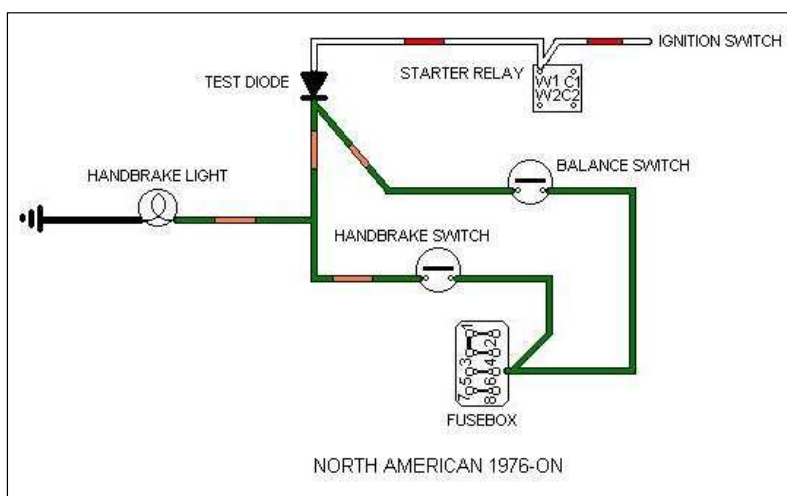
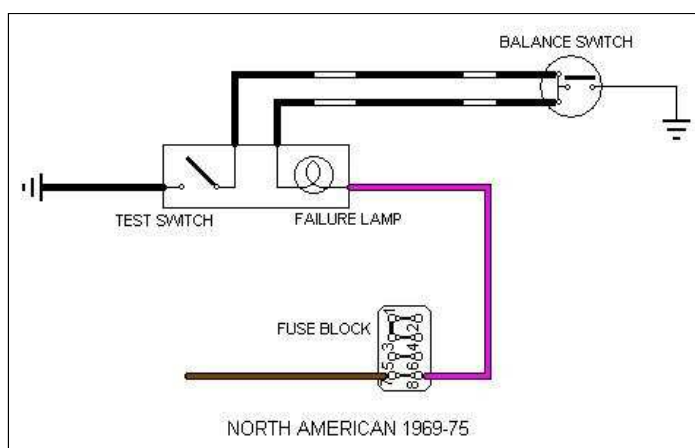
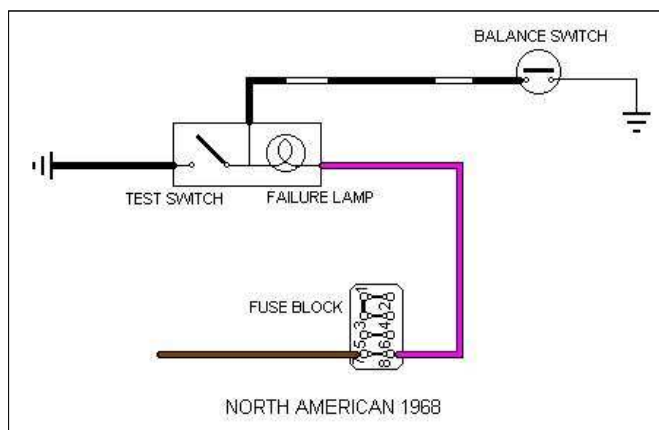
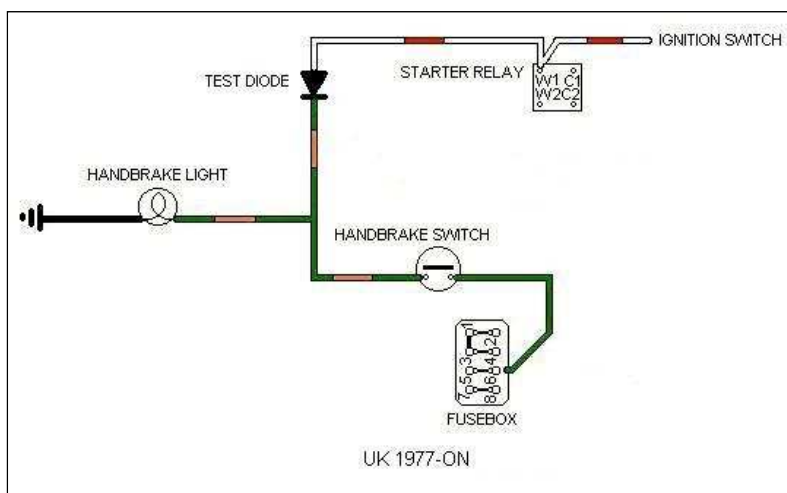


Brake Balance and Handbrake Warning





Warning light test diode showing the male connector for the white/red wire ...



... and the recessed female connector for the green/orange wires.



Caliper and Disc Change

Using 'ground effect' to assist in undoing the nuts and bolts. All the bolts turned before the nuts cracked loose so I had to have a socket either side. That on the bolt head needs to be kept as square as possible and pushed onto the head as much as possible as the socket only fits on about half-way due to a step on the disc flange. When I knew I was going to do the same job on a pals car I got hold of a large bench vice which I was able to use to grip the disc while my pal pushed the socket/box-spanner (see below) onto the bolt head while I used a breaker bar on the socket.



One of Bee's discs showing no clearance at all between the angle on the bolt head and the raised portion at the bottom of the well. This is a result of the flange being cast much thicker than it needs to be, so quite a lot of metal has been machined off, but not out to the wall of the well. This leaves a step on the flange which significantly reduces how far a socket can go on the head and also puts it an angle, making it very likely to slip off damaging the head in the process.

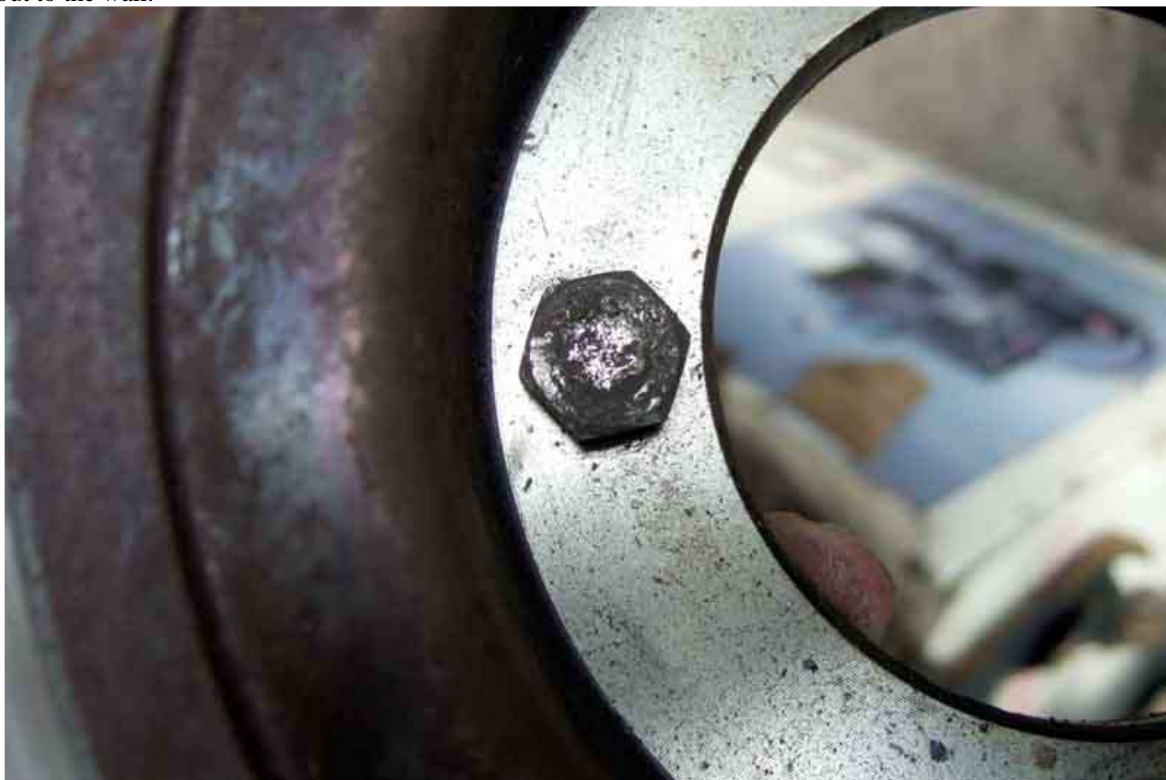


The new disc has a larger clearance, but still isn't enough for a socket to fully seat. However a box-spanner (inherited from

my Dad, been in my toolbox unused for probably 40 years) did when the bolt head flat was aligned as shown, as the box-spanner is only 0.747" across the flats externally whereas my sockets are 0.809" OD.



My pal's original disc with significantly greater clearance, enough for a socket to fully seat. This is cast differently as the rough wall of the well goes straight down almost to the machined face, so very little machining, and what there is goes right out to the wall.



One of the old discs not much more than half the thickness of the new, the other is not so thin so probably has been replaced in the past.



Blued disc. Swept depth also seems to be noticeably smaller than the other disc. This is the very thin disc, but I opt for replacing both.



Shiny new calipers, discs and pads



Old pads, overheated side on the right showing them badly crumbled as well as reduced in thickness. Annoying, as they were only replaced a couple of years ago.



Hose clamp. Halfords had two, this was about a pound cheaper than the other, so got my vote. However they are only plastic whereas the others are steel. If they get brittle and break than they will have been poorer value. Also the part that

grips the hose is 'V' shaped on these plastic clamps whereas it is 3/16" or so round bar on the metal ones, so probably less harmful to the hose.



A rear brake cylinder E-clip fitting tool



Looking at the clip it consists of a ring with a section cut out and three tongues pointing inwards. It isn't flat but slightly twisted such that the middle tongue is bent one way and the other two the other which makes it 'handed'. Whilst it can be fitted either way I found that if fitted with the two end tongues pointing towards the backplate held the cylinder in place it was a bit sloppy, but fitting the clip the other way up results in the 'spring' in the clip holding the cylinder firmly. It seemed to me that by pressing down evenly on the outer part of the ring you could get the tongues to ride over the edge and slide down the sides of the boss on the cylinder at least part of the way. Then it should be a relatively easy matter of pressing the tongues down to drop into the groove of the boss. Both the commercially available tools use a bolt screwed into the pipe fitting of the cylinder and a nut on the bolt to apply the force which seemed reasonable, and a 3/8" UNF bolt and nut satisfy that requirement.



I found a brass pipe fitting in a box of bits where the outer circumference of the fitting was just slightly bigger than the clip as shown above (note that this picture shows the clip the 'wrong' way up).



The next requirement is to be able to position the clip correctly and firmly before applying the pressure. The fitting above has a large hole in the centre which allows far too much lateral movement but I found that the Outside Diameter (OD) of a nut off a 1/2" compression fitting was just slightly bigger than the Inside Diameter (ID) of the larger fitting and with a little filing down of the angles of the spanner flats allowed it to be pressed into the larger fitting. This still left quite a bit of free play but I found a wheel nut (off a Metro or possibly dating back to when I had a Mini around 1970) again with a little filing could be pressed into the inner fitting. This was the same 3/8" thread as the bolt so drilling a clearance hole allows it to slide up and down the bolt while giving very good lateral location. This left the tapered section of the wheel nut standing proud which I cut off.



This still allowed the clip to move around under the 'tool' but I found an old copper U-bend a short length of which snugly fitted over the circular portion of the larger fitting to hold the clip in exactly the right position. To clear the bleeder valve and locating peg I shaped the brass fitting and copper sleeve as shown. A later refinement (right-hand picture) was to chamfer the ID of the outer fitting to make it easier for the tongues of the clip to be eased over the end of the cylinder boss. Note that in the left-hand picture the clip is in the correct orientation for fitting.



In use you just 'hang' the clip off the boss by its middle tongue ...



... then fit the tool over the clip while you screw the bolt into the pipe fitting. Gently turn the nut there is a little resistance then a 'click' and the nut becomes much easier to turn ...



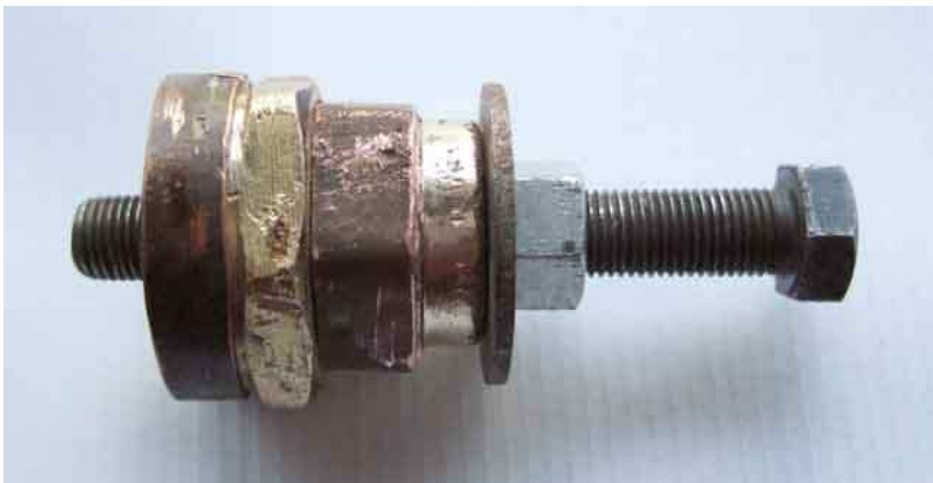
... as the clip slips onto the boss although the tongues are not yet located in the groove. At this point you could press the tongues of the clip into the groove one-by-one with a screwdriver with no chance of it pinging off but I wanted to go a bit further. I had noticed that the ID of the 1/2" compression fitting nut I had used was just slightly smaller than the OD of the slave cylinder boss. I found another nut and a bit of work with a file opened it out so it just slides over the boss. This then can be used with the bolt and nut as before and a suitably sized washer to press all three tongues into place in one go. I felt it would be nicer to have both parts of the tool attached together and found another piece of copper pipe of smaller diameter than the first which with a bit of shaping was an interference fit over the spanner flats of the two 1/2" compression fitting nuts so holding them together. They could be brazed but I don't have the facilities.



So now I just install the clip over the boss with the tool one way round, remove it and refit it the other way round as above, and with a couple of turns of the spanner you can hear the tongues clip into place in the groove.



So there it is, a few hours fun in the garage saving some aggro under the car.



Later GT (not V8) wheel cylinder showing the locating peg further away from the fluid port than on the roadster, early GT and V8 item.

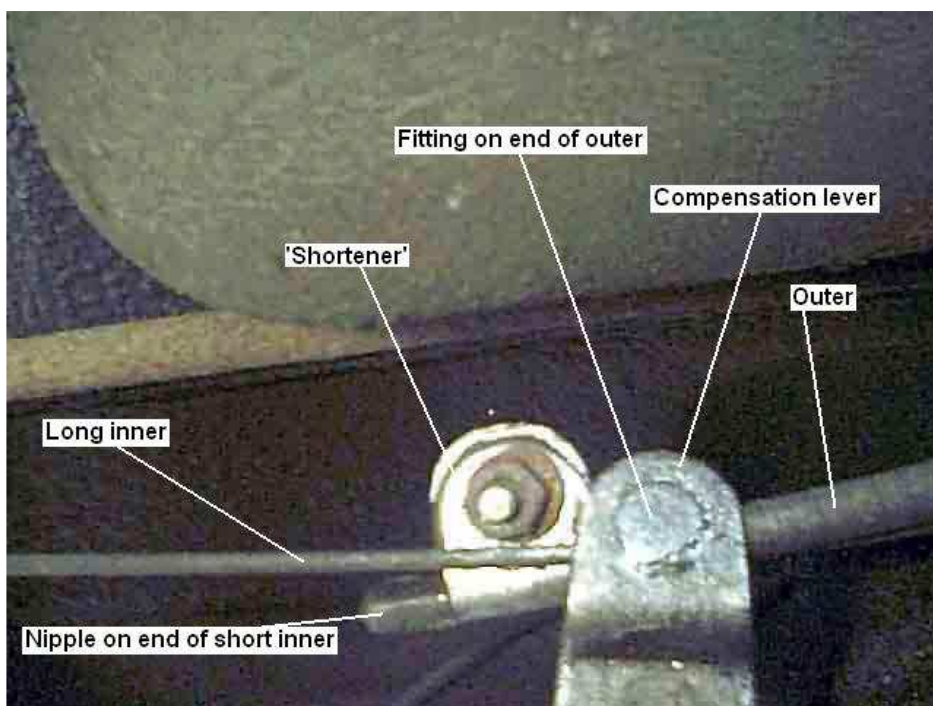


Handbrake Cable

An old stud-wheel cable measuring 30" from the tip of the nipple in the short cable at the compensation lever end, to the top if the U-clip that attaches to the lever sticking from the back-plate. A new, almost certainly wire-wheel axle cable measured 28.5" here.

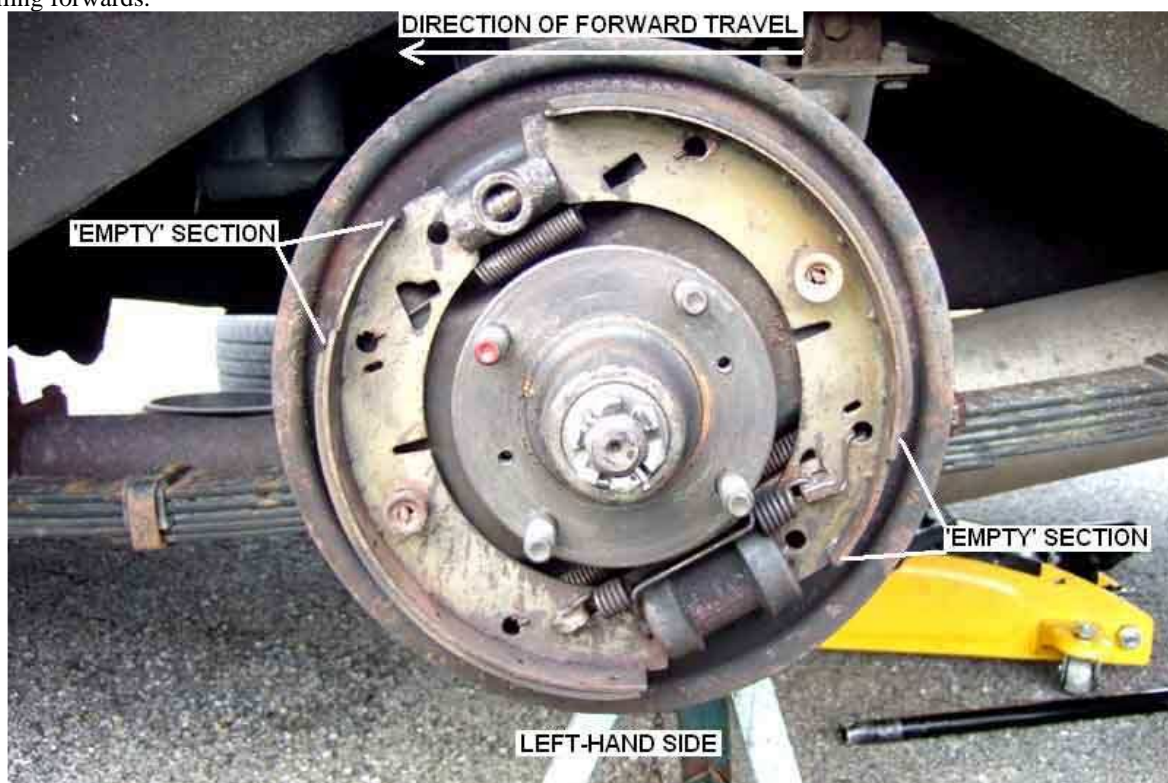


A 1" 'shortener' fitted between the nipple and the fitting on the end of the outer sheath at the compensation lever

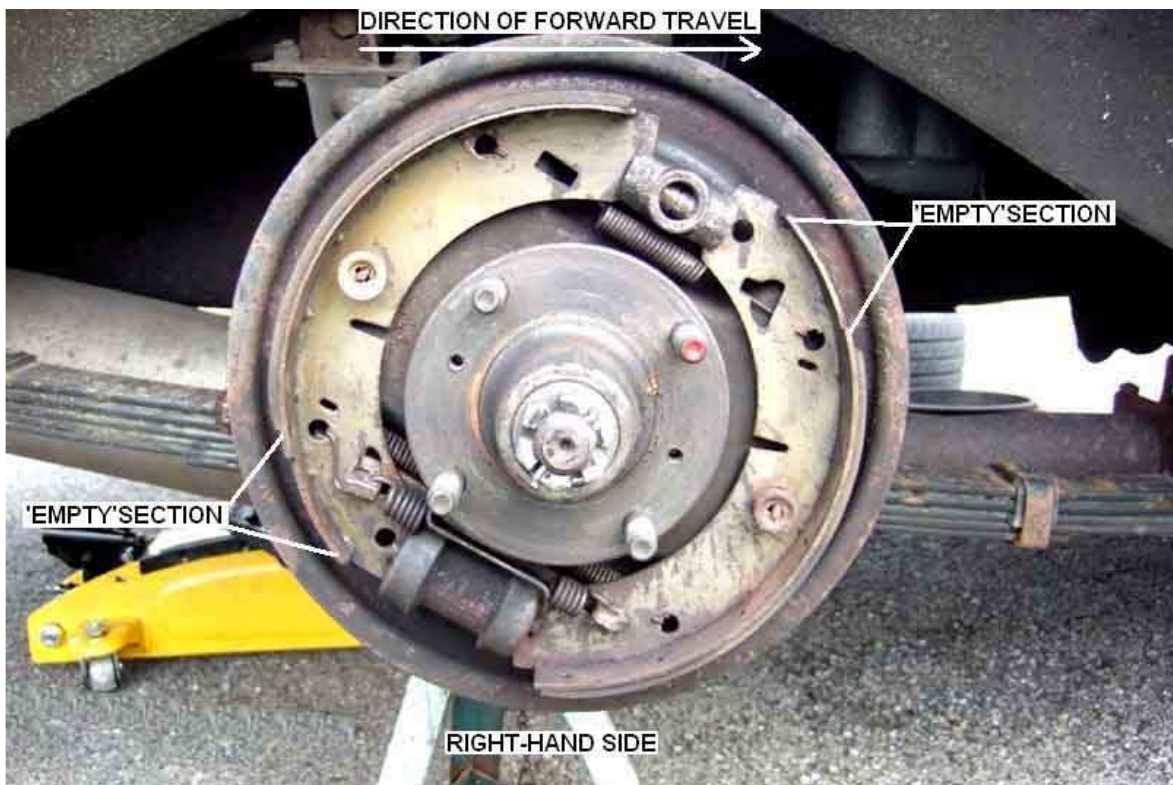


Rear Brakes

Left-hand side. A given point on the drum will pass over the 'empty' portion of the shoe first, on both shoes, when travelling forwards.



Right-hand side.



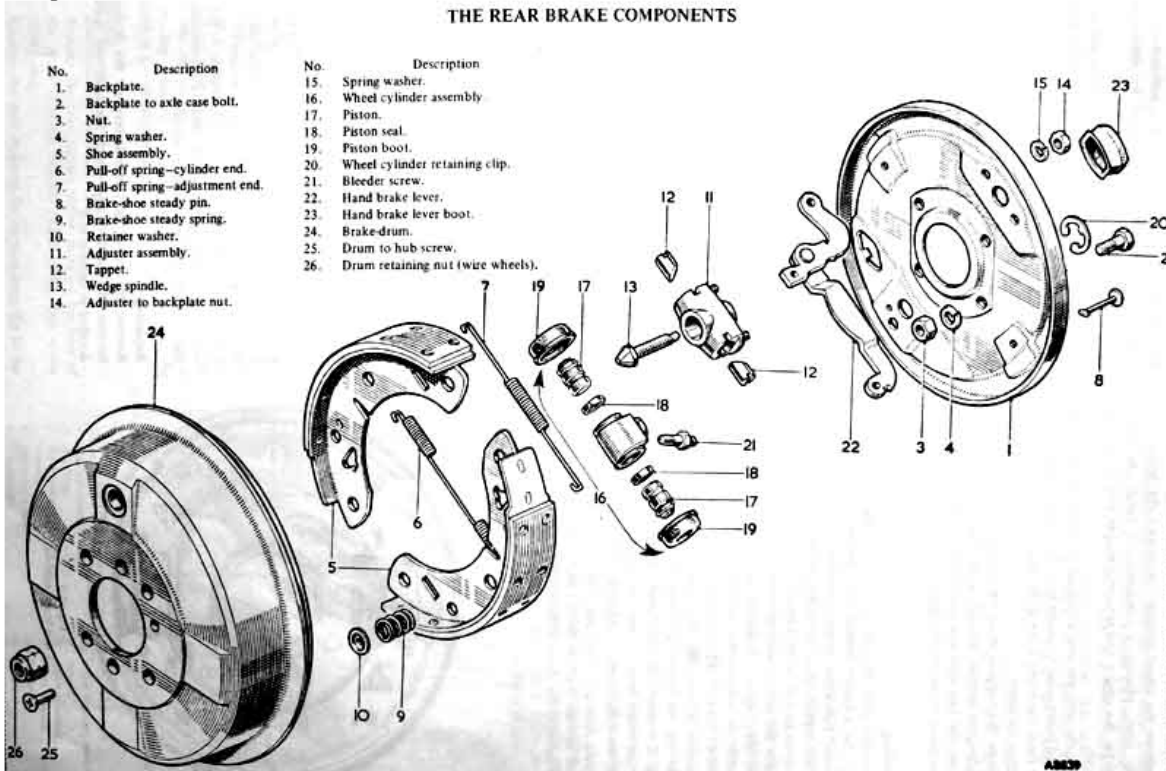
The top spring is fitted to the holes in the shoes and not the slots, and is orientated such that the coil is below the line of the arms of the spring.



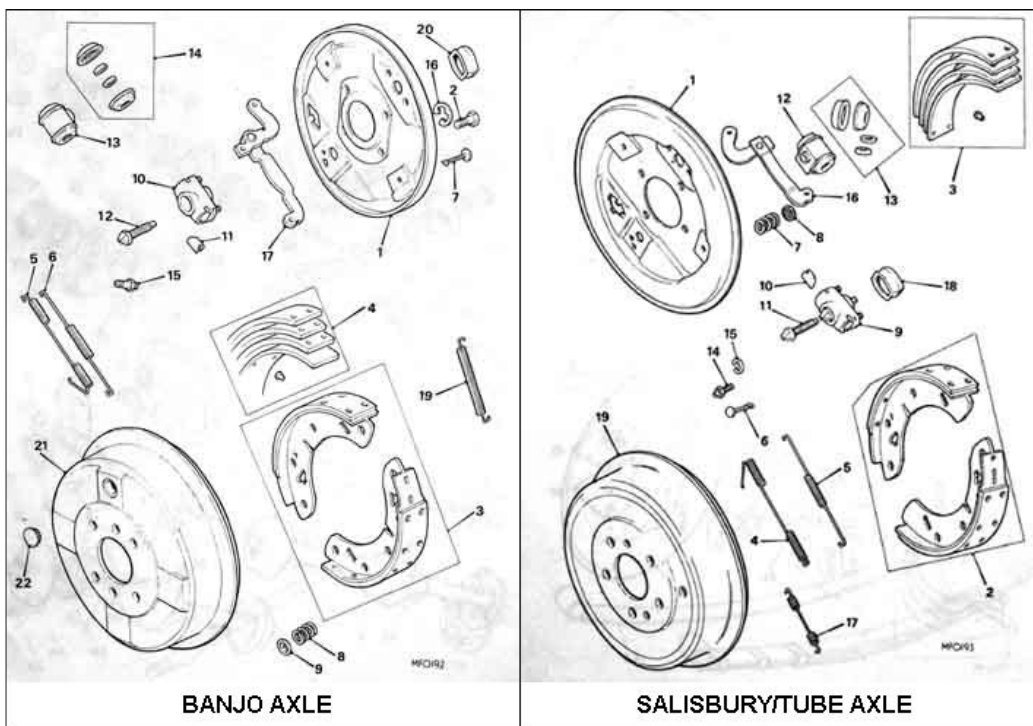
Detail of bottom springs showing the inner spring also mounted in the holes and not the slots, long wire hook to the rear passing under the part of handbrake lever that passes through the back-plate, and the outer spring with the wire between the coils in the outboard position. Note that a third pull-off spring was added to the banjo axle at some point, the Salisbury/tube type axles always had three. Note also the orientation of the handbrake lever, with the short lever going through the backplate **below** the long lever going forwards to the front shoe on the Salisbury/tube axle.



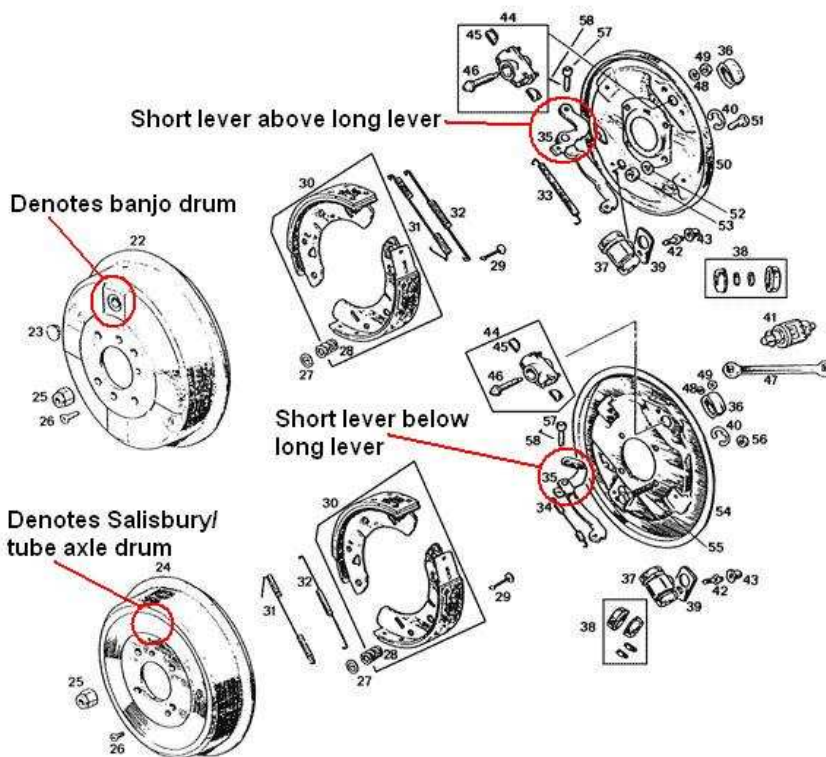
Drawing from the Leyland Workshop Manual. This clearly shows the short lever **above** the long lever, but it also shows the banjo brake drum with the large hole in the face. There is a drawing in the Haynes manual that also shows the short lever above the long lever, but it doesn't show the face of the brake drum so at first sight it isn't possible to work out which axle it represents. However both only show two pull-off springs, which confirms it as banjo. Haynes also has a photograph but it isn't possible to make out the orientation of the levers, or for that matter be certain which axle it is.



Drawings from the Leyland Parts Catalogue showing the banjo and Salisbury/tube axles. This shows the short lever above the long lever for the banjo axle as per the Leyland Workshop Manual, and shows it **below** the long lever for the Salisbury/tube axle i.e as per my photo above. However to confuse things even further although the Salisbury/tube axle drawing shows the short lever in the correct position, it shows the levers from the left-hand side with the right-hand brake assembly!



Drawings from Moss Europe web site showing the banjo and Salisbury/tube axles. This shows the short lever above the long lever for the banjo axle as per the Leyland Workshop Manual, and shows it **below** the long lever for the Salisbury/tube axle i.e as per my photo above, this time with the correct levers for that side.



Original handbrake lever on top, new one below. The excess material was fouling the rear shoe and holding it further out such that the drum could not be refitted.



Slot cut in end of adjuster so it can be removed and refitted with a screwdriver. Note this is not for adjustment of the shoes!



Handbrake Cable, 1977-on Rear Axle

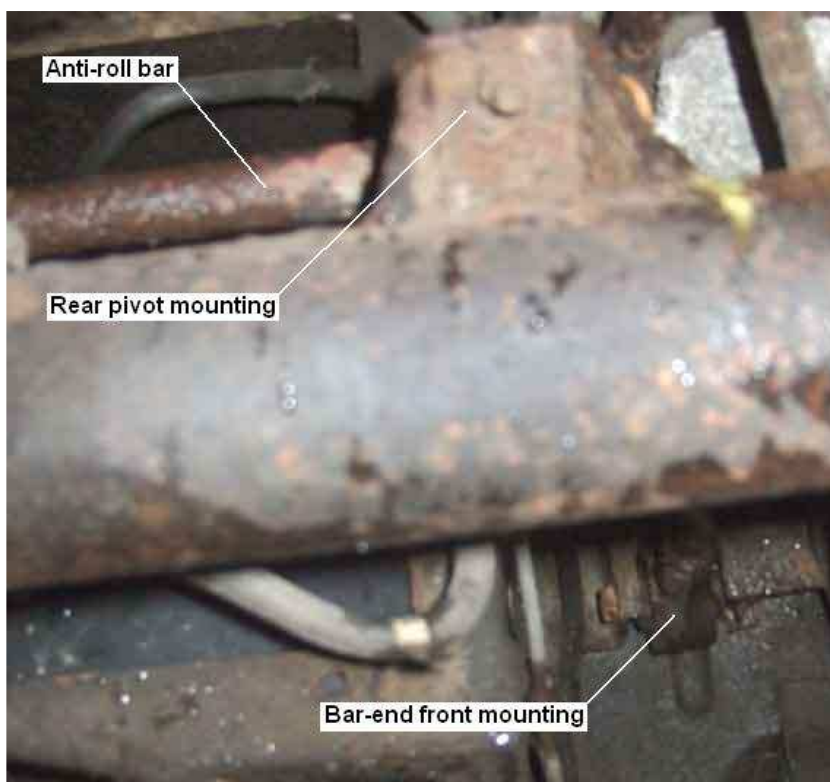
Showing the rubber flap attached to a flange on the axle casing, to which a bracket on the handbrake cable is attached. The rear pivot and mounting for the anti-roll bar can be seen on top of the axle casing (top left), but other than both being attached to the tube in adjacent areas the two are entirely separate.



Showing the rear of the diff, where the handbrake pivot used to be, with the anti-roll bar well out of the way.

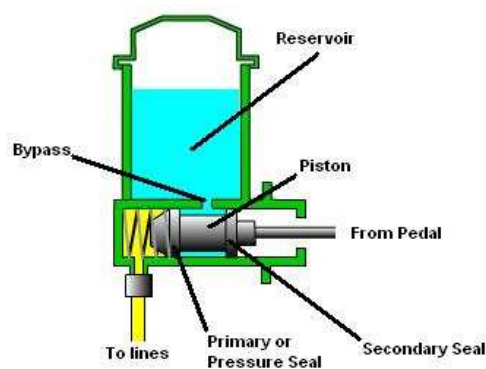


Showing the anti-roll bar, rear pivot on the axle casing, and front pivot mounting point on the body.

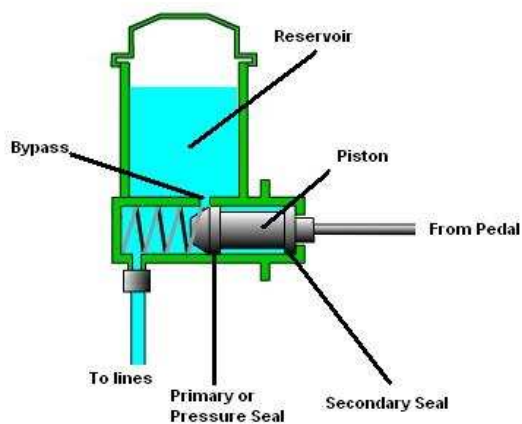


Brake Master Cylinder

Showing how fluid fills the space between the two seals when the pedal is operated. If the secondary seal (nearest the pedal fulcrum) leaks you will get fluid running down the pedal, but the brakes are otherwise operating normally (until all the fluid is lost!).

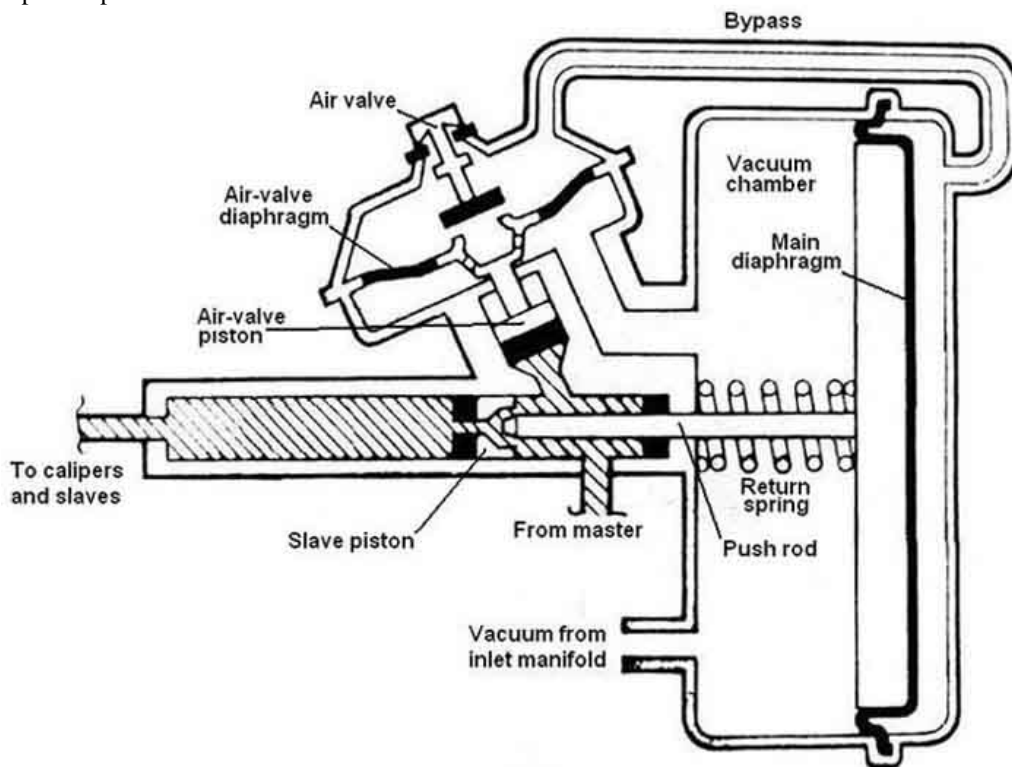


Showing how the primary seal must clear the bypass hole to allow fluid expansion and contraction to pass in and out of the reservoir. If this doesn't happen - for example if the mechanical brake-light switch is screwed in too far - and the fluid expands, the brakes will be applied without the pedal being operated.

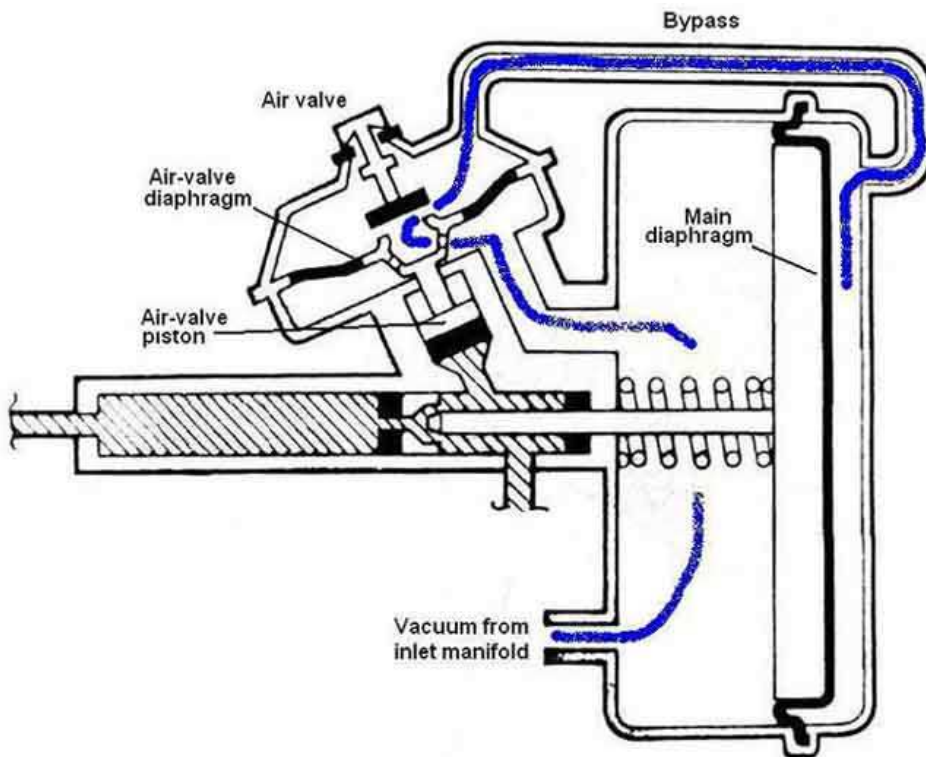


Remote Brake Servo

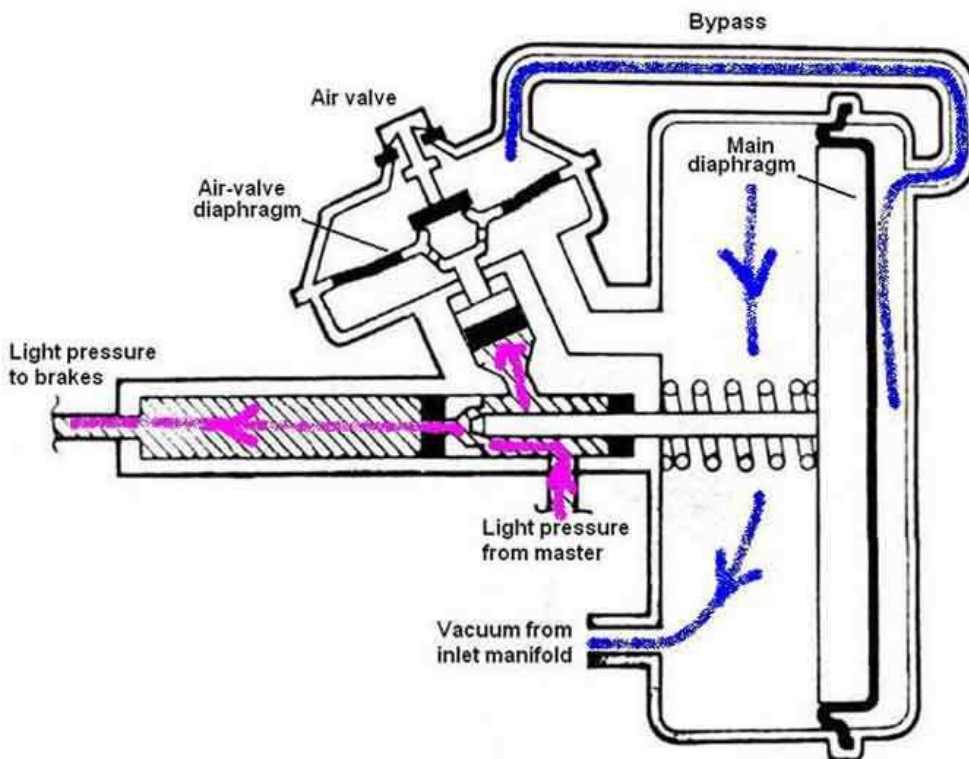
The main component parts



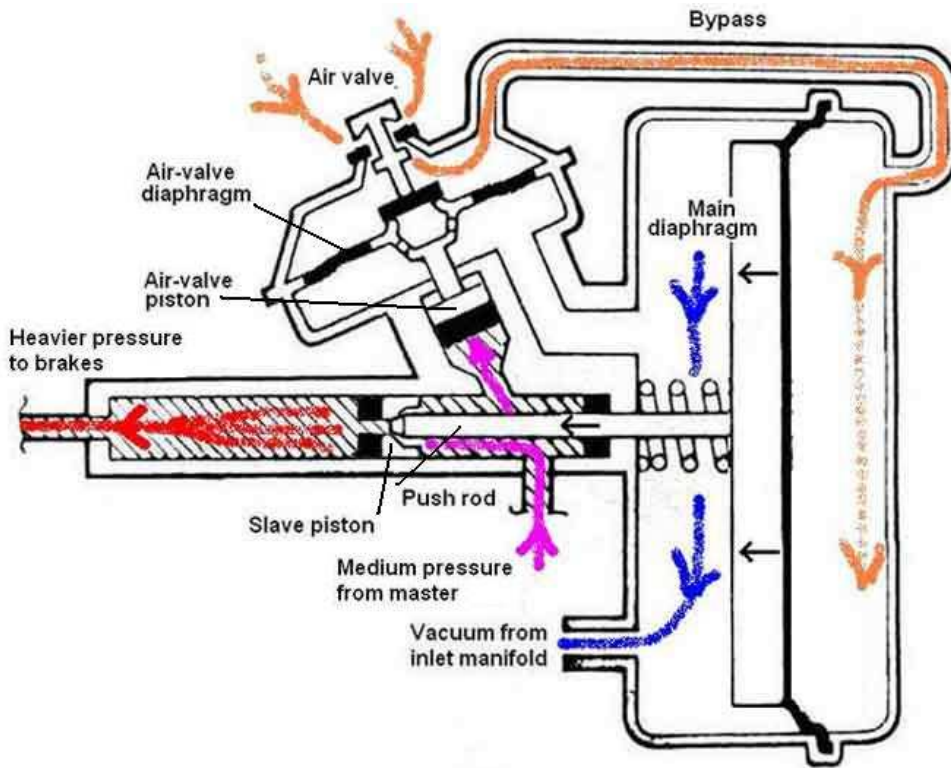
Engine running, brakes not applied. Vacuum from the inlet manifold is applied to the front of the main diaphragm, but also through the passage in the air-valve diaphragm, gap between the diaphragm and the air valve, the bypass pipe, to the back of the diaphragm. Thus the diaphragm has the same air pressure both sides and the return spring keeps it pressed to the back of the vacuum chamber.



Brakes applied lightly. Light fluid pressure from the master is applied to the bottom of the air-valve diaphragm, and also through the space between the push-rod and the slave cylinder and onward to the brakes. Light pressure on the air-valve piston pushes the air-valve diaphragm up to the air valve, closing off the gap between the two, but not yet lifting the air-valve off its seat. Thus there is still the same air pressure both sides of the diaphragm and it remains pressed to the back of the vacuum chamber. This lack of assistance on light pedal pressure prevents the brakes coming on harder and more suddenly than one might wish.



Heavier pressure on brake pedal. Heavier fluid pressure pushes the air-valve piston and its diaphragm further, which lifts the air-valve off its seat. This opens the air-valve allowing air at atmospheric pressure through the bypass pipe to the back of the diaphragm. With a depression on the other side the diaphragm is pulled forward, together with the push-rod, which closes off the gap between it and the slave piston, and pushes the slave piston along the bore to give a higher pressure at the outlet to the brakes than there is on the inlet from the master cylinder, which gives the 'boost' effect.



When the brake pedal is released, pressure on the air-valve piston is removed, it drops back, allowing its diaphragm and air valve to drop back also, and the latter closes the opening to the atmosphere. When the air-valve diaphragm moves away from the air valve the gap between them is opened up also, and manifold vacuum can now be applied via the bypass pipe to the back of the diaphragm again. This moves back to the rear of the chamber, pulling the push-rod back. The push-rod is connected to the slave piston with a loose connection (not shown in the diagram) so as well as opening up the gap between the two and releasing pressure from the brakes, it also pulls the slave piston back as well.

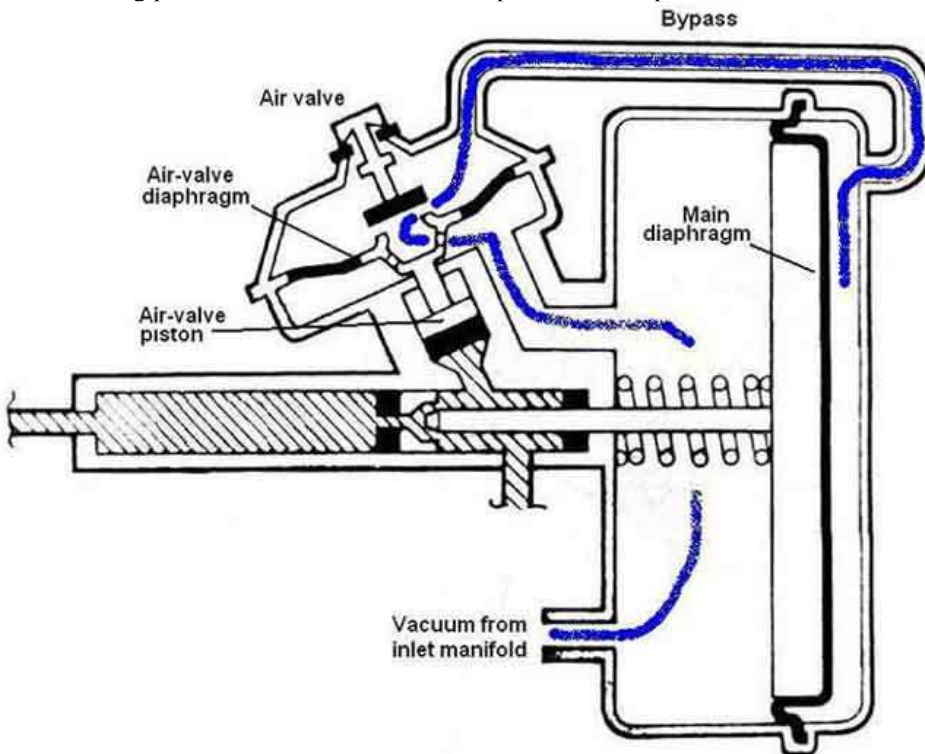
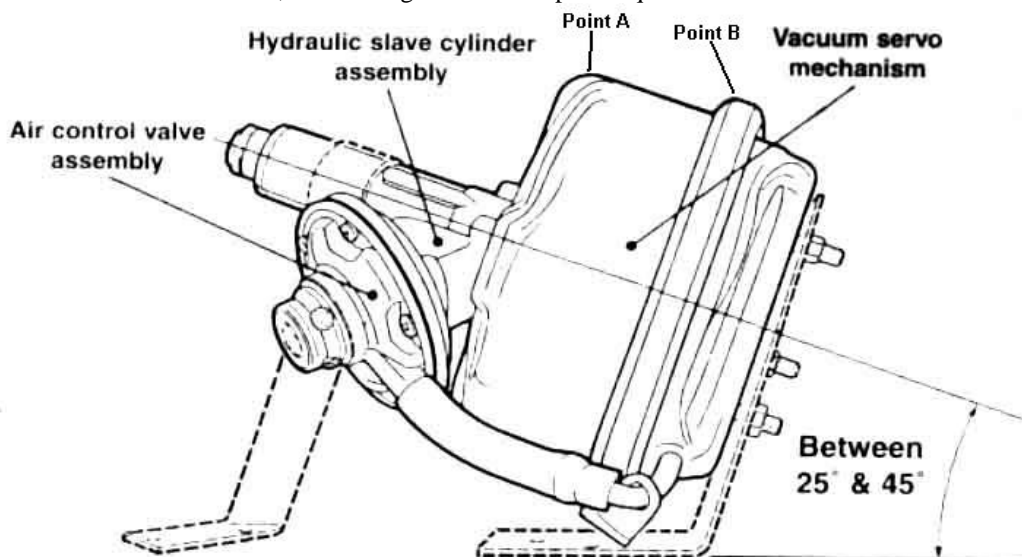


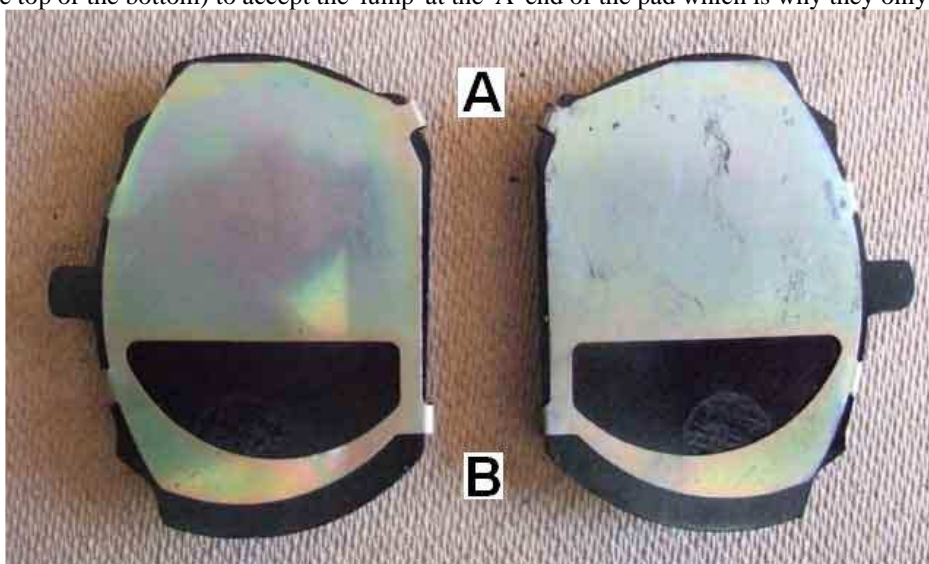
Image from [AP/Lockheed fitting instructions](#) found on a [Lotus Elan forum](#) showing a pronounced upward angle of the cylinder, and the air-valve assembly pointing downwards, both of which will reduce the amount of air that can be trapped in the servo. But whether there is enough room to tilt the servo in an MGB by 45 degrees, or even 25 degrees, I don't know, as it is already pretty-well sandwiched between the bonnet and the shelf as it is. It could be tilted by about 10 degrees before point A rises above point B and so needs more vertical space, and once you start tilting it there is scope to move the

whole servo down on the main bracket, so reducing the vertical space required.

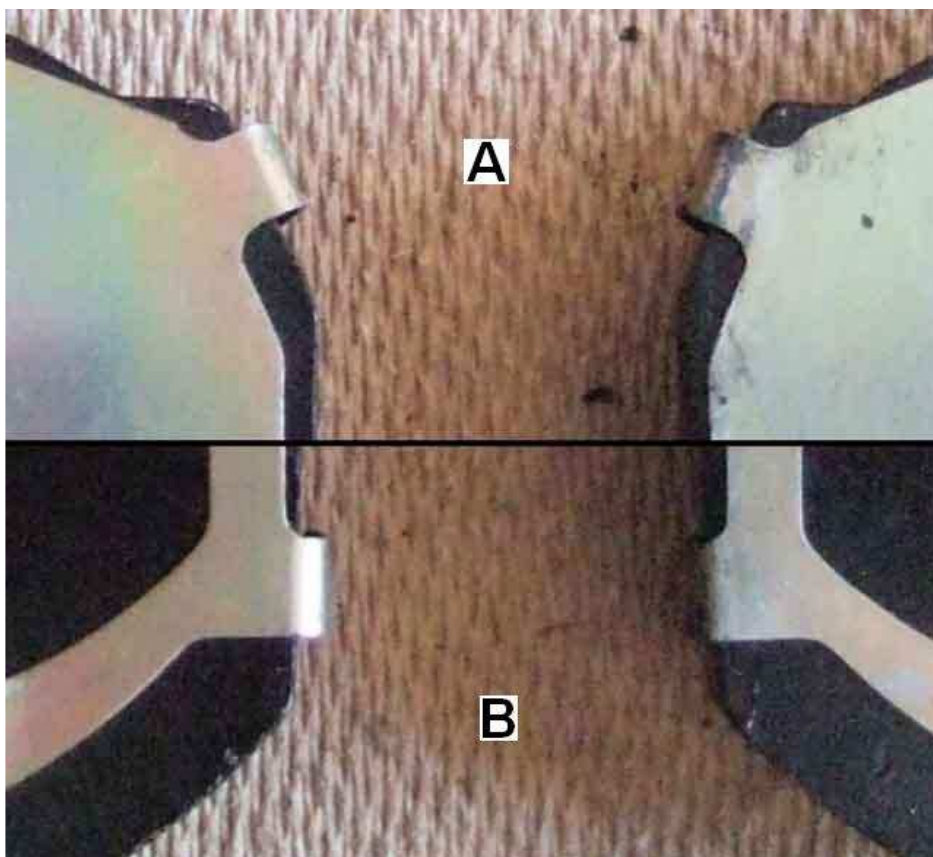


V8 Brake Pads

The 'handing' can be seen at either end of the only straight edge of each pad. In the picture above the 'A' end shows the curve coming down the side of the pad to meet the straight edge but before it does so it takes jink out from the curve then a sharp turn back in to meet the straight edge which results in a sticking out 'lump' (detail below). On the 'B' end the curve follows smoothly round till it meets the straight edge. There is a cut-out in one part of each half of the caliper (can't recall if it is at the top or the bottom) to accept the 'lump' at the 'A' end of the pad which is why they only fit one way.



Detail



<http://www.mgb-stuff.org.uk/>

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