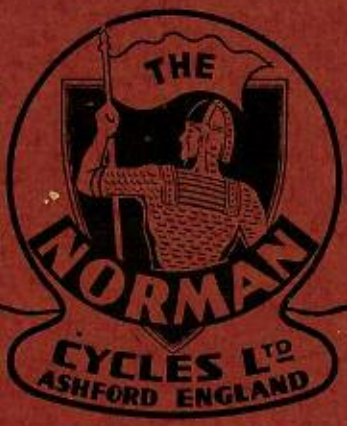


The NORMAN MODEL D

MAINTENANCE AND INSTRUCTION BOOK

NORMAN CYCLES LTD.
ASHFORD - KENT

COMPLETE SET OF INSTRUCTION BOOKLETS **PRICE 4/6**

MAINTENANCE

and

INSTRUCTION BOOK

NORMAN

MODEL "D"
(SERIES IF)

ULTRA LIGHTWEIGHT MOTOR CYCLE

NORMAN CYCLES LTD.
ASHFORD, KENT

INTRODUCTION

This booklet is intended to be of help to riders of the Norman Ultra-Lightweight Motor Cycle, we have as far as possible written in non-technical language, in order that it may be understood by those who are not familiar with motor cycles. For those who have some experience, a certain amount of technical details are given and are to be found mostly on the data charts of both the engine and the machine, and it is hoped these will be found of interest to this class of rider.

The Villiers 1F engine is of two-stroke cycle in operation and is equipped with unit construction two-speed gearbox with handlebar control, self-contained flywheel magneto and lighting generator.

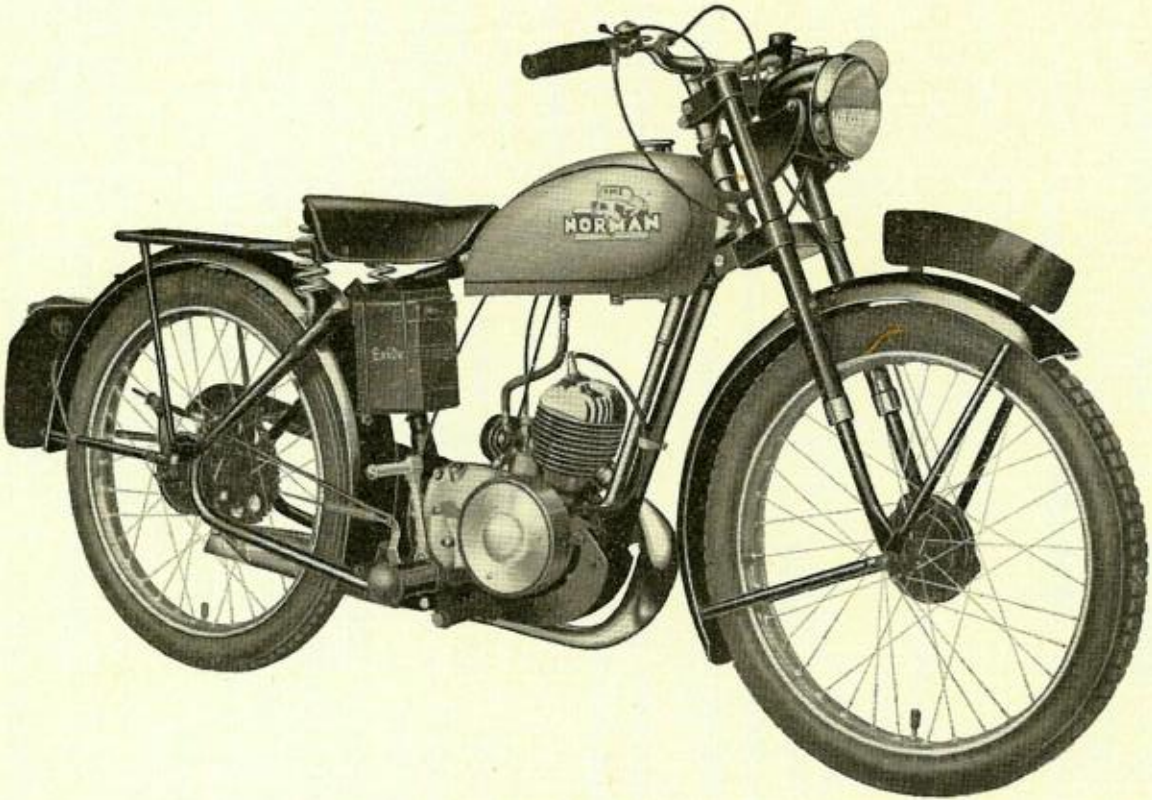
Full maintenance details together with a spare parts list for this engine and published by the manufacturers—Messrs. Villiers Engineering Co., Ltd., is enclosed with this booklet and we recommend you to this for authoritative information regarding the care and running of the Villiers Engine.

The Bicycle parts of the motor cycle are of Norman design and manufacture throughout. The frame is of unique design, jig built and accurately set, and the cycle parts and accessories which are not of our manufacture have been carefully selected for high quality and efficiency, which the whole, if given reasonable care and attention, will give the rider many, and we hope, happy miles of carefree riding.

Norman Cycles Ltd.,

Ashford,

Kent.



MODEL D. 98 c.c.

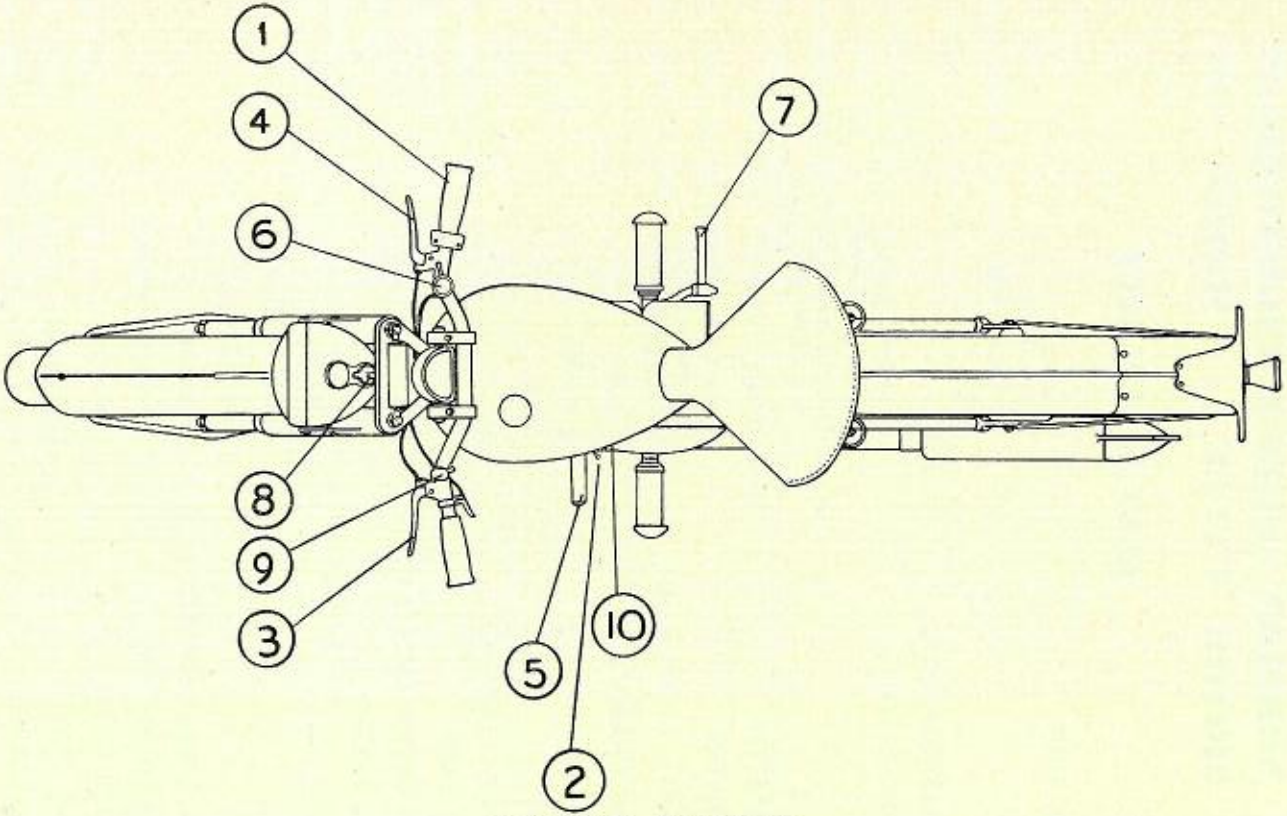
GENERAL ENGINE DATA

ENGINE UNIT	Model Mk. 1F.
BORE	47 mm.=1.8504 inches.
STROKE	57 mm.=2.244 inches.
CAPACITY	98 c.c.=6 cubic inches.
HORSE POWER, MAXIMUM ...	2.8 at 4,000 r.p.m.
ENGINE SPROCKET	17 teeth, $\frac{3}{8}$" pitch.
CLUTCH SPROCKET	42 teeth, $\frac{3}{8}$" pitch.
RATIO, ENGINE TO CLUTCH ...	2.47—1.
GEAR BOX RATIOS	1.54—1 and 1—1.
FINAL DRIVE SPROCKET ...	14 teeth, $\frac{1}{2}$" pitch for Coventry Chain No. 112045.
CHAIN LINE, FINAL DRIVE ...	$2\frac{1}{2}$".
FINAL GEAR RATIOS	Top 8.0—1, Bottom 12.125—1 with rear wheel sprocket having 46 teeth, Tyre size 24".
EXHAUST PIPE	$1\frac{1}{4}$" external diameter.
SPARKING PLUG	14 mm. Lodge H14, Point Gap .018" to .025".
CARBURETTER	Villiers "Junior" type 6/0.
CARBURETTER JET SIZE	No. 8 type 6/0.
CARBURETTER TAPER NEEDLE	No. $2\frac{1}{2}$ type 6/0.
IGNITION TIMING	$\frac{1}{8}$" before Top Dead Centre.
CONTACT BREAKER	Point Gap .015" Maximum.
LIGHTING SET	Head lamp. Main bulb—6 v. 12/12 W. S.B.C. Pilot bulb—6 v. 3 W. Miniature Bayonet Cap. Tail lamp bulb. Double Filament S.B.C.—6 v. 3 W./6 v. 18 W. stop light.
LUBRICATION, ENGINE	Petroil mixture in fuel tank (Oil S.A.E. 30).
LUBRICATION, GEARBOX AND CHAINCASE.	See page 11. (S.A.E. 140) filled to level plug. (See Fig. 1).

NORMAN ULTRA LIGHTWEIGHT MOTOR CYCLE - MODEL "D"

DATA CHART

ENGINE UNIT	Villiers 1F. Bore—47 mm. Stroke—57 mm. 98 c.c.
COMPRESSION RATIO	8—1.
LIGHTING SYSTEM...	Head lamp main bulb—6 v. 12/12 W. S.B.C. Pilot bulb—6 v. 3W. Tail lamp bulb double filament S.B.C. 6 v. 3 W. 6 v. 18W. stop light.
CARBURETTER	Villiers "Junior" Type 6/0.
GEAR RATIOS	46 teeth hub sprocket. First gear—12.125. Second gear—8.0.
DRIVING CHAIN	$\frac{1}{2} \times \frac{3}{16}$".
PRIMARY CHAIN	$\frac{3}{8} \times .155$.
WEIGHT	140 lb.
GROUND CLEARANCE	$4\frac{1}{2}$"
WHEEL BASE	48".
WIDTH OVER HANDLEBARS ...	$27\frac{1}{2}$".
SADDLE HEIGHT	28".
WHEELS	4" Hubs.
RIMS	Dunlop W.M.O.
TYRES	Dunlop 250 × 19.
PETROL TANK CAPACITY ...	$1\frac{3}{4}$ gallons.
FUEL CONSUMPTION	120 m.p.g. (average).
MAXIMUM SPEED	38-40 m.p.h.
CRUSING SPEED	25-30 m.p.h.
TYRE PRESSURES	16 lbs. front, 20 lbs. rear.



CONTROL DIAGRAM.

CONTROLS

Reference to the scale diagram on the opposite page will familiarise the rider with the various controls of his machine with which he should fully acquaint himself before taking the machine on the road.

The controls on the drawing are numerated and we will give below in the numerical order, which and for what purpose each control is used.

1.—Is the TWIST GRIP control, this controls the throttle and varies the speed of the engine. To open the throttle, that is to say, speed up the engine, the control is twisted inwards.

2.—Is the CHOKE control, this is operated by lifting the slide by means of the tab provided (which is situated on the near side of the carburetter air intake cleaner), when the tab is depressed downwards the choke is closed and gives the engine a very rich mixture to ensure easy starting from cold, after the engine is started and gradually warms up, the slide should be opened by sliding the tab upwards, it should only be used when starting from cold.

3.—Is the CLUTCH LEVER, its purpose is to disengage the clutch whose purpose in turn is to disengage the drive between the engine and the back wheel. It is used for gear changing and starting the machine away from rest.

4.—Is the FRONT BRAKE LEVER, this is used to operate the front brake, an examination will soon disclose its full purpose.

5.—Is the REAR BRAKE, it is arranged for operation by the left foot, which when depressed operates the brake on the rear wheel.

6.—Is the GEAR CHANGE LEVER, this operates the gears through the Bowden cable. When in its mid-way position (this is marked N) the machine is in neutral or free gear. First gear is engaged by turning the lever outwards and top gear by turning the lever inwards to its fullest extent. There is no positive stop, so a little practice is necessary to find Neutral.

7.—Is the KICK START PEDAL, this is on the right-hand side of the machine just behind the foot rest. Its purpose as the name implies is for kick starting the engine.

8.—Is the LIGHTING SWITCH, this operates both head and tail lamps, by turning indicator to position (H) that is to say towards the left. By turning to position (L) will operate the parking light only.

THE DIPPER SWITCH shown as No. 9 is situated on the left-hand side of the handlebars, near the clutch lever and its purpose is to dip the head lamp beam.

10.—This is the FUEL COCK and is fitted to the underside of the petrol tank for turning the fuel on and off. It is marked PUSH ON or PULL OFF. It is always advisable to turn off the fuel when stopping the engine.

RIDING

You will by this time be very eager to try your new machine out on the road.

To start the engine, first see that the gear lever is in Neutral position, close the choke on the carburetter and turn the petrol cock ON, depress tickler on the carburetter until petrol appears, your engine is now ready for starting.

Open the throttle about a quarter, give the kick starter a good sharp kick, when the engine should fire.

Allow the engine to run slowly for a few minutes and then gradually open the choke, as it warms up. Now sit astride the machine and withdraw the clutch lever to its fullest extent, snick gear lever into low gear position that is, pushed away from you as far as it will go. Now let clutch lever in very gently, and at the same time progressively opening the throttle, when the machine will move smoothly away from rest. Now speed up the engine by opening the throttle, to between 10-15 miles an hour, momentarily close the throttle, withdraw the clutch fully, and snick gear lever from low to high position, this is towards you as far as it will go. The speed of the machine should now be controlled by the throttle. When driving in traffic and when encountering a steep hill, it will be necessary to change down, in order to assist the engine. This is carried out by withdrawing the clutch, snick the gear lever fom high to low position and letting the clutch in quickly. The whole operation of changing down should be carried out as quickly as possible or the engine is liable to race and gear change will be harsh and noisy.

You will notice on changing down we have made no mention to closing the throttle, a little consideration on the part of the rider will make it clear why this has not been mentioned.

The whole idea of changing down is to give the engine a lower gear to pull on and in consequence the engine will be running considerably faster for the same road speed than when in top gear. It is in order to avoid a jerk or sharp pulling up of the machine when changing to low gear that we do not close the throttle but have the engine running rather fast.

It now remains with the novice to practice and gain experience in driving, and to assist in making the road safe for all to travel on, we cannot do better than to recommend him to make a careful study of the Highway Code.

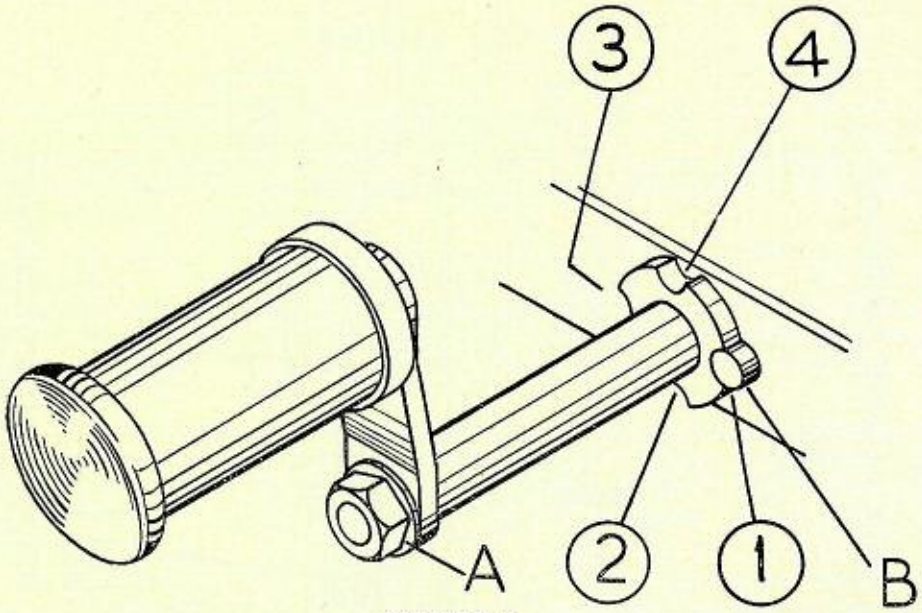


FIGURE 1.

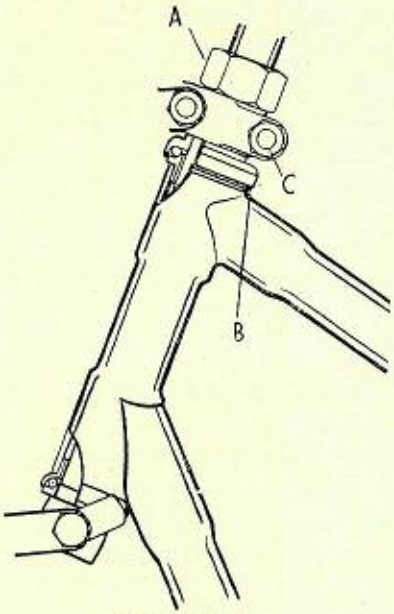


FIGURE 3.

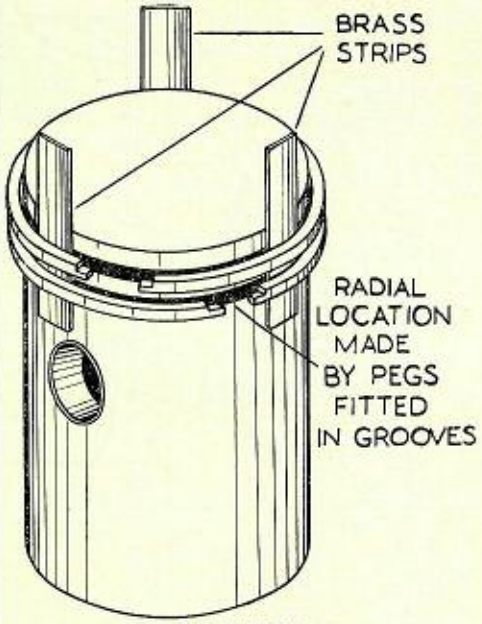
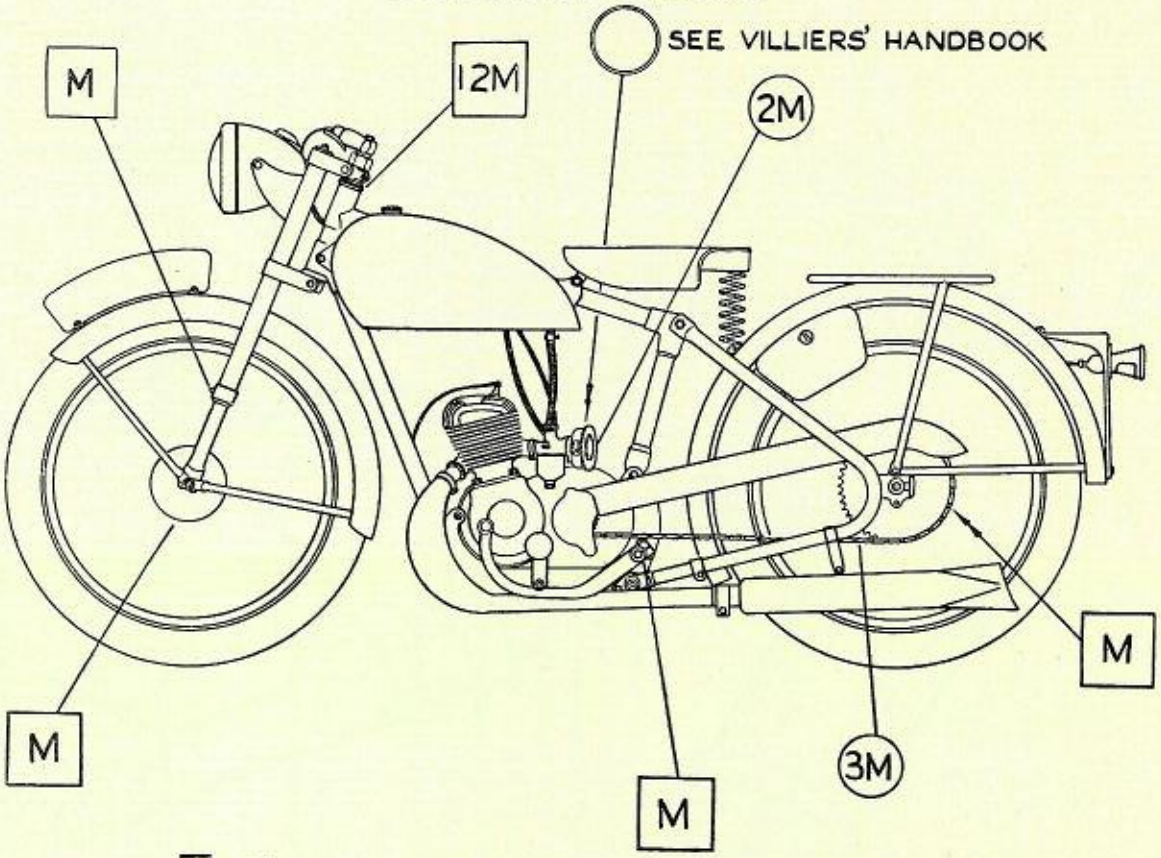


FIGURE 2.

LUBRICATION DIAGRAM.



KEY :-

□ - Grease O - Oil

W - Weeks M - Monthly

FOR RECOMMENDED LUBRICANTS SEE BACK COVER

LUBRICATION

1.—Lubrication of the ENGINE is by petrol-oil mixture, this mixture should be made in a separate container and thoroughly mixed before pouring into the petrol tank. The ratio of petrol to oil is 16 to 1, i.e., ½ pint of oil to one gallon of petrol, or if the filler cap measure is used 5½ measures of oil to one gallon of petrol. The capacity of the petrol tank is 1¾ gallons.

2.—Lubrication of the REAR CHAIN should be carried out at periodical intervals of 2,000 miles. It should be removed from the machine and thoroughly cleaned in a paraffin bath, drained and wiped dry. Immerse in a bath of warm oil for 15 minutes, wipe off surplus oil and replace on the machine, the oil will penetrate to all bearing surfaces of the chain and this is the only satisfactory way a roller chain can be lubricated.

3.—Lubrication of the HUBS. The hubs are packed with grease when assembled in the works and although fitted with grease gun nipples in the shell, grease should be applied sparingly and not more often than every 500 miles. Over oiling of the hubs must be guarded against or oil will penetrate into the brake drums and render the brakes inefficient.

4.—BRAKE CAM AND SPINDLE lubrication. A little oil applied with an oil squirt behind the operating lever on the hubs will work its way through to the bearing and the cam if the lever is operated to and fro.

5.—The BRAKE PEDAL SPINDLE is provided with a grease gun nipple for lubrication and this should have a charge of grease applied at least every two weeks.

6.—ALL BRAKE ROD JOINTS exposed ends of Bowden cables and operating pivots of the handlebar levers should have a spot of oil applied once every week. Not only will this lubricate the joints but it will also prevent rust.

7.—FRONT FORKS are provided with oil points, these should be lubricated once a month.

8.—The STEERING HEAD is packed with grease on assembly at works and will require no attention for at least 10,000 miles, in fact if these bearings are repacked annually, this will prove sufficient.

TRANSMISSION AND WHEELS

The transmission is by roller chain throughout.

1.—REAR OR SECONDARY CHAIN is adjusted by the orthodox method of cycle chain adjusters but before carrying out any adjustment, it is necessary to slacken both spindle nuts and also the brake anchor arm bolt. Care should be exercised to ensure that each adjuster is moved an equal amount, thereby keeping the wheel centrally placed between the chain stays. If this simple precaution is not observed alignment of the wheels will suffer.

2.—THE FRONT OR PRIMARY CHAIN is enclosed in an oil bath and is not provided with or requires any adjustment. If lubrication is attended to as described in the Villiers Handbook, this chain will give years of satisfactory service.

3.—WHEEL BEARINGS. The bearings on both front and rear hubs are of the cup and cone type. These are adjustable by first slackening the cone lock-nuts situated on the opposite side of the hub to the brake drum. After slackening the nut, the cone spanner is applied to the flats of the cone and desired adjustment obtained. These bearings should never be adjusted tightly, when locking-nut and both wheel nuts are tightened up there should be $\frac{1}{16}$" shake measured at rim.

4.—REMOVAL OF THE WHEELS. The rear wheel is removed by first taking off the chain by removal of the spring link, the two wheel spindle nuts slackened off and removing the brake anchor bolt. The rear mudguard has a hinged rear section and if the stays are uncoupled, the wheel is easily withdrawn from the fork ends.

5.—THE FRONT WHEEL is removable by placing a suitable block, or such-like under the engine plates to lift the front wheel well clear of the ground. Take off both spindle nuts, pull off the mudguard stays and uncouple the front brake cable, when the wheel will easily drop from the fork ends.

The replacement of either wheel is just the reverse procedure and no difficulty should be encountered.

ADJUSTMENTS

After the engine running-in period (500 miles) certain adjustments will be necessary to compensate for initial wear.

All cables, i.e., front brake, clutch and throttle cables should be checked for adjustment and adjusted by the cable adjusters provided.

1.—FRONT BRAKE CABLE should be adjusted to take up all back lash, but not so tightly that the brake rubs on the drum when the wheel is turned by hand.

2.—The THROTTLE CABLE should be adjusted just sufficiently to stop the engine when the throttle is closed.

3.—The CLUTCH CABLE should be adjusted to allow $\frac{1}{16}$" free movement of the lever. Never adjust this cable tightly or trouble will be encountered with a slipping clutch.

4.—The REAR BRAKE is adjusted by the hand-nut on the rear brake rod and its best possible adjustment is really a matter of taste of the individual rider.

5.—The FOOT RESTS are adjustable to four positions and this adjustment is carried out by first taking off the foot rest bar nuts and turning the foot rest to the desired position and replacing the nuts and tightening securely. (See Fig. 1.)

6.—FRONT FORK. The Ultra-Lightweight telescopic fork fitted to this machine is not provided with, neither does it require any adjustment. Providing it is periodically lubricated as mentioned under the heading LUBRICATION, no further attention will be called for.

7.—The STEERING HEAD is adjusted in the same manner as the ordinary bicycle, the head lock-nut (a) Fig. 3, is first slackened off and screwed race (b) is adjusted as required, the lock-nut is then again retightened. To facilitate adjustment of the head bearing, it is a good plan to first slacken off the head clip bolt (c).

THE ENGINE

For general particulars of adjustment to the engine, we recommend you to Villiers Official Handbook enclosed.

Unlike a four-stroke engine which requires decarbonising every 4-5,000 miles, your two-stroke engine will need decarbonising at least every 2,000 and this process if undertaken in a systematical manner is quite simple.

DECARBONISING

Firstly, remove the exhaust pipe, silencer, carburetter and sparking plug. Now undo the four bolts holding the cylinder head in place and lift off the head. Now unscrew the four cylinder base nuts, and withdraw the cylinder from the piston, taking care not to twist the cylinder when drawing it off, or the piston rings will catch in the ports and may be broken.

The Gudgeon pin is held in place by spring circlips and if one of these is taken out, the gudgeon pin can be pushed through from the opposite end.

The job is now to remove the carbon, and the best tool for this job is a blunt scraper, the piston crown, the cylinder head and exhaust ports and the ring of carbon at the top of the cylinder barrel should all be scraped clean.

Do not under any circumstances be tempted to use emery cloth or metal polish for obtaining clean, bright surfaces as it is impossible to remove all traces of these abrasives and ultimate damage to your engine will be bound to result.

On an engine which has seen long service, the piston rings may need renewing, but before fitting new piston rings (See Fig. 2) the carbon must be cleaned out of the piston ring grooves. After removing the carbon all the parts should be thoroughly cleaned, the piston replaced and gudgeon pin circlips re-inserted.

NOTE.—Should the gudgeon pin prove difficult to replace, do not attempt to drive this in with a hammer or similar implement, but immerse the piston for a few seconds in boiling water, this will expand the gudgeon pin hole sufficiently for easy insertion of the gudgeon pin. Before replacing the cylinder, smear this internally with engine oil, now offer up to the piston and guide the first ring in place, lower the cylinder and guide the second ring into the bore, the cylinder will now slide down easily on to the crank case.

Now replace the cylinder base nuts and securely tighten. Tighten these evenly and NOT one at a time or cylinder base may be fractured, now replace the cylinder head (no gasket or washer is fitted here) and tighten up the four bolts in the same manner as described for the cylinder base nuts.

The exhaust pipe and silencer should receive a thorough clean out, the silencer is detachable for easy cleaning. These can now be replaced on the machine, the carburetter and sparking plug refitted and the job is done.

NOTE

Finally, the tool kit is supplied with the machine for your help and it must be fully appreciated that a mechanically propelled vehicle is subjected to considerably more wearing strain than the ordinary bicycle, and it will not go for ever without some attention.

To avoid unnecessary and annoying delays on the road, we advise you to check over your machine once a week, all nuts, bolts, etc. These should be checked for tightness and a check should be made for the necessity of any adjustments mentioned in this booklet, it is just a case of a stitch in time, which may save you hours of unnecessary hold up on the road.

We can say, with all modesty, that we have designed and built you one of the finest machines of its class, and all we ask is that you give it this small necessary attention, when we know it will serve you well.

TOOL KIT

1 Set of Tubular Box Spanners and Tommy Bar.
1 Tyre Lever.
1 Magneto Spanner.
1 Sparking Plug Spanner.
1 Cone and Exhaust Union Nut Spanner.
2 Set Spanners.
1 Grease Gun.
1 Screwdriver.

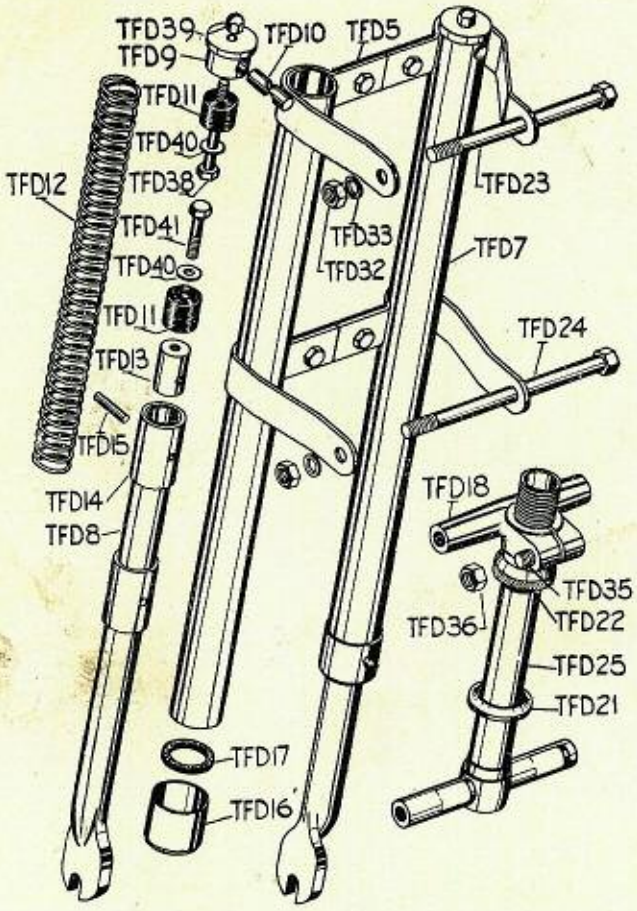


FIGURE 4. FORK.

KEY TO FORK.

TFD 5 — Fish plate top.
7 — Main tubes comp. assm.
8 — Fork end tube.
9 — Main tube cap.
10 — Main tube cap pin.
11 — Rubber spring adapter.
12 — Main spring.
13 — Fork end tube bush.
14 — Fork tube bearing bush.
15 — Locating pin.
16 — Dust excluder cap.
17 — Dust excluder washer.
18 — Top head lug.

TFD 21 — Crown race.
22 — Screwed race.
23 — Top link bolt.
24 — Bottom link bolt.
25 — Fork stem assm. complete.
32 — Link bolt nut.
33 — Link bolt washer.
35 — Head clip bolt.
36 — Head clip bolt nut.
38 — Spring adapter bolt top.
39 — Spring adapter bolt nut.
40 — Spring adapter bolt washer.
41 — Spring adapter bolt bottom.

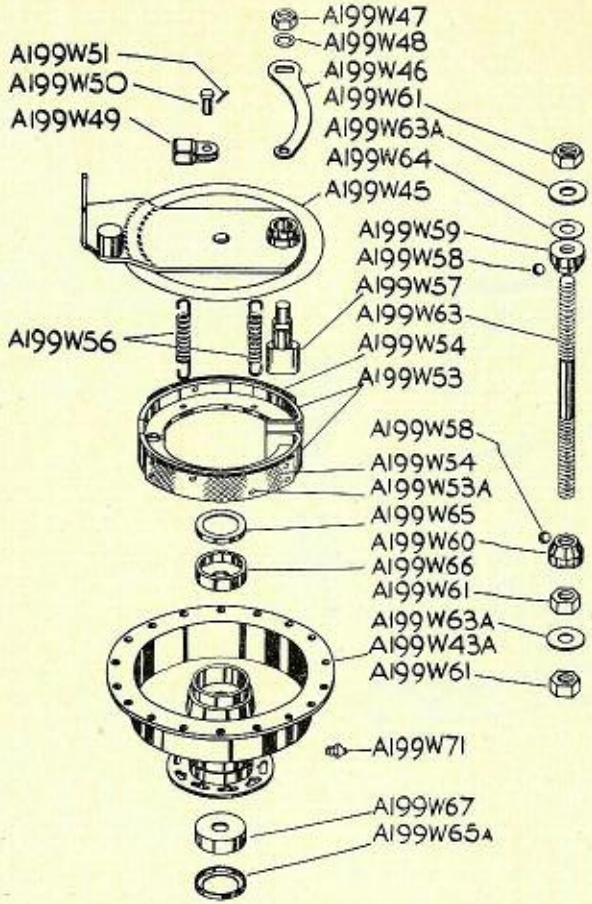


FIGURE 5. FRONT HUB.

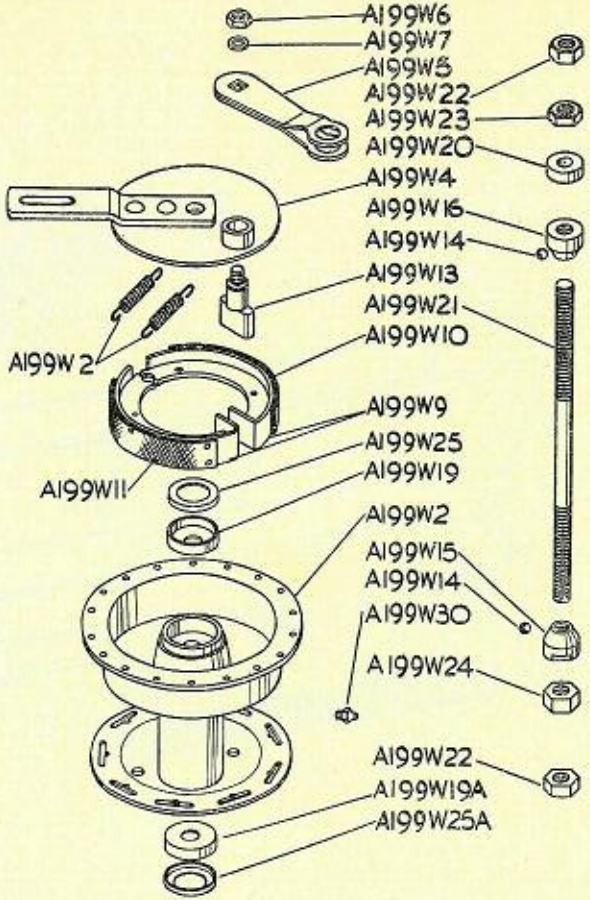


FIGURE 6. REAR HUB.

KEY TO FRONT HUB.

A199W 43a— Hub shell.
45 — Brake side plate.
46 — Cam operating lever.
47 — Cam spindle nut.
48 — Cam spindle washer
49 — Cable link.
50 — Pivot pin.
51 — Split pin.
53 — Brake shoes.
53a— Brake lining rivets.
54 — Brake lining.
56 — Brake shoe springs.
57 — Brake cam.

A199W 58 — Ball bearing.
59 — Fixed cone.
60 — Adjusting cone.
61 — Spindle nut.
63 — Spindle.
63a— Spindle washer.
64 — Spacer washer.
65 — Dust cap—near side.
65a— Dust cap—off side.
66 — Near side ball cup.
67 — Off side ball cup.
71 — Grease gun nipple.

KEY TO REAR HUB.

A199W 2 — Hub shell.
4 — Brake side plate.
5 — Cam operating lever.
6 — Cam shaft lock-nut.
7 — Cam shaft washer.
9 — Brake shoes.
10 — Brake linings.
11 — Brake linings rivets.
12 — Brake shoe springs.
13 — Brake cam.
14 — Ball bearing.
15 — Adjusting cone.

A199W 16 — Fixed cone.
19 — Offside bearing cup.
19a— Near side bearing cup.
20 — Spindle dis. collar.
21 — Spindle.
22 — Spindle nuts.
23 — Off side lock-nut.
24 — Near side cone lock-nut.
25 — Off side dust cap.
25a— Near side dust cap.
30 — Grease gun nipple.

RECOMMENDED LUBRICANTS

U.K.

	SHELL	VACUUM	PRICE'S	WAKEFIELD	ESSO
ENGINE (All Seasons)	Shell X-100 SAE 40 Shell X-100 SAE 30 Shell X-100 SAE 20	Mobiloil A	Energol SAE 40	Castrol XL	Essolube 30
GEARBOX	Shell Spirax C	Mobilube C	Energol SAE 140	Castrol D	Esso Gear Oil 140
ENCLOSED CHAINS	Shell Spirax C	Mobilube C	Energol SAE 140	Castrol D	Esso Gear Oil 140
TELESCOPIC FORKS	Double Shell	Mobiloil A	Energol SAE 30	Castrol XL	Essolube 30
GREASE GUN	Shell Retinax RB	Mobilgrease No. 2	Belmoline C	Castrolease CL	Esso Grease
OIL CAN	Double Shell	Mobiloil A	Energol SAE 40	Castrol XL	Essolube 30
HUBS and other bearings lubricated with grease	Shell Retinax RB	Mobilgrease No. 2	Belmoline C	Castrolease CL	Esso Grease

OVERSEAS

	SHELL	VACUUM	ENERGOL	WAKEFIELD	ESSO
ENGINE: Above 90° F.	Shell X-100 SAE 40	Mobiloil AF	Energol Auto 300	Castrol XL	Essolube 50
32°-90° F.	Shell X-100 SAE 30	Mobiloil A	Energol Auto 200	Castrol XL	Essolube 40
Below 32° F.	Shell X-100 SAE 20	Mobiloil Arctic	Energol Auto 150	Castrol XL	Essolube 30
GEARBOX	Shell Spirax 140 EP	Mobilube C	Energol Transmission 700	Castrol D	Esso Gear Oil 140
ENCLOSED CHAINS	Shell Spirax 140 EP	Mobilube C	Energol Transmission 700	Castrol D	Esso Gear Oil 140
TELESCOPIC FORKS	Shell X-100 SAE 30	Mobiloil A	Energol Auto 200	Castrol XL	Essolube 30
GREASE GUN	Shell Retinax RB	Mobilgrease No. 2	Energrease Chassis P. No. 2	Castrolease CL	Esso Grease
OIL CAN	Engine Oil	Engine Oil	Engine Oil	Engine Oil	Engine Oil
HUBS and other bearings lubricated with grease	Shell Retinax RB	Mobilgrease No. 2	Energrease Wheel Hub	Castrolease CL	Esso Grease

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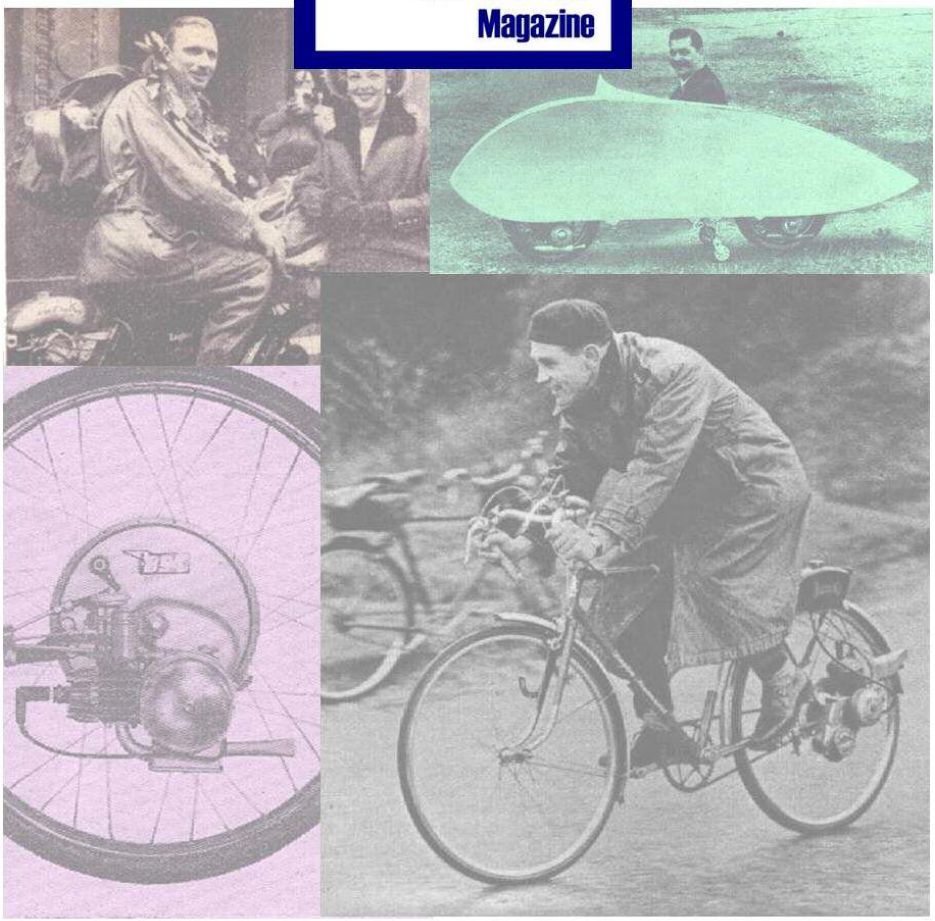

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