



No. 131, January/February 2014

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STEAM IN THE GARDEN

A review of a new 1:32-scale from WuHu Bowande

British A4



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- A modification for 'Dora'
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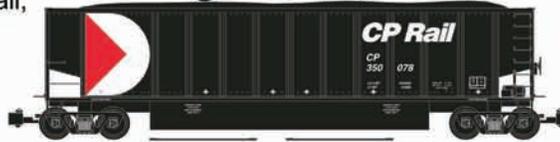
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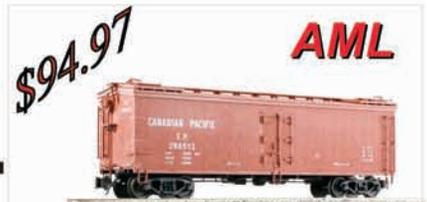
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The No. 1 "Falk" is a 1:20.3-scale, 0-4-0 brass, Gauge 1 (45mm) live-steam model of a locomotive built in San Francisco and used as a Pacific Northwest logging engine. With axial pump, it runs more than 10 minutes. 21½-inch radius. 8¾-inches long, 4¼-inches wide, 6-inches tall (222mm by 109mm by 151mm).



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.



Limited to 50 sets released worldwide

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, 3¾-inches wide and 5½-inches tall. It's butane fired by a ceramic burner.



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.



Limited to 200 sets released worldwide

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, 5¾-inches tall (210mm by 90mm by 137mm). 45mm gauge. 3.6 pounds (1.65 kg).



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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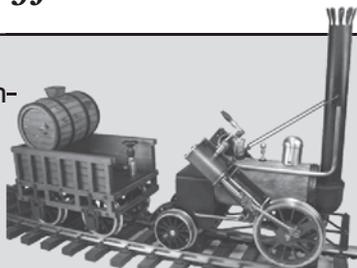
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STEAM IN THE GARDEN

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

Latest waybill. A new hand-held radio control transmitter. Regner makes a 'Rocket.' Accucraft to build a 'Tornado' and 1:32-scale passenger cars. Hartford Products acquired by Ozark Miniatures. **Page 8.**

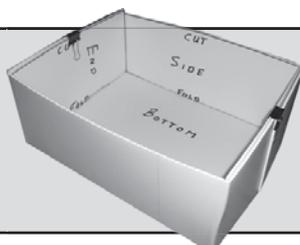


Heavyweights. Making 1:32-scale passenger cars (maybe the hard way). **By Simon Duhamel.**

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Carriers. Building strong and inexpensive boxes for locomotives and rolling stock. **By Will Lindley.**



British A4. A review of WuHu Bowande's new 1:32-scale locomotive. **By Jim Overland.**

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Painless reversing. The direction-handle on Accucraft's new 'Dora' gets hot; a modification. **By Marc Horovitz.**



Cupola view. The passing of three contributors to small-scale live steaming: Aristo-Craft Toy Trains, David Passard, Walter Permann. **Page 40.**

Cover: Jim Overland's WuHu Bowande A4 stretches its legs on the wide curves at Staver Locomotive in Portland, Ore. Photo by Harlan Chinn.

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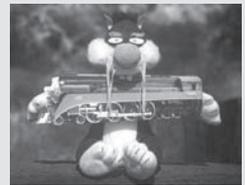


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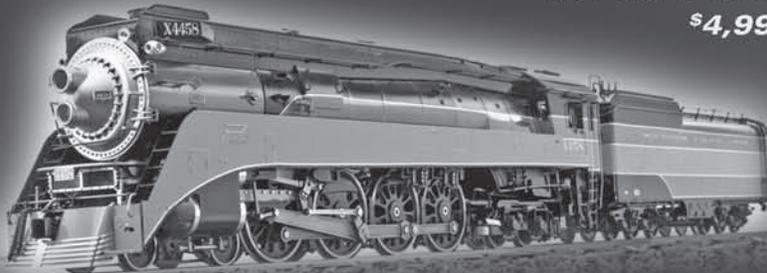
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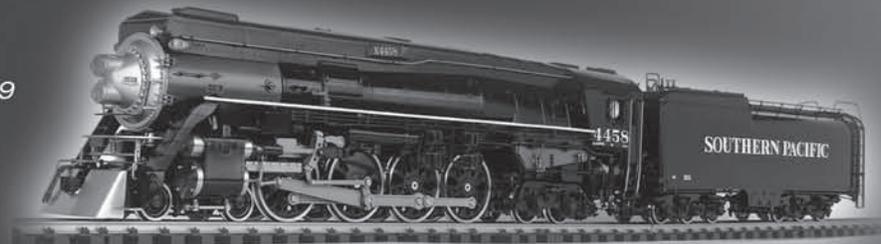
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LATEST WAYBILL

New transmitter

A longtime supplier of small-scale live steam radio control systems has announced a hand-held 2.4 GHz transmitter designed specifically for live steam.

Remote Control Systems of Australia said in November its TX20-LS transmitter can replace any 2.4 GHz transmitter such as a Spektrum DX4e but has more intuitive controls in an easy-to-hold form.

“The TX20 works exactly the same way as a stick radio does,” said Tony Walsham, the founder of Remote Control Systems (RCS) and designer of the TX20. “The small knob is for setting the valve gear and is infinitely variable. The big knob controls the steam regulator.”

Live steamers have adopted 2.4 GHz spread-spectrum radio control in recent years because the receivers that signal the locomotive are less likely to suffer from “glitching,” where receiver-servos go out of control. In addition, a single 2.4 GHz transmitter can be “bonded” to multiple receivers (or locomotives), meaning hobbyists need only one transmitter for multiple radio-controlled locomotives.

Remote Control Systems is currently marketing its products directly in the United States. A TX20-LS retails for \$94 (\$A99), not including shipping. The company is on the Web at <http://www.rcs-rc.com/> or by phone at (011) 614 2902 9083.

Regner makes a ‘Rocket’

In celebration of its 35th year in business, Regner Steam & Railway Technology of Germany said recently it was developing a 45mm-gauge live-steam

kit of Stephenson’s 1829 “Rocket.”

The limited edition of 60 kits worldwide will be 11-inches long including tender (280mm), three-inches wide (75mm) and 7/8-inches tall including smokestack (180mm) and will weigh in at 2¼ pounds (1000g). The butane-fired locomotive will have two working piston cylinders with 5/16th-inch bore (8mm) and 11/16th-inch stroke (17mm) with Teflon coating.

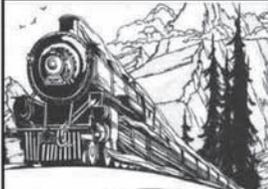
Rotary valve gear are cylinder-driven and support reversing and throttle control. Lubrication is a drip-feed for each cylinder and the gas tank is underneath the barrel in the tender. The locomotive supports a Goodall-type water feed on the boiler and there is a safety valve.

While Robert Stephenson’s “Rocket” wasn’t the first steam locomotive, it was the first to bring together a number of innovations of the era and won England’s Rainhill Trials with a speed of 29mph (46.5km/h) in a competition to supply engines to the Liverpool & Manchester Railway. Stephenson used an 0-2-2 wheel arrangement, multiple fire tubes in the boiler, a blast pipe to increase draft in the fire box, angled cylinders directly attached to the drive wheels and a separate fire box.

The original Stephenson “Rocket” — though heavily modified — is preserved at London’s Science Museum and a number of replicas have been built, including those at the Museum of Science and



Hand-held transmitter: Remote Control Systems’ TX20-LS.



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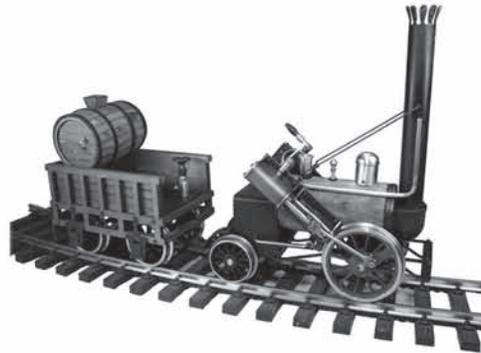
*Waist Side Wagon
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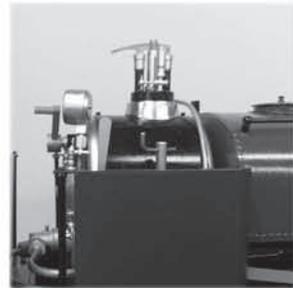
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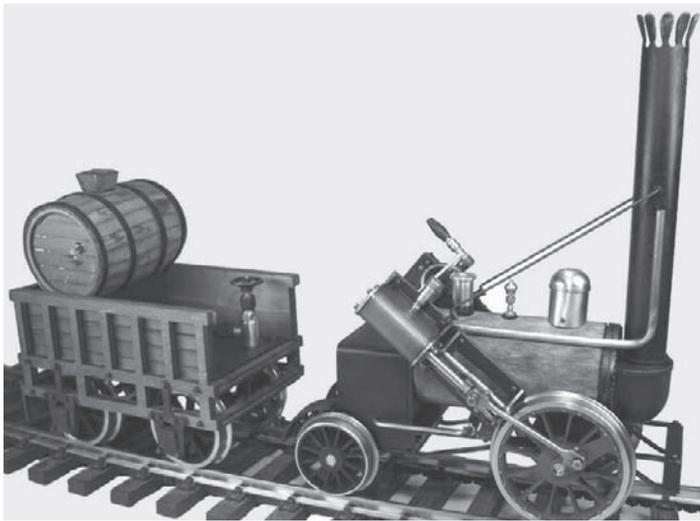
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Regner 'Rocket': Limited edition kit will highlight the earliest era in steam locomotion.

Industry in Chicago and the Henry Ford Museum in suburban Detroit.

Regner, whose U.S. dealer is The Train Department of Hazlet, N.J., is offering the kit for a suggested retail price of \$2026 (€1,495). The Train Department is on the Web at <http://www.thetraindepartment.com/> and by phone at (732) 770-9625.

English 'Tornado'; new U.S. cars

Mainline Gauge One products highlight the latest offerings from Accucraft Trains Co., with the announcement of a live-steam model of a unique British locomotive and a new series of 1:32-scale U.S. streamline rail cars.

The company's United Kingdom distributor, Accu-



Accucraft 'Tornado': A 1:32-scale live steam model of England's most recent mainline locomotive.

craft UK Ltd., said recently it has commissioned a model of the "Tornado," the 4-6-2 A1 locomotive built from 1994-2008. The 1:32-scale locomotive for 45mm track will be 29½-inches long (690mm), 3½-inches wide (90mm), 5¼-inches tall (130mm) and support a minimum radius of eight feet (2.5m). The butane-fired engine will operate at 60psi and be run with true Walchaert gearing, with two slide-valve cylinders.

The "Tornado" will come in four different versions: apple green, British rail blue and British rail green with either rimmed or rimless smokestacks and differing emblems. The locomotive, which is expected later this year, will have a suggested retail price of \$4633 (£2895).

The A1 "Tornado" was the first modern live-steam locomotive built in Britain since 1960 and was commissioned by the non-profit A1 Steam Locomotive Trust. Forty-nine A1-series engines were originally built in 1948-1949 for the London & North Eastern Railway but all were scrapped during dieselization in the 1960s.

Accucraft also said recently it would begin making metal-body streamline cars for passenger trains in 1:32-scale for 45mm track in a variety of liveries. The

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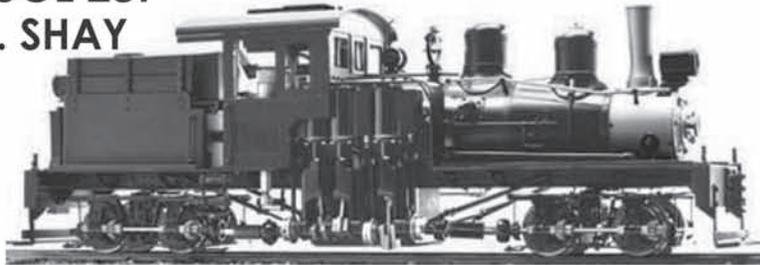
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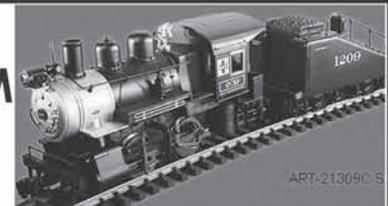
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cars will be 31½-inches long, 3¼-inches wide and 5¼-inches tall.

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each livery (two coaches and one baggage, diner, sleeper and observation car) is \$1425.

Accucraft UK is based in Shropshire, England, and is on the Web at <http://www.accucraft.uk.com/> or by phone at (011) 44 1694 723799; Accucraft Trains Co. is headquartered in Union City, Calif., and is on the Web at <http://www.accucraft.com/> and by phone at (510) 324-3399.

Ken Sheridan's line of 1:20.3-scale detail parts in 2005, Precision Products' line of material and plans for building miniature outdoor buildings in 2007 and both CDS Lettering and Larry Larson Graphics in 2010.

Bob Hartford began making kits for 1:20.3-scale, narrow-gauge railroad rolling stock as a way to relax from a career in demography (the statistical study of human populations) that included teaching at Duke University in Durham, N.C. Bob started his business in September 1989 and sold his first kit a year later.

But the business has had bumps along the way. Bob moved from the East Coast to New Mexico in 1990 and tried to sell the business in 2005, but the new owners "drove it into the ground," he said. He took it back under default in 2009. A year later his wife of 43 years, Valentina, passed away. "She was really half the business — more than half," Bob said. "It really wasn't fun anymore without her."

Ozark is on the Web at <http://www.ozarkminiatures.com/> and by phone at (435) 586-1036.



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Hartford acquired by Ozark

Longtime maker of highly accurate 1:20.3-scale rolling stock kits Hartford Products Inc. of Hillsborough, N.C., in November was acquired by the owners of Ozark Miniatures Inc., who said they would continue Hartford's commitment to high-quality kits.

David and Brenda Rhoton, the proprietors of Ozark of Cedar City, Utah, said Bob Hartford would remain involved in the business, helping to develop new products.

The Rhotons have developed a burgeoning business over the years, taking over Ozark from its founders, Larry and Carol Herget, in 2001 after the Hergets had run it for 23 years. Ozark acquired

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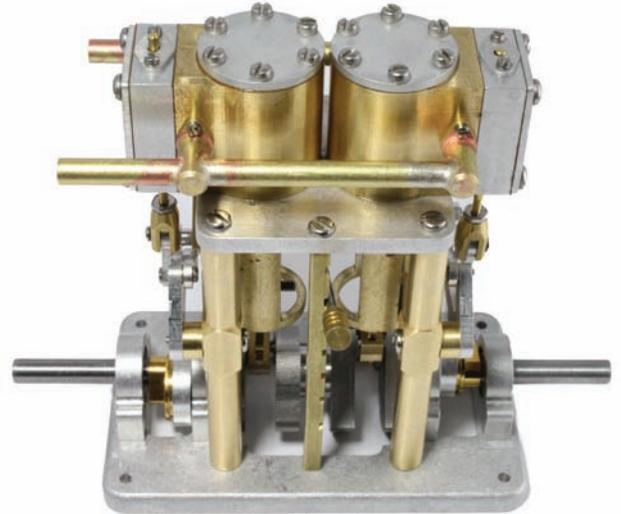
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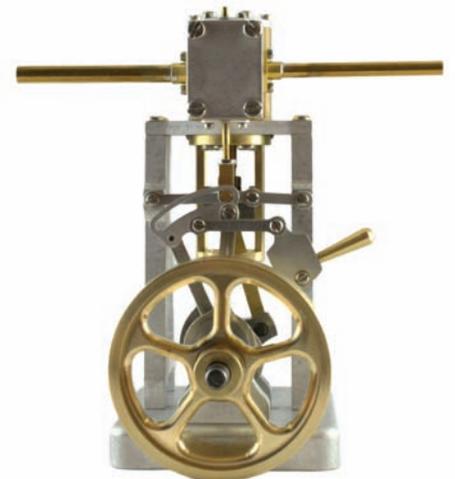
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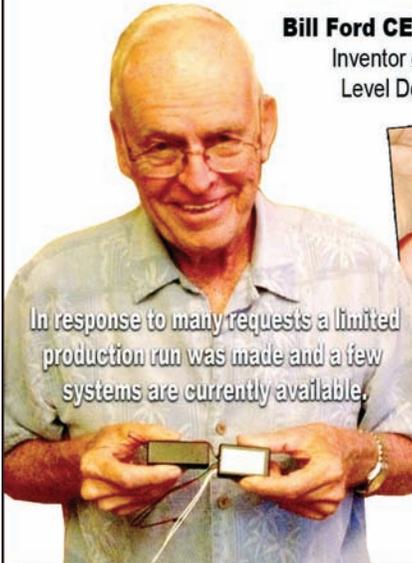
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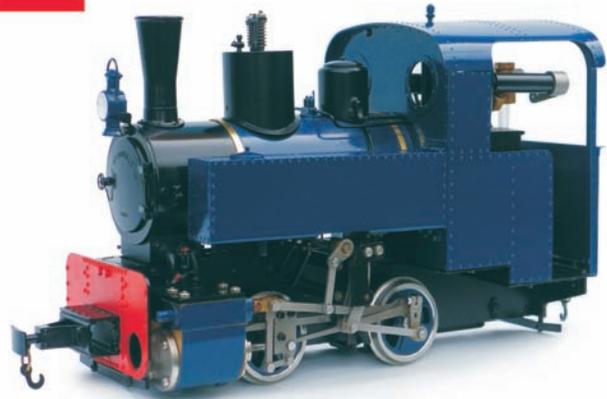
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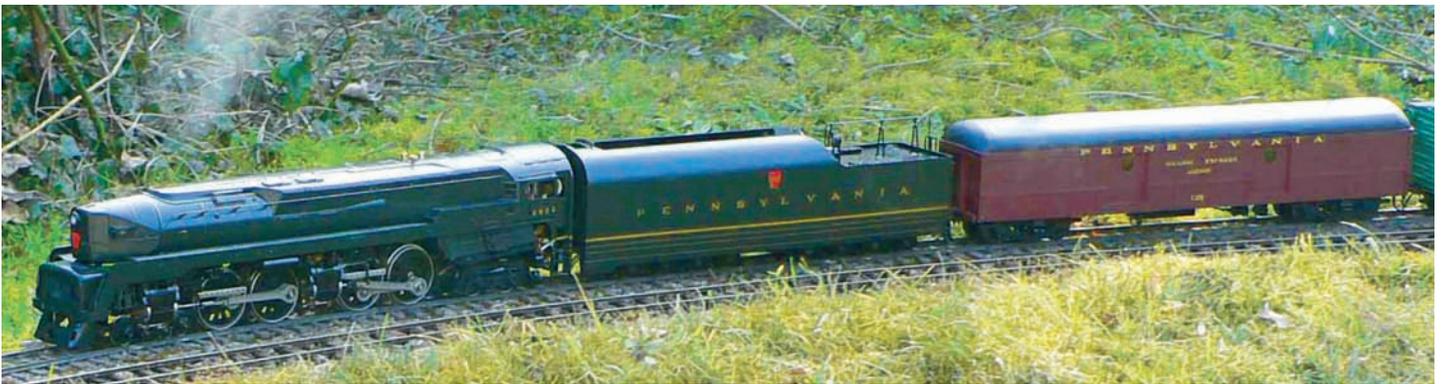
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Making 1:32-scale cars (maybe the hard way)

Heavyweights

Text and photos by Simon Duhamel



PRR in France: Author's Pennsylvania Railroad T1 4-4-4 pulling a heavyweight baggage car he built.

Some people may find this a hard way to model railroads, but it is actually simpler and quicker than one thinks. I am French and have modeled in HO-scale for years in both French and U.S. prototypes (depending on where I lived at the time). I learned a great deal from modeling in the 1960s, when *Model Railroader* magazine had fine construction articles. I learned even more when I found at a swap meet some old *Model Railroaders* from the 1948-1949 era.

Simply because there wasn't as much stuff available to modelers in those days, they had to figure out for themselves how to make the models they wanted. Since I have modeled the French railway system in Gauge One, outside of some fine and representative locomotives offered by Aster Hobby Co. Inc. and some sleeping cars, dining cars and Pullmans once offered by J & M Models Ltd. (formerly in England, now of The Netherlands), we did not have much to run on our pikes. Especially as these Pullmans only represented prestige limited's and not the bulk of what our trains were; nor were they often run in solid wagons-lits (sleeping car) sets.

So I continued my method of scratch building from my HO days and adapting the technique to a larger scale. When in 2009 I bought my first U.S. engine in 1:32 scale, I discovered that the situation for 1:32-scale modelers of U.S. prototypes was pretty much the same as the French ones, and after four years, this is the result.

After getting some lightweight Pullmans from David Leech of Canada (a live-steamer who once had a 1:32-scale car building business) which made up the bulk of my passenger consist, I decided to build some heavyweight cars not available commercially for my Pennsylvania Railroad train.

I model the Pennsylvania Railroad (PRR) in the 1930-1957 time frame, and through my research (as well as some personal memories of the PRR), I wanted my consist to represent a typical mix of lightweight equipment from both the pre-war era and the post-war era (1938's "Fleet of Modernism" cars and 1949 and older) and of heavyweight cars as well as ones that had been modernized ("betterment cars").

I was able to find a J & M Models' 12-1 sleeper, which beefs up the heavyweight consist a bit, as well



Vise and clamps: A first attempt at making a bend in the aluminum (where a half-round piece of wood was used; later a quarter-round was substituted). The vise holds the work to the bench.

as an Accucraft REA Express reefer, which adds to the head-end equipment. My pike has 11-foot minimum radius (which I plan to augment to 17½-foot) and No. Eight switches, so long close-coupled equipment can operate in an eye-pleasing way, and high-speed passenger operations are the norm, just like on the real PRR.

Three cars seemed necessary at first: A B60 baggage car, as these seemed to be a sort of Pennsy icon that I remember well from my travels on PRR trains; a 70-foot railway post office car, and a D78 diner car. That order was changed about, as I felt my train, now grown to a nine-car consist, really needed that diner first.

I will describe the construction of both the baggage and the diner in this series. Each represents a different technique, the former having an arch roof, the latter with a clerestory roof.

For the baggage car, I used a technique inspired by David Leech and a common way of constructing cars among the Gauge One Model Railway Association community in England. This consists of folding over the roof and sides of the car in one piece. But as these do not have straight roof ends but rounded ones, I have added my little contribution on how to make this rounded end.

In the diner, which has a clerestory roof, I

used a J & M Models' clerestory, which I obtained from the current owner of the firm, who was selling off his last stock. As most of the readers of this article will not be able to obtain one, I will describe how to make a clerestory roof in wood. I have also seen an advertisement for a 1:32 scale clerestory roof in basswood which may still be available.

Both of these cars ride on David Leech-built trucks modified to resemble Pennsy's unique trucks. This has always been a source of amusement to me: How can a railroad that claimed to be "the standards railroad of the world" employ such a high number of original designs of trucks which nobody else used? I guess the answer was that it built most of its equipment in Altoona, Pa., and produced its own designs so as not to pay patents on other manufacturers' designs. But it did standardize quite largely on its own rolling stock.

One more comment before I start: Why on earth build cars in aluminum? The reason is that I have built quite a few cars in wood and styrene, using aviation plywood (3/32-inch or 2.5mm) and non-solvent neoprene glue to hold the styrene veneer to the plywood (this is to hide the wood grain, also to make rivet details). I have a powerful SNCF 2-D-2 9100 (4-8-4) locomotive that I scratch built. It has direct-gear drive; when a switch blade wasn't mak-

Making heavyweights

A three-part series that follows steamer Simon Duhamel of France as he builds two 1:32-scale heavyweight cars for his Pennsylvania Railroad consist.

➡ **Part One — Shaping aluminum.** Some background on the process of building the model cars and starting the B60 baggage car.

• **Part Two — A clerestory roof.** Painting the baggage car and then on to building the diner car, with its unique roof.

• **Part Three — Origami and diaphragms.** A technique to replicate the end-of-car passageways used on passenger trains.



Two more bends: *Left, the quarter-round in place, a second bend is put into the roof. Right, the full form for the roof's big curve is placed into the vise, allowing for the top of the roof to be formed.*

ing contact during an early spring run, the engine would coast across the switch, and when it joined up again with a live rail it would jump forward and pry off the ends of the car! I must explain that in Europe we use hook and chain couplers with buffers, so all the weight of the train is taken on the car ends. This probably wouldn't happen with Janey (knuckle) couplers. So it became necessary to go to metal cars, but since I run live steam and want to make up realistic consists, weight is also a premium to consider.

The late legendary Gauge-One enthusiast John Van Riemsdijk used to write about our overweight cars; he actually computed the weight of a real car in 1:32-scale and compared it with the weight of most models available (they're too heavy). And I agree with him (I have his Nord Atlantic which is light and not too powerful and it can't haul the typical — short — consist of the Oiseau Bleue, or the Etoile du Nord Pullman train the prototype used to haul, because J & M Models' Pullmans are too heavy). I may rebuild them into lighter cars one day to pursue that endeavor. John also put me on the right track by giving me and selling me some of his coaches built in aluminum.

So aluminum seemed to me to be a judicious choice. Then, as I acquired more confidence with it (this is my fifth car built that way), I also discovered that it has a few other advantages: It is worked extremely easily, it can be found in my local hardware store and I don't have to run to Paris to buy it; it makes a solid bond with epoxy glue; it also bends nicely on wood formers. Once when I was scratch building my 2-D-2, I found that soldering thin waistbands and joint covers on thicker brass is quite a nightmare as the two expand at different speeds and it is difficult to obtain a straight surface. Not so with

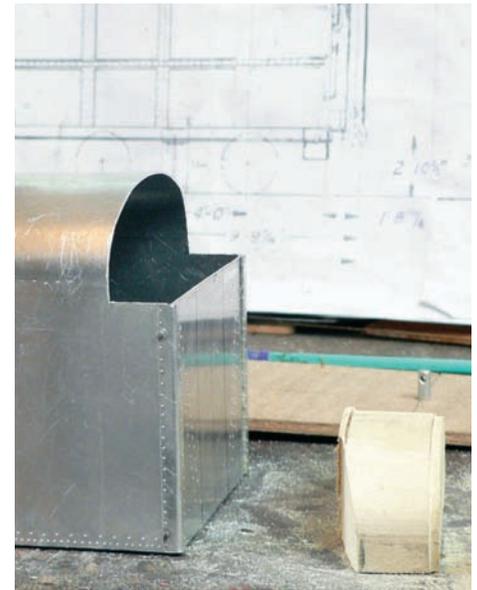
epoxy resin. I suspect that a lot of commercial brass stuff out there uses this type of construction for the same reason.

The B60 baggage car

So let's get started: I first make my drawings. These are scanned and then enlarged from Alan B. Chesley's "Pennsylvania Railroad Heavyweight Passenger Equipment Plan and Photo Book" (NJ International, 1984) on my computer using Microsoft Paint to set them to 1:32 scale, and are printed on letter-sized sheets. I then glue as many sheets as necessary using white glue and assemble it on a window so as to see through the paper to line up everything. These make into quite long plans and are suitable for building.

For the baggage car, I calculated the total circumference of one side, plus the roof, plus the other side, so as to mark out my sheet of aluminum. I use .025-inch (23-gauge or 6/10ths of a millimeter) aluminum sheet sold at my local hardware store (in the United States, chain hardware stores like Lowes and Home Depot do not sell large sheets of 23-gauge aluminum, but many independent stores do and it is available online). I find the length of the car on my drawings; this length times the partial circumference leaves us with a big rectangle. I cut this with my trusty metal shears. And then I file the resulting cuts straight using a straight ruler; to mark out the line I use a permanent fine point marker.

If you have access to a sheet metal press cutter or have a friend who has one, this is going to make life a lot easier for you. As for myself I do not have one, so I spend an enormous amount of time squaring after shearing. At this point I make all the rivet details on both sides that are on the basic sheet (most are on the



Early assembly: Left, the car's ends are attached to the sides and roof. Right, a notch is cut out of the end of the roof to make a space for a wooden block that has been formed, which makes the end solid.

joint overlap covers, done later). For this thickness of aluminum, I use my rivet punch without the lever and use a small hammer to punch the rivet (but don't overdo it). Now, out of habit, I space the rivets by eye.

Note that my rivet punch has a long neck, indispensable in this scale. It is for this reason that I could not do any rivet detail on the roof. I did not make the cut outs for the two baggage doors fearing that they might get deformed during the bending process for the roof. But I did mark them out. This enabled me to drill some holes where the doors are going to be.

I then made the two bends at the roof edges; these are sharper curves than the rest of the roof. The former is made up of three-quarter-inch plywood (19mm) with a half-round glued and nailed to it on one edge. It was described in my article on the N5 caboose ("Building the Pennsylvania Railroad's N5 cabin car," *Steam in the Garden*, January/February 2012, No. 119) and can be seen in the photos on the previous page. Another sheet of three-quarter-inch plywood is used to clamp one side of the car to the bending form at the appropriate height.

I used some screws (through holes made in the doorway) and some presses to achieve this, then I set the whole into my vice and proceeded with my first bend. This must be done with a piece of wood that is the full length of the car. Held by each end and pushing as parallel as can be, one must judge how sharp of an angle to create. Don't overdo it; it's a trial-and-error thing.

I then flip the whole thing over and make the bend on the other side, in the exact same manner as the first.

For the central large radius on the roof I made a form using what carpenters over here call a "chev-

ron"; it is a large rectangular section used on roofs, and is about $3\frac{5}{32}$ -inches wide by $3\frac{1}{2}$ -inches tall (eight centimeters by nine centimeters). I make a template of the roof curve and plane a one-yard section to match the template. I figured that with the spring back in the metal, I needed to make forms about one-fifth smaller than the real curve.

So I made a print one-fifth smaller than the car end and used it to make the template. You can sand the form after it is planed to the correct contour. I then clamp one side to this form in the same way that it is clamped to the first form, and made the final bend. I finished by adjusting things by hand although this may not be necessary. At this point one must check for parallelism of both sides to each other and in both directions. It is also useful to make a template to check that the roof profile is according to drawing.

The next step was to make the two ends — these use a simple right-angle bend that fit inside the sides, making the whole a large U-bend rectangle. These are bolted onto the sides using four small No. 000 machine screws and nuts (one millimeter). The rivet detail is done before fitting. Once again, at this point, check that all is square.

I also made four riveted angles to mask the end joints and to follow prototype construction. Next, the door openings in the sides were cut out. I found that these doors were inset quite deeply into the sides so I placed some $1/32$ -inch thick flat stock (two millimeters) as spacers on each side of the doors (on the inside) as well as the top of the doors. I made the doors with the characteristic PRR porthole, but of course you could make the door of your chosen prototype.

Underneath the doors is glued a three-eighths-inch



Window sash: *Difficult to make without a guillotine-type cutter, a window sash can be made by hand.*

by three-eighths-inch (one centimeter square) aluminum angle. This is to hold down the floor and make rigid the lower part of the car body. It is placed so that the lower edge of the horizontal part of the angle is 7/16-inch (11mm) from the bottom of the sides. Nevertheless, because the bolster of the truck is so high, I had to cut a well for the bolster to fit in and place another piece of one-quarter-inch plywood (five millimeters) over it to fix the bogie pivot plus shimming.

While we are on the subject, let me say a few words on how I glue these things in place. It is useful to clean off the aluminum before gluing; an abrasive eraser like that used for electric model railroad track cleaning comes in handy here. I next score the aluminum with a file if the bond is an important one (such as the angle). I then use a de-greasing agent sold in department stores. Dry the aluminum off thoroughly and then mix the 10-minute epoxy completely and apply. Then place the parts in their correct position using clamps, clothes pins or weights as needed. For important bonds I use 24-hour epoxy (the angle is such a case).

In the next step we cut a notch in the roof to fit a wooden block for the roof curve — this notch must be marked out. (Measure on your drawing from the beginning of the curve to the projection from the end at the diaphragm.) Cut it carefully, following your marks. Making the wood block is a simple affair if you have access to an electric scroll (fret) saw, like a Hegner, which does an excellent job.

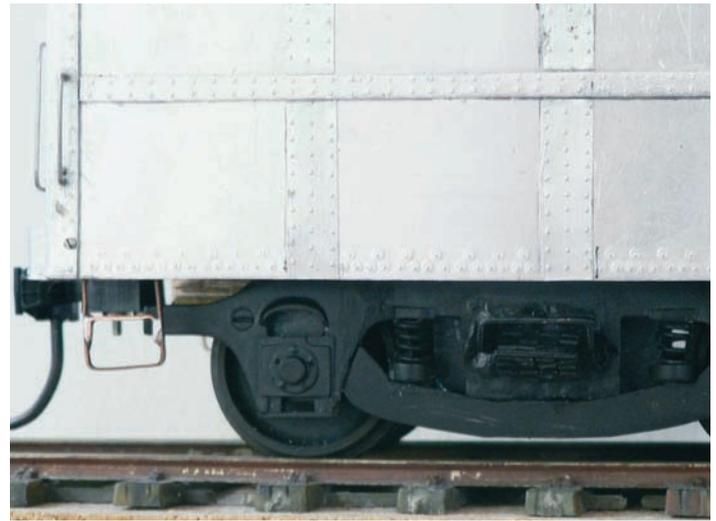
Mark out the roof profile with your template, and cut the block from a suitable rectangular section of

wood (samba, poplar or basswood). Next turn the block over and mark the V shape of the end to the diaphragms and cut it with the fret saw. Then I mark out a 3/16-inch section (five millimeters) of the roof that should be reduced with a file so that it can be set into the aluminum roof. This helps tremendously to make a sturdy joint with the roof.

At this point I epoxy the block in place. Once dry, I then use my belt sander turned upside down and bolted to the work table to adjust the radius of the block to that of the roof (a bench-top sander works as well). Then use the sander to make the curve of the end of the roof. If you don't have a good eye for proportions, you can make a small template for that too. Go easy, the sander makes fast work of all this.

The next step is making the end beam and coupler mount, which is made out of a three-eighths-inch square bar (one centimeter) of samba or similar wood. It is cut to the characteristic V shape. The coupler I use is Kadee No. 1917 — with no slack it is bolted to the end beam and this could bend the end, so I made an extra beam inside the body. The two are bolted together after being epoxied to the ends with two No. 1 bolts (two millimeters) in the buffer area.

This makes a sturdy end beam and mine has now been in service for two years with no signs of trouble. I did this because these are head-end cars which have to cope with the drag of the entire train. I then cover this beam with an aluminum veneer which has the appropriate rivet detail. Two wood beams were used as base for the diaphragms, but on a more recent car I used an appropriate I-bar of brass.



Details: *Left, a close-up of the end beam and how the coupler was mounted to it. Right, the painted trucks with a small step made from a piece of copper sheet.*

I then fitted the floor, which is made from one-quarter-inch plywood. This is screwed with six bolts to the aluminum angle, which is drilled and tapped. Be sure to check for squareness as this is what can make your car warp.

I then fitted the cotter pins, and two large I channels under the frame with notches for the David Leech bogie pivot. I made some underbody details, as described below. I made a Pennsy-type brake wheel from brass wire formed and soldered. I also made the curved steel awning which covers the roof end and joins up with the vertical beams behind the diaphragm.

I made a paper template which can be used on other cars, and should be kept for that. It has rivets embossed also and meets up with the sash above the window area along the sides which is a strip of .025-inch thick aluminum (23-gauge or 6/10th of a millimeter) embossed and glued into place. There is also a sash under the window area — these are quite difficult to make without a guillotine type of metal cutter.

The embossed vertical strips joint covers are made from thinner material — I use recycled offset printing plates, which are ideal. (Aluminum plates are now used only for longer press runs, our editor tells me, meaning finding used plates will be more difficult — and my cache is running out.) These must be thoroughly cleaned with the abrasive block before use as the film may prevent the glue from making a strong joint. When I emboss the rivet detail on these I do use the lever of the rivet punch, as a small hammer blow would be too much.

I then installed grab irons throughout. And made some underbody detail — battery boxes, with aluminum doors, hinges and grab handle details, a brake

cylinder, an air tank and a generator were turned from wood dowel on my lathe, a steam trap was turned from brass and tapped so I could screw it to the floor from the inside. The generator detail was drilled right through so a long finishing nail could be run through it making a strong joint with the frame.

Next I modified the trucks to more closely resemble the standard Pennsy truck. I used David Leech's commonwealth truck of a British railway standard truck as a basis: I ground out with my Dremel rotary tool the secondary suspension detail altogether, as well as a good bit of the equalizing bar, which I replaced with one more like the characteristic shape of the 2P D3, made out of 1/32-inch styrene sheet (one millimeter). And I adjusted it to fit around the coil-spring cups.

I then folded a piece of aluminum to the shape of the pedestal. In the back, I let two sides (wings) project a few millimeters so that they could be inserted into holes drilled into the truck frame. It is epoxied to the truck-side frame. I made some leaf spring detail by glue-laminating thin styrene bands (Evergreen) and let them dry thoroughly. Then I filed the back flush and epoxied this detail under the pedestal. I made some wood blocks to represent the friction blocks; these are normally part of the body but mine are glued to the pedestal and just fit inside the body side of the car (unfortunately not visible in the detail photo).

I also made some steps from copper sheet, but brass sheet or band would be just as suitable. I had to fit some extension blocks of hard wood to the inside of the body ends to glue these steps into holes made in the blocks (this is visible on the right side of the end beam draught gear in the detail photo).

Next time: Painting and lettering the baggage car and building the diner car.

Building strong but inexpensive locomotive and car

Carriers

Text and photos by Will Lindley

As a live steamer, how many times have you struggled with cardboard boxes, brief cases, wooden cases, plastic totes and so on to move your equipment safely?

Rarely do off-the-shelf boxes and cases fit your equipment well, while at the same time conserving valuable space. Custom-made cases can be expensive and they can be heavy and bulky too. I'm always on the lookout for solutions to my problem, whether it be the produce section of our local grocery store for apple boxes or even a big-box store which sells shipping supplies.

On returning from a vacation last spring, I picked up two weeks of mail in a corrugated plastic bin used by U.S. Postal Service. Bingo, there was the material I thought might solve my problem. Corrugated plastic totes used by the Post Office seemed indestructible. They were light weight, strong, impervious to most liquids and the product was thin.

The next problem was to locate a sheet of the material (which goes by the brand names Coroplast, Correx, Polyflute, plus others) and develop a pattern which could be modified to fit any shape or dimension.

Home Depot sells a 10-pack of four-by-eight, .157-inch (4mm) corrugated plastic sheets for \$110 on its web site and will ship to your local store for free, but it was out of stock when I started this project (stock had returned by late last year).

The material is used often in sign-making, so I



Coach carriers: *Two of the author's corrugated plastic boxes.*

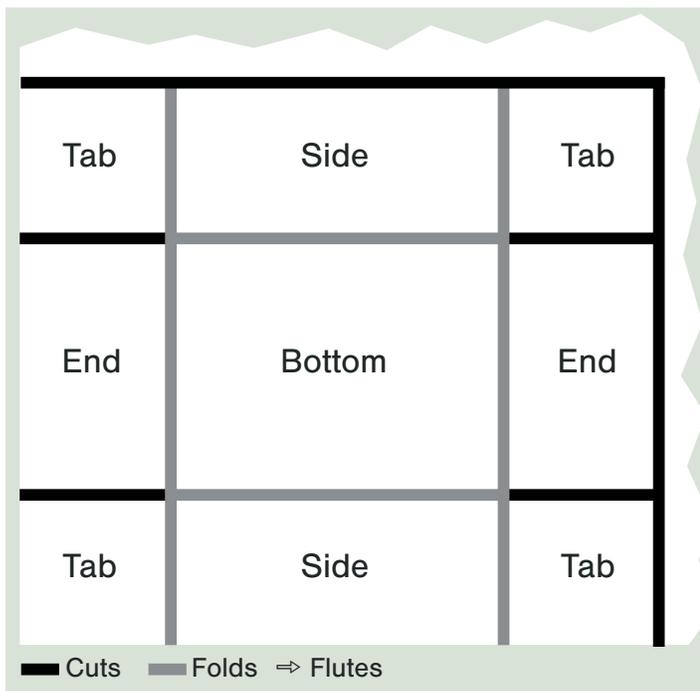
asked a local sign printer for the name of its supplier. At first, the shop didn't want to sell the product on a retail basis. I pleaded, showed some photos and videos from my smart phone of the equipment I wanted to carry, and ended up with an account.

I also sought the sign-shop salesman's recommendations for using the product, especially with regard to cutting, folding and gluing.

Upon returning home with four sheets of corrugated plastic, I pulled together tools and material I thought would be needed to make the first box. Included were:

- Four sheets of corrugated plastic (four-feet by eight-feet and 4mm thick — \$13.25 per sheet, including tax). Corrugated plastic is available in a wide variety of thicknesses, plies and colors. The supplier recommended using .157-inch (4mm) single ply sheets as they are much easier to handle and work with than any of the thicker multiple ply sheets.

- One 50-foot roll glue tape (\$26). The sign store



Cutting diagram: *Where to put cuts and folds.*

insisted that this was the only way to make strong joints. The drawbacks are that it is expensive and it's bulky.

- Carpenter's square.
- X-Acto brand knife and sharp blades (any sharp, thin blade will do).
- Tape measure.
- Indelible marker (Sharpie). Use a thin one as corrugations are easier to see.
- Pizza cutter. Surprisingly, it will not cut the plastic but helps to compress the plastic when making folds. The plastic is difficult to fold where needed, so this helps.

My construction preferences

After completing five boxes, I have developed some preferences for my carriers. For coaches and goods wagons:

- All tabs should be glued on the outside at the end of the boxes and lids, not the sides.
- Corrugations should all run perpendicular to the longest dimensions of each box and lid so that the corrugations will be vertical along the sides of the box and lid. The plastic is very difficult to compress when the corrugations are vertical, but if horizontal, the plastic bends easily.
- If possible, the ends of each box should have double walls. This greatly increases the compressive strength of the ends. Laminations add stiffness to the ends and strength if a box needs handles cut.
- To keep the lid from bowing out along the

• Wallpaper seam roller, again for help when making folds.

- Hot glue gun and glue (added later).
- Hook and loop (Velcro) self-adhesive tape for holding the lid in place.
- Foam or bubble wrap for internal padding between dividers and coaches.

A large work space is required simply because you need to handle four-foot by eight-foot sheets of plastic.

The sign store was insistent that the 3M glue tape they sold was necessary, but since it was so expensive, I bought just one roll to try with the first couple boxes. The argument was that hot glue would eventually harden while solvent glues were toxic and equally expensive. It was also suggested that I try contact cement, although I've not yet tried it. So far, I've found it impossible to separate a hot glue joint once it has cooled.

So far, I've built five storage boxes which range in size from a small five-inch by eight-inch by 17-inch box for five loaded slate wagons, to a large 28-inch by 21-inch by 12-inch box with two layers for eight new British Pullman coaches which were built by David Leech. Since the first projects were all built by the trial and error method, some ideas worked well, others didn't. I've now settled on a few design features which seem to work well for all boxes. Regardless of the original design features, all are strong, lightweight and compact when compared to either original packing or the container I had previously used.

I will illustrate here building a carrying case for three new Isle of Man coaches and I will walk you through the process on a step-by-step basis.

My process included the following steps:

- Assemble the tools.

sides, each lid should have a minimum height of 1³/₄-inches.

Although I haven't yet built a locomotive carrier, I plan to insert a separate U-shaped piece inside the box to add strength to the box for the increased weight of the contents. I'll glue the insert along the bottom and up each end of the box. This additional lamination will make each box much stronger.

Here, I want corrugations for the ends of the inserts to be vertical. Also, don't forget to adjust the size of the box because the insert will reduce the internal height and length for your load. Because locomotives will all sit lengthwise in the box, consider standardizing the width and height of locomotive boxes. This will conserve space in storage or packing equipment for a steamup.

— W.L.



First cut: After cutting the corrugated plastic, use the wallpaper seam roller to compress at folding points.

- Measure the equipment that will be held in the box to be constructed.

- Lay out the plans for the box (bottom and lid, a rough sketch will do at this point). Here, the choices include: number of pieces the box will hold, orientation of the load and whether the load will be a single or double layer.

- Calculate the needed internal dimension for the box (based upon the size and number of pieces the box will hold).

- Determine where cuts and folds are to be made.
- Mark all lines with “fold” or “cut” to make sure you don’t cut in error (see photos).

- Cut.
- Make folds.
- Glue.
- Label.

For this project, the exterior dimensions of each coach are 12¹/₄-inches long, five-inches wide and 6¹/₄-inches high. Since I plan to store the coaches side by side, the box will have three compartments. In order to handle the contents and to protect the vents on the coach roofs, I add another half inch to each dimension. I also add enough to the length of the box to accommodate the width of the two internal partitions (one layer of corrugated plastic and two layers of one-eighth-inch foam or bubble wrap for each of the two partitions).

For this box, the internal dimensions will be 12³/₄-inches in width, 16³/₄-inches in length (for three coaches and two dividers) and 6³/₄-inches in height.

For the lid, I measure all dimensions of the completed box and then allow an extra half inch so that the lid will fit over the box.

For the pattern for the box, I used a standard copy paper box with a separate lid. My thought here is that the packaging engineers have spent many hours on the design to make it strong. Further, I’m not going to second guess the engineers on this. See photo for layout.

The next step, and probably most important one, is to lay out the plan on the plastic. Here, taking everything from above, I determined that I would need a piece of plastic 25³/₄-inches wide by 29³/₄-inches long for the box (base plus two ends, plus two sides).

Because corrugated plastic does not fold exactly where you want it, wait until the box is built before designing the lid.

To make the plan easy to photograph, masking tape was used for all lines. Other photos show parts of the plan as actually drawn on the plastic.

Note: I have marked where cuts and folds will be made. It is important to note that external dimensions may vary slightly from measurements calculated as it is impossible to fold corrugated plastic

— Continued on Page 26



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SP M-6 2-6-0

NEW



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- Butane Fired
- D-Valve

\$2,750.00

DB CLASS 45 010 2-10-2

NEW ACCEPTING RESERVATIONS



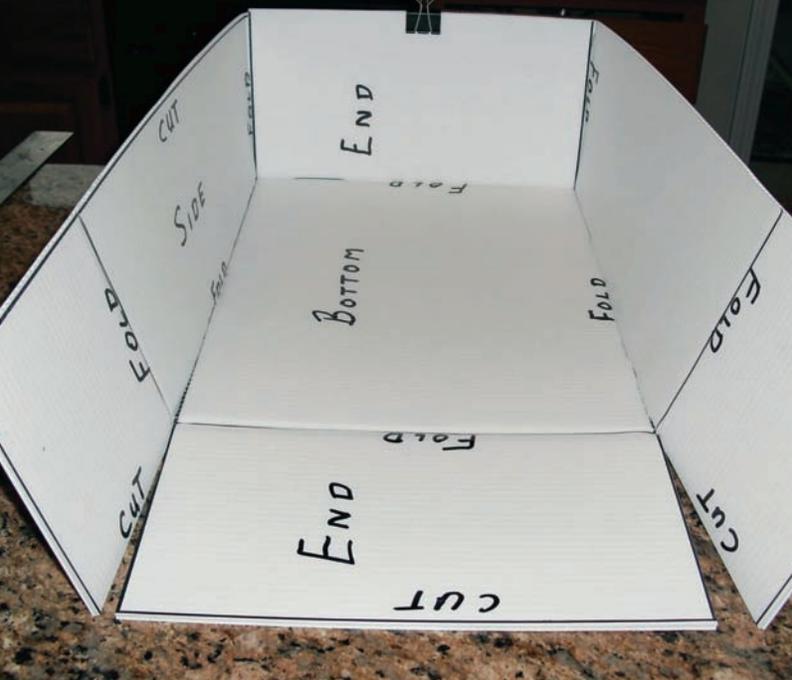
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Folding, gluing: *Temporarily hold the sides and tabs of the box together with binder clips when folding the box into its shape and then use them to hold the pieces after applying the hot glue.*

— Continued from Page 23

precisely. It is strong and tends to fold along the hollow tubes/corrugations. Also, plan so that side tabs will be glued to the outside of the end pieces. Gluing these tabs to the inside of the ends will reduce the length of the inside of the box by 5/16-inch (8mm) which may make it difficult to load.

Once the layout for the bottom is complete and all measurements are verified, it's time to complete required cuts and folds. I start with the pizza cutter and score all fold and cut lines. Then I take the wallpaper seam roller to further compress all fold lines. When the box blank has been cut, I then make all folds and use binder clips to see whether folds and cuts match. Also, it's a good time to see whether the box bottom properly holds its intended contents. As you can see in the photos, there is sufficient room between the coaches for the internal dividers and there is about a half inch to spare at the coupler end of each coach. Also, there is about a half inch to spare between the top of the vents and the top of the box, enough for a layer of small bubble wrap to keep the coaches in place.

At this time, mark the overlap of the end flaps and trim the excess off one of the end flaps so that both can be glued completely to the ends of the box. At this point it is important to note that it requires about three feet of the 3M glue tape at each end. This amounts to almost one fourth of a \$26 roll, hence the reason for using a generous amount of hot glue instead. The hot glue joint is also much thinner than when the 3M tape is used.

Now it's time to make the dividers. They are simply single ply corrugated plastic inserts with thin foam padding or bubble wrap on each side. Here

it is important that the height of the two inserts be the same height as the inside of the box. This helps support the weight of any other boxes that may be stacked on top. These inserts are attached with hot glue.

The lid is made in the same manner as the box. Here, the critical dimension is the height of the sides of the lid. I've gone to 1¾-inches for the sides and ends of the lid as thinner or shorter lids are difficult to assemble and they tend to bow out along the box. Measure the length and width of the completed box, add one-quarter-inch to the length and width to make sure the lid fits over the box, and another 1¾-inches for each side and end. Construction of the lids is exactly like the box except the tabs at the ends are shorter. I like to attach the lids to the box using about one square inch of self-glued Velcro tape on each side. Here, less is actually better as the lids are so light.

The end result for this project is a box which is seven-inches high, 13½-inches wide and 17-inches long. The volume is .93 cubic feet or only 41 percent of the volume of the original shipping boxes. It is strong, lightweight, impervious to most liquids and easy to handle.

Finally, I like to label the contents to avoid confusion.

If you plan your material use carefully, it should be possible to make two or more small boxes from a single sheet of plastic. I estimate the cost of the completed small box to be only \$8, while the materials for the larger box for the Pullman coaches cost about \$15. With just a small amount of work and inexpensive materials, I now have custom carriers worth triple the price.

New 1:32-scale locomotive from WuHu Bowande

British A4

Text by Jim Overland. Photos by Harlan Chinn.



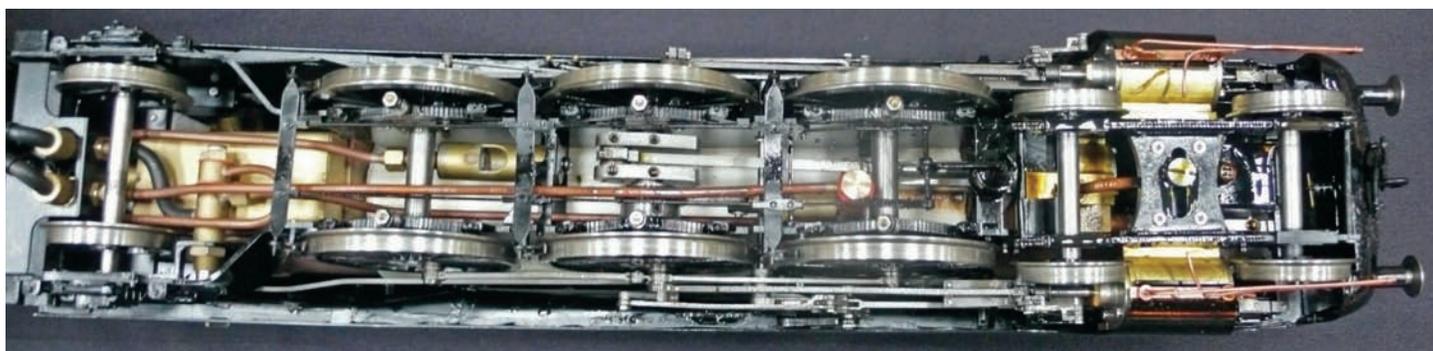
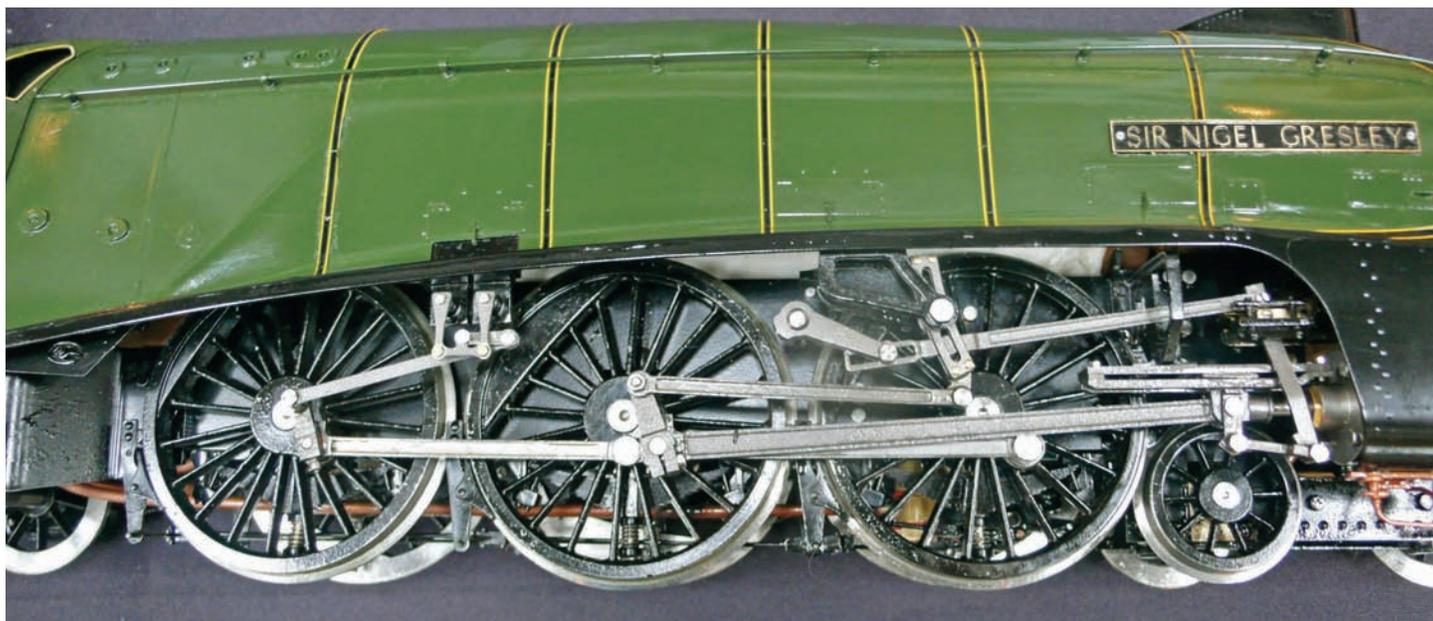
'Gresley': *The author's A4 on the outdoor portion of Staver Locomotive's layout in Portland, Ore.*

Woohoo (or should I say, "WuHu"? — there is a new builder of up-scale Gauge One locomotives on the block with an impressive product. WuHu Bowande's Gresley A4 British Rail Pacific is quite a contribution.

While construction is brass and stainless steel, this understates the model. Turn it over and see the machining that went into the three-cylinder running gear with the set of inside eccentrics and the outside Walschaert reversing gear. Now turn it back over and admire the paint and the layout of gauges and controls in the cab. There is a British-type worm reverser that is accessed through a sliding panel in the roof. There is a large fire box window for visual inspection of the gas ceramic burner.

A first thing that comes to mind in such a purchase is buying something of significant value from an unknown supplier direct from China. There were actually two different ads for A4 models in the *Gauge One Model Railway Association Newsletter and Journal*: One was for the 1930s version London & North Eastern Railway (LNER) Mallard with outside cylinders, and one for the British Rail (BR) version with full three-cylinder running gear from WuHu Bowande and an associate in England.

While new, Bowande had made several other Gauge One models and it seemed that Bowande was working with a firm in England on the project. I am unclear of the histories of the different relationships that are going on between retail and manufacturing



Complex gearing: *The Walschaert linkage and the underside cylinders of the Bowande WuHu A4.*

on the business end. But it appeared that there had been considerable interaction and back and forth in developing the A4 project between modelers in England and the manufacturer in China. This increased my confidence in the purchase.

Negotiation for me was by email with rapid responses from China; \$3995. Payment was through a bank transfer which added an additional expense. Shipping was air freight, so a box arrived within a week.

The locomotive comes in a beautiful lacquered wood case with

WuHu Bowande A4

- **Loco type:** London and North Eastern Railway A4, 4-6-2, 1935-1938. Cylinders: Three, 18½-inch diameter, 26-inch stroke. Drive wheels: Six-foot, eight-inches. Boiler pressure: 250 psi. Tractive effort: 35,455 pounds. Weight: 230,600 pounds.
- **Scale:** 1:32, 45mm gauge.
- **Length:** 30 inches (685mm).
- **Width:** 3⅞ inches (93mm).
- **Height:** Five inches (127mm).
- **Boiler:** Four flues.
- **Fuel:** Butane (ceramic burner).
- **Min. radius:** Nine-feet, 10 inches (three meters).
- **Water pumps:** Axle pump with bypass valve; tender water pump.
- **Cylinders:** Three piston.
- **Valve gear:** Walschaert.
- **Fittings:** Throttle, water-level gauge, pressure gauge, working whistle, sprung axles, sprung buffers.
- **Available models:** Green, blue, silver-gray.
- **MSRP:** \$3990.

stiff foam inside and separate cut outs for the locomotive and tender. One drawback is that I like to keep tender water hoses attached, so I cannot use the case as an easy carrier. Plus, the box is too pretty to carry around. Out of the box, the locomotive ran on the bench with slight coaxing on the driving wheels. No shelf queen here.

I do not have a track of my own, so my A4 only gets occasional running. On Staver Locomotive's great track in Oregon, the Bowande had trouble keeping steam pressure. The fire also looked a bit low.

A4 story

Beginning in the 1910s, Sir Nigel Gresley was the chief mechanical engineer for the Great Northern Railway, followed by a career with the London & North Eastern Railway (LNER). There was a need for increased motive power at the time, but British railways were limited on locomotive size based on the clearance for platforms and tunnels. Gresley was enamored with the K4 Pacific design from the United States, with a rear truck to support a large fire box. Scaled-down versions became the A1 through A3 of “Flying Scotsman” fame beginning in 1923.

By the mid-1930s, Gresley became interested in streamlining and was pushed by competition from other railways, most notably the London, Midland and Scottish Railway. Discussions became the basis for a new A4 design. Gresley was influenced by the streamlining designs of the Italian car designer Bugatti and the German railcar, the “Flying Hamburger.”

Bugatti contributed ideas for streamlining including the sloping front to help clear smoke away from the locomotive. When I visited the York Railway Museum a few years ago and climbed



A4 in the wild: *The LNER ‘Mallard’ at the National Rail Museum in York, England, at Railfest, June 2012. Photo by Mike Gill.*

into the cab of its A4, the back head had a beautiful clean layout with symmetric polished piping, a very Italian design.

Only four A4 locomotives were built in the first batch in 1935. Gresley noted that it was the Silver Jubilee of the monarchy; he thought it was a good idea to capitalize on this timing, so the locomotives were “Sliver Link,” “Quicksilver,” “Silver Fox” and “Silver King,” with silver-gray liveries. The second batch in 1937-1938 were blue and named for birds. The famous locomotive with the speed record was

of course “Mallard,” but other names were “Sea Gull,” “Guilemont” and the like.

After British railways nationalized in 1948, the ’37-’38 locomotives’ paint was switched to green, which stood for second-tier high speed passenger locomotives. (First tier were painted blue, like the British Rail’s “Duchess.”) Additional names were given commemorating the Commonwealth of Canada, South Africa, and Australia, and people such as Dwight Eisenhower and Sir Nigel Gresley.

— J.O.

Was it because of cool outside temperatures? On the next run back in Seattle, I (wrongly) tried heating the water in the tender surrounding the gas tank without much success.

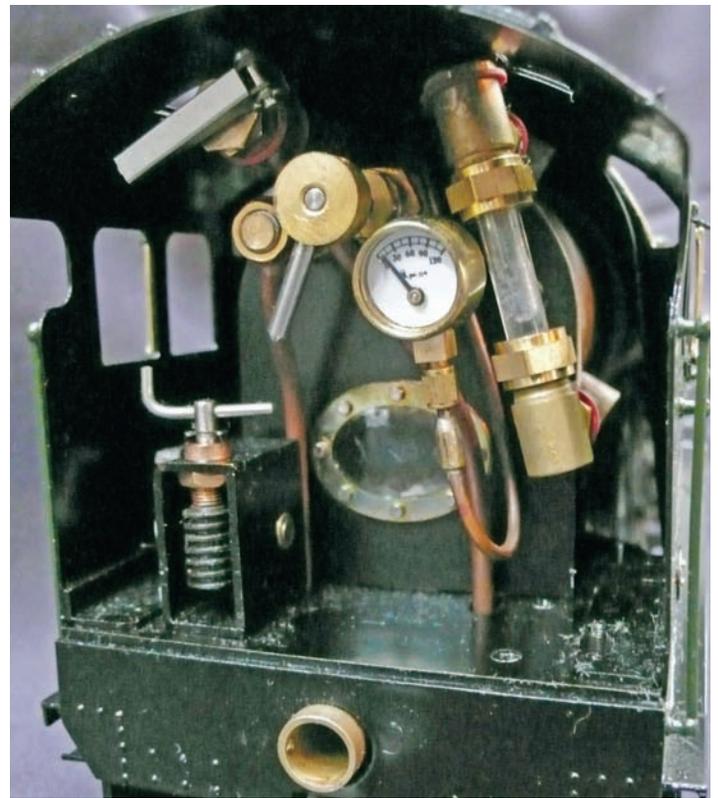
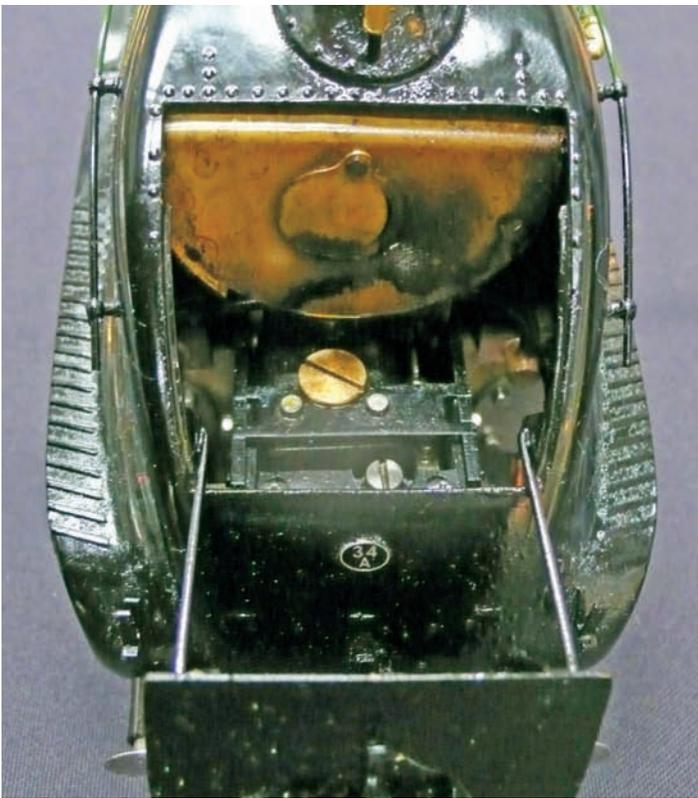
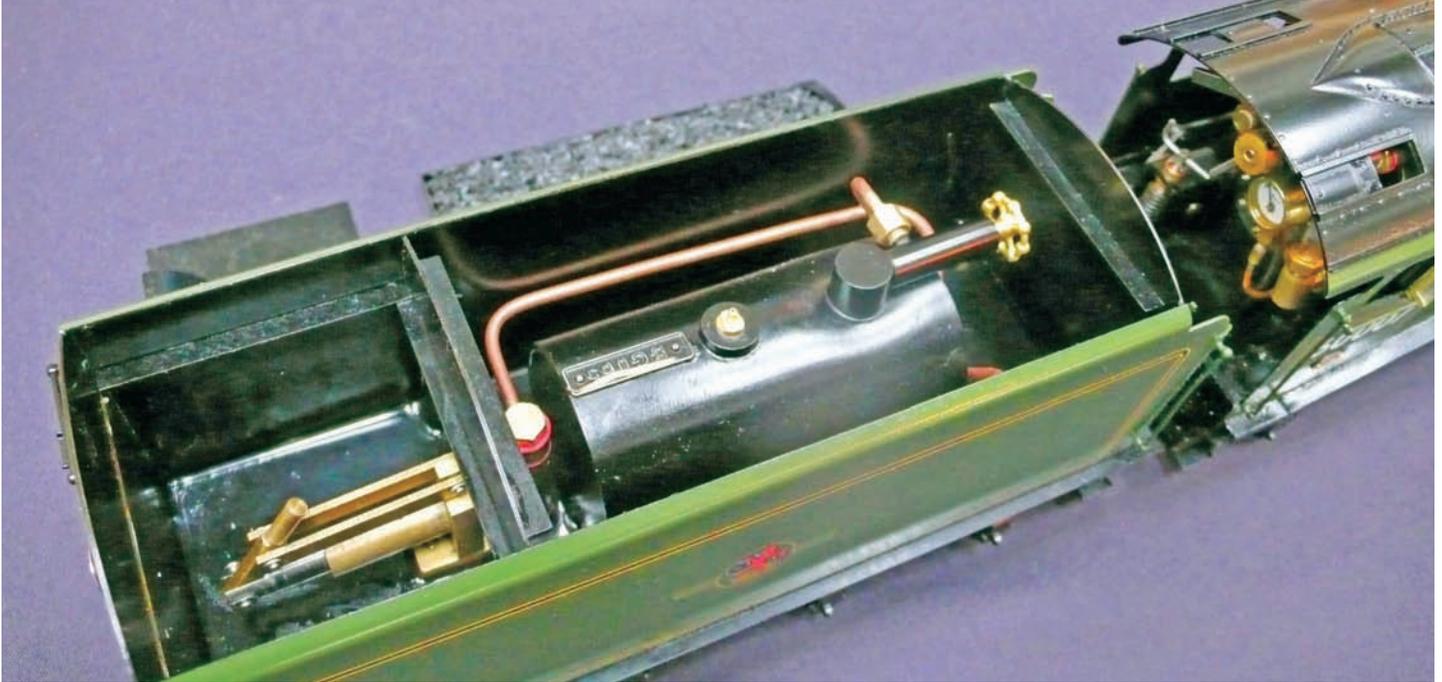
Back running on the bench, I was sure the fire was low. Simply cleaning the jet did nothing, but cleaning the whole jet system — hose, connector and jet — did wonders, a bright flame on the entire ceramic burner was seen through the smoke box window. I again got a 45-minute run.

Later out on the track of my local club, the Puget Sound Garden Railway Society, I started a good run with more than adequate pressure for 30 minutes with a six-car train. Then it seemed like the jet was

blocked again. Such blockage is a typical problem on some new gas-fired locomotives.

There are also some nice videos of a well-running Bowande A4 from Maine on the Internet. David Johnson took the shell off and readjusted the timing. This smoothed out the operation considerably as his central cylinder was off. Low speed performance was greatly enhanced. While he had it apart, he added radio control to the throttle, reverser and whistle. Ernie Noa was supportive to the changes. I have also heard from Bob Weltyk that he replaced a connecting rod, made the smoke box more air tight and re-timed a Bowande A4 for a friend and it is now a good runner.

So the overall quality of the Bowande A4 locomotive



Back, front, back: Top, a view of the inside of the WuHu Bowande A4's tender, with hand pump. Bottom left, a view inside the smoke box. Bottom right, the back head, with a window into the fire box.

and my experiences are positive. Besides the beautiful craftsmanship of the running gears, ceramic burner and fire box window, the boiler has four flues, there is a fully functional Walschaert valve gear and sprung axles. The axle pump is adequate for the locomotive.

The first production runs of these Bowande A4s were models of British Rail prototypes. I notice now on the company's web site and in recent ads that it is showing silver and blue liveries with full streamlining on the sides.

A drawback on the locomotive that I have is that

Bowande has moved the connectors on the locomotive for the tender water supply tubes to the bottom of the cab, pointed downward. This gives too tight a bend for the tubing; Bowande should add an L bend so the tubes can remain horizontal.

And while the literature claims a minimum radius of three meters (nine-feet, 10-inches) and it is true that the locomotive will function on our club's 12-foot radius, this is a racehorse locomotive and dreams of its next opportunity to run on the large radiuses at the Staver or Pete Comley layouts.

'Dora's' reverser gets hot; how to make using it

Painless

Text, photos and drawings by Marc Horovitz.

As compact and easy to run as “Dora” is, it does have one fault — it gets hot! With the reversing lever tucked up under the burner, singed knuckles are almost guaranteed. Thanks to a suggestion made by Graham Stowell to Dave Pinniger, here’s a solution that can be accomplished with hand tools, though a drill press is handy.

Disassembly

First, let’s take the engine apart. The object here is to strip the engine down to its deck plate, which must also be removed. The bodywork is first separated from the locomotive. This is easily done by removing the four hex-head screws that hold it in place. The arrows in **Photo 1** show you which ones to take out. I find it helpful to return the screws to the holes from whence they came to save me from later wondering what I did with them.

Before going on, look at the reversing lever on your engine. If it has a plastic or rubber sleeve on it (**Photo 2**), this needs to come off. I used an X-Acto brand knife to cut the sleeve off without taking anything else apart (**Photo 3**).

Before removing the boiler, unscrew the nut securing the gas pipe to the burner (**Photo 4**). From beneath the deck plate, unscrew the two nuts that hold the gas tank in place (**Photo 5**) and set the gas tank and gas line aside. Disconnect the steam line to the lubricator from the throttle (**Photo 6**). Now, by removing the four screws indicated by arrows in **Photo 7**, the boiler assembly will easily lift off. Set it aside.

Remove the nut from beneath the lubricator (**Photo 8**). Then, without unfastening the copper line to the steam motor, carefully raise the lubricator until it’s just above the deck plate. (**Photo 9**). What remains now are six hex-head screws, indicat-



Reverser: Improved control that slides for ‘Dora.’

ed by arrows in **Photo 10**, holding the deck plate to the frames. Take ’em out. Once these screws are out, slide the deck plate off the chassis. This will take a little twisty-turny to get it past the lubricator and the exhaust pipe but you can do it. After all, I did. Now we’re ready to tackle the job at hand.

The deck plate

Referring to **Figure 1**, you’ll see that all that needs doing to the deck plate is properly locating, drilling, and tapping two holes. To mark the holes’ locations, start by aligning the edge of a small square with the rear edge of the cutout for the reversing lever (**Photo 11**). Then, with a scribe, scribe a line on either side of the cutout (**Photo 12**). Don’t worry about scratching the paint — it will all be covered up later.

With your caliper, measure in from either edge 1.116-inch and scribe cross marks through your first

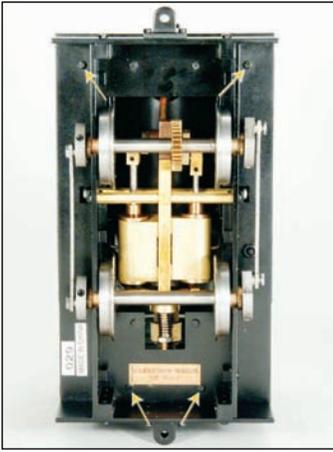


Photo 1



Photo 2



Photo 3

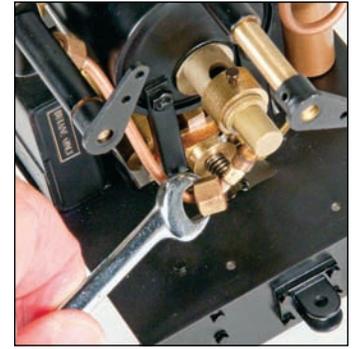


Photo 4

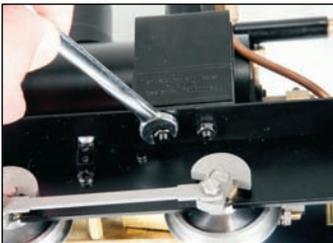


Photo 5



Photo 6

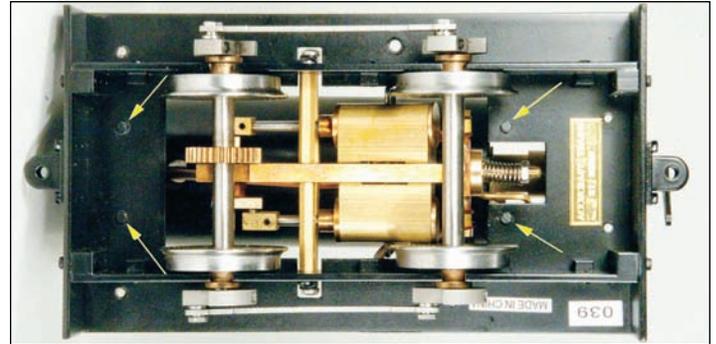


Photo 7

lines (**Photo 13**). Center-pop the cross hairs and drill the holes No. 51 (**Photo 14**). Tap each hole 2-56 (**Photo 15**). The deck plate is steel, so be careful while tapping. Now you're finished with the deck plate.

The slider

Next comes a little metal working. You'll need a piece of 1/16-inch-thick brass or steel, one-quarter-inch wide by 3.200-inch long. Steel is stronger; brass is easier to work. (I'm using steel, just because I had some in the bin.) Cover the top surface with layout dye or color it with a black marker.

The two slots will be made by drilling a hole at either end of each slot, then connecting them with a jeweler's saw. (If you have a milling machine, you could do them that way, of course.) According to **Figure 2**, lay out the No. 43 holes at either end of each slot. Also mark the center hole, which will be drilled No. 51 and tapped 2-56. Center pop all holes. Also, mark the fold lines on the ends. Your marked-out piece should look like **Photo 16**.

Drill the holes. I like to drill the small holes first, then the bigger ones (**Photo 17**), as that allows less room for error. When you're finished drilling, clean up the back side with a file so that it's nice and smooth. Your drilled piece should look like **Photo 18**.

Set your caliper to the distance between the edge of one of the slot-holes and the edge of the piece (**Photo 19**). Then, using the point of the caliper, draw the lines of the slots between the holes. Your piece should now look like **Photo 20**.

If you've never worked with a jeweler's saw, this will be a good exercise for you. There's not room here for a lot of instruction, so check out this YouTube tutorial. This lady knows her stuff: <http://www.youtube.com/watch?v=5w6hJLYtEXo>

To saw these slots, you'll need to thread the work piece onto the saw blade before you tighten the blade (**Photo 21**). Just remember that the teeth point toward the handle. When sawing, always support your work with the bench pin and keep the saw 90-degrees to the work (**Photo 22**). As you saw, don't saw on the line — saw to the inside of it. You can get as close to the line as you like, but don't go over it. We'll use a file later to clean up the sawn edges. Your sawn slots should look like **Photo 23**. As you can see, they are neither neat nor straight, but they don't have to be at this point.

You'll need to be able to slip a thin, flat file into the slots you've cut. I use needle files. Place the work piece in your vise, with one edge of the holes just touching the top edge of the vise jaws (**Photo 24**). Slip the file into a slot and go to work (**Photo 25**).

The idea is to file the slots level with the top of the vise jaws. Just work on the lower edges of the slots — never mind the upper for now. When the lower edges are smooth and even with the vise jaws, turn the piece over and file the other edges until they, too, are smooth and even. The shaft of a 2-56 screw should easily pass all the way along the slots. Your piece should end up looking something like **Photo 26**.

Now go ahead and tap the middle hole 2-56



Photo 8



Photo 9

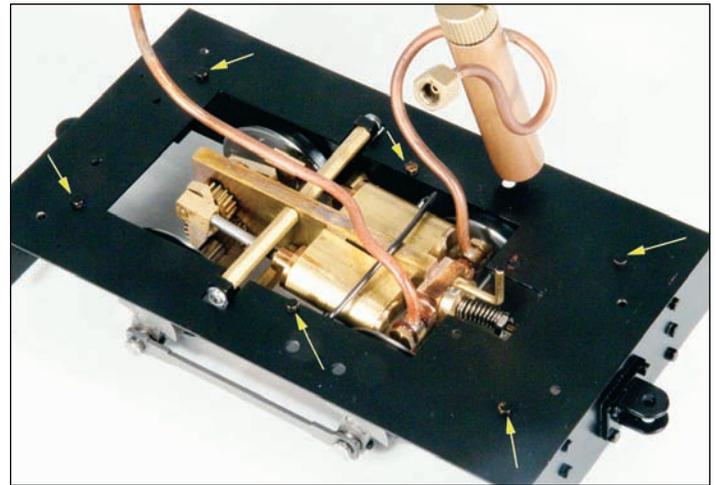


Photo 10

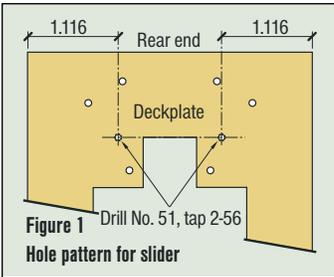


Figure 1
Hole pattern for slider



Photo 11

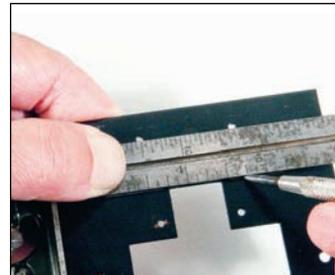


Photo 12

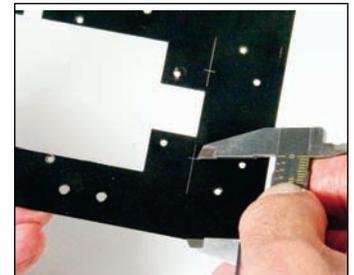


Photo 13

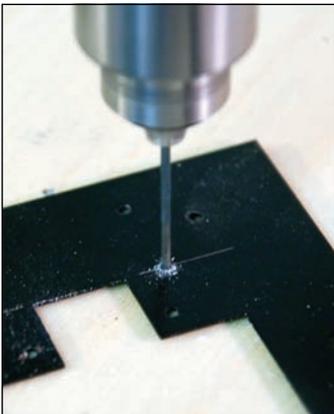


Photo 14

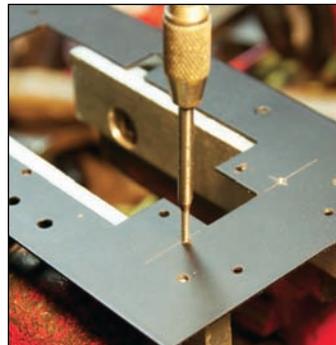


Photo 15

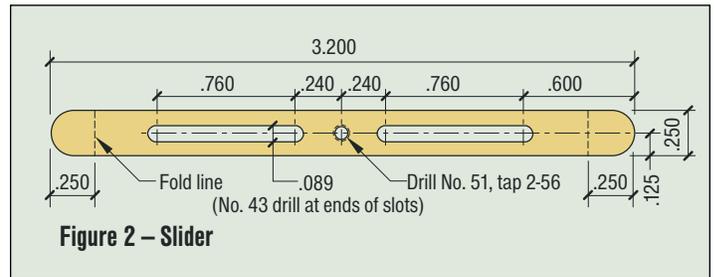


Figure 2

(Photo 27). This would also be a good time to remove the layout dye and clean up the piece. Make sure that you can still see the score lines for folding up the ends.

It's time to shape the ends. I've drawn the ends as semicircles but you can do anything you want: leave them as they are, round the corners, make semicircles, whatever. Do this with a file, your belt sander or your rotary tool (Dremel); I used a belt sander on mine. **Photo 28** shows the piece with shaped ends, prior to bending.

To bend up the ends, we'll hold the piece in the vise and whack it with a hammer. There are two options: hold the piece by the short end and whack the middle or hold the piece by the middle and whack the short end. Intuition tells us that if we hold the short end, we'll have more leverage when bending. However, because of the inherent weakness of the middle, now that the slots are in, I'm opting to hold

the work piece by the middle and bend the short end.

Grip the work in the vise, with the top of the jaws aligned with your fold mark (**Photo 29**). To get the bend started, use a piece of hardwood, angled against the metal at about 45-degrees, and start tapping it with the hammer (**Photo 30**). As the metal begins to bend, follow it around with the wood as you're tapping.

When it gets all the way around, take the wood away. You'll probably see that you don't have a really sharp fold. At this point, you can tap the work directly with your hammer, making a nice crease (**Photo 31**). Now turn the work in the vise and do the same with the other end. Your finished piece should look like **Photo 32**. Set it aside.

The actuator

If you got through the slider okay, the actuator will be a breeze (see **Figure 3**). You'll need another

Fixing the reversing lever

While I was testing the slider on my “Dora,” I found that the reversing lever had come loose from the rotary valve and was twisted to one side (**Photo A**). The lever is just a piece of brass rod, threaded on one end, bent to a Z shape, and screwed into the valve. It’s held in position with a tiny speck of soft solder, which, on my engine, let go. You may or may not experience this problem on your engine.

Since the engine was in pieces

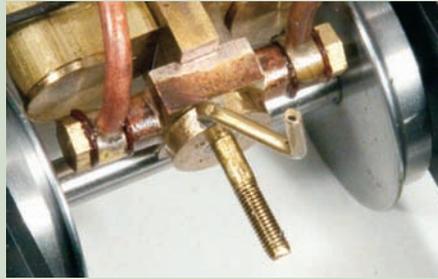


Photo A, left. Photo B, above.

anyway, it was easy to unscrew the nut that retains the spring, which presses the valve against the port block. I removed the valve, unscrewed the lever, gave them both a good cleaning,

then screwed the lever back in. I reheated it to melt the existing solder, and added a little more in the hope that it will hold better (**Photo B**). Stay tuned.

— M.H.



Photo 16



Photo 17

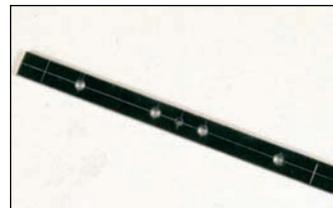


Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23

piece of 1/16-inch by one-quarter-inch metal, this time .520-inch long. Mark out the two drilling points and the fold line as you did the last piece. Drill both holes No. 43. Using the edge of the hole that is farthest from one end, mark the edges of the slot with your calipers in the same way that you did the slots in the slider piece (**Photo 33**).

We will cut the slot in the same way that we did those in the slider. However, since this piece is so small, I found it more convenient to grip it in the vise for sawing instead of using the bench pin (**Photo 34**). With the jeweler’s saw, make two cuts into the work toward the hole, staying inside the slot area. Then clean up the cut edges with a file in the vise like you did the last piece. Your work should look like **Photo 35**.

Remove the layout dye and grip the actuator in the vise with the slotted end sticking up (**Photo 36**). This protects the drilled hole. Using the same bending technique, bend the fingers over to 45-degrees

with a piece of wood and your hammer. The finished actuator should look like **Photo 37**.

Putting it all together

To assemble the reverser, you’ll need two 2-56 screws, each about one-quarter-inch long; one 2-56 screw, one-eighth-inch long; two 2-56 nuts; and four No. 2 washers. Use any kind of screws you like.

Start by screwing the actuator to the top of the slider with the short screw (**Photo 38**). The screw is actually there just to position and hold the actuator on the slider. I strongly suggest that you either epoxy or solder it in place. I soldered mine. If you do solder yours, just use soft solder — you don’t want to anneal the metal with the heat of silver soldering. If the screw protrudes through the bottom of the slider, file the screw off flush with the bottom, which needs to be nice and smooth.

Referring to **Figure 4**, assemble the slider to the

— Continued on Page 38

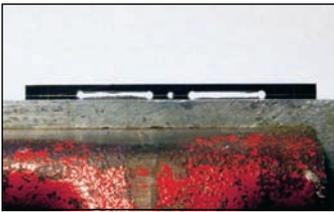


Photo 24



Photo 25



Photo 26



Photo 27



Photo 28



Photo 30



Photo 31



Photo 32



Photo 29



Photo 33

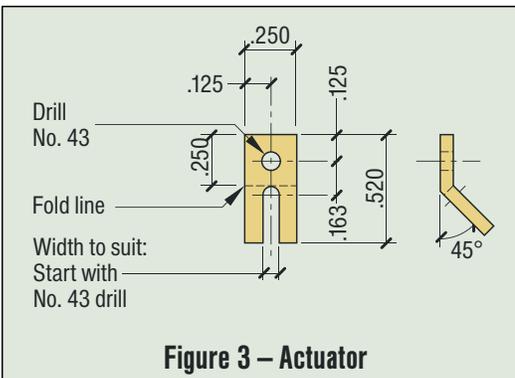


Figure 3 - Actuator



Photo 34



Photo 35



Photo 36

Figure 3



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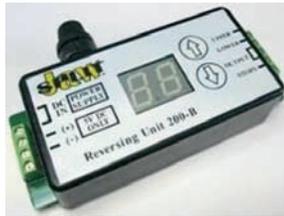
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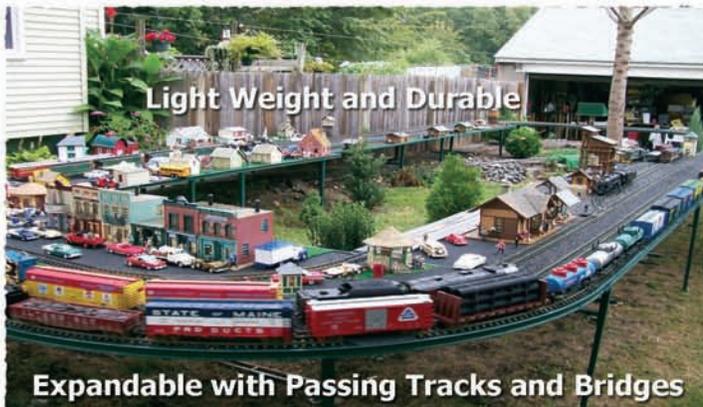
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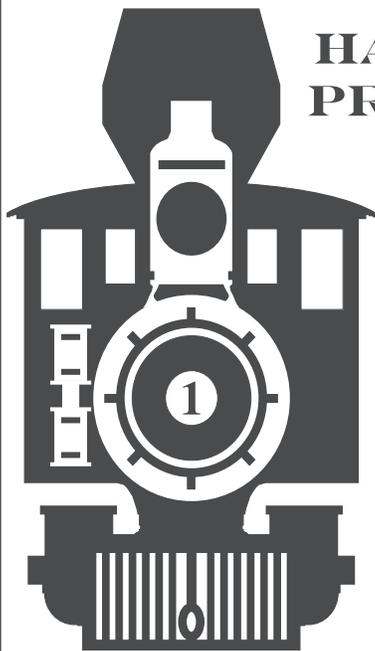
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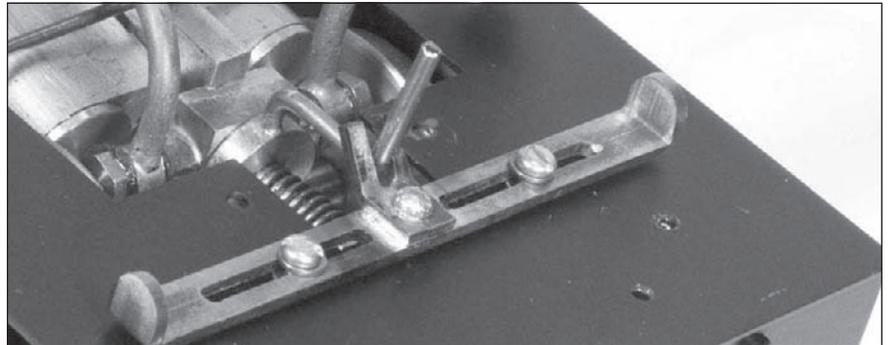
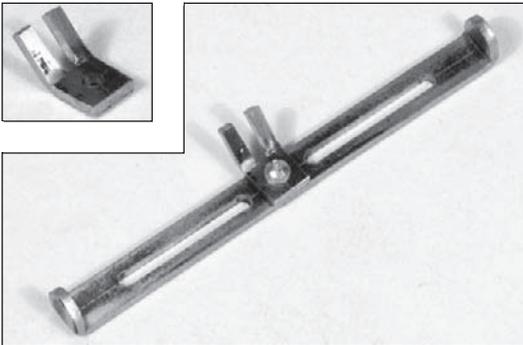
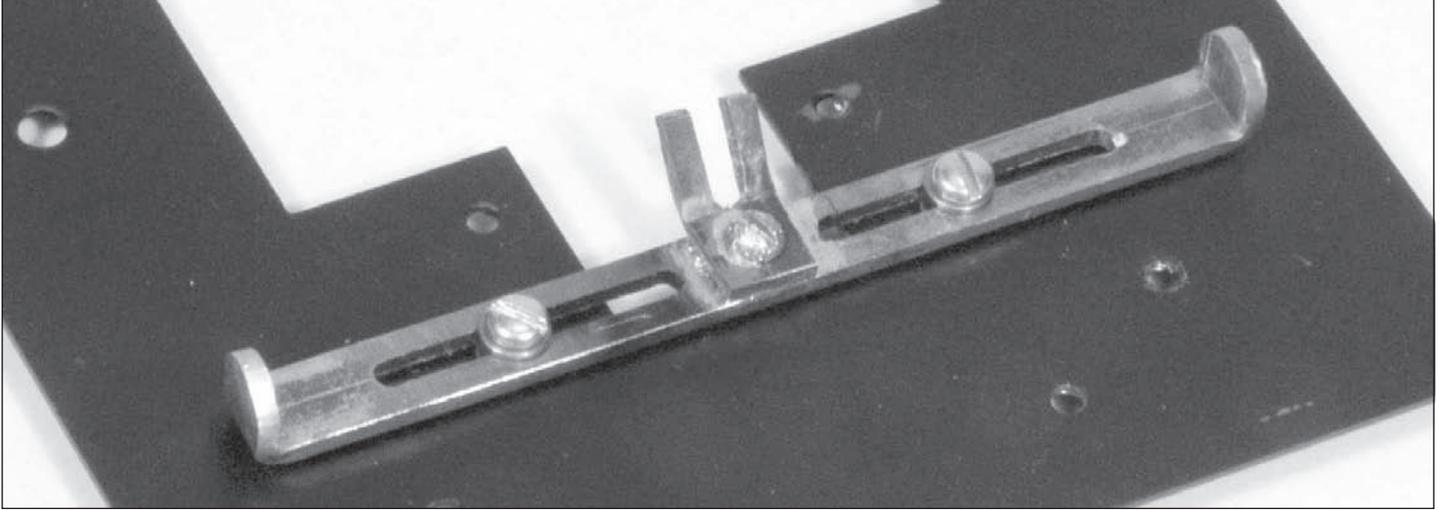
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Inset, Photo 37. Top, Photo 39. Left, Photo 38. Right, Photo 40.

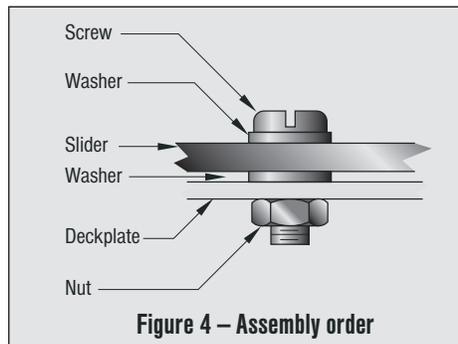
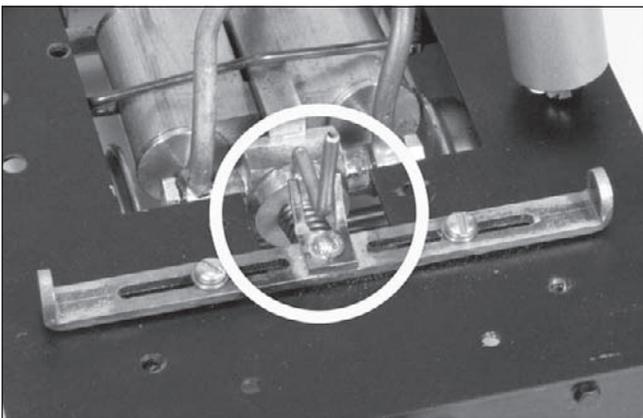


Figure 4 – Assembly order

Left, Photo 41. Middle, Figure 4. Right, Figure 5.

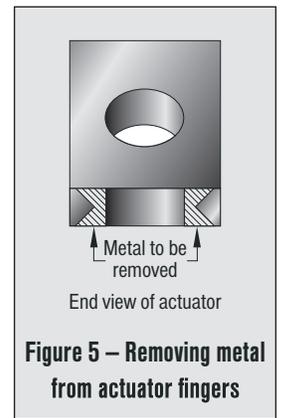


Figure 5 – Removing metal from actuator fingers

— *Continued from Page 34*

deck plate (**Photo 39**). The slider is sandwiched between two washers. The fingers of the actuator point forward. Screw one screw down tight, then back it off just enough for the slider to move smoothly. Cinch up a nut on the bottom of the screw to hold it in place. Do the same on the other side. The slider should move smoothly throughout its range, without slop.

Once the slider is in place, moving freely and smoothly, place the deck plate back on the chassis but don't screw it down (**Photo 40**) — just hold it in place with your fingers. Now here's the fiddly bit. If you've been careful about your work, you'll probably find that the slider doesn't function properly. It will move the reversing lever, but not as far as it needs to go in either direction. You'll need to file the insides of the actuator's fingers until full movement

is attained. This will entail some trial and error with, probably, several fittings before all is good. I ended up having to remove a fair bit of metal until I was satisfied, as you can see in **Photo 41**. While you're removing metal, take bevel cuts off the insides of the fingers, as shown in **Figure 5**. This will allow the maximum amount of metal to remain in the fingers.

The reversing lever need not seat tightly between the actuator fingers; indeed, it cannot. There must be a fair amount of play. The actuator only pushes the lever from one side to the other, it does not hold it in place.

At this point you have two options. You can remove the slider and paint it black before reassembling the loco or you can just put it all back together and start running, without the detriment of burned fingers every time you change direction.

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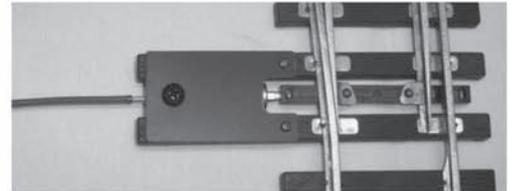
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THE CUPOLA VIEW

Aristo-Craft, Passard, Permann

While there's no plan to make this space a on-going obituary column, recent deaths of live steamers and a manufacturer shouldn't go unnoticed.

Aristo-Craft Toy Trains — provider of 1:29-scale rolling stock, 45mm track and at least two live-steam locomotives — said in October it would close its doors at the end of 2013 after 78 years in business. Longtime railroad engineer, enthusiastic collector of railroad memorabilia and small-scale live steamer David Passard of Van Nuys, Calif., died in late September at age 73. Garden railroad enthusiast Walt Permann, who started Custom Model Products Inc. to provide 1:32- and 1:20.3-scale hobbyists with accurate locomotives and rolling stock, died in late October at age 83.

Passard started his railroad career as a diesel fire-

'Cupola View' is written by Editor Dave Cole; you can contact him at dmcole@steamup.com or P.O. Box 719, Pacifica, Calif. 94044-0719.

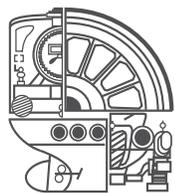
man with the Atchison, Topeka and Santa Fe in the late 1950s and was later an engineer with the Southern Pacific (and subsequently Union Pacific), retiring in 2004. He then switched full-time to his avocation: collecting railroad equipment. Passard's passion was described by *American Heritage* magazine in 2009: "The house, garage, yard and outbuildings were crammed with antique locomotive generators, lights, bulbs and books stockpiled over four decades."

Passard started his railroad collection while still a teen growing up in Antioch, Calif., his brother Jim Passard said. After graduating high school in the mid-1950s, David went to work for a can maker, across the street from a locomotive-laden scrap yard. Jim said that David would finish a shift at the can company and walk across the street and liberate locomotive fixtures like gauges and whistles.

Portions of David Passard's collection were used to restore Denver & Rio Grand Western Railroad's No. 315, according to *American Heritage*.

An avid live steamer, Passard was known for his Aster GS-4 in Southern Pacific "Daylight" livery. He advised Accucraft Trains Co. on developing a variety of small-scale live steamers. In addition, Passard was a longtime member of the Morse Telegraph Club of Southern California.

"Dave was full of stories, as well as opinions about



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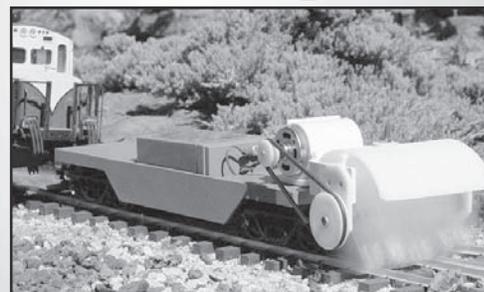
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why this or that engine wasn't running quite right," said fellow Southern California steamer Gary Woolard. "The thing was, give him a micrometer, a pair of needle-nose pliers and 15 minutes, and sure enough he'd have it running better than you thought it could."

Jim Passard has donated much of David's collection to Central California's San Luis Obispo Railroad Museum.

Permenn was a founding member of the Bay Area Garden Railway Society in 1988 and participated in the group's first major activity, the Fifth Annual National Garden Railway Convention in 1989. A successful businessman, Permenn founded his Control Master Products Inc. — a purveyor of electrical wire and cable — in 1968 and sold it 40 years later to a Wisconsin-based wire and cable company.

Permenn then switched focus to another CMP — his model-train business, Custom Model Products, which he had founded in 1964. Since "retiring" to Custom Model in 2008, Permenn had developed a large inventory of both Gauge One mainline and narrow-gauge rolling stock and live-steam locomotives.

But the business of model railroading remains perilous: Nat and Irwin Polk founded Polk's Model Craft Hobbies Inc. in New Jersey in 1933 and that business in turn created Aristo-Craft Toy Trains two years later. Though Aristo-Craft at first specialized in HO-scale trains, in the 1960s it shifted to 45mm



Live steamers, hobbyists: *Left, Walt Permenn. Photo by Carla Brand Breitner. Right, David Passard. Photo by Rick Parker.*

track and pioneered the use of 1:29 scale. The company marketed two live-steam locomotives: in 2005 it sold a 1:29-scale 2-8-2 Mikado and in 2009 it sold an 0-4-0 switcher with a slope-back tender.

In an Oct. 1, letter to customers, the Polk family said it was to shut the business' doors on Dec. 31, because of the "continued depression" that has "caused us to fall into debt that is unsustainable."

Lewis Polk, son of the company's founders, said he would "pay out of his own pocket" the costs of keeping alive the Aristo-Craft online customer-support forum indefinitely. The Crest Electronics business, which provides digital train control and maintenance, is being spun off and will continue.

Passard, Permenn and Aristo-Craft will all be missed. The small-scale, live steam hobby is better for their contributions.

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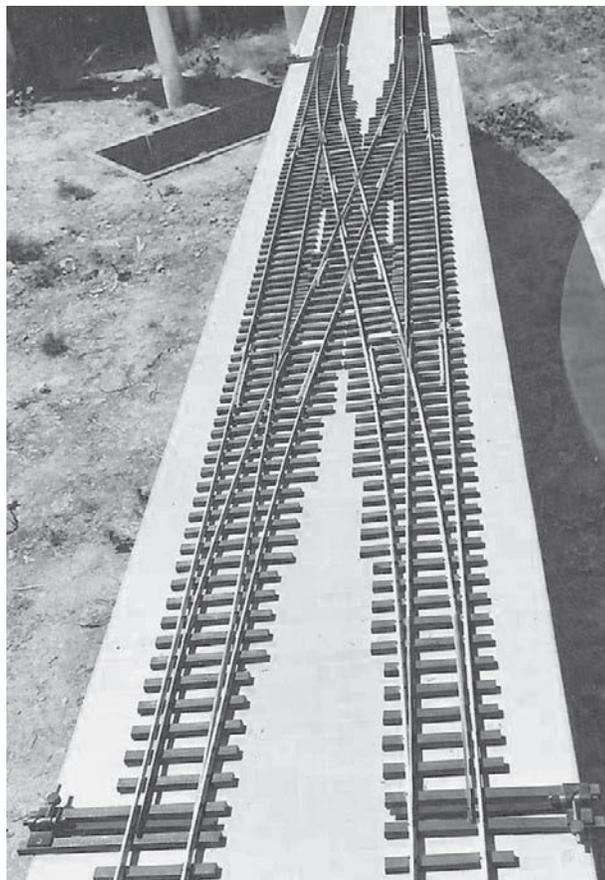
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TIMETABLE

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 and extracurricular activities. 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. Two tracks in G-gauge and O-gauge sponsored by the Pennsylvania Garden Railway Society, Warrior Run Loco Works, Aikenback Live Steamers and Wyoming Valley Live Steamers. Info: wrunloco@aol.com or call Clem O’Jevich (570) 735-5570.

March 21-22, 2014 — East Coast Large Scale Train Show, York Fairgrounds, York, Pa. Aikenback Live Steamers will set up 54-foot layout. Info: mike@aikenback.net.

April 11-13, 2014 — Cabin Fever Model Engineering Expo, Toyota Arena, York Fairgrounds, York, Pa. Gas and steam engines, hot air engines, steam boats, cars, live-steam Gauge One model trains. Info: <http://www.cabinfeverexpo.com>.

April 24-27, 2014 — Spring Steamup, Staver Locomotive, Portland, Ore. Info: <http://www.staverlocomotive.com>.

May 5-10, 2014 — National Garden Railway Convention, Embassy Suites USF, Tampa, Fla. Clinics, demonstrations, tours of local garden railways, deal-

er room. <http://on.fb.me/1dInmUg>

July 16-20, 2014 — 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. Lions Gate room reservations: (866) 258-5651. Info: <http://www.summersteamup.com>.

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

Regular steamups

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

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

On the Brink Live Steamers. Weekly Wednesday, and occasional weekend, greater Sacramento, Calif., steamups 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/>.

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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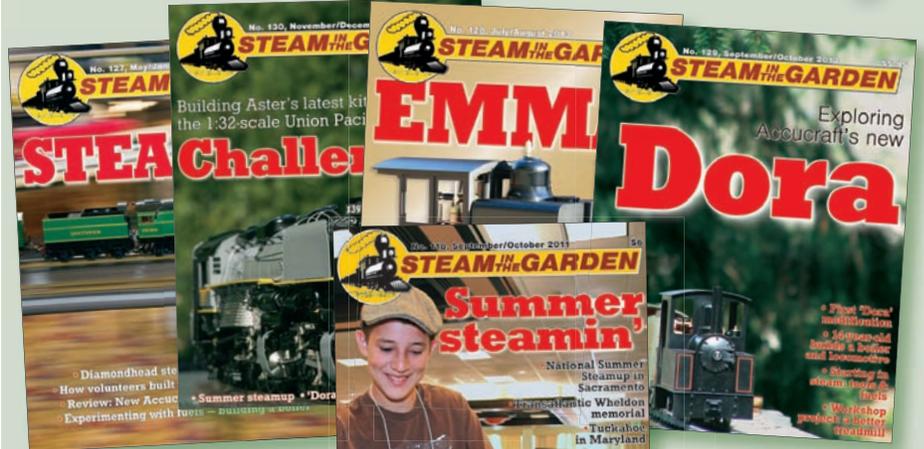
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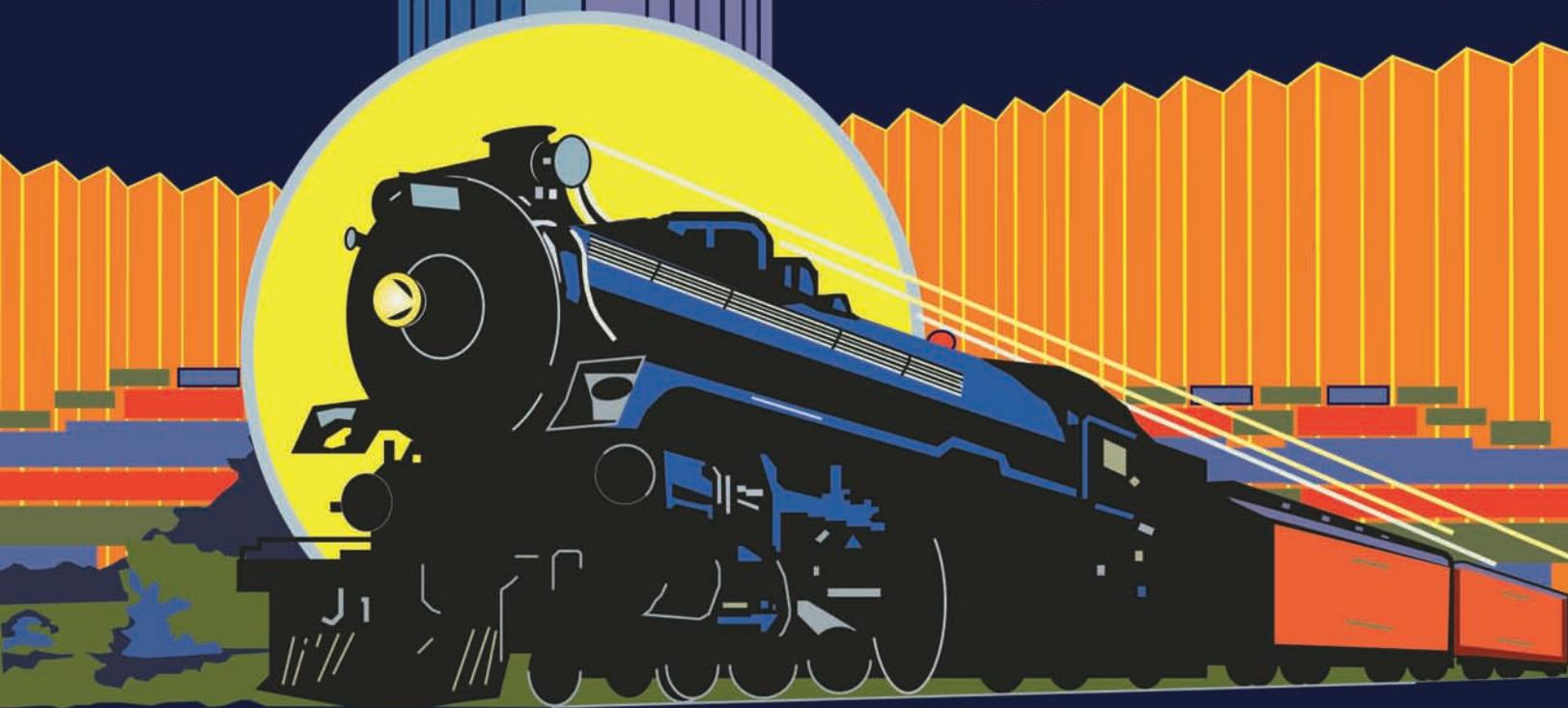
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SNCF 241P projected for late 2013 release

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. **Pilot model shown; production models subject to change.**

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 has been delayed to spring 2014. Limited production available by advance reservations. **Reservation deposits of \$1000 are required.**

Pilot model shown; production models subject to change.

See our web site for additional information.



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.

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D&RGW K-37 2-8-2

1:20.3 Scale
Butane Fired, Live Steam
50 units

The K-37s were originally built as standard gauge 2-8-0s by Baldwin in 1902. Ten of these engines were converted to narrow gauge between 1928 to 1930 by the D&RGW. New chassis were created, and the boilers and tenders were used over again on the narrow gauge versions. D&RGW numbered these engines 490 to 499, and most survive today on display. These engines were not as popular as the K-36s. The reason for this was the K-36 was easier on the crews and the track as well. However in model form the K-37 is the largest locomotive that can be built in 1:20.3 scale. The huge boiler allows runs of well over an hour without ever injecting water. This new Live Steam version is also cross ported so that valve gear is in prototypical position for forward and reverse. This large model is extremely powerful, but unlike the prototype is very easy and rewarding to run.

