THIS IS THE MANURHIN

THE SCOOTER FOR EVERYBODY

A Scooter with a "Variator", the Uher constant automatic speed changer system, is now being built in France by the Manufacture de Machines du Haut-Rhin (MANURHIN), in its plant in Mulhouse (Alsace). It excited great interest at the 1956 Automobile Show in Paris.

The Manurhin scooter, with most of the same characteristics as the D.K.W. "Hobby", has 16-inch wheels, a strong tubular frame of heavy construction, and has very pleasing lines. The motor develops 3 H.P. at 5,000 r.p.m., has a 1.77 inch bore, a 1.85 inch stroke, and a piston displacement of 4.52 cu. in.

Thanks to its very efficient motor and its highly efficient automatic transmission, the Manurhin can easily take two riders, even under mountainous conditions. It is an extra-ordinarily stable scooter because of its carefully studied wheel size, the position of the motor and general distribution of weight on the two wheels, and the carefully designed telescopic front fork and rear swinging arm suspension. Safety is increased by the large brakes, 0.8 inch wide, with 4.9 inch front and 3.11 inch rear drums.

The price of this excellent scooter is low, and it is within the means of everyone as a form of transportation. The worker no longer has to depend on train, subway or bus schedules, and it is an ideal means of transportation in the city, as traffic becomes more dense and parking difficult.

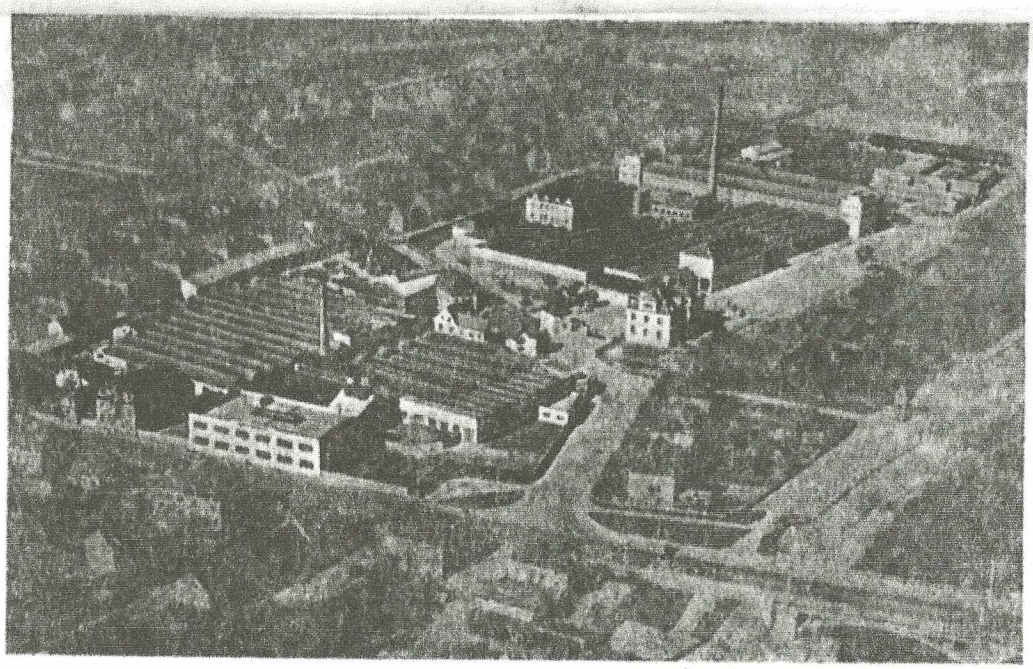
The "Variator", or automatic transmission, is

remarkable in its simplicity, its robust qualities, and in the ease it lends to driving the Manurhin scooter. Once the motor is running and the transmission "engaged", the Variator does the thinking for the rider as far as "changing gears" is concerned. A sturdy, unstretchable V-belt runs on two pulleys, each with separable faces and variable belt contact diameters. As road conditions change these diameters change automatically, and the ratio between motor speed and rear wheel speed changes cot respondingly.

The following pages contain all instructions for dismantling and re-assembling the MANURHIN motor scooter.

As always, we recommend that all those who are not experienced mechanics, and who do not possess the necessary tools should avoid doing any repair work themselves, and apply to a specialist. An adequate number of Manurhin service stations ensures that there must be one not very far away from you, manned by trained mechanics who have undergone an extended course at our Mulhouse works and possess a thorough technical knowledge of our motor scooter.

Breakdowns are usually of a superficial nature and repairs (whether involving spare parts or man-hours) are reasonably priced.



The Manurhin plant at Mulhouse - Bourtzwiller (Alsace)

"BLOWN-UP" VIEWS OF THE MANURHIN SCOOTER

PRACTICAL SUGGESTIONS

1) THE FRAME

TO REMOVE MOTOR AND REAR WHEEL HOUSING.

Close fuel tap and disconnect fuel line. Close carburetor trap so as not to distort it.

Loosen and remove fixing screws on each side of the motor housing.

Raise housing forwards. A turn of the handlebars will hold it in the open position.

Disconnect the rear-light wire at the strap near the flywheel-magneto.

Lower the housing and remove the hinge pin at the front of the housing. Remove rear housing. Both engine and rear of the scooter are now easily accessible.

TO REMOVE FRONT LEG SHIELD.

Remove the ten cross-shaped Phillips type fixing screws.

Loosen engine's two rear fixing nuts so that it may be gently tilted upwards. Remove brake pedal head. Free clutch and throttle cables.

Remove engine forward fixing bolts.

BE CAREFUL of the chocks between the casing lugs and the running boards. (When re-assembling, the chain must necessarily be aligned.)

Free engine lug of clutch cable tube, then remove this from underneath. Free shield by raising the front, at the same time getting free of brake pedal. Shield and running board will come away together. Slightly tilt engine. To do this it may be necessary to remove exhaust pipe.

TO STRIP FRONT FORK.

Remove front wheel (no difficulty), then the headlight optical system and disconnect (wiring follows a continuous colour plan.) The headlight is fixed to the fork by a centre screw at the back.

Remove and disconnect horn. Behind is a fixing bolt for the fork fairing. Remove both screws of the upper fork bracket, and the steering cap nut. (Use special spanner wrench no. 583.)

Fork is now free, leaving handlebars fixed to upper fork bracket. These should both be left in place and swung back of the shield. The forward fork fairing is fitted over the fork tubes.

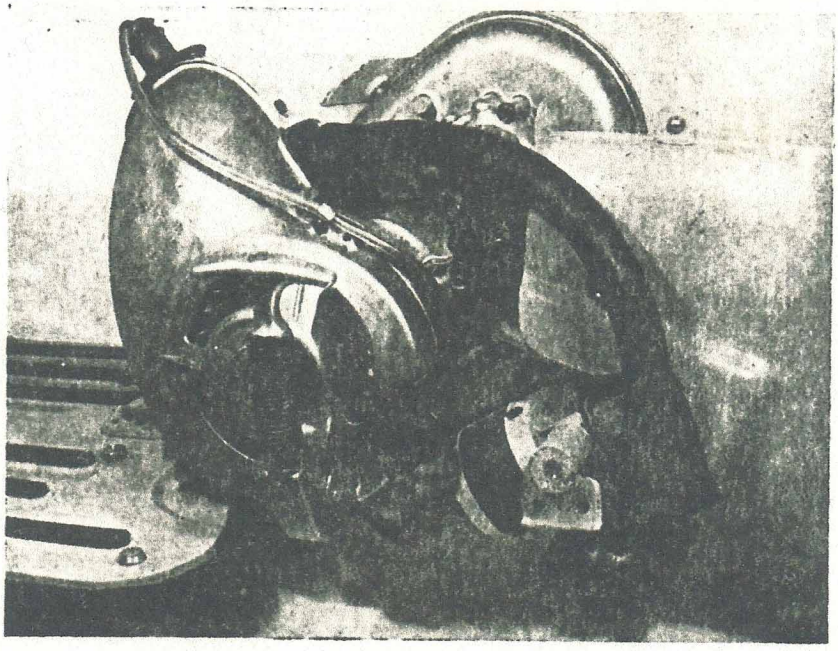
TO STRIP REAR SUSPENSION.

Remove rear wheel which is held with a special axle and leaves both chain and brake drum in position.

Disconnect exhaust pipe between cylinder and muffler. Remove chain casing cover ; this is held by a cap screw, a nut behind the exhaust pipe and a screw above.

Disconnect chain and rear brake control.

Remove the three bolts of the inner casing.



Motor : starter side.

Loosen the lock nuts and nuts holding the damper piston rods.

Remove suspension pin. The brake drum is removed from the left suspension arm by unscrewing the nut holding the hollow drum shaft.

2) THE ENGINE DISMANTLING

TO REMOVE ENGINE FROM FRAME.

Disconnect fuel line and remove rear housing. (See above.)

Remove exhaust pipe and chain casing cover. Disconnect chain, and throttle and clutch cables. Disconnect the terminal plate.

Remove the two rear fixing nuts and the two forward fixing bolts of engine. (Again, care must be taken to align chain when re-assembling.)

The engine now being removed from the frame, one can pass to.

STRIPPING THE ENGINE.

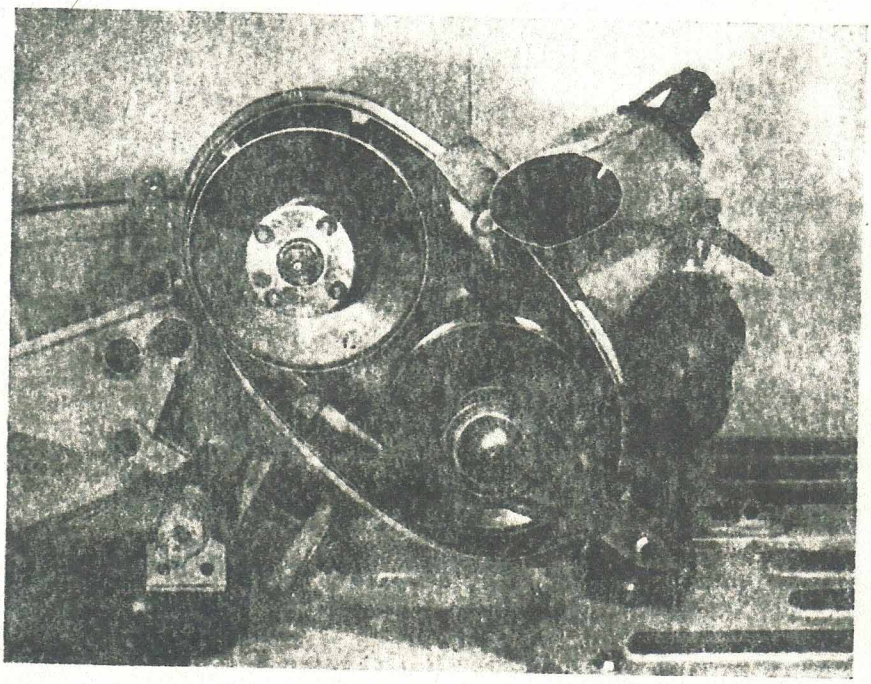
Remove spark plug, then carburetor by loosening the clamp screw.

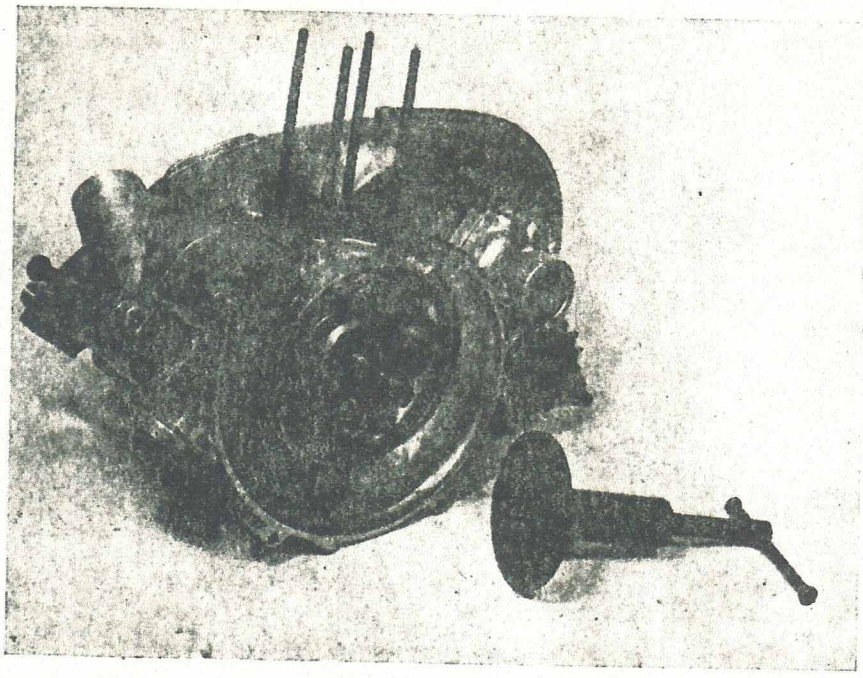
Undo the five fixing screws of the cast air-intake and remove.

Loosen and remove the four starter screws. BE CAREFUL of the flanges supporting the terminal plate and plug lead end.

Remove starter. BE CAREFUL of the centering feet.

Strip cylinder head and block. Note that both these are held to casing by four guide columns (studs). Loosen the four retaining nuts, taking them crosswise in order to avoid straining cylinder head. NOTE that the cylinder head fins are in line with the frame, that is to say turned towards the draught coming from the blower. There is





Top : *Motor. - Automatic transmission ("Variator") side.*
Bottom : *Crankcase opened, flywheel-magneto side, showing special tool no. 585.*

a gasket between the head and the cylinder.

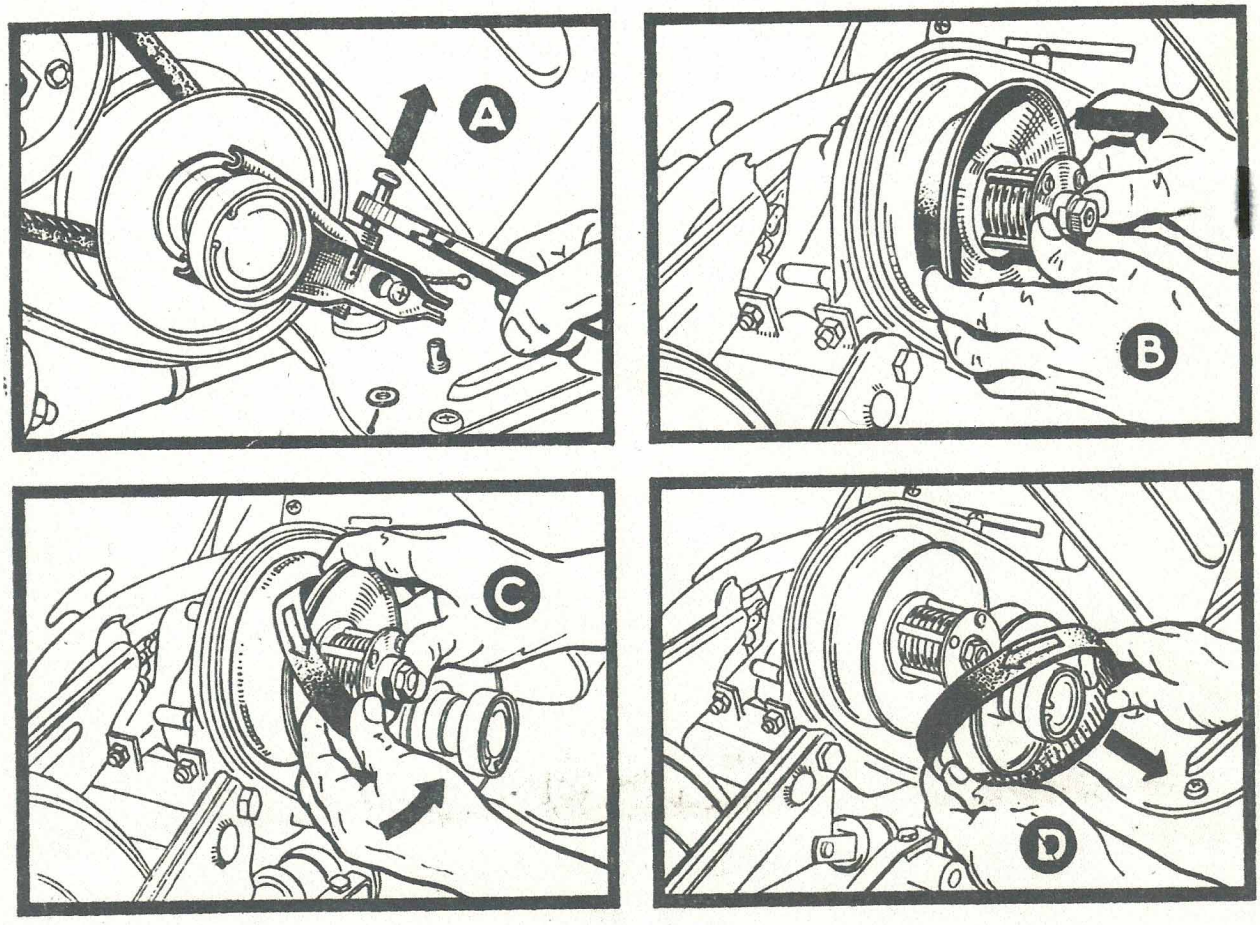
To remove cylinder, ease piston to bottom dead centre and raise.

The piston has two rings.

Mark piston. (The rear of the piston carries an arrow indicating the position of the exhaust port.)

To remove piston, take off circlips ; both piston pin and connecting rod little end being fitted oiled, no heat is called for when stripping.

There is a gasket between the cylinder and the crankcase.



REMOVAL OF FLYWHEEL MAGNETO.

The Morel flywheel-magneto fitted to the Manurhin motor scooter is easy to remove.

First remove cover lock ring (a notch is provided for insertion of a screwdriver), and then the protecting plate. Hold rotor with special Manurhin spanner wrench no. 389.

Loosen centre nut maintaining rotor. Remove lock washer.

Remove rotor by means of special extractor no. 597. NOTE that there is a lug on the cone at the end of the crankshaft which acts as a marker when re-mounting the rotor but does not help in setting the advance. The manner of doing this is dealt with further on.

Removing the stator requires only the removal of two fixing screws. Withdraw the plug lead after removal of the protective head for the plug.

When replacing the stator the make-and-break should be at twelve o'clock.

TO STRIP "VARIATOR" (Automatic speed changer).

Remove the cotter pin and clutch fork (A) and disengage the latter from the compensating spring (there is an arrangement of studs).

Pull the face of the primary driving pulley outwards. Compress the spring of the secondary driven pulley by hand and free the driving belt. (B and C.)

IMPORTANT : Note the direction in which the belt is fitted. It is sometimes marked with an arrow, but sometimes not. The direction in which it has been mounted should be remembered (D). And do not forget that the engine runs counter to the wheels.

To remove the clutch thrust block, remove the lock ring with special pliers. Remove the dust-cover, if necessary using a wooden mallet lightly to tap the clutch engagement cage.

Remove the locking screw with special two-notch wrench no. 591 (right hand thread).

Free clutch thrust block together with its ball-race.

NOTE : When re-assembling, care should be taken that the ball-race is properly put back, i.e. with the ball bearings resting inwards to the cup.

With the two Manurhin spanner wrenches nos. 591 and 592, remove the primary pulley fixing nut. LOOK OUT for the lock washer.

Remove pulley ; this is mounted on the finely splined end of the crankshaft.

Look out for the thin washer behind.

Block the reductor driving chain pinion. Unscrew the nut at the pulley shaft end ; this hides a lock washer. Use special tool no. 593 to compress the spring. Remove circlips from guide columns, loosening spring with this tool to remove. The outer face of the secondary pulley is also mounted on fine splines.

Remove secondary pulley inner face lock ring. When re-assembling, this must of necessity be replaced and positioned by means of the specially devised cone and tube nos. 601 and 602. Do NOT open a new ring with the removal pliers for it would then be hopelessly distorted.

TO OPEN UP CRANK CASE.

Ease out the eight assembly screws and separate the two half casings by means of special appliance no. 585 fitted with cap no. 599.

The greased paper gasket between the two halves should be replaced when re-assembling. The same appliance with cap no. 598 should be used to disengage the crankshaft from the second half casing. Gaskets are fitted to each half casing and are held by means of circlips. There are also compensating washers to take up any lateral play of the crankshaft. Note these when re-assembling). Ball-races should in principal remain where they are in the casings although they sometimes come away with the crankshaft.

For re-assembling purposes they should be removed by means of a puller and re-set in the casings which should, for the purpose, be heated to 80° C (176° F).

Should the races remain fixed in the casings, they should be removed by slightly heating the casing, and then lightly tapping it against the edge of the bench.

NOTE : Before heating the casings care should be taken to remove the gaskets.

TO REMOVE THE REDUCTOR (Reduction gear unit).

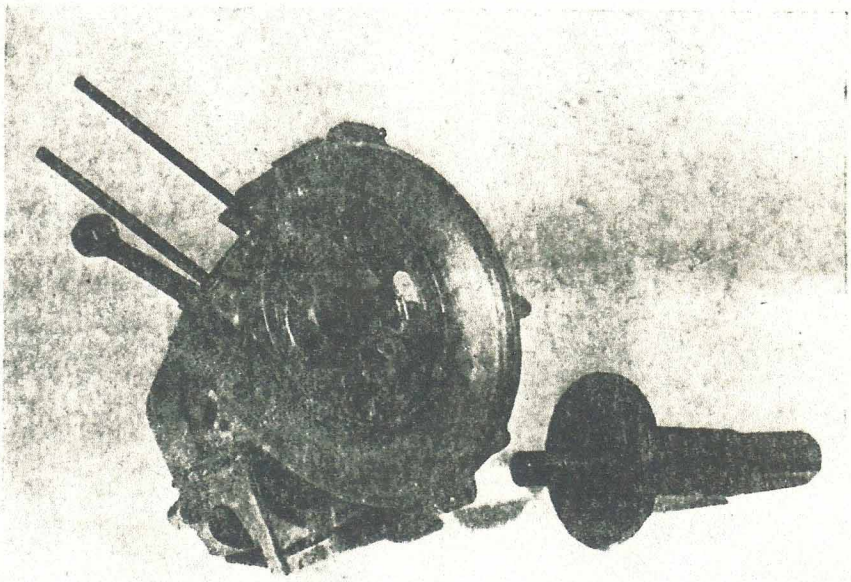
Remove the seven cross-slotted Phillips type screws and open up the reductor casing.

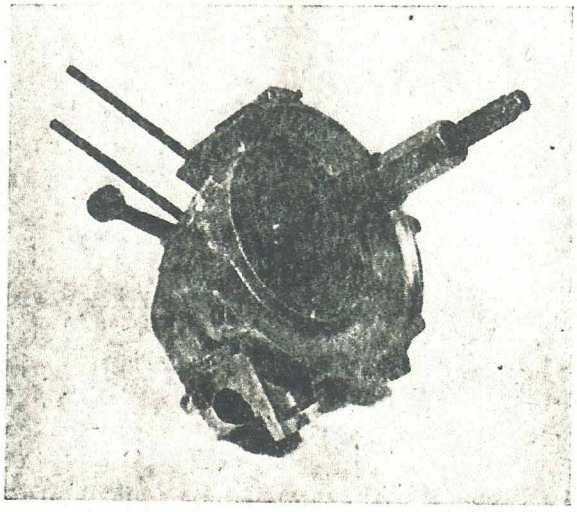
There is a grease nipple at the end of the secondary pulley shaft. A special cap is therefore available so that the shaft can be brought away without damage to the nipple.

TO REMOVE THE PRIMARY PULLEY.

Compress the three inertia blocks by hand and remove inner pulley face.

Free the hollow splined bushing in the other face.





▲ 1.

◀ 2.

Two steps in assembling crankshaft.

1. Upper : *Special tool no. 586.*

2. Lower: *Tool no. 586 in place for crankshaft assembly.*

RE-ASSEMBLING

TO REPLACE BEARINGS

The gaskets having been removed, heat casings up to about 80° C (176° F) in order to re-set ball-races.

NOTE : Position compensating washers before putting races back into their cages. Place a new greased gasket between the two half casings. Screw the threaded protection tube onto crankshaft end nearest to flywheel-magneto.

Insert crankshaft into half casing nearest to flywheel-magneto. Screw on the head of Manurhin special tool no. 586 and fit. By turning this, the crankshaft will come into place.

Assemble the two half casings by means of the special tool fitted with the other head designed for the transmission end of the crankshaft.

Remember to use special chock no. 590 for holding the connecting rod and prevent gripping or distortion of the crankshaft halves.

Insert the eight assembly screws and tighten opposite screws, two at a time.

Remount gaskets.

TO REPLACE CYLINDER AND CYLINDER HEAD.

Mount piston with due regard to marker E, with an arrow on the exhaust side. This presents no difficulty as the piston pis in inserted oiled. Adjust circlips. Fit piston rings, with due care that the lugs in the piston grooves line up with spaces in the piston rings.

After fitting a new greased gasket at the base, slip the cylinder over the piston using the special wood chock provided.

Ease cylinder between guide columns (studs) and compress piston rings by means of special collar no. 596. Slightly grease inner surface of cylinder and lower over guide columns (studs).

After fitting a new slightly greased gasket, re-fit cylinder head, care being taken that the fins are parallel with the frame. (VERY IMPORTANT.)

Tighten opposite cylinder head nuts two at a time.

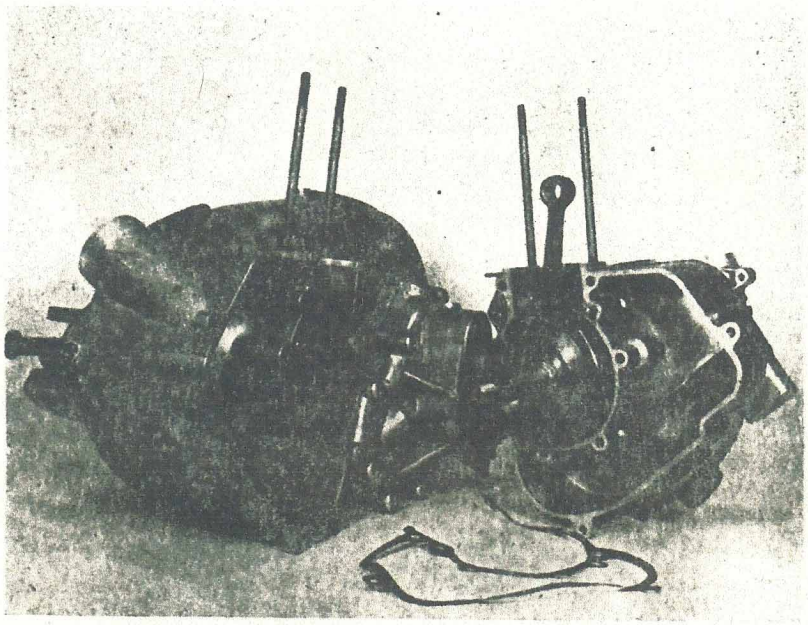
TO REPLACE AND SET THE FLYWHEEL-MAGNETO.

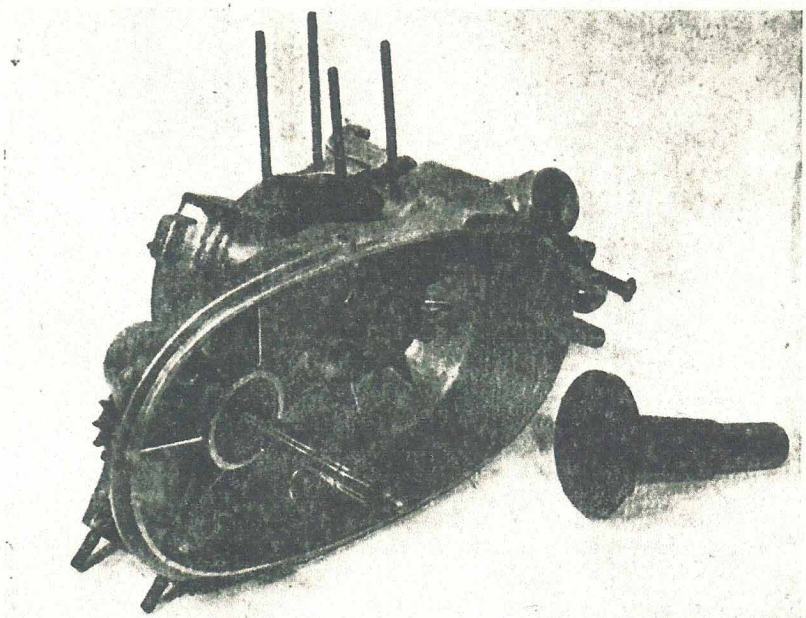
Replace stator with make-and-break at 12 o'clock, after threading high tension and low tension leads through the appropriate aperture of casing, insulated by a rubber sleeve.

Care should be taken that leads are well pulled through so that they do not rub against the rotor, also that the stator is securely placed on its four centerings. Tighten the two stator screws.

Mount the rotor on the cone at the end of the crankshaft and see that the small lug slips into the groove of the main core. This serves no useful purpose for setting, but is a marker placed there by the makers in order to provide the best extracting point.

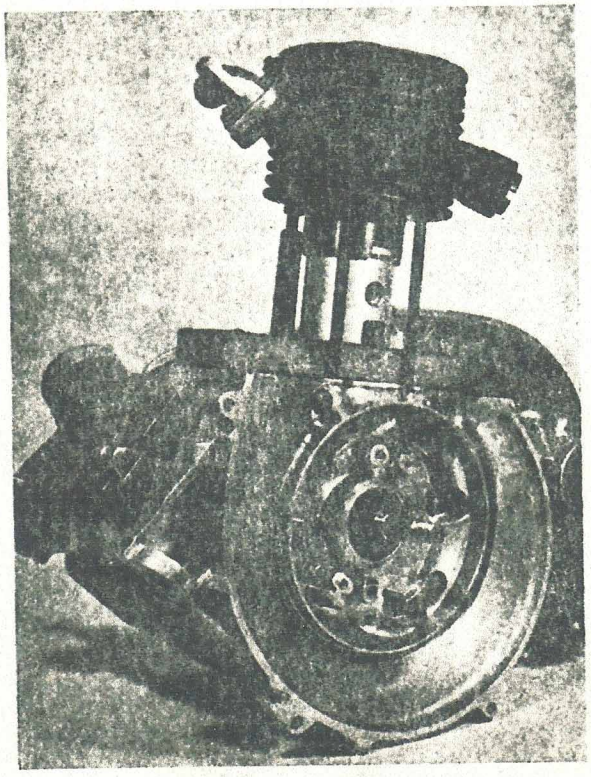
Place washer and block centre nut. Hold rotor with special wrench no. 589 and block nut with a 15 socket wrench.





Top : *The two crankcase halves ready for assembly.*

Bottom : *Two crankcase halves before final assembly, with special Manurhin tool no. 586.*



From top to bottom :

■

Re-assembly of piston and cylinder. Use of wooden chock facilitates insertion of piston.

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Stator in place. Rotor ready to be fitted. Positioning pin at end of crankshaft can be clearly seen.

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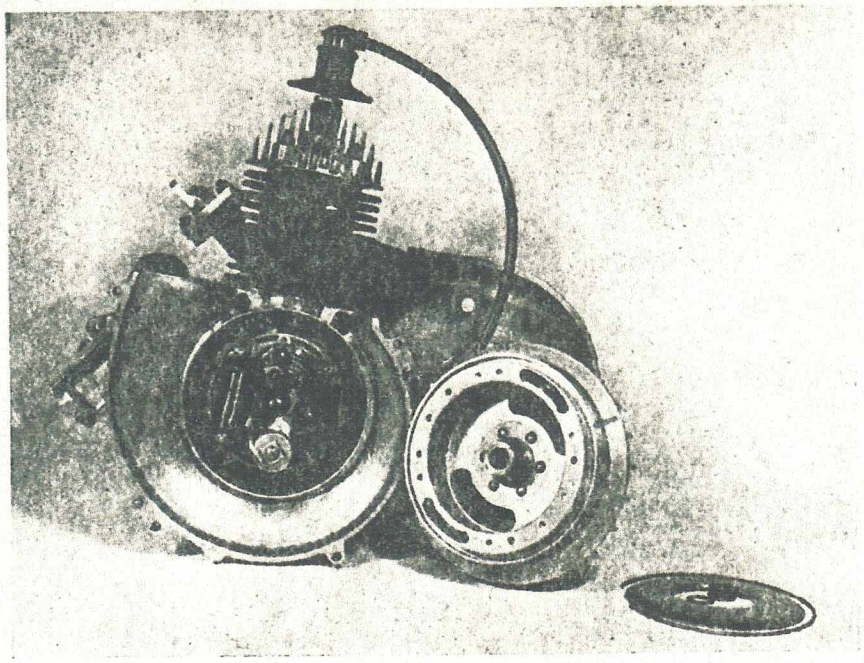
Compression of inertia blocks for assembly of the two driving pulley faces.



Set points at .016 in. and set flywheel by moving stator which is fixed on studs. Timing should be with rising piston 0.104 to 0.112 in. (2.6 to 2.8 mm) from top dead center.

VERY IMPORTANT : Never set before fixing cylinder head, for without it, the cylinder is not held to its base and may possibly shift.

Replace dust cover plate of rotor and place lock ring.

TO RE-ASSEMBLE REDUCTOR.

Mount the four ball-races, — two of which bear the transmission shaft and the two others the counter-shaft. Heat should be used to replace them. They are held by circlips.

When stripping, washers may be found between the races and the circlips. Do not forget to put them back as they take up any lateral play.

Insert transmission shaft into its ball-race on the engine side casing. Do the same with the countershaft. Replace the reductor casing cover (having previously replaced the lightly greased paper gasket) and see that it is firmly in place by lightly tapping with a mallet.

Tighten the seven fixing screws.

Place gaskets (i) at the exit of the reductor and (ii) at the exit of the main shaft on the "variator" side. Replace the reductor driving pinion.

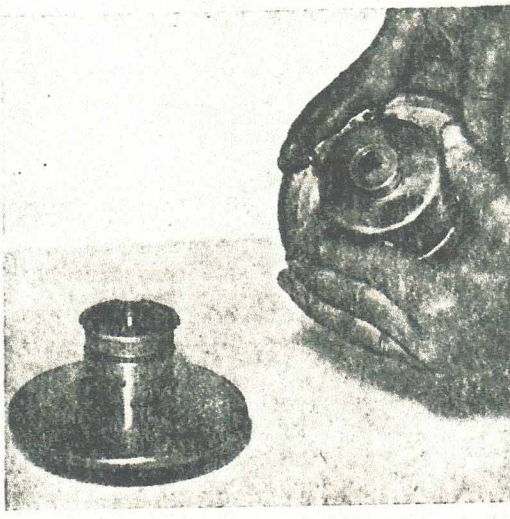
Pour 3/4 qt. motor oil into reductor. A dipstick is fitted forward of the casing.

TO ASSEMBLE DRIVING PULLEY.

Compress the three inertia blocks and fit inner face onto outer face. Care should be taken to fit the three pawls onto the spring cage.

Insert splined bushing into the outer face, push, and turn inner face until the two lugs fit into the appropriate bush grooves.

Screw lock nut by hand to secure bush with the lugs and replace complete pulley.



Remove lock nut. Place lock washer and centre nut. (Use a 10 male wrench no. 592 and special four notch wrench no. 591.) Mount ballrace and cage ; also lock nut. Fit cover, then circlips.

TO ASSEMBLE SECONDARY DRIVEN PULLEY.

Fit inner face of secondary pulley onto reductor main shaft. Special rings no. 602 are provided so that the gasket edges shall not be damaged when passed over the lock ring groove.

Fit a new lock ring with special Manurhin cone no. 601.

Ease outer face onto the four guide columns and the fine shaft splines.

Put spring and guiding disc into place. Compress all with special tool no. 593 and fasten the four fixing clips onto the columns. Remove tool no. 593.

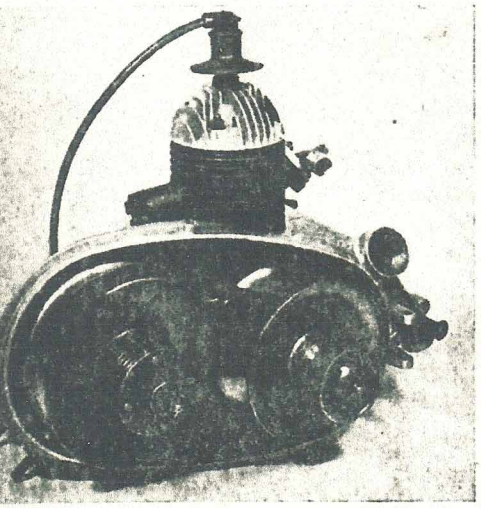
Mount lock washer and nut. Block, preventing pulley movement by use of chain pinion fixing collar.

Fit belt first onto primary pulley, separating faces to ensure that it is well down.

Thrust back inner face of secondary pulley and fit belt as deeply as possible. The belt will assume its normal position if the two pulleys are then turned a few times.

TO RE-FIT CLUTCH CONTROL FORK.

Fit fork onto screw by compression of spring. Insert pin and replace cotter pin.



Top to bottom :

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Setting flywheel-magneto. (Use of the comparator permits greater precision).

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Re-mounting secondary pulley by means of Manurhin special tool no. 593.

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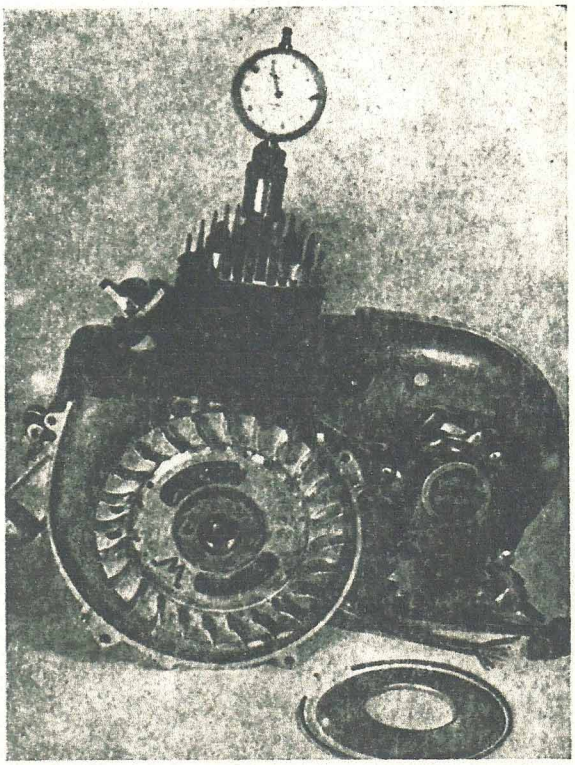
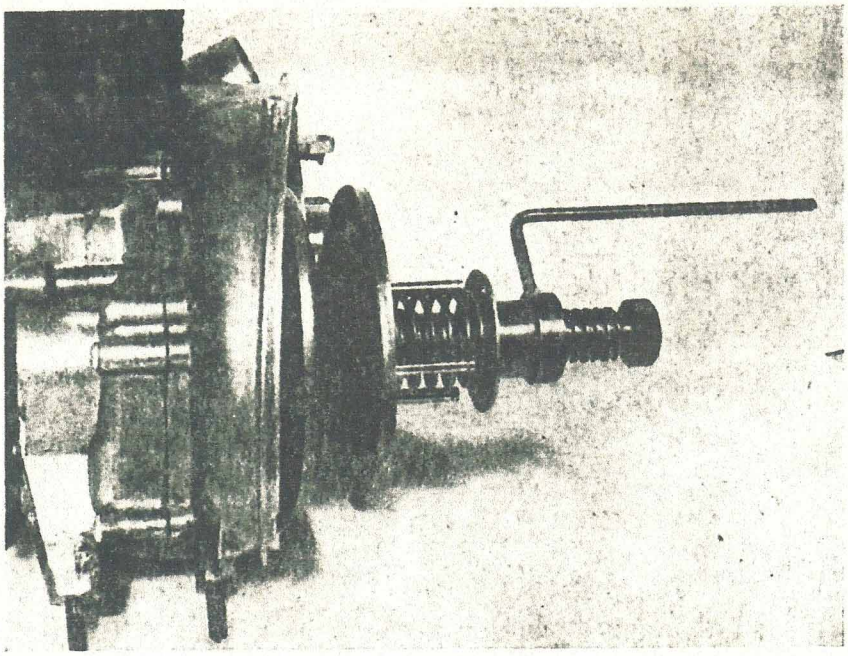
Replacing "variator" belt. Also see drawings p. 15 showing various stages gone through.

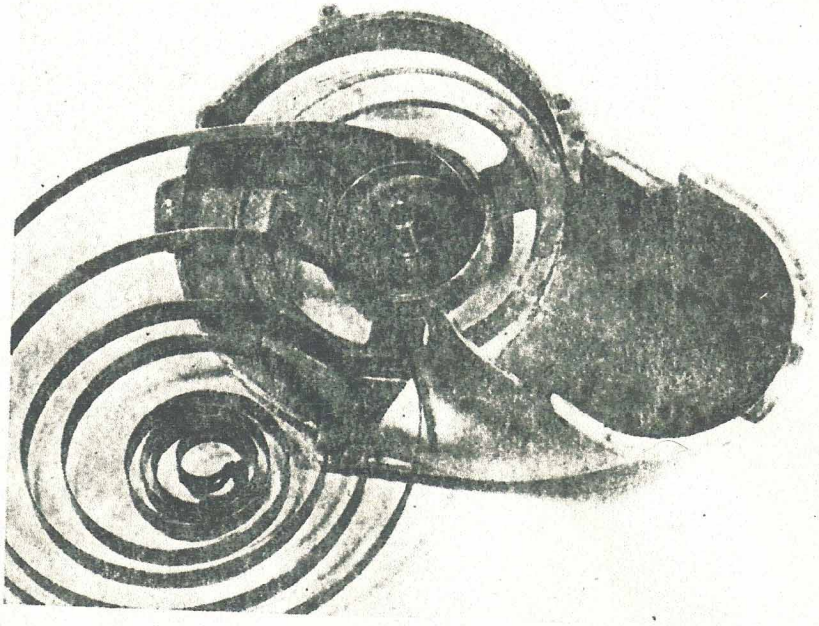




TO RE-ASSEMBLE STARTER.

Engage starter casing onto centering guides on engine casing. Insert four assembly screws but do not tighten before making sure, by a pull of the starting handle, that the latches are properly introduced in the ratchet teeth. Do not forget to re-mount the flange supports of the terminal plate and ignition lead tube.

Secure air-intake with its five screws.



Above : *Mounting starter spring in housing.*

■

Below : *Assembling starter hub. To facilitate introduction of lug in spring aperture, use a wooden chock.*

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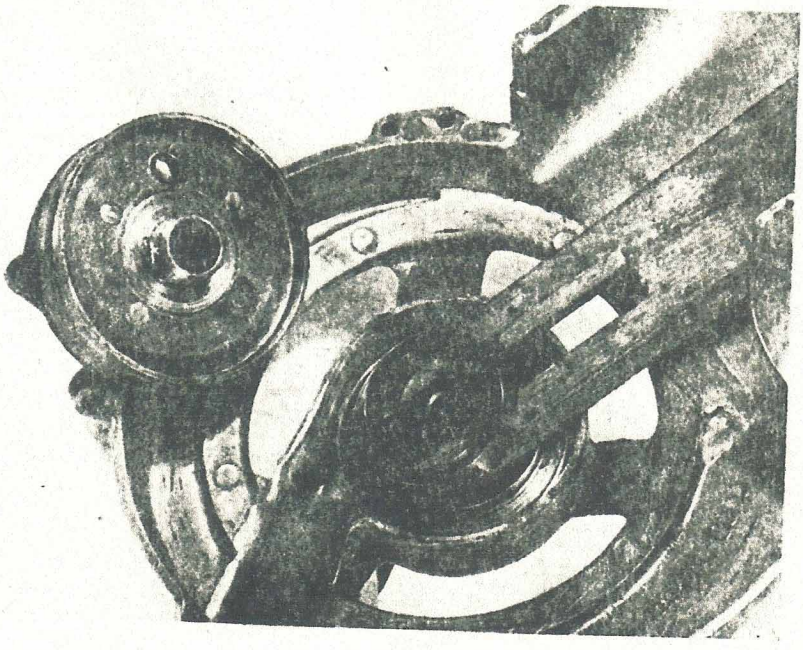
Opposite : *The starter spring is compressed with handle no. 587. To block drum use tool no. 588. The cable is thus engaged in the drum. Note position of aperture.*



TO REPLACE STARTER SPRING.

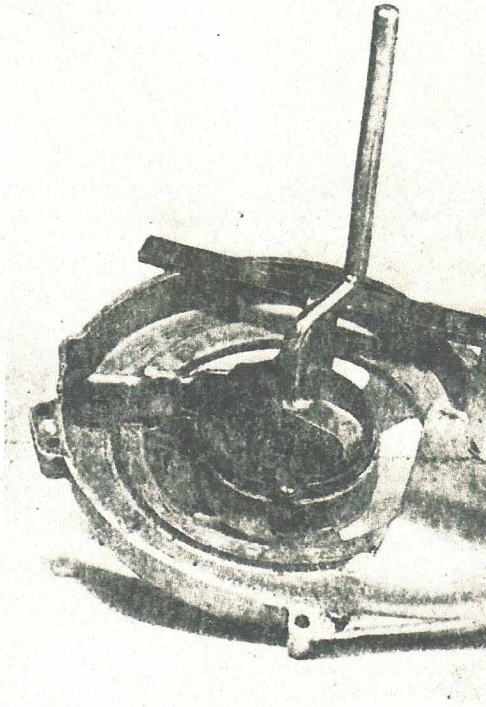
Strip starter casing.

Secure it in a vice on a level with the cable pulley.

Loosen cable lock screw on handle. Under this, is a light alloy washer and, under that, the cable which is looped around a drum.

Free cable and remove handle. The cable will then spring back round the drum. Extract spindle of cable guiding pulley.

Remove pulley and metal guide. Loosen centre screw of the ratchet control lever. TAKE CARE of the two washers. Free spindle and its spiral spring.



Remove circlips and pull the starter hub so that it is gently freed, allowing the spring to expand under control.

Slightly raise the central spring hub and make a half clockwise turn in order to unhook the spring fixed to two lugs, — one on the hub and the other on the casing.

Take a new spring ; hook the outer end to the casing lug and gradually roll.

Slightly lift the inner end of the spring and insert the hub lug into

the spring opening. Replace circlips.

Fully compress spring with special tool no. 587 and then come back two turns, care being taken that the starter cable eye comes opposite the aperture of the spring housing. Block the spring hub with special Manurhin tool no. 558.

Replace the ratchet control lever.

Draw the cable through the eye and the housing exit sheath.

Fit pulley and cable guide and mount pulley spindle. Secure cable to handle. Loop cable back inside handle, put the holding lug through the loop. Draw the cable inside handle, adjust alloy washer and hold with screw.

Hold handle. Remove special Manurhin tool no. 588 blocking the spring hub then ease handle back to its resting position.

NOTE : The spring in its housing should be lightly greased. Once the cable has been fixed, draw handle and lightly lubricate cable with motor oil.

SCOOTER MANURHIN

MAINTENANCE

DECARBONISING.

All engines, whether 2-stroke or 4-stroke, occasionally need to be decarbonised, that is to say to have the carbon deposit on the piston head and the inside of the cylinder head and the exhaust port (in the case of a 2-stroke), scraped off.

A 2-stroke engine requires this to be done rather more often than a 4-stroke since it fires at each revolution and lubrication is provided by a mixture of petrol (gasoline) and motor oil.

The engine should in principle be decarbonised every 2,500 to 3,000 miles. Owing to the absence of valves, rockers and push rods, — added complications in the case of a 4-stroke, — decarbonising a Manurhin is a simple matter.

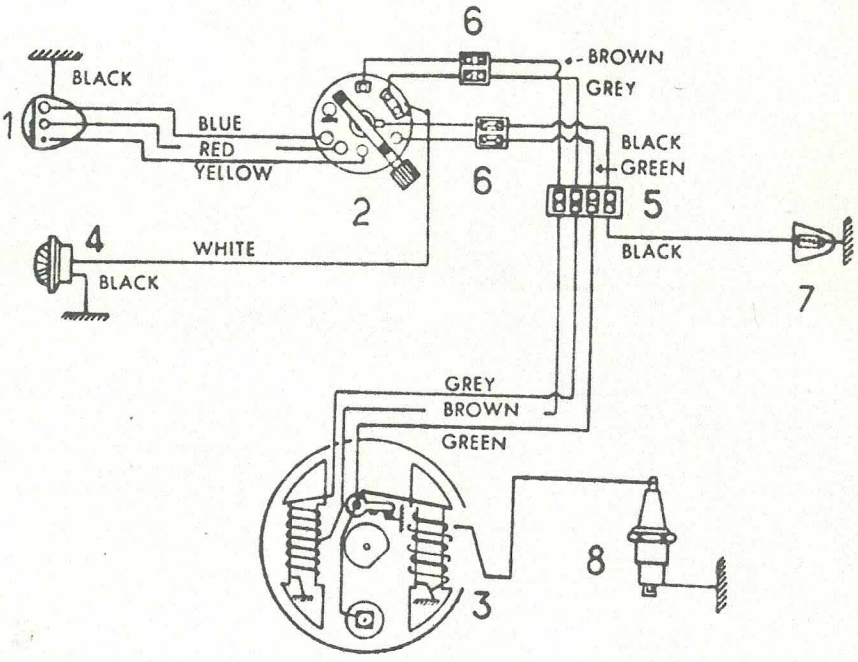
The engine need not be removed from the frame. Take off the rear housing, the blower, the starter and the cylinder head as indicated above. Remove the cylinder.

Scrape off the carbon deposit inside the cylinder head with a soft copper or aluminium scraper.

Put a rag over the opening of the crank case and deal similarly with the piston head. When both these parts have been carefully dealt with, blow away any remaining particles and finish off with a slightly oily rag.

Carefully clean out, with the same scraper, the exhaust port which is often partially blocked up with carbon. Finish off with a rag lightly soaked in clean oil.

PLAN OF ELECTRICAL EQUIPMENT



1 = Headlight with 1 country (two intensities) bulb and 1 city bulb.
2 = Combined lighting-ignition-horn switch.
3 = Magnetic flywheel 12 V-29 W.
4 = Horn.
5 = Terminal plate 4 connections.
6= Terminal plate 2 connections.
7 = Rear light on number plate.
8 = Spark plug.

Various bulbs

HEADLIGHT :	1 city bulb 12 V - 2,7 W
	1 country bulb 12 V - 25,25 W
REAR LIGHT :	1 bulb 12 V - 2,7 W

It is as well to free the exhaust pipe and silencer (muffler) of any carbon deposit which interferes with the free displacement of waste gases.

There are several ways of cleaning the pipe, such as drawing a large-linked chain backwards and forwards through it, or heating it and then tapping it with a wooden block. The silencer in the more recent models can be taken apart and therefore presents no difficulty. In other cases it can be heated and then tapped with a wooden block.

When re-assembling it is advisable to replace the gaskets at the cylinder base and between the cylinder and the cylinder head.

CHANGING PISTON RINGS.

Lack of compression may be due to worn rings or the fact that they are stuck in their grooves.

Change rings as follows :

Remove cylinder and cylinder head (see above). It is unnecessary to take off the piston. Remove the worn or damaged rings either with special pincers or by inserting three or four thin pieces of foil between the rings and the piston.

Take the new rings and try them inside the cylinder to check (see table) gap space.

Place them over the piston, then into their grooves with the aid of the three or four pieces of foil, care being taken that the gaps are opposite the lugs.

Re-assemble the cylinder and cylinder head ; fit new gaskets.

Re-assemble blower, starter etc as explained above.

TABLE OF CHARACTERISTICS

(The figures are given in the metric system, because this is a French-made motor)

ENGINE

General

No. of cylinders	1
Bore	45 mm
Stroke	47 mm
Displacement	74 cm³
Taxable HP	1 CV
Compression ratio	6 to 1
Normal engine speed	4.500 tr/mn
Maximum do.	5.000 tr/mn
Power (actual)	3 CV à 5.000 tr/mn

Cylinder Head

Capacity	14,1 à 13,59 cm³

Piston

Total height	59-0,2
Piston pin height	25-0,1
Weight	90 gr

Piston pin

Diameter	12 ± 0,002
Length	37-0,2

Rings

Dimensions :	
— Bore	⌀ 45
— Thickness	1,8 mm
— Height	2 mm
Play, in grooves	0,05
Gap space	0,20

Connecting rod

Distance between axes	91-0,1
Lateral play	0,14 à 0,43
Size of rollers	⌀ 4-0,002 ⌀ 4-0,004
Length	8 + 0,003 — 0,009

Crankshaft

Lateral play	0,02
End play	0,02

Crankpin

Diameter	⌀ 15,3 - 0,003 - 0,012
Length	33

Variator :

Ratio :

from	$\frac{63}{122}$ = 1 : 1,94 vit. mini
to	$\frac{112}{74}$ = 1,51 : 1 vit. maxi

Reductor

No. of gear teeth	15 et 54
Ratio	1 : 3,6

Secondary transmission

No. of sprocket teeth on drive from box	16
No. of sprocket teeth on rear wheel	56

Chain

Secondary :	
Diameter of rollers	⌀ 7,75
Interior width	4,88
No. of links	102 rouleaux
Pitch	12,7

Carburetor

Make	BING
Type	4/14/1
Jet	84
Mixture flow	⌀ 14
Position	Verticale
Control	Câble, poignée tourn.
Cable, twist grip	

Flywheel-magneto

Make	MOREL
Type	S.D.M. 71 (A)
Power	12 volts, 30 watts
Setting full advance	2 mm 60 à 2 mm 80
Gap between platinum points	4/10

Spark plug

Type	Floquet F 101.S
Gap between points	0,4 à 0,5

Various bulbs

Code-head	12 volts, 25 watts
Town	12 volts, 2,7 watts
Rear	12 volts, 2,7 watts

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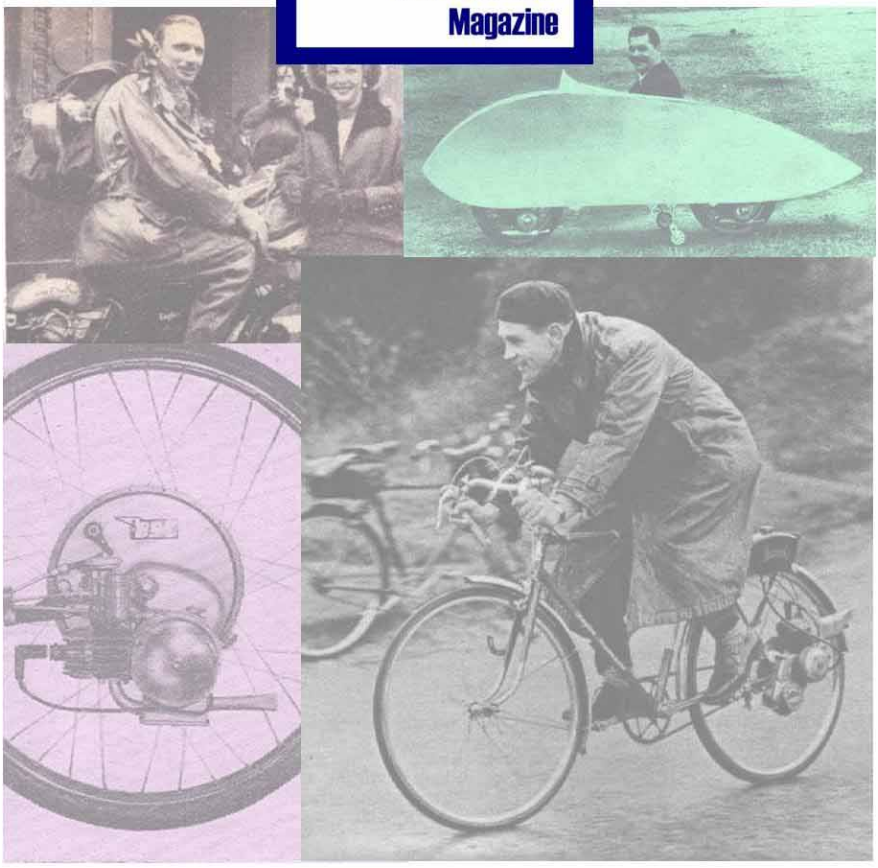
The Iceni CAM Magazine
Cyclemotor Autocycle C Moped



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