

No. 137, January/February 2015

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STEAM IN THE GARDEN

CASEY JONES

**Bowande
Wuhu's new
1:32-scale
4-6-0 steamer
reviewed —
and the history
behind the real
locomotive**

• **Making Accucraft valves better**

• **Latest 'Dora' mod: Adding dummy cylinders**

• **Build a throttle and J-bar for your R/C transmitter**

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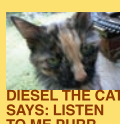
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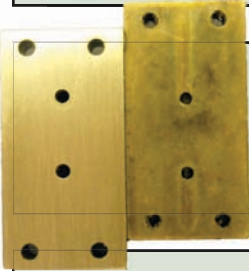


STEAM IN THE GARDEN

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

9

Latest waybill. Shift in Australian dealership; in memoriam – “Stretch” Manley; Aster U.P. 4-8-4s getting close; Chinese “Big Boy” in 1:32 scale; special run of “Wilma.”



Expand the ports. Make Accu-craft cylinders and valves work more efficiently. **By Bill Allen.**

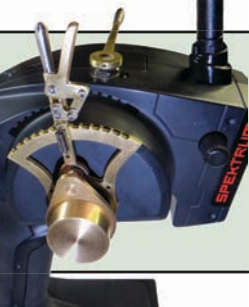
17

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Casey Jones.

Bow-

ande Wuhu releases a 1:32-scale live steam 1898 10-wheeler like the one driven by the legend. **By Jim Overland.**

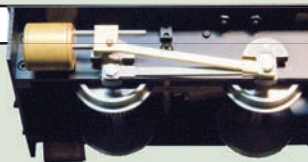


R/C J-bar. Does your Spektrum radio-control transmitter look a little too much like a race car? Give it a steamera makeover. **By Rick Weber.**

26

34

Dummy cylinders. With her gears and action inside the frame, make “Dora” look more like a real locomotive. **By Marc Horovitz.**



The Cupola View. Two recently released books – a compendium of *Trains* essays and a history of San Francisco’s waterfront pike. **By Dave Cole.**

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Cover: Illinois Central Railroad’s No. 382 waits at the Pickens, Miss., station the morning of April 30, 1900, John “Casey” Jones at the throttle, in Gil Reid’s 1979 painting, “Six Point Six Miles From Destiny.” Reid’s railroad lithographs are at <http://www.gilreid.com>.

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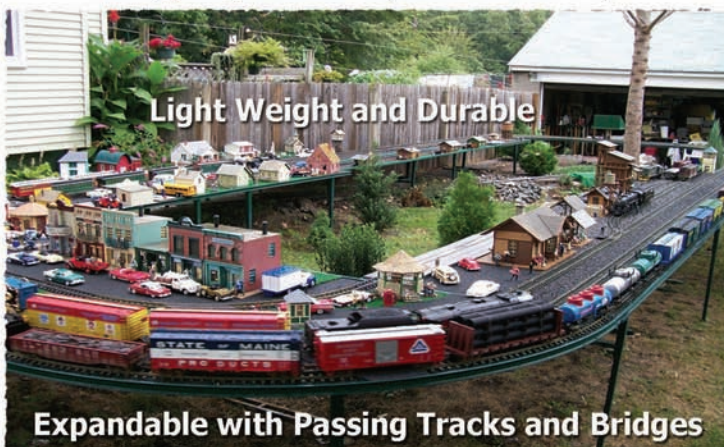
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LATEST WAYBILL

Shift in Australian dealership

Long-time Australian small-scale live steam manufacturer and dealer Argyle Locomotive Works said late last year it is spinning off its locomotive and rolling stock development group that works with Accucraft Trains into a new stand-alone business.

Accucraft Australia Pty. Ltd. will be the new entity that helps Accucraft Trains of Union City, Calif., create both live steam and electric trains that operate in scales from 1:19 to 1:32. Argyle will continue to operate as the Australian retailer of not only Accucraft products, but also those of Aster Hobbies Ltd. of Japan and two leading British manufacturers, Roundhouse Engineering Co. Ltd. and Mamod Ltd., as well as the Australian maker Steamco Engines.

Accucraft Australia and Argyle Locomotive Works will continue to be owned and operated by Gordon Watson and Michael Ragg. Watson started Argyle in the early 1990s to develop and market "bespoke and batch-built" live steam locomotives.

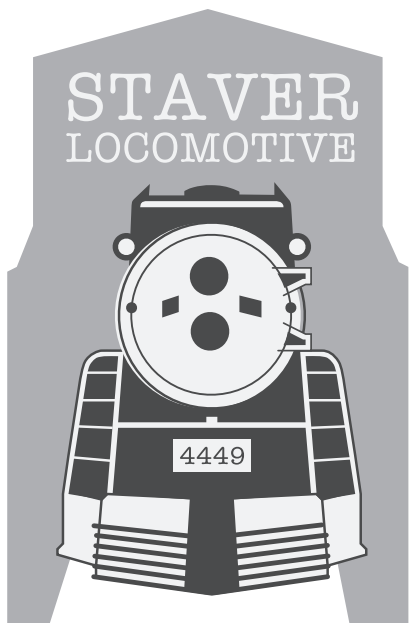
As part and parcel of the spin off, Accucraft Aus-



Speedy steamer: Accucraft Australia is developing a 1:32-scale version of Australia's NSW's No. 380, shown here in 2006. Photo by Chris Walters.

tralia said it would be developing two more locomotives: the New South Wales Government Railways C38 Class No. 3801 and the N.S.W. Government Tramways Baldwin steam-tram motor and trailer.

The C38 Class will be a 1:32-scale model of No. 3801, a 4-6-2 that achieved the fastest journey from Sydney to Newcastle by rail (two hours, one minute and 51 seconds) for a non-stop run on June 28, 1964. The model will be Gauge One (45mm) and come in



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two live-steam versions — alcohol- and butane-fired — as well as electric. A pilot is expected later this year.

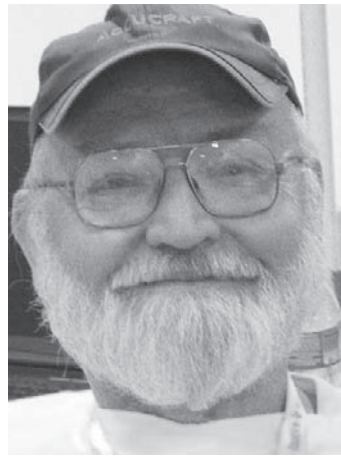
The tram will also be 1:32 scale, making it “an appealing balance to the much larger models normally associated with the scale.” The model will be offered as a motor and trailer, with additional trailers to be available. It will come in either live steam or electric and its pilot is also expected later this year.

Accucraft Australia Pty. Ltd. is available by phone at 011-61-03-9751-1964, while Argyle is on the Web at <http://www.argyleloco.com.au>.

In memoriam: ‘Stretch’ Manley

A life-long train buff who spent a decade as a supplier to the small-scale live steam community, Darrel “Stretch” Manley provided many in the hobby with a lifeline to a variety of parts and components for steaming and garden railroading. Manley’s January 2014 death after a long illness was revealed only late last year.

Manley’s California and Oregon Coast Railway, founded in 1999 in Rogue River, Ore., was a distributor of rail, switches and ties from Llagas Creek Railways as well as a provider of Del-Aire pneumatic switch controls. When Del-Aire went out of business in 2003, Manley helped create a new line of air-driven switch machines for outdoor use, which he ini-



Steamin’ Stretch: Longtime dealer of live-steam products Darrel Manley; lover of Mamod locomotives and bad jokes. Photo by Rick Parker.

tially called “E-Z Air Motion Control,” but because of a trademark conflict, later was renamed “EA-ZE Air Motion Control.”

California and Oregon Coast carried a wide variety of model-railroading parts for garden railroaders and live steamers. It was a dealer for both Accucraft Trains and track manufacturer Llagas Creek Railways. Manley once said that after he received numerous requests for wooden ties, he began to cut up scrap redwood he’d find in his Southern Oregon town and sell it as ties in small bags.

He was a supporter of garden railway groups on the West Coast, providing both time as a presenter at

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New South Wales Government Railways C38 Class 4-6-2



Image kindly provided by Craig Mackey

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| Un-Streamlined, Black livery '3820' as 1970 livery |
| Un-Streamlined, Black livery (Data Only) |

1:32 Scale 45mm gauge. Pilot Model 2015. More details shortly.

N.S.W. Government Tramways Baldwin Steam Tram Motor and Trailer



Image: ARHSnw Rail Resource Centre Collection

To be offered as a set of Steam Motor and Trailer (as pictured) with extra trailers available separately. This attractive set will make a welcome addition to the Gauge One model fraternity offering an appealing balance to the much larger models normally associated with the scale.

1:32 Scale, 45mm gauge. Live steam and electric. Pilot Model 2015. More details shortly.

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meetings, and product for door prizes and raffles. He also was a long-time member of the Southern Oregon chapter of the National Railway Historical Society and served as activities director for the group.

Manley was an avid live-steamer and owned a variety of locomotives, including one of the first of Accucraft's "Ruby"; he especially liked his Mamod live-steamers. Manley, north of six-foot-six, was wry but only told jokes if they were especially bad — not in poor taste, just bad jokes..

California and Oregon Coast shuttered its business in 2009 in the midst of the Great Recession, citing a downturn in business.

Darrel Raymond Manley was born in 1942 in Ramsey, Ill., and he and his family moved back and forth from suburban Chicago to Montana until the late 1970s. He was an eight-year U.S. Navy veteran, married in 1976 and moved to Rogue River in 1979, by which time he had become a self-taught computer programmer. He wrote a six-part series about Ohio Scientific Inc. computers for a computer newsletter in 1981-1982, detailing how to use the programming language BASIC with the OSI machines. He developed all the shopping cart, order-fulfillment and web software for the California and Oregon Coast site himself.

Manley's first marriage ended in divorce and he later married his long-time friend Christine Ranieri,

who also worked at California and Oregon Coast for four years. He is survived by Chris, as well as two brothers, three sisters, three stepsons, a step-daughter, two step grandchildren and a train-load of nieces and nephews.

Aster U.P. 4-8-4s getting close

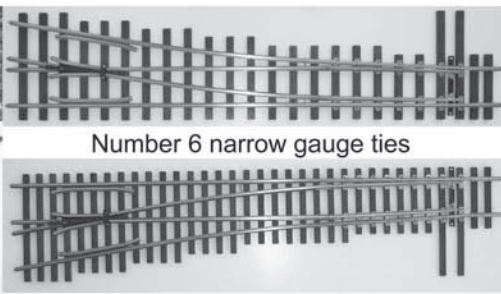
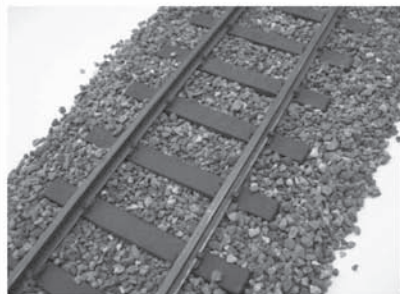
Last summer a pilot model of Aster Hobby of Japan's 1:32-scale, 45mm-gauge Union Pacific 4-8-4 (called "FEF," for "four-eight-four") was delivered to Aster Hobby USA for evaluation and testing. Several technical and cosmetic improvements were recommended to the manufacturer and they were applied to the second pilot model — FEF No. 837, in the "Greyhound" livery — which was also to be reviewed in the United States before production goes into full swing this winter.

The FEF models feature an alcohol fired, C-type boiler equipped with seven flue tubes, similar to the Challenger design. The FEF3 is the first U.S. two-cylinder locomotive built by Aster featuring twin exhaust stacks. This presented some initial performance issues, Aster Hobby said, until the correct blast pipe dynamics were established.

The prototype FEFs were constructed with frames featuring integrally cast compressed air reservoirs — no compressed air cylinders were used under the

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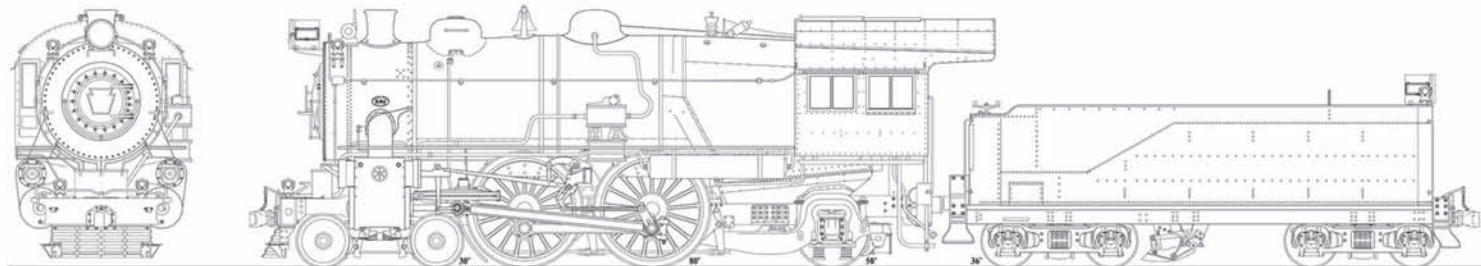
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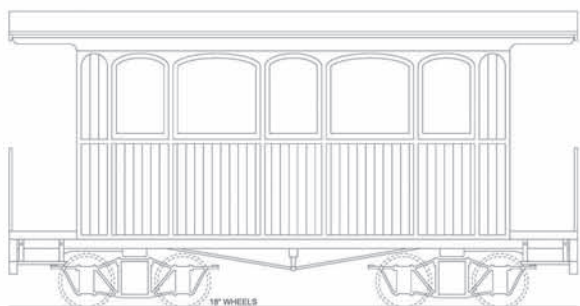
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Sunset Valley
Peco Track



*Accucraft smooth-side cars 1:32 scale
Five Different cars with six road name options*

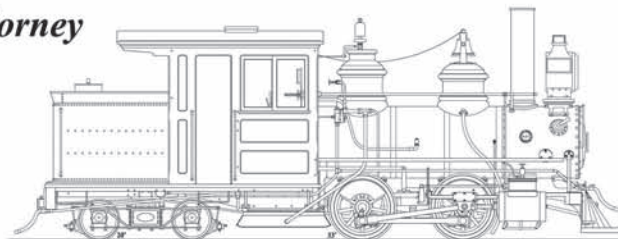


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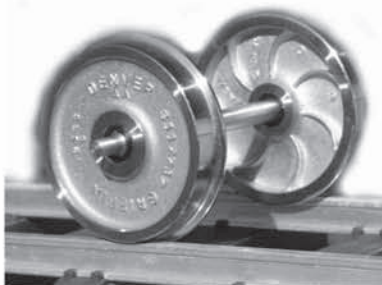
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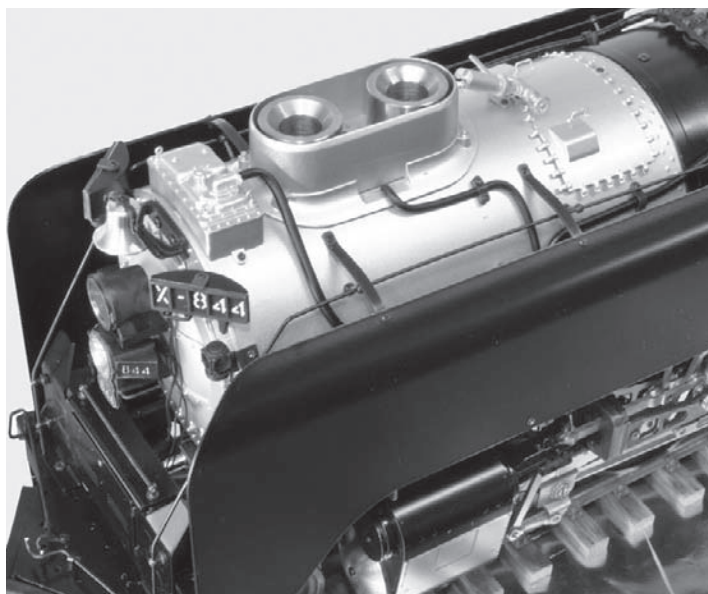
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Arriving soon: Aster Hobby's new 1:32-scale Union Pacific 4-8-4 is on track for early 2015 delivery.

running boards. Since these air tanks are the logical solution for steam oil tanks on small-scale models, Aster solved the absence of them by installing the steam-oil tank inside the sand dome.

The FEF requires nine-foot minimum radius curves (three meters). Dry weight of the locomotive is 23 pounds and the tender weighs in at 8½

pounds. The length of the combination over couplers measures 40½ inches.

The projected retail kit price for the black No. 844 is \$7700 and the Greyhound No. 837 is expected to be around \$200 more. The ready-to-run price hasn't yet been determined. Production release is expected for late winter 2015.

The usual \$1000 reservation deposit is required. Aster Hobby USA is at <http://www.asterhobbyusa.com> or by phone at (864) 587-7999, while Aster Japan is at <http://www.asterhobby.com>.

Chinese 'Big Boy' in 1:32 scale

Live-steam locomotive manufacturer Wuhu Arts & Crafts Co. Ltd. of Anhui, China, said late last year it would build a 1:32-scale model of the China Railways' QianJin 2-10-2, known because of its wheel arrangement as the "Big Boy" of China.

Bowande Wuhu said it planned to show the pilot model at the International Small-Scale Steamup in Diamondhead, Miss., in mid-January.

The maker said it would build models either with butane or coal firing. With its six-wheeled tender, Bowande Wuhu said, the scale locomotive will be almost three feet long; with the four-wheeled tender, it will be 32-inches long.

The company's U.S. agent, Stoke 'm and Smoke 'm,

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◆ International Small Scale Steamup ◆

JANUARY
11 to 18
2015

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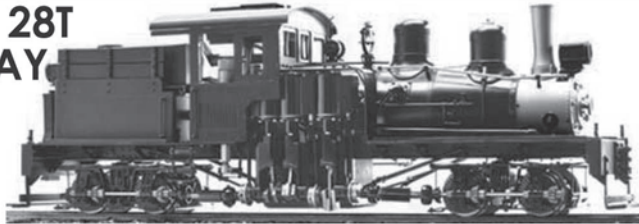
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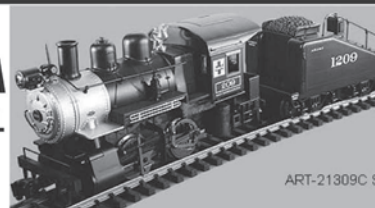
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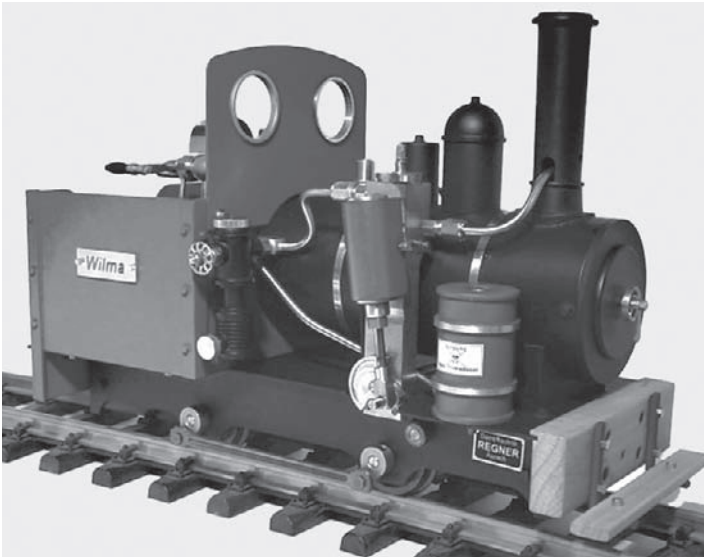
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German 0-4-0: Regner has agreed to do a special run of 'Wilma' for The Train Department.

is now on the Web at <http://www.LiveSteamG1US.com> and by phone at (301) 467-3348, while Bowande Wuhu itself is on the Web at <http://www.bowandeusa.com>.

Special run of 'Wilma'

A small-scale live steam locomotive that had been discontinued by Regner Steam & Railway Tech-

nology of Germany has been resurrected for a one-time reissue, The Train Department of Hazlet, N.J., said late last year.

The "Wilma," an 0-4-0 locomotive in the company's "Easy Line" group of products, was discontinued in 2011, but was given a reprieve at the urging of Jason Kovac, the proprietor of The Train Department, which represents Regner in the United States.

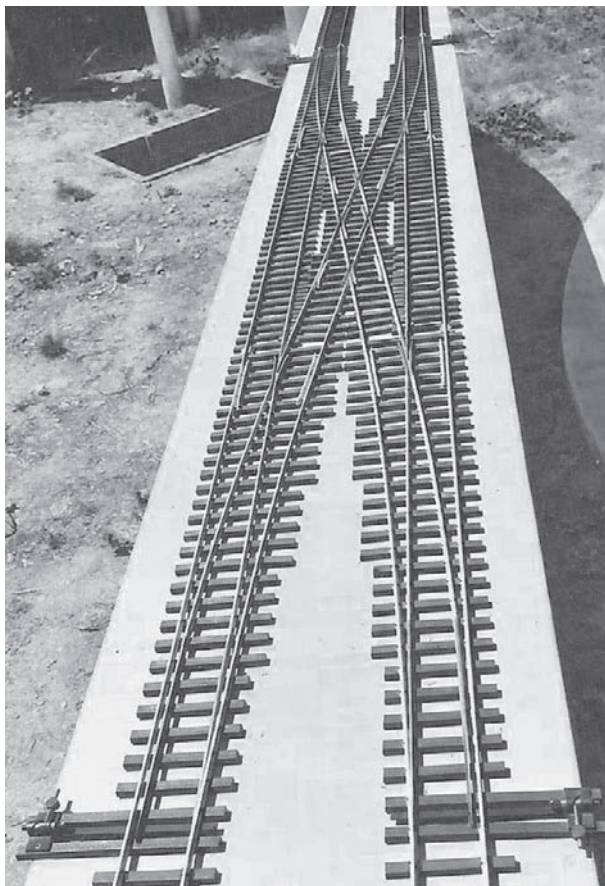
The 45mm gauge locomotive is a free-lance design that is butane-fired and has an oscillating cylinder with a three-eighths-inch bore (10mm), as well as a water re-feed system and a pressure gauge.

The special run of locomotives is limited, said Kovac, and delivery is expected in the United States in early spring. "Wilma" will retail for \$850 (without shipping) and reservations are being accepted.

The Train Department is on the Web at <http://www.thetraindepartment.com> and by phone at (732) 770-9625. Regner's web site (in German) is at <http://www.regner-dampftechnik.de>.

Correction

In last issue's "Latest Waybill," the development of Accucraft's London, Midland and Scottish Railway Black 5 was misattributed to the dealer TrackShack. The locomotive was solely developed by Accucraft UK Ltd. The editor apologizes for the mistake.



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Make 'Ruby'-like cylinders work more efficiently: expand the

PORTS

Text, illustrations and photos by Bill Allen

Have you ever wondered why it is so hard to tune an Accucraft “Ruby” to run well in both directions? If so, you are not alone. Like many of you, my start into live steam was with a “Ruby” from Accucraft Trains Co. From the moment I ran it around a temporary track in the garage, I was hooked.

It had trouble in forward but ran pretty well in reverse. With the help of some excellent articles by steamer Dave Hottmann, I learned how to reverse the admission and air tune it to my satisfaction. I then bought a couple of “Ruby” kits and bashed them into a Garratt; later I bought a Forney. Needless to say, I think they are a wonderful product. I did, however, spend many hours getting them in perfect tune — or at least as good as possible.

The “Ruby” has a simple valve system. (For the benefit of simplicity, when I refer to a “Ruby” here, I am including any Accucraft engine with a reversing valve.) It has one eccentric for each cylinder, and a piston-valve reverser which reverses the steam flow to change direction. The “Ruby” uses outside admission for forward and inside admission for reverse.

Because of the design of the “Ruby” valve, when the steam admission is on the outside of the spool valve, the steam pressure pushes the valve piston toward the rear of the engine, changing the timing slightly and causing excessive wear on the valve linkage and eccentrics.

Reversing the admission makes these things happen in reverse, thus making for better running in forward and reduced wear as the strain in the valve gear

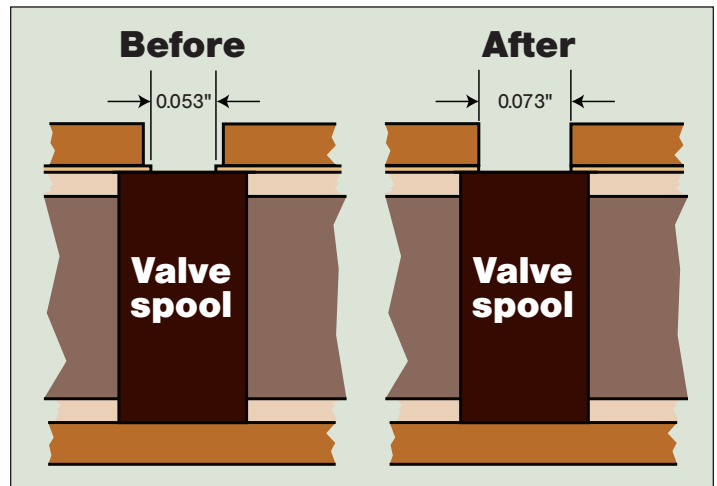


Figure 1: The lap change is shown with the 0.073-inch port. Note how piston now needs to move less to open valve, which causes timing to be advanced.



Photo 1: ‘Ruby’ valve piston showing spool portion.

is now only when backing up. I believe that Accucraft is now reversing the admission on some models.

But even with the admission reversed, there is a lot of performance in forward that cannot be achieved if

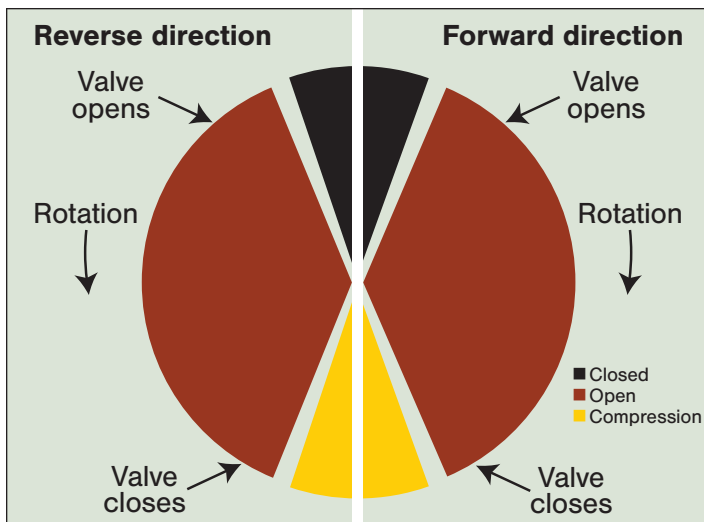


Figure 2: Stock 'Ruby,' port size 0.053 inches.

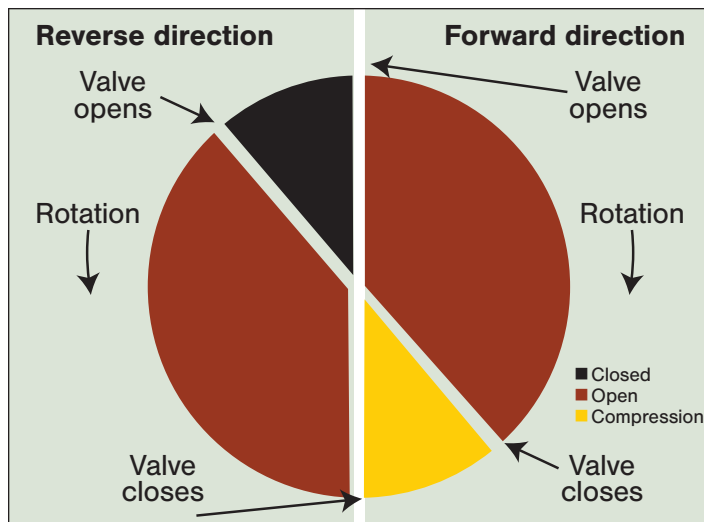


Figure 3: 'Ruby' timed for best forward running.

you want the engine to run OK in reverse. Here's why.

The more sophisticated valve systems use either two eccentrics per cylinder (one for forward and one for reverse) or one eccentric crank plus a combination lever for each cylinder. Without getting into the specifics of each type of gear, here's a list of what they can do:

- To be able to advance the timing to dead center or earlier in both directions.
- To be able to cut off steam admission prior to the end of the stroke while the exhaust on the opposite

side remains open, creating expansion and free power.

- To be able to close the exhaust on the opposite side just before the end of the stroke, causing compression.

One of the key ways to do this in addition to the dual eccentrics and combination levers is with lap. Lap is where the valve overlaps the port when the valve is in center position.

In the sophisticated systems, the valve is designed to overlap only on the admission side of the port.

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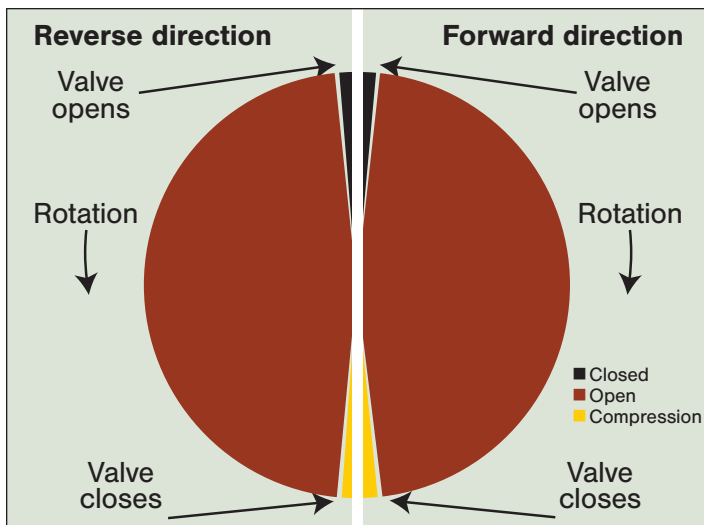


Figure 4: Port size changed to 0.073 inches.

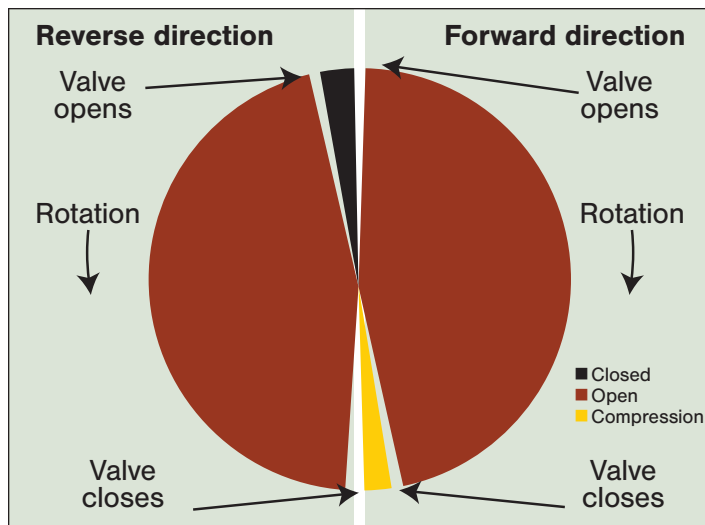


Figure 5: Best forward-running 0.073-inch port.

This allows the exhaust side to remain open longer to accommodate the expansion portion of the stroke.

This cannot be done on the simple “Ruby” valve as the admission and exhaust sides of the valve change with the Johnson bar position. Therefore the lap must be equal on both sides of the port. By making them equal you take away one of the main ingredients in the steam engine cycle — expansion.

Because of the equal lap, the expansion — where the boiler steam is shut off and power is being pro-

duced by the expanding steam — is now replaced with compression (because the exhaust port on the other side is now closed off). A little compression in a steam engine is good. It cushions the piston at the end of the stroke and charges the cylinder for the next power stroke but too much compression will cause loss of power and jerky running.

We discussed how lap helps the vehicle to achieve top performance in sophisticated systems which have the ability to move the effects of the lap around.

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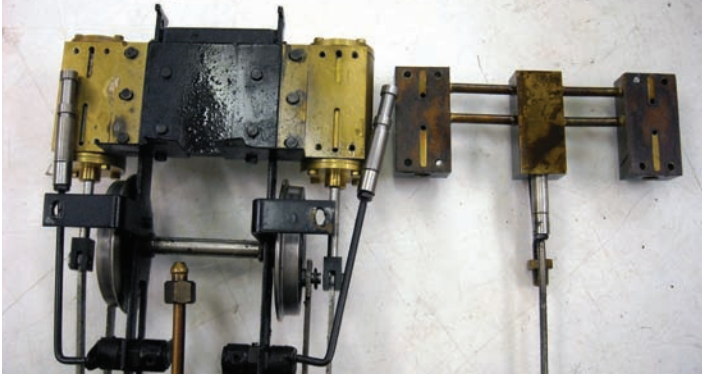


Photo 2: Valve body is removed from chassis. Reverse valve is still in the valve because the linkage wasn't connected to the chassis but it would normally stay in the chassis.

Lap is also necessary to prevent valve leakage or blow by. Therefore, every engine should have some degree of lap. In the sophisticated systems, the measured lap is between 75 percent and 100 percent of the port opening. In a simple system where the lap cannot be manipulated, it should be only enough to prevent leakage and allow a slight compression cushion at the end of the stroke.

But could there be a way to achieve some of these more sophisticated effects in a simple valve system like the “Ruby’s”? I had an old “Ruby” valve lying around so I decided to measure it up. The piston is similar to other piston valves in that the working part of the valve looks like a thread spool as shown in **Photo 1**. The “Ruby” spool ends measured between 0.093 inches and 0.098 inches and the mean was 0.095 inches, so that is what I used for my study.

The port holes are 0.058 inches but there is a sleeve inside the valve cylinder bore which has port holes which are 0.053 inches. This, by my measurements, relates to a 79-percent lap, or two-to-three times where I thought it should be.

There are only two ways to change the lap — decrease the spool width or increase the port size. Decreasing the width of the spool ends is not an option, as the spool is precision ground, and re-cutting the grooves on the lathe causes a ridge in the very hard stainless steel, which is difficult to remove without changing the diameter of the edge. Increasing the port size, however, is easily done. By doing it this way, not only do you improve the timing but you allow the engine to breathe better. (See **Figure 1**.)

If you have ever tuned a “Ruby,” you know that you get the best performance when the eccentrics are advanced. The problem is that when you get it to run perfectly in forward, it won't run in reverse.

If you look at **Figures 2 and 3**, you will see why. The pie charts do not show a full revolution of the axle, just the power stroke. Forward is on the right and reverse on the left. So for best running, we want the valve to open at the top of the pie on each side of the graph.

As you can see in **Figure 2** — which is a “Ruby”

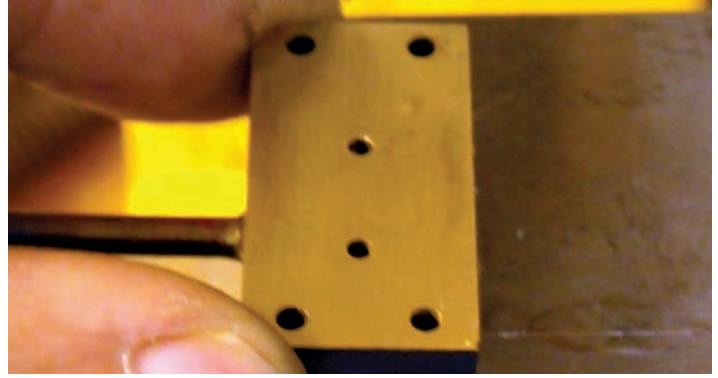


Photo 3: Valve body is set on the top of mill vice to let the existing hole center the drill. The drill is set to stop in middle of the valve bore to prevent damage to the bore. Masking tape can also be wrapped around the bit to limit the depth of the drilling.

timed per the factory recommendations — the timing is very late in both directions.

In **Figure 3**, the eccentric is advanced in the forward direction which will make for admission at top center in forward, but there is a large amount of compression at the bottom of the stroke, and reverse is so retarded that it won't run. Therefore, the optimal position for the stock “Ruby” valve is somewhere between **Figures 2 and 3**.

The black slices indicate where both valves are closed at the start of the cycle and there is no steam power. The red is with the admission and exhaust open for full power. The yellow shows where at the end of the power stroke, both valves are closed creating compression.

Figure 4 shows the pie chart for the drilled-out ports. As you can see the timing is advanced, the valve stays open longer, compression is reduced to a manageable amount and there is still enough lap to prevent leaking.

A friend had an old Porter which had a ton of hours on it. It got to the point where it would hardly run. He had the chassis in a box and offered to let me conduct my mad experiment on it. Before I did anything, I tested it on air at 10 psi and my air throttle at one-quarter turn open. It was rough in forward and barely ran in reverse. I then drilled the holes out to 0.068 inches, put it back together with no other changes and ran it with the same settings. It was like day and night. It now ran beautifully in both directions. I continued testing it with different size holes and determined that 0.073 inches was the way to go. On a subsequent test of a friend's fairly new “Ruby,” we drilled the ports out to 0.080 inches. In a before and after test, it was able to pull twice the number of cars as before and seemed to be more economical. We did the 0.080-inch modification because the engine had not been run much and we knew the valves were not worn or leaking.

Figure 5 shows the new valve tuned for maximum forward running but I found that unless you want to race someone, this is not now necessary.

Drilling out the ports

This improvement can be done with a Phillips screwdriver, a drill and some numbered drill bits, once the chassis is removed from the engine. I won't go into the chassis removal as it varies by engine.

Once the chassis is removed, the first thing to do is remove the valve from the chassis. Remove the eight screws with a quality No. 1 Phillips-head screwdriver. A No. 2 will work also but make sure it is a real Phillips or you can strip the screw head. (Phillips-head screwdrivers have the number stamped on the shaft near the handle.) Once the screws are removed, the valve can be lifted and slid forward, leaving the three cylinder pistons and linkage in the chassis. Now turn the valve over. These are the four holes we will be working on (**Photo 2**).

In order to keep the holes in the same position in the valve body, the holes should be drilled out in small increments. Don't clamp the valve in a vice for drilling. Let the previous hole be the guide for the next one. Start with a No. 54 bit and work up to a No. 49, in single-number increments. This will make the holes concentric and limit the amount of breakthrough in the valve bore. (See **Photo 3**.)

After drilling, the surface can be faced off by sliding the valve body over a sheet of No. 600 sandpaper, laid on a glass sheet (**Photo 4**). The inside of the

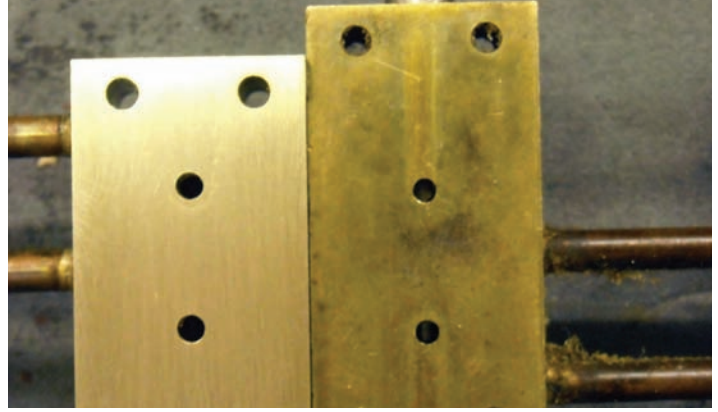


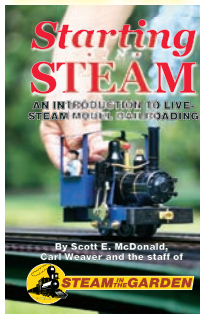
Photo 4: Valve with larger holes is shown on left. Valve body is surfaced with No. 600 sandpaper.

valve bore may have some breakthrough burs from the drilling process. The hard piston should be able to knock these off by just pushing them through by hand after coating them with oil, preferably cutting oil. Be careful not to scratch the bore during this process. The valve body should then be cleaned out with compressed air or soaked in solvent and cleaned with a brush and cotton swabs (Q-tips) for the bore.

Carefully slide the valve body over the three pistons and secure the valve body to the cylinders with the eight screws. You can reuse the gaskets, provided they are not damaged. Make sure you get the screws well tightened to prevent any leakage.

You should now have a great-running Accucraft locomotive.

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Bowande Wuhu releases a 1:32-scale live steam 1898 Rogers 10-wheeler like the one that was driven by

CASEY JONES

Text by Jim Overland. Photos by Harlan Chinn.

Looking for a nice mid-size locomotive? Is carting around a 4-8-4 Northern with a full rake of consist cars to every steamup a bit too much? I enjoy the 1:32-scale Aster Great Northern S2 that I have, but sometimes. ...

For going to our club track, wanting a less-hassle locomotive to quickly show off, or just being lazy, I often default to the Accucraft American. It's nice looking with three or four wood coaches, and runs well and steady every time.

So when I noticed the Wuhu Arts & Crafts Co. Ltd. "Casey Jones" 4-6-0 in online videos from the International Small Scale Steamup at Diamondhead, Miss., I was intrigued from several points of view.

First was to slow down fellow steamer Jim Montgomery, who at steamups normally says, "Oh, I see you brought the American again."

The second was that it was 1:32 scale, so it can relate to other main-line locomotives but is smaller overall.

Third, it was a leading passenger locomotive in its day, found on many main lines in the early 1900s and lasting until the 1920s and 1930s on secondary lines. This

was of interest to me as my parents traveled behind one on the Spokane, Portland and Seattle Railroad (SP&S) from Portland to the Oregon coast in the early 1930s. Part of its longevity in Oregon was because the route was flat and there were several trestles near Astoria with weight limits.

Fourth, gas firing can be a bit easier than alcohol operation; you can turn the gas off for a while if the loco, track or cars need attention.

The 4-6-0 (Ten Wheeler) with large diameter driving wheels was the popular passenger locomotive of its day, with many made around 1900 by several

builders: Baldwin, Cooke, Rogers, Alco. The requirement for increased power lead to Pacifics (4-6-2) and Mountains (4-8-2) in the 1920s, and finally Northerns (4-8-4) in the 1930s. (The rear trucks were needed to support larger fire boxes.) By the time of the Northerns, the rear trucks also provided power assists for starting.

The Bowande Wuhu model of the 4-6-0 is after Rogers manufacture and is based on an Illinois Central Railroad prototype, hence "Casey Jones." I ordered mine without lettering as I will add SP&S. The detail, materials and engineering

Bowande Wuhu 'Casey Jones' 4-6-0

- **Prototype:** Rogers Locomotive Works, 4-6-0, 1898. Cylinders: 19½-inch diameter, 26-inch stroke. Drive wheels: 69-inches. Boiler pressure: 180 psi. Tractive effort: 21,922 pounds. Weight: 158,300 pounds.
- **Scale:** 1:32, 45mm gauge.
- **Length:** 22 inches.
- **Height:** 5¾ inches.
- **Width:** Four inches.
- **Boiler:** Single flue, ceramic burner.
- **Fuel:** Butane.
- **Min. radius:** 6½-feet (two meters).
- **Water pumps:** Axle pump with bypass valve; tender water pump with check valve.
- **Cylinders:** Two.
- **Valve gear:** Full Stephenson.
- **Fittings:** Throttle, water-level gauge, British pressure gauge, sprung buffers, whistle.
- **MSRP:** \$2495.



Twenty wheels: *Larry Staver's Bowande Wuhu locomotive, right, at rest next to the author's, left.*

are well done, yet the locomotive is rugged enough for use rather than having excessive fragile external bits, a great compromise. The design allows easy access for operating and working on the locomotive.

The locomotive is diminutive, at 22-inches by four-inches by 5¾-inches (560mm by 97mm by 144mm), a nice mainline size and shape that contrasts to narrow gauge 1:20- and 1:19-scale locos. The Bowande Wuhu model has full Stephenson valve gear that is rather small and compact between the frames.

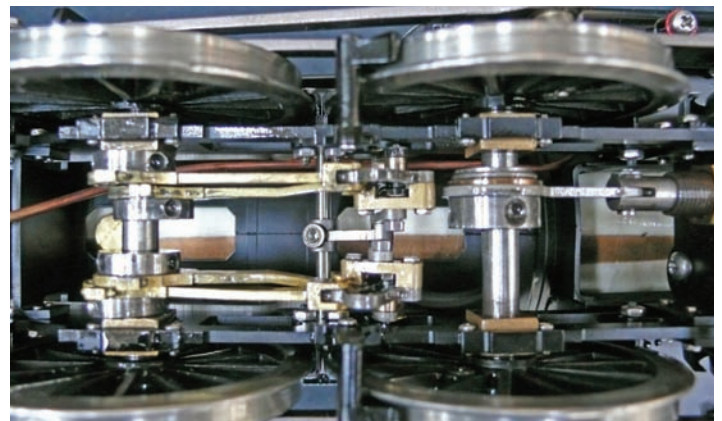
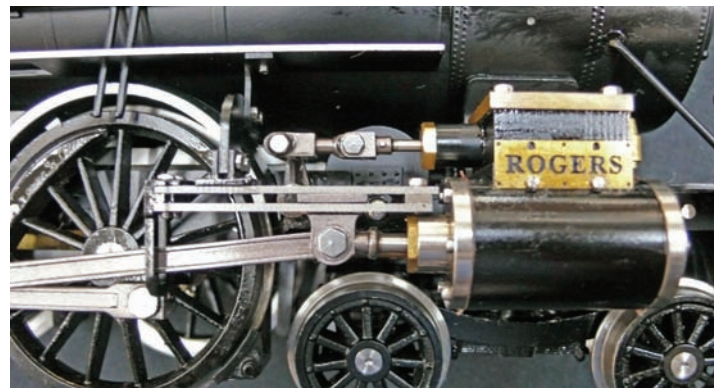
There is some concern about Bowande Wuhu as a manufacturer in our hobby, as I heard in conversations during the National Summer Steamup in Sacramento in July. My take is that Bowande Wuhu has good engineering and excellent manufacturing control, as I noted in my previous review of its British A4 model locomotive (see *Steam in the Garden*, January/February 2014, No. 131).

But Wuhu needs the assistance of people with experience in development of small-scale live steam locomotives. As with the A4 locomotive, there was a hobbyist involved with the final development of the "Casey Jones." This was Bob Clark of Stoke 'm & Smoke 'm, who is the Chinese company's U.S. agent, based in suburban Baltimore.

I contacted Bob and he said the "Casey Jones" was designed to be a medium-sized locomotive that could operate on a medium-radius track. He specified a number of operating goodies such as axle- and hand-water pumps, bypass valve, a well-positioned sight glass, reasonably adjustable throttle and corresponding cylinder bore, an accurate-looking Johnson bar and a quality safety valve. The gas burner is aimed downward in the fire tube.

After the pilot model was evaluated, a hinged cab roof was added, the lubricator was moved to be less obtrusive, the diameter of the oil lube pipe was reduced and the water hose locations were moved.

In addition to Bob, Triple R Services LLC of Mount Holly, N.J., has been contracted to act as an after-sale service resource. Given the support of Bob and Triple R's Charles and Ryan Bednarik in North America — and the engineering quality of the prod-



Cylinders, undercarriage: *Middle photo shows ICRR No. 328's front truck and cylinder, while bottom photo shows the eccentrics.*

uct — a buyer now can be assured that he or she will not be left with an unknown product.

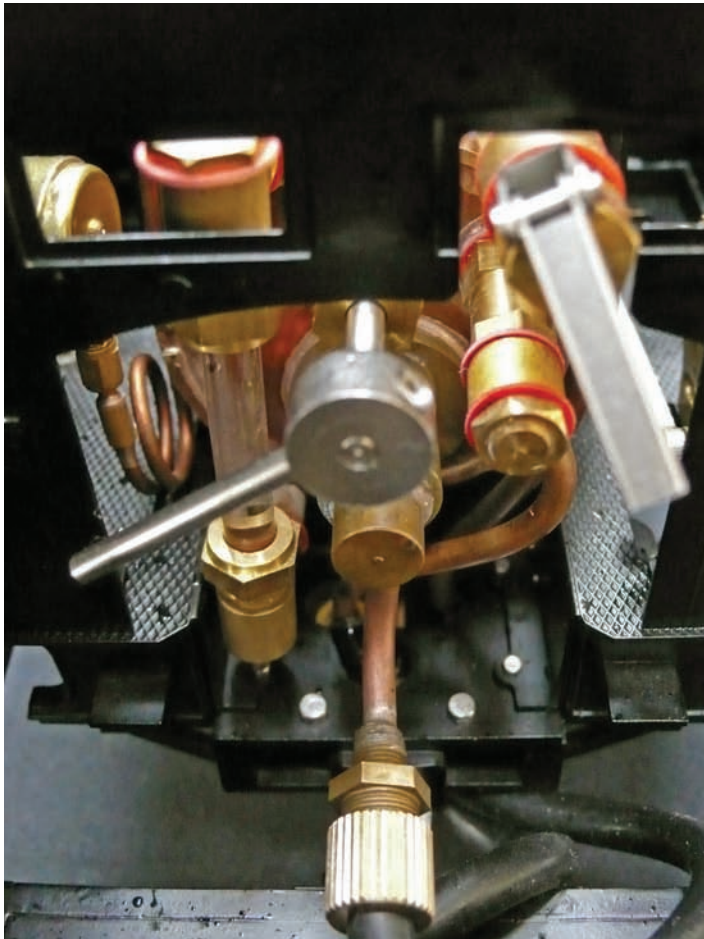
(Full disclosure: After my review of the A4, which was running OK, I have sent the locomotive to Ryan Bednarik. His diagnosis was that the central cylinder was slightly out of time.)

I can report on direct experience with two "Casey Jones" locomotives. Larry Staver purchased a loco at the Summer Steamup and we took it out of the box at Larry's fabulous steamup in Portland, Ore., during the third week of September. His ran well right out of the box for three runs of 45 minutes. I have hearsay of good performances of other "Casey Jones" engines, both out of the box and after correcting some issues.

I had some initial issues with my "Casey Jones."



Ten wheels: An impressive profile is another attribute of the Bowande Wuhu Illinois Central No. 382



Cab view: A look inside the cab of the ICRR No. 382 shows pressure gauge and water glass.

After a first good run on my new outdoor 20-foot by 34-foot elevated loop, the locomotive was bucking a bit and a cylinder was wobbling on the second run. Note: This is not an oscillating cylinder loco!

Each cylinder is held on to the frame by two rather large bolts, one of which was loose. After easily removing the lead truck, I tightened the bolt, using a thread adhesive (Loctite). At the next Seattle club steamup, the bolt came loose on the other side. This time the bolt was lost, but Bob quickly sent me a replacement. Now all four attachment bolts have had Loctite added, there seem to be no more issues, and the timing seems good.

Back in Portland, we checked the bolts on Larry's

locomotive, but they seemed tight, so I am not sure I would recommend retightening them. Just be aware of their potential to become loose.

Another issue for me was hot water coming out of the bypass pipe into the tender. I first thought that this was to help heat the gas tank, but further investigation revealed that it was coming out of the clack valve from the boiler, and so was an issue.

With some helpful logic from steamer Marc Horowitz, I removed the ball-and-spring assembly while at Staver's. It appeared that the ball was not seating correctly, perhaps fastened to the spring, but after reassembly the ball now seats as the pressure comes up. Bob said that he had a report that the ball and spring was reversed in another loco, but that was not the case here. Wuhu is also replacing the gas filler valves which tend to leak too much on filling.

I have four 1:32 heavyweight coaches that were to be part of a set for the S2 Empire Builder which was never completed. Three of these coaches are just right for the 4-6-0 running in a prototypical 1920s fashion.

The "Casey Jones" came with considerable packing. I use the mounting board as my carrying board and use the Velcro nailed to the bottom of the board for a tie down.

The loco likes to have a healthy fire behind it with a pressure of greater than 45 pounds. There is a necessary balance that needs to be set between the throttle, fire (gas valve), and the water bypass. This is probably due to the axle pump being of substantial size given the boiler size. Closing the bypass can actually lower the pressure with too much cool water. About 1/16th to one-eighth of a turn on the bypass is about right, but all three components need to be watched. The water pump will always match the boiler's need for water, and one needs to not overfill. But after some adjustment the loco will settle down to a steady run. Therefore, there is a bit more to running the locomotive than fire it and forget it.

So after some tweaking, I now have a great looking and running locomotive and consist with runs of more than 45 minutes. The high diameter driving wheels, driving rods, and striking appearance provide a wished for kinematic sculpture.

Legend of Casey Jones

As cultural historians have written, being a steam locomotive engineer in the late 19th and early 20th centuries was akin to being an astronaut in the early 21st century — a widely admired profession whose skills baffled the general public.

So it was no wonder that when an employee of the Illinois Central Railroad wrote a song about an engineer who died trying to save the passengers on his train, it might become something of a hit.

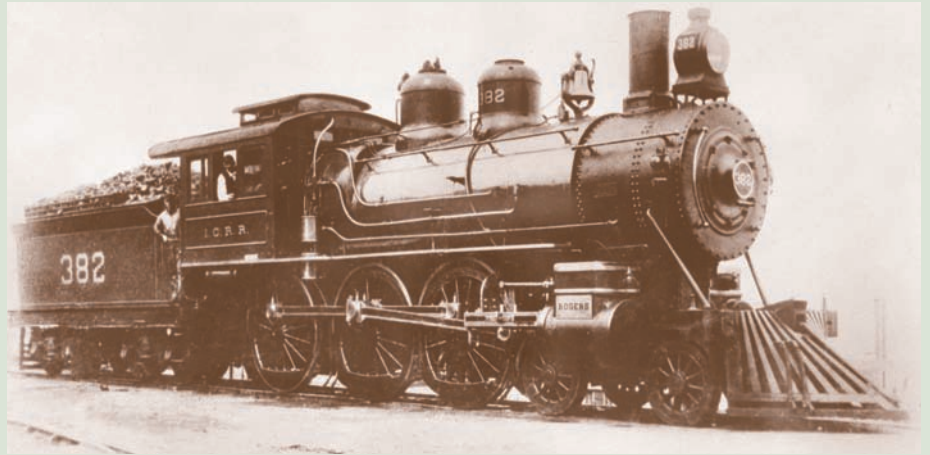
While there are conflicting reports about what happened in the early morning of April 30, 1900, this much is agreed upon: Jonathan Luther “Casey” Jones, an eight-year veteran ICRR engineer, agreed to cover for a sick colleague and took the No. 1 run from Memphis, Tenn., to Canton, Miss., which was already 90 minutes late, leaving at 12:50 a.m.

Jones was known for his ability to keep his trains running on time. That night Jones was driving the sick engineer’s locomotive, ICRR’s No. 382, a 4-6-0, and had with him his loyal fireman, Simeon Webb.

No. 382 was built by Rogers Locomotive and Machine Works (later to become American Locomotive Co., or Alco) in 1898, part of a batch of nine; ultimately Rogers, Brooks Locomotive and Baldwin Locomotive would build 63 of the class for the ICRR.

The engineer and his fireman were able to make up more than an hour of the schedule in the first 100 miles of the trip and another 15 minutes in the following 20 miles. As No. 382 came around a bend just outside of Vaughn, Miss., Webb saw trouble: a caboose on the tracks ahead.

A freight had pulled onto a siding a mile from the Vaughn station to let No. 382 pass, but



The train, the song: Above, an undated photo of Illinois Central No. 382. Below, sheet music cover of ‘Casey Jones, The Brave Engineer.’ Both, courtesy of Tennessee State Library and Archives.

a coupler bust and the last three cars and the caboose were left on the mainline. According to the ICRR’s accident report, the flagman was waving and had placed “torpedoes” — gunpowder-powered caps attached to the track to warn engineers of impending trouble. Maybe Jones was going too fast, maybe he didn’t hear the torpedoes.

Jones immediately threw the engine into reverse and hit the brakes, but he knew it was too late. “Jump, Sim, jump,” the fireman later recalled Jones telling him.

At 3:52 a.m., No. 382 plowed into the freight, but the engine had slowed sufficiently that there was only one fatality in the accident: Jones himself, who was said to be found with his hands still on the brake and whistle, trying to save the passengers until the end.

An “engine wiper” at Canton, Wallace Saunders, a friend and something of a singer and musician, crafted new words to a then-popular ditty and called the result “The Ballad of Casey Jones.” It was eventually distributed as sheet music nationwide. A 1923 book was written and a 1927 movie was made about Jones and that April night, help-



ing to seal the hero’s story.

No. 382 was rebuilt by the ICRR and put back into service; it was in another accident in 1903 and was later scrapped. The locomotive that is preserved on display at the Casey Jones House and Museum in Jackson, Tenn., is not a Rogers 10-wheeler.

Interestingly, the 1900 ICRR accident report puts the full blame for the tragedy on Jones’ shoulders, something missing from the legend; but then, the ICRR superintendents didn’t have a song, book or movie written about them.

— dmc

Does your radio-control transmitter look a little too much like a race car? Give it a steam-era makeover

R/C J-BAR

Text, illustrations and photos by Rick Weber

The good news is that Spektrum offers a nice, inexpensive two-channel radio-control transmitter and receiver for surface models (which maker Horizon Hobby LLC calls the DX2E). The bad news is that, although it is great for boats and cars, it is definitely not configured for small-scale live steam locomotives. There are two reasons why this transmitter fails in this regard:

First, unlike drivers of boats and cars, which need continual control of throttle and steering, we locomotive engineers tend to set our throttle and forward/reverse (Johnson bar) controls in position and leave them there for long periods of time. This is typically done by removing the return-to-center springs in a stock transmitter and adding some means of friction to keep the controls from rotating freely, once set. This is not easily done on a transmitter like the DX2E.

Second, this transmitter just seems weird and out of place in our little locomotive world with its Glock-like trigger and a steering wheel that looks like a race-car tire. So, I decided to modify mine by replacing the wheel with a Johnson bar and the trigger with a locomotive-style throttle (regulator); see **Photo 1**. I'm going to show you how to make these mods to your Spektrum DX2E. And, of course, the dimensions can be tweaked to fit these components

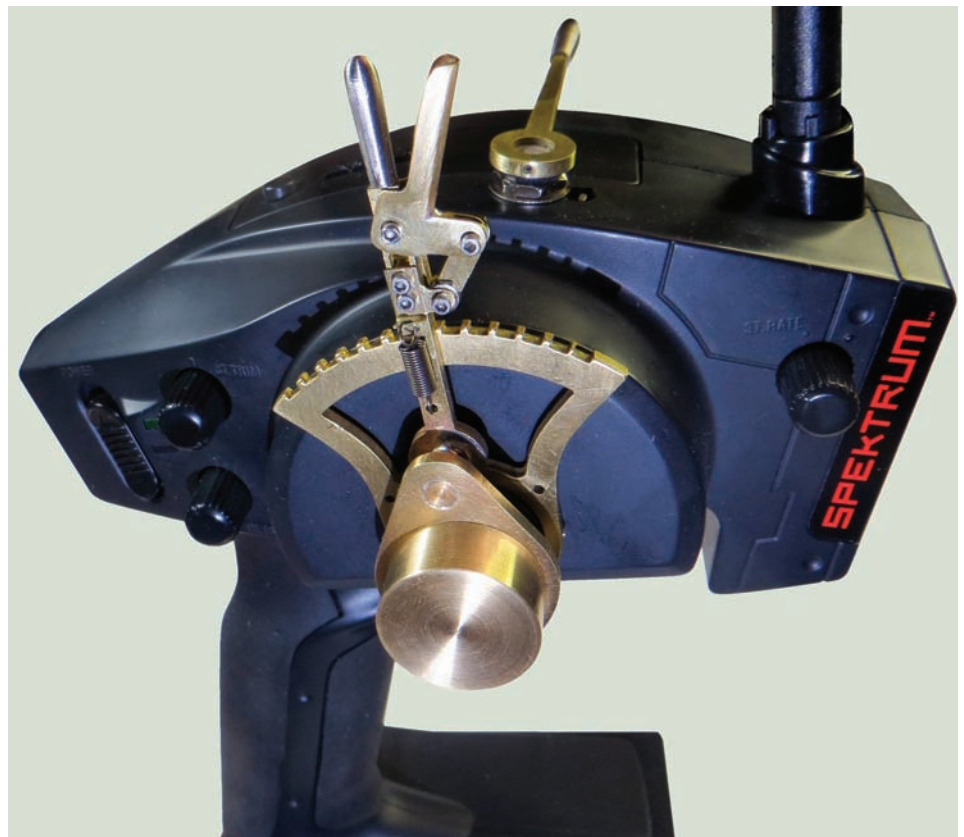


Photo 1

to similar transmitters from other manufacturers.

For those of you who want to tackle this project, you will need model building skills and, preferably, access to an abrasive water jet cutting (AWC) service to fabricate most of the parts (see *Steam in the Garden*, July/August 2014, No. 134).

All the parts drawings include sufficient dimensions to lay out the designs and cut them with small saws and files. As these parts lend themselves well

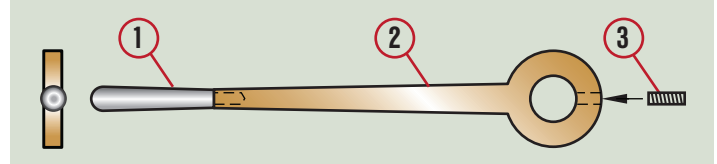
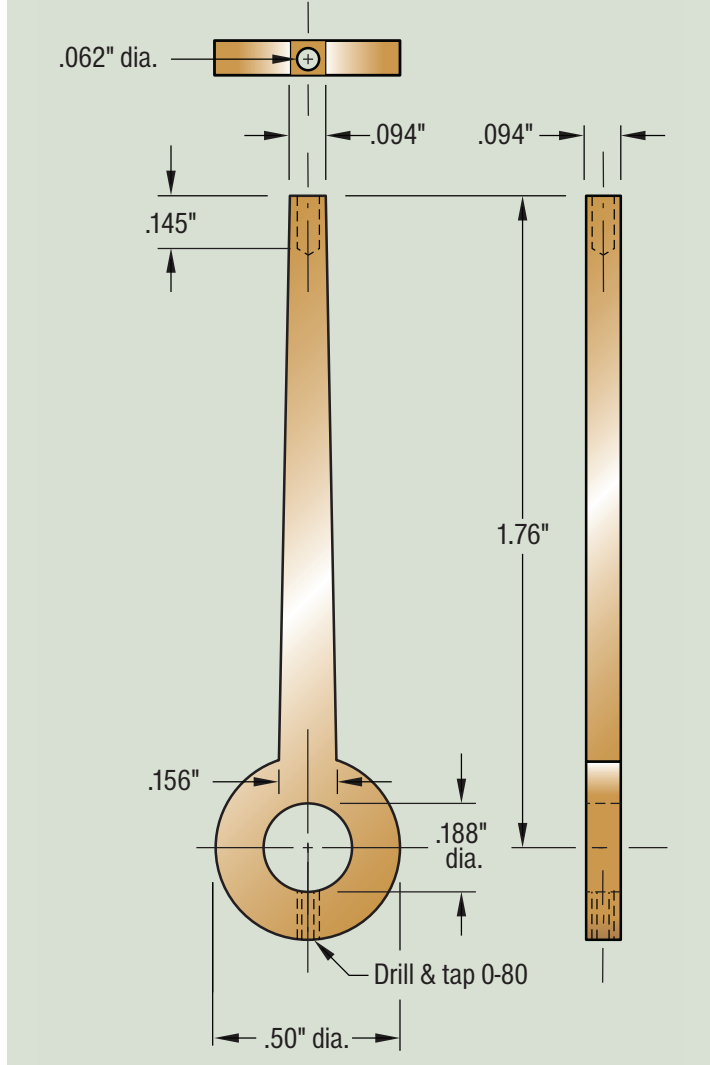


Figure 3: Throttle assembly, full size. 1 – Throttle handle; 2 – Throttle arm; 3 – 0-80 by 0.188-inch cup point set screw.

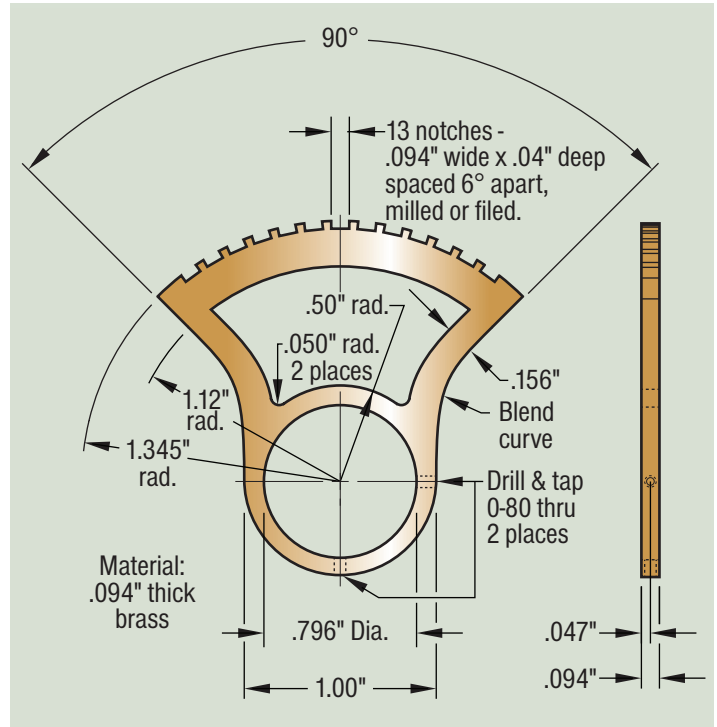


Figure 4

Figure 1, above; Figure 2, below, center.

to AWC, you could save a lot of time by going this route. We've provided a Drawing Exchange Format (.dxf) file of the parts needed at the magazine's web site, which you can give to a local AWC service:

<http://www.steamup.com/rc-jbar.dxf.zip>

Also, it would be wise to fabricate and assemble all the components before tearing apart your transmitter. Then, if the building doesn't work out so well, you will still have a workable transmitter.

As is common in plans for small locomotives, the parts drawings here don't include tolerances on the dimensions. It is assumed that the builder has the skill necessary to build and fit the components – some of which are quite tiny – together to make a functioning control.

Start by building the throttle arm from a 0.094-inch thick piece of brass as shown in **Figure 1**. Carefully drill and tap the 0-80 threaded hole in the location shown in the drawing and screw in a 0-80 by one-eighth-inch cup-point set screw.

Next, turn the throttle handle on a lathe from a 0.125-inch diameter piece of 303 or 304 stainless steel, as shown in **Figure 2**. Alternatively, you can

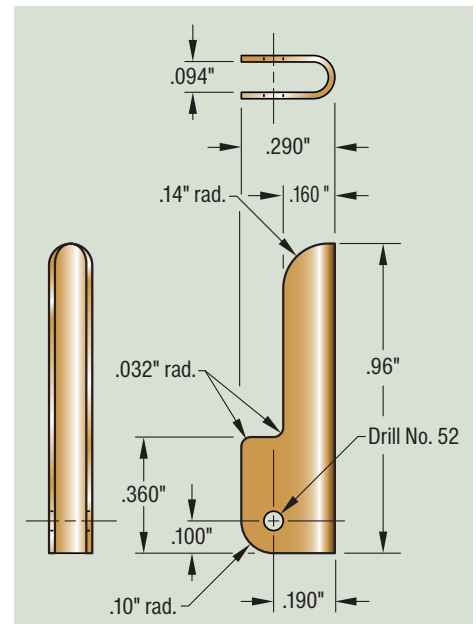
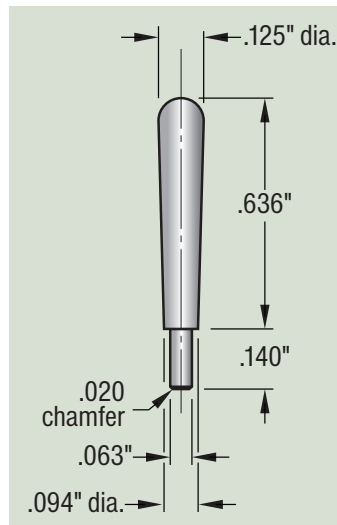


Figure 5

chuck up the rod and file it to shape in a drill press. As shown

in **Figure 3**, press the throttle handle into the 0.062-inch diameter hole at top end of the throttle arm. Use thread-locking adhesive (Loctite) to make the joint snug. The throttle assembly is finished; set it aside to be added to the transmitter later.

– Continued on Page 30



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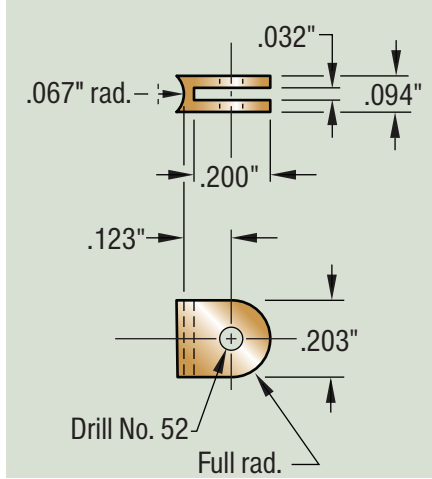


Figure 6

— Continued from Page 27

Next, cut out the quadrant to the shape and size shown in **Figure 4**. Drill and tap the 0-80 threaded holes in the three locations shown in the drawing and screw in three 0-80 by one-eighth-inch long cup-point set screws. These will secure the quadrant to a fixed boss extending from the transmitter's case.

Make the handle grip from a piece of 0.020-inch thick brass sheet as shown in **Figure 5**. It is easier to form the curve on a larger piece — say two-inches by two-inches — by bending it half-way around a 0.094-inch diameter steel rod. Then, cut it out to size with a jeweler's saw and drill the No. 52 holes.

Make the handle grip extension as shown in **Figure 6**, taking care to match the concave surface to the curve on the handle grip.

Position the handle grip extension in contact with the handle grip, as shown in **Figure 7**, and soft solder these two parts together. A "third hand" tool can provide the means for holding the parts together in their correct position while you solder.

Make a connector rod as shown in **Figure 8**. Cut out the yoke and Johnson bar arm from a 0.094-inch thick sheet of half-hard brass to the sizes shown in **Figures 9 and 10**, respectively. Carefully drill and tap the 0-80 threaded holes in the three locations on the edge of the yoke shown in the drawing, and screw in three 0-80 by one-eighth-inch long cup-point set screws. Assemble and align these three parts, as shown in **Figure 11**, and soft solder them together.

As with the throttle handle, turn the Johnson bar handle, as shown in **Figure 12**, on a lathe from a 0.094-inch diameter piece of 303 or 304 stainless steel. Alternatively, you can chuck up the rod and file it to shape in a drill press. Press it into the 0.062-inch diameter hole at top end of the Johnson bar arm, as shown in **Figure 11**. Use Loctite to make the joint snug.

Machine or file the slide according to **Figure 13**.

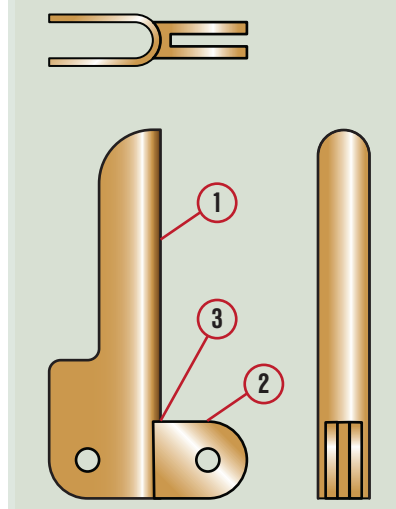


Figure 7: Handle grip subassembly, twice size. 1 — Handle grip; 2 — Grip extension; 3 — soft solder 1 and 2 together.

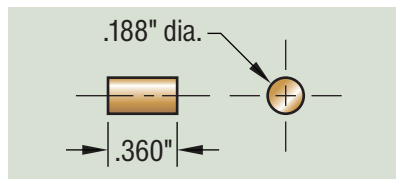


Figure 8

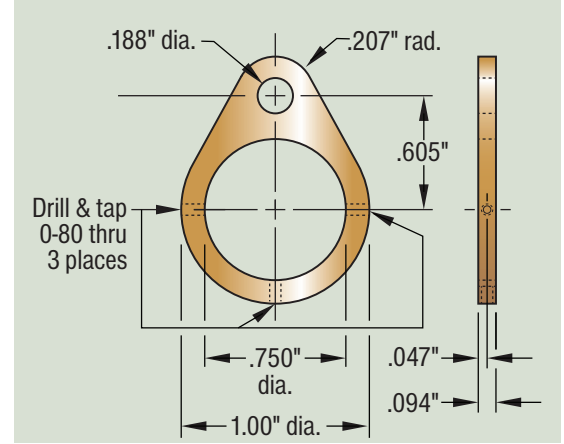


Figure 9

It should slide freely, but without slop, in the slot in the Johnson bar arm. Drill and tap both 0-80 holes through as shown in the drawing. Make the link according to **Figure 14** from a small piece of 0.020-inch thick brass.

Layout the shape of the slide extension, as shown in **Figure 15**, on a small piece of 0.020-inch thick brass. First, drill the three No. 52 holes and one No. 60 hole. Then, with a jeweler's saw, cut the outer shape. After you have removed burrs and sharp edges with fine emery paper, bend up the tab as shown in the bottom of the figure.

Refer to the Johnson bar assembly drawing in **Figure 16**; attach the handle grip near the top of the Johnson bar arm with a 0-80 by quarter-inch socket head cap screw and a 0-80 hex nut. Use Loctite to secure the nut after tightening it just short of snug, so that the handle grip rotates freely about the screw.

Insert the slide into the slot in the Johnson bar arm with the 0.094-inch wide "tooth" pointing downwards. Make sure it slides smoothly — not too tight or loose. Attach the slide extension, as shown in the drawing, with two 0-80 by quarter-inch socket head cap screws. Insert a 0-80 by quarter-inch socket head cap screw through the right-most hole in the slide extension from the front and secure it tightly with a nut and Loctite.

Slip one end of the link onto the end of the screw protruding from the nut and screw on another nut. This nut is not tightened down, but rather positioned so that the link is captured between the two nuts and can rotate freely about the screw. Now, slip the other end of the link up into the grip extension and connect it with a 0-80 by quarter-inch socket head cap screw, a 0-80 nut, and Loctite. Connect the spring between the No. 60 hole in the slide extension and the No. 52 hole in the Johnson bar arm. This will require tweaking the ends of the spring to fit into the holes.

It's time to set your parts aside and modify the transmitter so that these components can be assembled to it. It is important to note that some of the parts

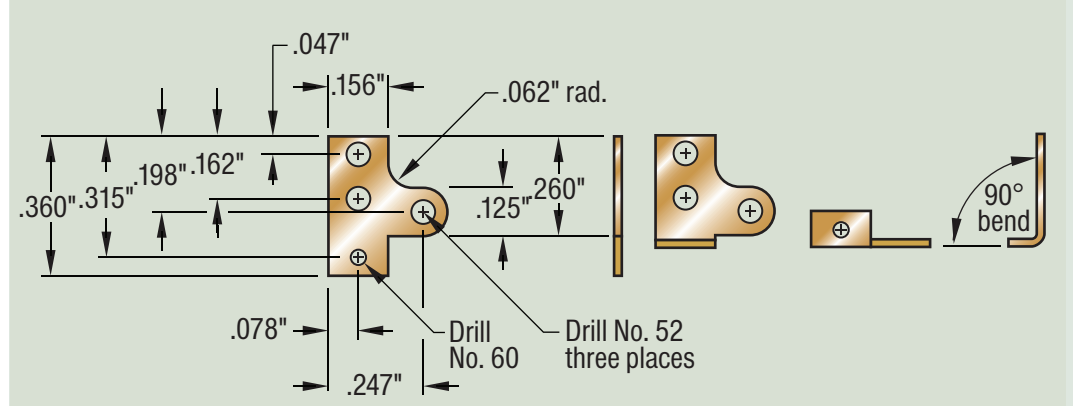
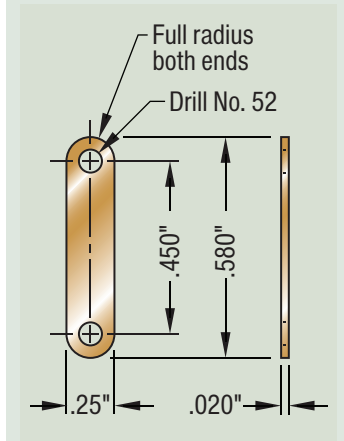


Figure 14, left. Figure 15, above.

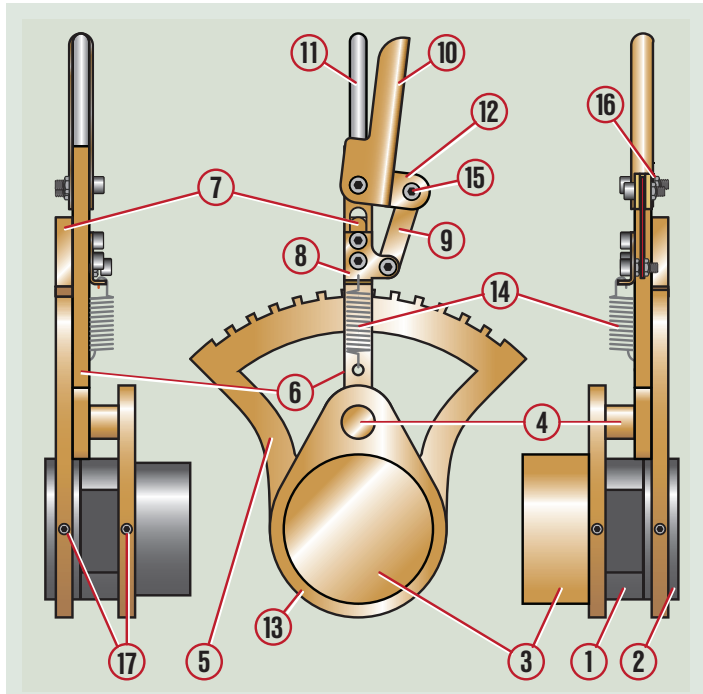


Figure 16, Johnson bar assembly (slightly undersized). 1 – rotating hub (with steering wheel removed); 2 – fixed hub (molded as part of the front case); 3 – cap; 4 – connector rod; 5 – quadrant; 6 – Johnson bar arm; 7 – slide; 8 – extension; 9 – link; 10 – handle grip; 11 – Johnson bar handle; 12 – grip extension; 13 – yoke; 14 – tension spring (McMaster Carr Part No. 9654K941); 15 – four 0-80 x .25-inch socket head cap screws (trim to suit); 16 – four 0-80 x .125-inch hex nuts; 17 – six 0-80 x .125-inch cup point set screws (some pointers omitted for clarity).



Photo 2

tic parts and return spring that are used to return the steering wheel to a neutral position, but do not remove this pot. It will remain in its original location within the case. Discard the plastic parts and spring.

Drill two holes in the top of the case as shown in **Photo 5**. Push the shank of the trigger's pot up through the larger hole so that its locking tab enters the smaller hole. Secure it to the case with the nut and washer that originally held it into the lower portion of the case as shown in **Photo 6**. Now, use a jeweler's saw to trim the shank of the pot to a length of 0.156 inches above the nut. OK, you're finished with the internal parts and ready to re-assemble the transmitter.

Re-attach the printed-circuit board and position the wires back in their original locations. Reassemble the two case halves, first checking your sketches or photos you made of the transmitter's insides to make sure all the bits and pieces are back in their proper places and no wires have become detached. Make sure to put the switch plate, "Bind" button and battery compartment back in place before fitting the back of the case to the front. Press the power switch slide button back in its place in the front case.

Before putting the handle grips back on, fire up the transmitter and a receiver with the two servos connected to ensure that everything is working correctly. Rotating the shank of the servo on the top of the case should activate the steering servo that is now assigned the duty of your locomotive's throttle. Rotating the hub should activate the steering servo

by unscrewing the nut on the rotating shaft. Don't cut or disconnect the two wire leads on the pot. Later, you will relocate the pot in the case. Discard the plastic parts and spring.

Remove the three Phillips-head screws that secure the printed circuit board in the upper section of the case. Avoid touching any of the electronic gizmos on the printed-circuit board while making the mods to your transmitter. Grasping only the edges of the printed-circuit board, carefully lift it up and out of the way so you can access the steering wheel's potentiometer assembly (see **Photo 4**). Remove the plas-



Photo 3

that will now control your loco's forward and reverse.

It's time to do the final assembly of the throttle and Johnson bar assemblies to the transmitter's two controls. Slip a 1/16-inch by one-quarter-inch interior diameter by three-eighths-inch outside diameter rubber O-ring (Buna or Viton) onto the pot shaft protruding from the top of the case. Then, slip the throttle arm onto the shank of the pot, push down to snug it up against the O-ring, and tighten the set screw to secure it to the shaft. The purpose of the O-ring is to provide friction to the throttle arm to keep it in position during running of your loco. Don't worry about the angular position at this time; you will position it correctly later when fitting up the servos to your loco.

Next, slide the quadrant over the hubs on the front of the transmitter until it is on the fixed hub and about 0.032-inch from touching the face of the case. Position it as shown in **Figure 16** and tighten the three set screws to secure it to the fixed portion of the hub. Slide the remainder of the Johnson bar assembly onto the rotating portion of the hub until the back surface of the arm is up against the quadrant.

Position this assembly angularly so that the arm covers the full angle of the quadrant when rotated between the pot's two stops. When positioned correctly, tighten the three set screws on the yoke to secure this assembly to the rotating hub. Adjust the components so that when the handle grip is squeezed against the handle, the slide will lift and disengage with the quadrant's notches. The arm should rotate freely and lock down on a tooth of the quadrant when the handle grip is released — just as

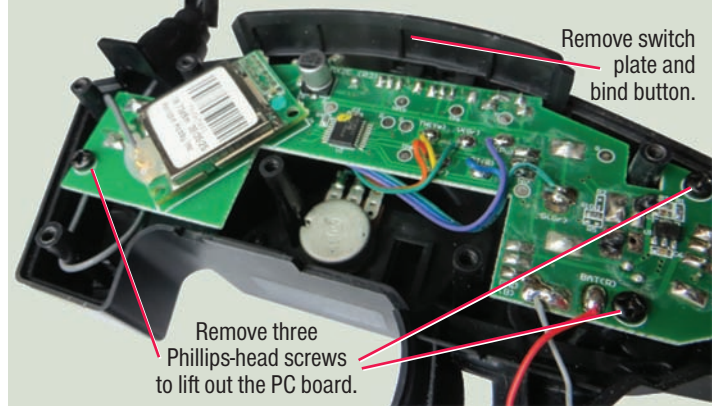


Photo 4



Photo 5

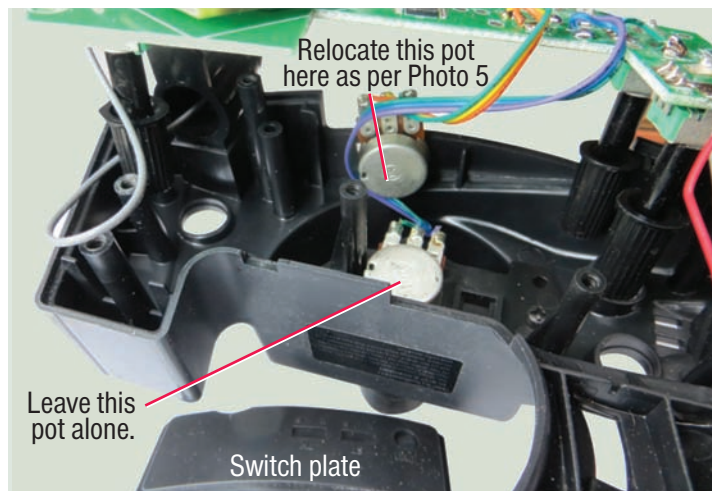


Photo 6

it would in a full-scale steam locomotive.

Fire up the transmitter and receiver and adjust the two servos' rate, trim and direction to ensure it is working to your liking. Just as you would with any radio-control installation in a small locomotive, you will need to adjust and tweak your servos, linkages and controls to work the way you wish them to in your application.

Your new steam locomotive-ized transmitter will be the hit of your next steamup.

With her gears and action inside the frame, Accucraft's 'Dora' could use some dummy

CYLINDERS

Text, illustrations and photos by Marc Horovitz

One thing that just doesn't look right about Accucraft Trains' "Dora" is the fact that all of the mechanism is out of sight, between the frames. One thing that will make the engine look more like a real locomotive is the addition of dummy cylinders and main rods outside, where they should be. There are several parts to make but none of them are difficult, although a couple involve several steps. You will need a drill press and lathe, though, as well as a milling machine.

I will assume that you have some basic metal-working skills, so I'm not going to go into a lot of detail on every step. If you're a beginner, I hope that the photos will make my intentions clear. Let's get started.

Main rods

We'll start with the main rods, for no good reason. These need to be made of 1/16-inch-thick material, either brass or steel. I made mine of brass, just because I had some around.

Start by cutting a couple of blanks around the right shape. Smooth them up and stick 'em together. If you're using steel, you could use cyanoacrylate cement



Outside action: Adding dummy cylinders to your Accucraft 'Dora' makes the engine look much more locomotive-like. This project involves some basic machining.

(CA — SuperGlue) to put them together. I soft-soldered mine (**Photo 1**). Once that's done, file two adjacent edges flat and square to use as references, then mark out the rods as per the drawing (**Photo 2**).

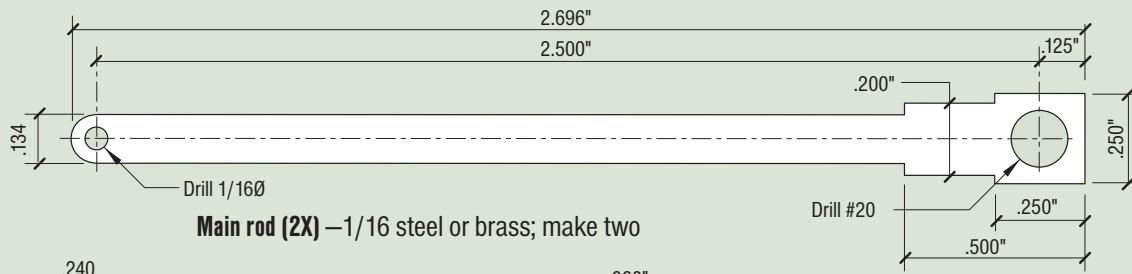
With the rods marked out, go ahead and drill the two holes. Then shape the rods. To do this, you can use your milling machine or you can hand-file them using a large flat file as I did. When you get finished, take them apart. You should have a set of rods that look something like **Photo 3**.

Cross heads

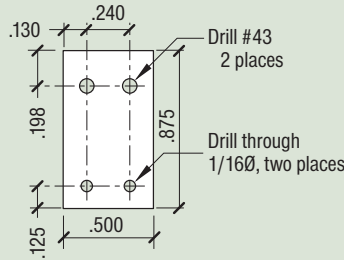
The cross heads are made of pieces of 3/16-inch by three-eighths-inch bar. Cut off two pieces, each around half an inch long. Mill the half-inch dimension down to

0.465-inches on both pieces. Then mill the cutout in each piece, making sure they are opposite hand to one another (**Photo 4**). Your pieces should look like **Photo 5** at this point. Mark and center-pop the pieces for the 1/16-inch hole (**Photo 6**). Go ahead and drill the holes.

Before we can drill the holes for the piston rod and cross head guide, we need to make a little tool — a drilling guide. Cut another piece of 3/16-inch by three-eighths-inch bar and mill it to the same

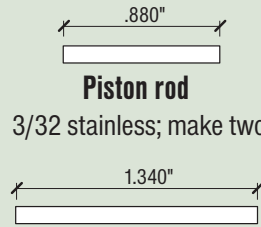


Main rod (2X)—1/16 steel or brass; make two



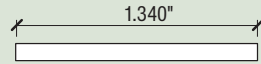
Mounting plate

Make two from 1/16-thick brass



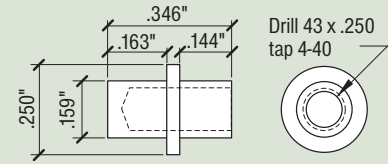
Piston rod

3/32 stainless; make two



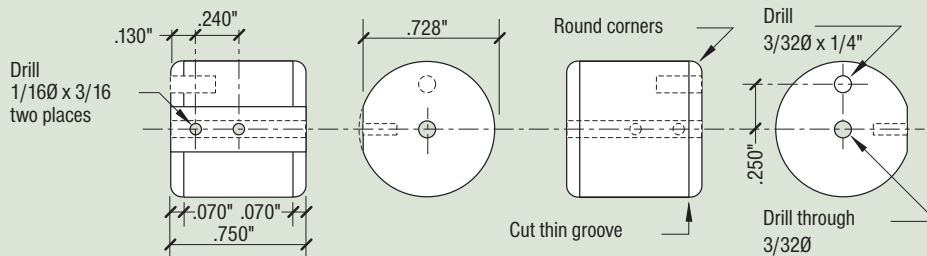
Cross head guide

3/32 stainless; make two

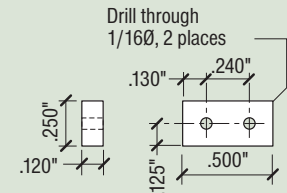


New crank pin (2X)

Steel; make two

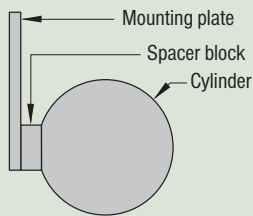


Left-hand cylinder (right hand opposite); make two from 3/4Ø brass rod

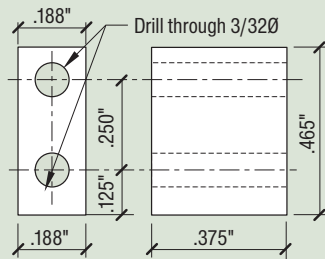


Spacer block

Make two from brass

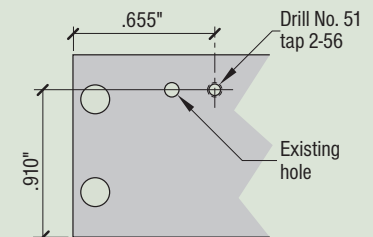


Cylinder mounting diagram



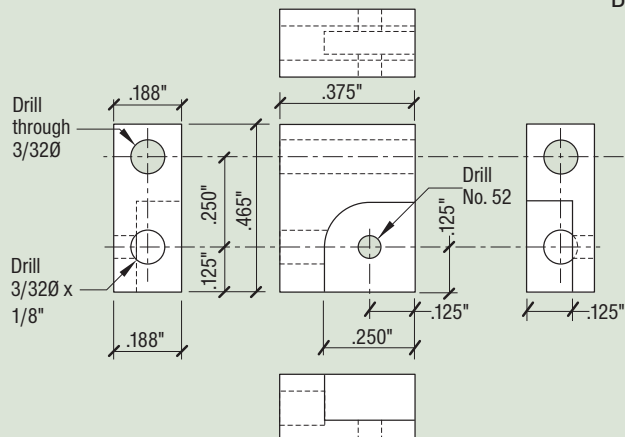
Drilling guide (2X)

Brass

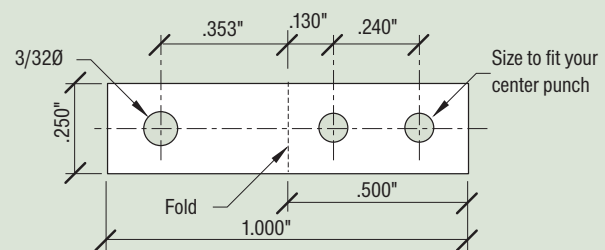


Left-hand frame modification

(Right hand opposite)



Right-hand cross head (2X) (left hand opposite), brass; make two



Hole-marking guide (2X)

Brass



Photo 1



Photo 2



Photo 3

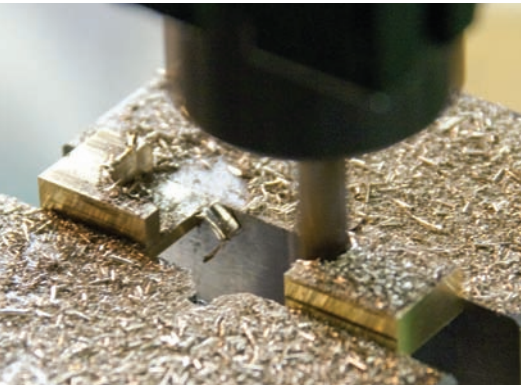


Photo 4

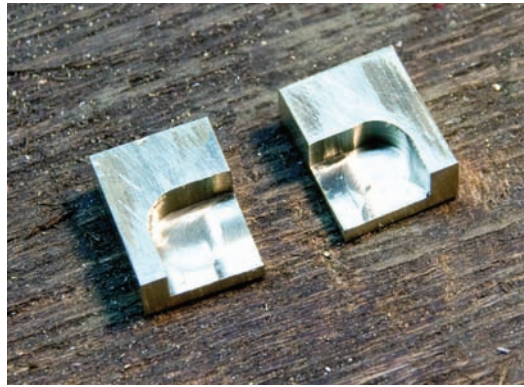


Photo 5

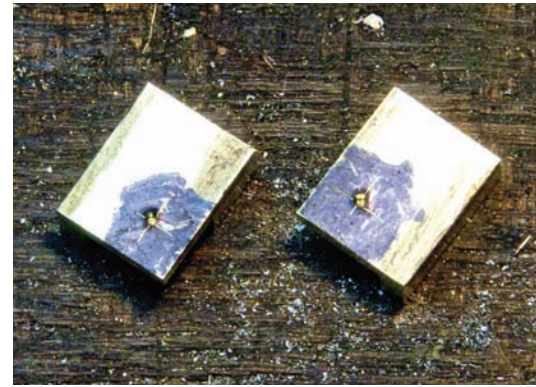


Photo 6

dimension (0.465-inches) as the cross heads. Mark and center-pop the piece as per the drawing (**Photo 7**). Then drill the 3/32-inch holes with your drill press, taking little bites and clearing the drill as you go. The drilled piece should look like **Photo 8**.

Cut a piece of brass sheet (0.020-inch to 0.040-inch thick) to 0.465-inches by 0.750-inches (**Photo 9**). Soft-solder the brass sheet to the drilling guide, as per **Photo 10**. When you're finished, if there is any solder in the inside corner where the pieces join, be sure to file it out.

To use the guide, orient the cross head as shown in **Photo 11**. Note that one hole in the drilling guide is a little closer to the edge than the other. The hole that is closest to the edge is for the cross head guide; the other is for the piston rod. Make sure the cross head is oriented properly to the drilling guide (refer to the drawings if necessary). Clamp the cross head in your drill-press vise with the brass sheet of the guide sandwiched in (**Photo 12**). It's a little difficult to see in the photo, but the guide is actually above the vise, with the cross head immediately below it, waiting to be drilled.

Drill each cross head as you did the drilling guide. You should end up with a pair of parallel holes spaced identically in each cross head (**Photo 13**). Set the finished cross heads aside and we'll move on to the cylinders.

Cylinders

Chuck up a piece of three-quarter-inch round brass stock in your lathe, with an inch or so hanging out. Clean up the end if necessary, then set your

parting tool to cut off a piece 0.750-inches long. Cut into the work piece one-eighth-inch or so but do not part it off (**Photo 14**). Put a pointy tool, like a thread-cutting tool, into the tool holder. Move the tool 0.070-inch in from the end and cut a groove 0.010-inches deep. Do the same at the other end (**Photo 15**). These grooves will represent the cylinder covers.

With a flat file and the lathe running, round off the right-hand corner so that it looks good to you (**Photo 16**). Part off the cylinder, turn it around, and re-chuck it. File the second corner round to match the first.

Put a small center drill into your tail stock chuck and center drill the end of the cylinder. Then, using a 3/32-inch drill, carefully drill all the way through the cylinder, taking small bites and clearing the drill each time (**Photo 17**). The cylinder is drilled all the way through to relieve any compression caused by the tight-fitting piston rod in the hole once oil has been applied. Before removing the cylinder from the lathe, insert a piece of the 3/32 rod that you'll use for the pistons into the hole to check the fit (I used 3/32-inch-diameter stainless welding rod). The rod should slide in smoothly, without resistance (**Photo 18**). Remove the cylinder from the chuck, then repeat the whole process for the second cylinder. When you're finished, you should have a pair that looks like **Photo 19**.

Now we'll drill the hole for the cross head guide. This must not only be parallel to the piston-rod hole in the center of the cylinder, but it must be precisely the same distance from it as the holes in the cross heads. To achieve this, we'll use the same drilling

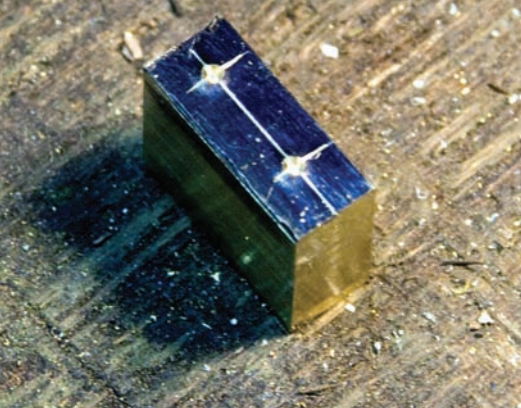


Photo 7



Photo 8



Photo 9

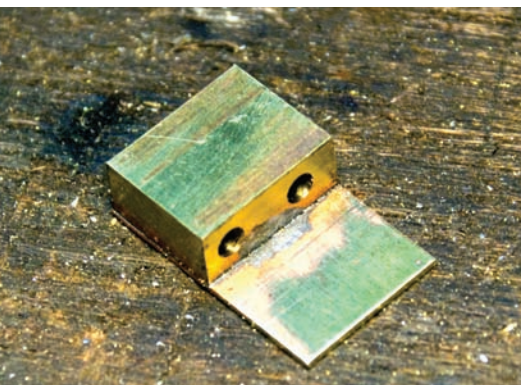


Photo 10



Photo 11

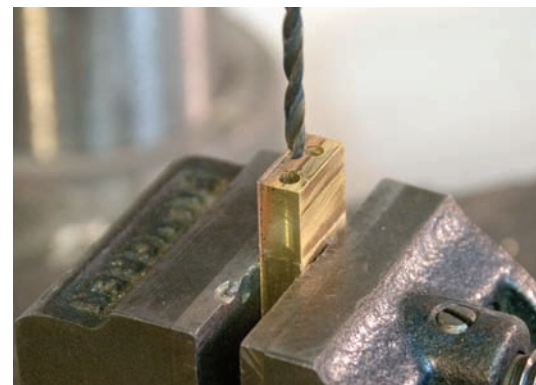


Photo 12

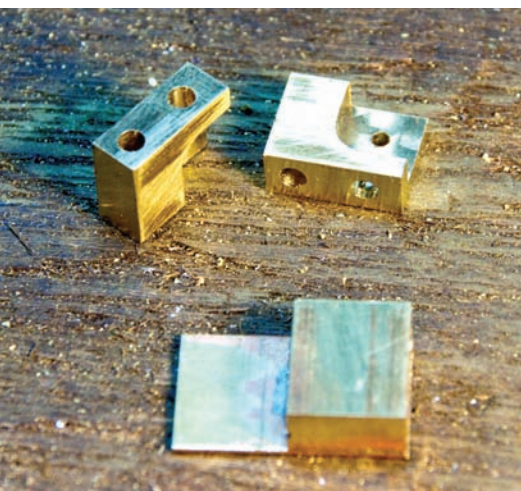


Photo 13

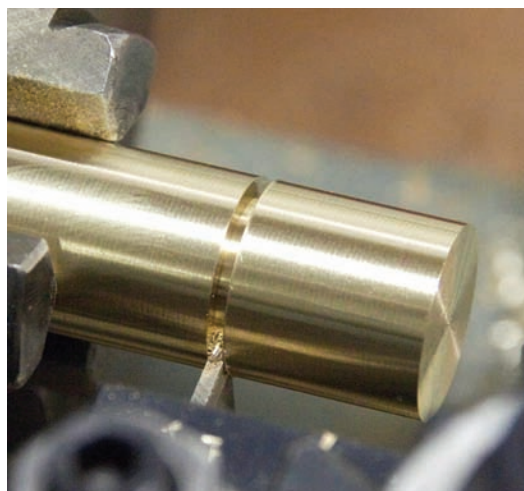


Photo 14



Photo 15

guide we used to make the cross heads.

Cut a scrap of 3/32-inch rod, 1¼-inches long. Insert this into the piston-rod hole (**Photo 20**), then slip the drilling guide over it — either hole is fine. Gently start drilling the hole in the cylinder through the drilling guide, firmly holding the piece on the drill-press table to prevent the drill from wandering (**Photo 21**). Drill the hole one-quarter-inch deep. Do the same for the other cylinder. Your cylinders should now look like **Photo 22**.

You can test your fit with some 3/32-inch-rod scraps, as shown in **Photo 23** (don't put anything together permanently yet). Things should slide easily, with little or no friction. In the event that they don't (as happened with one of mine), open out the

hole in the cross head for the cross head guide with a No. 41 drill. If that doesn't work, do it again with a No. 40. That should be all you need.

Piston rods and cross head guides

This is a good time to make the piston rods and cross head guides. Cut the piston rods from 3/32-inch-diameter stock, as per the drawing.

The holes you made in the cylinders for the cross head guides may or may not be exactly the right depth, so the best way to make the cross head guides is to insert a length of 3/32-inch rod in a cross head-guide hole in a cylinder, then mark it and cut it. There needs to be 1.125-inches of it sticking out of the cylinder (**Photo 24**).



Photo 16

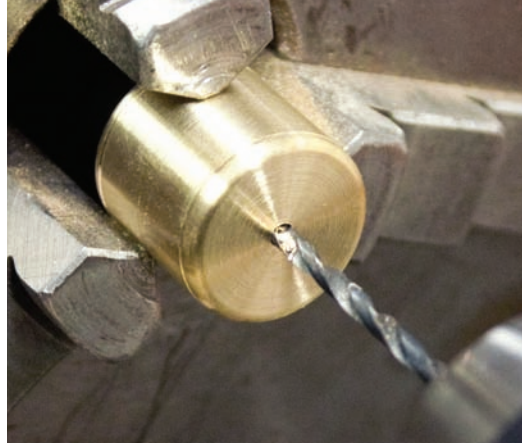


Photo 17



Photo 18



Photo 19



Photo 20

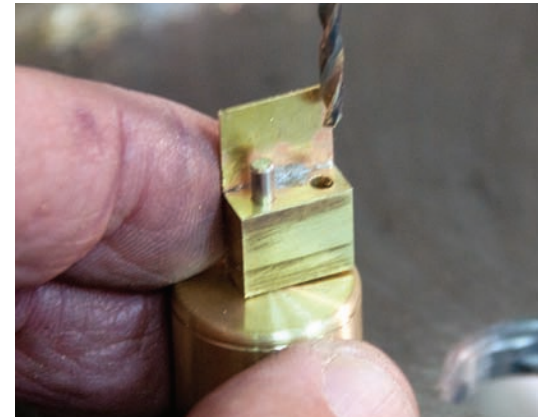


Photo 21

Back to the cylinders

The backsides of the cylinders need to be milled flat. These flat surfaces must be parallel to the imaginary line between the center lines of the piston rod and the cross head guide on each cylinder. Now that the piston rods and cross head guides have been made, they can be used in setting up the cylinders for milling.

Put the piston rods in the cross head-guide holes and the cross head guides in the piston-rod holes in both cylinders, then position the cylinders in your milling vise as per **Photo 25** (or you can cut them one at a time). Rest the rods on top of the vise jaws. This will ensure that the cuts are properly parallel to the rods. From this point on, “handedness” (i.e., left hand, right hand) is very important, so make sure that the cylinders are positioned in the vise in opposite directions. Now you can mill the flats. Take off 0.022-inches of material, so that the cylinder measures 0.728-inches across the flat. The milled cylinders should look like **Photo 26**.

A marking guide

The cylinders, spacer block and mounting plate all need holes in them that will match up. To help drill these, we’ll need a marking guide. Cut a piece of brass — 0.040-inches thick is good — one-inch by one-quarter-inch. It will need holes in it, as per the drawing, but it might be more accurate to mark and drill the holes after the piece has been bent.

Bend the piece along the fold line, 90 degrees. I suggest holding it in your vise, then bending one leg down. Smack the fold once or twice with a good hammer to get a nice, sharp inside corner. It should look like **Photo 27**. Then, measuring from the inside corner, mark and center-pop the piece for the holes. On the one-hole leg, drill that hole 3/32-inches in diameter. For the holes on the other leg, first measure the tip of your center punch and choose a drill that closely matches it. Then drill the holes. Note: If your center punch has a taper at the tip that is longer than the thickness of the gauge, drill a much smaller hole, then try the punch through it. If it leaves a mark, you’re good. If it doesn’t, enlarge the hole slightly and try again. Your finished hole-marking guide should look like **Photo 28**.

To use the gauge to drill the cylinders, slip the 3/32-inch hole over the piston rod (**Photo 29**). Be sure that you’re working from the end of the cylinder that has the second hole in it. The two-hole leg of the gauge should fit snugly against the flat that you milled in the side of the cylinder. Holding the gauge firmly in place, mark the holes with your punch.

With a rod in the piston-rod hole and another in the cross head-guide hole, place the cylinder in the vise as shown in **Photo 30**. Drill the 1/16-inch-diameter holes. They needn’t be too deep — 3/16 to one-quarter-inch would be fine. Just be sure you don’t drill into the piston-rod hole. The cylinders should



Photo 22

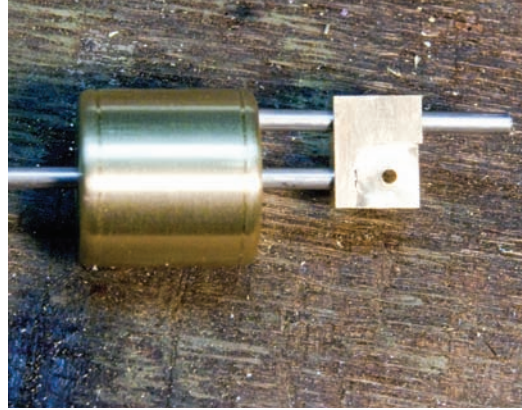


Photo 23



Photo 24



Photo 25

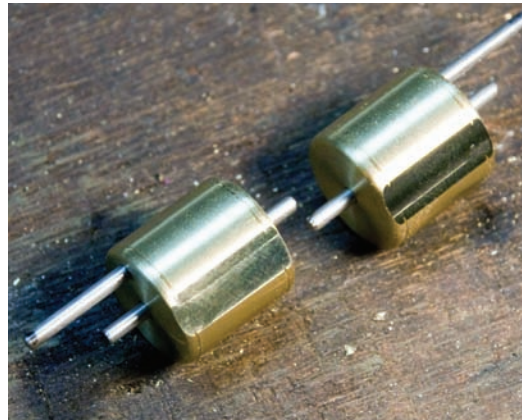


Photo 26

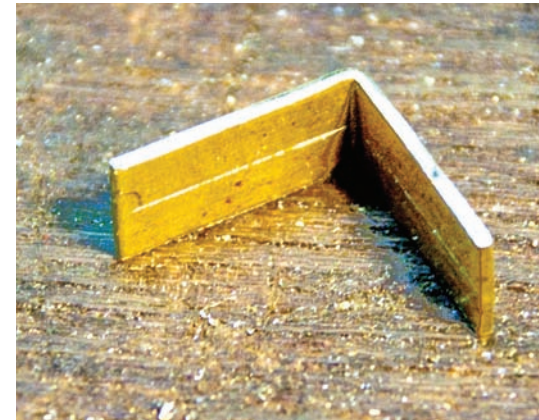


Photo 27



Photo 28



Photo 29



Photo 30

now look like **Photo 31**.

Now is a good time to permanently attach the cross head guide. You can do this with a drop of thread adhesive (Loctite) or, as I did, you can press them into place. To do this, slightly deform the end of the rod to be inserted by tapping it with a ball-peen hammer. If you can see the distortion, it's probably too much. You just want a good interference fit. Using a small hammer, lightly tap the cross head guide into its hole.

Go ahead and attach the piston rods to the cross heads, too. Because of the limited surface area there, I would strongly recommend silver solder. The cylinder/cross head assemblies can be seen in **Photo 32**.

Mounting blocks

The mounting blocks are straightforward. The pair

are made from one-quarter-inch by one-half-inch brass. Once the blocks are machined to size, as per the drawing, the hole-marking guide can be used to mark their holes. Once marked, drill them through 1/16-inch. The finished blocks can be seen in **Photo 33**.

Mounting plates

The mounting plates are also straightforward. Make them out of 1/16-inch sheet brass, according to the drawing. Once they have been cut to size, they can be drilled together. Glue them together with some CA cement. Once set, lay out and mark the top holes for the No. 43 drill and use the hole-marking guide to mark the bottom holes. Once the holes are drilled, heat the pieces up until they separate, clean them up and they're finished (**Photo 34**).



Photo 31

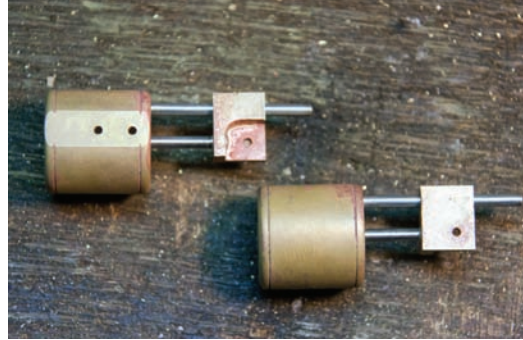


Photo 32



Photo 33



Photo 34

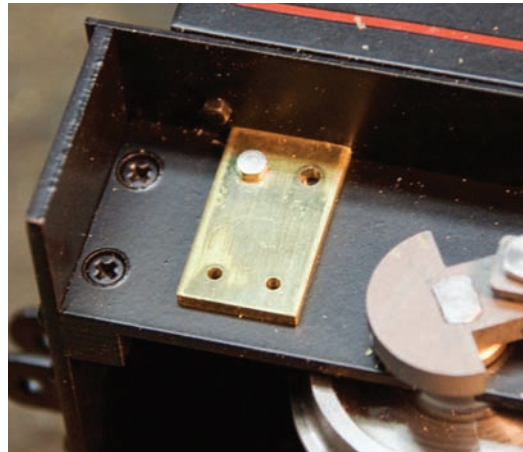


Photo 35

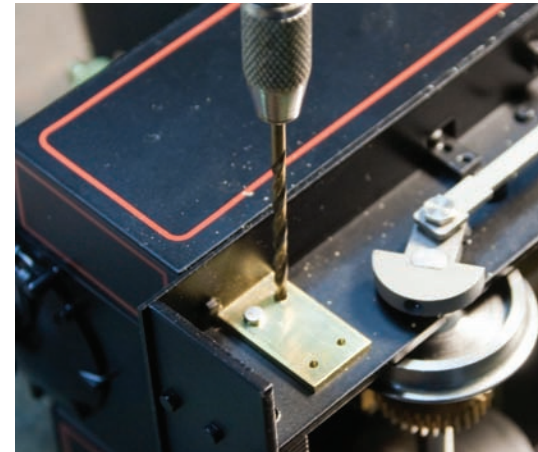


Photo 36

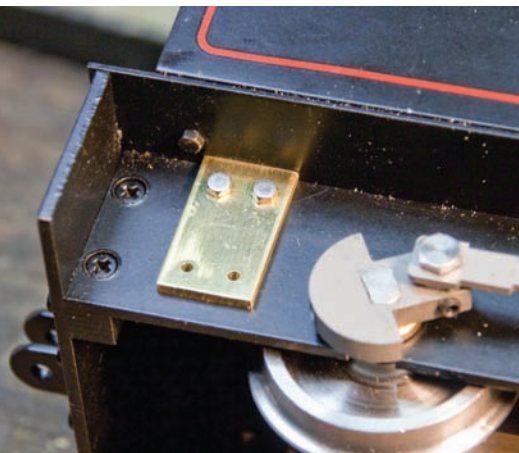


Photo 37

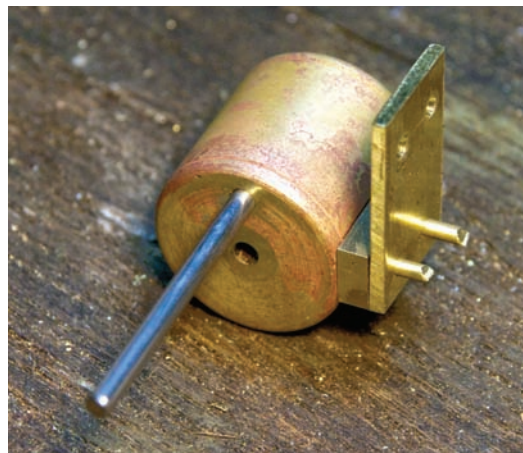


Photo 38



Photo 39

Mounting the plates

Before putting the cylinder assembly together, let's do some work to pave the way. If we mount the plates by themselves first, we'll know that the cylinders will go on just fine. This can be done without disassembling the locomotive at all.

Start by removing the first hex-head screw in the frame, under the floor, just back of the buffer beam. You'll need a longer M2 screw to replace it. If you've got one (maybe left over from your last Aster build), fine. If not, here's a dodge: This is a nasty bit of metal working but it works — I've tried it. Simply take a 2-56 tap and run it through the threaded metric hole, essentially re-threading it to 2-56. Then you can screw the plate to the locomotive's frame with a 2-56 screw, as shown in **Photo 35**.

Once it's securely in place, use a No. 43 drill in a pin vise to mark the position of the adjacent hole on the frame (**Photo 36**). I did a drawing of this, but this way is easier and more foolproof. With the hole marked, center-pop it and drill it with a No. 50 drill. Then tap that hole 2-56. Screw the plate to the engine's frame with two 2-56 screws (**Photo 37**). Do the same on the other side. When all is good, unscrew them.

The cylinder assembly

The cylinder, spacer block, and mounting plate will need to be soft-soldered together in a sandwich to form the cylinder assembly. The 1/16-inch holes will be used for positive alignment of the parts.

Cut four pieces of 1/16-inch brass rod, each about

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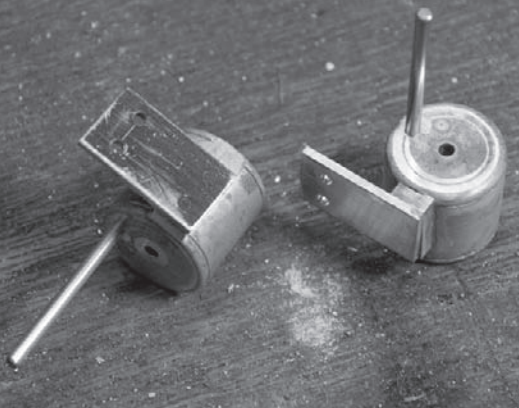


Photo 40

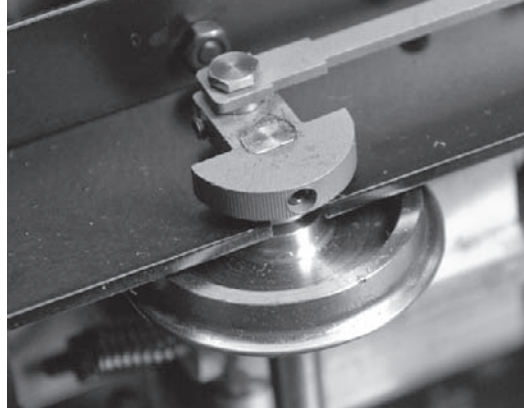


Photo 41

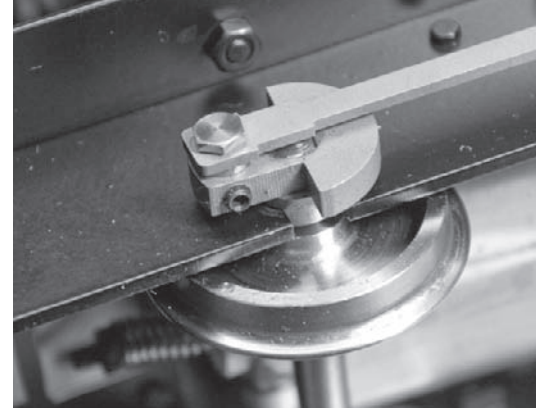


Photo 42

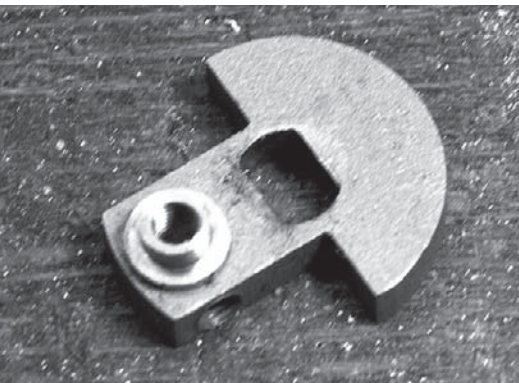


Photo 43

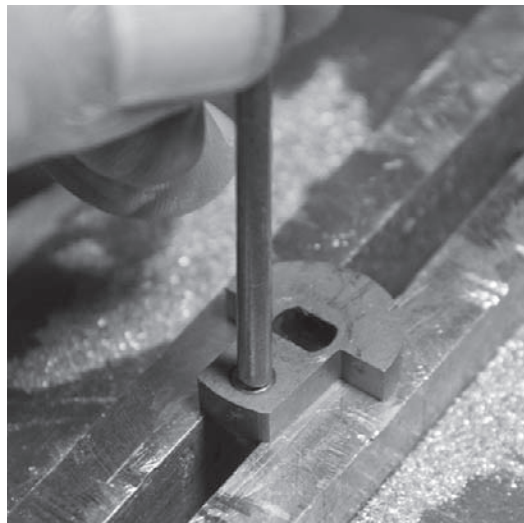


Photo 44

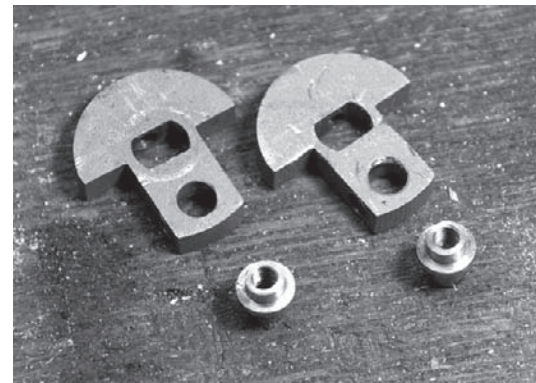


Photo 45

three-eighths-inches long. Clean up one end of each, so that there are no burrs. Put the three pieces of the cylinder assembly together in a trial fit, using the rods in the holes to line up all of the parts (**Photo 38**).

In the event that the holes do not line up perfectly (despite your best efforts with the marking guide) do this: put a pin through one hole of each piece; then, with a 1/16-inch drill in your rotary tool (Dremel) or a hand drill, drill through the other holes to align them better. Once that's done, you should be able to insert the other pin.

When all of the parts go together well, flux the mating surfaces and reassemble the parts. A small spring clamp may be used to hold them together if necessary. Put a small piece of solder near each joint (**Photo 39**).

Heat the assembly with a torch, applying most of the heat to the cylinder, which will transfer it to the other parts. The solder should flow smoothly into the joints. When the parts have cooled, clean off all the flux and file the pins flat on the backside of the mounting plate. The finished assemblies should look like **Photo 40**.

New rear counter-weight crank pins

Before going further we need to disassemble the locomotive a little. The rear counter weights need to come off and their crank pins extracted. Fortunately, Accucraft has made it easy for us to do this. If you

look at a counter weight, you'll see two set screws in the edge. One holds the counter weight in place on the axle (**Photo 41**) and the other secures the crank pin in the counter weight (**Photo 42**). Remove both of these set screws.

If your engine is like mine, you'll find that the counter weights do not just slip off. I was able to get mine off by some gentle prying and wiggling back and forth. Once the counter weight is off (**Photo 43**), the side-rod crank pin must be removed. Again, it didn't just slip out. Place the counter weight on top of the jaws of your vise, face down, with the crank pin between the jaws. Don't tighten the vise. Using a small hammer and pin, you should be able to easily tap the crank pins out (**Photo 44**). Both counter weights and their removed crank pins can be seen in **Photo 45**. Now it's time to make some replacement crank pins.

Chuck up a piece of one-quarter-inch steel bar in your three-jaw. Turn the end down to 0.159-inch diameter by 0.163 inches, then chamfer the edge with a file (**Photo 46**). Part the piece off 0.346-inches long. Reverse the piece in the chuck and turn that end down to 0.159-inch diameter by 0.144 inches, and chamfer that edge slightly. Center drill, then drill the end No. 43 by 0.250-inches deep. Tap the hole 4-40 (**Photo 47**). Do the same again and you'll have your replacement crank pins (**Photo 48**).

Putting it all together

We're near the end now. The new crank pins must



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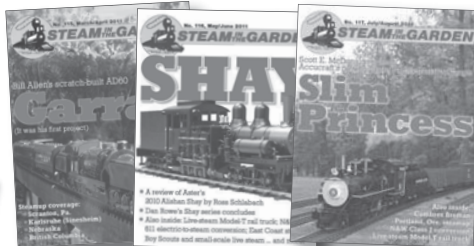
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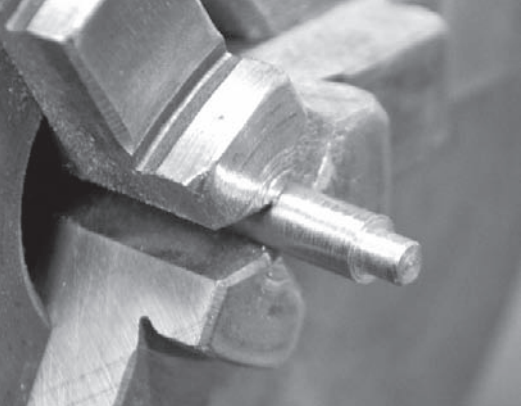


Photo 46

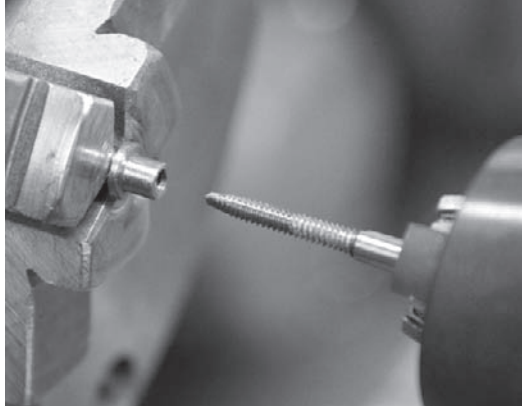


Photo 47

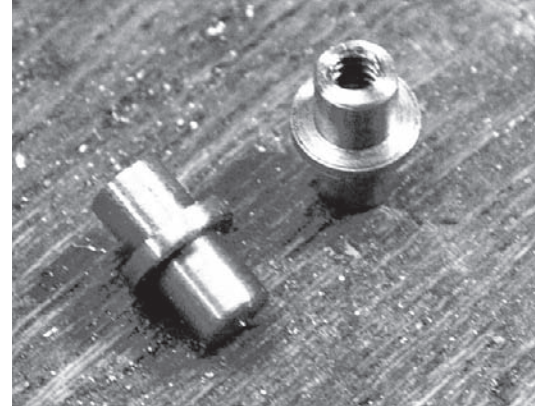


Photo 48

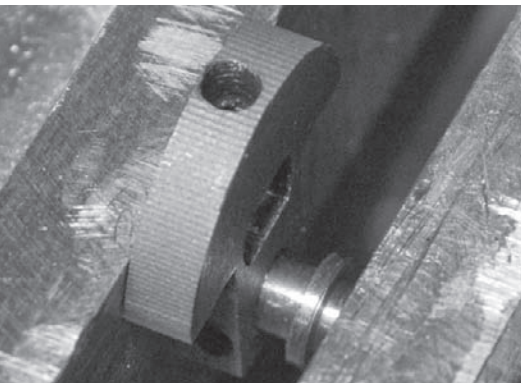


Photo 49

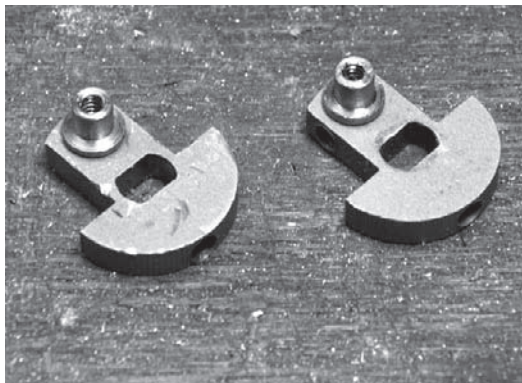


Photo 50

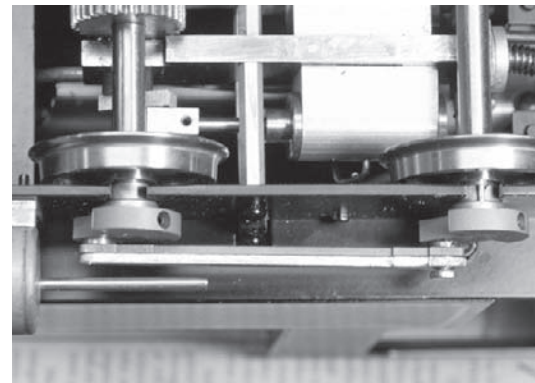


Photo 51

be put into the counter weights. They will probably need to be pressed in. This can be carefully done in the vise (**Photo 49**). Make sure they're in all the way (**Photo 50**). Replace the crank pins' set screws, then replace the counter weights on the axles and replace those set screws.

You'll need some 4-40 screws to hold the rods onto the rear counter weights. I used hex screws that I had on hand. They were too long so I had to grind them to length. Make sure they fit well in the new crank pins — I had to countersink the threaded holes in my crank pins a little to get the screws to seat well.

Place your new main rods over the crank pins. **Photo 51** shows what a main rod looks like edge-on at this point. You'll see that it is exactly parallel with the side rod and it lies next to it. The small end of the main rod needs to be in line with the cross head guide.

Remove the rod and carefully bend it out at the big end, then back in at the small end, so that it resembles the rod in **Photo 52**. Do the same on the other side. It would probably be a good idea to mark the rods so that you know which side of the engine they belong to.

We can finally attach the main rods to the cross heads. The connector is a 1/16-inch-diameter pin. You can turn up something on the lathe or do as I did and use a 1/16-inch copper (or brass) rivet. The rivet is free to rotate in the cross head and is soft-soldered to the backside of the main rod. I suggest using a soldering iron for this — I did it with a small 30-watt unit.

You need to get in and out quickly to be sure that you don't solder the pin to the cross head. I

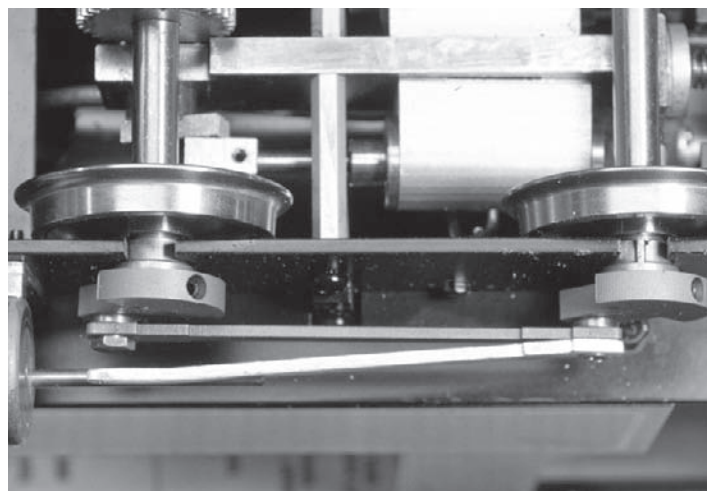


Photo 52

marked the areas where I didn't want solder with a graphite pencil to prevent the solder from flowing there. **Photo 53** shows the setup. Parts to be soldered have been lightly fluxed. A piece of heavy paper was inserted between the cross head and the main rod to act as a spacer.

After the parts have been soldered and you know that everything moves freely, remove the paper, clip the protruding part of the rivet or pin, and smooth the end. Both sides of the finished assemblies can be seen in **Photos 54** and **55**.

Slip the cross heads onto their guides and the piston rods into the cylinders. Put the big ends over the crank pins and attach the retaining screws. Be certain that everything works smoothly without bind-

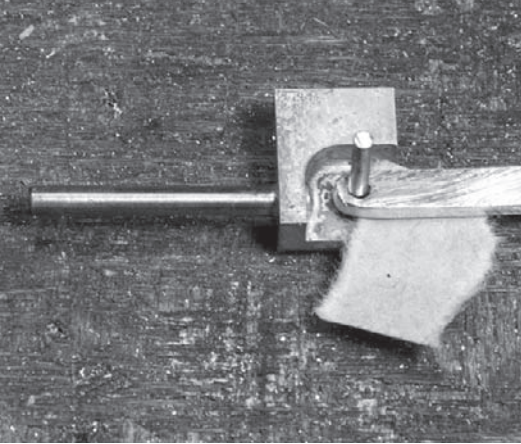


Photo 53

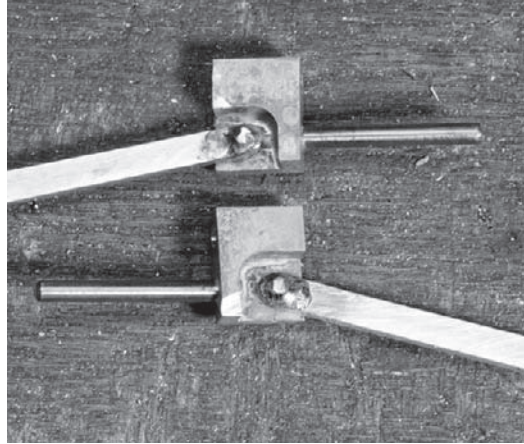


Photo 54

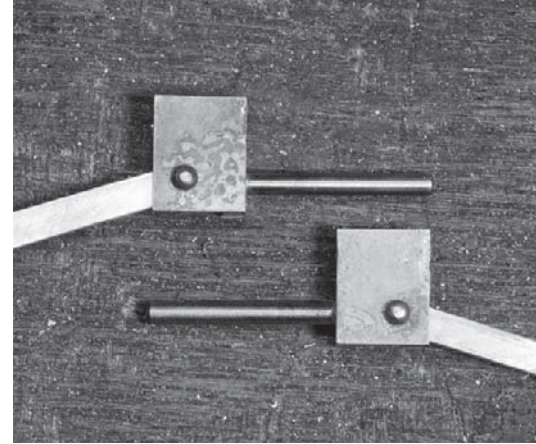


Photo 55

ing. If so, you're finished with the mechanical part of this project (**Photo 56**) — all that's left is painting.

I painted my cylinders semi-gloss black to try to match Accucraft's finish. I found that Dupli-Color acrylic enamel semi-gloss black (No. DA1603, available at the auto-parts store) is not too bad a match. The rods I painted red for greater visibility.

As with many machining projects, you may have the inclination to look at your finished work and say to yourself, "I spent all that time for that?" The answer, of course, is, yep, you did. The thing to remember, though, is that there was no other way to accomplish that particular task. You've done something that not many people can (or will) do, so take pride in your work and enjoy it.

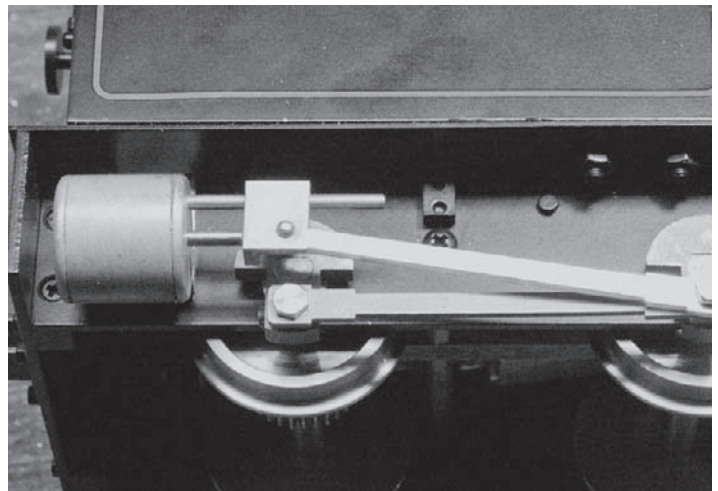


Photo 56

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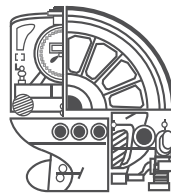
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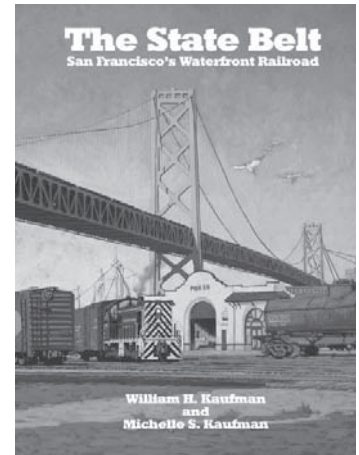
Railroad librarian: Train stories, personal history

I like to think that I came by my love of railroads through blood. My mother's grandfather was a conductor for the Atchison, Topeka & Santa Fe Railroad, helping to push the company's holdings west. T.J. McGinty, an Irishman apparently from upstate New York, worked in Arizona and California, spending the 1890s-1910s at the railroad's major West Coast switching yards in San Bernardino and Richmond.

The decade in San Bernardino would prove fruitful in other ways: McGinty and his wife Sarah became confidants with a couple across the street, Friend and Augusta Richardson. At the turn of the century Richardson, a newspaper publisher, bought the daily paper in Berkeley, Calif., and from there launched a political career that in 1923 would land him in the California governor's mansion.

One of the patronage jobs of the era was "State Superintendent of Railroads," a grander job in title than reality. California owned the Belt Railroad of San Francisco, a pike that switched box and flat cars on the waterfront from one shipping pier to another,

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



and the state superintendent ran this railroad.

According to family lore, Mrs. Richardson and Mrs. McGinty remained fast friends throughout their lives and shortly after Richardson became governor, the two cooked up that McGinty should take an early leave of the Santa Fe and run the State Belt Railroad. And so it passed.

Even with transcribed oral histories from the McGinty children, it has taken me almost a decade to nail down everything I wrote above. "Papa ran the railroad in San Francisco," was pretty much all I had to go on.

Imagine my surprise then, when I learned last year that a railroad buff had recently written a book on the State Belt. William Kaufman, a model train enthusiast, wanted to build a layout based on the State Belt but found scant hard data about the service.

He then embarked on a search of old newspapers and old state reports, scouring libraries throughout



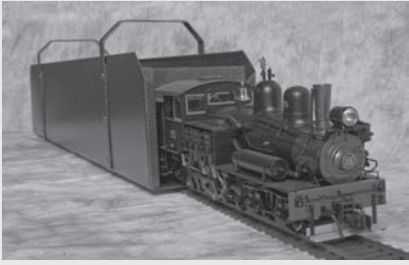

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the West for details about the State Belt, which existed from 1891-1993, shuttling cars from warehouses from the Golden Gate Bridge to the Southern Pacific's switching yards at Mission Bay, 67 miles of track.

Even if your great-grandfather didn't run the railway for four years, Kaufman's book "The State Belt: San Francisco's Waterfront Railroad," is a fascinating story of politics, locomotives, money and a little more politics. Kaufman — who was aided in his endeavors by daughter-in-law Michelle Kaufman, a museum director — tells the story in a straight time

line from the Belt's start to its ignoble finish.

The 8½-by-11¼ hardback book is lush with color and black-and-white photos and illustrations. The writing is sprightly and when combined with the quality reproduction, reading it makes an afternoon go by as fast as the "Daylight" along the coast.

McGinty, by the way, makes a special guest appearance in "The State Belt," criticizing his predecessors for acquiring switchers that were "too light." He bought heavier locomotives and sold off the tiny ones.

While "The State Belt" focuses on one specific

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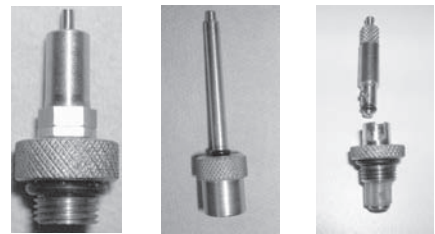

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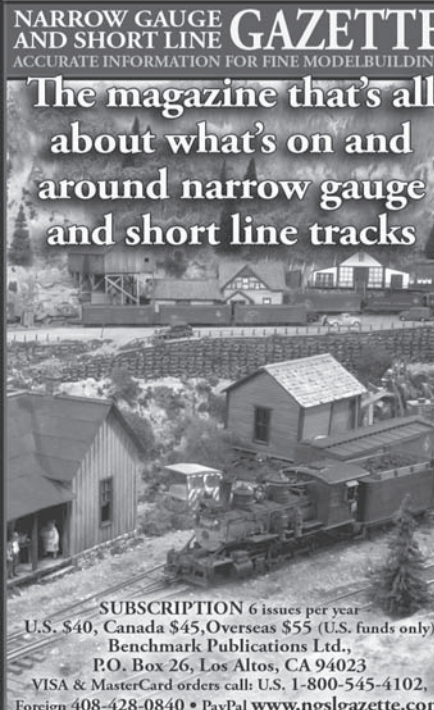
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railroad, Kalmbach Publishing Co.'s "Great American Railroad Stories," is jam-packed with chapters about every railroad imaginable. A celebration of the company's 75 years of publishing *Trains* magazine, Kalmbach editors have hand-picked more than 50 of

what they have deemed to be the best articles from the magazine's archives.

Though there are photographs in "Railroad Stories," it is the words that are the focus here. Writers ranging from the infamous Lucius Beebe to the magazine's founding editor, Al Kalmbach — not to mention railroad historians such as John White Jr. and John Hankey — pack in essays ranging from a few hundred to a few thousand words each.

Articles from the earlier days of the magazine were undoubtedly turned into book chapters through digital scanning of the old pages and there are a few typographical errors that such production methods engender, but they are few and far between.

Chapters on being a fireman in the 1920s or a railroad telegrapher in the 1930s are pleasurable not only for their writing style but also because of the history they provide. Beebe visits a short line in Florida about to end the use of wood-burning locomotives, while the diary of an 1869 transcontinental trip is reproduced. Two topics discussed in this issue of this very magazine — Casey Jones and 10-wheelers — each garner a chapter.

Short of keeping 75 years worth of *Trains* magazine, this 8½-by-10¾ soft-bound book is well worth having in your library

"*The State Belt: San Francisco's Waterfront Railroad*," by William H. Kaufman and Michelle S. Kaufman. Signature Press, Wilton, Calif., 2013, 171 pages, with index. \$60.

"*Great American Railroad Stories: From Trains*." Kalmbach Publishing Co., Waukesha, Wisc., 2014, 256 pages, with index. \$24.99.

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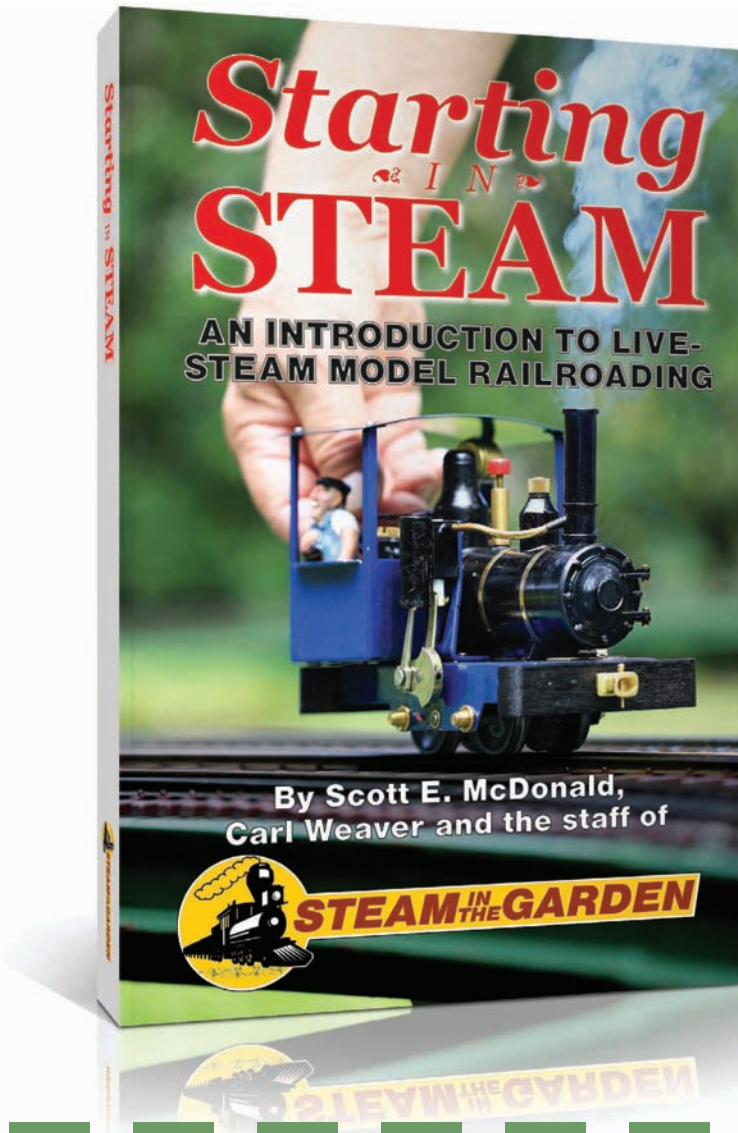
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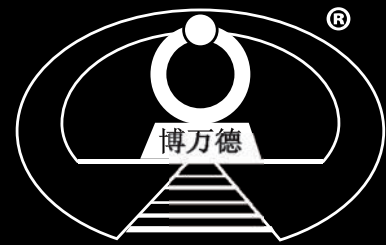
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Feb. 13-15, 2015 — 18th Annual Presidents’ Day Steamup, Electric City Trolley Station & Museum (Steamtown), Scranton, Pa. Two tracks in G-gauge and O-gauge, sponsored by the Pennsylvania Garden Railway Society, Warrior Run Loco Works, Aikenback Live Steamers and Wyoming Valley Live Steamers. Info: Clem O’Jevich Jr., (570) 735-5570 or wrunloco@aol.com.

March 27-28, 2015 — East Coast Large Scale Train Show, York Fairgrounds, York, Pa. Aikenback Live Steamers will set up its layout at this event. Info: <http://www.eclsts.com> and Mike Moore, mike@aikenback.net.

April 10-12, 2015 — Cabin Fever Model Engineering Expo, York Fairgrounds & Expo Center, Toyota Arena, York, Pa. Info: <http://www.cabinfeverexpo.com>.

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

July 5-11, 2014 — National Garden Railway Con-

vention, Crowne Plaza Airport Hotel, Denver, Colo. Info: <http://ngrc2015.com>.

July 15-19, 2015 — National Summer Steamup, Lions Gate Hotel, McClellan, Calif. Multiple layouts. Lions Gate room reservations: (916) 643-6222 (<http://www.lionsgatehotel.com>). Info: <http://www.summersteamup.com> or (650) 898-7878.

Sept. 2-5, 2015 — Thirty-fifth National Narrow Gauge Convention, Royal Sonesta Galleria Hotel, Houston, Texas. Info: <http://www.nngc-2015.com>.

Regular steamups

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

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

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

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

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

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

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



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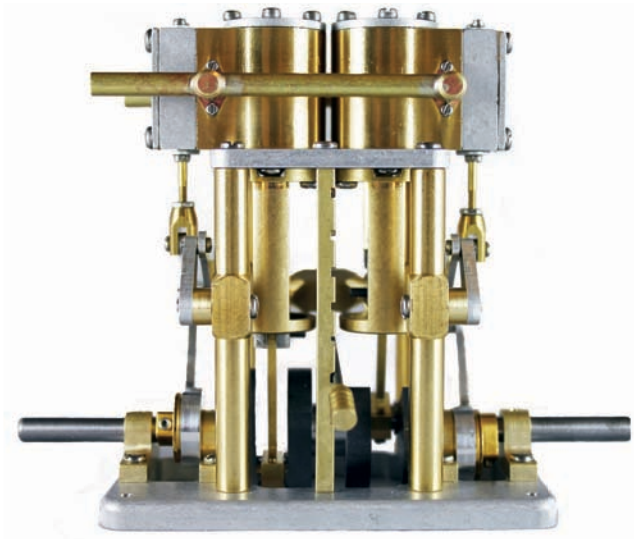
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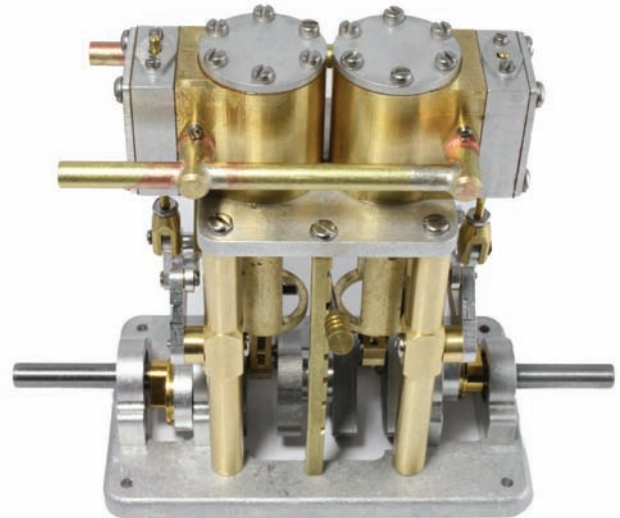
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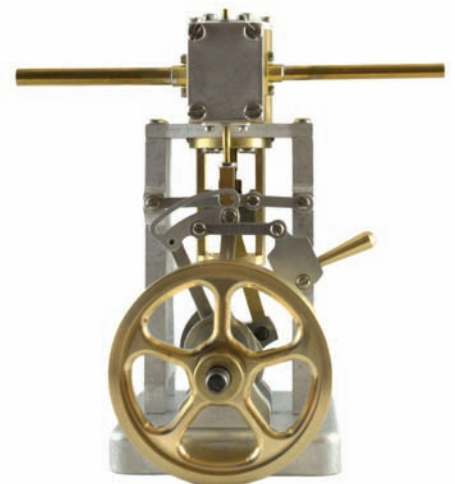
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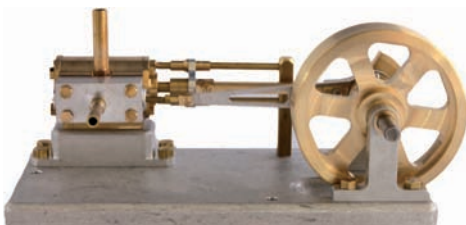


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