

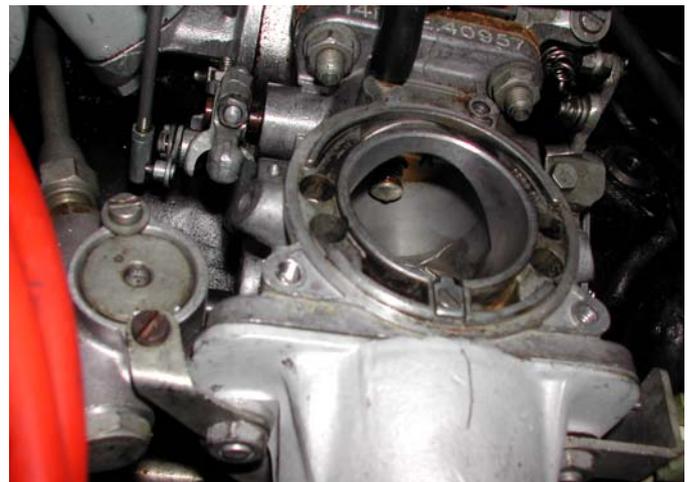
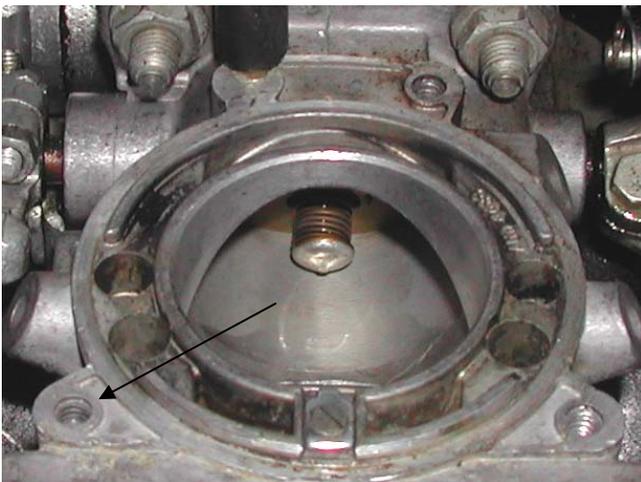
TEE ONE TOPICS

Number 44 June, 2005

HORROR AT THE THIRD HOLE

This is not an unusual story but when it happens to you it is momentarily the end of the world. The pictures below show one of the SU carburettors on a Bentley T2. As you always do you periodically pull off the dome bit and clean inside it and the piston and the bit that it slides in. Then you carefully reassemble the whole lot absolutely clean and dry and do up the screws. But in this case the screw in the third hole went in and screwed and screwed and screwed. Bugger as the ad says. The previous operator determined that a nuclear explosion was going to blow the top off the carburettor and tightened it accordingly. Perhaps he was trying to see how tight he could actually make it and bingo most of the thread was dragged off that fairly soft composition metal these assemblies are cast in.

Though not very likely, given the clearances the piston operates in that bell housing, if the latter cants slightly to one side the piston will jam either up or down and the mixture will be wrong and the engine will stall or won't start. So we have to fix it.



Get a new carburetter! Not bloody likely, the manufacturers sadly are running down apparently because not many cars run SU's these days. The Factory has stocks no doubt but at the cost of some 3 arms and a left foot. Best you fix the thread eh! The first thing to do is find out what thread it is. For many of us, this it is like trying to find the IQ of the third girl (or lad) at the first checkout counter at the local supermarket. The model of the car (as in year) will help but otherwise take the screw or bolt to your nearest machinist, fitter and turner or bolts and nuts shop and ask them to tell you. Then you will find for instance in the SU problem that it is a 3/16" Whitworth thread. So again to a suitable store in your location and buy a thread form kit. In Australia this is manufactured as Helicoil and used in every aluminium blocked engine ever made by Rolls-Royce!

So here on the upper left we have the casualty hole at lower left of the photograph. The pic below it shows how to run a special tap which is provided with the kit from Helicoil in order to screw in the replacement thread! Bottom right is the tool with the new thread coil being screwed in and above that the finished product.



CLEANING YOUR UNDERPARTS

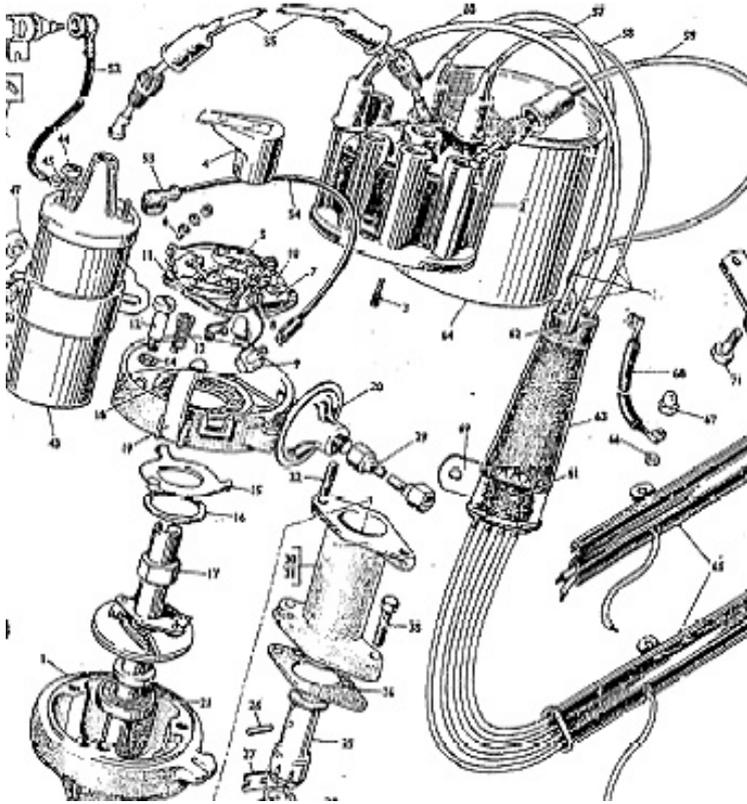
Readers of my generation (post-Neolithic) will have had an elderly aunt who always ensured that she wore fresh undergarments when she went out in case she was knocked down and had to go to hospital. Whilst RTA inspections can be a bit irksome I think it is unlikely that any inspector would remove the cover from the legendary rat trap to inspect it for cleanliness.



Pressed in aluminium and sealed around the edges with simple draft proof adhesive sponge foam tape, the cover is seldom a problem but it does get dirty. The valves which actually apply the brakes do not have seals on them and always drop a minute bit of fluid which collects on the tray. Cleaning is not essential but it does cut down one of the sources of 'old car' smell from the vehicle. And the same approach should be applied to pre-Shadow cars with their under trays for the same reason.

The other opportunity is to repair the tray. Some bright sparks try to jack up the car with it or else crush the leading edge of the assembly during a short paddock bash. Having cleaned and straightened the tray, give the car a treat and buy new screws for it and the little plastic inserts in the forward end of the cover then you can have a monumental accident and expose your rattrap without any embarrassment at all!

REPLACING HIGH TENSION LEADS IN A SHADOW



It is very easy to ignore the condition of these leads in any car. They are of course vital to the running of the engine. In the good old days they were made of a heavy copper core in good heavy insulation. These unfortunately tended to radiate some electronic emissions that other components and passing gadgets did not appreciate. And so it is actually illegal to use this stuff anymore. The newer material is apparently a vast improvement in function and causes no problems. It does however require a special terminating tool which if you were only doing your own car would be difficult to amortize. The suggested approach is to remove the leads from the distributor cap, unbolt the two brackets from the rear of the cylinder heads that hold the 'funnels' that carry them around the back of the engine and unbolt the carriers that run across the top of the tappet covers. Pull the leads

from the spark plugs and the two complete looms can be lifted out!

The carriers across the tappet covers when turned over will reveal their secret as to how the wires are threaded. The cylinder head holding brackets can be removed. What you have left you send to an appropriate tuning shop and they will make up new leads properly threaded through the 'funnels'.

Note that the 'funnels' consist of three mouldings items 61, 62 and 63 in the spares drawing and all of these are available. Understand that these are not decorative but very functional in that they stop chafing and cross-inductance. When you give them to your man insist that he put numbered collars on the leads (A1 B1 A2 B2 etc) above the funnels since they need to be seen over the distributor cap. You might also consider giving your car a present of a new distributor cap and rotor.

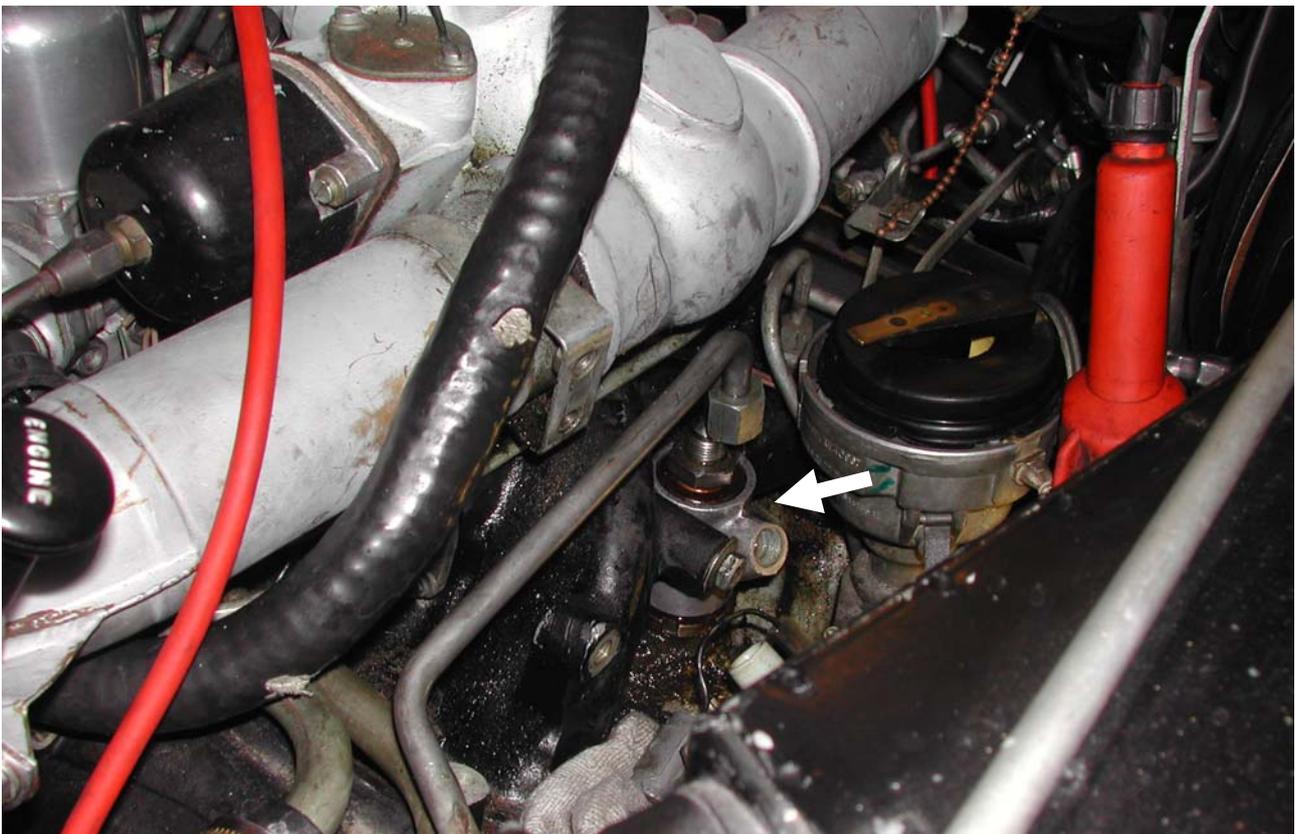
If you are one of those compulsive painters of components, be aware that the carriers that run across the tappet covers are coated with a dielectric to avoid conductive misfiring. Do not remove this before painting!



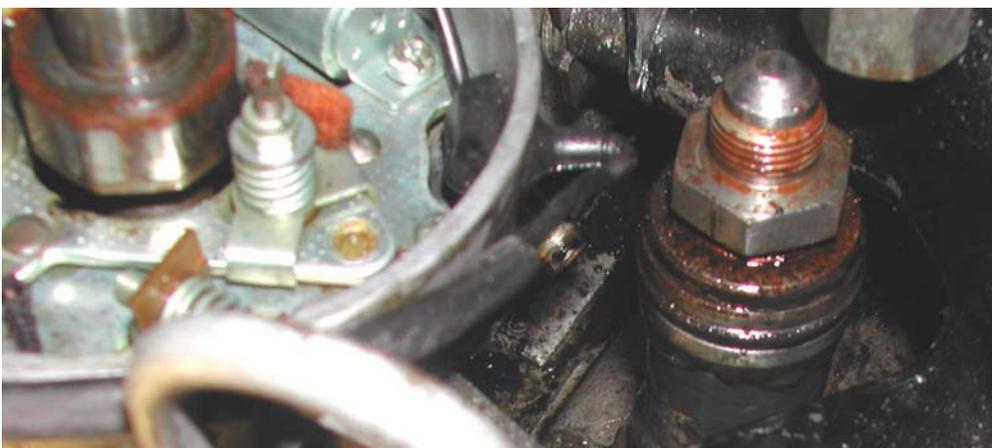
For some years I have used Thundercords in Sydney who provide a very quick service and do very neat work. They also have the specs for most cars which got over a recent problem I had with a T2 which had bright red leads strewn over the engine none of which equated to the originals. Thundercords had the lengths to a millimetre!



THOSE ELUSIVE LITTLE PUMPS



We hear them clicking away but pay them little attention. As you can see by the above they are fairly well hidden. Fed by gravity from the hydraulic reservoir they are capable of pushing the accumulators up to at least 2800 psi and then some. They are 'pushed' by an exclusive cam on the camshaft are beautifully machined, only stop working when the engine is switched off and apart from the occasional external leak and being crudded up rarely give any trouble.



At the picture above you are looking down to the rear of the engine of a T2 engine. To the left of the distributor is the pump (arrowed). The angled pipe above it is the line, here disconnected, to the accumulators down the side of the

engine. The threaded hole on the side of the pump is the entry point for brake fluid from the reservoir. The large black pipe sweeping from left to the top is the engine breather.

This is a view of an early Shadow taken from the right hand side. The outer cover has been removed from the rear pump to reveal a heap of gunk around the body of the pump. Since the brake fluid is fed to the pump by gravity there is really no 'flushing' pressure as there is with the rest of the system!

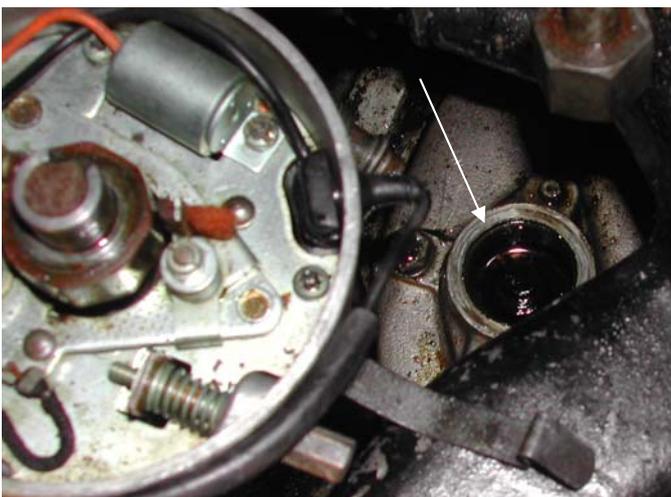


A good view of the gunk on the pump now removed and the 'O' rings (arrowed) that contain the brake fluid in the outer casing of the pump. This stuff is thought to be generated by mixing RR363 with conventional brake fluid. The two 'O' rings contain the fluid around the pump and seal the outer casing. These definitely fail and it is usually the rear pump that has the most problem since that is subjected to

the most heat. Apart from the mysterious loss of brake fluid from one reservoir the clue to a leaking pump is a nice puddle of oil below the rear of the engine.

Changing the 'O' rings is really quite simple, the only special tool needed is a pair of circlip pliers to undo the top. First clamp off the respective low pressure feed pipe to the pump and exhaust the accumulators by pumping the brake pedal until the lights come on then some. The high pressure pipe on the adapter outlet at the top of the pump is released as with the low pressure feed pipe that angles into the side of the pump casing. Off with the circlip and the casing can be prised upwards and lifted off the pump body.

Remove the lower 'O' ring first and roll it off the pump then the upper one. Clean every thing and using some fresh brake fluid fit the top 'O' ring followed by the bottom one. Before you slide the lubricated body back on replace the small 'O' ring in the feed aperture. Put it all back together and when you have just started the thread on the low pressure nipple, release the clamp on the feed line. You should have a good healthy drip around the pump while you screw the supply line back on. This overcomes an oft occurring problem of the line getting an air block in it.



At the bottom of the arrowed hole is the push rod that operates the pumps. The push rod itself is 'waisted' as a safety precaution. Some clever fellow worked out just what pressure the 'thickness' of the rod would break and

I would like to think everybody is changing their RR363 every year and for peace of mind it is not a bad idea to replace these 'O' rings at the same time.



'waisted' it to that dimension. It actually shatters at about 3000 psi.

The special tool used for removing the pumps. The ring slides over the serrations to give them extra support as the pumps are invariably very very tight. If this tool is not to hand the whole intake system needs to be removed and the pumps can then be removed with a 'C' spanner.



The pump dismantled. The actual business bit is the plunger and barrel (arrowed) and to their right the non return valve yet to be dismantled. There really is little to go wrong other than the odd spring breaking. It is here of course that the ravages caused by not changing brake fluid become painfully apparent and these bits are predictably very expensive.

Here we have a general sectioned view of the pump installed on the engine. The drawing is actually of a very early setup as the 'guide' for the push rod and cam follower was changed in the early seventies to a much more open fitting allowing the general climate of oil to get at the working bits unlike the design shown here.

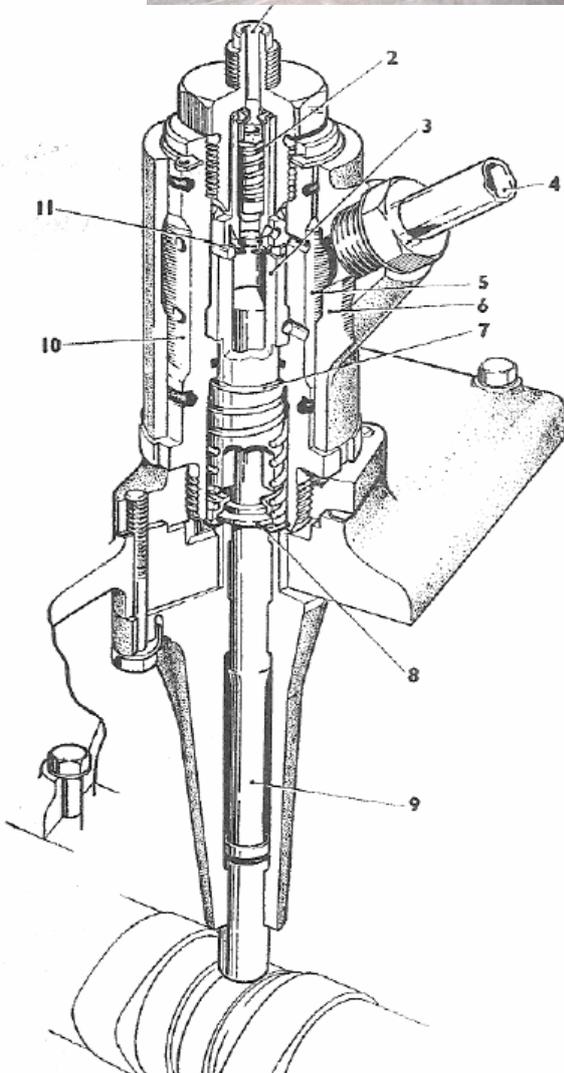
One problem that occasionally occurs is that the cam lobe that operates one or both pumps wears prematurely and loses its case hardening. The exposed non-hardened cam then proceeds to wear very quickly indeed and as a result the push rod lifts a lot less and pump becomes eventually inoperative.

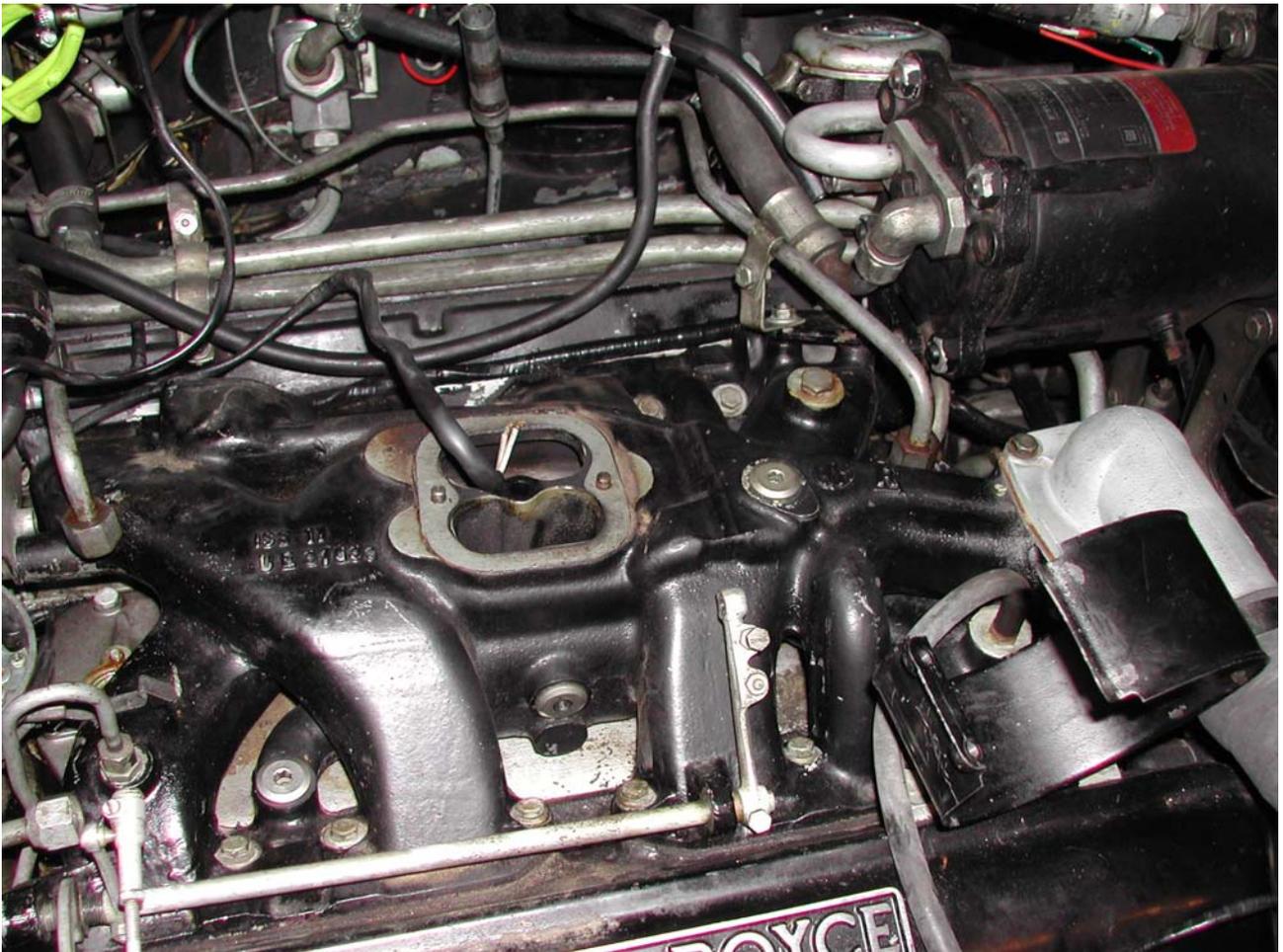
For those interested the cam shaft can be fiddled with in profile, significantly improving performance but if pump performance is the problem, it is out with the engine, the camshaft has to come out of the rear end and it can be built up or remanufactured to whatever specs you require.

- | | |
|-------------------------------|-----------------------|
| 1 Adaptor and outlet port | 6 Pump housing—outer |
| 2 Non-return valve and spring | 7 Plunger spring |
| 3 Pump barrel | 8 Plunger |
| 4 Adaptor and inlet port | 9 Push rod |
| 5 Inlet annulus | 10 Pump housing—inner |
| | 11 Inlet valve |

ured to whatever specs you require.

Below is a picture of the engine after the induction system has been removed. This is not as horrendous as it might appear. There is a central bolt in the induction system which when removed allows the whole assembly of carburetters induction horns and sundry other bits to be lifted off in one assembly.





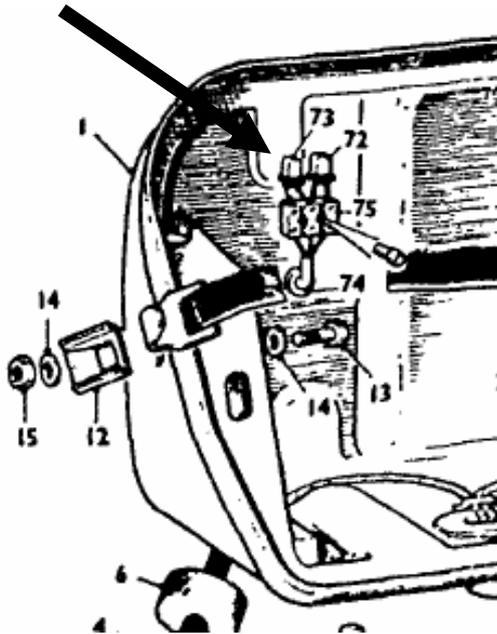
Take a note of where the various rubber tubes connect some are obvious by size but others are not. Mostly they are vacuum connections although in later cars fuel is piped in in rubber rather than steel to reduce the conductance of heat and attendant vapourisation. And while you have this complex off is a good time to replace leaking carburettor diaphragms and cracked tubing anyway!! Note also from this picture, the ease with which the front pump can be removed.



Unlike the other pump pictured this pump on a T2 Bentley is the later 'staked' type identified by the notched disc adapter seen here with the pump outer cover removed. Note that even with the correct serrated tube spanner it is still necessary to move the induction system forward for access to the rear pump.

SHADOW II BATTERY TEMPERATURE SENSING

Mark Herbstreit offered this advice recently on the Club website.



This is for the benefit of all Shadow II and T2 owners who are about to throw away perfectly good CAV alternators. There is a temp sensor in the battery box behind the battery that is supposed to switch the voltage regulator to a lower charge rate in extreme temperature conditions (I think from memory below 0 c and above 35c). The problem is it can fail in the low setting. Move the battery out of the way and reapply power with some jumper cables. With the engine running check the battery voltage with a multimeter. If it is around 13V the device has probably failed. If you disconnect the center (earth) of the sensor, the voltage should jump to above 14v. The device is located in the top left hand corner of the battery box (arrowed) of RHD cars. (The layout may be slightly different in LHD cars). This sensor was only used in the Shadow II era.



HOUSEKEEPING THE POWER STEERING



The Factory first dabbled in power steering with the 'S' series cars. The first Silver Clouds and their sister Bentleys to emerge however had manual systems which must have been a financial gut punch given that the units were designed and built for the car but were used for only a small number of chassis before applying the powered system. Legend has it that quite a few manual cars were quietly returned to the factory for retrofitting.

The initial system was I believe unique to Rolls-Royce at least in the domestic car club. A relatively conventional steering box was fitted with valving that directed oil pressure to a simple ram that poked out the front of car, hidden by the bumper bar and its fairings. By directing pressure to one end of the ram, the plunger within moved and via a connecting rod pulled the steering levers in one direction. Switch the pressure to the

other end and lo the levers went the other way!

The system worked OK although there were interminable arguments as to whether the ratios were too fast or too slow and whether it was too light to steer or too heavy. The best way to shut these critics was to give them a manual Cloud and tell them to park it between two other cars. When they got back from the last session with their physiotherapist they tended to avoid the subject of power steering!

The Cloud setup you will have guessed by now if you don't have one, involved the box with its internal valving, the ram out the front, the pump to provide the oil pressure and the hoses to connect all these units together. The Achilles Heels (everybody seems to know about this podiatric legend these days) were the hoses and the ram. The former had the quaint habit of bursting and showering the very hot exhaust manifold with oil inspiring the mechanical treat of flambé Rolls-Royce. The ram which given its tiresome task of trudging up and down that small cylinder would eventually wear out the seals and there would be mysterious puddles of oil under the radiator grille, confounding the uninitiated mechanic.

The Cloud chassis used two different pumps which did the same thing but both had substantial intake filters in their reservoirs. These ensured that the odd fly that got into the tank would not clag up the mechanisms lower down. There is a gem of a Service Bulletin issued by the Factory in May 1957 when power steering first emerged. And I quote

FOR INFORMATION

POWER ASSISTED STEERING.

It is particularly important that in discussing this feature with prospective customers, existing owners, members of the Press or in any form of correspondence, that it should always be referred to as Power Assisted Steering and not just Power Steering.

The reason for this is that many people, particularly from the United States and other places Overseas, have experienced Power Steering and have not been impressed due to the lack of "road feel", and we want them to understand clearly that Power Assisted Steering is not the same thing, and that in designing it we have introduced a very large measure of "road feel",

So my ear will be tuned to listen for this transgression.

The introduction of the vee eight engine forced the design of an extraordinary steering box to replace the conventional item sitting at the bottom of the steering column. Because of the width of the engine and the position of the exhaust pipes there was simply no room for the old box so it was

pushed back under the driver's toe board and tipped on its end . To cope with the steering column having to make a 70° turn a transfer gear box had to be planted on top. The setup worked well unless you had to work on it! Again you had long hoses to monitor and the ram out front which not only had to put up with wear but also owners inadvertently using it as a battering ram or even worse the other garage attendant wacking a jack under it and lifting the car!!!

Come the Silver Shadow without a chassis, they were able to use a very orthodox steering box which contained the valving to route the high pressure oil. This meant only one high pressure hose between the pump and steering box which was less than a metre long, no rams and quite reasonable accessibility.



DEVOLUTION

My worry with the world is the increasing tendency to worship stupidity - everywhere you look things are designed for the lowest common denominator - we are literally interfering with Darwin's theory by protecting cretins from themselves. - A.J (2005)

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SERVICE EXCHANGE units from alternators to auto transmissions, brake accumulator valves and spheres to height control valves and replated brake fluid reservoirs.

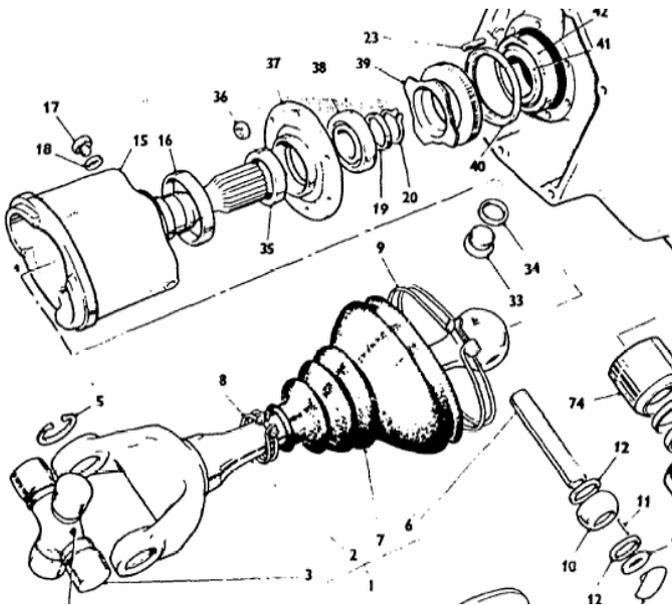
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A SOURCE OF VIBRATION

The poor old rear axles one of which is pictured here are often quite neglected. They should have grease nipples in the universal joints (Item 3 in the drawing) and a filler plug (17) for the trunnion joints on the inner end. Removal is very simple involving undoing the two saddles and the half dozen nuts securing the inner bearing flange (37) to the rear axle casing.



The inner trunnion joint was as you know copied from Buick immediately after the last World War. The joint was used on the front end of the propeller shaft on all the Silver Clouds and Phantoms V and VI and also the very early Shadows. They are very expensive to produce are fiddley to service and the rubber sealing boots are very difficult to replace. They were discontinued on the propeller shaft shortly after the start of Shadow production but continued to be used on rear axles until the Spirit line got established.

As with any other joint they wear and vibrate and on a Shadow this is often felt on acceleration. One quick cure is to reverse the axles which are identical. While doing so have a very good look at the boots ((7) to ensure they are not about to puncture and consider replacing the universal joints. They are not expensive and can be the cause of a pronounced 'clunk' when engine power is applied.

And seeing that you have the axles out why not pull out the inner bearings (38) and replace the oil seals (35)?

KEEPING THE SIGHT GLASSES CLEAN



I was chatting to the manager of a major auto supply shop recently and he was telling me about honesty. Some time previously he had physically 'caught' one of his young staff exercising his in house investment rights by employing the contents of the cash register! Separation occurred very quickly but the lad with some indignation appealed under the unlawful dismissal legislation which our leader is attempting to water down we gather.

Fronting the magistrate the manager was asked had he instructed the lad NOT to help himself to the contents of the till? No he hadn't confessed the manager. Case dismissed said the magistrate you should have told him! I am starting to choke so will desist from the subject but the relevance is that every dripping word fired at owners of Silver Shadows and their siblings about cleanliness of the hydraulics seems to be ignored by the many.

I will happily concede that the average owner is not about to bleed off a half litre of his hydraulics to see if it is clean or not but surely checking the clarity of the sight glasses of the reservoir is not too much to expect.

Cleaning the reservoir for the intrepid is really pretty simple. First undo all the screws on the top



cover, noting that some screw into the support brackets others into captive nuts and the remainder into simple 2BA nuts – welcome to Rolls-Royce land! Lever the cover off. Before you do this, however, you will have covered the mudguards and any other area you may inadvertently flick brake fluid onto paint work. Also you would have a bucket of clean water and a sponge handy so that if the unthinkable happens you can flood the area with water and hopefully avert disaster. Remember that brake fluid is an excellent paint remover. Under the cover you should find a large filter to stop the ingress of finger

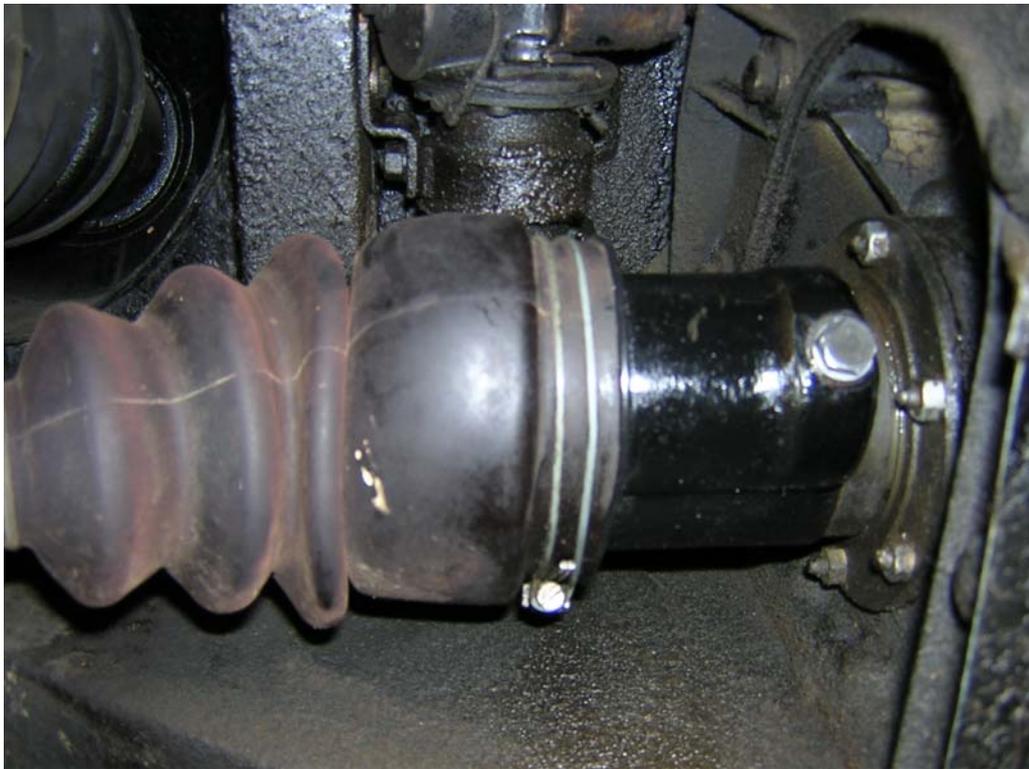
nail clippings and the odd bird dropping and hopefully a large piece of 'rubber' sitting on the reservoir divide. This slows down the passage of fluid from one compartment in the reservoir to the other when doing those wonderful filmed leaps over the hills of San Francisco. Then there is an aluminium baffle or baffles to minimise the slosh. These are held in place by a couple of 2BA screws and nuts. They all come off. Get yourself a large syringe and suck the fluid out of the reservoir. Or if you like the taste of the stuff suck it up and start a syphon. It is only slightly fatal to ingest!

Having got the fluid out clean the residual muck out using paper towelling then unscrew the gauze filters on the bottom where the intakes lurk. Check they are not broken if so replace.

To clean the sight glasses, if God is in his Heaven you will be able to remove the four screws holding the instruction plate to the outside of the reservoir, then using a perfectly fitting very small Allen key you can remove the countersunk screws remaining to hold the plates retaining the sight glasses. This may prove impossible. If the screws have frozen they will have to be left until the whole reservoir is removed and the screws drilled out! In the mean time try squirting methylated spirits through the upper and lower holes of the sight glass apertures as in the picture. Of course pack cloth or paper towel on the bottom to avoid getting solvent down the filter holes. This should get the glass sufficiently clean to see what is happening!

PS. You will notice my attempts to list bits to remove – unsuccessfully. There were at least four iterations of these reservoirs so if you go to exchange one be sure you describe it carefully.

TRUNNION MAINTENANCE



When did you last have a look at these dear old things stuck either side of your differential (read final drive). They have quite a job to do are very expensive to replace yet the number I find utterly empty of oil. If you haven't been there get the car up into the air clean around the filler plug and remove it preferably when the plug is at 3.00 o'clock. Ideally oil should just start to dribble out. If not turn the trunnion down until it does dribble which will give you an idea of how much is there. You may as well let the lot out and start again.

The required oil is the same as that you put in the diff of 90 viscosity and the quantity is 150 millilitres. That is about ½ a coffee mug, the amount is not really critical. The easiest way I find to get it in is to use a medical syringe available from most chemists. The most common size available is 50ml. Buy three, fill them all and take them under the car with you. Pull the plunger out fill it with oil pop the plunger back poke it in the hole and squeeze. The more clever among you will

also realise that the trunnion has the right amount of oil when it is just about to overflow when it is horizontal.

While you are at it of course have a very good look at the rubber boot which keeps the oil in the assembly any splits or holes and the boot has to be replaced.



WHO'S DAT A 'KNOCKIN' AT MAH DOOR

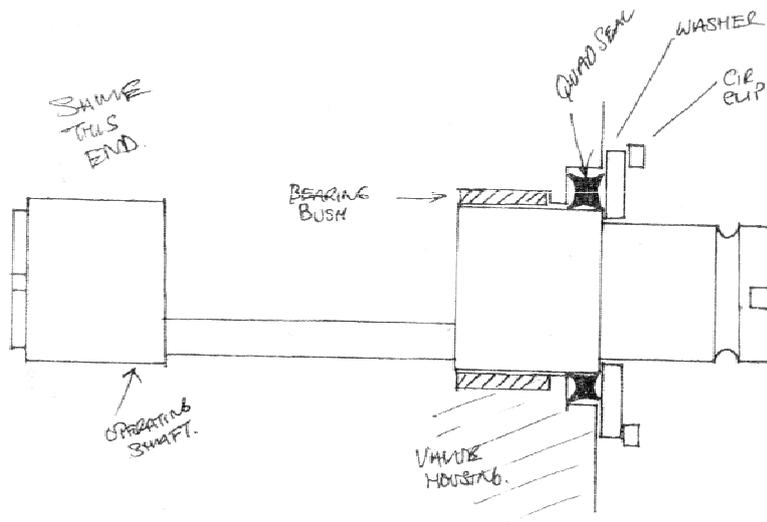
This is an old story but one that became suddenly topical recently when I was borrowing a friend's Shadow. As luck would have it, I had two rear seat passengers who were shall we say gravitationally challenged and between them would have increased our grip of the pavement by some 300 kilograms. Once installed and belted I started the engine and the vision in the rear view mirror changed from road surface to that of the car behind us. So far so good. Those rams must have been working hard but they didn't fail me and the car rode almost level. The design limit for the back end is some 600 lbs after which with the rams fully extended the springs simply squash as in any normal car.

The conversation had turned to the current practice being perfected overseas of using prepared cars for spectacular fireworks displays and population control. At the time we had pulled up on the shore of our lake, engine was switched off and admiring the view, when during a lull in the conversation there was very clear percussive knock immediately under my rear seat passengers. Instant silence and very querulous looks. Someone was about to speak and there was another knock. At this stage my passengers were about to decamp very quickly. I made reassuring sounds and they sat quite obediently while I explained.

Each of the two levelling valves at this point would have had some 2600 psi of hydraulic oil to hold in the rams keeping the car level. They do this by means of a small metal disc with a bonded curved 'plastic' moulding on the faces. The latter is pushed very firmly against a small hole in the valve body. If the face of the 'plastic' is damaged or grooved or if there is a nick in the face of the valve seat there will inevitably be a very slight leak which can build up until the pressure is overcome, the seal is broken, the button springs off under the pressure and then slams shut.

With the incompressible brake fluid at such high pressure, the 'bullet' of oil suddenly coursing down the lines, releases considerable energy most of which dissipates as noise. The cure of course is to check the offending surfaces and if they cannot be corrected replace the parts.

There are only four places in the entire hydraulic system of the Shadow that can leak in the normal circumstances of usage. The operating shaft seals in the levelling valves usually top the list! Seals of any kind are a discipline in engineering fields by themselves but containing the enormous pressures in hydraulics is a design skill to be marvelled at. The levelling valve seals are no exception involving special soft materials precisely moulded so that the pressure you are trying to contain actually applies a sealing force to the operating shaft. The soft material of the seal however while it can handle very large pressures is not designed to handle abrasion. For some reason the Factory did not concern itself with ensuring that the seal and the surfaces of the operating shaft which run together were adequately shielded from the muck that gets hurled up around the valves by the rear wheels.



The end of the shaft away from that where the operating arm is fastened has a slot in it that allows the shaft to be held while the operating arm is unclenched and moved to a new position. Road grime can easily penetrate this area which not only provides an abrasive to cut the seal but also corrodes the shaft surfaces where the seal runs. Clearly a perfect setup to destroy the seal and precipitate a significant leak. The other end is similarly placed for

destruction.

More and more of these valves are starting to leak for the third and fourth time with the overhaul period becoming shorter and shorter. All the forgoing is to alert you the owner to have a good look at the operating shaft surfaces and if there is the slightest sign of corrosion or damage replace them. I understand RA Chapman is now making these shafts and they are readily available.



WEB SITES YOU SHOULD HAVE ON YOUR COMPUTER

<http://www.rrocavictoria.org.au>

The Victoria Branch of the RROC of Australia who kindly store issues on their web site for all members to read.

<http://www.rroc.org.au/>

Rolls-Royce Owners' Club of Australia

<http://web.rroc.org/>

Rolls-Royce Owners' Club of America

<http://www.swammelstein.nl/rolls.htm>

A Dutch private web site with an excellent forum

All the above sites have free forums where you are welcome to share your knowledge and ask your questions. Or write to me - Bill Coburn Post Office Box 827 FYSHWICK ACT 2609 Australia or spur84@bigpond.com.

<http://www.kda132.com/>

A site dedicated immediate post war cars. The owner is a member of the RROC of A.

<http://www.BritishStarters.com>

An American site offering Nippondenso Starters for all Rolls-Royce vee eights.

<http://www.nzrrbc.co.nz/>

Our New Zealand enthusiasts web site

<http://www.books4cars.com/>

A great source for handbooks and workshop manuals

<http://www.rrec.co.uk/>

The British RREC.

barbarawestlake@rrec.org.uk

The address of the lady who will send you the build sheets for your car.

www.enginesaver.com.au

The sensor to warn you about the loss of coolant

<http://www.rachapmanautomotive.com.au/>

Supplier of after market manufactured parts as well as comprehensive service

<http://www.sumidel.com/>

The Australian home for all SU carburettors and parts

<http://www.magnecor.com.au/Default.html>

Thundercords who will make up your high tension leads.

<http://www.vinwire.com.au/>

A family business located in Bellingen NSW who will make up wiring harness for any car.

<http://www.natspring.com.au/>

A firm that will make virtually any spring needed on a car particularly ones that are not individually available in an assembly

<http://www.classicfasteners.com.au/>

A South Australia concern that has a very wide range of fasteners detailed in a very comprehensive on-line catalogue

<http://www.ppc.au.com/>

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