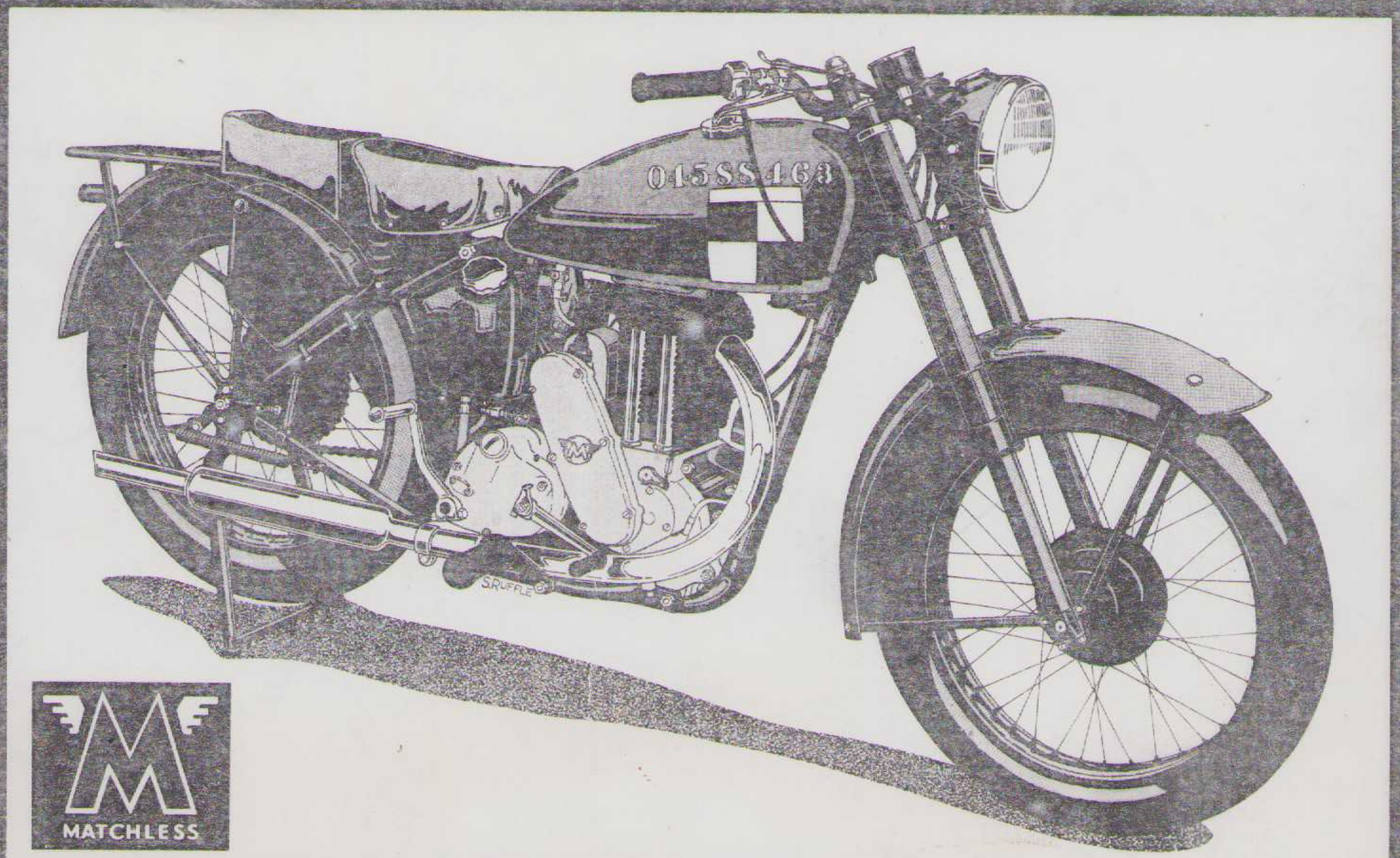
SERVICE SERIES

MATCHLESS

BMS

350 & 500 cc Heavyweight Singles 1939-1955



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and
EX-W.D. 347 c.c. MODELS

First published 1958

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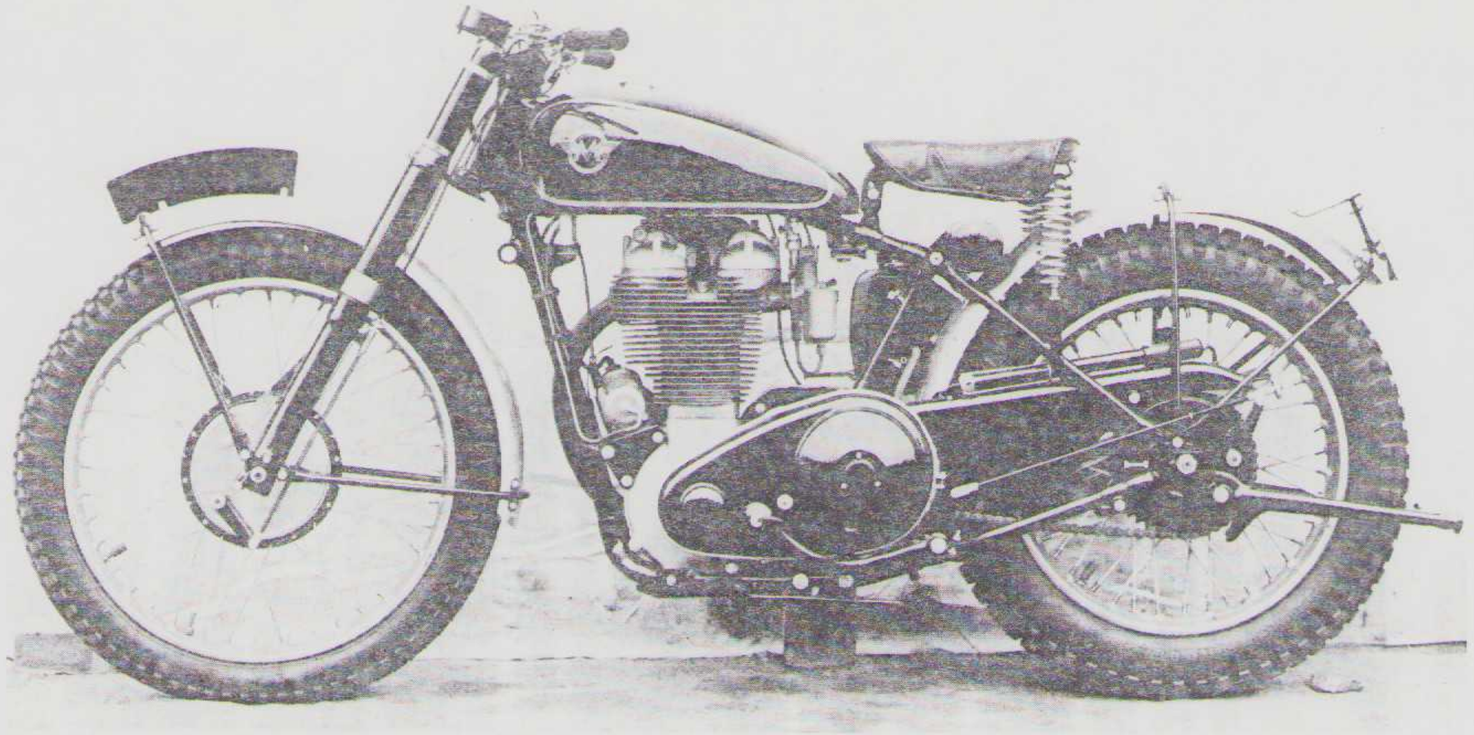

A maker's definitive photograph by courtesy of Motorcycle Sport for the 1953 500 cc Matchless G80C shown here in trials guise with light-alloy motor, pre-Monobloc carburetter, rigid frame, Burman box and the AJS-style of forward mounted magneto introduced from September 1951. The Lucas instrument here is of course the Wader type. It has the new-type front brake brought in September 1952, the fullwidth front hub not arriving until 12 months later

BMS SERVICE SERIES

MATCHLESS 350 & 500 cc Heavyweight Singles 1939-1955

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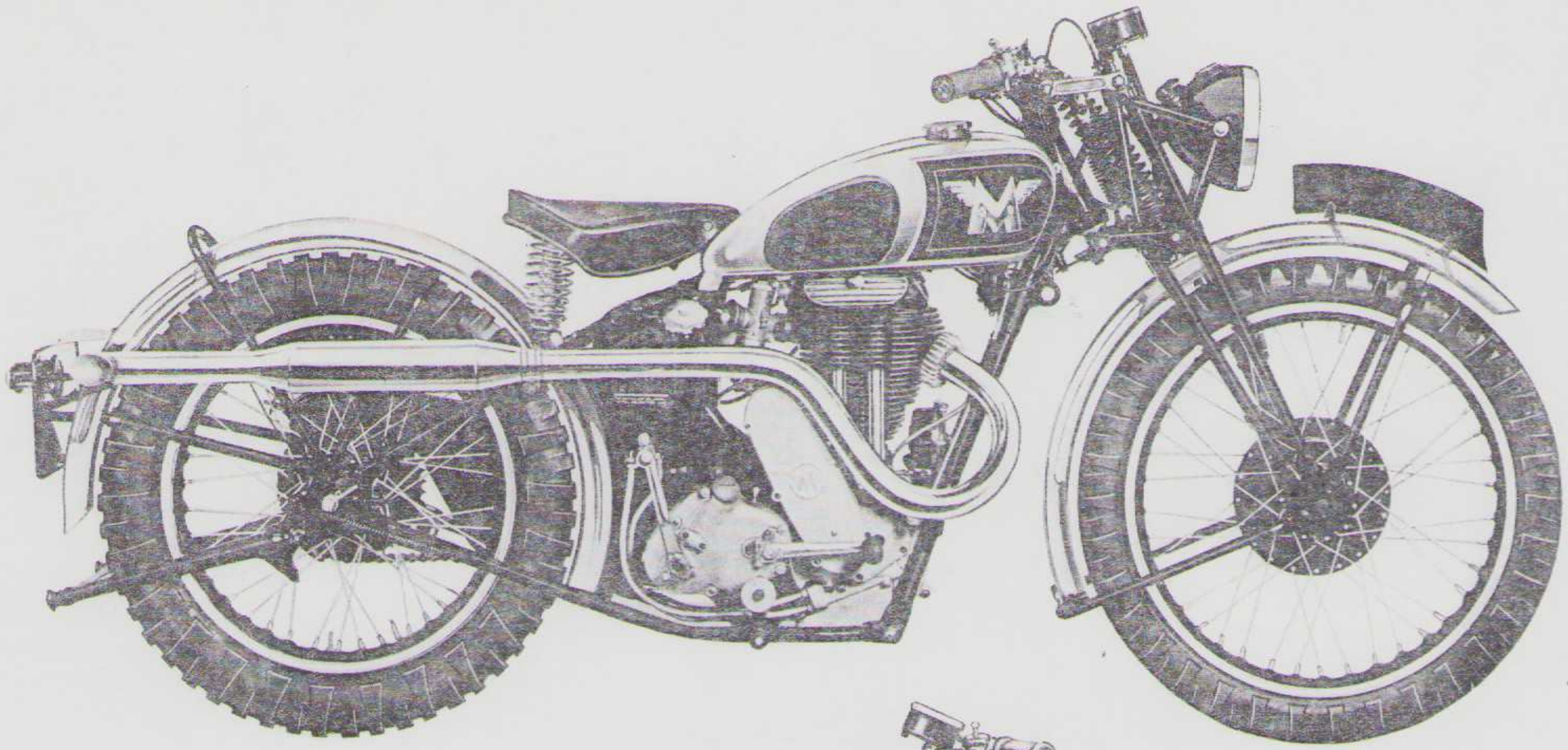
- ★ *Full workshop manual, girder and tele-fork types*
- ★ *Military WD-G3L illustrated spares list in full*
- ★ *Numerous line drawings plus lavish data section*
- ★ *Roadster coverage supported by special WD appendix*
- ★ *Intended for Matchless but good for AJS too*



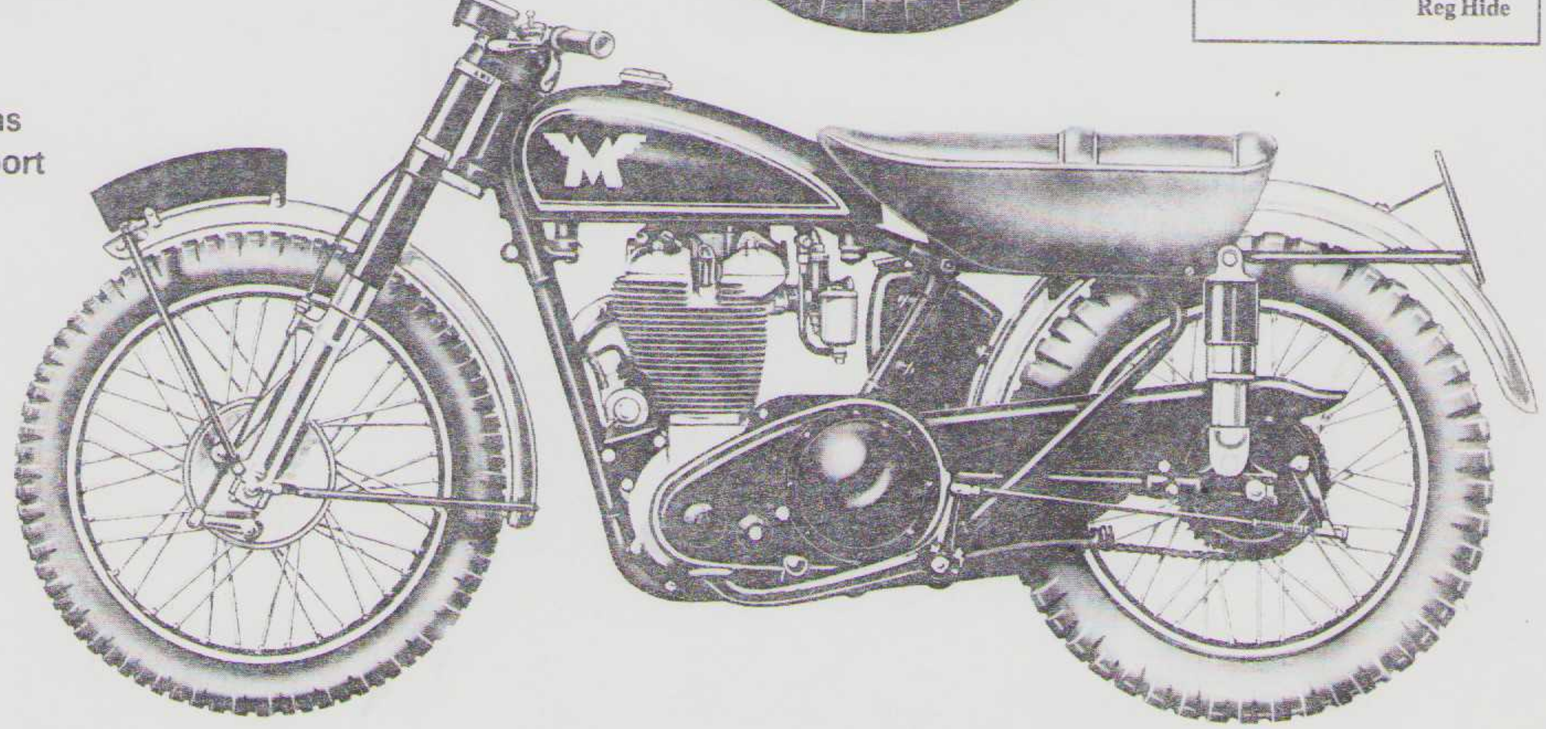
(Left) Another maker's definitive photograph showing the 350 cc G3C as it was in 1938 with of course girder forks and the stylised M symbol on the chromed tank

IMPORTANT NOTE

Since the text was written for the original book, AMC Ltd has passed into other hands and the Woolwich factory has been demolished. Comments about over-haulers refering to the makers should be read in this light. Spares and specialist service are now concentrated in the hands of a few UK dealers who include Messrs Hamrax and Joe Francis Motors —

Reg Hide

Maker's definitive photographs by courtesy of Motorcycle Sport



Again a factory photograph. The 1954-season 500 cc G80CS introduced from September 1953 with the new for that year full-width front hub of 7-inch diameter brake, lightweight welded front frame and a twin seat. Rear legs are AMC's own Jampots. The alloy motor has the magneto forward mounted of course

FOREWORD TO THE ORIGINAL BOOK

This book is a practical guide carefully compiled to enable both the new owner and the expert to carry out routine maintencance, complete overhauls, and to service those Matchless single-cylinder machines built between 1939 and 1955. It will also be of assistance to dealers' service staff as the comprehensive information provided in the text is culled from extensive experience in servicing these machines.

To obtain maximum efficiency, reliability, and long life from component parts, regular and systematic maintenance is essential. Performance, too, is likely to be improved if careful attention is given to the instructions outlined in these chapters. The aim throughout has been to guide the reader step by step through the sequence of dismantling and reassembly, paying particular attention to the elimination of defects, and so avoiding those trial and error methods which can prove so frustrating and, in the end, so expensive.

Chapters are devoted to ex-WD machines, giving conversions that will improve performance; and to trials and scrambles machines. Technical data and illustrations of special tools recommended and used by the manufacturers are included in the text.

Finally, the Publishers wish to make grateful acknowledgment to Associated Motor Cycles Ltd. for permission to reproduce a number of their copyright drawings in the text —

BERNAL OSBORNE, Temple Press Ltd.

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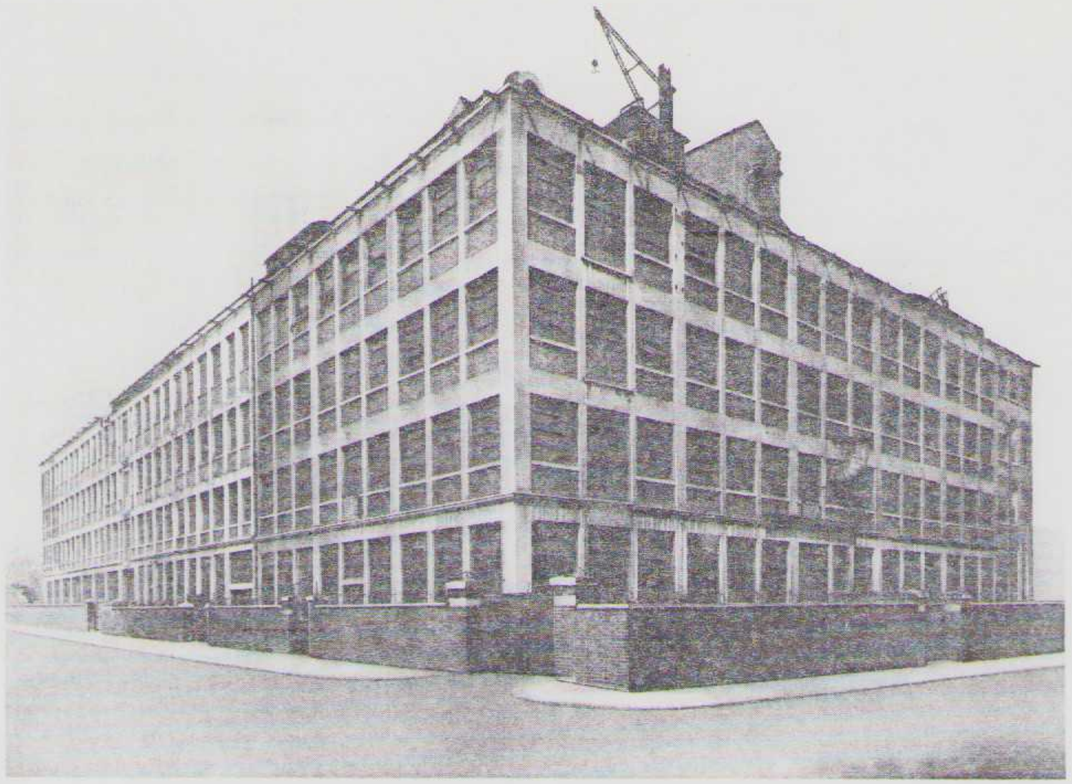


An official photograph, courtesy of Motorcycle Sport, revealing the side and rear of the AMC factory at Plumstead, taken from the corner of Burrage Grove. The front, hidden here, is in the parallel Plumstead Road. Date is unknown but certainly is the early 1950's

EDITOR'S PREFACE

The only workshop manual currently in print for Matchless 350 and 500 cc heavyweight singles, this book has had considerable extra material added by the publishers, Bruce Main-Smith Ltd. I have included an expanded WD-G3 and WD-G3L section which also features the factory illustrated spare parts lists in full on the military 350's; my thanks to Mr J.C. Martin of Leighton Buzzard for the loan of a set of mint-condition lists for this purpose.

There is also a greatly increased amount of tabular information not found in the original Temple Press edition.

The machines covered are of course those the factory came to call (at a later date) heavyweights, to distinguish them from the lightweight 250 and 350 cc ohv singles with their Phil Walker designed engines, gearboxes and frames introduced in June 1958 under both AJS and Matchless brand names by Associated Motor Cycles Ltd, then of Plumstead Rd, Woolwich, London SE18. The heavyweights can be instantly identified by their usage of a conventional oil tank behind the engine. The lightweights used no oil tank as such, lubricant being carried dry-sump-wise in a reservoir cast integrally with the crankcases.

Though there are differences between early postwar AJS and Matchless heavyweights — notably the positioning of magneto and dynamo — this workshop manual will serve reasonably well for AJS too. Cams as manufactured by AMC were dual marked for both engines. Otherwise the motors were broadly similar and of course the cycle parts were identical other than for insignia and detail differences attendant on dynamo/magneto mountings and drives.

Both types of Burman box are dealt with in full. The AMC gearbox was not phased in until April 1957 and is outside the scope of this manual — REG HIDE, Editor.

1. DECARBONIZING THE ENGINE

Beyond the limit of periodic maintenance and running adjustments, the work involved in decarbonizing a motorcycle engine is likely to constitute the first venture by the owner into the rather deeper technicalities of his machine. It is necessary, on an average, every 5,000 miles or so, to clean away carbon deposit from the inside of the power unit — just as one would clean a domestic flue and get more efficient combustion thereby. The job is an interesting one and usually not too difficult to be carried out with the tools in the kit plus the few additional items listed.

The engine should be decarbonized only when it shows a definite sign of requiring attention. A gradual loss of power, poor compression, difficulty in starting, combined with an increase in petrol consumption, are all signs that decarbonizing is necessary. Conversely, some owners prefer to decarbonize at fixed intervals of between 5,000 to 8,000 miles.

The risk in prolonging the interval between decarbonizing the engine is the possibility of exhaust-valve burning.

Checking the compression from time to time will enable the owner to decide if compression is satisfactory or otherwise. It is imperative that the push-rod adjustment is correct, also that the throttle is fully open when this check is made.

As work of this kind is usually carried out at week-ends, have ready the necessary tools and spares, so that it can be completed without delay.

Suggested equipment for this purpose is listed below:

(i) Decarbonizing gasket set.
(ii) Valve spring compressor.
(iii) Short length of rubber tubing with a ¼-in.-diameter bore with a nail through one end to act as a tommy bar.
(iv) Scraping tool, such as a cheap 6-in. steel rule with the corners ground off.
(v) Grinding paste, jointing compound, clean rag and washing gear.

Dismantling

To start dismantling, remove:

(i) Petrol tank and petrol pipe.
(ii) Exhaust pipe with silencer attached to it.
(iii) Sparking plug after detaching H.T. cable.
(iv) Throttle and air slides, leaving the needle in position. (Wrap these parts in clean rag and secure them to the handlebar lug to avoid possible damage.)
(v) Rocker-box oil pipe; use two spanners, one for the pipe nipple nut, the other to prevent the union from turning.
(vi) Cylinder-head steady stay, if used.
(vii) Valve-lifter cable (for engines after 1948).
(viii) Three nuts and washers securing the cover for the rocker box; take off the cover, turn the engine until both valves are closed then release all bolts securing the rocker box to the cylinder head.

Tilt upwards the right side of the rocker box and extract the two long push-rods. The rocker box can now be lifted off.

Whilst the two push-rods are identical, it is preferable to refit them in the original position. They should be marked suitably for correct order of replacement. Remove:

(ix) Two valve end caps (for engines before 1949), then the four cylinder-head holding-down bolts; the cylinder head can now be taken away.

If it is difficult to separate the cylinder head from the barrel, place a short piece of wood under the exhaust port and give the free end a series of light blows to cause separation. Remove:

(x) Push-rod cover tubes; watch for a thin steel washer which may be fitted on each tube below the sealing rubbers.
(xi) Carburetter mixing body and float chamber attached. This can be dealt with later.

In all probability the rocker-box gasket or pieces of it will stick to the cylinder head. These can be removed with the steel rule previously mentioned, taking care to ensure that particles do not obstruct the oil drilling in the cylinder head.

Before removing the valve springs and valves, scrape the carbon deposit from the cylinder-head sphere, also from the heads of both valves. The small amount of carbon remaining can be removed after the valves have been extracted.

To remove both valves, a valve-spring compressor is required. The springs should not be compressed unduly and only sufficient to extract the valve collets. A sharp, light blow on the valve collar will help to separate the collar from the collets.

On the 500 cc models both valves are similar in size, but different in material. Valves are marked IN or EX on the valve end above the collet groove. On the 350 cc models the inlet-valve head is larger in diameter than the exhaust.

With valves removed, scrape off the residue of carbon from the cylinder head, remove also all traces of burnt oil or carbon from inside the exhaust-valve guide, using a piece of emery cloth (most important on engines made *before* 1949), then get rid of all particles of carbon from the ports and valve guides before starting to grind-in the valves. Scrape the exhaust-valve stem and head; if emery cloth is used on the valve stem, clean and polish with an up-and-down movement, not rotary, as the valve stems are hard-chromed during manufacture.

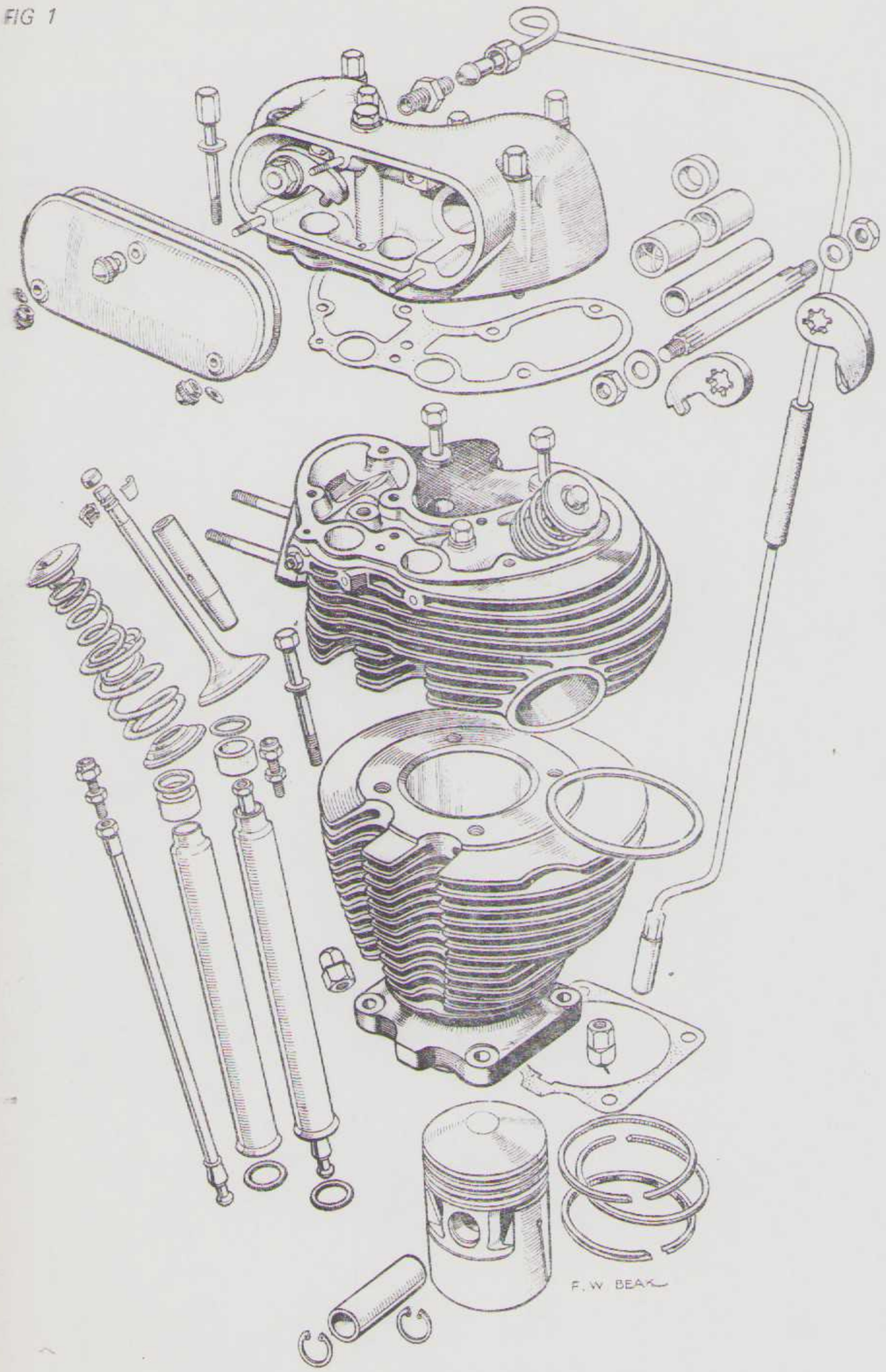
A short piece of rubber tubing of ¼ in. internal diameter, pushed over the end of the valve, is a suitable tool for valve grinding.

To grind the valves, apply a little fine-grinding paste on the valve face, insert the valve into the head and press the rubber tube on to the valve end. Holding the rubber tubing, pull the valve lightly on to its seating and turn the valve forward and backwards, raising the valve occasionally off its seating, and continue the process until the grinding compound ceases to "bite."

When an even matt surface is seen on both the valve and the seating in the head, grinding is complete.

Badly pitted valves, or valve seats, should be reseated by refacing the valve and recutting the valve seat in the cylinder head. The valve angle is 45°. Excess valve

FIG 1



Top-half components of the Matchless WD-G3L, circa 1941

grinding must be avoided, particularly as the valve seats in light-alloy heads are not replaceable.

After valve grinding, wash the head and valves in petrol, check oil passages in the valve guides and ensure that all trace of grinding paste is removed. Pass a piece of non-fluffy rag through each valve guide in turn, one way only, and then squirt clean oil through passages in the head for guide lubrication.

Check the valve springs for free length. If the free length has decreased $\frac{1}{16}$-in. or more, fit new springs.

Oil both valve stems and reassemble with springs, taking care that both collets are correctly located in the two grooves on the valve stem.

To check if the valves are seating correctly, wipe off oil from both valve heads and the sphere of the cylinder head. Hold the head with the exhaust port vertical and nearly fill the port with petrol. If after a few minutes petrol does not seep past the valve, the seating is in order. Empty out the petrol, and if petrol is spilled into the sphere of the head wipe it dry and repeat the test for the inlet valve, after which the head can be put aside.

Set the piston on the top of its stroke, carefully scrape off carbon formed on the piston crown, using the recommended tool. The ridge of carbon formed in the cylinder barrel should also be removed. Afford a little time in which to remove the particles of carbon trapped in the gap formed by the top land of the piston and cylinder wall.

If the cylinder is removed to examine piston rings for gas leakage, do not remove the rings unless it is necessary. Gas leakage is indicated by black or brown portions on the ring bearing face.

Renew the cylinder-base gasket before refitting the cylinder.

Reassembly

The use of new gaskets is most desirable if one is to avoid again taking down the engine after reassembly in order to rectify oil leaks and a leaking cylinder-head joint. Cylinder-head gaskets of the solid-copper type can be used again if not distorted or showing ovality in the bolt holes, by heating them until cherry red and then plunging into cold water. This will make the gasket ductile. Renew the two bottom push-rod tube rubbers.

Start assembling by:

(i) Turning the engine until the piston is on the top of its stroke with both tappets down.
(ii) Place new sealing rubber over each tappet.
(iii) Pull out and discard the two sealing rubbers for the push-rod tubes in the cylinder head. Watch for the steel washer on top of each rubber; press new rubbers into position, apply a little jointing compound on the top end of each push-rod tube and insert them into the head with a rotary motion.
(iv) Clean the threads for the cylinder-head bolts and apply a little graphite grease to facilitate subsequent removal.
(v) Put in position the cylinder-head gasket and place the cylinder head and cover tubes into the cylinder barrel.

Some care and patience is needed at this stage to verify that the head gasket is located accurately when the head bolts are passed through the cylinder head. Lift the head slightly and see if the bolts go through the four gasket holes correctly, then tighten down the head bolts diagonally until all four are firmly tightened. If a

torque spanner is available, set it to 36 lb.ft.

Note: On early models the space between the carburetter air intake and oil tank is restricted; it is therefore preferable to fit the carburetter to the cylinder head before refitting the head and *after* dealing with the carburetter as detailed later.

Oil both push-rod ends before placing them in the push-rod tubes.

A new rocker-box gasket must be used, and this can now be placed on the cylinder head. On engines made before 1949 there is a projection on the gasket with a hole in it which must register with the oil-feed hole in the cylinder head lubricating the inlet-valve guide.

Refit the two valve end caps (on engines *before* 1949).

Clean both faces of the rocker box; fit the centre rocker-box bolts first, put the rocker box into position, tilt it and engage the push-rods with the two rocker arms, tighten lightly the centre bolts, fit the remaining bolts and tighten all down evenly and diagonally.

Remember that a soft gasket is used and exercise care by not over-tightening these bolts, which may stretch or break if undue force is used.

Both valves *must* be closed when rocker-box bolts are tightened, and with the engine in this position adjust push-rods so that there is no noticeable up-and-down movement with free rotation. For engines with iron cylinder heads this adjustment is made with the engine cold.

The petrol tank may be replaced temporarily so that the engine can be run for a short period to settle the valve gear when a final adjustment can be made after the engine has cooled down. On engines with alloy heads make this adjustment with the engine reasonably warm.

Finally, before fitting the petrol tank and the rest of the parts removed, adjust the throttle and air cables to take up slack; neatly arrange these cables, the H.T. wire and lighting harness, which should be attached to the frame top tube with clips or adhesive tape.

Avoid over-tightening the petrol-tank fixing bolts and secure these with copper wire run through holes in tank bolts, thus joining front and rear bolts in pairs.

2. SERVICING ENGINES

Heavy Oil Consumption

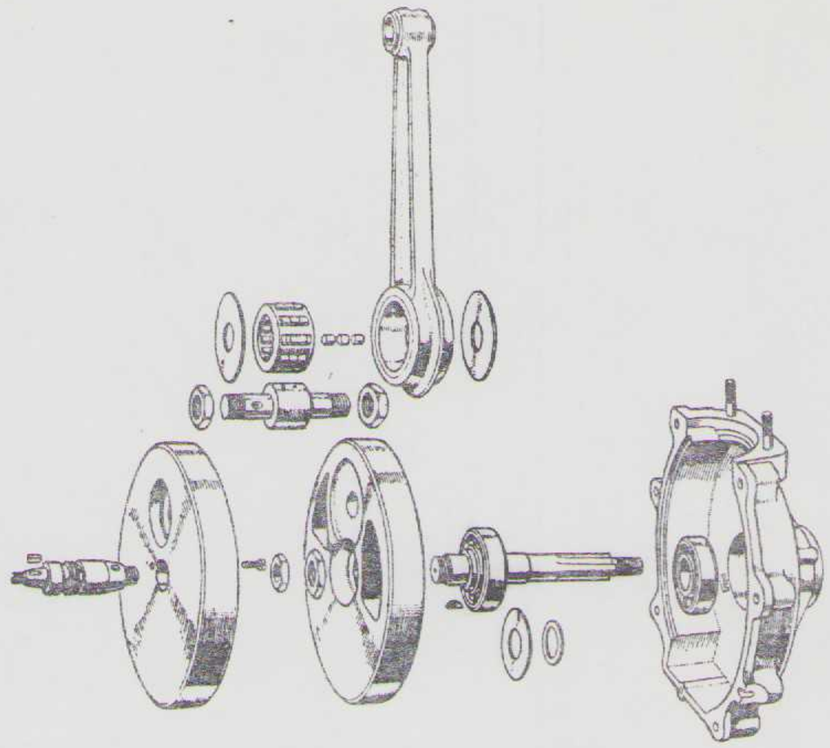
If the machine has covered considerable mileage with a gradual increase in oil consumption, the cause can be due to worn or broken piston rings, cylinder wear, or a combination of both.

The normal ring gap is 0.006 in. with a permissible maximum of 0.030 in. The ring clearance in its groove is 0.002 in.

Should cylinder wear exceed 0.008 in., the cylinder should be rebored and a suitable oversize piston used.

When fitting new piston rings a chromium-plated compression ring for the top ring groove should be used, since this will minimize cylinder wear. These rings, when new, have a slightly tapered exterior and are marked with the word TOP on one side to indicate assembly position.

FIG.



Bottom-half crankshafts with drive-side crankcase. (Above) For 1945-1954 models. (Below) For 1955-on

FIG.

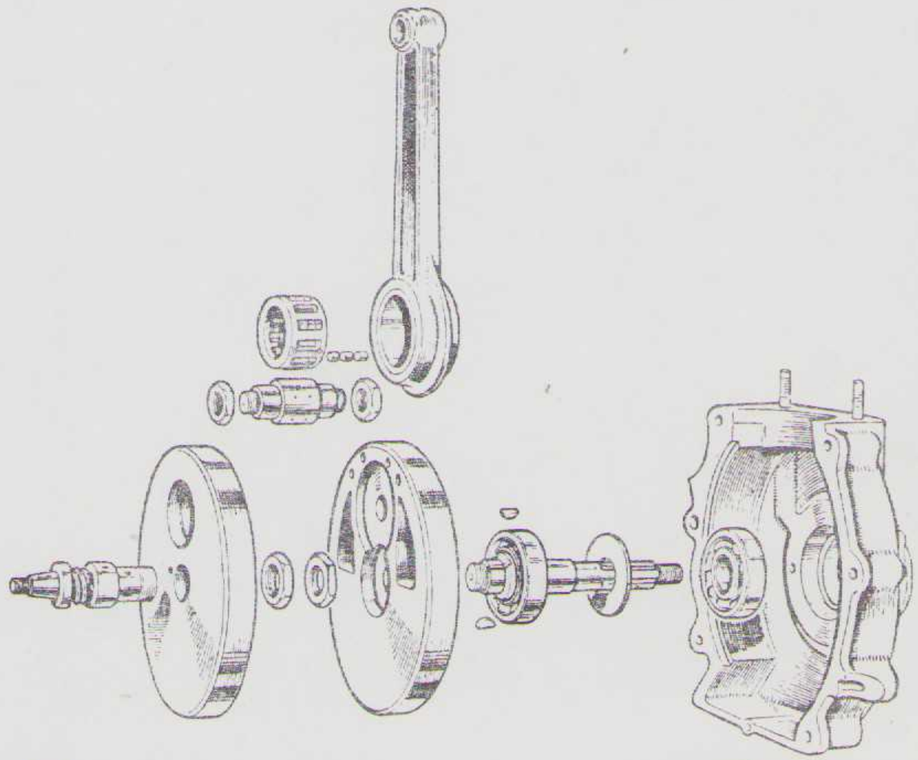
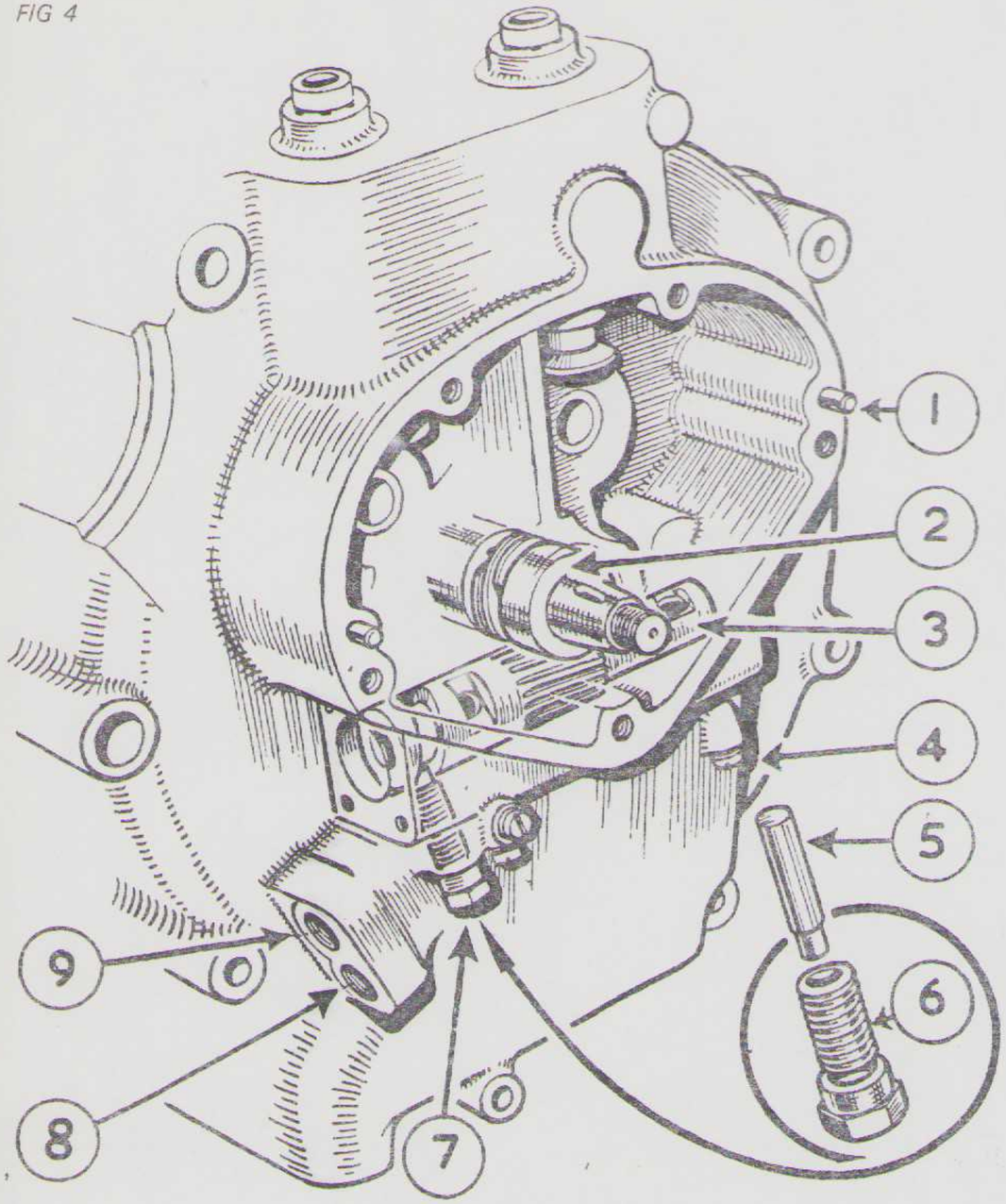


FIG 4



Inset is the fixed guide screw which engages in the scroll grooved in the plunger body whereby reciprocating action is added to the rotation of the plunger

1. *Dowel peg, locating timing-gear cover*
2. *Timing-side flywheel axle with integral gear for driving oil-pump plunger*
3. *Oil-pump plunger*
4. *Screw (one of three)*
5. *Guide pin*
6. *Screwed body for guide pin*
7. *Guide pin in position engaged in profiled cam groove of plunger*
8. *Tapped hole (for oil-feed pipe to pump)*
9. *Tapped hole (for pipe returning oil to oil tank)*

An incorrectly set oil-regulating screw, which controls oil supply to inlet valve, can affect oil consumption. The correct position for this screw is half a turn open from the fully-closed position. Worn valve guides will allow oil to enter the combustion chamber.

Evidence of an excessive amount of oil in the valve-spring chambers can be due to oil building up in the push-rod cover tubes on early-type engines.

The use of a later-type tappet guide with six slots, described in Chapter 3, "Overhauling the Egine," will enable oil to drain into the timing chest more freely.

Excessive Smoke on Starting

The cause can be due to the details given for heavy oil consumption, or excessive oil in the crankcase due to bad scavenging; alternatively, oil seeps into the crankcase when the engine is stationary. Bad scavenging can be caused by an air leak between the cap covering the rear end of the pump housing or obstruction in the oil passage from the sump to the pump.

In the event of oil seepage, this is usually due to a worn or scored pump-plunger housing in the crankcase.

To decide if seepage occurs, use a dipstick to measure the oil level in the tank, then check the oil level again after the machine has been standing overnight. If the level has fallen the timing-side crankcase should be sent to the manufacturer for examination and possibility of bushing the pump plunger bore.

Restriction in the oil-tank filter will affect the oil return from the sump.

Oil Pump Plunger

This part of the engine should not be disturbed unless the crankcase is dismantled or the oiling system becomes defective. The small hexagon bolt housing the pump-guide pin, situated at the rear end of the plunger housing, is often mistaken for a drain plug. If this bolt is unscrewed, either intentionally or unintentionally, the pump plunger will be damaged beyond further use when the bolt is tightened if the guide pin is not correctly located in the groove machined in the plunger.

To ensure correct location the cap at the rear end of the plunger housing should first be removed. If a short piece of spoke or stiff wire is inserted into the hole drilled in the plunger, this can be moved slightly inwards and outwards during the process of screwing home the pump-guide pin bolt by hand, and finally tightening it with a spanner when correct location is effected.

Excessive tooth wear in one particular position indicates a restriction in the feed line. This can be due to a blocked oil passage in the timing-side axle, the crankpin or an obstruction in the rocker-box oil-feed line. Slight uniform tooth marking is normal on engines that have covered a considerable mileage.

If the pump plunger is damaged after an engine overhaul, the timing-side axle or crankpin are incorrectly located (*see* Chapter 3, "Overhauling the Engine").

If all the teeth are badly damaged the main-bearing spacing washer may be worn (*see* the section on "Flywheel Assembly.")

Rocker Box Oil Supply

If the oil supply to this part of the engine is gradually reduced or stops entirely, wear at the end of the pump guide pin has developed and a new pin should be used.

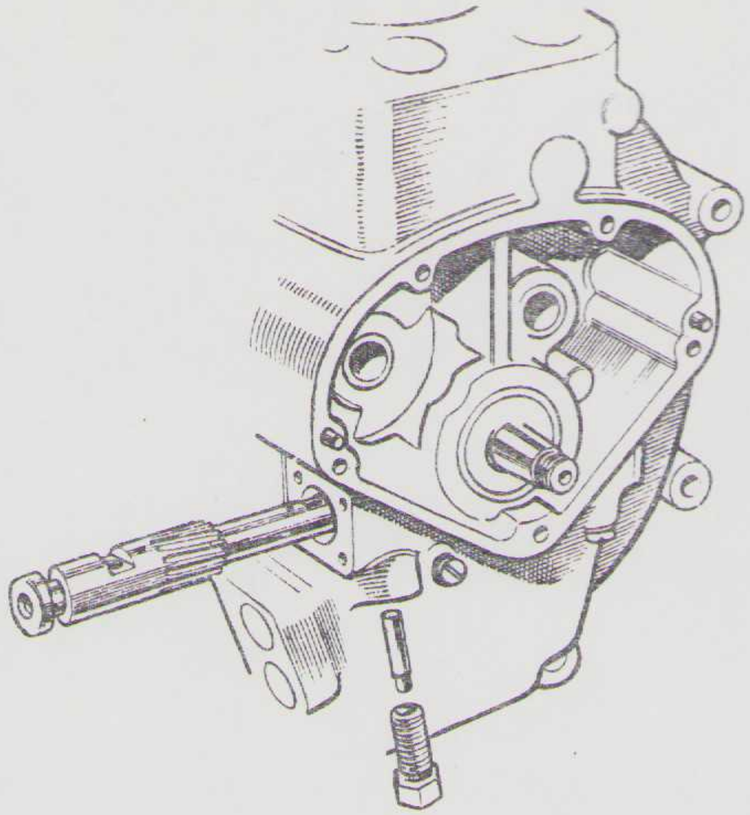


FIG 5

Correct assembly of the oil pump. The spiral groove at the end of the pump plunger must mesh with stationary peg shown at the bottom of the sketch; the plunger should both rotate and reciprocate when the engine is turned by hand

An incorrectly located paper gasket used between the front pump end-cap and crankcase will also stop the oil supply.

Crankcase Release Valve

This valve will be found on the driving-side crankcase, behind the primary chaincase, and has a short copper pipe attached to it. The valve is a steel disc or diaphragm, retained in the valve body, which has a serrated seat; the disc moves towards the serrated seat as the piston descends, allowing pressure in the crankcase to escape into the atmosphere.

If the disc is trapped between the valve body and the crankcase it will not operate and will cause oil leakage from engine joints. It will also cause oil to accumulate in the push-rod cover tubes and cause the engine to smoke badly.

If this valve is dismantled, place a little grease on the serrated seat to retain the disc in position whilst the valve is refitted.

Oil Leaks

First ascertain the exact position of leakage as oil can run down the back of the push-rod cover tubes and give the impression that the leak occurs at the cylinder-base joint.

Oil leakage at the cylinder base can only be due to loose cylinder nuts or a damaged paper gasket provided that the crankcase face is not bruised or otherwise damaged.

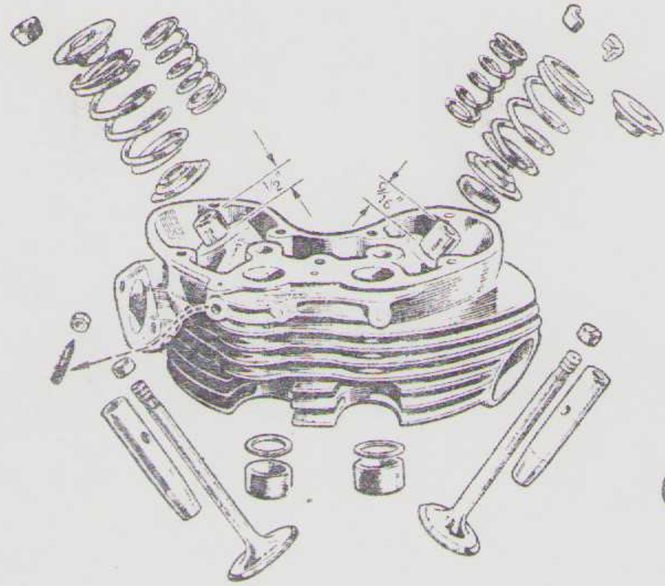


FIG 6

The oilways in the valve guides and in the head must align

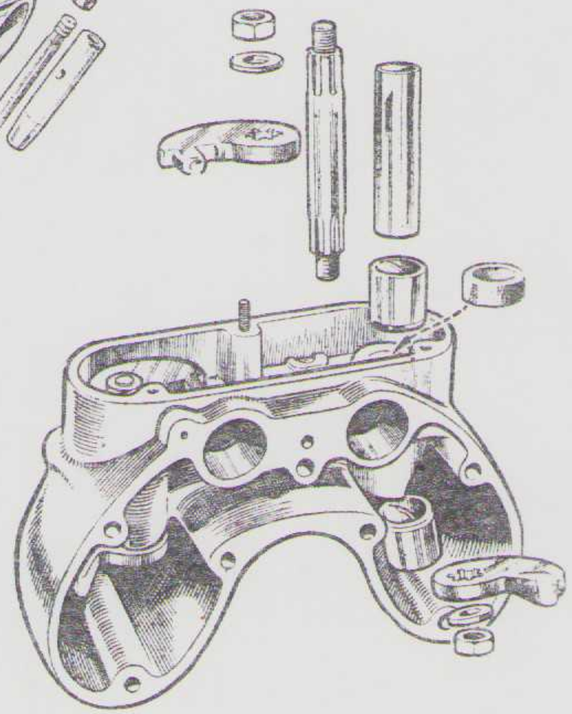


FIG 7

Part-disassembled arrangement of the Matchless oil pump

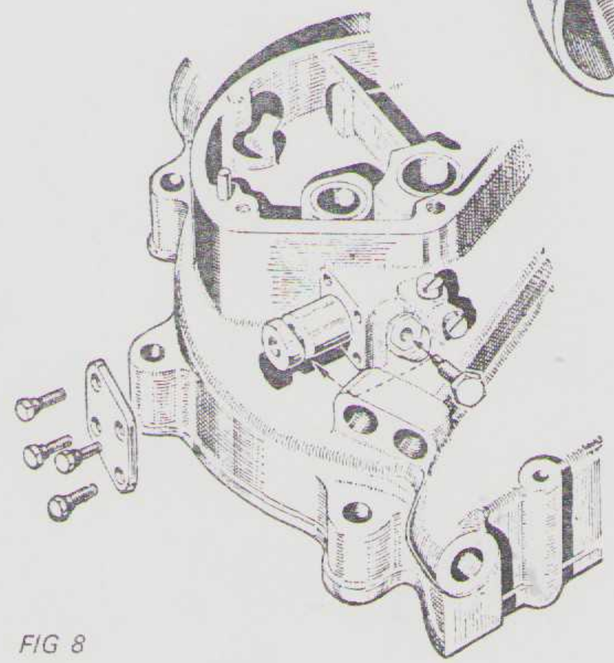


FIG 8

Defective rubber sealing rings at the top and bottom of the push-rod cover tubes will cause oil leakage. If the cover tubes can be moved, there is insufficient pressure on the oil seals.

To remedy, fit a $\frac{3}{64}$-in. steel washer on the reduced end of the cover tubes below the top sealing rubbers in the cylinder head.

An oil leak from the metal cap in the timing cover can be cured only by fitting a new cap. Pierce a hole in the cap and prise it out, wash the aperture with petrol, apply jointing compound on the outside rim of the cap and tap it into position. Let the jointing compound set before starting the engine.

Exhaust Valve Seizure or Sluggishness

The symptoms of this trouble are misfiring — the engine cuts out with a sudden increase in push-rod noise, usually after driving fast or after climbing a gradient. Engines with light-alloy heads are not usually affected with this trouble as the cylinder-head temperature is lower under normal driving conditions.

A heavy formation of carbon or burnt oil on the exhaust-valve stem and in the guide bore causes the valve to become sluggish and possibly to seize when the engine temperature increases.

To remedy, the head must be removed from the cylinder so that all carbon or burnt oil deposited on the valve stem and its guide can be removed (*see* Chapter 1, "Decarbonizing the Engine"). Reducing the oil supply will prevent a repetition, which can be effected by inserting a short piece of $\frac{3}{16}$-in. outside diameter tube into the hole in the rocker box, which feeds oil by gravity to the exhaust valve. The tube should protrude $\frac{3}{16}$-in. to ¼-in. above the rocker-box case.

As an alternative, a copper or aluminium plug with a small flat filed on it can be inserted into the oil hole in the cylinder head, which registers with the exhaust-valve oil-feed hole in the rocker box.

Hairpin Valve Spring and Collar Wear

Engines made from 1949 up to 1953 are most likely to be affected by this kind of wear and then usually the inlet spring only shows signs of it. This can be prevented by increasing the oil supply to the inlet-valve rocker arm.

To modify, enlarge the oil hole drilled in the boss for the rocker axle to $\frac{3}{16}$-in. Obtain a metering plug from the manufacturer, Part No. 018890, and insert this into the enlarged hole. This plug has a small hole at one end; insert this end first and tap the plug home. A further light tap with a centre punch will prevent the plug from moving.

This adjustment reduces the oil supply to the exhaust valve, which is already generous, and increases the oil feed to the inlet rocker. Later-type rocker arms, valve end only, have a groove machined on the face of each rocker to convey oil to the valve end and valve-spring collar.

Wear on Valve Ends and Rockers

Wear on the valve-stem tips will certainly take place if engines made before 1949 are used without the hardened valve end-caps. Engines made from 1949 are fitted with heat-treated valve-stem tips and are of a different overall length (*see* Tables). If the wear is slight the valve, after removal, can be turned 90° to its original position, as wear by contact with the rocker forms a groove across the valve end.

A permanent cure is to grind $\frac{1}{32}$-in. off the valve end and employ the hardened valve-end caps used on earlier-type engines.

The oil modification to the rocker box should be included if the engine is made before 1954. If the rocker is slightly worn it can be stoned, otherwise replaced.

VALVE LENGTH

Model	cc	Inlet Exhaust
1946-48	350	$4\frac{1}{16}$-in.
1946-48	500	$3\frac{15}{16}$-in.
1949-57	350	$4\frac{3}{16}$-in.
1949-57	500	$4\frac{1}{16}$-in.

Valve Guides

All types are a force fit in the cylinder head and the guide protrusion away from the port is of paramount importance. (*See* overleaf.) They are made from chilled cast iron, are hard and somewhat brittle, therefore care to avoid breaking the guide during the process of removal or refitting is most necessary.

To remove guides on iron cylinder heads, clean off burnt oil from the guide, where it protrudes above the port, with emery cloth. With the head supported on a bench, use a suitable drift to drive out the guide, or use a hand press if available.

When dealing with alloy heads, the head must be heated before attempting to remove a guide, otherwise damage by enlargement of the guide bore will take place. First ascertain if a circlip is fitted to the exhaust guide; this is a standard fitting in all models after 1955. If a circlip is fitted, heat the head, tap the guide up through the port so that the circlip can be prised out of its groove. Reheat the head and follow the instructions given for iron heads.

Refitting Valve Guides

To ensure that the guide starts parallel with the guide bore, insert the valve into the head, press the valve firmly on to its seat. Retaining the pressure, place the guide over the valve and ensure that the oil hole is properly aligned; then press the guide down as far as possible and, finally, tap the guide home to the specified protrusion.

Loose Valve Guide

Removing the exhaust-valve guide on alloy cylinder heads without pre-heating is usually the cause of this trouble. As a new head is expensive, a satisfactory repair can be made by copper plating the external diameter of the guide to the extent of 0.003 in. to 0.004 in. to close up the interference fit. Use a guide machined for a circlip, together with a later-type valve-spring seat. If a radius is ground on the valve-spring seat to clear the circlip, the original seat can be retained.

Valve Guide Protrusion

Before 1948.	Inlet-valve guide, ½-in.; exhaust-valve guide, ⅝-in.
After 1948.	Inlet-valve guide, ½-in.; exhaust-valve guide, ½-in.

Camshaft Wear

If the peak of either cam is bruised or badly worn, look for overloading on the valve-operating gear. The usual reason is that the valve springs are coil-bound when the valve is at full lift (coil-type springs) or the valve-guide protrusion is incorrect, causing the spring collar to foul the guide.

To check valve motion, turn the engine until the valve is at maximum lift. Place a box key on the nut retaining the push-rod rocker arm and endeavour to open the valve further; if further movement cannot be made the valve springs are solid or coil-bound and should be exchanged for a set of the correct type.

If the cams are badly damaged, check also both tappets for wear and *see* Chapter 3, "Overhauling the Engine," for removal drill.

Piston Slap

Engine noises of various kinds are often attributed to piston slap, which is caused only by excessive clearance between the piston and the cylinder. Piston slap is audible when the engine is pulling, or on changing up to a higher gear, but not when the engine is running light or without load.

Reboring the cylinder and using an oversize piston is the only remedy for a noise of this kind. The wire-wound piston which has been used for some time permits the use of a close running clearance of 0.001 in. with a reduced risk of piston seizure.

Engines made before 1947 can use this type of piston if the connecting rod is exchanged for a later type, as there is a difference of ½-in. in the two connecting-rod lengths.

The small-end bush is not usually affected by premature or undue wear; therefore piston slap should not be confused with a slack small-end bearing.

Big-End Noise

If a light rattle develops, which becomes inaudible when the engine is pulling or under load, a little movement in the big-end assembly is usually the cause.

This does not indicate that the bearing is completely worn out, for it is often possible to cover a further 8,000 to 10,000 miles without effect on the engine efficiency.

This noise can develop when there is an accumulated clearance between 0.0015 in. and 0.002 in. in the big-end assembly. It is possible that a new set of rollers will absorb movement; alternatively, fit rollers plus 0.001 in. oversize after lapping the connecting rod (*see* Chapter 3, "Overhauling the Engine"), provided the roller path on the crankpin and liner are undamaged.

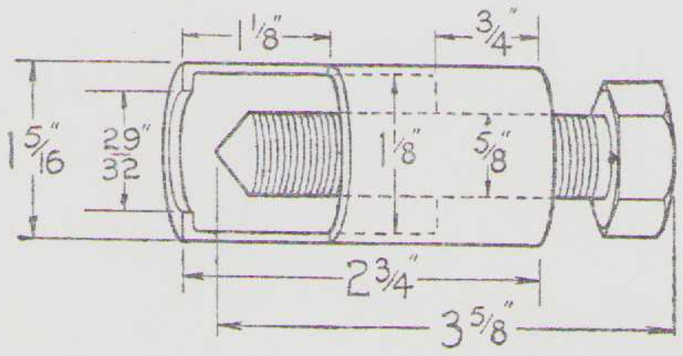


FIG 9

Details of one of the few special tools, a main-shaft timing pinion extractor, suggested by the makers

Timing Gear Noise

This noise can develop when there is *(a)* an accumulated clearance between the camwheels and small timing pinion, *(b)* end-float between the cam which drives the magneto and the crankcase, and *(c)* wear on the bushes for the cams or a worn timing-shaft bush, which would affect teeth engagement on the timing gear.

First check for end-float by removing the magneto chain cover, run the engine to develop the noise and press on the end of the shaft that drives the lower magneto sprocket with a piece of wood or screwdriver handle. If the noise stops there is end-float, which is cured by removing the magneto drive and the timing-gear cover and fitting a shim washer either 0.005 in. or 0.010 in. thick over the shaft for the cam wheel before refitting the timing-gear cover.

Backlash can be verified by reproducing the noise and applying pressure on the top run of the magneto driving chain with a wooden screwdriver handle. If the noise stops, try first a new small timing pinion before replacing the cam wheels. If the noise persists, check for worn bushes.

Noise in the Rocker Box

A little end-float in the rocker axles is of no consequence. This movement can be taken up by tapping outwards one of the two bushes after removing the rocker arm, axle and sleeve. The rockers should move freely if the bushes are correctly located.

A distorted hairpin-type valve spring may make contact with the rocker box. Reversing the position of the spring may have the desired effect. Look also for a groove on the valve spring at the point where the rocker operates — this can also cause a noise. A slight radius ground on the rocker arm at the position of contact will prevent a recurrence. If the spring is badly grooved it should be discarded.

3. OVERHAULING THE ENGINE

Provided workshop facilities, together with an adequate supply of box keys and spanners are available, no great difficulty should be experienced in dealing with work of this kind.

Some thought on preparation for overhauling is desirable by having available such items as an extractor tool for the dynamo sprocket, a small timing pinion extractor, a spare parts list, a complete gasket set, jointing compound, preferably

of the type that does not flake, such as "Wellseal', wooden boxes to accommodate parts as they are removed. When dealing with engine work, cleanliness is vitally important both in the handling and fitting of moving parts.

Invariably the under surface of the crankcase is oily and impregnated by road grit, so start by cleaning the exterior of the engine before dealing with the interior; detergents or solvents are obtainable for this purpose.

A careful note as to the position of bolts, distance pieces and washers should be made during the process of dismantling; nuts and washers replaced on the bolts as they are removed will save time and patience when the machine is put together again.

Removing the Engine

Commence dismantling by following the instructions for decarbonizing the engine.

Proceed to remove:

(i) The outer portion front chaincase and place a tray underneath it to catch the oil.
(ii) The battery and strap securing its carrier to the back half of the chaincase.
(iii) The clutch outer plate with springs and thimbles.
(iv) The circlip and lock washer from the dynamo sprocket. Engage top gear, apply the rear brake and unscrew the engine sprocket nut, using a ring spanner and tapping the free end.
(v) The gearbox mainshaft nut securing the clutch (early type 1-in. across flats, later type 1 5/16-in.)..
(vi) The nut securing the dynamo sprocket nut with a thin spanner on the flats at back of sprocket to avoid bending the armature.

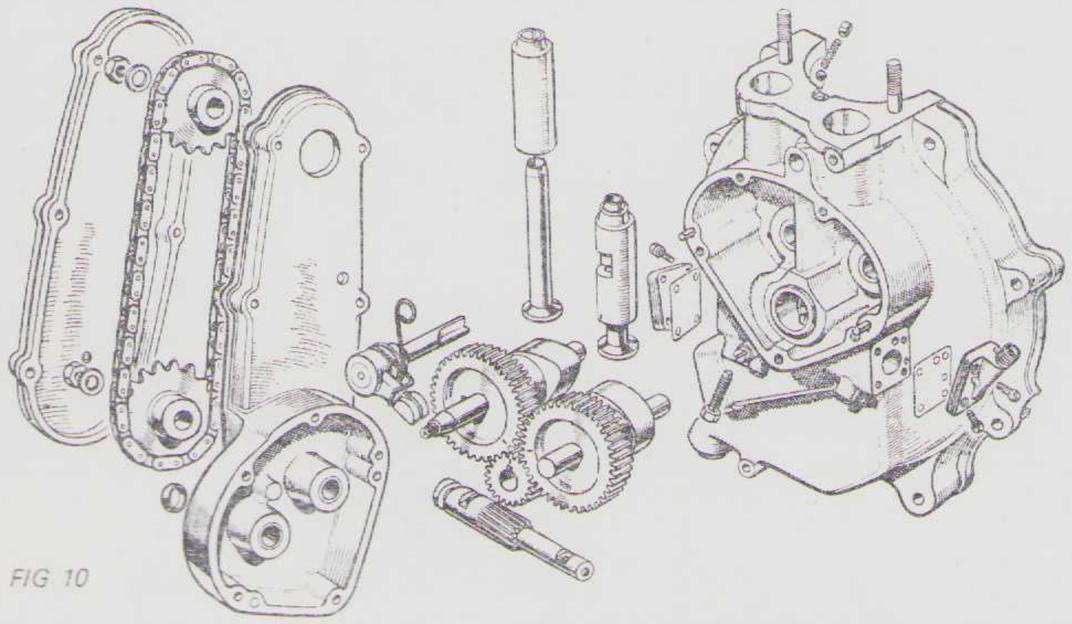


FIG 10

Exploded drawing of timing gear, valve actuating mechanism, and magneto drive. It also shows the oil pump parts, valve lifter parts and timing side crankcase of the WD G3L engine

The timing gear of the engine is a very simple arrangement. Inset are seen the tappets and guides and the oil pump rotor shaft of the WD engine

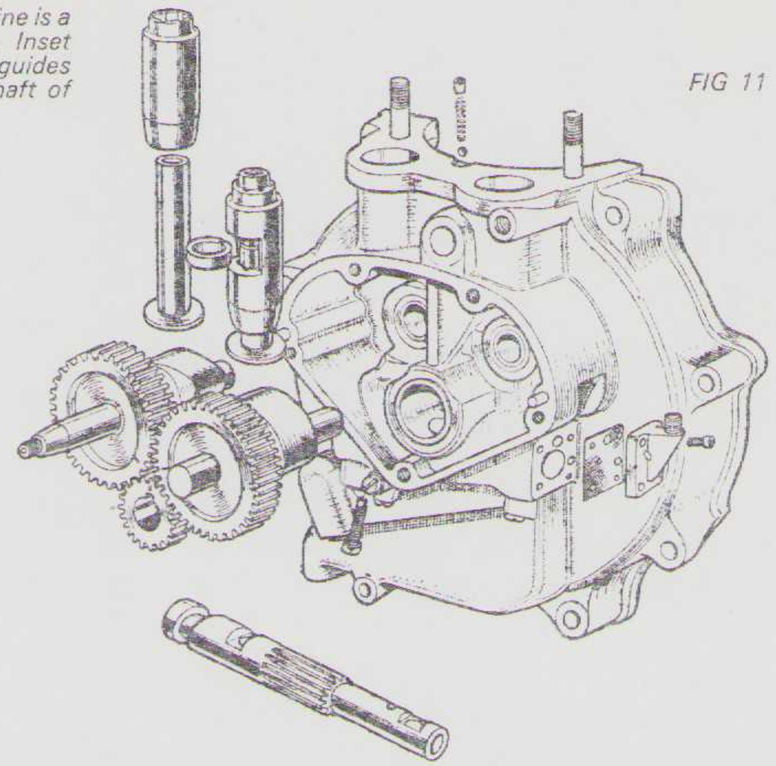


FIG 11

(vii) Disconnect the front chain then take off the dynamo sprocket using wedge-shape tool.
(viii) The clutch assembly; watch for 24 rollers, which will drop out.
(ix) The shock absorber assembly and engine sprocket with the distance piece at the back of it.
(x) The rear portion of the front chaincase; straighten the three tab washers before applying the small box key.
(xi) The bolt securing the chaincase to the engine and identify the location of the two dissimilar distance pieces.

Most of these parts will be oily or messy so keep them in a box away from engine parts.

Drain the oil tank and whilst this is taking place remove:

(xii) Both oil pipes, tank end first, then the rocker-box oil-feed pipe.
(xiii) The magneto chaincase cover.
(xiv) Both sprockets for the magneto chain (magnetos with auto-advance are self-extracting). Use the dynamo sprocket tool for the top sprocket (early models) and a tyre lever (with its end bent at right angles) for the camshaft sprocket.
(xv) The timing cover on the crankcase.
(xvi) Disconnect the ignition control cable (handlebar end), and then remove the magneto platform with the magneto attached and identify the location of the distance pieces where fitted.
(xvii) Remove all bolts passing through the crankcase and loosen the gearbox bolt nuts. It will be easier to lift the engine out of the frame if the cylinder is left in position, but it may be necessary to spring out the front frame down tube when the engine is lifted out.

Note.—When unscrewing the oil-return pipe nut (top nut) at the crankcase end, take care that the spanner does not touch the feed pipe nut (lower nut) thus creating a levering action on the lower nut *which can break the crankcase.*

DISMANTLING THE ENGINE

Thoroughly clean the exterior of the crankcase before it is placed on the bench, then remove the sump plug to drain the oil. Remove:

(i) Both oil-pump end-caps, the pump guide pin, and take out the oil-pump plunger, before attempting to separate the crankcase.
(ii) The small timing-pinion nut which has a *left-hand thread.*
(iii) Both cam wheels.
(iv) The timing pinion.
(v) The bottom crankcase bolt if fitted.
(vi) The cylinder barrel. If a compression plate is used it will come away with the cylinder.
(vii) One circlip only, push out the gudgeon pin and take off the piston. If the gudgeon pin, which is a sliding fit, is difficult to extract, remove burrs round the circlip groove. Wrap the piston in clean rag and put it in a place of safety.

The crankcase can now be separated and the flywheels taken out.

Big-End Assembly

Squirt petrol through holes in the timing-side axle with the object of removing oil from the big-end bearing so that up-and-down movement between the connecting rod and bearing can be detected. Should there be no up-and-down movement but the connecting rod can be rocked sideways (this must not be confused with side clearance between the rod and flywheel), then attention is necessary.

Separating the Flywheels

Remove both crankpin nuts; use a separating tool as shown in Fig. 6, or alternatively an Arbor press, to separate as the crankpin centre is a force fit in both flywheels. Check crankpin roller path and connecting-rod liner for wear or damage.

Flywheel Shafts

Remove the nut retaining the driving-side axle which has a right-hand thread and push out the shaft, which is usually a tight fit, from inside the flywheel.

Take out the grub screw alongside the nut retaining the timing-side axle (engines before 1954), unscrew the nut a few turns and tap the end of the shaft sharply to remove it as it is a taper fit. Take off the nut when the shaft is loose.

Engines from 1954 onwards have a parallel shaft and must be pressed out.

Main Bearings

To remove the bearings, uniformly heat the crankcase and drop it face downwards on to a bench; the bearings [illegible] spacing washers will fall out.

Cam Wheel Bushes

With a two-diameter drift drive out the cam-wheel bushes. The metal cap in the timing cover must be pressed out before the bush behind it can be removed.

Timing-Side Bush

Support the crankcase with a short length of steel tube (1½-in. outside diameter, 1¼-in. internal diameter) placed in the timing chest around the bearing bore in the crankcase, and force out the bush.

If a bush with two diameters is used, support the crankcase and force out the bush from inside the timing chest.

Tappet and Guides

The tappet and its guide can only be removed together. Some difficulty may be experienced as the guides are a very tight fit in the crankcase. Repair shops and the manufacturers use a special tool.

These guides should only be removed when the tappet feet are worn, or when the six-slot guides are to be fitted.

The valve-lifter shaft, if fitted, is removed and the two crankcase halves bolted together to prevent distortion.

Without the special tool, heat the crankcase uniformly and drive out tappet and guide from inside the timing chest.

Rocker Box

To dismantle the rocker box completely, remove both rocker-axle nuts and washers securing the valve-end rockers. Tap out each axle or prise off the rocker. The axle with its loose steel sleeve and push-rod rocker attached can be withdrawn.

The rocker-axle sleeve is mounted on two short bushes with a felt sealing ring between each bush.

Heat the rocker box and press out the four bushes.

REASSEMBLING THE ENGINE

Connecting Rod

A detachable liner is fitted to the connecting rod. Liners sold as replacements are ground internally to allow for contraction when fitted; even so complete concentricity cannot be guaranteed as contraction is controlled by the interference fit of the liner in the rod. To ensure concentricity a lapping tool is used with grinding compound.

If the big-end assembly is correct the rod should just fit over the rollers, with no appreciable side rock.

Flywheel Assembly

Fit the timing-side axle, with the oil hole in register with the hole in the flywheel. A jig can be used for ensuring accurate register. Tap the shaft home (if a taper shaft is used) to prevent it turning while the nut is tightened (do not overtighten the nut). After the nut is in position fit the grub screw.

Where the shaft has a parallel shank use a press to force it home, then firmly tighten the nut. A grub screw is not used with this arrangement.

Insert the crankpin and washer, if fitted, into the flywheel with both oil holes in register and press the crankpin home. Apply oil to the crankpin, fit the cage and fill it with ¼-in. by ¼-in. rollers (a total of 30). Apply more oil to the cage and rollers, fit the other washer, then take up the driving-side flywheel. Press home the shaft, ensure that the Woodruff keys (if two are fitted) do not fall out, and firmly tighten the shaft nut.

Offer up the flywheel on the crankpin and align as near as possible, with a straight edge on both rims, then press the flywheels firmly together. If this process is omitted the flywheels will flex and break the crankpin. Therefore do not rely on the nut pressure. Run down the crankpin nuts evenly to avoid disturbing the centre shaft and firmly tighten both nuts. The torque spanner setting for these nuts is 190 lb. ft.

Set the flywheels to run true with maximum error 0.001/0.002 in. Check the error between centres with a gauge on the shafts as close as possible to the flywheel face.

Crankcase

To fit a new timing-axle bush, support the crankcase and insert the chamfered end of the bush first and press home. The bush will contract when in position; ream to the dimensions given in the Appendix. The long plain bush may need adjustment to obtain the specified amount of flywheel end-float. Insufficient end-float can cause seizure.

The narrow roller bearings and short bush fitted to very early engines are now obsolete. The substitute is a two-diameter bush. The steel sleeve for the roller is retained to locate the new-type bush on the larger diameter.

Driving Side Bearings

Engines made from 1952 up to 1955 have two diameters in the bearing housing, sometimes mistaken for incorrect machining or wear. The outer bearing nearest the sprocket is a close interference fit, the inner bearing is a slight interference fit. This allows the inner bearing when in position to be tapped away from the outer bearing thus preventing end loading and permitting both inner races to rotate independently and freely.

If a bearing that is normally a close interference fit is loose in its housing, the housing can be knurled or a copper deposit 0.002 in. thick used on the outer perimeter of the bearing. The bearing must be completely shrouded, leaving only the perimeter bare, before it is immersed in the vat.

To fit the bearings, the crankcase must be heated. The assembly order with spacing washers is shown in the illustrations.

On the 1955 models one large and one smaller bearing with one spacing washer only are used. Wear on this type of spacing washer will create flywheel end-float and possible damage to the oil-pump plunger. This wear is the result of the rubbing action of the inner race caused by the bearing jamming because of foreign matter.

The driving-side shaft can be used to locate the bearing spacing washers.

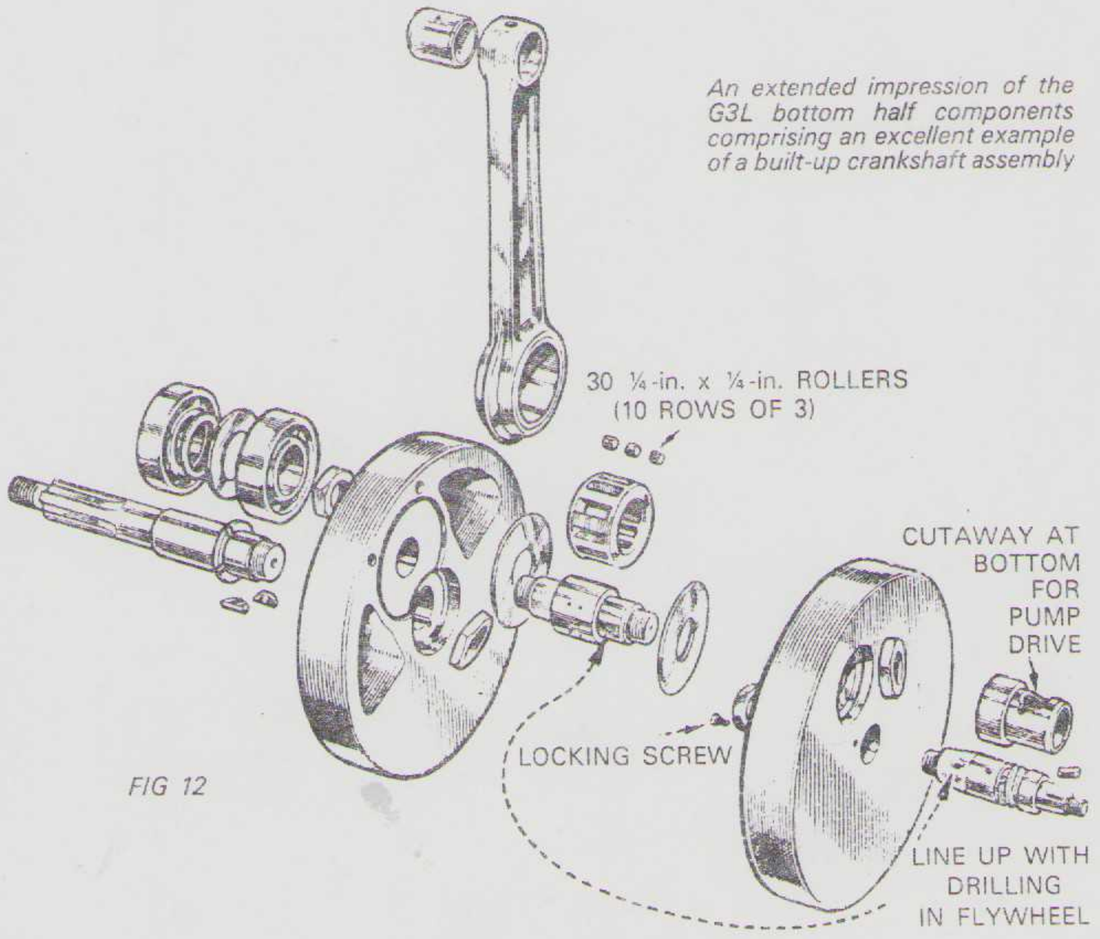
Cam Wheel Bushes

Bushes are fitted chamfered end first, flush with the housing; care should be taken to fit the bush correctly in the timing cover for the camshaft that drives the magneto. A spiral groove is machined at one end of the bush to prevent oil leaking into the magneto chaincase. This spiral groove should be on the outer end next to the magneto drive sprocket. To fit the timing cover to the crankcase use a pilot reamer through both bushes. Take off the timing cover, fit both camwheels and adjust for end play with shim washers, i.e., nil end float with free rotation.

Tappets and Guides

Bolt together both crankcase halves, heat the crankcase, insert tappets in the guides, drive downwards until the guide is flush with the crankcase.

Refit valve lifter if used.



An extended impression of the G3L bottom half components comprising an excellent example of a built-up crankshaft assembly

FIG 12

Rocker Box Assembly

If new bushes are fitted, heat the rocker box and first fit the two inside bushes, then the outside bushes, which should protrude approximately 0.010 in.

Ream the bushes to the dimensions set out in the Appendix, remove swarf and fit new felt sealing rings into the space between the inner and outer bushes.

A taper mandrel or a paint-brush handle can be used to press the rings outwards and into position, otherwise difficulty will occur in entering the rocker sleeve.

Assemble the rockers, firmly tighten the axle retaining nut and washer.

If the rocker is stiff to move, due to a lack of end play, a light tap on the outside rocker-axle nut will move the bush inwards to give free movement. When end play is excessive, take out the rocker-axle assembly and tap the inner bush outwards, to the required amount.

Assembling the Crankcase

Apply some clean oil to the bearings, bushes and tappet guides.

Fit both crankcase halves to the flywheel assembly. Bolt the crankcase together with at least four bolts, also with the bottom bolt if used.

Test the flywheels for free rotation, then check for end-float, minimum 0.020 in. to 0.025 in.

Where a long plain bush is used, it can be pressed either inwards or outwards to allow correct end play. In the case of a two-diameter bush, face back the bush as required.

The oil-pump plunger can now be fitted with care to locate correctly the guide pin.

Fit the piston, with the split in the skirt face *forwards*. Take care to ensure that the gudgeon pin circlip is correctly located.

Apply clean oil to both the piston and cylinder bore, slacken all bolts passing through the crankcase and position the crankcase so that both halves are flush with each other when the cylinder is bolted down.

Fit the small timing pinion.

Re-install the engine by reversing the instructions given for removal.

For details on refitting the cams see the following section.

Camshafts

It is possible to modify by fitting high-lift and racing camshafts. In this case the boss surrounding the timing-side bush on earlier models has to be machined to provide clearance for the higher lift of these cams. Where machines are fitted with a valve lifter in the crankcase, the valve-lifter shaft will require adjusting otherwise the valve clearance and valve timing will be wrong. Valve movement should also be checked. Racing camshafts should not be used on machines fitted with a silencer or loss of power will result. High-lift cams (marked HL) increase the volumetric efficiency of standard models. Cams marked SH are for use with open exhaust pipe.

The valve timing of both require alteration (*see* Chapter 6: "Competition and Scrambles Models") and so will the carburetters if full benefit is to be derived. The manufacturers recommend carburetter bore sizes of $1\frac{3}{16}$-in. (500 cc) $1\frac{1}{16}$-in. (350 cc).

Compression Ratios

The compression ratio of pre-1955 models can now be raised to 7.3 (500 cc) or 7.5 (350 cc). Actually the fitting of a 1956 piston to 1952 500 cc models serves to raise the compression ratio to 7.3 : 1. On pre-1952 models the compression plates can be dispensed with after the ridge formed in the top of the barrel is honed out; it is absolutely essential to do this. The fitting of a new piston to the 350 cc machine (7.5 : 1 and no compression plate) fulfils the same object. No alteration is required to either the ignition timing or carburation. The special piston used on scrambles machines gives a ratio of 8.3 (500 cc) : 9.5 (350 cc) but these pistons are not suitable for standard models.

Plugs recommended are long reach (alloy heads): KLG FE 100: Champion NA 10: Lodge 3 HLN: KLG FE 220. Short reach (iron heads): KLG F 100: Champion L-11S: Lodge 3HN: KLG F 220. These grades provide for a higher heat factor consequent upon fast riding.

Ignition Timing

A careful check is essential and it is recommended that the manufacturer's setting should always be used. Much care is taken to determine these settings and it is extremely unlikely that better ones can be chosen. Excessive ignition advance in these days of high-octane fuel, and consequent ability to run without pinking, produces considerable stresses on the big-end assembly. The importance of correct contact-point setting (0.012 in.) cannot be over-emphasized.

To check ignition timing, set the contact-breaker points at 0.012 in. Remove the rocker-box cover and plug. Turn the engine until the inlet valve opens and then closes and, with a rod, check the position of the piston through the plug hole. Engage top gear in order that the piston can be rocked; use the rear wheel and rotate the engine shaft until the piston is at t.d.c. Mark the rod where it now registers with plug seat and then remove it and make a mark half an inch higher *up* the rod. A cigarette paper should now be inserted between the contact-breaker points; set the ignition lever to *full advance* (A.T.D. units can be fixed in that position with a small wood wedge) and again insert the rod into the plug hole. Turn the engine *back* until the half-inch mark registers with the plug-hole seat. The contact-breaker points should be just about to open at this stage, so freeing the cigarette paper. Half an inch before t.d.c. with the manual control or A.T.D. fully forward is the maximum recommended by the manufacturers. If it is necessary to reset ignition timing, leave the sprocket loose on the camshaft. To remove the sprocket, loosen the nut a few turns and, with the turned-in end of a tyre lever inserted behind the sprocket, lever it off. If it is difficult to remove, tap the shaft end with a mallet whilst maintaining leverage. A.T.D. unit nuts are self-extracting and will present little difficulty.

Oil Filters

Pre-1956 machines were fitted with felt filters in oil tank, giving a cleansing phase during the passage of lubricant from sump to oil tank. A strainer is fitted in the oil feed pipe to prevent extraneous matter entering the feed side. When major engine overhauls have been completed, the oil and filter need attention after a further 500 miles. Change the oil and clean the filter. Attention should be given again after 5,000 to 6,000 miles have been covered.

PRE-1955 CARBURETTERS

Erratic Running at Slow Speeds

Check the pilot jet, for this is usually responsible by being blocked or wrongly set; look for air-leaks, a distorted flange face; or the erratic running may be the result of wrong mixture. Slow-running and mixture control can be improved by opening out the hole drilled diagonally through the mixing chamber to the inlet tract (pilot outlet), using a No. 66 drill (0.033 in.) in conjunction with a watchmaker's hand chuck, or eclipse pin vice No. 121. Great care should be exercised not to use undue force. Remove burrs from the hole.

This alteration is recommended in order to obtain full control on pilot adjustment during the increase of volume of fuel fed to the engine. Pilot-screw adjustment should now be 1½ to 2 turns open. It is essential that positive slow-running is obtained by adjusting the pilot air-control screw before the engine becomes unduly hot. If this adjustment is made with the engine unduly hot, the final setting will be weak. It has been established that positive slow-running is best obtained with the plug gap set at .020/.022 in.

Petrol Consumption

When checking with a view to improving m.p.g. figures ensure that the carburetter is not faulty by reason of ovality in the needle-jet aperture, also that the float is not faulty. Fit a new needle jet and float if in doubt and see that the engine is in good general condition.

Throttle Slide

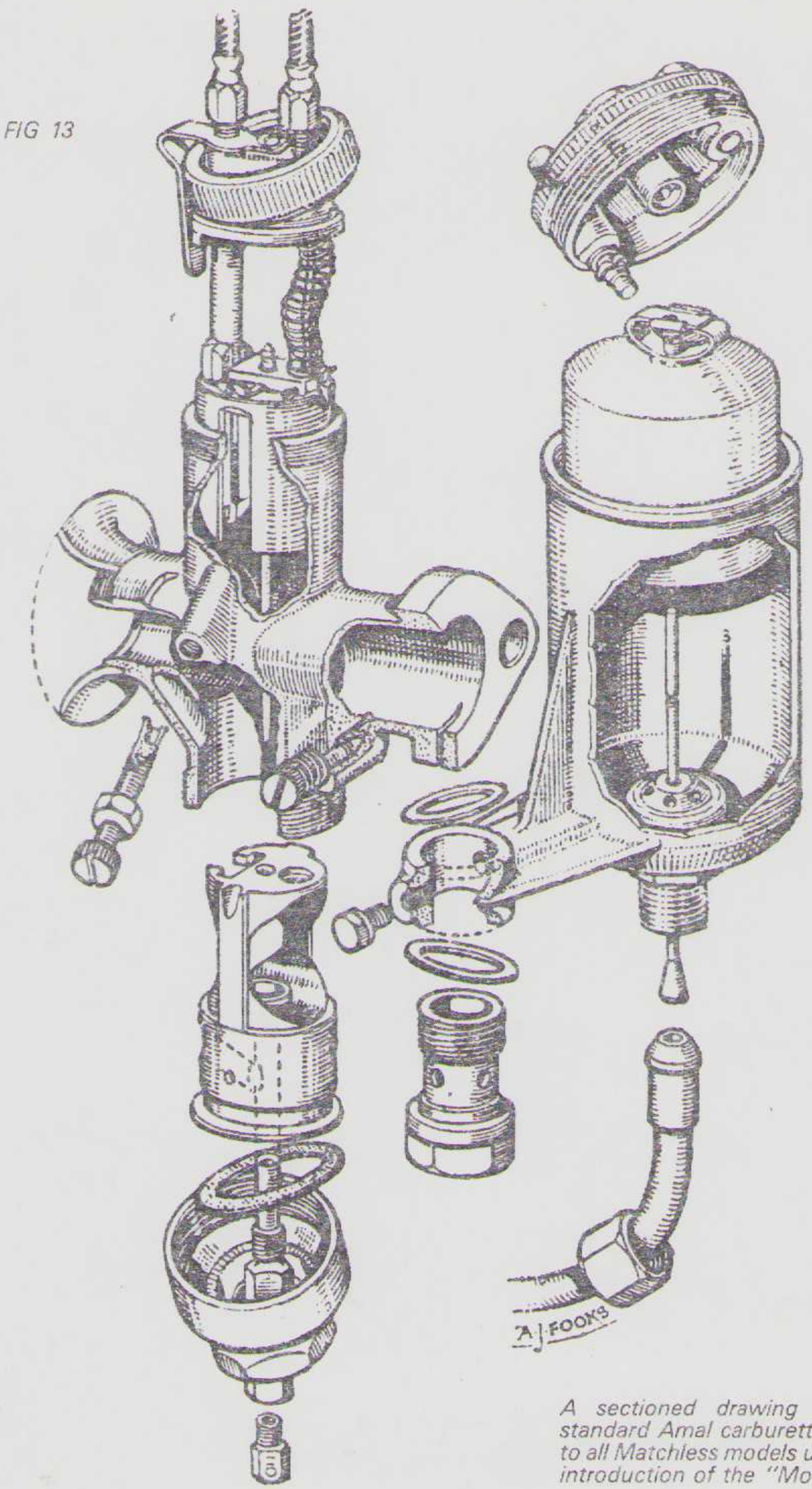
The degree of cutaway is determined by the manufacturers. The slide, as fitted to the standard models, is usually adequate but, if it is intended to alter this, an understanding of the principles involved is desirable.

Slides are marked on the head, the first figure indicating the type, and the second the amount of cutaway in sixteenths of an inch. The mark 29/4, for instance, shows that the amount of cutaway is ¼-in. Using a larger cutaway weakens the mixture; a smaller cutaway enriches. To remedy a weak or flat spot after leaving the pilot phase, use a smaller slide cutaway. This increases petrol consumption, so before changing a slide check that the pilot setting is not weak and thus the cause of the trouble. A surging effect will be noticed at 30-40 m.p.h. if the cutaway is too shallow.

Fuel Consumption

A few hints on this topic may assist the tyro rider. No gain in fuel consumption will be achieved by reducing the main jet size (if the recommended jet is already fitted) except after the throttle is more than three-quarters open. Needle position affects fuel consumption and engine performance only at about 50 m.p.h. or more. But raising the needle improves acceleration. The answer to high fuel consumption is to keep the throttle turned well down.

FIG 13



A sectioned drawing of the standard Amal carburetter fitted to all Matchless models up to the introduction of the "Monobloc"

Silencer Noises

An uneven or explosive exhaust noise is usually due to the effect of a weak pilot setting, revealed when the throttle is nearly closed or closed. If the exhaust pipe is loose in the exhaust port this, also , will cause silencer noise. Check the throttle slide for wear. This has the effect of admitting air additional to requirements, producing a weak mixture. To remedy the loose exhaust pipe, swell out the end with a taper cylindrical wedge.

THE "MONOBLOC" CARBURETTER (1955)

This instrument introduces many new features, among them a removable pilot jet and a combined fuel and mixing chamber. The primary air choke has a compensating action in combination with two bleed holes in the needle jet which serve the purposes of air-compensating the mixture from the needle jet and providing a reserve of fuel for sharp acceleration. Tuning routine is very similar to that for the old-type carburetter and presents little difficulty.

To Remove the Float

Take off the side-cover fixing screws; raise the float off the hinge pins and check for punctures. When re-fitting see that the narrow hinge leg is uppermost.

To Remove the Float Needle

Remove the banjo bolt, washer and filter gauze; unscrew the needle seating and lift out the needle; check the pointed end and seating. Care should be exercised when handling the needle and gauze.

To Remove the Pilot Jet

Remove the pilot-jet cover nut and washer and unscrew the jet with a screwdriver. Ensure that the pilot by-pass and the pilot outlet are clear. On assembly see also that the pilot jet is not over-tightened, for a damaged pilot-jet seating cannot be rectified.

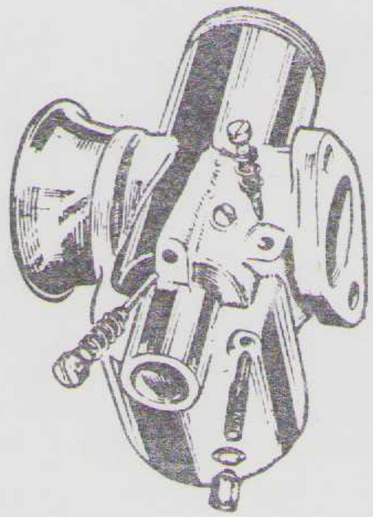
To Remove the Jet Block

Take out the air and throttle slides, the jet holder, complete with needle jet and main jet, and unscrew fully the throttle-slide adjuster. Lift out the jet block from the mixing chamber, watching that the gasket at the base is undamaged, otherwise fuel will leak across the face, resulting in heavy consumption and a rich mixture. When replacing the slide, carefully locate the taper needle in the jet block.

Adjustments

The following sequence should be observed;
First check the rocker adjustment, plug gap and contact-breaker points. Screw home fully the pilot air-adjusting screw, then unscrew it 1½ turns. For engines

(Below) The "Monobloc" body showing removed the slide stop, slow-running screw and pilot jet



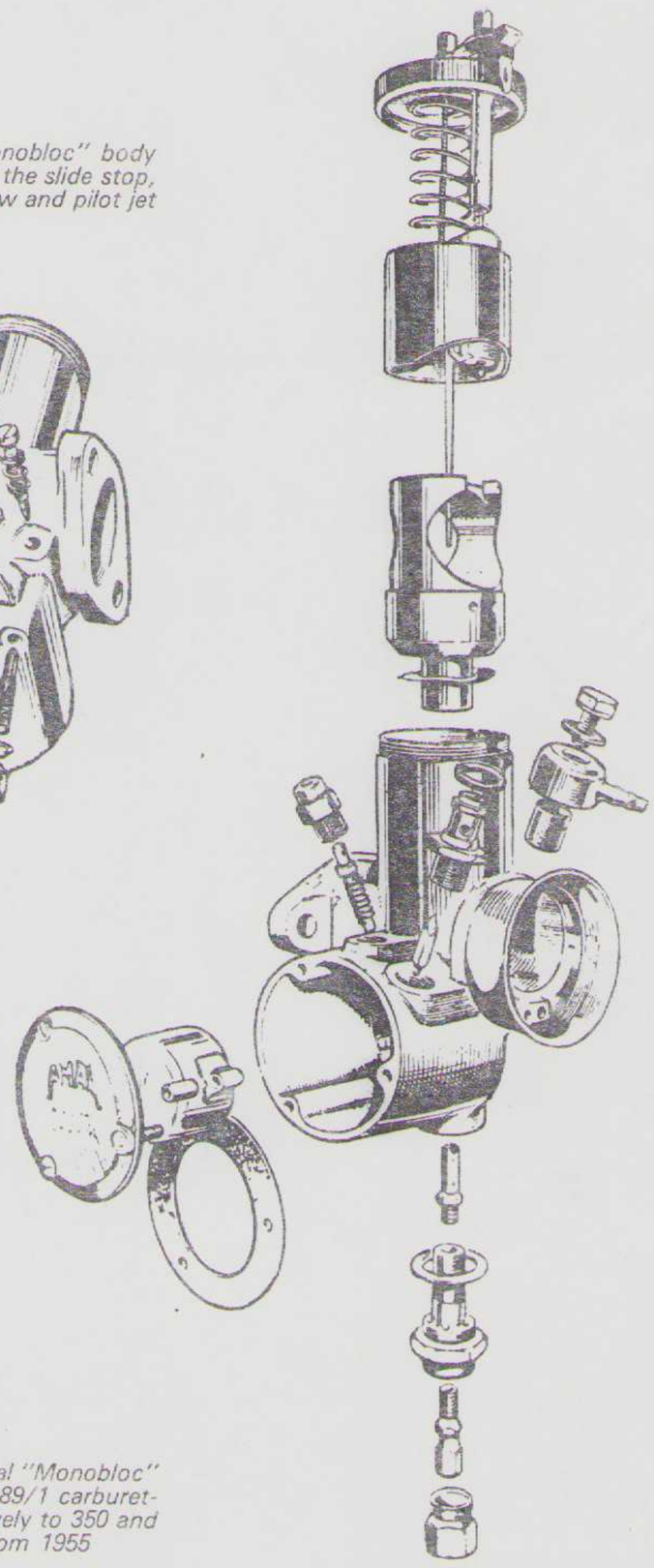


FIG 14

Details of the Amal "Monobloc" type, 376/5 and 389/1 carburetter fitted respectively to 350 and 500 cc models from 1955

fitted with manual ignition control, retard the lever ⅛ in. Now warm-up the engine with the air lever fully open and set the throttle-adjusting screws so that the engine runs just too fast for idling or slow-running speeds with the twist-grip closed. Then gently unscrew the throttle-adjusting screw to reduce the engine speed until the engine falters. Finally screw in or out the pilot adjuster until the engine runs evenly and slowly. If engine speeds increase rapidly, the setting is too weak. Recheck. Open and close the throttle sharply and check for any falter. The engine must not be allowed to become too hot during this work, so complete the slow-running setting first and as quickly as possible.

Petrol Consumption

Fuel wastage can be caused by incorrect setting of the pilot jet and consequent flooding. Fit a new nylon needle and check the washer at the base of the jet block. On old machines fit a new needle and needle jet but do not alter the jet size.

Pre-1956 350 cc machines can be adapted to use a larger cutaway slide (size 3½) which should show a petrol consumption improvement of up to 13 m.p.g. at 40 m.p.h.

When fitting a new jet block, ensure that the holes in the mixing chamber register with those in the primary choke. If necessary, the taper needle can be lowered one notch but it should be borne in mind that this reduces the acceleration rate.

4. GEARBOXES

THE CP-TYPE BURMAN GEARBOX

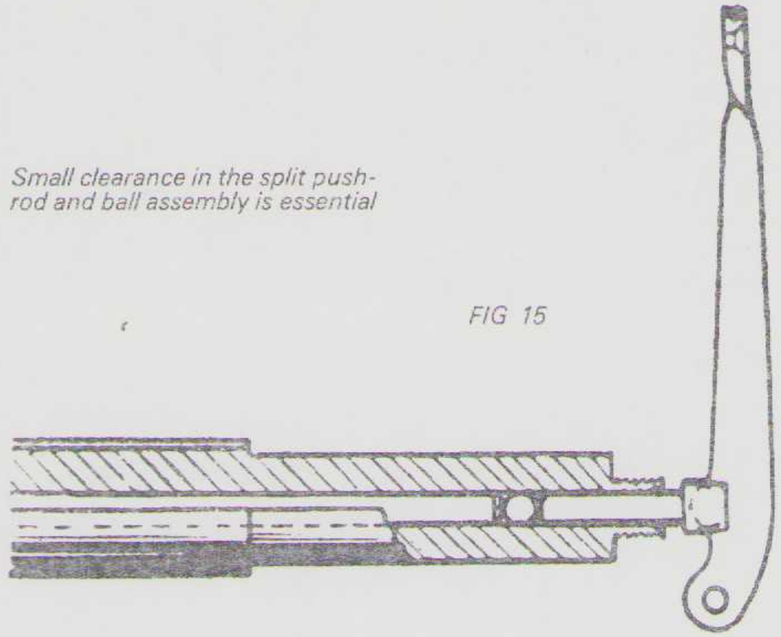
This gearbox is fitted to W.D. models and 1945-51 machines. Pre-1948 boxes were grease lubricated; 1948-51 were lubricated by S.A.E. 50 oil (capacity 1 pt.). Hypoid 80 or 90 has also been satisfactorily used consequent on improved types available in the 1960's.

Gear Selection

If engagement is uncertain, check the rocking-pawl mechanism for wear or for a broken spring in the spring box. Ascertain that the assembly is correct by taking out the footchange assembly. The small pinion on the camshaft is marked with an "O"; turn the shaft until the "O" is at nine o'clock and remove the foot-change mechanism. The toothed sector engages with the camshaft pinion, also marked "O." With both marks in register the gears are indexed correctly. If difficulty continues, worn striker forks are likely to be the cause of the trouble.

Top Gear

If top gear disengages under load, the striker forks are probably worn, or possibly the main driving-gear bush has moved towards the kickstarter side of the gearbox, .. ing full engagement of the gear. Fit a new bush.



Small clearance in the split push-rod and ball assembly is essential

FIG 15

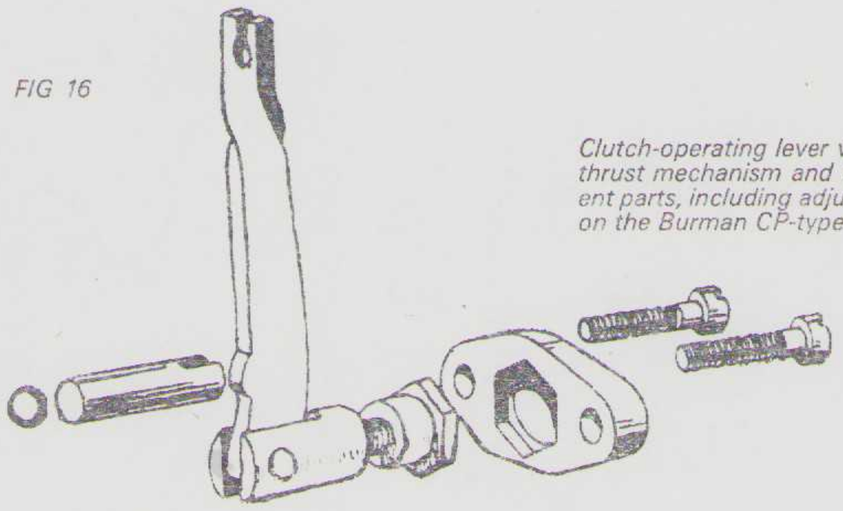
Gearbox Noises

If the transmission is noisy in third gear, look for wear on the layshaft fixed pinion and/or main driving gear, which engages with the layshaft fixed pinion. Also check the layshaft bush.

Noisy gear engagement when the machine is moving off is due to clutch drag. Holding the clutch lever tight against the handlebar depress the kickstarter lever. If, after this, the gear engages without noise, clutch drag is confirmed. Check for clearance ($\frac{1}{32}$-in.) between the operating plunger and the nose on the operating lever by testing the top end of the clutch withdrawal lever. It should move about $\frac{3}{32}$-in. to and fro.

Check for sticky friction plates, caused by oil residue, and, if necessary, clean with paraffin. At the same time, check for buckles in the plain plates. Check that the pressure plate is running true. Pull out the clutch lever, depress the kickstarter

FIG 16



Clutch-operating lever with ball-thrust mechanism and component parts, including adjuster pad, on the Burman CP-type gearbox

and watch for plates rotating out of true. To cure, balance the clutch springs equally. Check that there is sufficient clutch-plate separation; it is sometimes lacking, due to wear in the operating mechanism.

Clutch Fails to Disengage

Check the nut retaining the kickstarter ratchet pinion, the thrust stud in the clutch pressure-plate and the clutch-hub retaining nut. The push-rod and operating lever should be checked if trouble has developed gradually.

Kickstarter Faults

If the kickstarter fails to engage, or sticks up, it is usually due to damage of the first tooth on the quadrant; this can be ground off with little loss in leverage. The trouble is often due to the absence of a stop rubber. If the kickstarter fails to return to the neutral position, check for a broken spring and for seizure on the shaft.

Gearbox Mainshaft End-Play

Assuming the kickstarter pinion nut is tight, check the small bearing of the mainshaft in the kickstarter case. Shim washers placed between the bearing and the housing may provide a remedy if wear is not too advanced.

Clutch Rattle

Sometimes experienced when the engine is idling. It is due to backlash between the tongues on the clutch friction plates and the slots on the clutch driver. If the clutch is pulled in and the noise disappears, that is the trouble. Renew clutch driver if wear is considerable.

Clutch Sprocket Movement

This is usually due to wear on the clutch hub rollers and/or sleeve. If the bearing surfaces are correct, the width of the mainshaft bearing sleeve can be reduced and new rollers fitted.

Broken Pinion Teeth

In order that further trouble may be avoided after fitting new gears it is essential that both the mainshaft and the layshaft should be checked for straightness before reassembling. If there is a bow, and it is slight, the shaft can be straightened between V blocks.

It may be of interest to readers to study the working of a gearbox, usually taken for granted by the majority of riders.

The illustration is of the CP-type Burman gearbox, which has four forward gears and has positive-stop foot gear-change mechanism. The component is clamped between the two rear engine plates by two bolts, the bottom bolt acting as a pivot. The top bolt passes through the gearbox top lug and the rear plates, which are slotted; this allows the gearbox to be moved to adjust the primary chain.

Power Transmission through the Gears

First (lowest) Gear

Sliding gear, Fig. 17, "C" on the mainshaft is in the midway position, that is, disengaged from gear "B" and "D." The layshaft sliding on clutch "W" moves to the right and engages with gear "G." Power now is transmitted through clutch "A" to mainshaft "T," mainshaft sliding gear "C," layshaft gear "G," layshaft "W," layshaft "V," layshaft gear "E," to main gear "B" and chain sprocket "J."

Second Gear

Sliding gear "C" on the mainshaft is in the midway position, that is, disengaged from gears "B" and "D." Layshaft sliding clutch "W" moves to the left and engages with gear "F." Transmission is by way of clutch "A," to mainshaft "T," mainshaft sliding gear "C," layshaft gear "F," layshaft clutch "W," layshaft "V," layshaft gear "E," and main gear "B" to chain sprocket "J."

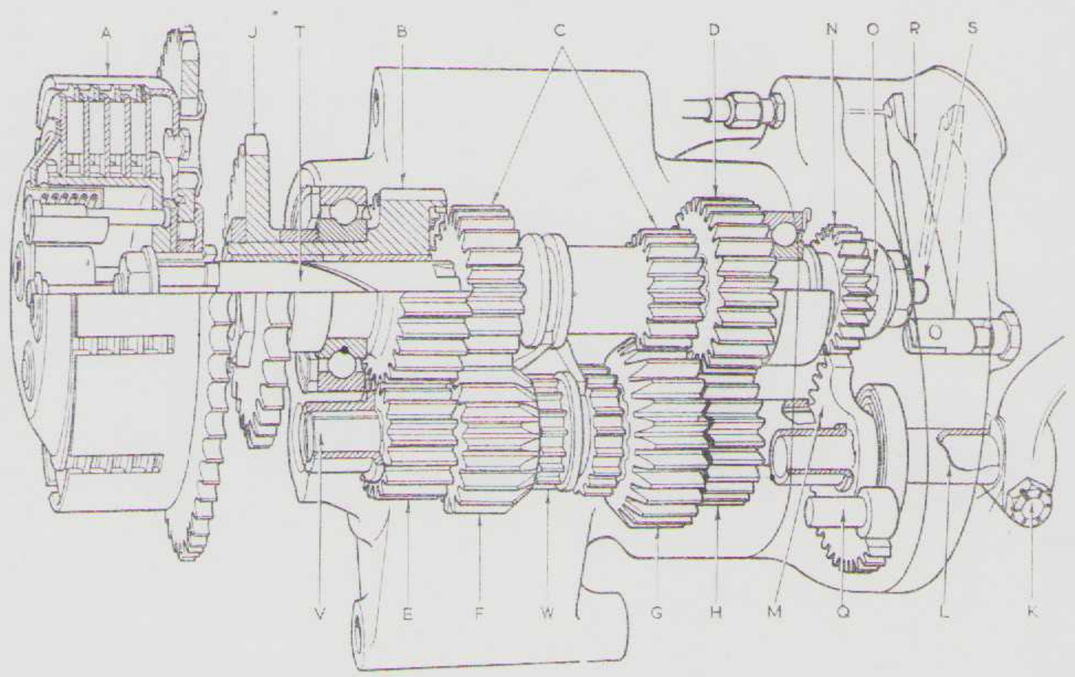


FIG 17 The CP-type Burman gearbox-clutch assembly

Third Gear

Sliding clutch "W" on the layshaft is in the midway position, that is, disengaged from gears "F" and "G." Mainshaft sliding gear "C" moves to the right and engages with gear "D". The transmission is through clutch "A", to mainshaft "T," to mainshaft sliding gear "C," mainshaft gear "D," layshaft gear "H," layshaft "V," layshaft gear "E" and main gear "B" to chain sprocket "J."

Fourth (highest) Gear

Sliding clutch "W" on the layshaft is in the midway position, that is, disengaged from gears "F" and "G." Mainshaft sliding gear "C," moves to the left and engages with main gear "B." Power is controlled by clutch "A," mainshaft "T," mainshaft sliding gear "C" and main gear "B" to chain sprocket "J."

THE B52 BURMAN GEARBOX

This gearbox is fitted to 1952-55 machines. Oil capacity, 1 pt. S.A.E. 50 grade. Hypoid 80 or 90 may also be used.

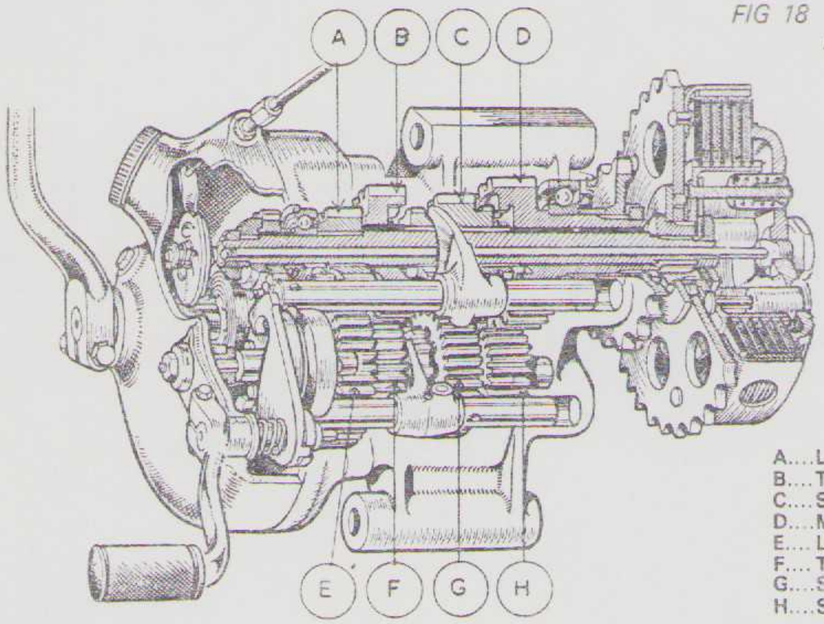


FIG 18 Section through the Burman B52 gearbox showing gears and clutch with actuating mechanism

A....Low gear on mainshaft.
B....Third gear on mainshaft.
C....Second gear on mainshaft.
D....Main driving gear.
E....Low gear on layshaft.
F....Third gear on layshaft.
G....Second gear on layshaft.
H....Small pinion on layshaft.

Gear Selection

Faulty selection is almost certain to be due to the small cam-barrel plunger sticking in its housing. Rub down the plunger with an abrasive and apply oil.

Top Gear

If top gear disengages under load (early 1952 models), the probable fault is that the main-bearing housing is machined too deeply and so causing partial engagement between the main driving gear and the mainshaft sliding gear. Make a steel washer, $\frac{1}{16}$-in. thick, and place it between the main bearing and the housing.

Gear Disengagement

Disengagement under load is probably due to the weakness of the V-shaped footchange centralizing spring in the kickstarter case, or to a weak footchange quadrant coil spring. Stretching the spring will cure. Check the cam-barrel plunger for free movement in its housing.

Footchange Lever

It is sometimes found that the lever sticks. Check for friction between the footchange shaft and bearing in the kickstarter case cover. Lay the machine over on its left side and free by using penetrating oil or paraffin; failing this, dismantle and rub down the shaft with an abrasive. Oil before reassembling. A weak centra[illegible]ring is betrayed by the same symptoms.

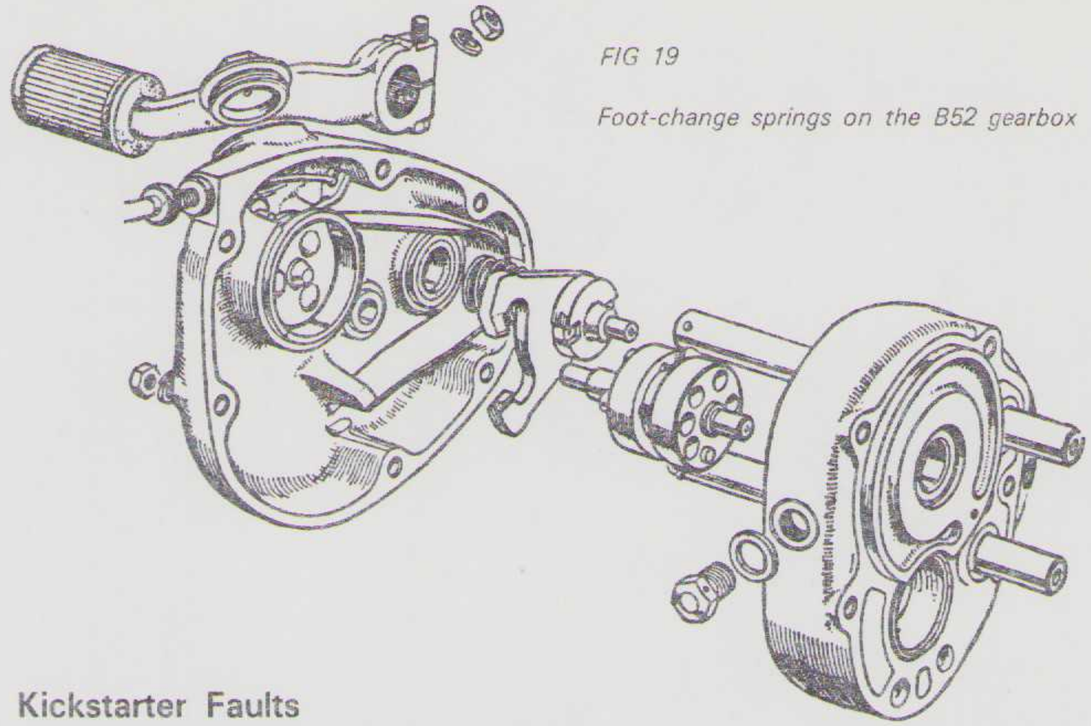


FIG 19

Foot-change springs on the B52 gearbox

Kickstarter Faults

If the crank sticks, ease the cover screws and then depress the lever. The spring is probably broken if the crank does not return to its position. If the crank returns, the loosened state of the screws may show that normally the kickstarter axle bearings in the case and cover are out of line. Ensure that the kickstarter axle is perfectly clean. Do not use the machine with the kickstarter left in an incorrect position.

Oil Leakage

Leakage can occur from the two metal caps that seal the shaft holes, or from the main-bearing oil seal. Leakage from the kickstarter cover case is due to a broken or defective gasket fitted between the case and the cover. To stop an oil leak from the two metal caps wash the parts with petrol; use jointing compound in both apertures and allow to set. Try this first before replacing the oil seal.

5. THE CLUTCH

Clutch Spring Adjustment

Check that the clutch-spring studs are not bent. Insert the spring cups, then the springs. Fit the nuts, leaving them slack. Ensure that the pressure plate is in the correct position; tighten the nuts diagonally (top left, bottom right, and so on). When all nuts are fully tightened, unscrew each four turns. If a slot is cut in the end of a screwdriver, sufficient to clear stud bolts, this modified tool will facilitate fitting.

Clutch Adjustment: CP-Type Burman Gearboxes

A small adjustment can be made by screwing in or out the clutch-cable adjusting screw located on the gearbox, leaving free movement at the clutch lever end of between ⅛-in. to $\frac{3}{16}$-in. If this adjustment is insufficient it will be necessary to alter the position of the operating-lever fulcrum pin, located within the kickstarter case, by adjusting the sleeve nut. The effective length of the clutch push-rod is then too long and can be compensated by means of the sleeve nut. There should be $\frac{1}{32}$-in. free movement between the operating lever and the operating plunger. To increase the clearance turn clockwise; to decrease, turn anti-clockwise (usually about half to one turn). Check the movement of the operating lever by inserting a finger in the gearbox filler hole. Remember that a well-lubricated clutch cable is essential to smooth working.

Clutch Adjustment: B52-Type Burman Gearboxes

The clutch will not disengage if adjustment is incorrect. Reset the operating mechanism by slackening the cable adjuster as far as it will go. Next, release the nut in the centre of the pressure plate (use a spark-plug spanner); screw in the clutch thrust-stud until light contact with the push-rod is felt. Then unscrew the thrust stud half a turn. Again tighten the nut, noting that the thrust stud must not move. The clutch cable can now be adjusted until there is ⅛-in. to $\frac{3}{16}$-in. movement in the outer casing and the adjuster.

Clutch Cables

To remove the clutch cable, first take off the oil-filler cap on the gearbox; screw the clutch-cable adjuster fully home and, with a suitable lever, press in the operating lever and release the clutch cable. Withdraw the clutch-cable adjuster from the gearbox and remove the cable from the handlebar lever.

When refitting the clutch cable see that sharp bends are avoided.

Clutch Slip

There are many causes. Friction inserts rendered ineffective by oil is the chief offender. In this case, wash them in petrol and apply fuller's earth, or fit one of the types of oil-resisting inserts recently marketed. Clutch springs are usually weakened by heat generated through persistent clutch slip so check for a free length of $1\frac{25}{32}$-in. Clearance between the clutch-actuating lever and plunger should be $\frac{1}{32}$-in. Free movement at the handlebar clutch lever should be ⅛-in. to $\frac{3}{16}$-in. Check that the top of the operating lever in the kickstarter case is not in contact with the oil-filler plug. The clutch hub-nut on the mainshaft of CP-type gearboxes sometimes fouls on the spring cups; change for a smaller-sized nut (B52 type).

Complete Clutch Removal

Remove the chaincase, the clutch screws, springs and cups, and pressure plate. Turn back the clutch hub-nut lock-washer. Now engage top gear, depress the rear brake pedal as a locking device and unscrew the hub nut. Remove the front chain. Ease off the clutch assembly, taking care not to lose the 24 clutch rollers which will now fall out.

Reverse the procedure to reassemble; grease the roller bearings when assembling.

6. COMPETITION AND SCRAMBLES MODELS

Trials

In order to obtain good results, i.e., dead-slow running with plenty of power at slow speeds, use a low compression ratio: 5.8 (500 cc) : 6.3 (350 cc) with standard cams (1949-53 type) and correct pilot adjustment. If necessary, fit a throttle slide with $\frac{1}{16}$-in. less cutaway and eliminate air leaks. Use heavier flywheels and a manually-operated ignition lever. Flywheels are identical on both 350 cc and 500 cc machines, with the exception of the balance factor, but if the machine is a standard competition model no alteration is necessary.

Gear Ratios

An ultra-low bottom gear is necessary; fit an engine sprocket with 18 teeth (500 cc) : 16 teeth (350 cc). This will do for normal events (*see* Gearbox Ratios in the Appendix).

Chaincase Sealing

Pre-1952 model owners should use a rear-half primary chaincase with a mud excluder fitted at the mainshaft hole. Use a felt sealing-washer between the back of the engine sprocket and the crankcase, and fit a length of rubber tubing from the crankcase release-valve orifice.

Conversions

A great deal of thought should be devoted to converting standard models for trials. Some of the essentials follow: mudguard clearance must be ample, and the front guard presents no difficulty in this respect, but the rear mudguard bridge piece must be raised. Preferably, competition-type guards should be fitted. The main driving gear and layshaft fixed pinion must be changed to provide the ultra-low ratios needed for competition work. Competition ratios for the CP box are obtained with 32 teeth for the main gear and 18 for the meshing layshaft pinion. For the B52 box, sizes are 30 and 17 respectively. Change the engine sprocket.

Converted machines may not handle so well as standard competition models because of the difference in the frame head-lug angle which determines trail or castor action. The fitting of a 21-in. front wheel helps to offset this difference.

General Tips

Waterproof the H.T. brush holder; seal the contact-breaker cover, but not the vent hole (use Plasticine); fit spare clutch and throttle cables.

Scrambles Models

Maximum engine efficiency is called for and this can only be achieved by attention to every detail. Polish the sphere of the head and the ports; use a compression ratio of 8.3 : 1 (500 cc); 9.5 : 1 (350 cc) and fit special cams, marked

SH. Use an open exhaust-pipe system (pre-1956, 48 in. long) and fit a "Monobloc" or "T.T."-type carburetter, preferably the former. With compression ratios as above, run on premium grade fuels. If higher compression ratios are chosen (11 : 1 to 13 : 1), methanol-benzole mixture must be used.

Plugs

Fit plugs with a high heat factor, such as FE 220 or 250 (long reach, for light-alloy heads): F 220 or 250 (short reach, for iron heads). If a long-reach plug is used in a short-reach head it will cause damage. A short-reach plug used in a long-reach head will have the effect of retarding the ignition. Plug points should be flush with the sphere of the head to obtain the best results. If the standard plug washer is too deep, use a solid-copper washer cut to width.

Connecting Rods

If there is marking on the top end of one side and the bottom end of the other side of the piston, the connecting rod needs aligning. It is possible to check the con-rod without removing it by employing a steel block and mandrel.

Flywheels

Light flywheels improve acceleration. Engines made before No. 8,000 had flywheels which were 2.5 lb. lighter than at present. Flywheel balance will not be affected if the periphery (not side) is reduced by ⅛ in.

It is sometimes found that the flywheels move on the crankpin, especially in old models, due mainly to exceptional stresses and strains of scrambling. The interference fit of the crankpin shaft should therefore be checked. A copper deposit 0.002 to 0.003 in. on both shanks of the crankpin will produce new interference-fit dimensions. When crankpin washers are used fit steel in preference to bronze.

Short-Circuit Racing

As with scrambles models, machine preparation for racing is all-important and no detail should be ignored. All-round tightness of nuts, bolts, guards, cables, etc., wheels correctly balanced, correct carburation, correct plugs and a very high standard of engine efficiency are essential.

Gear ratios must be altered to suit the purpose. On touring machines silencers can be removed, subject to increasing the main-jet size to 190 or 200 (500 cc) and to 160 or 170 (350 cc). "Monobloc" increases are to 280 (500 cc); 220 (350 cc). Plugs recommended are KLG FE 220 or 250 (long reach): KLG F 220 or 250 (short reach).

Valve Timing

All timing pinions and cams are marked and little difficulty should be experienced in refitting. Cam markings are as follows:

1937-48. Cams marked with a dot. Timing pinion with a line on the outside face midway in the keyway slot (*see* Figs. 19 and 20).

1949-5 ns 1 and 2. One is Matchless; two is AJS (*see* Fig. 21).

1952-53. Cams marked 1 and 2 (*see* Fig. 21). Two is used on both Matchless and AJS.

1954-55. High-lift cams (HL). Cams marked 1, 2 and 3 (*see* Fig. 22). For 350 cc models use No. 3 for inlet; No. 2 for exhaust. For 500 cc models use No. 2 for both valves. When fitting camshafts that have neither a slot nor keyway for the long shaft, use a No. 1 marking for the exhaust cam.

Many owners experiment with the valve timing, only to revert to the original. It is a waste of time, for each tooth represents 20 degrees of the engine rotation, so that any slight change results in completely different timing.

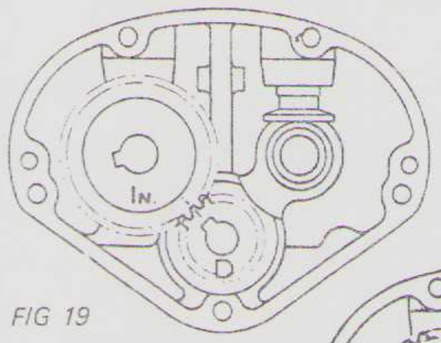


FIG 19

Meshing the timing pinion and inlet valve gear

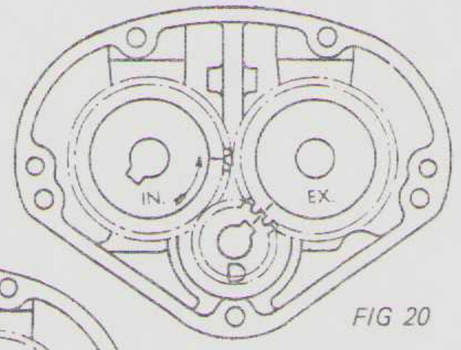


FIG 20

Second operation in meshing the timing pinion and exhaust valve gear

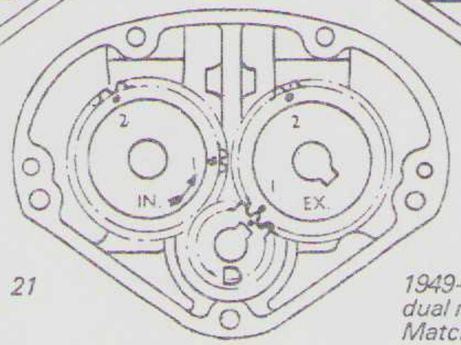


FIG 21

1949-51 timing arrangement, dual marked to suit either AJS or Matchless engines

The method of cam marking has been altered since 1945. The year of manufacture and type of marking used are as follows:-

1945-48—Cams are marked with a dot. The pinion has a line on the outside face midway in the keyway slot.

1949-51—Cams are marked *one* and *two* for use on both Matchless and AJS engines. Number *one* marks are for Matchless engines, number *two* for AJS.

1952-53 (Valve Lift 0.326 in.)—Marking similar to 1950-51 models, with the exception of assembling, when number *two* marks are used for *both* Matchless and AJS models inlet and exhaust. (Both models have magneto in front of cylinder at this date.)

1954-55 (Valve Lift 0.362 in.)—Cams are of the high-lift type (marked HL). Additional figure number *three* is used for setting inlet timing on the *350-cc model only*. Use number *two* marks for the 350-cc exhaust and for both valves of the 500-cc model.

1956-58 (Valve Lift 0.362 in.)—Number *three* used for the *350-cc inlet*, number *two* for the *500-cc inlet* and number *one* for the *350-cc* and *500-cc exhaust.*

Note—The latest type camshafts do not use a keyed shaft to drive the magneto. If a keyway is not visible in the cam wheel use No.1 mark for the exhaust-cam setting, before 1956-57.

Fitting Cams

The drill is the same for all models:

(1) Turn the engine until the mark on the pinion is at about 10 o'clock (inlet cam). Insert the cam with its mark to register with the mark on the pinion.
(2) Turn the engine *forward* until the mark on the pinion is at about 2 o'clock (exhaust cam). Insert cam also with the mark in mesh with the mark on the pinion.

Lubricate all parts before replacing the timing cover.

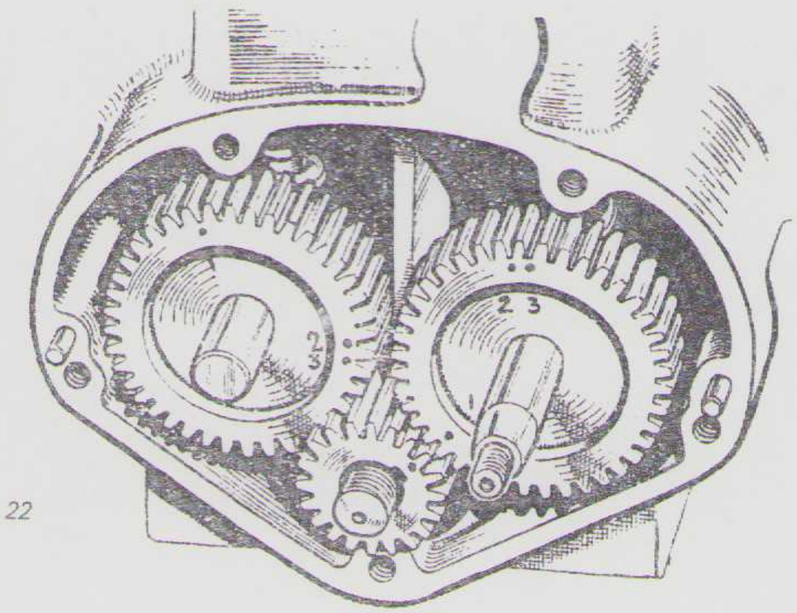


FIG 22

1954-55 High-lift cams are signified by the 1, 2, 3 marking

7. TRANSMISSION

Front Chain Adjustment

To adjust the front chain, first remove the inspection cap. Follow this by:

(i) Slackening the nut on the gearbox top fixing bolt.
(ii) Slackening the *forward* nut on the chain adjuster about three turns.
(iii) Tightening slowly the *rear* nut on the chain adjuster until the chain is tight.
(iv) Slackening by about three turns the rear nut on the chain adjuster.
(v) Tightening slowly the forward adjusting nut to give a ⅜-in. chain whip at the tightest point of the chain run.
(vi) Tighten the rear nut to lock the assembly.
(vii) Tighten the gearbox top fixing bolt and replace the inspection cap.

Note: Altering the position of the ge[illegible]ll affect rear chain adjustment.

Rear Chain Adjustment: Spring Frame

Spring-frame Models 1950-54

The rear-wheel spindle carries two cams which, when rotated, alter the position of the spindle in the fork-ends. The cams abut against projections in the fork-ends and the right-hand one with a lock nut is adjustable and is pre-set on initial assembly. The position of this projection should not be altered unless wheel alignment is incorrect.

To adjust the rear chain with the machine on a centre stand, slacken the nut securing the speedometer gearbox and the left side wheel nut. Continue by:

(i) Moving the wheel forward so that the two cams on the axle contact the projections.
(ii) Apply an adjustable spanner to the hexagonal body on the wheel axle, keeping the wheel pressed forward, and turn until chain whip is 1⅛ in. when tested midway between sprocket centres.
(iii) Tighten the wheel axle nut, turn the wheel and check the chain tension in several positions; correct whip is that at the tightest place in the chain travel.
(iv) Tighten the nut securing the speedometer gearbox, positioning the drive cable before finally tightening.
(v) Check brake adjustment.

Rear Chain Adjustment: Rigid Frame

Rigid-frame Models (Machine on Rear Stand)

Slacken both axle nuts slightly and the lock-nut on the adjuster bolts.

To adjust the chain

(i) Screw-in equally the two adjuster bolts until chain whip is ⅜ in. to ½ in. in the tightest place. Check the chain at more than one point.
(ii) Tighten the axle nuts.
(iii) Tighten the adjuster locknuts.

Q-D Wheel Models

Follow details given for rigid-frame models but also slacken the nut securing the brake drum to the fork-end as well as both the axle nuts.

Chain Lubrication

The most effective method, particularly during winter, is to remove the chain and wash it in paraffin. A small quantity of "Mobilgrease No. 2", "Esso" fluid grease, "Castrolease" graphited grease, or "Energrease A.O".should be used as a bath. Put the grease in a tin and heat it until just fluid; immerse the chain and reheat grease (the chain will cool the grease), leaving the chain to soak; then wipe off sur[illegible] refit.

8. FORKS AND FRAMES

Teledraulic Front Forks 1945 to 1955

Other than periodically checking the oil content, this part of the machine does not need frequent attention.

If the fork motion becomes stiff, and provided that the fork sliders or main tubes are not bent by impact, the trouble is due to swelling of the plastic bushes.

To remedy, remove the sliders and take off the plastic bushes. With emery cloth ease down the bore of the bush until it is a sliding fit. Apply oil or a little graphite compound and reassemble.

A scraping noise as the forks move is caused by the springs rubbing against the cover tubes. Grease applied to each fork spring will have the desired effect. A rattle in the forks may be due to a disconnected damper rod or insufficient oil content.

To Remove the Fork Assembly

Before dismantling, a study of the construction should be made. Remove:

(i) The wheel, front mudguard and stand.
(ii) The speedometer drive, the bulb holder and the speedometer head.
(iii) The switch panel from the headlamp and the headlamp.
(iv) The handlebars, with fittings; detach brake cable from forks. (Put an old coat on the petrol tank to prevent damage by the handlebars.)
(v) The two bolts in the handlebar lug for the fork tube and disconnect both damper rods, if fitted.
(vi) The dome and lock nut from the steering column.
(vii) Tap the handlebar lug upwards until it is free of the fork stem. Take out the top frame race, the 28 balls from the bearing and then withdraw the assembly. A further 28 balls are used in the bottom frame race.

Assembly

Pack the fork crown race with grease and fill with the 28 balls, pass the steering column through the frame and reverse the dismantling procedure.

Fork Sliders

"Teledraulic" fork sliders comprise the light-alloy moving members of the fork assembly, carrying the front-wheel spindle, mudguard, brake anchorage and, most important, housing the damper mechanism. Modifications have been made to the detail working of this mechanism over the years since "Teledraulics" were first introduced early in the war, but the fundamental principle has remained. "Teledraulic" operation depends on the action of disc-type damper valves with limited permitted movement, or orifice cut-aways, designed to obstruct progressively the transfer of hydraulic fluid from one compartment to another during the movement of the slider under running conditions and, thereby, to damp, or slow down, slider movement at both the impact and rebound phases.

To remove one or both sliders raise the front wheel clear of the ground. With a hook spanner first unscrew the slider extension and follow this by:

(i) Removing the front wheel, mudguard and stand.
(ii) Detaching the brake cable.
(iii) Unscrewing the bolts in the handlebar lug.
(iv) Detaching the damper rods, if fitted.
(v) With a sharp downward movement withdrawing the slider (warming the enlarged top end of the slider will facilitate removal).

To remove the damper rod and tube a thin-wall box key, fashioned to enter the recess in the bottom of the slider, is required.

To Refit

With the damper rod and tube assembled in the slider, operations are:

(i) Pass the damper rod up the fork tube and raise the slider until it meets the oil seal.
(ii) Warm the enlarged end of the slider and press in the oil seal sufficiently to allow engagement of the screwed extension.
(iii) Reassemble in the reverse order for dismantling and finally tighten the screwed extension when the wheel is refitted. A length of copper wire, or an old push-rod screwed on to rod, can be used to lift up the damper rods for attachment.

To Remove Fork Inner Tubes

Both fork tubes can be removed with the sliders attached, but a draw-bolt to pull up the tubes will be required.

Without this tool, first remove the fork sliders as previously described. Release the two screws or bolts clamping the fork tubes from the fork crown and pull out the tubes from the fork crown and handlebar lug.

Rear Suspension

The swinging-arm is hinged behind the gearbox on two robust self-lubricating bronze bushes. There is a reservoir for oil incorporated in the swinging-arm.

To lubricate, remove the screw in the right-hand cap and use a heavy gear oil; normal content 1½ fluid ounces.

Wear on the bushes is only likely to take place after the machine has covered considerable mileage.

Rear Suspension Units

The normal oil content is 3 fluid ounces (85 cc) S.A.E. 20 oil.

To change the oil, deal with one unit at a time and remove it from the frame. A clamp to grip and encircle the outer tube is needed and is applied close to the bottom pivot lug.

With the clamp gripped in a vice, slacken the bottom pivot lug. Turn the unit upside down and remove the bottom pivot lug.

Take hold of the exposed damper tube and work it up and down, then pour the oil content into a graduated measure, and allow the unit to drain. Pour back the specified amount of oil and reassemble in the reverse order.

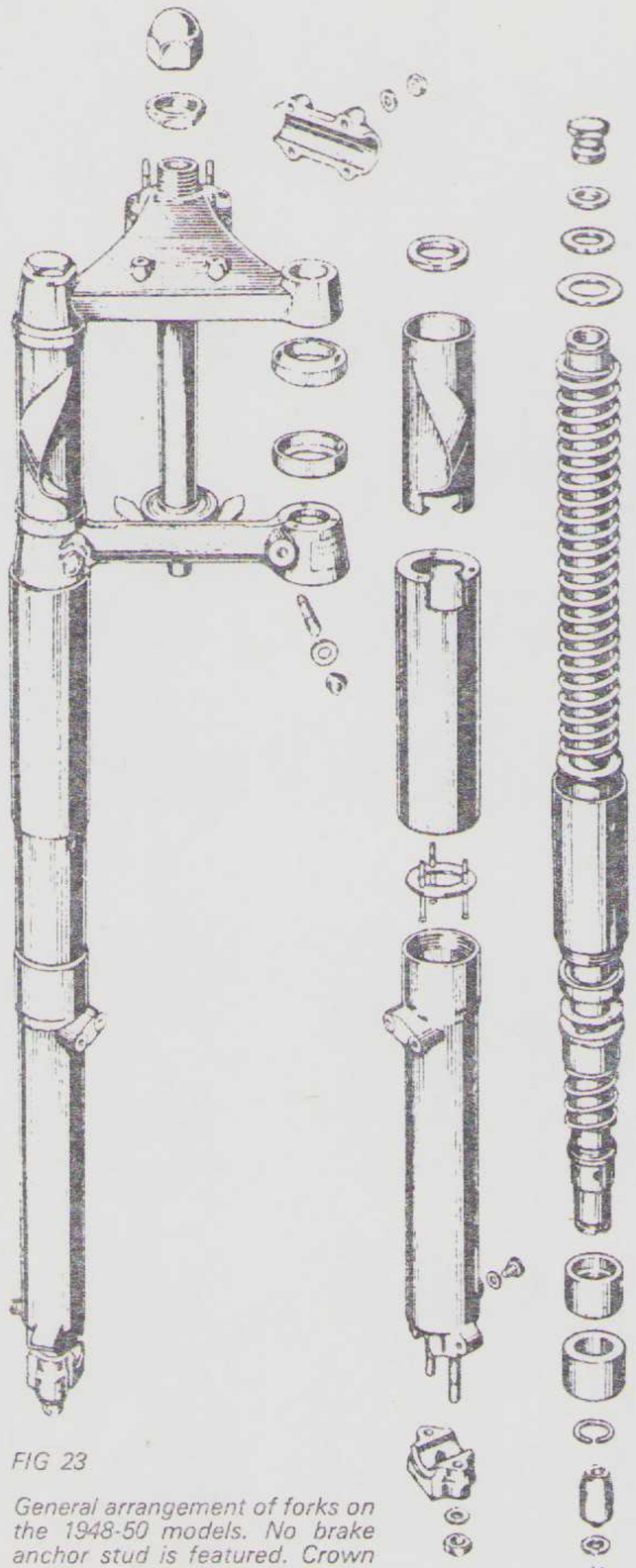


FIG 23

General arrangement of forks on the 1948-50 models. No brake anchor stud is featured. Crown design is also different

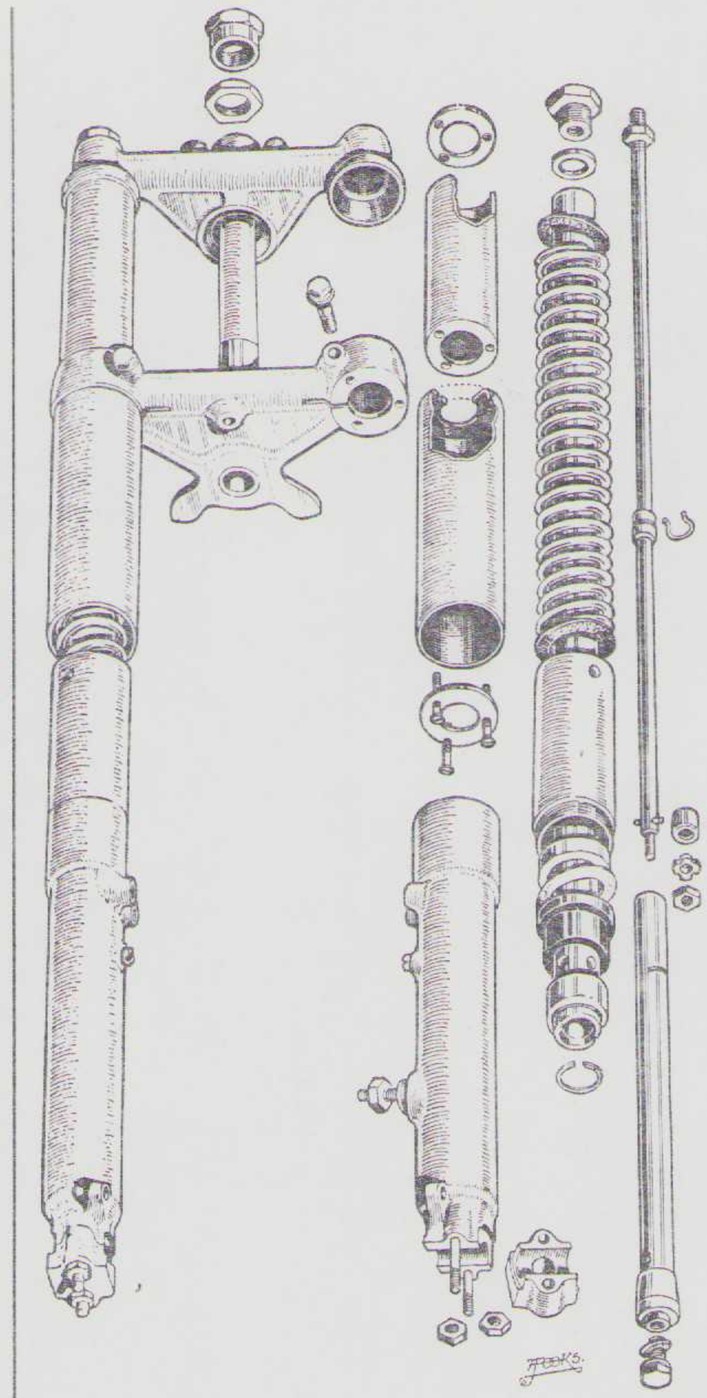


FIG 24

General arrangement drawing of Teledraulic front fork used on the WD G3L. Note the brake anchor stud and bolts for the bottom crown clamps

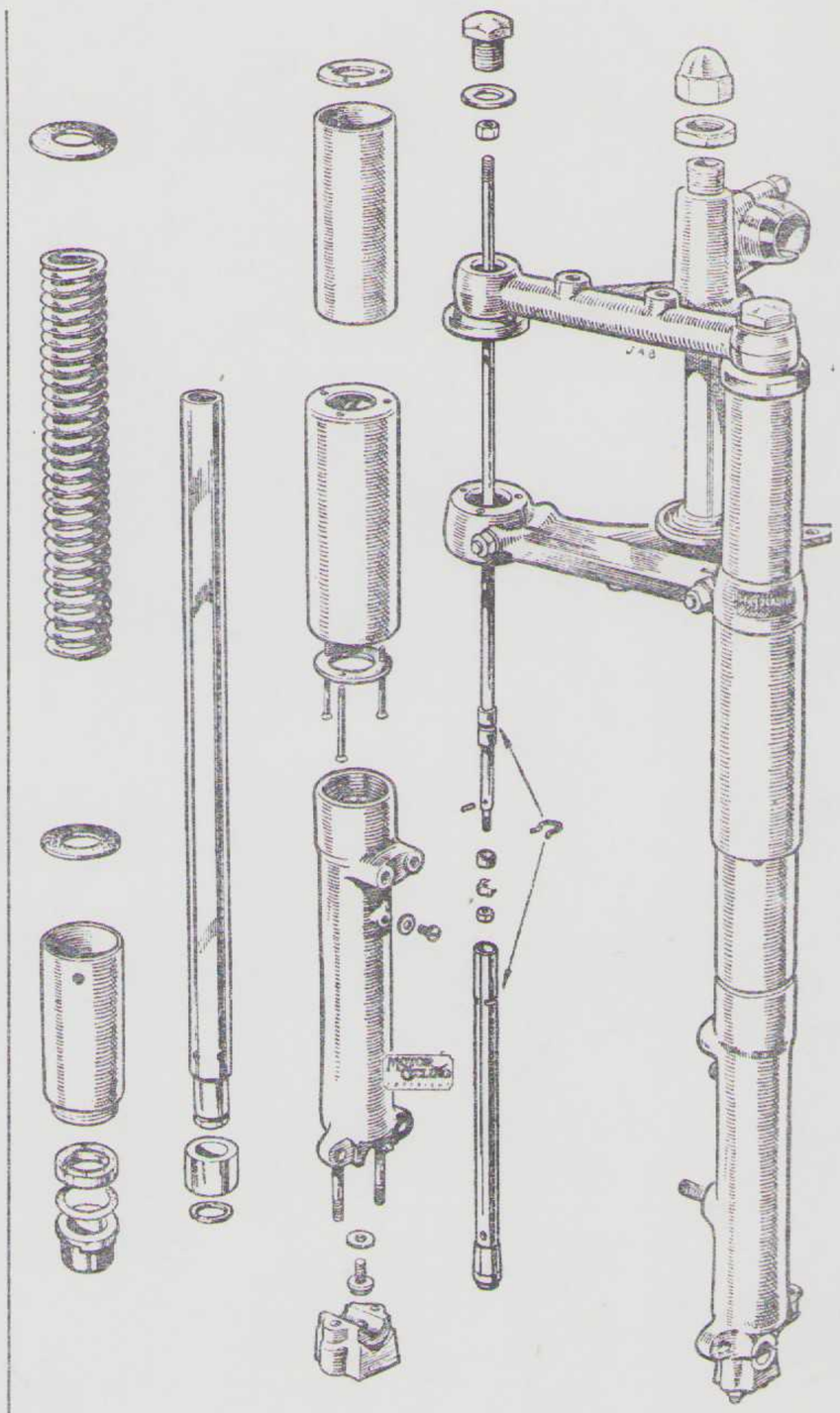


FIG 25

An exploded impression of the Matchless "Teledraulic" front fork arrangement — one of very few enterprising developments launched by a motorcycle manufacturer in time of war and retained for peace production. Bottom crown clamping is by stud[illegible]ts

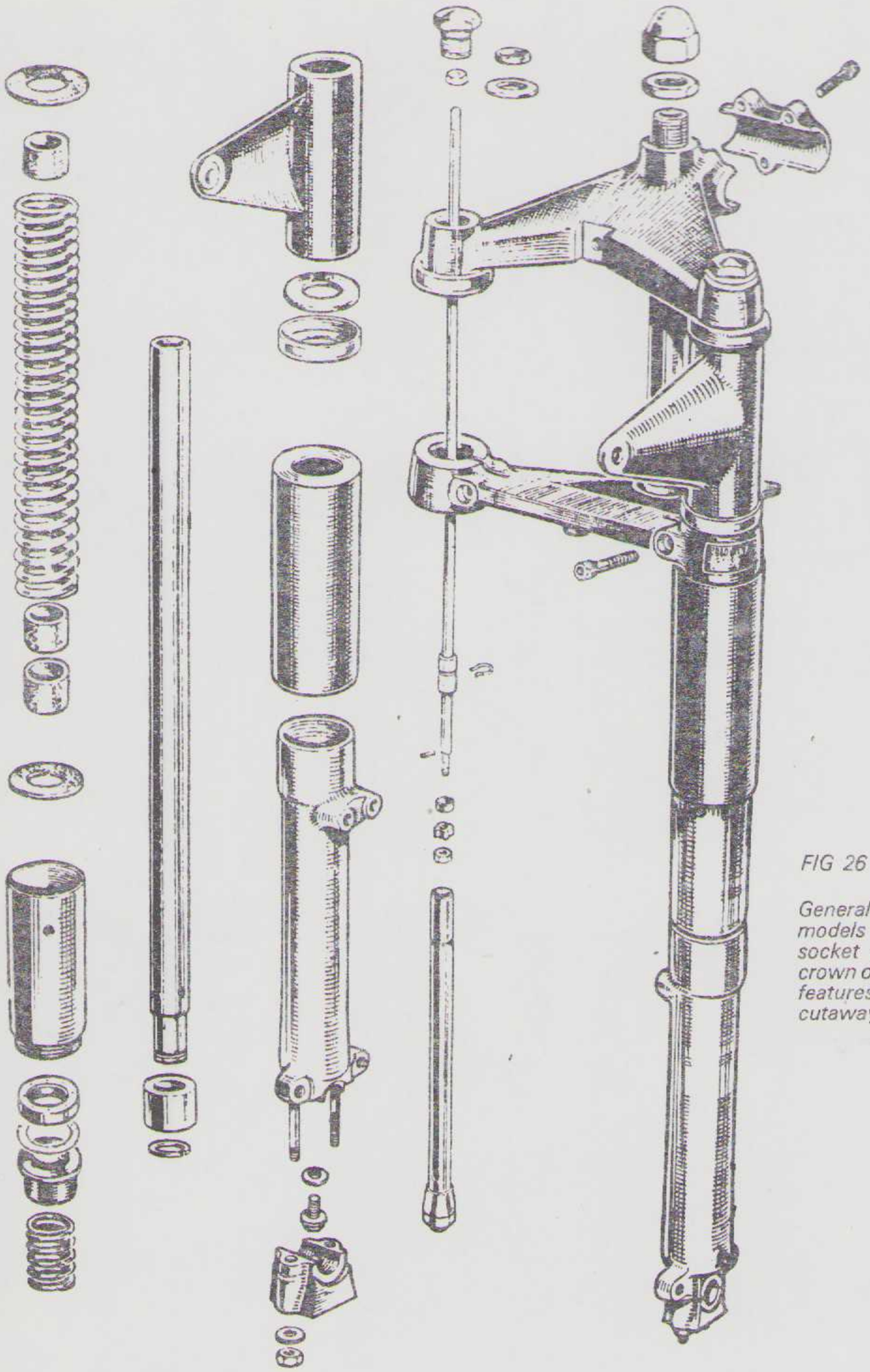


FIG 26

General arrangement of forks on all models except 1948-50. Cap head socket screws clamp the bottom crown on the stanchions. Top crown features a speedometer mounting cutaway with tapped thread

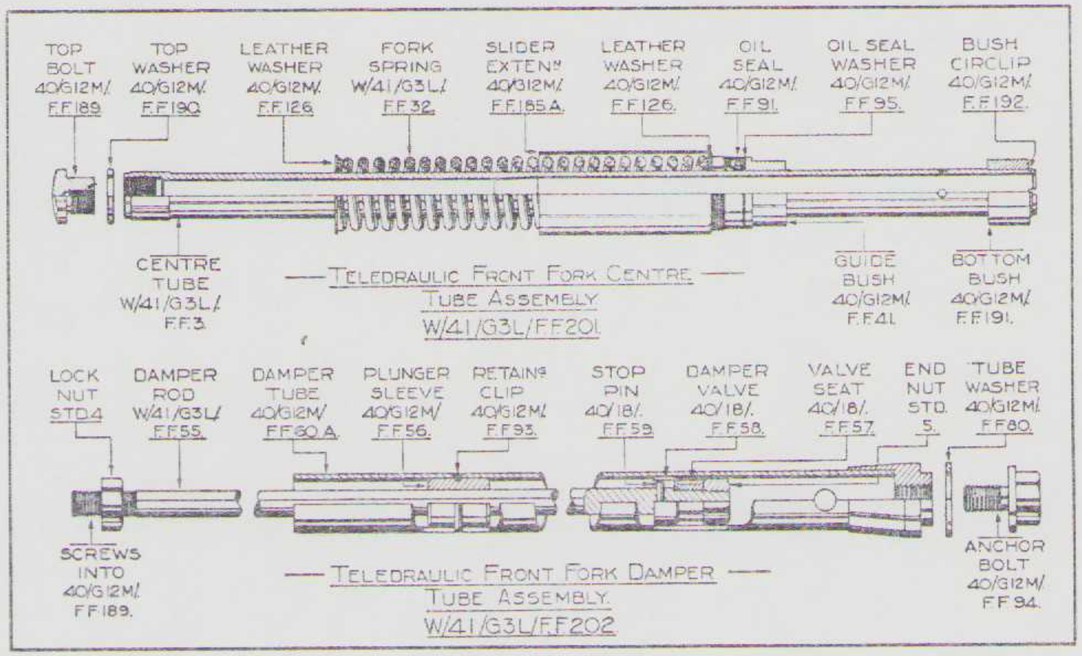


FIG 27

(Above) Details of the assembly order of the WD G3L Teledraulic front forks

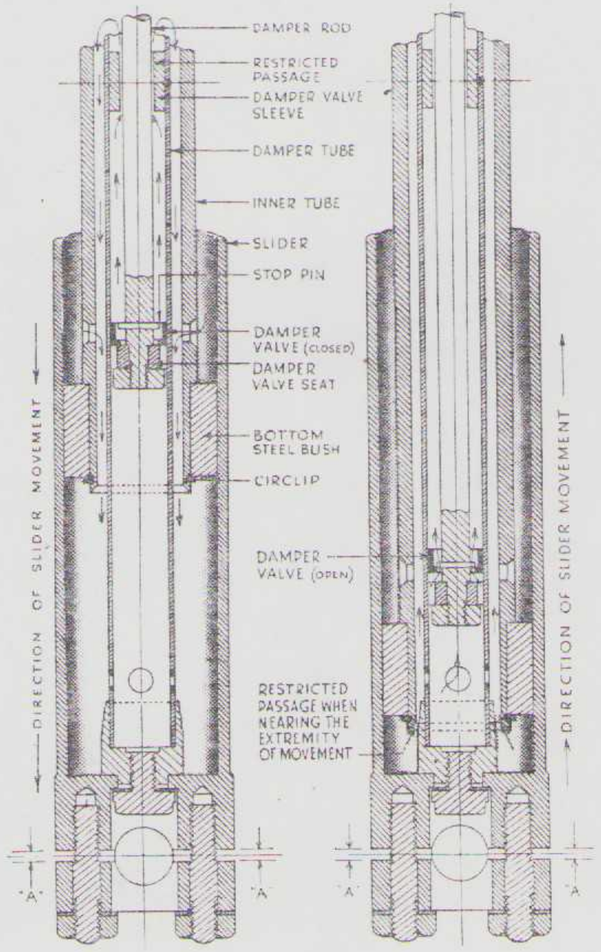


FIG 28

(Right) Oil movement in the WD fork, recoil on the left, bump on the right

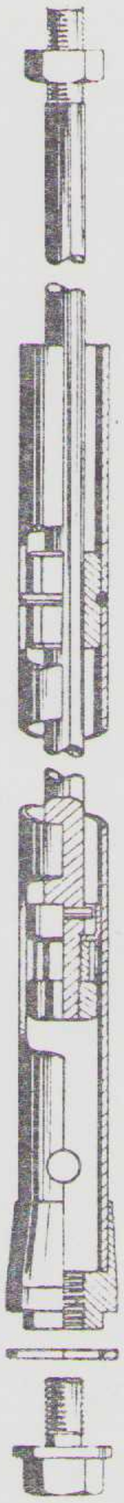


FIG 29

A cut-away impression of the damper tube and damper rod assembly

To Grease or Change the Unit Springs

Apply a clamp on the outer tube close to the bottom pivot lug and grip the clamp in a vice. Unscrew the ring nut which is below the bottom cover tube. Slacken the lower pivot lug, take the clamp out of the vice, then turn the unit upside down.

Take off the clamp, the bottom pivot lug and the bottom cover tube; when the spring can be removed.

On models made after 1953 a circlip is used in place of the ring nut.

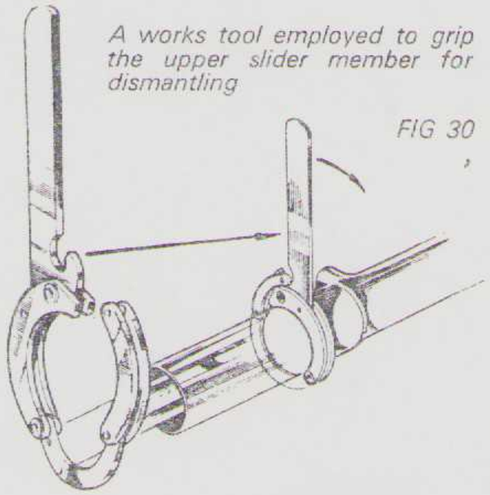
Dismantling this type of unit is a two-handed task; the help of a second person is needed to compress the spring to extract the circlip.

To reassemble reverse the dismantling instructions.

Steering Head

To check for correct adjustment take the weight off the front wheel by placing a support beneath the frame or footrests. Place one hand under the front guard and the other on the steering head and check for movement, or attempt to obtain movement, lifting upward and forward. If slackness is discerned, adjust as follows:

Slacken the nuts on the fork-crown studs and the nut above the steering column. Tighten the hexagon beneath the dome nut and again check for movement. Repeat this tightening-up drill until no "shake" is discernible and the fork assembly rotates freely. When satisfied that adjustment is correct tighten down the dome nut and the fork-crown stud nuts or screw. If a steering damper is fitted it should be quite slack during this work.



A works tool employed to grip the upper slider member for dismantling

FIG 30

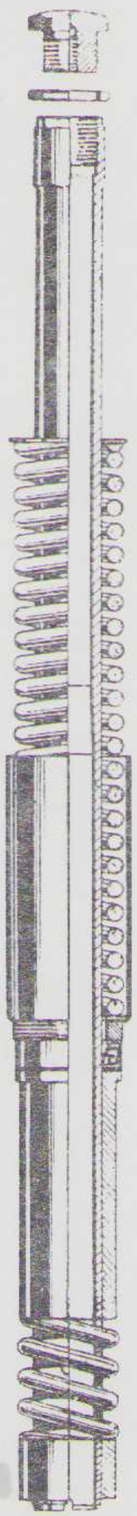


FIG 31

The tube assembly with main and rebound springs

9. WHEEL BEARINGS

Wheel bearings are of the taper-roller type. They have a fixed location on one side, the other being adjustable. The fixed location has a circlip in a groove cut in one end of the hub shell; the adjustable location is by a screwed ring, threaded into the hub, and a locking ring. The rear-wheel adjusting ring is at the left side of the hub and on the front wheel at the right. When adjusting ensure that there is a little end-to-end play — about 0.002-in. The maximum rock of the wheel in position should be not more than $\frac{1}{64}$-in. at the rim.

To adjust the rear wheel remove it from the frame. The front wheel can be dealt with *in situ*. A recommended drill is first to slacken the locking ring after which tighten the adjusting ring until all slackness has been taken up and then slacken back the adjusting ring half a turn. Now tighten the locking ring, seeing that the adjusting ring does not move.

Front Wheel Bearings

Remove nuts and brake cover plate complete. Slacken Fig 32's locking ring (11). Unscrew the adjusting ring fully (10) and remove with locking ring (11) *in situ*. Apply firm pressure to the threaded end of the spindle, so removing from the other end the cup housing (9) for the oil seal, the oil seal itself, the metal washer (7) behind the oil seal and then the outer cap. The front wheel spindle (6), with two sets of rollers, may now be removed from the hub.

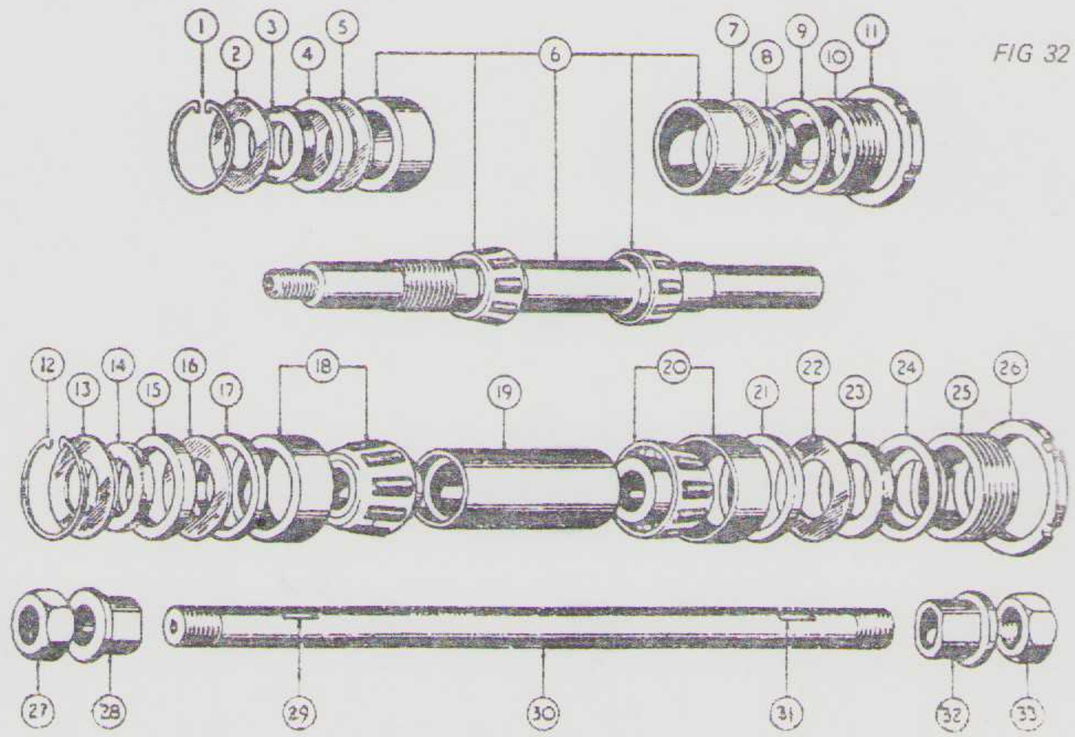


FIG 32

Post-war layout of wheel bearings showing (top) the front-wheel assembly and (bottom) rear hub components [illegible]-frame models

At the fixed location end exert pressure on the visible washer, so pushing the whole assembly farther into the hub. Remove the circlip (1). Reverse the hub and press on the inside edge of the outer cup (6), forcing it out of the hub. It will bring with it an external oil-seal plain washer (2), the oil seal (3) with encircling spacer collar (4), and the oil-seal inner plain washer (5) and the cup (6).

To reassemble, reverse the above procedure.

Rear Wheel Bearings

In spring-frame models remove brake cover plate, brake shoes, centre spindle with cams, bushes, spacers, nut and speedometer gearbox. Remove the lock nut (*see* Fig 32's lower part) (26) on the left-hand side and unscrew the adjusting ring (25) completely, removing this with the lock nut *in situ* (26).

At the fixed location end, press the visible washer, so pushing out the assembly at the other end – the cup housing (24) for the oil seal, the oil seal itself (23) and the metal washer behind it (22), the spacing ring (21) between the metal washer and taper bearing, and then the outer cup (20).

Remove the roller cage (26), centre spacer (19) and rollers in the cage (18).

At the fixed location end, having applied pressure on the visible washer and removed the circlip (12), apply pressure with a suitable tool through the open end of the hub, on the inner edge of the outer cup (18) and so force out the oil-seal plain washer (13), the oil seal (14) with its encircling spacer collar (15), the oil-seal internal plain washer (16), and the spacing ring (17) between the metal washer and the taper bearing. Take out the cup (18).

To reassemble, reverse the above procedure.

10. FRONT AND REAR BRAKE ADJUSTMENT

Brake adjustment to compensate for lining wear is made by finger adjustment on the rear brake rod and the front-brake cable adjuster. When excessive movement develops it can be taken up by adjusting the position of the thrust pads fitted to each brake shoe.

Where steel brake shoes are used, the collar position can be varied as the slots machined in it are of a different depth.

With alloy brake shoes, washers are used under the head of the steel thrust pins.

Centralizing Brake Shoes

In order that both shoes contact the brake drum simultaneously and to remedy a "spongy effect", release the nut securing the brake cover plate and apply pressure on the brake pedal or handlebar lever, depending upon which brake is being dealt with. Maintain this pressure and retighten firmly the brake cover nut. The brake adjustment can be closed up considerably to improve brake efficiency.

Two types of thrust-pad adjustment used to compensate for brake-lining wear.

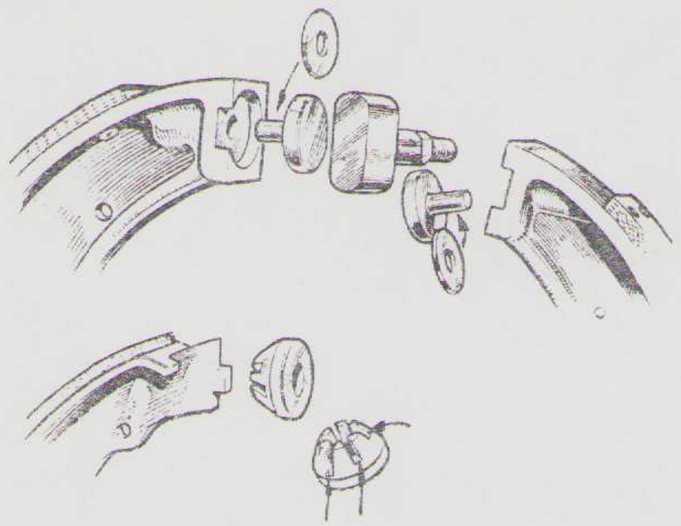


FIG 33

If this adjustment is ineffective, slightly enlarge the hole in the cover plate and repeat the process.

Water in Brakes

Brake linings which are not affected by water to any considerable extent are available for machines made after 1947. The use of a thin steel washer behind the rear cover plate will allow water to escape and thus ensure that the brake is unaffected.

11. DYNAMOS

Two types of dynamo were fitted. 1939-49: E3AR/A05/1, with negative earth; 1950-55: E3-N, with positive earth. The later (longer) type can be fitted to earlier models if the kickstarter case is exchanged. Some W.D. machines used Miller equipment, some Lucas.

Dynamo Chain

To adjust the chain, remove the inspection cap (front chaincase), unscrew the dynamo clamp bolt, turn the dynamo with a spanner engaged on flats on the left side of the component. There should be ¼-in. chain whip. Check through the inspection cover hole. The armature shaft is eccentric to the body of the dynamo, therefore, to tighten the chain the dynamo should be turned anticlockwise; to slacken it, turn the dynamo clockwise.

Screw up the dynamo clamp bolt and re-check. Use this opportunity to check the oil level in the chaincase.

Magneto Chain

To adjust, remove the chain case; slacken the nuts on the magneto platform bolts, insert a lever beneath the end of the platform and prise upwards until the chain whip is ¼-in.; tighten nuts and re-check. Do not forget to grease the chain well before replacing the case.

Removing Dynamo

For all Models before 1953

Remove the front chaincase, clutch, engine sprocket, circlip lockwasher, dynamo sprocket and the rear section of the chaincase. Remove cables, slacken clamp bolts. Take out the dynamo from the drive side of the engine. Instructions for dismantling are given in the previous chapter.

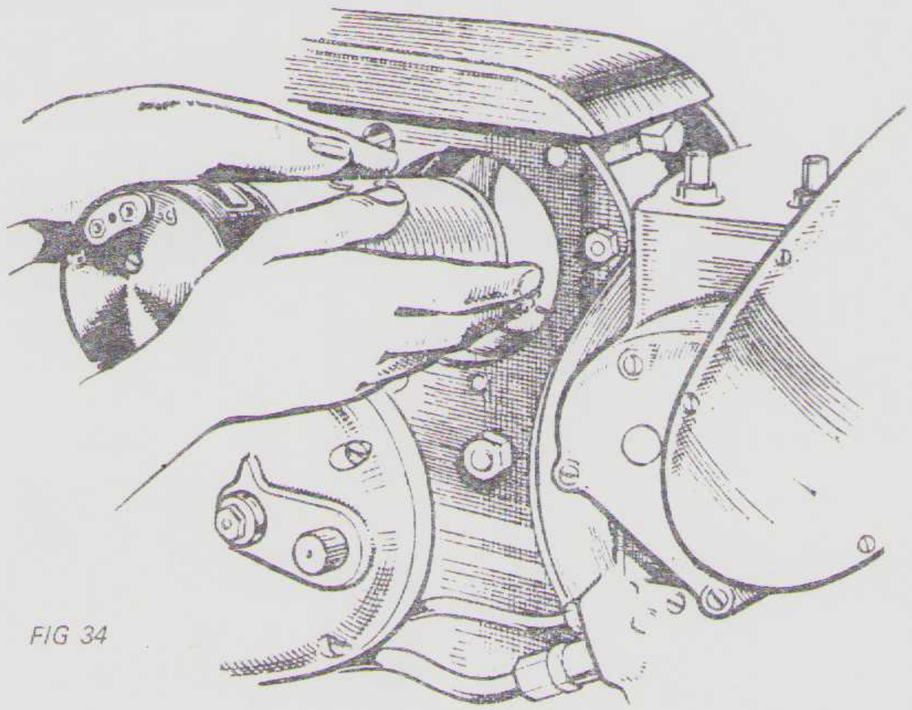


FIG 34

Removal of the dynamo on post-1953 models. In earlier years it was necessary first to take away the gearbox outer cover

For all Models after 1953

Remove the chaincase, the spring circlip and locking plate from the dynamo shaft nut, and with a spanner engaged with the flats at the back of the dynamo sprocket, unscrew the sprocket nut. Place a suitable wedge between the sprocket and the dynamo body when a few gentle taps on the wedge will push off the sprocket without damage to the armature. Remove cables. Turn the dynamo until the locating strip is in line with the keyway in the engine plate. Take away the dynamo from the timing side of the engine, tilting it upwards to clear the gearbox casing.

To refit, reverse the above procedure. Carefully check the position of the locking plate and circlip after the arm[illegible]ut has been tightened.

12. ELECTRICAL EQUIPMENT

Ignition, 1945-55

Many models have the Lucas type N1-4 magneto. Competition models have the racing NR1 magneto with a manual ignition control. 1954-55 models are fitted with A.T.D. units, and feature the SR1 magneto with rotating magnets.

Where A.T.D. units are standard, a wedge placed between the moving part of the unit and the stop holds the setting in a fully advanced position.

Removing Contact Breaker, N1-4 Magneto

Move aside the swivel blade retaining the contact-breaker cover. Take off the cover and the screw and spring washer securing the spring blade and backing spring. Remove the screw and fibre bush. Straighten the lock-washer under the centre screw retaining the contact breaker and ease off the assembly. When reassembling lubricate the wick with oil.

Contact Points

A special abrasive strip is available for cleaning the contact points. It may be necessary to reface pitted points by using a fine Carborundum stone. If the points are found repeatedly to be burnt, a faulty condenser is usually the cause.

Cleaning Contact Breaker Points

Turn the engine shaft until the points are fully open, clean and check for the correct gap (0.010 to 0.012 in.). To reset the gap, slacken the locknut, set the required gap and tighten the locknut.

SR1 Contact Points

Remove the moulded cover; slacken the nut securing the end of the contact-breaker spring and take off the contact-breaker lever. To adjust, loosen the two screws holding the fixed contact plate and alter the position of the plate until the required gap is obtained.

Dynamo

To test the dynamo while it is on the machine, remove the "D" and "F" cables from the dynamo and connect the two terminals with wire. Run the engine at idling speed and connect the positive lead of a moving-coil voltmeter (calibrated for not less than 0-10 volts) to either of the two dynamo terminals and link the negative lead with a good earth point. Slowly increase the engine speed, when the voltmeter reading should rise rapidly and steadily. Do not allow the voltmeter reading to exceed 10V and do not rev up the engine in order to obtain greater

c[illegible] 1 on page 34

The 1953 Matchless 350 cc G3L

Bearing an illustrious designation, the G3L is featured here by way of a maker's definitive photograph prior to factory retouching for the 1953 catalogue. Loaned by courtesy of Motorcycle Sport, the picture shows the 350 fitted with the Burman B52 box which superseded the earlier pre-1952 CP type. On the CP box the primary chaincase clutch dome was plain, on the B52 it had the small detachable cover shown here, and on the April 1957-on AMC box there was a large chainwheel-sized cover.

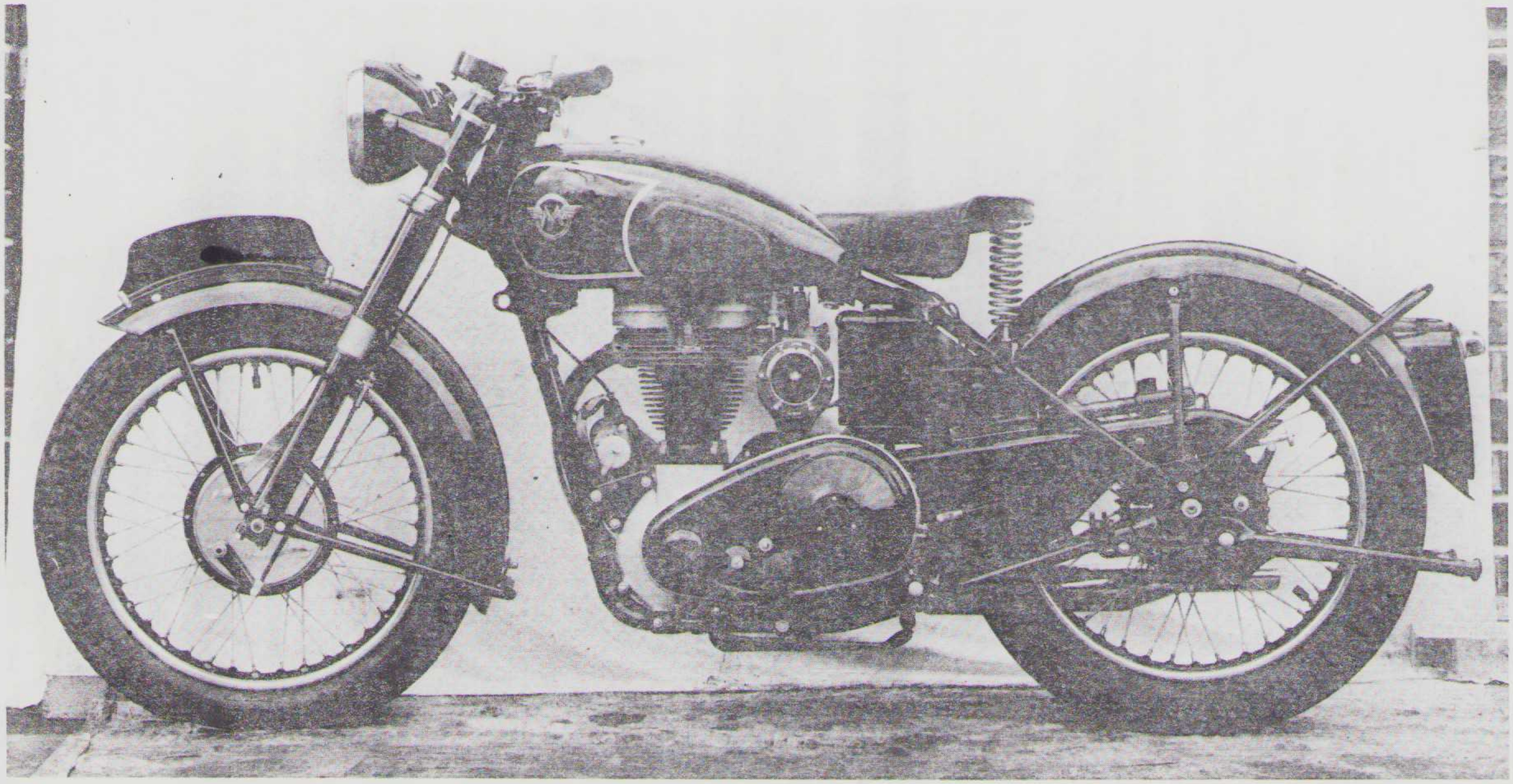
Roadsters gained full-width front hubs from September 1953; the full-width rear hub came in 12 months later. Here are seen the offset-brake types.

Motor is light-alloy head with iron barrel, AJS front-mounted magneto, pre-Monobloc carburetter (Monoblocs arrived in 1955 on AJS and Matchless), and the saddle could be of Lycetts or Terry manufacture. Twin seats were never offered on rigid roadsters.

Centre stands were used on springers only but a prop stand was an optional extra on all. The speedometer is mounted a'top the Teledraulics' upper crown, prior to later integration inside the headlamp shell.

A Lucas 6-volt dynamo, driven by a separate short chain from the back of the engine sprocket, is featured. The Lucas alternator (springers only) was introduced for the 1958 season complete with a cast-alloy chaincase to replace the pressed-steel type shown here.

The final year of the G3L was 1955, it being lapsed in August of that year, the already-catalogued G3LS springer holding sole sway in the lists — REG HIDE



The 1949 Matchless 500 cc G80C

Maker's definitive photographs by courtesy of Motorcycle Sport

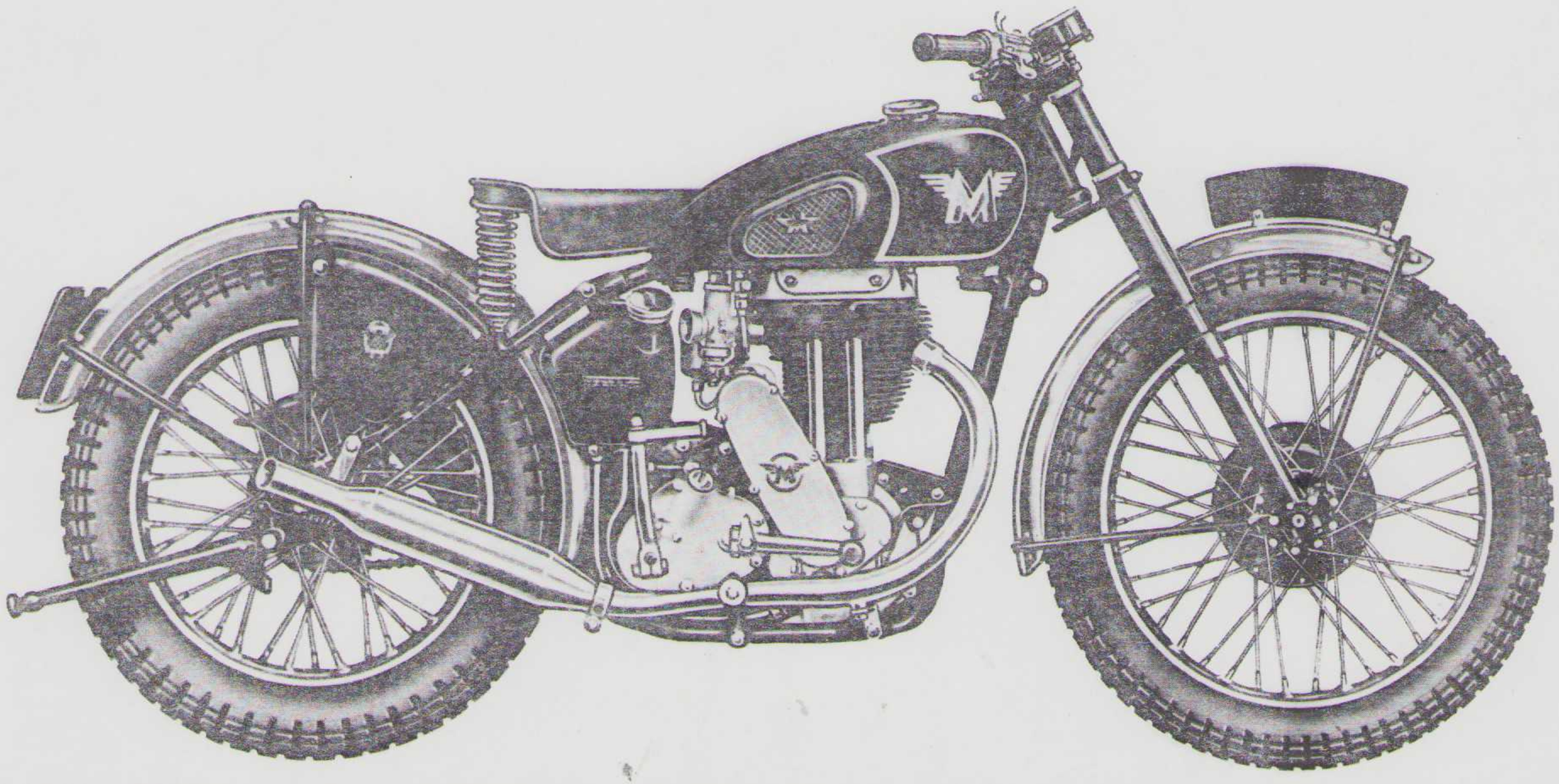
Shown here in the final year of the rigid rear end-only, the G80C did not take swingingarm rear suspension until 1950 when it became known as the G80CS (S for Springer), with the rigid G80C continuing as an inconsequential option right through to August 1955. The first springers had slim-type AMC candle legs though these were soon replaced by the Jampot variety.

A G80S springer however was offered for export-only in 1949.

The G80C shown here has iron head. The engine and frame numbers commenced with 451C and 467C respectively in 1946 and then continued 474C and 576C for 1947, 557C and 978C for 1948, 700C and 1547C for 1949 and 900C and 2105C for 1950 when the new lightalloy head and short wheelbase frame were introduced.

Magneto position on Matchless versions of the AMC singles was behind the cylinder until September 1951 (961C and 2694C) when the Lucas instrument was moved to the familiar AJS site in front of the engine. In 1952 (1096C and 3218C) a new front brake was fitted from September of that year for the 1953 season.

A twin seat — G80S only — was not offered on the 500 singles until September 1952, the term dualseat (one word and coined by Feridax) being avoided by AMC — REG HIDE



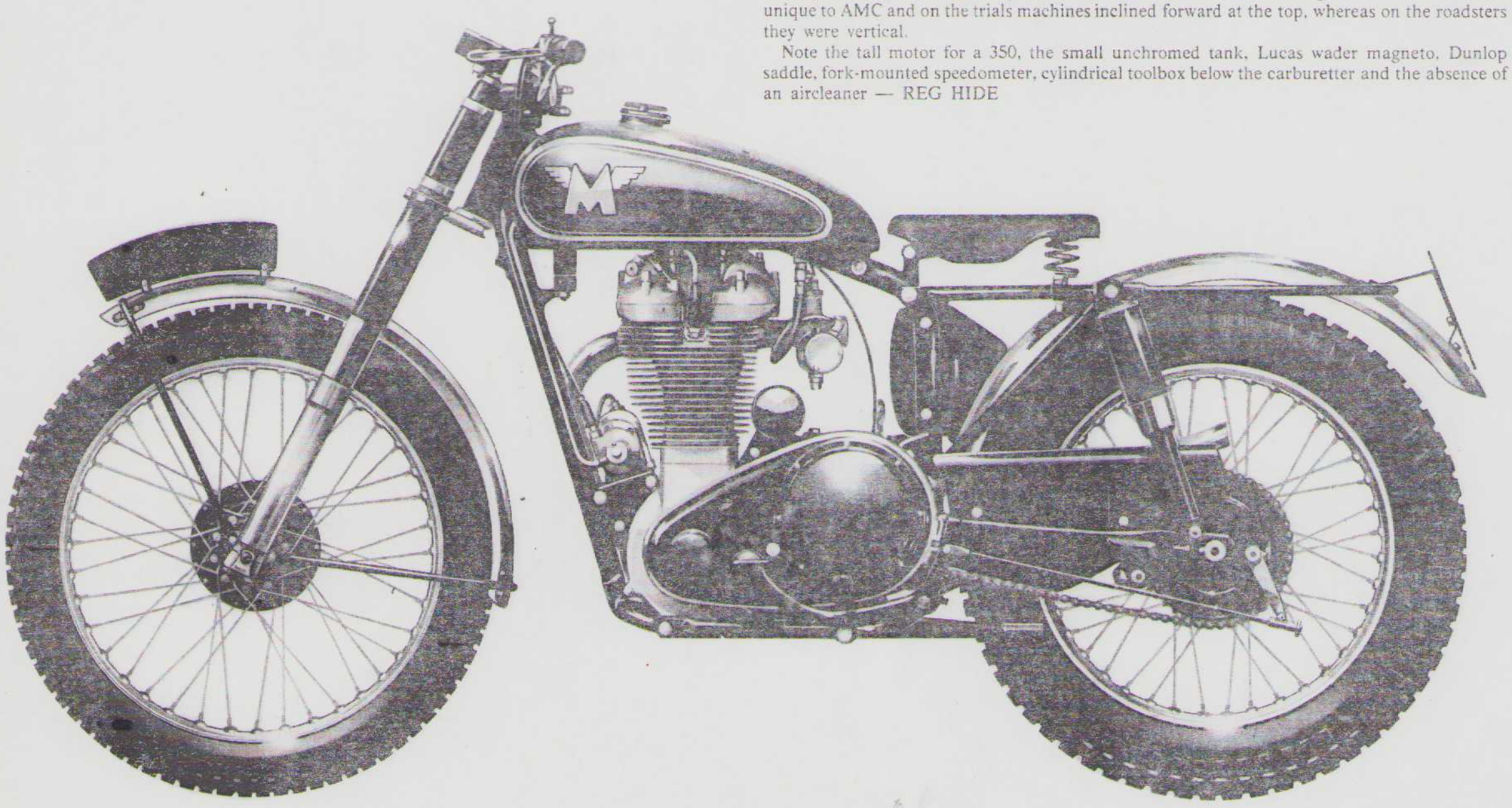
Maker's definitive photographs by courtesy of Motorcycle Sport

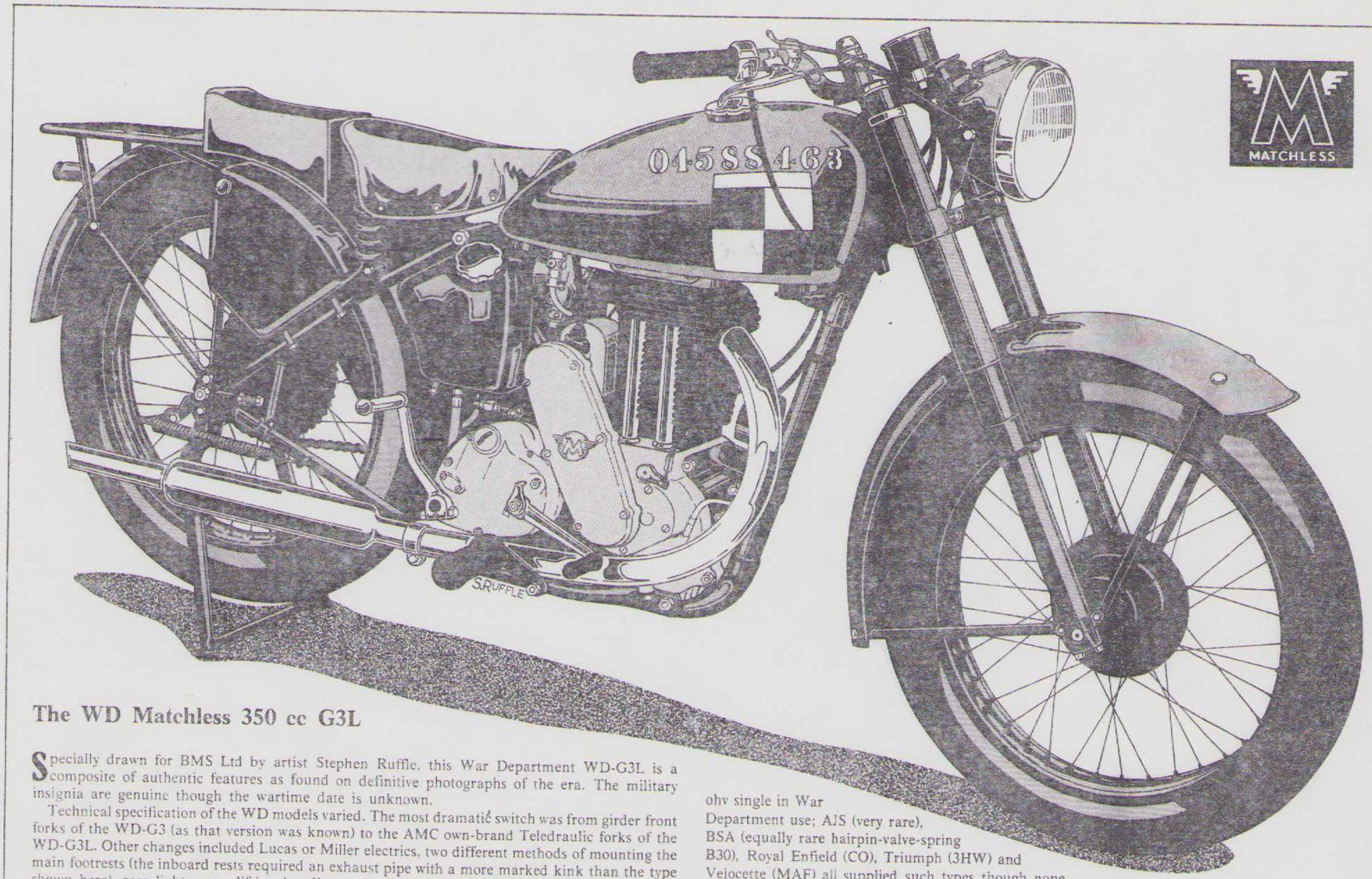
The 1959 350 cc Matchless G3C Trials

In the hands of such maestri as Gordon Jackson and Hugh Viney, the AJS/Matchless trials type gained innumerable postwar competition successes, paralleled on the scrambles side by Dave Curtis and others on the Matchless G80-series. The version shown here is for the 1959 season when it became known as the Matchless G3C Trials instead of the G3LC as hitherto. This maker's definitive photograph is not of course strictly within the ambit of this book but being to hand is too important not to include. To many it will represent the culmination of the art of the British big fourstroke trials machine with its accent on plonk.

The G3C Trials, with the AMC gearbox, had a new frame giving 3-inches more ground clearance in September 1956 (frame number 7350-on). The following year saw a wider rear mudguard (7952-on). In September 1958 there came a shorter and lighter frame (8490-on). Girling swinging-fork rear suspension was standard, the units having the clevis lower ends unique to AMC and on the trials machines inclined forward at the top, whereas on the roadsters they were vertical.

Note the tall motor for a 350, the small unchromed tank, Lucas wader magneto, Dunlop saddle, fork-mounted speedometer, cylindrical toolbox below the carburetter and the absence of an aircleaner — REG HIDE





The WD Matchless 350 cc G3L

Specially drawn for BMS Ltd by artist Stephen Ruffle, this War Department WD-G3L is a composite of authentic features as found on definitive photographs of the era. The military insignia are genuine though the wartime date is unknown.

Technical specification of the WD models varied. The most dramatic switch was from girder front forks of the WD-G3 (as that version was known) to the AMC own-brand Teledraulic forks of the WD-G3L. Other changes included Lucas or Miller electrics, two different methods of mounting the main footrests (the inboard rests required an exhaust pipe with a more marked kink than the type shown here), rear lights, rear lifting handles, and the make of pillion seat (when fitted).

Wartime blackout masks on the headlamp were of course in common use. We have traced three different styles of mudguarding and there may have been more.

Matchless were easily the most popular with Don-R servicemen as the marque was the first production machine to be equipped with a telescopic fork. They were also probably the second most numerous though the BSA 500 cc sidevalve M20 — with 126,334 put into Armed Forces service between 1940 and 1945 — was certainly top of the numbers league. Nor was the Matchless the only ohv single in War Department use; AJS (very rare), BSA (equally rare hairpin-valve-spring B30), Royal Enfield (CO), Triumph (3HW) and Velocette (MAF) all supplied such types though none of these equalled the 350 cc Ariel WNG ohv single in numbers.

At the outbreak of war, 3 September 1939, the British forces had 21,000 service machines and 6,000 of these were impressed civilian models of many makes and sometimes very up-the-market types. Some 425,000 WD machines of all makes were built during the war and 270,000 were in service on VE day.

Few Don-R's would quarrel with the claim that it is the Matchless G3L that is remembered with the greatest affection — REG HIDE

The 1949 500 cc Matchless G80

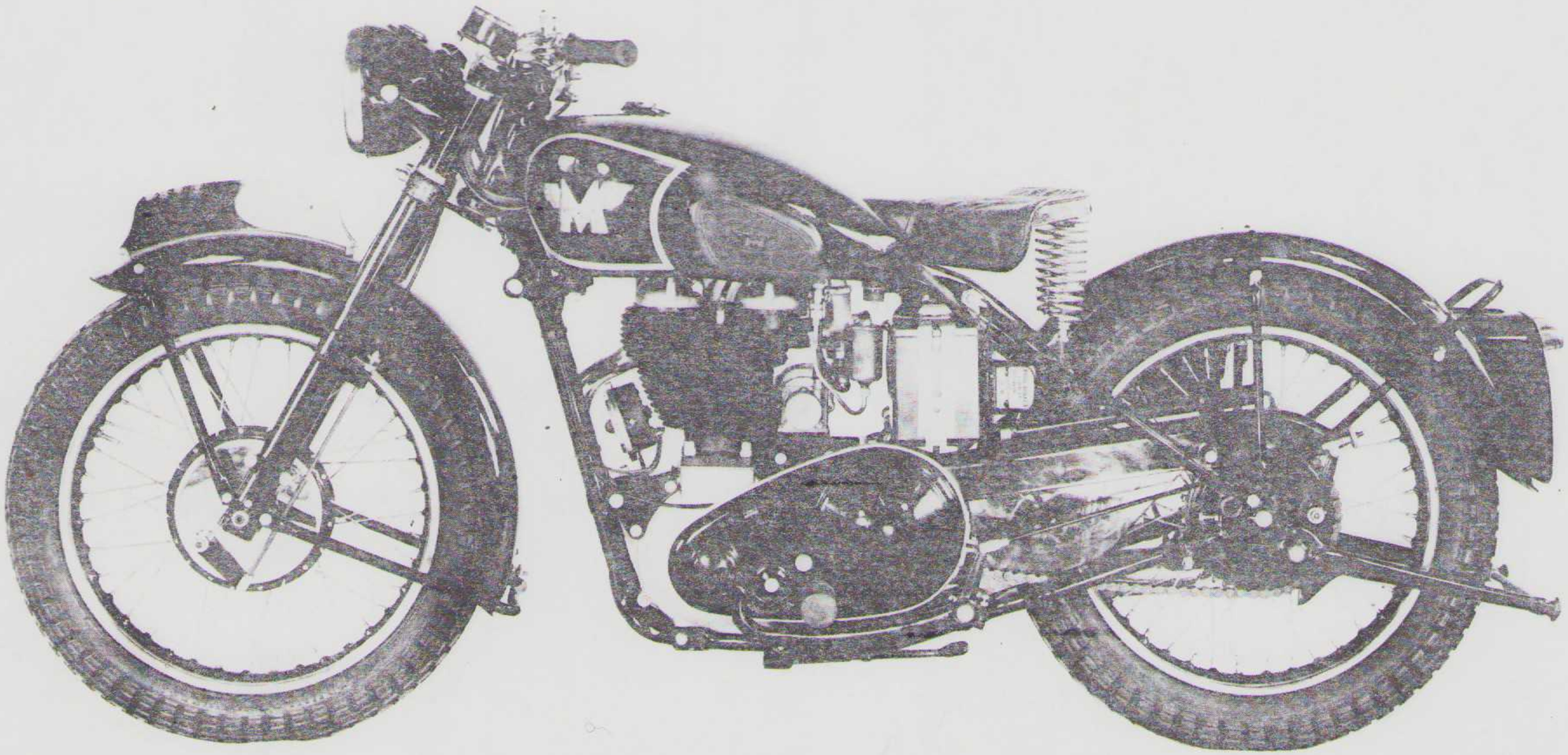
Maker's definitive photographs by courtesy of Motorcycle Sport.

With its all-iron overhead-valve single-cylinder engine, the AMC-made Matchless G80 was unchanged postwar until September 1950 when the 1951-season models took a die-cast light-alloy cylinder head, an increased compression ratio and a new clutch.

As with AMC practice, the engine number (stamped on the driveside crankcase immediately under the cylinder) gave the last two digits of the year of manufacture, an oblique stroke, the model designation, another oblique stroke, and then the actual engine number. Thus the 1949 G80, commencing with 9000, would be 49/G80/9000 ...

The frame number that year commenced at 35000 and was stamped on the head lug casting.

Though not roadtested — this being against the maker's policy to allow the specialist press to evaluate their products — the G80's top speed was traditionally in the mid-80's and performance was reckoned as being brisk for the engine specification on the Pool petrol of those days. The 7-inch diameter brakes, as with the later fullwidth hub, was always felt to be borderline for the potential of the machine — REG HIDE



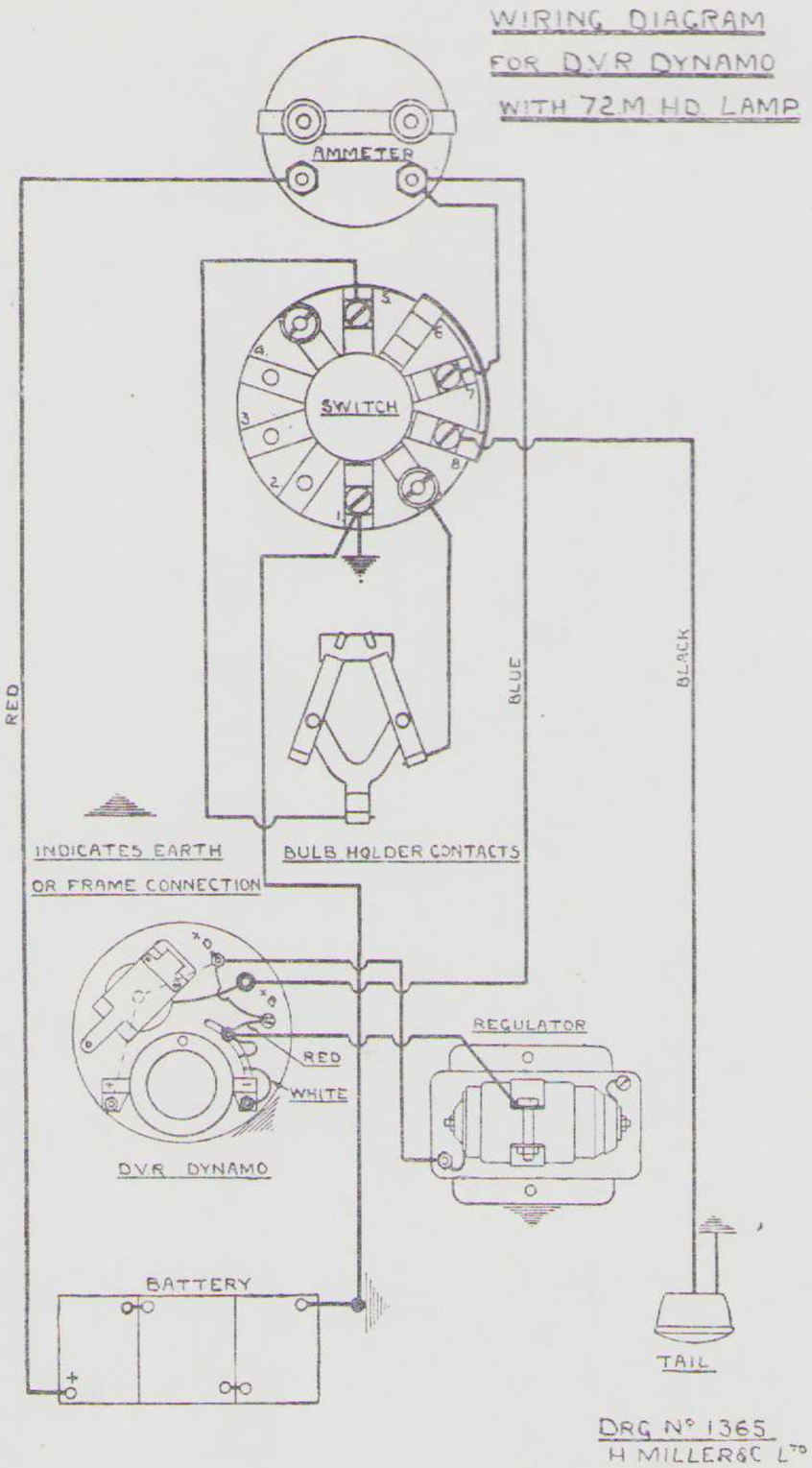
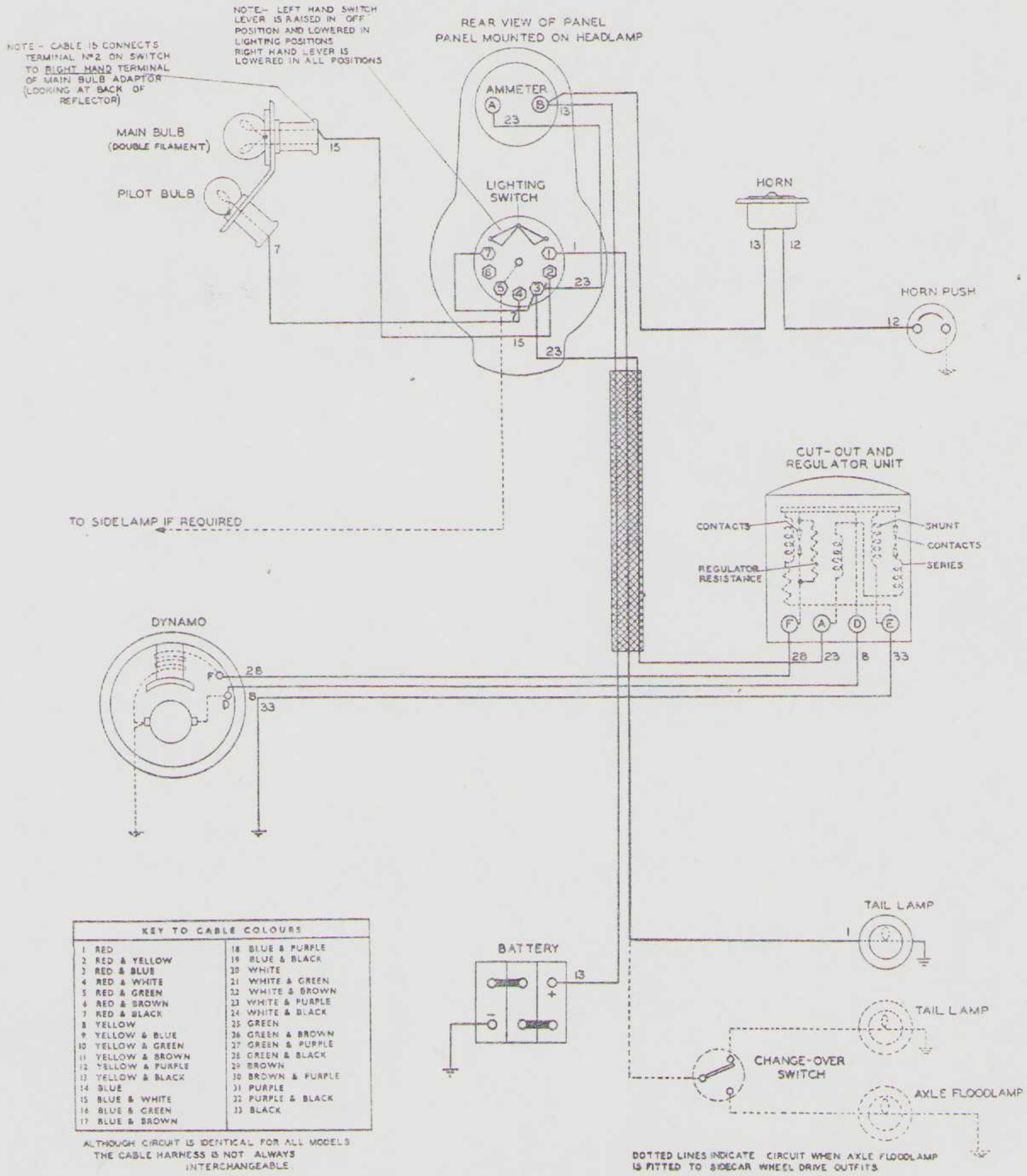


FIG 35 Wiring diagram for the Miller equipment found on some WD Matchless machines



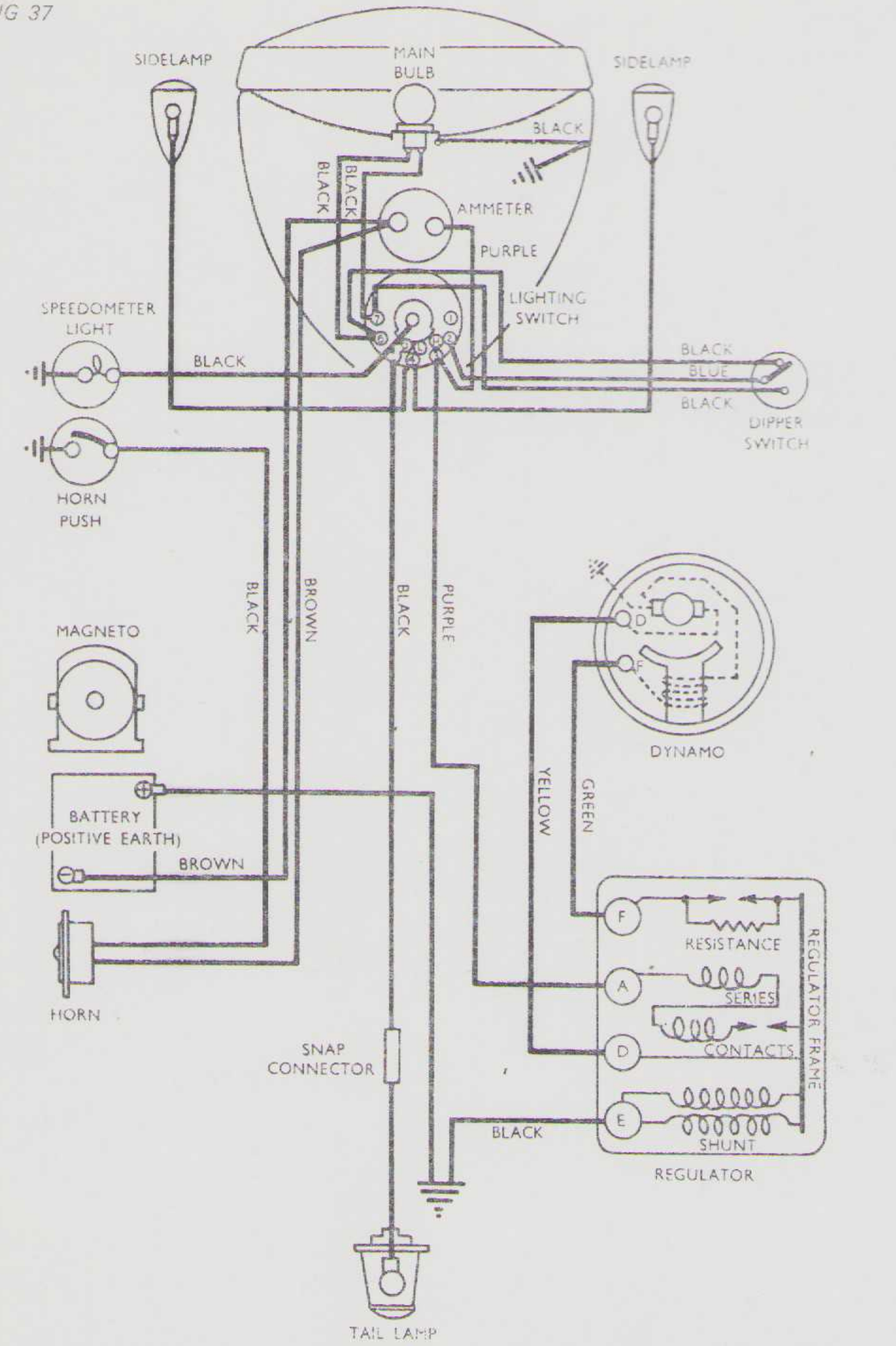
KEY TO CABLE COLOURS

1 RED	18 BLUE & PURPLE
2 RED & YELLOW	19 BLUE & BLACK
3 RED & BLUE	20 WHITE
4 RED & WHITE	21 WHITE & GREEN
5 RED & GREEN	22 WHITE & BROWN
6 RED & BROWN	23 WHITE & PURPLE
7 RED & BLACK	24 WHITE & BLACK
8 YELLOW	25 GREEN
9 YELLOW & BLUE	26 GREEN & BROWN
10 YELLOW & GREEN	27 GREEN & PURPLE
11 YELLOW & BROWN	28 GREEN & BLACK
12 YELLOW & PURPLE	29 BROWN
13 YELLOW & BLACK	30 BROWN & PURPLE
14 BLUE	31 PURPLE
15 BLUE & WHITE	32 PURPLE & BLACK
16 BLUE & GREEN	33 BLACK
17 BLUE & BROWN	

ALTHOUGH CIRCUIT IS IDENTICAL FOR ALL MODELS THE CABLE HARNESS IS NOT ALWAYS INTERCHANGEABLE

FIG 36 The Lucas wiring diagram for the WD G3L so equipped features minor departures from that s[illegible] later civilian roadsters

FIG 37



1952-55 positive earth system. Note: Use one lead for pilot when twin side lamps are not fitted

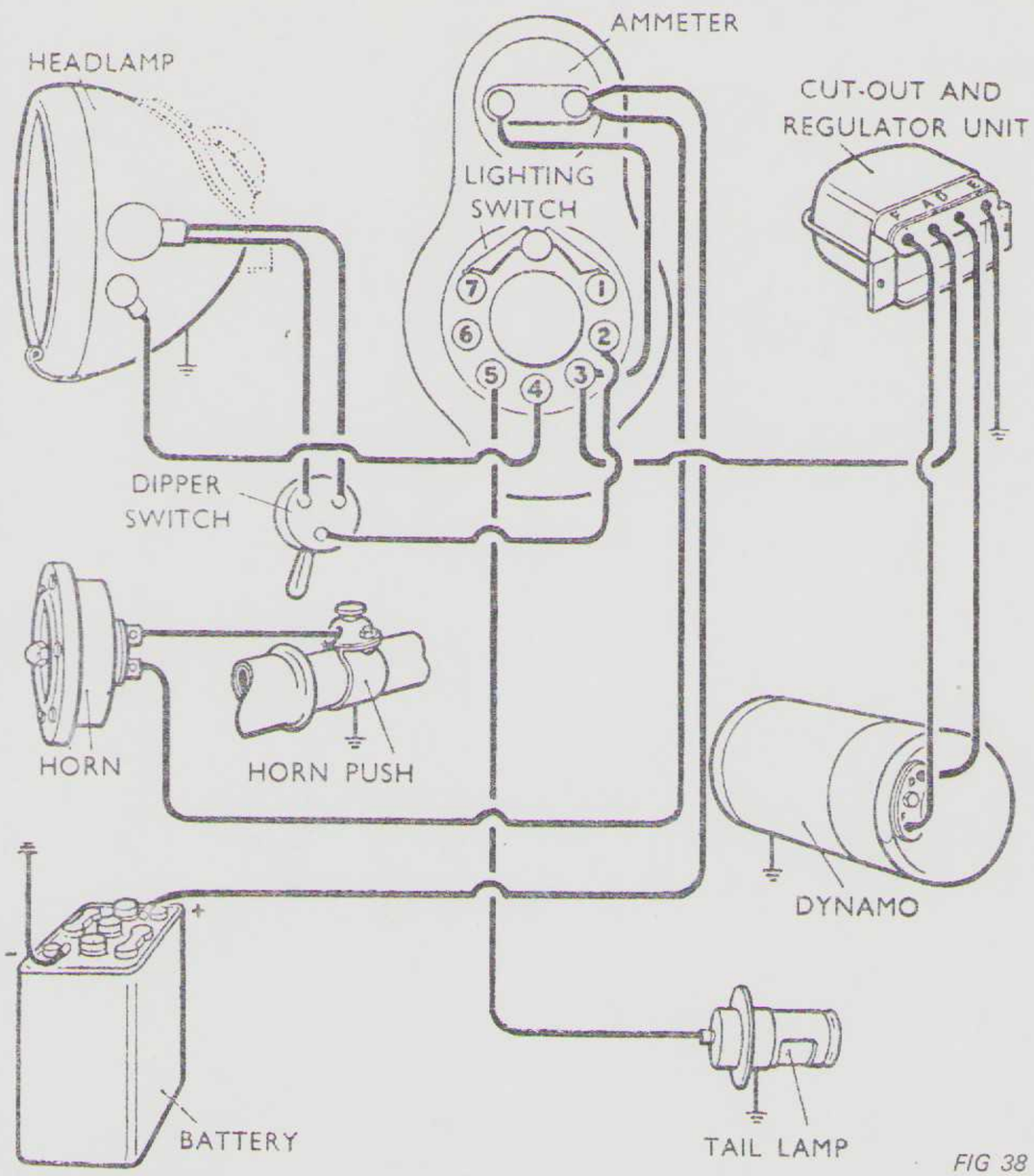


FIG 38

Both WD and civilian roadsters to 1951 operated on the negative earth system. This can easily be transposed to positive earth and the dynamo polarity readily reversed

voltage — one-eighth throttle is considered sufficient and, if the above reading is obtained, the dynamo is in order.

If there is no reading, check the brushes. If there is a reading of about 1 ½ to 2 V only, the armature winding may be faulty. It may be necessary to remove the dynamo. For dynamo removal procedure see page 27. If a reading of about ½ V is obtained, the field winding may be at fault. It is recommended that if an overhaul is necessary the services of the dynamo manufacturer should be sought.

Both W.D. and civilian roadsters to 1951 operated on the negative earth system. This can easily be transposed to positive earth and the dynamo polarity readily reversed.

Compensated Voltage Control Unit

The regulator is set to maintain a predetermined generator output at all speeds and controls the flow to the battery. The rate of charging is at its maximum when the battery is at lowest ebb, and at minimum when the battery is fully, or almost fully, charged.

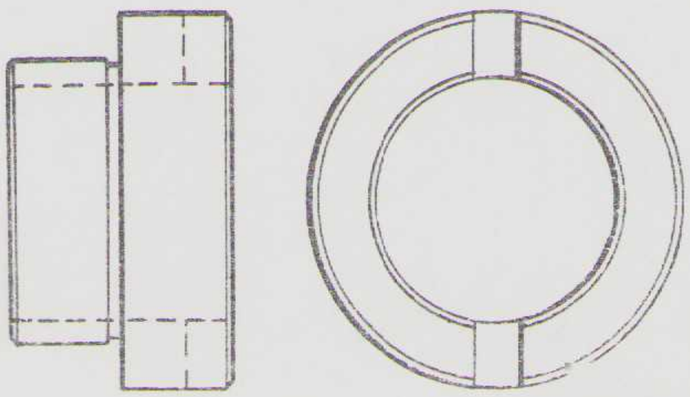
When the battery is in good condition the dynamo gives a trickle charge and an ammeter reading of about 1 to 2 amp. The cut-out is an automatic switch connecting the dynamo and the battery. When the engine is running fast enough to cause the voltage of the dynamo output to exceed that of the battery, the cut-out links up the battery for charging. When engine speed is low or the engine not running, the cut-out disconnects the battery from the dynamo, so preventing the battery discharging through the brushes and commutator. If, under normal running conditions, the battery is continually in a low state of charge, or is being overcharged, then the regulator setting should be adjusted at a Lucas Service Station. The C.V.C. unit is marked with the letters "F", "A", "D" and "E". "E" is earthed, "A" is connected to the ammeter and "F" and "D" pair with markings "F" and "D" on the dynamo.

It pays to use the services of an expert, so do not yourself meddle with the C.V.C. settings and cut-out contacts.

13. EX-W.D. MODEL 350 cc 41-G3L

Army models were first manufactured in 1939 and were similar to the 1939 civilian models. These machines are also similar to the 1945 models, with the exception that girder instead of "Teledraulic" forks were fitted. Instructions for fork servicing, overhauling and reassembling, therefore, have wide application. "Teledraulic" forks can be fitted to girder-fork models, the front frame layout being similar. The changeover necessitates the speedometer drive from the front wheel being discarded and transferred to the rear wheel, as on later models fitted with "Teledraulic" forks. This work involves the rear hub being machined. Two slots are cut in the face of the hub tube to drive the speedometer gearbox. If good workshop facilities are not available the owner is advised to purchase a second-hand ex-W.D. wheel. An alternative method is to make an adapter. The hollow spindle must be reversed to permit the wheel to be bolted to the brake drum, as on civilian models. Note that the quickly detachable method cannot be used when the speedometer drive is modified in this way. A new rear wheel and a solid spindle with distance piece, speedometer drive and cable are required to complete the conversion.

FIG 39



Speedometer drive. Adapter details for modification of a 1939 model for "Teledraulic" front suspension

The near-side fork slider anchoring the front brake can be exchanged for a later type if W.D. "Teledraulic" forks are used; alternatively, modify the front-brake anchorage, employing the front mudguard fixing bolts for this purpose. W.D. models were purposely detuned by a reduction of the compression ratio to 5.8, effected by a $\frac{1}{16}$-in. compression plate between the cylinder and crankcase. A $\frac{7}{8}$-in.-bore carburetter was standard.

Gear ratios (1941) provided for a low bottom ratio, similar to that on the post-war competition machines. An improved valve timing was introduced on engines after No. 54512. Owners of 1941 models can convert their machines, if they are in the original form, to the civilian counterpart by the following procedure:

Remove the compression plate, then machine away the ridge in the cylinder barrel at the limit of the piston-ring travel. Steel washers $\frac{1}{16}$-in. thick for push-rod tubes can be dispensed with. Fit the later-type carburetter with bore size 1-in., the inlet port being enlarged to match the carburetter; this applies also to the distance piece. Change the main driving gear and layshaft fixed pinion for similar gears of the standard type (30/20) teeth.

Engine efficiency can be further increased by fitting post-war high-lift cams, provided that the valve-lifter shaft is dealt with as described in an earlier chapter and by taking care to check the valve motion as a precaution against the valve springs closing up or being coil-bound when the valves are at full lift.

If it is desired to use a machine for scramble-type events, the following modifications will be found useful:

Discard the timing-side roller bearing and use a double-diameter bronze bush, obtainable from the makers. Modify the flywheels to take a $\frac{7}{8}$-in.-diameter crankpin, assuming the engine is fitted with the earlier-type $\frac{3}{4}$-in. shaft. Fit the shorter-type 1947-55 connecting rod and use a high-compression piston of 9.5 : 1 ratio. Discard the compression plate and steel washer for push-rod cover tubes ($\frac{1}{16}$-in. thick).

Fit 1948-type valve springs, top collars and an exhaust pipe of $1\frac{3}{4}$-in. diameter, 48-in. long. Also enlarge the inlet port to 1 or $1\frac{1}{16}$-in. and use a carburetter to match.

If workshop facilities are available, modify to use an inlet valve $\frac{1}{32}$-in. larger in diameter than standard. The valve seat should be made approximately $\frac{3}{32}$-in. wide and a cutter used to reduce valve-seat width. With this arrangement, check the valve motion and ensure that the valve head does not foul the cylinder barrel when the valve is at full lift. The application of a half-round file to the cylinder barrel at the point of contact will provide the necessary clearance.

The inlet-valve guide can be made of bronze with a bore of $\frac{5}{16}$-in. for the inlet valve instead of the normal $\frac{3}{8}$-in. The exhaust-valve stem diameter should not be reduced. Exhaust-valve material is KE 965.

An excess of oil in the combustion chamber will affect engine performance, and the reader's attention is drawn to the procedure for reducing oil supply to this part of the engine in the chapter dealing with 1945-55 models with particular

attention to 1947 models, iron heads.

If at any time the oil-pump plunger and timing-side shaft is changed, care should be taken to ensure that the new parts are of the correct type. In 1947 a two-start pump was introduced; it can be identified by the marking 2S on the oil-pump shaft end and by 2S marked on the timing-side shaft worm. The new parts will not interchange with the old. To adapt the new pump and timing-side shaft in ex-W.D. models, it will be necessary to fit a ⅜-in.-diameter oil-return pipe and enlarge the oil-return passage in the crankcase.

To improve braking efficiency — provided that expense is not important — 7-in.-diameter brake parts (1948 type) can be fitted to front and rear wheels, the brake anchor on the front wheel being modified to fit on to the top lugs.

If a prop stand is inclined to bend, or the stop fails, the fault may be due to wear in the lug in the frame on which the prop stand pivots. Ream out the lug hole and insert a thin steel bush.

Combinations

The 41-G3L is suitable for conversion for sidecar work. The wheels, frame and forks are similar to those used on the 1945 500 cc machines. Fit a 16-tooth engine sprocket, stronger front springs, sidecar-type 951/54 12¾-in. long. Also fit a steering damper and use a lightweight sidecar.

A cylinder-head "steady stay" can be used to damp down the effect of engine torque. The parts can be obtained from the makers and include, apart from the "steady stays" and clip, a special bolt with extended thread to accommodate one end of the stay. When servicing the engine ensure that the hardened valve-end caps, used on all engines up to 1948, are not dislodged when refitting the rocker box.

Wheel Alignment

To check wheel alignment use a straight wooden batten, raised about 4-in. from the ground; adjust until the batten touches each tyre at both sides of the wheel centres. Alternatively, use a length of string, tightly stretched. If tyre sizes are unequal, balance the gap between the batten and the front tyre.

Wheel Bearings

Wheel bearings are of the taper-roller type; the inner races and rollers are integral with the wheel spindle, the outer cups being a pressed hub shell. At one end is an adjustable location, the other end being fixed. Each roller bearing has an oil sealing ring and, where a felt washer is fitted, this should be changed to the later-type rubber sealing ring.

To adjust, rotate the ring screwed into the hub shell and secure it by means of the locking ring. Rear-wheel adjustment is made from the brake side with the wheel removed, and on the front wheel from the right-hand side with the wheel *in situ*. The amount of end-play in these bearings is 0.002 in., and if adjusted too tightly damaged bearings will result. Tighten the adjusting ring until movement is not discernible, then slacken half a turn. When tightening the locking ring ensure that the adjusting ring does not move.

Dismantling Wheel Bearings

Remove the cover plate and brake shoes. When dealing with the rear wheel take out the centre spindle and remove the speedometer drive complete. Remove the locking ring and unscrew the adjusting ring. Remove the adjusting ring, locking ring, dished steel washer, oil seal and plain steel washer. Turning to the other end, remove the spring ring, plain steel washer, oil seal with spacing collar, plain steel washer and spindle, complete with rollers and cages and one outer cup. Press out the hub shell from the other end, leaving the outer bearing cup in position.

ABRIDGED DATA

ENGINE

Cylinder Bore :
2.7187 in. ± .0005 in. Rebore to + .020 in when wear exceeds .008 in.

Small-End Bush :
⅞ in. +.0005 in. — .00025 in.

Crankpin Diameter:
1.20325 in. /1.20350 in.

Big-End Eye (I/D) :
1.70375/1.70400 in.

Rocker Spindle Bushes :
⅝ in. + .001 in.

Rocker Spindle Sleeve:
.6230 in./.6235 in.

Camshaft Bushes :
½ in. ± .0005 in.

Timing Side Mainshaft Bush :
⅞ in. +.00125 in.

Gudgeon Pin :
⅞ in. — .0015/.001 in.

Piston Diameters :
Top Land. 2.6877 ± .0005 in.
Second Land. 2.6962 in. ± .0005 in.
Third Land. 2.6962 ± .0005 in.
Top Skirt. 2.7132 ± .0005 in.
Bottom Skirt. 2.7143 ± .0005 in.

Piston Rings :
Compression (2) 2 23/32 × 1/16 in.
Scraper (1) 2 23/32 × ⅛ in.
Gap : .006/.008 in. normal. Maximum .030 in.

Valve Stems :
.375 — .0035/.0045 in.

Valve Guides : (I/D)
⅜ in. ± .0005 in.

VALVE TIMING

Early Models :
Inlet opens before T.D.C. 20°
Inlet closes after B.D.C. 67°
Exhaust opens before B.D.C. 78°
Exhaust closes after T.D.C. 28°

Engines numbered 54512 onwards :
Inlet opens before T.D.C. 32°
Inlet closes after B.D.C. 63°
Exhaust opens before B.D.C. 65°
Exhaust closes after T.D.C. 30°
(Set with .016 in. tappet clearance.)

Contact-Breaker Gap :
.010/.012 in.

Ignition Advance (with lever control fully advanced) ⅛ in.

Sparking-Plug Gap :
.020/.025 in.

CARBURATION

Amal type 275/1J with 120 main jet, 5 × 5 throttle slide and needle in third or fourth notch.

Gearbox:
Mainshaft, over-all length 10.25 in.
Main sleeve-gear bearing, bore 1 9/32 in. × O/D 62 mm. × 16 mm.
Bearing in end cover, bore 12 mm. × O/D 40 mm. × 17 mm.
Ratios, 5.8, 7.5, 12.2 and 18.5 : 1.

Transmission:
Clutch thrust rod, 9⅞ in.
Operating lever clearance (in gearbox) 1/32 in.

Sprockets:
Clutch 40T for ½-in. × .305-in. chain.
Engine 18T for ½-in. × .305-in. chain.
Gearbox 16T for ⅜-in. × .380-in chain.
Rear wheel 42T for ⅜-in. × .380-in. chain.

Spokes:
Front left, 5 13/16 in. 8G × 10G butted.
,, right, 8 1/16 in. 9G × 11G butted.
Rear left, 8 1/16 in. 6G × 9G butted.
,, right, 8 3/16 in. 6G × 9G butted.

GEARBOX INTERNAL RATIOS

	First gear	Second gear	Third gear	Fourth gear (top)
Standard	1 to 2.67	1 to 1.76	1 to 1.28	1 to 1
Competition	1 to 3.16	1 to 2.09	1 to 1.28	1 to 1

FORK SPRING DATA

Part No.	Year	Free length
017127	1945-46	9.997 in. Solo 6G } Use 016782 for sidecar
010308	1948	10 1/32 in. Solo 6G } Use 016782 for sidecar
012972	1949	11 in. Solo 6G } Use 016782 for sidecar
015002	1950	12.09 in. Solo 6G
016526	1951-54	12¾ in. Solo 6G
016782	1951-54	12¾ in. Sidecar 0.212 in. dia. wire
021784	1955	12¾ in. Solo 5½G
021789	1955-60	12¾ in. Sidecar 0.212 in. dia. wire

REAR SUSPENSION SPRING DATA

011945	1950	8⅝ in. 9/32 in. dia. wire
016297	1951-56	5¾ in. 5/16 in. dia. wire (Solo)
016061	1951-56	5¾ in. 11/32 in. dia. wire (Sidecar)
023373	1957-60	Solo
023372	1957-60	Sidecar

APPENDIX OF USEFUL TECHNICAL DATA

The following data are common to all machines except ex-W.D. 350 c.c. Model 41-G3L.

Stroke 93 mm.
Tappet clearance Nil, t.d.c., firing stroke
Magneto contact gap 0.012 in.
Flywheel balance factor 65%
End float (max.) 0.025 in.
Valve lift 5/16 in.
Valve seat angle 45°
Camshaft bush ½ in. ±0.0005 in.
Camshaft axle ½ in. −0.00125/0.00175 in.
Crankpin diameter 1.20350/1.20375 in.
Piston ring gap 0.003 in. per each inch in diameter.
Crankpin rollers 0.25 × 0.25 in. (30 off)
Connecting-rod sleeve *in situ* diameter 1.70375/1.70400 in.
Driving-side shaft 0.9997/1.0002 in.
Gudgeon pin size ⅞ in. −0.0010/0.0013 in.
Rocker axle bush ⅝ in. +0.00075 in. −0.0005 in.
Rocker axle sleeve, O/D 0.6230/0.6235 in.
Small end bush ⅞ in. +0.00050 in. −0.00025 in.
Valve timing 0.016 in. tappet clearance

TECHNICAL DATA 1945-47

	1945 350-cc	1945 500-cc	1946 350-cc	1946 500-cc	1947 350-cc	1947 500-cc
Bore, mm	69	82.5	69	82.5	69	82.5
Stroke, mm	93	93	93	93	93	93
Capacity, cc	347	498	347	498	347	498
Compression ratio	6.35	6.0	6.35	6.0	6.35	6.0
Valve timing	All models use 0.016 tappet clearance					
Inlet opens B.T.D.C.	32°	32°	32°	32°	32°	32°
Inlet closes A.B.D.C.	63°	63°	63°	63°	63°	63°
Exhaust opens B.B.D.C.	65°	65°	65°	65°	65°	65°
Exhaust closes A.T.D.C.	30°	30°	30°	30°	30°	0° 3
Ignition before T.D.C., full advance	All ½					
Tappet clearance, engine cold	All models nil clearance Set with piston on T.D.C. firing stroke					
Carburetter, bore size	1	1 1/32	1	1 1/32	1	1 1/32
Main jet	150	180	150	180	150	180
Slide	6/4	29/4	6/4	29.4	6/4	29/4
Needle position	2	2	2	2	2	2
Needle jet	4.061	29.076	4.061	29.076	4.061	29.076
Needle	6	29	6	29	6	29
Cylinder size	2.7187	3.250	2.7187	3.250	2.7187	3.250
Tolerance +0.0005 −0.0005						
K.L.G. sparking-plug	F80	F80	F80	F80	F80	F80
Magneto contact gap	0.012					
Gearbox lubricant	1¾ pints light grease					
Petrol-tank capacity, pints	24					
Petrol-tank reserve, pints	4					
Oil-tank capacity, pints	4					
Top of skirt, piston diameter	All 350 cc 2.7132					
Top of skirt, mean diameter	All 500 cc 3.2435					
Bottom of skirt, piston size	All 350 cc 2.7143					
Bottom of skirt, mean diameter	All 500 cc 3.2446					
Gudgeon-pin size	⅞ −0.0010 −0.0013					
Connecting-rod length, centres	~~7⅜ (1945-46)~~ 6⅞ (1947)					

(All dimens... in inches unless otherwise indicated.)

TECHNICAL DATA 1945-47 — continued

	350-cc and 500-cc models
Timing-side shaft diameter	$\frac{7}{8}$ $^{-0.0020}_{-0.0025}$
Rocker-axle bush	$\frac{5}{8}$ $^{+0.00075}_{-0.00050}$
Camshaft bush	$\frac{1}{2}$ $^{+0.0005}_{-0.0005}$
Rocker-axle sleeve	High limit 0.6235 Low limit 0.6230
Camshaft axle	$^{-0.00125}_{-0.00175}$
Small-end bush	$\frac{7}{8}$ $^{+0.00050}_{-0.00025}$
Flywheel end-float	0.025 maximum With shock absorber spring removed
Flywheel diameter	All 350 7 ⅛ x 1.098 All 500 7¾ x 1.156
Balance factor	All 65%
Total rotating weight	All 350 843.3 gm. All 500 843.3 gm.
Reciprocating weight	All 350 497.4 gm. All 500 673.2 gm.
Balance weight	All 350 1 lb. 4 oz. 9¾ gm. (one flywheel) All 500 1 lb. 6 oz. 8½ gm. (one flywheel)
Exhaust pipe	Best length (open) 48
Wheel base	53
Head angle	63°
Trail	2 $\frac{5}{8}$
Valve spring, free length inner	1 $\frac{13}{16}$
Valve spring, free length outer	2 $\frac{1}{16}$
Valve lift	$\frac{5}{16}$
Valve-seat angle (all engines)	45°
Push-rod, overall length	All 350 9 $\frac{41}{64}$. All 500 9 $\frac{5}{32}$
Valve guide (inlet)	½
Protrusion (exhaust)	⅝
Valve stem (inlet)	0.3730 high limit and 0.3720 low limit
Diameter (exhaust)	0.3715 high limit and 0.3705 low limit
Crankpin diameter	1.20375 high limit and 1.20350 low limit
Crank-pin rollers	All 0.250 x 0.0250 (30 off)
Connecting-rod sleeve diameter	1.70400 high limit and 1.70375 low limit
Timing-side bush	$\frac{7}{8}$ $^{+0.00075}_{+0.0}$
Driving-side shaft	1.0002 high limit and 0.9997 low limit

(All dimensions are in inches unless otherwise indicated.)

TECHNICAL DATA 1948-60

	1948 350-cc	1948 500-cc	1949 350-cc	1949 500-cc	1950-60 350-cc	1950-60 500-cc
Bore, mm	69	82.5	69	82.5	69	82.5
Stroke, mm	93	93	93	93	93	93
Capacity, cc	347	498	347	498	347	498
Compression ratio	6.35	6.0	6.35	6.0	6.35	6.0
	All models use 0.016 tappet clearance					
Valve timing						
Inlet opens B.T.D.C.	32°	32°	32°	32°	32°	32°
Inlet closes A.B.D.C.	63°	63°	63°	63°	63°	63°
Exhaust opens B.B.D.C.	65°	65°	65°	65°	65°	65°
Exhaust closes A.T.D.C.	30°	30°	30°	30°	30°	30°
Ignition before T.D.C., full advance	All ½					
Tappet clearance, engine cold	All models nil clearance Set with piston on T.D.C. firing stroke					
Carburetter, bore size	1	1 $\frac{3}{32}$	1	1 $\frac{3}{32}$	1	1 $\frac{3}{32}$
Main jet	150	180	150	180	150	180
Slide	6/4	29/4	6/4	29/4	6/4	29/4
Needle position	2	2	3	2	3	2
Needle jet	4.061	29.076	4.061	29.076	4.061	29.076
Needle	6	29	6	29	6	29
Cylinder size	2.7187	3.250	2.7187	3.250	2.7187	3.250
Tolerance $^{+0.0005}_{-0.0005}$						
K.L.G. sparking-plug	F80	F80	F80	F80	F80	FE80*
Magneto contact gap	0.012					
Alternator gap	0.019-0.016					
Gearbox lubricant	1 pint engine oil					
Petrol-tank capacity, pints	24					
Petrol-tank reserve, pints	4					
Oil-tank capacity, pints	4					
Top of skirt, piston diameter	All 350-cc 2.7176					
	All 500-cc 3.2490					
Top of skirt, mean diameter	All 350-cc 2.7180					
	All 500-cc 3.2494					
Bottom of skirt, piston size	$\frac{7}{8}$ $^{-0.0010}_{-0.0013}$					
Bottom of skirt, mean diameter						
Gudgeon-pin size						
Connecting-rod length, centres	6⅜ (1948-51)					

(All dimensions are in inches unless otherwise indicated.)

* Alloy head.

TECHNICAL DATA 1948-60 — continued

	1948 350-cc	1948 500-cc	1949-51 350-cc	1949 500-cc	1950-53 500-cc
Timing-side shaft diameter	All 1948-49 ⅞ −0.0020 −0.0025				
	All 1950-51 ⅞ −0.00150 −0.00175				
Rocker-axle bush	⅝ +0.00075 −0.00050				
Camshaft bush	¼ +0.0005 −0.0005				
Rocker-axle sleeve	High limit 0.6235 Low limit 0.6230				
Camshaft axle	½ −0.00125 −0.00175				
small-end bush	⅞ +0.00050 −0.00025				
Flywheel end float	0.025 maximum With shock absorber spring remove				
Flywheel diameter	All engines (after 8000) 7¾ x 1.156				
Balance factor	65%				
Total rotating weight	All 350 843.3 gm. All 500 843.3 gm.				
Reciprocating weight	All 350 497.4 gm. All 500 673.2 gm.				
Balance weight	All 350 1 lb. 4 oz. 9¾ gm. (one flywheel) All 500 1 lb. 6 oz. 8¼ gm. (one flywheel)				
Exhaust pipe	Best length (open) 48				
Wheel base	53	53	54	54	54
Head angle	63¼°	63¼°	63¼°	63¼°	63¼°
Trail	2⅝	2⅝	2⅝	2⅝	2⅝
Valve spring, free length inner	2	2	2	2	2
Valve spring, free length outer	2 13/64	2 13/64	—	—	—
Valve lift	5/16	5/16	5/16	5/16	5/16
Valve-seat angle (all engines)	45°	45°	45°	45°	45°
Push-rod, overall length	9 41/64	9 5/32	9 5/32	9 5/32	9 5/32
Valve guide (inlet) protrusion (exhaust)	¼ 9/16	½ 9/16	½ 5/16	½ 9/16	½ 9/16
Valve stem dia. (inlet)	0.3730 high limit and 0.3720 low limit				
" " (exhaust)	0.3715 high limit and 0.3705 low limit				
Crank-pin diameter	1.20375 high limit and 1.20350 low limit				
Crank-pin rollers	0.250 x 0.250 (30 off)				
Connecting-rod sleeve diameter	1.70400 high limit and 1.70375 low limit				
Timing-side bush	All 1948-49 ⅞ +0.00075 +0.0				
	All 1950-51 ⅞ +0.0005 +0.0000				
Driving-side shaft	1.0002 high limit 0.9998 low limit				

(All dimensions are in inches unless otherwise indicated.)

TECHNICAL DATA 1954-60

	350-cc and 500-cc models	
Timing-side shaft diameter	1.2275-1.2300	
Rocker-axle bush	⅝ +0.00075 −0.00050	
Camshaft bush	½ +0.0005 −0.0005	
Rocker-axle sleeve	High limit 0.6235 Low limit 0.6230	
Camshaft axle	⅜ −0.00125 −0.00175	
Small-end bush	⅞ +0.00050 −0.00025	
Flywheel end float	0.025 maximum With shock absorber spring removed	
Flywheel diameter	All engines (after 8000) 7¾ x 1.156	
Balance factor	All 65%	
Total rotating weight	All 350 843.3 gm. All 500 843.3 gm.	
Reciprocating weight	All 350 497.4 gm. All 500 673.2 gm.	
Balance weight	All 350 1 lb. 4 oz. 9¾ gm. (one flywheel) All 500 1 lb. 6 oz. 8¼ gm. (one flywheel)	
Exhaust pipe	Best length (open) 48	
Wheel base	54	
	500-cc	350-cc
Head angle	63¼°	63¼°
Trail	2⅝	2⅝
Valve spring, free length narrow	3⅛ 2	2⅝ 2
Valve spring, free length wide	2	2
Valve lift	5/16	5/16
Valve-seat angle (all engines)	45°	45°
Push-rod, overall length	9 5/32	9 5/32
Valve guide (inlet) protrusion (exhaust)	½ ½	½ ½
Valve stem dia. (inlet)	0.3730 high limit and 0.3720 low limit	
" " (exhaust)	0.3715 high limit and 0.3705 low limit	
Crankpin diameter	1.20375 high limit and 1.20350 low limit	
Crankpin rollers	0.250 x 0.0250 (30 off)	
Connecting-rod sleeve diameter	1.70400 high limit and 1.70375 low limit	
Timing-side bush	1.125-1.1255	
Driving-side shaft	1.0002 high limit and 0.9997 low limit	

(All dimensions are in inches unless otherwise indicated.)

Gear Ratios—347 c.c. and 498 c.c. Models

ENGINE SPROCKET	1st	2nd	3rd	Top	INTERNAL RATIOS
15 teeth	18.69	12.32	8.96	7.0	
16 teeth	17.5	11.54	8.39	6.56	1st 2.67
17 teeth	16.44	10.48	7.88	6.16	2nd 1.76
*18 teeth	15.57	10.26	7.47	5.83	3rd 1.28
19 teeth	14.6	9.6	7.0	5.49	Top 1—1
20 teeth	14.01	9.24	6.72	5.25	
†21 teeth	13.35	8.8	6.4	5.0	

* Standard 350 c.c. † Standard 500 c.c.

Gear Ratios—Competition Models

ENGINE SPROCKET	1st	2nd	3rd	Top	INTERNAL RATIOS
15 teeth	22.12	14.63	8.96	7.0	
*16 teeth	20.72	13.71	8.39	6.56	1st 3.16
17 teeth	19.46	12.87	7.88	6.16	2nd 2.09
†18 teeth	18.44	12.20	7.47	5.83	3rd 1.28
19 teeth	17.34	11.47	7.0	5.49	Top 1—1
20 teeth	16.59	10.97	6.72	5.25	
21 teeth	15.8	10.45	6.4	5.0	

* Standard 350 c.c. † Standard 500 c.c.

Carburetters

The various types of Amal carburetters fitted are given below:

347 c.c. Models

YEAR	TYPE	BORE SIZE	SLIDE	NEEDLE POSITION	MAIN JET
1946–50	76DIJ	1 in.	6×4	2	150
1951–53	76/AE/IAK	1 in.	6×4	2	150
1954	76AV/IED	1.063 in.	6×4	2	150
1955	376/5	1.063 in.	376/060.3	3	210

498 c.c. Models

YEAR	TYPE	BORE SIZE	MAIN JET	SLIDE	NEEDLE POSITION
1946–53	89B/IAK	1.097 in.	180	29/4	3
1954	89NIED	1.161 in.	180	29/4	2
1955	389/1	1.161 in.	260	389/060.3	3

ENGINE DESIGN CHANGES

1947 Models
(1) Improved type oil-pump plunger (two-start type) with new timing-side axle (identified by 2S stamped on plunger).
(2) Oil-feed passage in timing-side half crankcase increased to $\frac{3}{32}$-in. diameter to prevent cavitation, with corresponding increase in diameter of the oil pipe, ($\frac{3}{8}$-in. diameter).
(3) A two piece oil pump guide pin $\frac{3}{16}$-in. in diameter to prevent wear on the pin due to the increased plunger speed.
(4) Shorter connecting-rod.
(5) The use of a long plain bush for the timing-side bearing; the small roller bearing is now obsolete. Engines fitted with the old-type bearing can use a modified bush with two external diameters. The steel sleeve is retained to locate the new bush on the large external diameter.

1948 Models
(1) Annular groove in pump plunger increased from $\frac{3}{16}$ to $\frac{1}{4}$-in. diameter with suitable guide pin.
(2) Wire-wound pistons fitted to 500-cc models.
(3) 500-cc type high crankcase used for 350-cc models after engine number 8000.
(4) 500-cc flywheels used for the 350-cc model.
(5) Larger brakes (7-in. diameter).

1949 Models
(1) New-type cylinder-head, with hair-pin valve springs with rocker box to suit.
(2) Valve lifter transferred from crankcase to rocker box.
(3) Wire-wound pistons for all models.
(4) Longer valves, hardened valve end caps discarded.
(5) New rockers for longer valves, also new valve guides.

1950 Models
(1) Alloy cylinder-heads and barrels used on Competition models only. Steel crankpin washer in place of bronze type.

1951 Models
(1) Alloy cylinder-heads used on both touring-type engines. Crankpin washers discarded, flywheels altered.

1952 Models
(1) Open-tray valve-spring seat, prongs for valve springs increased in length.
(2) Cylinder barrel lengthened $\frac{1}{8}$-in. on 500-cc touring engine, compression plate discarded.
(3) Recess for driving-side bearings in crankcase with two diameters, for close and easy interference fit to avoid "end loading" of these bearings.
(4) Top compression ring chrome-plated.

ENGINE DESIGN CHANGES—continued

1953 Models
No change.

1954 Models
(1) Oil feed in rocker box modified to increase oil supply to rocker end of inlet valve and stop valve-spring wear.
(2) New rockers for valve ends with groove in side for oil duct.
(3) High-lift cams.
(4) Larger-diameter timing-side shaft, with flywheel to suit.
(5) Two-diameter timing-side bush, steel sleeve discarded.
(6) Automatic ignition control on 500-cc model.

1955 Models
(1) New crankcase to use one small and one large driving-side bearing.
(2) New driving-side flywheel (keyways at 180%).
(3) Circlip fitted to exhaust-valve guide.

1956 Models
(1) Cylinder-wall oil feed discontinued.
(2) Compression ratio increased to 7.5 for 350-cc models, 7.3 for 500-cc models.
(3) Oil-tank felt filter deleted and magnetic filter fitted in crankcase.

1957 Models
(1) Engine-shaft shock absorber discarded, shock absorber incorporated in the clutch assembly.
(2) A.M.C. gearbox on all models.
(3) Improved detachable rear-wheel design.
(4) Girling rear suspension units introduced.

1958-60 Models
(1) Lucas RM 15 Alternator A.C. lighting/ignition used on 350 cc and 500-cc models.
(2) Aluminium front chaincase replaces steel type.

PERMISSIBLE FRAME MODIFICATIONS

Front Forks
Longer Fork Springs (free length 12¾ in.) can be used in place of earlier types, which were 9.997 in. and 11 in. free length. The longer springs improve the fork motion, but will expose the holes in the slider extension first used in 1954. Buffer springs for fork inner tubes can be used on models before 1947.
1948 Top Fork Cover Tubes with incorporated lamp brackets will interchange with the earlier type to discard the strip-steel lamp brackets.
Polished Fork Sliders, in place of the black-enamelled type, can be fitted without other alteration.
A 1956-type Front Mudguard, which dispenses with the two strip-steel stays, will fit any machine fitted with Teledraulic forks made before 1956. Front forks with large-diameter tubes (1955-57) can be fitted to earlier models.

PERMISSIBLE FRAME MODIFICATIONS—continued

Rear Suspension
"Jam-pot" Units, first used in 1951, can be adapted for 1950 models if the top anchorage on the frame loop is cut away to clear the unit top pivot.

Front Chaincase
The outer portion of the chaincase with a detachable clutch cover for clutch adjustment, without disturbing the chaincase, first used in 1954, can be fitted to earlier models.

Full-width Hubs
The full-width front hub can be fitted to any model which has Teledraulic forks.
Rear-wheel hubs of the same type can also be fitted to any spring-frame model.

Spring Frame
Rigid-frame models made from 1949 can be converted into spring frame models.

TECHNICAL DATA FOR EX-W.D. 350 cc MODEL 41-G3L

Cubic capacity 347 c.c.
Stroke 93 mm. (3.6614 in.)
Cylinder bore 2.7187 in. ±0.0005 in.
Compression ratio 5.88 : 1 with plate
6.30 : 1 without plate

AXLES
Camshaft axle diameter
½ in.—0.00125/0.00175 in.
Driving flywheel axle diameter
1 in. ±0.0002 in.
Gearbox mainshaft length 10¼ in.
Timing side flywheel axle diameter
⅞ in.—0.0030/0.0035 in.
Nut retaining small timing pinion to flywheel axle 0.7 in.×26 tpi, left-hand thread. Flywheel axle run to 0.001 in. from dead true.

BALL JOURNAL BEARINGS
Driving side flywheel axle ball bearings Bore 1×2¼ in. O/D by ⅝ in.
Gearbox main gear ball bearing
Bore 1.281 in.×62 mm. O/D by 16 mm.
Gearbox mainshaft (right-hand end) ball bearing Bore 12×40 mm. O/D × 17 mm.
Steering head 0.187 in. balls (56 off)

EX-WD G3L DATA—continued

BIG-END BEARING
Crankpin diameter on roller race 1.20325/1.20350 in.
Crankpin diameter in flywheel 0.8775/0.8780 in.
Crankpin rollers diameter $\frac{1}{4} \times \frac{1}{4}$ in. (30 off)
Big-end liner external diameter 2.0000/2.0005 in.
Big-end liner internal diameter 1.70375/1.70400 in. (fitted and ground)

BUSHES (FITTED AND REAMED)
Camshaft bushes $\frac{1}{2}$ in. $\pm$0.0005 in.
Gudgeon pin bush $\frac{7}{8}$ in. +0.0005 in. −0.00025 in.
Rocker bushes $\frac{5}{8}$ in. +0.001 in. −0.000 in.
Timing axle bush $\frac{7}{8}$ in. +0.00125 in. −0.00150 in.

CAPACITIES (OIL OR GREASE)
Front forks $6\frac{1}{2}$ fluid oz. S.A.E.20
Gearbox $1\frac{1}{4}$ pts. light grease
Oil tank 3 pts.
Petrol tank 3 gallons

CARBURETTER
Carburetter Amal, type 275 F/1J. (W.D. type)
Main jet size 120
Throttle valve size 5×5
Jet taper needle Early models 3rd, later models 4th notch.

CHAINS
Front $\frac{1}{2} \times 0.305$ in. (66 links)
Rear $\frac{5}{8} \times 0.380$ in. (91 links)
Magneto $\frac{3}{8} \times 0.225$ in. (58 links)
Dynamo $\frac{3}{8} \times 0.225$ in. (47 links)
(Whip-front, $\frac{3}{8}$ in.; rear, $\frac{3}{8}$ in. to $\frac{1}{2}$ in.; magneto, $\frac{1}{4}$ in.; dynamo, $\frac{1}{4}$ in.)

CLUTCH
Thrust rod $9\frac{7}{8}$ in.
Gear ratios 5.8, 7.5, 12.2 and 18.5 : 1
Gudgeon pin diameter $\frac{7}{8}$ in. −0.0010/0.0015 in.

IGNITION
Contact breaker points 0.012 in.
Setting, b.t.d.c., fully advanced 0.438 in. (max. $\frac{1}{2}$ in.)
Plug ga[illegible] /0.022 in.

PISTON
Top land 2.6877 in. ±0.0005 in.
2nd land 2.6962 in. ±0.0005 in.
3rd land 2.6962 in. ±0.0005 in.
Top of skirt 2.7132 in. ±0.0005 in.
Bottom of skirt 2.7143 in. ±0.0005 in.
(Measurements at right angles to gudgeon pin)

PISTON RINGS
Compression 2.719×0.0625 in.
Scraper 2.719×0.125 in.
Gap Normal, 0.006/0.008 in. (max. 0.030 in.)
Ring clearance 0.003 in.
Rocker sleeve diameter 0.6230/0.6235 in.

SPROCKETS
Clutch 40 teeth ($\frac{1}{2} \times 0.305$ in. chain)
Engine 18 teeth ($\frac{1}{2} \times 0.305$ in. chain)
Gearbox 16 teeth ($\frac{5}{8} \times 0.380$ in. chain)
Rear wheel 42 teeth ($\frac{5}{8} \times 0.380$ in. chain)

TAPPET GUIDES
Projection from crankcase face 0.281 in.

VALVE TIMING
Exhaust opens 65° b.b.d.c.; closes 30° a.t.d.c.
Inlet (engines before No. 54512) opens 20° b.t.d.c.; closes 67° a.b.d.c.
Inlet (engines after No. 54512) opens 32° b.t.d.c.; closes 63° a.b.d.c.
(All timings with 0.016 in. tapped clearance.)

VALVES
Clearance (cold engine) nil
Head diameter - inlet 1.864 in. ±0.005 in.; exhaust 1.5 in. ±0.005 in.
Seat angle 45°
Stem diameter, inlet and exhaust 0.375 in. −0.0034/0.0045 in.

VALVE GUIDES
External diameter $\frac{5}{8}$ in. +0.00175/0.00225 in.
Internal diameter $\frac{3}{8}$ in. ±0.0005 in.
Projection from cylinder head Inlet $\frac{1}{2}$ in.; exhaust $\frac{5}{8}$ in.

VALVE SPRINGS
Outer valve spring free length 2.0625 in.
Inner valve spring free length 1.812 in.
(Replace springs when 0.1875 to 0.25 in. below these lengths)

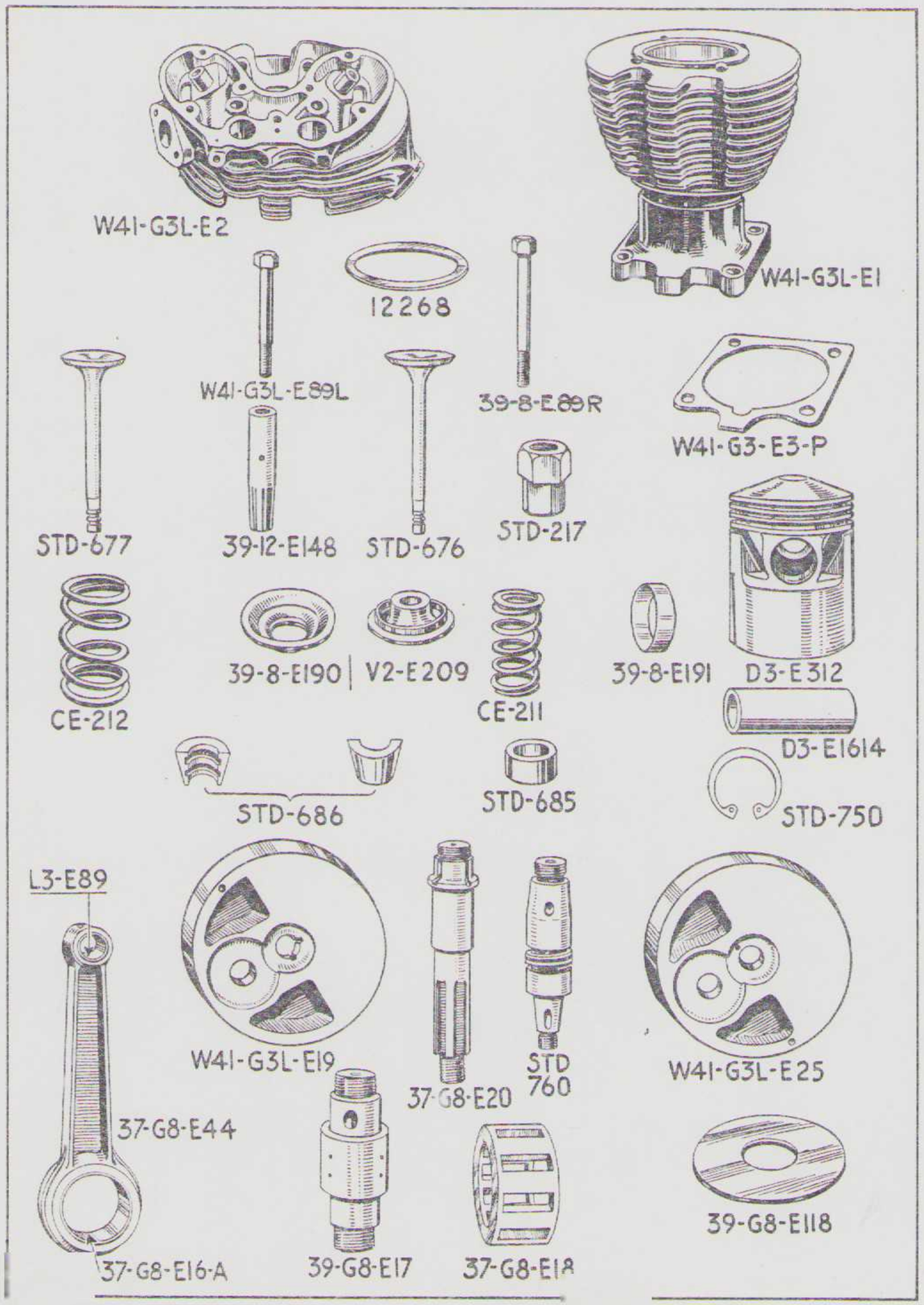
ILLUSTRATED
SPARES LIST

for

G3L MATCHLESS MOTOR CYCLES
(With War Office Modifications)

Compiled by the Manufacturers :

MATCHLESS MOTOR CYCLES



ENGINE SECTION.

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
CYLINDER.			
Cylinder barrel	1	... ...	W41-G3L-E1
Paper washer, for cylinder base and Compression plate	2	... ...	37-8-E3
Nut, retaining cylinder to crankcase	4	... ...	STD-217
Compression plate	1	... ...	W41-G3-E3-P
CYLINDER HEAD.			
Cylinder head, less valve guides	1	... ...	W41-G3L-E2
Cylinder head, with valve guides	1	... ...	W41-G3L-E2-ASS
Gasket, for cylinder head	1	... ...	12268
Bolt, securing head to barrel, left (short)	2	... ...	W41-G3L-E89-L
Bolt, securing head to barrel, right (long)	2	... ...	39-8-E89-R
Washer, for head fixing bolt	4	... ...	STD-10
Stud, fixing carburetter	2	... ...	37-8-E161
Nut, for carburetter stud	2	... ...	STD-4
ENGINE VALVES.			
Inlet valve	1	... ...	STD-676
Exhaust valve	1	... ...	STD-677
Guide, for valve (inlet or exhaust)	2	... ...	39-12-E148
Spring, inner, for valve	2	... ...	CE-211
Spring, outer, for valve	2	... ...	CE-212
Collar, for valve springs	2	... ...	V2-E209
Cup, for valve springs	2	... ...	39-8-E190
Distance sleeve, for valve spring cup	1	... ...	39-8-E191
Collet, for valve (each in two pieces)	2	... ...	STD-686
Cap (or thimble), for valve stem	2	... ...	STD-685

The Distance Sleeve DF-39-8-E191 is only fitted on the exhaust valve assembly.

PISTON.			
Piston, bare	1	... ...	D3-E312
Ring, compression, for piston 69 mm. by $\frac{1}{16}$ in.	2	... ...	D3-E311
Ring, scraper, for piston 69 mm. by $\frac{1}{4}$ in.	1	... ...	38-G3-E111
Gudgeon pin, for piston	1	... ...	D3-E1614
Circlip, for gudgeon pin	2	... ...	STD-750
Piston, complete with gudgeon pin and rings	1	... ...	D3-E312-A

THE FOLLOWING OVERSIZE PARTS CAN BE SUPPLIED

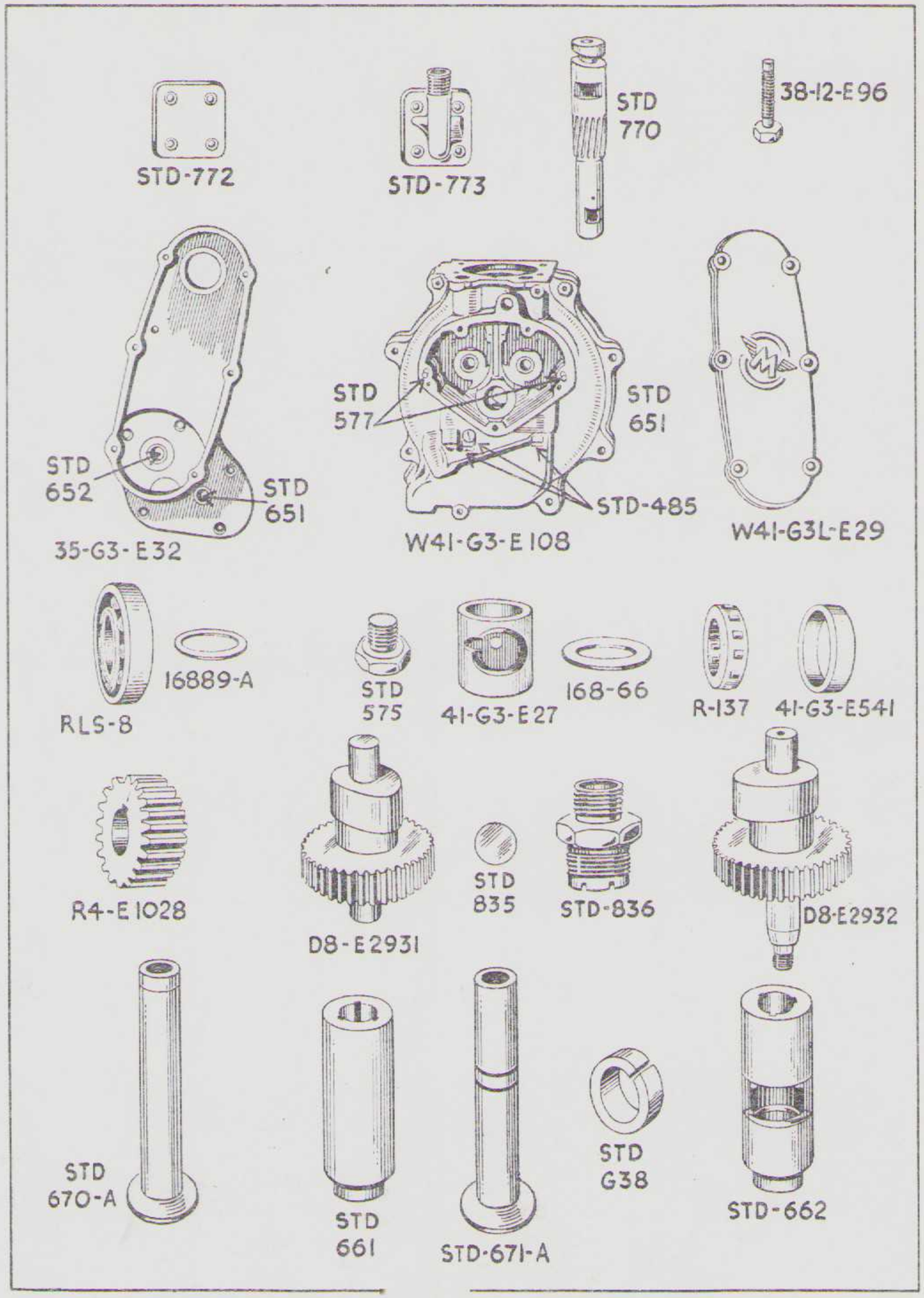
All are ·020 in. oversize

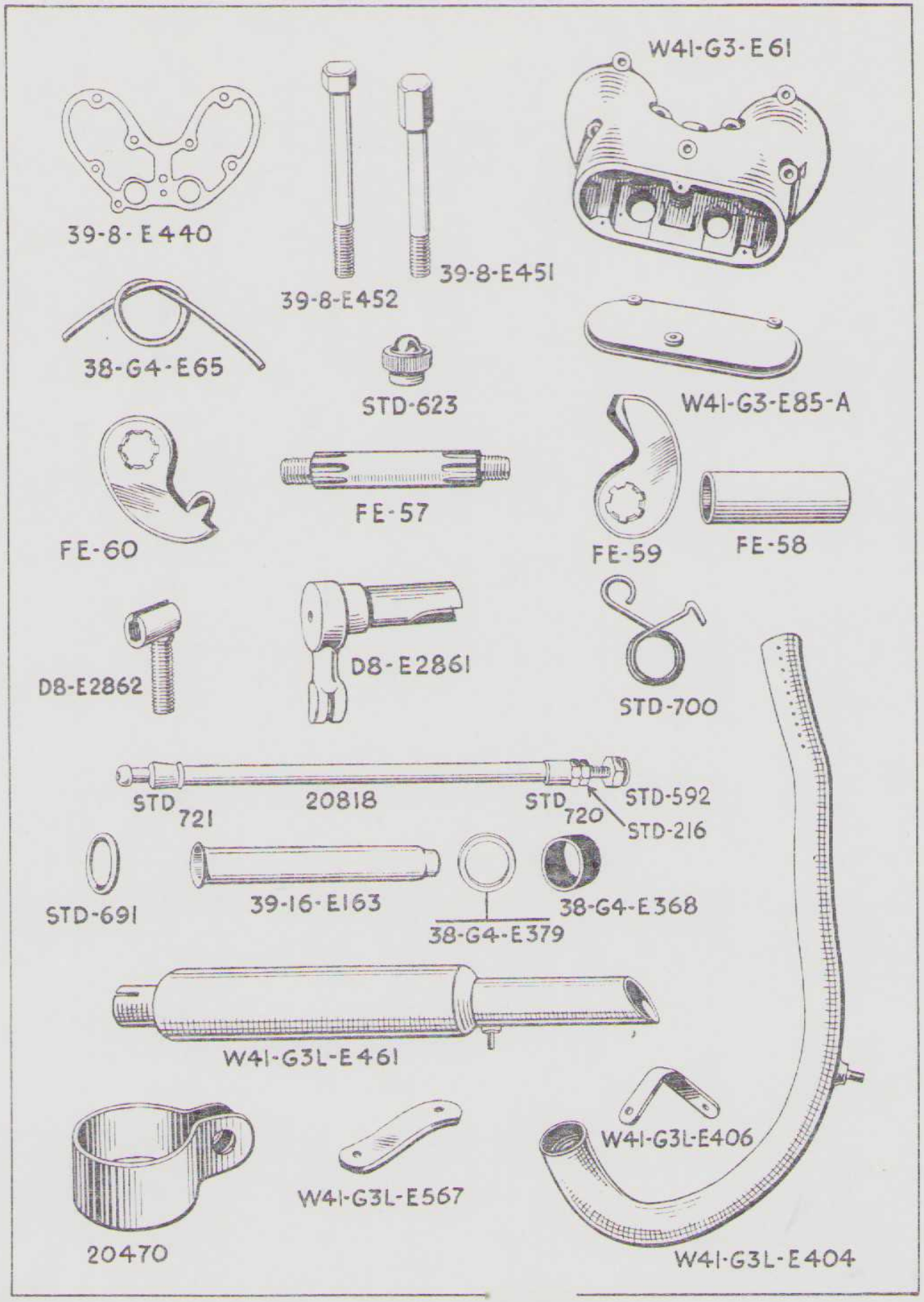
Piston, bare, oversize	1	... ...	O D3-E312
Ring, compression, oversize	2	... ...	O D3-E311
Ring scraper, oversize	1	... ...	O 38-G3-E111
Piston, complete, oversize	1	... ...	O D3-E312-A
FLYWHEELS.			
Flywheel, bare, timing side	1	... ...	W41-G3L-E25
Flywheel, bare, driving side	1	... ...	W41-G3L-E19
Axle, for timing side flywheel	1	... ...	STD-760
Axle, for driving side flywheel	1	... ...	37-G8-E20
Key, for driving side axle	2	... ...	STD-573
Nut, for timing side axle	1	... ...	STD-230
Nut, for driving side axle	1	... ...	STD-234
Lock screw, for timing side axle nut	1	... ...	STD-15
CONNECTING ROD.			
Connecting rod, with liner and bush	1	... ...	37-G8-E44
Liner, only, for big end bearing	1	... ...	37-G8-E16-A
Bush only, for gudgeon pin	1	... ...	L3-E89
Roller, for crankpin	30	... ...	STD-75
Cage, for crankpin rollers	1	... ...	37-G8-E18
Crankpin $\frac{7}{8}$ in. diameter shaft	1	... ...	39-G8-E17
Washer, for crankpin	2	... ...	39-G8-E118
Nut, for crankpin	2	... ...	STD-233

OVERSIZE CRANKPIN ROLLERS, ·001 in. OVERSIZE CAN BE SUPPLIED.

The Part Number is O/STD-75

Description.	Qty.	Price each. £ s. d.	Part Number.
CRANKCASE.			
Crankcase, complete, Khaki-green	1	... ...	W-41-63-E108
Crankcase, driving side only	1	... ...	37-8-E30
Crankcase, timing side only	1	... ...	41-G3-E31
"CRANKCASE COMPLETE" includes all bronze bushes and the cylinder base studs, but does not include timing gear and magneto chain covers. HALVES OF CRANKCASES must be matched in the factory. Therefore, it is necessary to send the sound half of the crankcase when ordering a new half.			
Drain plug, for crankcase	1	... ...	STD-575
Plug screw, for crankcase oil holes	3	... ...	STD-485
Fibre washer, for oil hole screws	3	... ...	STD-203
Timing gear cover, with bushes, Khaki-green	1	... ...	35-G3-E32
Paper washer, for timing gear cover	1	... ...	37-8-E78
Dowel peg, locating timing gear cover	2	... ...	STD-577
Screw, fixing timing gear cover	5	... ...	STD-482
Magneto chaincase cover, Khaki-green	1	... ...	W41-G3L-E29
Screw, fixing magneto chaincase cover	6	... ...	STD-484
Grease nipple, for magneto chaincase cover	1	... ...	STD-51
Cap, in timing gear cover, for cam bush	1	... ...	STD-765
Stud, for cylinder base	4	... ...	STD-300
Ball, for cylinder oil feed valve	1	... ...	STD-21
Plug, for cylinder oil feed valve	1	... ...	STD-576
Spring, for cylinder oil feed valve	1	... ...	STD-701
CRANKCASE BEARINGS.			
Bush, for timing side flywheel axle	1	... ...	41-G3-E27
Rollers and cage, for timing side axle	1	... ...	137
Sleeve, for timing side roller bearing	1	... ...	41-G3-E541
Ball bearing, for driving side flywheel axle	2	... ...	RLS-8
Spacing washer, between ball bearings	1	... ...	16866
Spacing collar, between ball bearings	1	... ...	16889-A
Bush for inlet cam, in crankcase	1	... ...	STD-651
Bush for inlet cam, in timing cover	1	... ...	STD-652
Bush for exhaust cam, in crankcase	1	... ...	STD-651
Bush for exhaust cam, in timing cover	1	... ...	STD-651
Dimensions of UF-RLS-8 Bearing : 1in. by 2¼in. by ⅝in.			
Dimensions of R-137 rollers and cage : ⅞in. by 1⅛in. by $\frac{7}{16}$in.			
CRANKCASE BOLTS.			
Front bolt, top position, 4⅝in. by $\frac{1}{16}$in.	1	... ...	STD-278
Front bolt, centre position, 4⅛in. by ⅛in.	1	... ...	STD-278
Front bolt, bottom position, 3⅝in. by ⅛in.	1	... ...	STD-273
Bottom bolt, rear position, 4½in. by ¼in.	1	... ...	STD-261
Rear bolt, top position, 3⅝in. by ⅛in.	1	... ...	STD-274
Rear bolt, centre position, 3½in. by ⅛in.	1	... ...	STD-274
Rear bolt, bottom position, 3⅝in. by ⅛in.	1	... ...	STD-274
Spacer for front top bolt	2	... ...	40-G3-F66
Spacer for front centre bolt	2	... ...	40-G3-F66
Washer for front top bolt	2	... ...	STD-11
Washer for front centre bolt	2	... ...	STD-11
Nut, for bottom rear bolt	2	... ...	STD-5
Nut, for all front and rear bolts	12	... ...	STD-4
For the bottom, front, bolt that passes through the crankcase, the bottom of the main frame front down tube and the front ends of the rear frame assembly, and the spacing tubes, washers and nuts on it, see FRAME SECTION.			
OIL PUMP.			
Plunger, for oil pump	1	... ...	STD-770
Guide screw, for oil pump plunger	1	... ...	38-12-E96
Front end cap, for oil pump, Khaki-green	1	... ...	STD-773
Rear end cap, for oil pump, Khaki-green	1	... ...	STD-772
Paper washer, for pump end caps	2	... ...	STD-582
Screw, fixing front end cap	4	... ...	STD-15
Bolt, fixing rear end cap	4	... ...	STD-591
RELEASE VALVE.			
Release valve body	1	... ...	STD-836
Diaphragm, for release valve body	1	... ...	STD-835
TIMING GEAR.			
Inlet camshaft	1	... ...	D8-E2932
Exhaust camshaft	1	... ...	D8-E2931
Timing pinion, on flywheel axle	1	... ...	R4-E1028
Key, for timing pinion	1	... ...	STD-570
Nut, retaining timing pinion to axle	1	... ...	STD-221
TAPPETS.			
Inlet tappet, bare	1	... ...	STD-670-A
Exhaust tappet, bare	1	... ...	STD-671-A
Collar, for exhaust tappet	1	... ...	STD-638
Guide, for inlet tappet	1	... ...	STD-661
Guide, for exhaust tappet	1	... ...	STD-662
Fibre washer, for tappet guides	2	... ...	35-12-E73





Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
PUSH RODS.			
Long push rod, bare	2		20818
Ball end (bottom), for long push rod	2		STD-721
Sleeve end (top), for top of long push rod	2		STD-720
Adjusting screw, for top of long push rod	2		STD-592
Lock nut, for push rod adjusting screw	2		STD-216
Long push rod, complete	2		20818-1
PUSH ROD COVER TUBES.			
Cover tube, for long push rod	2		39-16-E163
Gasket, for top of cover tube	2		38-G4-E368
Washer, for top of gasket	2		38-G4-E379
Rubber gland, for bottom of cover tube	2		STD-691
ROCKER BOX.			
Rocker box, assembled with all fittings	1		W41-G3-E61-ASS.
Rocker box, bare, Khaki-green	1		W41-G3--E61
Bolt, fixing box, short head	1		39-8-E452
Bolt, fixing box, long head	6		39-8-E451
Washer, for box fixing bolt	7		STD-11
Side cover, for rocker box, Khaki-green	1		W41-G3-E85-A
Rubber fillet, for side cover	1		38-G4-E65
Stud, fixing side cover	3		STD-251
Nut, for side cover stud, Khaki-green	3		STD-623
Fibre washer, for cover stud nut	3		STD-205
Gasket, for rocker box	1		39-8-E440
Bush, for rocker box	4		38-G4-E204

The Rocker Box bare does not include the four bushes.

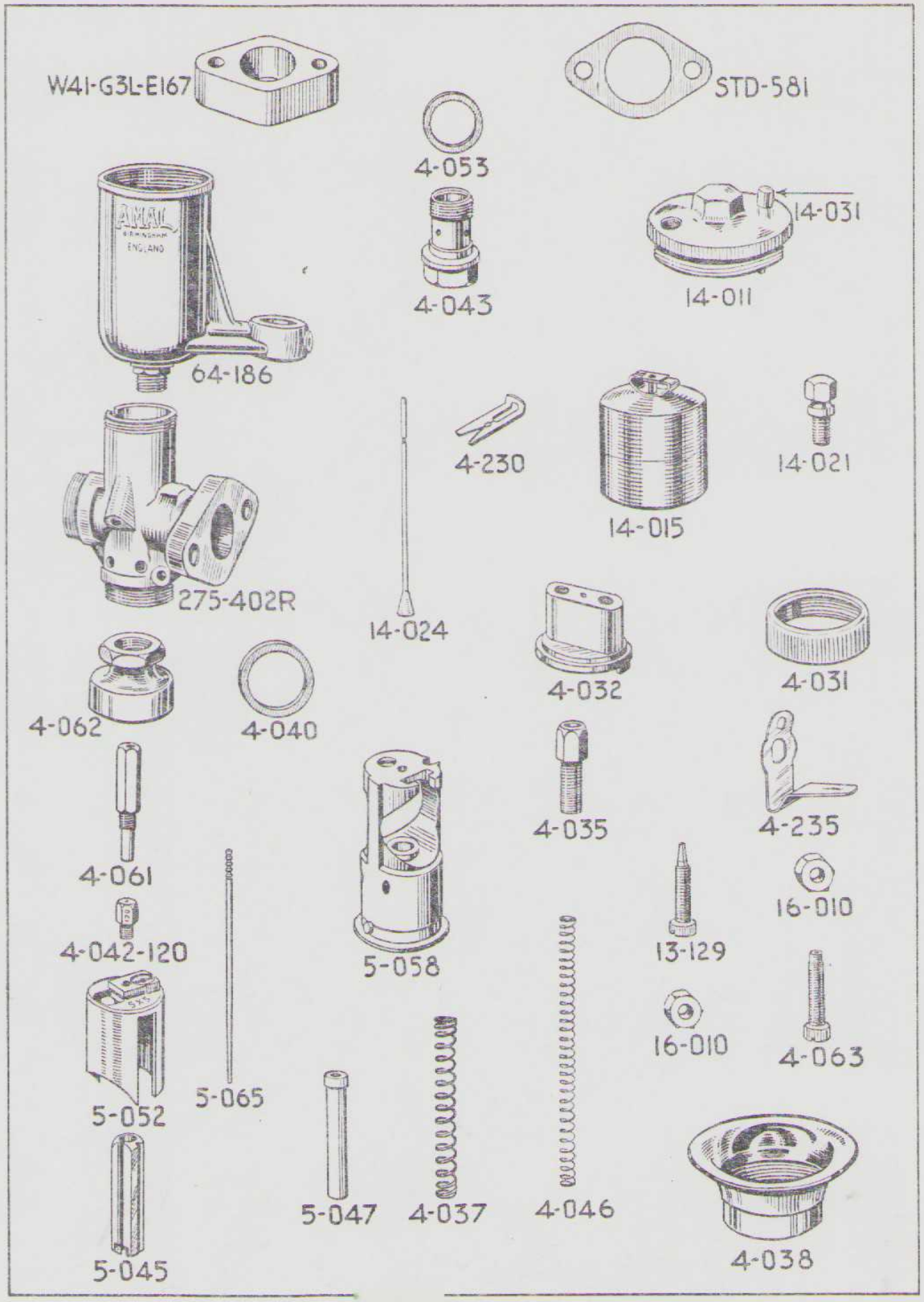
OVERHEAD ROCKERS.			
Rocker axle	2		FE-57
Felt ring, for rocker axle	2		D8-E1865
Nut, for rocker axle	4		STD-3
Sleeve, for rocker axle	2		FE-58
Washer, for rocker axle	4		STD-10
Rocker arm, valve end (inlet or exhaust)	2		FE-59
Rocker arm, push rod end (inlet or exhaust)	2		FE-60
EXHAUST VALVE LIFTER.			
Lifter lever and spindle (combined)	1		D8-E2861
Spring, for lifter lever	1		STD-700
Crosshead, for valve lifter cable	1		D8-E2862
Lock nut, for cable crosshead	1		STD-74

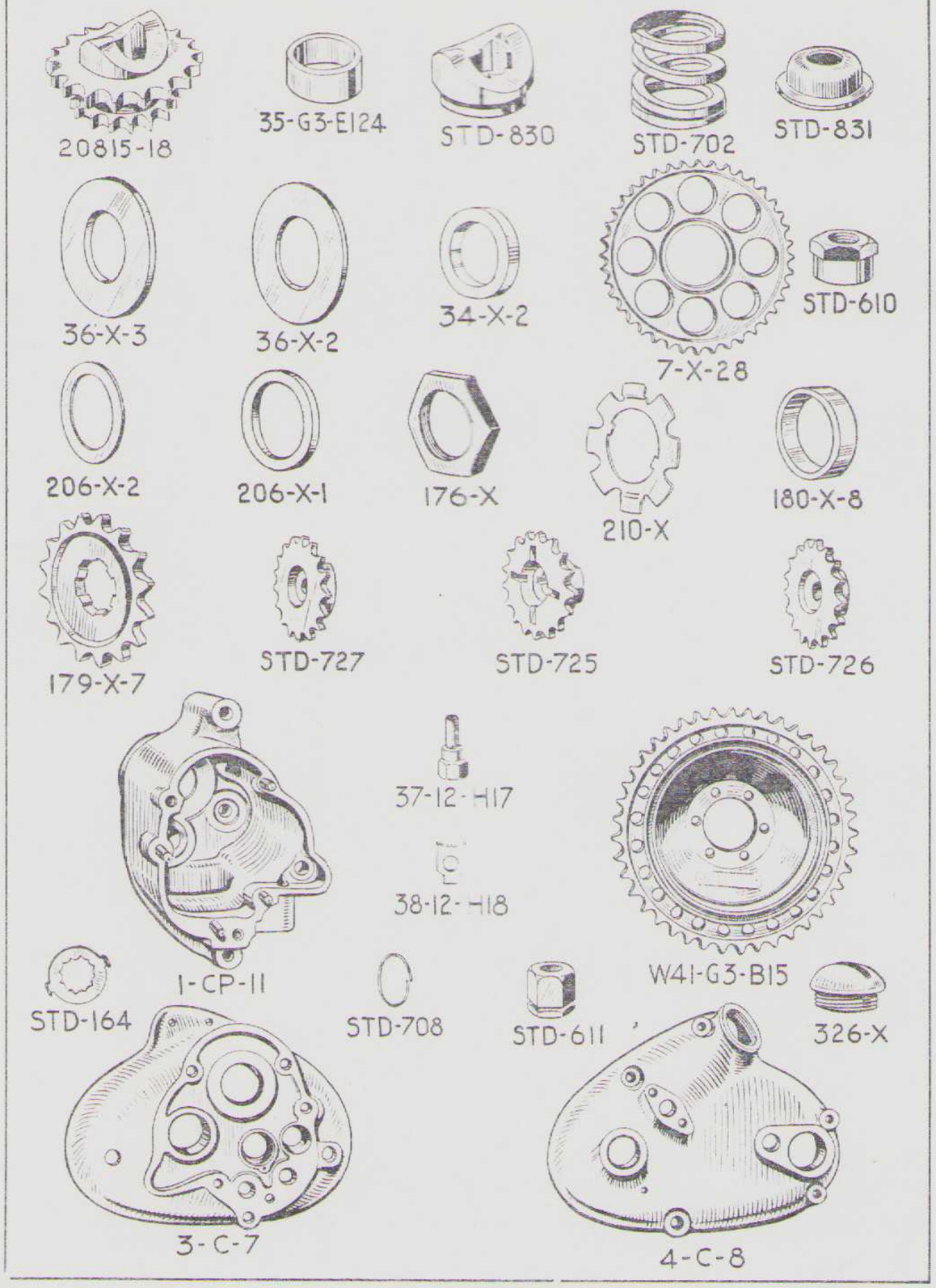
EXHAUST PIPE AND SILENCER SECTION.

EXHAUST PIPE.			
Exhaust pipe, bare	1		W41-G3L-E404
Stay, for exhaust pipe	1		W41-G3L-E406
Nut, fixing pipe to stay	1		STD-4
Plain washer, for pipe fixing nut	1		STD-174
Spring washer, for pipe fixing nut	1		STD-192
SILENCER.			
Silencer, bare	1		W41-G3L-E461
Front clip, clamping silencer to pipe	1		20470
Bolt, for silencer front clip	1		STD-363
Washer, for silencer front clip bolt	2		STD-174
Washer, spring, for silencer front clip bolt	1		STD-192
Nut, for silencer front clip bolt	1		STD-4
Stay, for silencer	1		W41-G3L-E567
Nut, fixing silencer to stay	1		STD-4
Plain washer, for silencer fixing nut	1		STD-174
Spring washer, for silencer fixing nut	1		STD-192
Bolt, fixing stay to fork end	1		STD-363
Washer, for fork end bolt	2		STD-174
Nut, for fo[illegible]	1		

CARBURETTER SECTION.

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
COMPLETE CARBURETTER.			
Complete carburetter, Type 275F/1J	1	... ...	W41-G3L-E67
Packing piece, for carburetter	1	... ...	W41-G3L-E167
Gasket, for packing piece	1	... ...	STD-581
Gasket, for carburetter	1	... ...	STD-581
The complete carburetter does not include the control levers and cables.			
FLOAT CHAMBER.			
Float chamber, bare	1	... ...	64-186
Plug screw, for passage in chamber	1	... ...	13-153
Fibre washer, for plug screw	1	... ...	14-039
Bolt, holding chamber to mixing body	1	... ...	4-043
Fibre washer, for holding bolt	2	... ...	4-053
Top (or cover), for float chamber	1	... ...	14-208
Screw, locking float chamber top	1	... ...	14-021
Float, bare	1	... ...	14-015
Needle, for float	1	... ...	14-024
Lock nut, for float needle seat	1	... ...	14-178
Fibre washer, for float needle seat	1	... ...	14-175
Tickler plunger, for float chamber top	1	... ...	14-209
Stop sleeve, for tickler plunger	1	... ...	14-210
Spring, for tickler plunger	1	... ...	14-032
Split pin, for tickler plunger sleeve	1	... ...	4-060
MIXING BODY.			
Mixing body, bare	1	... ...	275-402-R
Union nut, for mixing body base	1	... ...	4-062
Fibre washer, for union nut	1	... ...	4-040
Top, for mixing body	1	... ...	4-032
Ring, fixing top to mixing body	1	... ...	4-031
Spring clip, locking fixing ring	1	.. ...	4-235
Screw, securing locking clip to body top	1	... ...	4-241
Cable adjuster, for body top	2	... ...	4-035
JETS.			
Jet barrel, or choke	1	... ...	275-403
Needle jet	1	... ...	4-061
Main jet, Size 120	1	... ...	4-042-120
Taper needle, for needle jet, 3 ⅛ in. long	1	... ...	5-065
Clip, for jet taper needle	1	... ...	4-230
Split pin, locating taper needle clip	1	... ...	4-060
Screw, for pilot jet air adjustment	1	... ...	13-129
Lock nut, for pilot jet air screw	1	... ...	16-010
VALVES.			
Throttle valve, Size 5/5	1	... ...	5-052
Spring, for throttle valve	1	... ...	4-037
Stop screw, for throttle	1	... ...	4-206
Lock nut, for throttle stop screw	1	... ...	16-010
Air Valve	1	... ...	5-045
Tubular guide, for air valve	1	... ...	5-047
Spring, for air valve	1	... ...	4-046
Air intake	1	... ...	4-038





TRANSMISSION SECTION.

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
ENGINE SPROCKET.			
Engine sprocket, bare, 18 teeth	1		20815-18
Distance collar, for engine sprocket	1		35-G3-E124
Shock absorber cam	1		STD-830
Spring, for shock absorber	1		STD-702
Cap washer, for shock absorber spring	1		STD-831
Lock nut, for shock absorber	1		STD-610
CLUTCH SPROCKET.			
Chainwheel, bare, 40 teeth, ½in. by .305in. Also see CLUTCH.	1		7-X-28
Roller race, for sprocket bearing	1		34-X-2
Rollers, for sprocket bearing (per set of)	24		35-X
Thin washer, for sprocket bearing	1		36-X-2
Thick washer, for sprocket bearing	1		36-X-3
GEAR BOX SMALL SPROCKET.			
Gear box sprocket, 16 teeth, ½in. by .380in.	1		179-X-7
Distance collar, for sprocket, ⅞in. thick	1		180-X-8
Distance washer, for sprocket, ⅞in. thick	1		206-X-2
Nut, retaining sprocket to main gear	1		176-X
Collar, under sprocket nut, ⅞in. thick	1		206-X-1
Lock washer for sprocket nut	1		210-X
REAR WHEEL SPROCKET.			
Brake drum and sprocket, 42 teeth	1		W41-G3-B15
Bolt, retaining brake drum and sprocket	6		37-12-H17
Lock washer, for retaining bolt	6		38-12-H18
Nut, for retaining bolt	6		STD-4
MAGNETO DRIVING SPROCKETS.			
Sprocket, on engine camshaft	1		STD-727
Washer, for camshaft sprocket	1		STD-11
Nut, for camshaft sprocket	1		STD-4
Sprocket, on magneto armature shaft	1		STD-726
Washer, for magneto sprocket	1		1102-1269
Nut, retaining magneto sprocket	1		868-1036
DYNAMO SPROCKET.			
Sprocket, on dynamo shaft	1		STD-725
Key, for dynamo sprocket	1		STD-572
Washer, plain, for dynamo sprocket	1		STD-10
Lock washer, for dynamo sprocket nut	1		STD-164
Lock ring, for dynamo sprocket nut	1		STD-708
Nut, retaining dynamo sprocket	1		STD-611
CHAINS.			
Front chain, 66 links, ½in. by .305in.	1		110046-66
Rear chain, 91 links, ⅝in. by .380in.	1		110056-91
Magneto chain, 58 links, ⅜in. by .225 in.	1		110036-58
Dynamo chain, 47 links, ⅜in. by .225in.	1		110036-47
Connecting link, for ½in. chain	Q		46-26
Connecting link, for ⅝in. chain	Q		56-26
Cranked link, for ½in. chain	Q		46-30
Cranked link, for ⅝in. chain	Q		56-30
Spring clip, for ½in. connecting link	Q		46-27
Spring clip, for ⅝in. connecting link	Q		56-27
The front and rear chains include connecting links, and these are included in the number of links per chain. Magneto and dynamo chains are endless.			
GEAR BOX			
Complete gear box	1		W41-G3L-G68
GEAR BOX SHELL.			
Shell, bare (with provision for drain plug)	1		1-CP-16
Stud, for shell, 1⅛in. by ⅜in.	2		60-X-6
Stud, for shell, 3⅛in. by ⅜in.	2		60-X-7
Stud, for shell, 1in. by ½in.	2		60-X-1
Nut, for ⅜in. stud	4		152-X
Nut, for ½in. stud	2		63-X
Plug, drain, for gear box shell	1		N-8008
Kick-starter case, Khaki-green	1		3-C-7
Stud, for kick-starter case, 2½in. by ½in.	3		286-X
Nut, for ½in. kick-starter case stud	3		63-X
Grease nipple, angular, for kick-starter case	1		245-X-2
Cover, for kick-starter case, Khaki-green	1		4-C-8
Filler, kick-starter, case cover, Khaki-green	1		3-X

Description.	Qty.	Price Each.	Part Number.
GEAR BOX FIXING BOLTS.		s. d.	
Top fixing bolt, 4 $\frac{13}{16}$ in. by $\frac{7}{16}$ in.	1	... ...	STD-313
Bottom fixing bolt, 3 $\frac{13}{16}$ in. by $\frac{7}{16}$ in.	1	... ...	STD-312
Distance collar, for top fixing bolt	1	... ...	STD-632
Nut, for top fixing bolt	2	... ...	STD-2
Nut, for bottom fixing bolt	2	... ...	STD-2
Washer, for top fixing bolt, left side	1	... ...	STD-9
Eye bolt, for front chain adjustment	1	... ...	STD-594
Nut, for eye bolt	2	... ...	STD-215
Crosshead block, for eye bolt	1	... ...	STD-785
Bolt, fixing crosshead to engine plate	1	... ...	STD-361
Washer, for crosshead fixing bolt	1	... ...	STD-11
SHAFTS AND GEARS.			
Mainshaft, 10$\frac{1}{2}$in. overall length	1	... ...	10-C-15
Driving gear, with bushes, 32 teeth	1	... ...	15-C-12
Bush, only, for driving gear	2	... ...	187-X-3
Sliding gear, for mainshaft, 18/23 teeth	1	... ...	14-C-4
Third gear, for mainshaft, 29 teeth	1	... ...	24-C-4
Layshaft spindle	1	... ...	30-C-9
Small gear on layshaft, 18 teeth	1	... ...	28-C-6
First gear on layshaft, 32 teeth	1	... ...	27-C-5
Second gear on layshaft, 27 teeth	1	... ...	26-C-5
Third gear on layshaft, 21 teeth	1	... ...	25-C-5
Sliding clutch, for layshaft	1	... ...	29-C-3
GEAR BOX BEARINGS.			
Ball bearing, for main driving gear	1	... ...	177-X
Gland felt washer, for ball bearing	1	... ...	112-C
Gland metal washer, dished	1	... ...	115-C
Split ring, locating bearing in shell	1	... ...	113-C
Gland outer washer, for bearing	1	... ...	114-C
Spring split ring, retaining outer washer	1	... ...	80-X
Ball bearing, for mainshaft	1	... ...	68-X
Metal washer, for mainshaft bearing	1	... ...	37-1-C-2
Spring split ring, retaining washer	1	... ...	37-2-C
Bush, for layshaft	2	... ...	181-X
Peg, locating layshaft bush	2	... ...	87-X
Cover washer, in shell, for layshaft bush	1	... ...	182-X

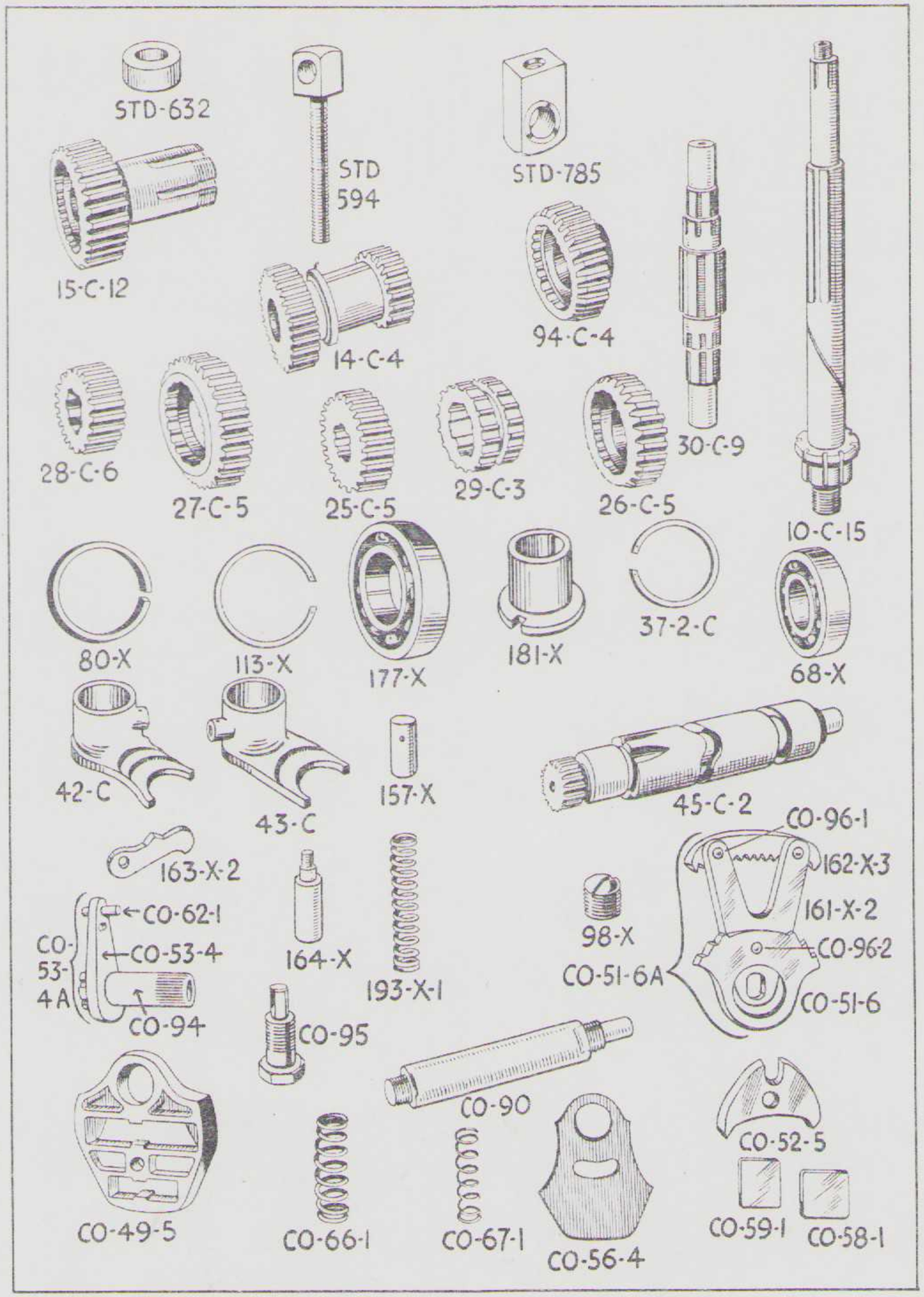
Dimensions of UF-177-X 1$\frac{7}{16}$in. by 62mm. by 16mm.
Dimensions of UF-115-C 1$\frac{7}{16}$in. by 2in.
Dimensions of UF-114-C 1$\frac{5}{16}$in. by 2$\frac{7}{16}$in.
Dimensions of UF-68-X 12mm. by 40mm. by 17mm.
Dimensions of UF-37-1-C-2 : 1$\frac{1}{2}$in. by 1$\frac{7}{16}$in.

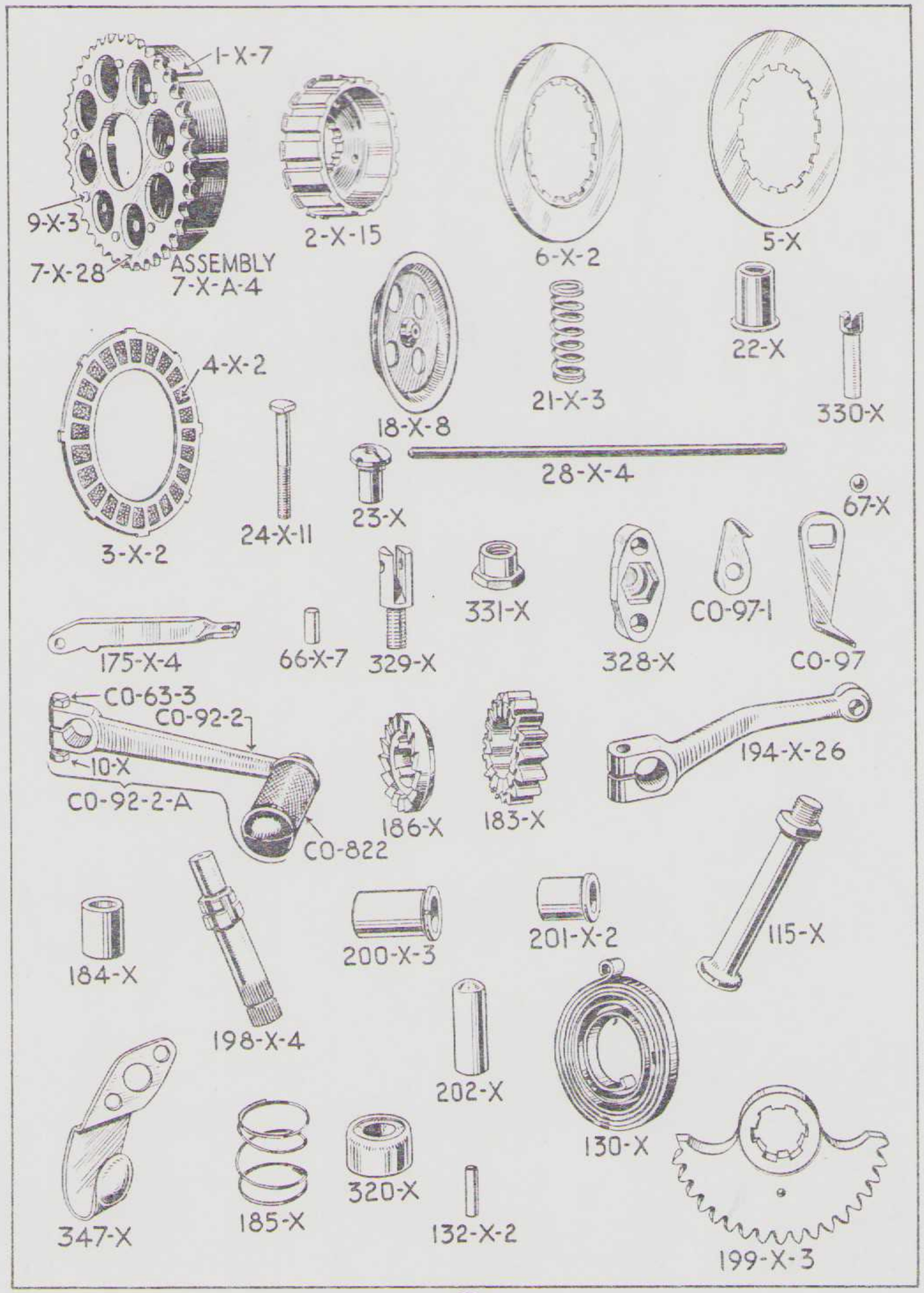
GEAR OPERATING PARTS.			
Operating fork, for mainshaft sliding gear	1	... ...	42-C
Operating fork, for layshaft sliding clutch	1	... ...	43-C
Peg, for operating forks	2	... ...	157-X
Split pin, for operating fork pegs	2	... ...	158-X
Camshaft, bare	1	... ...	45-C-2
Bush, in shell, for camshaft	1	... ...	159-X
Pawl (engages in camshaft)	1	... ...	163-X-2
Bearing pin, for pawl	1	... ...	164-X
Nut, for pawl bearing pin	1	... ...	95-X
Spring, for pawl	1	... ...	193-X-1
Screwed plug, for pawl spring	1	... ...	98-X

All the above parts are INSIDE the GEAR BOX SHELL

Quadrant	1	... ...	162-X-3
Sector	1	... ...	161-X-2
Ratchet	1	... ...	CO-51-6
Quadrant, sector and ratchet assembled	1	... ...	CO-51-6A
Rivet, fixing sector	2	... ...	CO-96-1
Rivet, fixing ratchet	1	... ...	CO-96-2
Control spindle	1	... ...	CO-90
Nut (inside) for control spindle	1	... ...	287-X
Bush, for control spindle (in K.S. case)	1	... ...	CO-91
Bush, for camshaft (in K.S. case) Used on gear boxes	1	... ...	160-X-2
Rollers, for camshaft (in K.S. case) up to 70975	12	... ...	192-X
Bush, for camshaft (in K.S. case . Used on gear boxes numbered 70975 upwards and dispenses with rollers	1	... ...	160-X-3
Control quadrant	1	... ...	CO-53-4
Sleeve for control quadrant	1	... ...	CO-94
Peg, for operating pawl	1	... ...	CO-62-1
Quadrant, sleeve and pawl peg, assembled	1	... ...	CO-53-4-A
Bush, for control quadrant sleeve	1	... ...	CO-54-7
Bolt, fixing quadrant sleeve bush	1	... ...	CO-95
Indexing rocking pawl	1	... ...	CO-52-5
Spindle, for indexing pawl	1	... ...	CO-60-1
Spring box	1	... ...	CO-49-5
Cover plate, for spring box	1	... ...	CO-56-4
Main spring, for spring box (large spring)	2	... ...	CO-66-1
Pawl spring, for spring box (small spring)	2	... ...	CO-67-1
Plate, for main spring	2	... ...	CO-59-1
Plate, for pawl spring	2	... ...	CO-58-1

All the above parts are INSIDE THE KICKSTARTER CASE.





Description.	Qty.	Price Each.	Part Number.
		s. d.	
CLUTCH.			
Clutch case	1	... ...	1-X-7
Chainwheel and clutch case rivet	8	... ...	9-X-3
Chainwheel and clutch case, assembled	1	... ...	7-X-A-4
Clutch centre, 1¼in.	1	... ...	2-X-15
Nut, retaining clutch centre to mainshaft	1	... ...	69-X
Plain washer, for centre retaining nut	1	... ...	71-X
Spring washer, for centre retaining nut	1	... ...	212-X
Steel plain clutch plate, thick	1	... ...	6-X-2
Steel plain clutch plate, thin	4	... ...	5-X
Clutch friction plate, with inserts	4	... ...	3-X-2
Fabric inserts only (price per dozen)	96	... ...	4-X-2
Spring pressure plate	1	... ...	18-X-8
Spring, for clutch	4	... ...	21-X-3
Cup, for clutch spring	4	... ...	22-X
Stud, for clutch spring, 1⅛in.	4	... ...	24-X-11
Adjustment nut, for clutch spring	4	... ...	23-X

For the bare clutch chainwheel and roller bearings, see CLUTCH SPROCKET in the TRANSMISSION SECTION.

CLUTCH OPERATING PARTS.

Thrust rod, 9⅞ in. long	1	... ...	28-X-4
Operating plunger	1	... ...	330-X
Steel ball, for operating plunger	1	... ...	67-X
Operating lever	1	... ...	175-X-4
Pin, or axle, for operating lever	1	... ..	66-X-7
Fork, for operating lever	1	... ...	329-X
Sleeve, or nut, for operating lever fork	1	... ...	331-X
Cap, covering sleeve, on K.S. case cover, Khaki-green	1	... ...	328-X
Screw, fixing cap to K.S. case cover	2	... ...	333-X

GEAR CONTROL PARTS.

Neutral indicator, fixed, Khaki-green	1	... ...	CO-97-1
Neutral indicator, moving, Khaki-green	1	... ...	CO-97
Nut, retaining moving indicator, Khaki-green	1	... ...	171-X
Foot control lever, bare, Khaki-green	1	... ...	CO-92-2
Foot control lever, with rubber, Khaki-green	1	... ...	CO-92-2-A
Rubber, for foot control lever	1	... ...	CO-82-2
Bolt, clamping foot lever to sleeve, Khaki-green	1	... ...	CO-63-3
Nut, for foot lever clamping bolt, Khaki-green	1	... ...	10-X

KICKSTARTER.

Driving ratchet	1	... ...	186-X
Ratchet pinion	1	... ...	183-X
Bush, for ratchet pinion	1	... ...	184-X
Spring, for ratchet pinion	1	... ...	185-X
Nut, retaining ratchet pinion	1	... ...	70-X
Spindle, for K.S. quadrant and foot lever	1	... ...	198-X-4
Bush, for K.S. spindle (in K.S. case)	1	... ...	201-X-2
Bush, for K.S. spindle (in K.S. case cover)	1	... ...	200-X-3
Quadrant, for K.S. spindle	1	... ...	199-X-3
K.S. spindle and quadrant, assembled	1	... ...	199-X-3A
Return spring, for kickstarter	1	... ...	130-X
Pin, for return spring	1	... ...	132-X-2
Stop rubber and sleeve, for quadrant	1	... ...	320-X
Peg, for stop rubber and sleeve	1	... ...	202-X
Spring clip—external—for crank	1	... ...	347-X

All the above parts are INSIDE the KICKSTARTER CASE.

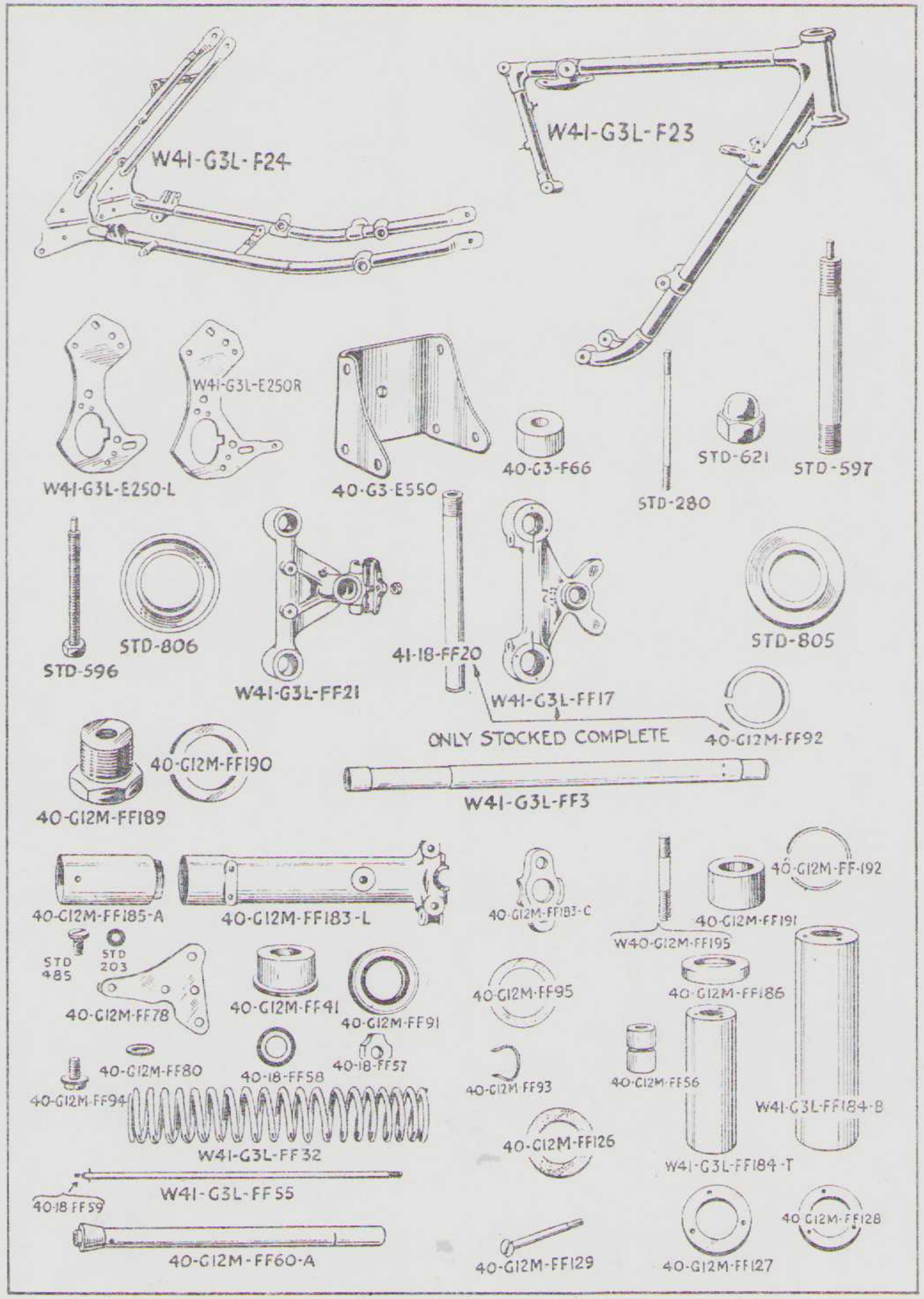
Kick-start foot lever, bare, Khaki-green	1	... ...	194-X-26
Pedal pin, for foot lever, Khaki-green	1	... ...	115-X
Bolt, clamping foot lever to spindle, Khaki-green	1	... ...	315-X
Spring washer, for lever clamping bolt	1	... ...	109-X
Nut, for lever clamping bolt, Khaki-green	1	... ...	144-X

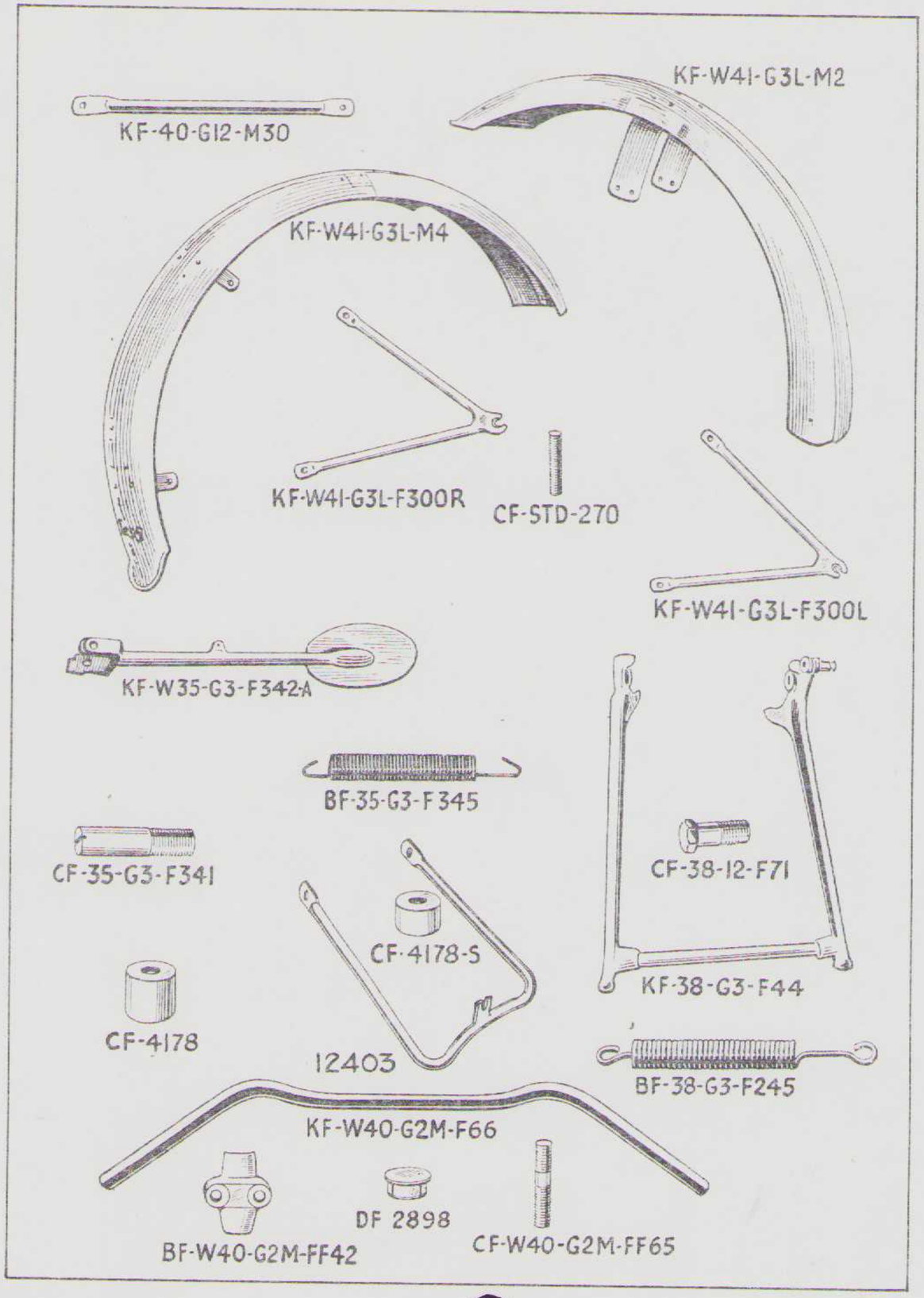
All the above parts are OUTSIDE the GEAR BOX

FRAME SECTION.

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
FRAME.			
Frame, complete	1	... ...	W41-G3L-F23-24
Front portion of frame, bare, Khaki-green	1	... ...	W41-G3L-F23
Rear portion of frame, bare, Khaki-green	1	... ...	W41-G3L-F24
Bolt, for seat lug (under saddle)	1	... ...	STD-597
Washer, for seat lug bolt	2	... ...	STD-8
Nut, for seat lug bolt	2	... ...	STD-1
Nut, for earth wire, on seat lug bolt	1	... ...	STD-79
Bolt, for seat tube bottom lug	1	... ...	STD-302
Washer, for seat tube bottom lug bolt	2	... ...	STD-10
Nut, for seat tube bottom lug bolt	2	... ...	STD-3
Bolt, uniting front and rear frame	1	... ...	STD-280
Spacer, for frame uniting bolt, Khaki-green	2	... ...	40-G3-F66
Nut (domed), for frame uniting bolt	2	... ...	STD-621
Bolt, adjusting rear chain	2	... ...	STD-596
Nut, for chain adjusting bolt	2	... ...	STD-5
Grease nipple, for head lug	1	... ...	STD-51
Engine plate, left side, Khaki-green	1	... ...	W41-G3L-E250-L
Engine plate, right side, Khaki-green	1	... ...	W41-G3L-E250-R
Bracket, for electric horn, Khaki-green	1	... ...	40-G3-E550
Bolt, fixing bracket to front frame tube	1	... ...	STD-303
Nut, for bracket to front frame tube bolt	2	... ...	STD-3
Ball race, for frame	2	... ...	STD-806
Balls, $\frac{1}{4}$ in. diameter, for steering head (per set)	58	... ...	STD-72
FORKS.			
Fork crown (ONLY STOCKED COMPLETE)	1	... ...	W41-G3L-FF17
Head stem (ONLY STOCKED COMPLETE)	1	... ...	41-18-FF20
Circlip, for head stem (ONLY STOCKED COMPLETE)	1	... ...	40-G12M-FF92
Ball race, for fork crown	1	... ...	STD-805
Pinch bolt, for fork crown	2	... ...	STD-369
Washer, for fork crown pinch bolt	2	... ...	STD-11
Handlebar lug	1	... ...	W41-G3L-FF21
The above handlebar lug includes the handlebar half clip and its studs with washers and nuts.			
Ball race, for handlebar lug	1	... ...	STD-806
Grease nipple, for handlebar lug	1	... ...	STD-51
Adjusting nut, for head stem	1	... ...	LFF-42
Lock nut (domed), for adjusting nut	1	... ...	L4-FF46
Tube, inner, fixed A	2	... ...	W41-G3L-FF3
Bush, bottom, for fixed inner tube A	2	... ...	40-G12M-FF191
Circlip, for bottom bush A	2	... ...	40-G12M-FF192
Bolt, for top of inner tube A	2	... ...	40-G12M-FF189
Washer, for inner tube top bolt A	2	... ...	40-G12M-FF190
Fork slider, left side	1	... ...	40-G12M-FF183-L
Fork slider, right side	1	... ...	40-G12M-FF183-R
Cap, for fork slider	2	... ...	40-G12M-FF183-C
Slider extension A	2	... ...	40-G12M-FF185-A
Bush (fibre), guide, for fork tube A	2	... ...	40-G12M-FF41
Oil seal, for fork tube A	2	... ...	40-G12M-FF91
Washer (paper), for oil seal A	2	... ...	40-G12M-FF95
Spring, for fork A	2	... ...	W41-G3L-FF32
Washer (leather), seating, for spring A	4	... ...	40-G12M-FF126
Tube, cover, top	2	... ...	W41-G3L-FF184-T
Cap, for top cover tube	2	... ...	40-G12M-FF186
Plate, locating, for top plate (screwed)	2	... ...	40-G12M-FF128
Tube, cover, bottom	2	... ...	W41-G3L-FF184-B
Plate, locating, for bottom tube (plain)	2	... ...	40-G12M-FF127
Screw, retaining both locating plates	6	... ...	40-G12M-FF129
Plug, oil level, for slider	2	... ...	STD-485
Washer (fibre), for oil level plug	2	... ...	STD-203
Rod, for damper B	2	... ...	W41-G3L-FF55
Nut, lock, for top of damper B	2	... ...	STD-4
Tube, assembled, for damper B	2	... ...	40-G12M-FF60-A
Sleeve, plunger, for damper tube B	2	... ...	40-G12M-FF56
Valve, for damper tube B	2	... ...	40-18-FF58
Seat, for damper tube valve B	2	... ...	40-18-FF57
Pin, stop, for damper tube valve B	2	... ...	40-18-FF59
Nut, lock, for damper tube valve B	2	... ...	STD-5
Clip, retaining damper sleeve B	2	... ...	40-G12M-FF93
Washer (fibre), for damper tube bolt B	2	... ...	40-G12M-FF80
Bolt, for damper tube (bottom) B	2	... ...	40-G12M-FF94
Bracket, for speedometer	1	... ...	40-G12M-FF78
Bolt, fixing speedometer bracket	2	... ...	STD-342
Washer, for speedometer bracket bolt	2	... ...	STD-12
Stud, securing front wheel axle	4	... ...	W40-G12M-FF195
Nut, for front wheel axle stud	4	... ...	STD-4

(SEE NEXT PAGE FOR COMPLETE FORK ASSEMBLIES.)



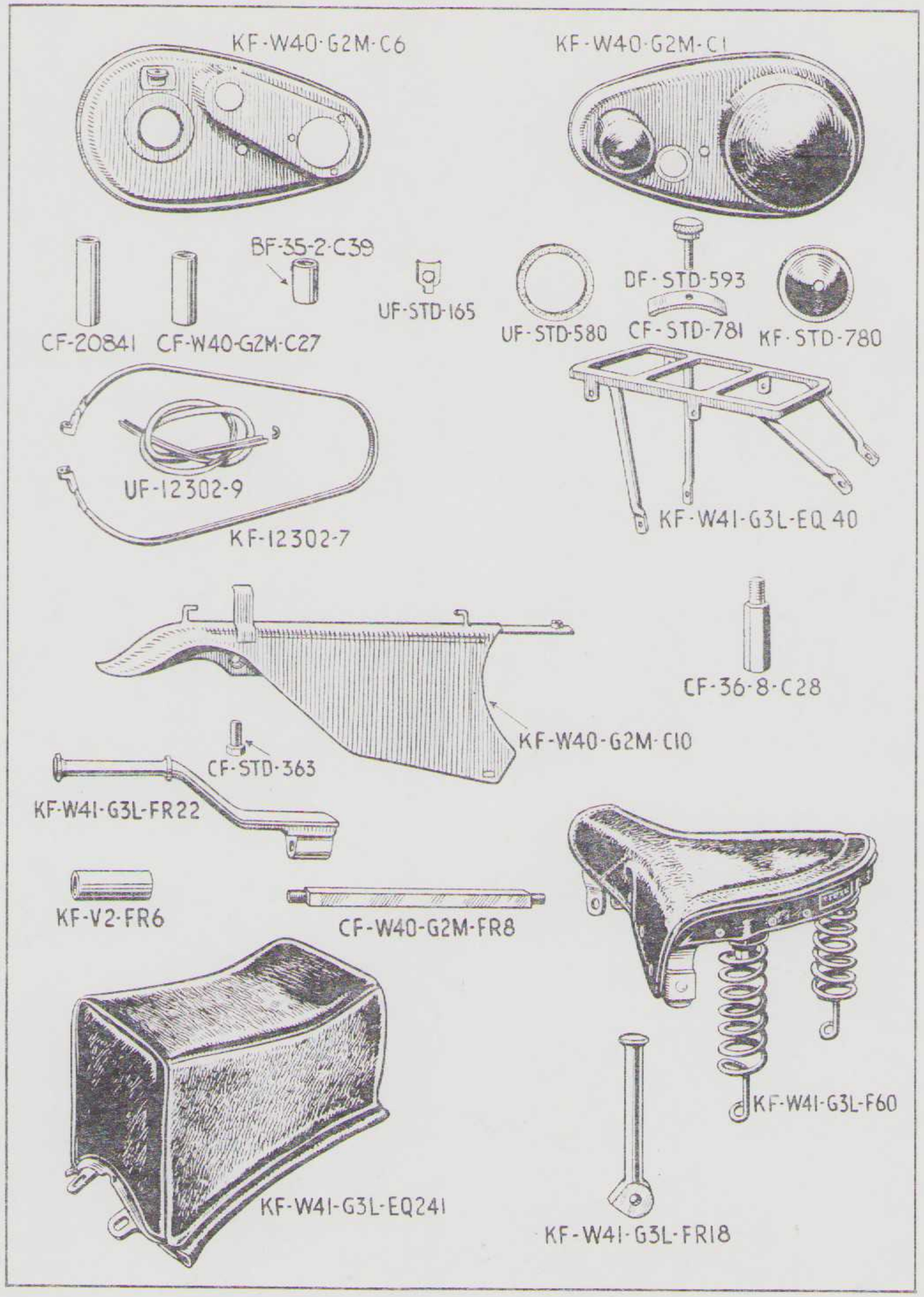


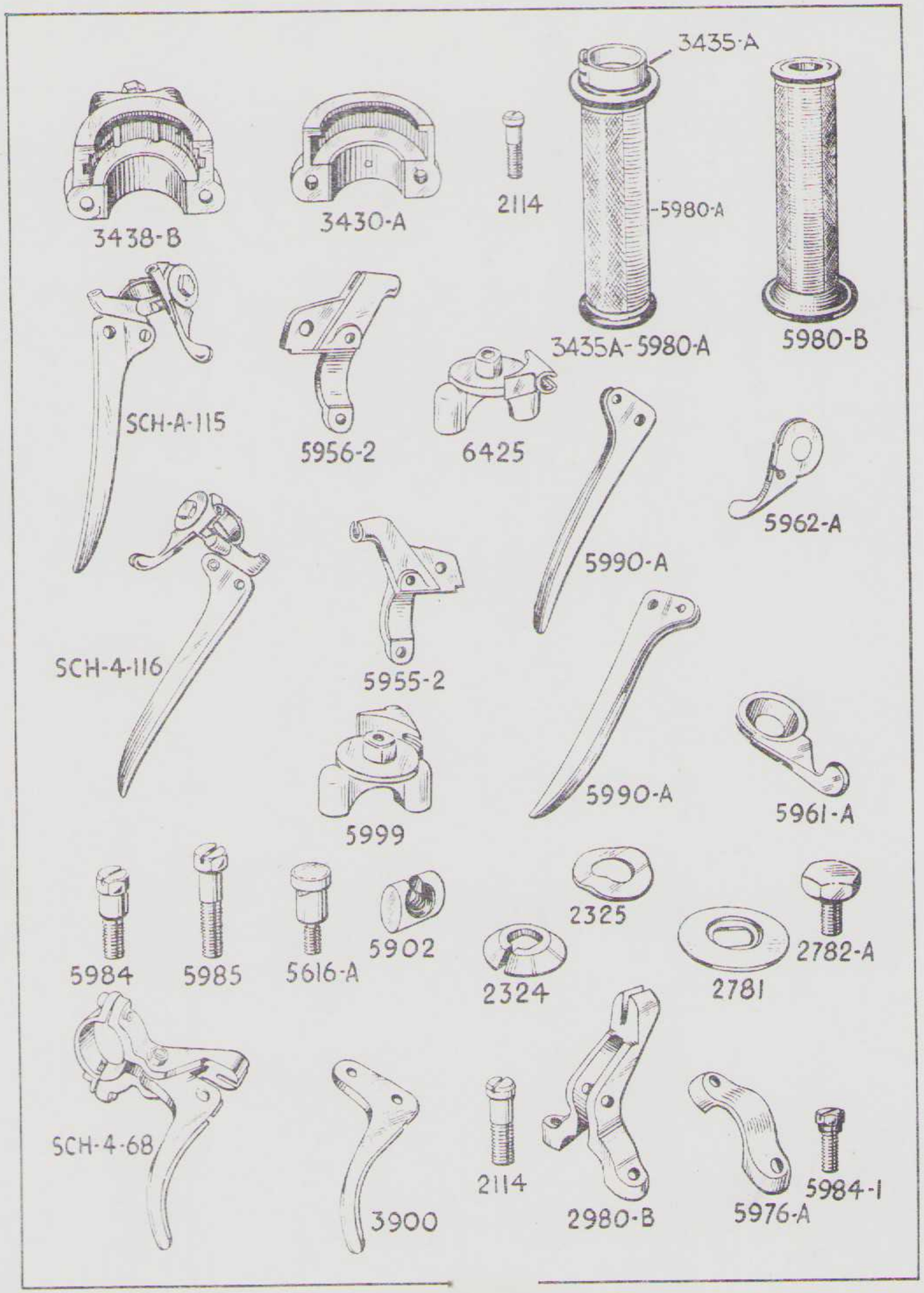
A COMPLETE FRONT FORK ASSEMBLY COMPRISES ALL THE PARTS LISTED IN THE FORK GROUP ON THE PREVIOUS PAGE. THE PART No. IS W41-G3L-FF1.

FOR EASE OF SERVICING, THE MAIN FORK UNITS ARE LISTED AND SUPPLIED AS SEPARATE ASSEMBLIES, THE OBJECT BEING TO ENABLE A COMPLETE ASSEMBLY TO BE EXCHANGED IN THE MINIMUM OF TIME. THESE COMPLETE ASSEMBLIES ARE LISTED BELOW.

Description.	Qty.	Price Each. £ s. d.	Part Number.
Front fork central tube assembly	2		W41-G3L-FF201
The above assembly comprises all those parts in the fork section (page 16) that are marked A.			
Front fork damper tube assembly	2		W41-G3L-FF202
The above assembly fits inside the central tube assembly and comprises all those parts in the fork section (page 16) that are marked B.			
HANDLEBAR.			
Handlebar, bare, Khaki-green	1		W40-G2M-FF66
Half clip, only, for handlebar	1		W40-G2M-FF42
Stud, for handlebar clip	2		W40-G2M-FF65
Washer, for handlebar clip stud	2		STD-11
Nut, for handlebar clip stud	2		STD-4
End plug, for handlebars	2		2898
FRONT STAND			
Front stand, bare	1		12403
Bolt, fixing stand to fork end, left side	1		W41-G3L-FF422
Bolt, fixing stand to fork end, right side	1		W41-G3L-FF421
Spring washer, for stand fixing bolt	2		HBD-52
Split pin, for stand fixing bolt	2		STD-14
Bolt, anchoring front stand to mudguard	1		STD-344
Washer, for anchor bolt	1		STD-12
Nut, plain, for anchor bolt	1		STD-5
Nut, with collar, for anchor bolt	1		STD-211
REAR STAND.			
Rear stand, bare, Khaki-green	1		38-G3-F44
Bolt, fixing stand to fork end	2		38-12-F71
Nut, for stand fixing bolt	2		STD-71
Return spring, for rear stand	1		38-G3-F245
PROP STAND.			
Prop stand leg, bare, Khaki-green	1		W35-G3-F342-A
Hinge bolt, for prop stand leg	1		35-G3-F341
Nut, for hinge bolt	1		STD-2
Return spring, for prop stand leg	1		35-G3-F345
FRONT MUDGUARD.			
Mudguard, bare, Khaki-green	1		W41-G3L-M2
Bolt, fixing bracket to fork tubes	4		W41-G3L-M38
Washer, for bracket fixing bolt	4		STD-192
Stay, for mudguard, Khaki-green	2		40-G12-M30
Bolt, fixing stay to mudguard	2		STD-70
Spring washer, for stay to guard bolt	2		STD-191
Plain washer, for stay to guard bolt	2		STD-12
Nut, for stay to guard bolt	2		STD-5
Bolt, fixing stay to fork end	2		W41-G3L-M38
Washer, for stay to fork end bolt	2		STD-192
REAR MUDGUARD.			
Mudguard, bare, Khaki-green	1		W41-G3L-M4
Nut, uniting front and rear portions, Khaki-green	2		STD-5
Washer, for guard uniting nut	2		STD-12
Bolt, fixing guard to bottom bridge	1		STD-345
Spring washer, for bottom bridge bolt	1		STD-191
Nut, for bottom bridge bolt	1		STD-5
Bolt, fixing guard to oil tank bracket	1		STD-369
Spacer, thick, for oil tank bracket bolt	1		4178
Spacer, thin, for oil tank bracket bolt	1		4178-S
Washer, for oil tank bracket bolt (plain)	1		STD-11
Washer, for oil tank bracket bolt (spring)	1		STD-192
Nut, for oil tank bracket bolt	2		STD-4
Bolt, fixing guard to top bridge	1		STD-346
Spring washer for top bridge bolt	1		STD-191
Nut, for top bridge bolt	1		STD-5
Stay assembly, for guard, left side	1		W41-G3L-F300-L
Stay assembly, for guard, right side	1		W41-G3L-F300-R
Stud, fixing stay to fork end	2		STD-270
Nut, locking stay stud in fork end	2		STD-74
Nut, locking stay to fork end stud	2		STD-213
Bolt, fixing guard to rear of stay	1		STD-363
Spring washer, for rear stay bolt	1		STD-192
Nut, for rear stay bolt	1		STD-74
Bolt, fixing guard to front of stay, left	1		STD-363
Bolt, fixing guard to front of stay, right	1		STD-364
Spring washer, for front stay bolt	2		STD-192
Nut for front stay bolt	2		STD-4

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
REAR CARRIER.			
Rear carrier, bare, Khaki-green	1		W41-G3L-EQ 40
For the fixing bolts see the REAR MUDGUARD.			
FRONT CHAINCASE.			
Chaincase, complete, Khaki-green	1		W40-G2M-C-A
Chaincase, back half, bare, Khaki-green	1		W40-G2M-C6
Chaincase, front half, bare, Khaki-green	1		W40-G2M-C1
Metal band, for chaincase, Khaki-green	1		12302-7
Screw, clamping metal band for chaincase	1		STD-452
Rubber fillet (or joint) for chaincase band	1		12302-9
Inspection cap, complete, Khaki-green	1		17350-1
Inspection cap, bare, Khaki-green	1		STD-780
Cork washer, for inspection cap	1		STD-580
Knurled screw, for inspection cap	1		STD-593
Back plate, for knurled screw	1		STD-781
Bolt, fixing chaincase to engine	3		STD-440
Locking plate, for engine bolt	3		STD-165
Bolt, fixing centre of chaincase	1		STD-315
Spacer, for centre bolt (between engine plates) 2½ in. long	1		20841
Spacer, for centre bolt (outside engine plate) 1 61/64 in. long	1		W40-G2M-C27
Spacer, for centre bolt (inside chaincase) ⅝ in. long	1		35-2-C29
Washer, for centre bolt	2		STD-9
Nut, for centre bolt	3		STD-2
REAR CHAINGUARD.			
Chainguard, bare, Khaki-green	1		W40-G2M-C10
Bolt, fixing top of guard, in front	1		36-8-C28
Washer, for top of guard front bolt	1		STD-11
Bolt, fixing bottom of guard, in front	1		STD-70
Washer, for bottom front bolt	1		STD-12
Nut, for bottom front bolt	1		STD-5
Bolt, fixing rear of guard	1		STD-363
Washer, for rear of guard fixing bolt	1		STD-11
FOOTRESTS.			
Footrest, rod, bare	1		W40-G2M-FR8
Spacer, for rod, inside engine plates	1		V2-FR6
Washer, for footrest rod	2		STD-194
Nut, for footrest rod	2		STD-2
Footrest arm (or hanger), Khaki-green	2		W41-G3L-FR22
PILLION FOOTRESTS.			
Spindle, for pillion footrests	2		W41-G3L-FR18
Bolt, pivot, for footrest spindle	2		STD-403
Nut, for spindle pivot bolt	2		STD-73
Pillion footrests, complete, per pair	1		W41-G3L-FR18-A
SADDLE.			
Saddle with springs	1		W41-G3L-F60
Rexine cover (or saddle top), bare	1		38-G3-F60T
Rear spring, for saddle	2		D5-F560
Hinge bolt, for front of saddle	1		STD-410
Washer, for hinge bolt	1		STD-10
Nut, for hinge bolt	1		STD-3
Bolt, fixing spring to frame	2		STD-368
Washer, for spring to frame bolt	2		STD-11
Nut, for spring to frame bolt	2		STD-4
PILLION SEAT.			
Pillion seat	1		W41-G3L-EQ241
Bolt, fixing pillion seat	4		STD-70
Washer, for pillion seat bolt	4		STD-12
Nut, for pillion seat bolt	4		STD-5
NAME TRANSFERS.			
Transfer for rear mudguard	1		38-G3-F383
Transfer for top of oil tank	1		38-G3-F381
Transfer for side of oil tank	1		38-G3-F392
Transfer for front chaincase	1		38-G3-F393





CONTROL LEVER SECTION.

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
TWIST GRIP.			
Twist grip, complete	1	...	SCH-4-139
Half clip, with friction spring	1	...	3438-B
Half clip, plain	1	...	3430-A
Screw, clamping half clips	2	...	2114
Friction spring	1	...	3436-A
Adjusting bolt, for friction spring	1	...	BC-40
Lock nut, for adjusting bolt	1	...	BC-41
Sleeve, less rubber grip	1	...	3435-A
Rubber grip, only, for sleeve	1	...	5980-A
Sleeve, with rubber grip fitted	1	...	3435-A-5980-A
Split adaptor, for throttle casing	1	...	3434
DUMMY GRIP.			
Dummy grip	1	...	5980-B
CLUTCH AND IGNITION CONTROLS.			
Lever assembly, complete	1	...	SCH-4-115
Body, only, for clutch lever	1	...	5956-2
Body, only, for ignition lever	1	...	6425
Lever, only, for clutch (long)	1	...	5990-A
Lever, only, for ignition (short)	1	...	5962-A
BRAKE AND AIR CONTROLS.			
Lever assembly, complete	1	...	SCH-4-116
Body only, for brake lever	1	...	5955-2
Body, only, for air lever	1	...	5999
Lever, only, for brake (long)	1	...	5990-A
Lever, only, for air (short)	1	...	5961-A
FITTINGS FOR CLUTCH, BRAKE, IGNITION AND AIR LEVERS.			
Bolt, clamping bodies (with sleeve)	1	...	5984
Bolt, clamping bodies (plain)	1	...	5985
Fulcrum screw, for long levers	1	...	5616-A
Nut, large, for fulcrum screw	1	...	5931
Nut, small, for fulcrum screw	1	...	5932
Roller adaptor, for long levers	1	...	5902
Fibre washer, grey, for short levers	1	...	2324
Spring washer, for short levers	1	...	2325
Central screw, for short levers	1	...	2782-A
Cap, for short levers	1	...	2781

The quantities given above are those for one lever assembly only

EXHAUST LIFTER LEVER.

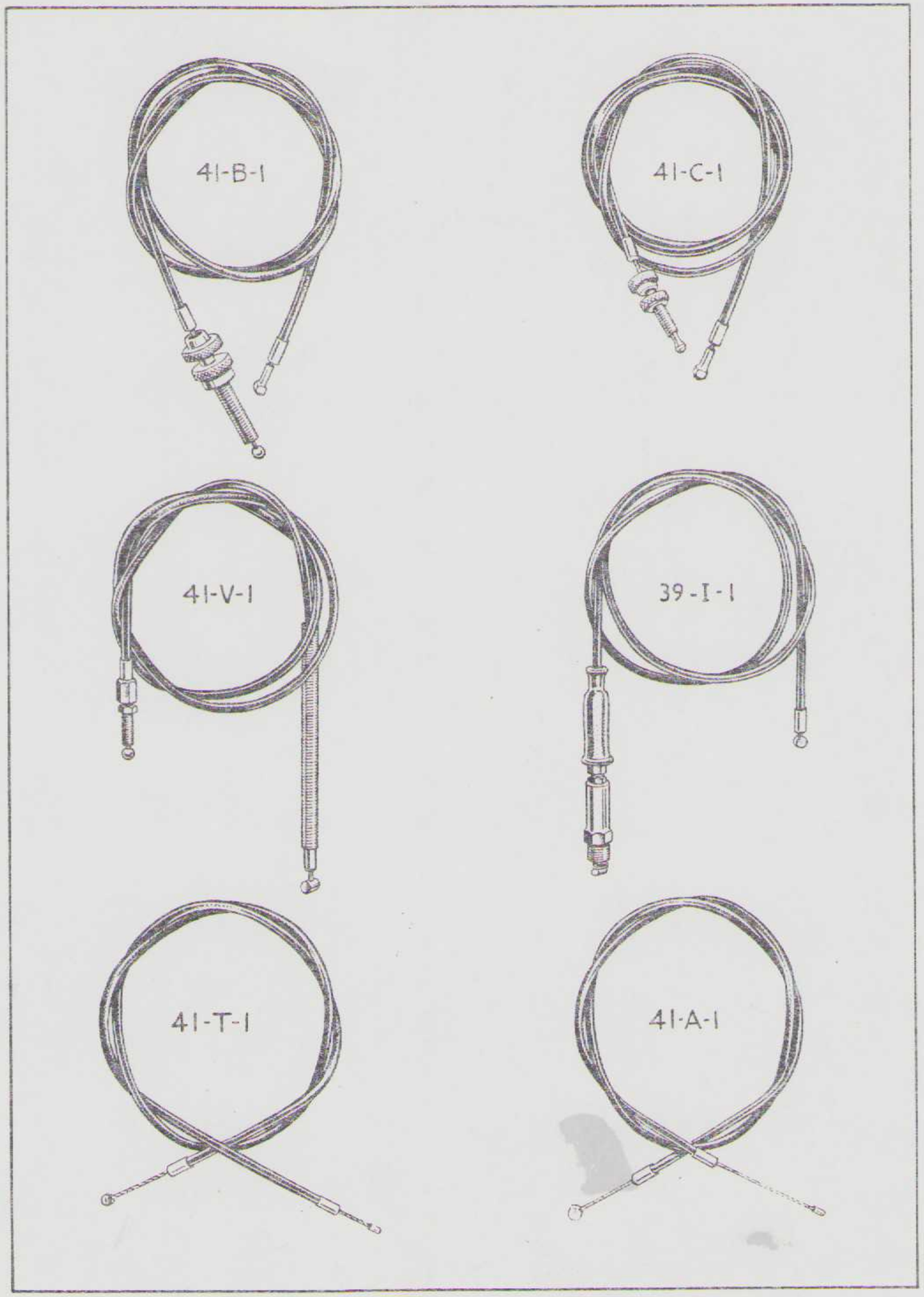
Exhaust lifter lever, complete assembly	1	...	SCH-4-68
Exhaust lifter lever, only	1	...	3900
Fulcrum screw, for exhaust lifter lever	1	...	2114
Nut, for fulcrum screw	1	...	8
Body, bare, for exhaust lifter lever	1	...	2980-B
Half clip, for lever body	1	...	5976-A
Bare, clamping half clip	2	...	9841-1

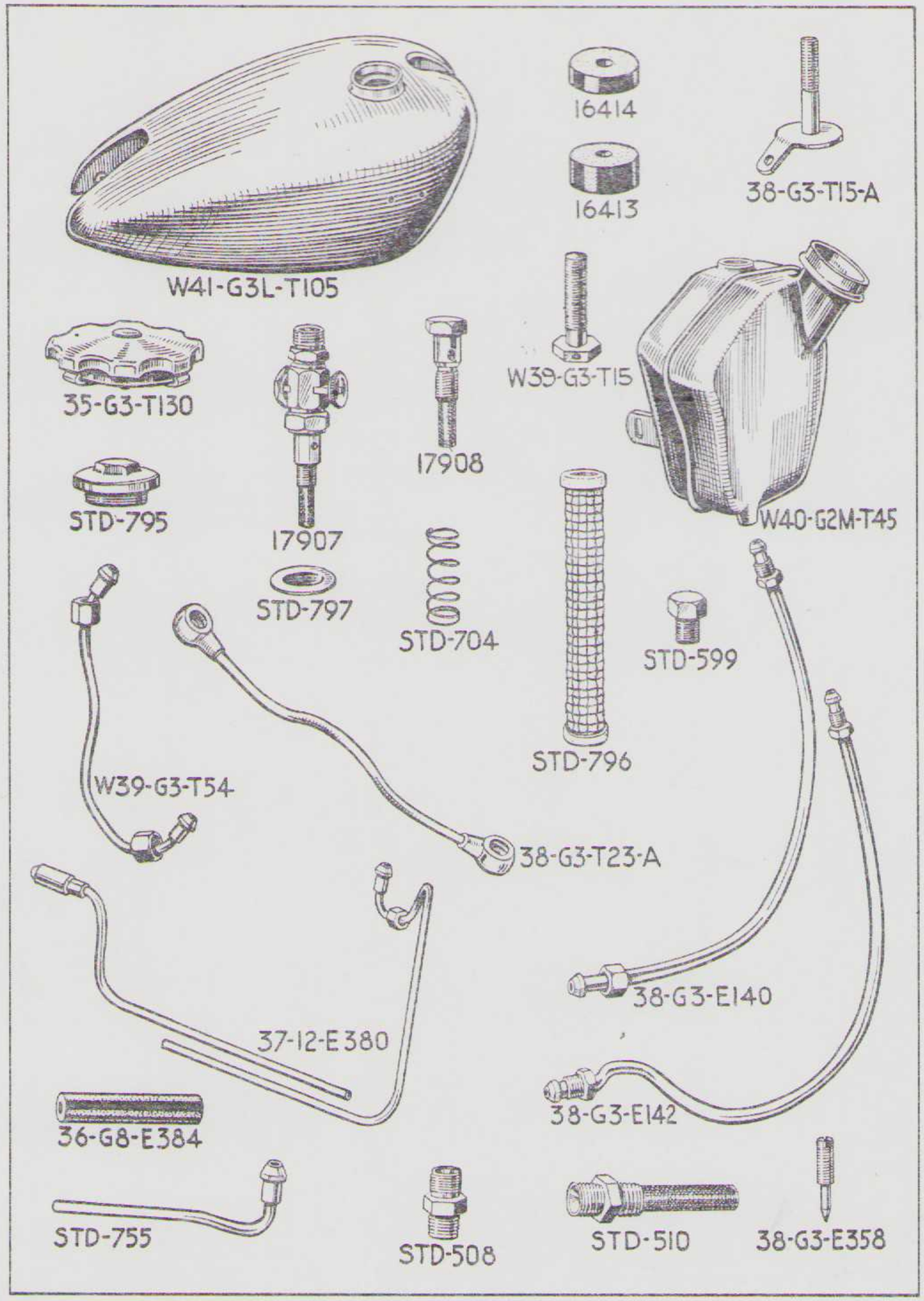
CONTROL CABLE SECTION.

THE COMPLETE CONTROL CABLES LISTED IN THE FOLLOWING SIX PARAGRAPHS INCLUDE ALL THE PARTS THAT MUST BE THREADED ON THE INNER CABLES BEFORE THE NIPPLES ARE FITTED. THEY ARE ASSEMBLED READY FOR USE.

THE INNER WIRES DO NOT INCLUDE THE NIPPLES AND THE OUTER CASINGS DO NOT INCLUDE THE END FERRULES.

Description.	Qty.	Price Each. £ s. d.	Part Number.
FRONT BRAKE CABLE.			
Front brake cable, complete, assembled	1		41-B-1
Inner wire, bare, 44in.	1		12-44
Nipple, for inner wire, brake end	1		993
Nipple, for inner wire, handlebar end	1		5538
Outer casing, bare, 38in.	1		12C-38
Ferrule, for outer casing	2		12E
Clip, to cover grease patch on casing	1		STD-50
Knurled adjuster, for brake cable	1		16365
Lock nut, for knurled adjuster	1		16363
Yoke end, for front brake cable	1		16482
Pin, for yoke end	1		STD-736
Split pin, for yoke end pin	1		STD-14
CLUTCH CABLE.			
Clutch cable, complete, assembled	1		41-C-1
Inner wire, bare, 53¼in.	1		12-53¼
Nipple, for inner wire, gear box end	1		4
Nipple, for inner wire, handlebar end	1		5538
Outer casing, bare, 47¼in.	1		12C-47¼
Ferrule, for outer casing	2		12E
Clip, to cover grease patch on casing	1		STD-50
Adjuster, for clutch casing	1		20876
Lock nut, for cable adjuster	1		STD-612
VALVE LIFTER CABLE.			
Valve lifter cable, complete, assembled	1		41-V-1
Inner wire, bare, 34in.	1		12-34
Nipple, for inner wire, engine end	1		993
Nipple, for inner wire, handlebar end	1		2368
Outer casing, bare, 30in.	1		12C-30
Ferrule, for outer casing	2		12E
Clip, to cover grease patch on casing	1		STD-50
Armoured sheath, for outer casing	1		STD-709
Adjuster, for valve lifter cable	1		11751
Lock nut, for cable adjuster	1		STD-622
IGNITION CONTROL CABLE.			
Ignition cable, complete, assembled	1		39-I-1
Inner wire, bare, 45in.	1		11-45½
Nipple, for inner wire, magneto end	1		MC4
Nipple, for inner wire, handlebar end	1		3327
Outer casing, bare, 40in.	1		11C-39½
Ferrule, for outer casing	2		11E
Clip, to cover grease patch on casing	1		STD-50
Rubber cap, for cable entry to magneto	1		MC9
Cable adjuster, with lock nut	1		MC7-8
Cable sleeve (screws into magneto)	1		MC6
Cable return spring	1		MC5
THROTTLE CONTROL CABLE.			
Throttle cable, complete, assembled	1		41-T-1
Inner wire, bare, 42½in.	1		11-42½
Nipple, for inner wire, carburetter end	1		1482
Nipple, for inner wire, handlebar end	1		3327
Outer casing, bare, 36½in.	1		11C-36½
Ferrule, for outer casing	2		11E
Clip, to cover grease patch on casing	1		STD-50
Cable adjuster	1		14-035
AIR CONTROL CABLE.			
Air cable, complete, assembled	1		41-A-1
Inner wire, bare, 37in.	1		11-37
Nipple, for inner wire, carburetter end	1		1482
Nipple, for inner wire, handlebar end	1		3327
Outer casing, bare, 31in.	1		11C-31
Ferrule, for outer casing	2		11E
Clip, to cover grease patch on casing	1		STD-50
Cable adjuster	1		14-035





TANK SECTION.

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
PETROL TANK.			
Petrol tank, bare, Khaki-green	1		KF-W41-G3L-T105
Bolt, fixing tank to frame, front	2		38-G3-T15-A
Bolt, fixing tank to frame, rear right	1		38-G3-T15-A
Bolt, fixing tank to frame, rear left	1		W39-G3-T15
Rubber pad, thick, for tank fixing bolts	4		16413
Rubber pad, thin, for tank fixing bolts	3		16414
There is no Thin Rubber Pad on the rear left tank fixing bolt.			
Metal washer, for tank fixing bolts	5		STD-173
There are two metal washers on the rear left tank fixing bolt.			
PETROL TANK FITTINGS.			
Filler cap, for petrol tank	1		35-G3-T130
Washer, only, for filler cap	1		AT-30-C
Tap, for petrol supply	1		17907
Banjo pin, for tank connection pipe	1		17908
Fibre washer, small, for tap and pin	2		STD-200
Fibre washer, large, for tap and pin	2		STD-201
Wing emblem, for tank, left side	1		38-G3-T57-L
Wing emblem, for tank, right side	1		38-G3-T57-R
Embossed letter M, for tank, left side	1		D5-T500-L
Embossed letter M, for tank, right side	1		D5-T500-R
Screw, fixing letter M and wing emblem	4		STD-150
OIL TANK.			
Tank, bare, Khaki-green	1		W40-G2M-T45
Filler cap, for oil tank	1		35-G3-T130
Washer, only, for filler cap	1		AT-30-C
Drain plug, for oil tank	1		STD-599
Washer, fibre, for drain plug	1		STD-200
Felt filter, or cartridge	1		STD-796
Spring, for felt filter	1		STD-704
Dished washer, for filter spring	1		STD-797
Screwed cap, for filter compartment	1		STD-795
Cork washer, for compartment cap	1		STD-583
For the nuts and washers fixing the oil tank to the frame see BATTERY CARRIER.			
For the bolt, spacers, washer and nut fixing the oil tank to the rear mudguard, see REAR MUDGUARD.			
PETROL PIPE AND FITTINGS.			
Feed pipe, complete with nipples and nuts	1		W39-G3-T54
Nipple, for petrol pipe, tank end	1		STD-504
Nipple, for petrol pipe, carburetter end	1		14-026
Union nut, for petrol pipe, tank end	1		STD-504-N
Union nut, for petrol pipe, carburetter end	1		14-042
Tank connection pipe with banjo unions	1		38-G3-T23-A
Banjo union, for tank connection pipe	2		STD-500
OIL PIPES.			
Feed pipe, tank to engine	1		38-G3-E140
Feed pipe, pump to rocker box	1		37-12-E380
Return pipe, engine to tank	1		38-G3-E142
Oil discharge pipe, for release valve	1		STD-755
Rubber connection, for rocker box feed pipe	1		36-G8-E384
The feed pipe to rocker box (DF-37-12-E380) is in two pieces. The price includes the union nuts but not the rubber connection.			
OIL PIPE FITTINGS.			
Oil union in rocker box	1		STD-508
Oil union, in oil tank, for oil main feed	1		STD-510
Nipple, for rocker feed pipe, top end	1		STD-504
Nipple, for rocker feed pipe, bottom end	1		STD-509
Nipple, for oil discharge pipe	1		STD-505
Union nut, for rocker feed, top end	1		STD-504-N
Union nut, for rocker feed, bottom end	1		37-12-E385
Union nut, for oil discharge pipe	1		STD-504-N
Needle adjusting screw	1		38-G3-E358
Lock nut, for needle adjusting screw	1		STD-290
The needle adjusting screw (CF-38-G3-E358) screws into the right hand side of the cylinder head and regulates the oil supply to the inlet valve guide.			

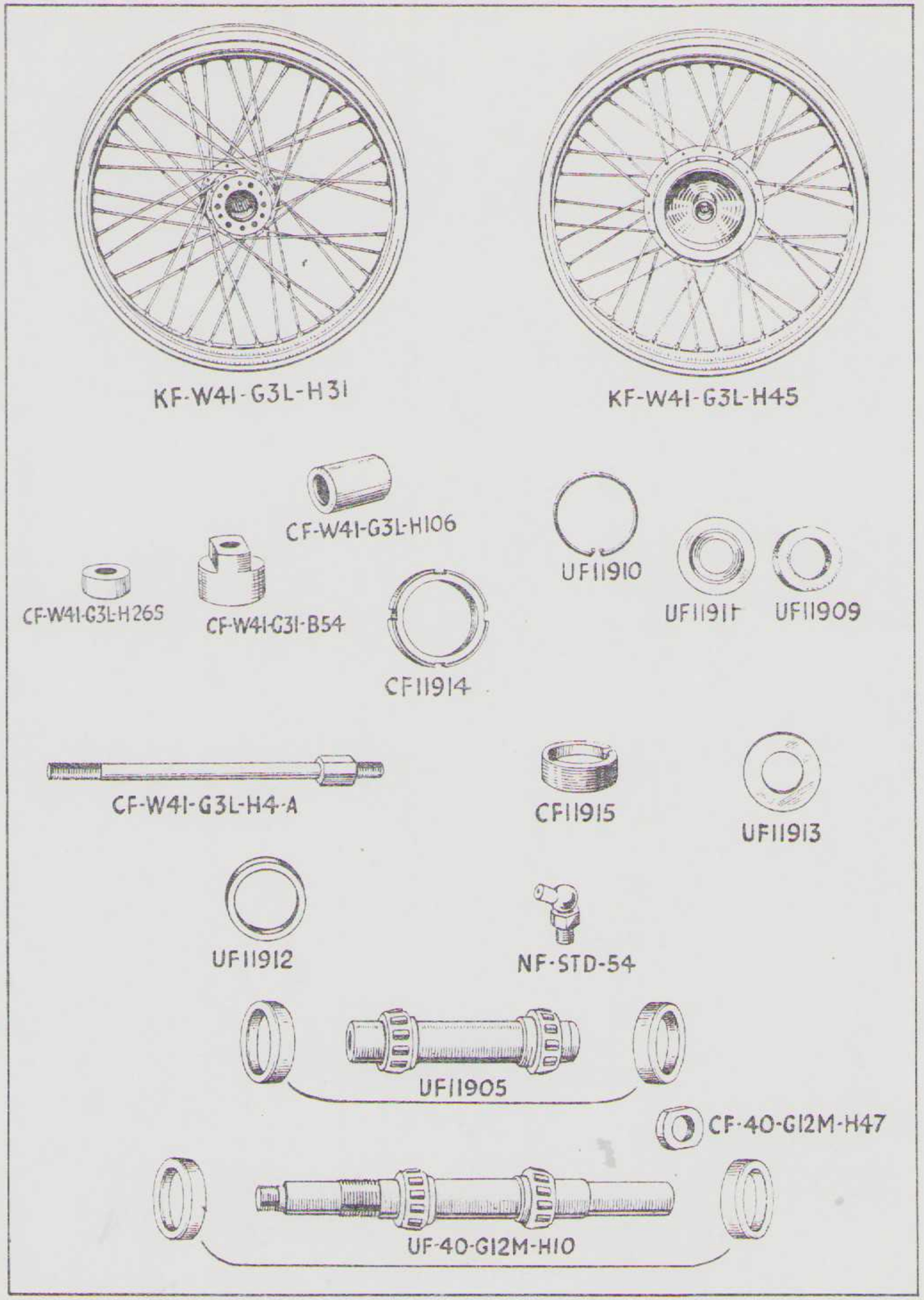
WHEEL AND BRAKE SECTION.

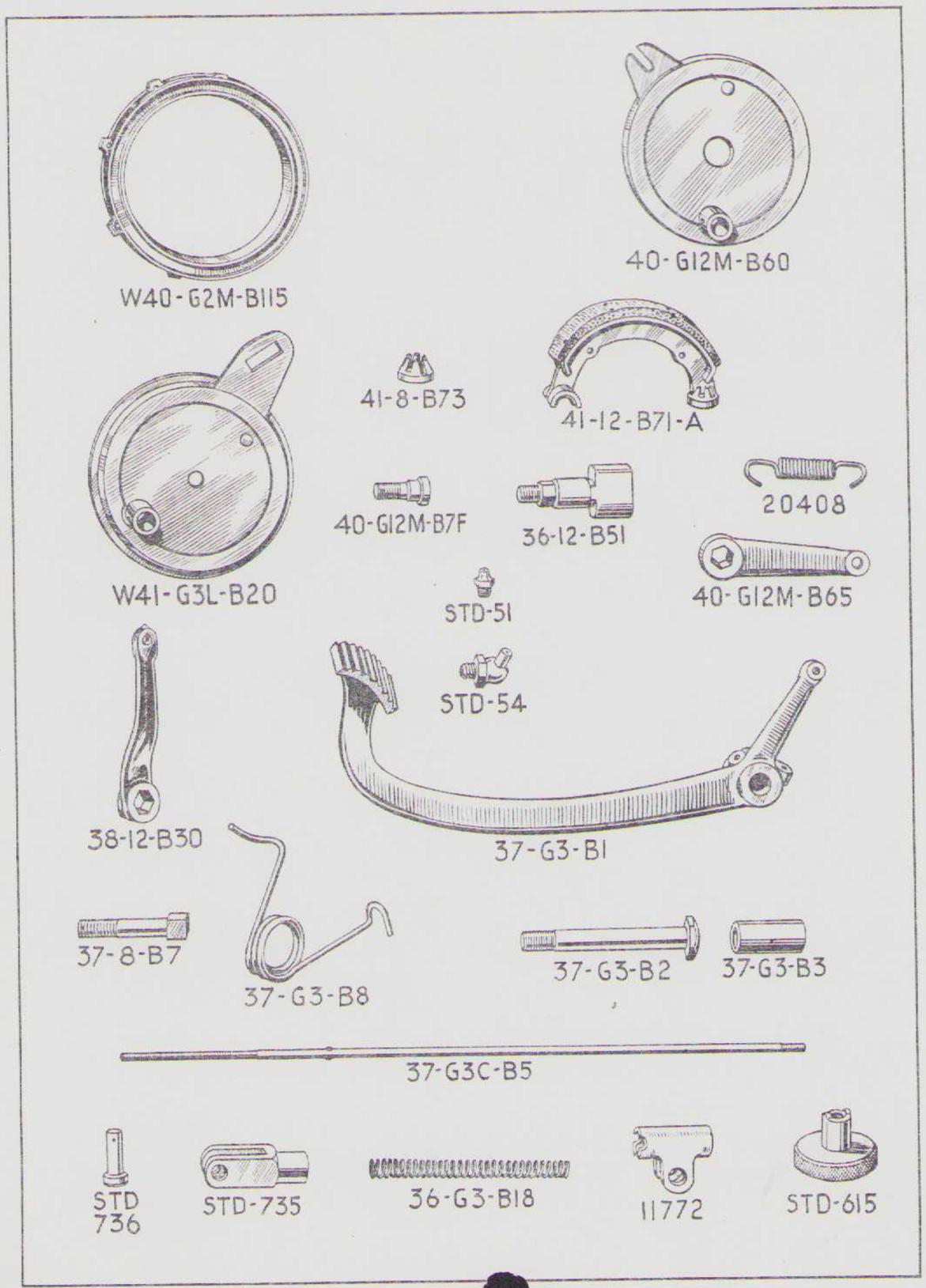
A FRONT WHEEL COMPLETE, WITH ALL FITTINGS, INCLUDES ALL BRAKE PARTS AND HUB BEARINGS, SPINDLE WITH WASHER AND NUT, BUT DOES NOT INCLUDE THE TYRE.

Description.	Qty.	Price Each. £ s. d.	Part Number.
FRONT WHEEL.			
Wheel, with all fittings, Khaki-green	1		W41-G3L-H45A
Wheel, less all fittings, Khaki-green	1		W41-G3L-H45
Rim, 19in. by 2½in., Khaki-green	1		40-G3W0-H20
Spoke, left, 5gin. by 8 G by 10 G	20		W41-G3L-H51
Spoke, right, 8 ⅛ in. by 9 G by 11 G	20		12399
Nipple, for spoke, left	20		20678
Nipple, for spoke, right	20		20680
Hub shell, with brake drum, bare	1		W40-G2M-H19
Grease nipple, angular, for hub shell	1		STD-54
Security bolt, for tyre	1		41-G3-H132
FRONT WHEEL BEARINGS.			
Spindle with roller bearings	1		40-G12M-H10
Felt washer, for bearings	2		11909
Spring ring, for bearings	1		11910
Cup, for felt washer	1		11911
Spacing ring, for felt washer	1		11912
Retaining ring, for felt washer	3		11913
Lock nut, for bearing adjusting ring	1		11914
Adjusting ring, for bearings	1		11915
Nut, locating front brake cover plate	1		40-G12M-H47
Washer, locating front brake cover plate	1		40-G12M-B100
Nut, outside front brake cover plate	1		40-G12M-H46
Nut, left, for spindle	1		STD-1
Washer, for spindle	1		STD-8

A REAR WHEEL, COMPLETE WITH ALL FITTINGS, INCLUDES ALL BEARINGS ASSEMBLED, BUT DOES NOT INCLUDE THE CENTRE SOLID SPINDLE, AXLE WASHERS, AXLE NUTS, BRAKE PARTS, SPEEDOMETER DRIVE, SPROCKET AND TYRE.

Description.	Qty.	Price Each. £ s. d.	Part Number.
REAR WHEEL.			
Wheel, with all fittings, Khaki-green	1		W41-G3L-H31-A
Wheel, less all fittings, Khaki-green	1		W41-G3L-H31
Rim, 19in. by 2½in., Khaki-green	1		40-G3W0-H21
Spoke, 8 ⅛ in. by 6 G by 9 G (left or right)	40		39-8-H54
Nipple, for spoke (left or right)	40		12344
Hub shell, bare	1		W41-G3L-H2
Grease nipple, angular, for hub shell	1		STD-54
Security bolt, for tyre	1		41-G3-H132
REAR WHEEL BEARINGS.			
Hollow spindle with roller bearings	1		11905
Felt washer, for bearings	2		11909
Spring ring, for bearings	1		11910
Cup, for felt washer	1		11911
Spacing ring, for felt washer	1		11912
Felt retaining ring, small hole	3		11913
Lock nut, for bearing adjusting ring	1		11914
Adjusting ring, for bearings	1		11915
Centre solid spindle	1		W41-G3L-H4-A
Distance piece, for spindle (next to cover plate)	1		W41-G3L-H106
Distance piece, for spindle (fits in fork end)	1		W41-G3LB-54
Distance piece, for speedometer gear box	1		W41-G3L-H26-S
Nut, left, for solid spindle	2		STD-2
Washer, for solid spindle	2		STD-9





Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
FRONT BRAKE.			
Brake drum, bare	1		W40-G2M-B115
Screw, fixing brake drum to hub shell	8		STD-140
Cover plate, for brake shoes	1		40-G12M-B60
Anchor bolt, for brake cover plate	1		40-G12M-B7F
Washer, for anchor bolt	1		STD-11
Nut, for anchor bolt	1		STD-4
Split pin, for brake anchor bolt	1		STD-14
Brake linings, with rivets, per pair	1		3836-3
Rivets, for brake linings, per set	16		STD-105
Spring, for brake shoes	2		20408
Expander, or cam, for brake shoes	1		36-12-B51
Lever, for brake shoe expander	1		40-G12M-B65
Grease nipple, for brake expander	1		STD-51
Washer, for brake expander	1		STD-174
Nut, for brake expander	1		STD-4
Brake shoes, with linings and collars, per pair	1		41-12-B71-A
Brake expander thrust collar, adjusting	2		41-8-B73
REAR BRAKE.			
Brake cover plate, bare	1		W41-G3L-B20
Anchor bolt, for brake cover plate	1		37-8-B7
Nut, for brake cover plate anchor bolt	1		STD-3
Lock nut, for brake cover plate anchor bolt	1		STD-73
Split pin, for brake cover plate anchor bolt	1		STD-6
Brake linings, with rivets, per pair	1		3836-3
Rivets, for brake linings, per set	16		STD-105
Spring, for brake shoes	2		20408
Expander, or cam, for brake shoes	1		36-12-B51
Lever, for brake expander	1		38-12-B30
Grease nipple, for brake expander	1		STD-51
Washer, for brake expander	1		STD-174
Nut, for brake expander	1		STD-4
Brake shoes, with linings and collars, per pair	1		41-12-B71-A
Brake expander thrust collar, adjusting	2		41-8-B73

For the rear brake drum and sprocket, fixing bolts and nuts, see the TRANSMISSION SECTION.

REAR BRAKE OPERATING PARTS.

Rear brake foot pedal, Khaki-green	1		37-G3-B1
Bush, for foot pedal	1		37-G3-B3
Grease nipple, angular, for foot pedal	1		STD-54
Spindle, for foot pedal	1		37-G3-B2
Plain washer, for foot pedal spindle	2		STD-9
Spring washer, for foot pedal spindle	1		STD-194
Nut, for foot pedal spindle	1		STD-2
Return spring, for foot pedal	1		37-G3-B8
Adjusting bolt, for foot pedal	1		STD-345
Lock nut, for pedal adjusting bolt	1		STD-5
Brake rod, bare	1		37-G3C-B5
Yoke end, for front end of rod	1		STD-735
Pin, for yoke end	1		STD-736
Split pin, for yoke end pin	1		STD-14
Spring, for brake rod	1		36-G3-B18
Washer, for brake rod spring	1		STD-178
Adjusting clip, for rear end of brake rod	1		11772
Pin, for adjusting clip	1		STD-736
Split pin, for adjusting clip pin	1		STD-14
Knurled adjusting nut, for brake rod	1		STD-615

ELECTRICAL SECTION.

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
MAGNETO.			
Magneto, complete (Lucas, Type N1-1-A-O)	1		454-229
High tension pick-up, with brush and spring	1		454-205
Cover, for contact breaker	1		M-2648-1-DP
Contact breaker point set	1		484-098
Platform, for magneto, Khaki-green	1		37-G3-E76
Bolt, fixing magneto, right, long	2		STD-341
Bolt, fixing magneto, left, short	2		STD-340
Washer, for magneto fixing bolts	4		STD-12
Nut, left, for platform front fixing bolt	1		STD-4
Nut, right, for platform front fixing bolt	1		35-G3-E56
Washer, for platform front fixing bolt	2		STD-11

The magneto platform is mounted above the rear engine plates. The rear end is secured by the bolt on the seat tube bottom lug (see FRAME parts) and the forward end is secured by the dynamo strap crossbar, which is threaded on both ends and the nuts and washers (CF-STD-4, CF-35-G3-E56 and CF-STD-11), listed above, fit on this bar.

DYNAMO.

Dynamo, complete (Lucas type E3AR-AO5-1)	1		200-430
Brush set, for dynamo	1		200-290
Locating plate, for dynamo	1		35-G3-E275
Screw, fixing locating plate to dynamo	2		STD-44
Washer, for locating plate screw	2		STD-178
Strap, clamping dynamo	1		FE-76
Hinge pin, for clamping strap	1		STD-791
Threaded collar, for strap eye	1		35-G3-E277
Bolt, tightening, for clamping strap	1		35-G3-E280
Square crossbar, for clamping strap bolt	1		35-G3-E279

VOLTAGE CONTROL UNIT.

Voltage regulator and cut-out, complete, Type L33	1		33020-A-L33
Bolt, fixing regulator to frame	2		STD-70
Washer, for regulator fixing bolts	2		STD-12
Nut, for regulator fixing bolts	2		STD-5

BATTERY.

Battery, complete, Lead-Acid type, dry	1		PUW-7E
Battery, complete, Lead-Acid type, charged	1		PUW-7E-CH
Cover, only, for Lead-Acid Battery	1		S-2171-1B

BATTERY CARRIER.

Battery carrier, complete, Khaki-green	1		W36-G3-E185
Back portion of carrier, bare, Khaki-green	1		W36-G3-E181-A
Front portion of carrier, bare, Khaki-green	1		W39-G3-E182
Hinge pin, for battery carrier front	1		XE-184
Battery clamping bolt	1		AE-180
Seat, for battery clamping bolt	1		AE-178
Nut, for battery clamping bolt	1		AE-177
Nut, fixing carrier to frame	2		STD-4
Washer, for battery fixing nut	2		STD-174
Stay, from carrier to chain guard	1		DE-181-B
Screw, fixing stay to carrier	1		STD-40

HORN.

Horn, less switch and bracket (HF-500)	1		HF-500
Bolt, fixing horn to plate on frame	1		STD-402
Washer, for horn fixing bolt	1		STD-10
Nut, for horn fixing bolt	1		STD-3

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
HEAD LAMP.			
Head lamp, complete, Khaki-green (DU-42	1		054673D
Outer shell, for head lamp, Khaki-green	1		515-677
Panel, complete with switch and ammeter	1		308-333
Front rim, for head lamp, Khaki-green	1		560-876
Glass, only, for head lamp	1		560-862
Mask, black Manilla, (fitted behind glass)	1		560-667
Reflector, for head lamp, less bulb holders	1		NB398-36
Reflector, back shell assembly	1		515-191
Clip and screw assembly, for main bulb holder	1		N-890
Main bulb, for head lamp, 6 volts, 24 by 24 watts	1		70
Pilot bulb, for head lamp, 6 volts, 3 watts	1		200
Lamp stay, or bracket, top, left	1		W41-G3L-FF74-L
Lamp stay, or bracket, top, right	1		W41-G3L-FF74-R
Lamp stay, or bracket, bottom, left	1		W41-G3L-FF73-L
Lamp stay, or bracket, bottom, right	1		W41-G3L-FF73-R
Bolt, fixing stay to fork crown	2		STD-360
Washer, for stay fixing bolt	2		STD-192
Bolt, fixing lamp to brackets	2		112-209
Washer, for lamp fixing bolts	2		137-141
Washer, "Shakeproof" per dozen	2		188-366

REAR LAMP.

Rear lamp, complete, less bulb, type L-WD-MCT-1	1		53000A
Rear portion of lamp (bracket body)	1		525-892
Front portion of lamp, with red glass	1		525-906
Bulb holder parts, with Cable	1		525-897
Bulb, for rear lamp, 6 volts, 3 watts	1		200
Bolt, fixing rear lamp	2		STD-70
Washer, plain, for lamp fixing bolt	2		STD-12
Washer, spring, for lamp fixing bolt	2		STD-191
Nut, for lamp fixing bolt	2		STD-5

SWITCHES.

Lighting main switch, for panel in head lamp	1		351-541
Handle, only, for main switch (with screw)	1		351544
Spring, fixing switch in panel per dozen	1		308-234
Horn switch, complete	1		762-100

ELECTRICAL SUNDRIES.

Ammeter, for panel in head lamp	1		364-461
Cable harness, complete	1		983-321
Electric light cable, single per foot	Q		ELC-WO
Electric light cable, triple per foot	Q		ELC-3
Screwed connector, for rear lamp cable	1		SA-147
Sparking plug (LODGE H-53)	1		H-53-678
High tension cable per foot	Q		STD-543
Terminal, for high tension cable	1		STD-541
Suppressor, for sparking plug	1	This is a War Office Supply.	

ACCESSORY SECTION.

Description.	Qty.	Price Each.	Part Number.
		£ s. d.	
SPEEDOMETER.			
Speedometer head, only, non-trip, 80 m.p.h.	1		S-433-B-EX-5413
Nut, fixing head to bracket	2		N-1115
Washer, for head fixing nut	2		W-7001
Driving cable, complete, 54in. long	1		53395-1-54
Inner cable, only, 54in. long	1		52108-54
Outer cable, only, 54in. long	1		53398-1-54
Clip, for outer cable	1		W41-G3L-F311
Screw, for outer cable clip	1		STD-450
Washer, for outer cable clip screw	1		STD-190
Gear box, complete	1		52283-2
Bracket, for speedometer	1		40-G12M-FF78
Bolt, fixing speedometer bracket	2		STD-342
Washer, for speedometer bracket bolt	2		STD-12

TOOLS.

Tool bag	1	...	17520
Screwdriver	1	...	LTK-13
Pliers	1	...	LTK-15
Gudgeon pin circlip pliers	1	...	11024
Grease gun	1	...	LTK-20
Tyre inflator	1	...	38-G3-EQ2
Tyre lever	1	...	W40-G3-TK29
Spanner, double end, ⅜in. by ¼in.	2	...	W41-G3L-TK1
Spanner, double end, ⅞in. by ¾in.	1	...	W41-G3L-TK2
Spanner, triple end, .80in. by 1.011in. by 1.200in.	1	...	RTK-3
Spanner, box, for sparking plug	1	...	17634
Spanner, for dynamo chain adjustment	1	...	RTK-1
Spanner, for hub lock nut	1	...	11717
Spanner, for contact breaker points	1	...	LTK-5
Adjustable wrench	1	...	LTK-12

TOOL BOXES.

Tool box, bare, Khaki-green	1	...	W40-G3-F45-1
Knurled screw, for tool box lid	1	...	37-8-F53
Spring washer, for tool box lid screw	1	...	STD-189
Nut, for tool box lid screw	2	...	STD-5
Bolt, fixing tool box to guard stay	1	...	STD-70
Washer, for stay bolt	1	...	STD-12
Nut, for stay bolt	1	...	STD-5
Bolt, front, fixing box to seat stay	1	...	STD-346
Bolt, rear, fixing box to seat stay	1	...	STD-347
Spacer, for seat stay bolt	2	...	RC-28
Washer, for seat stay bolt	2	...	STD-12
Nut, for seat stay bolt	2	...	STD-5
Stay, for tool box	1	...	W40-G3-F158
Bolt, fixing stay to tool box	1	...	STD-361
Washer, for tool box stay bolt	1	...	STD-11
Nut, for tool box stay bolt	1	...	STD-4

For the bolt fixing the stay to the mudguard stay, see " Bolt, fixing guard to front of stay, right " in " REAR MUDGUARD."

CABLE CLIPS.

Rubber clip, size A	5	...	STD-523
Rubber clip, size B	4	...	STD-522
Rubber clip, size C	2	...	STD-521
Rubber clip, size D	2	...	STD-520
Strip aluminium pliable clip		...	STD-525

The Cable Clips are used to retain the Control cables, the Electric Lighting cables and the Speedometer Driving cable.

GASKET SET.

INDIVIDUAL GASKETS AND WASHERS ARE LISTED IN THE GROUPS TO WHICH THEY BELONG. A COMPLETE SET OF ENGINE GASKETS CAN BE SUPPLIED, AS UNDER :—

Gasket set, for engine	1	...	41-WO-EQ5

THE ABOVE SET OF GASKETS CONTAINS :—

2	37-8-E3	Paper washer, for cylinder base.
2	STD-582	Paper washer, for oil pump end caps.
1	37-8-E78	Paper washer, for timing gear cover.
1	STD-581	Compo washer, for carburetter.
1	STD-581	Compo washer, for carburetter packing piece.
1	39-8-E440	Compo washer, for rocker box.
2	38-G4-E368	Rubber gasket, for cover tube (top).
2	STD-691	Rubber gland, for cover tube (bottom).
1	38-G4-E65	Rubber fillet, for tappet cover.
3	STD-205	Fibre washer, for tappet cover nuts.
2	38-12-E73	Fibre washer, for tappet guides.
1	STD-201	Fibre washer (large), for petrol tap and pin.
1	STD-200	Fibre washer (small), for petrol tap and pin.
3	STD-203	Fibre washer, for oil hole screws in crankcase.
1	12268	Copper gasket, for cylinder head.