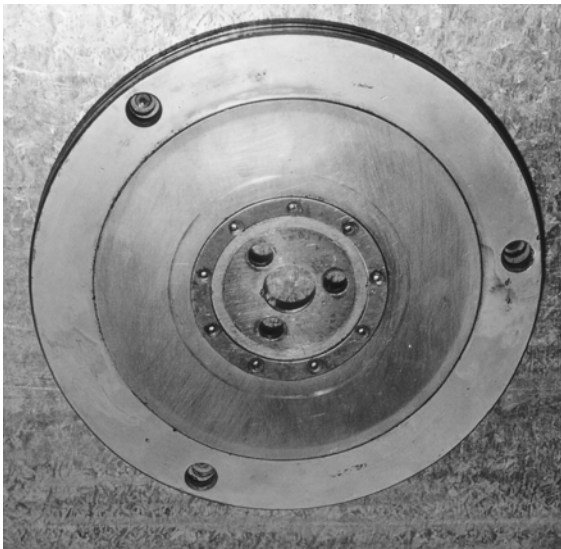


Having got that far it is a nice touch to rub the finished lining down on medium sandpaper on a sheet of glass (best flat surface usually available) to remove the glaze and ensure any distortions induced by the riveting are smoothed out. But before you start putting that plate and associated bits back together it is essential that you ensure that oil is not getting past the seal (#2 in the diagram above). If that occurs you may as well leave the car at home. Replace whatever is there with a double lip seal available at any good seal

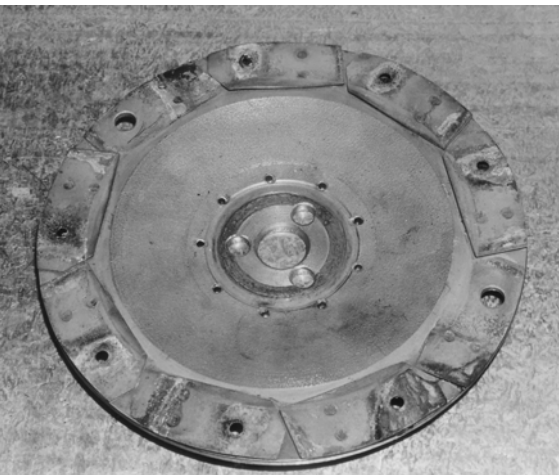


shop and have a good look at the drive shaft. If there is any evidence of scoring either replace it or more practically get a Redi-Sleeve to go over it. That way you should not have any more leakage before the car becomes a basket case. The pic below shows a very faint ring (if the printer reproduces it just to the left of the bearing. This 'score' does not like lip seals and it is here that the leaks occur.

Lastly have a good look at the bronze drive gear (#7 in the above diagram). If it is showing more than superficial wear replace it lest it wears right through and you suddenly find you have no servo action at all.



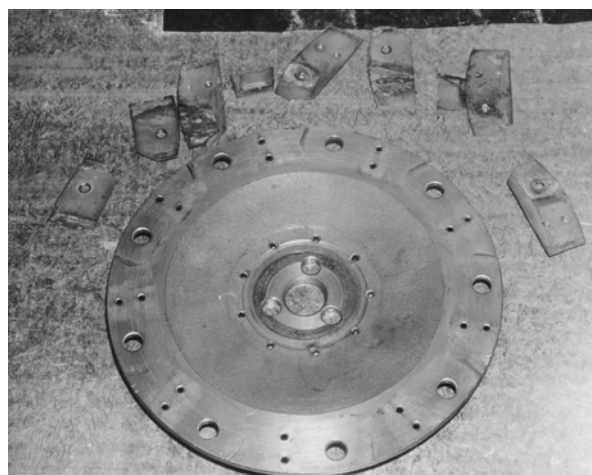
At left is a rear view of the servo drive plate. Around the centre drive pin holes is a ring of rivets. These can be drilled out to reduce the large Bellville washer and release the inertia ring beneath it.



This is the business side of the servo showing the spring plates riveted to the drive plate. These were Dispensed with after the Silver Cloud I (sic) and the lining was riveted direct to the drive plate.



Down to the bare bones. This is the from a Silver Dawn with the spring plates. When riveting the lining be very careful and can easily be cracked.



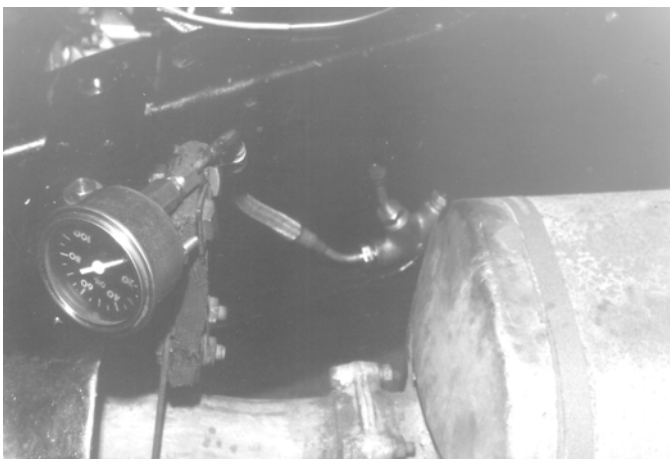
drive plate unriveted. they are brittle

KEEPING YOUR TAIL DOWN

The idea of controlling the ride of your car from the driver's seat is still a feature wondered at by passengers and drivers alike. Our Lexus LX470 has a ride and height control which is not only very effective but obvious as well. The coal face end of the system is the shock damper or as the uneducated such as myself would call it, the shock absorber. How these things stand the hammering they do beats me. The damper as we had better call it, assuaging the sensibilities of some of our more devout devotees, is simply a piston in a cylinder. The top of the cylinder is fastened to the body of the car the piston to the axle. The whole thing is filled with oil. With this set up the damper would be just one solid structure and a ride down even the smoothest road would induce corns where they were not meant to grow.

The 'damping' effect is actually achieved by drilling holes through the piston so that when it moves the oil can pass from one side of the piston to the other. Obviously there is a lot of resistance to this. The smaller the holes the more resistance and vice versa. And so as hard as the wheel may be pushing to ram the axle through the car the damper resists it and allows movement in a more sedate manner. The reverse action applies since having eventually shoved the axle up, the spring which does not favour compression is desperately trying to shove the wheel down. Again the oil has to be pushed through those little holes. And so the damper effect is applied to the wheel when travelling in both directions – hence the term double acting shock absorbers.

T'was not always so. Single acting shock absorbers in the absence of anything else were a great step forward in the infancy of the car in the last century. But back to this one, the size of the holes obviously dictates the type of ride and please, I am being simplistic here. Imagine being able to vary the size of the holes and change the ride. Well only twenty years ago dampers were sold which could be adjusted. All you had to do was crawl under the car, grasp the body of the tubular damper and give it a twist. But this was a little awkward in the middle of Macquarie Street or whilst tearing down Brown Mountain or at 125K on the Hume highway when you suddenly hit a patch of yet-to-be-repaired road!

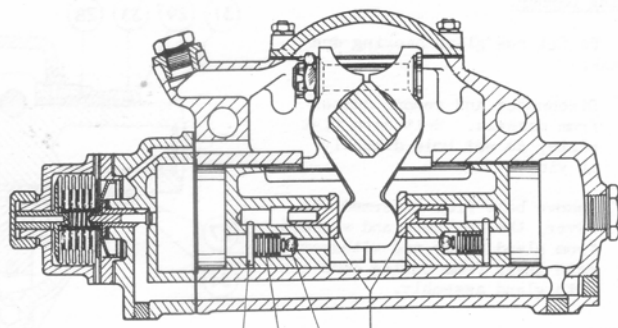


Rolls-Royce many years ago did just this although in a limited way. They changed the size of the holes but only for the rebound stroke. This required something to move and they did it by moving a small plunger in a valve in the rear shock dampers. To move it they initially pushed the plunger hydraulically by pumping oil from the gearbox back to the shock damper. To the left is a glimpse of the line that ran from the pump in the gearbox which was driven by the other end of the brake servo shaft. The brass junction has

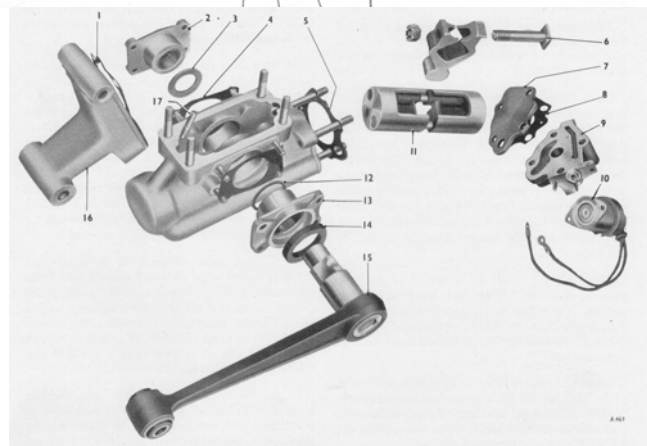
a tapping into which can be screwed a pressure gauge to check the efficiency of the pump. The other quaint procedure one had to follow was to bleed the pressure lines since any air in them could be compressed and the plunger wouldn't be plunged. There was a small bleed screw on the rear dampers that allowed you to do this. It is well to keep an eye on the flexible line from the gearbox to the chassis as these have been known to leak badly enough to drain the gearbox – an event calling for self immolation! The gearbox oil of course did not get into the damper

proper but filled a bellows which pushed the plunger. The effect on the ride particularly if the car was heavily loaded, was to stop the rear leaping up and down on an undulating road. To control the plunger the driver moved a lever in a quadrant on the steering wheel boss. Rabid owners would demonstrate how the setting would make a radical difference to the ride of the car, moving the control one tiny notch one way or another 'See' they would squeal, 'Feel how much firmer that is!'. I who suffered these demonstrations in my younger days finally decided that the effectiveness of the ride control bore a close relationship to the drinking habits of the driver. As far as I know no attempt was made to hydraulically control the front dampers.

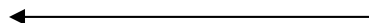
When the Cloud and its derivatives appeared, lo, the hydraulics had disappeared, replaced by a modern solenoid. These contraptions are simply switches that can move things, in this case our plunger. But unlike our hydraulic system which could be varied, the solenoid was either on or off and the ride was either hard or normal. Generally the effect is minimal for any car. With the Cloud however as it was not much trouble to run a wire so the Factory fitted solenoids to the front dampers as well as the rear and that setup was fairly noticeable when switched on. The fitting was certainly not universal but was a feature on a number of Australian delivered cars.



This is a side elevation of the rear damper. The piston in the middle moves back and forth, pushed by the lever in the middle. The oil is forced through valves the adjustable one with bellows is seen on the left hand end.



An 'exploded' view of the same shock absorber this one on a Silver Cloud complete with solenoid (the bits on the right). The actuating shaft seen poking out of the operating arm The long black one, tends to get corroded. As far as I am aware the only way to repair this is to have it metal sprayed and re-finished this gives a perfect surface for the quaint Russian wax and hemp seal to run on. The front shock absorbers are identical in essence, simply different shafting. These must have been the last lever action shock absorbers used on a passenger car.

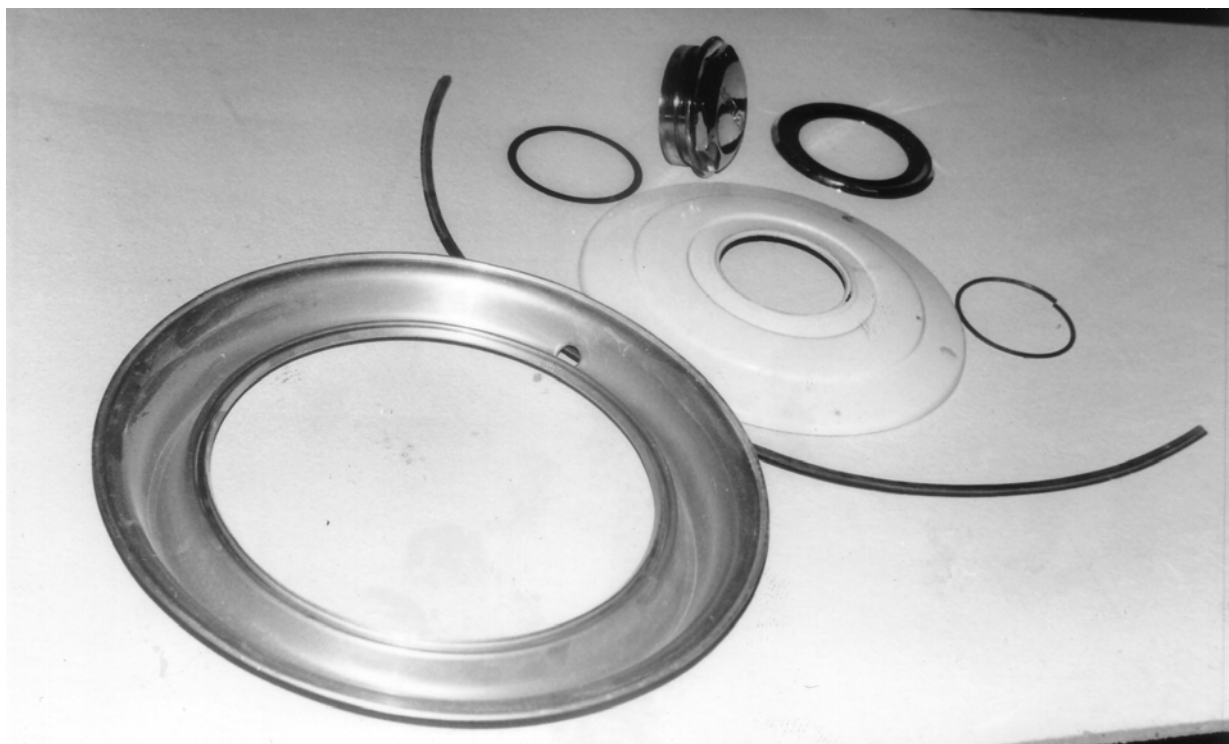


Lucas Electrical Theory

John Kilkenny

A very practical plain speaking site <http://www.bayourovers.com/lucas.html> dealing mainly with Land Rovers presented the following insight sent to us by John. Robert Chapman explained this theory to me some years ago but my mentation couldn't handle it. Now that I have it in writing it is becoming clearer. Perhaps Ken Saunders our resident electrical guru could elaborate!

Positive ground depends upon proper circuit functioning, which is the transmission of negative ions by retention of the visible spectral manifestation known as "smoke". Smoke is the thing that makes electrical circuits work; we know this to be true because every time one lets smoke out of the electrical system, it stops working. This can be verified repeatedly through empirical testing. When for example, the smoke escapes from an electrical component (like, say, a Lucas voltage regulator), it will be observed that the component stops working. The function of the wire harness is to carry smoke from one device to another, when the wire harness "springs a leak" and lets all the smoke out of the system, nothing works afterwards. Starter motors were frowned upon in British motorcycles for some time, largely because they consume large quantities of smoke, requiring very large wires. It has been noted that Lucas components are possibly more prone to electrical leakage than Bosch or generic Japanese electrics. Experts point out that this is because Lucas is British and all things British leak. British engines leak oil, shock absorbers and hydraulic forks and disc brakes leak fluid, British Tyres leak air, and the British defense establishment leaks secrets...so, naturally, British electrics leak smoke. From the basic concept of electrical transmission of energy in the form of smoke, a better understanding of the mysteries of electrical components--especially those of Lucas manufacture--is gained by the casual user.



COVERING THE WHEELS

I am often amazed at the beautifully intricate hubcaps that one sees littering the streets these days. Invariably they are plastic and off modern cars. They do their job, are cheap to produce inexpensive to replace and readily available. Wheel trims as the Factory refers to them, were never of plastic but with few exceptions always very smart. Pre-war spoked wheels were very much in favour presumably to reduce the unsprung weight. They were a swine to clean and needed the attention of one of the more assiduous chauffeurs. One way around this cleaning task was to fit covers to the wheels which were much easier to clean. The above assembly however is the solution for a late 'R' Type Bentley. The outer ring is usually in aluminium and sat on rubber blocks fastened to the main wheel. The strip of rubber shown was pressed into the

ring and the painted section pressed into the rubber. The centre nut seen at the very top of the picture had a fibre washer beneath it to minimise damage to the chrome finish on the mounting ring to its right. The split ring retained the nut. The whole assembly was screwed onto the hub and tightened with a monstrous ring spanner—supplied!



The following paper presented by A J Phillips the designer of the still used vee eight engine found in so many of our cars presented this paper to the Institution of Mechanical Engineers in London at the end of 1961 when the newly powered Silver Wraith II had been in production for a couple of years. The content is rather esoteric but given that we are the inheritors of these amazing contraptions it behoves us to at least be aware of some detail. I apologise for the pictures— they were beyond my scanning abilities

THE DESIGN HISTORY OF A V8 ENGINE

By A. J. Phillips*

The author describes the design of a modern high-quality car engine and gives details of special problems encountered with the use of light alloys, and how they were successfully overcome. The principal engine components are described and illustrated and details of balancing calculations are given in the Appendix.

INTRODUCTION

THE successful evolution of a power unit is a process beginning with the rough project design, through the refinement of detail design and the preparation of detail drawings to the production of hardware upon which development testing and proving can be undertaken.

Opinions differ as to the relative importance of each contributor to the whole but this paper is confined to the design stage where the foundations are laid, for good or ill, of all engineering accomplishments.

A well-defined conception of requirement is essential to enable the designer to survey the many alternative arrangements of essentials in order to discard the impracticable and less desirable of the many variations on the original theme.

The refinement of the project design consumes many hours of concentrated effort by those who have the ability to picture mentally in three dimensions, two-dimensional presentation of ideas on the drawing board, and who in so doing avoid most, though it is to be regretted, not all, the less evident pitfalls of over-complication, difficulties of production and assembly.

The usually conflicting requirements of stylist, production engineer, planner and tool designer must at the same time, as far as possible, be met or reconciled.

It is proposed in this paper to show in as great a detail as space permits, how this refinement was conducted during the design of a V8 petrol engine and the decisions dictating its final form.

THE ASSESSMENT OF THE REQUIREMENT

The requirement was to produce a successor to a 4.9 litre in-line six-cylinder motor car engine which, at that time had almost twenty years of development behind it.

The MS. of this paper was received at the Institution on 22nd December 1961. A report of the meeting, in Derby, at which this paper was presented is on p. 358.

* *Rolls-Royce, Car Division, Crewe.*

Proc Instn Mech Engrs (A.D.)

The new engine was to possess the following characteristics:

- (1) A power potential at least 50 per cent greater than the in-line six.
- (2) No increase in weight.
- (3) As little increase in cost as possible.
- (4) A level of silence, smoothness and reliability at least as high as previously achieved.
- (5) The engine should fit into the same bonnet space as that previously occupied by the in-line six-cylinder unit without resort to styling or structural alterations.

The first requirement dictated a potential cylinder capacity of at least six litres assuming that an increase of 20 per cent in specific power output could be achieved.

The second, that both a more compact design and a much lower specific weight should be attained—this dictated the extensive use of light alloys.

The third demanded close attention to production requirements and the elimination of complicated coring in the main castings, hence wet cylinder liners and co-planar faces whenever possible.

The fourth suggested the arrangement of as many as possible of the auxiliaries—potential noise producers—at the forward end of the engine and a short stiff configuration of engine structure.

As a natural coalescence of the first four requirements and the need for a small bulk/power ratio a vee form of engine was almost inevitable.

The project was therefore an 'all-aluminium' wet lined V8 of approximately 3.8 in. bore, 3.5 in. stroke (giving 5.2 litres but having cylinder spacing large enough to allow an increase in swept volume of up to 6 litres) 7.25/1 compression ratio; the short stroke being dictated as much by bonnet side clearances as the more technical reason of increased crankshaft rigidity.

The employment of the two-plane crankshaft with 90°