This text was written by Stephen Hoxie in the PRRPro on-line forum. I compiled a large set of close-up photos of I1sa #4483, courtesy of Scott Hawbaker, and labeled them to try to clarify the text written by Stephen.

Part numbers mentioned in the text refer to HO scale Cary or Cal-Scale castings. Your best bet for N Scale equivalents is to search at www.RepublicLocomotiveWorks.com. They do not have nearly the castings for N that are available for an HO modeler. However, you can usually find major components like feedwater heaters, air compressors, and injectors that are fairly close to what you need for an I1. I noted these in the text as “RLW” part numbers, when possible.

--- Max Magliaro 8-Jun-2007

With 598 engines in service, the I1s was the backbone of the Pennsy motive power fleet. There were no visible differences between the I1s and I1sa. However, there were two distinctly different versions, Altoona built and Baldwin built, and both classified as I1s or I1sa. The 123 Altoona engines did not have the large feedwater heater on the left side while the 475 Baldwin engines did. A complementary difference was that the Altoona engines thus had an injector under the engineer's side of the cab while the Baldwin engines did not. Some of both Baldwin and Altoona engines could be found with a second air pump on the right side.

Over the course of their careers numerous changes were made in walkway configuration, generator and headlight location, and, of course, tenders. To obtain an accurate, true-to-the-prototype model, it is essential that photos from the desired era be used.

My experience has been with HO models available from Bowser, PFM/United, and Sunset. All of these models have been Baldwin engines. Since all three require extensive work to get them "right"; my favorite is the Sunset. Much has to be upgraded, but Sunset came closest to accurately modeling the shapes of the boiler courses (sections), and they can be acquired for a reasonable price. Early Bowser models used the same boiler size as the K4, resulting in an incorrect model. The first run of the PFM/United I1 also used the smaller K4/L1 boiler; also on this run there is an injector on the engineer's side which is incorrect for a Baldwin engine. Aside from repowering/regearing discussions, what must be done to any HO model I1 to make it recognizable as "the one in the picture"?

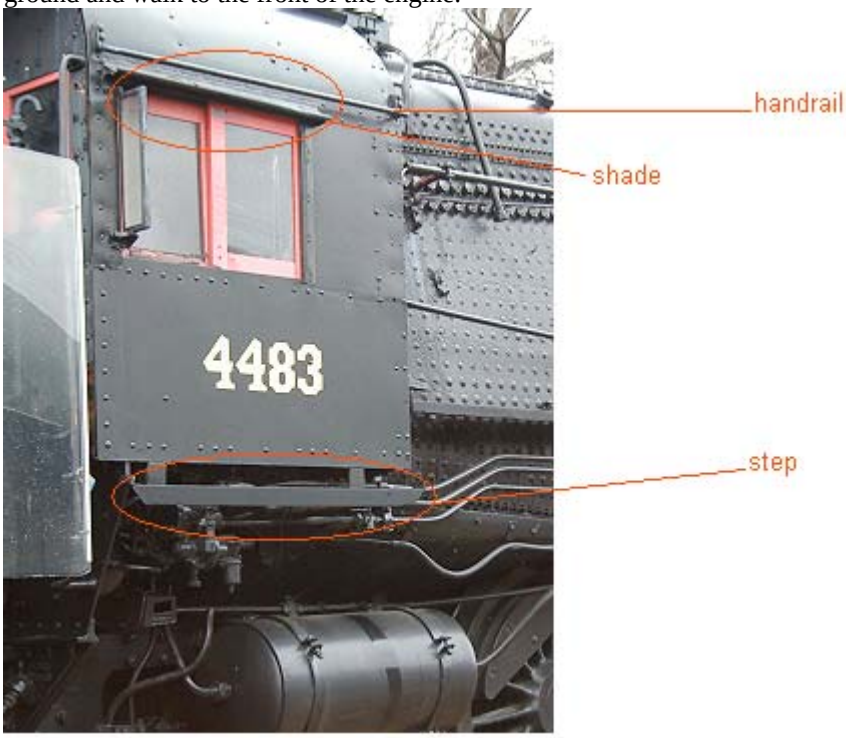
Speaking of pictures--as a result of undergoing improvements and "the facelift" over the years, these engines appeared in multiple configurations. So much for "The Standard Railroad of the World"! Doing an accurate model requires first settling on an era, then finding supporting photos.

Part numbers starting with 13 are Cary parts from
http://www.bowser-trains.com/pdf/cary_parts.pdf

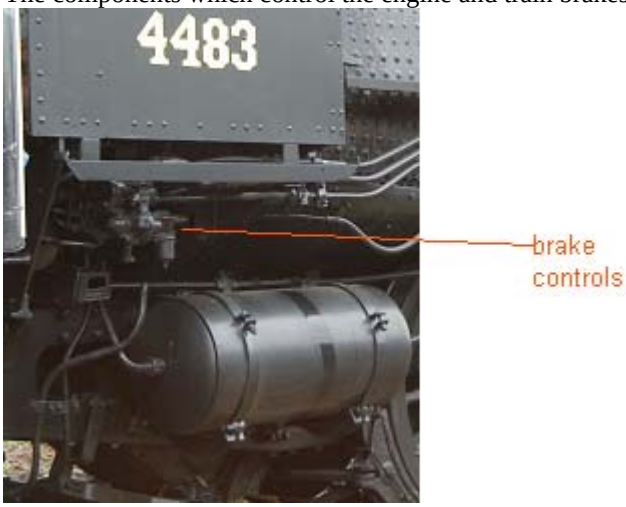
Part numbers staring with 190 are CalScale parts from
http://www.bowser-trains.com/pdf/cal_scale_steam_locoparts.pdf

Let's take a walk around an I1, starting at the engineer's side of the cab and working forward and around.

A "window shade", 190-382, over the window, and an undercab step, 190-379, are needed. There is also a handrail just above the window shade. The step and handrail enabled a crewman to move from the rear of the cab around the outside of the cab to gain access to the walkway without having to go down on the ground and walk to the front of the engine.

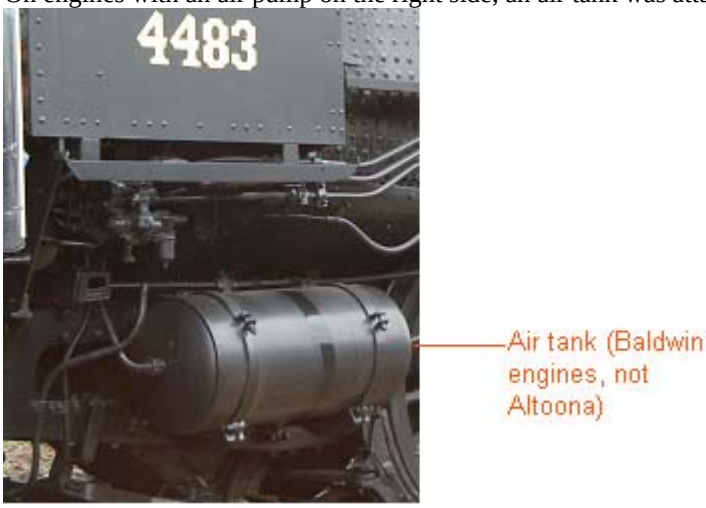


The components which control the engine and train brakes are mounted under the cab, 190-359.

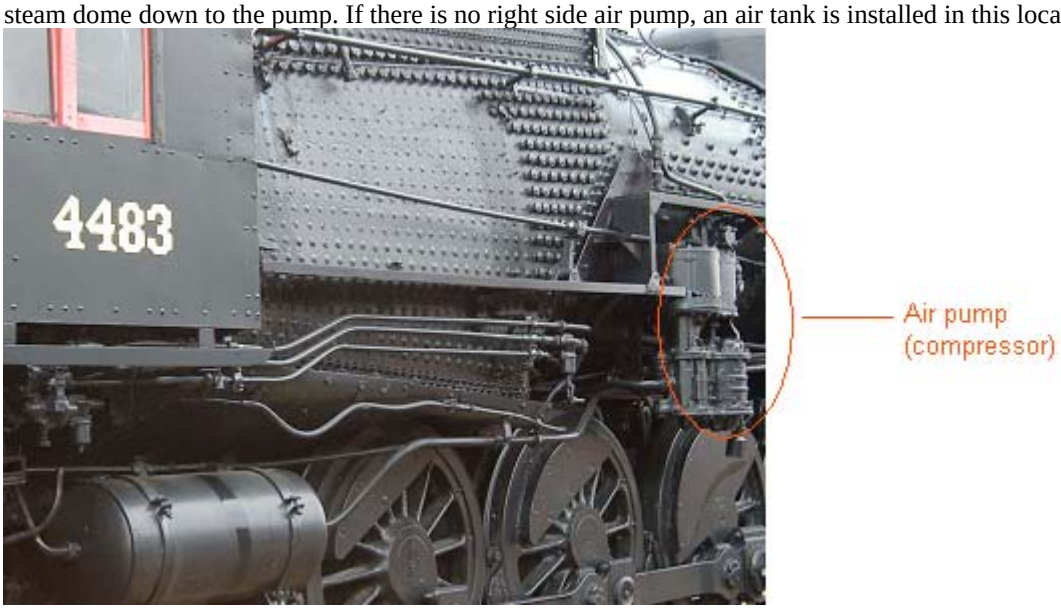


Also below the cab on Altoona engines only is an injector, 13-107 (the apparatus that takes cold water from the tender and injects it into the 200+psi in the boiler). (N Scale, RLW part number GHQ_55-002/3-33)

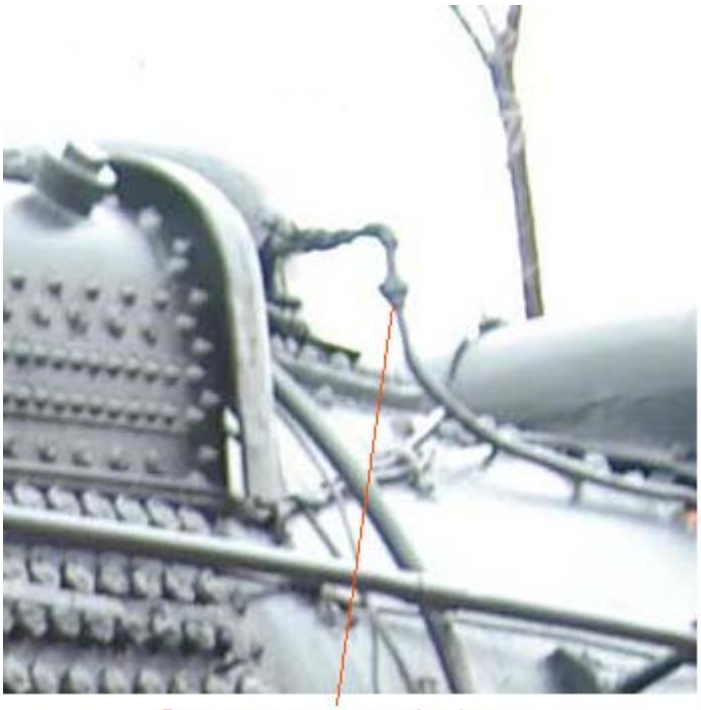
On engines with an air pump on the right side, an air tank was attached below the cab.



The right side air pump was attached just forward of the angled front of the firebox. Initially there was no walkway provided over the pump. Later photos show the walkway over the power reverse was extended rearward to assist access over the pump. Steam supply for the right side air pump came from the rear of the steam dome down to the pump. If there is no right side air pump, an air tank is installed in this location.



A frequently overlooked but simple detail is the generator steam supply pipe which exits the right side of the steam dome then turns 90 deg down to pass beneath the boiler sheathing, running forward, hidden until it exits the sheathing at the smokebox, then running forward to the generator. (Steam engine boilers were covered with insulating asbestos which in turn was covered with iron or steel sheathing. Normally the smokebox and lower parts of the firebox were not insulated, requiring them to be painted with corrosion resisting paint. Current day photos of the 4483 show it without the asbestos.) There was a valve to cut off steam to the generator in this line adjacent to the steam dome so there was a reach rod back to the handle in the cab.

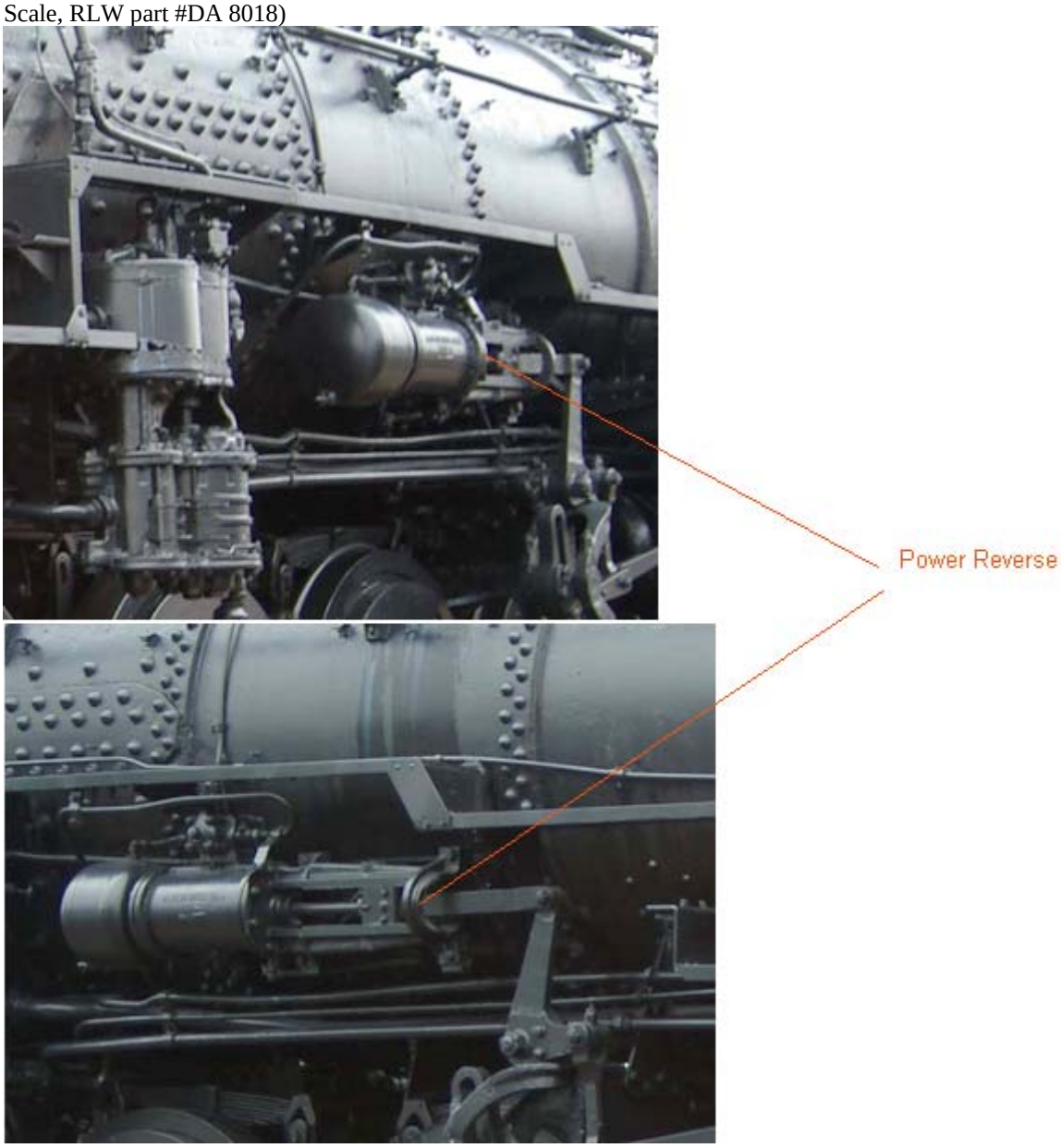


Generator steam supply pipe

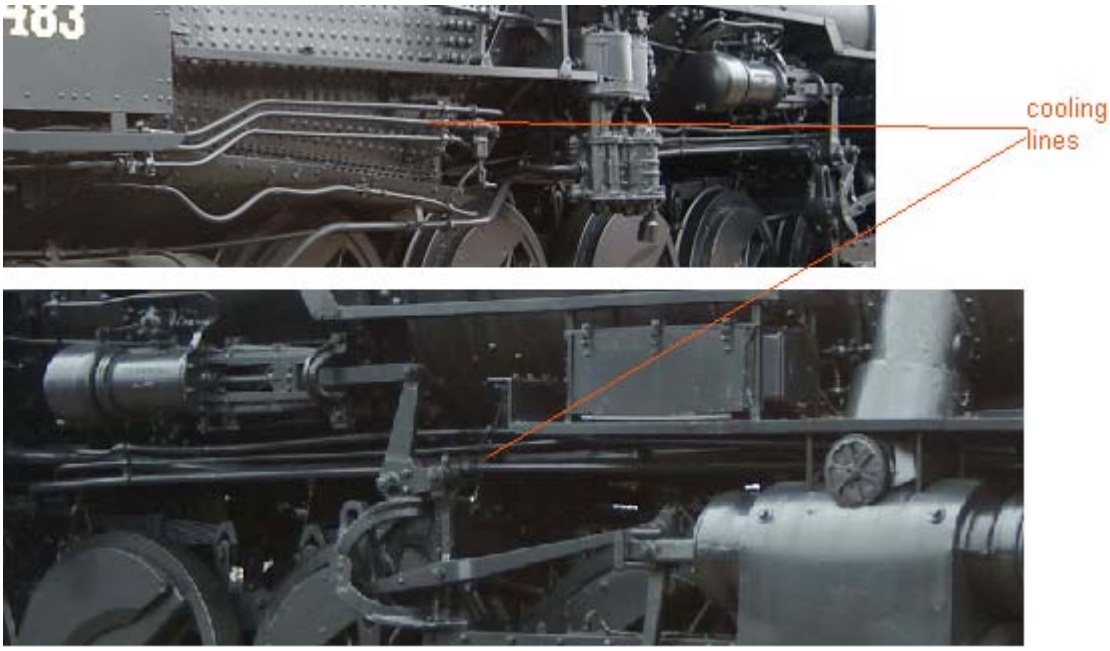
Generator steam supply line disappears under jacket.

Line appears from under jacketing and connects to generator. 4483 has the jacketing removed, so the line is visible the whole way along the boiler.

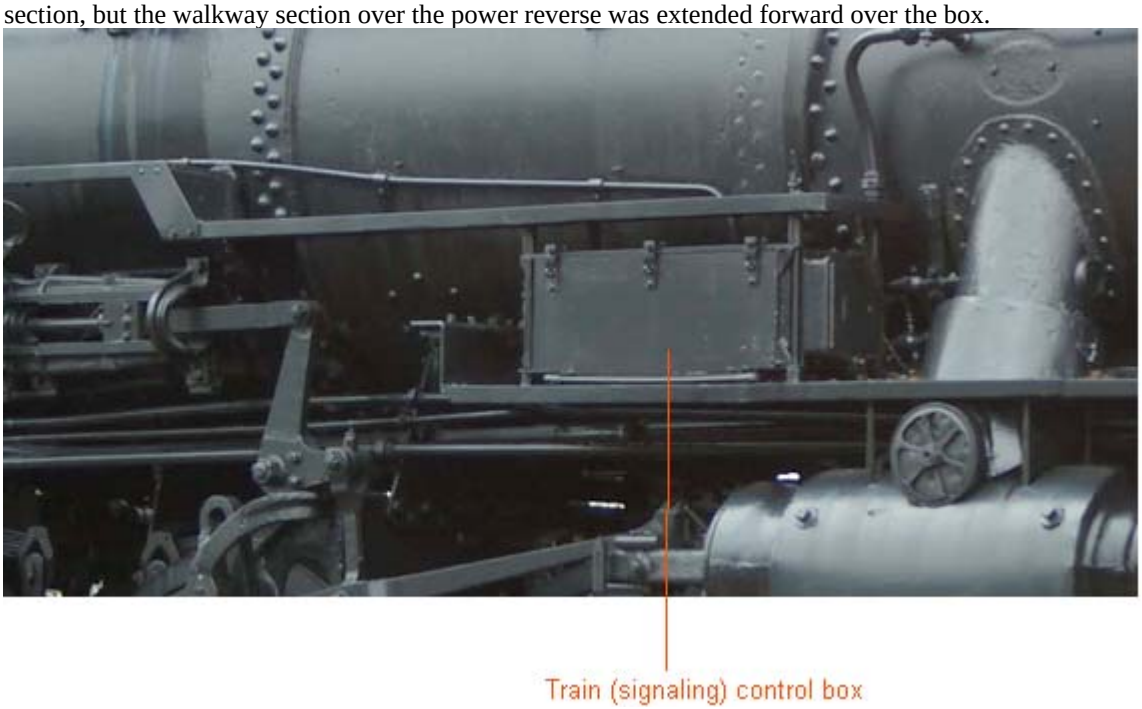
Moving forward to the power reverse, 190-216 or 190-237 for the later configuration can be used. (N Scale, RLW part #DA 8018)



Installation of air cooling lines along the bottom of the walkway varied. As can be seen from photos, these lines ran from below the cab forward until turning inward just to the rear of the cylinders. If the engine had a right side air pump, the lines ran somewhat hidden from view behind the air pump and behind the power reverse. If the engine did not have the right side air pump, there were three possibilities.
First, the lines could run fully exposed in front of the air tank and power reverse until turning inward. Second, the lines could run in front of the air tank then turn inward to run behind the power reverse. Third, some engines had these lines turn in and run behind both the air tank and power reverse. From a modeling stand point, this is the easiest to accomplish since these lines are difficult to form satisfactorily, and, if installed along the walkway are vulnerable to handling. For the brave, pipe hangers 13-158 or 130170 may help.

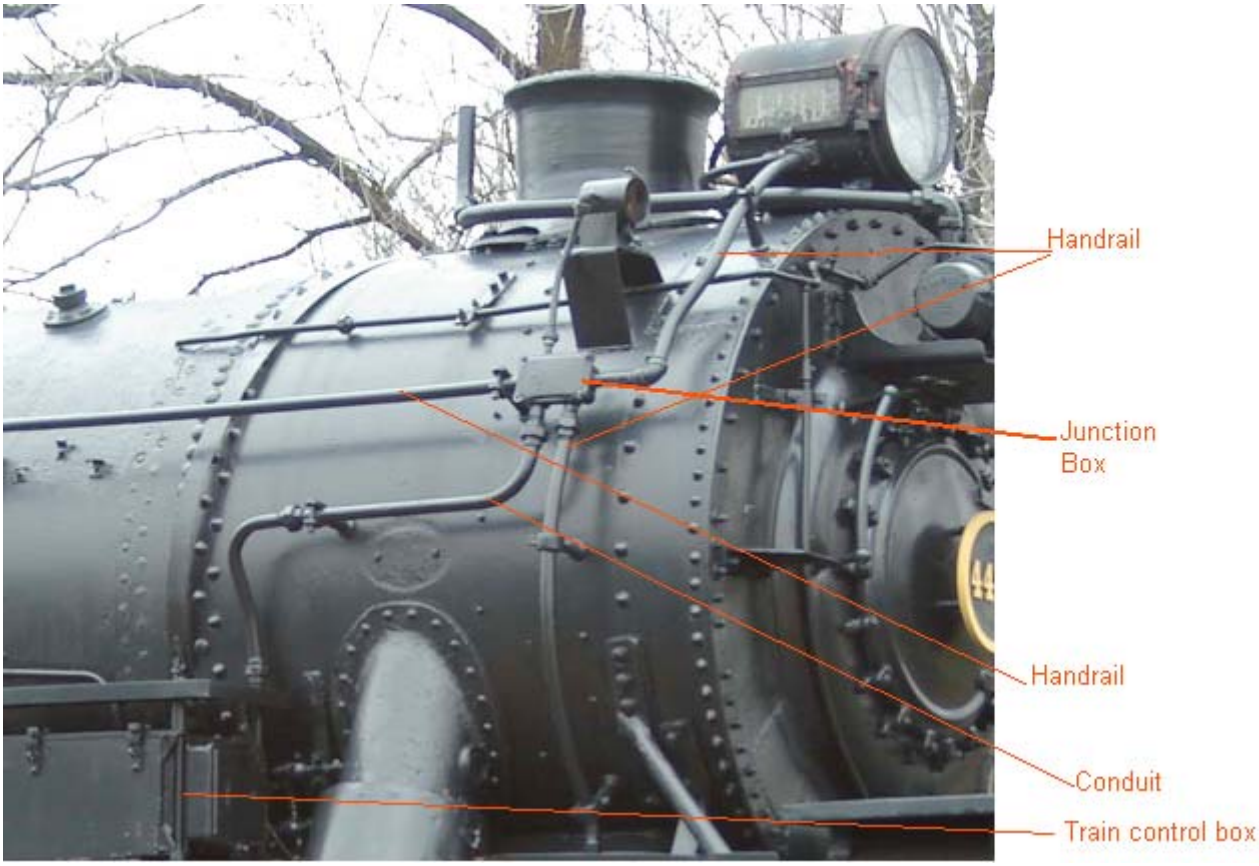


If the engine was equipped with a train control box, 190-252, it was mounted on the forward walkway section, but the walkway section over the power reverse was extended forward over the box.



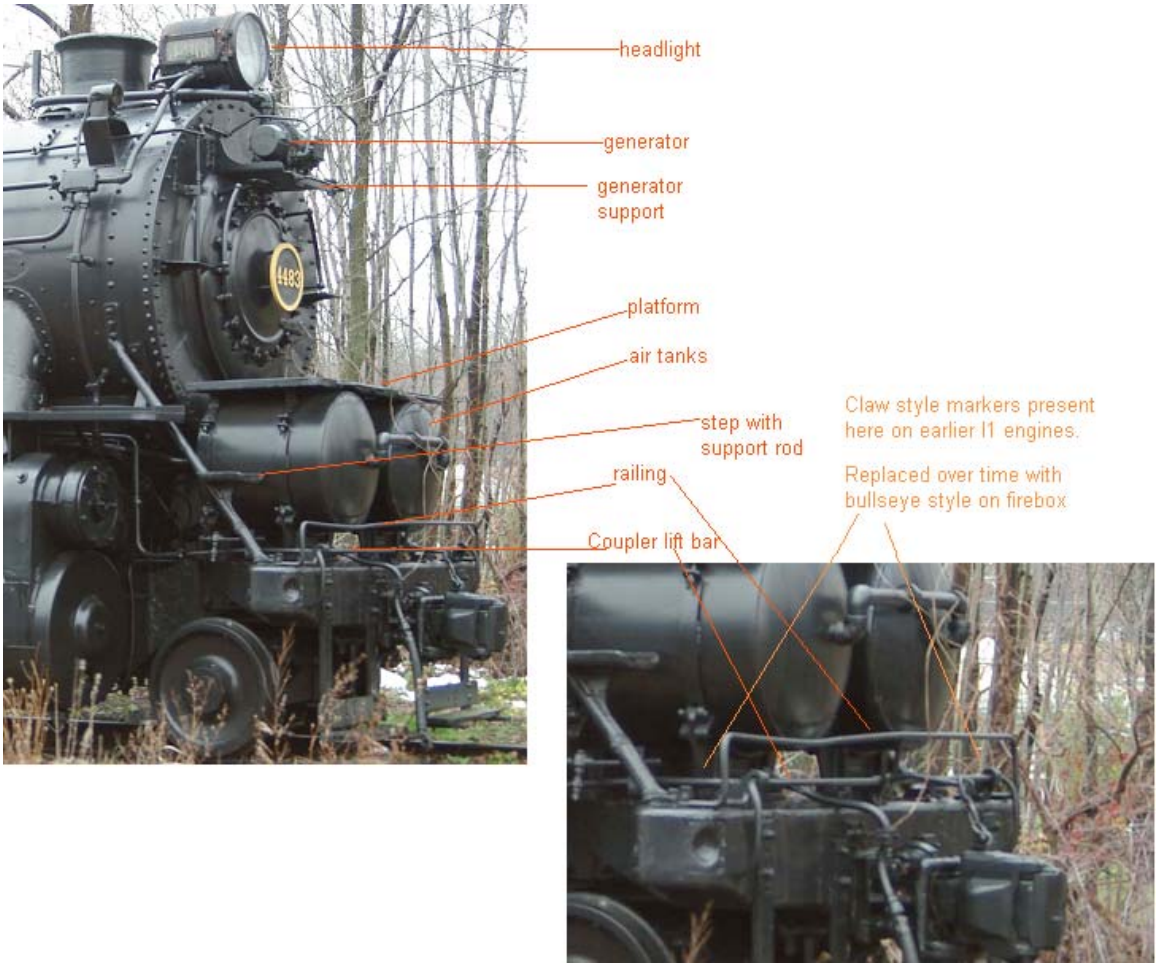
None of the models I have seen have had the correct bell, which should be Precision Scale 585-3155.

The last component on this side is the junction box in the handrail. The handrails served the additonal function of being conduits for electrical wiring. On the right side the junction box connected the horizontal handrail, the handrail going up over the top of the smokebox, and the lower vertical handrail. If the engine had a train control box, an addtional conduit ran from the train control box to the bottom side of this junction box. A junction box is available, 190-383; however, in my experience these are more easily modeled from small styrene stock.



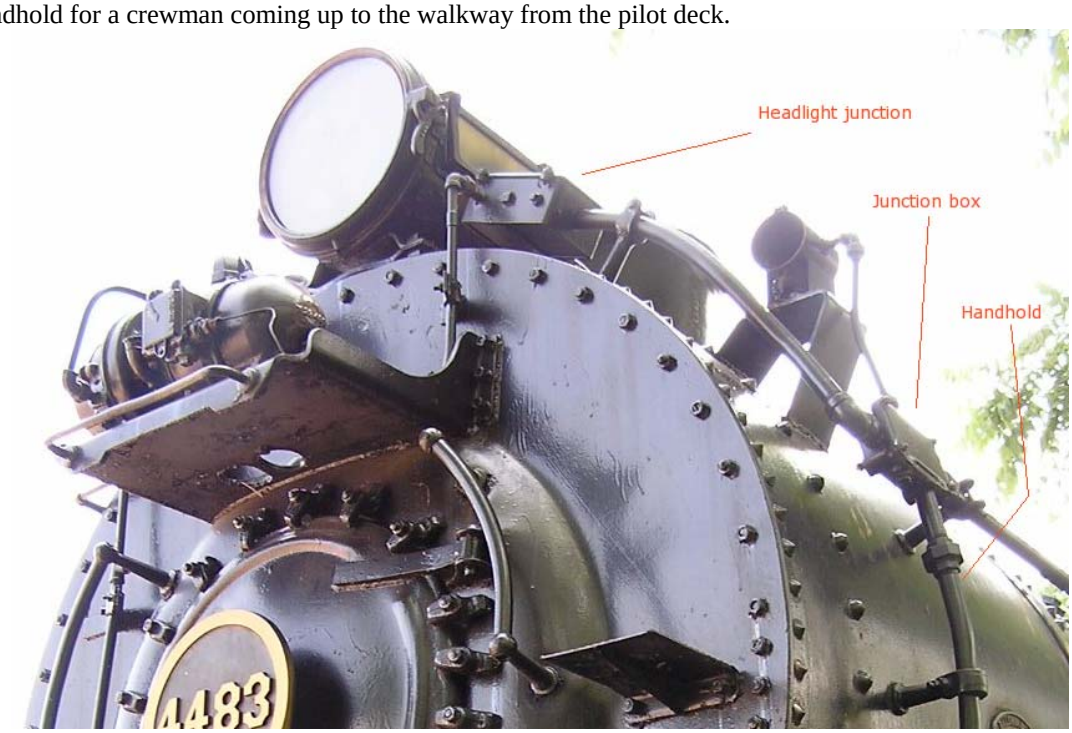
For the front end (see next page), working upward, some engines had shields installed between the pilot step supports, some had none, and a few had one on one side only. On the pilot beam were the coupler cut bar and a handrail. Depending on the era, claw style marker lights, 13-106, were mounted at the ends of the beam. Support rods with a step were mounted to the pilot deck next to the air tanks and attached at the other end to the sides of the smokebox. As the front ends were updated, no change was made to the platform over the air tanks. For the number plate, 190-245 can be used. On PFM/United models, the existing plate can be used if the inner circle is removed. (With care, a Dremel abrasive disk can be used.) Depending on the era, claw type classification lights, 13-106, no classification/marker lights, or bullseye markers, 13-159 or from kit 190-2001, can be used. Some engines were equipped with tombstone style markers, but I am unaware of a suitable HO part. Several styles of generator can be used; 190-211, 190-212, 190-234, and the one in 190-2001 are good examples. If it is desired to mount it on the smokebox front, the correct bracket is only available in 190-2001. Use either 190-202, original, or 190-235, late, for the headlight.

CalScale makes a PRR Headlight 190-477, but to my eye it appears too long. 190-202 is the one installed from the factory on the PFM/United model. To mount it on the smokebox front, use 190-478. As the front ends were updated, either headlight could be found in either position. On engines with the generator on the smokebox front, a pipe to carry exhausting steam from the generator was installed so that it wrapped around the right of the stack and turned upward behind the stack. Also on these engines a junction box was fitted on the left side of the headlight in the handrail which curved over the top of the smokebox.

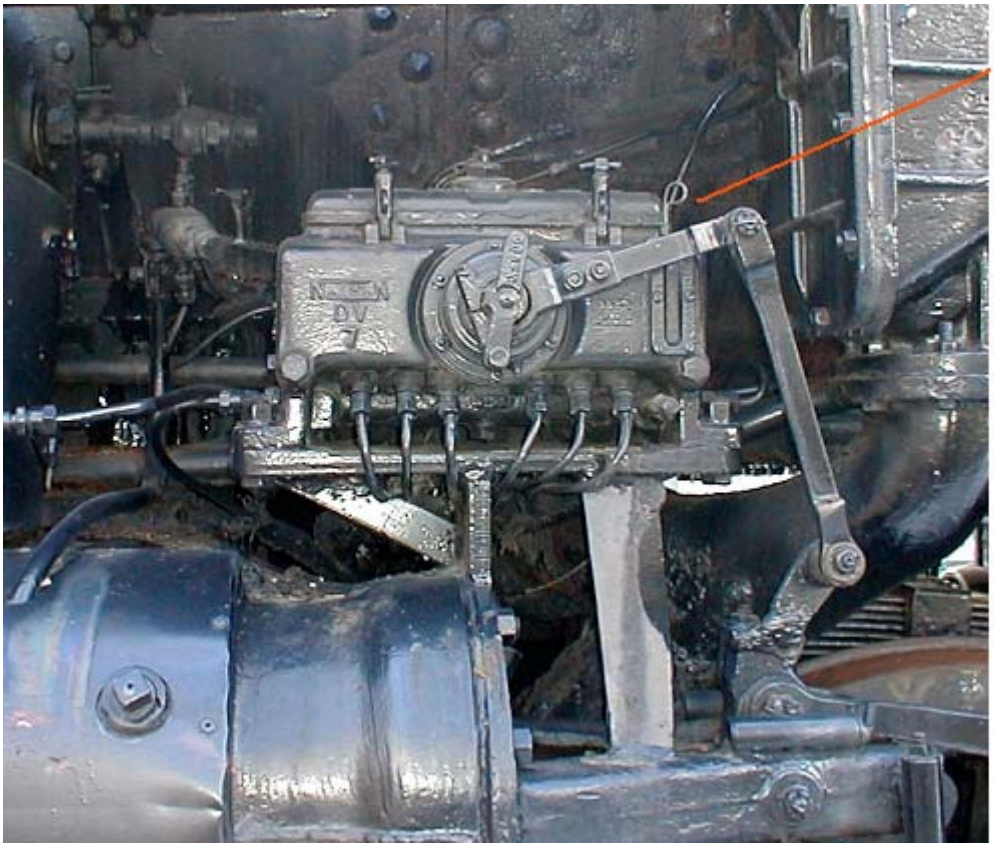

headlight
generator
generator support
platform
air tanks
step with support rod
railing
Coupler lift bar
Claw style markers present here on earlier I1 engines.
Replaced over time with bullseye style on firebox

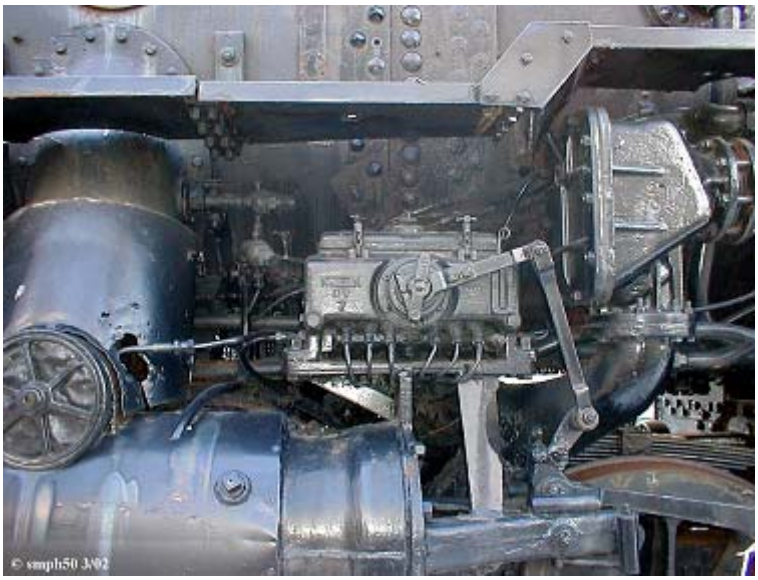
Right side summary shot.

Now moving from front to rear along the fireman's side, there is another junction box in the handrail with one branch going upward to the junction box adjacent to the headlight and another going down as a handhold for a crewman coming up to the walkway from the pilot deck.



The walkway over the cylinder on this side had two configurations, depending on whether or not there was a mechanical lubricator, 190-271. The mechanical lubricator was a device that injected lubricating oil, "steam oil", into the pilot valve for lubrication.

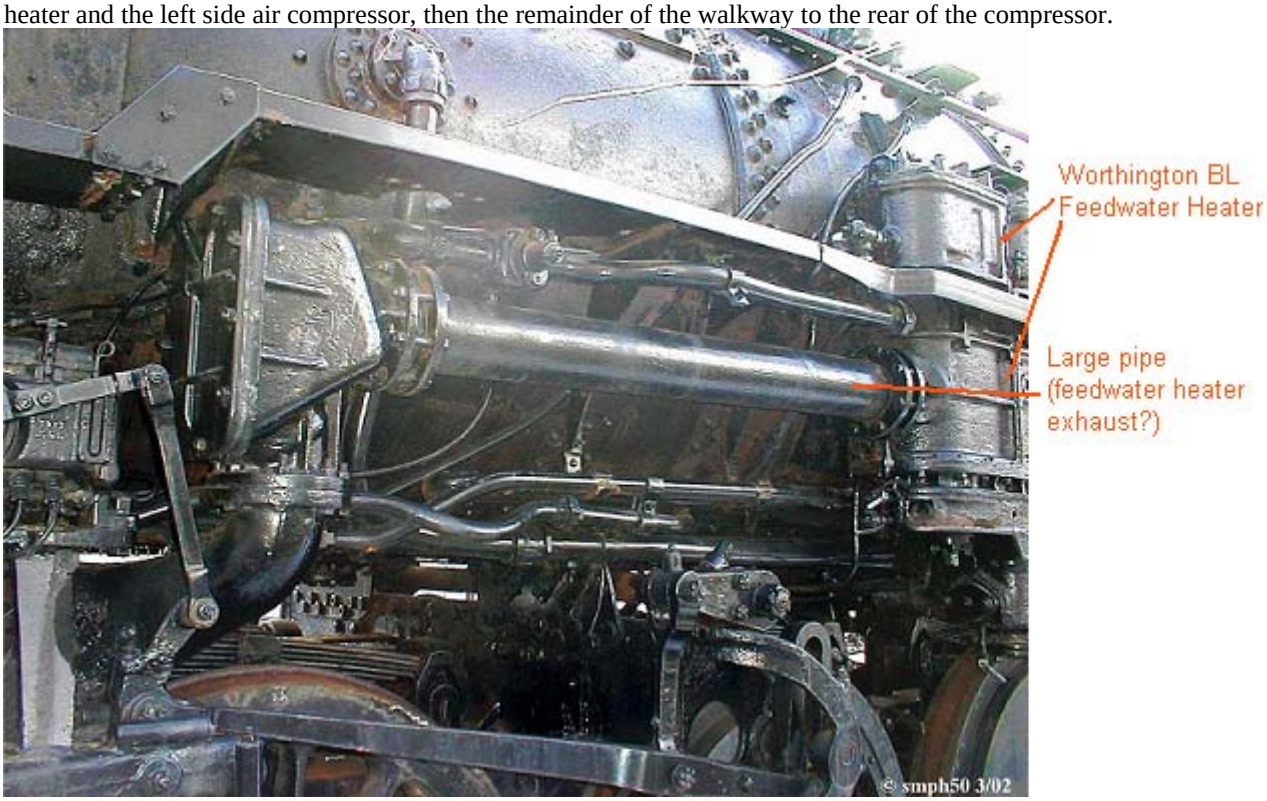




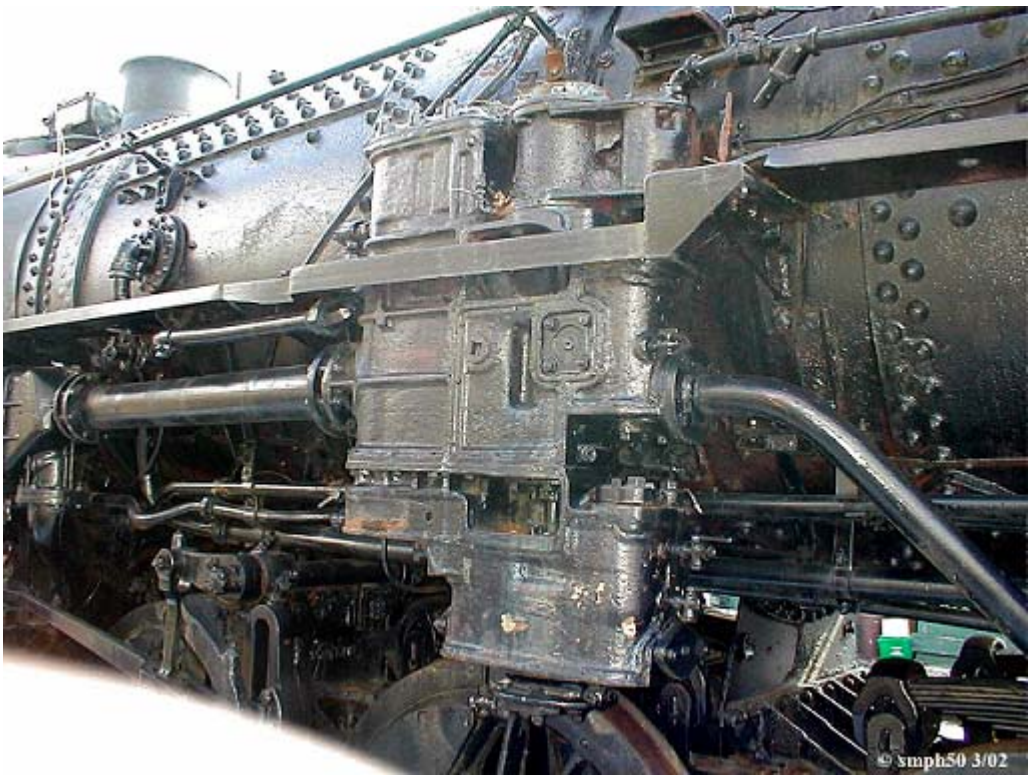
If there was no mechanical device, oil was gravity fed from reservoirs which the fireman tended in the cab. The mechanical lubricator was mounted just to the rear of the left side cylinder, just above the pilot valve piston rod. If there was no lubricator, the walkway remained at its initial level until the feedwater heater was encountered. If equipped with a mechanical lubricator, the walkway stepped up to pass above the steam delivery pipe to the cylinder and over the lubricator.

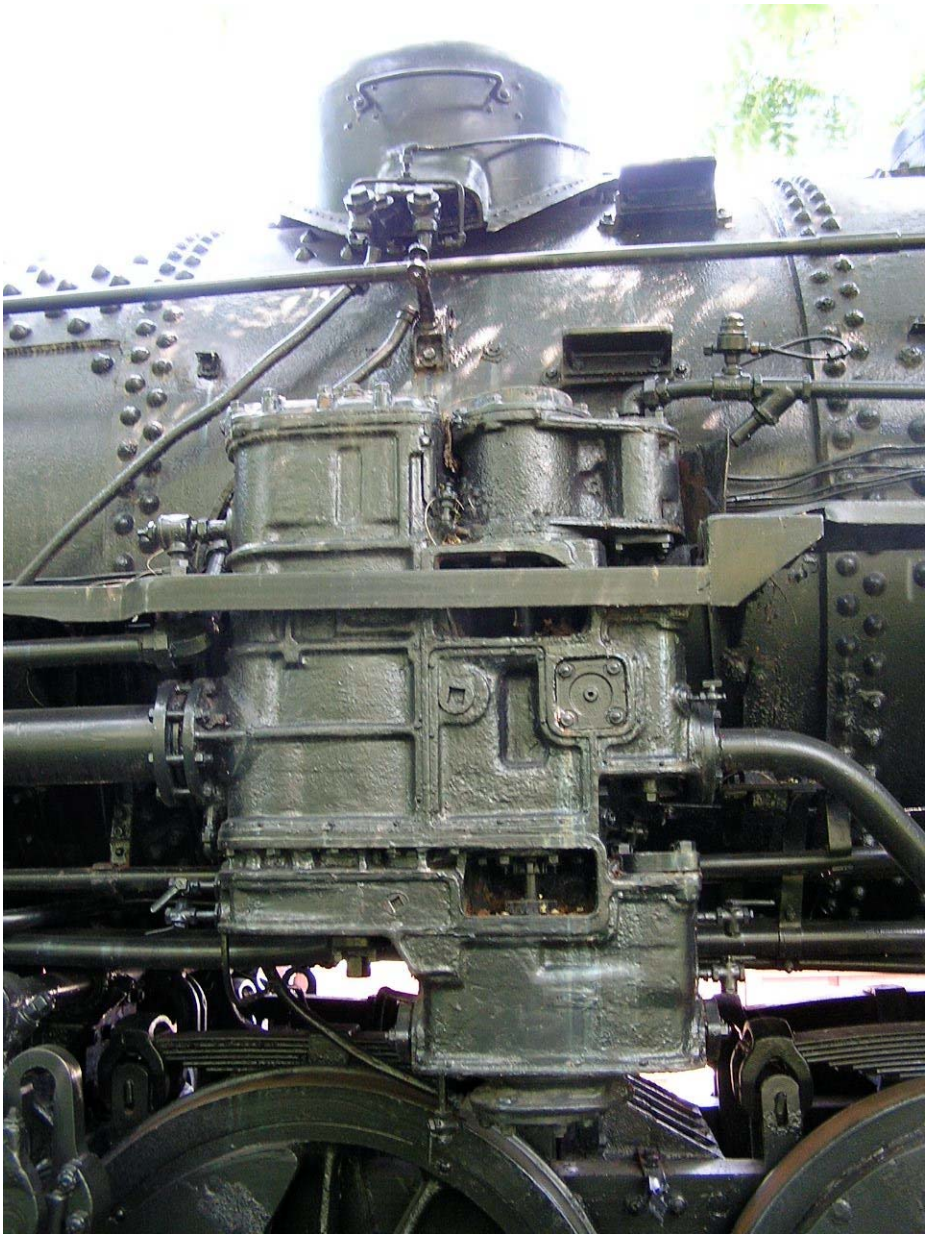
Next we encounter the large pipe which exits the front of the feedwater heater. I believe this is the steam exhaust from the feedwater heater, but that could be in error. The walkway goes above this pipe. The

early configuration had the walkway stop at the feedwater heater. This is the stock configuration of the PFM/United model as well as Bowser. Cary Feedwater Heater 13-102 (N Scale, RLW part number GHQ_55-002/3-02 for the heater, and part number GHQ_55-002/3-05 for the large pipe and box housing at the end of the pipe) is in this configuration. There was a short segment of walkway between the feedwater heater and the left side air compressor, then the remainder of the walkway to the rear of the compressor.



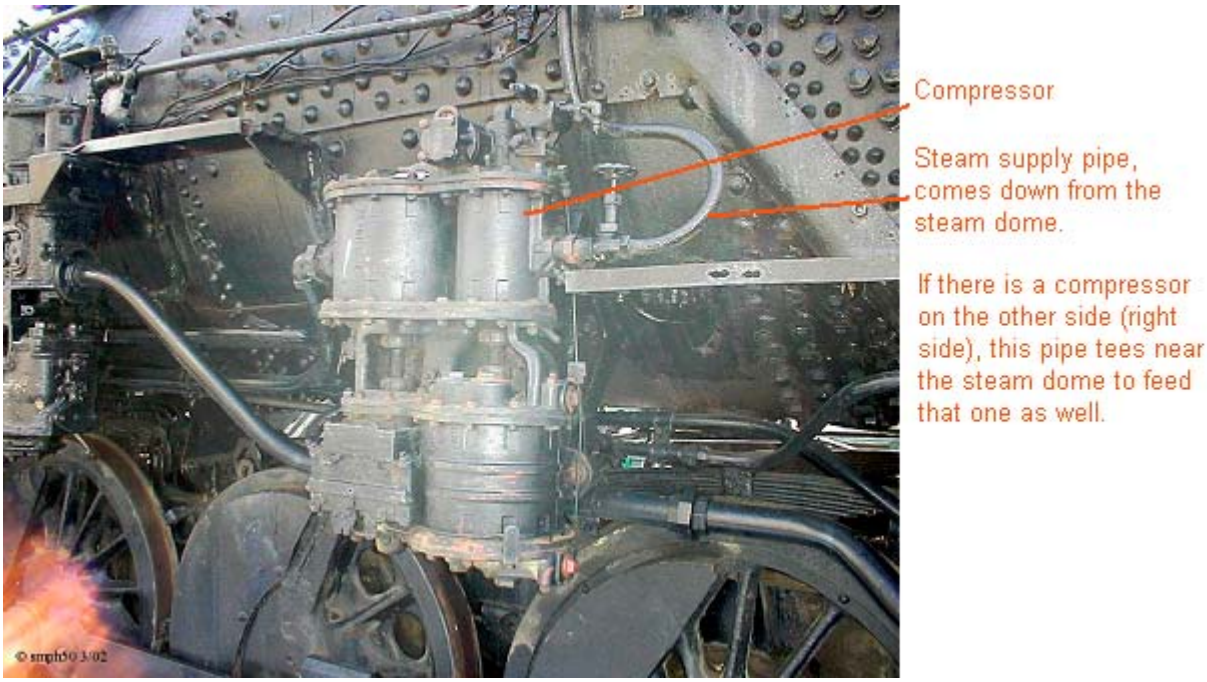
The later configuration of walkway had a narrow foothold around the feedwater heater, connecting and stepping up slightly to the walkway going above the left side air pump. After the air pump, the walkway stepped down alongside the firebox.

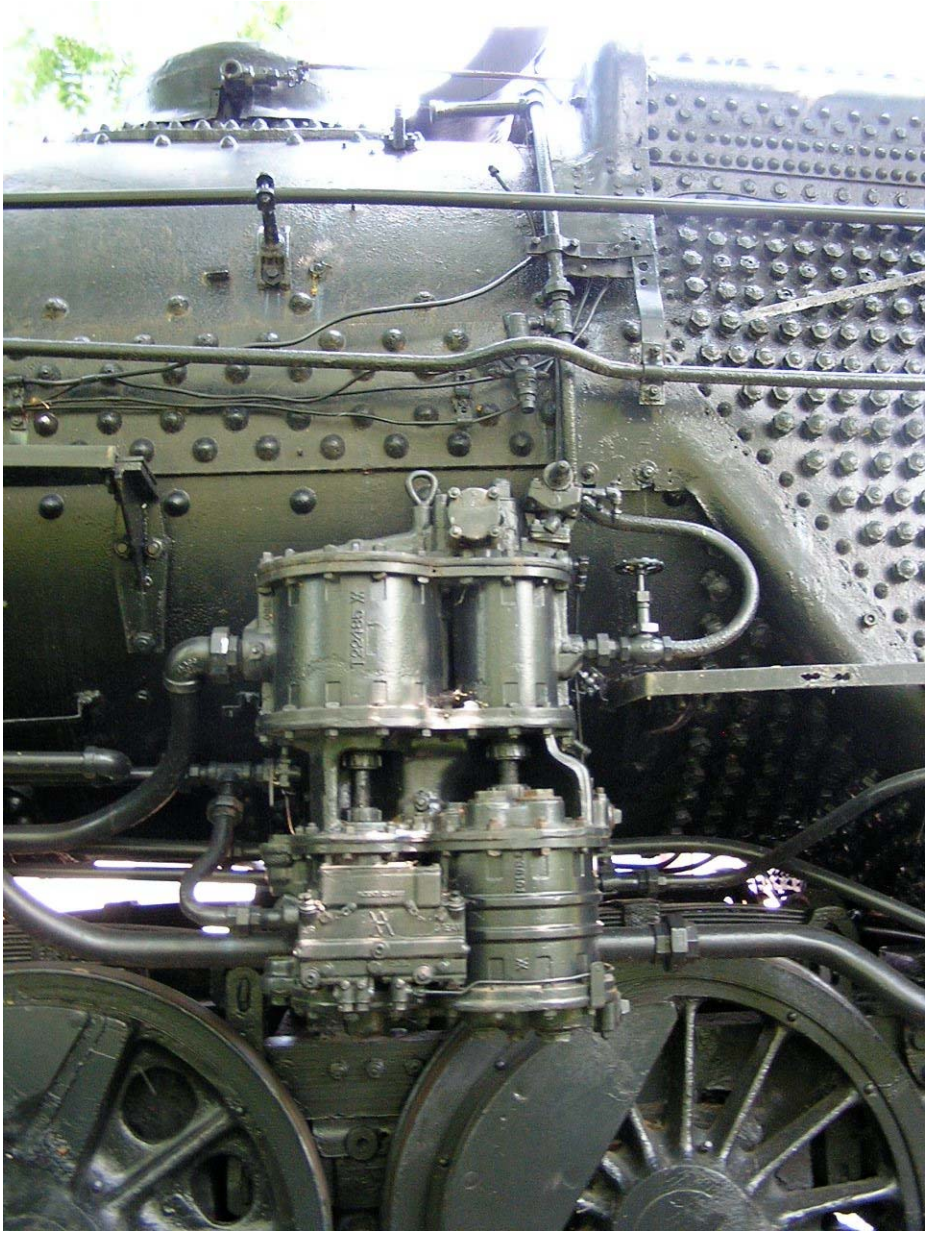

© smph50 3/02



Some feedwater heater observations. The feedwater heater had two functions. One was to raise the temperature of water from the tender so that less heating was required inside the boiler. Second, it pumped heated water into the boiler. I think the short vertical pipe into the boiler just above the large pipe is the entry into the boiler. Steam was supplied from the turret, the rectangular box on top of the firebox immediately in front of the cab. The insulated supply pipe ran down the side of the firebox, then forward to the rear of the feedwater heater. Water was pumped from the tender through a pipe which ran under the cab, then under the walkway. As built, the feedwater heater on Baldwin engines
was like 13-150 with a flat bottom surface. Improvement in the design resulted in the appearance of a "notch" taken out of the lower front corner, like 13-102. At least some Sunset models have the original style feedwater heater, but it is significanly oversized and out of scale; it definitely should be replaced.

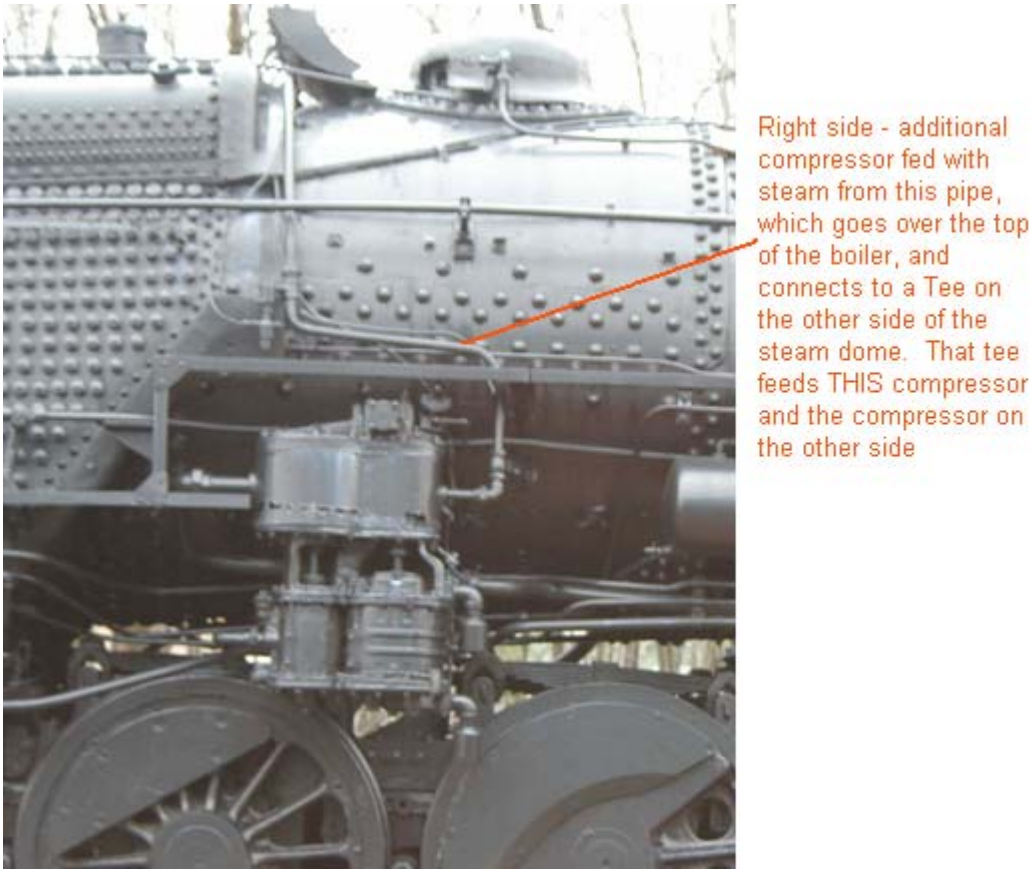
Continuing past the feedwater heater, we come to the air compressor.





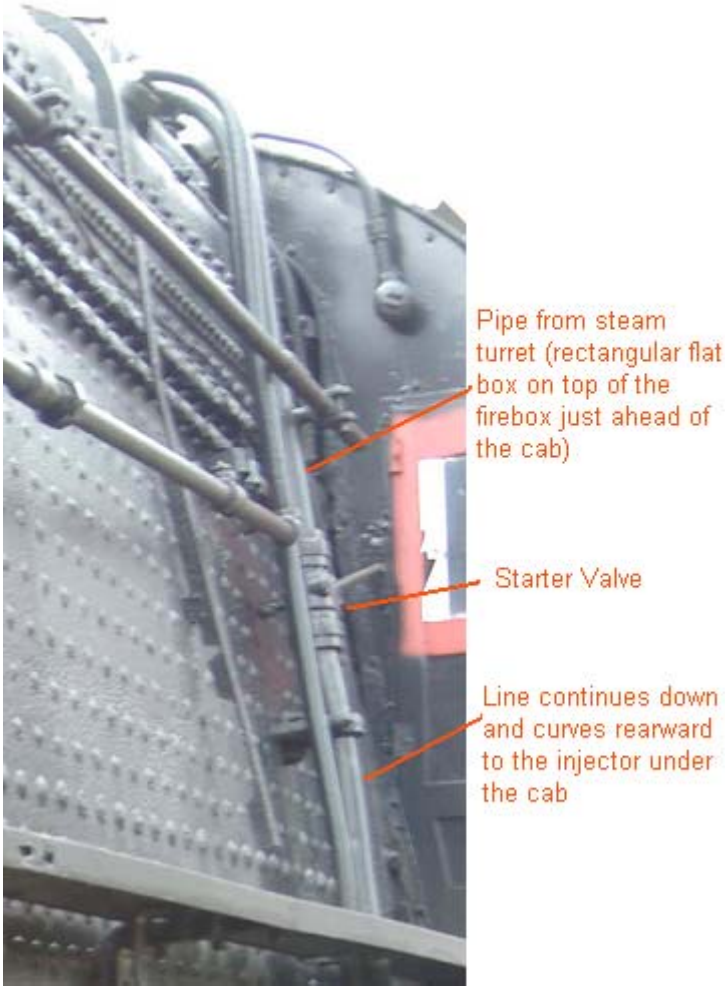
If the casting quality is not satisfactory, 190-240, 190-346, or 190-347 are good substitutes. In N Scale, use RLW part number DA 8013). Steam is supplied from the left side of the steam dome through a pipe that turns to the rear then comes down the boiler side. At the exit from the dome is a valve controlled by a reach rod to the valve handle in the cab.

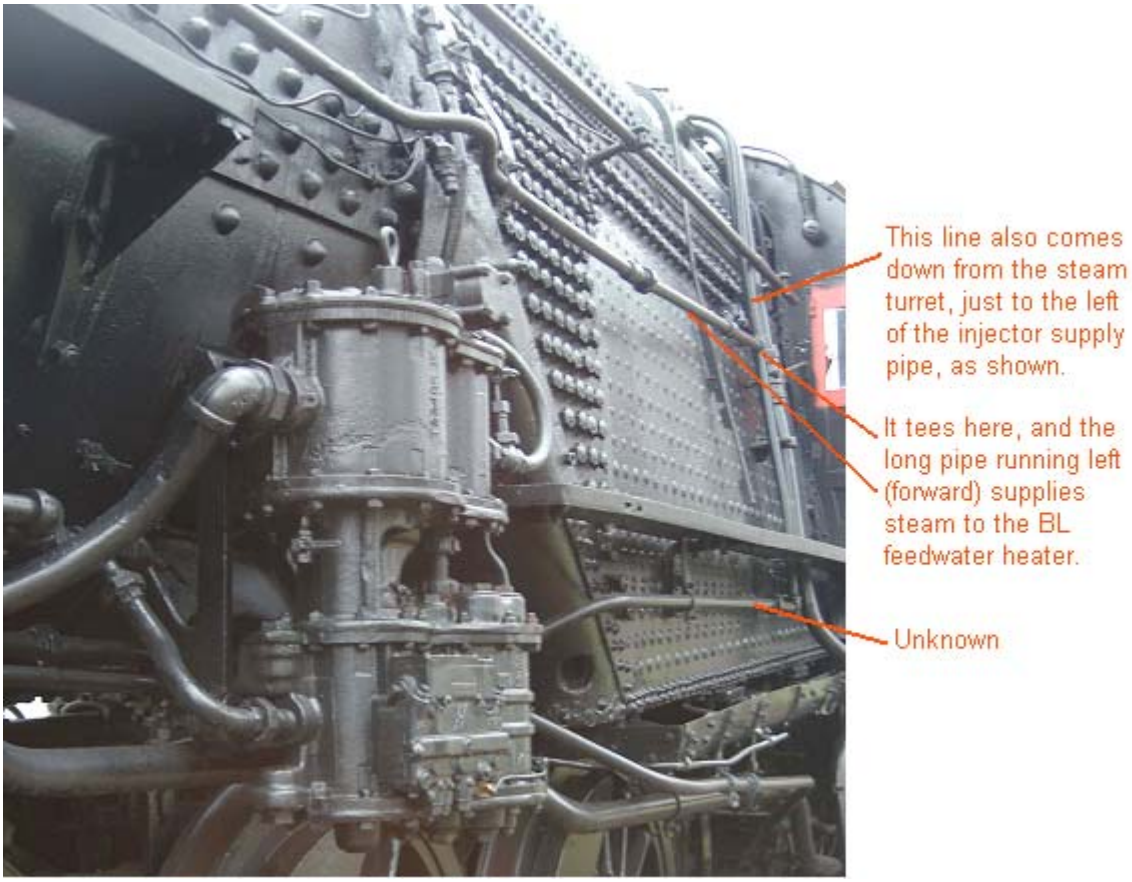
If there is an additonal pump on the right side, the supply goes through a "tee", with the other branch going over the boiler top and down the right side to the pump.

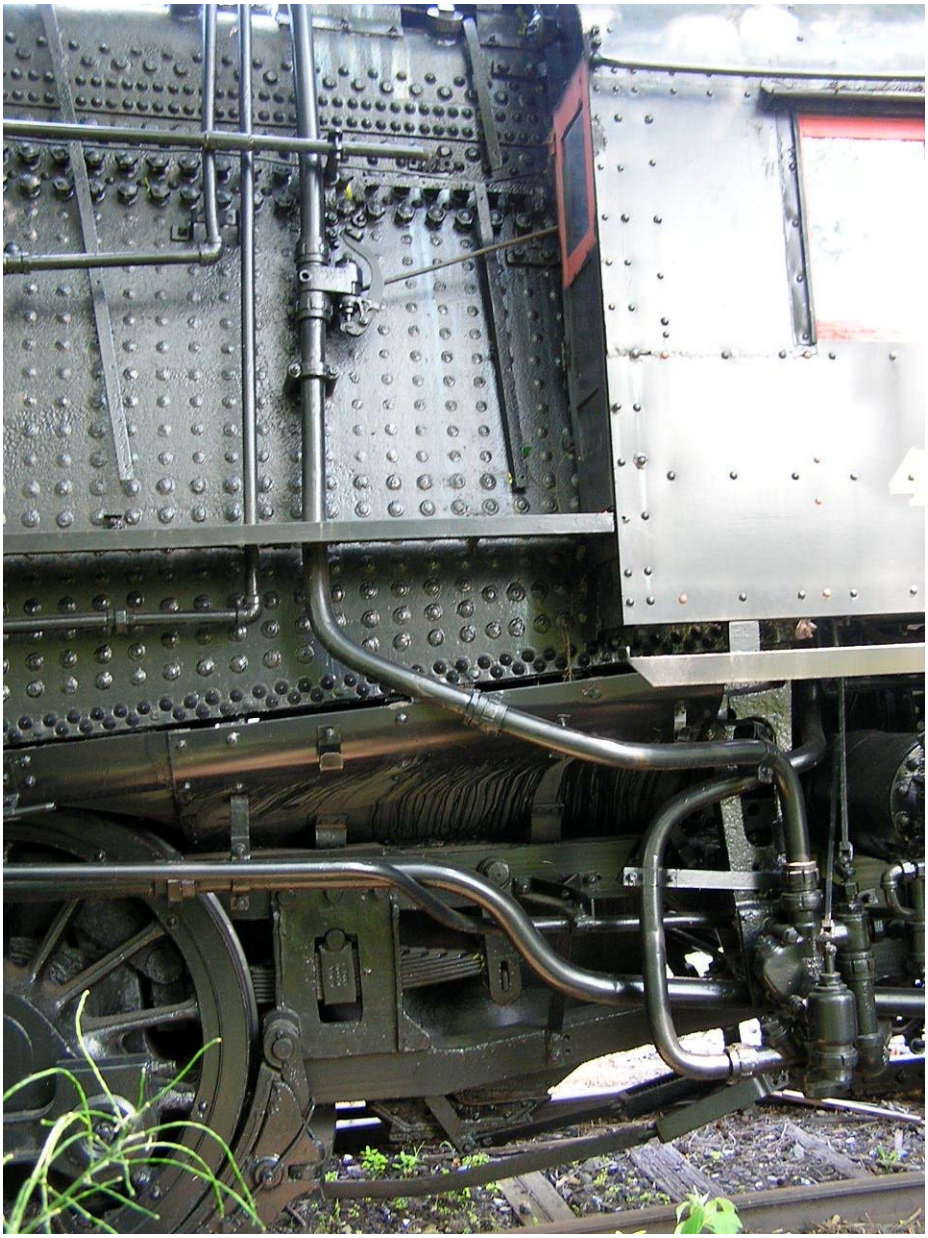


Some engines were equipped with a blow down muffler, a cylindrical device mounted on top of the firebox. Two pipes were connected to it, one on the front, the other on the rear. Both pipes run down the firebox side and through the walkway. The front one turning forward, disappearing behind the air pump. The rear pipe turns to the rear and goes under the cab.

Coming out of the side of the turret and down the firebox side is the pipe which includes the starter valve; this is the steam supply to the injector, 13-107,). (N Scale, RLW part number GHQ_55-002/3-33) mounted under the fireman's side of the cab.

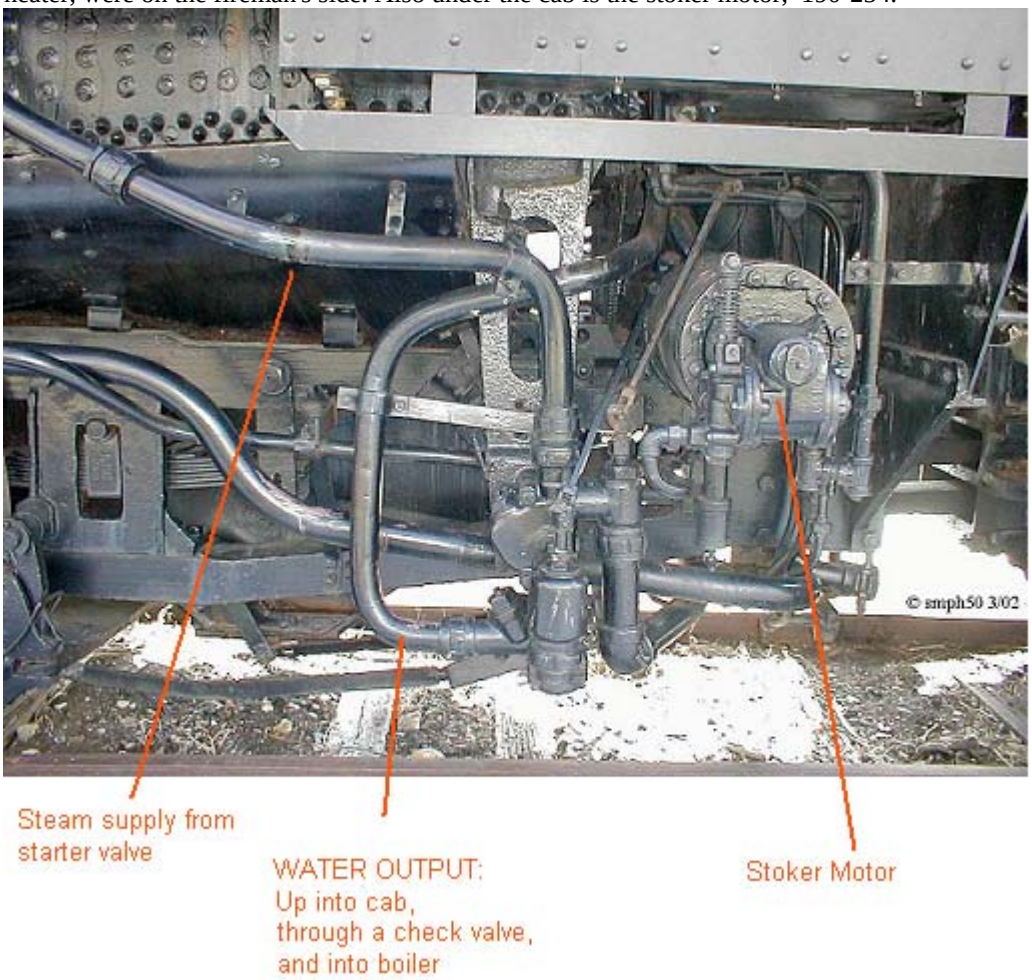

Pipe from steam turret (rectangular flat box on top of the firebox just ahead of the cab)
Starter Valve
Line continues down and curves rearward to the injector under the cab


This line also comes down from the steam turret, just to the left of the injector supply pipe, as shown.
It tees here, and the long pipe running left (forward) supplies steam to the BL feedwater heater.
Unknown

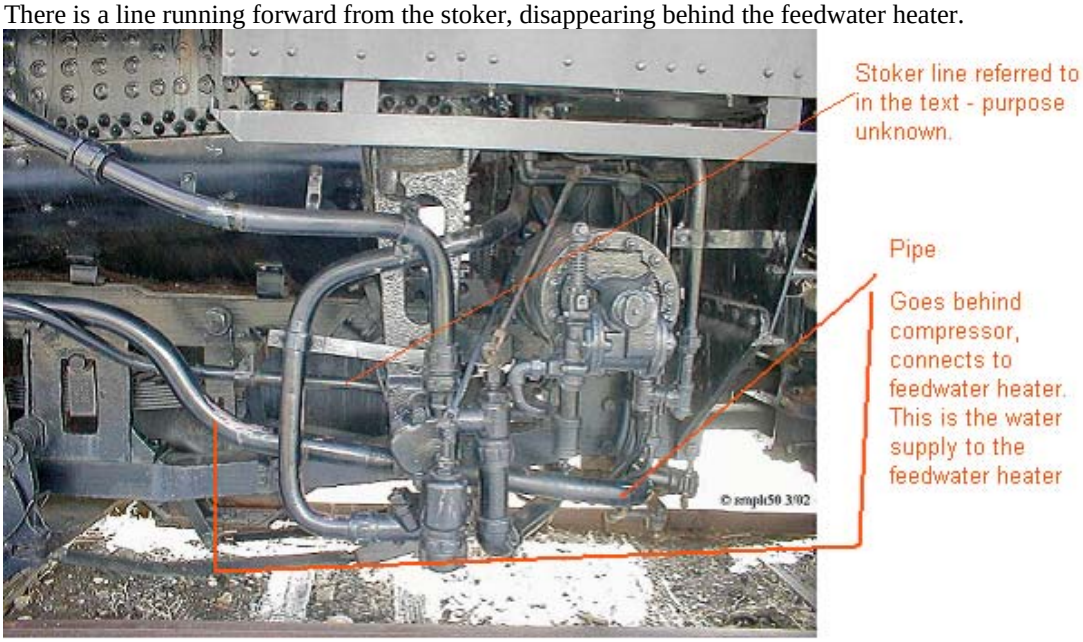


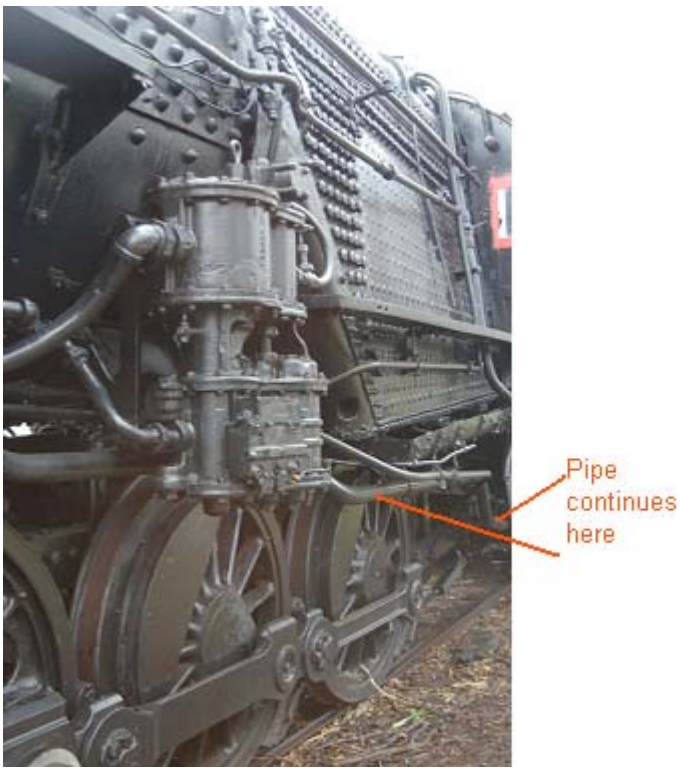
The other line on the front of the injector turns sharply upward through the cab floor. On the prototype the line continued upward and through a check valve into the boiler backface.

Under the cab on the left side is a busy place. It helps to remember the requirement for redundancy in systems supplying water to the boiler. On the Baldwin I1, both of these, the injector and the feedwater heater, were on the fireman's side. Also under the cab is the stoker motor, 190-254.



There is a line running forward from the stoker, disappearing behind the feedwater heater.





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"STEPHEN HOXIE" stevehprr@... Apr 4, 2005
Photos inserted in Steve's text and annotated by Max Magliaro: 8-June-2007.