More About Maintenance—No. 4

Overhauling the 350 c.c. o.h.v. Model C

Advice to Military Riders on Jobs Beyond the Range of the Daily Task System

By A SERGEANT INSTRUCTOR

THE difficulties of this article have been considerably lessened by the fact that the makers of the Matchless machine supply a really excellent instruction book and spares list which explains thoroughly and illustrates clearly a great deal of what it would have otherwise been necessary to translate into words.

Nevertheless, there are numerous points which deserve comment, and I propose to deal with the type of job lying just beyond the scope of the Tasks, thus following the precedent of previous articles in this series. It is hoped that these notes will be of particular interest and use to Unit Fitters and to those military motorcyclists who like to do work on their own machines of a nature rather more advanced than the official requirements.

It will be as well to explain that the article concerns particularly the G3/L (Teledraulic fork) model, though much of it applies to the earlier G3 (girder fork) types. There are, I believe, a few Pilot models about which are very similar to the G3s, save that they have the new forks—they differ from the G3/Ls in being not so thoroughly lightened, and they have the earlier set of close ratios with a high bottom gear. It will not, however, be necessary to make many special references in the text to the various types as these will be obvious from the context.

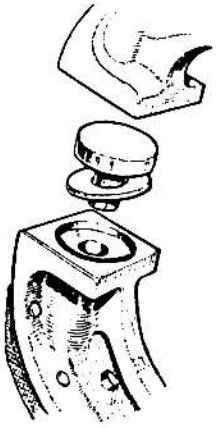
As regards the engine, decarbonization is a straightforward process adequately dealt with in the instruction book, and no especial care is necessary other than that which one normally bestows on a high-performance engine. It may be as well to remove the magneto chaincase cover whilst the engine is stripped, repacking it with new grease after the old has been cleaned out and the tension adjusted. The chain should have at least a quarter of an inch total play, but not much more.

It may, on occasions, be necessary to re-set the oil-feed control to the inlet valve guide. Normally the set-screw affecting this is set one half a turn from the fully closed (i.e., screwed-in) position, but if the sparking plug is found to oil up frequently, or if the exhaust smoke is thick, the control screw can be closed a fraction. If, on the other hand, the inlet valve runs dry and tends to squeak, the set-screw must be opened a fraction. Almost needless to add, this adjustment is very sensitive, and one-eighth of a turn is enough for each trial alteration.

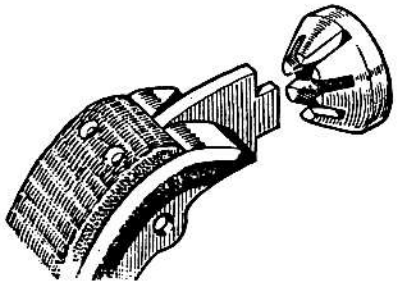
To prevent possible leakage, the flexible connection in the rocker box feed pipe should be bound at each end with thin copper wire: an "American whipping" is the neatest way of doing it. This is done by laying a loop of wire along the pipe, binding it in place with half a dozen coils of wire. The free end is then passed through the projecting part of the loop. When the other (starting) end of the wire is pulled it draws the loop and free end under the coils, hiding them neatly. The projecting pieces can finally be cut off. But I think a sketch will make the plot clearer than words can do.

As regards engine lubrication, the main oil filter (a corrugated felt cartridge) is set in the top of the oil tank just under the saddle, and this must be removed and cleaned in petrol in the manner dictated in the instruction book when carrying out periodic oil changes. At the same time, the less obtrusive gauze filter at the tank end of the main oil supply pipe must be taken out and swilled to clean the mesh. Finally, the drain-plug in the off-rear corner of the crankcase will have to be taken out to drain the sump.

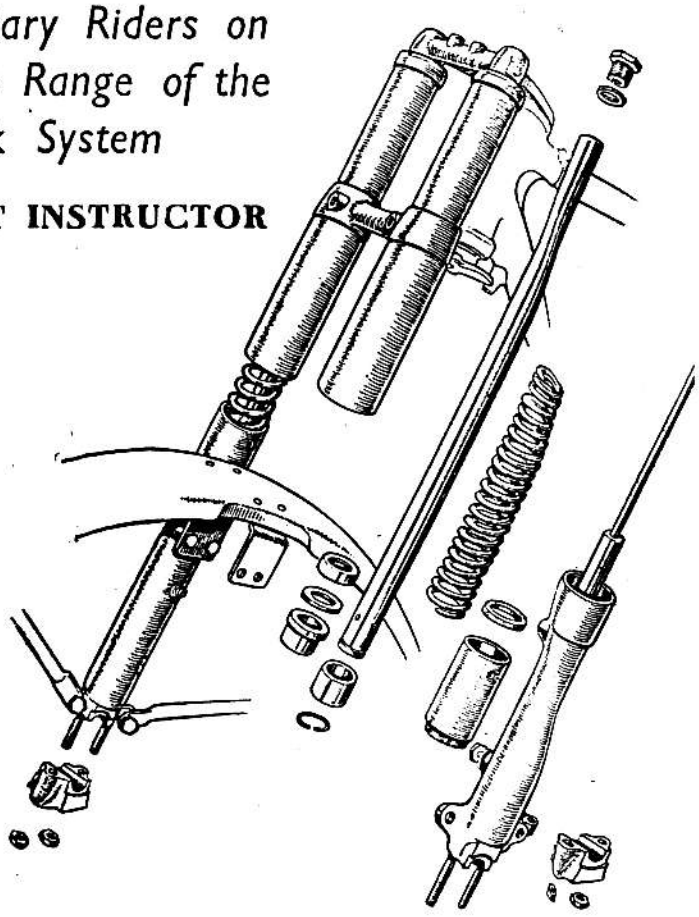
One other point occurs to me in regard to engine maintenance: always see that the valve lifter is adjusted properly and that the cable is unfrayed and working freely. The adjustment should be set so that almost half the trigger movement is "lost"; if it is set too close, or if the cable is not



On the G3 models the addition of shims beneath the mushroom-headed pins in the brakeshoe ends provides a simple means for accommodating wear in the linings.

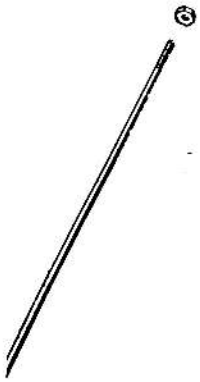


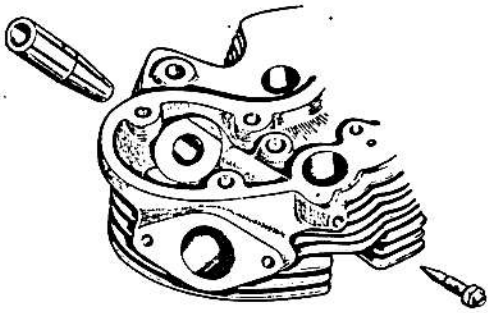
On the G3/L models wear on the brake linings is taken up by means of an ingenious cone which is provided with transverse slots of differing depths.



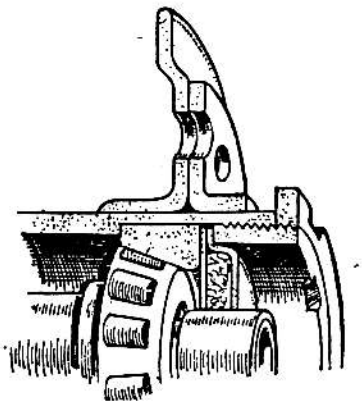
The highly efficient Teledraulic fork is both simple and robust in its construction. Only as the result of a very severe impact is the butted chrome molybdenum fixed member likely to become bent. The "exploded" details in the drawing show (on the left) the fixed member, with the coil spring, oil sealing washer and fibre block, which slide on it and (below) the steel guide-block which is retained in position by a circlip. The light alloy tubular sliding member which carries the front spindle is shown on the right, assembled with the inner portion of the hydraulic mechanism (which slides within the fixed member) and the long rod which carries the stationary hydraulic check valve.

G3/L W.D. Matchless

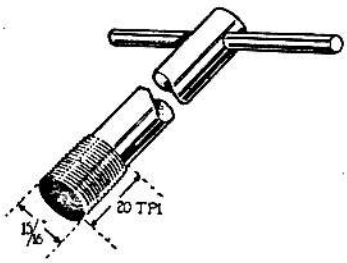




Supply of oil to the inlet valve guide is controlled by a taper ended screw. When fitting a new guide care must be taken to ensure the hole in the guide registering with the oilway drilled in the head.



The taper-roller wheel bearings are adjusted by a screwed sleeve which is retained in position by an external locking ring.



This easily made tool will prove of great assistance to fitters handling the new Teledraulic forks. It enables the fixed member to be removed or replaced without fear of damage to internal threads.

returning properly, the arm will bear on the tappet to its eventual detriment.

The Gearbox

It will not be necessary to write much about the gearbox, as this has been exhaustively discussed both in "Motor Cycling's" "Practical Hints on the Maintenance of W.D. Motorcycles," and in a previous article in this series dealing with Ariel machines. Contrary to the usual Burman practice, the box fitted to the Matchless should be lubricated with C600 oil, but the amount stipulated in the handbook has been found insufficient for really hard work. Perhaps the most practical way of doing the job is to check the level on a rod pushed through the kick-starter case inspection cap and add oil until the level is about 1 in. from the bottom—1¾ pints is the total capacity.

Boxes occasionally give warning of under-lubrication by emitting, in neutral, a screaming noise from one of the plain bushes. This sounds painfully expensive, but in practice no harm has been found to result if about a pint of thin oil is added at once and the level thereafter maintained with C600.

An exactly similar noise occasionally gives warning that the clutch sprocket roller race is dry: the cure is, of course, quite obvious; namely, to take off the outer chaincase half, strip the clutch and smear the roller race fairly generously with grease.

Another point as regards the gearbox—when any box has to be stripped, due to damage to the gears or shafts, always examine the layshaft bushes most carefully as any unusual shock, such as a broken layshaft or stripped pinion, may cause a hairline crack which will eventually spread, so that the bush breaks up.

Ratios

Those people who find the high bottom gear of the G3 Matchless rather a handicap when it comes to tricky cross-country work, may be interested to know that they can get a "competition" bottom gear ratio (now standardized on the G3/L) by swopping the original main driving gear for one with 32 teeth (Part No. UF-15-C-12) and its mate, the layshaft small gear, for an 18-tooth pinion (UF-28-C-6). This will leave the intermediate ratios a fraction higher than the newly standardized G3/L set, but the difference is too small to make alteration worth while.

A final hint as regards the gearbox is that it is worth while taking off the kick-starter crank so as to centre-pop the threaded spindle: unless this is done it is rather liable to work loose and get lost.

Readers will be familiar with the Matchless transmission arrangement by which the dynamo chain runs in the primary chain case. It is very important that this chain should be kept at the proper tension, which can be checked with a finger through the inspection cover. If the chain is allowed to tighten up (to less than the stipulated ¼-in. minimum) there is rather more than a sporting chance that the dynamo armature will break.

Quite a few of the aforementioned inspection covers have been lost through being incorrectly replaced, and it seems to me a good idea to make the fitment "captive" by fastening it to the footrest with a length of copper or Bowden wire. This must have a loop around the cover knob to allow it to be unscrewed and sufficient slack to permit the cover to be removed easily.

Keeping the Caps

A similar plan can be applied to the petrol and oil filler caps—and, judging from the number of machines seen about with a rag stuffed in the hole, it is more than justified. As there is nothing on the standard cap to fix a wire to, the best thing is to solder a shortened clevis pin or even a short bolt to the central "pip" of the cap around which a yoked wire can be fastened with a running loop.

Apart from the conventional cable stop or wing-nut adjusters, Matchless machines have a neat gadget for taking up wear in the brake shoes. On the earlier G3s (with aluminium shoes) this takes the form of a loose "mushroom" pressed into the end of the shoe. Adjustment of this type is effected by slipping out the mushroom and placing additional shims beneath it.

The welded steel shoes of the G3/Ls end in a tongue carrying a slotted cone-shaped collar which bears against the cam. The trick lies in the collars having three pairs of slots, recessed to varying depths so that turning them gives a wider or closer spacing of the shoe.

Whichever type is fitted, there is one precaution to be observed before the brake plate is finally replaced. When the spindle nut holding the brake plate is being finally tightened, hold the brake hard on with a box spanner slipped over the cam spindle arm: this will ensure that the mechanism is properly centralized with the drum. Unless this is done the operation may prove harsh and ineffective.

The wheel bearings of these machines are rather unusual in that it is the outer races which move to take up play and not the inner cones, as is gener-

ally the case. To get at the rear-hub adjustment, which lies inside the brake drum, the wheel must, of course, be removed.

The correct way to do the job is to slacken the locking ring and then to screw the adjusting ring (the inner one) firmly in until it is fully home. Then unscrew it one half a turn, and hold it in place while the locking ring is done up tight. This will allow the necessary few "thou." sideplay without which the hub would soon be ruined.

I must reiterate that, where the muckier sorts of cross-country going are often tackled, it is not sufficient merely to pump grease regularly into the hubs. To ensure good braking and the long life of hub bearings, the whole assembly must be stripped and cleaned regularly; this, of course, does not apply to Matchless machines only!

We now come to what is technically the most interesting feature of the whole machine—the Teledraulic front forks. In normal service these are so simple and trouble-free that an occasional "top-up" with M120 is the sum total of maintenance, but there must always be an occasion, even in the best regulated Units, when someone plasters his machine against a rock and one is left wondering just what can be done about it. Experience enables one to answer "quite a lot," and out of half-a-dozen training accidents—due to students "running out of road" and so on, only one necessitated new parts to repair the damage. In the other instances it was only necessary to employ a little "persuasion."

The Forks

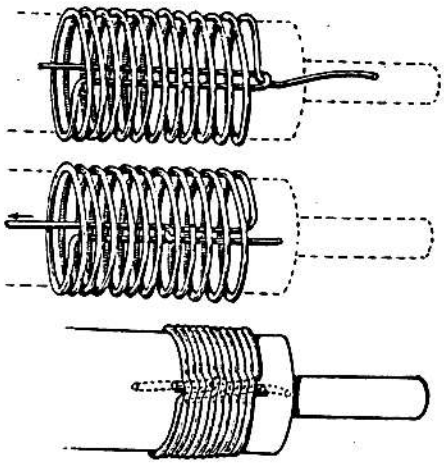
As telescopic forks are new to most of us, it may be helpful to those who have not had their machines very long if an explanation of the design and function of the forks is made as a preliminary, it being assumed that the reader already posseses a copy of the excellent Matchless instruction book to which reference can be made.

Basically, each "leg" of the forks consists of an inner tube (FF3) held in two cross-members, the fork crown (FF17) and the handlebar lug (FF21). This tube controls the position of the fork slider (FF183L or R), which carries the wheel spindle at its foot. There is, of course, a spring which slides over the fixed inner tube to absorb the shocks and several dust covers and extension tubes which neaten and enclose the mechanism.

That, at root, is all there is to the "tele" part of the mechanism; the "draulic" section consists of a clever application of the conventional plunger and cylinder idea used on other devices of a similar function.

It is unlikely that anyone will have to concern himself much with the hydraulic apparatus, as it is the mechanical telescopic part which "takes the rap" in any accident less serious than a real write-off.

In two or three cases we have found that a slanting blow has merely had the effect of twisting the legs out of parallel, i.e., turning either the handlebar lug or fork crown radially around



When making a flexible joint in an oil pipe the American whipping system employing copper wire provides a workmanlike finish to the job. The three stages are shown in this sketch.

the head stem (FF20). This can be cured quite simply by slackening the handlebar lug fixing and pulling the leg back into place by hand. Before this can be done the wheel and the mudguard must be removed, as both the wheel spindle and the mudguard bridge play a large part in locating the relative positions of the two legs.

Rectifying Damage

A more powerful and direct blow may result in one or both of the fixed inner tubes (FF3) being bent back and, perhaps, sideways as well. To rectify this it will be necessary to remove these fixed inner tubes, which probably will be found to be bent just below the "waisted" portion (the tubes are internally butted at this point), where they leave the main cross-members. The procedure for doing this is detailed very completely in the instruction book and need not be recounted here in full, but some additional hints may be helpful. I would like to point out, however, that the fork members are naturally made to close limits and, if possible, it is always advisable to fit new parts. There must, nevertheless, be an odd occasion when such parts are not immediately available and make-shift methods must be adopted.

Assuming the latter to be the case, having removed the front wheel and stripped the sliders, remove the top bolts (FF189) and screw in the tool illustrated overleaf. The latter can readily be made up either from an old bolt with the head cut off and a stem brazed or screwed into it, or from a piece of rod turned down over the plain part and suitably threaded at its end. With this in position, the fixed tube can be driven out. Conversely, a new or straightened member can be pulled into position. Should the clamping cross members provide too tight a grip when their bolts have been removed, they can be wedged open by obvious means.

Once the tubes are out, the degree of damage can be assessed by offering them up against a true straight-edge. As already mentioned, the bend will usually occur just below the lower fixing point. I am a little chary of mentioning our brutal method of straightening, which calls for a strong man, a long lever and a large blow-lamp, but half a dozen successful attempts have given me the courage of my convictions! I am the first to admit, however, that an arbor press with a steel or hardwood jig, bored and split to accommodate the tube, would be very much nicer.

There are, of course, snags in the blacksmith method; there is a danger of the tube going oval under the grip of the vice, but this can be avoided if the top bolt is screwed into position before bending is commenced. Another trouble is that one tends to make the correcting bend slightly out of place, so that the tube assumes the shape of a very flat or elongated "S." This defect can be overcome by patient bending, but is better prevented in the first case by (a) ascertaining the *exact* point of the original bend before starting to work and (b) concentrating the heat of the blow-lamp on the *inside* of the bend.

It is not easy to set any definite standard for the finished job, but I should say that a maximum error of one-sixteenth of an inch is permissible.

Final Tips

It is quite likely that a blow that bends the legs will distort the cover tubes (FF184-B) or the slider extension (FF185A). These are easily malleable and can best be re-shaped on a specially turned wooden "dolly" made to slide in them and having a chamfered end to give an easy lead-in.

It should, too, be checked that the cover tubes are firmly fixed to the lower cross-member to which they are held by long cheese-headed screws. If these are loose, or are not co-axial to the rest of the assembly, they may jam when the fork returns from the fully extended position. They must be tightened whilst the forks are stripped, but can only be finally set after assembly, when they can be bent by hand to pass easily over the fork sliders.

I think that I must, in conclusion, say that the space I have devoted to the new forks is in respect of their novelty and is in no way due to their troublesomeness. What bothers we have had have been caused by students whose ambition has outrun their ability and one cannot blame that on the makers of an excellent suspension system!

PRACTICAL HINTS ON THE SERVICING OF W.D. MOTORCYCLES

Copies of the above book can still be obtained upon application to the Publishers, Temple Press Ltd., Bowling Green Lane, London, E.C.1, the price being 1/6 per copy, or 1/8 post free. It deals in a most comprehensive manner with the servicing of engines, gearboxes and electrical equipment as used in modern W.D. machines.