulty insulator	Replace
		X	X	X	X						Insulator leaky when hot	Replace
X											Fouled or shorted	Clean and re-check
X	X	X		X							<b>HIGH TENSION CABLE</b> Insulation weak or perished and shorting to frame	Replace high tension cable
X	X			X							Conductors broken	Replace high tension cable
	X		X	X		X					<b>MAGNETO CONTACT BREAKER</b> Contact gap oversize	Re-set to 0.012"
X	X	X			X						Contact gap, small	Re-set to 0.012"
X	X	X									Oil or dirt on contacts	Clean contacts and re-set
		X	X		X						Flashing at contacts due to faulty condenser	Replace condenser
	X		X	X							Worn or pitted contacts	Remove and true up contact faces or replace
X											Collector mouldings shorting to body	Clean moulding; replace if cracked or damaged
							X	X	X	X	<b>HEADLAMP CONTROL SWITCH</b> Distorted contact springs	Remove and set or replace
							X	X	X	X	Thermal switch contacts dirty	Clean and re-assemble
							X	X	X	X	Thermal element sticking	Clean and re-adjust
							X	X	X	X	Terminal connection loose	Re-make connection and tighten
								X	X	X	<b>GENERATOR</b> Output terminal damaged	Repair or replace terminal
								X	X		Loose connection at terminal	Re-make connection and tighten
							X	X	X	X	<b>CABLE HARNESS</b> Conductor broken	Repair or replace cable
							X	X	X	X	Cable chafed and shorting to frame	Insulate with tape or replace cable
							X	X	X		<b>RECTIFIER</b> Damaged	Replace
									X		Ballast resistance broken	Re-connect if broken near terminal
								X			Compensating resistance broken	Re-connect if broken near terminal

**B.T.H. ELECTRICAL EQUIPMENT****Generator (Type R.B.)****DESCRIPTION**

## 1. MARK 1—FORM A1-1

## MARK 2—FORM A2-2

The equipment installed on the Mark 1 T.R.W. machine, has the negative earth wiring system and employs a 36/36 watt main headlamp bulb. The Mark 2 machine has the positive earth wiring system and employs a 30/24 watt main bulb of the pre-focus type.

2. The generator is a permanent magnet alternator built into the primary chaincase and comprises two units only; a wound stator and a permanent magnet rotor. (See Fig. 4, Page 13).

**STATOR.**—The stator member is fitted into the primary outer chaincase and is registered in a deep spigot and held in position by six screws. The windings on the twelve salient poles of the stator are connected in series and are impervious to oil. Removal of the outer chaincase separates the stator from the rotor.

**ROTOR.**—The rotor member has its permanent magnet cast in a solid ring of aluminium which is keyed directly on to the engine crankshaft.

One end of the generating winding is "earthed" to the stator frame and the other end is brought through to a terminal post fitted to the chaincase. This terminal is protected by means of a small aluminium cover which also serves to anchor the cable leading from the generator to the headlamp switch.

3. The wiring circuit is arranged so that the headlamp filaments are fed directly from the alternator, the battery is charged through a metal rectifier and the "dim" and "tail" lamps fed with D.C. from the battery. When the headlamp bulb is not in use, the current normally taken by this unit is by-passed through a resistance fitted to the base of the headlamp switch. The ohmic value of this resistance is 1.5 ohms which allows a slightly higher charging current to be obtained from the generator for all positions of the switch except when the headlamp is on. In order to maintain the generator load constant in the "dip" and "tail" headlight switch positions on the Mark 2 equipment, a compensating resistance is connected in parallel with the dip filament. This prevents the generator voltage

rising to a higher value when the switch is operated, bringing in the 24 watt filament. See Fig. 7 and 8 for the wiring diagram.

4. The headlamp switch serves to change over from "Off" to "Tail only", "Dim" and "Full" lights, and also carries the thermostatic switch which automatically breaks the battery circuit when the engine is stationary. The purpose of this device is to prevent the battery from becoming discharged by leakage through the rectifier in the event of the motorcycle being left stationary for a long period.

5. The dip switch which changes over the A.C. supply from the main to the dip filament in the headlamp bulb is designed so that the headlamp circuit is never broken. This prevents high voltages being applied to the rectifier during change over from "dip" to "full" and vice versa. If the headlamp filament fails, the thermostatic switch opens after a few seconds and so disconnects the rectifier from the generator.

**TO CHECK THE ALTERNATOR AIR GAP**

6. It is important that the air gap between the rotor and stator is maintained at 0.014 in. maximum, 0.012 in. minimum. This gap may be checked by inserting a narrow feeler gauge between the rotor and stator poles through the inspection window provided in the primary chaincase. The gap is not likely to alter during normal use of the motorcycle unless very considerable wear in the drive side crankshaft bearing takes place, or the chaincase carrying the generator stator is removed and is re-assembled without the locating dowels being correctly fitted.

**TO REMOVE THE STATOR FROM THE PRIMARY CHAINCASE**

7. If it is necessary at any time to remove the generator stator from the chaincase, care should be taken to remove the terminal details before attempting to detach the stator. Then unscrew the six retaining screws and withdraw the stator complete with the inner terminal lead.

**TO REMOVE THE ROTOR**

8. The generator rotor may be removed from the engine after removing the outer chaincase, by first removing the retaining nut and washer and then smartly tapping the end of the crankshaft with a mallet. As the rotor is a powerful permanent magnet, as soon as it is exposed by the removal of

the chaincase, or if it is taken off the crankshaft, it should be immediately covered with a clean cloth or wrapped in paper to prevent it picking up metallic particles.

### TO REPLACE THE STATOR AND ROTOR

9. When the rotor and stator are being assembled, care must be taken to ensure that no metallic particles are sticking to the rotor which could cause fouling or scoring of the poles when the engine is run. On re-fitting the stator into the chaincase, care must be taken to ensure that it is fitted squarely in its locating bore and it must be pressed home by hand before fitting any screws. If the stator is allowed to tip or become out of square, it must not be forced with the fixing screws as this may cause distortion of the chaincase.

### HEADLAMP SWITCH

10. The following points should be carefully noted when re-assembling or adjusting the headlamp switch.

#### TO ADJUST THE CONTACT SPRINGS

The current carrying elements consist of two Beryllium-Copper leaf springs which should give

prolonged life without distortion or fatigue. Should these springs become distorted and require re-setting, to give greater pressure on the terminal studs, they should be set with great care at the base of the leaf. (See point where arrow indicating part A is shown on Fig. 1). When tightening the spring retaining screw it is important to ensure that the springs seat squarely on the flat machined on the locating pillar.

#### RATCHET SPRING

11. This spring should be thickly coated with protective PX-7 to ensure that the curved ends of the spring snap smartly into the serrations in the hardened steel base of the moulded cam. Should this spring be removed from the moulded switch base it should be smeared with protective PX-7 before being re-assembled in the switch base.

If this operation is carried out with the cam and ratchet assembly (part B, Fig. 1) removed from the switch, the bowed ends of the ratchet spring should be pinched together between the thumb and finger until the gap in the locating hole is closed. This reduces the effective diameter of the spring locating loop and facilitates insertion of the spring in the moulding.

#### THERMAL ELEMENT

12. Should trouble occur due to the thermal switch sticking or becoming sluggish in operation, the thermal element should be removed, taking care not to damage or distort the spiral bi-metal element. The bore of the centre sleeve should also be examined to make sure that it is clean and smooth.

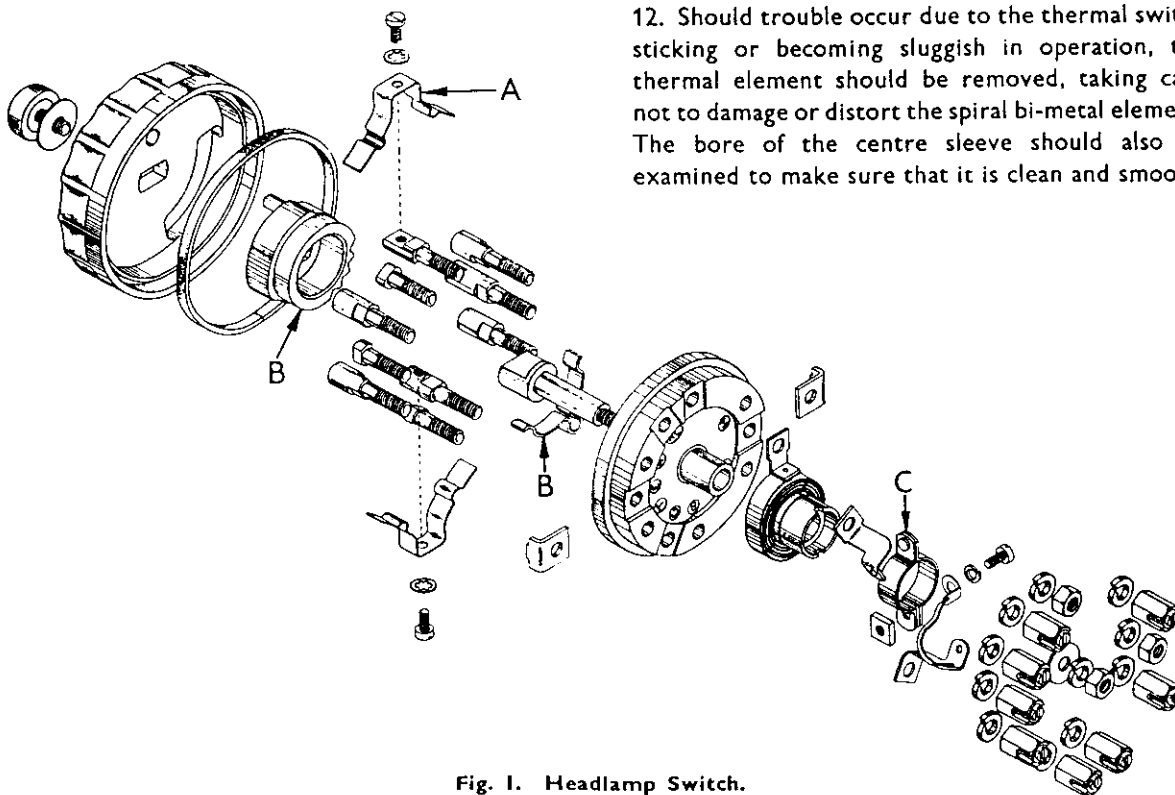


Fig. 1. Headlamp Switch.

Should this bore be dirty or corroded, it should be carefully cleaned with fine emery cloth or a 9 mm. or  $\frac{23}{4}$  in. reamer may be passed through the bore. The fixed and moveable contacts should also be cleaned if necessary with very fine emery cloth or a smooth file. The contact material is soft and care should be taken not to remove too much metal.

Before re-assembly, the bore in the thermal element centre sleeve and the spindle on to which it fits should be lightly smeared with "Dow Corning No. 44 Silicone grease XG271".

When re-setting the centre sleeve and thermal element assembly, care should be taken not to distort the spiral element. The outside turn of the bi-metal strip should be well clear of the terminal studs and should lie as shown on the under-side view of the switch assembly.

The thermal switch contact pressure and the length of time required to close may be adjusted by turning the bracket carrying the adjustable contact Part C, Fig. 1) relative to the centre sleeve.

#### TO ADJUST THE THERMAL ELEMENT

13. After slackening the clamping screw the bracket carrying the adjustable contact (Part C, Fig. 1) should be moved so that the tension of the spiral element is *just sufficient* to pull the adjustable contact breaker back against the stop formed by the connector assembly.

Operation of the thermal switch may be checked by running the engine at approximately 2,000 r.p.m. (30 m.p.h. in top gear) when the time to close should be not more than 10-12 seconds. It is preferable to carry out this test with the main switch in the "OFF" position as this precludes the risk of "blowing" the headlamp bulb filament during the test.

In the case of extreme emergency, if for any reason the thermal switch cannot be adjusted to operate satisfactorily, the contacts should be fixed in the "closed" position. With the thermal switch contacts permanently closed, there is little likelihood of headlamp bulbs being blown, a trouble which might occur if the thermal switch was stuck in the "open" position.

#### RECTIFIER

14. The rectifier requires no attention in service and should not be dismantled. It can be removed from the motorcycle by removing its retaining nut. The nut securing the rectifier plates together

should not be disturbed. At no time should the rectifier be heated above 75°C. or its performance may be seriously impaired.

#### HEADLAMP BULB

15. The headlamp bulb used with this equipment is a double filament S.B.C. 6-volt 36/36 watt (Mark 1) or Prefocus 6-volt 30/24 watt (Mark 2). It is important that replacement bulbs are of identical wattage as the stator windings are designed to match this load and to give a substantially flat voltage-speed characteristic over the complete speed range of the engine. If a lower wattage bulb is used, the alternator voltage will rise to a value which will result in almost immediate failure of the bulb.

#### PILOT AND TAIL LAMP BULBS

16. The pilot and tail lamp bulbs are 6-volt 3-watt (See page 5). The battery charging rate is arranged to balance this load at all speeds above 1,300 r.p.m. with excess to meet the use of the electric horn.

### B.T.H. IGNITION EQUIPMENT (Mk. 1 and 2 only)

#### DESCRIPTION

17. The ignition system on the Mk. 1 and 2 machines consists of a separate B.T.H. Magneto K.C.2. R.H. rotation. The magneto is driven at half engine speed and provides two sparks per revolution. The bearings are pre-packed with grease and need re-packing only when the magneto is overhauled. The drive is through an automatic timing device incorporated in the magneto pinion. This device advances the spark as the engine speed increases, returning to the retarded position when the engine slows down or stops. In common with the rest of the timing gears this device is lubricated by oil-mist.

#### TO ADJUST THE CONTACT BREAKER

18. Remove the three screws securing the magneto end cover and inspect the contact breaker, as it is important that the points are kept free from oil and grease. If the points are left in a dirty state they will become oxidised, causing bad electrical contact between the points when closed and also result in difficult starting and misfiring. The points are made slightly convex and when necessary may



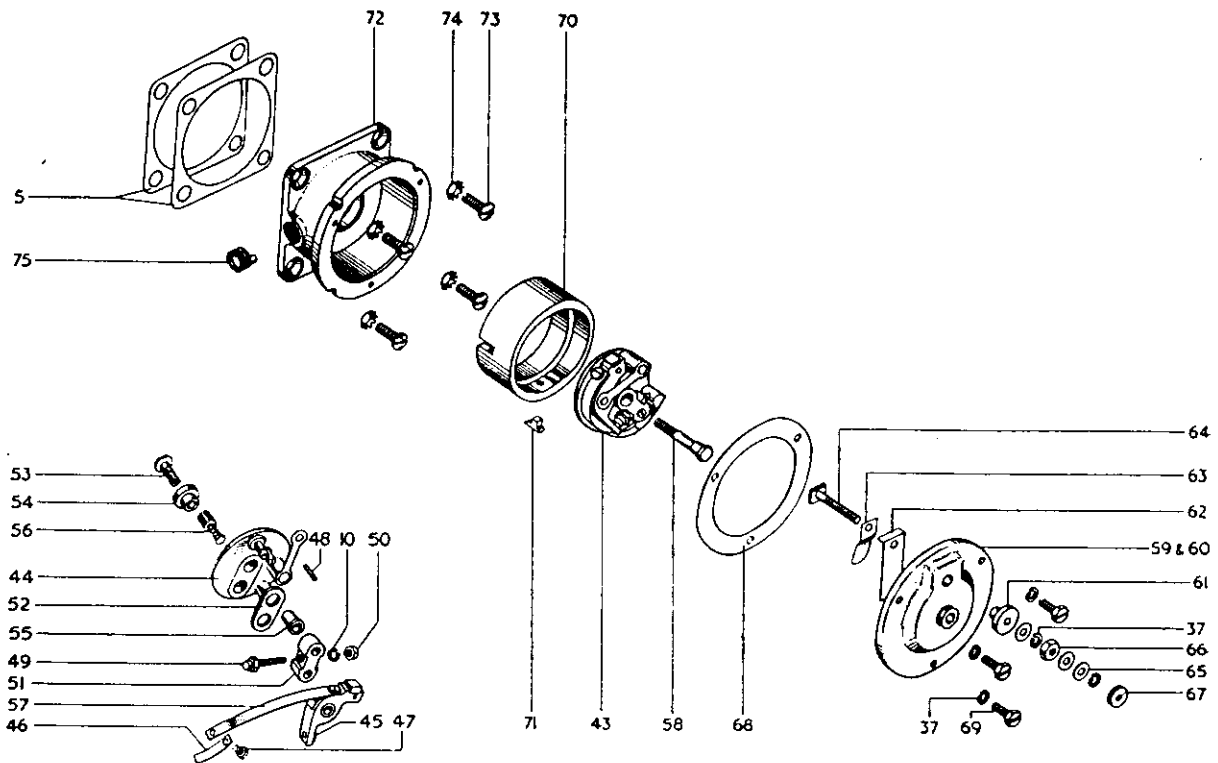


Fig. 4. Magneto Contact Breaker.

## INDEX TO FIGS. 2, 3 &amp; 4. B.T.H. MAGNETO.

- |                                |                                   |                                   |
|--------------------------------|-----------------------------------|-----------------------------------|
| 1 Housing, main.               | 28 Armature.                      | 52 Strip, insulating.             |
| 2 Bearing, ball.               | 29 Screw, spindle to core.        | 53 Screw, block to base.          |
| 3 Insulation, bearing.         | 30 Dowel, armature end plate.     | 54 Bush, screw insulating.        |
| 4 Seal, oil.                   | 31 Screw, end plate fixing.       | 55 Bush, centre.                  |
| 5 Shim, bearing adjusting.     | 32 Dowel, armature, end plate.    | 56 Brush and spring, earthing.    |
| 6 Magnet.                      | 33 Condenser.                     | 57 Spring, contact lever.         |
| 7 Screw, magnet locating.      | 34 Insulation, condenser (large). | 58 Screw, contact breaker fixing. |
| 8 Cover, magnet.               | 35 Insulation, condenser (small). | 59 Contact breaker cover.         |
| 9 Screw, magnet cover.         | 36 Screw condenser fixing.        | 60 Contact breaker cover.         |
| 10 Washer, cover screw.        | 37 Washer, condenser screw.       | 61 Bush, terminal insulating.     |
| 11 Screw, safety gap.          | 38 Bush, condenser insulating.    | 62 Insulation, terminal.          |
| 12 Washer, tab.                | 39 Slip-ring.                     | 63 Strip, contact.                |
| 13 Holder, collector brush.    | 40 Washer, slip-ring.             | 64 Terminal.                      |
| 14 Brush and spring.           | 41 Washer, slip-ring.             | 65 Washer, terminal nut.          |
| 15 Washer, brush holder.       | 42 Ring, reinforcing.             | 66 Nut, terminal locking.         |
| 16 Knurled ring, brush holder. | 43 Contact breaker.               | 67 Nut, terminal knurled.         |
| 17 H.T. cable.                 | 44 Base, contact breaker.         | 68 Washer, cover joint.           |
| 18 Screw, H.T. cable securing. | 45 Lever, contact.                | 69 Screw, cover fixing.           |
| 19 Grommet, rubber.            | 46 Spring, backing.               | 70 Ring, cam.                     |
| 20 Gear, A.T.D.                | 47 Screw, spring fixing.          | 71 Wick, cam lubricating.         |
| 22 Hub assembly, A.T.D.        | 48 Wick, lever lubricating.       | 72 Housing, cam ring.             |
| 24 Roller, A.T.D.              | 49 Contact, stationary.           | 73 Screw, housing fixing.         |
| 25 Spring, A.T.D.              | 50 Nut, contact locking.          | 74 Washer, shakeproof.            |
| 26 Circlip, hub to gear.       | 51 Block, contact holding.        | 75 Screw, cam stop.               |

be cleaned with a carborundum stone; in no circumstances should they be filed. The contact breaker may be removed for cleaning by unscrewing the central hexagon headed screw and withdrawing the assembly from its housing.

The contact lever may then be lifted from its bearing pin by first raising and then moving to one side the check spring which is located in the end of the bearing bush. Care should be taken not to distort the contact lever spring. When replacing the contact lever, smear the bearing pin lightly with thin lubricating oil; carefully wipe off any surplus oil.

#### TO CLEAN THE COLLECTOR BRUSHES

19. The collector brush holder should be removed by pulling back the rubber grommets on the plug leads and unscrewing the knurled ring, and the surface wiped clean with a cloth moistened with spirit. Before replacing the mouldings, the slip-ring track should be cleaned. To do this insert a corner of clean cloth into the aperture from which the holders have been taken, so that it bears against the slip-ring track and the flange; at the same time turn the magneto. This will remove any oil, or carbon deposit which would be likely to cause an electrical leakage. See that the cleaned parts are dry and that the spirit vapour is expelled before restoring the magneto to service.

#### TO REMOVE THE MAGNETO

20. See Section 1, paras. 20 and 23.

#### TO DISMANTLE THE MAGNETO

21. Remove the three contact breaker cover securing screws and when detaching the cover, take care not to damage the sealing washer.

Unscrew the hexagon headed screw in the centre of the contact breaker, when the contact breaker can be withdrawn complete.

Remove the collector mouldings by unscrewing the knurled retaining rings. Take care not to damage the carbon brushes.

The safety gap screws are situated at the top and bottom of the main housing at the drive end. Ease back the locking tabs and unscrew the screws from the housing. It is most important to observe this as failure to do so will result in damage to the slip ring when the armature is withdrawn.

Unscrew the four cam ring housing fixing screws. The special locking washers which retain the screws should be preserved for re-assembling.

Withdraw the armature assembly from the main housing.

#### TO ASSEMBLE THE MAGNETO

22. Re-assembly of the magneto is exactly the reverse of dismantling but the following points must be observed:—

- (1) If the armature is withdrawn from the housing it will be necessary to re-magnetise the magneto after replacing the armature.
- (2) Make sure that all parts are thoroughly cleaned and that no foreign matter is present, particularly in the tunnel of the main housing, otherwise binding and ultimate seizure of the armature will follow.
- (3) It is essential that all washers and locking tabs should be replaced in their original positions. Damaged tabs should not be used, but replacements obtained.
- (4) If the cam ring has been removed from the housing, be sure that the lubricating wick is in position and lubricated with thin oil and that the cam is properly located in the housing with the timing slot engaged with the timing stop screw. In no circumstances should the timing stop screw be moved from its original position, as this is set by an electrical process at the manufacturers, and has been peened over as a safety measure.
- (5) Care should be taken when replacing the contact breaker to ensure that the key on the contact breaker base engages with the corresponding slot in the armature and is held firmly in position during the tightening of the retaining screw.
- (6) All carbon brushes should move freely in their holders and the spring pressure should not be adjusted unnecessarily.
- (7) High-tension cables should be examined for cracks, caused by dry or perished rubber and should be screwed securely home in the collector mouldings. A special screw is fitted in the collector mouldings for this purpose and has a woodscrew-threaded portion protruding in the cable outlet position into which the cables are screwed.

#### TO REPLACE THE MAGNETO AND TIME THE IGNITION

23. See Section 1, paras. 47 and 50.

**VARLEY BATTERY****INITIAL FILLING AND FIRST CHARGE INSTRUCTIONS**

24. If the battery has not been filled with acid and received its first charge, the following instructions must be carried out.

**FILLING**

Only Sulphuric Acid of the best accumulator grade should be used, specific gravity (sp. gr.) to be as follows:—

Temperate Climate ... ..	1.275 @ 60° F.
Warm Climate ... ..	1.250 @ 60° F.
Tropical Climate ... ..	1.235 @ 60° F.

Remove the three vent stoppers and fill the battery with the correct sp. gr. acid, by filling each vent. When the level of the liquid in the vents remains unchanged for several minutes, after adding more acid, the battery is fully filled and should be left standing for at least 5 hours, but no longer than over-night. If after this period of standing, any cells are dry, top up again with acid. It is of the utmost importance that the battery receives its full quantity of acid since on this depends the satisfactory performance and life. The battery should be put on first charge within fifteen hours of the commencement of filling.

**FIRST CHARGING**

25. The input should be 90 Ah. at a rate not exceeding 1.5 amps. (i.e. 90 hours at 1 amp. or 60 hours at 1.5 amps.)

During the first charge, top up with distilled water only.

The first charge should be continuous and it is not advisable for the current to be switched off until completion. If, for any major reason, the current has to be cut, the open circuit standing time should be allowed for.

During the final stage of charge, the voltage of the battery should read at least 7.8 volts, that is, 2.6 volts per cell and each cell should be gassing freely.

**TO PREPARE FOR USE**

26. After completion of charge any liquid remaining in the vents should be discharged by siphoning or shaking out. The battery should then be cleaned and dried. Replace the vent plugs and remove any sealing tape from them. Before connecting the terminals, grease them slightly with protective PX7.

**MAINTENANCE INSTRUCTIONS**

27. When standing idle the battery must be given a freshening charge at least once a month.

8 ampere hours (8 hrs. at 1 amp. recommended). When in use the alternator will maintain the battery in a charged condition. Once a month the battery needs topping up with a small quantity of distilled water in order to maintain the plates and separators in a moist condition. Normally a teaspoonful of distilled water per vent is sufficient. AFTER STANDING FOR 15 MINUTES ALL SURPLUS LIQUID SHOULD THEN BE REMOVED BY SIPHONING OR SHAKING OUT. Topping up should be carried out after and not before a journey. The following voltages will indicate the approximate state of charge.

Fully discharged ... ..	5.7 volts or under
Partially discharged ... ..	6.15 " " "
Open circuit fully charged	6.3 " " over
On charge, fully charged...	7.8 " " "

**RECHARGING ON THE BENCH**

28. Normal charge rate 1.5 amperes. When voltage reading on charge reaches 7.8 volts, continue charging for a further three hours. Normally ten hours at 1.5 amps is sufficient.

If the battery is allowed to get abnormally dry, it should be topped up with distilled water before and during charge. After charge, all surplus liquid should be removed.

In the event of the battery falling off in capacity after it has been in constant use for some considerable time, it should be topped up with weak acid (specific gravity = 1.10) instead of distilled water for one or two charges.

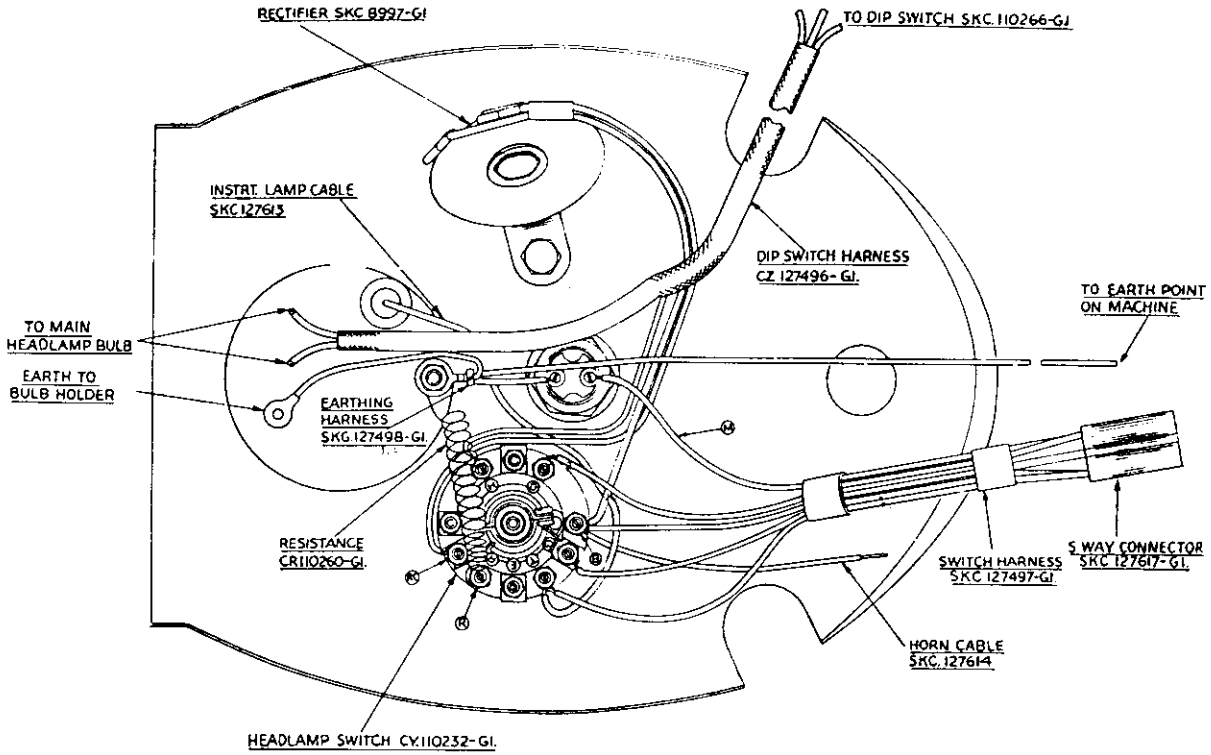


Fig. 5. Mk. 1 Nacelle Wiring Diagram.

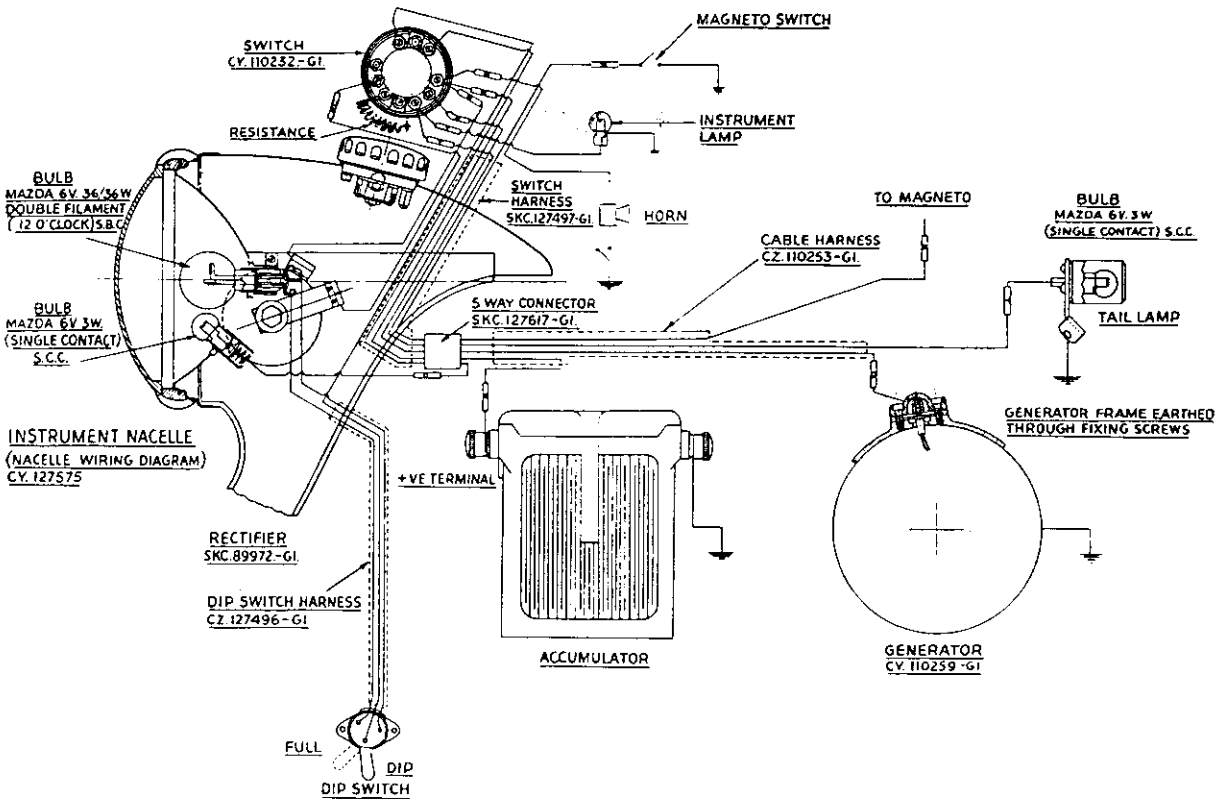


Fig. 6. Mk. 1 Machine Wiring Diagram.

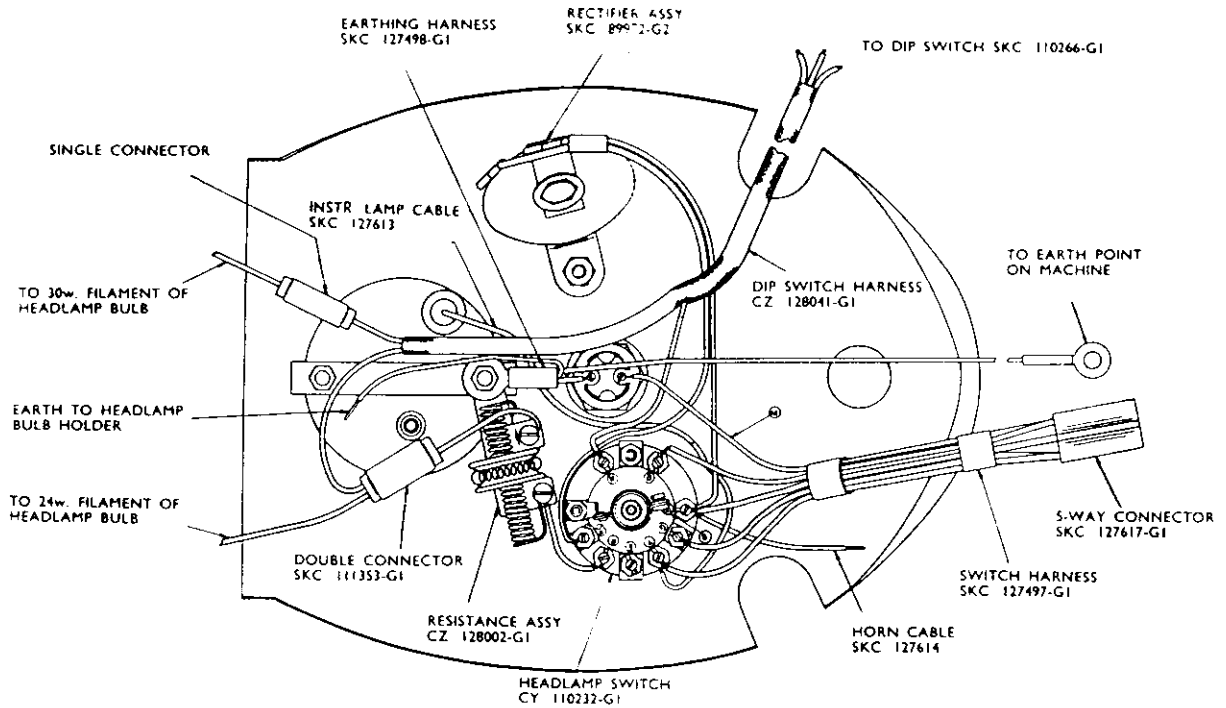


Fig. 7. Mk. 2 Nacelle Wiring Diagram.

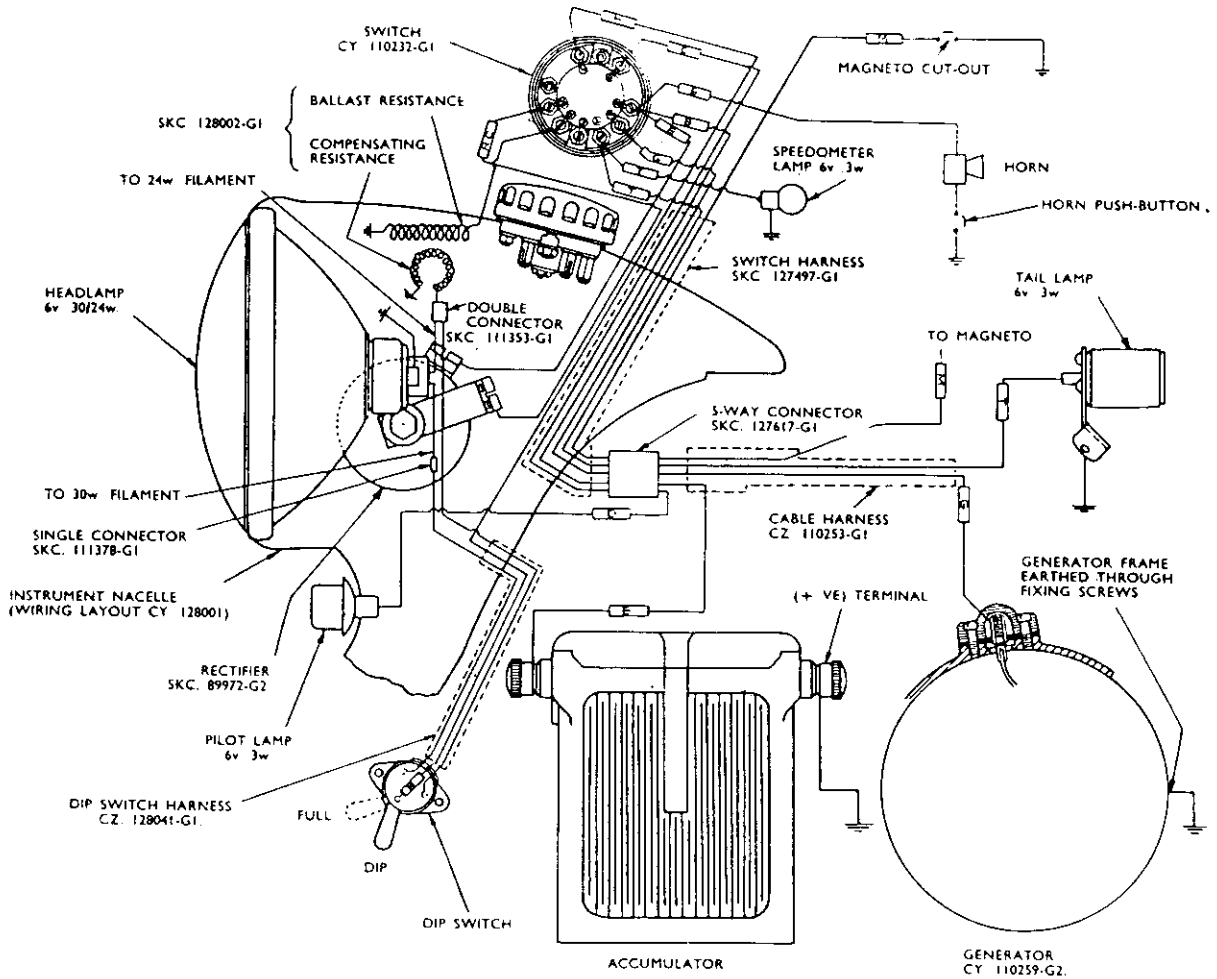


Fig. 8. Mk. 2 Machine Wiring Diagram.



# SECTION SEVEN

# LUCAS EQUIPMENT

(Mk. 2 B Machines only)

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## LIST OF CONTENTS

<i>Paragraph</i>	<i>Title</i>	<i>Page</i>
1	Description ... ..	104
7	Maintenance ... ..	104
9	Testing ... ..	105
12	Test 1—To check D.C. Output ... ..	105
13	Test 2—To Check A.C. Output ... ..	106
14	Test 3—To Check the Rectifier ... ..	107
15	Circuit Checking ... ..	108
16	Distributor Model DKX2A ... ..	110
18	Testing in position to locate Ignition Fault ... ..	111
20	To Dismantle the Distributor ... ..	112
23	To Assemble the Distributor ... ..	112
	To Time the Distributor ... ..	112
24	Horn, Model HF 1441 ... ..	113
27	Lighting and Ignition Switch, Model PRS8 ... ..	114
28	Headlamp, Model MCF700 ... ..	114
33	Parking Lamp, Model 517 ... ..	115
34	Stop and Tail Lamp, Model 525 ... ..	115

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## LIST OF ILLUSTRATIONS

<i>Fig.</i>	<i>Title</i>	<i>Page</i>
1	RM14 Alternator ... ..	104
2	Rectifier, showing Cable Colours ... ..	105
3	D.C. Output Test ... ..	106
4	A.C. Output Test ... ..	106
5	RM Thin Alternator in Correct Position in the Chaincase ... ..	107
6	Rectifier Test ... ..	107
7-10	Circuit Checking ... ..	108-9
11	Distributor ... ..	110
12	Horn Adjustment ... ..	113
13	Head and Pilot Lamps ... ..	114
14	Stop-Tail Lamp ... ..	115
15	Lucas Wiring Diagram ... ..	116

## LUCAS AC/DC ELECTRICAL EQUIPMENT

(Mk. 2B Machines)

### DESCRIPTION

1. The 6-volt circuit of the machine is fed by an alternating current generator (alternator), which is mounted on an extension of the engine mainshaft in the primary chaincase. In order to charge the battery, it is necessary to rectify the whole alternator output to Direct Current. This is done by a full-wave, bridge connected rectifier. The battery is a Varley Type MC 7/12 and is wired with the positive "+" terminal, earthed to the frame of the machine.

**NOTE.**—IF THE BATTERY IS CONNECTED WRONGLY, THE REVERSE CURRENT IN THE ALTERNATOR WINDINGS WILL DEMAGNETISE THE ROTOR.

Remember "Positive Earth"

### ALTERNATOR DESCRIPTION

2. The RM14 alternator comprises two main components, a stator and a rotor. The stator is built up from iron laminations and carries three pairs of series-connected coils insulated from the stator. The rotor has an hexagonal steel core, each face of which carries a permanent magnet keyed to a laminated pole tip. The pole tips are riveted circumferentially to brass side plates, the assembly being cast in aluminium and machined to give a smooth external finish. The stator and rotor can be separated without the need to fit magnet keepers to the rotor poles.

3. The alternating current output of the alternator is rectified to direct current (essential for battery charging) by a full-wave bridge-connected rectifier.

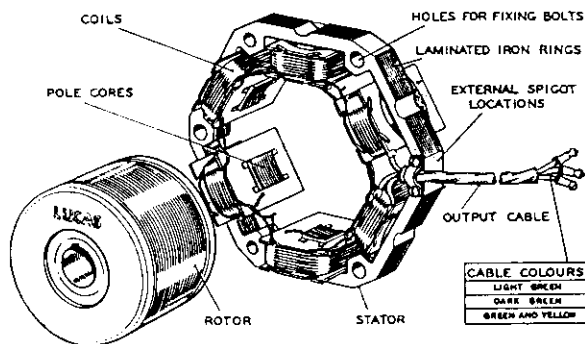


Fig. 1. RM14 Alternator.

### OUTPUT CONTROL

4. (1) During normal daylight running, when the alternator has only to trickle-charge the battery and to supply the ignition coil, one pair only of the stator coils is in circuit—the remaining coils being short-circuited. The magnet flux set up by the current flowing in the short-circuited coils interacts with the rotor flux and regulates the alternator output to its minimum value.
- (2) When the lighting switch is turned to the pilot position the two pairs of output control coils are disconnected and the regulating fluxes are consequently reduced. The alternating output therefore increases and compensates for the additional pilot light load.
- (3) With the lighting switch in the headlight position, the output from the alternator is further increased by connecting the three pairs of stator coils in parallel.

### EMERGENCY STARTING

5. An emergency starting position is provided on the ignition switch, for use if the battery has become discharged and a normal start cannot be made. In the switch position "EMG" the alternator is connected direct to the ignition coil and allows the engine to be started independently of the battery. After starting has been effected the ignition switch should be turned to the normal running ("IGN") position. Proper functioning of the Emergency Starting feature is dependent on accurate ignition timing being observed.

### DIRECT OPERATION

6. Short journeys, without battery or lighting can be made in the "EMG" position, providing the cable normally connected to the battery negative terminal is connected to an earthed point on the machine.

### MAINTENANCE

7. The alternator and rectifier require no maintenance apart from ensuring all connections are clean and tight. The nut which clamps together the rectifier plate assembly must not under any circumstances be slackened, as this has been carefully set during manufacture to give correct rectifier performance. A separate nut is used to

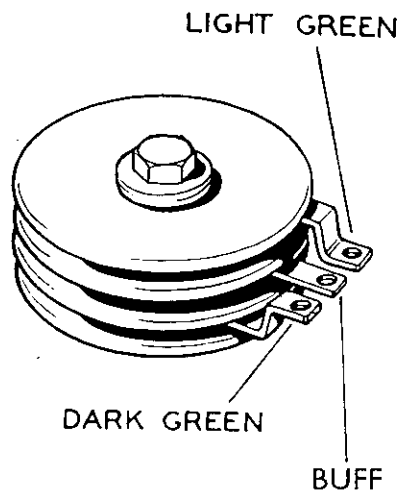


Fig. 2. Rectifier showing Cable Colours.

secure the rectifier to the frame of the motorcycle and this should be checked for tightness. Also, check the terminal connections for tightness.

**ROTOR—STATOR AIR GAP**

8. Periodically, or after removal of the primary chain case, the air gap between the rotor and the stator poles should be checked. Remove the inspection cover from the forward end of the chain case and check the air gap under each of the six poles. The gap should be 0.008 in. An uneven air gap will result both in unnecessary stressing of the engine bearings, and possible mechanical damage to the alternator if fouling occurs.

**TESTING—Apparatus**

9. To carry out a thorough test of the A.C. ignition installations, only high grade moving coil instruments should be used. The meters should have clear scales permitting readings accurate to 1/2-volt to be made over the range 5-9 volts (A.C. or D.C.)

Apparatus required is:—

- (1) D.C. ammeter, scale 0-15 amps.
- (2) D.C. voltmeter, scale 0-15 volts.
- (3) A.C. voltmeter, scale 0-15 volts.
- (4) 1-ohm load resistance, capable of carrying 8 amps. without overheating.
- (5) 12 volt battery and 12 volt 6 watt bulb.

10. A suitable resistance can be made from 12 feet of 18 S.W.G. (0.048 in. dia.) Nichrome wire together with two flexible leads and suitable spring clips. The resistance must be accurately calibrated to ensure correct test readings.

To Calibrate:

- (1) Bend the wire into two equal parts.
- (2) Attach a flexible cable to the centre bend of the wire and connect to the +ve terminal of a 6-volt battery.
- (3) Connect the D.C. voltmeter across the battery terminals.
- (4) Connect one terminal of the D.C. ammeter to the battery -ve terminal.
- (5) Connect a flexible cable to the remaining ammeter terminal. Attach a crocodile clip to the other end of the cable and clip on to the free ends of the resistance wire (which should be twisted together).
- (6) Move the clip along the wire, making contact with both wires until the discharge reading on the ammeter exactly equals the number of volts shown on the voltmeter. The resistance is then 1 ohm.
- (7) Cut the wire at this point, twist the two ends together and attach the second flexible cable.
- (8) Wind the wire on to an asbestos former 2 ins. diameter.

The resistance is now calibrated at 1 ohm and has flexible cables attached to each end.

**ALTERNATOR SPEED FOR TESTING**

11. For the main tests using the D.C. and A.C. voltmeters, the alternator should be run at approximately 2,000 r.p.m.

**TEST I—To Check D.C. Output**

12. (1) Connect the ammeter in series with the motorcycle battery. With the alternator running at 2,000 r.p.m. (approx.) the following readings should be obtained:—

Lighting Switch Positions	Amperes
OFF ... ..	2½ - 3½
PILOT ... ..	1½ - 2½
HEAD ... ..	2½ - 3½

(2) If the battery on the motorcycle is in a low state of charge, the 1-ohm load resistance should be connected in place of the battery and, to enable the engine to run, a feed taken to the ignition coil from a separate 6-volt battery. Turn the ignition switch to the "IGN" position. With the engine running at 2,000 r.p.m. (approx.) and the D.C. voltmeter connected across the resistance, the following voltage readings should be obtained:

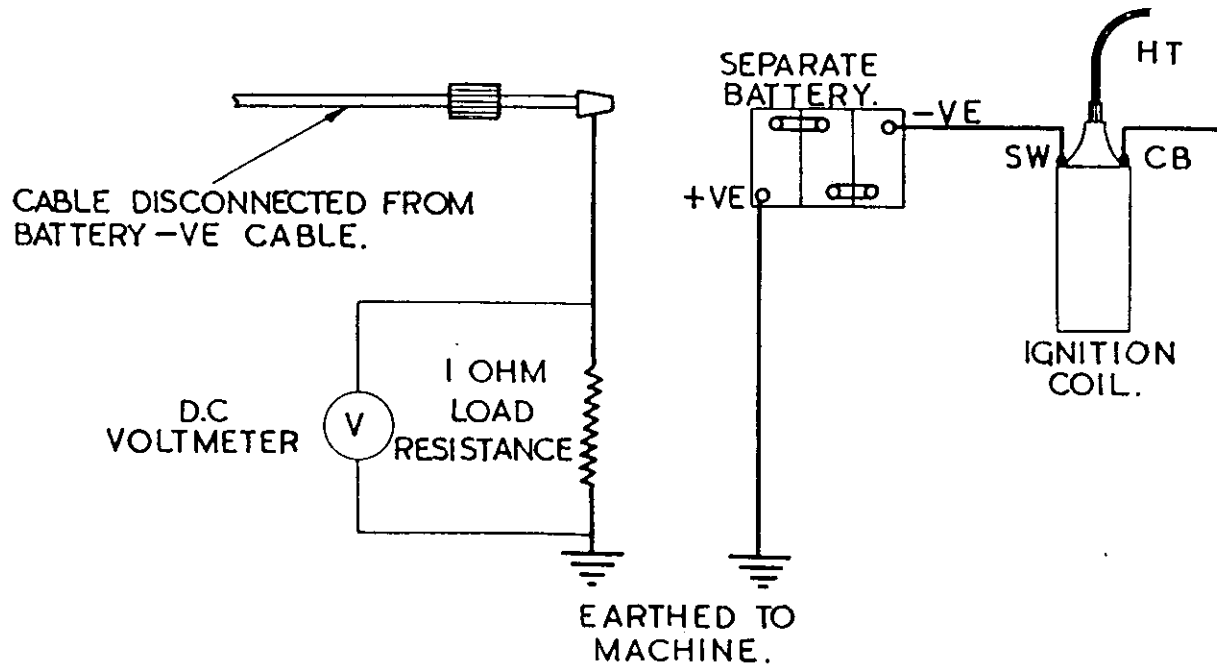


Fig. 3. D.C. Output Test.

Lighting Switch Positions	— OFF	...	...	...	Volts $2\frac{1}{2} - 3\frac{1}{2}$
" " "	PILOT	...	...	...	" 2 - 3
" " "	HEAD	...	...	...	" 3 - 4

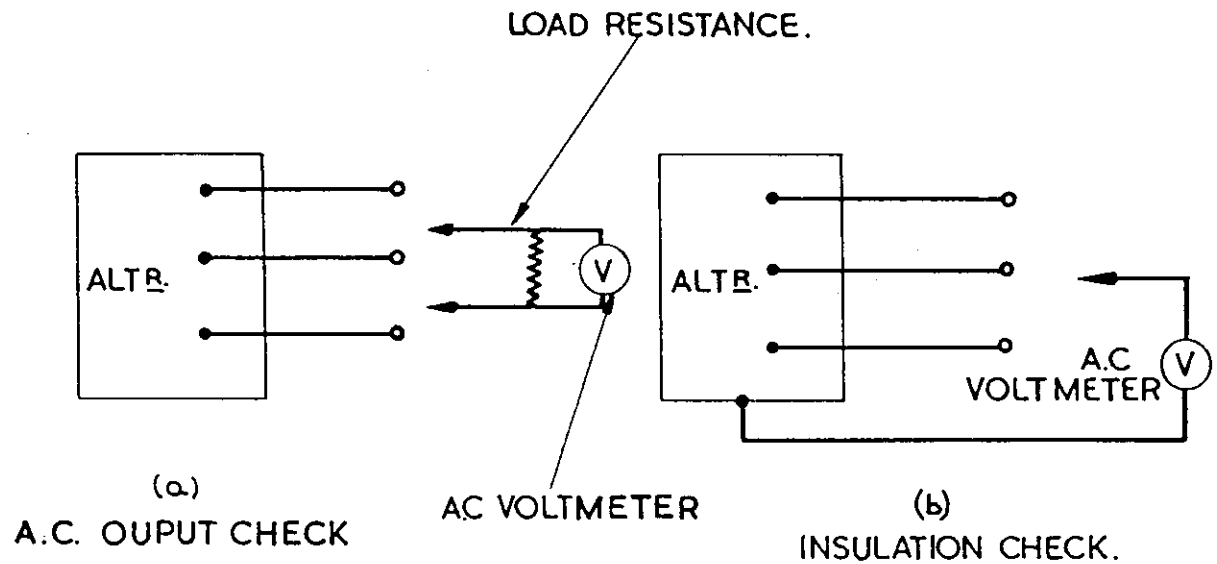


Fig. 4. A.C. Output Test.

**TEST 2—To Check A.C. Output**

13. (1) Disconnect the three alternator output cables and run the alternator at 2,000 r.p.m. (approx.). Connect the 1-ohm load resistance in parallel with the A.C. voltmeter, and check the voltage readings across the following pairs of cable ends:—

Voltmeter Connections	Volts
Dark Green—Light Green	4 - $4\frac{1}{2}$
Light Green—Green and Yellow	$6\frac{1}{2} - 7$
Light Green—Green and Yellow & Dark Green	9 - 10

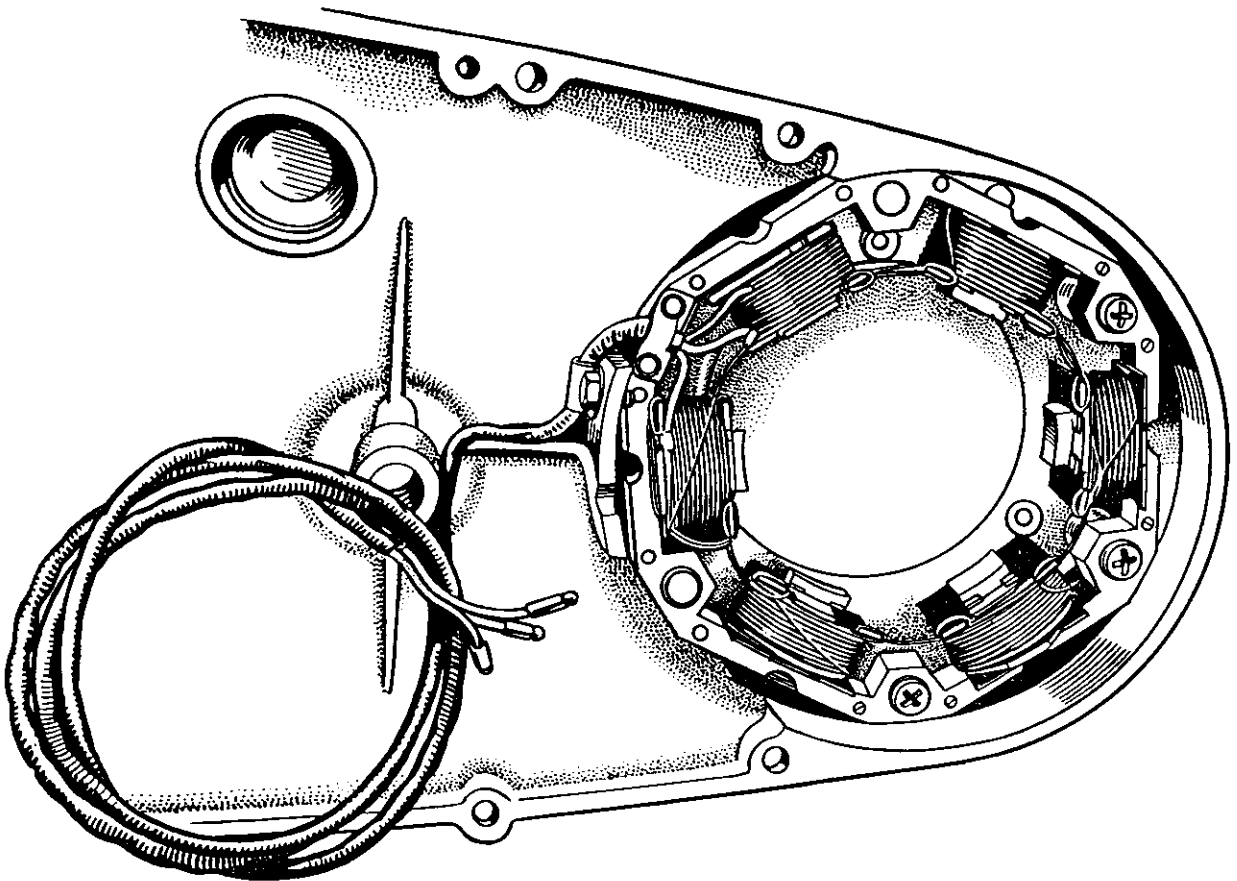


Fig. 5. RM 14 Thin Alternator in Correct Position in the Chaincase.

(2) To check insulation:

Using the A.C. voltmeter, check between the stator laminations and each snap-connector in turn. No reading should be obtained. If a reading is obtained, the insulation is defective and a new stator should be fitted.

the battery connections, when the bulb should light if the rectifier is operating correctly.

**TEST 3—To Check the Rectifier**

14. Disconnect all three cable connections from the rectifier. Using the 12-volt battery and 12-volt 6-watt bulb, connect the negative side of the battery to terminal 2 as shown in Fig. 6. (The 6-volt motorcycle battery is not suitable for this test). With the circuit arranged as shown, the bulb should not light. If the bulb does light this indicates short-circuited rectifier plates and a replacement rectifier must be fitted.

Complete the rectifier test by reversing

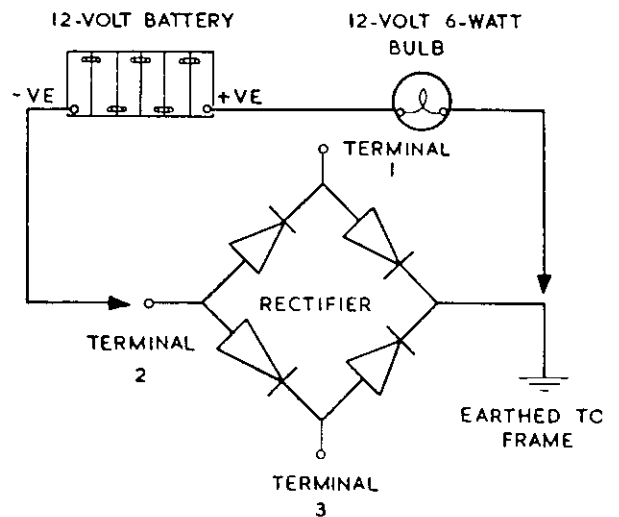


Fig. 6. Rectifier Test.

**CIRCUIT CHECKING**—15. To facilitate circuit checking, the circuits and switch connections are shown, diagrammatically, as follows:—

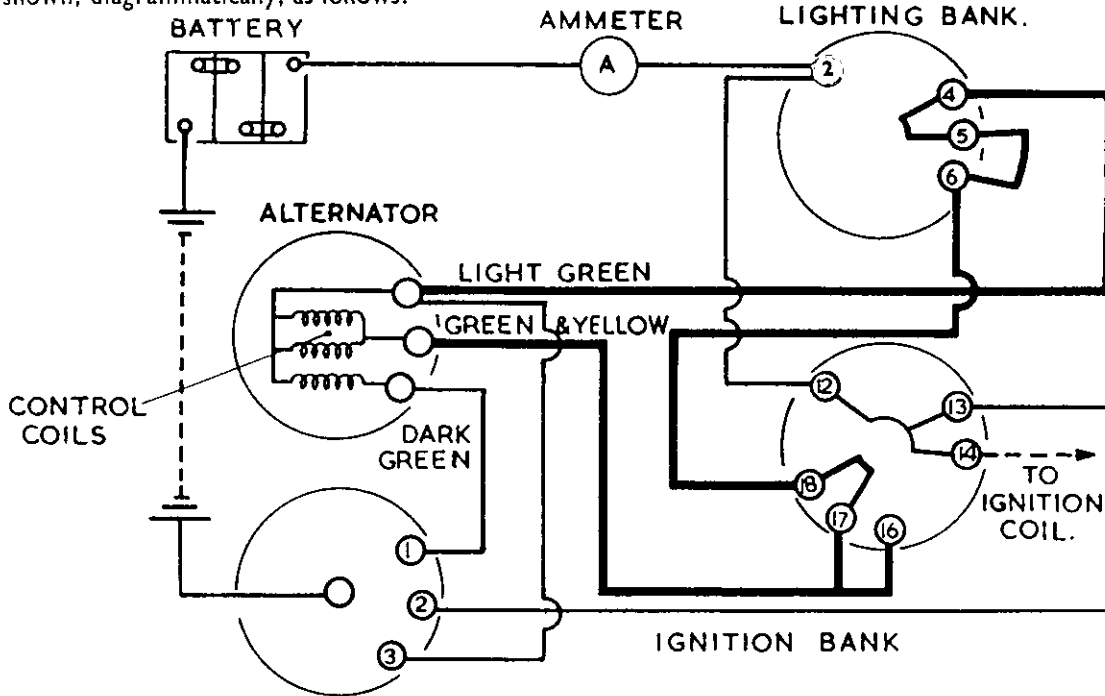


Fig. 7. **RECTIFIER** — OUTPUT CONTROL CIRCUIT  
 Basic circuit with lights "OFF" and ignition switch at "IGN". — CHARGING CIRCUIT  
 Light green cable is connected to green and yellow cable by - - - OTHER CIRCUITS  
 moving contact joining terminals 4 and 5 on lighting bank of switch. Alternator output low.

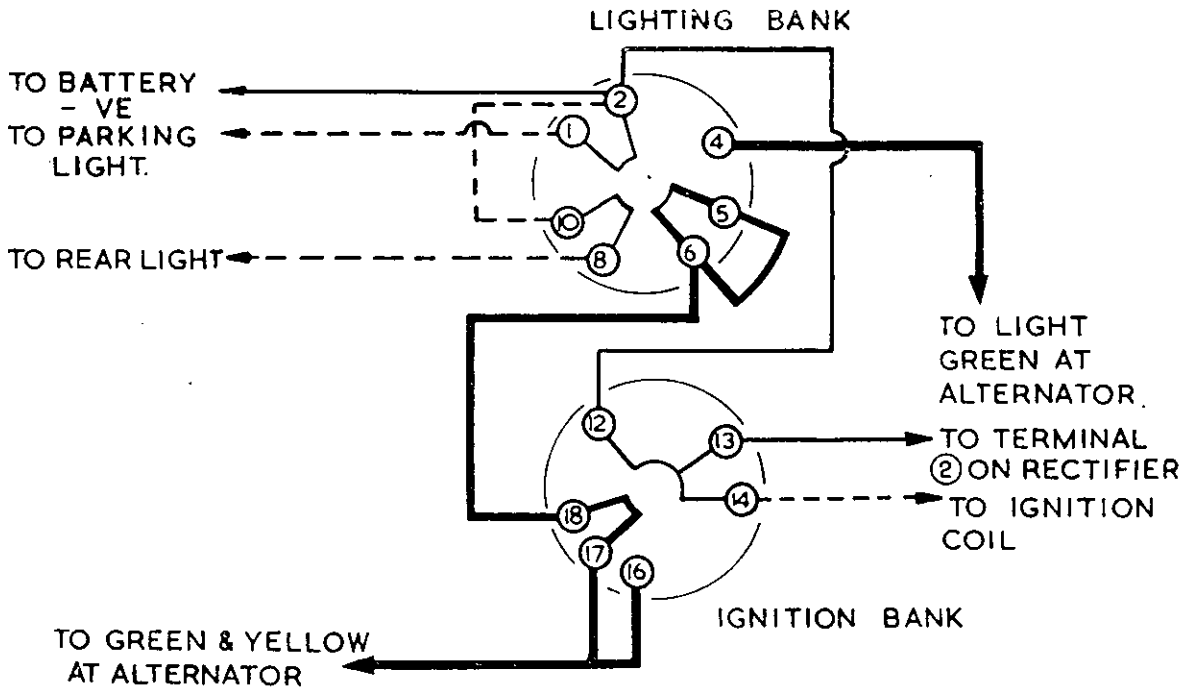


Fig. 8. — OUTPUT CONTROL CIRCUIT  
 Switch connections with parking lights on and ignition — CHARGING CIRCUIT  
 switch at "IGN". Circuit connecting light green and green - - - OTHER CIRCUITS  
 and yellow cables, broken between terminals 4 and 5 on lighting bank of switch. Alternator output increased.

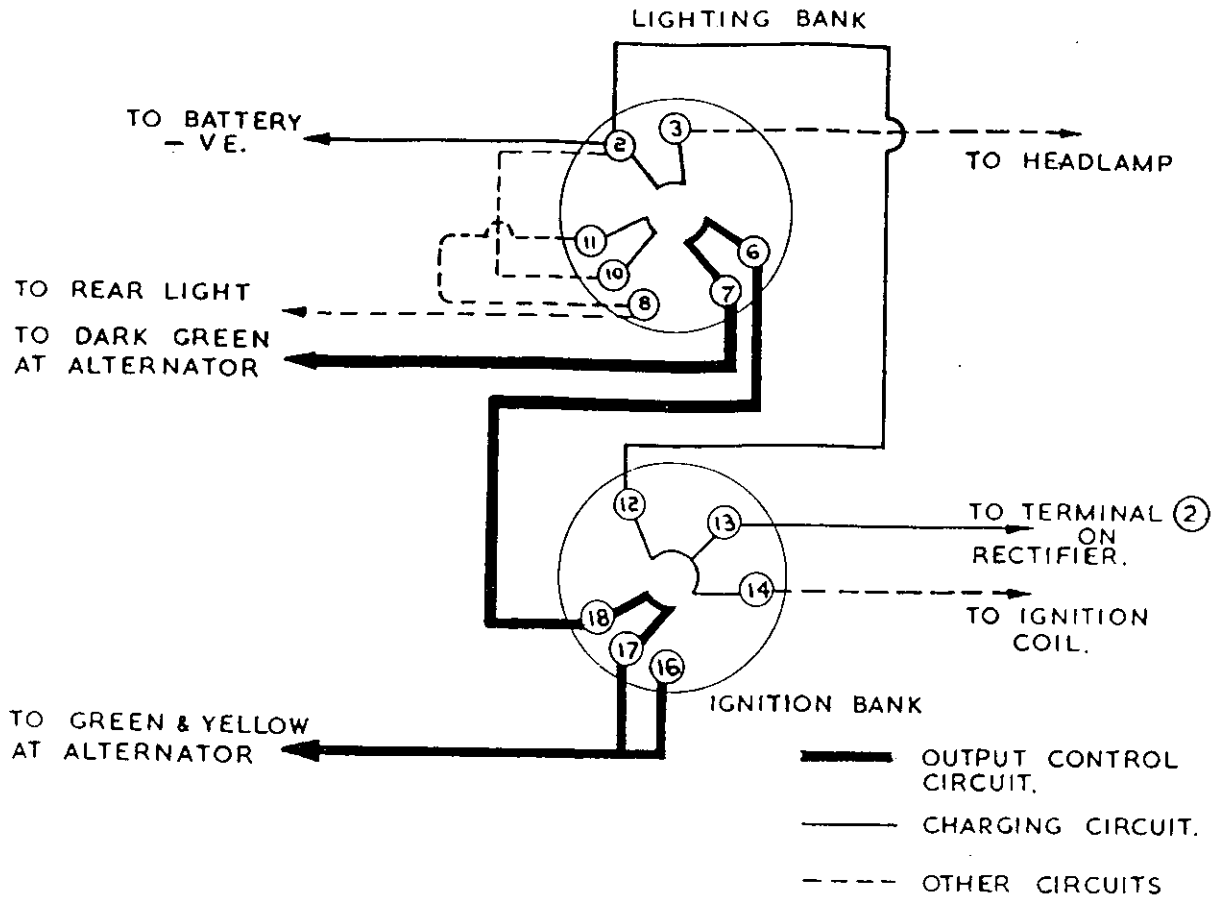


Fig. 9.

Switch connections with headlamp on and ignition switch at "IGN". Output control circuit connected in parallel with dark

green cable through terminals 6 and 7 on lighting bank of switch. Alternator output at maximum.

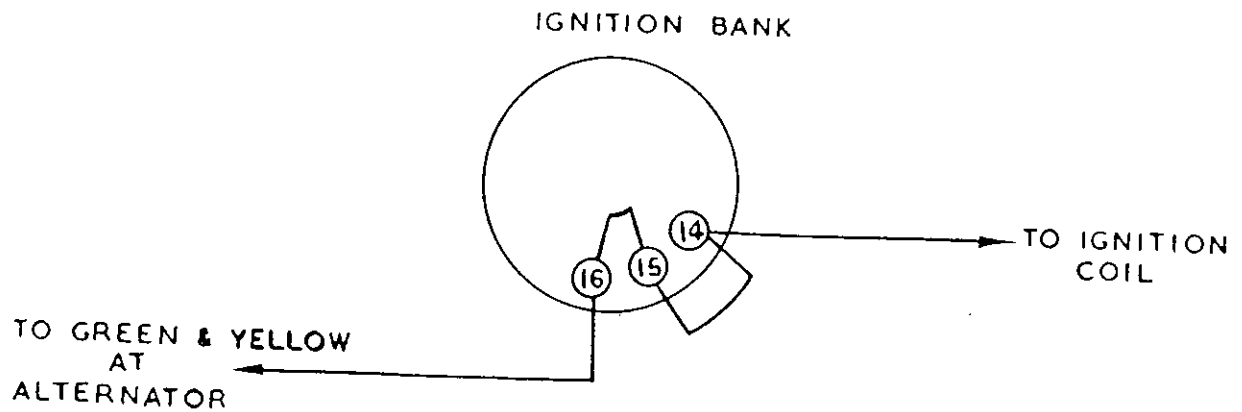


Fig. 10.

Switch connections with lights "OFF" and ignition switch at "EMG". Alternator control coils connected to ignition circuit.

If the lighting and ignition switch is found to be faulty, a replacement switch should be fitted.

## Section 7

LUCAS EQUIPMENT

## DISTRIBUTOR, MODEL DKX2A

## DESCRIPTION

16. This distributor has a moulded contact breaker base, and the shaft is carried in a single long porous bronze bush. Mounted immediately beneath the contact breaker base is an automatic timing control mechanism, consisting of a pair of spring-loaded governor weights linked by lever action to the contact breaker cam.

At low engine speeds, the spring force maintains the cam in a position in which the spark is slightly retarded. Under the centrifugal force imparted by increased engine speeds, the governor weights swing out against the spring tension, to advance the cam and thereby the timing of the spark to suit engine conditions at the greater speed.

The ignition coil consists of a laminated core around which are wound the secondary and primary windings. One end of each winding is connected to the CB terminal, the other end of the secondary winding is connected to the high tension outlet and that of the primary winding to the SW terminal. The coil assembly is wax-impregnated, and the sealed metal case is filled with an insulating compound.

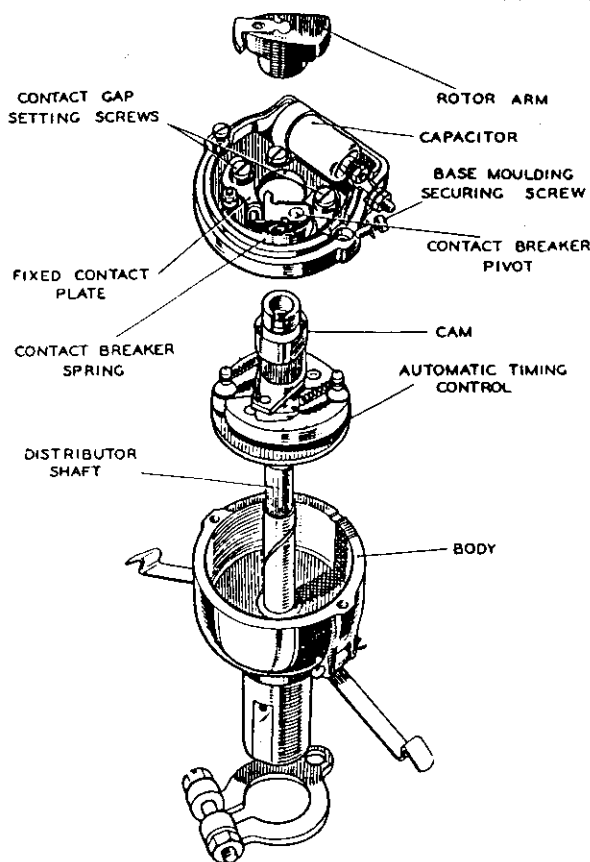


Fig. 11. Distributor.

## ROUTINE MAINTENANCE

## 17. (1) Ignition Coil.

The only maintenance necessary is to keep the coil casing clean and free from oil and water, paying special attention to the moulding at the terminal end, and to check the terminal connections for tightness from time to time.

## (2) Distributor

## (a) Lubrication.

**Cam.** Smear the surface of the cam very lightly with grease XG271 or, if this is not available, clean engine oil may be used.

**Cam bearing.** Lift the rotor arm from the top of the spindle by pulling it off vertically and add one drop of thin machine oil to lubricate the cam bearing. Do not remove the screw exposed to view as it is drilled to enable oil to pass through.

**Contact breaker pivot.** Place a small amount of grease XG271 or clean engine oil on the pivot on which the contact breaker lever works.

**Automatic timing control.** Unscrew the two screws securing the contact breaker base plate to the distributor body and lubricate the timing control mechanism with thin machine oil, paying particular attention to the pivots. Refit the base plate.

NO GREASE OR OIL MUST BE ALLOWED TO GET ON OR NEAR THE CONTACTS WHEN CARRYING OUT THE FOREGOING PROCEDURE.

## (b) Cleaning

Wipe the inside and the outside of the cover moulding with a soft dry cloth. Pay particular attention to the spaces between the metal electrodes, and check that the small carbon brush moves freely in its holder. Examine the contact breaker. The contacts must be free from grease or oil. If they are burned or blackened, clean them with a fine carborundum stone afterwards wiping away any trace of dirt or metal dust with a spirit-moistened cloth. Cleaning is facilitated by removing the contact breaker lever. To do this,

remove the nut securing the end of the contact breaker spring, and remove the nut, spring washer and bush. Lift the contact breaker lever off its bearing. Before refitting the contact breaker smear the pivot with clean engine oil or Mobilgrease No. 2. After cleaning, check the contact breaker gap setting.

**(c) Contact breaker setting**

If the gap is allowed to decrease below the specified setting, rapid and excessive pitting and piling may occur.

Turn the engine until the contacts are seen to be fully opened and check the gap with a gauge having a thickness of .010 in.-.012 in. If the gap is correct, the gauge should be a sliding fit, but if the gap varies from the gauge, the setting must be adjusted.

To do this, keep the engine in the position giving maximum contact opening and slacken the two screws securing the fixed contact plate. Adjust the position of the plate until the gap is set to the thickness of the gauge and tighten the two locking screws.

**(3) High tension cables**

Examine the high tension cables. Any which have the insulation cracked or perished, or show signs of damage in any other way, must be renewed.

## TESTING IN POSITION TO LOCATE IGNITION FAULT

18. If a failure of ignition or misfiring occurs, first make sure that the trouble is not due to defects in the engine, carburettor, petrol supply, sparking plug, etc. If necessary adjust the sparking plug gap to the setting recommended. Ensure also that the battery is not discharged.

- (1) Examine the high tension cables. If the rubber shows signs of deterioration or cracking, the cable should be renewed.
- (2) Test each plug and high tension cable by removing the plug and allowing it to rest on the cylinder head and observing whether a spark occurs at the points when the engine is turned. It should, however, be noted that this is only a rough test, since it is possible that a spark may not take place when the plug is under compression.

- (3) Examine the contact breaker, checking the gap setting and measuring the contact breaker spring tension. This should be 20-24 oz. measured at the contacts.

- (4) Switch on the ignition, turn the engine and observe the ammeter reading. If an ammeter reading is given which rises and falls with the closing and opening of the contacts, then the low tension wiring is in order. If the reading does not fluctuate in this way a short circuit in the low tension wiring is indicated.

When no reading is given, a broken or loose connection in the low tension wiring is indicated.

- (5) To trace a fault in the low tension wiring, switch on the ignition and then turn the engine until the distributor contacts are opened. With the aid of a voltmeter (0-10-volts), proceed to make a point-to-point check around the low tension circuit in the following manner:—

**Lead from the unearthed battery terminal to terminal B on ammeter.** Connect voltmeter between ammeter terminal B and earth; no reading indicates faulty lead or loose connections.

**Ammeter**

Connect voltmeter to the second ammeter terminal and earth. No reading indicates faulty ammeter.

**Lead between ammeter and ignition switch**

Connect voltmeter to terminal 2 on ignition bank of switch and earth. No reading indicates faulty lead or loose connections.

**Ignition switch**

Connect voltmeter to terminal 14 on ignition bank of switch and earth. No reading indicates fault in switch.

**Cable between ignition switch and ignition coil**

Connect voltmeter to ignition coil terminal "SW" and earth. No reading indicates faulty lead or loose connections.

**Ignition coil**

Connect voltmeter to ignition coil terminal "CB" and earth. No reading indicates that fault lies in the coil primary winding.

**Lead between ignition coil and contact breaker**

Remove the lead from the terminal on the contact breaker, and connect voltmeter between the end of this lead and earth. No reading indicates faulty lead or loose connections. Reconnect lead.

**Condenser**

Connect the voltmeter across the contacts. If no reading is obtained, disconnect the condenser and test again. If a reading is now given, a new condenser (0.2 microfarad) is required.

- (6) If the primary circuit is in order, the secondary or high tension circuit can be checked as follows:—

Remove the high tension cable from the centre distributor terminal. Switch on the ignition and turn the engine until the contacts close. Flick the contact breaker lever open while the high tension lead from the coil is held about  $\frac{1}{8}$  in. away from the cylinder block. If the ignition equipment is in order a strong spark should be obtained. If no spark is given, it indicates a fault in the circuit of the secondary winding of the coil and the coil should be replaced.

**TO CHECK THE AUTOMATIC TIMING CONTROL (on stroboscope or similar special instrument).**

19. Set the advance to zero.  
Run the distributor up to 1,500 r.p.m. At this speed the advance should be 7°-8°.  
Decelerate and test at the following speeds:

SPEED	ADVANCE
750 ...	... 5° - 7°
500 ...	... 1° - 3°
400 ...	... 0° - 1°

**Note.**—Distributor rotation is anti-clockwise when viewed from the drive end.

**TO DISMANTLE THE DISTRIBUTOR**

20. Spring back the securing clips and remove the moulded cover. Lift the moulded rotor arm off the top of the spindle. Withdraw the two base plate securing screws together with the spring washers, when the contact breaker base moulding can be lifted off. Slacken and remove the nut securing the end of the contact breaker, taking care not to lose

the spring washer. Lift off the contact breaker spring and lever. The fixed contact is carried on a plate secured by two screws. The condenser can be removed when its terminal nuts and single securing screw are removed. The distributor shaft carrying the cam and automatic timing control can be removed when the driving dog is taken off. The automatic timing control should not be dismantled unnecessarily. If it is desired to dismantle the mechanism, carefully note the position of the various components in order that they may be refitted correctly.

21. A badly worn bearing is usually indicated by the maximum opening of the contacts varying considerably as the shaft is slowly rotated by hand, while side pressure is applied to the cam. The single long bearing bush used in this distributor can be pressed out of the shank by means of a shouldered mandrel. The new bush should be prepared for fitting by allowing it to stand completely immersed in thin engine oil, for at least 24 hours. In a case of extreme urgency this period of soaking may be shortened to 2 hours by heating the oil to 100°C. Press the bearing into the shank, using a shouldered polished mandrel of slightly larger diameter than the shaft. Under no circumstances should the bushes be overbored by reamering or any other means, since this will impair the porosity and thereby the effective lubricating quality of the bushes. Cross drill the new bearing by inserting a drill through the lubricating hole in the shank.

**CONTACT BREAKER**

22. When dressing a pair of contacts, it is not essential to grind down a slightly pitted contact, but only to remove excess metal from the piled contact. Should the pitting and piling be found excessive, a replacement contact set, comprising both fixed and moving contacts should be fitted. Before despatch, replacement contacts are given a protective coating of oil which should be removed with a spirit-moistened cloth before fitting.

**TO ASSEMBLE THE DISTRIBUTOR**

23. Re-assembly is a reversal of the dismantling procedure described in para. 20. Note that an insulating washer must be placed over the contact breaker pivot before the moving contact is fitted.

**TO TIME THE DISTRIBUTOR**

23A. See Page 27, Paragraph 51.

**HORN, MODEL HF 1441****DESCRIPTION**

24. This horn is of the high frequency type, and the operation is based on the simple electric bell principle. When the horn push is pressed, current flows through the closed contacts of the contact breaker and energises the coil. The coil core is thus magnetised and attracts the armature towards the core face. The contact breaker opens each time the armature is pulled down to the core, de-energising the magnet system and causing the cycle to be repeated at a frequency determined by the characteristics of the diaphragm.

The vibrating armature is coupled to a flexible diaphragm and to a rigid tone disc. The impact of the armature on the core face sets the diaphragm and tone disc into vibration, the diaphragm at a relatively low frequency (300-400 c/s) and the tone disc at a higher frequency determined by its size and the rigidity of its material. These two sets of vibrations combine together with their various "overtones" to give the horn its characteristic note.

25. Before making any adjustments to the horn, make certain that the battery is in a good state of charge.

Do not attempt to adjust the horn until the following checks have been made.

**(1) Horn loose on mounting**

Check that the bolt securing the horn bracket is tight and that the body of the horn does not foul any other fixture. See that any units fitted near the horn are rigidly mounted and do not vibrate when the horn is operated.

**(2) Wiring**

Examine the cables of the horn circuit, renewing any that are badly worn or chafed. Ensure that all connections are tight and that the connecting eyelets, or ferrules, make good contact with the cables. In the event of complete failure of the horn, check the wiring for an open circuit.

**(3) Contact breaker adjustment**

Make sure that the poor performance is not due to one of the above causes before attempting any adjustment of the horn. Adjustment takes up wear of moving parts which, if not corrected, will result in loss of power and/or roughness of tone.

26. Correct adjustment of the horn requires the use of a 0-5 amp. D.C. ammeter, and the procedure is as follows:—

The note of the horn is to be tested when the horn is cold, using a pure D.C. supply (rectified A.C. is not permissible) over a range of 4 to 8 volts. An indication of correct contact breaker adjustment is given by measurement of the current consumption of the horn, which should at no time exceed 4 amps., and a good clear "high frequency" note should be obtained over the full voltage range. If current is in excess of 4 amps., remove cover nut, slacken the push-rod locking ring and turn the push-rod clockwise to decrease current consumption or anticlockwise to increase. Make only a small adjustment at a time, continuing until the correct setting is obtained. For adjusting the push rod and tightening the locking ring, use a tool similar to that illustrated in Fig. 12.

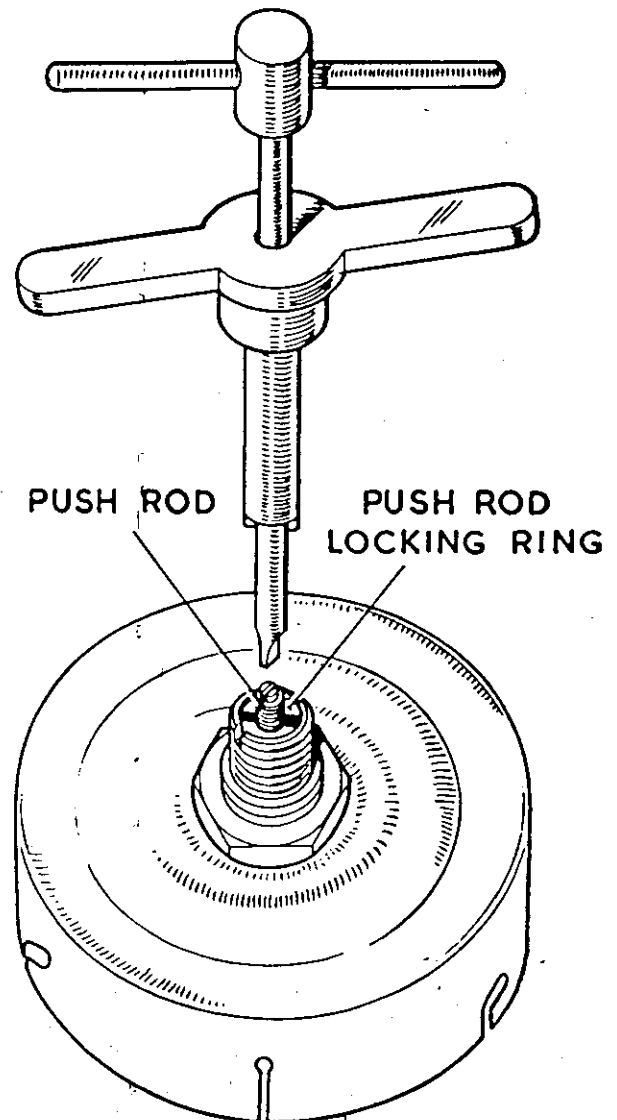


Fig. 12. Horn Adjustment.

Section 7

**LIGHTING AND IGNITION SWITCH**

(Model P.R.S.8)

**DESCRIPTION**

27. The main lighting and ignition switch is a double bank switch, the upper bank controlling the lighting system and the lower bank the ignition system;

The lighting is controlled by the large serrated knob. When the lights are in use the alternator output is correspondingly increased by the switch. (See paras. 4 and 15).

The knob positions are:—

- O ... .. All lights off.
- P ... .. Tail and parking light on.
- H ... .. Tail and headlight on.

The ignition system is controlled by inserting the key in the rubber-covered slot in the top of the knob.

The positions are:—

- Central ... .. Ignition off.
- Ign. ... .. Ignition on (Normal).
- Emg. ... .. Ignition on (Emergency).

For switch linkages, see Fig. 15, Page 116.

**HEADLAMP, MODEL MCF 700**

**DESCRIPTION**

28. This lamp incorporates a combined reflector and front lens assembly known as the Light Unit. The construction of the Light Unit ensures that the reflector is permanently protected, with obvious advantage to its efficiency. The outer surface of the front lens is smooth, to facilitate cleaning, but the inner surface is formed in a series of lenses which determine the spread and pattern of the light beam.

The standard main bulb fitment is known as a "prefocus" bulb, which ensures that the filament is positioned correctly with respect to the focal point of the reflector, and eliminates the need for any focusing in the headlamp. The bulb has a cap, which is carried on a flange accurately positioned in relation to the filament during manufacture. A slot in the flange engages with a projection on the inside of the bulb holder at the back of the reflector, thus ensuring correct positioning of the filament. A bayonet fitting adaptor with spring-loaded contacts secures the bulb firmly in position and also carries the current to the bulb contacts.

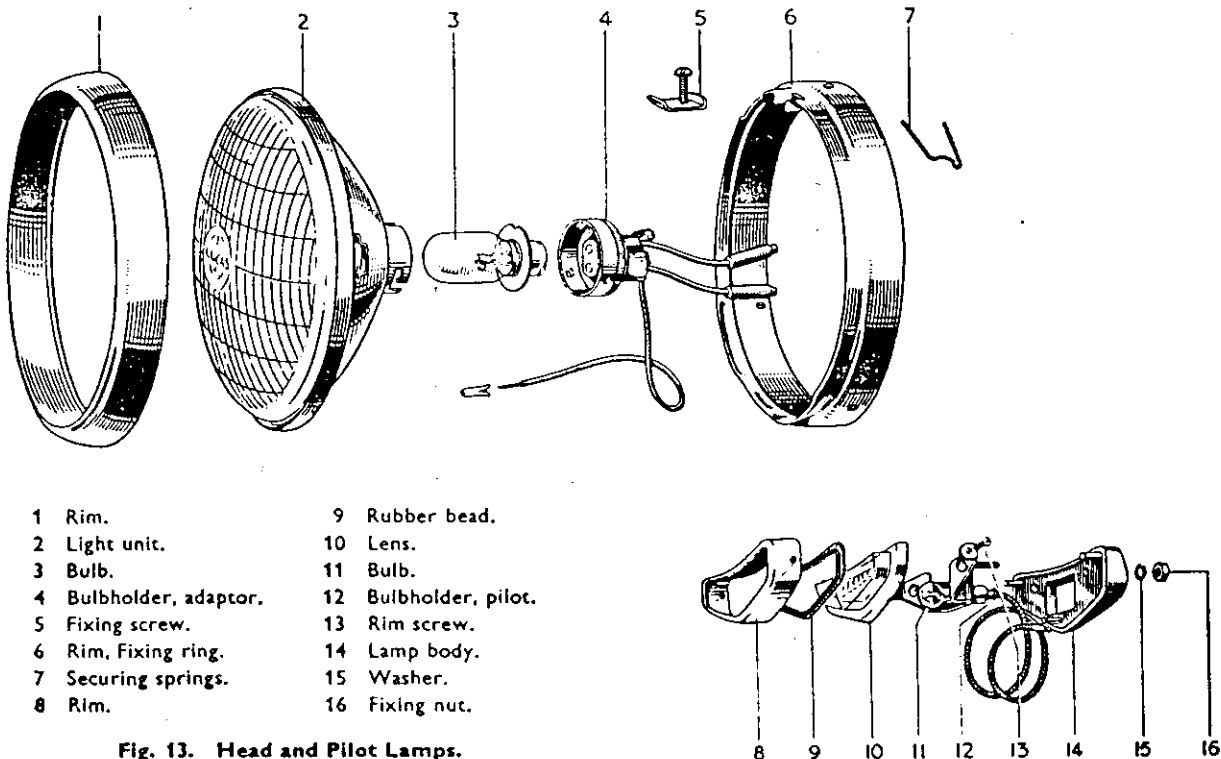


Fig. 13. Head and Pilot Lamps.

**CHECK**

29. Test the alignment of the main headlamp beam with the machine normally laden. The main beam should not be directed above the horizontal. When the main beam is set the dipped beam cannot be adjusted in relation to it as this relationship is determined by the positioning of the bulb filaments during their manufacture.

**ROUTINE SERVICING AND ADJUSTMENTS**

30. To remove the rim and Light Unit assembly, slacken the securing screw at the top of the lamp fixing ring and carefully lift the assembly away. To gain access to the bulb, twist the adaptor in an anti-clockwise direction and pull it off. The bulb can now be removed from its locating sleeve on the rear of the reflector. Fit the correct replacement bulb (6-volt 30/24 watt, Prefocus, Lucas No. 312). Engage the projections on the inside of the adaptor with the slots in the locating sleeve, press on and secure by twisting clockwise.

31. In the event of damage to either the front lens or reflector, a replacement Light Unit must be fitted. To do this remove the Light Unit and rim, twist off the adaptor and withdraw the bulb from the locating sleeve. Disengage the Light Unit securing springs from the rim and lift out the Light Unit. Position the new unit in the rim so that the word "TOP" on the lens is correctly located when the assembly is mounted on the headlamp nacelle. Refit the securing springs, spaced equally around the rim.

32. To replace the rim and Light Unit assembly, locate the peg in the slot at the bottom of the lamp fixing ring. Tilt the assembly back into position and tighten the securing screw at the top of the fixing ring. To adjust the position of the headlamp beam, slacken the two small round headed screws in the lower part of the fixing ring. Then by pushing or

pulling the lower part of the lamp assembly, the beam may be lowered or raised. When satisfactory tighten the two screws.

**PARKING LAMP, MODEL 517**

33. The parking lamp is located in the nacelle beneath the headlamp. To replace the bulb, unscrew the small, round headed screws one in either side of lamp rim. Slide the rim and lens forward to expose the bulb. Press the bulb and turn anti-clockwise to remove. The correct replacement bulb is a 6-volt 3-watt miniature bayonet cap, Lucas No. 988. Place the lens in position and press home while inserting the two screws. Tighten the screws.

**STOP AND TAIL LAMP, MODEL 525**

34. This lamp employs a double filament bulb (6-volt 6/18-watt offset pins, Lucas No. 384) the 6-watt filament providing normal tail illumination whilst the 18-watt is illuminated on movement of the brake pedal. To replace the bulb, slacken the two screws securing the red lens until the lens may be removed. Press the bulb and turn anti-clockwise to remove. When replacing note that the fixing pins are offset and the bulb holder slots are offset, so that the bulb may only be replaced in one position. Replace the lens and tighten the two fixing screws.

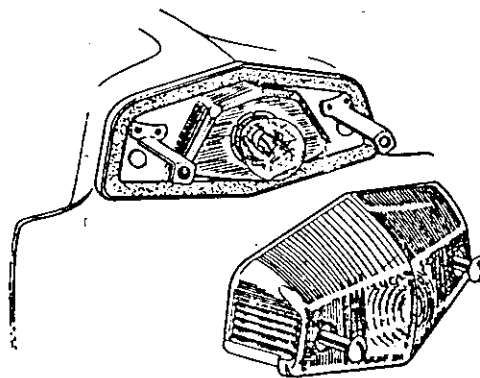


Fig. 14. Stop-Tail Lamp Model 525.

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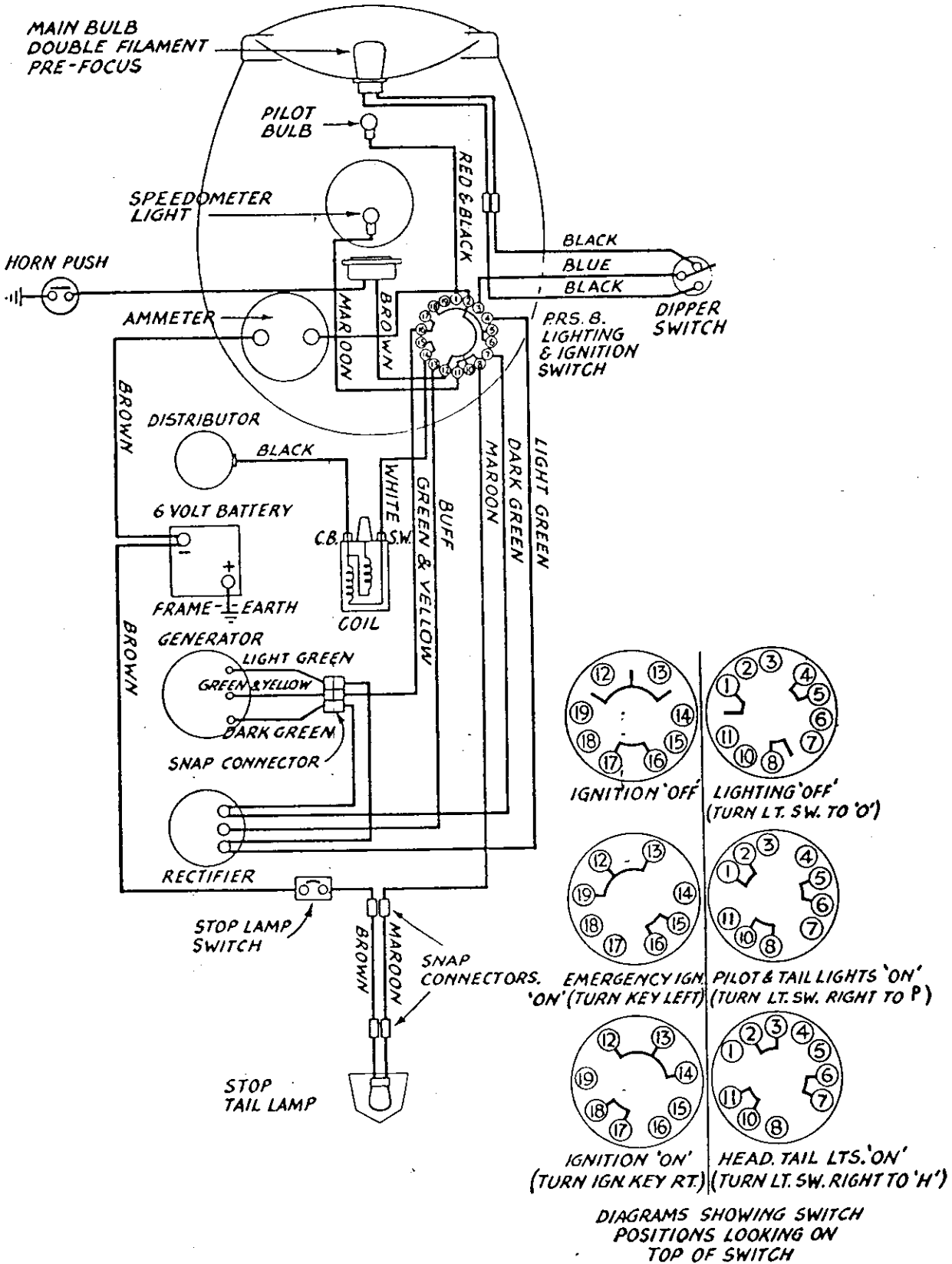


Fig. 15. Wiring Diagram—Lucas.

WD

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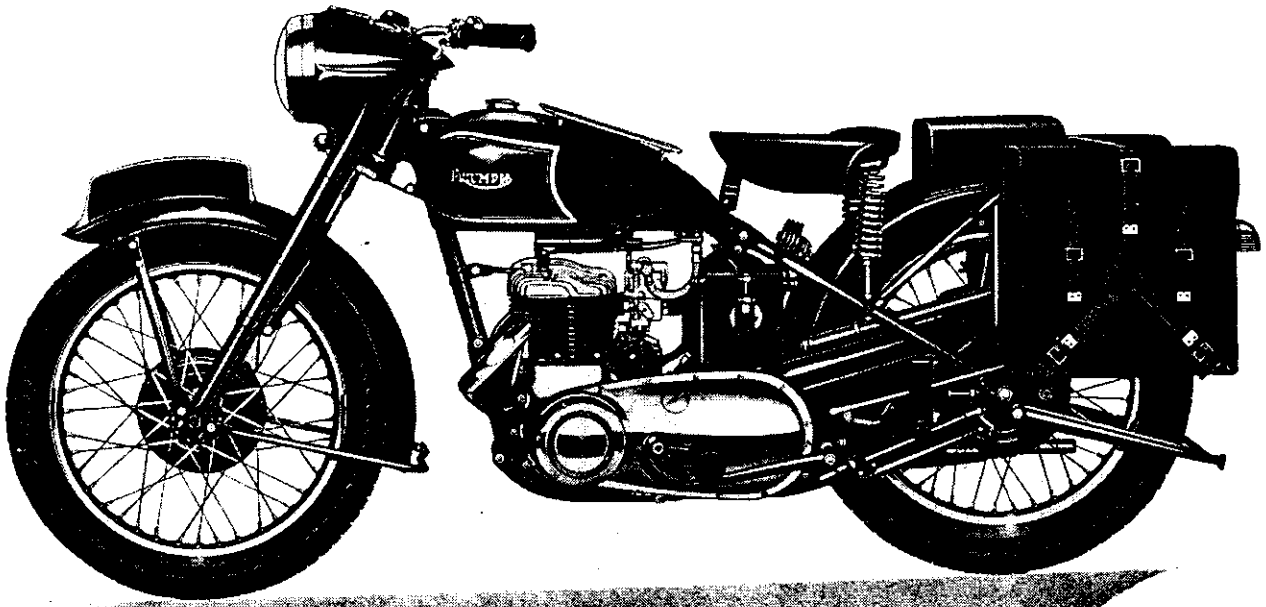
# PARTS LIST

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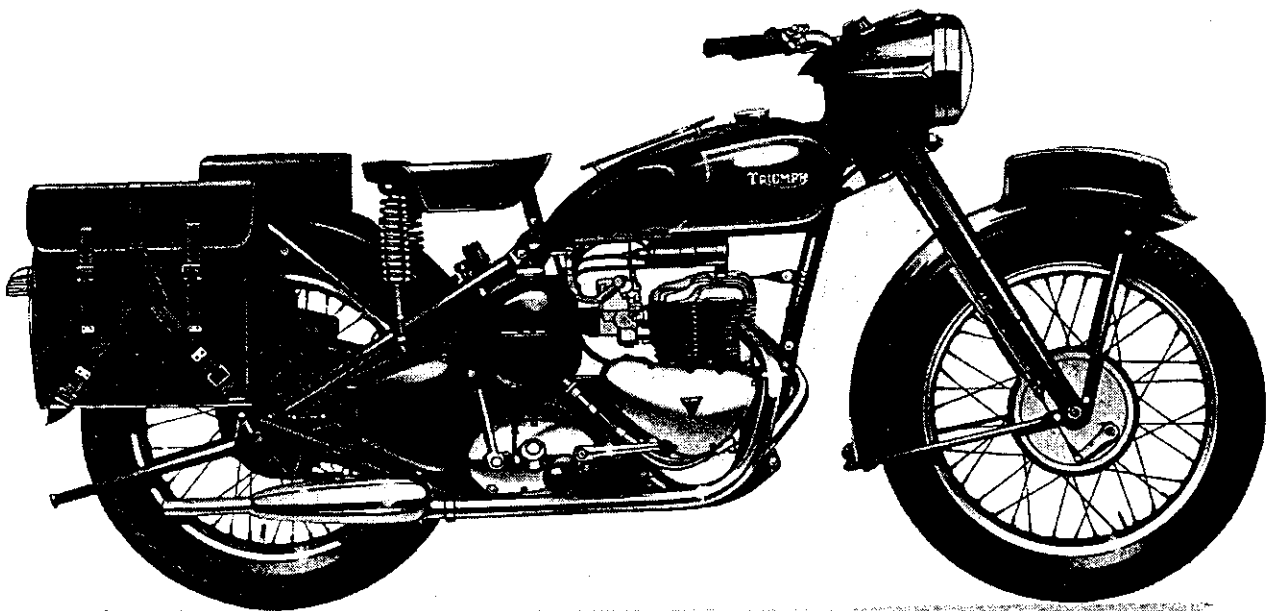
**MOTOR CYCLE 500 c.c. SV. TWIN TYPE TRW. 2B TRIUMPH**

CONTRACT No. 6/VEHS/16762/CB28B. Cat. Ref. No. 28

TRIUMPH ENGINEERING CO. LTD.  
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LEFT-HAND VIEW.



RIGHT-HAND VIEW



# INDEX OF CONTENTS

	Page No.		Page No.
<b>AIR FILTER GROUP</b> ... ..	31	<b>EXHAUST SYSTEM GROUP</b> ... ..	10
<b>BATTERY AND CARRIER GROUP</b> ... ..	39	<b>FOOTREST GROUP</b> ... ..	30
<b>CARRIER AND PANNIER GROUP</b> ... ..	24	Pillion footrest ... ..	30
Carrier ... ..	24	<b>FRAME GROUP</b> ... ..	16
Pannier frames ... ..	24	Front portion ... ..	16
Pannier bag ... ..	24	Rear portion ... ..	16
<b>CHAIN GROUP</b> ... ..	25	<b>FRONT FORK GROUP</b> ... ..	18
<b>CHAINGUARD GROUP</b> ... ..	25	Steering cups, cones and balls ... ..	20
<b>CONTROL CABLE GROUP</b> ... ..	29	Steering damper ... ..	20
Clutch cable ... ..	29	<b>FRONT WHEEL GROUP</b> ... ..	20
Exhaust valve lifter cable ... ..	30	Front wheel brake ... ..	22
Front brake cable ... ..	29	<b>GEAR BOX GROUP</b> ... ..	11
Throttle cable ... ..	29	Clutch control ... ..	14
<b>ELECTRICAL EQUIPMENT GROUP</b> ... ..	35	Gear control (enclosed footchange) ... ..	13
Alternator ... ..	38	Gear control (selector mechanism) ... ..	13
Ammeter ... ..	37	Gearbox casing ... ..	11
Coil ... ..	38	Clutch and shock absorber ... ..	14
Dipper switch ... ..	37	Gearbox fittings ... ..	13
Distributor ... ..	37	Gearbox sprocket ... ..	14
Headlamp ... ..	35	Kickstarter ... ..	14
Horn ... ..	36	Shafts and gears ... ..	13
Lighting and ignition switch ... ..	37	<b>HANDLEBAR GROUP</b> ... ..	28
Pilot lamp ... ..	35	Clutch and exhaust valve lifter control ... ..	29
Rectifier ... ..	38	Front brake control ... ..	28
Stop lamp switch ... ..	37	Handlebar ... ..	28
Stop/Tail lamp ... ..	36	Throttle control ... ..	28
Wiring harness ... ..	38	<b>MUDGUARD GROUP</b> ... ..	23
<b>ENGINE GROUP</b> ... ..	5	Front mudguard ... ..	23
Connecting rods ... ..	7	Rear mudguard ... ..	23
Crankcase ... ..	7	<b>NUMBER PLATE GROUP</b> ... ..	23
Crankcase filter ... ..	9	<b>OIL TANK GROUP</b> ... ..	27
Crankcase undershield ... ..	9	Oil pipes ... ..	27
Crankshaft and flywheel assembly ... ..	7	<b>PETROL TANK GROUP</b> ... ..	26
Cylinder block ... ..	5	Attachment fittings ... ..	27
Cylinder head ... ..	5	Petrol taps and pipes ... ..	27
Engine sprocket and shock absorber ... ..	10	Tank parcel grid ... ..	27
Oil pump ... ..	9	<b>PILLION SEAT GROUP</b> ... ..	30
Oil release valve and indicator ... ..	9	<b>PRIMARY CHAINCASE GROUP</b> ... ..	25
Pistons ... ..	7	Inner cover ... ..	25
Tappets ... ..	5	Outer cover ... ..	25
Timing gears ... ..	10	<b>ENGINE PLATE GROUP</b> ... ..	16
Timing gear cover ... ..	10		
Torque stays ... ..	5		
Valves ... ..	5		
Valve chamber cover ... ..	5		

## INDEX OF CONTENTS—*continued*

	Page No.		Page No.
<b>REAR BRAKE CONTROL GROUP</b> ...	31	<b>SPARKING PLUG GROUP</b> ...	34
<b>REAR WHEEL GROUP</b> ...	22	<b>SPEEDOMETER GROUP</b> ...	39
Rear wheel brake ...	22		
<b>SADDLE GROUP</b> ...	31	<b>STAND GROUP</b> ...	24
		Front stand ...	24
		Rear stand ...	24
		Prop stand ...	24
<b>SOLEX CARBURETTER GROUP</b> ...	33		
Carburetter fittings (Triumph) ...	33		
<b>TOOL BOX GROUP</b> ...	32	<b>TOOL KIT GROUP</b> ...	32

## INDEX OF ILLUSTRATIONS

Fig. No.	Title	Page No.	Fig. No.	Title	Page No.
1	Crankcase, cylinder block and head ...	6	8	Front wheel and mudguard ...	21
2	Crankshaft assembly, pistons and timing gears ...	8	9	Rear wheel ...	21
3	Gearbox shafts, gears and casing ...	12	10	Petrol and oil tanks ...	26
4	Clutch and shock absorber ...	15	11	Handlebar and controls ...	28
5	Engine plates, studs and nuts ...	15	12	Solex carburetter ...	34
6	Frame arrangement ...	17	13	Head and pilot lamps ...	35
7	Telescopic front fork ...	19	14	Distributor type DKX2A ...	36

**For machines supplied on Contract 6/VEHS/21330**  
See page 44. Alterations 2 and 3 only.

**For machines supplied on Contract 6/VEHS/22335**  
See page 44. Alterations 1, 2, 3 and 4.

**For machines supplied on Contract 6/VEHS/22589**  
See page 44. Alterations 1, 2, 3 and 4.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
	<b>ENTRW-2B</b>	<b>ENGINE GROUP</b>		
		Engine complete with distributor, alternator and carburetter ... ..	1	
		<b>CYLINDER BLOCK</b>		
1-8	E.3524	Block, cylinder ... ..	1	
1-34	E.2373	Washer, cylinder block base ... ..	1	
1-6	E.3055	Stud, cylinder block to head ... ..	10	
1-7	E.3056	Stud, cylinder block to head and torque stay	2	
	E.3102	Stud, cylinder block to carburetter ... ..	2	
1-31	E.3058	Stud, cylinder block valve chamber ... ..	2	
	GS134	Dowel, cylinder block valve chamber ... ..	2	
1-41	S1-51	Nut, cylinder base stud ... ..	6	
1-42	S25-3	Washer, cylinder base stud ... ..	8	
1-41A	E.1310	Nut, cylinder base stud at valve chamber ...	2	
		<b>CYLINDER HEAD</b>		
1-3	E.3054	Head, cylinder ... ..	1	
1-4	E.2387	Gasket, cylinder head ... ..	1	
1-1	E.2412	Nut, cylinder head to block studs ... ..	12	
1-2	GS308	Washer, cylinder head to block studs ... ..	12	
	E.2440	Plug, cylinder head timing ... ..	1	
	E.2441	Washer, cylinder head timing plug ... ..	1	
		<b>TORQUE STAYS</b>		
	E.2939	Stay, engine torque, L/H ... ..	1	
	E.2940	Stay, engine torque, R/H ... ..	1	
	E.2941	Clip, stay to frame ... ..	1	
	E.2412	Nut, stay to engine stud ... ..	2	
	F.1031	Bolt, stay to frame clip ... ..	1	
	PO.172A	Nut, stay to frame clip ... ..	1	
	S25-3	Washer, stay to frame clip ... ..	1	
		<b>VALVES</b>		
1-9	E.2382	Valve, inlet ... ..	2	
1-9	E.2383	Valve, exhaust ... ..	2	
1-10	E.3062	Guide, inlet and exhaust ... ..	4	
1-12	E.2413	Spring, inlet and exhaust valve ... ..	4	
1-11	E.2384	Collar, valve spring top ... ..	4	
1-13	E.2417	Collar, valve spring bottom ... ..	4	
1-14	WE259A	Cotter, valve split ... ..	8	
		<b>TAPPETS</b>		
1-18	E.3490	Tappet ... ..	4	
1-15	E.2375	Adjuster, tappet ... ..	4	
1-16A	E.3491	Spring, tappet adjuster ... ..	4	
1-17	E.2434	Distance piece, tappet ... ..	2	
1-16	E.3492	Cap, tappet adjuster spring ... ..	4	
		<b>VALVE CHAMBER COVER</b>		
1-30	E.3099	Cover, valve chamber ... ..	1	
1-19	E.2446	Washer, valve chamber joint ... ..	1	
1-33	E.2386	Domed nut, valve chamber cover ... ..	2	
1-22	E.2377	Spindle, exhaust valve lifter ... ..	1	
	E.2936	Washer, spindle oil seal ... ..	1	
1-20	E.2378	Lever, spindle internal ... ..	2	

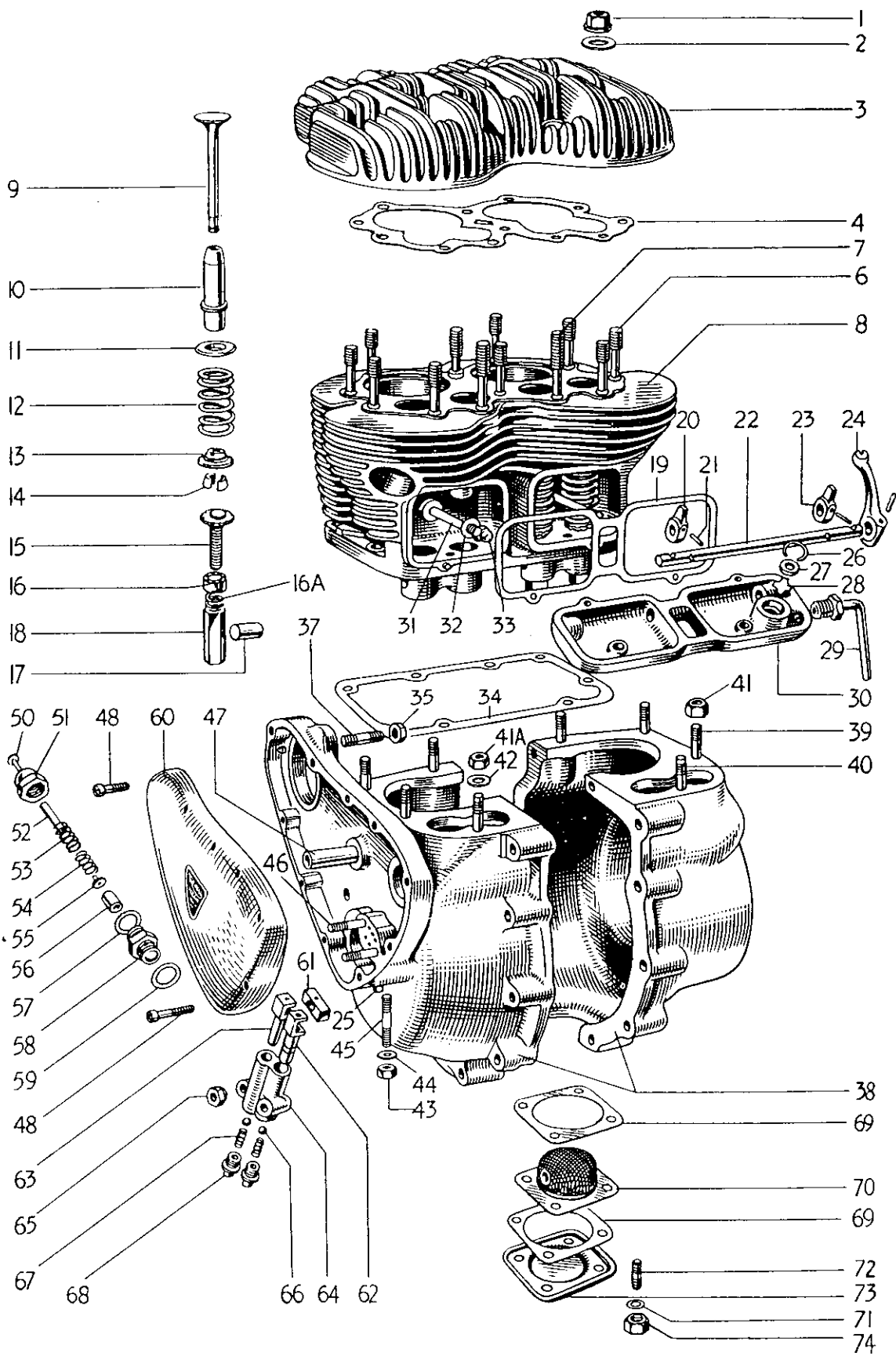


Fig. 1. CRANKCASE, CYLINDER BLOCK AND HEAD.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>Valve Chamber Cover—continued</b>				
1-24	E.2379	Lever, spindle external ... ..	1	
1-21	E.2380	Taper pin, levers to spindle ... ..	3	
1-29	E.3497	Pipe, crankcase breather assembly ... ..	1	
	F.3339	Extension pipe, crankcase breather ... ..	1	
1-28	E.3080	Diaphragm, crankcase breather ... ..	1	
1-27	E.2906	Plate, diaphragm retaining ... ..	1	
1-26	E.1767	Circlip, diaphragm retaining plate ... ..	1	
<b>PISTONS AND RINGS</b>				
2-3	CP.105	PISTON COMPLETE ... ..	2	
2-1	E.656	Ring, piston compression ... ..	2	
2-1A	*E.3048	Ring, (taper) piston compression ... ..	2	
2-2	GE.29	Ring, piston scraper ... ..	2	
2-4	E.2322	Pin, piston gudgeon ... ..	2	
2-5	E.2323	Circlip, gudgeon pin ... ..	4	
2-3	CP.105/20	PISTON, COMPLETE 0.020" O/S ... ..	2	
2-1	E.656/20	Ring, piston compression 0.020" O/S ... ..	2	
2-1A	*E.3048/20	Ring, (taper) piston compression 0.020" O/S ... ..	2	
2-2	GE.29/20	Ring, piston scraper 0.020" O/S ... ..	2	
2-4	E.2322	Pin, piston gudgeon ... ..	2	
2-5	E.2323	Circlip, gudgeon pin ... ..	4	
2-3	CP.105/40	PISTON COMPLETE, 0.040" O/S ... ..	2	
2-1	E.656/40	Ring, piston compression, 0.040" O/S ... ..	2	
2-1A	*E.3048/40	Ring, (taper) piston compression, 0.040" O/S ... ..	2	
2-2	GE.29/40	Ring, piston scraper, 0.040" O/S ... ..	2	
2-4	E.2322	Pin, piston gudgeon ... ..	2	
2-5	E.2323	Circlip, gudgeon pin ... ..	4	
*To be fitted in the middle groove. The upper face of the ring is marked Top, this must face towards the top of the piston.				
<b>CRANKSHAFT AND FLYWHEEL ASSY.</b>				
2-25	E.2328	Flywheel ... ..	1	
2-26	E.3522	CRANKSHAFT, L/H SIDE ... ..	1	
2-32	E.3114	Stud, L/H side crankshaft ... ..	1	
2-20	E.2299	Crankshaft, R/H side ... ..	1	
2-22	E.3519	Tube, crankshaft oil seal assembly ... ..	1	
2-22A	E.3460	Washer oil seal tube (rubber) ... ..	2	
2-23	E.2329	Bolt, crankshaft to flywheel ... ..	2	
2-24	E.1797	Nut, crankshaft to flywheel ... ..	2	
<b>CONNECTING RODS</b>				
2-7	E.2324	ROD, CONNECTING C/W BUSHES ... ..	2	
2-21	E.2326	Bush, connecting rod big ends ... ..	2	
2-6	E.2325	Bush, connecting rod small ends ... ..	2	
2-21	E.2326/10	Bush, connecting rod big end, 0.010" O/S ... ..	2	
<b>CRANKCASE</b>				
1-38	E.2806/7	CRANKCASE ASSEMBLY C/W BEARINGS ... ..	1	
2-28	E.1591	Bearing, L/H side ... ..	1	
2-33	E.2816	Disc, L/H bearing ... ..	1	LV6/MT7/6023
2-29	E.2926	Oil seal, L/H bearing ... ..	1	
2-18	E.2331	Bearing, R/H side (plain) ... ..	1	LV6/MT1/PT/212116/N10
2-38	E.2333	Bush, camshaft L/H ... ..	1	
2-10	E.2332	Bush, camshaft R/H ... ..	1	
2-18	E.2331/10	Bearing, R/H side (plain) 0.010" U/S ... ..	1	
1-39	E.2389	Stud, crankcase to cylinder base ... ..	6	

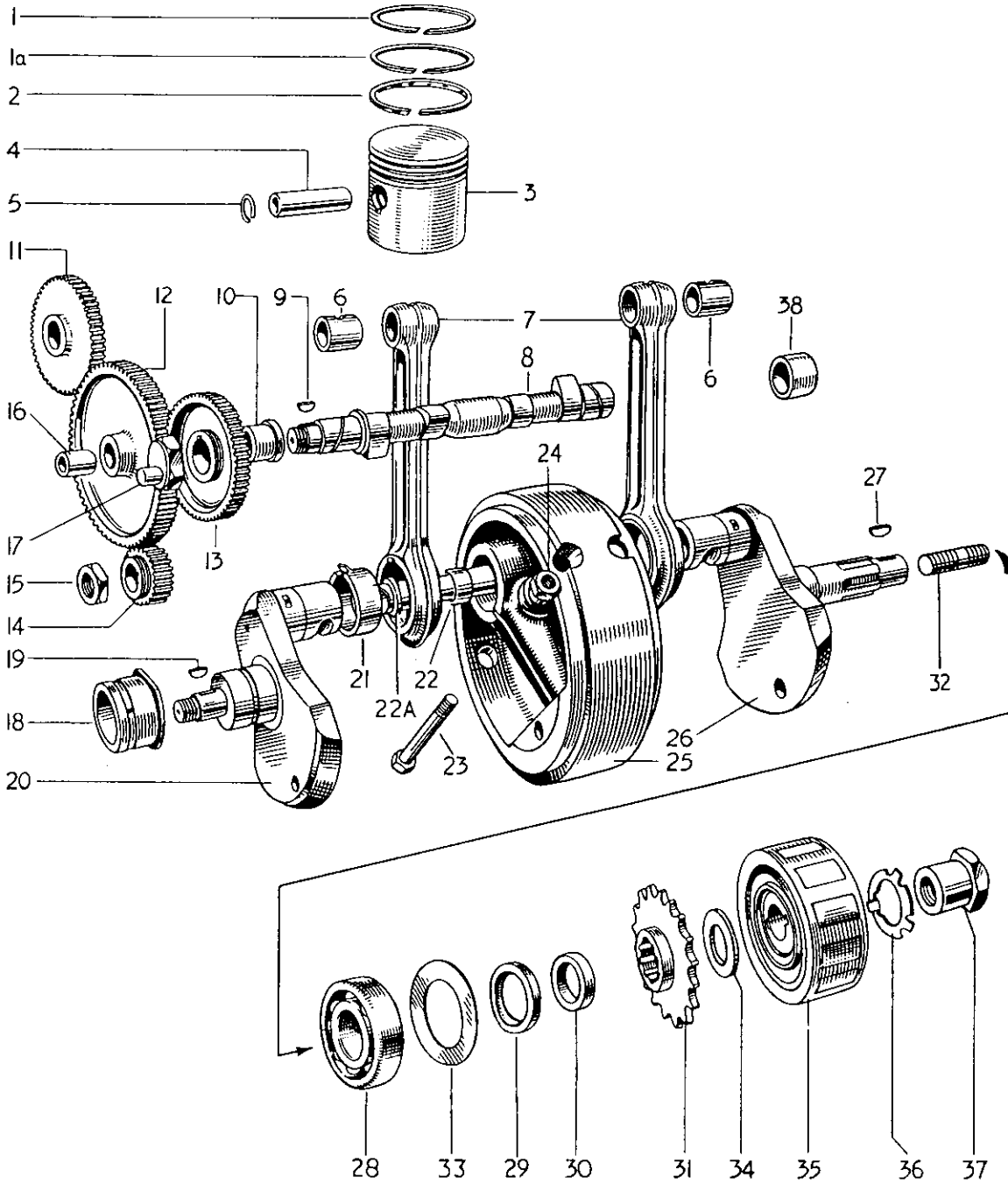


Fig. 2. CRANKSHAFT ASSEMBLY, PISTONS AND TIMING GEARS.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>Crankcase—continued</b>				
1-40	E.2428	Stud, crankcase to cylinder base (spigot) ...	2	
1-46	E.1536	Stud, crankcase to oil pump ...	2	
1-37	E.2022	Stud, crankcase to distributor ...	3	
1-45	E.2022	Stud, crankcase to oil junction block ...	1	
1-25	E.1532	Dowel, crankcase to junction block hollow ...	1	
	E.1579	Dowel, crankcase halves ...	1	
1-72	E.1540	Stud, crankcase to oil filter ...	4	
	S46-15	Plug, crankcase R/H inspection ...	1	
	PT.104B	Washer, crankcase R/H inspection plug ...	1	
	E.2342	Pipe, crankcase oil return ...	1	
	E.1509	Clip, crankcase oil return pipe ...	1	
	E.1645	Screw, crankcase oil return pipe ...	1	
	E.2853	Plug, crankcase L/H upper rear stud ...	1	
	GS761	Washer, crankcase L/H upper rear stud ...	1	
1-47	E.2334	Spindle, intermediate timing gear ...	1	
5-4	E.2437	Bolt, crankcase top rear ...	1	
	S25-3	Washer, crankcase top rear bolt ...	1	
	E.1647	Screw, crankcase internal boss ...	1	
See page 15 for Engine Plate, Studs and Nuts.				
<b>CRANKCASE FILTER</b>				
1-70	E.2343	Filter, crankcase oil ...	1	
1-69	E.2344	Washer, filter joint ...	2	
1-73	E.2345	Cover, filter ...	1	
1-74	F.879	Nut, filter securing ...	4	
1-71	E.1612	Washer, filter bolt spring ...	4	
<b>CRANKCASE UNDERSHIELD</b>				
	F.3079	Undershield, crankcase ...	1	
	F.3078	Bracket, undershield ...	1	
	F.1369	Bolt, undershield bracket ...	2	
	F.879	Nut, undershield bracket bolt ...	2	
<b>OIL PUMP</b>				
	E.2354	<b>OIL PUMP COMPLETE</b> ...	1	
1-64	E.2355	Body, oil pump ...	1	
1-63	E.2358	Plunger, oil pump feed ...	1	
1-62	E.2359	Plunger, oil pump scavenge ...	1	
1-61	E.495	Slider block, oil pump ...	1	
1-66	S70-7	Ball, oil pump valve ...	2	
1-67	E.403	Spring, oil pump valve ...	2	
1-68	E.2360	Plug, oil pump valve ...	2	
	E.2356	Washer, oil pump joint ...	1	
1-63	F.879	Nut, oil pump securing ...	2	
	E.1612	Washer, oil pump securing nut ...	2	
<b>OIL RELEASE VALVE AND PRESSURE INDICATOR</b>				
	E.2795	<b>VALVE ASSEMBLY, OIL RELEASE AND PRESSURE INDICATOR</b> ...	1	
1-58	E.2794	Body, oil release valve ...	1	
1-56	GS251	Piston, oil release valve ...	1	
1-53	E.2788	Spring, oil release valve main ...	1	
1-54	E.2789	Spring, oil release valve auxiliary ...	1	
1-51	E.2790	Cap, oil release valve body ...	1	
1-57	GS.254	Washer, oil release valve cap ...	1	
1-50	E.2791	Shaft, indicator ...	1	

LV6/MT7/163

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>Oil Release Valve—continued</b>				
1-52	E.2793	Tube, indicator rubber ... ..	1	
1-55	E.2792	Nut, indicator shaft ... ..	1	
1-59	E.1670	Washer, oil release valve body ... ..	1	
<b>TIMING GEAR COVER</b>				
1-60	E.2297	Cover, timing gear ... ..	1	
1-48	E.3439	Screw, timing gear cover (long) ... ..	1	
1-48	E.3437	Screw, timing gear cover (short) ... ..	9	
<b>TIMING GEARS</b>				
2-14	E.2346	Pinion, crankshaft timing (28T) ... ..	1	
2-19	GS.305	Key, crankshaft timing pinion ... ..	1	
2-15	E.2419	Nut, crankshaft timing pinion ... ..	1	
2-8	E.2301	Camshaft ... ..	1	
2-13	E.2352	Pinion, camshaft (56T) ... ..	1	
2-9	E.1558	Key, camshaft pinion ... ..	1	
2-17	E.1463	Nut, camshaft pinion eccentric ... ..	1	
2-12	E.2998	WHEEL, INTERMEDIATE GEAR (85T) ... ..	1	
2-16	E.2999	Bush, intermediate gear wheel ... ..	1	
For distributor drive see page 37.				
<b>ENGINE SPROCKET AND SHOCK ABSORBER</b>				
2-31	E.3108/19	Sprocket, engine (19T) ... ..	1	
2-30	E.3129	Collar ... ..	1	
2-34	E.3116	Washer, rotor backing ... ..	1	
2-27	E.3115	Key, rotor to crankshaft ... ..	1	
For A.C. Generator, rotor securing nut and fittings, see page 38.				
<b>EXHAUST SYSTEM GROUP</b>				
<b>EXHAUST PIPES</b>				
	E.2947	Pipe, exhaust L/H ... ..	1	
	E.2949	Pipe, exhaust R/H ... ..	1	
	E.2857	Clip, exhaust L/H to extension pipe ... ..	1	
	TE.164D	"D" washer, clip bolt ... ..	1	
	TE.164E	Bolt, clip ... ..	1	
	TE.164C	"D" Nut, clip bolt ... ..	1	
<b>SILENCER</b>				
	E.3450	Silencer ... ..	1	
	E.2857	Clip, silencer to exhaust pipe ... ..	1	
	TE.164D	"D" washer, clip bolt ... ..	1	
	TE.164E	Bolt, clip ... ..	1	
	TE.164C	"D" nut, clip bolt ... ..	1	
	H.570	Bolt, silencer to frame ... ..	1	
	T.224	Nut, silencer to frame bolt ... ..	1	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
		<b>GEARBOX GROUP</b>		
	T.1336	Gearbox assembly less clutch ... ..	1	
		<b>GEARBOX CASING</b>		
		CASING WITH BUSHES, GEARBOX ... ..	1	
3-1	T.909	Bush, layshaft ... ..	1	
3-33	T.911	Peg, layshaft bush ... ..	1	
3-34	T.912	Disc, layshaft bush ... ..	1	
3-35	T.981	Bush, camplate spindle ... ..	1	
3-36	T.341	Peg, camplate spindle bush ... ..	1	
3-94	E.3449	Dowel, casing to inner cover ... ..	1	
3-2	T.989	Stud, gearbox casing ... ..	2	
3-3	E.698	Bearing, high gear ... ..	1	LV6/MT7/4363
3-28	T.448	Oil seal, bearing ... ..	1	LV6/MT1/PT/250118/N10
3-29	T.946	Circlip, bearing retaining ... ..	1	
3-30	E.489	Plunger, gear control camplate ... ..	1	
3-46	T.44	Spring, camplate plunger ... ..	1	
3-48	T.373	Nut, camplate plunger spring domed ... ..	1	
3-47	T.372	Plug, gearbox drain ... ..	1	
3-14	S46-15	Washer, gearbox drain plug ... ..	1	
3-15	PT.104B			
		<b>INNER COVER</b>		
		COVER WITH BUSHES, GEARBOX INNER	1	
3-7	T.1307	Quadrant, gear indicator ... ..	1	Not serviced
3-66	T.396	Pin, gear indicator quadrant... ..	2	Not serviced
3-67	D.208-17	Bush layshaft ... ..	1	
3-33	T.911	Peg, layshaft bush ... ..	1	
3-34	T.912	Bush, footchange spindle inner ... ..	1	
3-37	T.412	Stop, K/S quadrant ... ..	1	
3-11	T.45	Stud, gearbox inner cover ... ..	1	
3-8	T.323A	Bearing, mainshaft ... ..	1	LV6/MT7/6013
3-31	S35-7	Circlip, mainshaft bearing ... ..	1	
3-32	T.280	Plug, level ... ..	1	
3-14	S46-15	Washer, level plug ... ..	1	
3-15	PT.104B	Quadrant, gear operating ... ..	1	
3-42	T.397	Spindle, gear operating quadrant ... ..	1	
3-43	T.399	Split pin, 1½" × ¼" dia. ... ..	1	
3-63	T.395	Finger, gear indicator ... ..	1	
3-64	T.224	Nut, gear indicator ... ..	1	
3-65	S25-3	Washer, gear indicator ... ..	1	
	E.3436	Screw, inner cover to casing (long) ... ..	1	
	E.3437	Screw, inner cover to casing ... ..	3	
		For speedometer drive parts, see page 39.		
		<b>OUTER COVER</b>		
		COVER WITH BUSHES, GEARBOX OUTER	1	
3-6	T.935	Bush, footchange spindle outer ... ..	1	
3-38	T.57	Bush, kickstarter outer ... ..	1	
3-39	T.23	Peg, kickstarter spring anchor ... ..	1	
3-72	T.47	Stud, footchange guide plate ... ..	4	
3-53	T.454	Cap, gearbox oil filler ... ..	1	
3-12	E.1564	Washer, gearbox oil filler joint ... ..	1	
3-13	E.1577	Screw, outer cover to casing (long) ... ..	1	
	E.3442	Screw, outer cover to casing ... ..	1	
	E.3438	Screw, outer cover to inner cover ... ..	2	
	E.3437	Screw, outer cover to inner cover (long) ... ..	1	
	E.3439	Nut, outer cover to casing ... ..	3	
3-4	S1-51			

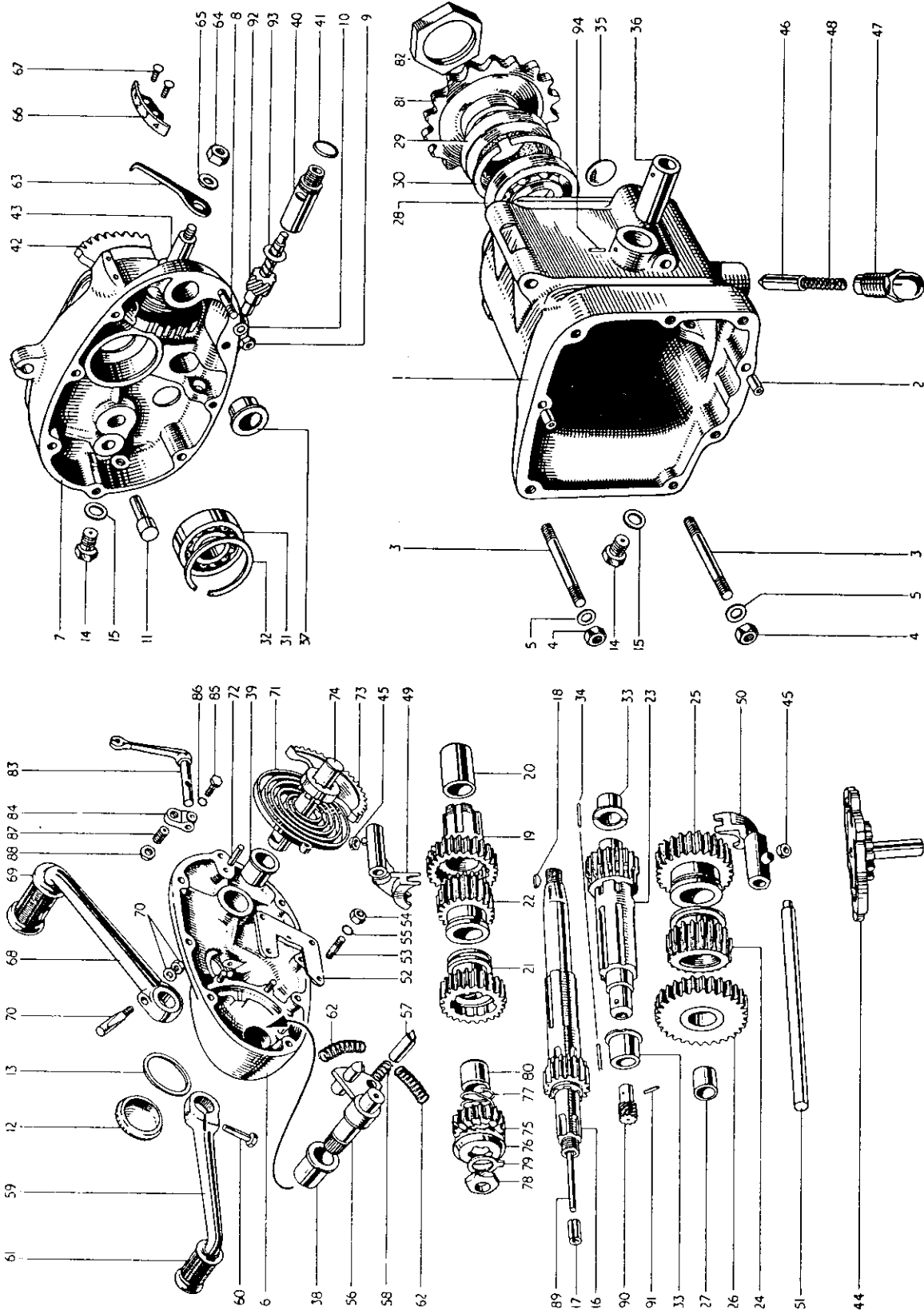


Fig. 3. GEARBOX SHAFTS, GEARS AND CASING.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
		<b>Outer Cover—continued</b>		
3-5	S.25-3	Washer, outer cover to casing nut ... ..	3	
		<b>SHAFTS AND GEARS</b>		
3-16	T.914	MAINSHAFT C/W LOW GEAR (16T) ... ..	1	
3-17	PT.108B	Bush, mainshaft for clutch rod ... ..	1	
3-18	S66-1	Woodruff Key No. 6 ... ..	1	LV6/MT1/19637
4-1	T.1047	Nut, clutch to mainshaft ... ..	1	
4-2	T.1045	Washer, clutch to mainshaft plain ... ..	1	
4-3	T.1046	Washer, clutch to mainshaft lock ... ..	1	
3-19	T.969	GEAR, MAINSHAFT HIGH (28T) ... ..	1	
3-20	T.920	Bush, mainshaft high gear ... ..	1	
3-21	T.917	Gear, mainshaft 3rd (24T) ... ..	1	
3-22	T.968	Gear, mainshaft 2nd (19T) ... ..	1	
3-23	T.971	Layshaft, c/w high gear and speedo gear (8T)	1	
3-24	T.930	Gear, layshaft, 3rd (22T) ... ..	1	
3-25	T.974	Gear, layshaft, 2nd (27T) ... ..	1	
3-26	T.926	GEAR, LAYSHAFT, LOW (30T) ... ..	1	
3-27	T.928	Bush, layshaft, low gear ... ..	1	
		<b>GEAR CONTROL (SELECTOR MECHANISM)</b>		
3-44	T.500	Camplate, gear control ... ..	1	
3-45	NT.261	Roller, gear control camplate ... ..	2	
3-49	T.260B	Fork, gear control selector mainshaft ... ..	1	
3-50	T.913	Fork, gear control selector layshaft ... ..	1	
3-51	T.291	Rod, gear control forks ... ..	1	
		<b>GEAR CONTROL (ENCLOSED FOOTCHANGE)</b>		
3-52	T.407	Plate, footchange guide ... ..	1	
3-54	F.879	Nut, footchange guide plate stud ... ..	4	
3-55	E.1612	Washer, shakeproof, footchange guide plate stud ... ..	4	
3-56	T.408/9	Quadrant, gearchange plunger ... ..	1	
3-57	T.406	Plunger, gear quadrant ... ..	2	
3-58	T.405	Spring, gear quadrant plunger ... ..	2	
3-62	T.404	Spring, footchange pedal return ... ..	2	
3-59	T.398	Pedal, footchange ... ..	1	
3-60	W.932	Setscrew, footchange pedal ... ..	1	
3-61	T.449	Rubber, pedal ... ..	1	
		<b>GEARBOX FITTINGS</b>		
6-32	T.717	Plate, gearbox mounting ... ..	2	
6-78	T.456	Stud, gearbox ... ..	2	
6-79	S.1-51	Nut, gearbox stud ... ..	3	
6-80	T.461	Nut, gearbox stud ... ..	1	
	S.26-3	Washer, gearbox stud spring ... ..	2	
6-18	F.1681	Bolt, gearbox to frame clamp ... ..	1	
6-19	S.4-13	Nut, gearbox clamp bolt ... ..	1	
	S.25-8	Washer, gearbox clamp bolt ... ..	1	
6-20	F.3108	Bolt, gearbox pivot ... ..	1	
6-21	PO.172A	Nut, gearbox pivot bolt ... ..	1	
	S26-1	Washer, gearbox pivot bolt ... ..	1	
6-82	T.887	Adjuster, primary chain ... ..	1	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>KICKSTARTER</b>				
3-68	T.1270	FOLDING KICKSTARTER CRANK ASSY.	1	LV6/MT7/5912
	T.1271	Crank, kickstarter ... ..	1	
	T.1167	Spring, crank for ball ... ..	1	
	S.70-3	Ball, crank for pedal ... ..	1	
	T.1272	Pedal, kickstarter ... ..	1	
	T.1273	Bolt, pedal pivot ... ..	1	
3-69	F.1814	Rubber, pedal ... ..	1	
3-70	S52-1	Cotter pin, with nut and washer ... ..	1	
3-71	T.31	Spring, kickstarter return ... ..	1	
3-73	T.25A	Quadrant, kickstarter ... ..	1	
3-74	T.24A	Shaft, kickstarter axle ... ..	1	
3-75	T.730	Pinion, kickstarter ... ..	1	
3-76	T.731	Ratchet, kickstarter ... ..	1	
3-80	T.1338	Sleeve, kickstarter pinion ... ..	1	
3-77	T.1250	Spring, kickstarter pinion ... ..	1	
3-78	NT.297	Nut, kickstarter ratchet ... ..	1	
3-79	T.732	Washer, kickstarter ratchet lock ... ..	1	
<b>GEARBOX SPROCKET</b>				
3-81	T.471A	Sprocket, gearbox (18T) ... ..	1	
3-82	T.440	Nut, gearbox sprocket locking ... ..	1	
<b>CLUTCH AND SHOCK ABSORBER</b>				
4-4	T.1360	CLUTCH ASSEMBLY ... ..	1	
	T.940	Clutch housing with sprocket ... ..	1	
	T.472	Ring, clutch bearing ... ..	1	
4-13	T.394	Roller ... ..	20	
4-5	T.1037	Centre, clutch ... ..	1	
4-12	T.418	Hub, clutch ... ..	1	
4-14	T.1362	Plate, clutch driving bonded ... ..	4	
4-16	T.1363	Plate, clutch driven ... ..	5	
4-17	T.429	Spring, clutch ... ..	4	
4-18	T.423	Pin, clutch spring ... ..	4	
4-19	T.427	Nut, clutch spring pin ... ..	4	
4-20	T.425	Cup, clutch spring ... ..	4	
4-21	T.986	Plate assembly, clutch pressure ... ..	1	
	T.422	Button, clutch pressure plate ... ..	1	
4-6	T.1039	Plate, inner shock absorber retaining ... ..	1	
4-7	T.1040	Screw, inner and outer retaining plates ... ..	8	
4-8	T.1041	Spider, shock absorber ... ..	1	
4-9	T.1185	Rubber insert, driving ... ..	4	
4-10	T.1043	Rubber insert, rebound ... ..	4	
4-11	T.1044	Plate, outer shock absorber retaining ... ..	1	
<b>CLUTCH CONTROL</b>				
3-83	T.487	Lever, clutch operating ... ..	1	
	T.495	Cap, clutch operating lever rubber ... ..	1	
3-84	T.402	Arm, clutch operating lever ... ..	1	
3-85	T.401	Peg, clutch operating lever ... ..	1	
3-86	E.1612	Washer, clutch operating peg (shakeproof) ... ..	1	
3-87	T.413	Pin, clutch lever adjusting with ball ... ..	1	
3-88	T.453	Nut, clutch lever adjusting pin locking ... ..	1	
3-89	T.455	Rod, clutch lever operating ... ..	1	

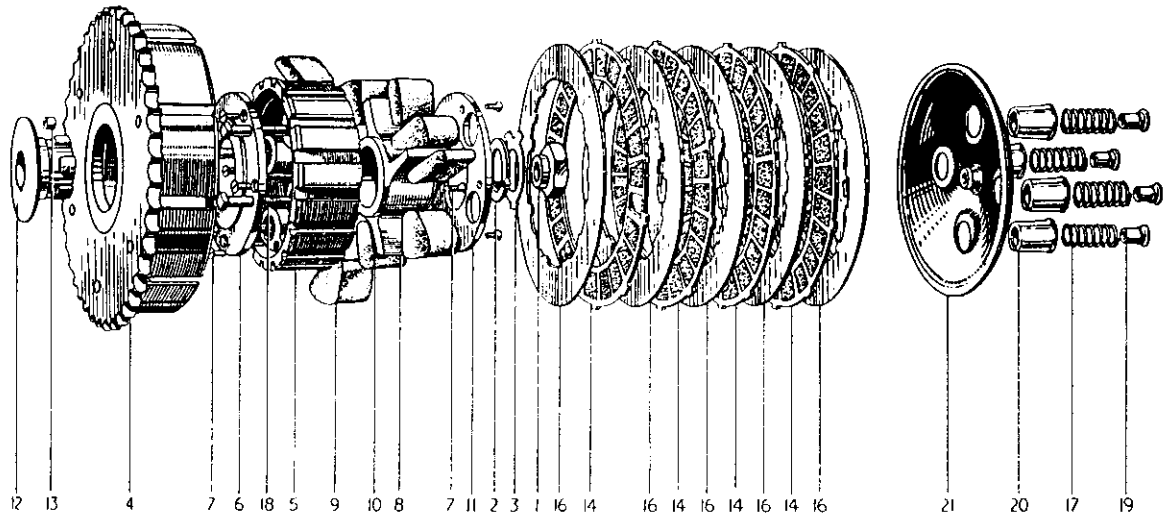


Fig. 4. CLUTCH AND SHOCK ABSORBER.

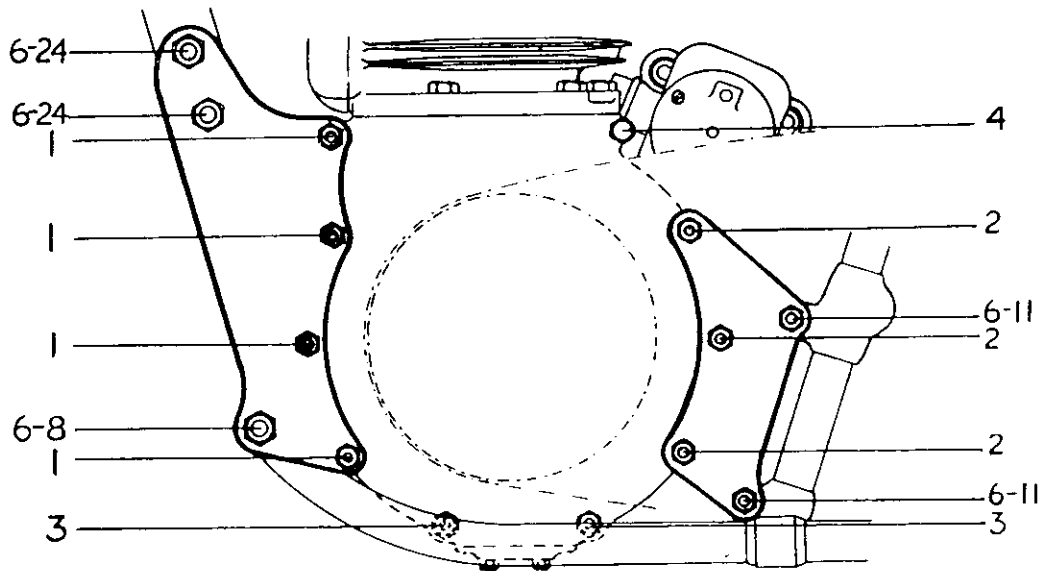


Fig. 5. ENGINE PLATES, STUDS AND NUTS.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number	
<b>FRAME GROUP</b>					
<b>FRONT PORTION</b>					
6-2	F.3295	Frame, front portion ... ..	1	LV6/MT1/TT/NC.6057	
6-12	E.1023	Stud, seat lug to back stays ... ..	1		
6-9	PO.172A	Nut, seat lug to back stays stud ... ..	2		
	S26-1	Washer, seat lug to back stays stud ... ..	2		
6-13	F.994	Stud, frame to chain stay seat tube ... ..	1		
6-14	S1-30	Nut, frame to chain stay seat tube stud ... ..	2		
6-7	F.1682	Stud, oil tank and air filter to frame ... ..	2		
	SCZ.45	Washer, frame to chain stay seat tube stud ... ..	2		
6-3	NW100	Lubricator, steering column ... ..	1		
<b>REAR PORTION</b>					
6-67	F.3319	Frame, rear portion ... ..	1		
6-58	F.969	Screw, rear chain adjuster ... ..	2		
6-59	F.1008	Locknut, rear chain adjuster screw ... ..	2		
6-29	F.3067	Plate, engine front assembly ... ..	1		
6-30	F.3070	Plate, engine rear, L/H ... ..	1		
6-31	F.3071	PLATE ENGINE REAR, R/H ... ..	1		
	F.1117	Dowel, footrest to engine plate ... ..	2		
<b>ENGINE PLATE AND CRANKCASE STUDS, NUTS AND WASHERS</b>					
6-24	F.1711	Stud, engine plate to frame ... ..	2		
6-25	PO.172A	Nut, for F.1711 stud ... ..	4		
	S26-1	Washer, for PO.172A nut ... ..	4		
6-8	F.839	Stud, engine plate to frame, front (bottom) ... ..	1		
6-6	PO.172A	Nut, for F.839 stud ... ..	2		
	S26-1	Washer, for PO.172A nut ... ..	2		
6-11	E.654	Stud, engine plate to frame, rear ... ..	2		
6-10	S1-51	Nut, for E.654 stud ... ..	4		
	S26-3	Washer, for S1-51 nut ... ..	4		
5-1	E.2888	Stud, crankcase to engine plate, front ... ..	4		
	S1-51	Nut, for E.2888 stud ... ..	6		
	E.2889	Nut, for E.2888 stud (bottom front) ... ..	2		
	S26-3	Washer, for S1-51 and E.2889 nut ... ..	8		
5-2	E.654	Stud, crankcase to engine plate, rear ... ..	3		
	S1-51	Nut, for E.654 stud ... ..	6		
	S26-3	Washer, for S1-51 nut ... ..	6		
5-3	E.2555	Stud, crankcase bottom ... ..	2		
	S1-51	Nut, for E.2555 stud ... ..	4		
	S25-3	Washer, for S1-51 nut ... ..	4		



Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>FRONT FORK GROUP</b>				
	H.988	FORK ASSEMBLY ... ..	1	
7-1	H.663A	Lug, fork head ... ..	1	
7-2	F.1760	Bolt, head lug pinch ... ..	1	
7-3	H.379	Nut, head lug bolt ... ..	1	
7-4	H.660	"U" bolt, handlebar clamp ... ..	2	
	S.25-3	Washer, handlebar clamp ... ..	4	
7-5	S1-51	Nut, handlebar clamp ... ..	4	
7-6	H.970	Crown lug and stem, fork ... ..	4	
7-7	H.405	Nut, crown and stem sleeve ... ..	1	
7-8	H.941	Bolt, crown and stem to stanchion pinch ...	2	
7-9	H.975	Nut, crown and stem to stanchion pinch bolt	2	
	E.2288	Washer, crown and stem to stanchion pinch	2	
7-10	H.799	Cover, nacelle L/H ... ..	1	
7-11	H.800	Cover, nacelle R/H ... ..	1	
7-15	H.420	Washer, cover tube felt ... ..	2	
7-16	H.414	Cover tube bottom, c/w wheel spindle lug L/H ... ..	1	
7-17	H.415	Cover tube bottom, c/w wheel spindle lug R/H ... ..	1	
7-18	H.519	Plug, cover tube drain ... ..	2	
7-19	H.430	Washer, cover tube drain plug ... ..	2	
7-20	F.1760	Bolt, L/H cover tube wheel lug pinch ...	1	
7-21	H.379	Nut, L/H cover tube wheel lug bolt ...	1	
7-22	H.390	Sleeve, cover tube dust excluder ... ..	2	
7-23	H.391	Washer, cover tube dust excluder sleeve felt sleeve felt ... ..	2	
7-24	H.445	Washer, inner retaining for H.391 ... ..	2	
7-25	H.431	Washer, outer retaining for H.391 ... ..	2	
7-26	H.441	Bearing, cover tube top ... ..	2	
7-27	H.382A	Stanchion ... ..	2	
7-28	H.519A	Plug, stanchion oil filler ... ..	2	
7-29	H.430	Washer, stanchion oil filler ... ..	2	
7-30	H.432A	Nut, stanchion to top lug ... ..	2	
7-31	H.443	Bearing, stanchion lower ... ..	2	
7-32	H.444	Nut, stanchion hydraulic stop ... ..	2	
7-33	H.750	Spring, main (identification mark, Green)	2	
7-34	H.399A	Rod, oil restrictor ... ..	2	
7-35	H.452	Restrictor, oil ... ..	2	
7-36	H.453	Cup, oil restrictor rod ... ..	2	
7-37	H.454	Pin, oil restrictor rod cup ... ..	2	
7-38	F.879	Nut, oil restrictor rod ... ..	2	
7-39	H.394	Tube, pressure ... ..	2	
7-40	H.1012	Body, pressure tube valve ... ..	2	
7-41	H.397	Sleeve, pressure tube support ... ..	2	
	H.500	Pin, valve body ... ..	2	
7-42	H.398	Bolt, pressure valve body to lug ... ..	2	
7-43	E.1335	Washer, pressure valve body to lug ... ..	2	
<p>The fork assembly part number H.988 also includes the steering damper as listed on page 20.</p>				
7-12	H.917	Top unit, nacelle ... ..	1	
	H.669	Grommet, handlebar rubber ... ..	2	
	H.689	Screw, top unit to bottom unit (rear) ...	2	
	H.691	Nut for H.689 ... ..	2	
	E.2880	Washer for H.691 ... ..	2	
7-13	H.623	Motif (flash) L/H ... ..	1	
7-14	H.624	Motif (flash) R/H ... ..	1	

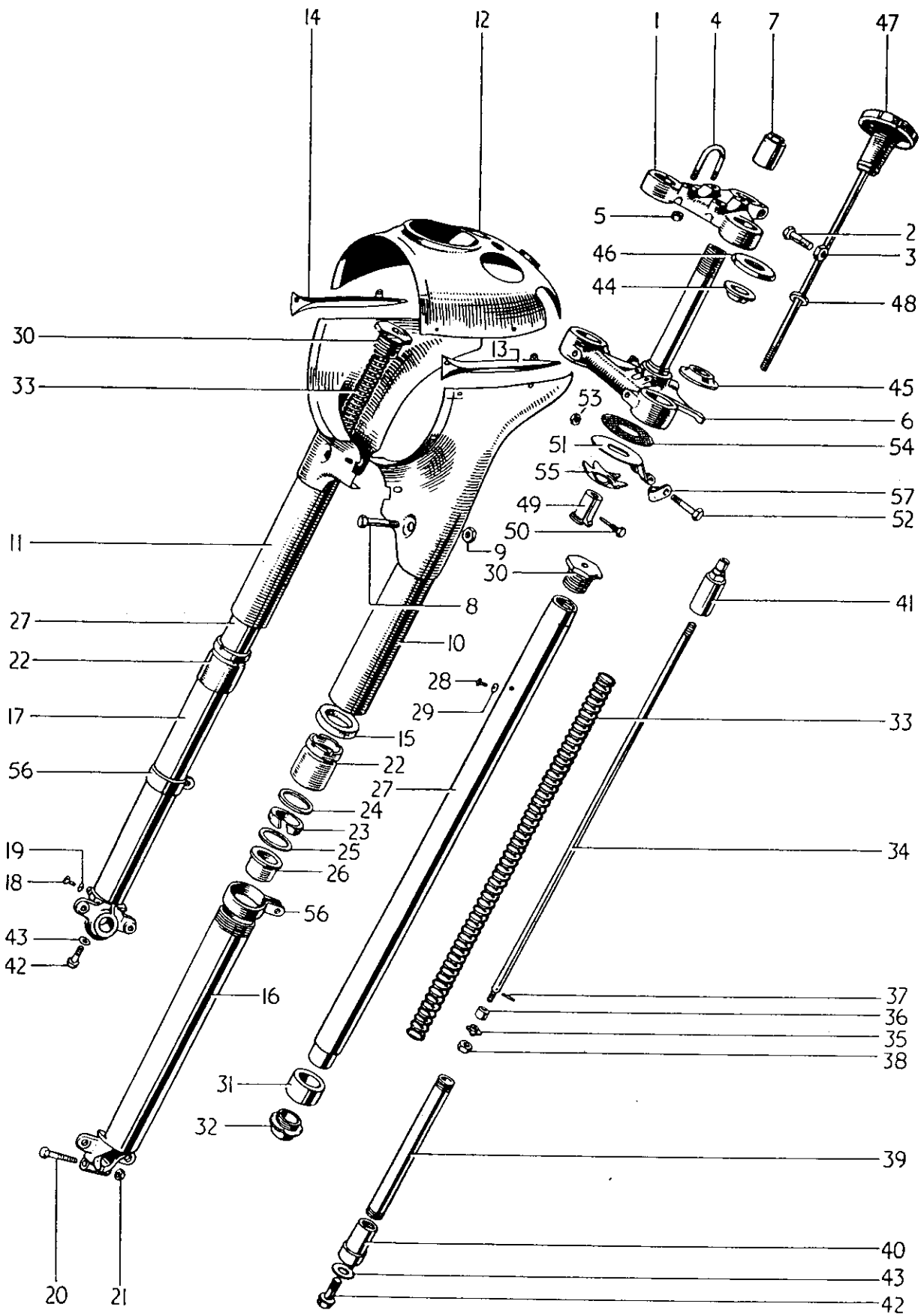
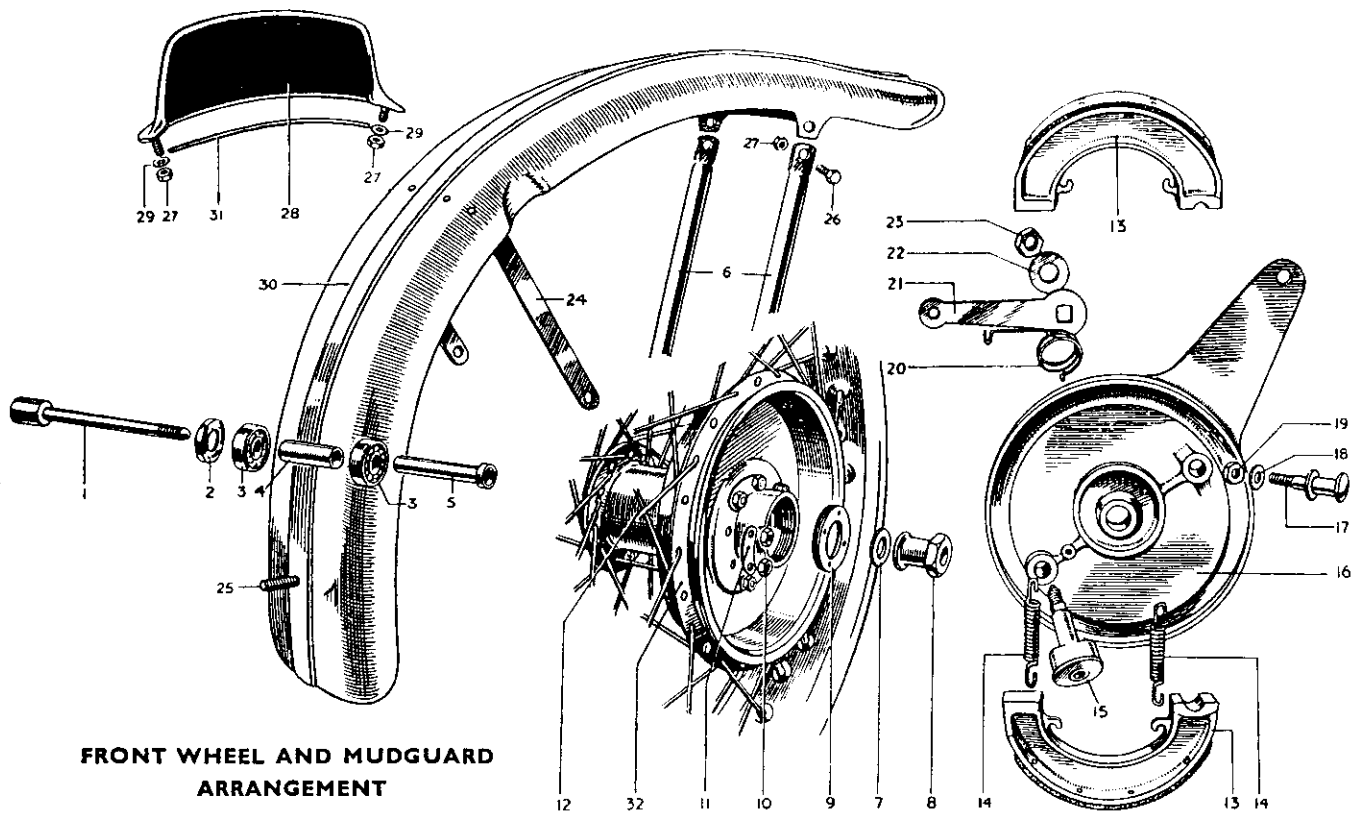


Fig. 7. TELESCOPIC FRONT FORK.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>Front Fork—continued</b>				
	H.688	Screw, motif front ... ..	2	
	H.691	Nut, motif front ... ..	2	
	E.2880	Washer, for H.691 ... ..	2	
	H.687	Screw, top and bottom units ... ..	2	
<b>STEERING CUPS, CONES AND BALLS</b>				
6-1	H.437	Cup, frame lug, top ... ..	1	
6-81	H.111	Cup, frame lug, bottom ... ..	1	
7-44	H.438	Cone, head lug top ... ..	1	
7-45	H.439	Cone, crown and stem bottom ... ..	1	
	S.70-4	Ball, top race $\frac{3}{16}$ " ... ..	22	LV6/MT7/162
	S.70-3	Ball, bottom race $\frac{1}{4}$ " ... ..	20	LV6/MT7/5912
7-46	H.407	Cover, top cone dust ... ..	1	
<b>STEERING DAMPER</b>				
7-47	H.536	Knob, with rod ... ..	1	
7-48	H.565	Washer, rod ... ..	1	
7-49	H.408	Sleeve, rod adjusting ... ..	1	
7-50	H.409	Pin, securing sleeve ... ..	1	
7-51	H.724	Plate, damper anchor ... ..	1	
7-52	F.1718	Bolt, damper anchor plate ... ..	1	
7-53	H.518	Nut, damper anchor plate bolt ... ..	1	
	S25-3	Washer, damper anchor plate bolt ... ..	1	
7-54	H.435	Disc, damper friction ... ..	1	
7-55	H.95	Plate, friction disc spring ... ..	1	
<b>FRONT WHEEL GROUP</b>				
	W.938	WHEEL, FRONT, LESS BEARINGS AND BRAKE ASSEMBLY ... ..	1	
	W.351	Rim, front wheel ... ..	1	
	W.933	Spoke, short $6\frac{3}{8}$ " $\times$ 10G $\times$ 83° R/H, complete with nipple ... ..	10	
	W.934	Spoke, short $6\frac{3}{8}$ " $\times$ 10G $\times$ 94° R/H, complete with nipple ... ..	10	
	W.660	Spoke, long $8\frac{1}{2}$ " $\times$ 10G $\times$ 88° L/H, complete with nipple ... ..	10	
	W.661	Spoke, long $8\frac{1}{2}$ " $\times$ 10G $\times$ 90° L/H, complete with nipple ... ..	10	
	S79-2	Nipple, spoke ... ..	40	
	W.573A	Hub ... ..	1	
8-32	W.940	Drum, brake ... ..	8	
	W.62	Bolt, brake drum ... ..	8	
8-10	S1-51	Nut, brake drum bolt ... ..	4	
8-11	W.63	Lockplate, brake drum nut ... ..	1	
8-1	W.578	Spindle, front wheel hub ... ..	1	
8-5	W.761	Sleeve and collar, front wheel spindle ... ..	1	
8-8	W.544	Nut, front wheel spindle ... ..	1	
8-7	W.545	Washer, front wheel spindle nut ... ..	2	LV6/MT7/6083
8-3	W.653	Bearing, front wheel ball ... ..	1	
8-4	W.481	Distance piece, ball bearing ... ..	1	
8-9	W.582	Ring, ball bearing, retaining ... ..	1	
8-2	W.583	Cap, ball bearing, dust ... ..	1	

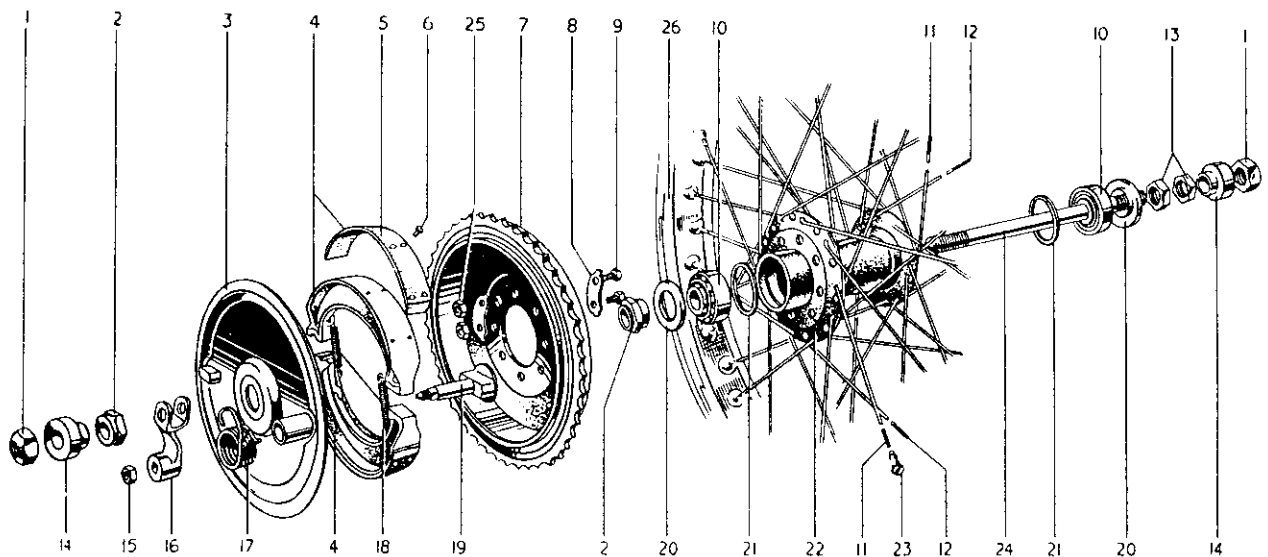


**FRONT WHEEL AND MUDGUARD ARRANGEMENT**

**Fig. 8. FRONT WHEEL AND MUDGUARD.**

**SPECIAL NOTE : WHEEL BUILDING.** Spokes with specially angled heads ensures very sturdy wheel construction. To maintain this condition, state clearly when ordering sundry spokes :—

- (a) Side of wheel, i.e. L/H or R/H.
- (b) Whether head of spoke is toward or away from wheel centre, i.e., Front wheel:  $83^\circ$  towards centre.  $90^\circ$  away from centre.  $88^\circ$  towards centre.  $94^\circ$  away from centre.



**Fig. 9. REAR WHEEL.**

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>Front Wheel—continued</b>				
<b>FRONT WHEEL BRAKE</b>				
8-16	W.585	Plate, front brake anchor ... ..	1	
8-17	W.588	Pin, front brake shoe fulcrum ... ..	1	
8-19	PO.172A	Nut, front brake shoe fulcrum pin ... ..	1	
8-18	E.2288	Washer, front brake shoe fulcrum pin ... ..	1	
	W.591	Abutment, brake cable adjuster ... ..	1	
8-13	W.93	SHOE, BRAKE C/W LINING ... ..	2	
	NW.243	Lining, brake shoe ... ..	2	
	W.129	Rivets, brake lining ... ..	16	
8-14	W.135	Spring, brake shoe return ... ..	2	
8-15	W.386A	Cam, brake ... ..	1	
8-21	W.589	Lever, front brake cam ... ..	1	
8-23	S1-51	Nut, front brake cam lever ... ..	1	
8-22	S25-6	Washer, front brake cam lever nut ... ..	1	
8-20	W.592	Spring, front brake cam lever return ... ..	1	
	WF.32	Pin, front brake lever pivot ... ..	1	
		Split pin, pivot pin $\frac{1}{16}$ " dia. $\times$ $\frac{1}{2}$ " ... ..	1	
<b>REAR WHEEL GROUP</b>				
	W.889	WHEEL, REAR, LESS BEARINGS AND BRAKE ASSEMBLY ... ..	1	
9-26	W.270A	Rim, rear wheel WM.3-19 ... ..	1	
9-12	NW.125X	Spoke, $8\frac{3}{4}$ " $\times$ 9G $\times$ 100° L/H and R/H, complete with nipple ... ..	20	
9-11	NW.125	Spoke, $8\frac{3}{4}$ " $\times$ 9G $\times$ 76° L/H and R/H, complete with nipple ... ..	20	
9-23	TW.5	Nipple, spoke ... ..	40	
9-22	W.861	Hub ... ..	1	
9-7	W.951	Drum and sprocket, rear brake ... ..	1	
9-9	W.62	Bolt, rear hub to brake drum ... ..	8	
9-25	S1-51	Nut, rear hub to brake drum bolt ... ..	8	
9-8	W.63	Lockplate, nut to brake drum bolt ... ..	8	
9-21	NW.225	Ring, bearing backing ... ..	2	
9-10	W.7A	Bearing, rear wheel taper roller ... ..	2	LV6/MT7/TN/1163X/1120N1
9-20	W.12	Cap, bearing dust ... ..	1	
9-24	W.61	Spindle, rear wheel hub ... ..	1	
9-13	W.4	Nut, bearing adjustment lock R/H side ... ..	2	
9-14	W.6	Collar, chain adjuster thrust ... ..	2	
9-1	TS.42	Nut, rear wheel hub ... ..	2	
	WM.3	Bolt, tyre security ... ..	2	LV6/MT14/26293
<b>REAR WHEEL BRAKE</b>				
9-3	W.762	Plate, rear brake anchor ... ..	1	
9-2	W.5	Locknut, rear brake anchor plate ... ..	2	
9-4	W.93	SHOE, BRAKE C/W LINING ... ..	2	
9-5	NW.243	Lining, brake shoe ... ..	2	
9-6	W.129	Rivet, brake lining ... ..	16	
9-18	W.135	Spring, brake shoe return ... ..	2	
9-19	W.856	Cam, brake ... ..	1	
9-16	W.74A	Lever, brake cam ... ..	1	
9-15	S1-52	Nut, brake cam lever ... ..	1	
9-17	W.123	Spring, brake cam lever return ... ..	1	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>MUDGUARD GROUP</b>				
<b>FRONT MUDGUARD</b>				
8-30	H.566	MUDGUARD ASSY, LESS FRONT STAYS	1	
8-24	H.427	Bridge, mudguard centre support ... ..	1	
	NF.658	Rivet, mudguard centre bridge ... ..	4	
8-6	H.569	Stay, mudguard front ... ..	2	
8-26	DS.57	Bolt, mudguard front stay ... ..	2	
8-27	F.879	Nut, mudguard front stay ... ..	2	
	E.1612	Washer, mudguard front stay ... ..	2	
7-56	H.428	Clip, bridge to fork leg ... ..	2	
	H.426	Bolt, clip L/H ... ..	1	
	H.451	Bolt, clip R/H ... ..	1	
	PO.172A	Nut, clip bolt ... ..	2	
	S26-1	Washer, clip bolt ... ..	2	
	F.929	Bolt, mudguard stay to fork end ... ..	2	
	S26-3	Washer, mudguard stay to fork end ... ..	2	
<b>LICENCE HOLDER</b>				
	D.261	Licence holder complete ... ..	1	LV6/MT1/32787
<b>REAR MUDGUARD</b>				
	F.3126	MUDGUARD ASSEMBLY, REAR ... ..	1	
	F.3130	Tailguard, rear mudguard ... ..	1	
	F.3131	Stay, tailguard rear ... ..	2	
	F.1369	Bolt, tailguard rear stay ... ..	2	
	F.879	Nut, tailguard rear stay ... ..	2	
	DS.57	Bolt, tailguard to mudguard blade ... ..	2	
	S25-3	Washer, tailguard to mudguard blade ... ..	2	
	F.2717	Clip, mudguard to frame, lower ... ..	1	
	PF.204	Clip, mudguard to frame, upper ... ..	2	
	F.444	Backing plate, clip ... ..	4	
	S23-42	Bolt, clip and backing plate ... ..	4	
	S25-1	Washer, clip and backing plate bolt ... ..	1	
<b>NUMBER PLATE GROUP</b>				
<b>FRONT NUMBER PLATE</b>				
8-28	F.2698	Plate, front number ... ..	1	
8-27	F.879	Nut, number plate stud ... ..	2	
8-31	H.251	Beading, number plate base ... ..	1	
<b>REAR NUMBER PLATE</b>				
	F.3363	Plate, rear number ... ..	1	
	F.929	Bolt, number plate top fixing ... ..	1	
	S1-51	Nut, number plate top fixing bolt ... ..	1	
	S26-3	Washer, number plate top fixing bolt ... ..	1	
	F.1369	Bolt, number plate bottom fixing ... ..	2	
	F.879	Nut, number plate bottom fixing bolt ... ..	2	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>STAND GROUP</b>				
<b>FRONT STAND</b>				
	H.412	Stand, front ... ..	1	
	S1-51	Nut, front stand to guard ... ..	1	
	NS.362	Nut, front stand to guard spigot ... ..	1	
	H.424	Bolt, front stand pivot ... ..	2	
	S25-3	Washer, front stand plain ... ..	2	
	H.425	Washer, front stand spring ... ..	2	
<b>REAR STAND</b>				
6-41	F.3146	Stand, rear ... ..	1	
6-45	F.975A	Spring, rear stand ... ..	1	
6-43	F.977	Bolt, rear stand pivot ... ..	2	
6-44	W.630	Nut, rear stand pivot bolt ... ..	2	
6-42	F.976	Washer, rear stand pivot bolt ... ..	2	
<b>PROP STAND</b>				
	F.3094	PROP STAND, COMPLETE ... ..	1	
	F.3097	Pin, prop stand swivel ... ..	1	
	F.3096	Washer, prop stand swivel pin lock ... ..	1	
	F.2610	Spring, prop stand tension ... ..	1	
<b>CARRIER &amp; PANNIER GROUP</b>				
<b>CARRIER</b>				
	F.2235	Carrier, rear ... ..	1	
	F.1213	Bolt, carrier to mudguard bridge ... ..	4	
	S1-51	Nut, carrier to mudguard bridge ... ..	4	
	S26-3	Washer, carrier to mudguard bridge ... ..	4	
	F.946	Stud, carrier to fork end ... ..	2	
	S1-51	Nut, carrier to fork end ... ..	2	
	S26-3	Washer, carrier to fork end ... ..	2	
<b>PANNIER FRAMES</b>				
	F.2261	PANNIER FRAMES, L/H AND R/H ... ..	2	LV6/MT13/21259
	F.2251	Screw, pannier tray to stay locking ... ..	4	
	F.2252	Wing nut, locking screw ... ..	4	
	E.1612	Washer, locking screw ... ..	4	
	F.1369	Bolt, pannier frame to carrier ... ..	4	
	F.879	Nut, pannier frame to carrier ... ..	4	
	F.2245	Bracket, lower support L/H front ... ..	1	
	F.2246	Bracket, lower support R/H front ... ..	1	
	DS.57	Bolt, support bracket to pannier ... ..	4	
	F.879	Nut, support bracket to pannier ... ..	4	
	F.2254	Stay, pannier to rear mudguard ... ..	1	
	F.879	Nut, pannier to rear mudguard ... ..	2	
<b>PANNIER BAG</b>				
	F.2262	Bag, pannier L/H ... ..	1	LV6/MT13/21246
	F.2263	Bag, pannier R/H ... ..	1	LV6/MT13/21257
	F.2311	"Y" strap, long ... ..	1	LV6/MT13/21263
	F.2310	"Y" strap, short... ..	1	LV6/MT13/21272

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>PRIMARY CHAINCASE GROUP</b>				
<b>OUTER COVER</b>				
	T.1275	Cover, chaincase outer ... ..	1	
	NT.367	Plug, chaincase filler ... ..	1	
	NT.376	Washer, chaincase filler plug ... ..	1	
	PCE.102F	Plug, chaincase drain ... ..	1	
	WE.170	Washer, chaincase drain plug ... ..	1	
	T.496	Adjuster, chaincase rear chain oiler ... ..	1	
	T.497	Spring, chaincase rear chain oiler adj....	1	
	NT.316	Dowel, chaincase footrest ... ..	2	
	T.991	Cover, chaincase inspection ... ..	1	
	T.990	Washer, chaincase inspection cover ... ..	1	
	H.687	Screw, chaincase inspection cover ... ..	3	
	GS.299	Washer, chaincase inspection cover screw ...	3	
	E.3442	Screw, chaincase to crankcase (long) ...	3	
	E.3437	Screw, chaincase outer to inner (short) ...	13	
	E.3475	Grommet, alternator leads ... ..	1	
	E.3168	Clip, alternator leads ... ..	1	
	T.1076	Bolt, alternator leads clip ... ..	1	
<b>INNER COVER</b>				
	T.889	Cover, chaincase inner ... ..	1	
	T.91	Spring plate, oil retainer to cover ... ..	1	
	T.177A	Rivet, spring plate ... ..	2	
	T.1031	Plate, chaincase oil retainer ... ..	1	
	E.2818	Bolt, cover to crankcase (top) ... ..	1	
	E.2819	Bolt, cover to crankcase (bottom) ... ..	1	
	E.2817	Bolt, cover to crankcase (inner) ... ..	2	
	E.2131	Nut, cover to crankcase bolt (sleeve) ...	2	
	E.1612	Washer, cover to crankcase bolt ... ..	4	
	T.1276	Boss, alternator cable outlet ... ..	1	
	T.1059	Rubber sleeve, alternator cable ... ..	1	
<b>REAR CHAINGUARD GROUP</b>				
	T.993	Chainguard assembly ... ..	1	
	S23-37	Bolt, chainguard to primary cover ... ..	1	
	S25-1	Washer, chainguard to primary cover bolt ...	1	
	DS57	Bolt, chainguard to carrier frame ... ..	1	
	S25-1	Washer, chainguard to carrier frame bolt ...	1	
	E.2615	Bolt, chainguard to distance piece ... ..	1	
	E.2288	Washer, chainguard to distance piece bolt ...	1	
	F.3174	Distance piece, chainguard to footrest lug ...	1	
<b>CHAIN GROUP</b>				
<b>CHAIN</b>				
	T.376	Chain, primary 74 links $\frac{1}{2}$ " x .335" x $\frac{5}{16}$ " ...	1	LV6/MT11/17163
	D.69	Chain rear 90 links $\frac{5}{8}$ " x .400" x $\frac{3}{8}$ " ...	1	LV6/MT11/28572
		Kit, primary chain repair ... ..	1	LV6/MT11/28961
		Rear chain link connector ... ..	1	LV6/MT11/46452
		Rear chain cranked link ... ..	1	LV6/MT11/46440
		Rear chain inner link ... ..	1	LV6/MT11/46448
		Rear chain spring clips ... ..	1	LV6/MT11/1375
				VAOS/G1/XB13080

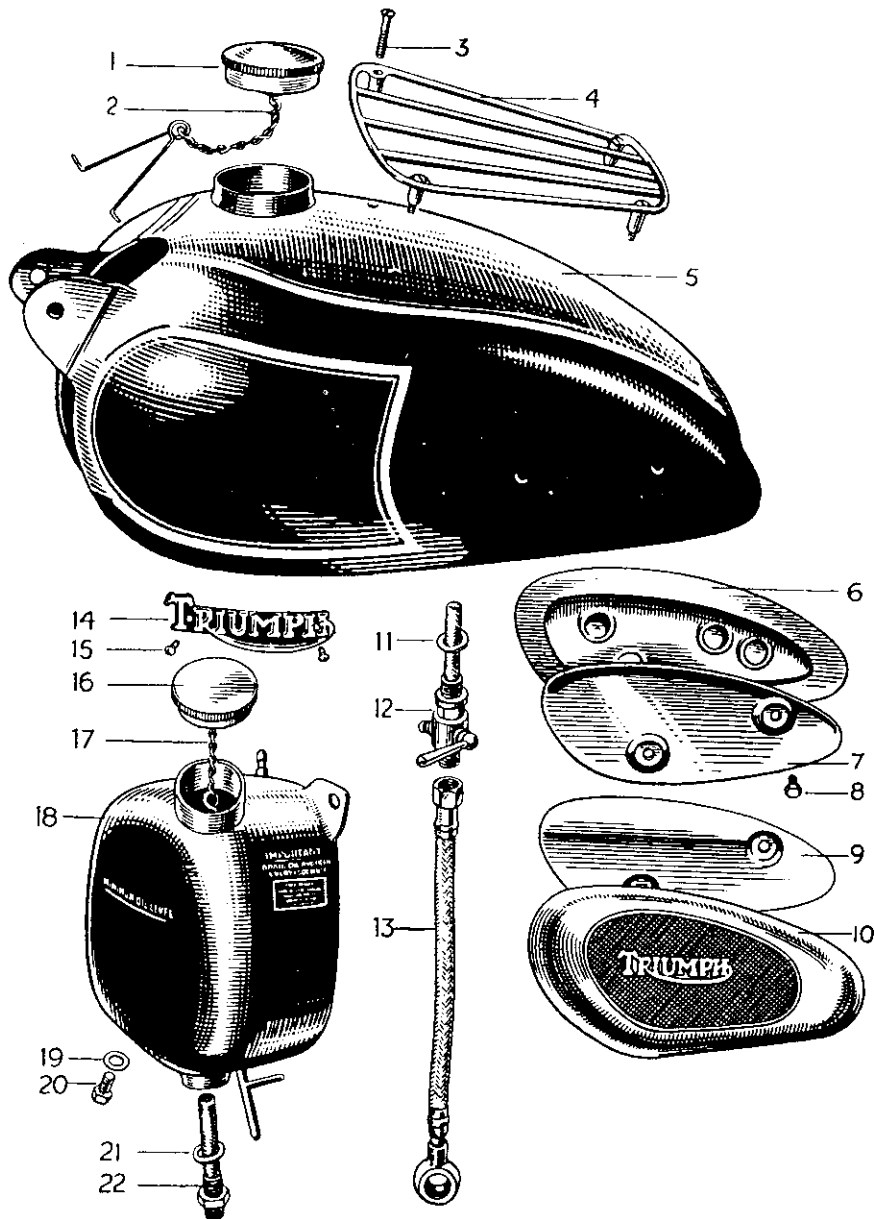


Fig. 10. PETROL AND OIL TANKS.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>PETROL TANK GROUP</b>				
<b>PETROL TANK</b>				
10-5	F.3287	Tank, petrol, less fittings ... ..	1	
10-1	F.3219	CAP, PETROL TANK FILLER COMPLETE	1	
10-2	F.3217/21	Jack chain, filler cap ... ..	1	
10-14	F.1823	Name plate, petrol tank ... ..	2	
10-15	F.1915	Screw, name plate ... ..	4	
10-10	F.1606	Knee grip, L/H ... ..	1	
10-6	F.1605	Knee grip, R/H ... ..	1	
10-9	F.1607	Plate, knee grip, L/H ... ..	1	
10-7	F.1607A	Plate, knee grip, R/H ... ..	1	
10-8	T.361	Bolt, knee grip plate ... ..	4	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>ATTACHMENT FITTINGS</b>				
6-15	F.3007	Bolt, petrol tank, front ... ..	1	
6-17	S1-51	Nut, petrol tank, front bolt ... ..	1	
	E.2287	Washer, petrol tank, front bolt ... ..	1	
6-16	F.3006	Washer, petrol tank, front (rubber) ... ..	2	
	F.3005	Tube, petrol tank, front distance ... ..	1	
6-5	F.966	Bolt, petrol tank, rear ... ..	2	
	S25-27	Washer, petrol tank, rear bolt ... ..	2	
6-4	F.967	Washer, petrol tank, rear bolt (rubber) ... ..	4	
<b>PETROL TAPS AND PIPES</b>				
10-12	F.3057	Tap, petrol L/H ... ..	1	
10-12	F.3116	Tap, petrol R/H ... ..	1	
10-11	F.1511	Washer, petrol tap (fibre) ... ..	2	
10-13	F.3879	Pipe, petrol ... ..	2	
For petrol pipe fittings, see page 33.				
<b>TANK PARCEL GRID</b>				
10-4	F.2933	Grid, tank parcel c/w screws ... ..	1	
10-3	F.2936	Screw, tank parcel grid ... ..	4	
	F.3026	*Plug, tank screw ... ..	4	
*For use when grid is not fitted.				
<b>OIL TANK GROUP</b>				
<b>OIL TANK</b>				
10-18	F.3187	Tank, oil, less fittings ... ..	1	
10-16	F.3215	CAP, OIL TANK, COMPLETE ... ..	1	
10-17	F.3217/18	Jack chain and clip filler cap ... ..	1	
10-20	F.1792	Plug, oil tank drain ... ..	1	
10-19	PT104B	Washer, oil tank drain plug ... ..	1	
	T.1027	Pipe, oil tank vent (metal pipe) ... ..	1	
	F.3077	Connection, oil tank vent (rubber) ... ..	1	
	F.2398	Bolt, oil tank to seat tube ... ..	1	
	S1-51	Nut, oil tank to seat tube ... ..	1	
	F.3323	Distance piece, oil tank bolt ... ..	1	
	H.604	Bolt, oil tank to bridge ... ..	1	
	F.3207	Distance piece, bridge bolt ... ..	1	
10-22	F.3179	Filter, oil tank ... ..	1	
10-21	F.1713	Washer, oil tank filter ... ..	1	
<b>OIL PIPES</b>				
	E.2943	Oil pipes and block, oil tank to engine ... ..	1	
	F.3189	Oil pipe, top half feed ... ..	1	
	F.3182	Union nut, top half feed pipe ... ..	1	
	MF.119/20	Connection, oil pipe (rubber) ... ..	2	
	E.2364	Washer, oil pipe block joint ... ..	1	
1-43	S1-51	Nut, oil pipe block stud ... ..	1	
1-44	S25-3	Washer, oil pipe block stud ... ..	1	

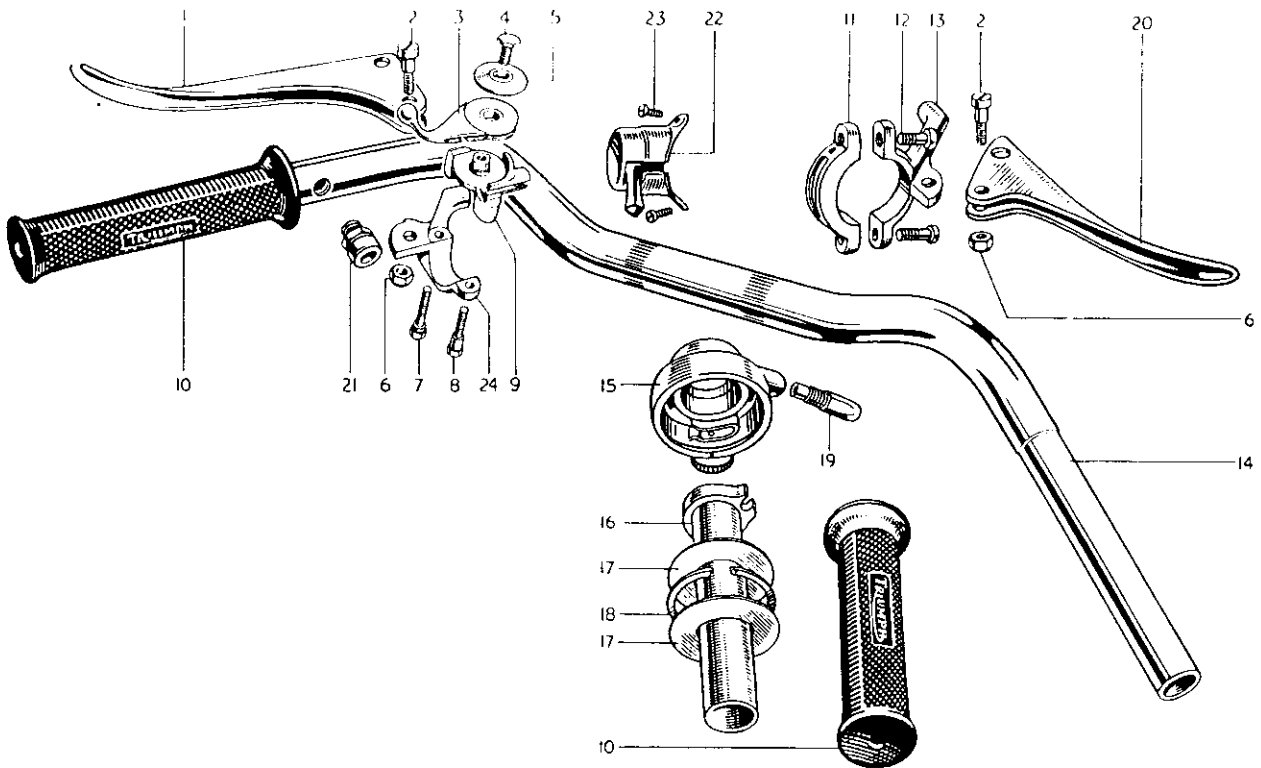


Fig. 11. HANDLEBAR AND CONTROLS.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>HANDLEBAR GROUP</b>				
<b>HANDLEBAR</b>				
11-14	H.659	Handlebar bend, only ... ..	1	
<b>THROTTLE CONTROL</b>				
<b>TWIST GRIP ASSEMBLY</b> ... ..				
11-15	H.697	Head assembly, twist grip ... ..	1	
	H.698	Adjuster screw, twist grip friction ... ..	1	
	H.665	Spring, twist grip friction adjuster ... ..	1	
	H.685	Spring, twist grip friction ... ..	1	
	H.686	Thimble, twist grip cable ... ..	1	
	H.234	Grub screw, twist grip ... ..	1	
	H.237	Sleeve assembly, twist grip ... ..	1	
11-16	H.700	Plate, twist grip retaining ... ..	2	
11-17	H.233	Circlip, twist grip plate ... ..	1	
11-18	H.232	Grip, twist grip and handlebar rubber ... ..	2	
11-10	H.230			
<b>FRONT BRAKE CONTROL</b>				
<b>LEVER, CONTROL ASSEMBLY</b> ... ..				
11-20	18/599	Lever only ... ..	1	LV6/MT1/AM/18/599
11-13	18/535	Bracket, lever ... ..	1	LV6/MT1/AM/18/535
11-11	18/174	Clamp, brake lever ... ..	1	LV6/MT1/AM/18/174
11-12	18/598	Screw, clamp ... ..	2	LV6/MT1/AM/18/598
11-2	61/004	Pin, lever fulcrum ... ..	1	LV6/MT1/AM/61/004
11-6	18/087	Nut, lever fulcrum pin ... ..	1	LV6/MT1/AM/18/087
	18/053	Washer, lever fulcrum pin ... ..	1	LV6/MT1/AM/18/053
	70/016		1	LV6/MT1/AM/70/016

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>CLUTCH AND EXHAUST LIFTER CONTROL</b>				
	18/665	LEVERS, CONTROL ASSEMBLY ... ..	1	LV6/MT1/AM/18/665
11-1	18/528	Lever only, clutch ... ..	1	LV6/MT1/AM/18/528
11-2	18/087	Pin, lever fulcrum ... ..	1	LV6/MT1/AM/18/087
11-6	18/053	Nut, lever fulcrum pin ... ..	1	LV6/MT1/AM/18/053
11-23	18/239	Bracket, lever ... ..	1	LV6/MT1/AM/18/239
11-7	18/135	Screw, clamp ... ..	1	LV6/MT1/AM/18/135
11-6	18/136	Screw, clamp ... ..	1	LV6/MT1/AM/18/136
11-3	12/408	Lever, exhaust lifter ... ..	1	LV6/MT1/AM/12/408
11-9	12/509	Body, lever control ... ..	1	LV6/MT1/AM/12/509
11-4	12/029	Bolt, cap ... ..	1	LV6/MT1/AM/12/029
11-5	12/031	Cap, body ... ..	1	LV6/MT1/AM/12/031
<b>CONTROL CABLES GROUP</b>				
	XA69	Clip, cables to frame ... ..	10	LV6/MT4/24496
<b>CLUTCH CABLE</b>				
	D.307	CABLE ASSEMBLY, CLUTCH ... ..	1	
	D.307-C	Casing only, clutch ... ..	1	
	D.307-W	Wire only, clutch ... ..	1	
	D.103	Ferrule, clutch casing ... ..	2	LV6/MT1/21503
	D.81	Nipple, clutch wire (handlebar end) ... ..	1	
	DS73	Nipple, clutch wire (gearbox end) ... ..	1	
	DS74	Adjuster, clutch cable ... ..	1	
	W76	Locknut, clutch cable adjuster ... ..	1	
<b>FRONT BRAKE CABLE</b>				
	D.247	CABLE ASSEMBLY, BRAKE ... ..	1	
	D.247W	Wire only, brake ... ..	1	
	D247C	Casing only, brake ... ..	1	
	H.751	Sleeve, casing rubber ... ..	1	
	D.103	Ferrule, brake casing ... ..	2	LV6/MT1/21503
	D.81	Nipple, brake wire (handlebar) end ... ..	1	
	H.446B	Tube, brake wire ... ..	1	
	W.593	Fork end, brake wire ... ..	1	
	H.447	Cable end, brake ... ..	1	
	W.328A	Adjuster, cable ... ..	1	
	W.329	Thumb, nut, cable adjuster ... ..	1	
<b>THROTTLE CABLE</b>				
	D.248	CABLE ASSEMBLY, THROTTLE ... ..	1	
	D.248C	Casing only, throttle ... ..	1	
	D.248W	Wire only, throttle ... ..	1	
	D.101	Ferrule, throttle casing ... ..	2	
	D.83	Nipple, throttle wire (handlebar end) ... ..	1	
	NS.191	Nipple, throttle wire (carburettor end) ... ..	1	
	D.249	Adjuster, throttle cable ... ..	1	
	D.250	Locknut, throttle cable adjuster ... ..	1	
	H.670	Tube, cable guide ... ..	1	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
		<b>EXHAUST VALVE LIFTER CABLE</b>		
	D.252	CABLE ASSY., EXHAUST VALVE LIFTER	1	
	D.252C	Casing only, exhaust valve lifter ...	1	
	D.252W	Wire only, exhaust valve lifter ...	1	
	D.101	Ferrule, cable casing ...	2	
	QS250	Nipple, cable wire (gearbox end) ...	1	
	D.83	Nipple, cable wire (handlebar end) ...	1	
	D.249	Adjuster, cable ...	1	
	D.250	Locknut, cable adjuster ...	1	
	D.253	Spring, cable ...	1	
	E.2934	Abutment, cable to cylinder block ...	1	
	E.2935	Locknut, cable to cylinder block abutment ...	1	
		<b>FOOTREST GROUP</b>		
		<b>FOOTREST</b>		
6-72	F.1731	Footrest, R/H ...	1	
6-71	F.987	Footrest, L/H ...	1	
6-69	NF.704	Rubber, footrest ...	2	
6-77	F.1736	Tube, footrest support, R/H ...	1	
6-75	F.1092	Rod, footrest ...	1	
6-70	DS.48	Nut, footrest rod ...	2	
6-73	S25-8	Washer, footrest rod, R/H (plain) ...	1	
6-76	F.1081	Tube, distance, engine plate ...	1	
6-74	T.200	Tube, distance, footrest ...	1	
		<b>PILLION FOOTREST</b>		
	F.2312	FOOTREST ASSEMBLY, PILLION ...	2	
	F.1694	Pedal, footrest ...	2	
	F.1695	Rubber, footrest pedal ...	2	
	F.2271	Bolt, footrest pedal pivot ...	2	
	S1-51	Nut, footrest pedal pivot bolt ...	2	
	F.2277	Washer, footrest pedal pivot bolt ...	2	
	F.2268	Hanger, footrest pedal ...	2	
	F.1696	Stud, footrest pedal hanger ...	2	
	PO.172A	Nut, footrest pedal hanger stud ...	2	
	S26-1	Washer, footrest pedal hanger stud ...	2	
		<b>PILLION SEAT GROUP</b>		
		<b>PILLION SEAT</b>		
	NF.761	Pillion seat, complete ...	1	
	S23-42	Bolt, pillion seat fixing ...	4	
	S4-9	Nut, pillion seat bolt ...	4	
	S25-1	Washer, pillion seat bolt ...	4	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>REAR BRAKE CONTROL GROUP</b>				
<b>REAR BRAKE CONTROL</b>				
6-50	F.3313	Pedal, rear brake ... ..	1	
6-60	F.1149	Stop-screw, rear brake pedal ... ..	1	
6-61	F.879	Locknut, rear brake pedal stop-screw ... ..	1	
6-53	F.867	Spindle, rear brake pedal ... ..	1	
	DS48	Nut, spindle to frame ... ..	1	
	SCZ45	Washer, spindle to frame nut ... ..	1	
6-26	S1-52	Nut, spindle to pedal ... ..	1	
6-52	S26-16	Washer, spindle to pedal (spring) ... ..	1	
6-51	S.25-2	Washer, spindle to pedal (plain) ... ..	1	
6-54	F.1015	Rod, brake operating ... ..	1	
6-55	WF32	Pivot pin, rod to pedal ... ..	1	
6-57		Split pin $\frac{1}{16}$ " dia. $\times \frac{1}{2}$ " ... ..	1	
	W.11	Pivot pin, rod to cam lever ... ..	1	
6-55	F.2896	Nut, rear brake rod, adjusting ... ..	1	
<b>SADDLE GROUP</b>				
<b>SADDLE</b>				
	F.3119	SADDLE C/W FITTINGS ... ..	1	LV6/MT1/BS/A451/100
	F.3234	Cover, saddle ... ..	1	LV6/MT1/BS/3901/00
	F.3236	Spring, saddle main ... ..	2	LV6/MT1/BS/C4132
	F.3238	Bolt and nut, saddle nose ... ..	1	
	F.3239	Spring, saddle nose ... ..	4	LV6/MT1/BS/C3568
	F.3240	Spring, saddle nose ... ..	3	LV6/MT1/BS/C3568
	F.3241	Spring, saddle top ... ..	2	LV6/MT1/BS/C3567
	F.3242	Spring, saddle top ... ..	2	LV6/MT1/BS/C3567
	F.3243	Spring, saddle top ... ..	2	LV6/MT1/BS/C3566
	F.3244	Spring, saddle top ... ..	9	LV6/MT1/BS/C3566
	F.3237	{ Bolt, spring fixing saddle ... ..	2	LV6/MT1/BS/C3284/12
		{ Washer, domed, saddle spring ... ..	2	LV6/MT1/BS/C4030
	F.2720	Stud, saddle spring to lug ... ..	2	
	W.76	Nut, saddle spring stud ... ..	6	
	W.630	Nut, saddle spring stud (beneath spring) ... ..	2	
	S.25-2	Washer, saddle spring stud ... ..	6	
<b>AIR FILTER GROUP</b>				
<b>AIR FILTER</b>				
	F.3115	AIR FILTER, ASSEMBLY ... ..	1	
	F.3223	Element, c/w filter cover ... ..	1	
	F.3114	Connection, filter to carburetter ... ..	1	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>TOOL KIT GROUP</b>				
<b>TOOL KIT</b>				
	KA.50	Spanner, open-ended .338" x .375" ... ..	1	
	NA.55	Spanner, open-ended .525" x .600" ... ..	1	
	DA.16	Spanner, open-ended .712" x .820" ... ..	1	
	DA.72	Spanner, open-ended .920" x 1.010" ... ..	1	VAOS/FI/FA/17234
	NA.66	Spanner, closed .448" x .600" ... ..	1	VAOS/FI/FA/17235
	PA.57	Spanner, closed .919" x 1.011" ... ..	1	
	PA.56	Spanner, combination ... ..	1	
	PA.60	Spanner, box .390" x .525" ... ..	1	
	DA.87	Spanner, sparking plug ... ..	1	
	D.258	Tommy-bar-cum-tyre lever ... ..	1	
	D.202	Spanner, tappet adjustment ... ..	1	LV7/RE/2116
	PA.55	Screwdriver ... ..	1	
	D.336	Screwdriver, Phillips No. 3 ... ..	1	
	DA.163	Pliers ... ..	1	VAOS/FI/FA/16801
	NA.14A	Lever, tyre ... ..	1	
	NA.12	Grease gun ... ..	1	VAOS/FI/FA/15875
	D.49	Tyre-inflator ... ..	1	LV6/MT2/18571
			1	LV6/MT1/TT/Type 7.MC.
			1	VAOS/FI/FA/16810
<b>TOOL BOX GROUP</b>				
<b>TOOL BOX</b>				
	F.1692A	TOOL BOX WITH FASTENER ... ..		
	F.3224/7	Fastener assembly ... ..		
	F.1700	Clip, tool box to frame ... ..	1	
	F.1335	Distance washer, lower clip ... ..	1	
	DS57	Bolt, tool box clip ... ..	2	
	F.879	Nut, tool box clip bolt ... ..	1	
			2	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>SOLEX CARBURETTER GROUP</b>				
<b>SOLEX CARBURETTER</b>				
	26WH-2/ S1552	CARBURETTER ... ..	1	LV6/MT12/SX/26WH-2/ S1552
	10515/S1552	Body c/w fittings ... ..	1	LV6/MT12/SX/10515/S1552
	9758	Spindle, throttle ... ..	1	LV6/MT12/SX/9758
	52077	Butterfly, throttle ... ..	1	LV6/MT12/SX/52077
	1129	Screw, butterfly fixing ... ..	2	LV6/MT12/SX/1129
	9859	Ring, neoprene ... ..	2	LV6/MT12/SX/9859
	10771	Plate, throttle abutment ... ..	1	LV6/MT12/SX/10771
	4023	Screw, throttle slow running adjustment ...	1	LV6/MT12/SX/4023
	4384	Spring, throttle slow running adjustment ...	1	LV6/MT12/SX/4384
	10700	Lever, throttle slow running adjustment ...	1	LV6/MT12/SX/10700
	4031	Washer, throttle spindle distance ... ..	2	LV6/MT12/SX/4031
	4024	Nut, throttle spindle end ... ..	2	LV6/MT12/SX/4024
	10517	Screw, volume control ... ..	1	LV6/MT12/SX/10517
	4384	Spring, volume control ... ..	1	LV6/MT12/SX/4384
	10465	Tube, emulsion ... ..	1	LV6/MT12/SX/10465
	51612/190	Bleed, main jet correction ... ..	1	LV6/MT12/SX/51612/190
	50552/7/110	Jet, main ... ..	1	LV6/MT12/SX/50552/7/110
	50797/4/45	Jet, auxiliary ... ..	1	LV6/MT12/SX/50797/4/45
	50676/2/65	Jet, G.S. petrol ... ..	1	LV6/MT12/SX/50676/2/65
	9193	Washer, petrol jet ... ..	1	LV6/MT12/SX/9193
	9734/22	Tube, choke ... ..	1	Not serviced
	50236	Screw, choke tube fixing ... ..	1	LV6/MT12/SX/50236
	971	Washer, choke tube fixing ... ..	1	LV6/MT5/49947
	12187	Spring, throttle return ... ..	1	LV6/MT12/SX/12187
	12188	Lever, throttle return ... ..	1	LV6/MT12/SX/12188
	9891	Plate, starter valve ... ..	1	LV6/MT12/SX/9891
	50906/3	Jet, air ... ..	1	LV6/MT12/SX/50906/3
	9861	Body, starter only ... ..	1	LV6/MT12/SX/9861
	10520	Valve, starter complete ... ..	1	LV6/MT12/SX/10520
	10466	Cover, starter complete ... ..	1	LV6/MT12/SX/10466
	51728	Ball, starter valve locating ... ..	1	LV6/MT12/SX/51728
	51762	Spring, starter valve locating ... ..	1	LV6/MT12/SX/51762
	53364	Ring, neoprene ... ..	1	LV6/MT12/SX/53364
	8493	Washer, starter spindle ... ..	1	LV6/MT12/SX/8493
	10953	Lever, starter complete ... ..	1	LV6/MT12/SX/10953
	4031/1	Washer, starter spindle ... ..	1	LV6/MT12/SX/4031/1
	4024	Nut, starter spindle end ... ..	1	LV6/MT12/SX/4024
	51421/4	Screw, starter cover fixing ... ..	4	LV6/MT12/SX/51421/4
	51421/6	Screw, starter body fixing ... ..	2	LV6/MT12/SX/51421/6
	9727	Float ... ..	1	LV6/MT12/SX/9724
	9722	Spindle, float ... ..	2	LV6/MT12/SX/9722
	51287	Washer, float spindle ... ..	2	LV6/MT12/SX/51287
	10525	Cover, float chamber complete ... ..	1	LV6/MT12/SX/10525
	51305/17	Valve, needle, complete ... ..	1	LV6/MT12/SX/51035/17
	2261	Washer, needle valve ... ..	1	LV6/MT1/19582
	9574	Washer, banjo union (small) ... ..	2	LV6/MT12/SX/9574
	4122	Bolt, banjo union ... ..	2	LV6/MT12/SX/4122
	9573	Washer, banjo union (large) ... ..	2	LV6/MT12/SX/9573
	4123	Gauze, banjo union filter ... ..	2	LV6/MT12/SX/4123
	7018	Screw, float chamber cover ... ..	3	LV6/MT12/SX/7018
	901	Washer, float chamber cover ... ..	3	LV6/MT5/9664
	10701	Washer, flange ... ..	1	LV6/MT12/SX/10701
<b>CARBURETTER FITTINGS (TRIUMPH)</b>				
	E.2942	Block, carburetter to cylinder insulating ...	1	
	NA.48	Washer, carb. to cylinder insulating joint ...	2	

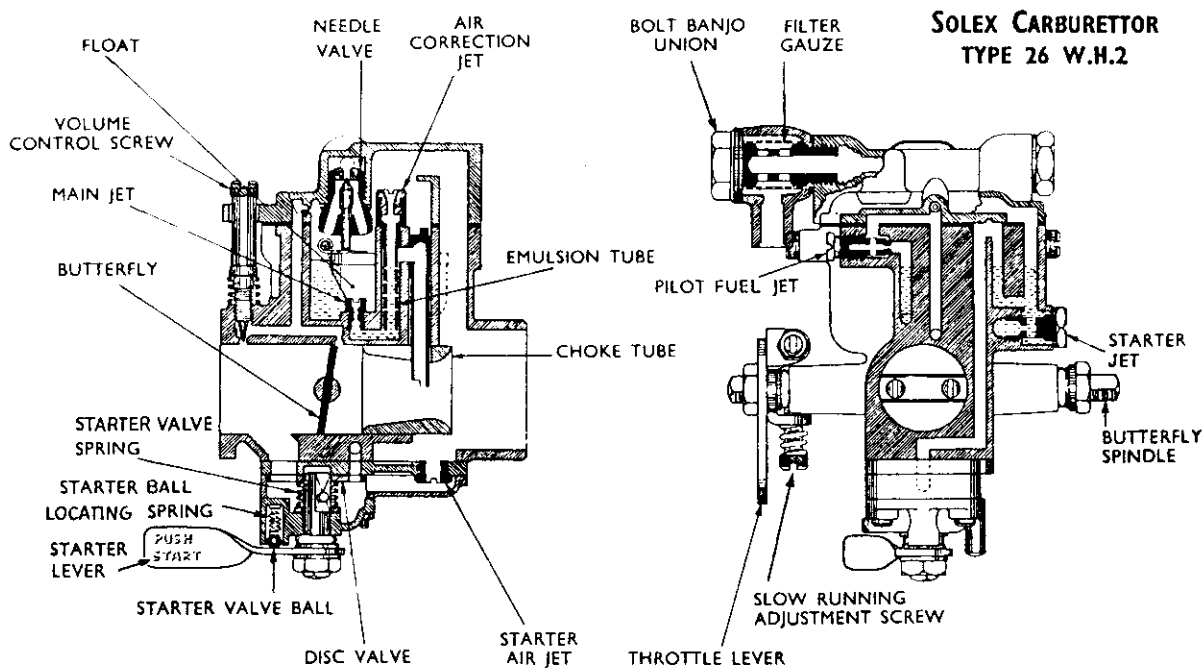


Fig. 12. SOLEX CARBURETTOR.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>Carburettor Fittings (Triumph)—continued</b>				
	E.2952	Abutment plate, carburettor body ... ..	1	
	DS.57	Bolt, abutment plate to carburettor ... ..	1	
	E.1612	Washer, abutment plate to carburettor ... ..	1	
	E.2953	Pivot, carburettor lever cable ... ..	1	
	E.2338	Backing washer, cable pivot ... ..	1	
	S1-51	Nut, carburettor to cylinder stud ... ..	2	
	S25-3	Washer, carburettor to cylinder stud ... ..	2	
	E.3526	Drip-shield, carburettor ... ..	1	
	GS.299	Washer ... ..	1	
	T.1076	Bolt, drip shield to carburettor ... ..	1	
<b>SPARKING PLUG GROUP</b>				
<b>SPARKING PLUG</b>				
	L11S	Plug, sparking (Champion) ... ..	2	LV6/MT4/29943
	D.262	Cover, sparking plug (M6-TA45) ... ..	2	LV6/MT8/LO/M.90
	D.170	Suppressor, Ignition Leads (MT4/21387) ... ..	2	LV6/MT4/21387

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>ELECTRICAL EQUIPMENT GROUP</b>				
<b>HEADLAMP (Type MCF.700)</b>				
	50943B	HEADLAMP ASSEMBLY ... ..	1	LV6/MT3/LU/51312A
13-1	553248	Rim, front ... ..	1	LV6/MT3/LU/553248
13-5	534296	Screw and plate, front rim fixing ... ..	1	LV6/MT3/LU/534296
13-2	553925	Glass and reflector unit ... ..	1	LV6/MT3/LU/554430
13-6	553267	Ring, lamp fixing ... ..	1	LV6/MT3/LU/553267
13-4	859598	Adaptor, bulb ... ..	1	LV6/MT3/LU/859598
13-7	504665	Fixing wire, light unit ... ..	6	LV6/MT3/LU/504665
13-3	312	Bulb, pre-focused 30/24 ... ..	1	LV6/MT3/X954422
<b>PILOT LAMP (Type 517)</b>				
	52184	PILOT LAMP ASSEMBLY ... ..	1	LV6/MT3/LU/52184D
13-8	516556	Rim, lamp ... ..	1	LV6/MT3/LU/516556
13-9	516395	Bead, lamp rubber ... ..	1	LV6/MT3/LU/516395
13-10	516386	Lens, lamp glass ... ..	1	LV6/MT3/LU/516386
13-12	553780	Adaptor, lamp ... ..	1	LV6/MT3/LU/553780
13-14	516553	Gasket, lamp to nacelle ... ..	1	LV6/MT3/LU/516553
13-13	136231	Screw, rim to lamp body ... ..	2	Not serviced
13-16	166014	Nut, lamp body to nacelle ... ..	2	Not serviced
13-15	185037	Washer, lamp body to nacelle ... ..	2	Not serviced
13-11	988	Bulb, pilot ... ..	1	LV6/MT3/X951242

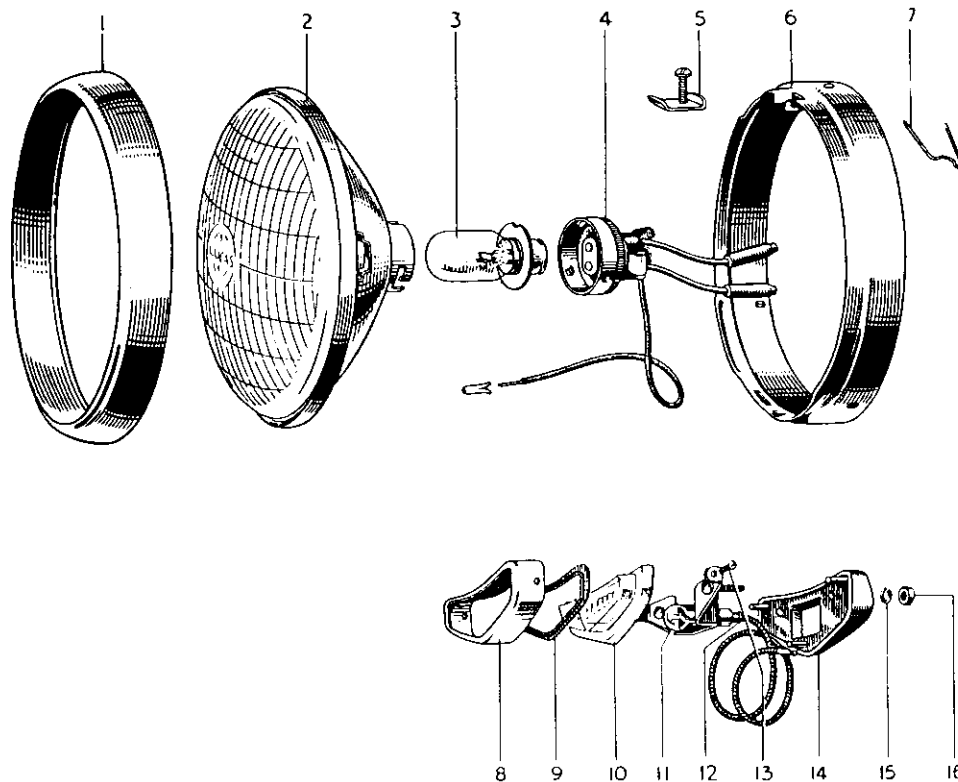


Fig. 13. HEAD AND PILOT LAMPS.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
		<b>TAIL LAMP (Type 525)</b>		
	53269B	LAMP, STOP/TAIL ... ..	1	LV6/MT3/LU/53269B
	573819	Lens, Stop/Tail lamp ... ..	1	LV6/MT3/LU/573819
	573814	Gasket, rubber ... ..	1	LV6/MT3/LU/573814
	572072	Screw, lens fixing ... ..	2	LV6/MT3/LU/572072
	573825	Grommet, rubber ... ..	1	LV6/MT3/LU/573825
	860428	Interior, bulb holder ... ..	1	LV6/MT3/LU/860428
	384	Lamp, filament SBC 6 Volt 18/6 Watt ...	1	LV6/MT3/X953207
		<b>HORN (H.F.1441)</b>		
	70048F	HORN, WITH BRACKET ... ..	1	LV6/MT3/LU/70048F
	701851	Bracket, horn ... ..	4	LV6/MT3/LU/700777
	700920	Bracket, horn (Angle) ... ..	1	LV6/MT3/4562
	142689	Screw, horn bracket fixing ... ..	2	LV6/MT5/FB/104/5D
	185051	Washer, horn bracket fixing ... ..	2	LV6/MT5/49947
	DS.57	Bolt, horn fixing ... ..	2	
11-21	76200A	Push, horn button ... ..	1	LV6/MT4/LU/76200A

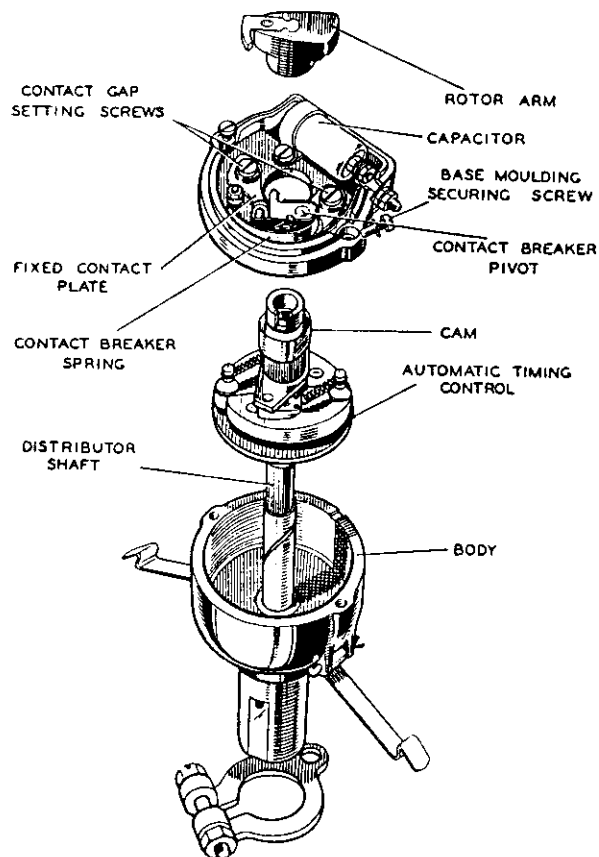


Fig. 14. DISTRIBUTOR, TYPE DKX2A.

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
		<b>SWITCHES</b>		
	31443	SWITCH, LIGHTING & IGNITION (P.R.S.8)	1	LV6/MT4/LU/31460A
	318341	Key, ignition ... ..	1	
	318346	Knob, complete with fixing pin ... ..	1	
11-22	31405A	Switch, dipper ... ..	1	LV6/MT4/LU/31405A
11-23	H.689	Screw, dipper switch to brake lever ... ..	2	
	31437B	Switch, brake stop light ... ..	1	LV6/MT4/LU/31437B
	315738	Spring, stop light switch operating ... ..	1	LV6/MT4/LU/315738
	T.988	Clip, spring to brake rod ... ..	1	
	H.687	Screw, clip fixing ... ..	1	
	GS.299	Washer ... ..	1	
	H.745	Nut, fixing screw ... ..	1	
	F.3666	Bracket, stop light switch (secured by L.H. pillion footrest hanger) ... ..	1	
	H.687	Screw, switch to bracket fixing ... ..	1	
	GS.299	Washer ... ..	1	
	H.745	Nut, fixing screw ... ..	1	
		<b>AMMETER</b>		
	36189A	Ammeter ... ..	1	LV6/MT4/LU/36189A
		<b>DISTRIBUTOR</b>		
	40458	DISTRIBUTOR DKX2A ... ..	1	LV6/MT8/LU/40458
	406105	Timing lever ... ..	1	LV6/MT8/LU/406105
	401119	Clamp screw and nut ... ..	1	LV6/MT8/LU/401082
	146460	Thrust washer (drive) ... ..	1	LV6/MT8/LU/146460
	400136	Distributor cap ... ..	1	LV6/MT8/LU/400136
	410600	H.T. nut ... ..	3	LV6/MT8/LU/410600
	404435	Brush and spring ... ..	1	LV6/MT8/LU/404435
	400051	Distributor rotor ... ..	1	LV6/MT8/LU/400051
	400308	Distributor condenser ... ..	1	LV6/MT8/LU/400308
	400034	Connector ... ..	1	LV6/MT8/LU/400034
	400415	Contact set ... ..	1	LV6/MT8/LU/400415
	123022	Terminal dist. ... ..	1	LV6/MT8/LU/123022
	400001	Contact breaker base ... ..	1	LV6/MT8/LU/400001
	422381	Cam ... ..	1	LV6/MT8/LU/422381
	421538/S	Auto-Advance spring set ... ..	1	LV6/MT8/LU/421538/S
	415729	Auto-Advance weights ... ..	2	LV6/MT8/LU/415729
	422380	Shaft and action plate ... ..	1	LV6/MT8/LU/422380
	407131	Toggle, Auto-Advance ... ..	1	LV6/MT8/LU/407131
	420406	Bush bearing ... ..	1	LV6/MT8/LU/420406
	420261	Cover clip ... ..	2	LV6/MT8/LU/420261
	400843	Sundry parts kit ... ..	1	LV6/MT8/LU/400843
		<b>DISTRIBUTOR FITTINGS (TRIUMPH)</b>		
	E.3122	Adaptor, crankcase for distributor ... ..	1	
	S1-51	Nut, adaptor to studs ... ..	3	
	PCE.102F	Bolt, distributor lever anchorage ... ..	1	
	E.1612	Washer, lever anchorage bolt ... ..	1	
	E.3587	Wheel, distributor gear ... ..	1	
	E.3125	Pin, wheel to shaft ... ..	1	
	E.3126	Circlip, pin securing ... ..	1	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>IGNITION COIL</b>				
45016		Ignition coil Q6. ... ..	1	LV6/MT8/LU/45016
414965		Rubber cover, H.T. lead ... ..	1	
236741		Rubber cover, L.T. lead ... ..	2	
F.3368		Clip, coil to frame tube ... ..	1	
F.929		Bolt, clip to tube ... ..	1	
S26-3		Washer, spring ... ..	1	
S1-51		Nut, clip bolt ... ..	1	
S.57		Bolt, coil to clip ... ..	2	
E.1612		Washer, shakeproof ... ..	2	
F.879		Nut, coil bolt ... ..	2	
<b>RECTIFIER</b>				
47111		Rectifier FSW1501 ... ..	1	LV6/MT8/LU/47111
F.3600		Nut, rectifier to bracket ... ..	1	
F.3848		Bracket, rectifier ... ..	1	
S57		Bolt, bracket to frame ... ..	2	
E.1612		Washer, shakeproof ... ..	2	
F.879		Nut, bracket bolt ... ..	2	
<b>ALTERNATOR</b>				
047512		ALTERNATOR RM14/RO ... ..	1	LV6/MT8/LU/047512
465969		Alternator rotor ... ..	1	
465998		Wound stator ... ..	1	
465672		Tab washer, rotor securing nut ... ..	1	
465981		Rotor securing nut ... ..	1	
E.3498		Distance piece, fixing screw ... ..	5	
S25-13		Washer, fixing screws ... ..	3	
E.1612		Washer, shakeproof ... ..	5	
E.3441		Screw, alternator fixing ... ..	5	
<b>WIRING HARNESS</b>				
838591		HARNESS, C/W TWO BELL-MOUTH CLIPS	1	
187049		Clip, at handlebar bolt ... ..	1	
187045		Clip, at tail lamp stud ... ..	1	
D.343-7		Rubber clip (at head lug, top tube and seat lug)	3	
D.343-3		Rubber clip (at chain stays) ... ..	2	
D.343-5		Rubber clip (at rear mudguard stays)... ..	2	

Plate Ref.	Makers' Part No.	DESCRIPTION	No. Off	Misc. or M.T. Part Number
<b>BATTERY &amp; CARRIER GROUP</b>				
<b>BATTERY AND CARRIER</b>				
	D.263	Battery (Varley, MC7/12) ... ..	1	LV6/MT4/6140-101516
	F.2876	CARRIER ASSEMBLY, BATTERY ... ..	1	
	F.2877/8	Base and back assembly, carrier ... ..	1	
	E.534	Swivel, carrier strap (plain hole) ... ..	1	
	E.535	Swivel, carrier strap (tapped hole) ... ..	1	
	E.536	Bolt, carrier strap swivel ... ..	1	
	F.1667	Strap, carrier top ... ..	1	
	F.1668	Strap, carrier front ... ..	1	
	F.1727	Pin, carrier strap hinge ... ..	2	
	F.1682	Stud, carrier to seat tube boss ... ..	1	
	S1-51	Nut, carrier to seat tube boss ... ..	1	
	F.1715	Bolt, carrier to primary cover ... ..	2	
<b>SPEEDOMETER GROUP</b>				
<b>SPEEDOMETER</b>				
	S467/91/L	SPEEDOMETER HEAD, 120 M.P.H. ... ..	1	LV6/MT1/SM/S467/91/L.
	P.52305	Bulb only ... ..	1	
	P.22469	Rubber ring, speedometer head ... ..	1	LV6/MT1/SM/P22469
	25578/2	Clamp-bar, speedometer head ... ..	1	Local manufacture
	N.1253	Nut, clamp-bar to head ... ..	2	LV6/MT1/SM/N/25
	D.273	CABLE, SPEEDOMETER DRIVE (45" LONG) (53395/23) ... ..	1	LV6/MT1/SM/53395/23/45
	D.273W	Wire, speedometer inner ... ..	1	LV6/MT1/SM/52108/1/45
3-90	T.973	Pinion (8T), speedometer G/B layshaft ... ..	1	
3-91	T.925	Peg, pinion to layshaft ... ..	1	
3-92	T.975	Gear (15T) speedometer driven ... ..	1	
3-93	T.825	Thrust washer, driven gear ... ..	1	
3-40	T.933	Bush, driven gear ... ..	1	
3-41	T.948	Washer, driven gear oil seal (rubber) ... ..	1	
	F.3098	Clip, speedometer cable at crankcase stud ... ..	1	







# INDEX OF MISCELLANEOUS AND M.T. PART NUMBERS

NOTE.—This index is compiled in numerical sequence of part numbers.

Section	Part No.	Page No.	Section	Part No.	Page No.	Section	Part No.	Page No.
LV6/MT1	TT/Type 7MC	32	LV7/BC	18/053	28	LV6/MT1	BS/3901/00	31
LV6/MT1	SM/N25	39	LV7/BC	18/087	29	LV6/MT8	LU/400001	37
LV6/MT8	LO/M90	34	LV7/BC	18/135	28	LV6/MT8	LU/400034	37
LV6/MT7	162	20	LV7/BC	18/136	29	LV6/MT8	LU/400051	37
LV6/MT7	163	9	LV7/BC	18/174	29	LV6/MT8	LU/400136	37
LV6/MT5	FB104/5D	36	LV7/BC	18/239	29	LV6/MT8	LU/400308	37
LV6/MT12	SX/1129	33	LV7/BC	18/528	28	LV6/MT8	LU/400415	37
LV6/MT11	1375	25	LV7/BC	18/535	29	LV6/MT8	LU/400843	37
LV7/RE	2116	32	LV6/MT2	18571	29	LV6/MT8	LU/401082	37
LV6/MT1	BS/C.3566	31	LV7/BC	18/598	28	LV6/MT8	LU/404435	37
LV6/MT1	BS/C.3567	31	LV7/BC	18/599	32	LV6/MT8	LU/406105	37
LV6/MT1	BS/C.3566	31	LV7/BC	18/665	28	LV6/MT8	LU/407131	37
LV6/MT12	SX/4023	33	LV6/MT1	19582	28	LV6/MT8	LU/410600	37
LV6/MT12	SX/4024	33	LV6/MT1	19637	29	LV6/MT8	LU/415729	37
LV6/MT1	BS/C.4030	31	LV6/MT1	19637	33	LV6/MT8	LU/420261	37
LV6/MT12	SX/4031	33	LV6/MT13	21246	13	LV6/MT8	LU/420406	37
LV6/MT12	SX/4122	33	LV6/MT13	21257	24	LV6/MT8	LU/421538/S	37
LV6/MT12	SX/4123	33	LV6/MT13	21259	24	LV6/MT8	LU/422380	37
LV6/MT1	BS/C.4132	31	LV6/MT13	21259	24	LV6/MT8	LU/422381	37
LV6/MT7	4363	11	LV6/MT13	21263	24	LV6/MT1	BS/A451/100	31
LV6/MT12	SX/4384	33	LV6/MT13	21272	24	LV6/MT8	LU/465672	38
LV6/MT3	4562	36	LV6/MT4	21387	34	LV6/MT8	LU/46969	38
LV6/MT7	5912	14	LV6/MT1	21503	29	LV6/MT8	LU/465981	38
LV6/MT7	6013	20	LV6/MT1	SM/P.22469	39	LV6/MT8	LU/465998	38
LV6/MT7	6023	11	LV6/MT4	24496	29	LV6/MT3	LU/504665	35
LV6/MT1	TT/NC.6057	7	LV6/MT14	26293	29	LV6/MT12	SX/50906/3	33
LV6/MT7	6083	16	LV6/MT11	28572	22	LV6/MT12	SX/514214	33
LV6/MT12	SX/7018	20	LV6/MT11	28961	25	LV6/MT12	SX/51421/6	33
LV6/MT12	SX/8493	33	LV6/MT4	29943	34	LV6/MT3	LU/516386	35
LV6/MT12	SX/9193	33	LV6/MT4	LU/31405A	37	LV6/MT3	LU/516395	35
LV6/MT12	SX/9573	33	LV6/MT4	LU/31437B	37	LV6/MT3	LU/516553	35
LV6/MT12	SX/9574	33	LV6/MT4	LU/31460A	37	LV6/MT3	LU/516556	35
LV6/MT5	9664	33	LV6/MT1	32787	37	LV6/MT3	LU/534296	35
LV6/MT12	SX/9722	33	LV6/MT4	LU/36189A	23	LV6/MT3	LU/553248	35
LV6/MT12	SX/9724	33	LV6/MT12	SX/4031/1	37	LV6/MT3	LU/553267	35
LV6/MT12	SX/9758	33	LV6/MT8	LU/40458	37	LV6/MT3	LU/553780	35
LV6/MT12	SX/9859	33	LV6/MT8	LU/45016	38	LV6/MT3	LU/554430	35
LV6/MT12	SX/9861	33	LV6/MT11	46440	25	LV6/MT3	LU/572072	36
LV6/MT12	SX/9891	33	LV6/MT11	46448	25	LV6/MT3	LU/573814	36
LV6/MT12	SX/10465	33	LV6/MT11	46452	25	LV6/MT3	LU/573819	36
LV6/MT12	SX/10466	33	LV6/MT1	SM/S.467/91/L	39	LV6/MT3	LU/573825	36
LV6/MT12	SX/10517	33	LV6/MT8	LU/47111	38	LV6/MT3	LU/700777	36
LV6/MT12	SX/10520	33	LV6/MT8	LU/047512	38	LV6/MT3	LU/859598	35
LV6/MT12	SX/10525	33	LV6/MT5	49947	38	LV6/MT3	LU/860428	36
LV6/MT12	SX/10700	33	LV6/MT12	SX/50236	33	LV6/MT3	X.951236	39
LV6/MT12	SX/10701	33	LV6/MT12	SX/51287	36	LV6/MT3	X.951242	35
LV6/MT12	SX/10771	33	LV6/MT3	LU/51312A	33	LV6/MT3	X.953207	36
LV6/MT12	SX/10953	33	LV6/MT12	SX/51728	35	LV6/MT3	X.954422	35
LV7/BC	12/029	29	LV6/MT12	SX/51762	33	LV6/MT12	SX/26WH-2/S.1552	33
LV7/BC	12/031	29	LV6/MT12	SX/52077	33	LV6/MT12	SX/51035/17	33
LV6/MT12	SX/12187	33	LV6/MT3	LU/52184D	33	LV6/MT1	PT/212116/N10	7
LV6/MT12	SX/12188	33	LV6/MT3	LU/53269B	35	LV6/MT1	PT/250118/N10	11
LV7/BC	12/408	29	LV6/MT3	LU/53269B	36	LV6/MT12	SX/50676/2/65	33
LV7/BC	12/509	29	LV6/MT3	SX/53364	33	LV6/MT12	SX/50797/4/45	33
VAOS/G1	XB.13080	25	LV7/BC	61/004	28	LV6/MT12	SX/51612/190	33
VAOS/F1	FA/15875	32	LV7/BC	70/016	28	LV6/MT1	SM/52108/1/45	39
VAOS/F1	FA/16801	32	LV6/MT3	LU/70048F	36	LV6/MT12	SX/10515/S1552	33
VAOS/F1	FA/16810	32	LV6/MT4	LU/76200A	36	LV6/MT7	TN/1163X/1120N1	22
LV6/MT11	17163	25	LV6/MT8	LU/123022	37	LV6/MT12	SX/50552/7/110	33
VAOS/F1	FA/17234	32	LV6/MT8	LU/146460	37	LV6/MT1	SM/53395/23/45	39
VAOS/F1	FA/17235	32	LV6/MT4	LU/315738	37	LV6/MT4	6140-101516	39
			LV6/MT1	BS/C.3284/12	31			

FOR EXPLANATION SEE PAGE 4.

**ALTERATION 1.**

Substitute the following group for Valve Chamber Cover Group on pages 5 and 7.

E.3625	VALVE CHAMBER COVER ASSEMBLY	...	...	...	...	1
E.3618	Breather valve	...	...	...	...	2
E.3626	Valve lifter spindle and external lever	...	...	...	...	1
E.2936	Washer, rubber, valve lifter spindle	...	...	...	...	1
E.3620	Internal lever, D.S.	...	...	...	...	1
E.3636	Internal lever, T.S.	...	...	...	...	1
T.401A	Bolt, internal levers to spindle	...	...	...	...	2
E.3622	Adaptor, to breather pipe	...	...	...	...	1
T.1150	Screw, adaptor to cover	...	...	...	...	2
E.3078	Extension pipe, flexible	...	...	...	...	1
E.2446	Washer, cover joint	...	...	...	...	1
WE.170	Washer, cover nut	...	...	...	...	2
E.2386	Domed nut, cover securing	...	...	...	...	2

**ALTERATION 2.**

Substitute the following in the Gearbox Group page 11.

T.1367	Bush, layshaft	...	...	1 off gearbox casing and 1 off gearbox inner cover replaces T.911
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**ALTERATION 3.**

Substitute the following in Rear Wheel Brake Group page 22.

W.1200	Plate, rear brake anchor	...	...	...	...	1 was W.762
W.1083	Cam, brake	...	...	...	...	1 was W.856
W.1203	Lever, brake cam	...	...	...	...	1 was W.74A

**ALTERATION 4.**

Clutch and Exhaust Lifter Control page 29 delete

18/665	Levers, control assembly and all components parts	...
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Substitute

18/546	LEVER, CLUTCH ASSEMBLY	...	...	...	...	1
18/528	Lever only	...	...	...	...	1
18/174	Bracket lever fulcrum	...	...	...	...	1
12/044	Clamp, lever bracket	...	...	...	...	1
11/014	Screw, clamp to bracket	...	...	...	...	2
18/087	Screw, lever fulcrum	...	...	...	...	1
18/053	Nut, lever fulcrum screw	...	...	...	...	1
18/282	LEVER, EXHAUST LIFTER ASSEMBLY	...	...	...	...	1
18/059	Lever only	...	...	...	...	1
18/281	Bracket, lever fulcrum	...	...	...	...	1
12/044	Clamp, lever bracket	...	...	...	...	1
18/300	Screw, clamp to bracket	...	...	...	...	2
11/014	Screw, lever fulcrum	...	...	...	...	1
18/060	Nut, lever fulcrum screw	...	...	...	...	1

And also Exhaust Valve Lifter Cable page 30, substitute

D.344	CABLE ASSEMBLY, VALVE LIFTER	...	...	...	1 similar to
D.252	except for				
QS.250	Nipple (Handlebar end)	...	...	...	1 replaces D.83