Building an Austin Seven Special – Part 1

Introduction

During the summer of 2019, I mentioned to a friend, that having recently finished re-building a 1928 Chummy - I seemed to be left with a huge collection of spare A7 parts; in-fact almost enough to build another car except that unfortunately, I didn't have a chassis. This very generous friend said 'don't worry, I have a chassis that you can use' and that's how this project started.

The chassis had spent its former life in a 1938 Pearl Cabriolet and turned-out to be in remarkably good condition despite its age. Some very minor surface pitting was evident on the rear extensions but the main chassis rails looked as good as new. There was more good news - it came complete with a bona-fide V5 Registration document and the period registration - 381 UXH. Wonderful, but I can't help thinking UXB would have been even better!

It was necessary to make room in the garage for the new project and this was achieved by re-housing the garden tractor in its own bespoke new shelter at the end of the garden. Actually, an enjoyable weekend project in its own right and greatly assisted by visiting family, who I am sure, really appreciated being put to work. I recall that Heather became suspicious at this point and wanted to know why the tractor suddenly needed a new home. Her suspicions grew further when she noticed an unusual metal A-frame and evidence of major tidying and cleaning in the garage. I was feeling slightly nervous about telling her what was going-on but I needn't have worried, my friend (the chassis donor) told her straight ….. 'he's building another car you know'. Charming!

Tractor shelter

Next, it was time to decide what sort of A7 to build. My interests centre largely on the mechanical side of things and thrashing around the countryside in open-top Sevens but (to the obvious disapproval of some) I have no strong interest in preserving absolute originality. It was therefore easy to decide that I should build a Special. My motoring 'career' started with an A7 Special that I built at the age of seventeen. I can remember preparing the preliminary sketches whilst still at school and the end-product provided daily transport for a number of years. So, it seems as if I'm destined to end my motoring days much as they started.

At this stage, I had no clear idea what shape the car might take but liked the idea of: a cut-down A7 Box saloon radiator shell (much cheaper than the more desirable Chummy type), a nice low frontal area to assist performance and I've always fancied aero-screens. Finally, an aluminium body – really low (to wind-up Graham Honnor) with single curvature panels to make construction easy, no doors and a laden ground clearance of around six inches to ensure the car was suitable for road use.

My various A7s over many years, have all enjoyed hydraulic brakes and I wanted to carry-on this tradition. If you are happy to toddle around at 'Granny' speeds, I am sure Austin cable brakes are fine but I am a great believer in being able to stop from sixty mph or more really quickly when necessary.

Chassis, axles & suspension

By early August 2019, the chassis was thoroughly cleaned, degreased, primed, painted in satin black (they say 'sporting girls have black underwear') and sat on axle stands in an unusually clean, tidy garage.

Source of suspension items

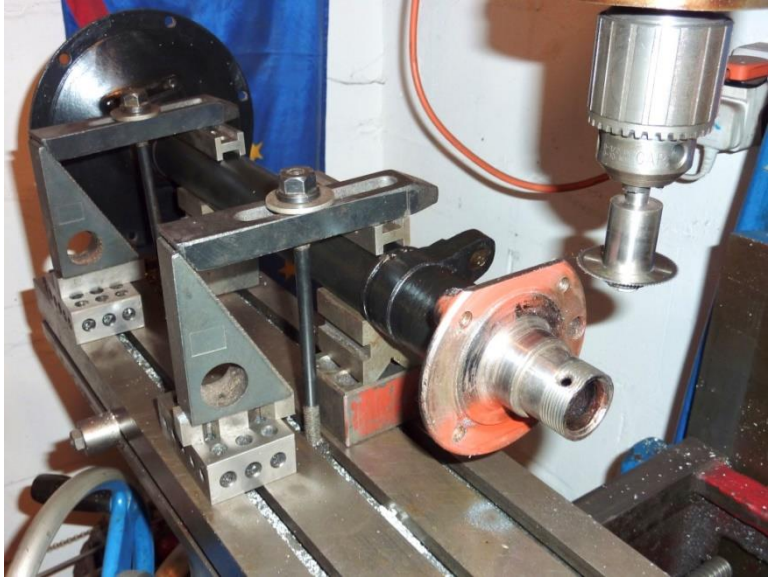
I was delighted to find a Bowden twin-spring independent front suspension (the wide version), a pair of flat 'Softride' rear springs and four Bowden steel hydraulic brake backplates – although, all these items were terribly scruffy (see photo). The seller mentioned something about 'one careful owner' but it didn't look like it. However, after carefully dismantling, grit blasting and painting everything – the parts appeared perfectly serviceable. So, they were reassembled and attached to the chassis along with a pair of Semi-Girling front stub axles and beautifully fitting king-pins from the spares box that seemed as good as new.

The Bowden front suspension came with a correct 'two-ball' chassis plate for the radius arms - in good condition. So, this was cleaned-up and bolted to the front chassis crossmember at the same height as the removed Austin 'single ball' item. A pair of early radius arms was also included and although they were usefully boxed-in for use with hydraulic brakes – they were not serviceable, being extremely corroded and badly bent. Fortunately, I had a pair of excellent late Semi Girling arms that fitted perfectly - once the top secondary mountings had been cut-off. Cue for the purists to wince!

I carefully examined my spare engine and found it to be in excellent condition with plenty of compression despite having done several thousand hard-pressed miles in addition to a 2,300 - mile trip to Austria and back in 2017. So, I installed the engine in the chassis and clamped a steering column roughly in position - really just to make it look as if some progress was being made.

Well - it's a start

The engine nose-cone was shortened to allow room for an electric cooling fan and a much lower radiator. It would also leave room for a drive belt to an alternator, if mounted it on the off-side. The nose-cone was blanked-off with an aluminium plate secured with sealant and an array of CSK 6BA setscrews. Incidentally, I had already decided that this would be my first twelve-volt Austin Seven.



Machining an axle case to take hydraulic brakes

My spare back axle was retrieved from a dark corner of the workshop and being of the early Ruby variety, needed its outer ends machined to accommodate the rear hydraulic backplates. This was a very simple exercise – see photo. The axle cases were secured in-turn on the vertical mill table and the offending metal removed with a small HSS circular saw held on a mandrel in the chuck. Yes, I know the photo shows a drill chuck. Definitely not the right thing but OK for light, non-precision work and very easy to use. It worked fine.

Two symmetrical flats were cut at the outer end of each axle casing, removing just enough material for the backplates to fit snugly in position at the required angle.

The rear axle was then re-assembled and the crown-wheel/pinion meshing carefully adjusted. There are numerous articles telling us how to do this but none individually seemed to clearly explain absolutely everything. Nevertheless, by combining elements of advice from different sources, and numerous iterations of: marking, assembly, rotating (both ways) and dismantling for inspection - the job was eventually completed satisfactorily. As a point of interest, I use slightly thinned 'Humbrol' model enamel paint for marking the teeth, which works rather well.

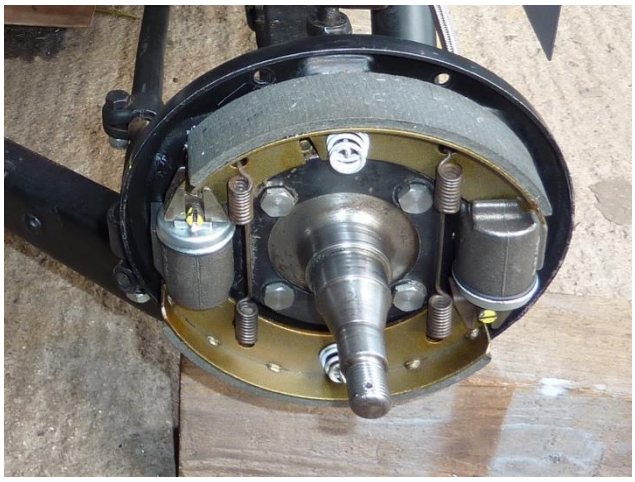
The left-hand photo above shows the nice clean shims ready to adjust fore & aft position of the pinion. The centre photo shows the tooth marking getting close to what is required. In my experience, the markings rarely look exactly the same as those shown in the textbooks but for an A7, the contact area needs to be somewhat towards the rear (small end) of the pinion and half way between the root and tip of the teeth. The right-hand photo shows a simple indicator arm attached to the drive pinion to read against a fixed index (temporarily secured beneath the grease nipple) to help set the backlash to one sixteenth of an inch at a radius of seven inches.

This is not in any way meant to be a definitive treatise on back axle adjustment – but it might be enough to whet the reader's appetite to have a go? One other point perhaps worth mentioning, is the pre-load on the differential bearings, where some authors simply say it should be set at 2 to 4 thou', but omit to say how this might be achieved, others that they should be 'tight' and some say 'just touching'. Well, the crown-wheel adjusters have 14 teeth and their threads are 20 tpi, so, simple arithmetic informs us that tightening each adjuster half-a-tooth (from initial contact) will provide a pre-load of 3.6 thou without altering the meshing. Job done!

Brakes

The backplates I sourced were modified early Morris Minor ones, commonly supplied in the fifties and sixties by Bowden Engineering of Ottery-St-Mary in Devon. Amazingly, they still occasionally come-up for sale in useable condition. Incidentally, I dealt with this firm whilst living in Devon about fifteen years ago which was by then, managed by Keith Bowden's son; who told me he tries very hard to keep his dad out of the workshop and away from customers – because, all he wanted to do was talk about building specials in the good-old-days. I thought he was really interesting!

Front (twin leading shoe) hydraulic backplate



Front off-side brake assembly

The backplates were fabricated from those fitted to early seven-inch Morris Minor brakes. They had their centres cut-out and a recessed steel plate welded in position, so that, when fitted with MM slave cylinders and springs etc - the shoes would correctly align with A7 brake drums running on A7 hubs. When modified in this way, they can be fitted directly to A7 Semi-Girling rear and front stub, axles - otherwise the axles have to be modified as described earlier.

With the backplates spruced-up and painted to look like new, they were attached to the axles and fitted with new cylinders, shoes, pull-off (and bee-hive) springs together with perfectly serviceable 'snail' cam adjusters & masks from the spares box. I also found four Semi-Girling cast iron brake drums in excellent condition that just needed to be drilled to give access to the brake adjusters. I have heard that some people drill a hole in the backplate and reverse the adjusters to avoid drilling the drum but I believe this could make adjustment rather difficult. Incidentally, it's not desperately easy doing it through the drum - so, I paint a line on the outside of the backplate to indicate the angular position of the adjuster. I also put a blob of light-coloured paint on the front of the snail adjuster pin, which enables it to be seen with a torch (through the hole in the drum) making it much easier to engage a screwdriver when adjusting the brakes.

Wheels and Hubs

The spares box yielded four hubs that were dismantled, cleaned and inspected. All were found to have good bearings, flat mating faces and sound wheel studs, so, after replacing the old felt seals with modern 'spring lip' types, they were greased and fitted to the axles with new paper gaskets & a thin smear of Blue Hylomar.

The back-axle ratio is 5.25:1 so, I decided on 15-inch wheels all round and managed to source some at a good price, probably because it's the sixteen-inch wheels that are favoured by VSCC types. With 135 section tyres on 15-inch wheels, the top speed would only be 70 mph assuming the engine could peak at 5,500 revs in top gear which is a bit fanciful without a strong tail-wind …. but the acceleration should be good.

At this stage it became clear that the rear 'Softride' springs were exactly that. The rear end was therefore beefed-up by the addition of a pair of motorcycle spring-dampers set at around 60° from the horizontal. This arrangement had been previously employed with some success on an RN saloon. The damping will almost certainly be fine but if the springing is too stiff – I shall have to either find some softer springs or reduce the mounting angle.

I had the wheels grit blasted by Steve Jones near Builth Wells (excellent job) and promptly applied primer and a silvery grey top coat (actually Toyota Decuma grey) & I'm very pleased with the result. I found four virtually unused tyres at the Welland Steam Rally that came at a very attractive price – the seller was asking £20 each which I told him was ridiculous and they came home for just over £10 each. Brian Wooster was very proud of me! Apparently, the tyres were from a 2CV that met an untimely end and I just hope the crash was nothing to do with the tyres!

To be continued …… Bob G

Building an Austin Seven Special - Part 2

Fuel tank

I had a Ruby fuel tank in good condition but the simple bodywork I had-in-mind would not accommodate the filler tube in its normal position. I'm terrified of welding petrol tanks but a friend who has experience of such work, kindly removed the filler and replaced it with a patch – then welded a new filler tube into the top of the tank – exactly where required. This was topped-off with a rather nifty, ex Triumph Spitfire flip-top filler cap that I found lurking at Beaulieu.

The Chummy gains a new friend

The tank gauge sender seemed in good order and was retained. Although I planned to adopt a 12-volt system, I discovered a small electronic device that sits in the circuit enabling a six-volt A7 gauge to be used. This was important because I had several spare gauges in my goody box.

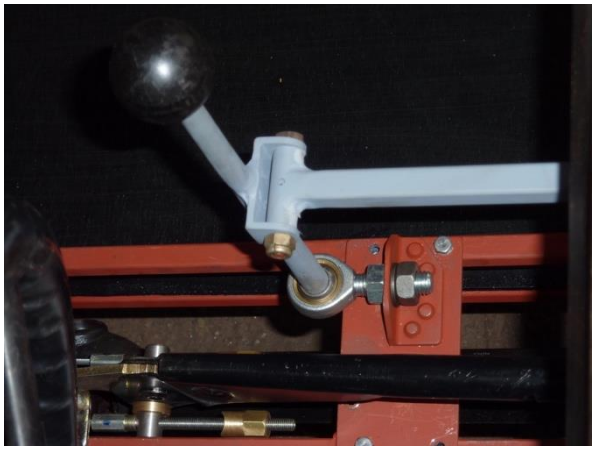
Gearbox & prop-shaft

The gearbox is a late Ruby four-speed unit with synchromesh on 2nd, 3rd and 4th that has been converted (by Vince Leek) to 'Close Ratio' by replacing the A7 standard 20:32 tooth constant mesh gears with 22:29 tooth gears. This changes the ratio from 1.6 to 1.32 and can reasonably be described as an 'intermediate close ratio' set-up. It is perhaps interesting to compare these ratios with the Austin 4-speed sports box (e.g. Nippy) which is 1.43 and the 'Super Accessories' (racing) version of 1.22. Incidentally, I have used this gearbox in a variety of different road going Sevens and in my view it's probably the single most effective way of improving an A7 driving experience - next to hydraulic brakes that is. The standard four-speed box has an enormous gap between 3rd & 4th and first seems unnecessarily low. Sorry, but I have very little experience of 3-speed gearboxes – apart from removing and selling them!

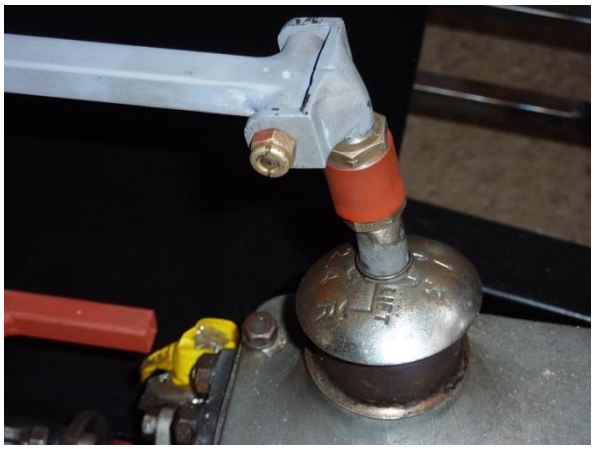
Austin Sevens enjoyed a variety of different prop-shafts during their production life but I have a strong preference for the later full Hardy Spicer version. Again, I found an excellent example in the spares corner that had no discernible play either on the sliding spline or the HS needle bearings.

To keep the scuttle height nice and low, a remote gear-change mechanism was required and the simple design can be seen in the following photos. However, to select reverse, it is necessary to reach forward, lift the fore & aft shaft and pull backwards. This arrangement, although slightly inconvenient - was used on my previous special and as far as I can remember (from 55 years ago!) – it worked well enough. Subsequently it was discovered that selecting reverse proved more difficult than expected. So, a lever was attached to the gear stick that lifts the gearbox arm via a simple bicycle brake cable and suitable brackets. Happily, all gears can now be selected with ease.

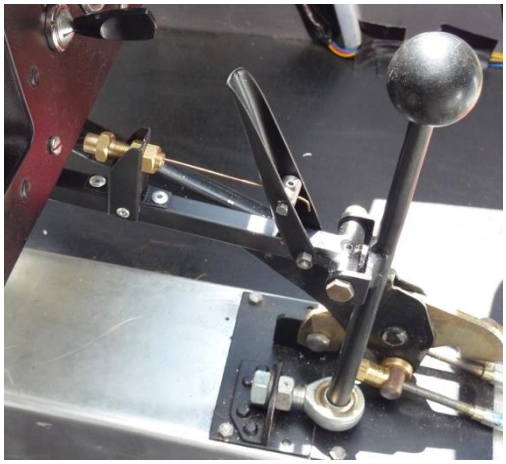
The gearbox selector arm incorporates a joining collar (threaded ½" BSF) because I forgot to put the gearbox attachment items on the shaft before welding. Clearly, I neglected the famous six Ps.



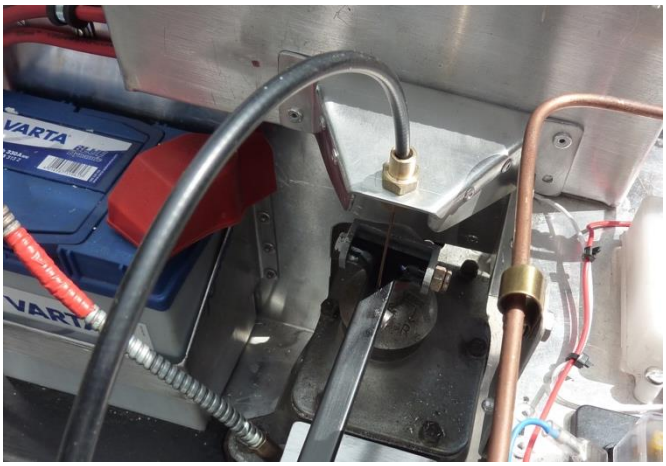
Remote gear change V1 - driver's end



Remote gear change - Gearbox end V1



Gear change V2



V2 - Reverse lift cable above the gearbox

Specials often have a prop-shaft tunnel comprising a simple curved sheet of aluminium which might be fine for keeping mud off your legs but I wanted a strong mounting for the gear and hand-brake levers. So, I fabricated a tubular steel subframe from (mostly) 12 mm square 18-gauge MS tube and this proved to be very rigid and not too heavy.

Prop-shaft tunnel sub-frame

..... and now with its aluminium skin

Access to the torque tube grease nipple was initially provided via an aluminium plate fixed in the top of the tunnel with six self-tapping screws. Then I realised that the plastic flip-top from a giant-size tube of Smarties would 'fit the bill' brilliantly. Sweet result!

Handbrake

A Classic Mini handbrake lever was mounted close to the gear-stick and operates the rear cylinder levers via a pair of shortened Morris Minor cables. The cables were shortened by applying silver

'solder' where the inner cables were to be cut (otherwise they fray terribly), then after cutting to the required length with a Dremel disc cutter - a simply turned-up replacement steel nipple was silver 'soldered' on the outer end.

Radiator and surround

The radiator surround was formed by cutting-down an old and very tatty example from a box saloon but how much should it be shortened? Well, I placed the un-cut shell at the front of the chassis so that its bottom edge gave just a little more than the required six inches of ground clearance and judged how far the top could be lowered to give a bonnet line that just cleared the engine and header tank. It turned-out that I was able shorten the shell by three inches. I originally planned to have an old A7 radiator re-cored but the estimated cost was about £250. Then, quite by chance, I noticed a brand-new alloy radiator (actually for a Honda Civic) advertised on E-bay at around £65 and it came complete with an electric cooling fan. Unusually, the listing included detailed dimensions and it happened to be exactly the right size - it even had the required 32 mm inlet and outlet pipes in the right positions.

Steering column

A late Ruby steering column in very good condition was obtained, adjusted and attached to the chassis by a very rigid fabricated mild steel bracket, designed to give the required rake and steering wheel position.

A drag-link came with the front suspension items that had already been modified to suit the wide Bowden unit. The spares box provided a pair of excellent end caps and the assembly was treated to new ball pins, cups and springs etc.

Steering box bracket

Body frame

The chassis is from a late A7 and therefore reasonably strong compared to earlier versions, so, I decided not to box-in the side members, in order to keep the car as light as possible. I may of course regret this decision but the car is intended simply for road use rather than the track. My previous special initially had an unboxed 1936 chassis but had 'boxing' plates added at a later stage of its life but I remember being disappointed that it made little difference to the handling.

The body frame is exactly that - and is in no way intended to be a proper 'spaceframe', although, when fully panelled, it might perhaps add a little extra stiffness to the chassis. The frame was built from 12 mm and 16 mm 18-gauge (1.22 mm) square MS tubing and was largely 'designed' as I went along – keeping to: simple lines, single curvature panels and making the scuttle as low as practicable. All joints were gas welded to give slightly less-brittle joints than MIG (or so I am told) – anyway I don't possess a MIG welder.

I wanted the exhaust to run down the outside of the body, and a suitable manifold was discovered at Beaulieu. With this magnificent four branch affair temporarily mounted in position - the near-side of the body frame was shaped to give suitable clearances.

I decided the scuttle should be only just long enough (fore and aft) to support the Aero Screens, thus leaving a lovely long bonnet opening to maximise access to the engine, gearbox, instruments and wiring etc.

Early stage of body frame

Later stage – now with floor

Bending square tube

I needed moderately tight radius bends in square tube for the top corners of the scuttle and top and bottom corners of the rear panel but was unsure how this might be achieved.

Then, I hit on the idea of making a series of equally spaced saw-cuts (almost through) as shown in the photo. This made the tube really floppy and very easy to bent by hand. An increasing number of cuts were made, until the desired angle was achieved. The bends were then clamped in a jig to maintain the required 90° angle and all the cuts – cleaned, fluxed and brazed together using SIF Bronze. This process seemed to work perfectly well and a test piece proved to be just as strong as the parent tube.

Everything went really well - the frame looked fine and fitted perfectly. The only slight problem was that I discovered I couldn't actually get into the car! This was overcome by replacing the A7 15" diameter steering wheel with a cheap & cheerful 13" alloy specimen (from ebay) and replacing the straight rail behind the seats with one that was curved to give a little more room for both the driver and passenger. Getting in and out of the car was now achievable – and would of course be even easier if I could lose weight and get fitter.

Fitting the steering wheel was an interesting process. The 'new' wheel fortunately came with a detachable boss that contained a small hole for the column which was carefully opened-out in the lathe to exactly match the inner diameter of the splines on the Austin column. It then looked like a case of having to index the work piece appropriately and broach a set of matching splines – something I had never done before. However, I found the remains of a bent steering column that had been damaged some years previously during an accident in France (don't ask); so, the top male spline was cut-off and machined to give very sharp 'cutting edges' to the splines. This was then used as a press tool with plenty of WD40 lubricant (which seems to work well when 'machining' aluminium) and hey-presto - a set of beautifully formed, matching female splines was created in the hub and it fitted the column perfectly.

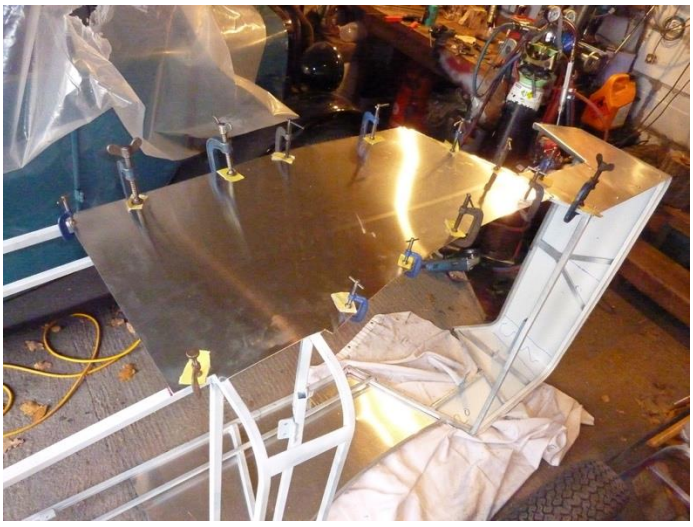
Proud owner of a virtually complete body frame

To be continued …… Bob G

Building an Austin Seven Special - Part 3

Body panels

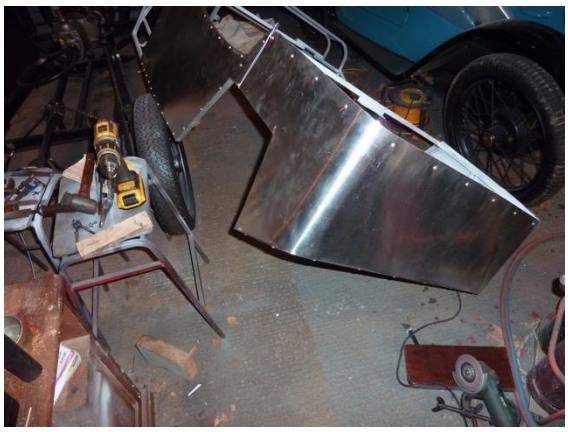
The majority of the frame was covered with 1.0 mm thick aluminium, fixed temporarily with stainless steel self-tapping screws, in-case I cocked things up and the panels needed to be removed. The self-tappers would later be removed for final fixing with 4 mm pop rivets at more frequent intervals. The scuttle needed to be a little stronger to support the aero-screens so, was formed with thicker - 1.5 mm aluminium.



Panel fitting

0.9 mm thick aluminium is easy to bend to single curvature shapes and starting from the back of the car – I clamped deliberately oversized panels in position and marked where each edge should be cut to give the required 'wrap'.

After cutting to size, the panels were repositioned, clamped and attached to the frame with self-tappers before 'dressing' the edges into place.



First panels in position

Frame and first panels on chassis

An earlier photo showed a nicely chromed Box type radiator surround, but I can reassure the reader that it was not the one that was carved-up. The one I used (see photo above), was a particularly scruffy example that I cut-down by removing three inches (at about mid height), then re-joined by riveting and then brazing a suitably shaped brass reinforcing plate inside each side. Numerous other splits and holes were also repaired before the shell was filled, primed and painted. The assembly was topped with a delightful 'dummy' brass filler cap that had been languishing in my odds-&-sods box for many years. Finally, a sheet of 'diamond' pattern expanded metal mesh was fitted to help protect the radiator.

The bonnet was made from a single sheet of 1.5mm aluminium and although it looks a fairly simple shape, it turned-out to be more difficult than I expected. The radii of the top corners at the front and back are different and bending it by hand over various sized pipes, left it a poor fit. By good fortune, I happened to have a telephone conversation with Rod Yates (yes, he of excellent Ulster

style bodies fame) to discuss the possibility of him making some rear wings. Our conversation turned to forming curves in bonnets and he kindly explained how he achieves this - by having a scaffold pole mounted securely just clear of a larger pipe. Having marked where the required curves begin and end, he then enters the bonnet panel between the pole and pipe and carefully (and skilfully in his case) pulls the panel by hand, moving it a bit at a time working slowly outwards from the centre of the curve, first one half of the curve then the other.

Every home should have a panel bending jig

This advice came rather late for me but I did cobble-together a poor imitation of the bending jig Rod had described. Mine comprised of a length of 4" x 2" rounded edge timber mounted just clear of the top rail of our garden gate. Although this was a decidedly 'Heath Robinson' affair, it did enable me to improve my previous efforts. The bonnet never became a brilliant fit but I decided it would have to do. Finally, a cut-out was made to accommodate the protruding carburettor and four delightfully simple spring catches installed to hold the bonnet firmly in position.

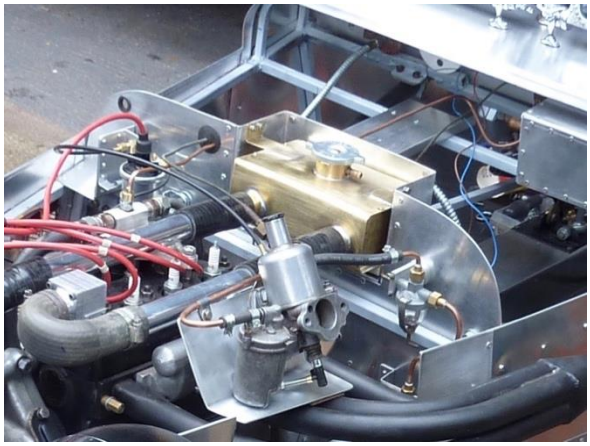
Engine compartment vent in side panel

I have always admired Specials with bonnets adorned with neat rows of louvres, so, I considered the possibility of making a press and obtaining suitable dies and having a go myself. However, the cost and required intellect were both more than I could muster, so, elected instead, to install mesh-covered vents each side of the car. If this subsequently proves inadequate and the engine compartment overheats, I will re-visit the possibility of having some bonnet louvres professionally formed.

Bulkhead

The bulk-head between the engine and passenger compartments is a little complicated. So, I started by cutting and fitting a series of cardboard templates before using them to mark-out and then attack the precious 2 mm thick aluminium. The bulkhead was eventually formed by joining two main components in-situ with pop-rivets and then firmly attaching the whole thing to the floor and body frame. Finally, cuts were made to accommodate the foot pedals, steering column, coolant header tank and provide numerous holes for wiring and pipework grommets. Simple 'strap' style brackets were also fitted for holding the battery at the front of the passenger foot-well and the SU electric fuel pump in the engine compartment.

Cardboard bulkhead template in position



Bulkhead complete

A stout bulkhead bracket was fabricated to hold and provide adjustment for the throttle cable and a strong steel plate for mounting the brake master cylinder was fitted between the steering column bracket and the body frame.

Brake pedal and master cylinder

A standard Ruby brake pedal was bent (cherry-red heat) to clear the drag-link and a boss brazed in position to operate the master cylinder push-rod yoke using a clevis pin. The master cylinder was found at Beaulieu and looked in good condition (perhaps new old stock) although I had no idea of the diameter the piston and the geometry of the brake lever was also rather hit and miss – I just hoped for the best. Anyway, more by luck than judgement, after struggling for ages to get all the air out of the system – we eventually had excellent brakes without the need for excessive foot pedal pressure.

Coolant system

The low bonnet line meant the coolant system would need to incorporate a header tank and a coolant pump of some sort.

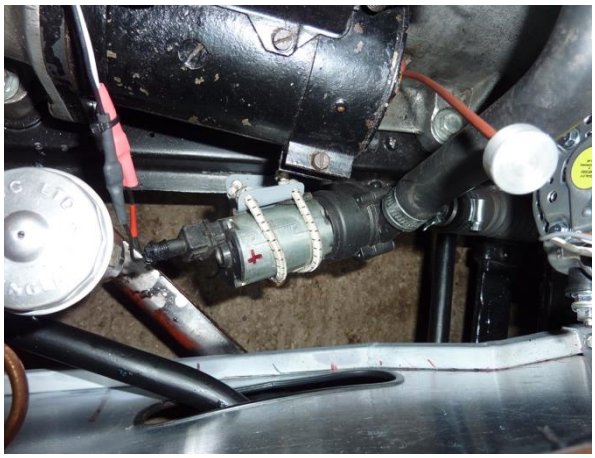
Bombproof header tank

I fabricated a header tank from 18G brass sheet and discovered a radiator specialist in Yorkshire that supplied brass filler sockets and proper swaged stub pipes at amazingly fair prices. The flanged sides were formed over a hardwood block requiring several iterations of heating/softening and repeated bashing. After a thorough clean, the tank was temporarily held together with 8 BA brass round head setscrews, fluxed and silver soldered together. Seriously over-designed but I have seen flimsy tanks that swell under pressure and I didn't fancy that.

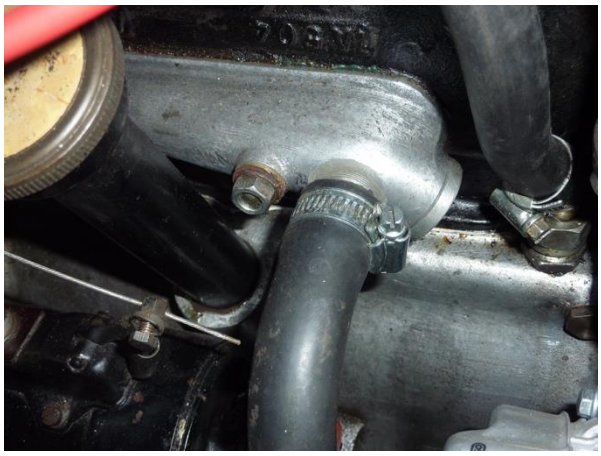
A7 Specials in the sixties often employed heavy, cast iron 'Ford Export', pulley driven water pumps. Although (maybe fortunately) none seem to be available nowadays, I was excited to find that the Aquaplane firm were making reproductions in aluminium. However, at over £200 a shot I suddenly

lost interest. Then, by chance I spotted a photograph of a vintage car sporting a modern car electric heater pump to circulate coolant.

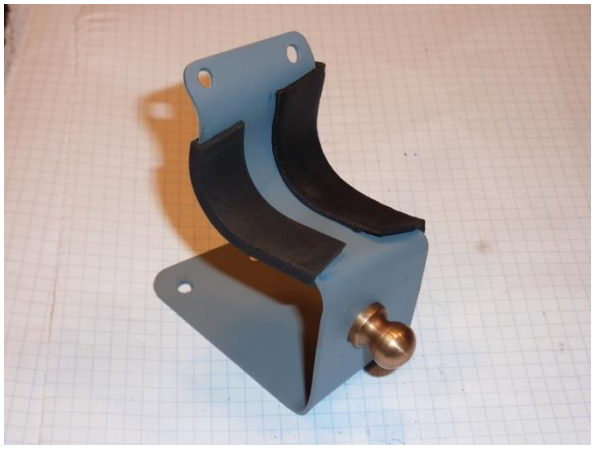
These pumps are not expensive and I found a 'new-old-stock' example destined for a Vauxhall Vectra and took a chance that it would pump at an appropriate rate (although, I had no idea what that might be).



Electric coolant pump



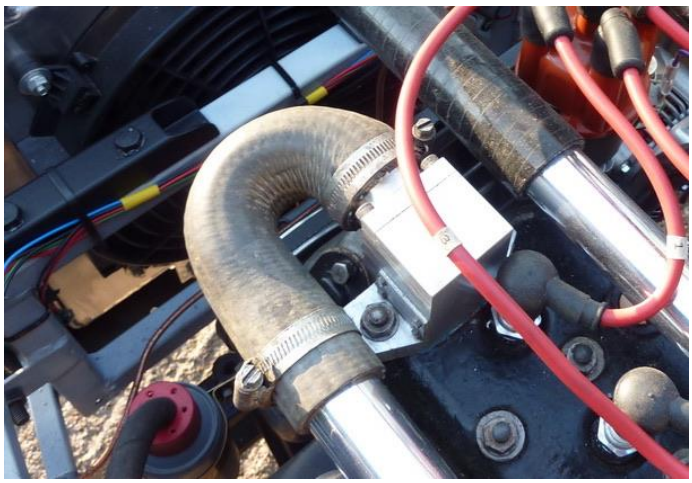
Modified side water inlet



Chassis bracket for water pump

An A7 side water inlet branch was modified to provide a 22 mm OD pipe facing horizontally towards the off-side of the car and an alloy reducer (32 to 22 mm) turned-up to fit in the bottom hose. Finally, a chassis bracket was made to hold the pump securely.

The engine has a '1937' head and its front outlet water branch needed somehow to turn through 180° to connect back to the header tank. This was achieved by milling a solid billet of aluminium to form a new horizontal outlet which was connected to a 32 mm diameter 180° top-hose from an Austin Princess.



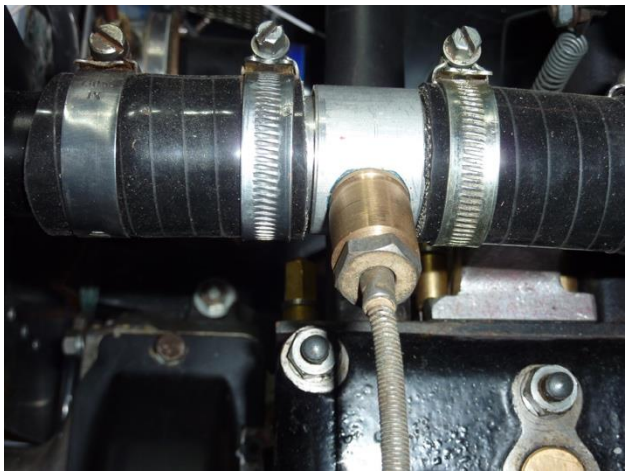
New water outlet branch and hose

Another friend (I am very lucky with my friends) kindly gave me a capillary temperature gauge that I believe was

liberated from an early Landrover (or 'Llandrover' as they say in Wales). This was tested in our electric kettle alongside a 'proper' mercury thermometer and was found to work perfectly. The bezel of the gauge had been painted with silver paint and was not a thing of great aesthetic beauty - but I found that an A7 fuel gauge bezel fitted perfectly and I had a spare with excellent chrome. The happy result is a temperature gauge that looks as good as new.

A four-inch length of 1.5" diameter Aluminium bar was turned 32 mm OD each end to fit in the top hose and bored to maximise the waterway bore whilst leaving sufficient wall thickness to take a thread for the sensor boss.

A brass boss was turned-up and threaded internally to accommodate the temperature gauge 'bulb' sender and externally to screw into the aluminium and fixed (hopefully permanently) with high strength Loctite.



Temperature gauge sender

To be continued …… Bob G

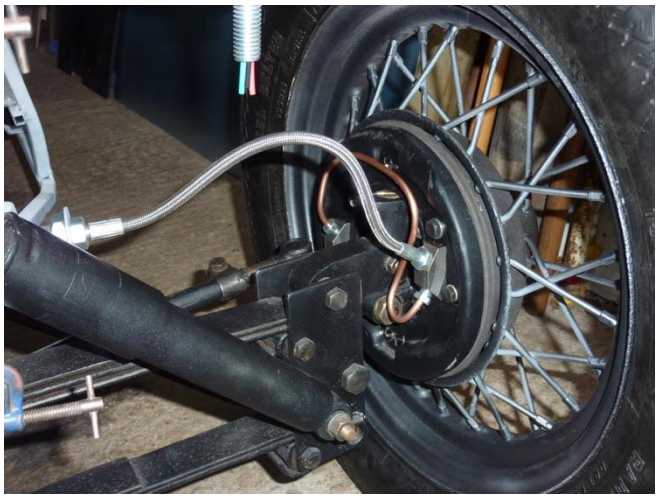
Building an Austin Seven Special - Part 4

Hydraulic pipework

Modern 3/16" hydraulic pipe is relatively inexpensive and after a few practice-runs with an old end-forming swage tool – I managed to produce quite tidy pipe-ends. Especially after being advised that a spot of grease would dramatically improve the outcome.

Hydraulic pipe attachment

After careful measurement, all the required 'fixed' lines were bent to shape and securely attached to the chassis or body frame with home-made brass 'P'clips.



Front hydraulics

Next, I required three flexible pipes (one to the back axle and two at the front) and I initially fancied some small diameter stainless steel braided items. However, after two quotes, each well over £100 – I decided an 'off-the-shelf' set destined for an early Morris Minor was more to my liking at around £25. Unfortunately, they are a bit shorter than I would have ideally liked but seem OK.

I have seen a variety of different layouts for A7 front hydraulics, i.e. different positions for: the flexible attachment to a wheel cylinder, the bridge pipe and the bleed nipple. I have even seen a 'twin *trailing* shoe' arrangement that the owner said was 'not as good as he had expected' – no surprise there!

The layout that I adopted, accommodated the short flexibles and gave good access to the bleed nipple. The latter is often difficult with a conventional A7 axle because of the position of the steering arms.

Shortened dynamo case and alternator

Having decided to fit an alternator, I was able to dispense with the A7 dynamo but still needed to drive a distributor and it seemed the easiest way to achieve this was by means of a shortened dynamo case and drive shaft. Luckily, I found an early A7 alloy distributor drive housing that contained a ball bearing rather than the later more common plain variety. The unit's skew gear is driven from the camshaft in exactly the same way as a conventional post magneto A7 dynamo and

Distributor drive

the distributor is set vertically, luckily fitting neatly just under the bonnet.
Clearly, the easiest way to drive an alternator on an A7 engine is from the front of the camshaft but this poses two potential difficulties. If it is mounted conventionally with the pulley facing towards the front of the car, it will be driven a) in reverse and b) at half the usual speed of rotation. After a good deal of thought, I decided it would probably be OK running in reverse, after-all, AC current doesn't have a consistent sense of direction, also, I tend rev my engines fairly generously, so, hopefully a unit of around 50 Amps output would hopefully charge the battery sufficiently well. The only potential downside, is that the alternator's internal cooling vanes will be moving the air in the opposite direction from that which they were designed.

Alternator mounting

To help increase the speed of rotation, I selected a fairly small pulley for the alternator and attached a 5" diameter pulley to the front of the A7 camshaft pulley. It seemed to me that anything larger than 5" might struggle on the relatively small, unkeyed front camshaft taper. Incidentally, the pulleys and belt are Z-Section (10 mm wide).

The top of the alternator is supported on a transverse bracket from the 'dynamo/fan' housing and underneath, by an adjustable bracket attached to two of the front timing-gear housing bolts.

The alternator I selected was a new 45 Amp Type 115319, a lightweight three-wire unit. Interestingly, it became clear that the cost of a given model was determined by the vehicle for which it is intended and this particular unit could cost anything from £180 to well over £300. Matt of AP in Hereford was very helpful and sold me one at the more desirable end of this range.

Wiring & lights

The car was wired from scratch using appropriately sized (thin wall) PVC auto' wire, incorporating modern blade type fuses and a battery master switch. The electric coolant pump and radiator fan are currently both manually switched from the dashboard. All spade connections are soldered as are all the wire ends secured in screw connectors.

Having a 12 Volt system led me to choose conventional (relatively cheap) tungsten filament lamps rather than LEDs and the various lamps were acquired mostly from ebay. Landrover rear lights and direction indicators were a particular bargain!

Wings (mudguards)

Cycle wings seemed an obvious choice and an enormous variety of steel or alloy examples can be found on eBay, mostly destined for use on motorcycles or trailers. However, many were for larger diameter or wider wheels than mine and they mostly had a pronounced 'C' section; whereas I wanted a flatter transverse profile. I briefly flirted with the idea of attaching the front wings to the brake backplates with a lovely snug clearance, to turn with the steering and generally look great! However, the hydraulic brakes left precious little room for attachment, the backplates are not

terribly strong and all the experienced advice was to forget the whole idea. It seems there was a strong likelihood that our roads would soon shake them adrift and I didn't much fancy the idea of a detached wing whistling past my ear.

Fortunately, a friend happened to mention that Rod Yates (East Sussex) was making him an 'Ulster' body together with cycle wings and suggested he might be prepared to make some for me. The outcome was a very satisfactory deal with this charming and extremely knowledgeable gentleman and I obtained four beautifully made, wired-edge, aluminium wings, made very promptly and exactly to my required dimensions.

Next, it was simply a matter of designing and quickly making some steel brackets to attach the wings. Unexpectedly, this turned-out to be neither simple nor quick. In-fact, it took longer to make and fit the wing brackets than to construct the entire body frame.

Rear cover & boot

The space behind the seats and above the fuel tank was boarded and lined to provide a small boot with just sufficient capacity for a slimmer's picnic. The petrol filler cap and boot are accessed via a hinged plywood lid covered in vinyl to keep out the rain.

Fuel filler and small boot

Rear vinyl cover

Seats

The seat frames were made from 1.0 mm thick aluminium. The bases have a simple folded top edge for added strength and were bent by hand, to the shape of our Chummy seats. This enables the use of existing seat cushions until I get around to making some more. Well, I can't drive both cars at once!

Lightweight seat

The seat backs were cut-out to match cardboard patterns shaped by trial & error to the desired height and curve of the bulkhead. An allowance of 0.5" was added for the swaged edges that were then rolled and wired using a cheap and cheerful hand-operated rolling machine together with three horizontal semi-circular strengthening grooves. The backs were then bent by hand around an eight-inch

diameter fence post to the required curve and finally attached to the bases with numerous pop-rivets on each side. Operating a swaging machine was a fairly new experience but aluminium is very forgiving and the results look reasonable – from a distance anyway.

I had no idea how to upholster the seat backs, so, as a temporary measure, a simple thin plywood 'card' covered in vinyl was shaped so that it snapped into position within the rolled edges. Surprisingly, this arrangement is reasonably comfortable but I will probably add some padding at a later stage.

Well, that's about it. The car is on-the-road and great fun to drive. The alternator keeps the battery charged (despite running backwards) and the unusual cooling arrangements seem to maintain a satisfactory engine temperature. The independent front suspension, stiffened rear-end and proper damping, have pretty-much eliminated the need to slow-down for corners and its light weight promotes good acceleration. The mildly tuned engine propels the car to just over the legal limit and although a proper windscreen would offer increased comfort, I'm reluctant to do anything that might slow us down. So, I'll stick to the fly screens and the leather gear – flying helmet and goggles!

Every home should have one?

Finally, I couldn't resist including a picture of the Herbert Austin crest I found for the steering wheel and the very 'tasteful' ignition switch key fob.

Altogether, a most enjoyable project that has kept me out of mischief (mostly anyway) during the Covid Lockdown period - so, now it's time to decide what's next. Maybe build an electric bike or possibly some decorating in the house? …. Actually, that's not a terribly difficult decision!

…….. Bob G