

Shay Fire - Oil Burner

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Initial: 12/03/03 Last Revised: 09/23/2005

The basis for burner described here is Bob Reedy's burner for his Three-Truck Climax described in the May/June 2003 issue of [Live Steam](#).

Update 4/28/04: After a number of tests the burner described here was modified, see [Shay Fire - Burner Tests & Modifications](#)

Update 9/23/05: The fire pan was redesigned with much improved results. See [More Improvements](#) . **End Updates.**

Fire Pan: The photo shows the upper side of the fire pan with nozzle in place. There are several deviations from Reedy's design. The sides slide into the firebox rather than being bent over like the ends. The nozzle is outside the box to give more room for the flame. The air/steam pipe is 3/16" rather than 1/4".



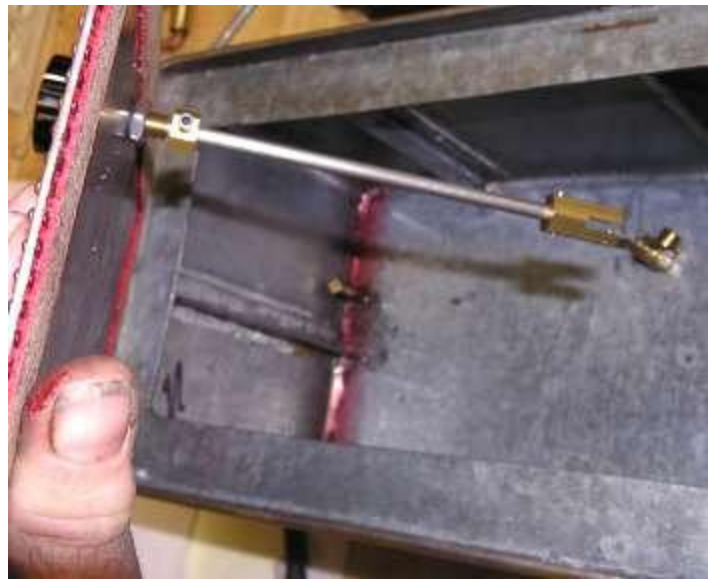
This shows the under side of the fire pan. The nozzle mount is made from 1/2" thick brass bar with a set screw in the side to hold the nozzle in position.



Oil Valve: This shows the inside of the oil tank. The oil valve is a 1/8" NPT angle needle valve as suggested by Dave Johnson.



The fuel control is on the top of the fuel tank. The control is connected to the valve by the rod in the photo. The brass fitting on the bottom end of the rod is slotted to fit over the needle valve tee handle. There is a bushing for the rod in the top and a collar to retain the rod in the bushing.



This shows the underside of the oil tank. The drain valve on the lower right is a 1/8" NPT needle valve screwed into a street elbow. The elbow is retained by a nut in the tank with a sealing washer between the elbow and tank.



The hose leads to a fuel filter as suggested by Chester Peterson in his oil burner chapter in SO YOU WANT TO BUILD A LIVE STEAM LOCOMOTIVE. There is a street elbow screwed into the fuel valve inside the tank (sealing washer required) and a brass hose nipple screwed into the elbow.

This is the label from the fuel filter -- a couple dollars at the local discount auto parts store. The filter has 5/16" ID hose input and 1/8" NPT on the output. (This filter proved to be too fine. See the Tests & Modifications page.) and update A fil



This photo is looking down on the filter. There is a compression fitting between the filter and the fuel line to the nozzle. The filter is behind and slightly above the right side of the fire pan. The fuel tank with filter can be easily removed by disconnecting the compression fitting and removing two tank hold-down screws.



This is the view from the left side of the locomotive.



Atomizer: The atomizer regulator is located under the platform covering the the reversing linkage as shown on the right. This view is from the right side (cab removed). The regulator is a Clippard model MAR-1-2 with a regulation range of 0- 20 psi. The input from the lower valve on the manifold goes to the center rear of the regulator via the 1/4" tube. The regulator bottom port is the output that goes to the left leg of the 3/16" tee. The right leg of the tee goes down to a union that connects to the atomizer pipe at the rear of the fire pan. The upper port of the tee goes to the elbow-union-elbow fittings and then via the bent pipe to a compressing fitting and then into 1/8" pipe fittings to a pressure gauge.



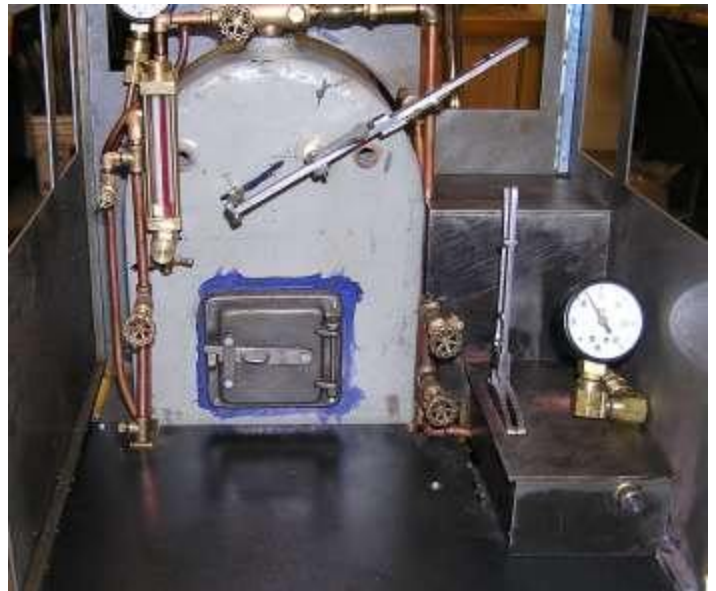
The regulator ports are threaded 10-32. Adaptor nipples threaded 10-32 on one end and MTP on the other were fabricated. The regulator end of the nipples were initially sealed with Teflon washers and nuts. The Teflon leaked at higher temperatures and when the nuts were tightened to add pressure on the Teflon, it mere squeezed out the sides. The Teflon washers were replaced with aluminum washers which sealed properly.

This is the view looking down on regulator. (The platform cover is removed.) The two brass 1/8" pipe street elbows rest on the platform top and provide support for the gauge.



The regulator is rated at 230 degrees F so this application will stretch it a bit. Unions are used on the connections so that regulator can be replaced without disassembling the cab.

This is the inside of the cab. The input pipe to the regulator is visible under the lower valve on the blower/atomizer manifold. The regulator control knob is at the rear side of the platform. The gauge is 0-30 psi. The system was pressurized with compressed air and the regulator was set to 12 psi when the photo was taken.



The burner is ready to go. However, the blower must be hooked up before the fire can be started.

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