



OPERATING INSTRUCTIONS

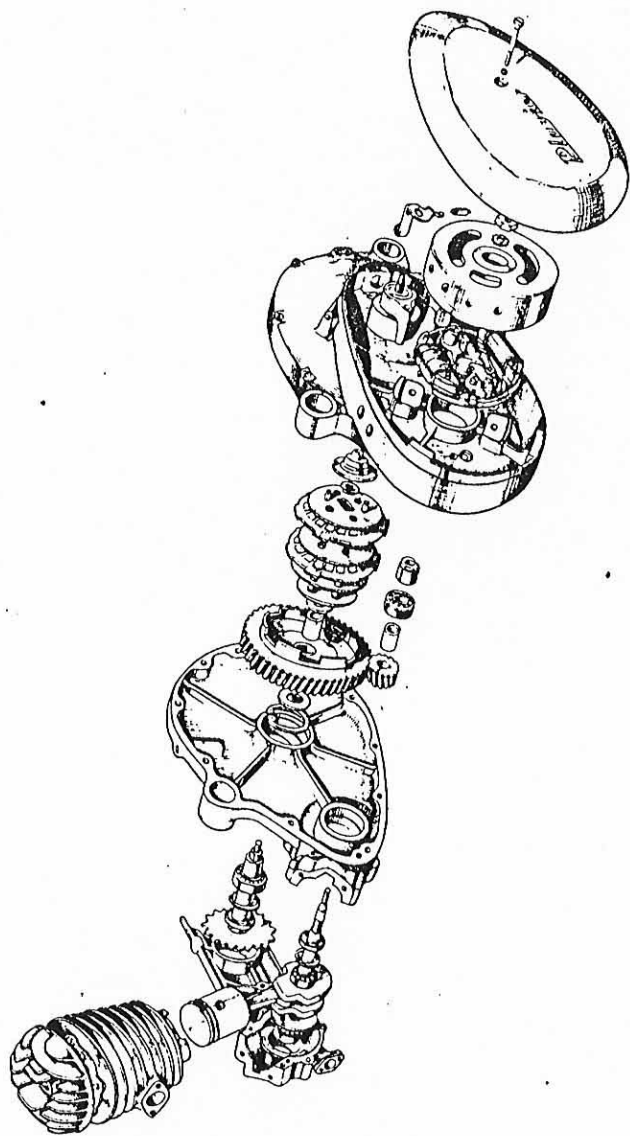
Benini m 91

*Read thoroughly,
before riding!*

N.V. MOTORENFABRIEK

PLUVIER

SLUISJESDIJK 109 - ROTTERDAM
HOLLAND



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INTRODUCTION

The BERINI M 21 is the latest model in the range of the wellknown BERINI Cycle-motors, manufactured by the N.V. Motorenfabriek PLUVIER.

It has been designed to meet the highest demands of the public and incorporates in its construction years of experience in the field of small two-stroke engines.

Some of its features are, amongst others, a well balanced double-webbed crankshaft, supported by three precision ball-bearings; the use of rubber gas and oilseals, bigend bearing with rollers and bronze cage; rotary induction valve, ensuring adequate crankcase filling at all revolutions of the engine, thus creating maximum efficiency at any speed. This made it superfluous to introduce a gearbox, which also may become a source of mechanical troubles and expensive repairs, if used inexpertly.

Furthermore the BERINI M 21 is equipped with a primary drive of silent gears and a robust, wet, multi-plate clutch enabling the rider to disengage the drive instantaneously by means of a lever on the handlebars at many moment. This offers the possibility of letting the engine to idle, which makes the BERINI M 21 easy to handle in traffic.

All parts are made from carefully selected material, while first class makes were chosen for the carburettor and flywheel magneto.

The complete unit excels by its simplicity and soundness, making the BERINI M 21 an exceedingly dependable means of transport, requiring a minimum of running costs.

It is obvious that the BERINI M 21, as any motorized means of transport, needs some kind of necessary unkeep and maintenance. Therefore pay particular attention to the following instructions and put these into practice.

IT WILL SAVE MONEY !!

Normal use

A. The fuel.

The dependability and the life of an engine are not only depending on a correct use and an efficient maintenance, but are mainly determined by the use of first class lubrication oils.

In this respect it is advised for the BERINI M 21 to use solely special twostroke oils of a well-known brand of an S. A. E. grade 30 or 40. This oil should be mixed with good petrol in a porportion of 1 part of oil to 25 parts of petrol (1 : 25).

Note.

Preferably use one brand of oil only, if this gives you good results.

If different brands are used on with another, various troubles may occur.

When mixing the fuel ("petroil"), take the following precautions:

- a. The fuel must absolutely be free of impurities;
- b. The fuel must always be mixed in a clean container;
- c. When filling the tank, use a funnel with a fine sieve.

Important: Oil and petrol must never be poured separately into the tank.

The filler cap serves as an oil measure, which holds the correct amount of oil suitable for one quart of petrol.

Tank capacity is approximately 0,5 Imp. gallon.

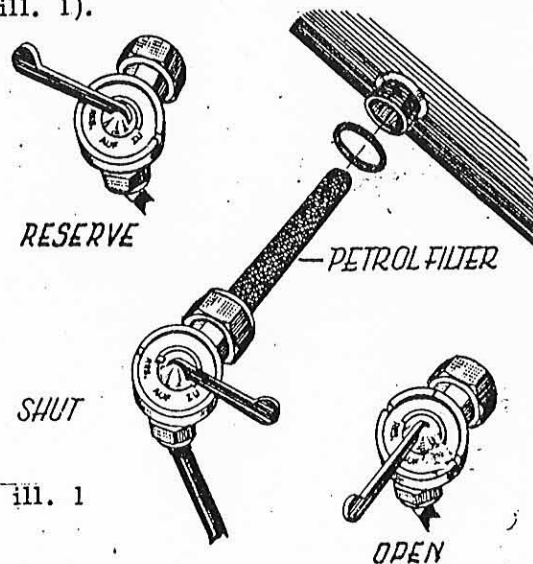
B. Running in.

During the initial 300 miles (500 km) a maximum speed of 20 m. p. h. (30 kmp. h.) must not be exceeded, while special care must be taken not to maintain this speed constantly. One should "play" with the throttle, i. e. one does 20 m. p. h. for a short time, then a few moments 25 m. p. h., after this drop down to 15 m. p. h. for a little while and so on. This means vary the speed continuously.

After 300 miles the mainjet 58 can be replaced by a number 56, and the abovementioned speeds raised with 3 to 6 m. p. h. but it is still essential to keep on playing with the throttle. Having covered a total of 700 miles (1000 km) consult your dealer whether jet 56 should be replaced by jet 54. If, however, the engine does not tend to start running "four-stroke" and petrol consumption is reasonable, keep to jet 56.

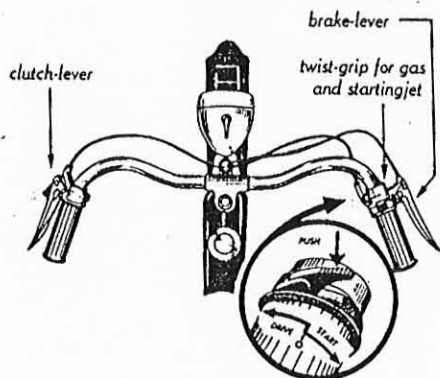
C. Starting the engine.

- a. Open petrol tap. Turn in correct position and not on reserve. The reserve position offers you an extra amount of fuel to cover approx. 5 miles, in case you run out of fuel (ill. 1).



- b. Turn twistgrip in start-position. The BERINI M 21 is equipped with a CARWI carburettor, which has an automatic starting jet, operated by means of the twistgrip located on the right-hand side of the handlebars. Opening the starting-jet occurs, if the twistgrip is turned to the right (away from the rider), at the same time pushing on the button (starter-lock) and turning grip beyond catch.

The starting-jet is now engaged, supplying an extra amount of fuel required to start the cold engine (ill. 2).



ill. 2

c. Start to pedal

Retract clutch lever on the left-hand side of the handlebars until the catch therein snaps into place, thus disconnecting the drive from engine to rear-wheel.

Start pedalling the normal way, until a speed of approx. 5 to 7 m.p.h. is attained.

d. Engage clutch.

Having reached sufficient speed, lift clutch-lever a little more, at the same time pushing catch in lever. Now the lever can be dropped until it is felt that the clutch is becoming engaged, and the engine starts turning and picks up.

e. Throttle control.

At the moment the engine springs to life, continue to pedal a short distance at the same time twisting the throttle-grip towards oneself, just beyond the starter-lock (0-position). In doing this the starting-jet is put out of action and speed is regulated the normal way. Do not open throttle fully immediately, as this will, in most cases stall the cold engine.

f. Continue to pedal

Go on using pedals in order to assist engine to pick up enough speed to take over the work of legs. If the engine shows signs of stalling, e.g. in cold weather, place twistgrip in starting position again and repeat operation b and e.

g. Driving.

Now regulate the speed at will by twisting the grip.

IMPORTANT: If engine is still warm, it is not necessary to use the starting jet.

To prolong the engine-life it is desirable to pedal-assist the engine at speeds below 5 m.p.h. Although the clutch is made extra-heavy, it is advised always to start by using the pedals, even when the engine is running (e.g. at traffic lights) until a speed of 5 m.p.h. is attained. Never let the clutch slip if it can be avoided.

D. STOPPING

To slacken speed when driving, the twist-grip is turned away from oneself, thus cutting the gas-flow to the engine, causing it to run slower. If the bicycle should be brought to a standstill, close throttle completely, pull up clutch-lever (de-clutch) and now apply brakes.

Never stop with the engine engaged. Always close petrol-tap before putting away the bicycle.

Maintenance

A. FREE SERVICE.

Always contact the official dealer who supplied the bicycle in the first instance.

During the first month in particular a regular and thorough inspection is necessary. To ascertain this, your local dealer will give you this free service during the first month following delivery of your bicycle on production of your warranty-card.

Free service includes only those jobs which will ensure a trouble-free condition of engine and bicycle. They consist of:

1. Inspection and adjustment of spark-plug electrodes and contact-breaker points;
2. Inspection and adjustment of carburettor and airfilter;
3. Inspection and adjustment of clutch and oil-level in clutch-housing;
4. Inspection and adjustment of brakes;
5. Inspection of screws, nuts and bolts of engine and bicycle;
6. Inspection of condition and tension of spokes;
7. Inspection and adjustment of both chains;
8. Oiling of frontfork hinges;
9. Oiling of coaster hub.

Attention is drawn to the fact that decarbonising of engine or exhaust-system is not included in the free service.

The warranty regulations demand that during the first month the bicycle should be brought into the dealer for inspection at least twice.

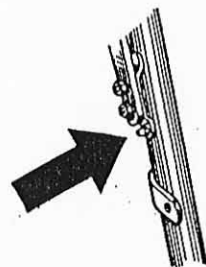
B. MAINTENANCE

Apart from the afore mentioned free service, it is obvious that after the first month, regular care and proper attention should be paid to the engine and bicycle. Normal maintenance jobs, as described later on, can be carried out by yourself, but we warn against doing jobs which require technical knowledge and special tools. These jobs should be carried out by the dealer.

Jobs you can do yourself.

- a. Clean engine and bicycle regularly.
- b. Clean and adjust spark-plug regularly (See page 24, C).
- c. Clean jet, petrol-filter in banjo-bolt and floatchamber (Ill. 6).
- d. The airfilter should be rinsed in clean petrol every 600 to 800 miles and thereafter wetted with a few drops of engine-oil.
- e. Lubricate coaster hub (Beckson) monthly (every 600 miles) with Shell Spirax EP 90 (or any other hypoid oil). Lubricate freely and use the

special spout to be soldered on an ordinary oilcan (ill. 4) which can be ordered from your dealer.

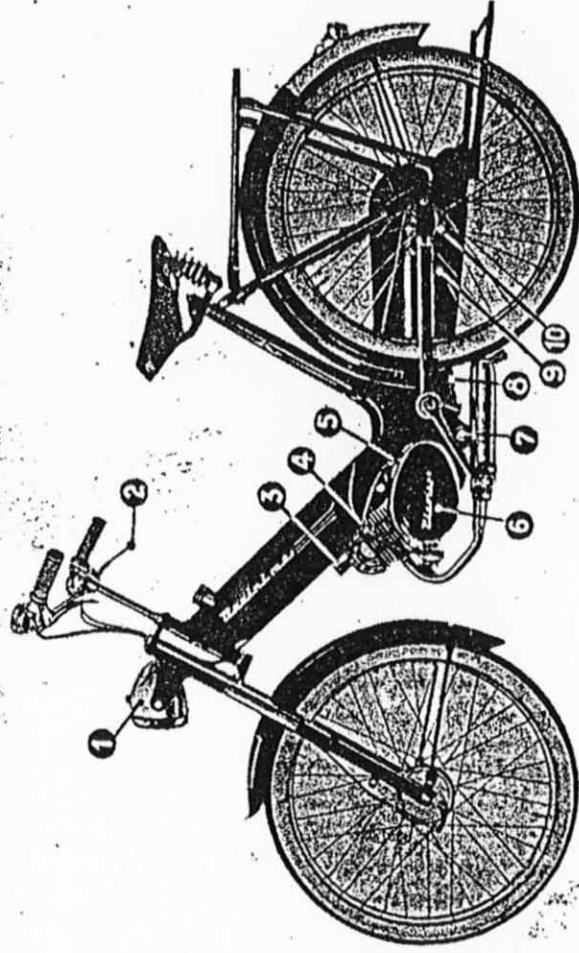


ill. 3



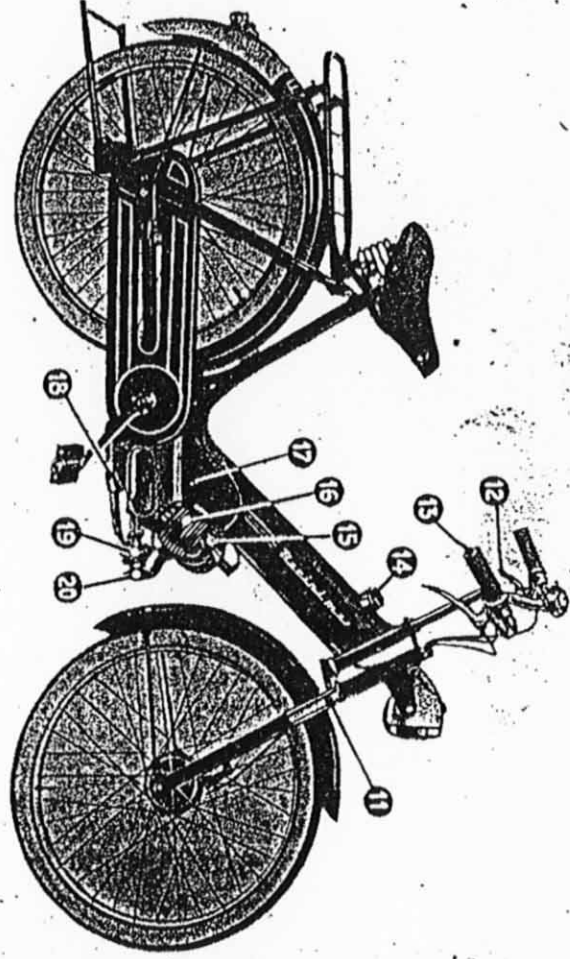
ill. 4

- f. Lubricate the chains regularly (but never too much) and check their tension. Never ride with chains which are too tight. Adjust drive-chain as follows:
Loosen upper engine-bolt (page 17, nr. 17) and slacken lower enginebolt (page 16, nr. 7) just a little. Tip engine around upper engine bolt until chain-tension is correct (ill. 5). Now tighten both engine bolts.
- g. Lubricate telescopic fork regularly and apply a grease gun every month (750 miles). See ill. 3. The grease nipples are located on rearside of both legs.



MAGNETO SIDE

- | | |
|---------------------------|-------------------------|
| 1. Headlamp | 6. Magneto cover |
| 2. Front-brake lever | 7. Lower engine-bolt |
| 3. Spark-plug adapter | 8. Bicycle chain |
| 4. Petrol tap | 9. Drive chain |
| 5. Cable-adjuster, clutch | 10. Beckson coaster hub |



CHAIN SIDE.

- | | |
|-------------------------|---------------------------|
| 11. Telescopic fork | 16. Cylinder |
| 12. Clutch lever | 17. Upper engine-bolt |
| 13. Throttle twist-grip | 18. Exhaust with silencer |
| 14. Filler cap | 19. Carburettor |
| 15. Cylinder head | 20. Airfilter |

- h. Check oil level in clutch housing weekly. Drain and refill with fresh engine-oil every 1500 miles. (ill. 6). Oil level should be at dotted line (approx. $\frac{1}{4}$ " below oil-filler hole). To check whether oil-level is still correct remove filler-plug and lean bicycle approx. 30° over to the left. Oil should then appear through filler-hole.

Important: It is necessary to drain and refill after the initial 150 miles, after the initial 600 miles and thereafter every 1500 miles.

In winter cover all chromium-plated parts with a special moisture-proof substance to prevent formation of rust.

Jobs which should be carried out by dealers.

- a. Approx. every 1300 miles the exhaust-port in the cylinder might be cleared of carbon deposit. In doing this, it is unnecessary to dismantle cylinder-head and cylinder.
- b. Approx. every 2500 miles cylinder-head and piston should be decarbonized. At this time inspect silencer for excessive carbon and sludge, which of course should be removed.

The above jobs require a certain amount of technical experience. Do not tackle them if

you think yourself not quite capable of doing it; leave it to your dealer.

The following routine inspection should also be carried out by dealers:

- Ignition : adjustment of breaker-points;
- Clutch : adjustment and (later on) relining of plates;
- Chains : care and replacement;
- Bicycle : steering-head, hubs, front-wheel suspension, etc.

C. WINTER STORAGE.

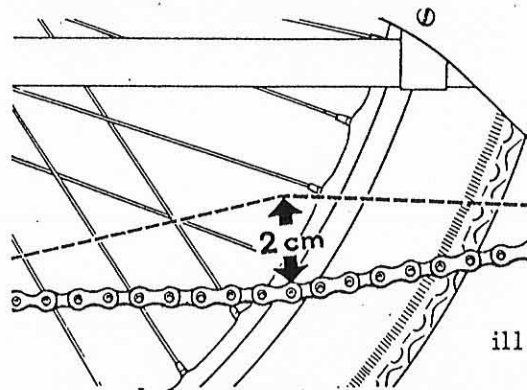
In case of storing the BERINI M 21 during the winter months, follow undermentioned hints. It will avoid difficulties when putting it on the road again.

1. Always decarbonise cylinder and piston, leaving the engine's interior absolutely clean.
2. Just before putting the bicycle away, drive it fast on the road for at least 7 or 8 miles, thus warming the engine thoroughly. (When burning petrol, water is released which will condense and cause substantial harm to ball-bearings, crankshaft and other vital internal parts, if the engine is not really hot). Drain oil in clutch housing and refill with fresh oil (65 cc = 4 cub. inch).
3. Clean bicycle thoroughly and remove all grease and dirt from engine.
4. Dismantle carburettor and rinse all parts in clean, pure petrol. Make sure all parts are dry when assembling.
5. Drain petrol-tank (take off petrol-tap) and rinse tank with a mixture consist-

ing of 1 part petrol and 3 parts oil, thus "greasing" inside of tank. All this is essential to prevent formation of rust. If petrol is left inside a container long enough, it will start to "gum", leaving a sticky mass which will clog all petrol passages and being very difficult to remove.

Store bicycle dry on all accounts, otherwise damage will be done to the electrical equipment especially the coils, making them unsuitable for further use. Rust is also a very dangerous enemy.

It is wise to cover the complete bicycle with oil or vaseline (petroleum jelly) using a paint-brush and pay particular attention to the connections of parts (mudguards, frame, wheel-nuts, etc.).



Remove tires and tubes, check them for wear and fractures (especially the cord-layers), use french chalk freely when re-fitting and inflate hard. Check

tire-pressure every fortnight.

Remove spark-plug and pour a thimble full of oil through spark-plug hole into the cylinder. Rotate crankshaft a few times to assist the oil in spreading itself along the cylinder-bore and re-install sparkplug.

Rotate crankshaft by hand a few turns monthly.

NEVER START ENGINE DURING ITS STORAGE PERIOD: THIS WILL CAUSE HARM TO ALL MOVING PARTS INSIDE IT!

Troubles

A. Carburettor.

The carburettor (ill. 7), operated by means of the twist-grip, provides the correct mixture of petrol and air at all engine speeds.

This mixture is formed by petrol entering through the main-jet and air drawn in via the air-filter.

To avoid impurities in the petrol (blocked main-jet) and in the petrol/air mixture ("bridging" of spark-plug electrodes) petrol is filtered by two petrol strainers (in tap and banjo-bolt) and air by the air-filter on the carburettor.

Keep these filters clean regularly taking care that the small one in the carburettor is always kept tight in its place in the banjo-bolt. Pay attention to both fibre washers: do not loose them!

If nevertheless the main-jet will become

blocked, remove jet-holder by means of the internal hexagon in the plug-spanner (ill. 8). and remove the obstruction by blowing through it, either with your mouth or a tire-pump. Before doing this, close petrol-tap.

Preferrably remove main-jet from jet-holder and blow through it in opposite direction of the normal flow of petrol.

When fitting jet-holder, do not forget its fibre washer!

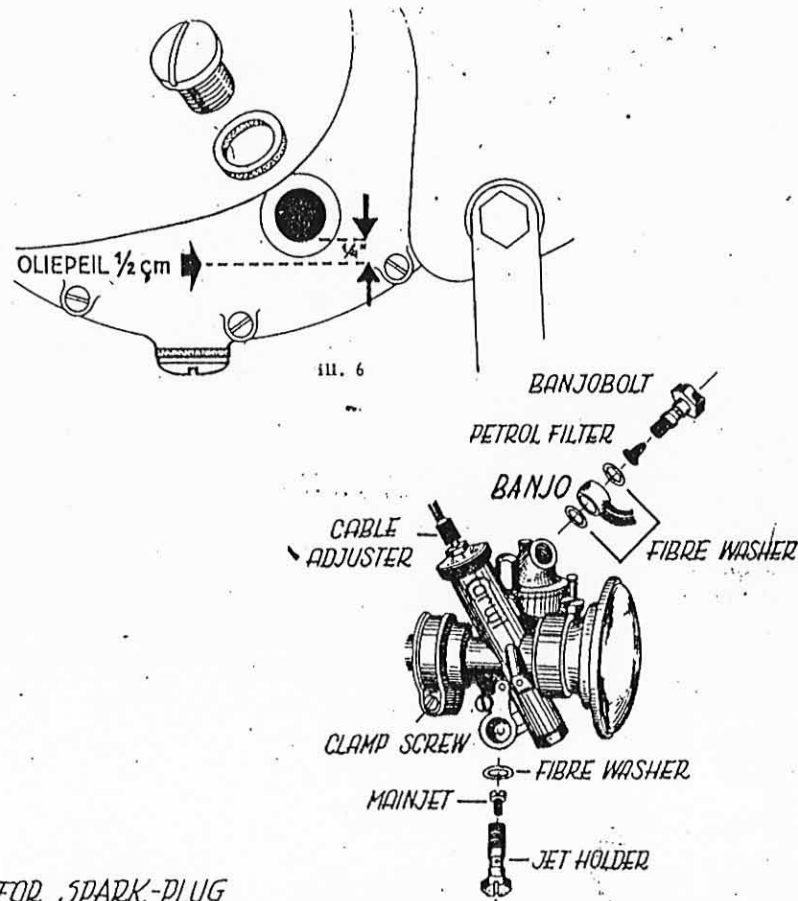
If jet becomes blocked repeatedly, it shows that the fuel is polluted, in which case tank, petrol-pipe and carburettor must be cleaned.

IMPORTANT : Never clean main-jet by means of a metal object, such as a needle or a pin. This will harm the jet and upset its calibration.

B. Ignition.

The BERINI M21 is equipped with a BOSCH ignition system with lighting-coil. The spark which ignites the gas inside the combustion-chamber of the engine, is raised by a powerful flywheel-magneto, consisting mainly of a stationary BASE-PLATE, into which are fitted the IGNITION-COIL, CONDENSOR, CONTACT-BREAKER POINTS and LIGHTING-COIL. The rotating flywheel contains 6 built-in magnets.

If these powerful magnets pass along the coils, an electric current is raised in the windings of these coils. Every moment the breaker-points separate, the current in the ignition-coil is raised to a very



ill. 6

ill. 7

FOR SPARK-PLUG

SCREWDRIVER

FOR JET-HOLDER

ill. 8

high tension (approx. 10,000 volts), which is led via the PLUG-LEAD to the SPARK-PLUG, causing a spark to jump across the SPARK-PLUG ELECTRODES. This spark ignites the gas inside the cylinder. In the same way, but without the aid of breaker-points, the current of the lamps is produced by the lighting-coil.

C. Spark plug.

As mentioned before, the sparkplug ignites the fresh gas in the cylinder. The necessary current for doing this is produced by the flywheel magneto, which causes a spark to jump at the right moment across the spark plug electrodes inside the combustion chamber.

These electrodes should be apart .016" to .018". This distance is very important and must never be increased. If left too far apart, the ignition-coil will be damaged beyond repair in many cases. It is therefore essential to check this gap every 750 miles.

If the engine cuts-out suddenly on the way, it will be necessary to take out the spark plug with the aid of the supplied special spanner, which you should always carry with you.

Check whether sparkplug is internally clean and look for a small black particle between the electrode-gap. If sparkplug is not to be cleaned on the spot, fit spare plug. At the first opportunity clean old plug by taking it apart, cleaning it thoroughly and after assembly, adjust electrode-gap. Plugs which are of the non-detachable type are best cleaned with

the aid of a gas-flame or welding-torch. Better see your dealer about this.

We advise you always to use spark plugs of the detachable type, thus simplifying the job of cleaning them.

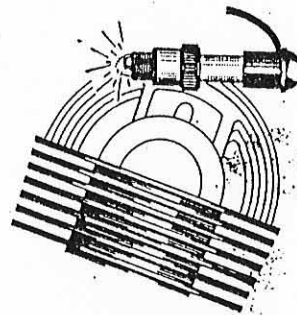
When replacing spark plug in cylinder-head, do not omit copper washer which must be used always. Tighten plug properly, but overdoing it is useless.

Important: No "pearl" deposit should be visible on the plug electrodes (not to be mistaken for "lead" deposit, which is caused by diluted fuel, dirty airfilter, air-leaks, etc.). If spherical deposit (like pin-heads) is discovered, it proves that the engine has been running too hot. See your local dealer in this case.

Pay attention to the condition of the plug-lead and proper connection of lead in plug-adapter.

To check whether a powerful spark is present, act as follows:

- a. Take out spark plug.
- b. Connect adapter to plug again.



ill. 9

- c. Place plug onto cylinderhead (ill. 9).
- d. Engage clutch and turn rear-wheel by hand, leaving bicycle on its stand.

A crackling, blue spark should now jump the electrodes. If not, try another spark plug. If still no spark, contact a dealer to check the ignition-circuit.

General hints

Always carry a clean, spare plug and a plug-spanner with you.

A. Engine fails to start.

1. Petrol-tap closed.
2. No fuel.
3. Spark-plug dry: no fuel-supply, blocked jet, dirty petrolfilters.
4. Spark-plug wet: try spare plug, otherwise test for spark.

B. Engine stops suddenly.

1. Run out of fuel : turn tap on reserve or fill-up. See also A 1, 2 and 3.
2. Short-circuit of spark-plug electrodes: clean plug or change it.

C. Engine does not pull.

1. Carbon deposit in exhaust-port or exhaust.
2. Blocked main-jet (in very cold weather: jet-size too small).
3. Ignition off timing: see a dealer.

D. Engine runs 4-stroke.

1. Main jet too large.
2. Sticking float.
3. Scavenge ports partially blocked with carbon deposit.
4. Exhaust-port or exhaust blocked with carbon deposit.

E. Engine does not run regular.

1. Spark plug-gap too wide.
2. Faulty fuel supply (check jet, filters, air-vent in filler-cap).

F. Engine runs too hot.

1. Faulty sparkplug (replace).
2. Ignition off timing. See C 3.
3. Insufficient cooling. Clean cooling fins of cylinder and cylinderhead.

G. Engine backfires in carburettor.

1. Faulty sparkplug: replace plug and dismantle and clean old one as soon as possible.
2. Partially blocked mainjet.

H. Flooding of carburettor.

If this happens, the float (and needle) is sticking in the float-chamber.
Cause:

- a. Dirt in between float-needle and its seating.
Remove floatchamber-cover, wash named parts in clean petrol and apply air-blast. Pay particular attention that sharp point of needle is not crook-

ed. Replace float with sharp end upward!

- b. Dirt in float-needle guide on bottom of float-chamber. Remove float-cover. With the aid of a needle or a fitting drill remove dirt, rinse with clean petrol and apply air-blast.
- c. It sometimes occurs that the float will be jammed by the main-jet, protruding into the float-chamber as a result of a thin fibre washer. Replace washer or add a second one.

Technical data

Engine: Single cylinder two-stroke with reversed scavenging, flat-top piston, 2 scavenge-ports and rotary induction-valve.

Bore: 40 mm. (1 37/64 inch).

Stroke: 38 mm. (approx. 1 1/2 inch).

Cub. capacity: 49 cc. (approx. 2.9 cub. inch).

Compression ratio: 6.8 to 1.

Output: 1.8 BHP at 4800 r.p.m.

Cylinder: Perlitic cast-iron with 2 integrally-cast scavenge-ducts.

Cylinder-head: Aluminium, detachable (no gasket).

Piston: Aluminium-alloy, 2 compression rings.

Crankshaft: Built-up type, supported by 3 ball-bearings.

Connecting-rod: Big-end bearing rollers in bronze cage
Little-end bearing: bronze bush

Carburettor: CARWI with float and automatic choke. Main jet 58 (running-in), normal 56 (sometimes 54). Twist-grip controlled.

Lubrication: Engine: Special two-stroke oil, SAE 30 to 40. Mixture ratio 25:1
Clutch: Use engine oil. Capacity 65 cc (1 1/2 times filler-cap).
Coaster hub: Shell Spirax E.P. 90 or any other E.P.-oil.
Front suspension: Grease and/or engine oil.

Ignition: BOSCH flywheel magneto with lighting coil 6 Volt-8 Watts.
Breaker-points gap .018" (0,45 mm).
Advance 2 mm (5/64") before T.D.C.

Lighting: Headlight: 6 volt-6 watt (1 amp) Use Splendor 79
Taillight: 6 volt-2 watt (0,35 amp) Use Splendor 79 A.

Spark plug: 14 mm. KLG F 50
Electrode gap .016 to .018 inch (0,4 - 0,45 mm).

Transmission: Primary: silent gears
in oil-bath.
Secondary: chain ($\frac{1}{2} \times$
 $\frac{3}{16}$ inch, 112 links).
Total reduction 1 : 14,7
Bicycle chain: $\frac{1}{2} \times \frac{1}{8}$ inch, 90 links.
Clutch: Multiple plate with cork
lining in oil-bath.
Operated directly from
handlebars.
Tank capacity: Approx. 2,5 Liter (just
over 0,5 Imp. gall.).
Max. speed: Up to 30 m. p. h.
Wheel size: 24 x $1\frac{1}{2}$ x $1\frac{3}{4}$ inch.
Tyre size: 25 x 2 inch, white walls.
Weight: Approx. 40 kilos (88
lbs).

Please always mention engine number
in your correspondence

ALTERATIONS RESERVED

SOLE REPRESENTATIVES FOR:

IceniCAM Information Service



www.icenicam.org.uk