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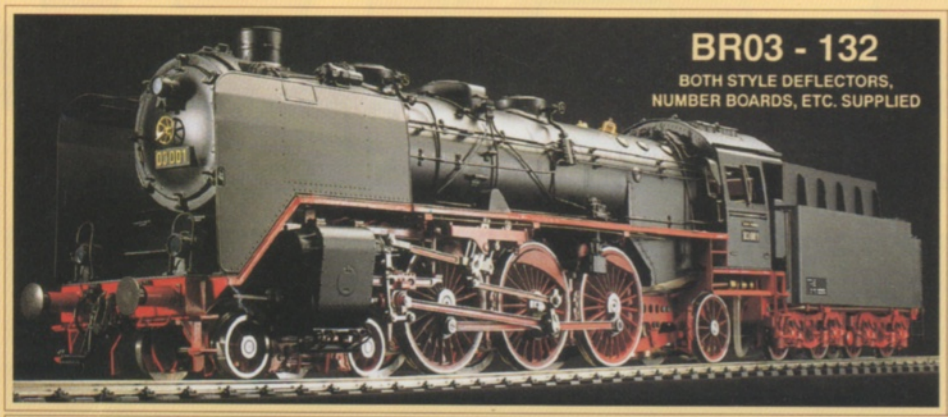

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STEAM IN THE GARDEN

Vol. 8, Nº 2
Issue Nº 44
March/April 1998

Articles

Departments

ON THE COVER: With Three Peaks just visible in the background through the early morning mist, the one-woman crew prepares her tiny logging loco for a day's work in the woods. These days, having been replaced by Shays, Heislers and Climaxes, the little lokie is assigned simple tasks, like bringing in firewood or hauling lunch to the crews on the mountain. Locomotive scratchbuilt by Larry Herget and proudly owned and operated by Marie Brown - custom paintwork by Kathy Morningstar - RR by Rio Pecos.
photo by Ron & Marie Brown

Back Cover (Top): The ancient Climax loco rocks and sways as it backs down the siding to couple up to a string of empty log cars. Soon smoke and cinders will be belching from the stack as it clatters into the high country for another load of logs. The locomotive was scratchbuilt by Gary Lyons, using VPC trucks and a Graham vertical twin steam engine.
photo by Gary Lyons

Back Cover (bottom): *Miss Randi* rolls through Brock's Tunnel and out onto Three Peaks Trestle on the way to Mom's Pond with a load of logs. The locomotive was scratchbuilt by Bob Nowell and is based on Roundhouse components. RR by Rob & Fran Osterhoudt of the Rio Pecos Steam Team.
photo by Bob Nowell

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Faithful Assistant & Most Valuable Asset
Marie Brown

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Harry Wade

CAD (and other) drawings in this issue by:
Harry Wade ● Randy Stein ● Peter Jones

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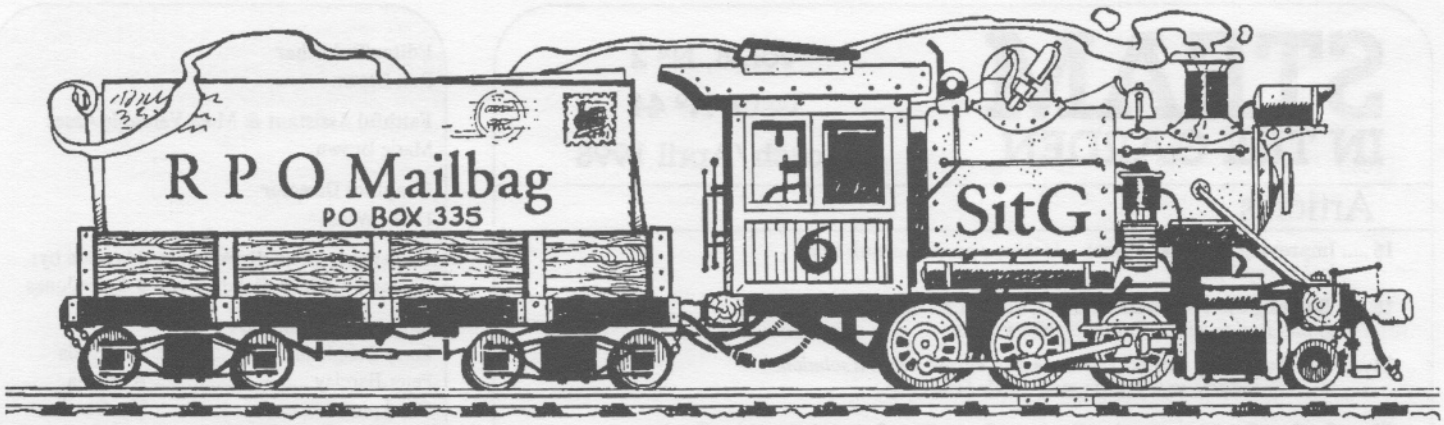


Letters from readers are welcomed and encouraged. Offer advice, encouragement, suggestions or constructive criticism. Tell us about your current project (and don't forget the photos!) or just share live steam experiences. But please keep your letters to a reasonable length so everyone has a chance to use this forum. Letters may be edited for length or clarity. Send your letters & photos to: SitG, Dept. RPO, P.O. Box 335, Newark Valley, NY 13811, USA.

* * * * * *

San Jose, California

Dear Editor,

I am horrified to notify you of the following.

It has been discovered by scientists in Idaho (rumored to associated with the Idaho National Engineering Laboratory and Atomic Energy Commission) that Dihydrogen Monoxide, commonly used in all types of live steam engines, is responsible for all of the following:

1. it can cause excessive sweating and vomiting
2. it is a major component in acid rain
3. it can cause severe burns in its gaseous state
4. accidental inhalation can kill you
5. it contributes to erosion
6. it decreases effectiveness of automobile brakes
7. it has been found in tumors of terminal cancer patients

Extreme care should be exercised because Dihydrogen Monoxide, sometimes referred to as water, is commonly used in all live steam locomotives. The Dihydrogen Monoxide National Safe Disposal site is 2408 Grandby Dr, San Jose, CA 95130. For safety's sake, all live steam locomotives should be immediately mailed to this address.

Regards,

Richard Finlayson

Hampton, New Hampshire

Ref: NH "Summer Photo of the I of S #5, "Mr. Baldwin" (ex Frank S) depicted in SitG-On-Line and SitG #39, page 17.

Editors:

Winters are indeed harsh here in the South's most Northern State. However, the snow does clear, usually, by Memorial Day, which gives us at least 4 weeks to grade the line and repair frost heave damage from the previous 11 months.

Said photo was taken around Tax Day, April 15, 1997. #5 was heading up the Revenuers special, taking Government agents on a tour of tax lien properties and repossessed boats, pickup trucks, mobile homes and snowmobiles.

These boys really know how to have fun! We're still waiting to get paid...

Rich Chiodo

Warren, Maine

Dear Ron:

Looking through my December, 1997 issue I read the Don Beach editorial and thought I'd throw my two cents in.

It would seem to me we already have an excellent system for an estate to achieve a fair market value on a collection of live steam trains. The live steam dealers that I have met over the years are honest, trustworthy individuals or couples who, if approached by a family, will be able to consult with them as to current valuations and be able to list and broker the sale of the items. Let's face it, the fair market value for something is determined by price/condition/demand. The dealers will advertise an item at current valuations with a certain bid/ask spread built into the price. All offers will be referred to the owner who will make the determination of selling the item. Probably the most important thing a live steamer could do to insure the collection receives maximum selling exposure is to provide a list of dealers that the estate could work with. If the items were bought new, the original sales agent would be the obvious starting point.

Jim Curry

Albuquerque, New Mexico

Dear Ron,

I read Gene Rutkowski's article, "Casting About (SitG № 43), with great interest. I have done a little rubber-mold casting, and anticipate doing more, with harder metals, sometime in the not too distant future.

Like Gene, I was surprised to learn that some larger scale steam suppliers are using zinc alloys for their moving-part castings. I asked Gail Graham about this, and found that he's a big proponent of ZA-27 as well. I don't know what Gene received from his supplier, but I believe that this is the alloy used for 1.5" scale castings.

So I started doing a little research on the subject. I wanted to find out just how hard the ZnAl alloys are, and determine whether I thought they were suitable for parts such as cylinders, wheels, etc. Here are the results of my investigation.

Referring to a chart put out by a supplier of ZnAl casting metal, I found the following about ZA-27. The "27" refers to the percentage of aluminum in the alloy. It also has about 2% copper, and some trace amounts of cadmium, iron, etc. The balance is zinc. (This is at http://www.stpaulmetalcraft.com/specs.htm, if you're interested.)

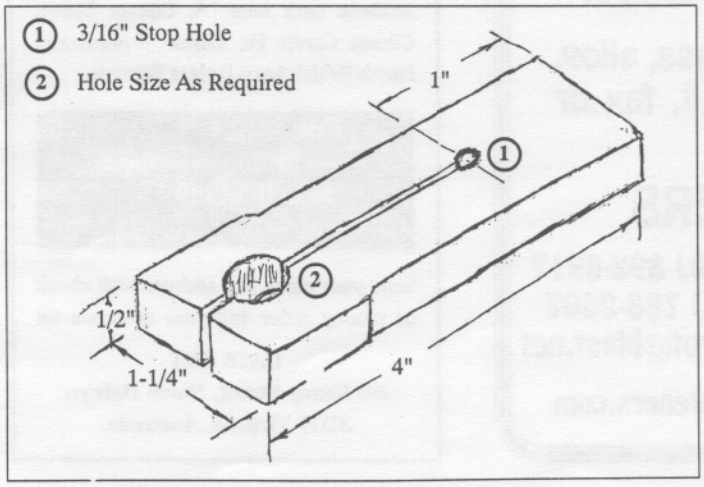
The Brinell hardness of ZA-27 is 120. In comparison, the Brinell number of half-hard brass is around 95, full-hard is around 140. Hot-rolled 1030 Steel is between Brinell 126 and 179; cold-drawn rod is in the 150-200 range, depending on annealing or other treatment. (*Machinery's Handbook*, 20th ed.)

Presumably, a brass wheel would work-harden to something closer to the 140 number during turning and running. Yes, ZA-27 is somewhat softer than steel or hardened brass. Personally, I don't find the 120 number for ZA-27 enough lower than the 1030 steel numbers to be worrisome. I'm inclined to give it a try.

Regards,
-Vance-

San Antonio, Texas

Ron,



For years I have used the tool shown in the sketch to hold small parts vertically in a vise. I have several sizes. I make the tool from cotton based phenolic. After drilling the hole size required and the stop hole, a slot is sawed down the centerline. The projections in line with the main hole allow for better clamping.

Ed Anderson

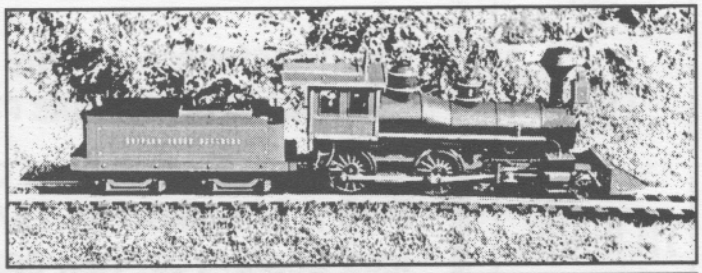
Warren, Maine

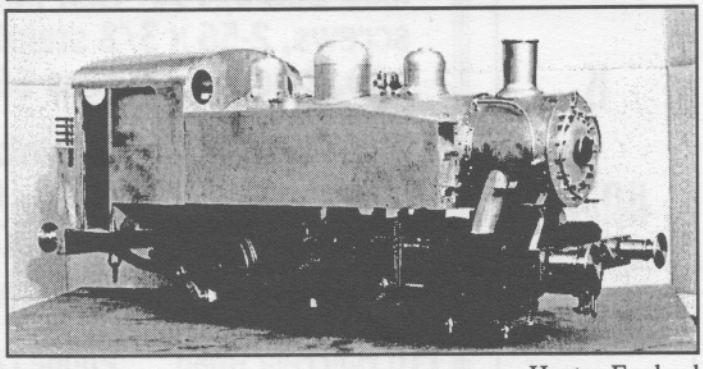
Dear Ron:

Looking through my December '97 issue I read the Don Beach editorial and thought I'd throw my 2 cents in.

It would seem to me we already have an excellent system for an estate to achieve a fair market value on a collection of live steam trains. The live steam dealers that I have met over the years are honest, trustworthy individuals or couples who, if approached by a family, will be able to consult with them as to current valuations and be able to list and broker the sale of the items. Let's face it, the fair market value for something is determined by price/condition/demand. The dealers will advertise an item at current valuations with a certain bid/ask spread built into the price. All offers will be referred to the owner who will make the determination of selling the item. Probably the most important thing a live steamer could do to insure the collection receives maximum selling exposure is to provide a list of dealers that the estate could work with. If the items were bought new, the original sales agent would be the obvious starting point.

Jim Curry





Hants., England

Hello,

I am now retired from service with British Railways where I had been some time as Locomotive Fireman and Locomotive Engineer (steam). My hobby interest has always been with the steam

locos of U.S. railroads. To date I have built a 4-4-0 and almost completed an 0-6-0T in 3/4" scale (see photos). Whilst I have been building in 3/4", my interest also goes towards Gauge 1, hence my reason for writing to you.

Are there drawings available for Gauge 1 S.P. Daylights and U.P. Challengers, or other similar locomotives?

Yours sincerely,

E. F. Moxham

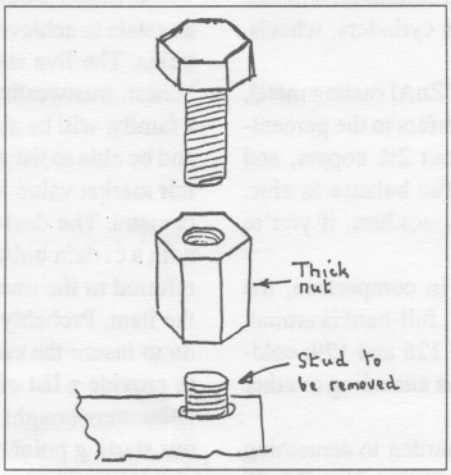
None that I know of...but I'll bet our readers can turn something up for you. How about it, readers? Send in your sources and suggestions for the benefit of Mr. Moxham, and anyone else who wants to get started on a mainline steam loco from scratch - ed.

Swarthmore, Pennsylvania

Dear Ron,

I recently had to remove steam chest studs in order to get the chest off the cylinder. There was insufficient thread showing for the usual locknut trick to be used, so I made the device described below. It is an old idea, but may not be known to all readers.

The sketch tells most of the story. Essentially, a thick nut is made for the stud, say four times the diameter. This is screwed onto the stud far enough to get a good engagement, but not hard down onto the bolted surface, and then a screw is put in from the other end until it jams on the head of the stud. The screw is tightened while holding the nut, and then using the wrench (on the nut only) the assembly is turned in the direction which should screw out the stud. Usually it will do this.



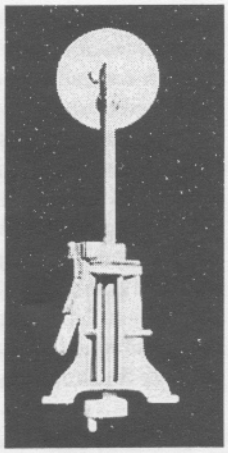
The same device can be used for the installation of studs. It is so simple to make that there is little reason ever to use the jammed locknut method, but I expect I'll continue to do so on the easy jobs.

Murray Wilson

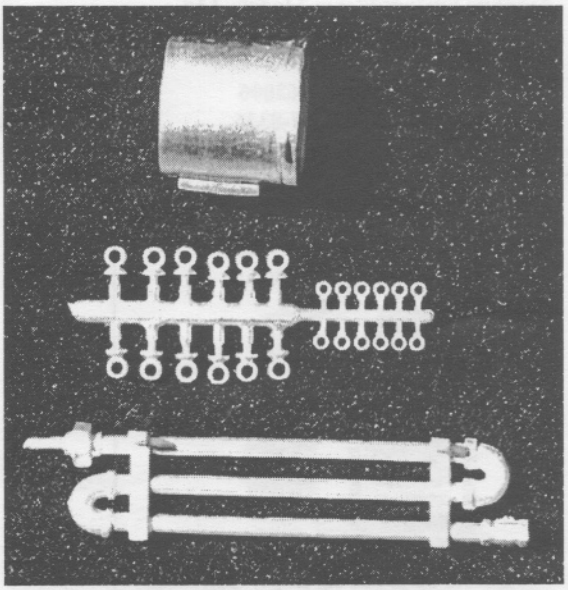
WHAT'S NEW?

Good news for Colorado narrow gauge fans from **D J B Engineering, 17 Meadow Way, Bracknell, Berks RG42 1UE, England - phone/fax 011-44-1344-423256.** D J B Engineering has announced a live steam model of the famous D&RGS K27 Class locomotive, affectionately known as the Mudhen. It will be built to a scale of 1:20.3, which is the correct scale for modeling 3-ft. narrow gauge on gauge 1 (45mm) track. The loco will be available in coal fired and spirit fired versions. Construction will be of the highest quality, utilizing laser cut steel frames, many lost wax brass detail castings, and will feature a wood cab with opening doors and windows as per the prototype. Contact the builder for full details, and please tell them you saw it in Steam in the Garden.

And for you Maine 2-footer and 7/8" scale fans.....**a free sample copy of the 7/8n2 Newsletter can be had by requesting it from the editor/publisher, Stephen D. King, 54 Claybrook Road, Rocky Mount VA 24151 - phone 540-483-9230 M-F 9-5 Eastern - e-mail: seven8n2@aol.com.**



Sunset Valley Railroad, 13428 - 209th S.E., Issaquah, WA 98027 - (206) 277-1625 - Fax: (206) 255-2453, has released the latest incarnation of Ted's Pet, a high level switchstand kit utilizing pewter castings, plus a brass target and shaft. The review sample we received makes a very impressive switch stand. We've always liked the Ted's Pet, and this version is an improvement that you will appreciate. The castings are super clean and sharp. The kit is quick and easy to assemble, and will add a touch of class to your railroad. The switchstand can be painted, and enamel is recommended for outdoor use. A ground throw will be released soon, and SVRR will shortly be producing a #10, equilateral three-way turnout, which will handle the largest locos available in Gauge 1.



Trackside Details, 1331 Avalon St., San Luis Obispo CA 93405, has released another selection of high quality lost wax brass detail castings, as shown in the photo at left. TD-167 is a headlight for Shay and other locomotives. It measures 11/16" dia x 11/16" deep, and there is a small bezel, base, hinge and latch detail. TD-165 is a cooling pipe casting for air compressor pump and air tank. The casting includes mounting tabs and an exquisite little valve, and will add a great deal of visual interest to any locomotive. TD-166 is a sprue of eyebolts for mounting brackets, pipe holders, etc.. The sprue contains 12 each of both large and medium sizes. All these castings are clean and sharp, and there are no visible parting lines or flash. Another beautiful release from Pete Thorp at Trackside Details. Highly recommended.....no modeler should be without the Trackside catalog! See their ad in this issue for ordering instructions, and please let Pete know that you saw it in SitG.

7/8n2 Railway Equipment Co., 54 Claybrook Road, Rocky Mount, VA 24151, phone 540-483-9230 (Day) or 489-5007 (Evenings & weekends) - Fax 540-483-8703 - e-mail <seven8n2@aol.com> is now offering products for Two-Foot Narrow Gauge Railways running on Gauge 1 track in 13.7:1 scale. Now available, new 7/8 scale 2-foot gauge swing motion freight truck kit. Also many other 7/8n2 parts, such as body bolsters, brake wheels, 33" driver castings, loco frames, 20" steel wheels and cast domes. Contact Stephen King for more information and pricing.

1998 CALENDAR OF EVENTS

May 2, 1998 - 9:00 am to 2:00 pm – Central New York "G" Scale Modular Club's 2nd Annual Large-Scale train show and sale. Something for every large scale modeler, including live steam. For more information and table reservations, contact Gordon Davis, 315 Viking Place, Liverpool NY 13088 (315) 451-3199

May 23 - 24 - 25, 1998 – Pennsylvania Live Steamers Memorial Day Steamup, Rt. 29, 1 mile north of Rt. 113, Rahns, PA. We have completed construction of the Gauge 1 track. Dedication will be at 2:00 p.m. on Saturday. Also available - ground level track for 1/2" - 3/4" - 1" and 1-1/2" (7-1/4" gauge) scale trains. Food is available on site, lodging nearby. For more information, contact Harry or Paul Quirk, PO Box 215, Springtown, PA 18081, phone 610-346-8073. Murray Wilson will be running his vintage tinplate steam trains on site.

May 29-31, 1998 – Second Annual National Spring Steamup. The location will be the Sunnyvale Hilton, located conveniently between the San Jose and San Francisco International Airports. This is the same location and same weekend as last year. In addition to steam tracks, dealer room, and clinics, the 1998 National Spring Steamup schedule will include an excursion to the Roaring Camp & Big Trees Narrow Gauge Railroad for a ride behind geared locomotives through the Redwoods, and three additional days of steamups at local garden railroads. National Spring Steamup registration will be $60 per person before April 1st, $65 thereafter. A special rate has been secured for Steamup attendees at the Hilton of $61 per night. Contact Richard Finlayson for more information: 2408 Grandby Dr. San Jose, CA 95130 408/871-0318. Info and registration forms are on the Web: <http://www.steamup.com/steamup> or Email:info@steamup.com

May 16 - 17, 1998 - Ridge Road Station's Rail Blast '98. Come one, come all to 16131 Ridge Road (Rt 104), Holley, NY (between Rochester and Buffalo). Train races, rocket and electric, will be held Saturday the 16th. A live steam track will be available both days with demos by local live steam enthusiasts, and a clinic on live steam will be presented on Saturday. Lewis Polk of Aristocraft will be in attendance and special prices on Aristocraft products will be in effect. Peter Mills' 2000 sq foot indoor layout will be featured, and the largest selection of Gauge 1 trains, accessories, Ozark and Trackside detail parts, scratchbuilding supplies, figures, structures and whatnot to be found anywhere will be available. For more info, call Peter Mills at Ridge Road Station - phone (716) 638-6000.

July 5, 1998 - STEAM BOATS ONLY FUN FLOAT RALLY, hosted by Valley Forge Model Ship Society at Gotwalls Pond in Kimberton, PA, off Rt. 113 just outside of Phoenixville, PA. Condensed navigational course set up, but no judging, no prizes - just a good time. Lots of steam talk ensues. Call Ernest Morris at 610-948-8107, or write to him at 82 Spring City Road, Phoenixville, PA 19460.

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.)

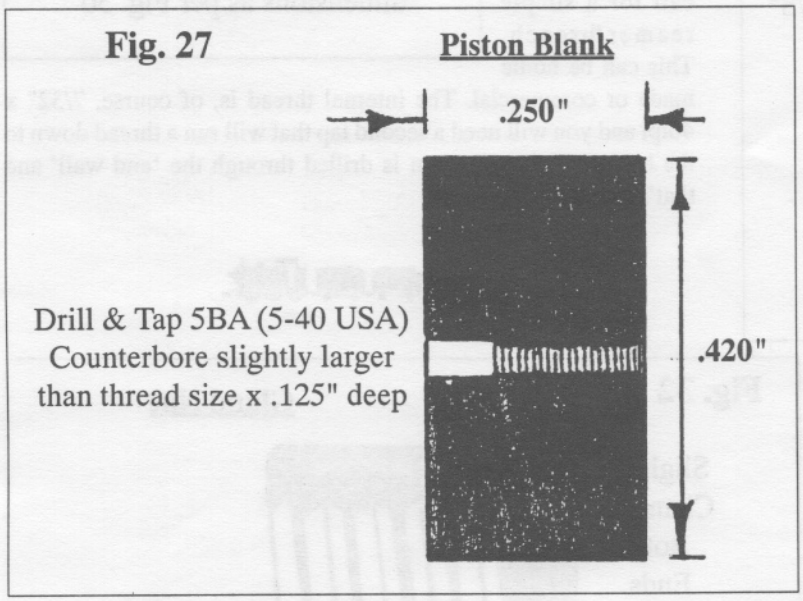
GAZING INTO THE FIRE

by Peter Jones
photos & drawings by the Author

Kissing Frogs (part 6)

We will now make new pistons and piston rods. These will be screwed together and not allowed to 'float' (as per the as-built by Mamod to try and overcome manufacturing error). Various materials have been tried for pistons - bronze, aluminium, ptfe etc., but given the circumstances of light loading and irregular lubrication, brass is by far the best in the long term.

Figure 27 shows the dimensions of the piston blank. After turning 1/4" of a brass rod to .420" dia, it is drilled and tapped 5BA (or 5-40 USA). This is then counterbored slightly larger than thread size by .125" deep (apologies for the mixed measurements throughout this article but they do make life easier). It is important that all of this is done without disturbing the job in the chuck. The piston rod is made from 1/8" dia ground stainless steel. The 5BA thread needs to be accurately cut on the tailstock dieholder and is 1/8" deep (see figure 28) The piston rod is now tightly screwed onto the piston.



The next job has to be done very accurately so as to turn the piston true, to an exact diameter. The 3-jaw just isn't good enough. Fortunately there is an easy way out. We will make a little device called the crush collet (as I call it). Construction is as follows:

Figure 29 gives the dimensions of a simple, shouldered shape made from 1/4" dia brass bar. Make a centre pop opposite number 1 jaw of the chuck. Face the end across and then drill and ream 1/8" dia through it. This little device will now crush under a tightening chuck and grip the rod in an accurate centre.

The piston rod is pushed in and gripped with the piston just about 1/8" clear of the chuck jaws. With a well sharpened knife tool, turn the piston down to .394" diameter. Pull back the toolpost and, without disturbing the piston, offer up the cylinder. It should j-u-s-t fit but no more. We are into the realms of 'feel' here. The best description is that it should just push on with light hand pressure, but without a trace of wobble. If it falls in it is too slack and you will have to make another. Time and material are cheap enough to us but, without apology, I repeat the dictum that, when turning metal it is easy enough to take it off but damned hard work to glue it back on.

The fit we are looking for is called a running fit. The piston is turned to a length of 6mm and repeated for the second cylinder. Note that the packing groove is not turned at this stage. The piston rod is now pulled out further from the chuck so that only a few millimetres are left gripped: the rest of the rod and the piston protrudes into fresh air and looks vulnerable... Apply a little oil to the piston and then push the cylinder on, working it backwards and forwards. After a few minutes of this you should have a lovely, silky feel to the fit.

Now is the time to push the rod back into the collet and turn a packing groove. This calls for a tool ground to a width of .050". A groove is turned to a depth of .047". Don't forget that this counts double when turning a bar, and so the diameter of the groove will actually be .094" less than the diameter of the

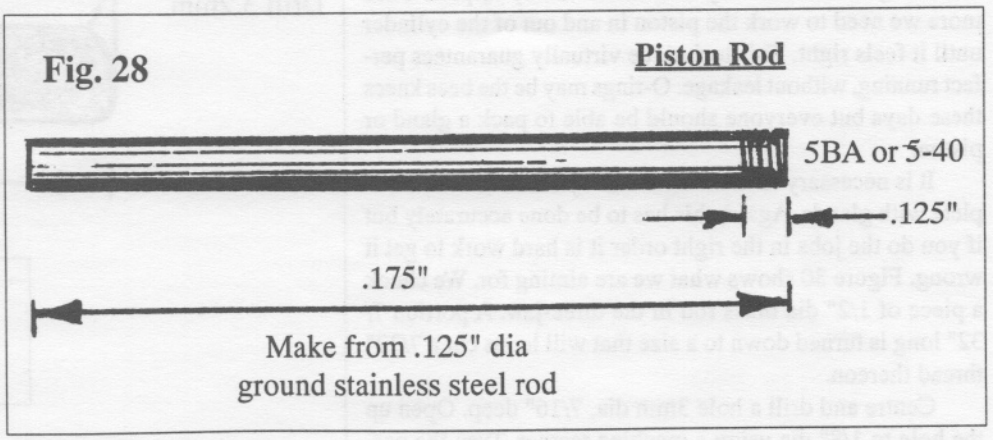
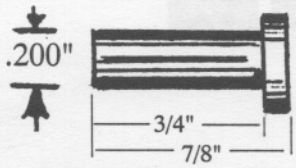


Fig. 29

Crush Collet

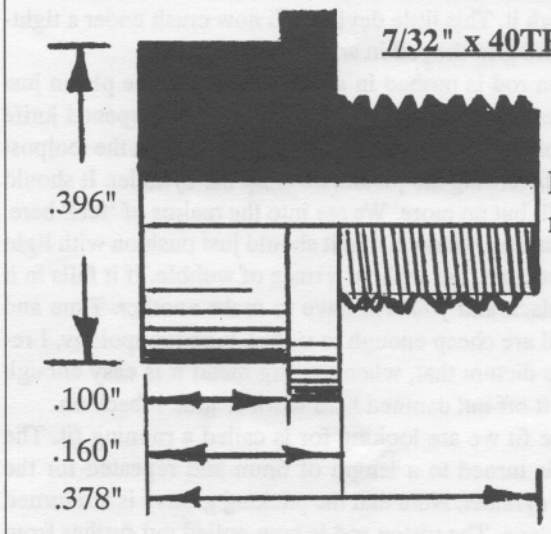


piston.

The groove is packed with 1/16" round graphited yarn, which can sometimes be obtained by unravelling a larger twisted section. Packing a piston is easy, provided that you go about it the right way. The aim is to get what looks like a continuous diameter of piston with the packing flush with the brass bits. At the same time the groove must be comfortably packed. The trick is to wind the packing round the groove until it stands just proud of the piston diameter. Take a piece of flat steel and then roll the piston on a flat surface like the lathe bed or drilling table. This rolling process tends to cut off any surplus, but an overpacked groove might need a touch of excess cut off and then try rolling it again. Once you have packed your first piston, you are set for life and will wonder what all the fuss was about.

Fig. 30 **Rear Cover**

7/32" x 40TPI

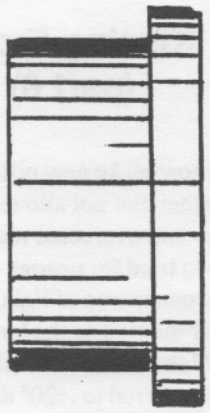


Should the packing still be slightly fat, try pushing it into the cylinder. This may well shave off any surplus. Once more we need to work the piston in and out of the cylinder until it feels right. This technique virtually guarantees perfect running, without leakage. O-rings may be the bees knees these days but everyone should be able to pack a gland or piston.

It is necessary to make new rear cylinder covers, complete with glands. Again, this has to be done accurately but if you do the jobs in the right order it is hard work to get it wrong. Figure 30 shows what we are aiming for. We chuck a piece of 1/2" dia brass rod in the three-jaw. A portion 7/32" long is turned down to a size that will let us cut a 7/32" thread thereon.

Centre and drill a hole 3mm dia, 7/16" deep. Open up the hole to 1/8" dia using a machine reamer. Turn the portion mentioned above 7/32" x 40TPI (that's the ME Thread). Turn the cylinder register using a parting tool. Now part off the job, leaving that register .100" long. As you are parting off, just break the sharp edge to allow for an easy entry of the register into the cylinder.

Fig. 31 **Front Cover**

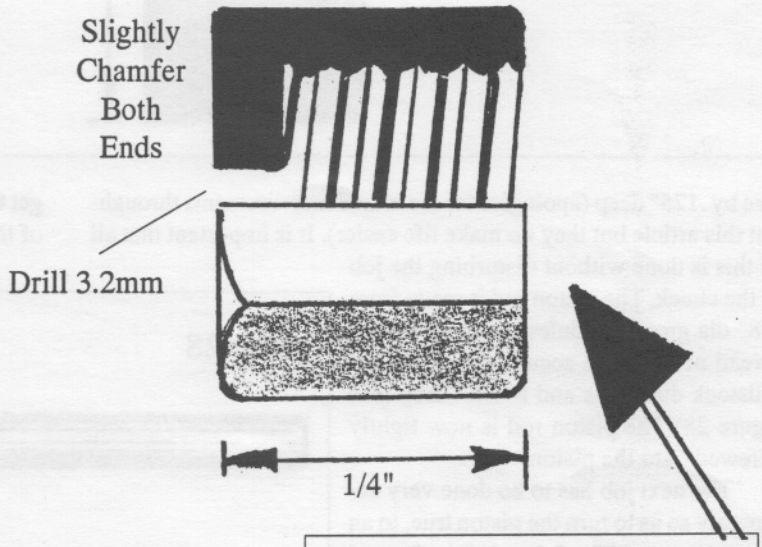


dimensions as per Fig. 30

After making the back covers, the front ones are a doddle - as seen in Fig. 31.

The final component in this section is the gland nut. This is made from 1/4" hex brass. Figure 32 shows all. It is put into the 3-jaw and drilled 3/16" dia x 7/32" deep. The bottom of the hole is flat and this will call for a simple reamer/broach. This can be home made or commercial. The internal thread is, of course, 7/32" x 40tpi and you will need a second tap that will run a thread down to the bottom. A hole 3.2mm is drilled through the 'end wall' and that's the job done.

Fig. 32 **Gland Nut**



Drill 3/16" dia x 7/32" deep.
Bottom of hole to be flat.
Tap 7/32" x 40tpi

Notes From The Backyard

by Rich Chiodo

Seeking a Higher Level...

My Isle of Shoals Light Railway & Navigation Company is far from complete. Given the weather here on the coast of New Hampshire, family and job commitments and my desire not to be in any particular rush, I suspect the I of S has a few more years of construction to go. In these pages I have chronicled how the I of S came to be and my thoughts on what a proper Steam Powered line should ascend to. No grades and broad curves are just a beginning.

Over the past year or so I have shared ideas and philosophies with many fellow garden railroaders. These discussions centered more around what makes a terrific Garden line, especially a Steam powered one, how does one go about creating this marvel and how do we know if we were successful. This topic is being covered quite well with a series of articles currently running in *Garden Railways*. I encourage you to read them.

After digesting my discussions and reading several of the GR articles it struck me that we are just scratching the surface as to what can really be obtained if one were serious about creating an excellent garden line.

This forum is centered around small scale live steamers and the operation of these locomotives in a garden setting. Much of what is written about the former only lightly covers the latter, and a serious discourse on the whole is only occasional presented. It is a legitimate point that small scale live steamers are a hobby unto themselves. All that is needed to enjoy them is a loop of level track with broad curves, or even a just a test bed. Popular events at Diamondhead and Sunnyvale attest to the health of this end of the hobby spectrum.

What I'm talking about is the conception, design, development, construction and operation of a legitimate and plausible railroad, albeit in miniature and, for the sake of this audience, a steam-friendly one.

What does it take? What constraints do the laws of nature really place? Do you know what you are trying to achieve before you begin digging up the lawn? Can the level of garden lines, especially those true to motive power prototype (live steamers, battery, and even internal combustion), be raised to the level of seeming plausibility our indoor model railroaders are achieving? I say "seeming" because we are working outside with real dirt and real rocks and real weathering and many of the real problems experienced by real railroads. Show me where the New York Central kept their track cleaning eraser...HAH!

Sadly, all garden railroads begin to look the same when you step back, use the 10 foot rule and squint. If it isn't the similarity of the structures, it's the track and roadbed or, perhaps, that bridge, plant, freight car, figure, color scheme, detail part, lettering, track plan, operating philosophy, etc., etc., etc. Of course, you say, that's what's available, that's what the D&RGW ran in 1923, bucko!

The hobby shop sells structures and details and rail and spikes and rolling stock, and decals and paint and.... I encourage you to support the trade. BUT...is purchasing stuff for the GR randomly or even with some overall theme really going to give you that picture in your mind's eye? Did the prototype or your fictitious line really use clapboard sided structures with cedar shake roofs? Would that rock outcropping really be basalt, not sandstone? Would the rail really represent 160 pound mainline welded rail?

And the compromises add up, little by little. After a while what you have is an excellent example of the best the trade can offer, perhaps arranged a little differently, sitting out in your backyard.

Now, some compromises are inevitable, though I know at least two garden railroaders who Bronx cheer at the idea of any compromise. Their lines are unique, wonderful and smack of a true RR look and feel. Some compromise sneaks in, but it is held at bay and minimized where possible.

I have a looser grip. My rail is code 332 with plastic tie strip. If I didn't make this concession I wouldn't have a RR because of the time involved in properly hand laying track and the severe weather the track would have to endure where I live. I do hand lay switches and crossings, etc. The sight of a Nº 8 left hand curved switch (which is almost 4 feet long!) operated by a scale target switch stand yells RAILROAD, so here I don't compromise.

My rolling stock is appropriate for its function, scratch built and weathered where necessary, though that's a bit of a sham.

The 3 or 4 structures will be to prototype, hand built and able to withstand the weather. And so it goes.

It's not how much railroad you have, it's how good a railroad (no matter how small or incomplete) you have or are attempting. Obviously and excellently executed, expansive pike is "WAY KOOL"! So raise your efforts to a higher level. Pick one thing to improve.

Ballast! This summer research dirt and stone dust and chippings and baseball diamond dirt until you find ballast that looks like ballast for your line. An associate of mine is contemplating renting a 10-wheel dump truck to visit a fellow garden railroader who has access to superb ballast. Now that's spitting in the face of compromise!

A little at a time your creation will rise out of the ordinary... and you will know why, while your visitors puzzle over what exactly makes this unique, better, worth staying 'til after dark.

Oh yes, the 332 rail did bother me and it was terribly troublesome for my friends. Recently, without changing a stick of rail I solved much of the problem. The Isle of Shoals went upscale to 7/8" to the foot, effectively making it a 2 foot line using 60 pound rail. See, you can always find a way. More on this marvelous scale transmorgrification another time.

Casting About

by E. V. Rutkowski

Chapter II - What Do I Do Now?.

I was familiar with the overall concepts of the various casting methods; sand casting, shell casting, investment casting etc. but I had no skill in any of these arts. Obviously the first thing to do was read about the casting processes which were suited to my needs. My local library provided several texts describing investment and sand casting techniques. I discarded shell casting as impractical for the hobbyist. Maybe I was wrong. I considered investment casting and sent for some catalogs from jewelry maker suppliers. These showed me the kinds of investment casting equipment generally available to hobbyists. Similarly, I obtained catalogs from suppliers of small sand casting equipment.

It seemed to me that investment castings for the cylinder block and the drivers would result in beautifully finished parts but would cost a lot in getting the necessary equipment together; vacuum pump, furnace, burnout oven, etc. Also, the size of the castings I needed were too large for the jewelry making equipment I saw in the catalogs. Investment casting appeared to be more suitable for smaller detail parts. Maybe in the future I'll give it a try for making headlights, marker lamps and all the other small stuff.

I narrowed in on sand casting. I decided I didn't know enough about the details of actually doing sand casting to know what I needed to get to start making casting. I needed more detail than my library could provide so I sent off for a number of books and pamphlets on the subject. Here is a list of them with my opinion of their value to me:

Casting Brass by C.W. Ammen, Published by TAB Books, Blue Ridge Summit, PA

Much detail on the composition and properties of various brass alloys. It also has discussions of foundry practice in casting brass alloys as well as a small section on the business aspects of running a small foundry. Save this for later reading when you want to become a more advanced foundryman.

The Complete Handbook of Sand Casting by C.W. Ammen, Published by TAB Books, Blue Ridge Summit, PA

This one contains lots of good information for the amateur wrillen by an old time foundryman. It contains a lot of information useful only if you want to get into the business of making castings, but is still worthwhile reading because of the many simple drawings of various type of flasks, cores and simple tools that the author describes.

Foundrywork For the Amateur by B.Terry Aspin, Published by Argus Books Ltd., England. (Obtained from Coles' Power Models,Inc.)

A small but good general text on sand casting tools and methods. I recommend it to anyone just getting started.

Ornamental Metal Casting By R.E. Whitmoyer, printed by Lindsay Publications Inc., Bradley, IL

This is a good little book to start with. The casting process and tools needed are simply presented. It gives you an "I can do that" feeling. Many ofthe things you learn here you will use.

U.S. Navy Foundry Manual Reprinted by Lindsay Publications Inc., Bradley, IL

One of the many useful publications out of Lindsay Pubs. While intended for Navy foundrymen making the many repair parts needed by a fleet at sea, it makes interesting reading for anyone seriously interested in producing good castings. You won't need this text but it will show you many details on making molds and cores which you can use.

In addition to the above texts I sent off for a video describing the sand casting process;

Greensand Casting Techniques by David J. Gingery & Robert M. Bailey, P.O. Box 276, Fulton, MO (I believe this is also available from Lindsay Pubs)

Reading all these manuals and watching the video gave me the confidence to get the equipment I needed and start making my own castings. It seemed to me that the first thing to get was the furnace, crucible and other casting tools. The choice between electric and gas fired furnaces fell on the gas fired side. I wanted to be able to melt at least 10 pounds of metal, and gas fired furnaces of this capacity were much cheaper than electric furnaces. As I found out later they are also faster in coming up to pouring temperature.

Now the choice was between buying a furnace ready made or making one myself. There is a very nice little book on building a gas fired furnace for the hobbyist foundryman;

Building a Gas Fired Crucible Furnace by David J. Gingery, Lindsay Publications Inc., Bradley, IL

While Gingery's book shows how simple it is to build your own gas fired fur-

nace, I decided to buy a furnace instead because I didn't need another project on my list of things to do. Responding to an advertisement in one of the hobby magazines, I sent to PYRAMID PRODUCTS CO. for a catalog of furnaces and foundry supplies. Their catalog listed a number of furnace options ranging from a nine inch diameter by nine inch high unit to one that was nineteen inch diameter by eighteen inch high. All of the furnaces come equipped with electric forced air blowers. Pyramid also supplies other necessities such as tongs, flasks, crucibles, sand, pyrometers etc. Considering my needs and limited space for setting up the furnace, I and sent off for a medium size furnace with a capability of melting up to 20 pounds of brass. At the same time I ordered a crucible and crucible tongs.

While in the process of learning about the various aspects of foundry work I kept finding descriptions of the casting crucibles as "a #5" or "a #10". I finally found out that this number indicates the pounds of brass that a crucible will hold. I put together all I could find on crucible sizes and related furnace sizes. These data are given in Table I, below. The "bilge diameter" of a crucible is its largest outside diameter.

Reading the various texts on casting convinced me to make my drivers and cylinders of bronze. Two factors entered into that decision. Bronze is strong, rust resistant and long wearing. The other alternative, cast iron, while both tough and wear resistant was subject to rusting and melted at a higher temperature than bronze. Cast iron is also somewhat more difficult to machine and is a little harder on tools than bronze. I found that I could buy scrap bronze valve bodies from a Boeing surplus store which was near my home, so I bought about 30 pounds of these and cut them into chunks suitable for melting down when I got my furnace installed.

Some other things I did to get ready for my foundry work were to go to a local welding supply store and buy a pair of leather gauntlets and apron. I aleady had a pair of heavy leather work shoes. All this gear was to keep any inadvertently spilled, molten metal off of my tender parts. While at the welding supply store I also picked up a pair of gas welder's dark goggles to be used for eye protection and to be able to see into the bright (1800+ degrees F.) furnace.

TABLE I - CRUCIBLE AND FURNACE SIZES

CRUCIBLE SIZES

Crucible No.*	Height Inches	Max. Bilge Dia. Inches	Capacity lb Alum.	Brass	Iron
1	3 1/2	3 1/2	3 1/8	1	3
2	4 1/2	4 1/2	3 11/16	2	6
4	5 3/4	?	4 9/16	4	12
6	6 1/2	?	5 1/4	6	18
8	7 1/8	?	5 7/8	8	24
10	8 1/16	?	6 9/16	10	30

RECOMMENDED FURNACE SIZES

Crucible No.	Height Inches	ID in	Volume cubic in
1	4 1/4	4 1/2	65
2	4 3/4	5 1/4	103
4	6	6 1/4	184
6	6 3/4	6 3/4	242
8	7 1/2	7 1/2	331
10	8 1/2	8 1/2	482

Improving the Aster Mogul

by Murray Wilson

Making a good loco even better...

The original Aster Japanese Mogul and the later Americanised version have a number of awkward features that can be fairly simply improved. In previous issues of SitG a few improvements have been described and here are a couple more that make for greater convenience in operation.

Filling the cold boiler through the plug under the steam dome is a fiddly job because the dome is held by an easily dropped screw, and also a wrench must be used on the plug. Two five minute jobs of work will correct this.

Take a metal disc of about 7/8" diameter and bore a central hole that will just fit over the plug stem. I used the 'push out' disc from an electrical box. Solder the disc to the stem. If you have a lathe and a knurling tool the rim may be knurled, otherwise file a milled finish to the rim, or make it square if you prefer. The plug can now easily be removed or tightened with the fingers.

The next task is to eliminate the screw which retains the dome. Obtain an inline, solderless electrical connector of the type sold for automobile wiring. It must be one with a cylindrical plug like a banana plug, not a spade, though we only need the socket half. Trim off the part where the wire would be crimped to the socket and solder the socket to the inside top of the dome. Reduce the diameter of the top of the boiler plug stem until it is a comfortable fit into the socket. A convenient way to judge the required size is to try the shanks of Number drills into the socket until one with the desired fit is found. Reduce the stem to that diameter and put a small lead onto the top end. The dome will now snap on and off.

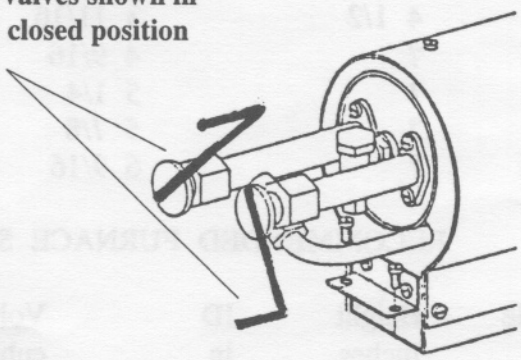
Other simple improvements that do not require a description are:

1. Remove the first couple of threads from the lubricator plug so that it is more easily started when being replaced.

2. Fit a drain to the lubricator.

Levers added to throttle and blower valves.

Valves shown in closed position



3. Add levers to the throttle and lower valve handwheels.

4. Fit a pipe to the alcohol sump overflow hole and lead it away to a safer place. With the original arrangement, any overflow runs along the outside of the plastic tube and to the burner, resulting in a track fire and maybe a tender fire.

Adding a boiler feed connection to the Aster Mogul

The original Aster Mogul and the "Americanised" variant have a Smithies boiler of quite small capacity. It is an advantage to be able to top up the boiler under pressure, and a simple modification enables this to be done.

There is already a check valve on the backhead, with a blanking cap on it. The cap can be converted into a union nut by drilling a hole appropriate to the pipe size, 0.125", through the blank end. This is best done in a lathe as the hole must be accurately centered. Alternatively it is possible to use a drill press, as described in the appendix.

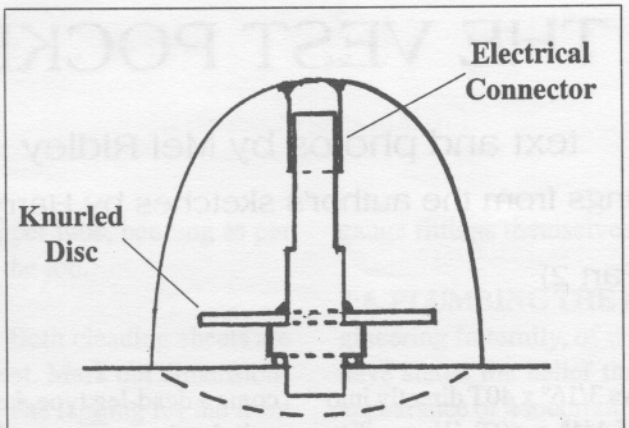
I don't know for what pipe end preparation the Aster union is intended, but the normal 60° cone works fine. If you have a lathe this is simple to make, otherwise cones are available from the usual steam part suppliers.

I see no point in installing a tender pump if there is not also an axle pump, so I made a connection for an external pump. A second check valve is desirable, a single valve cannot really be depended upon to prevent water being blown back out of the boiler. You can make one, buy one, or use one that you can get free. I used the free one. It is a standard Schraeder tire

valve. The rubber is removed with the aid of a knife and a wire wheel. There may be various styles of brasswork under the rubber, but no doubt any of them can be adapted easily to our need.

I chose to install the feed connection in the cab roof and removed the existing roof vent to do this. The vent is held by four spot we!ds and these are easily broken by gentle work with pliers. The Schraeder valve is mounted in a bracket and a new, hinged cover made for the vent opening. The new valve is piped to the check valve on the backhead. Try to avoid soft soldered joints in the cab as it quickly gets very hot in there if draft is lost for any reason.

An alternative to the modification described would be to replace the boiler filler plug with a valve of the Goodall type. I have yet to find a source for suitable rubber sleeving for such a valve and so have never made one. *(hobby shops catering to model airplane hobbyists will have silicone tubing in various sizes, which works very well on a Goodall-type valve - ed.)*



Modifications to Filler Plug & Dome

Water may be pumped into the boiler by whatever means you choose. I use a home made portable lineside pump. Whatever the pump, it should discharge into a hose terminated by an appropriate connector, in my case a Schraeder tire jack. The Mogul does not have a water level gauge, so the blower valve inlet pipe inside the boiler should be set with its open end at the maximum intended water level. With this arrangement the spitting of water from the blower will show when the boiler has been sufficiently refilled.

On an historical note, back before the first World War the English firm of Carson put a bicycle tire valve on the backhead of some of their engines. This was so the boiler could be pressurised with air and the blower used whilst raising steam. I tried this with the Mogul and its Schraeder valve. It worked, but the boiler is too small to give a worthwhile blower duration on one filling of air.

Addendum . A way to center the drill to drill the blank cap is to put a Slocum center drill in the drill press chuck, bring the drill down to the vise, align the vise and clamp the drill in it. Release the drill from the chuck and put the blank cap in the chuck. Taking care not to disturb the settings, drill a pilot hole. Then drill the final size hole. If you don't have Slocum drills you should get some, they are among the workshop essentials. Don't use them in a hand held drill, as they are easily broken.

BUILDING THE VEST POCKET CLIMAX

text and photos by Mel Ridley

drawings from the author's sketches by Harry Wade

Section 7 – The Boiler (Part 2)

7:4:1. REGULATOR: This screws 3/16" x 40T directly into the turret with the steam take-off 1/4" x 40T. We need to extend the 5/32" diameter spindle by 1.1/4", and as the end is already turned down to 1/8" by 1/4" long, the job is made quite simple.

Chuck some 3/16" round or hex brass, centre and drill 1/8" for 9/32". Part off 1.1/4" long. At the other end, cross drill № 46, 1/8" in from the end. The handle is a 1.1/2" long piece of l4swg wire bent at 90° for 1/4" and soldered in postion. We will solder the extension piece to the spindle after the steam test.

7:4:2. BURNER & SUPERHEATER: The plug-in burner slides directly into, and is held captive by, the flame tube and needs one small modification to encompass the superheater element. There are two 3/32" dia. secondary air holes in the body either side of centreline, so midway between the two and 3/32" from the top, pop and drill through, opening out to № 30 for the 6.1/2" long x 1/8" o/d s/s element, and slot down from the top for easy insertion and removal.

For the front end, chuck some round 1/4" o/d phosphor bronze, centre & drill 3/32" x 7/16" deep. Countersink for 1/8" nipple. This is tough material so take it slowly using plenty of lubricant. Thread 1/4" x 40T for 1/4" and before parting off 1/2" long overall, cross drill 1/8" into the bore.

The rear piece is most easily made from 3/16" or 1/4" hex material, as the angle at which the copper steam pipe enters is at the correct angle on the flats. (See Drg.7:4:2.) Centre and drill 1/8" x 3/16" deep. Before parting off 1/4" long, cross drill through one of the flats 1/8" into the bore. Cut and trim a 2" length of 1/8" copper tube.

Degrease the components and insert the element into the burner, fit the front end locating it vertically downwards, with the entry pipe at the rear pointing 45° upwards and to the right hand side. Flux the parts and silver solder. The superheater element is now held captive in the burner body.

7:4:3. LUBRICATOR: This standard design is going to become a dead-leg type, i.e. the steam & oil mixture enters and exits by the same route. Despite various opinions to the contrary in certain applications, the system works well with the cylinders receiving adequate lubrication as evidenced by the drain valve after each run.

Having unscrewed the cap with O-ring, cleanly remove one of the 2.1/2" long cross arms or whichever is the shorter. Drill & tap the body no more than 1/4" deep by 8BA. Insert a brass screw and part off the remainder. Flux and soft solder with multicore or similar, afterwards removing the flux residue. The body is hard soldered, but soft solder is perfectly adequate for this purpose.

The only other modification is to reduce the length of the drain valve, which also serves as a mount for the lubricator body, so as not to foul the rear truck on curves. Saw 3/32" off the screwed boss and re-countersink for the valve. Remove a similar amount from the top of the nut and the bottom of the valve stem. This stem will be cross drilled for a 1/16" pin on final assembly.

Fitted between the Lubricator and Regulator is a Tee piece to accept the superheater steam line. Chuck some 1/4" round bronze or brass, face, centre & drill 1/8" by 7/16" deep. Thread the end l/4"/40T for 1/4". Countersink for 1/8" nipple. Before parting off 1/2" long, cross drill and open out to № 30 (.1285") 1/8" in from the end. This piece will be soldered to the lubricator arm after forming during assembly.

7:4:4. PRESSURE GAUGE: The choice of gauge here is graduated 0 to 100 psi, and is 3/4" in diameter. The nuts and tails for these vary from time to time so you may have to make a simple sleeve to solder up the nipple & pipe at the gauge end.

A union is called for between the pipework & turret. Chuck some 1/4" or 3/8" hex brass and face off. Centre & drill though 1/32" for 9/16". Countersink for 3/32" nipple. Turn down to 3/16" for 3/16" and thread 3/16"/40T. Part off 1/2" long. Turning the piece about, thread the other end the same leaving a 1/8" wide hex collar.

Form the pipework from 3/32" copper tube, bending as per Drg. 7:4:4 and adjusting for fit on the job.

7:5. CLEADING & LAGGING: Both cleading sheets are made from 20swg (.036") brass sheet. Mark out dimensions and hole locations as per Drg. 7:5. The lagging for the front section uses wood veneer (about .020" - .025" thick) in order to preserve the narrow lines of the boiler and allows the cleading to push fit over the end of the smokebox. When cutting it to size, remember to let the wood grain run lengthwise. The rear section uses woven fibreglass sheet as used in auto body repairs (about 5/64" or 2mm thick).

A number of holes are called for in the front section. Unless you are using bending rollers, drill a pilot hole only for the 7/16" filler plug and open out afterwards, doing the same for the rear section. Hole 'D' is drilled and tapped 8BA for the Trackside Details bell, the base of which will be drilled accordingly. If you use another type, figure out the best way of mounting it.

If forming by hand using a mandrel, anneal the work before starting. It will probably require another couple of goes during the process to make life easier. The hole for the turret can be cut out afterwards with a piercing saw. Note that this section slips around the shell and a gap is left underneath where the footplate meets. Try both for fit.

The handrail knobs are tapped 8BA. Open out the cast handrail knobs to 1/16" whilst still on the sprue. If they are a bit tight for the 1/16" handrails, open out to № 52. Clean up the threads, sawing off excess material and fit these along with the push fit globe valves into position. Solder in place with multicore. Open out the globe valves to № 44, a loose sliding fit for the captive 14swg injector lines. Before painting (see note below) bend the lines to shape as per Drg.7:5:1. Insert them through the globe valves and solder the non-return valve into position, taking note of the vertical alignment when assembled. Ref. painting, you may find it more convenient to fit the injector lines afterwards, with a simple mask for the boiler, and paint them individually. In any event, they need to be a sliding fit for positioning receptor holes in the cab front later.

We can now mount the boiler onto the chassis, sandwiching the rear footplate in between, but before doing so, screw in the Gauge Glass fittings (without the glass), checking they are in angular alignment both with the backhead and themselves. If they are not aligned correctly, we can make up a 'shifter' by threading a 5" or 6" piece of 1/4" steel roundstock 1/4"/40T for a 1/4", inserting into the screwed bushes and bringing them into line. The backhead is quite soft and will quickly work harden so go carefully. Do not try to align the gauge fittings themselves using brute force.

7:6. PLUMBING THE BOILER: For years, the model engineering fraternity, of which we've become minor players, have stated the belief that nothing detracts more from the appearance of a locomotive than deformed and poorly fitted pipework, an opinion the author doesn't disagree with. So for this task, leave your pliers, molegrips & stilson wrenches where they belong, in the toolbox. From the Drg. work out the various radii and use any spare tube or barstock as a mandrel in the forming process.

Fortunately our only job on the backhead is the swan-necked lubricator lead. Go very carefully and slowly. If you don't get this right first time, and it is a try & fit kind of operation, anneal it and start again.

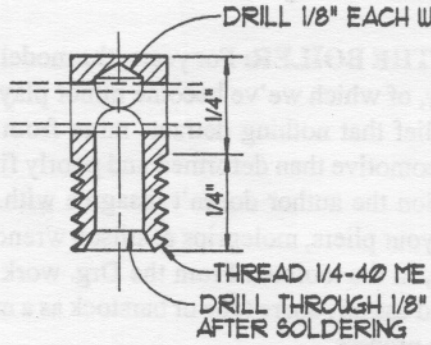
Fit the burner/superheater into the flame tube and lightly fasten the front retaining nut from the cylinder steam pipe. In this position, the superheater lead will be pointing about 45° to the r/h side. Screw in the regulator body with the outlet facing 90° to the right and locate the lubricator in the footplate.

The first bend brings the lead up over the lubricator cap, and as we need to get our fingers in there and unscrew it, room has to be left for the cap's removal. The following bend brings it back in line with the steam take-off from the regulator, but has to be as long and straight as possible to accept the Tee piece we've just made to connect to the superheater.

Having aligned the lubricator pipework, cut to length allowing for the nipple to the regulator, and slide on the Tee piece. Bend up the superheater lead to match and cut to length, ensuring that you can get a spanner to the nut after assembly and you can finger the gauge glass nuts for breakage replacement.

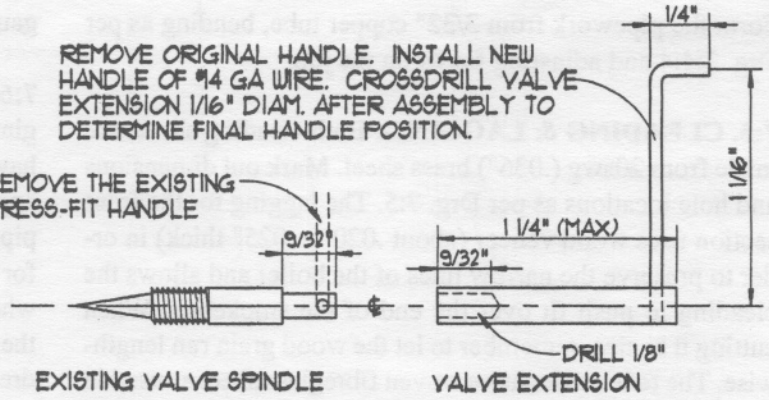
With the backhead assembled, soft solder the Tee piece in position on the lubricator arm. Undo the assembly and drill through into the steamline. Unlike the writer, you will only forget to do this little drilling operation once.

For the blow-down drain, just eyeball the position from both angles and scribe the footplate accordingly. This will be drilled at the same time we come to the cab/bunker platework and a small length of pipe can be added.



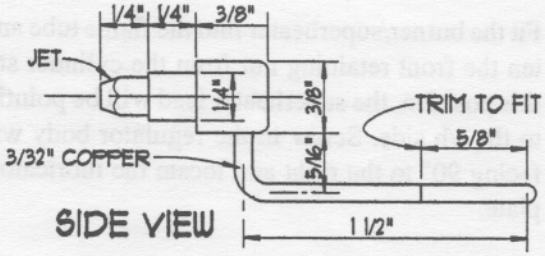
TEE PIECE 7:4:3

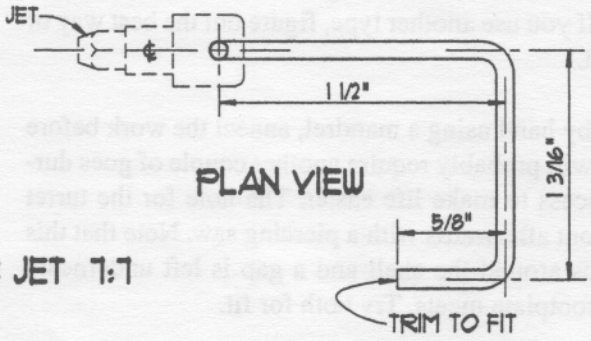
1 OFF 1/4" BRASS ROD
TWICE ACTUAL SIZE



REGULATOR VALVE & EXTENSION 7:4:1

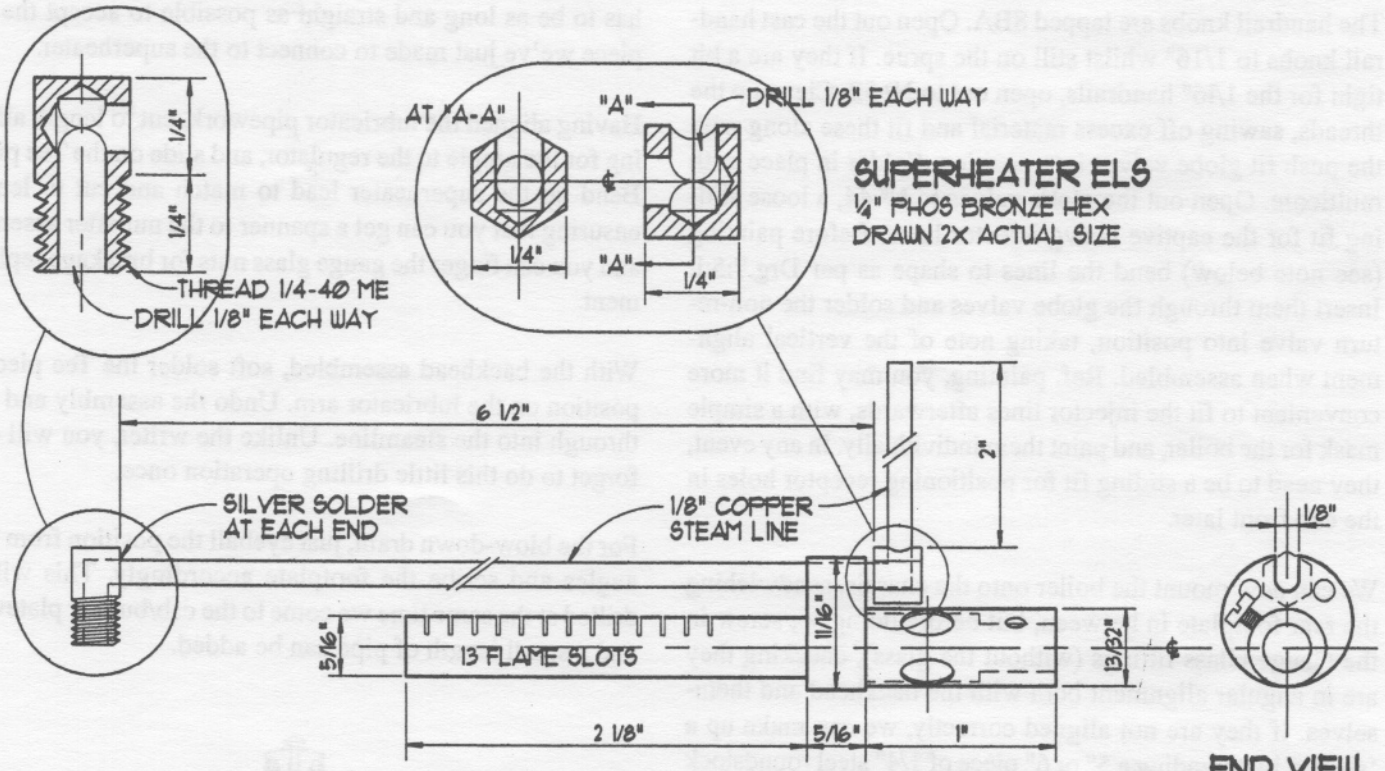
1 OFF 3/16" OD BRASS ROD





BURNER FEED PIPE & JET 7:7

1 OFF 3/32" COPPER TUBE



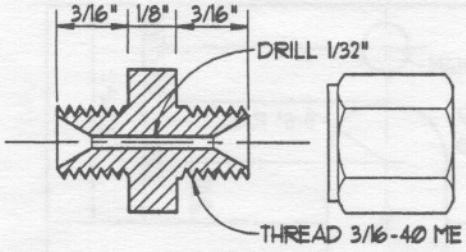
SUPERHEATER ELS

¼" PHOS BRONZE HEX
DRAWN 2X ACTUAL SIZE

SUPERHEATER 7:4:2

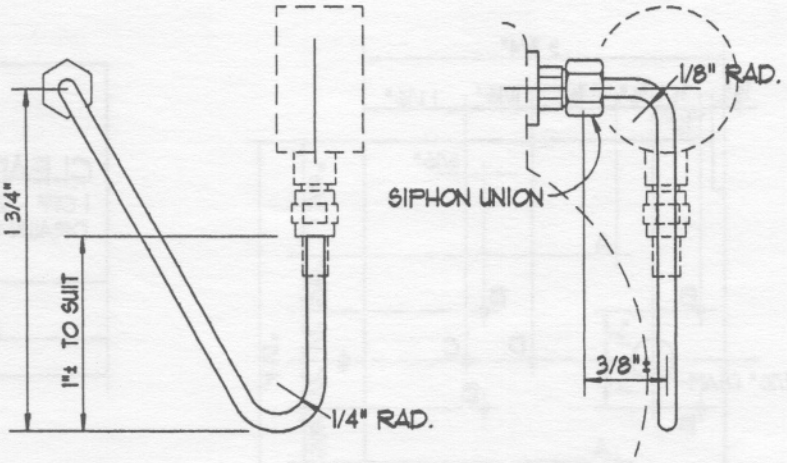
1 OFF PHOS BRONZE

UNLESS SPECIFICALLY NOTED,
ALL PARTS ARE DRAWN FULL SIZE.



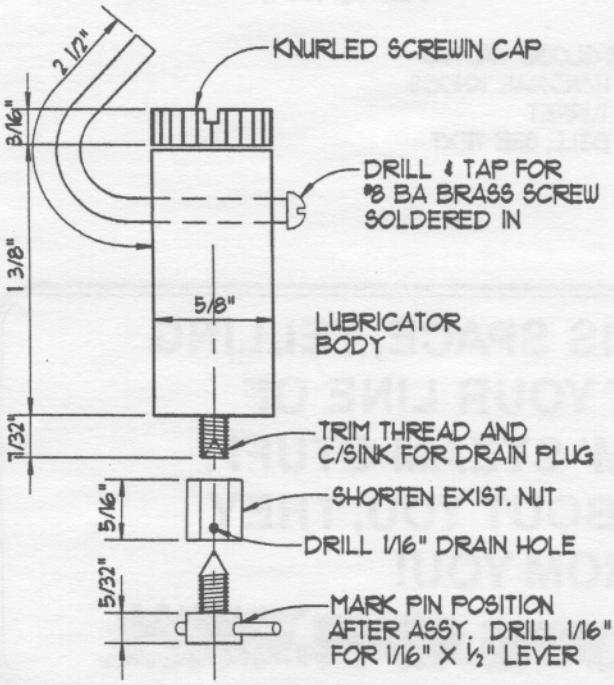
SIPHON UNION & NUT 7:4:4

1 OFF 5/16" BRASS HEX
TWICE ACTUAL SIZE



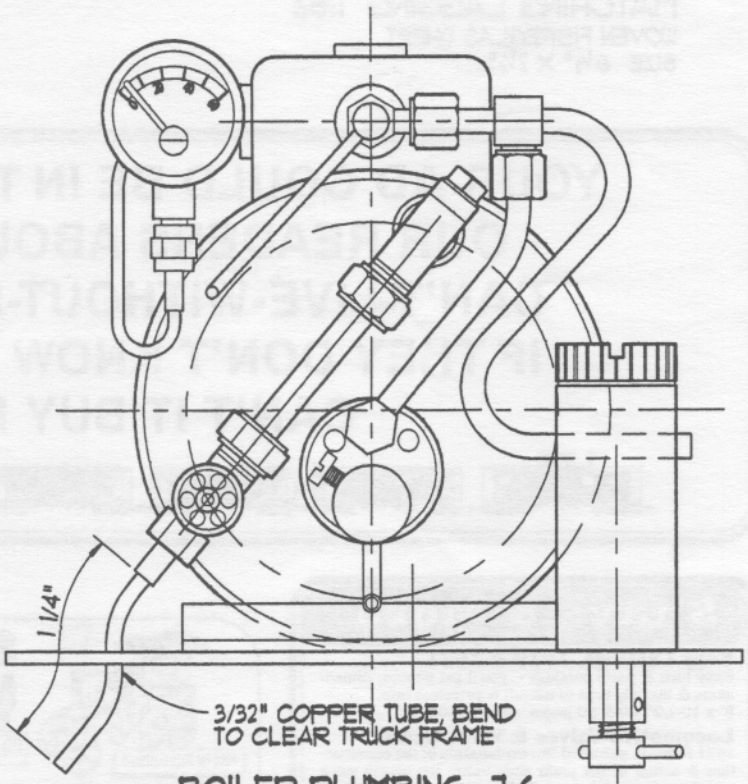
PRESSURE GAUGE SIPHON 7:4:4

1 OFF 3/32" COPPER TUBE
1 OFF UNION - 5/16" BRASS

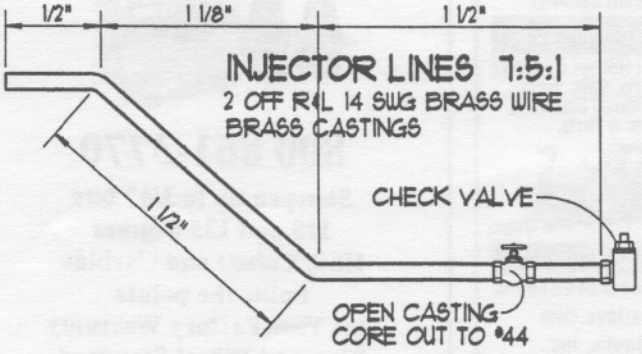


LUBRICATOR 7:4:3

1 OFF BRASS OR BRONZE



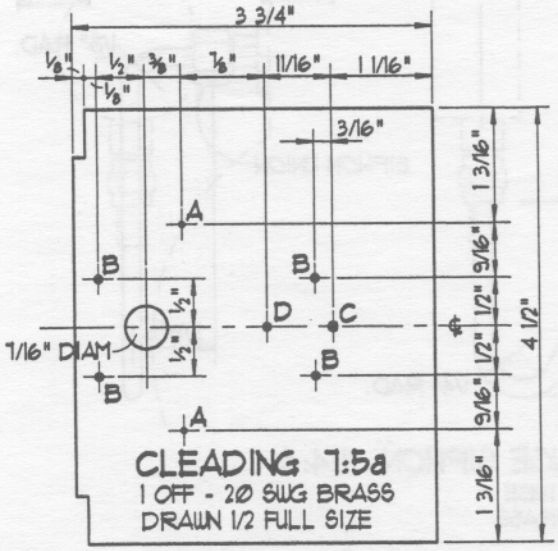
BOILER PLUMBING 7:6



INJECTOR LINES 7:5:1

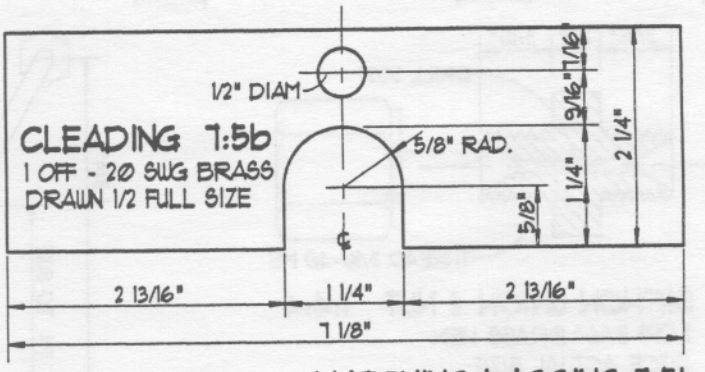
2 OFF R4L 14 SWG BRASS WIRE
BRASS CASTINGS

UNLESS SPECIFICALLY NOTED,
ALL PARTS ARE DRAWN FULL SIZE.



CLEADING 7:5a
1 OFF - 20 SWG BRASS
DRAWN 1/2 FULL SIZE

MATCHING LAGGING 7:5a
WOVEN FIBREGLAS SHEET
SIZE 6½" X 2¼"

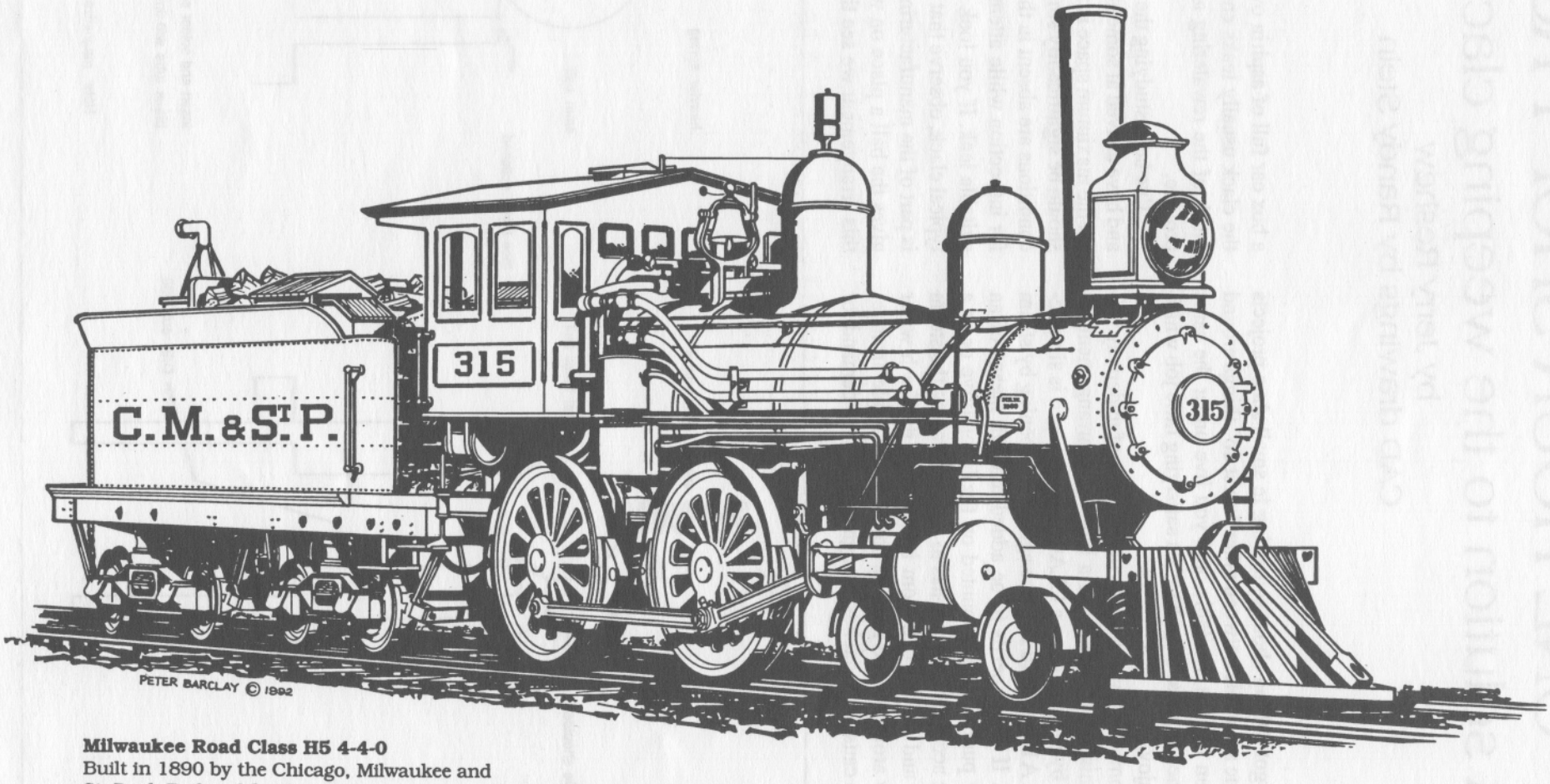


CLEADING 7:5b
1 OFF - 20 SWG BRASS
DRAWN 1/2 FULL SIZE

MATCHING LAGGING 7:5b
Ø25" WOOD VENEER
SIZE 4⅜" X 3⅝"

HOLE SIZES:
A - DRILL 1/16" FOR GLOBE VALVES
B - TAP 8 BA FOR HANDRAIL KNOBS
C - DRILL #34 FOR TURRET
D - TAP 8 BA FOR BELL, SEE TEXT

Peter's Page



Milwaukee Road Class H5 4-4-0
Built in 1890 by the Chicago, Milwaukee and
St. Paul Railroad for their premium service between Chicago and St. Paul,
these handsome locomotives later continued on branch line services until the 1930's.

Number 3 of a series.

ONE HOUR SHOP PROJECT

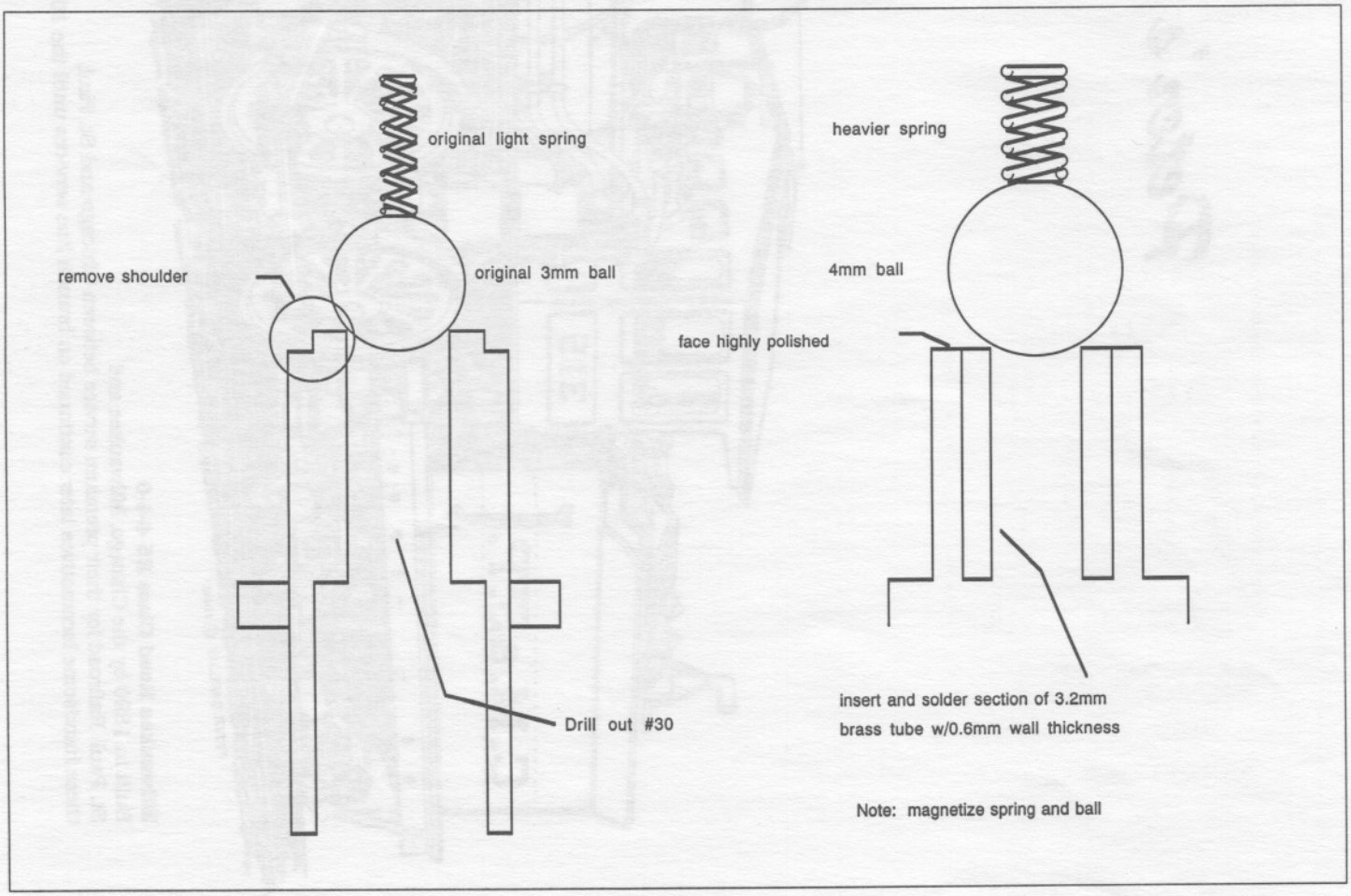
A solution to the weeping clack problem

by Jerry Reshew
CAD drawings by Randy Stein

I've got a thing about squeezing in small shop projects in the time available between other "must do" things around here. If an hour is available, and you live under the same time crunch as most of us,here's a satisfying little job which you'll enjoy.

Locomotives which enjoy the benefits of underway water replenishment must have a ball valve arrangement referred to by most of us as a CLACK. In theory, it is simplicity itself. A ball is held in place against an opening by steam pressure. If water needs to be added through means of an auxiliary pump, either mounted on the locomotive or as a trackside accessory, all one has to do is overcome the steam pressure and lift the ball from its seat and the fresh water will flow around it and into the boiler. This simple arrangement has caused headaches enough to create the demand for a box car full of aspirin over the years. The problem is that the clack usually leaks enough water or steam to eliminate much of the rewatering advantage that it was designed to provide.

I've been studying the mechanics of the clack for awhile and have arrived at some simple conclusions: the ball should fill the maximum space in the receiving body, and the orifice should be significantly smaller than the ball diameter. These conditions are absent in the clacks which I've disassembled for inspection while attempting to find the cause of the inevitable leak. If you look at the drawing of the unmodified typical clack, observe that the fitting carries a shoulder. This is part of the manufacturing process of the screw thread and gives the ball a place on which to rest. Again, if we look at this arrangement we see that the ball can be pushed against



the body of the clack and rest there if the spring doesn't do its job of returning the ball to the seat after each pulse of water is injected. A minute amount of foreign material can upset this arrangement and a weeping clack is the result.

A simple solution to this clack weep requires three things: A larger ball,a smaller orifice,and a stronger spring.

Here's what you'll need - hobby shop brass or copper tubing 3.5mm OD, wall thickness about .6mm. A larger stainless steel ball than the one that is in the clack (the one in the drawing is the Aster Pannier valve, and the larger ball is also available from Aster). If you want to get this project underway and don't have a replacement ball, use the one that is in the clack - it might just work. A steel spring longer and stronger than the one in the clack (a ball point pen spring works just fine). Flux and soft solder (and a torch).

Here's how you go about it.

1. Remove the leaky clack body from the boiler and chuck it up in the lathe.

2. Mount a #30 drill in the tail stock bit holder and then drill out the clack to a depth just above the mounting nut.

3. Flux the tubing sparingly and insert into the clack. Apply the torch lightly and then touch a dab of solder to the assembly. I did this while it was on the lathe.

4. When cool ,cut the shoulder and tubing off with a cut-off tool or Dremel wheel.

5. Run a Swiss file into the new orifice to insure that it is smooth.

6. Remove from the lathe and polish the face using wet 1000 grit paper against a glass surface. The result that you are looking for is a mirror finish

7. Wipe a magnet against the spring and ball so that they in effect become a single unit.

8. Reassemble!

The theory behind all this is that the steam under pressure will take the path of least resistance. Once a ball is upset, the path of least resistance is around the ball. In the modified clack, the increased ball size and the decreased orifice size gives the steam only the ball to push against since we have increased the amount of effort required to reach the orifice by displacing the ball. Magnetizing the ball and spring are just insurance niceties. A mirror polish on the face gives the ball no desire to go anywhere but to the orifice. The pressure to insert water against the ball is somewhat higher than before, but it not significant.

A mathematical analysis of this project will prove that the concept works - but give me a break! Have fun with your new weep free clack.

Product Review – Hartford Products' Carter Brothers' Swing Motion 4 Foot Trucks

review and photo by Jim McDavid

Scale/Gauge: 1:20.3 scale, Gauge 1

Features: Custom cut and fully sprung wood bolsters
Duracast side frames
Unplated Sierra Valley steel wheels
Brake beam detail

Last minute changes: The side bearings that go on top of the bolsters are now included, and the trucks have been modified and now have wood, rather than cast, spring planks

Price: $39.95/pr + $4.00 shipping for 1 pair - add $2.00/pair for 2 pair or more

Available from: Your favorite hobby dealer or direct from Hartford Products Inc., 18 Ranch Road, Cedar Crest, NM 87008 ● Phone: (505) 286-2200 ● Fax: (505) 286-2141 ● Home page: www.abqmall.com/HartfordPr.htm ● e-mail: HartfordPr@aol.com

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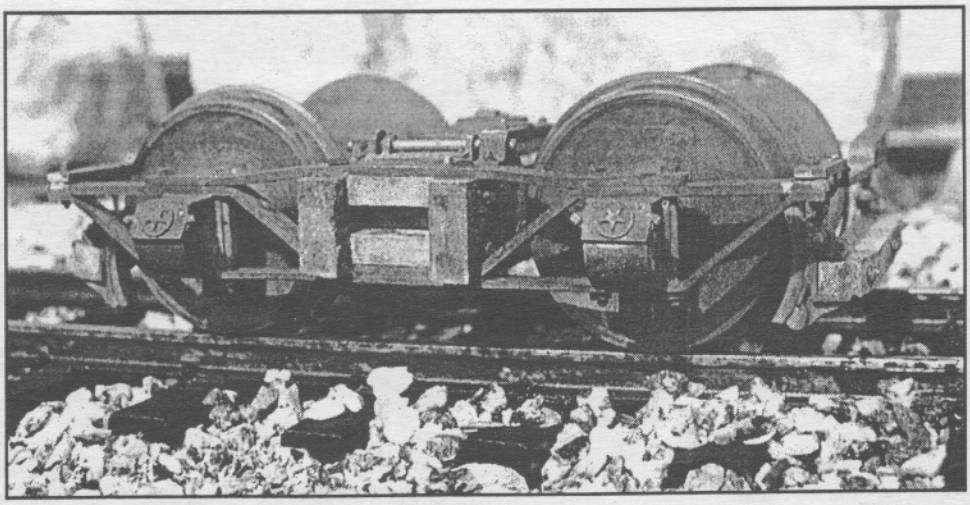
The Carter Brothers were well known builders of narrow gauge rolling stock for many West Coast railroads. The South Pacific Coast, North Pacific Coast, Nevada County Narrow Gauge and the West Side Lumber Company were just a few of the more notable railroads to use Carter Brothers cars or patterns on their lines.

The Carter Brothers, Thomas and Martin, incorporated in 1872 and ended operations in 1902. During this period they produced upwards of 5000 cars, including some standard gauge cars and cable cars. Early on the brothers operated out of shops in Monterey, Sausalito and San Francisco, but in 1877 opened a permanent shop in Newark, California.



A characteristic unique to the Carter Brothers cars was their patented swing motion trucks. These trucks had strap iron side frames and sprung wooden bolsters. Hartford Products has reproduced these trucks in 1:20.3 scale right down to the star and "C.B.S.F." on the journal box lids.

Hartford Products' swing motion trucks come as a kit and must be assembled using glue. Instructions, parts list and a CAD drawing are included. The kit is a breeze to put together, but you must be very careful when working with the brake hanger. At one point you have to cut a section out of the brake hanger cross bolt to accept the brake shoe. This is where you must go slowly and not bend or pry the hangers too much to avoid breaking them. Other than this the assembly is straightforward and quite easy. Add a little bit of paint or stain and you will end up with a true to prototype, museum quality Carter Brothers swing motion truck - just the thing to go under that narrow gauge car sitting up on blocks on your worktable. These fine scale trucks are yet another exquisite issue from Bob Hartford. There is wood where wood is supposed to be and there is metal where metal is supposed to be; I love it!

References: *Carter Bros. Builders,* by Dr. Leo L. Stanley, MD.; *The Western Railroader,* Volume 37, issue 410, July 1974. *The Carbuilders of California,* Compiled by Randy Hees, 7-7-96; *WEST SIDE Narrow Gauge in the Sierra,* by Mallory Hope Ferrell, PFM Publications 1992.

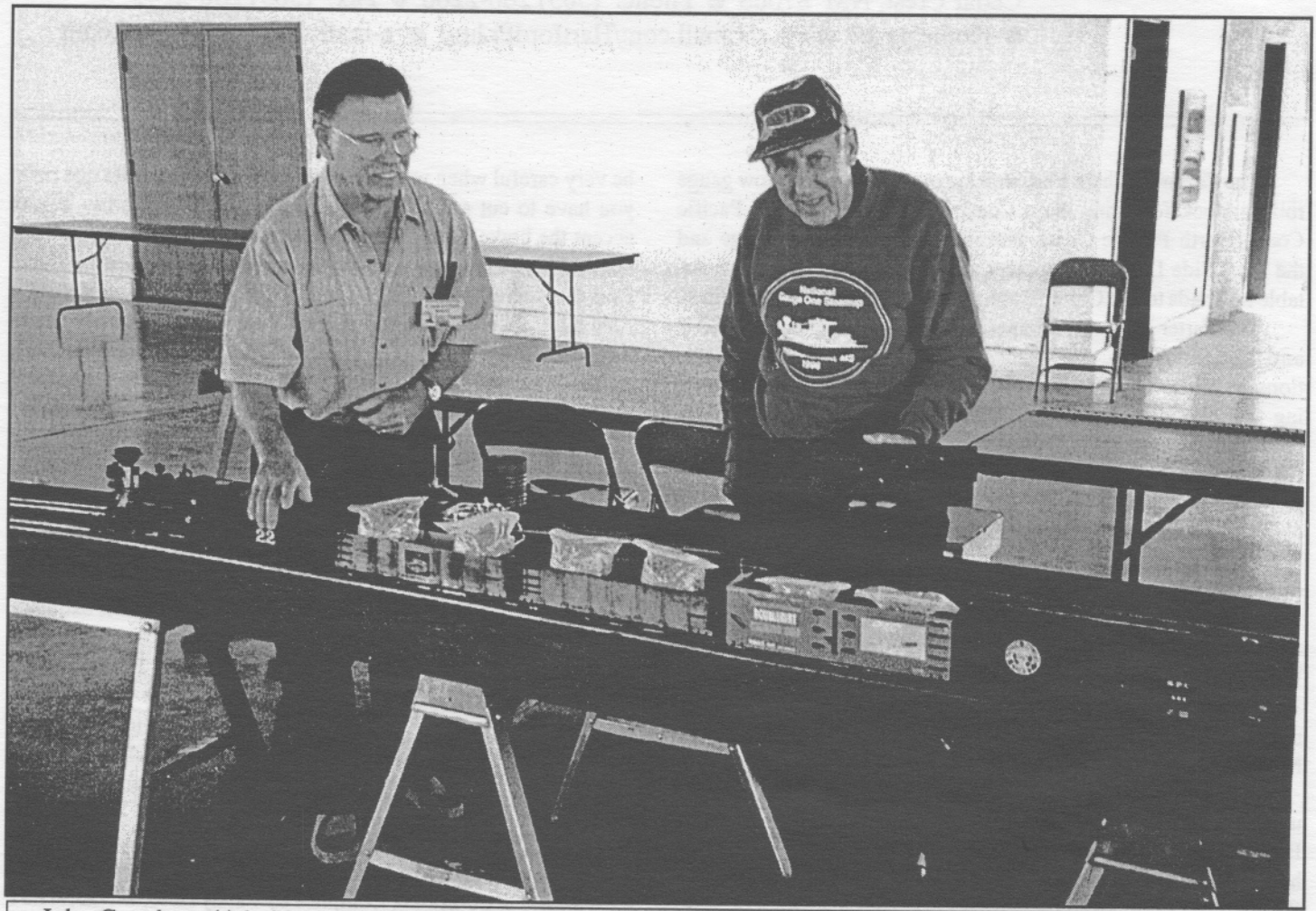
Locomotive Haulage Trials

by Arnold Hoffman

Let's put our locos to work!

Arnold Hoffman called a few months ago, and our conversation centered on Arnold's suggestion that we "Do Something" with our trains. Watching them run in circles gets boring after a while. What are some of the things we can do to make the operation of miniature railroads and steam locomotives more interesting? Arnold and some of his fellow steamers in the Southern California area took this to heart, and staged a Locomotive Haulage Trials event at their Paso Robles Steamup in the fall of 1997. The results will be found on these pages, and we hope that it will inspire others to build on Arnold's idea. Our readers are an innovative, talented, imaginative bunch, and we know they will come up with some wonderful ideas. And fellows...when you do, please share them with the rest of us! - ed.

There were a limited number of locos available for the trials. The cars used in the test were loaded with ballast to bring the weight of each car up to 8 lbs. When a loco was warmed up and ready to work, cars were added to the test train until the locomotive drivers started slipping. At this point the weight of the train was recorded. This was a crude measurement, but it was a start. The locomotive roster with performance results and comments is shown on the next page.



John Coughran (r) holds the roof of one of the cars used in the haulage trials to show the 2 lb. bags of gravel inside. Larry Bangham (l) outpulled all other contenders with his Aster C&S Mogul to win the event by pulling 30 lbs. of cars and gravel without slipping or stalling around the complete loop.

photo by Pete Thorp

Locomotive Roster 1997 Pacific Coast Fall Steamup				
Owner	**Type Loco**	**Mfg.**	**Fuel**	**Remarks**
Larry Bangham	C&S Mogul	Aster	Propane	5 cars - 30 lbs.
Larry Bangham	Porter	Maxwell Hemmens	Butane	2 cars - 12 lbs.
Pete Thorp	Shay	Steamlines	Butane	
A. Jonas	Frank S.	LGB	Butane	
Sonny Wizelman	Shay	Geoffbuilt	Butane	3 cars - 20 lbs.
Richard Finlayson	Porter	Wrightscale	Butane	
Richard Finlayson	SR&RL #24	Roundhouse	Coal	
Richard Finlayson	Meteor	Merlin	Alcohol	
John Coughran	BR86	Aster	Alcohol	4 cars - 24 lbs.
John Coughran	Kitten	Mike Chaney	Alcohol	1 car - 8 lbs.
John Coughran	Argyll	Roundhouse	Butane	3 cars - 22 lbs.
Pete Thorp	Philadelphia	Argyle	Butane	1 car - 8 lbs.
Gary Van Treece	Mogul	Pearse	Butane	
Gary Van Treece	SR&RL #24	Roundhouse	Butane	
Arnold Hoffman	SR&RL #24	Roundhouse	Butane	3 cars - 16 lbs.

Shop Tips - Quick Quartering

by William F. Kaiser
CAD drawings by Randy Stein

I was recently involved in a locomotive building project, and eventually came to the task of quartering the drivers. I went to my book shelf and looked up quartering methods. The methods I found struck me as being insufficiently accurate, or overly complicated and too cumbersome for the small sized drivers we are likely to be using. So, I sat down and tried to think of a simple, accurate way to quarter drivers.

The twist to the method I devised is that it does not align the crankpins vertically and horizontally with respect to the axle, the usual way of quartering drivers, but they are on diagonals instead. Figure 1 shows the geometry of the method. The view, looking at teh axle end on, shows the two crankpins appearing in the same plane and forming the base of an isosceles triangle, with the axle at the top. The angle a is the angle between the crankpins, which should be 90°. If the wheels and axle are supported above a horizontal plane, the distances between the crankpins and the plane are equal for both crankpins.

To implement this method, I made a V block, shown in Figure 2. This is made up of three separate pieces: a center block, and two end pieces with 90° V notches cut in them. This leaves the center of the block unobstructed to clear any axleboxes, eccentrics, cranks, etc. that may be on the axle. The length of the block, w, must be less than the distance between wheels, and the height of the V should be greater than the radius of the wheels. Other dimensions are not critical.

I made my block of steel. I cut the end pieces with the V's and screwed them firmly to the central block. I finished the sides of the V's with a safe edge file after assembly. To get the bottom of the block parallel with the V notches, I put a rod in my shaper vise, put the block upside down in the vise so it was supported by the rod, and planed the bottom side flat and parallel to the rod. The most important consideration in making the V block is to be sure that it doesn't rock on a flat surface.

The only remaining tooling is two spacers, to establish the crankpins at the same height above the horizontal surface. Two rods, say 1/2" in diameter, could be faced to the same length for this purpose. I used an adjustable parallel and a shaper-planer gauge for my spacers.

Use the following formula to calculate the height of the spacers:

S = h - t - l - c where S = Height of spacers
h = distance from top of axle to bottom of V block
t = Crank throw / square root 2 (Pythagorean Theorem)
1 = radius of axle
c = radius of crankpin

Place the axle in the V block and measure h with a micrometer or vernier. Get the crank throw from your draw-

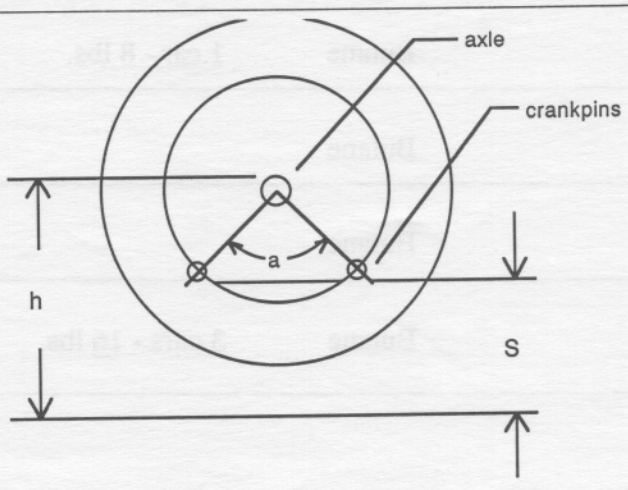


Fig. 1 Axle and crankpins in relation to horizontal plane

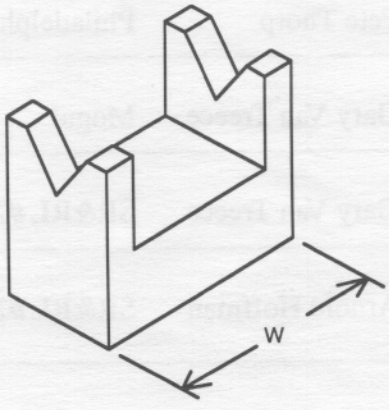


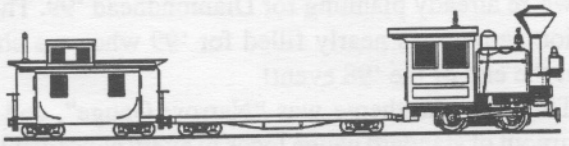
Fig. 2 The V block. W is less than wheel back-to-back.

ings to calculate t. 1 and c are half the diameters of the axle and crankpin. Set/make your spacers to the dimension S.

With the tooling made up, you're ready to quarter drivers. The wheels should have the crankpins already pressed into place. Press one wheel all the way onto an axle. Push the other wheel onto the axle far enough to stay, but loose enough to be able to twist it. Place the block on a flat surface - surface plate, drill press table, whatever. Put the axle in the V and spacers under the crankpins. If the angle between the crankpins is less than 90°, the axle will not be in the bottom of the V, and it will move back and forth in the groove. If the angle is greater than 90°, both crankpins will not touch the spacers, and the assembly will rock around the axle. Twist the wheels until the axle is firmly in the V and both crankpins touch the spacers.

You should be able to slide a spacer out from under a crankpin and back in again without undue resistance, and the assembly should not rock around the axle. It will take a little practice to get the correct feel of this. When this is done, your drivers are quartered. Press the wheel part way onto the axle with whatever press you are using, check the quartering again, and then finish pressing the wheel home. When doing the next axle(s), be sure to quarter them in the same direction as the first one.

One of the nice things about this method is that it is highly tolerant of inaccuracy in the tooling, but will still produce wheels that are quartered consistently. In other words, as long as the V block doesn't rock, even if the V notches don't hold the axle parallel to the horizontal surface, even if the spacers are not the same length, all wheel sets will have the same angle between crankpins, though the angle may not be exactly 90°. This consistency of angle is much more important than the exact magnitude of the angle.



Diamondhead '98

another smashing success for The Big One

photos by Carol Jobusch, Carl Malone and Marie Brown

We filled the convention center to overflowing; we greeted old friends and met new ones; we bought and sold locos and accessories....but most of all, we boiled water and ran trains for days and days, seemingly without end. We're still talking about this year's event nearly 3 months later, and we're already planning for Diamondhead '99. The convention center was nearly filled for '99 when we checked out at the end of the '98 event!

This year the theme was "Narrow Gauge", and while the turnout of standard gauge locos in every conceivable size, shape, make and model was not diminished from previous years, there did seem to be a big increase in the number of narrow gauge locos.

Quoting briefly from founder Jerry Reshew's letter recapping the event, "It was a week to remember! Here are some numbers which you'll find of interest: 211 people registered. We ran from Tuesday afternoon through Sunday evening, a total of 1,360 half-hour time slots. Our attendees came from 33 states and 10 foreign countries.

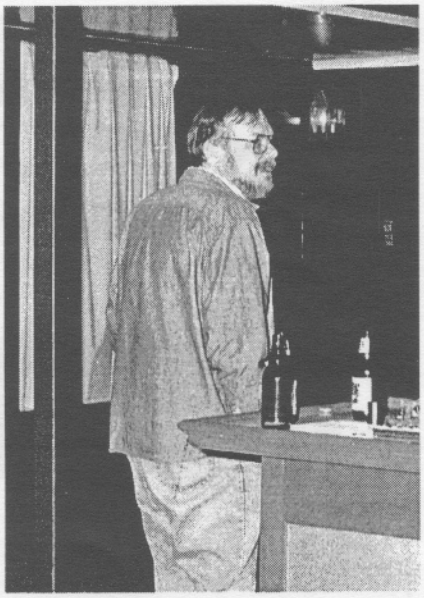
"You attended the seminars in great numbers. We all owe a debt of gratitude to our presenters, including Gordon Watson, Richard Finlayson, Alan Olson, Bob Hartford, John Synnestvedt and the team of Richard Longley and Andrew Barnes.

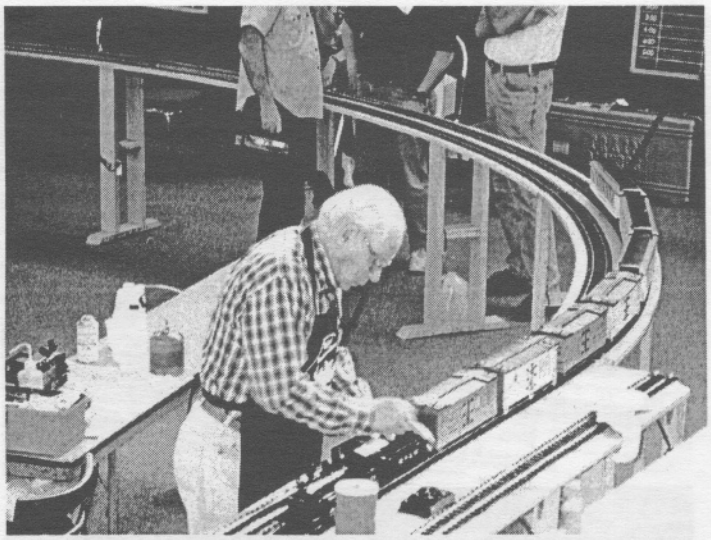
"The feeding frenzy in the Dealer Showroom was amazing! We set a record with 193 locomotives sold, and at least 12 of them changed hands privately. The Flea Market was a new feature this year, and the team of Carol Homuth and Andrew Pullen were right on the money with their suggestion to hold this."

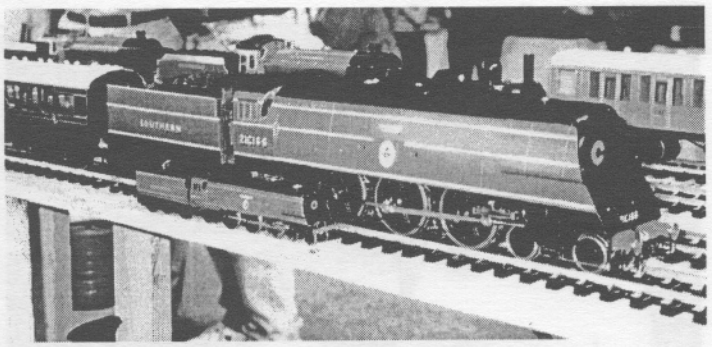
Another new event this year, promoted by Marc Horovitz and Vance Bass, was the Pop-Pop Boat Regatta. This event was great fun, though the timing was unfortunate, as it was held while the dealer room was open. This kept many of those who would have liked to attend occupied at their stand in the dealer room instead. We hope that this will become a regular event, and that it will be scheduled at a time when all who wish to attend can be there.

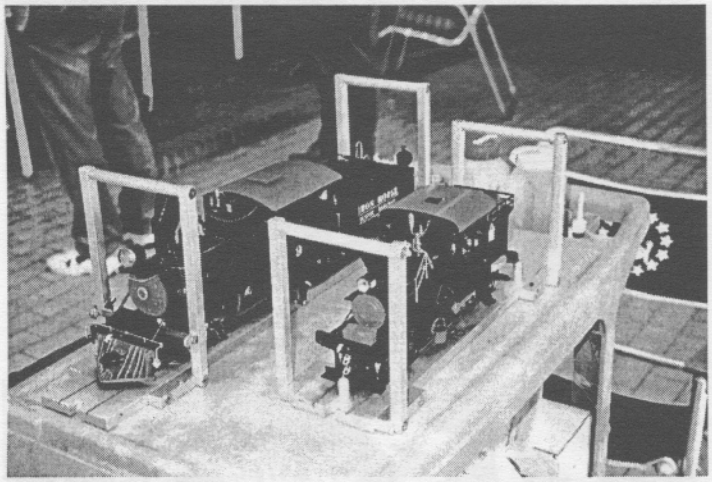
We can't thank Jerry Reshew and his crew of volunteers enough for making Diamondhead '98 the best ever, and for continuing to do a great job of it year after year. THANKS!

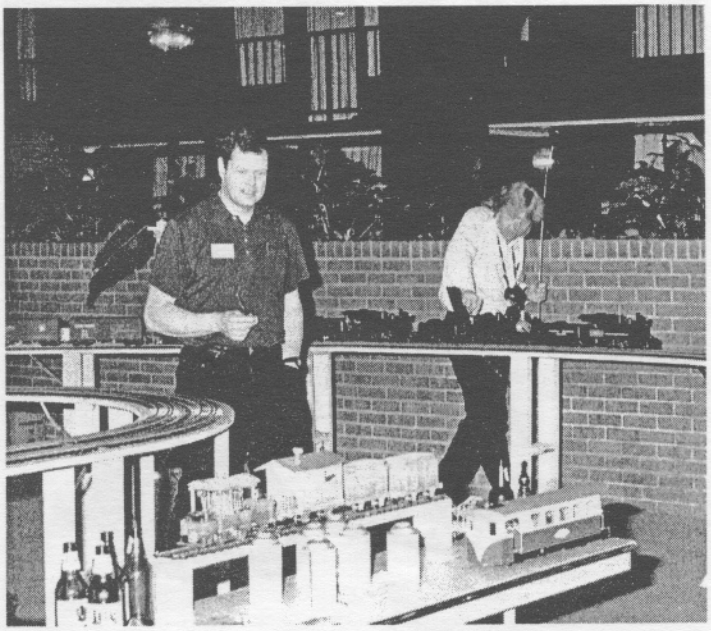
We believe in the saying, "A picture is worth a thousand words", and we have a good selection of photos from several sources this year (thanks to all of you who sent in your photos!). Enjoy!











Opposite page, left: Jim Montgomery (Washington) poses with his tiny HO steam train. It ran amazingly well.

Opposite page, right: Gary White (California) tries to elude the photographer. You can run, but you can't hide, Gary!

Top left: Marty Maloy (New Jersey) adds some water to the boiler.

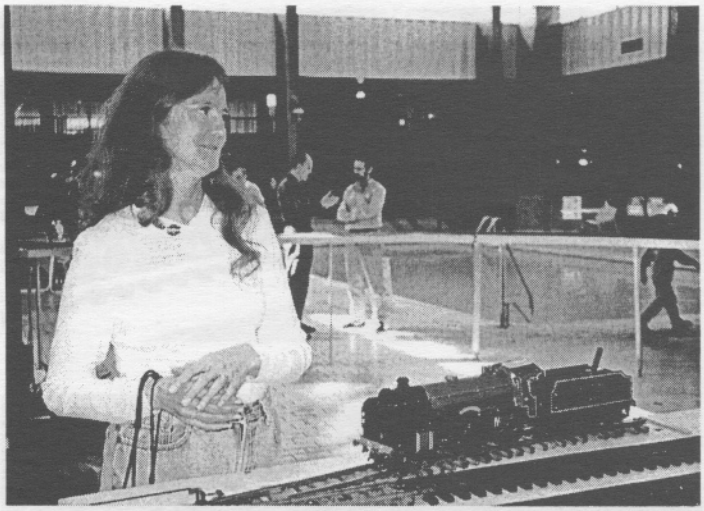
Top right: All creatures Great and Small.....

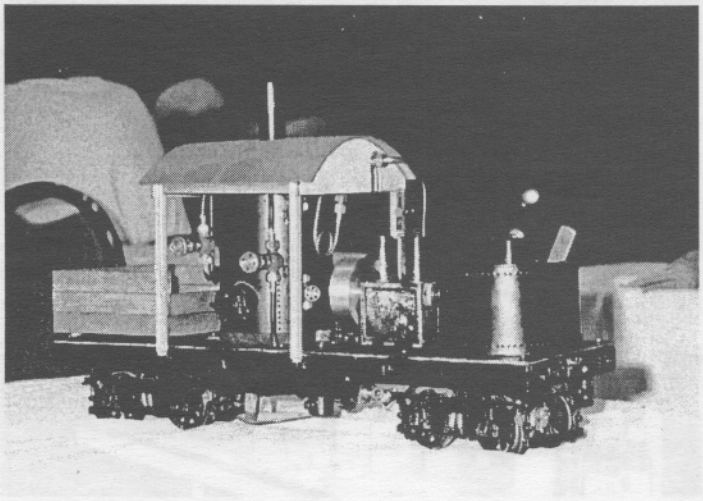
Center left: Some of Bill Casteel's (Florida) neatly detailed steamers on Walt Swartz's very handy steamup carriers.

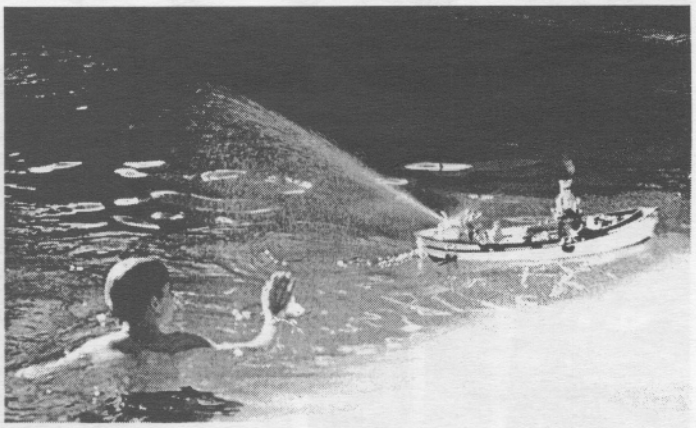
Center right: James Ritson (Alaska) walks toward the work/display area while Les Knoll (Illinois) tweaks his loco in a Pearse tripleheader with Gary Lantz (New York) and Carl Malone (Tesax).Great fun!

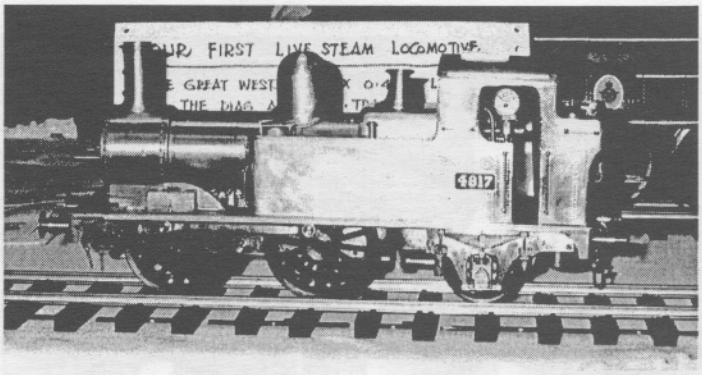
Bottom left: Bob Moser (New Jersey) getting in some track time.

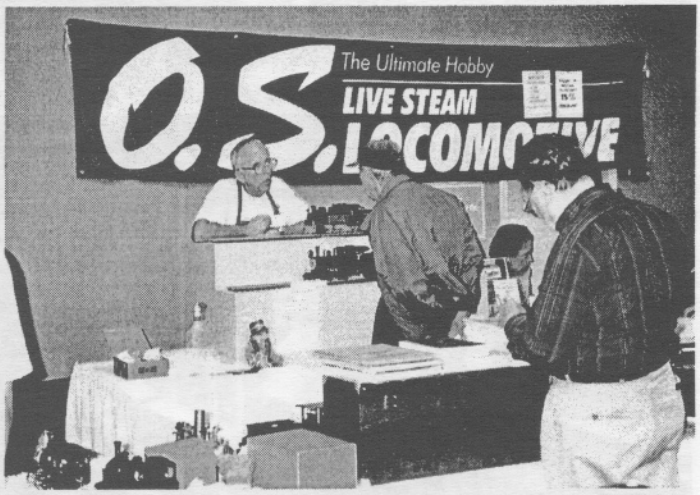
Bottom right: Stephen Leersmaker (Ohio) readies his loco while his wife Anne and Graham Smith (England) exchange pleasantries.











Top left: Laurel Synnestvedt (Virginia) watches over husband John's tricked out Aster Schools..

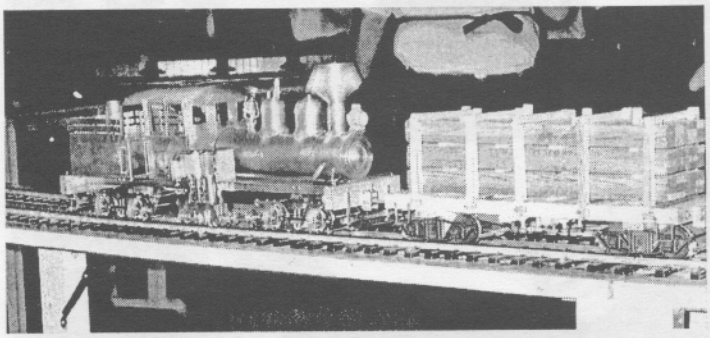
Top right: John Fuller (England) seems to be reaching to set the points as Bill Payne (Kansas) brings his train back into the yard.

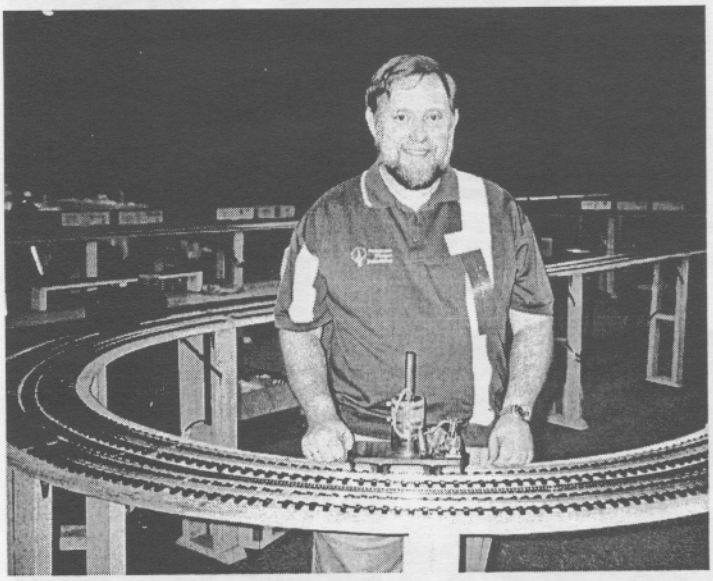
Center left: Keith Manison's (Jamaic, West Indiesa) scratchbuilt Class A Climax. We'll have more on this in an upcoming issue!

Center right: The crowd loved the steamboats. A few of us (including your editor) got caught unaware and soaked by this one.

Bottom left: The pilot model for a new loco from The Finescale Locomotive Company (England).

Bottom right: The dealer room was very crowded and busy, as always. Bob Osterhoudt of the Rio Pecos Steam Team (Florida) answers questions for a potential customer.





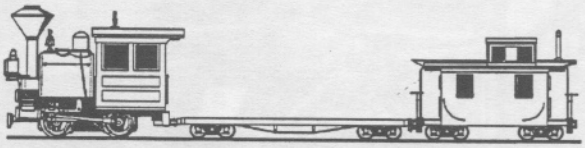
Top left: The Thursday night SitG Chat group.....or at least as many of us as could be rounded up for a photo..(l to r) Clark Lord (Nevada), Walt Swartz (Florida), Jim Overland (Washington), Carl Malone (Texas), Dan Rowe (Texas), Ron Brown (New York), Mike McCormack (Massachusetts) and Richard Finlayson (California).

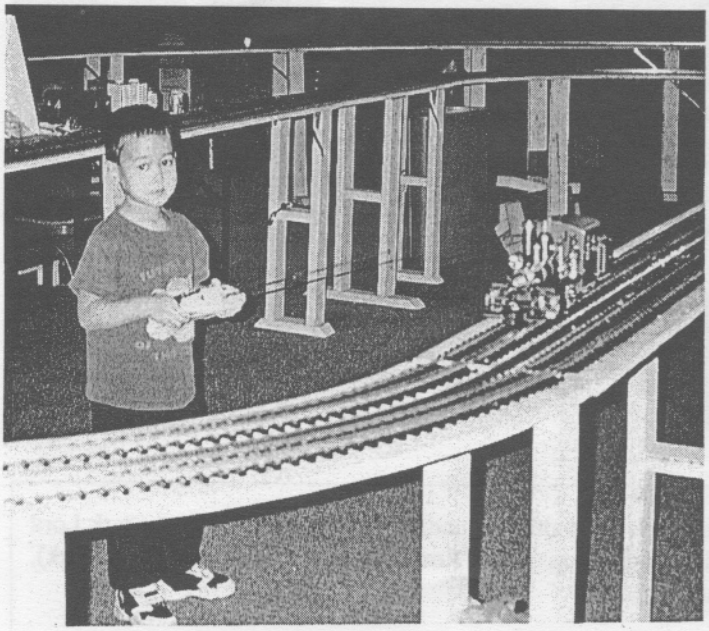
Top right: The ladies at the registration desk put in some long hours, and they really make this event run smooth. Valerie Nichols (Maryland), Jo Anne Stapleton (Virginia), Marie Brown (New York), and Isabel Grummons (Virginia). Thanks, ladies!

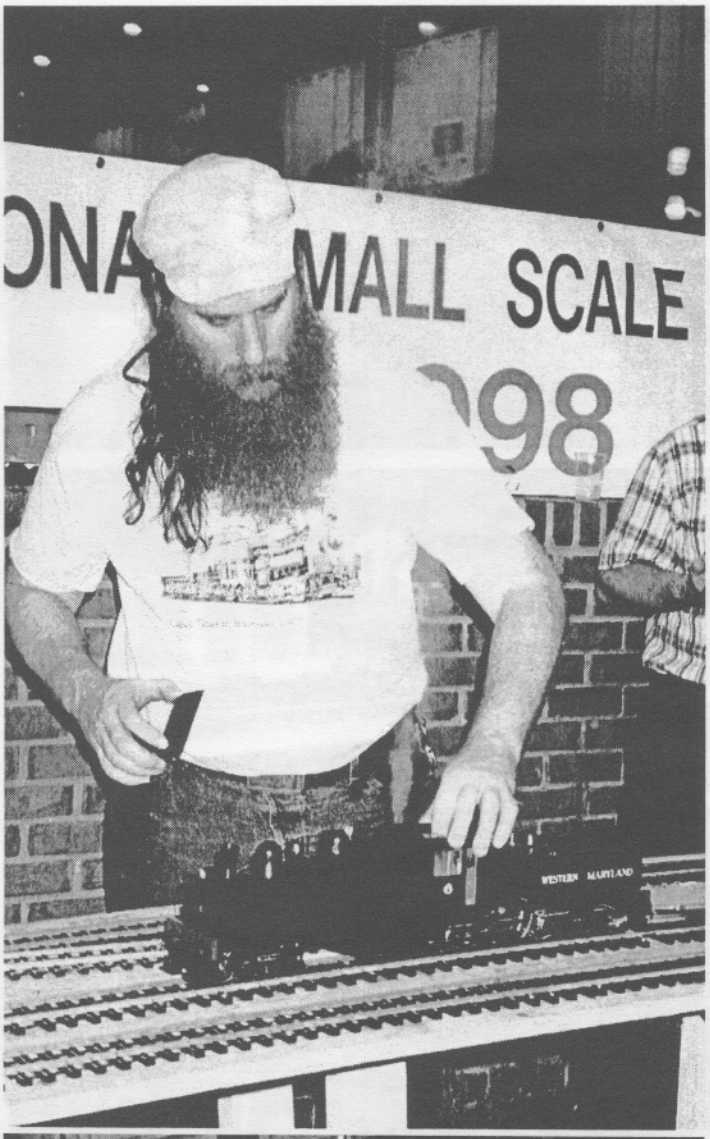
Center left: The pilot model of the new Catatonk Loco Works 24-ton Shay, built by Mike Chaney (England), put on a good show. It's shown here moving a load of finished lumber along the mainline for Bob Hartford.

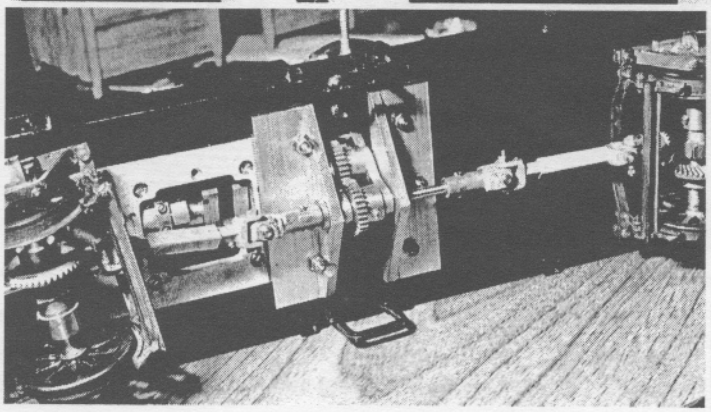
Bottom left: Scott McDonald (Virginia) with his newly completed BAGRS Project Loco. Nice runner, Scott.

Bottom right: Caleb Roberts Jr.(Texas) was obviously having a fine time with his Pearse steamer.







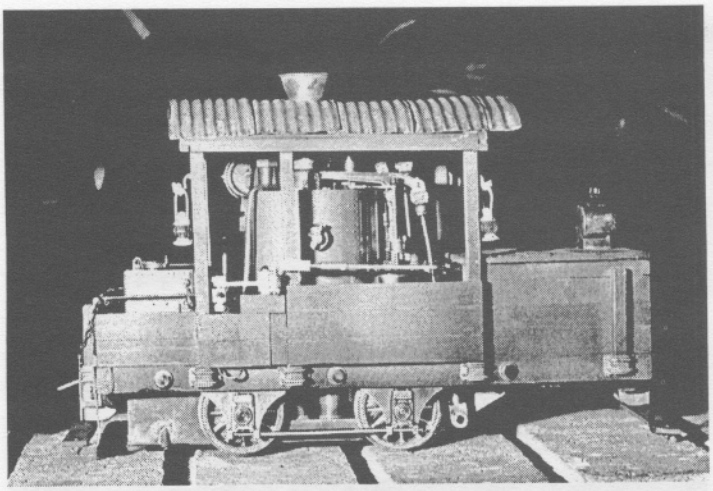


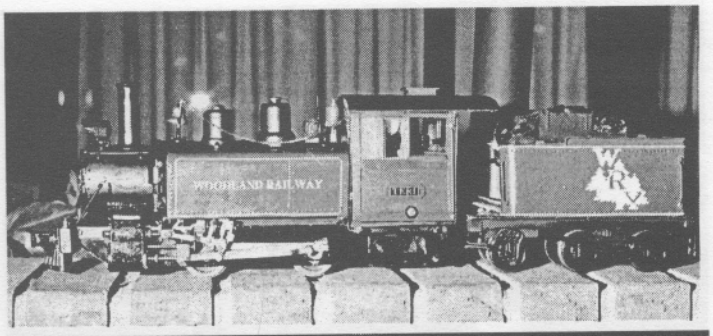
Top left: With some help from his wife Barbara, Bill Courtright (Texas) prepares his loco for steaming on Walt Swartz's excellent portable track.

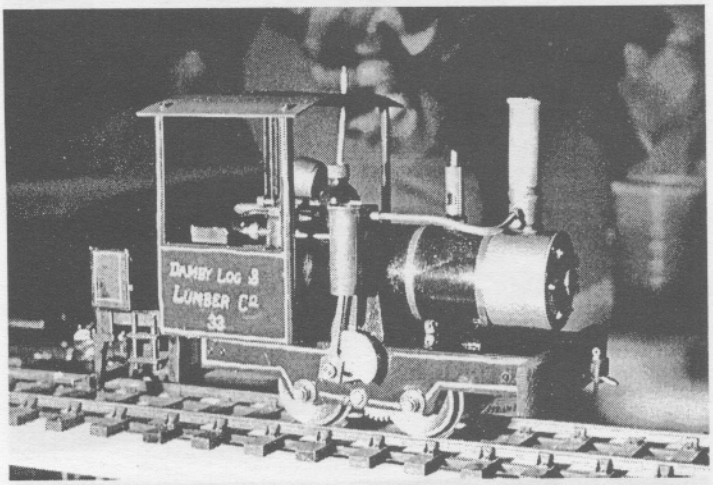
Top right: Dan Rowe (Texas) has as much fun as anyone at these steamups, and definitely gets less sleep than most of us!

Bottom left: Charlie Mynhier Jr. (Texas) did a fine job of running one of his dad's scratchbuilt locos.

Bottom right: Bottom view of Keith Manison's (Jamaica, West Indies) Class A Climax. Keith added a transmission, which can be clearly seen in this photo. It was great fun to see Keith's loco sitting still, while the 2-cylinder steam motor was ticking over.







Top left: An interesting modification to an Aster Grasshopper by Joel Neshkin (Alabama).

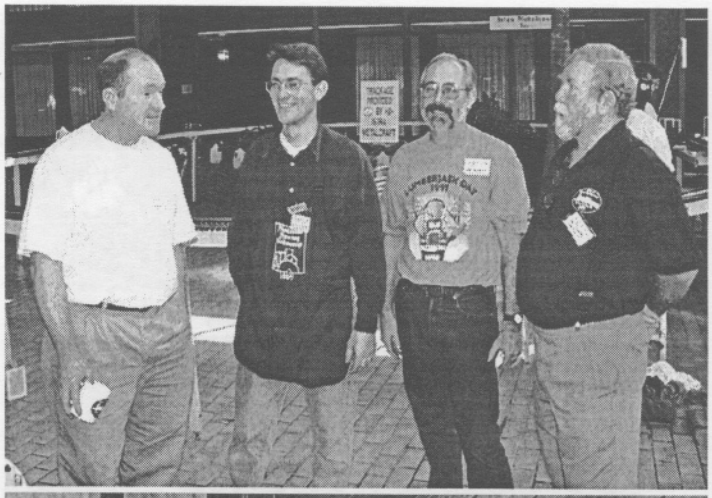
Top right: Kevin Strong's (New York) very neat Roundhouse bash.

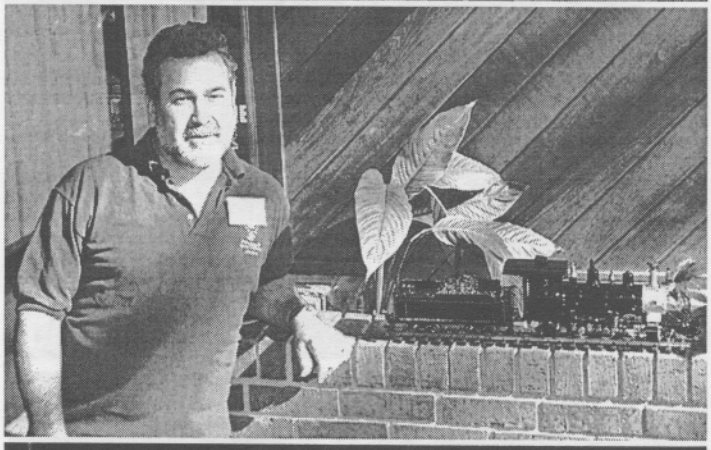
Center left: A Berkeley Loco Works Cricket, modified by Charlie Lix (Nevada).

Center right: Les Knoll (left, Illinois) looks on as Richard Finlayson (California) works his train through the mainline curve.

Bottom left: A group gathers at trackside to watch Carol Paule (Missouri) and Dan Rowe (Texas) doublehead their Aster Western Maryland Shays on a snowplowing run with Pete Olson's new steam powered rotary.

Bottom right: Boat Guy Don Keller (Louisiana) prepares his steamboat for a run. Watch out for that water cannon!





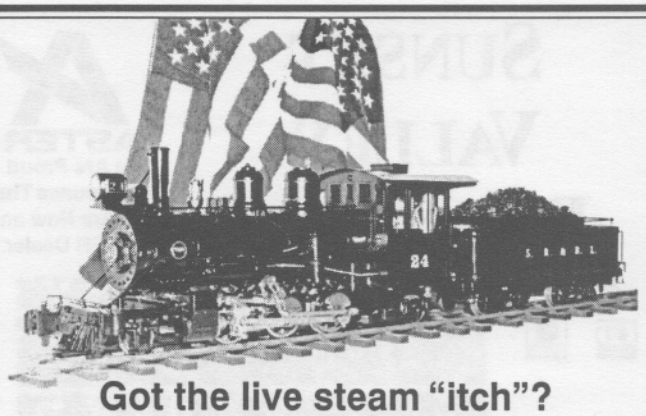
Top left: Charlie Lix (Nevada), Richard Finlayson (California), Jim McDavid (California) and Jim O'Hearn (California) enjoying the wonderful aroma of steam, alcohol butane and hot oil.

Top right: Roy Scott (England) takes a turn at manning the G1MRA booth.

Center left: Tom Toth(Michigan) is pleased with his new loco, a custom job built by Paul Kenney (Louisiana) of Bayou Ltd.

Bottom left: Our Hero Jerry Reshew (Mississippi), Founder and Superhost at Diamondhead, examines some of the stationary steam engines on display while awaiting his turn on the track during Founder's Hour.

Bottom right: John Synnestvedt (Virginia) does some maintenance on his venerable Merlin. John is a fine and innovative craftsman, and his locos are tricked out with the neatest gadgetry you ever saw.



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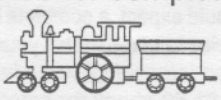

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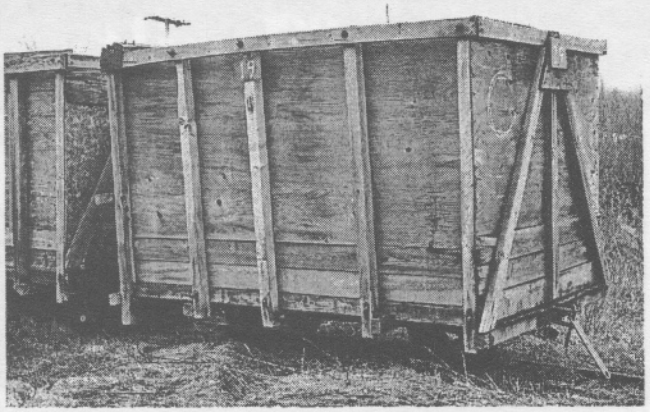

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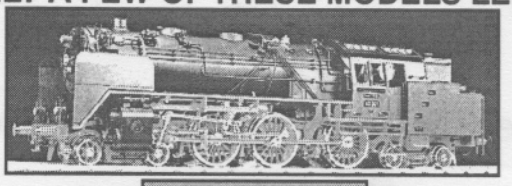

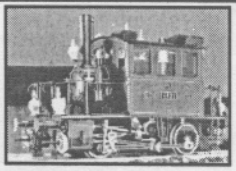

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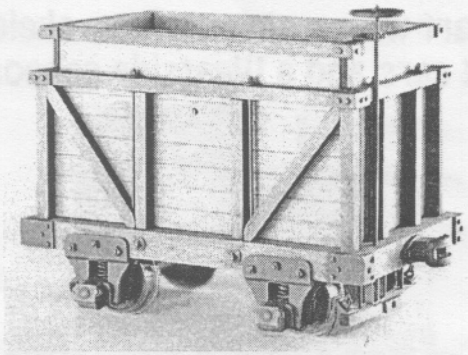

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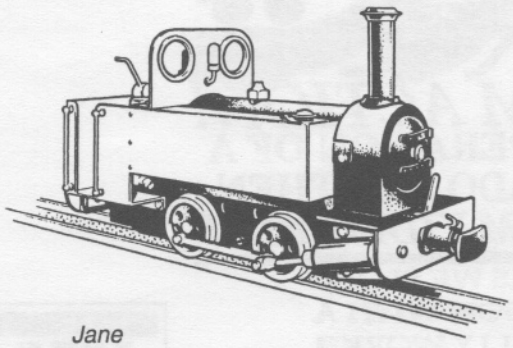

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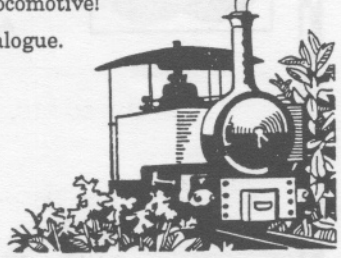

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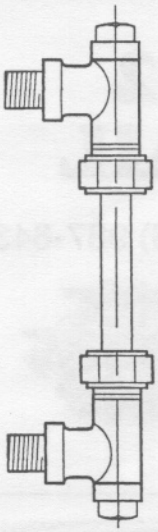

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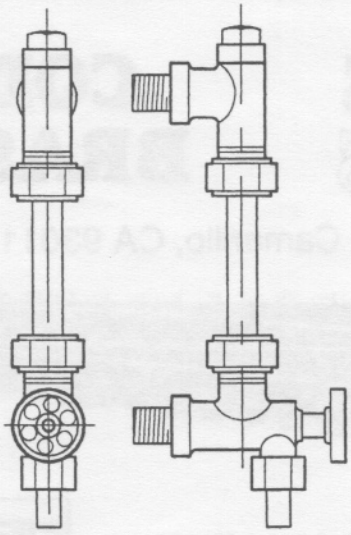

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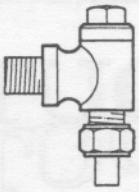

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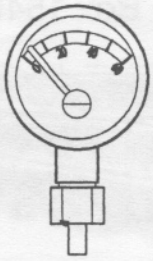

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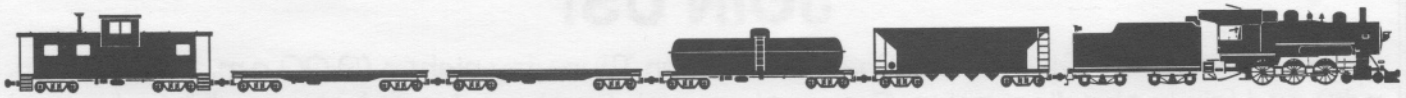

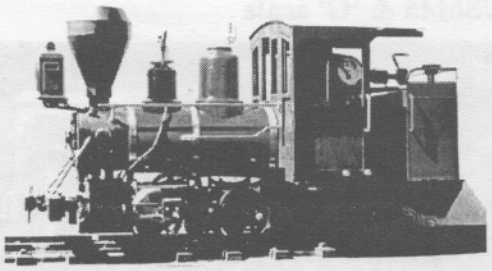

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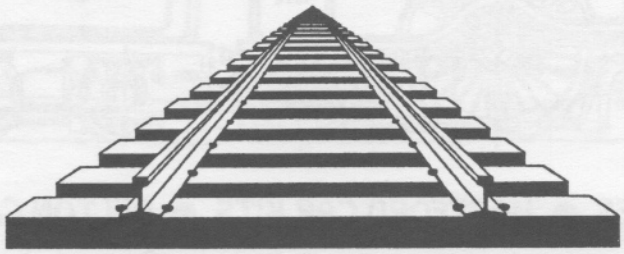

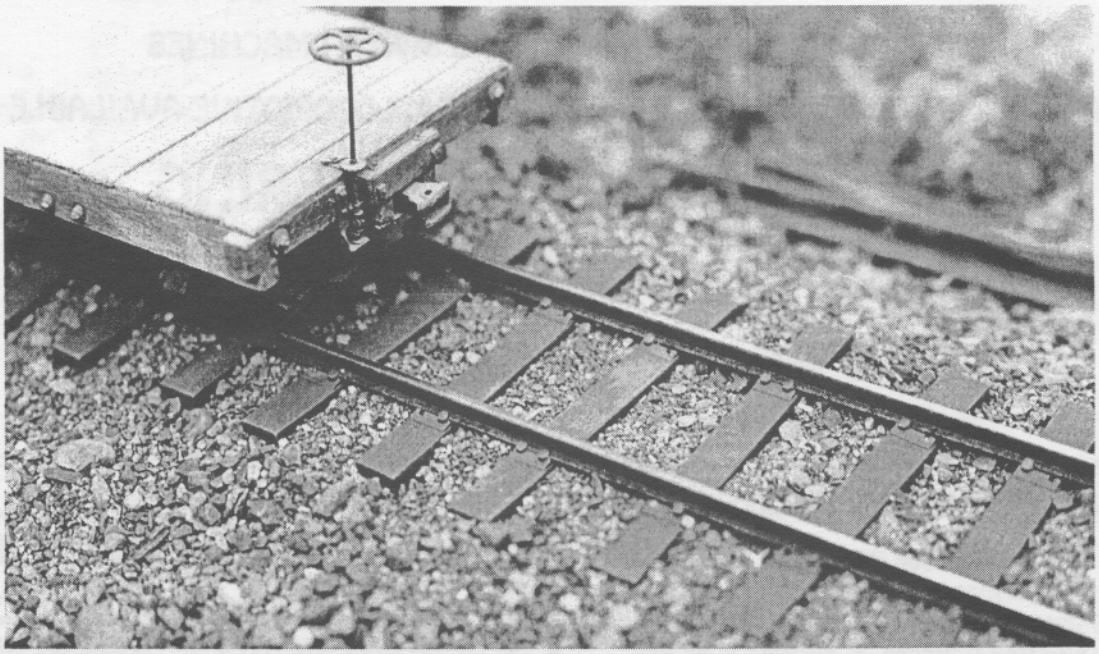

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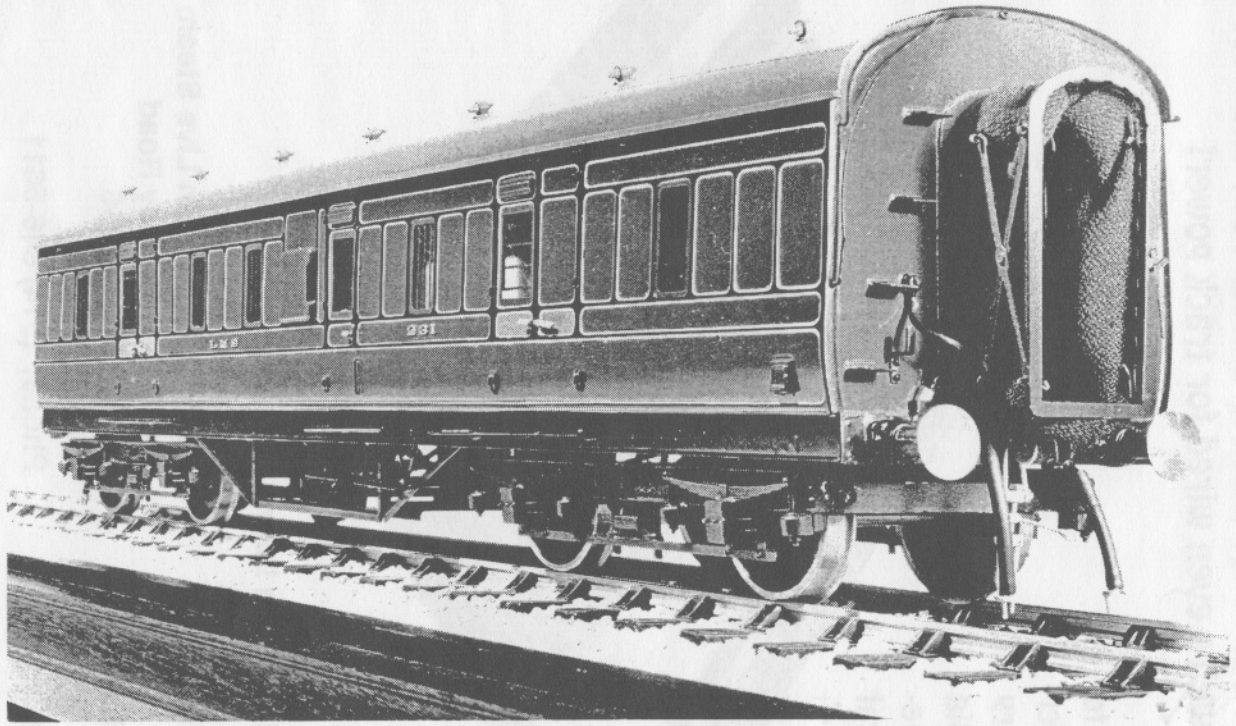

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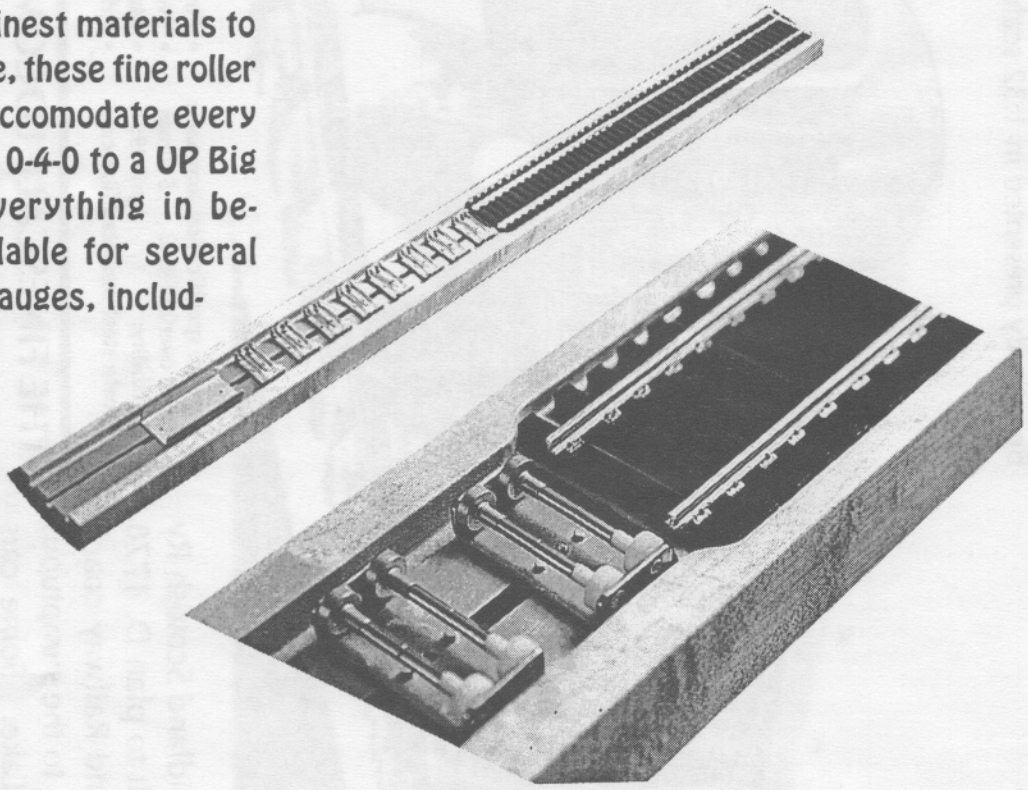

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For Sale: Hyde-Out Mountain Shay. Needs valve block & burner. $400.00 as is. Call Bill at 941-674-0566 ● Fax 941-674-0564. (44)

For Sale: Maxwell Hemmens stationary steam plant (Colliery Plant). Coal fired, with whistle, pressure gauge, water pump, coal bin. Vertical boiler with mahogany lagging. Cylinder also lagged w/mahogany. Only run a couple of times - a magnificent model in perfect condition. $1500.00 + shipping. Call Ron at 607-642-8119 or e-mail <docsteam@spectra.net>.

Lost or Missing: My Aster suction fan disappeared at Diamondhead '98. It is easily identified by the thumb switch in the power cord. If it showed up in your box and you don't know who it belongs to, please call Barry Harper at (216) 464-8126. (44)

For Sale: (1) Beck Helene 0-6-2, green, butane fired, external slip eccentric, runs great, unique. $900. (2) RH Pooter 0-4-0, maroon w/ yellow lining, named "THE BARON", meths fired, runs great. $900. (3) Aster GER 0-6-0 (Two for sale) both run great. One is missing a drive rod bolt, the other has a black boiler (original is blue). $600 each. (4) Merlin Monarch 0-4-0 (based on the quarry Hunslet saddle tank look), maroon, perfect condition, runs great, 27Mhz R/C, $1000. (5) Frank S. Americanized, two truck tender, all black, new cab w/o side tanks, Goodall type filler valve, mounting bracket has been installed for pilot truck (not included). Single channel R/C in tender, Runs great.$1200. If anybody has an Aster Schools KIT I would gladly accept that on trade.Richard Finlayson, e-mail <richardf@steamup.com> or phone 408-374-8486 (California time). (44)

Swap Shop listings are offered at no charge as space permits. No dealers and no phone-in ads, please! Send your listings to SitG, P0 Box 335, Newark Valley NY 13811, or fax to 607-642-8978 (24 hours), or e-mail to <docsteam@spectra.net>. Ads must contain sellers name, plus address and/or phone number. Ads will be run one time only unless previous arrangements are made.

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End of the Line

Faithful Assistant and I were lucky enough to be able to spend a few weeks in Florida recently, during the most miserable part of the winter season here in the Frozen North. We attended steamups, talked steam with readers and advertisers, visited friends, walked on the beach, spent time with family and spent a lot of time just walking or driving around and enjoying the warmth and sunshine. Have you ever walked through an orange grove and smelled the blossoms? It's the most heavenly scent imaginable!

We enjoyed ourselves in Florida so much that we will be relocating our posh, luxurious, tastefully appointed SitG Editorial Offices about 1400 miles south for those long, cold New England winters...and we won't be coming back to Paradise East until our son calls to tell us that the lawn needs mowing.

We will do our best to make this relocation down and back every year as seamless and transparent as possible for our readers, and we hope that you will be patient with us if we are not able to get right back to you during the time we are in transit or setting up our office at either location. It would be nice if we could just have Scotty beam us there and back, but.....

We've already begun discussions and negotiations for a small, portable elevated track for our Snowbird Haven in southwest Florida, and we are looking forward to being outdoors running steamers all year around.

We want to thank all of you in the Florida steam community for your kindness, generosity and wonderful hospitality. You should all be on salary (or commission) with the Chamber of Commerce!

Happy Steaming!

Ron

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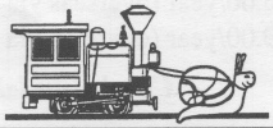

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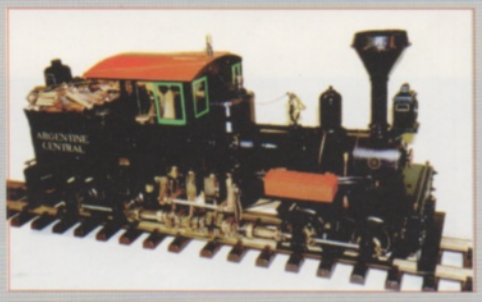

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