# Section 7

# Suspension Wheels and Brakes

Velocette

## SUSPENSION, WHEELS AND BRAKES

### FRONT SUSPENSION

The LE front fork is as unique as the rest of the machine's design, in that it has oil in it; yet has no damping other than normal rubbing friction. It has no oil seals to keep the oil in, and the whole thing is assembled with soft solder. Even more remarkable is that it works reasonably well - with only a little pitching when solo, and very good steering. The handling is little affected by the thick white lines and assorted drain covers found on the roads.

To top the forks up with oil without completely dismantling the machine, the procedure is as follows:

1) Place a 2in block of wood under each stand foot and raise the front wheel clear of the ground, with an additional block of wood under the sump.

2) Remove the front wheel (it may be advisable to loosen the wheel spindle whilst the front wheel is still on the ground).

3) Grasp the end of the fork slider (the section through which the wheel spindle passes) and turn it clockwise (viewed from above) until it comes free from its spring.

4) Lower the slider gently to the extent of its travel.

5) Now examine the fork tube and locate the small vent hole about 1/16 in. in diameter. Oil may now be squirted through this hole to the inside of the slider.

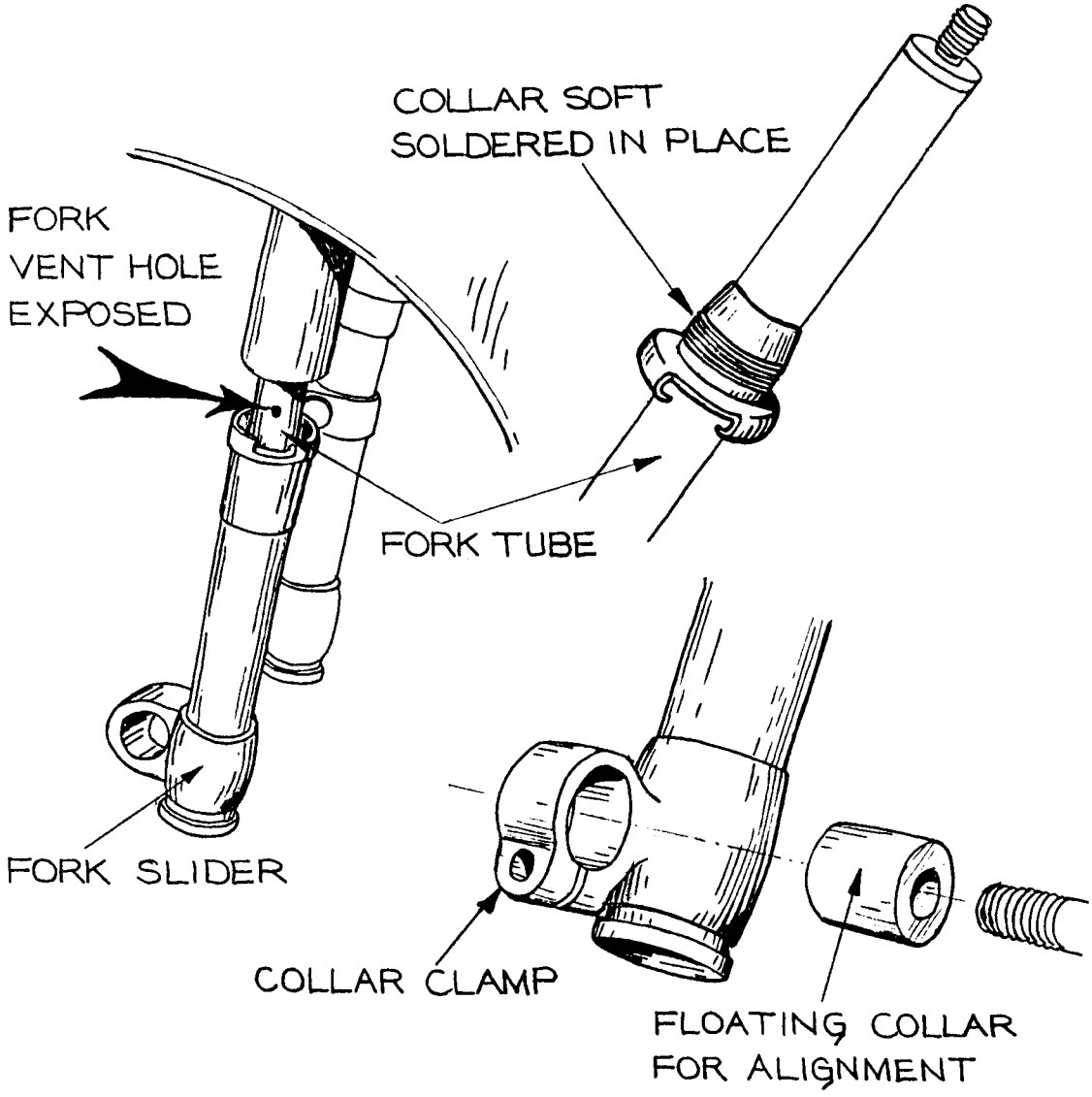
6) Raise up the fork slider, re-engage it with the fork spring and turn anti-clockwise as far as it will go, and as hard as possible.

If this all sounds incredibly easy, remember that the tricky bit is disengaging and re-engaging the slider from its spring. The parts are often rusty and seized up. If trouble is experienced, it is advisable to take the whole fork out of the machine by undoing the lock ring and top nut. It can then be transported to the bench and worked on at leisure.

Once the bushes are a little worn, all the oil will be systematically pumped out over the front of the machine and the tyre! The best remedy can only be to use the thickest possible oil, such as Hypoy 90 gear oil. In these circumstances the lack of oil seals become a problem, in that they would at least serve to keep the oil in and abrasives out. The other point to note is the vent hole has not always been employed.

Occasional trouble is experienced with the front tyre rubbing on the fork leg, particularly with the later 3.25 section tyre. The answer lies in the floating collar through which the front wheel spindle passes. This is clamped in the nearside fork slider. As will be clear from the Service Manual, Veloce recommended (when replacing the front wheel) tightening the

spindle nut while leaving this collar clamp bolt loose. By bouncing the forks up and down a few times, the collar would become centralised, after which the clamp bolt could be tightened. This way, everything should be correctly aligned. If the tyre does rub on the fork leg and it is not due to the tyre being badly fitted, or the wheel rim buckled, it is permissible to loosen the collar and force the wheel away from the fork leg at the point where rubbing occurs. Only force the wheel over the bare minimum to get clearance, or else the forks will be badly misaligned. This can also occur if the clamping bolt is not done up tight enough (usually really tight) so that the collar shifts in service. The tyre rubbing on the fork leg may then be a sign that the forks are misaligned. From all this, it follows that this collar does have an important part to play, so that it is as well to check that it is not just rusted solid in the fork leg.




# LE FRONT FORK DETAILS

At the top of the fork there is a stud by which the tube is attached to the top fork yoke, and then about 6 in. down there is a short threaded portion by which the fork tube is clamped with a lockring to the lower fork yoke. This latter threaded portion is simply a collar, soft soldered in position onto the fork tube. In cases where the soldering has been badly carried out, both collars can work free so that the top yoke is supporting the entire machine. A satisfactory 'in situ' repair can be made by using Araldite. Should it be necessary to attempt this, it is essential to get the joint really clean with a solvent such as 'Inhibisol'. It is useful to arrange the collar's position on the fork tube so as to slightly pre-tension the joint, i.e. the top and bottom yokes are pulled towards each other by about 1mm as the fork tube is bolted to the yokes. Ideally, it is better to completely dismantle the fork and effect a proper brazed or silver soldered repair.

Whilst mentioning soft soldered joints - and for the benefit of restorers - the Service Manuals of the early 1950's did have a specific warning. "In cases where reconditioning and re-enamelling are undertaken....it is very important to know that several parts of the machine, including the front fork slider assemblies LAS 49 and LAS 50, will be seriously damaged if they are stoved at high temperature after re-enamelling, or if the old enamel is burned off. These parts must not be stoved or heated above 212 deg.F (100 deg C)". Strangely, this was omitted from later editions.

For anyone interested, the solder used by Veloce was Fryolux Solder Paint Grade K with a shear strength of 2.5 tons per square inch. Done properly, there would be about 3 sq. in. for each collar, but a poor joint would have considerably less area of contact than this. Thus it is easy to see why they can come loose.

It goes without saying that the lock rings and nuts holding the fork tubes to the yokes should be kept really tight. The standard 'C' spanner provided by Veloce is hardly adequate for these lockrings and if a hammer is used, it simply digs into the rings. The double-ended tool LET783 is much more effective - with a piece of tubing slipped over its end.

Finally, it is probably helpful to provide details of the bushes, so they can be made by members with the necessary skill. It is important that sintered bronze is used ('Oilite' - oil impregnated - is the most widely known material of this type) and not plain brass tube.

| Bush | O.D. | I.D. | Length |
|---|---|---|---|
| LE 215 | 1.5025" +0.000 -0.001 | 1.244" +0.000 -0.001 | 1.0" +0.005 -0.005 |
| LE 216 | 1.371" +0.001 -0.000 | 1.187" +0.0005 -0.005 | 1.5" +0.005 -0.005 |

REAR SPRING STRUTS

The design of the pivots at either end of the rear spring struts is sound in theory, but bad in practice, in that the bearing is formed by an 'Oilite' bush running on a hardened steel sleeve.

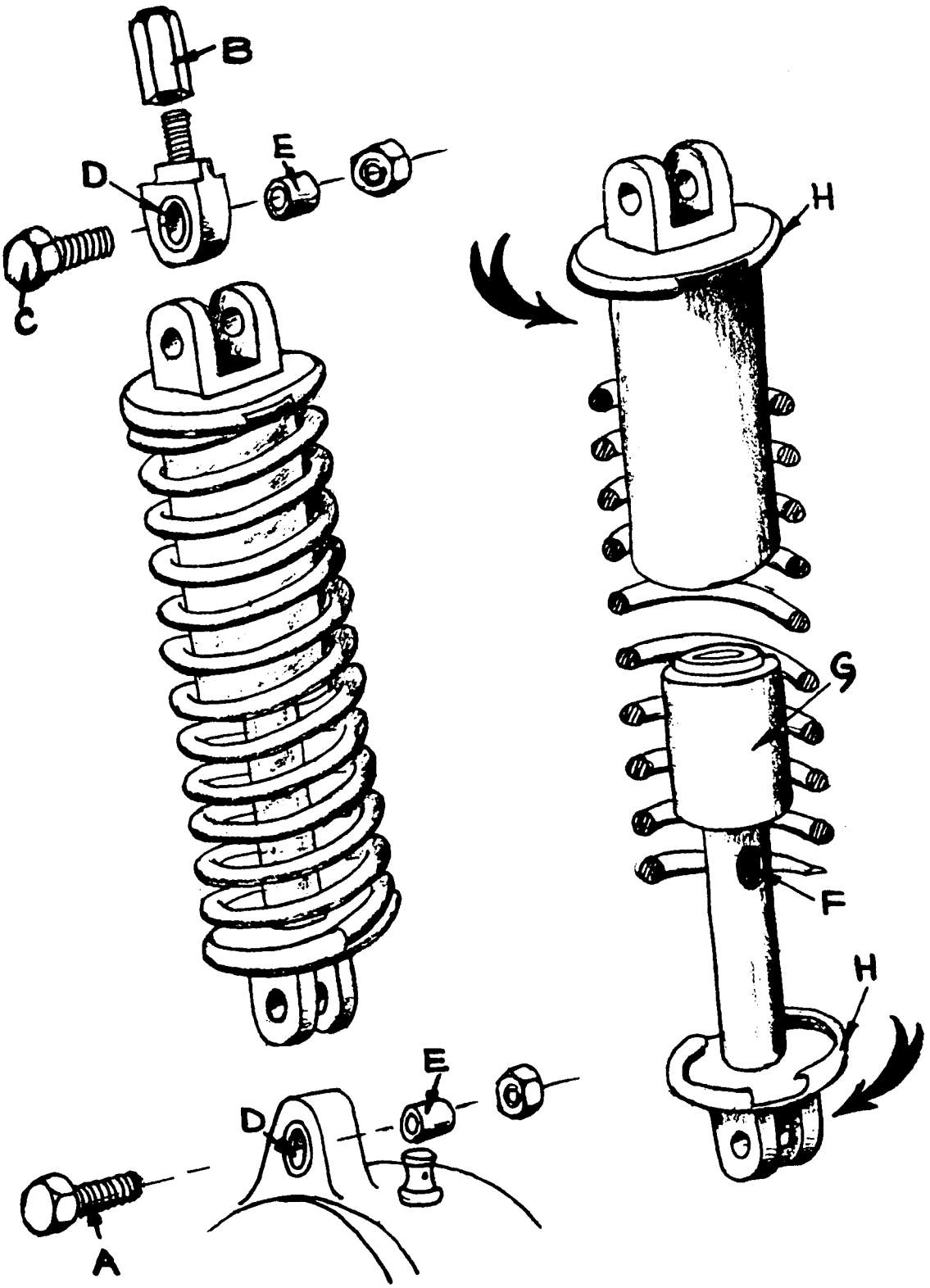
Unfortunately, there is little in the way of sealing to keep out water and grit, so that ideal conditions are created for bush and sleeve to rust themselves solid. ( Late LE's did have a pair of 'O' rings sealing the top pivots). When this occurs a variety of things happen, for example - ride comfort suffers. Also, articulation at the top pivot tries to take place, by the steel sleeve rotating about the leg bolt, and at the bottom, by the 'Oilite' bush rotating within the aluminium rear fork/bevel box housing. Worst of all, and probably assisted by wear in the spring plunger bush, cracks occur in the frame, radiating out from the suspension adjustment slots. That alone makes it vital that the rear struts should not be neglected. Experience shows that it is necessary to strip and lubricate the strut pivots at intervals of approximately 5,000 miles. Even then, it is likely that they will be on the point of seizing again.

Block up the bike with the rear wheel clear of the ground and attending to just one strut at a time, remove the lower pivot bolt (A), as shown in the sketch. Remove the top eyebolt nut (B) used for adjusting the springing, and grasping the complete unit, pull it out rearwards. Withdraw the top pivot bolt (C). Examine the top and bottom pivot bearings, which consist of an 'Oilite' bush (D) and steel sleeve (E). The latter should be free to turn in the bush, but is likely to be rusted solid.

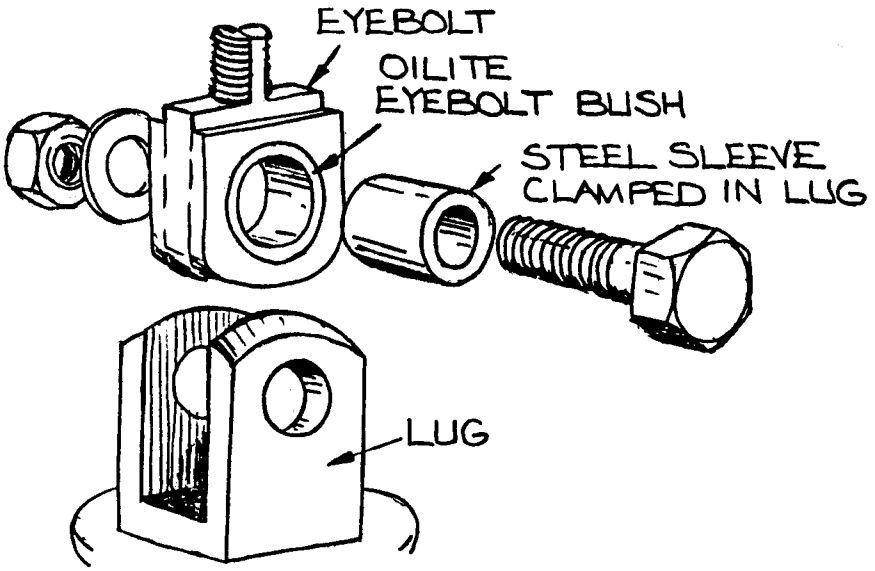
The next task is to separate these two components by use of releasing fluid, penetrating oil, heat, force, etc. etc.. After cleaning up the hardened steel sleeve with fine emery, re-assemble with plenty of grease; preferably a waterproof one such as a graphited grease. It is worthwhile lubricating the slider bush (G), as well as giving everything a good clean prior to greasing. Complete disassembly may be achieved by grasping the top and bottom of the strut and turning in opposite directions as indicated by the arrows (see sketch). This should cause the spring to be disengaged, although again the presence of rust may require some special attention.

Everything may now be washed off in petrol and re-assembled with grease as already described. It is worthwhile coating the whole spring as well, and making sure this is screwed back fully into the spring seats (H); scraping any muck out of these first if need be.

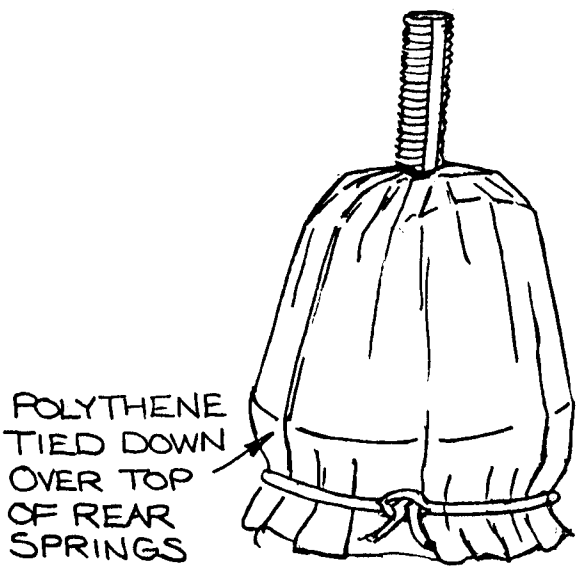
During re-assembly, do make sure that the leg bolts are really tight, since these stop the eyebolts slopping from side to side. Check to see whether the bottom 'Oilite' bushes are loose in the aluminium housing and if necessary thoroughly clean them in solvent, and Loctite in place. If the bushes and sleeves are too far gone, renew them - since a good fit will help to keep out water and grit a bit longer.


B
D
E
C
H
G
F
H
E
D
A

It is worth considering protecting the struts better. For example, a washing-up liquid bottle can be sandwiched between the top spring lug and its seat. This will provide a useful level of protection. Later MkIII L.E.'s - particularly Police models - were fitted with rubber gaiters, which were slipped over metal discs fitted to each end of the struts. To protect the top pivots, a circle of thick polythene, slipped over the eyebolt thread and tied round the top of the spring, is a crude but effective addition. Do not alter the spring setting once these are in place since this tends to split the polythene.




Two additional modifications that may be of interest to those with the facilities, are firstly to fit grease nipples to the eye bolts and secondly to improve damping of the rear suspension by totally or partially blocking the air hole (F) in the damper strut by brazing or soldering a plate over the hole.

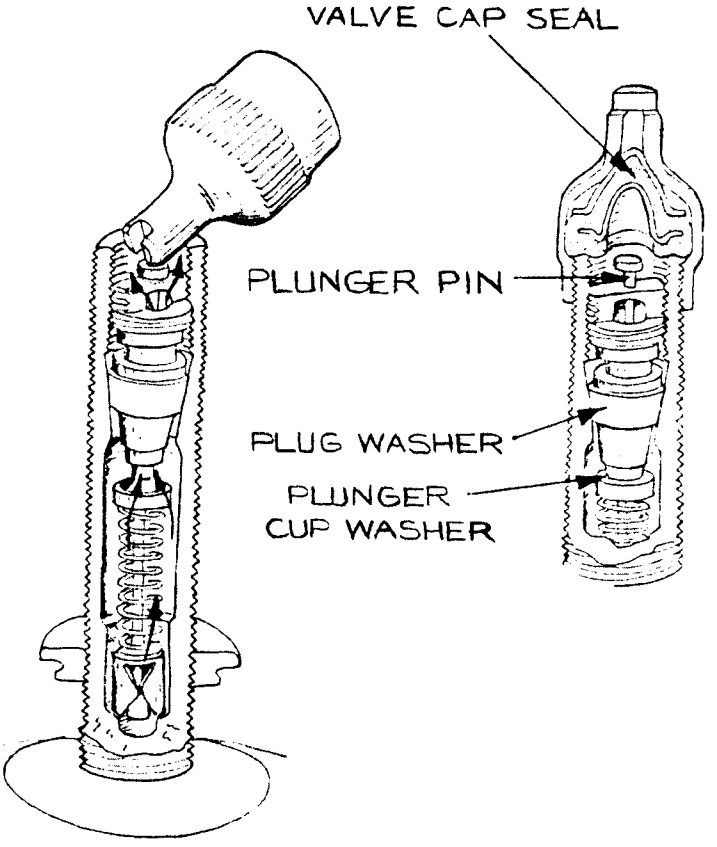


TYRES AND TUBES

One piece of equipment that most of us take for granted is the humble Schrader tyre valve, yet the job of work it has to do is as important as any on a motorcycle.

As an insurance against air leakage through the valve, a proper Schrader valve cap is a good investment. Veloce and most other British manufacturers properly equipped their machines, but Dunlop inner tubes, and some Japanese machines come with a cheap plastic dust cap. The genuine article forms a third seal with a synthetic rubber washer inside it.

Naturally, dirt is the biggest enemy of the seals in the valve, so make it a rule never to leave valve cores and caps kicking around in the dirt, or rattling around in a dirty tool box. Similarly, keep the tyre pump in a clean place or else you could be pumping a load of dirt into the valve. If a tyre does appear to be losing air, it is always as well to check whether the valve is leaking before reaching for the puncture repair outfit. A quick blip of the core pin with the fingernail or the reverse end of the valve cap should clear a speck of grit from the plunger cup seal. Otherwise there is the traditional test for a leaking core - a dollop of good natural spit on the valve body and then watch for a tell tale bubble to emerge. Because of its sturdier construction, trouble with the PTFE taper plug secondary seal is rare; suffice to say that the valve assembly should be just nipped up tight when replacing. Again a Schrader valve cap is ideal - this is what the two little prongs on the top are provided for.



The best way to stay clear of punctures is to regularly examine tyre treads for nails, sharp flints, etc. and remove them before they do any harm. Secondly, the thickness of the tyre tread seems to have a definite influence. It would appear that cycle and moped riders suffer a relatively higher incidence of punctures as well as people who ride on worn out tyres.

A modern advance, which certainly deserves a mention for anyone who has not yet met it is 'Finilec'- an aerosol packed product connected up to and squirted through the tyre valve to repair a puncture and reflate the tyre. Provided you have been able to remove the cause of the puncture, this product is really effective, although it should only be used as a "get you home" expedient.

It is always important to establish just what did cause a puncture. Feel carefully around the inside of the tyre and check it is not caused by a protruding spoke. This is one advantage of carrying a full toolkit; puncture repair outfit/new inner tube, tyre pump etc.. However, when did you last check that the glue in that repair kit was still in liquid form and the patches have been replaced since the last repair?

While replicas of the original tyre pump Veloce fitted are available, virtually every cycle shop in Britain sells a schrader adaptor for use with an ordinary cycle pump. The standard issue is exactly the correct length to fit in the clips provided on the offside legshield. It is not a bad idea to check the pump over occasionally to make sure it works. The washers tend to dry out with disuse, and the fixing screw works loose as a result. Consequently, they will no longer pump air when the need is urgent. A spot of grease and a tighten up is all that is required to put things right.

There should be no need here to emphasise the desirability of regular tyre pressure checks. Tyre pressures are purely dependant on tyre size, and the load the tyre has to carry viz:

| Pressure (psi) | 3.00" Tyre Section Load (lbf) | 3.25" Tyre Section Load (lbf) |
|---|---|---|
| 16 | 160 | 200 |
| 18 | 180 | 240 |
| 20 | 200 | 280 |
| 24 | 240 | 350 |
| 28 | 300 | 400 |
| 32 | 350 | 440 |

To get an idea of the tyre loading, an LE weighs about 265lb dry, or about 275lb actual. Hence, with a 13 stone rider (182lb) and assuming the load is distributed in the ratio of 2:3 front to rear, the load on the front tyre is 183lbf and 275lbf on the rear. Reading from the table this gives pressures of 16psi and 20psi respectively for a 3.25" section tyre. Any extra loads, due to a pillion rider or loaded panniers, must be added directly to the rear tyre load. Naturally, nobody is going to alter their tyre pressures every few minutes, but it does give an idea of what to aim at. Admittedly, over inflation is less serious than under inflation. The latter can cause the tyre to break up due to over heating and of course the

faster the machine travels, the more important this becomes.

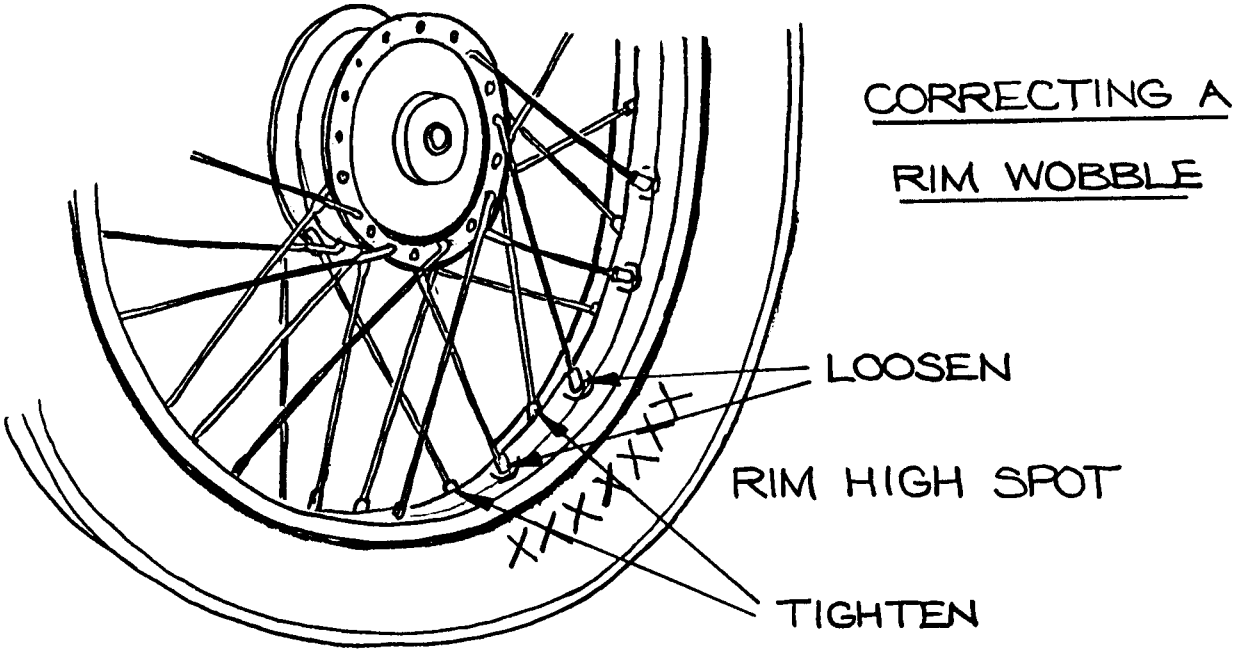
Finally, a tip for the low mileage rider; try and protect tyres against sunshine, and also mineral oils. These can both cause premature failure due to cracking. M.O.T. testers are becoming much tougher on this sort of thing, as well as tyres becoming increasingly more expensive. If laying up the machine, it is also advisable to take the weight off the tyres to prevent them developing a "set".

WHEELS

Any work on the spokes must start with the removal of the tyre and inner tube. Rusted up spoke nipples can be dealt with by soaking them in penetrating oil or 'Plus Gas'. Also check that no spoke ends protrude beyond the nipples, leading to eventual penetration of the inner tube.

For checking correct spoke tension, one can either try squeezing adjacent spokes together. Properly tensioned, they will only give slightly. Alternatively, if one is musical, there is the 'ping' test. Equally tensioned, spokes will ring with the same noise if hit lightly with something like a small screwdriver. Untensioned ones will give a dull 'clunk'.

To tighten the spokes, one needs a proper nipple key - which is available at most motor cycle and bicycle shops - do not be tempted to use pliers.... Tightening is achieved by turning the nipple anti-clockwise. If, when tightening the nipple the spoke begins to twist, any more effort and it will break. Stop tightening and try penetrating oil first on the nipple thread.



When all the spokes are tight, now check for wheel wobble. A piece of chalk held against the rotating rim will soon show how true it runs laterally and where the high spots are. If there is a high spot, slacken the spokes adjacent to it which originate from the near side by a 1/4 turn, and tighten those from the opposite side a corresponding amount (see sketch). Recheck the position of the high spot again and so on until the rim runs with the required degree of trueness. A low spot requires the reverse procedure.

If any of the spokes are broken, make a note of which way round the end of the spoke is secured in the hub flange before replacing it.

For reference the wheel details are as follows:

a) 19in Front Wheel
   Rim WM1-19.
   Spokes - Brake side 12G X 7.785in
   Plain side 12G X 8.375in
   Rim offset 0.745in

b) 19in Rear Wheel
   Rim WM1-19
   Spokes - Brake side 10/12 S.W.G butted X 7.687in
   Plain side 10/12 S.W.G butted X 8.375in
   Rim offset 0.145in

c) 18in Front Wheel
   Rim WM2-18
   Spokes - 10/12 S.W.G butted X 7.25in
   Rim offset 0.600in

d) 18in Rear Wheel
   Rim WM2-18
   Spokes - 10/12 S.W.G butted X 7.25in
   Rim offset Zero

Rim offset is measured from the edge of the brake drum to the side of the rim on that side of the wheel.

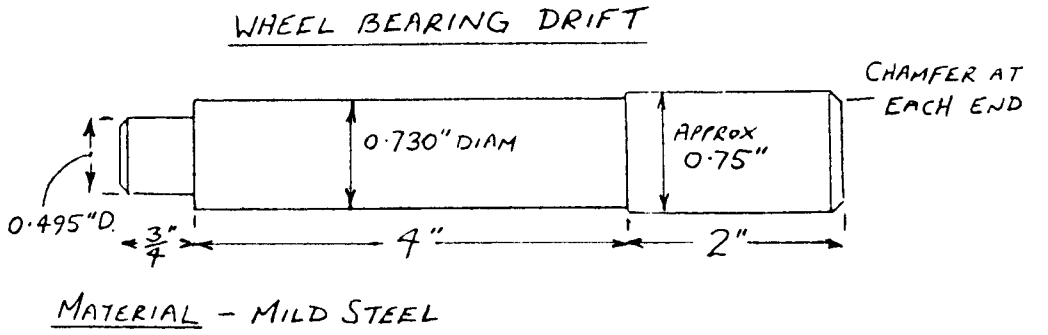
Unfortunately, butted spokes are in short supply, so wheel builders are often having to supply plain 10 S.W.G. spokes, which look rather unsightly on the L.E..

## SERVICING WHEEL BEARINGS

Servicing wheel bearings ought to be carried out now and again on bikes in regular use. Before removing the wheels, slacken off the brake adjusters. Spin the wheel to check for free running and listen for any ominous noises. Then try for movement by holding the fork leg with one hand and the tyre with the other. Push and pull both hands at the same time, carefully, feeling for any sideways movement. This should be minimal, and certainly not enough to see. If there is any detectable movement, replace both bearings as no adjustment is possible.

To dismantle the hubs, first prise off the hub dust cover to gain access to the lock-ring. Careful use of a large screwdriver, evenly all round, usually does the trick. Sometimes the sheet metal cover becomes detached from the ring on the hollow spindle. With care they can be re-assembled and used again.

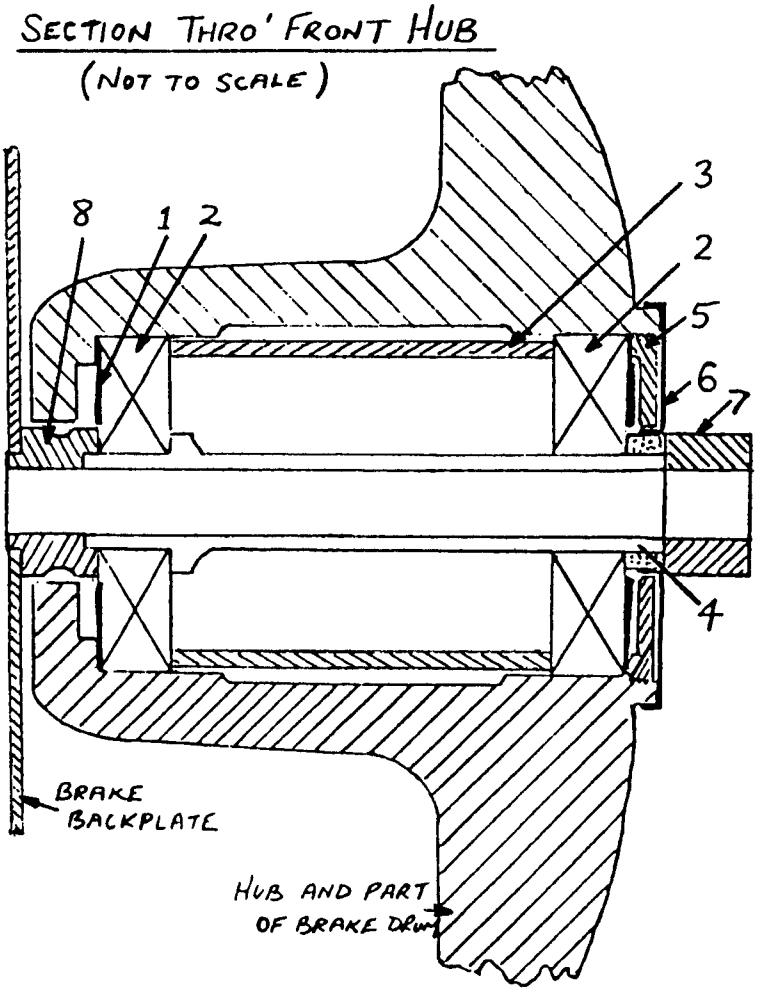
Removal of the lock-ring needs the service tool number LET781. Never try to hammer them loose using a drift or chisel as they are very tight and rather delicate. You will find the handle on the service tool hopelessly inadequate. The Service Manual suggests you hold the spanner in a vice. Point it upwards, place the wheel on top and turn the wheel by gripping the tyre. This is all very well if you have one. If not, lay the wheel flat on the floor and insert the dogs of the spanner into the nut. Keep some pressure on it - some assistance at this point makes the job easier. Two small tubes slid into the handles give more leverage which helps too. With some firm pressure it should unscrew, albeit at the cost of badly bent handles on the tool.




Once the lock ring has been removed the metal grease retainer can be fished out. If the brake distance piece did not come out with the brake assembly, remove it now. A drift, as shown in the sketch, makes the job of bearing removal much easier. It also prevents the ends of the hollow spindle getting damaged. If it gets burred the distance piece will not fit properly and the wheel bolt will be difficult to remove. Use the drift from the brake drum side. Hit it firmly with a hammer and the spindle should come out, complete with the opposite side bearing.

If the bearings have been removed simply to repack with grease, you need go no further with the dismantling process. Using a good quality high melting point grease, repack the bearings. Take care not to put in too much. i.e. only fill the bearing itself and not the space in between the bearings, or else grease will be flung out everywhere.

Before replacing the bearings, first the one remaining in the wheel needs to be tapped out using a brass drift. It is not a tight fit right through the hub as the centre is bored larger (not quite as much as shown in the sketch). Avoid damaging the other grease retainer. To re-assemble, lay the other bearing across a vice on two blocks of wood, then using the stepped drift, tap the spindle through.




| ITEM | PART NO | DESCRIPTION |
|---|---|---|
| 1 | LE 134 | HUB GREASE RETAINER |
| 2 | LE 383 | HUB BALL BEARING (SKF RLS 6) |
| 3 | LE 135/2 | HUB DISTANCE TUBE |
| 4 | LE 138/2 | HUB HOLLOW SPINDLE |
| 5 | LE 133 | HUB LOCK RING |
| 6 | LAS 26 | HUB DUST COVER ASSY. |
| 7 | LE 213/2 | FRONT WHEEL DIST. PIECE |
| 8 | LE 214 | BRAKE DISTANCE PIECE |

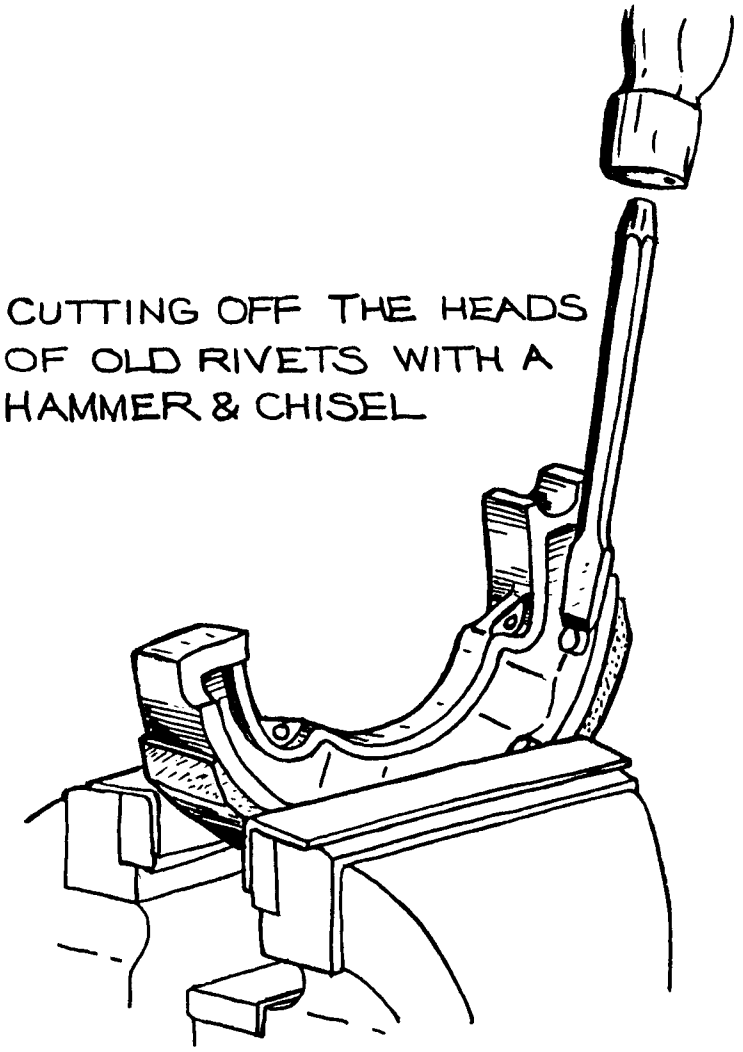
Re-assemble in reverse order and firmly tighten the lock-ring. Make sure both grease retainers and the dust cover are undamaged first.

The above process describes a front hub; the rear is basically the same internally so dismantle in the same manner.

## BRAKE RE-LINING

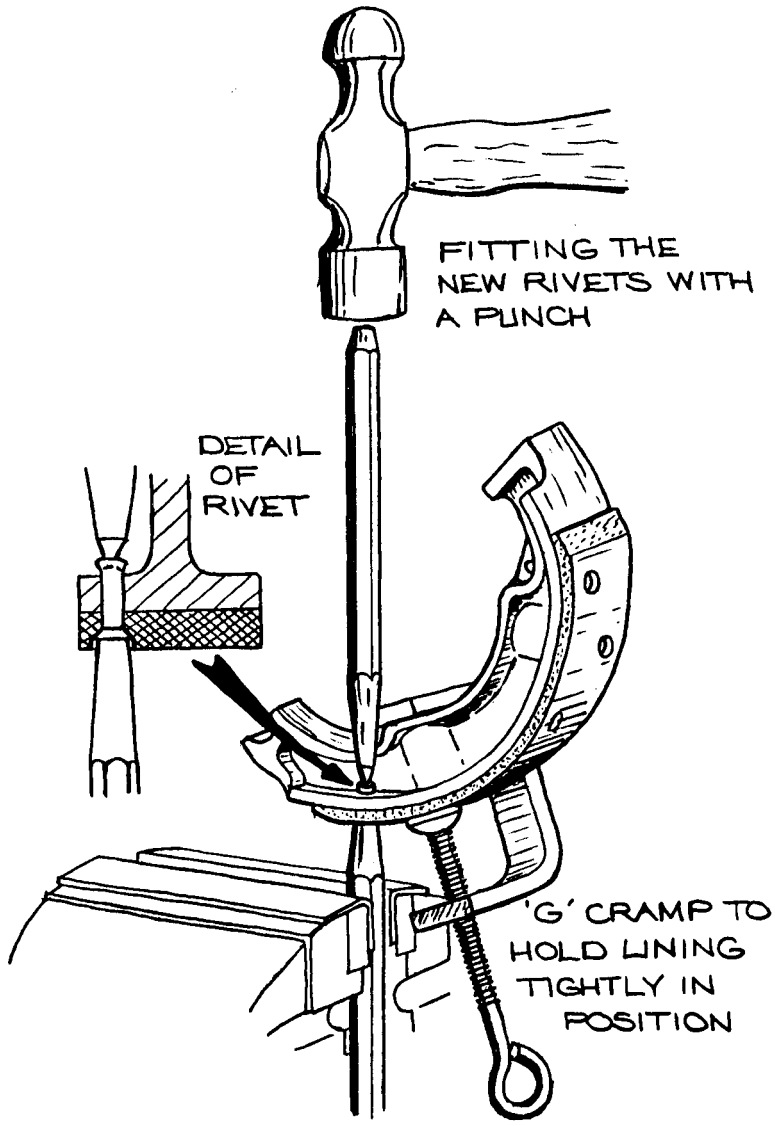
The first task is to remove the old linings, and provided these are only riveted in place there is no problem. Simply hold the brake shoe in a vice and use a small 1/4in. cold chisel to shear off the heads flush with the inside face of the shoe. Then tap the rest of the rivet out backwards with a small 1/32in. flat ended punch (see sketch). Alternatively, they can be drilled out, although what usually happens is the old rivets end up turning with the drill.

If it is found that the linings are bonded on, it may be advisable to send the whole assembly to a brake specialist for re-lining. Never attempt to bond new linings on yourself - with Araldite or similar. It is very unlikely that such proprietary glues are capable of sustaining the temperatures involved during hard braking. If a set of pre-drilled linings and rivets are available, then chisel off the bonded linings and clean off the remaining glue with a file.



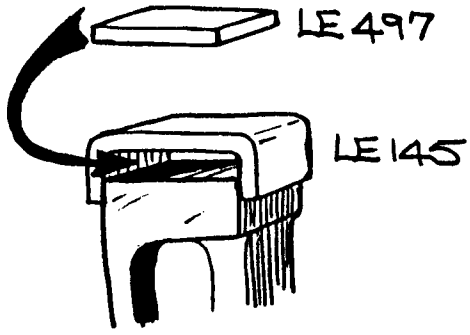

The really important thing is to get the rivets in tight. Be especially careful to ensure the linings are seated right home on the shoes since any gap, even just a couple of thou., will lead to distinct sponginess in application of the brakes. The only way to ensure this does not happen is to tightly clamp the lining down on to the shoes immediately adjacent to the particular rivet being put in. One of those cheap little clamps made from nothing more than a strip of bent metal (as shown in the sketch) is even better than the proper 'G' clamp in this application.

Always start with the middle rivet. If you start at one end you will probably find the holes for the last rivet have become rather too misaligned. Push the rivet through the brake lining and shoe, ensuring it goes right home, and clamp everything into position - ensuring the other rivet holes are correctly lined up. Support the shoe on the head of the rivet, using a flat end on a piece of 3/16in. bar, and drive over the other end with a centre punch. Do not hurry the job. Just tap the punch lightly to start with, and avoid pushing the forming head over to one side, or else it will split. What you should be aiming for is a strong head not a weak, flat splodge of hammered metal.




Fit the other rivets in a similar fashion, working out from the centre and when all are in place, check your handiwork by holding the assembly up to the light and looking for any air space between the linings and shoe. Admittedly, it is difficult to avoid and you will certainly get a little gap under the extreme ends. It is worth trying to eliminate it all by tightening down all the rivets a little bit more.

Whilst on the subject of brake shoes a word or two about the slippers fitted over the ends. Firstly, whereas most motorcycles just run the brake cam directly on the soft aluminium shoe, which soon wears a groove in it, Veloce fitted steel slippers over the brake shoe ends as a matter of course. It will probably be found that they drop off when you try to refit the brake shoes and it may be tempting to bend them to fit tightly. However, careful observation has noted that what then happens is a gap develops between slipper and shoe, once again adding sponginess.




BRAKE SHOE SHIMS
& SLIPPERS

Secondly, whereas most manufacturers fit the arm on the end of the brake cam spindle by means of fine splines, so that wear of the shoes may be taken up by advancing the arm one spline each time the adjustment in the brake cable becomes used up, Veloce - the purists - preferred to avoid the problem of varying the leverage ratio between cam and shoes by supplying shims. This explains the plight of the owners who have run out of cable adjustment, only to find their brake shoes apparently little worn - particularly if the brake drums are worn or have been skimmed. Anyway, the shims are easy enough to make oneself from sheet steel. Veloce's were 1/16in. thick and it is possible to fit two without running the brake shoes down to the rivets, though sponginess may increase however careful one is in ensuring everything seats squarely. The other problem with the shims is fitting them. Fitting the slippers loose is difficult enough without doubling up the problem.

Brake shoes should always be fitted with both springs in position or else the ends of the springs have to be opened out. Remember to first remove the retaining washer on the end of the pivot which is held by a bolt. Hold the brake shoes at 90 degrees to each other, pulling them apart all the time to keep the springs in place. Then spring them on the ends of brake cam pivot and open the shoes out flat. Finally, push them down into position. It is easiest to slip the shims into place once the brake shoes are in position, particularly in the case of the rear brake shoes - where the oil seal drain channel forms a convenient point to lever them open against, at least enough to slip the shims into place.

A further improvement to the brakes, involves fitting a little extra shim, say 0.010in. or 0.015in. thick, under the end of the 'leading' brake shoe. This is of real value with part worn linings since the 'leading' shoe wears faster than the 'trailing' one by virtue of doing more work. The braking effort applied by the rider becomes more directed to the inefficient trailing shoe and this extra shim restores the status quo.

Definitions: the front leading shoe is the rearmost one and on the rear brake it is the upper of the two; the difference between the leading and trailing shoe arising from the friction force between lining and drum

tending to pull it away from the drum in the latter case, and vice versa.

If you think this is all too complicated, there are plenty more reasons why your brakes may not be able to match the kind of stopping power that all the road tests said the LE was capable of - 30ft. or less from 30 m.p.h.. These figures are very respectable indeed and just goes to prove that the LE's brakes are adequately sized for the job in hand. The main problem is convincing the M.O.T. examiner.

Starting with the elementary; oil, grease and dirt are the mortal enemies and especially in the case of the rear brake there is the possibility of oil leakage from the bevel box and grease from the drive splines. Good brake linings can soon become ruined. Possibly petrol or boiling in detergent may save the day, otherwise it is new linings. Be especially careful when refitting brake shoes that grease does not get transferred from the fingers, or make sure it is thoroughly cleaned off with petrol if it does. The front brake is more affected by dirt, simply because it is in the front line against the elements - especially water. The brake drum does therefore tend to get scored, and once this occurs, the only solution is to have it skimmed up clean by one of the specialist wheel builders, who can often do this to an assembled wheel. Accumulated brake dust must also be periodically removed, though being formed of asbestos material, this is a potential health hazard. Garages now have special facilities, but it is easy enough to remove 'wet', with a petrol soaked rag.

Grade of lining is also something that gets overlooked; virtually any brake can be made to perform well using a soft enough material, albeit at a high rate of lining consumption, and with a risk of fading after hard usage. Indeed there are also differences between linings for steel and iron brake drums. If you go to your local motorcycle shop, should he still run a relining service, you are liable to end up with some really hard racing material - the type that starts to work once you have descended an Alpine pass or two, and have got the brake drums glowing cherry red!

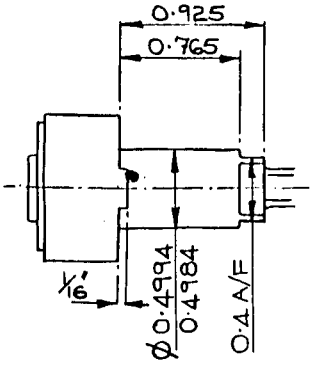
Finally, there is the long and complex topic of the linkage between brake pedal or handlebar lever and the brake cam. Once again, with the steadily increasing age of our LE's the demon wear is relentlessly doing its stuff, so that movement of the controls is largely taken up by all the various sources of backlash. Wear of the brake pedal pivot; wear between cable nipples and shackles; wear between brake arms; shackles and clevis pins; wear of the brake cam spindle and bush and so on - in fact it is rather instructive to slowly apply the brake pedal or lever and carefully watch all the linkages tighten up.

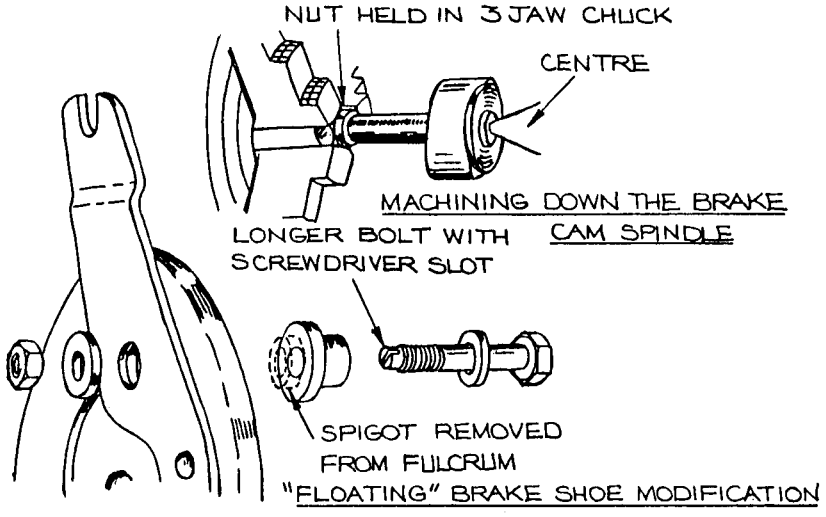
The remedies are fairly obvious. The cam spindle and brake lever bushes are standard off-the-shelf parts. The spindles themselves may be sleeved. Oversize clevis pins can be made from silver steel or the like, and their pivot holes reamed out oversize and so on. If no new parts are available, satisfaction must be derived from reclaiming worn parts.

Remember, a 30ft. stopping distance from 30 m.p.h. is your target.

IMPROVING POOR BRAKING

One of the weaknesses of the simple type brake drum on the LE is that the leading shoe, which does the majority of the work, wears more rapidly than the trailing shoe. Consequently, and as the leading shoe wears down, force is switched to the less effective trailing shoe and hence the effort goes down. If you have experienced a gradual decline in brake performance after fitting a new pair of shoes, this is likely to be the explanation. Similarly, placing an extra shim under the leading shoe's slipper will restore the performance (See BRAKE RE-LINING above). Of course there are many other causes of bad brakes, some of which are covered in the previous section. The use of a fully floating arrangement does at least overcome this problem by ensuring that the force applied to each brake remains constant, irrespective of the wear differential between the pair of brake shoes.




To achieve this, there is a simple modification that can be carried out to the front brake. First, remove the brake shoe fulcrum from the brake plate assembly - into which it is spigotted and retained by a nut and bolt. Machine, or saw and file away the spigotted portion of the fulcrum or, better still, file the spigot hole on the back plate into a curved slot. Change the bolt for one a little longer, (1½in., should do) and cut a

screwdriver slot in the threaded end. Re-assemble everything as normal, but leave the nut and bolt only done up finger tight. Apply the front brake hard and the pivot will float to its correct position. Whilst continuing to hold the brake on hard, tighten the pivot up firmly - with a screwdriver in the slot and a spanner on the nut. Though the pivot does not of course float continually, it can at least be reset regularly; each time you adjust the brakes say.

The result of a worn back brake mechanism, has been the difficulty in adjusting it sufficiently so that the brake pedal does not touch the foot board under heavy braking, but at the same time the brake shoes do not drag in the 'off' position. One of the major causes of all this slop, is wear in the brake cam spindle and its bush in the bevel box. Replacement of the bush is naturally straightforward, except that being in a confined space it is difficult to press out. Carefully sawing it through and collasping the bush is a good method to adopt. A standard 'Oilite' bush is used, so replacement will be no problem. So far as the brake cam and spindle are concerned, and ignoring the possibility of finding a new one, a workable method of salvage is as follows:-

1) Make up a suitable sleeve from a piece of steel bar or tube with a 1/2in. nominal sized O/D - for correct fit in your new bush and a 3/8in. bore size. This size took a bit of trial and error to arrive at since one must have enough metal to cut square flats for the operating lever, but avoid excessively weakening the spindle.

2) Chuck the worn assembly on the spindle portion and centre drill the cam end. A No. 2 centre drill seemed to be about the largest size practicable for this without weakening things.

3) Screw a nut with washers firmly onto the threaded portion and hold the assembly in the chuck by the nut flats (three jaw chuck) and on a centre at the other end.

4) Turn the spindle down so that the sleeve is a nice press fit onto it, preferably with a radius adjacent to the cam. This will of course require a corresponding chamfer in the end of the sleeve. Turn the last inch at the threaded end down a further 0.005in. for purposes of silver soldering the sleeve on - just to be certain.

5) Press the sleeve on and, very sparingly, silver solder it in position. Machine the end square and clean up the thread as necessary, making sure all the overall lengths are correct.

6) Finally add the square flats, preferably by milling, though quite a satisfactory job can be achieved with a file by first cutting the "backs" with a fine saw. The important thing is to keep the angular relationship with the cam approximately correct - notice that the flats are parallel to the middle (parallel) section of the cam. The cam is also cut slightly onto the spindle - presumably to give the ends of the brake shoe ample clearance. Do not forget to replicate this feature as well.