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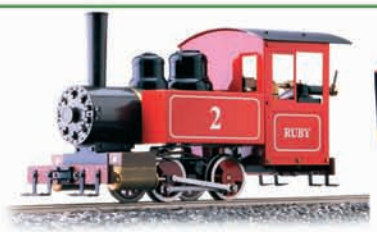

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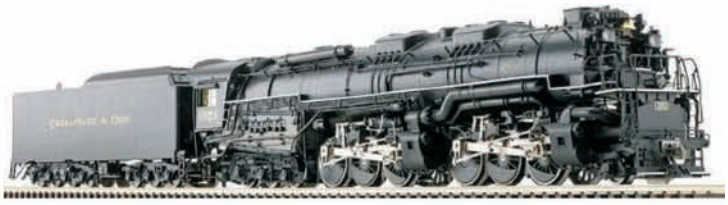

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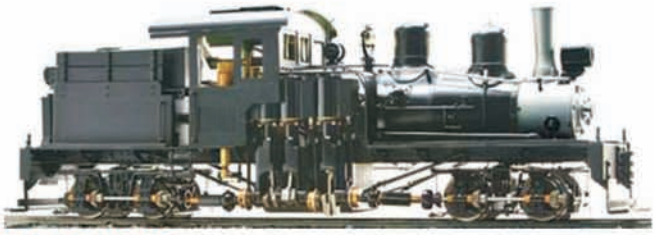

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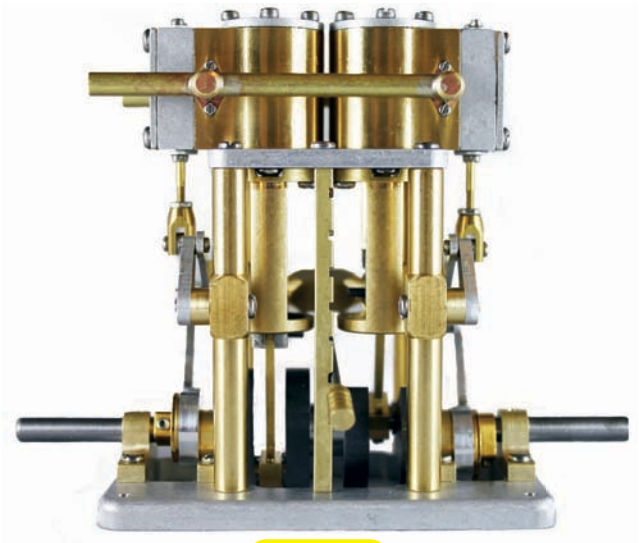

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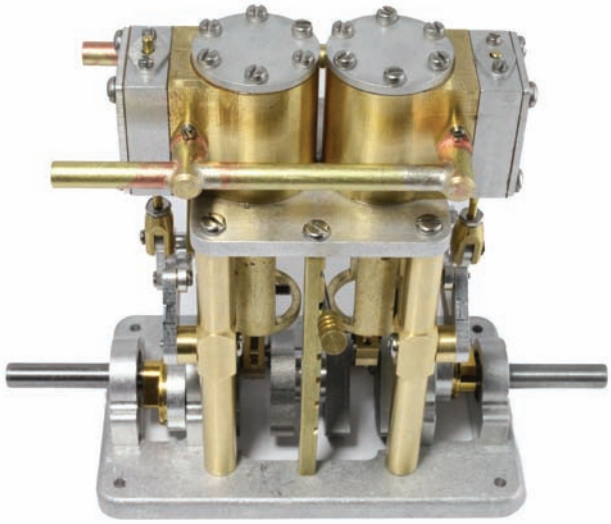

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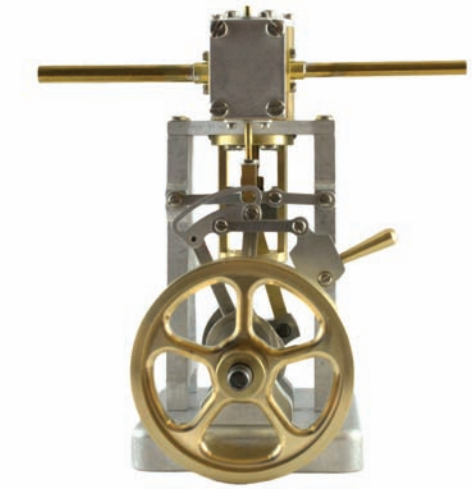

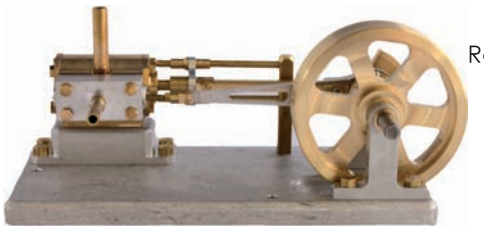

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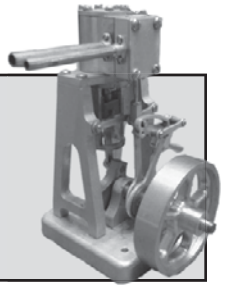
Vol. 23, No. 5; Issue No. 129; September/October 2013

STEAM IN THE GARDEN

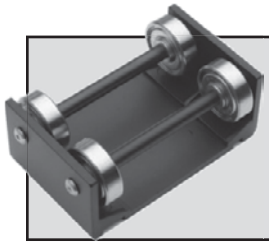
Gather friends, while we inquire,
into trains, propelled by fire ...



15 **Ben builds a boiler.** With a little help from his dad, a 14-year-old machines a backwoods-type logging locomotive. **By Ben Schade.**

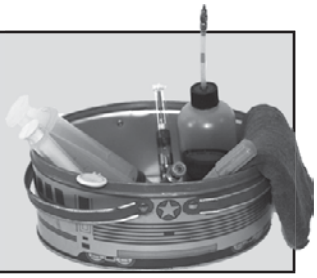
Exploring 'Dora.' Accucraft's new 1:20.3-scale locomotive has a lot going for it, including a great pedigree and out-of-the-box steaming success. **By Dave Cole.** **21**

28 **Shortening 'Dora's' throttle valve.** In what will be the first of many 'Dora' modification articles, bringing the new loco's throttle inside the cab. **By Marc Horovitz.**



Building a better treadmill. An improved way to line up an engine on treadmill rollers. **By Dave Frediani.** **31**

34 **Tools & fuels.** In Part Four of our 'Starting in Steam' series, what every small-scale live steamer should bring to a steamup. **By Scott E. McDonald.**



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Cover: A new 'Dora' rumbles down the track on the Grand Teton & Everglades Steam Excursion Co. in Pacifica, Calif.

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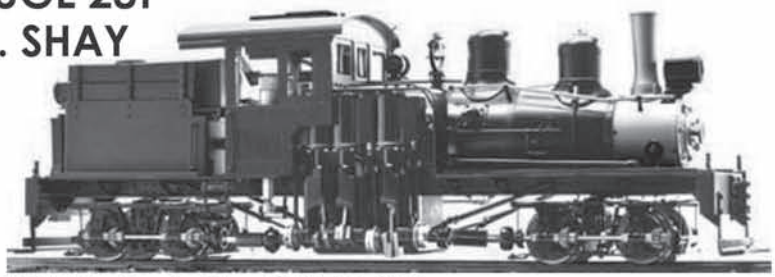

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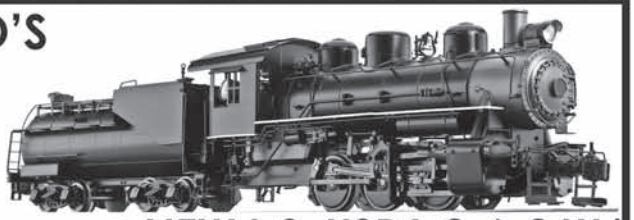

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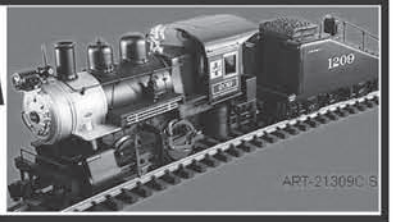

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Wrong scale

I wanted to point out an error in the article, "Seven-eights superiority" (*Steam in the Garden*, July/August 2013). You wrote that 7/8th-inch-scale is "30-inch gauge railways on 45mm track (or 24-inch railways on 32mm track)." It should actually have read, "24-inch gauge railways on 45mm track (or 18-inch railways on 32mm track)"

Otherwise, excellent as always! I have been a happy subscriber for about 10 years now.

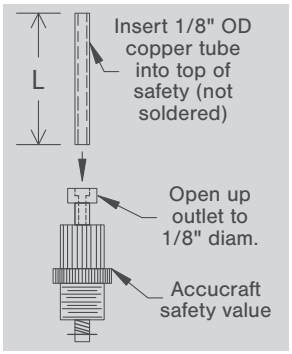
Scot Lawrence
Rochester, N.Y.

Safety, weep for me

In the article "How to make 'Emma's' safety valve more accessible," (*Steam in the Garden*, July/August 2013), I noted Marc Horovitz's comment:

"Concealing the safety valve under a steam dome ... water gets trapped between the dome and the tank and messes up the paint."

This is the first time that I have heard a reference to this problem but it definitely happened to one of my other Accucraft steamers. In an effort to prevent this, I opened up the diameter of the hole on the top of the safety valve and inserted a copper tube, which extended up through the steam dome. With this modification, most of the steam exhausts outside of the dome when the safety lifts (see the drawing).



Steam away: *A small tube added to a safety valve will send excess steam out the top of the dome. Note that 'L' is determined by the height of the dome and that the one-eighth-inch tube should* not *be soldered to the safety. Drawing by Bob Winkel.*

There are a few cautions: The pressure release valve is a safety component and its performance must not be compromised. Do not drill too far into the safety valve, as shown in the drawing, so that there is a "shelf" for the pipe to sit on. One of my domes had to have the exit port opened up slightly to fit the tube. Do not solder the copper tube into the safety valve.

Bob Winkel
Rochester, Mich.

Correction

In the article "New overseas locos from Accucraft" (*Steam in the Garden*, July/August 2013), we made a mistake about the MBV Schug "Decauville" locomotive. MBV Schug, Accucraft's European distributor, is only coming out with an 0-4-0T locomotive at this time, though it will be offered in either 45mm or 32mm gauge. Schug says the U.S. suggested manufacturer's price will be $1695. MBV Schug is on the Web at http://www.accucraft.de/ or by phone at (49) 6507-802326. We apologize for the mistake.

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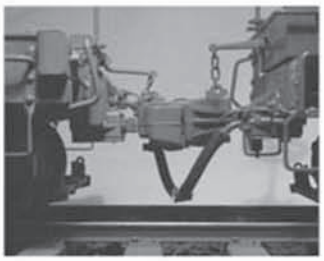

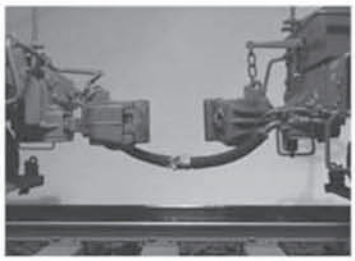

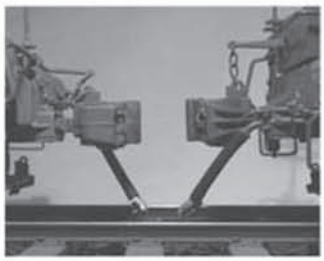

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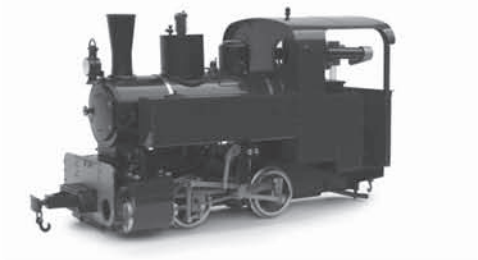

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LATEST WAYBILL

Air-based switching from Sunset Valley

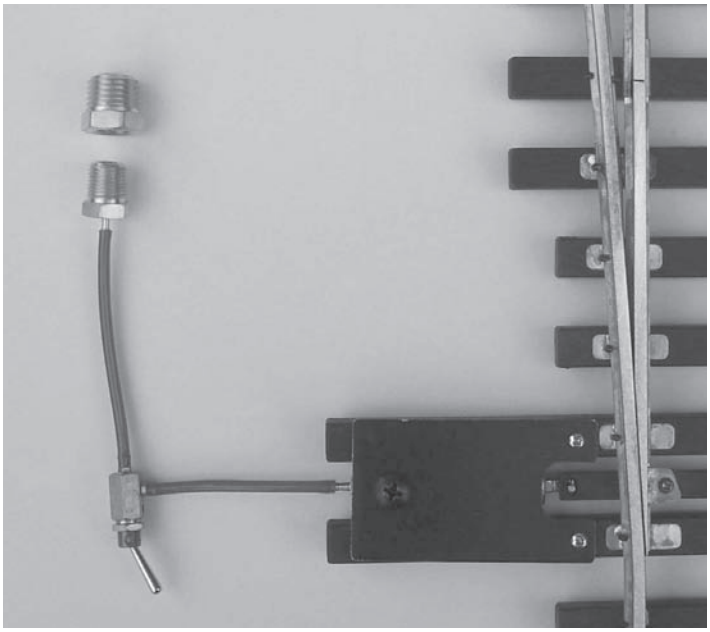
A pneumatic switch operating system is being offered by Sunset Valley Railroad LLC of Lake Tapps, Wash., that allows for remote operation of Gauge One switches (turnouts) without the expense or trouble of electrically controlled turnout activation.

The Sunset Valley system includes a wide variety of components, including actuators, toggles, manifolds, adaptors, T-unions, quick disconnects, indicators, solenoids for radio control of pneumatic switches and, of course, hose.

The company says its switching system will work with "all popular makes of G-gauge switches" and provides an online instruction sheet for installation.

Sunset Valley has been in business since 1989 and was founded by the late Ted Sharpe as a provider of Code 250 model train railroad track in both 32mm and 45mm gauge. The company was acquired by Pete Comley in 2004.

Comely said last spring that because of the growth of the rail business, he has decided to consolidate his product line and will no longer be a dealer of locomotives for Accucraft Co., Aster Hobby Inc. or Roundhouse Engineering Co. Ltd. "Instead, we will concentrate on our successful core business of track, switches and pneumatic systems," said Comley.



Air bender: *Sunset Valley's pneumatic switch system uses air pressure to open, close turnouts.*

Sunset Valley is on the Web at http://www.svr-ronline.com/ and by phone at (253) 862-6748.

A tender moment for 0-6-0 switcher

Accucraft Co.'s latest offering is the United States Railroad Administration 0-6-0 live-steam switcher and while the locomotive is a re-run of a 2008 release, the company is offering versions with a new tender based on the Vanderbilt design.

The model will be in 1:29-scale for 45mm gauge, Accucraft said, it will be butane fired and have piston-valve cylinders, a water-level gauge, a pressure gauge

and store its gas in the tender. Without the tender, the locomotive is 28½-inches long, 3⅝-inches wide and 5⅝-inches tall (724mm by 98mm by 148mm).

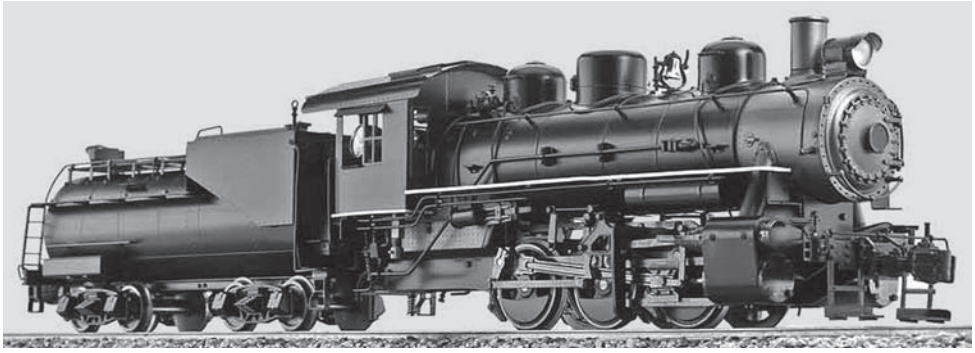
The company will be offering a wide array of liveries for the locomotive with the Vanderbilt tender, including lettering for Canadian National No. 7428, the Erie Railroad No. 119, Great Northern No. 58, Southern Pacific No. 1221 and Union Pacific No. 4436, as well as an unlettered, all-black version.

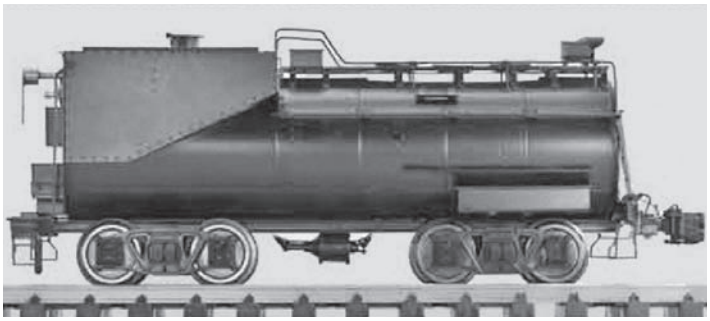
The company will also be selling the Vanderbilt tender as an individual item and both the Vanderbilt tender and the original tender are designed to accept an optional hand-water pump.

Accucraft also said it will re-offer the USRA 0-6-0 switcher with the original rectangular tender, lettered as Canadian National No. 7470, Chicago & North Western No. 2605, Denver & Rio Grande Western No. 61, New York Central No. 6999, Nickel Plate Road No. 384 and Pennsylvania No. 8362.

The United States nationalized parts of the railroad industry during World War I and the U.S. Railroad Administration was formed in part to develop locomotive reference designs that addressed a variety of functions, including switching, light freight hauling and heavy freight hauling. The common designs were then executed by the various locomotive builders, including railroads themselves.

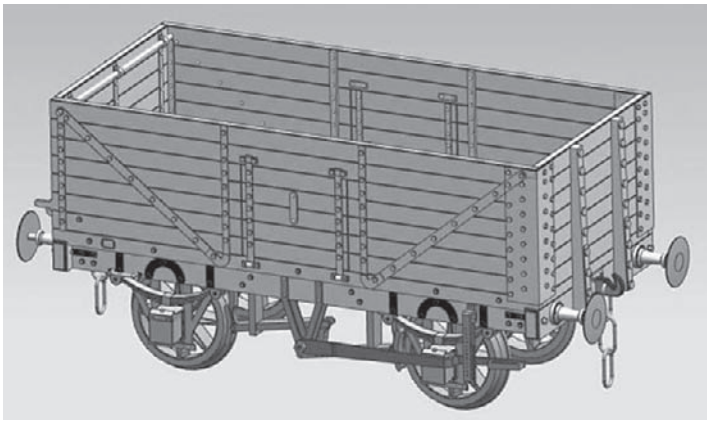
The Vanderbilt tender was designed by the great-grandson of Commodore Cornelius Vanderbilt — Cornelius III — and patented in 1901. The tender's cylindrical shape would hold more fluid (either fuel oil or water) than a rectangular tank that had the same surface area, while the shape provided more strength and weighed less than a same-sized rectangular tank (because a rectangular tank required lots of internal bracing).

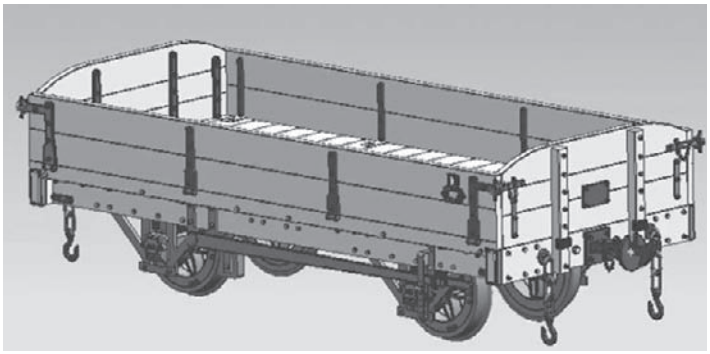




Water, fuel supply: *Accucraft's new USRA 0-6-0 switcher is offered with a Vanderbilt tender.*

The manufacturer's suggested retail price for the USRA live-steam switcher is $1295, while the stand-alone tender has a suggested price of $625 and the





Wagon train: *Designs for Accucraft UK's new seven-plank (left) and two-plank (right) goods wagons.*

hand-pump is listed at $125. Accucraft Co., based in Union City, Calif., is at http://www.accucraft.com/ and (510) 324-3399.

Goods wagons for UK trains

To complement its recent line of Gauge One live-steam models, Accucraft UK Ltd. has said it will develop two new pieces of rolling stock, a seven-plank goods wagon and a two-plank goods wagon.

The seven-plank wagon will be based on the 1923 Railway Clearing House design. "Our wagon represents a type that was built by the tens of thousands, many of them for private owners," said Accucraft UK.

The company said it would offer the wagons in the liveries of the "Big Four" and the British Rail gray and Bauxite. Accucraft UK said it "will be encouraging our dealers to commission private owners in liveries pertinent to their location or personal whim!"

The two-plank "M" wagon will be developed in cooperation with TrackShack Ltd. of Peel, Isle of Man, and represent wagons used on the island. The run will include eight different numbers as well as an unnumbered version.

Accucraft UK says the recommended retail price of the seven-plank wagon will be £70 ($107), while the two-plank wagon will have an RRP of £59 ($90). The company, based in Shropshire, England, is at http://www.accucraft.uk.com/ or at (44) 01694 723799.

A 14-year-old (with a little help from his dad) machines a backwoods-type logging locomotive

BEN BUILDS A BOILER

Text by Ben Schade. Photos & illustrations by Eric Schade

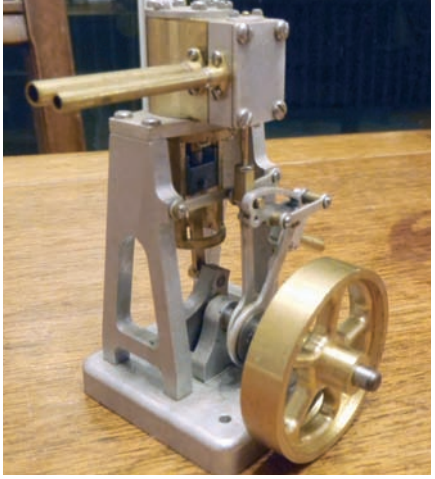
My dad, Eric Schade, and I spent two weeks in January 2013, each building a live-steam model logging locomotive. We spent about 75 hours working on the project, and we both made engines that run well.

The project started with a pair of steam-engine kits we purchased from Graham Industries of Rio Rancho, N.M. After putting those together, I wanted to go farther. We each built a boiler from scratch and added fittings that I machined on a lathe.

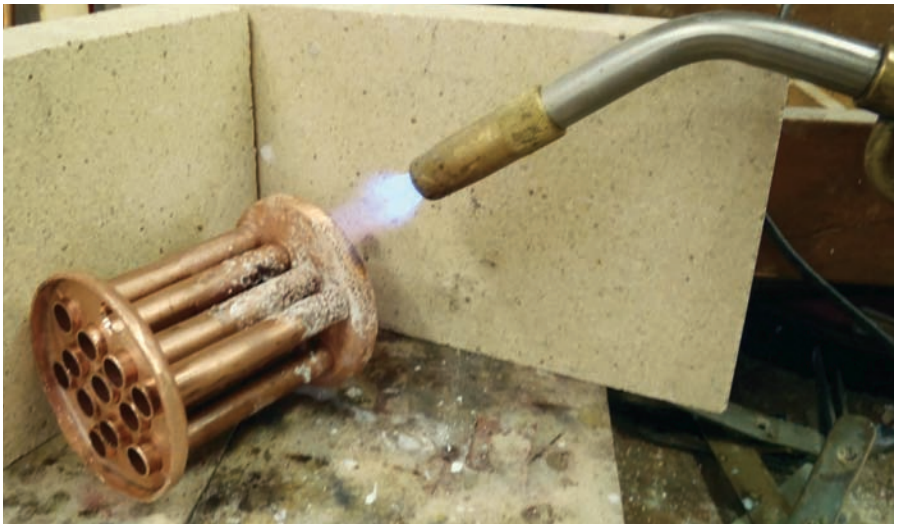
We designed and milled wheels out a lump of brass using AutoCAD and a computer-numerical control (CNC) milling machine. We each made a fuel tank and burner from raw materials. During those two weeks, we put it all together and had a running locomotive.

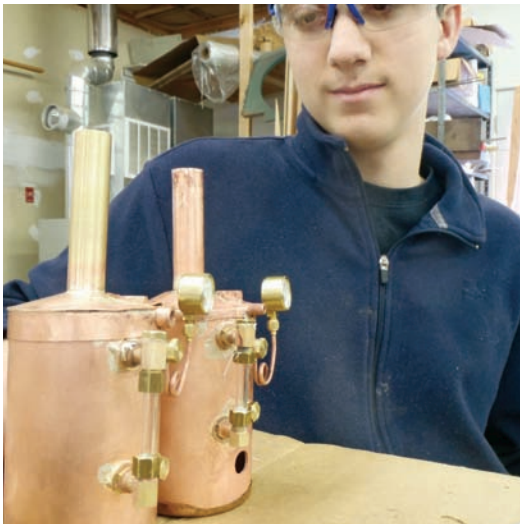
Boilermakers, *pere et fils*: *Eric Schade, left, poses with his son Ben and their matching completed logging locomotives.*

My dad and I each assembled a Graham Industries' kit for the VR1A single cylinder vertical steam engine. The kit has good instructions with photographs and step-by-step instructions. Sometimes we had to think about how stuff would go together and



Beginnings: *Left, engine assembly; center, it is finished; right, parts for a boiler.*





Boiler building: *Left, torch on the fire tubes; right, author with two completed vertical boilers.*

we made a few mistakes, but they were easily corrected once we realized what to do.

The parts fit well and needed only to be screwed together. We used thread locker on some of the little screws so they wouldn't come loose when the engine was running. We tested the finished engine using air from my dad's air compressor. It was tight at first but soon was running well in both directions.

I learned the boiler is an important part of the locomotive. We started out by sawing off a length of 2½-inch copper pipe for the boiler shell. Then we annealed two pieces of copper to shape them as the top and bottom. These pieces were drilled for boiler tubes. We silver soldered the boiler tubes into the ends and then inserted the assembly into the boiler shell and silver soldered them together. We used Dad's lathe to make bushings for boiler accessories like the pressure gauge and water glass. Finally, we silver soldered the bushings in place.

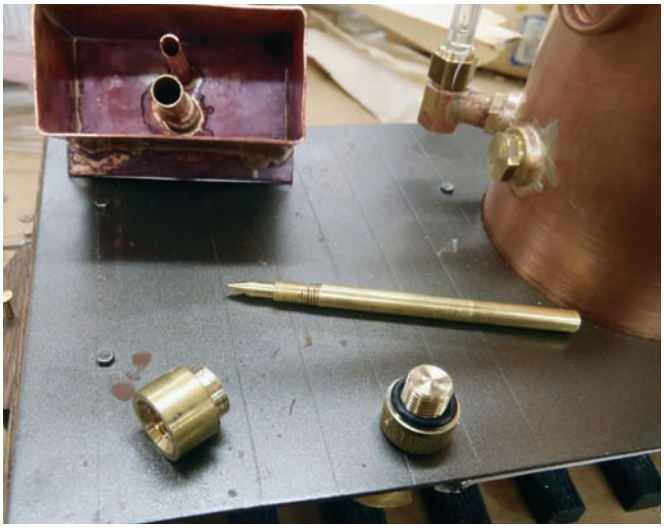
We purchased some boiler accessories and made others. The throttle valve was made by PM Research Inc. of Wellsville, N.Y., which has saved time and effort and we don't know how to make a pressure gauge. We did make the fittings and cut the glass tubing for the water glass. The safety valve was from Accucraft Co. We installed all the parts using Teflon tape as a sealant.

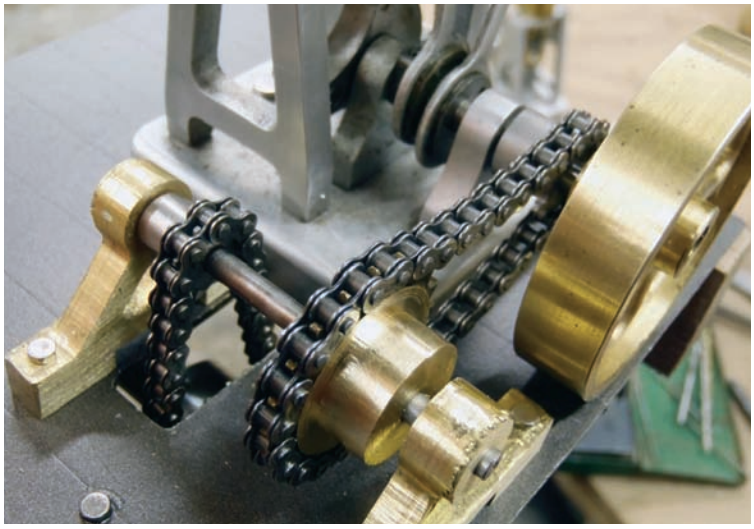
We needed to test the boiler to make sure it was safe and effective. When we over-filled it with water, it was able to hold more than 50 pounds per square inch (psi) of pressure for an extended amount of time and reached near 100 psi. This test is called a hydro-static test and it is customary to pressurize the boiler to double the working pressure, which in this case is 30 psi.

We each designed our own wheels for our locomotives. I started the design on AutoCAD by just creating a fairly simple 2D drawing. I designed a seven-spoked wheel. We exported the drawing into a computer program called Vectrix which allows us to create

Ben Schade, 14, lives in Phippsburg, Maine, with his brother and his parents. He modified a "Ruby" with his father in 2009 to represent Wiscasset, Waterville & Farmington No. 10. He made this logging locomotive in ninth grade in January 2013, as a project for his school, the Maine School of Science and Mathematics, which is a state-run boarding magnet high school in Limestone, Maine.

Wheels, fuel tanks, chain: *Far left, the author sets up the CNC milling machine to cut his drive wheels. Near left, a newly milled wheel. Lower left, the fuel tank was made from sheet copper with a shop-made valve. Lower right, roller chain drives the wheels.*





a tool-path program for the CNC milling machine. The CNC milling machine is a small milling machine controlled by a computer that gives us the opportunity to make many complicated pieces exactly the same without a mold. After loading the program we just made and clamping down the piece of brass, all we had to do was press "Go" and the machine went to work.

The frame, on the other hand, was simple enough that we made it by hand. The milling machine, while it does an exact job, is painfully slow when doing something like the frame. So we decided to cut it out of aluminum on the band saw. Though when we got to drilling the axel-bushing holes, it was important to be exact, so we used the CNC milling machine to drill those.

My dad had lots of miniature chain in his scrap bin, so we used that and purchased matching sprockets for a chain drive. We had a 10-tooth sprocket on the engine fly-wheel, and a 20-tooth on an idler shaft driving an eight-toothed sprocket, which was connected to a 24-tooth sprocket, leaving us with a six-to-one speed reduction.

The speed reduction increases the torque and the locomotive's pulling ability. We made a fitting so we could plumb the boiler to the engine. We also made the lubricator that goes into the steam line. The lubricator was made from a piece of copper tubing capped on the bottom with a bushing on the top threaded to take a screw cap and a thin tube connects it to the steam line.

To lubricate the engine, steam enters through the little tube, condenses and

— *See Page 20*

Logging locos

A three-part series that follows hobbyists in their builds of what are sometimes called "backwoods locomotives." All the projects share vertical boilers, 0-4-0 wheel configurations and somewhat similar final looks, but they are as different as possible.

- **Part One — Hand tools in Japan.** A live steamer with few resources designs a single-cylinder scratch-built effort using a boiler kit, ingenuity and some understanding of physics.
- ➡ **Part Two — Ben builds a boiler.** A father-and-son team take a school winter vacation to scratch-build a pair of logging locomotives using machine-shop tools.
- **Part Three — To the Max.** A live steamer who has no experience in locomotive building confronts a lack of tools and a lack of multilingual skills to expand his railroading horizons.

A dad's-eye view

The idea for this project started a while back. Ben had enjoyed building and running trains on our outdoor railway. We were looking for the next project that we could do together. We sketched up some ideas based on an Accucraft "Ruby" kit. Well, he had already done one of those and wanted something different.

I scratched my head and thought of the nice little kits offered by Graham Industries. I had a TVR1A twin-cylinder vertical steam engine which is designed to run a small steam boat. The VR1A is a single cylinder variant which is suitable for a small geared back-woods logging engine, like might have been built in the logger's blacksmith shop. This struck up some interest in Ben. We worked on this project over the tail end of his Christmas break and the two weeks of his school's January term as a school-sanctioned home project class.

The Graham kit went together quite well; it is basically a screw-driver assembly procedure. We did need to lap the valve surfaces with the provided emery paper and oil things during assembly. When first built, the engine was tight but with several applications of light oil, and turning it over by hand, it soon was running nicely on air.

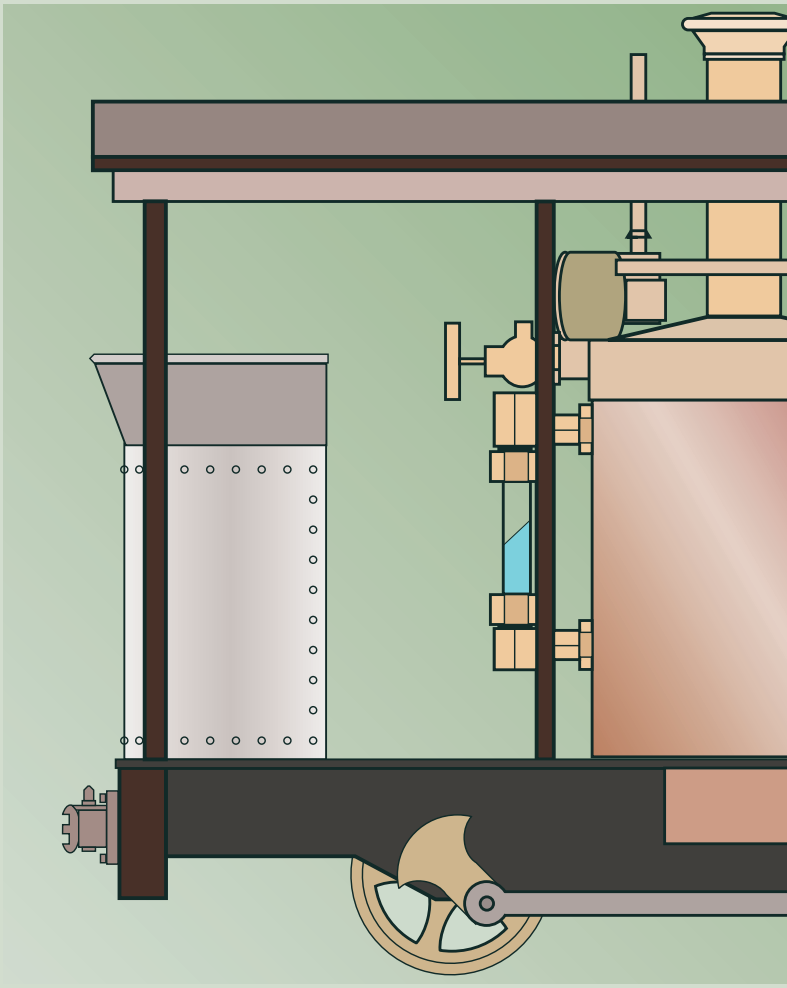
I had built vertical boilers before and designed this one like the old ones with actual dimensions arrived at by eye. We formed a flange on the tube sheets with a small hammer over a wooden form, and laid out the dozen three-eighth-inch diameter boiler tubes with a compass right on them. I made bushings on the lathe first, while Ben watched; then he made his own.

We silver soldered all the joints; again, I did mine first. Ben did well and even used the oxy-acetylene torch safely and successfully. We made fittings and installed gauges, plugs and valves then hydrostatically tested the boiler. Ben's worked better than mine; I had to fix a leak at the bottom tube sheet.

We each designed wheels for the locomotive on the computer using AutoCAD, then produced the cutting program and set up brass stock on the CNC mill. AutoCAD takes a little getting used to, but he did well. Ben probably has better computer aptitude than I do, but experience is helpful.

We made the frame from one-eighth-inch aluminum plate. The only dimensions which are really critical are the size and spacing of the drive-axle holes. We printed out a full size drawing, glued it to the plate and used the band saw to cut out its basic shape.

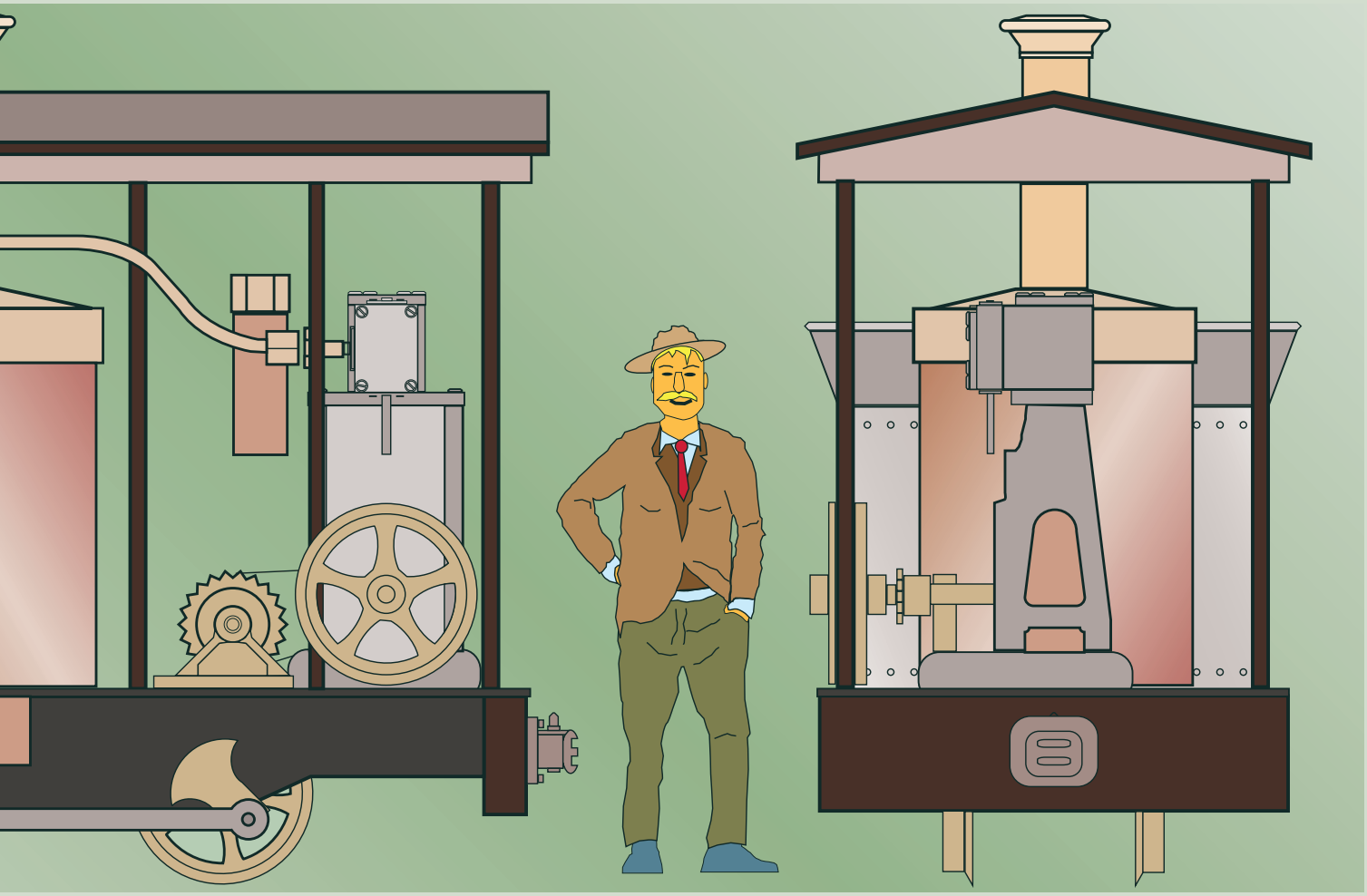
We center punched through the paper for the screws used to assemble the frame and drilled them through the right and left frames at the same time. When it came to the axle bushing holes, we set the frame up on the mill and drilled and reamed the holes accurately 5.000-inches apart. Brass bushings were pressed into the holes.



We just sawed out frame stretchers from one-quarter-inch by one-half-inch brass bar. The frame pieces were then clamped to a board and drilled and tapped for 2-56NC screws. A piece of 0.050-inch brass plate made up the deck. I deeply scribed lines one-half-inch apart to represent planks, lighter scratches represented wood grain. Walnut buffer beams finished up the bed of the locomotive.

I ended up purchasing sprockets from Stock Drive Products of New Hyde Park, N.Y. The chain I had was a long continuous length which could be "cut" and spliced with a small punch and hammer. Each engine required two loops of chain and four sprockets with an idler shaft. We used the CNC mill to carve stands for the idler shaft, though we certainly could have fabricated them by hand.

The two axles were to be connected by side rods. I spent some time trying to figure out a reasonably easy way to quarter them. With the CNC mill, I



could mill out holes in the cranks which include a "flat" that would mate to a flat milled into ends of the axles. The flats on both ends of the axles were cut at the same time so they would be on the same plane relative to each other.

The flats on the cranks were tilted 45-degrees from the crank. When the crank is slid (forced) onto the axle, the flats would keep them from rotating and would also force the angle between the right and left hand crank to be 90-degrees. This arrangement worked pretty well though there were some tight spots when rotating the wheels at first indicating that I didn't quite get the quartering perfect.

We made a simple dead-leg lubricator from copper tubing and mounted it on the engine frame. When the plumbing was complete we tested the engine on air through the boiler fill/safety valve bushing.

We made chicken-feed fuel systems for our engines, which is typical of alcohol-fired engines. The burner pot was not typical; I made one large burner from two concentric pieces of copper pipe silver soldered to a base sheet. I used stainless steel mesh for the wick which formed a circle.

I mounted the burner in a pan which shelters the fire from the wind and fits into the bottom of the boiler. Again, Ben's worked better than mine.

The completed engine ran well once we worked out a couple of bugs. It ran at a reasonable speed, probably only a little fast for a logging engine like this. It also seems to be able to pull a pretty heavy train. Ben and I both learned a lot with this project and enjoyed working together. It was a bit of a stretch of my design and building skills to build the engine in two weeks and even more so since I had to show Ben how to build his at the same time.

I felt the pressure of getting the two engines actually running in the short time while letting Ben do most of the work on his and without overworking him. I did not have detailed drawings of the engine before hand (and actually still do not), as much of the design was done on the fly.

We got the basic engines done and they really worked well, so I guess we can both be proud. We will spend some time when he returns from school, later, to finish them up and make the details that will make them a work of art as well as engineering.

— Eric Schade

Outdoor trials: *Finishing the engine can include a proper fuel bunker, perhaps a roof and assorted details.*

More boiler work: *Left, building the fire box; right, the added steam exhaust to help the fire burn better.*

— From Page 17

pushes out a bit of steam cylinder oil. Once everything was attached we tested the mechanism on air. We put air into the boiler from an air compressor and were then able to control the speed with the throttle valve.

The burner uses alcohol and consists of a fuel tank with a valve, a sump with a tube to the burner and a wick. The tank is on the rear deck and the burner is under the boiler. I machined the valve and fuel cap using the lathe. The tank was made from copper sheet and all the parts were silver soldered together. The burner was also made out of copper and has a wick made from fine stainless-steel mesh.

My dad discovered that the exhaust steam had to shoot up the smoke stack in order to improve the draft so the fire would burn better. We thought the vertical boiler would have enough natural draft for a good fire, but a forced draft makes a big difference.

The first test was on the bench, with the engine up on blocks so that the wheels didn't touch. It ran OK, but this is where we discovered more draft was needed and our side-rods fell off. We were able to re-attach them such that they won't come off again. We steamed it up again and it ran great. We filled the alcohol tank and it ran for five or 10 minutes.

We set up a loop of track on the shop floor because there was snow and ice on the track outside. We fired up the locomotive and ran it on this little loop. It had plenty of pressure and plenty of power. It pulled several cars without breaking a sweat. It went slow compared to our Accucraft "Ruby," but kept a nice pace. It seemed to run smoothly.

I had a fun time and am really glad to have built my engine with my father. It was a lot of work and a great experience. I learned how to solder, operate a lathe and use the CNC milling machine. I learned a lot about steam engines and how they work. I had a great time and will have a cool working locomotive for a long time. I recommend this project to anyone who thinks they can commit the time to it.

Exploring Accucraft's new 'Dora'

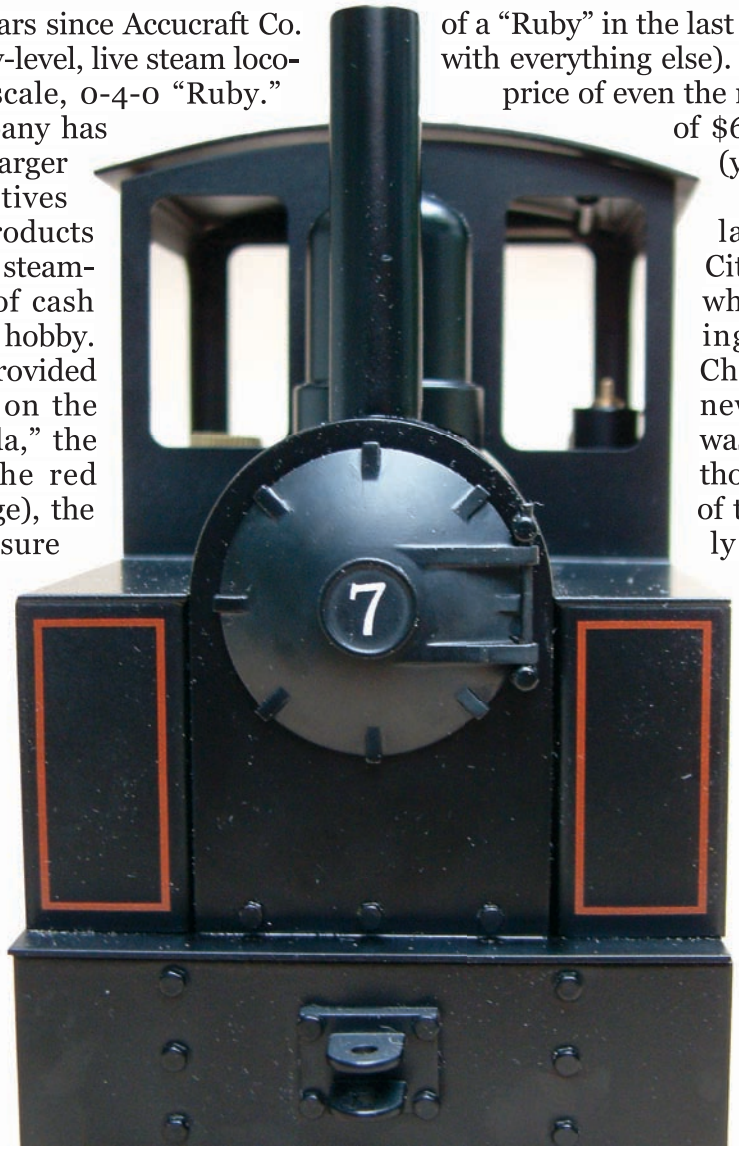
Text and photos by Dave Cole

It's been almost 14 years since Accucraft Co. released its first entry-level, live steam locomotive, the 1:20.3-scale, 0-4-0 "Ruby." Over that time the company has consistently focused on larger and even larger locomotives in a variety of scales, products aimed at the experienced steamer who has quite a bit of cash that can be devoted to the hobby.

While Accucraft has provided a number of variations on the "Ruby" theme — the "Ida," the "Ruby" No. 2 (that's the red one with a pressure gauge), the "Ruby" No. 5 (with pressure gauge and the spark-arrestor stack), not to mention the 2-4-4 "Forney" and the 0-4-2 "Iuki" which use "Ruby" components — essentially the company had little to offer those interested in smaller locomotives.

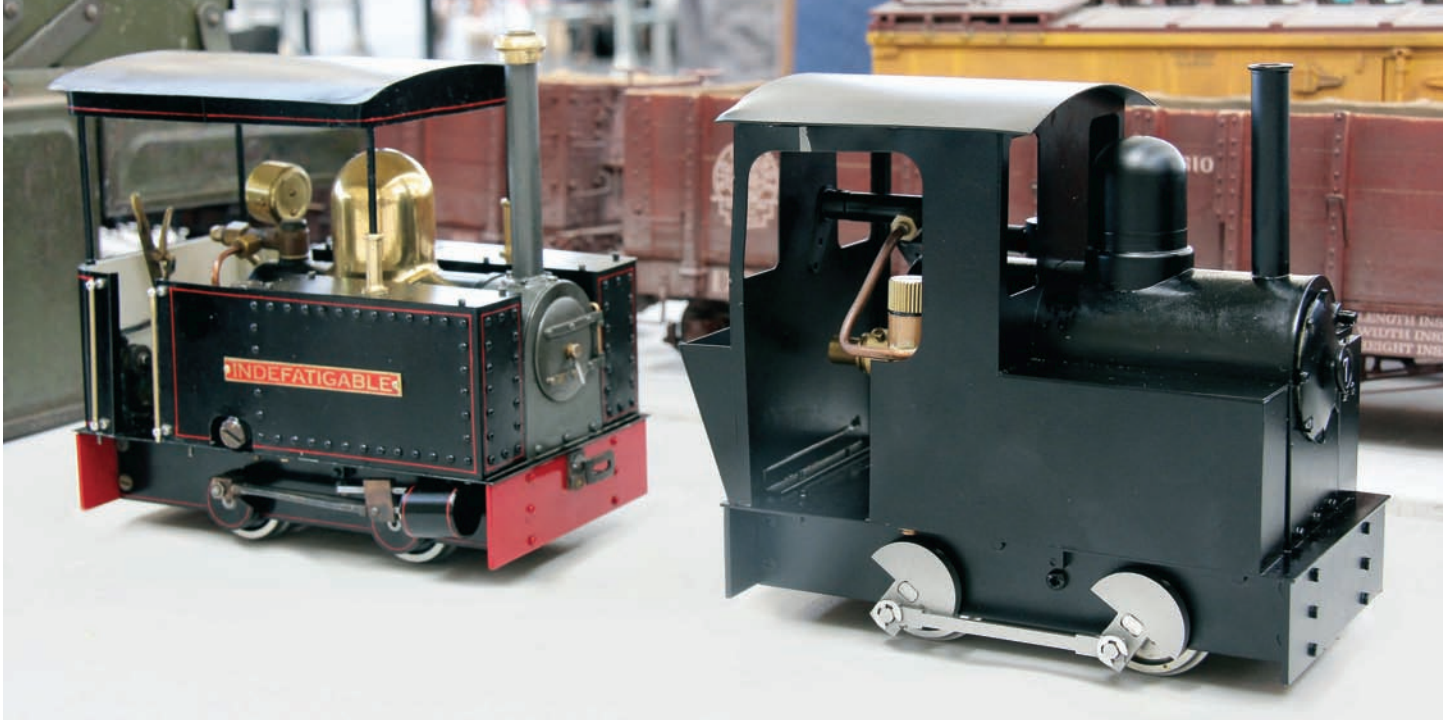
Or those on a limited budget who might become interested in small-scale live steam if there were an inexpensive starter locomotive.

Further, inflation being what it is, the price of a "Ruby" in the last decade has gone up (along with everything else). Today the suggested retail price of even the most basic "Ruby" is north of $600 with tax and shipping (yes, deals can be found).



So the announcement last year that the Union City, Calif.-based company, which does its manufacturing in Wuhu City, Anhui, China, would be creating a new entry-level locomotive was greeted with cheers. For those interested in the future of the hobby, a new, relatively inexpensive locomotive could mean more converts to the cause.

A development prototype of the locomotive was shown at July 2012's National Summer Steamup in Sacramento and while it received a generally good response, since Accucraft also brought along early versions of locomotives such as its first 1:13.7-scale U.S.-profile engine, "Emma" (see *Steam in the Garden*, July/August 2013) and the as-yet



'Dora's' inspiration: *Marc Horovitz's 'Indefatigable,' left, next to the prototype of 'Dora' at July 2012's National Summer Steamup in Sacramento. Photo by Mike Martin.*

released, 1:32-scale Union Pacific 4-8-8-4 "Big Boy," the poor little entry-level steamer was almost ignored.

What was learned, though, was that this new, small steamer was based on a design by Marc Horovitz. Certainly one of the legends in small-scale live steaming — not to mention garden railroading in general (he is the founder and longtime editor of Garden Railways magazine) — Marc has designed and built a number of interesting locomotives over the years and keeps two of the great resources of the hobby, the "Locomotive of the Month" and the "Locomotive Galley," on his site, http://www.sidestreetbannerworks.com/.

Marc's original design, which he ended up naming "Indefatigable," was a freelance project based on United Kingdom practice, "because I like British narrow gauge." It was butane fired, used a pair of offset oscillating cylinders and a geared drive train, which offered both forward and reverse.

The whys and hows of Accucraft's locomotive choices still remain opaque after all these years of creating products for the hobby, but suffice it to say Marc's "Indefatigable" caught the attention of the company and it decided to go forward with its own version.

Accucraft named the new little beast "Dora" and locomotive deliveries began in early June.

First impressions

Even though it is significantly shorter than "Ruby" (6¼-inches long versus nine-inches long), the new "Dora" has heft, which isn't surprising, since the bane of little locomotives is a lack of weight over the driving wheels, which in turn prevents traction. "Dora" had to weigh as much as a "Ruby" in order to pull anything besides herself.

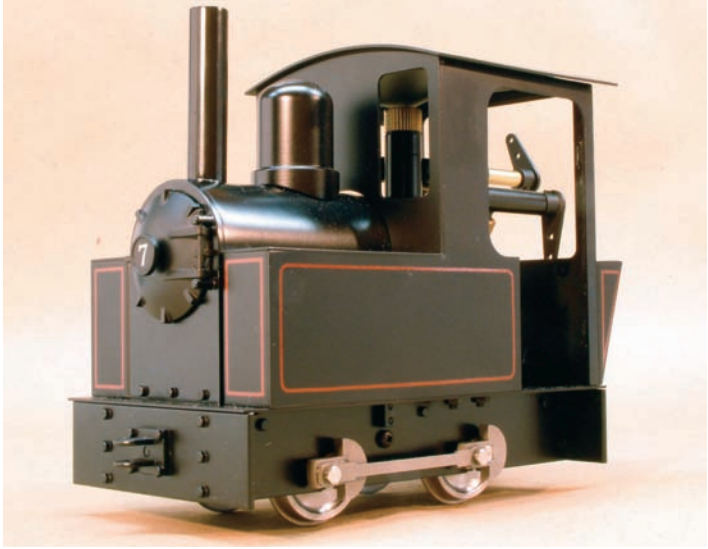
Like all Accucraft products, "Dora" appears to be made from brass and stainless steel throughout. Construction on the body work seems to be sturdy and might even take a degree of abuse without operational damage.

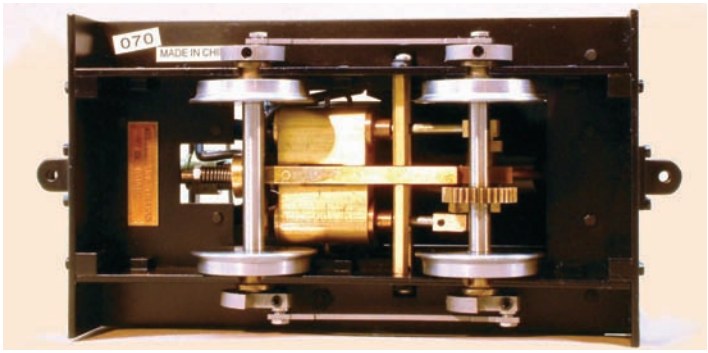
The saddle tanks on "Dora" are shorter than those on "Indefatigable," revealing more of the boiler and giving it a somewhat less British look. Rather than the gloss paint that Accucraft has traditionally used for "Ruby," "Dora" is painted in a satin-black finish and even includes a set of deep sienna pin-stripes around the saddle tanks and on rear piece of metalwork that represents a coal bunker.

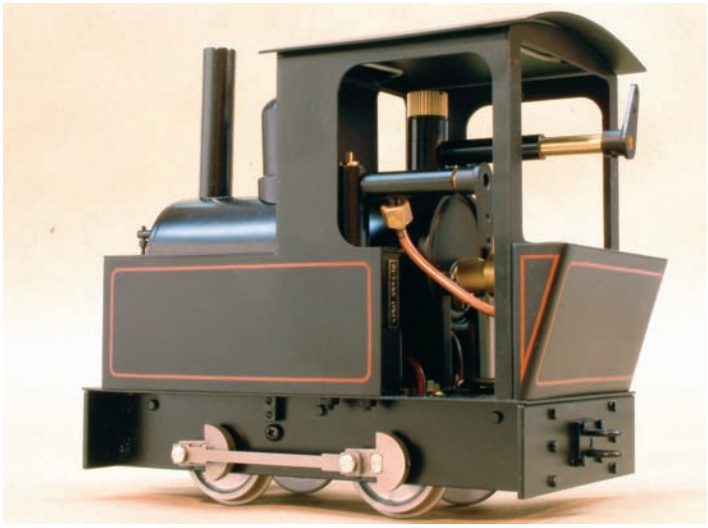
Another major dif-

Accucraft 'Dora'

- **Loco type:** Freelance, somewhat British-looking 0-4-0, saddle tanks, coal bunker.
- **Scale:** 1:20.3, 45mm gauge.
- **Length:** 6 3/32 inches (155mm).
- **Width:** 3½ inches (89mm).
- **Height:** 6 1/16 inches (180mm).
- **Boiler:** Single-flue. Pressure: 60 psi. Capacity: 65ml (2⅕ oz.).
- **Fuel:** Butane.
- **Cylinders:** Two oscillating.
- **Fittings:** Safety valve, throttle, filler plug, displacement lubricator.
- **Available models:** Black.
- **MSRP:** $435.







Every angle: *'Dora' comes in a satin finish and is black with the exception of the pin-stripes.*

ference from "Indefatigable" is that the original has mocked-up side pistons, while "Dora's" motive power remains an illustrated mystery. The nicety of Marc's little pistons are certainly missed on "Dora," but making a set would be a great project.

All four wheels are drivers; the front two via the gears and the rear two from the side-rods connected to the front wheels.

The smoke box door has nice details and has a round number plate that Accucraft has helpfully painted No. 7. Hex-head bolts are used both for detailing and structural purposes throughout, though there is a Philips-head screw that holds the brass cross beam in place about midway along both sides of the frame. Certainly an ambitious hobbyist could find a hex-head bolt that would still hold the cross beam but have a more prototypical look.

Maybe my favorite detail in "Dora" is the roof of the cab — it is hinged to lift off and away from the cab, folding neatly down one side. The hinge is a simple heavy-gauge wire affair, meaning the wires can be pinched together and the roof then comes completely off (the company has used similar designs in its more expensive locomotives). Having to remove the entire "Ruby" cab in order to work inside has always seemed to me to be a problem waiting for a design solution. And here it is.

While "Dora's" place in the firmament means that it had to dispense with frills, Accucraft is offering add-ons such as a pressure gauge and a Goodall valve (which combined will set you back more than $100). A fitting near the boiler plug where the pressure gauge can be attached was included.

"Dora" is rigged for link-and-pin coupling, though the coupler is higher than my existing 1:20.3 rolling stock, set up to be pulled by a "Ruby" (the "Ruby's" link-and-pin is about one-inch off the rail head, while "Dora's" coupler is 11/8-inches above).

"Dora" arrived in a red box (a sienna that almost matches the pin-striping) and was taped and Styrofoam cocooned in the same manner as all Accucraft products arrive these days. In addition to a well written and illustrated instruction manual, "Dora" came with a neat little kit of two syringes with plastic tubes, a gas-filler pipe, two hex-head wrenches, two Allen wrenches and a set of spare screws and bolts.

Also in the kit, new for Accucraft, was a pair of cotton gloves, a feature that makers such as Aster have always provided. Unfortunately, the gloves were designed for someone with hands smaller than mine (and I have pretty small hands).

Lastly in the box were two pressure-vessel cer-

— *See Page 26*

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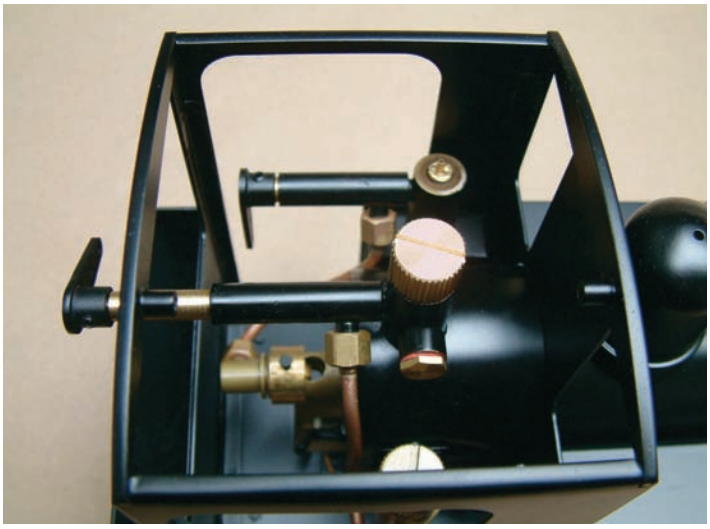
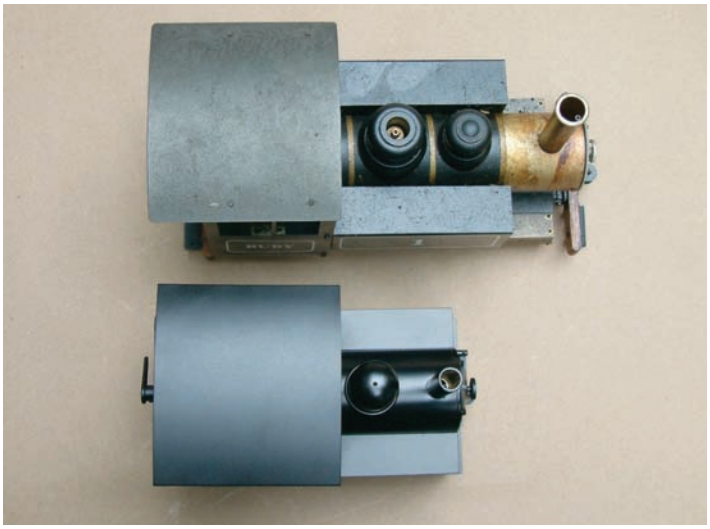




Inside 'Dora': *Left, the cab controls of a 'Dora.' Right, the top engine, 'Ruby' is much longer than 'Dora.'*

— From Page 23

tificates, one for the boiler and one for the gas tank. While apparently there are small-scale live steam venues overseas — and a few in the United States, frequently those connected with ride-on clubs — that require a boiler certificate, after close to 15 years in the hobby I have never been asked for one.

Boiling water

After admiring "Dora," the first thing I did was to grasp her in my right hand and roll my left palm across the wheels, to make sure the cylinders would move freely. She was a little stiff, but when I put her on the track and pushed, she moved without undue force.

I then tried out the steam throttle and gas control; I found both to be stiff, especially the gas, and worked them on and off trying to get them to loosen a bit. They remained stiff.

On blocks in the workshop and following the instruction manual to the letter, I oiled around all the moving parts with a light-weight, high-speed oil and then filled the steam-cylinder oil reservoir. "Dora" took 2.5ml of steam oil (about a half teaspoon).

I then filled the boiler with distilled water, using the second recommended method of filling it to the top and then extracting 20ml of water to leave steam space (for a total of about 65ml of water, or 2⅕-ounces).

Lastly, I filled the gas tank. The gas-filler valve is about four inches inside the engine because of the body work and most typical portable burner cartridges or camping-gas cans can't reach, so the extension tube is needed. Since my Berkeley Locomotive Works' "Cricket" requires an extension tube to fill its tank, I was familiar with the trick of holding both the gas cartridge and the tube at the same time.

Then I opened the smoke box door and lit her. There was a "whoosh" and flame coursed out of the smoke box and I quickly closed down the gas control. In doing so, I found the gas control definitely was finicky and began playing with it, listening to the amount of gas that was escaping at each fractional turn of the control.

I waited for this excess gas to dissipate, then refilled the gas tank and tried lighting her again. This time she lit correctly and with an adjustment the flame popped back into the flue. Eight minutes later steam began to escape from the safety valve and I opened the throttle.

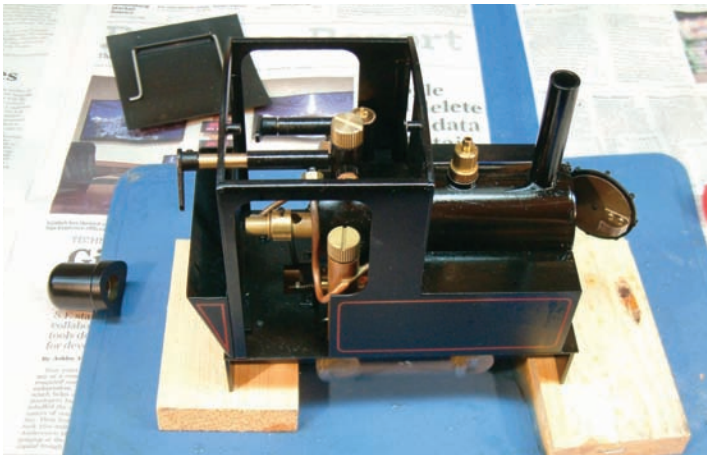
Nothing happened. I closed the throttle and reopened it. Nothing. I tried the process again and again, and nothing. Finally with one more try a big slug of hot, steamy, oily water launched into the atmosphere and landed on the top of my balding pate.

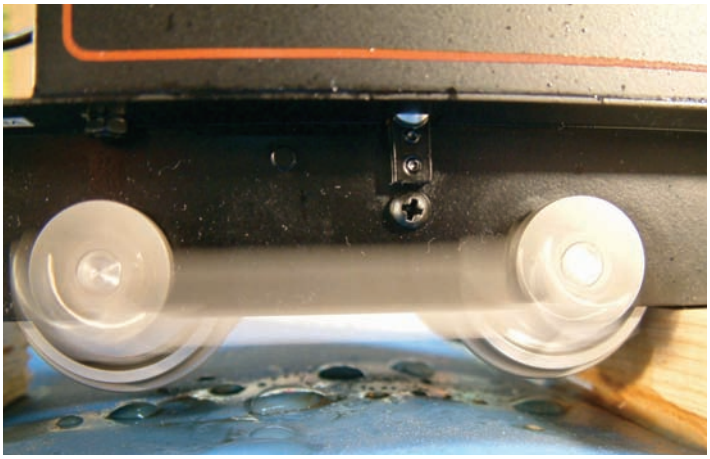
But "Dora's" wheels were turning, so I happily ignored the slimy water running into my eyes and onto my glasses.

"Dora" ran for almost exactly 10 minutes and then she stopped; the gas ran out and a quick jiggle showed she still had water in the boiler to spare. I quickly re-watered and re-fueled, but despite the fact she was warm, it still took her eight minutes to raise enough steam to weep the safety. Again, it was difficult to get her to turn on her own (this time I coaxed her to start by nudging the push rod with my finger) and this time her flame went out after about 90 seconds of running.

I re-lit her and it took a couple of minutes to get enough steam to start again and she ran fine, once again for almost exactly 10 minutes (and once again, no gas but still some water).

"Dora" ran four times on blocks and with each successive run she seemed to start smoother and run less roughly. But throughout this process I felt like the gas control was a little too fiddly.





On blocks: *Left, 'Dora' on the bench. Right, 'Dora's' connecting rod moves so fast it's almost invisible.*

I backed the control out and noticed the rubber O-ring seemed a little off; I re-seated it, screwed the control back in and from then on the control worked much better.

On the main line

For her next performance, I took "Dora" out to the backyard, where I have a 180-foot, elevated railroad that runs around a patio and a deck. I set "Dora" up on the outside loop, oiled her and filled her with water and butane and lit her off. Like clockwork, eight minutes later, the safety began to weep and I opened the throttle and gave her a nudge.

She ran a nice 10 minutes on the layout, so I re-watered and refueled her and brought out a small rake of cars (it's an ecumenical consist — two Northeast Narrow Gauge 1:20.3-scale kit cars and an LGB 1:22.5-scale German caboose that looks right with the other two). Eight minutes and a "Diamondhead coupler" (a bent paper clip) later, and she was off.

"Dora" ran the small rake the same way she had run light — 10 minutes at a steady pace.

This time "Dora" ended her run quite a ways away from the steamup bay, so I uncoupled the cars, went to pick her up and learned why gloves are included.

Unlike "Ruby" or many other locomotives, there is no wood on "Dora" — she's heat-carrying metal through and through. Unless you have gloves or a rag, she's not about to be picked up immediately after a firing.

Also, I learned out on the layout that "Dora's" throttle and gas-control handles get hot during runs as well and to be careful when adjusting them. Again, gloves aren't optional with "Dora."

I ran "Dora" three more times that day with no problems.

I have subsequently fired her on blocks and on the layout and she has performed admirably. There have been a couple of occasions where I have allowed a little too much gas in the smoke box before bringing in the lighter and "Dora" will do a flame "whoosh" at those moments, but otherwise, there have been no problems.

Even after that tweak of the gas control, the valve still seems to be a little tricky and I (and perhaps all "Dora" operators) need to be careful when adjusting it.

After the firings

"Dora" will bring about much debate in our hobby: there will be those who believe she is too small, too underpowered and so far from the look of an American locomotive as to be undesirable.

Others will point to her low cost, quality manufacturing and her inherent ability to be kit-bashed into looking like any 0-4-0 with wheels inside the frame (four small hex-head screws are all that hold the body to the frame).

There are some aspects of "Dora" that are frustrating — in communicating with other "Dora" owners, it appears that I'm not the only one having trouble keeping the gas adjusted correctly — but overall it is a spunky little loco that seems to work for most part right out of the box.

For the neophyte unconcerned about fidelity to historical railroads, "Dora" would make a great first-time locomotive. A $500-or-less investment gets a beginner started in the hobby. For someone who wants a locomotive that looks like it came out of a U.S. history book or wants one that will run longer than 10 minutes at a filling, perhaps an incarnation of a "Ruby" (and its attendant $65-$200 higher price) is more appropriate.

For me, "Dora" matches my other tiny locomotives, such as my Berkeley "Cricket" and my first-generation "Ruby." As such, I have rolling stock that looks appropriate with "Dora" and a lot of experience running locomotives much like "Dora." I think "Dora" makes a great addition to my stable of engines and I'm happy I bought her.

The first of what will be many 'Dora' modifications: Shortening the throttle

VALVE

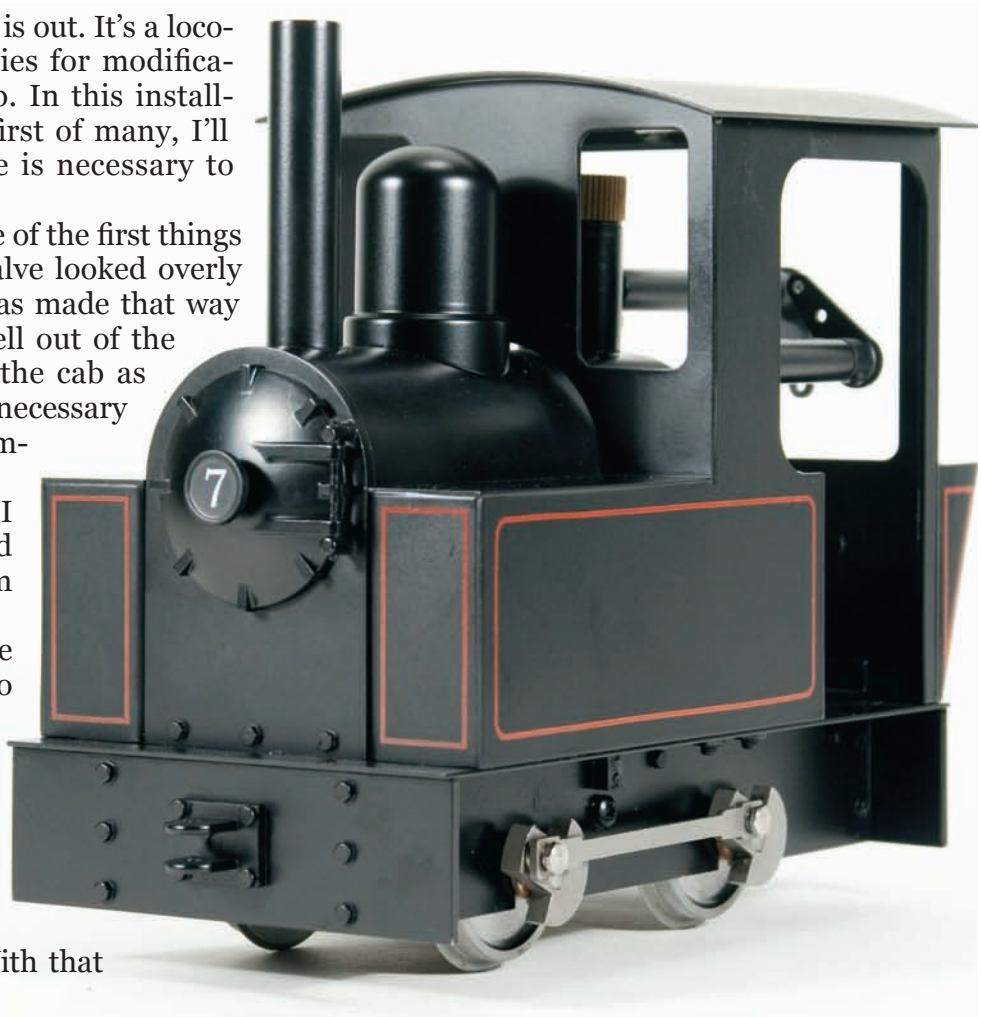
Text, photos and illustrations by Marc Horovitz

Accucraft Trains' new "Dora" is out. It's a locomotive ripe with possibilities for modification, innovation and fix up. In this installment, which I hope will be the first of many, I'll tackle the throttle valve. A lathe is necessary to make this modification.

Upon unpacking the engine, one of the first things I noticed was that the throttle valve looked overly long (**Photo 1**). Presumably, it was made that way for convenience, as it extends well out of the back of the cab. However, with the cab as open as it is, this seems both unnecessary and unsightly. I prefer a more compact design.

With that thought in mind, I removed the throttle handle and unscrewed the throttle valve from its housing.

I carefully measured the valve and drew it up (**Figure 1**). I also measured the housing, including the length of the smooth inside diameter before the thread started. This revealed that a little over a quarter of an inch (.275-inch) might be cut off of the housing without altering the throttle's performance. With that



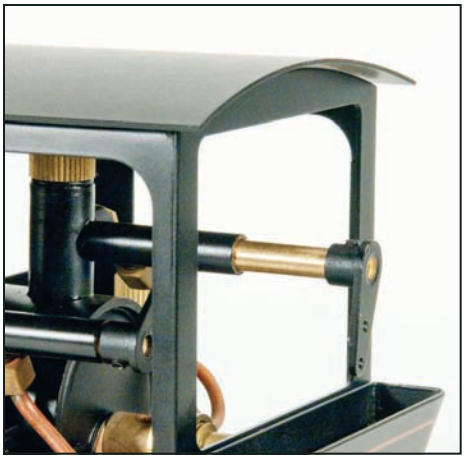


Photo 1

Photo 4

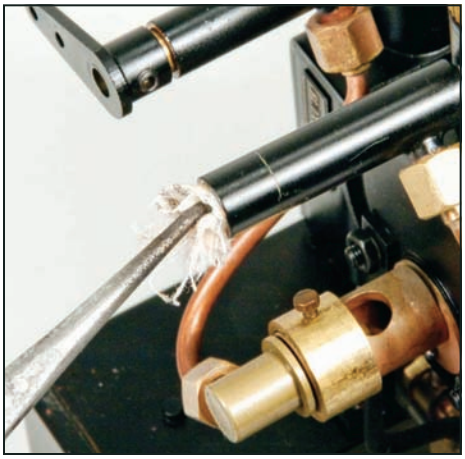


Photo 6

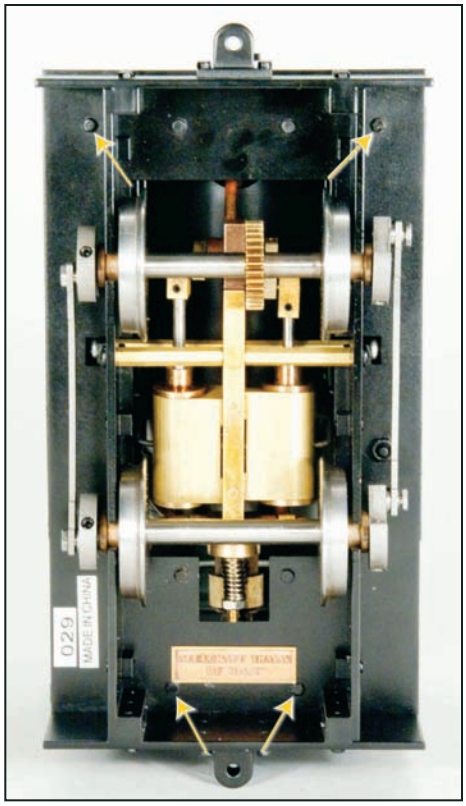


Photo 2

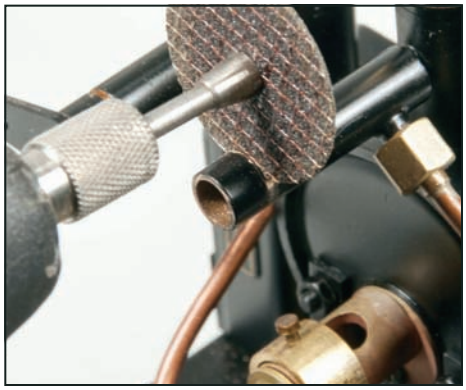


Photo 7

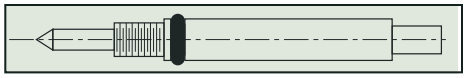


Figure 1

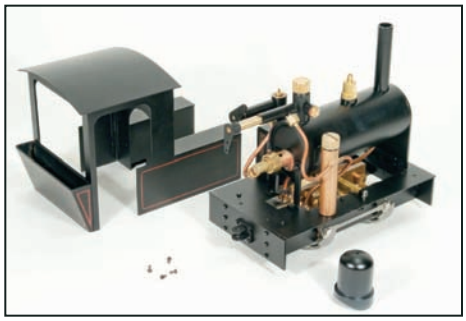


Photo 3

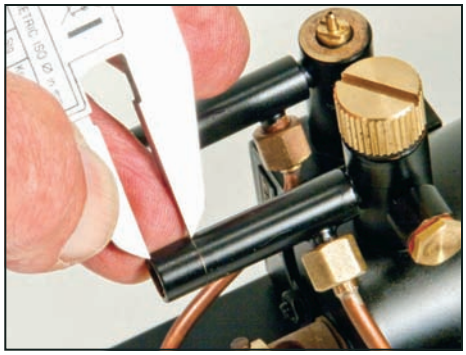


Photo 5

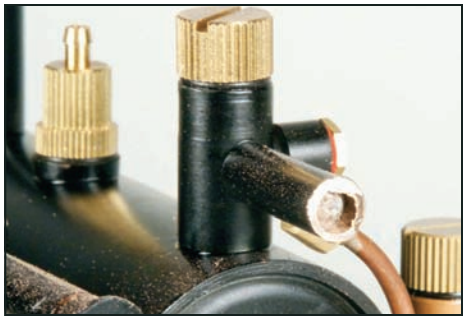


Photo 8

removed, the valve itself could be shortened by nearly an inch (.900-inch).

(Note: Accucraft has been known to make changes to its designs in mid-production, so I suggest that you double-check these measurements.)

The first thing is to remove the body from the rest of the engine. This is easily accomplished by removing four hex-head screws — the ones at which the arrows point in **Photo 2**. A hex wrench is supplied with the engine but I found this to be ineffective, so I used my own.

With the four screws removed — make sure you take off the dome too — the body slips right off (**Photo 3**). Unscrew and remove the throttle valve, then remove the handle from the end of the valve by loosening the Allen screw with the supplied wrench (**Photo 4**).

Modifying the throttle housing

Set your caliper (digital or dial) to .275-inch and scribe a line around the throttle housing (**Photo 5**). I'll use a cut-off disc in my Dremel rotary tool to remove the unwanted section; a jeweler's saw could also be used.

It's important not to get metal chips or dust in the throttle housing. To prevent this, I stuffed a bit of rag that used to be part of a favorite shirt into the open end of the housing with a pair of tweezers, making sure that it was tightly packed far enough in not to foul my tool when I was cutting (**Photo 6**). If using the Dremel, be sure to wear safety glasses. Cut very close to the line (**Photo 7**).

The finished cut will be rough (**Photo 8**), so use a flat file to smooth it off. Carefully go around the inside of the hole with a utility knife (X-Acto) with a No. 11 blade

Photo 9

Photo 10

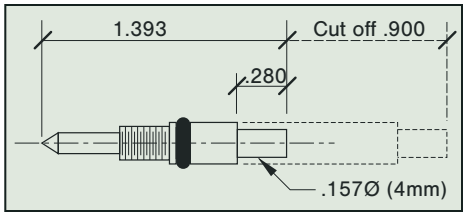


Figure 2

Photo 11

Photo 12

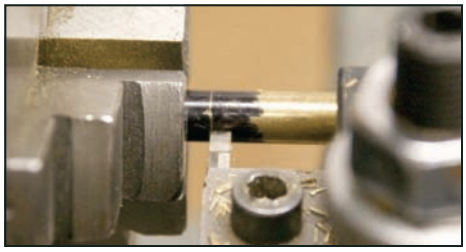


Photo 13

Photo 14

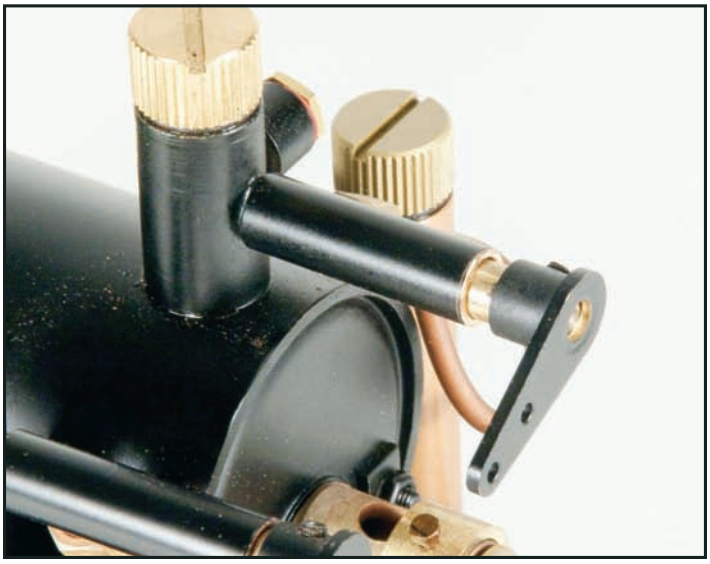


Photo 15

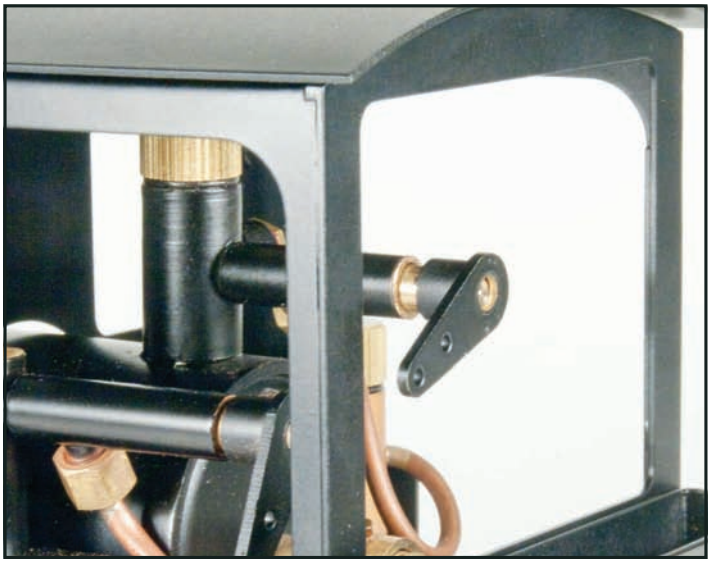


Photo 16

to remove any burrs (**Photo 9**). Then remove the rag.

That completes the modification to the housing (**Photo 10**). You can touch up the cut end of the housing with a little black paint if you want to (I didn't).

Modifying the throttle

Figure 2 shows the final configuration of the throttle valve. Using a felt-tip pen, blacken the throttle body (**Photo 11**). Set your caliper to .900-inch and scribe a line around the body, measuring from the non-pointy end (**Photo 12**).

Chuck the throttle in your three-jaw chuck, pointy end inward, with the scribed line close to the chuck. No need to remove the O-ring — it will be fine. Part off the section to the right of the line (**Photo 13**). Then reposition the work in the chuck and simply turn down the shaft to .157-inch (4mm) diameter for a length of .280-inch (**Photo 14**).

Once that's done, you can reattach the handle to the throttle and replace the throttle in its housing (**Photo 15**). Compare **Photo 16** with **Photo 1**. Much better, methinks.

Difficulties testing locomotives? Try building a better roller

Treadmill

Text, photos and illustration by Dave Frediani

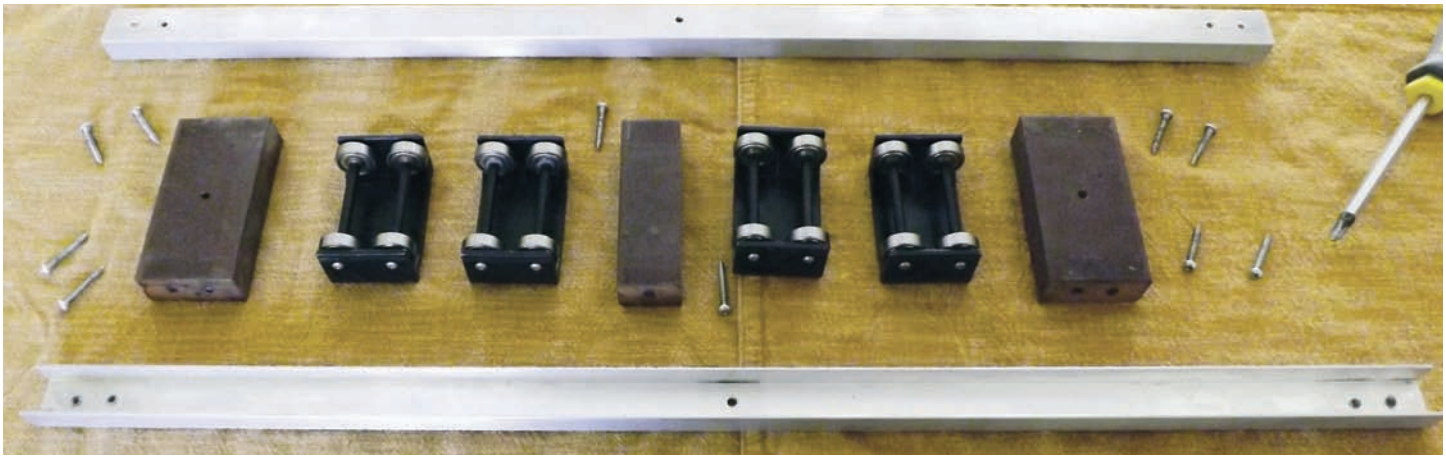
After seeing a three-year-old video of a small-scale live steam treadmill system on YouTube.com, testing the then-new Accucraft Climax locomotive, I was impressed with the devised treadmill roller assembly that steamer used and the convenience of placing or removing engines for testing purposes.

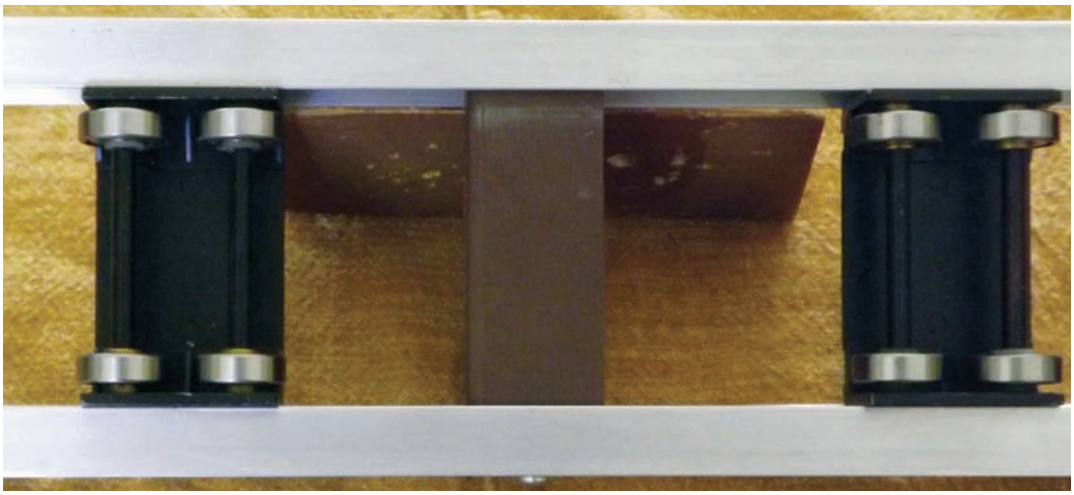
In my experience, I've found without having a separate section of track to line up the rollers for stationary testing was very frustrating at times. That's when I decided to build my own treadmill system.

To start the project, here are the materials you will need:

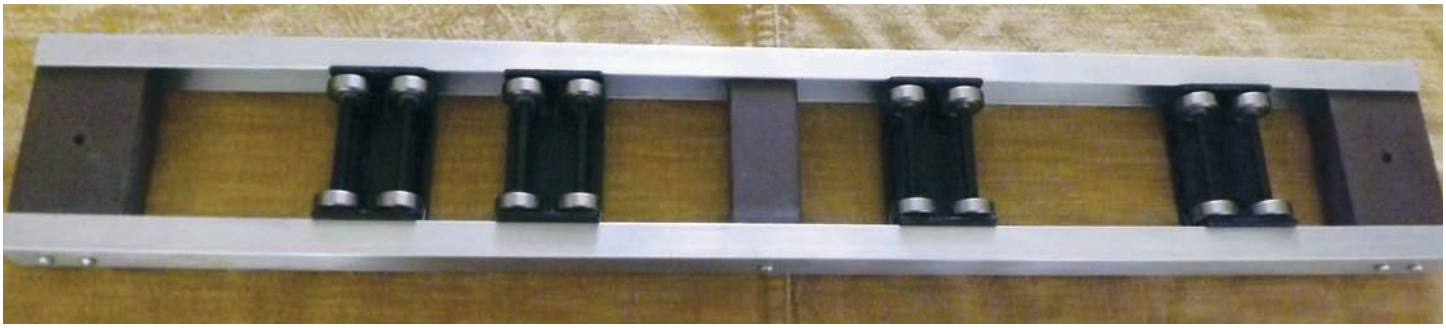
- One piece of aluminum channel, one-half-inch by three-quarters-inch by six-feet; if you choose to make a longer unit just pick the length you would like. Cut the channel in half to get two equal-length pieces.
- One piece of wood, one-inch by two-inches by one foot; keep in mind a one-inch piece of wood is roughly three-quarters-inch thick, which will fit inside the channel perfectly. A one-foot piece of wood can be purchased at any hobby or craft store.
- Twelve No. 6 by one-inch screws.
- Four Accucraft treadmill rollers (any makers' rollers should work); keep in mind that you may have to adjust the length of the wooden blocks in the channels between the rollers as needed.

Vanilla treadmill: *A locomotive's drive wheels sit between rollers on each side. Photo: Accucraft Co.*





Better treadmill: *Top, the components of the system laid out ready to be built. Left, a close up of the center block and rollers. Below, the finished assembly.*



Directions

Step One: Cut the aluminum channel into two three-foot lengths (or equal lengths if you've chosen to build a longer system).

Step Two: Cut the wood into three pieces. Each end piece should be $3\frac{15}{32}$-inches long; for the middle block you will need to cut a one-inch by one-inch by $3\frac{15}{32}$-inch piece.

Step Three: Drill two 9/64-inch holes on each end of the two pieces of channel, then one 9/64-inch hole in the middle of each channel piece.

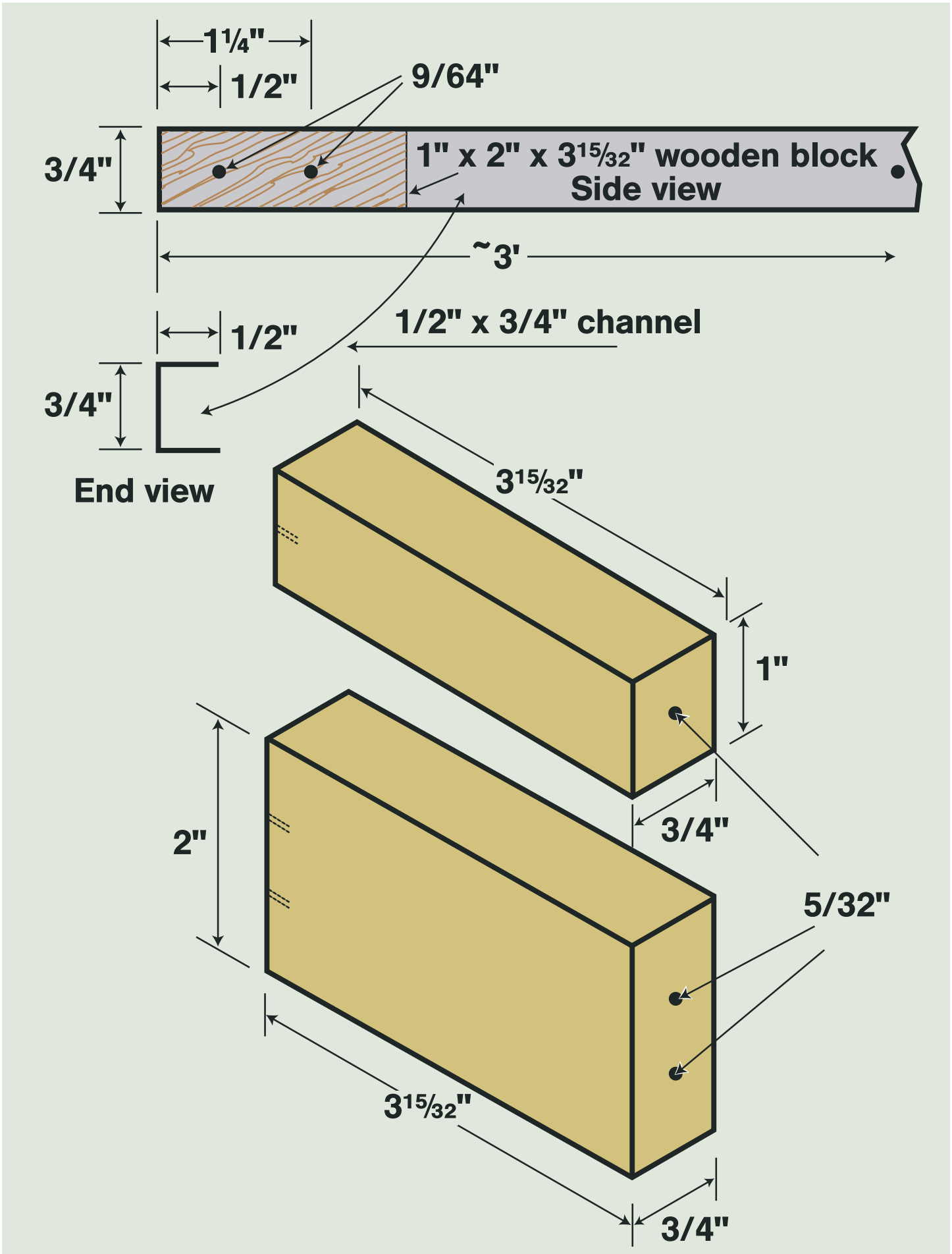
Step Four: Line up the channels horizontally. Place the four treadmill rollers between the channels, then place the wooden blocks on each end of the channel and place the third piece of the one-inch by one-inch wood in the middle of the channels.

Step Five: Use two C-clamps to hold the unit in place, drill 5/32-inch pilot holes through the wooden blocks and the 9/64-inch holes already drilled in the channel, then attach the wooden blocks to the channels using the No. 6 screws.

Your project is now complete.

After the unit is assembled, place the rollers on a level work space and you should be able to slide the rollers fore and aft by loosening one of the middle screws about one half turn. Once you have the rollers in the desired position tighten down the middle screw, which will lock the rollers in place.

Building this project, using these specifications, your total cost should be around $9, not including the treadmill rollers (if you don't already own rollers, a new set of four will set you back about $70).


1¼"
1/2"
9/64"
3/4"
1" x 2" x 3 15/32" wooden block
Side view
~3'
1/2"
1/2" x 3/4" channel
3/4"
End view
3 15/32"
1"
2"
3/4"
5/32"
3 15/32"
3/4"

Series Part Four

TOOLS & FUELS

Text and photos by Scott E. McDonald

Starting IN STEAM

As one starting in live steam, you are going to need a small steamup kit in order to get your locomotive fired up. A steamup kit contains the basic minimum needs for steaming the locomotive. Here are the most basic tools you will require:

- Syringe (typically nylon). For watering and dewatering the boiler
- Small syringe (sometimes brass). For oiling and removing the left over water/oil sludge. To be used only for this purpose.
- Fuel transfer device.

— Butane: If you have butane-fired locomotive you will need a transfer nozzle to get butane from the fuel canister into the locomotive butane tank. These come in a variety of shapes and sizes (see Steam in the Garden, July/August 2012, No. 122, "A primer on gas").

— Alcohol: If you have an alcohol-fired locomotive you will need another small syringe with a short piece of silicon tubing to fill the alcohol tank (again, you shouldn't use your water syringe or sludge syringe for this purpose).

- Rag. To wipe down the loco or help pick it up when it's hot.
- Small screwdriver. Some locomotive caps for lubricators need a small straight-slot screwdriver. It also comes in handy for tightening small screws.
- Small hex-head driver. If your locomotive has hex-head screws to hold it together, double checking every once in a while is a good idea as vibration can loosen screws over a period of time.
- Lighter. Barbecue type with a long nozzle.
- Fan. For drafting air (if your locomotive is alcohol fired with an enclosed firebox).
- Small mirror. For checking under alcohol-fired locomotives, but it also comes in handy for looking back into the fire tube of a butane locomotive when you are at the back end of the cab and you want to check that the fire is lit without having to move to the front to look down through the open smoke box door.

You will need some sort of box/bag/antique lunch pail to carry your kit. There are a lot of tool boxes to pick from at your local hardware store. Size, shape and style are personal choices. You might be able to find a box that will carry the tools, fuel and your locomotive.

My favorite tool-kit carrier is a vintage Burlington Zephyr lunch box.

Flight-line boxes used by model airplane hob-

Creating a kit: *The author's steamer's kit includes, starting bottom left and moving right, a large nylon syringe for water, another nylon syringe for water (smaller), a brass syringe for cleaning the steam oil sludge, a flat-blade screwdriver, a hex-head driver, an applicator with machine oil and a small mirror. Behind those are a bottle of steam cylinder oil and a fan for creating draft. A rag and barbecue lighter sit atop his antique lunch pail, which contains it all.*

byists also make great steamup boxes. They are designed with compartments to hold fuel bottles, and some come with a built-in hand crank fuel transfer pump that can be re-purposed for cranking distilled water into the boiler. This is especially handy if you have a large boiler.

- Water. Distilled. Period. End of discussion. Yes I have heard and read all about rain water, de-ionized, etcetera, etcetera, etcetera. The answer then, now and in the future will simply be: distilled.

You may also want to have water available during the run. Using the large syringe and a gallon jug of distilled water might be a bit cumbersome around the track so investment in a "top-off" bottle and valve — if your locomotive will take such a device, usually called a "Goodall valve" — makes running a bit more worry free.

Lubricants

Light oil. You will need to keep your motion parts lubricated. Probably the most common and popular is Blue 3-in-One Oil. It is available in two forms, distinguished by its black and red or blue label. I prefer the blue label as it is designed for use where the application of the oil is in a high heat environment or near heat. The can says that it is SAE20 designated for use on electric motors.

Steam cylinder oil. It has three basic purposes:

- It lubricates the piston so that it slides smoothly.
- It coats the cylinder walls to protect from the abrasiveness of the steam.
- It helps provide a seal so steam doesn't escape.

Steam cylinder oil is not to be confused with motor oil or lighter all-purpose lubricants. Steam oil is a mineral oil designed specifically to maintain its viscosity when the high temperature of the steam carries it to the pistons and it includes fatty oils (tallow).

The steam cylinder oils I am currently using are

Liquids, gases: *Left, a pump bottle with distilled water; center, a flask of alcohol; right, butane.*

an 80-weight Shell Valvata for my larger locomotives and a 40-weight for my smaller locomotives. I picked up a quart from a vendor at a national steamup and it has served me well for more than seven years and I still have a half quart left.

As to which weight you will use will depend on your locomotive; the manufacturer should suggest which weight to use. If you bought a locomotive second hand, discuss it with the previous owner to find out what they thought worked best. If that is not an option, a good rule of thumb is to use a 40-weight for a locomotive that operates below 20 psi and an 80-weight for those that operate above 20 psi.

You will fill the lubricator at the beginning of the run and at the end remove the left over condensate/oil mix (sludge). If you are planning on running again, you will drain the left over condensate and refill for each run.

Most small-scale locomotives have a displacement-type lubricator. If you look down into the top of the lubricator you will see the steam line enter along the top of the lubricator and a small pinhole in the top of the tube.

As steam enters the lubricator it ejects a small amount of steam out of the pinhole which in turn shoots up and splatters against the bottom of the lubricator cap. This action causes the steam to displace the oil as oil floats on water and the oil then gets picked up by the steam passing through the piping through that little pinhole and is carried to the cylinder.

When filling the lubricator it is important to not overfill. The oil should only come up to the bottom of the tubing with the pinhole in it.

The ABCs of fuels

Alcohol. You will hear live steamers refer to different types of alcohol as Meths, short for methanol, and denatured alcohol. Denatured alcohol is ethanol that has additives (methanol) to make it undrinkable and is available at hardware stores. In addition to its burning properties, it is used as a solvent.

Meths and denatured are not the same as they have different flash points and their use will depend on your live steamer and where the fuel bunker is located with respect to the burner. If you have a small locomotive where the fuel bunker is close to the burners, then you will want to use alcohol that has a higher flash point, such as denatured.

The heat from the close proximity of the flame will not readily cause the alcohol in the tank to vaporize and ignite. If you have a locomotive where the fuel is in a tender far from the burners, then the lower flash point, fast-burning methylated spirits may be your fuel of choice.

Care must be given to using alcohol that when filling the fuel tank of your locomotive that you don't spill. This is where a large syringe with some tubing comes in handy for better control of the transfer.

Alcohol also attracts water from the atmosphere. Leaving your alcohol can/bottle open for long periods of time will cause the attraction of water to eventually dilute the alcohol to where it's burning properties are hindered, thus wasting a perfectly good supply of alcohol.

Since alcohol is clear, like the water you put into your boiler, mistaking one for the other while preparing your locomotive for steaming is unsafe.

It is advisable to put a few drops of food coloring (your choice of color) into the alcohol shortly after you purchase it so that when transferring the extra visual ensures that what you are transferring into the fuel tank is the correct substance and vice versa for the boiler.

This is especially important if you put together any steamup kit where you are carrying water and alcohol in containers to fit your kit. Sporting-goods stores sell fuel flasks used in camping for the transport of alcohol used in camping stoves (the Trangia brand fuel bottle is an example). These make a nice addition to the steamup kit.

Butane. Let's first talk about the butane tank on your locomotive. The fittings on a standard butane gas tank in a locomotive are the filling valve and

the gas outlet valve. The device comes in two types: self- and non-venting valves. Many times you will hear the self-venting referred to by the most popular manufacturer, the "Ronson" valve. The "self venting" part means that when you have filled the butane tank on the locomotive, gas will vent back out into the atmosphere. When you start getting that gas "spitting" back, it's time to stop filling and pull the gas filler nozzle away from the filler valve.

Non-venting valves clearly do not vent and it can be difficult to tell when the tank is full. In some cases, back pressure will prevent the transfer of gas and you will not get as much into the tank for a full run. One way to avoid this is to slightly crack open the gas outlet valve while filling and then close after a few seconds while still filling. You will know when you tank is full by the brief blow-back from the valve as the nozzle is removed. A full tank will blow back more gas for a brief second than one that is only half full.

The more familiar you get with your locomotive, the more comfortable you will get knowing when you have a full tank or not. One way to first see the difference is to start filling, count to three and remove the nozzle. Start filling again but hold the nozzle on the filler valve for 20 seconds before removing and note the difference.

When using butane, you have to remember that there is going to be some spillage of gas in the area where you are filling the locomotive. You can't see it, it's heavy and will fall down around the bottom of your locomotive and there will be an invisible pool until it finally disperses into the atmosphere.

Regardless of the fuel you use, you never fire up the locomotive in the same area where you fill it. You move the locomotive down the track a bit or move it from the table to the track after filling. The goal here is to ensure that there are no lingering vapors, so that when you light off the locomotive, that you will not be lighting a pool of gas or alcohol that is in the area where you fueled your locomotive.

If you are participating in a steamup, where other locomotives are passing by the steamup area, an open-flame alcohol burning locomotive passing by can ignite an invisible pool of gas if there is a lot of spillage. So make certain of your surroundings before fueling a butane fired locomotive. Better yet, fuel it at a table away from the track and then transfer your loco to the track.

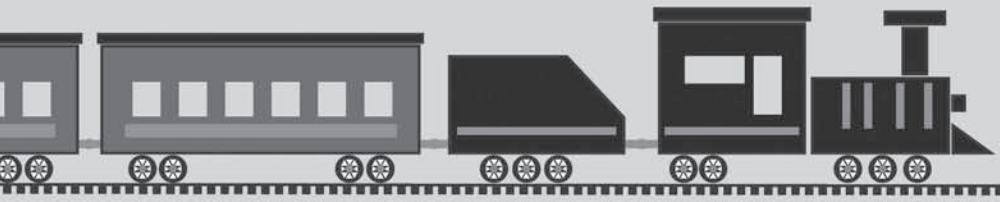
Coal. Sorry, not going to discuss that in this series since this is for beginners. If you think that coal firing is for you, then get a mentor and observe and learn.

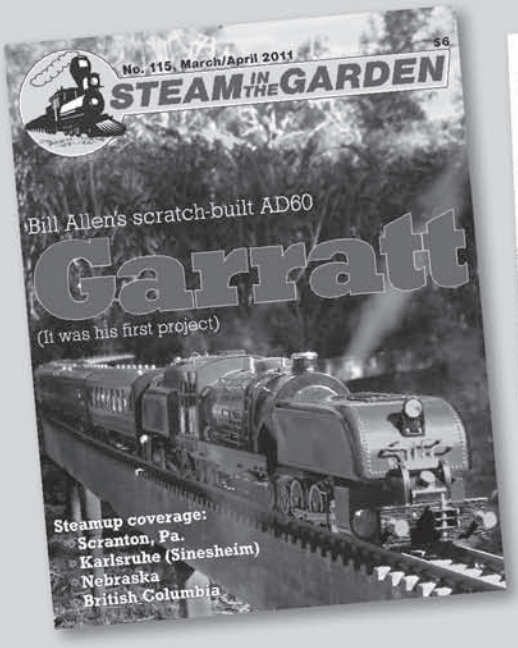
Sterno. The brand name of a gelled fuel used in chafing dishes and small camp stoves. The BAGRS/Basic Project Loco (http://www.panyo.com/project/) uses a boiler designed to use a gelled fuel. The transfer vessel is a spoon to fill the fuel cup and a knife to level the fuel so that it burns evenly across the bottom of the boiler. When using this fuel, care should be taken to ensure you don't get any on you or your clothing. It will stay in place and burn.

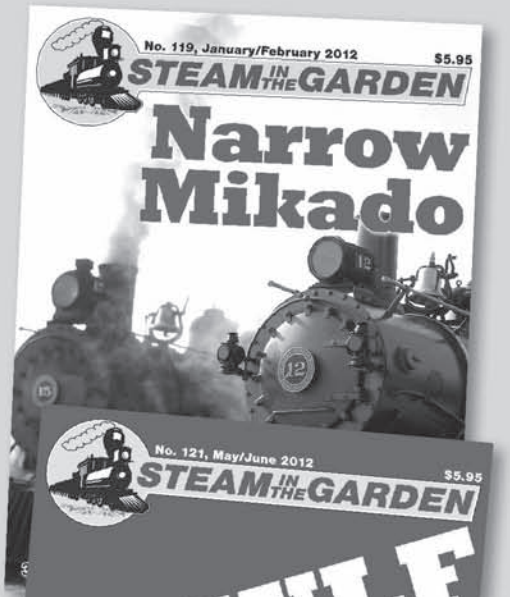
The "s" in "ABCs" can also stand for "solid," which would refer to the Esbit tablets used in some locomotives, stationary and tractor steam engines marketed in Europe by Mamod and Wilesco.

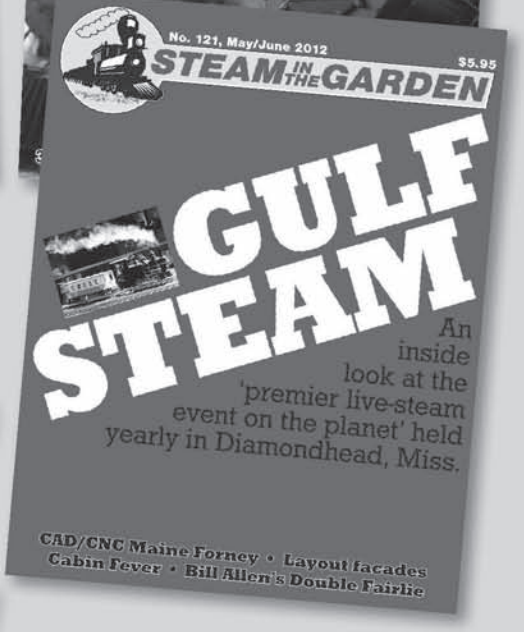
This should get you up and running and provide you with the basic items needed to steamup your locomotive. I keep my steamup kit to the basics, and don't carry lot of tools, as I plan to run not repair. How many extra tools you carry is up to you. As time goes on, you will learn what works best for you and you steamup kit will reflect your personality in steaming up a locomotive.

FALL SALE!









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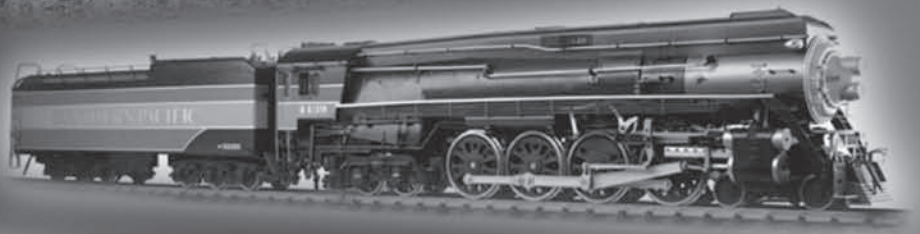

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TIMETABLE

Sept. 7-9, 2013 — Fall Meet (open to public), Pioneer Valley Live Steamers, Southwick, Mass. Info: http://www.pvls.org.

Sept. 8, 2013 — Houston Area "G" Gaugers at the Houston Area Live Steamers, Hockley, Texas. Garden railroad club meets at Zube Park for a Gauge One steamup. Info: http://www.houstonagg.com/.

Sept. 26-29, 2013 — Fall Steamup, Staver Locomotive, Portland, Ore. Info: http://www.staverlocomotive.com/.

Nov. 29, 2013 — Gauge One Turkey Trot, Pennsylvania Live Steamers, Collegeville, Pa. Info: http://www.palivesteamers.org/.

Jan. 12-19, 2014 — International Small Scale Steamup and Arts Festival, Diamondhead Inn and Suites, Diamondhead, Miss. Called "the most important small-scale event in the U.S.," Diamondhead includes 24-hour steaming, a "flea market," seminars, a dealer room, a festive meal. Info: Patrick Darby, k5pat@bellsouth.net, (985) 867-8695; http://www.diamondhead.org/ Diamondhead Inn & Suites: (228) 255-1300.

Feb. 15-17, 2014 — 17th Annual Presidents' Day Steamup, Electric City Trolley Station & Museum, Scranton, Pa. Info: wrunloco@aol.com or call Clem O'Jevich (570) 735-5570.

Regular steamups

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.

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.

On the Brink Live Steamers: Weekly Wednesday, occasional weekend, greater Sacramento, Calif., on elevated live-steam only tracks at two locations. Info: Paul Brink (916) 635-1559, paulbr@aol.com.

Puget Sound Garden Railway Society. Two steamups per month, one at the Georgetown Powerplant in Seattle on the second Saturday and a steamup at a member's track on the fourth Saturday. Info: http://psgrs.org/livesteamtimetable.html.

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

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New model No. 1 British A4

The A4s are among the most celebrated locomotives ever built. A series of record-breaking exploits led to them being known affectionately as "Streaks" and one of their number, "Mallard," still holds the world's speed record for steam traction. We not only seek to create a Gauge 1 model that looks right, but also replicates as closely as possible the technical features of the full-size engine. Specifications: 1/32-scale, 45mm gauge, 4-6-2 locomotive of brass, stainless steel construction; butane gas firing; 27-inches long, 3½-inches wide, 5-inches tall and weighs 13 pounds (685mm by 87mm by 127mm, 5.9kg); 8¼-foot radius (2500mm); runs more than one hour; automatic water pump; working whistle.

U.S. 'Falk' in 1:20.3 scale
This fine brass and steel model is gauged for 45mm track (G-gauge) and comes as a live-steam (butane fuel) or electric engine. 8¾-inches long, by 4¼-inches wide, by 6-inches tall, this locomotive weighs in at five pounds and runs for more than 10 minutes.

Reservations accepted

U.S. Porter in 1:20.3 scale
This 0-4-0 loco is simple and easy to operate, yet it is also a fine-scale brass model. 8¼-inches long, 3½-inches wide, 5⅜-inches tall (210mm by 90mm by 137mm). 45mm gauge. 3.6 pounds (1.65 kg).

BRITISH 8F in 1:32 scale
Real Stephenson valve gear highlight this butane-fired model of the LM&S 2-8-0. 24-inches long, 3¼-inches wide, 4¾-inches tall, 11 pounds Run-time of 50-plus minutes with auto water feed on four-foot radius curves.

BRITISH BLACK 5 in 1:32 scale
All brass model of LM&S' 4-6-0; G-gauge with whistle. 24¼-inches long, 3½-inches wide, 4¾-inches tall, 11 pounds. Single-flue, butane-fired boiler, runs more than 60 minutes with automatic water feed.

Reservations accepted

BR41 in 1:32 scale
Our first German live-steam model train, the BR41 is a 2-8-2 brass and stainless steel G-gauge locomotive, 29½-inches long, 3 13/16-inches wide and 5⅝-inches tall. It's butane fired by a ceramic burner.

COACHES: MK1 Coach in 1:32 scale
British rail coaches built in all brass: RFO (two types), SK, TSO, FK and BSK. 25-inches long, 3-inches wide, 4¾-inches tall, 5½-pounds. Colors: crimson & creme; chocolate & creme; maroon.

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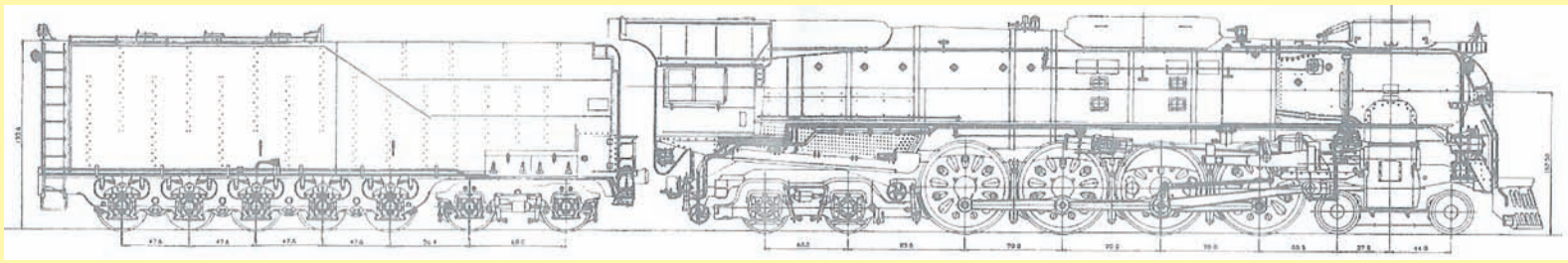
SNCF 241P now in production for late 2013 release

This stunning four-cylinder compound model will be equipped for coal and alcohol firing. Cosmetic detailing and functional mechanical features are unparalleled, which will make this easily the finest European-type locomotive built by Aster. Available by advanced reservation only. A non-refundable deposit of $1000 is required. More details on our web site soon. **Picture is of pilot model and is subject to minor changes.**

Union Pacific FEF 3 #844, the next U.S. prototype locomotive, now in development

Projected for late 2014 release, this famous locomotive will be made available in black and gray livery.



Rebuilt Merchant Navy Class

The British Railways' Merchant Navy Class "Clan Line 35028" is now going into production. This engine will be equipped with an alcohol-fired, C-type boiler and functional Walschaert valve gear on all three cylinders. Projected date of release is late 2013. Limited production available by advance reservations.

Reservation deposts of $1000 are required.

Pilot model shown; production models subject to change.

Great Northern S2 #2584

This superb-performing 4-8-4 is still available in glacier green livery as shown; RTR and black has sold out.

Small locomotives in 1/32 standard-gauge and 1/22 narrow-gauge scale

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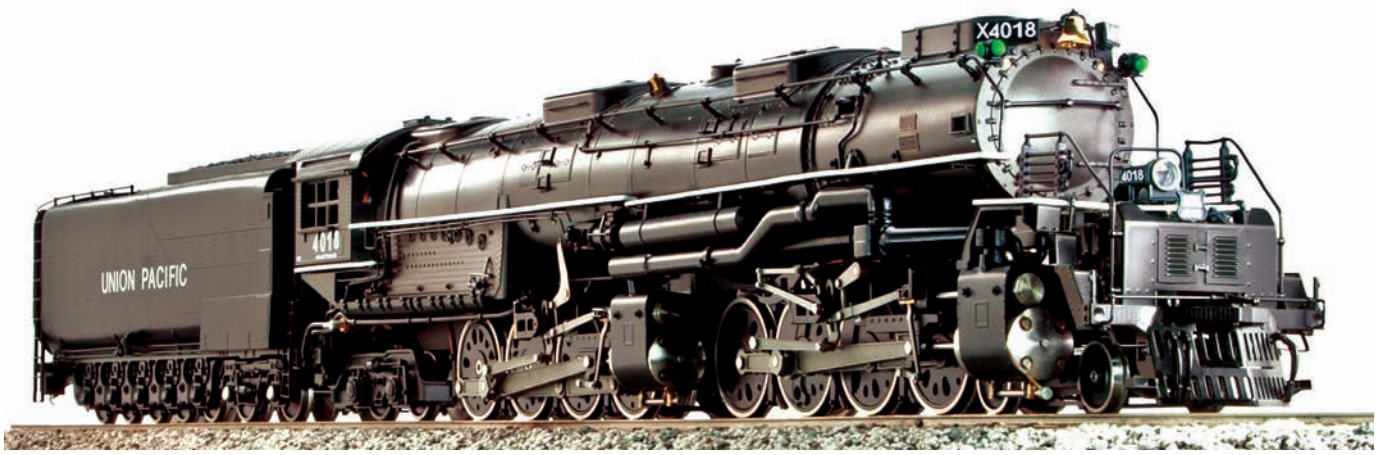

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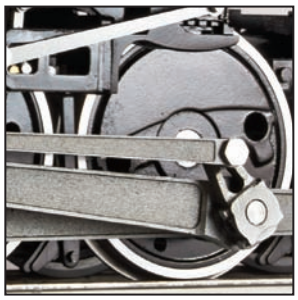

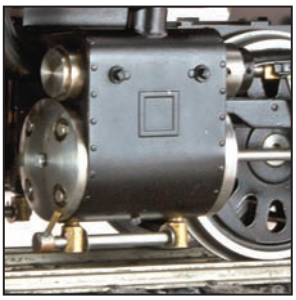

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