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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. This locomotive won the Drawbar Pull Certificate and Trophy at the 2014 International Small Scale Steamup at Diamondhead.

No. 1 'Falk'

A Gauge 1, 1:20.3-scale, 0-4-0 brass, live-steam model of a locomotive built in San Francisco and used as a Pacific Northwest logging engine. With axial pump, it runs more than 10 minutes. 21½-inch radius. 8¾-inches long, 4¼-inches wide, 6-inches tall (222mm by 109mm by 151mm).

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 A4 in 1:32 scale

Brass and stainless-steel 4-6-2; G-gauge with whistle. 27-inches long, 3½-inches wide, 5-inches tall, 13 pounds. Single-flue, butane-fired boiler, runs more than 60 minutes with automatic water pump.

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Three Qian Jin 2-10-2 locomotives still operate in the United States. The model will be offered with a butane ceramic burner or coal firing and can be supplied with radio-control or as R/C ready.

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All brass model of LM&S' 4-6-0; G-gauge (45mm) with whistle. 24¼-inches long, 3½-inches wide, 4¾-inches tall, 11 pounds. Single-flue, 60-65 PSI boiler, reinforced buffer beam and cab frame; runs more than 60 minutes with automatic water feed.

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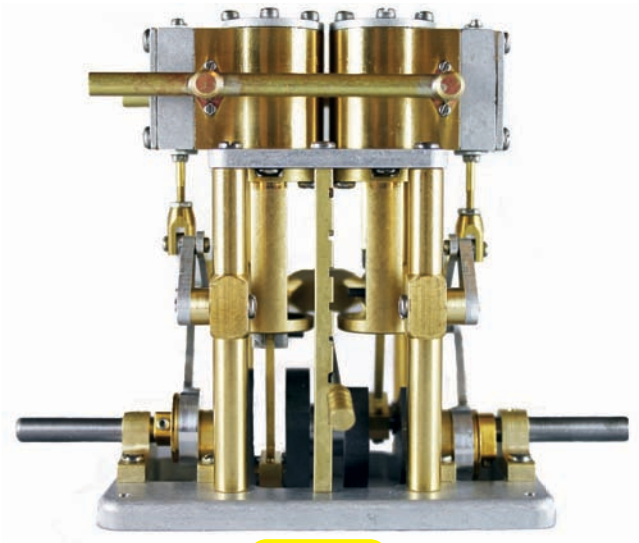

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Includes full-color assembly manual
Dimensions:
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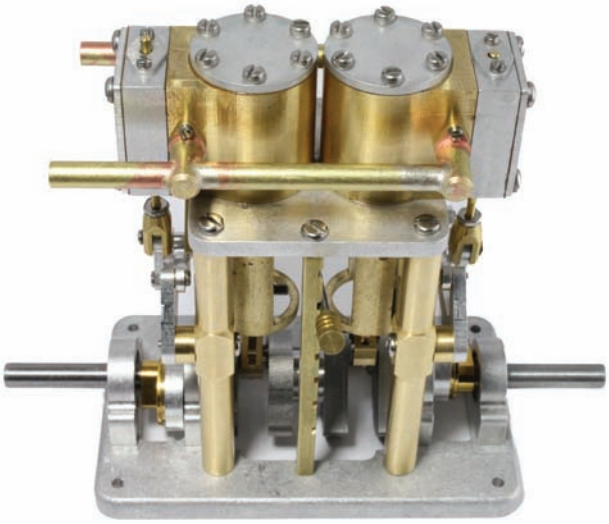
Crankshaft end-to-end: 4.344"
Height: 3.375"
Weight: 327 g



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Dimensions: Same as TVR1A
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BFLY2: $30
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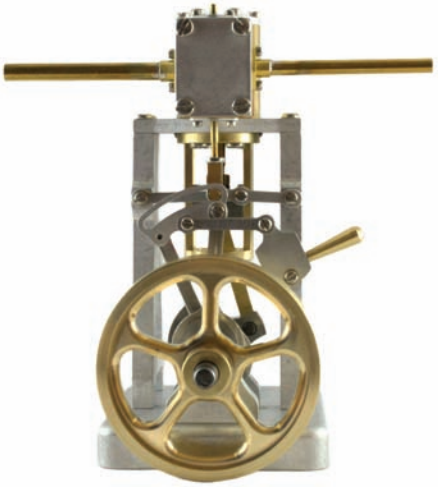

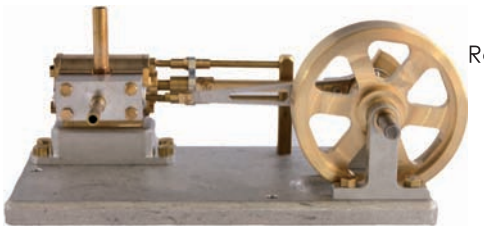

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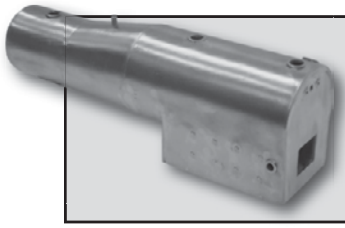
Vol. 24, No. 5; Issue No. 135; September/October 2014

STEAM IN THE GARDEN

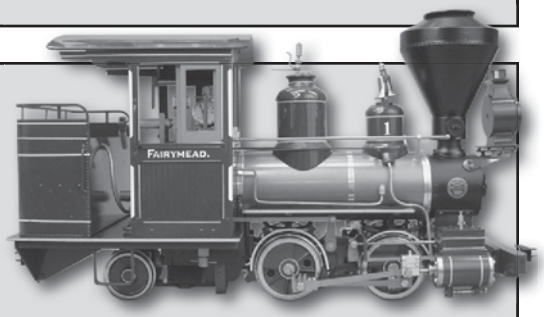
Gather friends, while we inquire,
into trains, propelled by fire ...

8 **Latest Waybill.** Accucraft brings out 1:32-scale rolling stock for new loco. End of the line for a boiler detection system. New wheels. A new book publisher and dealer.



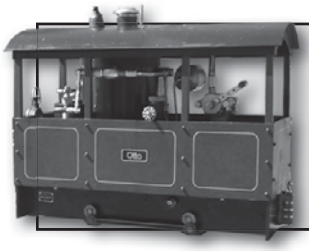
16 **Scratch building the 1:20.3-scale, four cylinder Heisler.** Part Two of a three-part series, the boiler. **By Bill Allen.**

21 **A big little locomotive.** Accucraft's latest is a 1:13.7-scale engine based on a Baldwin 0-4-2T run by a sugar-cane mill in Australia; a review. **By Dave Cole.**



28 **Rivendell & Midland Railroad.** Third time is a charm for this ground-based steam layout. Part One of two. **By Les Knoll.**

32 **Train barn.** Tired of carrying locomotives inside and out? Build one of these. **By Dave Frediani.**



34 **Regner's "Otto."** Don't scare the horses — go with this 1:22.5-scale steam tram; a review. **By Shawn Viggiano.**

Cover photo: 'Fairymead' putters across a trestle on the late Dr. Dan Liebowitz' Woodside, Calif. layout, pulling a consist of 7/8ths-scale flat cars built by Ron Sickler. Photo by Mike Martin.

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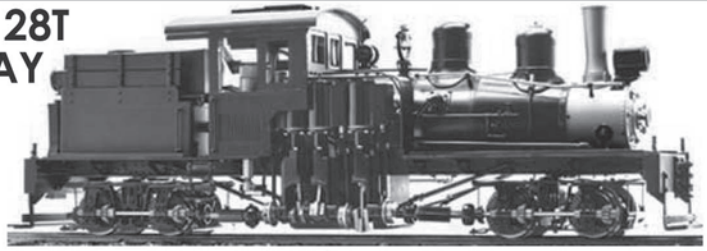

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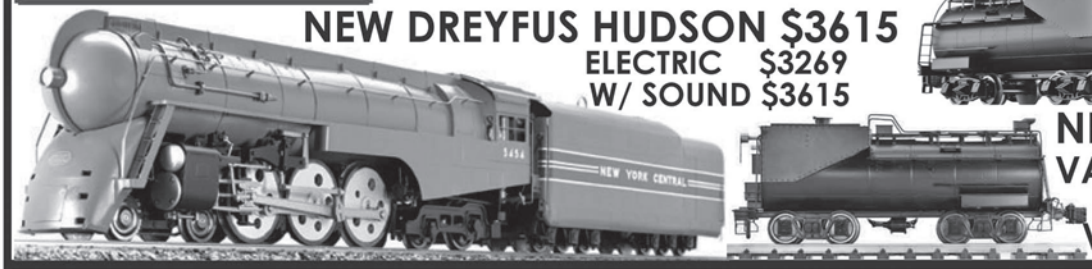

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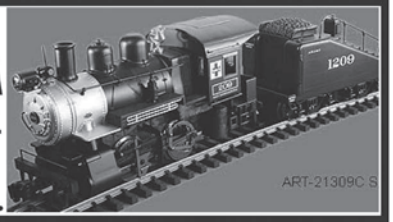

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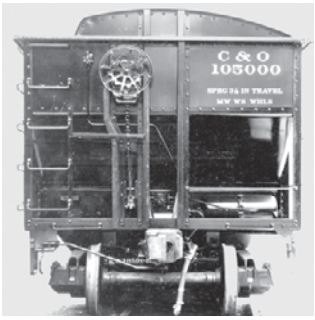
LATEST WAYBILL

Caboose, hopper, rail

Focusing on providing its 1:32-scale Chesapeake & Ohio 2-6-6-6 Allegheny Gauge One live-steam locomotive with proper consists, Accucraft Trains has said in recent weeks it will release a C&O caboose and a series of three-bay open hoppers in 24 different road numbers. The Union City, Calif.-based firm has also said it has developed Code 250 aluminum flex track in 45mm gauge.

Based on cabooses built by the American Car & Foundry Co., the models will be painted for the 1940s-1950s era in "bright red," carry the Chesapeake & Ohio lettering and have four different road numbers from the 90200-90299 series. C&O in the late 1950s repainted this series of cabooses in yellow with blue lettering, but Accucraft said, "Our models will represent the as-delivered appearance."

Accucraft says the cabooses will be of all-brass construction, with steel wheels and working knuckle couplers, and that the underbody and draft gear will be detailed.



Cupola view: *Above, Accucraft's latest is a 1:32-scale, 45mm-gauge brass-and-steel caboose, based on circa 1950s Chesapeake & Ohio Railway practice. Right, a C&O 42-foot hopper car was also announced.*

The company said the cabooses will be a limited series, with 25 units in each number, for a total of 100 cabooses, and have a manufacturer's suggested retail price of $450.

Bethlehem Steel Corp. built 1000 42-foot three-bay hoppers for C&O in early 1951 and Accucraft will model these 2622-cubic-foot cars. The Accucraft

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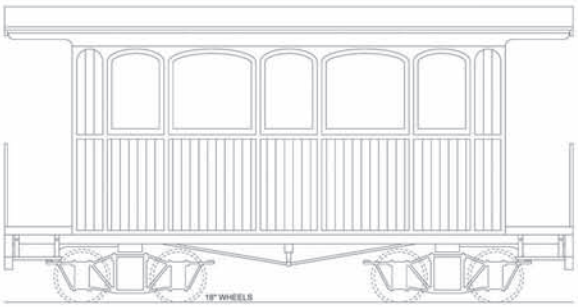

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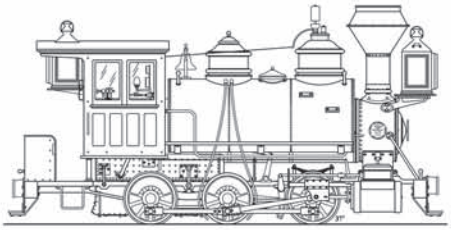

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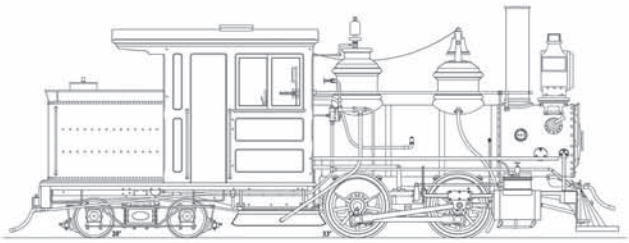

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Boiler system: *Bill Ford is ending the development of his Water Level Detection System.*

hoppers will have "finely detailed" plastic bodies, sprung die-cast trucks, detailed underbody and working knuckle couplers. Accucraft also says that the model was "developed directly from the builder's general arrangement drawings."

The company will offer 24 different road numbers on the hoppers, as well as an unnumbered version, allowing modelers to provide their own numbers.

"Cars decorated for the Virginian Railway will not be 100-percent accurate," said Accucraft in its announcement for the cars. "However, we believe our three-bay hopper can still serve as a fine 'stand-in' model, particularly for those interested in operating coal trains behind their Virginian edition 2-6-6-6 Allegheny."

Suggested retail price will be $145 per hopper car.

Both the caboose and the hopper cars are expected to be delivered in the latter part of the year.

Accucraft's American Model Supply division also said recently it has developed Code 250 aluminum flex track in 45mm gauge with either narrow-gauge or standard-gauge ties and tie spacing.

The flex track comes in a box of 12 five-foot pieces, for 60 total feet of track. Both tie types are priced at $190 per box.

Accucraft is on the Web at http://www.accucraft.com and by phone at (510) 324-3399.

End of boiler detection system

A digital system that detects the water-level in small-scale boilers used in locomotives and steam boats will no longer be developed, and existing inventory will be sold at sale prices, the maker said last spring.

Bill Ford, the Fern Park, Fla., hobbyist who created the Water Level Detection System, gave no reason for ending his business after 10 years of "successful development and production." He said the

system "provided protection from boiler damage, longer runs and monitoring of the boiler-water level without stopping."

Ford said, "Hundreds of systems have been installed in steam locomotives and boats in the United States and overseas and I'm proud to say no reports of failure have ever been reported."

Ford said he wanted to thank "the many steamers who have sent complimentary responses on the operation of the system."

The remaining inventory of systems will be sold at "a significantly reduced price" of $85, with limited supply, Ford said. Information on the product is at http://www.wldssystem.weebly.com or by e-mailing bfinduswlds@gmail.com.

New wheel supplier

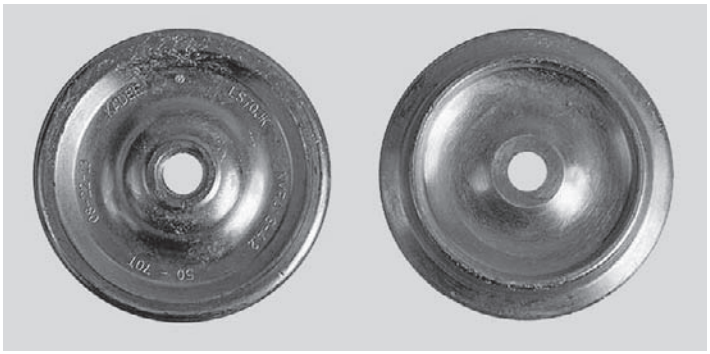
Kadee Quality Products Co., probably best known as "the coupler people," said recently it is making 45mm-gauge wheel sets.

The Oregon-based manufacturer said it has four new products with two primary feature sets: uncolored or black metal wheels that have either smooth backs or ribbed backs.

The wheel axles are just a bit over 2¾-inches wide, tip to tip, while the axle diameter is .118 inches. The sets can represent 33-inch wheels in 1:29 scale or 36-inch wheels in 1:32 scale and would be typical for either freight or passenger cars.

Kadee says the wheel sets feature non-magnetic metal, smooth tracking, free rolling and have contoured, insulated axles.

Based in White City, Ore., Kadee said the uncolored wheels are sold for $14 a pair (two axles, enough for one truck) or $16 for a pair of black wheels. Kadee is on the Web at http://www.kadee.com/ or by phone at (541) 826-3883.



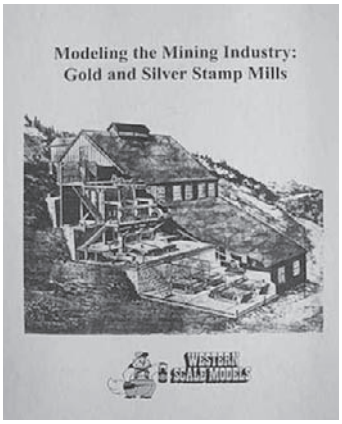
New wheels: *Kadee Products has released a line of 45mm-gauge wheels for 1:32- or 1:29-scale.*

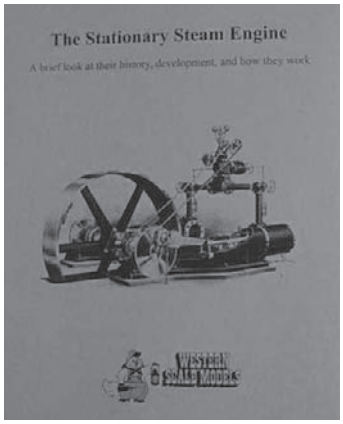
Rail book publisher, dealer launched

A longtime maker of scale-model railroad products has been sold and the company's founder has created a new business that will publish its own railroad books and sell those of other publishers.

Bill Gustafson founded Western Scale Models in 1990 and developed dozens of kits in a wide range of scales. In late 2013, Bill sold the business to Mike Pyne of Wild West Scale Model Builders. (As a side note, Mike is "in the process of bringing back all of the kits" Bill produced.)

During his 23 years at Western Scale Models, Bill wrote eight books on mining, machines, steam engines and sawmills, "to help modelers understand the industries they were putting on their layouts."





Modeling books: *Author and publisher to continue with books to aid in railroad modeling.*

When Bill sold Western Scale Models, he kept the copyrights of those books, and has now launched Western Publications, a publisher and dealer in used railroad books.

Western Publications, said Bill, will sell books "that can help people become better modelers by helping them understand the processes involved in industrial companies."

Last summer, Western Publications was offering three books on gold mining and milling ("Modeling the Mining Industry: Gold and Silver Stamp Mills," "Modeling the Mining Industry: Compressed Air, its Generation and Use in Mining," "Gold and Silver Stamp Mills: A detailed look at mill interiors with emphasis on the Standard Gold Mill, Bodie, Calif."), two on steam engines and machinery ("The Sierra Railroad Machine Shop," and "The Stationary Steam Engine") and three on lumber and sawmills (including "Modeling a Steam-Powered Sawmill" and "Let's Build a Sawmill: How I built a 1:20.3-Scale Sawmill").

The Western Publications' on-line book store also had a collection of used books, including titles in railroading, gold mining and milling, steam engines and machinery and logging and sawmills. Checkout is with either a standard credit card or via the PayPal online payment system.

Bill said he started Western Scale Models "because of my interest in gold mining and ore processing. It started with a set of O-scale ore cars with two mine figures and grew into a company that produced extremely detailed model kits with complete interiors for machine shops, gold mills and sawmills."

Bill says he decided to focus on publishing and dealing because, "I have sold more than 5000 books in the last 10 years."

Western Publications, based in Richland, Wash., is on the Web at http://westernpublications.net and by phone at (844) 377-4247.

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Scratch building the 1:20.3-scale, four cylinder

HEISLER

Text and photos by Bill Allen

My goal in building models has always been to try to build something no one has — or likely will ever — build, and the four-cylinder Heisler certainly fit that bill. While Charles Heisler did patent a four-cylinder version of his iconic, V-pistoned engine, it was thought at the time that the design would be too expensive and so one was never built.

Until now.

In the last issue, I wrote about designing and building the four-cylinder motor itself. The rest of the loco is based on standard Heisler designs. My model is a 1:20.3 scale model of the 70-ton, three-truck Heisler, which was the largest Heisler available in narrow gauge. The larger Heislers were built with a diamond frame which opened up to allow the engine cylinders to poke through.

The measurements of the frame are critical. I took the dimensions from "Building the Heisler," by Kozo Hiraoka (Wildwood Publications, June 1986) and converted them to my scale for the height and width and then used my own design for the length.

The height and width of the frame at the engine were used to design the front-engine profile, the motor mounts and the boiler diameter. I used one-quarter-inch square stock and bolted the pieces together with numerous 0-80 hex screws and then soft soldered the entire assembly.

The lower frame rail drops down and I had to do some silver soldering to get that done (**Photo 1**). The rest was soft soldered to prevent the bending and twisting that would occur from the high heat of silver soldering such a large structure.

The design of the frame is such that the bolts alone

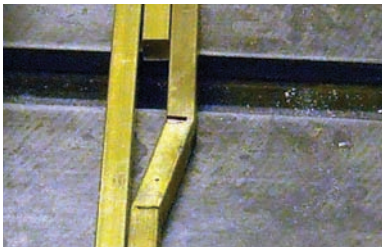


Photo 1: *Vs are cut in diamond frame stock and then silver soldered to get the sharp bends. The drop is one-quarter-inch so I used a piece of one-quarter-inch stock shown between the two rails to keep the rail true.*

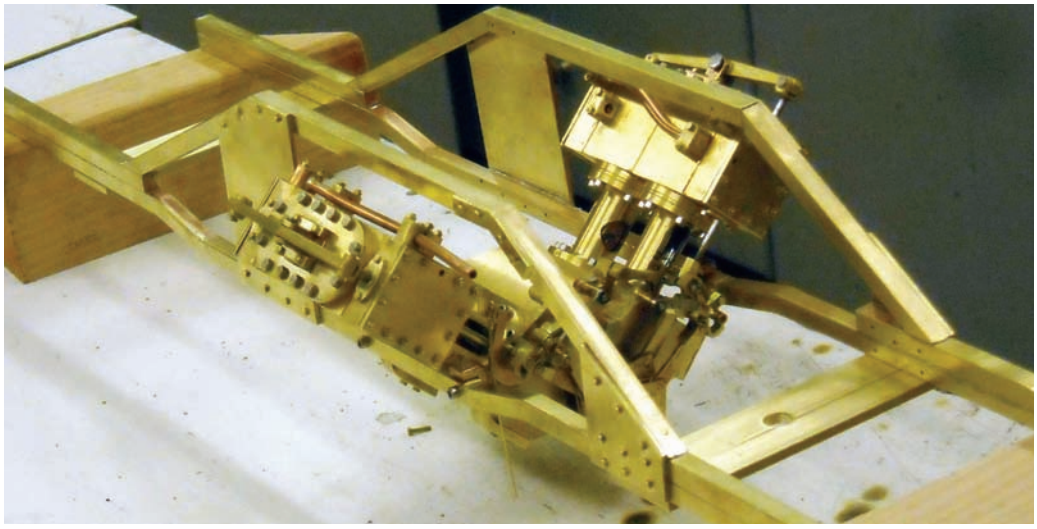


Photo 2: *Engine mounted in frame and checked for square and clearance.*

Patented, never built: *Author's completed four-cylinder Heisler passing through a town on his layout.*

will hold it true but soldering it just makes it stronger. The cross members are bolted on only to accommodate motor removal. This design is extremely strong and rigid (**Photo 2**).

Trucks

The 70-ton Heisler had 10 spoke wheels, and I was unable to find them anywhere. My friend Dennis Mead and I had been talking about casting for a while, but I never saw the need until I came up blank on the wheels. Home casting is not something you just jump into and I didn't know where to start.

But Dennis had some No. 3 Zamac (zinc, aluminum, magnesium and copper alloy, also known as Zamak), which has similar properties to brass but melts at about 900-degrees Fahrenheit versus 1700 degrees for brass.

Hydrocal is a plaster which will withstand the casting temperatures we needed. We subsequently found out that it needs to be reinforced with glass fibers to keep from cracking and that drying out the mold in the oven prior to casting is necessary.

Dennis took a photo of the correct wheel, scanned it into a 3D computer-assisted design program (**Photo 3**) and printed a plastic wheel on his 3D printer. We set the wheel in plaster to make a mold, but when we removed it, the wheel pulled some of the plaster between the spokes with it. Dennis then got the idea of casting the wheel in silicone and then using the silicone mold to make a silicone positive which could be used to make perfect plaster molds (**Photo 3a**).

The wheels were then cast and machined as shown in **Photos 3b-3d**. This may seem like a lot of work for this project, but it was the only way to get the proper wheels and it was a great learning experience. Dennis has since cast other jobs in Zamac.

The next thing to make was the gear boxes. The Heisler uses a simple beveled gear ring and pinion setup as shown in **Photo 5**. The ratio is 2:1 and I was lucky to find some gears on eBay which fit the ticket. The gears were adapted as shown in **Photo 3e**.

I guess I got a little carried away with the ball bearings on the engine and decided to add them all over. I ended up using 35 ball bearings on the job.

The center truck has the drive shaft passing over the top in route to the rear truck. The pinion for this truck is driven by two spur gears as shown in **Photo 6**.

The axle pump is mounted on the rear truck and is driven by a ball bearing eccentric (**Photo 7**). The gear box photos have the covers left off to show the gears, but the finished trucks have covers on the top and bottom.

The truck frames are unique to the Heislers. They are held in by the wheels and held out by a swivel bar, which is flanged to keep them at the proper distance but allows the frames to swivel slightly around this bar. This, coupled with the coil springs that are housed in vertical holes supporting the cross plate (which mounts to the frame), makes for an independent suspension (**Photos 7 and 8**).

If you look at **Photo 8**, you can see the round mounts in the rear two trucks. These slip over the pivot mechanism that attaches to the frame cross member, and they are held in place by a set screw so the trucks can be removed by merely loosening the one screw. The truck in the front is for the tender and will bolt directly to the cross member with two screws.

The wheels were set up in my homemade quartering

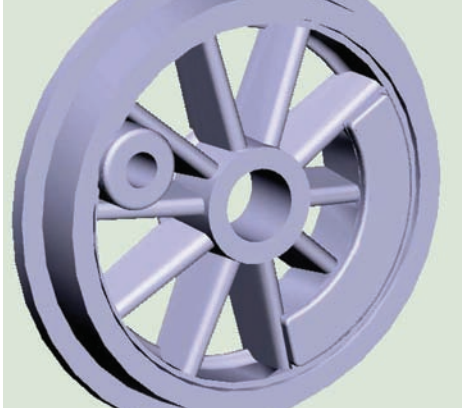


Photo 3: *Wheel scanned in 3D.*

Photo 3a: *Silicone positive is removed from Hydrocal mold.*

Photo 3b: *Wheels are poured with a large sprue which forces the metal into the small crevices.*

Photo 3c: *A wheel is machined on the lathe.*

Photo 3d: *A tread-cutting tool is ground to shape with a cut off tool (Dremel).*

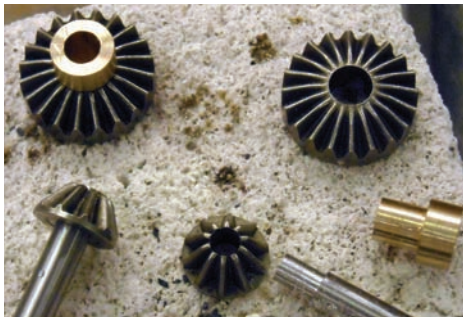


Photo 3e: *Pinion shaft is turned down, ready to be soldered to pinion. Hub for ring gear is on right and shown in place on left.*

jig. Care had to be taken to make sure I had everything in place before attaching the second wheel with engineering adhesive (Loctite). I also had to work fast to get everything in place before it set up. The 680 Loctite you see in **Photo 4** is extremely strong but is fast setting. I found out later that if you store it in the refrigerator prior to using, you have more working time.

The Heisler drive shaft universal joints are similar to the automotive type with a cross connecting each yoke. This is not possible to duplicate in this scale so a block replaces the cross. Other than that it is prototypical with square slip yokes (**Photo 9**).

Boiler

The Heisler boiler is a wagon-top design where the diameter increases midway from the smoke box to the back head to accommodate a larger fire box and more water storage. There are several wagon-top boiler designs, and Heisler used more than one, but the type used on the 70-ton model was level across the entire bottom length, and then increasing on the top and sides. Thus, the conical shell that makes the transition is not a true cone shape, as shown in **Photos 11 and 13**.

I usually like to use standard copper pipe sizes, as it is less work and stronger than a seamed tube. Unfortunately, what I needed was an in-between size. I started with pieces of three-inch and 2½-inch pipe (copper pipe sizes are for inside diameters). I needed to reduce each diameter by one-quarter-inch, which meant slightly more than three-quarters-inch on the circumference.

I cut these strips out on the table saw and then used them as seam reinforcement (**Photo 10**). I also cut some rings to solder to the inside of the tubes to accommodate assembly. The rings show at the bottom of **Photo 10**. Dennis sent me a pattern for a cone as a PDF

Building the 4-cylinder Heisler

California small-scale live steamer Bill Allen became intrigued with a Heisler when he found a patent drawing for a four-cylinder model (one which never existed in real life). Not knowing much about Heislers, he set about learning about them and building the locomotive, emphasizing the use of compound steam.

- **Part One — Engine design, construction.** Working up the initial drawings for the cylinders, as well as getting the steam motor built and bench tested.
- **Part Two — Frame, trucks and boiler.** Following practice for the 70-ton Heisler, wheels are cast in metal (with help from a 3D printer) and a wagon-top boiler is constructed from copper pipe.
- **Part Three — Accessories, cab and tender.** Adding a ceramic gas burner to the boiler, developing a clack valve, soldering the cab together, adding fuel and water tanks to the tender.

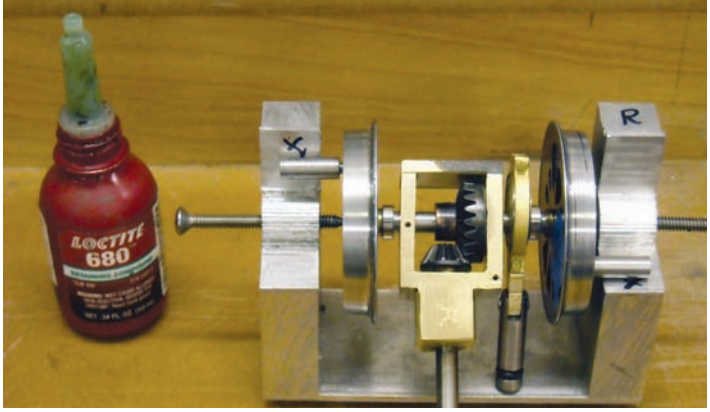


Photo 4: *Quartering jig is used to set the wheels. Inside wheels from left to right: ball bearing, gear box, axle pump eccentric and another ball bearing.*

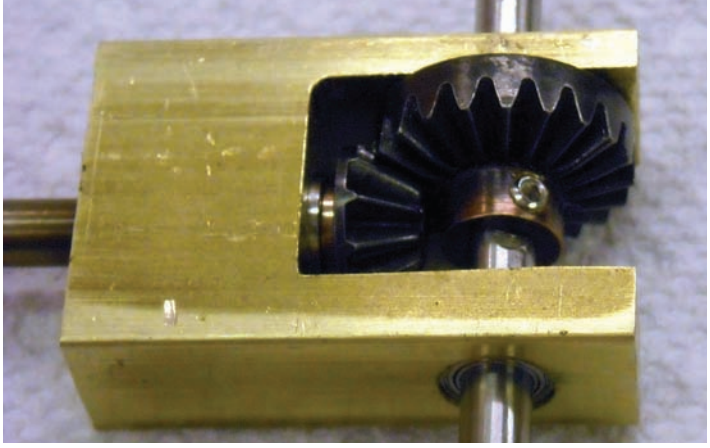


Photo 5: *Ball bearings can be seen on both the pinion shaft and axle shaft of the gear box.*

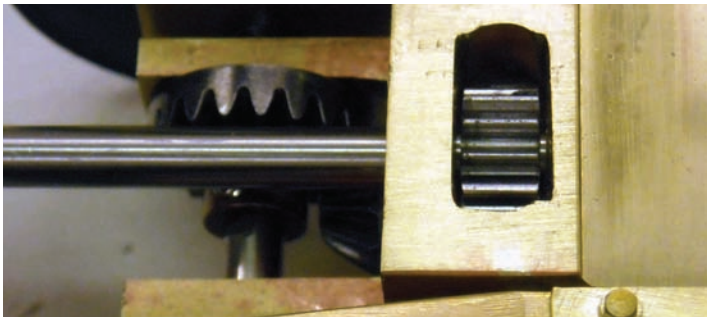


Photo 6: *Drive shaft passes through center truck; two spur gears carry torque through to pinion below.*

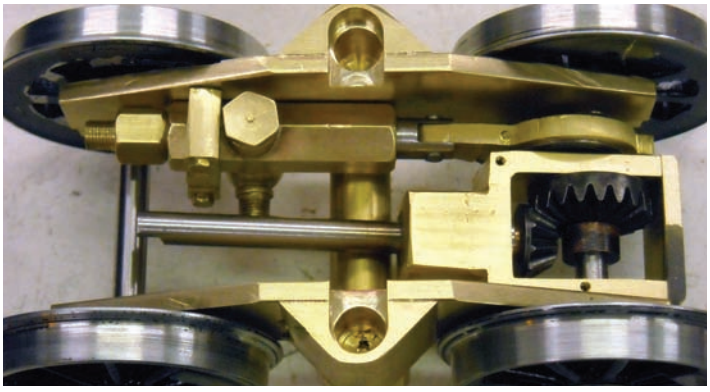


Photo 7: *Rear truck houses axle pump; two holes on side frames hold coil springs on which cross plate is set. Lower round bar (swivel bar) holds the sides in place but allows wheels to individually rise and fall with track variations.*

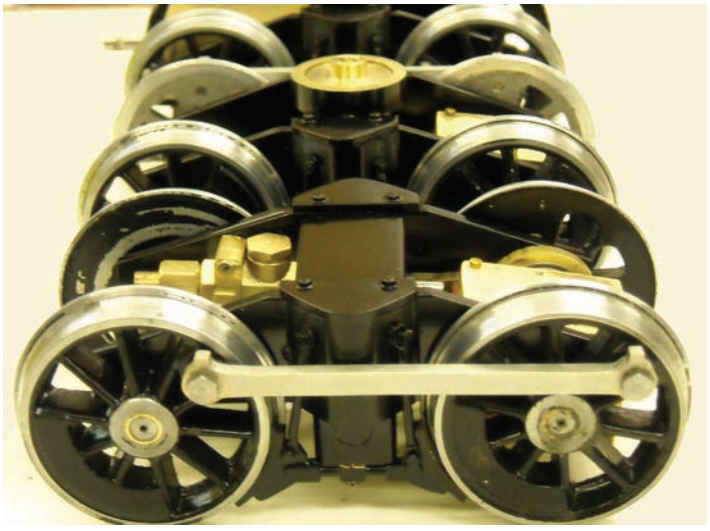


Photo 8: *Completed trucks show cross plate where frames will be mounted (brakes are now installed).*

Photo 9: *Drive shaft universal joints are turned from 303 stainless; slip joint on lower right is square tool steel. The female end is K&S square stock silver soldered into a hole drilled in yoke.*

file, which I printed on card stock and used to check for fit. It was a little off but was easily fixed by cutting the long side and adding masking tape where it was short. Using the pattern, I then cut the copper piece on the band saw and bent it by hand over a steel pipe.

The boiler is a "locomotive type," which means it has tubes going from a fire box through the boiler to the smoke box. The fire box is shown in **Photo 12**. The locomotive-type boiler is efficient because the fire box allows for a large and hot flame and provides more heating surface than other types of boilers.

In a dry fire box, the sides and back head are a single sheet and the majority of heat is transmitted through the top (crown sheet), which is in contact with the boiler water. Because the sides and back head are copper, there is still good heat transfer to the boiler water. In a wet fire box, the box is completely surrounded with boiler water, creating the most heat transfer and excellent circulation as the water heated by the sides of the firebox rises and is replaced by cooler water.

This fire box is a wet leg with a dry back head. It has good heat transfer and circulation and is suitable for coal firing, but I currently prefer gas-fired ceramic.

I used the dry back head design because I wanted to run the super-heating tube through the back head;

Photo 10: *Using Kozo's method the boiler tubes are soldered with a strip over the seam.*

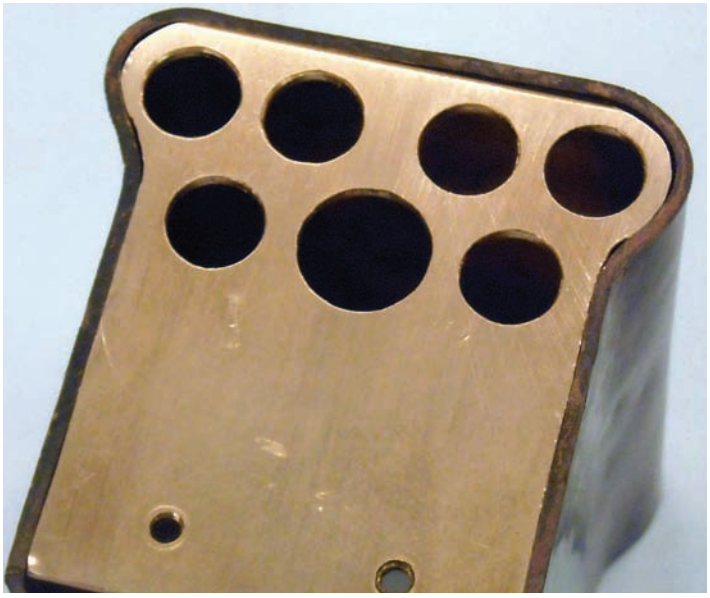
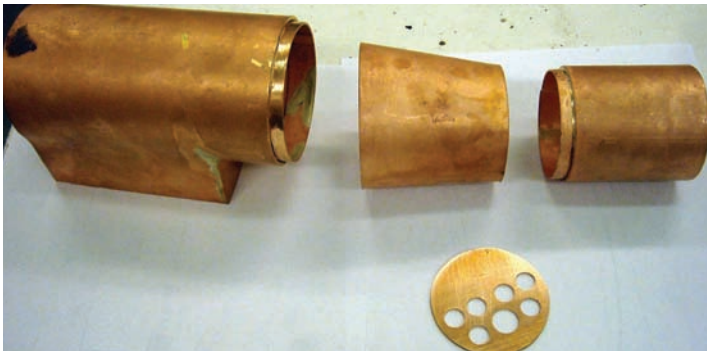


Photo 12: *Fire box shape is patterned after 70-ton prototype. Sharp bends were made by cutting a hardwood former and hammering the shell to fit.*



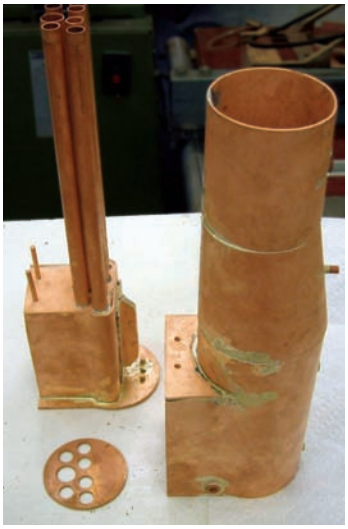


Photo 11: *Top, the three sections of the wagon top Boiler are ready to solder up. Note the rings on either side of the cone which center everything and make for a stronger solder job.*

Photo 13: *Left, fire box, back head and tubes are soldered up and ready to be soldered to the outer casing.*

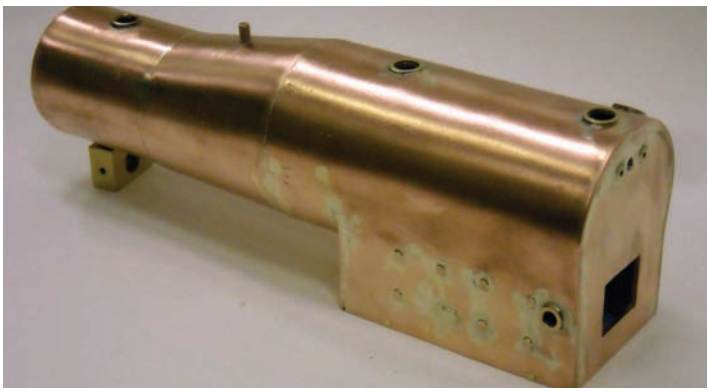


Photo 14: *Stays are added to the side of the firebox during the final solder job.*

and wanted to make it replaceable so I couldn't silver solder it in. **Photo 13** shows how the fire-box assembly, on the left, will be soldered to the inside of the boiler, on the right, with water circulating all around it, with the exception of at the back head.

I used the prototypical narrow fire-box design versus the straight-leg design used by Kozo. I later found out that I could have used the straight leg design which would have been easier and would have allowed a wider ceramic element or grate. I do think mine looks better though (**Photo 12**).

Photo 13 shows the two main boiler components ready for the final soldering. The fire box has been soldered to the tubes. The tubes were kept true by sliding them into the front plate. The back head was then soldered on to the other end of the fire box. Not shown in **Photo 13** are the stays which went in through the side of the boiler and the fire box and the foundation ring pieces which were attached with screws prior to soldering.

I needed help to solder the boiler. My friend Henner Meinhold brought over his huge propane torch and Dennis brought his acetylene/air torch. The propane torch keeps the large copper mass from robbing heat while the acetylene torch concentrates the heat where the silver soldering is happening. This is a job that is best done with more than two hands.

With two-thirds of the project finished, in the next issue I'll detail how I installed the gas burner, created a clack valve for filling water, built the cab and the tender and wrapped up the four-cylinder Heisler.

Accucraft's new 7/8ths-scale 'Fairymead'

A BIG LITTLE locomotive

Text and photos by Dave Cole

"How much does *that* one cost?"

We are at Staver Locomotive in Portland, Ore., last April and are admiring the table of locomotives brought to the event by Accucraft Trains Co. and its dealer Silver State Trains. The question is coming from my ever-lovin', Shirleen, whose interest in small-scale live steam during my 16 years in the hobby has been limited at best.

But she humors me by being my companion to events like Staver's (I think she likes Portland more than the steamup) and has been supportive enough of the hobby that when we sought a new abode in 2000, a backyard big enough for a railroad was easily on the must-have list.

'Fairymead': *In the author's Pacifica, Calif. backyard.*

The "*that* one" to which she was referring was Accucraft's latest arrival from the factory, a 1:13.7-scale model of a Baldwin 0-4-2T shipped to Australia for two-foot-gauge work in the sugar cane fields. It is "Fairymead," perhaps the prettiest of any commercially available live-steam locomotive, replete with a green livery, brown roof, Planish Iron blue boiler and yellow lettering (an all-black version is also available).

Shirleen explains that though she likes the livery, she really likes the size. In 1:13.7-scale (also known as 7/8ths-scale, referring to the fractional inch relation to one foot), 45mm track represents two-foot gauge, so everything is bigger. The cab and controls are easy to access (even with the roof on) and the details aren't tiny. The "Fairymead" is a big little locomotive.

I give Shirleen the price of the "Fairymead," she gets a faraway look for a moment and then we move on to the next locomotive (somewhat incongruously, it is Accucraft's 1:32-scale 2-6-6-6 Allegheny, at the far other end of the scale scale).

A while later, after Shirleen has wandered off in one direction and I in another, Mark Johnson of Silver State comes up to me and says, "Your wife just asked me about buying the 'Fairymead.' Is she serious?" I

Teaching moment: *Left, Mark Johnson gives tips to Shirleen on operating the engine at Staver Locomotive. Right, the black livery 'Fairymead.'*

demur; Shirleen and I have been together since 1991 and I don't pretend to know when she's serious or not.

Later on in the morning, Shirleen comes up to me and says, "I bought a 'Fairymead.' You're going to have to teach me how to run it."

And with that, the household — if not me — gained another locomotive.

A number of Staver denizens assisted in the unboxing ritual and we performed the first necessary tweak: expanding one of the springs on the rear truck.

On online railroad forums, early buyers had complained that the "Fairymead," with its bulbous diamond stack, was somewhat top heavy and prone to tipping. (In fact, a couple of unlucky early owners said their engines suffered serious dings as they rounded corners at speed and tipped over.) The diagnosis was that the spring on the rear truck wasn't springy enough.

An early remedy suggested was to grab both ends of the spring with pliers and pull it apart to make it springier. Done. "Fairymead" is shipped with the smoke stack and the front headlight unattached; we did the bare minimum of putting on the smoke stack for this first run.

I dodged the teaching moment by turning Shirleen and the "Fairymead" over to Mark (talk about sales and service), who then showed Shirleen how to oil the bearings and rods and how to put in the steam oil. He was called away by another customer emergency and I finished up, showing her how to fill the boiler and the butane tank.

We elected to not fill the rear tank (which has a hand pump) because of the reported problems of tippiness. So we were going to go with just a single boiler of water.

She then lit the burner and we watched the pressure gauge come up to 50psi, and took the locomotive over to the Staver track and put it on. A turn of the steam throttle and "Fairymead" was off.

Shirleen paced the locomotive for four circuits of the Staver layout, quickly learning how to goose the throttle when going into a tight curve and when to cut back on the steam when on the straight-away.

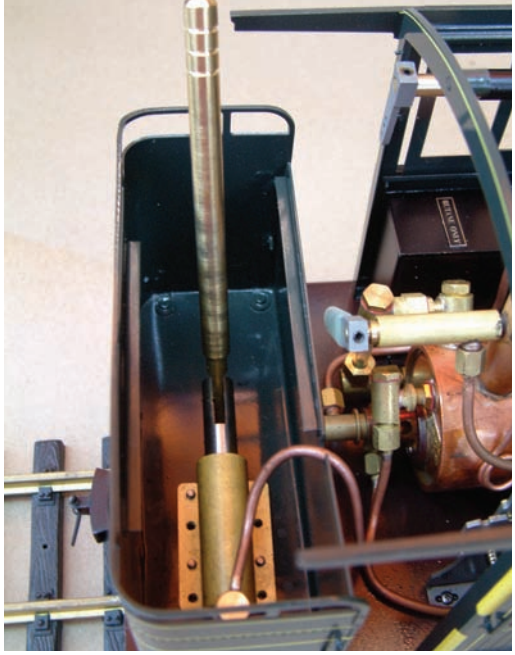
The locomotive ran well for about 30 minutes and it was a great break-in run. We repacked the "Fairymead" into its shipping box and since we had flown to Portland, I arm-twisted Rob Lenicheck — a Staver

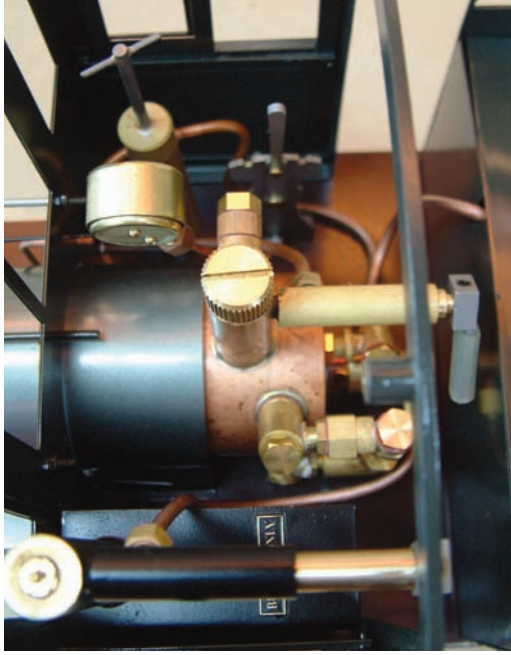
Accucraft 'Fairymead'

- **Loco type:** Baldwin Locomotive Works, 0-4-2T, manufactured in 1889, used in Australian sugar-cane production. Gauge: 24-inches. Cylinders: seven-inch diameter, 10-inch stroke. Drive wheels: 24-inches. Boiler pressure: 150psi. Weight (empty): 14,000 pounds.
- **Scale:** 1:13.7, 45mm gauge.
- **Length:** 13⅝ inches.
- **Width:** 5⅝ inches.
- **Height:** 7½ inches.
- **Boiler:** Copper, single flue, five ounces (150ml) of water, 55psi.
- **Fuel:** Butane.
- **Min. radius:** 48 inches.
- **Water pumps:** Hand-operated rear-tank pump.
- **Cylinders:** Two, piston.
- **Valves:** Slide-valve cylinders, Stephenson valve gear.
- **Fittings:** Throttle, water-level gauge, pressure gauge, cylinder drain cocks, hydrostatic lubricator, safety valve.
- **Available models:** Black and historically correct green and yellow.
- **MSRP:** $2200.

attendee who had driven and lives close to us — to drive the "Fairymead" back to the Bay Area. I picked up the locomotive a few days later at Rob's house.

It took a week or more before I had the spare time to get "Fairymead" up on the bench in order to do that basic assembly of the smoke stack and the headlight. The manual prepared by Accucraft (and the locomotive's main promoter, Jason Kovac, the proprietor of The Train Department of Hazlet, N.J.), is quite thorough though there are little mistakes here and there (I puzzled for a while over the phrase to lubricate with a "steal cylinder oil" until I realized it was a typo and should say "steam cylinder oil"). Regardless, the assembly of the smoke stack and headlight are detailed well in the manual.





Back end: *Left, the water tank's cover is removed to reveal pump, which has the handle attached. Right, 'Fairymead's' back head.*

But there is no question that dealing with the M2-sized bolts required to remove the smoke box front (in turn required for the proper attachment of the stack and light) is difficult.

Of course, taking the bolts out are no real problem; it's getting them back in that's hard. The smoke box front is tapped, so the bolts should go directly into the front, but getting the front aligned and the bolts started proved to be painful. I dropped both bolts at least twice and an M2 bolt is about one-eighth-inch square. Fat fingers, bad eyes — need I say more?

Oh, and the manual helpfully says, "Be careful not to damage the finish" of those M2 bolts. Well, care was taken, but the finish was damaged nonetheless. A daub of black permanent marker restored enough of the color that nobody will notice.

Interestingly, the smoke stack is more difficult to install than the headlight, itself having four more of the M2 bolts, though these have nuts rather than the smoke box itself being tapped, thus the head light installed easily.

The smoke stack has a curved copper washer that is supposed to seat up against the curved top of the smoke box and then has a knurled nut that is to be tightened. After much trial and error, I got it to work (though the stack still gets a little loose after a run), but one "Fairymead" owner confided to me that he just left the copper washer out of the mix after fighting it for a while and was satisfied with the resulting fit.

While "Fairymead" was fired on the bench a couple of times in May, its next major run was at a Bay Area Garden Railway Society event, held annually on Father's Day weekend at the Roaring Camp and Big Trees Railroad. A full-scale live steam excursion railway in Felton, Calif., Roaring Camp is a 90-minute drive from our home. The BAGRS group sets up its portable live-steam layout every year to help entertain the throngs of families.

Shirleen was able to unpack, oil, water and fuel "Fairymead" with no trouble. She got it lit and it was off on a nice 20-minute run.

In Portland, Shirleen had noted how hot the steam throttle gets and Mark provided a piece of silicon tubing to slip over the metal handle (used to provide easy attachment of a radio-controlled servo, should the owner so desire). During the Felton run, Shirleen said even the silicon tubing got hot and I'm on the lookout for a good solid-plastic knob to replace the servo connector.

Because of other obligations that weekend, we couldn't stay beyond that one run, but "Fairymead" again acquitted itself with no problems.

But another little hiccup on the road to "Fairymead" bliss also hit in late April, when it was discovered that the factory left off the brass bushings from the side rods. The idea is that the bushings will wear rather than the pins or the rods; some low-end Accucraft steamers don't have bushings.

Further, after the replacement rods were delivered to customers in late June, it became evident that mere mortals couldn't affect the change, as the bolts on the cross-head guide needed to be ground down with a rotary tool like a Dremel in order to remove the guide and then the old rods.

Also shipped with the side rods was a thick brass washer to place into series with the rear-truck

— Continued on Page 26

ACCUCRAFT TRAINS
MUSEUM QUALITY BRASS MODELS

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

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

$5,250.00

EMMA
ACCEPTING RESERVATIONS

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

$995.00

DORA
IN STOCK

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

$435.00

RUBY
IN STOCK

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

Starting at $499.00

SHAY - 13T
IN STOCK

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

$2,049.00

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

FORNEY
IN STOCK

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

$835.00

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
ACCEPTING RESERVATIONS

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

$2,750.00

SHAY 28T
ACCEPTING RESERVATIONS

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

$2,499.00

LNER & BR A4 MALLARD
ACCEPTING RESERVATIONS

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

$3,750.00

REBUILT MERCHANT NAVY 4-6-2
ACCEPTING RESERVATIONS

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

TBA

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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ACCUCRAFT TRAINS
MUSEUM QUALITY BRASS MODELS

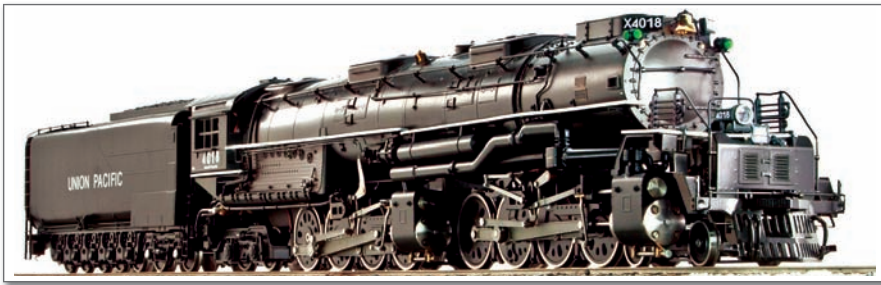
C&O / VGN H8 ALLEGHENY 2-6-6-6

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

PENNSYLVANIA T1 4-4-4-4

IN STOCK

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

$6,050.00

SP M-6 2-6-0

IN STOCK

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

$2,750.00

LNER 'TORNADO' 4-6-2

ACCEPTING RESERVATIONS

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

$4,250.00

DECAUVILLE 0-4-0T

ACCEPTING RESERVATIONS

- 1:19 Scale, 45/32mm Gauge
- Brass & Stainless Steel

$1,695.00

C&O STEEL CABOOSE

ACCEPTING RESERVATIONS

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

$450.00

DB CLASS 45 010 2-10-2

ACCEPTING RESERVATIONS

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

$4,526.00

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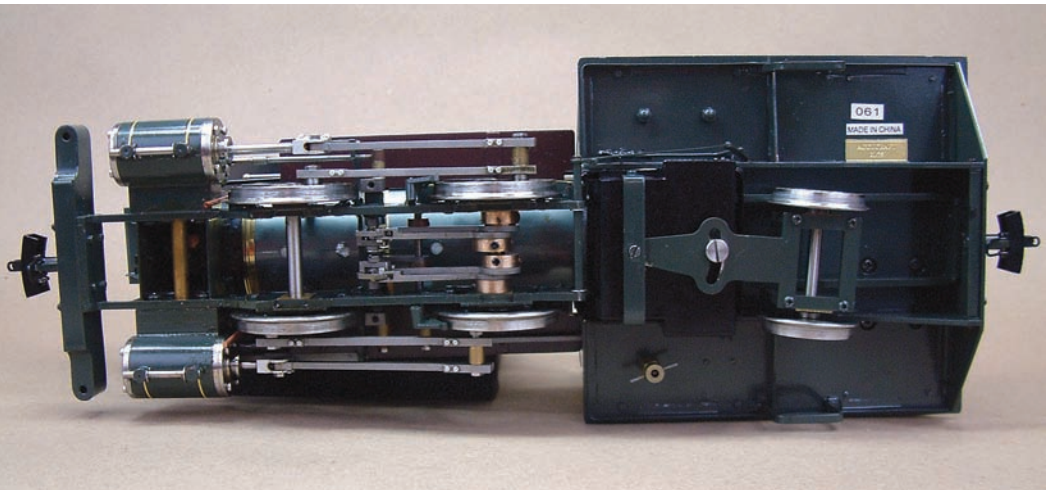


'Fairymead': *Locomotive's undercarriage (new washer not installed).*

— Continued from Page 23

spring. The washer will put more tension on the spring, making it work better. This is an easy fix with the quick unfastening of the screw that holds the spring, the insertion of the washer and a retightening of the screw.

And while the detailing on the "Fairymead" is wonderful, as we were packing up to go home from Felton, Shirleen showed me a little copper-colored plastic wire bent into a weird shape that had fallen off. "What's this?" she asked. I didn't have a clue.

A few days later I figured out it was the fake water line that runs from the cab on the engineer's side of the boiler. It wasn't glued very well into the fake 45-degree elbow attached to the side of the boiler and had fallen off when the locomotive was being put back into its carrying case (I picked up a $20 plastic tool box from Lowes).

"Fairymead" is a wonderful big-little locomotive and anytime she's seen, live steamers and civilians all comment on her looks and proportions. Shirleen's initial attraction — the size of the controls — will probably be that of many potential newcomers to the hobby.

We all believe we have specific strengths in this hobby and Shirleen's introduction of "Fairymead" into our collection favors mine: after more than a baker's dozen years of building rolling stock in 1:20.3 scale, now 1:13.7-scale equipment is needed. In fact, days after Shirleen bought the "Fairymead," I was on the Internet looking for plans to convert a 1:20.3-scale flat car into one more appropriate for 7/8ths scale.

I've spoken with a half-dozen other "Fairymead" owners directly and read on-line postings from another handful, and with the exception of the early tipping problems and the side-rod issue, there don't seem to be any other complaints.

While the locomotive had initial problems, they are relatively minor, with one easily correctable. But the other one will probably require a visit to a experienced hobbyist with advanced skills (or a trip back to the manufacturer).

It may be unfortunate that Accucraft built only a limited number of the "Fairymead"; by mid-July the run was pretty much sold out. The locomotive's scale and looks might entice those on the edge of joining the hobby to take the plunge. But whether for a newbie or a veteran, "Fairymead" is a good looking, good running locomotive and she converted another bystander into a convert to our hobby.

A 'Fairymead' tale

(This is an edited version of the "Fairymead" story used in Accucraft's manual; reproduced here by the author's permission.)

Arriving in Australia from New Zealand in 1878, the Young Brothers began a sugar-cane business the following year at Fairymead, in the Bundaberg region of Queensland. As they expanded their business over the next decade, the brothers decided they needed to transport cane via rail and ordered a small locomotive from Philadelphia's Baldwin Locomotive Works in mid-1889 to connect the Fairymead Mill to the main railway line. The little two-foot-gauge locomotive moved over the 42-inch gauge connection via dual-gauge track.

The locomotive, No. 1, was delivered in early 1890 and was named "Fairymead" after the mill's location. The locomotive was a 0-4-2 type with a rear tank and seven-inch diameter cylinders.

The Fairymead Mill was clearly satisfied with the tiny locomotive, for in 1907 a second locomotive was ordered to the same design, with the specifications noting the design to be identical except for modern appliances. A third and final locomotive was ordered in 1925.

The three engines would serve the mill through to 1957 when Nos. 2 and 3 were scrapped. The much-used 1889 original, however, was saved by a mill engineer for sentimental reasons. In the 1960s the little engine was placed in a sea-side park at Bargara, Queensland, and slowly succumbed to the salt air and neglect.

Having survived through to the 1970s and the heritage railway movement, the locomotive was again rescued and moved to The Museum of Historic Engines at Goulburn, New South Wales, for restoration. But "Fairymead" moved into private ownership in 1977, with the new owner, Graeme Belbin, determined to complete the restoration and bring the locomotive back to working order.

With the assistance of the New South Wales Rail Transport Museum workshop at Thirlmere, which did the majority of the rebuild work including boiler work and assembly, the restoration was completed in 1993. Today "Fairymead" is steamed regularly at the privately owned Lake Macquarie Light Railway north of Sydney.

When Graeme Belbin lovingly restored "Fairymead" in the early 1990s, little of the original archival material was available to assist. Since that time much original design documentation has been uncovered, all of which has been used to reconstruct the drawings used to design the Accucraft model.

Cane train: *'Fairymead' in Australia in the 1940s. Photo from the Bruce Belbin Collection, colorized by Scott Lawrence, used with permission.*

The color and decoration of the locomotive has also been reconstructed using the original specification and data from the surviving Baldwin paint books or "Style Book" held in the Special Collection at Stanford University.

"Fairymead" and her sisters were painted Baldwin's standard "olive green" as the base color, with deep yellow line work applied based on the "Style Book's" standard Style 216 livery, which would have been particularly prevalent on industrial locomotives around the turn of the 20th century.

The original boiler jacket of the 1889 and 1907 locomotives were the typical Planished Iron material (developed from the original Russia Iron, an unpainted oxidized, heat- and pressure-treated metal jacket), while "Fairymead" No. 3 had a polished copper-steel jacket when delivered in 1925.

The restored "Fairymead" today sports a far more decorative livery than the original Style 216 and is much removed from the original deep tones of the 1889 Victorian era. This was partly brought about by the two-tone green liveries of the 1890s developed by Baldwin as decorative styles for Brazilian exports.

The Accucraft "Fairymead" brings the original livery, design and character of the little Baldwin back to life, exactly how she looked when arriving in Australia in 1890 and so very typical of the many industrials built by Baldwin in this period.

— David Fletcher

Third time is a charm for this ground-based steam layout

Rivendell & Midland RR

Text, photos and illustration by Les Knoll, P.E.

At the end of a locomotive construction article I wrote for *Steam in the Garden*, November/December 1999, the last issue of the millennium, the late editor Ron Brown wrote a tag about my original live steam Rivendell & Midland Railroad in Carol Stream, Ill., being torn up and stored while our new home in Bartlett, Ill., outside of Chicago, was being built. Ron predicted that like the Phoenix, the railroad would rise from the ashes. That prediction certainly came true, and the greatly expanded live-steam layout in Bartlett gave many hours of operating enjoyment along with being the site of some great steamups.

Logging bridge: *Steaming from Lothloran toward Moria.*

History repeated itself in late 2010 when my wife Ruth and I decided to relocate from the Chicago area to North Carolina. In 2012 we built a home on a heavily wooded lot with lake frontage on Lake Norman, just north of Charlotte. Coincidentally, the move-in date was Ruth's birthday.

I was fortunate in that I knew nearly a year before the house was finished what area would be available for the railroad. I knew the location of every small stream, every major tree, and exactly how much land could be graded flat to accommodate a live steam railroad at ground level. Because of conservation restrictions on our wooded lake lot, this layout was going to be considerably smaller than the one in Chicago, but the scenery couldn't be beat.

It was known from the start that major trade-offs would have to be made. Five-foot radius curves would have to be used instead of the 10-foot curves used on the Chicago railroad, and No. 4 switches would have to replace the No. 6s. All of the Rivendell & Midland's locomotives and rolling stock represent small prototypes, so this did not pose any major mechanical difficulties. All the rolling stock had been run on five-foot radius indoor test tracks in the garage during the Illinois winters.

On the newly reincarnated Rivendell & Midland, quality would trump quantity. The beautiful wooded North Carolina scenery was a perfect background for a logging and mining themed railroad, and since excavation of the available area was essentially a blank slate, there was the potential for improvement of every major feature of the previous railroad, and even room for new ones.

As soon as the "railroad land survey" was finished, I turned again to my trusty TurboCad software, a mechanical engineering and architecture oriented CAD product that I have used in the engineering profession for decades. This software was used to design my final HO scale railroad and all three of the

outdoor large-scale layouts. Two-dimensional CAD modeling was all that was needed for track plan development.

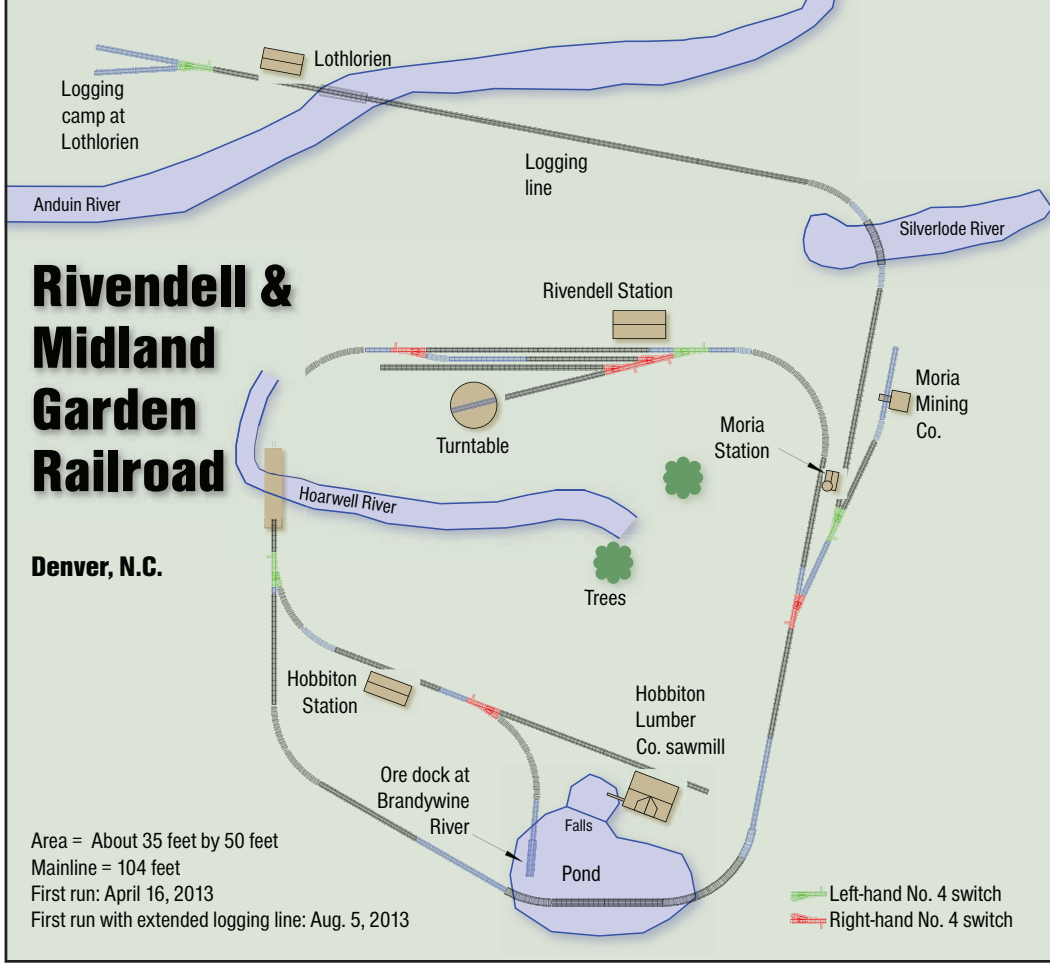
Since the curve radius and switch size had to change, all new track had to be obtained. Experiences with hand-bent, light-gauge rail on ties with flimsy rail attachment led to the decision to use Code 332 sectional track with five-foot radius curves and six-foot straight sections.

Aristo-Craft Code 332 aluminum sectional track was chosen because the look and spacing of the ties was good, the tie-to-rail attachment was robust, the track had no center runner that needed to be hidden with ballast, and the aluminum rail was cost effective. (Aristo-Craft went out of business at the end of 2013; a buyer might be able to find used or new old stock by searching the Internet.)

Since this is a purely live-steam railroad, not one ampere of current will ever flow through the rails, eliminating conductivity issues. With its deeper cross section, the Code 332 aluminum rail is sturdy enough for this application. Deer populate these woods, not elephants, and believe it or not, the deer are actually careful enough not to step on the track! They are always welcome here.

Samples of straight and curved track were acquired, and were "reverse engineered" into TurboCad, creating track building blocks that could be assembled on the computer just like assembling the actual track. The Aristo-Craft product has an added advantage in that the tie strips can be disassembled from the rail.

Taking off the tie strips, eliminating nearly all the spacing between the ties, and reassembling results in the creation of "bridge track," a detail that is often forgotten about on large-scale outdoor railroads. With streams, ponds and drainage to contend with, this



On golden pond: *A freight goes over the trestle toward Rivendell.*

Moria: *The mining company's Witches Hat Station at Moria.*

railroad would have its share of bridges.

Switchcrafters of Albany, Ore., builds matching aluminum Code 332 No. 4 switches to complement the Aristo-Craft track. After purchasing a sample switch, these were a hands-down choice. Switchcrafters also has CAD files of their switches that could be converted to TurboCad use, an added plus.

Trackage components had been chosen and now what was needed was a terrific track plan. The Rivendell & Midland has always been far more a garden railroad than a steaming track. Operations have always been favored over continuous running alone. It was hoped that the original Rivendell & Midland concept could continue with the new layout.

The genesis for the operating concept of the Rivendell & Midland Railroad was the HO scale railroad of the same name that once filled the basement of my Carol Stream, Ill., home. The HO railroad itself had several predecessors of the same name and similar concept, but the final HO railroad represented the concept's fullest development. That concept has remained the same throughout all subsequent changes in size, scale and source of motive power on my railroads.

The names of towns and other locations in the concept railroad followed those in the stories of J.R.R. Tolkien, notably the journey taken by Bilbo Baggins in "The Hobbit." The concept railroad is set in 1910 and is a single-track mainline linking Midland City, the main terminus and largest city on the line, with the logging town of Hobbiton, the town of Rivendell and the ore docks at Brandywine River, then continuing through to the Misty Mountains and the Mordor Loop.

The line continued on, servicing the Moria Mining Co. (Tolkien's "Mines of Moria") with the end terminus at Lonely Mountain and the logging camps of Lothlorien. This was a lot of operation to tackle in HO, and even the large Bartlett, Ill., live-steam railroad dropped off a considerable portion of the route, taking up beyond Midland City and starting "in the boondocks" of the logging town of Hobbiton, through Rivendell and beyond.

Three months before our new lake house was completed, I was sent on an engineering assignment to Bangkok, Thailand. Even though this was a steady diet of six-day, 60-hour work weeks, I still had time to work on track planning, and my office laptop was of course equipped with my handy-dandy TurboCad with all the current track plan files.

While working in Thailand, I got the idea to concentrate on running and switching in a single direction, clockwise. This way the "good side" of the Shay could be seen while operating within the confines of the layout.

There simply was no room for all the passing sidings the Chicago railroad had without the track plan looking like a "bowl of spaghetti." Passing sidings or run arounds are required if a spur or siding is to be switched from either direction. All sidings and spurs were laid out to be trailing point when running clockwise.

A single passing siding or run-around was to be located at the yard in Rivendell. After this major decision, everything fell into place. The mainline would skirt the periphery of the available real estate for as long a continuous run as possible, and the yard would be placed on the side of the property that had the longest track run, so yard sidings could be long. The mainline turned out to be 104 feet long, a little over half the size of the Bartlett mainline.

While Midland City was the site of the main rail yards on the HO layouts, the live steam layouts moved these yard facilities to Rivendell, since Midland City was no longer modeled. Rivendell became a much more important city on the live steam layouts.

On the newest version of the Rivendell & Midland, four towns were to be modeled. Hobbiton was the beginning of the line and the sawmill town, home of the Hobbiton Lumber Co. with the ore dock on the Brandywine River on a nearby spur. Rivendell, the namesake of the railroad, has become the main yard facility. Moria is considered to be the far terminus of the main line and is the home of the Moria Mining Co. (Tolkien's "Mines of Moria").

With the available topography, it was an easy matter to run a long logging spur beyond Moria. This spur terminates at Lothlorien, modeled on the HO railroad as a logging camp at the end of a long logging branch line. Sadly, it was represented by a mere six-foot spur on the Chicago layout. Now, at the end

of a beautifully scenic 65-foot logging spur line, it has become a town of its own as well as a logging camp on the new Rivendell & Midland. The yard at Rivendell consists of a runaround track, one single-ended siding, and a turntable lead. The yard is built entirely in the open with no landscaping obstacles as on previous layouts. The trackage consists of a simplified straight switch ladder engine in a long straight lead to the Falls Creek turntable.

This lead can double as an additional siding if need be. It also serves as a steaming track and is the location of the coaling tower. Because of the open location of the turntable and other yard features, there is an opportunity to add an engine house or even a three-stall roundhouse.

Hobbiton Lumber Co.: *Picking up log loads at Lothlorien.*

A portion of the back yard that slopes toward the lakeshore was chosen as the location of the two-level pond. This pond was the water feature that was dreamed about on all the previous layouts, but never realized. Besides being a scenic water feature, the pond serves four major functions: A log pond for the sawmill, a location for a sizeable tall ore dock, it would have two levels with a waterfall between them, and it was to be spanned by a long, spindly trestle bridge at its widest point.

The planning of the shape, location and orientation of the pond was as involved as the railroad itself, and went through at least as many iterations. Besides serving all these functions, it had to be of a manageable size for construction and maintenance.

To get the pond exactly the way I wanted it (and also save some bucks), I hand dug it myself. The perimeter of the pond was staked out according to coordinates worked out in TurboCad, and the pond was dug over about a month period at an age when many men have since retired. It was my physical fitness program.

The laying of the pond liner and pond rock was done by landscaping professionals who provided the nearly four tons of rock needed to complete the project. I installed and piped the 3500 gallons-per-hour pump for the falls, adding a diverter valve for draining the lower pond when needed. A check valve was also put in the line so the water in the upper pond is not siphoned back to the lower pond when the pump is shut off.

Creating a two-level pond in the side of a hill was not without its problems. I learned that a six-inch high dam must be constructed on the entire periphery of the pond to prevent ground water from the surrounding land from flowing into the pond. If this is not done, you will have a pond full of brown water after the first rain. With the pond in place, the main straight runs of track were staked out in much the same manner as was done for the pond. Once the path of trackage was established — a relatively easy thing to do using sectional track — a four-inch deep trench was dug and gray No. 78 crushed stone from a nearby quarry was poured in the trench to a height several inches above ground. This was leveled using a three-foot digital level, and the track was laid directly on the ballast, as is prototype practice.

The ballast is a larger size than was used in the Illinois layouts because that is what is available here in North Carolina. The gray No. 78 crushed stone drains well, does not wash away severely with our heavy rains, and most importantly does not contain the fine dust found in previously used ballast which got into bearings and valve gear of locomotives, creating additional wear and maintenance. Some ballast must be replaced occasionally, but the quarry is only 20 minutes away.

The ground cover in the railroad area is dirt, brown mulch and leaves. No lawn is growing in the area. Although this portion of the lot had to be excavated for the house and railroad, an attempt is being made to restore the entire back yard to its natural state, as if the woods were to come right up to the house.

Nothing anchors the track into the ground; it is free to float on the ballast. The track sections are joined together with rail clamps from Split-Jaw Products Inc. of Portland, Ore., something I had never done before but will never be without again.

The track now stays solidly in place and permanently joined together with no gaps to cause derailments. Since the track floats on ballast, expansion is not a problem, and in the wooded setting, the rails do not see a lot of direct sunlight so they stay cooler.

Next time I'll address the operating philosophies of the Rivendell & Midland Garden Railroad.

Tired of carrying locomotives in and out? Build one of these, a

Train barn

Text, photos and illustration by Dave Frediani

I got tired of moving my live-steam trains from my garage to my outdoor tracks, so I decided to build an outdoor train barn. It was very easy to build. Just like framing a small house. When I determined how long I wanted it to be, I made a list of the material I would need.

To build the barn, I started by cutting 18 pieces of one-inch by two-inch furring strips 12 inches long to form the studs for both walls. Cut four pieces of one-inch by two-inch by 72-inches long for the top and base plates. Now the wall is ready to assemble.

Side wall assembly: I started the side wall assembly by marking the top and base plates six inches on center for the placement of the studs. I glued the ends of all the studs placing them on the marked areas. I used a nail to hold the studs in place at the top and base, making sure that everything was square. (I used Elmer's White Water Resistant Glue for this project.)

Back wall assembly: The back is built in the same manner. I cut three one-inch by two-inch by 12-inch studs. Place a stud on each end and one in the middle, at six inches on center. Proceed to glue and nail (same as side wall above) and check to be sure it is square.

Front assembly: For the front, I cut two one-inch by two-inch by 12-inch studs, one for each side, and one one-inch by two-inch by 12-inch header. Glued and nailed the studs in place. No base plate is needed.

Exterior siding: Next, the plywood for the exterior siding is measured and cut to fit both sides and the back of the barn. Nail the cut pieces at each stud. On the front, I nailed the top plate to the side walls and took a piece of scrap to hold the bottom of the front wall in place.

After checking to see if all four walls are squared, it's time to construct the roof.

Dave's train barn: *The padlock is off the barn door and Dave is ready to bring out the locomotives.*

Roof construction: The roof was just as easy. Cut seven pieces of one-inch by six-inch wood for the roof joists. Mark the center for the roof joist at the base, which will be 6½ inches. Draw a 90-degree line at the 6½-inch mark. By drawing lines from the top center of the roof joist to each end of the joists, this will

Barn door open: *Trains can be secured on the layout without having to carry them indoors after a run.*

determine the pitch of the roof. Placing the joists at 12 inches on center, then cut pieces of the header to fit between the joists and glue them in place.

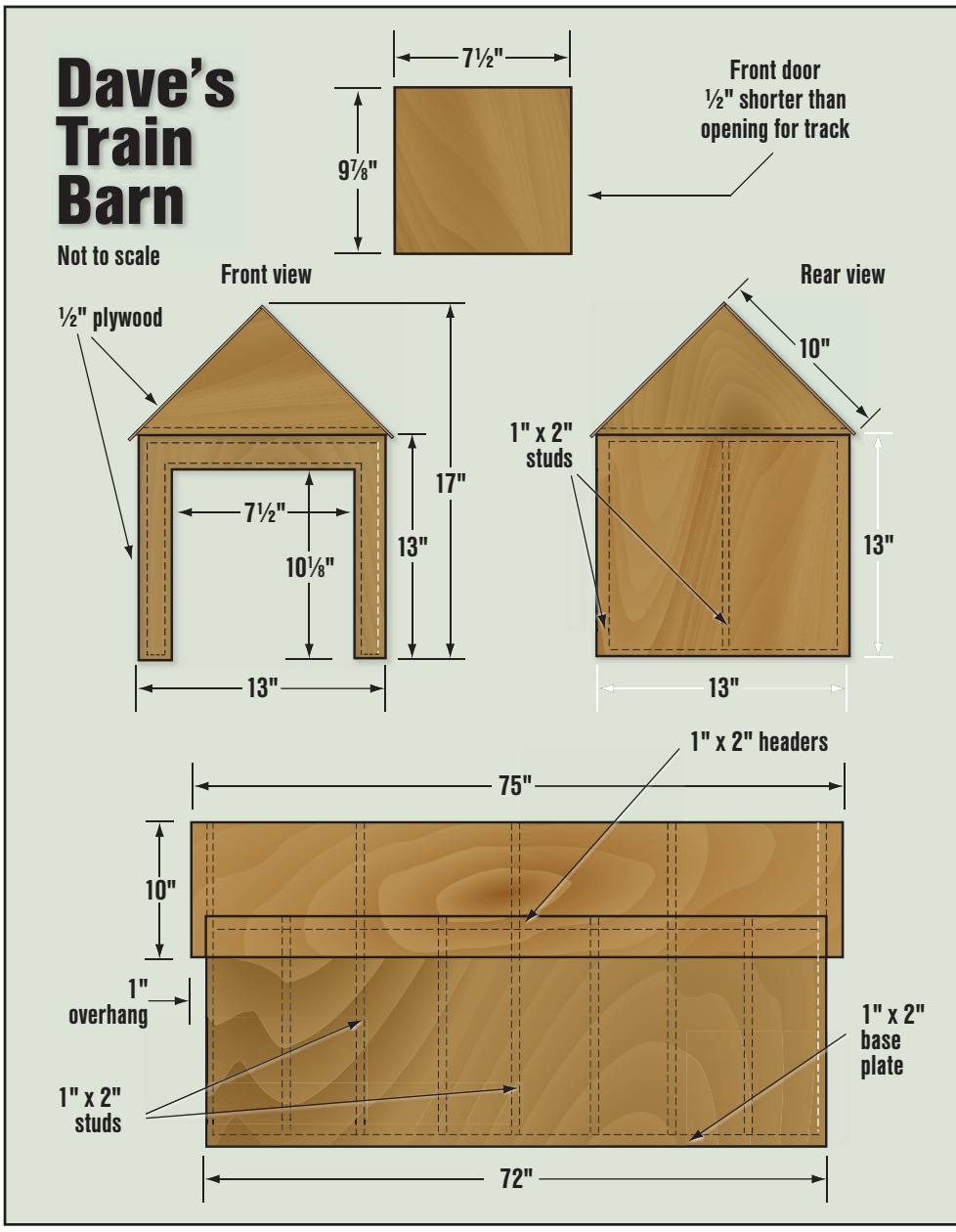
Next I cut two pieces of one-half-inch plywood 10-inches by 75-inches, glued it to the joist and nailed the plywood for the roof in place. Again I made sure the overhang was centered on each side as well as the front and back.

Over the plywood, I used ceramic shingles. The first row of shingles are placed upside down, leaving a one-half-inch overhang. The reason you put the shingles upside down is to keep the water out. The second row of shingles are placed top up, and staggered so the space for water run off doesn't line up with the row below.

Do the same on the opposite side. Once the roof is completely shingled, cut a piece of galvanized sheet metal two inches by 75 inches at a 90-degree angle and place it on the crown of the roof. Secure the sheet metal by screwing it down.

Now, all that's left to do is remove the piece of scrap at the bottom of the front of the barn. For the front of the barn, I cut the plywood siding to fit the opening, 7½-inches by 11-inches and made sure I allowed one-half-inch opening at the bottom for the track.

Project completed. I built my "train barn" about nine years ago. It sits today still weather tight.



Don't scare the horses — go with this 1:22.5-scale steam tram

Regner's 'Otto'

Text and photos by Shawn Viggiano

I have to admit I was never really a fan of tram engines until I was forced — wink, wink — into playing with my four-year-old son's "Toby the Tram Engine" (a friend of "Thomas the Tank Engine," the anthropomorphic steam locomotive of literary and television fame) on a loop of wooden track.

After hours of rolling "Toby" with him on the wooden track, tram engines started to grow on me (not so much the ones with a face on them). Then I started thinking about how a tram engine would look on my logging layout. At that time the only live steam trams I have seen were scratch-built ones. I figured I might have to build something.

'Otto' mobile: *Steaming on the author's Sussex, N.J., layout.*

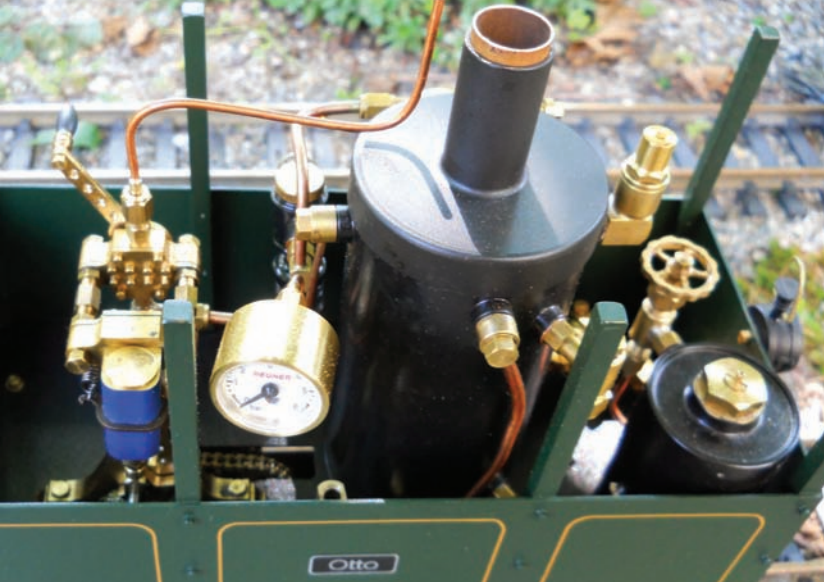
I have been thinking about building a backwoods logging style tram engine for a while. My plan was to use a single cylinder with a chain drive; something along the lines of my backwoods engine (a BAGRS Project engine).

Then Regner Steam & Railway Technology of Germany came out with the "Otto" and I immediately fell in love with it. It was the style tram engine I was looking for to add to my Kittatinny Mountain Railroad roster for hauling logs. It was a simple live-steam engine. As soon as I heard that The Train Department of Hazlet, N.J., had received an order of "Ottos," I immediately ordered one. Two days later it arrived at my doorstep.

Inspection

The "Otto" was packaged well and came in the typical plain box with a picture of the "Otto" on top. My first step after taking the "Otto" out of the box was to inspect everything. I made sure all nuts and bolts were tight and that there was no cosmetic damage. For such a long trip I found everything in perfect shape.

The "Otto" is part of Regner's "Easy Line" and includes a pressure gauge, sight glass, throttle, reversing lever, a lubricator and link-and-pin style couplers. It has a few nice detailed parts to add to the look, such as a bell on top and a nice headlight up front, as well as a wooden beam.



Insight: *Left, 'Otto's' controls viewed with the roof off. Right, 'Otto' last winter pulling logs.*

After inspecting the "Otto," I then took the directions out and started to read them, but soon discovered that they were written for "Konrad," "Willi" and "Vincent." No mention of the "Otto." Either way, I continued to read it and substituted the "Willi" directions for the "Otto." I had also ordered the Ronson-style filler valve from The Train Department to replace the Regner stock valve. It was a simple task removing the Regner stock valve and replacing with the more common Ronson valve.

Firing up

Before firing "Otto," I oiled all the moving parts. The roof comes off very easy and is held in place by the side beams. I lifted the roof off and filled the oiler up with steam oil. (The oiler is disguised as a steam pump.) Then I continued filling the boiler by removing the safety valve. (This was the way I filled up my "Lumberjack" and "Konrad.")

As I was filling the boiler I noticed half the water would spit back out. The reason why the water squirted out is due to the fact that the fill/safety valve comes off the side of the boiler utilizing an L-shaped fitting. I contacted Jason Kovac of the Train Department concerning the issue. Jason contacted Regner and they said that the fill plug was located on the side of the boiler next to the sight glass. After further inspection, I found the hex nut plug that Regner had mentioned.

The disadvantage to using the plug is that you need a wrench to remove it. The easy solution would be to install a Regner top-up system and as it was only a minor inconvenience, I ended up installing Regner's system. It was an easy install because Regner engineers had thought ahead and had predrilled a hole in the bottom of the cab to secure the top-up system.

Normally I like to fill the boiler all the way and then take about an ounce (30ml) out. Since there is no way to do this with the current set up, I just filled up the boiler until the water reached the top nut on the sight glass, as per the instructions for the "Willi." I then proceeded with filling up the gas tank with butane until the tank was full.

The moment had come to light the burner. The gas was slowly turned up as I held a flame to the top of the stack and the burner immediately lit. My first official run was done outside when the temperature was a balmy 17 degrees Fahrenheit, so getting the pressure up took longer than normal. Once the pressure hit 60psi the safety went off and it was time to flip the fly wheel.

The "Otto" will start moving at 20psi. Because it is a single cylinder, it is not self-starting. You have to flip the fly wheel for the engine to move. After a few flips of the flywheel the cold water in the cylinder was replaced with steam and the "Otto" started to come to life.

It ran on my layout with ease, pulling two log cars on slight grades. It never hesitated when going up the grades because of its 3:1 gearing. The "Otto" ran at a perfect speed and even when the throttle was opened all the way the speed went from very slow to slow.

The exhaust runs out a thin copper tube next to the stack. This gives it a nice steam plume appearing to come from the smokestack. There is also a forward/reverse lever located on the cylinder. Run time varies depending on weather, but with one boiler of water you will get about 15 minutes.

Be careful because "Otto's" boiler will run out of water before it runs out of gas — further indicating why it's a good idea to install the Regner top-up system. With the system you will get around 35 minutes of run time. I found it's best to top off the water every eight minutes or so.

"Otto" has a short wheel base that will allow it to negotiate around a 31-inch diameter curve; Regner says

'Otto's' origins

With limited access to German rail history material in the United States (not to mention the language differences), it's difficult to create a full profile of the "Plettenberg," the tram locomotive Regner Steam and Rail Technology used as a prototype for "Otto."

Tram engines were used throughout the world; in the United States they were known as "steam dummies" and ran mostly along or through streets and roads where horses and pedestrians were present.

Tram engines were used for a variety of services from passenger to light industrial use and had to comply with municipal regulations, including limiting steam and smoke emissions. To get around the smoke issue, tram engines burned coke, a fuel with few impurities and a high carbon content.

Regulations also required tram machinery to be concealed from view, with some rules being so specific as to say skirts had to be "above four inches from rail level" and they had to be free from noise. The enclosure and noise regulations were to prevent scaring the horses.

Steam tram engines began being replaced with electric and gas engines in the 1890s. One of the more well known tram engines, especially among the youngsters, is "Toby" from the "Thomas the Tank Engine" books and TV series; another notable tram is the Geldersche Tramwegen of The Netherlands.

'Otto's' ancestor: *'Plettenberg' steams at the Sauerland Small Railway in 2012. Photo by Georg Peter Landsiedel.*

What we specifically know about "Plettenberg" is that it was built in 1927 by Henschel & Son in Kassel, Germany, for what is now known as the Plettenberger Kleinbahn in the industrial region of North Rhine-Westphalia, Germany.

This was a meter-gauge (39⅜ inches) light railroad developed in 1900 that primarily served as an industrial feeder line to the area's long-haul standard-gauge railroad. According to an anonymous history of German light railways, Plettenberger had "no fewer than 23 industrial sidings" over its short 1.8-mile length.

According to a history by the Deutscher Eisenbhan Verein (German Railway Club), today the owner of "Plettenberg," the locomotive was used through 1967, when it needed new boiler certification, which was deemed too expensive to perform. The club purchased "Plettenberg" in 1968 and moved it to its shops in Bruchhausen-Vilsen, Lower Saxony, in 1971. It apparently took 20 years to refurbish the boiler but starting in the early 1990s, "Plettenberg" was used on the club's railroad.

"Plettenberg" was loaned out to the Sauerland Small Railway in Schmallenberg — only 30 miles (46.6km) from Plettenberg — in 2012 for a weekend tourist event that produced many photos and videos.

— S.V. & dmc

it will work on LGB R1 curves, which are 24 inches.

Conclusion

Overall, I am very happy with the Regner "Otto." It's perfect for a beginner; it is an easy engine to get started and has all the features that the more expensive steamers have.

It's what I like to call my pack-and-play engine — it is smooth running, has great pulling power and runs at a nice slow speed. Further, it has a lot of potential for those who like to kit bash. The body is easily removed and could be replaced with someone's own creation.

My one piece of negative feedback is the way the "Otto" boiler has to be filled. It would be easier to fill the boiler if it had something on top of the boiler rather than on the side using the L-shaped fitting. The top up system solves the problem.

But if you are in the market for a small steam tram, this is the one.

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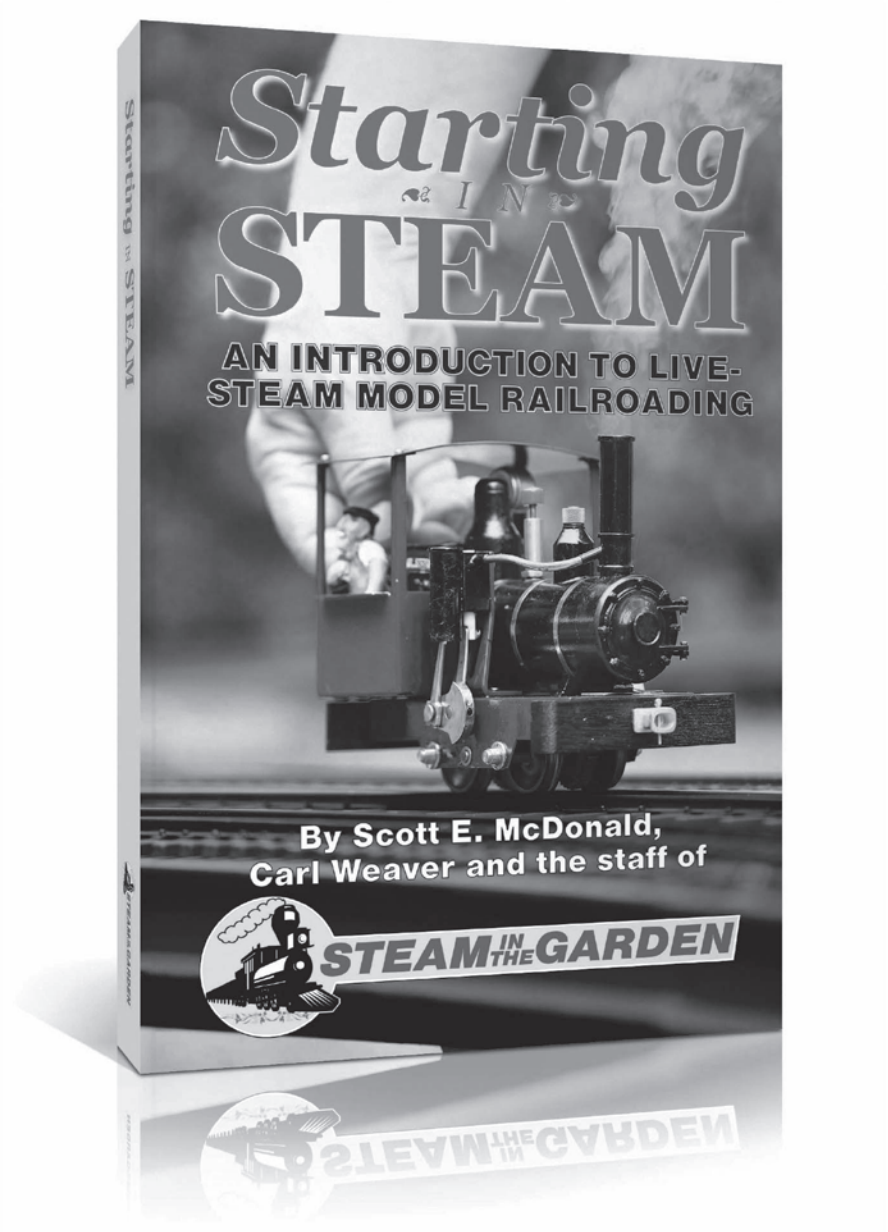

Hot off the press, *Starting in STEAM* is now available as both paperback and e-book editions. Including new material and articles from *Steam in the Garden,* this 148-page book not only introduces new hobbyists to the fun and excitement of small-scale live steam, but will also provide experienced steamers with tips and tricks from seasoned hands. Buy your copy of *Starting in STEAM* today.

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RAILWAY POST OFFICE

April Fool's Day letter

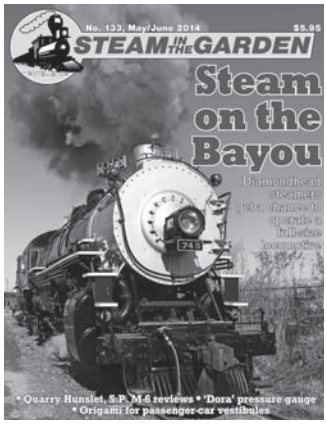
All I can say is *wow* and *wow*. The cover photo of issue No. 133 (May/June 2014) is terrific. The loco is amazing. I especially like the attention to detail. The piping in front of the stack is well done and not often seen in most model work. The upgrading of the loco to include "hidden" ditch lights is a nice touch. The paint job is a great "out of the box and-or shop," but I would have preferred more weathering. Speaking of that, the weathering is not very well done, just some minor streaking from the stack and the smoke box door.

While the loco is pretty well done, the line side brush is way too tall and obscures a well done cyclone fence (with barbed wire on top) and some car models in the adjacent lot.

I also noted that the number of rivets on the smoke box front is incorrect. The texture on the front buffer beam shows that the model maker must have been getting tired. It could have been cleaned up with a few touches of a file.

The use of Photoshopped smoke and steam above the stack is way too obvious. The figure in the background has a paint error in the white blob on its chest. Other than these minor notes, it is a pretty good cover shot.

Myron Smith
Marksville, Wash.



Editor's note: Of course, Myron is joking (somewhat); the locomotive is a full-size behemoth driven by some lucky attendees of the International Small-Scale Steamup in Diamondhead last January. Others unwilling to commit thoughts to virtual paper have criticized that it is not a model live-steam engine. Sorry; that photo by Rick Parker was the best of the almost 300 that were submitted for publication.

On-line archive

Just a quick note to thank *Steam in the Garden* for putting magazine indexes on line. My search for live-steam RC servo applications quickly found pay dirt with your web site's information.

Bob Winkel
Rochester, Mich.

Editor's note: Readers who have an account at Steamup.com and sign on can see this new feature under the site's left-hand side group of buttons headed "Magazine." (You need not be a subscriber to either the print or digital edition to see this feature.) The button "Search back issues" brings up a form that allows you to search for headline, author or keyword topic (it is not a full-text search) for issues dating back to issue No. 60, June/July 2001.

TIMETABLE

Sept. 3-6, 2014 — Thirty-fourth Narrow Gauge Convention, Overland Park Convention Center, Kansas City, Mo. Layout tours, modular layouts, clinics, dealers. Info: http://www.kansascity2014.com.

Sept. 18-21, 2014 — Fall Steamup, Staver Locomotive, Portland, Ore. Info: http://www.staverlocomotive.com.

Sept. 27-28, 2014 — Greater Cincinnati Garden Railway Society Steamup, West Chester, Ohio. All Gauge One live steamers welcome; layout features two outdoor loops of track. Info: wmn.rail@gmail.com.

Nov. 28, 2014 — Gauge One Turkey Trot, Pennsylvania Live Steamers, Collegeville, Pa. Info: http://www.palivesteamers.org.

Jan. 11-18, 2015 — 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, dealer tables, a festive meal and extracurricular activities. Diamondhead Inn & Suites: (228) 255-1300. Info: Patrick Darby, k5pat@bellsouth.net, (985) 867-8695; http://www.diamondhead.org.

Feb. 13-15, 2015 — Presidents' Day Steamup, Electric City Trolley Museum (Steamtown), Scranton, Pa. Info: Clem O'Jevich Jr., (570) 735-5570 or wrunloco@aol.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: (866) 258-5651. Info: http://www.summersteamup.com or (650) 898-7878.

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.

On the Brink Live Steamers. Wednesday, and occasional weekend, greater Sacramento, Calif., steamups on elevated live-steam 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.

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

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.

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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.

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British Railways Rebuilt Merchant Navy Class

By the time you read this, the BR Merchant Navy Class "Clan Line 35028" may have already sold out. Call us to see if any are still available. (Scheduled for late spring 2014 release.)

Union Pacific 4-8-4 FEF3 No. 844

The pilot model for this most popular locomotive is now under development and expected to be available for evaluation this summer. The production version is projected for late 2014 release and will be available in black or two-tone gray. **Reservation deposits of $1000 will be required.**

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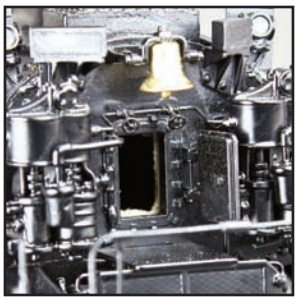





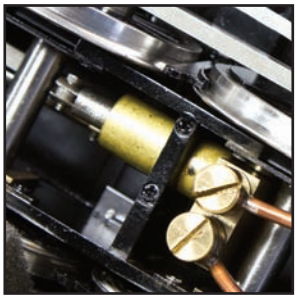
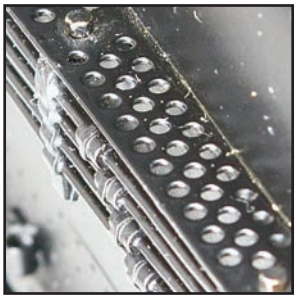

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