



Start of a Plague

by Stu Martyn

Plague? One would hope not, especially when related to that pestilent insect, the locust, but it's open to personal opinion when applied to a 'toy' car. I named my latest creation *Locust* for a number of reasons. The first is that the 'car' is based on the 1896 Locomobile steam car manufactured initially by the Stanley Brothers in the USA, the second is that it was reasonably cheap to construct hence a take off of 'low cost' and the third one was that a mate commenced his project of building a Locost full sized sports car based on the Lotus at the same time as I started mine and whilst my project has been completed some months ago he is still in the process of building his! Yes, I know that his car is much more advanced than mine technically and he will eventually be able to get his vehicle registered for road use while I'm still ducking from tree to tree hiding from the authorities (when I'm illegally operating on the street) but why ruin a good yarn by lumbering it with the truth?

When I built my version of Henry Ford's Quadricycle (AME May-June 2008 Issue 138) I ended up with a spare set of 26 inch industrial wheels complete with tubes and tyres due to an over order on my behalf and I was at a bit of a loss as to what to use these wheels for. Mark Needham from up Queensland way was kind enough to lend me some of his books relating to cars back in the vintage era. Thanks Mark. I was amazed to learn from these books that there were up to 500 or so manufacturers of small automobiles in the USA alone during the period between 1896 – 1902 and that most of these went broke after only a couple of years in operation. I like these old models mainly due to the different ways that their suspension and chassis' were hung and arranged, all in some way related to the old horse drawn buggies.

Of all the old vehicles I looked at I was intrigued by the layout of mechanical components in the 1896 Locomobile and how the original was steam powered with the twin cylinder double acting engine mounted vertically and driven by a chain to the differential mounted on the sprung rear axle rather than the later Stanley designs, which had the steam engine laying horizontal and fixed directly to the diff. and sprung rear axle. I reckoned I could get away with using my spare set of wheels on this model even though they are a bit on the 'skinny' side. One of these days I might get around to buying another set of tyres with about 3 inches width and put them on over the existing tyres after cutting off the beads on the original set. Won't happen too soon, I'd hate to destroy a good set of tyres just to get it all to look right! Besides, who's to know? I should also thank Simon Jenkins for sending me a copy of an article, *The Lika-mobile*, written up in the *Model Engineer* in 1995 by John Liming who built a four seater copy of the Locomobile Surrey. This article



also included some drawings of the model I planned to build. I used these drawings in John's article to get some 'near enough' measurements. I love to use old drawings, especially when the scale is shown as a measured and marked rule adjacent to the relevant drawing, rather than the modern way of just stating the scale in words or numbers.

Oh Sacrilege! I reckoned that the design would allow me to discard all idea of using steam and replace the steam engine with an old lawn mower petrol engine I had laying around in the shed. With a bit of manipulation I reckoned I could hide the 'smelly' within the bodywork and still use the original chain drive idea.

First items to be constructed were the front and rear axles as they appeared to be the most difficult part of the project especially with all that bent and curved pipe work for the axle tubes. No problem. Heaps of heat from the gas axe and pulled





the steam pipes (34mm OD for the front axle tube, 43mm OD for the rear axle tubes and 34mm OD for the remaining braces and 'reach' rods) into shape by hand and welded it all up. The building of the differential caused a bit of head scratching until I finally found an easy way to use a discarded diff from a small Mazda front wheel drive car. I removed the original 'bull' gear on the diff, as well as the taper bearings on the ends of the diff, and replaced these with a sprocket and normal ball bearings fitted in 'cups' so that the finished assembly could be slipped into position in the rear axle yoke. I then cut off the splined parts of the original Mazda CV joints and welded these to the correct lengths of 1 inch dia. mild steel rod with the outer ends of these rods turned down to suit the wheel hubs and threaded to take the wheel nuts, as well as being keyed for the drive wheels.

I've never been big on cutting internal keyways with



broaches so I cut my internal keys (for the drive wheels) from the outside - in, using a slotting mill. Small bridges are left intentionally at each end so it won't close up and trap the slotter tool, and the keyway is manually filed in these bits. This might seem like madness to a competent machinist. The wheel hubs consist of a tube made of some very tough material, so hard that it's almost impossible to even drill a hole in it. These hubs, as manufactured, have a flange at each end (for the wheel spokes) and these flanges each have a number of holes drilled radially apart from the ones for the spokes. I welded a circular flange to one end of my 'slotted' piece then inserted it into the wheel hub and used bolts through these holes in the wheel flange to provide a solid connection between the internals and the wheel hub. I then used two keys with the second key laying on top of the usual key underneath to take up the extra space left by the external slotting exercise. It can't come apart unless it expands the wheel hub and I can't see that happening before the torque tears the heart out of a few spokes and if that happens it's too late to worry about some keys rotating in their slots.

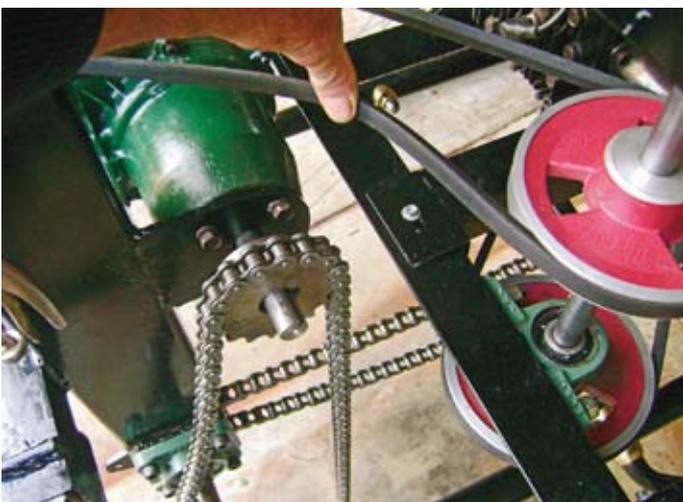
The springs were made up by using a ball peen hammer on cold spring steel to bend it into the required shape. I expect





the springs to sag over a period of time without further heat treatment and if that happens I'll rip them out and repeat the cold hammering process. Chassis is of a welded construction and is made up from 50mm x 25mm box section steel. The body panels are made from 12mm thick marine ply sheeting.

The original car used a post or pillar mounted vertically to the car chassis and the steam cylinders were attached to each side of the top end of the pillar. The bottom end of this pillar, which protrudes and is visible under the car body, then provided support for the engines crank, main bearings and sprocket drive to the differential. The engine itself was thus hidden from view by the body work with only the engine cranks being visible to the bystander. I retained the pillar and bearings minus the crank arms and all things steam related. I then fitted a chain sprocket



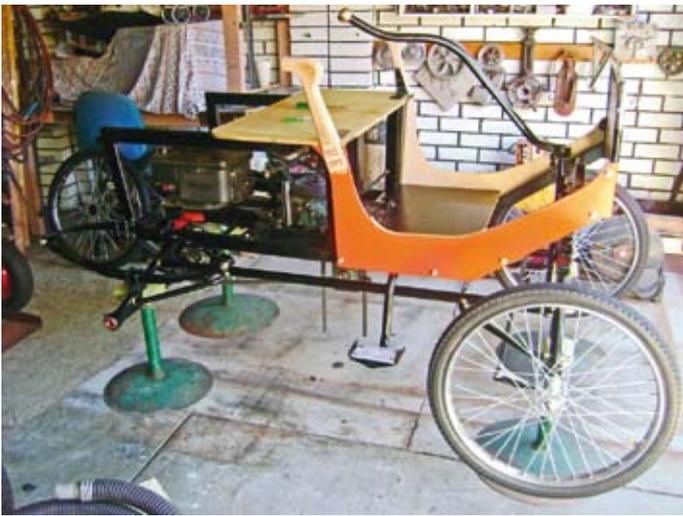
to this crankless shaft to accept the vertical chain drive from a gearbox hidden out of sight above. About this time I fully realized that using a four stroke petrol engine created some extra problems compared to a steam driven unit. One, I needed a clutch. Two, I also needed a gearbox if not for any thing else at least for a reverse gear. I was lucky to be given an old ride-on-lawnmower gearbox by Tom Talbot – thanks Tom, and that solved the reverse problem as well as giving me three forward gears to play with. I came up with a number of ideas for a clutch, each design more complicated than the first. In the end I experimented with slipping belts and have been more than pleased with the final results. The vehicle requires some practice to drive but as soon as the hand fumbling exercise is mastered driving it is a joy. The clutch is engaged by drawing back on the 'joy' stick mounted adjacent to the driver at the same time as twisting the throttle control which is similar in action to a motor bike twist throttle mounted on the same stick. Almost like flying a chopper and using the collective stick. It can make for some interesting moments when changing gears!

The brakes on my quad are somewhat ineffective so decided to use disc brakes on the *Locust*. Why not? The rest of the car is all bogus anyway and I really like to be able to stop it when I want. The brake discs and calipers are from a large Kawasaki



motor bike and the master cylinder is from the Mazda referred to earlier. The master cylinder is of the dual system type so I just paralleled up the outputs into a single line since I only have rear brakes and much to my surprise it works beautifully.

The old Briggs and Stratton lawnmower engine puts out more than enough oomph and if one is not careful a sudden application of the clutch will send one down the road with the front wheels clawing for the sky. I didn't like the sound of a lawnmower engine exhaust so I built up a home made muffler from a little fire extinguisher I had laying around. Prior to this modification it sounds like some bugger was mowing up the street. It still sounds the same only more muted. One must be



the wooden spindles which I turned up by eye on my metal lathe. The spindles were made from old jarrah tomato stakes and the lathe has benefited from this exercise as all the worn slides are now filled with wood dust! The hand rails are angled out more than the original to give more bum space. The original looked pretty narrow to me.



happy with the granting of small mercies.

Out of my trifecta of cars I prefer to drive the *Locust* and the only thing I'd like to do to improve it would be to fit an electric starter instead of the pull rope. Briggs and Co have fitted an ingenious device to their exhaust cam which radically changes the exhaust valve opening to reduce compression which makes for easy starting but this also makes the engine run like a hairy goat if the engine idle speed is too low. Oh well, next job is to have a look at how to overcome this – probably make more sense to buy another engine with all these modern gizmos already attached.

I'm very proud of the seat that I made for *Locust* especially





I have added a sun shade canopy which I purchased from a marine outlet. I had to cut and change the aluminium 'bows' to suit the narrower profile of my car as the canopy was originally designed to suit a boat which had an extra 500mm in width. The canopy also had to have this amount of 'meat' removed from its middle section and it was a time consuming job hand sewing it back together! The things which some model engineers get up to! Still have some more needle work to do to take up the slack in the side panels but that will have to wait until later. I've mistakenly poked the needle into my thumb too many times as it is.

Now that it's almost finished I'm not sure whether I like the look of it or not! To my mind it makes the car look more like a kid's pram! Not only that but I now have to lower the canopy every time I park the *Locust* in my shed as it's too tall to go under the door. Oh well, at least it will keep the sun of my noggin.

Some readers will be pleased to note that this effort will be my last article on cars. I won't be building anymore — my spare space is starting to look like a second hand car dealer's yard!

