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Bown

AUTO ROADSTER

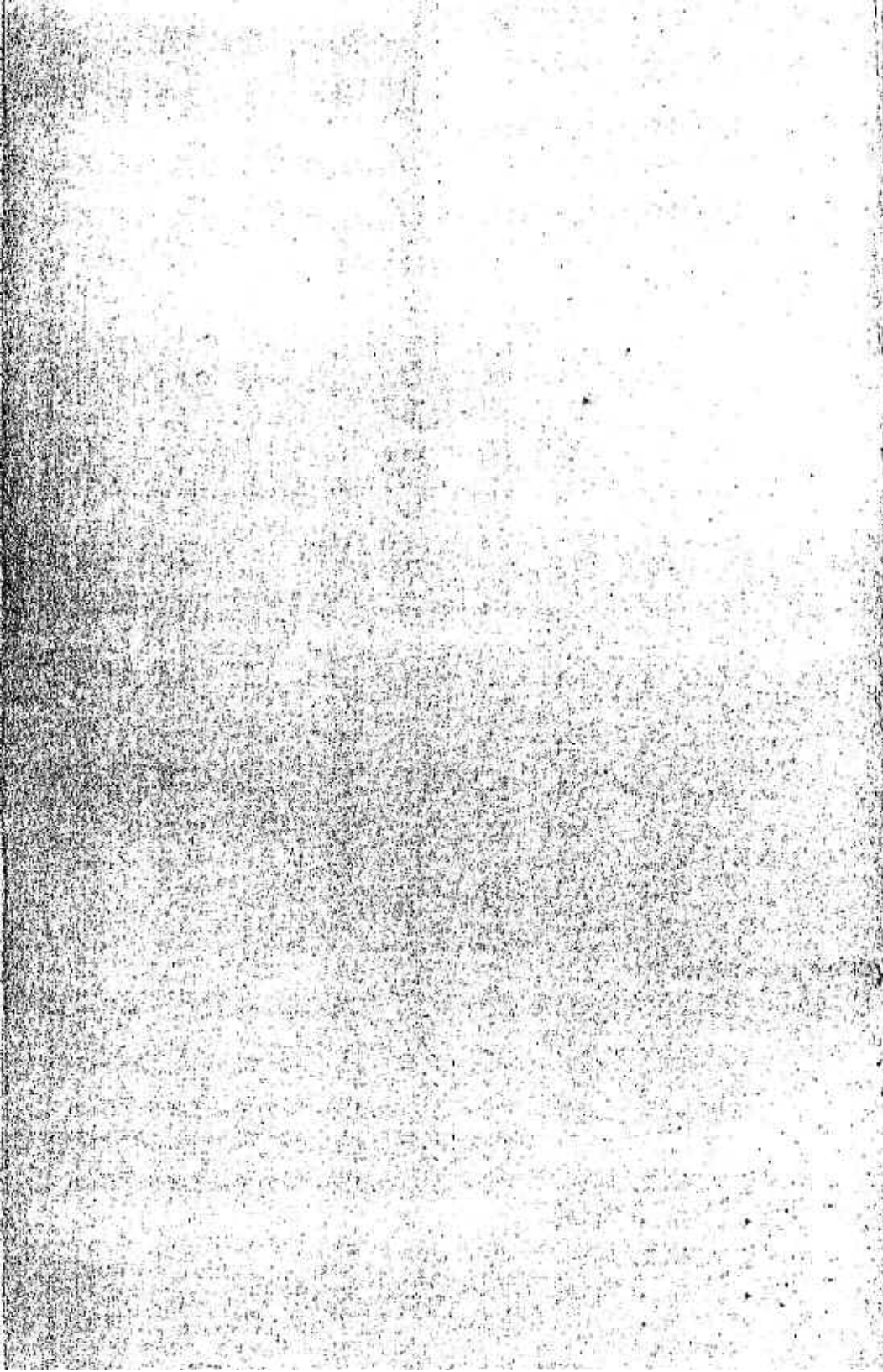
98 c.c. Mark 2.F.



ERIC KENNARD
AND CO
MOTOR CYCLES
SEAFORD SUSSEX

**RIDER'S HANDBOOK
& SPARE PARTS LIST**

BOWN CYCLE COMPANY LIMITED
LLWYNYPYA - TONYPANDY - SOUTH WALES



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RIDER'S HANDBOOK
& SPARE PARTS LIST
FOR THE
BOWN 98_{c.c.} MARK 2.F.
AUTO-ROADSTER

BOWN CYCLE COMPANY LTD.
LLWYNYPYA, TONYPANDY
SOUTH WALES

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INTRODUCTION

The Bown Auto-Roadster is hand-built by craftsmen to a design which is entirely new and surpasses that of any other power-driven bicycle. It has been evolved after patient research and exhaustive trials; it is backed, too, by the skill and traditions of one of the pioneer firms in the Cycle Industry, with 90 years' experience of building the highest grade Bicycles and Motor Cycles.

It is, therefore, a product of outstanding quality, and, properly maintained, will give you years of trouble-free service. Follow carefully the simple instructions in regard to running-in and subsequent maintenance contained in this book, and you will be rewarded with many thousands of miles of safe and economical travel.

If you have not ridden a power-driven Cycle before, you will quickly master the controls, which are simple and light in action, and will delight in the sensation of effortless speed. If you have had previous experience, you will immediately appreciate the Bown's sterling qualities and will soon realise that the Bown Auto-Roadster is, in truth, "Built for the Connoisseur."



GENERAL DATA

Unladen weight	-	-	-	-	-	-	127 lbs.
Overall length	-	-	-	-	-	-	6' 5"
Wheelbase	-	-	-	-	-	-	4' 0 $\frac{1}{4}$ "
Width over handlebars	-	-	-	-	-	-	22 $\frac{1}{2}$ "
Ground clearance	-	-	-	-	-	-	4"
Fuel tank capacity	-	-	-	-	-	-	1 $\frac{1}{2}$ gallons—petrol and oil mixture
Engine bore	-	-	-	-	-	-	47 mm. = 1.8504 inches
Engine stroke	-	-	-	-	-	-	57 mm. = 2.244 inches
Engine 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, $\frac{1}{2}$ inch pitch
Chain line, final drive	-	-	-	-	-	-	1 $\frac{7}{8}$ inches
Final gear ratio	-	-	-	-	-	-	10.76—1
Exhaust pipe	-	-	-	-	-	-	1 $\frac{1}{4}$ inch 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
Lighting set	-	-	-	-	-	-	Head lamp bulb, 6 volt—12 watt 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.
Tyre size	-	-	-	-	-	-	2.25 x 21

Tyre pressures :

				Weight of rider		
				9 stone	11 stone	13 stone
Front	-	-	-	16 lbs.	17 lbs.	18 lbs.
Rear	-	-	-	28 lbs.	31 lbs.	32 lbs.

The VILLIERS Mk. 2.F. AUTOCYCLE ENGINE

SPECIFICATION

The Mark 2 F. Engine is built in unit with a countershaft clutch, the drive from engine crankshaft being by an endless roller type chain running in an oil bath case.

A deeply finned cast iron cylinder with one exhaust and two transfer ports of unique design is used, the carburetter being mounted on a stub at the rear.

Secured to the cylinder by four bolts is an aluminium alloy head in which is fitted a 14 mm. sparking plug. The aluminium flat-topped piston carries a floating gudgeon pin located endways by circlips. The "big end" bearing consists of two rows of steel rollers running on a crankpin fitted in double crankwebs carried by a large ball journal bearing on each side.

Power is taken through a two-plate cork-insert clutch, control being by Bowden cable and lever fitted on cycle handlebar.

Final drive to rear wheel is by a roller chain. A Villiers Junior pattern carburetter is fitted at the rear of cylinder, control being by a single lever. A strangler for easy starting, and within the reach of the rider, is provided, and a gauze type air filter prevents the entry of dirt and water.

A decompressor to assist in starting the engine is fitted in the cylinder head, control being by Bowden cable and lever fitted on the handlebar.

The ignition and lighting current is provided by the Villiers flywheel magneto, a special model giving increased output having been developed. The headlamp now carries a 6 Volt-12 Watt bulb.

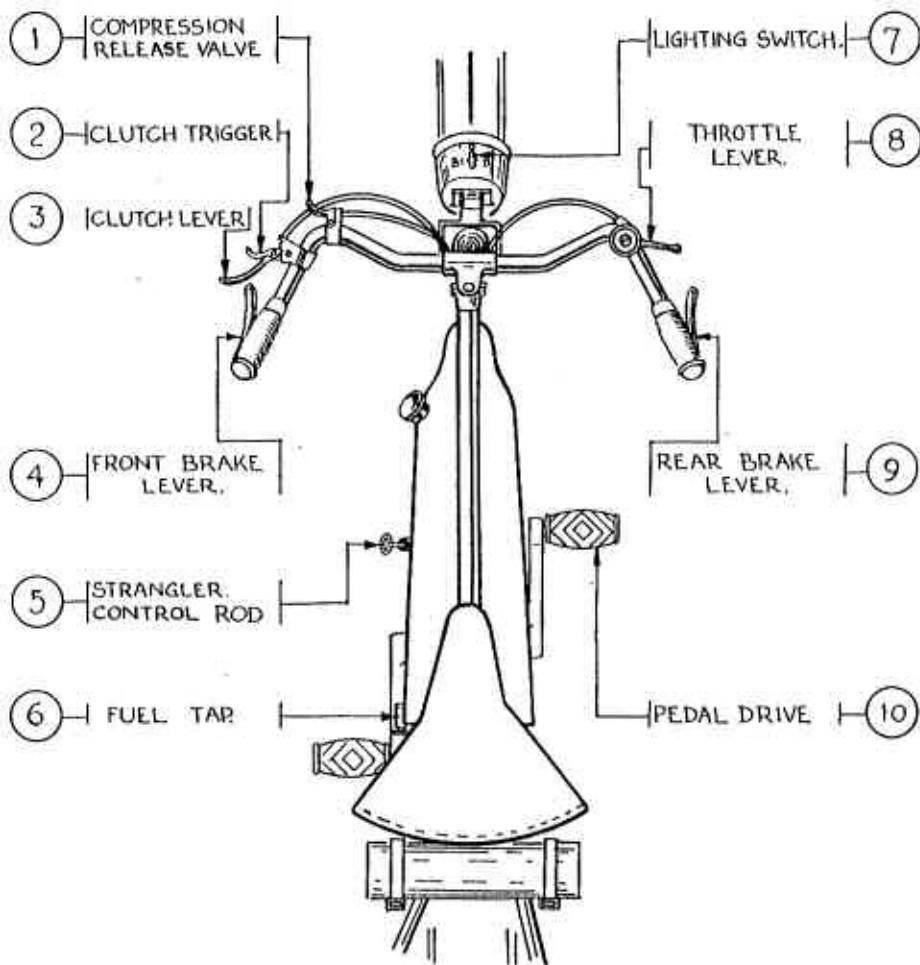
CONTROLS

If the rider is inexperienced, it is advisable to become thoroughly familiar with the position and operation of the controls before taking the machine on the road.

They are as follows, and are illustrated in the diagram opposite :—

1. **Compression Release Valve**
This releases engine compression to facilitate starting. Pull lever towards handlebar to operate.
2. **Clutch Trigger**
To lock the clutch in the " Out " position.
3. **Clutch Lever**
Operates the clutch. Normally in the " In " position; depress lever to withdraw the clutch.
4. **Front Brake Lever**
On left hand side of handlebar. Pull towards handlebar to operate.
5. **Strangler Control Rod**
Operates the strangler, cutting off air supply to the carburetter to increase richness of mixture for starting. Pull up to close, push down for " Open " position.
6. **Fuel Tap**
Cuts off the supply of fuel to the carburetter. Pull out the round end of the fuel cock for the " On " position, push in for " Off."
7. **Lighting Switch**
Controls the head and tail lamps. Turn the switch to the right (position " D ") for full riding light; turn to the left (position " B ") for parking light.
8. **Throttle Lever**
Regulates the speed of the engine by controlling the quantity of fuel mixture admitted. Open clockwise to increase speed.
9. **Rear Brake Lever**
Situating on right of handlebar. Pull towards handlebar to operate.
10. **Pedal Drive**
For use in starting the autocyple, or to assist the engine in exceptional circumstances.

CONTROLS



The Bown 98 c.c. Mk. 2.F. Auto Roadster

OPERATING INSTRUCTIONS

THE VILLIERS MARK 2.F. UNIT

BEFORE USE

- Chaincase.** Remove the chaincase oil filler and oil level plugs, see Fig. 1, and with the cycle off the stand, pour in the correct grade of oil as recommended on page 12 until it runs out at the level plug hole. Refit plugs securely. Examine every 500 miles and top up if necessary.
- Fuel Tank.** Fill up tank with "Petrol" mixture made by mixing thoroughly half a pint of the correct grade of oil as recommended on page 12 with one gallon of petrol. On no account must the oil be put into the tank before mixing, and it is advisable to pour the mixture through a fine mesh gauze when putting into tank.

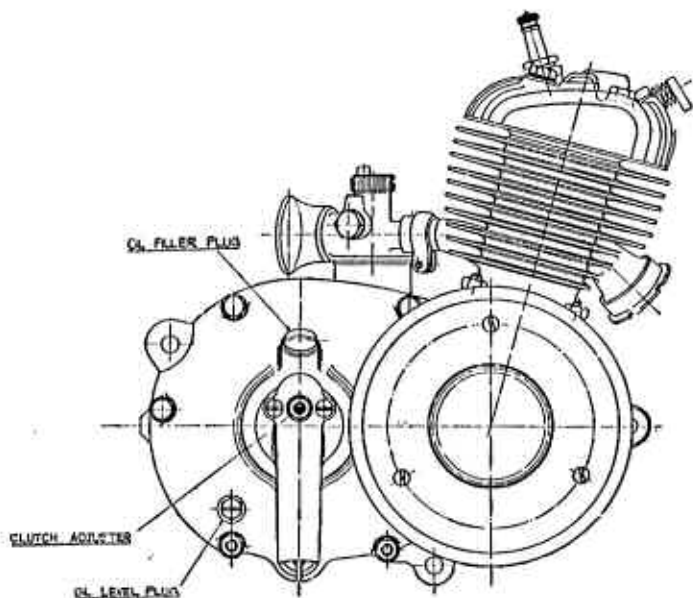


Fig. 1.

STARTING THE ENGINE

1. Ensure that there is sufficient fuel in the tank.
2. If the machine has been standing for some time, shake well to mix the petrol and oil.
3. Turn the fuel tap to the "On" position.
4. Close the strangler by lifting the strangler rod.
5. Flood the carburetter float chamber by depressing the tickler.
6. Open throttle lever about one-third of its total movement.
7. Depress compression release valve to release the compression in the cylinder.
8. Wheel the machine forward a couple of yards, release the compression valve control lever, and as the engine fires pull up the clutch control lever and lock in the "Out" position by the spring-loaded trigger.

As the engine warms up after running half-a-minute or so, the strangler can gradually be moved to the full open position by pushing the strangler rod down. In very cold weather, of course, the engine will require longer to warm; if the strangler is opened too quickly spitting-back through the carburetter will occur.

When the engine is warm from previous running it should not be necessary either to flood the carburetter or to use the strangler when starting.

An alternative method of starting the engine which is, perhaps, more suitable for the learner, is by pedalling the machine whilst on its stand. This method should not be used regularly, however, since the stand is only intended to support the autocycle and not the weight of the rider as well; hence if frequently adopted excessive strain will be put upon the stand members.

1. Check the fuel supply as in 1, 2, and 3 above.
2. Place the autocycle on its stand.
3. Close the strangler, flood carburetter, partly open throttle, and depress compression release valve as in 4, 5, 6, and 7 above.

4. Whilst sitting on the saddle, rotate the engine by pedalling.
5. Release the compression valve control lever, and the engine should start.
6. Withdraw the clutch and lock in the "Out" position, then remove the autocycle from its stand.

Failure to Start

If the engine will not start after a reasonable number of attempts, ascertain if this is due to lack of compression, no fuel, or faulty ignition.

COMPRESSION should be felt whilst rotating the engine by the pedalling gear, with the throttle partly open.

FUEL SUPPLY—Depress tickler at side of carburetter body. If fuel is reaching float chamber, it will spurt from vent hole in tickler cap.

FAULTY IGNITION—Unscrew spark plug from cylinder head and with the ignition cable attached place on a flat metal part of engine. When the engine is rotated a spark should be visible at the points. If no spark, detach cable and hold end one-eighth inch from cylinder whilst rotating engine. If these preliminary tests prove negative a more detailed examination will have to be made, and reference should be made to "Tracing Engine Troubles" on pages 21-23.

STOPPING THE ENGINE

Move the throttle control lever to the closed position, and just before the engine comes to rest the compression release valve should be used to prevent the motor jerking over compression. When the machine is to be left standing for a considerable length of time, e.g. overnight or for a long period during the day, it is advisable to turn off the petrol tap and allow the engine to use up the supply of fuel in the carburetter whilst coming to rest. This will assist in restarting by obviating the possibility of fuel draining into the engine.

ON THE ROAD

Having started and warmed the engine, sit astride the autocycle, free the clutch control lever by releasing the spring-loaded trigger and gently let in the clutch. The machine will start to move forward, and as it does so open the throttle lever to take the load, afterwards controlling the speed of the autocycle by the use of the same control.

To ensure a smooth start always let the clutch in as gently as possible and try to synchronise the throttle movement—do not race the engine unnecessarily, or let the clutch in suddenly, otherwise the rear wheel will spin or a jerky start will result.

To stop the autocycle, close the throttle, declutch by depressing the clutch lever, and gently apply both brakes, increasing the pressure on them as the speed of the machine decreases. If halting temporarily in traffic do not close the throttle completely or the engine will stop—leave it sufficiently open so that the engine remains "ticking-over."

Under wet or greasy road conditions it is better to apply both brakes together, as the sudden application of one brake alone may result in a skid.

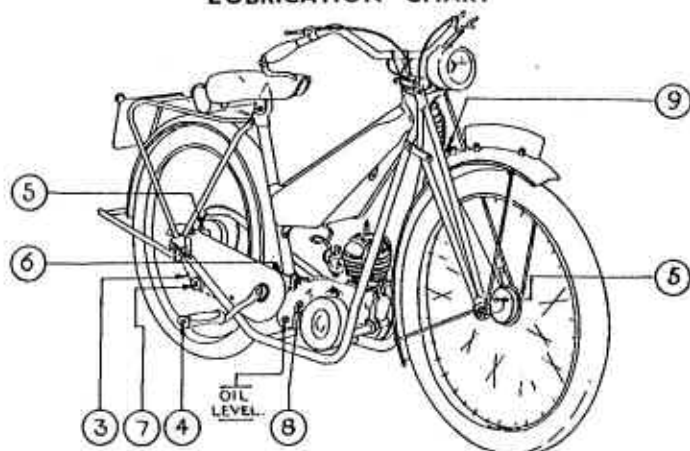
RUNNING IN

Since the future performance of the engine depends largely upon the care taken during running-in, the following instructions should be strictly observed.

For the first 500 miles at least, care should be taken to avoid over-driving the engine, and during this period the throttle must not be fully opened. Do not exceed 20 m.p.h. on the road, or allow the engine to race or run at high speed whilst unladen during the running-in period.

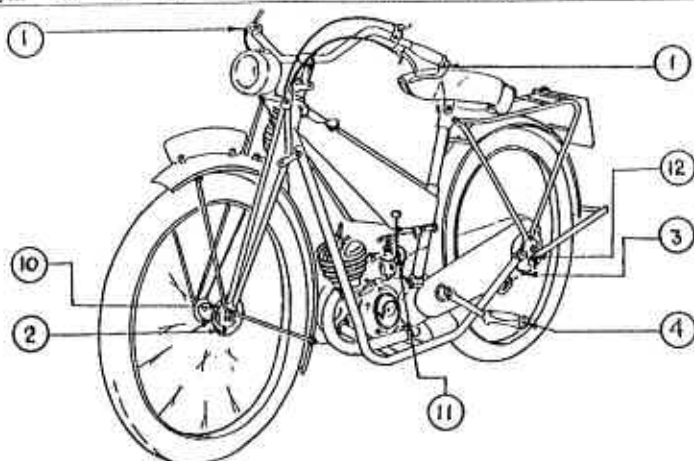
After about 500 miles it will probably be necessary to weaken off the fuel mixture by lowering slightly the taper needle in the carburetter. How to do this is explained in the section dealing with the carburetter. At the same time examine the contact breaker points as they may require slight adjustment after initial bedding in. The correct gap when points are fully open is .015". They should also be kept free from oil.

LUBRICATION CHART



RECOMMENDED LUBRICANTS

PART	SHELL	VACUUM	WAKEFIELD	PRICE'S	ESSO
Engine (Petrol Mixture) All Seasons... ..	Double Shell	Mobiloil A	Castrol XL	Price's Energol SAE 40	Essolube 40
1. Control lever pivots	Single Shell	Mobiloil Arctic	Castrolite	Price's Energol SAE 20	Essolube 20
2. Brake hub cams (front and rear)					
10. Inner cable wire					
11. Choke wire	Double Shell	Mobiloil A	Castrol XL	Price's Energol SAE 40	Essolube 40
3. Chains (pedal and main drive)... ..					
4. Pedals					
7. Jockey pulley and arm					
12. Rear stand bearings	Shell Retinax RB	Mobil Hub Grease	Castrolase Heavy	Belmoline C	Esso Grease
5. Front and rear hub nipples					
6. Bottom bracket	Shell Splrax C	Mobilube C	Castrol D	Price's Energol SAE 140	Esso Gear Oil 140 (Heavy)
8. Engine chain case	Shell Retinax C	Mobilgrease No. 2	Castrolase CL	Belmoline C	Esso Grease
9. Front fork nipples (5 lubricating points)					



MAINTENANCE

PERIODICAL ATTENTION

It is necessary, in order to obtain the best performance and to ensure freedom from trouble on the road, that your machine be given regular attention as under :

Every 500 miles

Examine the oil level in the clutchcase by removing the level screw (See Fig. 1). Top up if necessary with the grade of oil recommended on the opposite page.

Lubricate chains, jockey pulley, control levers, inner cable wires, choke wire, rear stand bearings
with the recommended lubricant shown on the chart on the opposite page.

Clean (a) sparking plug, setting the points to the gap shown on page 4. If any adjustment is necessary, always set the side points and not the central electrode,
(b) carburetter and petrol supply pipe.

Check tension of main driving chain and adjust if necessary—see page 14.

Every 1,000 miles

Lubricate brake hub cams, fork links
with the recommended lubricant shown on the chart on the opposite page.

Clean contact breaker points and adjust if necessary.

Check adjustment of brakes, fork links, and clutch cable, and adjust if necessary.

Every 2,000 miles

Remove and clean the cylinder head and scrape out carbon. The edges of the exhaust port in the cylinder can be cleaned when the piston is at the bottom of the stroke. Clean piston top. It should not be necessary to remove barrel and piston every 2,000 miles; every 4,000 miles should be sufficient. Also remove and clean the silencer and exhaust pipe.

Examine all joints, cylinder head, cylinder base, and clutchcase for gas or oil leaks, and tighten if necessary. Examine all visible nuts, bolts, and screws for looseness.

Every 5,000 miles

Lubricate hubs, pedals, bottom bracket

with the recommended lubricant shown on the chart on page 12.

Check adjustment of hub cones and head.

Tyre pressures should be checked frequently (preferably at weekly intervals) and pressures maintained at those recommended on page 4. Examine the covers for cuts, and remove flints embedded in the tread.

ADJUSTMENTS

The auticycle is road-tested and all parts correctly adjusted before leaving the works, but subsequent wear may cause slackness in certain parts which requires to be taken up to maintain maximum efficiency, particularly at the conclusion of the running-in period.

Details of adjustments to the most important items are given below.

Chains. The main chain is correctly tensioned before despatch. To take up subsequent slackness proceed as follows. Loosen hub nuts (D), see Fig. 2, and brake arm pin (A), then slacken the chain adjuster lock-nuts (C). The wheel may now be moved back as necessary by turning the adjusters (B), but care must be taken to keep the wheel central by giving each adjuster the same number of turns. When the right degree of tension on the chain ($\frac{1}{4}$ " slack at the tightest place) is achieved, tighten lock-nuts (C), hub nuts (D), and brake arm pin (A).

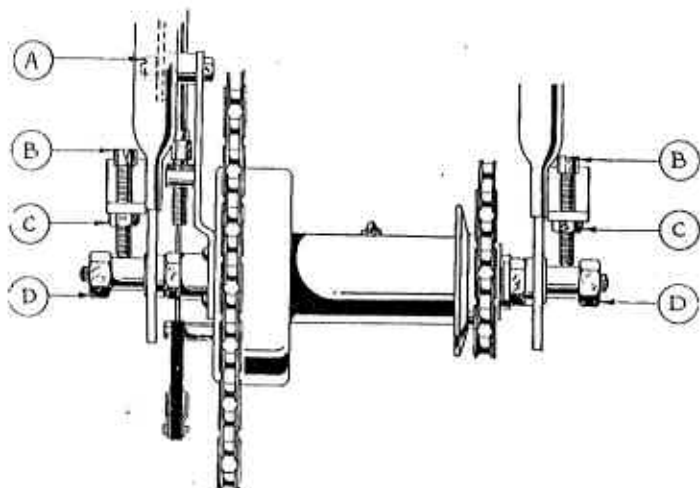


Fig. 2.

The jockey pulley automatically takes up slackness in the pedal chain and no adjustment is required.

Brakes. To adjust front or rear brakes, grip the hexagon nut (H), see Fig. 3, and turn the knurled nut (I) as required. When adjusting brakes take care that they are not adjusted so tightly as to rub on the brake drum.

Fork Links. Slackness in the fork links may be taken up by loosening the lock-nuts (L) and (Q), see Fig. 4, and tightening the spindles (M) and (O), afterwards tightening the locknuts (L) and (Q). Repeat the process on the lower links. When correctly adjusted there should be sufficient play on the spindle to allow the fork to move freely under road conditions. An alternative method is to tighten the spindles until there is no play on them at all, and then to slacken each half-a-turn.

Clutch Cable. The clutch cable is adjusted by means of the adjustment screw on the clutch bridge (see Fig. 1, page 8). Screw adjuster in until there is just a trace of slack in the cable; this is essential, otherwise the clutch may be slightly disengaged and cause slipping. Tighten locknut after adjustment.

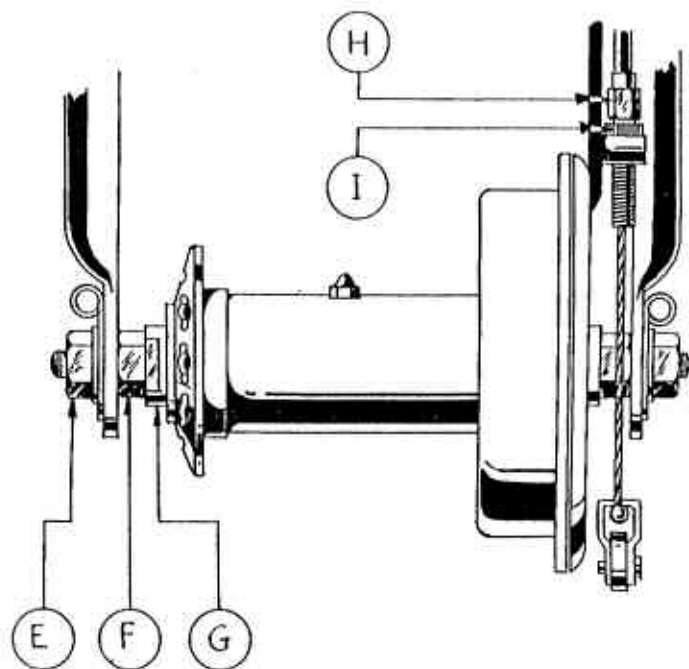


Fig. 3.

Hubs. Any lateral slackness in both front and rear wheels may be taken up as follows. Loosen hub nuts (E), see Fig. 3, and cone locking nuts (F). The cone (G) may then be adjusted as required, using a cone spanner. When correctly adjusted there should be no side play, but the wheel should revolve quite freely. Tighten locking nuts (F) very securely and finally tighten hub nuts (E).

Head. To take up play caused by wear, slacken the locking bracket nut (K) and column locknut (N), see Fig. 4, after which the knurled headrace (P) may be tightened as necessary. Tighten locknut (N) and locking bracket nut (K).

Handlebars. To adjust handlebars, loosen bolt (J), see Fig. 4, and unscrew about $\frac{1}{4}$ ". Tap down with wooden mallet to free the expander cone, and the handlebar can then be moved as desired. Afterwards re-tighten bolt (J) securely.

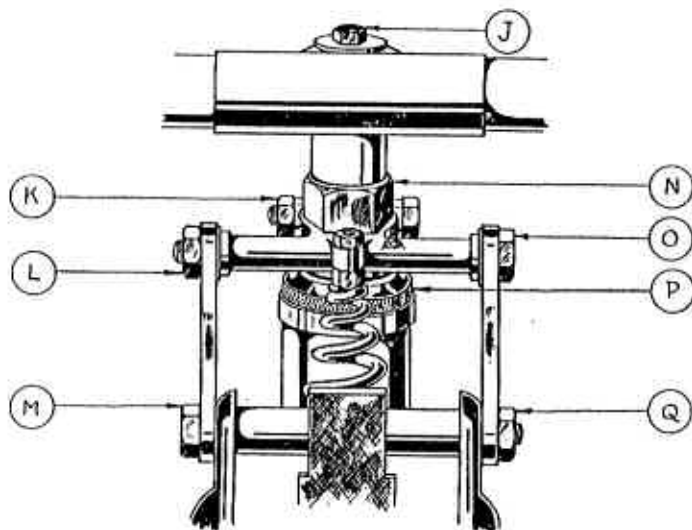


Fig. 4.

Carburettor

The Villiers Junior Carburettor is used with the Mark 2.F. Engine, and it should not be necessary to alter the setting obtained by the maker (except for needle adjustment), after road testing the machine.

Operation of Carburettor

The function of the Carburettor is to supply a mixture of petrol and air in correct proportion under all conditions. In the Villiers Carburettor the float chamber surrounds the jet and centrepiece, and in the chamber

an annular float rises as the fuel enters the chamber until the correct level is obtained, then the forked lever which rests on the top of the float lifts the fuel needle which has a conical end and shuts off the fuel supply by closing the hole in the bush fitted in carburetter body.

Fuel enters the centrepiece through a hole in the side and passes through the calibrated jet fitted in the bottom of centrepiece.

The throttle operated by the cable is fitted with a taper needle which extends below the throttle and into the centrepiece. When the throttle slide closes the air supply the largest diameter of the needle nearly closes the fuel outlet, but when the slide is lifted admitting more air, the smaller diameter of the needle now in the centrepiece allows more fuel to pass. A suitable combination jet size, needle position and taper will give a correct mixture strength on all throttle openings.

The fuel level is maintained by a float and needle valve, and under no circumstance should any alteration be made either to the above or to the float lever.

The amount of fuel supplied to the engine is controlled by one jet which is fixed in the bottom of the centrepiece, and by the taper needle which is carried in the throttle and operates in the top end of the centrepiece.

The jet is not detachable from the centrepiece and is not supplied separately.

The Carburetter is automatic in action and gives a correct mixture over the whole range of throttle openings, the only available adjustment being the position of the taper needle in the throttle (which controls the size of the jet orifice), and is necessary to suit individual engines.

The needle controls the mixture strength from tickover to approximately two-thirds throttle, the jet controls the remainder.

The position of the taper needle in the throttle is determined during testing at the works, but should it be necessary to alter the setting this is done by the needle adjusting screw situated in the centre and top of throttle. Screw in to weaken mixture (i.e. lower needle), the screw should not be loose in the throttle slide as it is likely to move and alter the setting. It is split to make it grip the hole. Should the screw be loose the split portion should be gently prised apart before fitting.

Note.—The taper needle spring should be fitted with the small coil under the head of needle.

To Dismantle Carburetter

To Remove Throttle from Body. Open throttle to full open, undo top ring, throttle can now be withdrawn. Take care not to damage or bend the taper needle. Return throttle to fully closed position, the guide peg

attached to top disc will then be exposed and, if necessary, the control cable can be detached by compressing throttle spring, the inner cable then being lifted out through the slot.

To Remove Centrepiece and Fuel Needle. Unscrew the bottom nut underneath the float chamber cup. Next remove the fibre washer, the cup with float inside, and if loose, the fibre washer between cup and carburetter body. Then remove the small centrepiece locking screw situated below and to the rear of the banjo petrol pipe union, the centrepiece with fibre washer under head can now be pushed up through the throttle bore.

When the centrepiece is removed the fuel needle lever can swing round and will thus allow the fuel needle to drop out of its seating; the needle should, therefore, be removed at the same time as the centrepiece and kept in a safe place until required for reassembly. No attempt should be made to remove the fuel needle lever from the carburetter body.

To Remove Tickler. This should not be necessary unless the vent hole in base of body is blocked, in which case remove the split cotter pin at end of tickler which will release the tickler and its spring. One vent hole is at the bottom of the hole where the spring fits, the other being in the side of the tickler cap.

Carburetter Setting. The Carburetter is fitted with a taper needle marked 2½ on the parallel portion under the head, a centrepiece marked JB on the head, and the jet (which is not detachable) marked B on the hexagon portion. The normal taper needle setting is $\frac{3}{32}$ " from the bottom of the throttle to the end of the needle, but this is usually a matter of individual adjustment to suit each engine.

Reassembly of Carburetter. This, of course, is the reverse process to that already described; the fuel needle should be fitted point first, the fuel needle lever should then be placed so that it holds the needle in position whilst the centrepiece is replaced. Care should be taken to see that the centrepiece complete with fibre washer is fitted so that the locking screw locates in the slot in the head of the centrepiece. When refitting float do not overtighten bottom nut as this may distort the jet.

Flywheel Magneto

The Villiers 6-Pole Flywheel Magneto provides alternating current for both ignition and lighting. A connector is fitted to the lighting cable and this must be unscrewed should the engine be removed. Keep the rubber sleeve in position over the connector, otherwise a short circuit may occur.

The armature plate which carries the ignition coil, lighting coils, and contact breaker mechanism is secured to the engine crankcase by four screws. The H.T. Lead from ignition coil to sparking plug is detachable by unscrewing from armature plate and when refitting it is important to make sure that the brass pad carried by the spring and secured to the terminal makes contact with the soldered disc on the outside of the ignition coil.

In the magneto flywheel are fitted four permanent magnets and two dummies, and it is very important should these be removed at any time that they are replaced in the original position in relation to the peak of the cam profile ground on the centre boss which is rivetted to the arms of the flywheel.

Contact Breaker Assembly

This is of the latest improved type requiring a screwdriver only to adjust the contact points. To adjust the contact points proceed as follows :—

Turn flywheel until rocker pad is on top of cam profile of flywheel boss. Release the screw "A," see Illustration, Fig. 5.

Position Bracket "B" with .015" feeler gauge between contact points, tighten screw, taking care not to use too much force. It is not necessary to disturb screw "C" when adjusting point gap.

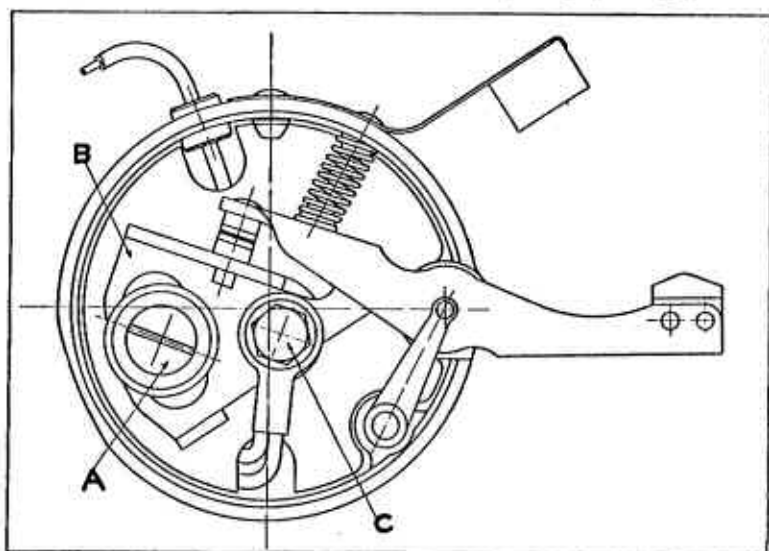


Fig. 5.
Contact Breaker Assembly

A felt pad is used to keep the cam in a slightly oily condition, and is impregnated when new with grease. This can, if visibly dry, be oiled with a small amount of the heaviest oil available. It is better, however, to soak the pad in a molten high temperature grease if it is convenient to detach the box itself for this operation. If too much oil is put on the felt pad it may creep along the Rocker Arm, get on the contact points, and so cause ignition trouble.

The flywheel should not be removed unless absolutely necessary, and then it is advisable to use a Villiers hammer-tight Spanner for the centre nut. The nut is imprisoned in the flywheel and acts as an extractor when turned anti-clockwise looking at the Magneto.

Before access can be made to the nut, of course, the flywheel cover has first to be removed by releasing the three screws holding cover to flywheel.

Timing of the Magneto

The contact breaker points should commence to open when the piston is $\frac{1}{8}$ " before top of stroke. Timing marks are stamped on both the armature plate and flywheel rim.

The mark on the armature plate is stamped on a small boss on the rim of the armature plate, and the mark on the flywheel rim coincides with this mark when the piston is at the top of the stroke. On checking timing it is only necessary to remove the sparking plug ; turn flywheel until the two marks are opposite when the piston should be at top of stroke.

When timing ignition after dismantling loosely fit the flywheel to shaft and, having set piston $\frac{1}{8}$ " from top of stroke, rotate flywheel without turning the crankshaft until the contact points commence to open. Tighten up flywheel centre nut sufficiently tight for crankshaft to be rotated. Check to see that the flywheel has not slipped. Finally tighten the centre nut with the special hammer-tight spanner, refit cover and screws.

Lighting Set

The head and tail lamps are fitted with single pole, single contact bulbs, and it is essential that both lamp bodies make metal to metal contact with the cycle frame to ensure a good EARTH for the lighting circuit.

The correct bulbs are listed on page 4 and the dry battery fitted in the head lamp is the Ever-Ready No. 1289, or one of similar size and capacity.

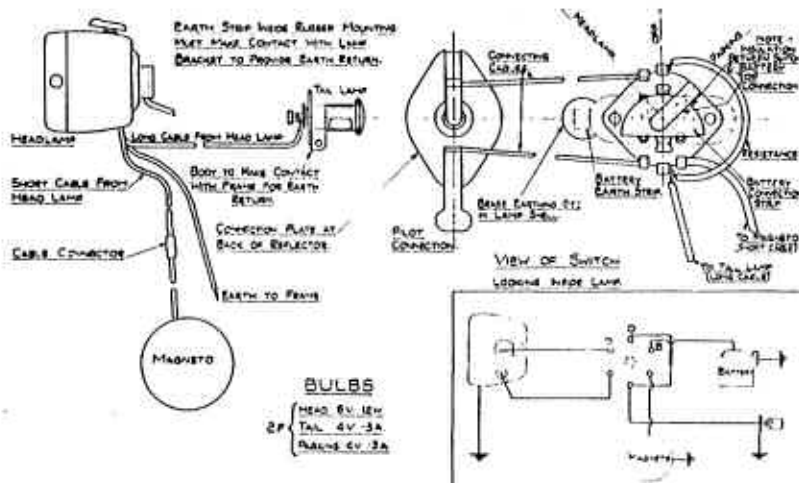


Fig. 6. Wiring Diagram Mk. 2.F.

TRACING TROUBLES

For the satisfactory running of any Villiers Engine it is essential that three main conditions are fulfilled, and by making a systematic and intelligent investigation the faults can usually be located and rectified. Usually when the engine stops, symptoms give a clue to the cause, but where this is not the case, the trouble can be more easily diagnosed by following a definite method of investigation.

The three conditions mentioned above are as follows :—

1. The required quantity of combustible mixture (petrol and air) must enter the engine, which means that a sufficient supply of fuel must be available at the carburetter and that the throttle should open and close freely.
2. There must be a good spark at the plug points, when under compression, and at the correct time in relation to the position of piston on its upward stroke.
3. The engine must be in good mechanical condition, there must be good compression in cylinder and crankcase, and no air leaks at the various joints.

When cause of the trouble is not evident carry out a preliminary examination covering the following points, but if this fails to trace the cause reference should be made to the Fault-Finding Chart.

Having made sure that there is "Petrol" in the tank, and tap is in the "On" position, depress tickler to check if there is any stoppage or obstruction in the fuel supply either in the tap, fuel pipe, banjo union, or fuel needle seating. Being satisfied that fuel is reaching the carburetter, next unscrew sparking plug and with high tension lead attached lay on cylinder head. Test by turning engine by pedals with cycle on stand, and if the spark is satisfactory it is possible that the timing is incorrect. Finally examine the carburetter controls to make certain the throttle is actually opening when the control lever is moved.

FAULT-FINDING CHART

Sequence of Testing	Possible Trouble	Remedy
Engine will not start Depress tickler on carburetter to check whether fuel is reaching carburetter.	No fuel reaching carburetter, air lock in petrol pipe.	Turn tap to "On," refill tank, clear air vent in filler cap. Turn on reserve tap where fitted.
If no fuel, even when tap is on and fuel is in tank.	Choked petrol pipe, filter on tap, filter in banjo. Fuel needle sticking in seating.	Remove and clean out. Dismantle carburetter and fit new needle.
Test for spark by holding sparking plug body on cylinder head.	Leak along insulation of plug or high tension lead.	Try a new plug of the type recommended and/or new H.T. lead.
If still no spark : Test for spark at end of H.T. lead held $\frac{1}{4}$ " from cylinder fins.	Plug points may be oily or sooted up. If no spark at end of H.T. lead, contact breaker point gap may be too narrow or points pitted or dirty or oily.	Clean plug or fit new one. Adjust point gap to .015 inches. Clean.
	Moisture on insulation of condenser box.	Clean and dry out.
	High tension pick-up not making good contact on ignition coil due to corrosion or misplacement.	Clean and correct.
	Cracked insulation of adjustable contact breaker point.	Renew.
	Damaged insulating sleeving on wires connecting contact breaker to coil or condenser.	Replace with new sleeving.
	Faulty connection to low tension wire of ignition coil.	Correct.
If above tests are O.K. but engine will not start.	Faulty condenser.	Replace.
	Faulty ignition coil.	Replace.
	Mixture may be too rich due to use of strangler, or incorrect setting of taper needle.	Open throttle wide and rotate pedals several times to clear engine of petrol mixture, adjust taper needle, drain crankcase.
	Air leaks at carburetter stub or manifold joint causing weak mixture.	Correct.
	Incorrect ignition timing due to flywheel having slipped on driving shaft taper.	Check, following instructions given for respective type of engine.

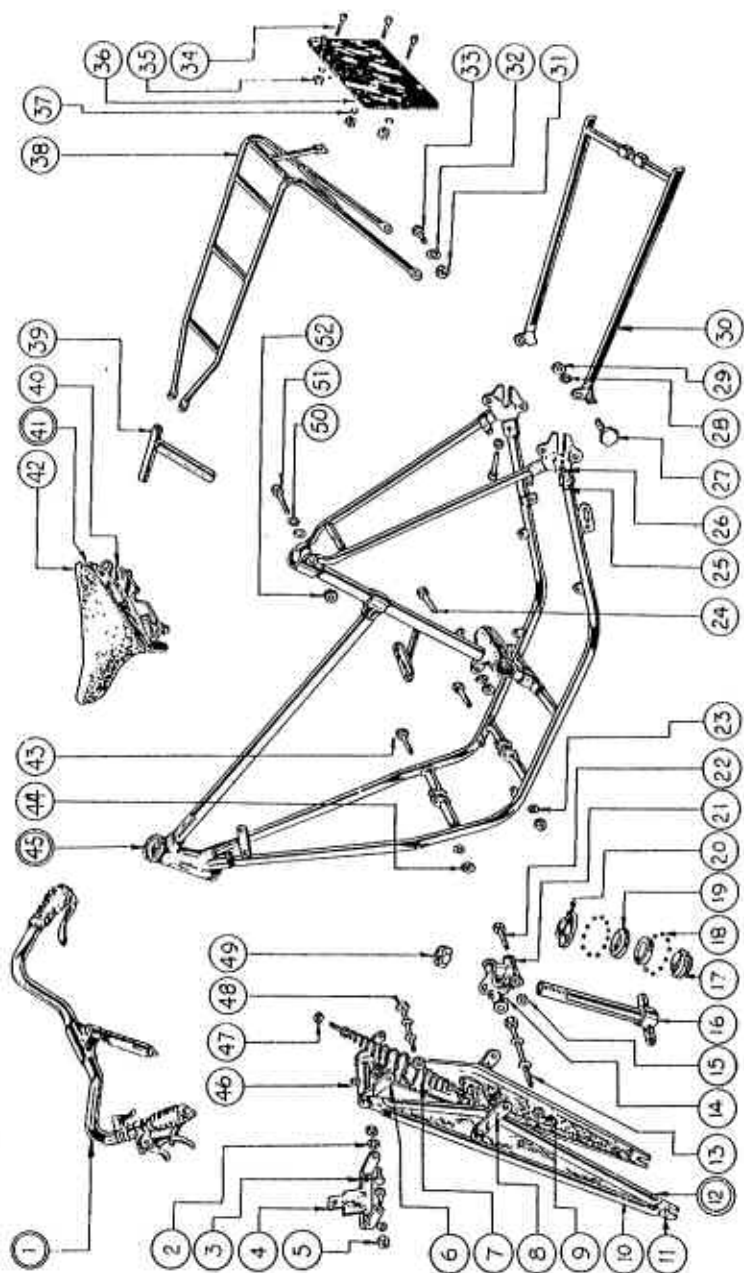
Sequence of Testing	Possible Trouble	Remedy
Engine Four or Eight Strokes		
Strangler may not be fully open or taper needle in the "Rich" position. Air filter where fitted may need cleaning. Check by watching for excessive smoke from exhaust pipe or silencers.	Mixture too rich.	Lower taper needle by moving to "Weak" position. Lower needle by adjuster screw fitted in throttle.
	Engine may four stroke for a little while after standing due to accumulation of oil in crankcase. Flooding of carburetter.	Usually ceases when engine has been running for a few minutes unless too much oil has been mixed with the petrol. Persistent flooding is usually due to dirt under fuel needle seating, or sticking fuel needle, or damaged seating or punctured float.
Engine Lacks Power	Engine out of tune, bearings worn. Unsuitable sparking plug. Loss of compression. Incorrect "Petrol" mixture. Excessive carbon deposit on piston crown, and cylinder head. Exhaust system choked with carbon. Incorrect carburetter setting. Air cleaner choked. Obstruction in fuel supply.	Overhaul. Replace with recommended type. Tighten cylinder head bolts. Worn piston rings. Correct mixture is 1 part oil, 16 parts petrol. Decarbonize.
Engine will not run Slowly	Incorrect ignition timing. Brakes binding. Driving chains too tight.	Clean out silencer and exhaust pipes. Check with setting chart. Wash in petrol, drain, and dip in thin oil. Clean out tap, fuel pipe, and filters. Check against timing chart.
	Weak mixture due to air leaks at carburetter stub or manifold joint, crankcase and cylinder base joints. Crankcase drain screw loose or missing. Worn crankshaft bearings or leaking compression gland. Ignition timing too far advanced.	Adjust. Adjust. Tighten all joints.
Engine Suddenly Stops Firing.	Tighten or replace. Replace. Correct.	
	Sparking plug lead detached. Plug points bridged by oil, carbon, or deposit caused by use of leaded petrol. Short circuit of high tension current by water on H.T. lead.	Replace and tighten nut. Clean or replace. Dry out.

Frame, Fork and Handlebar

Illus. No.	Part No.	Component	List Price	
			£	s. d.
1	C19	Handlebars (Complete with Levers and Cables)	2	11 0 each
	C19 A	Handlebar Sub-Assembly, Complete...	15	0 "
	C19 B	Handlebar Bend and Stem ...	14	0 "
	C19 C	Expander Bolt ...		8 "
	C19 D	Expander Cone ...		3 "
	C19 E	Expander Washer ...		2 "
	C19 F	Handlebar Grip...	1	6 per pair
2	D68	Lamp Bracket Securing Washer ...		3 per doz.
3	D75	Lamp Bracket Securing Bolts ...		2 each
4	D104A	Lamp Bracket ...	1	0 "
5	D88	Lamp Bracket Securing Nuts ...		2 "
6	D241	Front Fork Top Links ...	2	0 "
7	D240	Front Fork Spring with Bolts and Nuts ...	7	6 "
8	D238	Front Fork Lower Links ...	2	0 "
9	D252	Front Fork Link Locknuts ...		3 "
10	A6B	Front Fork Blades and Spring only ...	1	17 6 "
11	A6A	Front Fork Girder Complete ...	1	10 0 "
12	B7	Front Forks complete ...	3	0 0 "
13	D237	Front Fork Lower Link Bolt with Washers...		2 0 "
14	D254	Front Fork Locking Bracket ...		7 0 "
15	D252A	Front Fork Locking Bracket Nut ...		3 "
16	D253	Front Fork Column with Cross Tube and Support Tube (state length from seating)	10	0 "
17	D99	Crown Ball Race ...		9 "
18	D102	Headrace Ballbearings ...	1	0 per set
19	D100	Ball Headrace ...		10 each
20	D98	Screwed Headrace ...		10 "
21	A7	Front Fork Locking Bracket with Bolt and Nut	8	3 "
22	D251	Front Fork Locking Bracket Bolt ...	1	0 "
23	D64	Engine Bolt Washers ...		6 per doz.
24	D39	Engine Bolt ...		3 each
25	D87	Chain Adjuster Screw ...		4 "
26	D88	Chain Adjuster Nut ...		1 "
27	D47	Stand Bolt ...		6 "
28	D49	Stand Bolt Washer ...		8 per doz.
29	D48	Stand Bolt Nut ...		1 each
30	D43A	Stand (complete) ...	9	0 "
31	D48	Carrier Attachment Nuts ...		1 "
32	D49	Carrier Attachment Washers...		8 per doz.
33	D53	Carrier Attachment Bolts ...		2 each
34	D111	Rear Number Plate Securing Screws ...		4 per doz.
35	D112	Rear Number Plate Securing Nuts ...		4 "
36	C21A	Rear Number Plate ...	1	3 each
37	D113	Rear Number Plate Securing Washers ...		3 per doz.
38	D51A	Carrier ...		9 0 each
39	C20	Seat Pillar ...	2	2 "
40	D244	Saddle Springs ...		
41	C18	Saddle Complete ...	1	0 0 "
42	D245	Saddle Cover ...		
43	D39	Engine Bolts ...		3 "
44	D41	Engine Bolt Nuts ...		2 "
45	A5	Frame (complete) ...	8	0 0 "
46	D233	Front Fork Grease Nipple ...		3 "
47	D239	Front Fork Spring Securing Nut ...		3 "
48	D242	Front Fork Top Link Bolt with Nut and Washers ...	1	9 "
49	D101	Front Fork Column Locknut (Chromed) ...	2	6 "
50	D123	Seat Bolt Washers ...		4 per doz.
51	D96	Seat Bolt...		3 each
52	D41	Seat Bolt Nut ...		2 "

All spare parts may be obtained through your local Bown agent.

Frame, Fork and Handlebar



Wheels and Hub Assembly

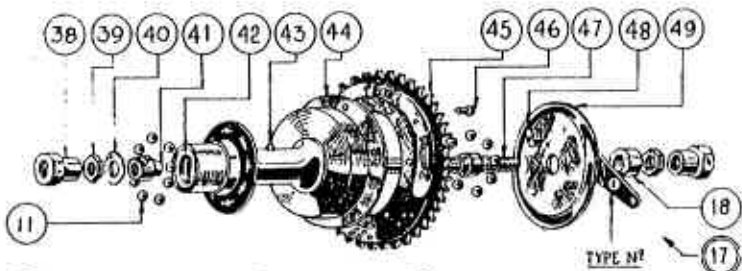
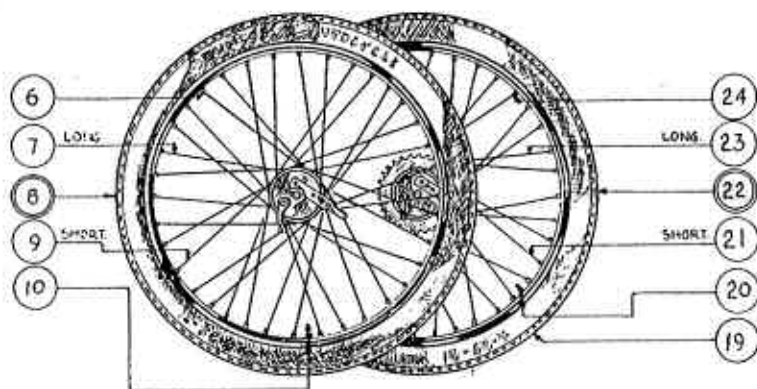
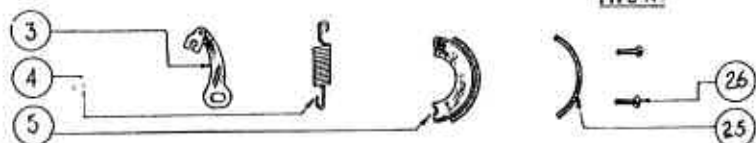
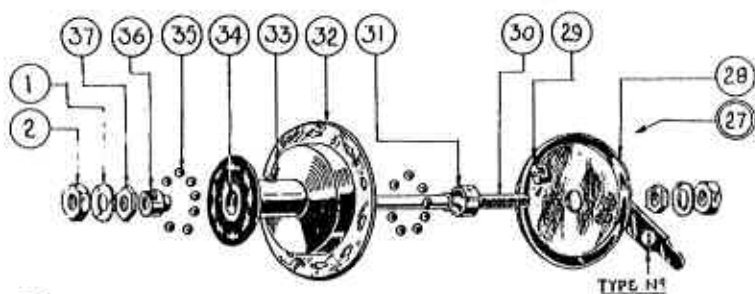
Illus. No.	Part No.	Component	List Price	
			£	s. d.
1	D123	Front Hub Packing Washer	1	each
2	D187	Front Hub Spindle Nuts	4	"
3	D203	Front Brake Operating Lever... ..	1	6 "
4	D204	Front Brake Shoe Springs	1	2 per pair
5	D205	Front Brake Shoe with Lining	9	0 "
6	D82	Front Spoke Nipples (13 gauge)	6	per doz.
7	D83	Front Spokes 9 $\frac{1}{8}$ " long x 13 gauge	8	"
8	D305	Front Wheel complete (less tyre)	2	16 0 each
9	D81	Front Spokes 9 $\frac{1}{8}$ " long x 13 gauge	8	per doz.
10	C14	Tubes (front and rear)... ..	*	"
11	D60	Ballbearings (rear hub)	1	6 per set
12	D214	Rear Brake Operating Lever	1	6 each
13	D216	Rear Brake Shoe Springs	1	2 per pair
14	D215	Rear Brake Shoe with Lining	9	0 "
15	D217	Brake Liners (rear)	2	2 "
16	D306	Brake Liner Rivets		
17	D307	Rear Hub (complete)	2	9 4 each
18	D213	Rear Spindle Packing Collar	6	"
19	C13	Covers (front and rear)	*	"
20	C15	Tapes (front and rear)... ..	*	"
21	D86	Rear Spokes 8 $\frac{1}{8}$ " x 12 gauge	9	per doz.
22	D309	Rear Wheel complete (less tyre)	3	14 0 each
23	D84	Rear Spokes 9 $\frac{1}{8}$ " long x 12 gauge	9	per doz.
24	D80	Rear Spoke Nipples (12 gauge)	6	"
25	D206	Brake Liners (front)	2	2 per pair
26	D306	Brake Liner Rivets		
27	D308	Front Hub (complete)	1	12 0 each
28	D199	Front Brake Sideplate with Bush and Fulcrum Pin, also Anchor Plate	8	3 "
29	D310	Front Brake Operating Cam (with Fulcrum Pin and Bush)	3	9 "
30	D202	Front Spindle $\frac{1}{4}$ "	2	3 "
31	D201	Front Spindle Cone (fixed)	1	6 "
32	D198	Front Hub Drum with Tube and Spoke Flange	15	0 "
33	D197	Front Hub Grease Nipple	9	"
34	D196	Front Hub Dust Washer	9	"
35	D60	Front Hub Ballbearings	1	6 per set
36	D195	Front Spindle Cone (adjustable)	1	6 each
37	D304	Front Hub Packing Nut	4	"
38	D188	Rear Spindle Nuts	1	6 per pair
39	D194	Rear Hub Packing Nuts	6	each
40	D129	Rear Hub Packing Washers	3	"
41	D231	Rear Spindle Cone (adjustable)	1	6 "
42	D232	Rear Hub Dust Washers	9	"
43	D197	Rear Hub Grease Nipple	9	"
44	D208	Rear Hub Drum with Tube and Spoke Flange	1	1 0 "
45	D209	Rear Hub Sprocket Flange with Rivets	1	1 3 "
46	D234	Rear Hub Sprocket Flange Rivets		
47	D211	Rear Spindle	2	8 "
48	D311	Rear Brake Operating Cam (with Fulcrum Pin and Bush)	3	9 "
49	D207	Rear Brake Sideplate with Cable Stop, Bush, and Fulcrum Pin; also Anchor Plate	10	6 "

When Ordering please quote Type Number on Brake Arm.

* Covers, tubes, and tapes obtainable only through your local Dealer except on repair orders.

All spare parts may be obtained through your local Bown agent.

Wheels and Hub Assembly



WHEN ORDERING PLEASE QUOTE TYPE N° ON BRAKE ARM.

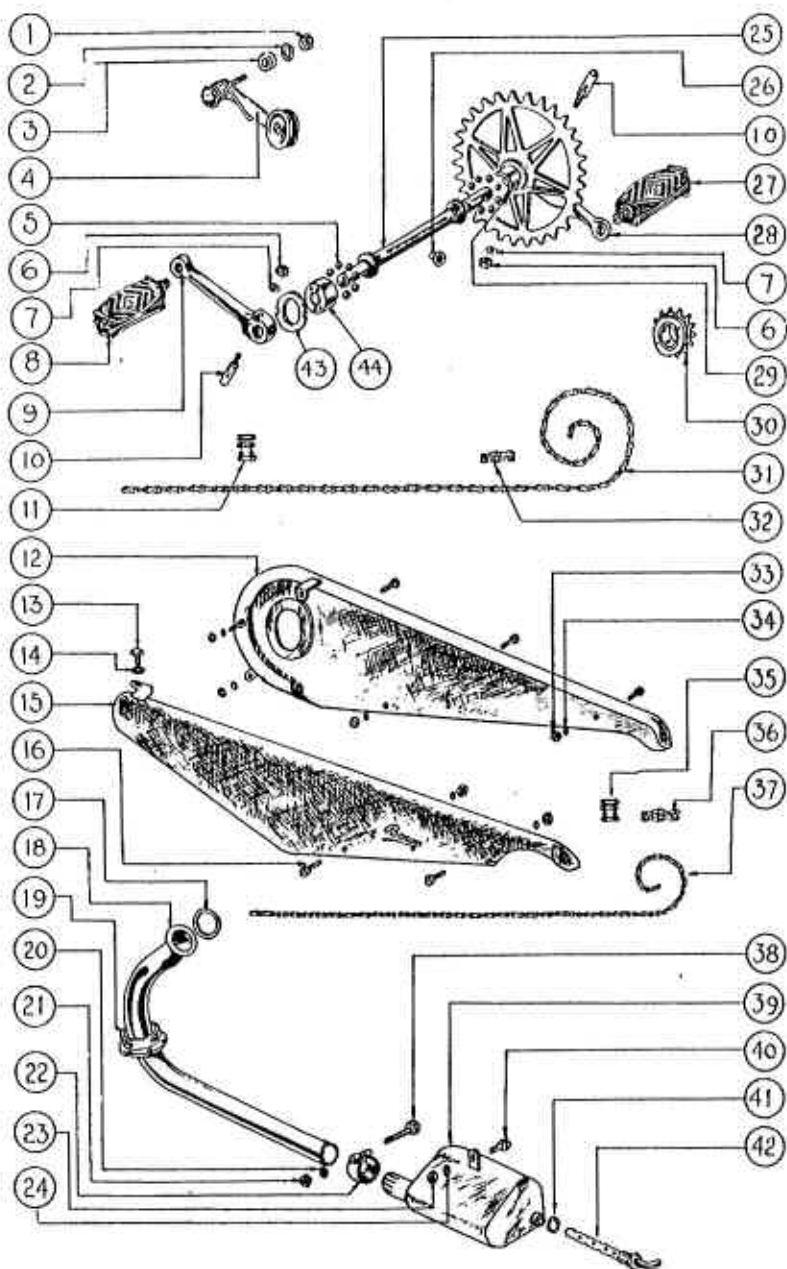
Bottom Bracket Assembly, Exhaust and Chainguards

Illus. No.	Part No.	Component	List Price	
			£	s. d.
1	D48	Jockey Pulley Attachment Nut	1	each
2	D49	Jockey Pulley Attachment Nut Washer	6	per doz.
3	D126	Jockey Pulley Spacer	3	each
4	C17	Jockey Pulley	7	0 ..
5	D60	Bottom Bracket Ballbearings	1	0 per set
6	D62A	Cotter Pin Nut	2	each
7	D62B	Cotter Pin Washer	3	per doz.
8	D61	Pedal, left hand	4	3 each
9	C4	Crank, left hand	4	10 ..
10	D62	Cotter Pin	4	"
11	D182	Chain Connector (pedal drive)	*	"
12	B4	Pedal Chain Guard	10	6 ..
13	D75	Engine Chain Guard Attachment Bolt	2	"
14	D68	Engine Chain Guard Attachment Washer	3	per doz.
15	B3	Engine Chain Guard	10	0 each
16	D115	Chain Guard Securing Bolts	3	per doz.
17	D184	Exhaust Pipe Sealing Ring (copper)	3	each
18	C7	Exhaust Pipe	15	0 ..
19	D185	Exhaust Pipe to Engine Nut	1	3 ..
20	D138	Silencer Clip Washer	3	per doz.
21	D88	Silencer Clip Nut	1	each
22	D33	Silencer Clip	6	"
23	D88	Silencer Securing Nut	1	"
24	D138	Silencer Securing Washer	3	per doz.
25	D56	Bottom Bracket Axle	4	6 each
26	D63	Bottom Bracket Lubricator	2	"
27	D61A	Pedal, right hand	4	3 ..
28	C3	Chain Wheel	11	10 ..
29	D57	Bracket Cup, flanged	8	"
30	D79	Freewheel	5	2 ..
31	C16	Chain (pedal drive) 94 links	*	"
32	D183	Half Link (pedal chain)	*	"
33	D112	Chain Guard Securing Nuts	4	per doz.
34	D113	Chain Guard Securing Washers	3	"
35	D182A	Connector (engine drive chain)	*	"
36	D183A	Half Link (engine drive chain)	*	"
37	D67	Engine Drive Chain, 118 links	*	"
38	D136	Silencer Clip Bolt	1	each
39	B5	Silencer	11	6 ..
40	D70	Silencer Attachment Bolt	1	"
41	D34	Silencer Outlet Washer	5	per doz.
42	D186	Silencer Exhaust Outlet	4	0 each
43	D59	Bottom Bracket Cup Locking Ring	4	"
44	D58	Bottom Bracket Cup (left hand adjusting)	7	"

* Chains obtainable only through your local Dealer
except on repair orders.

All spare parts may be obtained through your local Bown agent.

Bottom Bracket Assembly, Exhaust and Chainguards

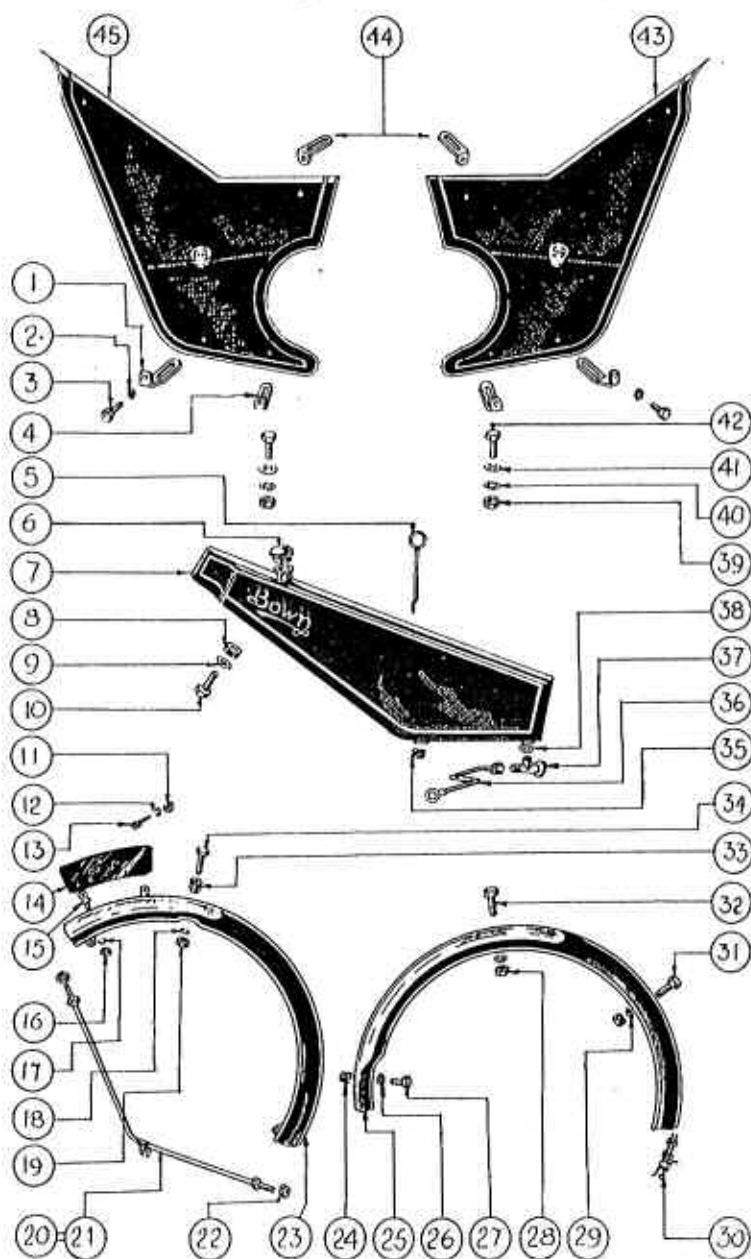


Petrol Tank, Engine Shields and Mudguards

Illus. No.	Part No.	Component	List Price £ s. d.
1	D150	Engine Shield Attachment Brackets (lower front)	10 each
2	D138	Engine Shield Attachment Washers	3 per doz.
3	D75	Engine Shield Attachment Bolts	2 each
4	D153	Engine Shield Attachment Brackets (lower rear)	10 "
5	D18	Choke Wire	4 "
6	D95	Petrol Tank Filler Cap	2 10 "
7	B6	Petrol Tank	2 10 0 "
8	D91	Rubber Tank Washers... ..	1 "
9	D127	Steel Tank Washers	6 per doz.
10	D92	Tank Attachment Bolts	2 each
11	D112	Front Number Plate Attachment Nuts	4 per doz.
12	D113	Front Number Plate Attachment Washers	3 per doz.
13	D115	Front Number Plate Attachment Screws	3 per doz.
14	C22	Front Number Plate	1 6 each
15	D109A	Front Number Plate Clips	3 "
16	D88	Front Number Plate Clip Nuts	1 "
17	D68	Front Number Plate Clip Washers	3 per doz.
18	D68	Front Mudguard Securing Washer	3 "
19	D88	Front Mudguard Securing Nut	1 each
20	C9B	Front Mudguard Stays (right hand)	11 "
21	C9A	Front Mudguard Stays (left hand)	11 "
22	D88	Front Mudguard Stay Nuts	1 "
23	C8	Front Mudguard	7 6 "
24	D162	Rear Mudguard Spacer	4 "
25	C6	Rear Mudguard	7 6 "
26	D68	Rear Mudguard Lower Attachment Washer	3 per doz.
27	D70	Rear Mudguard Lower Attachment Bolt	2 each
28	D88	Rear Mudguard Fixing Nuts	1 "
29	D68	Rear Mudguard Securing Washer	3 per doz.
30	D50B	Stand Support Clip	3 0 each
31	D75	Rear Mudguard to Carrier Bolt	2 "
32	D66	Rear Mudguard Top Fixing Bolt	1 "
33	D69	Front Mudguard Spacer	4 "
34	D66	Front Mudguard Securing Bolt	1 "
35	D130	Choke Wire Rubber Grommet	3 "
36	D17	Petrol Feed Pipe Complete with Union	4 0 "
37	D93	Petrol Tap	2 6 "
38	D94	Petrol Tap Washer (fibre)	3 per doz.
39	D88	Engine Shield Bracket Fixing Nuts	1 each
40	D138	Engine Shield Bracket Fixing Washers	3 per doz.
41	D154	Engine Shield Bracket Fixing Washers (plain)	3 per doz.
42	D70	Engine Shield Bracket Fixing Bolts	2 each
43	A1	Engine Shield (right hand)	16 6 "
44	D152	Engine Shield Attachment Brackets (top)	8 "
45	A2	Engine Shield (left hand)	16 6 "

All spare parts may be obtained through your local Bown agent.

Petrol Tank, Engine Shields and Mudguards

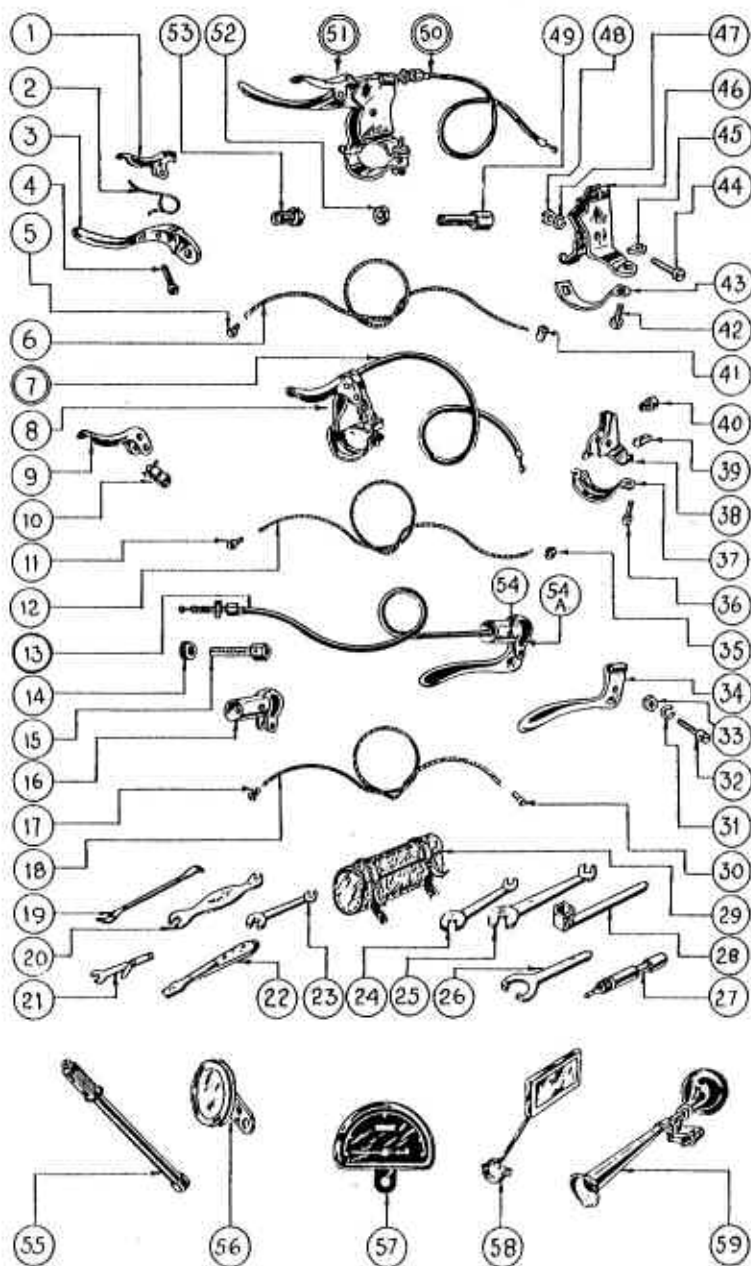


Handlebar Controls and Equipment

Illus. No.	Part No.	Component	Est price £ s. d.
1	D281	Clutch Trigger ...	4 each
2	D271	Clutch Trigger Spring ...	2 "
3	D282	Clutch Lever ...	4 0 "
4	D283	Clutch Trigger Rivet ...	2 "
5	D246	Clutch Cable Nipple ...	2 "
6	D235	Clutch Inner Cable ...	1 0 "
7	D261	Decompression Valve Cable, complete ...	2 6 "
8	D279	Decompression Valve Lever and Cable, complete ...	5 6 "
9	D284	Decompression Valve Lever ...	1 0 "
10	D285	Decompression Valve Lever Trunnion and Split Pin ...	1 6 "
11	D246	Decompression Valve Cable Nipple ...	2 "
12	D236	Decompression Valve Inner Cable ...	9 "
13	D243	Brake Cable, complete (front) ...	3 0 "
	D256	Brake Cable, complete (rear) ...	4 0 "
14	D247	Brake Cable Adjuster Nut (front and rear) ...	2 "
15	D248	Brake Cable Adjuster Screw (front and rear) ...	3 "
16	D250	Brake Handlebar Socket Insert (state front or rear) ...	2 3 "
17	D246	Brake Cable Nipples ...	2 "
18	D249	Brake Inner Cable (front) ...	1 0 "
		Brake Inner Cable (rear) ...	1 6 "
19	D172	Spoon Type Tyre Lever ...	1 1 "
20	D173	Spanner Terry, 4.BA and 6.BA ...	1 6 "
21	D171	Magneto Spanner ...	1 5 "
22	D170	Screwdriver "Perfect" pattern ...	2 10 "
23	D176	Spanners $\frac{1}{2}$ " and 2.BA... ..	1 10 "
24	D175	Spanners $\frac{1}{2}$ " and $\frac{3}{8}$ " Whit. ...	1 11 "
25	D174	Spanner $\frac{3}{8}$ " and $\frac{1}{2}$ " Whit. ...	1 9 "
26	D168	Exhaust "C" Spanner ...	1 4 "
27	D167	Grease Gun ...	3 7 "
28	D169	Plug Spanner ...	1 3 "
29	D166	Toolbag (leather) ...	4 6 "
30	D246	Brake Cable Nipple ...	2 "
31	D286	Brake Lever Screw Washer (front and rear) ...	1 1 "
32	D287	Brake Lever Fulcrum Screw (front and rear) ...	1 1 "
33	D288	Brake Lever Screw Nut (front and rear) ...	3 6 "
34	D289	Brake Lever (front and rear) ...	3 3 "
35	D246A	Decompression Valve Inner Cable Stop ...	2 6 "
36	D290	Decompression Valve Lever Saddle Clip Screw ...	1 2 "
37	D291	Decompression Valve Lever Clip ...	6 "
38	D292	Decompression Valve Lever Saddle ...	1 2 "
39	D293	Decompression Valve Lever Clip Nut ...	2 "
40	D260	Decompression Valve Lever Cable Stop Bush ...	6 "
41	D246B	Clutch Inner Cable Stop ...	3 "
42	D294	Clutch Lever Clip Screw ...	2 4 "
43	D295	Clutch Lever Clip ...	4 2 "
44	D296	Clutch Lever Pivot Screw or Rivet ...	2 0 "
45	D297	Clutch Lever Clip "D" Nut ...	2 2 "
46	D298	Clutch Lever Saddle ...	2 0 "
47	D299	Clutch Lever Saddle Washer ...	2 2 "
48	D300	Clutch Lever Pivot Nut ...	6 "
49	D257	Clutch Cable Adjusting Screw ...	6 6 "
50	D255	Clutch Cable, complete ...	3 0 "
51	D255A	Clutch Control (lever and cable) complete ...	10 0 "
		Clutch Control Lever (without cable) ...	7 0 "
52	D258	Clutch Cable Adjuster Nut ...	2 "
53	D301	Clutch Saddle Tapped Nose piece ...	2 "
54	D250A	Brake Lever Grub Screw ...	6 2 "
54A	D568	Brake Lever, complete ...	6 0 "
55	D89	Pump ...	5 6 "
56	D177	Licence Holder ...	2 6 "
Extras :			
57	D131	Speedometer (miles per hour) ...	3 16 0 each
	D131A	Speedometer (kilometres per hour) ...	3 16 0 "
58	D303	Driving mirror ...	8 0 "
59	D132	Post Horn ...	7 0 "

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Handlebar Controls and Equipment

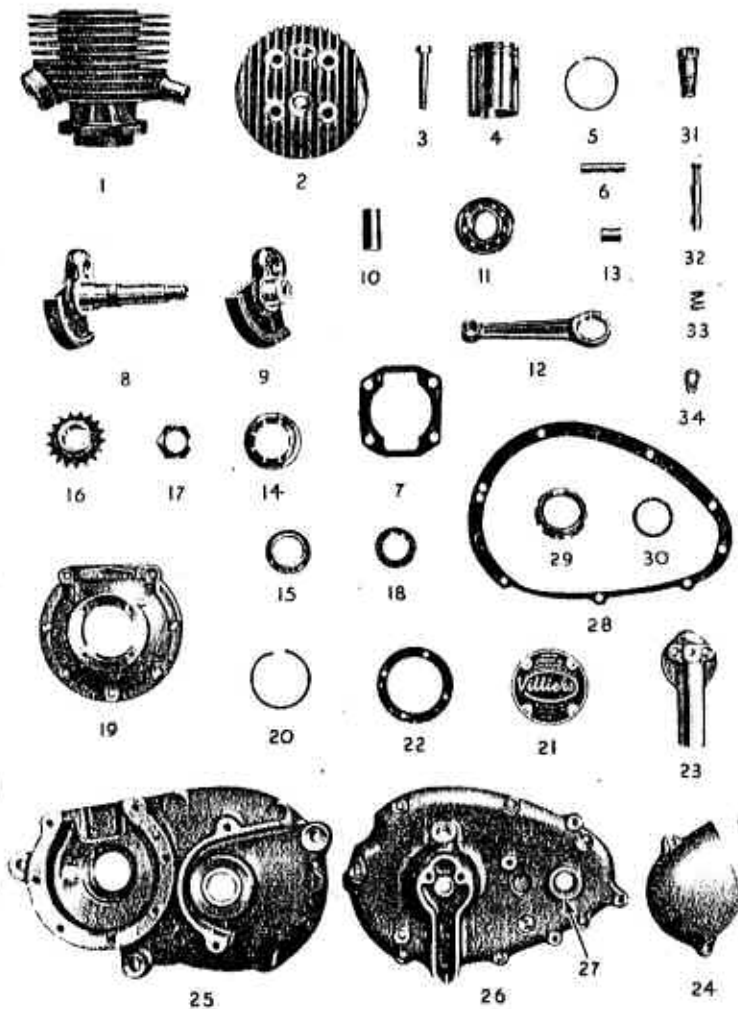


Engine

Illus. No.	Part No.	Component	List Price			each
			£	s.	d.	
1	B7261/2	Cylinder	2	10	0	each
2	B7455	Cylinder Head	16	0	0	"
3	E3907	Cylinder Head Bolt	8	0	0	"
4	C7045	Piston, Bushed, Standard Size ...	1	0	0	"
5	E6141	Piston Ring, Standard Size ...	1	9	0	"
5	E7516	Piston Ring, .015" Oversize ...	1	9	0	"
5	E7518	Piston Ring, .03" Oversize ...	1	9	0	"
6	E7198	Gudgeon Pin	2	6	0	"
7	E7168	Joint Washer, Cylinder Base ...	4	0	0	"
8	D7266	Driving Shaft, Right Hand ...	1	10	0	"
9	D7267	Driving Shaft, Left Hand ...	12	0	0	"
10	E7493	Crankpin, .001" Oversize ...	4	6	0	"
11	6205	Ball Bearing, Driving Shaft ...	—	0	0	"
12	D7494	Con. Rod, .001" Oversize ...	12	6	0	"
13	E6192	Con. Rod, Small End Bush ...	2	6	0	"
14	E6221	Crankcase Gland Spring ...	1	0	0	"
15	E6724/1	Crankcase Gland Bush ...	4	0	0	"
16	E6725	Engine Sprocket	7	0	0	"
17	E6930	Engine Sprocket Nut	9	0	0	"
18	E7197	Engine Sprocket Lockwasher ...	4	0	0	"
19	B7262	Crankcase, Left Hand	1	0	0	"
20	E7189	Crankcase Bearing Circlip ...	6	0	0	"
21	E7275	Crankcase End Plate	2	0	0	"
22	E7276	Crankcase End Plate Washer ...	3	0	0	"
23	D7410	Clutch Bridge	6	0	0	"
24	D7413	Chain Cover	5	0	0	"
25	A7408	Crank and Clutchcase	2	0	0	"
26	A7409	Clutch Cover	1	15	0	"
27	E7385	Clutch Cover Bush	2	6	0	"
28	C7417	Clutch Cover Washer	4	0	0	"
29	E3934	Nut, Exhaust Pipe	1	3	0	"
30	E4453	Washer for Nut	3	0	0	"
31	E3064	Body, Release Valve	3	0	0	"
32	E1280	Stem, Release Valve	1	9	0	"
33	E1163	Spring, Release Valve	5	0	0	"
34	E1276	Nut, Release Valve	3	0	0	"

All spare parts may be obtained through your local Bown agent.

Engine



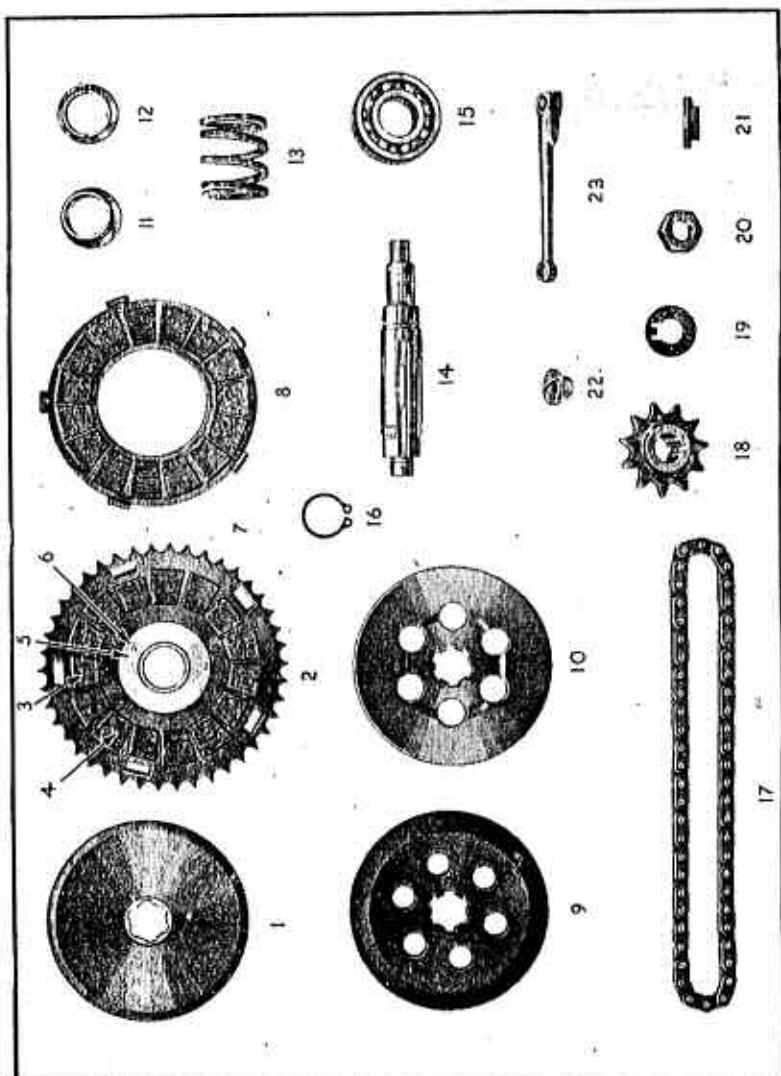
Always quote Engine Number when ordering spares.

Engine—continued

Illus. No.	Part No.	Component	List Price		
			£	s.	d.
1	D5433	Clutch Plate, Outer	5	3	each
2	D5232	Clutch Sprocket, Assembly ...	11	6	..
3	E5220	Clutch Cork, Small	1		..
4	E4960	Clutch Cork, Large	1		..
5	E4955	Clutch Sprocket Side Plate ...	5		..
6	E5001	Rivet for Side Plate	2		per set
7	E4948	Sprocket Ball Race	2	3	each
8	D5233	Clutch Plate, Corked	5	9	..
9	D4951	Clutch Plate, Outer	5	3	..
10	D4954	Clutch Plate Centre, Dished ...	5	3	..
11	E5556	Clutch Spring Bush, Long ...	1	6	..
12	E7608	Clutch Spring Bush, Short, Split	1	6	per pair
13	E5558/1	Clutch Spring	1	2	each
14	C7411/1	Clutch Shaft	10	0	..
15	6204	Clutch Shaft Ball Bearing ...			
16	E7454	Clutch Shaft Circlip	9		..
17	110037	Primary Chain, 54 Pitches ...	12	0	..
18	D7415	Drive Sprocket, 11 Teeth ...	6	6	..
19	D6125	Drive Sprocket Lockwasher ...	4		..
20	E3931	Drive Sprocket Nut	6		..
21	E4944	Clutch Cotter	10		..
22	E4104	Oil Filler Plug	10		..
23	D7412	Clutch Lever	2	6	..

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Engine—continued



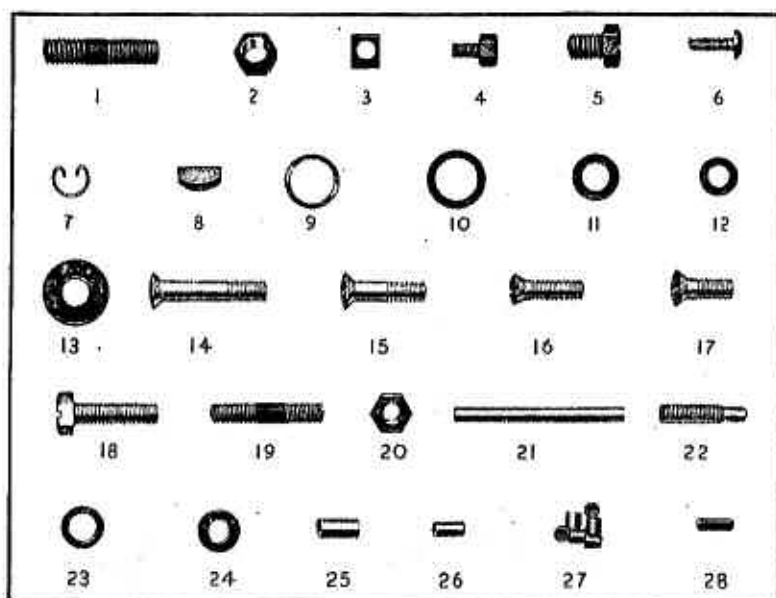
Always quote Engine Number when ordering spares.

Engine—continued

Illus. No.	Part No.	Component	List Price		
			£	s.	d.
1	E363	Cylinder Base Stud			3 each.
2	E3961	Nut for Stud	2	..	
3	E1545	Clamp, Release Valve	2	..	
4	E6737	Clamp Screw, Release Valve	2	..	
5	E1962	Oil Level Plug	4	..	
6	E7530	Screw, Crankcase End Plate	2	..	
7	E5218	Circlip, Gudgeon Pin	4	..	
8	E5581	Key, Drive Sprocket	3	..	
9	E3318	Joint Washer, Release Valve	2	..	
10	V107 x 3	Joint Washer, Oil Filler Plug	2	..	
11	E1905	Joint Washer, Level Screw	2	..	
12	V476	Joint Washer, Crankcase Drain Screw	1	..	
13	E5808	Washer, Cylinder Head Bolt	2	..	
14	E7271	Crankcase Screw, $1\frac{1}{10}$ " x 90°	5	..	
15	E7128	Crankcase Screw, $\frac{3}{4}$ " x 90°	4	..	
16	E4934	Clutch Bridge Screw, $\frac{11}{16}$ " x 60°	3	..	
17	E7326	Clutch Cover Screw, 1" x 90°	3	..	
18	E3222	Clutch Cover Bolt & Drain Screw	6	..	
19	E5107	Stud, Clutch Cover, $\frac{1}{2}$ " x $1\frac{5}{16}$ "	3	..	
20	E2539	Nut for Stud, Small Hex.	2	..	

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Engine—continued



Illus. No.	Part No.	Component	List Price		
			£	s.	d.
20	E401	Nut for Clutch Adjuster Screw			2 each
21	E7414	Clutch Operating Rod	9		..
22	E6567	Clutch Adjuster Screw	6		..
23	E1050	Spring Washer, $\frac{5}{16}$ "	2		..
24	E2924	Plain Washer, $\frac{1}{4}$ "	1		..
25	E7619	Dowel, Clutch Case	3		..
26	E2677	Dowel, Crankcase	3		..
27	E7452	Crankpin Roller	2		..
28	E5124	Key, Engine Sprocket	3		..

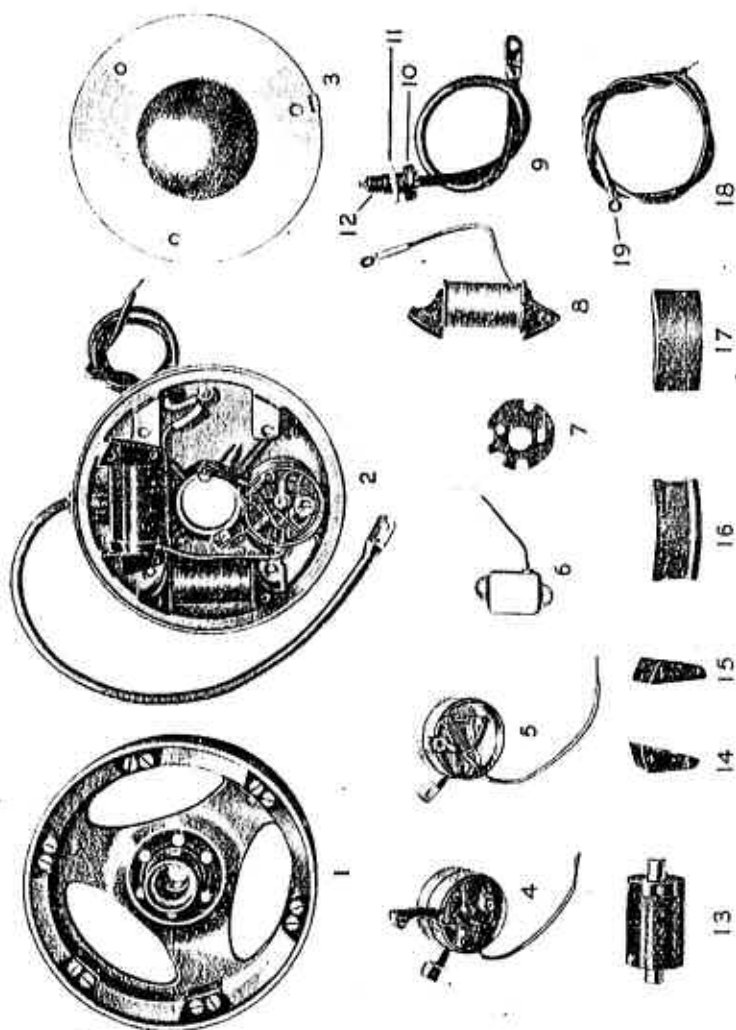
Always quote Engine Number when ordering spares.

Magneto

Illus. No.	Part No.	Component	List Price		
			£	s.	d.
1	R110	Flywheel Assembly, less Cover	4	12	0 each
2	A107	Armature Plate Assembly ...	4	0	0 ..
3	M1580	Flywheel Cover	4	0	..
4	M1864	Con. Box Assembly	18	6	..
5	M1872	Con. Box Only with Oil Pad	5	0	..
6	M1750	Condenser	4	6	..
7	M1803	Insulating Pad, Con. Box ...	3		..
8	M2049	Lighting Coil Assembly ...	12	0	..
9	1148 x 4	H.T. Lead Complete	4	6	..
10	1124 x 8	H.T. Terminal	1	0	..
11	E869	H.T. Terminal Felt Washer ...	3		..
—	1010 x 11	H.T. Spring	2		..
12	1046 x 13	H.T. Spring Pad	2		..
—	½" x No. 2	H.T. Spring Screw	2		..
13	M1361	H.T. Coil	1	0	0 ..
14	M1855	H.T. Coil End, L. Hand ...	3	0	..
15	M1856	H.T. Coil End, R. Hand ...	3	0	..
16	M1553	Dummy Magnet	2	0	..
17	M1354	Magnet	4	0	..
18	125/114	Lighting Lead	7		..
19	M1291	Lighting Lead Terminal ...	1		..

All spare parts may be obtained through your local Bown agent.

Magneto



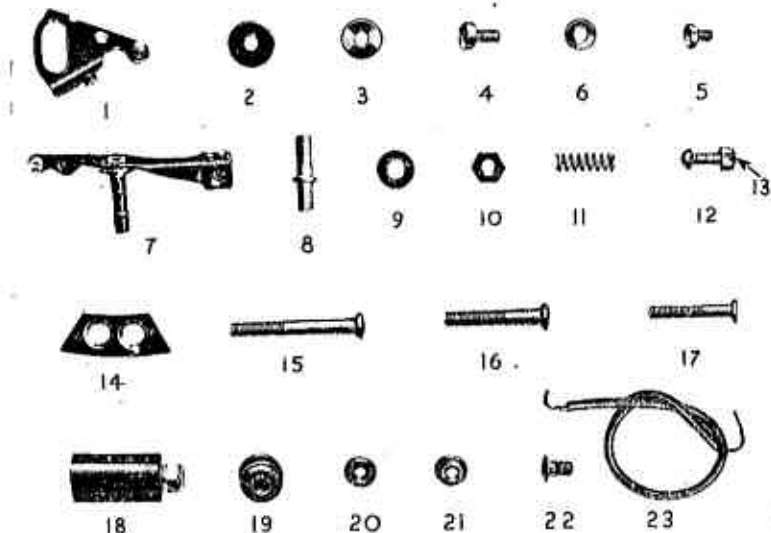
Always quote Engine Number when ordering spares.

Magneto—continued

Illus. No.	Part No.	Component	List Price		
			£	s.	d.
1	M1873	Point Bracket	2	3	each
2	M1805	Fibre Washer, Locking Screw	2		..
2	M1802	Brass Washer, Locking Screw	2		..
4	M1801	Locking Screw, Point Bracket	4		..
5	1006 x 3	Contact Screw, Point Bracket	2		..
6	1113 x 5	Contact Screw Washer ...	1		..
7	M1714	Rocker Arm with Point and Pad	4	6	..
8	1053 x 1	Stud, Con. Box Fixing	3		..
9	1002 x 13	Spring Washer for Stud ...	2		..
10	1002 x 15	Nut for Stud	2		..
11	1047 x 3	Rocker Arm Spring	3		..
12	M1670	Terminal Screw	3		..
13	1113 x 4	Nut for Screw	1		..
14	M1822	Top Plate, Pole Shoe	3		..
15	1002 x 9	Fixing Screw, Pole Shoe ...	3		..
16	1124 x 9	Fixing Screw, Arm Plate and Lighting Coil	3		..
17	M1383	Fixing Screw, H.T. Coil Ends ...	3		..

All spare parts may be obtained through your local Bown agent.

Magneto—continued



Illus. No.	Part No.	Component	List Price	
			£	s. d.
18	1106 x 14	Lighting Lead Connector ...	7	each
19	M1232	Rubber Grommet	2	..
20	1013 x 13	Terminal Bush, Inside	3	..
21	1013 x 12	Terminal Bush, Outside	3	..
22	M1228	Screw, Flywheel Cover	3	..
23	482	L.T. Lead, H.T. Coil to Point Bracket	6	..

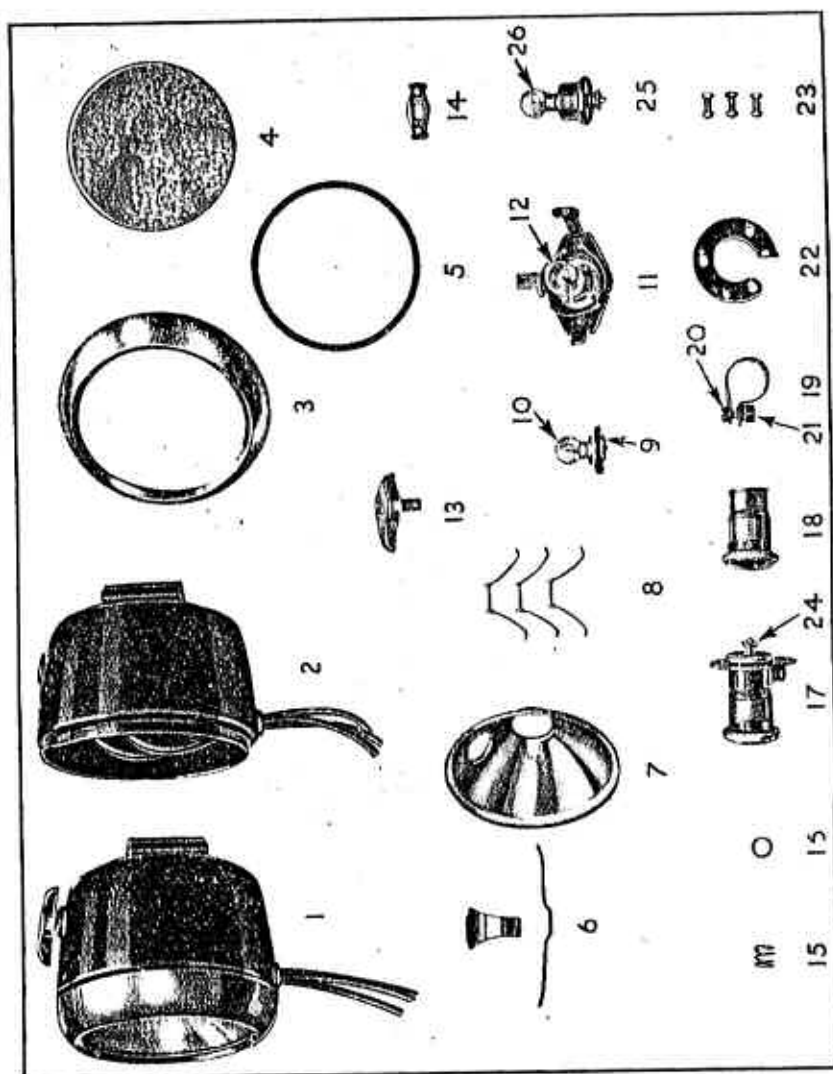
Always quote Engine Number when ordering spares.

Lighting Set

Illus. No.	Part No.	Component	List Price		
			£	s.	d.
—	VRS.304	Complete Lighting Set with Head Lamp, Tail Lamp, Bulbs, and Cables			
1	64004B	Head Lamp complete with Cables			
2	608094	Head Lamp Body Assembly with Bracket and Cables... ..			
3	608254	Front Rim			
4	608340	Front Glass			
5	600307	Rubber Packing for Glass			
6	608190	Front Clip and Fixing Wire			
7	608552	Reflector			
8	608073	Reflector Retaining Wire			
9	608025	Pilot Bulb Holder			
10		Pilot Bulb, 4 V.—3A, Screw Cap			
11	601036	Main Bulbholder Assembly			
12		Main Bulb, 6 V.—12 W.			
13	608179	Switch Knob Assembly			
14	608033	Switch Arm			
15	608030	Switch Spindle Spring			
16	699009	Switch Spindle Spring Washer... ..			
—	601087A	Cable, Head to Magneto, 23"			
—	608076F	Cable, Head to Tail, 82"			
—	631067A	Cable, Head to Earth, 29"			
—	601081	Resistance			
17	606212A	Tail Lamp complete, type V.T.31			
18	601082	Tail Lamp Body			
19	606216	Tail Lamp Body Clip			
20	126520	Clip Screw			
21	165190	Clip Screw Nut			
—	G1405	Clip Screw Washer			
22	601084	Fixing Plate			
23	608177	Fixing Plate Screw and Nut			
24	630050	Terminal Nut			
25	606207	Bulb Holder Assembly			
26		Bulb, 4 V.—3 A, Screw Cap			
—		Parking Battery, Ever-Ready No. 1289			

All spare parts may be obtained through your local Bown agent.

Lighting Set



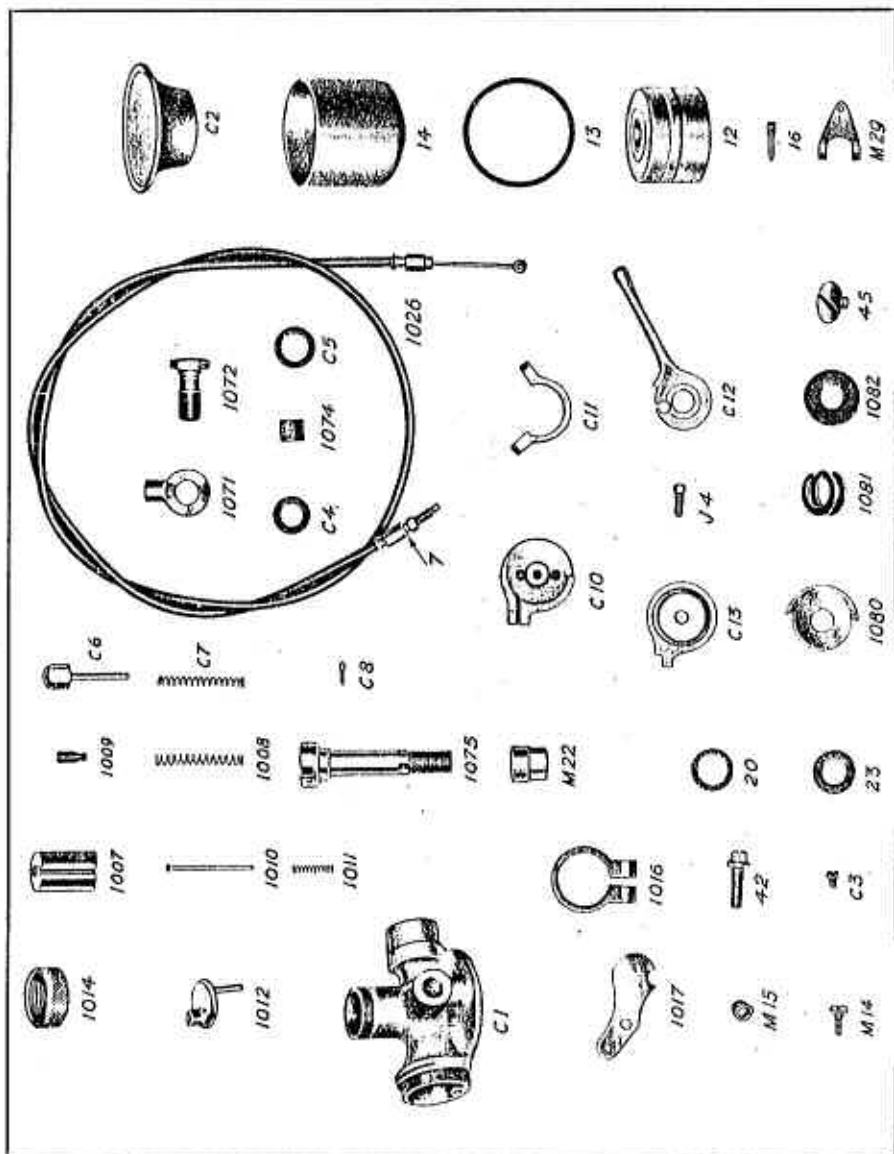
Always quote Engine Number when ordering spares.

Carburetter

Illus. No.	Part No.	Component	List Price		
			£	s.	d.
C1	V508	Carburetter Body	9	3	each
1014	V367	Top Ring	1	3	"
1012	V665	Top Disc	2	0	"
1007	V365	Throttle	2	3	"
1008	V369	Throttle Spring		6	"
1010	V651	Taper Needle, No. 2 $\frac{1}{2}$	1	0	"
1009	V413	Taper Needle Adjuster		6	"
1011	V107 x 7	Taper Needle Spring		3	"
1075	V408	Centrepiece and Jet J.8	4	0	"
20	V107 x 3	Centrepiece Washer		2	"
C3	V424	Centrepiece Locating Screw		3	"
M22	V172	Bottom Nut	1	0	"
23	V107 x 4	Bottom Nut Washer		2	"
12	V107 x 1	Float	3	6	"
14	V146 x 6	Float Cup	3	3	"
13	V107 x 2	Float Cup Washer		6	"
16	V355	Fuel Needle		9	"
M29	V257	Fuel Needle Lever and Pin		7	"
1016	V326	Body Clip	2	0	"
42	V107 x 16	Body Clip Screw		6	"
1017	V373	Strangler Plate		9	"
M14	V626	Strangler Plate Screw		3	"
M15	V146 x 2	Strangler Plate Screw Washer		2	"
C2	V148 x 3	Air Cleaner	3	0	"
1071	V381	Banjo Union	1	9	"
1072	V382	Banjo Union Bolt	1	0	"
1074	V404	Banjo Union Filter Gauze		6	"
C4	H104 x 8	Fibre Washer, Large Hole		3	"
C5	V383	Fibre Washer, Small Hole		3	"
C6	V207	Tickler		5	"
C7	V21	Tickler Spring		3	"
C8	V111 x 2	Tickler Split Pin		1	"
1026	V234B.C.G.	Control Cable Complete	4	6	"
C10	V405	Control Body	3	6	"
C11	V142 x 7	Control Body Handlebar Clip	1	6	"
J4	V142 x 5	Control Body Handlebar Clip Screw		2	"
C12	V406	Control Lever	3	0	"
C13	V387	Control Top Cover	1	3	"
1080	V429	Control Body Friction Plate		6	"
1081	V142 x 11	Control Body Spring Washer		3	"
1082	V142 x 10	Control Body Fibre Washer		3	"
45	V117 x 5	Control Body Top Screw		6	"
—	V123 x 15	Cable Nipple, Control End		2	"
—	V145 x 16	Cable Nipple, Throttle End		2	"
—	V108 x 4	Cable Nipple, Sleeve		4	"
7	V105 x 1	Cable Adjuster		7	"
7	V105 x 2	Cable Adjuster Locknut		2	"

All spare parts may be obtained through your local Bown agent

Carburettor



Always quote Engine Number when ordering spares.

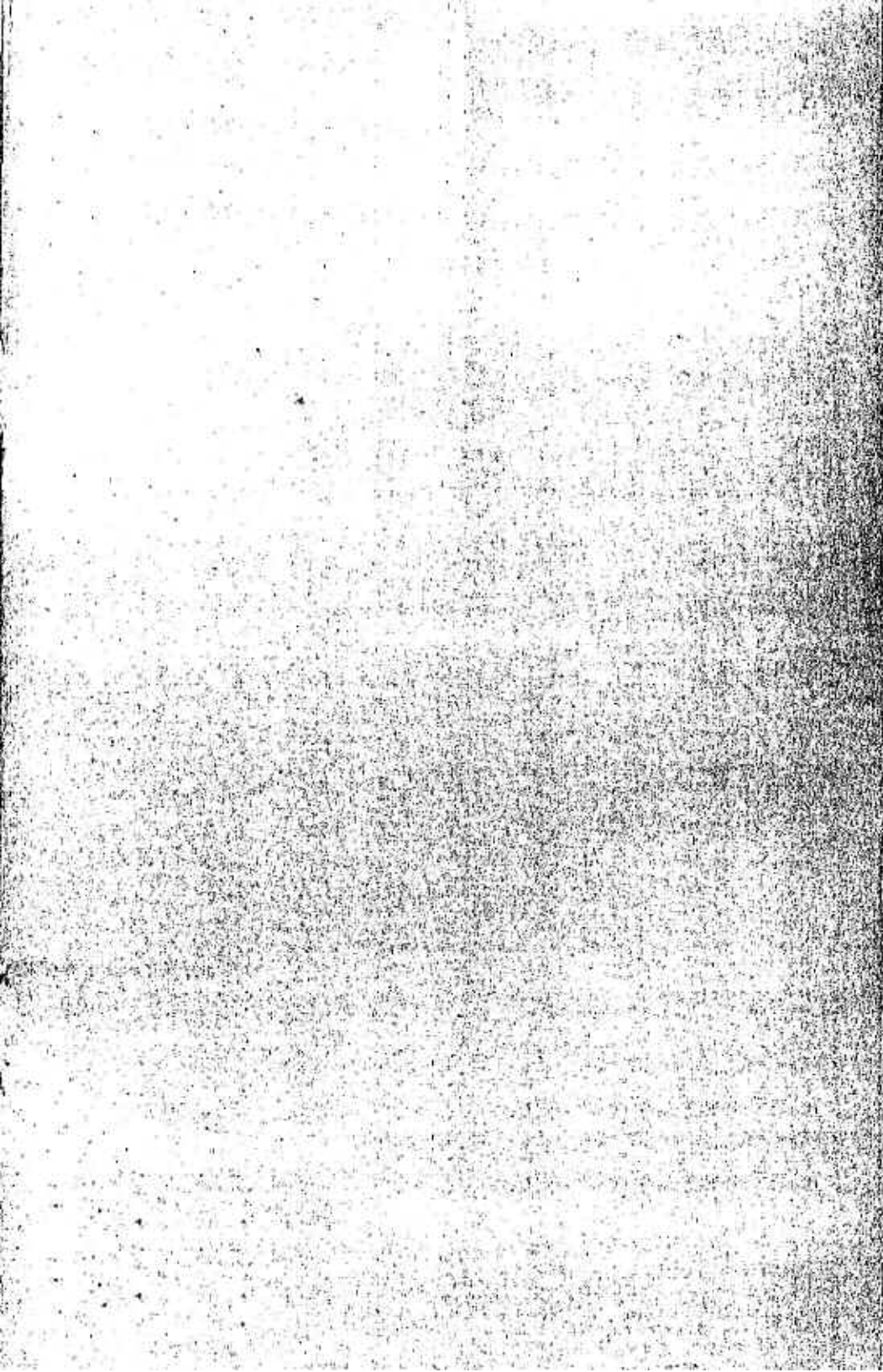
BOWN CYCLE Co. Ltd.

GUARANTEE

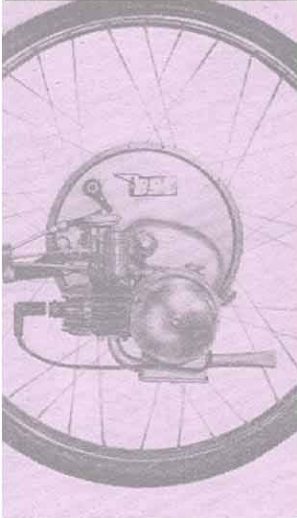
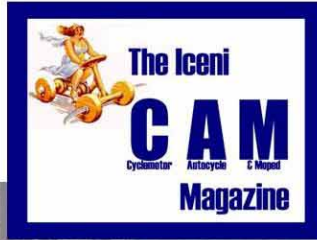
TERMS OF GUARANTEE : In substitution for any statutory or other warranty express or implied, Bown Cycle Company Limited (hereinafter called the Company) guarantees that every reasonable care has been taken to secure excellence of materials and workmanship in the manufacture of this machine and the Company undertakes to replace any part found to be defective by reason of fair wear and tear free of charge for a period of six calendar months from the date of purchase subject to the following conditions—

CONDITIONS

1. This Guarantee only becomes effective if the Guarantee Registration Card is duly completed and returned to the Company within 10 days of the date of purchase. It is only applicable to the original purchaser who has purchased from an accredited Dealer at the Company's published Retail Selling Price and is not transferable.
2. This Guarantee applies to all parts of the machine manufactured by the Company, but does not apply to specialities or parts supplied by other firms, such as tyres, saddles, chains, lighting and electrical equipment, etc.
3. Claims under this Guarantee should in the first instance be made to an accredited Dealer who may be able to apply a quick remedy and who should be able to advise if the fault is due to fair wear and tear. Improper or excessive use or neglect are not covered by this Guarantee.
4. The return to the Company of the machine or any part should it be necessary, must be carriage paid to the Company's works, and the Company accepts no responsibility for damage or loss in transit, or from the Company's works.
5. When claiming under this Guarantee the claimant must advise the Company of the Frame and Engine numbers of the machine, the reference number of this Guarantee, the date of purchase and the name of the Dealer from whom it was purchased.
6. The Company reserves the right to charge for any labour involved in effecting any replacement under this Guarantee.
7. This Guarantee will be rendered invalid (a) if the machine is misused (the term "misused" shall include the carrying of more persons or a greater weight than that for which the machine was designed by the Company) or (b) if any unauthorised repair, modification, alteration or substitution of any part or parts of it be made or if any serial numbers are defaced or altered, or (c) in the case of (i) machines which have been used for "hiring out" purposes or (ii) machines from which the trade mark, name or manufacturing number has been altered or removed or (iii) any machine in which parts have been used not supplied by the Company.
8. A Dealer is entitled to charge for labour and carriage and packing costs involved.
9. No variation of the Terms and Conditions of this Guarantee is valid unless made in writing by the Company and signed by a Managing Director.
10. No guarantee, condition or warranty of any kind statutory or otherwise is given or is to be implied nor is the Company to be under any liability whatsoever in respect of machines or parts not expressly covered by this Guarantee.



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