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STEAM IN THE GARDEN

Vol. 17, № 4
Issue № 94

Gather, friends, while we inquire, into trains propelled by fire...

Articles

Departments

FRONT COVER:

Matilda's Iron & Steel rail truck idles in the yard at the beginning of another hot, dry California day while the crew (Ed & Gus) give some serious thought to their first coffee break. If they aren't careful, the Boss could assign them to that velocipede!

Photo by Sonny Wizelman

Editor
Ron Brown

Faithful Assistant & Staff Photographer
Marie Brown

CAD & Other Drawings in This Issue
Les Knoll

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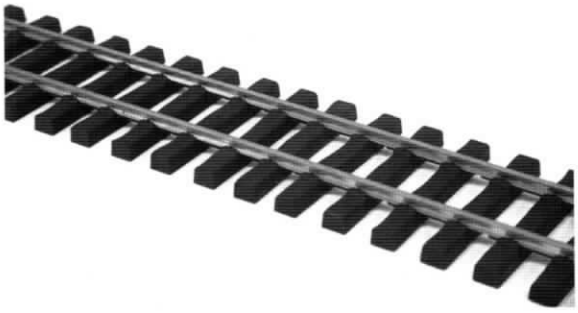
http://steamup.info

WHAT'S NEW?



American Mainline (a division of Accucraft Trains), 33268 Central Ave., Union City CA 94587, phone: (510) 324-3399 , FAX: (510) 324-3366, web site: www.accucraft.com, has announced their Code 332 Brass Euro Flex Track. It features solid brass rails and UV resistant, authentic looking railroad ties with bolt head detail. Tie spacing is 11 ties per foot. For more information, contact your Accucraft dealer.

Trackside Details, 7070 N. Harrison Ave., Pinedale CA 93650, phone: 559-439-0419, web site: http://www.tracksidedetails.com/ has just released another in their long list of detail parts for the large scale model railroader. TD-246 is a Loco Stack in 1:20.3 scale. The heavy brass casting is neatly done, with no flash or casting lines. The base is curved to fit on the smokebox of your loco, and there is rivet detail around the base for added realism. Contact your favorite dealer or Trackside Details for a catalog and to place your order.

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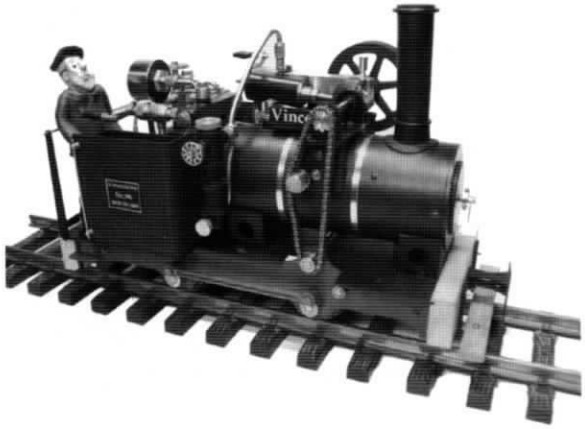


The Train Department, www.traindept.com or phone 757-855-6364 is the exclusive USA dealer for **REGNER** products. In addition to an extensive line of small scale steam locomotives, The Train Department also stocks marine steam engines, boilers, and a long list of accessories such as feedwater pumps, whistles, couplers and many other items for the steam hobbyist. Check their web site for photos and information on all available items. A new addition to their **EASY LINE** is ***Vincent***, (photo on the left) an overtype 0-4-0 steam loco driven by chain, sprockets and gears. Look for a review of this loco in our next issue!

CALENDAR OF EVENTS

Southern California Steamers - contact Sonny Wizelman for dates, places and any other pertinent information. 310-558-4872 ● sonnyw04@comcast.net

Check the Calendar of Events on our web site (http:steamup.info) for regional and club events.

September 1-2, 2007 - Pennsylvania Live Steamers Labor Day Weekend Steamup. Rte. 29, 1 mile north of Rte. 113, Rahns, PA. Permanent Gauge 1 track and Gauge 0/Gauge 1 portable tracks in operation. Night running with lights. Food available on site with lodging nearby. For information and directions contact Harry Quirk, PO Box 215, Springtown PA 18081 - phone 610-346-8073.

September 21-23, 2007 - Staver Locomotive Fall Steamup - 2537 NW 29th Ave, Portland, Oregon - Check our web site for details: www.staverlocomotive.com

Because of publication lead time, please send info for Calendar of Events well in advance. Include name of host and location of event, with address and/or phone number to contact for complete information. Some basic info about the site is also useful (i.e., ground level or elevated, minimum curve radius, ruling grade, etc.)

THE ANTI-CLIMAX - Part One

by Les Knoll

Beginnings

A Class B Climax, the two truck version with horizontal boiler, was a logical addition for my Rivendell and Midland Railroad. The live steam incarnation of this railroad closely follows its HO predecessor. The HO version had a two truck Climax, a birthday gift from my wife. The locomotive's primary function was to haul ore from the Moria Mining Company to the ore docks at West Rivendell. These operations were inspired by the Dolly Varden Mines in British Columbia as illustrated in the book ***Steel Rails and Silver Dreams***.

The small scale live steam version of the railroad has the Moria Mining Company, a three foot tall G scale version of Malcom Furlow's Saratoga Mine, and a greatly downscaled version of the Dolly Varden ore dock. As I write this, it is February in Chicago and in the Spring I am planning a revision to the trackplan to relocate the present ore dock so that it stands taller in the water as the prototype did, and have a longer and more interesting branch line leading to it. This will make the mining portion of the Rivendell and Midland more complete. To cap it all off, the Moria Mining Company will have its own locomotive, a Class B Climax.

The Climax is one of the three most popular types of geared steam locomotives, the other two be-

The author's Anti-Climax crosses a trestle on his Rivendell & Midland logging line.

ing the Shay and the Heisler. About the same time that Ephraim Shay was developing his locomotive in Michigan, a logger in Pennsylvania named Charles Scott was developing another type of geared locomotive for his logging operations. Scott had his design built by the Climax manufacturing Company of Corry, Pennsylvania. Climax had previously manufactured farm machinery and stationary steam engines. This experience enabled them to add locomotives to their product line. The first production models were sold in the 1880's. Had Mr. Scott built his own initial locomotives and followed in the footsteps of his Michigan counterpart, today we might be calling these locomotives 'Scott Geared'. Scott didn't even get the patent on his locomotive. George Gilbert, who was a relative of Scott's by marriage as well as an engineer at Climax Manufacturing Company, secured the patent, hence the Climax name. Interesting to note, Mr. Gilbert later worked for Dunkirk, another manufacturer of geared locomotives, and Dunkirk also built the first Heisler. Small world.

Climax locomotives, like Shays, basically came in three flavors: The Class A had a marine type engine in the center of the frame and drove front and rear trucks through center mounted universal shafts and a two speed gearbox. These could be either vertical or horizontal boiler locomotives. They were the earliest (and also the last-read on) model produced, and are often associated with 'backwoods' Climaxes. The Class B was the horizontal boilered model with the inclined cylinders that was the most common. These locos had two cylinders canted upwards at around 25 degrees, driving a center gearbox. This gearbox powered front and rear drive shafts and universals, driving eight wheels on two trucks through skew bevel, or more properly, 'hypoid' gears. The third type of Climax was the Class C. This model was like the Class B and added a third truck mounted under a trailing tender like the larger Shays did.

Climax locos varied in size from the early Class A vertical boiler 4 wheel locomotives of 7-8 tons up to the 100 ton Class C types. About 1,100 were produced from 1888 until 1928 when production was suspended. They were in use from coast to coast, Alaska and Hawaii, and some were exported to Mexico, Canada, Australia and New Zealand. The last manufactured, like the first, were the small Class A types.

Climax went through the same types of design evolution as the other geared locomotive manufacturers. Many design changes were driven by the demands of West Coast logging. Lima had their Pacific Coast Shays, Willamette Iron and Steel Works built the Willamette Shay when original patents ran out and Heisler had their West Coast Specials. Climax improvements included adopting Walscharets valve gear in 1915. They also used piston valves in their larger models. These two major design improvements directly parallel the Willamette Shays, although the Climax improvements pre-date the Willamette designs by seven years or more.

Climax locos were a favorite of West Coast loggers. More were sold in Washington State than any other location. Their sales and service facility in Seattle rivaled those handling Shays. All in all, Climax came in at number two in overall sales behind Lima. Lima more than doubled the Climax production, but Climax nearly doubled the production of Heislers.

Climax suspended manufacture of locomotives in 1928 after 40 years of production. Some say that Lima drove them out of business with competition from the Shay, but during their heyday the Climax facility had to turn away orders since their facility was not as large as Lima's. This probably brought some business over to their competition. In actuality The Climax Manufacturing Company was aggressively managed, and this management saw the dropoff of locomotive sales in the 20's and the writing on the wall leading to the Great Depression as good reason to cease operations and sell off the business. Lima, unlike Climax, had their rod locomotive business to rely on. Lima did hang on until 1945, but from 1929 onward sold only 8 more Shays, including the Western Maryland monsters.

According to **www.gearedsteam.com**, there are 23 surviving Climaxes, 7 of which are operational. Interesting to note that there is one in Australia and another in New Zealand.

I call my project the "Anti-Climax" because this is a locomotive is built out of many components never intended to be used on a Class B Climax. The project went through many design stages and at times it was as if it was working against itself. In the end perseverance and Roundhouse components won out.

Building this locomotive was like many research projects. There are often a number of failed attempts before something works. If you are smart, you learn from each one. Keep whatever turned out right and know why whatever was wrong caused the project to not turn out as you wanted. If you look at it that way, failures aren't really failures, but learning experiences. I think about how inexperienced I would have remained if everything had worked the first time. There would have been much knowledge about construction, tuning and adjusting, troubleshooting and

locomotive performance still unlearned.

Three different prototypes were built before there was a truly successful design:

Chassis with Ruby cylinders, modified Ruby valve gear and scratchbuilt "tee" boiler. (boiler never built)

Chassis with Roundhouse cylinders, scratch-built valve gear and Ruby boiler

Chassis with Roundhouse cylinders, scratch-built valve gear and Roundhouse 'Lady Ann' boiler.

Some of these prototypes involved more commercially built parts than others. Some were built when I had more machine shop facilities available. All were based on rod locomotive components. All development involved layout of components using CAD. None of the components were 'perfect' for a Class B Climax. Part of each design involved making non-Climax components look like they belonged. There was no accurately predicting performance, so prototypes had to be built and tested. The third time was the charm.

The first version was Ruby based. I designed a chassis that had Ruby cylinders and valve gear inclined at approximately 25 degrees as is Climax practice. New linkage for the valve gear was designed and the reversing block piping was revised to be low slung in the frame, below the boiler, almost in the exact place it is in a Ruby rod engine.

The hypoid gearing was available through Sulphur Springs Steam Models as part of a Class A Climax project by David Bailey's DJB Engineering. I intended to scratchbuild the trucks as I did with my Shay, and add the DJB gearing. I bought one of the four required sets of hypoid gears to experiment with.

Much inspiration for this project came from Mel Ridley's Vest Pocket Climax project. (SitG issues number 35 thru 45). From this project I learned the technique of building the center gearbox. Mel used helix gearing of his own manufacture for his center gearbox. By the time I started building my locomotive, this was no longer available. I purchased a set of Helix gears from Chicago Gear Company that had a ratio of 1.5:1. With the 2:1 reduction from the DJB hypoid gearing in the trucks, this was a total gear ratio of 3:1, something I figured I needed when originally designing the locomotive around Ruby components. I also knew from engineering practice that helix gears used at 90 degree angles are only 50% efficient, something the additional reduction might help compensate for. That's probably why the prototypes used the hypoid gearing in the center gear box as well as in the trucks. In a Class B Climax, the engine's power must make two 90 degree turns before it can drive the wheels.

The gear box is fabricated from sheet brass cut from a pattern, with slightly oversized holes cut for the shaft bushings. After the brass sheet was folded into a box shape, the shaft bushings were soft soldered into position using the meshing gears as a guide for alignment. This was admittedly a bit unscientific, but if the gears run smoothly, the shafts are fairly well in alignment, and the gears stay in mesh under load, it is good enough for this application. My own test of how well the gears mesh is 'backdriving' the gearset, that is, turning the output shaft and seeing if the input shaft will rotate smoothly.

The locomotive frame followed the tried and true design used on my 14 ton 'tee' boiler Shay (See SitG articles 'A Shay From The Ground Up') which is 1/4" brass squares for the side members, cross members and truck bolsters. Since I model more by proportion and for aesthetic effect, all the components had to be laid out in a CAD layout to see not only how they would work together, but how to best make them look good together. My ideal at the time was Mel Ridley's old time Climax. So the locomotive would look good with the others on my roster, I kept a final drawing of my 14 ton Shay on the same CAD file so I could make quick comparisons. This initial frame design was to be no longer than the Shay, 14". The boiler was to be a 'tee' boiler as on the Shay. This has proven to be a successful design, although the boiler is so skinny that you better keep your Goodall filler bottle handy when running. Until the 'tee' boiler was built, I would have to use a Ruby boiler for steam testing.

I built the cab and bunker from sheet brass. The front of the cab was cut out for the Ruby boiler as a temporary measure. The cutout for the 'tee' boiler would be larger and would be done when that boiler was built. I admit the small diameter Ruby boiler looked good on the locomotive.

As it turned out, I could not get the altered Ruby valve gear to work out right. I had problems with parts wearing too quickly and excess play not allowing the engine to stay in time. In hindsight, if I had used practically all of the Ruby valve gear parts as is, this project may well have worked out. Maybe someone will want to take up where I left off on that; it's

still an idea worth pursuing.

At this stage of the game I had a modified Ruby engine of questionable performance, a Ruby 'test' boiler that could provide steam for it, a frame, cab, bunker and a working gearbox. I admit, that Ruby engine conversion was driving me nuts. It just would not run well no matter what I did with it. Diamondhead was coming up, and I decided to abandon the project, cut my losses and sell off what I had built at Diamondhead.

While at Diamondhead, I ran into a number of steamers that had class A 'backwoods' Climaxes modeled. On one locomotive, I saw a very clever way of using the commercially available hypoid gearing on a set of Hartford trucks. This could be a good shortcut to scratchbuilding trucks. Photos of the Shawnigan Lake Lumber Co. #2 on www.gearedsteam.com clearly show a Climax built on what appear to be conventional freight car trucks. I must mention that this locomotive was restored to display status in a British Columbia museum, and whether or not it ever ran with these trucks or not is unknown. Doesn't look bad that way, though.

In the Diamondhead vendor's area, David Bailey from DJB Engineering was selling the trucks, gearing and other drive components from his class A Climax project locomotive as well as other detail parts. Looking at his Climax truck kit renewed my interest in trying to build my Climax. Here were most of the drive components, hypoid gearing and beautifully detailed trucks right in front of me, and for a reasonable price, too. Instead of selling off my Climax project, I invested in the DJB truck kits and the remaining Climax gearing. The project was active again.

Putting the engine assembly concerns aside for a while, I concentrated my efforts on getting a rolling chassis built with the DJB trucks, gearing, scratchbuilt universals and the completed center gearbox. I discovered that there are many gear and collar adjustments that must be made to give the proper operating clearances for the gearing without getting sloppy and causing the gearing to come out of mesh.

After the chassis drive was fully functional and running smoothly I decided that the engine assembly to power it would not be from a Ruby. The most logical alternative was Roundhouse components. The cylinders are admittedly larger, but they look a lot more prototypical with their rectangular steam chests and other details. It was back to the virtual drawing board to do a CAD layout of how the locomotive would look with a Roundhouse engine assembly, and how the engine assembly itself would have to be modified to fit on the Climax.

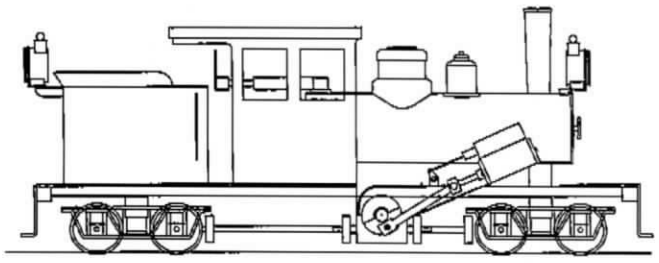
I ordered a pair of Roundhouse cylinders and when they came, I noticed that there had been a design revision resulting in the cylinders appearing a bit larger than the originals. I had to play some artistic tricks as it was to make the original cylinders not look too oversized, what to do about these 'monsters'? This turned out to be a blessing in disguise. I simply put the new larger cylinders on the front engine of my 2-4-4-2 Mallet and used the original Mallet cylinders on the Climax. Now the Mallet had a large and small pair of cylinders as it should have, and the Climax had the smaller original design cylinders. Both locomotives came out winners.

To make the Roundhouse cylinders look like they 'belonged' on a small Climax, I lowered the engine assembly as much as practical so that the top of the cylinders would only come up to around the centerline of the boiler. There were several tricks to doing this, one of them was to simply raise the boiler slightly further off the frame. This turned out to be handy anyway because the Roundhouse Walscharets valve gear requires a weight shaft to run between the two cylinders to synchronize reversing of both sides. This shaft passes underneath the boiler, and on Roundhouse locomotives, it is bow shaped to clear the bottom of the boiler. With the small diameter boiler I was going to use, this bowing was not necessary, and a straight shaft could be used.

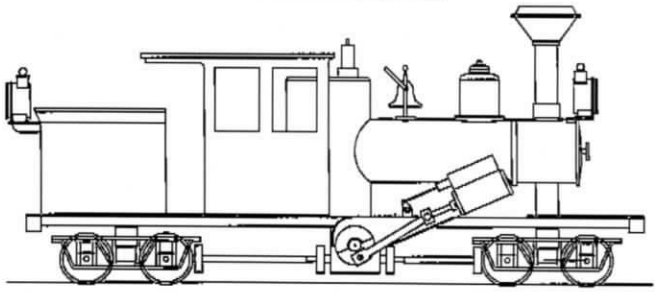
An additional design consideration was the valve gear itself. If I were to lay out a standard Roundhouse 0-4-0 mechanism in the place of the Climax engine assembly, the mechanism would be way too long. The length from the cylinder to the crankshaft had to be drastically shortened. Fortunately I am no stranger to this. Both my 2-4-4-2 Mallet and my 2-8-0 Consolidation have greatly shortened engine geometry. The geometry for the Climax engine was taken almost directly from my 2-8-0 Consolidation. In laying out the valve gear, I discovered that the only stock Roundhouse components that could be used were the return cranks and the expansion links. I had a spare set of Roundhouse return cranks, and ordered two expansion links directly from Roundhouse. This saved the expense of buying an entire valve gear kit and using only four parts. I could then say that most of my valve gear was scratchbuilt. Scratchbuilding most of the linkage gave me an opportunity to lighten up the linkage members and make them appear more prototypical in size.

The HO scale brass Climax I got as a birthday present from my wife had Walscharets valve gear on

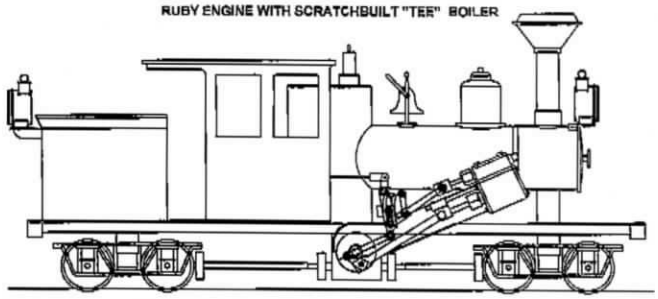
DESIGN EVOLUTION OF THE CLIMAX PROJECT



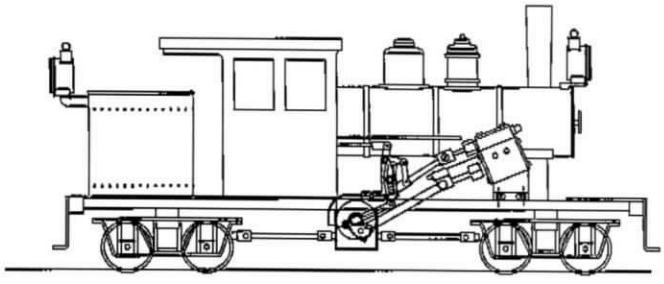
RUBY ENGINE WITH RUBY BOILER



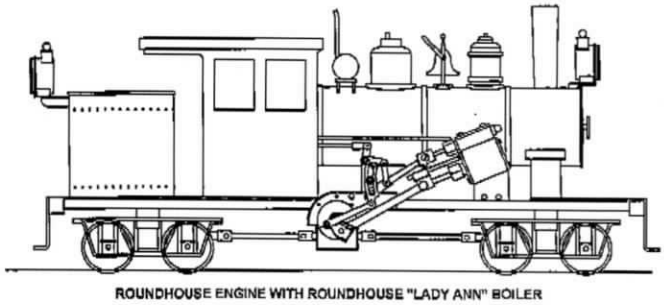
RUBY ENGINE WITH SCRATCHBUILT "TEE" BOILER



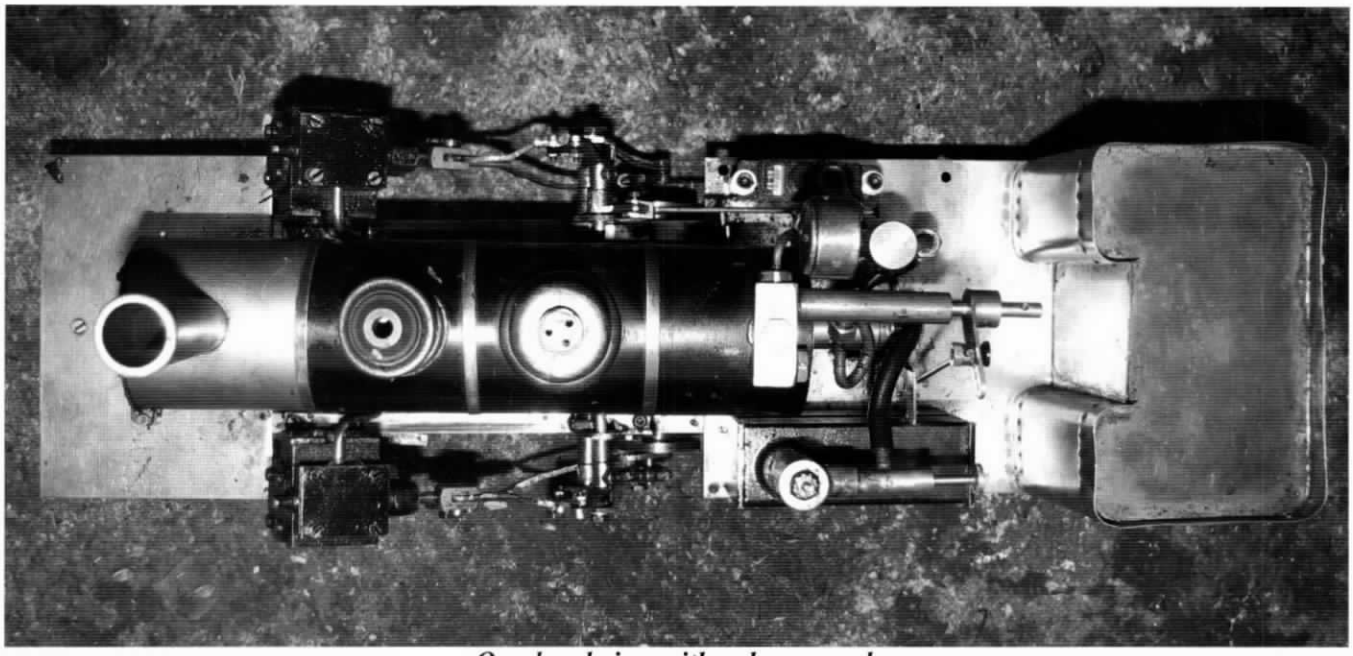
ROUNDHOUSE ENGINE WITH SCRATCHBUILT "TEE" BOILER



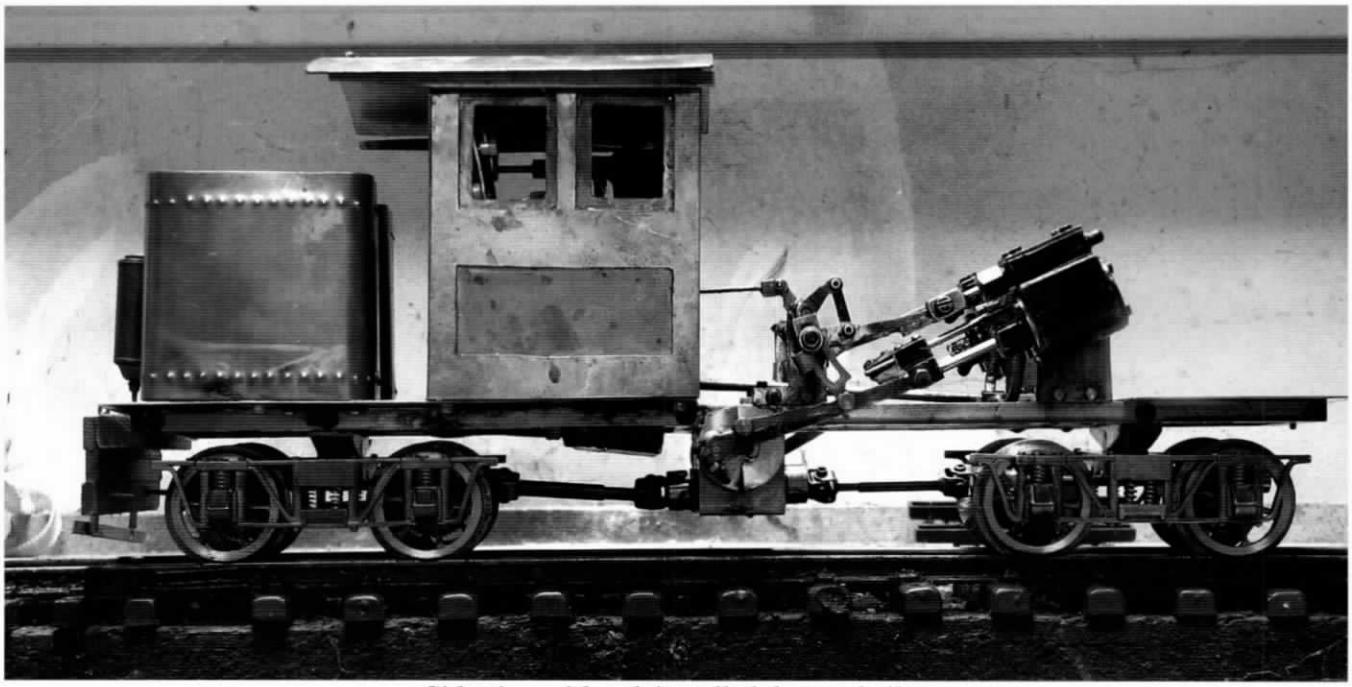
ROUNDHOUSE ENGINE WITH RUBY BOILER



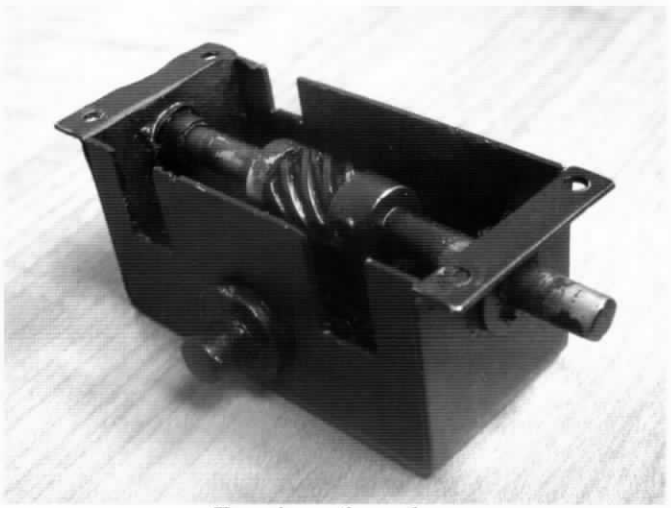
ROUNDHOUSE ENGINE WITH ROUNDHOUSE "LADY ANN" BOILER



Overhead view with cab removed.

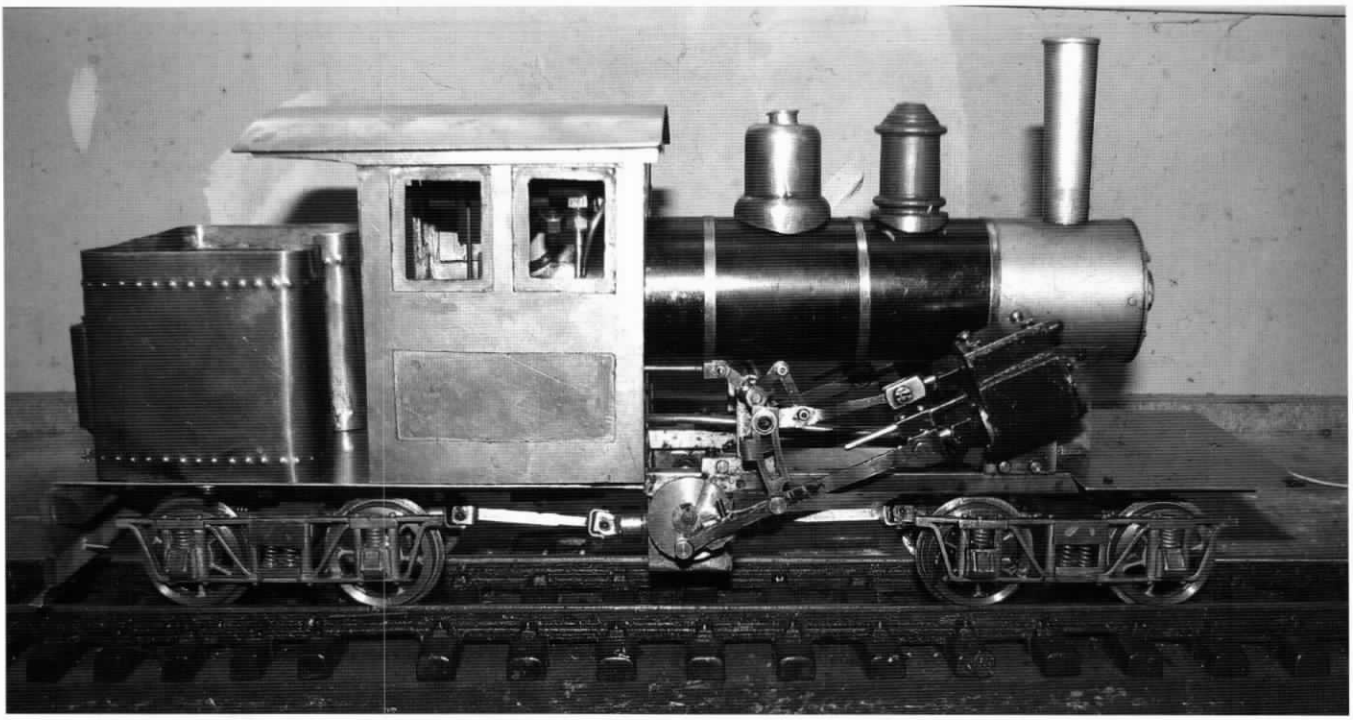


Side view with cab installed, but no boiler.

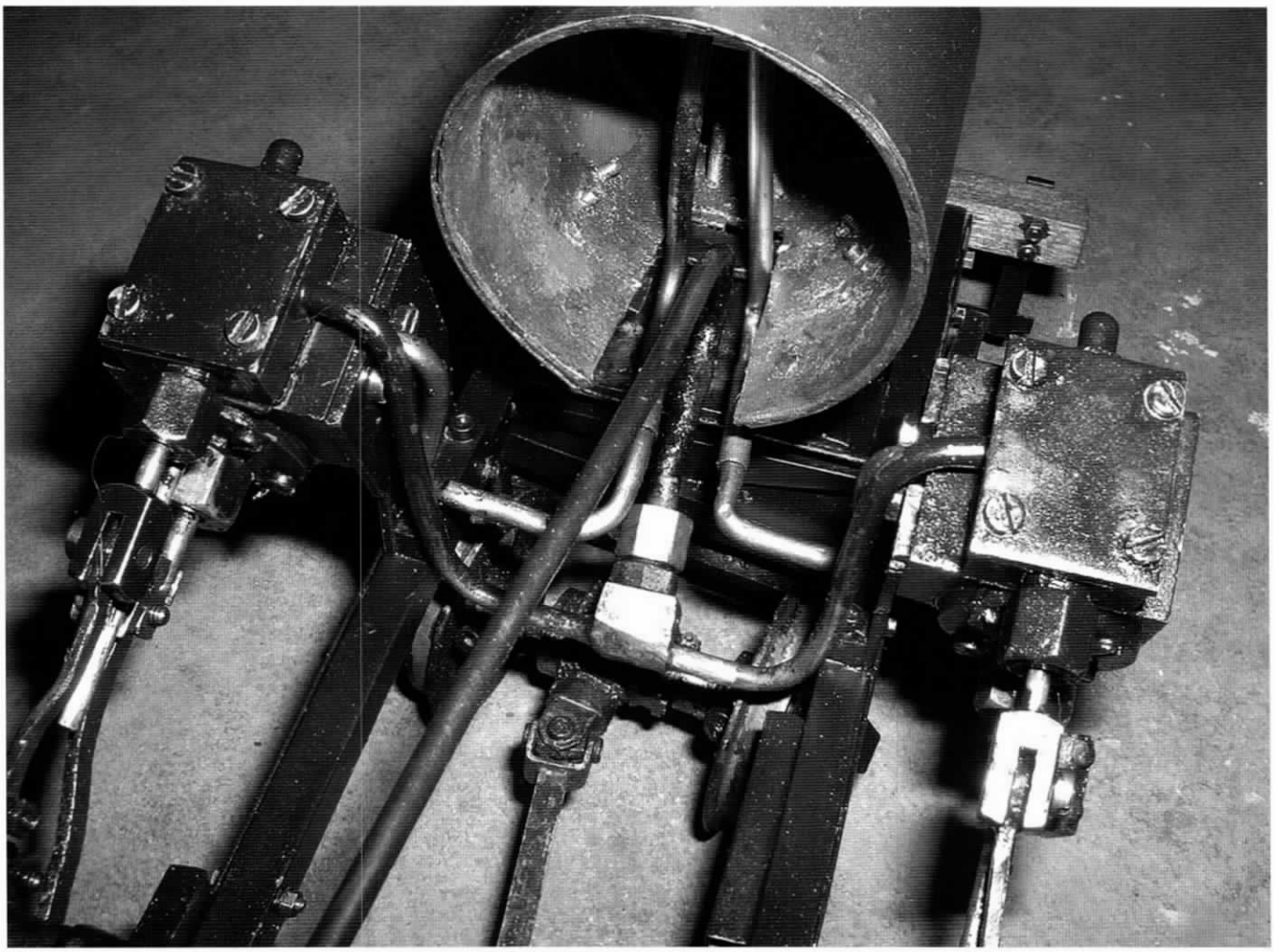


Top view of gearbox.

Bottom view of gearbox.



Locomotive with Ruby boiler.



Climax plumbing.

it, and that was the first time I had ever seen a Climax without Stephenson's valve gear. Maybe that was an omen. Most of the Climaxes seen in photos and almost all that are modeled are the smaller, earlier locomotives with Stephenson's valve gear. As mentioned earlier, Climax introduced Walschaerts valve gear in 1915, but in actual practice never put it on locomotives as small as the one my model represents. There are a great number of pictures on the Climax websites of Walschaerts equipped locos, both Class 'B' and the three truck Class 'C'.

The cylinder mounts were designed using the CAD layout of the chassis, as were the brackets for the valve gear. The only dimensional 'constant' from the Ruby engine assembly was the location of the crankshaft. The entire Roundhouse engine assembly was laid out with this as a starting or datum point.

Plumbing was far from standard Roundhouse. Both steam and exhaust lines make an abrupt 90 degree downward turn coming out of the cylinders. The exhaust then follows a serpentine route to the smokebox and out the stack. The steam lines for the two cylinders meet in the middle of the chassis. The original design called for a single steam line to run under the boiler and back to the throttle in the cab. No superheater was planned.

In the next installment I'll describe the air tests of the Roundhouse powered chassis and pass along some tips for locomotive builders doing this sort of testing. I'll also describe the bittersweet first meeting of chassis and boiler, and how the final design of the locomotive came about. Until then, I hope these articles inspire some readers to start building some of their own locomotives, or take up where they left off on existing projects. It's never too late to pick up where you left off, and there's nothing that has been done that can't be revised, rebuilt or redone if you are not satisfied with the results.

N

see page 20

Railbed Systems

by Tom Bowdler

Track Support System

In 1990 Donald Quintal, Jr. conceived the Railbed Systems track support concept and began manufacturing components in 1991. Each section is made to be compatible with LGB track pieces, although Aristocraft and USA Trains track will also fit. Straight and curved sections are available as well as crossings and switch supports. All consist of welded assemblies of 3/4" x 3/4" x 1/8" angle iron, delivered primed with DuPont® lacquer based primer allowing an overcoat of any type of paint if desired... although Don recommends RustOleum® brand.

The ends of each piece are drilled for the stainless steel hardware that is provided for assembly. The crosspiece tops are drilled and tapped 8-32 and aluminum rectangles are provided which are used to hold the track sections to the railbed with 8-32 screws. Closer spacing of the holddowns should be used on curves.

The author set up a mini-test track on his patio, using the samples provided. His Regner Willi trundled happily back and forth. Just don't get distracted!

Railbed components could be supported in many ways. They could be laid directly on the ground, on gravel, placed on paver blocks or just about any pier arrangement the owner would choose. Don has developed a system utilizing half inch pipe that attaches to the railbed with U-shaped swivel plates. You lay out the system then take a half inch drill bit welded to a shaft of threaded rod and drill holes one foot in the ground at appropriate locations. Half inch pipe is placed in these holes and a string is utilized to mark either a level surface or the desired grade and a pipe cutter is used to trim to length. Electrical pipe connectors attach the swivel plate pipe to the pipes in the ground and the use of cotter pins compensates for misalignment of the vertical supports.

Don is proud of his ability to custom make railbed components as required. He enjoys working with customers to incorporate their ideas for innovations

to the railbed system. He suggests that his system could be used as a portable track or sections could be unbolted with the track still in place to be put away for the winter. As close to a "slogan" as his company has could be "put it together on Saturday and run trains on Sunday". You then have a railway to enjoy while you continue work on landscaping and other features.

I received for review one each 72", 24" and 12" straight bed supports, one curved support and one left handed switch support along with a couple of swivel support plates and hardware. I assembled the pieces upside down as Don recommends for easy access to tighten the bolts. I placed the pieces on flower pots and used some Aristsocraft track I had on hand to build a small point to point garden railway. It was fun running my modified Regner Willi back and forth and even performing some "switching" chores on my little railway.

I really like the Railbed System. It is strong, versatile and easy to erect. The major brands of gauge 1 track can be used and the flexible systems from Sunset Valley, Llagas Creek and AMS could also be employed. I asked Don about building a table framework to be used as a steamup area. He can custom make any length or width using straight components but curves are limited to LGB sizes with the maximum being nominally 15' in diameter, for which his subcontractor has the tooling in place. This is a drawback if your track design calls for sweeping mainline curves, but if either space constraints or style of railway operations dictates curved track of 15' diameter or smaller, you should consider the Railbed Systems Track Support bed.

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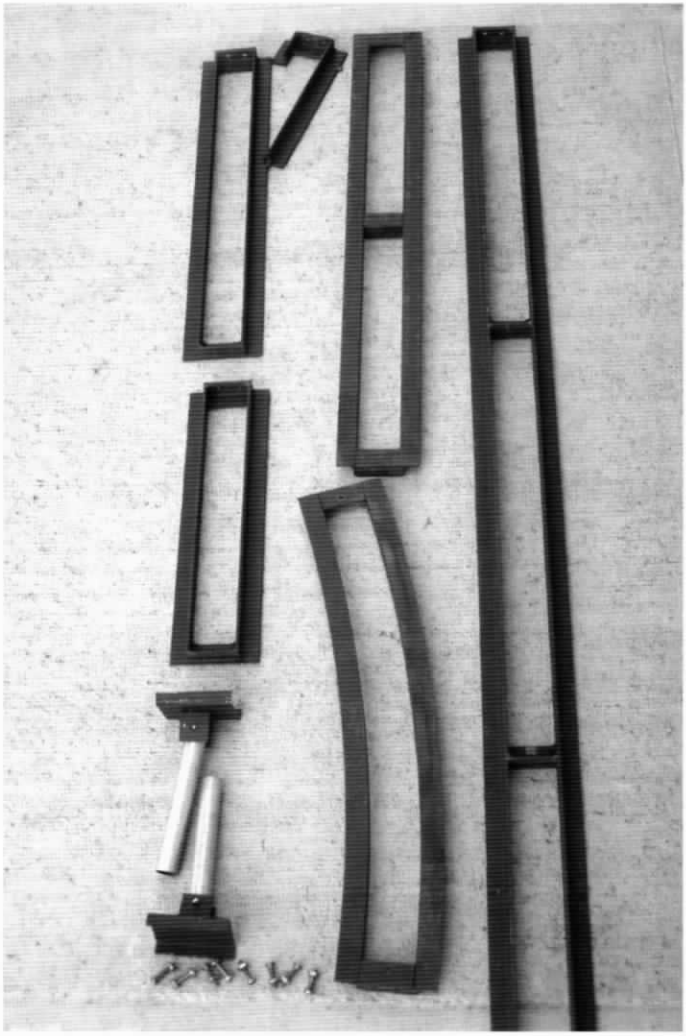

Left: All the pieces received for evaluation. A very high quality product.

Below: This shot demonstrates the method used to support the railbed sections. (No, not the flowerpot!)

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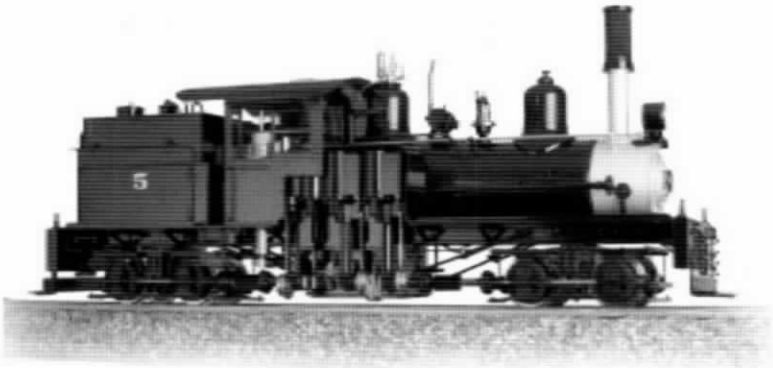

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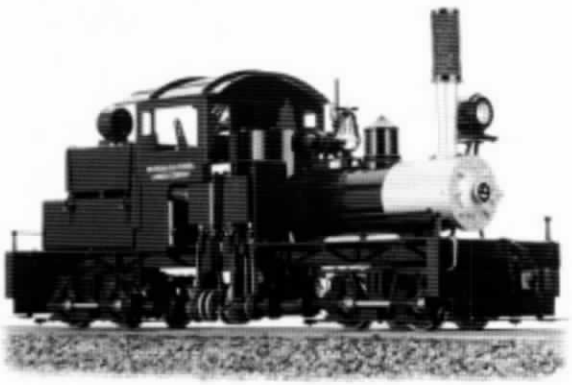

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Review

Accucraft's San Juan Cars

by Bert Horner

It's early 1940 and the late afternoon sun sinks behind Gable Mountain, which casts long shadows over Tres Piedras depot. The track gang on the left welcome the cooling shadow. The Shavano Express on the right is preparing to leave after exchanging mail sacks and taking on a couple of urgent crates that have to be in Denver by tomorrow morning. There are very few passengers these days and there are rumors that the passenger service will be totally withdrawn in the near future. With the war raging in Europe, the mineral and coal mines are working flat out securing jobs on the freight sector for the moment. The crew manning the caboose on the helper engine spur are resting up after being caught out under the sixteen hour regulation.

The little Porter is an Accucraft electric model, the K-27 in charge of today's Shavano is a two year old Accucraft live steamer and it handles the six brass cars with no problems over the steep grades in my garden. All my Accucraft engines continue to give Stirling service in spite of doing regular heavy work. A K-28 purchased just before Christmas is proving to be a very powerful engine. (the whistle is on the wrong side of the steam dome but....)

The cars are also by Accucraft (San Juan Set) and look excellent from the outside, However, there are no interior fittings at all in the RPO or Baggage cars. The interior lighting did not work because the lighting boards were screwed directly onto the metal bodies which naturally caused short circuits. While

on the subject of electrics the wiring is secured with normal clear cellophane tape as used in offices and homes for sticking onto paper, with the result that the wires hang behind open doors and are visible behind windows as the tape un-sticks itself when the sun warms your cars.

There are no fittings in the observation car galley and no fittings in the toilets of all cars. *Rio Grande Narrow Gauge Varnish,* published by the Colorado Railway Museum, suggests that the windows in these facilities should also have been frosted. There are smoke jacks on the roofs but no stoves under them.

The trucks are beautiful replicas of the originals and are sprung. On my set the springs are so stiff I have to use force to compress them, so they might as well have no springs at all. The cars negotiate LGB R3 curves but will not traverse an "S" unless about 800mm of straight is between the curves. These are long cars and have body mounted couplers so I find this is quite acceptable.

LGB switches need to taken slowly as the small flanges tend to fall into the gap on LGB frogs (LGB wheels run through on the flanges). The cars look great and measure up perfectly. The paint job is one of the nicest I've seen. They behave well even in my stony garden under adverse conditions. I do, however, feel that to describe these as museum quality is an exaggeration. There is a lot to be done on the insides of these cars. Particularly hiding unsightly coolers on the constant lighting electronics and securing wires with proper harnesses as well as fitting interiors as mentioned above. I doubt if these would conform with European trade descriptions laws under the title "Museum Quality".

Specifications (taken from the Accucraft web site)

Accucraft Trains D&RGW San Juan passenger cars in 1:20.3 scale and 45mm gauge. Models are constructed from brass and stainless steel. Some of the features are operating doors, full interior details, full underbody details, lights, and ball bearing wheels.

Workshop Project

Matilda's Iron & Steel Rail Truck

A Gauge 1 "Steam Community" Project Engine

by Sonny Wizelman

The inspiration for this rail truck came when I saw the one that John Riley brought to Diamondhead in January 2004. I had a project engine that was based on the Bay Area Garden Railway Society Live Steamer's Project Engine. I had purchased a Midwest boiler, a wobbler steam motor and a gear rack with plastic gears and chain from Sam Muncy in 1996. I built a platform and a body for it and it appeared in the publication *Awnuts* (Vol. 4, No. 3). I had the idea that I could turn it into a rail truck based on what John had done.

The frame is K&S square brass tubing. It comes in 12" lengths, so I used 1/4" x 1/4" for the outside and the next smaller size inside to increase the length to 15 1/4". The width was dictated by the length of the axle on the rear wheels. All the cross frame members are 1/4" x 1/4" as well. I used brass screws to hold it together. The front truck is from a Northeast Narrow Gauge Forney locomotive kit, and the box car body is also from a Northeast Narrow Gauge kit. The bell and pilot are from Brandbright, LTD. I used K&S .025" sheet brass as the base to hold the components. I dropped the platform 3/8" under the boiler so that the car body would fit over the top of the boiler. The lights are K&S tubing with mag light bulbs, and are powered by one AAA battery which is located behind the gear rack. The displacement lubricator is from Potomac Steam Industries.

Here is why I call it the "Community Project". The boiler did not put out enough heat and the wobbler motor had very little power. A twig on the track was enough to stop its progress. This became a 3-year project and I enlisted the help of many of my steam friends to get the project done. I first converted the fuel source from Sterno to alcohol by making a John Thompson designed burner. I had more heat, but an uncontrollable fire and still not enough power. I consulted Mike Martin (designer of the BAGRS Project Loco) and he discovered the motor I had was worn out. I replaced it with a new one but was still unhappy with the lack of power. I spoke with Jim Hadden, Norm Saley and Steve Shyvers and got their suggestions. Their advice led me to change the motor to a Graham HM1. I built it and Steve Ciambrone helped me run it in on air. I could see some steam leaks and sent it to Dave Hottmann for some fine tuning. After installing it, I was still not happy with the power. The next step was replacing the fuel system with a Cheddar ceramic burner and butane tank from Sulphur Springs in order to get more heat into the boiler. This gave me a much hotter fire and all the power I needed. This little 2" round ceramic burner puts out way more heat than I needed. it melted the plastic chain and gears and burned the box car. At the time I had a '40 Ford cab with plastic windows and seats, which also melted. I asked Bill Turkel to silver solder a baffle to reduce the flame. I replaced the chain and gears with Sulphur Springs brass gears and chaines. This setup gave me plenty of power, but also melted the Midwest boiler which is soft soldered. When Bill Turkel saw the look on my face he said he would make a coiler from copper pipe and silver solder it. It is based on the design and size of the old boiler. He added a safety valve and a valve that works as a throttle.

The new boiler was about 1/4" higher than the old boiler, and that required raising the roof on the front third of the box car to fit over the taller boiler.

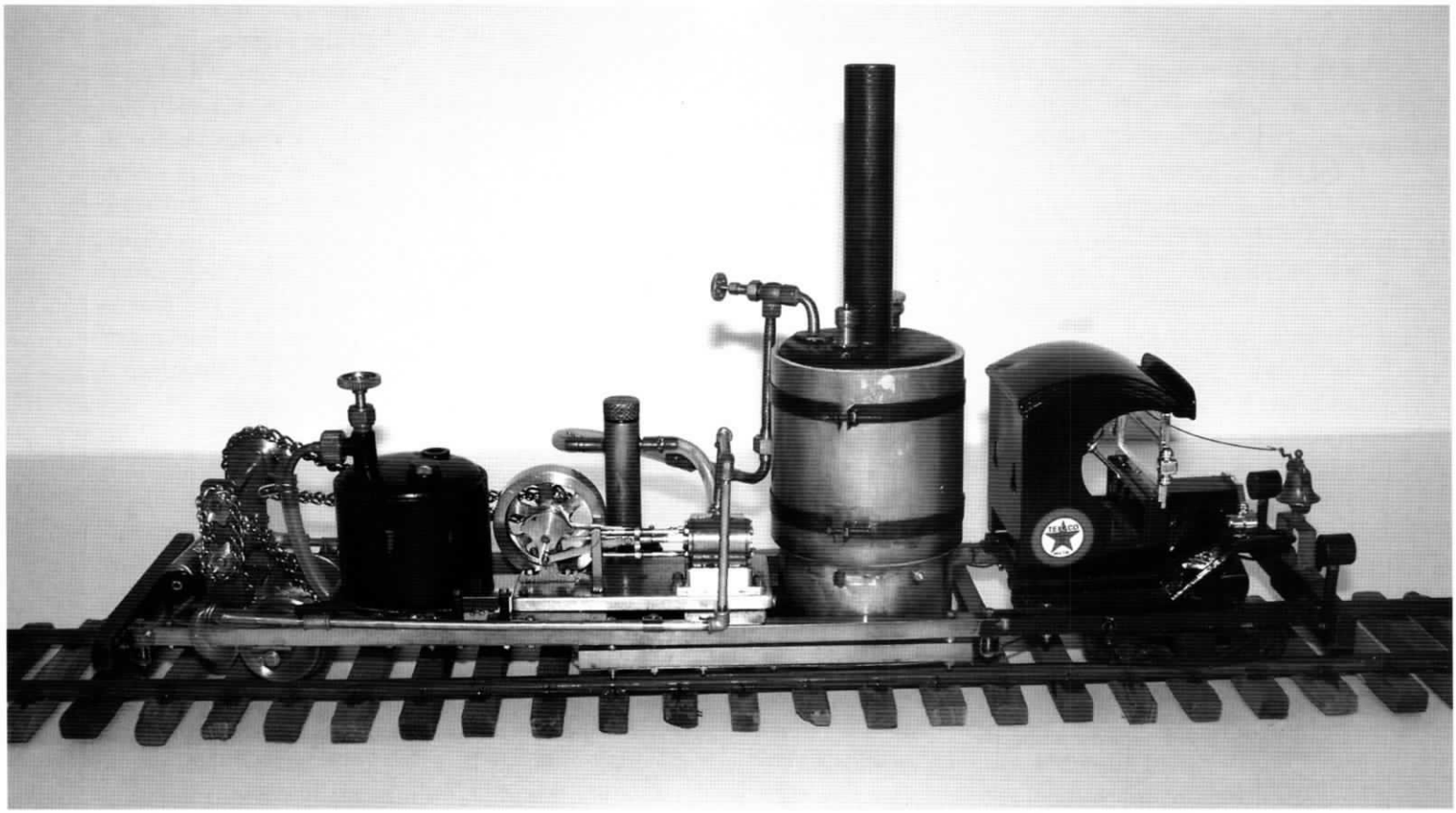
At this time the boiler was behind the cab, followed by thte gas tank and then the steam motor. This configuration radiated heat from the boiler to the gas tank and made the gas flow too strong. The fire was uncontrollable. Bob Starr suggested changing the position of thte gas tank and the motor so that the motor was behind the boiler and the gas tank was behind the motor. I finally had a controllable fire and enough power, and it was performing really well. At this time it had a single exhaust. Jerry Reshew came up with the idea to make a dual exhaust. I used 1/8" thick wall

brass tubing, 1/8" elbows and tee from Coles Power Models. I also bought their tap and die and the system was screwed together. The current truck cab was a die cast bank. I removed the wheels and sawed off the body, then soldered it to a .025" brass support which was screwed onto the body. If you examine the sheet brass holding the components, you will see all the extra holes I had to make during the various attempts at getting this to work.

I ran it several times and felt I had been successful. It was performing well and I was planning to take it to Diamondhead 2007. A week or so before leaving I tested it and it was working fine. They always do when no one else is watching! On my first run at Diamondhead a gasket broke on the steam chest cover and steam was leaking. I tried to tighten the nut to stop the leak and broke the screw. John Garrett found a longer nut and he cut and filed it to fit. Rob Lenicheck made 2 new gaskets from a dollar bill (his dollar!). When I put it back together, the D valve was in backward and it would not run. Howard Freed, Jim Gabelich and Tom Bowdler came to my aid and we got it straightened out. I fired it up and had several successful runs after that. During one run the flame was visible coming out of the top of the stack. Larry Herget suggested that I get the next size smaller jet and that would allow me to turn the flame down lower. I plan to do what he recommended. Jon Kling gave me some information about using LED lights to replace the mag lights, which I am also planning to do. The photos were taken at Warren Weiss's railroad.

As you can see, this has truly been a steam "community" project. Our hobby is full of people who are ready and willing to help out their fellow steamers. I would not have been able to do this without their help and encouragement. If I have forgotten to mention anyone else who contributed, I apologize.

Was it worth the effort? I say it was. When it runs I get satisfaction from knowing what it to to get this to run, and when other people watch it run there are smiles all around. The project is named for one of our 10 grandchldren, a delightful and spunky 2 1/2 year old little girl who brings smiles to grandma's and grandpa's faces just as the rail truck does. (07-15-04, the number on the boxcar, is the date of Matilda's birth).



With the body shell off, the entire steam plant is exposed. Not much room left for cargo!

Matilda is ready to roll, but her crew can't decide what they want to do first.

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Matilda serves as a very useful multi-purpose vehicle.

Below: Freshly washed and polished, Matilda is a very handsome addition to the roster.

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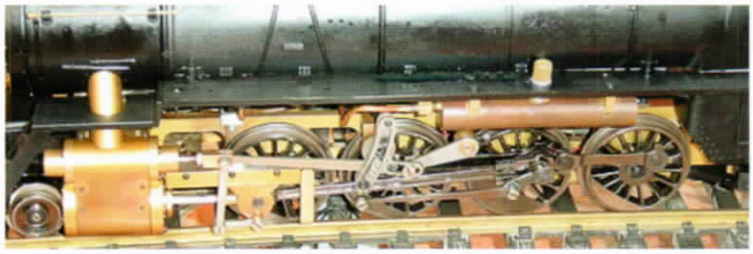

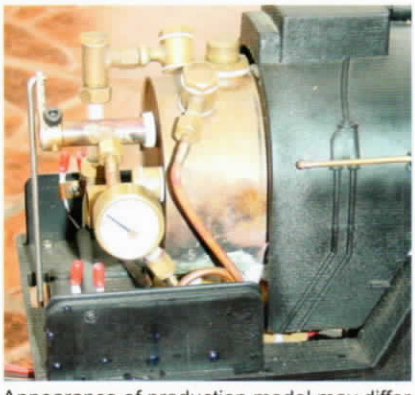

Photos are of Engineering Sample. Appearance of production model may differ. Cylinders, under frame & many other metal components will be blackened.

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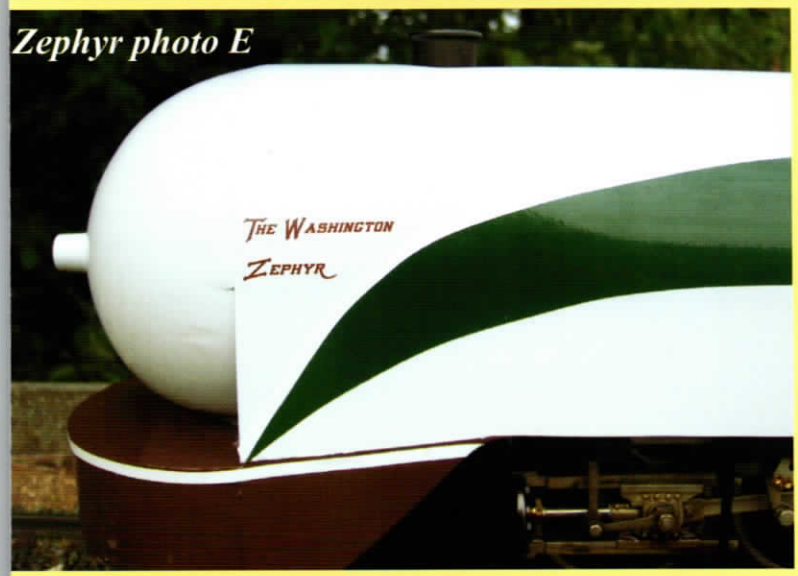
Zephyr photo D

Zephyr photo F

Zephyr photo B

Zephyr photo C



Zephyr photo E

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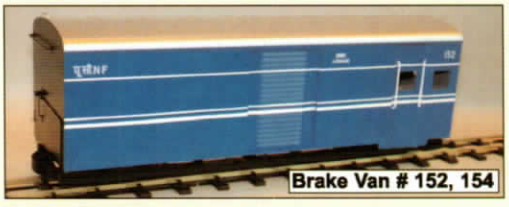

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The Talgo and the Zephyr

by Pete Comley

Definitely not your father's steamer!

A most unusual train runs between Portland and Seattle. Named after the Spanish company that builds it, the Amtrak Cascades Talgo train represents the ultimate for lightweight passenger car construction, having only two wheels per car (instead of eight).

Each car piggybacks onto the car in front for support. A unique pendulum system hangs the car from an upper pivot point on a yoke, this allows the car to swing outwards on corners, for passenger comfort at high speed. The wheels are not connected by an axle, they are individually mounted in the yoke system, and steered by a link connecting the car to the next. The floor level is actually lower than the wheel centers, and the overall height of the car is only 10ft 8in. This makes the train look tiny when hooked up to an engine, so for aesthetic reasons the two end cars have enormous 50's style Cadillac tailfins on the roofs to bring them up to the engine height.

All this cries out for having a model made of it, and in 2001 I obtained some drawings from Talgo and made the "Mt Rainier" set, one of 5 sets in the Cascades series. I believe this must be the only 1:32 scale model of the Talgo in existence. Having made the 13 car set train I started on the GE locomotive, with LGB motors and a scratch built body. Five years later the project still wasn't finished, my heart really wasn't into it, and I was quite happy pulling the train with my Aster Mikado. Of course this looked completely dumb, what the train really needed was a sleek streamlined passenger express engine, everything the Mike wasn't.

Hence the Zephyr was born. I have a certain soft spot for the futuristic 1930's Art Deco look, and I reasoned the Talgo would look just perfect behind such a locomotive, especially if it were steam powered. I had made a streamlined LMS Duchess shell a couple of years ago and I was eager to try a freelance design. The concept of the model would be to use the Mikado as the motive power, and build a shell that would slip over the top of the loco when running the Talgo, thus making two locos out of one. I envisaged a bulbous round front end with a powerful headlight in the mid-

Zephyr photo A

Cardboard & styrofoam mockup

dle, and a smooth sweeping design that would carry on over the tender to meet with the Cadillac fins on the leading car.

A mockup in cardboard and a styrene ball ***(Zephyr A photo)*** yielded the first idea of what the engine would look like. A few alterations later I had a shell that could be fitted over the engine with room over the boiler and cab to access the controls. One concern was the height of the tender, the extra height needed to continue the lines of the loco meant the stroke of the hand pump in the tender would be limited. Another concern was the location of the axle pump bypass valve, but by cutting away the valance I found it could be accommodated.

Once the cardboard prototype was complete it was time to build the metalwork. My success with incorporating a copper toilet tank float as the front end of my Duchess was again put to good use on this loco; by cutting a 4" diameter float in half I was able to make the desired smooth hemisphere. The rest of the metalwork was aluminum sheet, bent, sawn, filed and bondo'd to shape. ***(Zephyr B photo)*** The tender was done in the same fashion. The boss of the tank float into which the arm is screwed served as an ideal headlight housing, and a grain of wheat light fitted nicely into the hole, with the circuitry and battery behind. The on/off switch was tucked into the space at the front of the valance.

The shell fits snugly over the Mikado body, with the valance resting just below the side foot plates on the loco. The hemispherical front is about 1 inch in front of the smokebox door so it keeps the electronics cool.

The Talgo color scheme on the cars is green on the bottom and brown at the window level, with a white roof. These colors are transposed on the end cars, with the green swooping up the Cadillac fins. I decided the green should carry on over the top of the sides of the tender and engine, and then plunge down at the front over the cylinders, leaving the bulbous front end white. The roof is also white, very sensible color for a steam engine, don't you think? It turned out not to be a problem, the steam oil wipes off easily during a run keeping the roof clean and white. The base color of the loco is white ***(Zephyr C photo)***, with the green and brown coats added. Painting presented the problem of getting a gentle curving line between two colors. I use Scotch tape instead of masking tape at paint edges, to prevent bleeding, but although this works fine for straight lines it can't be used very well for curves. I ended up cutting very small straight sections, with the intent to cover the join with white vinyl car pinstriping. To my dismay the adhesive of the Scotch tape stuck to the paint in these small sections as I peeled the tape away. These proved impossible to remove without damaging the finish, and unfortunately they mar the appearance in that area. As always, it's nigh impossible to get a perfect paint job everywhere on a model.

After the painting was complete, all that remained were the logos. I did these on my printer using transparent waterslide decal paper and a Nickel Plate font. The engine is called the "Washington Zephyr" for no good reason except it sounds good ***(photo Zephyr E).*** The engine number happens to be my street address.

The result is shown in ***photo Zephyr D.*** I'm pleased with the overall effect of the streamlining and the paint scheme. It fits well with the Talgo and was everything I envisaged. The train certainly gets a lot of comments when I run it, kids love to race alongside it, and the headlight looks good as it beams out in front. The complete train is shown in ***photo Zephyr F.*** It was a very satisfying and worthwhile little project.

By the way, if anyone needs half of a toilet tank float.....give me a call.

Don't forget to get started on your entry for our KONRAD Bashing Contest for 2007!

Les lecteurs francophones peuvent contacter Guy Ozanne pour obtenir, gratuittement, une tradauction sur un element de texte paru dans SitG. 41 rue Jeanne d'Arc, 94.500 Champigny, France.

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Accucraft Trains - Limited Edition Narrow Gauge D&RGW Long Caboose

by Ron Brown

Accucraft has been producing excellent quality rolling stock in plastic for quite a few years now. Every once in awhile they will release a special Limited Edition model in brass. We recently received one of these....the DR&RGW Long Caboose. It's a beauty! The craftsmanship is beautiful, the paint and lettering are flawless. The only problem noted on our review sample was that one of the marker lights had fallen off when we received it. The screw that held it on was missing in action, but a call to Cliff at Accucraft brought not only a packet of replacement screws in the next mail, but wrenches to install the screw as well. Problem solved.

Detailing on this car is as good as it gets. The grabs and railings are the right diameter and very pleasing to the eye. Windows are glazed. Knuckle couplers are fitted, and wheelsets are steel.

The interior is not detailed. Power for the marker lights is picked up from the rails via wipers on the wheels. This is fine for those who are running track power, but not many live steam layouts have track power. It would be nice if Accucraft would fit their lighted stock with an easily accessible battery box and switch, but until they do, it's not a big deal for the modeler to do it himself.

This caboose has some serious weight to it! No question when you pick it up that it's made of metal, rather than plastic. It's something you will display with pride, whether it's on your mantel, in a glass cabinet or following your trains around the track.

TECHNICAL SPECIFICATIONS:
Scale/Gauge - 1:20.3 Scale/ 45mm Gauge
Construction - Brass & Stainless Steel
Minimum Radius - 0.75 M, 30 inches

Available in the following liveries:

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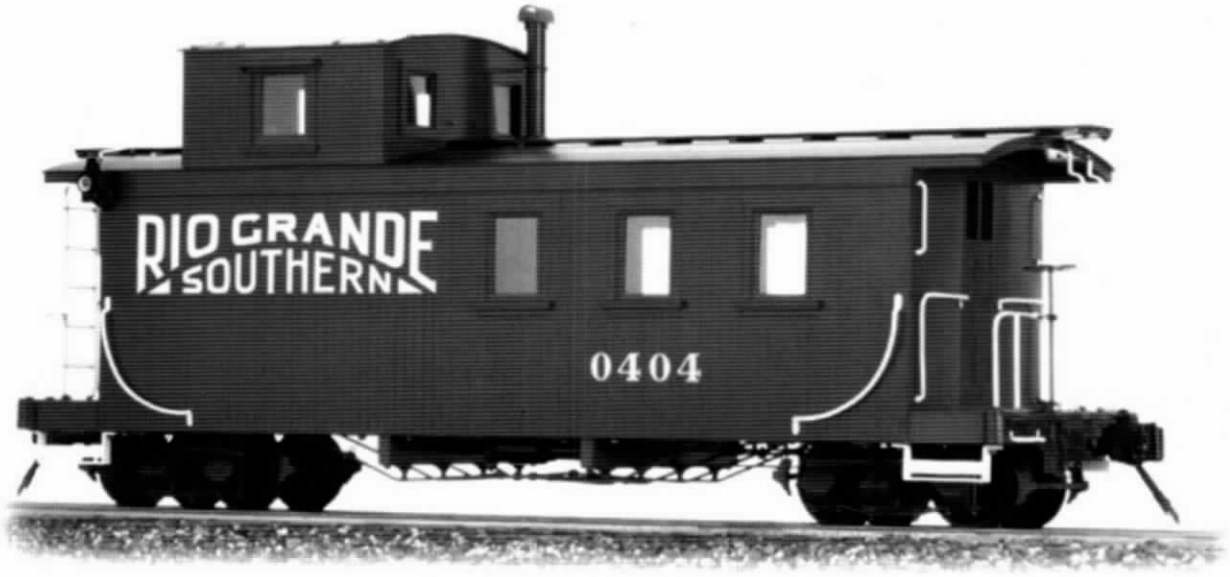


Review

American Model Supply (Accucraft) 1:20.3 Scale Log Cars & Logging Disconnects

Good news for loggers! AMS has just released a plethora of logging cars and disconnects in 1:20.3 scale, 45mm gauge for the narrow gauge logger. The first thing I noticed upon opening the boxes was that these cars have some serious heft to them. No bouncing around and hopping off the rails, even when traveling light! The level of detail is excellent, as is the finish. The logging disconnects are fitted with link & pin couplers and a rooster is included.

The long and short log cars are identical except for length. These cars are equipped with working knuckle couplers. The log bunks on all the log cars and buggies are fitted with chains, and there is extra chain included in the package.

All feature plastic bodies with brass castings, die-cast trucks with working springs, smooth rolling metal wheels and detailed underframes. The long and short log cars are available in Westside and Swayne lettering, and a variety of car numbers are also available. They can also be had unlettered with data only. The disconnects are unlettered.

No matter what size your logging operation, these cars are ready to go to work and should give years of troublefree operation.

SPECIFICATIONS for the LOGGING DISCONNECTS (2 to a package)
Length 760 mm (30 in.)
Width 127 mm (5 in.)
Height 76.2 mm (3 in.)
Minimum radius 0.75 M (30 in.)

SPECIFICATIONS for the SHORT LOG CAR
Length 508 mm (20 in.)
Width 127 mm (5 in.)
Height 76.2 mm (3 in.)
Minimum radius 1.2 M (48 in.)

SPECIFICATIONS for the LONG LOG CAR
Length 635 mm (25 in.)
Width 127 mm (5 in.)
Height 76.2 mm (3 in.)
Minimum radius 1.2 M (48 in.)
Weight 0.6 Kg (1.25 lb.)

Fixes for those Pesky Gas Burner Problems

by Bert Horner

After hearing of problems with some gas burners, particularly double burners on gauge one locomotives, I set out on the search for answers. I placed questions on an Internet forum and also posed the problem to people I know in the German speaking area of Europe where I live. The discussion was extended in Sinsheim by contributions from colleagues from France and Italy. The next step was to examine the input which came from lands like Australia, U.S.A, Mexico, England, Germany, France, Italy and Switzerland, and see how much of the information was the same. Not surprisingly, quite a lot was. We also received contributions from professional model builders and manufacturers. The catalogue, which I have put together, has so far been able to solve or at least identify all of the problems I have been confronted with to date. I'll start with the obvious, or as it proved in some cases, not quite so obvious as I thought?

1) The 2 burner engines have a large gas tank. Filling the tank causes the temperature to drop. So fill the gas tank first, allowing it to warm up a little while oiling and watering the engine. Starting on a frozen tank is not optimal. No problems in the S.W. states in the U.S.A. etc., but in northern states and other northerly countries it can cost nerves.

2) If only one burner goes out, first turn the burner over so that the jet now burns in the other flue. If the same jet goes out it is probably a dirty jet.

3) Take the burner out of the fire tube and have someone hold it carefully. Gently just crack the gas valve and light both burners. If one is a larger flame than the other, the chances are that it is a dirty jet. Remove and clean the jet. Repeat the test afterwards to ensure that both flames are the same. Replace, and fire up the engine.

4) If the problem has not been solved check the metal pipe-bends to each burner. If one has a kink in it put the right jet in the left side and the left jet in the right side, If the problem remains it probably indicates a restriction of the gas flow. Replace the manifold.

5) If all this is ok but one fire still goes out, check with a little more gas pressure to the burners. Being used to single flue engines we tend to keep the fire at a minimum. In a double flue engine this can lead to fuel starvation, which has proved to be often the cause of the fire going out on one burner.

6) If the problem still persists the next possibility is the flexible gas connection from tender gas tank to engine. It could be that if the engine is close coupled this could kink and reduce the gas flow in spite of the spiral metal spring-like casing which should prevent this from happening. Reduce the length, keeping an eye on the flex-pipe in curves. It may be that this tube is too long as it has proved on some engines.

7) If the problem is still there check the gas tank temperature. Here hot water is the old standby. However, help can be found by taking the coal boards out of the front of the tender (surgery on most engines) and the warm air being forced backwards out of the cab by the forwards travel is now pressed into the tender. Make sure there is a space behind the coal load to let the warm air out. This is important. Regner has a steam heated gas tank! A second small gas tank in the cab near the boiler is also a suggestion. The available miniature quick connect couplings available on the market make this easy. (See ad in ***SitG***) Another advantage here is that the tender tank can be topped up without having to wait for it to cool down.

8) We have now checked all of the easy points but the problem is still there. We have noticed that one manufacturer has not placed his jets uniformly in the burners. By that I mean that most burners have the jet level with the air holes. That is, the jet just can be seen

at the jet or rear side of the air hole. These engines seem to be free from problems. However, engines with the jet some distance from the air holes still have the problem in most cases. Talk to the manufacturer about this one. Ask him for a dimension to work to. It is, after all, an expensive model.

9) Some improvements have been reported by increasing the diameter of the air holes by up to 2mm more in diameter. Some have changed burners from slit (toast rack) burners to burners having three rows of holes on an 8mm diameter burner as apposed to the 10 mm burner fitted as standard. The theory here is that the 10mm burners are too large in dia. and do not allow "clean burning". I have personally changed the burner in my Accucraft 2cyl Shay. The engine heats quicker, burns longer and has lost its typical burner howl. Replacing the gas volume valve with a gas pressure regulator (eg. Cheddar) can reduce the effects of a cooling tank and reduce to some extent the tendency to freeze. The other advantage of this valve type is you set it once only. The varying pressure in the gas tank due to temperature etc. has no influence on these valves. They remain set. Some people we have talked to fill a small bag with rice, heat it in a Micro oven and lay it around the gas tank. The claim here is keeps warm longer and is not wet or messy.

10) If your jet blocks regularly, first check that liquid gas is not being pushed through the jet. If this is the case, release some of the gas from the tank by pressing the Ronson valve down, (make sure no naked flame is near you first) then check that the burner is clean and light up again, the problem should now be solved. If not, change the gas brand and wash out your gas tank carefully, then clean your jet as per the manufacturers instructions (usually by blowing gas through the jet from the flame side), then reassemble and light up again.

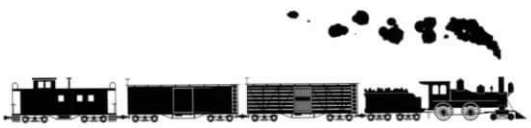
11) Reduced running time. We have heard about this problem and the cause was a Ronson valve which has a breather hole on its side. In the case we examined, the seat it was screwed into covered the hole. If the seat where the valve is screwed into is more than 2mm thick it will probably cover this hole and you will have problems getting gas into the tank because the air cannot escape from the tank as gas is forced into it. The solution is to fit a valve with the breather hole at the bottom. (source for central Europe is Ralph Reppingen).

12) An unusual problem was a loco with the gas tank in the tender where the owner complained of short running time. We found that the coal load which sits over the gas tank was pressing the Ronson valve down and letting gas escape. Here a small hole was drilled into the coal load and the valve filler went into the hole. End of problem.

This should, as it has with us, solve 99.9% of all problems. Some problems will not be solved. For example, one dealer told us he had two identical engines where the burner air holes were set at differing distances from the jet. Cases like this need to be sent back to the manufacturer who will usually solve the problem without cost.

I would be pleased for additions to this catalogue. After all, some two flue engines are being bought by beginners. This is intended as self help for such persons as well. Thanks go to all contributors for all of your help. I wanted to put names to the originators of input, but many of the same ideas came from several people so I allowed myself to put solutions from all around the world and several languages into one list without the names of the originators. Many readers will be aware of all of these solutions. I was not. Thanks to the reaction to my enquiries, I am now.

A quick tip for those wanting to make their own burners. I have learned that plumbers working on heating systems often have pieces of stainless steel thin walled (0,5mm) tubing 8mm and 10mm in diameter up to about 2 feet long which just get thrown into the scrap box. I got over 20 feet for nothing. I assume that systems are similar world wide and that your plumber or even air conditioning installation company may be able to help. If you do not want to buy lengths of round stock to make plugs for the end of the tube, buy one long stainless bolt, cut off slices and silver solder them in the end of your burner. They also make very good fire tubes for multi tube boilers. They can be TIG welded to stainless tube plates and are practically indestructible even with no water! Perfect for G scale coal fired boilers in my opinion.



Roundhouse Cylinder Restoration

by Les Knoll

Is your D-valved steam loco getting weak and wheezy? Make it run like new!

Although it is a common axiom that "D" valve cylinders wear in, not wear out, it is possible to get a wearing and/or scoring on the sliding surfaces inside the steamchest. The usual causes of this are lack of proper lubrication, introduction of scale into the steamchest or improper assembly of the "D" valve and an attempt to operate it afterwards.

Roundhouse components have a well deserved reputation for being robust, but without proper care, even they can fall prey to excessive wear. Even Superman has to watch out for kryptonite!

My 2-8-0 Consolidation has a scratchbuilt Roundhouse powered chassis. Two 'Classic Series' cylinders drive eight Walsall manufactured drivers and the Walschaerts valve gear is a hybrid of Roundhouse and scratchbuilt parts. This locomotive has been the flagship of my roster, considered to be the most reliable and easiest to run. It is the locomotive I bring out when my 8 year old nephew, a budding train fanatic, asks to run a live steamer. I was very unpleasantly surprised when, on his last visit, this bastion of reliability would not make two trips around my indoor track with a moderate train in tow without running out of steam. Instead of the steady 4-beat chuff I am used to, there were weak chuffs with a steady hiss of steam out the stack. There was also a very disappointed little boy to deal with.

Most people who are used to locomotive repair would immediately diagnose this as a leaky piston seal. The sound could also be from the piston actually coming off the rod. In that case the locomotive would probably not run at all. I was getting a small amount of performance. When I got the locomotive on the bench, I removed the cylinders and applied air to see where the constant hiss was coming from (Figure 1) The hiss was coming from the exhaust port. In the past this was an indication that the piston seals needed to be replaced.

When I repeated the air test after the piston seal change, the hiss was still there. A steam cylinder and "D" valve assembly is a relatively simple piece of machinery, and there are only a few things that can go wrong with it. The only other place where there could be a leak from steam inlet to exhaust would be through the "D" valve itself. I suspected that the valve was not seating properly, causing the leakage. A call to Roger Loxley of Roundhouse Engineering confirmed this. Roger said that this could be caused by lack of lubrication or improper lubricant.

I took the top off of the steamchest (Figure 2) and after removing the chest, I saw very bad scoring on the valve surface on the top of the cylinder casting (Figure 3). Matching that was the same type of scoring on the "D" valve. (Figure 4) This looks horrible, but is actually easily fixed. The sliding surfaces must be lapped or made flat and given a very smooth surface free of scoring.

I learned the lapping technique from Geoff Coldrick of Geoffbilt fame. I used to own one of his Shays that had oscillating cylinder steam motors. Mine would occasionally lose power, and I would see a lot of steam coming from the outside of the cylinders. Lapping the two flat surfaces of the oscillating cylinders brought the power back.

Before lapping the top of the cylinder casting, remove all components (Figure 5). In order to lap the cylinder top and the "D" valve, you must have 400 grit sandpaper (additional 600 grit optional), either a piece of glass or a machined surface from some type of machine tool, and steam oil.

Put the sandpaper on the glass or machined surface, and apply a few of drops of steam oil. Rub the cylinder block top surface on the sandpaper in a figure 8 pattern (Figure 6). After about 20 'figure '8's', examine the cylinder top surface. The entire surface should appear smoother, and the scoring should be starting to diminish. Repeat this process until all the scoring marks disappear. Some may be so severe that much lapping will be required. Figures 7 & 8 show various stages as the scoring starts to disappear.

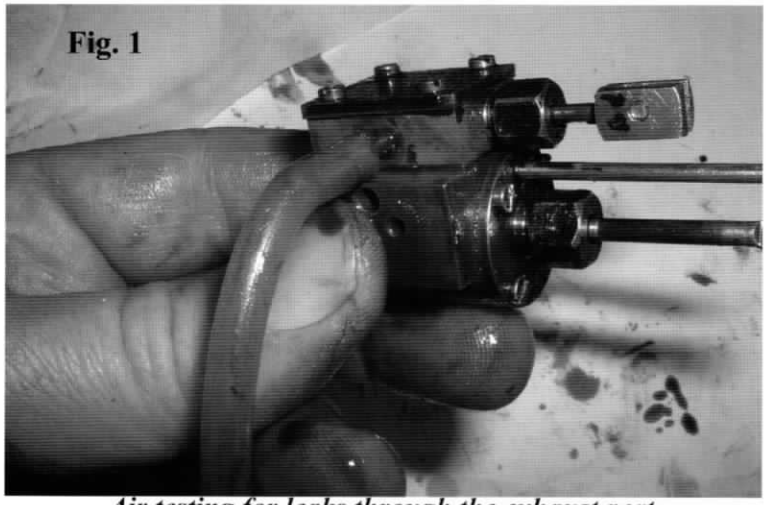


Fig. 1

Air testing for leaks through the exhaust port.

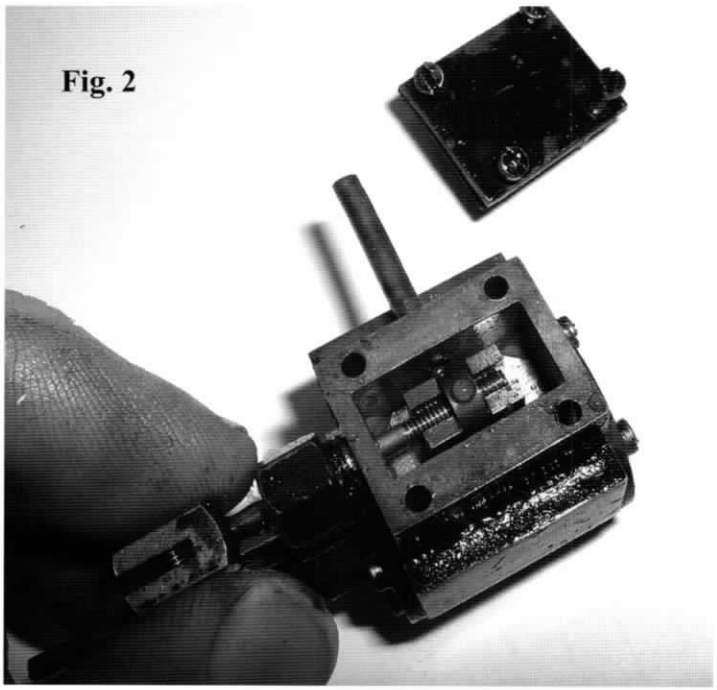


Fig. 2

Steamchest with top cover removed.

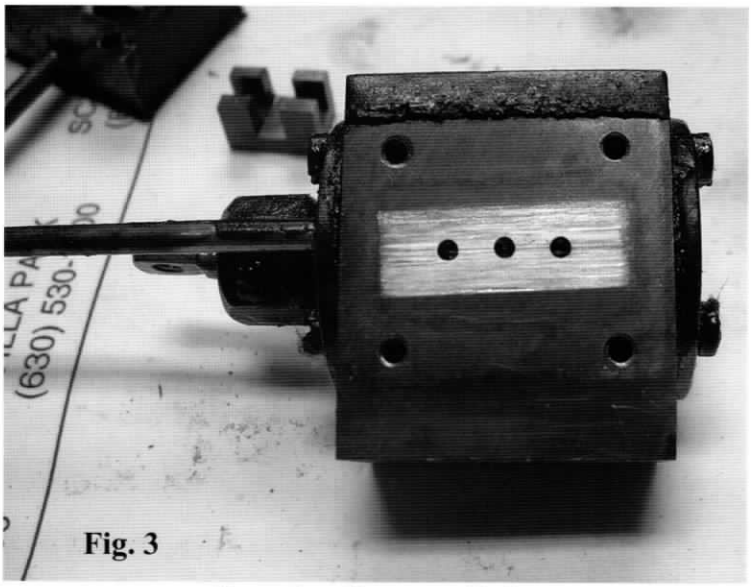


Fig. 3

Scored surface on cylinder.

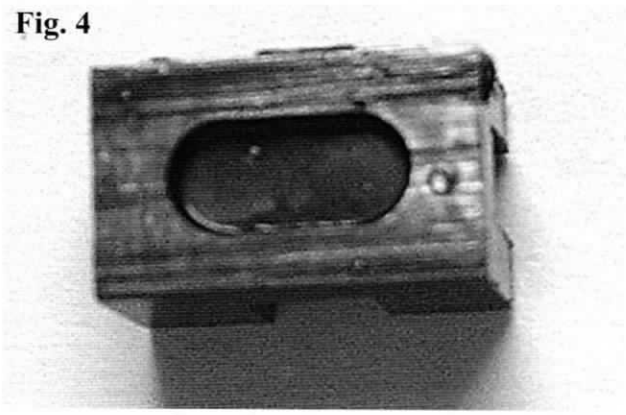


Fig. 4

Scored surface on valve.

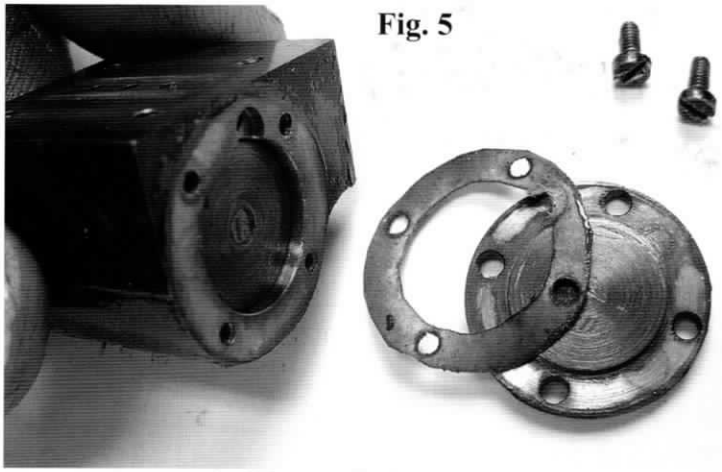


Fig. 5

Removal of front cylinder cover & gasket.

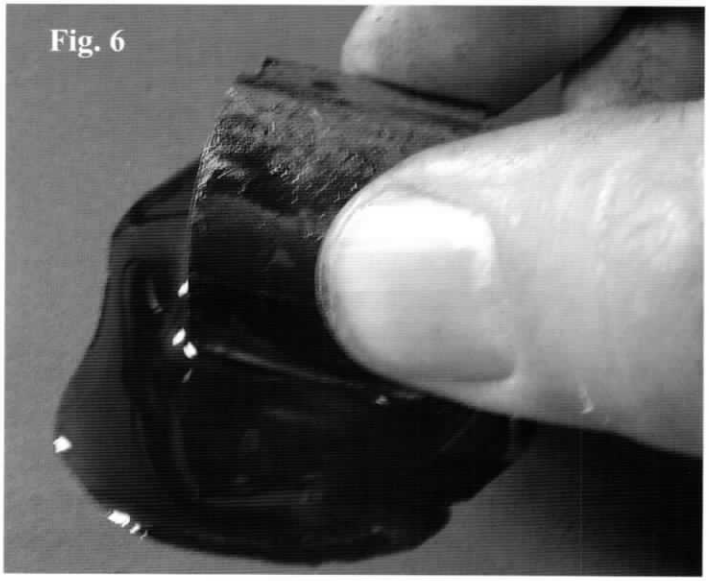
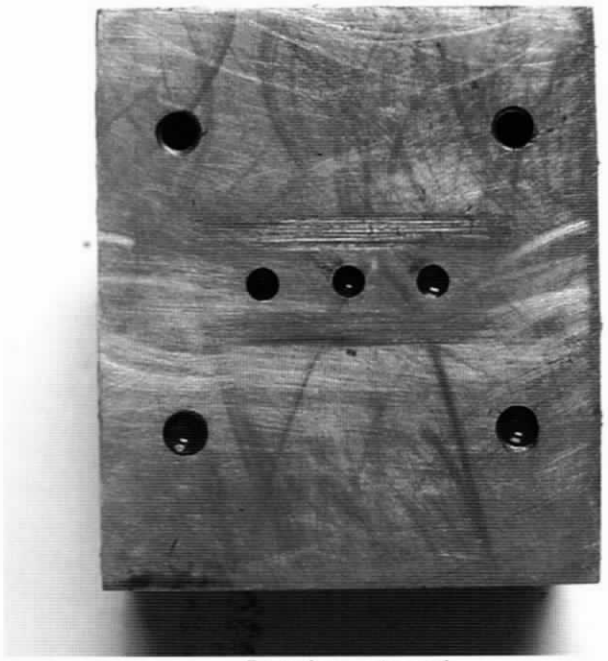


Fig. 6

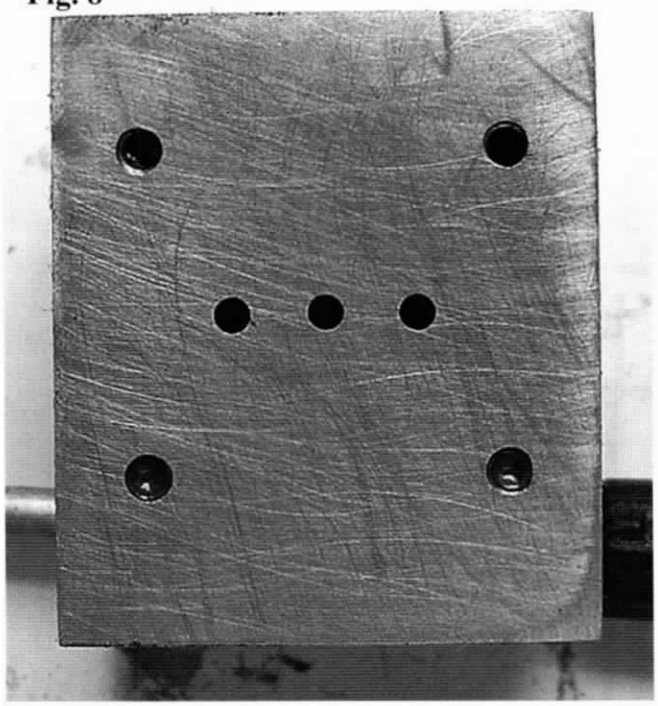
Lapping steamchest valve surface.

Fig. 7



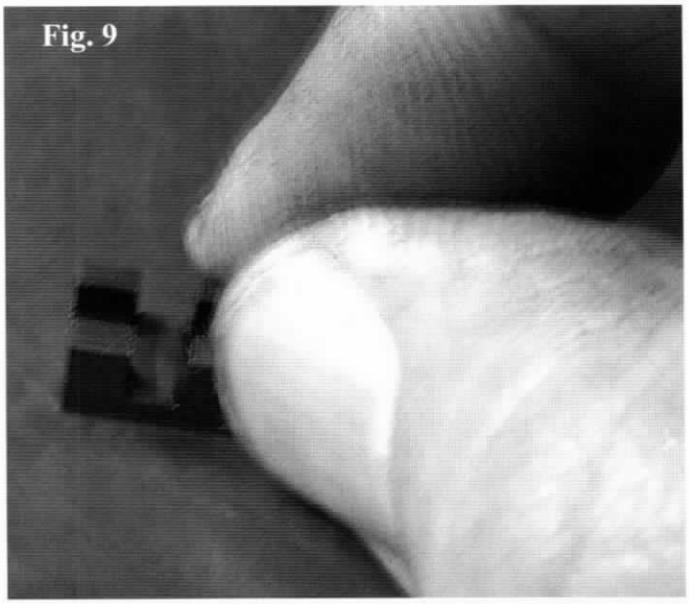
Lapping...stage 1.

Fig. 8



Lapping...stage 6 & final.

Fig. 9



Lapping valve.

In my case the scoring was so severe that the lapping process was accelerated by using 200 grit paper after finding that the 400 grit was not making much of a dent in removing the deeper score marks. After you have made the deepest scoring marks disappear with the 200 grit paper, use the 400 grit to create a finer finish. As an option, you may want to make the surface even smoother using 600 grit sandpaper after all scoring marks have been removed.

The process is repeated with the "D" valve, although chances are only a light lapping will be needed to remove any scoring on the valve (Figure 9). Thoroughly clean out the steam and exhaust ports in the cylinder block with compressed air and maybe a bit of degreasing solvent like acetone or MEK. Clean off all the surfaces of the "D" valve also, and make sure that none of the grit laden steam oil remains on any surfaces of the parts, especially the top of the cylinder and the cylinder bore.

While the cylinder was apart, I took the opportunity to replace all the seals in the assembly. These can be purchased through your Roundhouse dealer or by ordering BS 013 silicone "O" rings through an industrial supplier such as Lutz Sales in Hanover Park, IL. (800-323-0496). They have a $25.00 minimum so while you are at it, you may want to order the BS 006 Silicone "O" rings for the rod gland and the BS 004 Silicone "O" rings for the valve glands. The advantage in this is that $25.00 gets you a lifetime supply. The disadvantage is that you do not get all the paper seals for piston heads or steamchests. The Roundhouse seal replacement kit is available form Sulphur Springs Steam Models for about $12.00 and contains all required seals and also some additional spares hardware such as cylinder head and steamchest screws. This kit is ideal for the one time rebuild. I have a 2-8-0 Consolidation, a Climax and a 2-4-4-2 Mallet that all have Roundhouse cylinders, so when it comes to spare parts, I must think beyond the single rebuild and more like a shop superintendent.

Don't forget to apply Threadlocker to the threads of the piston rod. Now you have the piston, rod, gland "O" ring, gland nut and rear cylinder head all assembled and ready to put back onto the cylinder block. Before assembly onto the block, replace the cylinder head seal, applying apply generous amounts of steam oil to both sides of the seal in the process. You might want to put some steam oil into the cylinder itself to make inserting the piston all the easier. Yes, this is a messy process. Do not wear white.

You can cut out your own home made steamchest seals. You do not have to do this if you have purchased the Roundhouse seal kit, but I find that seals made of 100 pound paper or heavier make thicker, more 'spongy' seals, especially if soaked in steam oil. Very heavy paper such as this can be gotten at any retail office supply store. Like the "O" rings, one ream of this paper will supply you and all of your steaming friends for a lifetime, and will still be in use by their great grandchildren. I prefer to 'roll my own' because I mess around with these locomotives so much, I change seals almost every time I open the steamchests, which is often. I can disassemble any of my scratchbuilt locomotives with the ease that a Marine can field strip an M16.

A test under compressed air is done to check the work. Pressure over 20 PSI is not necessary. Move the "D" valve around in the chest several times to assure it is seated. With the "D" valve in the center position, no hissing should be heard from anywhere on the assembly. If there is a slight hiss from the steam chest, tighten the steamchest screws in rotation, that is, tighten one screw, then the one in the opposite corner from it, repeating for the other screws. If, when pushing the valve stem to a position where the piston moves, a hiss is heard from one of the cylinder heads, again tighten down these screws in rotation. There should be no perceptible hiss heard from the exhaust port except when actually exhausting air during a piston stroke.

In reassembling my locomotive and steam testing, I found that all the power the locomotive formerly had was restored. The exhaust barks were sharper than ever, and the locomotive could pull more on significantly less pressure. The locomotive did not seem to have the rough running or lack of full power associated with a run-in period. This is probably because the lapping with very fine grit paper brings the valve surfaces to the level of surface finish that a run-in does.

This is not a really tough operation to perform, but with disassembly and reassembly can be a lot of work. There are several things that can be done to avoid having to repeat the process in the near future. The first and most obvious is making sure lubricators are filled with steam oil before every run. Secondly, make sure only the proper steam oil is being used. If in doubt, check the manufacturer or distributor.

My problem was one that a scratchbuilder can occasionally encounter. My lubricator was not correct for the cylinders I was using. I have used this lubricator on both the piston valve locomotive it came with, and this Roundhouse powered chassis. In both instances, it flooded the steam lines with oil during the first minutes of operation, and no oil was left for the remaining 15-30 minutes of operation. This made for a very messy locomotive and both piston and slide valves that wore out quickly. My solution was to seal the hole in the lubricator and drill a smaller one. In my case a #74 (.022" Dia.) drill bit did the trick.

The final way to avoid scoring is to make sure that the "D" valve is assembled properly in the steamchest before tightening the top cover. Scoring can result if the round valve actuator does not have its flat spot against the "D" valve, and the steamchest cover is tightened down and/or the valve stem is moved with the valve bound up.

This rebuild will bring new life to locomotives with worn or damaged "D" valves. "D" valve lapping combined with changing of all seals will make sure that precious steam is not wasted. A small leak or any waste of steam can make the difference between a poor performing locomotive and one that's at the top of its game.

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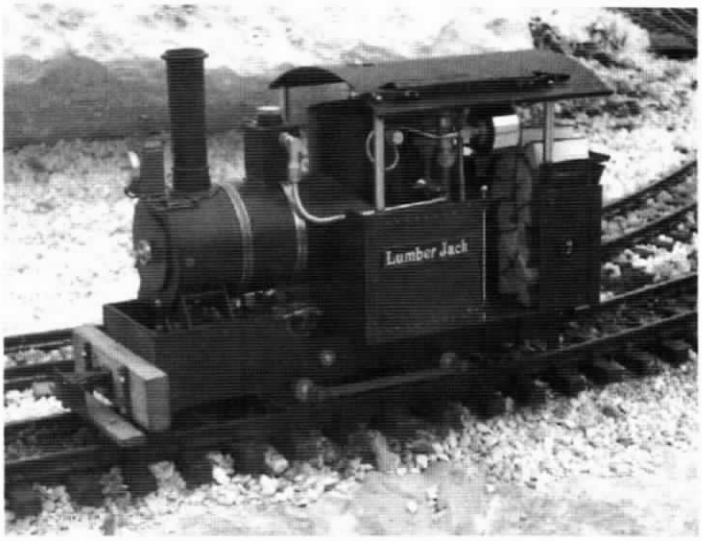

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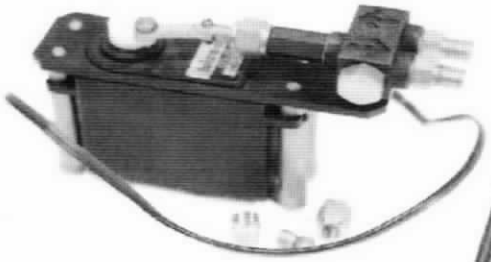

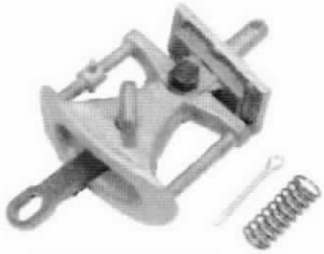

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Calculating the Volume of a Boiler Under Construction

by Mike Simpson

I was asked to calculate the volume of a boiler under construction. While not complicated, the math involved may be useful for some of our fellow boiler builders.

The volume of a cylinder is the product of its length and the area of its cross-section, or V = (pi)(radius squared)(length). We usually use copper plumbing pipe, measured in inches, so this produces an answer in cubic inches. To convert to ounces, multiply by .554. For milliliters, multiply by 16.387.

Diameter	KM (cubic inches)	KM (Milliliters)	KM (ounces)
3"	7.07	115.8	3.92
2 1/2"	4.91	80.4	23.72
2"	3.14	51.5	1.74
1 1/2"	1.77	29.0	0.98
1"	0.79	12.9	0.44
7/8"	0.60	9.9	0.33
3/4"	0.44	7.2	0.24
5/8"	0.31	5.0	0.17
1/2"	0.20	3.2	0.11
1/4"	0.05	0.8	0.03

Thus, the top line tells you that each inch of three inch ID pipe contains 7.07 cubic inches, or 115.8 ml, or 3.92 ounces of volume. The smaller diameters are included for calculation of the volume of flues, for deduction from the boiler capacity. For these, you use the outside diameter of the pipe; for boilers you use the inside diameter Note that the calculation is for total volume. For useful capacity, deduct the amount needed for steam space.

There is an alternate method which some will find more convenient: Build boiler. Add water. Find measuring cup.

Regards, Mike Simpson (BS in math, Tulane U, 1973)

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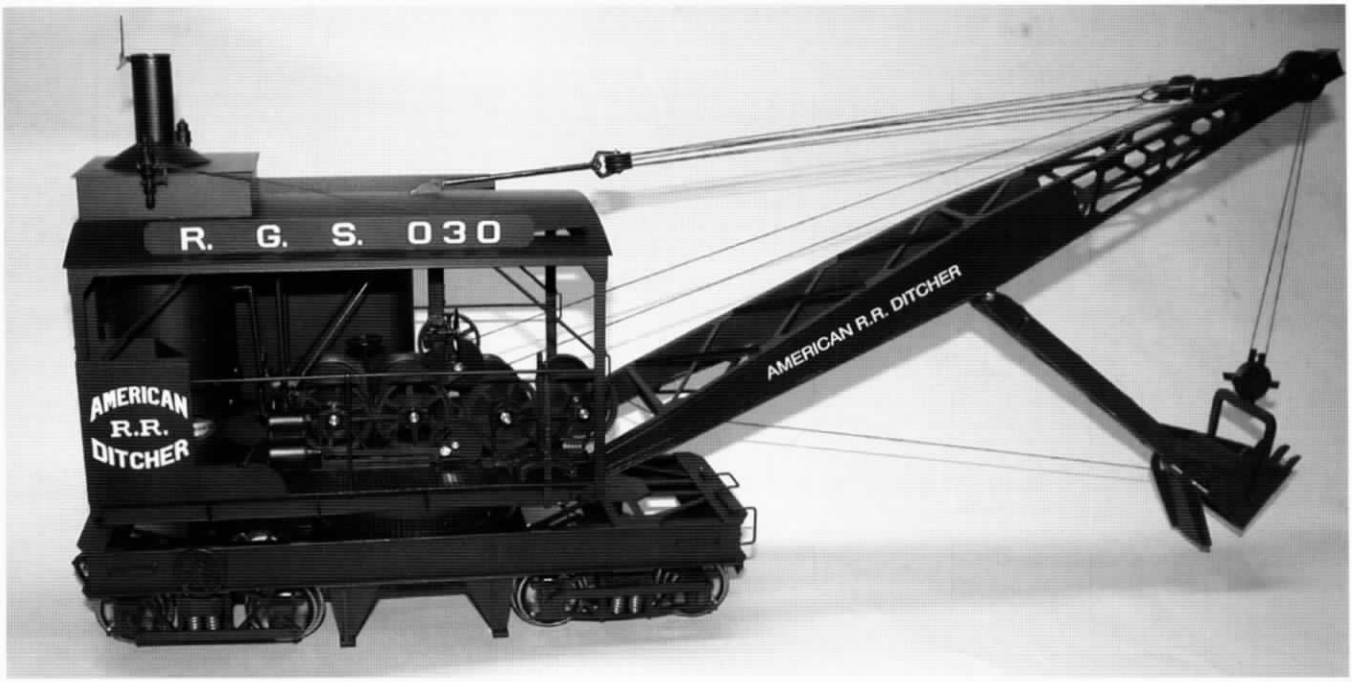

Coming in the next issue of ***Steam in the Garden!*** Watch for a review of this beauty in issue #95.

Useful Workshop Tip

Springing Springs

by Jerry Reshew

It's about time that we had some information about those diabolical little springs that are part of every locomotive assembly project and which are somewhat responsible for the blue air and gray hair in many a workshop.

Here's an idea that seems to have tamed those little rascals for me. No more having to get down on the floor and search for these parts, magnet in hand and mini flashlight in mouth.

Take a 2 foot long section of sewing thread and push it onto each spring at about 6 inch spacing. When you need a spring , cut the thread, leaving about 3 inches on each side of the spring, and then leave the thread in place while inserting the spring into the part. When it is in place, put a drop of cyanoacrylate (super glue to the uninitiated) at the metal to metal contact. Wait a minute or so, then slip the thread out. Done !

What happens when the spring decides to act its part as a nuisance while you are placing it in whatever assembly that you are working on? It doesn't have the momentum that it once had when it was free range. It just sort of poops out before gaining any altitude. Whether this is from altering its aerodynamic configuration, or because of the weight of the thread that it now carries is a wonderful subject for a monograph that one might prepare if the arcane is important to you.

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FOR SALE: PRICE REDUCED - The Charlie Mynhier gauge one, 0-6-0 locomotive, tender, & flat car that Charlie Mynhier "rode" at Diamondhead in January, 1995. The locomotive, tender flat car & custom carrying case are hand built by Charlie out of stainless steel, steel plate and some brass. It has a water pump, sight gauge, and a pressure gauge. It is radio controlled with a SAM-2 filter. It is propane fired & runs very well at 40 psi. Excellent condition. $5580.00 + shipping. Contact me (Frank Dunn) at dunn4n220@sbcglobal.net or at 630-377-3666 (93)

FOR SALE: PRICE REDUCED: Now just $1690.00 + shipping! Pearse Colorado, 2-6-0, gauge one locomotive and tender with radio control. It is in excellent condition and runs very well. Contact Frank Dunn at dunn4n220@sbcglobal.net or 630-377-3666. (93)

FOR SALE: New In Box #8130 Accucraft RGS Galloping Goose #2. Never used. $250.00 and I will pay freight. Send questions to Jeff Sudderth at: olddoggy2@aol.com (94)

WANTED: Pearse W&L Countess/Earl in GWR green, Email me if you have one needing a new home. cadetpwr@hotmail.com (94)

FOR SALE: Sherline Mill and Lathe package for sale. I've had this for about two years, but have not really used it, so it's up for sale. Here's the link to the MFG site and the product description: http://www.sherline.com/images/6000c.jpg It also comes with a few other tools and holders I bought along the way and a couple of books from Sherline. $1500. Contact Larry Mosher via e-mail at: lv.mosher@verizon.net (94)

FOR SALE: Aster BR Flying Scotsman #60103, factory built serial #15. New, Never Run. Includes all orginal boxes and instructions. $6500.00 plus shipping. Contact Mike Albert, 1934 W. Fairbanks Ave, Winter Park FL 32789 - phone: 407-647-2244 (Mon.-Sat. 10-5) (94)

FOR SALE: Aster Great Western - King George V #6000, kit built. Test ran at Diamondhead 07 for 30 minutes and ran flawless, engine and mechanics are 100%, instructions included, no orginal box. $5600.00 plus shipping. Contact Mike Albert, 1934 W. Fairbanks Ave, Winter Park FL 32789 - phone: 407-647-2244 (Mon.-Sat. 10-5) (94)

WANTED: Seeking the older (1986) version of the Aster Japanese National Railways (JNR) D51 Mikado. Please contact me by email. Thanks, Richard richard.finlayson@gmail.com (94)

Swap Shop listings are offered at no charge as space permits. No dealers and no phone-in ads, please! Send your listings to SitG, PO Box 335, Newark Valley NY 13811 ● fax to 253-323-2125 ● e-mail to <rbrown54@stny.rr.com>. Ads must contain sellers name, plus address and/or phone number. Ads will be run one time only unless previous arrangements are made.

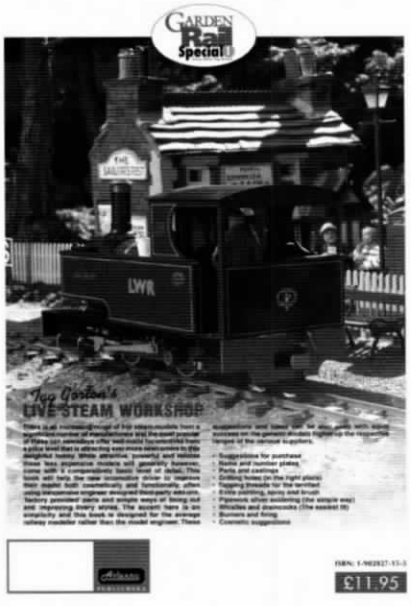
END OF THE LINE

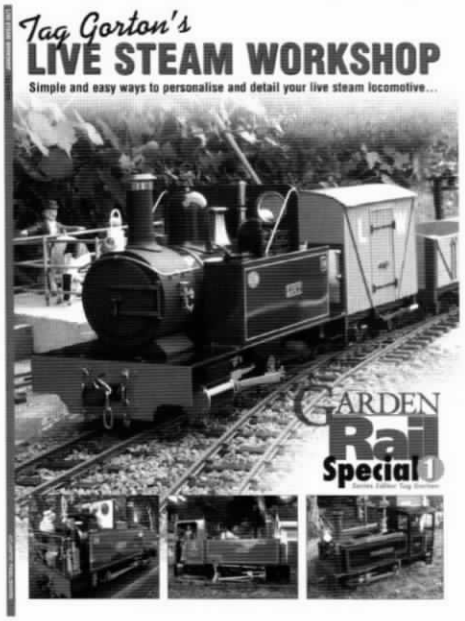
Our good friend, Tag Gorton, editor of ***GardenRail*** magazine, has written a book that should be part of every live steamer's library. ***Live Steam Workshop*** (see photo of cover below) is loaded with valuable information about detailing, tuning, and otherwise getting more out of your favorite steam locos. Tag's book will be released this summer by Atlantic Publishers.

As this column is written, we are right in the middle of steamup season....at least that's true for those of us who live in the Frozen North. Here at Paradise East, we are gearing up for our annual steamup on the Silo Falls Railway. The refurbished track is holding up beautifully, and the new dual-gauge stub turnouts are a real joy. More on these in an upcoming issue! Until next time.....

Happy steaming!

Ron





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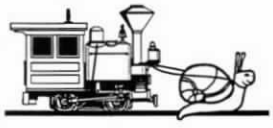

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If your passion demands 1/32 scale live steam models of highest precision, aesthetic presentation and prototypical functionality, look no further than Aster. All locomotives are designed and manufactured by Aster Hobby Co. Inc. of Yokohama Japan.

New British locomotive!

The **BR type 9F "Evening Star"** is scheduled for release by Christmas 2007. This lovely 2–10-0 freight locomotive will be produced in BR green (pictured on right) and black livery. Due to low production quantities and short lead-time, please make your reservation soon.

Technical Specifications and additional pictures can be reviewed on our web site.

(The pilot model shown is subject to detail changes.)

NICKEL PLATE ROAD 779

S3 Berkshire. Still a few left in kit and RTR version.

Pictured below: As close to reality as possible, the Aster model and the real live NKR 779.

New ! The SNCF 140C now in stock

Bulleid Light Pacific (Spam Can) in BR and Southern Livery

Aster Hobby USA LLC has in stock for immediate delivery NKP Berkshire, SNCF 140C, Spam Cans, USRA Mikado, BR 52, BR 38, BR 89, KPEV P8, LMS Jumbo, Thunderbolt, JNR 9600 as well as JNR rolling stock and all popular accessories. Please call or email for details.

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