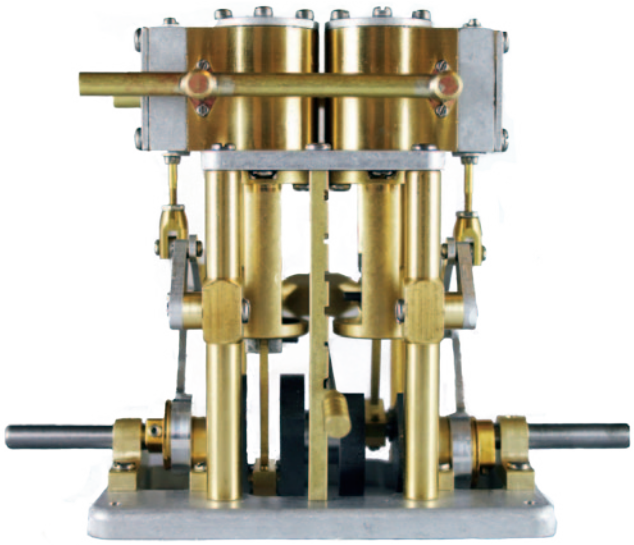
No. 175, September/October 2021 US $5.95
Canada $7.95

STEAM IN THE GARDEN

Sweet Sixteen

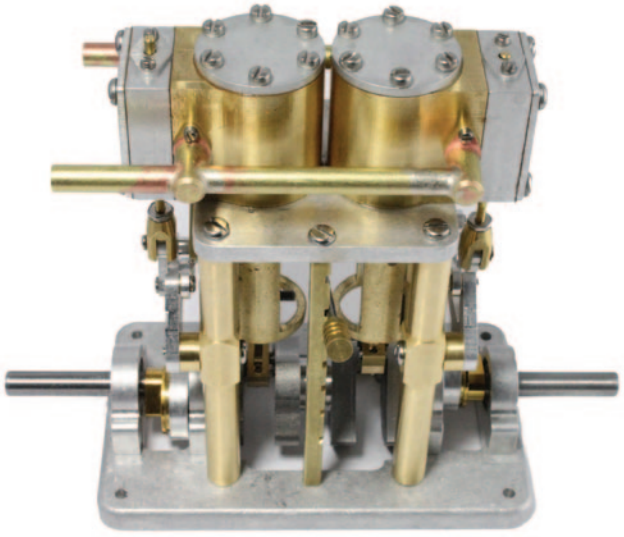
*** Freelance Consolidation - Part 5 Build Series * Readers Builds Pictorial * Climax Reincarnation ... and lots more!**

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

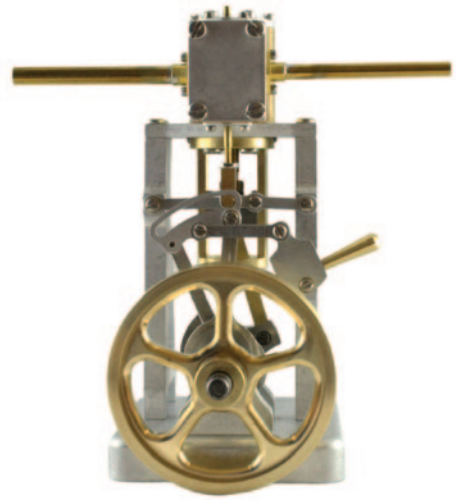
Ready to assemble steam engine kit: $295
Fully assembled and tested: $400
Includes all hardware
SAME AS TVR1A but with shielded ball bearings
Includes full-color assembly manual
Dimensions: Same as TVR1A
Weight: 323 g

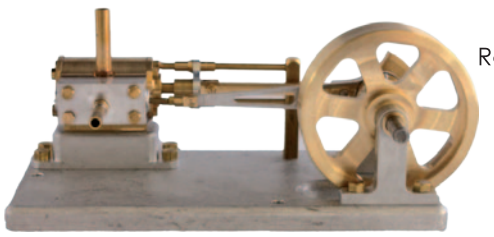
Flywheels for TVR1A / TVR1ABB

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

Graham Industries PO Box 15230 Rio Rancho, NM 87174
FAX (505) 715-4527
Order online at: www.grahamind.com
As always, shipping in the USA is FREE! (USPS Priority Mail)

Vol. 31 No. 3 Issue No. 175; September/October 2021

STEAM IN THE GARDEN

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

Editor ..... Scott E. McDonald
sitgeditor@gmail.com
(703) 490-9867

Associate Editor.....Gary Woolard
garishw2@earthlink.net
(310) 880-1369

Advertising Manager ..... Sonny Wizelman
sonnyw04@gmail.com
(310) 558-4872

Circulation Manager ..... Marie Brown
circ@steamup.com
(607) 642-8119

POSTMASTER: **Send Form 3579 to Steam in the Garden, P.O. Box 335, Newark Valley, N.Y. 13811-0335.**

Subscriptions **for the United States, Canada or overseas should be mailed to Steam in the Garden, P.O. Box 335, Newark Valley, N.Y. 13811-0335. Phone, fax and e-mail subscriptions are gladly accepted and we take VISA, Discover and MasterCard. PayPal payments are also available. Phone: (607) 642-8119; fax: (253) 323-2125.**

Hobby retailers: **Contact Kalmbach Publishing Co. at (800) 588-1544, ext. 818, if you wish to stock Steam in the Garden in your store.**

Steam in the Garden LLC
A Utah corporation

Dan Pantages President
Howard Freed Secretary/Treasurer

Marie Brown Scott McDonald
Paul Scheasley Sonny Wizelman

Editorial: **P.O. Box 1539, Lorton, VA 22199 USA**

Advertising: **10321 Northvale Road Los Angeles, Calif. 90064-4330 USA**

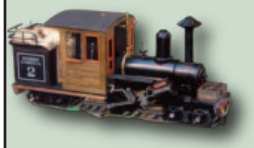
Circulation: **P.O. Box 335 Newark Valley, N.Y. 13811-0335.**

Steam in the Garden **(USPS 011-885, ISSN 1078-859X) is published bimonthly for $35 (Canada: $US42; Overseas: $US72) per year (six issues) by Steam in the Garden LLC, P.O. Box 335, Newark Valley, N.Y. 13811-0335. New subscriptions, please allow six-eight weeks for delivery. Periodical postage paid at Newark Valley, N.Y., and additional mailing offices.**

http://www.steamup.com/

In This Issue

Swift Sixteen Steam Tram - Review and tips on building the SS Tram with a Roundhouse Bertie Boiler **- by Steve Ciambrone**



A Whimsical Climax Part 1- A new approach to building the Hall & Hall #407 Climax **- by Bill Allen**

Rishon Refurb - Bringing a veteran of live steam back into full power. **- by Peter Thornton**

Couplers- A look at some commercially available couplers and their fidelity to scale **- by Kendrick Bisset**

Freelance Consolidations - Part Five- Narrow Gauge 2-8-0. Cab and Running Boards. **- by Les Knoll**

Also inside:

Cover: Steve's Swift Sixteen Tram ready for operations.- **Photo by Steve Ciambrone**

RAILWAY LIBRARIAN

Review - 2021 Garden Trains Annual; White River Productions, Chris Lane, ed. $24.95. 116 pages on heavy gloss stock.

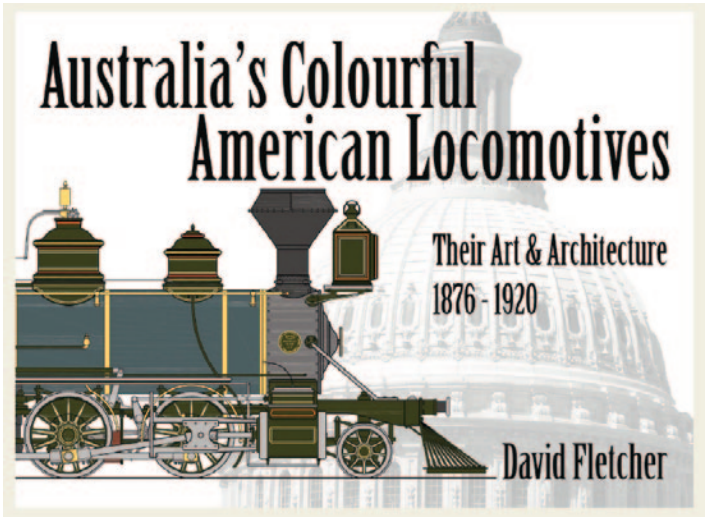
With the demise of Garden Railways magazine in 2020, there are several efforts ongoing to 'fill the void' for both readers and vendors. This "2021 Annual" is White River's entry in the field. It includes 22 articles, heavily illustrated with photos and a few drawings. Many of the articles are aimed at the beginning garden railroader, but some should also appeal to the seasoned hobbyist.

Several articles are of interest to the live steamer; one from David Fletcher is a detailed history of the genesis and execution of the Accucraft Mason Bogie, arguably one of the most beautiful Gauge One steamers built. Another is a "Starting in Steam" style article by George Riley. This article recommends Accucraft's "Emma" as a beginning live steam locomotive, which is a bit surprising. Emma does have a reputation as a stable and easy to fire runner, but its 7/8th's scale thrusts a new user into the 'two-foot' realm; a scale which, while interesting, is still not as widely supported by commercial suppliers as 1/32nd or 1/20.3 scales.

Perhaps in answer to such objections, Mr. Riley has several more articles in this issue, including detailed "how-to's" on scratch-building 7/8n2 flat cars and industrial cane cars. These will be of interest to live steamers expanding into that scale.

Serendipitously, this reviewer had the pleasure of meeting George Riley at the recent National Garden Railroad Show in Nashville. George is associate editor of Garden Trains Annual, and a confirmed 7/8th's live steamer. We agreed amicably to disagree about beginning scales & gauges, as many of us in this hobby do!

All in all, the 2021 Garden Trains Annual is well produced, well-written, and well worth the price. And it's nice to know they have a live steamer on staff. Recommended.

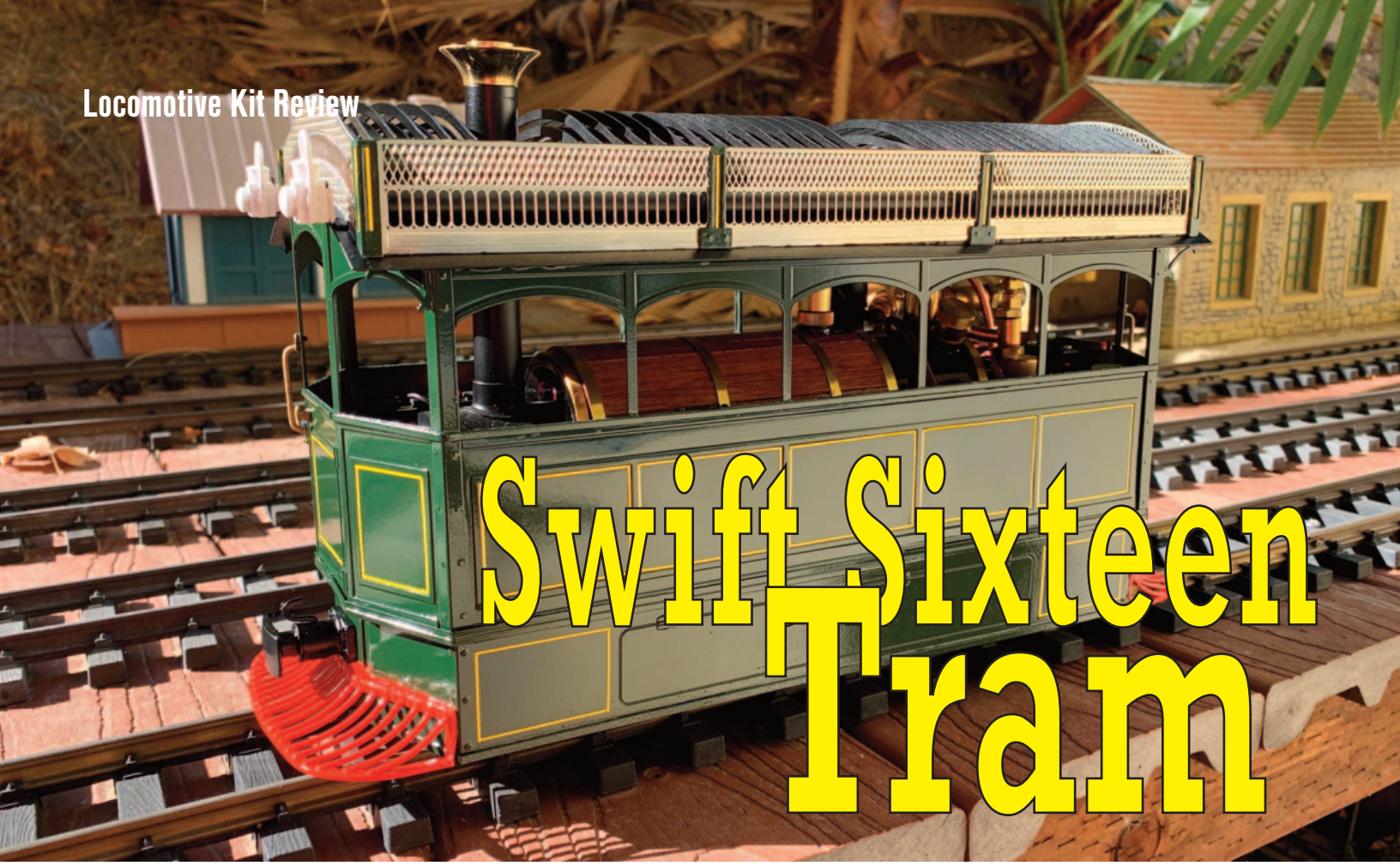


Australia's Colourful American Locomotives - Locomotive artist David Fletcher is largely known to American audiences from his color locomotive portraits featured in Narrow Gauge and Shortline Gazette. He has consulted for Accucraft U.S.A. and Accucraft U.K., and some may remember the "Master Class" scratchbuilding projects he used to host on MyLargescale.com. Now Fletcher has written a book.

The book is called "Australia's Colourful American Locomotives" and is available for pre-order from Light Railway Research Society of Australia Inc (LRRSA). Pre-order price is $102 AU, which amounts to roughly $77 American. Production will be limited to 500 copies only, and delivery is scheduled for some time after mid-July.

This is a large "coffee table" style volume of 160 A-3 sized pages, each in color. The book covers the architectural origins, styling and liveries of Australia's US built locomotives from 1876 to1920. Fletcher says that the book is equally relevant to the locomotives on US soil and other export destinations. A preview of the book is available on Youtube at:
https://www.youtube.com/watch?v=Jfkb67KjQaE

Judging from that preview, the book will be filled with Fletch's exquisitely detailed renderings of early Baldwin designs.



Swift Sixteen Tram

Text and Photos by Steve Ciambrone

I had been aware of the Swift Sixteen brass Tram Body Kit for a while before I finally decided I really wanted to build it. The kit builds into a typical steam tram that would have been run in England and even in the United States in the late 1800s and early 1900s, though in the States they were called steam dummies. The design would be at home anywhere in the world since they were exported to most places that had tram or trolley networks.

The Swift Sixteen Tram Body Kit is designed to be used with the Roundhouse Bertie Power Unit (**Photo 1**), which can be purchased from Roundhouse Engineering directly or through your favorite dealer. I purchased the tram body kit with all the available options, which included the chimney extension and the cow catcher. The chimney extension simply gets inserted into the Bertie stack and provides the needed height to raise the chimney enough to clear the tram roof and condenser assembly. I just really liked the shape of the cow catcher, and it was a brass casting which I certainly prefer.

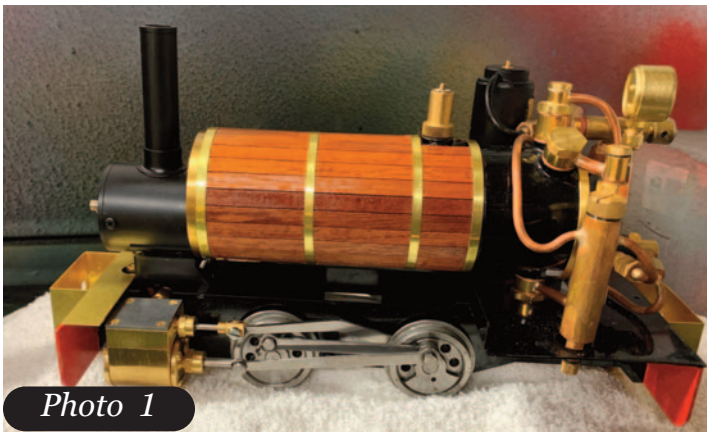


Photo 1

While the steam tram kit is designed for the Bertie chassis it can also be adapted to a similarly sized engine or even a self-made steam power chassis. Also, for those who may not be into live steam, an electric power chassis of almost any configuration could be used to power it either on track or battery power. It would be up to the modeler to determine what best suited their tastes.

When I received the kit from Swift Sixteen it arrived in a nicely packaged box and no damage was done during shipping. The contents as you would expect is many etched sheets of brass. The etching was excellent and of high quality. As you can see in **Photo 2**, the side and end panels have large re-

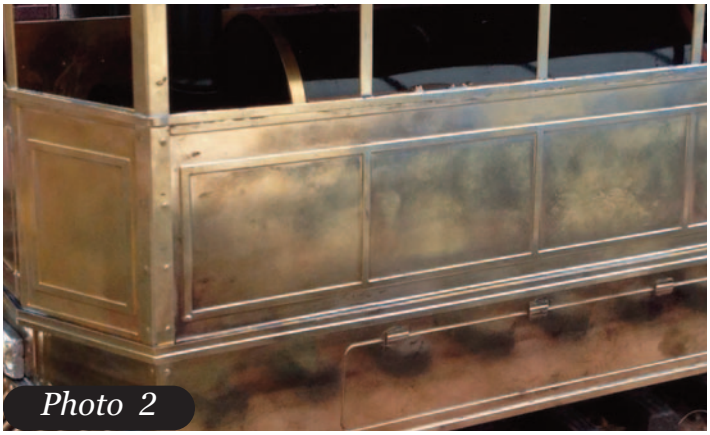


Photo 2


Photo 3

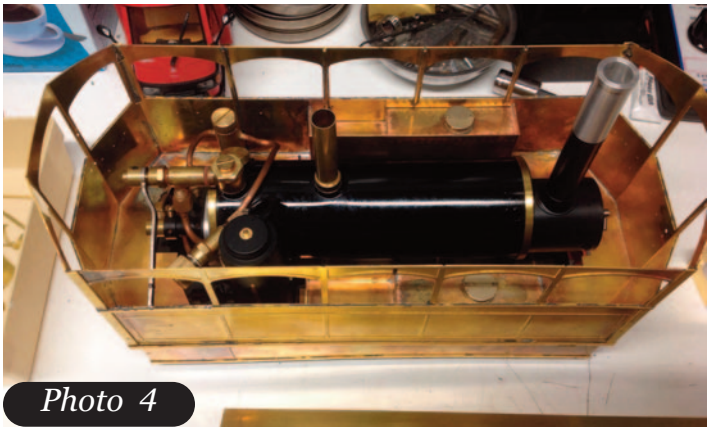


Photo 4

cessed areas which are etched to produce their depth relief, not created by building up an overlay or soldering on strips of brass to generate the effect. The large etched areas were done with such a smooth and even thickness it was quite amazing; they must have their etching process quite refined to produce such good results. Other parts were well packaged in separate bags and well organized.

The assembly directions were available for download on the Swift Sixteen website. I initially printed them out, but during the build I referred more to my computer for the directions since I could increase the size of the pictures and see more detail of the assembly photos. I found the assembly instructions very useful with clear instructions, helpful tips, and good photographs.

Assembly is started with the inner tanks to the foot plate or chassis. First I made a crude rivet press with my drill press and a rounded off center punch, and pressed most of the rivets out at the provided half-etched rivet locations in the brass sheets. Really my press was not all that good, so I only did enough to satisfy myself. Most of the kit was soldered with lead free soft solder using an acid flux with an 80 watt soldering iron; later in the build for the smaller parts I used JB Weld two part epoxy with good results.

After the tanks are soldered to the chassis, the sides and ends are soldered on, this sets the square of the model. The skirts are then soldered on, and now most of the main assembly is completed. I continued on with the smaller detail parts and some of the reinforcement pieces; the assembly is quite stiff and strong.

I had ordered the Bertie Power Chassis before the plague of 2020 and was given a delivery date, but of course there was a delay of a few months due to the stay at home orders in the UK. Additionally I ordered some of the Bertie upgrades -- the pressure gauge, and Roundhouse's water top up system which also includes the water sight glass (**Photo 3**). After some delay, I received the Bertie chassis, so final fitting of the Bertie chassis was carried out (**Photo 4**). Some trimming of the inside tram body footplate was done, and with the extra clearance provided, it all fit together really well. The Bertie power chassis is attached to the tram body by the front and rear center buffer coupling bolts which is easy to do. Access to steaming controls with the body attached is not an issue, since a section of the roof is removed when the condenser is lifted off, which provides adequate access.

I made a few other additions to the Bertie Chassis: fiberglass cloth 1.5 oz weight around the boiler, mahogany strips, and brass boiler bands to act as boiler cladding, which is visible in **Photo 1**. I saw this done on prototype steam trams and liked the way it looked. I love the look of mahogany wood after its been given a clear polyurethane coating; it


Photo 5

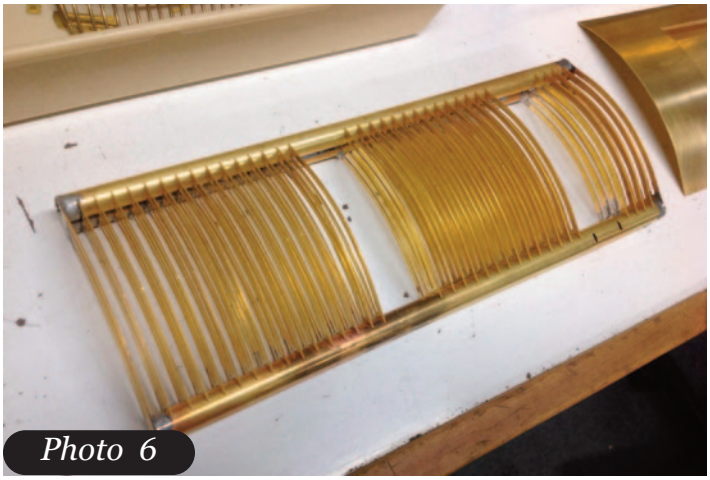


Photo 6

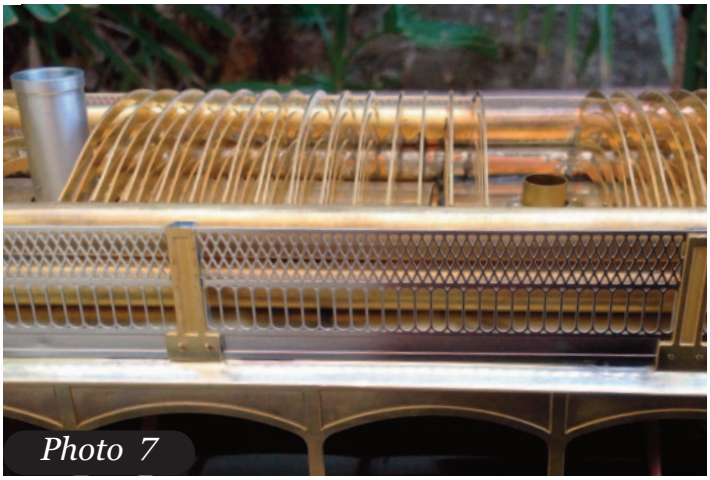


Photo 7


Photo 8

really brings out the natural color and grain of the wood.

The tram kit construction was completed with the final joining of the main body to the roof (**Photo 5**).

Looking at the condenser on the roof (**Photo 6**), and all the pieces involved, most would think it would be a difficult part to assemble, but it was not. The condenser assembly is designed in a manner so that the main tubes and ends are first soldered. After the main portion of the condenser was soldered, I simply stood it up on end and then with a spacer for each cross tube piece soldered them to the outer tubes. I had pre-marked where the safety valve and chimney were going to go and left space for them to protrude through the condenser assembly. Very little clean up of the solder was needed. The roof section was then glued on.

The roof fencing surrounding the condenser is made with brass uprights and the panels are photo etched nickel silver. I thought these looked too good to paint over so I left them in their natural state (**Photo 7**).

I painted the steam tram body with a light coat of self-etching primer to give the paint a good base to adhere to the brass body material. I chose to use Tamiya British Green paint. After the paint was cured, I added yellow pin striping to the body panels, using vinyl striping which was made for me in 1/32-inch wide strips by a local sign shop. After the striping was applied, I sealed the finish with Testors clear gloss coat; this will keep the striping in place (**Photo 8**). As an added touch I made a custom brass chimney cap in my shop at home.

I added radio control to this model using an Orange 2.4 Ghz Receiver and micro servo for throttle only control. The Bertie has slip eccentric reversing, so no reversing servo is needed. I used my RCS small pocket size transmitter for control.

Running the model was just like running any other Roundhouse live steamer --it ran great, but this one has a tram body which is rare, and I built it myself. I found it started better with a full boiler if I ran it with the chimney in the rear, so I simply put the marker lights on the other end and have been running it like that. The slip eccentric is quite

Parts List

Swift Sixteen
Tram, Chimney, Cow Catcher

Roundhouse
040SEBCB-Bertie - Slip Eccentric Chassis with Boiler
GCK - Gauge Conversion Kit Bertie (for 45mm gauge)

https://www.swiftsixteen.co.uk/

https://www.roundhouse-eng.com

easy to use; when the model is stopped and the throttle closed, a simple push of the model a few inches in the direction of travel desired will start the model running.

Overall, the Swift Sixteen Tram Body kit quality was excellent, and the build was a very fun project, which was much needed during the isolation imposed during the pandemic.

A Whimsical Climax

Text and Photos by Bill Allen

Several years ago, during the closing hours of a Bay Area Garden Railway Society swap meet, I was able to score two Aster tenders, which were removed from three-truck Climaxes; both for only $20. One had the Climax truck attached.

A few years later I was talking to Jim Hadden at the National Summer Steamup and he mentioned he also had one Aster truck. I was able to swap a ceramic burner for the truck and now had the start for my project. Jim suggested a whimsical version of the B Climax in 7/8ths-inch scale. He sent me a drawing he had (**Photo 1-1**), but when I drew things to scale, I felt the Aster trucks were too small, so I decided to do it in 1:20.3.

The plan was to accentuate certain aspects of the 18 ton Climax and to use Walschaerts gearing rather than the Stephenson gearing used on the early Climaxes. I wanted the outside gearing of the Walschaerts as it adds another movement to the cylinder motion.

The most difficult part of building a Climax is the trucks with their skewed bevel gears which allow the drive pinion gear and shaft to be offset from the driven gear center, thus allowing the drive shaft to pass over or under the first axle and drive the gear on the second axle. I didn't have the expertise or the desire to machine the gears so the Aster trucks worked perfectly for me. I later found out that scale Climax bevel gears are now available from Shapeways.

Whimsical Climax Series

- ➲ Part 1 - Frame & Cylinders
- Part 2 - Boiler
- Part 3 - Chassis
- Part 4 - Cab & Bunker

FRAME

I started with a drawing of the frame with the cylinders and gears laid out (**Figure 1-1**). I needed a right-angle gear set so I found a nice ring and pinion gear set on eBay. This coupled with a pair of spur gears did the trick. The spur gears were cut from gear stock from McMaster Carr (**Photo 1-2**).

Per the drawing, the gears were mounted in a gear box under the center crossmember (**Photo 1-3**). The frame is made from one-eighth inch flat stock with one-half inch for the rails and one inch for the crossmembers supporting the trucks (**Photo 1-4**). You may notice that one universal joint is missing. Using the Aster joint as a model, I was able to duplicate one. The joint consists of a square shaft on one end and a yoke on the other, held together with a ring. In **Photo 1-5** you can see the shaft on the right with a 1/16-inch stainless shaft going through it and two brass spacers. On the left is the yoke

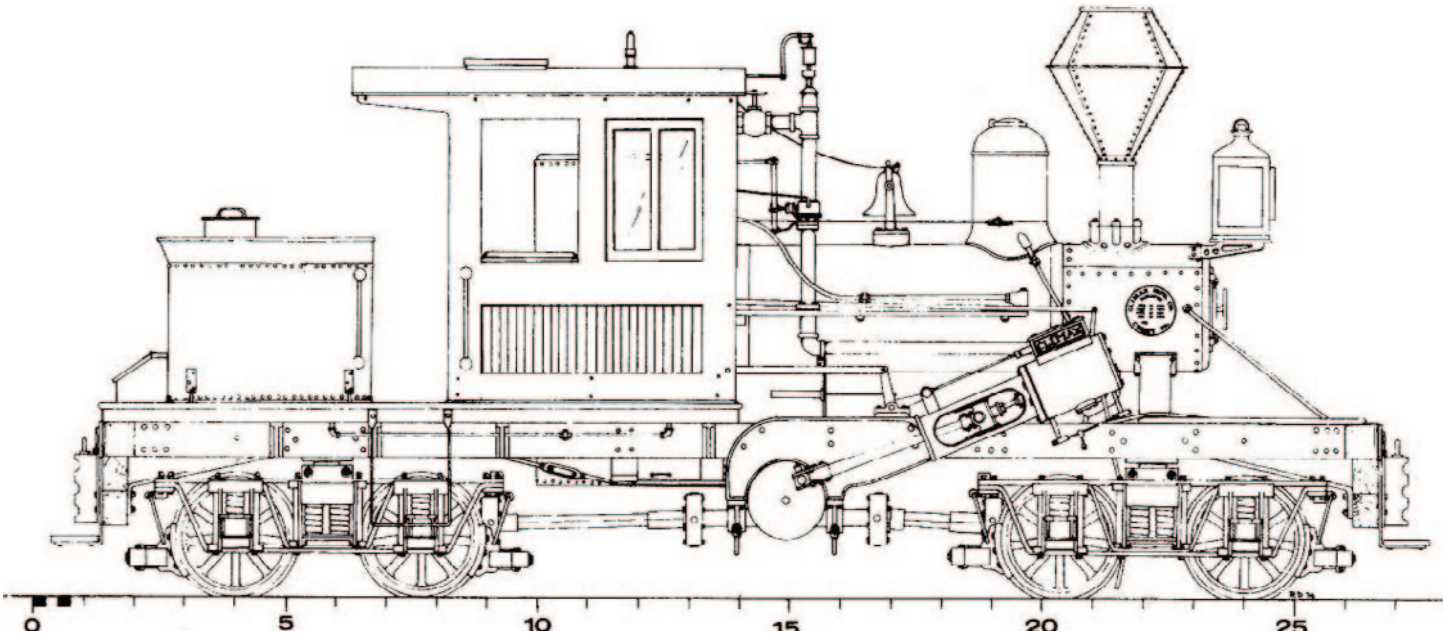


Photo 1-1

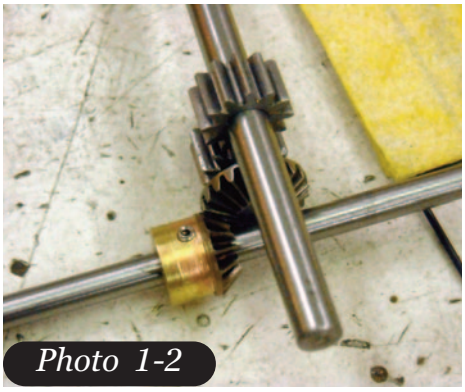


Photo 1-2

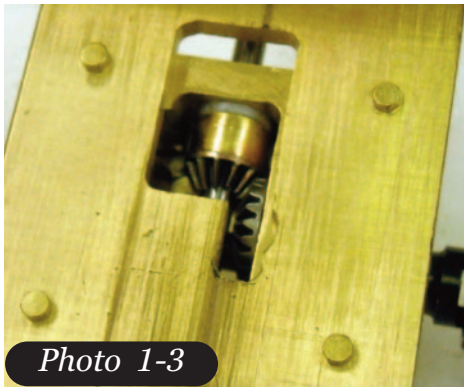


Photo 1-3

Photo 1-5

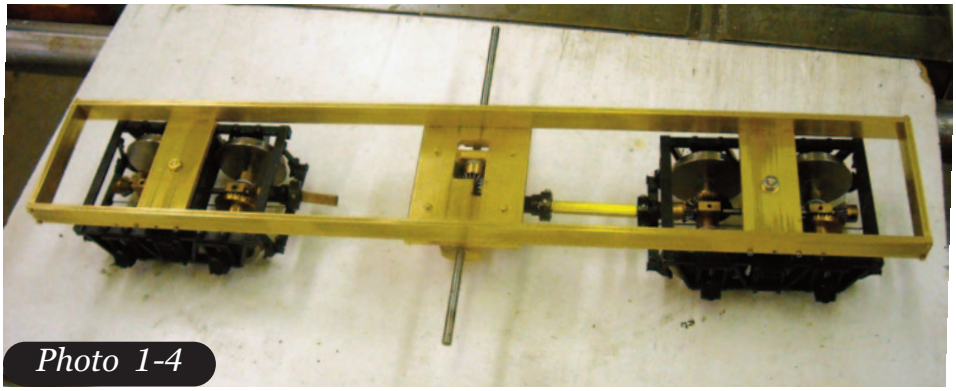


Photo 1-4

Photo 1-6

which is partially hidden by the ring. The shaft on the right will be permanently fixed to the ring with the shaft going through the square shaft and the two 1/16-inch holes in the ring and then the shaft will be peened over on both ends. The ring is then attached to the yoke with 0-80 stainless socket head screws. The 3/32-inch head of the screws just fits into the 3/32-inch holes drilled into the ring (**Photo 1-6**).

Because the cylinders are at a 22.5-degree angle, a separate frame is needed for them (**Figure 1-2**). I started by drawing it out with the four cylinder-mount holes along with the expansion link bracket and pivot hole.

I then printed the drawing to scale and on a piece of 1/8-inch x 1-1/2-inch stock, I scribed out the cuts and, on the mill, drilled out the cylinder mount holes (**Photo 7**).

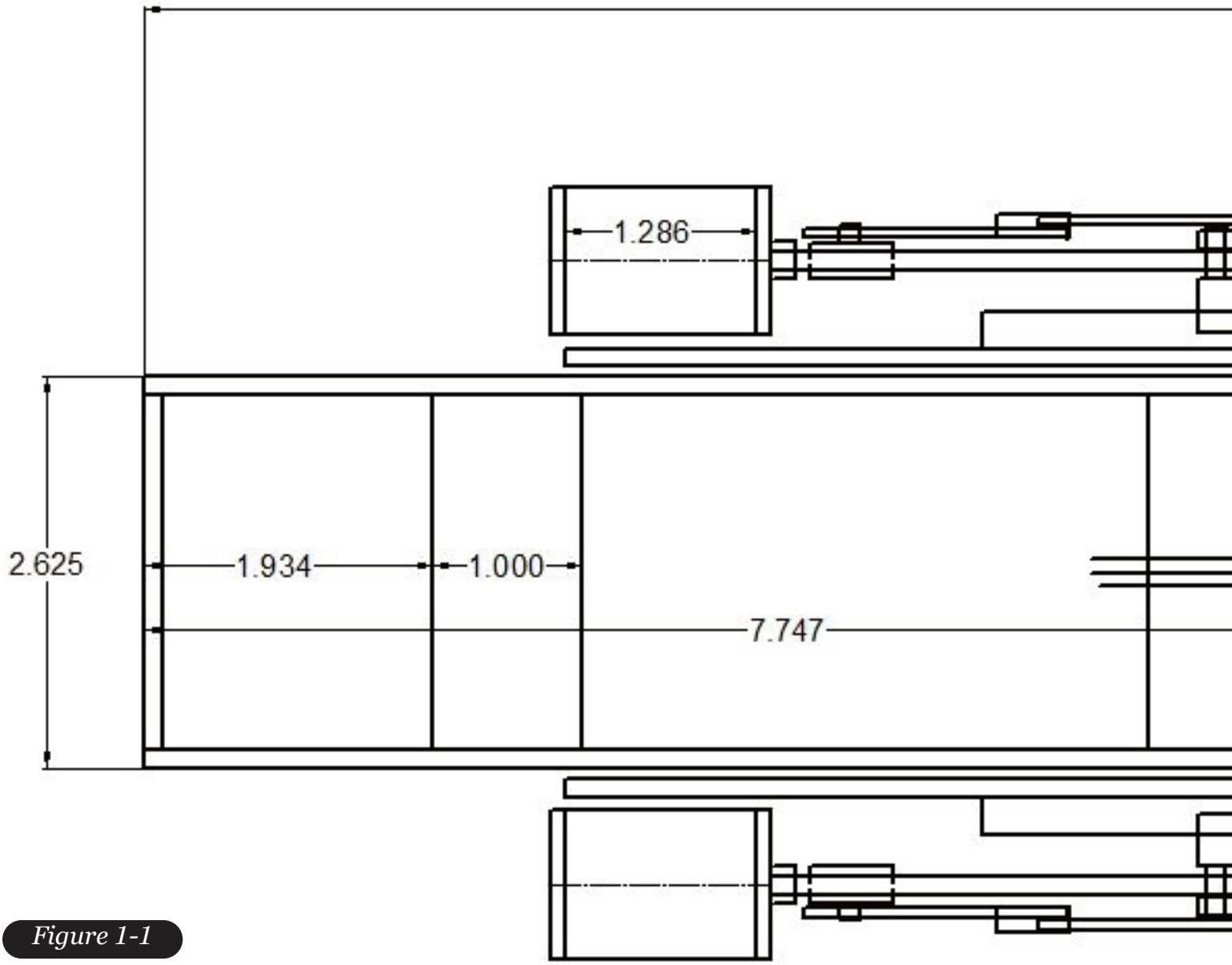


Figure 1-1

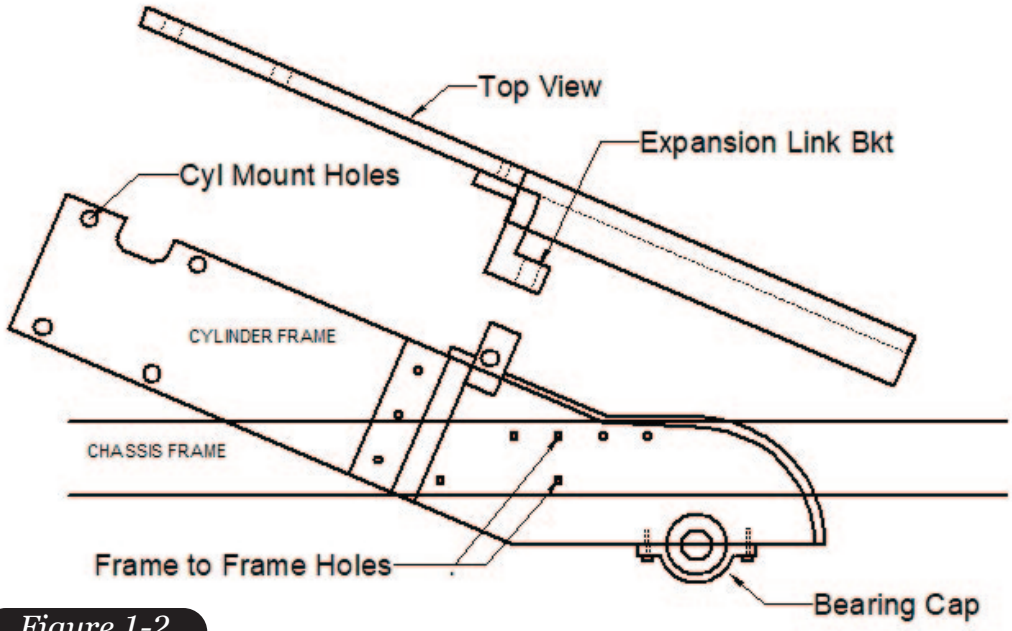
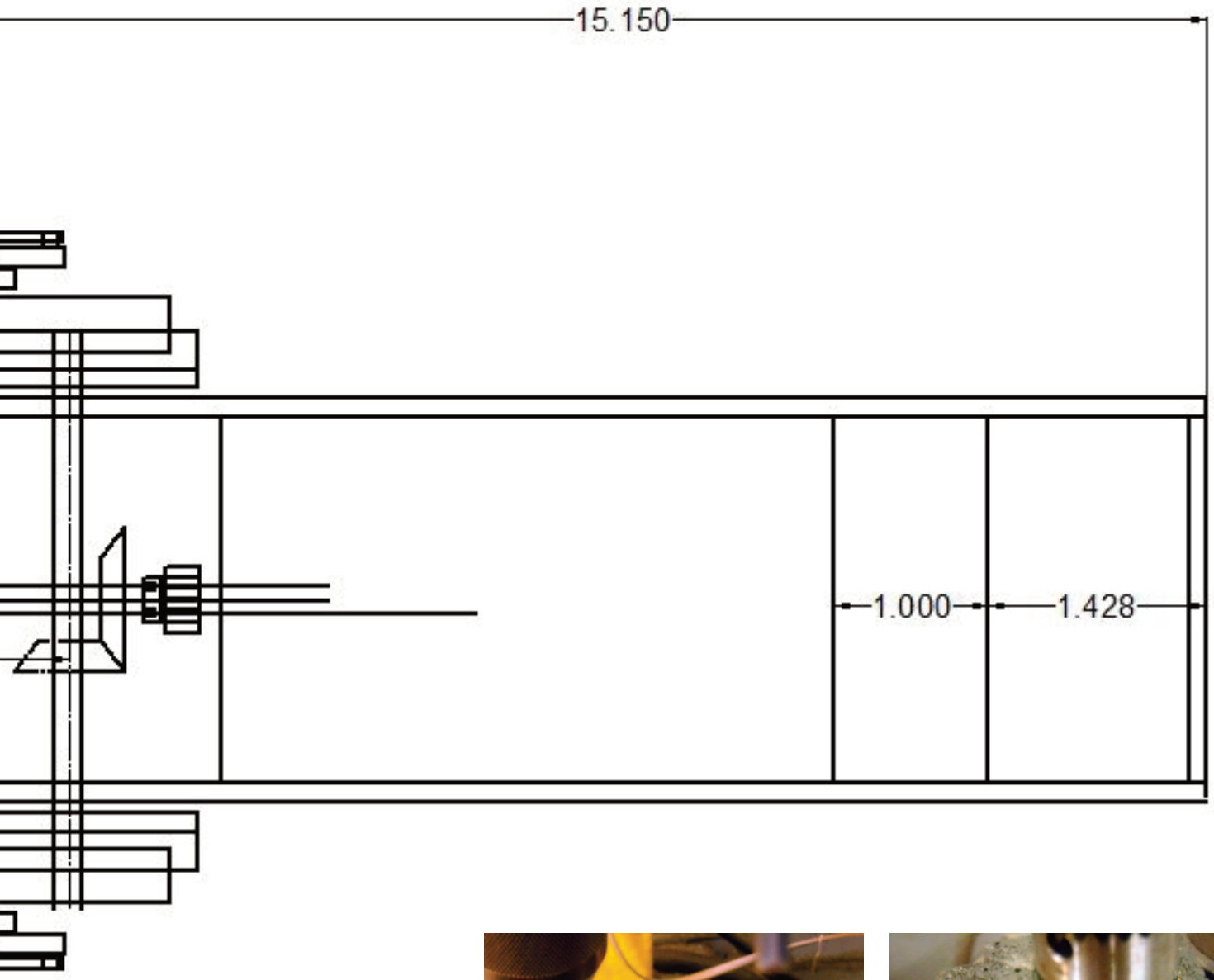


Figure 1-2

Shapeways - Climax



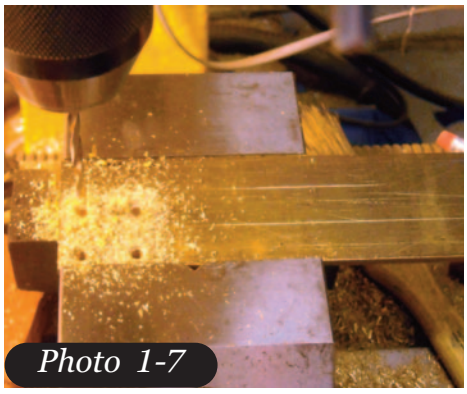


Photo 1-7

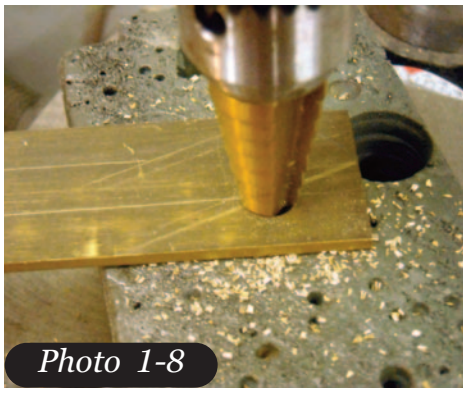


Photo 1-8

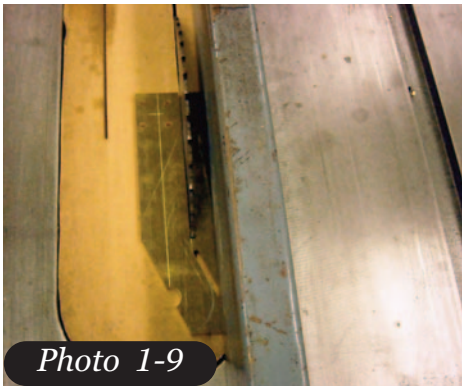


Photo 1-9

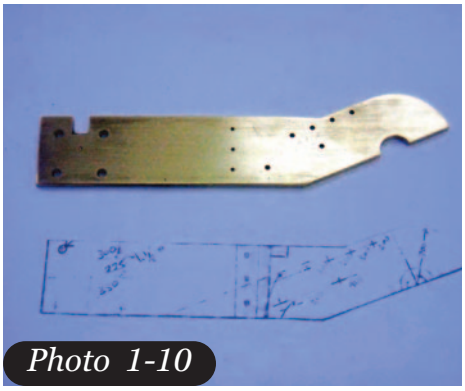


Photo 1-10


Photo 1-11

Then, also on the mill, I drilled out the crankshaft hole for the ball bearing (**Photo 1-8**). The shape was then cut out on the table saw and band saw (**Photo 1-9**). The holes for mounting the expansion-link-bracket and the six holes for mounting the cylinder frame to the chassis frame were drilled out on the mill (**Photo 1-10**). The fender was cut, bent to shape and soldered on (**Photo 1-11**).

CYLINDERS

I like to make my cylinders from square stock. It makes for nice flat surfaces for mounting to the frame and for the valve mounting. The other alternative is to use round stock and solder flat stock to it. With the Climax cylinders it was a tossup between the two but I decided to go with the tried and true method that works for me. Another way to do it is by casting or 3D printing, but stainless printed parts are very hard to machine and the brass versions have shrinkage problems. This can all be fixed by machining the parts but there is still the danger of ruining them and having to start all over, throwing out a very expensive part. This is just my opinion though.

I start with 1-inch bar stock and usually get a piece a little longer than I need so I can make extra cylinder blanks for future projects, and also because a long piece is easier to shape on the router table. I use a router with a roundover bit to shape one corner though this can be done on the mill or even with a bench sander.

I set the movable fence on the router table so that I take about 1/16-inch off with each cut (**Photos 1-12 & 1-13**).

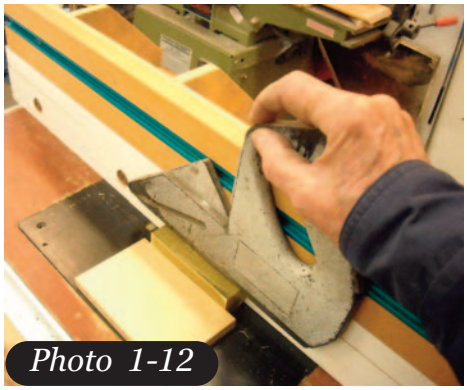


Photo 1-12


Photo 1-13

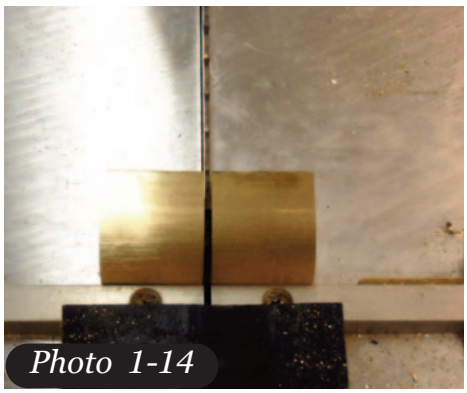


Photo 1-14

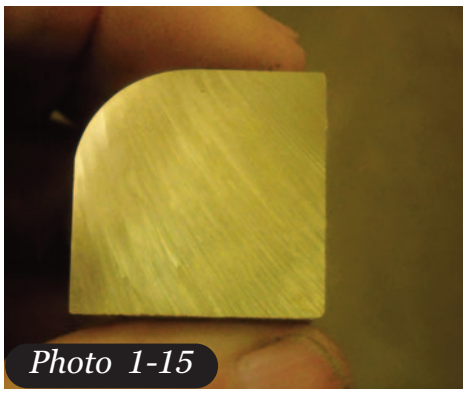


Photo 1-15

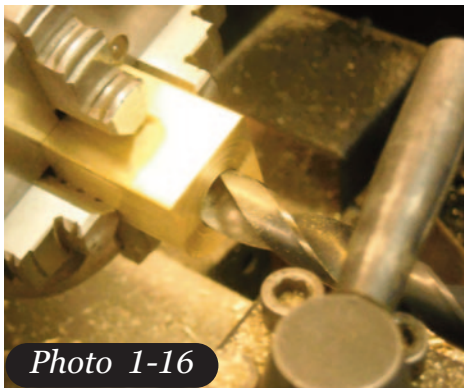


Photo 1-16

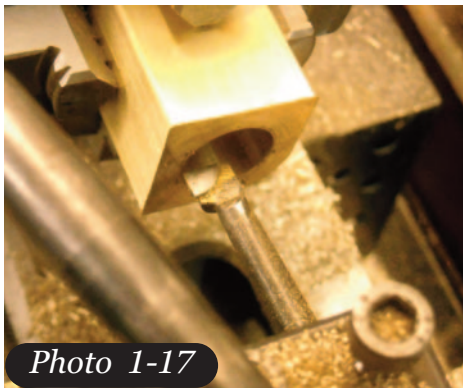


Photo 1-17

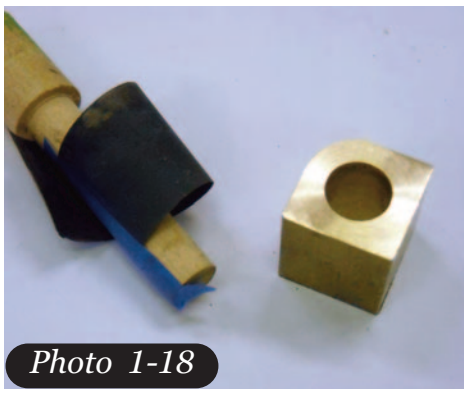


Photo 1-18

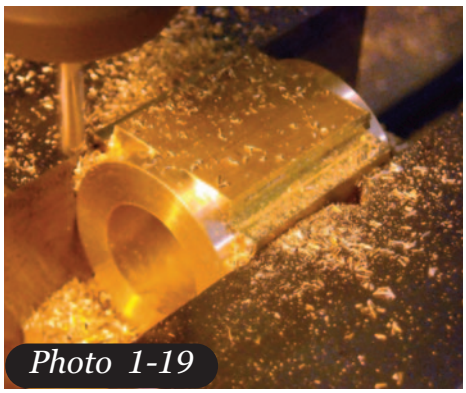


Photo 1-19

I then cut the cylinders to a little over length on the table saw (**Photo 1-14**) and now have the profile shown in **Photo 1-15**.

The cylinder blank is then set in the lathe with a four-jaw self-centering chuck. Both ends are squared off and the cylinder is trimmed to length. The bore will be 9/16-inch so I first drill it out

Photo 1-20

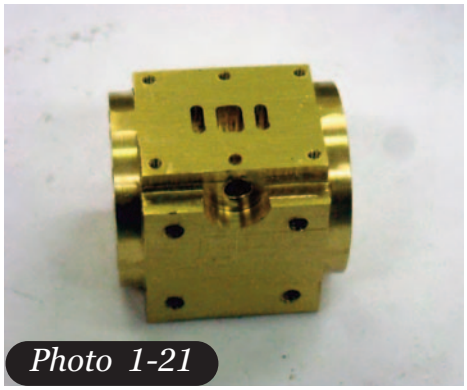


Photo 1-21

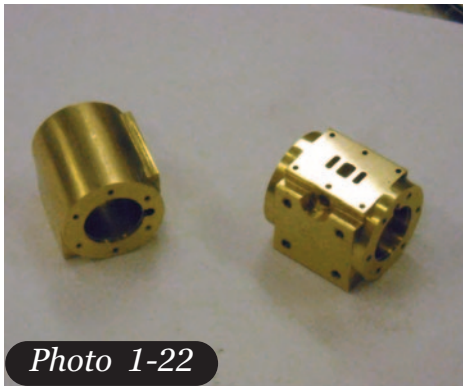


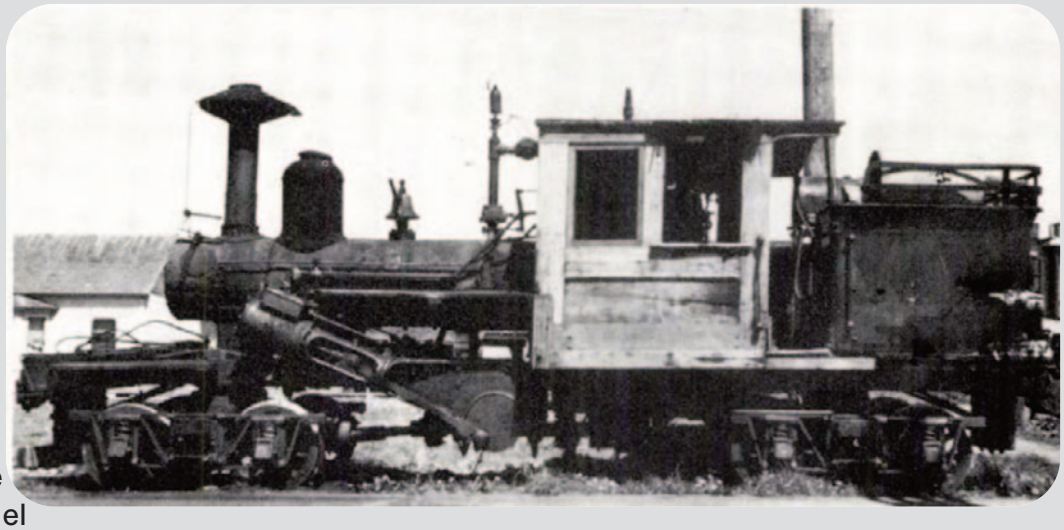
Photo 1-22

to one-half inch (**Photo 1-16**) and then bore it out to 9/16-inch (**Photo 1-17**). The boring tool makes a very nice finish but I make it a little better by wrapping a wood dowel with 600 sandpaper and mounting it in the lathe to get a very smooth finish (**Photo 1-18**). I didn't get a photo but before I finished on the lathe, I rounded off each end of the cylinder to about 1/8-inch back to set off the valve chest mounting area. Then on the mill, I cut out the valve chest sides (**Photo 1-19**) and mill out the valve ports. In **Photo 1-20** you can see the valve ports on the top of the cylinder and the drilled opening for the steam port in the front and the exhaust on the left side. Also drilled and tapped out are the cylinder head and valve chest holes.

Photos 1-21 & 1-22 show different views of the cylinders.

In our next installment we will make the T-box boiler with a ceramic burner.

History Repeating?



If you are a long time reader of *Steam in the Garden*, then this locomotive may be giving you a sense of *Deja Vu*. Back in the very early days of SitG one of our first construction series was for a small narrow gauge Climax that was based on the same photo that is the inspiration for this project — the Vest Pocket Climax by Mel Ridley. That series ran in ten consecutive issues from 1996 to 1998.

The locomotive prototype is the Hall & Hall locomotive #407. Built as a 36-inch narrow gauge locomotive, it was later regauged to standard. That is about all we know of its history based on all available research at our disposal.

Bill Allen is providing us a new approach to building this project, one that has had our readers asking for an update to the original series, especially with respect to part sources referenced in the original series that are no longer in business. The most difficult of these parts is the Skew Bevel Gear that is critical to building the Climax trucks, which will be covered in detail in a later installment.

So everything old is new again, and we have an update to the diminutive VPC now recreated by Bill's locomotive. *(.ed)*

Refurbishing the Rishon

Text and Photos by Peter Thornton

In 2019 I acquired a Rishon Mason Bogie, a model of one of the later "large bogies" which is bigger than the one modeled by Accucraft. It was built by Paul Trevaskis' Rishon Locomotive Works in Australia, and sold through Sulphur Springs Steam Models. I believe the retail price in 2001 was something like $3,000, though some of that may have been due to the exchange rate. The locomotive was reviewed in *Steam in the Garden Issue No.75 - March/April 2004*.

The prototypes were built by Mason Locomotive works in Massachusetts, based on the Fairlie design licensed from England. I understand Mason made lots of improvements to the design, and built about 147 of them in the mid-1800s.

I bought the locomotive from an estate and there was no information if it ran or was complete. However, it seemed to have potential, and I like a challenge. The cab is made from something like one-eighth inch thick plywood, and is flimsy compared with the weight of the loco (**Photo 1**). The joints had to be re-glued, a difficult task, and I ended up putting a small pin in the top corners of the front to hold the cab sides in place (**Photo 2 - arrow**).The roof had to be repainted after I finally

Photo 1

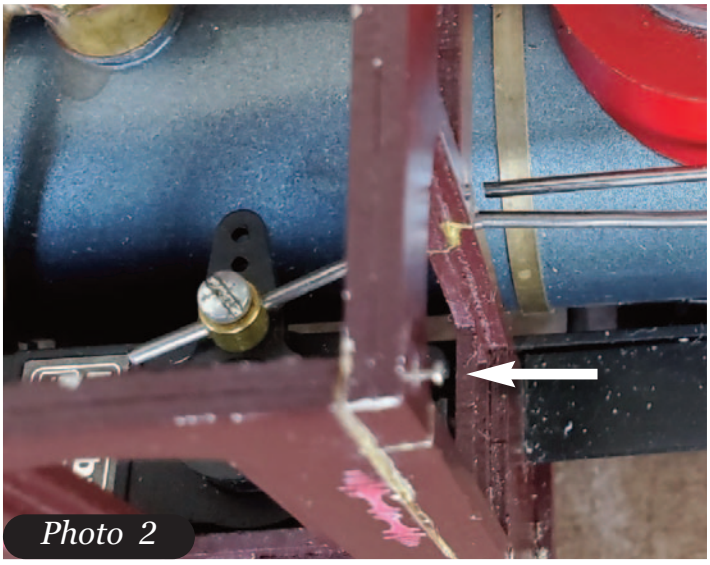


Photo 2

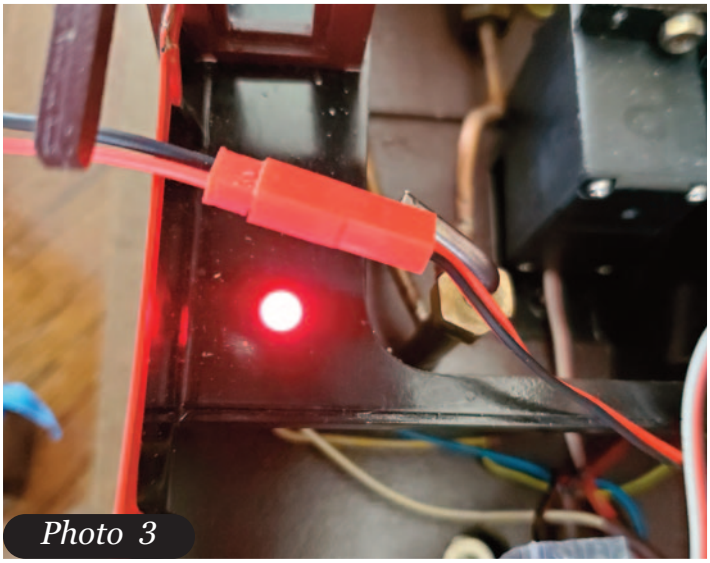


Photo 3

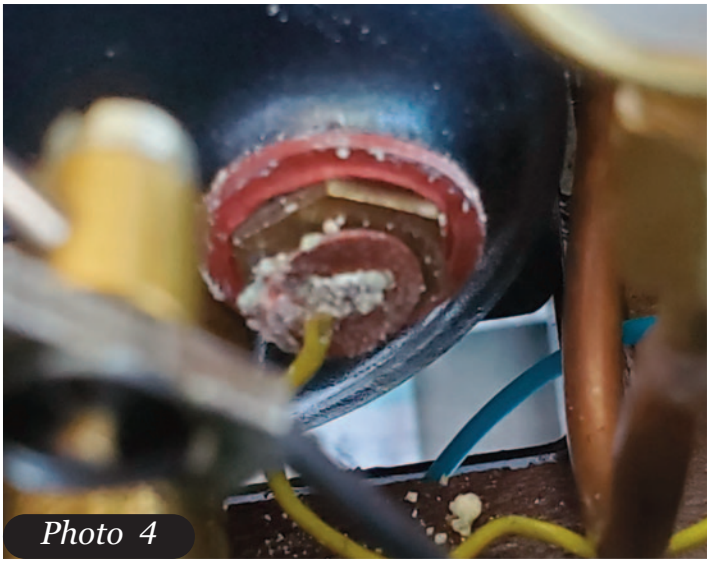


Photo 4

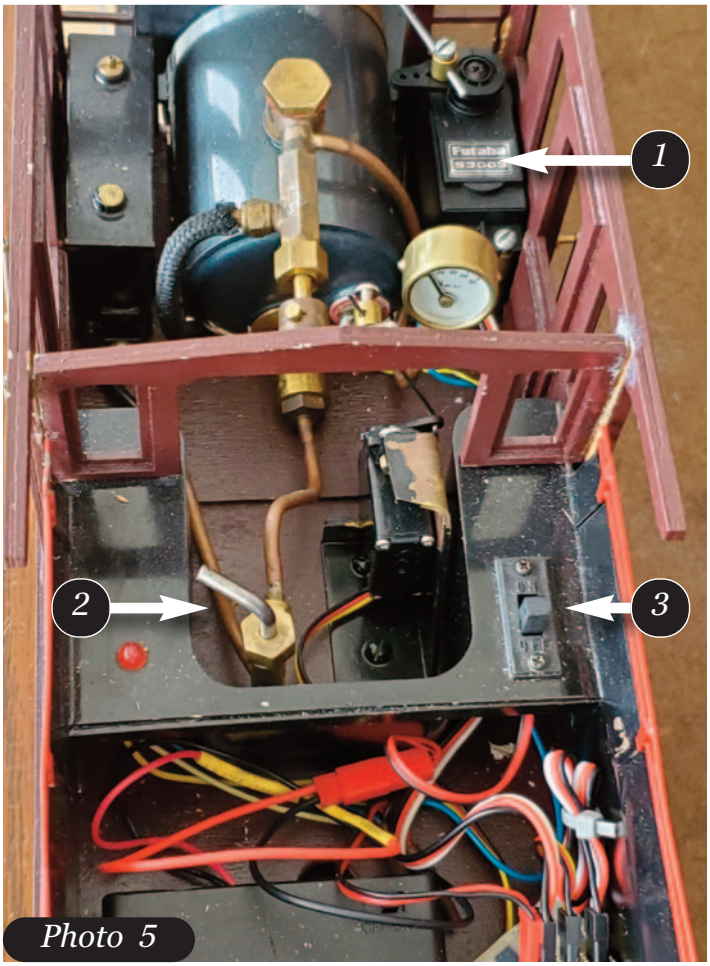


Photo 5

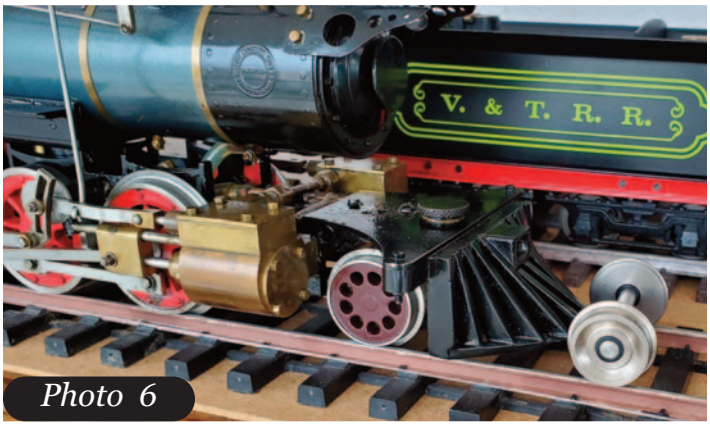


Photo 6

got it back in one piece.

The locomotive was fitted with two-channel r/c and an old transmitter, plus a "water-level detection" system, which was not the old WLDS sold in the US. **Photo 3** shows the red LED that lights up if no water is detected in the boiler. On the right is the detector which was a bit dirty when the loco arrived (**Photo 4**). A wash soon took off the crud and it seems to work as designed – although I have not run it enough to make any definitive decision about how well. If you fill the boiler, the LED goes out, which is good enough for now until I can get some more track time with it.

I dumped the radio and installed a small DSM2 receiver with a battery box, as I use an RCS transmitter with knobs instead of sticks. A pair of monster Futuba S3003 servos were fitted, and both worked on my first test – and then both promptly died. I just happened to have a new S3003 in my box, so I fitted that to the reversing gear (**Photo 5 — arrow 1**), which is quite complicated on this loco. I figured the throttle didn't need so much, so it has a small Hitec servo driving it. Both work fine.

Photo 5 shows the inside of the cab, with the new throttle servo in the center and the gas tank on the left of the boiler. The gas valve, however, is at the back outside the cab (small metal lever next to the water LED (**arrow 2**)) which is unusual compared with current models. On the right side tank is the battery on/off, (**arrow 3**), and there is a lift-out platform over the back of the tank – in this case

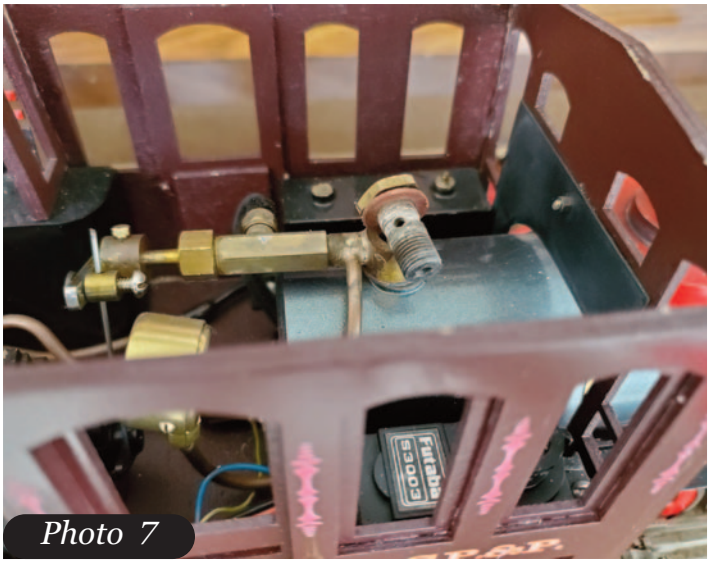


Photo 7

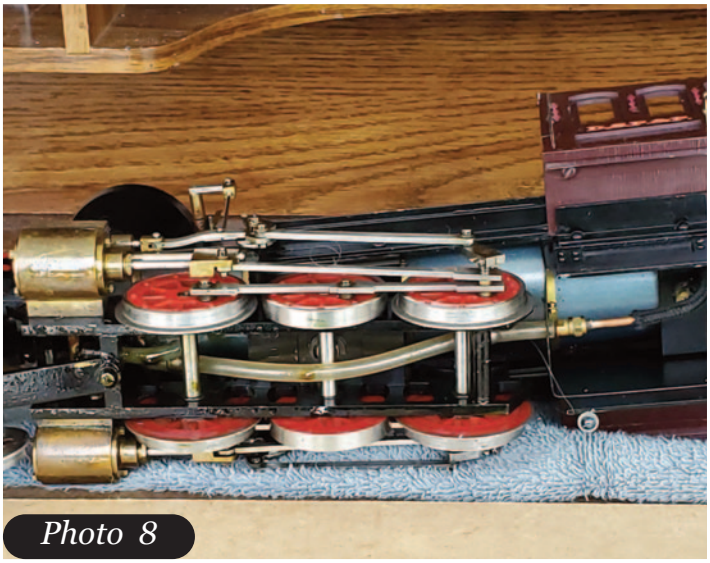


Photo 8

removed so you can see the receiver and wiring. I cut and fitted a wood log load, only to be told by a friend that they were coal burners. I am in the process of making a new rear cover with a speaker mounted under it, as I have one of RCS's five-chime whistle modules, which are very effective in an r/c locomotive like this. It will be covered with 'coal'.

Between the pilot wheels in front is a lubricator oil tank with a filler plug on top, which is very nicely done and unobtrusive. The small wheels shown in **Photo 6** in front were an experiment. The pilot wheels are prevented from swinging by the oil tank, but as the pilot is attached to the power truck which swings anyway, the locomotive spec says it will handle a three-foot radius. (The small wheels went back into the wheel stash.)

The boiler is fitted with a Goodall valve, which has another piece of silicon tubing. As I don't have spares yet, I resisted the temptation to try it. The safety valve seems to work. It might be leaking and thus I'm not getting enough steam pressure. The domes just lift (or fall) off, as I discovered when I turned the loco on its side.

Finally, the back of the boiler has a fitting for the throttle and pressure gauge and presumably for filling the boiler. The bolt in it is actually a banjo bolt. I assume Rishon fitted that so the bolt would not be short – the throttle take-off is right at the top, as you can see in the cab picture (**Photo 7**).

Having a moving power truck makes for some interesting features. The throttle valve feeds a pipe down under the cab and a long silicon tube carries the steam to the cylinders (**Photo 8**). (No super-heater on this engine!)

The exhaust is also a silicon pipe feeding up into the smokebox (**Photo 9**). I was expecting problems with the pipes as I imagine they must be quite old, but so far, so good.

The rear truck literally fell off on one occasion, but it turned out to be nothing more than a loose

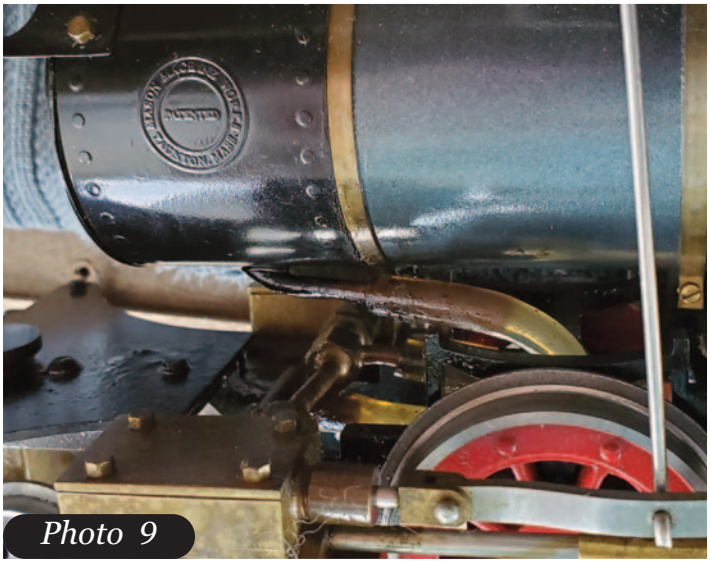


Photo 9

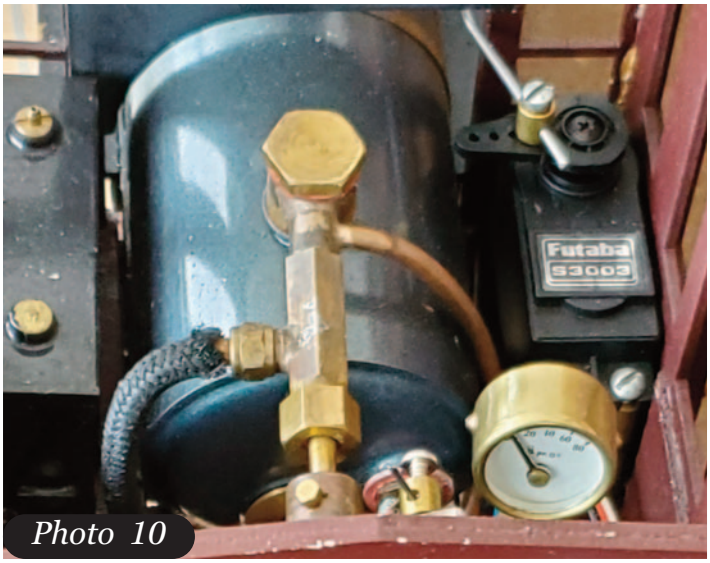


Photo 10

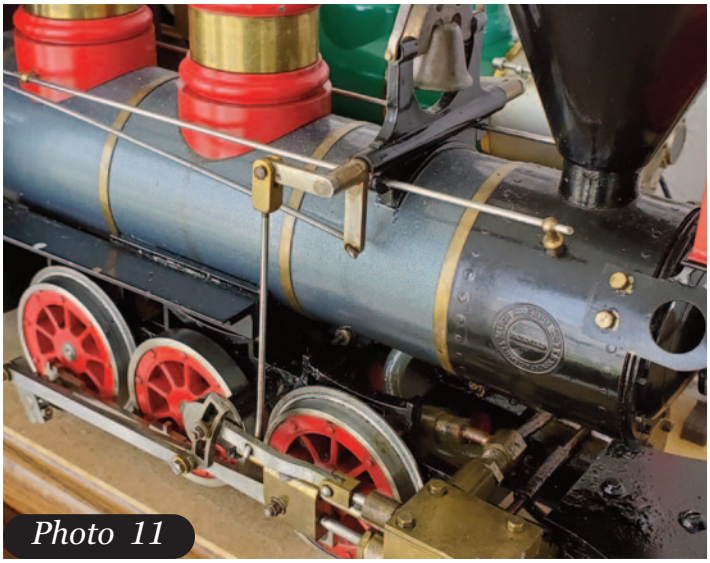


Photo 11

pivot screw. It is difficult to reach underneath as i is under the center axle, but it is easily accessible inside the cab/tender.

If you are familiar with the Mason Bogies, you will be aware that the reverser has a shaft over the top of the boiler to carry the motion to the other side's valve gear. On **Photo 10** you can see the rod from the servo in the cab, and the connection to the valve gear in **Photo 11**.

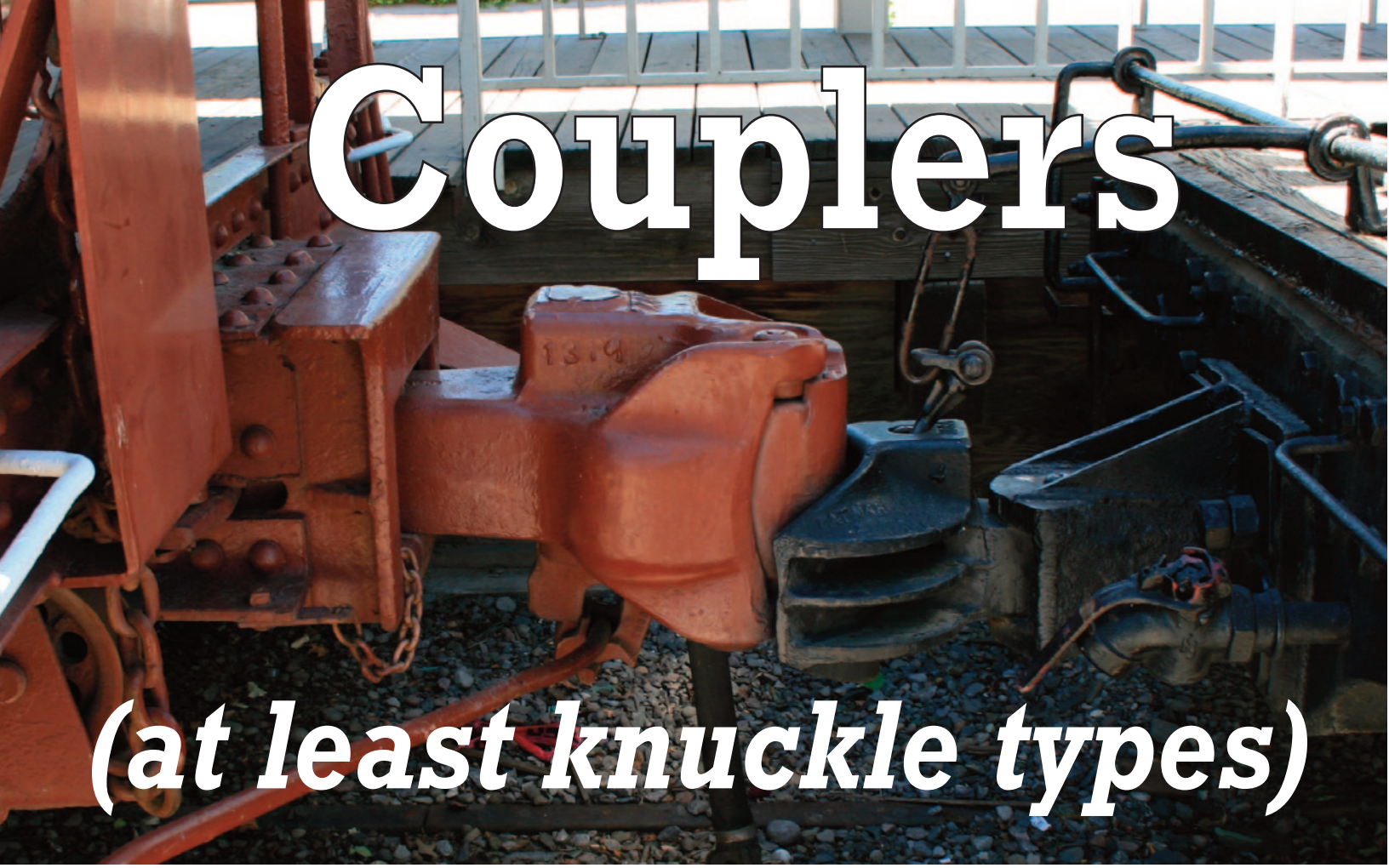
Unfortunately, the locomotive arrived last year just as the pandemic started, so I ran it on rollers to confirm things were operating, and then had two short runs last March just before the lockdown. It was a blustery day and I think the wind was sucking the heat out of the steam, as it did not seem to want to run fast.

With the editor's permission, I'll post an update later this year when I have had my vaccination shots.

Above - First steam run on a railway before COVID lockdown.
Below - Original Ad from SitG Issue #59 - April/May 2001

Couplers

(at least knuckle types)



Text by Kendrick Bisset
Drawing: Scott E. McDonald

Above: Standard Gauge coupler (l) coupled to a 3/4 Narrow Gauge coupler (r), of the Southern Pacific Narrow Gauge #8 on display in Sparks, NV. Photo by Scott E. McDonald

A project for a standard gauge boxcar on narrow gauge trucks (as on the East Broad Top Railroad) took a side track (branch line?) when a question arose about the size and height of the couplers. For this application, we are only dealing with knuckle couplers. This discussion will not include link and pin, chopper, three-link, chain and buffer, screw and buffer, or other couplers.

There were many early designs of "automatic" couplers, and few were compatible with each other. The design by Eli H. Janney, first patented in 1873 with additional patents in 1879 and 1882, became the basis of the standard approved in 1887 by the Master Car Builders (MCB) Association. Congress passed the Railroad Safety Act in 1893, requiring use of "automatic" couplers and air brakes, among other items, by 1898. This was extended to 1900.

By that time, nearly all cars subject to interchange had knuckle couplers, but maintenance was a headache because the internal parts were not interchangeable. In 1916, the "D" coupler was approved, with standardized internal parts to ease the maintenance issues. The overall shape, defined by the contour (the shape looking down on the coupler), was well established. Early couplers had a 9-inch high (minimum) knuckle; 11-inch high knuckles were mentioned in 1919, but not required – yet. Thus, early couplers looked smaller than later ones, but they were still able to couple because the contour had been standardized since 1887. In 1918, the "No. 10" contour line was approved, but it could still couple with the MCB contour couplers. The Standard "E" coupler was approved in 1930; apparently, this required the 11-inch high knuckle, and used the "No. 10-A" contour. The new contour apparently defined a bit more of the end of the guard arm – the "thumb" which prevents the coupler from sliding sideways and uncoupling.

To be clear, most of the outside shape behind the contour line was not part of the standard. Over time, the outside width did change to increase strength, and there were internal improvements, but the newer designs still had to couple with the older couplers.

Figure 1

The mounting height of the coupler above top of rail had also been standardized, apparently since 1887, at 34-1/2-inch for empty standard gauge cars. Which leads to a discussion of narrow gauge couplers.

The railroads in general were reluctant to spend lots of money to comply with a Federal mandate if it could be avoided. Many carriers tried to point out that they operated entirely within a state, and so were not an interstate operation. Courts eventually dismissed this argument, but even short lines found they had to change in order to remain part of the larger railroad network. This, though, did not apply to narrow gauge railroads, so link and pin couplers persisted. There are pictures of EBT standard gauge locomotives with knuckle couplers for standard gauge cars, but link and pin couplers for the narrow gauge. Eventually, even the narrow gauge common carriers were required to convert.

To start, a 34-1/2-inch coupler height on a narrow gauge car would place the coupler above the car floor, unless the floor was raised higher than required to clear the trucks. Since narrow gauge cars would not need to couple with standard gauge cars (with the later exception of the instigating project for this discussion), there was no need to meet the standard height. Based on scaling pictures, and a few dimensioned drawings of narrow gauge rolling stock, it appears that a number of three-foot gauge railroads mounted their couplers at about 26 inches, center line to top of rail.

A great deal of effort was expended to arrive at this tentative number, when a check of the Code of Federal Regulations specifies the height for standard, three-foot, and two foot gauges. From 49 CFR 231.31, three-foot gauge couplers must be between 26 and 23-inches above top of rail, and two-foot gauge must be between 17-1/2 and 14-1/2 inches. Railroads with other gauges greater than two foot must apply to the FRA for approval of coupler height.

With lighter equipment on the narrow gauge, many railroads decided to use 3/4 size couplers. Several of the major coupler manufacturers offered this size, in part to provide smaller, cheaper couplers for overseas railways. From pictures, it appears that the D&RG used full size standard gauge couplers on their narrow gauge equipment, although mounted about 26-inch above top of rail. Since the D&RG/D&RGW had to equip their standard gauge stock, it would seem to make sense that they would maintain only one size of coupler for their entire system. Early 3/4 size couplers as used on the EBT would have had knuckles 3/4 of 9-inch, or 6-3/4-inches high, but probably by 1920, 8 1/4 -inch (3/ of 11-inch) would have become common. (**See Lead Photo**)

Summarizing the above, there were two sizes of "standard gauge" couplers, (**Figure 1**): early (until around 1915?) with a knuckle 9 inches high, and later with an 11-inch knuckle. The width of the mating surfaces remained about the same at around 12-1/2-inch to 13-inch. There were also two varieties of 3/4 size couplers, used by many three-foot gauge railroads. These two varieties would have 6-3/4-inch high knuckles (3/4 of 9-inch) or 8-1/4-inch high knuckles. Again, the width of the two varieties would be about the same at around 9 -3/4-inch. From photos, it appears that many Colorado narrow gauge railroads used full size ("standard gauge") couplers.

The next question is the type of coupler to use. I have liked Kadee couplers for a long time for my HO models, so when I started in 1:20.3 modeling, Kadee was the obvious choice. My early equipment was Bachmann, and their couplers were obviously too large, and mounted too low. Bachmann also mounts the couplers on the trucks; my experiences

in HO suggested that this is not a good idea. Kadee makes two sizes of "large scale" couplers, so a couple of samples were tried. The "G scale" couplers seemed too big for the narrow gauge Bachmann cars, so my equipment has used the Kadee "Gauge 1" couplers. However, the 'standard' Bachmann cars (as opposed to their Spectrum line) are smaller than 1:20; perhaps 1:22 or 1:24, so the "Gauge 1" couplers seemed more appropriate.

The three couplers of interest are:

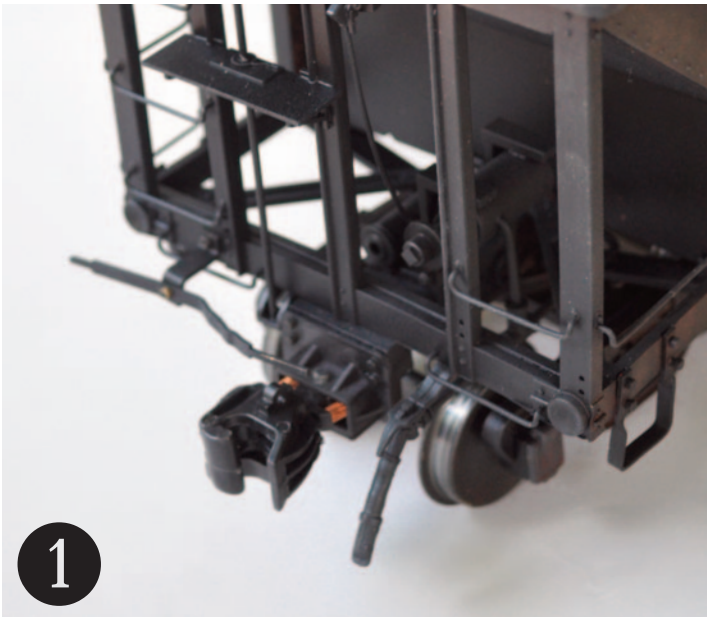
1. Accucraft, which appear to be 1:20.3 scale "standard gauge" couplers, probably appropriate for D&RG and other Colorado narrow gauge models, as well as (of course) standard gauge models.
2. Kadee "G scale", which are listed as 1:22.5 scale, and are about the right size for a "standard gauge" coupler in that scale, although the height is close to a scale 26" for three foot gauge models in 1:22.5
3. Kadee "No. 1 scale", which are listed as 1:32 scale, and are about the right size and height for "standard gauge" 1:32 models.

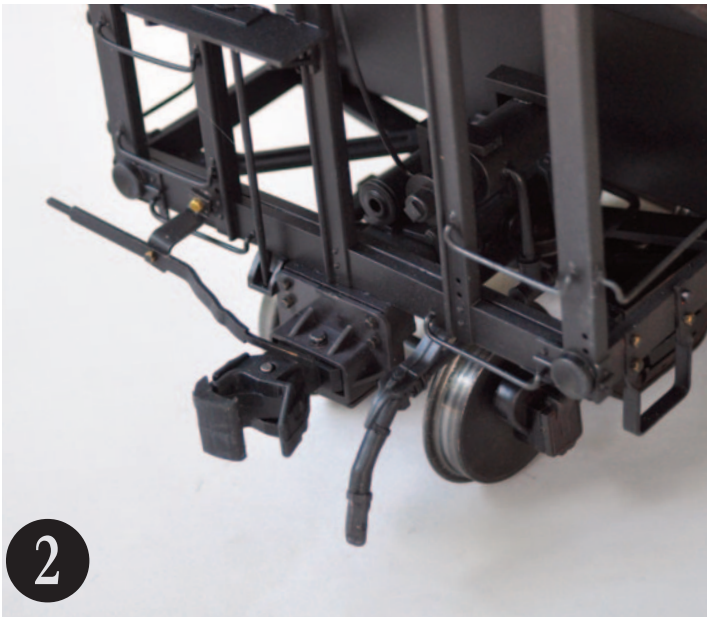
Accucraft sells a "1:29" coupler, which would be about 7% undersize for a 3/4 size 1:20.3 coupler. However, it turns out that these are the same size as their 1:20.3 coupler (and will couple with that coupler). Thus, there are only three couplers to consider.

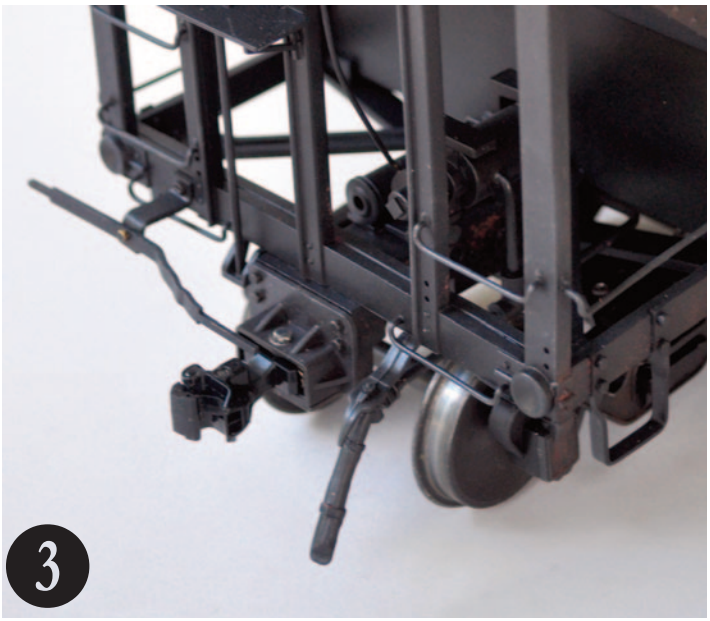
The Accucraft coupler has no constraint on mounting height, so can be used for standard or narrow gauge equipment without modification.

The Kadee couplers have an uncoupling pin and therefore a defined mounting height. If the coupler is mounted lower, the uncoupling pin must be cut off. With higher mounting, the uncoupling pin will be ineffective; while cutting it is not required, the uncoupling pin can be cut off without affecting the operation of the coupler. As an aside, I am not aware of any live steam operators who use the remote uncoupling feature of the Kadee couplers, so the uncoupling pins are probably not needed anyway. (Beware: the uncoupling pins are hard steel, and a good quality heavy duty diagonal cutter is required. I used an eight inch Klein alloy steel diagonal pliers to cut my pins.)

So, what size to use for 1:20.3 3/4 size couplers?







Ideally, that size would be a 1:27 scale "standard gauge" coupler. The available choices are 1:32 (about 15% undersize), or 1:22.5 (about 20% oversize). I had bought and installed 1:22.5 couplers, and had cut off the uncoupling pins. I did try installing a 1:32 coupler, and the small size in comparison to the car led me to leave the larger couplers in place.

Installing Kadee couplers on Accucraft EBT cars is surprisingly easy. The mounting arrangements of the Kadee #1850 couplers (or #789 or #835) are very similar to the Accucraft couplers that are installed on the Accucraft EBT equipment. The Kadee hole needs to be slightly enlarged; a #5 drill can be used by hand to ream the hole to fit the Accucraft boss. Otherwise, the Kadee coupler and springs drop right into the Accucraft pocket.

Finally, the two Kadee couplers will couple with each other (assuming, of course, that they are installed at nearly the same height). The larger Kadee will also couple with the Accucraft coupler, but not the smaller Kadee.

Sources:

Rich Wickett, through the Friends of the East Broad Top

American Society of Mechanical Engineers, The Janney Coupler, #267 in the series Historic Mechanical Engineering Landmarks

Master Car Builders' Association; The Car Builders' Dictionary, 1909 Edition.

Master Car Builders' Association; The Car Builders' Dictionary, 1916 Edition.

Master Car Builders' Association; The Car Builders' Dictionary and Cyclopedia, 1919 Edition.

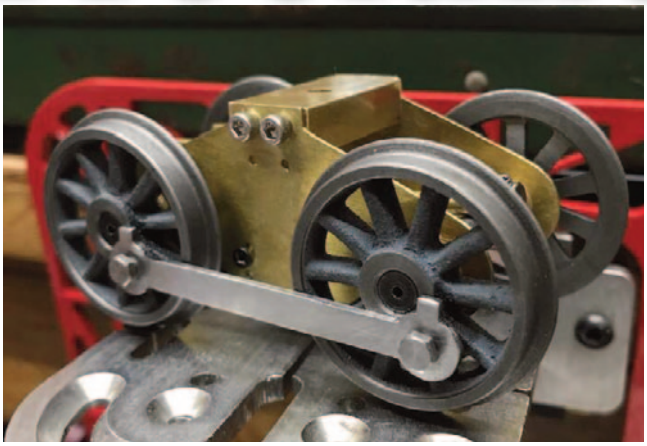
Association of American Railroads; The Car Builders' Cyclopedia, 1946 Edition

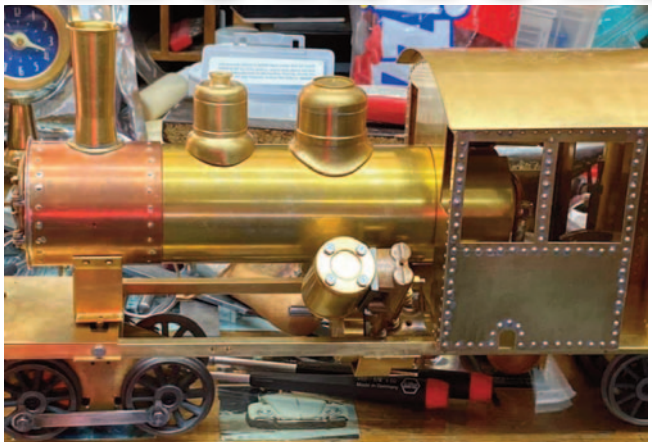
Code of Federal Regulations, Title 49 Parts 200 to 299, Revised as of October1, 2012

George Hilton; American Narrow Gauge Railroads, Stanford University Press, 1994

Elizabeth and Carol Mulina; Quick Pic Book East Broad Top Combine 14
Rick Blanchard and Tim Mulina: Quick Pic Book East Broad Top 3 Bay Hoppers

Freelance Heislers

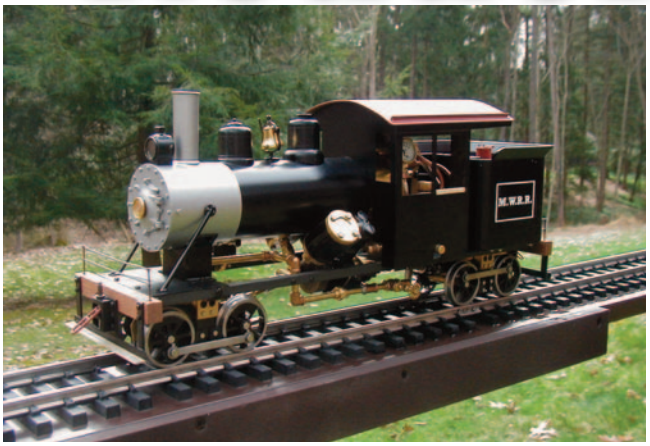




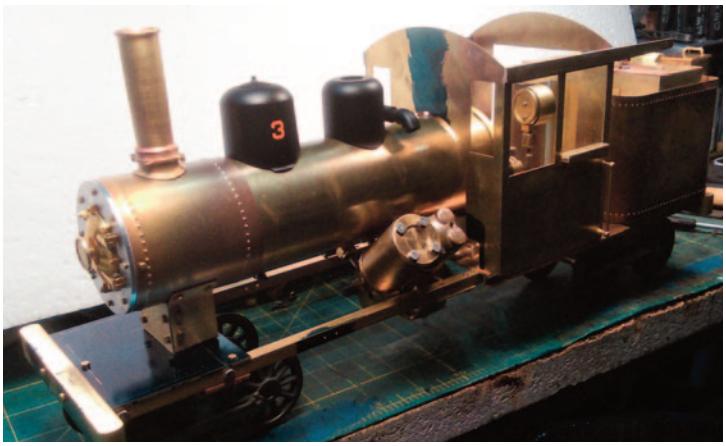
Glen Simpson, California — Glen had a lot of irons in the fire when he first started the project in 2019. Now he's getting closer to getting his Heisler under steam and finished. Glen has added lot of his own tweaks to the project to personalize it. Great job Glen. It's looking great!

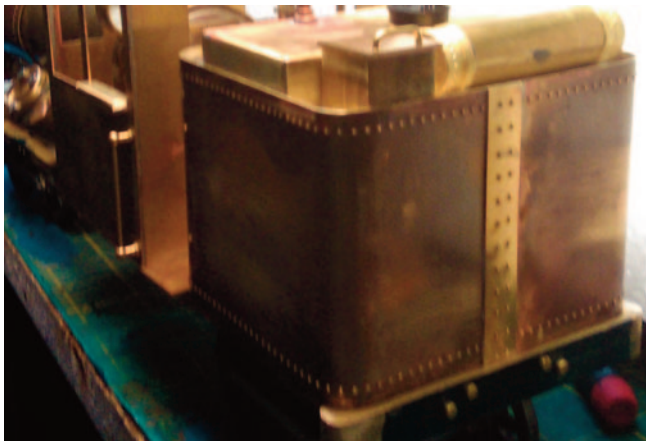
Scott Baldridge, Pennsylvania — In Issue #167 under the the Editorial we showed you a couple of pictures from the last Cabin Fever Model Engineering Expo of Scott's project at the almost finished stage. Adding personal touches really makes your project a one-of-a-kind model. Note the air vent that Scott added to the top of the cab roof for his Heisler.

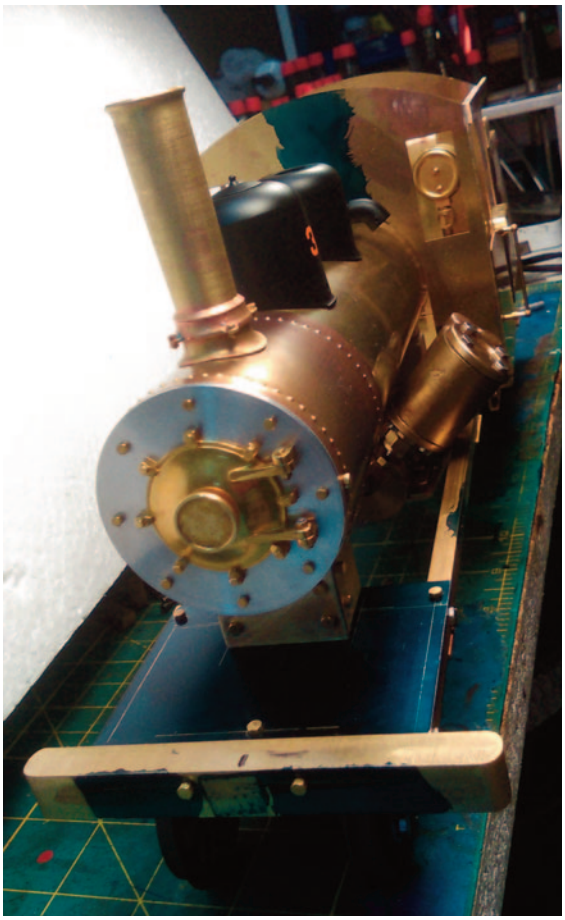
Readers Projects



Rich Blackham, New Jersey — Rich and Scott Baldridge have been working together to build their models. Their efforts have produced two beautiful models appropriatley labled for their personal railroads.







Scott McDonald, Virginia — Your editor has enlisted the help of Mike McCormack of Massachusetts to complete his locomotive. Scott's model was the project test bed with the author Les Knoll building it up to adding the boiler. Les then decided to build his own Heisler with a Westside Lumber style cab where Scott wanted the Pacific Coast Borax style cab and fuel bunker, same as Scott B. and Rich. The domes were sourced from an Accucraft Heisler. Note the extra details on the fuel bunker. Steam lines will eventually run alongside the boiler, same as the historical prototype.

Live Steam Station is the newest and largest online store for all your live steam needs: Accucraft, Aster Hobby, Maxitrak, and mor

LIVE STEAM STATION

Southern Pacific P8
1:32, Alcohol or Butane
Kit $3995, RTR $4495

LNER B1
1:32, Alcohol Fired
Kit $3100, RTR $3600

BR 4-6-0 5MT
1:32, Alcohol Fired (Black Only)
Kit $3100, RTR $3600

USRA Mikado Heavy
1:32, Alcohol Fired w/ 6 Free Cars
Kit $4400, RTR $5500

N&W 4-8-4 J-Class
1:32, Alcohol Fired or Electric
Alcohol $5950, Electric $5250

DB Class 45
1:32, Butane Fired
RTR $4995

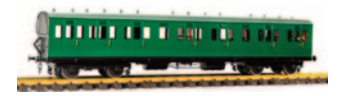
Adams Radial Tank
1:32, Butane Fired
Kit $1995, RTR $2160

Tiger 0-6-0 with Tender
1:32, Alcohol Fired
Kit $3250, RTR $3800

Smooth Sided Pax Cars
1:32, Alum Body
$340/Car, $2040/Set of 6 Cars

BR Mk1 Passenger Cars
1:32, Plastic body, Metral Trcks
$275/Car

L&SWR Coaches
1:32, Brass
$800/Car, $3040/Set of 4 Cars

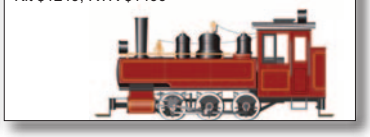


3 Bay Hopper Car
1:32, Plastic Body, Metral Trucks
$119/Car

D&RGW C-25
1:20.3, Coal or Butane
RTR $5250

D&RGW C-18
1:20.3, Butane Ceramic
$3095-$3395

Baldwin “Mabel” 0-6-0T
1:20.3, Butane Fired
Kit $1249, RTR $1499



Ruby #1 0-4-0T
1:20.3, Butane Fired
Kit $559, RTR $599

Jackson & Sharp Coach
1:20.3, Plastic, Ball Bearing, Lighting
$295/Car

Drop Bottom Gondola
1:20.3, Plastic Body, Metral Trucks
$220/Car

3-Bay Hopper
1:20.3, Plastic Body, Metral Trucks
$150/Car

Box Car
1:20.3, Plastic Body, Metral Trucks
$170/Car

Wheel & Tie Car
1:20.3, Plastic Body, Metral Trucks
$150/Car

Gondola
1:20.3, Plastic Body, Metral Trucks
$140/Car

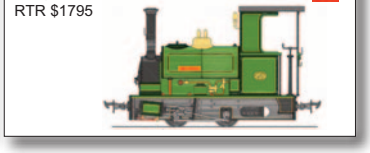
Open Ended Gondola
1:20.3, Plastic Body, Metral Trucks
$140/Car

Long Logging Car
1:20.3, Plastic Body, Metral Trucks
$110/Car

“Talyllyn” Railway 0-4-2ST
1:19, Butane Fired
RTR $1700

Quarry Hunslet 0-4-0T
1:19, Butane Fired
RTR $1600

‘Cranmore’ Peckett
1:19, Butane Fired
RTR $1795



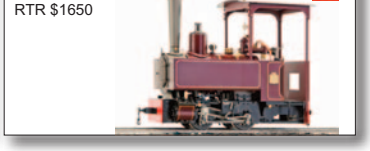
War Dept Hunslet 4-6-0
1:19, Butane Fired
RTR $1900

Emma 0-4-4
1:13.7, Butane
RTR $1095

Forney SR&RL & WW&F
1:13.7, Butane or Coal
Butane $3200, Coal $4200

2-4-0 7.5” Gauge Ride-on
2.5” Scale, Coal Fired
Kit $12,000 RTR $18,000

Decauville 0-4-0T
1:13.7, Butane Fired
RTR $1650



re can all be found here. *www.livesteamstation.com* will replace *www.accucraftestore.com*. Visit us online and happy steaming!

THE WORLD'S LARGEST STORE FOR MODEL STEAM TRAIN SUPPLIES

ACCUCRAFT · ASTER HOBBY · MAXITRAK · J&M MODELS · ARGYLE LOCO WORKS · AMS

USRA Mikado Light
1:32, Alcohol Fired w/ 6 Free Cars
Kit $3900, RTR $5000

GWR 43xx 2-6-0
1:32, Butane, Green and Black
Kit $2695, RTR $2895

Chinese QJ-Class 2-10-2
1:32, Butane Fired
RTR $4500, Electric $4150

DeutscheReichsbahn BR38
1:32, Alcohol Fired
DB/DR RTR $5400

GWR 43XX
1:32, Butane Fired
Kit $2695, RTR $2895

Kerr Stuart 'Victory'
1:32, Butane Fired
RTR $1100

"Train Bleu" CIWL Sleeper
1:32, Brass
$950/Car, $3800/Set of 4

Japan National Railway
1:32, Coach and Observation
Coach Kit $680, Obs RTR $1545

40' Reefer Car
1:32, Plastic Body, Metal Trucks
$119/Car

AAR Box Car
1:32, Plastic Body, Metal Trucks
$119/Car

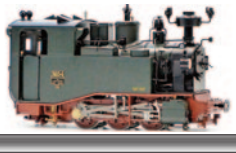
C&O Steel Caboose
1:32, Brass
$450/Car

Pennsylvania Caboose
1:32, Brass
$499/Car

Dora 0-4-0T
1:20.3, Butane Fired
Black, Maroon, Blue & Green
RTR $499

Saxonian IIIK
1:20.3, Butane Fired
RTR $2975

Saxonian 1K
1:20.3, Butane Fired
RTR $2200



Jackson & Sharp Coach
1:20.3, Plastic Body, Metal Trucks
$220/Car

40' Reefer Car
1:20.3, Plastic Body, Metal Trucks
$119/Car

Tank Car
1:20.3, Plastic Body, Metal Trucks
$160/Car

Flat Car
1:20.3, Plastic Body, Metal Trucks
$140/Car

Logging Disconnects
1:20.3, Plastic Body, Metal Trucks
$120/Car

Short Logging Car
1:20.3, Plastic Body, Metal Trucks
$120/Car

Short Flat Car
1:20.3, Plastic Body, Metal Trucks
$70/Car

Iron Mountain Car
1:20.3, Plastic Body, Metal Trucks
$60/Car

Short Caboose
1:20.3, Plastic Body, Metal Trucks
$170/Car

Lawley 4-4-0
1:19, Butane Fired
TBA

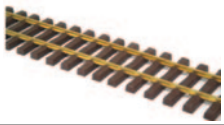
Sentinel DG6 Lorry
1" Scale, Butane Fired
RTR $1580

Allchin
1.5" Scale, Butane Fired
RTR $3800

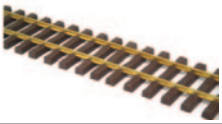
Fowler Ploughing Engine
1" Scale, Butane Fired
RTR $5295

Kerr Stuart 'Wren' 0-4-0ST
1:13.7, Butane Fired
RTR $1775

Code 250 Rail
Brass Rail System



Code 332 Rail
Brass and Alum Rail System



West Coast 1" Rail
Steel, Rail System

TEL: (510) 324-3399 | FAX: (510) 324-3366 | WWW.LIVESTEAMSTATION.COM

Freelance Consolidations Part Five

Text, Photos & Drawings by Les Knoll, PE

CAB AND RUNNING BOARDS

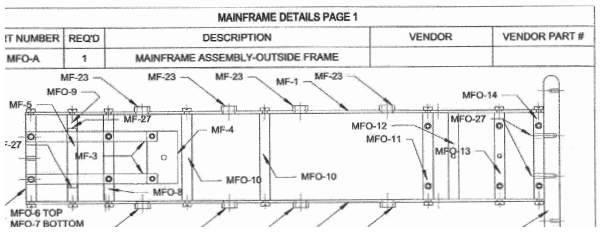
In this installment we will fabricate the cab and add running boards to the side of the boiler. These cosmetic additions go a long way to making our bare bones locomotive look a lot more locomotive-ish.

Cab Assembly

Figure 5-1 contains two assembly drawings, the Final Assembly of the Cab and the Roof Assembly. The upper portion of the page contains the Final Assembly which brings together all the sub-assemblies and additional loose parts, and describes the mounting of the cab onto the lower works. The lower portion of the page contains the Roof (sub) Assembly which is a soldered assembly of the roof components. **Figure 5-2** contains the Cab Body (sub) Assembly, which is also a soldered assembly, and contains the majority of the fabricated parts.

The detail drawings that follow describe all the sheet brass parts required for the cab. These can be cut by hand, but a lot of time and effort can be saved by ordering the package "LRK280CAB" from Denver Waterjet in Denver, NC. You will receive

Freelance Consolidations Construction Series



Editor's note; 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.

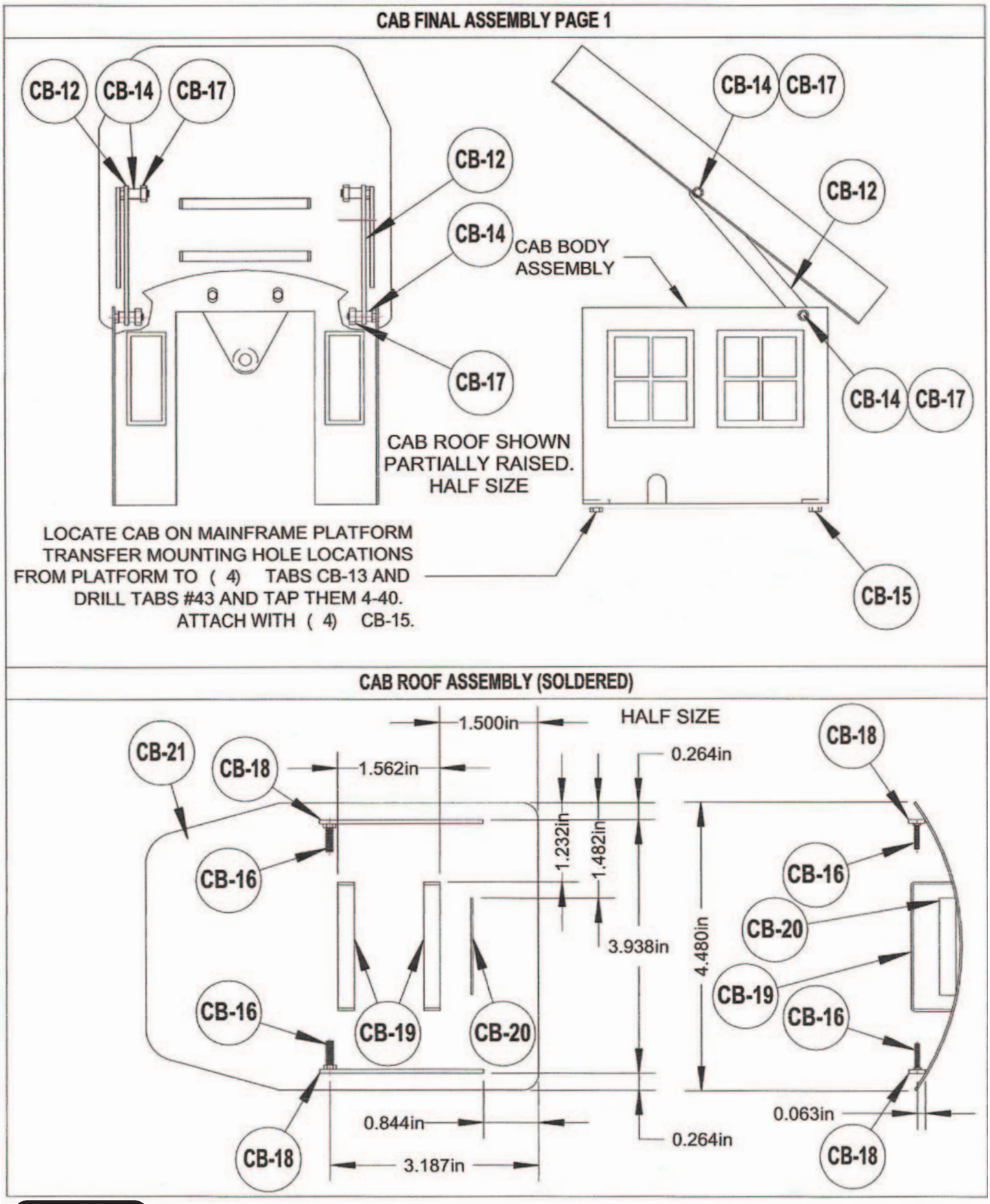

CAB FINAL ASSEMBLY PAGE 1
CB-12
CB-14
CB-17
CB-12
CB-14
CB-17
CAB BODY ASSEMBLY
CB-14
CB-17
CB-12
CB-14
CB-17
CAB ROOF SHOWN PARTIALLY RAISED. HALF SIZE
LOCATE CAB ON MAINFRAME PLATFORM TRANSFER MOUNTING HOLE LOCATIONS FROM PLATFORM TO (4) TABS CB-13 AND DRILL TABS #43 AND TAP THEM 4-40. ATTACH WITH (4) CB-15.
CB-15
CAB ROOF ASSEMBLY (SOLDERED)
HALF SIZE
1.500in
1.562in
0.264in
1.232in
1.482in
3.938in
4.480in
0.844in
3.187in
0.264in
0.063in
CB-21
CB-18
CB-16
CB-16
CB-19
CB-20
CB-18
CB-18
CB-16
CB-20
CB-19
CB-16
CB-18

Figure 5-1

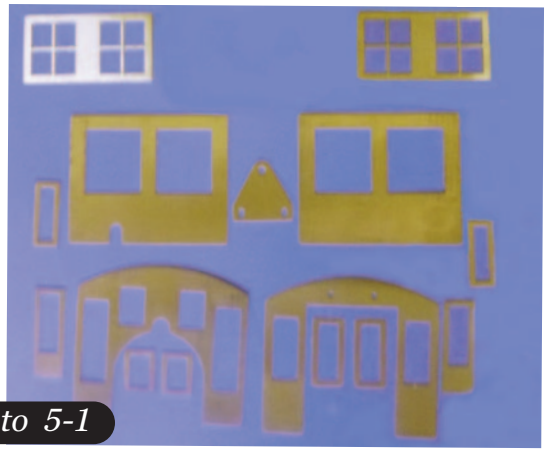


Photo 5-1

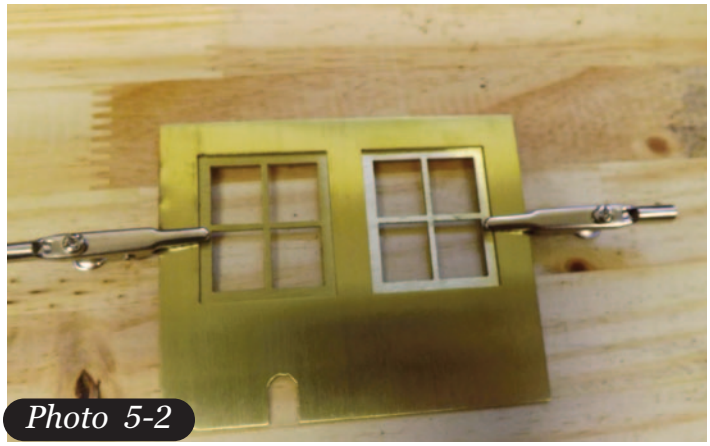


Photo 5-2

Photo 5-3

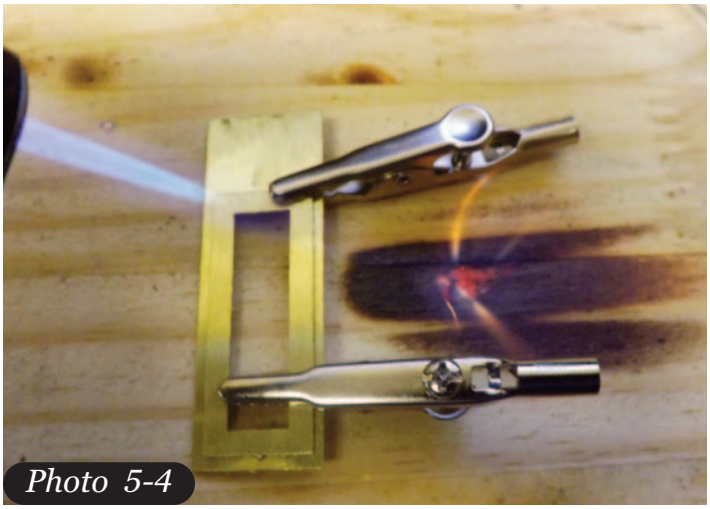


Photo 5-4

parts cut from the same CNC files (actually .dxf CAD files) that were used to produce the prototype locomotive seen in this series. Most of the parts received in the package are shown in **Photo 5- 1**. This was the prototype lot and did not include additional details such as the cab hinge arms, mounting tabs and battery brackets, but these along with a roof panel are all included in the package. The extra expense of using the waterjet service is offset by the ease of not having to source material or cut the brass, as well as the accuracy of the parts produced. These people spoil me, they make scratchbuilding so much easier, especially if you are like me and have no direct access to a machine shop.

The cab body is fabricated first. Using the Cab Body Assembly in **Figure 5-2** as a guide, this is done by fabricating the side and end panels and then soldering them together to form the cab body (**Figure 5-3**). The body is then completed by adding the brass screws which will be used for the compound hinge cab roof.

The sides CB-1 and CB-2 each get a recessed window panel CB-3 soldered to their inside. This multi-layer window treatment adds a lot of visual appeal to the cab. Photo 5- 2 shows setting up CB-1 for addition of the window panel CB-3, using alligator clips to hold CB-3 in place. Make sure when putting the CB-1 assembly together that the slot on the bottom of the panel is to the rear. This slot is for the lubricator drain and the cab will only assemble over the lubricator and its drain one way.

All four cab panels, CB-1-2-4 and 5, shown in Figures 5-3 through 5-5, all have multi-layer windows, and the front panel CB-4 has doors two panels deep consisting of CB-8 and CB-9 (**Figure 5-6**). A bit of extra work, but it really looks great when it is completed. **Photos 5-3** and **5-4** show the door panels being set up and soldered.

When the four panels are completed, carefully solder them together to make the cab body as shown in **Figure 5-1**. All four panels should have their bottom edges line up, NOT the tops. The sides are cut just slightly short of the straight vertical lengths of the ends for clearance of the rounded cab roof. The cab sides are located on the OUTSIDE, and the ends on the INSIDE. This may be a bit difficult to see in the drawings, so it is mentioned here.

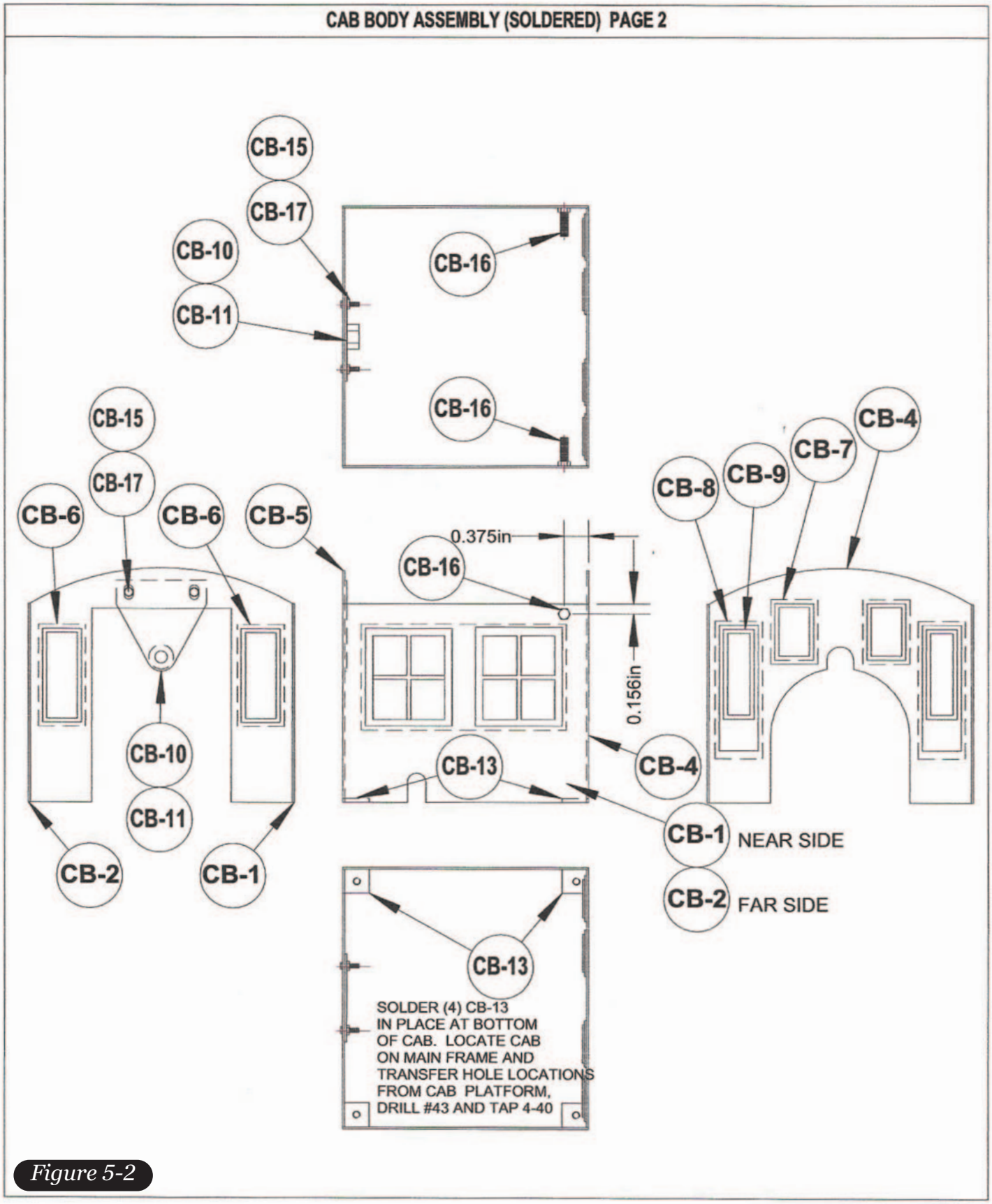


Figure 5-2

The screws CB-16 will be soldered to the cab body and roof and therefore cannot be made of steel like most readily available hardware. Since the brass 4-40 screws that are sold in most "big box" home improvement centers and hardware stores are usually round head with a screwdriver slot, the drawing for CB-16 in **Figure 5-7** calls for the round top of the screw to be ground flat to facilitate mounting by

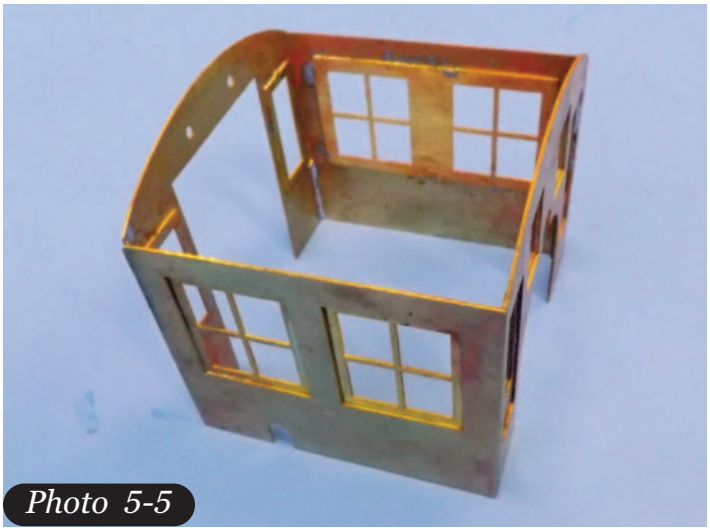


Photo 5-5

soldering.

Complete the cab body assembly by soldering on the screws for the cab roof hinge arms CB-16 and attach the soldered assembly CB-10/CB-11 with screws and nuts CB-15 and CB-17 if you are planning in using radio control. The model was designed from the ground up for the ease of radio control installation, so a number of parts to facilitate this are included and locations have been provided for the equipment required. The completed cab body is shown in **Photo 5- 5**.

The cab roof is rolled from a 0.030-inch brass sheet cut to 6.375 inches x 8.75 inches. The roof sheet is included in the package from Denver Waterjet. Note that you have the option of making the roof longer or shorter if desired by changing the 6.375-inch dimension. The roof sheet is two inches wider on each side than the final size of the roof. The extra material is shown as rectangular boxes in red on the CB-21 pattern drawing in **Figure 5-8**. This extra material allows for handling while rolling. Use of lead-in stock is common manufacturing practice for rolled parts. You would not easily be able to roll the roof if it was cut to its exact size before rolling. The rolling pattern is superimposed over the flat pattern on **Figure 5-8**. The solid lines represent the roof as finished and the red dashed lines represent the lead-in allowance material which will also be formed to insure the portion of roof sheet that is used is fully rolled.

To make the roof, roll the brass sheet to 3.875-inch radius using either the cab front CB-4 or cab rear CB-5 as a guide. Always roll over a mandrel somewhat smaller than the intended radius. I used a 2.00-inch wooden dowel as shown in **Photo 5-6**. After the full sheet is rolled, cut off the 2.00-inch lead-in allowance from both sides of the roof. If you want the roof to be tapered at the rear and/or with rounded corners at the front as shown in the photos, place the cutoff template, outlined in blue on the pattern drawing, on the roof. Then scribe the lines for cutoff and using a shears, cut the tapers and rounded edges into the roof sheet as shown in **Photo 5-7**. The roof could also remain straight, without tapers or rounded edges; the choice is yours.

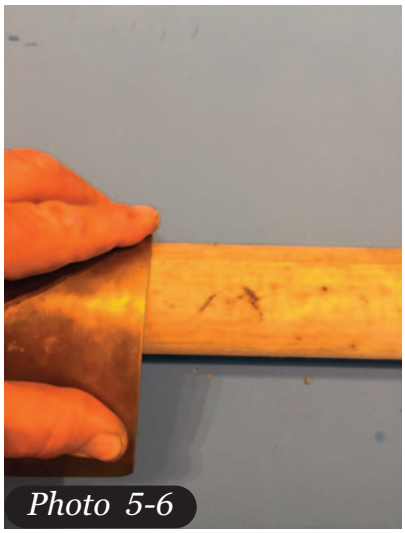


Photo 5-6


Photo 5-7

As a perfect example of "Don't do as I do, do as I say," the prototype roof sheet had the tapers at the rear of the roof cut in while the sheet was still flat. These tapers completely remove the rolling allowance material from almost half the roof, and trying to roll the sheet with the tapers cut into it in the flat was nearly impossible. This is why the full size template for cutting the tapers and corners after rolling was included in the drawings. It is also why we build prototypes!

After rolling and cutting the roof sheet, the tabs for mounting the screws for the roof lifting pivot arms CB-18 and the mounting screws CB-16 (same ones you put on the cab body) are soldered in place. If you are opting for radio control, add the battery mount components CB-19 and CB-20.

The Cab Final Assembly in **Figure 5-1** brings all the assemblies together and mounts the cab onto the lower works. Four hinge tubes CB-14 are slipped over the pivot screws CB-16 (shown in the cab body and cab roof assemblies). The hinge arms CB-12 are assembled over the tubes and kept in place by 4-40 nuts CB-17. This final assembly is shown in **Photo 5- 8**. **Figure 5-1** shows the cab roof partially lifted away both to reveal the component

CAB DETAILS PAGE 3			
PART NUMBER	REQ'D	DESCRIPTION	VENDOR
CB-1	1	BRASS, .030 x 4.00 x 4.00	K & S OR MCMASTER CARR
CB-2	1	BRASS, .030 x 4.00 x 4.00	K & S OR MCMASTER CARR
CB-3	2	BRASS, .030 x 2.00 x 3.125	K & S OR MCMASTER CARR

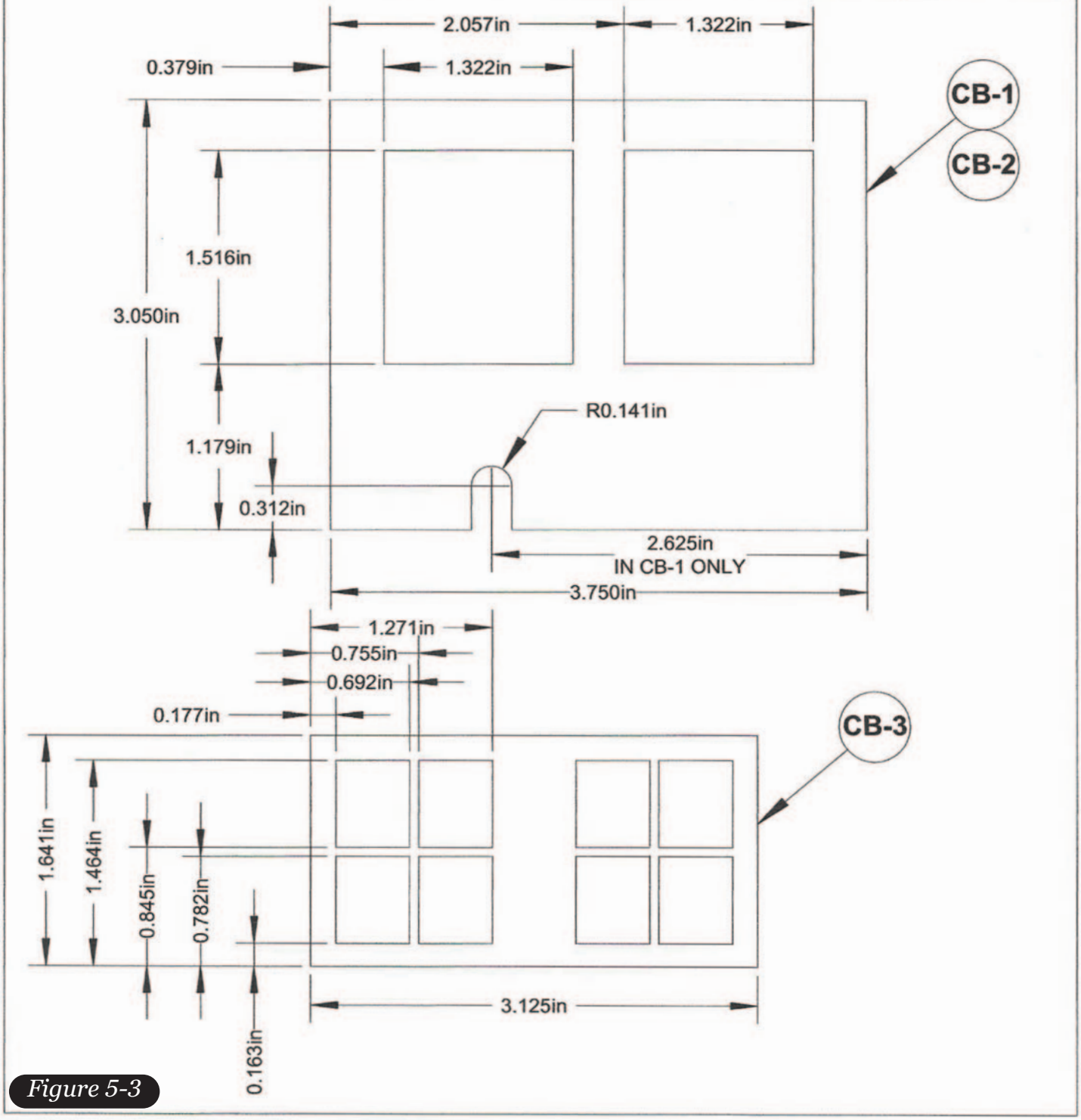


Figure 5-3

assembly and to demonstrate how the cab roof can be lifted away for access to the cab interior while remaining attached to the cab body.

Boiler Bands and Running Boards

Boiler bands were provided with the boiler kit as ordered from Roundhouse Engineering. They are attached using the screws supplied with the bands. Position them as shown in the photos and drawings or to suit. **Photo 5-9** shows three boiler bands in position with running boards attached. One band is put right at the front of the boiler to conceal the joint between the boiler wrapper and smokebox and the remaining two are centered between the domes. **Photo 5-10** shows a close up from the front underside of the running boards and mounts attached to the boiler bands.

Since technically the running boards are part of the boiler assembly, parts for the running boards have a "BI" prefix, taking up where the boiler detail parts left off. Brass strips BI-12 are 0.1875-inch wide and are soldered to the boiler bands to mount the running boards. This strip size is no longer available from K&S. Four strips with mounting holes are included in the Denver Waterjet package. They can also be sheared by hand from sheet stock. This is mostly a fit-up in place operation. The running board mounting strips are cut and drilled, then formed, either to the template shown in **Figure 5-9**, or formed in place on the mounted boiler bands. They are then torch soldered to the boiler bands while the bands are LOOSELY fastened to the boiler. This is a soft solder operation and very short in duration so it should not damage the boiler. As long as sufficient water is in the boiler, it will not get hot enough to melt the soft solder. This has been proven out by running the prototype many times. It is best to pre-tin both the area on the boiler bands to which the running board mounts are to be soldered and the back side of the running board mount strips themselves. Apply some flux paste and melt both the solder on the strips and bands together to attach the strips.

The running boards are 1/16-inch x 3/8-inch basswood, available online from Micro Mart or Hobbytown USA. It might be a good idea to stain these ahead of time. I used Minwax 'Special Walnut." If the boards were to get greasy during handling and fit up, they may not take the stain as easily or not do so uniformly.

The boards are fastened to the brass mounts with 0-80 x one-quarter inch hex head screws, nuts and washers from Woodland Scenics "Hob-Bits." With the running board mounts and mounts in position where you want them to be (this can be a cosmetic choice), transfer the holes from the running board mounts through the bottom side of the running boards. A drill in a pin vise is a good tool for this. Drill through with a #50 drill. Fasten the boards to the mounts by placing a #0 washer over the hole on the top of the running board and passing the 0-80 screws through the washer and mounting boards. Fasten from the bottom using the 0-80 nuts.


Photo 5-8

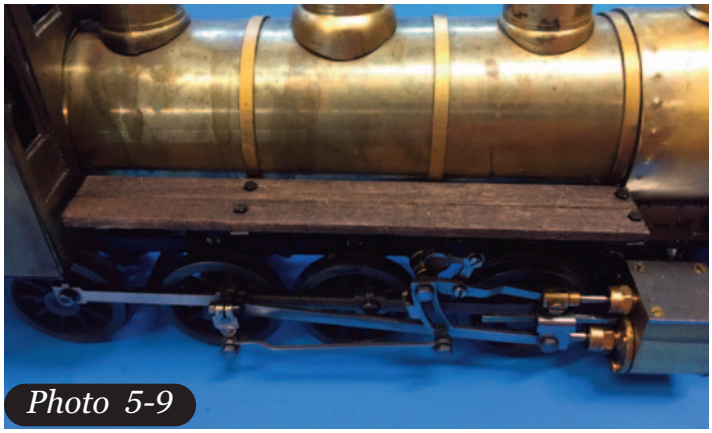


Photo 5-9

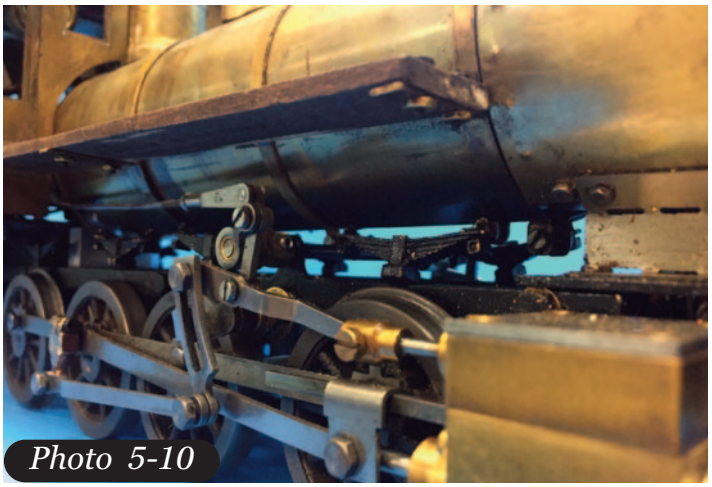


Photo 5-10

CAB DETAILS PAGE 4

PART NUMBER	REQ'D	DESCRIPTION	VENDOR
CB-4	1	BRASS, .030 x 4.00 x 4.00	K & S OR MCMASTER CARR

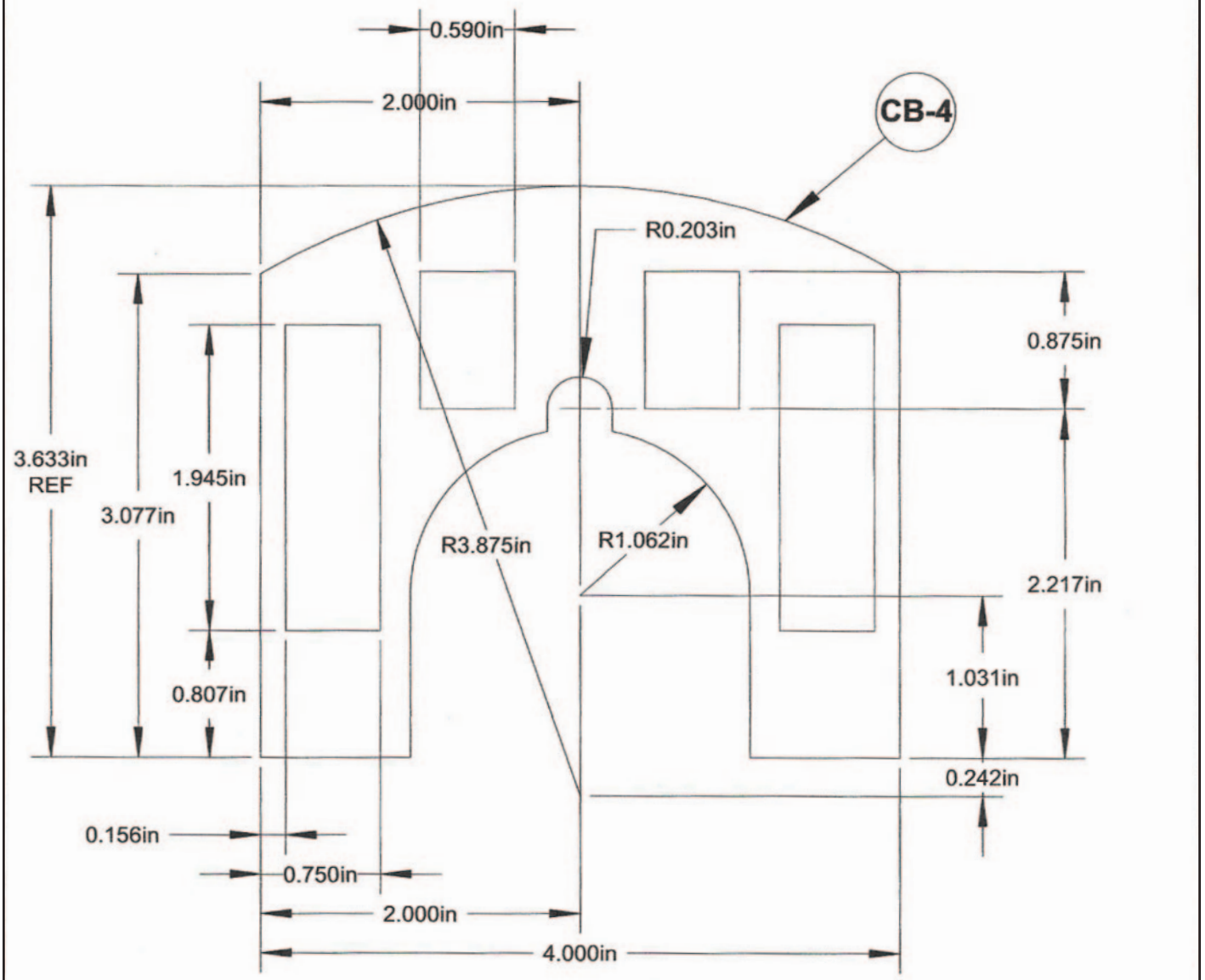


Figure 5-4

That concludes the construction of the locomotive, but there is no reason to stop here. With the variety of detail parts available from Trackside Details, Precision Scale, Ozark Miniatures and others, the locomotive can be taken to any level of detail you want. I have seen some of the great work readers have done with the Heisler project that was published in 2019, and am looking forward to seeing what fine levels of super detail readers will come up with on this project.

The final installment will cover the construction of the tender and the addition of radio control. It will be good to have something for your locomotive to pull and have a coupler on it to pull other cars as well. The radio control will be easy to add since the model was prepared for it from its initial design stages. Like the cab described in this installment, the tender will involve a lot of sheet metal work with cutting, forming and soldering. This cab project should sharpen your skills for the final portion of the Consolidation project. In the meantime, enjoy building completing and running your Consolidation.

CAB DETAILS PAGE 5

PART NUMBER	REQ'D	DESCRIPTION	VENDOR
CB-5	1	BRASS, .030 x 4.00 x 4.00	K & S OR MCMASTER CARR

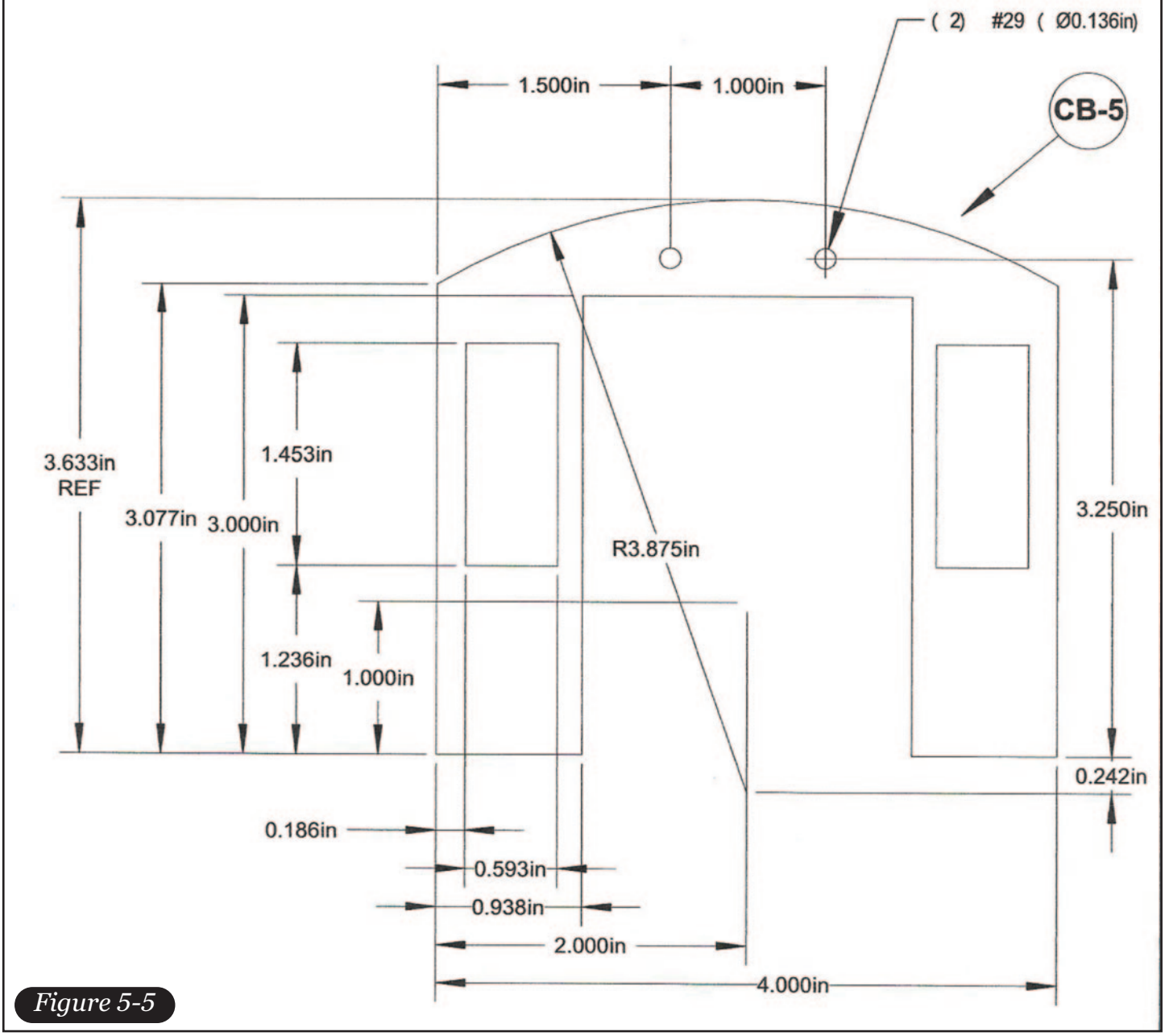


Figure 5-5

CAB DETAILS PAGE 6			
PART NUMBER	REQ'D	DESCRIPTION	VENDOR
CB-6	2	BRASS, .030 x 1.00 x 2.00	K & S OR MCMASTER CARR
CB-7	2	BRASS, .030 x 1.00 x 1.00	K & S OR MCMASTER CARR
CB-8	2	BRASS, .030 x 1.00 x 2.00	K & S OR MCMASTER CARR
CB-9	2	BRASS, .030 x 1.00 x 2.00	K & S OR MCMASTER CARR
CB-10	1	BRASS, .030 x 4.00 x 4.00	K & S OR MCMASTER CARR
CB-11	1	COLLAR, .188	DU BRO

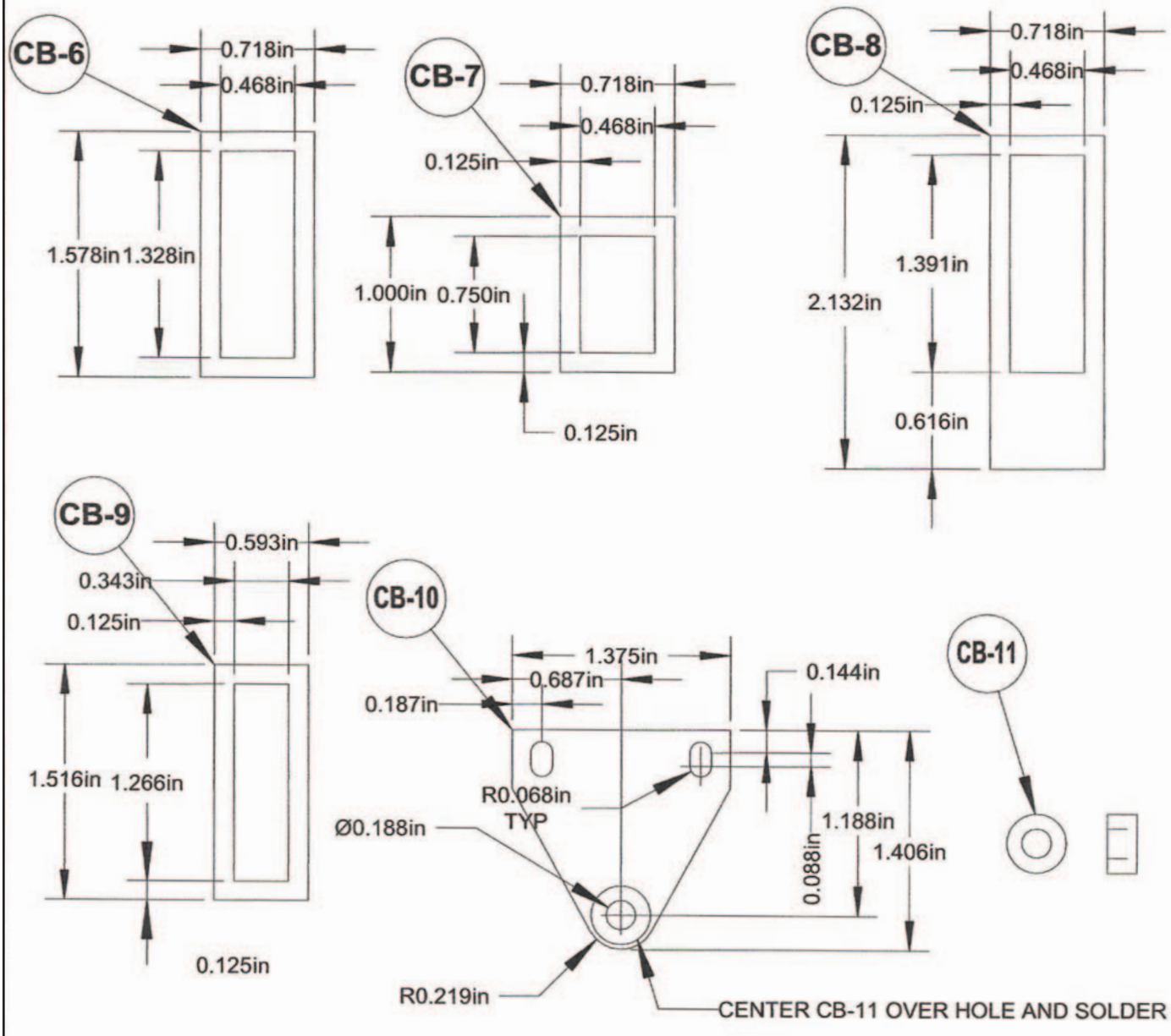


Figure 5-6

CAB DETAILS PAGE 7			
PART NUMBER	REQ'D	DESCRIPTION	VENDOR
CB-12	2	STRIP, BRASS, .060 x .250 x 2.75	K & S OR MCMASTER CARR
CB-13	4	STRIP, BRASS, .030 x .375	K & S OR MCMASTER CARR
CB-14	4	TUBE, BRASS, .156 OD x .250	K & S OR MCMASTER CARR
CB-15	6	SCREW, SOCKET HEAD CAP, 4-40 x .250	MCMASTER CARR
CB-16	4	SCREW, BRASS, .ROUND HEAD, 4-40 x .375	MCMASTER CARR
CB-17	4	NUT, 4-40	MCMASTER CARR
CB-18	2	STRIP, BRASS, .030 x .250 x 2.50	K & S OR MCMASTER CARR
CB-19	2	STRIP BRASS, .030 x .250 x 3.25	K & S OR MCMASTER CARR
CB-20	1	STRIP BRASS, .030 x .250 x 1.75	K & S OR MCMASTER CARR

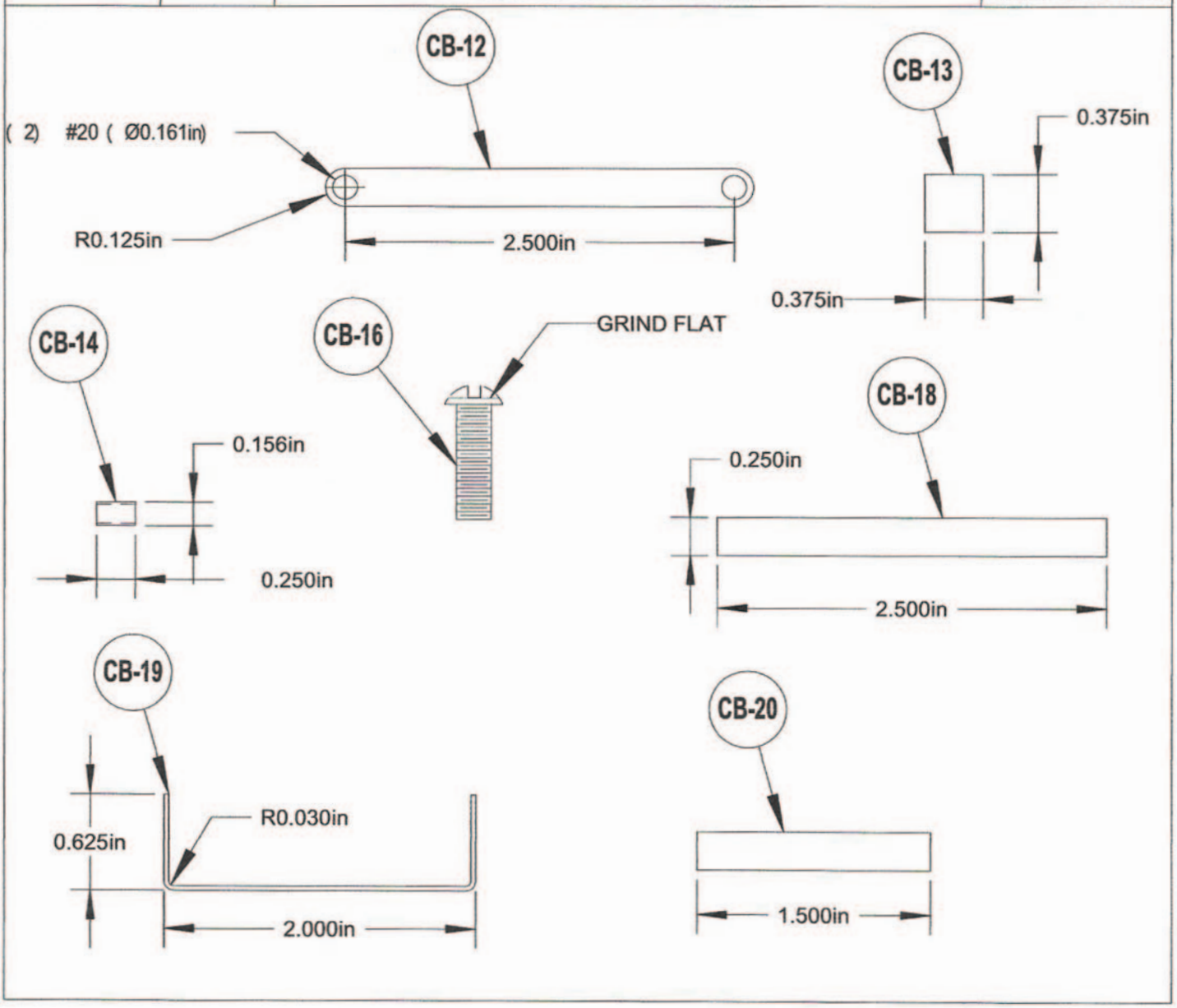


Figure 5-7

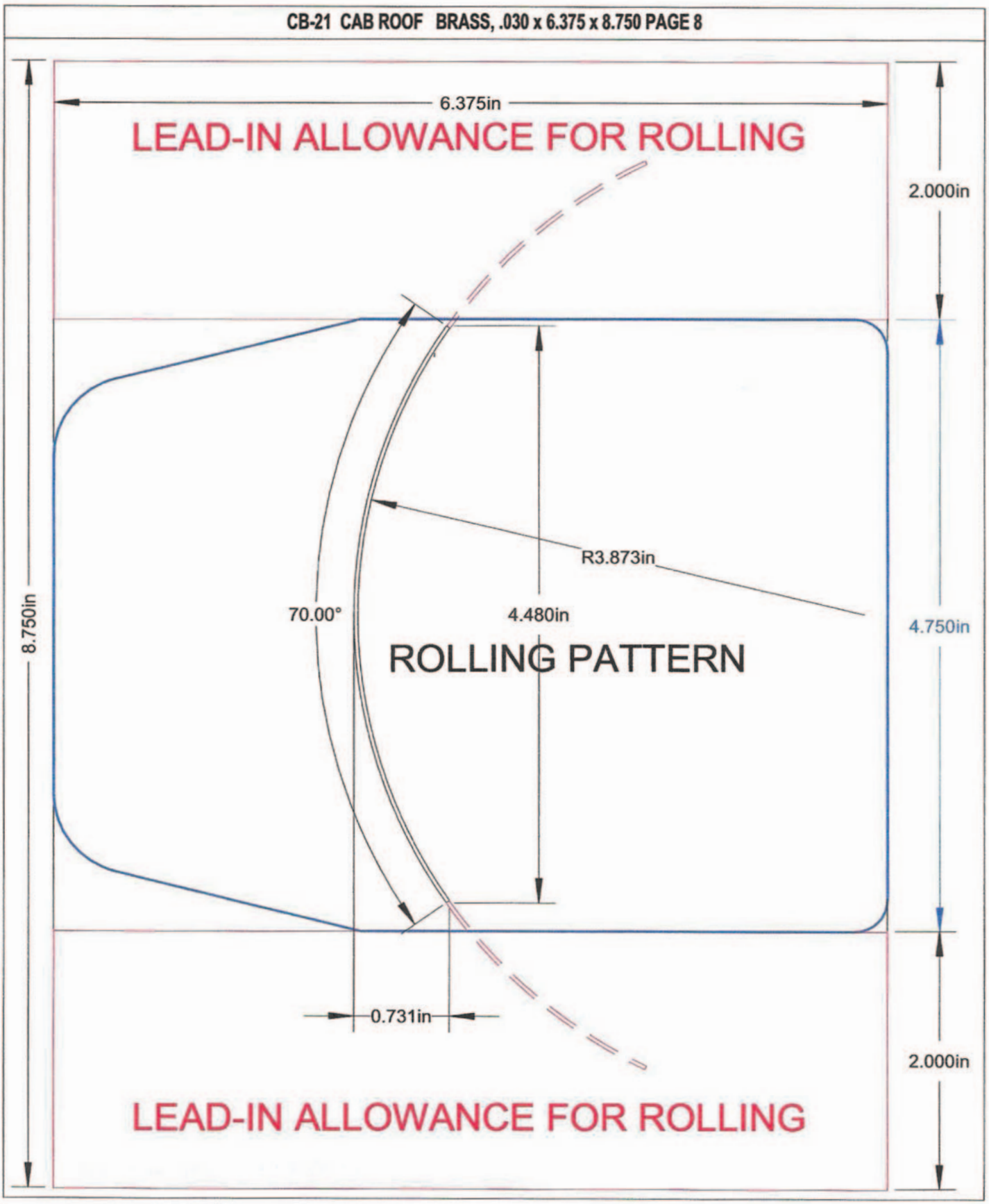

CB-21 CAB ROOF BRASS, .030 x 6.375 x 8.750 PAGE 8
6.375in
LEAD-IN ALLOWANCE FOR ROLLING
2.000in
8.750in
R3.873in
70.00°
4.480in
4.750in
ROLLING PATTERN
0.731in
2.000in
LEAD-IN ALLOWANCE FOR ROLLING

Figure 5-8

RUNNING BOARDS PAGE 9			
PART NUMBER	REQ'D	DESCRIPTION	VENDOR
BI-12	4	STRIP, BRASS, .030	K & S OR MCMASTER CARR
BI-13	4	STRIP WOOD, BASSWOOD, 1/8 x 3/8 x 5 .875	MICRO MART
BI-14	16	SCREW, HEX HEAD 0-80 x .250	HOB BITS H866
BI-15	16	NUT, 0-80	HOB BITS H882
BI-16	16	WASHER #0	HOB BITS 892

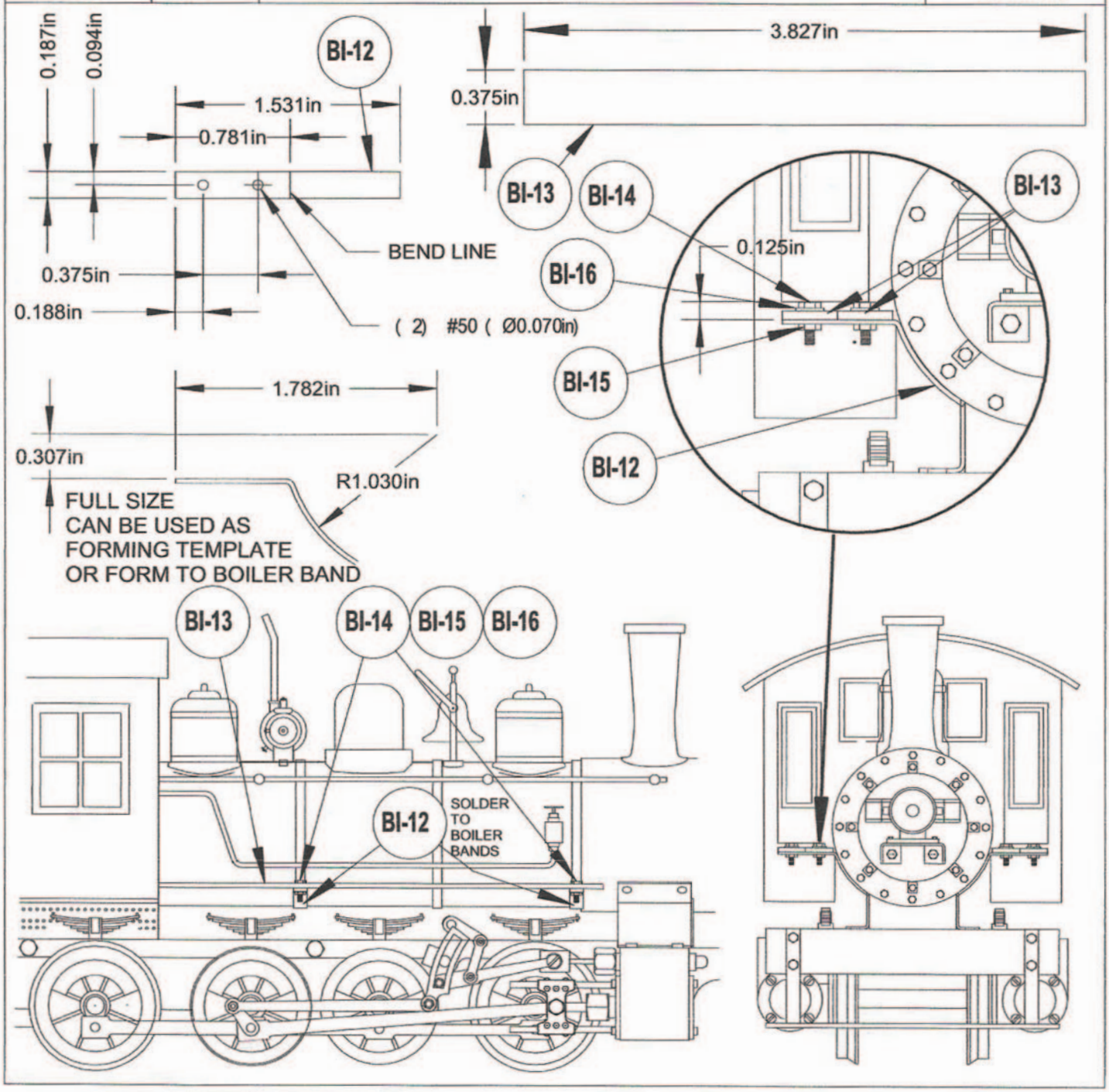


Figure 5-9

Bob's Bit's

Weekend Projects for Steamers
by Bob Sorenson
CAD by Dan Pantages

Silver Soldering

Figure 1

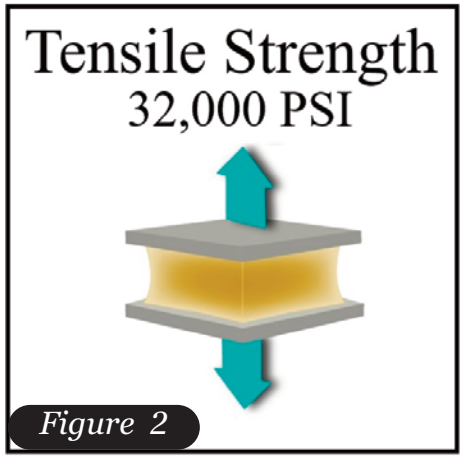


Figure 2

Figure 3

A while back a friend of mine made a request for an article on silver soldering. He was working on a boiler project, had a few questions and suggested the topic. So, let's take a look at it.

Soldering, in general, is the process of joining two or more metal parts together by means of a molten filler material. The filler material has a lower melting point than the adjoining metal. Generally speaking, soldering is divided into two categories: soft and hard. Soft soldering uses a mostly lead/tin or lead/silver based alloy as the filler material. Soft solder melts at around 400° to 500°F. It works very well to join copper and brass, somewhat difficult to join steel and useless on stainless steel. Hard soldering uses a mostly silver based alloy for the filler material and melts at between 1,100°F and 1,300°F. The high temperature silver solder works on all metals we use in the hobby, including cast iron.

Figure 1 shows a container of the most generally used type of silver soldering alloy. The term "Safety-Silv 56" is the product brand name of the Harris Company. It is mostly referred to in industry as "BAg-7". It is composed of 56 percent silver, 22 percent copper, 17 percent zinc and five percent tin. BAg-7 has a temperature range of 1,148°F to 1,202°F and comes in wire form, either 1/16-inch or 1/32-inch diameter. **Figure 2** shows the strength of BAg-7. It is an overall superior filler material for our purposes.

Successful soldering of any type requires good surface preparation. Keep the gaps between the adjoining metals as close as possible; 0.003-inch is ideal, but BAg-7 is pretty forgiving up to 0.010-inch or 0.012-inch. Mechanically clean the

surfaces by sanding, steel wool or wire brush to remove contamination, dirt, oil, paint or oxidation. All alloys of silver solder require "flux" to chemically clean the surface during the soldering process. **Figure 3** shows a couple of brands. Silver solder flux is a powder dissolved in water. It comes pre-dissolved, ready to use in white and black colors. The white is general purpose, while black is better for stainless steel. The maximum working temperature is 1,600°F.

Now for the heat. The usual "Bernzomatic" or MAPP Gas torches do not work for silver soldering. They are simply too small for the job. Silver soldering requires a propane-air torch that produces a large volume, fairly low temperature flame over a wide area. **Figure 4** show the Sievert brand I use. Sievert torches operate from a standard five gallon "Bar-B-Que" propane tank and have interchangeable tips. The #2942 tip is rated for 87,000 BTU output and works for small parts and boilers up to two inches diameter. The #2943 tip is rated for 148,000 BTU and works for bigger parts and boilers. Sievert also has the #2944 tip, which is a hand-held volcano and way more then we need. Sievert components are sold separately. A ten-foot hose and single stage handle are adequate. In the US, Sievert products are available from Best Materials (https://www.best-materials.com/default.aspx)

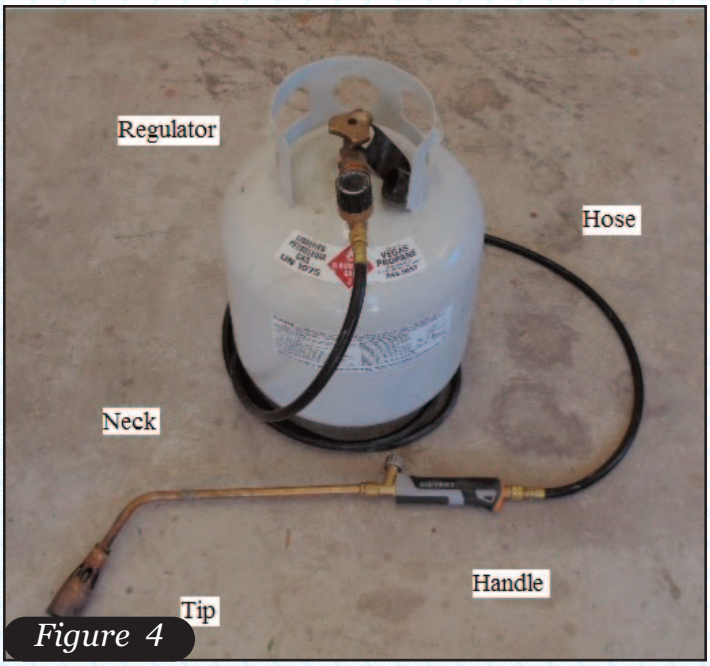


Figure 4

Other torches will probably work fine, but I have no experience with them. **Figure 5** is a torch from Harbor Freight used for weed burning. I have used these to melt lead for rifle bullet casting. They put out a lot of flame and get very hot. It will probably work fine. Stay away from oxygen-acetylene. The flame is way too pinpoint and way too hot. They will melt the whole project and make a big mess.

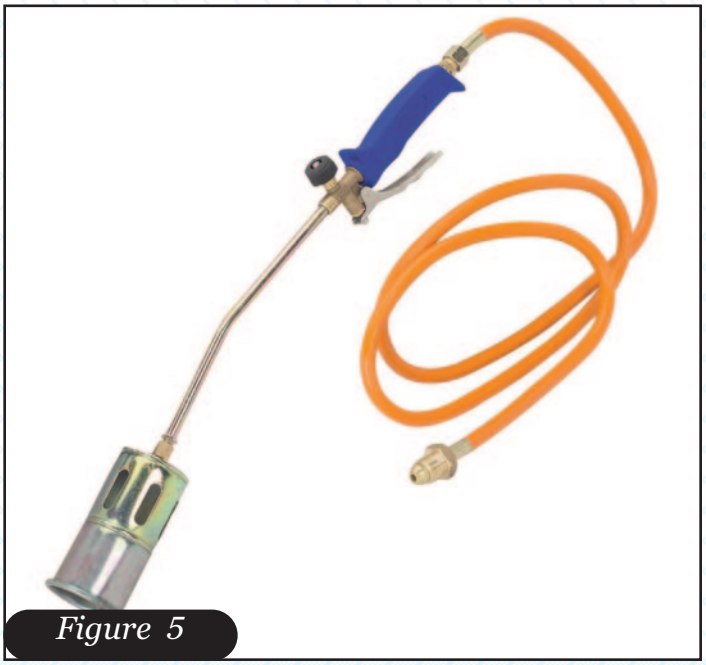


Figure 5

Another very handy little tool is a scratch

rod as shown in **Figure 6**. Sometimes molten silver solder does not want to start flowing. It is probably a chemical "surface tension" issue. Giving it a little scratch from the scratch rod will get it going.

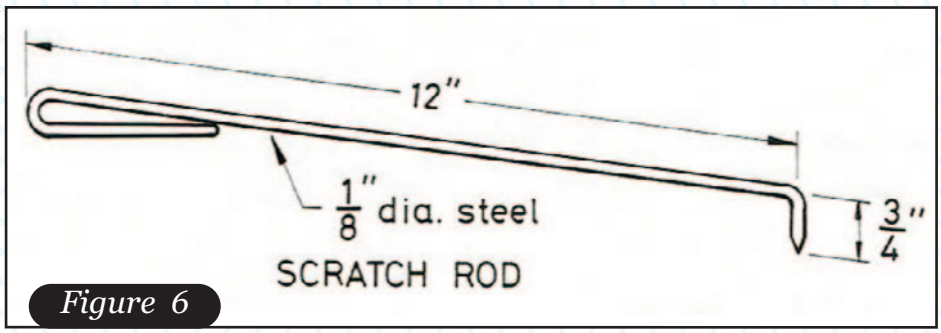


Figure 6

The silver solder flux leaves a glass-like residue after cooling down. This is best removed with a solution of citric acid and water. Mix powdered citric acid in water until saturation. The solution is reusable, and a one-gallon batch will last a very long time. Place the cooled part in the solution and all residue is gone in about 10 minutes. Citric acid is available from many online sources and specialty organic food stores. Many use a 10 percent battery acid, 90 percent water solution to clean flux residue. Avoid this method. Battery acid is very dangerous and will burn your skin (among other hazards). Battery acid dissolves steel. If you forget your steel assembly in the clean up bath, it will be gone by morning.

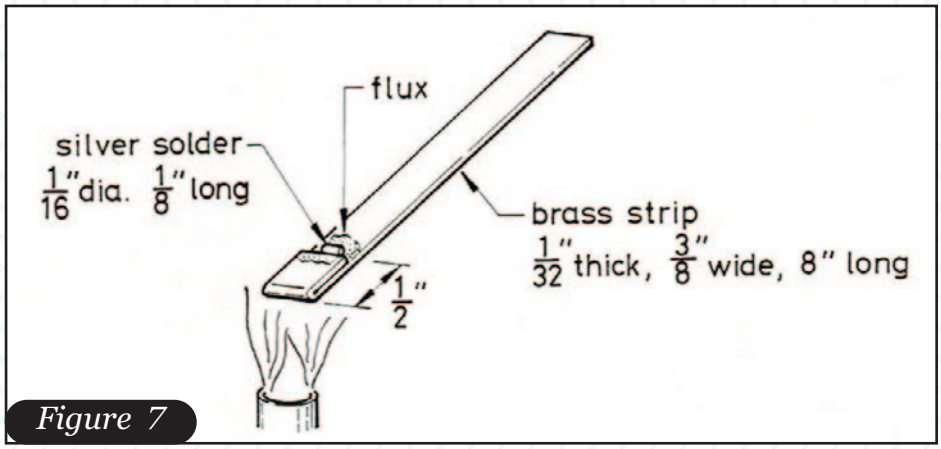


Figure 7

The silver soldering process itself is kind of an art. It requires practice. **Figure 7** shows an excellent first exercise. Set up the test joint as shown. Very slowly apply heat and observe the flux. The water in the flux will first boil out and leave the powder behind. The top and edges of the flux will turn black. The flux melts to a glass like material and bubbles. When a bubble breaks, bright shiny metal appears underneath. The solder melts at about this point; when it does, give it a nudge with the scratch rod and away it flows. Let the part cool and clean up with the citric acid and a little brush with a brass brush under soap and water. It will be a perfect joint and look like a brand-new penny.

The best source for specific techniques is the book "Building the Shay" by Kozo Hiraoka (**Figure 8**). "Building the Shay" (ISBN 0-914104-07-1) is available from Village Press (https://secure.villagepress.com/) and is highly recommended.

Take care, see you next time.

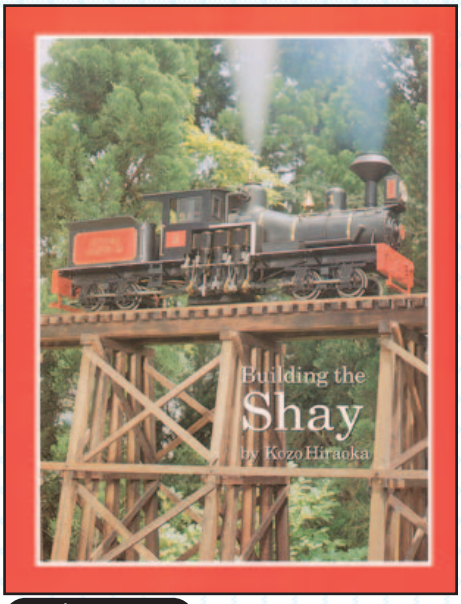


Figure 8

Steam Scene - Post Pandemic Steam!!

Live steam returned to Jim Gabelich's after the rebuild of his line in Palos Verdes, CA. From left to right - John Polen, Sonny Wizelman, Greg Dahlem, Pete Comley and Jim Gabelich enjoy the beautiful Southern California weather at Jim's new track. A full article showing the rebuild will be coming to the pages of Steam in the Garden soon!

Rick Parker Photo

Gary Woolard (center left) begins his preparations to steam as Sonny Wizelman (right center), and Tom Woolson (far right) provide their input into the proceedings.

Rick Parker Photo

Sonny Wizelman attends to his locomotive as Carla Brand Breitner looks on (far left).

Rick Parker Photo

In April, The Aikenback Steamers on the East Coast celebrated the arrival of Spring at the Marshall Steam Museum in Auburn Heights, DE.

Still required to "mask up", Roy Ganderton (front left) attends to his locomotive while Charlie Zimmerman (back right) captures the moment

Scott McDonald Photo

The Aikenback steamers also set up in June at the Antique Farm Museum in West Friendship, Maryland. An annual event that had to take a break in 2020, the attending patrons enjoyed the return to the farm's activites and live steam.

Scott McDonald Photos

THE CUPOLA VIEW

Best Laid Plans – A behind the scenes look as Editor of SitG

As a railfan, when visiting a railroad, museum, chasing a train, or just passing by an interesting scene relating to railroading, the camera is always close by (i.e. cell phone these days). I like to look for things that might be of interest to me later in either modelling, or now since becoming editor in 2017, for the magazine.

When I headed out to the National Summer Steamup in 2010 I had a mission to accomplish for Ron Brown, in the form of an article about the steamup from the viewpoint of someone who hadn't been to NSS for quite a few years. In fact about thirteen years had gone by since I last made the trek from Virginia to the West Coast, aside from visiting family. So I was keen to ensure that my new digital camera was ready to get as much coverage as possible, so that Ron could pick and choose what he wanted for the magazine.

A side trek during that trip was to visit all three of the Southern Pacific Narrow Gauge "Slim Princesses" that were on display in Independence and Laws, CA (#18 & #9), and then on up to Sparks, NV for #8. It was in Sparks that the display of #8 was so uniquely different from the others. The locomotive is in an area called Victorian Square. There is a short section of standard gauge track with additional rails laid inside for the locomotive in order to line up the centerline to couple with the standard gauge cars which are also there as part of the display.

This is not a setup I had ever seen anywhere else. The absurdity of it piqued my interest, so I just had to get a close-up of the diminutive ¾ size SPng coupler that was attached to the standard gauge coupler. I'm sure there was some modification done somewhere in the execution of the attachment, but what a neat size comparison it made. So I took a couple of photos.

So here we are, eleven years later, and that picture found its way into a lead-in photo for Kendrick Bisset's "Couplers" article in this issue. Something I just happened to have in my archive that could be used for such an occasion. Kendrick and I went back and forth in discussion about it, and Kendrick mentioned that it would be nice to have a shot of two different types of ¾ size narrow gauge couplers coupled – a SPng and a DRGW, since they were both unique in their own way, and his article was about his approach to narrow gauge couplers for his models.

As luck would have it, Kevin Schindler, a live steam buddy from California, was on his way to Colorado to spend a week or so chasing and riding behind SPng #18, which is on duty this summer in Durango and double heading with former DRGW locomotives and rolling stock. A quick note off to Kevin via Facebook Messenger and I had Kevin online for the pic. And he got it! And in time for publication of this issue! What a champ.

But, guess what? The Durango Silverton Railroad now uses full size couplers! SPng #18 was retrofitted to be able to work with the D&SNGRR. So what we have is not the narrow gauge we wanted. Oh well, best laid plans. But bravo to Kevin for stepping up. So we'll file these photos away. Who knows, maybe in another eleven years they will come in handy for a different kind of article about modeling couplers.

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.

Above: Standard gauge refit of couplers on the D&S RR K-36 (left) and SPng #18 (right)
Photo by Kevin Schindler .

Special or Annual Meets

National Narrow Gauge Convention, September 1-4, 2021 - Hickory, NC. Visit *https://41nngc.com/* for more information. Elevated Gauge One steamup track will be available to attendees.

Staver Locomotive Fall Steamup, September 23-26 September 2021 — Staver Locomotive, Portland, Oregon. Visit *www.staverlocomotive.com* for latest information.

National Summer Steamup, September 29 - October 2, 2022 - Lodi Grape Festival and Events Center, Lodi, California. Visit *www.steam-events.org* for more information.

The Fourth Annual Gathering of North American members of the Association of 16mm Narrow Gauge Modellers will be hosted by the New Jersey Live Steamers at their annual Fall Steamup to be held Friday, Saturday, and Sunday Sept. 24-26th.
Visit *www.northamerican16mmmodellers.org* for registration and venue 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

Important Contacts

Patrick Darby, Registration
15616 Hwy 1085
Covington, LA 70433
985-867-8695
k5pat@bellsouth.net

Richard Jacobs, Manager
504-343-8091
trainmax@yahoo.com

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

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

ASTER HOBBY

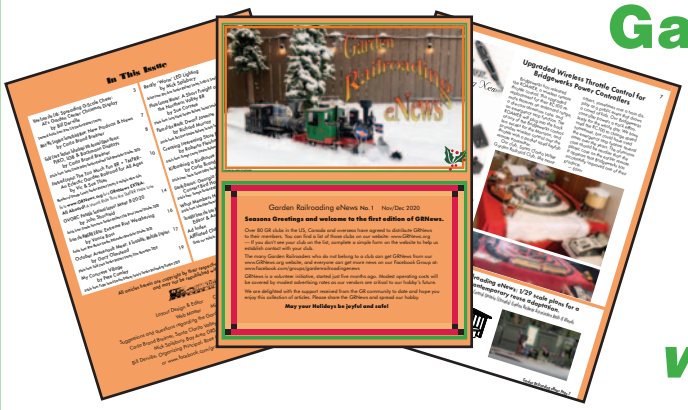
ACCUCRAFT TRAINS

North Jersey Gauge One

Authorized Aster and Accucraft Dealer

Contact: Jeff Koenig - northjerseygaugeone@yahoo.com
28 Old Route 84, Wantage, NJ 07461
(973) 943-7371

LIVE STEAM GAUGE ONE LOCOMOTIVES



Garden Railroading News

A free bi-monthly digital magazine

G-Scale layout tours, tips, and how-tos shared by 110 garden rail clubs in North America and overseas — and providing sources and product news for GR supplies to help you build your G-Scale layout!

Free PDF Downloads!

www.GRNews.org/get

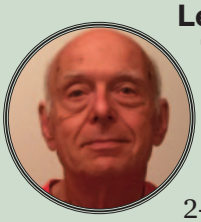
CONTRIBUTOR BIOS

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.

Bill Allen - Bill lives in Woodside, California and first became interested in live steam in 2008 when he saw Richard Murray's layout at a BAGRS open house. He proceeded to buy a Ruby, C16 and Forney before deciding to start building his own. He bought a mill and lathe and with the help of some BAGRS members learned to use them and was soon making chips. Since then he has completed 20 projects, some of which have been featured in Steam in the Garden, and currently has a multi-part article running in Live Steam. All of his builds are one-of-a-kind as he only builds those which have never been done before and probably will never be done again in G Gauge live steam. Bill's prior hobby was building fine furniture and he uses some of those skills and tools in hie engine building.

Kendrick Bisset - Kendrick is a retired railroad signal engineer. His love of railroads started by age four with his first American Flyer train set (even though he was in England at the time). HO trains came at age 10. School, girls (and one in particular), and entering the railroad industry followed in seemingly quick succession – and then children, too. Kendrick feels very fortunate that his life work and his hobby have been so closely related. He got into live steam around 2006, and has been enjoying the companionship of the small scale live steam community since then.

Steve Ciambrone - Steve has always had a fascination with technology and especially steam driven machines; his first steamer was a Jenson Model 60 stationary live steam engine, at the age of about 13 or so. Steve volunteered for the Submarine Service, feeling that nuclear submarines are just a more complex version of a steam ship. In about 1986 he built a early Roundhouse Engineering kit. With his second house, he finally had enough room for a garden layout, and his stable of engines has grown considerably. Steve also includes live steam boats and road vehicles in his interests.



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.

Peter Thornton - Peter has been playing with trains for most of his life. He recalls a Hornby clockwork set in the attic when he was 5, and he graduated to OO/HO until the slot car craze in the '60s took his interest. Trains took a backseat to career and family for a few years, but the birth of his son was the catalyst for more trains. Twenty years ago, he bought his first live steamer, a Roundhouse Argyll, and since then has owned and tinkered with a wide variety of locomotives. Now living in Maryland, and Florida in the winter, he maintains two small collections of trains; one in each home.

***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!

Advertiser Index

Coming Soon!
Issue #176
November/December 2021

Part 2
Whimsical Climax
Build Series
by Bill Allen

THE FINEST IN LIVE STEAM MODELS

ASTER HOBBY - USRA LIGHT & HEAVY MIKADO
1:32 Scale, Live Steam

ACCUCRAFT TRAINS - SOUTHERN PACIFIC P8
1:32 Scale, Live Stam

J&M MODELS - “TRAIN BLEU’ CIWL SLEEPER
1:32 Scale, Brass

WWW.LIVESTEAMSTATION.COM