Phil's Narrow Gauge

7/8ths Scale Flatcar
Sandy River & Rangeley Lakes

Part # PNG-781

Tools Needed:
Sandpaper
Wood Glue
ACC Glue
#'s 66, 56, 54, 52, 51, 50 and 47 drill bits
Drill press and handheld "Dremel" type drill
Xacto knife
Needle nose pliers
Diagonal (wire cutting) pliers
Various plastic and metal small clamps
12" Ruler
Needle Files

Parts List

Wood

W-1	1 ea.	Frame, Fully Assembled
W-2	60 ea.	Shiplap Decking Boards
W-3	2 ea.	Turnbuckle Boards

White Metal

WM-1	16 ea.	Stake Pockets
WM-2	4 ea.	Turnbuckles
WM-3	8 ea.	Queen Post
WM-4	1 ea.	Brake Cylinder
WM-5	1 ea.	Brake Cylinder Saddle
WM-6	1 ea.	Brake Cylinder Base
WM-7	1 ea.	Air Reservoir
WM-8	1 ea.	Air Reservoir Saddle
WM-9	1 ea.	Air Reservoir Base
WM-10	1 ea.	Main Brake Lever
WM-11	1 ea.	Main Brake Lever Support
WM-12	1 ea.	Secondary Brake Lever
WM-13	1 ea.	Secondary Brake Lever Support
WM-14	4 ea.	Bolster Terminating Plate
WM-15	1 ea.	Brake Rod Support
WM-16	1 ea.	Brake Chain Roller
WM-17	1 ea.	Lock Pawl
WM-18	1 ea.	Brake Wheel
WM-19	6 ea.	Grab Iron
WM-20	8 ea.	Truss Rod Square Nut Bolt
WM-21	1 ea.	Retainer Valve

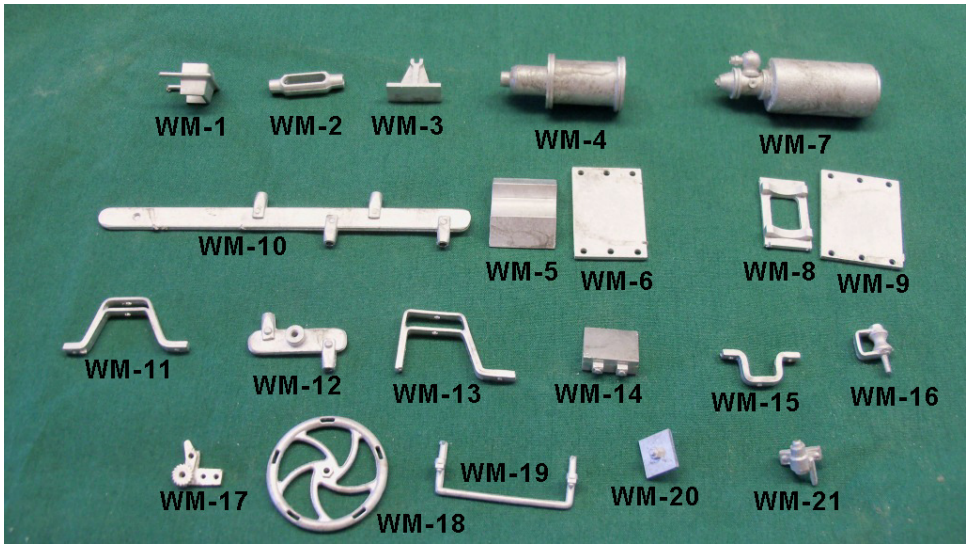
Misc. Parts

MP-1	1 ea.	1 Foot of Chain
MP-2	2 ea.	Brass Wire End Strap Steps
MP-3	1 ea.	Brass Wire Main Brake Lever Limiter
MP-4	4 ea.	Stainless Steel Strap Steps
MP-5	6 ea.	Brass Rod, 1 foot long, 1/16” Diameter
MP-6	2 ea.	Kadee Couplers
MP-7	2 ea.	#4 Wood Screws for Kadee Couplers
MP-8	4 ea.	Eye Pins
MP-9	55 Ea.	Brass Nut Bolts
MP-10	4 ea.	3mm Jump Rings
MP-11	2 ea.	5mm Jump Rings
MP-12	1 ea.	3” Music Wire 1/16” Diameter, Brake Staff
MP-13	2 ea.	Coupler Lift Bars
MP-14	2 ea.	Brake Hose Assemble
MP-15	1 ea.	T-18 Size Staple (not pictured)

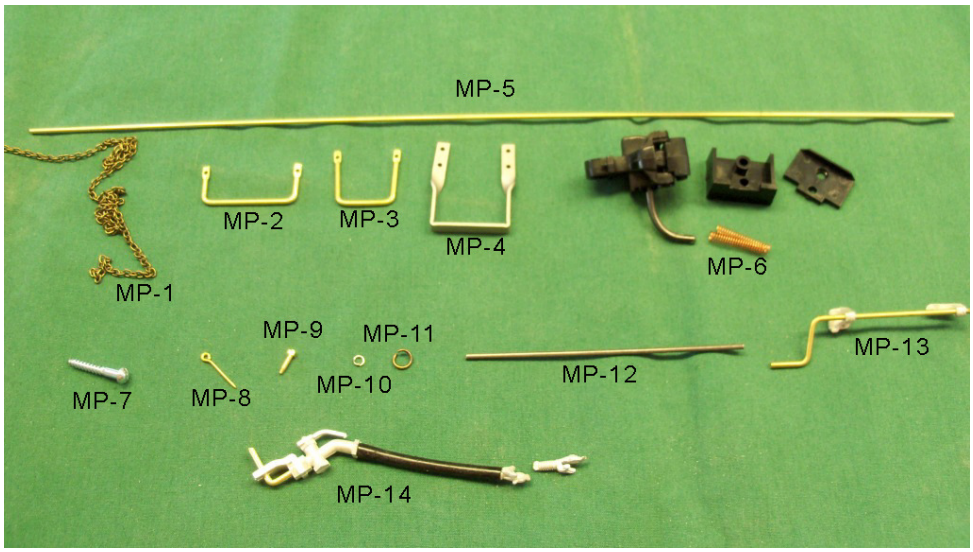
7/8ths Trucks with 20” Wheels

TR-1	2 ea.	Trucks, Assembled
TR-2	8 ea.	Journal Box Lids
TR-3	2 ea.	3/16 White Nylon Washers
TR-4	2 ea.	1-1/4” 8/32 Machine Screws
TR-5	2 ea.	Springs
TR-6	2 ea.	1” Fender Washer
TR-7	----	Misc. Spare Parts

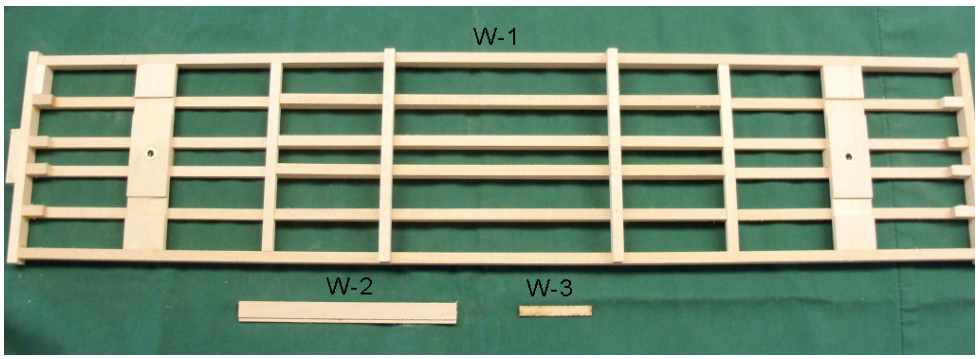
White Metal Parts



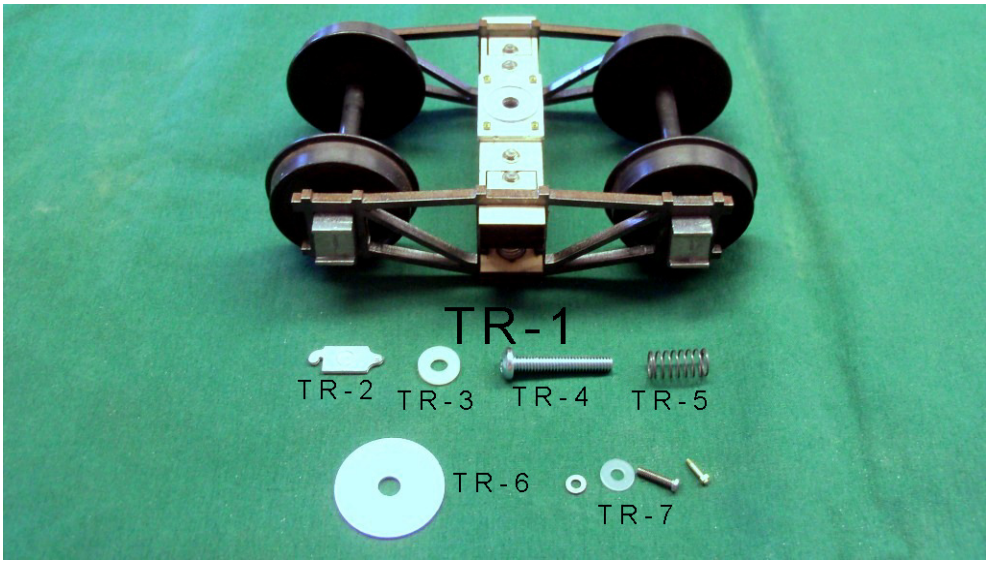
Misc. Parts



Wood Parts



Trucks



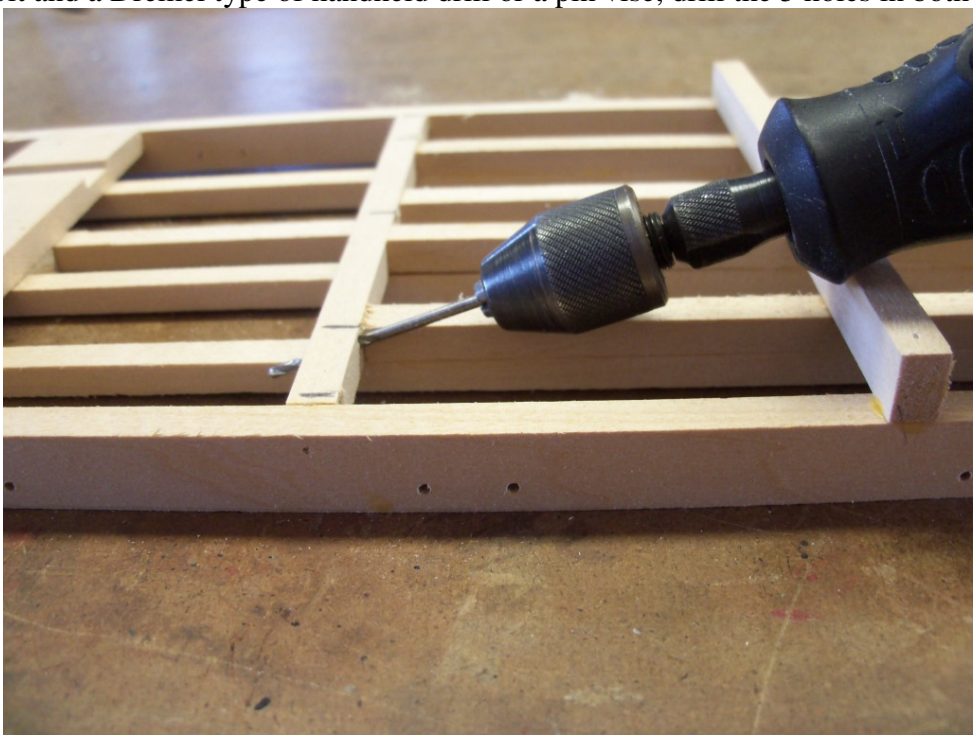
Step 1.

Sand any fuzz and or glue spots from the frame. The frame is fully assembled. It's easier for me and cheaper for you for me to cut the wood, fit into a jig, glue and pin verses cutting extra wood to provide a jig for you to construct the frame upon.

Once you have the frame cleaned up you will notice extra blocks of wood in the corners of one side. The brake staff will mount through one of these and this end is the "B" end of the car.

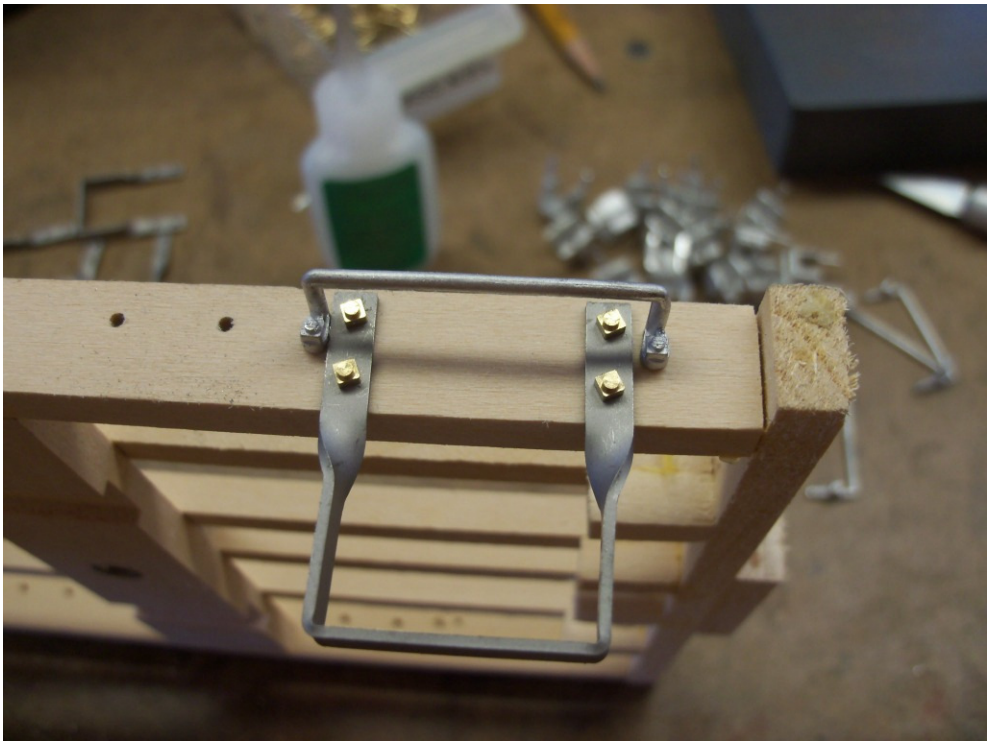
Next up is drilling holes for the truss rods and brake rods to terminate. 6-1/2" in from both sides are the truss rod and brake rod terminating boards. These are ¼" square sticks. Mark them like this;

Using a #50 drill bit and a Dremel type of handheld drill or a pin vise, drill the 5 holes in both beams like this;

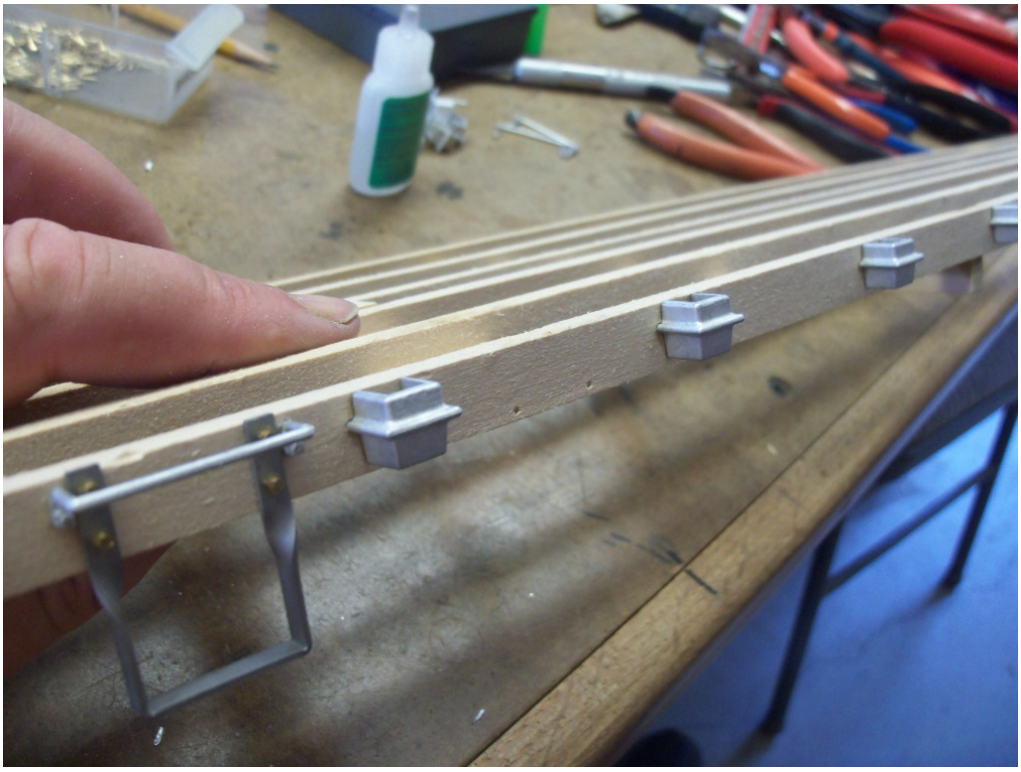


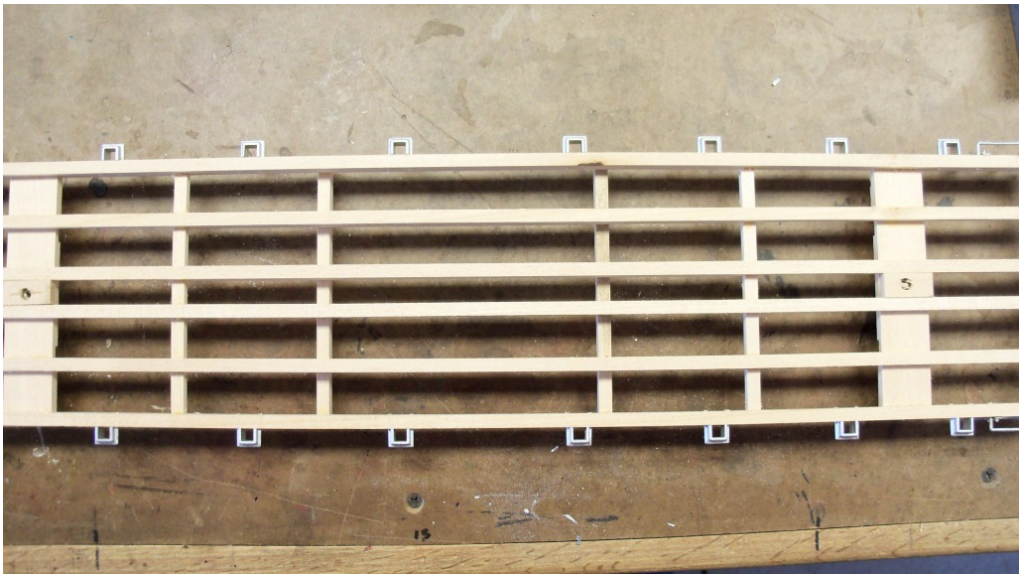
Step 2.

Now gather up the 16 stake pockets, 4 strap steps, 4 of the 6 grab irons and 16 brass NB's. Using a fine needle file, clear any left-over flash from the 2 pins of the stake pockets and 2 pins of the grab irons. A burr could cause the stake pocket or grab iron to bend or brake when inserting. Make sure the twist of the strap steps is correct and pin with the NB's. The grabs push in with the cast NB to the bottom. Add a drop of ACC glue to the holes for the grabs and push them in using your fingernails against the cast in NB's. Any pressure on the middle of the grab will bend or possible brake them.



Now add a drop of ACC to the 2 holes for the stake pockets and push them in with the tapered section of the pocket down towards the bottom of the frame.

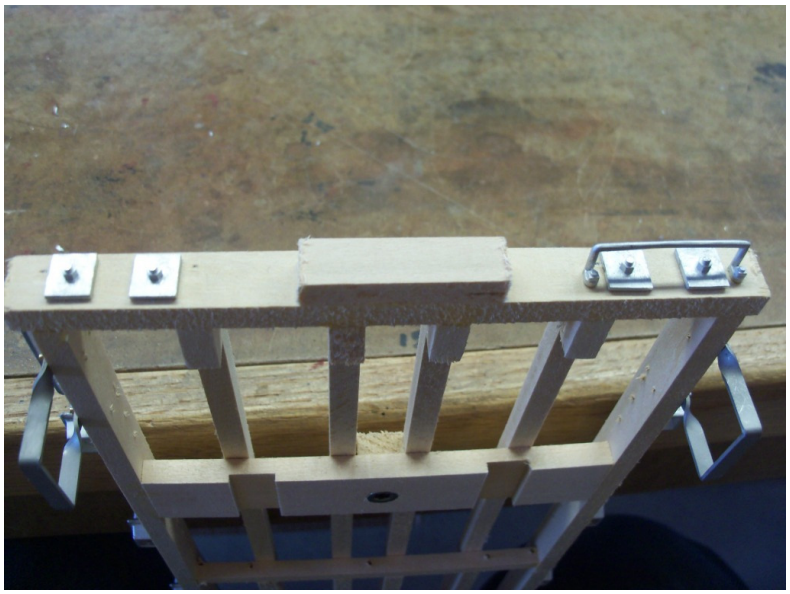


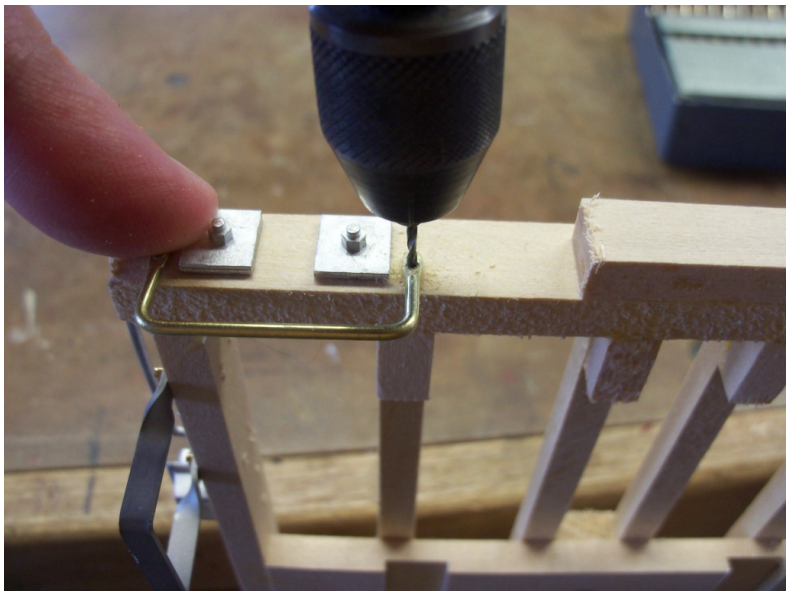


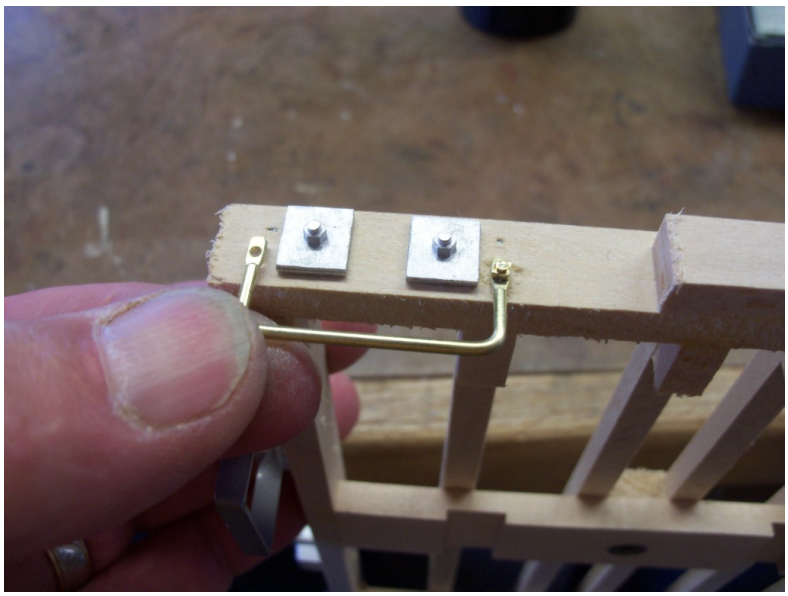
Step 3.

Gather the 8 square truss rod NB's, both coupler lift bars and the remining 2 grab irons. At one end, glue 4 of the truss rod NB's into the 4 pre-drilled holes. The truss rod NB are rectangular and not square. Glue them as pictured with the long width up and down and the narrow width side to side. This is important as the coupler lift bar won't fit if placed wrong. Glue and press in the grab iron on the right side of the frame end.

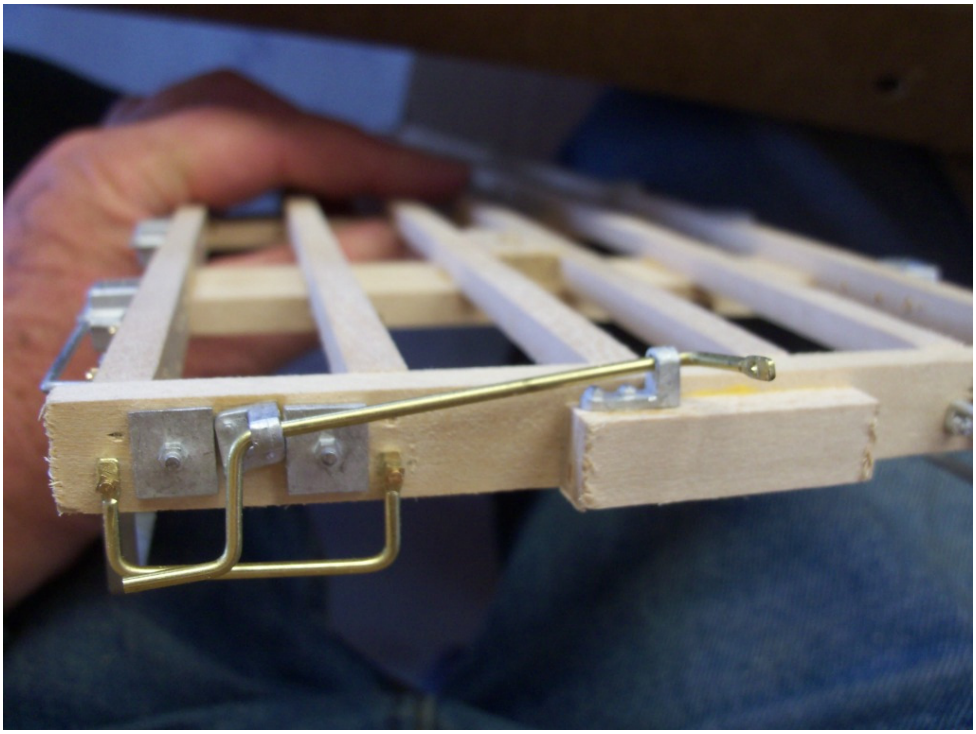
Repeat for the other end of the frame. Grab both the handmade brass steps, part #MP-2 and 4 brass NB's. Hold one in place and drill one side with a #56 bit. Use the picture as a guide for placement. Repeat for the other side.





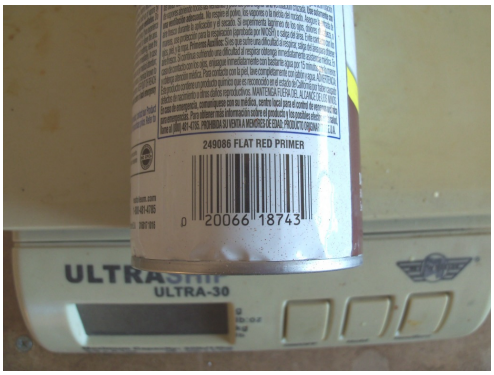


Hold the left side of one of the coupler lift bars in place and determine where the mounting hole should be located. Final placement has the white metal cast at the top between the 2 truss rod NB's. The mounting pin on the back side of the casting is not centered so your hole won't be centered. Mark the location and drill with a #51 bit. Press the casting into place and mark the top of the end plate for the casting mounting hole. Drill that hole with the #51 bit down through the top of the plate. The lift bar will slant upwards when finished.



Step 4.

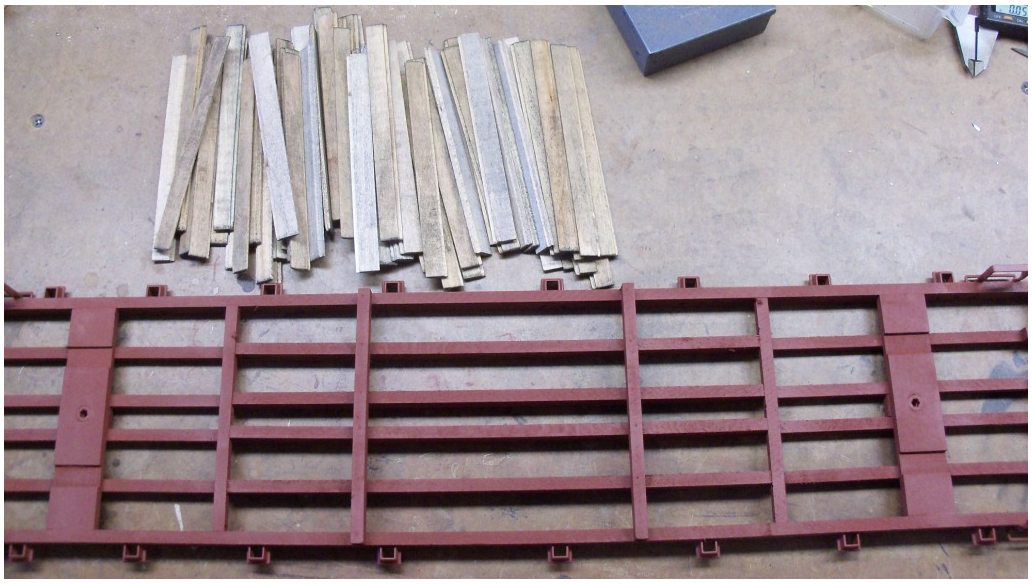
At this point the frame is ready to paint. I use a rattle can Rustoleum red primer which to my eye is brown.



The only part not mounted to frame yet is the retainer valve. You can attach it now if your want it painted. I blackened mine and mounted it at a later point.

While the frame is drying, use this time to start treating the 60 pieces of shiplap decking. There is a lot of "hair" and fuzz on the pieces. The cut ends need sanding as do some of the cuts that create the shiplap. The boards are manual saw cut and therefore need sanding. There are a couple choices for coloring the wood. You may have already developed your favorite method. There is the old standard of India ink and alcohol as well. I had some Minwax Ebony stain #2718 left over from a previous project. I put a small amount of mineral spirits in a cup and maybe 2 or 3 small artist brush loads of stain mixed into it. The Ebony stain is VERY black, and a tiny bit

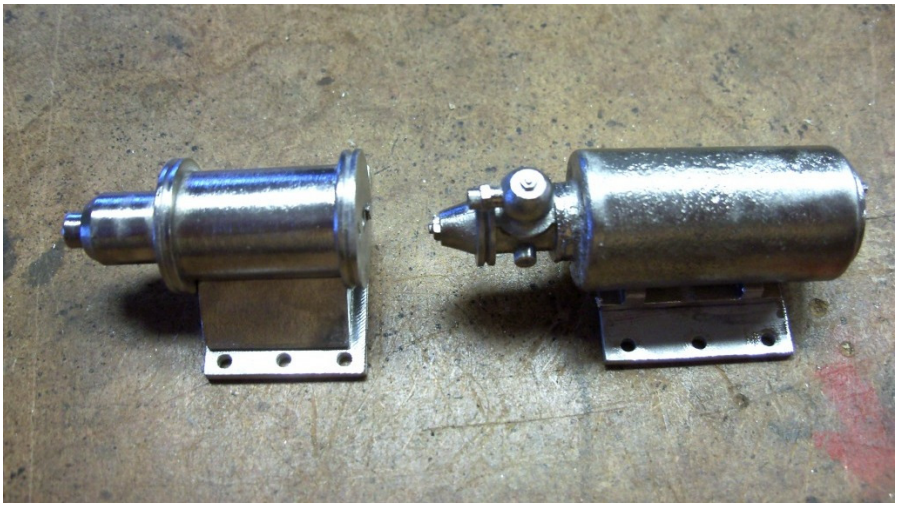
of it achieved the stain color I wanted. I did test it on some scrap wood first to make sure I wasn't just painting the wood black. This stain gives an uneven color to the wood verses the way India ink and alcohol give a more uniform gray. But, use whatever method you prefer. Here's the frame painted, and the decking stained.



Step 5.

Time for the brake gear and truss rods. This will be my method of coloring the hardware. Feel free to use your own methods if mine don't fit your needs. Most of the cars in Maine I crawled under were not painted and the brake gear, queen post, turnbuckles, levers and truss rods were quite rusty. But these conditions are the results of current management and not the SR&RL RR. I did read one article that prior to WWII, the SR&RL kept all rolling stock painted and in good running order. During the war, lead paint became scarce and things became run down looking and remained that way until abandonment.

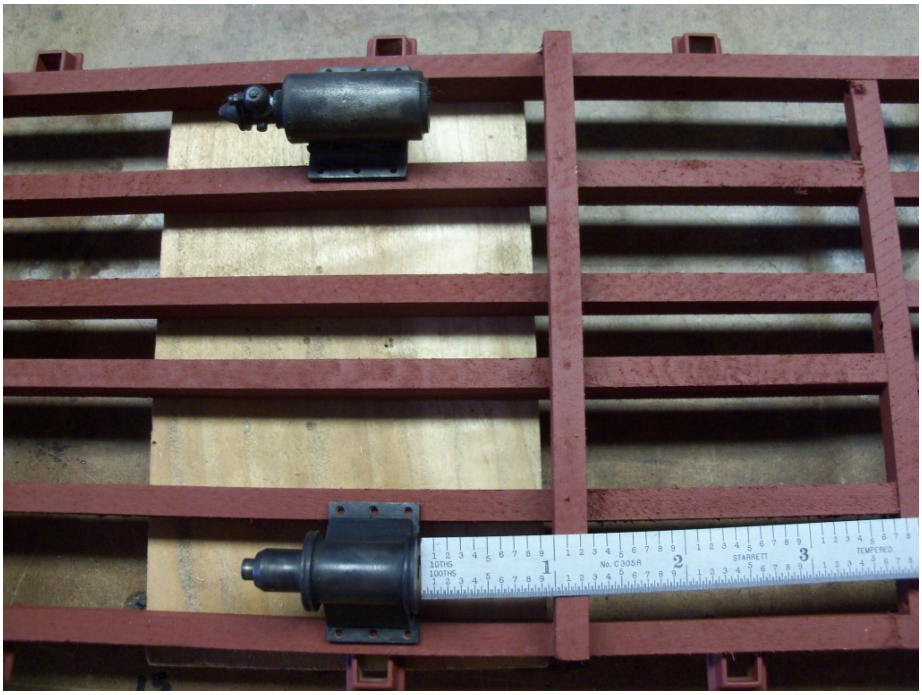
Gather up all the remaining white metal and the 6 sticks of 12" long brass rod. One of the rod ends has been flattened with a hole punched in it. Remember this piece. I sanded all the brass rod with sandpaper and using a wire brush in my Dremel, shined up all the white metal after filing any leftover flash. All this will be blackened but first let's glue together the cylinder, saddle and base and the air reservoir, saddle and base. For whatever reason the blackening agent I use nullifies the ACC from bonding. Maybe one of you chemical engineers know why. WM-4, 5 and 6 make up the cylinder and WM-7, 8 and 9 the air reservoir. Should look like this once glued together with ACC.



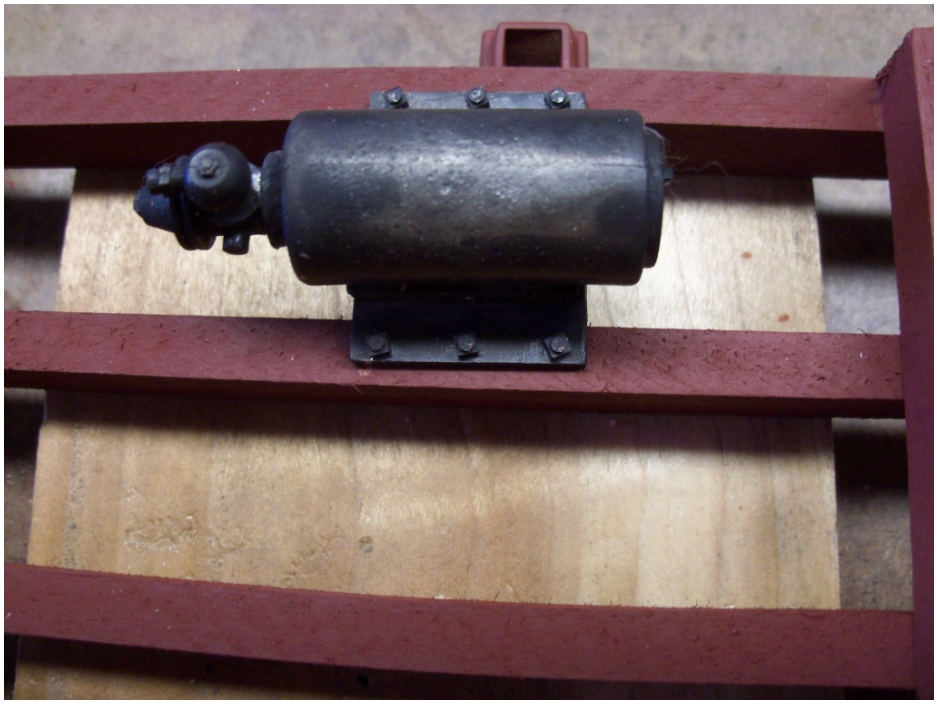
All the remaining white metal, brass rods, NB's and eye pins blackened and drying. I use a stained-glass patina called Novacan. As a black patina, it comes for use on zinc or solder. Both blacken equally well on white metal which is well over 90% tin as may solders are and zinc which the journal boxes on the trucks are made of. As I mentioned above, I lightly shine up all the white metal with a round wire brush in my Dremel tool. You don't need to do this but doing it cleans the surface of the metal allowing the patina or whatever blackening agent you use to act faster. Once dry, I put a wool wheel in my Dremel and polished all the parts. This leaves a gun metal look to the surface.

Step 6.

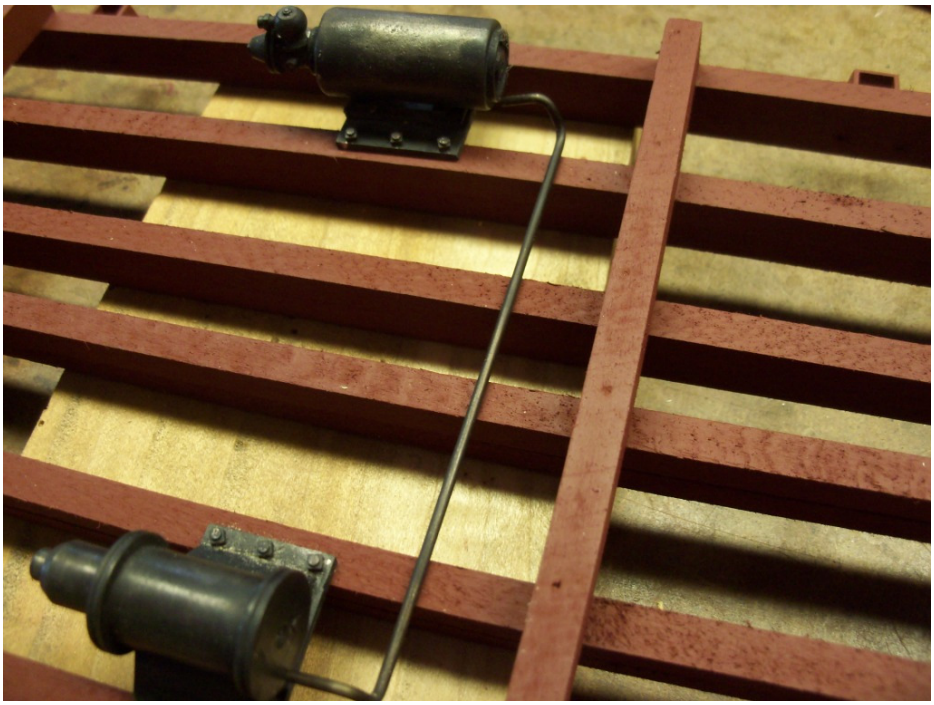
Position the frame upside down with the "B" end to the left. Remember the "B" end has the extra blocks of wood in the corners. The tops of the coupler lift bars will be holding the ends up from sitting flat on your bench. I put a 6" by 6" block of plywood under my frame for support. Set the brake cylinder between the two needle beams near the closer side and the air reservoir on the opposite side. With a ruler, measure the back ends of both parts from the right needle beam out 1 inch as pictured.



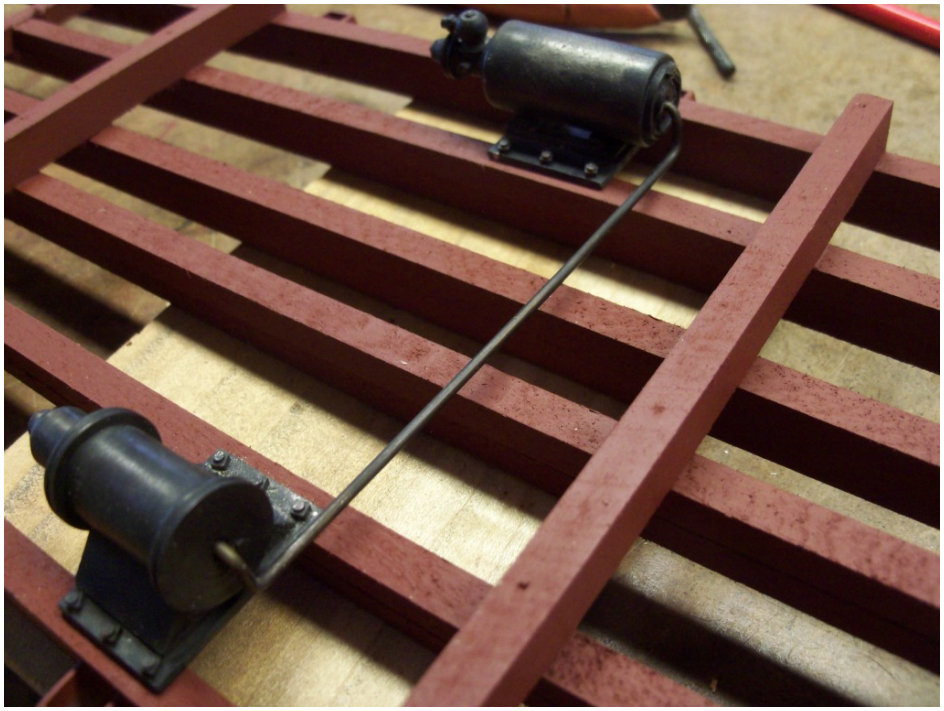
Using a #56 bit, drill the 3 holes on one side of the brake cylinder and the 3 holes on the air reservoir. Push in 6 NB's to those holes. Now drill the other 6 holes, 3 on the cylinder and 3 on the air reservoir and pin them.



Gather the 6 pieces of 12" brass rod which you have blackened. Find the one with a flattened end and hole and measure 4-1/2" from the flattened end and cut it off. Set it aside with 4 other 12" lengths. Those 4 will be used as the truss rods and need to be 12" long so don't use them for the brake airline plumbing or brake rods. Measure between the pre-drilled holes in the back side of the cylinder and reservoir. Add 1" and cut that length from the last 12" piece of rod. Bend up ½" in the same direction at both ends of this rod. Now bend ¼" of the ½" out which will fit into the pre-drilled holes. You may need to tilt the bends in or out a tad to line up with the holes.



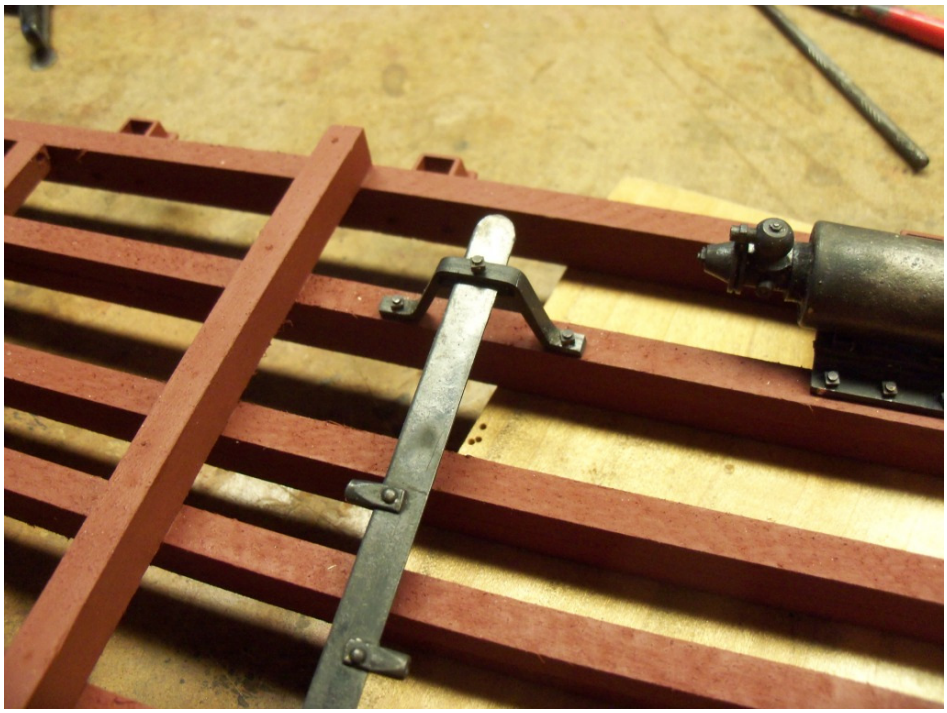
Rod bent but not pushed into the holes.



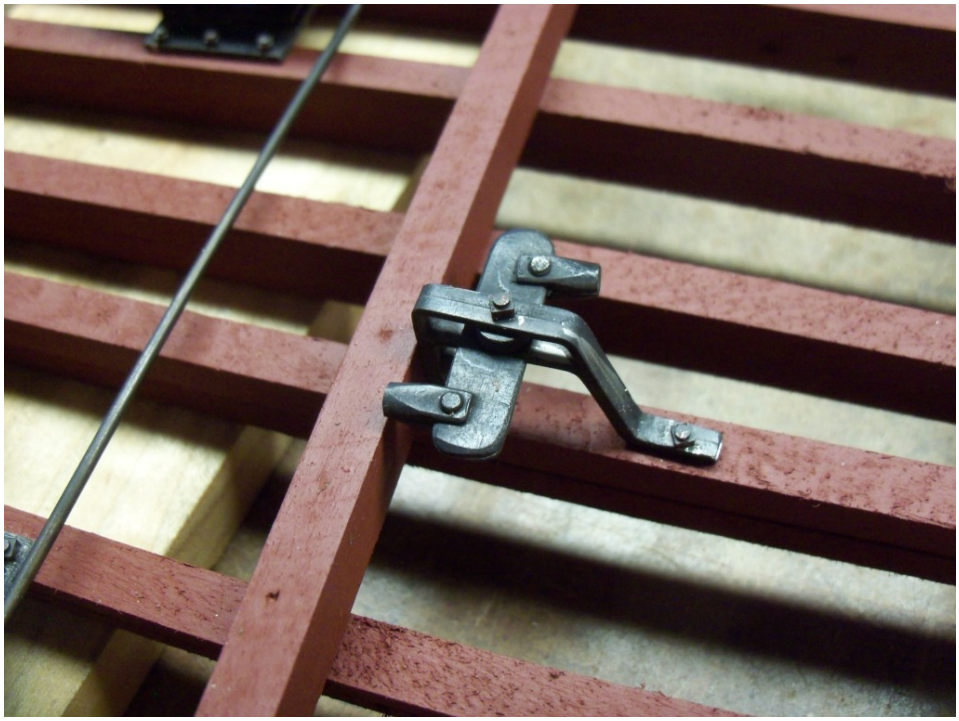
Pushed into the pre-drilled holes and a tiny drop of ACC applied to glue in place.

Step 7.

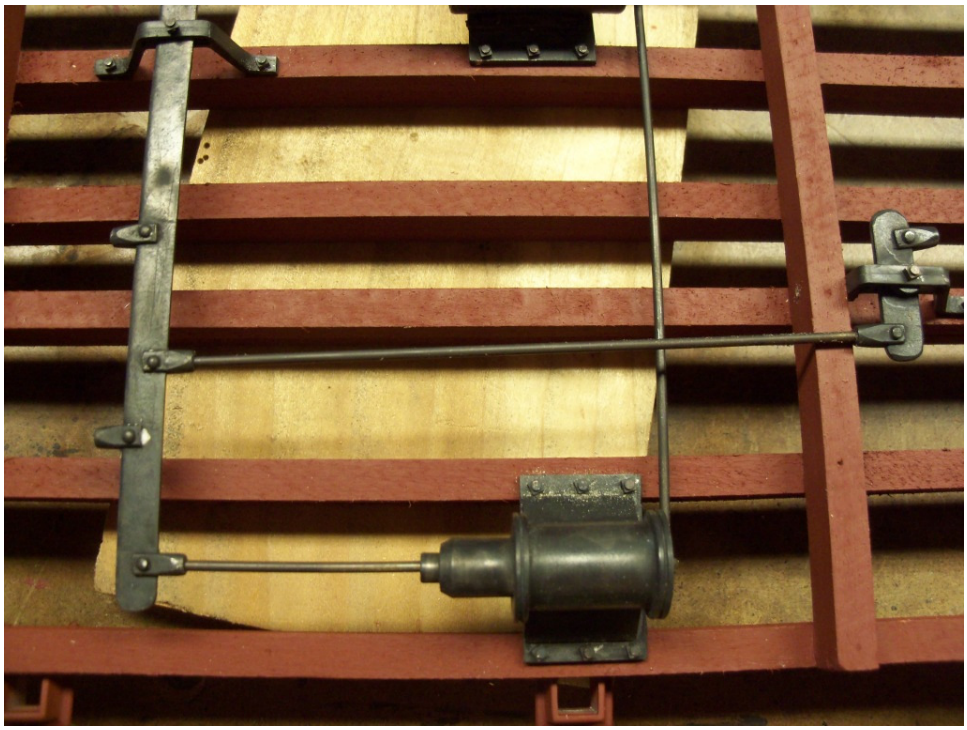
Gather the main brake lever and support and the small lever and support plus 6 NB's and the remaining piece of rod used in the previous step. Per the picture, place the main lever support in position, drill #56 holes through the legs of the support and pin. Push a third pin through the center hole into the hole in the lever.



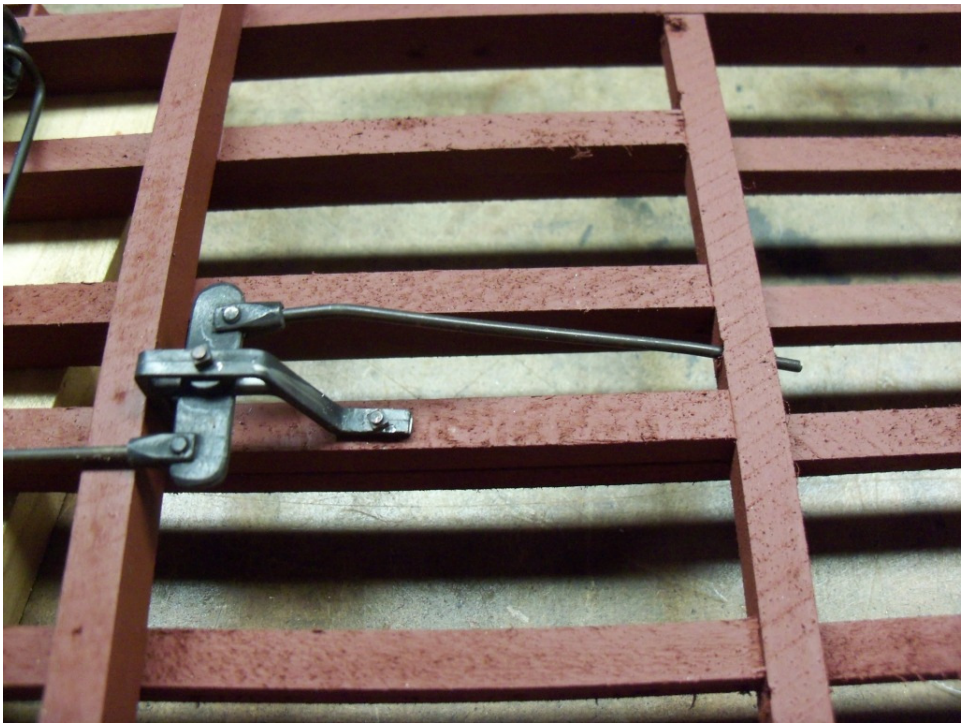
Now mount the secondary brake lever by drilling a #56 hole into the needle beam and then through the foot into the sill. Press 2 NB's into the holes and the third through the center and through the lever.



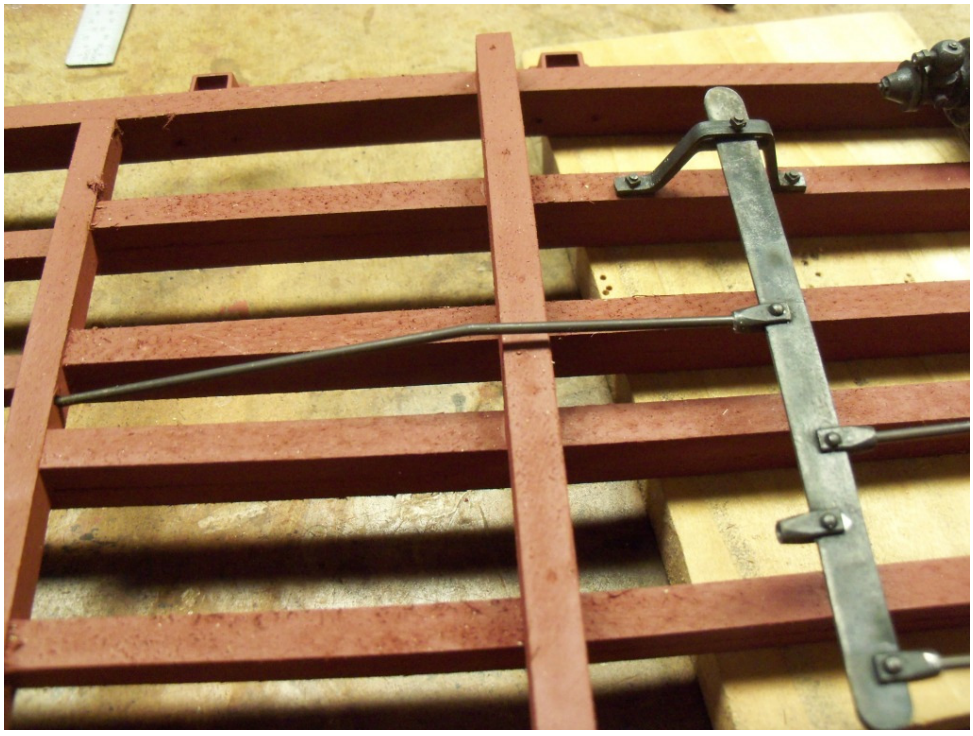
With the remaining rod used to connect the cylinder and reservoir, measure cut and place the rod from the clevis on the main lever to the cylinder and from the clevis to the secondary lever clevis.



There should be enough rod to do these two connections. The piece cut from the 12” rod with a flattened end is 7-1/2” long and will be used from the main lever clevis to the terminating truss rod board and from the secondary lever clevis to the other terminating truss rod board. 4-1/2” from the main lever and 3” from the secondary lever.



3” piece of rod.

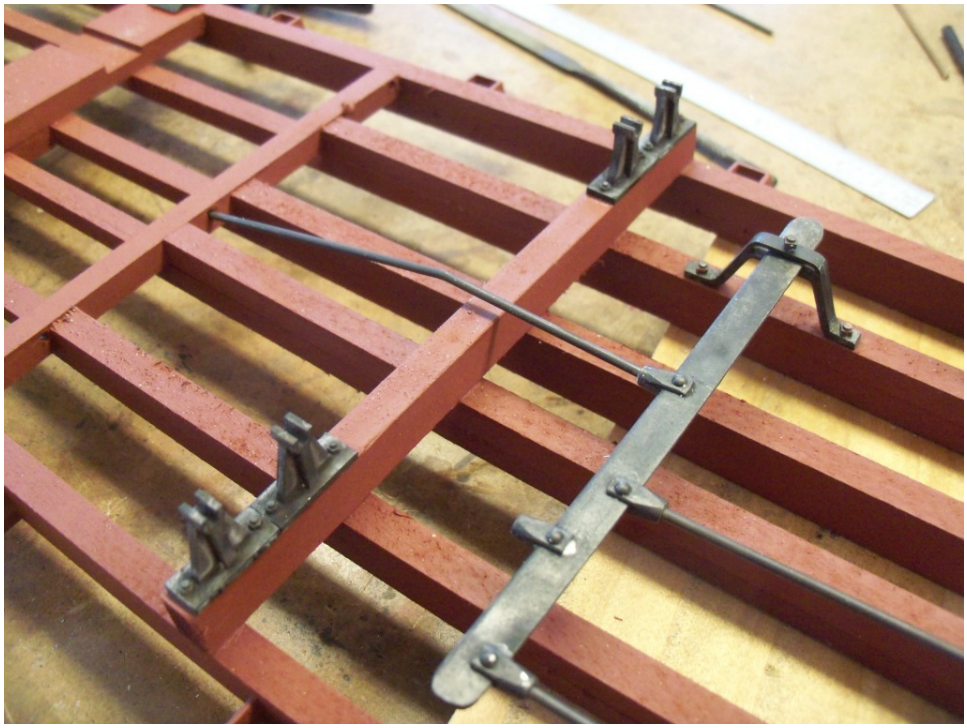


4-1/2” piece of rod.

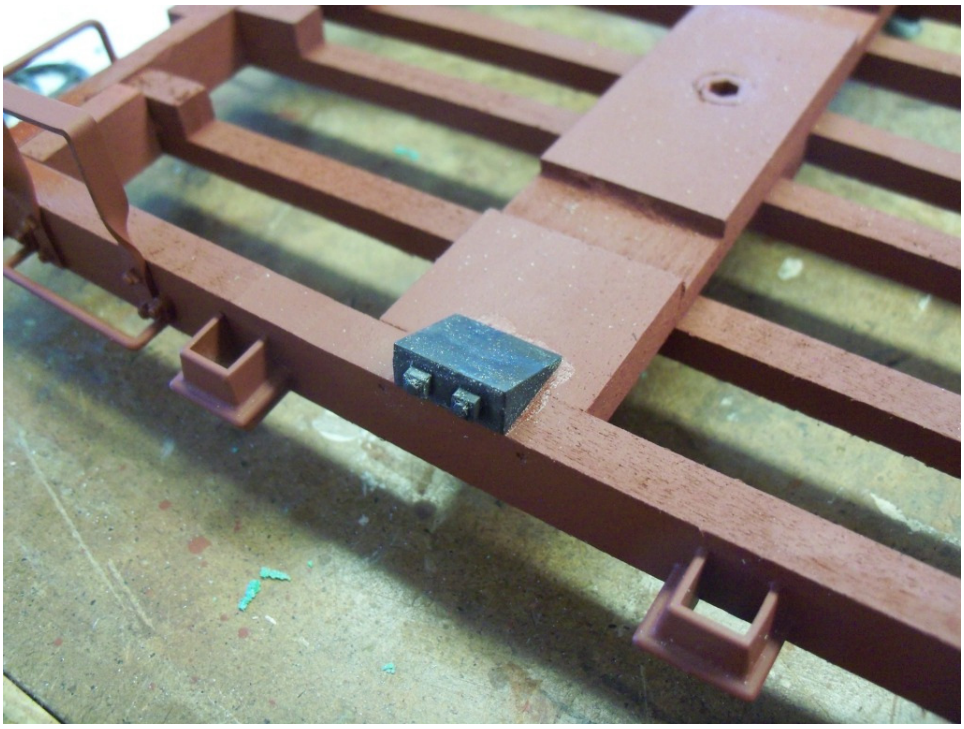
Add a drop of ACC to each of the connecting points of rod to clevis, cylinder and terminating board.

Step 8.

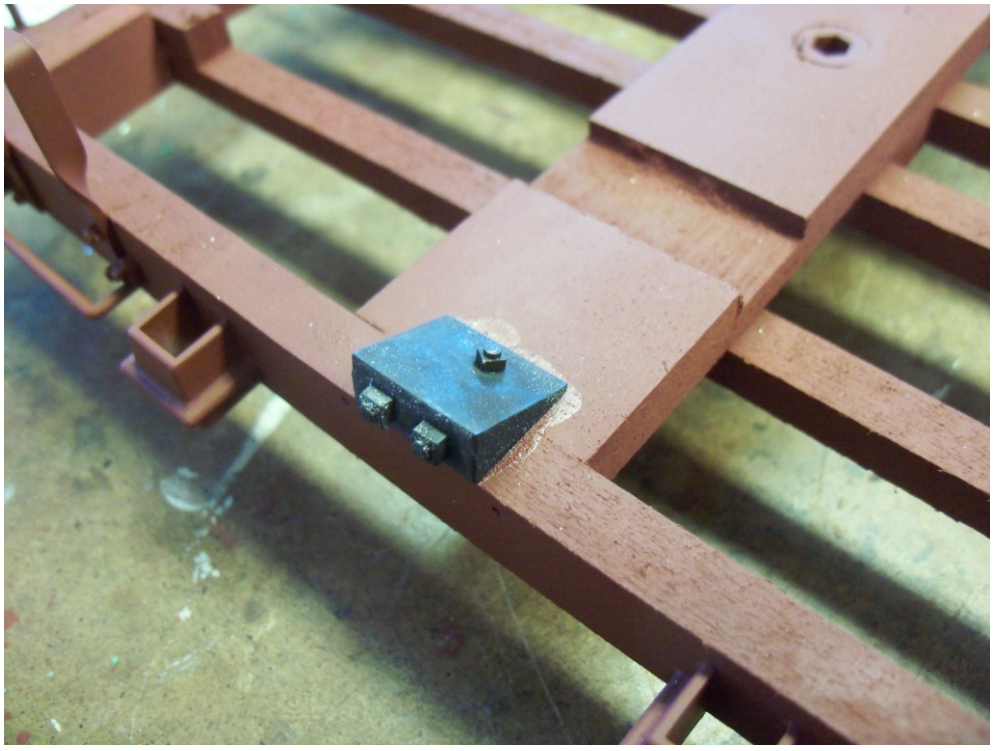
Gather the 8 queen post, 4 turnbuckles and 4 remaining pieces of 12” brass rod. Sand or file clean the bottoms of the 8 queen post so they will glue properly to the needle beams and glue them as shown in the picture.



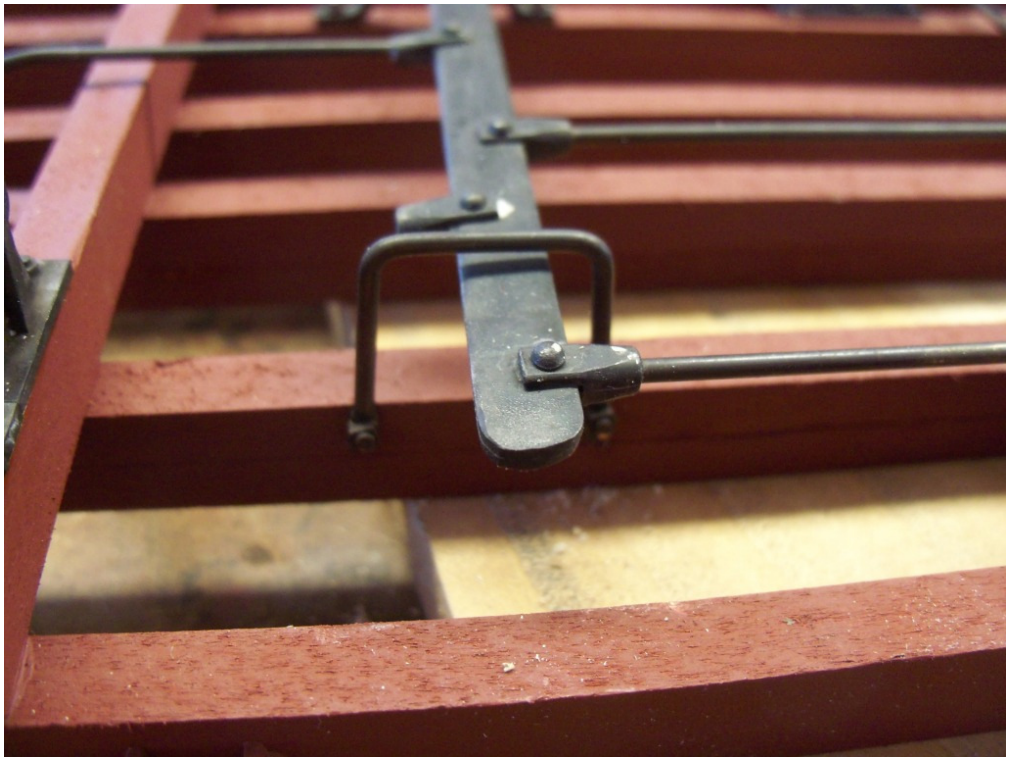
Glue the 4 bolster terminating plates over the frame bolsters as pictured.



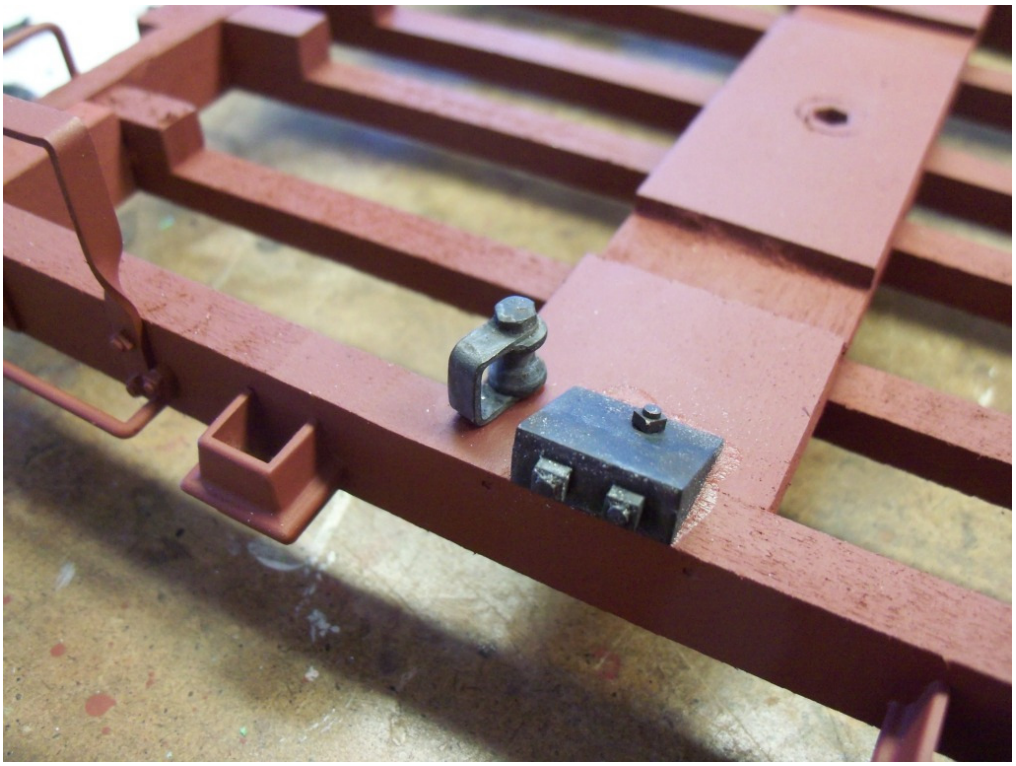
I drilled mine and pinned with NB's to insure they don't fall off. Drill the castings with a #54 bit and into the frame with a #56 bit.



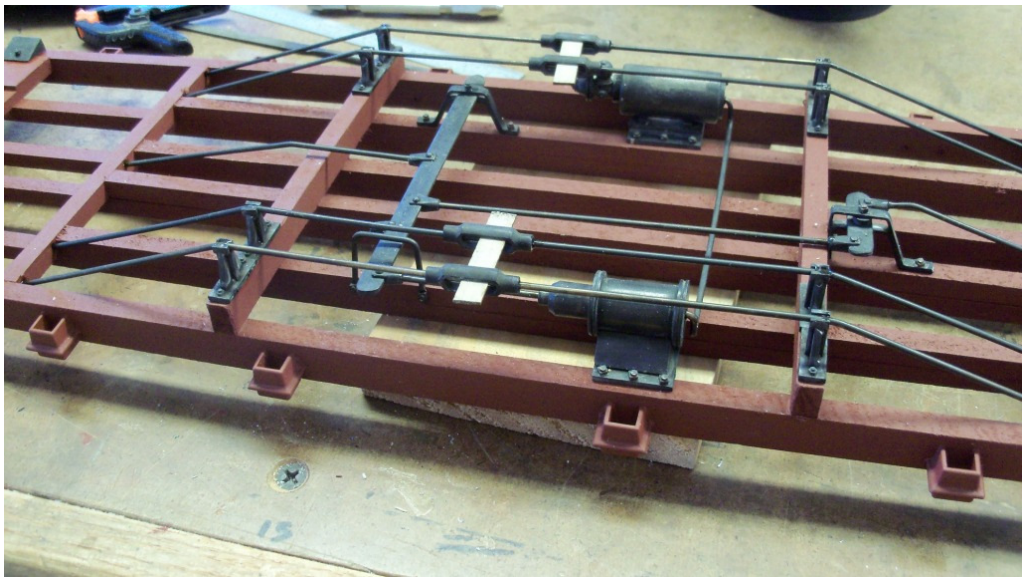
Hold the main lever limiting bar in place and drill a #56 hole through it into the sill and pin with a NB. Drill the other leg and pin.



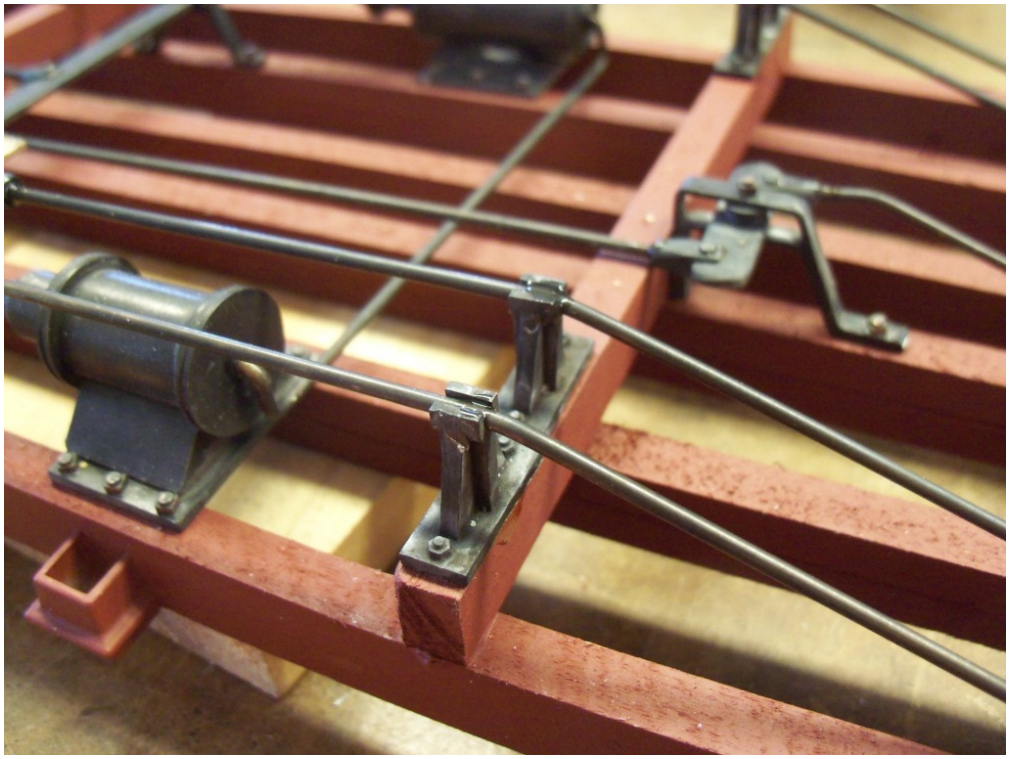
Drill a #52 hole near the lower left bolster terminating plate for the chain roller and glue as pictured.



Slide one of the turnbuckles onto one of the 4 remaining 12’ rods. Place one end into one of the holes drilled in step 1. Bend the rod over the first queen post and then the second. Left out of the queen post tops to fit into the drilled hole on the opposite truss rod terminating board. Repeat for the other 3 truss rods.



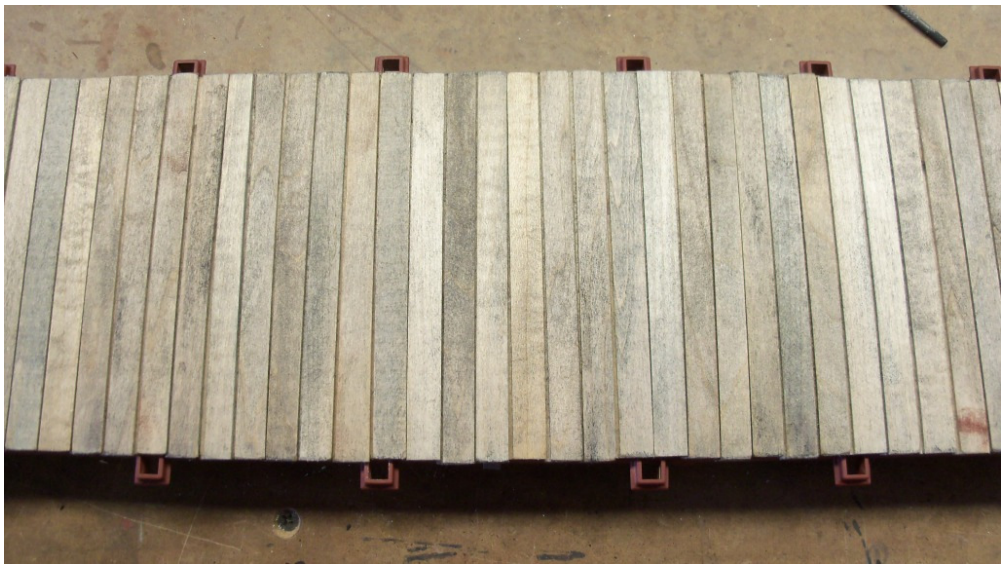
When I drew up the queen post in 3D CAD, I made the pocket for the truss rod a little deeper than normal. In the past, I’ve had issues of the truss rod popping out of the queen post. With the pocket deeper, the tops can be gently squeezed just a little to capture the rod within. If you do this, be gentle and not too much pressure. Then a tiny drop of ACC to lock everything together.



Step 9.

I've supplied 60 pieces of shiplap board for the deck. I've built 4 cars including this one. 3 to get the frame and all the castings and fittings to come together properly and this one, for the purpose of pictures and instructions. All 4 cars used 56 boards. I don't butt the boards up against each other super tight. In fact, I fit them rather loose, so the shiplap is very pronounced.

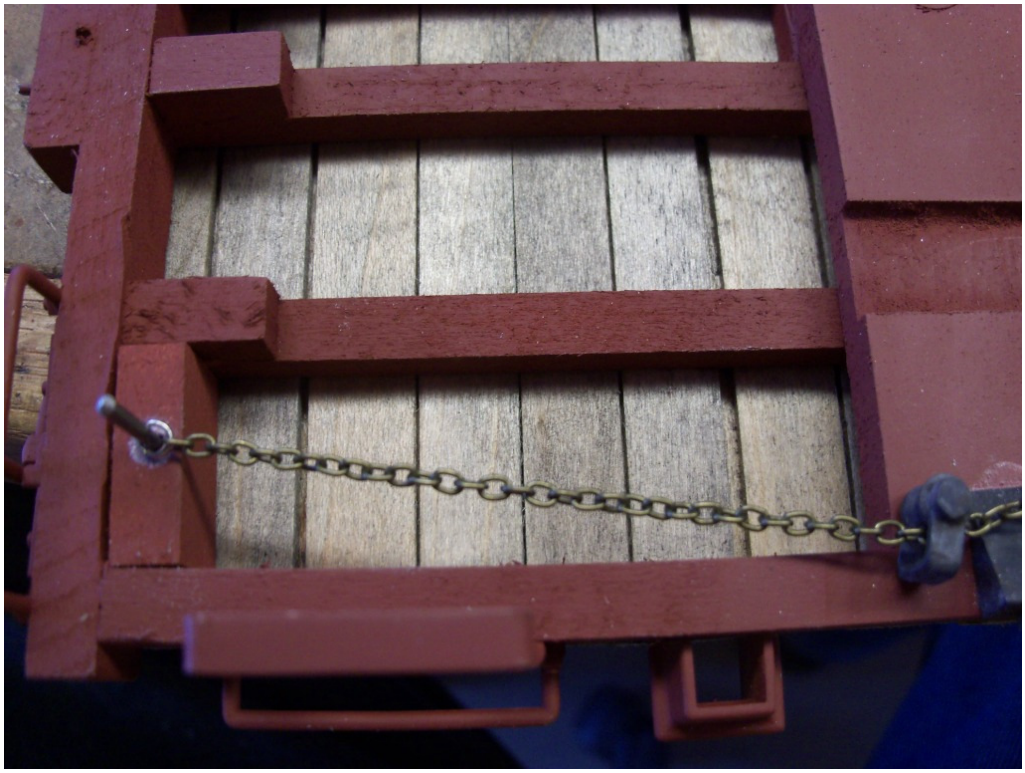
On the first board, sand off or cut off the edge of one side's shiplap. Glue this board down with the flat edge out. Then glue about 6" or so at a time until reaching the other end of the car. If the last board fits to the edge, you're done. If a little overhang, sand or cut off that edge's shiplap. If short, cut a board to fit with the smooth edge out.



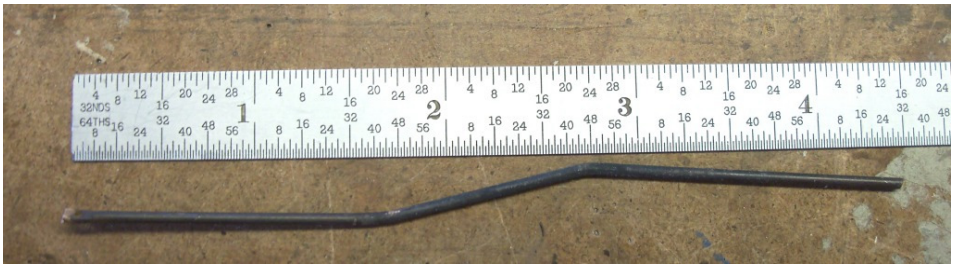

First board on the left and last board on the right. This car ended with a full board.

Step 10.

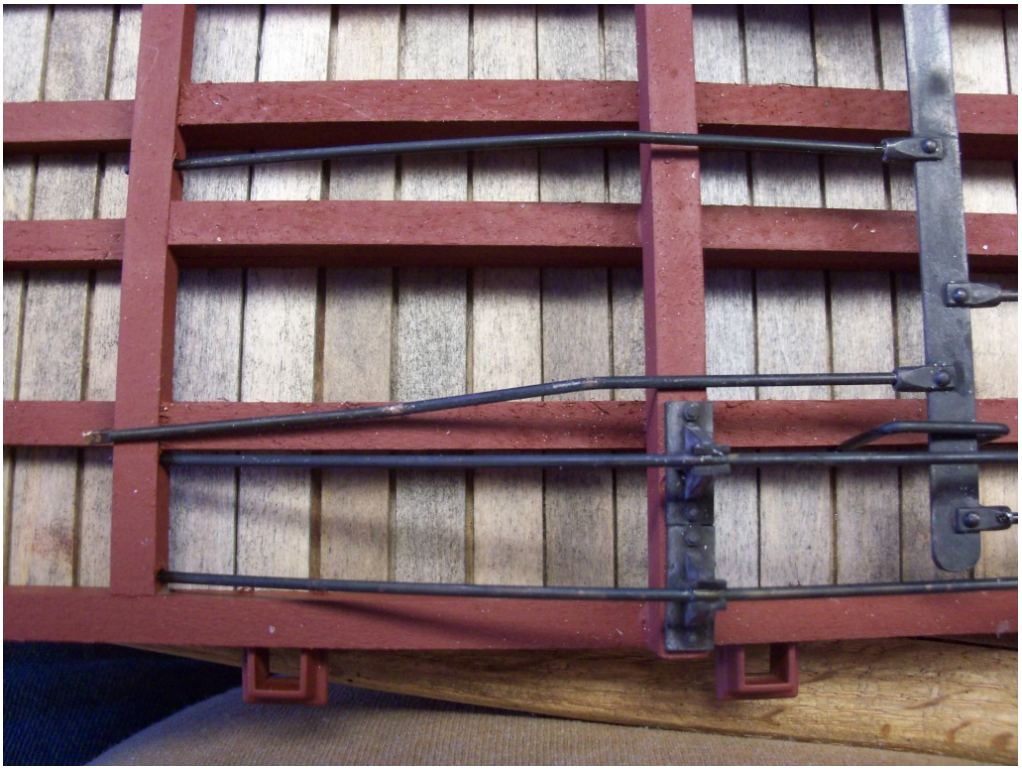
With the car upside down, drill a hole with a #50 bit through the extra block on the "B" end for the brake staff. Insert the staff leaving 1" or so showing. You will have to move that end of the car off your bench for the shaft to extend down. Open one of the 3mm jump rings and insert into one end of the 12" of chain. Close the jump ring. Thread the jump ring and chain through the chain roller and slide the ring over the brake staff.



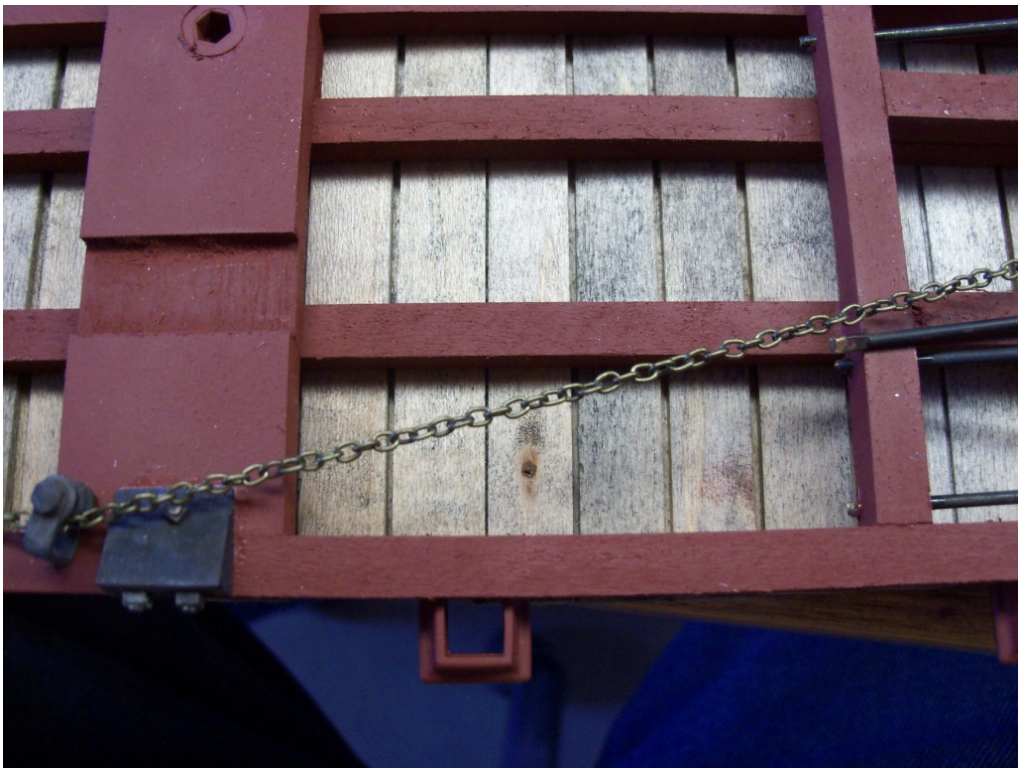
The final piece of 1.16" brass rod with the flat at one end is 4-1/2" long. Bend 1-3/4" of the wire at both ends to create this shape. Hard to tell but the flat is at the left side.



Test fit the piece into the clevis as pictured. Don't glue it in, just test fit and adjust the bends so the end with the flat is touching the sill under it.

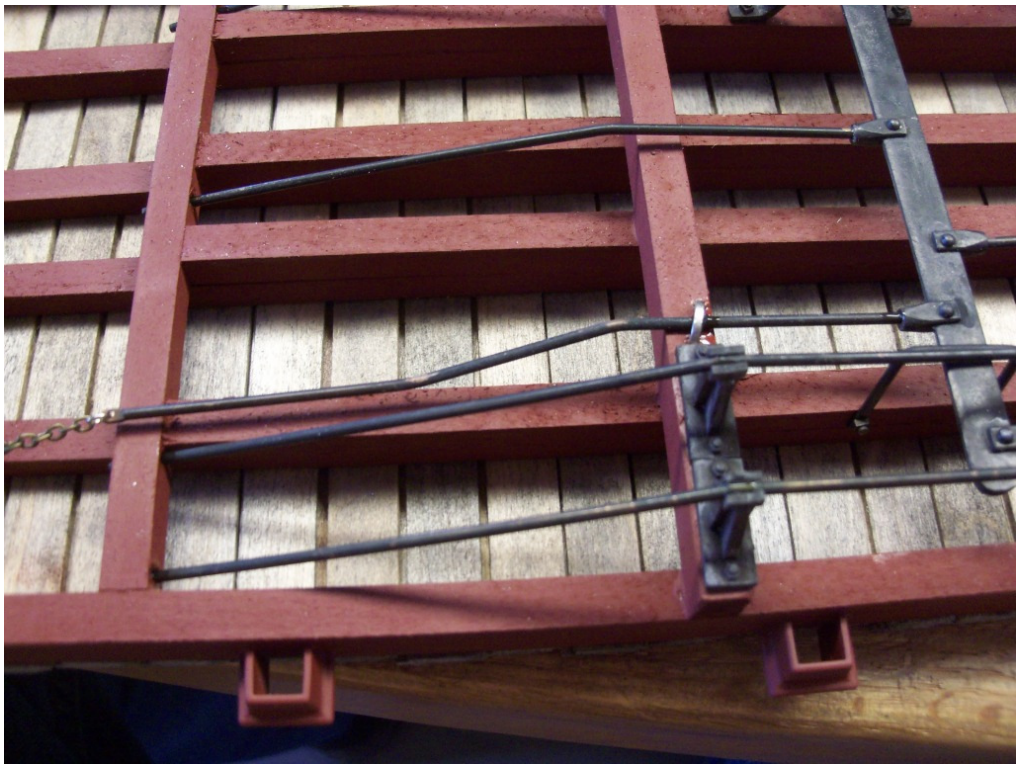


Hold the chain to the flattened end to determine where to cut it. Cut it right at the link next to the flattened end.

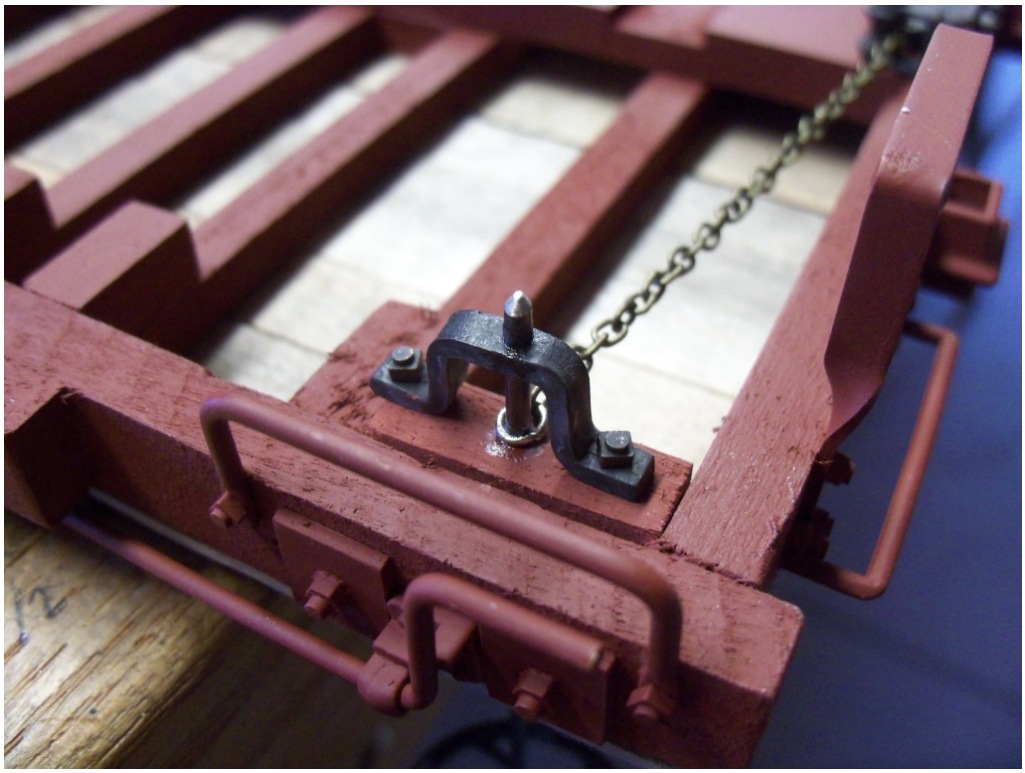


The cut would be approximately 12 links in from the right edge of the picture. Open another 3mm jump ring and thread it through the hole in the flattened end and the end of the chain. Close the ring and fit the wire back into the clevis. The chain will be a bit loose. Remove the wire and trim a tiny bit off the clevis end and test the

chain for tightness. Repeat if necessary, to snug up the chain. Press the staple (MP-15) into the terminating board to mark for holes. Drill with the #56 bit and press in the staple. Add a drop of ACC to the clevis and wire joint and where the wire is under the staple.



Now place the brake staff support over the staff and drill a hole through one of the feet with a #56 bit and press in an NB. Drill the other side and press in the NB. Add a drop of ACC to the staff where is passes through the wood block and the support.

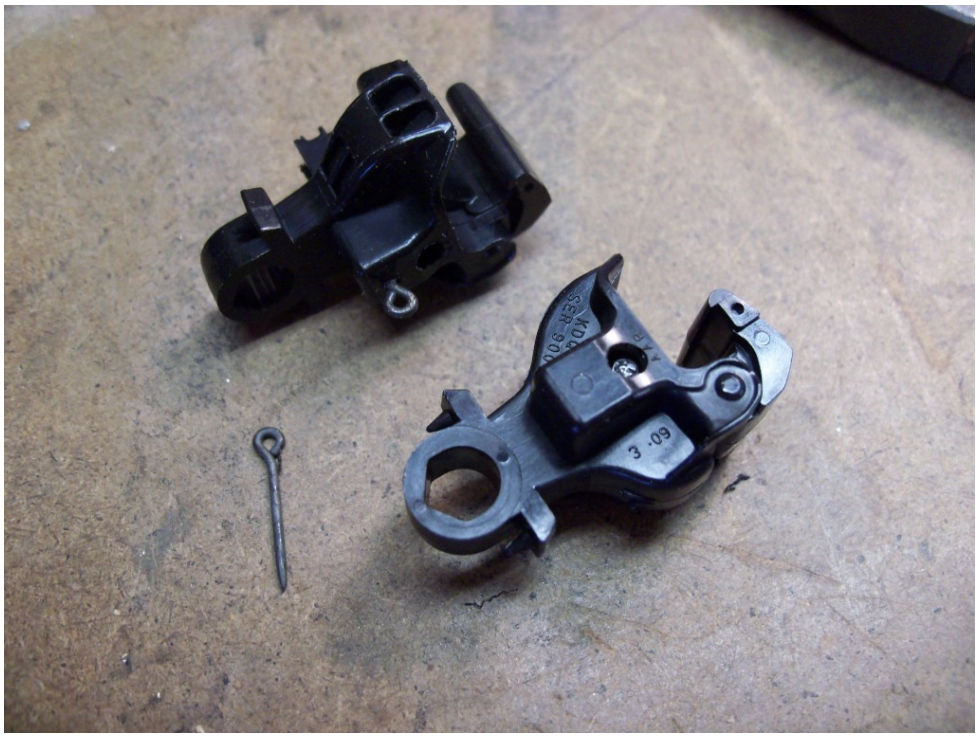


Flip the car over top side up and fit the lock pawl over the brake staff. You may need to enlarge the hole through the gear with a #50 bit to fit the staff. Drill one hole with a #56 bit in one of the holes and press in a NB. Drill the other 2 hole with the same bit and press in the remain 2 NB's.

Drill the center of the bake wheel with a #50 bit and glue to the top of the staff.

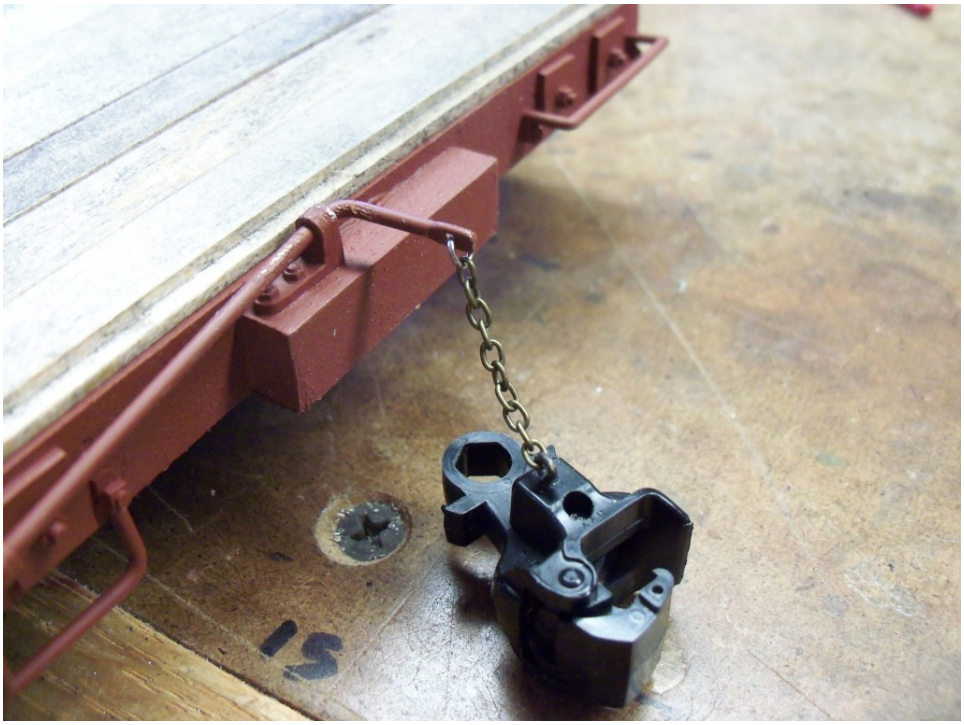
Step 11.

Gather the Kadee couplers, 2 eye pins, 2 #4 wood screws, 2 3mm jump rings and the remaining chain. I cut the uncoupling bar off my couplers as it interferes with the brake hose assembly, but I leave that to you. Drill a #66 hole in the top of the coupler. There is a round mark left by a pushout pin during the injection process. Use that as the center point for drilling all the way through the coupler body. There are no "working" parts in this section of the coupler.

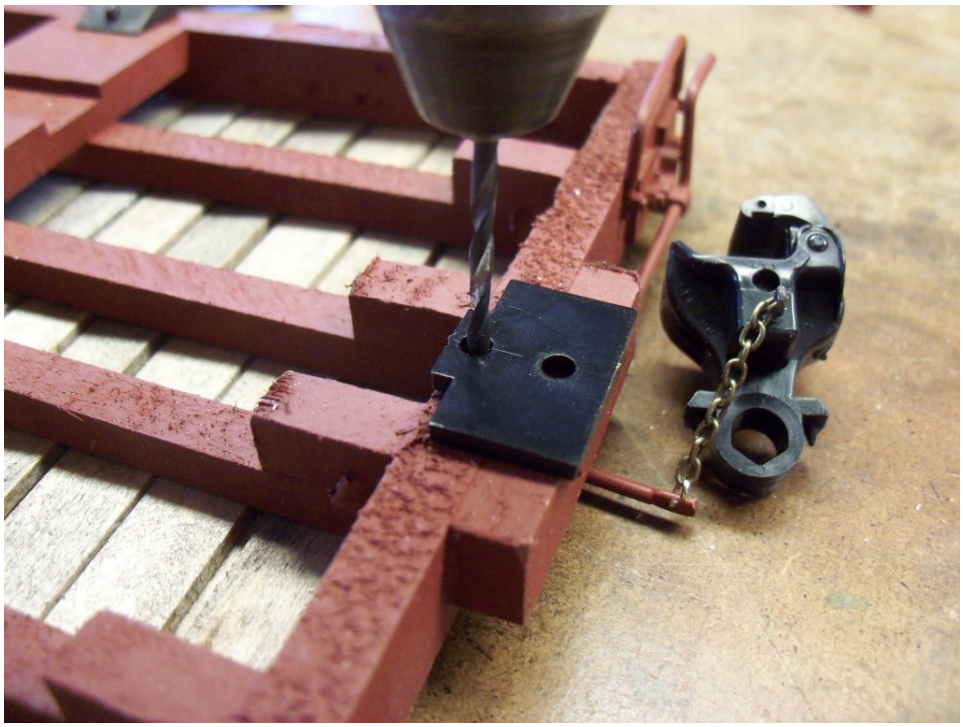


The top coupler has been drilled and the eye pin pressed in. You can see the round mark top center of the bottom coupler. This is an artifact from the injection molding process where a pin pushed the plastic part from the mold. Use this mark as the center point for drilling.

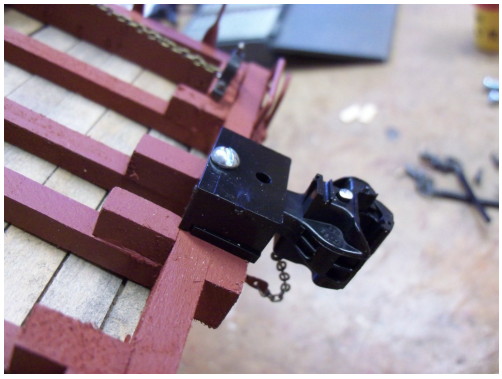
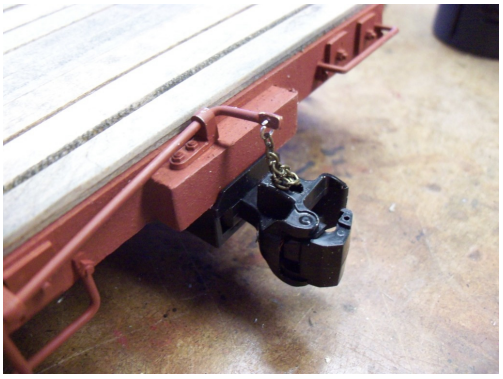
Cut 2 pieces of chain from the remaining length. Both pieces to be 10 links long. If you're like me, time for the heavy duty magnifying goggles. Open a jump ring and connect the chain to the hole in the coupler lift bar. Close the jump ring and open the eye of the eye pin on one of the couplers. Connect the other end of the chain and close the eye of the eye pin.



Using the lid of the coupler draft gear box as a template, drill a #47 hole into the end beam approximately ¼". You don't want to drill through the decking on the top of the car.



Now assemble the coupler with springs and lid and screw to the bottom of the car.

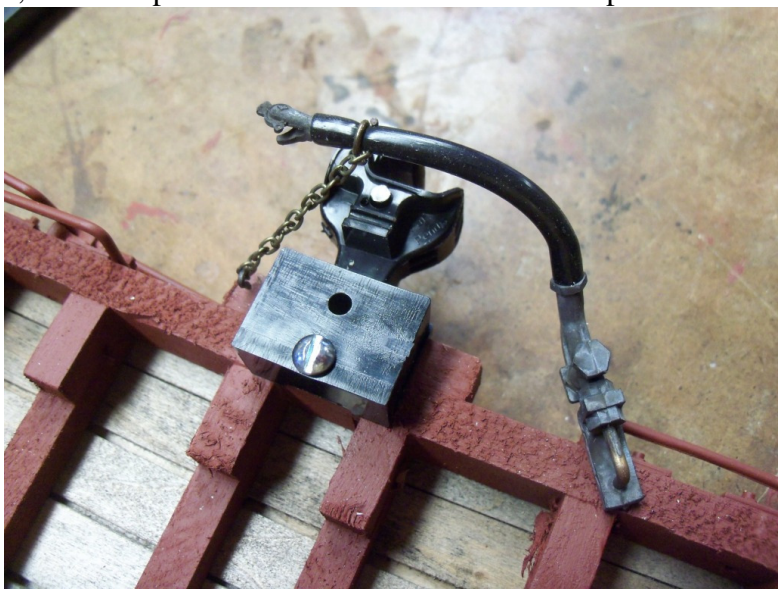
Coupler lift bar doesn't work but it looks good! Repeat for the other side.

Step 12.

Gather the 2 brake hose assemblies, the 2 remaining eye pins, chain and the 2 5mm jump rings. Cut 2 lengths of chain 15 links long. Open the eye of the eye pin and connect one length of chain. Open a jump ring and connect the other end of the chain and fit the jump ring over the hose next to the glad hand. It might be easier to remove the glad hand to slide the jump ring onto the hose.

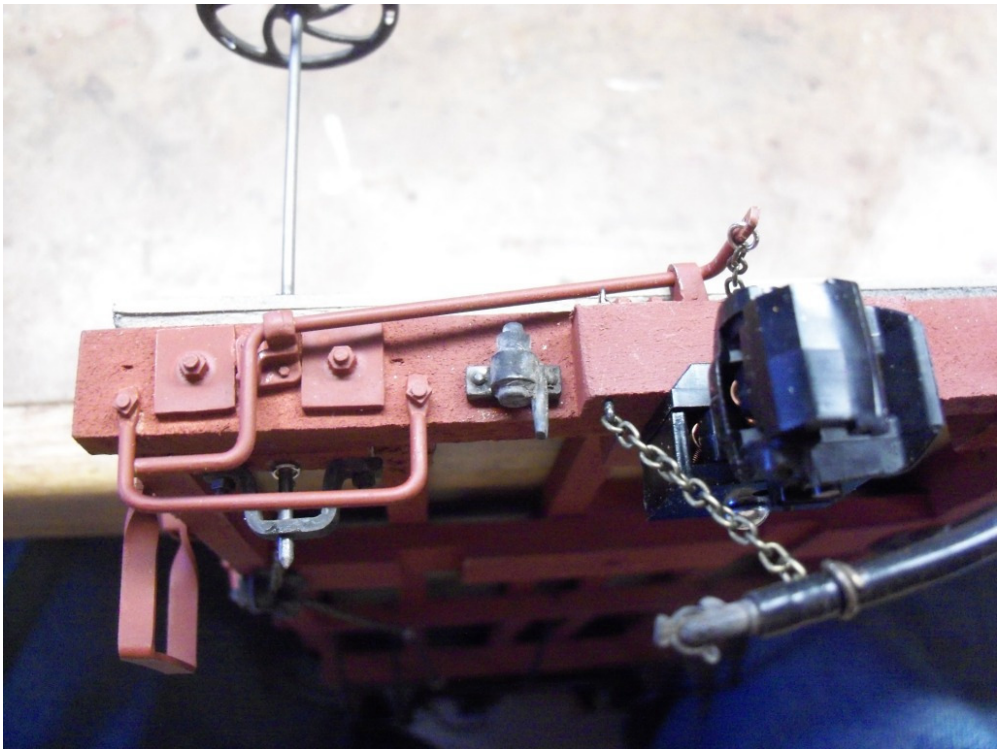
Drill a #50 hole in the bottom of the end beam 1-1/4" from the edge of the beam. Drill a #66 hole in the bottom of the buffer block near the edge so you don't drill into the lift bar casting as per the picture.

Insert the brass bar end of the angle cock into the #50 hole and the eye pin into the #66 hole. Position the angle cock so it doesn't interfere with the coupler knuckle's side to side swing. When happy with the angle, remove the angle cock, add a drop of ACC and re-insert and hold in position for the glue to set.



Step 13.

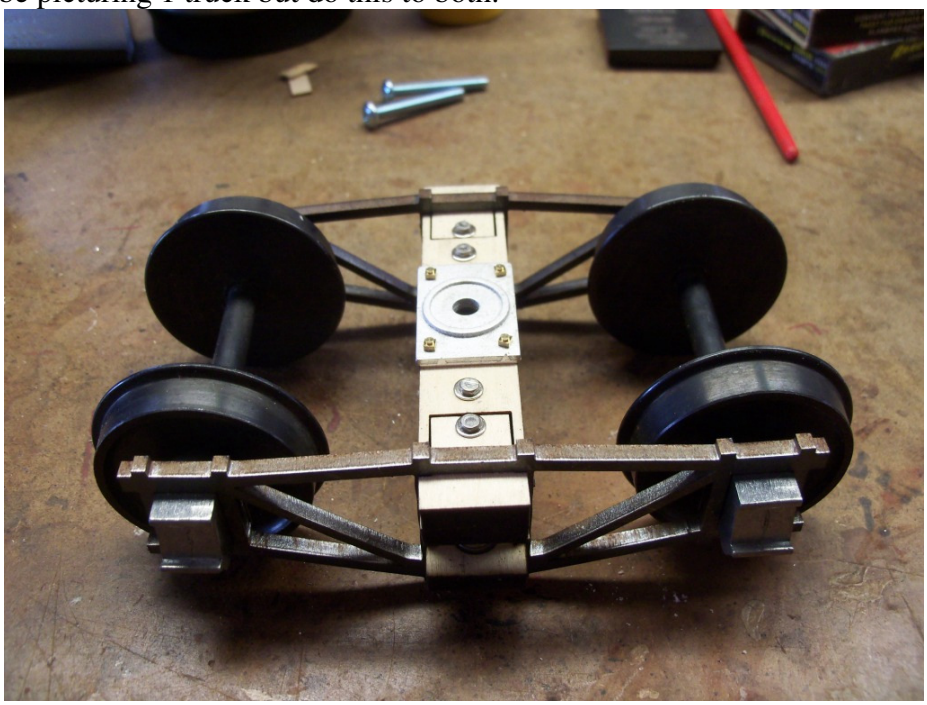
Drill a #50 hole just to the left of the buffer block at the B end of the car for the retainer valve. Add a drop of ACC and press the valve in.



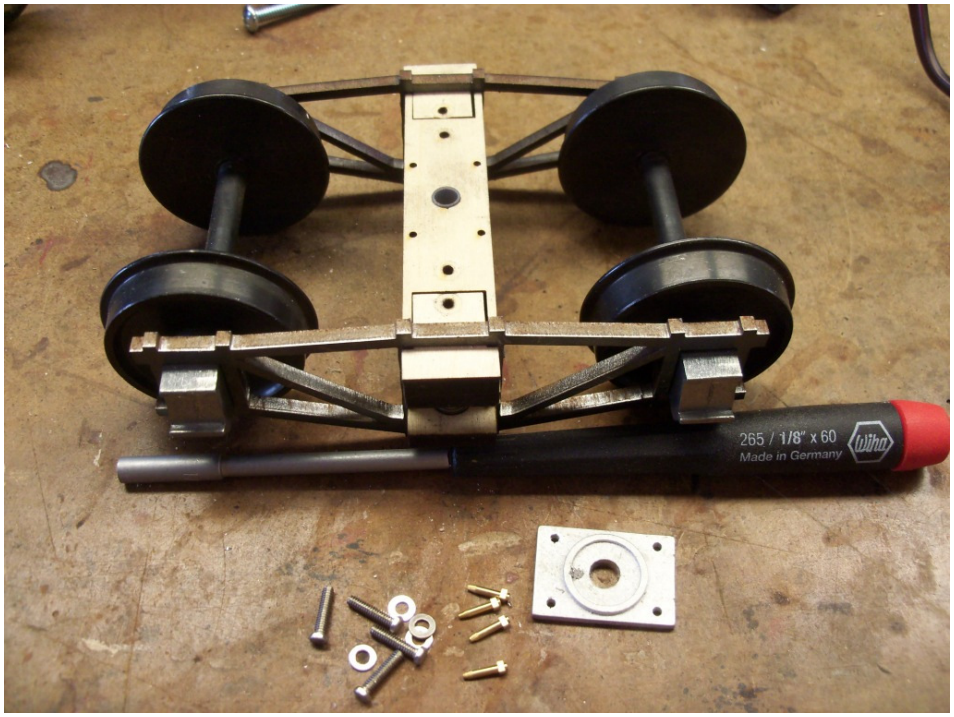
This completes the assembly of the car. Next up is the trucks.

Step 14.

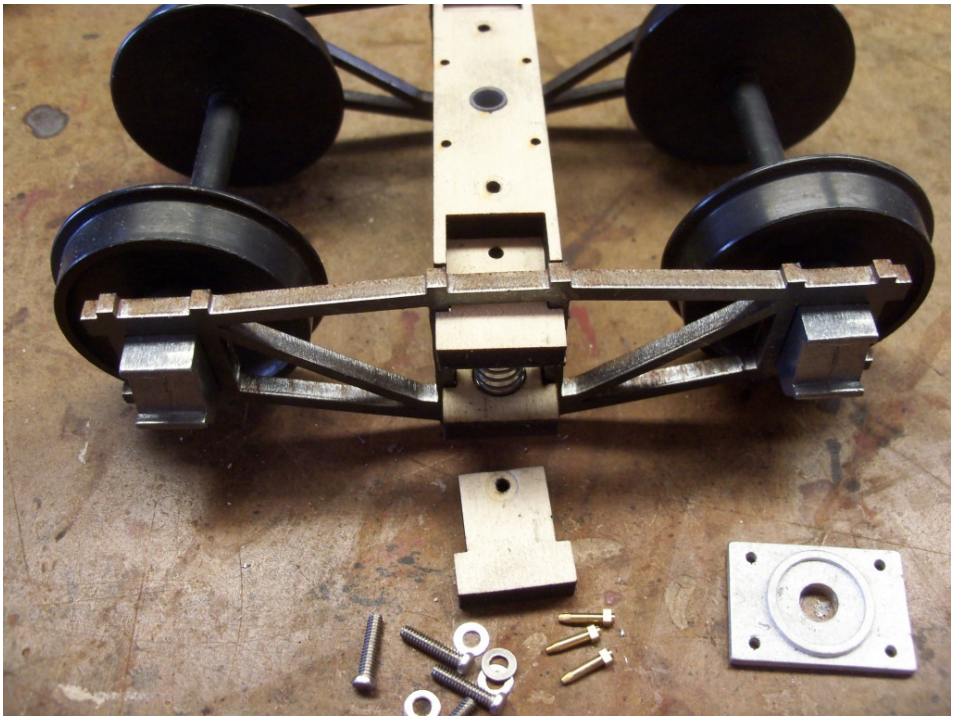
Grab both the trucks, 8 journal box lids, 2 springs, 2 nylon washers, 2 fender washer, 2 8/32 by 1-1/4" screws and spare parts. I'll be picturing 1 truck but do this to both.



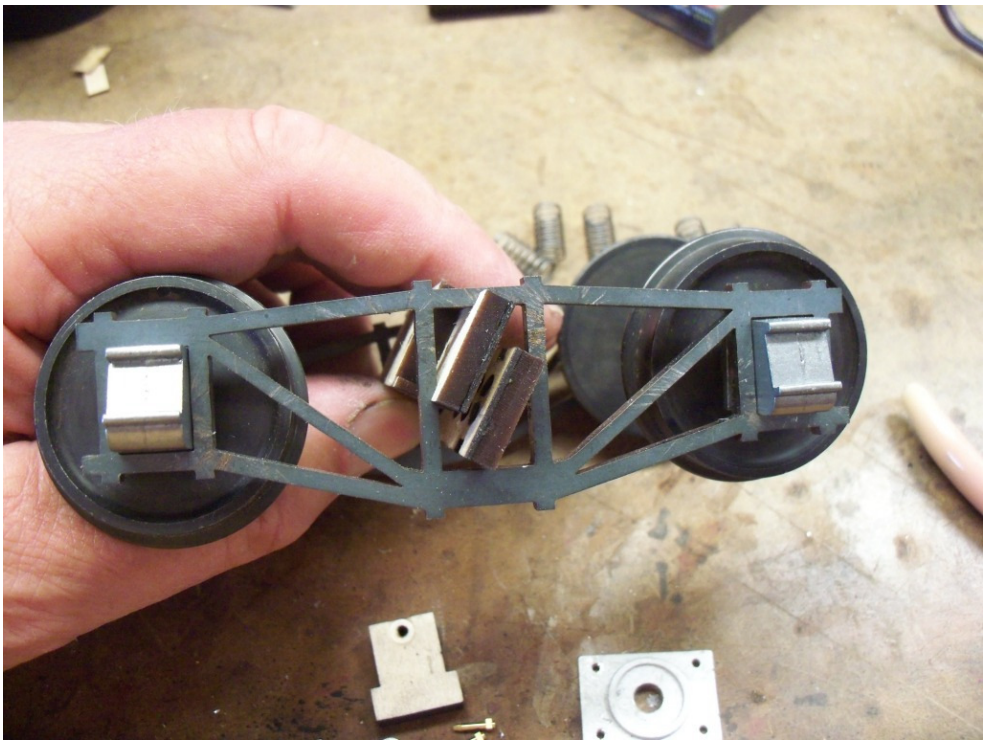
Using a 1/8” socket (3.2mm will work), remove the 4 2-56 hex head screws and #2 washers. Also remove the 4 NB’s and white metal bolster pivot plate. Also pictured is my 1/8” socket wrench.

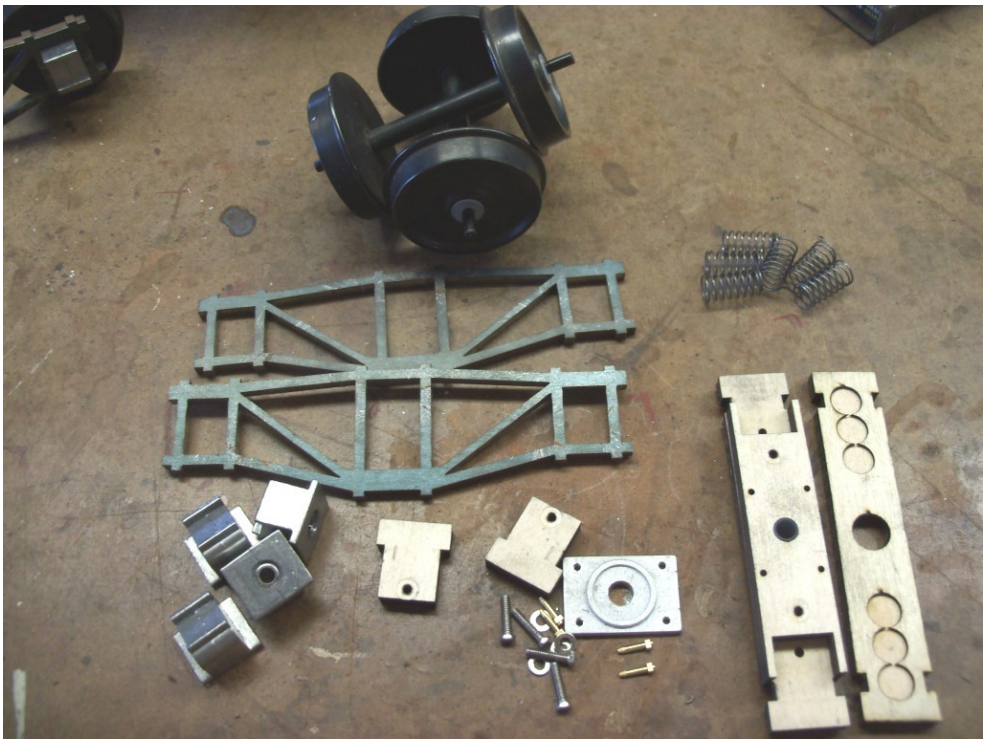


Remove the 2 wood pieces from the side of the bolster.



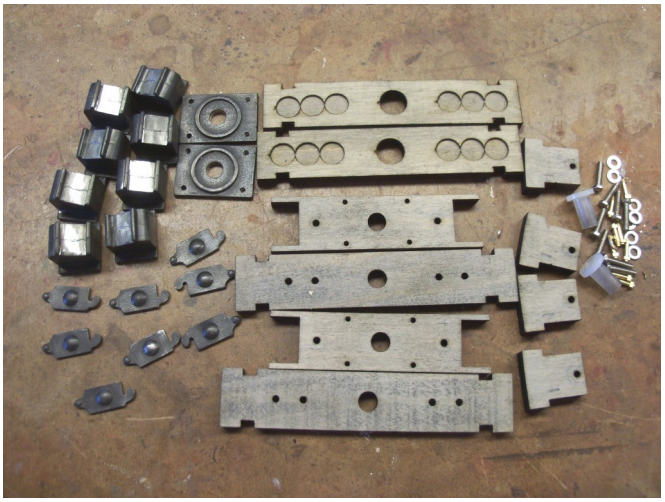
Tilt the bolster leaving the spring plank flat and the springs should pop out. You may need to pull them out. Now tilt both the bolster and spring plank so they are both 90 degrees from the flat position. This will allow you to slide the side frame off allowing the trucks to fully come apart. There are thin, white nylon washers on the axle tips so don’t loose them. I added them in case you plan on running the car on electrified track.





Take the sideframes outside and rattle can them flat black. I sprayed one side of mine on a piece of cardboard and then worked on staining with India ink and alcohol all the wood parts. I also shined up the white metal and diecast journal boxes and blackened them with patina. When dry, I buffed the blackened parts with a wool wheel in my Dremel. By this time, the first side of the sideframes was dry and I flipped them over and sprayed them with the flat black paint.

Once all parts were dry, it was time to re-assemble the trucks.

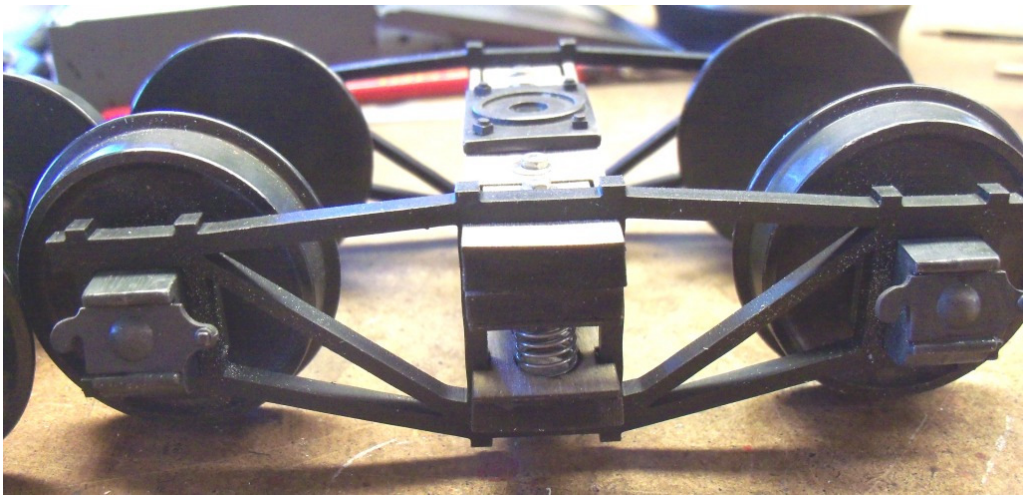


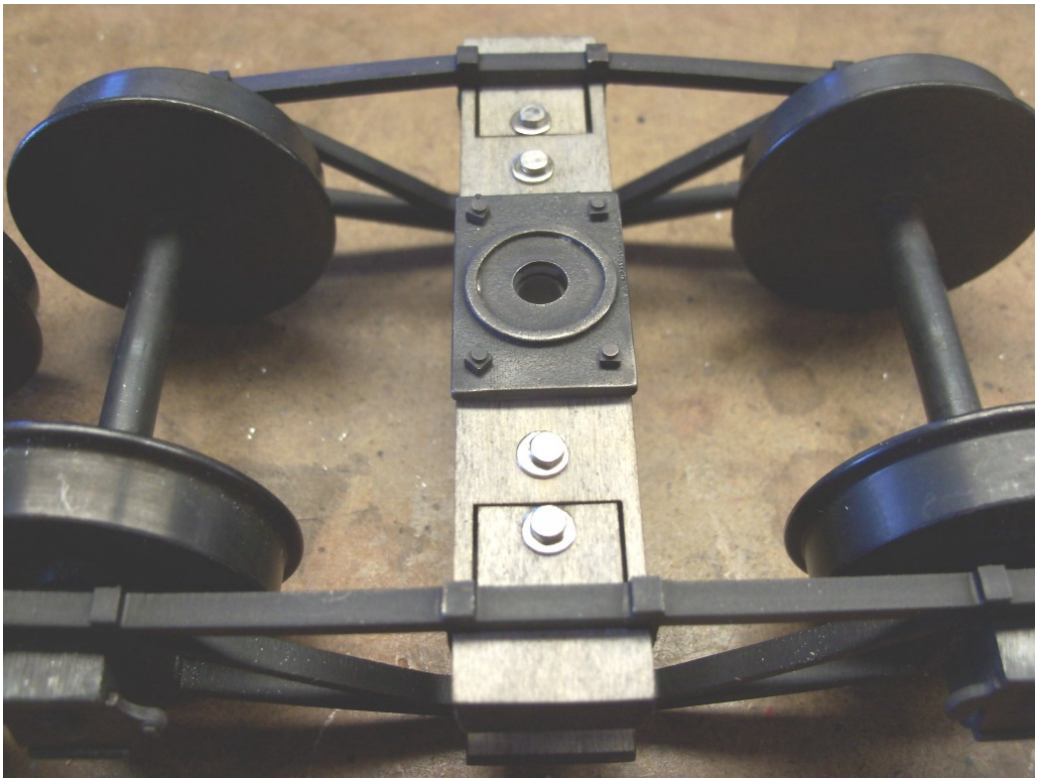
If you hold up a sideframe and look down its length, you'll see it is slightly warped. This is from the heat of the laser cutting them from a large sheet of 11 gauge steel. When you re-assemble the trucks, you want the middle bowed out from the truck. If you reverse them so the journal box ends are bowed out, the wheel and journal boxes will be overly loose and sloppy.

Start by placing the journal boxes into the sideframes. Then place the wheels into one frame and finally, the second frame and journal boxes onto the axle tips Don't let any of the axle tip washers to get lost. Holding this together, slide the bolster in from between the frames and the spring plank from one side. Hold the bolster up and rotate the spring plank flat. Rotate the bolster flat and put one spring in each side. Slide the end blocks in and screw in place. Put the other 4 springs into the pockets.

I'm supply 6 springs per truck. Each spring will support ¼ lb. So, 2 springs in the truck will support ½ lb. 1 lb over the 2 trucks. 4 springs per truck will support 2 lbs and 6 springs per truck will support 3 lbs. Adjust the number of springs per the load you plan to carry. The car itself weights 1 lb 5 ounces so you need 4 springs per truck just to support the weight of the car. If you will have a pound of weight on the car, you'll need all 6 per truck. If you plan to carry more than 1 lb of weight, you will need to source stronger springs from a different supplier.

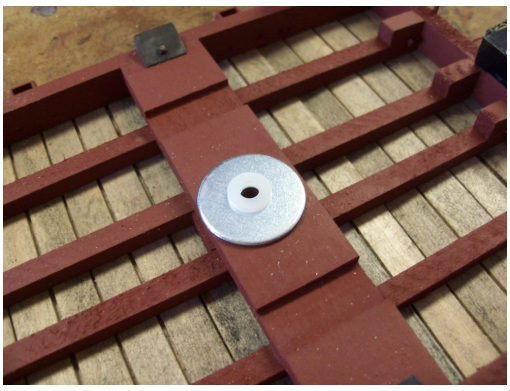
Shine up the pocket in the face of the journal boxes and the back side of the journal box lids. Add a drop of ACC to the back of the lids and glue in place. Let dry for several hours.

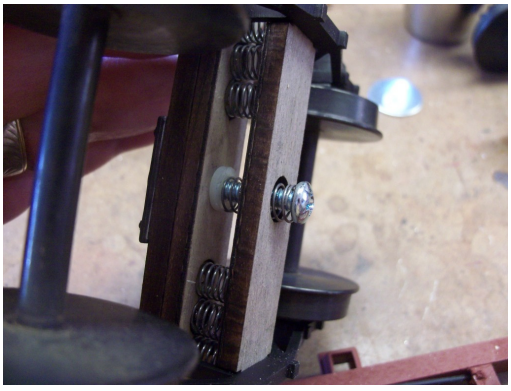




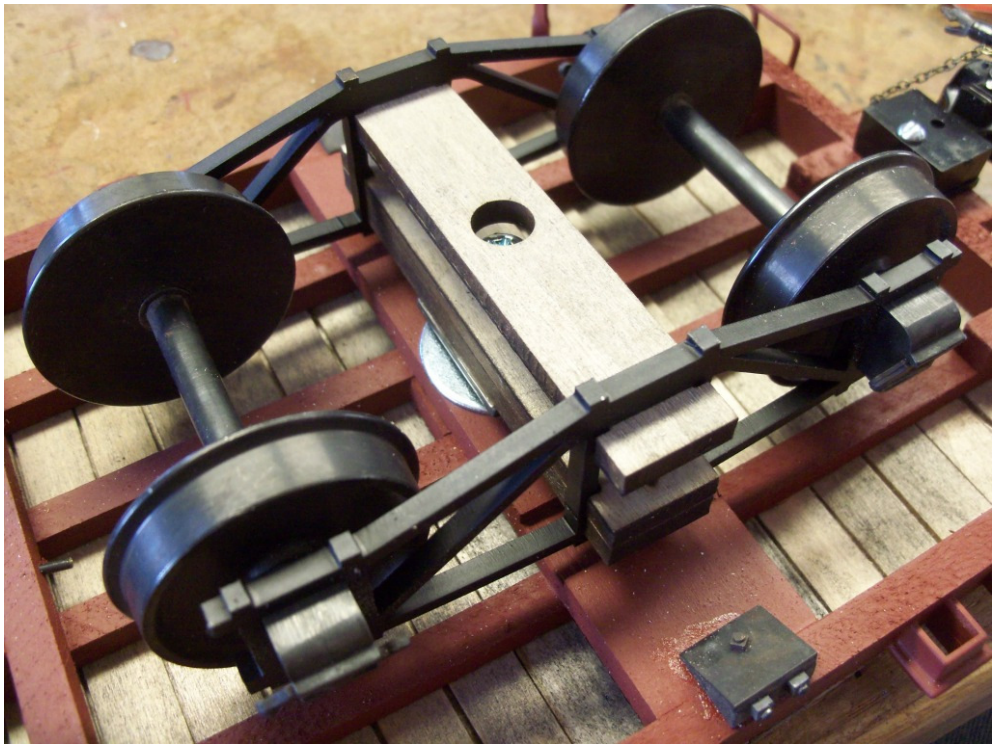
Step 15.

The remaining parts in the truck bag are 2 ea. 8-32 by 1-1/4" long machine screws, 2 1" fender washers, 2 nylon washers and 2 springs as well as a baggy of spare parts. Set the car upside-down and place a fender washer over the threaded insert on the body bolsters. Place a nylon washer over the center of the fender washer. Put a spring on the screw and push into the bottom of the spring plank and up through the bolster pivot plate. Position over the nylon washer and screw into the threaded insert. Screw in until the spring is fully compressed and back off 1 to 2 turns. The last thing you want to do is push up a deck board so if you feel the screw hitting something stop. The length of the screw verses the thickness of the truck and spring and washers should not allow the screw to contact the deck.





If the screw is working loose during operation, try a little silicon on a tiny portion of the screw threads. When silicon is dry, it's doesn't dry hard and remains flexible so you can remove the screw and trucks at a later point for maintenance.



Finished!! I'm working with San Juan Decals to carry 4 different sets of decals in 7/8ths scale. 1 set for the flatcar, 1 set each for the 2 different styles of boxcar and 1 set for the caboose. Watch my site for updates.

Comments are always welcome. Positive or negative. Please contact me for any issues with the construction. My email is phil@philsnarrowgauge.com. Email is the best way to reach me as I check it several times a day. I'm not always near a telephone.

Please send photos of your completed model. I always enjoy seeing my customers work.

Thank you for the purchase and I hope the build was as fun for you as the design was for me.

Phil Dippel
Phil's Narrow Gauge