R

Radiator & Cooling System

FACTORY

Rolls-Royce 20/25 automatic radiator shutters

by Mervyn C. Woodward

If your radiator Calorstat (thermostat) does not function, it should be changed. Before doing so first check your piggy bank, or hold a flag day, because new ones are not cheap.

After emptying the top tank, lift the spring loaded plunger and release it from the thermostat operating rod eye.

Next swing the top plate of the small link connecting the other side of the pivot arm to the rod which goes through the tunnel in the top tank and remove the pin. After moving the rod and link apart, replace the pin and swing the top plate back to prevent its loss.

Remove the five 1BA nuts and spring washers from around the periphery of the cover plate. There is no need to remove the sixth, which is inboard of the others on the hinge mounting lug, as this retains the hinge cotter pin.

When the cover plate is removed the Calorstat will be revealed and the trick is to remove it from its housing.

The brass flange must be levered gently away from the tank, and the gasket behind removed in pieces. With the extra space now available it may be possible to insert thin levers down behind that flange until outward pressure can be applied as near to the thermostat body as possible. If you are both extremely lucky as well as rich, it may just be possible to disturb that body, which after a lot of manipulation can be pulled out.

If, however, your status in finance and providence matches mine, a great deal more effort will have to be made.

The Calorstat body is inserted through a substantial brass flange, into which the retaining studs are also threaded. The fit is a very close one, and with the passage of time the clearance becomes fouled up. Advice from the Club several years ago was to the effect that butchery, as distinct from surgery, was the only solution.

I therefore first levered up the thermostat flange as far as the studs would allow. I then cut the flange at the stud holes, which allowed me to turn up the flange until it protruded at right angles to the tank. I then tapped the flange towards the centre of the thermostat, i.e. away from the housing flange, with a blunt screwdriver (these should be in everyone's tool kit) because a sharp one would cut through the brass instead of stretching it. The crud eventually cracked away, loosening the thermostat, which grudgingly surrendered.

If you propose doing this work, always remember that the top tank is made of several pieces of stainless metal soft soldered to each other, and to which a fragile and very expensive matrix is also soldered. Brute force and ignorance is not the order of the day.

As light relief I then spent some time fishing through the hole thus exposed in the top tank with a high powered magnet on the end of a wire to remove a quantity of rust flakes from off the top of the radiator core. It was also possible to remove a quantity of non-magnetic material with a strip of stiff plastic which could not be managed through the filler orifice. Only small pot magnets can be inserted through the filler neck, but the Calorstat hole allows for much larger, and hence more powerful, magnets to be used which are strong enough to lift the rust from between the top rows of the honeycomb. Such magnets can be obtained from scrap electricity meters or old car radio speakers etc.

Returning to the old thermostat, the next step is to remove the operating rod, complete with threaded eye on the outer end and a ball end on the other. It is retained in the central sleeve by a threaded insert which has been sweated in!

Before unsweating it with a torch or blowlamp, pierce the coiled copper tube inside to prevent excessive pressure which will build up when it is heated. Fluid, which smells like and which possibly is ether, will run out, and being highly volatile will blaze up when a flame is put to it. If this is done on a clean or wet concrete floor there is no danger from the blaze and, more importantly, there will be no explosion.

When hot enough to run the solder, the insert can be screwed out and, if also kept very hot, excess solder can be cleaned off it so that it will be possible to screw it into the new thermostat.

Clean up the ball end and also make sure that the eye at the other end turns very easily on its threads because once the reassembly has been completed adjustment to the operating length cannot be made on the car.

Smear some high melting point grease on the ball end, insert it into the central sleeve and screw down the insert until all end play has been taken up, and a small resistance to rotation can be felt, which should be no more than is required to turn the eye on the other end without turning the rod as well. I did not have the nerve to sweat that insert to lock it in its final position. Instead, I used thread sealer.

When I went to fit the unit into the top tank I came up against the biggest problem of all — the flange stud holes did not match the fixing studs. The five studs are not spaced equidistant from each other, presumably to ensure that the cover plate will only go on in the correct position. No matter how the thermostat was turned I could not get more than two studs to coincide with holes at any one time. Quite by accident I found that if the thermostat body was arranged to protrude into the engine bay instead of into the tank, it fitted. In other words, the flange of the new thermostat was a mirror image of what I required!

I rang Appleyard with the news and, after a pause, I was informed that they had had several calls over the years to the effect that the Calorstats could not be fitted as supplied. They had informed their customers that the new flanges would have to be altered to fit. They believed, however, that these thermostats would fit some models, but were not sure. Neither am I.

They would not accept that Rolls-Royce, the suppliers, could possibly have made such a mistake as producing a mirror image flange, and as this model is now the only one manufactured I also had to make the modifications.

The easiest way is to fit the thermostat on to the long stud first, with the second stud fitting more or less on the opposite side. The other three positions will be found to be in the angle alongside the other stud holes, where it is easy to cut into the flange from the outer edge with a round needle file. Do not file too deeply because there is only a narrow strip left to provide, with a gasket, a watertight joint.

The remaining reassembly is straightforward, but be sure to adjust the threaded eye so that the spring plunger can be inserted when the shutters are closed. After greasing all moving joints and a final tightening down, coolant can be added and the engine warmed up.

It is such a relief to know that the shutters will now open automatically, and that the days of fingernail breakage when opening them manually are over.

In closing, there have been suggestions in previous issues to use ice from defrosting the fridge for topping up the battery and the radiator. A better way is to either obtain a home dehumidifier or make friends with someone who has one. These appliances produce water up to a gallon a day from a normal household, which could even be used to wash down a cherished car.

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Radiator & Cooling System

RREC, RROC & Misc Articles

instruments

THERMOMETER REPAIR

If you have one of the early Cambridge thermometers on your car, and it needs repairing, send it to Mr G.Huxley, Service Technical Department, S.Smith & Sons, 50 Oxgate Lane, London NW10. They will be pleased to examine any vintage instrument and offer service if at all possible. They can definitely overhaul all instruments of Smiths' manufacture.

REPAIR OF TEMPERATURE GAUGES

My first Royce was (and is) a 1926 'Twenty' and it had a broken temperature gauge, the result of past overheating. The bourdon tube had been stressed beyond recall... Made by Cambridge Instrument Company, Automotive Department, I found this had been long since taken over by Smiths, and of course Smiths had absolutely no parts. Luck favoured me in a local scrap yard, and I secured another, apparently normal gauge: but with its tubing and bulb missing. The problem now was to join a good instrument to a bulb and tubing, and refill the system with suitable gas. Smith's helpfully supplied the information that the material was ordinary anesthetic either (Ethyl Ether), and that so long as the closed system was reasonably full, a true reading would be secured. To this end, the tubing was soldered to the stub of tube left with the gauge, inside a sleeve of copper shim (any sleeving would do), and the problem of filling the system considered. To this end I bored a hole in the end of the bulb, soldered in a one-inch length of fine copper tube, as a teat. I next filled a syringe with ether, and attaching an ordinary hypodermic needle, squirted the ether through the teat into the bulb, until it ran over. The teat was then quickly hammered flat on an anvil, sealing it, and it was cut as short as feasible (about 1/3 inch), and the end sealed with a smear of solder, just to be sure. The reading was tested by placing the bulb in a saucepan of water at the boil: and a reading of 100°C noted with keen satisfaction.

F.H.R.

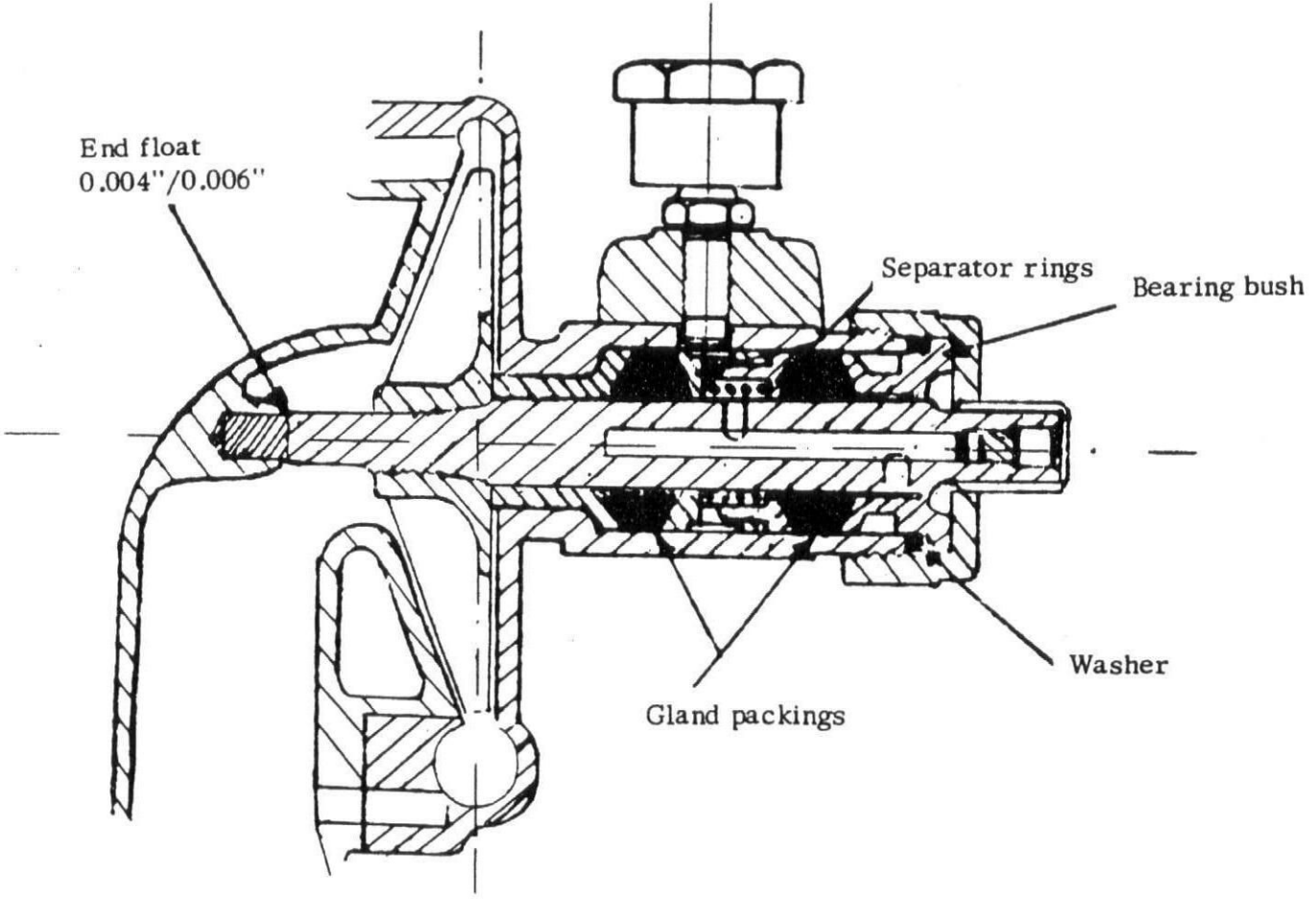
RECONDITIONING A 25/30 WATER PUMP

My water pump had been spraying for some time, so after reading the notes on pumps in Bulletin 42, I decided to have a go at mine. I took the pump off and found, on dismantling, that the vanes of the impeller had been rubbing on the casing and were worn down by about 1/16 inch. The fibre piece for taking up the end-float was intact, but came nowhere near the end of the shaft. This did not tie up with the drawing in Bulletin 42. My shaft finished at the end of the threads, whereas the drawing shows it to be $\frac{1}{2}$inch or so longer. However, I went to Hythe Road to buy some pump gland packing and asked if there was a different shaft for the 25/30 - shorter than the 20/25. After some discussion, we decided that my shaft must have corroded away although the end did not look as if it had, it being perfectly flat and polished. Our friends at Hythe Road finally sold me a new shaft, an impeller, two bearings and a new fibre piece. The price was quite reasonable, I thought, at a total of £5 15s 6d.

The most difficult part of the reconditioning job was removing and replacing the bearing at the impeller end of the shaft. I used a socket spanner as a drift and then had to go and buy a $\frac{1}{2}$inch reamer (25/-) before I could get the shaft in. The rest was reasonably plain sailing, except that I had to use a razor blade on the top edge of the packing to reduce its bulk where the two ends overlapped. It is definitely a job that the average owner can do himself.

Anyone like to buy a $\frac{1}{2}$inch reamer, cheap - 25/-? No, but can I borrow it? Ed.

ROLLS-ROYCE 20/25 HP - SECTIONED WATER PUMP



Note: Pump gland packings should be sufficiently wide when assembled to allow a 0.150 inch thick washer to be fitted after pump has been run and tested for any leaks that may arise.

Overheating - prewar engines

by Peter Wilkins

The long hot summer of 1989 was all very nice, but it played havoc with many of our prewar cars, with overheating on extremely hot days. The cooling system on prewar Rolls-Royce cars is very efficient and is designed to take care of ambient temperatures well into the 90s Fahrenheit and this is controlled by the radiator shutters rather than modern day thermostats. However, considering that the radiator and engine waterways on these are well over fifty years old there is probably a lot of encrusted silt, sludge and furring which restricts the water capacity and flow and although the system is only working to something like 80% of its design capacity it can still take care of normal summer temperatures up to 75 to 80 degrees Fahrenheit. When it begins to creep up into the high 80s and mid-90s, as it often did in 1989, then overheating develops as many of us will know.

It is possible to improve the efficiency of the cooling system and these notes are intended as a guide in carrying out some simple remedial actions at home with the minimum of equipment and just using a little time, patience and logic which can just make that difference between a normal coolant temperature and overheating on a very hot day, or when stuck in a traffic jam or tailback as often happens these days in the summer.

Firstly, it is essential to have some knowledge on how the cooling system works, and there is really no mystery about this. Looking at the diagram (Fig.1) you will see that, when standing on the right hand side of the car looking at the engine, the coolant travels in a clockwise direction, i.e. from the water pump, up through the cylinder block into the cylinder head, then along the head up through the top hose into the radiator header tank and then down through the radiator which acts as a 'heat exchanger' due to cool air passing through the honeycomb. It is then at its coolest when it reaches the bottom and then passes through the bottom hose into the water pump, where it is circulated again. If the temperature gauge in the car shows a higher than normal reading it will mean that the coolant is not circulating fast enough or there is insufficient air passing through the honeycomb or both.

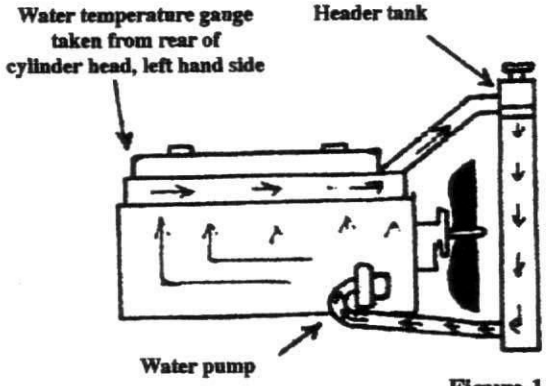


Figure 1

Cleaning and flushing the cooling system

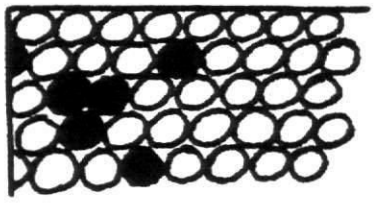
You should choose a fine day for this as the car should stand in the drive rather than in the garage. Place a large plastic washing up bowl under the drain tap and drain off the water; at the same time examine the water as this will give you some idea of the condition of the system by the amount of silt or general sludge etc., as will be noticed when slowly emptying the bowl on the garden - particularly the last few pints, which will clearly show any debris that may be present. Measure the water drained off carefully, as this will indicate the amount of corrosion in the system. If 2 1/2 gallons drained off when the system should have three gallons gives an indication.

Refill the cooling system and apply a proprietary radiator cleaning chemical. The Holts three-part treatment is very good: the first part is a general flushing powder; the second is a chemical cleaning powder; and the third part a neutralising powder. Follow the instructions carefully, and on examining the coolant drained into the bowl you should be able to see the amount of sludge dislodged and the effect the treatment has had. The next step is to remove the top and bottom hoses and thoroughly flush the cylinder head and block through the cylinder head top water outlet and also the radiator itself with a garden hose at full pressure for at least ten minutes each.

Backflush

Replace the bottom water hose only (I find that the red Hermetite makes a good water seal) and place a plastic sheet over the front of the engine, making sure it covers the ignition and the dynamo. Put the garden hose into the cylinder head water outlet and wrap a rag around it and grip tightly with your hand to make as tight a seal as possible and turn on full water pressure. The water will then travel in the reverse direction through the head, cylinder block, water pump and up through the radiator into the header tank and out through the filler hole and top pipe - you will now see the reason for the plastic sheet and your left shoulder will get a soaking too. This reverse flush will dislodge any sludge that might be trapped in any crevices which normal clockwise water flow cannot get at. Now refit the top radiator hose and refill the radiator. I would never recommend flushing agents as they also attack the copper tubes in prewar engines. Also, it is essential to remove the water doors on the block to remove sludge. Personally, I always use paraffin, either neat or one pint added to coolant.

When refilling with coolant do this fairly slowly and do not allow the water to reach the top of the T-piece pipe in the radiator otherwise the coolant will go down the top hose into the cylinder head and this could cause an air lock when meeting coolant coming the other way. The T-piece pipe can be seen inside the radiator just behind the filler cap. With the coolant seemingly static about half way up the header tank, leave for about ten minutes and then



Reflected light at rear will show up blocked honeycomb tubes.
Figure 2

start the engine and run at fast idle until you see coolant coming out of the T-piece pipe, which means that the impeller in the water pump is now forcing it round the engine and cylinder head. Stop the engine and leave for thirty minutes and then top up to the correct level - about two thirds up the header tank.

Cleaning the radiator honeycomb

The purpose of the honeycomb is to allow air through to cool the water in the radiator and it stands to reason that if any of these are blocked with flies and road muck then this can affect the cooling or 'heat exchanging efficiency.' On my 20/25 there are nearly seven thousand honeycomb tubes (yes, I have counted them) and I found nearly 300 of these blocked and they probably had been for many years. It is easy to clean these out but it does require some patience and it can be done in the garage on a winter's day, preferably with a heater and the radio on, playing soft music.

Firstly, open the radiator shutters to their maximum; on the early cars these are manually operated but on later cars these are thermostatically operated and it will be necessary to lift the little locking pin to release the operating linkage. Now lift the left or right hand bonnet and place a white sheet or white paper over the front of the engine. Place a 100 watt bulb in a lead light between the white sheet and radiator core and then look through the radiator core (honeycomb) from the front. It will be immediately evident which honeycomb tubes are blocked due to the back light from the white sheet and you will probably be surprised - especially the tubes near the bottom and those outside the radii of the fan (Fig. 2).

Obtain a thin plastic rod about six inches long and slightly thicker than a matchstick and poke this through the tubes to clear out the muck. Do not use metal rods as these could damage the tubes. Then put the car in the drive and with the shutters still open and a plastic sheet over the front of the engine, direct a high pressure hose from the front into the tubes to thoroughly clean them out. I carried out all this work on my 20/25 last summer with the result that the temperature gauge reading was reduced by three to four degrees centigrade from its usual reading, which represents approximately 6% improvement in cooling efficiency, so if you have hot weather problems it is worth a try.

Leaking honeycomb tubes

Where there is seepage or leakage from any of the tubes, do not despair as these can easily be cured by a simple remedy without having to resort to a radiator rebuild which can cost up to £1000. If it is only a slight leak this can usually be cured by adding 'Barsleak' to the coolant. Remember the water capacity in prewar cars is between 26 and 30 pints, so it might require two bottles, but read the instructions for the capacity treatment. If this does not do the trick there is another more permanent method, but it does require a bit of time and patience.

Firstly warm the engine to running temperature and open the shutters fully. Identify the leaking tube at the back of the radiator. This can sometimes be difficult as water from a leaking tube can run down and spread sideways over a very large area to make it look much worse than it really is. However, thinking logically, the leak should be the tube at the highest point and the end of this should be clearly marked with chalk. Now push a piece of thin wire through until it protrudes out of the front of the tube and again clearly mark with chalk, as it is essential to correctly identify both ends of the tube to be repaired. Drain off the hot water and the residual heat of the honeycomb should quickly dry off the water on the outside of the tubes and the chalk marks made more pronounced with additional chalk front and rear so there is no mistaking which tube it is.

Get a wine bottle cork and cut two strips about half an inch long and the same diameter of the tube, slightly tapered at one end, and push this end into each end of the tube, recessing them about one eighth of an inch (Fig. 3).

Now mix some 'Araldite Rapide' and with the end of a match stick apply this to the one eighth inch recessed area of the tube, filling it completely and butting up against the cork. Then smooth the Araldite with your thumb, making a perfect seal between the end of the tube and the cork, Without the cork you will see it would be difficult to make a perfect seal, and the cork, of course, helps to dry the end of the tube before applying the Araldite. The Araldite sets fairly quickly but it is best left for two or three hours before filling the radiator with water to test the repair. Remember, there are nearly seven thousand honeycomb tubes, so it would bet safe to repair quite a number of tubes this way without impairing the efficiency of the radiator. After the Araldite has set you can paint the ends of the tubes with matt black paint and the repair would hardly be discernible.

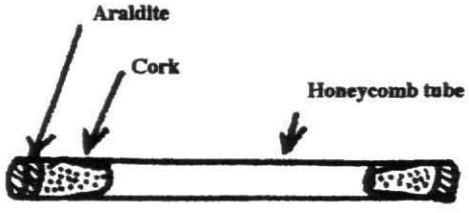


Figure 3

The repair is effective and permanent - I repaired eleven tubes in the radiator of my car by this method when I first had the car ten years ago and they have been no trouble since.

Water pump gland

If the water pump gland is constantly leaking this can also allow air to be drawn in at this point and this could cause an air lock in the cylinder head waterways and consequently a higher than normal temperature at spasmodic periods. New glands are available and should be fitted, and the correct water pump grease (thick like hard soap) should be applied. Remove grease cap, fill with grease and screw right down, preferably with the engine warm. The recommendation is every 2,000 miles, but if the shaft is worn then I would suggest every 500 miles or even less if necessary. The impeller vanes can also wear badly if the end float is incorrect.

Adjusting the radiator shutters

These cars were designed in the twenties and thirties. Petrol nowadays vaporises much better in the combustion chamber, but any excessive engine or under-bonnet heat can cause 'petrol line vapourisation' before it reaches the cylinder head and consequently misfiring and lumpy running can result. A friend recently called with the 20hp Rolls-Royce he had just purchased and complained of misfiring, especially in slow moving traffic. On opening the bonnet the heat from the engine was very apparent and when I asked him what the temperature gauge reading was on the journey he said: "Eighty degrees centigrade, which is according to the handbook." On the road test, sure enough, there was lumpy running, but on opening the manually operated shutters and reducing the temperature to 70 degrees the engine ran smoothly. The temperature was raised and lowered deliberately a number of times and each time the needle went over 75 degrees misfiring occurred, which proved the point beyond doubt,

On the 20/25 and other models the normal temperature is about 70-75 degrees centigrade as they have larger capacity radiators and greater under-bonnet areas, and on a long climb they can happily go to 80 degrees without misfiring as the heat is dissipated much better. On later cars the shutters are controlled automatically by means of a thermostat in the upper radiator header tank. The handbook says they commence to open at 60 degrees centigrade and are fully open at about 90 degrees centigrade, but remember, we are talking about the petrol in the 1930s and with today's it would be more efficient if they commenced opening at about 50 degrees centigrade and were fully open at about 80 degrees centigrade.

It is possible to adjust the shutters to achieve this. With the radiator cold, slacken off the small BA nuts on the lever pivot just behind the radiator header tank on the left hand side, and by moving the lever you will see it is possible to move the shutters to any position, even though the locking pin is still in place. With the shutters in the closed position start the engine, and as soon as the temperature indicates about 50 degrees centigrade on the gauge move the shutter lever to the point where the shutters are just beginning to open - about one eighth of an inch. Now tighten the BA nuts and continue to run the engine at slow tick over, when the temperature of the coolant will continue to rise and the shutters progressively open to the point where they should be fully open between about 75/80 degrees in still air. The setting of the shutters is not critical as it will vary from car to car and, of course, the ambient air temperature but the thing to aim for is to ensure they are fully open so as to prevent overheating and at the point which maintains a normal running temperature. A good road test under all conditions and a little trial and error adjustment as necessary should achieve this.

Finally, when switching the engine off after a journey, it will be noticed that the temperature gauge will rise approximately ten degrees or more, but this is nothing to worry about and is quite normal. This is because when the water pump impeller stops, the coolant becomes 'static' and therefore collects heat from the cylinder block (this is called heat sink) and consequently the temperature rises somewhat. On restarting the engine the coolant starts to circulate again and the gauge will quickly fall back to normal. Sometimes when the engine is idling in slow moving traffic the temperature will rise for the same reason and you may find it beneficial to increase the engine revs on the hand throttle to circulate the water faster and also speed up the fan.

It is hoped you will find these notes useful if your car suffers from hot weather high temperature problems, and with a little patience, spare time and logical thought it might well do the trick. Happy motoring.

(B179/44)

NB This article has been slightly edited to remove the confusion between octane rating and volatility of petrol.- PK.

Cooling fans

The solid cooling fan on early Shadows consumes 28 horsepower and delays warm up. Petrol consumption can be improved by fitting the viscous clutch operating fan from later Shadows. It is a direct replacement. The viscous clutch contains silicone, the viscosity of which determines whether or not the clutch is slipping. To check its operation start the engine from cold, when very little air movement will be felt in your engine compartment. KEEP YOUR HANDS CLEAR OF THE FAN! As the engine warms up the fan clutch will suddenly engage and lots of warm air will be felt. If not, the clutch is not working properly, possibly due to leakage of the silicone. The viscous may fit Clouds and S2 and S3, but I have not yet tried it.

Tony James (B205/50)

Shadow high temperature

If the temperature gauge indicates a high temperature but the engine does not boil, and a replacement thermostat does not help, the gauge or the calibration resistors in its circuit may be faulty. Check first for a bent pointer on the gauge. If air conditioning is fitted, dirt may be lodged between the air conditioning radiator and the engine coolant radiator, which is mounted behind it. To remove it you will have to remove the radiator. Check the pressure release valve (see Tip: 'Water Loss' - this manual page 164). Remove the radiator filler cap and check the water. If it is rusty and the car has lived in a hot climate or in a hard water area then the cooling system contains lime scale. Regular flushing and use of antifreeze for aluminium engines prevents buildup of scale. In extreme cases a new radiator matrix and thorough cleaning of engine waterways is needed. The only way to do this properly is to remove the cylinder liners - ouch!

by Tony James (B205/50)

Radiator Calorstat

If your radiator calorstat fails to open the radiator shutters, a replacement calorstat is available. However, before invoking the expense of a replacement it is worthwhile to lift the knurled locking pin from the eye of the calorstat shaft. Check that the shutters move freely without sticking. Grip each shutter between finger and thumb and check that there is discernible up and down movement. If not, set the shutters fully open and remove the plates at the bottom of the radiator. Each shutter is poised on a ball type pivot. The ball and socket should be clean. Each pivot is bolted to the bottomplate and its height is adjusted by the insertion of a washer above the plate. These washers were selected to achieve free play in the shutter.

The central shaft of the calorstat protrudes through a cast brass plate fixed to the radiator by 2BA studs and nuts. The hole in this plate gives a small clearance to the shaft which can stick. Carefully remove the cast plate - not the calorstat casing which is held in place by a thin brass flange. Clean the shaft and the hole in the cast plate.

With the plate removed and the radiator cold, grip the central shaft of the calorstat with your fingers and pull the shaft axially. If there is resistance the calorstat itself is probably all right. If the shaft moves with little resistance, the calorstat is faulty.

Tony James (B223/74)

20hp radiator shutter cable

I needed a new multistrand 'Bowden' type cable which links the dashboard mounted shutter handle and the radiator shutters. The inner cable for a bicycle rear brake was an exact match.

by Tony James (B207/46)

Paraffin as a coolant

Dave Carpenter of Peacehaven in Sussex, a member with many years of experience, points out the unwisdom of the one time practice of using paraffin instead of water as a coolant and preservative. I can only remember this as a form of anti-freeze, and that was in the ice-age winter of 1940 when there was no anti-freeze to be had. Dave points out that paraffin creeps and finds its way via the bolts through the cylinder head casting from the manifold and into the water jacket. Seeping its way out it reaches the nice hot manifold, stinks to high heaven and can create a lovely fire. Dave also preaches the wisdom of removing the radiator of prewar cars from time to time to up-end them and back-flush with a hosepipe, which removes an incredible amount of scale which tends to settle on the top of the rad. Simple stuff, but often the way to cure apparently terminal overheating

Eric Barrass.. (B177/17)

Water loss

by Tony James

The water cooling system on Silver Clouds, Shadows and the equivalent S and T series Bentleys is under pressure. The simplest way to check that all is well is to run the engine for a few minutes until it is warm. With the engine running, and taking care to avoid the fan, squeeze the water hose from the top of the radiator to the engine. It should be hard and unyielding, in contrast to its pliable state when the engine is cold and stationary. If the hose is easily squeezed, then check for leaks in the water system and related lowering of the water level. Check the filler cap for chips on the surface which abuts the rubber washer on to which it screws. If there is slight loss of water and no leaks are found, check the pressure release valve, sometimes known as the steam valve. On prewar cars, water leaking from the radiator filler cap while on the move is caused by an inoperative or missing steam valve, which is attached to the filler cap. (B203/44)

Hard water

I have read Tony James's interesting comments on rusty water in Mk. VI cooling systems in Bulletin 199 page 43.

I live in a very hard water district and I had to resolve problems with corrosion in prewar Rolls-Royce and Bentley engines. The corrosion and hard water deposits had led to blocked cooling water passages in a 25/30 head and in a Bentley radiator. These were both expensive and time consuming to repair.

In order to prevent a recurrence of the corrosion problems I was advised to purchase and use a laboratory water de-ioniser. I now process all the radiator water through the de-ioniser. This reduces the electrical conductivity of the water to a very low value. Consequently the electrolytic action between the dissimilar metals in the cooling system is reduced to a negligible level, and corrosion seems almost non-existent.

I also use a good anti-freeze because their corrosion inhibitors back-up the corrosion free performance of the de-ionised water.

The equipment to do this cost me less than one tenth of the cost of re-coring the Bentley radiator, and the cooling water stays clear throughout the year.

Nicholas Haran, St. Albans (B201/74)

Water hoses

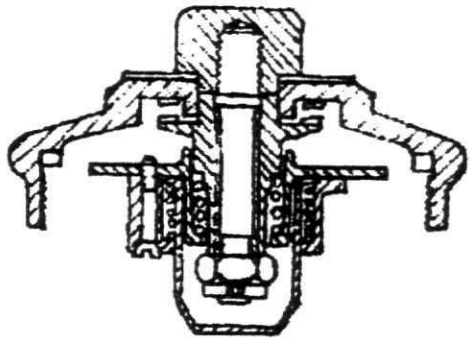
by Tony James

When did you last renew the water hoses? If it was ten years ago, replace all of them, including the heater hoses, unless, that is, you enjoy failing to proceed while enveloped in clouds of steam (B202/43)

Steam Valves

During the rally in Brittany a regular feature was a technical seminar' each afternoon. On the first day a steam valve was presented with the query as to whether it was correctly assembled. When it was announced it was not a veritable forest of steam valves was displayed. All were incorrectly assembled. The accompanying drawing, copied from an original, found with the usual diligence by Peter Baines in the Archives shows in cross section how a steam valve should be assembled. Incorrect assembly can lead to a mysterious loss of coolant.

(B219/63)



Water Pump Woes

by J.R. Utz

John Utz is a former editor and associate editor of The Flying Lady, *a recipient of the President's Trophy, the current editor of* The Lady of the Lakes *(the bulletin of the Iroquois Region), and an engineer. He has restored Rolls-Royces and Bentleys for many years and is particularly partial to the Derby Bentley. However, he does not discriminate...*

Water pumps on pre-war cars are all very similar in design from Silver Ghost to 25/30 and Derby Bentley, and subject to the same ills. The first indication that all is not well is a drip from the packing gland (seal). Tightening the knurled nut surrounding the shaft on pre-1929 cars should stop the leak. If not, sterner measures must be taken. Automatic adjustment began at the last of the 20 HP cars and the beginning of the P-IIs. A spring (S, see drawing) presses the halves of a telescoping center bushing (G, G1) apart to maintain pressure on the packings (F, F1) to adjust for wear. Lubrication of the shaft between it and the packing is effected by periodic filling of the grease cup with grease and screwing it down. This has often been neglected by ignorant or careless previous owners. Lack of lubrication and periods of idleness result in corrosion of the shaft, which in turn ruins the necessary close fit between the shaft and the packing to prevent leaking. The other problem which occurs is corrosion of the end of the pump shaft which protrudes through the impeller and bears endwise on a teflon plug (originally lignum vitae) pressed into the impeller housing. The shaft end rusts away and the impeller, no longer restrained from endwise movement, rubs on the housing, with resultant wearing away of both.

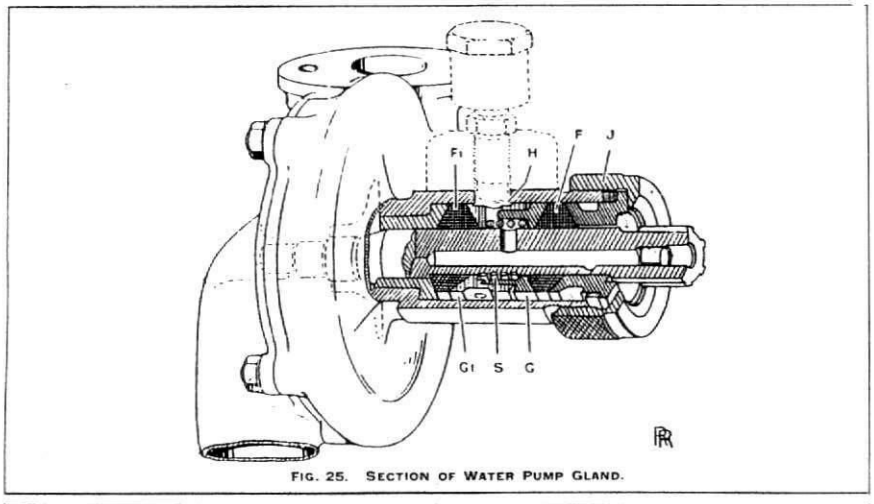
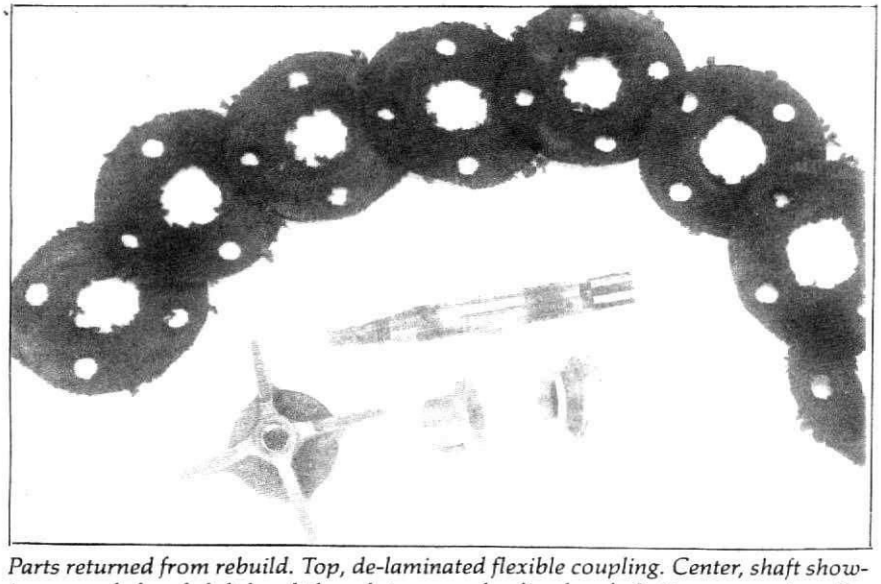


FIG. 25. SECTION OF WATER PUMP GLAND.



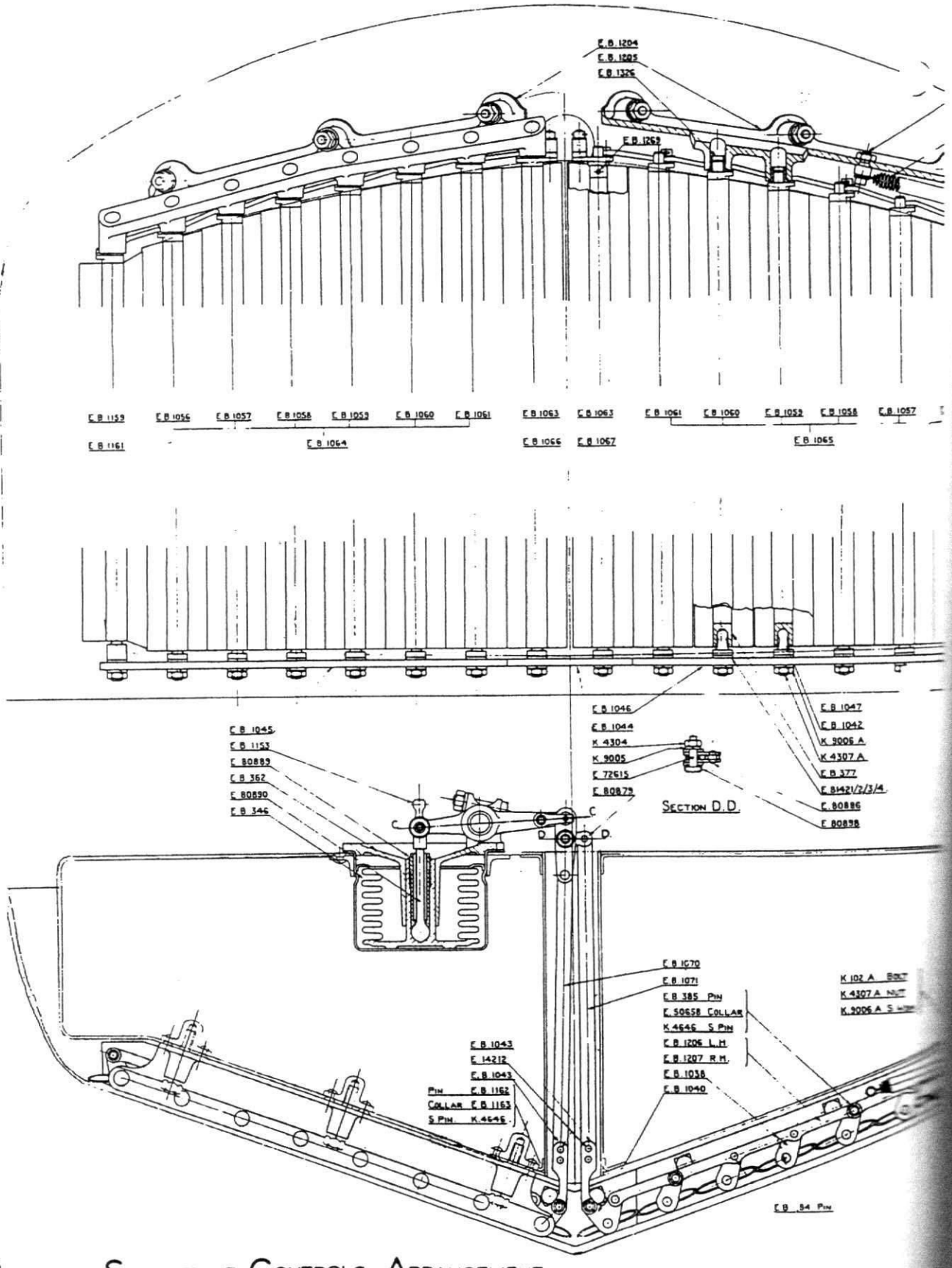
Parts returned from rebuild. Top, de-laminated flexible coupling. Center, shaft showing corroded end, left-hand thread, taper and splined end. Bottom, worn impeller, half of telescoping bushing, and outer bushing. Photo by Ray Miller.

Removal of the pump from the engine is fairly simple. The elbow between the engine block and the pump outlet can be disconnected at either end. It seemed easier to disconnect at the pump end on a 4¼ Bentley. Then remove the casting with the grease cup held on by two studs with nuts. Corrosion between the aluminum casting and the steel studs may indicate the gentle but firm application of a cold chisel between the half-round casting and the engine base. Do not try to disassemble the flexible coupling at this point. The splined end of the pumpshaft can be coaxed out of its place in the coupling by judicious twisting and levering of the pump body. If the flexible washer needs to be replaced, it is easier to disassemble the coupling (with its 4 nasty little cotter pins and castellated nuts) with the pump out of the way.

This last year, not having a toolroom facilities available, I have sent two pumps off for rebuild by professionals. The bill came to somewhat under $250 in both cases. In the one case where the bill was itemized, costs were:

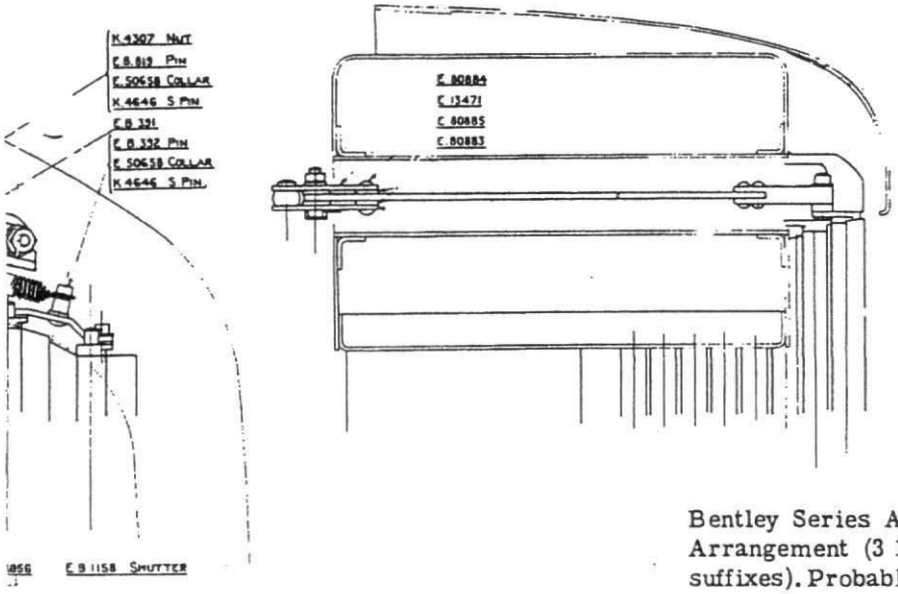
Shaft	$71.90
Outer bush	21.03
Inner bush	18.90
Impeller	63.40
Spacer	1.25
Flexible coupling	13.40
Subtotal	189.88
Labor	50.00
TOTAL	$239.88

Unless you have access to a machine shop with a lathe and a milling machine with a dividing head (plus the expertise to use them) the best recourse is to buy them or have the pump rebuilt by one of several shops which have the parts and competence to do the overhaul. The shaft is especially complicated to machine. It has a spline on one end and a left-hand thread and a taper (which must be a precision fit into the impeller) on the other.

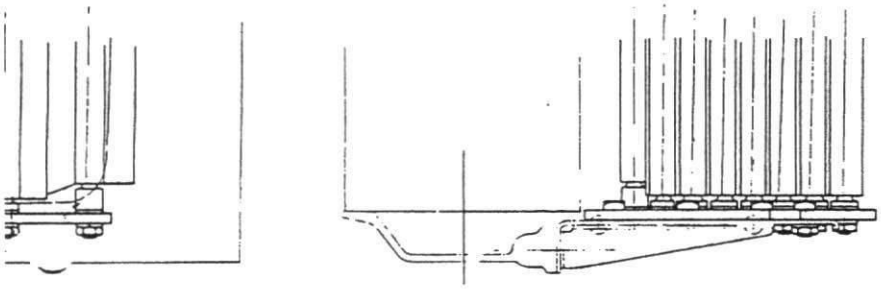


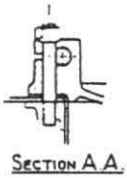
RADIATOR SHUTTERS & CONTROLS ARRANGEMENT.

BENTLEY

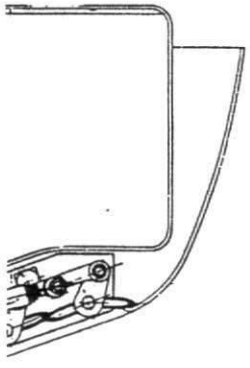


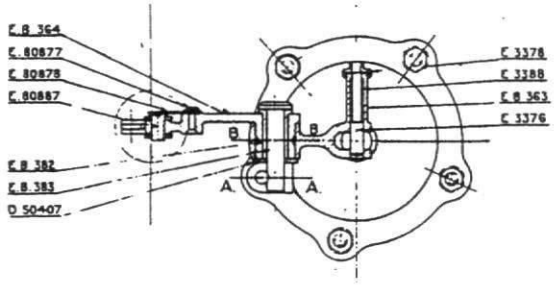
Bentley Series A and B Radiator Shutter and Control Arrangement (3 1/2 l. cars with AE, AH, BL, and BN suffixes). Probably applies in general to contemporary Rolls-Royces. Drawing dated Oct. 10, 1933, courtesy R-R Ltd.





SECTION A A.





SECTION C C.

SECTION B-B