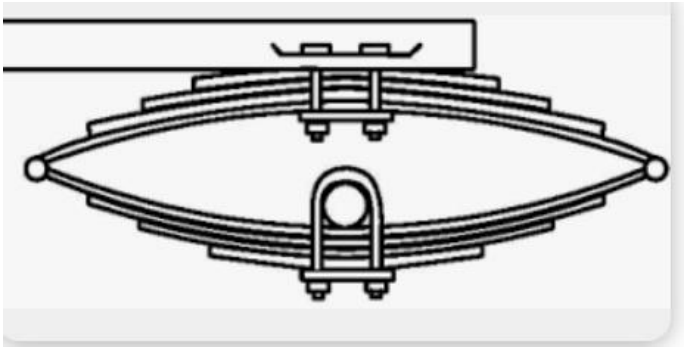
Suspension Shed Night (Pt 1) Eddie Loader

Springs for the first motor cars were often fully elliptic, *see right.* They soon changed to semi-elliptic (see below for the A7 transverse front spring).



The rear springs on the A7 are quarter elliptic, with the rear axle attached to the forged eye at the rear end of the spring (see below).

Originally, the spring leaves had chamfered leaf ends, but these eroded into the leaf below, so, they were changed to having squared-off ends which was also cheaper.

Chamfered leaf ends on a 1927 Chummy, top

Square leaf ends on a Ruby Chassis, bottom

Light commercials and HGVs still use semi-elliptical leaf springs. The longest leaf takes the initial load, and it is progressive as more leaves are affected. However, as the spring flattens it also elongates, and so has to be attached to the frame by at least one shackle to accommodate the change in length.

Shackle on A7. Note grease nipples on each pin

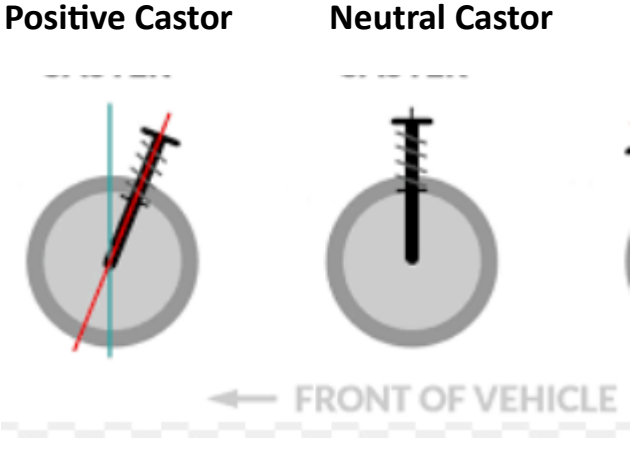
If the A7 front axle shackle pins and bronze bushes are badly worn, the car sometimes judders in reverse, but often without any noticeable adverse effect when going forwards.

The rear spring of the A7 does not have a mechanism to compensate for the change in length, and therefore causes the rear axle to move slightly backwards as the spring is compressed, similarly, as the load is reduced on the opposite spring, it will tend to contract for example during body roll when cornering. This effectively results in a small amount of rear wheel steering; i.e. in a left hand corner, the rear off-side spring elongates, the rear near-side spring contracts and the rear axle steers to the left (further into the corner). Which explains why Austin Sevens have a natural tendency to 'oversteer'. Of course, if both rear springs are simultaneously compressed when going over a bump for example, then the slight fore & aft backward movement of the whole back axle is accommodated by the torque-tube ball joint and its flexible chassis mounting, together with either the sliding propshaft spline on later cars or the flexible drive disc on early Sevens.

Interestingly, the flatter rear springs found on the later 'low chassis' Austin Sevens are less prone to 'rear axle steering'.

The after-market "Nobby" coil springs *(left)* were sometimes added to the rear axle of some A7s, but are of limited value, as they do not have dampers, and can sometimes cause damage to the floor of the car [Ed: I have now removed the ones on my chummy].

The castor angle is the slight forward rake (at the bottom of the king pin) seen when viewed from the side. Original Austin factory data suggest Austin Sevens should have 5 degrees of castor but 3 degrees is often quoted as satisfactory.



Eddie assures us that the front spring can go slightly flat without too much adverse effect on castor angle, although it will be slightly reduced, perhaps making steering lighter and harder to control, particularly on rough surfaces such as cobbles. However, if the rear springs go flat, then the castor angle of the front

wheels will be slightly increased, which can lead to heavier steering. It should be noted that even an extreme spring flattening of 2 inches will only affect castor angle by 1.5 degrees on a short chassis A7.

The lighter radius arms of pre Semi-Girling Sevens can be twisted if necessary to achieve some adjustment of castor angle. Although, they have a tendency to twist back in service unless an appropriate wedge is inserted between the chassis nose piece and the top of the spring. Also, the front radius arm spigot should ideally be 'pinned' into the axle and the securing nut needs to be tightened very firmly.

Suspension Maintenance: The shackles of the A7 front spring have one grease nipple for each pin. These must be regularly greased as they have a lot of work to do. The springs themselves should be cleaned with a wire brush, and thin grease applied [I used ACF-50, which is in an aerosol], which will work its way in between the leaves. It is possible, but not essential, to buy a leaf separator, which can even have a grease nipple to help get grease in between the leaves. Simply jacking-up the body will, of course, cause some separation of the spring leaves.