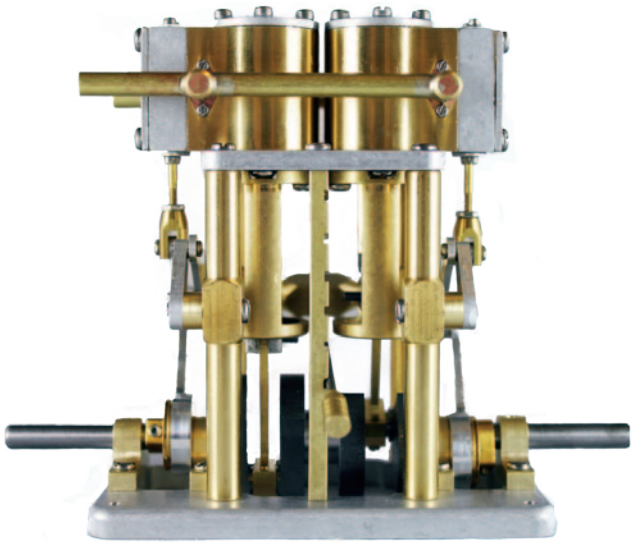
No. 173, May/June 2021 US $5.95
Canada $7.95

STEAM IN THE GARDEN

The Minitram

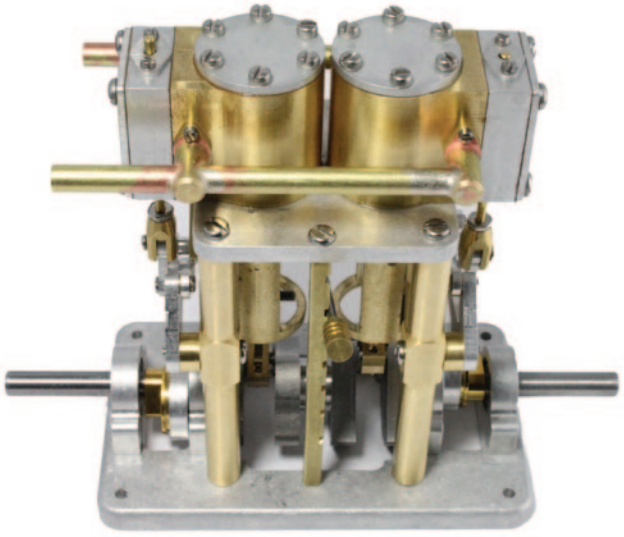
*** Completing the Minitram Build Project. * Freelance Consolidation - Part 3 Build Series *Accucraft Talyllyn Review ... and lots more!**

Fully Machined Steam Engine Kits



TVR1A

Ready to assemble steam engine kit: $245
Fully Assembled and Tested: $350
Includes all hardware
Double acting, twin cylinder
Hackworth reversing gear
Includes full-color assembly manual
Dimensions:
Base: 3.000" x 1.844"
Crankshaft end-to-end: 4.344"
Height: 3.375"
Weight: 327 g



TVR1ABB

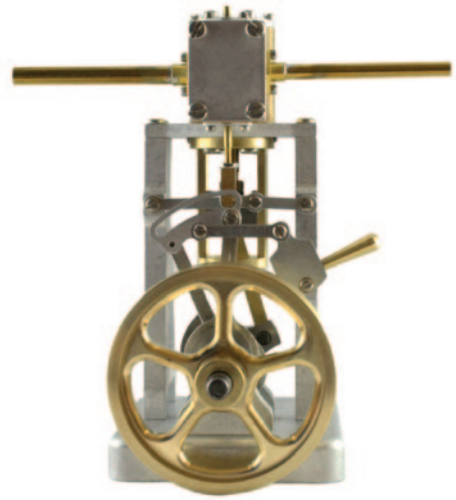
Ready to assemble steam engine kit: $295
Fully assembled and tested: $400
Includes all hardware
SAME AS TVR1A but with shielded ball bearings
Includes full-color assembly manual
Dimensions: Same as TVR1A
Weight: 323 g

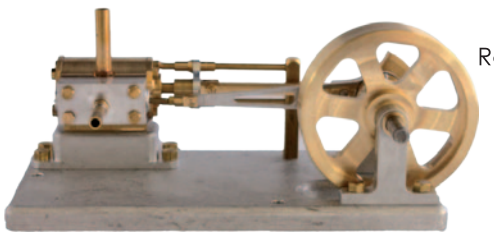
Flywheels for TVR1A / TVR1ABB

MFLY: $20
1 3/8" DIA
(Solid Marine)

BFLY1: $25
1 3/4" DIA (5 Spoke)

BFLY2: $30
1 3/4" DIA (6 Spoke)





HM1

Ready to assemble steam engine kit: $95
Fully Assembled and Tested: $145
Kit includes all hardware
.344" bore, .500" stroke
Double acting, single cylinder
Includes full-color assembly manual

VR1A

Ready to assemble steam engine kit: $119
Fully Assembled and Tested: $175
Includes all hardware
1/2" bore, 1/2" stroke
Double acting, single cylinder
Reversing lever
Includes full-color assembly manual

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- Tuned tracking and suspension.
- Multiple bearing cross heads.
- Lighting package includes pressure gauges.
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- Modeled in early 1950s time frame — just before oil conversion.
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STEAM IN THE GARDEN

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into trains, propelled by fire ...

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http://www.steamup.com/

In This Issue

Cover: The finished Minitram looking resplendant on the author's garden railway - **Photo by Marc Horovitz**

LATEST WAYBILL

In Memoriam James (Jim) M. Pitts - On 18 January 2021 the live steam community lost its 'Southern Gentleman' of live steam, the Reverend James M. Pitts of Travelers Rest, SC. A regular attendee of many steamups, most notably the Diamondhead International Small Scale Steamup, Jim was also a dealer for Aster Hobby Inc. with Southern Steam Trains.

Rick Parker Photo

Jim retired as Chaplain of Furman University in 2003, a post he assumed in 1982. Prior to serving as the Chaplain, Jim served as Assistant Chaplain and Assistant Professor of Religion beginning in 1967. In additon to his ministry on campus, Jim ministered in hospital settings with his expertise extending into crisis counselling and substance abuse intervention.

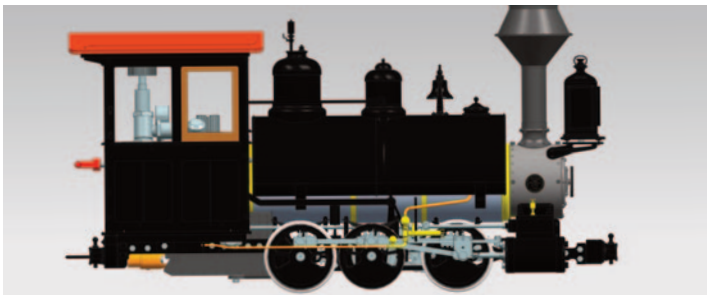
Jim was preceded in death by his son, J. Stewart Pitts. Jim is survived by his wife, Nancy Stewart Pitts; his son, Jonathan Pitts and wife, Jackie Pitts; a daughter-in-law, Kelley Ellison Pitts; four grandchildren: Will Pitts, Jon Walker Pitts, Colton Pitts and Lilli Pitts; brothers: Don F. Pitts and Bob Elliott; and sister, Barb Pitts.

The Train Dept and Bowande will offer a small 1/20.3 45mm gauge Baldwin Class 6-10D 0-6-0 engine, in both a 1884 Olive Green lined livery and a post 1900 Black livery. This will be available in both a Tender version or a Saddle tank in both of the optional liveries. Jason Kovac says that this would be a perfect sized model for the smaller garden railway, or for someone looking for an engine that's easy to manage and transport. Full CAD profiles and detail drawings were developed from original Baldwin works drawings and used for the development of this 1/20.3 scale accurate model by Bowande. This creates a streamlined development and ensures the detail accuracy on the model.

The models are available for reservation now, and the production is scheduled for mid 2021 with a prototype looking to arrive around March. .

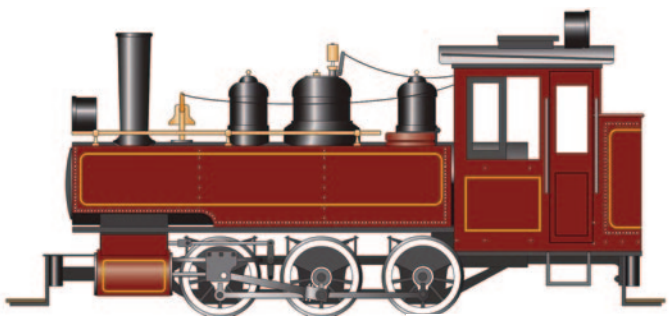
Item numbers for ordering:

GS43-STG Baldwin 6-10D Saddletank Olive Green 45mm gauge $2350.00
GS43-STB Baldwin 6-10D Saddletank Black 45mm gauge $2350.00
GS43-TG Baldwin 6-10D Tender engine Olive Green 45mm gauge $2550.00
GS43-TB Baldwin 6-10D Tender engine Black 45mm gauge $2550.00
GS43-Tender Baldwin Tender 2 axle with link and pin coupler $425.00

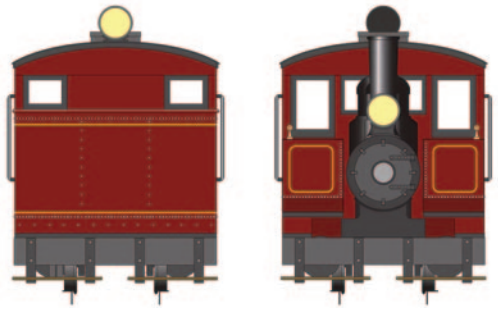


Accucraft, Union City, CA - Coming from Accucraft this Fall will be the 1:20.3 scale, freelance "Mabel." The model is based on a Baldwin 0-6-0T locomotive and will be available in both kit form and ready to run. Options include pre-installed radio control, extended frame, and pilot and rear trucks. With the add-ons, your Mabel could be a 0-6-2T or 2-6-2T. Accucraft hopes this model will join the ranks of the classic Ruby, Dora and Forney 0-4-4 in bringing the joy of live steam to both novices and experienced collectors alike.

Price: $1,249 Kit. $1,499 RTR. R/C: +$200
Taking reservations now. No deposit required.



STEAM IN THE GARDEN



Bowande UK - The elegant Stanier Jubilee class was a model Bowande UK has always wanted to bring to Gauge One. After much research they have chosen to produce the later, long firebox variant with 4000-gallon Stanier riveted tender, feeling that it looks more balanced than the Fowler tender variety. The model features Bowande's gas fired ceramic burner and prototypical Walschaerts valve gear three-cylinder operation.

The locomotive will be available in LMS Crimson Lake and British Rail Brunswick Green liveries.

There is a choice of 26 names available on a first come first served basis. As with all Bowande's models this is a limited-edition production run, so contact them early to secure your model as there will not be a second production run.

Bowande UK Photo

Specifications

* Gas fired boiler with ceramic burner and fine control valve.
* Three cylinders with fully functioning Walschaerts valve gear reversible from the cab.
* Axle pump with bypass valve for refilling under steam.
* Gas tank in bunker with 40+ minutes capacity
* Livery options – LMS Red or BR Green.
* Dimensions. Length buffer to buffer 670mm
  Height from rail 138mm
  Maximum Width 78mm

MSRP: $4750.00 £3500.00

Bowande's website is at:
www.bowandelivesteamuk.com

White River Productions, Garden Trains Annual - 2021. With the demise of *Garden Railways*, White River Productions, publisher of *Narrow Gauge and Shortline Gazette*, seems poised to dip their toe into the Garden Railroading market. They have sent us the following:

"Large scale railroading outdoors is magical and our new Annual brings that to you, just in time for Spring. The debut issue is packed with building and how-to projects along with great layout tours and our Garden Gallery photo feature, filled with great shots from readers like you! Brimming with information on prototype trains to flights of fancy and whimsy; whatever your style, you'll find the Garden Trains Annual is for you.

Featuring:

- The Making of the Model: Accucraft Mason Bogie
- In-Scale Ground Cover
- Garden Live Steam Basics
- New Life for an Old Bachmann
- Build a Two-Foot Flatcar in 7/8"
- The Cat Shed Turntable
- Springtime Track Maintenance

And Much Much More!"

https://shop.whiteriverproductions.com/products/gt21

Accucraft "Talyllyn"

Text and Photos by Jeff Young

Accucraft UK Photo

Introduction

Following on from the success of their 16mm scale "Dolgoch", Accucraft UK has delivered the other original Talyllyn Railway locomotive, "Talyllyn". "Talyllyn" is offered by Accucraft in three paint schemes: Indian red (a brownish red, which it wore in its early life), Talyllyn Railway preservation era dark green with black and yellow lining and Talyllyn Railway black, which is its most recent livery. As the model is not gauge adjustable, the various paint schemes are supplied in either 32mm (0 Gauge) or 45mm (Gauge One) versions. As a fan of this locomotive since first seeing it many years ago in a childhood British railway book, I awaited production and delivery with much anticipation.

Specifications

Scale:	16mm to 1 foot (1:19.1)
Gauge:	Either Gauge 0 (32mm) or Gauge One (45mm)
Min Radius:	36 inches (0.914 m)
Length:	11 inches (286mm) over buffers
Width:	3.5 inches (88mm)
Height:	5.5 inches (136mm)
Boiler:	Centre Flue

Working Pressure: 60 psi (4.1 bar)
Reversing Gear: Piston type, reversed by lever in the cab
Fuel: Butane Gas
Boiler Fittings: Safety valve, pressure gauge, slight glass, Goodall filler valve.

Versions:

S19-34A 32mm gauge – TR Green
S19-34B 32mm gauge – Indian Red
S19-34C 32mm gauge – Black
S19-35A 45mm gauge – TR Green
S19-35B 45mm gauge – Indian Red
S19-35C 45mm gauge – Black

Price: MSRP US$1700

The Model

Purchased through my dealer (Triple R Services), the model was delivered directly from the factory in China, and does not disappoint. My example is the Indian Red version in 32mm gauge, and as it represents the locomotive in the pre-preservation era, the name on the saddle tank is hyphenated as "Tal-y-llyn." Similar to "Dolgoch", it came in a hard fold-down thick-walled cardboard box with custom foam inserts, held together by three bands of Velcro strapping, inside a larger foam-lined cardboard box. It is up to the owner to install the coal basket, saddle tank water hatch, and cosmetic whistle and safety valve arms to the steamer. Also included were the usual assortment of Allen keys, two millimeter and three millimeter hex nut wrenches,

History of "Talyllyn"

The two-foot three-inch gauge Talyllyn Railway was built in North Wales in 1865 to haul slate from the Bryneglwys quarry for transhipment to the standard gauge railway at Tywyn. As well as slate, it hauled passengers and a limited amount of goods up the Fathew Valley. The railway continued to carry slate until 1946 and passengers until 1950. Since 1951, a group of enthusiasts known as the Talyllyn Railway Preservation Society has run it as a heritage railway, with both original locomotives and the passenger stock in operation.

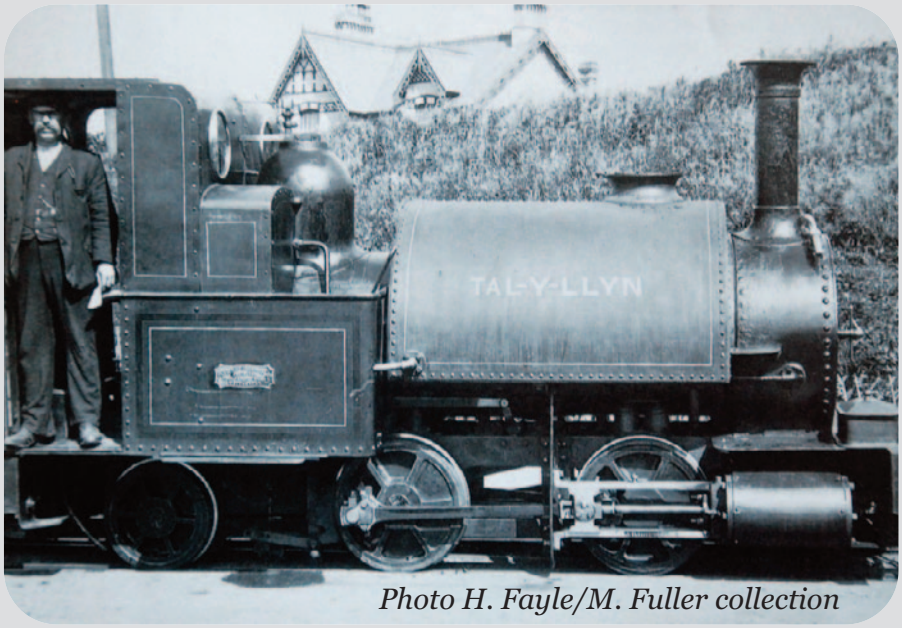


Photo H. Fayle/M. Fuller collection

Talyllyn's two locomotives were initially supplied to the railway by Fletcher Jennings; No. 1 "Talyllyn" (0-4-2) in 1864 and No. 2, "Dolgoch" (0-4-0) in 1865. Talyllyn was the first locomotive delivered to North Wales by the company. The locomotive was originally delivered as an 0-4-0 saddle tank with an open cab. This wheel arrangement resulted in poor riding characteristics and was returned to Fletcher Jennings for the addition of a pair of trailing wheels, making it into an 0-4-2. A cab was subsequently fitted in the railway's workshops at Pendre. The locomotive has been rebuilt a number of times over its life, receiving slight modifications to its appearance each time. Since 2018 it has been out of service undergoing a major overhaul, but is expected to return to service in 2021.

two syringes and a pair of cotton gloves (of dubious use, in my opinion).

The level of detail is very good, with all the piping, valves and other bits produced very accurately. The quality of paint and lining is superb as well, particularly the intricate lining on the wheels. The model has working spring buffers and a centre hook coupling as per the prototype. As with "Dolgoch", the prototypical centre hook can be replaced with their standard chopper couplers if so desired.

On "Talyllyn", the cab roof is fixed in place, but all controls can be accessed through the wide side doors. The gas control valve (a machined brass knob) is accessible on the left side of the cab. Given its shininess, it might benefit from a coat of matte black to make it less obvious. The sight glass is clearly visible through the left side cab door opening and has a drain valve below the footplate, tucked behind the cab step (see **Photo 1**). A noticeable improvement over previous Accucraft locomo-

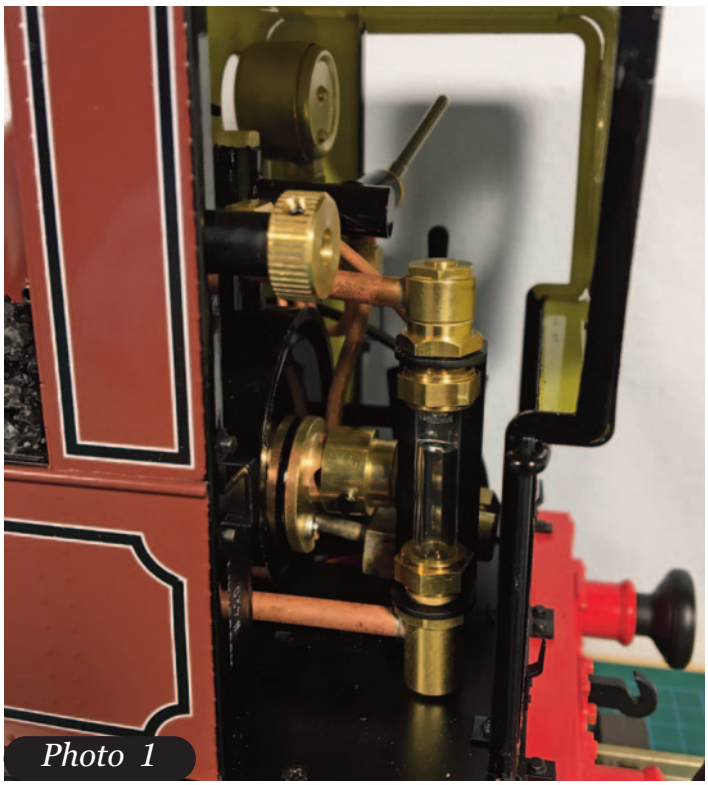


Photo 1

tives is that the valve has quite a low profile and, unlike many previous models, it is nearly invisible. The gas tank is in the left side bunker and the filler is accessed by removing the coal basket. The boiler filler plug (containing an integral Goodall valve) is cleverly hidden under the removable cast saddle tank water hatch. The locomotive's safety valve is tucked in the steam dome. The smokebox door opens as per usual on Accucraft locomotives, held shut with a rare earth magnet. The pressure gauge is set up such that it can be viewed through the right hand side front porthole cab window as on "Dolgoch". The dead-leg lubricator is tucked into the right hand bunker with a top cap flush with the top. There is no bottom drain on the lubricator and a syringe must be used to drain the condensate. The throttle and reverser are both accessed through the right hand cab door (see **Photo 2**). The model is clearly intended for manual operation only and as a result, fitting radio control would certainly be a challenge of epic proportions.

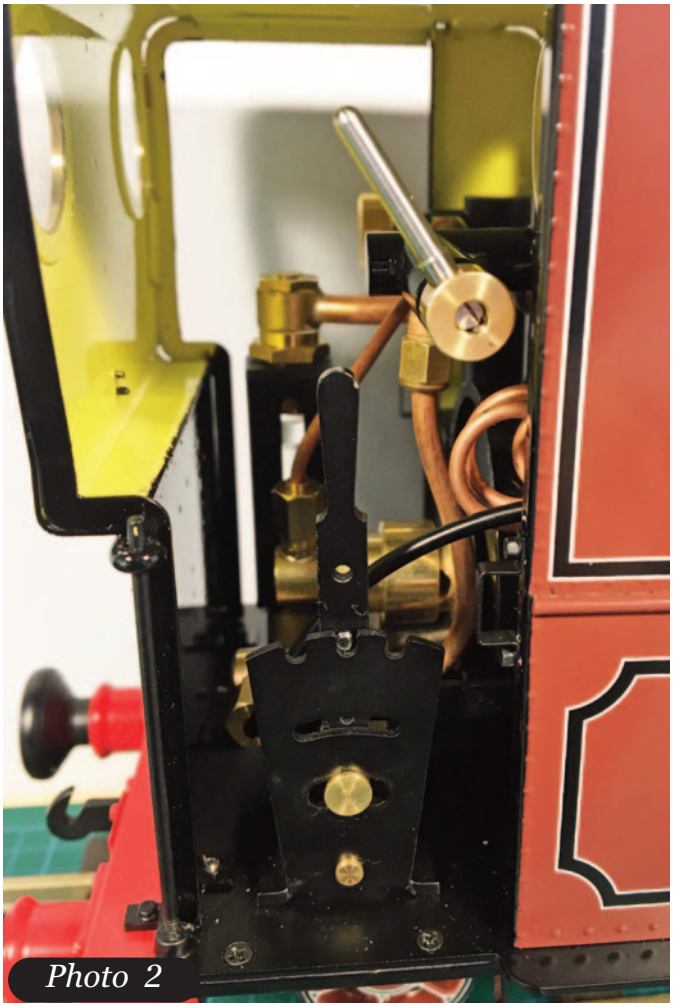


Photo 2

Operation

Due the cold winter conditions when it was delivered, I prepared the locomotive for its first run on my indoor basement layout. The chassis was first lubricated with machine oil from a needle point oiler. The lubricator was topped up with steam oil and the boiler filled up to three quarters full on the sight glass by removing the filler plug under the removable saddle tank hatch. The gas tank was then filled with butane. As well as "Dolgoch", the instructions advised to open the gas valve slightly to ignite the fire via the open smokebox door, let the fire stabilize, then turn up the gas a bit more, and after two minutes, close the smokebox door. The burner lit quickly and immediately flashed back into the flue. The burner is very quiet and the gas valve is quite controllable.

It took about seven minutes to come up to about 40 psi, followed by some back-and-forth with the reverser to clear the condensate from the cylinders. I opened the throttle and backed the locomotive to couple up to my prototypical Talyllyn train of four coaches and the brake van. By then, the safety was just starting to lift and I turned the gas down slightly. "Talyllyn" ran around the loop with the train for just over 20 minutes without the safety valve blowing off. I added water once during the run, more out of the desire to check the Goodall valve function rather than the necessity to add water. As it is mechanically similar to "Dolgoch", "Talyllyn" is a sedate runner. Subsequent runs in the order 25 minutes or more were obtained as the locomotive bedded in. One thing I did note is that even with the gas turned down low, the superheater pipe (which passes through the flue) got quite hot and glowed cherry red. That means the thinner weight of steam oil (ISO 220 ideally) should be used to prevent the pipe from being clogged with coke from thick steam oil.

Assessment

Right to the point, "Talyllyn" is a very good model. I was most pleased to see that the minor quibbles that I had identified when reviewing "Dolgoch" had been addressed in the production of "Talyllyn". In particular, the buffer beams which looked orange to me on "Dolgoch" are now more red. As noted previously, the reverser on "Dolgoch"

At home on the Author's railway — views showing both sides of the "Talyllyn"

was tucked in the forward right hand side of the cab and was a bit of a challenge to reach, especially for those with plus-size fingers. Talyllyn's is placed in the cab doorway and painted black to make it less noticeable. The throttle valve is immediately above, making all the controls within easy reach. As mentioned previously, the coal basket conceals the gas filler. It has two tabs on the bottom that fit into slots in the side bunker. On my example, it was a tight fit into the slots, due to rather a thick coat of paint. Removal of the paint from side of the tabs with a Swiss file quickly cured the problem.

One odd thing I noticed on the model is that Accucraft, for reasons unknown, has changed the size of the gas filler valve from the M 5.0 X 0.5mm threaded version (used on all their models for some time) to a new M 5.5 X 0.5mm version. I understand this is also the case on their recent 1/32nd scale Adams Radial Tank locomotive. A minor point, but it is something to keep in mind if the filler valve should fail. It means keeping another size of filler in the spares drawer of your toolkit. Note that the M5.5 X 0.5mm is not a standard Ronson filler size, so we will need Accucraft to supply any necessary spares.

Conclusions

As with "Dolgoch", I am quite impressed with how "Talyllyn" turned out. Its accuracy and level of detail are remarkable and speak volumes to the level of effort Accucraft UK is putting in to "get it right"; particularly on well-known prototype locomotives.

In my opinion, Accucraft has hit the "sweet spot" on fidelity of scale, performance and price on small narrow gauge live steam locomotives. There is a certainly a long list of locomotives of this size which would be great to see produced. Their next planned model is that of a "large'" type Quarry Hunslet, in 16mm scale, Gauge 0. These locomotives toiled in the slate quarries of North Wales and a good number of them are in operation to this day on preserved railways.

For More Information:

Talyllyn & Corris Steam Locomotives, Volume I: Pre-Preservation and Manufacturers, Martin Fuller, Imprint, Newtown, Wales, 2014

Talyllyn & Corris Steam Locomotives, Volume II: Early Preservation and Locomotive Rebuilds, Martin Fuller, Imprint, Newtown, Wales, 2017

Talyllyn & Corris Steam Locomotives, The Appendices to Volume I & II, Martin Fuller, Imprint, Newtown, Wales, 2018

The Talyllyn Railway, James I. C. Boyd, Wild Swan Publications, Didcot, United Kingdom, 1988

Narrow Gauge Railways in Profile No. 1: Talyllyn Railway Locomotives & Rolling Stock, John Bate, David Mitchell and Nigel Adams, Cheona Publications, The Railway Study Centre, Caernarfon, Wales, 2003

Freelance Consolidations

Part Three

A New Build Series

Text, Photos & Drawings by Les Knoll, PE

Smokebox

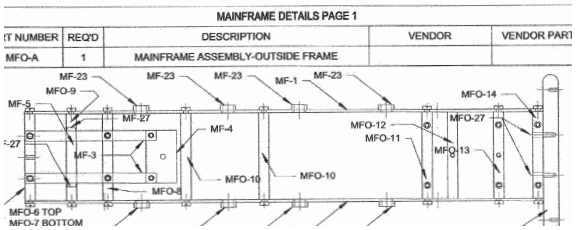
In this installment, a "cold fabricated" smokebox and pedestal will be built and installed on the locomotive mainframe. This smokebox requires no heat for its fabrication unless you opt for a number plate, which is soldered on with 430 degree metalworking solder. This means no silver soldering will be required.

After having the smokebox tubing professionally cut to insure accuracy, the smokebox assembly was built entirely on the workbench using a moderately sized (four inch) vise, a 10-inch drill press, a rotary tool and a bench grinder/wire brush to touch things up and break corners where necessary.

The Roundhouse Engineering boiler must be in place for the final mounting procedures of the smokebox, but in this installment, all components will be fabricated and assembled, ready for final fit up of smokebox and pedestal. The final fit up is to be done when the boiler is installed, which will be discussed in the next installment.

Freelance Consolidations Construction Series

Part 1 - Intro & Mainframe
Part 2 - Lower works
➔ Part 3 - Smokebox
Part 4 - Plumbing, Boiler and Steaming Accessories, Steam Test
Part 5 - Cab and Sheet Metal, R/C
Part 6 - Tender



Editor's note; Due to space limitations for printing, we are only showing the drawings specific to the "Inside Frame" version assembly & fabrication parts. All drawings for both versions are available online at www.steamup.com After logging in with your User Registration, (free), follow the "Workshop Plans" menu.

Ordering the Boiler

The boiler is only needed at this stage if you wish to test fit the mounting of the smokebox and pedestal right away. You really do not have to do this now, but if you feel the need to "jump the gun" and get your boiler right away, you will be ordering a special order boiler kit made available by Roundhouse En-

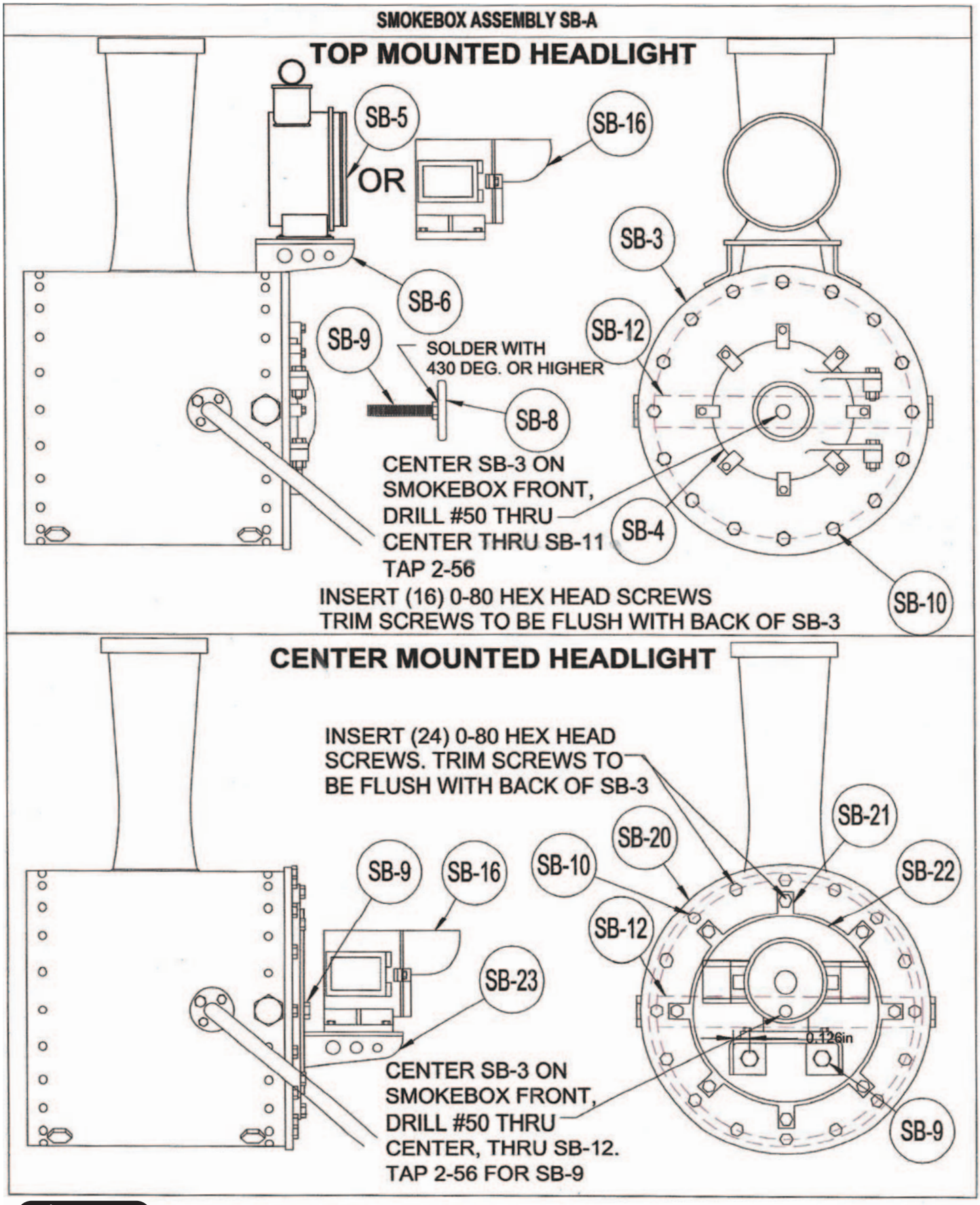

SMOKEBOX ASSEMBLY SB-A
TOP MOUNTED HEADLIGHT
SB-5
OR
SB-16
SB-6
SB-9
SOLDER WITH
430 DEG. OR HIGHER
SB-8
SB-3
SB-12
SB-4
SB-10
CENTER SB-3 ON
SMOKEBOX FRONT,
DRILL #50 THRU
CENTER THRU SB-11
TAP 2-56
INSERT (16) 0-80 HEX HEAD SCREWS
TRIM SCREWS TO BE FLUSH WITH BACK OF SB-3
CENTER MOUNTED HEADLIGHT
INSERT (24) 0-80 HEX HEAD
SCREWS. TRIM SCREWS TO
BE FLUSH WITH BACK OF SB-3
SB-21
SB-20
SB-22
SB-10
SB-9
SB-16
SB-12
SB-23
0.126in
CENTER SB-3 ON
SMOKEBOX FRONT,
DRILL #50 THRU
CENTER, THRU SB-12.
TAP 2-56 FOR SB-9
SB-9

Figure 3-1

gineering especially for this project. When the prototype was received, the box had "Les Knoll Special" written on it, so the Roundhouse staff is aware of all the specifications for this special boiler kit.

The boiler is basically the Roundhouse HBK4 boiler kit, used on their popular Lady Anne loco, with the following custom specification:

Lady Anne boiler kit two-inch diameter Type 1 boiler, internal gas firing, supplied complete with safety valve, pressure gauge, lubricator, steam regulator, gas burner, gas tank, gas regulator and wrapper.

1. Omit smoke box.
2. Substitute type D gas tank with fittings for standard.
3. Substitute R/C steam regulator if opting for radio control.
4. Substitute long boiler mounting bracket for standard.
5. Omit superheater. (This was ordered in Part Two -If you didn't, order it now.)
6. Add WTUV2 topoff valve.
7. Add "safety valve extension collar" as on "Beddgelert" loco.
8. Add three additional (total four) EBB boiler bands.
9. Gas line furnished as unassembled parts
10. Add one pack HK10 handrail knobs.

All smokebox parts can be fabricated and assembled without the boiler present. The boiler need only be in place for the smokebox fit up operations, which can be done in the order described here or after all other smokebox parts are fabricated and assembled.

The smokebox and smokebox pedestal are essentially separate sub-assemblies, to be bolted together at final fit up with the boiler in place. Besides making for an entirely heatless fabrication, this construction method also makes painting a graphited smokebox a different color than the pedestal quite easy.

Smokebox Pedestal

The construction of the smokebox follows the methods used in last year's "Freelance Heisler" project (see *Steam in the Garden, September/October 2019, No. 163*) fairly closely, with one interesting new twist — you can order the smokebox pedestal flat pattern SB-1 from Denver Waterjet in Denver, NC. It is constructed of 0.030-inch stainless steel. Despite this construction, it has been made extremely easy to bend into shape with hand tools (see **Figure 3-1**).

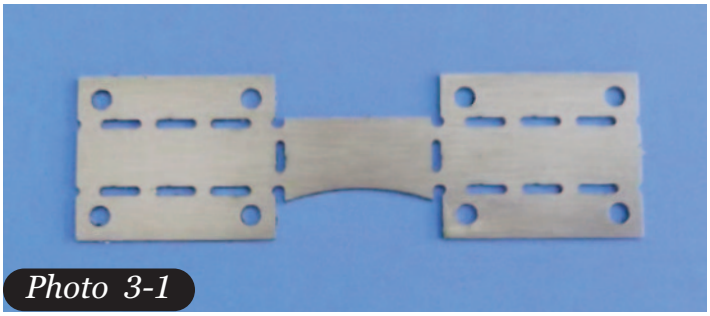


Photo 3-1

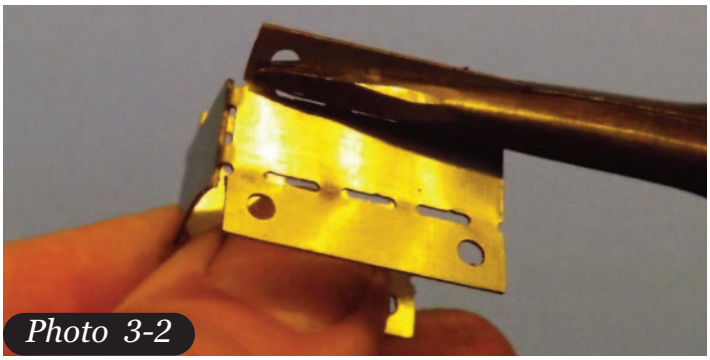


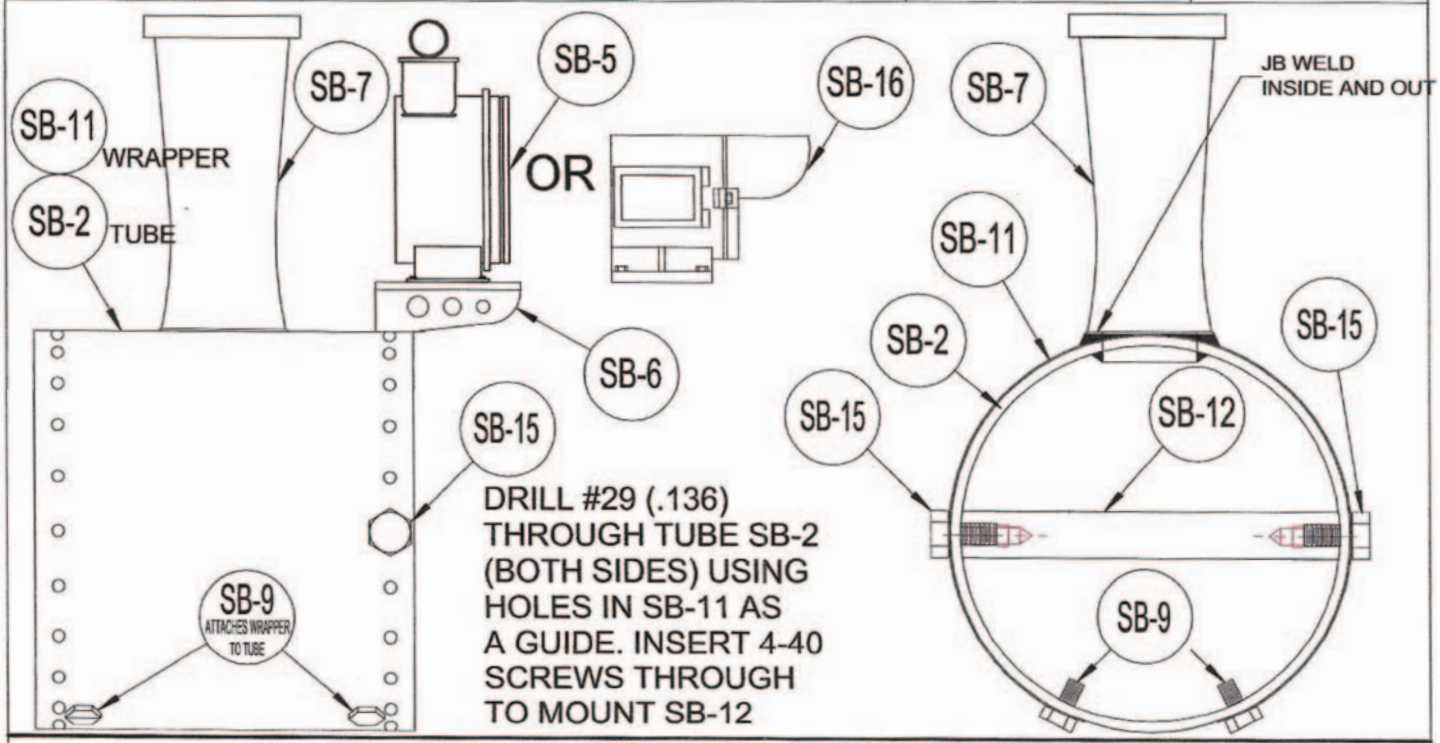
Photo 3-2

Photo 3-1 shows the smokebox pedestal SB-1 in the flat. **Photo 3-2** shows bending the pedestal into the proper shape. A needle nose pliers is used to grip the part over the entire length of a bend line. Bend first from one side, then put the pliers on the other side of the bend and make sure that that end is completely bent as well. The bending of the sides and the two lower bends are at 90 degrees, so they are fairly easy to gauge. The two upper bends can be approximated, then fit to the smokebox body after the wrapper is installed to insure a good "cradle" mount. The smokebox body should "cradle" into the pedestal as low as possible.

If you choose to fabricate the pedestal yourself, brass is an acceptable alternative material to stainless steel. **Photo 3-2** shows the prototype pedestal being formed out of water-jet cut brass. Stainless is a commonly available material at Denver Waterjet so it is lower in cost. It is also more easily painted than brass.

If laying out the pedestal yourself, note the extended cuts that are made at four intersections. These are important because when bent, the bottom tabs and smokebox side mounting tabs must be flush with their adjacent sides after bending. The cut made into the adjoining surface is approximately equal to the thickness of material plus a bending allowance. Most of the outline can be cut

SMOKEBOX ASSEMBLY SB-B				
PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
SB-15	2	SCREW, HEX HEAD 4-40 X 1/4"	McMASTER CARR	92314A106
SB-16	1	HEADLIGHT	TRACKSIDE DETAILS	TD-163
SB-17	1	STRIP, BRASS .030" X 1/4"	K & S	8240
SB-18	2	HEX HEAD SCREW 4-40 X 3/4"	McMASTER CARR	92314A113
SB-19	2	HEX NUT, 4-40	McMASTER CARR	90480A005



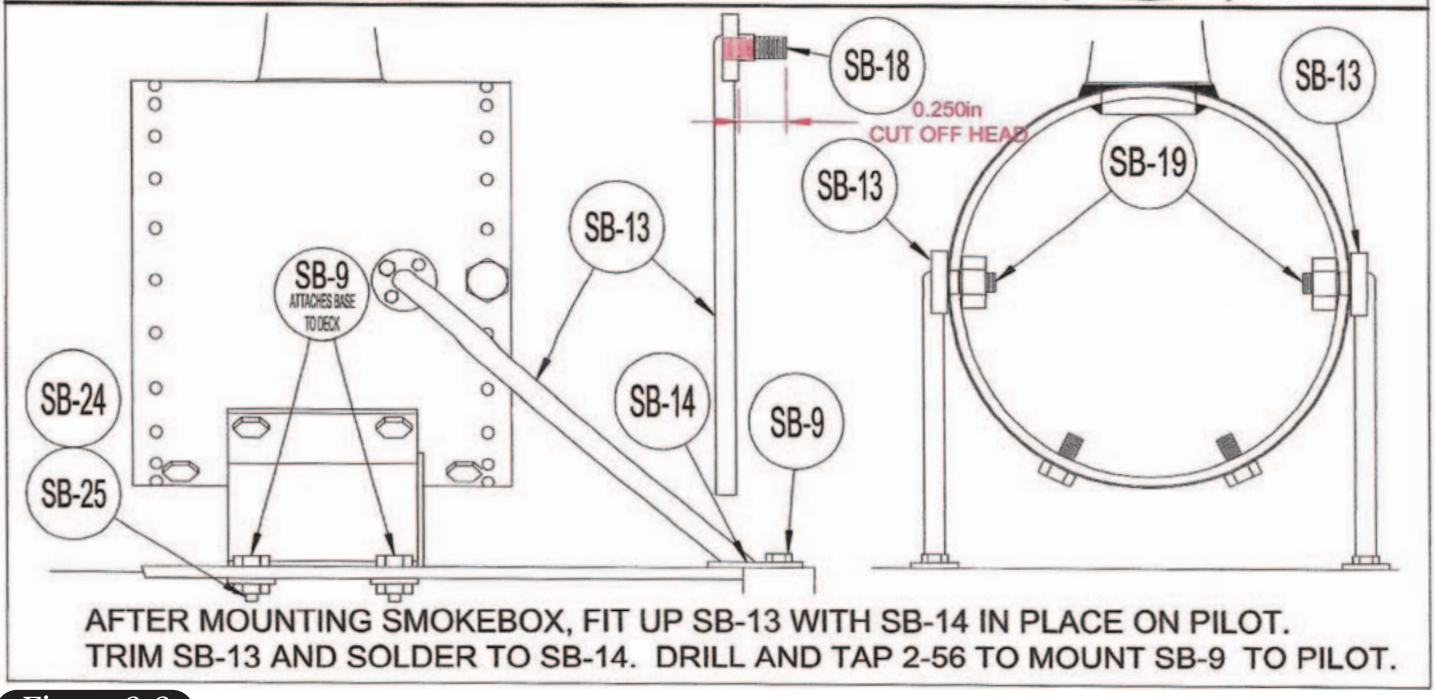


Figure 3-2

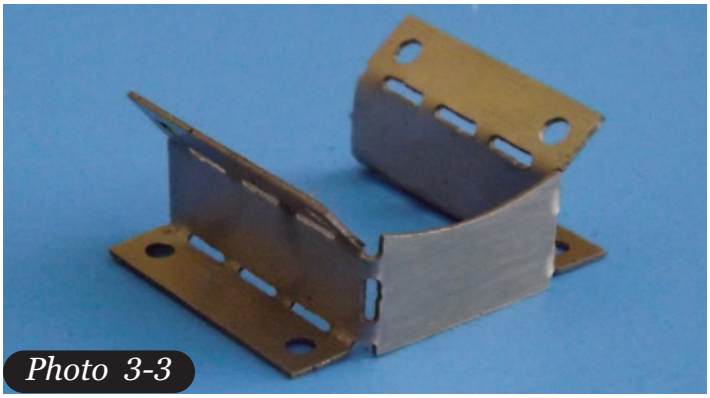


Photo 3-3

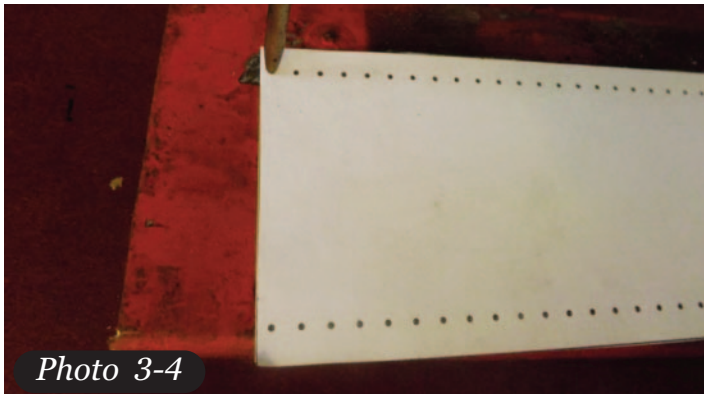


Photo 3-4

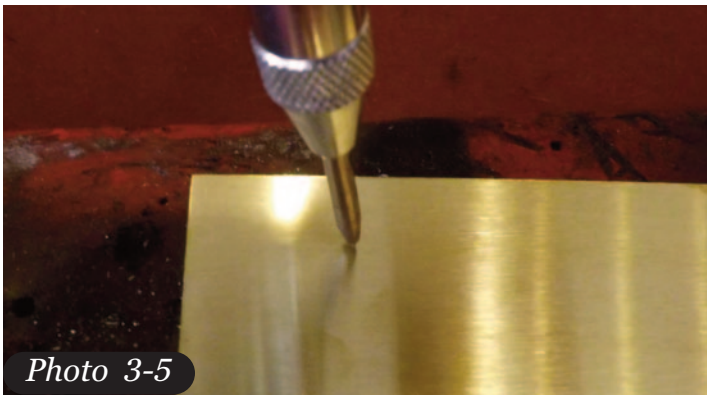


Photo 3-5

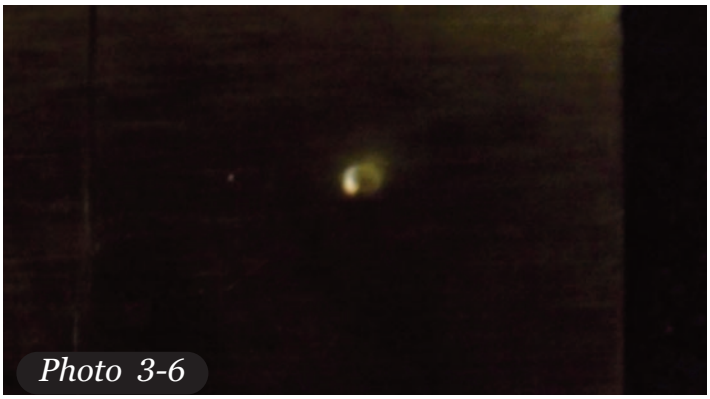


Photo 3-6

with a shear, but the internal detail is best done with a rotary tool with a thin cutoff wheel. The extended cuts mentioned earlier should be made with the rotary tool. All of these considerations have already been taken into account in the pattern on file with Denver Waterjet. They furnished the parts used in the prototype as proof-of-concept. The completed pedestal is shown in **Photo 3-3**.

Smokebox Body

The two-inch diameter tubing used in SB-2 was professionally cut to insure clean, straight edges. Any metal fabrication shop with a good sized metal saw can do this job, and you might inquire if McMaster Carr would also do custom cutting of the tubing they supply. Make sure you order the correct tubing as specified for SB-2 because this tubing has a slightly larger inside diameter than standard, and so that the Roundhouse boiler fits into it perfectly, just as their boiler does on the smokeboxes they manufacture. A fabricated smokebox was used on this project to give it a USA prototype look, just as was done on the Heisler project. It's also less expensive to build than the Roundhouse smokebox is to purchase, depending, of course on how many Trackside Detail castings you adorn it with.

Crosspiece

The crosspiece SB-12 at the front of the smokebox (see **Figure 3-2**) is a brass square which must fit inside the smokebox snugly. It is a good idea to cut this oversize and use a grinder to bring the size down to fit, slightly rounding both ends as you do. In tapping the 4-40 mounting holes, put a slight 82-degree countersink in the drilled holes as a guide for the tap. You must wait to mount the crosspiece into the smokebox until the smokebox wrapper is assembled to the smokebox body and mounting holes are drilled into the side of the smokebox. This is done in the next section.

Smokebox Wrapper

The 0.016-inch x two-inch strip SB-11 is used as the smokebox wrapper. It contains rivet detail and acts as a guide for mounting hole locations as well. It is important that the smokebox tube SB-2 be cut to exactly two inches long to match the width of this strip.

The rivet detail is put on the wrapper using the template provided in the drawings. It is applied to the wrapper using an automatic spring-loaded punch (**Photo 3-4**). This assures uniformity in the rivets. To determine the correct setting for the punch, place a scrap piece of 0.016-inch brass on a

SMOKEBOX DETAILS PAGE 1

PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
SB-1	1	STRIP, BRASS .032" x 2"	K&S	8244
SB-1 (ALT)	1	STRIP, STAINLESS STEEL .030"	DENVER WATERJET	LRK280/SB-1

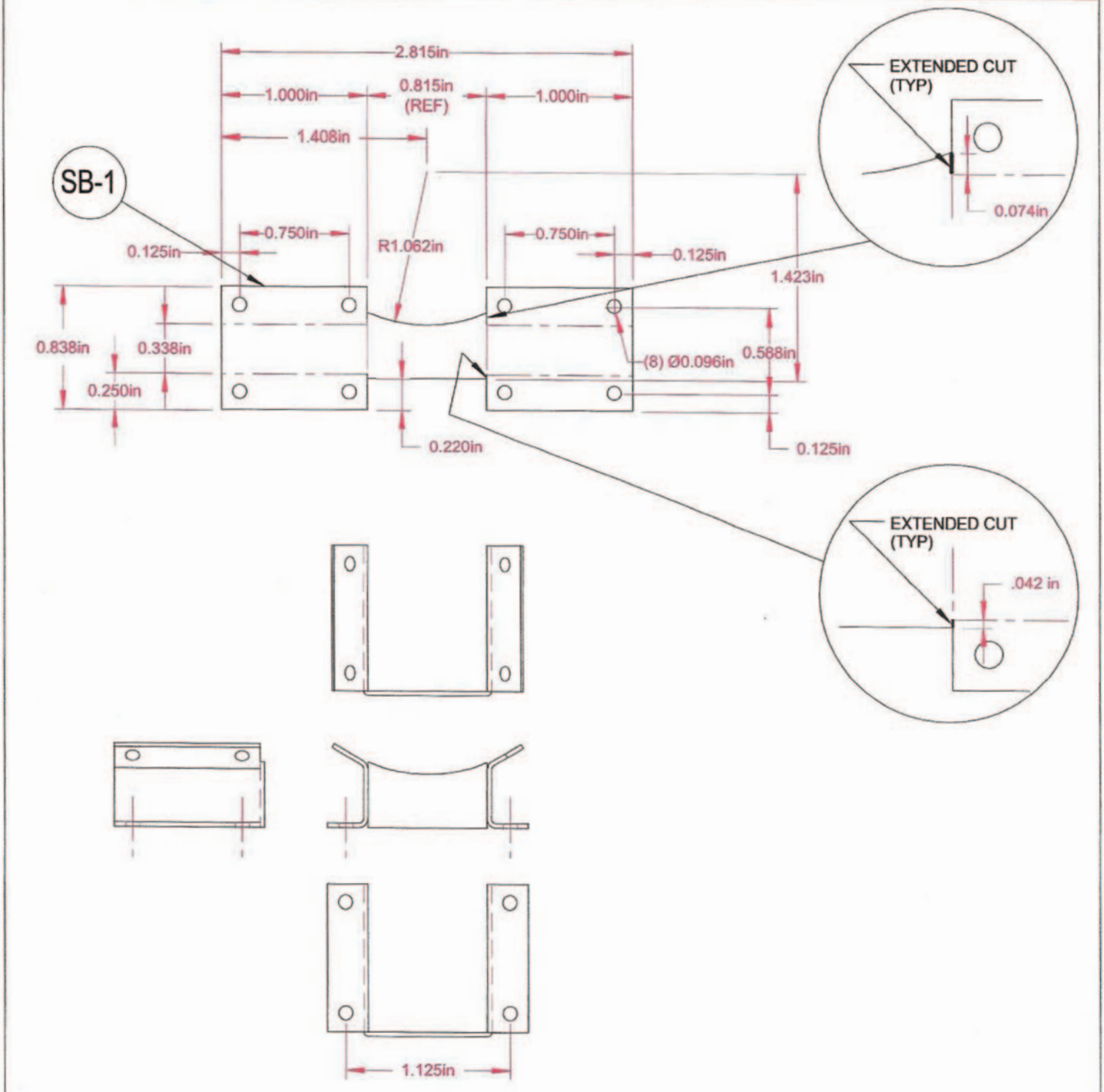


Figure 3-3

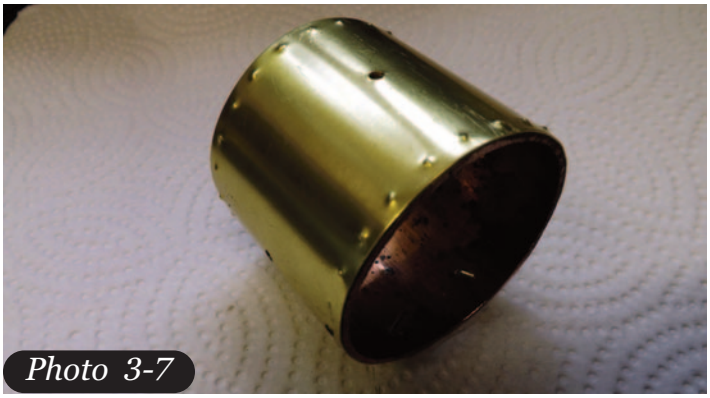


Photo 3-7

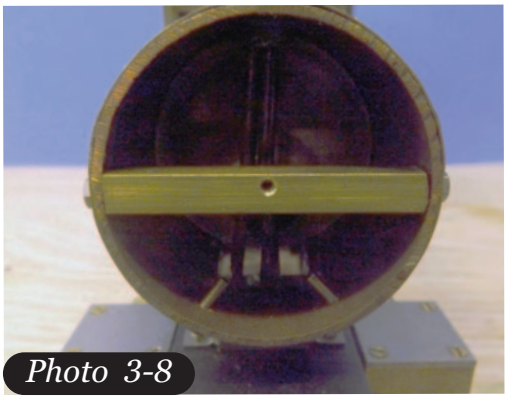


Photo 3-8

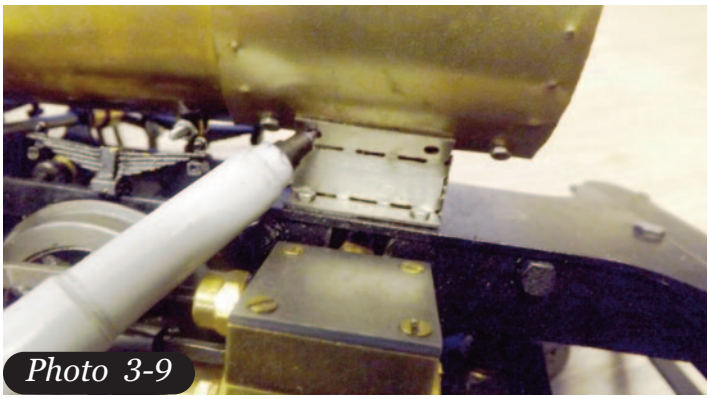


Photo 3-9


Photo 3-10

piece of soft wood and punch it using various settings to determine the best rivet depth (**Photo 3-5**). The rivet detail will be on the side opposite to that which is punched (**Photo 3-6**).

Copy the rivet/mounting hole detail template SB-11 (**Figure 3-3**) onto label paper such as Avery 15265. Paste the label onto the brass strip. Lay the brass strip on a piece of wood and, using the template as a guide, "punch" each individual rivet with an automatic spring-loaded punch. Note that punch locations are provided for the stack, crosspiece mount and pilot braces, as well as for drilling the tapped holes that will mount the wrapper to the smokebox body. After the punching operations are complete, these holes should be drilled from the back (punched) side while the wrapper is still in the flat. When the wrapper is installed on the smokebox body, these holes will be transferred to the smokebox body and the pilot hole for the stack enlarged to fit the stack by step drilling and final sizing by means of a rotary tool with a milling cutter attachment.

Bend the wrapper around the outside of the smokebox body and transfer the four wrapper mounting hole locations from the wrapper to the body and tap them in the body 2-56. Now open up the holes in the wrapper to #41 (0.096-inch) and attach the wrapper to the body with 2-56 hex bolts (**Photo 3-7**). Trim the excess bolt length inside the smokebox as the rear bolts could interfere with the insertion of the boiler if they are not trimmed flush. The two crosspiece mounting holes can now be drilled through the smokebox body using the existing holes in the wrapper as a guide. The crosspiece is then mounted with 4-40 hex bolts (**Photo 3-8**).

Test fitting the Boiler

If your boiler is available, you can test mount it at this point. If you did not order your boiler yet, you can go on to the next step of making the smokebox front.

The rear mounting hole for the boiler is centered on the boiler mounting tab MF-4 on the mainframe (**Figure 1-1**, *SitG-171*). The boiler mounting bracket (long) that came with the boiler is attached here and the rear of the boiler cradles in it. Mount the smokebox pedestal to the pilot platform (MFO-17 or MFI-17) (**Figure 1-4**, *SitG-171*) using 2-56 bolts and nuts SB-24 and SB-25, (**Figure 3-6**). Woodland Scenics' "Hob Bits" were chosen because of the small nut size and because their wrenches (H888) will fit on the underside of the pilot deck. You may have to remove cylinder mounting screws to get wrench clearance to mount the 2-56 screws.

SMOKEBOX DETAILS PAGE 2				
PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
SB-2	1	TUBE, COPPER, TYPE "M" 2.00" NOM DIA X 2.00" LG.	McMASTER CARR	5175K139 (2 FT.)
SB-3	1*	SHEET, COPPER, .062"	McMASTER CARR	8963K603
SB-3 (ALT)	1	SHEET, STAINLESS, .060"	DENVER WATERJET	LRK280/SB-3
SB-4	1	SMOKEBOX FRONT	TRACKSIDE DETAILS	TD-185
SB-5	1	HEADLIGHT*	TRACKSIDE DETAILS	TD-13
SB-6	1	HEADLIGHT BRACKET*	TRACKSIDE DETAILS	TD-106
SB-7	1	STACK*	TRACKSIDE DETAILS	TD-160
SB-8	1	NUMBER PLATE 19.9 M*	TRACKSIDE DETAILS	TD-139
SB-9	17-19**	SCREW, HEX HEAD 2-56 X .50	MICRO FASTENERS	HBB0208
SB-10	16-24**	SCREW, HEX HEAD 0-80 X .375	MICRO FASTENERS	HBB0006

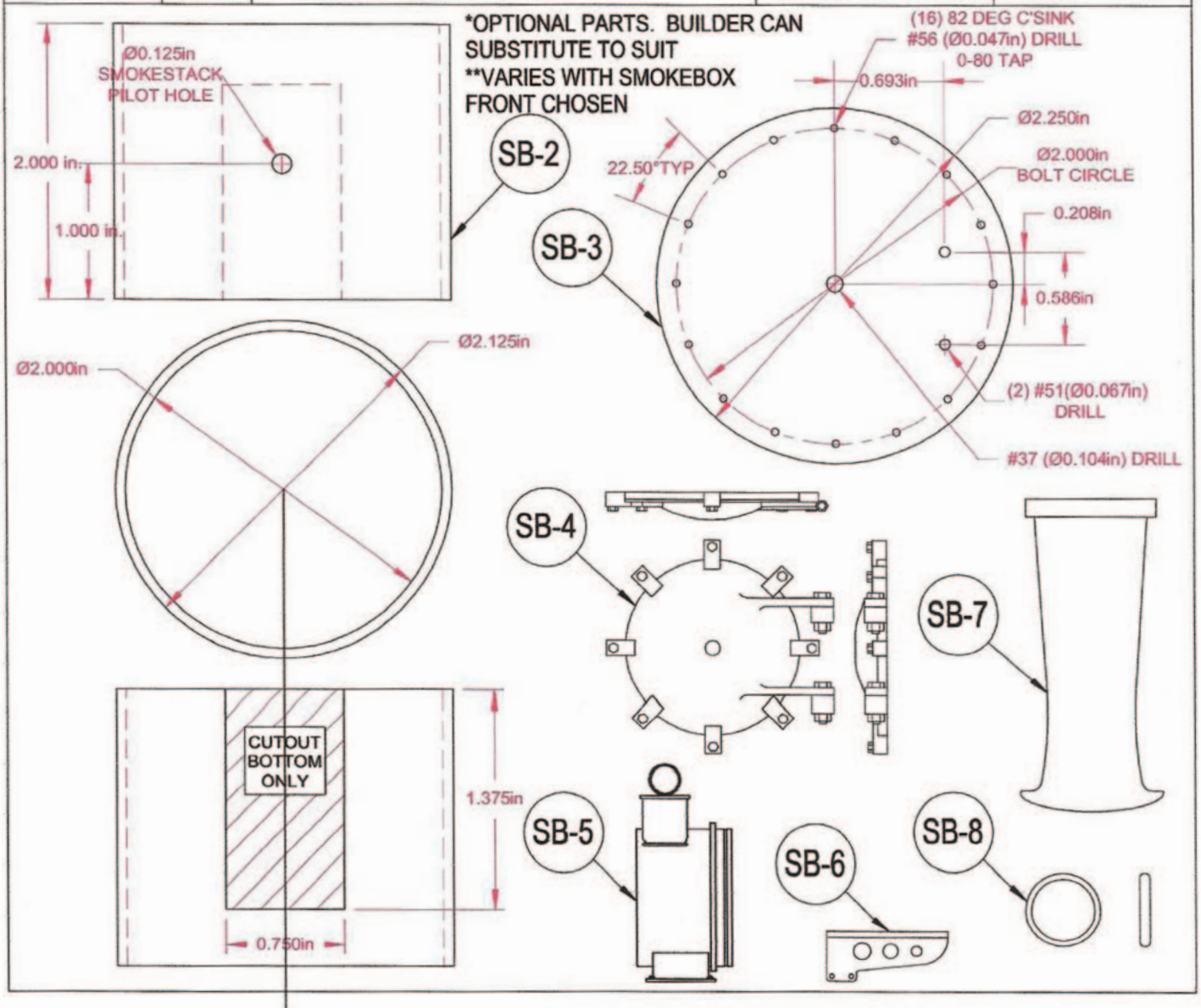


Figure 3-4

If you do this, remove them one at a time, replacing one before removing another to preserve the positioning of the cylinders. With the boiler in place, locate the smokebox body on the pedestal so that the boiler is inserted into the rear of the smokebox and the smokebox cradles in the pedestal with the rear of the smokebox touching the boiler wrapper (**Photo 3-9**). Mark the location of the mounting holes in the pedestal on the smokebox as shown in **Photo 3-9**.

Remove the smokebox body and drill and tap for 2-56 in the smokebox body at the four locations you just marked. You might want to dismount the pedestal from the mainframe to more easily bolt it to the smokebox body. Small wrenches or a needle nose pliers may be needed to screw in the 2-56 mounting screws because unlike the pedestal on the Heisler project, this one is much shorter with far less clearance for tools. The rearmost two 2-56 screws may have to be cut off flush with the inside of the smokebox to avoid possible interference with the boiler when it is re-inserted into the smokebox at final assembly. If you previously removed the pedestal from the mainframe, you can re-attach it now with the smokebox body attached. Attaching the bottom of the pedestal to the pilot deck is an easier process than what you have just gone through because it attaches with nuts on the opposite side of the pilot deck.

Making the Smokebox Front

You have a choice of two smokebox front configurations; one for a top-mounted headlight which was designed for use primarily with the inside frame version, and the centered headlight configuration which was based on the outside frame Bachman 2-8-0, the original basis for the project. Either configuration works on either version of the locomotive. In fact, the headlight used for the centered headlight version can also be top-mounted if desired. A number of ways to mix and match.

The smokebox front can be either cut from sheet copper and shaped (this is covered in depth in the Heisler project: see *SitG-163*) or it can be ordered in stainless from Denver Waterjet. If you are making the top mount headlight version, order LRK280/SB-3; if you are making the centered headlight version, order LRK280/SB-20.

Center the front plate on the front of the smokebox and transfer the location of the center hole in the front plate to the crosspiece on the smokebox by starting a #50 (0.070-inch) hole into the crosspiece, using the hole in the front plate as a guide. Remove the plate and finish drilling the hole and tap it 2-56 (**Photo 3-8**).

Detail the front plate SB-3 or SB-20 using 0-80 hex nuts as shown in the drawings, and the Trackside Details boiler front SB-4 for the top-mounted headlight configuration. You may wonder why the Micro Fasteners package of 100 0-80 bolts is specified. This is overkill for sure, but if you price out other fastener sources, you will pay $1.00 apiece for them and must order 20 pieces to get the required 16 for the outside of the smokebox front alone. If you choose the center-mounted headlight configuration, you must buy more, and now it becomes an even proposition price-wise. Also thinking ahead, these same screws will be used to mount the running boards along with 0-80 nuts, so the Micro Fastener option is actually more economical even though you will have quite a surplus of 0-80 screws when you're finished. These screws can also be used to mount the headlight bracket (top mounted headlight) and either of the headlights.

If you use a smokebox front furnished by Denver Waterjet, put a shallow countersink on each hole to be tapped 0-80 and run a #56 (0.047-inch) drill through to assure the minimum size of the hole. The thread fit must not be tight for fear the delicate 0-80 bolts could break off in mounting, and such small taps break easily when overstressed, especially in harder materials such as stainless steel.

If a screw breaks, you can drill it out and either re-tap or mount the screw with JB Weld in the threaded hole. Thread lock, even Threadlocker Red, will not hold because of the smokebox temperatures. The holes that mount the brass 'pins' for the smokebox hinges on boiler front SB-4 may need enlargement since the 'pins' are cast and their size may vary. Drill (or re-drill if necessary from the waterjet-cut part) these holes so that the fit is either size-on-size or a slight press fit. The prototype Denver Waterjet smokebox front required no re-drilling, only the addition of the countersinks before tapping. Finish by drilling clearance holes for 00-90 screws in the hinge holes and mounting the front using 00-90 screws and bolts.

The center screw will hold everything in place

SMOKEBOX DETAILS PAGE 3				
PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
SB-11	1	STRIP, BRASS, .016 X 2.00 X 10.00	K & S	8234
SB-12	1	BAR, BRASS 1/4" X 1/4"	McMASTER CARR	8951K13
SB-13	1 PAIR	PILOT BRACE AND FLANGE	TRACKSIDE DETAILS	TD-144
SB-14	2	STRIP, BRASS .032" X 1/4"	K & S	8240

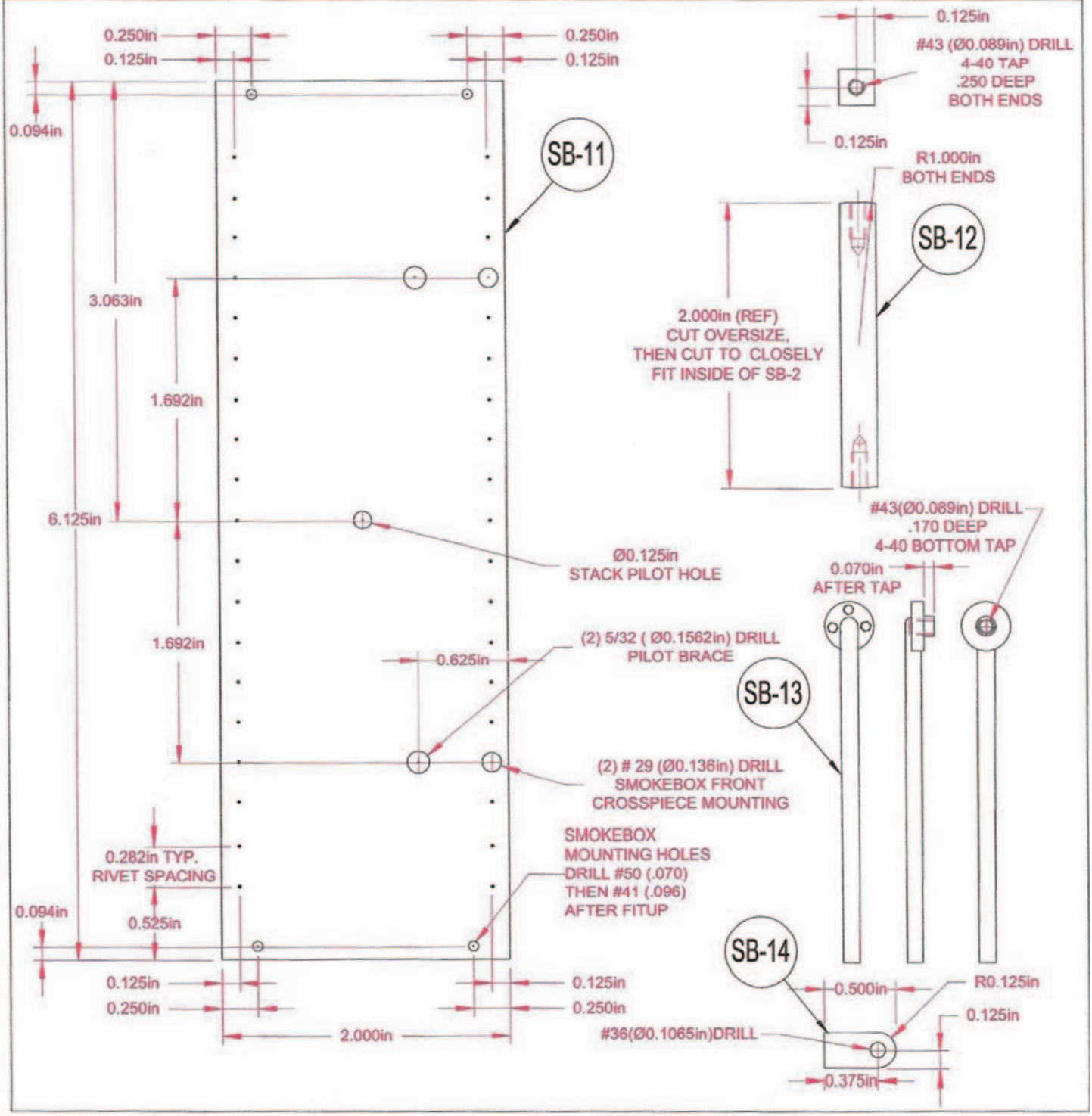


Figure 3-5

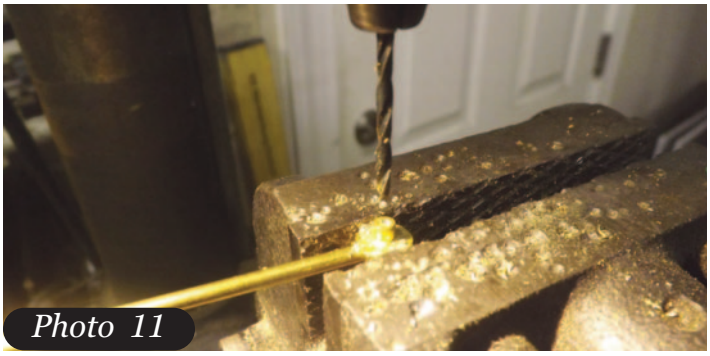


Photo 11


Photo 12

once the smokebox front is mounted, so if you don't want to work with 00-90 fasteners, you can just position the boiler front SB-4 where it would mount on the hinges, and the screw that holds the smokebox front in place will secure SB-4. You'll just have to reassemble these parts whenever you take off the smokebox front, which shouldn't be needed under normal circumstances since the boiler lights from the stack or under the smokebox, making it unnecessary to open the smokebox door.

Insert a 2-56 hex head brass screw through the boiler front SB-4 and front plate, then screw it to the crosspiece at the front of the smokebox. If you wish to add a brass number plate on the top-mounted headlight version, this can be soldered to the brass screw with high temperature solder such as acid core metal working solder from Bernz-O-Matic, available at big box home improvement or hardware stores. This method once again bypasses the use of silver solder but has proven successful in several locomotive projects.

A few additional parts are required if you are making the centered headlight configuration. This is a good look especially for the outside frame version because of its similarity to the Bachman Spectrum Consolidation, the original inspiration for this project. It also looks very good on the inside frame version; the choice is yours.

In this configuration, the Trackside Details boiler front SB-4 is not used and a multi-layered front with dogs holding the smokebox door in place is simulated. This is done because on the Trackside Details front, the smokebox door is contoured, which makes mounting the headlight bracket quite difficult. The headlight bracket SB-23 is a fabrication and replaces Trackside Details bracket SB-6. It is mounted with two 2-56 screws. If you don't want to tap the smokebox front plate, you can drill clearance holes and use small 2-56 nuts.

The final details to be added are the pilot braces.

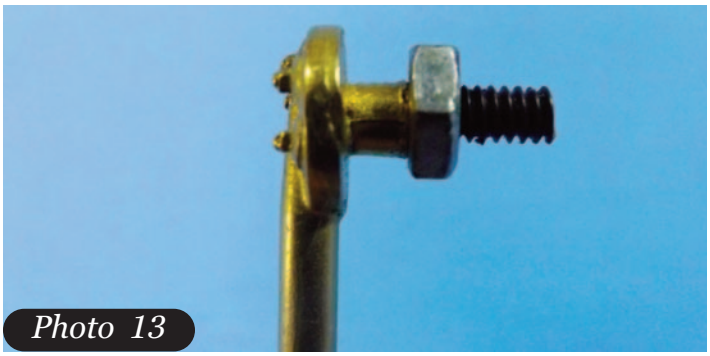


Photo 13

Their mounting is detailed here, but do not do this until the smokebox has been fitted with the boiler in place. You may have to backtrack after doing the boiler mount, which will be fully described in the next issue.

The Trackside Details Pilot Brace and Flange details SB-13 is carefully drilled and tapped 4-40 using a bottom tap and a 4-40 screw inserted in the tapped hole. The head of the screw is then cut off, leaving a threaded stud on the end of the pilot brace (**Photos 3-11** thru **3-13**). The round protrusion through which the tap is done is trimmed slightly to assure a good tight mounting fit in the smokebox.

Drill the smokebox side to clear the round protrusion on the pilot brace, insert it in the smokebox side and put the 4-40 nut inside the smokebox to secure the pilot brace, but leave it slightly loose. Swing the brace down to the deck and with SB-14 in place, but not fastened down, determine the height and angle to trim the pilot brace.

Solder SB-14 in place as shown in **Figure 3-2**, and using its location as a guide, drill and tap 2-56 to mount the pilot brace to the pilot deck. This tapped hole need not be any deeper than 3/16th-inch and a bottom tap can be used. The screws holding the pilot braces to the smokebox may now be tightened.

SMOKEBOX DETAILS FOR CENTER MOUNTED HEADLIGHT PAGE 4				
PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
SB-20	1	SHEET, COPPER, .062"	McMASTER CARR	8963K603
SB-20 (ALT)	1	SHEET, STAINLESS, .060"	DENVER WATERJET	LRK280/SB-20
SB-21	1	SHEET, COPPER, .062"	McMASTER CARR	8963K603
SB-21 (ALT)	1	SHEET, STAINLESS, .060"	DENVER WATERJET	LRK280/SB-21
SB-22	1	SHEET, BRASS, .032"	McMASTER CARR	8859K86
SB-22 (ALT)	1	SHEET, BRASS, .030"	DENVER WATERJET	LRK280/SB-22
SB-23	1	SHEET, BRASS, .032"	McMASTER CARR	8859K86
SB-23 (ALT)	1	SHEET, BRASS, .030"	DENVER WATERJET	LRK280/SB-23
SB-24	4	NUT, 2-56	WOODLAND SCENICS	H884
SB-25	4	WASHER, #2"	WOODLAND SCENICS	H894

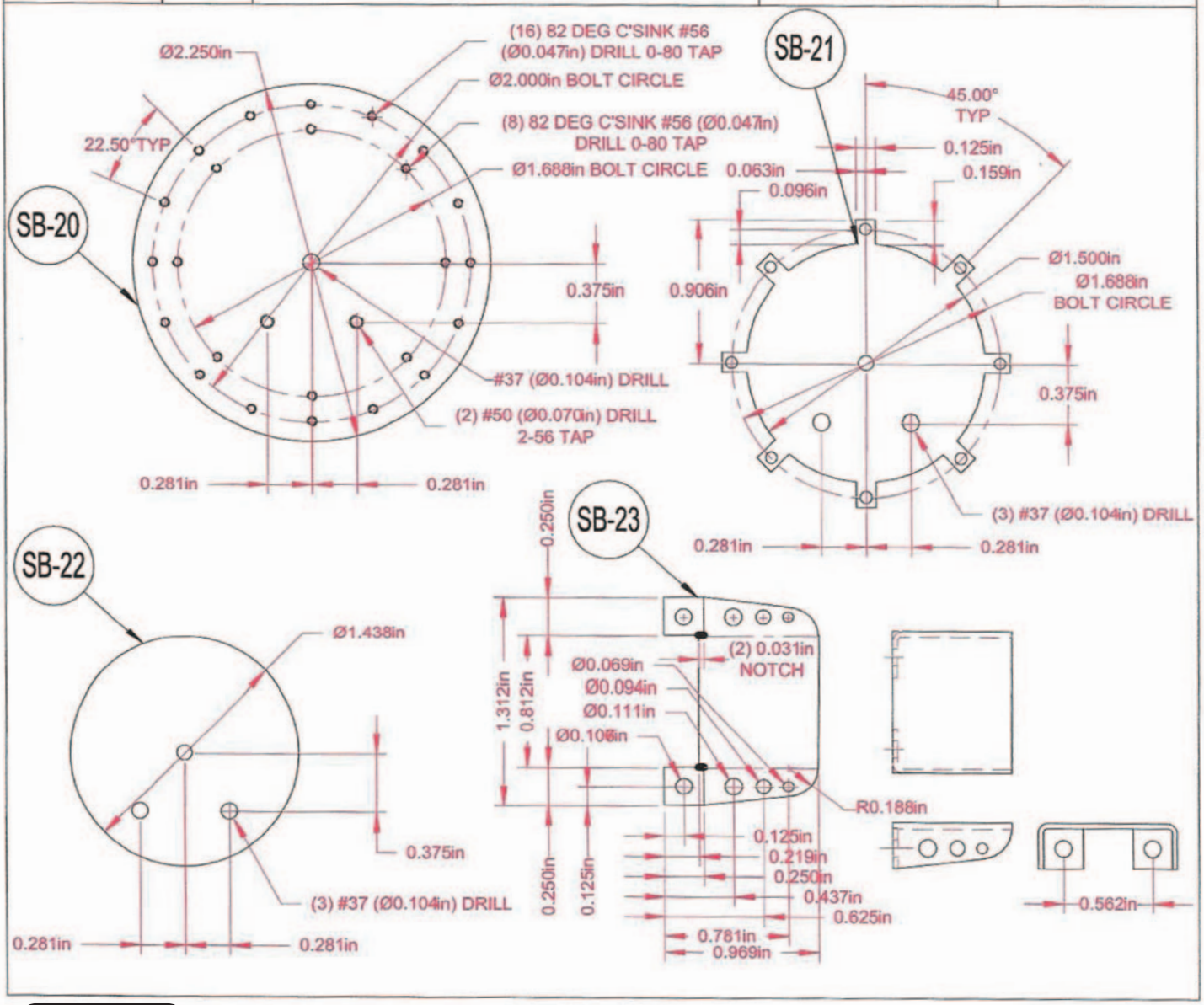


Figure 3-6

In the next installment the boiler and its associated components will be mounted and installed, making a fully steaming chassis. There is enough information in this installment to order the boiler ahead of time, so you can do that if you want to be ready.

"O" Gauge Streamlined Steamers

by Carl & Christine Berg
(because Carl can't type.)

Motivation for this article is our current predicament called 2020. No meets! I'm not the only one who misses them so I figure maybe I could cheer folks up with a story about developments in my Marx Steamers.

My building objective is to have a runner that looks like what I want. If there is an esthetic arc between toy-like trains and dead-on scale trains I probably favor the toy side of things.

The first Commodore I constructed was the subject of an article in *Steam in the Garden* July/August 2008, Issue 100. I'd probably been running it for a year or so before the story was published. In the intervening years it's traveled easily over 100 miles. I get about half a mile out of each run. At one of the tracks I've run on I've timed a scale lap speed of 200 mph from a rolling start, with the locomotive, tender and three Marx bogie passenger cars. At another track an older gentleman commented after a run that "Louis Marx would have been proud" to see it run. There is a nice segment about it in the Pennsylvania Live Steamers 50th Anniversary DVD. Repairs have been a piston "O" ring and a side rod pin.

No.1 has the engine in the cab driving the rear axle through a bevel gear set (**Photo 1**). It has Lionel solid metal wheels, which are excellent. At train shows you could pick up a four-coupled "playworn" Lionel loco for $10-15. I made a wheel press to remove the wheels from the axles. The wheels on one side were clean. The wheels on the other side had gears fused to the back of them. I found I could break the gear from the wheel by putting it in a vise and placing a worn utility razor blade between the gear and the wheel, then hitting the blade with a hammer. The gear would come right off.

You could also pick up spare wheels with hex-shaped center holes. The wheels from the used locos had serrated center holes because the axles were knurled. In either case you could mount the

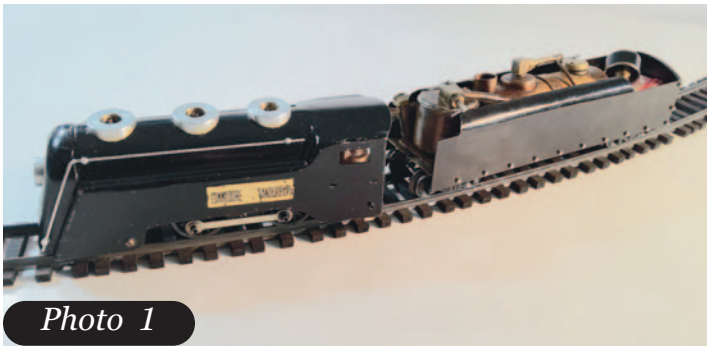


Photo 1

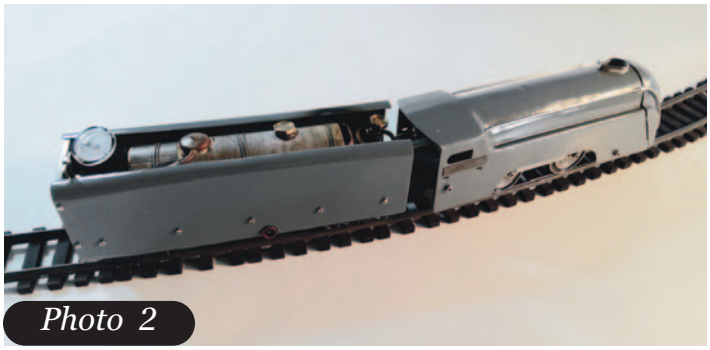


Photo 2

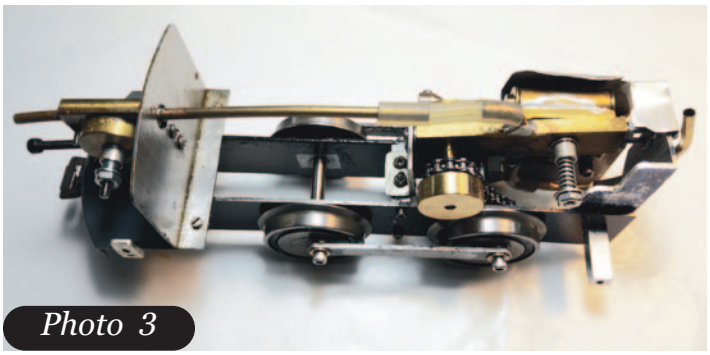


Photo 3

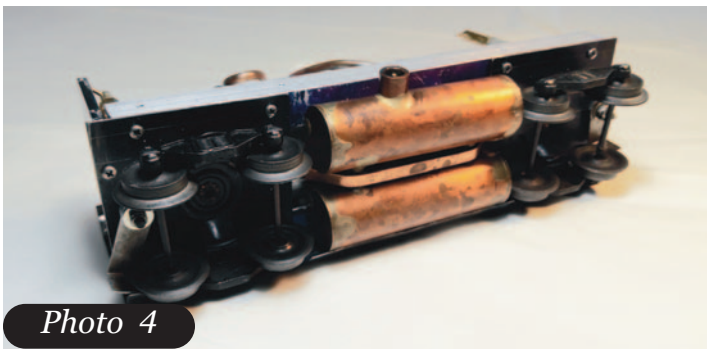


Photo 4

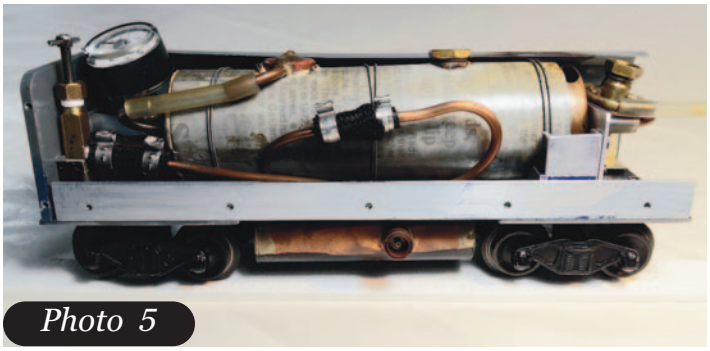


Photo 5

wheel in the three jaw chuck and use a center drill to clean up the axle hole. Best of all, the hole would be centered. (I confess I had to have someone explain this trick to me. Amazing.)

The second loco is a Marx Mercury (**Photo 2**). I got an overpriced beat up body and had a neighbor weld up some holes that were in it. I painted it grey. If you've seen videos of the NYC Mercury prototype you know a major feature of it is the giant hubs on the wheels. They even had lights on them, so they could be seen at night. I had a cast iron bar I cut into cookies and made the wheels, which really made the model.

I couldn't find a bevel gear set for the drive line so I set up a chain drive (**Photo 3**). I have some 0.1475-inch pitch roller chain and mounted the steam engine above the axle plane. I have a method for making double acting oscillating engines using K&S 0.014-inch wall tubing. They run very reliably on very little pressure. If there's interest I could describe their construction.

With the engine chassis operational I turned to the tender. I thought I could make a more scale length tender if I moved the butane tank under the boiler, between the trucks (**Photo 4**). I used two lengths of three-quarter inch copper pipe with cross pipes, a ferrule for the Ronson valve and an outlet pipe heading to a remote stop valve.

I put the boiler in the tender (**Photo 5**). It keeps the height of things quite low and insures stability at speed. The boiler is 1 1/2-inch diameter with a three-quarter inch fire tube inside. Steam dome is one-half inch copper end cap, screwed and silver soldered onto the boiler barrel. Under the dome the barrel has a bunch of one-sixteenth inch holes to limit liquid carry over in to the very low dome. This is a model steamboat trick. Boiler capacity is in the 50ml range. Duration, seven to nine minute runs. Pressure gauge is from PM Research.

I make oilers from used gun cartridges (**Photo 6**). The base of the cartridge is pretty thick and will hold several threads. I usually tap it ¼ -20. You need to clean off the markings on the back of the cartridge for a good seal. I use an "O" ring in the cap and bore the threaded shaft to have some air above the oil. I use a milling cutter to offset the steam line through the oiler. This makes it easier to empty with a syringe. Some of the commercial oiler designs I have seen betray a modest intelligence in this regard. Oil hole in the steam line is 0.040-inch. The circle of pipe attached to the Merc

Photo 6

oiler is your basic act of desperation. As to availability, there are hundreds of millions of guns in private hands in America. Getting a spent cartridge can't be that hard.

Tender trucks are the Lionel all metal ones.

Burner is a slotted tube with a commercial jet and homemade carrier. Stop valve is made from a long SS 4-40 bolt with a tapered point. Shaft has an "O" ring seal. The Merc has a stainless steel super heater. The steam line exits the smokebox, takes a hard left through the oiler and enters the loco body through the stop valve in the cab. Then there's the pipe run to the engine. Yes it's a long pipe run. Yes, there's a lot of condensate, which suggests a limit on the boiler in the tender idea.

It took a while to optimize performance but it's running well now.

The most touching operational moment was looking up to see one of the older Canadian guys staring at the Merc with the face of his ten year old self.

Six-Coupled Commodore

So, what's the chance some of my acquaintances who make the west coast steam meet came to me and said "Carl, there's a guy on the coast who has a Commodore steamer."?

The message was repeated several times and I admit I maybe got a little edgy. A rival! I must do something! Now my acquaintances do have a bit of

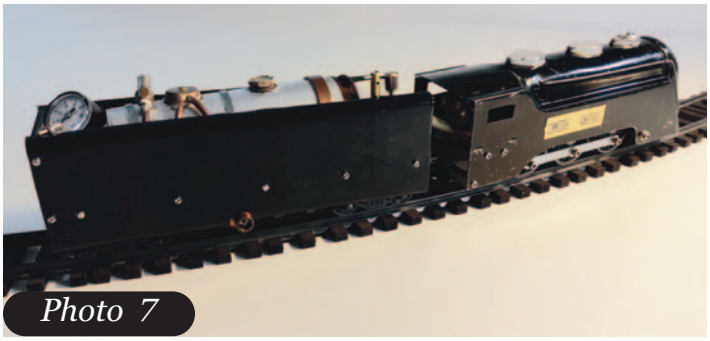


Photo 7

game to them and maybe I'm easily played, but I did want to rise to the occasion.

So it was that I descended into the depths of the remote research facility in search of inspiration. By chance I arranged three Lionel wheels below a Commodore body and noted they would fit under the wheel cutout valance of the body (**Photo 7**). I hadn't done this before and always figured I would need to Siamese a pair of bodies to accommodate a six-coupled chassis.

I found the gear set, which dictated the engine would be in the cab, like the first Commodore. The engine is a brother to the one in the first Commodore. The gear set is 3:1, which is probably too big a ratio. Construction was straight forward. Running it around the track on air revealed a tendency for the outside front wheel to climb the rail, so I made a weight to rest on the frame above the front axle. It keeps the front wheels on the track.

I ran it with the old tender for a while while I schemed out the new one. Lionel metal trucks, three-quarter inch copper pipe for the fuel tank. I set the outlet pipe higher on the tube as the Merc tank had liquid carryover when I overfilled it. You could tell when you turned the valve and it burbled. My solution was to fill the tank with a medium speed "10" count and that would be about the right amount.

On the six wheeler the higher tank outlet and the longish pipe run past the boiler to the valve solved that problem **(Photo 8)**. The Ronson valve ferrule on the side of the tank is part style points

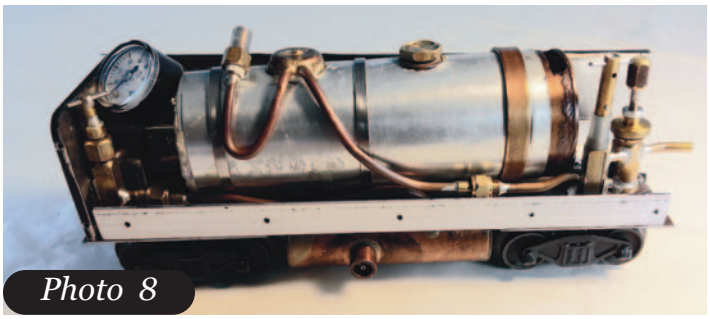


Photo 8

and part nowhere else to put it. The Ronson valve is from a dollar store pencil torch. I bought a dozen of them once. The thread is an easy tap to get.

The boiler is 1 ½-inch copper pipe with a three-quarter inch fire tube with a bunch of one-quarter inch cross tubes. Because of the cross tubes there's no super heater. There's a slot at the top of the smoke box for burner ventilation as on the Merc.

The steam dome has three tubes, one for the pressure gauge, one for the safety valve and one for the engine. The safety valve is a Charlie Mynhier artifact. It's detailed in the drawings for the first Loco he published in *SitG Nov-Dec1994 No. 25,* pg 29. Built more or less to his drawing it goes off just under 30lbs or so.

(I had a wonderful conversation with the late Kevin O'Connor regarding this valve and how to vary the pressure release point. His view was to vary the diameter of the waist. Here's the clever part: Experimentation would involve air pressure, a piece of silicone tubing and a box of number drills. Set the pressure and put number drills in the end of the tube until you get one that blubbers. That's the diameter of the waist in the safety valve. Yeah, I know air isn't steam. To test the idea with steam you could run a line from the boiler through a multi outlet manifold and test several examples at one go.

The last thing I said to Kevin was "for what it's worth, the more I learn, the smarter you get." Farewell, Commander.)

Anyway, I've made a lot of these safety valves. They cost pennies and I am cheap.

Photo 9

Realistically, the Marx locos run at 8-15 lbs. pressure so a safety valve isn't critical. On the six coupled one there's a steam valve upstream from the oiler. With a little work I could probably put a steam drying loop in the smokebox. Maybe the next build.

This tender resolves what I see as shortcomings in previous tenders and suggests additional changes for the next one.

So, what's next? Joe Rothwell has suggested the Lionel 259 E. It has a sheet metal body that could be adapted to a steam chassis. My candidate is Lionel 265, the Commodore Vanderbilt (**Photo 9**). It's sheet metal also and the sides of the body flair at the front so you could use outside cylinders, like the little boat anchor shown. The problems with this body are many. They aren't cheap. The cab is cast Mazak[1] which is a challenge to deal with. Of course if you knew the Marx Commodore cab would fit with some judicious trimming, and the addition of four pane cab windows would just about conceal what you did, you might wish to pro-

Above: Carl's collection of Streamliners showing those that have been converted, and a few in line for the chopping block.

ceed with this project.

I recommend double acting oscillating cylinders set at an angle to drive the front axle. That way you might be able to get a leading truck under the front of the chassis.

I actually got a chance to communicate with Joe Rothwell with the help of the Editor. We seem to be kindred spirits. I wonder if this story will spur him on to his next project.

There are a couple other candidates for this building approach. One would be the Canadian Pacific Streamliner and Marx did have a body for that but I think you could extemporize one.

There's another candidate, memorialized by the Lionel 265E (type II, III). It is the Blue & White Rexall train which in reality was a 4-8-2 with Commodore Vanderbilt like streamlining (**Photo 10**).

Imagine an eight coupled chassis under a stretched Marx body! The chassis would have to be a bit narrower to allow the interior axles to shift sideways a bit to get around corners. There's a lot more to think about. We'll have to see if I get anywhere with it.

Well I guess I'll close for now. Hope to see you again when circumstances allow, I'll try to have something interesting to run.

Photo 10

1. ZAMAK (formerly trademarked as MAZAK and also known as Zamac) is a family of alloys with a base metal of zinc and alloying elements of aluminum, magnesium, and copper.

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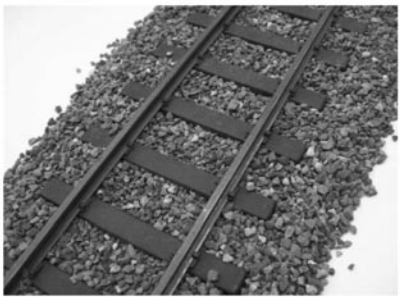

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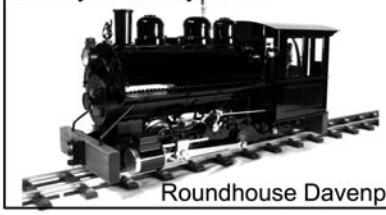

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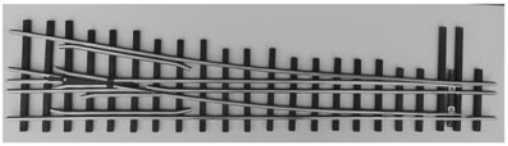

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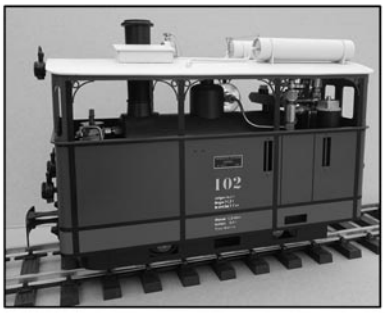

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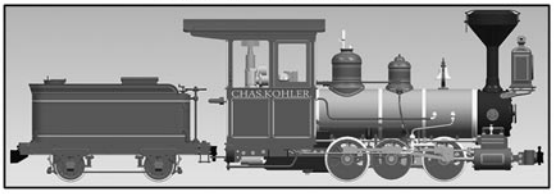

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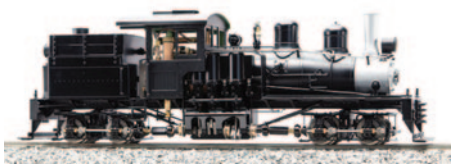

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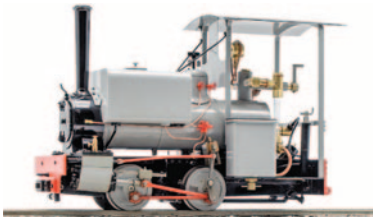

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Workshop Project

The Minitram

Part Four

Design, Text, and Photos
by Marc Horovitz

Boiler, burner, and plumbing

We'll start this session with the **boiler**. A piece of 1-1/4-inch ID (1-3/8-inch OD) copper pipe is required. If you have trouble finding this size, short lengths can be had on eBay.

Cut the piece, not necessarily to the dimension shown in **Figure 6**, but to a close fit inside your completed firebox (**Photo 158**). Ends need to be square and true. Then scribe a line across the top of the tube. An easy way of ensuring this is to use a piece of angle as a straightedge, which will produce a line both straight and true (**Photos 159** and **160**). Then scribe the lines that will form the center points for drilling the three holes in the top of the boiler. It is important that the middle one be in the center of the tube. The other two can be as shown in the drawing.

Center punch and drill the three 5/16-inch holes. I've found the best way to drill copper tubing is with a step drill. Start by drilling pilot holes the same size as the smallest step on your drill, then go from there (**Photo 161**). Your tube should now look like **Photo 162**.

The **bushings** are next. Bushings are traditionally made of bronze, which is an alloy of copper and tin. Brass is an alloy of copper and zinc, and is much easier to work than bronze. Over time, it is possible that the zinc might leach out, making the brass porous and weak. However, I have engines that are 90 years old and more whose boilers and bushings are made from brass. There's no discernable deterioration. Given this, I choose to make bushings of brass, especially for simple, low-pressure engines.

There are three bushings on this engine. You'll need to have chosen your safety valve before making the **safety-valve bushing**, as you'll need to know what thread it is. Aside from that, the **safety-valve bushing** and the **steam-line bushing** are straightforward pieces of turning, drilling, and tapping.

For the **exhaust bushing**, turn down the long end to be a close sliding fit inside the smokestack tube. Drill a 3/32-inch hole in the end, one-half inch deep. Then part off the piece at its full length, turn it around in the chuck, and turn the other end to fit. Holding it in your drill-press vise, drill the cross hole to meet the first hole (**Photo 163**). All three bushings can be seen in the boiler shell in **Photo 164**.

Cut another section of tubing, 1-1/2-inches long, then split it down the middle (**Photo 165**). Heat it up to red heat, quench it, then lay it out flat (**Photo 166**). On a flat, solid surface—say, on the anvil of your vise—tap it truly flat with a soft mallet (**Photo 167**).

Scribe a solid line right down the middle, lengthwise. Then mark points on that line three-quarter inch in from both ends. Center-punch those points. Then, using your caliper as a compass, scribe a circle that is the same size as the inside diameter of your boiler, around each of those points (**Photo 168**). These will become the **boiler ends**. Drill 3/32-inch holes in each of the centers.

With your snips, cut out squares of copper that contain the circles. Then nip off the corners close to, but not on, the line. Now nip off the remaining eight points (**Photo 169**).

There are a couple of ways to get these circles truly round. One is in the lathe, if you can figure out a good way to hold them. Then you skim off the tiniest

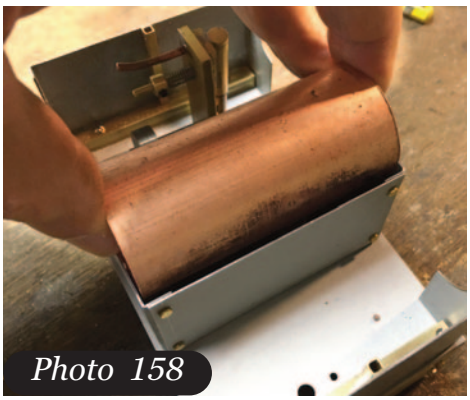


Photo 158

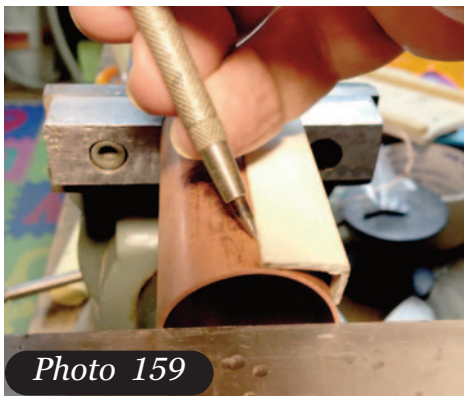


Photo 159


Photo 160

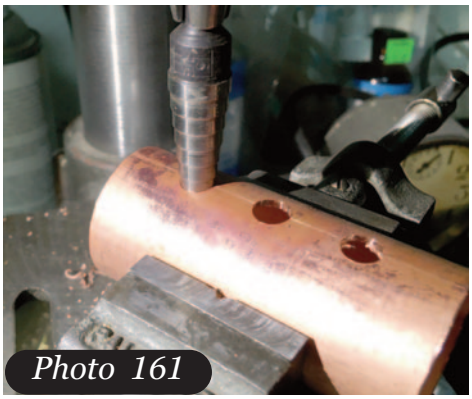


Photo 161


Photo 162

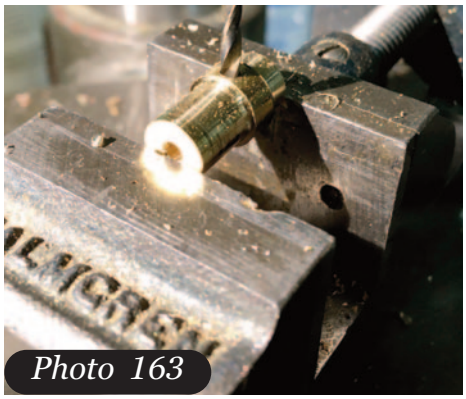


Photo 163


Photo 164


Photo 165


Photo 166

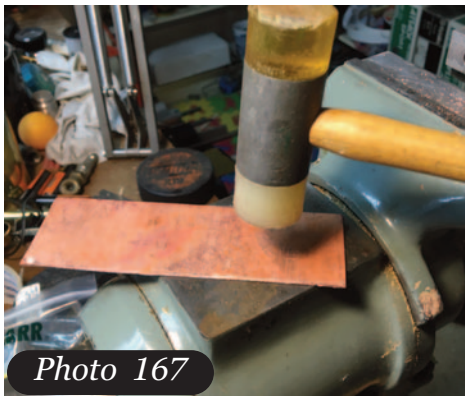


Photo 167


Photo 168


Photo 169

amounts—copper is a nasty material to try to turn—until you're at the required size. However, I chose to do it on the belt sander. Start by attacking the remaining points, sanding right up to the line. Work your way around the circle. Make sure you have a container of water at hand to cool the piece. It will get hot. You might be surprised at how close you can get to a perfect circle using this method. Just take it slow and easy, making sure that you have good light and can see the line at all times.

What you are trying for is a snug press fit in the boiler tube. On one end it is very important that the centerline of the circle be perfectly in line with the line that you scribed along the top of the boiler (**Photo 170**).

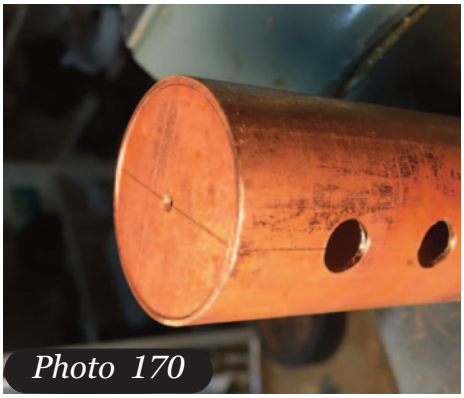
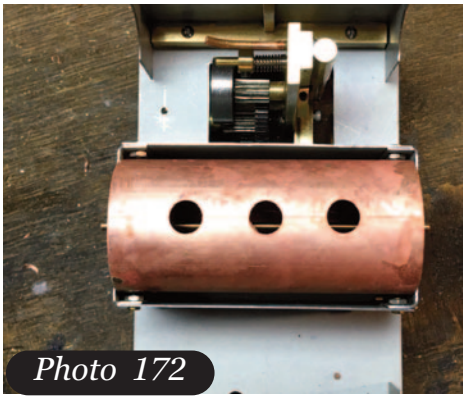


Photo 170


Photo 171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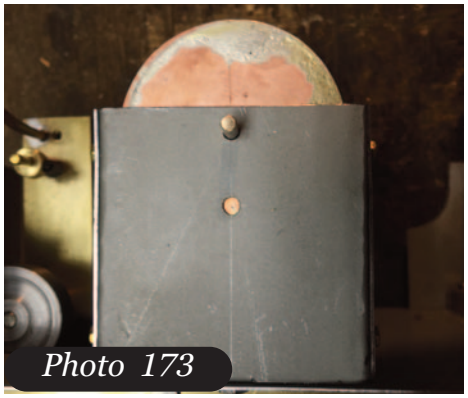


Photo 173

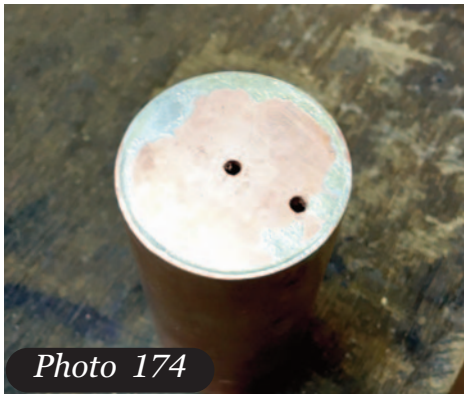


Photo 174


Photo 175

Now it's time to solder in the ends. These must be silver soldered—not silver-bearing solder, but real silver solder. A silver-soldered joint is as strong as the copper. Solder one end at a time, then pickle it and, when clean, solder the other end. The boiler will be heated several times before you're done. Flux the joint well, heat it to red heat, and carefully apply the solder. Then pickle. When the boiler is clean, repeat on the other end and pickle again (**Photo 171**).

Cut a length of 3/32-inch brass rod a little longer then the firebox. Hold the boiler in place in the firebox. The end of the boiler that has the centerlines lined up must be at the end of the firebox with two holes. Thread the rod through the firebox, both ends of the boiler, and out the other end of the firebox, holding the boiler in position (**Photo 172**). Turn the engine on its side, with the two-hole end of the firebox upward. Slowly rotate the boiler on its spindle until you can see the centerline of the boiler end through the second hole in the firebox end. Line up the boiler's centerline with the center of the hole, which should also be on the centerline scribed on the firebox end (**Photo 173**). Then twist a 3/32-inch drill in the hole, making a mark on the boiler end. Remove the boiler and center punch that mark. Drill the second 3/32-inch hole in that end of the boiler (**Photo 174**).

Cut a little stud of 3/32-inch rod and put it in the second hole. Put the long piece in place in the boiler with a little sticking out each end. Silver solder both pieces in place (**Photo 175**).

Set your chassis in front of you, with the steam motor on the left side, and determine which way the boiler will sit in the firebox, based on which end has two holes in it. Flux the holes and the bushings, and place the bushings in their holes (**Photo 176**). If your safety valve bushing is the same as the steam line, it makes no difference which end they occupy. However, if the safety valve bushing is different, it should go at the far end. The hole in the exhaust bushing should point to the left, toward the motor. You might notice that I have drawn circles in pencil around the bushing holes. This is a trick I just remembered. Solder will not flow over a graphite line. (As it happened, this wasn't necessary.) Place a piece of silver solder next to each joint on one side, then heat the boiler from the opposite side, until the solder flows around the joint (**Photo 177**).

The **banjo bolt** comes next. This may be made out of hex or round stock. The drawings show round stock, so that is what I'll do.

Chuck up a piece of three-eighth inch diameter brass. Turn the end down to 0.250-inch x 0.400-inch long. Then turn the waist down to 0.195-inch diameter x 0.200-inches, as per the drawing. Thread the one-quarter inch diameter section ¼-40. Center drill and drill the end 3/32-inch x 0.375 deep. Part off at 0.580-inches (**Photo 178**).

Holding the bolt in your drill-press vise, drill the 3/32-inch cross hole, as shown in the drawing (**Photo 179**).

Using the lubricator that you made as a holder, screw

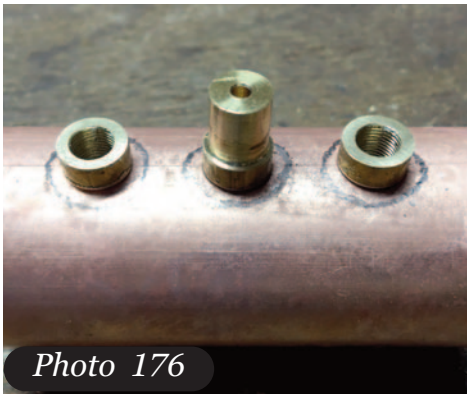


Photo 176


Photo 177


Photo 178

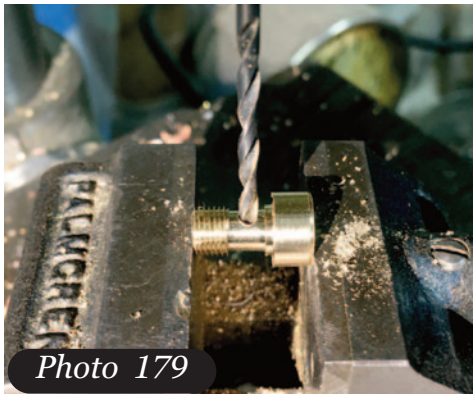


Photo 179

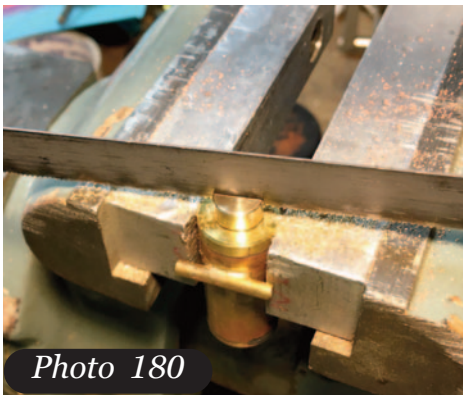


Photo 180


Photo 181


Photo 182

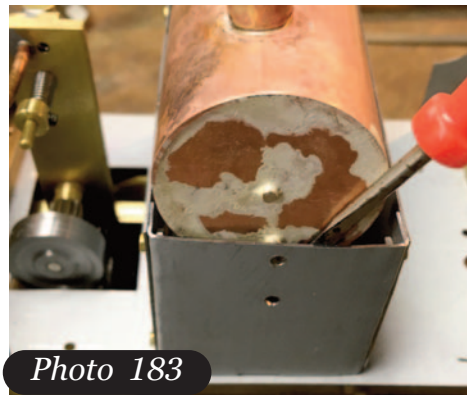


Photo 183

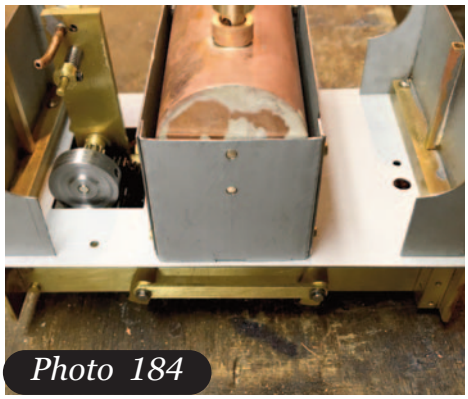


Photo 184

the bolt into it, then grip it in your vise. With a hacksaw, carefully cut a screwdriver slot into the top, as you did the lubricator cap (**Photo 180**).

The boiler needs to be put into the firebox to test its fit. First, though, the protruding studs need to be trimmed. They should stick out probably no more than 0.030-inches (**Photo 181**), depending on the closeness of the fit of the boiler in the firebox. After trimming, clean up the ends so that there are no burrs. Then test the fit from the outside, as it were. Offer up the single-stud end to the firebox from the outside (**Photo 182**). The stud should fit neatly in the hole. Do the same with the two-stud end. Both studs should fit snugly into their respective holes. If they do not, adjust the holes with a miniature round file. Once you're assured of a good fit, you should be able to insert the boiler by carefully spreading the ends of the firebox and sliding the boiler into place (**Photo 183**). The firebox ends should snap back into position, holding the boiler securely (**Photo 184**).

Boiler testing comes next. For this you'll need an additional plug, as well as a couple of gaskets. Make the plug like the banjo bolt, except thread it all the way up to the cap. You can make the threaded part shorter, too, say one-quarter inch. Cut a slot in the top as well (**Photo 185**).

The purpose of boiler testing is primarily to check for leaks. The structure that you have silver-soldered together is exceptionally strong, so there is absolutely no fear of explosion. A boiler should be tested to at least twice its working pressure. Since this engine should be running on 20 psi or less of steam, the boiler could be tested to only 40 psi. I would suggest, however, testing it to 80. There is a possibility of slightly bulging the ends, even with the stay, which we want to avoid.

The way you test a boiler is to fill it to the top with


Photo 185

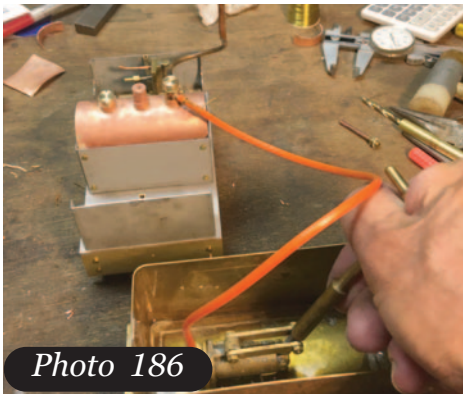


Photo 186


Photo 187

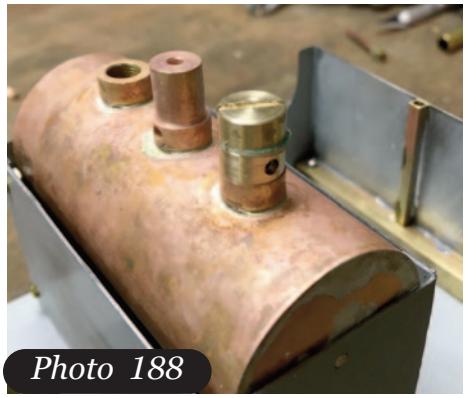


Photo 188

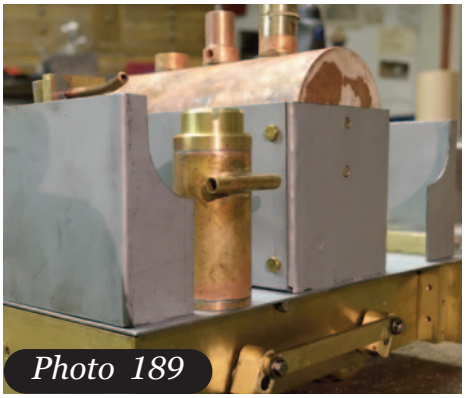


Photo 189

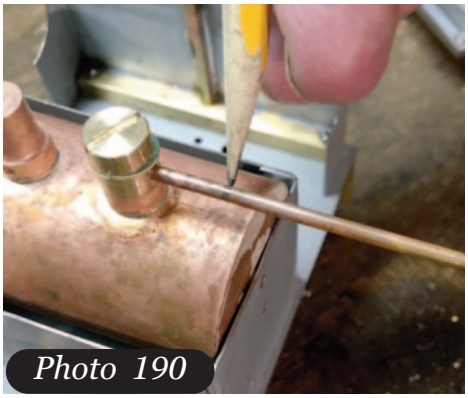


Photo 190

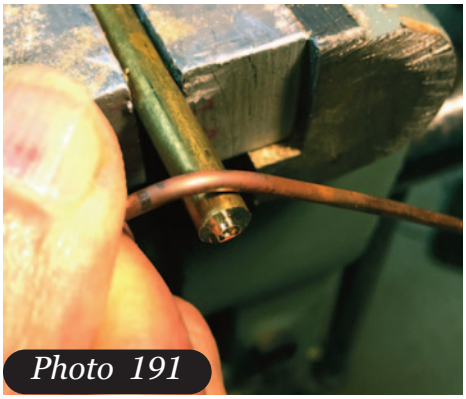


Photo 191

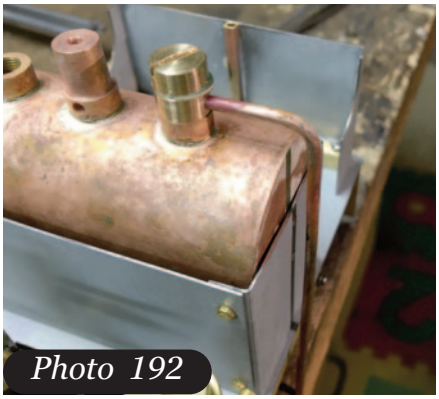


Photo 192

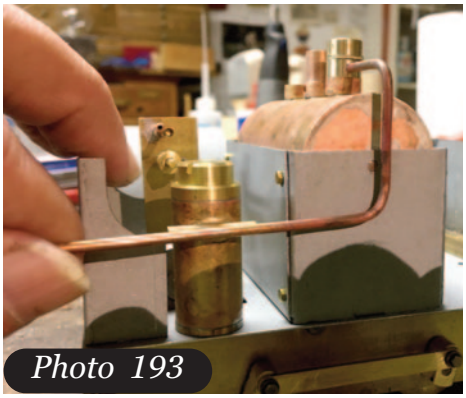


Photo 193

water. It needn't be distilled water, as it can all come out again. Then you hook up a pump and a pressure gauge—preferably a large one. You then pump water into the boiler until it comes up to the desired pressure. All the books say to maintain this pressure for half an hour. For a tiny boiler like this one, I don't think that's necessary—five or ten minutes should show up any fault. If your boiler is leaky, or if a leak occurs during the test, it will spurt water for a second and pressure will drop to zero. This is because water is incompressible. If you were to use steam, or even compressed air, it is conceivable that a more serious event could occur.

My test rig can be seen in **Photo 186**. It consists of an Aster water pump, a large pressure gauge, and the necessary plumbing. If you don't have gaskets to seal your parts, for the test you can get away with using Teflon tape, twisted into a string and wrapped around your plumbing. If you don't have a pump, you could use a good squirt bottle, as they can generate quite a lot of pressure. You'd just have to figure out how to hook it up to your boiler. My hand pump is a little leaky, so I had to keep pumping it to maintain pressure. You can see in **Photo 187** that I tested my boiler to 90 psi—no problem.

Once your boiler has passed the pressure test, it's time to plumb it up. First, though, you need to make one more part— the **banjo fitting**. This is just a simple ring with a 3/32-inch cross hole. When finished, put it in place on the boiler, securing it with the banjo bolt (**Photo 188**). Note the position of the hole, facing out the end. Then install the lubricator on the deck, securing it with a 2-56 nut from underneath (**Photo 189**).

All of the piping is 3/32-inch copper tubing. It will have to be bent at fairly sharp angles, which will require several annealings. Be patient—nice-looking plumbing is always worth the effort.

Take a piece of tubing and anneal the first inch or so

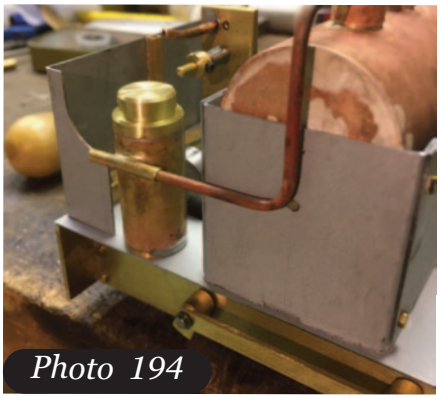


Photo 194

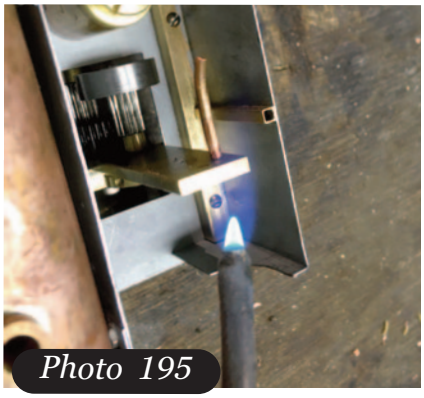


Photo 195

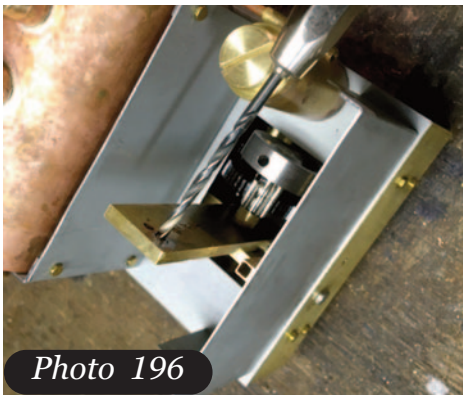


Photo 196

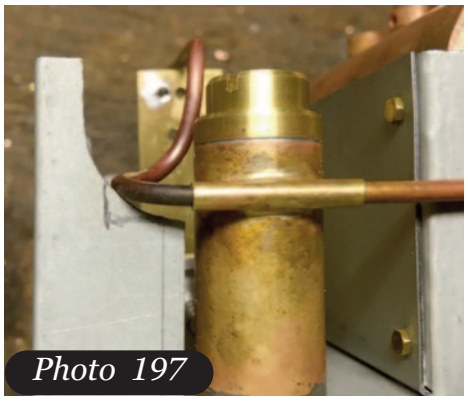


Photo 197

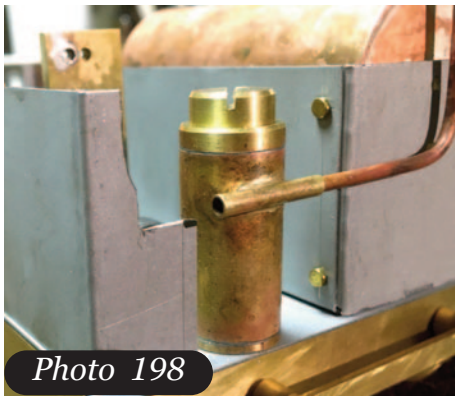


Photo 198

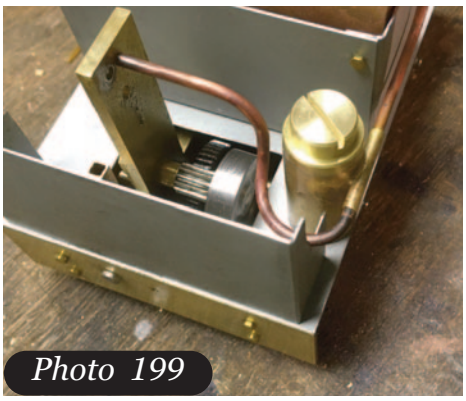


Photo 199

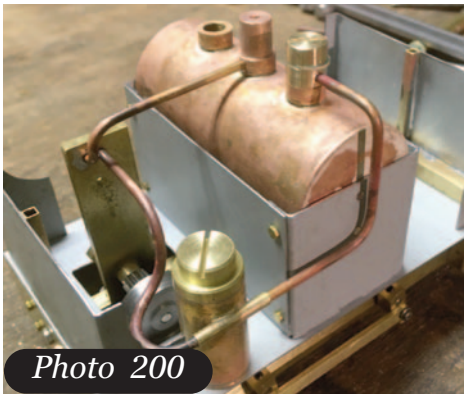


Photo 200


Photo 201


Photo 202

by bringing it up to a dull red heat, then quenching in water. Then put in the hole of the banjo fitting. Mark the tubing with pencil where you think the first bend should begin (**Photo 190**). Then start to bend it around a piece of quarter-inch bar held in your vise (**Photo 191**). Be careful not to bend it too far—just until you feel it start to harden up again. If you bend it too far, you'll kink the tube and have to start over. Anneal the pipe again and continue the bend to 90 degrees (**Photo 192**). My pipe took three annealings. The second bend will take the pipe to the lubricator. Again, anneal the pipe, estimate where the bend should start, and repeat the process (**Photo 193**). When you're happy with your bends and the pipe lines up well with the lubricator, mark and cut the pipe so that, when cut, it will enter the lubricator pipe about one-eigth inch (**Photo 194**). Leave the pipe in place for now.

Remove the cylinder assembly from the motor frame. Then gently heat the frame until the temporary pipe can be withdrawn (**Photo 195**). Clean out the hole with a 3/32-inch drill held in a pin vise (**Photo 196**).

The second pipe goes from the lubricator to the motor frame. The inlet port in the frame, which is the one you're aiming for, is the one closest to the boiler. Repeat the bending process as described above. It is during this bend you will find that the pipe fouls the front end plate. Mark the place where it fouls (**Photo 197**) and file out the notch (**Photo 198**). The finished pipe should look like **Photo 199**.

The final pipe goes from the exhaust port to the hole in the exhaust bushing on the boiler. It is a little fiddly getting a good fit but perseverance is a grace. The pipe should go into the exhaust bushing around one-eighth inch. The finished pipework can be seen in **Photo 200**.

Silver solder the banjo fitting to the steam pipe (**Photo 201**), then pickle all of the pipes until they're a

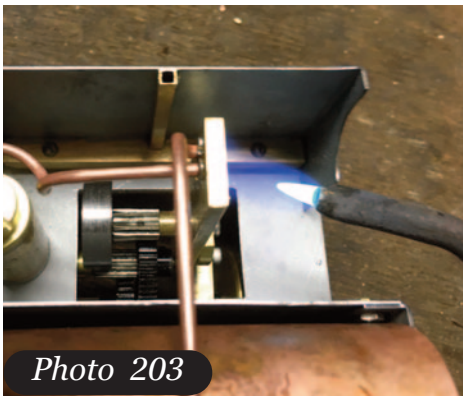


Photo 203

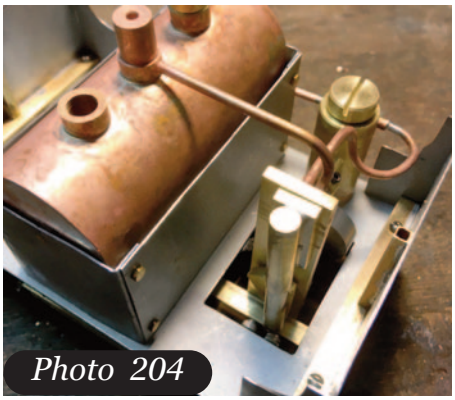


Photo 204

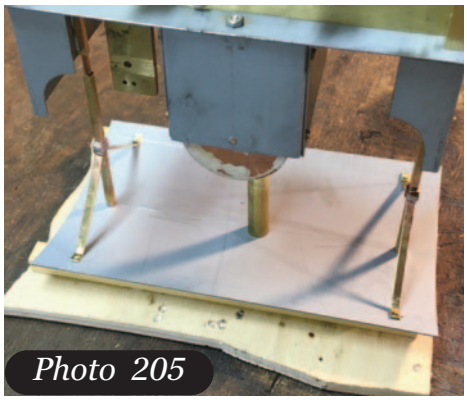


Photo 205


Photo 206

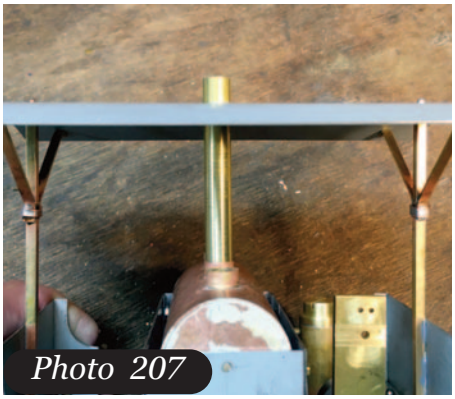


Photo 207

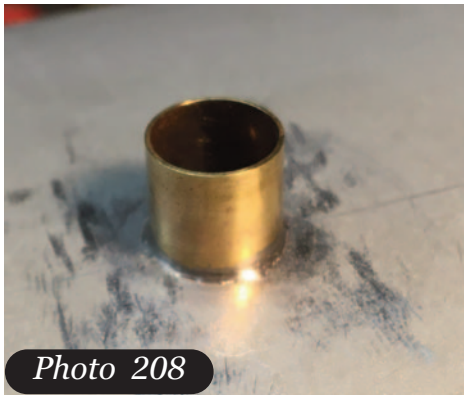


Photo 208


Photo 209

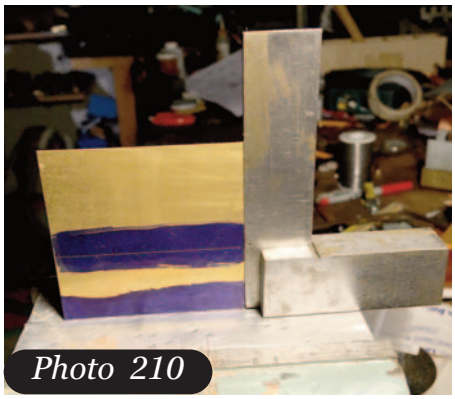


Photo 210

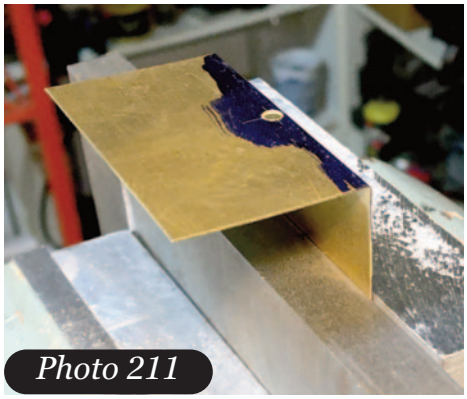


Photo 211

nice, rosy pink (**Photo 202**). Decide if you want polished-copper piping. If you do, now's the time to polish it. I prefer to paint mine, so will go ahead. When you're ready, flux the two pipes to the lubricator, the other end of the steam line where it enters the motor frame, and the exhaust line where it exits the motor frame. Then install the steam line from the boiler using the banjo bolt. You can add gaskets at this point, or use a gasketing compound, like Loctite Gasket Eliminator, #518. Carefully soft solder the joints. When soldering the pipes to the motor frame, heat the area from the side opposite the pipes (**Photo 203**). **NOTE:** Do *not* solder the exhaust pipe into the exhaust bushing. When you're finished, blow into the safety-valve hole in the boiler to see if there is any blockage in the line. The air should come out of the admission hole in the motor frame. When all is good, replace the cylinder assembly in the motor frame (**Photo 204**).

Put the smokestack in place on the boiler. Put the roof in place over it, with the roof supports engaged in the stanchions. Then invert the entire locomotive and place it back in the little cradle, on its roof (**Photo 205**). Carefully scribe a line around the smokestack on the underside of the roof (**Photo 206**). Measure the scribed circle carefully to determine its center point. Then center punch the spot and drill a pilot hole for your step drill. Using the step drill, drill an 11/32-inch hole in the roof from the underside. Clean up the hole and put the roof back in position on the engine (**Photo 207**). Neatly solder the smokestack to the roof (**Photo 208**) so that, when you lift off the roof, the smokestack comes with it. This last is an optional step. I like it because it adds a little more stability to the roof. If you don't want to do this step, you might want to drill the hole slightly larger, so there is a little space around the stack.

The last thing to do (aside from your choice of cou-

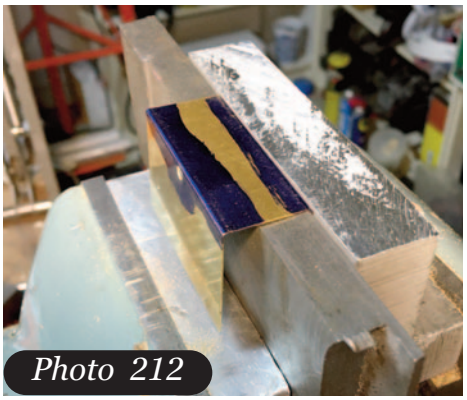


Photo 212


Photo 213

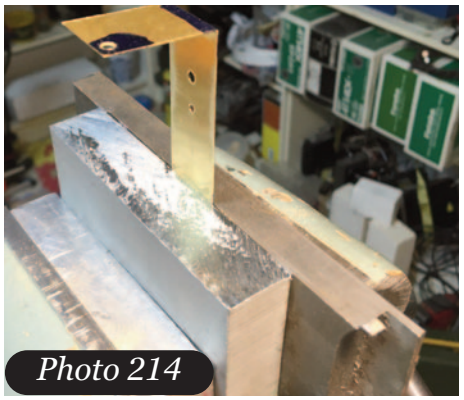


Photo 214

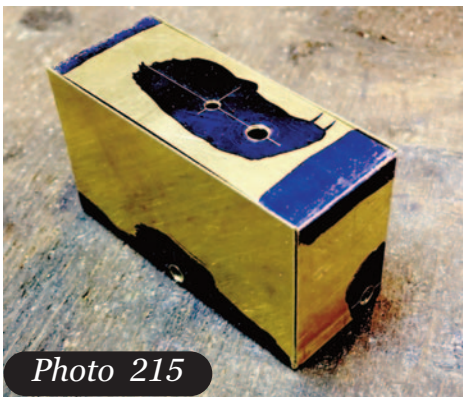


Photo 215


Photo 216

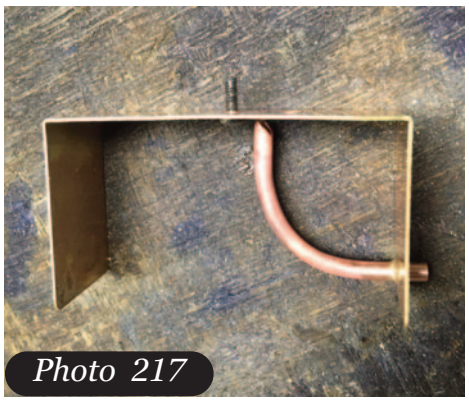


Photo 217

plers) is to build the **fuel tank** and **burner**. The fuel tank is made of sheet brass. Use something between 0.010 and 0.020-inches thick. I used 26-gauge brass (around 0.018), which is just right. The parts will be cut, drilled, and bent. The various tubes will be soldered in at the appropriate times and the whole thing will be silver soldered together.

Start by cutting out the two pieces of the fuel tank according to the drawings. Mark out the hole centerlines of the holes and the fold lines. Drill the four holes (**Photo 209**).

Grip the front/bottom/rear piece in your vise, aligning a fold line with the top edge of the jaws. Use a square to make sure everything is square (**Photo 210**), then fold the piece over as you've done before. Now there probably isn't room in your vise for the second fold. Instead, grip the piece between a couple pieces of scrap metal or wood. Hold them in your vise high enough to ensure that you can make the fold comfortably (**Photo 211**), then make the fold (**Photo 212**). Repeat the process with the other piece (**Photos 213** and **214**).

File the corners on the end/top/end piece for a good fit, then slide the pieces together (**Photo 215**). You may have to file the interior piece to get it to fit properly—I did. Once you've got a good fit, set the tank aside for now.

Cut a piece of one-eighth inch brass or copper tubing, around 1-3/4-inch long, for the **overflow pipe**. I use copper because it bends easier once annealed. Cut the end at a steep angle (**Photo 216**). Anneal the tube and bend it around 90 degrees. Put it through the end hole in the end/top/end piece. One end should protrude one-eighth inch or so, while the other end should touch the top. Silver solder it in place. Also silver solder in a 2-56 x one-quarter inch screw in the #43 hole, from the inside (**Photo 217**).

The tank may be silver soldered together now. I used iron binding wire to hold the pieces together (**Photo 218**). Flux the joint well, then slowly work your way around with the torch, adding solder sparingly to the joint as you go. Pickle when finished. Don't worry about soldering the wire to your tank. If that happens (it did to mine in a couple of places), you can always grind it off later. Rinse it well when it's pickled. One way to test for leaks is to cover two of the holes and suck through the third one. Although not foolproof, that will give you a better indication than blowing into it. If you find a leak, just go back and reheat it to get the solder to flow into the leak. Add solder only if necessary. If all is well, cut and solder in the filler tube in the remaining top hole. To prevent the tube from falling into the tank, you can crimp it just slightly near the bottom with a pair of pliers.

Cut the wick tube to length from 11/32-inch-diameter brass tubing. Mark and drill the one-eighth inch hole in it. To make the bottom cap, cut a little piece of brass sheet and silver solder it to the bottom of the tube (**Photo 219**). Trim and sand away the excess (**Photo 220**). Cut the fuel line from one-eighth inch-diameter brass tubing and silver solder it into the hole in the wick

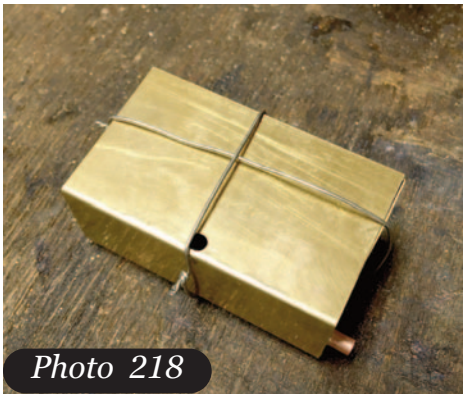


Photo 218


Photo 219


Photo 220


Photo 221

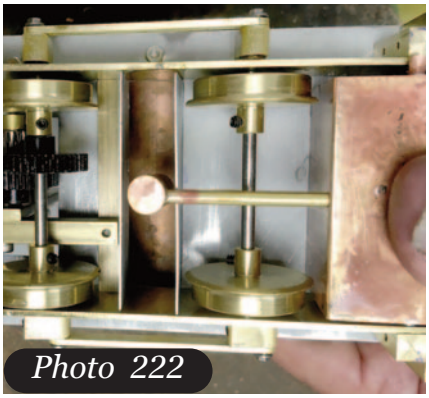


Photo 222

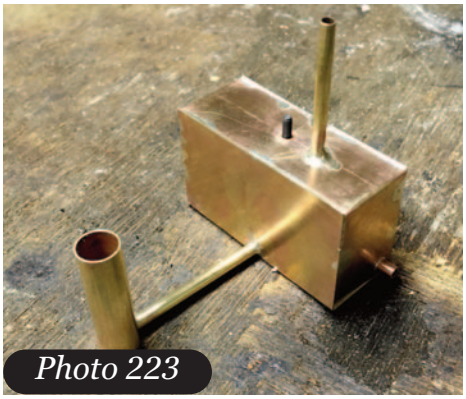


Photo 223

tube (**Photo 221**). Pickle.

Before soldering the wick assembly to the tank, it must be properly placed. Put the fuel line into the hole in the tank and put the whole assembly into the locomotive. The wick tube should be right in the center of the firebox (**Photo 222**). When you've found that position, make a mark on the fuel line. Then remove the assembly from the engine, flux the joint, and silver solder. Pickle. The finished fuel tank/burner can be seen in **Photo 223**.

Before you can install the burner, the wick must be packed. This is an area that has prompted endless discussion. Many, many different materials can be used as wicks. My preference is asbestos yarn, which isn't available any more. People use fiberglass, ceramic fiber, carbon fiber, fine stainless-steel mesh rolled up tight, even plugs of firebrick. Instead of asbestos, I'll use some ceramic fiber that I have on hand (**Photo 224**). I believe this can be obtained from fireplace-supply stores in a braided-rope form. You unbraid the rope to get the strands.

Wick packing is largely a matter of trial and error. You don't want a raging fire (wick too loose) and you don't want a flame too puny to make steam (wick too tightly packed). You may have to experiment with it. When packing the tube, do not twist the wick material—it should go straight in. **Photo 225** shows the initial pack. **Photo 226** shows the wick trimmed to the proper height—one-eighth inch or so above the top of the tube. Put some alcohol in and try it out, outside the engine. I use a syringe with a rubber tube that fits tightly over the filler pipe (**Photo 227**). The flame in **Photo 228** is too much, so I packed in a few more strands. **Photo 229** shows a flame of better size.

When the flame is where you think it should be, extinguish it and pour out the remaining alcohol. When installing the fuel tank, I suggest putting a piece of cardboard about the thickness of the back of a pad of note paper between it and the engine. This will keep the tank somewhat cooler. Secure the fuel tank with a 2-56 nut.

To the Track!

You're ready for a trial run. Lubricate all moving parts with some lightweight machine oil, fill the lubricator with steam oil, fill the boiler about two-thirds full of distilled water, and fill the fuel tank with alcohol until it comes out of the overflow tube. Light the fire and wait.

My test run was on a hot sunny day. Steam was up in less than five minutes but the run was less than satisfactory. The engine would run a little way, then run out of puff. I removed the burner and took out a couple of strands. Much better second run. I timed the third run at 18.4 minutes after steam was raised, this pushing five cane wagons. This was actually much better than I'd hoped.

If your engine doesn't run as expected, here are some things to check. The first is the mechanism. If it doesn't run very smoothly, find out why and correct it. The next thing is the wicks. They may be packed too tightly. The


Photo 224

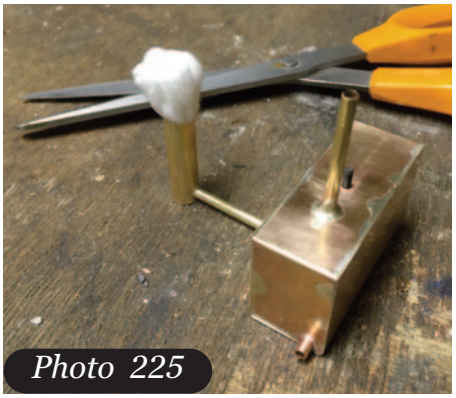


Photo 225

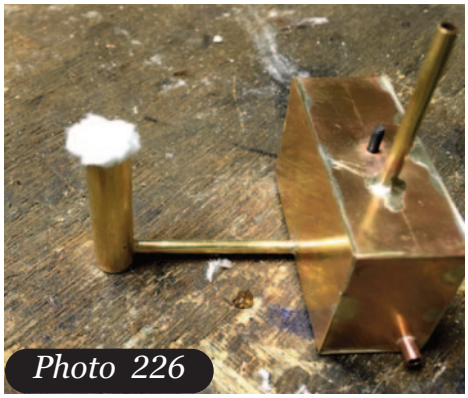


Photo 226

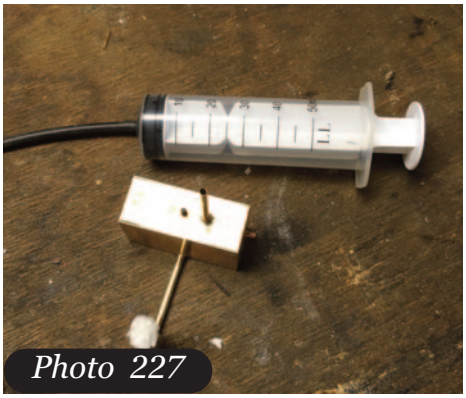


Photo 227

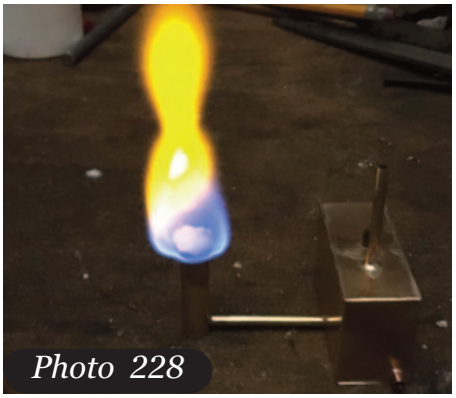


Photo 228

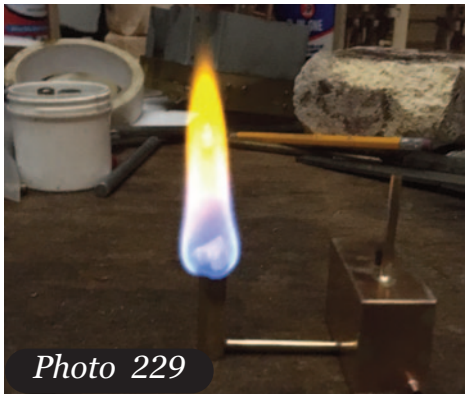


Photo 229

third thing you can play with is the pressure on the cylinder from the spring. Move the spring retainer back and forth until you find the optimal position.

All you need to do now is apply couplers and paint your engine. And enjoy it, of course!


Photo 230

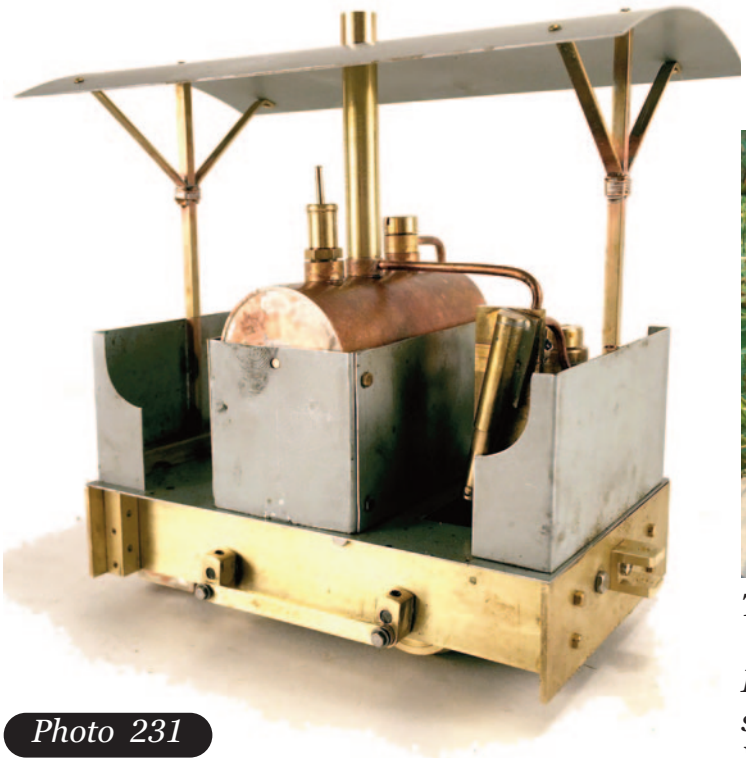


Photo 231

Tom Winter's Minitram is coming along nicely.

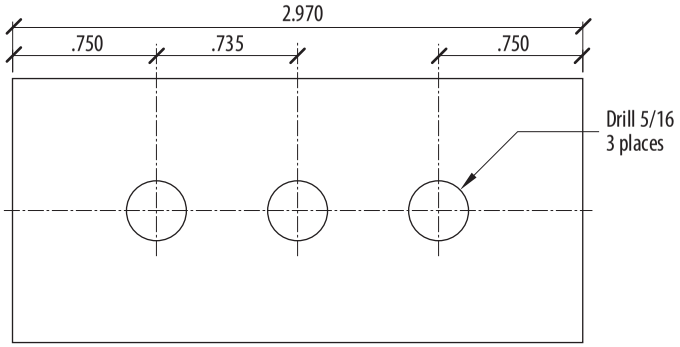
If you have pictures to share of your Minitram, send them to us for inclusion in the magazine. We'd love to see your work. — ed.

Figure 6

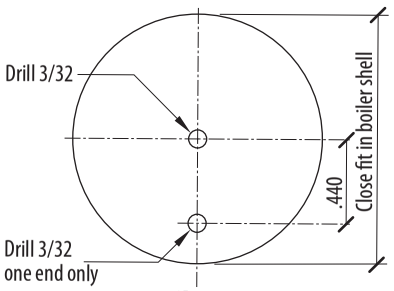
SHEET E

Boiler and burner

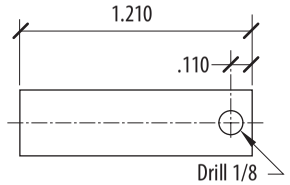
Sheet 6 of 6
Marc Horovitz
Date: 8-4-20



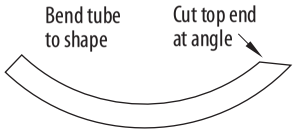
Boiler shell
Make one from 1-3/8 O.D. (1-1/4 I.D.) copper pipe



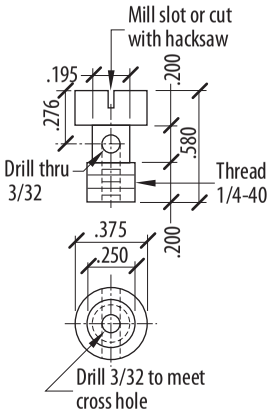
Boiler end
Make twofrom .040 copper sheet



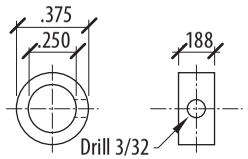
Wick tube
Make from 11/32 Ø K&S brass tube



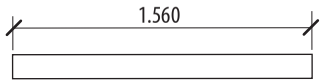
Overflow pipe
Make from 1/8 brass or copper tubing



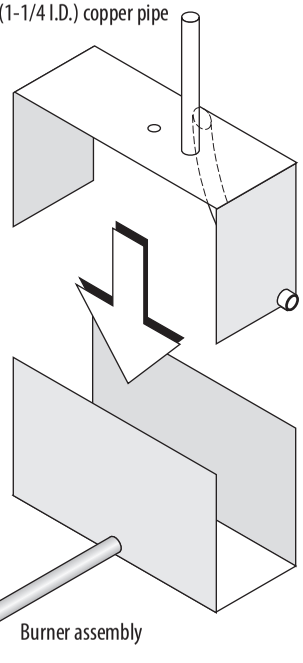
Banjo bolt
Make one from brass

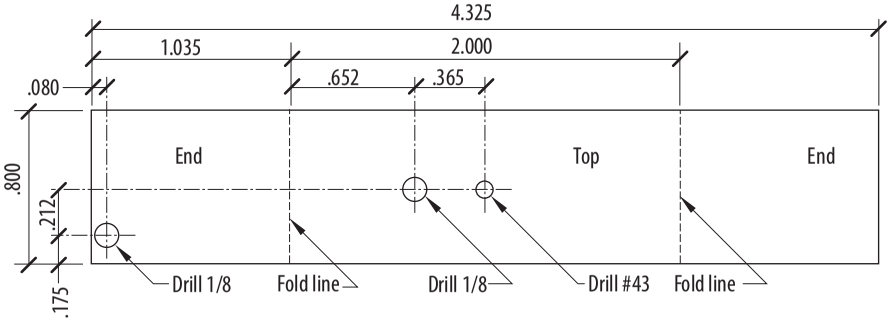


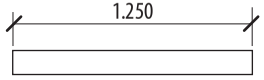
Banjo fitting
Make one from brass



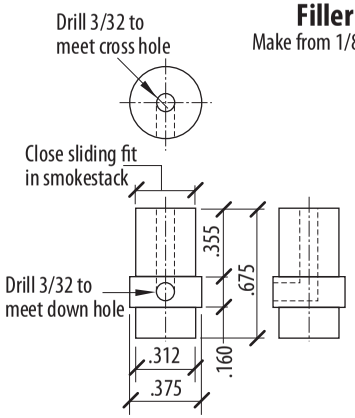
Fuel line
Make from 1/8 brass tubing



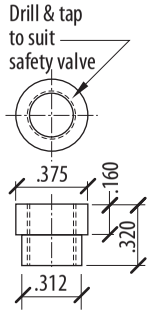




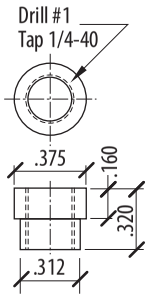
Filler tube
Make from 1/8 brass tubing



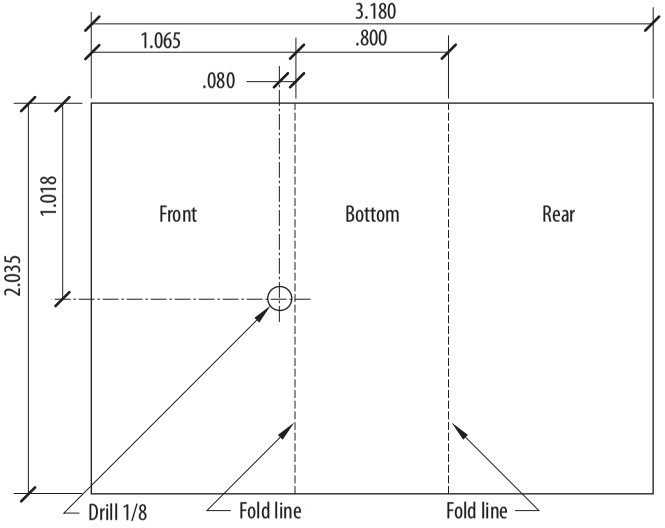
Exhaust bushing
Make one from brass or bronze



Safety-valve bushing
Make one from brass or bronze



Steam-line bushing
Make one from brass or bronze



Fuel tank
Make from .020 brass

My Minitram

Modifications from my build of Parts 1 and 2

Text, Drawings and Photos by Scott Baldridge

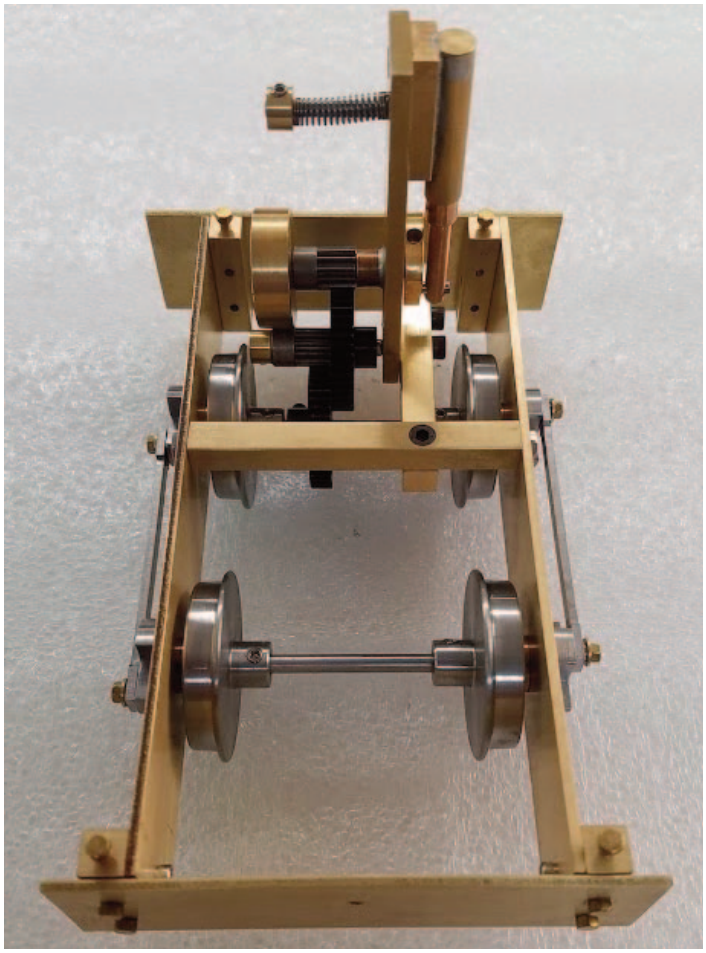
As we all know, if we set a part in front of ten-different people we will most likely get ten different ways of manufacturing that part. I have been following along with Marc's build of the Minitram and have it completed up to the end of Part Two. Marc has done a excellent job of documenting this build with text and photos and it has been a fun project to take on. In my build I have done a few things a bit differently and I will describe my thought process.

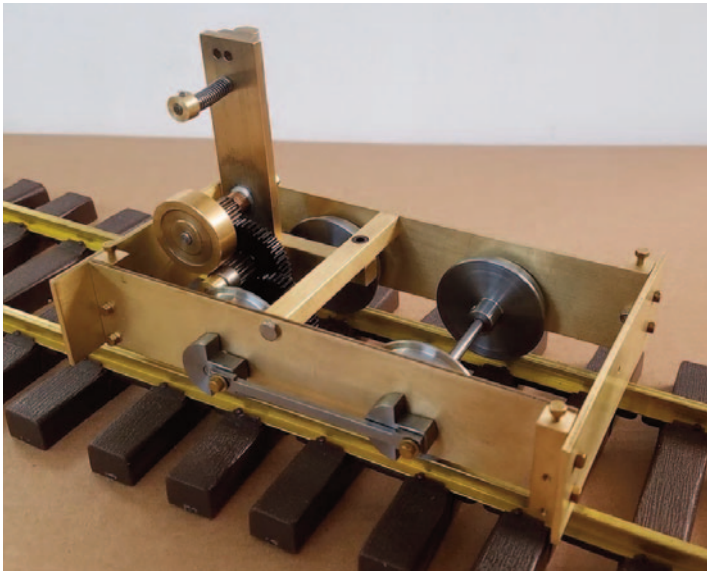
Port Face: On my port face I increased the thickness to 0.157-inch; doing so gave me adequate stock to mill a 0.125-inch radius channel x 0.032-inch deep to give the cylinder a positive pocket to nest into for easier soldering alignment See **Drawing 1**.

Crankshaft Bearing: In the build article, when soldering the crankshaft bearing to the frame Marc describes placing 0.009-inch shims under the motor frame to allow a positive protrusion of the bearing on the back side of the frame. My work around was to machine the crankshaft bearing with a step that provides a positive surface to butt up against on the frame that allows a 0.010-inch positive protrusion. In doing this the drilled hole for the bushing will need to be drilled to 3/16-inch diameter, not one-quarter inch as specified on Marc's drawing. I used bronze on my bearing but brass would work just as well. See **Drawing 2**.

Axle Bushings: I added axle bushings to my frames in order to provide a larger surface for the axles to run in. I used bronze here also but brass would work just as well. The bushings are installed with the heads on the inside of the frames. The four one-eigth inch holes in the frames for the axles will need to be drilled to a one-quarter inch diameter. My bushings were machined to a press fit and I added a few drops of Loctite retaining compound 680, just as an added measure to secure them in place. See **Drawing 3**.

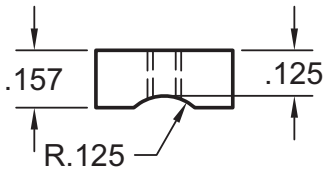
I made a few other cosmetic changes as we all have our own way of personalizing things. My **wheel cranks** were machined with counterweights **(Drawing 4)** and the **side rods** were relieved on the top and bottom just to add a bit of a visual flair **(Drawing 5)**.

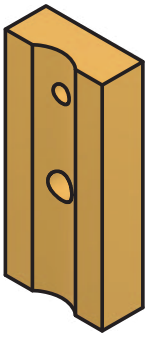


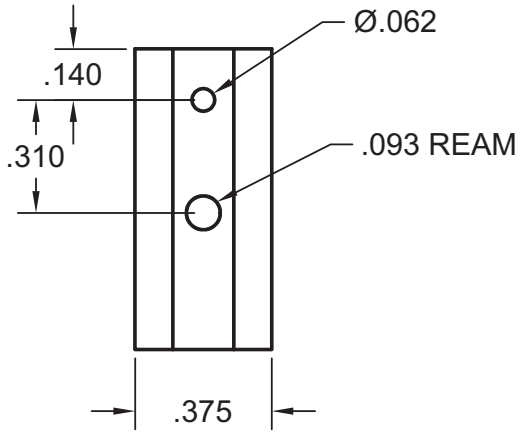


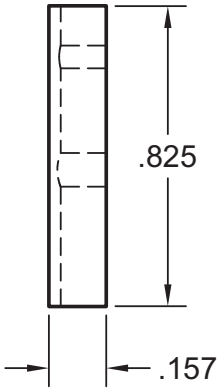
Top: View of Scott's Minitram as built with the modifications described.
Bottom: Side view showing the wheel cranks with counterweights and the side rods with a bit of relief.

Drawing 1



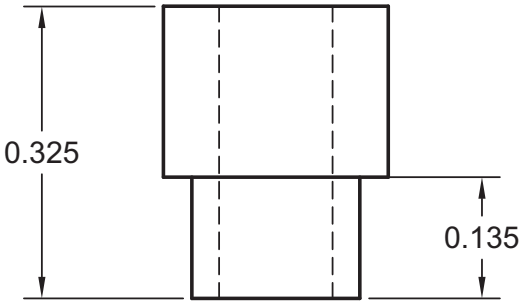


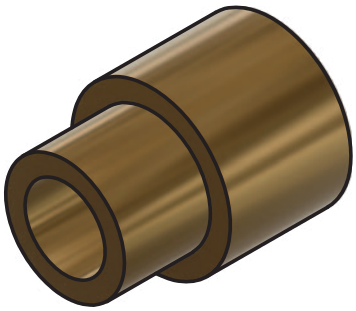


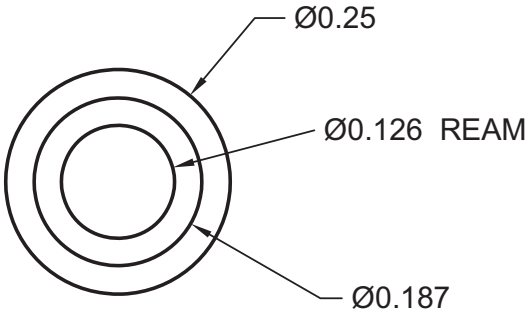


	PROJECT: SITG Minitram				
	TITLE: Port Face Modification				
APPROVED	SIZE	CODE	DWG NO		REV
CHECKED	A				
DRAWN Scott Baldridge 11/10/2020	SCALE 2:1	WEIGHT		SHEET 1/1	

Drawing 2

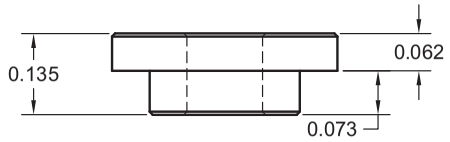


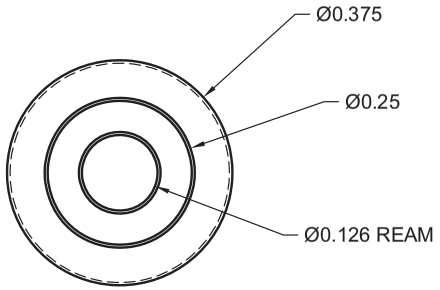




	PROJECT: SITG Minitram			
	TITLE: Crankshaft Bearing Modification			
APPROVED	SIZE: A	CODE	DWG NO	REV
CHECKED				
DRAWN: Scott Baldridge 11/12/2020	SCALE: 5:1	WEIGHT	SHEET: 1/1	

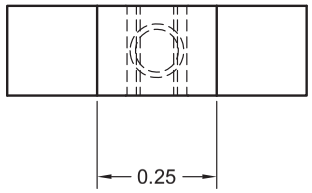
Drawing 3

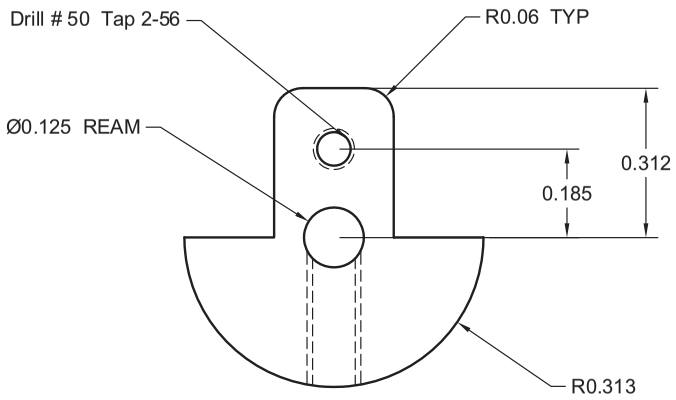


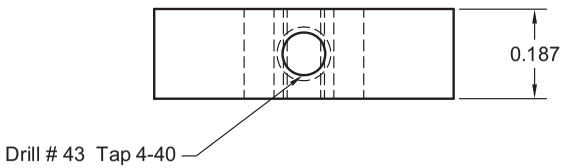


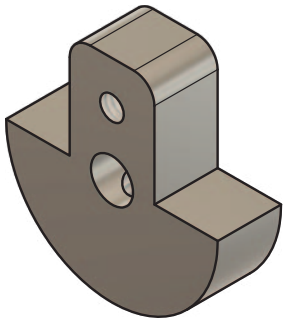
	PROJECT: SITG Minitram				
	TITLE: Axle Bushing Modification				
APPROVED	SIZE: B	CODE	DWG NO		REV
CHECKED					
DRAWN: Scott Baldridge 12/9/2020	SCALE: 5:1	WEIGHT	SHEET: 1/1		

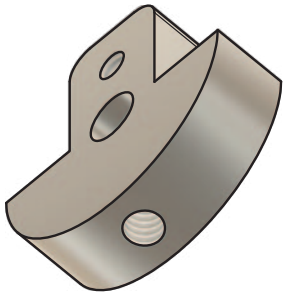
Drawing 4





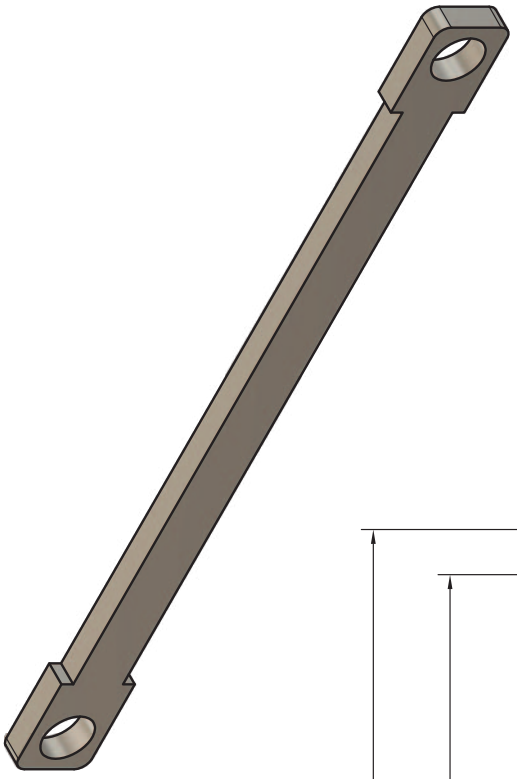


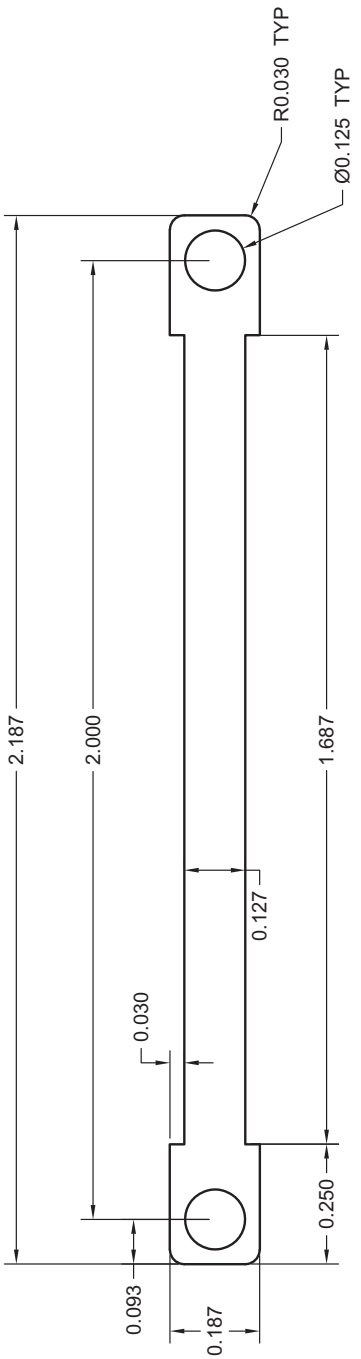




	PROJECT: SITG Minitram				
	TITLE: Wheel Crank 2				
APPROVED	SIZE	CODE	DWG NO		REV
CHECKED	B				
DRAWN Scott Baldridge 12/7/2020	SCALE 4:1	WEIGHT		SHEET 1/1	

Drawing 5





PROJECT	SITG Minitram			REV
TITLE	Side Rod V2		DWG NO	
		SIZE B	CODE	
		SCALE 4:1	WEIGHT	SHEET 1/1
APPROVED				
CHECKED				
DRAWN	Scott Baldridge	12/7/2020		

THE CUPOLA VIEW

The Year of the 0-6-0?

The very first garden scale live steamer I saw in action was an Aster GER 0-6-0. I had just joined the newly formed Washington, Virginia, & Maryland Garden Railway Society in August of 1987, and in October of that year the club put together an exhibition garden railway at a local nursery for their Fall Festival. Bob Clark, who operates Stoke'm and Smoke'm, was an Aster dealer at the time, and I watched as he fired up and ran the little steamer. It ran flawlessly around very tight corners of the largest LGB track available at the time, which was around five foot radius. The club had made allowance for a separate track for the live steamers and those with battery power, since the steamers' axles were not insulated to prevent electrical shorts.

I myself have two 0-6-0's in my collection; an Aster Pannier Tanker in the London Underground livery and an Accucraft SP S-12 switcher. Both are fun locos to run as well as being very nice models of the prototype. (Although the Pannier gets a bum rap for its bright red, but that's a discussion for another time).

When I received the announcements from Accucraft and Bowande about their 0-6-0 offerings for 2021, it seemed to me like it had been awhile since any 0-6-0's had been available, especially in an American prototype. If you take look at the rosters of models produced over the past forty years, I feel that the 0-6-0 comes up short. Now I can't say my research is all inclusive, but with what I could find through searching the internet, the short list below I think does a pretty good job of showing how small is the category. And for American prototypes, even smaller.

0-6-0 Models

Accucraft
- Southern Pacific S-12
- USRA 0-6-0 (AML)
- Lawley (Freelance Side Tank)
- Kerr Stuart Victory Class
- Mabel (In Development)

Aster
- GER / ETAT / Ouest 0-6-0T
- Pannier Tank
- KPEV T-3
- SBB E-3 Tigerli

Bowande
- Baldwin 610-D (In Development)

Pearse
- Countess
- Genesis

Roundhouse Engineering
- Lady Anne
- Silver Lady

Now if you add a leading truck or trailing truck of a pair of wheels, then the list gets much longer. But let's stay pure to the diminutive switcher. According to the database at *steamlocomotive.com*, there are 157 surviving locomotives in the United States. Although of those, one is actually listed as "sunk" in the Atchafalaya River, Berwick, LA. Not sure how you would visit that one unless you are into scuba diving.

The majority of these examples are stuffed and mounted on display, but of that number sixteen are operational. That's many more than just the three American models produced from the list above. And this number is probably high for a good reason -- the economics of running a smaller locomotive coupled with the large number produced during the prime of steam that were available for restoration.

So let's celebrate 2021 as the year of the 0-6-0. I think I hear my Pannier calling me for a run!

Happy Steaming!

Scott

'Cupola view' is written by Editor Scott E. McDonald: you can contact him at sitgeditor@gmail.com or P.O. Box 1539, Lorton, VA 22199.

Special or Annual Meets

Staver Locomotive Fall Steamup 2021 — Staver Locomotive, Portland, Oregon. Visit *www.staverlocomotive.com* for latest information.

Fourth Annual Gathering of North American Members of the Association of 16mm Narrow Gauge Modellers - 2021. Venue is being planned to be held in Northern New Jersey.
Visit *www.northamerican16mmmodellers.org* for registrations and venue information.

National Summer Steamup, July 2022 - Lodi Grape Festival and Events Center, Lodi, California. Visit *www.steam-events.org* for more information.

Cabin Fever Model Engineering Show January 2022 - Lebanon Valley Expo Center & Fairgrounds, Lebanon, PA. Gauge One Tracks available for steaming. Visit *www.cabinfeverexpo.com* for more information about 2022.

International Small Scale Steam Steamup. January 15-23, 2022 - 103 Live Oak Drive, Diamondhead, Mississippi. Visit *www.diamondhead.org* for more information.

Regular steamups

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

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

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/* or call Pete Comley at (253) 862-6748.

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

DIAMONDHEAD

♦ International Small Scale Steamup ♦

JANUARY
16-22
2022

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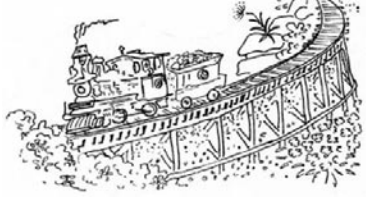
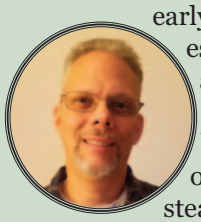
DIAMONDHEAD INN & SUITES
DIAMONDHEAD, MS
228-255-1300
Fax 228-255-9848

For more information and registration forms, visit www.diamondhead.org



CONTRIBUTOR BIOS

The magazine couldn't exist if it were not for the dedicated individuals who take time from the hobby to chronicle their endeavors, interests, and joy of live steam. If you get a chance to meet any of our contributors at a steamup, please thank them for their contribution.



Scott Baldridge - Scott is from North Huntingdon, PA and has been into model trains all his life. In his early years he always had a layout in HO scale where he modeled the 1940-1950 time period. His interest in machining and metalworking began in high school, and he carried that into his career as a manager of a machine tool manufacturing company. About 10 years ago Scott built his first steam engine, a single cylinder single acting oscillator by Stan Bray called a Slim Sam, and he has been hooked ever since. His steam interests carried into live steam boats , stationary steam engines and of course live steam locomotives. His primary interest is in 1:20 scale narrow gauge, but anything in steam interests him. He has a small elevated layout in his back yard with the road name of the Penns Woods RR. He enjoys kit building, scratch building, and freelance designs of his own.

Carl & Christine Berg - Carl has been a modeler for a very long time. He got into steam because he wanted to make the engines that powered his models. Ron Brown introduced himself to Carl in the early 1990's and asked if he would write an article about his Bachman-bodied steam interurban. It still runs strong, by the way.

Christine has been the one to make up the bed in the motorhome, bring Carl a drink, keep fresh batteries in the mosquito repeller, find the occasional lost screw, hand Carl the gun powder, fuse, lighter, oil, alcohol, butane, or water. When things are at an impasse, no solution can be found, all hope is lost, she says: "what about this?" thereby revealing success. Oh yeah, she also types.

Marc Horovitz - Marc has been interested in steam locomotives — both large and small — all of his life. In 1979 he opened the Light Railway Division of his existing business, Sidestreet Bannerworks, for the purpose of importing small scale live steamers in the U.S. Sidestreet Bannerworks was the original US importer of the Beck Anna and other Beck locos. Marc began writing the "Small Scale Live Steam" column for LIVE STEAM magazine around 1980, and continued on for five years or so, until Garden Railways magazine began to evolve. He has kit-bashed and built many steam locomotives.

Les Knoll - Les started his railroading experience with a Lionel F7 freight set at Christmas at age six. This grew to a tabletop layout in the family basement, later to be supplanted by a theater pipe organ and a rock band practice space in his teens. Later in life the HO/HOn3 bug bit, and the first incarnations of his Rivendell & Midland Railroad, one of the first JRR Tolkien-based railroads in the US, took shape. The R&M moved outdoors with his discovery of live steam in the early 90's, and after two purchased locomotives, five scratchbuilt live steamers followed, ranging from a 14-ton Shay to a 2-4-4-2 logging Mallet. The current Rivendell & Midland is in the back yard of Les's and wife Ruth's lake home in North Carolina. Les is a retired Forensic Engineer and a Registered Professional Mechanical Engineer.

Jeff Young - Jeff Young is a retired professional engineer, having worked in the rail transportation industry in academia, government and private sector consulting. As a life-long model railway enthusiast, he has been involved in small scale live steam since 1980. Jeff's back yard line, the Algonquin Light Railway, has been in operation for thirty years. As well as models, he enjoys running full size narrow gauge locomotives whenever possible.

***Your Name Can be on this Page!* -** The whole world is waiting to hear from you! We are always looking for Live Steamers to share their thoughts, experiences, projects, latest acquisition... The list goes on!

We need Locomotive Reviews, Tips & Hints, Steamup Reports, etcetera. All contributors are compensated for their submissions. Submitting is easy. Just e-mail your idea to sitgeditor@gmail.com and we'll work with you to bring your article to our pages. Visit *www.steamup.com* to view our Contributor Guidelines to see how easy it is to show the world your small scale live steam interests!

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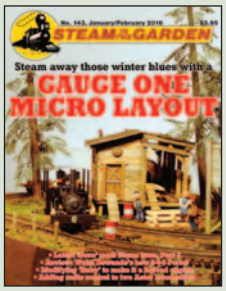

Vol. 26, No. 1; Issue 143; Jan./Feb. 2016
Micro layout: Building an indoor Gauge One track • Review of Wuhu Bowande Porter • Hot-rod 'Ruby': Hopping up a 1:20.3-scale engine • Rolex Asters: Adding radio control • Learning to model in tinplate with a 'Dora' modification, Part III • Latest waybill: Llagas Creek Railways sold, U.K. distributors merge.

Vol. 25, No. 6; Issue 142; Nov/Dec 2015
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Vol. 25, No. 5; Issue 141; Sept./Oct. 2015
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Vol. 25, No. 4; Issue 140; July/August 2015
Classy Class A Climax — Regner steamer and kit review • Big 'Dora' — Making it a 1:13.7-scale rail bus • Spinning metal • Cabin Fever • Speedometer • Latest waybill: Garratt from Roundhouse; in memoriam — Peter Jobusch; Accucraft UK goes with an African steamer; Mamod saddle-tank loco.

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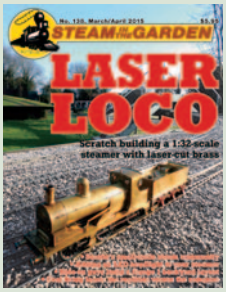

Vol. 25, No. 2; Issue 138; March/April 2015
Laser Loco: Scratch building with laser-cut brass. Part 1 • How steamers in Seattle created a community • Getting an LED onto the front of Accucraft's C-19 • Two former ride-on live steamers decide to go to Gauge One • Romance, realism of coal firing: factors to consider before taking the plunge.

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Vol. 24, No. 6; Issue 136; November/December 2014
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Vol. 24, No. 5; Issue 135; Sept./Oct. 2014
A big little locomotive: Accucraft's 7/8ths-scale 'Fairymead' • Scratch-building the four-cylinder Heisler, Part Two • The backyard Rivendell & Midland Railroad, Part One • Build a train barn • Review: Regner's 'Otto' • Latest Waybill: Accucraft 1:32-scale rolling stock; end of boiler detection; new wheels..

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