HORSELESS CARRIAGE REPLICA NEWSLETTER

Published by Lee Thevenet

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A Publication dedicated to the reporting of news, events, articles, photos, items for sale, etc, having to do with replica horseless carriages.
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From the HCR News Desk

Hello everyone in HCR Land, I would like to wish all of our readers, Happy New Year! I hope all of you had a joyful Christmas and have all your new shop tools ready to build that special HCR for this year's parade and show season.

I would like to start off the year with an article from a former contributor to the respected Newsletter of publisher and editor, Everett Moore. Mr. Moore featured articles by him in two Newsletters. His Ford Quad HCR, was covered very completely in the E&W publications but this extraordinary builder has built two other carriages besides his Quad.

In this issue *Page*

He probably needs no introduction, besides his writings in Mr. Moore's E&W issues, most of you have already seen his posts on the Yahoo HCR Forum. His name is Stu Martyn of Australia and would like to share some information of his builds, including his other work and interests. His writings have appeared in issues of the Australian Model Engineering. I have been granted permission to run the articles as they appeared in the magazines. They will appear in the next 2-3 issues of HCR News……Enjoy!

In The Land Down Under
By
Stu Martyn

I have always been interested in mechanical motions and it seems that the majority of the more interesting ones were developed during the steam era. Over the past few years I have built working steam models of just about everything steam powered known to man. This includes steam locos, steam tractors, steam turbines, steam launch engines, the weird engines such as the Rectilinear engine, the Coombers rotary, walking beam engines etc.

This is all very well but then I decided that I needed something big enough for me to sit on and operate rather than watch these toys run around on the shed floor. I then built a five inch gauge loco but became impatient with the other loco operators dictating on when I could go, or stop.

Next step was to build a half size steam tractor, the Wallis & Stevens, which gave me more freedom as to where it could be run. I eventually sold it because of its weight which posed problems transporting it to and fro to my local steam club.

In 2004 I built from scratch, and generally to my own design, a LPG fired 7/8 size steam car based on the 1904 C4 Stanley steamer. The laws in Australia relating to the construction and building of steam boilers are very strict and if one builds a boiler similar to that which the Stanley twins used originally then it would lead to a never ending bureaucratic bungling, to say the least, to get it passed -not to mention the associated costs to get the boiler accepted.

We are fortunate, in Australia, to have our own recognized boiler code for Model Engineers but this code puts its own restrictions such as the max boiler pressure which is limited to only 100 psi (700Kpa). Bearing in mind that the Stanley's used much higher boiler pressures than 100 psi, my car lacks grunt as it only develops about 1.5 HP. It runs free and well as long as one keeps the speed down to about 15 mph to conserve steam and it won't climb a steep hill without protest!

The Model Eng boiler code also limits the max amount of water that the boiler can contain as well as its max. dia which is 8 inches. To get enough steam capacity I used a loop hole in the code and have used two boilers in parallel. Using two boilers in parallel creates another problem and that is how to make two boilers work successfully without having unlit gas pool under the car if one main burner fails to ignite. I elected to use a system where the main burners are ignited by separate pilot lights and the whole system is monitored by heat sensitive thermocouples so that if either burner fails to ignite the whole show shuts down automatically. Brakes are of the drum type using motor bike internals.

My next venture (2007) was to build my version of Henry Ford's Quadricycle, including the engine - have a look at 'SmallCarPlans.com's web site, there is a brief glimpse of how it all came together. I tried band brakes on the quad and have to report that they are about as much use in stopping the vehicle as having a pair of pockets in one's underwear!

My mate, Tom Talbot, purchased a Likamobile kit in 2008 and while he was buggering around putting it together I went ahead and built my own version, based on the 1896 Locomobile, but elected to use an old 5HP Briggs & Co. engine to power it.

The clutch operation is by a vee belt which can be tensioned, at starting, and the gearbox is from a discarded ride-on mower. The brake system, which tends to make the purists puke, is a hybrid made up from Kawasaki motor bike discs and calipers (rear brakes only) with the master cylinder coming from a wrecked Mazda car. The brake master cylinder was originally a dual system until I converted it to single line operation by joining up the output lines to form a single. They work like a bloody charm! I became tired of pulling the starter rope for the Briggs and have fitted a Yamaha motor bike 12 volt starter motor which is engaged by the slipping vee belt design, similar to the main clutch, and the final drive to the engine is also fitted with a one way bearing clutch to prevent the petrol engine driving the starter motor once the 'smelly' has started. Now I get great perverse satisfaction from spinning the Briggs electrically, rather than having to learn new swear words to persuade it to start by tugging on the starter rope. Briggs & Stratton engine designers have employed a novel way of reducing the starting compression by using a variable cam on their exhaust cams so the engine compression is reduced at starting.

This makes the engine reluctant to run for any length of time at lower revs. I don't plan to change this setup as I'm not keen on running at slow revs as the engine is air cooled and doesn't take kindly to low cooling air flow which results from running at low engine revs.

About three months ago Tom Talbot asked me to finish putting his Likamobile kit car together as he was too busy earning a quid to do it himself. I must admit that I'm not at all impressed with the overall design of this kit. The engine has the same size stroke and bore as my Stanley but the bore of my Stanley, has a major failing in that it is not robust enough to drive outside admission valves under a high steam pressure nor is it really suitable for the higher engine revs as encountered with car steam engines. Probably why the Stanley twins only used Stephenson valve motion gear on their cars of which the Locomobile was the first steam powered car they made? I'm trying to convince Tom that we scrap the existing system and replace it with piston (bobbin) valves which will reduce the loading experienced with the present setup, but the final decision is up to him.

The Chinese electrics on their burner decided to fail after only a few starts and I eventually replaced it with Siemens electrical gear (the Chinese copied this gear but have failed rather drastically in their QA department!) together with using a larger capacity inverter and it's now working as it should. The pressure switch supplied is just a cheap piece of doo doo and we replaced it with a better quality Italian made one which also has the advantage in that the pressure differential setting is variable.

The sight glass is a bit of a joke as it is too small for the job, is incorrectly mounted unless one needs to see if the bottom part of the boiler has any water in it and to compound the hassles it is mounted in such a position that makes it impossible to view without removing panels or the judicial use of mirrors to even be able to see it!
The front steering tie rod is not sturdy enough to do the job and the use of a Scotch link is doubtful as far as strength is concerned.

I make up my own differentials by using modern diff guts. The original crown wheel can be easily removed and replaced with a sprocket. By making up bearing retaining cups for the diff bearings (usually tapered bearings pre-tensioned which I discard and replace with standard sealed ball bearings) I find I can insert the assembly into the rear axle housing. I reuse the splined ends of the original axle and weld an extension piece of axle to give me any desired track width. The gear type diff as supplied with the kit is prehistoric in design (to say the least!) and a real bugger to seal up to stop the oil dripping out. By using my setup I leave the diff guts dry, but with the occasional drop of oil hand applied (modern diffs are made from substantial hardened material and I don't expect mine to wear out during my lifetime!) and the axle outrigger bearings are held in position by circlips at the axle tube ends. The outrigger bearing comes up against a shoulder machined on the axle shaft. This means that I can pull up the nuts on the wheel hubs without affecting the tension on the outrigger bearings which is a bit different from the Likamobile idea of having the drive wheel hub loose on the shaft. No wonder that the early UK car builders, unlike the blokes in the USA, (Doble, White and Stanley), never ever made a successful production steam car!
Cheers,
Stu Martyn

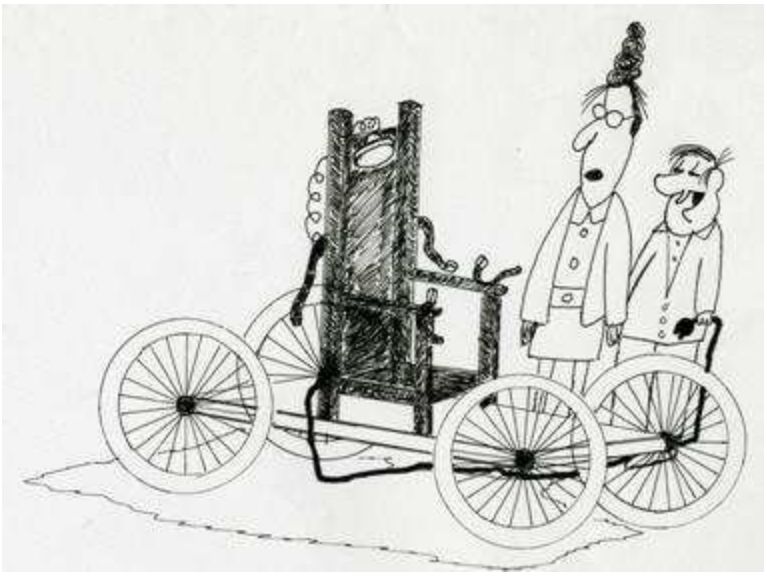
Well builders, did you enjoy Stu's article? That one was written especially for this issue of the HCR News. Like I said earlier, the HCR News will feature more of Stu's articles, especially more on his Stanley & other beautiful creations in the coming months thanks to the courtesy of Dave Proctor, Editor of the Australian Model Engineering Magazine.

My thanks to Dave for allowing me to re-publish Stu's accomplishments, It sure cut down my workload for awhile….:)

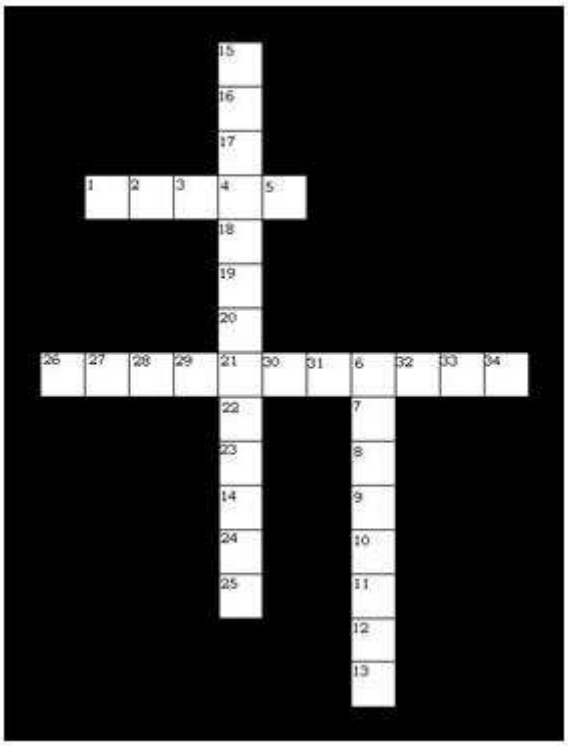
Lee Thevenet

From The Shed & Crossword

By
Lee



Oh Sure Hon, look it even has a seat belt, go ahead and try her out ...



Crossword

Across:

1- Builders favorite pastime

26- Fords first car

Down:

15- Everett Moore Site

6- You get more satisfaction if you build it _ _ _ _ _ _ _ _.

Make a sentence with these words…

Answers on page 12

Tool Time

By
Lee Thevenet

How many times have you ever wanted to lay out two parallel lines close to each other or lay out a line parallel to the edge of a piece of material you are building with?

There is a tool, that is fairly inexpensive at your local Harbor Freight store, when properly set up and used, will do the job correctly. I am speaking of, the "Mortise Gauge".

This neat little shop friend comes in assorted sizes, for both, metal or woodworking use. Referred to as a "scratch Gauge" by some, it is used basically to scribe a line, parallel to a reference edge or surface. The gauge consists of a beam, headstock, and a marking device, usually a pin, knife, pen or wheel. The marking device is fixed to the beam on one end and the headstock moves along the beam to the measurement or distance desired. The headstock is usually kept at the desired setting by a thumb screw, wedge or cam lever.

The Mortise Gauge is made by several different companies & of different materials, each differing in price. I've seen prices range from $10 to $70-$80. The one I speak of is the Windsor Design 6" Mortise Gauge, Item # 94645, now at Harbor Freight for under $10, and less, when on sale.

Next time you are browsing the racks at your local HF store, be sure to pick up one of these neat helpers.

A great addition, to any tool collection!

INERTIA AND THE CENTER OF GRAVITY

By
Bob Kapela

A high percentage of builders, especially "first timers", elect to build a generic replica, using Jimmy Wood's fine plans, or others, instead of tackling the more difficult true replicas of early cars. After the enjoyable experience of building and driving their first machine, they often decide to build a second, more challenging one, a true replica.

When building your first machine, it is common, and there is nothing wrong, with using a little "license" and deviating from the design to incorporate your own ideas, especially on the body style and finish. The many variants of the Jimmy Wood's design attest to this. Most of my machines have roots in the design from the original plans. Just be sure you stay within proven safety guidelines.

This article will deal primarily with the "Center of Gravity" and "Inertia". You do not want to challenge the basic laws of these when deviating from plans. The Jimmy Wood's design has a fairly high center of gravity. When built and driven as designed, it is fine. However, if someone builds one that can go 25 mph. or installs a wider seat, the combination can challenge the laws of gravity and inertia during sudden or sharp turns.

The seat height on my first machine, which closely follows the original plans, is 39" off the ground. On Pioneer #3, I lowered the engine/transmission mounting rails by 4". The seat height is also 4" lower, at 35". This lowers the center of gravity significantly, and also improves the appearance of the machine. I recommend doing this. (photo of lowering rails attached).

An easy improvement in lowering the center of gravity, is when you have the seat upholstered, instruct the craftsman to keep the thickness down to 3" or so, instead of 6". Also, do not allow the side cushions to have thick padding. You need all of the "butt" room you can get and do not want to build the seat too wide for your machine.

On my machines, I also make the tread width a couple of inches wider than the plans show. This is my own decision so I am more assured of being safe under all conditions. Our recommendations for top speed are 12 mph, and I observe that, but due to the design of them, If I were to "punch" the pedal to the floor, they are capable of significantly higher speeds. A driver without experience could go faster than he/she realized, and I want them to be safe. Using common sense when deviating from proven plan's, is ok if you deviate on the safe side and making the center of gravity lower, is a plus.

Increasing the tread width is also good. Making the seat too wide for the machine, is asking for trouble. Keep the seat thickness down. You will be rewarded with a great result and will enjoy the outcome.

Bob Kapela

GOOD NEWS FOR BUILDERS!!
WORKSMAN WHEELS WITH KILIAN BEARINGS NOW AVAILABLE DIRECT FROM WORKSMAN COMPANY!!

I am writing an article about the several Worksman wheels that are available, and the Kilian bearing option. This is to help clear up any confusion on part numbers, ordering problems, etc. The article is for a future HCR issue. During the writing of the article, I contacted Worksman to be sure that I would be listing correct part numbers. While talking to Al Venditti from Worksman, a very friendly and helpful individual, who is the "go to" guy, I mentioned that one option that builders use is the installation of the Kilian F-700 bearing in their 78SA wheels. I also mentioned that some builders have to purchase a minimum amount of 8 or 10 bearings to get the 4 that they need for the job. Al has agreed to purchase an inventory of these bearings and can supply these wheels, complete with the bearings installed. This will be helpful for the prospective builders of the "Everett" or "Jimmy Woods" type replicars, also some CDO models. For 26" wheels with bearings, the part number to order is 1007A-F700 @ $96.95 ea, and for a 26" wheel with bearings, and Kevlar tire with puncture resistant tube, part number 1007KVPR-F700, @ $138.80 ea.

Al mentioned that he has not gotten any orders for the 20" size wheel, but can supply them also, with the Kilian bearings for the same price. This would be a "special" order, as there is no part number assigned.

Bob Kapela

Stress Rise

By
Everett Moore

Few home builders have ever heard the term let alone considered how it might apply to their activities.

Stress rises can result with most machining processes, whether you realize it or not. While most are not intended, I can think of one process where the entire operation is for the purpose of causing a stress rise – the cutting of glass!

You may have observed a professional glass cutter, using a tool with a small rotary scribe, "scratch" a small line or groove onto the surface of the glass. Then, with a gentle tap on the glass, it is cut (broken) exactly where the line was scribed.

This simple process uses the scratch on the glass surface to create a "stress rise," causing the force lines to concentrate in this small area, which has become the weakest part of the sheet of glass. Properly done, the glass will neatly break where desired.

With the increased use of metal lathes in our home workshops, we need to concentrate on making our parts to be the strongest and of the best design possible. When turning a part on the lathe we create two things – inside and outside radiuses. Our main concern with outside radiuses is to remove this sharp edge for safety reasons. This is usually done with a hand-held flat file while the part is still turning in the lathe. When reading a drawing is common to read the note: "Remove all sharp edges."

It is the inside radius or "fillet radius" that we are concerned about. If this "corner" is machined with a sharp lathe bit, the result can be a "stress rise." Depending on the final usage of the part, this can be of no significance or, as in the case of a front wheel spindle, a critical part, that if failure occurs, great damage could result.

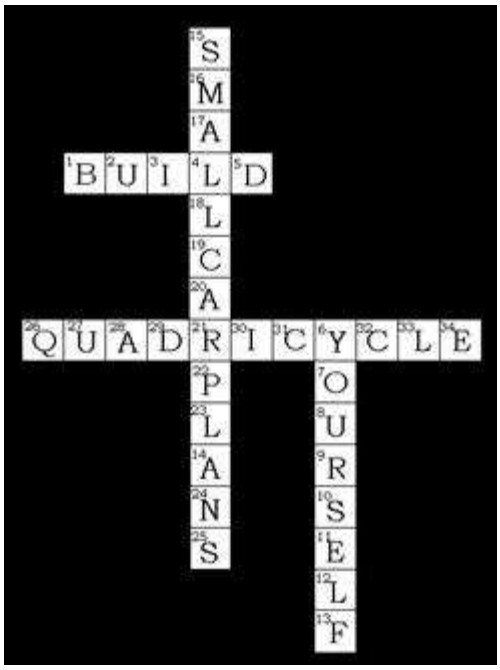
The best way to understand what we're trying to explain is to take a close look at an existing front wheel spindle. Several readers already have a Model T spindle on hand – so study the way the actual spindle was machined. You'll first see how all fillet radiuses have a gentle radius machined rather than a sharp corner.

It is, also, common for spindles to be machined with tapers rather than abrupt changes in diameters. This is to spread the cantilever load placed on the spindle over the entire length rather than concentrate it in one area such as an abrupt change in diameters.

Utilize older, worn lathe bits and grind a small radius in place of the sharp corner. Use as large a radius as you can, considering the mating part that will fit on this part. It is typical for a drawing to call out a radius from .030 to .050. Notice that the inner race of bearings will have a generous radius – this is to accommodate the very corner radius that we are talking about.

In summary, the emphasis is to remember that, when machining a part on the lathe, you have the choice of creating a well designed part or a piece of junk – the cost is about the same!

Everett Moore



Build Small Car Plans Quadricycle yourself

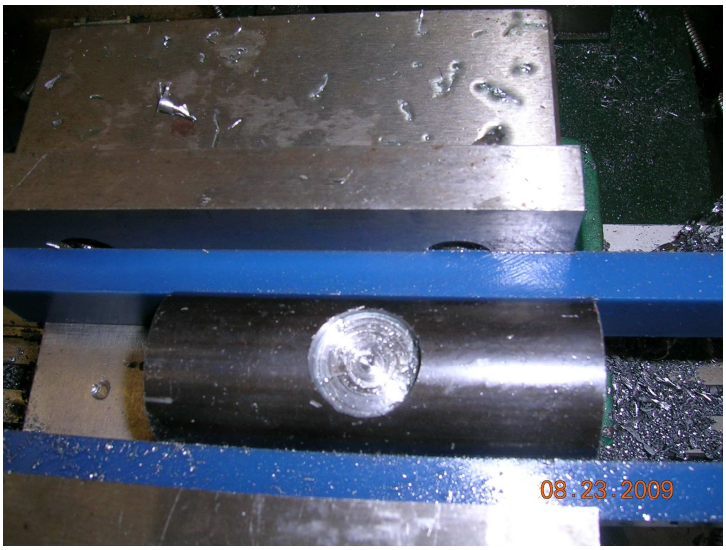
Building My First Car
The 1903 Curved Dash Oldsmobile
Part 2

By
Terry Wright

I am presently constructing a CDO from plans by Lee Thevenet. Having the frame and springs made, I had planned to fabricate the motor supports next as stated in my previous article but decided instead to build the front axle first.

I started with the kingpins and spindles, as it would help me later in measuring for the correct axle length. I am deviating from the plans slightly, as I had a problem finding "welders T's". I liked that idea and would certainly have used that method, if only I could have found some.

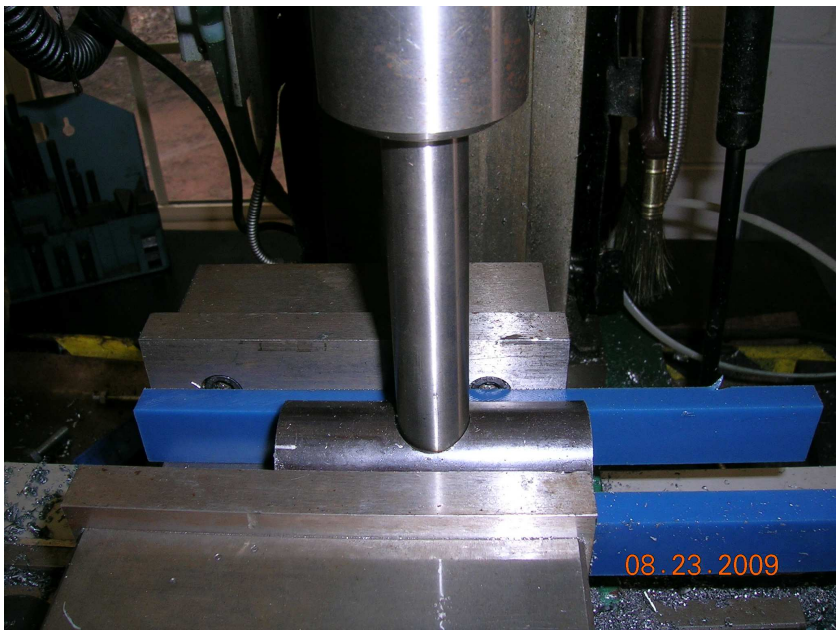
I started thinking about and came up with a way that I think will have just as much structural integrity without the "T's". I started with a length of 1 ¼" OD structural tubing with a ¾" ID. This tubing was cut into (2) 3 ¾" lengths. Each will house a ¾" OD X ½" ID flange (shoulder) bushing at each end to accept a ½" OD kingpin.

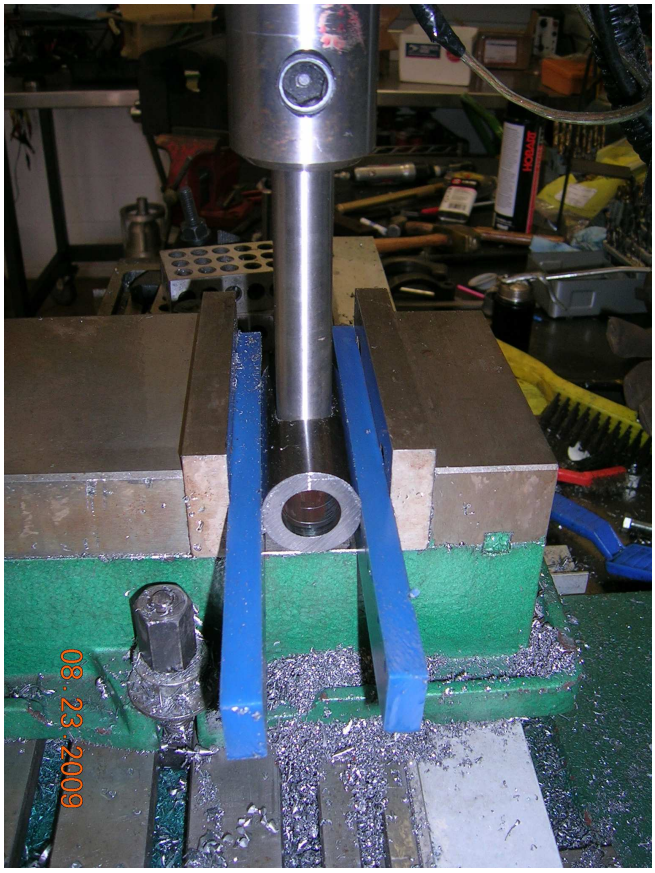


This is the tubing after milling a flat bottomed hole 3/16" deep and ¾" in diameter. This is where the spindle will be placed for welding.

This is a ¾" X 6" shoulder bolt that I removed the head on. I will use two of these for my spindles.

Without moving the set-up on the mill, I inserted one of the spindles into the chuck and lowered it into the previously milled hole in the tubing. This places the spindle and tubing in perfect alignment for welding. This procedure could just as easily be done on a drill press with a vice.





Above is an end view of the set-up. I used PVC sheets to insulate the weld area from the vice so the current from the welder would not feed through the motor of the mill. Not visible in the picture, is a small piece of plastic under the tubing.

This is after welding the spindle to the tubing.

This was as strong as it needed to be, but I intend on having my 86 year old Father ride with me in the 4th of July Parade next year, and I can not think of a worse failure than to be doing 10 MPH and have the spindle break off at the weld. I think both driver & passenger would go over the curved dash or the driver being impaled by the tiller. So, just to have a real peace of mind, I took another step.

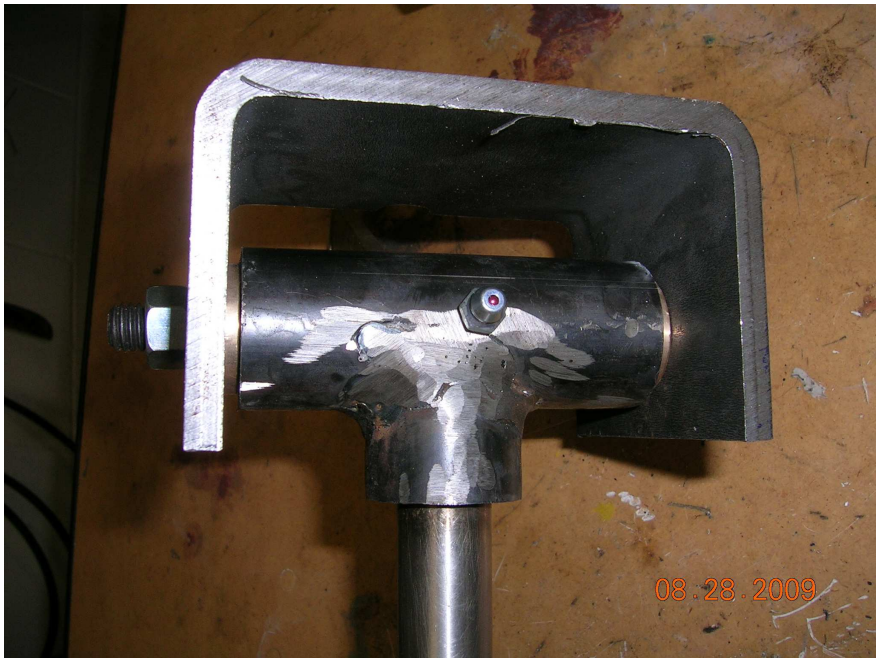
I cut a 3" length of the same 1 ¼" OD tubing, clamped it in the vice and drilled through & through with a 1 ¼" hole saw, giving me two pieces of tubing, each with a "bird mouth" end to fit over the spindle and tubing that will house the king pin bushings. Above is the piece of tubing in place for welding and below it has been welded in place and dressed.

After welding and dressing the weld, I drilled a 3/8" hole in the notched tubing, so I could plug weld it to the spindle also. I don't think I have

anything to worry about, as the whole thing is welded inside out. I then milled a flat area on the side, then milled a ¼" slot on the flat area side of the assembly to accept the steering arm. I then repeated the same procedure on the assembly for the other side.

I then welded the two previously made steering arms to the spindles. I found that 21º was the proper angle for the Ackerman effect. The place where I plug welded through the 3/8" hole can be seen in the picture below. I then pressed in the bushings and straight line honed them to accept the kingpins.

The above picture is showing what started out being a piece of 4” X 6” square (box) tubing 3” long. I cut it down the middle to get two pieces 4” X 3”. I straight line drilled a ½” hole for the kingpin. These two pieces will be the yokes for the axle and hold the spindle assemblies. Below they are assembled to the spindle assemblies.



Shown above is a side view of the assembly with the bushings and zerk grease fitting. A very tight fit, with very little free play. I left the channel steel (yoke) square cuts on ends to aid in alignment with axle tube for welding. I laid the two channel pieces on a level floor and shimmed the axle tube up off the floor so it was centered on the backside of the yoke. I then spot welded it in place and stood it up vertically on a fire brick and welded it solidly at 225 amps with the mig welder.

Here you can see the yoke has been rounded off

Here, the yoke assembly has been welded to the axle tube. I think this assembly should serve the purpose well. The axle tube is 2" OD X 1 ½" ID boiler tubing I picked up at the salvage yard for 20¢ a pound. The tube cost me $6.00.

Another view

In closing, I know photos take up a lot of space in a document when it is to be published on the internet. I am not good with any of the drawing programs, so I let the photos help show the details. Next I will be fabricating the spring perches, and mounting the axle to the springs. That will have to be in a later issue of HCR News.

Terry

UPDATE

I received an E-Mail from Terry a few days ago, in which he stated that he had his CDO very close to completion, so lets all hope he allows us to publish pictures of his carriage in the next issue of the HCR News….:)
Lee

NEW! NEW! NEW!

Just in case some of you missed my post on the HCR Yahoo Site, We now have a very fine selection of headgear for that parade, car show or back yard bar-b-que. Top quality ball caps, in your favorite color featuring the registered HCR logo, done in either gold or black. Now available at this site at a very reasonable price including shipping….:)

EDITORIAL

Well now builders, looks like Terry is doing a great job on his CDO build. This is the kind of building series other builders want to see. If any of you have a building story like Terry's, Bob's and Stu's, or technical articles as the one Everett sent in, I'm sure other builders would be interested in it. It takes just a few minutes, write it up, take a few pictures & send it to the HCR desk for publication.

You will help other builders and also help the HCR Newsletter to continue…

Again, from of all of the writers of the HCR Newsletter,

HAPPY NEW YEAR!
2010

As an addition to the HCR Newsletter, Mr. Everett Moore has given a "thumbs up" to having technical articles done by himself or others, that appeared in Engines & Wheels, be re-published in the HCR Newsletter. One of the technical articles will appear in each forthcoming issue of HCR News beginning with the March/April issue. Should anyone wish the complete E&W News library, including Issue #50 "The Builders Manual" all on CD disc, it can be ordered from Mr. Moore by going to the "Plans" section of this site for ordering information.

Keep On Building!
Lee