

The
NORMAN
MODEL C

**MAINTENANCE AND
INSTRUCTION BOOK**

**NORMAN CYCLES LTD.
ASHFORD - KENT**

COMPLETE SET OF INSTRUCTION BOOKLETS

PRICE 4/6

Certificate of Insurance.Certificate No. ^{M.C.}
6

138288

Policy No. MAR. 71939.

1. Index Mark and Registration
-
- Number of Vehicle.

FVV.305.

2. Name of Policyholder.

W.E. Allen.

3. Effective Date of the Commencement of
-
- Insurance for the purposes of the Acts. Noon

29. 3. 56.

4. Date of Expiry of Insurance. Noon

29. 3. 57.

5. Persons or Classes of Persons entitled to drive.*

The Policyholder.

~~The Policyholder is also entitled to drive any motor cycle not belonging to the Policyholder and not held by the Policyholder under a hire-purchase agreement.~~

Provided that the person driving holds a licence to drive the vehicle or has held and is not disqualified for holding or obtaining such a licence.

6. Limitations as to use.*

- (a) Use for social, domestic and pleasure purposes.
-
- (b) Use for any purpose in connection with the business or trade of the Policyholder.

MAINTENANCE

and

INSTRUCTION BOOK

NORMAN

MODEL "C"

(SERIES 2F)

AUTO CYCLE

NORMAN CYCLES LTD.
ASHFORD KENT

INTRODUCTION

The Auto Cycle has in some quarters been classed as the go-between the Cycle and Motor Cycle. This may be true in a good many instances, but an Auto Cycle such as the Norman, is designed and built for really hard work, and it is capable of taking you short journeys to work, or for shopping, and also for long journeys with as much ease as the Motor Cycle, but of course, just a little slower.

In order to get the best out of your machine, a little care and attention is necessary and it is to this end that this booklet has been written. As far as possible we have written in non-technical language which may be easily understood by those who are not familiar with the Motor Cycle.

These machines, apart from the engine, have many qualities in common with the bicycle, and there is little in the way of adjustments and upkeep which cannot be undertaken with confidence by the average rider.

The Villiers engine is of two-stroke cycle in operation and is equipped with self-contained clutch, flywheel magneto and lighting generator. Full details for the maintenance of this unit will be found in the accompanying booklet which is published by the manufacturers, Messrs. Villiers Engineering Co., Ltd., and we recommend you to this for authoritative information regarding the care and running of your engine.

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

Norman Cycles Ltd.,
Ashford,
Kent.



MODEL C. 98 c.c.

GENERAL ENGINE DATA

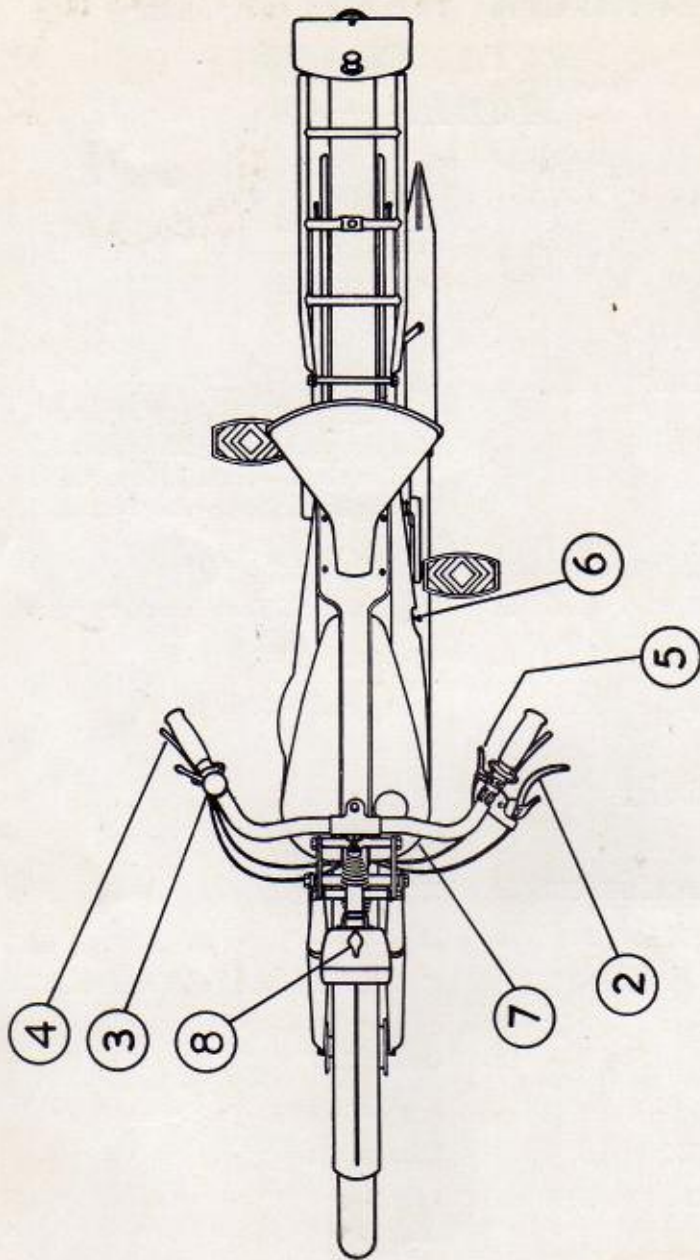
MODEL	... ..	Mk. 2F.
BORE	... ..	47 mm.—1.8504 inches.
STROKE	... ..	57 mm.—2.244 inches.
CAPACITY	... ..	98 c.c.—6 cubic inches.
HORSE POWER, MAXIMUM	...	2.0 at 3,750 r.p.m.
ENGINE SPROCKET	... ..	17 teeth.
CLUTCH SPROCKET	... ..	42 teeth.
RATIO, ENGINE TO CLUTCH	...	2.47.
FINAL DRIVE SPROCKET	...	11 teeth, $\frac{1}{2}$ " pitch for Coventry Chain No. 112045.
CHAIN LINE, FINAL DRIVE	...	$1\frac{7}{8}$ ".
FINAL GEAR RATIO	... ..	10.76—1 with rear wheel sprocket having 48 teeth. Tyre size 26".
EXHAUST PIPE	... ..	$1\frac{1}{4}$ " external diameter.
SPARKING PLUG	... ..	14 mm. Lodge H14. Point Gap .018" to .025".
CARBURETTER	... ..	Villiers "Junior" Type.
CARBURETTER JET SIZE	... ..	Marked J8.
CARBURETTER TAPER NEEDLE	...	No. 2 $\frac{1}{2}$. Setting 29/32" out.
IGNITION TIMING	... ..	$\frac{1}{8}$ " before Top Dead Centre.
CONTACT BREAKER	... ..	Point Gap .015" Maximum.
LUBRICATION ENGINE	... ..	Petrol Mixture in Fuel Tank (Oil S.A.E. 30).
LUBRICATION CHAINCASE	...	Castrol "D" Oil (S.A.E. 140) filled to level plug. (See Fig. 1).
LIGHTING SET	... ..	Head lamp bulb—6 volt 12W. S.B.C. Head lamp pilot bulb—4 volt .3 Amp. M.E.S. Tail lamp bulb—4 volt .3 Amp. M.E.S. Parking Battery Ever-Ready No. 1289.

NORMAN AUTO CYCLE

DATA CHART

MODEL "C"

ENGINE UNIT	...	...	...	Villiers 2F Engine. Bore—47 mm. Stroke—57 mm. 98 c.c.
COMPRESSION RATIO	...	...	...	8—1.
LIGHTING SYSTEM...	...	...	...	Direct lighting set—4" lamp. Head lamp bulb—6 volt 12 W. Pilot lamp bulb—4 volt .3 Amp. M.E.S. Tail lamp bulb—4 volt .3 Amp. M.E.S. Parking Battery Ever-ready No. 1289.
CARBURETTER	...	...	...	Villiers " Junior " Type.
GEAR RATIO	...	...	...	Single gear 10.75 hub sprocket 48 teeth.
DRIVING CHAIN	...	...	...	$\frac{1}{2} \times \frac{3}{16}$ ".
PRIMARY CHAIN	...	...	...	$\frac{3}{8}$ pitch by .155 side.
WEIGHT	...	...	...	128 lb.
GROUND CLEARANCE	...	...	...	4 $\frac{1}{2}$ ".
WHEEL BASE	...	...	...	50 $\frac{1}{2}$ ".
WIDTH OVER HANDLEBARS	...	...	...	23".
HEIGHT OF SADDLE	...	...	...	32".
WHEELS	...	...	...	4" Internal expanding brake hubs, Dunlop rims.
TYRES	...	...	...	Dunlop 2.25" \times 21".
TANK CAPACITY	...	...	...	1 $\frac{3}{4}$ gallons.
FUEL CONSUMPTION	...	...	...	120 m.p.g. (average).
MAXIMUM SPEED	...	...	...	35 m.p.h.
CRUISING SPEED	...	...	...	20-25 m.p.h.



CONTROL DIAGRAM.

PREPARING FOR THE ROAD

Before getting your machine on the road, it is advisable in the first place to become thoroughly acquainted with its various controls and a study of the following notes in conjunction with the plan view of the machine given on the preceding page should make these points clear.

1.—Is the FRONT BRAKE CONTROL LEVER.

2.—Is the CLUTCH CONTROL LEVER. This is used for disengaging the clutch, whose purpose in turn is to disengage the drive between the engine and the back wheel. It has a small trigger lever attached to it and this is for the purpose of holding the clutch out of engagement. When engaging the clutch, the small trigger lever must first be hooked back over its ratchet stop.

3.—This is the THROTTLE CONTROL and it is used for opening the throttle, or in other words, speeding up the engine. To open the throttle, the lever should be moved inwards towards the rider.

4.—Is the REAR BRAKE LEVER.

5.—Is the COMPRESSION RELEASE VALVE LEVER. Its use is for releasing the compression to enable the engine to be turned over easily for starting.

6.—Is the CHOKE CONTROL. This is situated on the near side of the carburettor air intake, it is operated by lifting the knob upwards and gives the engine a very rich mixture to ensure easy starting from cold, after the engine is started and gradually warms up the knob should be pushed downwards to its fullest extent. It should only be used when the engine is being started from cold.

7.—Is the PETROL TAP and is situated at the front of the near side of the bottom of the petrol tank. It is of the push/pull type and when the hexagon end is pushed in, the tap is ON, and when the round end is pushed in, the tap is OFF. Some taps are equipped with a small lever just above the main push and pull tab and its purpose is to give two levels of petrol within the tank. When pushed round against the mark RES. the petrol tank can be drained completely, when turned in the opposite direction, sufficient fuel is held in reserve against emergency for a distance of approximately five miles.

8.—Is the LIGHTING SWITCH. This operates both head and tail lights by turning the indicator to (D) and by turning to position (B) will operate the parking light only.

RIDING

You will by this time be very eager to try your new machine out on the road. First make sure that the chain case on the engine is filled with oil (See Fig. 1 in the Villiers Booklet), fill up petrol tank with petrol-oil mixture by mixing thoroughly half a pint of oil with 1 gallon of petrol but on no account must the oil be put into the tank before mixing.

Now put the machine up on its stand, close the choke on the carburetter and see the petrol tap is ON, flood the carburetter by depressing the tickler until petrol appears, open the throttle about one-third and set pedal crank at the top of its stroke. The compression release valve should be opened by compressing the lever on the handlebar, and the pedals given a smart turn over, at the same time releasing the compression valve lever when the engine should start immediately.

Having got the engine started, the clutch control lever should be drawn back on its ratchet, and as the engine warms up the choke on the carburetter should be slowly opened to its fullest possible extent. Leave the engine running for a few minutes to warm up but do not race it. Make sure the clutch is still fully withdrawn and push the machine off the stand.

Having got astride it, the clutch should be slowly engaged at the same time progressively opening the throttle when the machine will move smoothly away from rest.

Having got the machine under way, its speed must be controlled by the throttle, the clutch lever only being brought into use when stopping or slowing up in traffic. When starting the engine when warm, do not close the choke and do not flood the carburetter.

Once you get accustomed to your machine you will find it easy to pedal away with the clutch disengaged, engaging this when sufficient speed has been attained, when the engine will start instantly.

RUNNING IN

The engine should be run carefully for the first 500 miles and a speed of over 20 miles an hour should not be attempted. It will be found after this mileage that certain adjustments to the machine generally will be necessary to compensate for initial wear.

ADJUSTMENTS

All cables, i.e., front and rear 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 REAR HUB CABLE should receive similar treatment.

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

4.—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..

5.—FRONT FORK adjustment. The spindles of the front fork quite apart from receiving periodical lubrication must be kept in proper adjustment. The method of adjusting is to tackle each spindle individually. First slacken the lock-nut on the spindle and apply spanner to the hexagon head of the spindle itself, turning this in a clock-wise direction will tighten it and anti-clockwise direction will slacken it off. Each spindle should be carefully adjusted in turn so that when the lock-nut is tight, the milled washers between the links and the fork member can be just turned by hand.

Carefully guard against over tightening, as a stiff fork action will make the steering of the machine very unsteady.

The CHAINS will also call for adjustment. The main driving chain is adjusted in the same manner as the ordinary bicycle. Both wheel spindle nuts must first be slackened and the brake anchor arm bolt too, when adjusting the chain adjusters, adjust them both an equal amount to ensure the alignment of the wheels remains correct.

The Pedalling chain is adjusted at the chainwheel end. A study of Fig. 1 will show that the bottom bracket spindle is carried in an eccentric bearing between the engine plates. If locking screw (a) Fig. 1 is first slackened off, the entire bracket can be revolved thereby tightening or slackening the chain as required.

This bracket is arranged to take up sufficient slack in the chain to account for one link. If the chain becomes so slack that no more adjustment is possible, one link must be removed. After carrying out the adjustment to this chain the locking screw should be securely locked.

The STEERING HEAD is adjusted in the same manner as the ordinary bicycle ; the head lock-nut (a) Fig. 2, is first slackened off and screw 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 WHEEL bearings are both of the orthodox cup and cone type. To adjust either front or rear cones, slacken the wheel spindle nut on the hub on the opposite side to the brake drum, the cone lock-nut should now be slackened half a turn, the cone spanner applied to the flats on the cone. When in correct adjustment with all nuts tightened, the wheel should have $\frac{1}{32}$ " shake, measured at the rim. Under no circumstances must the cones be adjusted tighter than this.

REMOVAL OF THE WHEELS. The rear wheel is removed by first taking off the driving and pedalling chains, the latter are easily removed by taking out the spring

links, the two wheel spindle nuts should be slackened off, the brake anchor arm bolt and nut taken out completely and the brake cable disconnected, the wheel can then be slid back from the rear fork ends and dropped out by lifting the rear of the machine.

To remove the FRONT WHEEL. First place a suitable block under the engine plates to lift the front wheel clear of the ground. Take off both wheel spindle nuts, disconnect brake cable and take off the mudguard stays, the wheel will now drop clear of the forks.

The replacement of either wheel is in reverse order, and should present no difficulty.

At the end of the running-in period, all cables will call for adjustment, the brake cables are adjusted by means of the usual adjusters on the hubs, the clutch cable is adjusted with the adjuster fitted in the handlebar lever, and adjustment to the clutch itself is carried out at the engine end (See Villiers Booklet). The throttle cable is adjusted by the adjuster screw, in the top of the carburetter mixing chamber and this should be adjusted sufficiently to just stop the engine when the throttle lever is in closed position. The compression release valve cable is adjusted by lengthening or shortening the cable on the release valve body, the cable clamping screw is turned back a turn or so and the cable drawn through the required amount and the screw retightened.

It should be noted that both the release valve cable, and clutch cable, should be so adjusted to leave $\frac{1}{8}$ " free movement, otherwise the release valve will be held open in the first instance and the clutch will be prevented from making proper engagement in the second.

LUBRICATION

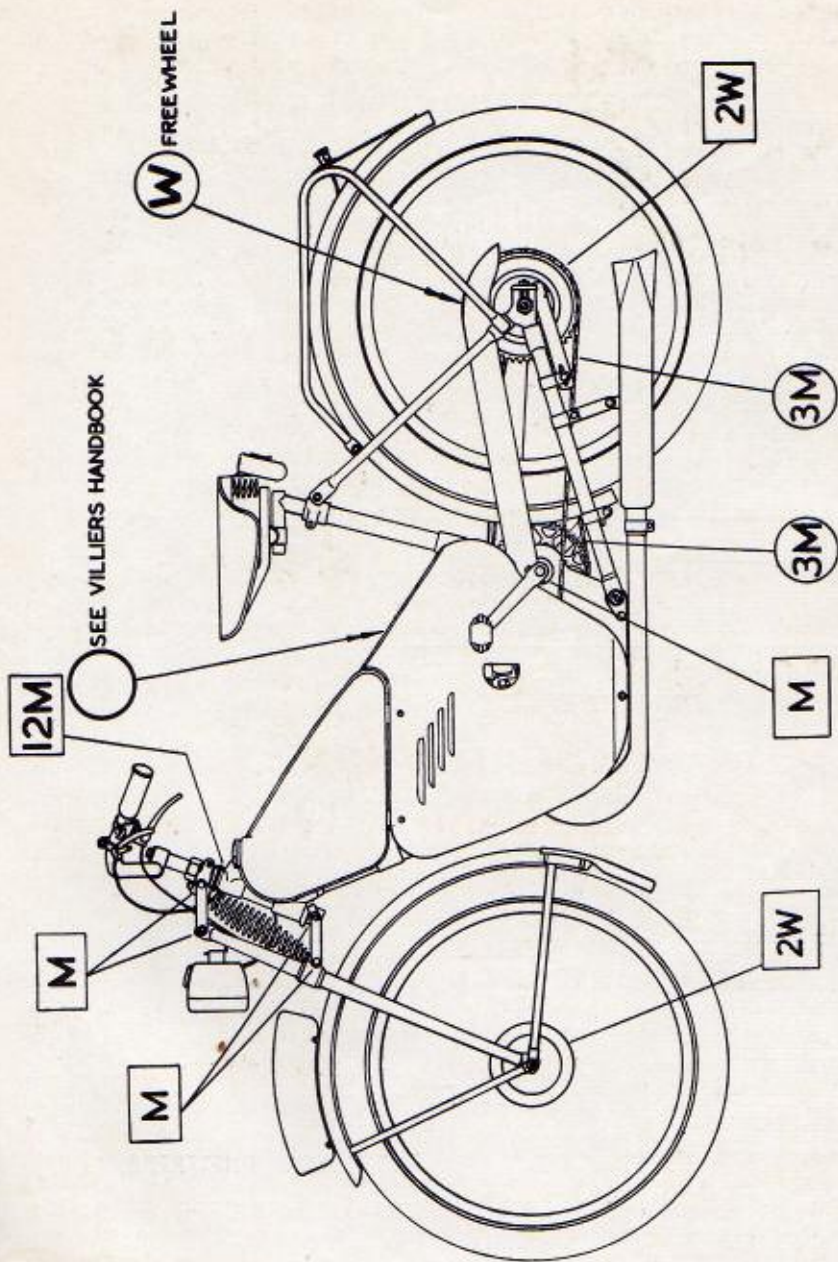
A study of the lubrication chart on page 11 will give a clear indication of what parts of the machine need attention.

The engine is dealt with in the Villiers Booklet and the remarks given therein can be followed with confidence. When undertaking the lubrication of the cycle parts, the following notes may prove helpful.

1.—The HUBS are packed at the works with grease on assembly, and although provided with grease gun nipples they should be greased sparingly. A periodical injection of fresh grease should be applied not more often than 500 miles or so. To over oil the hubs will result in the lubricant being forced into the brake drums, thus rendering the brakes ineffective.

2.—The BRAKE CAMS and operating spindle will also need lubrication from time to time, the best way of carrying this out is to disconnect the brake cable and inject ordinary engine oil between the brake operating lever and the brake plate, at the same time working the operating lever to and fro to distribute the oil. Under normal circumstances once every 500 miles will prove sufficient. The FREEWHEEL should be oiled every week.

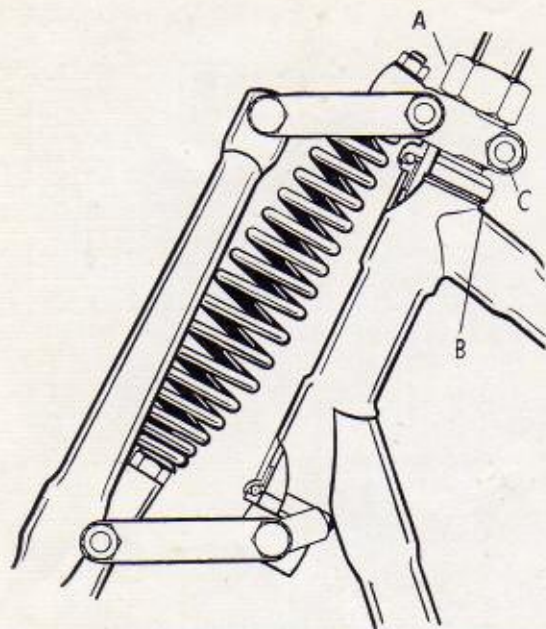
LUBRICATION DIAGRAM



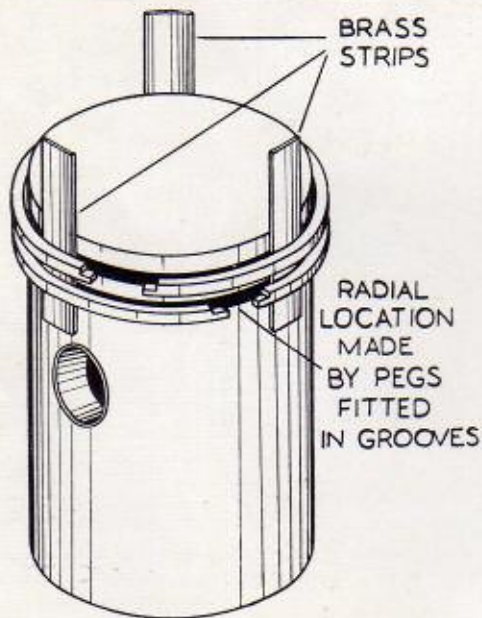
KEY :-
 □ - Grease
 ○ - Oil

W - Weeks
 M - Monthly

FOR RECOMMENDED LUBRICANTS
 SEE INSIDE BACK COVER



(Left) FIGURE 2.



(Left) FIGURE 3.

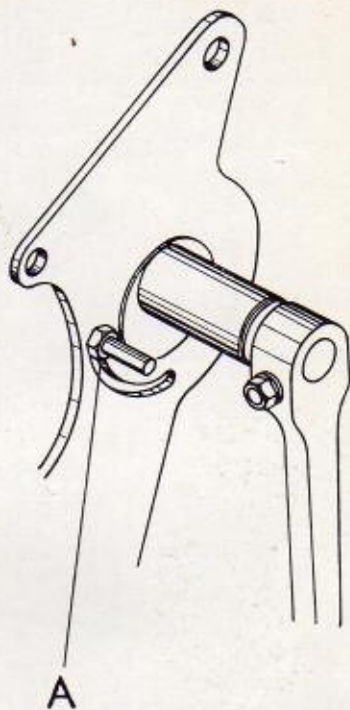


FIGURE 1.

3.—The FRONT FORKS should be lubricated at least every month by the use of the grease gun through the nipples provided.

4.—The BOTTOM BRACKET spindle is also provided with a grease gun lubricator and this should be greased at monthly intervals.

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

6.—Lubrication of both the main driving and pedalling chains should be carried out every 2,000 miles. They should be removed from the machine, thoroughly cleaned in a paraffin bath, drained and wiped dry. Immerse in a bath of warm oil for 15 minutes, wipe off all 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.

7.—All exposed cables, brake pivots and levers will need a spot of oil applied to them once a week, this will not only lubricate these parts but will also prevent rust.

The bearings on the central stand should also receive a spot of lubricant once a week and the pedals should be oiled with an oil can through the oil holes provided in the caps.

THE ENGINE

For general particulars of adjustment to the engine, we recommend you to The Villiers Official Handbook enclosed. Unlike a 4-stroke engine which requires decarbonising every 4-5,000 miles, your 2-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 now is 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 polish these parts with emery cloth or metal polish or you will regret it later.

On an engine which has seen long service the piston rings may need renewing, but before fitting new piston rings (See Fig. 3) 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 the 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.

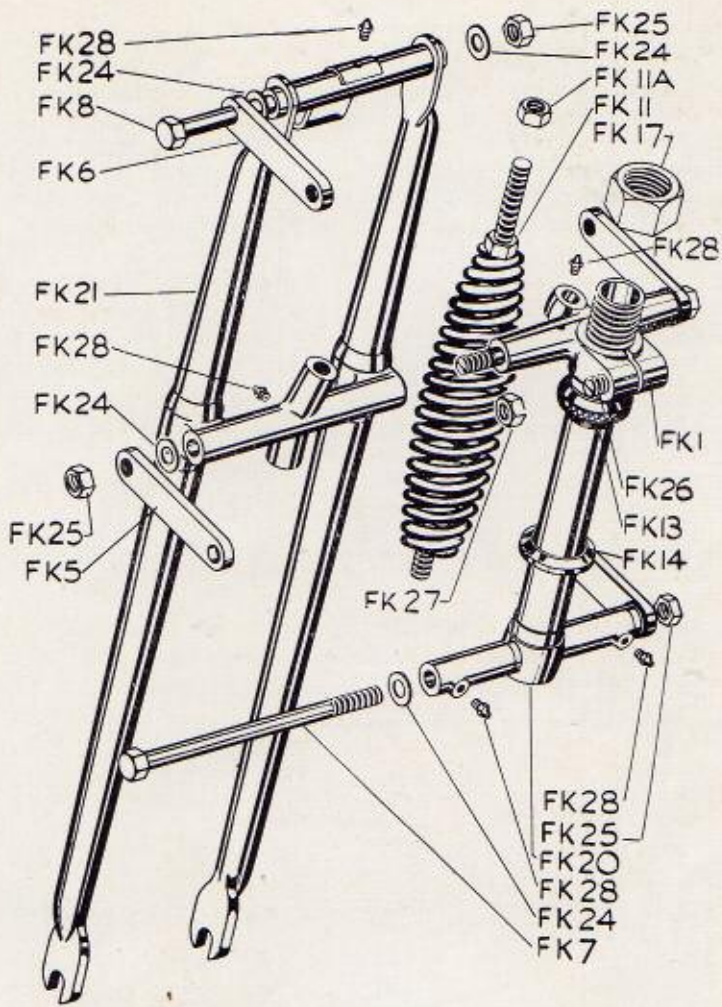
The exhaust pipe and silencer should receive a thorough clean out, the silencer is detachable for easy cleaning. These can now be replaced on the machine, the carburetter and sparking plug refitted and the job is done.

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., 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, and we know it will then serve you well.



**FIGURE 4. FRONT FORK.
KEY TO FORK.**

- | | |
|-------------------------|-----------------------------------------|
| FK 1 — Top head lug. | FK 17 — Head lock-nut. |
| 5 — Bottom link. | 20 — Fork crown lug and stem complete. |
| 6 — Top link. | 21 — Fork blade with yoke lug complete. |
| 7 — Bottom spindle. | 24 — Knurled washer. |
| 8 — Top spindle. | 25 — Fork spindle nut. |
| 11 — Spring. | 26 — Head clip bolt. |
| 11a — Spring nut. | 27 — Head clip bolt nut. |
| 13 — Screwed ball race. | 28 — Grease gun nipples. |
| 14 — Crown race. | |

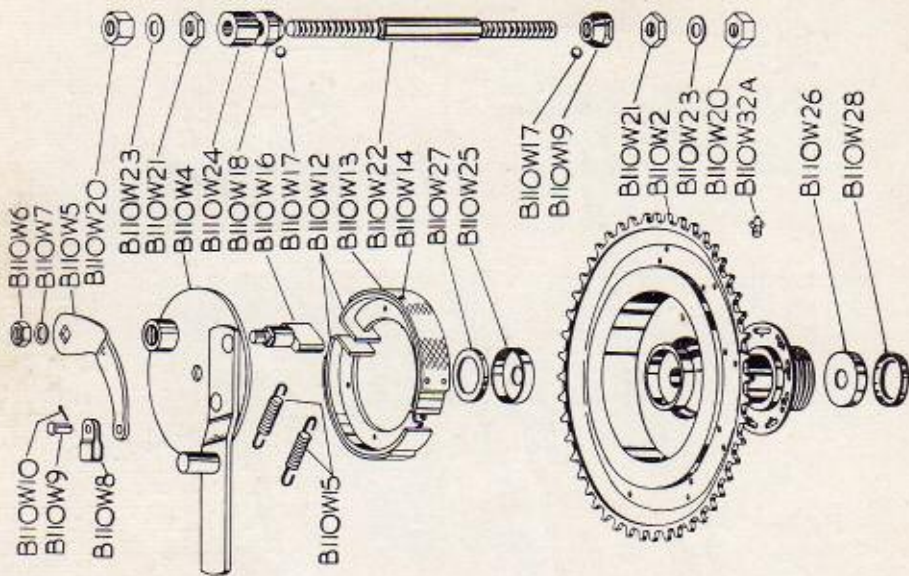


FIGURE 6. REAR HUB.

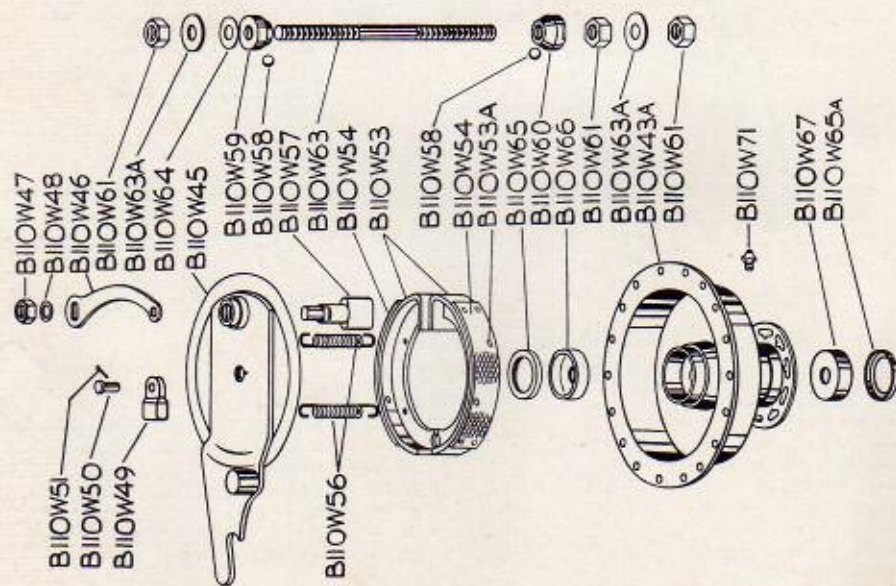


FIGURE 5. FRONT HUB.

RECOMMENDED LUBRICANTS

U.K.

	SHELL	ESSO	WAKEFIELD	B.P.	VACUUM
ENGINE (ALL Seasons)	X-100 30	Essolube 30	Castrol XL	Energol SAE 40	Mobiloil A
GEARBOX	Spirax 140 EP	Esso Gear Oil 140	Castrol D	Energol EP SAE 140	Mobilube C 140
ENCLOSED CHAINS	Spirax 140 EP	Esso Gear Oil 140	Castrol D	Energol EP SAE 140	Mobilube C 140
TELESCOPIC FORKS	X-100 30	Essolube 30	Castrol XL	Energol SAE 30	Mobiloil A
GREASE GUN	Retinax A or RB	Esso Grease	Castrolase CL	Energrease C.3	Mobilgrease No. 2
OIL CAN	X-100 30	Essolube 30	Castrol XL	Energol SAE 40	Mobiloil A
HUBS and other bearings lubricated with grease	Retinax A or RB	Esso Grease	Castrolase Heavy	Energrease C.3	Mobilgrease No. 2
OVERSEAS					
	SHELL	ESSO	WAKEFIELD	B.P.	VACUUM
ENGINE (All Temperatures)	X-100 30	Essolube 30	Castrol XL	Energol Motor Oil SAE 40	Mobiloil A
GEARBOX	Spirax 140 EP	Esso Gear Oil SAE 140	Castrol D	Energol Trans- mission Oil SAE 140 EP	Mobilube C 140
ENCLOSED CHAINS	Spirax 140 EP	Esso Gear Oil SAE 140	Castrol D	Energol Trans- mission Oil SAE 140 EP	Mobilube C 140
TELESCOPIC FORKS	X-100 30	Essolube 30	Castrol XL	Energol Motor Oil SAE 30	Mobiloil A
GREASE GUN	Retinax A or RB	Esso Chassis Grease H	Castrolase CL	Energrease	Mobilgrease No. 2
OIL CAN	X-100 30	Essolube 30	Castrol XL	Energol Motor Oil SAE 40	Mobiloil A
HUBS and other bearings lubricated with grease	Retinax A or RB	Esso Bearing Grease	Castrolase Heavy	Energrease C.3	Mobilgrease No. 2

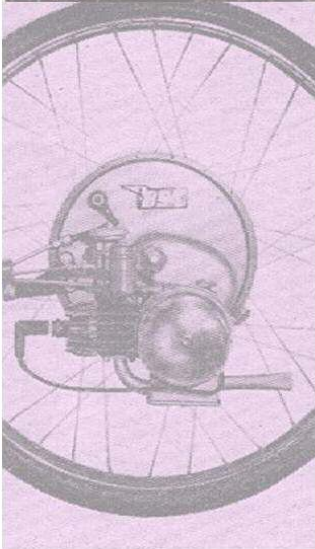
KEY TO FRONT HUB.

A199W 43a—Hub shell	A199W 53a—Brake lining rivets	A199W 63—Spindle
45—Brake sideplate	54—Brake lining	63a—Spindle washer
46—Cam operating lever	56—Brake shoe springs	64—Spacer washer
47—Cam spindle nut	57—Brake cam	65—Dust cap—near side
48—Cam spindle washer	58—Ball bearing	65a—Dust cap—off side
49—Cable link	59—Fixed cone	66—Near side ball cup
50—Pivot pin	60—Adjusting cone	67—Off side ball cup
51—Split pin	61—Spindle nut	71—Grease gun nipple
53—Brake shoes		

KEY TO REAR HUB.

B110W 2—Hub shell complete	B110W 13—Brake linings	B110W 22—Spindle
4—Brake side plate	14—Brake lining rivets	23—Spindle washer
5—Cam operating lever	15—Brake shoe springs	24—Spindle dis. piece
6—Cam spindle nut	16—Brake cam	25—Ball cup—near side
7—Cam spindle washer	17—Ball bearing	26—Ball cup—off side
8—Cable link	18—Fixed cone	27—Near side dust cap
9—Pivot pin	19—Adjusting cone	28—Off side dust cap
10—Split pin	20—Spindle nut	32a—Grease gun nipple
12—Brake shoes	21—Cone lock-nut	

IceniCAM Information Service



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