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STEAM IN THE GARDEN

Vol. 15, Nº 2
Issue Nº 80

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

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FRONT COVER:

It's early in the morning on a beautiful Spring day in Maine, and a Portland Forney is just passing through a covered bridge on the tiny 2-foot gauge railroad. Locomotive in 7/8" scale by Rishon Loco Works. See the review in this issue.

photo by Steve King

Editor
Ron Brown

Faithful Assistant
Marie Brown

CAD & Other Drawings in This Issue

Keith Bucklitch - Dan Rowe

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Paul Blake..... Australia
Tom Bowdler..... New York
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Steam in the Garden (USPS 011-885, ISSN 1078-859x) is published bimonthly for \$30.00 (\$38.00 Canadian or overseas) per year (6 issues) by Steam in the Garden, PO Box 335, 6629 SR 38, Newark Valley NY 13811. New subscriptions please allow 6 - 8 weeks for delivery (overseas via surface mail may take longer). Direct correspondence to PO Box 335, Newark Valley NY 13811. Periodicals postage paid at Newark Valley, NY and additional mailing offices.

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In the U.K., contact Brandbright Ltd., The Old School, Cromer Road, Bodham, Near Holt, Norfolk NR25 6QG — phone 01263 588 755 FAX 01263 588 424

In Australia, contact RCS, PO Box 1118, Bayswater, Victoria 3153 AUSTRALIA — phone/fax (03) 97 62 77 85

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Check out *Steam in the Garden Online*, located at: <<http://www.steamup.com>>.



CALENDAR OF EVENTS

May 7, 2005 - James Chadbourne's Second Annual Spring Steamup. 9:00 am to 4:00 pm. 150' elevated railway with 9' radius curves located in Rowley, MA (30 miles north of Boston.) Please RSVP to steam@mack505.mailshell.com or 978.948.7564.

5th ANNUAL MIDWEST SMALL SCALE STEAMUP - May 12-15, 2005, St. Peters (St. Louis) Missouri. We have two portable tracks for you to enjoy. One track has minimum 10ft radius curves, two tracks (45mm), and storage sidings. The other track is dual gauge, 32mm & 45mm, with a 6' 3" minimum radius. For more information:

- Web: www.geocities.com/teaton63376/
- e-mail: midweststeamup@sbcglobal.net
- Phone: Mike Eorgoff 630-830-5885 (Before 9 PM Chicago time) St. Peters (St. Louis) Missouri
- Holiday Inn Select, 800-767-3837 or 636-928-1500 for rooms.

July 7-10, 2005 - 32nd Annual Tuckahoe Steam and Gas Show, located in Talbot County on Maryland's Eastern Shore, five miles north of Easton between mileposts 57 and 58 on Route 50. Lots to see and do for the whole family. Mike Moore's portable Gauge 1/Gauge 0 track will be set up and operating, so bring your steamers and trains. For information call 410-822-9868 or e-mail: info@tuckahoesteam.org Web site: <http://www.tuckahoesteam.org/>

July 15-17, 2005 - 8th Annual Shay Days, located on the hallowed grounds of Ephraim Shay's estate in Harbor Springs, MI. Geared locos only! For more information contact Bruce Gathman • shayloco@voyager.net • 231-526-0174.

July 20-24, 2005 - The 2005 National Summer Steamup, at the Lions Gate Hotel in McClellan, California, a suburb of Sacramento. The National Summer Steamup gives owners and operators of small-scale (1:13.7-1:32) live steam locomotives the opportunity to meet and run equipment in a secure, indoor, friendly setting. The 2005 event will feature both 45mm and 32mm tracks, a Saturday night BBQ dinner, clinics and workshops, exhibitor displays and swap tables. The Lions Gate Hotel, on the grounds of the former McClellan Air Force Base in suburban Sacramento, will provide the steamers with a ballroom setting of more than 6400-square-feet. Event organizers have secured the services of the Pacific Coast Live Steamers' original track, a 110-foot, 45mm-32mm dual-gauge layout, as well as the new "San Luis Obispo" track; in addition, they are working to bring in even more trackage. The hotel is providing live steamers with the low room rental rate of \$81.50 per night (double-occupancy). Reservations can be made with the Lions Gate toll-free at 1-866-866-7100. For more information on the 2005 National Summer Steamup, please visit the web site at <http://www.summersteamup.com/> • e-mail steamup@summersteamup.com, or call (415) 794-4800.

September 10-11, 2005 - 2nd Annual Cincinnati Small Scale Steamup. For more information... www.gcgrs.org/steamup • 513-385-6599.

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.)

HELP WANTED!

We're running low on articles, steamup reports, loco and product reviews, photos, etc. So...we're turning to our readers for assistance. You have always been generous in your response to our requests for publishable materials with a focus on gauge 1 live steamers.

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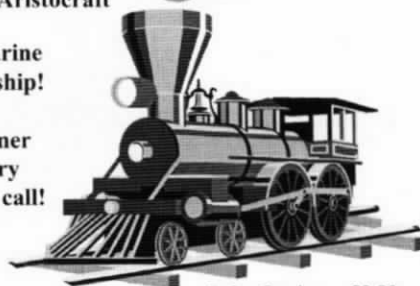
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Letters from readers are welcomed and encouraged. Offer advice, encouragement, suggestions or constructive criticism. Tell us about your current project (and don't forget the photos!) or just share live steam experiences. But please keep your letters 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...or e-mail to <rbrown54@stny.rr.com>.

Accucraft Mogul Review

Kansas City, MO
via e-mail

Ron,

Just got the Jan/Feb issue (#79) and in it was Mr. Erhart's review of AccuCraft's Mogul. It strikes me as odd that in Mr. Erhart comments he says, "...one of the sand pipes had broken off the sand dome".

In *Garden Railways* Feb 2005 edition, Mr. Vance Bass reviewed the same engine. He also made the statement, "One of the pipes had already broken loose when I unpacked our review sample....".

Two reviews commenting on the same problem. It will be interesting to see how AccuCraft responds and corrects the problem.

Douglas Bronson

Brighton, Colorado
via e-mail

Hello Ron,

I enjoyed the Accucraft Mogul review from issue #79. However, Mr. George Erhart has incorrectly identified a check valve located at the cab as a safety valve. This is a feature Accucraft adds to all their Mogul engines for use with hand pump in a tender. They may offer in the future, or a customer can obtain handpump from after market vendor to help add water to the boiler without shutting down the fire. I hope this will help to clear any confusion!

Thanks Ron!
Hung viet Ta

Toronto, Canada
via e-mail

Hi Ron,

Enjoy your magazine, and the Jan/Feb 05 review of the new Accucraft Mogul by George Erhart.

I'm a REAL NEOPHYTE live steamer, but chose this engine because it looked easy to run, is moderately priced, and being a narrow gauge fan - it's smack dab gorgeous.

A group of friendly live steamers in the Toronto area gave this novice some expert tutoring before the winter snow arrived, and here are a couple additional observations to George's review:

1. My railway has a few tight 30" radius curves. With decent boiler pressure the engine negotiates these just fine, but the binding slows progress considerably. This isn't all bad, as it serves to "self-regulate" the speed of an otherwise manually controlled locomotive.

2. The safety valve isn't below the throttle as George states on page 31...it's in the steam dome. (I assume the valve George mentions is a clack valve?, and the holes in the tender are for a water tank and pump? You experts will know this, and no doubt you'll have other letters)

3. The photo on page 31 shows a large horizontal cylinder (air reservoir?) below the fireman's side of the cab. My loco didn't come with this, so I gather it's a photo of the model prototype and production models weren't shipped with it. Too bad, I like the look of it.

Anyway, this letter is getting too long if it's of value to print at all. Just want to add that Accucraft has been really great with this beginner & his dumb questions. I had a smoke box support broken in shipping and I managed to break off the smokebox number plate (I notice George's is missing in the photo on page 29) - Accucraft had replacements to me within a week, along with operating instructions that weren't originally shipped - wonderful customer service & I'm going to like dealing with them.

Cheers,
Ralph Beaumont
Paris, Ontario

Several of our sharp-eyed readers wrote to tell us about the valve in question, which is definitely a Goodall-type valve, to be used for adding water to the boiler, and not a safety valve. The author tells us that he is red-faced, but his mistake is understandable given that his loco arrived without an owner's manual - ed.



The Spitinator (Accucraft 2-Cylinder Shay Spit and Smoke Eliminator)

If your Accucraft 2-Cylinder Shay spits and sputters around the track, sometimes leaving big blue clouds of smoke emit from under your smoke box, you need to add the Spitinator to eliminate this problem. Several design problems cause the spitting, sputtering, and smoking. The Spitinator was developed to eliminate these when properly installed.

The Spitinator comes in two different sizes, either a 1/2" or 3/4" diameter reservoir that fits on the front right running board of your Shay and resembles an air tank. The kit requires some modifications to the locomotive that are not reversible; but this modification usually outweighs any negative - through the greatly improved visual and audio performance. The kit requires normal live steam modeler's tools, a 5/32" tubing bender, a small soldering torch for soft soldering.

Kit \$30.00

For further information contact:

Bruce Gathman

6200 South State Road

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Water Control Systems For Use With The Water Level Detection System

NEW - BF Industries has developed an Electric Water Pump and a Solenoid valve for use with its Water Level Detection System. Both systems are controlled by the Water Level Detection System to automatically maintain a safe level of water in the boiler.

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For those using an Axle Pump, a normally open, on/off solenoid valve is placed in the Bypass line and the amount of water injected into the boiler is controlled by a signal from the Water Level Detection System circuitry.

Since the on time for both systems is short, large capacity batteries are not needed.

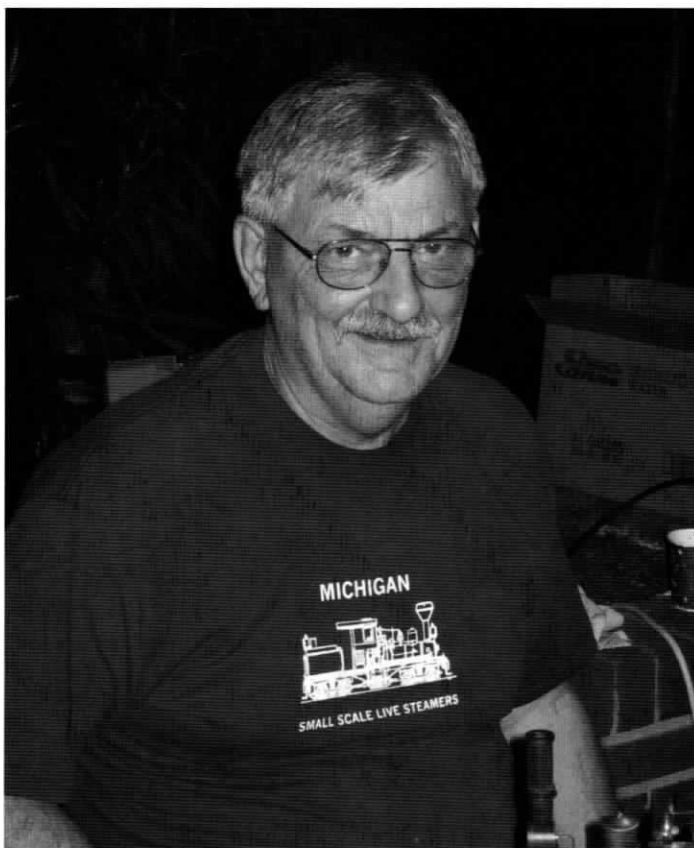
Further info is available from:

BF Industries

325 Dryberry Way

Fern Park, FL 32730

Email bfindus@earthlink.net



Bob Weltyk (Weltyk Whistles) introduced his new harmonic whistles, based on Larry Bangham's designs, at **Diamondhead 2005**. Bob installed his whistles on many locos during the event, working literally around the clock to get as many completed as was humanly possible. Weltyk Whistles have an excellent tone, and are made even better with a whistle valve designed by Bob that allows modulation of the whistle sound. Bob installed whistles on 2 of our own locos, and we love the sound and the look. For pricing and availability, contact Weltyk's Whistles, 2534 Mercury, Lake Orion MI 48360 ● phone: 248-391-1002.

* *

* * *



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Accucraft is proud to announce the production of D&RGW K-28 2-8-2 live steam in 1:20.3 scale and 45mm gauge. Butane fuel, pressure gauge, water level glass, cylinder drain cocks, D-valves and tender water pump are just some of the features of this locomotive. Like other fine products from Accucraft, these models will be meticulously handcrafted from brass and stainless steel.

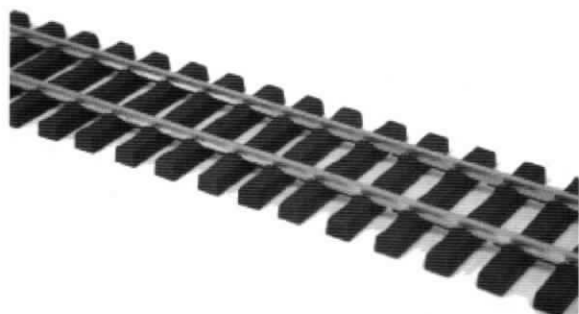
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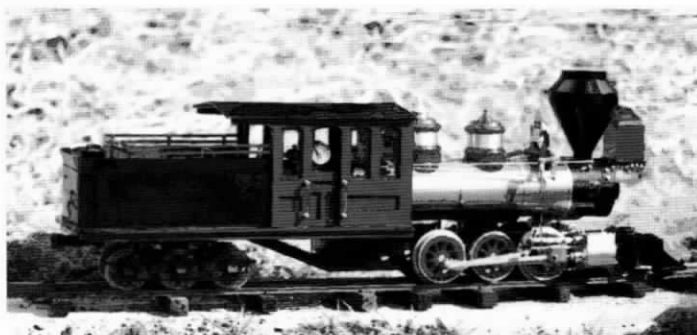
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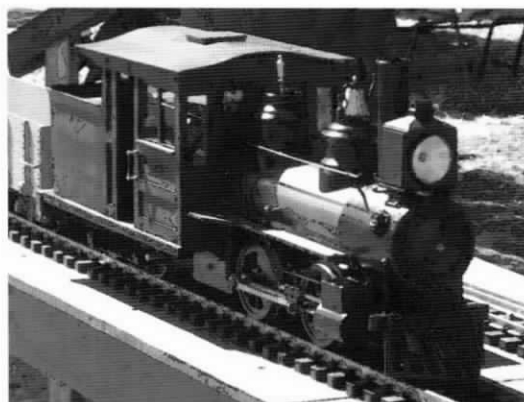
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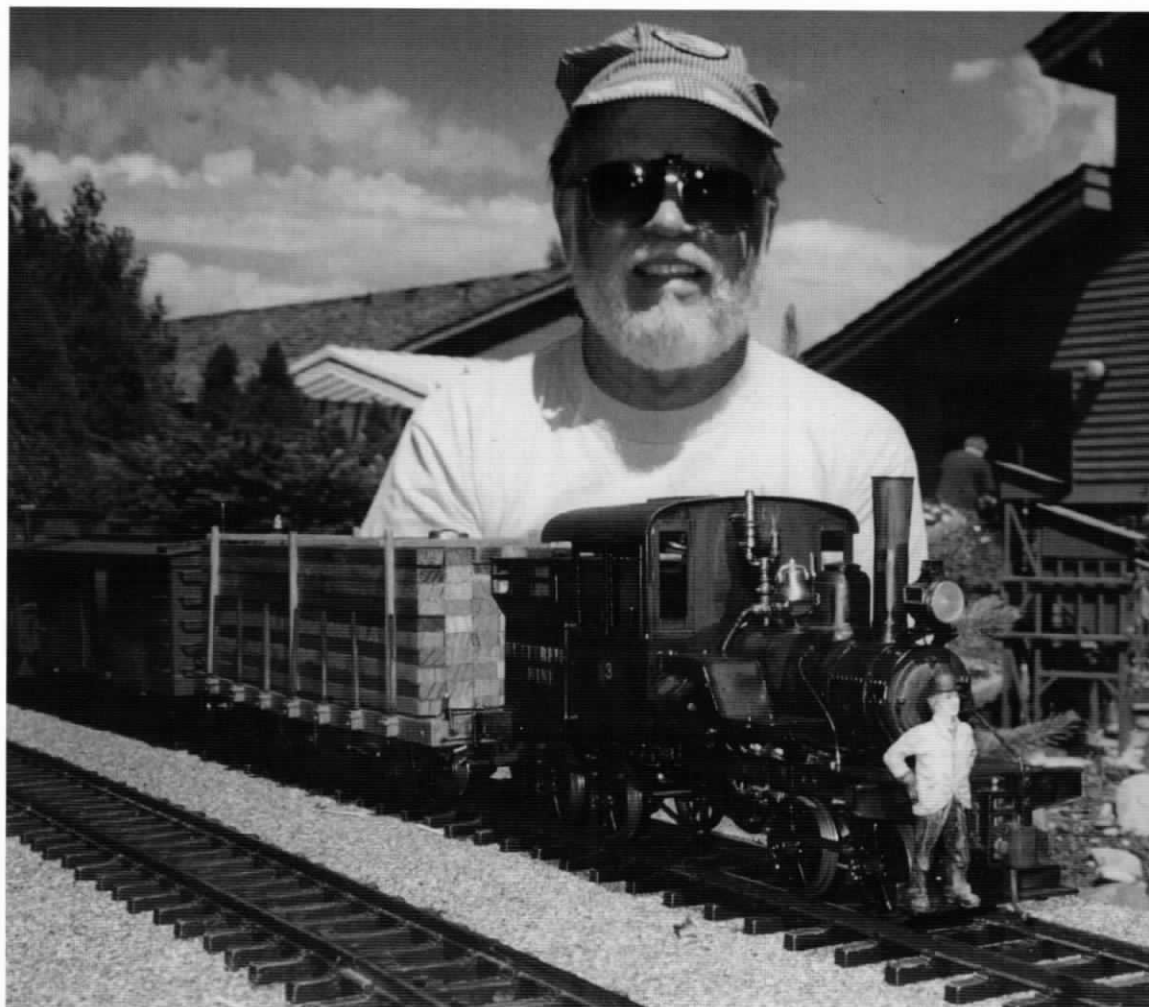


Portland Forney 7/8 Scale

Larry Bangham

by Sonny Wizelman

photo by Jim Hadden



The following is something that Larry wrote a couple of years ago that describes his first memories of trains. He was about 3 years old and living in Albany overlooking the Southern Pacific tracks that follow the east side of the San Francisco bay.

"The Return of Bygone Days"

My earliest memories are of the approach and passing of the evening freight, which occurred most every night just after bedtime. Lying in bed waiting for the sound that signaled the beginning of the evening drama. Finally the far off cry of the whistle, and me

twisting in anticipation of what was soon to follow. The chuff, far off, fading in and out, then steady, the power sending thrills up my back as it approached in crescendo, then passing, diminished to evolve into a cyclic pattern of wheels over joints with the occasional off beat of a flat spot. Repeating and repeating..... invariably I was asleep before it all ended, probably with a smile on my face.

These memories so long past, return now more vivid. This early passion was prophetic of things to come, for in my advancing years, whistles and chuffs are again a large part of my life.

Some History:

I spent my later childhood in Pasadena where I was an avid train chaser, riding my bike after the big Santa Fe engines that went right through the neighborhood, or pedaling down to Alhambra to watch the Cab Forwards storming out Mission Blvd. My other interests were model making, drawing and playing the piano.

After graduating from high school, the next 5 years were spent traveling around the country playing with small bands.

Then marriage, day job, night school, family, finally an engineering drafting job at Douglas Aircraft. Then thirty two years with North American, Rockwell and Boeing. I retired as a senior design engineer in 1993. During this period, music, model making and art remained an important part of my life. I also went through the HO and Hon3 train phase but large scale didn't come into my life until 1995.

When we moved to our present home in La Mirada, California I finally had enough yard for a railroad. I had always considered the mainline Aster engines beautiful but a bit too pricey. LGB narrow gauge was the big thing at the time, but their engines were a little too cute for my tastes.

I saw an ad for J&J Trains and gave them a call. John Weiland told me that he had a used Aster C&S Mogul that was in my price range. When I saw the engine it was love at first sight.

Current:

I have known Larry for about 10 years. He has been active in our local steam group and he and his wife Dorothy have hosted many steamups at their home. Larry is a master craftsman and engineer. I have had the good fortune to see first hand his unique creations.

In researching the information for this biography I found a large number of articles that Larry had written for *Steam In The Garden* dating back to 1996.

Most of you know about his work on the resonator whistle and valves. I am fortunate to have his whistles on several of my locomotives. He has also written a review on a book about *American Steam Whistles*.

In addition to whistles he has worked on many innovations for the hobby. Larry has done the work and then published articles on modifying the appearance and the operation of his C&S Mogul. He has made a radiant burner, a super heater, a condensate deflector, an electronic feed water system and a system for using propane to fuel the locomotive.

He has done a review on his coal fired K-27, which was later featured in an oil painting by David Tutwiler (*SitG No 76*). He also has developed an inertia car to simulate train loads.

Larry has used his art skills to beautifully detail and weather his locomotives and rolling stock.

Larry has even written several articles about general tips to add to our enjoyment of the hobby. His latest article is about modeling a shorty caboose.

There are several projects that I have seen recently. He made a 5 tone whistle to go on a 7.5 inch gauge loco. While I was at his home he hooked it up and ran air to it. The sound it made was pure and clear. It made my knees buckle. He also showed me his steam powered track cleaner which he is planning to give to the **National Summer Steam Up**.

I am sure that there will be many more things to come from this creative mind. I for one can't wait to see what they will be.

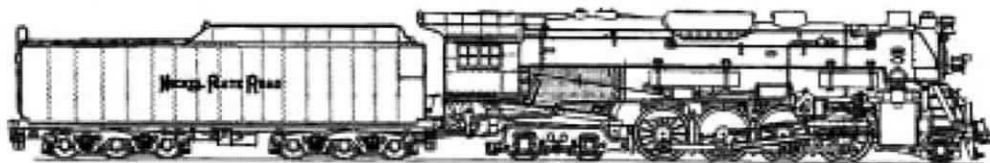


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Richard Wyckoff

With the passing of Dick Wyckoff on February 22nd we lost a valued friend, masterful machinist, avid steamer, boat builder and trainman. His interests spanned all things mechanical and centered around steam. Dick was a natural. When he was in his early teens, his father recognized his mechanical aptitude and gave him a small metal working lathe; thus began a 65 year tradition of building, redesigning and operating all kinds of steam and gasoline engines plus their associated equipment.

Dick not only excelled in building, but also had an uncanny diagnostic and fix it ability. My favorite story took place during his early years, while patiently waiting for his date to enter into her living room. The young lady had often mentioned the family clock, which resided on the mantle. The clock hadn't worked for as long as she could remember, nevertheless her father wouldn't let anyone near it for fear that further damage would result. There sat Dick with his inquisitive mind and no one around. He took the clock down, removed the back and noted that the main spring had simply been over wound. He removed the weight and continued to jog the pendulum until it started to tick on its own. Quickly he set the time, reassembled the clock and placed it back on the mantle, just in time for his date to enter the room and hear the clock gong for the first time.

His inquisitive mind also led to his first ride in a steam locomotive - might I add, it was solo! While riding his bicycle through the stone quarry late one afternoon, Dick noted that the steam engine was parked and still hot. Apparently it was standard practice to fill the boiler and bank the fire at the end of each work day; thereby keeping it in readiness for the next morning. He had watched the engineer from afar and therefore felt qualified - at least from a teenager's perspective. Dick added a little coal, built the steam pressure, and rode the rails for the remainder of the afternoon. Unfortunately succeeding trips in the engine were not to happen, apparently the locomotive wasn't left as found and therefore the "end of day" procedures were modified to include chains and padlocks.

I met Dick nearly 30 years ago when we were both involved in forming the Syracuse Model Boat Club. He had a wonderful collection which included one small steel hulled submarine and several power boats with fiberglass hulls. The real showcase however, included the kit and scratch built wooden boats, most of which were steam powered. We made a number of trips north to the Clayton Boat Show and over the boarder to Qananoque, Ontario for their annual model boat show. We both took models to operate and show, but it was Dick that returned with the trophies - a true craftsman. Then there was the day we learned that Dick could certainly move quickly, especially for an older

gentleman. During one of our club outings, I leaned over and mentioned that there seemed to be an abnormal amount of smoke rising from his stack. The boat was alcohol fired and fortunately not far from shore, little damage resulted but we certainly didn't let him forget about the entertainment he provided that day. Dick lived on the eastern shore of Owasco Lake (one of the up-state NY Finger Lakes), thus he had several larger boats. The queen of the fleet was a steam launch, which consisted of a 20 foot long

fiberglass hull, discarded laundry pants press vertical boiler and an antique single cylinder engine from one of the mail boats which once served the lakeside residents. It may not have been fast, but it certainly was majestic.

We both became interested in garden railroading about the same time. Dick quickly amassed an impressive collection of steam locomotives, rolling stock and accessory hardware. The engines included the Maxwell Hemmens Porter, an Aster / LGB Frank S, a modified Accucraft Ruby - Forney, and most recently the Accucraft Consolidation. But as far as I'm concerned, the absolute jewel is the 3/4" scale Virginian. Dick started this engine years ago with a collection of

raw castings, a few plumbing accessories and a huge number of hours in his shop - he even made every nut and bolt (some several times). A few years ago, Dick learned that the tolerances that he was accustomed to were too tight for this steam engine and set out with a file to make it right. Last year the Virginian was reassembled, and in my presents, it was introduced to air. Within only a few minutes, the engine was operating beautifully. It only needed a few cosmetic additions, a little break-in time and it would be ready for its debut.

In January Dick and I made our annual trek to the Cabin Fever Expo in York, Pennsylvania. For those not familiar, this is a fantastic exposition of model engineering - a collection of what Dick Wyckoff held closest to his inquisitive mechanical mind. Model demonstrations ranged from the Pennsylvania Live Steamers portable track, to a 12 foot deep temporary indoor pond measuring 32 feet by 80 feet. Exhibitions included the worlds smallest operating gasoline engine (fit on your fingernail) to a 1/8" scale, working model of the Rolls Royce Merlin V-12 which powered our P-51 Mustang aircraft in WW-II. Plans, castings and kits for every conceivable type engine were available, along with the machine tools and clinics to help build them. We had a wonderful weekend, and Dick was able to christen his latest model steam boat in the pond. A few problems solved and off it chugged - how befitting to a masterful model builder, he boiled his water and made steam right up to the end.

Sincerely, A friend



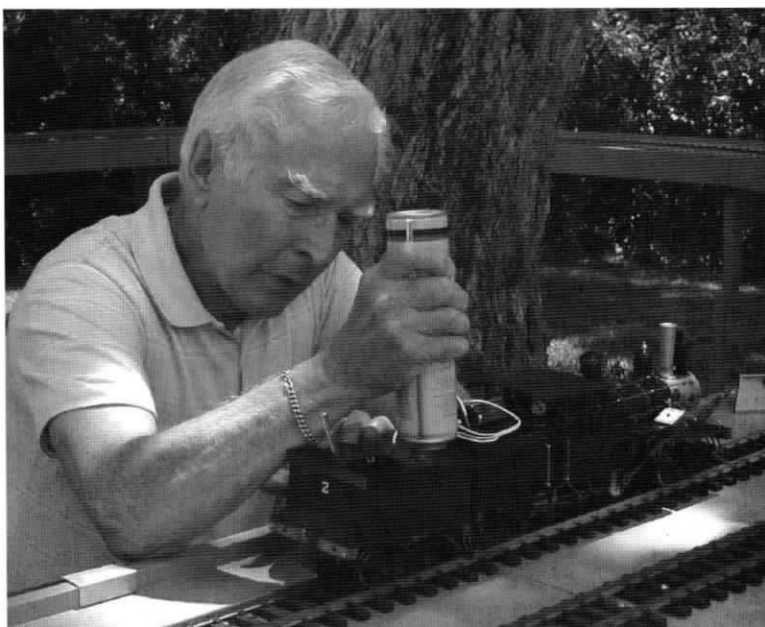
Alvin Lewis Sadler, train enthusiast, passed away February 21, 2005 from sudden heart failure. After serving as a Navy pilot, Al continued serving his country as a Marine. He retired from real estate and was past President of the Cincinnati Rotary Club, volunteered with the Better Business Bureau, was a beloved member of the Greater Cincinnati Garden Railway Society, and faithful participant at the live steam event at Diamondhead, Mississippi each January.

Al exemplified the hobbyist we all should aspire to become. Although he seemed to have "steam oil in his veins", it wasn't the actual trains that became his obsession, but sharing his love of the hobby and trains in general with friends, family, and extended family.

He constructed a permanent double track layout in his back yard and had an "open door" policy. "Give me a call and come on over. The track is always open", we'd often hear him say.

We had cleared snow off the track and had a great run on February 6th. As we were about to wrap up the run, Al mentioned something about celebrating his 80th birthday the next day. 80! We couldn't believe it! Al had more enthusiasm and energy than the rest of us combined.

Over the last few years, Al sparked an interest in live steam within the Greater Cincinnati Garden Railway Society which led to the formation of the 1st Annual Cincinnati Small Scale Steam. Plans are being formulated to conduct the Al Sadler Memorial Steamup in Cincinnati this fall. Al touched a lot of lives and will be sadly missed by all.



Charlotte Hughes & Daniel Stenger



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Accucraft

Graham Industries

Rishon Locomotive Works Portland Forney

review and photos by Steve King

A beautiful locomotive in 7/8" scale

Specifications:

Type:	Forney tank engine 24" gauge 0-4-4
Scale:	7/8", 1:13.7 (or 22.5 mm) Gauge: 45mm, 1.75"
OA Length:	22.50" Rear beam to pilot tip
OA Width:	5.75" at rear beam
OA Height:	8.43" at stack
Boiler:	500 mL copper tube, single flue, gas fired 2.5" dia x 9.50" L. Water fill port under sand dome, Goodall valve in cab
Safety valve, indicator:	55 psi, with LED low water indicator located on rear tank
Lubricator:	Displacement type in cab, with drain through floor
Pressure:	40-55 psi operating, 90 psi boiler test
Drivers:	Steel, 2.40" dia. 3.93" wheelbase
Rear truck:	Steel frame and wheels, equalized and pivot bar centered beneath cab.
Cylinders:	5/8" x 1" slide valve
Rods, Valve motion:	Rods stainless steel laser cut, bushed.
V.G.:	Stephenson - steel, brass and stainless components
Engine frame:	3/16" laser cut steel, with details "cut in"
Cab:	Laser cut plywood, fixed windows and doors, roof: 1/16" aluminum sheet, hinged to side for access
Domes:	Aluminum turnings
Gas tank:	1" x 2.4" x 2.5" in cab
Burner:	Poker type
Typical details:	Boiler checks, whistle, bell, smokebox sparking port, front link coupler, etched builder plates

The Portland Forney 0-4-4 tank engine is the first production Maine 24" gauge live steamer in 7/8" scale. Paul Trevaskis of Rishon Locomotive works in Australia has produced a faithful replica of the early locomotives that plied the rails of the Maine two footers in the 1890's. Many lasted until the 1930's, and the last remaining engine of this type is WW&F #9 which resides at the WW&F Museum at Alna, Maine.

Having long been an admirer of the Hinkley and Portland Forney locomotives, I just had to get on Rishon's list to have one built. I asked Paul to detail the engine as close to the original build of Sandy River #5, and #6 (built in 1891-2.) The builder has available options for some of the later versions of the engine. Over their lifetime the Forneys were wrecked, burned, rebuilt, bought and sold among the various Maine two footers, so details changed over the years. The model as delivered is correctly proportioned with most basic details included and will be an excellent starting point for the addition of finer detailing by the owner.

Up until this time, railroaders in 1:13.7 scale (7/8") have had little to choose from in live steam motive power, other than custom built jobs, and small tank or plantation engines. Some have built locomotives using visually smaller components of other scales. An out-of-scale engine looks a bit silly pulling 7/8" scale rolling stock, so at last we have proper motive power.

The \$3165.00 base price may seem steep to some, but it must be remembered that 7/8" scale is 50% larger than 1:20.3, and components must be specially designed and fabricated to suit the larger size. This model represents an excellent value for the money.

The first thing that I did was to check the engine against various drawings that I have of the prototype. Rishon has built an engine which is accurate to the prototype, and checks of scale measurements are generally spot-on. The only minor variation that was evident to me is that the tank wheels are about 19" rather than 20", which in 7/8" scale works out to about 1/16", truly not noticeable. The primary departure from the prototype is that the rear truck is on a "floating bolster" and pivots on a swing arm mounted under the cab. This is exactly the same arrangement that was used when I built a similar engine several years ago, and it allows operating on track down to 5 ft. radius, according to Rishon. I would suggest that running on 10 ft. radius and greater will give the best results.

Running the engine:

My engine has manual controls, which consist of long stiff wires attached to the throttle and reverser. Servos for r/c are easily added to the Forney, and many will prefer to have the engine delivered with r/c. I enjoy hands-on running, and this often leads to a good workout

chasing the locomotive.

The gas tank and lubricator have generous capacities, and with the 500 mL boiler capacity the Forney will run for 30 minutes or better without refilling. A Goodall valve in cab just behind the front wall allows for keeping the engine in steam indefinitely. The lubricator has a bottom drain under the cab floor, which eliminates having to suck out condensate. Actually it takes very few tools to run this engine, mainly a water bottle, gas with a long fill tube, bottles for your oils (steam and lube), a lighter, and gloves in case you have to handle a hot locomotive.

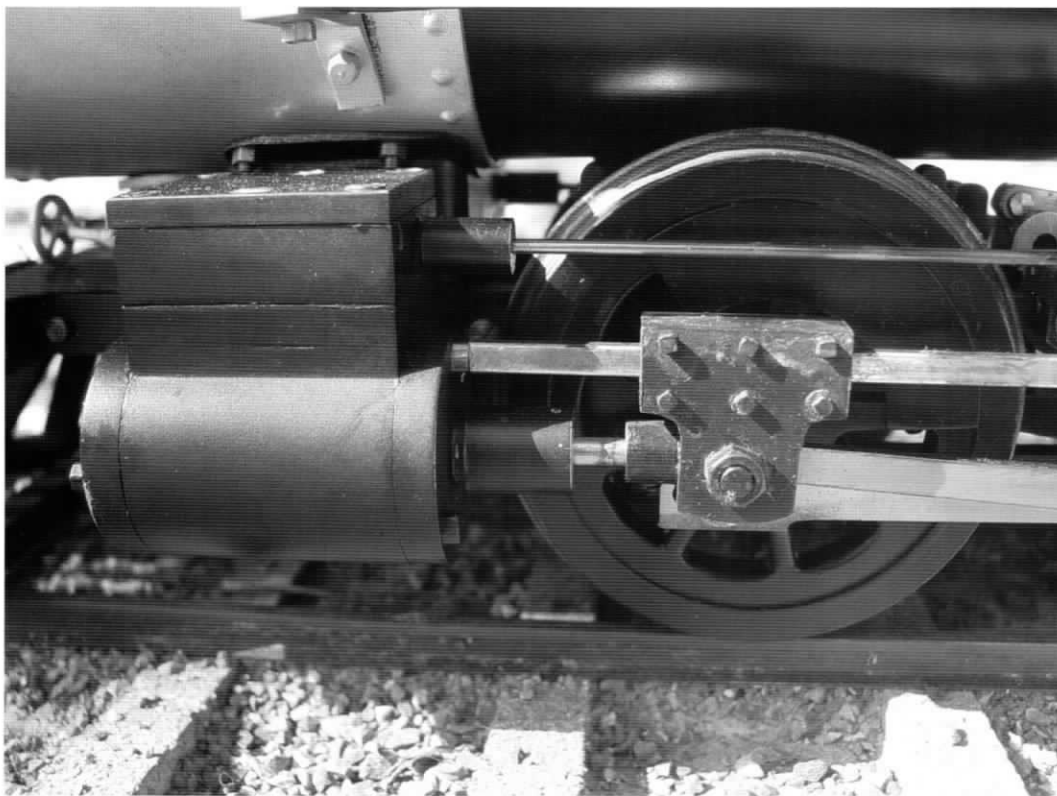
After having filled the gas, steam oil and water per the instructions, the burner was lit. The full smoke box front on the engine slips out, so you may view the fire if needed. I found that on my engine there was a loose nut on the steam line coming out of the boiler barrel, and this was tightened prior to lighting. It is possible that this part was left disconnected during transit to prevent damage to a fixed joint. The burner, once lit, is very quiet. There is quite a bit of fine control in the gas valve.

In about 15 minutes, the gauge was about 30 psi and it was time to try her out. The Forney runs quite well right out of the box. There is a good "chuff" sound and steam plume, since the exhaust pipe is set just below the rim of the stack. The smoke box is made tightly, so that exhaust steam is not wasted exiting through other areas. I found that the cylinders warmed quickly and there was no appreciable water spouting out the exhaust.

The regulator goes from full closed to full open in about 1/4 turn, yet there is quite a bit of fine adjustment within that range. I have no problem controlling the speed, and was able to make the engine run fairly slow without cars being attached. The safety valve let loose with a pop at 50-55 psi, and reseated at 40 psi. The plume shoots out from the steam dome, just like the prototype... very satisfying.

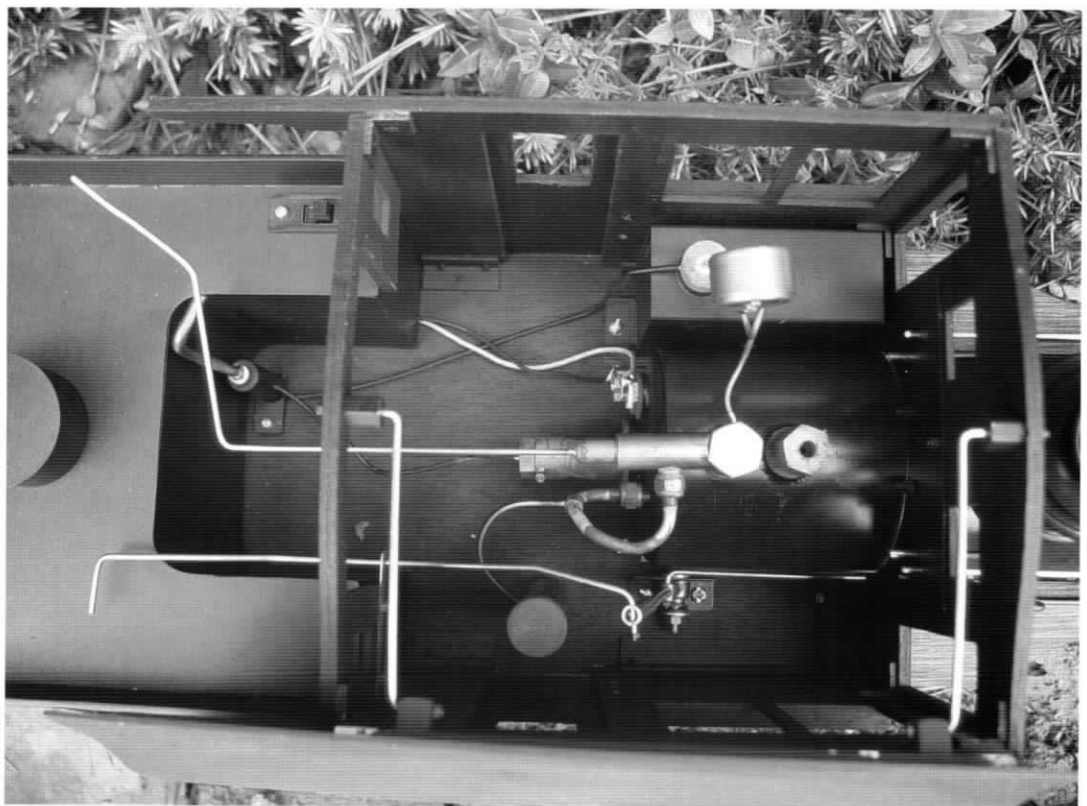
Because of the 2.40" drivers and 1" stroke cylinders, the Forney can run like a deer. However when pulling a typical Maine consist of 5-6 cars, this will temper the speed and allow the engine to work. This is an easy engine to operate, and the layout of the components and controls is very simple. This would actually serve as an excellent "beginner's" engine, or one that could be operated by junior live steamers (with adult supervision.) Paul Trevaskis has done some excellent model engineering to come up with a locomotive that is pleasing to the eye and a charm to operate. In the US, Sulphur Springs Steam Models handles sales for Rishon. I received my engine within the lead time promised, and shipped and received in good order. This product should do a lot to popularize 7/8" scale, which is about the most fun you can have on 45 mm track!





Quality and precision are the mark of a good craftsman. The Rishon Forney measures up.

Manual controls for the Forney are simple and straightforward and the cab space uncluttered



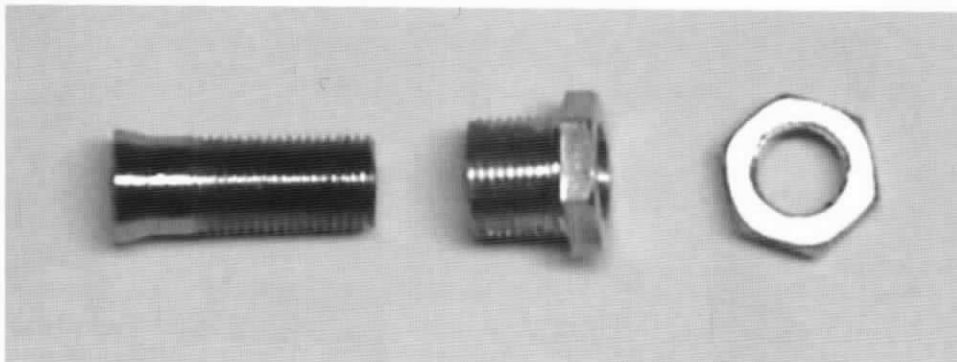
A Water Glass for the Accucraft Mogul

by Larry "olfart" Herget

A useful addition to this fine locomotive

I have installed a water glass on my Accucraft Mogul. This installation was done without any soldering. It is secure and safe as determined by a 120 PSI hydrostatic test on the solderless lower backhead bushing. This bushing works as a jobe bolt; the inner part of the bushing spreads to a diameter larger than the hole it was installed in, so there is no way it can come out.

The part on the left (photo top right) is made of stainless steel & threaded 1/4" X 40. The threaded center brass bushing has been reamed thru the center 1/4". The thread on the outside is 5/16" X 40 and it has

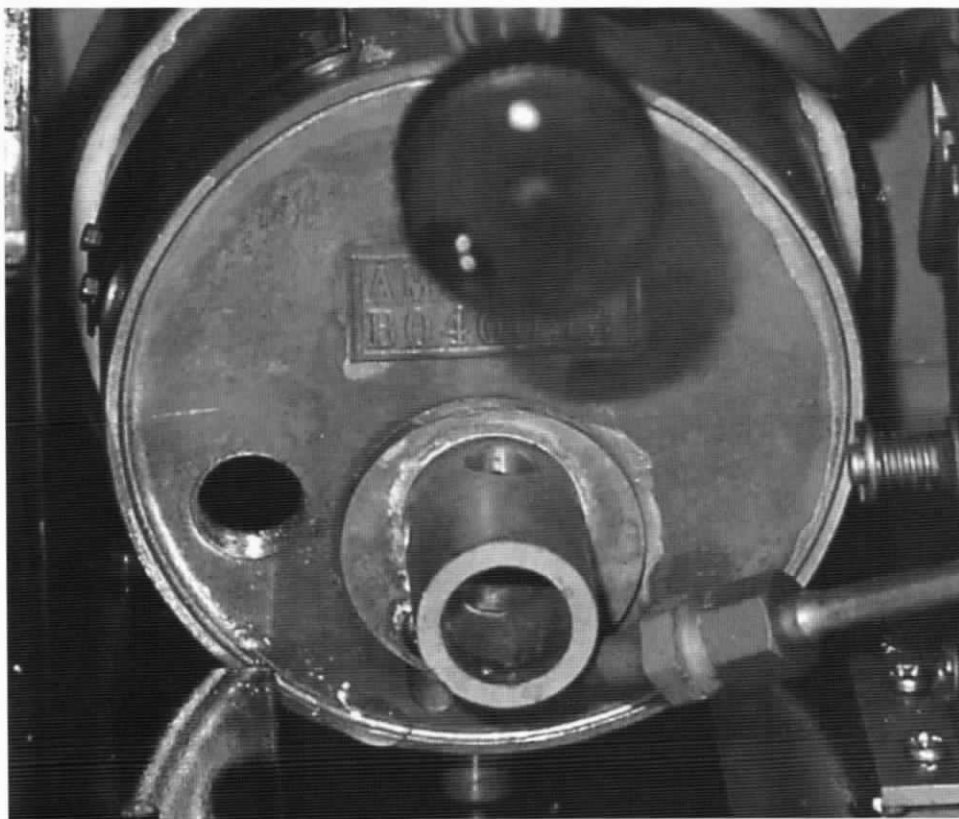


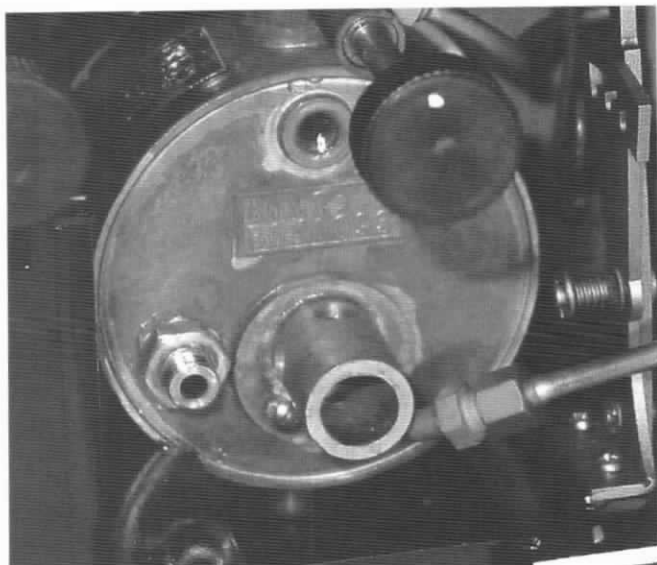
six evenly spaced Zona saw slots on the threaded end to a depth of 3/4 of the thread depth. This allows it to spread when the stainless tapered part is pulled in. The bushing and nut are made of .375" brass hex stock.

The photo below left shows the lower backhead bushing for the water glass. The part at the left and the center parts interior are coated with a liberal coating of J-B Weld. The stainless part is pushed into the threaded bushing and the nut on the right is loosely screwed onto the stainless part.

Photo next page, top left is the threaded 5/16" X 40 back head. By the way, the back head is .090" thick, ya gotta drill it to see that.

When tapping keep a liberal coating of light grease on the tap and back out frequently to catch all the chips you can. I also had an air line with 20 PSI attached to the top filler to aid in blowing the chips to the outside thru the flutes. After the hole was done I deburred the inside, then spent a good bit of time washing/flushing the boiler with hot





water by filling it and picking the loco up and shaking it in a sink until nothing but clean, debris free water came out.

Coat the 5/16" X 40 bushing threads with the J-B Weld and screw it tightly into the tapped hole. Then immediately after the bushing is tight, tighten the nut with the 1/4" X 40 threads slowly so it spreads the six inside legs of the bushing out against the backhead. Tighten it slowly and you will feel it coming toward you. Keep tightening until you feel it has come as far into the bushing as possible.

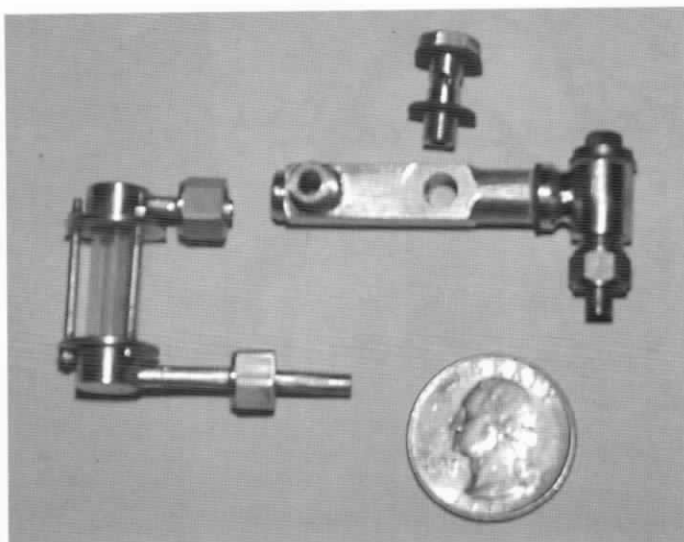
Photo top right shows what goes in the top existing 5m X 0.5 hole. The check valve on the right is for water in from the tender hand pump.

Lower left photo on the next page shows the assembly installed. Note the slight slope on the manifold, it is necessary so condensation or surged water can drain out.

In the lower right photo on the next page, it's telling me what I need to know as I am near deaf and can't hear stack changes.

Top of the next page....Thru the woods and over the bridge to Grandma's house we go.

This is without a doubt the best running and pulling loco for its size of any of the Accucraft locos I have.



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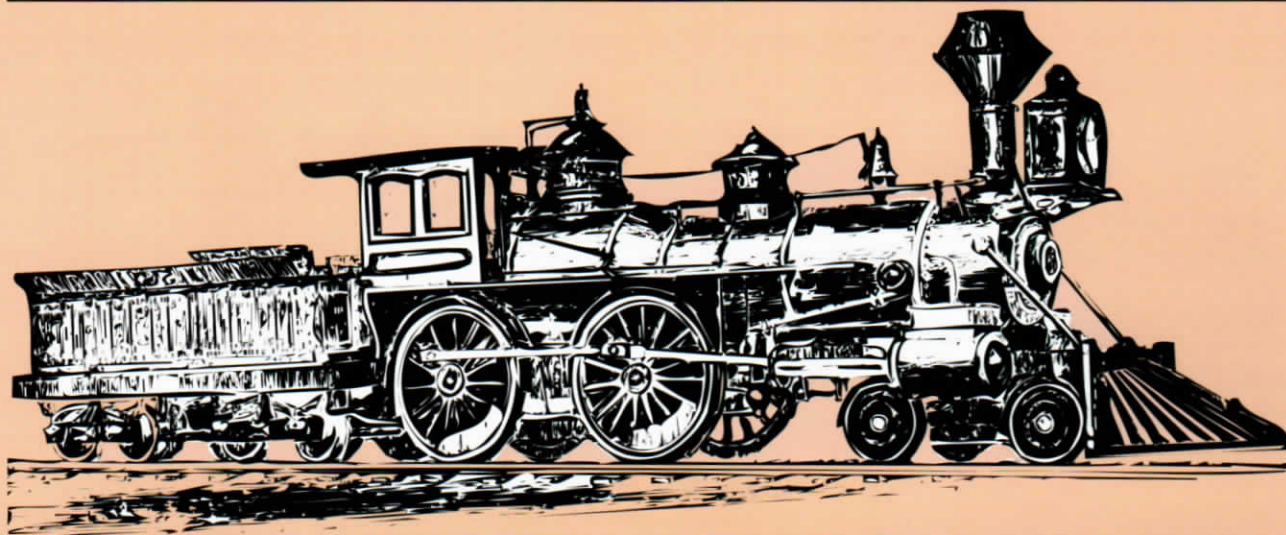
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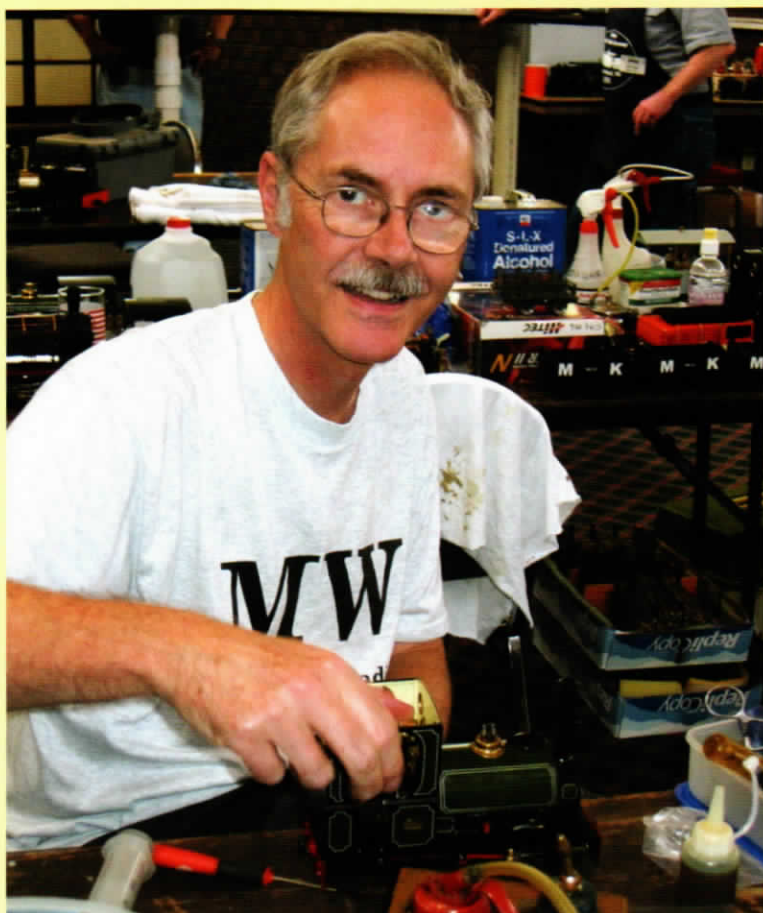
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DIAMONDHEAD 2005 in pictures



The Grand Old Gentleman of Steam, Geoff Spencely, seen here with his Aster Lion.



Dave Piniger with a 16mm lokie from England. Dave has made many contributions to the hobby over the years.



Jon Dekeles of mylargescale.com, preparing for a run with the Aristocraft Mikado that he tirelessly demonstrated at Diamondhead '05.



Peter Jobusch (l.) with his Tweetsie gauge 3 loco, custom built by Gordon Watson of Argyle Loco Works in Australia. Jim Sanders and Bruce Gathman are in the background.



(l. to r.) Kevin Strong, Allison Strong and Mike Martin pose with Mike's new BAGRS loco (left) and Allison's version of the BAGRS loco.



Larry Smith's antique steamer...a Beggs, made in Patterson, New Jersey by Eugene Beggs about 1900, maybe a little earlier. Larry modified the gauge from the original so it will run on gauge 1 track.



Above: Norm Saley's display of the useful bits and pieces he produces. Norm's stuff is beautifully crafted, and his table might best be labeled "Eye Candy".

Right: Paul Trevaskis (Rishon Locomotives) demonstrates his beautiful 7/8 scale Forney to Dave Graley.



Royce Brademan (Quisenberry Station) running the new Cheddar "Philadelphia". It comes complete with R/C, including whistle, and a manual water pump.



Bill Ford was showing his WLDS (Water Level Detection System), which eliminates the need for a sight glass.





Hans Huwyler, Aster Hobby USA, stands with the pilot models of Aster's new NPR 779 Berkshire and Duchess of Sutherland. I'm sure the questions were flying thick and fast!



*Ginny Morris enjoys running her steamer as much as anyone we know. Here she is at the *new* track.*



Dawn Brightwell, (l.) watches while Peter Comley pumps water into the boiler on his streamlined version of the "Duchess of Sutherland".



The "inner sanctum" inside the running tracks is always full to overflowing with locos and people!



Jim Hadden (r.) drew a crowd with his awesome scratchbuilt, R/C model of a steam powered ditcher. Jim scooped M&M's out of a box and dumped them into a gondola.



John Synnestvedt (r.) displayed the neatest sub-miniature connectors we've ever seen. The can be used for gas, alcohol or water, and make connections between tender and loco easy as can be. They also work super for Goodall valve connections.



Bob Weltyk, (l.) (Weltyk Whistles) displayed not only some great sounding whistles, but he wins the Iron Man Endurance award for sitting at his table and installing whistles literally around the clock! Bob makes whistles to Larry Bangham's design, and he has designed a valve that allows modulation of the whistle for a very realistic sound. Bob is shown here at his table with Herbert Haaf, a happy customer.



Mike McCormack (l.) chats with Alan Walker. Diamondhead gives us a chance to exchange ideas and information with fellow steamers from around the world.



Dan Fuller (l.) chats with Caleb Roberts about Caleb's Aster Daylight and Aster Big Boy.



Bryan Isaac George DeKeles, one of our younger steamers, takes a spin on the small track. Photo provided by Large Scale Online. (LSOL.com)



Another of Keene Golding's students reaches out a hand to slow her Ruby.



Tom Myers (center, wearing apron) offers two of Keene Golding's Advanced Physics class students some observations based on wisdom and experience pertaining to their kit-built Accu-craft Ruby.



Mike Dockery from England with his beautiful freelance Tri-plex.



Dave Young and his Aster Mikado...are we having fun yet?



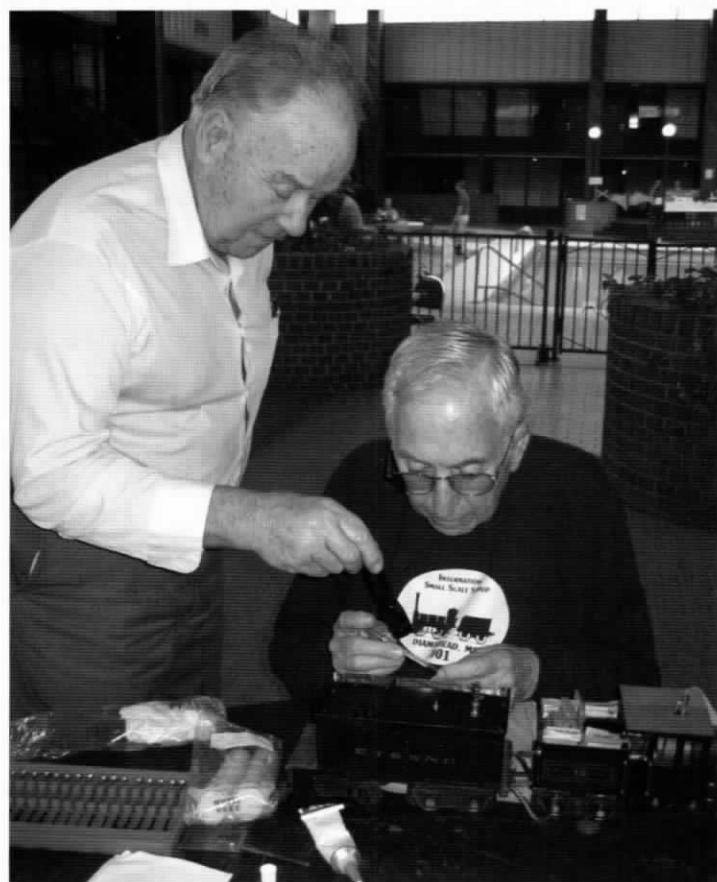
Jimmie Millhorn lubes his Aster Mikado.



Kevin O'Connor puts together a log train behind his Aster B-I Baldwin.

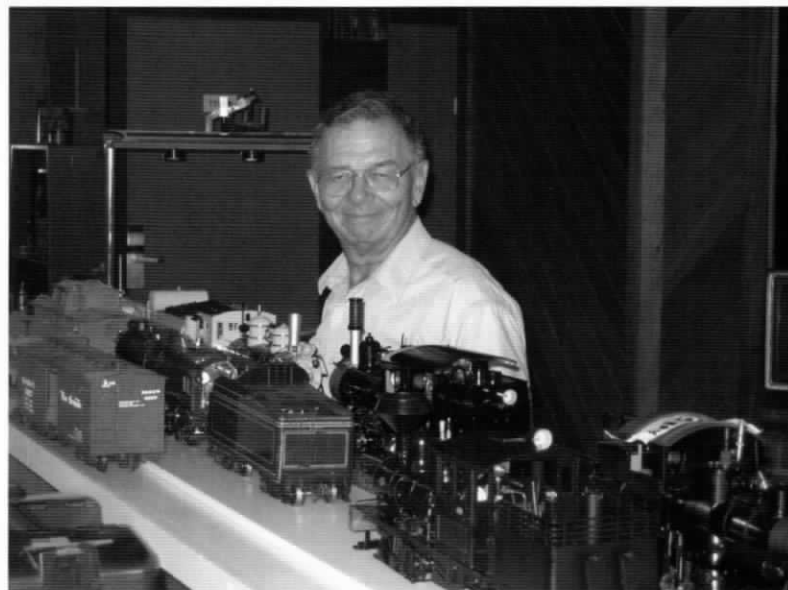


Aristocraft's entry into the live steam market, the ubiquitous Mi-kado. This loco features digital sound, R/C and electronic ignition. It put on an impressive performance at Diamondhead, and buyers were lining up to get their name on the reservation list.



Left: Ed Cook (l.) assists Jerry Reshew in a delicate operation.

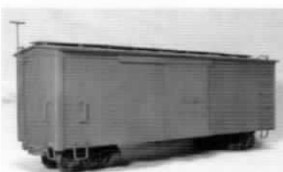
Below: Pat Darby expresses the satisfaction felt by all DH attendees!



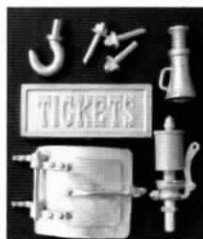
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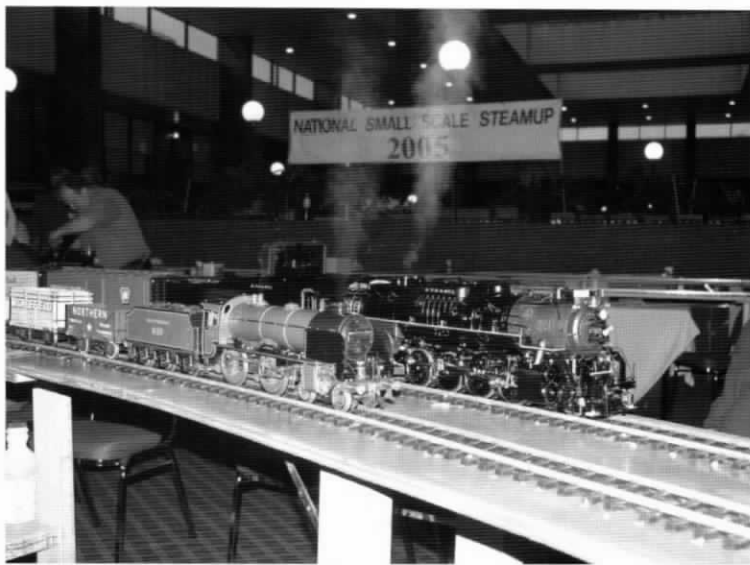
Sonny Wizelman beams over one of his fine little logging locos.



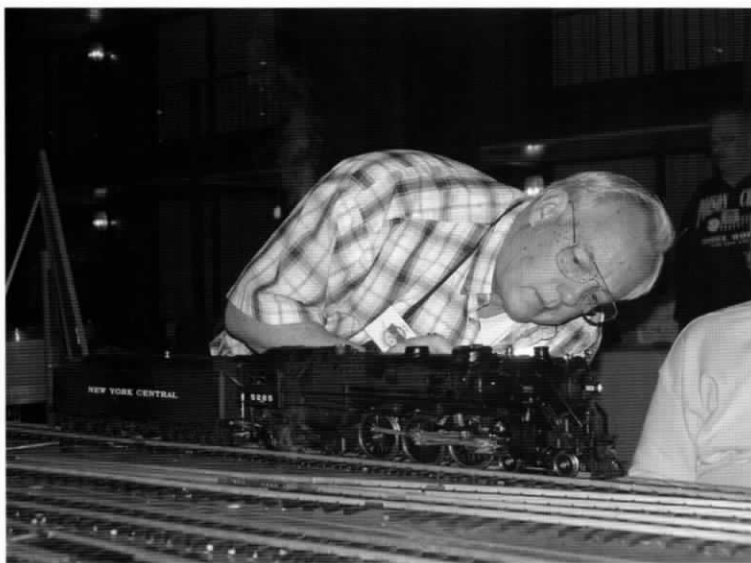
Satoshi Tamada (l.), Aster Hobby's Chief Sales Engineer, beams as he paces the new NKP Berkshire prototype.



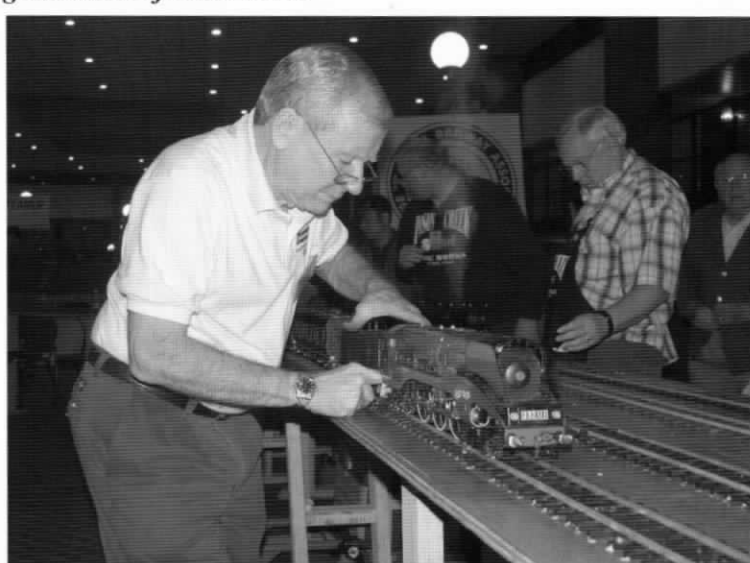
Charles Kessler (l.) chats with Norm Saley about some of Norm's scratchbuilt and kitbashed locos.



Old and new....an Aster Schools, one of their first gauge 1 steam locos, poses next to the NKP Berkshire, one of the new generation of Aster locos.



Bob Simpson takes a close look at the motion on his newly acquired Aster Hudson.



Yves Guillaume with Bill Crane's Aster French Hudson 232 UI - coal fired of course!

Thanks to all those contributors to this photo essay on Diamondhead 2005, including Peter & Carol Jobusch, Jim Pitts, Marie Brown, Michael Martin, Steve Heselton, Bill Payne and Large Scale Online. There are probably some others who I'm forgetting. I beg their forgiveness and acknowledge their contributions.



Riding the two-foot gauge line at Wales West in Alabama. Next year they will have both 7.5" gauge and gauge 1 tracks up and running for our visit.



Diamondhead 2005 was, in my opinion and the opinion of most attendees I spoke with, the best ever. How can it continue to get better every year? I don't know, but every year it seems to do so, for which organizer Jerry Reshew gets most of the credit! This year we saw new locomotives from manufacturers and one-offs from workshops in several countries. New goodies and gadgets to make our hobby more enjoyable were there in large numbers. The following pages will give a glimpse of the event, but the only way to soak up the spirit and camaraderie (not to mention the aromas of live steam!) is to be there in person. If you haven't been to Diamondhead, make an effort to get there in '06!

The Nuts and Bolts of Shays

Evolution of the Shay Locomotive

by Dan Rowe

This is the first of a series of articles on Shay Locomotives built by the Lima Machine works and the successor companies that produced 2768 Shays between 1880 and 1945.

The logical place for a marine engineer to start is with the steam engine. This is one of the most interesting and distinctive parts of the Shay locomotive. The engines evolved from the early two-cylinder 6"x6" bore and stroke to the massive 3-cylinder 18" bore and 20" stroke.

The shorthand notation used in this series of articles and Lima records for both examples are 2-6x6 and 3-18x20. The form is number of cylinders - bore x stroke in inches.

A typical early Shay engine is shown in Figures 1 and 2. All the drawings in this series with a few exceptions that will be noted are redrawn from Lima drawings, or in last resort a good photograph.

Figure 1 shows the side view of a two-cylinder Shay engine, the most commonly seen perspective. Figure 2 shows the front view of the same engine. This drawing is really a visual Shay Dictionary that the reader can use to see the parts of a Shay steam engine with names of all the major parts.

The following description is for readers not familiar with steam engines or Shay terminology. Advanced readers might find it useful for new lyrics to the old "hip bone connected to the leg bone" song.

The cross section of cylinder two on Figure 1 shows the double acting piston (1) and the D slide valve (2), inside the steam chest (3). The piston rod gland (4) seals the steam acting on the lower side of the piston. The piston rod (5) is bolted to the crosshead (6), which moves vertically in the crosshead guides (7). The crosshead keeps the piston rod centered and absorbs the side thrust of the connecting rod (8).

This engine arrangement with vertical cylinders and a crankshaft (9) was more commonly for marine or stationary engines. Counter weights (21) were used on two cylinder engines and engines 3-13x15 and larger. The valve gear or valve motion (10 - 20) has two main purposes: to distribute the steam and exhaust at the proper stroke position, and to enable

the locomotive to run both forward and backward.

Almost all the Shay engines, with only two known exceptions, used link motion. All the forms of link motion use two eccentrics with a link to connect the eccentric rods. The type of link motion used on Shay engines is commonly known as Stephenson link motion. This type of reversing valve gear was used on all types of steam engines. It was the most widely used valve gear for locomotives in the United States between 1855 and 1910.¹

Each cylinder has a forward (10) and a backward eccentric (11) which are connected to the link (12) by the forked ends of the eccentric rods (13). The link is free to slide in the link block (14), which pivots freely on the link pin (15). When the reverse lever (16) is set for either forward or backward motion, the universal ball coupling (17) moves the tumbling shaft (18) the same angle. The link lifter (19) moves the link until the corresponding forward or backward eccentric rod lines up with the valve rod (20). This arrangement without a rocker shaft is called direct Stephenson linkage.

Figure 1 has the lifting link, one eccentric rod, and the vertical arms of the tumbling shaft cut away for clarity. They are in the proper position in Figure 2.

Photographs of very early Shay engines show the steam chest extending beyond the cylinder top and bottom. These engines used double D valves. This type of double slide valve is referred to in some texts as a long slide valve. The first patented internal steam passages used double D slide. William Murdock, an assistant to James Watt, invented the double D slide valve in 1799.²

The ad card for the Carnes sawmill (Figure 3) shows the steam chest extending beyond the end of the cylinder. This leads to the conclusion that the sawmill also used a double D slide valve. I believe that the reason the old double D slide valve was used is because it is easier to make a core pattern for the internal steam passages.

A drawing and a photograph in the next issue will help show the early double D slide valve. This

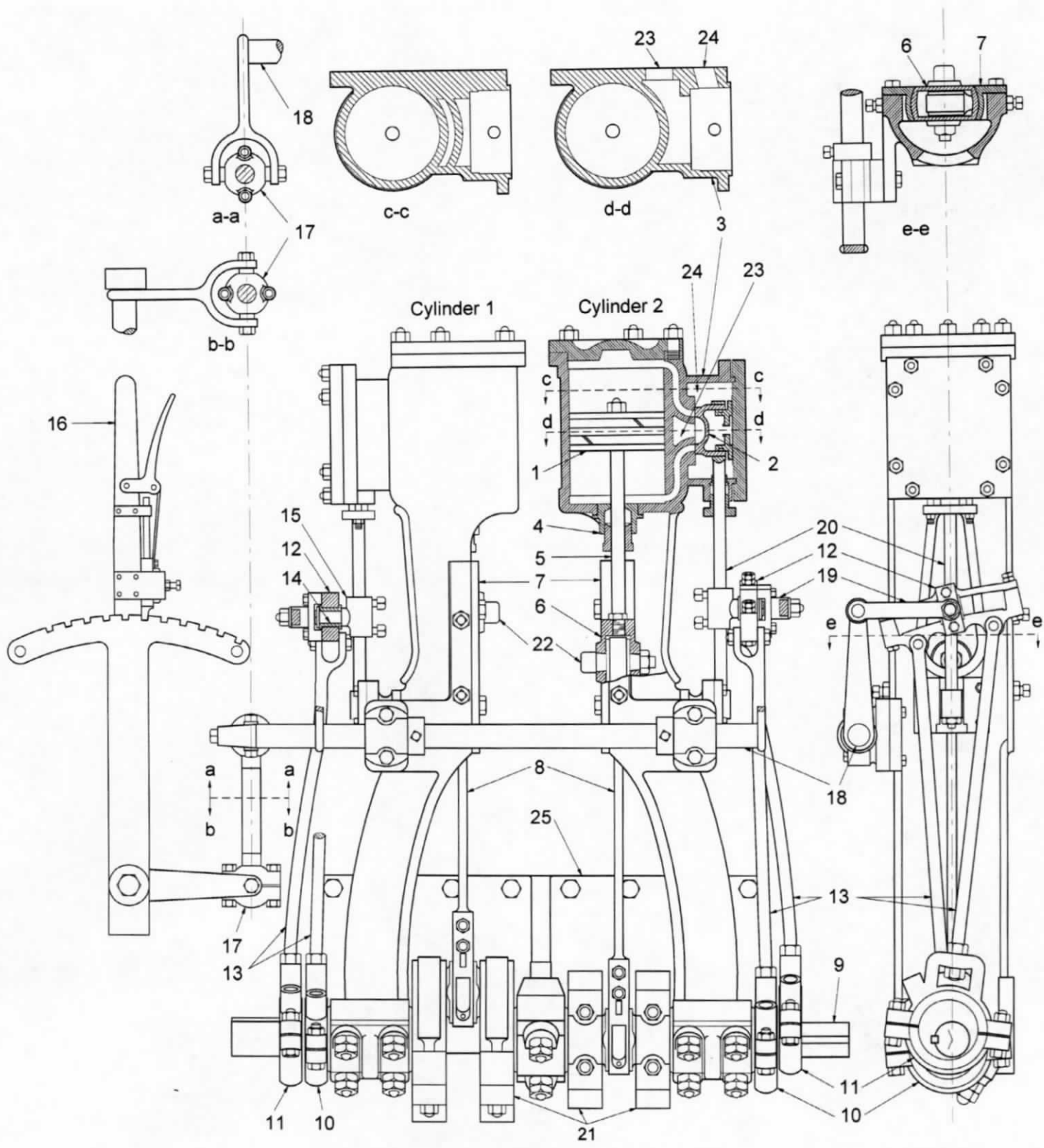


Figure 1

Figure 2

- | | | | | |
|---------------------|-----------------------|------------------------|-----------------------------|--------------------|
| 1. Piston | 6. Crosshead | 11. Backward eccentric | 16. Reverse lever | 21. Counter Weight |
| 2. D slide valve | 7. Crosshead guide | 12. Link | 17. Universal ball coupling | 22. Wrist pin |
| 3. Steam chest | 8. Connecting rod | 13. Eccentric rod | 18. Tumbling shaft | 23. Exhaust |
| 4. Piston rod gland | 9. Crank shaft | 14. Link block | 19. Link lifter | 24. Steam |
| 5. Piston rod | 10. Forward eccentric | 15. Link pin | 20. Valve rod | 25. Lower bracket |

series of articles are primarily based on my research of the Lima Drawing record, but I have had the help of a starting point in the writing and unpublished collection of Lima data by Dan Ranger Jr.

The published and unpublished data collected by George Kadelak, along with many emails and phone calls, have made this research possible. The soon to be published and unpublished data collected by John Benson and his help with engineering subjects has also been a big help to this work. The hard working staff of the Allen County Historical Society have been very gracious with their time.

A special thanks goes to Charles Bates, the curator of the ACHS railroad collection, for long hours spent providing the necessary documents, and still having a jolly sense of humor.

I also extend my thanks to the library staff of the California State Railroad Museum, Ellen Halteman and Kathryn Jigursky for their help with the Lima documents in the CSRM collection.

Send any questions or complaints about this series to me at locodanrowe@yahoo.com. Send any compliments to Ron Brown and staff for keeping this fine magazine going for 80 issues. I will try to answer the questions or expand the coverage of parts of this series that readers find most interesting.

¹ White, John H. "American Locomotives" revised edition, page 198

² Very early steam engines had the steam chests made in segments that were bolted together and caulked like a riveted boiler. British Patent number 2340 in 1799.

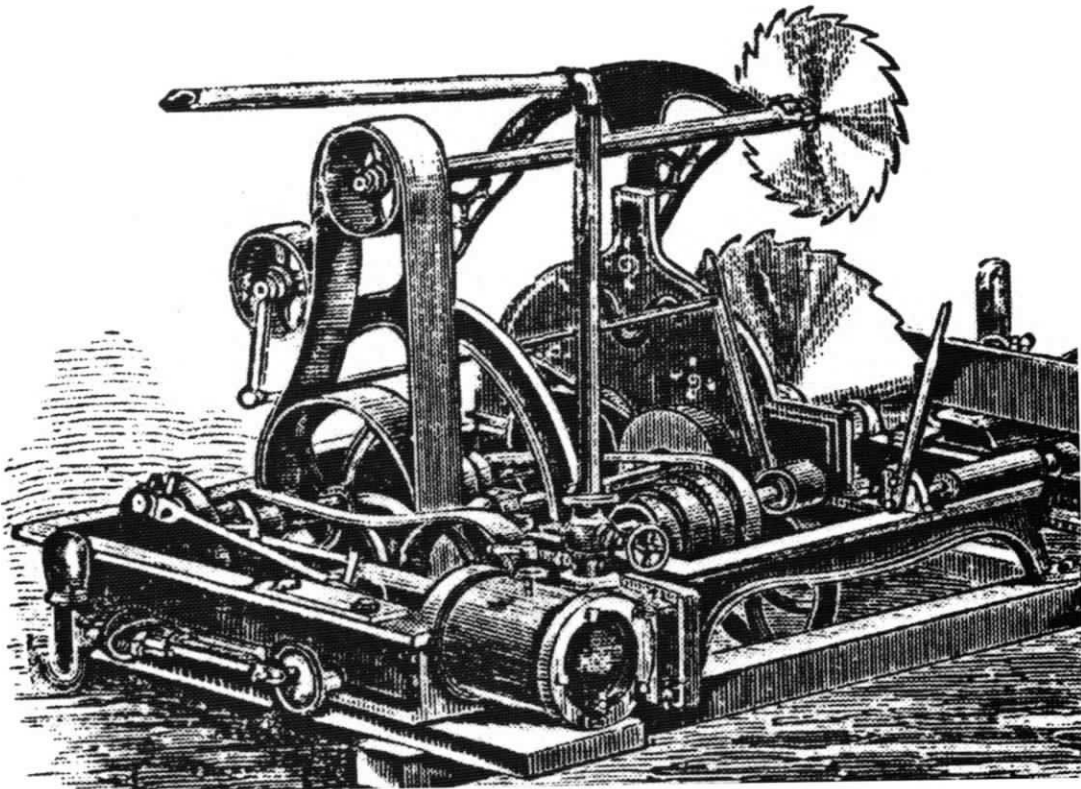


Figure 3. Carnes Sawmill

courtesy Allen County (Ohio) Historical Society

3rd Annual Nebraska Steamup

by Jerry Barnes

The small scale steam community isn't real big in the Heartland, but it's picking up steam...

The third annual Nebraska steamup was held at Marty Cozad's layout in eastern Nebraska at Nebraska City, on the 9th and 10th of October, 2004. People started arriving on the 8th and ran trains that afternoon and the group had dinner out that night.

Marty lives a few miles out of town on a gravel road. His layout is about 250' feet from end to end and about a 100' deep. It is divided into two loops about 500' long. The track runs into his workshop, which is a separate building from the house. The terrain varies dramatically and has some large bridges.

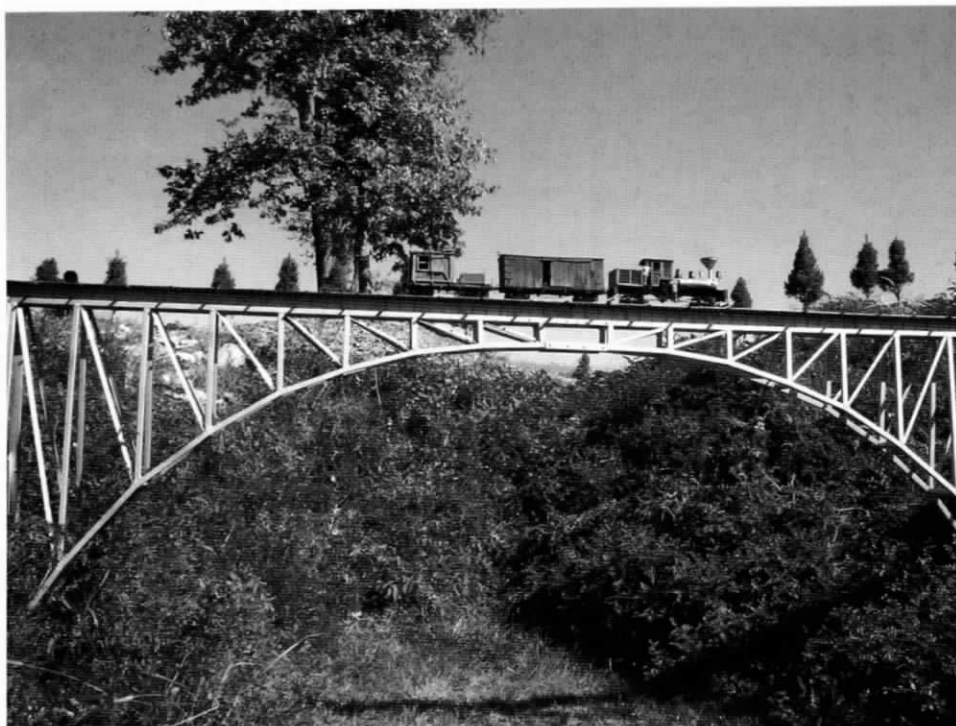
Marty is quite well known to the various train forums on the internet, although he is not a steamer himself. All his trains are battery powered - but he's a nice guy anyway, hosting a steamup for us 'hot water' guys. His charming wife, Carrie, made a great lunch for us on Saturday, which was very popular, since it was so good!

I arrived on Saturday morning, after a 230 mile drive from my house in central Nebraska. A friend of mine drove me down in his new pickup, lots of room for everything! He got excited down at the steamup and is now wanting to get a train of his own.

This was my first steamup, or meeting any other

Garden Railroad enthusiasts in a large group. There are not many garden railroads in Nebraska, and the number of steamers is even smaller, I only know of one other in the state, of course he is a loyal subscriber also!

Pulling in to park we saw cars from Arizona, Illinois, Arkansas, Missouri and Iowa, even a few from Nebraska!



Marty's railroad features several spectacular bridges.

Marty welcomed us and got us set up. I brought my Shay that I had built about 10 years ago. You may have read the articles in *SitG*. It is still my only steamer, alas. Many gathered around and I was introduced to the other steamers. They asked who made mine and were surprised that I had done it myself. I also brought my

scratch built wood cars for it to pull.

Joe Hall, a retired teacher also, had an Accucraft 3 cylinder Shay. He's from Cedar Rapids, Iowa. His first running of it was at Diamondhead last year, he was very enthusiastic about that. It was bit windy that morning and he had some difficulty lighting up, but did get it running fine. It is sure a nice looking engine!

Skip McEwin also had an Accucraft 3 cylinder Shay. He's from Belleville, Ill. He had arrived the day before and had run his Shay then. He helped me some and I got some advice from him - I was trying



Joe Hall and his Accucraft Shay.

to milk the brains of all the experienced steamers. He held off running till after I left in the afternoon, so I didn't see his run.

Bill Ferguson and his wife Elette had driven up from Plattsburgh, Mo with his Roundhouse Fowler and a two cylinder Accucraft shay. Bill hadn't run the Fowler in over a year and had some troubles with it, but did finally get it running in typical Roundhouse fashion. He was the only steamer with remote control - an RCS system, which they use on all their locomotives.

Bob Unik, a retired Nebraska farmer was also there, but did not bring his Roundhouse steamer down; he's looking at trading it in on a new Shay. He is the other *SitG* subscriber I mentioned.

There were about 4 warmup tracks to put your steamer on. I got after it right away and was the first one out. I had to back it up, with the cars attached. I was a bit wary of this but it went fine through the switches. It took some fiddling with the throttle and bar to get the correct setting...why are the controls so sensitive? Even the burner is super sensitive. You just think about moving it and it goes too far...but all this is the fun part, right?

As you can see from the pictures, Marty's layout has quite a few tunnels, bridges and some slight grades. I usually walked along with the Shay to adjust the throttle on the grades. On my first circuit of the track, my cars de-coupled right before the tunnel and of course rolled to a stop in the middle of the tunnel. I backed the Shay up slowly to push them back out, the pin had hit a magnet and forced it up, we guessed. We bent the pin a little and it did okay the rest of the day.

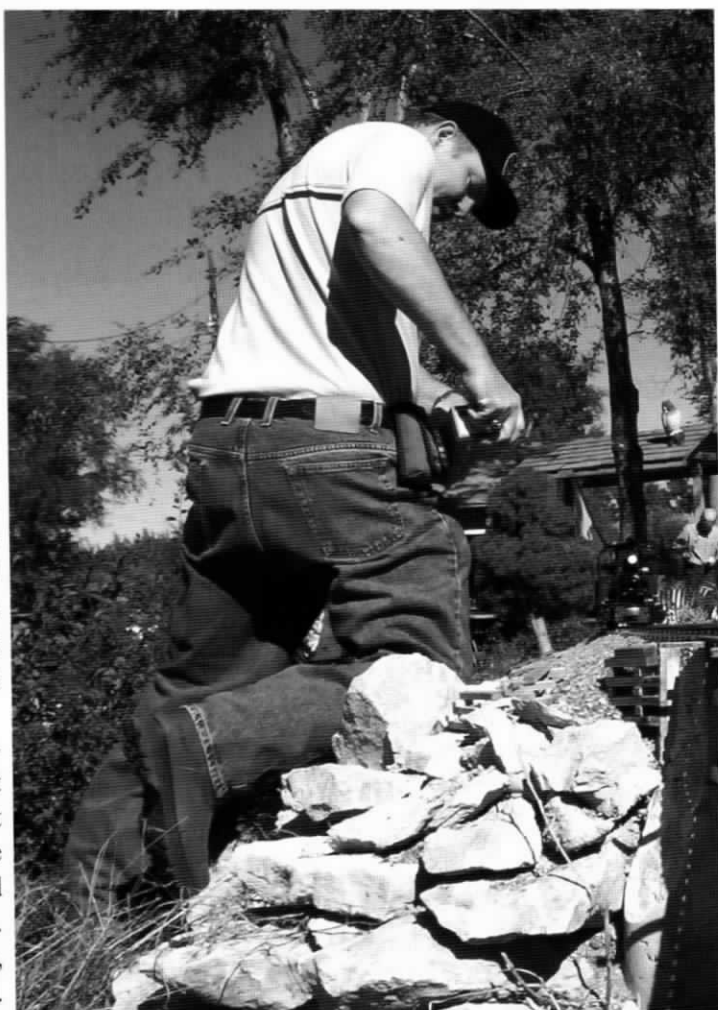
Marty learned how to weld last year and has made

several great bridges from metal that he welded up in his shop. He mentioned he had done some workshops demonstrating his talents. One bridge is about 20' long and 10' up off the ground. Sure glad my Shay didn't stop in the middle of it!

With the run being about 4 times longer than my 130' layout at home, I had to adjust to the fact that after just a few times around it I would need to refuel and add water. I have a nice Goodall valve I added to the Shay last year, when I started having problems with the water running out before the fuel. Pikes Peak Locomotive works did it for me. Torry Krutzke is a very nice guy to work with.

After a couple of runs I was worn out from walking all over the large layout, thankfully it was then lunch time and I could take a break.

Once lunch was taken care of we had a group picture. There were some non-steamers there also, they ran on the other loop. One picture shows all the steamers. The people that run MyLargeScale.com

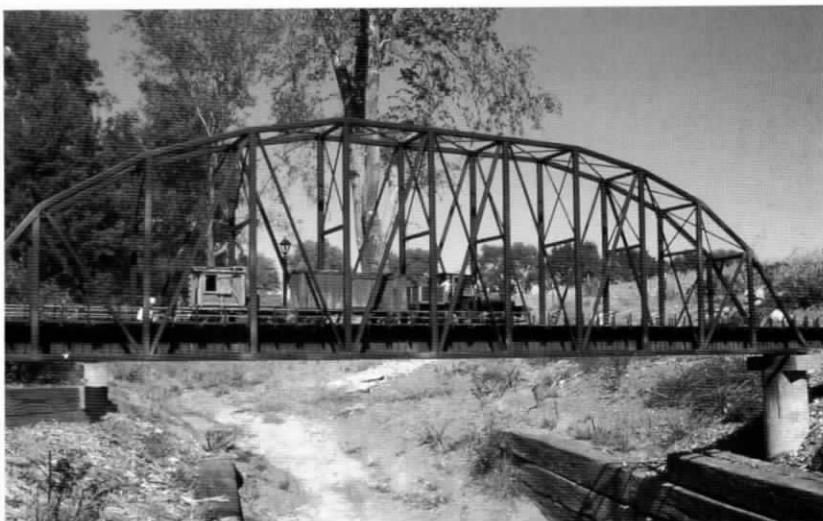


Bill Ferguson makes an adjustment to his loco during a run on Marty Cozad's line in eastern Nebraska.

were there also. There may have been some pictures of the steamup posted on their web site by now, so check it out.

I can't express how much fun I had meeting other steam guys and gals and seeing the locomotives I have read about for years but never seen in person. I picked up lots of good ideas, one being that smaller, dead level layouts are better on old guys following non-remote control steamers around! I was very tired on the way home, I showered and went to bed a bit earlier, but it was worth it. So if you are like I was and haven't gotten out to a steamup or meeting, GO and you will have a good time.

Marty is always happy to have a



GR person stop by, you can reach him in Nebraska City at 402-873-9284, or via e-mail at: cozy6z@yahoo.com

I am happy to see other steamers also. You can contact me at: 308-324-3004, I'm in Lexington, NE, right off I-80 in central Nebraska. E-mail is: juking@atcjet.net. I'm now retired from teaching so I am usually around and available to run trains, or mouth, or both!



Photos on this page show two more of Marty's awesome bridges. What a treat to see your train rolling across one of these beauties, with a steam plume hanging over the consist!



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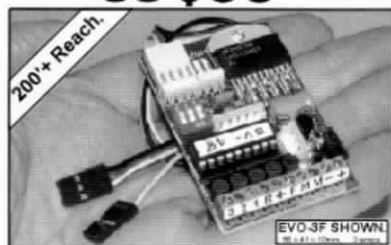
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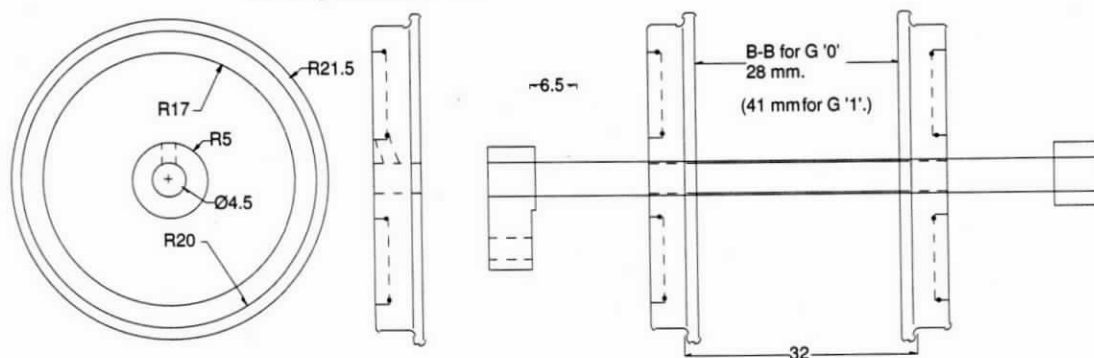
by Keith Bucklitch

Making Drivers

1. Cut four slices approximately 8 mm thick from a piece of 45 mm (1 3/4") mild steel bar. Chuck each of these in turn, face the cut surface, turn round and face the reverse. Drill a 4.7 mm hole and ream 3/16" for the axle. Repeat for all driving wheels.

It is quite common that your chuck is slightly out of true. Therefore, to ensure the wheels are concentric, make a wheel turning mandrel to fit in the chuck as follows. Firstly, cut a 30 mm length of 6.5 (1/4 inch) mild (or silver) steel rod. Thread one end 1/4 inch by 40 tpi for 10 mm. Place on one side. Take a piece of mild steel bar, around 30 mm diameter and 20 mm long. (These di-

Driving Wheels - ms



mensions are not critical.) Mount this in the chuck, face the end, centre drill and drill 7/32 inch and tap 1/4 inch by 40 tpi. (If you wish, mark the mandrel alongside No 1 Jaw of the chuck for future use, although you may find it is not accurate on a second use. However, retain the bar as you can easily make a new mandrel for another set of wheels.) Hold the piece of 6.5 mm rod in the tailstock chuck and screw it into the piece of bar as tightly as possible. Loosen from the tailstock. Face the end of the rod then carefully turn down until one of the wheel blanks will just slide along the rod without any slackness. From this point on ALL the wheel turning must be done without disturbing the mandrel. Thread the end of the rod 4 BA leaving approximately 6 mm plain to mount the wheels. Place a wheel blank on the mandrel and tighten a lock washer and 4 BA nut to hold the wheel firmly.

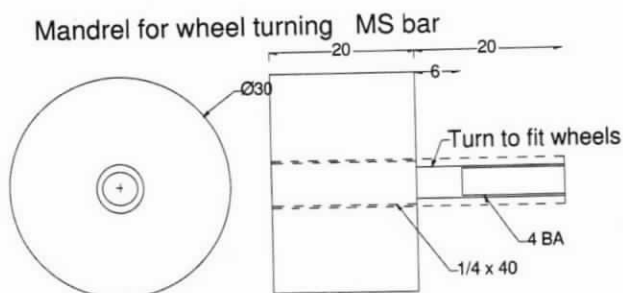
Using a freshly sharpened tool, turn the wheel

blank to 43 mm diameter. Note the setting on the cross slide. Remove the blank, and repeat with all the other wheels. Now turn the tread of the wheel to 40.5 mm diameter for a length of 5 mm. Remove the wheel and repeat for all of them. Now, after re-sharpening the tool, turn the wheel to 40 mm diameter. Note the cross-slide setting. Remove the wheel and do the same for each one in turn TO THE SAME SETTING. You can leave the treads parallel if you wish or turn a 2 degree taper on them by now setting the cross-slide over to the desired angle and working from the flange root, carefully turn the taper. Again repeat for each wheel. . Using a file,

break the edge where the face meets the tread, to leave a slight bevel. Also, using the file, shape a slight angle on the flange, and round off the edge. You should now have a set of wheels that are all the same diameter.

To turn the recess in the wheel face, use a round nose tool with sufficient overhang or a boring tool. Treat each wheel in turn noting the cross-slide setting for the first one and working to the same measurements. You have now finished with the mandrel for this set of wheels. Remove it from the chuck. You may use it again with a fresh stub axle for the pony wheels.

Take a wheel, mount it in the chuck gripped by the tread, with the flange pressed hard against the jaws. Face off the back of the wheel until the flange is 1.5 mm thick. Note the setting on the top slide. I usually lock the saddle traverse and use the top slide to ensure that all the wheels finish to the same flange thickness. Before



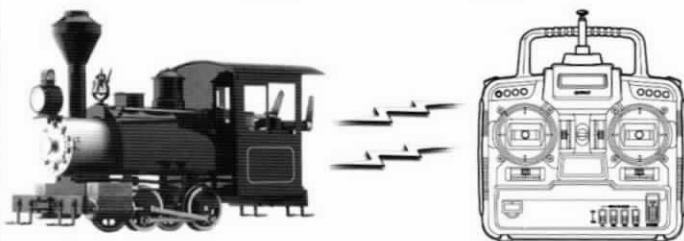
removing the wheel from the chuck, use a file to create a slight bevel at the flange. As before repeat with each wheel in turn.

I usually secure my wheels to the axles with 8 BA grub screws. A 1.8 mm hole is drilled through the wheel boss into the axle hole and tapped 8 BA. If I am certain that I will not want to move the wheels at some later date, I also drill a 1 mm hole and secure a pin through the wheel and axle with Loctite. Alternatively, drill two 8 BA holes and use two grub screws for each wheel. This model is capable of changing gauge, and therefore you may not wish to secure the wheels on the axles permanently. However, as the frame axle bushes are removable it is possible to remove the complete wheelset and replace with a different gauge.



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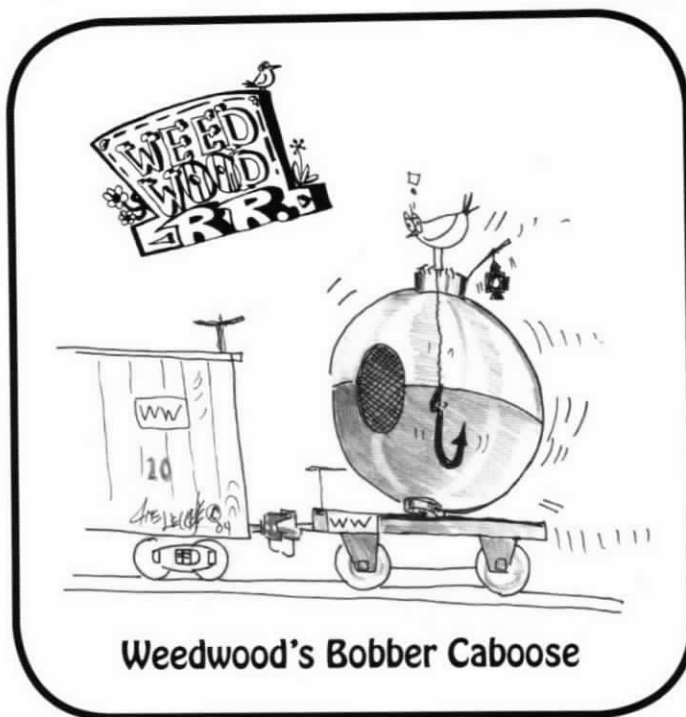
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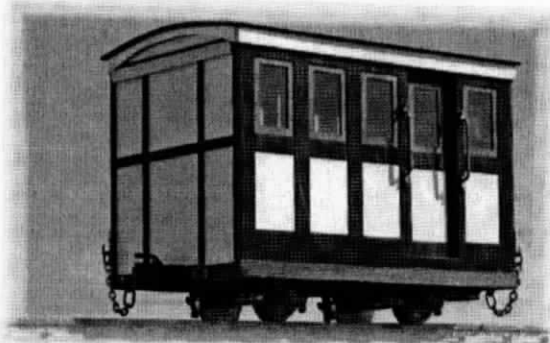
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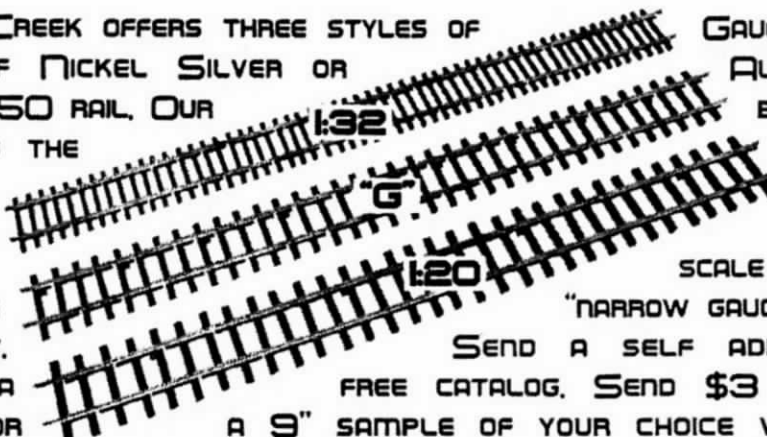
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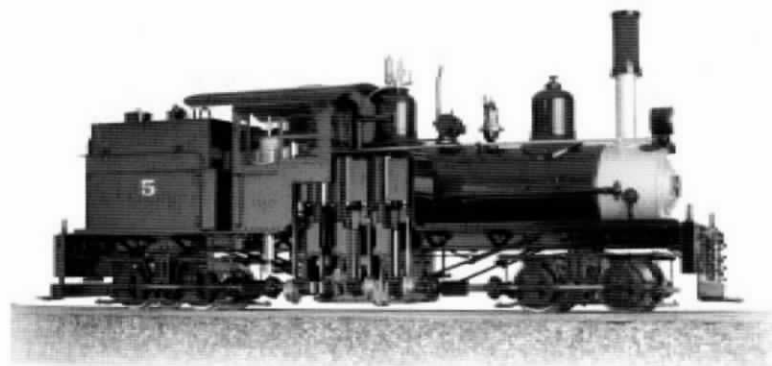
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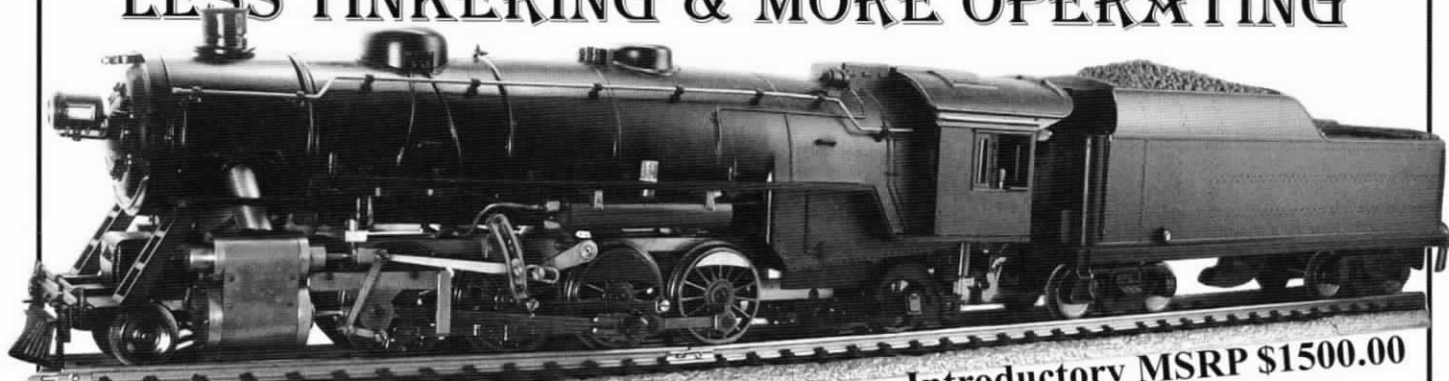
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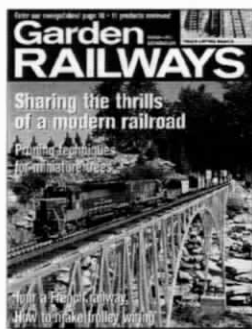
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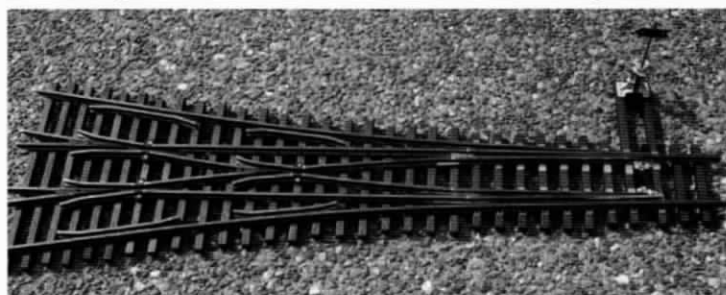
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END OF THE LINE

While enjoying our visit to the President's Day Weekend show, held in the Trolley Museum at Steamtown in Scranton, PA, I met a newcomer to our hobby. This in itself is not newsworthy...what made it exciting to me is that Sam lives less than half an hour from our place. When I tell you that I'm used to driving 2-3 hours to get to the closest steamer here in up-state NY, you will understand why I was excited.

Shortly after the show, Sam called to see if I was interested in riding with him to the East Coast Large Scale Train Show in York PA. I've never been to this show because I was under the impression that it was just for the electric side of the hobby. How wrong I was!

I was happy to find that Mike Moore had his huge steam track set up, and there were even a few dealers and manufacturers scattered around the 2 large halls who were either specializing in steam or at least carrying steam products along with the electrics.

Next year I will plan on attending for the full duration of the show,

and will bring along some trains to run.

So...when you are looking for a place to run your steamers with kindred spirits, don't overlook those shows that were formerly just for electrics. Times are changing!

Happy Steaming...

Ron



Outside back cover, bottom:

The pilot model of Aster's *Duchess of Sutherland* pulling eight Coronation Scot Coaches built by Peter Comley. The new Aster Gauge 1 Live Steam (1/32 scale) model represents the original non-streamlined version of The Princess Coronation Class locomotive series and its most famous survivor - LMS 6233 'Duchess of Sutherland'. The restored 'Duchess of Sutherland' prototype was entrusted with the working of the Royal Train during the Queen's Golden Jubilee year in June 2002.

photo by Jim Pitts

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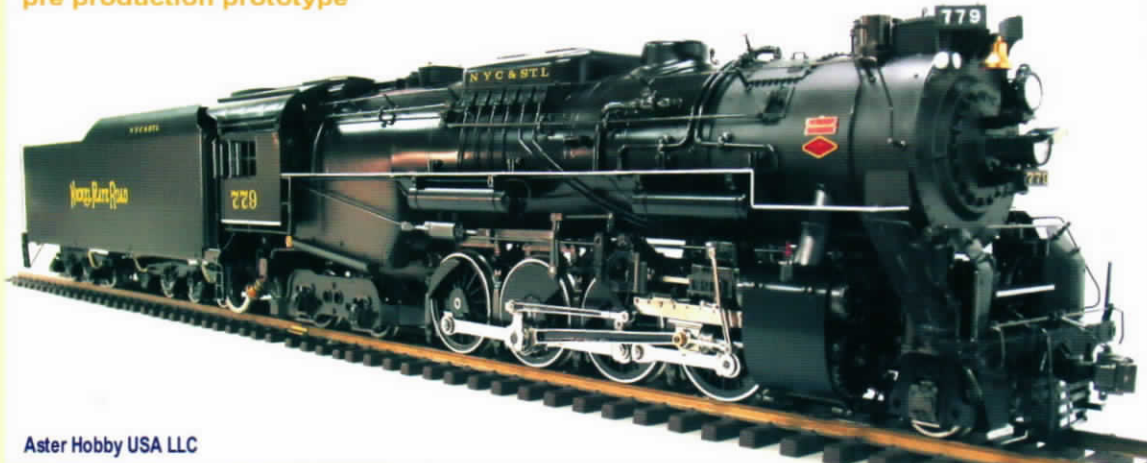
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