

Shay Boiler - Mounts & Holes

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Initial: 11/14/03 Last Revised: 06/06/2004

The boiler was fabricated by a professional as discussed elsewhere. It was supplied with the major cutouts in the smoke box for the smokestack and exhaust but without mounting screw holes, water feed holes and the various holes in the backhead. Drilling these holes was approached carefully because mistakes might be difficult to repair. The first thing done on the boiler was to install the throttle valve as described in the Throttle page. It was then decided to finish drilling all the remaining holes ---- it's too hard to repeatedly remove the boiler to drill a hole. The mountings/supports were finished and then all the holes for the plumbing and other functional fittings were drilled. The cosmetic fittings including lagging, jacket, handrail, etc were deferred until after the locomotive has been fully tested.

Front Support: This photo shows the front boiler mount on Cass No 10. It is a good match for Kenneth's drawings.



These are the front support brackets made to Kenneth's drawings except the four mounting holes are 4-40 instead of 5-40



The boiler came with the smoke box front supports --- 3/8" rods welded to each side of the smoke box. The ends of the supports were already turned to 1/4" and tapped 4-40 as per Kenneth's drawings.

This photo shows the installed front support. Those are button head cap screws (simulated rivets) holding the front support bracket to the inside of the frame I beam. The support strap is a little too wide --- will thin it before finishing the job.



Rear Support: This shows the rear support on Cass No 5. The angles appear to be bolted to the boiler. The holes in the angles accommodate the the ends of the stays. The angles are clamped to the frame.



This photo shows one of the rear support angles. The angles were moved up 1/4" to drop the cleanout holes below the bottom of the frame. The strap and 6-32 screw are temporary. The side of the boiler will probably be covered with lagging and the boiler jacket. The bottom of the angle is at the same height as the running boards. I will probably make a clamp that resembles the angles in the previous photo to fit over and hold down the support angle.



Fire Pan: The fire pan will be discussed in a separate page describing the burner system. The task here is to drill and tap the four holes for the studs that hold the pan to the bottom of the firebox. The boiler was placed upside down on the workbench and the holes drilled with a hand drill.



The Big Squeeze: Friend Dan Staron has an identical boiler and told me the smoke box was oval shaped, not round and the smoke box front didn't fit properly. My smoke box was also out of round by about 1/16". This was fixed by squeezing the front of the smoke box in a 10 ton press. (Those of you that have been to an IRS office might recognize the press; they use same kind.) Once the front was made round, the boiler was placed with the backhead on the floor and the 4 holes for the smoke box front studs drilled with a hand drill.



Smokestack & Exhaust Flanges: The mounting holes for the smokestack and exhaust flanges were drilled with the drill press ----- the smoke box is small enough to fit in the bench top drill

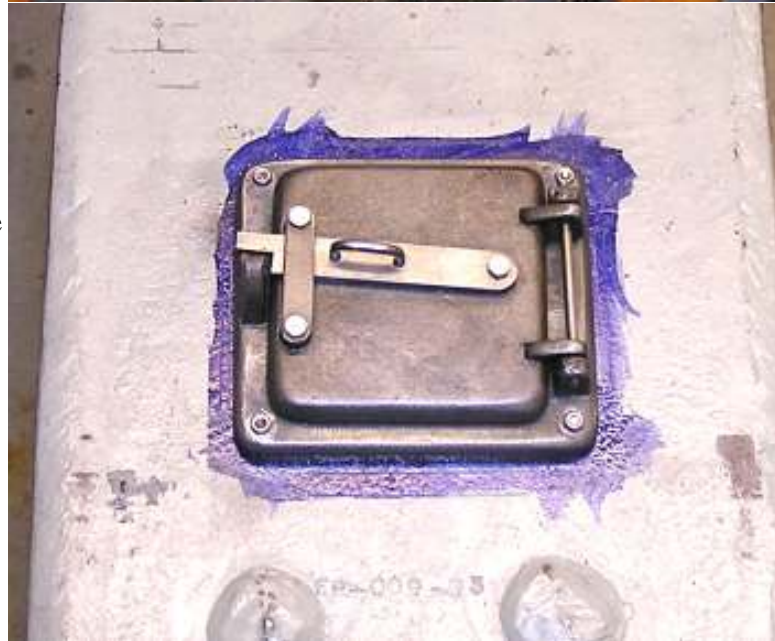
press as shown in photo on right. The studs to retain the smoke box front can also be seen in the photo.

Water Feed Holes: The water feed holes each side of the boiler were also drilled with the drill press. Care was taken to limit the drill depth to prevent drilling into a boiler tube.



Firebox Door: The boiler was moved back to the floor with the backhead pointed up. Four holes were then drilled to mount #2 studs for the fire box door as shown on the right.

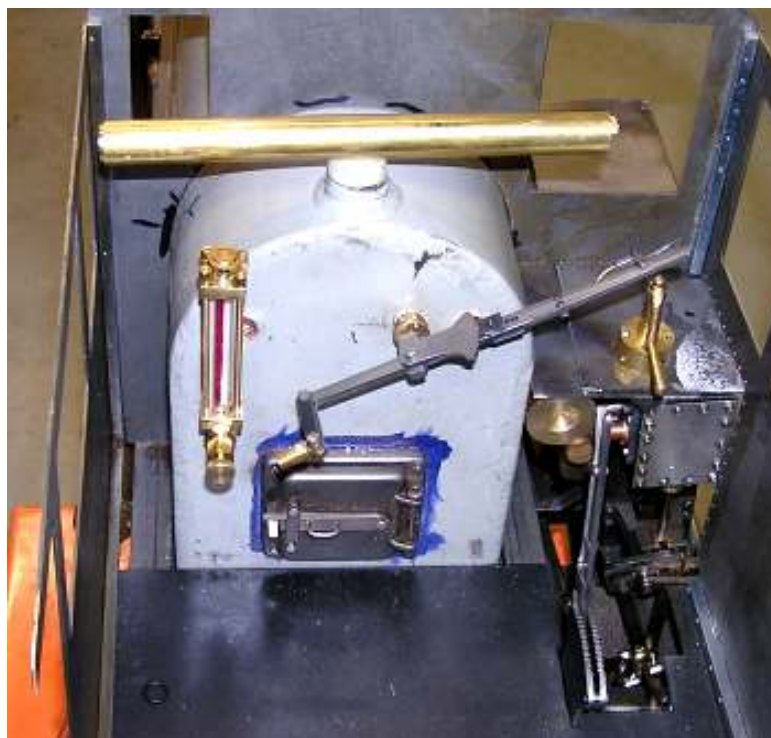
Water Gauge: The hole was then drilled for the lower end of the water gauge. The hole was positioned so that the bottom of the visible part of the glass is 3/4" above the crown sheet.



Throttle Angle: The last hole in the backhead is for the throttle pivot. Before making that hole, the boiler was placed on the frame as shown on the right. The brass rod on top the boiler is meant to simulate the steam turret. The steam brake valve

mounts on the ledge over the rear cylinder. The brake handle will be above the top of the reverse lever and below the throttle lever. This mockup helped in picking a good angle for the throttle.

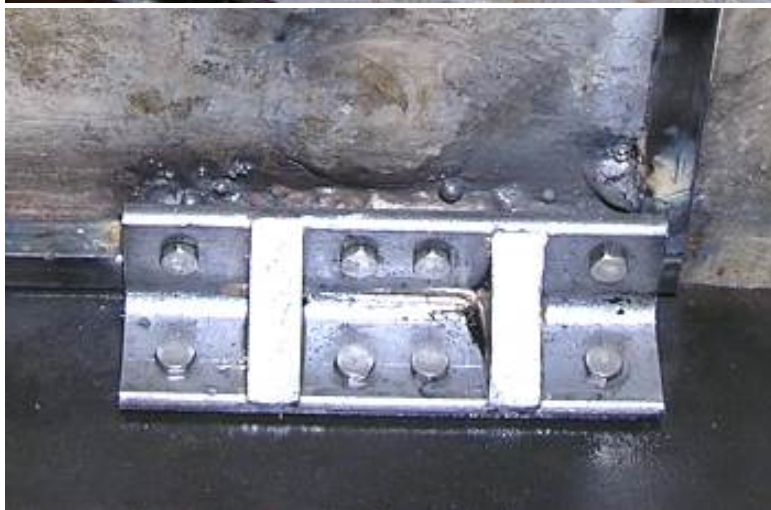
This finishes the holes in the boiler. The next step is to do some plumbing ----- run the steam and exhaust lines to the engine.



Update 2/16/2004: The walkways have been completed so it was a good time to make the rear boiler clamps. The boiler jacket will be supported by 1/4" square rod spacers tack welded to the boiler. The spacers adjacent to the front of the cab and on the sides over the rear boiler mount angles were tacked in place first. The clamps were then fitted over the rear mount angles and against the jacket spacers and holes drilled through the clamp, walkway and the flange of the frame I beam. The holes in the I beam flange were tapped 4-40 and the holes through the clamp and walkway were enlarged to #4 clearance (#33 drill). The photo shows the right side clamp made from 1" angle.



The right side clamp is hidden behind the engine so no effort was made to simulate the prototype clamp. The left side clamp is out in the open so an effort was made to spruce it up a bit as shown in photo on right. The four screws in the vertical leg of the clamp are screwed only into the clamp and are for decoration. The four screws in the horizontal leg go into the I beam flange the same as on the right side.



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