



No. 145, May/June 2016

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Coal conversion

Changing an Accucraft C-16
from butane to solid fuel.

Part I of Rob Lenicheck's new series

- Adding two wheels and a bunker to 'Dora'
- Heading south for the winter: Diamondhead 2016
- Accucraft's new 1/32-scale passenger cars: a review
- Bill Allen builds an Algerian streamlined Garratt, Part II

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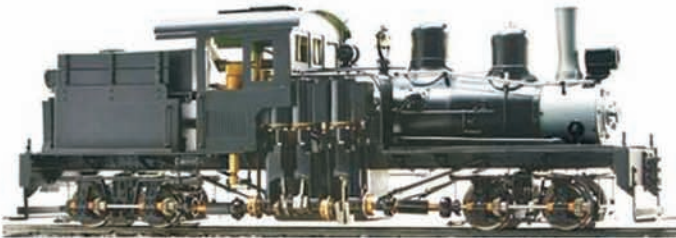
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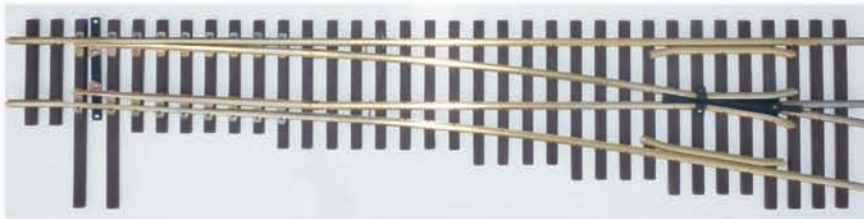
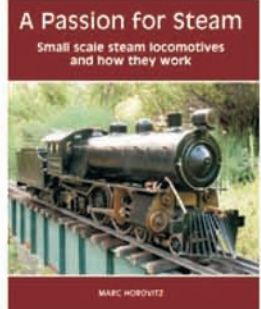


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Australia NSWGR C38

A 1:32-scale, butane-fired 12-wheeler

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The Australia New South Wales Government Railways C38 was designed in 1938 to haul express trains and to eliminate the need for double-heading. Built between 1943 and 1949, C38s were the only locomotive in the NSWGR to use the Pacific 4-6-2 wheel arrangement.

The model will be streamlined in green livery, have a ceramic burner, axle pump, see-through fire box door, bypass valve, tender pump, water gauge, whistle and reversing lever. Gauge One (45mm), 1:32-scale, butane fired.

U.S. PRR/LIRR G5



1:32-scale, Gauge 1 (45mm)
ceramic burner

U.S. CASEY JONES No. 382



1:32-scale, Gauge 1 (45mm)
ceramic burner

U.S. FALK



1:20.3-scale, Gauge 1 (45mm)
butane fired

U.S. PORTER



1:20.3-scale, Gauge 1 (45mm)
butane fired

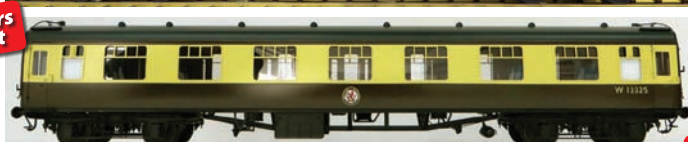
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C&O Hudson 490

Streamlined 1:32-scale, butane-fired 4-6-2

One of the most interesting Chesapeake & Ohio locomotives is the Class L-1 Hudson, the only streamlined conventional steam engine owned by the C&O. It has been compared both favorably and unfavorably to other examples of streamlining, but there is no argument that it is unique in the C&O experience. The second group of Hudson locomotives on the C&O was Class L-1 of 1947, following the Class L-2 of 1941/42 and preceding the Class L-2a of 1948. Unlike the L-2 and L-2a, which were built by

Baldwin, the L-1s were built by the railway in the Huntington shops, using as a basis the parts of the well known F-19 Pacifics built by Alco-Richmond in 1926.



German BR64 295

The model will be 1:32 scale, Gauge One (45mm), butane fired with a ceramic burner, bypass valve, Walschaert valve gear, hand pump, axle pump, working whistle. Limited to 60 sets worldwide, with 35 sets now sold, meaning just 25 are left!



GERMAN BR41 — TWO VERSIONS

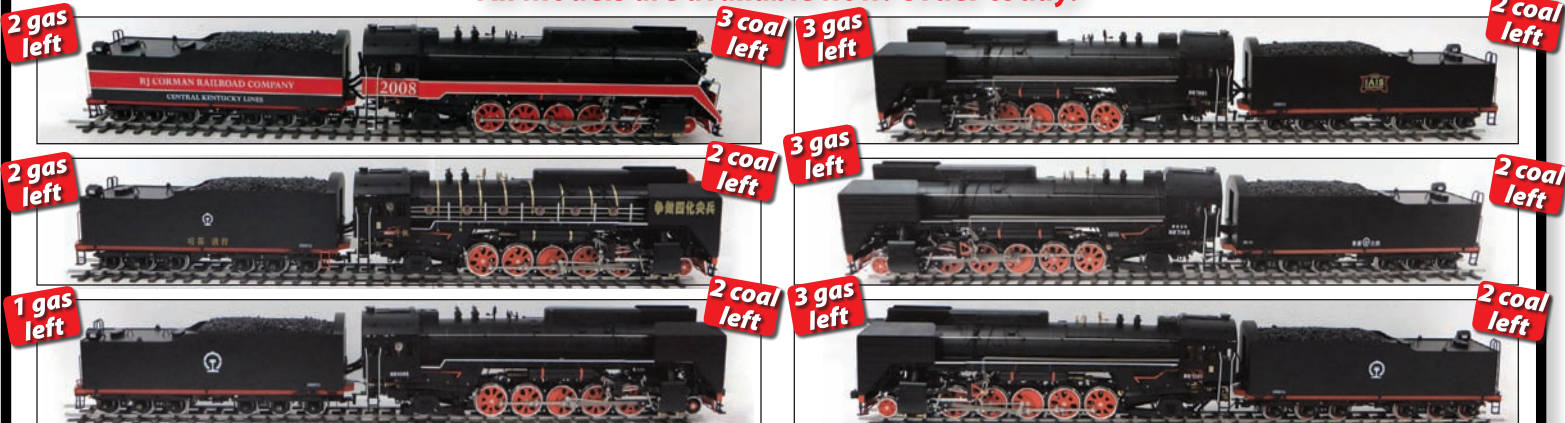


Big deflector (upper) or small deflector (lower). 2-8-2 locomotive, 1:32-scale, Gauge 1 (45mm), butane fired, ceramic burner. With R/C or R/C-ready. Walschaert valve gear; fully sprung axles, sprung buffers. 29½-inches long, 5½-inches tall, 3¾-inches wide (750mm x 142mm x 97mm). British pressure gauge, water gauge, working whistle.

China's 'Big Boy' — live steam model 'QianJin'

Limited to 50 sets released worldwide — 35 sets gas fired, 15 sets coal fired

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The 1:32-scale models come in both gas- and coal-fired versions and the butane locomotive uses a ceramic burner. The boiler holds 22 ounces (650ml) of water

and the engine runs for 70 minutes. Available numbers include 2008/7040, 6800, 6988, 7081, 7143 and 7207. Comes with a working whistle and headlight.

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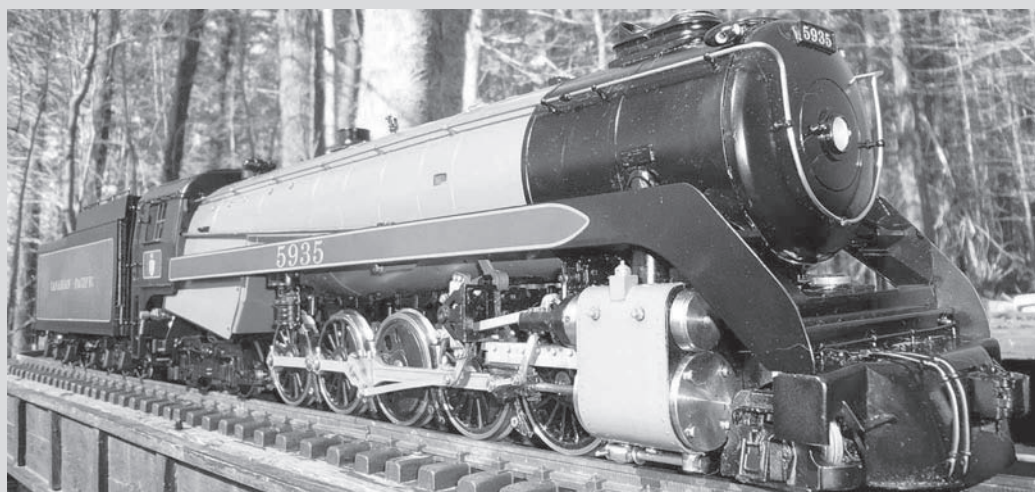
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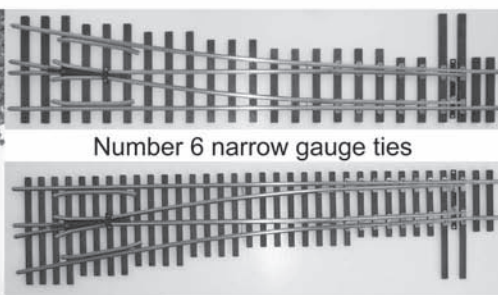
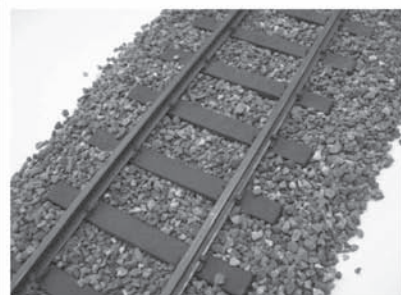
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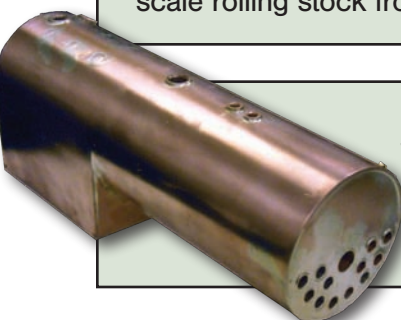
STEAM^{IN}THE GARDEN

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

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Latest waybill.

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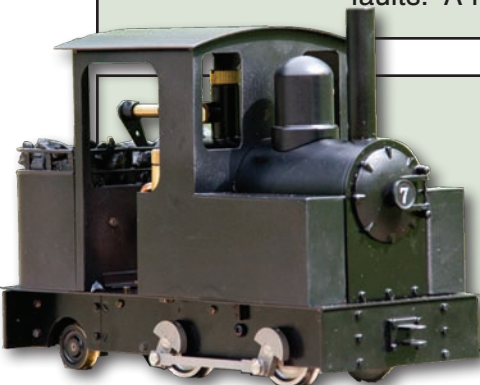
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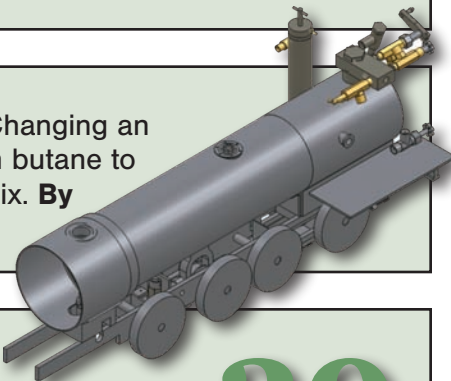


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<http://www.steamup.com/>

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LATEST WAYBILL

Aster adds locomotive trailing car

To accompany its latest 1:32-scale live steam locomotive — the Swiss Railways E3/3 “Tigerli” — Aster Hobby Co. Inc. of Yokohama, Japan, and Aster Hobby Europa in March announced a new “utility vehicle,” which will provide the engine with additional alcohol and water.

The trailing car is styled to look like a traditional Swiss box car (or “cargo wagon”), and will hold 300cc of water (10.1 fluid ounces) and 125cc of alcohol (4.2 fluid ounces). The car is 250mm long, 90mm wide and 120mm tall (9⁷/₈-inches long, 3¹/₂-inches wide and 4³/₄-inches tall) and weighs in dry at 1Kg (2.2 pounds). The wheels will have 30mm diameter (a little less than 1¹/₄ inches).

The “Tigerli” is a model of a Swiss Railways standard-gauge switch engine (its Whyte notation would be 0-6-0 but the Swiss call it an E3/3). The model, announced last summer, will be 272.5mm long, 94mm wide and 124mm tall (10³/₄-inches by 3³/₄-inches by 4⁷/₈-inches) and includes an axle-driven pump, Walschaert valve gear, a C-type boiler with five smoke tubes and a Roscoe-type displacement lubricator. The model will navigate a 1.5m radius (59-inches) and have a water glass, pressure gauge and blower valve.

Aster Hobby is creating the model on behalf of Aster Europa of Wohlenschwil, Switzerland. Aster Hobby is on the Web at <http://www.asterhobby.com/>, while Aster Europa is at <http://www.aster>



Tiger tank: Aster's utility vehicle provides the “Tigerli” with alcohol and water storage.

europa.com/. The U.S. distributor, Aster Hobby USA LLC, is at <http://asterhobbyusa.com/> and at (864) 587-7999.

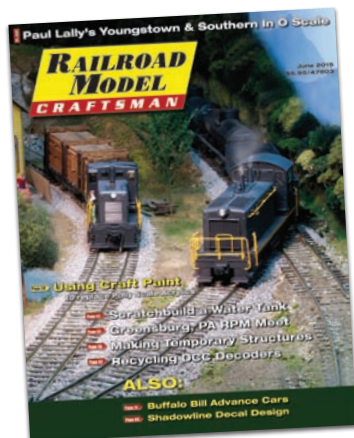
Live steam at narrow-gauge convention

Modelers at the National Narrow Gauge Convention in Maine next September will get to experience small-scale live steam, courtesy of the Owens Valley Live Steamers and narrow-gauge steamers.

The group will bring its 26-foot by 54-foot, double-tracked Gauge One layout to the event, to be held Sept. 7-10 in Augusta, Maine, for demonstrations and fun running. The layout, built with rail from Llagas Creek Railways of Claysville, Pa., sports 11-foot radius curves with nine-inch centers and has not only sidings but also double-track yards inside each end of the layout.

Steamers wishing to use the Owens Valley lay-

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out will need to be registered at the Narrow Gauge convention (credentials will be required) and may only use narrow-gauge equipment.

The Narrow Gauge Convention, in its 36th installment, will be held at the Augusta Civic Center and is co-sponsored by the Seacoast Division of the National Model Railroad Association. In Maine, the home of the two-foot narrow gauge railroads, the convention will feature "operating slim-gauge prototypes," as well as clinics on narrow-gauge historic railroads ("from coast-to-coast"). The "blue-ribbon lineup of speakers" will include Dave Frary, Bob Hayden, Peter Barney, Wes Ewell and others.

Local tours of prototype railroads and model-railroad layouts will also be highlighted at the convention, along with on-site modular layouts in a wide variety of scales and gauges (but all narrow gauge). The convention will also feature a manufacturers' room.

The 36th Annual National Narrow Gauge Convention is on the Web at <http://www.nngc2016.org/>. The Owens Valley steam-layout organizers are Charles Mote (cs mote@mindspring.com) and Bruce Gathman (shaygearhead@bellsouth.net).



J-class: Accucraft's 1:32-scale model of Norfolk & Western's No. 611.

Accucraft sets steamer delivery dates

Locomotive and steam-train manufacturer Accucraft Trains said in February and March that it anticipates deliveries of its Norfolk & Western J-class No. 611 and its Pennsylvania Railroad E-6 class in late spring or early summer.

The Union City, Calif., company said that it anticipates receiving the N&W locomotive in May or June, while the Pennsy engine is expected in June or July.

No. 611, developed in conjunction with the N&W Historical Society and the Virginia Museum of Transportation's Fire Up 611 project, models a streamlined 4-8-4 that ran in Virginia in the 1940s, 1950s and early 1960s. Accucraft says of No. 611, "The class quickly gained a reputation for hauling heavy trains at high speeds with an enviable record of reliability, often accumulating 15,000 miles per month."



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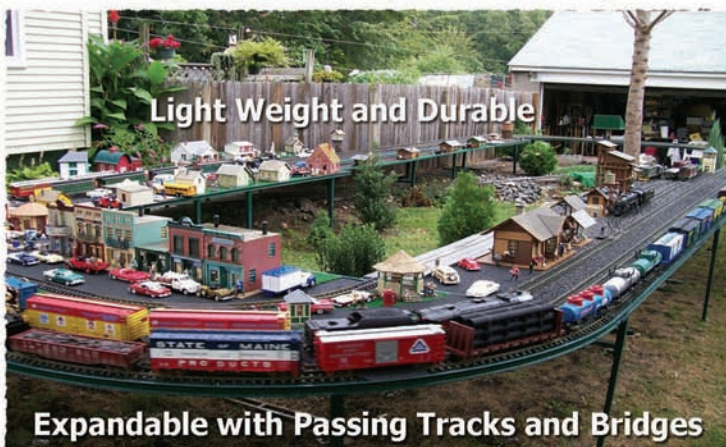
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Pennsy E-6: Pilot model of Accucraft's new 4-4-2, without paint.

The 1:32-scale model will come equipped for either alcohol or butane firing and will include two cylinders, 60 psi working pressure, two safety valves, a lubricator, a water-level gauge, a blow-down valve, throttle valve, axle-driven water pump with bypass valve and a hand operated water pump in the tender.

Both models of the Accucraft No. 611 will retail for \$5950 and the company said in the late winter it was still taking reservations for the locomotive.

The Pennsy E-6 prototype was built between 1910-1914 and featured "a large and free-steaming boiler," Accucraft said. The 4-4-2 Atlantic-type locomotive was used well into the 1950s, especially on commuter seaside routes in New Jersey.

Accucraft's 1:32-scale model of the PRR locomotive will include a safety valve, pressure gauge, water glass, lubricator, blow-down valve, axle water pump with bypass valve and a tender hand-water pump. It will operate at 60 psi.

The model-train maker said the E-6 was "developed with the assistance" of David Fletcher, Jerry Hyde and Jason Kovac.

The Pennsy E-6 model will also be available in both alcohol and butane (as well as electric) and will have either green-lined livery (number 1974) or Brunswick green livery (number 460) and retail for \$3200. Accucraft said the company is requiring \$200 reservations for this locomotive.

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

Steamer hobby store destroyed by fire

An accidental electrical fire on Feb. 18 destroyed Warrior Run Locomotive Works in Nanticoke, Pa. Owner Clem O'Jevich Jr. said he did not plan to rebuild.



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"It's like everything's a total loss," he told a local TV station. "There's nothing you can salvage — very, very, very little."

The hobby store, which sold not only small-scale live steam engines and accessories but also slot cars, had operated for decades. O'Jevich's family had owned the three-story building on South Market Street and had run businesses in the city for more than 70 years.

O'Jevich told the TV station that he had a "unique business, that nobody else kind of does, but it's all gone."

Citing his age, O'Jevich said, "At 74, I don't think I want to restart again, you know? This is basically my hobby. I came here every day because we had a business on this block since 1945 and you come here every day for your whole life and what do you do?"

The fire, which was described as having "heavy flames," took 30 minutes to bring under control. It started around 5:30 p.m., shortly after O'Jevich had closed up for the day. Firefighters from three jurisdictions fought the conflagration and no one was injured.

O'Jevich had set up his Warrior Run Locomotive Works' portable layout annually at the Presidents' Day Weekend steamup in Scranton, Pa., as well as the East Coast Large Scale Train Show in York, Pa.



Reefers: Great American Locomotion's new cars.

1:32-scale rolling stock from GAL

Refrigerator cars in 1:32-scale — marked as New York Central or Railway Express Agency — are being offered by Great American Locomotion of Pitman, N.J., the company said in March. The models of the 50-foot reefers are designed as kits but will also be offered in ready-to-run versions. The reefers mark the introduction of the company's new "Morning Express" series.

The rolling stock projects include all laser-cut and etched Styrene parts, express trucks, brass bearings and "36-inch" steel wheels supplied by Sierra Valley Enterprises of Merced, Calif.

In addition to the three 50-foot reefers, Great

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Got milk? GAL Line's 50-foot New York Central car.

American Locomotion (GAL Line) said it was also developing these other "Morning Express" cars: a 53-foot milk tank flat car with tanks, 40-foot Pennsylvania Railroad X28 and X29 express box cars, a 60-foot Rutland milk car (No. 337), a 60-foot New York Central baggage car, a 70-foot heavyweight passenger coach and a 70-foot heavyweight baggage car.

GAL Line's Alan Friedland said in a statement that he developed a new way to design heavyweight car roofs, which he says is "a modular system that will allow for different length cars with differing end designs. I currently have a library of around six different end designs."

Friedland added, "The roof components have been drawn in 3D [computer-assisted design] and are currently being printed on an industrial printer."

The GAL Line will sell the cars as kits, while Triple R Services LLC of Mount Holly, N.J., will sell the cars as ready to run. GAL Line has its web site at <http://www.thegalline.com>, while Triple R is on the Web at <http://www.realsteamservices.com> and by phone at (609) 280-8744.

Train Department tipplers, Regner 0-4-0

A new line of 1:13.7-scale ore tipper cars is now available from The Train Department, the company said in March. The cars, modeled on Orenstein & Koppel prewar designs, "were built and run around the world," the dealer said.

The ready-to-run cars (also known as "skip wagons") are all brass etched with brass-cast journals. The wheels are computer-numeric control turned and drilled, the Hazlet, N.J.-based Train Department said, "to follow the correct profile." They're scaled to 14-inches and are available in 45mm gauge or the optional 32mm gauge. They "match well with both 7/8ths-inch scale and 16mm locomotives," the company said.

In addition to the tipper cars, The Train Department also said it has become the exclusive sales agent for Bronson Tate Architecture Models' cab and pilot kits. The Grandview, Mo., maker of kits to enhance various 1:20.3-scale locomotives, including

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Tipper: 1:13.7-scale skip wagon in 45mm or 32mm.

Accucraft's "Ruby," says it continues to accept commissions for custom work.

Lastly, The Train Department said it is also accepting special orders for the Regner "Betsy" kit, a 1:22.5-scale 0-4-0 butane-fired 45mm gauge locomotive.

With tender, "Betsy" is almost 16-inches long, four-inches wide and 6½-inches tall, weighing in at 7¾ pounds. The boiler holds five ounces (150ml) and has a 20-plus-minute run time. The kit includes a Goodall valve and pressure gauge and is designed to have radio control added.

The "Betsy" will retail for \$1990, plus shipping, and



Regner 0-4-0: 'Betsy' kit is a butane-fired 1:22.5 scale locomotive in 45mm gauge.

as it's a special order, will take time for delivery. The Train Department is on the Web at <http://www.thetraindepartment.com> or by phone at (732) 770-9625.

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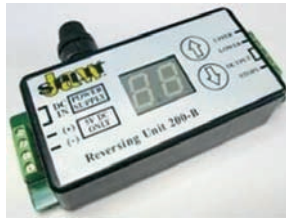
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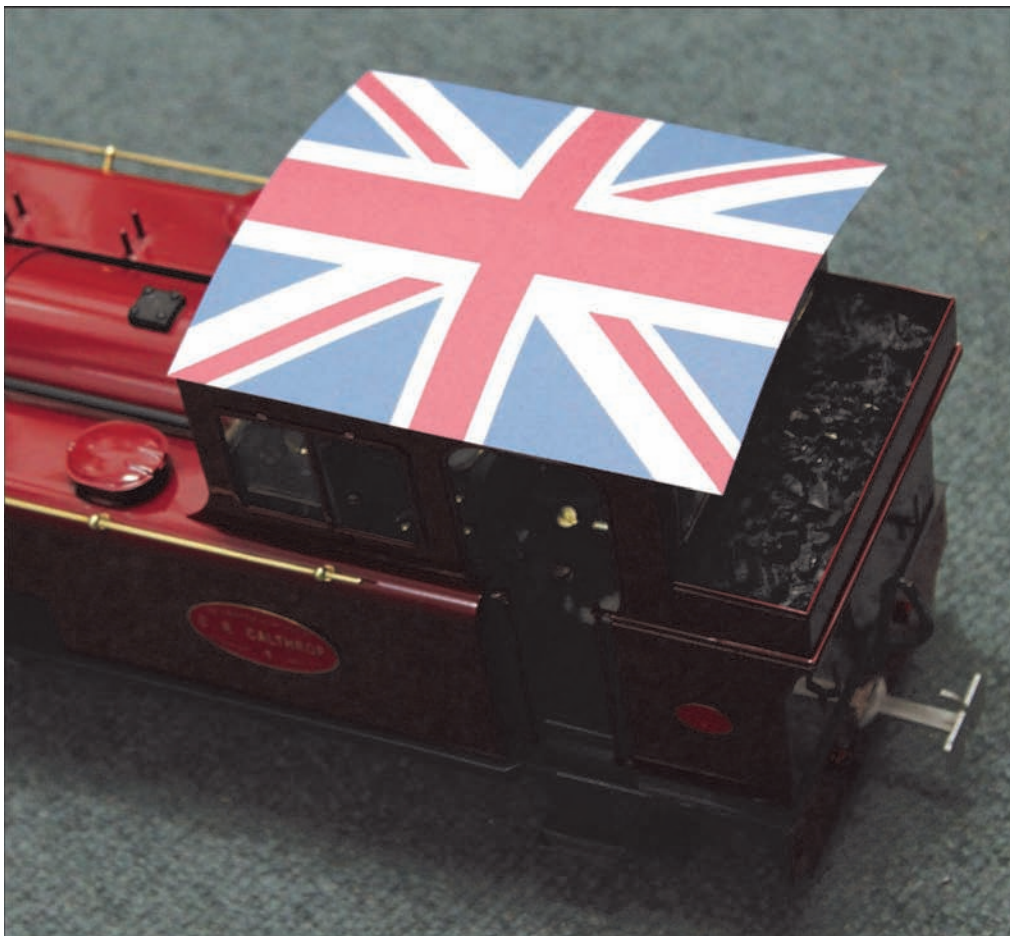
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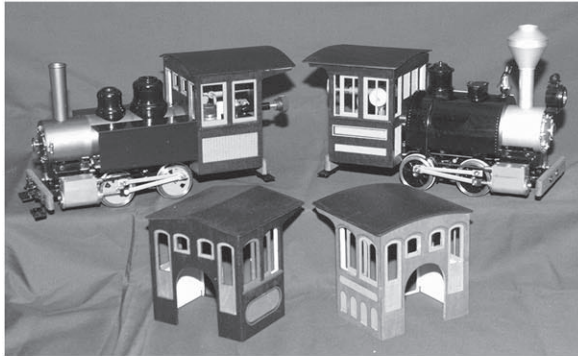
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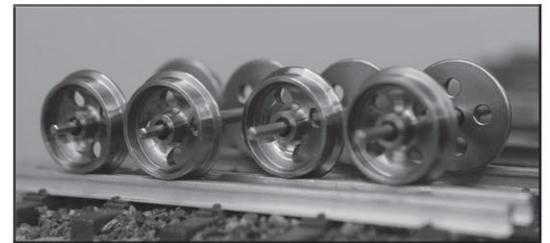
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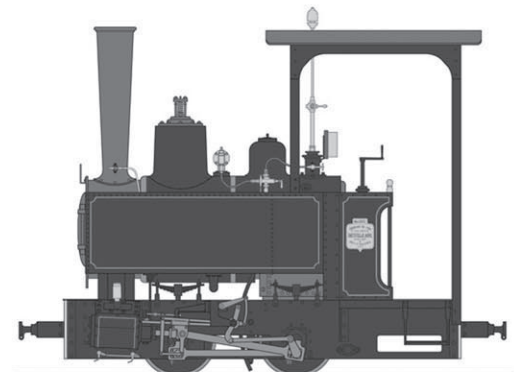
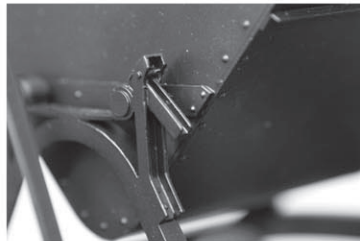


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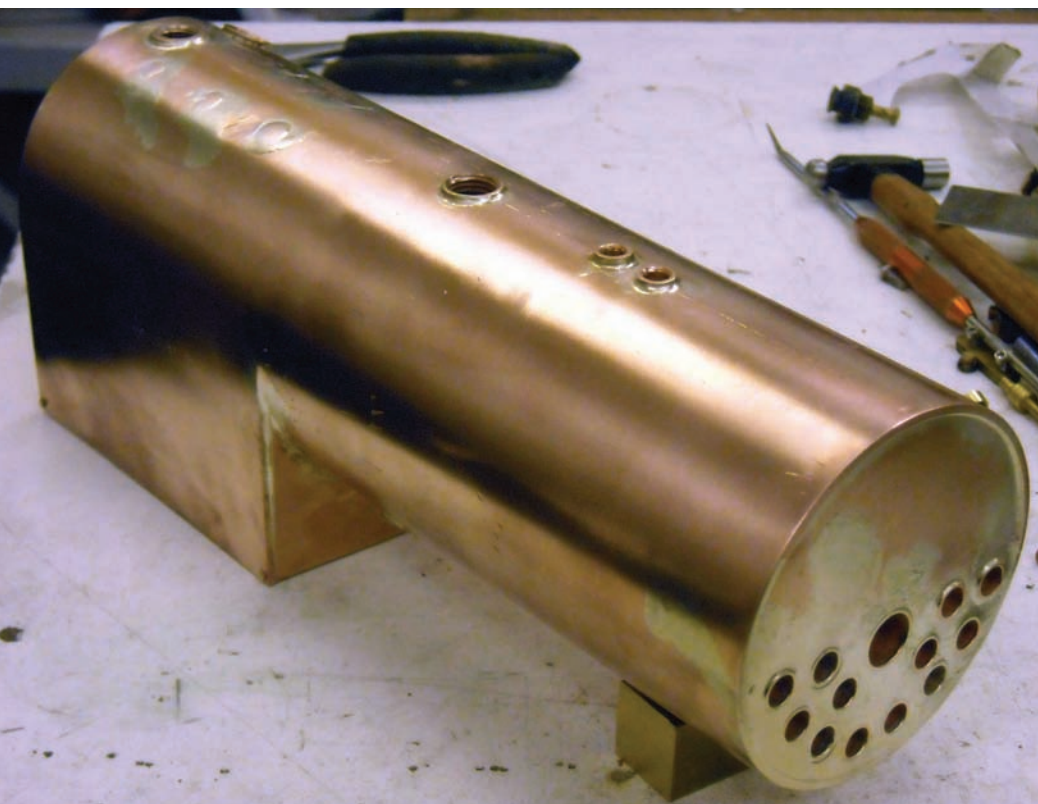
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Building a 1:32-scale engine from Algerian/French prototype

Streamlined GARRATT

Text and photos by Bill Allen



Boiler: Based on a three-inch copper pipe, with soldered tubes.

One of the main advantages of a Garratt is that the boiler sits on a separate frame between the two engine chassis. The frame is pivoted to the two chassis and because it has no wheels attached, it can be wide. With the wide frame and no wheels underneath the boiler, a wide and deep fire box may be used, which allows the boiler to produce generous amounts of steam.

The prototype had a short squat boiler and smoke box, which accounts for the side-by-side exhausts. I kept my measurements true to scale, which worked out great for my ceramic burner design, which I have used on several engines. The ceramic burner creates a lot of heat and is whisper quiet (**Figure 1**).

Boiler construction

A bit of luck came into play when I did my drawing as the boiler diameter came out to the exact measurement of a three-inch pipe, which made the job much easier. I have done ceramic burners with wet and dry fire boxes and it seems that the dry fire box actually heats better. I guess the reason for that is that a dry fire box allows for a larger crown sheet and more tubes. The ceramic burner produces a tremendous amount of radiant heat which is directed mainly at the crown sheet. Because copper transmits heat rapidly, the dry fire box sides heat the boiler water and stay close to the boiler water temperature.

Starting with the three-inch copper pipe, I cut a parallel slit the length of the fire box on the table saw. Then on the band saw, I cut a perpendicular cut at the end of the first cut to the midpoint of the



Photo 34



Photo 36



Photo 38

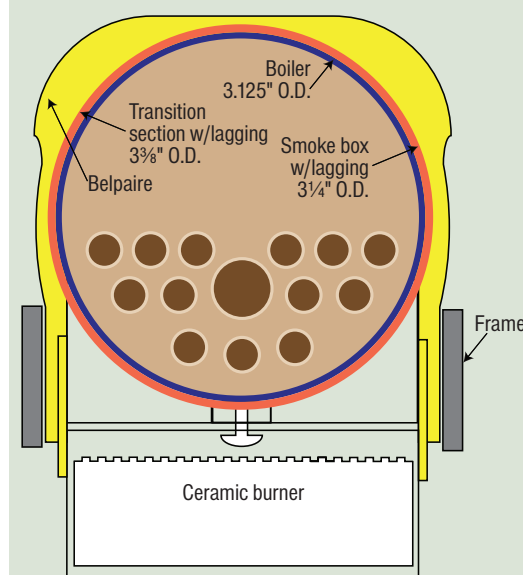


Figure 1

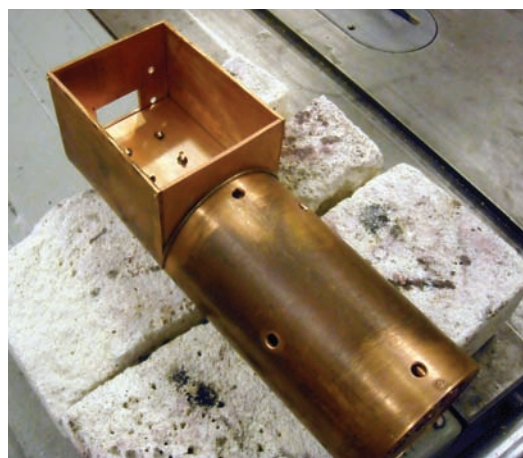


Photo 39

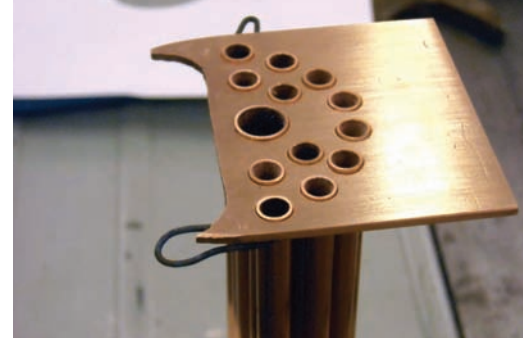


Photo 35



Photo 37



Photo 40

pipe's circumference. I then anneal the pipe where the cuts were made and bend the cut flaps down to make the fire box sides (**Photo 34**). The sides are usually longer than needed and can be cut to size on a table saw or by hand.

I then take a copy of my drawing and paste it on my front and rear (at the fire box) tube sheets. I pin punch the tube hole centers through the drawing copy and then drill them out with a step drill.

The rear tube sheet is the first to solder. The tubes are set in place into both tube sheets to keep them aligned during soldering (**Photo 35**). The solder job can be checked by inspecting each tube on the back side where solder should have flowed through completely around the tube. Any misses should be filled from the back at this time (**Photo 36**).

One of the hardest parts of boiler soldering is holding everything in place. You shouldn't use brass in a boiler — only copper or bronze is acceptable. In the dry fire box, brass screws are fine (**Photo 37**) but everywhere else I use copper. Electrical copper ground wire works fine to make pins or rivets which can be hit with the solder during the process to make them steam tight (**Photo 38**).

Photo 39 shows the boiler ready for soldering. Bronze bushings are turned on the lathe. I use threads commonly used on our engines — 5mm for pop offs, 1/4-28 for the mountings and fittings, and 3/8-24 for the dome and filler holes. The back head, front tube sheet and crown sheet are held in place with copper pins. With the tubes in both tube sheets, the structure is fairly stable.

One-thirty-second-inch silver solder can be purchased from welding supply houses. I wrap it around stays and bushings to make rings and lay lengths of it in joints to be soldered. The solder will melt when the base metal gets to the right temperature and it keeps the job from getting too hot or having excessive solder flow through. Vertical surfaces and touch up can be done with a length of one-sixteenth-inch solder. A good example of this is in **Photo 40**.

Once the boiler is stable, the soldering is usually done in two to three steps, cleaning it in citric acid between each step (a procedure known as "pickling"). The hardest part is the fire box. A regular torch won't work here, as the flame will consume the oxygen in the box and go out. An acetylene-air torch or a propane turbo torch that draws air from



Photo 41

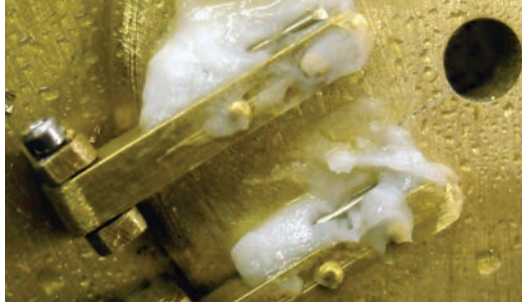


Photo 42



Photo 43

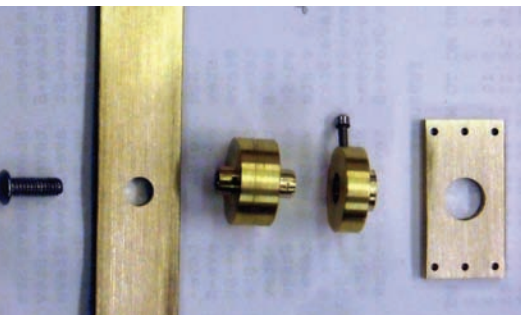


Photo 44

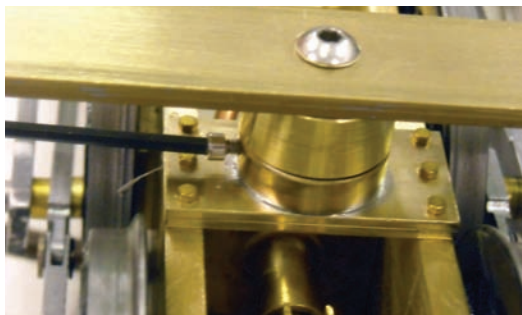


Photo 45

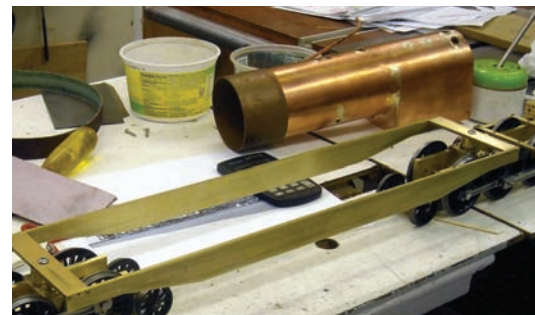


Photo 46



Photo 47



Photo 48

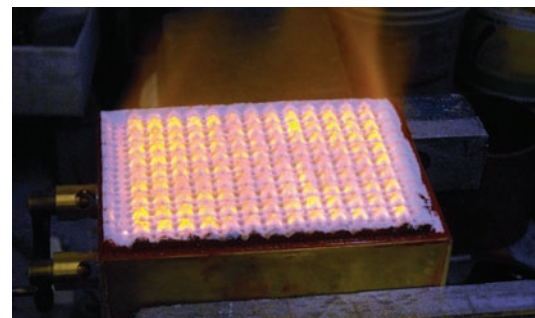


Photo 49

the outside will do the job. We use the acetylene air in conjunction with a propane “Big Bertha,” which is used to more evenly heat up the entire mass.

Smoke box, boiler frame

The nice thing about using standard copper pipe is that the same size brass pipe inside diameter is a snug fit to the outside of the copper pipe, thus making the smoke box a snap to make. The front is a little work, though.

I start with a square piece of sheet brass one-eighth-inch thick and slightly bigger than the smoke box diameter. I pin prick a dot in the middle and with a compass draw a circle the diameter of the smoke

box. On the band saw, I cut out the round slightly larger than I need. I then drill out the pin-pricked hole and mount the piece in an arbor, and then in my lathe.

I turn it to the outside dimension and then cut a 1/16-inch recess (the thickness of the pipe wall) to get a press fit into the smoke box. I then remove it from the arbor and mount it in the external jaws of the lathe for boring out the center hole. The round door is made in a similar fashion. The curvature is formed with a file while it is in the arbor. The hinges are milled from one-eighth-inch by one-quarter-inch rectangular rod and the hinge straps from one-eighth-inch square stock which is formed to the door curva-

Streamlined Garratt

Steamer Bill Allen prefers unique locomotives and sometimes to get the ones he wants, he must build them. The Algerian Double Pacific Garratt — a streamlined 4-6-2+2-6-4 articulated engine built by Franco-Belge in the late 1930s for the French railroad PLM and discarded during World War II — is one of his more recent projects. This three-part series includes:

- **Part I:** Chassis — Building the two Pacific style frames, cylinders, valves, wheels, axle pump and Cossart linkage.

- **Part II:** Boiler — Making the boiler and smoke box, ceramic burner, cab, accessories and plate work.

- **Part III:** Bunkers — Construction of the bunker, hand pump, fuel tank, headlights, tubing and wiring.



Photo 50



Photo 51



Photo 52



Photo 53



Photo 54



Photo 55



Photo 56

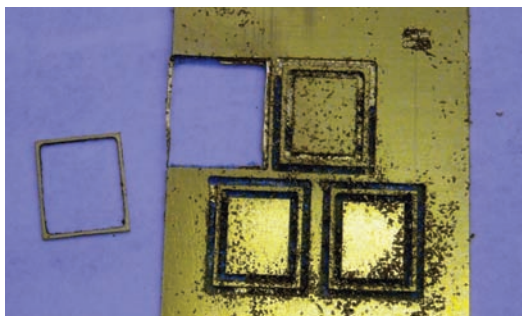


Photo 57



Photo 58

ture on the drum sander (**Photos 41 and 42**).

An exhaust gatherer is mounted to the bottom of the smoke box. This mixes the front and rear exhaust and has a small drain hole in the bottom to expel water. I decided to mix the two exhausts because the rear exhaust will be cooler because of the long distance traveled — it would therefore always have a more prominent plume, which would look funny because of the side by side stacks (**Photo 43**).

The boiler frame is fairly simple — just a box frame with pivots at each end. The pivots are usually concentric male and female blocks with a screw keeping them together. The problem is that the screw is not always accessible, so on mine, I add a third joint that is held together by an hex-head screw, which is accessible from the side. The rails are then bolted to the pivot assembly and cross members are bolted in for the boiler mounting (**Photos 44-47**).

Ceramic burner, boiler wrap

The burner is my own design, which uses two jets and has standoffs under the element which divert the gas flow to spread it out for even burning (**Photo 48**). The burner is first tested at a low gas setting to check for cold or hot spots (**Photo 49**), then on high

for output. Different size burners require different size jets or standoff placement for optimal operation (**Photo 50**).

The boiler wrap starts with a sheet of brass wrapped around the whole boiler, over a sheet of spun-ceramic fiber insulation (Fiberfrax) and secured at the bottom. The Belpaire detail over the fire box was formed from brass and copper sheeting. The skyline casing (sheet metal to reduce wind resistance in streamlined locomotives) spans three levels — the smoke box, boiler and the Belpaire. The steps are slight but the piece needed to have three different widths to fit properly.

I used my eight-inch steel cutting blade in a zero clearance throat in the saw, along with a hardwood board clamped to the fence and touching the bed of the saw. This prevented the thin material from slipping under the stock saw fence (**Photo 51**). I made a template out of card stock and checked the fit. Then I taped it to the brass sheet and marked where the stops on the saw blade should be (**Photo 52**). I then used my home-made rivet embosser and homemade bending jig to get the finished look (**Photo 53**).

The smoke deflectors are on the boiler and front bunker. The tricky part was getting the beading



Photo 59

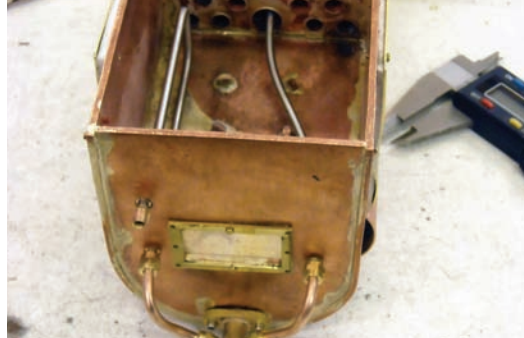


Photo 60



Photo 61



Photo 62

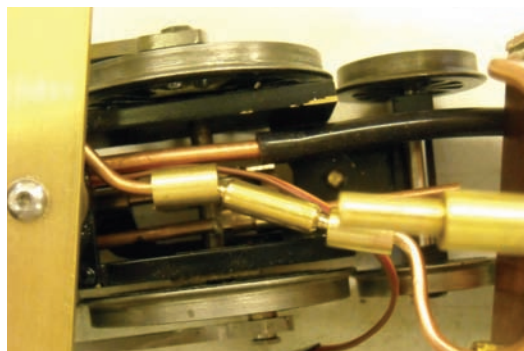


Photo 63

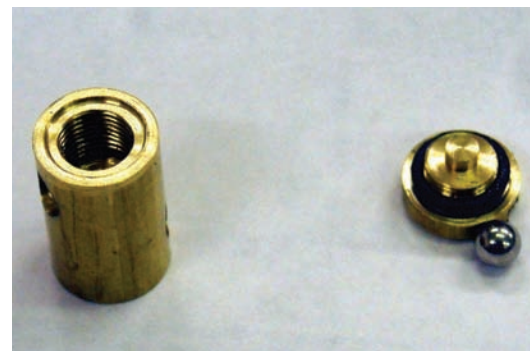


Photo 64

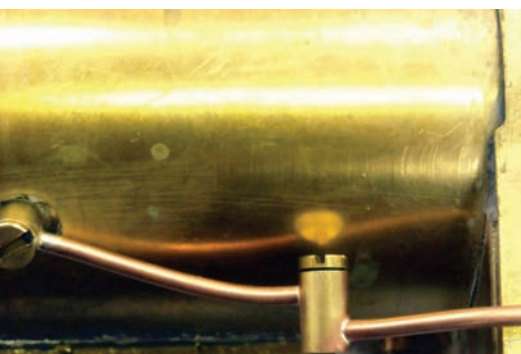


Photo 65



Photo 66

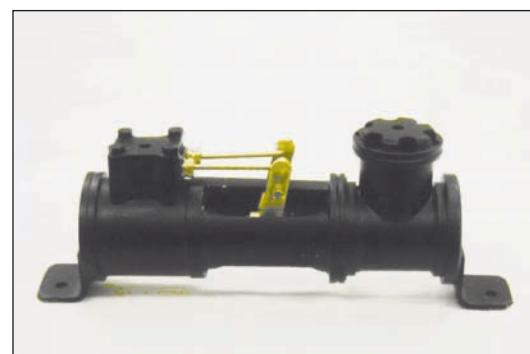


Photo 67

around them. Copper tubing is slit by ripping it on the table saw with the same setup as in **Photo 51**. With the blade lowered, I make sure my hands never get near the blade and only cut the front half of the tubing, so that the blade can be stopped and the piece removed safely (**Photos 54 and 55**).

Cab, accessories and piping

The cab sides were cut out on the mill with an end mill. A countersink was used to cut groves where the bends go (**Photo 56**). Then the window frames were cut out with an end mill (**Photo 57**). The cab front and rear were simply cut out on the band saw. The doorway goes into the roof so the side frame needed to go around the opening, thus the bend inward at the top. Stanchions are added for the grab rail (**Photo 58**).

The roof has a raised portion which lines up with the skyline casement. I bent the roof to the correct profile and then soldered on the raised portion. The side of the roof was cut out for the doorway and a rain gutter was made from one-sixteenth-inch square stock.

The steam supply to the cylinders is picked up through a pipe in the dome (**Photo 59**). From there it runs through the boiler to the throttle at the back head, where it splits and is routed to two superheaters (**Photos 60-62**). One goes through the fire box then through the large tube to the smoke box, and then to a dog bone connection to the front engine. The second makes a "U" turn in the fire box and then out the back head under the cab floor to another dog bone connection (**Photo 63**).

There is no visible clack valve in the photos so I made an in-line one which is under the running board (**Photos 64 and 65**).

The accessories shown in **Photos 66 and 67** are scratch built. The steam generators are connected to a valve so that they spout steam when the valve is opened. This also serves as a bleed down for the boiler, to prevent a vacuum forming on cool down. The Worthington pump (**Photo 67**) on the prototype was actually connected to a heat exchanger inside the smoke box which heated up the feed water.

Next time, we'll wrap up by building the bunkers.

Accucraft's new 1:32-scale passenger cars have 'no faults'

PLEASING Pullmans

Text and photos by Jim McDavid

For many years now those of us who run live-steam standard gauge engines in Gauge One have been sorely in need of a reasonably priced set of correctly scaled passenger cars. Well, to the delight of many — including myself — Accucraft Trains has come to the rescue. Accucraft has started delivery of its new line of 1/32-scale smooth side passenger cars. They can be had in five different car types and in nine different liveries.

The car types available are a baggage car, diner car, coach, 10-6 Pullman sleeper and observation car. In turn each car is available in a paint livery of unlettered gray, Southern Pacific Lark gray, Union Pacific gray, New York Central gray, Southern Pacific Daylight red and orange, Norfolk and Western maroon, Pennsylvania RR maroon, Canadian Pacific maroon and Union Pacific yellow. They can be ordered as a six-car set, which includes one each baggage, diner, sleeper, observation car and two coaches, or as individual cars.

The cars are based on Pullman Standard streamliner cars which ran on Northeastern railroads. The intention of Accucraft was to produce a generic, reasonably priced set of smooth-sided passenger cars which would look good running behind



Heavyweights: Accucraft's smooth-side cars weigh about 5¼ pounds.

the ever-increasing number of large steam engines now available to us in Gauge One. The cars have minimal under-body detail, but this is more than made up for by having smooth running ball-bearing trucks, a feature which you usually only see on much more expensive models.

The cars measure in at 29¾-inch body length, except for the observation car which is 31-inches long, 3¹¹/₁₆-inches wide and a height above rail of 5¹/₁₆ inches. This scales in full size to 79 feet-plus and 82 feet, eight inches, body length, nine-foot,

10-inch body width and 13-foot, six-inches above rail. These measurements are approximate, having been taken with a 36-inch ruler and my ever-decreasing eyesight.

Looking at the drawings that I can find, this is pretty darn close and as such provides a reason-



Fine details: Logo for S.P.'s train.



Smooth sides, smooth ride: Accucraft's new 1:32-scale passenger cars. Top, Southern Pacific's GS4 'Daylight' pulls a consist of 'Lark' cars on the author's layout. Mid-left, the detail on the trucks is shown. Mid-right, two Union Pacific cars. Bottom, the underside detail of a car is limited, but the wheels run well.

able alternative to the hard-to-find, highly detailed, expensive custom-made U.S. outline passenger cars.

Their weight comes in at between five and 5½ pounds which is fairly substantial and should make a good load with a rake of six or eight cars.

They have metal bodies with interior details such as seating, tables, walls and the like. The observation car even has a half-round bar as per the prototype. The body with a little work can be removed for adding details such as passengers and lighting. The trucks are die cast, sprung and with the above-mentioned ball-bearing axles.

The couplers are solid but could easily be swapped for working couplers. I personally prefer non-working couplers on heavy rolling stock for safety reasons. The couplers are body mounted so the manufacturer does recommend a minimum radius of 10 feet, although I have heard of them going around an 8½-foot radius just fine.

From the 1930s into the 1960s, there were three major players in the streamlined passenger business. The Pullman-Standard Co., The Budd Co. and American Car & Foundry. Pullman is probably the most well known of the three and Accucraft has cho-

sen its lightweight streamlined cars to model.

The Pullman Co. was first organized in 1867 by George M. Pullman and built passenger cars, but also owned and operated sleeping-car fleets on most railroads. The company grew in size — sometimes by mergers — and by the mid-1920s had a fleet of more than 9800 cars and employed in excess of 40,000 conductors and porters. Pullman even built its own company town in Illinois on 4000 acres south of Chicago. The company was broken up in 1944 into the Pullman-Standard Manufacturing Co. and the Pullman Co., which owned and operated the fleet. The Pullman Co. was then sold to a consortium of 57 railroads. Pullman-Standard continued afterward to manufacture passenger cars for many years.

My experience has shown the Accucraft cars to have excellent running characteristics, in no small part because of the ball-bearing trucks. They are robust and rugged with no small parts to break off during handling, but they are still visually appealing behind the correct locomotive.

For the price point at which these passenger cars are listed, I can find no faults. In my opinion they are an excellent value and I highly recommend them.

Adding two wheels gives Accucraft's engine new character

'DORA' wheelie

Text, illustrations and photos by Marc Horovitz

One way of significantly changing the character of a stock Accucraft "Dora" is to give it a new wheel arrangement. The possibilities here are many. It could become a 2-4-0, a 4-4-0, a 2-4-2, or an 0-4-2, to mention a few. In this project, we'll turn it into an 0-4-2T by extending the frame, adding a trailing truck, and making a new, larger bunker to go behind the cab.

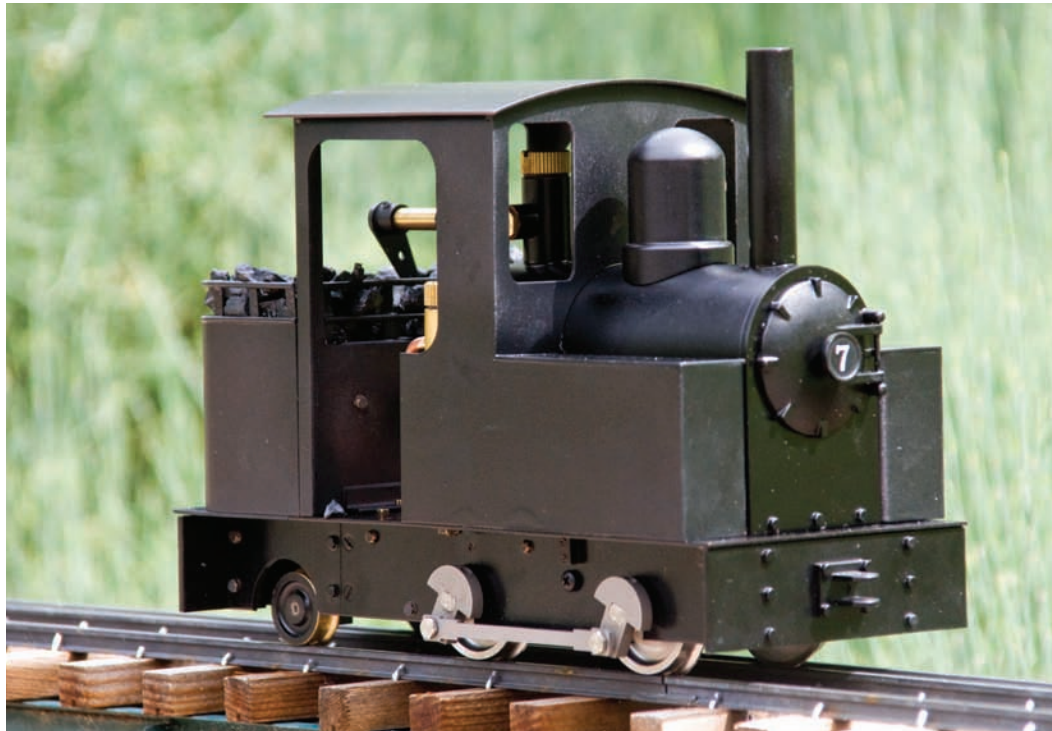
Disassembling the engine

We must first take the engine apart. The bodywork is quickly separated from the locomotive by removing the four hex-head screws that hold it in place. The arrows in **Photo 1** show you which ones to take out. With those screws out, the tanks and cab can be removed from the chassis.

Unscrew the nut securing the gas pipe to the burner (**Photo 2**). Disconnect the steam line to the lubricator from the throttle by unscrewing that nut (**Photo 3**). Now, by removing the four screws indicated by arrows in **Photo 4**, the boiler assembly will simply lift off. Remove the nut that secures the lubri-

cator (**Photo 5**), then remove the six hex screws that hold the deck in place (**Photo 6**).

You should be able to slide the deck aside or lift it enough to get a screwdriver in to remove the four Phillips-head screws that hold the motor assembly in place (**Photo 7**). The motor, lubricator and deck



0-4-2T: Following modification, 'Dora' has a trailing truck and tank.

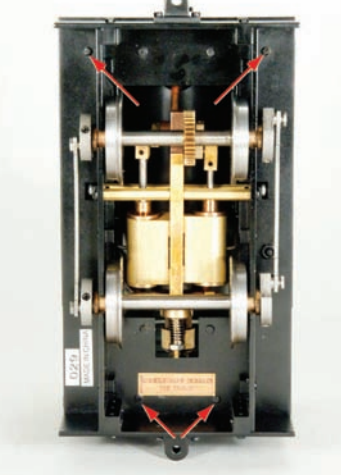


Photo 1

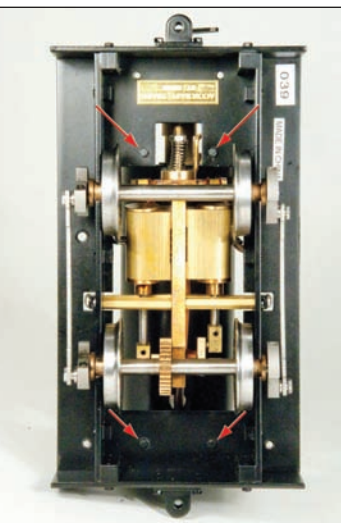


Photo 4



Photo 2

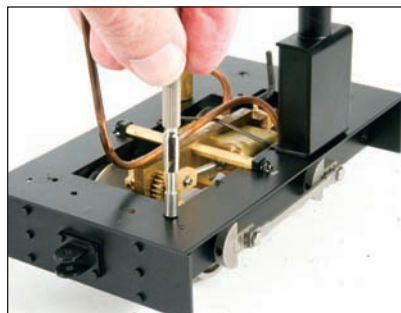


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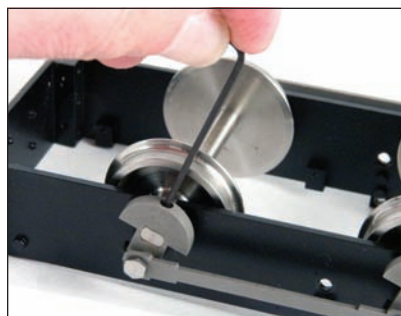


Photo 9



Photo 3

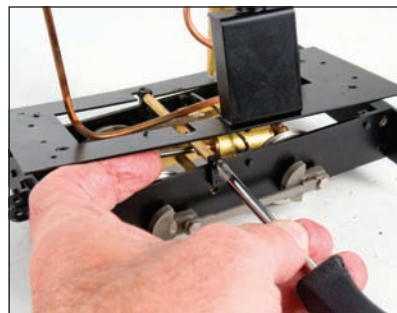


Photo 7



Photo 10

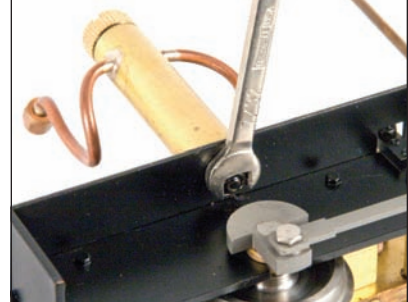


Photo 5

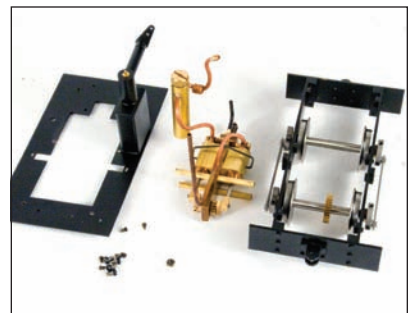


Photo 8

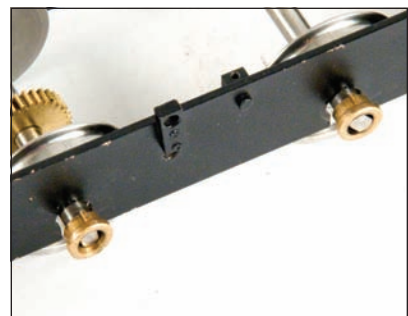


Photo 11

should then lift out (**Photo 8**). Set the deck and motor aside for now, although this would be a good time to make sure the banjo bolts that secure the steam line from the lubricator and the exhaust line to the motor are tight. They weren't on my engine.

With the hex wrench supplied with the engine, loosen the set screws in each of the counterweights (**Photo 9**). You needn't remove the screws entirely — just loosen them. Then remove the counterweights and side rods. The counterweights will not come off willingly but a little friendly (or not so friendly) persuasion with a large, flat screwdriver will save the day (**Photo 10**).

Set the counterweights and rods aside. The axle bearings will then slide out (**Photo 11**), allowing the axles to drop out through the slots in the bottom of the frame (**Photo 12**). All that remains is to disassemble the frames. Remove the Phillips-head screws in the corners, leaving the corner blocks attached to the front and rear end beams. Set the end beams aside. Then remove all other fasteners and bits on the side frames, leaving the frames flat and smooth (**Photo 13**).

Modifying the frame

Now comes the fun stuff. The first thing to do is to

drill the additional hole through both frame pieces. With a caliper, mark out the center of the hole as per **Figure 1** (see also **Photo 14**). Be sure you've marked the rear end of the frame. Center punch the mark for the hole.

Fasten the two frames together. I found that a 2-56 screw through two of the end holes (one on either end) did the job fine. Secure them with nuts. Holding the frames in your drill-press vise, drill the hole No. 43 (**Photo 15**). Clean up any burrs and set the frames aside for now.

Put a piece of one-quarter-inch hex stock in your three-jaw chuck and part off a piece 2.156-inches long (**Photo 16**). Chuck up the piece, center drill it lightly, then drill the end with a No. 50 drill, one-quarter-inch deep. Tap the hole 2-56 (**Photo 17**). Now do the same with the other end. Clean up any burrs. Find the center point on one of the flats as per the frame-stretcher drawing (**Figure 2**). Mark and center-punch the spot. Then, holding the part in your drill-press vise, drill through No. 43 and tap the hole 4-40 (**Photo 18**). That finishes up the frame stretcher.

To make the frame extensions and splice plates, you'll need some one-inch flat stock. The frames are made of steel, around 0.081-inches thick. If you

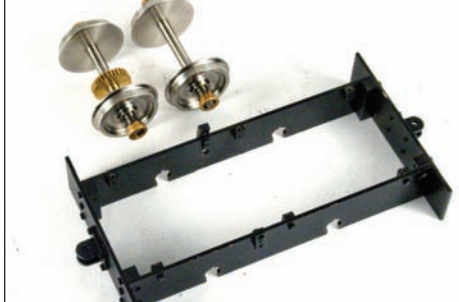


Photo 12

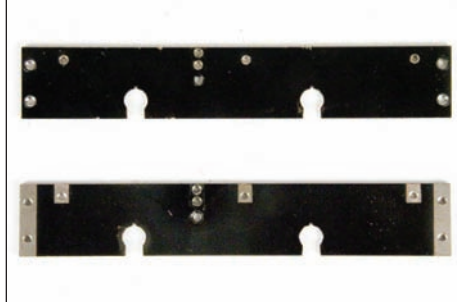


Photo 13



Photo 14

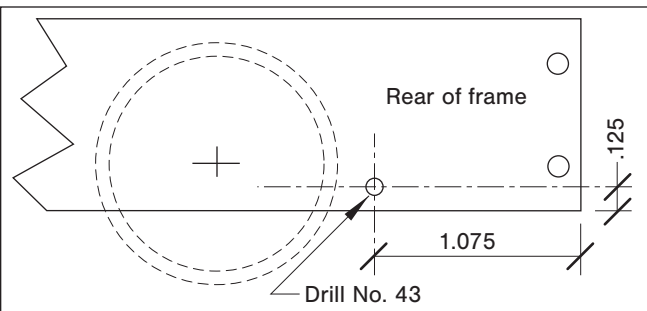


Figure 1: Modification to ‘Dora’s’ existing frame.

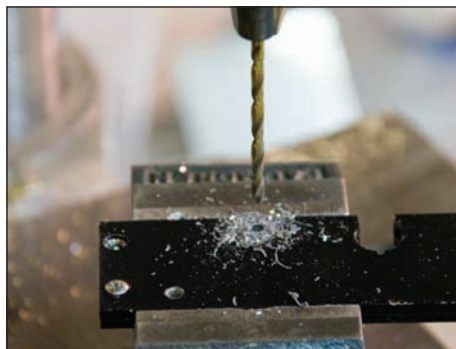


Photo 15



Photo 16

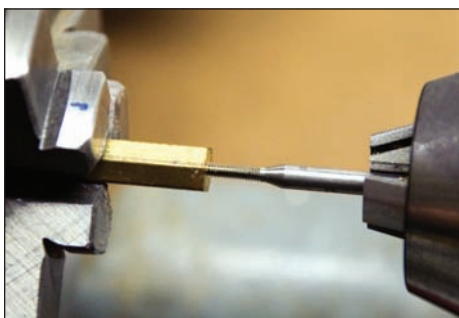


Photo 17

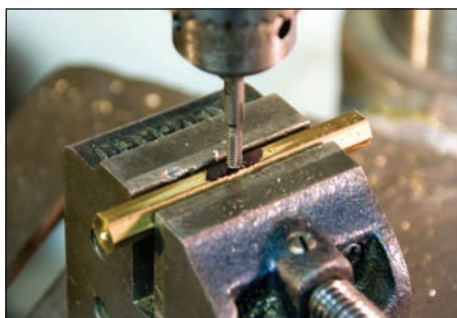


Photo 18

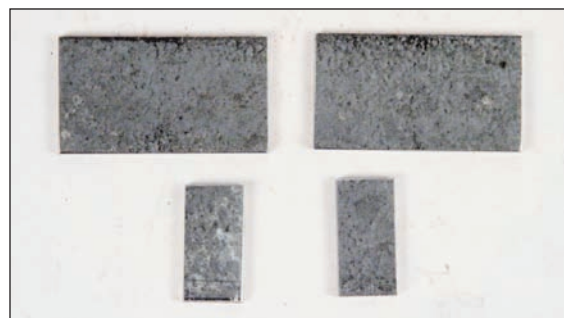


Photo 19

don’t have metal of that exact thickness, no problem. You can use 1/16-inch (0.0625-inch) flat stock instead — steel or brass would be suitable (**Figure 3**). I happened to have some galvanized lawn edging that was almost the identical thickness to “Dora’s” frames, so I used that. Cut out blanks for both the frame extensions and the splice plates (**Photo 19**).

Referring to the splice-plate drawing (**Figure 4**), carefully lay out and mark the hole pattern on one of the plates. Center-punch the holes (**Photo 20**). Clamp the two pieces together and grasp them in your drill-press vise. Carefully drill No. 50 holes through both pieces at once in all four corners (**Photo 21**). Tap each hole 2-56 (**Photo 22**). Remove all burrs and set the splice plates aside (**Photo 23**).

Next come the frame extensions. As you did

with the splice plates, Carefully mark out and center punch all of the holes in one piece, including the center hole for the wheel cut-out (**Photo 24**). Clamp the pieces together and grip them in your drill-press vise. Drill all of the holes No. 43, including the center hole for the wheel cut-out (**Photo 25**).

There are a variety of ways to cut out the wheel-clearance hole in the frame extension. You could mark out the perimeter of the hole, then use a jeweler’s saw to make the cut, cleaning it up with a file. Or you could use the time-honored method of drilling a series of small holes, as close to one another as possible, near the perimeter, then cutting between them and, again, cleaning up with a file. I chose to use a one-inch hole saw. I bought one specially for this purpose. It is basically a cup with a toothed edge

Giving ‘Dora’ more wheels

A new wheel arrangement gives the stock Accucraft “Dora” a significant change in character. Marc Horovitz chose to add a new rear truck and a larger bunker behind the cab to make her a 0-4-2T.

➊ **Part I:** Disassembling the engine, modifying the frame and starting the trailing truck.

• **Part II:** Finishing the trailing truck build and begin sheet metal work on the new bunker.

• **Part III:** Completing the bunker and finishing the project.



Photo 20



Photo 21



Photo 22

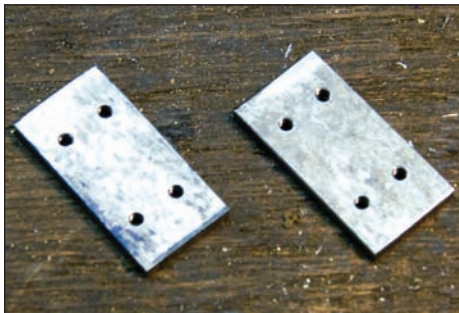


Photo 23

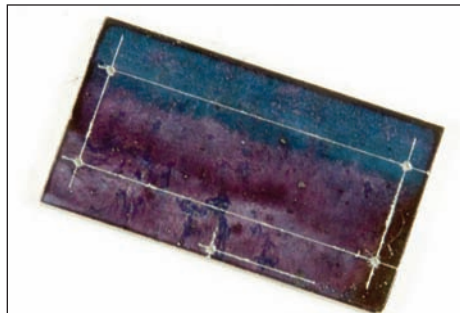


Photo 24



Photo 25

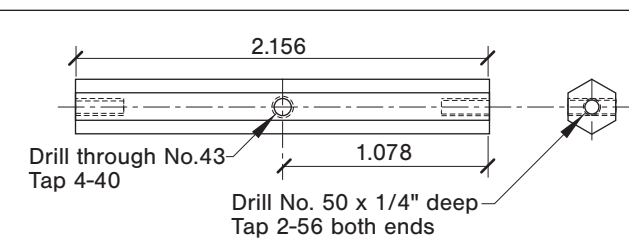


Figure 2: Frame stretcher — make from brass or steel, 1/4-inch hex.

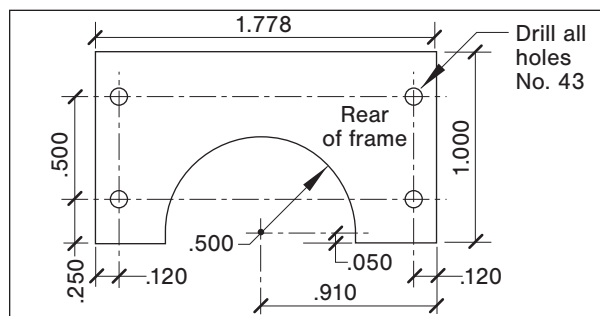


Figure 3: Frame extension. Make from brass or steel.

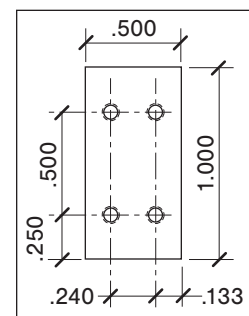


Figure 4: Splice plate. Make from 1/16-inch brass or steel. Drill all holes No. 50 and tap 2-56.

(Photo 26). Mine came with a mandrel but I had to provide my own one-quarter-inch pilot bit. The mandrel screws into the saw (a variety of different diameters are available) and a set screw secures the pilot bit. I ground a small flat on my bit for a better grip.

Here's the rub, though. The center point for the wheel cut-out is too close to the bottom edge of the frame extension for the pilot bit to get a good purchase. To circumvent this problem, we'll mount the frame extensions on a sacrificial piece of aluminum. I found a scrap of one-quarter-inch plate. You'll need to find something similar.

With masking tape or the like, tape one of the frame extensions to your aluminum plate (Photo 27). Make sure that there is enough room for the one-quarter-inch pilot hole of the hole-saw drill. Then, with the same No. 43 drill you just used, lightly drill into the aluminum just enough to make a shallow dimple. Do this just in the four corner holes. In the wheel-cut-out hole, drill deeply into the metal. Remove the tape. Drill the four corner holes with a No. 50 drill, one-quarter-inch deep or so, and tap the holes 2-56. The center hole for the wheel cut-out needs to be enlarged to one-quarter-inch diameter. Do this in small increments to ensure concentricity.

The finished plate should look like Photo 28.

On each frame extension, scribe a line that approximates the wheel cut-out, using the little hole you drilled as the center (Photo 29). Then, using a hacksaw, cut a notch in each piece within that semicircle that will clear the one-quarter-inch pilot drill of the hole saw (Photo 30). Clean up the burrs and screw one of the pieces to your aluminum plate (Photo 31).

Using the pilot drill on the hole saw as a guide, align the plate on your drill-press table, then clamp it securely to the table (Photo 32). Set your drill press to its slowest speed, then bring the hole saw into the work. Press firmly but not too hard — let the saw do the work. It may make a lot of noise. Some cutting oil may help. Clean up any burrs with a file. The end result can be seen in Photo 33.

Now's a good time to attach the frame extensions to the frames (Photo 34). I used flat-head screws in the countersunk holes on the original frames and hex-head bolts on the extensions. Go ahead and prime and paint the frames, then reassemble the frames (with the new frame stretcher) and the motor



Photo 26

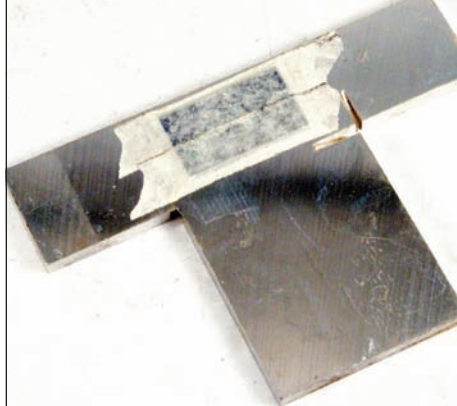


Photo 27



Photo 28



Photo 29



Photo 30



Photo 31



Photo 32



Photo 33

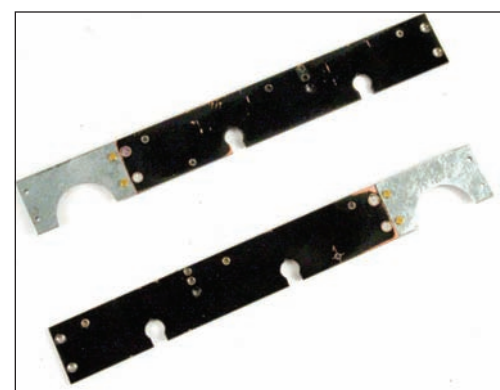


Photo 34

assembly (**Photo 35**). To attach the rear buffer beam you have two options: countersink the holes in the frame extensions for the original screws or drill out the corner posts with a No. 50 drill and re-tap them 2-56. I used the latter method.

The trailing truck

“Dora’s” new trailing truck is entirely cosmetic — it bears no weight. The weight of the engine is distributed in such a way that the addition of the frame extensions, new trailing truck, extended deck, and new bunker will not affect the engine’s performance.

Parts for the trailing truck can be made in any order. Let’s start with the bearings. These are made from three-eighths-inch square brass stock. Cut off a piece three or four inches long — long enough to hold in the lathe and work with. To hold the piece in the lathe, you’re going to need your four-jaw chuck.

The end of the work piece needs to be square and flat. If it isn’t, chuck it up in the four-jaw and face it off (**Photo 36**). For this operation, it doesn’t matter if it’s centered or not. Once the end has been faced

off, remove it from the chuck and carefully measure and mark the center of the end. Pop it with your center punch (**Photo 37**).

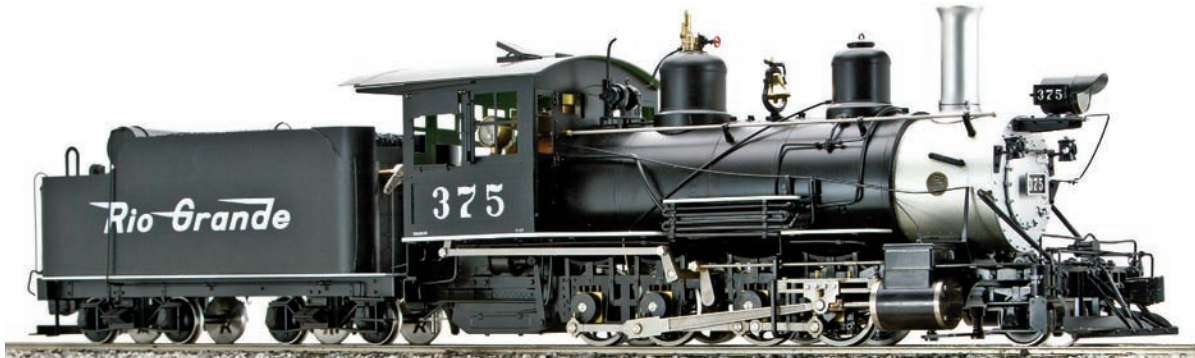
To drill this hole perfectly in the center of the square rod, you’ll need to precisely center the work in your four-jaw chuck. This is a procedure that terrifies some but it really isn’t that difficult. There are several ways to go about it. Here’s the way I like.

You’ll need to make a little tool, which you’ll use every time you want to center a spot in the four-jaw. I call it a “four-jaw centering tool” (**Figure 5**). Make it out of something durable — drill rod is good. Chuck up a piece of one-quarter-inch round drill rod in your three jaw and deeply center-drill the end. Then part off a two-inch piece. Reverse it in the chuck and put a point on that end with a 60-degree included angle, as per the drawing. Make sure the point is sharp. That’s all there is to it.

This tool is used in conjunction with a dial indicator, which should be mounted to your tool post (**Photo 38**). Mount the work piece in the four-jaw

— Continued on Page 30

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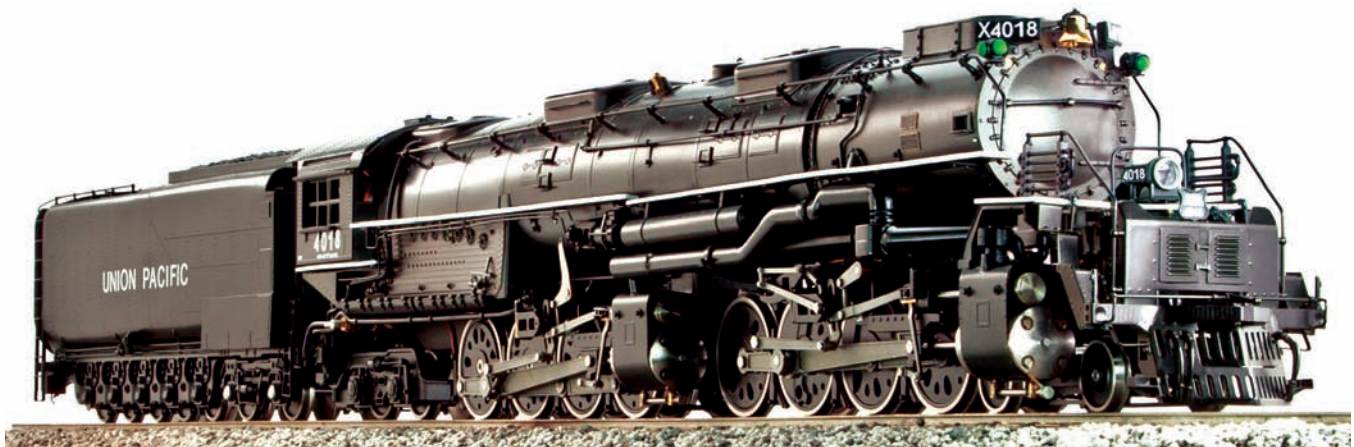
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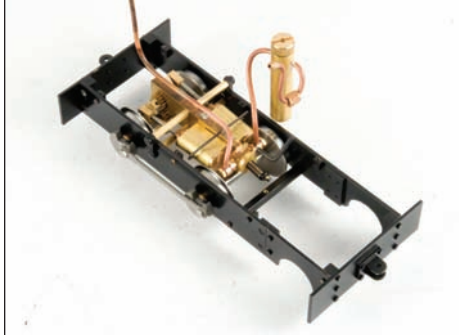


Photo 35



Photo 36

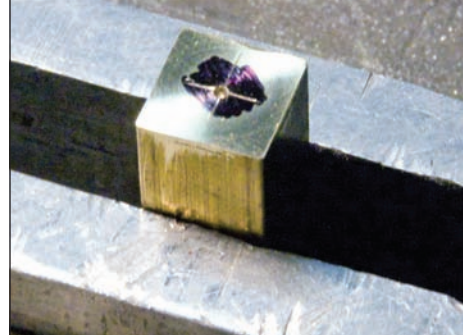


Photo 37

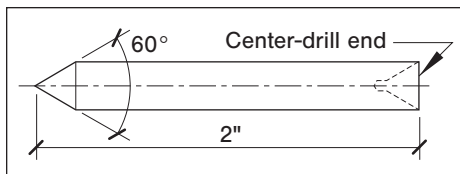


Figure 5: Four-jaw centering tool. Make from one-quarter-inch diameter round stock.

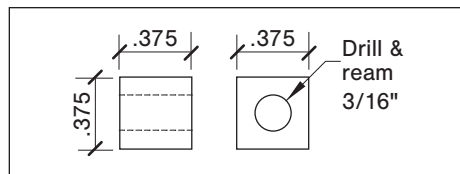


Figure 6: New rear truck bearing. Make from brass or bronze.



Photo 38



Photo 39

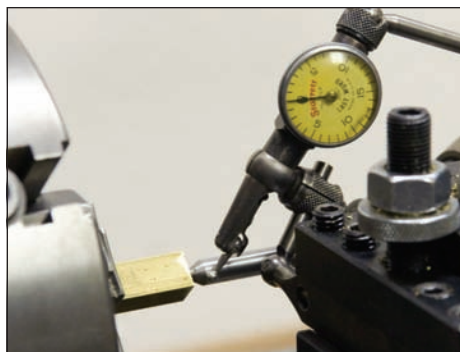


Photo 40

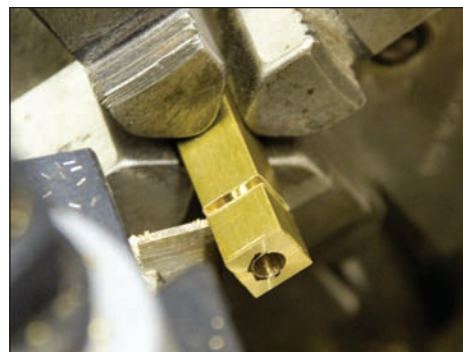


Photo 41

— Continued from Page 27
chuck with the center-popped end sticking out. Get the piece as centered as you can by eye. Then put the point of the tool into the dimple. Put the other end of the tool over the point of a live or dead center held in the tail stock (**Photo 39**). Lock the tail stock so that the tool is held firmly in place.

Now, when you rotate the four-jaw chuck by hand, you'll see that the pointed end of the tool describes a little circle. Stop the chuck so that the point of the tool is the farthest distance from the dial indicator, then run the indicator up until it just touches the side of the tool (**Photo 40**). As you rotate the chuck by hand, you'll see the needle on the dial moving back and forth. This will tell you how off-center the work is.

By a series of minor manipulations of the chuck's jaws, you can move the work until the needle on the indicator does not move at all. When that happens, the work will be perfectly centered. Let's say the work is 32 thousandths off. If you have an indicator like mine, with "zero" in the middle of the dial, rotate the



Photo 42

chuck so that the needle is at the highest point, then move the dial on the indicator to 16 (half of 32).

Loosen the jaw on the opposite side of the chuck, then tighten the jaw on the high side, leaving the dial indicator engaged. Tighten the jaw until the needle reads "zero," then tighten the opposite jaw. Rotate the chuck again and see

what the needle does. This is a multi-step process. After each adjustment, the needle should describe a smaller and smaller arc. Keep doing it until the needle doesn't move at all. With a little practice, this should just take a minute or two.

Once the piece is centered, center-drill the end, then drill No. 15 by one-quarter-inch deep or more, and ream to 3/16 inches (**Figure 6**). Part off the first bearing at 0.375 inches (**Photo 41**), clean up the burrs, and your bearing is finished. For the second bearing, the hole is already started, so just finish drilling it, ream it, and part it off. The finished bearings can be seen in **Photo 42**.

In the next issue we'll finish off the trailing truck and make a start on the new bunker.

Changing an Accucraft C-16 from butane to solid fuel

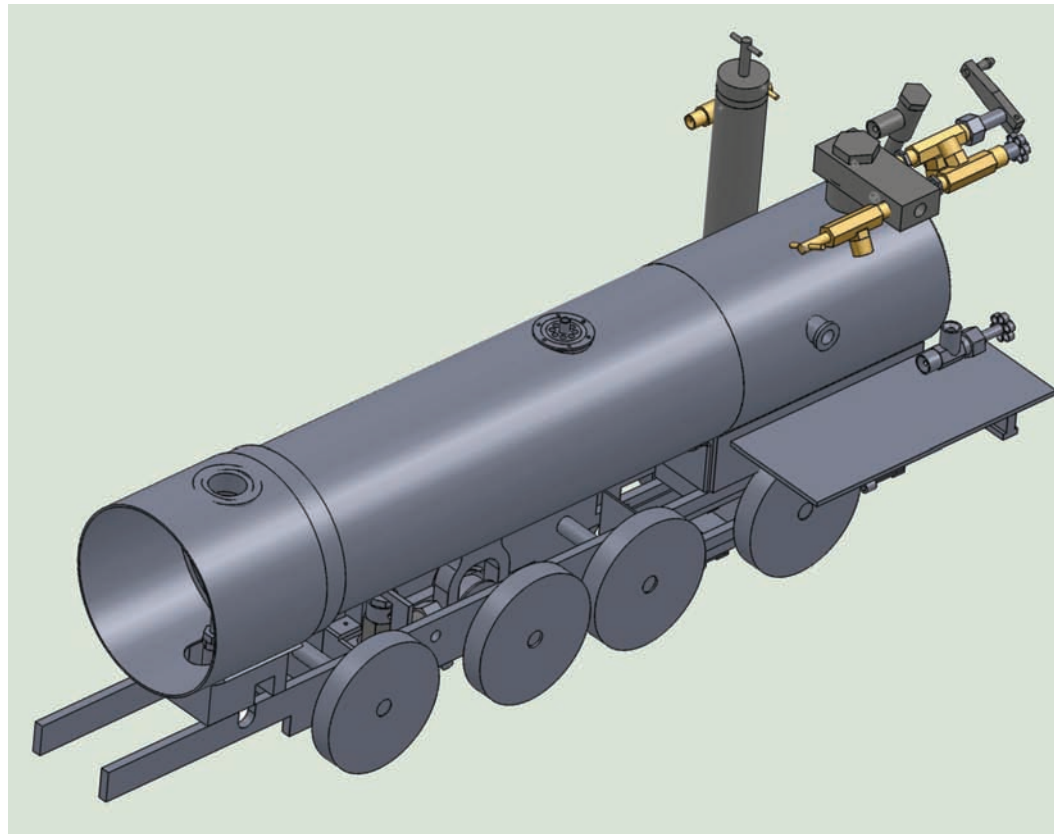
COAL conversion

Text, photos and illustrations by Rob Lenicheck

Iwonder how many Accucraft C-16s are in a state of suspended animation — mantle queens on the shelves of us live steamers. I believe the engine was one of the first modeled after a specific prototype produced by Accucraft Trains. It was certainly the first one I was interested in enough to purchase. Mine was a sweet runner for many years after the bugs were worked out and the fixes recommended by Arkansas steamer Dave Hottmann were put into place.

Even though my engine continued to run well, I grew tired of the “fire it up and watch it run, beer in hand” mentality. I wanted to have a more interactive experience. Thus, I felt the urge to deconstruct the engine’s initial design and do a “dark side” conversion to coal. Now, I’m sure some of you know this kind of change is not to be taken lightly. Not even considering the mechanical changes necessary, unless you have a lot of experience under your belt you are never quite sure if a newly-designed coal boiler can successfully burn coal until after you’ve done your best to design and build it.

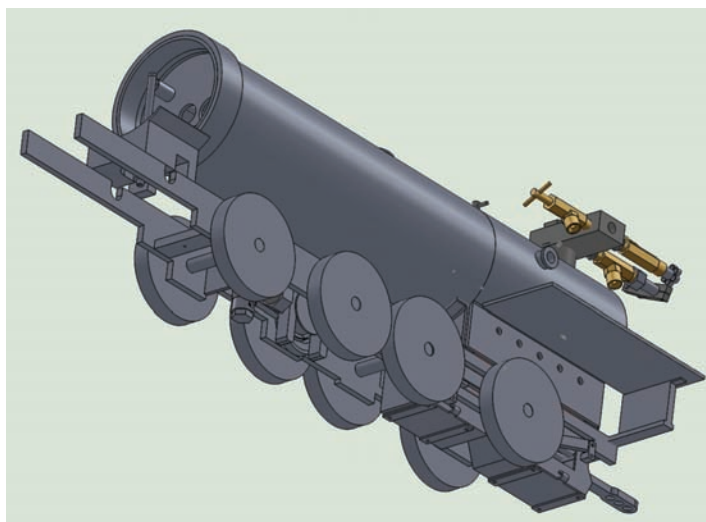
There are many things which can influence a successful coal boiler design: length and number of tubes,



Coal boiler: A 3D computer-assisted drawing of the top of new boiler.

grate area, firebox configuration, draft characteristics and the like. The list of potential problems related to design is quite intimidating. However, fool that I am, I decided to dive in. If it didn’t run at least I’d have a real mantle queen to enjoy looking at, beer in hand.

So, this series of articles describes what I have



Underside: Another view of the new boiler.

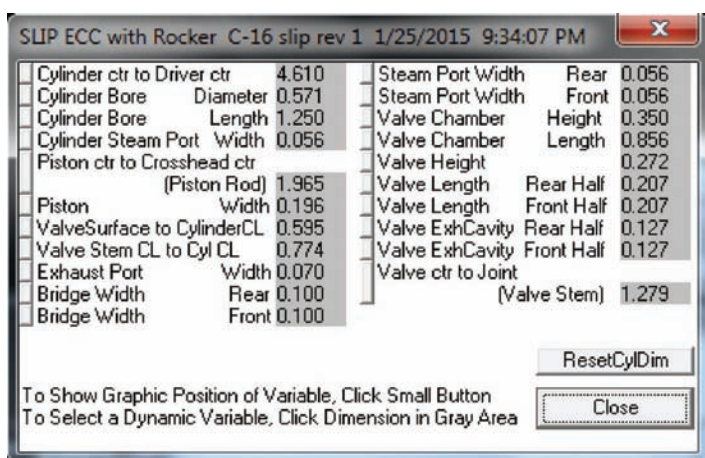


Figure 2

attempted to do; I hope in enough detail so that some of you could follow suit if so desired. I can say with some confidence that the conversion is a successful one. I have run the engine many times and am pleased with the results.

I will provide the prints of the new parts needed and discuss the alterations of the existing parts to accommodate the conversion. If you are to consider this undertaking, you do need to have access to a machine shop — a lathe and a milling machine are requirements. As to the machining and construction techniques, I have stated in previous articles that Kozo Hiraoka's construction techniques are robust. It is worth

Coal conversion of a C-16

Rob Lenicheck's Accucraft C-16 ran very nicely once he got it "peaked and tweaked" to his satisfaction. So nicely, in fact, that it grew boring. What to do? Rob, a committed coal-burner, decided that he would convert the engine to "the dark side." Here's how he did it:

➔ **Part I:** Designing the valve gear, disassembly, modifying the frame.

• **Part II:** Starting the boiler.

• **Part III:** Finishing the boiler, pressure-testing.

• **Part IV:** Smoke box, ash pan and grate.

• **Part V:** Steam manifold and its fittings, blast pipe.

• **Part VI:** Axle pump & bypass plumbing, water glass, wrapping it up.

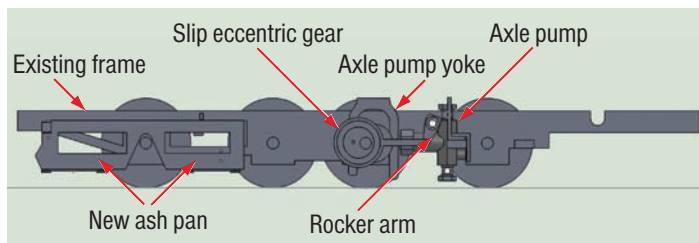


Figure 1

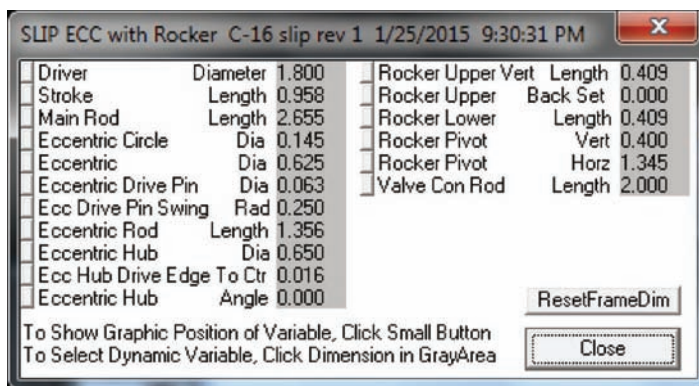


Figure 3

picking up any of his "Building the..." books — as far as I'm concerned they are the bible toward foolproof construction. To perform this transformation, I am, indeed, relying on the techniques in his books, and I think the best one to use for a reference is "The Pennsylvania A3 Switcher" (The Village Press, 2001).

The first step is to take a look at the engine and decide what changes are necessary to accommodate the coal boiler. Like the prototype, being an inside-frame engine dictates that the firebox be long and narrow, scaling out to about 13/16-inches by 3 1/8-inches. Furthermore, the firebox straddles the last driving axle so thought must be given as to how to isolate the axle from the heat.

Secondarily, coal burners require the addition of an axle pump to keep up with the steam production. This essentially means that the existing valve gear mechanism has to be removed and replaced if the axle pump is to go on the preferred main driver axle (the second driver, where the main rod connects from the piston) — there's just no room otherwise.

By far the simplest valve gear mechanism which can replace the existing one is the slip-ec-

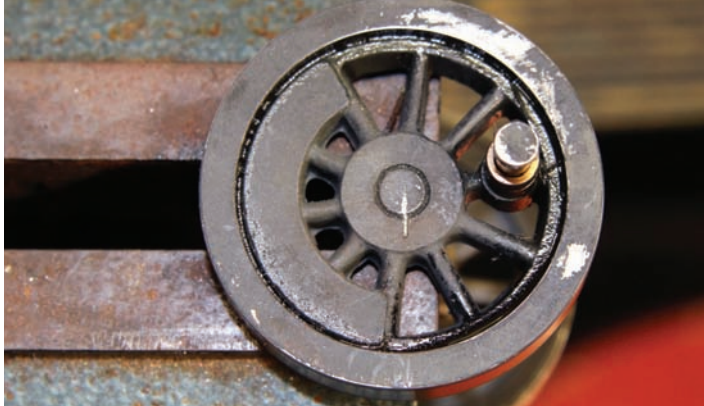


Photo 1

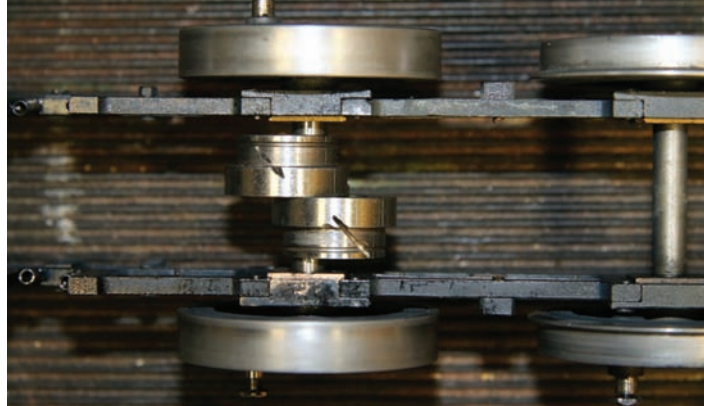


Photo 2



Photo 3

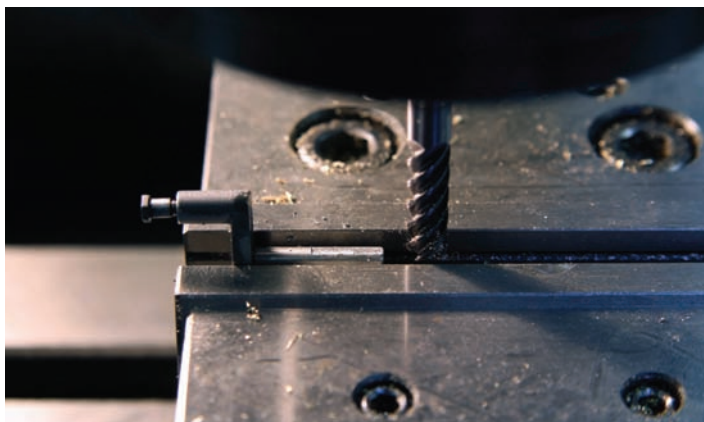


Photo 4

centric type. This is a great choice because it is simple, easy to understand and easy to control. Although you are losing the ability to change the direction of the engine from inside the cab (there is no Johnson bar required) it's not a show stopper because with a coal engine you need to be with it all the time anyway. For those who are not familiar with slip-eccentric valve gear, reversing the direction is as simple as pushing the engine by hand in the direction desired, rotating the drivers at least 180 degrees while doing so.

As I outline the conversion process I will be showing 3D models along with some pictures. **Figure 1** shows a drawing side view of the mechanism conversion, leaving off the right side frame for clarity. You can see the new ash pan, the slip-eccentric and its rocker arm connection, and behind it, the axle pump yoke and the axle pump body.

Measuring the valve lap

Before we start taking things apart, it's necessary to discuss the amount of valve travel we will need to duplicate with the new slip-eccentric gear. Traditionally, our models are designed with some valve "lap" which allows a "cutoff" of the steam being admitted into the cylinders prior to the full stroke of the piston.

Cutoff simply means that the steam supply is "cut off" prior to the end of the cylinder stroke. Without going into a lot of detail, the valve itself measures 0.414-inches in total length. In order to have valve lap this total must be longer than the entire distance of all

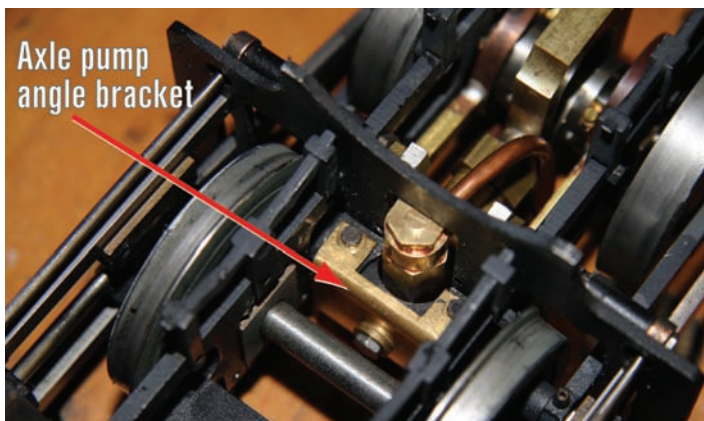


Photo 5

the ports, and spaces in between, in the cylinder head.

After disassembling the original valve gear and taking measurements, the parameters which are needed for comparison to the valve length are the exhaust port width, the two steam ports and the two bridge widths in between the steam and exhaust ports. (Huh?!?) OK, I'll try to explain.

There is a wonderful, and entirely free, Windows-based valve gear program available on the Web which was developed and given to the live steam community by Charles Dockstader (<http://goo.gl/fl4yxY>). It's really fun to see the types of valve gear simulations he has provided.

If you're at all curious about how many types of valve gears work, this is the place to start. But this software was really designed to help with develop-

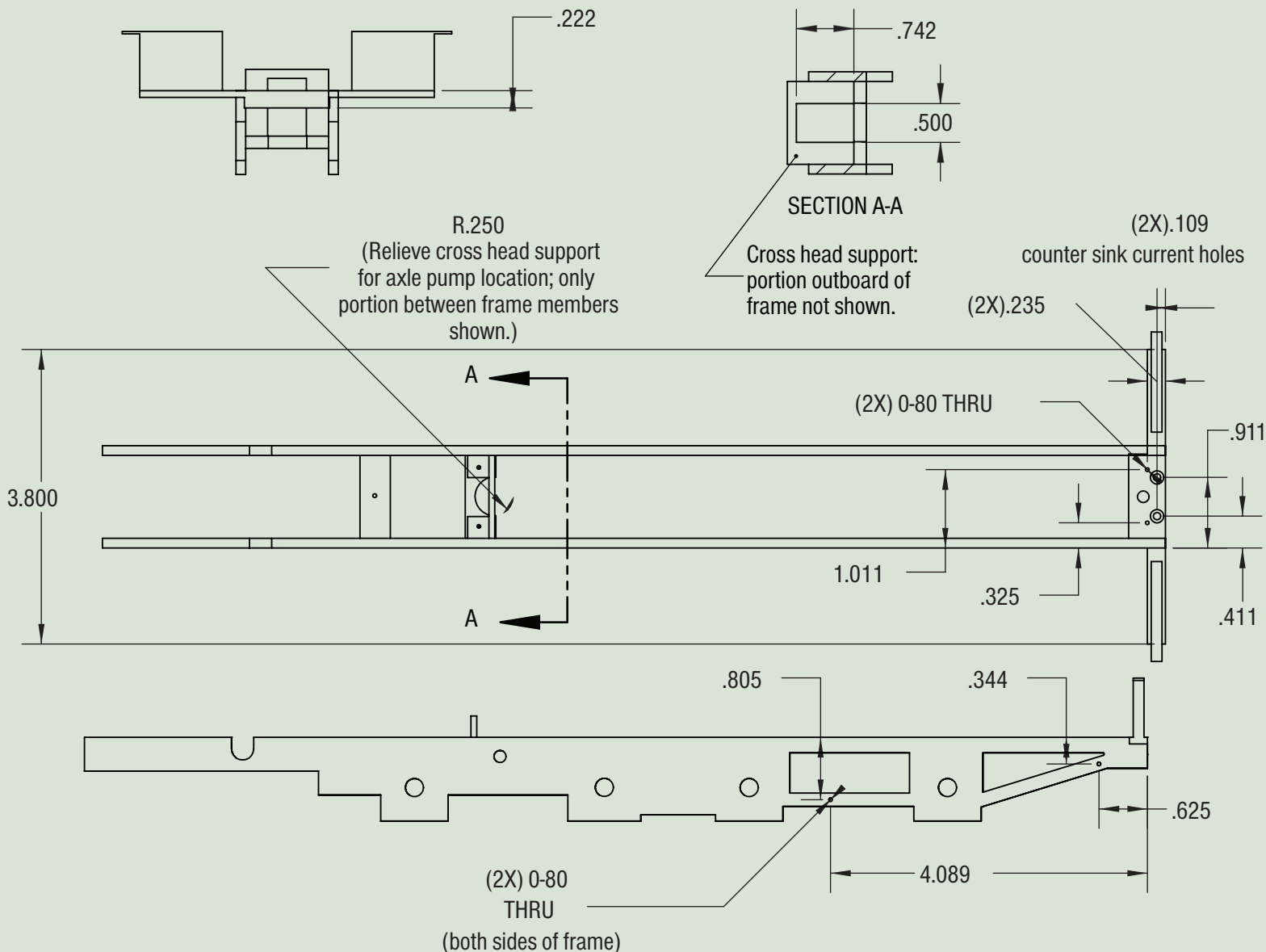


Figure 4

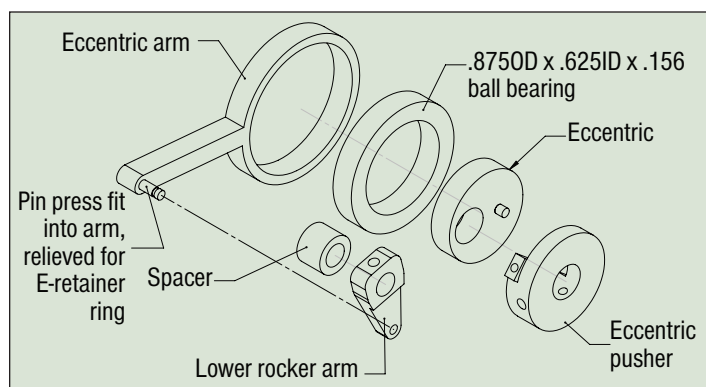


Figure 5

ment of each valve gear as applied to any specific engine you are building (or rebuilding, as in our case). Even though the slip-eccentric is fairly simple to understand he does provide the software simulation for this, too. Plugging in the numbers for the C-16 setup, the parameters for the cylinder and frame setup look like those illustrated in **Figures 2 and 3**.

If we add up the numbers of the exhaust port width, twice the steam port width (one at either end of valve travel), and the bridge width this equals: $0.07 + 2 \times 0.056 + 2 \times 0.1 = 0.382$, which means that the valve has a lap of $(0.414 - 0.382)/2 = 0.016$ -inches. We divided by two because there is equal overlap on the ends of the valve at its midrange of travel. Why this lap number is so important I'll get to later.

Now, if you're new to valve gear stuff this all may sound rather confusing. However, if you're interested in learning more I would highly suggest loading the slip eccentric gear software and taking the time to input the numbers used in the two screens shown in **Figures 2 and 3** to get a feel for the valve gear.

Boiler and valve gear disassembly

Enough about the valve gear discussion. Let's take a look at how to get the boiler off, which is what needs to happen before we can make any alterations. What I really like about Accucraft is that most of their

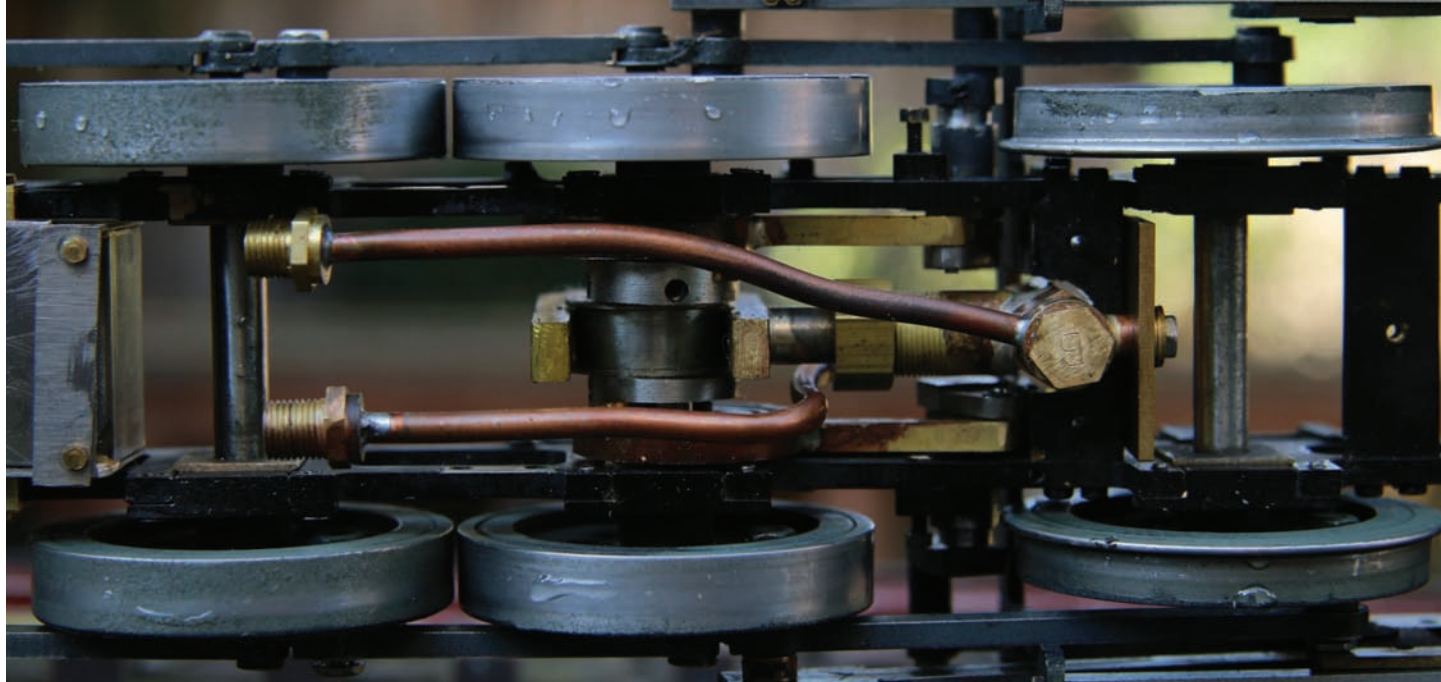


Photo 6

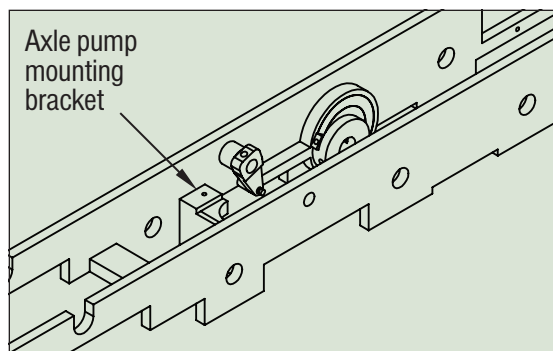
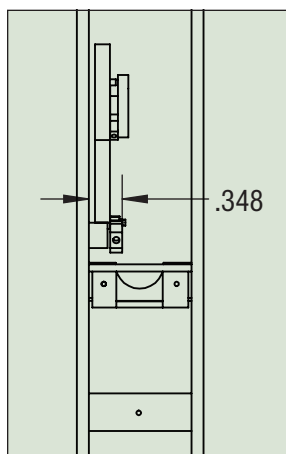


Figure 6

Figure 7

Figure 9

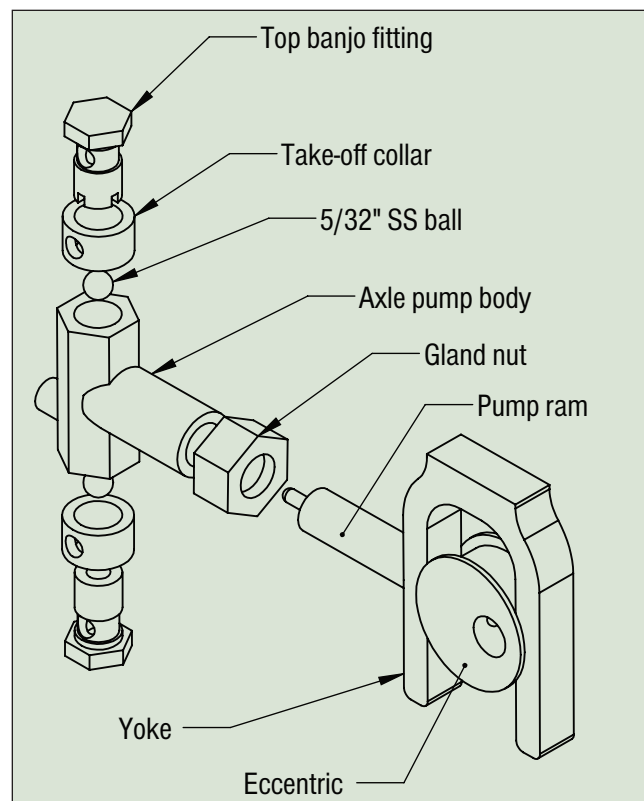
assemblies are held together with screws and threaded holes. If you're considering this change then you are probably mechanically minded enough to figure out how to take items off of the boiler area to get down to the frame, such as the cab, the safety valve and its extension and similar parts.

You will then find that there are only three screws that hold the boiler to the frame, plus other miscellaneous items. Start by turning the engine over on its side and unscrewing the hex nut which attaches the lubricator line to the back of the cylinder saddle steam piping. Then open the smoke box door, grip the knurled fitting beneath the stack, loosen it and take it off,

which releases the stack. You can then look down through the stack hole and see two Phillips-head screws which hold the smoke box onto the cylinder saddle. Once those are out the only attachment left is the single screw at the back of the boiler which keeps it on the frame.

Now that the boiler is off, slide the actual copper boiler out of the jacket. You might want to keep the old boiler for testing appliances. (Might make a nice horizontal teapot for Mum?)

On the raw frame there are several modifications which need to be made: the rear frame spacer needs to be altered to support the back head of the boiler and allow for



the grate removal, changes to the valve gear rocker arms, and changes to the cross head guide support to make room for the axle pump. But first we must remove the existing valve gear components to make room for the axle pump.

You can take the individual wheel sets out of the frame by simply taking off the pillow blocks under each wheel and then removing the side-rod screws, after disassembling any valve gear connections which get in the way of doing that. To

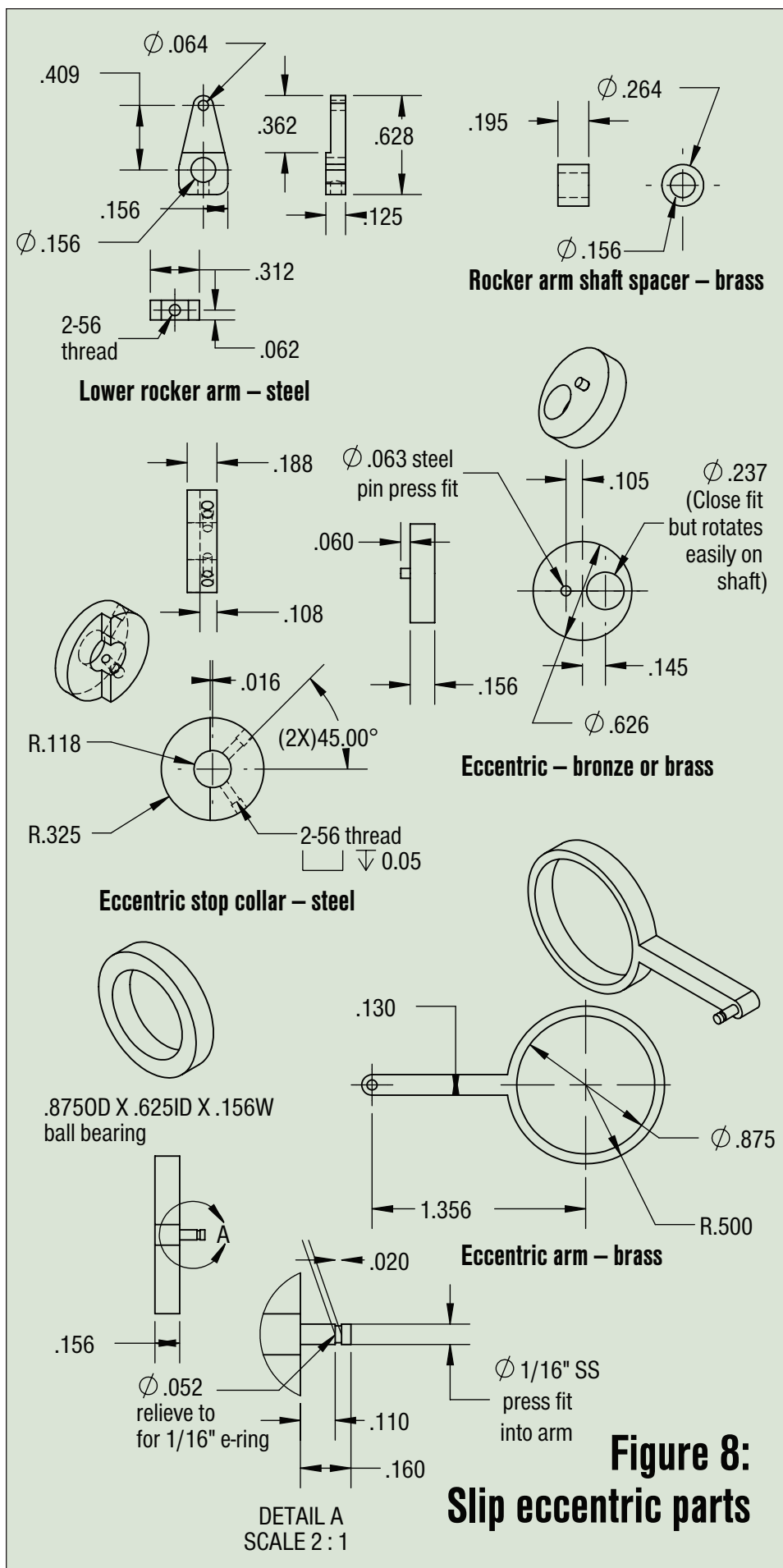


Figure 8:
Slip eccentric parts

my mind it's a scary proposition to think of removing a wheel because of having to deal with quartering. And I didn't really want to have to quarter all of the wheels to match the ones I was pulling off.

Instead, before you punch the wheel off the axle (it's a press fit), the guys in my Saturday morning modeling group here in the San Francisco Bay Area suggested that I simply scribe a precise mark which overlaps both wheel and axle (**Photo 1**).

When placing the wheel set back together you can align the marks to get your quartering back. But be particular about getting the mark back to the same spot. Otherwise you're going to have a real rail-thumper.

Before I realized that the eccentrics needed to be removed I used a rotary tool (Dremel) to cut the eccentric followers off of the eccentrics. There's just not room enough to leave these in place. **Photo 2** shows a view of the drivers with everything gone but the eccentrics.

Re-machining the frame

Now that the frame is stripped of all the "unimportant" stuff, we need to alter it by machining some locations and putting in a few threaded holes. Take a look at **Figure 4**. (I left some details of the frame profile out.)

There are locations where some machining is needed: a one-half-inch diameter slot in the cross head guide and front frame spacer and a reduction in thickness of the rear frame spacer to accommodate the firebox grate removal. The cross head guide can be taken off for machining; the front frame spacer which holds it can be machined in place (**Photo 3**).

There are two major assemblies that need to be made to support the coal boiler changeover: the axle pump and the slip eccentric valve gear mechanism. Let's start with the valve gear (**Figure 5**).

The rocker arm shaft needs to be shortened and changed to allow the lower rocker arm to be placed exactly at 180 degrees from the upper arm, which is swaged or soldered in place on the shaft. Shorten the shaft so that 0.35-inches protrudes from the inside of the frame. This is shown in **Figures 6 and 7**.

You must fabricate a new lower rocker arm which will be held onto the shaft with a 2-56 set screw. This will hold the lower rocker arm and its shaft in place.

Put a flat onto the top of the rocker arm shaft using an end mill. This is an easy operation and Accucraft has made it simple to grab the upper rocker arm on the flats in order to do that (**Photo 4**).

Other parts which must be made are included on the slip eccentric parts drawing (**Figure 8**). Notice that the flat on the eccentric stop collar has a shoulder that is offset 0.016-inches from the center line of the axle. As I mentioned earlier, this amount equals the valve lap of the gear. Make sure this position is located with some precision.

Now, on to the axle pump. As those of you know who are “dark-side” addicts, coal burners produce so much heat so quickly that an axle pump is necessary to keep up with the water usage, unless, of course, you want to stop often and fill the boiler using the hand pump (not a pleasant task). The pump is suspended in the frame by an extra angle bracket, which is attached using the same holes as the cross head boiler support (**Photo 5**).

Before you make the bracket check the location of the existing mounting holes to make sure that they match what you are about to make. The hole locations on your engine might be different.

Figure 9 is a diagram of the parts which make up the axle pump. A big thanks to Colorado steamer Torry Krutzke for allowing me to use his axle pump design, with some modifications.

**Figure 10:
Axle pump
parts**

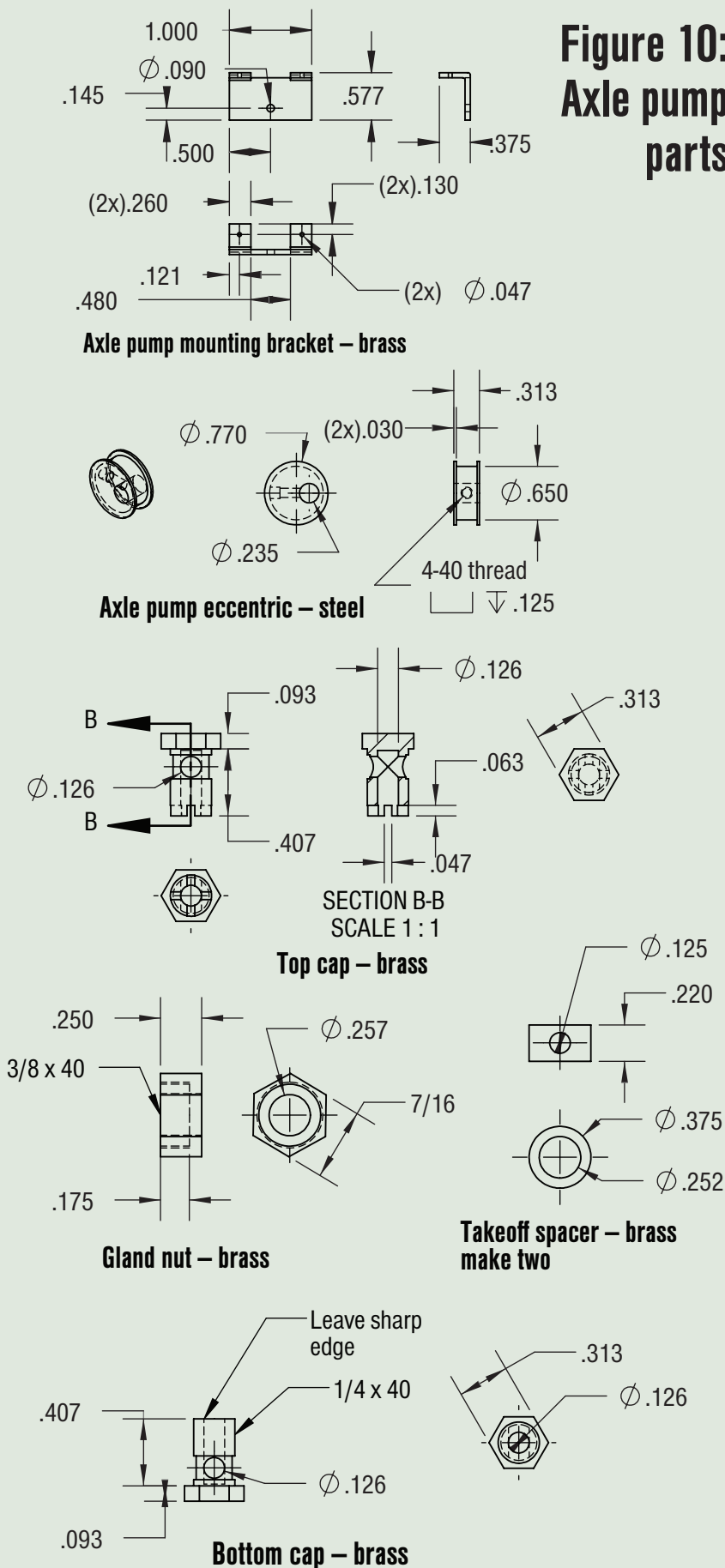
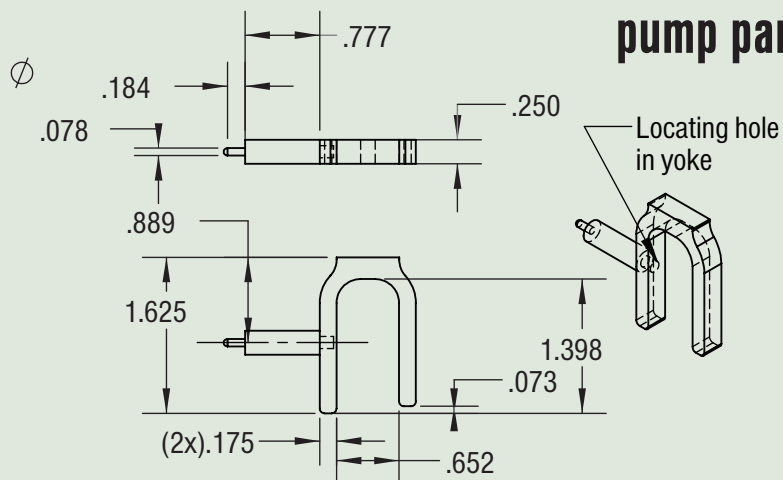
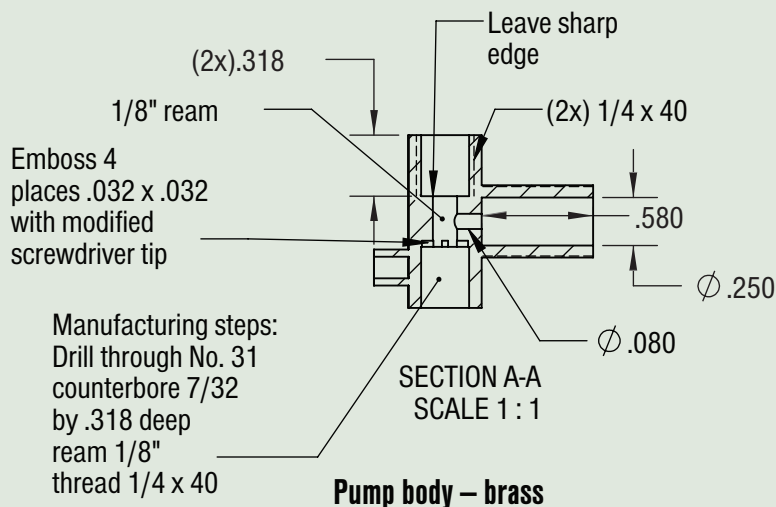
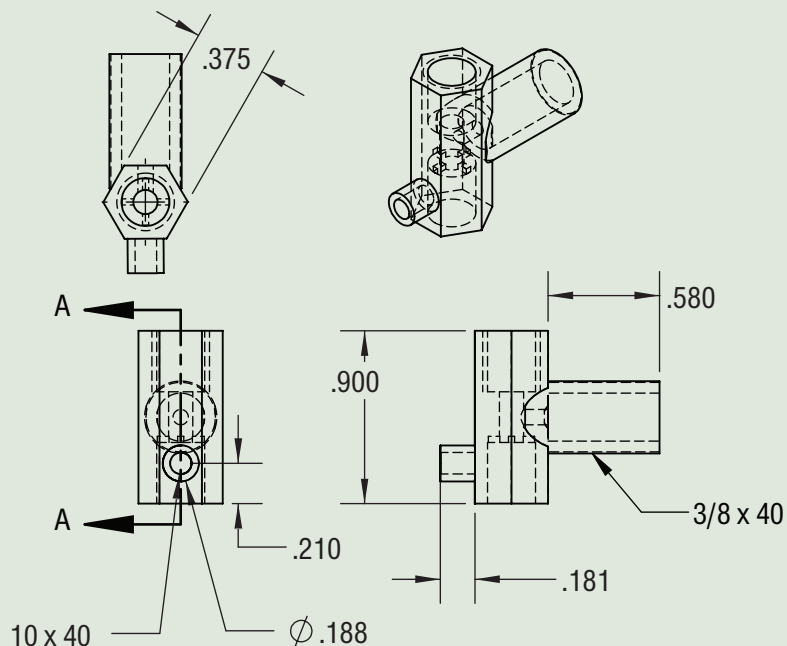


Figure 11: Axle pump parts



Axle pump yoke – brass with stainless-steel plunger



The pump works by drawing in the water from a source (the tender) at the bottom and pumping it out the top. The balls will automatically seal with each action.

The axle pump yoke is made from two parts: the yoke itself, which straddles the pump eccentric, and the plunger. Make the plunger from one-quarter-inch diameter stainless steel and silver solder it to the yoke body. Make a knob on the backside of the plunger to help locate it, corresponding to the hole on the yoke body.

Notice that the top and bottom takeoff collars accommodate the one-eighth-inch water lines to and from the pump. They are routed underneath the mechanism as shown in **Photo 6**.

Some pointers on the construction: For the pump body, I made mine from two separate pieces, the main body which holds 5/32-inches stainless steel balls, and the plunger fitting. I silver-soldered them together after they were mostly complete.

The one-eighth-inch reamer operation of the center bore is the last you should perform. Also, you want to make sure that the embossing you do with the modified screwdriver tip is as close to the recommended 0.032-inch as possible. If the slots are not deep or wide enough the pump will have to work too hard to pull incoming water around the ball and engine performance will suffer. Also, a critical dimension in making the top and bottom banjo fittings: the length of each is critical because of the need to limit the amount of ball travel (**Figures 10 and 11**).

By the way, I've probably made some mistakes or omissions in the part figures, or even left out some which are necessary. Please feel free to contact me at rlenicheck@yahoo.com if you notice something. Next time we will cover the design and construction of the boiler. Happy modeling!

Lots to see at the annual steamup in Diamondhead, Miss.

Locomotive diversity

Text by Bob Winkel

Photos by Carol Jobusch, John and Melinda Tribe, Bob Winkel.

After long months of waiting and preparation, all of sudden it was on us — time to attend the International Small Scale Steamup in Diamondhead, Miss. This year the 23rd annual event took place Jan. 10-17. Right away we saw Bob Weltyk, who was one of the few people who actually enjoyed the low-light environment of the Diamondhead Inn & Suites' atrium. The interiors of his newly detailed and lighted Pennsylvania Railroad coach cars were clearly visible, allowing one to see all his handiwork like plates, silver settings and candle lights. It got at least one vote for "best of show." Did you see Bob's commemorative slide show of the steamers no longer with us? Sadly, he had to add photos for Peter Jobusch, Tom King and Tom Flair.

Meanwhile, action was getting underway even as Rich Jacobs and his crew were putting the final touches on the large track Saturday afternoon. Many thanks to Terry Smelzer, Pat Darby, Ginny Morris, Carol Jobusch, Bruce Gathman and the many other volunteers who worked at this event. Thanks to this



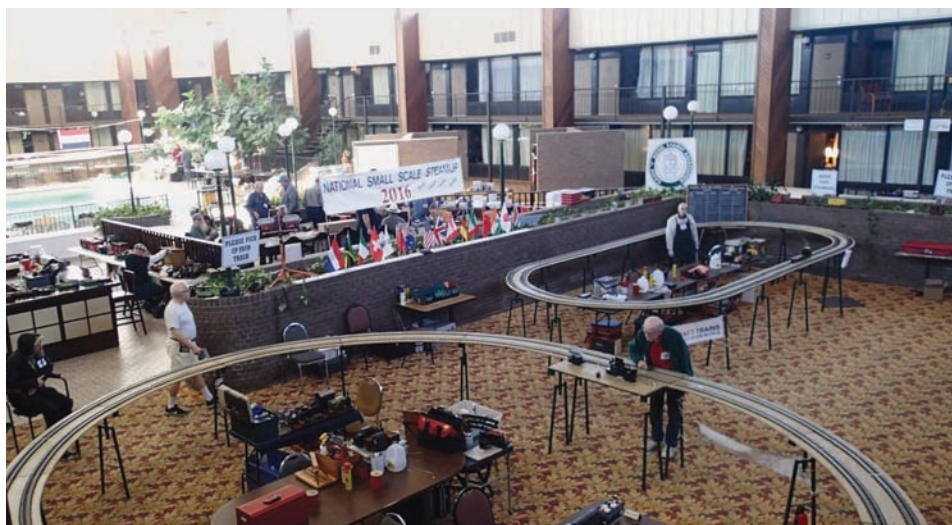
Testing: On the draw-bar pull rig, a Roundhouse supervised by Bob Pope.

wonderful group we have spent the time since trying to wean ourselves of our twin addictions to steaming and sugar. Thanks, guys.

These big shows are a perfect venue to display the latest offerings of hobby manufacturers. There was more than one steamer drooling over the latest offerings from Aster Hobby USA LLC, Accucraft Trains and Wuhu Brand Arts & Crafts Co. Ltd. It was a treat to watch the big hardware run during the week, with several prototypes and a number of relatively new engines. We saw a Union Pacific No. 844, a Norfolk & Western J-class No. 611 and the massive Chesapeake & Ohio Allegheny No. 1601. A crowd favorite was the Union Pacific Challenger No. 3977 in gray livery. And

that Great Northern might be one of the best looking locomotives ever. By the way, did you see the drone flying around filming the action?

Operations were pretty informal on all the tracks, and demand was only moderate during the early part of the week. We saw Leroy Patterson and Ryan Bednarik, among others, doing some coal firing.



Tracks, marshal: Left, overview of hotel atrium. Right, organizer Pat Darby wears a badge and bowler.



Transatlantic: Left, an S.P. GS-4 in Daylight livery. Right, a pair of British A4s, steaming in tandem.

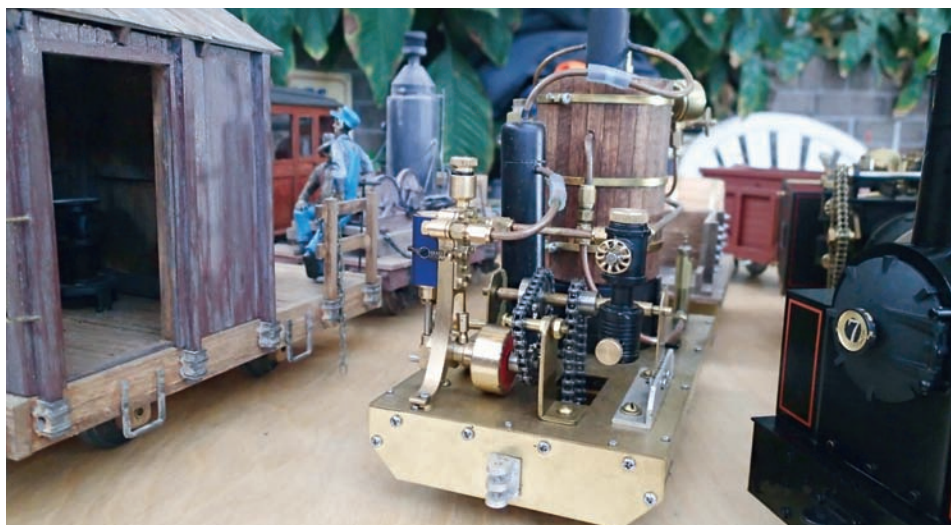
Leroy liked to build a fire in his K-27 while it was sitting well back on the siding of the big track — where the ceilings are low and the coal smell pungent. He liked working in the cloud.

If Diamondhead is anything, it is locomotive diversity. There were engines of all types and sizes. Plus there were trains of every description. There was a large selection of whimsical trains to admire — purple trains, Energizer bunnies, pigs in a poke and a track hog. On the large track there were long boxcar trains made up with house boxcars spotted and available to be pulled. Ken Bisset offered his consist for use too. Scott McDonald showed off his Disneyland excursion train, and we saw (ahem) a slow moving maintenance-of-way and a couple of nice freight trains with 1870s loads. The display of locomotives of all kinds keeps it interesting throughout the week. Tom Myers and Will Lindley had a fine lineup of British equipment, as usual. Oh, and some smooth Scotch too.

Briefly we saw a prototype Wuhu Bowande model of the yellow and silver Chesapeake & Ohio No. 490 Dreyfus Hudson. Rod Blakeman and Ross Schlabach test ran this extraordinary-looking model and later reported that, although it had issues, it was an excellent steamer.

The food was as tasty as ever, not only in the hospitality suite, but also at the local eateries and the group lunch on Friday. One gentleman told me that he had gained five pounds last year and did not intend to do it again (yeah, right...). Frankly, the King Cake was almost irresistible, but then so was the Scotch.

One of the recurrent themes over the years is that the event is half trains and half seeing and talking to old friends. It was true again this year and, almost continuously for 168 hours, there were big and small groups of “steam-aholics” chatting it up about our fun hobby. It’s also enjoyable to talk to the suppliers and manufacturers that come to the steamup. This event saw representatives from Accucraft, Wuhu Bowande, North Jersey Gauge One, Southern Steam Trains, Silver State Trains, *Steam in the Garden*, Stoke ’M & Smoke ’M and The Train Department. And most of the modelers freely shared their techniques, ideas and secrets, even that old reprobate Dave Frediani (thanks, Dave). Everyone enjoyed Dave’s little “Brunel” locomotive (see *Steam in the Garden*, September/October 2015, No. 141) and his 1:13.7-scale cars (see *Steam in the Garden*, November/December 2015, No. 142). He also provided



Loco diversity: Left, Jim Sanders with two Wuhu engines. Right, a table full of logging locomotives.



Passions: Left, German displays on stationary table. Right, Larry Green and his sand-hauling train.

laser-cut scale crates with “Diamondhead or Bust” commemorative markings.

Speaking of 7/8-inch-to-the-foot scale, it still seems to be gaining ground. Jeff Paxton had a fine example with his sugar cane train. His LittlePlastic-People scale figures really add a lot of flair.

There were also a few “Fairymead” locomotives at the event. Dave Frediani was selling 7/8th-inch scale cars, but one attendee mentioned that he was in the market for a 7/8th-inch scale engine but didn’t find what he was looking for in the flea market.

Speaking of the flea market, it opened Tuesday morning with a rush. There were some juicy items on display and from 9 a.m.-4 p.m. there were people browsing. We know for sure that a number of large-ticket items sold. Tom Toth mentioned that he sold his Aster Bay S 2-6 and an Accucraft three-cylinder Shay. A number of other locomotives also changed hands and we were able to watch a few of the “inaugural” runs with the new owners. However, some sellers were unsuccessful, and that meant reloading

the items in the vehicle for the return home (read: “bigggg bridge”).

It was fun to talk to the gents from the United Kingdom, including Ian Pearse and Dave Howarth. Ian couldn’t comment on upcoming releases from Accucraft, which your correspondent took as a good sign.

Mr. Howarth passed on some news of the 7½-inch gauge railroaders from the Ridge track in Florida.

Show attendees continued to check in throughout the week but, even with more track demand, it was still relatively easy to find an open track during the mid-week period. Of course, the 24-hour running schedule eases that problem. Wednesday evening we saw Ryan Bednarik firing the big Canadian Pacific on coal. On the medium track we saw Jeff Young pull the 16-axle drop bottom heavyweight with his “Ruby.” Did you see the beautiful maroon Marion Loader Model 10 on display near the pool? It was mounted on a rail car and was definitely fine-scale construction, voted by this reporter as best of show.

Thursday was a tour day for a number of steam-



Surgery: A group of steamers help Mark Tilden work on the gas tank of his ceramic-burner engine.



Whatever floats: Steamboats await a run in pool.

ers. The World War II museum in New Orleans was a bus destination and we heard lots of comments about it. Others did walking tours of the French Quarter. We were blessed by relatively good weather during the week. Yes, it did rain on Thursday afternoon and evening, but not before we got back to the vehicle and began our trip back from New Orleans.

Thursday evening we saw the “Box Cab Lash-up.” Will Lindley, Tom Myers, Leroy Patterson and Larry Green ran their box cabs together making for an unusual photo opportunity. Then, on Friday evening, we saw the “Chirp-up,” a gathering of Crickets. It looked, to the uninitiated, a bit like a NASCAR spoof. Bill Courtwright, John Garret, Scott McDonald, Jeff Paxton, Jim Sanders and Bob Simpson

steamed up their single-cylinder oscillator engine “Crickets” on the outside track. When ready they put them on the inside track and let ‘em go. It was pretty fun and gave some laughs to the peanut gallery sitting over in the corner. The slowest is at the front by default and everyone else comes around and pushes from behind. Here they come, click-click-click-click. Jim Sanders had troubles in the pits and came into the race late, about 10 laps down.

(Did you know: Although conceived as early as 1785, the first oscillating-cylinder engine did not appear until 1827 when Joseph Maudslay built the first one — a two-cylinder steam engine that was fitted to the paddle boat “Endeavour.” If you happened to see the little red paddle boat engine traveling in a Denver & Rio Grande gondola car, that was an Airfix model of Maudslay’s first oscillating engine. Why was it being shipped on the D&RG in the 1870s? We may never know — maybe it was going to a museum. ...)

Things proceeded calmly most of the week, not too much excitement. But we steamers can get moving when we want to. The first time people got moving was earlier in the week; an (old) o-gauge alcohol-fired locomotive got loose and scooted around the track trailing a ball of flame, looking rocket-propelled.

Tom Myers hustled over to get his trusty CO₂ cartridge and arrived back in time to blow out the fire before there was any damage. We also saw the group get energized twice on Friday; once when the group photo was announced, and shortly after that when we heard the event luncheon announcement. You never saw a room empty so fast. Our thanks to the show staff for such a delicious meal. Also, thanks to the presenters this year, including Will Lindley for



Setup: Left, Accucraft's Channing Cheng with the new J-11. Right, Jerry Sheehan adds water to his loco.



Ready to run: Left, Ken Bisset with his Garratt. Right, Yves Guillaume with a coal-fired Royal Hudson .

his insurance lecture and Ryan Bednarik for his presentation about coal firing.

The drawbar contest this year had only 12 entrants. Friday's results were topped by Ken Bisset's Accucraft Garratt, at five pounds, 2.3 ounces. Next was Rich Jacobs with his Accucraft K-36, at four pounds, four ounces. John Riley brought a "Tich" 0-4-0 and pulled three pounds, 10.6 ounces. The Tom Myers loco "Tom Rolt" pulled two pounds, 5.3 ounces, Steve Janus' Roundhouse 2-6-2 did two pounds, 4.3 ounces and Rod Blakeman fired his Accucraft "Victory" to achieve two pounds, two ounces. The new owner of the Regner "der uber" "Willi" gracefully declined the opportunity to extend his engine's win streak to three years in a row (last year it had a six-pound pull).

Friday evening was another laid-back time with only moderate demand for track time. Bill Ford mentioned that he was surprised that a number of

fellows were packing up. In years past, he said, Friday could be a hectic evening with many engineers chomping at the bit, trying to get on the rails. He offered the opinion that the current event size is well suited for the number of tracks at the show and engineers get enough run time during the week, and thus do not feel so pressed to run Friday evening. Ginny Morris, at the registration desk, agreed that this year's show was just about right, especially compared to the peak years like 2008. There were 111 preregistered entrants and "about a dozen" walk-ins, making a nice-sized group. Even John Garret's "track hog" seemed happy.

It was a good week but frustrating too. To paraphrase Will Lindley: "Too much to do, too much to see, too many people to talk to and too much good food, but *not* enough time to do it justice." Agreed. Thanks to all staff and participants of the 23rd annual International Small-Scale Steamup.

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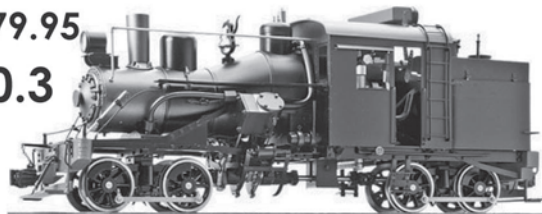
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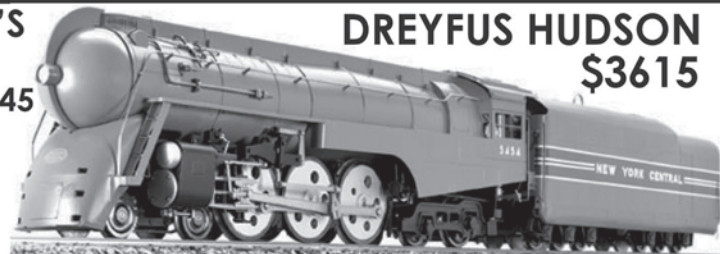
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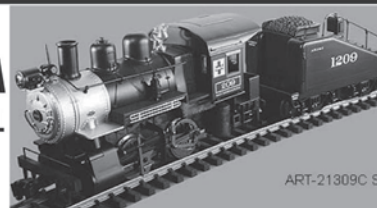
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Vol. 25, No. 2; Issue 144; March/April 2016

FEF-3: Locomotive review and workshop project building Aster kit • Resurrection of Bowman steamer • 'Dordlebug': A rail bus out of a 'Dora' and a plastic rail car • Streamlined Garrett: 1:32-scale scratch built steamer. Part I of three • Steam in the scenery • Latest waybill: Flair, Bates obituaries, bearing kits.



Vol. 25, No. 1; Issue 143; Jan./Feb. 2016

Micro layout: Building an indoor Gauge One track • Review of Wuhu Bowwade Porter • Hot-rod 'Ruby': Hopping up a 1:20.3-scale engine • Rolex Asters: Adding radio control • Learning to model in tinplate with a 'Dora' modification, Part III • Latest waybill: Llagas Creek Railways sold, U.K. distributors merge.



Vol. 25, No. 6; Issue 142; Nov./Dec. 2015

Sacramento stationaries: 2015 National Summer Steamup highlights • Review of Wuhu Bowwade G5 • Building an Accucraft 'Ruby' kit • Learning to model in tinplate with a 'Dora' modification, Part II • 7/8ths WWI car • New products: 1:32-scale U.K. 'Victory,' 1:20.3-scale 8-driver Saxon.



Vol. 25, No. 5; Issue 141; Sept./Oct. 2015

Mamod's latest: 'Brunel' • Learning to model in tinplate with a 'Dora' modification, Part I • Live-steam group makes sixth appearance at Maker Faire • Adding mesh to Accucraft burner • Salute to Tom King • New products: Aster 0-4-0, Wuhu Bowwade German 2-6-2T, Train Dept. with two 7/8ths-scale.



Vol. 25, No. 4; Issue 140; July/August 2015

Classy Class A Climax — Regner steamer and kit review • Big 'Dora' — Making it a 1:13.7-scale rail bus • Spinning metal • Cabin Fever • Speedometer • Latest waybill: Garratt from Roundhouse; in memoriam — Peter Jobusch; Accucraft UK goes with an African steamer; Mamod saddle-tank loco.



Vol. 25, No. 3; Issue 139; May/June 2015

Steaming amongst the magnolias: Diamond-head 2015 • Laser Loco: Aspinall 0-6-0 (series Part Two) • Workshop: sample tools and equipment • Wicks: A new material • Open cab 'Dora' • Latest waybill: Swiss, U.S. locomotives on the way; a new version of Saxonian in 1:20.3 scale.



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

Laser Loco: Scratch building with laser-cut brass. Part 1 • How steamers in Seattle created a community • Getting an LED onto the front of Accucraft's C-19 • Two former ride-on live steamers decide to go to Gauge One • Romance, realism of coal firing: factors to consider before taking the plunge.



Vol. 25, No. 1; Issue 137; January/February 2015

Expand Accucraft cylinder ports • Casey Jones: a new 10-wheeler from Wuhu and the engineer's history • R/C J-bar: adding steam controls to transmitter • Dummy cylinders: Give 'Dora' a more realistic look • Railroad librarian: 'Great American Railroad Stories'; 'The State Belt.'



Vol. 24, No. 6; Issue 136; November/December 2014

Sacramento steams. The 2014 National Summer Steamup provides a fun time for more than 150 steamers • Replacing axles • Scratch-building the four-cylinder Heisler, Part Three • The backyard Rivendell & Midland Railroad, Part Two • 'Dora' gets a snow plow (and a bell and a ...).



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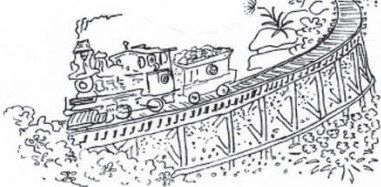
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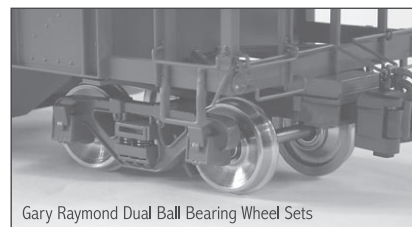
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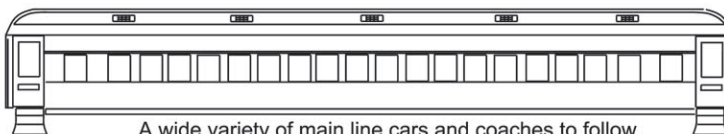
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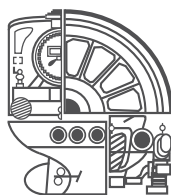
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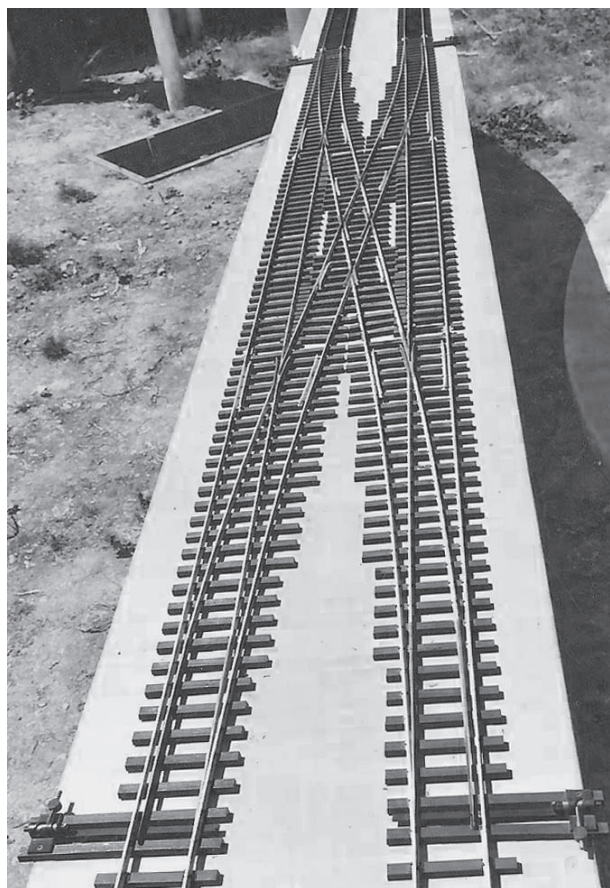


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Sept. 15-18, 2016 — Fall Steamup, Staver Locomotive, Portland, Ore. Info: <http://www.staverlocomotive.com>.

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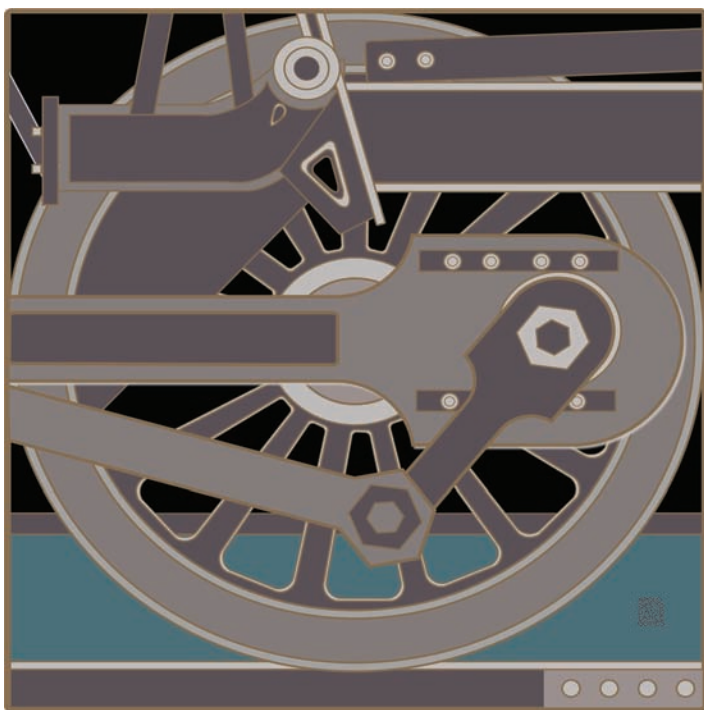
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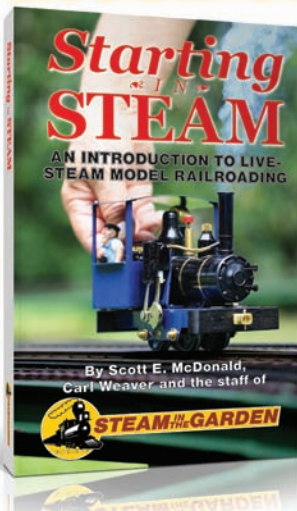
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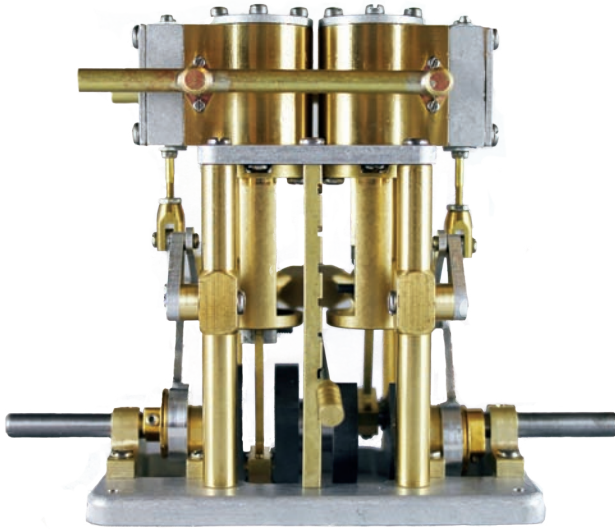
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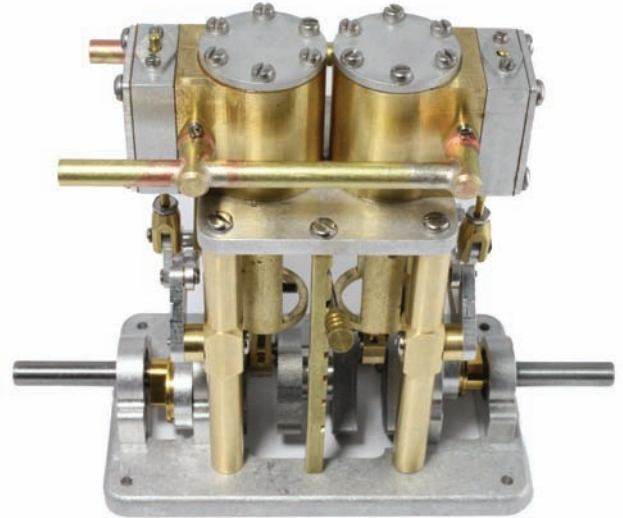
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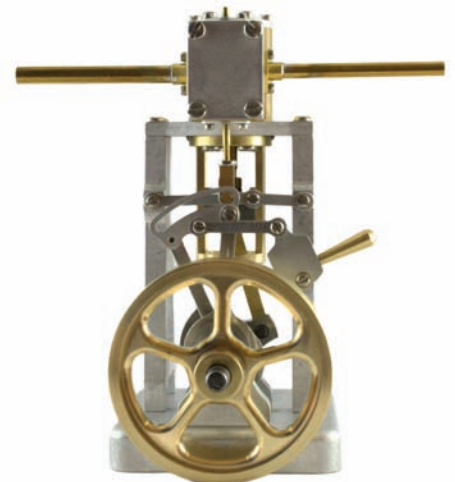
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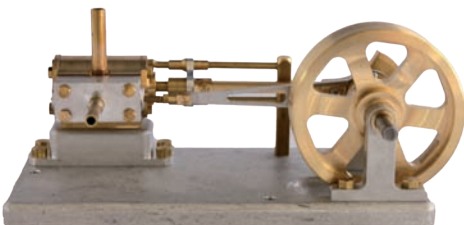


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Butane Fired, Live Steam

Limited Production

Gauge One

