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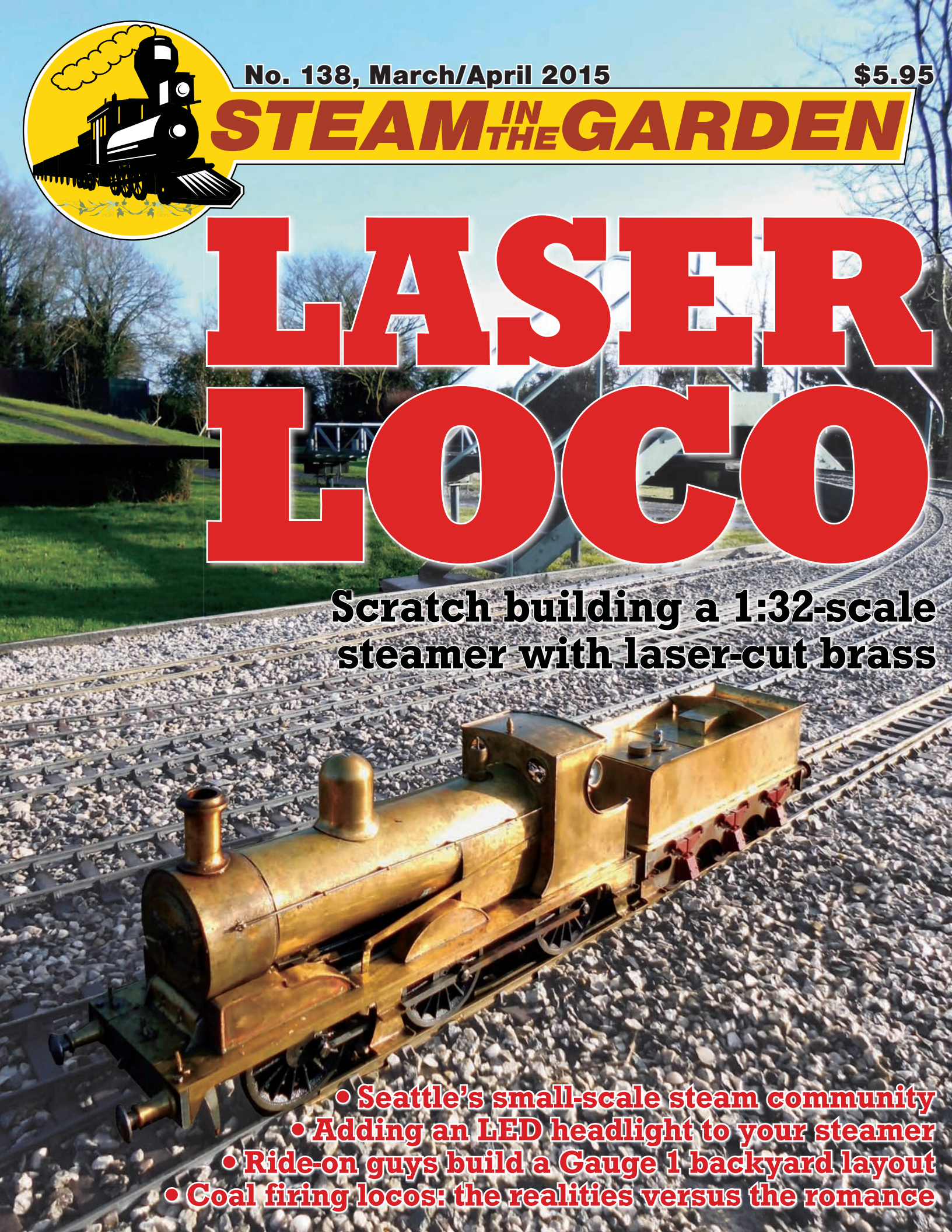

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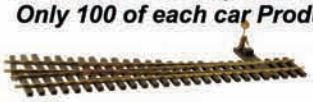

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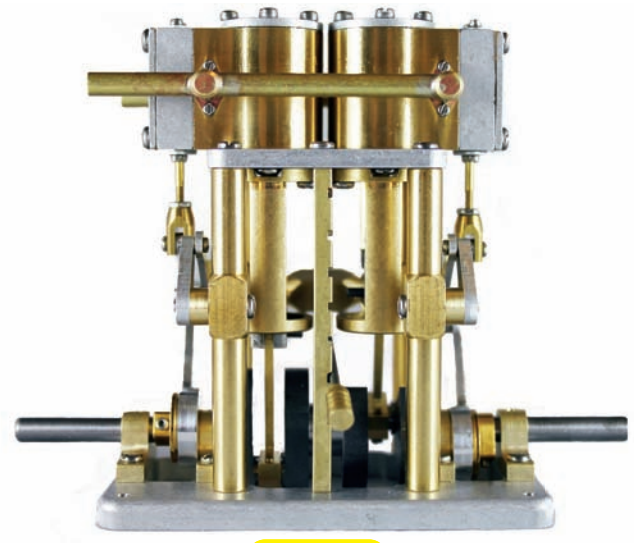

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Crankshaft end-to-end: 4.344"
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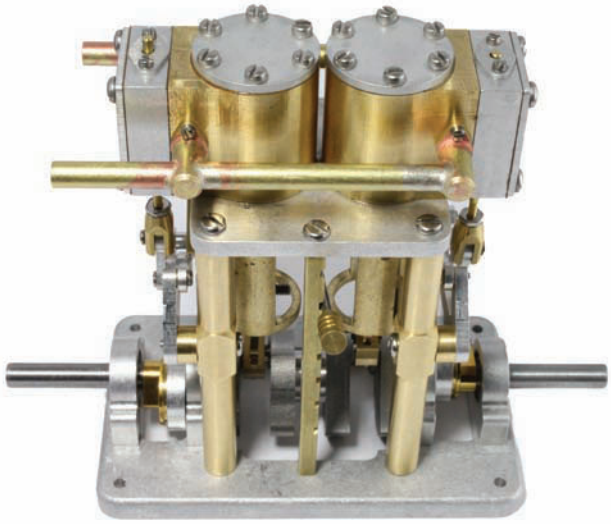

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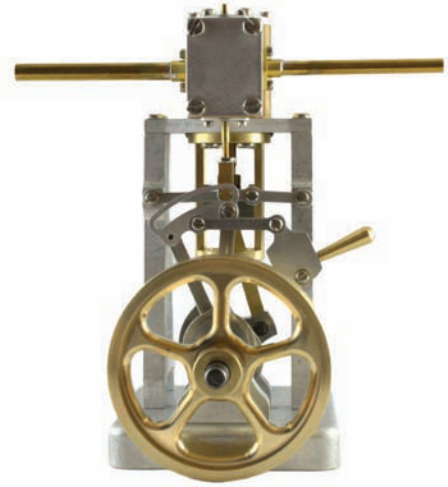

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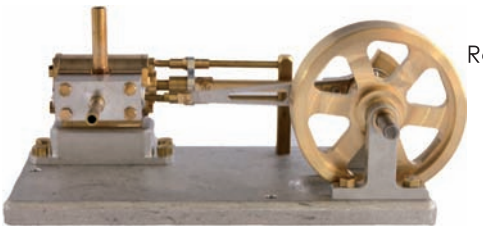

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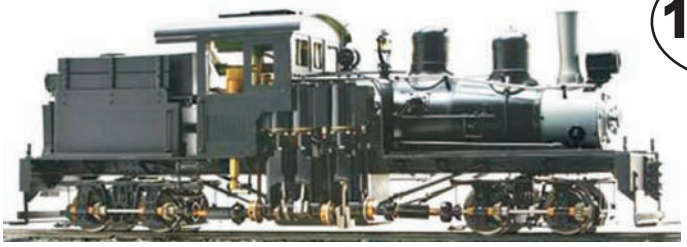

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Vol. 25, No. 2; Issue No. 138; March/April 2015

STEAM IN THE GARDEN

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

Cover: Keith Bucklitch's Lancashire & Yorkshire Railway 0-6-0, Aspinall A class — scratch built with laser-cut brass — ready to run in the English midlands. Photo by Keith Bucklitch.

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Also inside:

RAILWAY POST OFFICE

Locomotive heroes

While some *Steam in the Garden* hobbyists are machinists, some must depend upon others to keep our sophisticated models running. I obtained an Aster Flying Scotsman A3 with 11 Peter Comley London and North Eastern Railway coaches from the estate of the late Lynn Gasten and have run the wheels off of it for 10 years. I sent it to Ryan Bednarik at Triple R Services LLC of Mount Holly, N.J., and I thought it would be fun to share Ryan's work list:

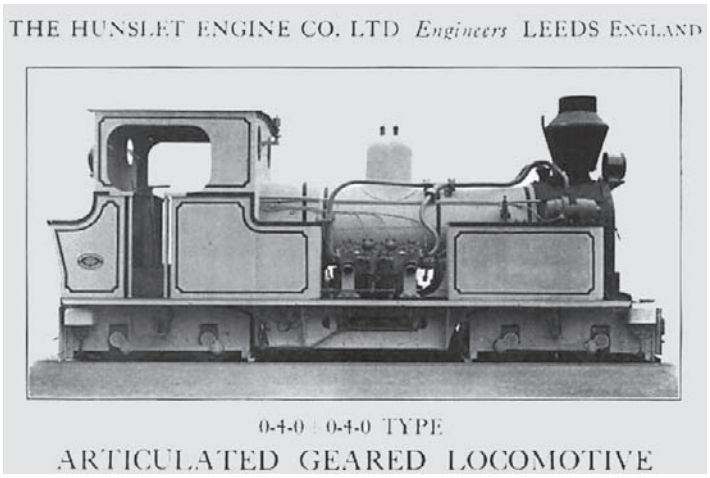
I have completed the extensive cylinder rework on the A3, which involved a complete overhaul of the cylinders to find the bores were not round, requiring a honing and pre-load backers to be put on the piston rings.

- The valve gear had quite a bit of slop which I corrected by tracing it to worn pivots in the combination levers and radius rods. The grub screws holding the valves on the rods were rusted in place so I had to drill them out and chase the threads for new stainless ones.
- The center cylinder small-end shoulder bolt was missing upon arrival, so I made a new one and also took the time to replace the one that was not long enough on the [right-hand] side of the engine. These are slotted for a (-) screwdriver
- All glands were re-done with new o-rings and graphite yarn as a backer where needed to lubricate and prevent leaks.
- Wicks were replaced as the old ones were not making enough steam to keep four bar with the axle pump full on, pulling the 12-coach test train. These are just Aster material to original spec of density and height (11-12mm approx. height above tube ends and medium-loose packing).
- I re-insulated the smokebox as the original insulation was degrading to the point of affecting the draft; notable was the large hole that had developed by a missing piece where the boiler and smokebox meet.
- Fuel and water f exible hoses were replaced with [original equipment manufacturer's] spec as the existing ones had tears and pinholes in them.

In short, the engine was just holding on to itself when we received it.

Guys like Ryan (and his father Charles), Bill Baxley of Foster City, Calif., Dave Hottmann of Cherokee Village, Ark., Tim Miller of Portland, Ore., Kevin O'Connor of Sacramento, Calif., Norm Saley of Orlando, Fla., and Bob Trabucco of Los Gatos, Calif., as well as the others who are willing to help us non-machinists, are the real heroes of our hobby.

Jim Overland
Seattle



Small Heisler: *Built for the South African market by Hunslet in the United Kingdom.*

Heisler history

I'm sure Bill Allen is correct that a four-cylinder Heisler was never built in the United States (see *Steam in the Garden,* November/December 2014, No. 136), but several were built by Avonside/Hunslet in the United Kingdom and exported to South Africa for use in sugar plantations. Attached is a works photo of what I think is "Blackburn" supplied to Natal Estates.

David Cairns
Westville, KwaZulu-Natal
South Africa

Kudos for book

I purchased *Steam in the Garden*'s "Starting in Steam" at the National Summer Steamup last July. My wife and I both read it and we both learned a lot about steaming up and also about operating in general. I think it's a must read for beginners and old pros alike.

Bransford and Rae Ann Banks
Highlands Ranch, Colo.

LATEST WAYBILL

Steam trench warfare

Railroads played a big part in World War I and Accucraft UK said late last year it plans to participate in a variety of commemorations of the "war to end all wars," fought 100 years ago.

The live-steam model maker said it was creating a special edition of the War Department Baldwin 4-6-0T during 2015 and that a percentage of the profits from the sale of the engine would be given to the Moseley Railway Trust, operator of the Apedale Valley Light Railway, in Staffordshire, England.

The Apedale facility staged a World War I reenactment event last September to honor the use of steam locomotives from 1914-1918, and included a dozen full-scale steam locomotives, as well as "numerous petrol tractors in action, as well as infantry, cavalry, armoured cars, lorries and even a Mk IV tank." Accucraft UK exhibited the War Department Baldwin at the event.

The War Department Baldwin, initially run in 2011, is a 1:19-scale locomotive available in either 32mm or 45mm gauge. It is almost 14-inches long, 4⅛-inches wide and almost six-inches tall (355mm by 106mm by 152mm) and operates on a minimum one-meter diameter track (39 inches).

Baldwin fighter: *A full-scale War Department Baldwin 0-6-0T at the Apedale Valley Light Railway last September, during a World War I re-enactment (Accucraft model is on the buffer).*

Accucraft UK, based in Shropshire, England, did not provide a list price for the War Department Baldwin; the company is on the Web at http://www.accucraft.uk.com and by phone at (011) 44-1694-723799.

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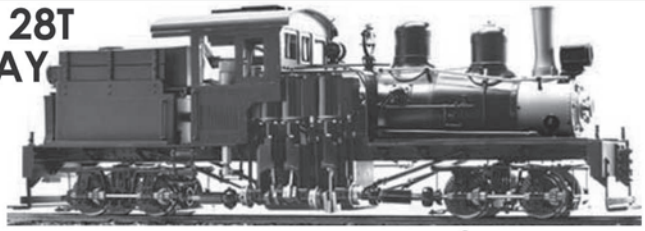

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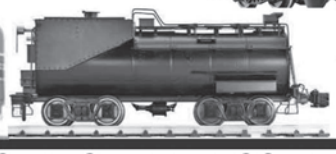

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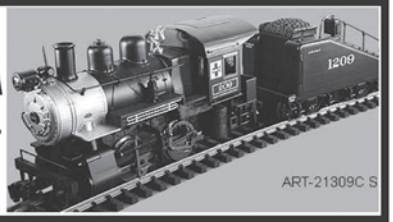

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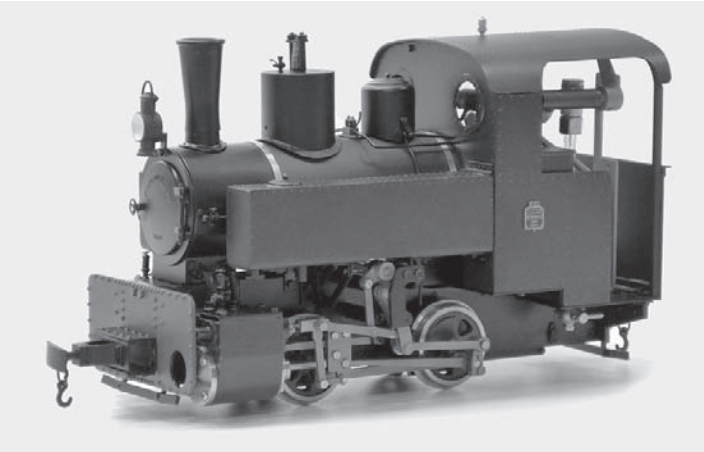
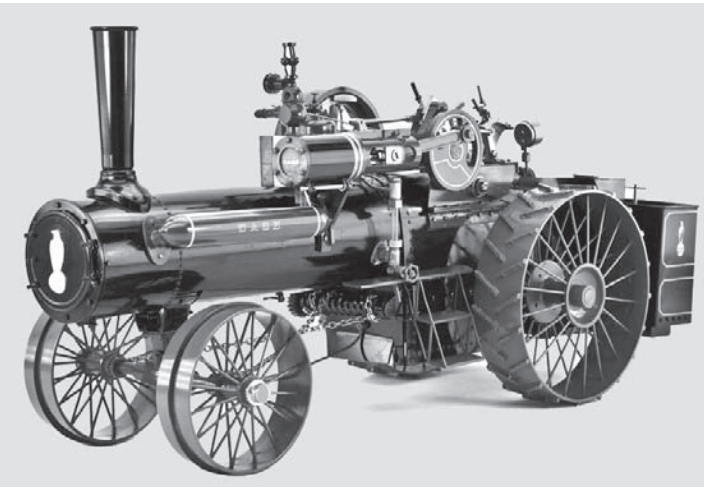


Decauville: *The French 0-4-0T 1:19-scale locomotive is now available for delivery.*



Steam tractor: *Accuraft's one-inch scale model of a circa late 1800s Case tractor.*

Decauville delivered

A live-steam model of a full-scale French locomotive designed to run on portable track is now available for delivery, the maker's representative said earlier this year.

MBV Schug, the Accucraft representative for Europe, said the 1:19-scale Decauville 0-4-0T is now available. The model is 8⅜-inches long, 3½-inches wide and 5½-inches tall, weighing in at 5¾ pounds. It operates on 21-inch minimum radius track and is available in either 45mm or 32mm gauge.

The butane-fired locomotive has two cylinders driven by D-valves, operates at 40 psi and includes a safety valve, a pressure gauge, a water-level gauge and a displacement lubricator with a drain cock.

The Decauville factory operated in the late 1890s and early 1900s and provided the French military with portable railroads that operated at 23⅜-inch gauge (600mm) throughout the first World War.

The Decauville 0-4-0T retails for about $2090. MBV Schug, which is based in Detzem, Germany, is on the Web at http://www.mbv-schug.de and can be reached by phone at (011) 49-6507-802326.

One-inch scale steam tractor

Expanding its line of oversized live-steam models, Accucraft Trains said earlier this year it would be making a one-inch scale model of a Case Co. steam tractor from the late 1800s.

The brass and stainless steel model will have a butane-fired boiler with twin-flue burners and a super heater. The single cylinder will drive Frick valve gear, all mounted on a cast frame. It will have

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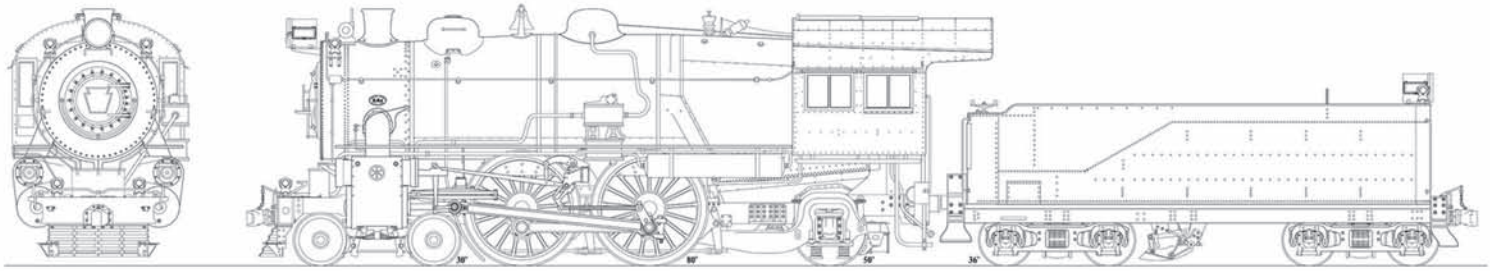

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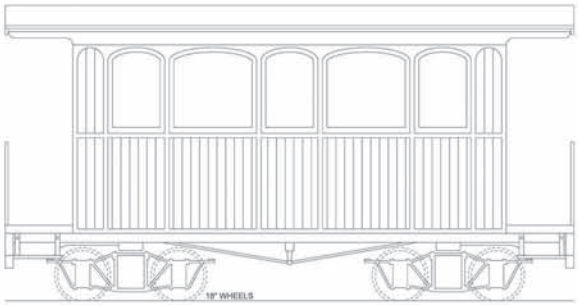
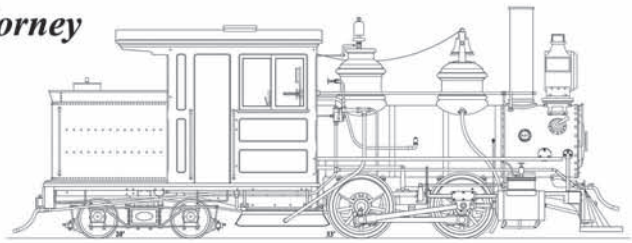


Accepting reservations
7/8ths S.R.R.L. #6 Forney



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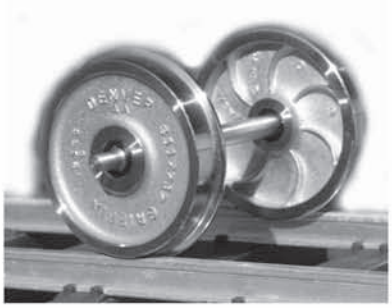

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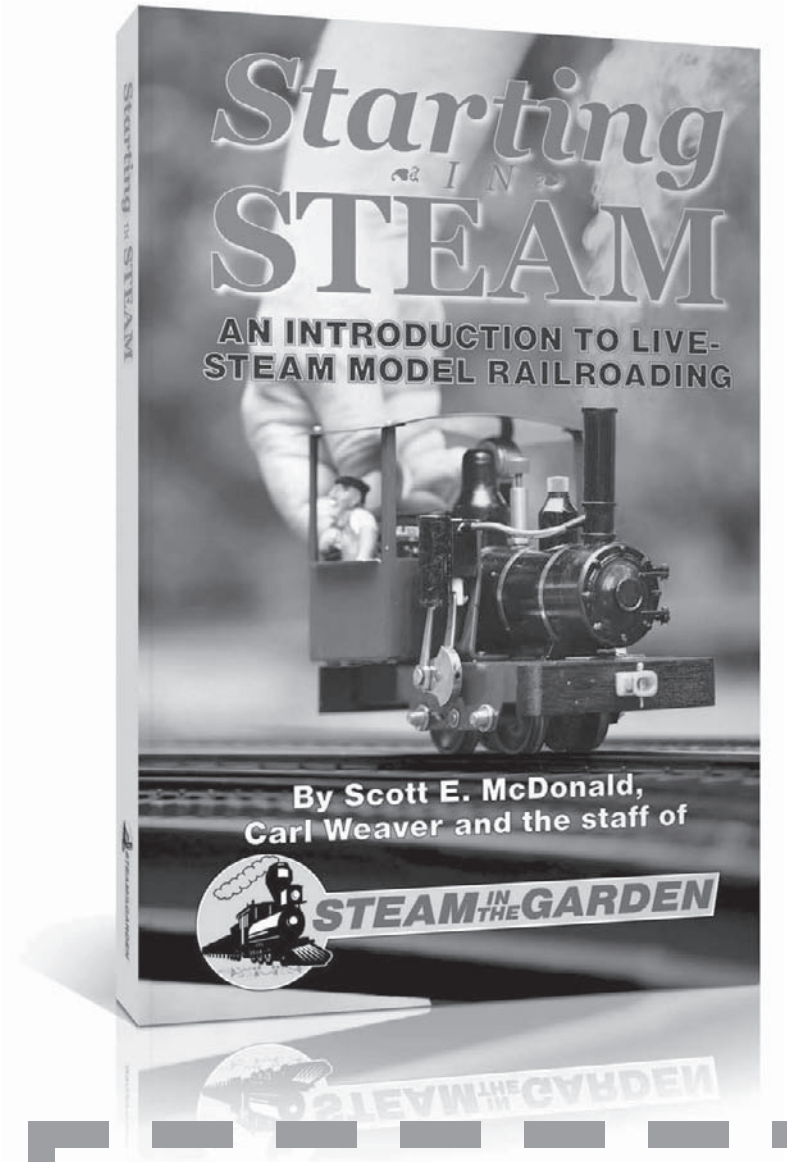

A BEGINNERS' GUIDE TO LIVE-STEAM MODEL RAILROADING

"STARTING in STEAM" is a new 174-page book designed to help not only small-scale live steam newcomers, but veterans as well. Written by the staff of *Steam in the Garden* magazine, the book has just been released and provides a wealth of information on how the locomotives work, how to run them, how to care for them and how to have fun with them.

"STARTING in STEAM" includes 10 chapters, with titles such as "Choosing your first locomotive," "Butane-firing basics" and "Getting help." Additionally, the book features an extensive glossary that addresses not only the specifics of live-steam model railroading but also general railroading terms such as "cylinder," "piston," "switch" and "Whyte notation."

"STARTING in STEAM" is available both in paperback and digital versions. The paperback retails for $9.95 in the United States and for a limited time we'll provide free shipping (Canada and overseas is higher). The digital version is $5.95 on the web site; single copies (as well as bulk purchases) are also available by calling (607) 642-8119.

http://www.steamup.com/starting/

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a dome, a feed-water heater and governor and have full-spring suspension on the rear axle, with the gears kept in alignment by a swing-link system.

The Case tractor will be 21⅛-inches long, 7¾-inches wide and 10½-inches tall, weighing in at 22 pounds.

Accucraft Trains, based in Union City, Calif., is on the Web at http://www.accucraft.com and by phone at (510) 324-3399.

Lots of steam at garden railway event

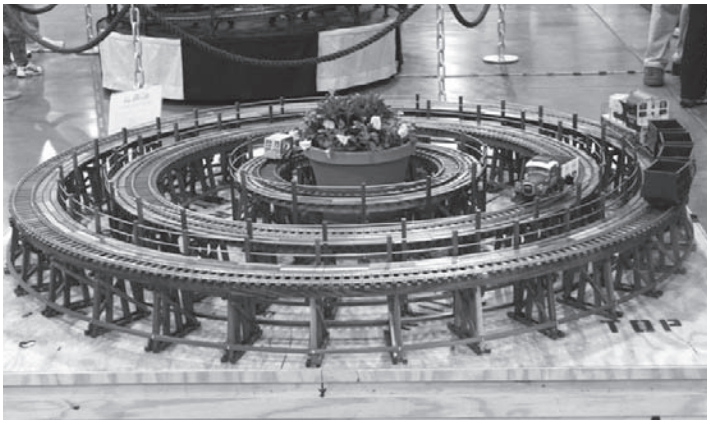
Organizers of the 2015 National Garden Railway Convention — to be held July 5-11 in Denver — said earlier this year they plan to have extensive opportunities to run small-scale live steam.

The Denver Garden Railway Society said it has persuaded the organizers of the International Small Scale Steamup of Diamondhead, Miss., to bring one of the layouts used in Mississippi to Denver. This layout will be set up in the trade-show hall at the Crowne Plaza Denver International Airport Hotel, and will be available for all in attendance at the convention to run steam trains.

The trade show, and therefore live steaming, will be open a total of 18 hours during the six-day event.

Additionally, organizers said that if steamers would like to schedule a run on the outdoor layout at the Colorado Railroad Museum during the week, to please contact Mike Harris of the Denver garden railway group, and he will set them up.

The Denver event will be the 31st of the national garden railway conventions. For more information, visit http://www.NGRC2015.com.



Hunter layout: *One of Ron Hunter's small railroads at a 2011 exhibit. Photo by Carla Brand Breitner.*

Hunter Railway moves to Vegas

A husband-and-wife team that have been long-time supporters of small-scale live steam have great ambitions for their business — so great that they moved their base of operations 550 miles in order to be in a place where they believe they can help revolutionize the model train hobby.

Hunter Railway Systems last spring moved from suburban Sacramento, Calif., to Las Vegas, Nev., in order to establish what Ron and Jamie Hunter call "a real hobby shop," which will feature trains in all scales, as well as an arcade and hands-on showroom where children can run trains themselves.

"Sadly, children are not encouraged to play with trains anymore," said Jamie Hunter. "Parents do not want to have to be bothered with setting up and/or taking down train sets." Further, she says, "All the big manufacturers in the train industry have apparently

lost interest in the reality of marketing to children."

Hunter Railway, which started as a business that provided modelers with custom elevated rail systems, bridges, trestles and helix systems that allow trains to move great heights in limited space, plans to expand in Las Vegas to create something of a mecca for model trains and railway enthusiasts.

"In order to get more people — with an emphasis on kids — interested" in the hobby, said Jamie, Hunter Railway "will offer classes in railroad design, diorama design, mechanics and low-voltage electrical. We will give locals as well as tourists a place to bring their kids — of all ages — and play with trains."

Las Vegas was chosen as their new location for a variety of reasons, Jamie said, including Nevada's business-friendly atmosphere and the large number of tourists who visit the city every year. "Yes, we know that it is hot two-three months out of the year," said Jamie. "However, this is relative, just a hiccup that can be given a remedy called 'air conditioning.'"

The Hunters' planned "Event Center" will feature tracks "of all sizes" and will be "constantly in use." The couple envisions a section for N, HO, O, and two sections for garden scales, which will be set up to accommodate steam trains, track electric or battery-powered trains. "We will have an area for conferences and meets, as well as club functions," said Jamie. "We envision the Event Center hosting national and international steamups, conventions and shows. Las Vegas is the convention center of the United States; we want to make it the train destination of the West."

Hunter Railway Systems is on the Web at http://www.hunterrailwaysystems.com or by phone at (702) 616-2181 and the shop is at 6275 Dean Martin Drive, Las Vegas, Nev. 89118.

How steamers in Seattle created a community that runs trains twice a month

EMERALD CITY STEAM

Text and photos by Paul Hagglund

Last year marked the silver anniversary not only of the Puget Sound Garden Railway Society, but of its live-steam subgroup as well. The club as a whole has seen growth and change over the years, with the live steamers being the most active segment of the group despite accounting for a relatively small portion of the overall membership. It seems fitting to look to our origins and growth and look ahead toward our opportunities for the future.

Small-scale live steam has been an integral part of the Puget Sound Garden Railway Society (PSGRS) since its inception. First mention of the live steam group came in the minutes of the second official meeting of the PSGRS, held at the home of Ted Sharpe in April 1989. Nick Wantiez was distributing copies of *Live Steam* magazine and Jim Overland is recorded as providing the first steam action at a club meeting with his Shay and a log train.

Steam power: *Bob Gladney prepares his Argyle Philadelphia at the Georgetown PowerPlant.*

Moving into the 1990s, the steam group grew, attracting members from both inside and outside the parent club. Rotating steamups were regularly scheduled amongst the members who had facilities more suited to the temperament of live-steam locos. One such steamup in 1994 is recounted as having 65 attendees braving the rain, though not all of them were raising steam.

Growth from outside came from taking part in the monthly Emerald City Model Engineers meetings, then held at Cropley Metal Fabricators in Seattle. In his April 1995 column in the newsletter *Puget Sound Garden Railroading*, Allan Starry noted that the group collectively owned more than 100 locomotives and that membership was growing robustly.

By 1998, the need for better exhibition facilities was realized, and so the first phase of our portable layout was constructed. It seems that the members of the electric modular group were none too keen on the idea of steam oil soaking into their scenery, and therefore they were supportive of the idea of a separate track for live steam.

Shortly after construction, the layout was expanded into an oval from its original circular arrangement, and a dual-gauge loop was laid inside to increase flexibility, and to allow a wider variety of models to appear for the viewing public.

In addition to the monthly steamups and occasional exhibition forays, the group also held excursions to various other rail-related attractions in the area. Recorded destinations from the first years of

Steam rain or shine: *Top left, Pete Comley, Rob Kuhlman and Nancy Brown watch Jim Montgomery wind his clockwork Chad Valley 4-4-0. Bottom left, Dave Sykes moves his C21 out of the steamup bay on Sharon Ricketts' unique track. Lower right, A Roundhouse 'Billy' scoots along Sharon Ricketts' layout.*

the group include the British Columbia Society of Model Engineers, Kitsap Live Steamers, Camp 6 Logging Museum, Mount Rainier Scenic Railroad and Anacortes Railway, as well as several private railways in 12-inch and 24-inch gauges.

To the present day, the steam group carries forth this torch, taking excursions, but these days, the destinations are not always railway – or even steam – related. A few members usually make a day trip to Vancouver, British Columbia in mid-May to attend the All British Field Meet and admire a wide range of British-built automobiles and motorcycles exhibited in the beautiful VanDuesen Gardens.

Georgetown PowerPlant

Our portable layout made a few visits to the Georgetown PowerPlant Museum for its annual picnic in May from 1998 to 2003. At the time, the steam group was also exhibiting at a large show on Thanksgiving weekend (where your scribe was hopelessly hooked on live steam in 2002) as well as appearances at the Great American Train Show when it was in town.

A former electricity-generating facility, the PowerPlant Museum was founded in 1985. After the 2003 picnic, the museum curator was approached about leaving the layout up for the course of the summer to provide an extra steaming venue. The response was favorable and the layout was welcomed to stay on the grounds summer and winter.

For its first year, the second Saturday steamup at the PowerPlant was a more informal affair than our regular steamups. As time went on, a small barbecue, portable canopy, a storage shed and even a large outdoor clock rounded out our facilities. On exceptionally rainy days, we would steam until thoroughly soaked and then move on to an appropriate spot in the nearby neighborhood to enjoy lunch and a chat.

A variety of groups besides the live steamers met at the PowerPlant on the second Saturday, including the Emerald City Model Engineers and a boiler operating certification course taught by the museum's curator. The plant was also home to a small 12-inch gauge track that played host to a 1946 Ottaway Amusements 4-4-0 several times per year.

Inside the decommissioned powerhouse, the rolling stock that comprised the much lamented 18-inch gauge Anacortes Railway slum-

Special thanks

Thanks to all the PSGRS members who shared pieces of the history of the group to flesh out this article. Thanks also to John Morrison of PSGRS for archiving and scanning his collection of newsletters which contained informative accounts of group events written by the late Allan Starry, the late Lynn Gaston, Jim Montgomery and John Bigelow.

Seattle steam: *Top left, Ted Sharpe prepares to double head two Garratts. Middle left, a modified Aster Americanized Mogul on Pete Comley's layout. Bottom left, John Bigelow's 'Millie' at Sharon's layout. Top right, Jim Overland at the throttle of the 12-inch gauge Ottaway at the PowerPlant.*

bered in storage along with a variety of other vintage and historic vehicles.

(As an aside, the PowerPlant itself is a fascinating place, being the oldest surviving application of Curtis patent vertical turbine generators in the world. Until the county upgraded the security fence around Boeing Field — immediately adjacent to the plant — it was also a great spot for aviation-inclined live steamers to watch the parade of aircraft passing.)

Unfortunately, nothing lasts forever and the PowerPlant Museum and grounds were closed in 2012. Seattle City Light needed to seismically retrofit the building and properly abate the asbestos inside the structure. As a result, the portable layout had to be relocated off the site, but not before a farewell steamup to commemorate nine good years of steaming at a unique venue.

Happily, two members of the PSGRS offered some space between their house and garage and the layout moved to its new home. This location is more weather protected (great news for those that like to run alcohol-fired pot boilers), has reliable and convenient restroom facilities, and we are treated to the hostess' wonderfully lavish lunches the second Saturday of each month.

First Saturday gatherings

Our meets on the first Saturday of each month began as a time for a work party at a member's track, frequently at the home of Lynn Gaston. Lynn had a number of projects on the go, and several club members provided labor for the project at hand and then raised steam in the afternoon to "test the finished product."

Projects included the addition of a fourth loop of track on Lynn's elevated circuit as well as the construction of a small portable layout for easier transport and exhibition by a small number of live steamers.

After several months of this routine, Lynn decided he liked having a crowd come around for a visit and put us on the schedule in January 2005. Not long after our monthly steamup at Lynn's became a schedule staple, health and mobility challenges made it more difficult for Lynn to get out to other club steamups.

Around the same time, Ted Sharpe became a less frequent attendee of steamups because of health and mobility concerns. Ted and his wife Pat relocated to a one-story home and installed an elevated layout under a cover, an appreciated facility carried over from the previous incarnation of the railway.

The group decided to keep the first Saturday get-together going with alternating visits to Ted and Lynn's respective homes. They each seemed to thoroughly enjoy the company and watching the steamup proceedings. Facilitated by Ted's wife Pat

Thomas the Tank Engine Days: *Visitors to the Northwest Railway Museum watch PSGRS live steamers run.*

and Lynn's caregiver Rick, visits continued until Ted and Lynn passed away.

A couple of steamups were held on Lynn's track in honor of our departed members before removal of the circuit. Both Ted and Lynn left us many memories after their many years of membership, and it is fitting that our current traveling exhibition track features tables from Ted's layout and some rail from Lynn's, carrying on the legacy.

The first Saturday meet still occurs, though officially now a clockwork running session as far as the events calendar is concerned. In summer it rotates among members of the clockwork group and in winter it is held in the living room of John Bigelow's condo overlooking the Seattle skyline and Elliott Bay. Clockwork is featured almost exclusively at the indoor events, but steam usually dominates the outdoor gatherings as it rightly should.

Spouses join in

For nearly two decades, the steamups were attended almost exclusively by the live steamers with occasional visits by spouses, usually during the summer. Several spouses also made the annual trek to Diamondhead, Miss., for the International Small-Scale Steamup, and operated the "PSGRS Hospitality Suite" much to the delight of scotch lovers.

In September 2007, the first Staver's Steamup took place in Portland with a couple of spouses joining in on the short trip south. They discovered a wealth of fabric shops and yarn stores to provide materials for their own hobby pursuits.

Over the next several years, more steamers' wives came to Staver's events to sample the retail delights in and around Portland. The knitters in the group soon latched onto the fact that the fall steamup often coincides with the Oregon Flock and Fiber Festival where all manner of woolen articles and supplies can be found for sale.

Of course, other attractions can be found in the form of Powell's Books (a place that is hard to escape without being parted from some money), an incredible variety of food trucks and carts available to sample, and a plethora of outdoor recreational activities.

As a result of time spent together shopping for fabric, yarn, and other goodies, the steamers' wives became good friends. At least one steamup per month usually finds the non-steamers in attendance chatting and working on their own projects. Staver's Fall Steamup is now a couples affair for a good many members with something for everyone to enjoy.

Present

Small-scale live steam is the common interest that drew a small group together 25 years ago. Through a series of experiments and fortunate circumstances, the group grew and the meeting schedule blossomed. Through public exhibitions, interest has been generated from people already interested in large scale model railroading, those involved in smaller scales, and people from other hobbies and interests far removed from model railways.

For the past few summers, we have exhibited at Thomas the Tank Engine Days at the Northwest Railway Museum in Snoqualmie, Wash., along with local train shows alongside largely electric exhibits. We plan to keep on flying the live-steam flag and raising more interest in small-scale live steam.

Getting an LED onto the front of Accucraft's C-19

HEADLIGHT AT THE END OF THE TUNNEL

Text and photos by Peter Thornton

I have an Accucraft C-19 that has gone through many changes to more closely represent East Broad Top's No. 7. A major effort was stripping the boiler of modern appliances and adding old-style domes and an oil lamp headlight as shown in **Photo 1** (see *Steam in the Garden*, November/December 2013, No. 130).

At the time, the headlight was an empty Trackside Details brass casting, but I was sensible enough to screw it to the headlight bracket so it could be illuminated later. Steamer Larry Green showed me the tubing he used to run wires on his locos — stainless-steel hypodermic tubing, which turned out to be available on Amazon in various sizes from Small Parts Inc.

When I looked a couple of years ago, the 0.083-inch by 0.067-inch by 36-inch tubing was in packs of five tubes for less than $5. (Yes, I was amazed too.) So I bought a pack and gave away a couple of 36-inch lengths to my friends. Inflation hit and it is now around $12 for 36-inches. Larry used a slightly smaller size, I believe, as he was concerned about it fitting it into the Accucraft handrail brackets. Since 0.083-inches is 2mm, I had no problems. **Photo 2** shows a test fitting to my EBT No. 12 Mikado.

An issue I had to address this time was the curved handrail on EBT No. 7 that ran from side to side across the smoke box. It looks smooth and contiguous in **Photo 1**, but it clearly had to have a joint or two. So I dug in my tubing box and found a copper wire that is 0.081-inches diameter — close enough.

A piece of two-inch pipe made a good form (**Photo 3**) so I soon had a curved handrail. But how to attach

Finished: *Light blazes in author's workshop*

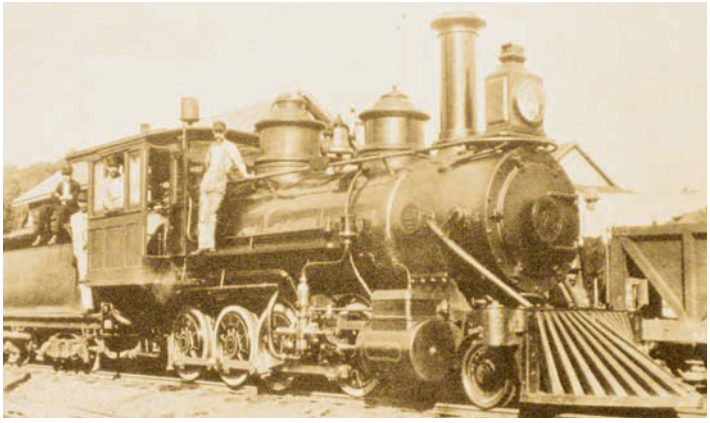
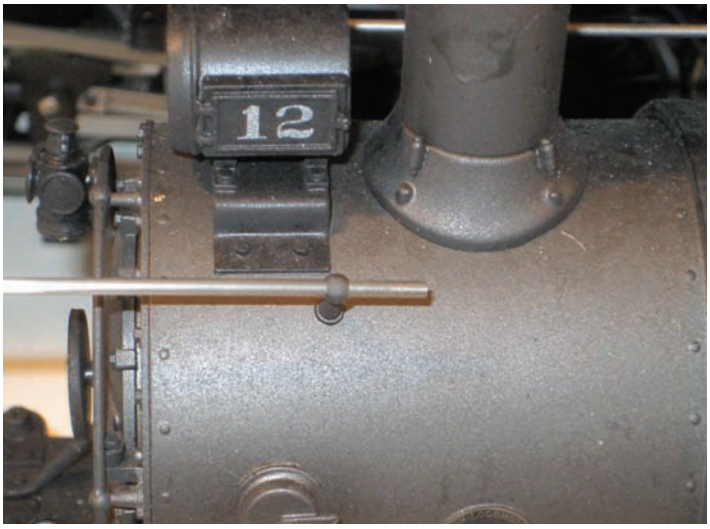


Photo 1.



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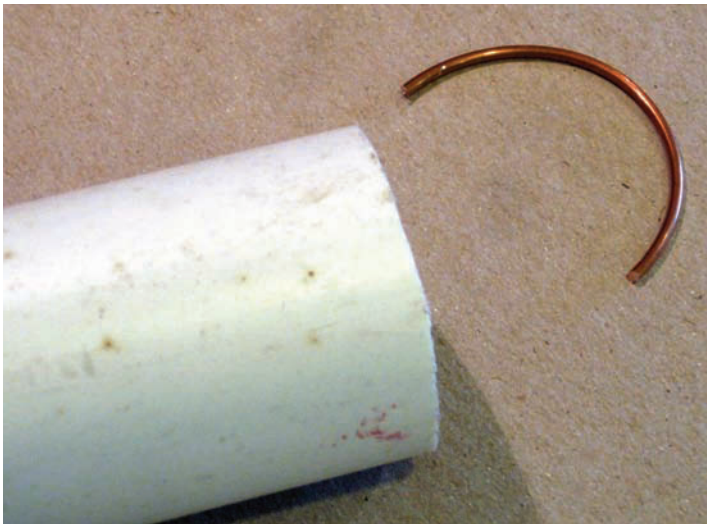

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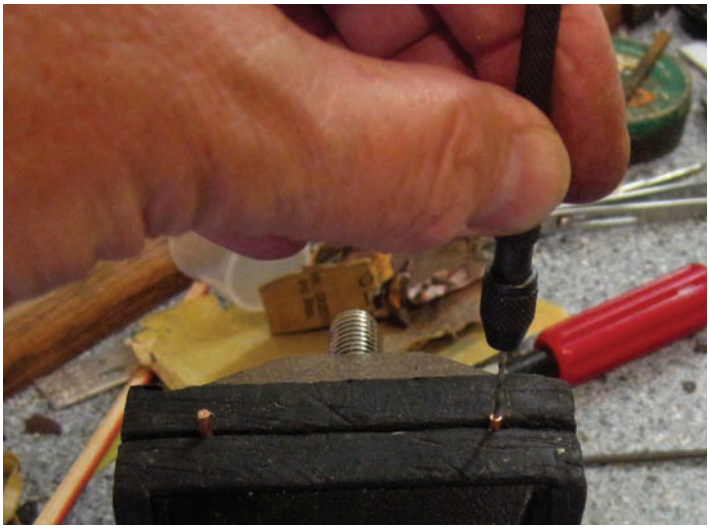

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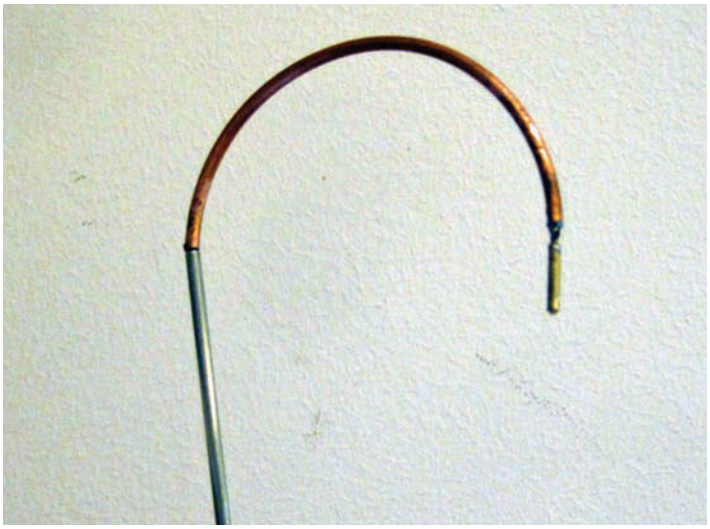


Photo 5.

it to the tubing? The hypodermic tube is 0.067-inches interior diameter — I think it has a 0.008-inch wall thickness — and 1/16-inches is 0.062-inches. So a 1/16-inch tube or rod will fit inside. I found a short piece of 1/32-inch brass rod and confirmed it fit inside a 1/16-inch tube, and I made adaptors for the ends of the curved wire.

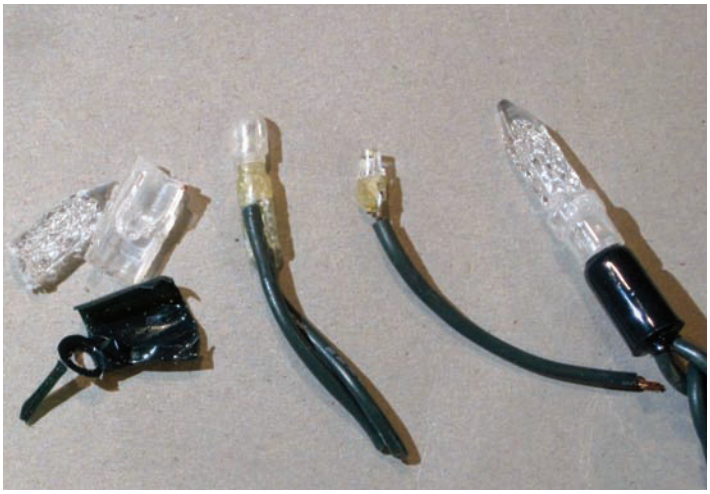
In **Photo 4** you can see how I drilled a short 1/32-inch hole in the flat end of the wire with a pin vice, after filing it flat and center-punching it carefully. I soldered the 1/32-inch rod into the hole, with a piece of 1/16-inch brass tube over it to the end of the wire After cleaning it up with a file, it fit easily (**Photo 5**). It was glued with cyanocrylate (Super Glue) when I finished painting it at the end of the project.

The source of the light is a string of LEDs that I got one Christmas for a few dollars. A better choice might be to use a warm white LED for this, but I have some paint and I wanted to try the Christmas-light approach. **Photo 6** shows three of the lights. On the right is the original, on the left is the debris from removing the "fir cone," leaving just a rounded lamp-shaped LED (second from left).

Inside is a square LED (second from right), which I decided was too small for an oil lamp unless I was going to make a complete fake glass cover, which I wasn't. The LED is a very bright cool blue-white color and worked at six volts when I tested it. However, my C-19 has a 4.8-volt NiMH battery pack for the radio, and with a few assumptions about forward current and the like, I figured a 100-ohm resistor would protect it and maybe make it a little dimmer, though it didn't seem to cut back on the brightness.

I had some very thin wire on a spool that fit the ID of the tubing. It has ordinary plastic insulation, and I wondered if it would last in the hot environment of a steam engine. I think the handrail area will be OK, but under the headlight, the handrail rests on the smoke box. A better option would be Teflon-coated wire, or some specific temperature-tolerant insulation.

But I can always re-wire it if this approach fails, so I went ahead and cut the tubing then fed the wires



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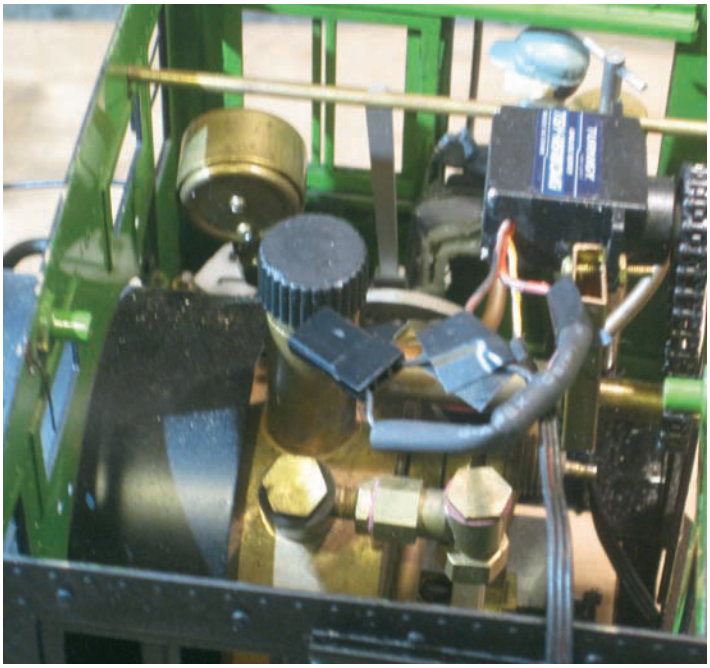

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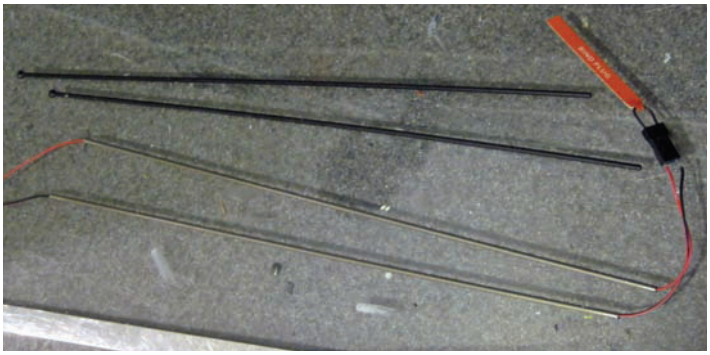


Photo 7.

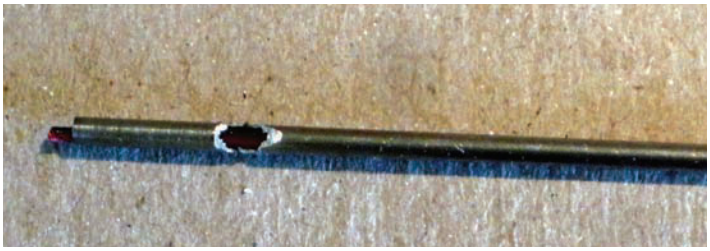


Photo 9.

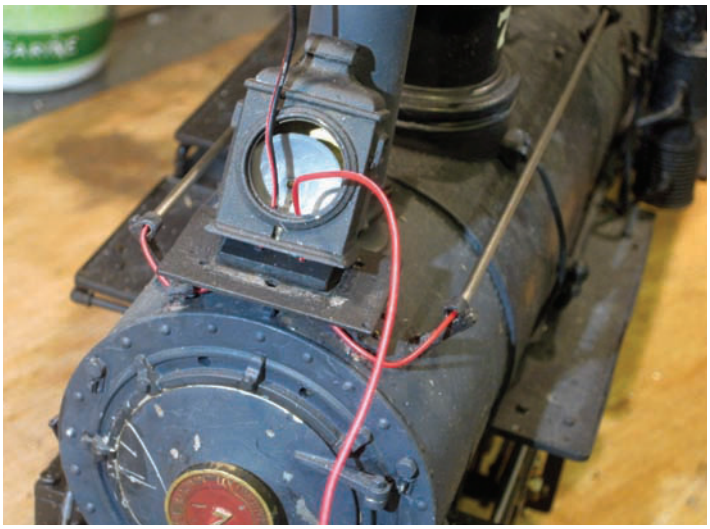


Photo 10.

through. **Photo 7** shows the old handrails next to the new ones. It also shows a "bind plug" for a radio-control system — if you have bought more than one 2.4GHz receiver you may have a stack of these, so I decided to use it as the connector for the wires in the cab.

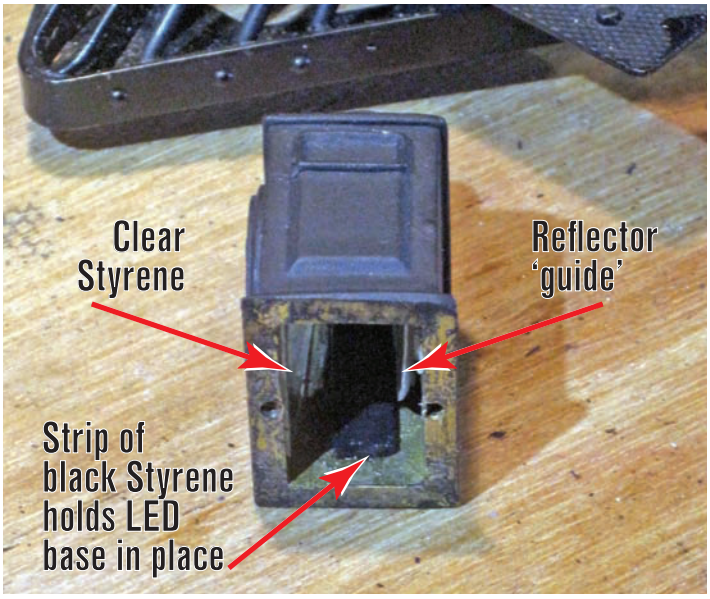
The reason for the socket is that I have to remove the cab any time I fiddle with the R/C servos, which is easier to do if you can remove the handrails and other paraphernalia from the cab front. The bind plug had its wire cut and I then soldered it into the power leads for the throttle servo, along with the 100-ohm resistor, suitably squashed into heat-shrink tubing (**Photo 8**).

With wires just plugged into the socket, I should be able to unplug and pull the wires out of the cab front if necessary. The same rationale made me pull the wires out of the handrails short of the handrail brackets, so the rail would slide forward enough to clear the cab front without dismantling the brackets.

If you don't have R/C power in your cab, then a battery source with three- to five volts of power will provide adequate power for an LED. There are plastic holders for two AAA batteries available, or you could even use hearing-aid or calculator batteries.

Photo 9 shows the handrail with the hole cut for the wire to emerge using a rotary tool (Dremel) cut-off disk. The tubing is quite thin, so I thought afterwards that a small file might have been more appropriate. (The edges look a bit sharp on that photo — I suggest you smooth them a bit.)

Before I filed the holes for the wires to emerge, I did a test fit of the headlight and associated parts. **Photo 10** shows the headlight and bracket, with the "reflector" glued in the back. A rectangle of black styrene can also be seen — it's an exact fit in the headlight casting



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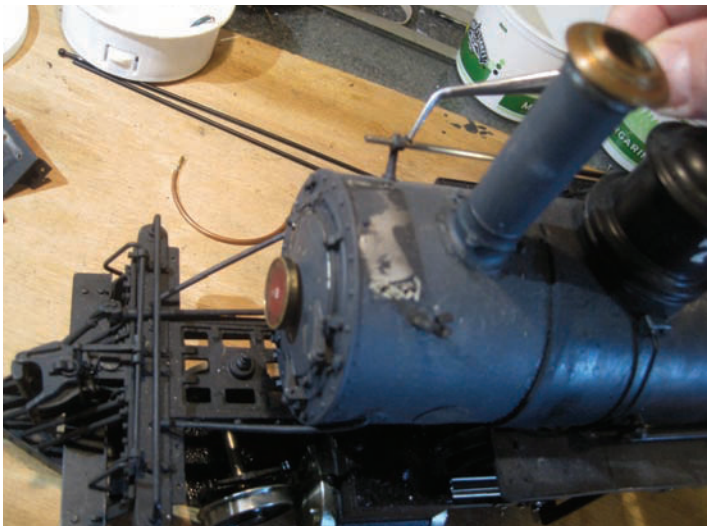


Photo 13.


Photo 12.


Photo 14.

base, and positions the LED in the center.

The "reflector" is a nylon furniture glide designed to fit in a chair or table leg. It had a small peg on the concave side, so I removed it and filed it flat — carefully using the side of a Dremel cut-off wheel. A thin strip of Styrene plastic is pushed up into the headlight to hold the base piece in place.

In **Photo 11**, you can see the thin strip (which loops across the top and down the other side,) and the reflector/glide, plus the thin clear styrene I cut and super-glued in the front to simulate the glass.

The LED, now dipped in orange paint to disguise the cool-white's blue tinge, is shown in **Photo 12**. Testors' plastic car paint from the craft shop includes a translucent yellow and red, designed for indicator and brake light clear plastic. I don't know if it is still available, but you'll probably use a warm-white LED so you don't need it.

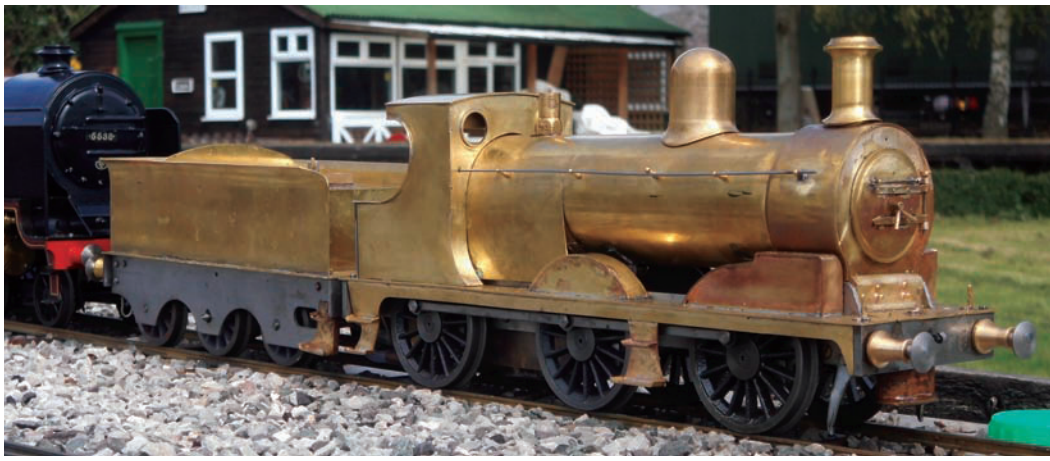
The connection wires are quite short so I cut slots in the front of a piece of the thin styrene and pushed the LED in so it sat on top. Another strip has slots at right angles to the first piece, to allow the connector wires to lay flat but trap the LED in place. **Photo 12** also shows the LED with both strips of styrene, ready to be glued on to the base piece after soldering on the wires.

Photo 13 shows the wire being pulled out of the holes in the tube. The final assembly will have the tube flush with the support bracket so the rounded front goes under the headlight. As can be seen in the final image (**Photo 14**), where everything has a nice coat of black flat paint to match the dirty locomotive, the new handrails look fine.

Scratch building a 1:32-scale steamer with laser-cut brass

LASER LOCO

Text, photos and illustrations by Keith Bucklitch



Almost complete: *The Aspinall 0-6-0 has yet to be painted.*

Although I now live in the English midlands (20 miles southwest of Birmingham), I originate from Lancashire in the northwest of England, and have a life-long interest in the Lancashire & Yorkshire Railway. I've always been taken by the railroad's Aspinall A class 0-6-0 and after building a string of L&YR fish vans (box cars to carry seafood), I needed another project.

I had pondered the need for some form of twin, inside-cylinder engine for some time and had drawn up a couple of designs, when Dick Moger announced the development of the ARMIG locomotive; ARMIG is G1MRA — Gauge One Model Railway Association — spelled backwards (see *Steam in the Garden*, September/October 2011, No. 118). Here was a complete power train system designed for inside twin-cylinder locomotives. (G1MRA published "The ARMIG Book" in 2011.)

I decided to build an ARMIG-based Aspinall loco.

The initial ARMIG itself is a model of a Wainwright, South-East & Chatham Railway 0-4-4 loco. The appeal of the ARMIG is the fact that the cylinder block is especially compact in height, allowing it to fit beneath the smoke box of a small tank engine.

The basic premise of the ARMIG design is that a number of Gauge One suppliers would produce parts for the complete loco, including frames, wheels, superstructure, crank axles, connecting rods and especially the cylinder block, enabling prospective builders to make what they were capable of producing and/or purchasing other components.

The 0-6-0 locomotives are variously referred to as "Aspinall's A class," "No 11 Class" or "Hughes Class 27s." More than 400 locomotives were built at the Horwich shops between 1889 and 1918. While Aspinall designed an 1800-gallon tender to accompany the engine, many were fitted with Barton Wright tenders. The Aspinall tenders were fitted with water scoops and could carry three tons of coal.

The original round-top boilers were later replaced with Belpaire fire boxes. A large number of the class continued into British Railway ownership, and No. 1300, built in 1896, is now preserved and can be

— *Continued on Page 28*

A slightly different version of this article originally appeared in The Lancashire & Yorkshire Railway Society Magazine*, No. 260 (July 2014).*

ACCUCRAFT TRAINS
MUSEUM QUALITY BRASS MODELS

D&RGW C-25 2-8-0
ACCEPTING RESERVATIONS

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Coal Fired
- D-Valve
- Boiler Feed
- Tender Water Pump
- Limited Production

$5,250.00

EMMA
IN STOCK

- 1:13.7 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$1,095.00

DORA
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$481.95

RUBY #1
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$539.00

RUBY #5
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$620.00

MOGUL
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- R/C Ready

$2,049.00

MOGUL RGS #11
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- R/C Ready

$2,049.00

MOGUL 'PONCHA'
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- R/C Ready

$2,299.00

CLIMAX
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$2,149.00

SHAY 28T
ACCEPTING RESERVATIONS

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$2,499.00

PLANTATION
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$999.00

AMERICAN
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

starting at **$2,199.00**

NA CLASS 2-6-2T
SOLD OUT

- 1:19 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$2,750.00

HEISLER WSL #3
ACCEPTING RESERVATIONS

- 1:20.3 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane Fired

$3,150.00

A4 MALLARD
ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel
- Alcohol Fired

$3,750.00

REBUILT MERCHANT NAVY 4-6-2
ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel

$3,750.00

D&RGW K-37 2-8-2
IN STOCK

- 1:20.3 Scale, 45mm Gauge
- Butane Fired
- Brass, Steel, Stainless Steel
- Limited Production

$5,995.00

STREAMLINED PASSENGER CAR
ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Metal Body, Die-Cast Trucks w/ Ball Bearings Metal Wheels
- Available in Unlettered, SP Lark, SP Gray, NYC, SP Daylight, UP Yellow, N&W, Pennsylvania, CP
- Limited Production

$300.00/car
$1,710.00/6 car set

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Price is FOB Union City, California. Items subject to change in price, color, specification design and availability without notice.

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ACCUCRAFT TRAINS
MUSEUM QUALITY BRASS MODELS

C&O / VGN H8 ALLEGHENY 2-6-6-6

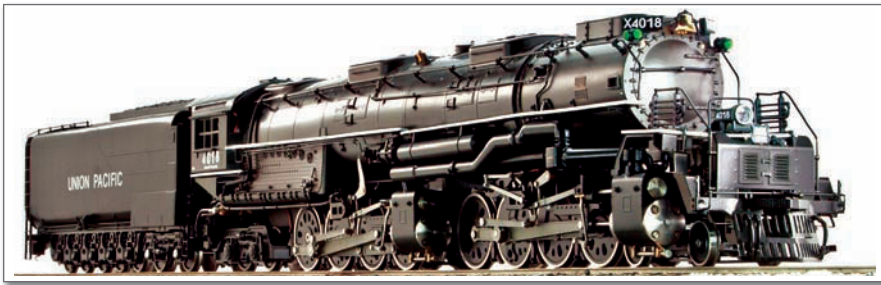
ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel
- Limited Production
- Butane Fired
- D-Valve

$7,000.00

UP 4-8-8-4 BIG BOY

IN STOCK



- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel
- Production Limited to 75 Units
- Butane Fired
- D-Valve

$8,995.00

N&W 4-8-4 J-CLASS #611

ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel
- Production Limited to 75 Units
- Alcohol Fired
- D-Valve

$5,750.00

CP 2-10-4 SELKIRK #5935

ACCEPTING RESERVATIONS

- 1:32 Scale
- 45mm Gauge
- Brass & Stainless Steel
- Alcohol Fired
- D-Valve

$5,995.00

QJ-CLASS 2-10-2

ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel
- Butane/Alcohol Fired
- Limited Production

starting at $4,500.00

PENNSYLVANIA T1

IN STOCK

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel

$6,050.00

FLYING SCOTSMAN

ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel

$3,400.00

TORNADO 4-6-2

ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel

$4,250.00

SP M-6 2-6-0

IN STOCK

- 1:32 Scale, 45mm Gauge
- Brass & Stainless Steel

$2,750.00

BLACK 5

ACCEPTING RESERVATIONS

- 1:32 Scale, 45mm Gauge
- Brass & Steel Construction

$3,100.00

DB CLASS 45 010 2-10-2

IN STOCK

- 1:32 Scale
- 45mm Gauge
- Brass & Stainless Steel
- Butane Fired
- D-Valve

$5,162.00

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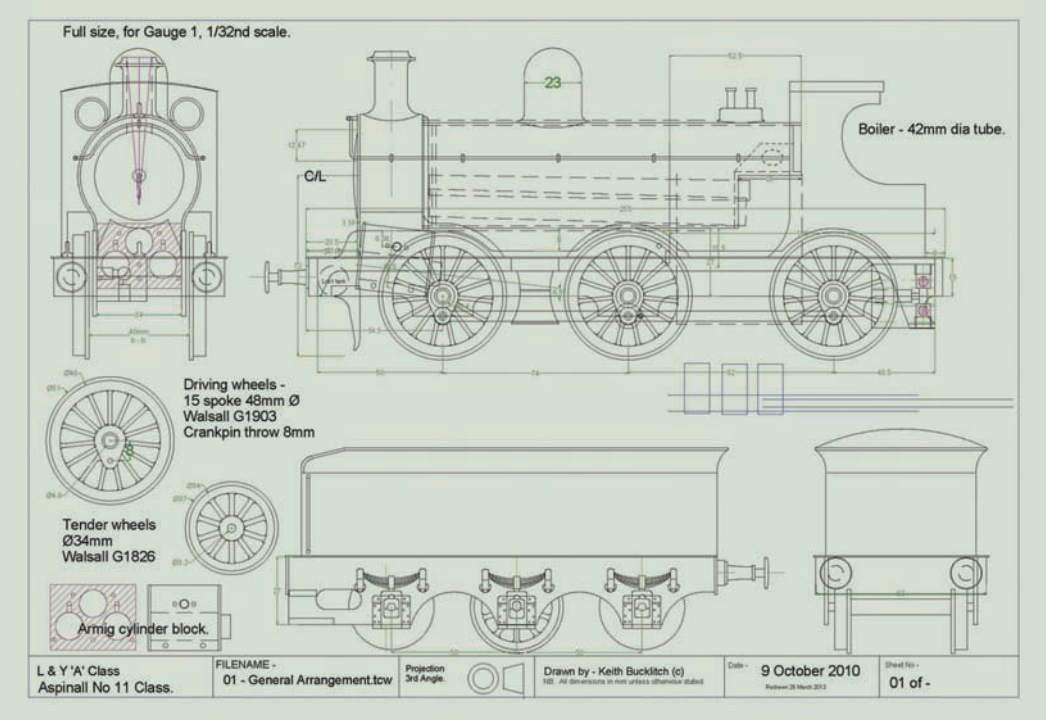


General arrangement: *Author's first CAD sheet showing components.*

— Continued from Page 25

observed running at different heritage railway sites around the United Kingdom. My model uses the Aspinall tender.

During the design stages of the model, I sought advice and assistance from a number of people, including Barry Applegate, Dick Moger and Malcolm High in particular.

Although my early design work was undertaken using two-dimension computer assisted design (2D CAD), I later used the facilities afforded by 3D CAD systems and must particularly thank Francis Leach for his patient advice and guidance. I also picked the brains of many others and used information from G1MRA's "The Dee Book," (axle pump) and other sources. Particular sources of information (photographs and drawings) were Peter Ward and Barry Staverton. My thanks to all of you who assisted me in some way.

Design

A couple of hours with TurboCAD produced a general arrangement drawing which showed that I could fit the ARMIG power unit in the outline of the A class frames and smoke box. With only some minor adjustment to the lengths, the complete power train could be utilized. This meant that if I made a total mess of them, I could at least purchase the components ready made. In that event, I compromised to save some time, in that I purchased a crank axle, but made my cylinder block and drive components.

The ARMIG system also uses square-ended axles with suitable square broached holes in the wheels. (This means easy quartering.) These are available from Slater's Plastikard Ltd., of Derbyshire, U.K, who supply plastic wheels with brass hubs and steel tires, or from Walsall Model Industries of West Midlands, England, who optionally will turn and broach cast-iron wheels from their range of castings. For the A class, I chose Walsall's G1903, 15-spoke, 48mm diameter wheels with an 8mm crank-pin throw. For the tender I used G1826 wheels.

Sometimes, when designing a locomotive model, one has to consider whether to compromise in order to make use of readily available material, and the A class' boiler is a case in point. Copper tube is available in a limited range of "preferred" sizes nowadays.

One can obtain special sizes at enormous costs, but when possible I make use of standard sizes. In this case 42mm outside dimension 20 SWG (standard wire gauge; a British measurement) copper tube is almost exactly the correct diameter — beneath the cladding — for the boiler of a 1:32-scale Aspinall A class loco. (In the United States, this would be roughly a 1⅝-inch, Type M copper pipe.) The alternative would have been to either cut a strip out of a larger diameter tube and butt joint it after squeezing to a smaller size or rolling the boiler from flat copper sheet.

There is another advantage to using standard-size pipe when possible. It is often possible to pick up an offcut from a friendly heating engineer or supplier at low cost or even free.

For the boiler design, I had to decide initially between gas firing (as per the ARMIG design) or alcohol (meths) firing.

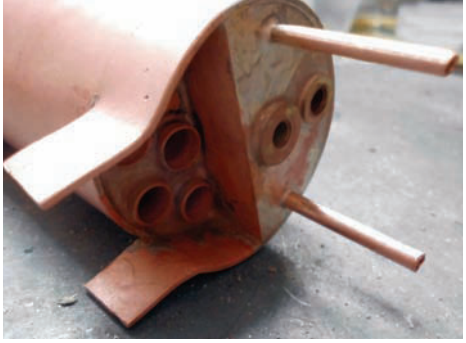
Personally, I am a fan

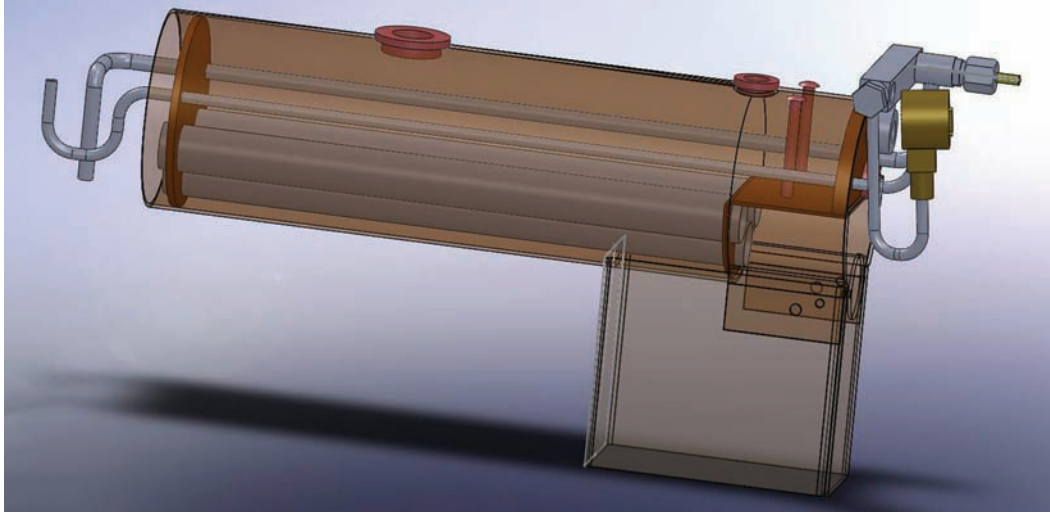
Lanky 0-6-0

English live steamer Keith Bucklitch gives a blow-by-blow account of how he used two- and three-dimensional computer-assisted design software and metal laser-cutting techniques to build a Lancashire & Yorkshire Railway Aspinall A Class, 0-6-0 locomotive.

➲ **Part 1:** Basing the design on the Gauge One Model Railway Association's ARMIG; developing the oil delivery system; building the axle pump.

● **Part 2:** Building the superstructure, the smoke box and tender, as well as working on the fuel supply, the hand pump and making the details. Then the locomotive is out for its first run.





Boiler, two views: *Right, a 3D CAD projection shows the elements of the planned 'C-type,' alcohol-fired boiler. Left, the fire-box end of the boiler as it was built.*

of alcohol firing, although in many ways a gas-fired loco is easier to build and design. For a start, one does not have to worry about the "front end" arrangements, such as blast pipe height and diameter, blower pipe, water feed arrangements, fuel plumbing, water plumbing and the like.

With gas, one fills the boiler, lights it off and away you go. Against that you may still have to provide a water-feed system, even if it takes the form of a hand pump. But to my ears, the worst thing is that often one cannot hear the locomotive working over the noise of the gas burner. With a spirit-fired boiler, one has to keep the balance of air, fire and steam correct. When set up properly, the beat of the engine can be heard, and the harder the loco has to work, the louder the exhaust sound.

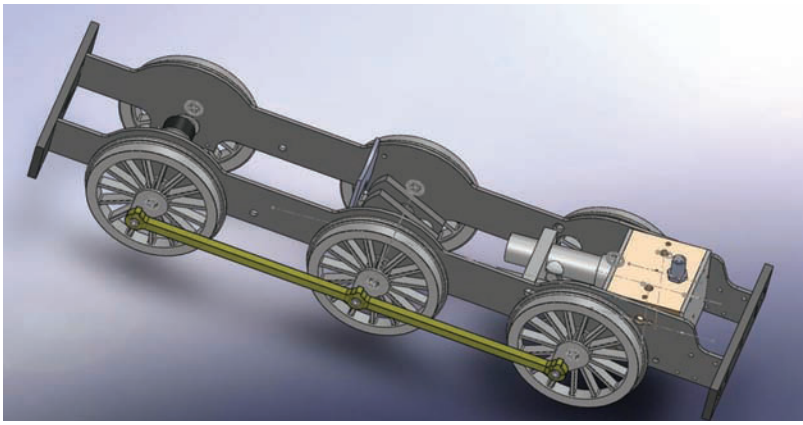
So, I chose to use alcohol firing. Now, how to convert the heat of the fire to steam. I do not intend to go into detail of the boiler I used, but basically there are three designs for spirit-fired boilers today.

The first is the simple "pot boiler" where a flame is held beneath the boiler, surrounded by a shield which encloses the fire, preventing it from being blown out and retaining the heat where it is required. Pot boilers such as the Mamod-type — with which we are all familiar — do not respond to increased work-load requirements and are only suitable for puttering around.

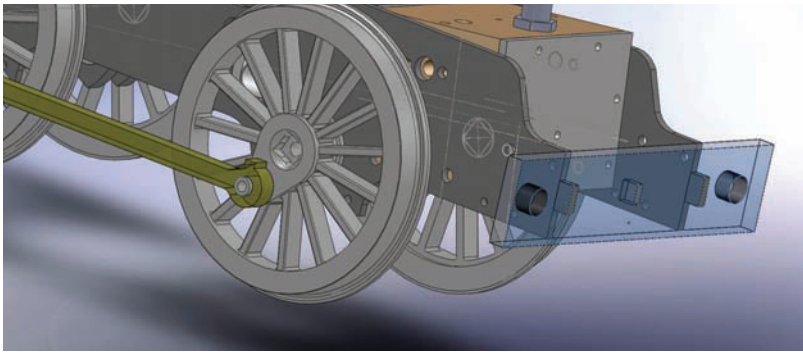
The second would be an internal firing system, and the choice comes down to building an internal fire box or an external fire box. Examples of boilers with internal fire boxes are the Gauge One "Project" design, or the "multi-tube" boilers designed by Paul Forsyth of Northampton, England.

The third choice is to use an external fire box, but combined with a tubed system. These were designed by the late English live-steam hobbyist John Van Riemsdjik and are commonly known as the "C-type" boiler. For my A class, I chose the C-type boiler.

By using five, 5/16-inch diameter fire tubes and a small grate area, I was able to design (with considerable help from Barry Applegate) a boiler with a heating area of more than 20 square inches.



CAD chassis: *Drawing shows drive train, frame.*

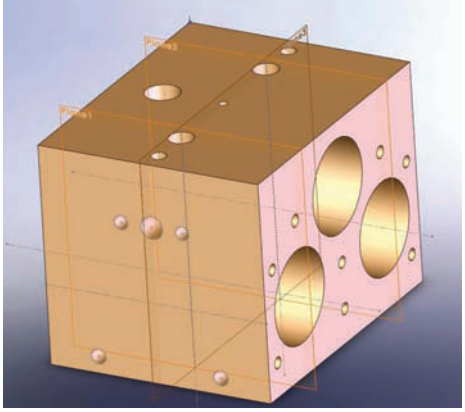


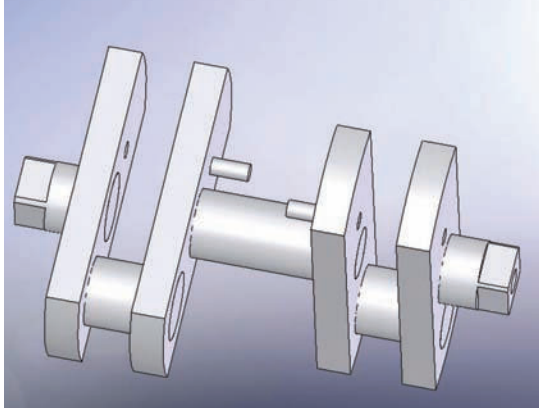
Mortise and tenon: *Technique to use laser cutting.*

So, the basic outline of the model was decided. Now for construction. I would add that almost four years had passed between the ARMIG appearing on the scene and my starting to actually cut metal. Like most modelers, I had several projects on the go and flitted from one to the other as the time was available or seemed right.

For many of my locomotives, I like to publish the drawings for other builders to follow, and have produced several laser-cut parts for chassis components over the years. Often though, I have machined the "prototype" model by hand (or through computer-numerical control — CNC), resolving errors and difficulties before producing the final laser-cut parts.

This time, I thought I would make use of laser cutting from the start, hopefully identifying any errors





Cylinder, crank axle: *Left, a standard ARM1G cylinder, which author machined following standard practice. Right, a standard ARM1G crank axle, which to save time was purchased from Just the Ticket of Wiltshire, England.*

and resolving any potential problems at the design stage (which was another reason for the four-year delay in producing the model).

We shall see how efficient I was at avoiding problems as we go along. Suffice it to say that by using 3D CAD, I was able to avoid some potential pitfalls early in the process. For example, I had wanted to fit sprung axle boxes to the loco. When I assembled the 3D crank axle into the 3D chassis assembly, it became obvious that the cranks fouled the axle boxes.

The only way to have obtained sufficient space would have been to thin down the cranks, but as my intention was that potential builders be able to use the ARMIG components, this was undesirable. Therefore the decision was made to run with an unsprung chassis. I might build another A class in the future, but next time springing (or compensating) the chassis if at all possible.

As I still wanted to be able to drop the wheel sets out of the chassis, I decided to use small keeper plates to secure the axle bushings in place in the frames, which could be removed if required by loosening the retaining screws.

Since I had created the general arrangement drawing using the layers facility of the CAD software, it was a fairly simple matter to extract the layer containing the frame components and copy and paste them to a new dedicated drawing. The two-dimensional frame components were extruded to the 3D shape, together with the buffer and drag beams and the saddle stretcher plate. These were then joined together in 3D to create the basic chassis assembly.

Initially, I had thought that the components would be bolted or riveted together using angle brackets at the corner joints. However, a chat with Malcolm High of Model Engineers Laser of Doncaster, England, indicated an alternative method of assembly using mortise and tenon joints. The frames were thus modified so they interlock together.

Once satisfied that everything was square, the joints were soldered with tinman's solder (62 percent tin, 38 percent lead). I used this in preference to silver solder (in the United States, typically 55 percent silver, 21 percent copper, 22 percent zinc and two percent tin) so that in the event of a major problem, the joints could be unsoldered relatively easily. I was pleasantly surprised how fast the chassis could be assembled by this method.

The previously made cylinder block was pushed in place and lined up exactly with the prepared holes in the frames. The system was almost self-aligning and was found to be perfectly square by default once the block was screwed in position.

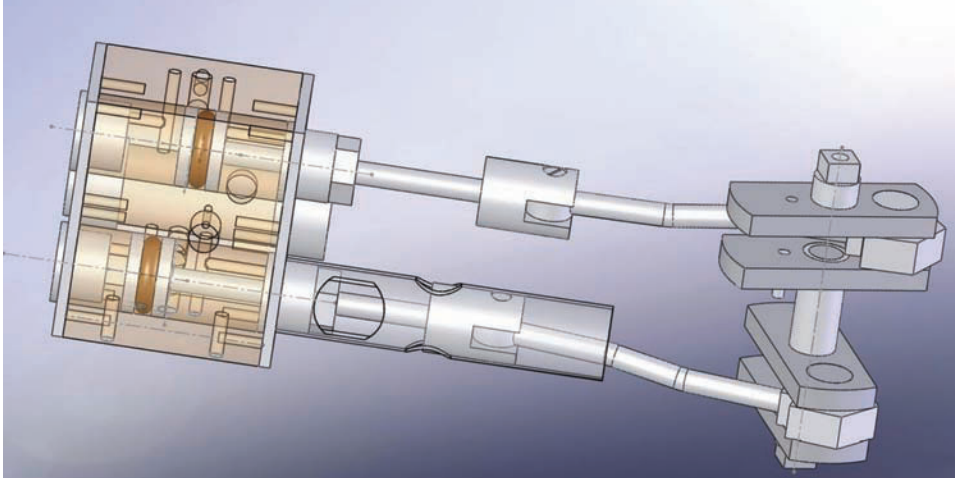
The cylinder block is machined according to the dimensions and instructions in "The ARMIG Book," so I do not intend to repeat them here. Ideally one should use bronze or gunmetal for the cylinder block, but brass is more easily obtainable and will last my lifetime. Machine the block to the outside dimensions and then mark out carefully for all the holes that have to be drilled or machined. For machining the cylinder bores and steam chest, I prefer to use the milling machine with suitable cutters.

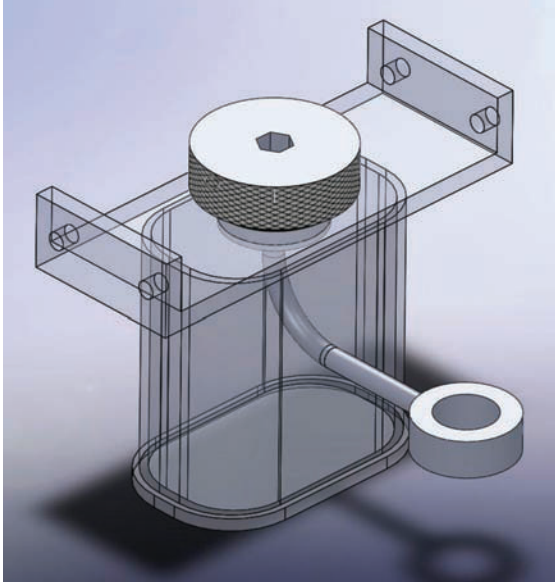
It is much easier to obtain accurate placements of the bores by using the milling table controls, and if you have access to CNC, then the whole job can be done automatically. Generally, if machining a stand-alone cylinder block, I most commonly mount it in a four-jaw

Suppliers

- **Laser cutting services:** Model Engineers Laser. http://www.modelengineerslaser.co.uk
- **Wheel castings:** Walsall Model Industries. http://www.walsallmodelindustries.co.uk
- **ARMIG components:** Just the Ticket. http://www.justtheticket.tv
- **3D Printing:** CWRailways. http://www.cwrailways.com
- **CAD software:** TurboCAD. http://www.turbocad.co.uk

Small details, handrail knobs and wire, castings etc. can be obtained from a number of suppliers including Walsall Model Industries, Just the Ticket (http://justtheticketsupplies.co.uk), Wagon & Carriage Works and Tenmille.





Power train, oiler: *Left, after making the piston and valve connecting rods, the power train with crank axle was assembled. Right, the oil tank has a narrow pipe where steam and oil mix to lubricate the cylinders.*

chuck on the lathe. However for the ARMIG block, where there are three bores required, the milling machine enables accuracy much more easily.

If using bronze for the cylinders, then brass is suitable for the pistons and slide valves, but if using brass, then substitute bronze for pistons and similar. The aim is to have dissimilar metals for the sliding faces when possible.

Partly to save time and effort, I purchased a crank axle from the supplier Just the Ticket of Wiltshire, England, ready-turned driving wheels broached for square-ended axles from Walsall Model Industries of West Midlands, England, (WMI) and the castings for the tender wheels also from WMI. These latter, I turned up myself on the lathe. I always find Walsall wheels beautiful to turn, with the iron coming off in a fine powder.

When turning wheels, I start by gripping the wheels in the three-jaw chuck with the back facing the tail stock. Face off the back, center drill and make a 3/16-inch diameter hole completely through the casting; repeat for all the wheels. The wheels are then mounted on a mandrel so they can be removed easily and all the stages of turning are repeated on each wheel in turn, ensuring that all dimensions are equal as appropriate. Using a mandrel also overcomes any errors of concentricity in the lathe chuck.

Assembly proceeded with making the piston and valve connecting rods and assembling the power train with the crank axle in position in the chassis.

Oil supply

Steam locomotives require a small, but constant supply of steam oil to the cylinders if they are going to run smoothly and for long periods with minimum wear. In the larger scales — 3½-inch, five-inch gauge and similar — the oil is usually pumped into the cylinders mechanically. Small-scale locomotives mostly rely on the oil being picked up by a flow of steam as the loco is running, using the condensation principle whereby steam condenses in the oil tank and displaces oil into the steam flow.

Commonly, this happens where the steam pipe passes through the oil tank and a tiny hole communicates with the inside of the oil reservoir. Some models feed steam under pressure to the tank to boost the oil supply initially. An alternative system — which I often use — is known as a "dead-leg lubricator." Here, the oil tank is connected to the cylinders via a narrow pipe (as small as 1/16-inch outside dimension). Steam flows into the tank, condenses and oil is displaced back along the pipe to the cylinders. Don't ask me how steam can flow in one direction and oil in the other along the same pipe, but I can assure you the system works.

The lubricator tank was mounted between the frames, below the front foot plate and behind the buffer beam. With the air flowing around it when running, hopefully, this is the coolest position to enhance condensation of the steam.

Once everything was connected up, the valve timing was set, a generous coating of oil on all moving surfaces was applied, and a compressed air supply fed to the cylinders. Opening the valves produced immediate rotation of the crank axle, indicating that things were working as required. The other axles were positioned, the wheels affixed and the coupling rods fitted in place.

One advantage of laser cutting (and CNC) is that items made to the same dimensions should fit together exactly, and it was found that all the axles rotated with no indication of binding anywhere once the rods were in place. Again the compressed air supply was turned on and the chassis left to run for a couple of hours, while I applied oil occasionally to allow it to "run-in."

Next time: Building the axle pump, the superstructure, the smoke box and tender, as well as working on the fuel supply, the hand pump and making the details. Then the locomotive is out for its first run.

Former ride-on live steamers decide to go Gauge One

ELEVATED

Text by John Haines. Photos by Don Cure

Between the ocean and the redwoods on the extreme Northern California shore, one railroad scheme or another has gladdened Crescent City spirits for as long as pack mule trains, steam schooners or winding two-lane roads were the only connection to distant, outside markets beyond the mountains and the sea.

The timber, mining and farming industries have faded, but the memories of the steam railroad service and travel are as sharp as ever. At least, in a small way — Gauge One — the railroad finally arrived here.

Crescent steam: *With an Accucraft Southern Pacific 4-6-0 (No. 8) steaming by, the author has an Aster Schools on its side, doing a little maintenance.*

In retirement, my friend Don Cure and I have gravitated into small-scale live steam after years of building and running ride-on miniature locomotives. I have spent a few years occasionally setting up a temporary Gauge One track on my apartment's driveway.

To watch my shelf-bound collection of electrics run for a few hours was a pleasant pastime. The wear and strain on old knees and muscles, however, in the work to set up and then pick up trains and track, soon convinced me of the need for a permanent, raised layout.

Don tried out one of my ground set ups to fire and run a new Accucraft Southern Pacific No. 8 narrow gauge. Never again! When down on all fours, or hurrying to catch an engine racing away on not very level track, hand firing and manual control lacks all practicality.

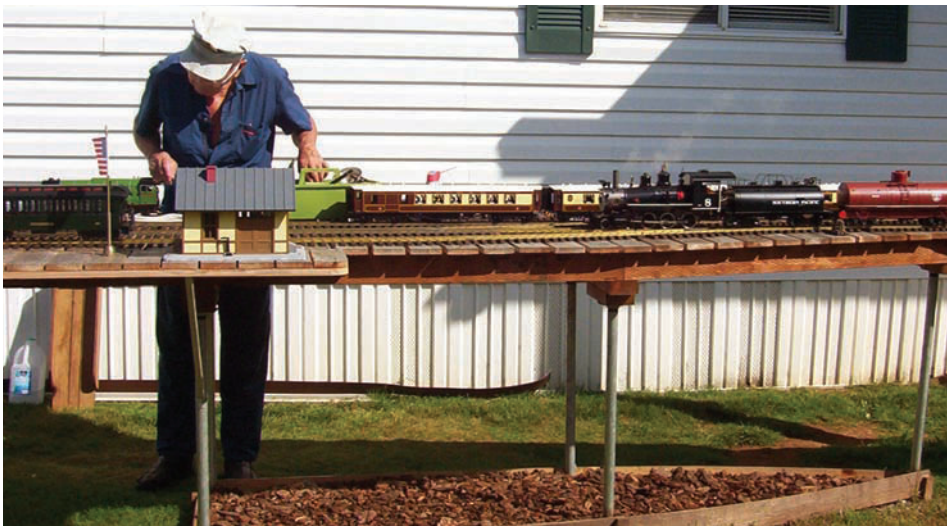
From that one run, it was not long before he experimented with a small elevated track in the yard of a former residence. Using electrical conduit for trestle bents and marine plywood for a track base, the first version of the Mill Creek Railroad lasted about a year in its original form.

Concluding a recent move, an undeveloped side yard has bloomed with a larger track plan and planter box garden. Quite a bit of research and thought on Don's part went into the elevated structure.

All of the popular, time-tested methods were considered for practicality and cost. Don decided on a post and stringer design that he and I together could manage from readily available materials with easy hauling and no digging required. Proposed was a double track oval within a space of 18-feet by 38-feet and about 36 inches off the ground.

The trestle support bent is a single post for all of the two-track line, and doubled supports under the four-track steaming and station siding section. These are simply one-inch galvanized pipe, 44-inches long and threaded on one end to take a common pipe flange.

Attached to the flange, a 12-inch long two-by-four short from pressure treated fencing stock is centered. This resulting T-assembly was designed to be



Backyard bounty: *Many different engines have visited the Mill Creek Railroad. No. 8 pulls a freight train (top left), while a Shay drags empty logging cars (middle left). An Accucraft 'Ruby' takes on water (top right). The author keeps an eagle eye on the operations (bottom right and left).*

pounded about eight inches into the existing lawn. Each support followed a staked string line, a radius point and a handy length of lath for a chord gauge.

A helper held the pipe and tested the level two ways across the two-by-four plate, with the foreman to operate the sledge hammer. Each post was driven down roughly level with its neighbor. After the majority of the posts were in, the final leveling was done with a straight edge spanning the gap between two plates.

The next step was the fitting of the double stringers. Again, two-by-four pressure treated fence stock, on edge and cut on site to closely butt on half the face of each post plate. The ends of the plates were drilled and long drive screws, from underneath, secure the stringers to the plate supports.

The track deck is from one-by-four, pressure-treated cedar fencing. Sixteen-inch lengths for the double track were air nailed to the stringers with a half-inch gap space as the nailing progressed. The center of each deck piece was marked and the marks lined up to a stretched string line.

A camera tripod, set up over a radius point, provided a guide for the 16-foot diameter oval curve. From this center point up in the air, an eight-foot trammel from aluminum angle made an easy reference to locate the theoretical center line and nail the decking on the curves. The finished double track work is on eight-inch centers, and 250 rail with No. 6 turnouts from the Accucraft/American Main Line narrow-gauge line is used. Don has the railroad wired for conventional DC power with isolation joints and toggle switches.

Maintaining the lawn and garden area inside the elevated track required a handy, removable bridge. Don worked out having one free stringer section. Crossed-braced and normally locked down with common hooks and eyes, the section readily lifts out for easy access when the trains aren't scheduled.

Now, with a few running sessions enjoyed, the pleasure of operating or just watching the trains from an improved controllable height makes our new track a great success.

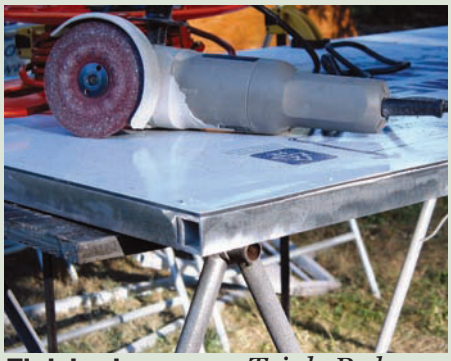
If you plan to be in the Crescent City area and would like to run trains on the layout, please contact Don Cure at diamondd1947@msn.com.

Ride-on club to support Gauge One

A non-profit group that has provided Los Angeles with a variety of live-steam experiences — including monthly train rides as well as an annual "Ghost Train" haunted railway ride — has decided to embrace Gauge One live steam, group leaders said late last year.

The Los Angeles Live Steamers Railroad Museum said it has ordered a 250-foot elevated Gauge One layout from Triple R Services LLC of Mount Holly, N.J. The resulting small-scale live steam track, which will have about 30 feet of steamup tracks and stand about 41-inches tall, will be installed at the group's Griffith Park location, just steps away from the Travel Town Museum, where dozens of railroad artifacts are kept and where there are also 16-inch gauge train rides.

The L.A. Live Steamers was established by local hobbyists, including movie maker Walt Disney, in the mid-1950s. Today the railroad has dozens of member-owned locomotives and rolling stock on site in 7½-inch, 4¾-inch and 3½-inch gauges, in scales ranging from 1:8 to 1:4. Many LALS members have live-steam engines, while others have diesel and electric locomotives. The group has more than 4½ real miles of track laid in Griffith Park.



Finished corners: *Triple R shows how one of its layouts is built.*

The L.A. Live Steamers Museum is also the home to "Walt's Barn," the actual building where Disney created many of his live-steam items for his backyard railroad. The "Barn" is the spiritual home of the Carolwood Pacific Historical Society, another non-profit group that supports live steam.

Robert Crone, a Simi Valley-based member of LALS and small-scale live steamer, has organized the project, which is not being funded by the museum. Crone has raised half the $12,000 needed for the layout, track and switches independent of LALS, though the layout will only be open to LALS members and their guests.

Crone pointed out that while there are other ride-on steam groups that have Gauge One layouts — including the Houston Live Steamers, the Pennsylvania Live Steamers and the New Jersey Live Steamers — the Los Angeles layout will be the largest permanent ride-on club layout in the country.

The L.A. Live Steamers are on the Web at http://www.lals.org and by phone at (323) 661-8958. Crone can be contacted at (805) 538-8185. Triple R is at http://www.realsteamservices.com or by phone at (609) 280-8744.

— dmc

Romance and realism of COAL FIRING

Text and photos by Ryan Bednarik

Growing up, I was always surrounded by items which fueled the industrial revolution. Frequent visits to tourist railroads and time spent in my grandfather's basement machine shop must have given this infusion of carbon into my system, an obsession that cannot be shaken. The one item that literally fueled this fascination with things mechanical and industrial was not steam powered, but had one of the key ingredients to making steam — a fire.

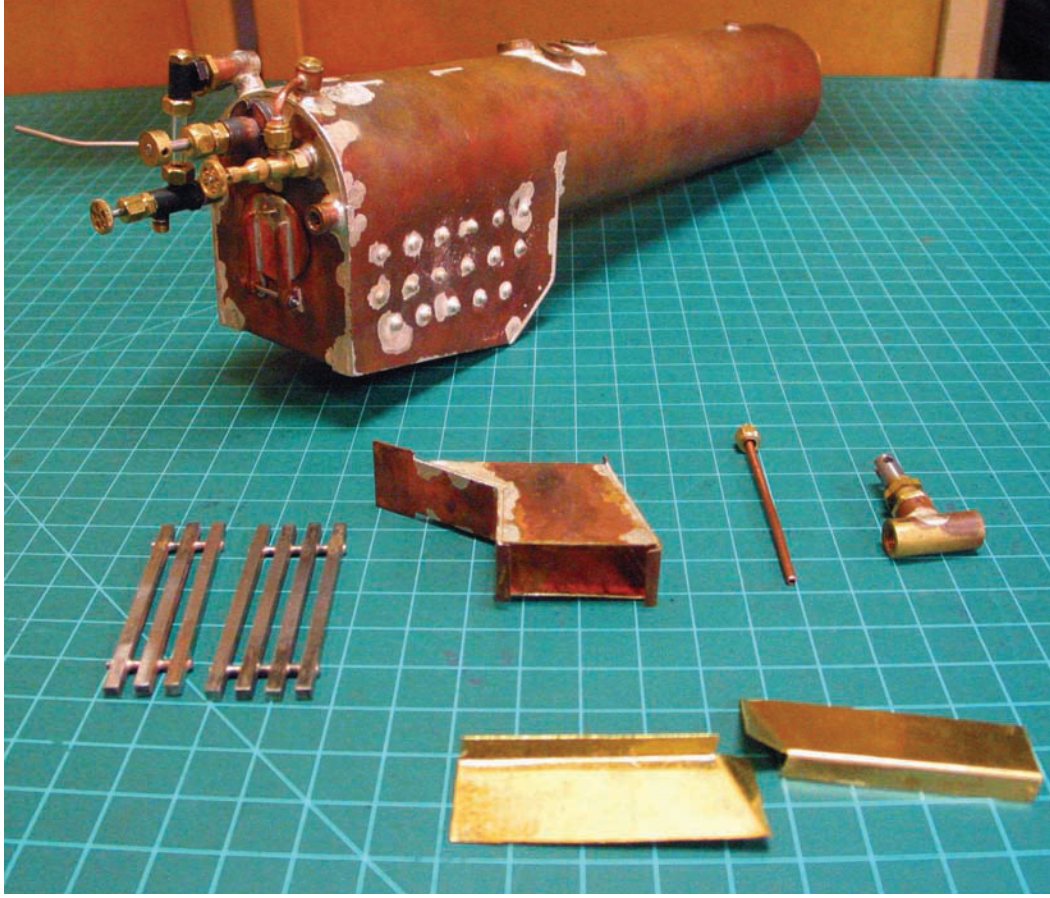
To be more specific, it was our coal stove in the living room which kept the house warm in winter during the tumultuous oil and economic crises of the 1980s and 1990s. Trudging through the snow to refill the coal scuttles every evening was the first step to learning coal firing. I might further embellish this by stating that this trip was uphill in both directions, but in reality the coal bin was only 50 feet away.

As I grew older, with oil prices on the rise again, the stove was taken out of its mothballed yet decorative federal-art status and put back into use. Keep in mind that Gauge One coal firing was still a few years away. The experiences and lessons learned firing that stove were a connection to the industrial age. This connection helped to further an intrigue with all things mechanical.

Moving forward those few more years, the live-steam bug had fully infiltrated both my dad, Charles, and I. By this time we had come to know Harry and Paul Quirk (among others in the Northeast steam scene). Having seen a few coal-fired engines running by this time, we were ecstatic that the black diamonds that had warmed our home could also fuel our engines.

Harry knew of our wish to try coal firing and graciously offered to lend us his alcohol or coal fired Aster K4 to give it a try. Only after we had wasted the container of starter charcoal and much coal did we learn the truth from Harry.

Harry never had great success with coal either and ran the engine on alcohol as a rule. The best result either of us got was a nice charcoal bed full of glowing energy– but once coal was shoveled in it would die a slow death after a short time. At first we chalked it up to inexperience, but further on we



Elements of coal: *Upper left, the family coal stove where the author first lit fire to anthracite. Right, components of coal firing (clockwise from top): a specially built boiler, with grates, ash pan parts and axle pump visible in foreground.*

began to realize that there was something fundamentally wrong with the engine.

Harry introduced us to John Shawe of Hertsfordshire, England, who most will know is one of the most knowledgeable coal-firing gurus — from 12-inches to the foot, all the way down to 0 gauge. John offered advice and then was willing to take the locomotive on to find the issues. The list of corrections was quite substantial and covered three out of the four major components of steam locomotion. The drafting was corrected, water feed system overhauled and the ash pans were altered for better air flow through the grates. The result was two beaming trainee firemen and a glowing hot fire bed on the first go.

This initial success was then met with some frustration in not being able to get a decent time between firings, or loosing the fire after adding fresh coal. Some failures were because of adding too much coal too quickly or sloppily, which blocked the flue plate. Other failures were caused by the fire burning too thinly at the back and going out, caused by the tall grates that left most of the fire above the large fire door. Knowing from our stove experiences that depth is critical, we sought to make new grates that were shorter in height and gave more air flow to the underside of the fire.

The new grates were half the height of the originals, increasing fire space to 1 5/16-inches. The performance was again transformed. A fire could now be easily obtained from a minimum of starter charcoal (loaded just to the bottom of the door), the fire could be deeply banked in the front and the rear, the tubes were not getting blocked and the rear of the fire stayed lit easily.

The grates also were able to utilize the built in rear-to-front downward slope of the fire box to help move the coal down over the course of the run. Stoking intervals were increased to 15 minutes with moderate train loads. The end result here illustrated one of the keys to successful coal-firing design: A deep fire box with good air flow under the grate is crucial to an easy-to-fire locomotive.

There are of course other key components that all must combine to create a good coal-fired engine.

The following are some essential points to having a successful coal burning locomotive. These points have been compiled from numerous sources and talks, so apologies if they sound familiar.

Correct drafting: The smoke box must be designed with one-in-three and one-in-six rules for stack and petticoat sizing. Exhaust and blower nozzle sizing must also be within the known formulas, although exceptions are not uncommon for the exhaust size. A good starting point for exhaust nozzle sizing is to take one-seventh the diameter of the cylinder bore for the diameter of the nozzle. This may need to be enlarged if the boiler makes too much steam (high exhaust rate) but smaller than one-seventh the bore should be avoided as the engine will have to overcome too much back pressure, decreasing efficiency.

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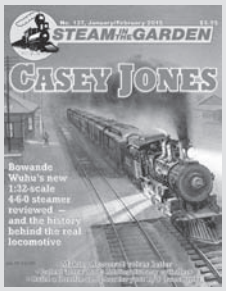

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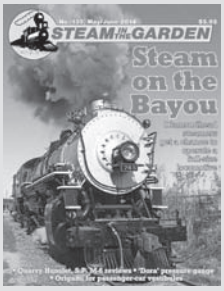

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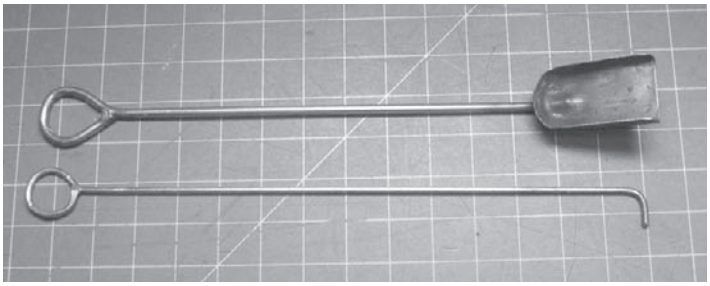
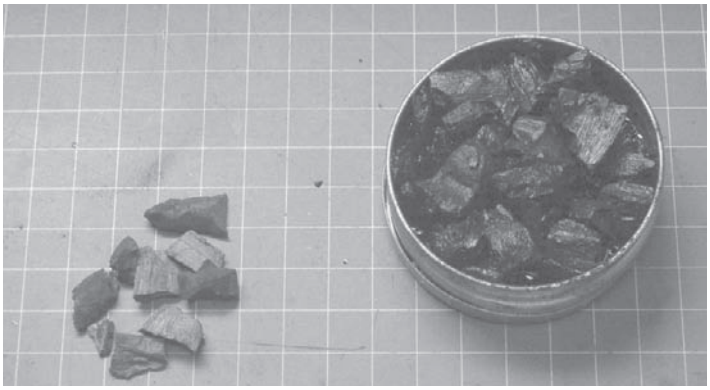




Tools of fire: *Left, the shovel and the poker (which is not for poking the fire). Right, dry wood charcoal is on the left, while wet charcoal is in the tin.*

Blower nozzle size should not be more than 0.9mm (a No. 65 index drill) and may be smaller if more than one nozzle is used in a ring or multiple jet arrangement.

All of these rules should be closely adhered to on any engine with a drafting (Stephenson) front-end arrangement. The proof is in the performance of countless Gauge One smoke box designs under these principals.

Boiler arrangement: It is crucial. Here the fire is being asked to use a minimal amount of fuel to convert water into steam while getting the most BTUs out of each unit of fuel consumed. There are many boiler arrangement formulas, from Martin Evans to Kozo Hiraoka and K.N. Harris. A combination of various ideas can also be used to create successful boiler designs.

This topic has varied opinions, enough to merit a discussion of its own in this magazine. Suffice to say that flues and water jacket are some of the key areas besides fire box size and depth (exceedingly important). Flues should be balanced and have good water circulation around them, with sizes kept reasonable to keep good vacuum (draft) through to the smoke box without becoming easily clogged. Water jackets can be as little as one-eighth-inch in width and do not have to encompass the entire fire box. If a choice must be made between sacrificing water jacket size or fire box grate area, always favor a larger grate area.

Fire box size and depth: They are probably the key to good coal firing. Without a well-designed fire box and generous grate size, the coal will not be used to full potential. Having observed and worked on coal-fired boilers for various engines, I have discovered that length and width of a fire box is not as critical as a good depth for the fire. One-inch deep of fire is what seems to be a good rule of thumb for an easy-to-fire locomotive.

Deeper, wider and longer grate area is always better, so long as the draft and air intake are sized to accommodate the larger grate area. A lack of depth can be compensated for by fitting a stainless steel fire arch to keep the heat in the fire box longer. However, the arch presents problems in cleaning the locomotive after a run, as there will be ash and small coal pieces trapped between the flues and the arch, eventually blocking the flues.

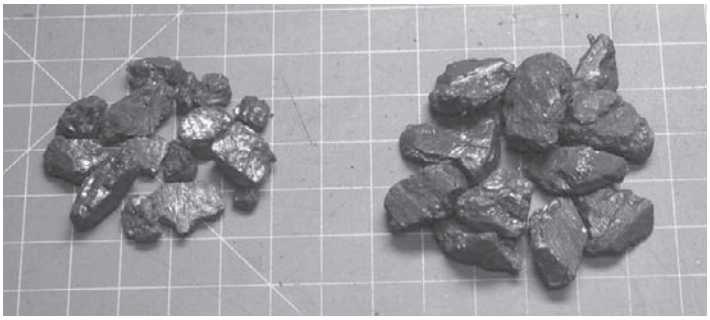
I also feel that etiquette and technique need to be mentioned. Throughout the years I have noticed that there are a variety of coal firing techniques and methods used in Gauge One. Although the technique and rituals used should be an individual's choice, there are some rules of coal firing that can be useful and provide a courtesy to fellow steamers. This is especially so at events taking place indoors. Some of these items are already familiar to seasoned firemen, and they may want to skip this section. However, for those just starting out in coal firing these are worth repeating.

Having your fan, tools and other supplies in good order, it is time to get the engine ready to fire. Give yourself plenty of time if the meet is using time slots for running as rushing will only end in frustration with a poor or lost fire. Above all else, be patient and find things to occupy yourself with while waiting for the various stages of the fire to take hold. Now, let's start the fire.

Starter fuel: It should only be hardwood charcoal found in your local home improvement store. This should be soaked in paint thinner or a odorless mineral spirit. Please be kind and refrain from using lamp oil. Even the smokeless lamp oil does not burn off well in the fire box– it creates plumes of white smoke which promptly follow the offending user around the venue. Paint thinner gives a good heat with a visible flame and with almost no odor or smoke.

(The use of lamp oil probably stems from two countries separated by a common language: British steamers talk about using "paraffin" to soak starter charcoal. In the United States, paraffin is a lamp oil; in the United Kingdom the word is used to describe what U.S. speakers call kerosene or paint thinner.)

You should only soak as much charcoal as is needed to fill the grate up to the bottom of the fire door. Once this is done and water and oil requirements are taken care of, light the charcoal and close the fire door. At



Sizes of coal: *Left, a small pile of grain-sized coal; right, a handful of the bean-sized Welsh anthracite.*

this point, put the draft fan on the engine stack. While we are waiting for the fire to start, let's talk about coal.

Coal: It should be sized accordingly. The best coal for our engines is Welsh anthracite, proven over the years to be ideal because of its high heat, low ash and no clinker. Welsh anthracite is often mistaken for Welsh steam coal, which is an entirely different coal, commonly used in larger scales, up to 1:1. The sizes we commonly use in Gauge One are "grains" and "beans."

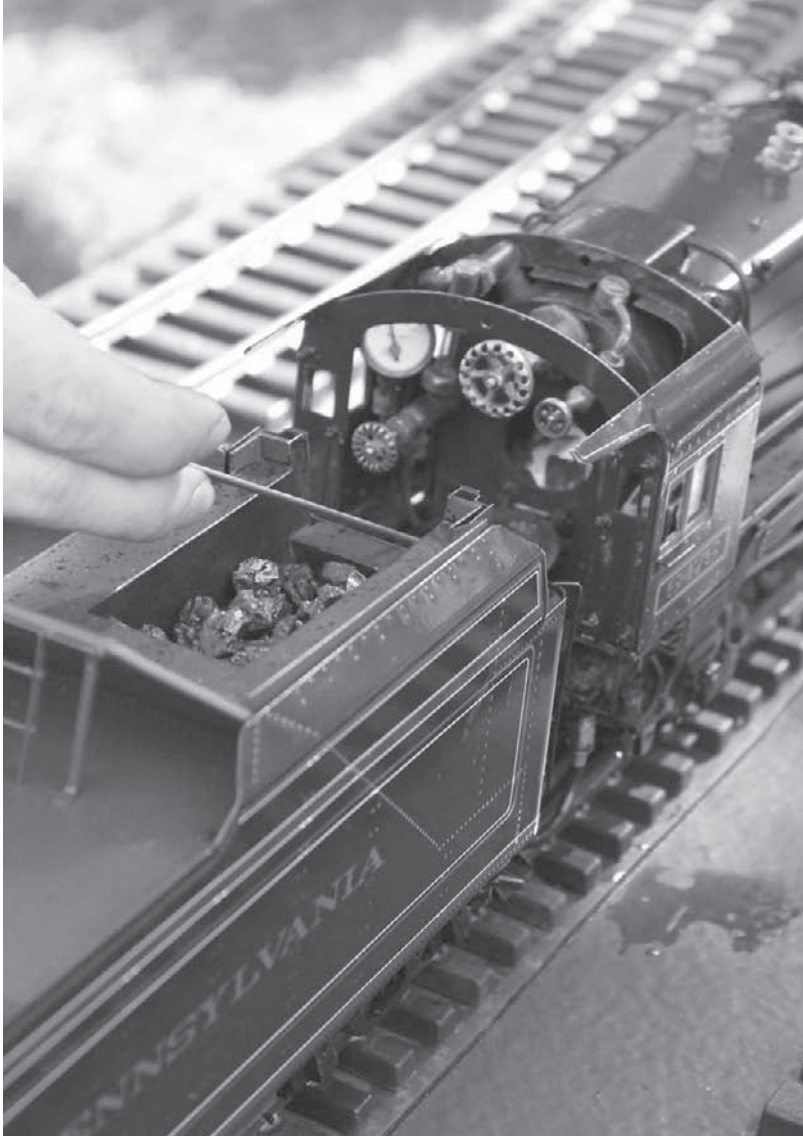
Welsh grains are roughly the size of a baked bean or the nail on your little finger. Welsh beans are much larger and are about the size of a U.S. 25-cent-piece in most dimensions. Of course you may have to use larger or smaller to suit your fire box, but grains generally are what most people will want in their fire box.

The smaller pieces not only light off quicker, but pack the coal bed to a higher density, regulating the air and therefore the heat. The close knit bed of small coal pieces is crucial to achieving a long burn time out of your coal as the air is effectively choked down. This forces the air throughout the coal bed, which helps to eliminate dead spots in the fire from excessive cold air coming through the coals.

Size coal to the fire box: As a general rule, the smaller the fire box the smaller the coal pieces which can be added once the soaked charcoal has begun to catch. *The health of the fire can be determined by looking from underneath in the ash pan (or grate if visible). If there is an even glow underneath then the fire is in good condition and will take coal well.* You should start to see a glow underneath within a few minutes of the liquid starter burning off the charcoal, combined with a rosy red glow greeting you when the fire door is opened. The Train Department of Hazlet, N.J., is one of the few places in the United States that sells Welsh coal.

Changeover to coal: Now we will add a few well placed shovelfuls of coal on top of the burning charcoal to get the changeover started. Use smaller pieces of coal for this and just lightly cover the glowing charcoal bed. The fire will look black on top, but it hasn't gone out.

Close the door and wait a few minutes, occupy yourself by oiling the running gear or cleaning the inevitable

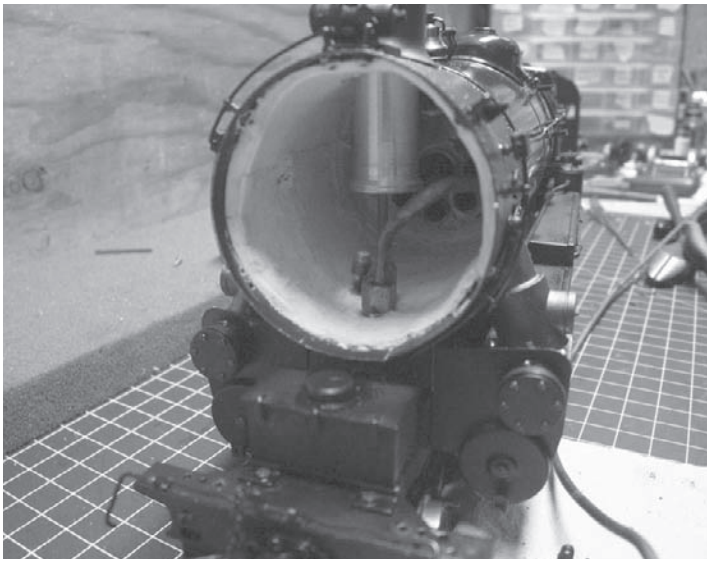


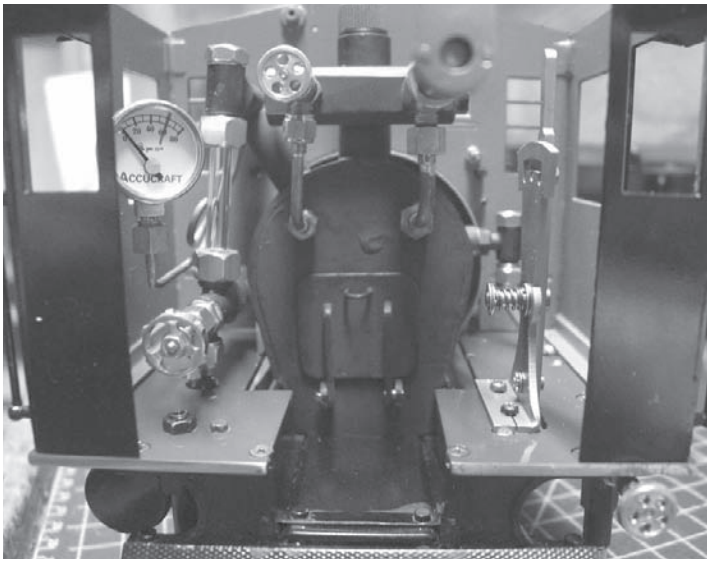
Stoking the fire: *The author shovels coal into his Pennsylvania Railroad's Class K4 Pacific (4-6-2).*

spilled coal off of the foot plate. Open the door again, ensuring that you can see a bluish gas flame coming off of the coals, which indicates good combustion, before placing a few more shovelfuls over the fire bed. Close the door and again occupy yourself while raising steam. The electric draft fan is still on at this point.

Fire-door rules: Do not open the door more than is necessary. You will be introducing cold air over the fire and will diminish the draft, cooling the fire when you need it the hottest. The door should only be open as long as it takes to put the coal in its correct places in the fire box and no more. Those wanting a peep show should look underneath at the ash pans for that warming glow.

Building up the fire: Now back to the engine. Check the pressure gauge. If your engine has a good draft and a correctly sized blower, you can take the draft fan off at anywhere between 15 and 30 psi. The blower should be opened up just a touch, enough to give a moderate jet out of the stack. If you cannot hold your hand over the stack without it being blown away, that's too much blower. Once on the





Opposite ends: *Left, the smoke box of the K4. Right, the back head of a coal-fired Accucraft Mogul.*

steam blower, open the fire door, assess the fire and start loading the fire up. The charcoal/coal mixture will be burning away rapidly now, and with good hot coals on top you should be able to load the fire box up to just under the door.

Readying for the run: In a few more minutes pressure will be rising rapidly to maximum operating pressure. It is tempting to immediately put the engine on a train and go for a run once the safety valve has lifted. This will only result in you fiddling around with the engine after a few short laps and not being able to keep the fire going. Be sure that your fire is completely coal, without any charcoal, before leaving the steaming bay. Take the extra minute or two to make sure you have enough partially burnt or just caught coal on top of the fire for a long run. You can now bank the fire, placing fresh coal up the sides, in the corners and along the fire door opening.

Banking the fire: It's different depending on the grate. Flat grates will bank up the sides, front (under the flues, please), rear and up the middle to the fire door opening. Sloping grates will be banked heavily along the sides and the rear, with minimal extra coal placed in the front or middle (the coal at the rear will work forward because of the downward grate angle).

Ready to go: Having banked up the fire and backed down on your train, check to make sure the bank is catching (gas flames above the still dark coal) and set off on your run. Blower setting will vary depending on how slow you want to run, but generally with a decent load the exhaust of the engine should be plenty to draw up the fire. You should be able to hear the beats of the engine clearly. If all you can hear is a constant hiss of the blower, turn it down.

You will have to experiment to see how long a run can be made between stokings of coal. Start with short intervals of five minutes until you become used to the engine and feel comfortable stretching it out. Once you are out on the mainline, taking care to pay attention to the fire every so often, the engine can be kept in steam for a long time– until the ash pans become full or the steam oil exhausted. You fire to the engine's demand according to the train size and the track you are running on that day. Some days will result in stops every five minutes for fuel, other days can be stretched to 15 or 20 minutes with ease. This can only be learned through practice and becoming comfortable with your firing ability.

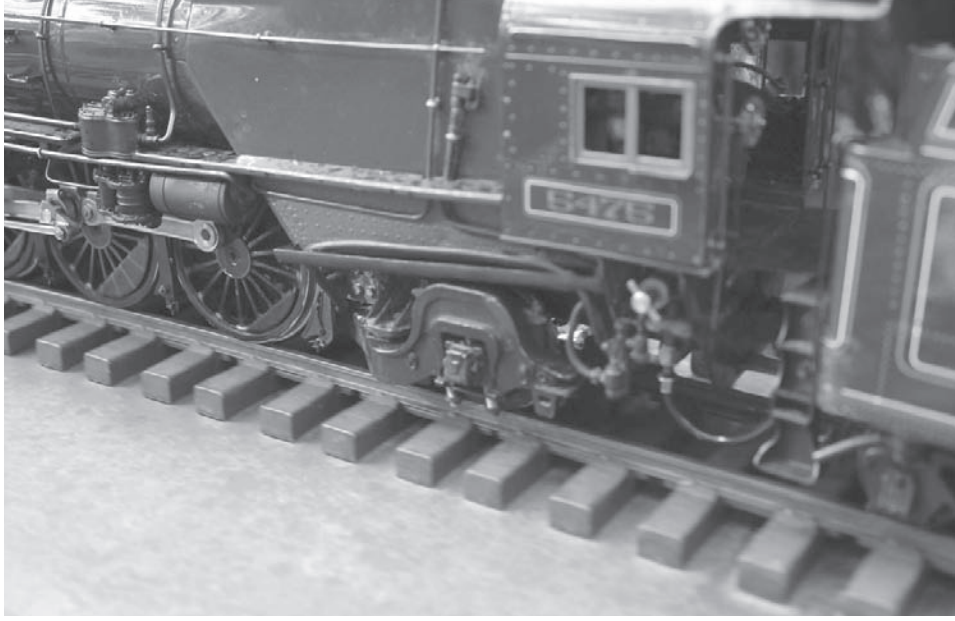
Coal takes time: It must respond to changes in draft and fuel load. If the fire is low, add little amounts of coal to slowly get the heat back in the fire. Piling a great lump of fresh coal on a fire with little heat energy left will surely put the fire out. It is tempting to use a tool to move the fire about and try and liven it up, this is only in a desperate situation. Most engines come with a poker and shovel, but only one will be used regularly, so now is a good time to talk about pokers.

Pokers are not for the fire: Coal fires do not like to be moved around as coal works on a contact burning principle. Poking the burning coal around will introduce holes in the fire and it will slowly die off. It may be tempting to clean the grate with the poker from the top, but that will result in a lost fire. As stated many times by John Shawe and other seasoned firemen — pokers are useful for flicking the fire door open or closed, pushing coal around in the tender, cleaning the foot plate of loose coal, operating switch points and warding off offending track marshals.

Stop, look and listen: When you come to a stop, look at the fire in the fire box and under the grates, and listen to the blower. Often a change in sound of the blower can make or break the firing session as the heat going up the flues changes the pitch.

Coal firing presents a challenge with rewards that are unparalleled by gas- and alcohol-fired locomotives. Throughout coal firing, be patient and do not hurry the development of a good fire. Coal firing can take upwards of 30 minutes of prep and starting time before you are ready to run. With experience this prep time can be cut in half, but when starting out on assigned track time, be sure to give yourself extra time to start the fire before your scheduled time.

This niche of the hobby is as much an art as a science, and no individual's experiences should be taken as a standard. But these findings seem to be in line with the experiences of others who enjoy the black art of coal firing.



Glowing: *The fire is clearly seen under the K4's cab.*

For further history and techniques on Gauge One coal firing, there are quite a number of good articles in the back issues of *Steam in the Garden*. Numbers 26 (January/February 1995), 57 (September/October 2000) and 91 (January/February 2007) are worth reading as the articles are still relevant to the topic of coal firing today.

Finally, remember that there is no success without failure. Coal firing takes dedication. If you have the grit, patience and persistence to understand the nature of your engine, then the reward of watching it run (mostly) self-sufficiently on a true scale fuel can never be matched by alcohol or gas firing.

Even the most dedicated Gauge One fireman will agree with this statement I heard years ago: "You have good days and bad days. When you start out, there are lots of bad days and some good ones. As you get better at it, the good days do not increase, but the bad days are many fewer."

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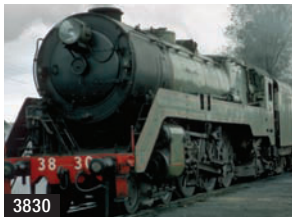

Images courtesy of ARHSnsw Railway Resource Centre

The 38 class design was based on a need to eliminate the complications of double heading required on a number of fast interstate passenger trains. The conditions of track work with frequent sharp curvature to be traversed at high speed would require six-coupled driving wheels in a 'Pacific' 4-6-2 configuration. Maintenance considerations suggested a two-cylinder simple steam locomotive. In May 1939 an order for five 38 class locomotives was placed with Clyde Engineering with a distinctive streamlined boiler casing. The remaining 25 locomotives were built without streamlining at the NSWGRs' Eveleigh and Cardiff Workshops. From 1961 the locomotives were progressively withdrawn from service. Four have survived into preservation being 3801, 3813, 3820 and 3830.

Accucraft Australia and Argyle Loco Works are offering the model in both Streamlined and Unstreamlined versions and in a variety of liveries and power options. Pilot Model 2015.

Product Specifications - Live Steam Version	
Scale: 1:32	**Valve Gear:** Walschaerts, two cylinders, slide valves, cylinder drain cocks
Gauge: 45mm	**Boiler Fittings:** Safety valve, pressure gauge, water gauge
Length over buffers: 756mm (29.8 inches)	**Working Pressure:** 60psi
Width: 91mm (3.6 inches)	Axle water pump with bypass valve, Water hand pump with check valve
Height: 133mm (5.2 inches)	**Construction:** Copper boiler, Brass boiler jacket, Brass cab, Brass tender, Steel drivers
Min Radius: 2m (6½ feet)	

Liveries Available	Models & Options Available
3801 Streamlined, green livery	**SG** Live Steam, Gas Fired
3803 Streamlined, black / red lining	**SA** Live Steam, Alcohol Fired with multi tube boiler
3813 Un-Streamlined, NSWGR Green	**EL** Electric with full Cab Detail
3820 Un-Streamlined, black / red lining	**DO** Display Only (Unmortised). Full Cab Detail
3830 Un-Streamlined, olive green 1961 livery	

Specifications are subject to update as development and production proceed and may change without notice

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live steam

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BRITISH BLACK 5

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live steam

BRITISH 8F

New ceramic burner 8F

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live steam

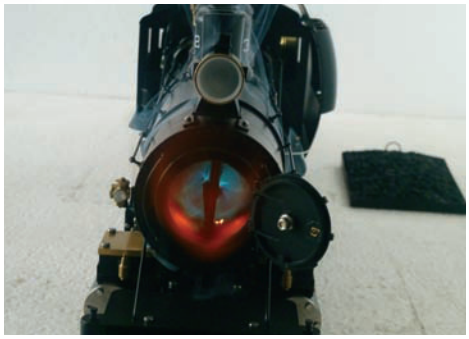
GERMANY BR41 — Small deflector

1:32-scale, G-gauge (45mm)
live steam

GERMANY BR41 — Big deflector

1:32-scale, G-gauge (45mm)
live steam

U.S. 'Casey Jones' ICRR No. 382



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BOWANDE

Pennsylvania RR's G5

A 1:32-scale, butane-fired 10-wheeler

Reservations accepted

The Pennsylvania Railroad needed a more powerful engine for commuter trains, with their many stations and tight schedules. The G5 4-6-0 was developed to handle heavier trains — both passenger and freight — that the typical 4-4-0 could not. The G5s were built between 1923-1925 at the railroad's Altoona shops in a batch of 50, numbered 5700-5749 for the Pennsy; another batch of 31 were built for the Pennsy subsidiary, the Long Island Railroad (they were numbered 20-50). These engines were used through until the end of steam in the mid-1950s.

New! Two Editions!

The PRR G5 and the Long Island RR G5 have both had pilot models built and tested. The locomotives will be 1:32-scale, G-gauge (45mm), butane-fired with ceramic burns, and will include two cylinders and operate at 60psi. The engine will be 27¾-inches long, by 4⅛-inches wide by 5¾-inches tall (705mm x 105mm x 146mm) and be able to negotiate a 78¾-inch radius (2 meters). The PRR G5 models will be numbered 5741 and 5748, while the LIRR G5 engines will be No. 28. *Reserve your steamer today!*

China's 'Big Boy' — The QianJing

2-10-2 engine built in China, prototypes still running in USA

The first high-powered locomotive designed and built in China, the QianJing production run ended in September 1956 after 4707 units had been made. No. 7207 was the last of the QJ to run in China, retiring in December 2005. Five of the engines were sold to U.S. railroads and three are still used in excursion today. Its 2-10-2 wheel arrangement naturally makes it China's "Big Boy."

Bowande Wuhu will show its 1:32-scale pilot of the QJ at the International Small Scale Steamup at Diamondhead, Miss., Jan. 11-18. Reservations will be taken after pilot testing.

The QJ will come in both butane- and coal-fired models (ceramic burner for butane), with two three-quarter-inch by one-inch cylinders (18mm by 25mm) and two-inch driver wheels (46.8mm), with boiler working pressure at 60psi. Including the six-axle tender, the locomotive will almost be 36-inches long (911.9mm); with the four-axle tender, 32-inches long (813.2mm). Both will be 4⅛-inches wide by 5⅞-inches tall (105.5mm by 149.7mm). Minimum radius will be 78¾-inches (2 meters). Number options will include 6988, 6998, 7002, 7040 and 7081.

Our U.S. Agent: Stoke 'm & Smoke 'm, Bob Clark, (301) 467-3348
U.S. after-sale support: Triple R Services, Charles & Ryan Bednarik
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TIMETABLE

March 27-28, 2015 — East Coast Large Scale Train Show, York Fairgrounds, York, Pa. Aikenback Live Steamers will set up its 54-foot, double-tracked and dual-gauged (32mm and 45mm) layout, with 10-foot curves, at this event. Info: http://www.eclsts.com and Mike Moore, mike@aikenback.net.

April 10-12, 2015 — Cabin Fever Model Engineering Expo, York Fairgrounds & Expo Center, Toyota Arena, York, Pa. Displays of all types of model engineering, including Gauge One live steam. Info: http://www.cabinfeverexpo.com.

April 23-26, 2015 — Spring Steamup, Staver Locomotive, Portland, Ore. Info: http://www.staverlocomotive.com.

July 5-11, 2015 — National Garden Railway Convention, Crowne Plaza Airport Hotel, Denver, Colo. Self-guided and motor-coach tours of area garden railroads; clinics, vendor hall (50-plus expected), speakers, banquet, ice cream social. Steam layout provided by International Small Scale Steamup will be open for general use in vendor hall. Crowne Plaza Airport Hotel: (303) 371-9494. Info: http://ngrc2015.com.

July 15-19, 2015 — National Summer Steamup, Lions Gate Hotel, McClellan, Calif. Multiple layouts, more than a dozen loops, 38,000-square-foot steamup hall; open 7 a.m.-1 a.m. Clinics, dealers' room, door prizes, swap tables, Saturday night BBQ. Lions Gate room reservations: (916) 643-6222 (http://www.lionsgatehotel.com). Info: http://www.summersteamup.com or (650) 898-7878.

Sept. 2-5, 2015 — Thirty-fifth National Narrow Gauge Convention, Royal Sonesta Galleria Hotel, Houston, Texas. Layout tours, modular layouts, clinics, dealers. Info: http://www.nngc-2015.com.

Jan. 10-17, 2016 — International Small Scale Steamup and Arts Festival, Diamondhead Inn and Suites, Diamondhead, Miss. Diamondhead Inn & Suites: (228) 255-1300. Info: Patrick Darby, k5pat@bellsouth.net, (985) 867-8695; http://www.diamondhead.org.

Feb. 12-14, 2016 — 18th Annual Presidents' Day Steamup, Electric City Trolley Station & Museum (Steamtown), Scranton, Pa. Info: Clem O'Jevich Jr., (570) 735-5570 or wrunloco@aol.com.

Regular steamups

On the Brink Live Steamers. Wednesday, and occasional weekends, greater Sacramento, Calif., steamups on elevated live-steam tracks at two locations. Info: Earl Martin (916) 773-0933, emartin187@aol.com.

Puget Sound Garden Railway Society. Two steamups per month, one at the Johnsons' on the second Saturday and a steamup at a member's track on the fourth Saturday. Info: http://psgrs.org/livesteamtimetable.html or call Pete Comley at (253) 862-6748.

Michigan Small Scale Live Steamers (MSSLS). Info: http://www.mssls.info.

Greater Baton Rouge Model Railroad Club Open House and Gauge One Steamup. Info: Ted Powell, (225) 236-2718 (cell), (225) 654-3615 (home), powell876@hotmail.com.

Upstate N.Y. Steamers. Several steamups per year in various locations around Western New York. Info: http://www.tinyurl.com/upstatesteamers.

Southern California Steamers. Contact Jim Gabelich for dates, places and other pertinent information. (310) 373-3096. jfgabelich@msn.com.

Crescent City High Iron. Steamups as necessary on an elevated backyard layout on Northern California's upper coast. Info: Don Cure, diamondd1947@msn.com.

Pacific Coast Live Steamers. Irregularly scheduled backyard steamups, mostly in S.F. Bay Area. Info: http://www.p-c-l-s.org.

Advertiser index

Steam ... it's the real thing!

Small-scale live-steam railroading — using models that are anywhere from 1:13.7 scale to 1:32 scale and run on 32mm or 45mm track — is a fun hobby that has room for rivet counters and freelancers, prototype purists and lovers of whimsy.

Steam in the Garden is the only magazine devoted entirely to covering the small-scale live-steam hobby. Since 1990 the magazine has taken readers inside the railroads and inside the workshops of the leading modelers and shown how fun and easy live steam model railroading can be. Six times a year, *Steam in the Garden* gives subscribers a look at the current trends in the hobby and reviews the latest products available.

Are you a builder of live-steam models (or do you want to be)? *Steam in the Garden* has detailed articles that explain how experienced builders create those once-in-a-lifetime projects that can't be found anywhere else.

Do you just want to run trains? *Steam in the Garden* explains how to build the best backyard live-steam railroads and how to build portable layouts as well.

Want to make improvements on your locomotive? *Steam in the Garden* has dozens of articles every year that show you in detail how to add features to your small-scale loco or make your rolling stock run better.

Want to know what's happening at the leading live-steam events? *Steam in the Garden* will take you there, to give you a flavor of what's happening, both on the track and in the clinic rooms, as well as the latest products shown by exhibitors.

Steam in the Garden has a new editor, but the magazine is sticking to its 20-year history of giving hobbyists the best information, illustrated profusely, in an easy-to-read format. Fill out the form below and subscribe today to *Steam in the Garden*.

☐ **Yes**, I want to subscribe to *Steam in the Garden* magazine. Please rush the next six issues of the bimonthly magazine to the address below. I've enclosed $35 for a regular U.S. subscription, $43 for a first-class mail U.S. subscription, $US42 Canada/Mexico, $US72 overseas. Mail to: *Steam in the Garden*, PO Box 335, Newark Valley, N.Y. 13811-0335.

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

Union Pacific FEF-3 No. 844

Now in production for late February 2015 release. Locomotive No. 844 will be made available in black only, as shown. A Greyhound version, No. 837, will also be produced. Kit price is projected at $7700 for the black and $7900 for the gray version. Ready-to-run prices are $9300 for the black No. 844 and $9700 for the Greyhound No. 837. For additional information, visit our web site:

www.asterhobbyusa.com

Pilot model shown; subject to alterations and modification.

Great Northern S2 kits

are still available from inventory for immediate delivery. You will not be disappointed with the performance and appearance of this easy to assemble and operate locomotive kit. More pictures and technical specs are posted on the web site **www.asterhobbyusa.com.**

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Bear Creek Railroad
Surrey, B.C., Canada V4P 1P7
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Email: pantages@telus.net

Quisenberry Station
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Tel.: 703-799-9643
Web: quisenberrystation.com

Southern Steam Trains LLC
Travelers Rest, S.C. 29690
Tel.: 864-834-3954
Web: southernsteamtrains.com

Gauge One Lines
Stittsville, Ont., Canada K2S 1P8
Tel.: 613-836-6455
Email: gaugeonelines@yahoo.com

North Jersey Gauge One Co.
Park Ridge, N.J. 07656
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Email: bob1027jane@aol.com

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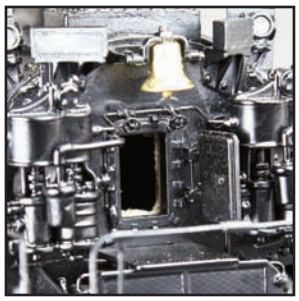



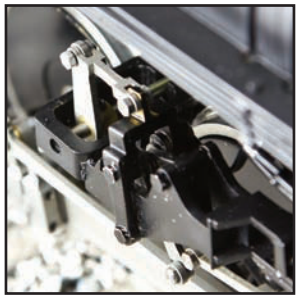

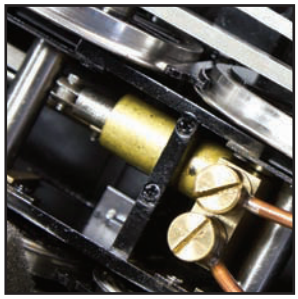
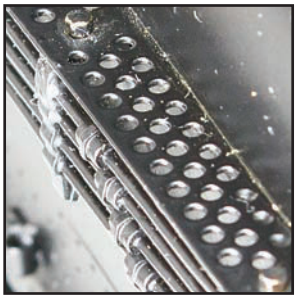

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