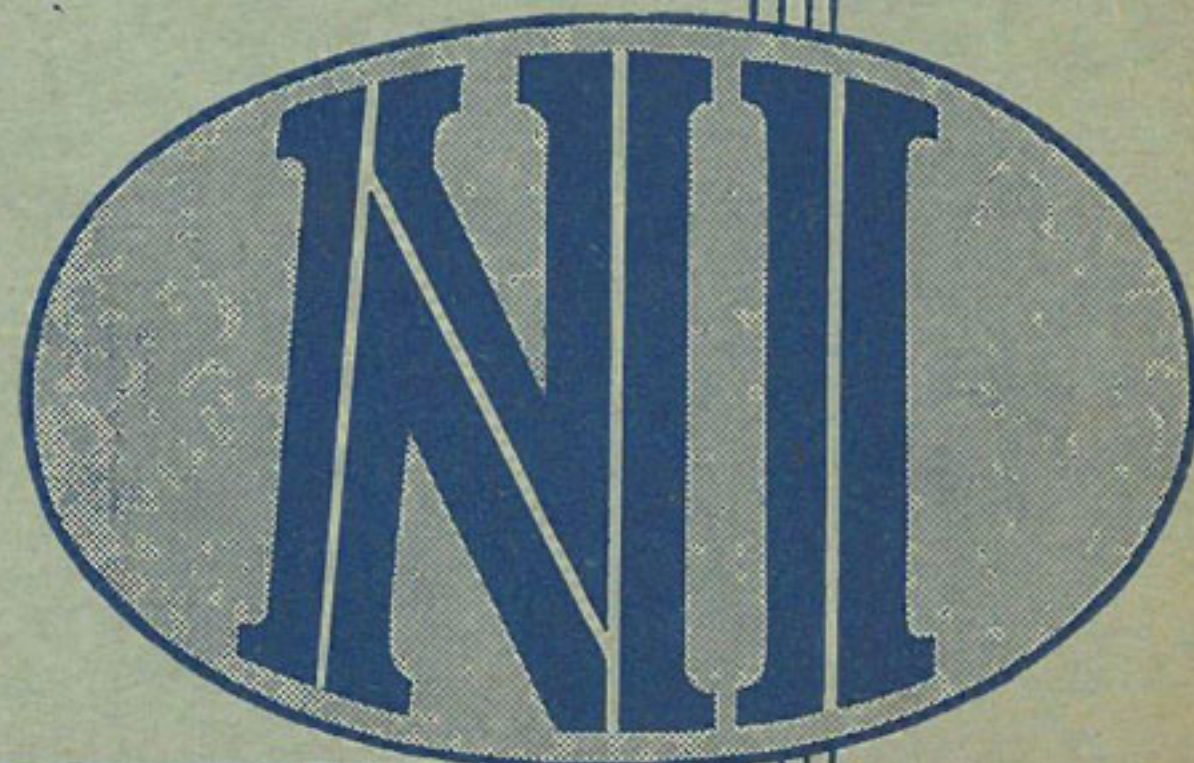


R. H. COLLIER & Co. Ltd.,
COLLIER'S CORNER,
SOUTH YARDLEY,
BIRMINGHAM.

NEW IMPERIAL

OWNERS' GUIDE
1938



PRICE ONE SHILLING

OWNERS GUIDE - NEW IMPERIAL - 1938 EDITION

This booklet is issued to New Imperial riders with a view to assisting them to obtain the greatest satisfaction from their machines. It does not attempt to cover those major operations which can only be done in the well-equipped workshops operated by New Imperial Dealers but it does cover such maintenance work as the owner may reasonably be expected to carry out successfully.

Owners are particularly requested to see that only genuine New Imperial spare parts, or those made by the Manufacturers of such proprietary articles as are specified in our machines, are fitted when repairs or replacements are being carried out, as the use of "pattern" parts might cause trouble, the responsibility for which would rest entirely on the owner.

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Part 1.

UNIT CONSTRUCTION

Chapter 1.

UNIT
CONSTRUCTION.Basic
Principle.

The basic principle of Unit Construction is the casting of the Engine Crankcase and the Gearbox Body in one piece, and with it is associated the practice of using helical gear wheels to take the primary drive (i.e., Engine to Gearbox), instead of the conventional chain-cum-sprockets.

Advantages.

Unless Unit Construction had some very real and definite advantages "NEW IMPERIAL MOTORS" would not have advocated, developed and marketed such design for so many years.

Here they are:—

- (a) In the case of a separate Engine and Gearbox, rigidity between the two Units is essential if a smooth drive is to be obtained, and if the chain is to run in line, at the proper tension. To produce these conditions the use of heavy brackets, etc., is essential and is complicated by the fact that provision for taking up chain stretch or wear has to be made, and at the same time an oil bath case or cover has to be fitted, allowing for the movement referred to above between the two Units. In the case of UNIT CONSTRUCTION, however, these difficulties do not arise because:—

(a) The two Units are built in one strong casting; (b) There is no primary chain to stretch or sprockets to wear—only two long-life, robust, helical gear wheels; (c) There is no stretch or wear to take up, and, therefore, no provision for relative movement (between Engine and Gearbox) is necessary.

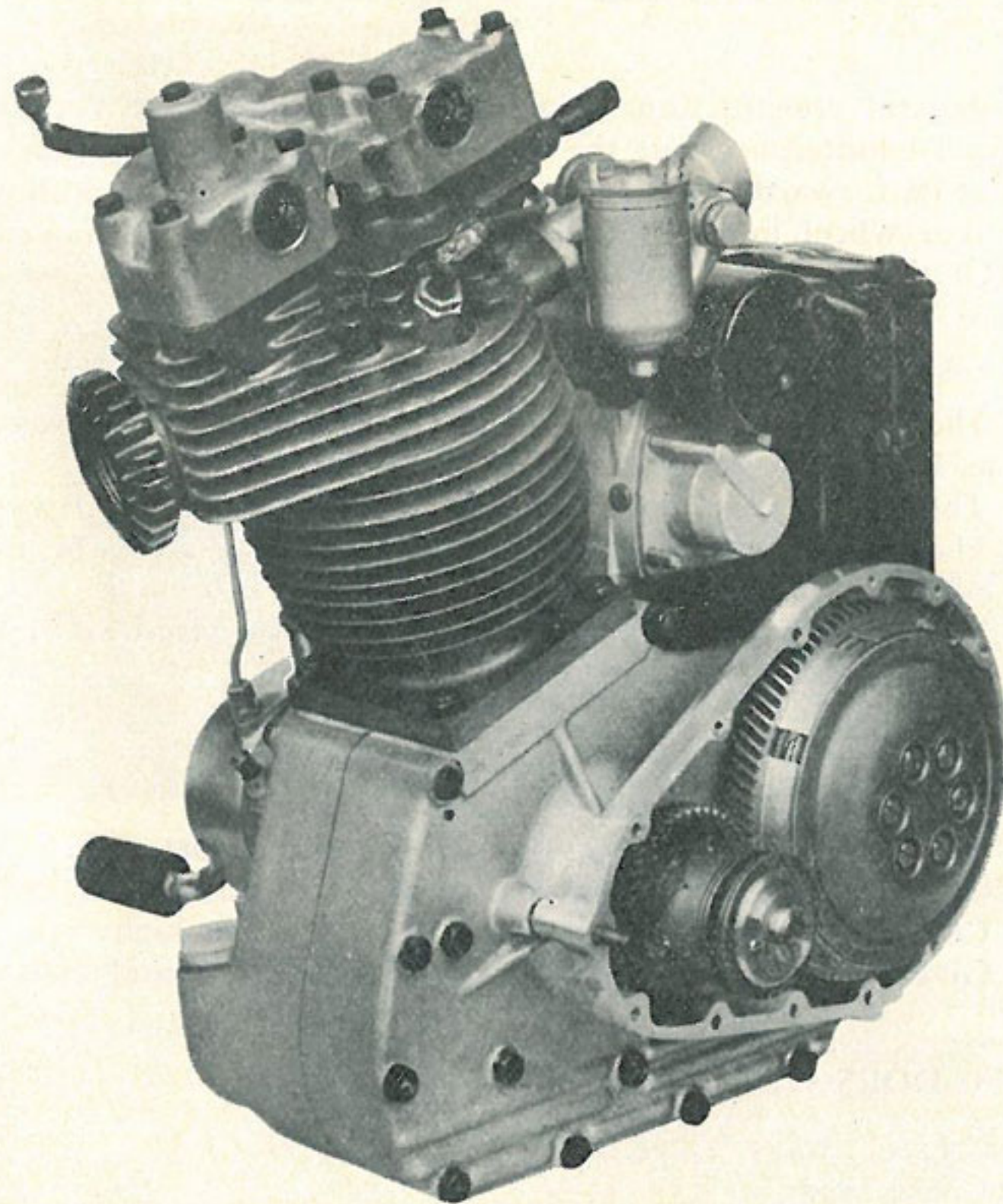
- (b) In the case of separate Units, chain wear must, and does, occur, and to take up this "slack" it is sometimes necessary to remove the chain cover to "feel" for corrected "slack"; to slack off Gearbox retaining bolts, operate Gearbox adjusting screw, tighten up Gearbox retaining bolts, adjust rear wheel position to take up "slack" in the rear chain, created by moving the Gearbox.

UNIT CONSTRUCTION renders these adjustments absolutely unnecessary. Save your money on chain replacements—your TIME matters, too!

- (c) The helical gear wheels run in an oil bath gear case, the oil supply, quite unconnected with the Engine oil circuit, is maintained through a large filler hole. A level plug is provided.

- (d) The great rigidity of UNIT CONSTRUCTION and the use of the helical gear wheels in place of chain and sprockets allows the power of the Engine to be transmitted to the Gearbox with a MINIMUM OF FRICTIONAL OR WHIP LOSSES—more M.P.G., and M.P.H. for you to use.

- (e) A. R. Foster, riding a "NEW IMPERIAL" 250 c.c. Unit Construction Model, won the Lightweight T.T. Race, 1936, at record speed of 74.28 m.p.h.



Model 36 Unit.

SPRING FRAMES

SPRING FRAMES.

Construction.

(Fig. 2).

The general construction of a Spring Frame follows very closely, in its outline, its rigid, conventional counterpart, but the chain stay portion of the rear triangle of the Spring Frame is mounted at its forward end on a pivot (A) so positioned as to allow the rear fork end (B) to move with the rear wheel in a vertical plane, the shock of the movement being taken up by spring-loading (C) the seat-stay, and controlling the movement by a damper (D).

The essentials of good Spring Frame design are:—

- (a) The Sprung part of the frame must be strong and scientifically triangulated and yet be as light as possible.
- (b) The pivots must be on wide centres to give a good working base.
- (c) The pivots must be mounted on large taper roller bearings, the wear on which must be taken up easily.
- (d) Lubrication must be made easy by the provision of suitable grease gun nipples.

Advantages.

WHAT IT DOES:

- (a) Removes riding fatigue.
- (b) Gives you a new perception of riding comfort.
- (c) Gives longer life to every part of the machine, particularly batteries and tyres.
- (d) Converts third-class by-roads into "A" class highways.
- (e) Gives you that "on rails" feeling on corners and makes for SAFETY FIRST.

WHAT IT DOES NOT DO:

- (a) Create "wavy" steering.
- (b) Cause skids.
- (c) "Roll" on corners.
- (d) Put the wheels out of track by the rear wheel "pulling round"—the taper roller bearings see to that.

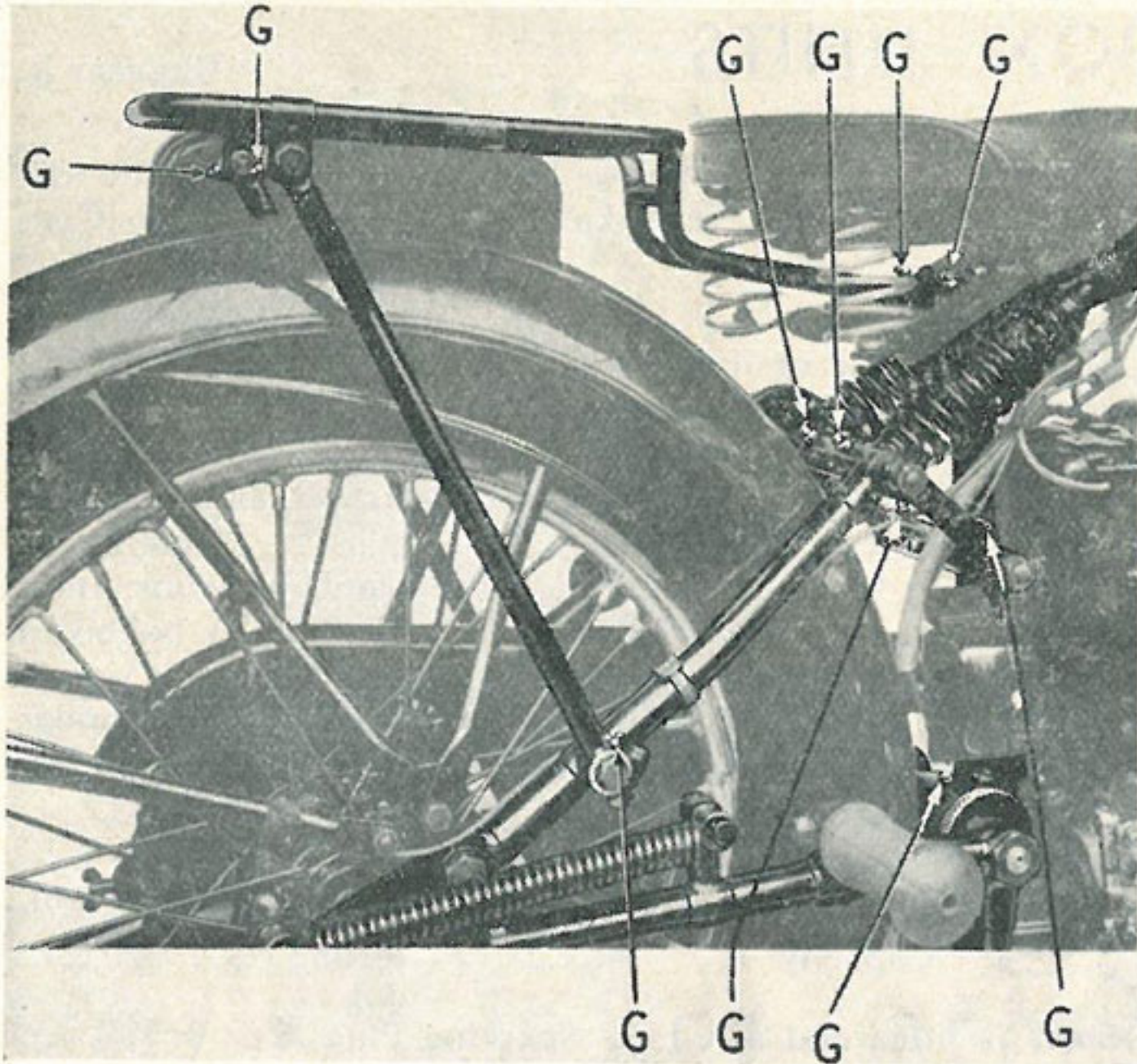


Fig. 1.

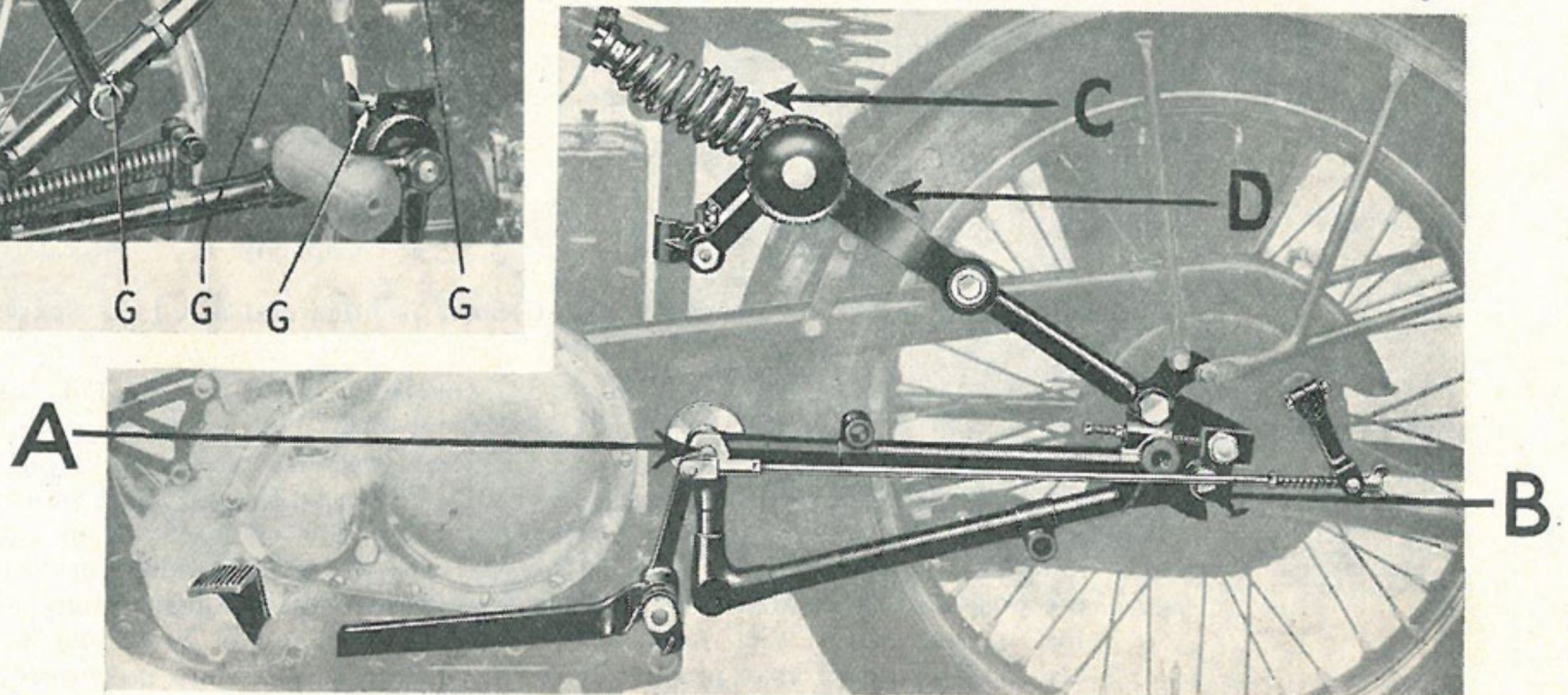


Fig. 2.

ENGINE/GEARBOX UNITS

ENGINE AND
GEARBOX UNITS.Lightweight Unit.
(Fig. 1).

For 1938 as for 1937 all New Imperial motor cycles employ Unit Construction. The decision to concentrate exclusively on this type follows the remarkable successes of Unit Construction since its inception.

This Unit is one in a class by itself, in that none of its parts are common to the rest of the Range, and its basic construction differs considerably, particularly with regard to lubrication (see Chap. 4, Part 1) and the method of driving the electrical equipment. The Primary Drive consists of two helical gear wheels, the smaller of which is mounted on the Engine mainshaft, and the larger of which is integral with the clutch and transmits the drive from Engine to Gearbox. This larger gear drives the Coil or Maglita Set, one of which is specified with this Model, and the whole train of gears is enclosed in an aluminium oil bath gear case. A robust cast-iron cylinder is bolted to the Crankcase in the normal manner and a single port cylinder head with totally enclosed Valves and Rocker Gear is used. The Rocker Gear and Valves are lubricated by oil mist, which, under Crankcase pressure, works up the push rod tubes, but the rocker spindles are greased by gun and nipple

The dimensions of the Unit are:—

Bore	.. 55 mm.	Stroke	.. 62.5 mm.
Capacity	146 c.c.	Rating	.. 150 c.c.

An Amal Carburetter with Air Cleaner is fitted and a K.L.G. Sparking Plug.

Mediumweight
Unit.

(Fig. 2).

The Mediumweight Unit is fitted to Models 36, 36 D.L., 46, 46 D.L. and 90. In its construction it follows very closely the Model 23, except that the lubricating principle employed varies considerably (see Chap. 4, Part 1). Only two primary gears are employed, the electrical instrument being driven from the timing side by chain. An Engine Shaft Shock Absorber can, therefore, be fitted, and the two primary drive gear wheels are enclosed in an exceptionally neat die cast aluminium oil bath. The Rocker Box (A) is a strong aluminium casting and the Valve Guides are positively lubricated by a lead (B) from the Internal Plunger Pump, situated immediately inside the forward end of the Magdyno drive Case (C). The Oil Filler (E) is conveniently placed and also acts as an oil level plug. The Exhaust Pipe or pipes are positioned by large finned nuts (F)

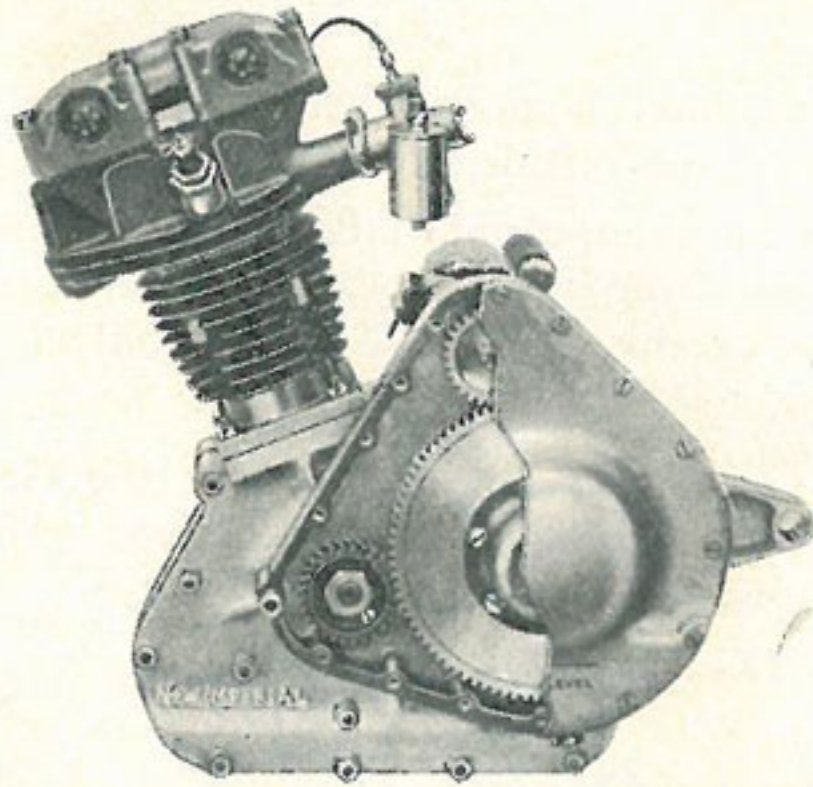


Fig. 1.

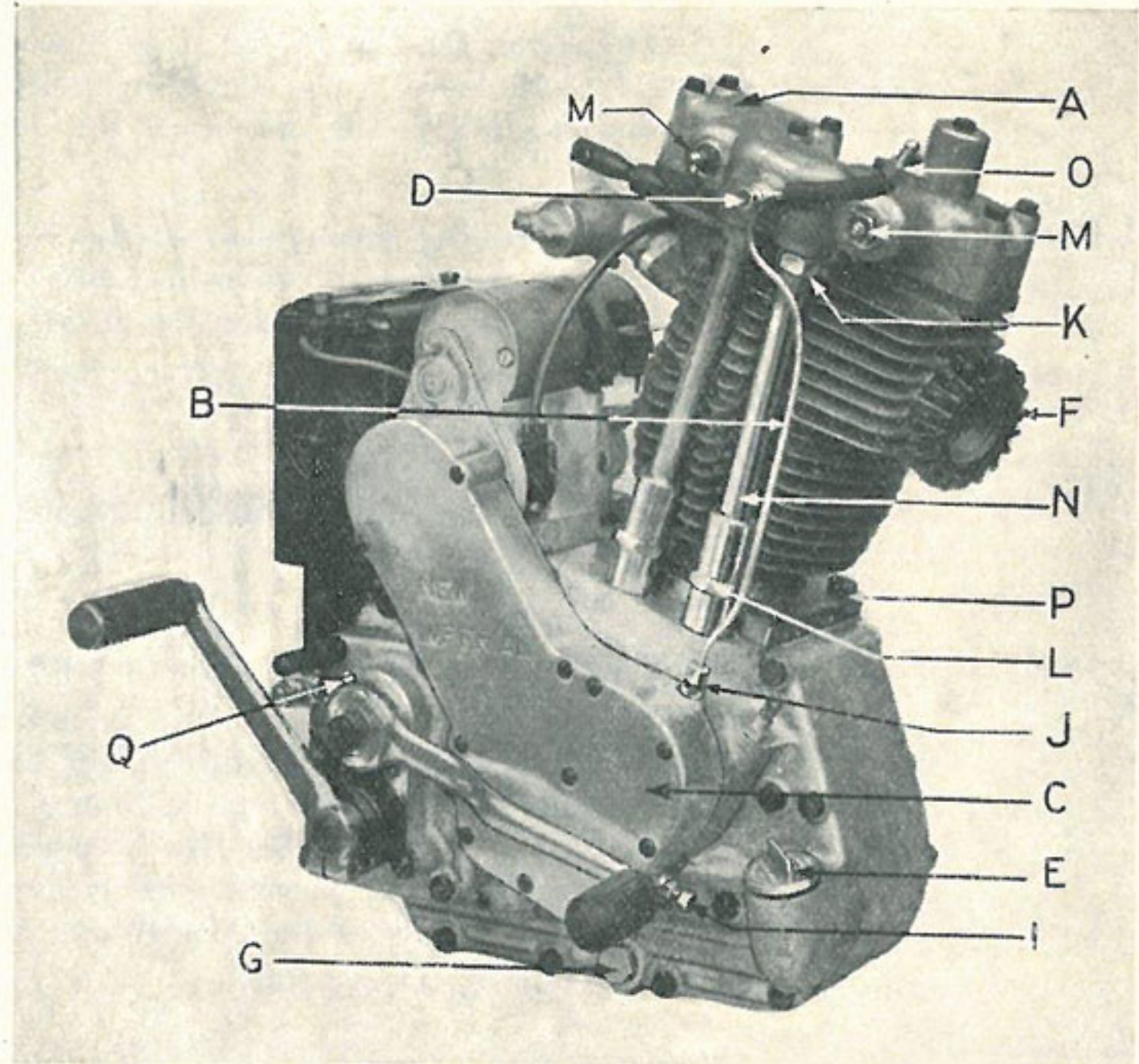


Fig. 2.

ENGINE/GEARBOX - UNITS

which draw up a flange on the end of the Exhaust Pipe to make a gas-tight joint with the ports. A drain plug (G) is conveniently situated at the bottom of the offside of the Crankcase.

The Gear Box employed is of the 4 speed type and the internal mechanism may be removed from the crankcase very simply without removing the unit from the frame. It can be operated by hand or foot at the choice of the owner when ordering his machine, foot control being standard.

Foot Control.

(Fig. 3).

The operating mechanism of the Foot Control (H) is positioned in the rear of the Gearbox itself and is therefore positive in action and not subject to "control slack," as is the case where the pawl action has to be transferred to the operating mechanism by rods and angle joints.

The dimensions of the 250 c.c. Unit (Models 36, 36 D.L. and 90) are as follows:—

Bore	..	67 mm.	Stroke	..	70 mm.
Capacity		247 c.c.	Rating	..	250 c.c.

On the 350 c.c. Unit (Models 46 and 46 D.L.) the dimensions are as follows:—

Bore	..	74 mm.	Stroke	..	80 mm.
Capacity		344 c.c.	Rating	..	350 c.c.

Heavyweight Unit.

The Heavyweight Unit is fitted to Models 100, 76, 76 D.L., 110.

The Heavyweight Crankcase is almost identical to the Mediumweight in its construction, except that it is built to slightly larger dimensions all round to (a) take Engines having, by virtue of their capacity or their type, a higher output of power than those fitted to the Mediumweight Crankcase and (b) where the Heavyweight Crankcase is employed double helical Primary Drive Gear Wheels are used. Otherwise, the Heavyweight Crankcase is identical with the Mediumweight.

The dimensions of the Models are as follows:—

350 c.c. Model 100:	Bore	..	70 mm.	Stroke	..	90 mm.
	Capacity		346 c.c.	Rating	..	350 c.c.
500 c.c. Model 76:	Bore	..	82 mm.	Stroke	..	94 mm.
	Capacity		496 c.c.	Rating	..	500 c.c.
500 c.c. Model 76 D.L.:	As Model 76.					
500 c.c. Model 110:	As Model 76.					

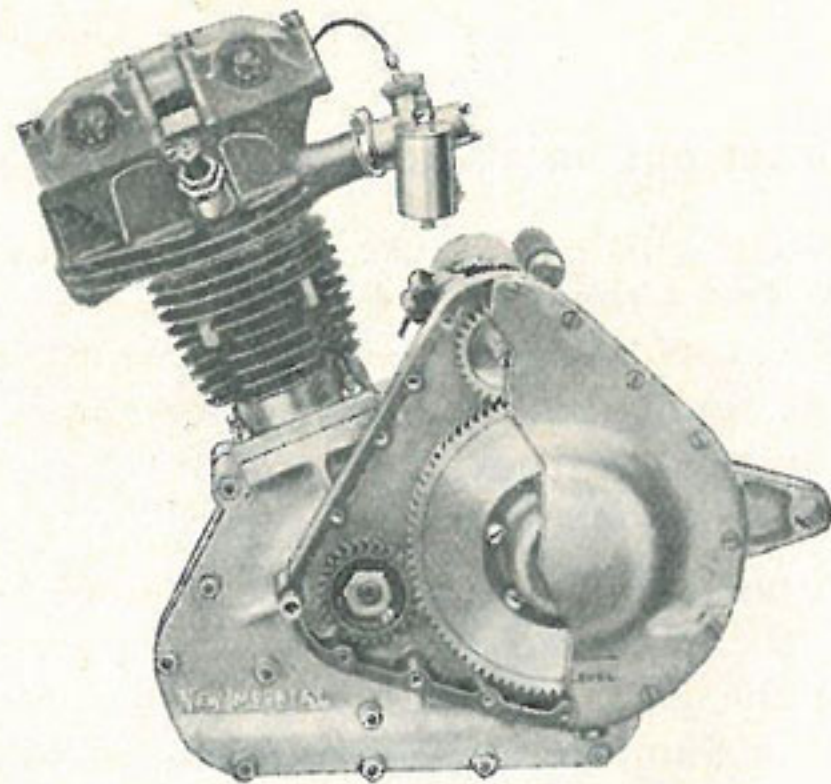


Fig. 1.

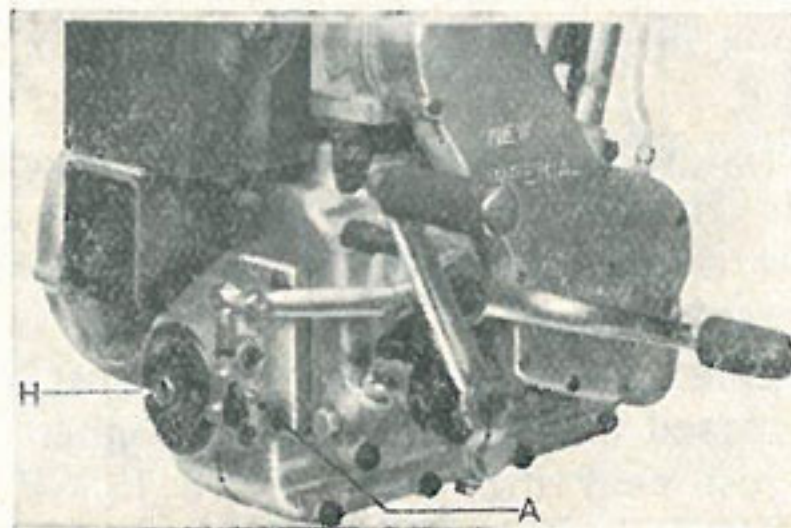


Fig. 3.

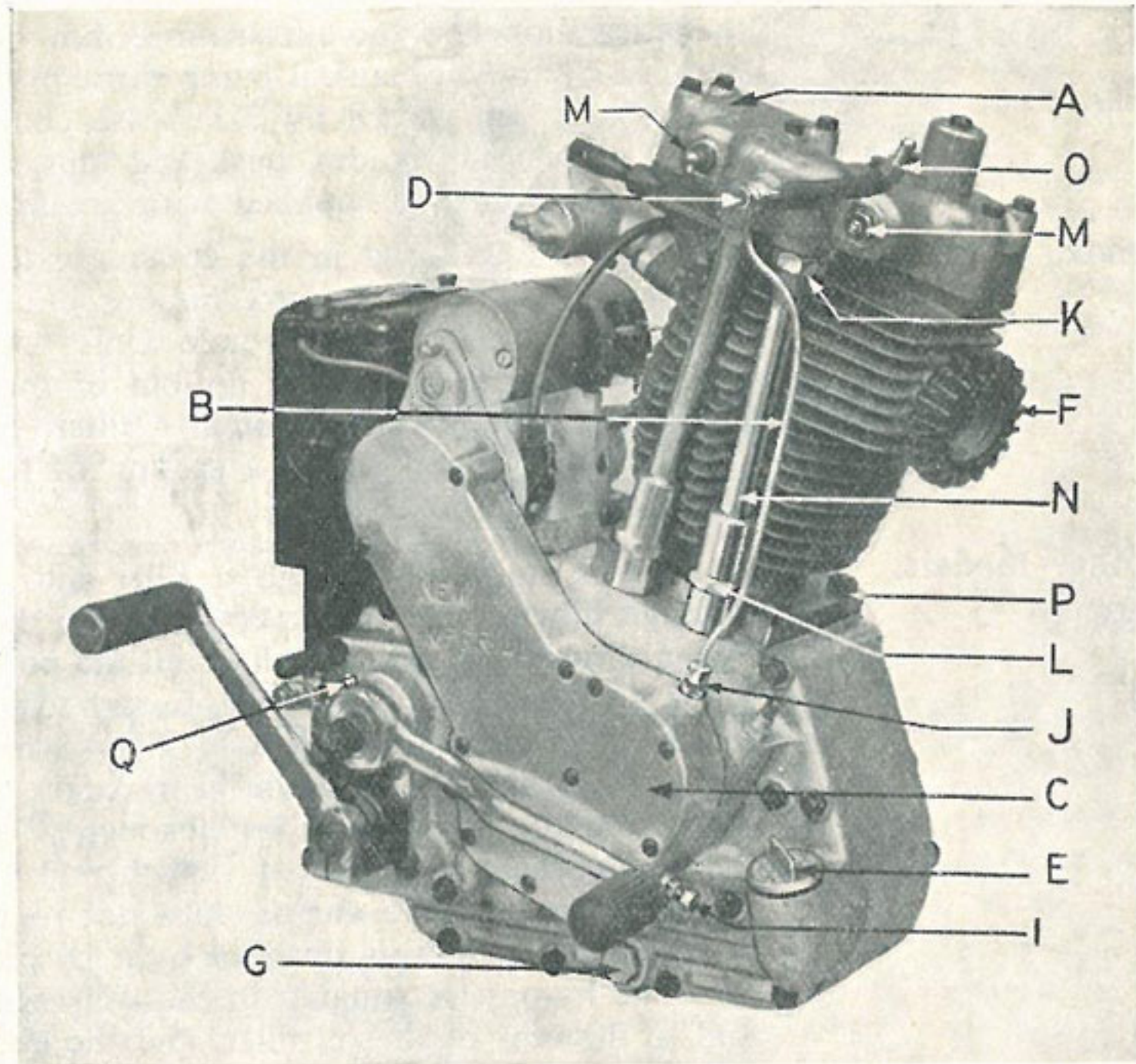


Fig. 2.

LUBRICATION

LUBRICATION.

We recommend the use only of the Lubricants as set out on Page 57 of this Guide.

Model 23. Engine Only.

(Fig. 1).

The method of lubrication is most simple and absolutely efficient. Oil is supplied through the filler shown in the Illustration, into the Sump below the Crankcase. From here the oil is pumped by the mechanical pump through the sight feed direct to the Flywheels, thence to Cylinder and Piston, and forced by Crankcase compression into the timing cover, automatically lubricating cams, tappets and guides, push and tops, rockers, valves and valve springs.

The rockers are supplied with grease through the rocker spindle greasers.

Gearbox.

Scrapers are used in the crankcase to deflect the surplus oil as it is carried round by the flywheels on to the gearbox pinions and shafts, and on all other parts in the gearbox, giving an automatic supply for the whole Unit. After lubricating the gears, the oil passes under pressure through an aperture in the bottom of the gearbox into the Sump, and is again pumped into the crankcase after passing through a filter, for re-circulation.

The Illustration shows a section of the crankcase, and the action of the Scrapers throwing the oil into the gearbox.

All other Models. ENGINE.

(Fig. 2).

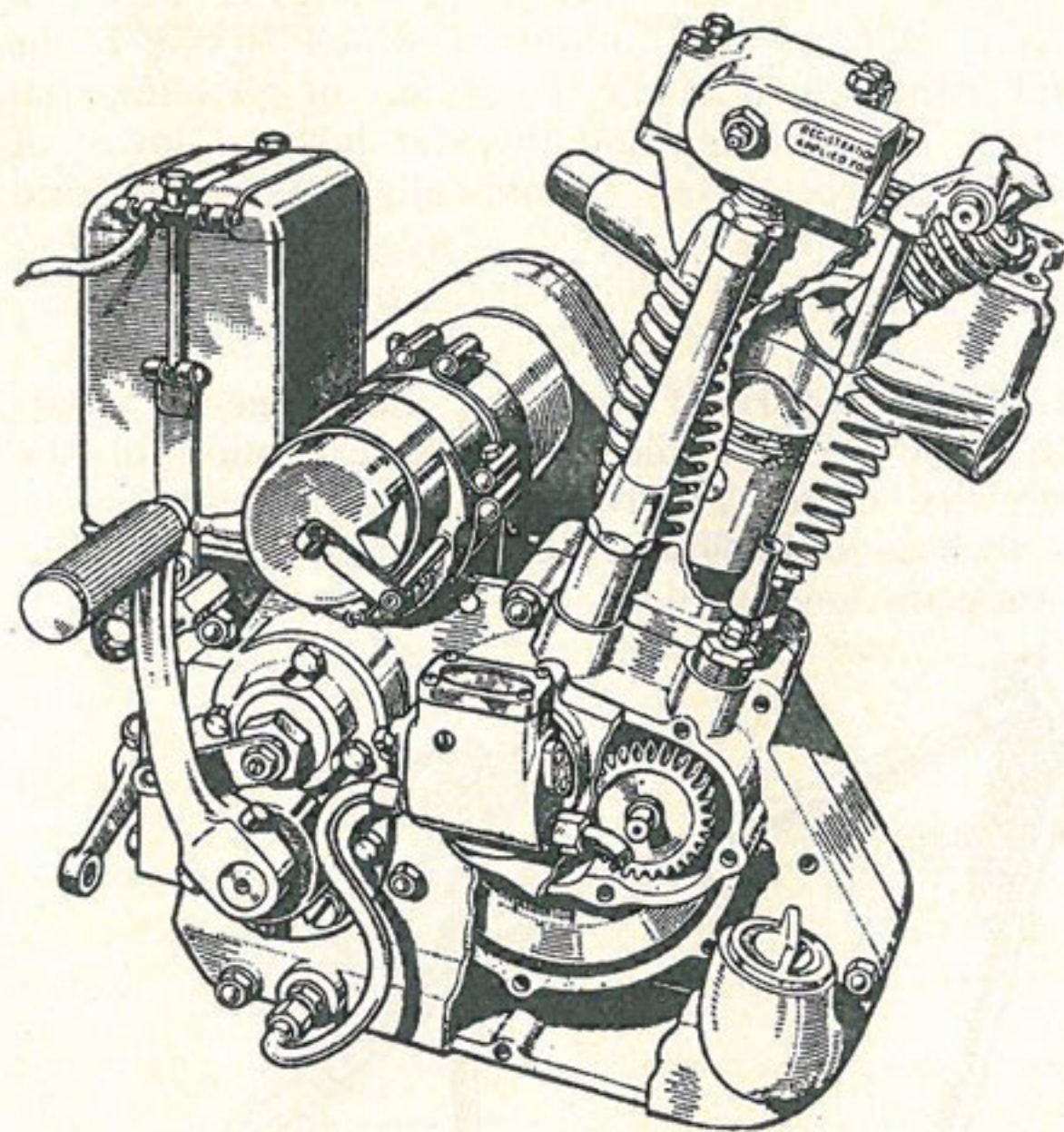
Oil is supplied through a filler into the sump and is forced, by an internal plunger pump, through oilways cast in the crankcase to the main bearings, big end and so out on to the flywheels. When thrown off, the oil collects at the bottom of the chamber in which the flywheels revolve and, when a certain level is reached, is carried off on the edge of the flywheels, from where it is picked up by a scraper wedge, cast in the flywheel chamber, which throws the oil into a trough situated inside the crankcase over the gearbox.

From the trough it is led through a cast-in oilway, fitted with a non-return valve, back into the sump where it is filtered, cooled and once more put in circulation. The pump is of a very efficient type and the engine does not require the full flow of oil delivered by it, so that three-quarters of the flow is diverted by a by-pass back to the crankcase.

The by-pass is situated in the web which joins the timing case to the crankcase just above, and to the rear of the oil filler, and the quantity of oil by-passed is controlled by the higher of the two hexagon-headed screws, fitted with lock nut situated just near the web. THIS IS SET AT THE FACTORY AND SHOULD NOT BE ALTERED EXCEPT BY A COMPETENT FITTER.

Gearbox.

Conventional Lubrication is employed (See Page 57). Care being taken not to fill above the level plug provided.



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Fig. 1.

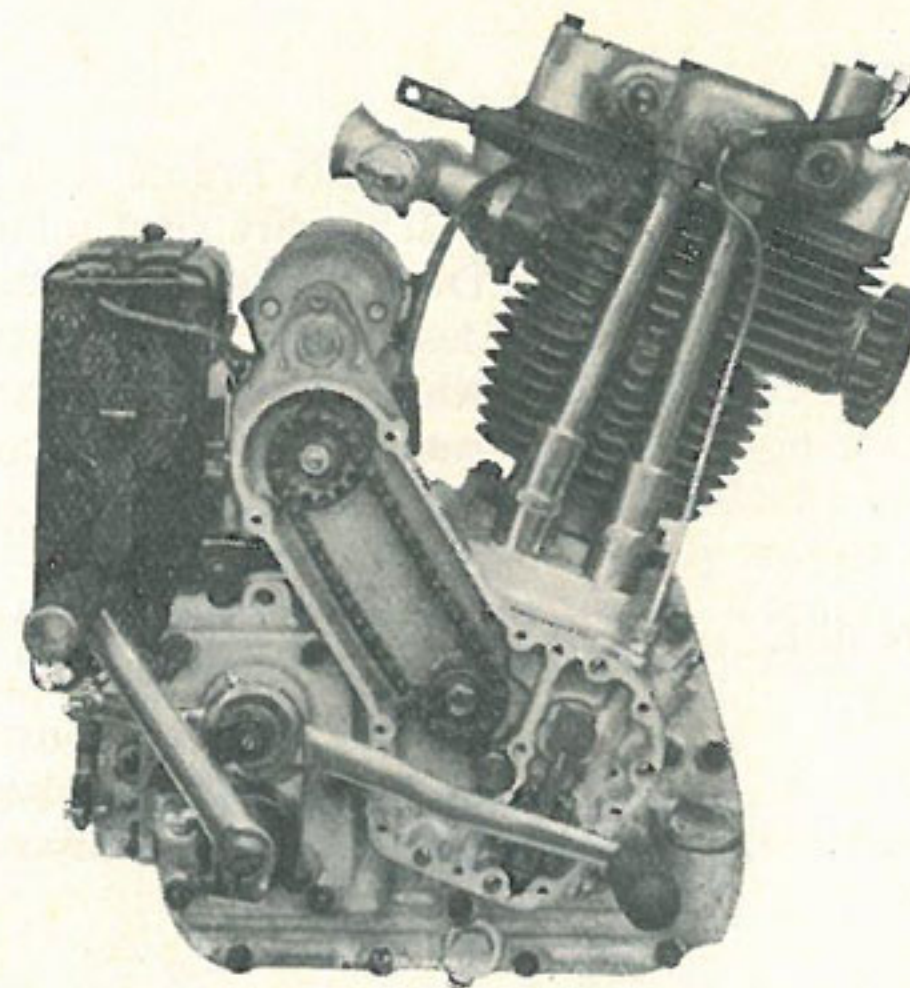
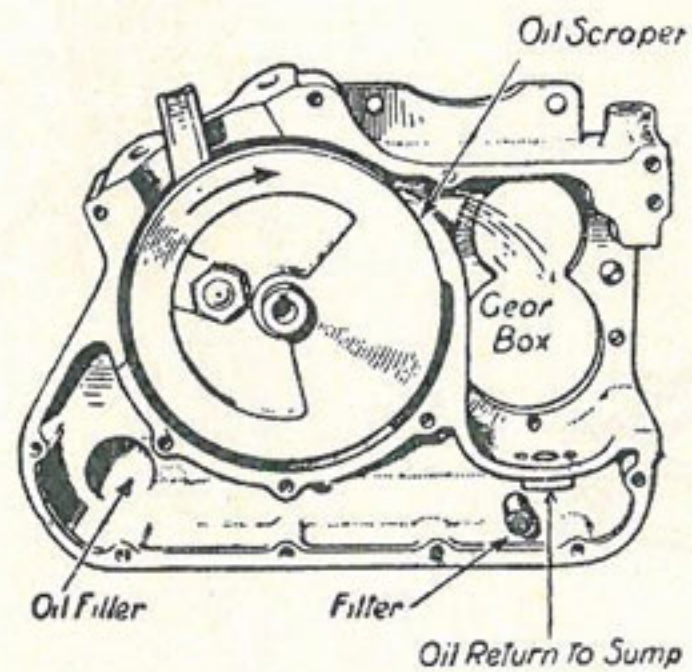


Fig. 2.



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FRAMES.**Lightweight.**

(Fig. 1).

This Frame is fitted only to the Model 23, 150 c.c. It is built of strong malleable lugs and best quality steel tubing. It has a single front down tube, to the bottom of which is bolted the Duplex Cradle, to permit of the patent three-point fixing, which has been a feature of New Imperial design for some years,—two rails are fitted between the head lug and the seat lug, the lower of which acts as the Tank rail. The Frame, while being light, is so scientifically constructed and robust that it is seldom indeed that any trouble is experienced.

Spring Frames cannot be fitted to this Model.

Heavyweight.

(Fig. 2).

The Frame is re-designed from the point of view of Head Lug, and the gauge of tubing employed, as it is now fitted to all Models in the 1938 programme, with the exception of the Model 23. Its construction follows very closely that of the Lightweight Frame, except that its dimensions are larger and its construction is such as will allow it adequately to deal with the greatest strains imposed upon it by the higher capacity Units.

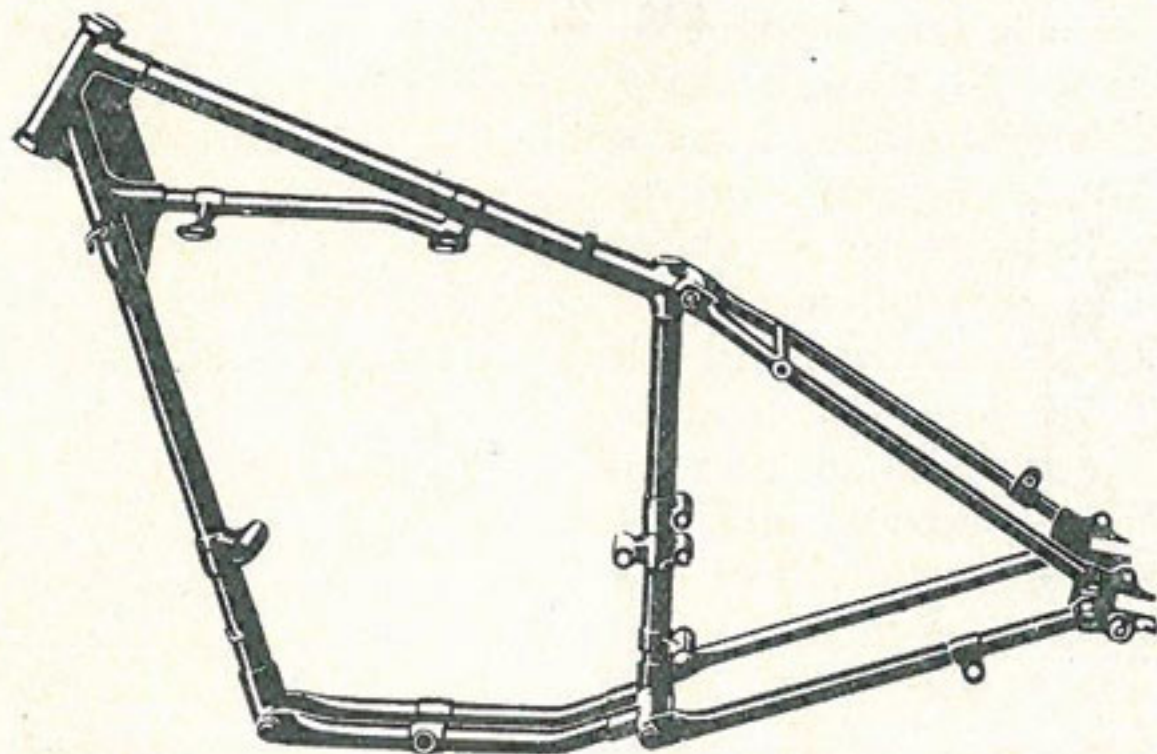


Fig. 1.

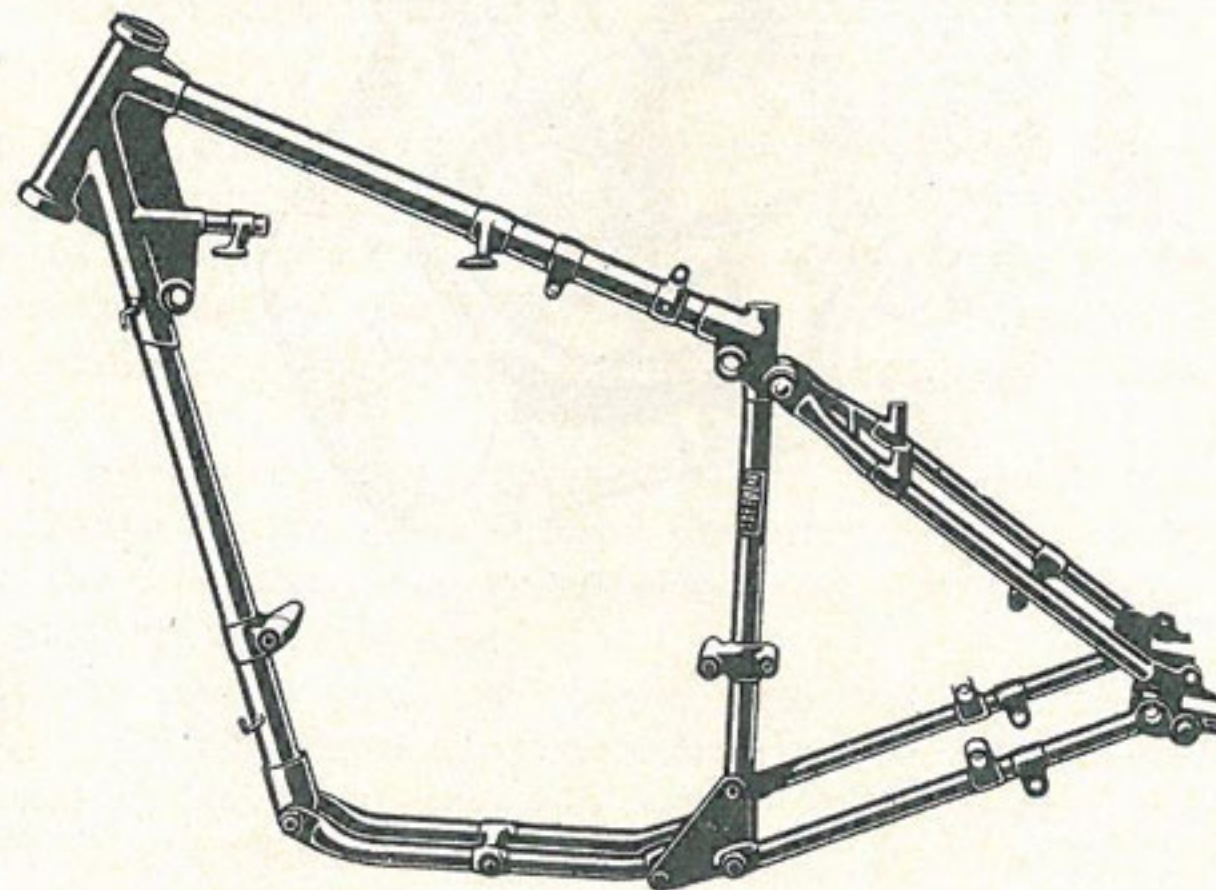


Fig. 2.

Part 1.

FORKS.**Lightweight.**

(Fig. 1).

Heavyweight.**All Models except
90, 100 and 110.**

(Fig. 2).

Models 90, 100, 110

(Fig. 3).

FORKS

Chapter 6.

This Fork is fitted only to the Model 23 and is of the pressed steel type. It is extremely simple in construction, and, while being very light, is strong and well up to its work. No Shock Absorber or Steering Damper is fitted and the Fork, therefore, requires very little attention. (Chapter 4: Part 3).

This Fork is of new design and employs taper tubing of first-class quality. Links of a rather longer pattern than usual, working in conjunction with a well-balanced compression spring, render the Fork unusually sensitive to road shocks, and the movement is governed vertically by a powerful Shock Absorber situated on the front spindle of the lower pair. A finely adjusted Steering Damper is fitted, and the use of this, together with intelligent use of the Shock Absorber, will give good steering and a comfortable ride under all but the very worst of road conditions. For maintenance see Chapter 4, Part 3.

This Fork employs the same principals as above, but the shock absorbers are situated on both sides of the front bottom spindle, and are controlled by hand adjuster levers. For maintenance, see Chapter 4, Part 3.

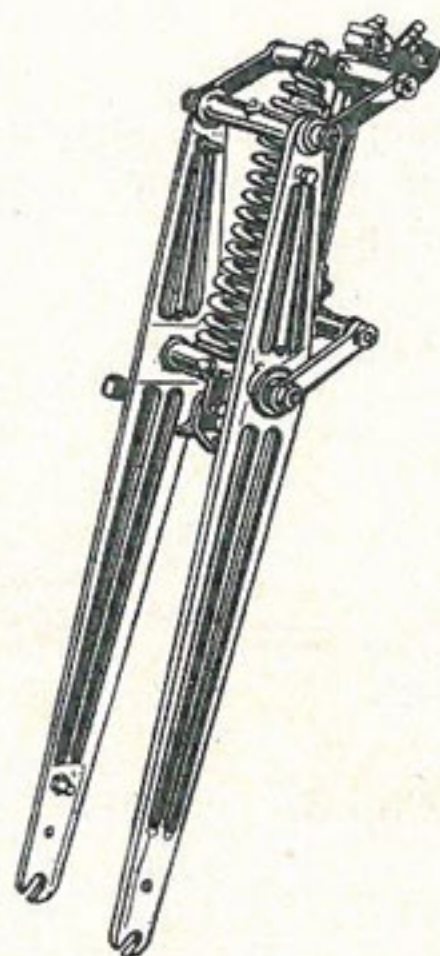


Fig. 1.

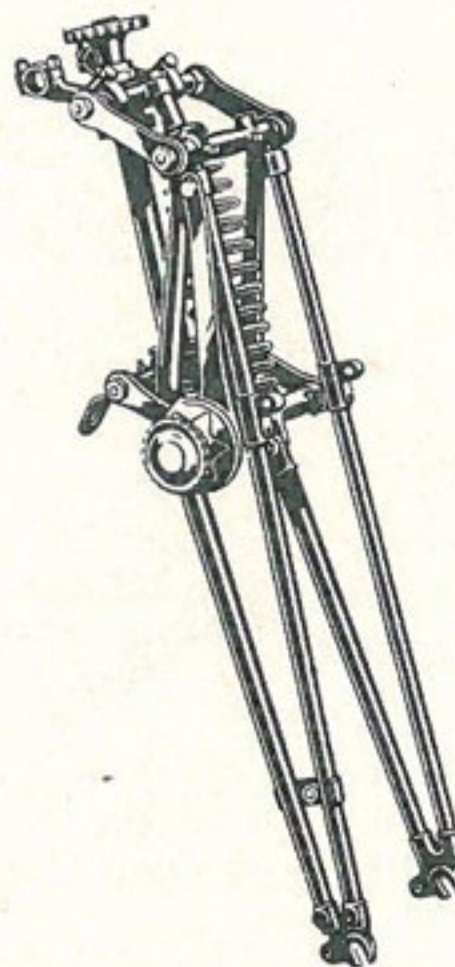


Fig. 2.

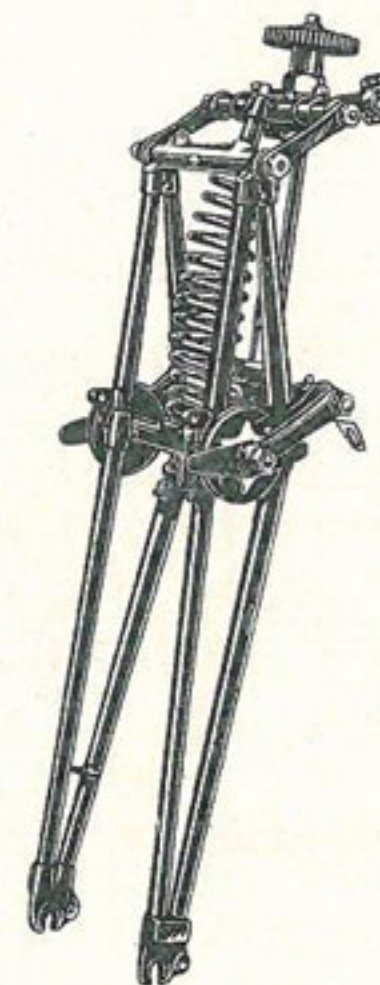


Fig. 3.

HANDLEBARS AND CONTROLS

**BARS and
CONTROLS.****Lightweight.
Model 23.**

(Fig. 1).

The Handlebar as fitted to the Model 23 is of the "clean" type. That is, the controls work on parts brazed to the bar and not clipped to the bar.

On a model of such a small cubic capacity, no exhaust lifter is fitted, and there is, therefore, no exhaust lever on the bar. The air control is fitted on the Carburetter. (See page 17).



Fig. 1.

Heavyweight.**All other Models.**

(Figs. 2 and 3).

This Handlebar is of the "open" type. That is, all controls, except the twist grip throttle control and the dummy grip, are clipped to the Bar and capable of adjustment to individual requirements. Exhaust lifter lever and air control lever are fitted on this Bar.

Alternative types of controls fitted to 1938 models are shown in Figs. 2 and 3.

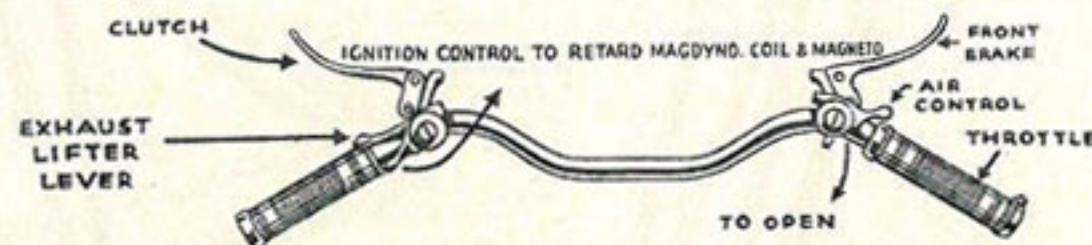


Fig. 2.

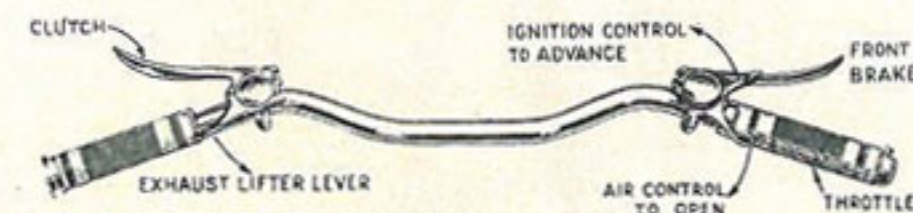


Fig. 3.

Part 1.

PROPRIETARY COMPONENTS

Chapter 8.

PROPRIETARY
COMPONENTS.

MODEL 23

Carburetter.

Electrical
Equipment.

Lightweight non-needle type "Amal". At the rear of the Carburetter is a small air control shutter. This should be used when cold and should be opened when the Engine has run a few seconds. This control should not be used when the engine is warm. See Amal List No. 362.

A 6 volt Lucas coil or Maglita set is fitted. For full particulars see Lucas Handbook. Coil Models fitted with compensated voltage control. High frequency horn with button on the right handlebar. Dimmer switch is fitted on the left handlebar.

OTHER MODELS.

Carburetter.

Needle jet type Amal. Air control by lever, fitted on right handlebar. See Amal Leaflet for further particulars (294 A).

Electrical
Equipment.
Models 36,
46 and 76.

Lucas 6 volt Magdyno or Coil equipment may be fitted on these Models. Black and chrome headlamp with dimmer switch on left handlebar. High frequency horn with button on right handlebar.

Models 36DL
46DL, 76DL
90, 100, 110.

Lucas 6 volt Magdyno (not Coil or Maglita) is fitted to these Models. (Magneto may be fitted to Models 90, 100 and 110, if required). Headlamp with dimmer switch on left handlebar, and high frequency horn with button on right handlebar. Compensated voltage control.

Tyres.

Dunlop Tyres fitted as standard. U—Universal. S—Studded. R—Ribbed.

			Model 23	Model 36	Model 46	Model 76	Model 36DL
Front	..	..	25 x 3 S	26 x 3.25 S	26 x 3.25 U	26 x 3.25 U	26 x 3.25 U
Rear	..	..	25 x 3 S	26 x 3.25 S	26 x 3.25 U	26 x 3.25 U	26 x 3.25 U
			Model 46DL	Model 76DL	Model 90	Model 100	Model 110
Front	..		26 x 3.25 U	26 x 3.25 U	27 x 3 R	27 x 3 R	27 x 3 R
Rear	..		26 x 3.25 U	26 x 3.25 U	26 x 3.25 U	26 x 3.25 U	26 x 3.25 U

Handbooks.

Suitable handbooks giving detailed descriptions of these components, prepared by the manufacturer concerned, may be had on application.

STARTING.**Model 23 Coil.**

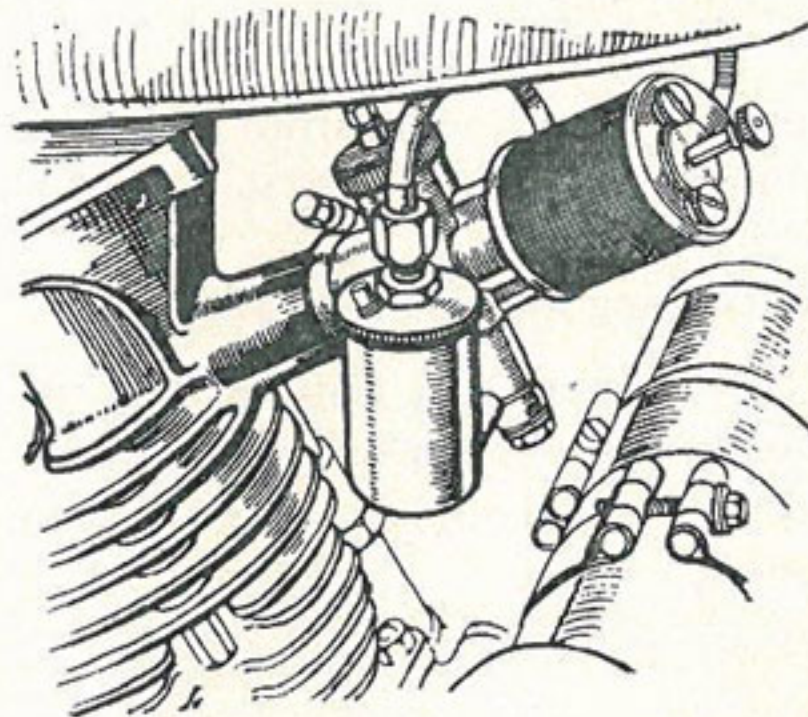
At the rear of the carburetter is a small shutter which it is necessary to close when starting the engine from cold (for re-starting the engine from warm this will be unnecessary). (See Fig. 1). Push on petrol tap—flood the carburetter by depressing the tickler on carburetter float top and close the air shutter (A) Turn the ignition switch on by means of the key in the switch gear in the Lamp) This operates a small red warning light at the back of ammeter. Set the ignition lever three quarters "Advance." **Open the Carburetter control slightly** by turning twist grip towards rider. Now depress the kickstarter smartly downwards. When the engine has started, open the air shutter gradually until the engine warms up, then open shutter fully.

Model 23 Maglita.

As for Coil (above) except that there is no Ignition switch to operate.

All other Models.

The air slide on these machines is controlled from the handlebars. The air lever should be closed for starting. Set the ignition lever three quarters advance. Flood the carburetter, and open the throttle **slightly**, by turning the twist grip towards the rider. Raise the exhaust valve lifter and depress the kick-starter smartly downwards, releasing the exhaust valve lifter half way down the kickstarter stroke. When the engine has started, open the air lever gradually until the engine warms up, then open fully. (See Fig. 2 or 3, Page 14).



Air Control "A." (Pull out to open).

Fig. 1.

Part 2. (DRIVING HINTS).

GEAR CHANGING

Chapter 2.

GEAR CHANGING
HAND.

Model 23.

3 Speed.

Gear changing will be found quite simple if the following hints are observed:—

TO START AWAY.—Lift the clutch lever and engage the bottom gear (nearest the Rider), then gently release the clutch lever and at the same time open the throttle a little.

When a speed of approximately 8-10 m.p.h. has been reached, the throttle should be slightly closed, and with the clutch lifted, the gear lever pushed into the second gear position and the clutch again gently released.

Now accelerate to 18-20 m.p.h. and change into top gear in the same manner.

When changing down from top gear the throttle should be left open, and with the clutch raised, the gear lever pulled back into second, and the clutch released; changing from second to bottom gear is exactly the same.

The main points to remember are, that when changing from a low to a high gear, i.e., bottom to second, or second to top, the throttle should be slightly closed, and when changing down to a lower gear the throttle should be left open.

Never let the Engine snatch, through running too slowly in a high gear—make use of the gears.

The method of gear changing is exactly the same as outlined for the three-speed type, with the exception that the bottom gear position is the one farthest away from the rider.

Remember. Slightly close the throttle when changing from low gears to higher gears and leave the throttle open when changing down.

The speeds at which to change gears are as follows:—

250 c.c. machines, solo;

350 c.c. machine with sidecar:

Bottom to Second Speed	10 to 12 m.p.h.
Second to Third Speed	20 to 25 m.p.h.
Third to Top Speed	25 to 30 m.p.h.

350 c.c. machines, solo;

500 c.c. machines, solo or with sidecar:

Bottom to Second Speed	10 to 12 m.p.h.
Second to Third Speed	20 to 25 m.p.h.
Third to Top Speed	27 to 30 m.p.h.

HAND.

ALL Models.

(except Model 23).

4 Speed.

Part 2. (DRIVING HINTS).

GEAR CHANGING

Chapter 2.

GEAR CHANGING

FOOT. All Models
(except Model 23).

On these models bottom gear is engaged by depressing the lever downwards as far as possible from the neutral position. To change up, i.e., from bottom to second, second to third, and third to top, raise the gear lever with the foot as far as possible. Always allow the pedal to return to the normal position before attempting to engage another gear. The foot control mechanism is of the positive stop type, so that it is impossible to engage more than one gear with one kick, so the lever must be allowed to return to the normal position between each gear change.

The speeds at which to change gear are as set out for the hand change models; and remember also to slightly close the throttle when changing from low gears to high gears, and leave the throttle open when changing down.

It is also a good plan on foot change models always to engage bottom gear as the machine is brought to rest, thus neutral gear is obtained readily by simply lifting the lever slightly.

There are two positions in the foot change operating lever to which is fitted the bottom yoke end. The inner position gives a harder change with a minimum movement of the foot-lever. The outer position gives an easier change with a slightly longer movement.

RIDING

Part 2.

DRIVING.

Ignition Lever.

Always run the machine with the Ignition Lever in the fully advanced position. The ignition should only be retarded for starting purposes or to prevent knocking when pulling slowly. Misuse of this control causes overheating and the consequences are burnt valves and blued exhaust pipe.

Valve Lifter.

This control is for starting only and should not be used for any other purpose.

Charging Switch .

The battery is being charged constantly (with the switch in the OFF position), controlled by the special instrument in the lighting set.

(a) **Coil.**

As for Coil.

(b) **Magdyno.**

(c) **Maglita.**

Switch should be in "charge" position for about one hour per day (not more). If duration of ride is more than one hour switch to OFF.

DRIVING

Part 2. (DRIVING HINTS).

Chapter 3.

DRIVING.

Braking.

One of the most important points in driving a motor cycle is the method of braking. The novice and the experienced rider alike should cultivate the habit of applying both brakes together under all circumstances. In this manner the machine may be brought to a standstill in an extremely short distance, even on a wet road, without fear of skidding. There is no doubt whatever that many accidents could be avoided if every rider cultivated this habit.

NOTE.—Hurried application of the rear brake only, may lock the rear wheel and thus cause the machine to skid. Similarly, the front brake only should not be applied suddenly when negotiating a sharp bend.

Stopping.

When stopping, lift the clutch, close the carburetter control and apply the brakes. When the machine is at a standstill engage neutral gear. On coil ignition models it is now necessary to switch off the ignition by means of the key in the headlamp. This is **most** important, as, unless this is done, the battery will be discharged, which will prevent the machine being restarted after a few hours.

PETROL TAP.

Lastly, push off the petrol tap. This applies to all models and is most important. Under no circumstances leave the machine standing with the petrol tap turned on.

Driving Hints.

Change gear (down) and use your brakes before getting to the corner.

Don't accelerate violently on wet roads or tramlines.

Be positive—make up your mind what you are going to do; make the conventional sign (Highway Code) and do it.

Treat all other road users as learners and watch the road signs.

Be careful and, above all, be courteous.

Part 2. (DRIVING HINTS).

RUNNING-IN

Chapter 4.

RUNNING IN.

The models when assembled in our works are assembled with all bearings and pistons on the tight side and so it is very necessary to run the engine at slow speeds until these bearings are correctly faced. This running in takes approximately 500 road miles at a speed not exceeding 30/35 miles per hour. Good use also should be made of the gears during this period to prevent the engine labouring. After starting the engine, and before setting out on any run, see that the oil pump is functioning. When the pump is working correctly the continual supply of oil can be seen through the sight feed on Model 23, or by the rise of the oil indicator Button on all other Models. When the engine has been started it will be a few seconds before this commences to operate, and the engine should, therefore, be run slowly until it is certain that the oil is flowing through to the engine.

During the running in period, certain parts will need attention, and we recommend that the instructions given under the heading of "Running-In Adjustments" be most carefully followed. The work is not in any way difficult or serious, but the rider will be amply repaid if the instructions are carefully followed. For the rider who wishes to get the best out of his machine with longest service these hints are most important.

RUNNING IN
ADJUSTMENTS.

At 150 miles.

The following need attention (for full particulars see MAINTENANCE):

- | | |
|--------------------------------|----------------------------------|
| 1. Steering Head. | 8. Front Brake Adjustment. |
| 2. Rear Chain. | 9. Spring Fork Greasing. |
| 3. All Nuts and Bolts. | 10. Spring Fork Adjustment. |
| 4. Tappet Adjustment. | 11. Rocker Spindle Greasing. |
| 5. Contact Breaker Adjustment. | 12. Fill up Engine Sump. |
| 6. Cables. | 13. Fill up Primary Drive Cover. |
| 7. Rear Brake Adjustment. | |

At 500 miles.

Repeat attention as at 150 miles.

(Conclusion).

In addition, carry out the following (see MAINTENANCE):

1. Empty sump and refill with recommended oil, and clean oil filter. (See page 57).
2. Top up Gearbox oil.
3. Dismantle and Clean Carburetter.
4. Inspect Plug.

ENGINE

Part 3. (MAINTENANCE).

Chapter 1.

ENGINE MAINTENANCE.

(1)

Tappet Adjustment. All Models.

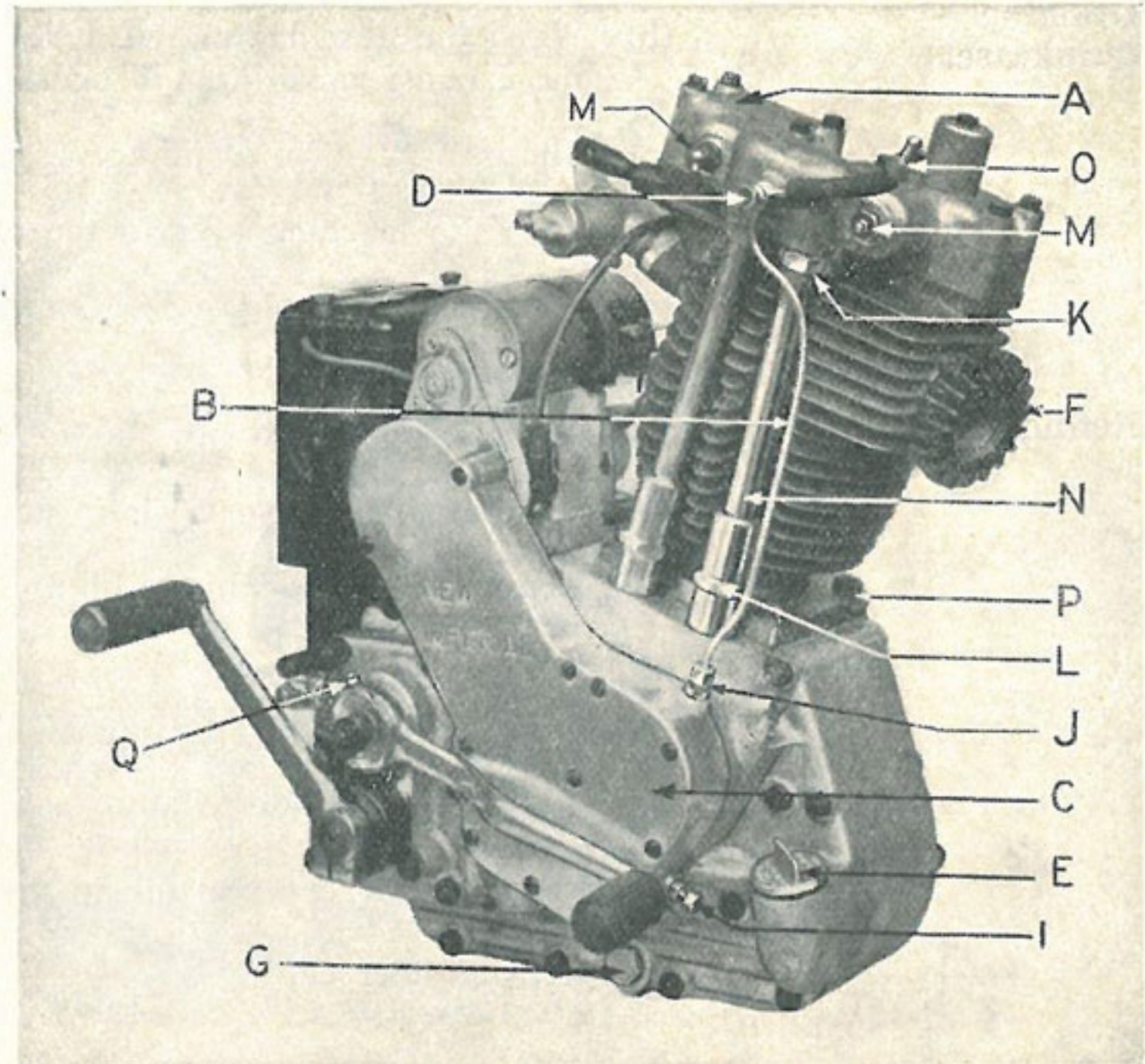
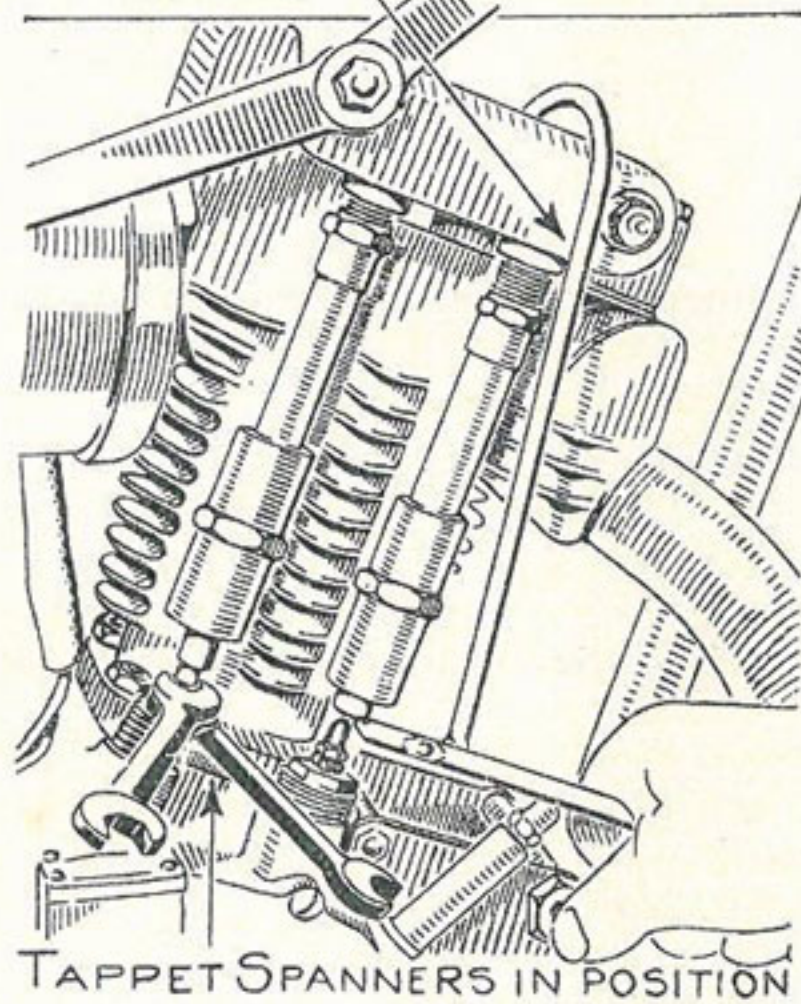
- (a) Unscrew the top hexagon nuts (K) on the push rod cover tubes (N) two or three turns clockwise.
- (b) Completely unscrew the hexagon nuts (L) on the bottom of the push rod cover tubes anti-clockwise.
- (c) Telescope the tubes, which will expose the Tappets.
- (d) Turn Engine over until both valves are closed and Tappets off compression.
- (e) Slacken the lock nut clockwise, holding the Tappet on the flats provided, just below the tappet head lock nut (except Model 23, where tappets do not revolve).
- (f) Turn Tappet head anti-clockwise until no up and down movement can be felt, but allowing the push rod to revolve freely.
- (g) Hold Tappet head and position by means of the locknut.
- (h) Tighten the bottom halves of the push rod cover tubes down to their full extent and then extend the tubes so as to screw the top half into position, which should not be locked too tightly, as this destroys the rubber joint between the two covers and may distort the Rocker Box in such a manner as to destroy the Tappet adjustment.
- (i) Tappet adjustments should be carried out while the Engine is COLD.

(2)

Rocker Spindles. (Greasing).

A grease nipple (M) is provided on the hexagon end of each Rocker Spindle and, except on Model 23, there is an oilway drilled through the Rocker Arm and Rocker Arm Ball, which allows the grease to pass into the inverted cup at the top of the push rod. A good class H.M.P. grease should be used in the grease gun provided in the tool kit. THIS IS MOST IMPORTANT.

SPECIAL TOOL FOR
REMOVAL OF PUSH
RODS AND COVER
TUBES



ENGINE LUBRICATION

Part 3. (MAINTENANCE).

Chapter 1.

LUBRICATION.

Draining Crankcase.

- (a) Remove drain plug (G) and allow the oil to flow out into a suitable receptacle.
- (b) When the flow has ceased, revolve the Engine several times by using the Kick Starter with the exhaust valve lifter in operation.
- (c) Allow machine to stand for a few moments.
- (d) Lean the machine over to the offside.
- (e) While the drain plug (G) is out the filter may be cleaned with a soft brush and petrol.

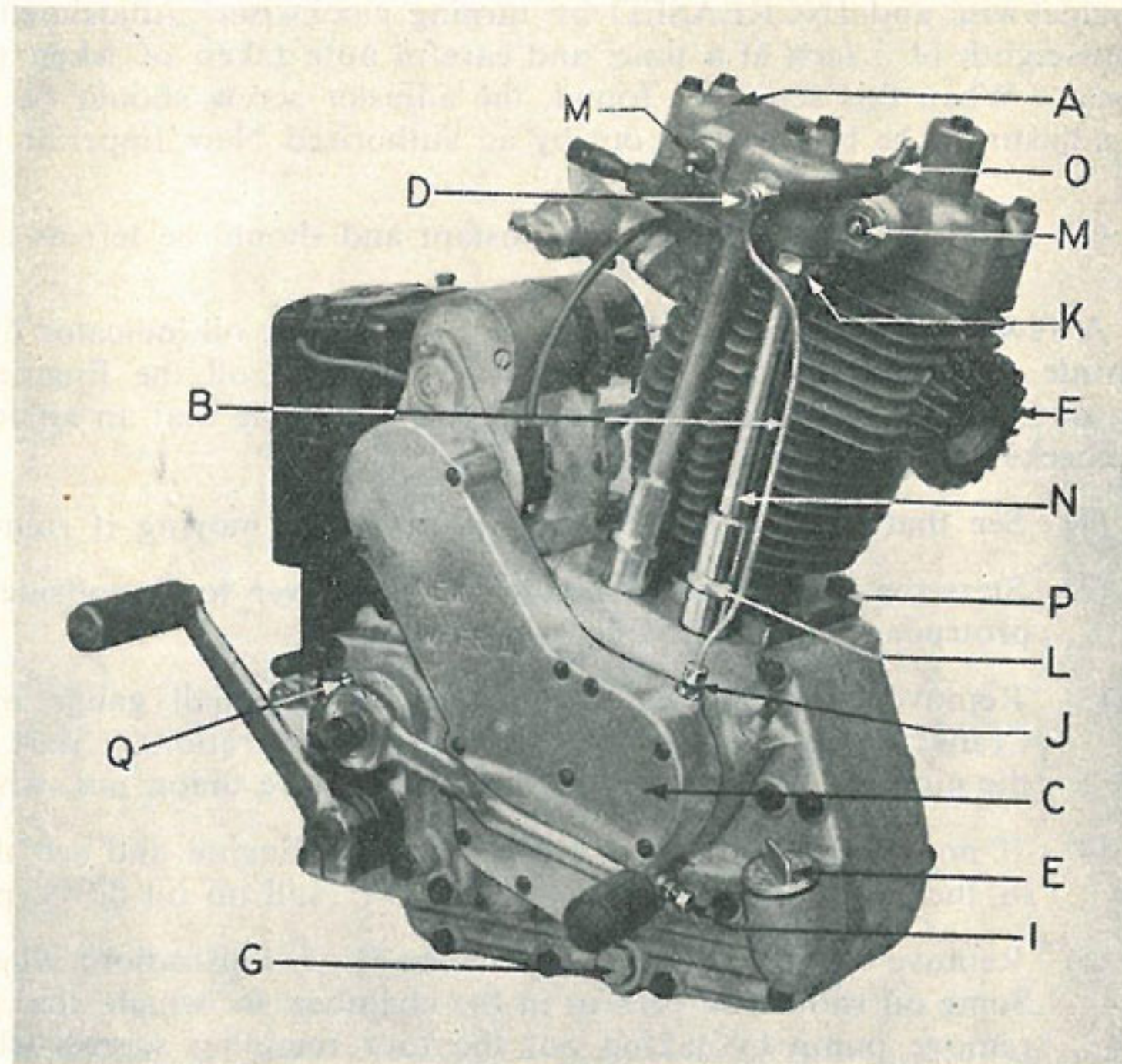
Refilling.

The Engine should now be refilled with a recommended grade of oil. (See page 57).

- (a) See that drain plug (G) is in position and tight.
- (b) Remove filler cap (E) and fill up until the oil level reaches the bottom of the filler aperture.
- (c) Replace filler cap.
- (d) Start up the Engine and allow to run for 30 seconds.
- (e) Allow to stand for a similar period.
- (f) Remove filler cap and fill up the sump to the same level.
- (g) Replace filler cap.

Adjusting the oil flow. (NOT Model 23).

The setting with which the machine leaves the factory is such as will give a proper supply of oil to the engine and should not be altered. If for any reason the rider suspects that an increase or a reduction of the oil supply would be beneficial, application to the works for detailed instructions should be made, or a New Imperial Service Agent consulted. The flow of oil to the



ENGINE LUBRICATION

Part 3. (MAINTENANCE).

Chapter 1.

Engine is controlled by a by-pass screw (I on the illustration), AND IS REDUCED by turning anti-clockwise and INCREASED by turning clockwise. Adjustment should not be made in excess of one-eighth of a turn at a time, and careful note taken of when the exhaust haze is reduced to normal. When this setting is found, the adjuster screw should be re-wired. It is suggested that this adjustment be best carried out by an authorised New Imperial Dealer.

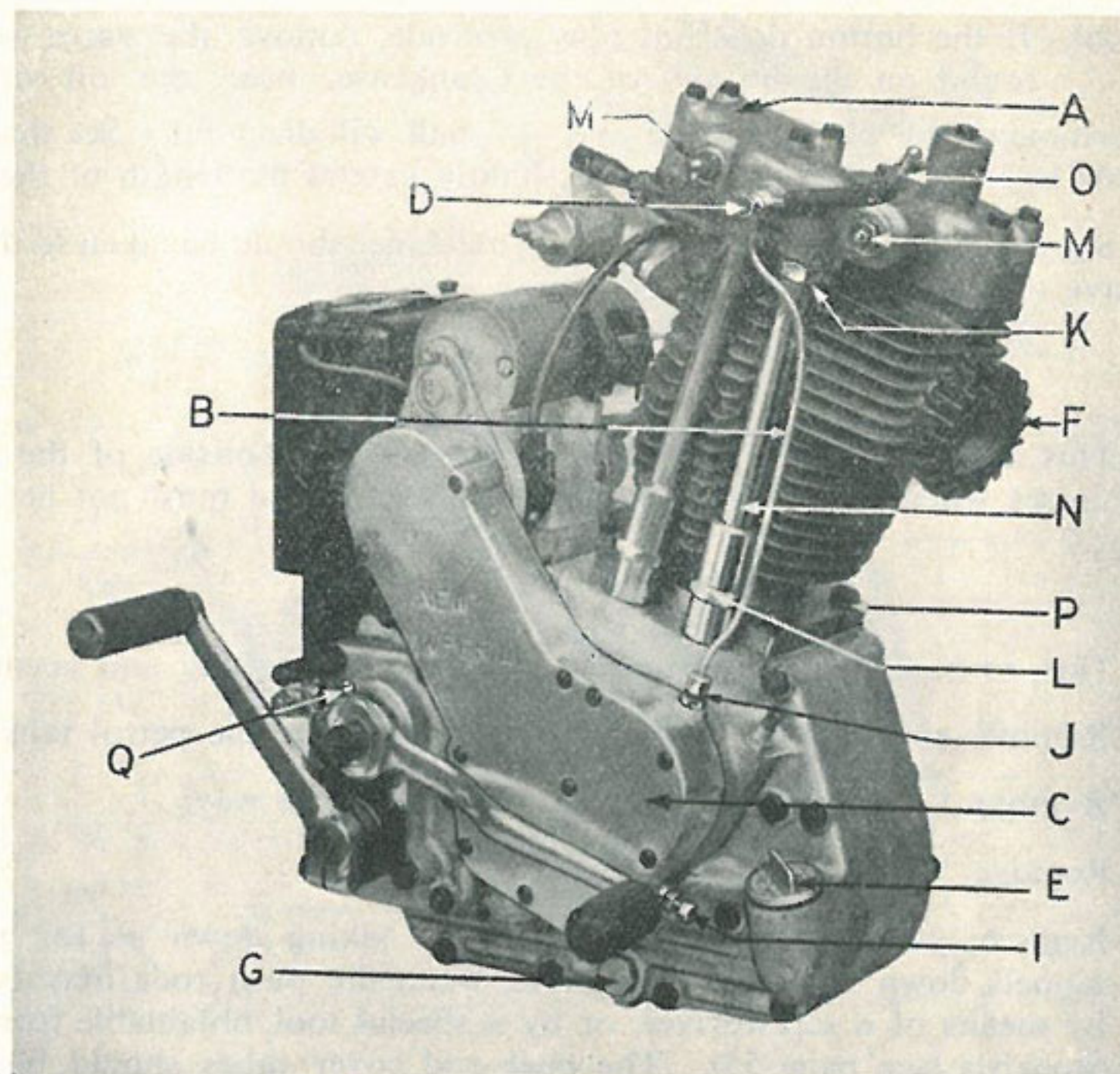
MODEL 23.

On Model 23 the oil setting is constant and should be left as delivered.

THE PUMP CIRCUIT. (NOT Model 23).

A few seconds after the Engine has started, the oil indicator button on the petrol tank should protrude about $\frac{3}{8}$ ". Should this not protrude, shut off the Engine. When the machine is quite new, or has been standing for some time, it is possible that an air lock may occur, and the following checks should be made:—

- (1) See that the button is free to protrude by moving it round with the ball of the finger.
- (2) Start the Engine and lean the Machine over to the offside. If the button does not then protrude, shut off Engine and proceed to—
- (3) Remove the union nut at the bottom of the small gauge oil pipe, which runs from the Crankcase to the Cylinder head (J in illustration). Start Engine and see if oil flows from the nipple. Allow a little to flow and replace union nut, when the button should protrude.
- (4) If no oil flows from the nipple, shut off Engine and see that there is a correct oil level in the Crankcase. Restart Engine. If still no oil flows, proceed to—
- (5) Remove the outer timing case cover (C in illustration) when the pump will be disclosed. Some oil should be present in the chamber in which the pump is situated. Carefully remove pump by taking out the four retaining screws which are wired together, when the inlet hole will be disclosed (the top hole). Prime this with lubricating oil and replace pump, after cleaning ball and seat, re-wire screws. Restart Engine, when the plunger should rise.



ENGINE DECARBONIZING

Part 3. (MAINTENANCE).

Chapter 1.

The Pump Circuit (cont'd).

- (6) If the button does not now protrude, remove the valve retaining plug, which is to be found on the bottom of the Crankcase, near the oil drain plug (G in illustration).

On removing the plug a spring and $\frac{3}{16}$ " ball will drop out. See that the ball and the seat on which it rests in the Crankcase are clean, slightly extend the length of the spring and refit.

Should no cure be effected, the machine should be taken to the nearest New Imperial Dealer, to have the oil flow to by-pass re-set.

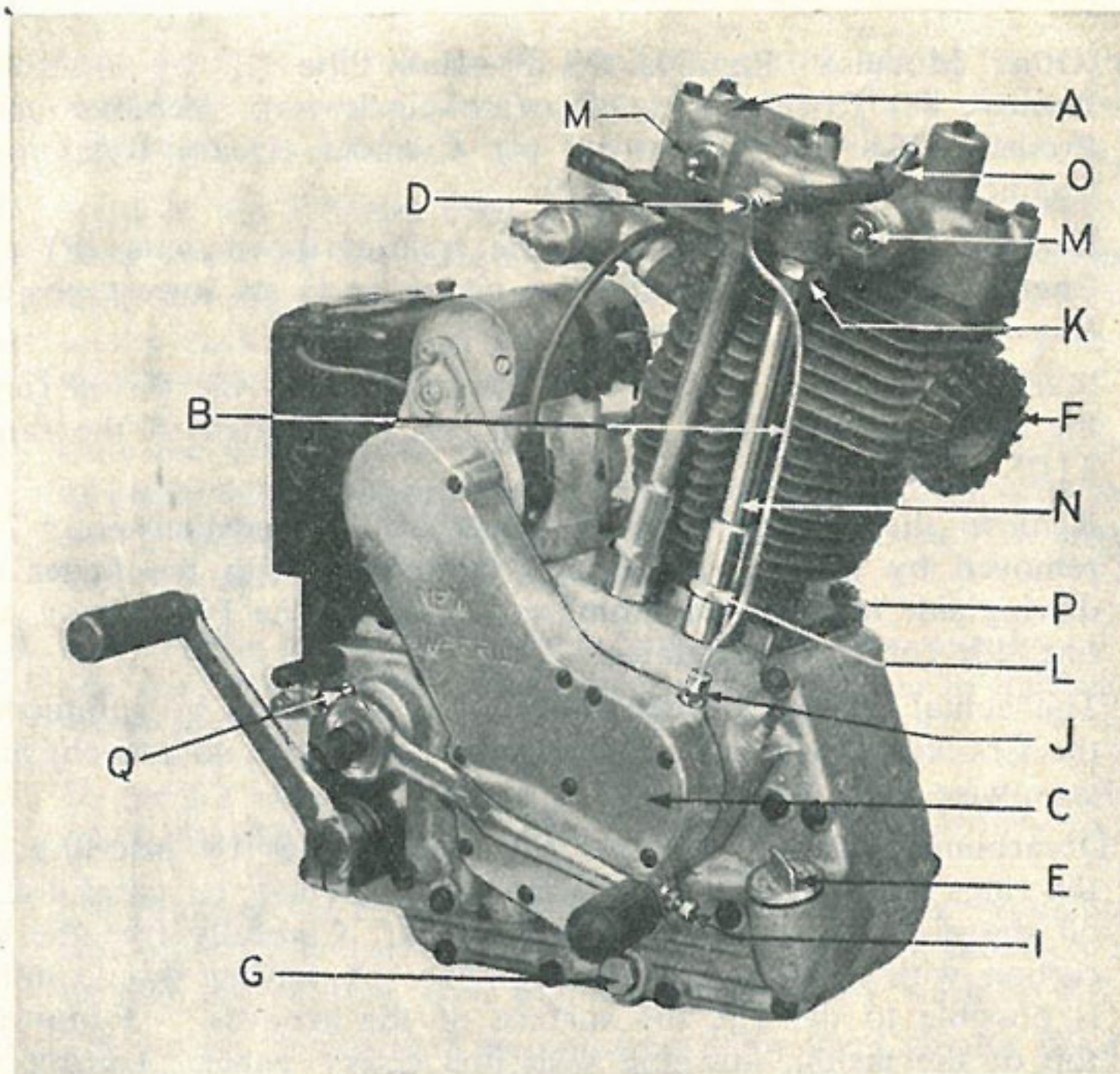
VALVE GUIDE LUBRICATION.

This is controlled by the fixed regulator on the offside of the rocker box (D in illustration). This is set when the machine leaves the factory, and must not be altered.

DECARBONIZING.

This, to be satisfactory, must be carried out carefully and accurately.

- (a) Remove exhaust pipes, and, for easy working, the petrol tank (except Model 23).
- (b) Remove Carburetter bodily and tie out of the way.
- (c) Remove Sparking Plug.
- (d) Remove push rod cover tubes (N) by taking down as for tappet adjustment and slacken tappets down as much as possible, when the push rods may be eased over the tappet heads by means of a screwdriver, or by a special tool, obtainable from our Works or our Spare Parts Stockists (see page 55). The push rod cover tubes should be removed with the push rods.
- (e) (Model 23 only). Remove Cylinder Head by unscrewing the four Cylinder holding down bolts clockwise and withdrawing them. The Cylinder Head, complete with Rocker Box, can then be lifted clear of the Cylinder Barrel and placed on one side for treatment later.



ENGINE DECARBONIZING

Part 3. (MAINTENANCE).

Chapter 1.

DECARBONIZING (cont'd).

(Other Models). Remove Oil Pressure Pipe (B) by unscrewing nipple nuts (J) and (O). Remove (8) Rocker Box Pins (anti-clockwise). Remove complete Rocker Box with Oil Pressure Pipe (B). Remove (4) Cylinder Head Retaining Bolts (anti-clockwise), and Engine Anchor Bolt (rear bolt).

- (f) Remove Cylinder by turning the holding-down nuts (P) anti-clockwise and turning the Engine very carefully until the piston is in its lowest position. The Barrel may then be Raised clear and removed.
- (g) Mark the gudgeon pin boss on the INSIDE of the Piston (on the timing cover side) with a file mark, in order that the piston can be re-fitted in the same position when re-assembled. THIS IS MOST IMPORTANT.

Remove the circlips from the ends of the gudgeon pin. The gudgeon pin may now be removed by pushing it through the bosses with the finger or a pencil, pushing from the driving side towards the timing cover side. The Piston may now be removed and placed on one side for treatment later.

- (h) The actual process of decarbonisation may now be commenced; covering the open top of the Crankcase with a large piece of clean cloth, to prevent any foreign matter falling inside, is a wise precaution.
- (i) Decarbonise piston. Remove the piston rings by inserting three thin strips of tin behind the rings at equal distances, when the rings may be carefully pushed over the strips and so off the piston without fear of breakage. Carefully free the ring grooves from all traces of carbon with a flat-pointed instrument. A scriber should not be used for this purpose as it is possible to damage the surface of the grooves. Remove the carbon deposit from the top of the piston, finishing with fine emery paper. During this process the piston should be held in the hand or in clean soft rag, and it should not be placed in a vice as this tends to distortion. Now clean the rings by removing the carbon from the back and ends. If the gap between the ends of the rings is in excess of 5-thousandths of an inch when the rings are positioned in the Barrel (not in the piston) new rings should be fitted. To position the rings, place ring in Barrel and insert piston into Barrel so that the skirt pushes the ring into the barrel squarely. Oil rings in groove before refitting.

ENGINE DECARBONIZING

Part 3. (MAINTENANCE).

Chapter 1.

DECARBONIZING (cont'd).

- (j) Now refit the Piston to the connecting rod, taking care that the Gudgeon pin is smeared with Engine oil and that the Piston has been fitted in the same position as before dismantling (file mark on Gudgeon pin boss). New circlips should be fitted.
- (k) Replace the cylinder base washer (with a new one if the original is damaged or broken). Now place the top piston ring with the gap towards the back of the cylinder, the second ring with the gap towards the front and the third, or scraper ring (not Model 23), with the gap to the back. The rings and piston should be smeared with Engine oil and also the inside of the Cylinder barrel.
- (l) Take the barrel in the right hand (this should have been carefully cleaned and washed out in clean paraffin), and, holding the rings in position with the left hand, the Barrel should be slowly and carefully eased down over the Piston until it may be seated on the holding-down bolts on the top of the Crankcase.
- (m) Replace the four holding-down nuts and tighten evenly, i.e., a little at a time, passing from one corner to the opposite corner, and continue to tighten until all movement of the nuts is taken up.
- (n) Be careful to cover the top of the Cylinder Barrel with a clean rag until the Cylinder head is ready for fitting.
- (o) Decarbonise the Cylinder head by first unscrewing anti-clockwise the eight hexagon pins which hold the Rocker Box to the Cylinder head and then removing the Rocker Box bodily, leaving the rockers, etc., in position, carefully washing out in clean paraffin.

The valves should then be removed from the Cylinder head by removing the valve end caps and compressing the valve springs until the split cotters fall out (special Tool may be purchased from works or stockists). The valves may now be pushed out of their guides and the springs and spring collars removed. The Cylinder head and valves should now be thoroughly cleaned, and any traces of carbon or dirt removed, finishing off with some fine emery cloth.

ENGINE DECARBONIZING

Part 3. (MAINTENANCE).

Chapter 1.

DECARBONIZING (cont'd).

- (p) Now grind in valves with a grinding compound (special Tool obtainable from Works or Stockists). While the valve is being ground in it is advisable to lift it slightly from the seat every few turns.
- (q) Remove the valves and thoroughly wash the Cylinder head, Valves, Valve Guides and Valve Springs, in clean paraffin until all traces of the grinding compound and carbon have been removed, when they should be finished off with a clean rag.
- (r) Reassemble the Head by fitting the Valves into the Guides, the Valve Stems having been lubricated with a little Engine oil and the Springs, Collars and Cotters replaced by means of the Special Tool for the purpose. Care must be taken in fitting the Valve Stem Caps, and the Head should not be turned upside down once these caps have been fitted, as they are liable to fall off and damage the Springs, etc.
- (s) Replace the Rocker Box on the Head, carefully tightening the Rocker Box pins.
- (t) Examine the Cylinder Head Gasket, and if burnt or damaged in any way, replace. The Cylinder head may now be fitted, care being taken to tighten the bolts evenly until no further movement is possible.
- (u) Replace the Push Rods and Cover Tubes seeing that a little oil is on the Push Rod Tops and Tappet Heads.
- (v) Adjust Tappets.
- (w) Clean the Sparking Plug (see separate Leaflet) and replace.
- (x) Replace Carburetter, having cleaned this thoroughly (see separate Leaflet).
- (y) Replace Exhaust Pipes.
- (z) Start Engine, being careful to see that the Oil Indicator Button protrudes.
In case of Model 23, no Oil Indicator Button is fitted, but the oil flow may be inspected through the glass top to the Pump.

IGNITION

Part 3. (MAINTENANCE).

Chapter 1.

**MAGDYNÔ CHAIN
ADJUSTMENT.**

All Models
except Model 23.

The Magdyno is held in position by four bolts which pass through the steel platform on which it is mounted. It is unnecessary to disturb this mounting to make adjustment as this can be done by slackening the nuts on the bolts which retain the platform itself, and tipping the Magdyno forwards or backwards until the chain is in proper tension. Tension is correct when there is an up or down movement of the chain of approximately $\frac{1}{4}$ ". Periodically the chain should be greased, the grease being worked into the chain by the use of a small stiff brush.

NOTE.—This adjustment cannot be made on the Model 23, as on that Machine the electrical instrument is gear-driven.

IGNITION.

Timing.
Model 23.

Remove the front half of the Primary Drive Cover and loosen the nut in the centre of the brass pinion in an anti-clockwise direction until the gear wheel may be removed from its taper. (Special Tool obtainable from Works or Stockists). Remove the Sparking Plug and revolve the Engine until the Piston is at the dead top of its stroke (T.D.C.). Fully retard the ignition control and rotate the armature until the points are just about to break. Lock the brass pinion tightly on its taper, check to see that the timing has not been disturbed, while this is done, and reassemble the front half of the Primary Drive Cover. As Maglitas and Coils both run at Engine speed it is immaterial which stroke of the Engine is used for timing purposes so long as the Piston is at T.D.C.

Other Models.

First remove the front half of the Magneto Chain Cover, then loosen the nut in the centre of the bottom sprocket in an anti-clockwise direction, and prise the sprocket off the taper spindle by means of two screw-drivers, placed behind the sprocket.

Remove the sparking plug and turn Engine over until the piston is at the top of the compression stroke (i.e., when both valves are closed). When the Piston is in this position, insert a piece of stiff wire in the plug hole and make a mark on the wire where it touches the top of the hole. Remove wire and make another mark 14, 13 or 11 mm. above it (according to model, see Page 58).

Replace the wire and turn the engine backwards, until the second mark is reached. Fully advance the Ignition Control on the Handlebar and rotate the Magneto until the contact breaker points are just about to break. Then lock the sprocket nut tightly. Check the timing to make sure it is correct, before finally replacing the front half of the Magneto Chain Cover.

NOTE.—13 mm. is just about $\frac{1}{2}$ ".

SHOCK ABSORBER

Part 3. (MAINTENANCE).

Chapter 1.

TRANSMISSION

SHOCK ABSORBER

All Models except
Model 23.

The Shock Absorber is mounted on the Main Engine Shaft, and consists of three inclined faces cut on the Engine Pinion, into which are meshed three inclined faces upon a sleeve, all are free to move longitudinally, but forced to rotate with the engine. A spring (adjustable for tension) keeps this sleeve in contact with the inclined faces on the Engine Pinion.

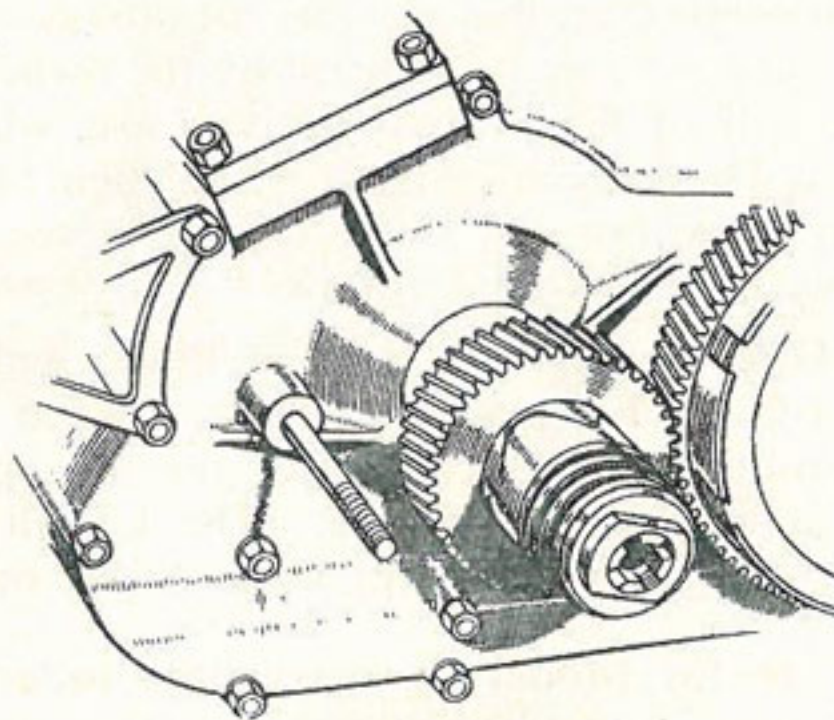
To dismantle the Shock Absorber, first remove the split cotter which locks the spring adjusting nut in position. Then remove the nut in an anti-clockwise direction. On careful examination the two lips on the Shock Absorber Lip Washer (which have been knocked down into their locking position) will be seen on top of the Shock Absorber sleeve nut. These lips must be knocked upright with a chisel. Replace the spring nut and insert a flat bar of steel such as a tyre lever into the slot in the sleeve nut, grip the bar with a movable spanner and lightly tap with a hammer in an anti-clockwise direction. When the sleeve nut has been removed, the pinion and the Sleeve can be pulled off. The Shock Absorber Adaptor can also be pulled off by hand, as this is fitted in position on parallel splines.

When re-assembling, it is always necessary to fit a new Shock Absorber Lip Washer and a Split Cotter, as the old ones are badly weakened or broken on removal. Re-assemble in the reverse order, taking care to knock the lips on the locking washer well down into the slots provided.

(A special Spring Compressor Tool is obtainable from our Stockists or from the works—see page 55).

SPARKING PLUG.

See separate Leaflet issued by Plug Manufacturer.



By courtesy of the "Motor Cycle."

CLUTCHES

Part 3. (MAINTENANCE).

Chapter 2.

GEARBOX.

In the opinion of the makers, replacement or adjustment to the actual Gear Operating Assembly should only be carried out by one of their authorised Dealers, and no instructions, therefore, are given in that connection.

MULTIPLATE CLUTCHES.

Model 23.

(Illustration 1).

This Clutch consists of two Ferodo discs and two plates fitted with Ferodo Inserts. As no trouble may be expected with New Imperial Clutches, except under exceptional circumstances, the makers recommend that the services of an authorised New Imperial Dealer be employed. If, however, the Clutch is to be dismantled by the owner, the following method should be employed: Remove the outer half of the Primary Drive Case, which will disclose the Clutch, mounted on the large Gear Wheel. The six centre pins should then be removed, which will allow the spring cups (A) and springs to be withdrawn. The Clutch Plates (B) may then be carefully removed. The order of reassembly of plates is as follows:—

One Ferodo Disc, one Dished Splined Plate, with the dished side outwards; Ferodo Insert Plate, Flat Splined Plate, Ferodo Insert Plate, Dished Splined Plate, with the dished side inwards, and finally, the Front Plate, which carries the six spring cups; retaining pins should then be screwed home in a clockwise direction. The Clutch Centre Back Plate (C) the Gear Wheel and Rollers should not be removed, except by a skilled mechanic.

MULTIPLATE CLUTCHES.

Models 36, 46,
36 D.L., 46 D.L.
and 90.

For removal, see for Model 23, reassembly order being as follows:—

Ferodo Ring, Dished Splined Plate, with the dished side outwards; Ferodo Insert Plate, Flat Splined Plate, Ferodo Insert Plate, Dished Splined Plate, with the dished side inwards; and finally, the Front Plate, which carries the six clutch spring cups. Refit the pins in a clockwise direction.

MULTIPLATE CLUTCHES.

Models 100, 110,
76 and 76 D.L.

Remove as for Model 23. Reassembly order as follows:—

Insert Plate, Splined Plate, dished side outwards, Insert Plate, Splined Plate, dished side outwards; Insert Plate, Splined Plate, dished side outwards; Insert Plate, Splined Plate, dished side inwards; Dome Plate.

MATERIALS.

The Clutch linings for all New Imperial models are "Ferodo R.A.D.5" type, special oil resisting.

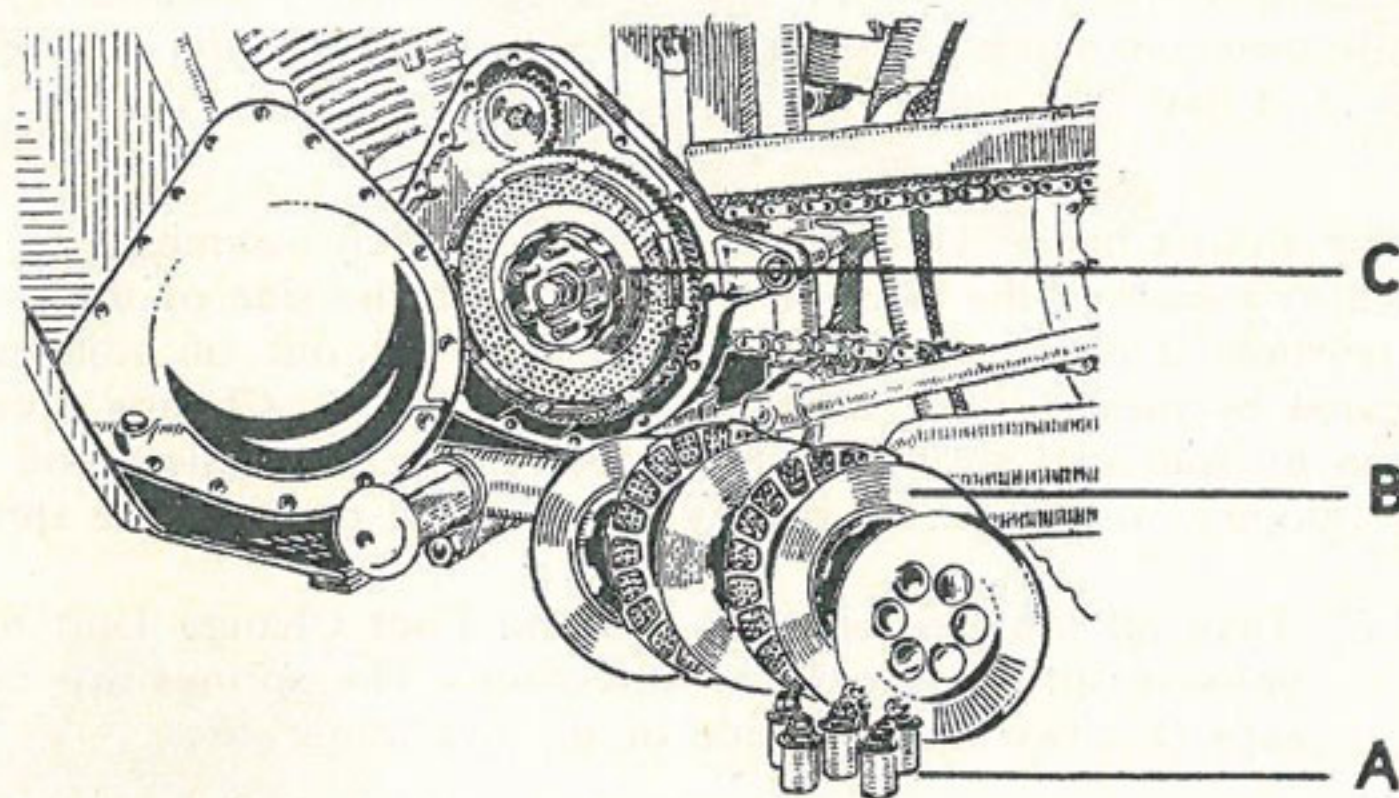


Illustration 1.

(Model 23).

GEAR CONTROL.**Hand Change.**

The Gear Lever should be removed completely from the Tank and the Pivot thoroughly cleaned and greased. All angle joints, pins, etc., should be inspected and oiled so that they run freely, and worn yoke pieces and pins renewed, if necessary, in order to avoid "slop" and difficult gear changing. See that the quadrant is in the same plane as that in which the lever moves, and that it is not worn or damaged.

Foot Change.

Fig. 1.

Fig 2.

The Foot Change Unit is accurately set when assembled at the Works and if it is regularly greased by means of the Greaser (A) situated on the side of the Foot Change Boss on the back of the Gearbox, it is almost impossible for it to get out of adjustment. Foot Change Levers are lubricated by means of the Greaser (Q). The Foot Change Lever is returned to its normal position by four coil springs in the Foot Change mechanism, and should the lever show a tendency to be "sloppy," or not return readily to its central position, the springs should be renewed, thus:—

- (a) Take off the Gearbox Lid (D) and Foot Change Unit by unscrewing the four retaining bolts in an anti-clockwise direction. The springs are held in position by four screwed caps (E), two on each side of the operating boss.
- (b) Withdraw the springs and replace with new.
- (c) The springs fitted at the top are a longer pair than those fitted at the bottom.
- (d) Fit new paper washer.
- (e) Replace the mechanism by carefully engaging the Internal Selector Arm in the slot at the back of the glut or Gear selector.
- (f) Refit the four retaining bolts in a clockwise direction.

There are two positions in the Footchange Operating Lever to which is fitted the bottom yoke end. The inner position gives a harder change with a minimum movement of the Foot-lever. The outer position gives an easier change with a slightly longer movement.

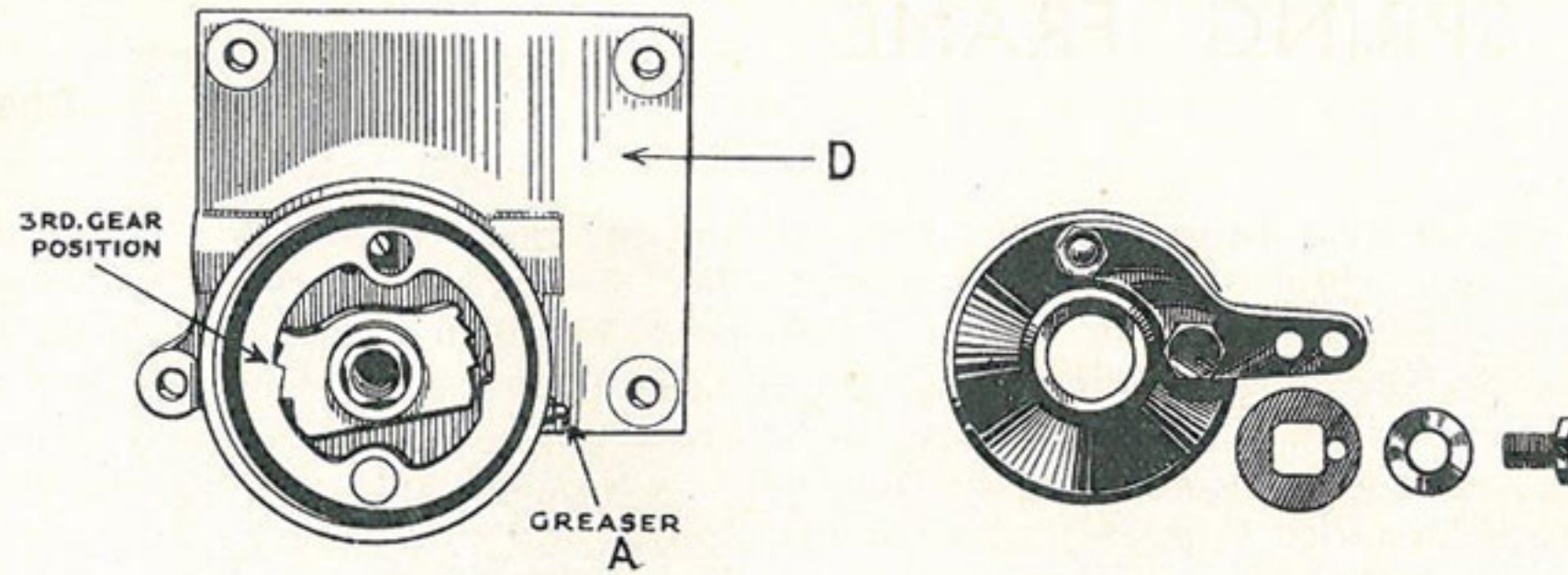
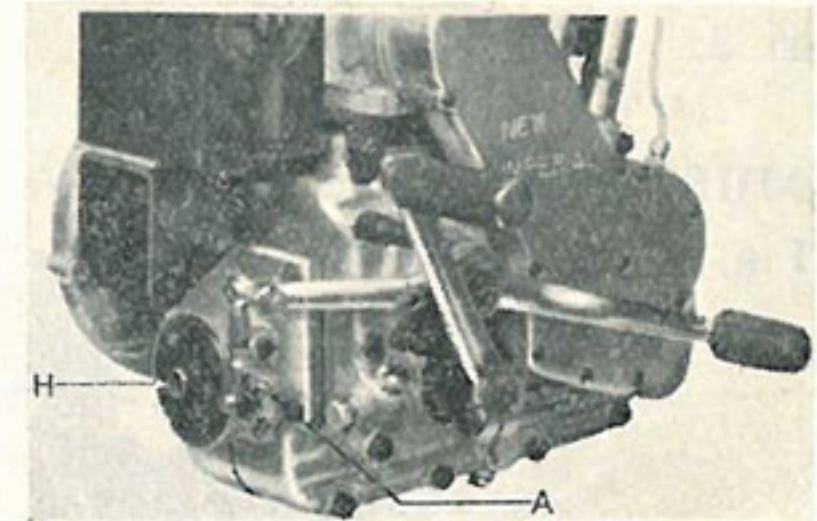


Fig. 1.



R. H. COLLIER & Co. Ltd.,
COLLIER'S CORNER,
SOUTH YARDLEY,
BIRMINGHAM.

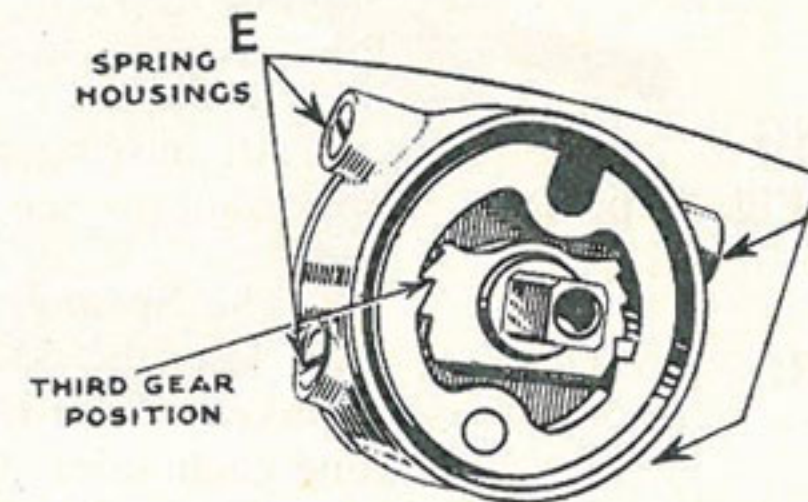
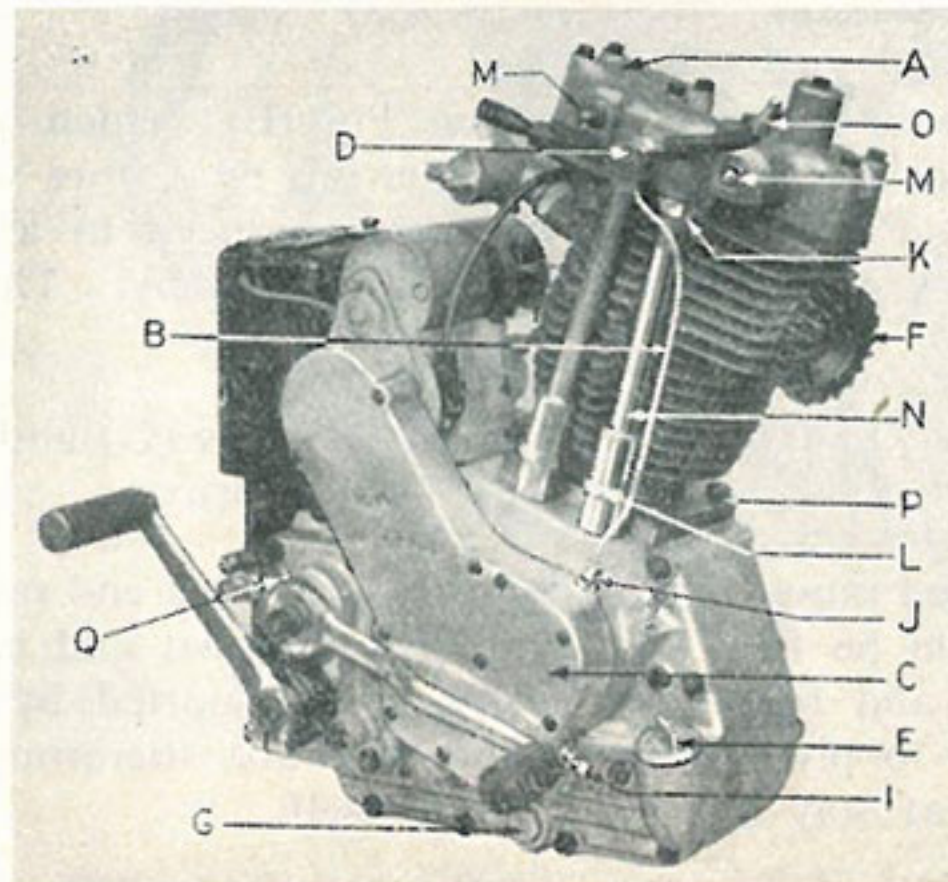


Fig. 2.

SPRING FRAME

Part 3. (MAINTENANCE).

Chapter 3.

ADJUSTMENT.

Fig. 1.

The Spring Frame Rear Bearing can be checked for side play by placing a box under the Engine so that the rear wheel is clear of the ground; then, by applying pressure sideways to the wheel any play on these bearings can be felt. This should be taken up by undoing the lock nut (A) on the main Spindle in an anti-clockwise direction and turning the Knurled Dust Cap (B) on the Primary Drive side of the machine in a clockwise direction, until no play is registered. Retighten the lock nut which completes the adjustment. No tools or force of any description must be used on the Knurled Cap, as this is readily adjusted by hand.

FRICTION DAMPER.

Remove the small aluminium Disc (C) in the centre of the Hand Adjuster Wheel.

Remove the two nuts which hold the Damper together in an anti-clockwise direction. Remove the Adjuster Wheel (D) itself, which will allow the Damper Plates and Friction Discs to be removed. Replace any worn parts and reassemble.

FORK END FULCRUM.

At the base of the Seat Stay Tubes is to be found a Fulcrum Pin (E)—which allows free movement at this point. What small side play might develop is taken up by a fibre washer, but as the movement of the stays on the Fulcrum Pin is so small, wear is reduced to a minimum. Should, however, the washer deteriorate, a new one should be fitted immediately. The Fulcrum Pin unscrews in an anti-clockwise direction.

GREASING.

(See also Fig. 1, p. 5)

All moving parts of the Spring Frame are fitted with Grease Gun Nipples (G) and it is most important to see that every moving part receives an adequate supply of lubricant.

SPRUNG CARRIER.

Fig. 1.

The Sprung Carrier for use with a Spring Frame, is mounted at its forward end on a lug (H) built into the Saddle Lug. The Carrier should be free to move up and down and care should be taken to see that the Pivot Pin is lubricated and free. The Carrier is supported by two stays (one each side) (J) both ends of which are free to pivot slightly, and they are, therefore, mounted on suitable Bosses (K) and (L) on both the Seat Stay and the Carrier itself.

(See also Fig. 1, p. 5)

Provision is made to take up wear by tightening the clamp bolts in a clockwise direction, and all moving parts should be carefully lubricated. (Greasers marked G).

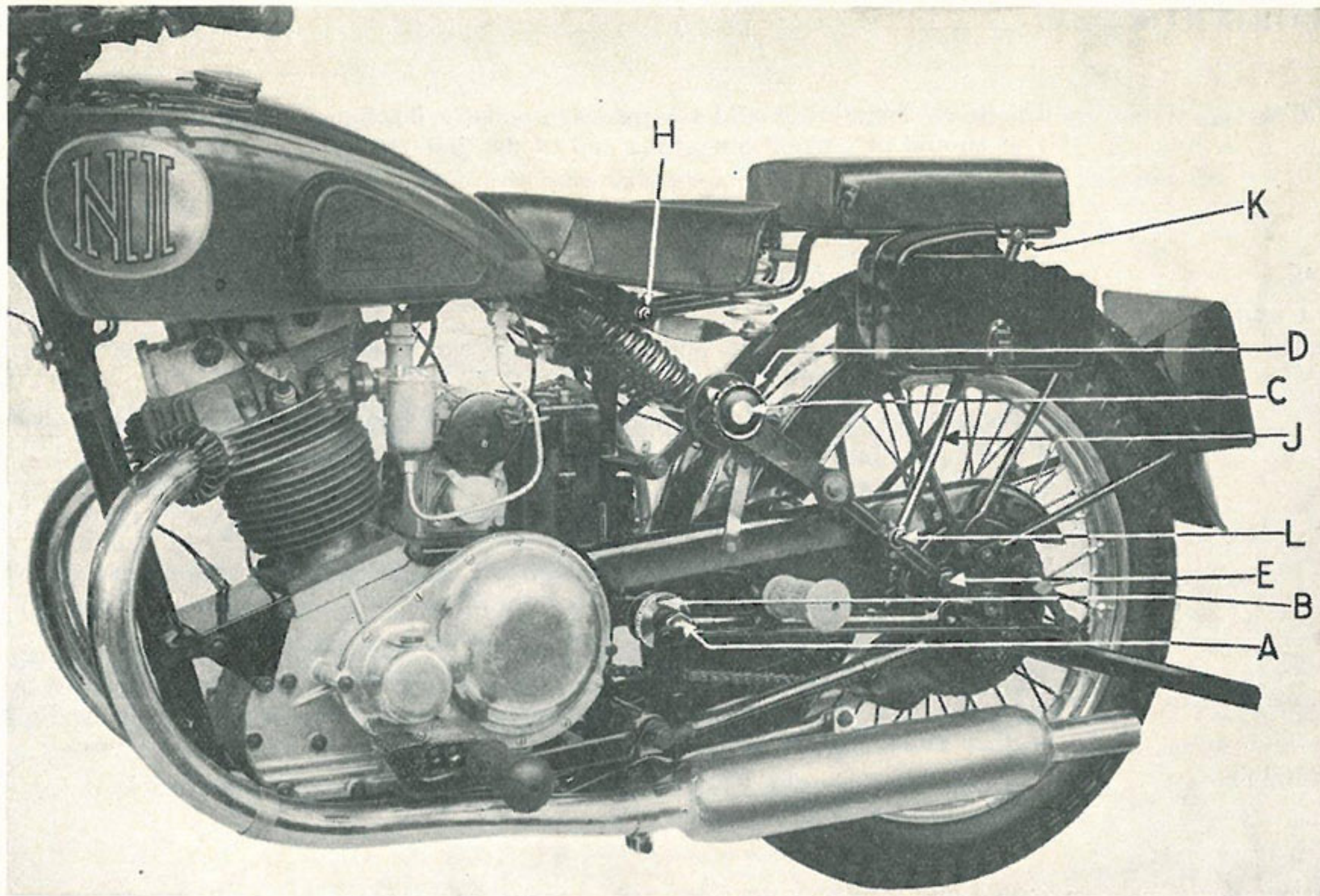


Fig. 1.

FORKS

Part 3. (MAINTENANCE).

Chapter 4.

FORKS.

Pressed Type.

Model 23.

Greasing.

The Fork Spindles should be greased regularly through the nipples provided.

This should be carried out at the end of the first 150 miles and then regularly every 500 miles.

This is MOST IMPORTANT.

Dismantling.

(See Figs. 1 and 2,
Page 45).

This should only be necessary when overhauling your machine at the conclusion of a season's riding:—

- (a) Remove the split cotters and unscrew the two spindle nuts (A) on the top near side of the machine, in an anti-clockwise direction.
- (b) Place a box under the front of the Crankcase to remove the weight of the machine from the Forks.
- (c) Remove near side Fork link. (B).
- (d) Withdraw the two Fork spindles complete with the offside link.
- (e) Brush off with clean paraffin, smear with oil and reassemble, seeing that the nuts are tight without prohibiting free movement of the Fork.
- (f) Carry out the same work on the bottom pair of spindles.
- (g) To reassemble, the spring washer (C) should be placed on the spindle against the offside link, followed by a plain washer (D). The spindle should then be inserted in the Fork and a plain washer added before replacing the near side link.

All other Models.

Fork Spindles should be greased regularly through the nipples provided for the purpose.

This is MOST IMPORTANT.

Fork Adjustment.

(See Figs. 3 and 4,
Page 45).

Should any side play develop carry out the following:—

- (a) Slacken the Fork spindle nuts (E) on the near side in an anti-clockwise direction.
- (b) Turn the adjuster nuts (F) inside the links in a clockwise direction until play is eliminated.
- (c) Replace the outside nuts.

FORKS

Part 3. (MAINTENANCE).

Chapter 4.

FORKS.

All Models except
23, and Clubman.

- (a) Take the weight of the machine off the Forks by supporting the Crankcase with a box.
- (b) Unscrew the two Spindle nuts (A) on the top near side link anti-clockwise .
- (c) Remove the link (B).
- (d) Remove the two adjusting nuts (C) on the inside of the link.
- (e) Remove the offside link with the Spindles.
- (f) In the case of the botton Spindles, the Shock Absorber Star Washer and the Anchor Plate need not be removed before removing the Spindles.
- (g) Brush off with paraffin and reassemble.

Dismantling.
(See Figs. 3 and 4,
Page 45).

SHOCK ABSORBER

Dismantling.

- (a) Remove aluminium disc in centre of Hand Adjuster Wheel.
- (b) Remove nuts so disclosed, anti-clockwise, with box spanner.
- (c) Unscrew Hand Adjuster Wheel anti-clockwise.
- (d) Remove damper plates and discs.
- (e) Clean, replace worn parts.
- (f) Re-assemble in order and replace Adjuster Wheel, lock nuts and disc.

FORKS

Part 3. (MAINTENANCE).

Chapter 4.

FORKS.

Should any side-play develop carry out the following adjustment:—

Clubman Type.

- (a) Slacken the spindle and nuts (AB) in an anti-clockwise direction.

Fork Adjustment.

- (b) Turn the spindle by means of the square end (C) in an anti-clockwise direction until all play is eliminated.
- (c) Finally lock up the spindle nuts (AB).
- (d) Check forks for up and down freedom.
- (e) It is advisable to adjust only one spindle a a time.

Dismantling.

(See Figs. 5 and 6,
Page 45).

- (a) Take the weight of the machine off the forks by supporting the crankcase with a box.
- (b) Unscrew the two spindle nuts (B) on the top near side link anti-clockwise.
- (c) Remove the link (D).
- (d) Remove the offside link (E) complete with spindles.
- (e) In the case of the bottom spindles the same procedure applies as the top spindles.
- (f) Clean or renew any parts required in the shock absorber when the bottom spindles are removed.

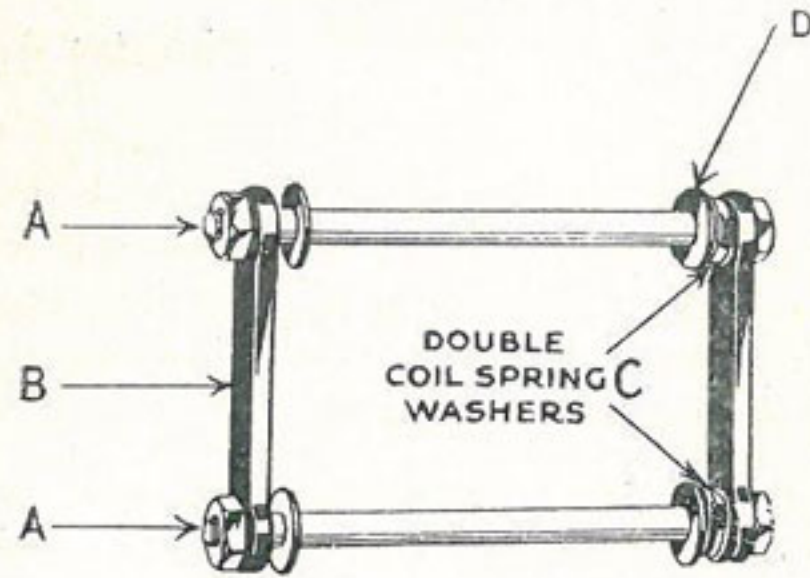


Fig. 1.

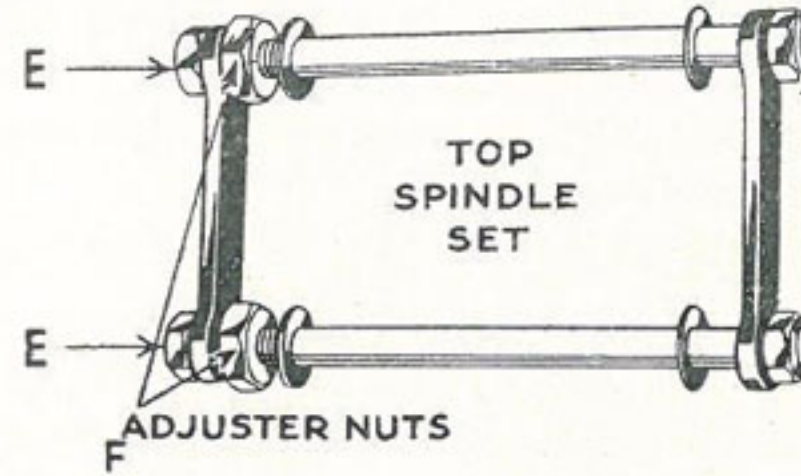


Fig. 3.

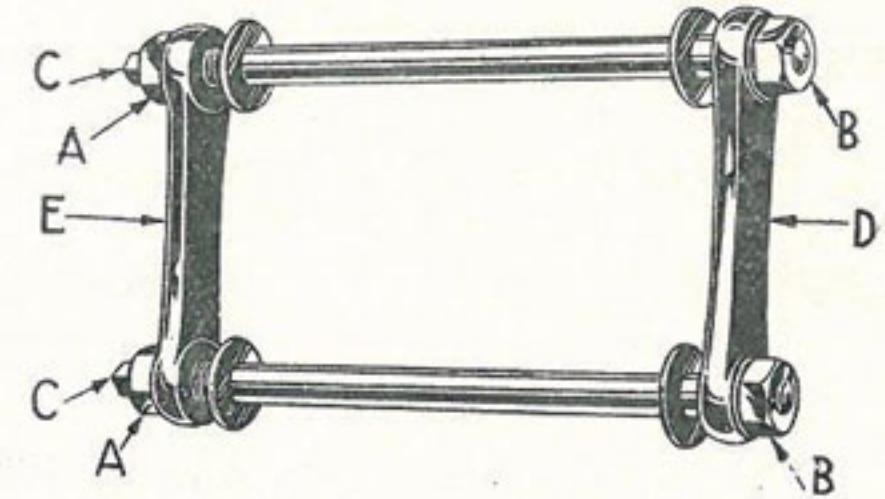


Fig. 5.

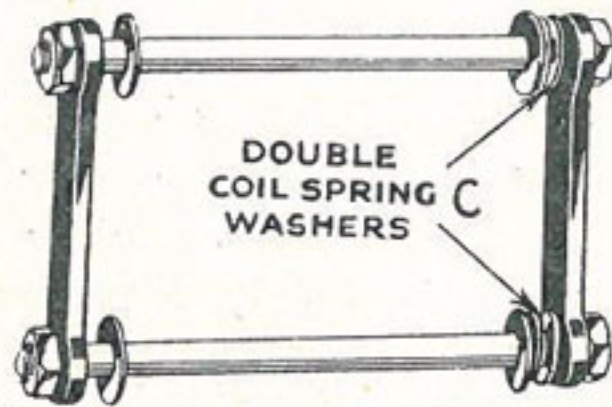


Fig. 2.

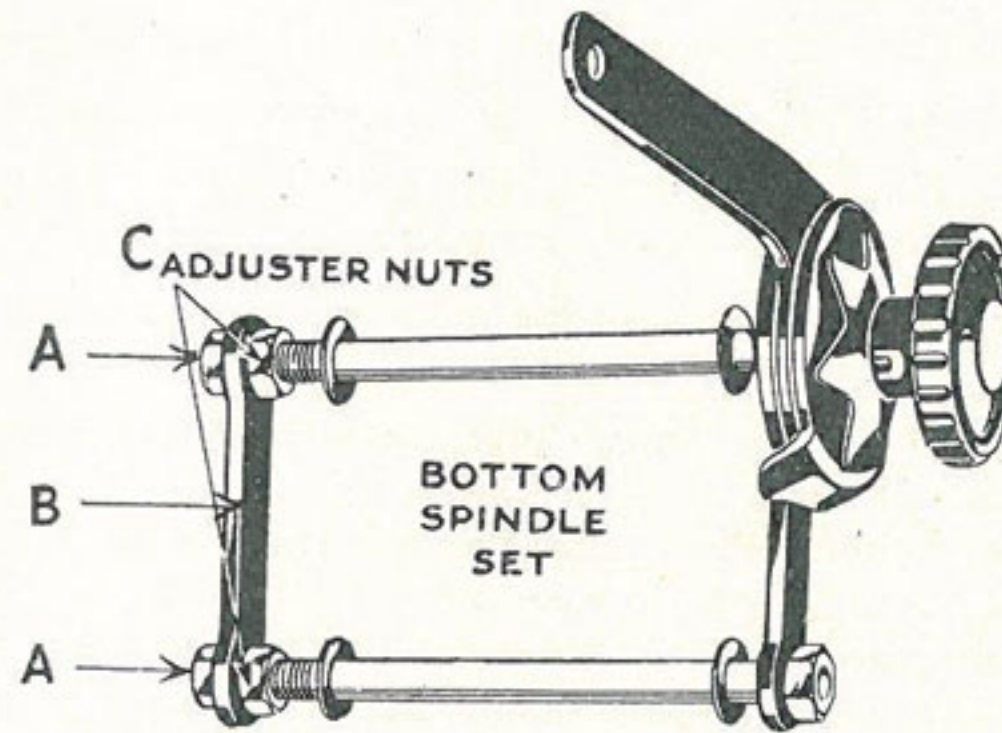


Fig. 4.

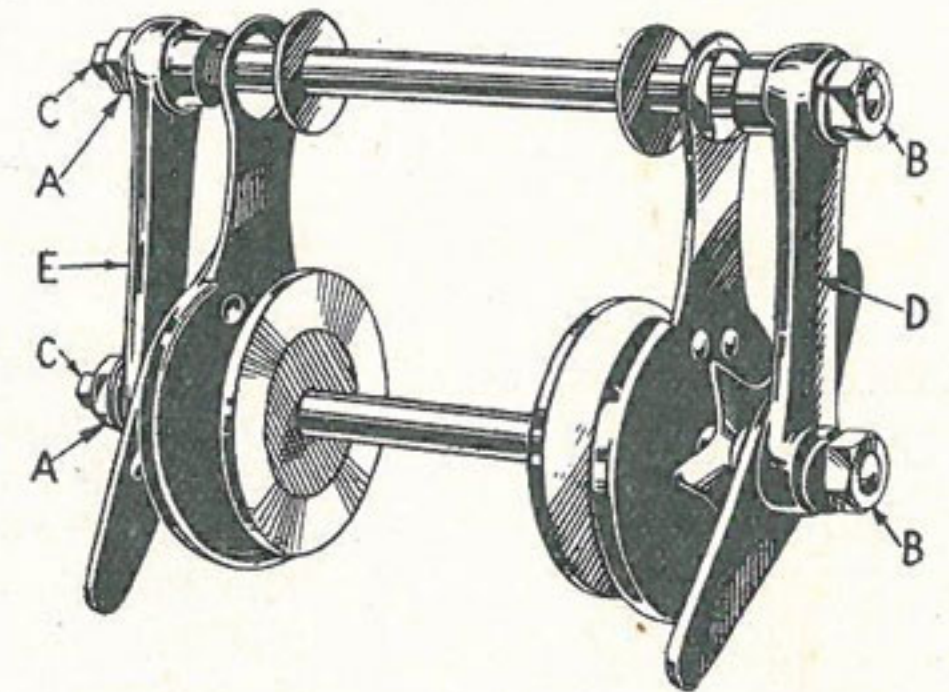


Fig. 6.

FORKS

Part 3. (MAINTENANCE).

Chapter 4.

STEERING DAMPER.

The Steering Damper is controlled by a Hand Adjuster Wheel situated on the top of the Fork Column. To apply the Damper, turn wheel in clockwise direction. The amount of Damping to be used can best be found by experience, but the rougher the road surface and the higher the speed, the more Damper action required, may be taken as the rule. If a sidecar is attached to the Machine, the Damper may be used with advantage under almost any conditions.

The Damper action is attained by the rod which passes down the Steering Column and to which the Hand Adjuster Wheel is fitted, exercising pressure on the plates, Friction Discs and Anchor Plate, which is to be found at the bottom of the Steering Column; the Anchor Plate being anchored to the Front Down Tube. Should new Friction Discs or Anchor Plates be required, fit as follows:—

- (a) Remove Steering Damper Knob and Rod completely, and also the pin which holds the Steering Damper Anchor Plate in position on the frame.
- (b) Take the weight of machine off Forks by placing a box under the Crankcase.
- (c) Remove bottom Fork Spindles, as described on page 43, or page 44 (according to Model).
- (d) The Steering Damper Assembly will then fall out complete, enabling the discs to be removed and replaced, or a new Anchor Plate to be fitted.
- (e) Re-assemble in the reverse order.

STEERING HEAD.

All Models.

Fig. 1.

The Illustration clearly shows the method of dismantling the Steering Head for cleaning or renewal purposes. It will be seen that only the bottom Fork Spindles need be removed. The Steering Damper Anchor Plate and the Steering Head Nut must be removed complete and the Steering Head Locking Bolt loosened. These nuts all unscrew in an anti-clockwise direction. The Fork Column can then be tapped out as shown on the Illustration. When dismantling in this way, the Steering Head Ball Races and the Bearings may be cleaned, examined and renewed if any signs of pitting are visible. When replacing bearings, pack the races thoroughly with grease. It will be seen that if this method of dismantling is used, it will be unnecessary to disconnect any control from the handlebars or the lighting set cables.

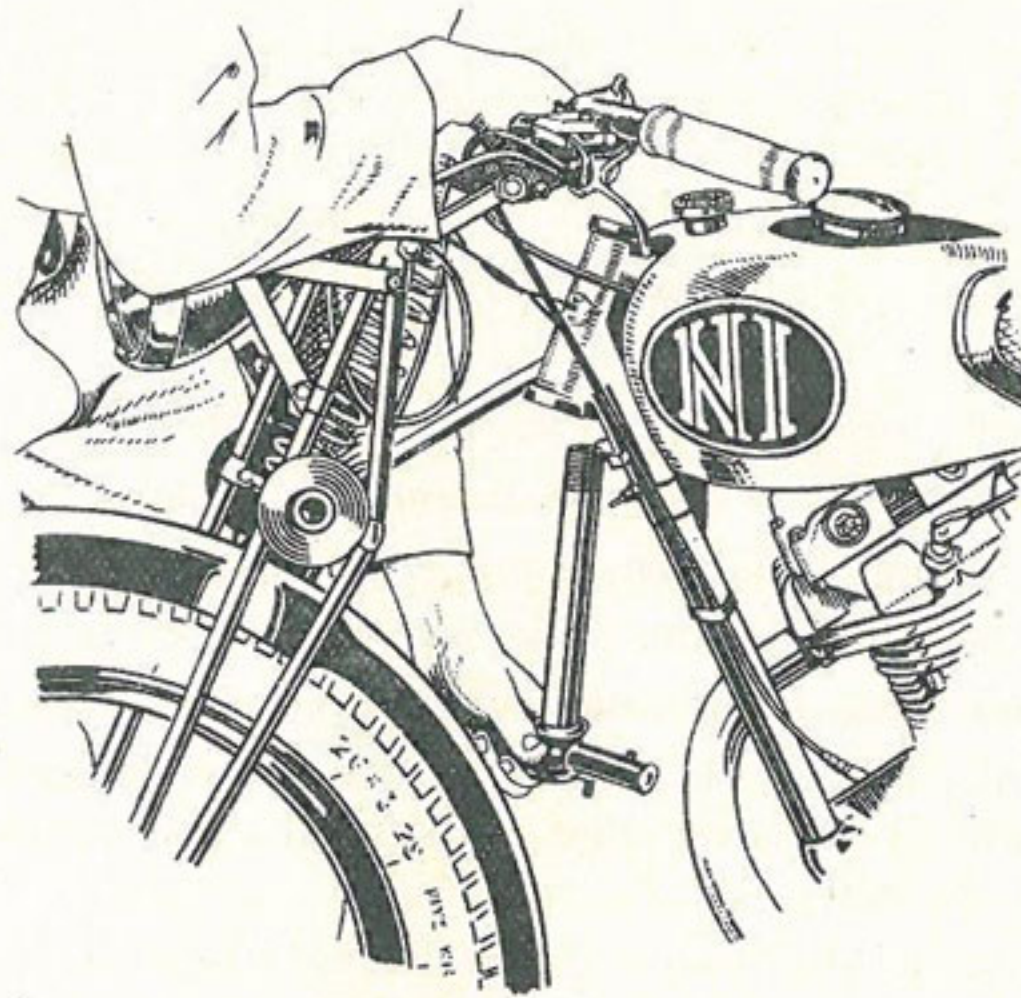


Fig. 1.

WHEELS

Part 3. (MAINTENANCE).

Chapter 5.

REMOVAL OF FRONT WHEELS.

All Models.

- (a) Raise the Front Wheel from the ground by placing a box under the Crankcase, or by use of the Front Stand.
- (b) Remove the Front Brake Cable at the Handlebar end by holding the Brake Operating Lever (on the Hub) with a spanner, which will allow sufficient slack in the Cable for the Cable End Cap to be removed from the Brake Lever on the Handlebar.
- (c) Slacken both Spindle Nuts in an anti-clockwise direction and withdraw wheel.

When replacing, care should be taken to see that the Brake Anchor Plate is correctly positioned on the stud.

REMOVAL OF REAR WHEELS.

All Models.

- (a) Place machine on the Rear Stand and remove rear half of Mudguard (except Model 23).
- (b) Unscrew Brake Rod Wing Nut anti-clockwise.
- (c) Remove Spring Connecting Link from the Rear Chain.
- (d) Slacken the Spindle Nuts in an anti-clockwise direction.
- (e) Pull Wheel towards the rear of Machine when it should readily disengage.
- (f) When replacing Wheel, care should be taken to see that the Chain Adjuster Blocks are fitted correctly in their slides; that is to say that the portion of the Block which fits into the Fork end is to the rear.
- (g) In the case of the Model 23, the Rear Mudguard is not split, but the Wheel can easily be withdrawn from the Rear Forks by leaning the machine over to the near side. The same treatment assists when replacing the Wheel.

If any difficulty is experienced deflate the tyre. (Fig. 2).

The construction of the Front Hub can be seen from the Illustration.

Should any side play be found in the bearings (more than $1/32''$ at the rim), the following adjustment should be made:—

- (a) Slacken lock nut (B) in an anti-clockwise direction, and adjust cone (A) in clockwise direction to take up the play.
- (b) Tighten lock nut (B), taking care that the cone (A) is not disturbed.
- (c) When the adjustment is complete, see that the Wheel revolves freely without side play.

FRONT HUB.

Models 23, 36
and 46.

Fig. 1.

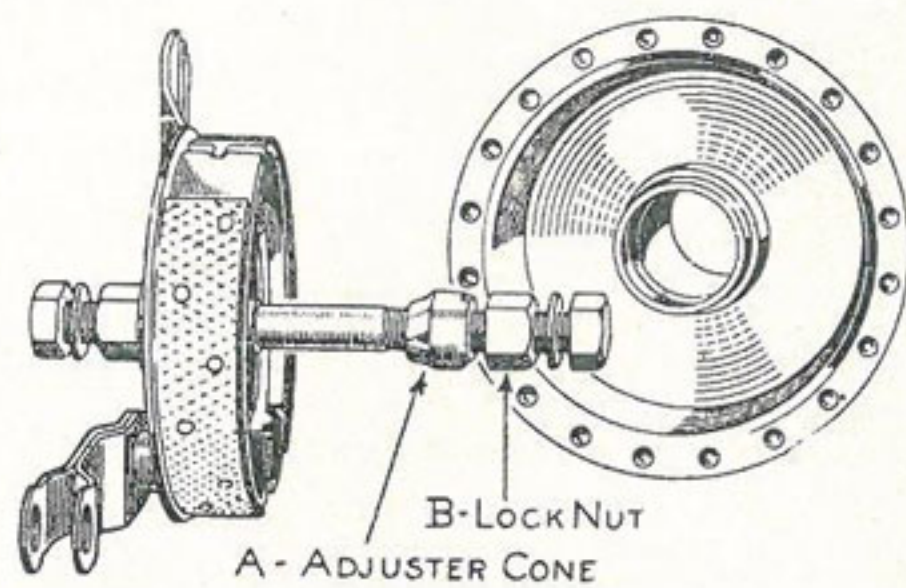


Fig. 1.

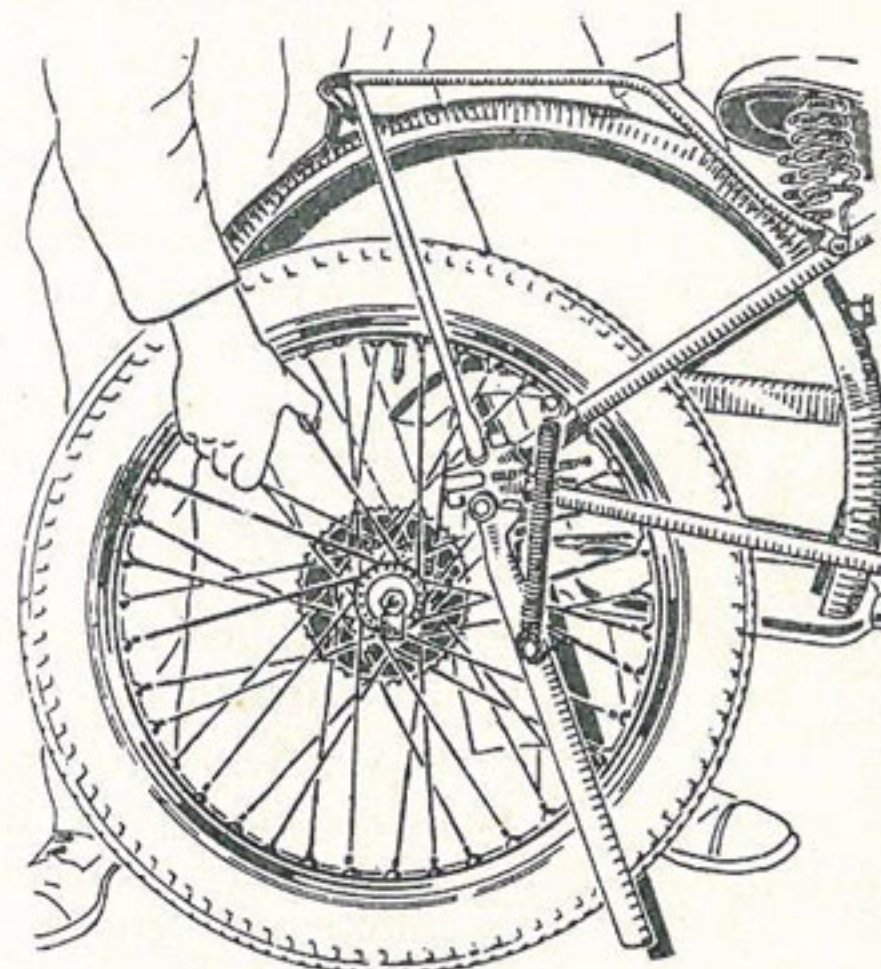


Fig. 2.

Part 3.

MAINTENANCE

Chapter 5.

REAR HUB.

Models 23, 36
and 46.
(Fig. 1).

The construction of the Hub is clearly shown in the Illustration.

Should any side play be found, the following adjustment should be carried out.

- (a) Slacken lock nut (C).
- (b) Adjust Taper Bearings by means of the nut (D).
- (c) Lock up nut (C).

NOTE.—Wheels which are fitted with Taper Roller Bearings should have a little play, which can be felt, but not more than $1/32''$ at the rim.

To take up side play, proceed as follows:—

- (a) Slacken lock nut (A) anti-clockwise.
- (b) Turn the Taper Roller Bearing (B) in a clockwise direction until not more than $1/32''$ play can be felt at the rim.
- (c) Retighten lock nut (A).

To take up side play, proceed as follows:—

- (a) Slacken lock nut (C) anti-clockwise.
- (b) Turn Adjuster Nut (D) clockwise until there is not more than $1/32''$ play at the rim.
- (c) Retighten lock nut (C).

REAR HUB.

All Other
Models.
(Fig. 3).

HUBS.

Greasing.

At intervals of not less than six months a good supply of first-class grease should be forced into the Hub by means of the Grease Gun through the two nipples provided on each Hub Shell. Once in twelve months, the Hubs should be dismantled, scrubbed in paraffin and repacked with recommended grease.

BRAKES.

Cleaning.

To obtain maximum efficiency the Brakes should be completely dismantled and cleaned periodically. No distance or time can be stated, but the rider will find from experience when his brakes require attention.

- (a) Remove Outer Brake Plate.
- (b) Take out Brake Shoes.
- (c) Scrub "Ferodo Linings" with Petrol.
- (d) If rivet heads stand above surface of the "Ferodo," knock down with punch.
- (e) Roughen surface of "Ferodos" with a coarse file, seeing that the linings taper down towards the Brake Shoe at their ends.
- (f) Remove Brake Cam. Clean Gears and reassemble.
- (g) Examine Brake Drum for scores (by rivets standing high). If scoring is bad, the matter should be attended to by one of our authorised Dealers.

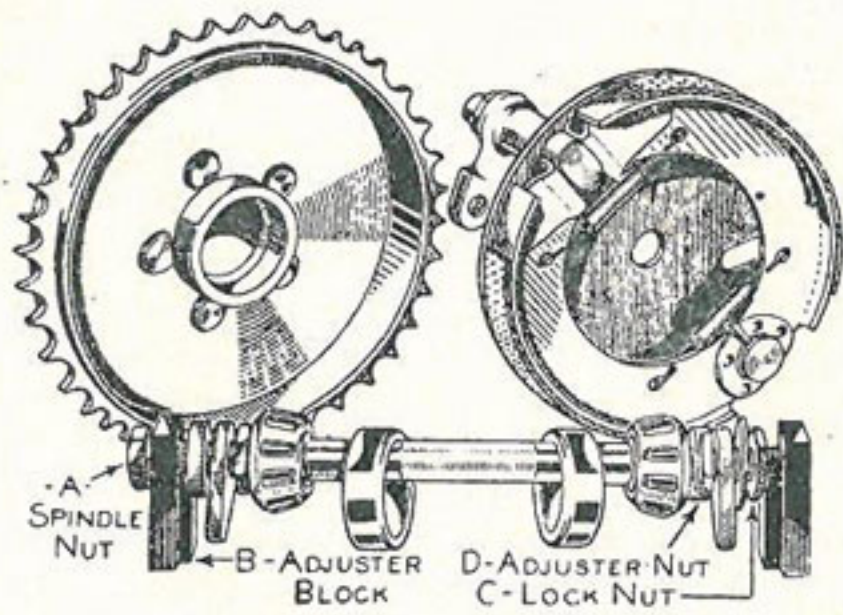


Fig. 1.

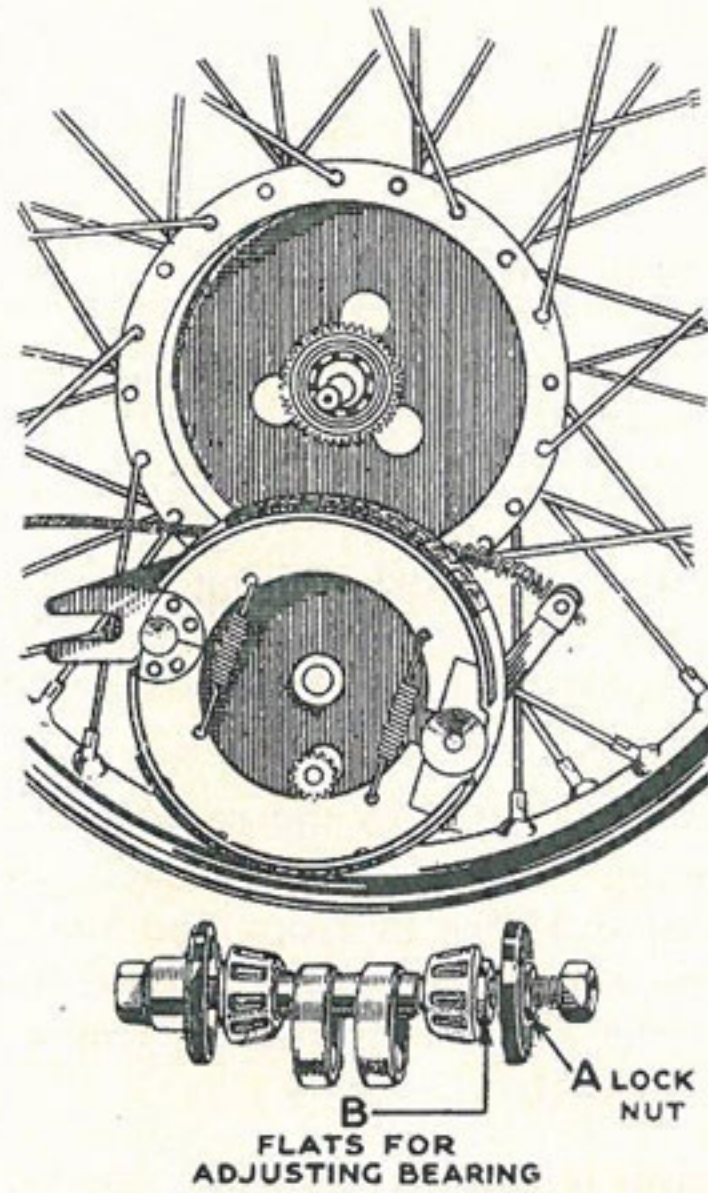


Fig. 2.

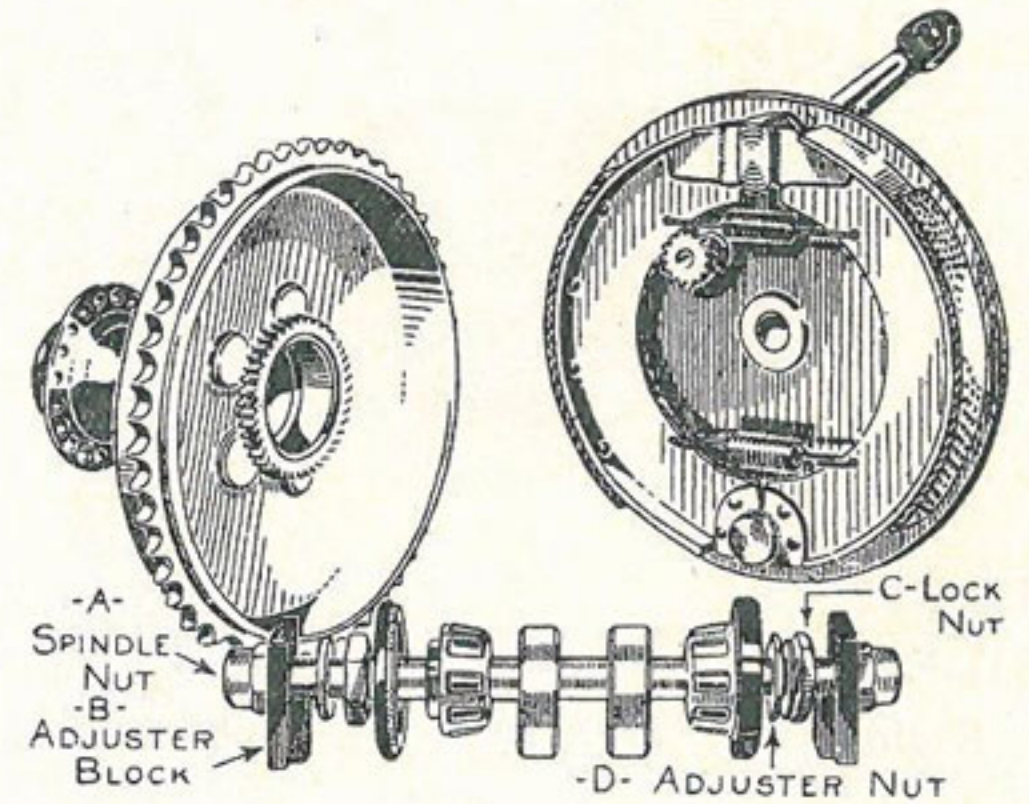


Fig. 3.

SIDE CARS

ALTERATION TO
SOLO MACHINE.

When any machine, previously used for solo work is to be fitted with a Sidecar, two important items must be altered:—

- (a) Gear ratio must be altered according to the following schedule:—

					Solo Sprocket	Sidecar Sprocket
Models 46 and 46 D.L.	..	..	..	..	50T.	57T.
Model 100	..	..	..	..	50T.	57T.
Models 76 and 76 D.L.	..	..	..	..	40T.	46T.
Model 110	..	..	..	..	40T.	46T.

- (b) A longer ($\frac{1}{2}$ ") and stronger Fork Spring should be fitted to bear the additional weight of the Sidecar and passenger. Suitable springs may be had from Works or Stockists.

TO FIT
SIDE CAR.
Rigid.

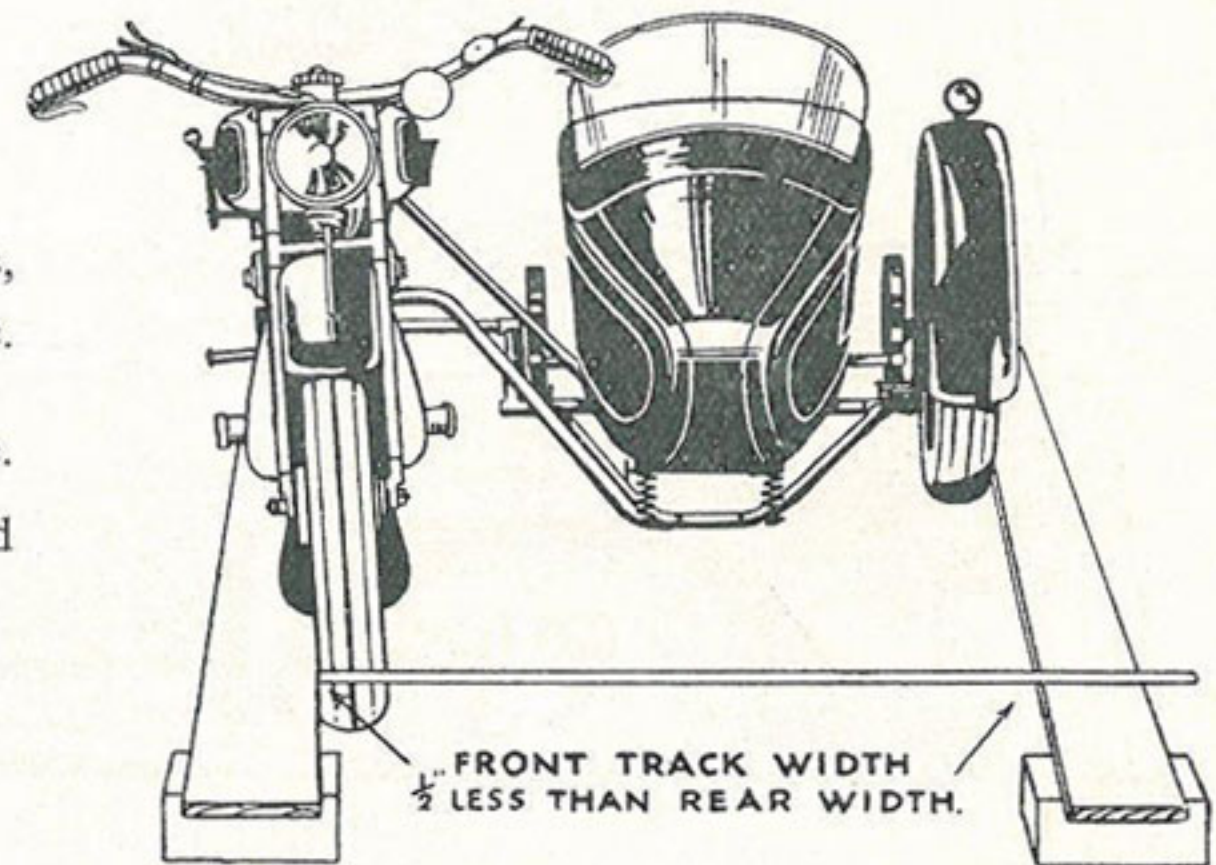
- (a) When a Sidecar has been fitted to the machine, it is advisable to check for correct alignment. This is done by placing straight edges on each side of the combination as per illustration, and adjusting by Telescopic Tubes at front and rear until parallel or about $\frac{1}{2}$ " narrower at front, with machine leaning slightly outward on level floor. Keep Sidecar close to Motor Cycle—the narrower the track, the easier it is for the Engine. Tighten all bolts, and, lastly, fit fourth point arm when provided.
- (b) When the combination is fitted up to your satisfaction, loosen nuts as if you were going to take off the Sidecar. If any bolts are difficult to draw or any attachment springs apart, there is undue strain somewhere, which must be overcome. Find out the fault and rectify.
- (c) When the Motor Cycle is allowed to lean outwards slightly, the Sidecar Chassis receives remarkable support.
- (d) An extra hour spent on fitting is never wasted. All nuts and bolts should be carefully tightened after the first run, particular attention being paid to the mudguard.

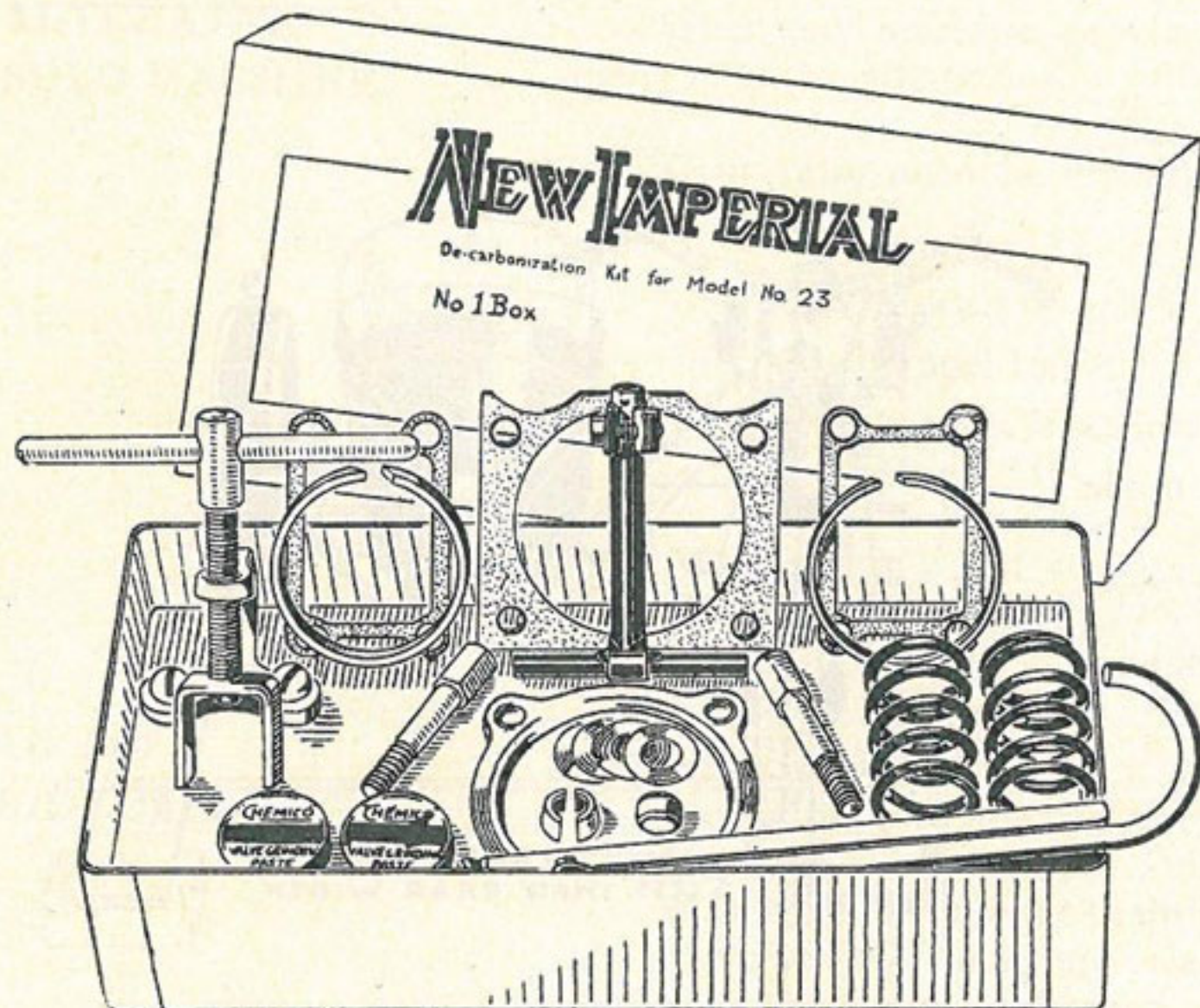
**TO FIT
SIDECAR.**

(Spring Frame).

When fitting Sidecar to spring frame machines, the following additional alterations must be made.

- (a) Frame springs exchanged for heavier type.
- (b) Brake pedal anchor plate and stud exchanged for heavier type.

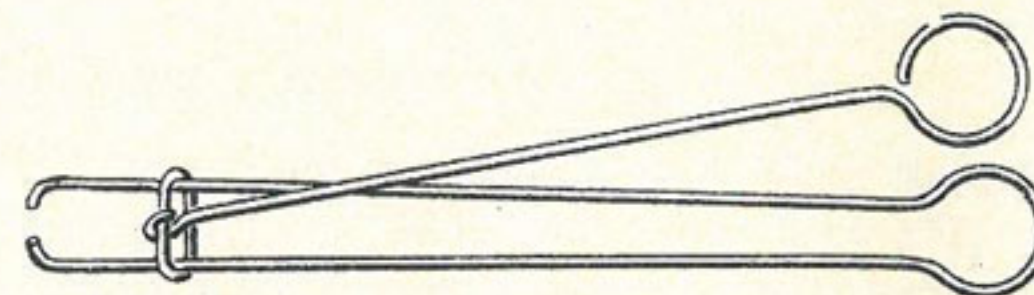




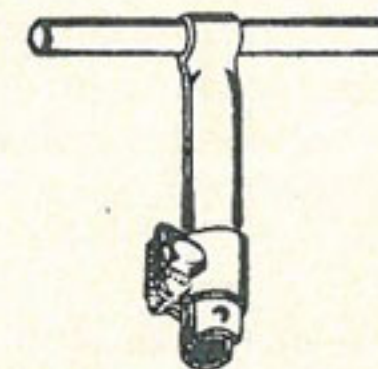
Prices from 18/6 each to 22/- each

For Prices and Contents of various Decarbonizing Kits, see page 56.

NOTE.—It is important that the Model No. or Frame and Engine No. of machine is quoted when ordering these kits.



CHAIN TOOL.
Price 7d.



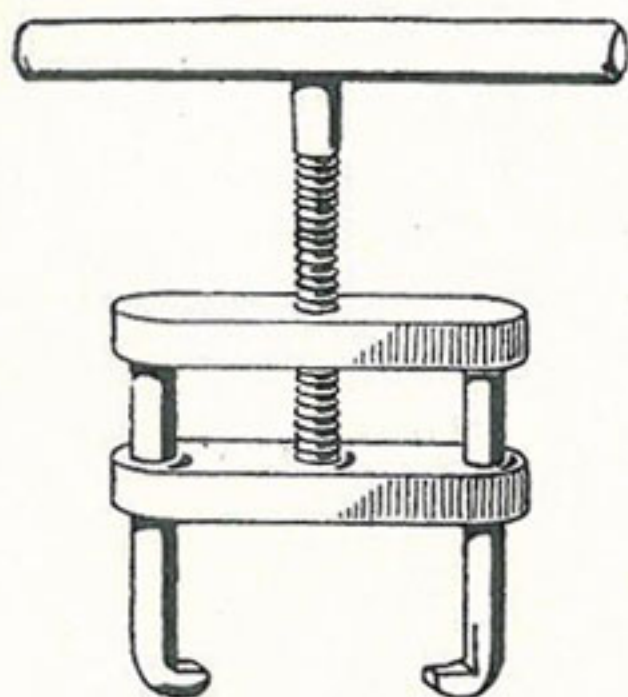
VALVE STEM HOLDER.
Price 1/-

(Please state whether $\frac{5}{16}$ in. or $\frac{11}{32}$ in. Valve Stem).

Part 3.

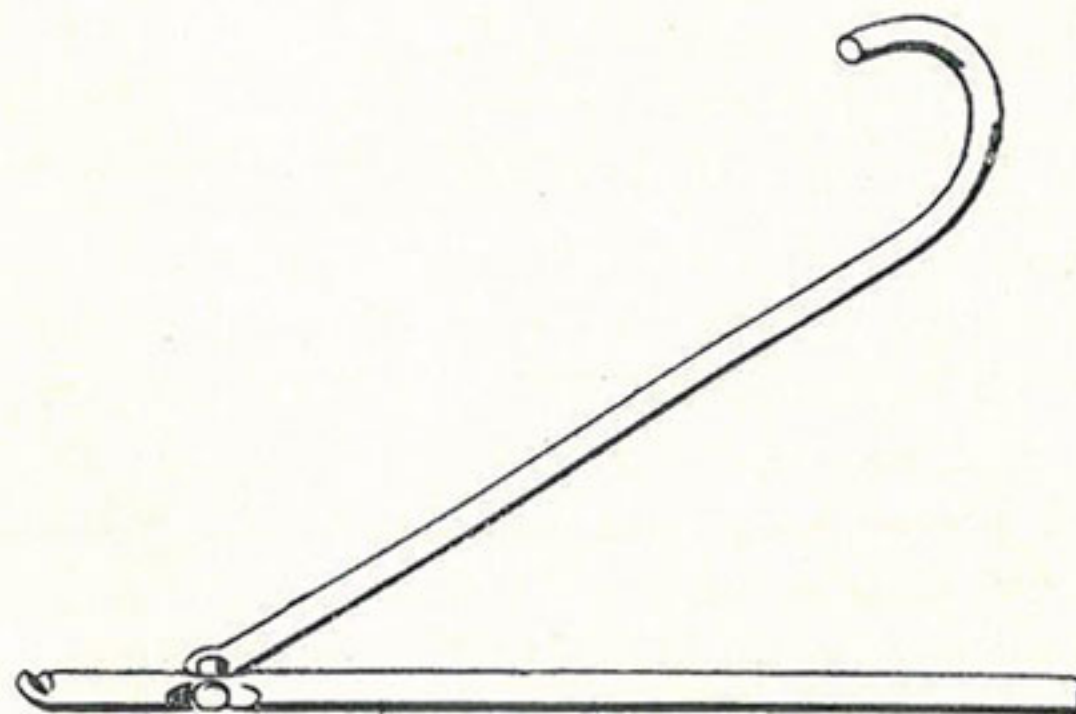
TOOLS AND KITS

Chapter 7.



SHOCK ABSORBER SPRING
TOOL OR SPROCKET
WITHDRAWAL TOOL.

Price 5/6 each.



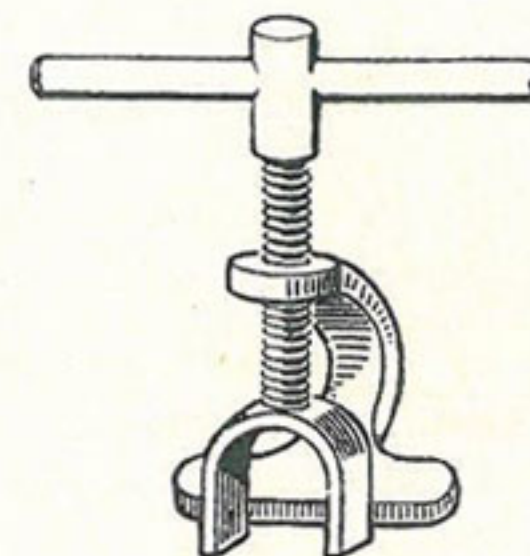
PUSH ROD AND COVER
TUBE TOOL.

For Model 23.

Price 2/- each.

For Other Models.

Price 3/3 each.



VALVE SPRING COMPRESSOR.

For Model 23.

Price 5/- each.

For Other Models.

Price 6/3 each.

DECARBONIZING KITS

Chapter 7.

Part 3.

PARTS SUPPLIED. IN KITS.

- (a) 1 Push Rod Tool.
- (b) 1 Valve Spring Compressor.
- (c) 1 Valve Grinding Tool.
- (d) 1 Tin Grinding Compound.
- (e) 1 Cylinder Head Gasket.
- (f) 2 Outer Valve Springs.
- (g) 2 Inner Valve Springs.
- (h) 2 Cylinder Head Bolts.
- (i) 2 Rocker Box Oil Washers.
- (j) 1 Compression Piston Ring (2 where 2 Rings are fitted).
- (k) 1 Scraper Piston Ring, Slotted.
- (l) 4 Rocker Spindle Shims.
- (m) 2 Pairs Valve Split Cotters.
- (n) 1 Cylinder Base Washer.
- (o) 1 Valve Stem Thimble.
- (p) 2 Gudgeon Pin Circlips.
- (q) 2 Push Rod Tube Washers.

PRICES.

Model 23	18/6
Models 36, 36 D.L., 46, 46 D.L. and 90	20/-
Models 76, 76 D.L., 100 and 110 ..	22/-

Part 3.

LUBRICANTS and FUELS—TYRE PRESSURES.

Chapter 8.

LUBRICANTS.

We recommend the use only of Lubricants for Engine, Primary Drive and Gear Box, as below:

ENGINE OIL. All models.

Summer. Mobiloil "D." Golden Shell, Extra heavy. Essolube "Racer."
Price's Motorine "B" de luxe. Wakefield Patent Castrol XXL.
Winter. Mobiloil "D." Triple Shell, Heavy. Essolube "Racer."
Price's Motorine "C" de luxe. Wakefield Patent Castrol XL.

PRIMARY DRIVE COVER LUBRICANT. All models.

Engine Oil, taken from the above recommended list.

GEAR OIL. (For Gear Boxes on all models, except Model 23).

Mobiloil "C." Shell Gear Oil, Heavy. Essolube Gear Oil, Heavy.
Price's Motorine Battersea "A." Castrol "D."

EXPOSED CHAINS AND GREASE GUN NIPPLES.

Mobilgrease No. 2. Shell Retinax. Esso Grease. Price's Belmoline "C." Castrolase, Light.

FUELS.

Model 23. We recommend for these machines either Shell or Esso High Test.

All other Models (except "Clubman Unit" Models). We recommend for these machines during running-in, either B.P. Ethyl or Esso Ethyl. Afterwards, machines will run satisfactorily on Shell or Esso High Test.

"Clubman Unit" Models. We recommend for these machines either B.P. Ethyl or or Esso Ethyl.

TYRE PRESSURES.

Minimum inflation pressures lbs. per sq. inch.

FOR SOLO MACHINES.								FOR SIDECAR MACHINES.									
Model No.	Tyre Size.	Front.	Rear.	Model No.	Tyre Size.	Front.	Rear.	Model No.	Tyre Size.	Front.	Rear.	Side-car.	Model No.	Tyre Size.	Front.	Rear.	Side-car.
23	25 × 3.00	16	22	100	27 × 3.00	18		46	26 × 3.25	20	22	16	110	27 × 3.00	26		
36	26 × 3.25	16	22		26 × 3.25		22	46DL	26 × 3.25	20	22	16		26 × 3.25		24	
36DL	26 × 3.25	16	22	76	26 × 3.25	16	22	100	27 × 3.00	24				26 × 3.25			16
90	27 × 3.00	18		76DL	26 × 3.25	16			26 × 3.25		22	16					
	26 × 3.25		22		26 × 3.25		22	76	26 × 3.25	20	24	16					
46	26 × 3.25	16	22	110	27 × 3.00	20		76DL	26 × 3.25	20		16					
46DL	26 × 3.25	16	22		26 × 3.25		22		26 × 3.25		24						

USEFUL INFORMATION

Part 3.

Chapter 8.

VALVE TIMING

Inlet valve opens 3/16" before T.D.C. Exhaust valve closes 3/16" after T.D.C.

IGNITION TIMING.

250 c.c. 14 mm. 350 c.c. 13 mm. 500 c.c. 11 mm. before T.D.C. with the ignition lever in the fully advance position, and the points set about to break.

RECOMMENDED
SPARKING PLUGS.

For normal road use K.L.G. Type 831.

For Trials and local Speed Events K.L.G. Type L.246.

PETROL TANK CAPACITY

Model 23. 2 3/4 gallons. All other models, 3 gallons.

OIL SUMP CAPACITY

Model 23. 2 pints (approx.).

Model 36, 46 and 90. 2 1/2 pints (approx.).

Model 76, 100 and 110. 3 pints (approx.).

	Model 23	Model 36 and 46	Model 76	Model 36 D.L. and 46 D.L.	Model 76 D.L.	Model 90 and 100	Model 110
Description	Unit Minor	Standard Unit	Standard Unit.	De Luxe Unit	De Luxe Unit	Clubman Unit	Clubman Unit
Cylinder Bore	55 mm.	67 mm. on Mod. 36 74 mm. on Mod. 46	82 mm.	67 mm. on Mod. 36D.L. 74 mm. on Mod. 46D.L.	82 mm.	67 mm. on Mod. 90 70 mm. on Mod. 100	82 mm.
Piston Stroke	62.5 mm.	70 mm. on Mod. 36 80 mm. on Mod. 46	94 mm.	70 mm. on Mod. 36D.L. 80 mm. on Mod. 46D.L.	94 mm.	70 mm. on Mod. 90 90 mm. on Mod. 100	94 mm.
Capacity	146 c.c.	247 c.c. on Mod. 36 344 c.c. on Mod. 46	496 c.c.	247 c.c. on Mod. 36D.L. 344 c.c. on Mod. 46D.L.	496 c.c.	247 c.c. on Mod. 90 346 c.c. on Mod. 100	496 c.c.
Type	All Models have O.H.V. Engine and Gear Box in Unit Construction.						
Carburetter	Amal, Air Cleaner	All Models fitted with Amal Carburetter.					
Control	Hand	Foot	Foot	Foot	Foot	Foot	Foot
Frame	All Models fitted with Cradle Frame with 3 point suspension.						
Forks	Pressed	Taper Tubular Forks, fitted with Steering and Movement Dampers on all Models except Model 23.					
Primary Drive	Helical Gears	Helical Gears	Double Helical Gears	Helical Gears	Double Helical Gears	Double Helical Gears (Mod. 100 only)	Double Helical Gears
Brakes	4" front 6" rear	5" front 7" rear	7" front 7" rear	7" front 7" rear	7" front 7" rear	7" front 7" rear	7" front 7" rear
Tank Finish	Black and Gold	Black and Gold	Black and Gold	Chrome, Blue and Gold	Chrome, Blue and Gold	Chrome, Carnation and Gold	Chrome, Carnation and Gold
Saddles	Dunlop or Lyett at choice.						
Lighting	Coil (M/L. extra)	Magdyno (Coil by allowance)	Magdyno (Coil by allowance)	Magdyno	Magdyno	Magdyno (Magneto by allowance)	Magdyno (Magneto by allowance)

The above specifications may be altered, substituted or withdrawn from time to time, of which no notice can be given.

GENERAL INFORMATION

Part 3.

Chapter 8.

Model	Capacity	Compression Ratios	Top Gear	Third Gear	Second Gear	Bottom Gear	Weight	Overall Width	Overall Length	Wheel Base	Approx. Petrol Consump.	Approx. Speed Top	Approx. Speed Third	Approx. Speed Second	Approx. Speed Bottom	B.H.P.	Tank Capacity	Oil Capacity	Saddle Height	Ground Clearance
28	146 cc.	7.8	8.0	—	11.5	21.5	LBS. 228	28"	6' 7"	4' 8"	MPG 120	MPH 50	MPH —	MPH 80	MPH 20	7	GALLS 2½	PINTS 2	27"	5½"
36	247 cc.	7.8	6.2	8.3	11.3	16.7	328	29"	6' 11"	4' 6"	95	62	47	32	20	12	3	2½	28"	4½"
46	344 cc.	6.6	5.8	7.8	10.6	15.7	328	29"	6' 11"	4' 6"	85	68	50	37	25	15.5	3	2½	28"	4½"
76	496 cc.	6.6	5.1	6.7	9.0	13.5	350	29"	6' 11"	4' 6"	80	73	55	45	28	21	3	3	28"	4½"
36DL	247 cc.	7.8	6.2	8.3	11.3	16.7	340	29"	6' 11"	4' 6"	95	60	45	30	20	11	3	2½	28"	4½"
46DL	344 cc.	6.6	5.8	7.8	10.6	15.7	340	29"	6' 11"	4' 6"	85	65	48	35	25	14.5	3	2½	28"	4½"
76DL	496 cc.	6.6	5.1	6.7	9.0	13.5	370	29"	6' 11"	4' 6"	80	70	52	42	28	20	3	3	28"	4½"
90	247 cc.	7.8	6.2	8.3	11.3	16.7	330	29"	6' 11½"	4' 6"	95	65	50	35	20	13.5	3	2½	28"	5"
100	346 cc.	7.2	5.8	7.8	10.6	15.7	350	29"	6' 11½"	4' 6"	85	73	56	40	25	17	3	3	28"	5"
110	496 cc.	7.0	5.1	6.7	9.0	13.5	362	29"	6' 11½"	4' 6"	80	80	60	50	30	23	3	3	28"	5"

NOTE SPRING FRAME MACHINES:—12 lbs. Extra Weight.
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