

Finishing the top of the Shay Boiler

Nelson Riedel NRiedel@Adelphia.net

Initial: 05/27/04 Last Revised: 05/27/2004

The shay is now running so it's time to finish those last few cosmetic details. This page covers the handrails and bell details on the top of the boiler.



The photo above shows the bell and handrails on Cass 5 which I chose to copy. The next photo shows the engine side of NLW No 1.



The bell is a casting set from [Railroad Warehouse](#). The base is made from a piece of 1" diameter brass rod. The bottom was machined to the correct radius at the same time the bottom of the sand dome was machined. The bell U-shaped casting is attached with a 4-40 screw through that round base into a 1/4" thick spacer previously welded to the top of the boiler. A socket

head screw was used and recessed flush with the casting. The bell was sanded (50 grit, then 80, then 220 and finally 400 grit) to remove all pits and then polished with rubbing compound. The sanding and polishing was done with the bell mounted in the 3-jaw chuck via the little stub at the top. The stub was sawed off after the polishing was completed. The U shaped casting has a extension on one side to mount a bell operating cylinder --- that part was sawed off. All bell parts except the bell and acorn nut on the top were painted (powder coated) black.

The handrail stanchions are also from [Railroad Warehouse](#) --- part number C-2114-1, the smallest size. The remains of the sprue was filed off each stanchion and then the lower end threaded 8-32. The threaded part of six of the stanchions was cut back to 3/16" length. The 3/16" hole was reamed to 13/64" to give some room for the bend handrail. The handrail is 3/16" thin wall tubing (K&S) available in 3' lengths from [McMaster-Carr](#). Clearance holes for the two stanchions mounted to the smoke box were drilled through and the stanchion secured with a nut and washer inside the smoke box. The other six stanchions were mounted in 1/4" deep holes tapped 8-32. These holes were in the 1/4" spacers welded to the boiler for this purpose. The rear three stanchions for each handrail were screwed in place first and the stanchion for the smoke box slipped over the handrail. The handrail was carefully threaded into the rear three stanchions. The tube is flexible enough to bend to the required shape. After the handrail was in position in the rear three stanchions, it was pulled away from the smoke box and the threaded part of the last stanchion inserted through the hole in the smoke box and secured with washer and nut.

The balls are 11/32" brass from McMaster-Carr. Holes for the handrail (3/16") were drilled about 1/4" deep into each ball. A fixture was made to assist in drilling the holes. A ~1" long piece of ~3/4" steel rod was center drilled 11/32" about 5/8" deep and then the rest of the way through with a 3/16" drill. The 11/32" hole was tapped about 7/16" deep 3/8"-24. A ball is dropped in the 11/32" hole and held in position with a 3/8" bolt. The ball is then drilled 3/16" while in the fixture using the 3/16" hole in the fixture as a guide. The end of the bolt left a small flat part on the balls. Next time I'll slip a piece of aluminum between the ball and the bolt. The balls are held in place with a couple drops of Loctite.

An opening was cut in the left side handrail for the headlamp wire as shown in the photo. The opening or slot was cut with a Dremel cutoff disk. The wire comes out the rear end of the handrail adjacent to the front of the cab and drops down and goes through the cab front via the opening for the left side feed water pipe.

The photo shows a dirty shay --- steam oil mixed with yellow pine tree pollen. What a gooey mess!



The only things remaining are the generator, the number plate and the builders plates. I decided to defer the generator to next winter and play around with making a working generator to charge the batteries. Custom NLW number and builders plates are on order.

[Shay Project](#)
[NLW Home](#)

