No. 172, March/April 2021 US $5.95
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STEAM IN THE GARDEN

RGS No. 20

* Minitram Build Project
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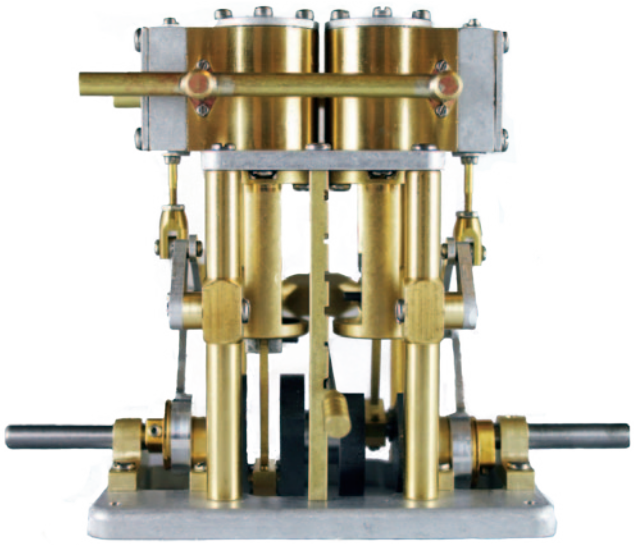
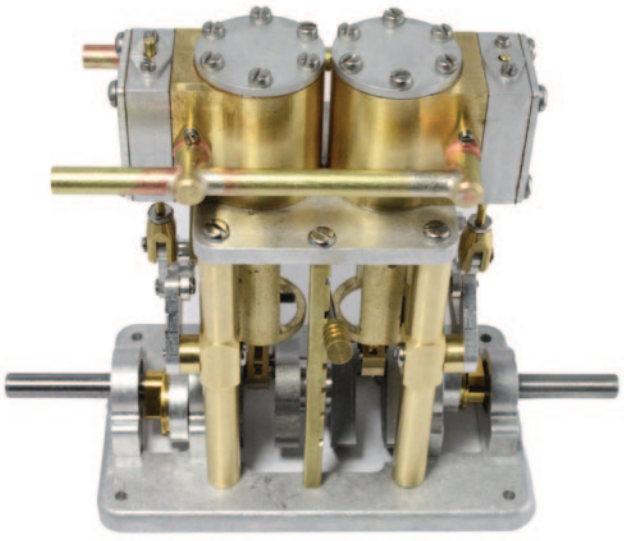


TVR1A

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

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(Solid Marine)

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

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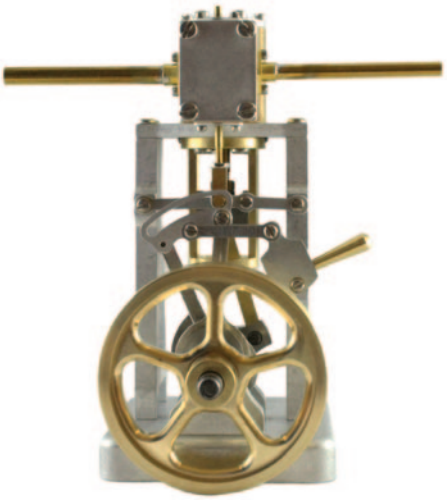

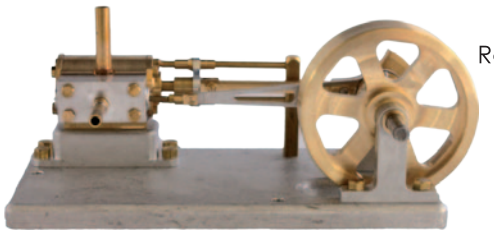

HM1

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

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Double acting, single cylinder
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STEAM IN THE GARDEN

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into trains, propelled by fire ...

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http://www.steamup.com/

In This Issue

Cover: Fresh from the Paint Shop, the RGS #20 is ready for its closeup - **Photo by Ross Schlabach**

Also inside:

LATEST WAYBILL

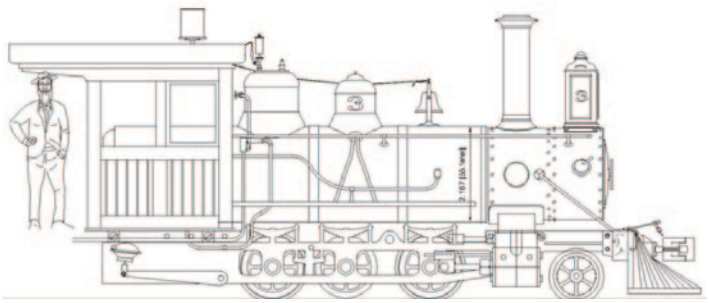
In Memoriam

Charles F. Ro Sr., founder of the Charles Ro Supply Company passed away on December 1, 2020. He was 88 years old.

Charles was a United States Marine Veteran who served during the Korean Conflict. In 1972 he founded the Charles Ro Supply Company in Malden, MA and became the manufacturer of USA Trains after realizing the need for US prototype models compatible with LGB model trains. Charles became one of the number one train manufacturers/dealers in America and the worlds largest Lionel train dealer.

Charles was the beloved husband of 64 years to Ruth L. (Tricca) Ro. He was the loving father of Charles F. Ro Jr. and his wife Jacqueline A. of Saugus, MA. Charles was the cherished grandfather of Katie A. McBride and Kristin A. Ro. He was the great grandfather of Riley D. McBride and Quinn J. McBride.

The Train Department, Hazlet, NJ - Back in stock again are the custom laser cut frames for making a Roundhouse-based 2-6-0.



The locomotive can be built as a inside or outside frame. Frames are designed to drop in SRRL drivers or can use the RH Forney drivers. Both are available as cast iron castings, machined to order. It also accepts a stock SRRL 24 pilot truck and has provisions for a frame mounted axle pump.

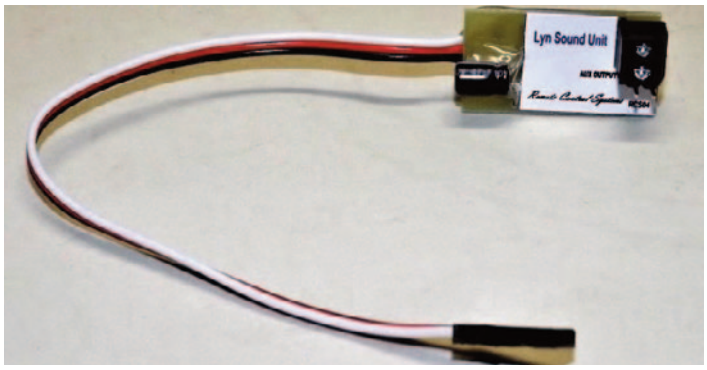
An erection drawing is available from TTD for a base of your build. *www.thetraindepartment.com*

Remote Control Systems (RCS), Australia - RCS, maker of remote control systems for both live steam and electric Gauge One locomotives, has announced the immediate availability of whistle only sound systems for live steam locos.

This plug and play system plugs into your receiver and only requires a suitable eight ohm speaker to produce the sound. Triggering the sounds can be accomplished by any R/C channel to activate the sound. The Channel #5 bind button on all RCS, Micron and Deltang Tx hand-pieces is ideal. Stick radios too.

Sounds currently available include L & B "LYN" whistle, British Narrow Gauge; USA Mainline three Chime; and USA Narrow Gauge five chime.

Vist *www.rcs-rc.com* for full details.



Garden Railroading eNews, Online Newsletter - With the discontinuation of the Kalmbach magazine *Garden Railways*, a grass roots effort to fill in this loss has resulted in the publication of GRNews. Published in digital format only, the newsletter incorporates submissions from Garden Railway societies and clubs from around the world. The newsletter is made available free with its funding from paid advertisers. While the primary focus of the newsletter is for the electric crowd, general garden railway articles on miniature gardening, railway maintenance, and rolling stock projects from club workshops will also be available. Visit *www.GRNews.org* for more information.

Workshop Project

SPng No. 9 to RGS No. 20 Conversion

Text and Photos by Ross Schlabach

When You Can't Buy It, Build It Yourself!

Background

When You Can't Buy It, Build It Yourself! That is not a motto that many people adhere to, but for this model railroader it was the only choice. As a long-time Colorado narrow gauge live steamer in 1:20.3, I have relied on Accucraft to create locomotives that I wanted to buy. And over the years, they have modeled most of the Rio Grande narrow gauge locomotives as well as a few from other railroads. But the one famous locomotive they have never tackled was the Rio Grande Southern No. 20. I was told that the reason Accucraft never modeled that locomotive was that Berlyn Locomotive Works had just built an excellent electric model, and Accucraft didn't believe that there was a big enough market for just a live steam model. Of course, with the recent hoopla around the full restoration and return of this locomotive to operation, it would be a great choice for the next narrow gauge model. Hint-hint! But my dreaming aside, it was not to be. If I wanted a live steam model of RGS No. 20, I was going to have to build it myself!

I'll acknowledge at the outset that I'm no machinist with a shop full of machines – or the skills to use them. I did have a Sherline lathe but my metal-working abilities were limited. So scratch-building a live steam mechanism was out of the question. This left me dead in a ditch until the day I spied a second-hand model of the Southern Pacific No. 9 for sale by the Train Department. As soon as I saw it, the die was cast. I yanked out my volume of "Silver San Juan" and flipped to the drawings section. In a few minutes I determined that the SP No. 9 chassis was close in configuration and dimensions to RGS No. 20, so I grabbed my iPhone and quickly called Jason Kovac. That conversation was brief but successful and in short order the model was on its way to me. In an instant I was in over my head, but I had a donor model and blind determination!

Planning

While waiting for the model to arrive, my first objective was to get a suitably sized set of drawings. And there was my first stumbling point. Kinkos and other copier operations won't make copies of copyrighted drawings, and they were true to that form when I showed up – even though the drawing had on its face a release for modelers to have copies made for personal use. I was finally able to find a

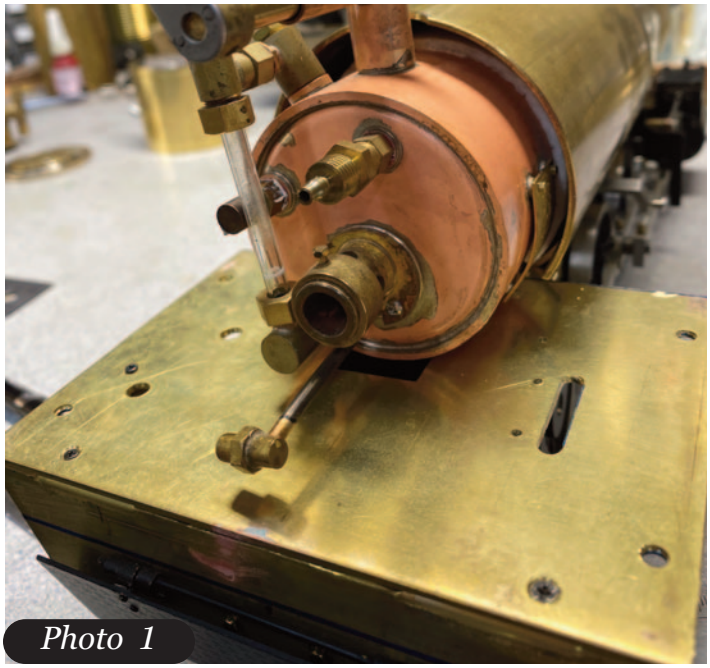


Photo 1

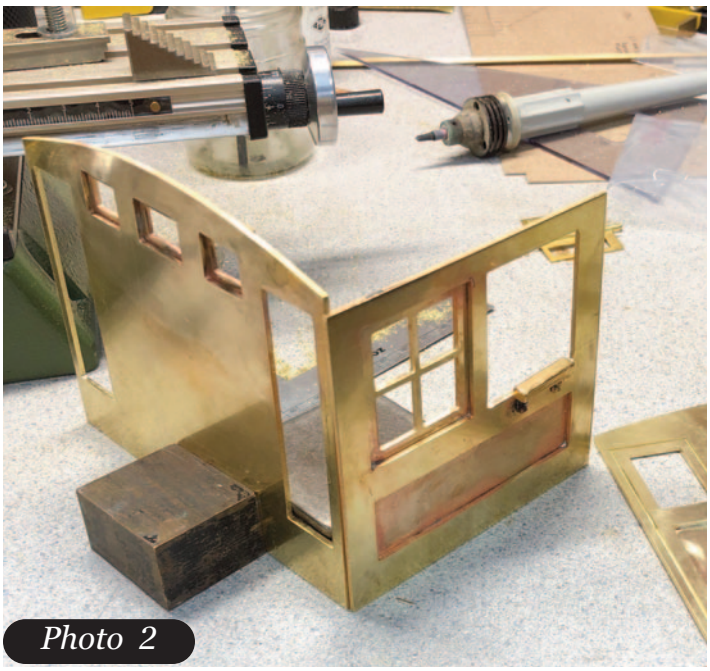


Photo 2

company that could read and understand the release and they were kind enough to make me several sets of 1:20.3 scale drawings. You would think that was the end of that problem, but as I discovered over the ensuing months, this drawing was not very accurate. Fortunately I only had to deal with the drawing errors one at a time. And since I accumulated lots of photos over the course of working on this project, I was able to identify and avoid most of the draftsman's oops.

Construction

My "Christmas Present" arrived in short order and, after a series of careful measurements, I started to dismantle SP No. 9. A quick inspection of the whaleback tender confirmed my suspicions that it would have no part in the conversion other than to surrender its pump and butane tank. Its next trip was a listing on eBay and a quick sale to help me recoup some of my initial expense. The locomotive proper was due for a different treatment. The model lost its cab, smokebox, boiler shell, and pilot in quick order - leaving me with a rolling chassis and an operational boiler. Fortunately for me, SP No. 9 had a cab that was close in size to RGS No. 20, although not so close that I could reuse anything. So my first replacement project was the cab floor (**Photo 1**). It had to be enlarged slightly and I had to insure that all the backhead devices would fit back in place with properly located screw holes and slots.

Next was to build a new cab, one wall at a time, to be soldered together when all the parts were ready. (See **Photo 2**.) Here, I discovered the usefulness of a product called Dykem. You paint this blue solution on the brass, let it dry, and then scratch in the lines for walls and windows. It was about this time that I found out just how tough that brass sheet was. I do have a nice little Hegner Swiss jigsaw with lots of metal-cutting blades, but very quickly I discovered that with this brass sheet you needed blades by the dozens – per wall! The cab had so many window and wood panel cutouts on each wall that I was consuming blades at the rate of one every minute or so. And lighter pressure on the sheet only meant that the cut didn't go anywhere. I needed another method for cutting the walls.

There was one piece of equipment I did have but had little experience with, and that was a Proxxon mini milling machine. I had nothing to lose so I clamped a rough cut piece of brass onto the mill table, slipped a 2mm end mill into the chuck and away I went spinning knobs. I'll give you a Readers Digest version of the outcome; in about five hours of mill time I had four beautiful walls - and I didn't break a single cutter! It was then time to bring out my PBL Resistance Soldering unit. Now *that* I know how to use! So in no time I had a completed cab.

From there I moved on to making a new boiler shell. Since I had no way to roll my own boiler sections, I had to search for suitably sized tubing - again on eBay. And while waiting for that to show

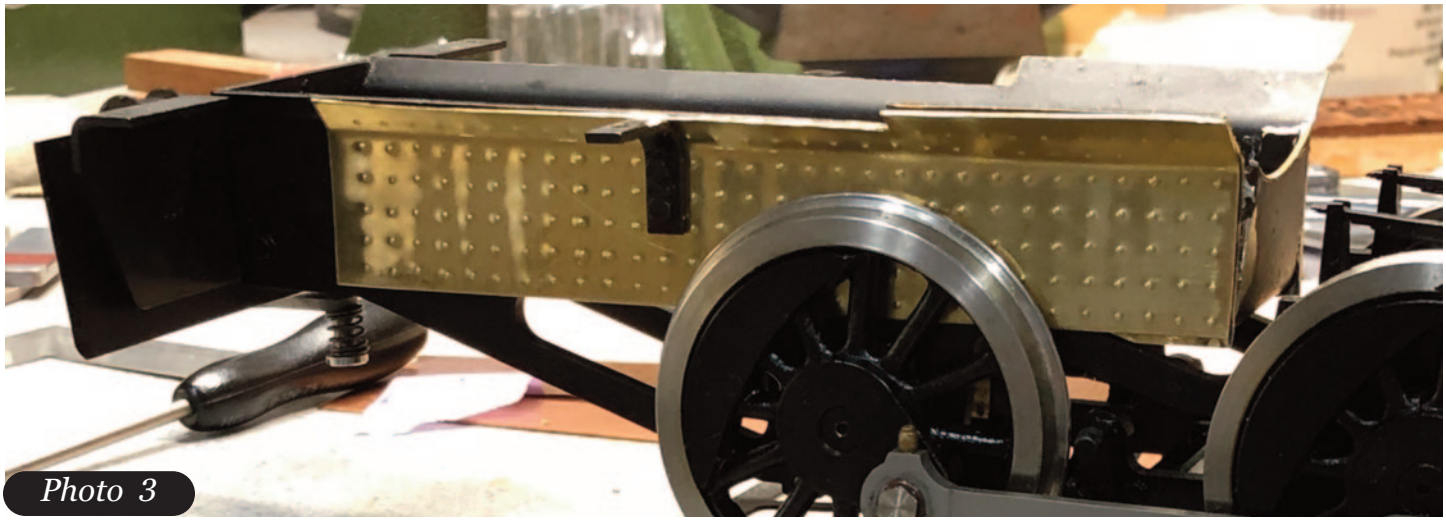


Photo 3

up in the mail, I decided to start tackling little jobs. The firebox on the existing chassis was all wrong, so I made up a new one and figured out how to attach it (see **Photo 3**). Then it was on to the pilot which I fabricated from a beam made of cherry wood and a boiler tube cowcatcher scratched from bits of copper tubing and sheet brass. (See **Photo 4**.)

Next came a new smokebox front since the original was unsuitable. In this process I learned that not all brass machines well; some brass smears when turned on a lathe. Another long delay ensued as I ordered a rotary table from Sherline so I could properly space all the "rivets". That's in quotes because the real thing had bolts and nuts around the front of the smokebox instead of rivets, but since there are no correct size nut/bolt castings to be found, rivets it had to be. The door proved to be the toughest challenge since eight dogs had to be soldered around the door perimeter to allow it to open for lighting the burner. And then there were the door hinges plus actually getting the door to close and latch properly. (See **Photo 5**.)

The SP No. 9 smokebox itself had way too many holes and most were in the wrong places, so the solution was carefully applied JB Weld with a couple of prototypical brass patches. But that wasn't the only problem with the smokebox; it was too big in diameter. So it had to be unsoldered, cut down and resoldered to exactly the right diameter while making sure the openings in the bottom of the smokebox provided the correct clearance for the exhaust nozzle and mounting screws.

The boiler shell was its own nightmare: three sections with the middle one being an offset-axis cone. And of course the front section was an odd

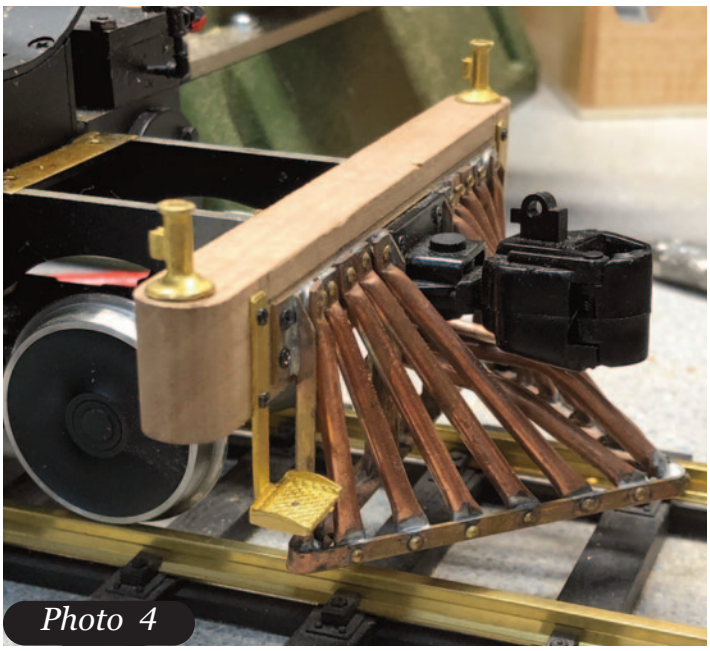


Photo 4

size that I had to fabricate by cutting a slice out of a larger tube and then using hose clamps to squeeze it down to the proper size before soldering it back together. (See **Photo 6**.) I was so bad at that soldering process that I soldered the clamps to the brass boiler section – requiring more careful desoldering to free the clamp without destroying the new boiler seam. With that work undone, I ended up bolting the two end sections to a board in their respective positions and made test cones out of heavy paper stock until I came up with one of the proper shape to fit in between the outer sections.

Then I had the less-than-delightful task of cutting that pattern in heavy brass, rolling it to the proper shape by hand and then soldering all three sections together. JB Weld came to my rescue as the seams were not perfect. The final act of wrapping the seams with narrow strips to simulate the boiler straps completed the repairs and left me

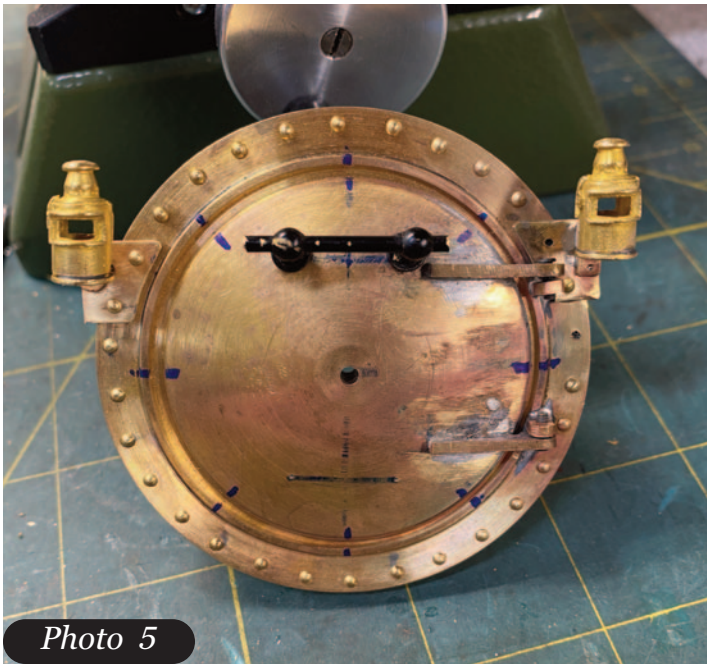


Photo 5

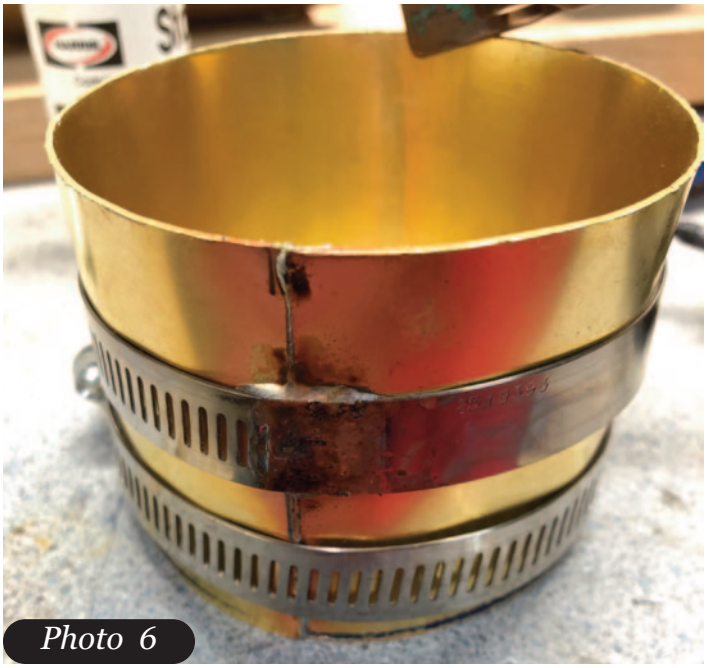


Photo 6

Photo 7

with a suitable boiler shell. But then I had to commit the indignity of cutting holes in the new boiler shell to clear valve components and the firebox. I was very fortunate that the new boiler shell was a good bit larger than the functional boiler inside, so clearances were not a serious issue. We'll not talk about all the other holes that had to be made in the boiler shell for domes, handrails, running boards and such. Just getting handrail stanchions level was a real challenge – especially on a boiler of uneven diameter.

The next challenge was domes. With a boiler shell over two inches in diameter, the bottom of each dome required serious fly cutting equipment and skills: neither of which I possessed. But Cliff Ward did. He provided me with beautifully fly cut domes for my model and he even did all the shaping on the sand dome. I owe him a debt of gratitude as well as recognition for his talents. He left to me the job of shaping the complex steam dome, and you wouldn't believe how big a slug of brass that a small Sherline lathe can swing. The end result speaks for itself. (See **Photo 7**.)

The detailing of the boiler, a procedure that took place both on and off the chassis, takes much longer than one might expect, and this process required that the boiler be repeatedly mounted and removed from the chassis. Having built over 35 Aster kits, I had learned how parts could be fastened to the boiler and yet be removable for painting or service. I put that knowledge to work and used up many of the excess screws I had accumulated in building all those Aster kits. This facilitated the final teardown for painting and reassembly.

Tender

While all this work was proceeding, I hadn't forgotten the tender. After discussions with folks I considered expert in the field, I made contact to get my tender tank drawn up and turned into a group of etchings that I could then assemble into a tender tank. This process spanned over ten months as life got in the way. I saw the finished drawings after four months, and turned them over to an expert who went back over the drawings with a fine tooth comb. Then the drawings were sent off for negatives to be made. Those came back to be checked and then they were sent to the etching company. After a long wait, the news came in that my etchings had been completed and sent back to my expert for inspection - where he discovered that they forgot the final step of etching all the line and rivet detail into the individual components. So back to the

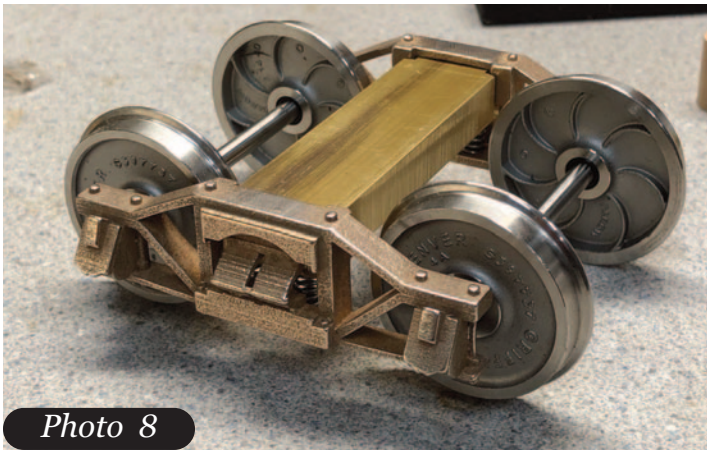


Photo 8

etching company who then took another month to complete the process they should have done properly five weeks before. But when the final etchings reached me, they were beautiful! In an abundance of caution I had two complete sets made, but I didn't need the spare set so they may show up on eBay some day soon.

I had a lot of spare time while waiting for the tender etchings, which I put to good use by building the tender chassis. There was one real stumbling point and that was the absence of any suitable tender trucks for this model. But I had a savior named Rob Lenicheck. With a profile drawing and a few photos, Rob whipped me up a drawing file that Shapeways turned into exquisite bronze side frames; see **Photo 8**. He also recommended suitable springs, drew up a sketch for the design of the bolsters, and sent me on my way. Rob is the second of the two heroes on this project without whom I would never have been able to complete this model. I also latched onto a set of Jason Kovac's scrumptious Denver Griffin wheelsets which were appropriate for this model. With a little time at my Proxxon table saw with a metal cutting blade and my drill press, I fabricated the bolsters and drilled the custom side frames for ball bearings, and in short order had a gorgeous set of tender trucks.

The rest of the chassis work was relatively simple and consisted of cutting the deck, bending up an underframe, and mounting a pair of cherry end beams. Then it was a matter of mounting the various detail parts, all of which I sourced from Trackside Details.

RGS20 Tender Truck Frame Link
shapeways.com

In what seemed an age, my tender etchings made their grand entrance. I followed my expert's advice and primed the etching sheet to guard against fingerprints and other blemishes on the etchings. Then I dove in, cutting components from the sheet as I needed them. The actual tender wrapper was 28 inches long while the limit for a single etched sheet was 24 inches, so I had to carefully solder together the two halves before starting the bending process. I had previously made a wooden tender tank plug and this gave me something to start the shaping on (see **Photo 9**), but 0.030-inch brass is mighty stiff and would spring back when released from the plug. So much of the forming ended up being done freehand. In the end, I got the shape right and soldered in the top of the tank. I couldn't enclose the bottom because the remaining opening was too small to allow the butane tank to pass through, so the tender tank was made as a cover that came down over a water tank with the butane tank installed inside. This leaves enough space behind the water tank for RC receiver and battery to be added at a later date.

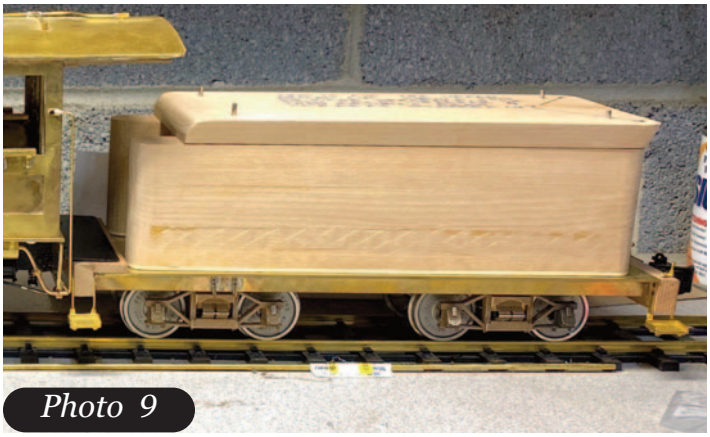


Photo 9

With the basic tank formed and mounted on the chassis, it was time to add details like coal boards, air tank, water hatch and such. RGS No. 20 is special in that it has special fittings on the rear of the tender that allow the display or storage of a pair of marker lights, and scratching together these bits ate up an entire afternoon, (**Photo 10**)

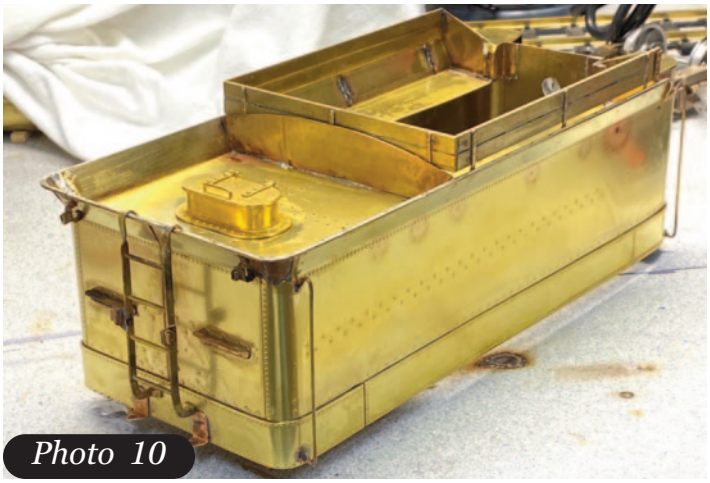


Photo 10

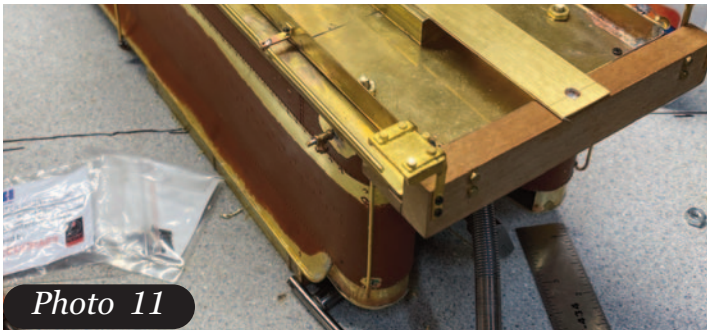


Photo 11

The last pieces to complete the tender were all the pipes to the air tank and last but not least, the drawbar pin. Nothing in the building of this model had been easy and the drawbar pin was to be no exception. Through careful measurement, I had determined that the model could be capable of negotiating an eight foot radius - even though most tracks I frequent are 10 feet or wider. This placed the drawbar pin right in the middle of the front cherry beam - not the strongest point for attachment. But I came up with a simple solution to protect the beam. I ran a five-eighths inch wide strap from the front truck bolster up to the front of the underside of the beam, (**Photo 11**), and the drawbar was installed through this plate into the beam. This strap carries the drawbar load back to the chassis and should protect the beam from splitting. With this step completed, the only tasks remaining were a final clean-up of the tender followed by paint and decals – plus a coal load to hide the butane tank.

Upon recommendations from Jon Cagle, I had primed all the etchings before assembly and just removed the primer from the spots where I needed to solder components together. So this created more work for me in preparation for final painting. But lacquer thinner was up to the task and in short order all traces of primer were gone, and the brass was given one last scrub-down before paint. I use Scalecoat I, so no primer was required, and the black went on nicely.

After baking and a suitable wait for a good cure, it was on with the decals, followed by sealer. I always dread this step because I have had less than complete compatibility between Scalecoat's paint and sealer products plus issues with decals lifting. This time I was able to breathe easy as the sealer went on well and gave me no complaints. There was one final step that I had not considered and that was the white stripe on the tender deck, so that was added and I scarcely breathed during that step either.

With the tender complete, I made one last run to the hardware store for a small piece of aluminum flashing and a bottle of white glue to make a coal load. The flashing formed up easily into a tray, and a small brass loop gave me something to pull on to remove the coal load for gas and water. My only hangup was that the gas filler stuck up too high and I had to pound a giant dimple into my flashing pan to clear it. After final fit was confirmed, I started adding coal chunks that I had beaten senseless to get them down to size, and I used the age-old track ballast method of securing the coal in place: a layer of coal, a quick spritz of water containing a few drops of detergent, and then dripped on the glue. A little extra spritz got everything flowing. I repeated that step several times until I was pleased with the shape of the load. After suitable drying time, I did apply a coat of clear to seal everything, but I must remember not to trust the coal load during wet-weather operations.

Since I had successfully steam-tested the model right after purchase, I have no reason to expect trouble. But it has found me before and it may find me again. That's why I carry a box of tools! I haven't had an opportunity to give No. 20 her first, post-conversion, steaming because of the lingering virus. But this wait should leave me time to build up my courage enough to do a decent weathering job on my still far-too-pristine locomotive. Stay tuned for a brief steam-up report in the near future!

Workshop Project

Freelance Consolidations

A New Build Series

Part Two

Text, Photos & Drawings by Les Knoll, PE

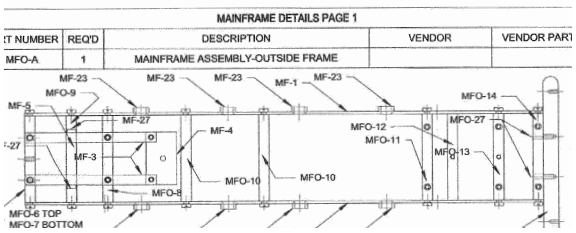
In this installment, the drivers, pilot truck, cylinders and valve gear will be installed on the mainframe. The finished result will be a rolling chassis capable of propelling itself by air or steam.

Freelance Consolidations Construction Series

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

Axles and Wheels

Installation of the axles and drivers in either outside frame or inside frame versions is straightforward. This was prepared for in the first installment by assuring the axles would turn freely. The Walsall drivers used in the inside version and the Roundhouse counterweighted cranks used in the outside frame version are both attached to their axles with square holes and square shaft ends, assuring proper quartering. Make sure that in all four wheelsets, the crankpins or crankpin holes on the right side are 90 degrees ahead of those on the left.



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

In the inside frame version (**Figure 2-1**), the wheelset assembly LWI-25 requires that the two crankpins be installed (**Figure 2-2**). This is covered in the drawings and consists of tapping the two crankpin holes in the drivers 5-40 UNC and screwing in a 5-40 socket head cap screw LWI-24, then securing it with Loctite Thread Locker Red. The excess length of the screw is then cut off, and the unthreaded portion is used as the crankpin. If the crankpin ever needs to be removed, as in replacement due to wear, application of

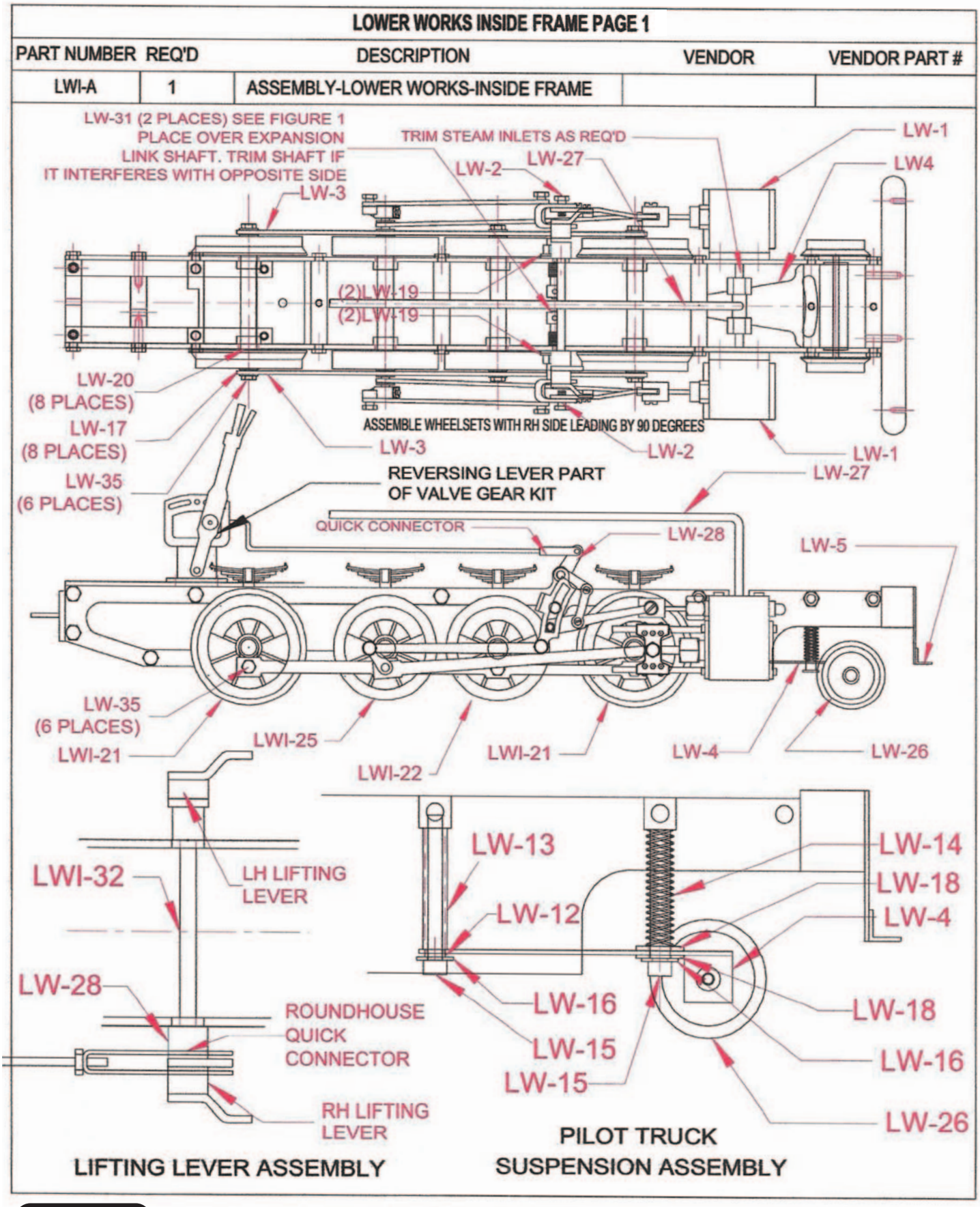

LOWER WORKS INSIDE FRAME PAGE 1
PART NUMBER REQ'D
DESCRIPTION
VENDOR
VENDOR PART #
LWI-A
1
ASSEMBLY-LOWER WORKS-INSIDE FRAME
LW-31 (2 PLACES) SEE FIGURE 1 PLACE OVER EXPANSION LINK SHAFT. TRIM SHAFT IF IT INTERFERES WITH OPPOSITE SIDE
TRIM STEAM INLETS AS REQ'D
LW-1
LW4
LW-2
LW-27
LW-3
(2)LW-19
(2)LW-19
LW-20 (8 PLACES)
LW-17 (8 PLACES)
LW-35 (6 PLACES)
ASSEMBLE WHEELSETS WITH RH SIDE LEADING BY 90 DEGREES
LW-3
LW-2
LW-1
REVERSING LEVER PART OF VALVE GEAR KIT
LW-27
QUICK CONNECTOR
LW-28
LW-5
LW-35 (6 PLACES)
LWI-21
LWI-25
LWI-22
LWI-21
LW-4
LW-26
LWI-32
LH LIFTING LEVER
LW-28
ROUNDHOUSE QUICK CONNECTOR
RH LIFTING LEVER
LIFTING LEVER ASSEMBLY
LW-13
LW-14
LW-18
LW-12
LW-4
LW-16
LW-18
LW-15
LW-15
LW-16
LW-26
PILOT TRUCK SUSPENSION ASSEMBLY

Figure 2-1

LOWER WORKS PAGE 7					
PART NUMBER	REQ'D	DESCRIPTION		VENDOR	VENDOR PART #
LWI-21	2	WHEELSET 42 MM X 46 MM FLANGED		WALSALL MODEL INDUSTRIES	1871
LWI-22	1	WHEELSET 42 MM BLIND		WALSALL MODEL INDUSTRIES	1871
LW-25	MADE FROM				
	1	LWI-23	WHEELSET, 42MM BLIND 2.6MM C'PIN HOLE	WALSALL MODEL INDUSTRIES	1871
	2	LW--24	SCREW, SOCKET HEAD CAP, 5-40 X 2.00	MCMASTER CARR	91251A219
LW-26	1	ROUNDHOUSE "SANDY RIVER" PILOT WHEELS		ROUNDHOUSE ENGINEERING	PILOT WHEELS FOR "SANDY RIVER"

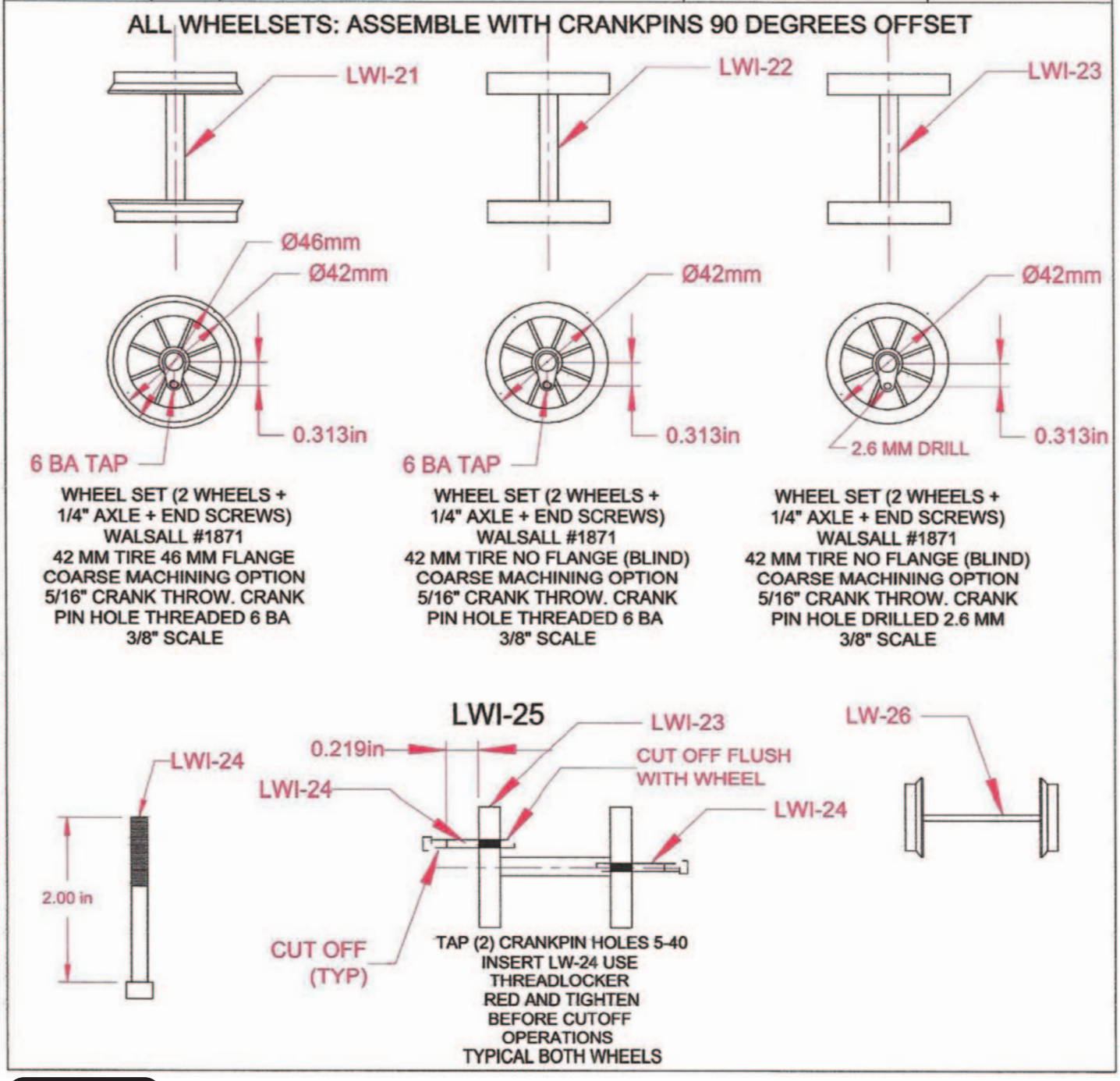


Figure 2-2

heat with a torch will plasticize the Thread Locker, freeing the crankpin without melting the cast iron drivers. The outside frame version has crankpins already press fit to the counterweighted cranks.

In the outside frame version, remove one crank/counterweight from the axle assembly LWO-23 or LWO-24 and place a brass washer LW-20 onto the axle. Pass the axle through the bushings on one side of the mainframe. Two drivers are then assembled onto the axle inside the mainframe. Finally pass the axle through the other bushing in the mainframe, add the second LW-20 brass washer, and assemble the second crank/counterweight to the axle 90 degrees out of phase with the first, with the right side leading. Holes are square to assure proper quartering. Brass washers LW-20 are also placed between the bushings and drivers in the inside frame version. The washers keep the side-to-side play of the drivers to a minimum and prevent the valve gear from fouling due to excess side-to-side axle play. The washers could be omitted if there is no significant side-to-side play in the assembly. Refer to the assembly drawings LWO-1 or LWI-1 to make sure the proper wheelsets and counterweights are installed at each axle location. The crankpin for either driven axle is on the third wheelset from the front. Note that on the outside frame version, the drivers will have to be set for correct gauge after assembly. Kadee makes a combination coupler height and track/wheel gauge, their KAD980, which is handy for setting wheel gauge as well as adjusting couplers.

When all four wheelsets are installed, the connecting rod LW-3 can be put on. A #30 (0.1285-inch) drill can be used to open up the crankpin holes because they may be slightly undersize as a result of the waterjet manufacturing process. Slip the second-last hole in the connecting rod over the crankpin and attach the connecting rod to the rest of the drivers using Roundhouse crankpins LW-35. The waterjet-produced sideframes and connecting rods are manufactured with extreme accuracy and if properly installed, the eight driver and connecting rod assembly should freely rotate without any adjustment or enlargement of the connecting rod crankpin holes.

Cylinders

Installation of the cylinders is essentially identical to what is done in the Roundhouse kit locomotives. The first step is admittedly the hardest – the installation of the exhaust tubes. These have to be done before assembling the cylinders into the mainframe because they screw into the cylinders. Installing the exhaust tubes into cylinders which are already in the mainframe is impossible. The screw-in exhaust tubes are a design improvement by Roundhouse. They eliminate exhaust tubes falling out of the cylinders during running, something that would occasionally happen when they were just pressed into the exhaust holes in the cylinders.

Before installing the cylinders, exhaust tubing and superheater, remove the front deck (MFO-17 or MFI-17). The copper tubes supplied in the cylinder kit are quite malleable and bend easily. The initial bends should be made using a small tube bender such as the Du-Bro No. 785. Making the first bend is shown in **Photo 1**. The tube must then be bent with a relatively wide radius around the steam inlet pipe, as shown in **Photo 2**. This is done to clear the attachment nut on the superheater (LW-27) fittings. When complete, the exhaust tubes should be centered on the frame with space left in the center for the superheater tube as shown in **Photo 3**.

After the exhaust tubes and the superheater are in place, the front deck may be replaced if desired. The front deck may be put on or removed by tilting the superheater upward and sliding the superheater and exhaust tubes through the opening in the deck (**Photo 4**).

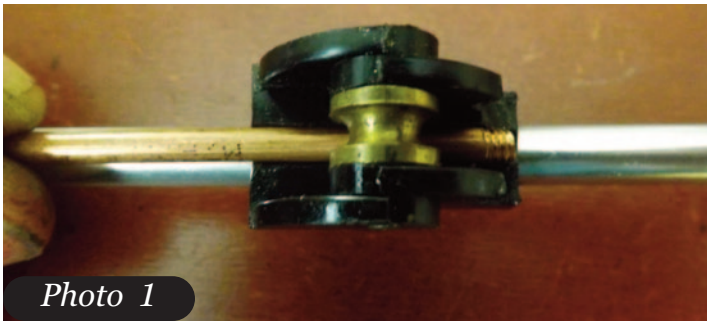


Photo 1

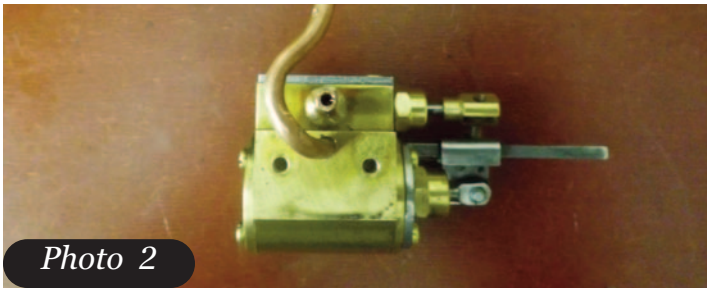


Photo 2

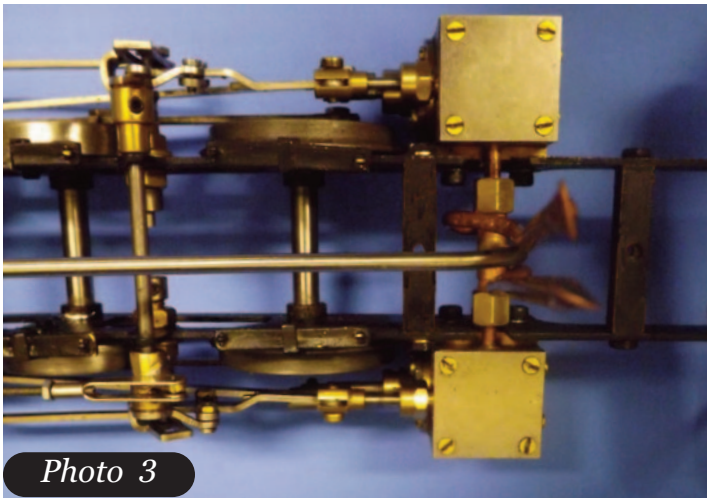


Photo 3

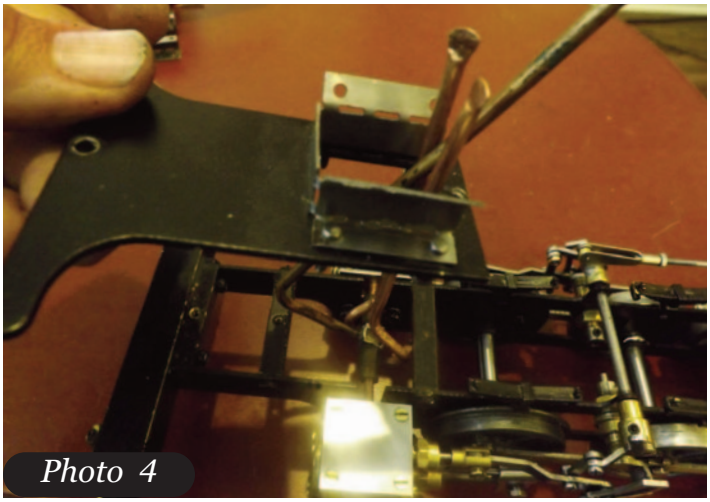


Photo 4

With the exhaust lines formed, the cylinders and superheater can be installed in the mainframe. The steam inlet lines on the cylinders are made overly long so they can be installed in either inside or outside frame locomotives, using the same standard Roundhouse nine-inch superheater for either one. As received, the steam lines will be too long to use on the inside frame version without trimming.

On the inside frame version, place the cylinders in position on the mainframe and determine how much inlet tubing must be trimmed if there is to be a 0.375-inch gap between the steam inlet lines, centered on the center of the mainframe. This is for clearance in the installation of the superheater, allowing it to clear the center steam inlet line from the boiler. Trim the steam inlet lines symmetrically using a rotary tool (safety goggles, please) then clean out the tube openings with a small round file. File a slight taper on the OD of each tube for easy insertion into the superheater nuts. The superheater fittings contain small "O" rings through which the cylinders' steam lines pass, and these must not be torn or otherwise damaged by rough edges on the inlet tubing.

Remove the nuts and "O" rings from the superheater LW-27 and place a nut on the cylinder steam inlet line, then slide an "O" ring over the steam inlet line. Do this for both cylinders then assemble the cylinders into the superheater as shown in LWO-A or LWI-A. Turn the nuts onto the superheater fitting, but do not fully tighten. Allow the steam inlet lines to freely slide in the superheater fitting. Mount the cylinders into the frame with the socket head screws and standard metric hex wrench provided. Before tightening the cylinder mounts, make sure the piston rod lines up with the center of the drivers. **Photo 5** shows an overview of the Lower Works for the inside frame locomotive, and is oriented in a similar way to LWI-A (**Figure 2-1**). Note that R/C servos have already been installed in this prototype as part of the design evaluation process. When everything is aligned and cylinders tightened down, the nuts on the superheater may be tightened to insure a steam tight seal.

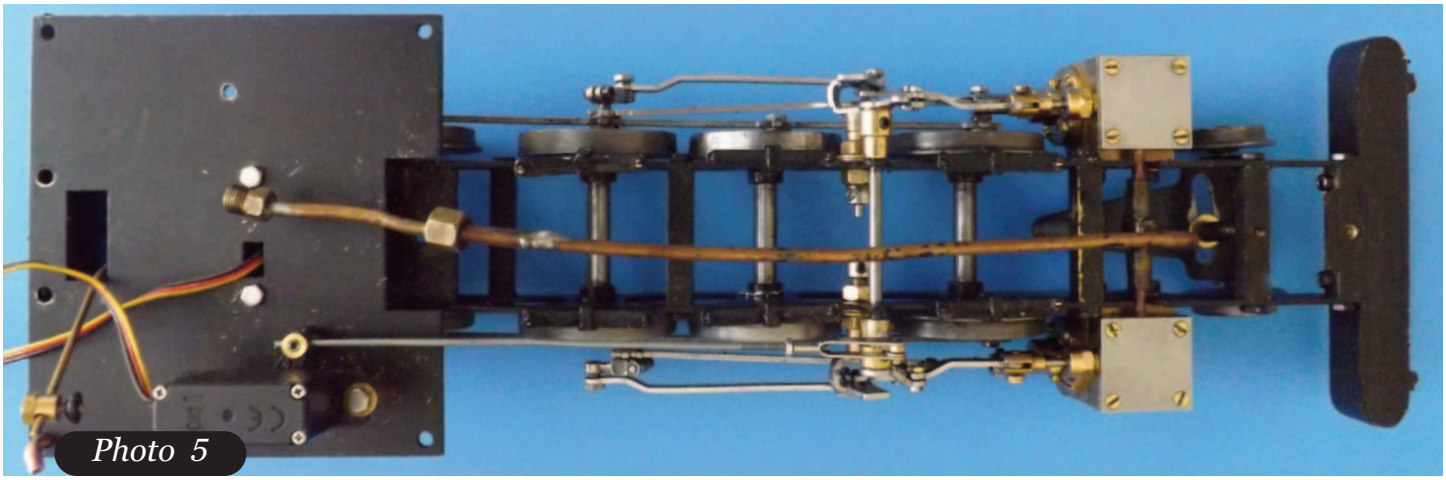


Photo 5

LOWER WORKS PAGE 2				
PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
LW-1	1	CYLINDER SET	ROUNDHOUSE ENGINEERING	C
LW-2	1	WALSCHAERT VALVE GEAR KIT	ROUNDHOUSE ENGINEERING	W V G INCLUDE 2 MEDIUM LENGTH (101.6MM) CONNECTING RODS

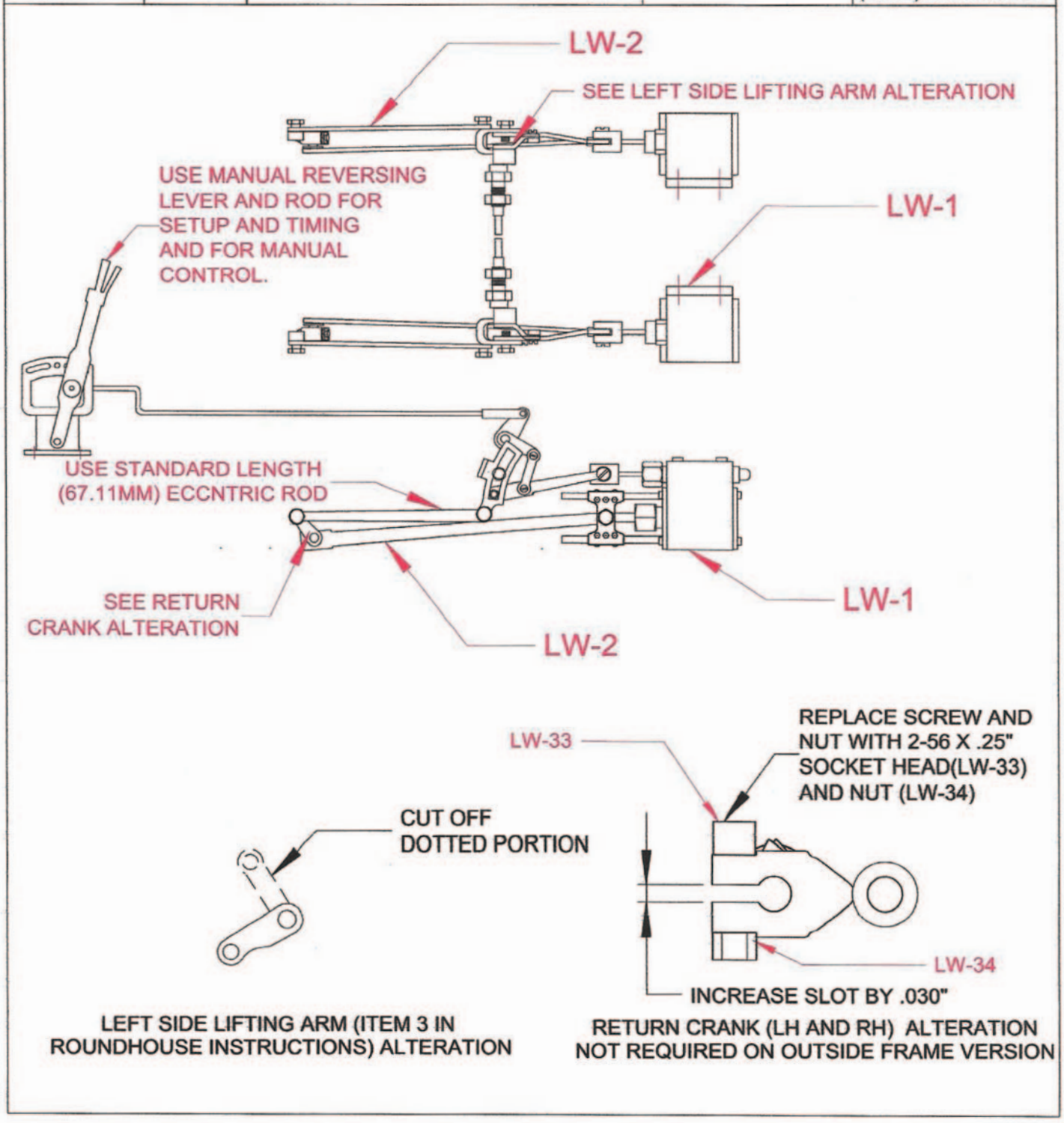


Figure 2-3

Valve Gear

Installation of the Roundhouse Walschaert valve gear (LW-2) is very clearly explained and well illustrated in the instructions that come with the kit, so there is no reason to re-invent the wheel by repeating these instructions. However, there are several notable variations which are shown in the drawings and discussed here.

The first of these is the installation of the expansion link (*Roundhouse item 9*) and expansion link bushing (*Roundhouse item 4*). Refer to **Figure 2-4** in the drawings. The mainframe design eliminates the need for the weight shaft bracket (*Roundhouse item 5*). In order that the rest of the valve gear still lines up as intended, two washers LW-19 are installed ahead of the expansion link bushing. The bushing is then inserted in the hole in the mainframe and fastened with the 2BA nut supplied. Instead of the Starlock washer (*Roundhouse item 7*) at the end of the expansion link shaft, a collar LW-31 is used. In the case of the inside frame version, the ends of the expansion link shafts may touch or even interfere with each other. If this is the case, they can be trimmed back to the end of the collar. This is shown in **Photo 5.**

The weight shaft assembly is also somewhat different. The curved weight shaft supplied in the valve gear kit cannot be used on the inside frame version and is not required on the outside frame version due to the height of the boiler. This item (*Roundhouse item 6*) is replaced by LWO- 32 on the outside frame version and LWI-32 on the inside version. The assembly of the weight shaft components is also different, because the reversing gear is now operated from the right side rather than the left. This is, after all, a Yankee locomotive with the engineer on the right! The left hand lifting arm has its link to the reversing mechanism cut off and a new arm assembly LW-28 is substituted on the right side.

Note that no location dimension for LW-28 has been given on the outside frame assembly drawing. Since the arm is built around a collar with setscrew, it can be easily adjusted. If the outside frame chassis is to be manually controlled, or when the manual reversing lever is used for setup and timing, this lever can be aligned with the actuator rod and quick connect clevis. A closer view of the weight shaft assembly can be seen in **Photo 6**.

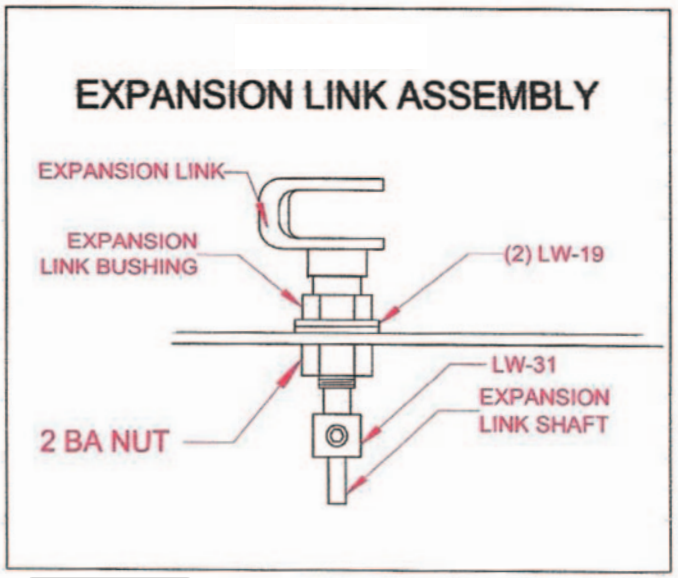


Figure 2-4

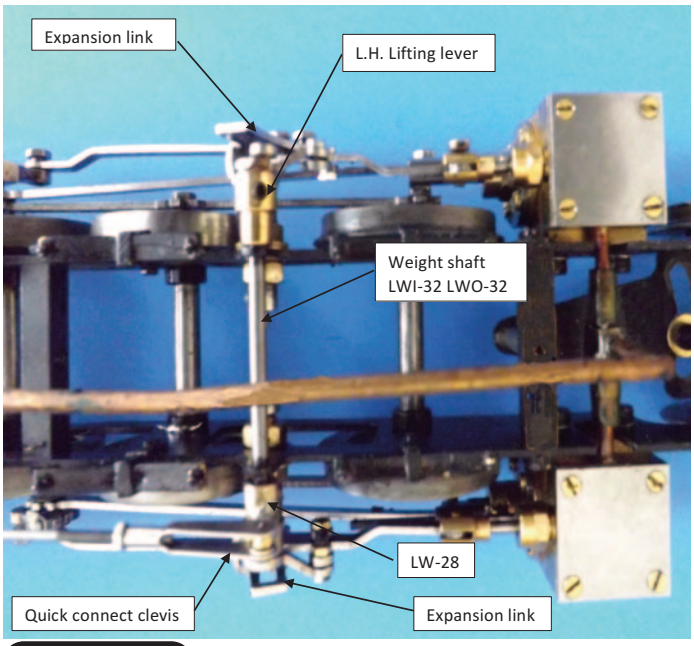


Photo 6

With the exception of these variations, assemble the valve gear in the manner described in the Roundhouse instructions just as if it was being installed on a Roundhouse kit locomotive. Note that the standard length eccentric rod is used in the assembly. Both the standard length and short length are supplied with the valve gear kit. The cylinder connecting rods (not usually included with the valve gear kit, but specified in item LW-2) should be installed at this point before installing the return cranks.

The installation of the return crank on the inside frame version requires a slight rework on the return crank itself. Since the 5-40 cap screws used as (main) cranks can run slightly undersize compared

LOWER WORKS PAGE 3				
PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
LW-3	2	STAINLESS STEEL BAR .025" x 1/2"	K & S	6511K221 (36" FOR 2 PCS)
LW-3 (ALT)	2	CONNECTING RODS .062" STAINLESS	DENVER WATERJET	LRK280/LW-3
LW-4	1	.032 MILD STEEL OR STAINLESS		
LW-4 (ALT)	1	SHEET, STAINLESS STEEL .030	DENVER WATERJET	LRK280/LW-4

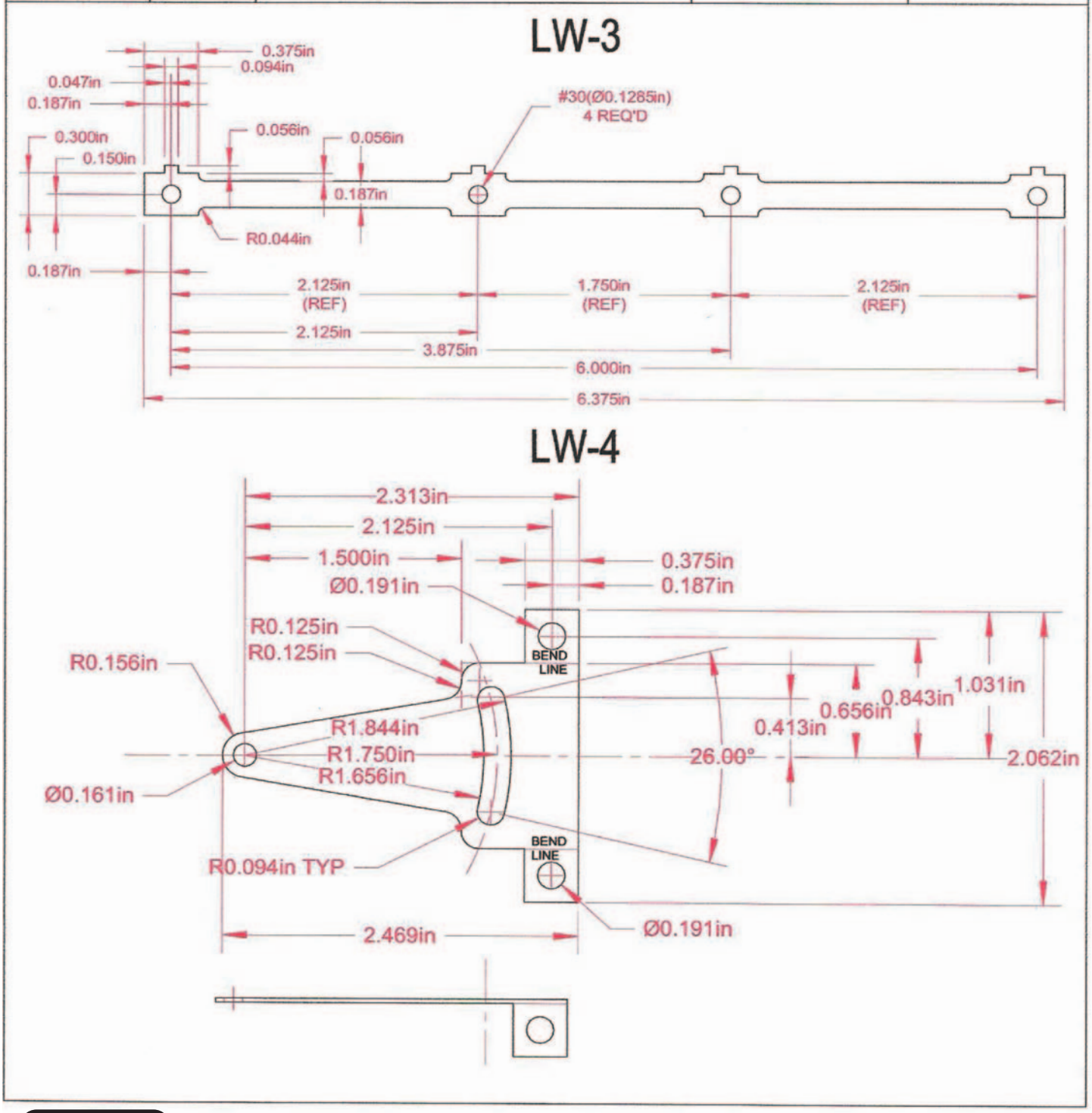


Figure 2-5

to the one-eighth inch crank normally used by Roundhouse, the slot on the shaft side of the return crank is opened up slightly to accommodate more adjustment, and the screw and nut provided are replaced with a socket head cap screw and nut for easier and tighter clamping. Drilling out and pinning the return cranks to the crankpins after timing is completed is not recommended in case the crankpins slip or wear after prolonged use, so this method of clamping must be entirely relied upon. There is no return crank rework required if using the Roundhouse outside frame axles and counterweights fitted with cranks. In the case of crankpin wear, the axle and counterweight/crank assembly must be replaced.

Setting the return cranks exactly 90 degrees ahead of the main crank can be a daunting task for the inexperienced builder, and even sometimes for experienced ones! To make this task easy and foolproof for everyone, there is an article in this issue of *Steam in the Garden* on setting the return cranks on Roundhouse (and other) locomotive mechanisms, using the same basic methodology used in smaller scale locomotive construction for quartering drivers. When installing the return cranks on either version of this locomotive, follow the instructions and use the fixtures described in the article. These simple but somewhat precision fixtures (**Figure 2-7**) may be ordered through Denver Waterjet. Part LWO-8 is for setting the main crank on outside frame versions, and LWO-9 is used to set the outside frame version return cranks. Part LWI-10 is used to set the main crank on inside frame versions, and LWI-11 to set the inside frame return cranks.

Continue with the valve timing section in the Roundhouse instructions. This next section covers the centering of the "D" valves. With the steam chest covers off, the operation of the valves as the drivers are turned may be observed. This is most educational in learning how a steam engine works. When the timing is set according to all instructions, replace the steam chest covers and make sure the nuts on the superheater tee are tight. The moment of truth has arrived.

As a preliminary check, rotate the drivers and make sure the connecting rods and valve gear all run smoothly, the drivers are properly quartered and the return cranks are properly set in relation to the main cranks. Do a second check with the fixtures just to make sure. For setup and timing purposes, install the manual reversing lever and push rod with its quick connect clevis on the cab base, and connect it to the lever that activates the weight shaft. Make sure that both sides of the valve gear are synchronized, i.e. both radius rods drop all the way to the bottom of the expansion link in forward and go all the way to the top in reverse.

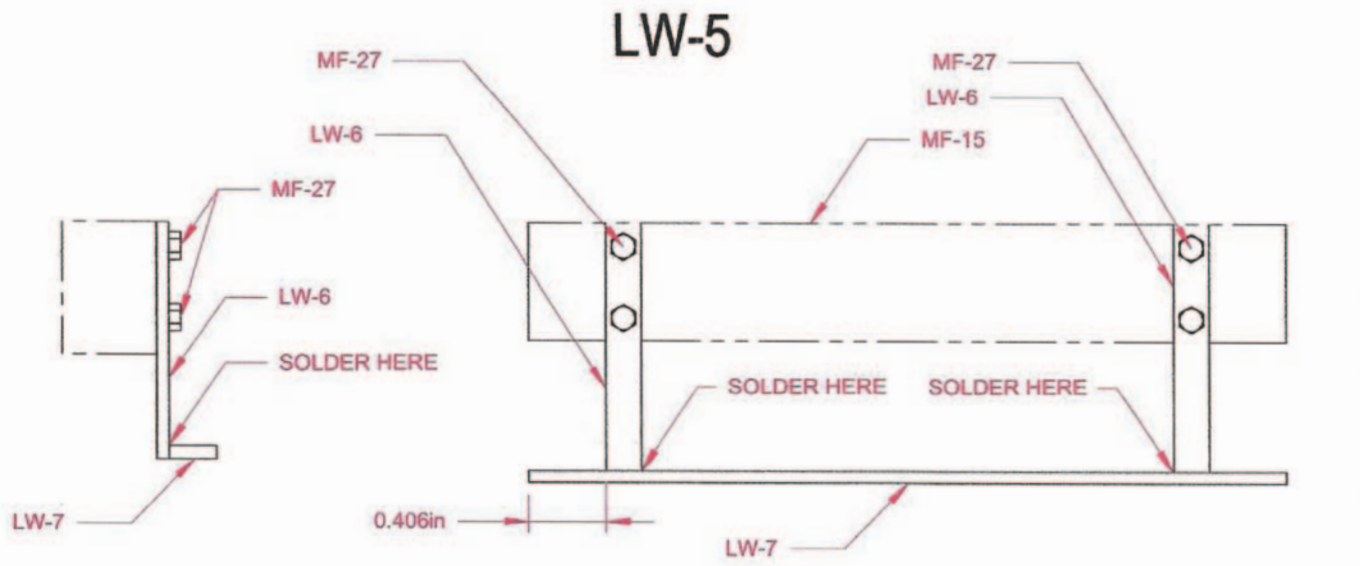
Put the chassis either on rollers, or on blocks at each end of the chassis, so that the wheels can freely rotate. Placing the chassis on blocks may be preferred for this step since rollers can introduce some rolling resistance. Place a few drops of light oil in the inlet end of the superheater, and a few drops on the piston rods and valve rods. Place the reversing lever so the valve gear is in forward position (radius rods at bottom or near bottom on the expansion link). Now connect an air supply and gently increase pressure from zero to 10-15 PSI. When the chassis springs to life, it's time for celebration! Shut the air off and put the valve gear in reverse. Again apply 10-15 PSI of air. The engine should run equally well in reverse.

If the chassis is running roughly or not at all, first check the "D" valve positioning as shown in Roundhouse instructions. If this does not cure it, read the instructions in the *SitG* article on timing with fixtures, and the instructions Roundhouse provides with the valve gear. Finally, if the chassis parts were not obtained from Denver Waterjet, check dimensions on mainframe sides, connecting rods and other mechanism parts. The prototype chassis was built with all Denver Waterjet parts to prove the design and the manufacturing process as well as the timing procedures. After assembly according to all instructions, the chassis operated perfectly on the first application of air (boy did I breathe a sigh of relief!) and has not yet had any adjustment made on either air or steam operation since.

When the chassis is running, the more "cosmetic" aspects of the lower works, such as the pilot and pilot truck, can be built. The pilot assembly LW-5 is made using the existing bolster MF-15 and several parts that are fastened to it, then soldered together when positioned on the bolster.

LOWER WORKS PAGE 4

LW-5	MADE FROM		DESCRIPTION	VENDOR	VENDOR PART #
	2	LW-6	BAR, BRASS .064" x .25"	McMASTER CARR	8859K87
	1	LW-7	BAR, BRASS .064" x .25"	McMASTER CARR	8859K87
	4	MF-27	SOCKET HEAD SCREW 2-56 X 1/4"	WOODLAND SCENICS	HOB-BITS H874



MOUNT (2) LW-4 TO MF-15 (ALREADY ON MAINFRAME)
USING (4) MF-27. SOLDER ON LW-3 WITH (2) LW-4 IN PLACE.

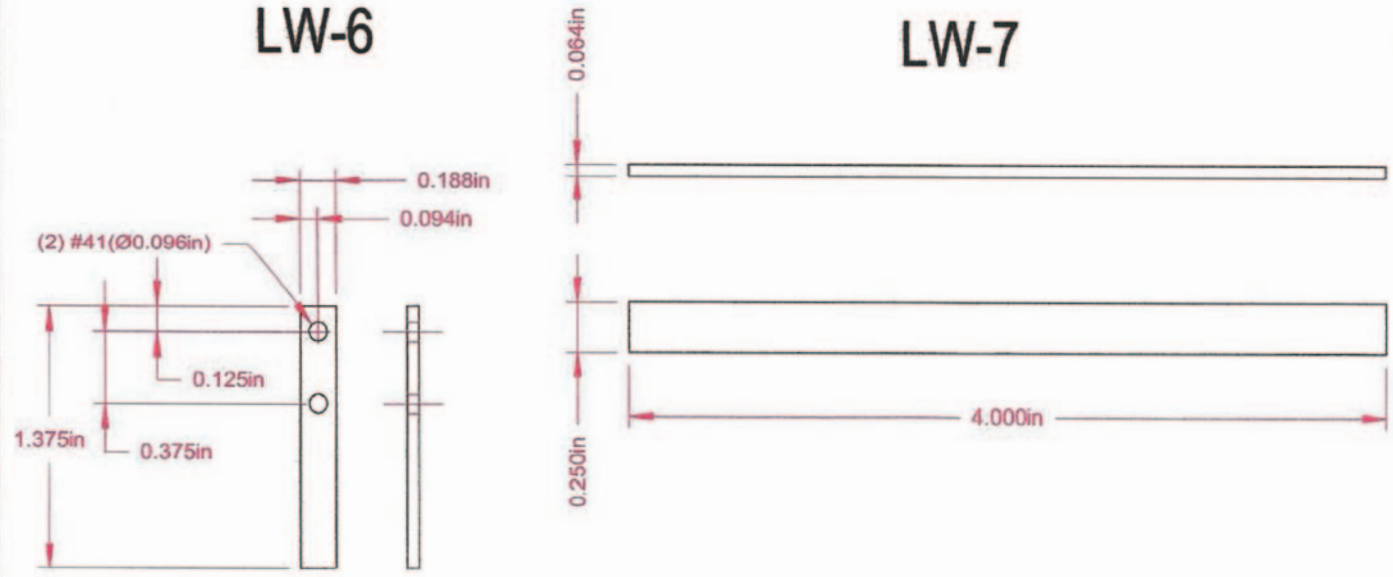


Figure 2-6

Pilot Truck

The pilot truck, containing the Sandy River style pilot wheels, is assembled as shown on LWO-A or LWI-A and in **Photo 7**. A stepped tube mounting on the rear pivot consists of two different lengths of telescoping tubing, LW-12 and LW-13. The longer, smaller diameter LW-12 is to protrude at the bottom, and the pilot truck frame LW-4 has its mounting hole placed over LW-12. Washer LW-16 and long cap screw LW-15 complete the assembly and retain the truck frame. The cap screw is fastened to the mainframe member MFO/MFI-10 at the rear of the smokebox, on the underside. Note that this same tapped hole is used to secure the pilot deck from the top.

The spring suspension at the front end of the truck frame is of similar construction, with a "sandwich" consisting of washers LW-16 and LW-18 on the underside of the pilot truck frame, another LW-18 on the other side of the truck frame, and a spring LW-14 above the washer, all held in place by another LW-15 cap screw. This screw is inserted into frame member LWO/LWI-10 roughly in the middle of the pilot deck, at the bottom. The pilot wheels LW-26 must be disassembled to be put through the holes in the pilot truck frame, then reassembled and gauged. The Kadee gauge KAD980 mentioned earlier would work well for that.

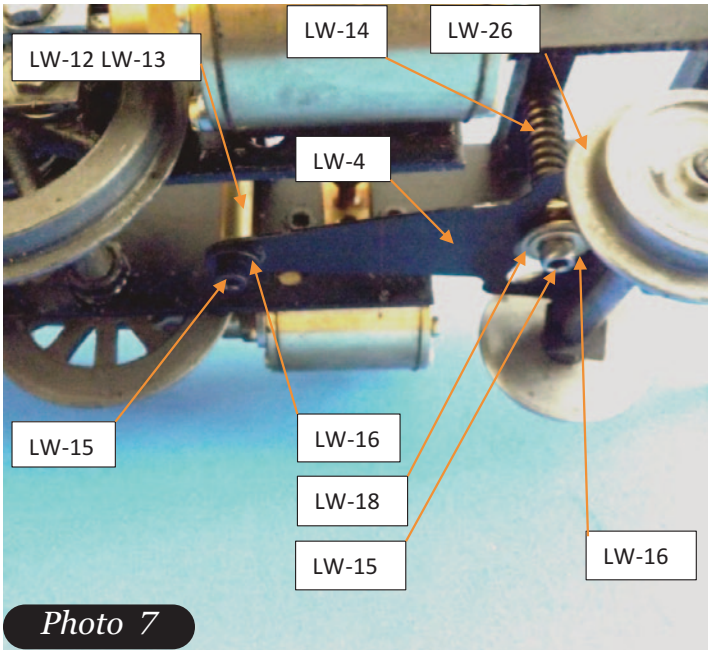


Photo 7

The lower works installment is surely a lot of work, but when completed it will be very rewarding. When everything described in this installment is finished, the result is a fully operational lower works capable of running on air or steam. When I got this far, I spent some time just running on my test track, tethered to my compressor by an air line. I even "borrowed" a boiler from one of my other locomotives and mounted it on the chassis to see how it would run on steam. I was not disappointed!

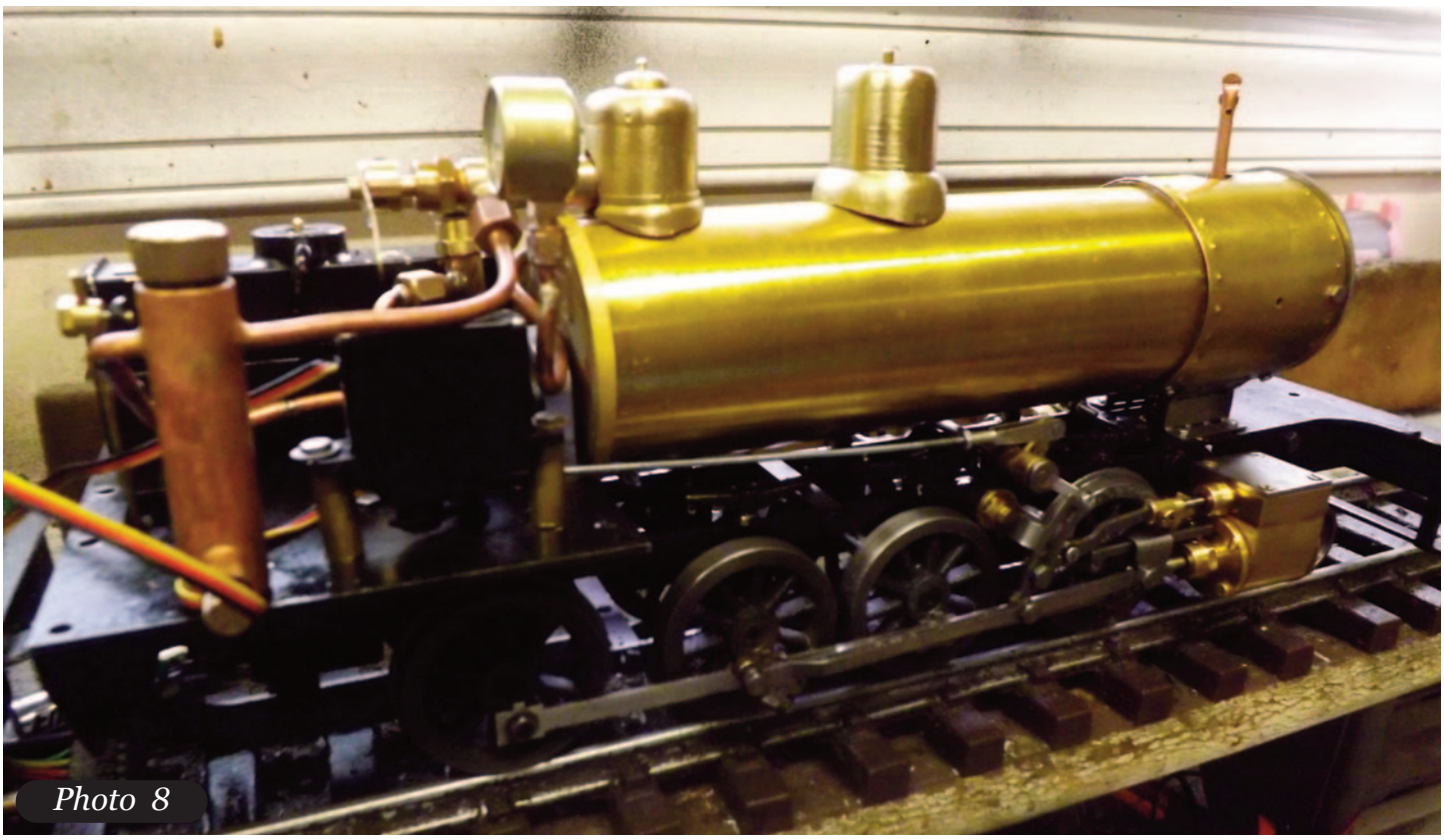


Photo 8

LOWER WORKS PAGE 5				
PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
LWO-8	1	STRIP, STAINLESS OR MILD STEEL .0625 x 1.00	MCMASTER CARR	9517K295
LWO-8 (ALT)	1	STRIP, STAINLESS STEEL .060	DENVER WATERJET	LRK280/LW8
LWO-9	1	STRIP, STAINLESS OR MILD STEEL .0625 x 1.25	MCMASTER CARR	9517K297
LWO-9 (ALT)	1	STRIP, STAINLESS STEEL .060	DENVER WATERJET	LRK280/LW-9
LWI10	1	STRIP, STAINLESS OR MILD STEEL .0625 x 1.00	MCMASTER CARR	9517K295
LWI-10 (ALT)	1	STRIP, STAINLESS STEEL .060	DENVER WATERJET	LRK280/LW-10
LWI-11	1	STRIP, STAINLESS OR MILD STEEL .0625 x 1.25	MCMASTER CARR	9517K297
LWI-11 (ALT)	1	STRIP, STAILLESS STEEL .060	DENVER WATERJET	LRK280/LW-11

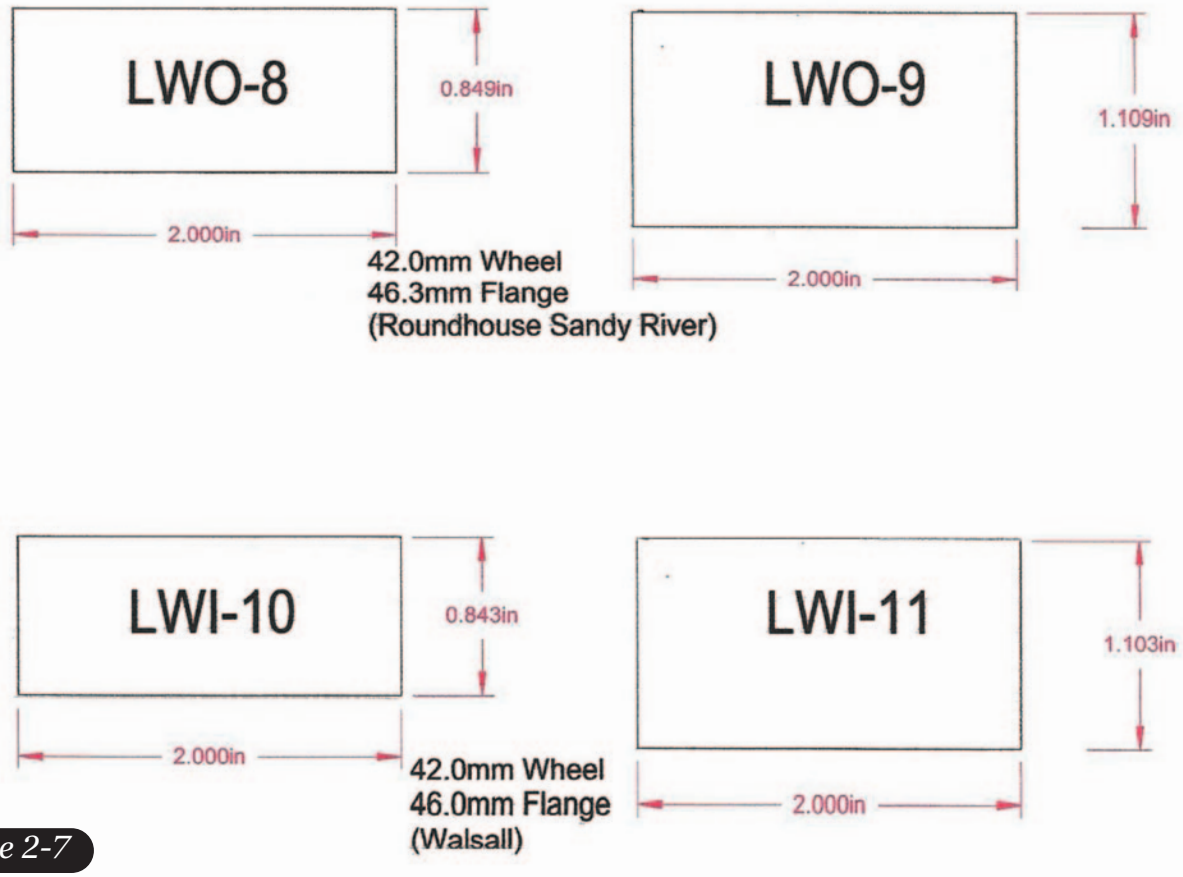


Figure 2-7

Next Time

In the next installment the smokebox will be built; no machine shop or silver solder required. This leads into the installation of the boiler and plumbing in the following installment. Just two installments away from a fully steaming chassis (**Photo 8**).

LOWER WORKS PAGE 6				
PART NUMBER	REQ'D	DESCRIPTION	VENDOR	VENDOR PART #
LW-12	2	TUBE, BRASS, .156 OD .014 WALL	MCMASTER CARR	8859K21*
LW-13	1	TUBE, BRASS, .188 OD .012 WALL	MCMASTER CARR	8859K22
LW-14	1	SPRING, COMPRESSION .218 OD .023 WIRE 4.93 #/IN	MCMASTER CARR	9657K73
LW-15	2	SOCKET HEAD CAP SCREW 4-40 X 1.125"	MCMASTER CARR	92196A117
LW-16	2	WASHER, BRASS #4	HILLMAN	491431
LW-17		WASHER, BRASS #6	HILLMAN	490710
LW-18	2	WASHER, BRASS #8	HILLMAN	490711
LW-19	4	WASHER, BRASS #10	HILLMAN	490712
LW-20	8	WASHER, BRASS #14	HILLMAN	490713

*ONE PIECE MAKES BOTH PARTS

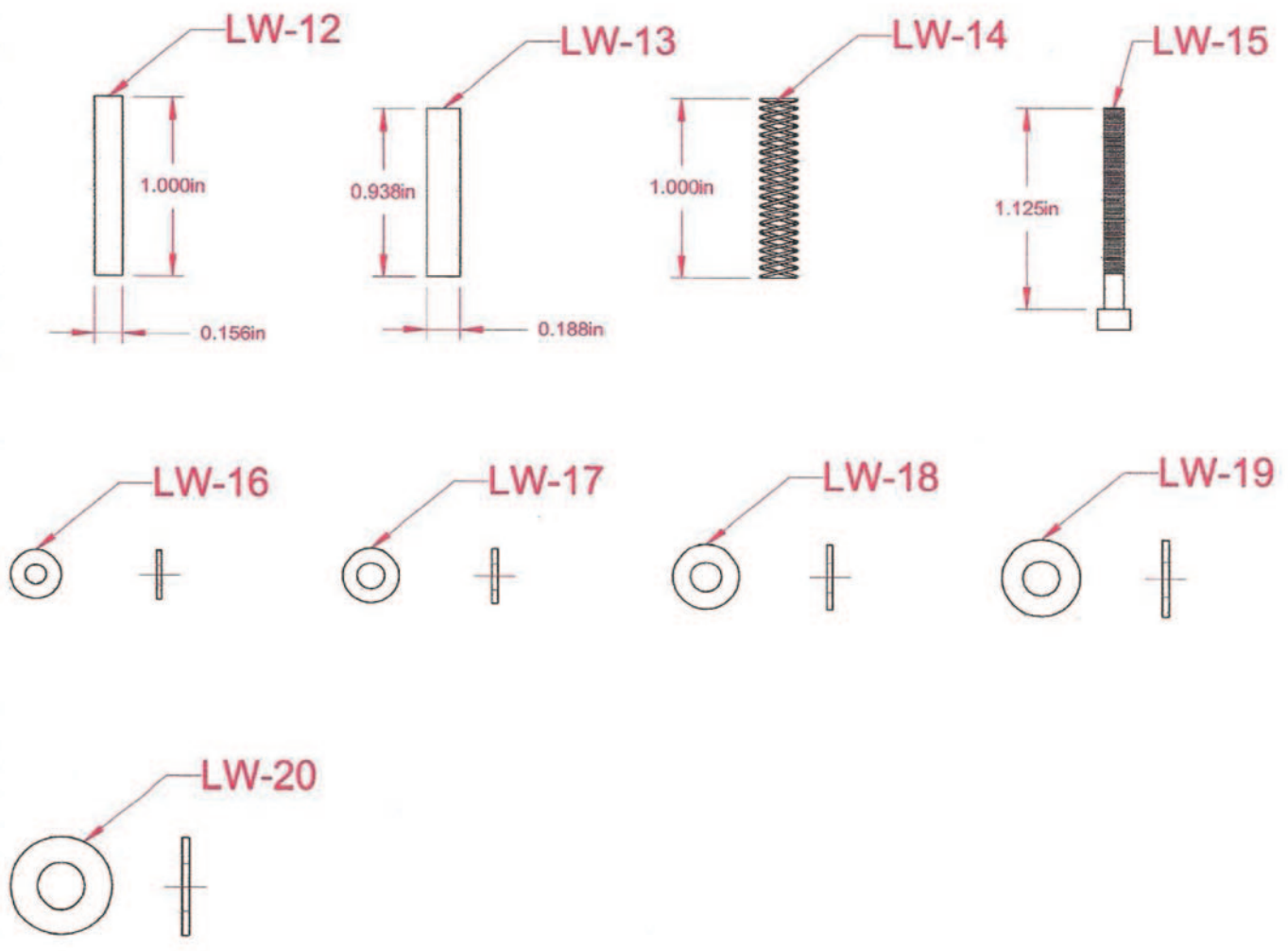


Figure 2-8

LOWER WORKS PAGE 8					
PART NUMBER	REQ'D		DESCRIPTION	VENDOR	VENDOR PART #
LW-27	1*		9" STANDARD STAINLESS STEEL SUPERHEATER	ROUNDHOUSE ENGINEERING	9" STANDARD SUPERHEATER
LW-28	MADE FROM				
	1	LW-29	STRIP, BRASS, .060 X .500 (6" LONG)	MCMASTER CARR	8951K03
	1-2*	LW--30	COLLAR, 1/8	MCMASTER CARR	9414T3
LW-31	2		COLLAR, 3/32	MCMASTER CARR	9414T2
LWI-32	1		SHAFTING, STEEL, 1/8"	MCMASTER CARR	1327K93
LW-33	2		SOCKET HEAT CAP SCREW 2-56 X .375	MCMASTER CARR	92196A078
LW-34	2		NUT, 2-56	MCMASTER CARR	90480A003
LW-35	1 PACK		CRANK PINS	ROUNDHOUSE ENGINEERING	CPS6

* 1 IS REQUIRED FOR INSIDE FRAME, 2 REQUIRED FOR OUTSIDE FRAME

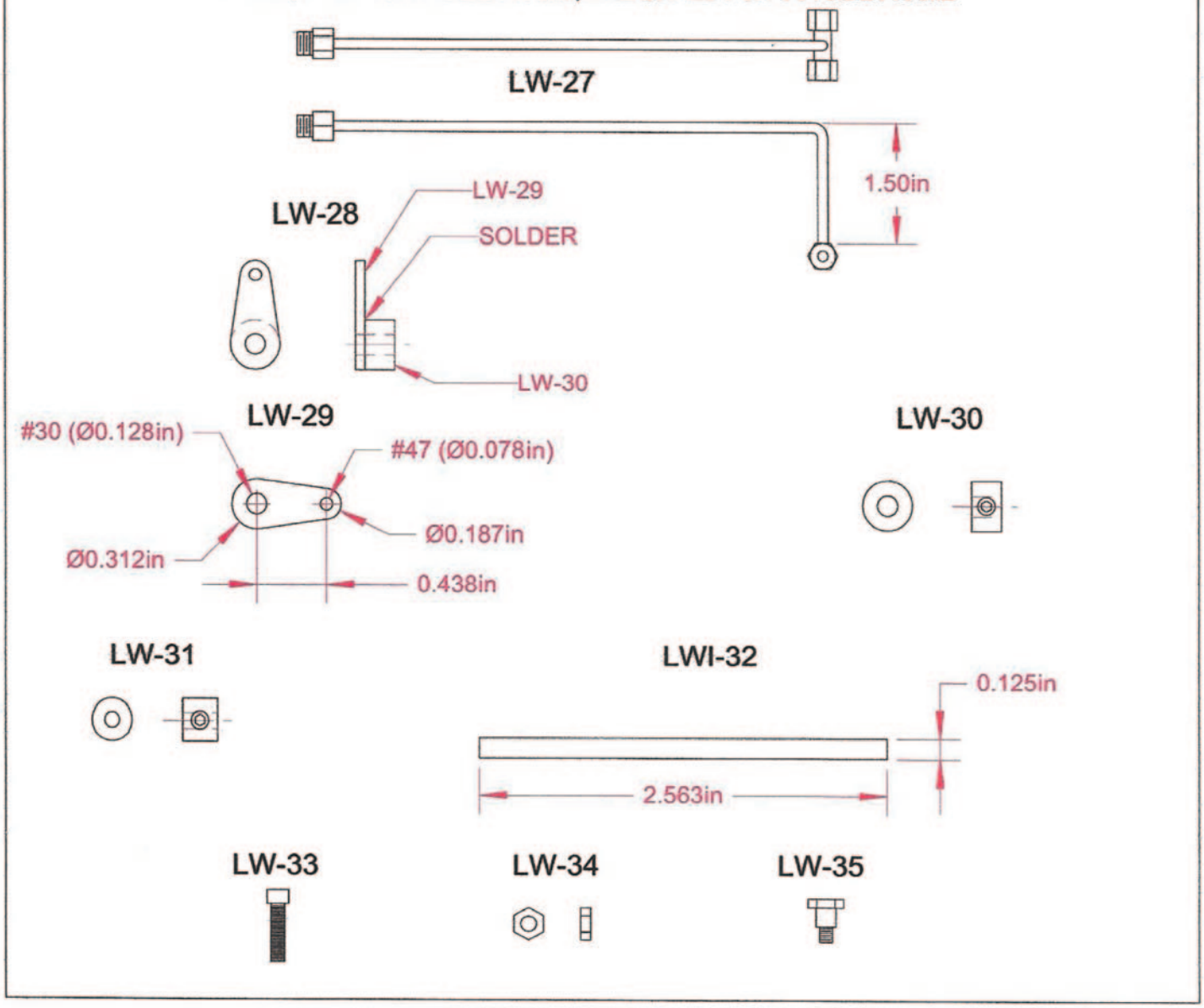


Figure 2-9

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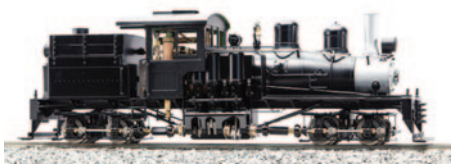
Butane $3200, Coal Fired $4200



28T Shay, 1:20.3, Butane
includes 2 free logging cars
AC77-217 $2499

Ruby #1 and Ruby #2
Kit $559, RTR $599

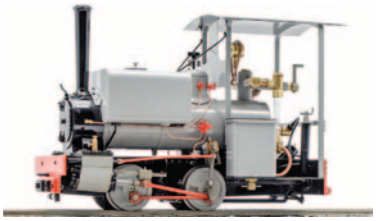
D&RGW C-25, 1:20.3
Butane/Ceramic $5250
Coal Fired, $5250

ACCUCRAFT UK LIMITED

Mannin #16, IOM 2-4-0T, 1:20.3
S20-1R Maroon, Butane $1950
S20-1G Green, Butane $1950

YEO, EXE or TAW
Butane $2166

Decauville, 7/8ths, Butane
Maroon $1650



Wren 0-4-0ST, 7/8th, Butane
S78-4GY $1775

Talyllyn No 1, 1:19, Butane, 45/32mm
Gauge. TR Green, Indian Red, Black
$1700

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

J&M Models

BR MK1 Coach
$275/Car

Smooth Sided Passenger Cars
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Southern Pacific P-8
1:32, Alcohol or Butane

D&RGW C-18 2-8-0
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BR Standard Class 4-6-0 5MT, Alcohol Fired
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RTR w/ 4 Mk1 Coaches $5700

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includes 6 Free Rolling Stock
Kit $4400, RTR $5500

USRA Mikado Light, Alcohol Fired
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ARGYLE LOCO WORKS

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Alcohol RTR $4000

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IOM G-Van, 1:20.3, $86

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RIDE-ON TRAINS

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Workshop Project

The Minitram

Part Three

Design, Text, and Photos
by Marc Horovitz

Floor, firebox, ends, and roof

Now that you've got a working chassis, it's time to move on to some sheet-metal work. All of the sheet metal, with the exception of the fuel tank, can be either brass or steel. I'm using steel, 0.026-inch thick. The thickness isn't critical, but you probably shouldn't go below 0.015 inch. I think 0.020 inch is optimal.

Let's start with the **floor**. Cut a piece of metal 3.25 x 5.125 inches. Carefully mark out and drill all of the holes. All are #43 with the exception of the single 3/16th-inch hole (**Photo 101**).

There are different ways of cutting out the rectangular holes. You could use a cutoff disc in a rotary tool. You could also drill a fairly large hole—say 3/8th-inch—in the middle of a cutout and use a hand nibbler to nibble out a hole. Or you could drill a series of small holes close to the line, then cut them apart with a chisel, finishing up with a file. My preferred method, though, is to use a jeweler's saw, which is the method I'll describe here.

A jeweler's saw (**Photo 102**) is a useful tool to have in your arsenal. It uses an extremely thin blade with very fine teeth. Different tooth counts are available, depending on the thickness and type of metal you're cutting. I use #2/0. The part that you hold in your hand is called the frame. You'll want an adjustable-frame saw. This saw will hold blades of any length up to the maximum, which is around five inches. These blades often break. In fact, they're usually sold by the dozen for just that reason. Depending on where the break occurs, you can often adjust the frame smaller and continue using a broken piece of the blade. Jeweler's saws are best used vertically. The blade is put into the frame with the teeth pointing toward the handle and is held at either end by a screw clamp on the frame. You secure one end of the blade, then compress the frame a little by putting the far end against your bench and leaning on the handle end while tightening the second screw clamp. Then the frame will spring back, making the blade taut.

The work must be solidly supported or blade breakage will be much more frequent. The best way of doing this is by supporting the work in a V-block securely clamped to your bench (**Photo 103**). You can buy these at jewelry-supply houses or simply make your own. All of the sawing should be done between the legs of the "V." The closer to the point of the "V," the better. Pull straight down in nice, even strokes, letting the blade do the work. Don't try to force it—that will only end in a broken blade. It may take a little while to get the hang of it, so don't get frustrated. You can do extremely fine and intricate work with a jeweler's saw but it is relatively slow work. Important: Each time you're finished using the saw, release one end of the blade so it can bend and flex. Otherwise you'll end up breaking more blades by putting the saw down carelessly, or putting something on top of it, than you will by using it.

To cut an inside hole, like the ones we're doing, drill a hole—say 3/32nd-inch or one-eighth-inch—near the line. Release the end of the saw blade near the handle and slip the blade into the hole. Then re-

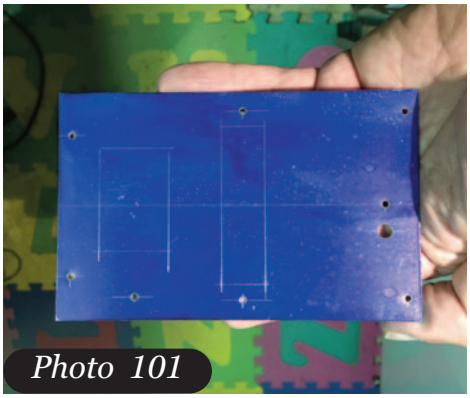


Photo 101

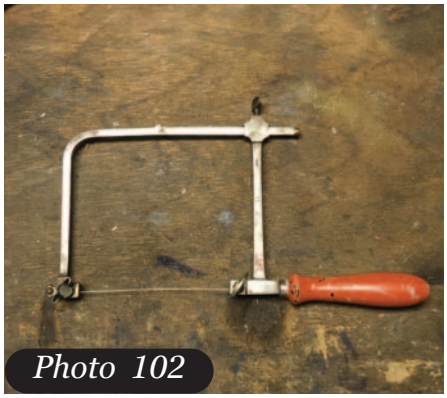


Photo 102


Photo 103

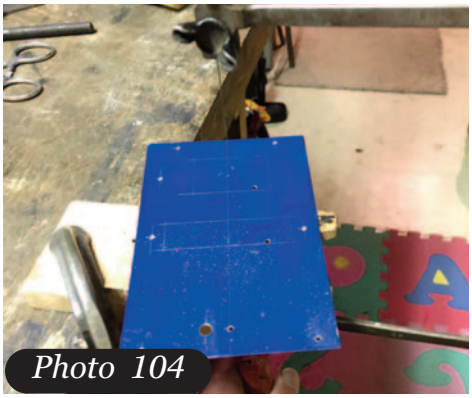


Photo 104

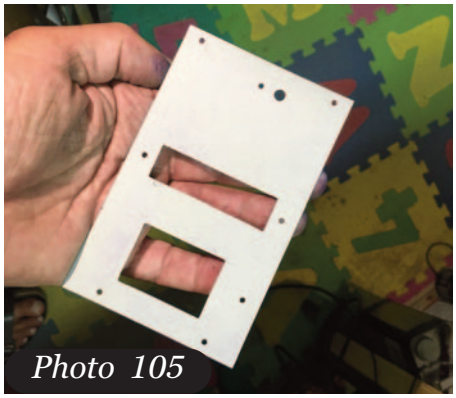


Photo 105

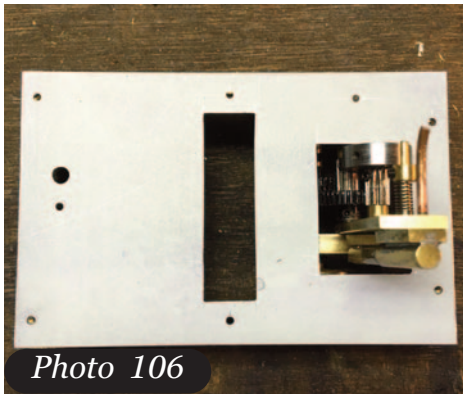


Photo 106

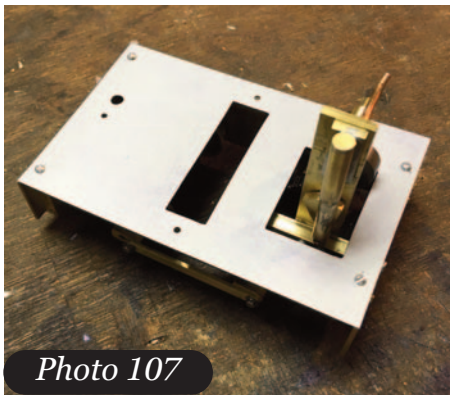


Photo 107

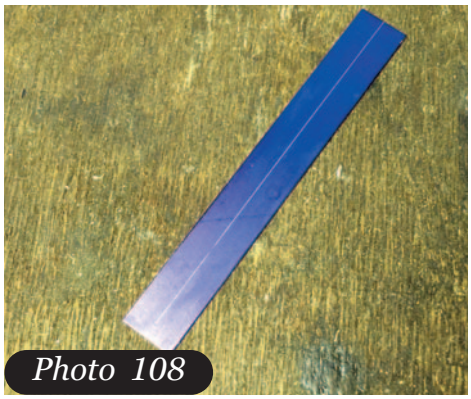


Photo 108

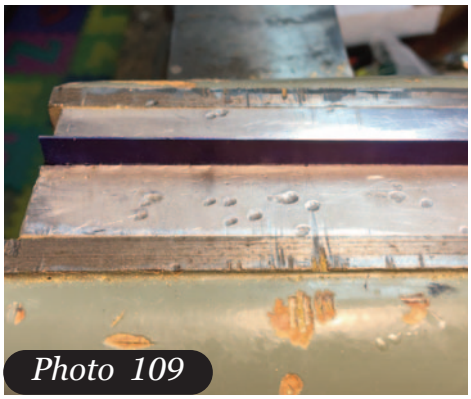


Photo 109

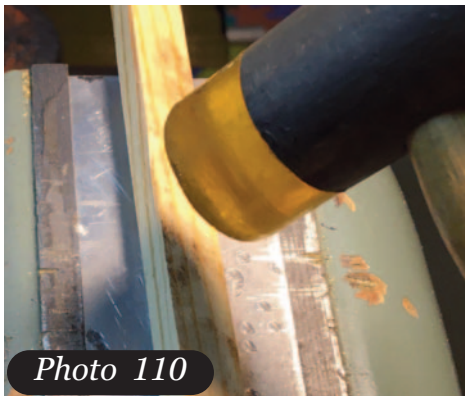


Photo 110

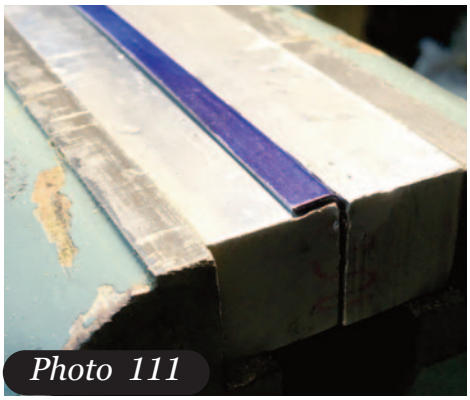


Photo 111

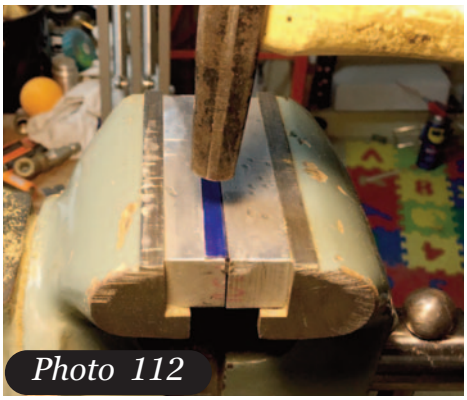


Photo 112

secure the blade and you're ready to go (**Photo 104**). I like to cut close to the line, then finish the job with a flat file. The finished floor is shown in **Photo 105**.

Place the finished floor on the frame and check the placement of the end holes (**Photo 106**). If they're not spot on (mine weren't), just use a small round file to open them out in the necessary direction. You'll know you're there when you can screw the floor to the frame with 2-56 screws and it is correctly positioned in all directions (**Photo 107**).

Let's move on to the **firebox**, which is made up of just four pieces—two sides and two ends. This will involve cutting, drilling, and bending the sheet metal to shape. However, before we get going, let's do a lit-

tle experiment. Say you want to make some quarter-inch angle—that is, a piece of angled metal that is 0.250-inch on each side, measured from the outside.

Start by cutting a piece of your chosen metal 0.500-inch wide by, say, three inches long. Scribe a line, dividing the piece exactly in half the long way (**Photo 108**). Place the piece in your vise, precisely lining up the scribed line with the top of the vise jaws (**Photo 109**). Now bend over the part sticking up. The best way I've found to do this is with a piece of scrap wood as long as the piece you're bending. You hit the wood with a hammer, bending the metal over as a unit, as opposed to a bit at a time (**Photo 110**). Don't try to whack it hard—just tap it until it bends over. Once it's bent as far as it wants to go, you can lay the wood on top and give it a few good bangs to flatten it out to 90 degrees.

You probably weren't able to make a really sharp corner (**Photo 111**). To solve that problem, take your hammer (I like to use a lightweight tack hammer) and tap the folded-down metal right on the fold line. This will encourage it to lie flat and also will minimize the radius at the corner (**Photo 112**). If you're not careful, though, you'll probably end up with a lumpy bend.

Now, with a caliper, measure each leg of the angle. I'll bet that neither leg measures 0.250-inch. If you're just making angle, this discrepancy may not be important. However, if you need more precision, you need to take into account the thickness of the metal you're using and also its bending characteristics. For instance, my metal is mild steel, which is actually fairly soft and bends well. It's also 0.026-inch thick. When I took it out of the vise, the leg that I folded over measured 0.264-inch outside, or 0.014-inch larger than half my piece. The dimension of the leg held in the vise was 0.289-inch, or 0.039-inch larger than half the piece. So the metal actually stretched as it was being bent.

There are a couple points to consider. One is that working with sheet metal (especially bending it) is often not as precise as working with solid stock. On the other hand, that kind of precision is often not necessary. Another point is that, based on the results of your experiment, you can anticipate how far off a bend might be and compensate for it in your marking out. The drawings presented in **Figures 4 and 5** are sort of an ideal. They do not take into account the thickness of the metal—they show what the final product should look like.

Lay out the firebox sides and ends, compensating for the thickness of your metal. Mark, center punch, and drill all of the holes. Cut the overall shape, then cut away the corner pieces on each. Again, you can do this with a jeweler's saw, a cutoff disc, or some good snips. I chose to use snips. When you're cutting the tabs on the firebox ends, cut slightly beyond the line. When you fold the tab over, you'll want it to be flush with the bottom edge.

If you use snips and the metal deforms while you're cutting it, just tap it flat again with a soft mallet on the anvil of your vise. The firebox parts should look like **Photo 113** at this point.

Grip an end piece in your vise, with the tab pointing upward (**Photo 114**). The edge of the main body of the piece should be above the top of the jaws by the thickness of the metal you are using. Fold the tab down and tap the fold flat. The folded tab should be flush with the bottom edge of the end piece so that it will sit flat (**Photo 115**). Now grip one of the side tabs in the vise with the fold line even with the top of the jaws and the main body sticking up. Fold the body down 90 degrees in the same direction as the tab. Do the same with the other side, then make similar folds on the other end. The end pieces should look like **Photo 116**.

Hold a firebox side in your vise, with the top segment sticking up and the fold line even with the top of the jaws. Fold the top down 90 degrees. Move the piece up so that the other fold line is even with the jaws, and make that fold in the opposite direction (see **Figure 5**). Because of the first fold, this will be a little trickier to do. Using a long stick may be useful to help get you started. Do the same with the other piece. The finished sides should look like **Photo 117**.

For the ends to fit the sides properly, you'll need to file away a little of the bottom edges of the flanges (where the holes are) to clear the folded-under part of the sides (**Photo 118**). Screw the sides to the ends (**Photo 119**), then screw the firebox in place on the floor, again with 2-56 screws and nuts (**Photo 120**). In the quite likely event that the mounting holes don't perfectly line up, just file them until they do.

Make the **front end-sheet hold down** and the **rear end-sheet hold down**. These are straightforward pieces that need no explanation (**Photo 121**). Now remove the screws holding the floor to the chassis and use longer screws to attach the hold downs, through the floor, to the chassis (**Photo 122**). If the alignment of the holes is slightly off, drill them out incrementally until you can screw the piece down. When doing this, drill out both holes to prevent one hole from becoming over-large.

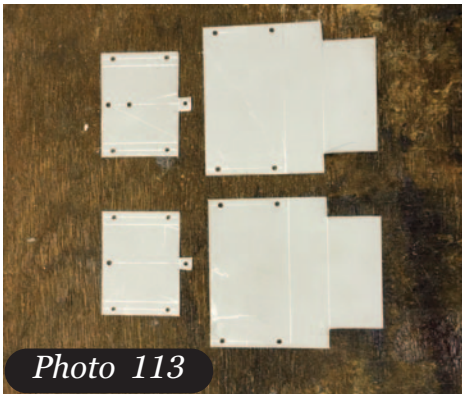


Photo 113

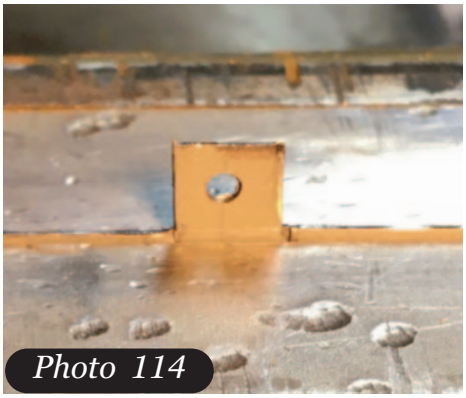


Photo 114

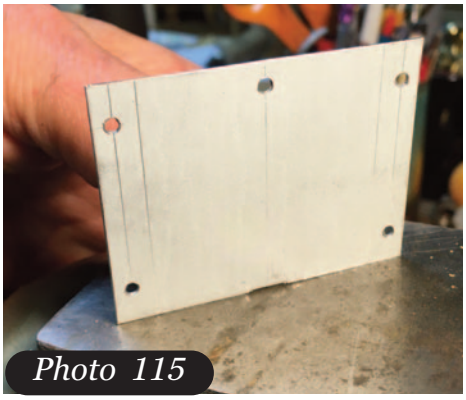


Photo 115

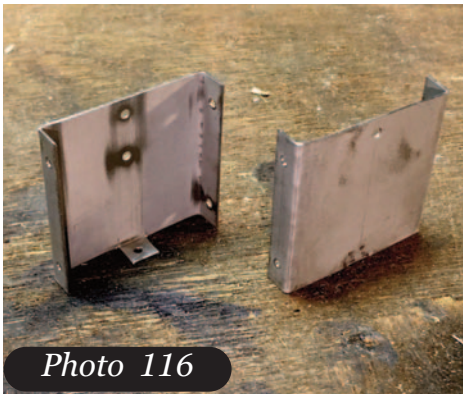
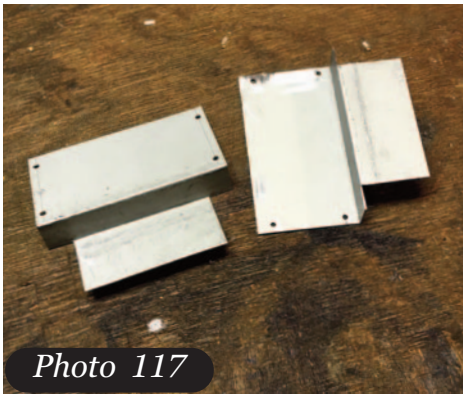


Photo 116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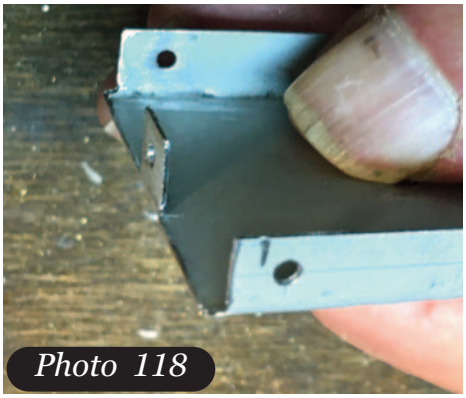
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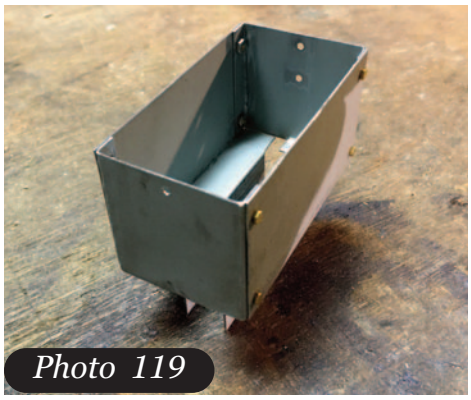
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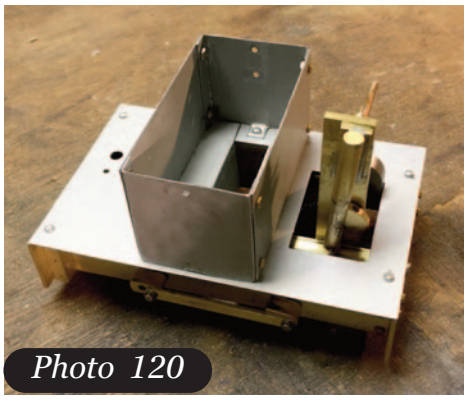


Photo 120


Photo 121

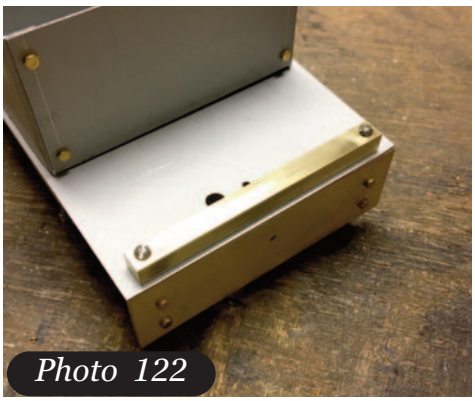


Photo 122


Photo 123

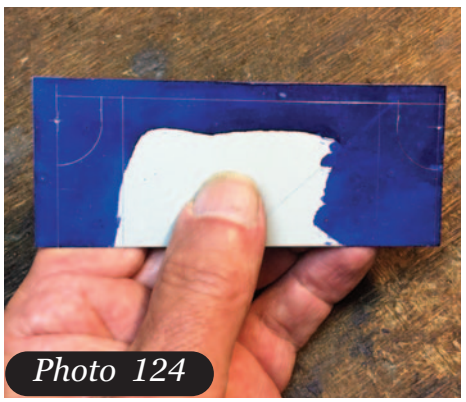


Photo 124

The **end sheets** are made of the same sheet metal you have used for other parts. The only slightly tricky part may be laying out the curves. Cut the sheet a little oversize. Within it, mark out the length and height, then mark and center punch the radius points, as shown in **Figure 5.** Then, using your caliper, scribe in the curve (**Photo 123**). Extend a tangent line up to the top of the piece and the curve is finished. Do the other end the same way (**Photo 124**). When everything is accurately marked out, trim the ends and cut out the curves. I used a jeweler's saw to cut the curves, cleaning them up with a file. **Photo**

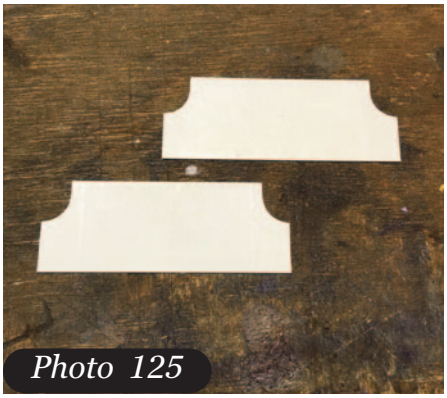


Photo 125

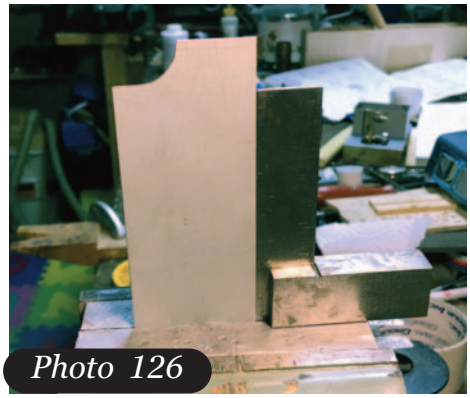


Photo 126

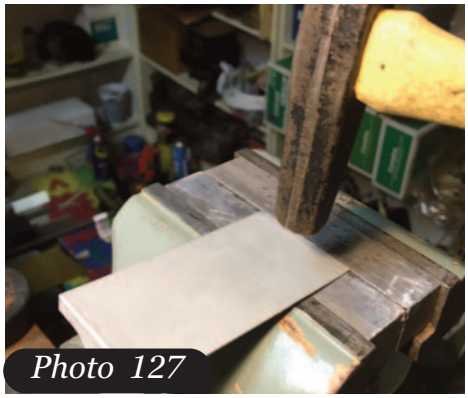


Photo 127

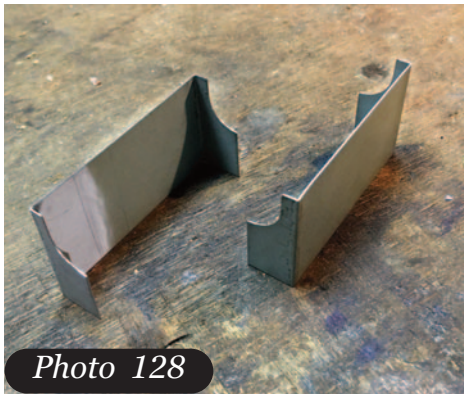


Photo 128

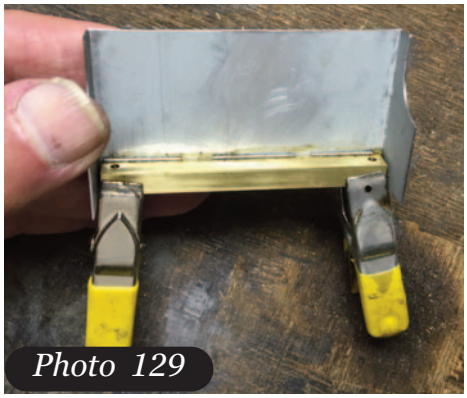


Photo 129


Photo 130

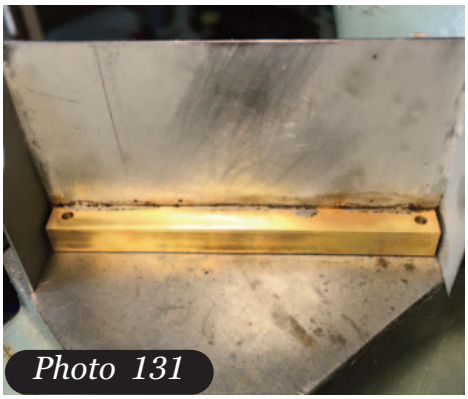


Photo 131


Photo 132

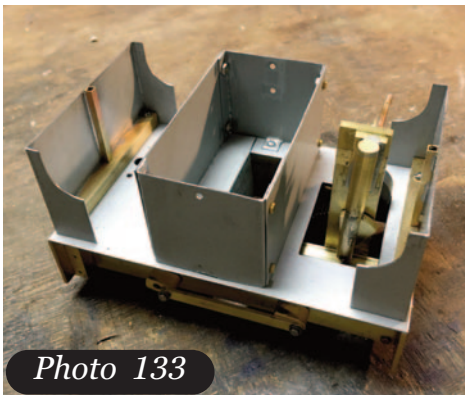


Photo 133

125 shows the end sheets ready for bending.

Bending the end sheets is similar to bending the firebox, but maybe a little easier. Grip one end panel in your vise, with the fold line just at the jaw's edge. Use a little square to ensure the trueness of your bend (**Photo 126**). Using a board, press the piece over as far as you can. Then use a hammer to make the corner really square (**Photo 127**). Repeat for all of the other folds, and your end sheets are complete (**Photo 128**).

Soldering the hold downs to the end sheets shouldn't be too difficult. Flux the mating surfaces on a hold down and an end sheet, center the hold down between the little side panels, flush with the bottom, and secure it in place with clips or small clamps. Place some strips of solder at the joint (**Photo 129**). Heat the metal from the side opposite where you placed the solder (**Photo 130**) until it neatly flows into the joint. The joint, before it's cleaned up, should look like **Photo 131**. Repeat the process for the other end sheet.

Cut the **smoke stack** from a piece of 11/32nd-inch brass tubing, as per the drawing in **Figure 5**, and set it aside.

Cut two **roof stanchions** from one-eighth-inch square brass tubing, as per **Figure 5**. These are placed vertically, on top of the end-sheet hold downs, against the end sheet. Flux the mating surfaces, center the stanchion in the end sheet, and hold it in place with a clip (**Photo 132**). Solder it in place as you did the hold downs. When you're finished, clean up the joints and screw the end sheets to the chassis (**Photo 133**).

Now comes a fun part — the **roof**. If you have a set of bending rolls, you can skip this part. Just cut and bend your roof to the shape of the roof-bending


Photo 134

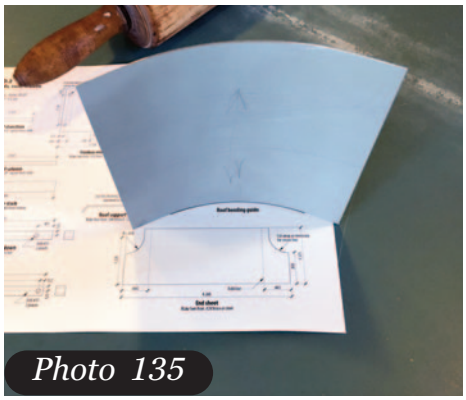


Photo 135

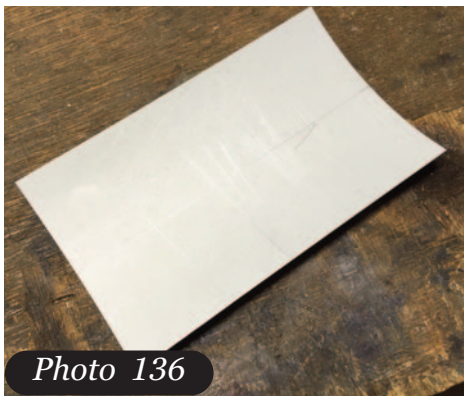


Photo 136

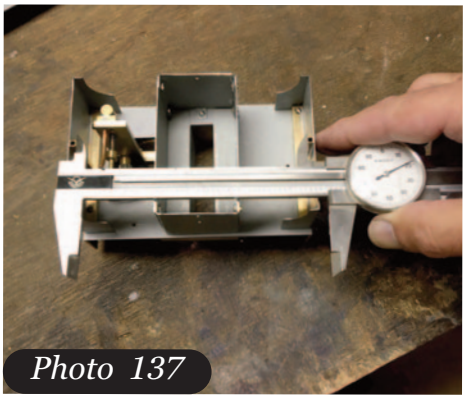


Photo 137

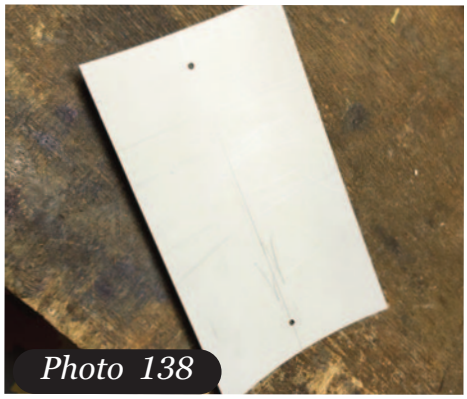


Photo 138


Photo 139

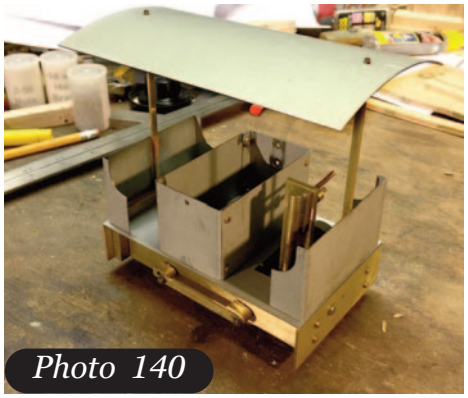


Photo 140

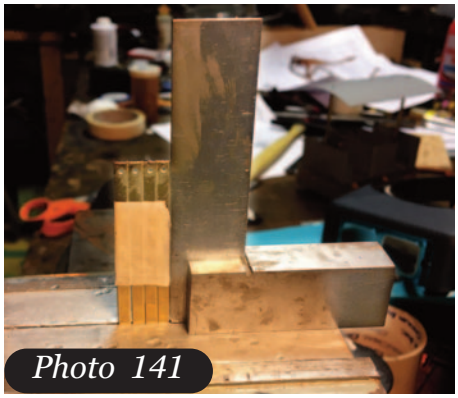


Photo 141

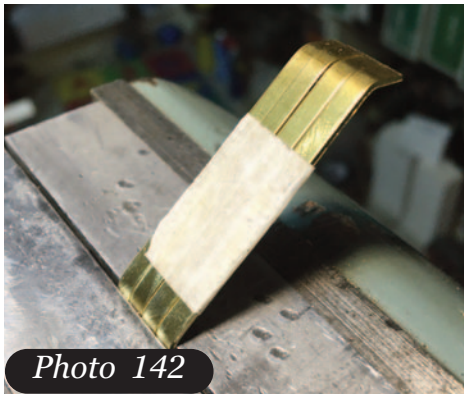


Photo 142

guide in **Figure 5**. If you don't have a set of rolls, you'll need a rolling pin, a fat dowel, or something else heavy and round.

Cut out a piece of metal for the roof. I suggest that you cut it about an inch larger on both sides. Cut it to the dimension in **Figure 4,** end to end.

To curve the roof, you'll need a pad of some kind. Some fairly stiff foam rubber might work. I used a thick bath towel, folded over several times. For the metal I was using, I found that I had to press down quite hard and go over it again and again (**Photo 134**). Toward the end, I finished shaping the roof by hand until it matched the bending guide in **Figure 5** (**Photo 135**). Once you're there, trim the excess metal from the edges and take the sharp points off the corners with a file.

Now scribe a line down the centerline of the roof on the inside of the curve—that is, the ceiling (**Photo 136**). Carefully measure the distance between the stanchions soldered to the end plates (**Photo 137**) and add 0.125 inch to that dimension. Subtract the result from the length of the roof, which should be 6.000 inches. Then divide that answer by two. The result is the distance in from the ends to drill 3/32nd-inch holes on that centerline (**Photo 138**).

Cut two pieces of one-eighth-inch square brass tubing, 2.665 inches long, for the roof columns. Cut two pieces of 3/32nd-inch rod, each 3-3/4-inch long. Insert one in each of the columns with around 3/32nds-inch sticking out one end. Solder these in place (**Photo 139**). Check your work by placing the columns in the roof stanchions and placing the roof on top. If all is well, your engine should look like **Photo 140**.

Next come the **roof braces**, made of brass strips,

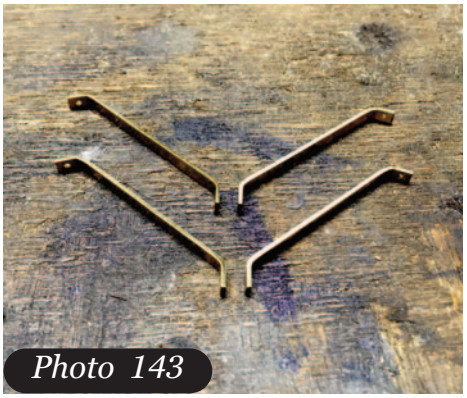


Photo 143

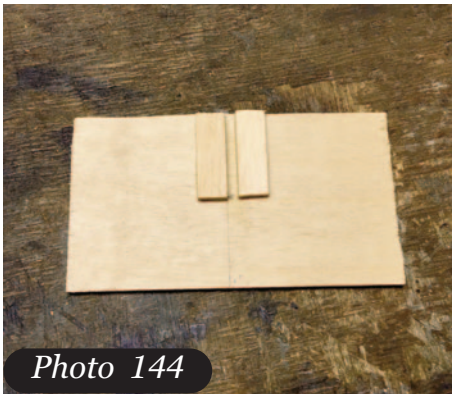


Photo 144

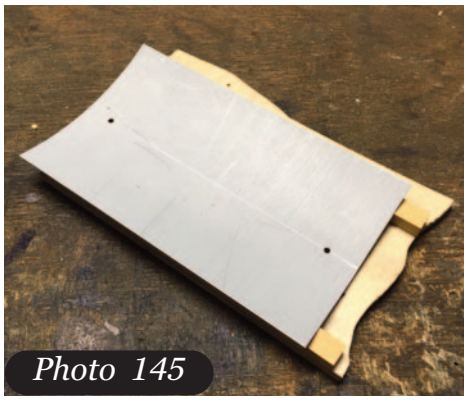


Photo 145

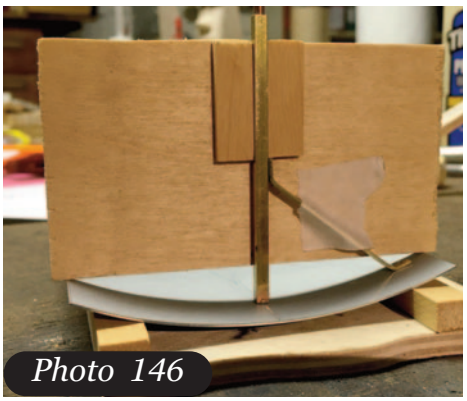


Photo 146

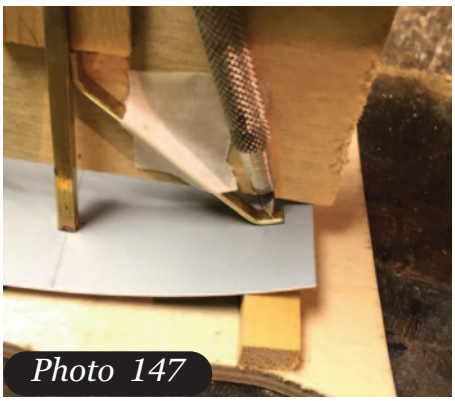


Photo 147


Photo 148

one-eighth-inch wide x 0.040- inch (or thereabout) thick. These are diagonal braces between the stanchions and the roof. You'll probably need to cut these strips out of sheet. There are different ways that you could connect the braces to the roof and stanchions. I riveted them to the roof and soldered them to the stanchions, so that is what I'm describing here.

Once the strips are cut, drill the #55 hole in one. This is the size hole required for the brass escutcheon pins that I use for rivets. If you are using something else, drill accordingly. Mark the fold lines on each piece. The braces are best bent together for uniformity. Tape them together, side by side, and grip them by one end in your vise, with the fold line even with the top of the jaws. Square them up with the vise using a small square (**Photo 141**). Using a piece of wood, bend them over to the approximate angle. Use the bending guide in **Figure 5** to gauge the angle. When one end fits the guide accurately, do the other end in the same manner (**Photo 142**). The finished braces are shown in **Photo 143**.

To properly place the braces, I made a couple of simple tools out of wood. The first is the jig shown in **Photo 144**. A stanchion fits between the two wooden blocks, which hold it 90 degrees to the base of the jig. The other tool is a simple cradle (**Photo 145**) to hold the roof upside down and a little off the base to clear the stub on top of the stanchion.

With a stanchion placed in the jig, and the stub end placed in a hole in the roof, the stanchion will be properly positioned. **Photo 146** shows it with one brace temporarily in place. Through the hole in the brace, carefully mark its location on the roof (**Photo 147**). Set your calipers to the distance from the side edge of the roof to the centerline of that hole, then score a line all along the underside of the roof (**Photo 148**). Next, reset the caliper to the distance between the end of the roof and the centerline of one of the holes in the roof, and score a line along each end of the roof (**Photo 149**). Where the lines intersect near the corners of the roof, mark, center punch, and drill #55 holes (**Photo 150**).

To set a rivet successfully you'll need at least one rivet set. I made mine out of a piece of quarter-inch brass rod. I drilled into the end of it the depth of a rivet head and beveled the end around the dimple. This I hold in my vise, pointing upward (**Photo 151**). You may be able to see in the photo that the dimple is a perfect hemisphere. It didn't start that way; this just comes in time with use.

The rivet is inserted through the top side of the roof. A brace is then put over the rivet. The rivet is then snipped off with a wire cutter, leaving a small nub sticking up. The head of the rivet is placed in the rivet set and the other end of the rivet is peened into a flat head. This is done by tapping on it lightly, many times, straight down on the end of the rivet (**Photo 152**). The metal will deform into the flat head (**Photo**

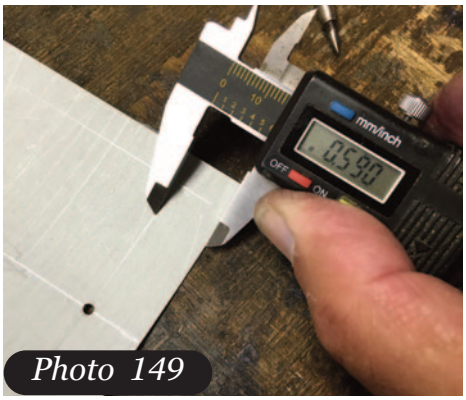


Photo 149

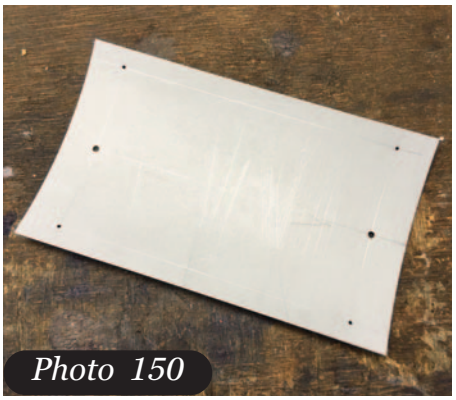


Photo 150


Photo 151

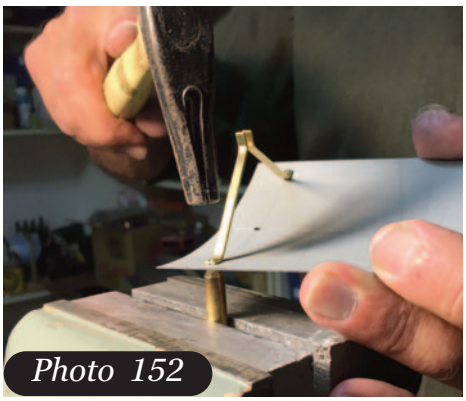


Photo 152

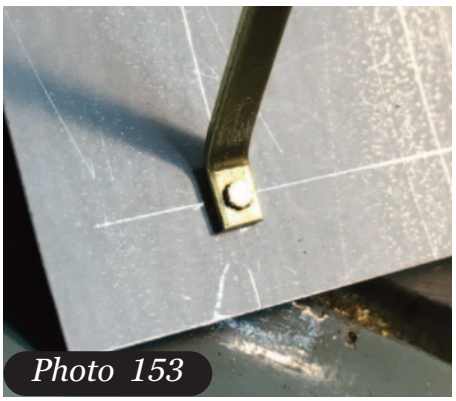


Photo 153

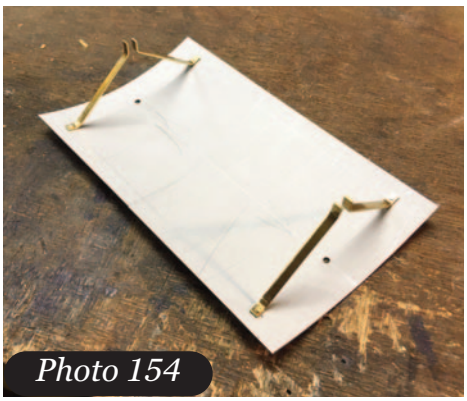


Photo 154

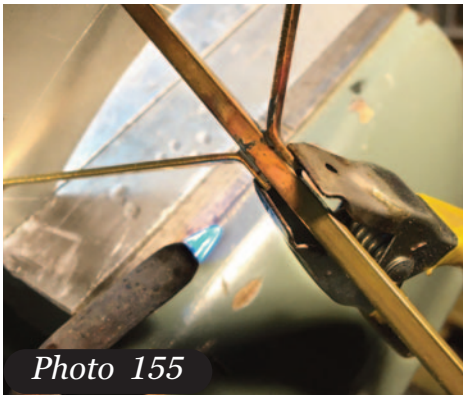


Photo 155

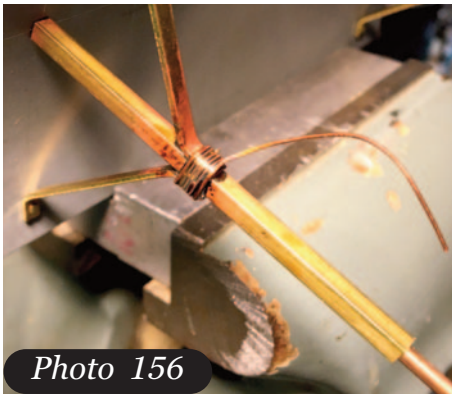


Photo 156


Photo 157

153). It might take a little practice. **Photo 154** shows all four braces riveted into place.

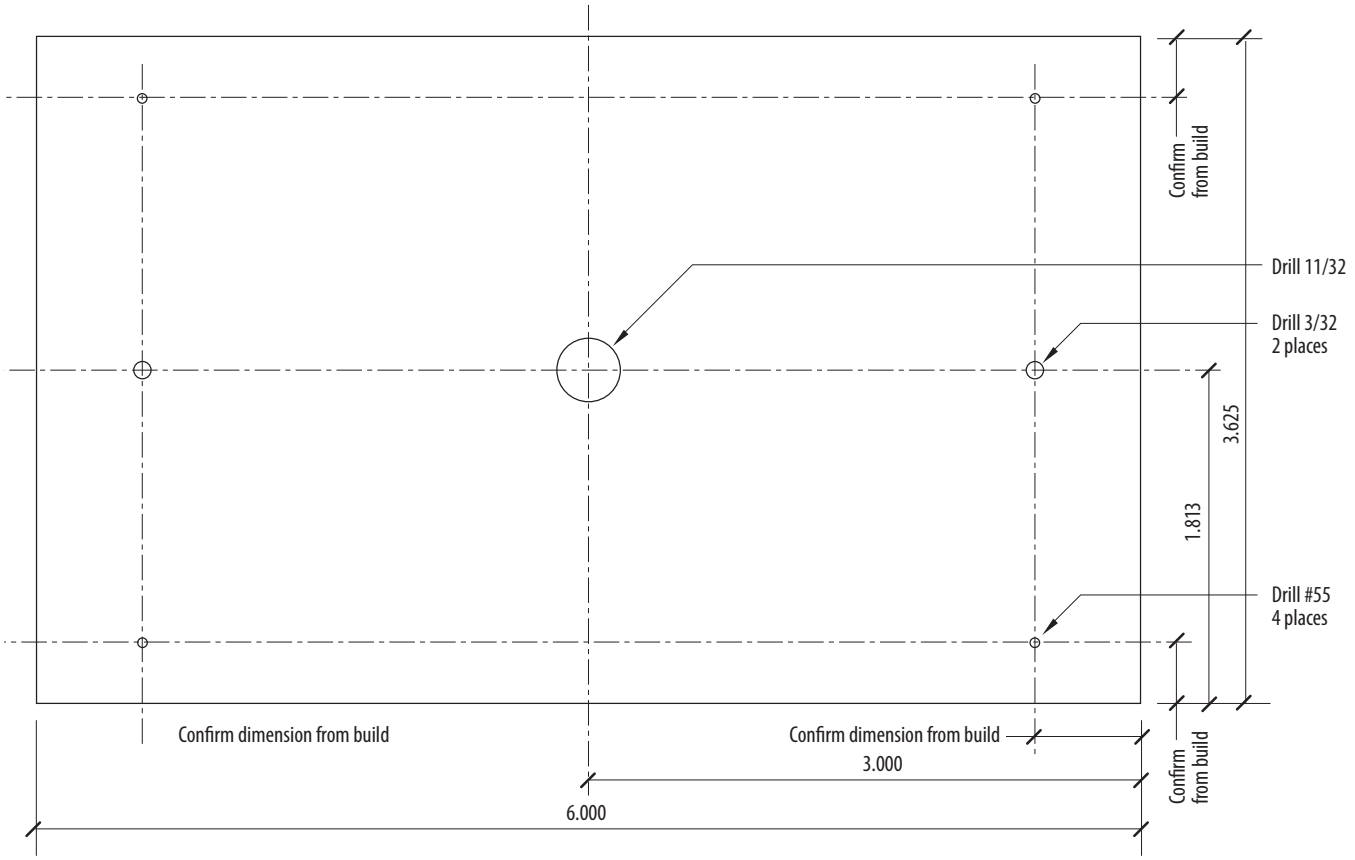
The stanchions can now be soldered to the braces. There's no need to solder the stanchion to the roof — the nub on top of each stanchion will keep it in place. Put a stanchion into its roof hole and, using the jig, make sure it is perpendicular to the roof. Flux the stanchion and the braces and clamp them together using a little spring clamp. Then, holding it in your vise, apply some heat and a little solder (**Photo 155**).

This engine gets pretty hot, so I don't trust the solder by itself. I wrapped the joint with thin copper wire, then applied a little more solder (**Photo 156**). When this is done, you can put the roof in position on the engine (**Photo 157**).

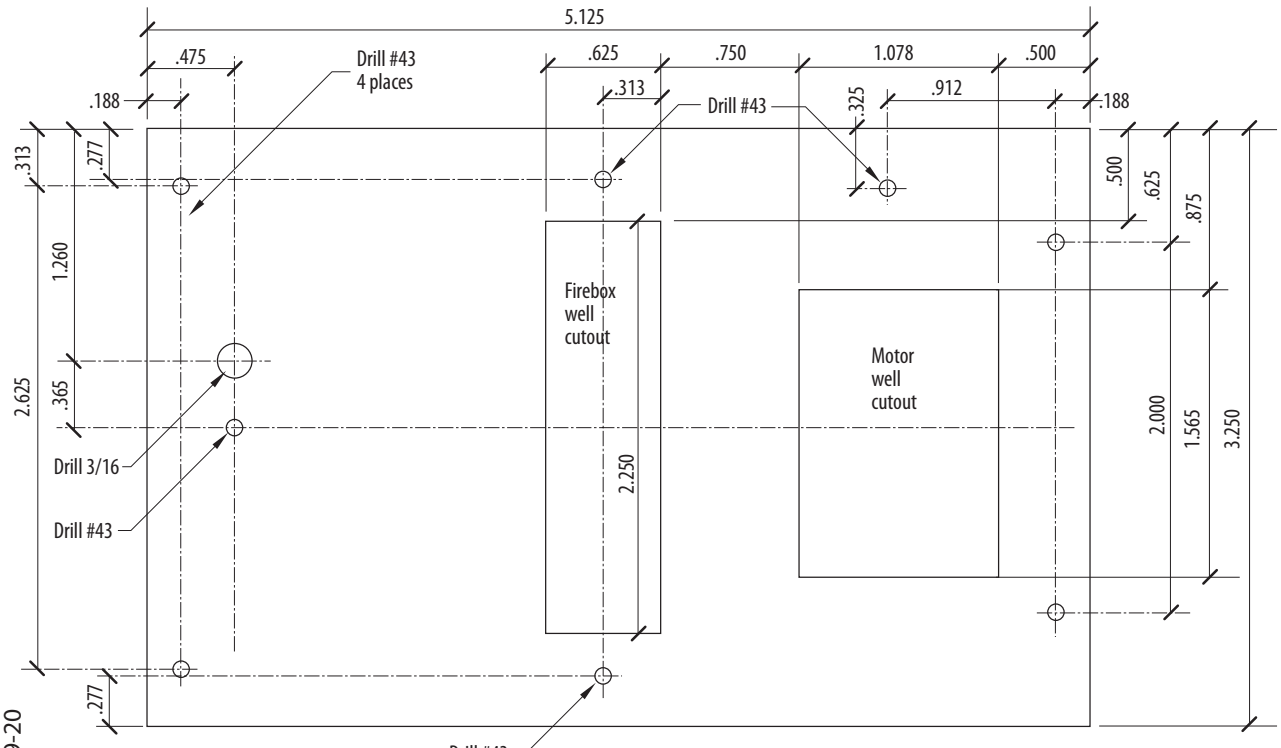
That's it for this time. Next time we'll finish up by building the boiler and the burner, plumbing it up, and getting it running.

Tom Winter's Minitram is coming along nicely.

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



Roof
Make one from .020 brass or steel



Floor
Make one from .020 brass or steel

SHEET D.1
Floor, ends, roof, firebox
Sheet 4 of 6
Marc Horovitz
Date: 9-29-20

Figure 4

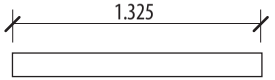
SHEET D.2

Floor, ends, roof, firebox

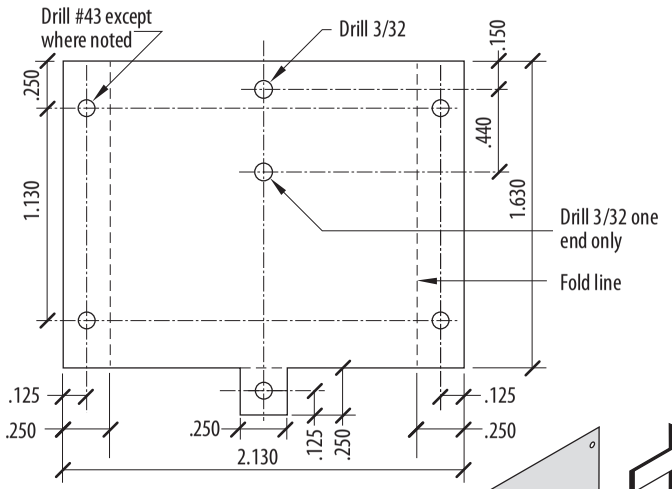
Sheet 5 of 6

Marc Horovitz

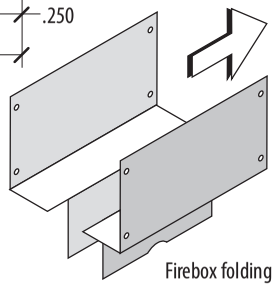
Date: 10-28-20

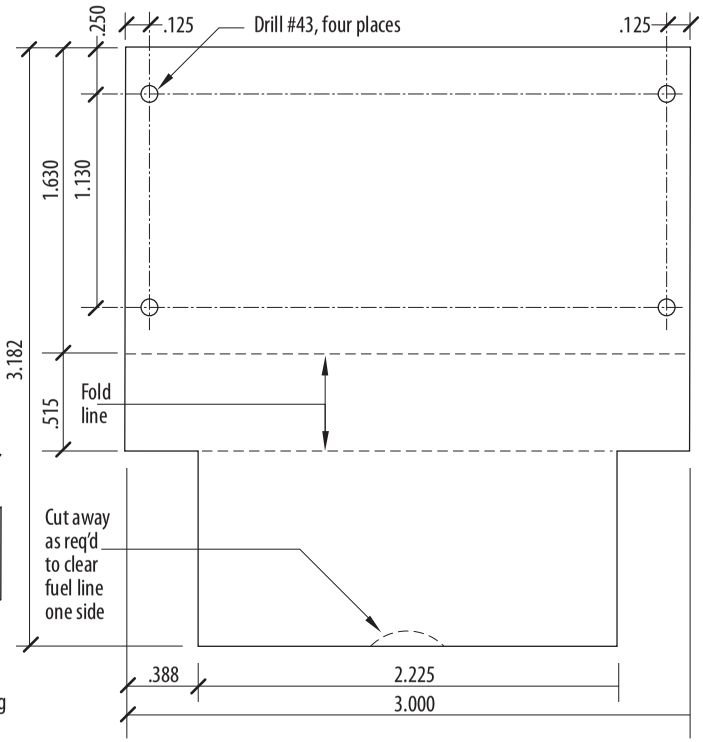


Roof stanchion
Cut two from 1/8″-square brass tube

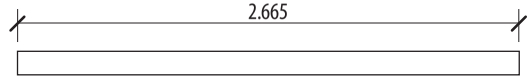


Firebox end
Make two from .020 brass or steel

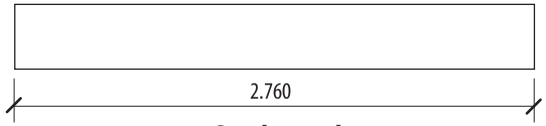




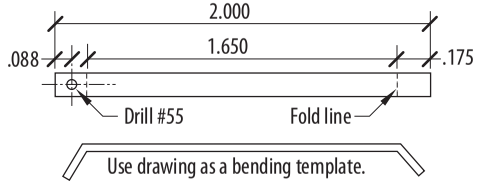
Firebox side
Make two from .020 brass or steel



Roof column
Cut two from 1/8″-square brass tube

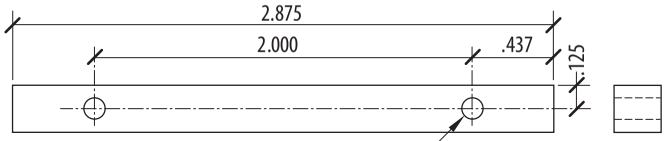


Smoke stack
Cut from 11/32 K&S brass tubing

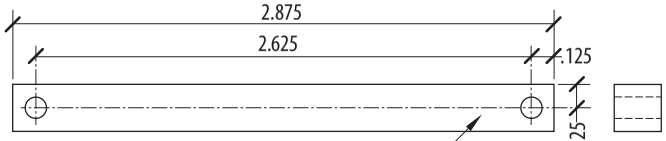


Roof braces
Make four from .040 brass X .125 wide

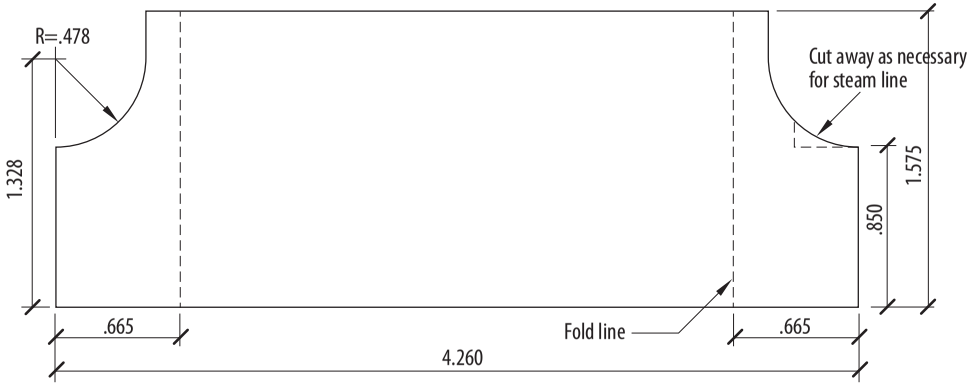
Roof bending guide



Front end-sheet hold down
Make one from 1/4″-square brass bar



Rear end-sheet hold down
Make one from 1/4″-square brass bar



End sheet
Make two from .020 brass or steel

TIMING ROUNDHOUSE WALSCHAERT VALVE GEAR USING FIXTURES

by Les Knoll, PE

The setting and timing of Roundhouse Walschaert valve gear involves two processes: one is the centering of the "D" valve in the steam chest with the valve gear in the neutral position, and the other is establishing the 90 degree offset relationship between the crank pin which is driven by the connecting rod and the return crank pin which operates the valves.

The instructions Roundhouse gives in their kits on centering the "D" valves are clear and concise. Follow this and it is hard to go wrong. But how about the return crank pin??

The diagram in Roundhouse's instructions makes it clear WHAT to do: set the two pins 90 degrees apart, but HOW this is to be accurately done is another matter. It is as if being told: "Here is a body of water, now walk across it." I was told by Roundhouse personnel that this relationship is mostly set by eye, then adjusted as needed when a locomotive is test run. My first few experiences attempting this did NOT produce the fine running Roundhouse locomotives I had become accustomed to!

I looked on a map of the UK, and Doncaster, the home of Roundhouse Engineering, is roughly 212 miles from Stonehenge. That's a long commute, so my original theory of Roundhouse employing Druid priests to time in valve gear using magic was probably incorrect!

It turns out that by using a little magic of your own (today it's commonly called engineering) you can apply the same methods modelers use to quarter locomotive drivers to establish this critical crank pin/return crank relationship simply and accurately. The sizes for the gauges can be determined by using middle school level math. For common Roundhouse locos, I have included gauge sizes drawings in **Figure 1** that follow along with the formulas for creating your own if you apply this method to other valve gear.

The timing method consists of using two gauges, cut from 0.030-inch metal, which are placed under their respective crank pins. Start with a locomotive chassis that at least has the drivers, valve gear and cylinders installed, ready to be timed in. It will make no difference if some of the drivers are flangeless or "blind", the process will be guided off of the flanged drivers.

Set the chassis on a flat surface, as shown in **Photo 1**. I chose the metal table of my drill press as shown in the photos. All drivers, flanged and blind, must be on this flat surface. Starting with the right side driver that contains the crank pin, install all connecting rods and spacers, then place the gauge for the crank pin between the crank pin and the work surface. Rotate the right hand driver containing the crank pin (the driven wheelset) until the crank pin is at the 9:00 position as shown in **Photo 2**. Insert a motion pin into the return crank and place the return crank on the crankshaft, tightening it with the clamping screw just a bit so it will stay in position but still be able to be rotated easily. With the crank pin set at 9:00 by means of its gauge, insert the return crank gauge on the opposite side of the crank pin gauge as shown in **Photo 3** and position the return crank so the motion pin touches the top of the return crank gauge at the 12:00 position. At this point tighten down the clamping screw on the return crank. Don't let anything slip. If the gauge heights are correct, you now have an accurate 90 degree relationship between the two cranks. The same operation is repeated for

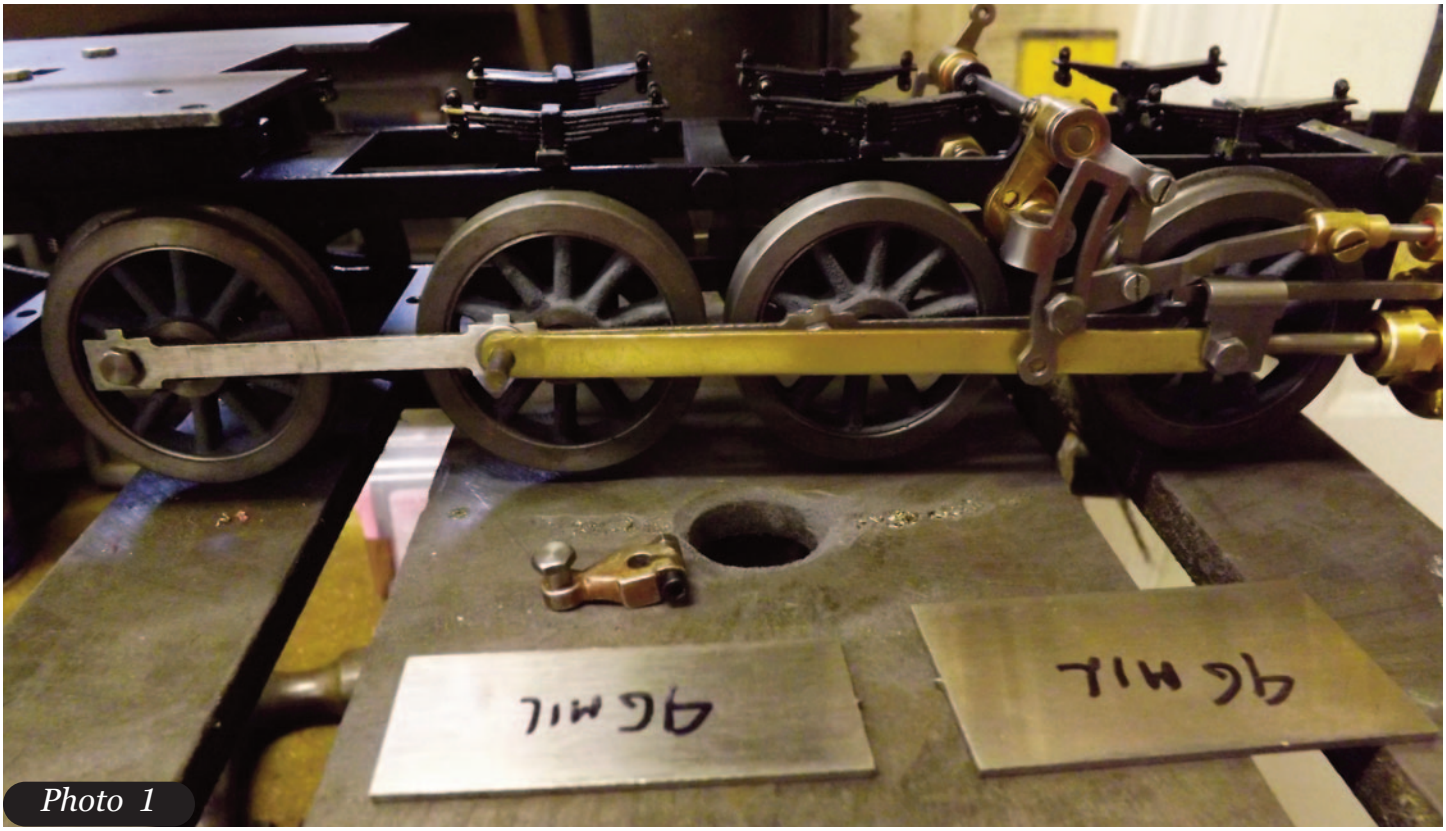


Photo 1

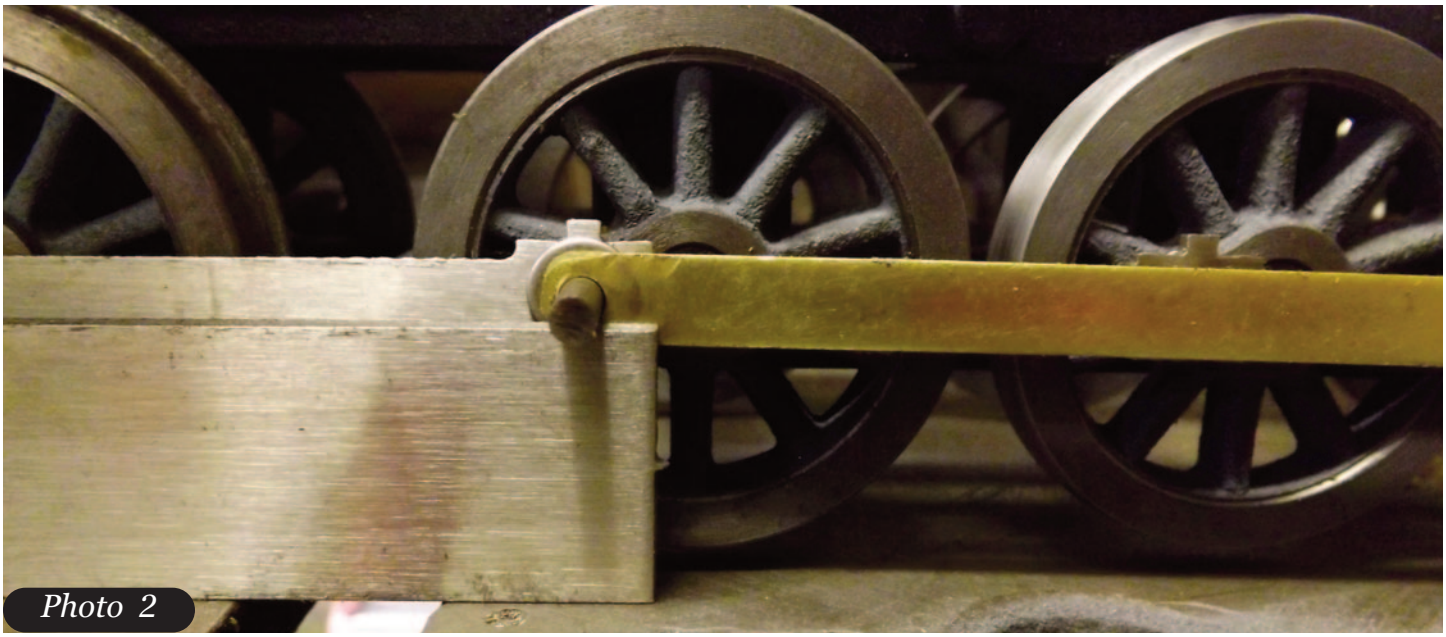


Photo 2

the left side driver, except the crank pin is to be oriented in the 3:00 position and the return crank pin once again at 12:00. This is VERY important!

Before doing any permanent pinning of the return crank as Roundhouse suggests, perform the operations prescribed by Roundhouse for centering the "D" valves and do an air test. Chances are you will be right on the money. If there is any difficulty running, the cause is likely to be in the centering of the "D" valves, and Roundhouse covers what to do about that quite clearly in the instructions that come with their locomotive and valve gear kits.

I have found by experience that if a slight adjustment is required in the return crank position, turning the return crank inward towards center improves forward operation while turning it outward improves performance in reverse. This method, however is no substitute for an accurately positioned return crank at precisely 90 degrees to the driven crank pin.

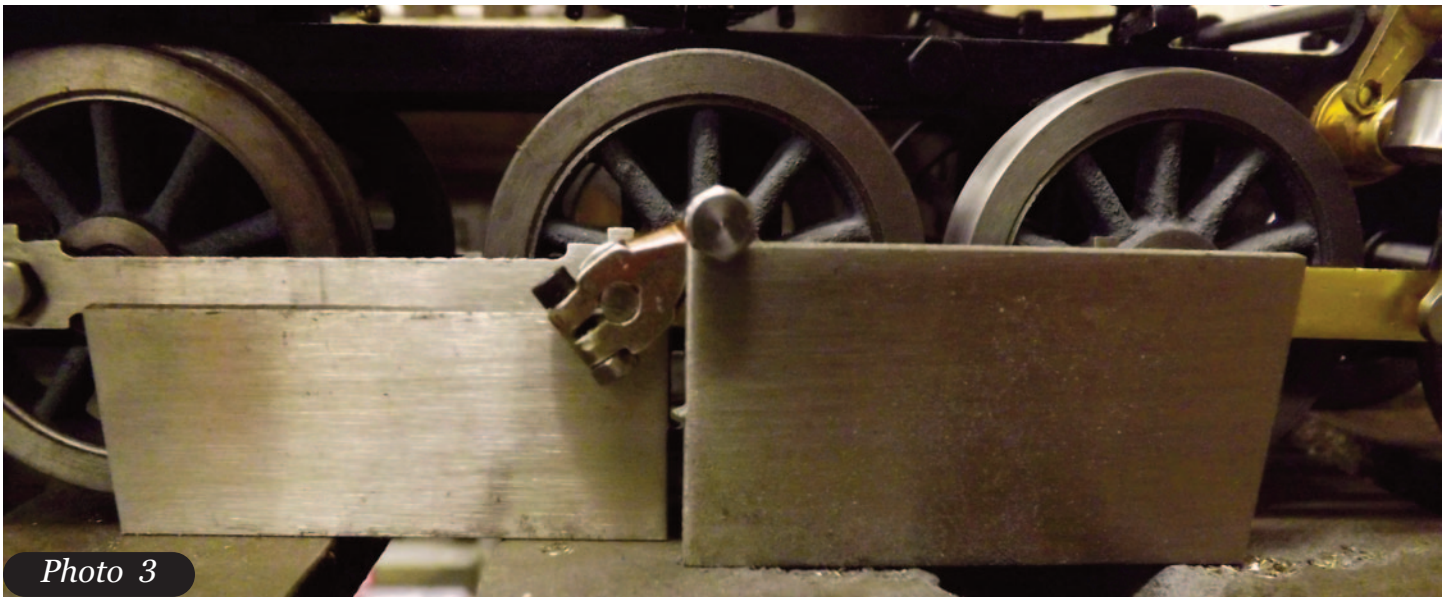


Photo 3

The gauges can be made by hand but they will not be as accurate as you might like. I suggest contacting Denver Waterjet in Denver, NC and requesting rectangles be cut of 0.030-inch stainless steel. Each one to be two inches long, with the heights shown in the drawings for your locomotive, or computed for the valve gear you are using.

I have had 100% success with this method as long as the gauges are accurate. I once built a 2-4-4-2 Mallet articulated for the late Ted Sharpe, then owner of Sunset Valley Railroad. Ted was a huge logging railroad fan and was quite taken by my own "Little River" styled 2-4-4-2 which employed Roundhouse mechanisms. This was the first iteration of the loco, and at the time, I used Lionel solid disc drivers. After 'discovering' what beautiful drivers are produced by Walsall of England, I immediately equipped my 2-4-4-2 with them and showed my reworked loco to Ted. He HAD to have those drivers, so he sent the locomotive back for a rework. As part of changing out drivers, you must re-install the return cranks and re-time the locomotive, in this case for TWO separate engines, front and rear. Since I had fixtures made for my locomotive, I reused them for Ted's installation, and the re-timing literally took no more time than assembling the valve gear parts onto the Mallet's two engines. NO further adjustment was required.

The same held true with the building of the Consolidation project covered in the current issues of Steam in the Garden. After assembling the brand new frame and chassis, I centered the "D" valves as per Roundhouse instructions, and set the return cranks using the fixture method. Applying air for the first time, the chassis ran flawlessly. Again, NO additional adjustment required. I have gauges on hand for all my locomotives that use Roundhouse valve gear, from a conventional 2-8-0 to a 2-4-4-2 Mallet, and even a Roundhouse powered Climax.

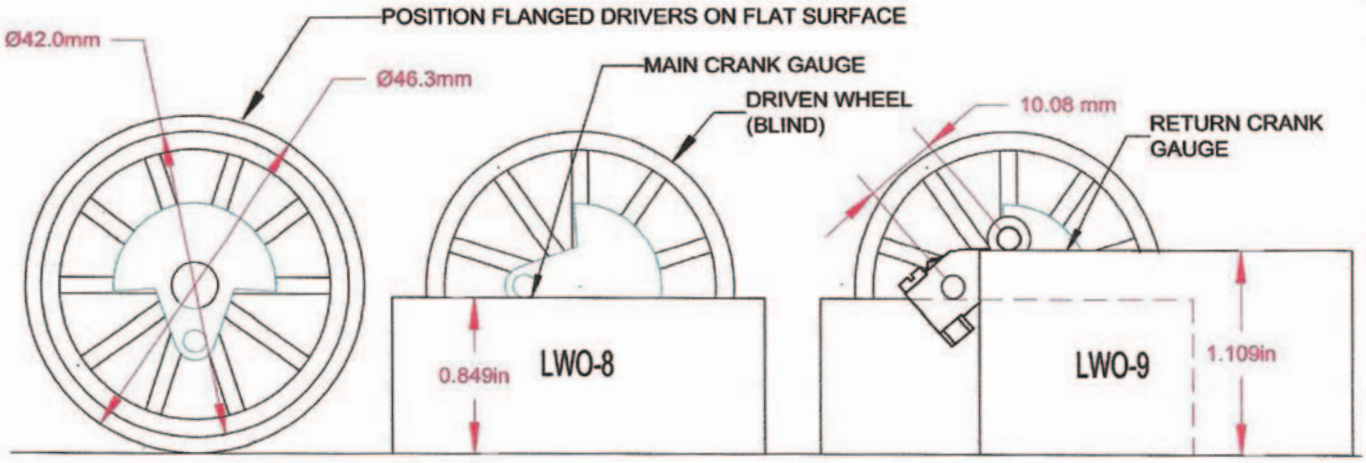
One final word and a bit of opinion: Roundhouse recommends that you pin the return cranks in position after establishing their relationship with the main crank. I have never done this. This is primarily because since I run my locomotives so much and keep them forever (some are old enough to vote, others are old enough to drink!) that crank pins can and do get worn out and the holes in connecting rods 'egg out' with prolonged use. Replacing these parts would be difficult with a permanently attached return crank. If the crank WERE to come loose, so what? With this fixture method, you can have it accurately repositioned in a matter of minutes.

With this technique you'll have no more excuses for a roughly timed engine.

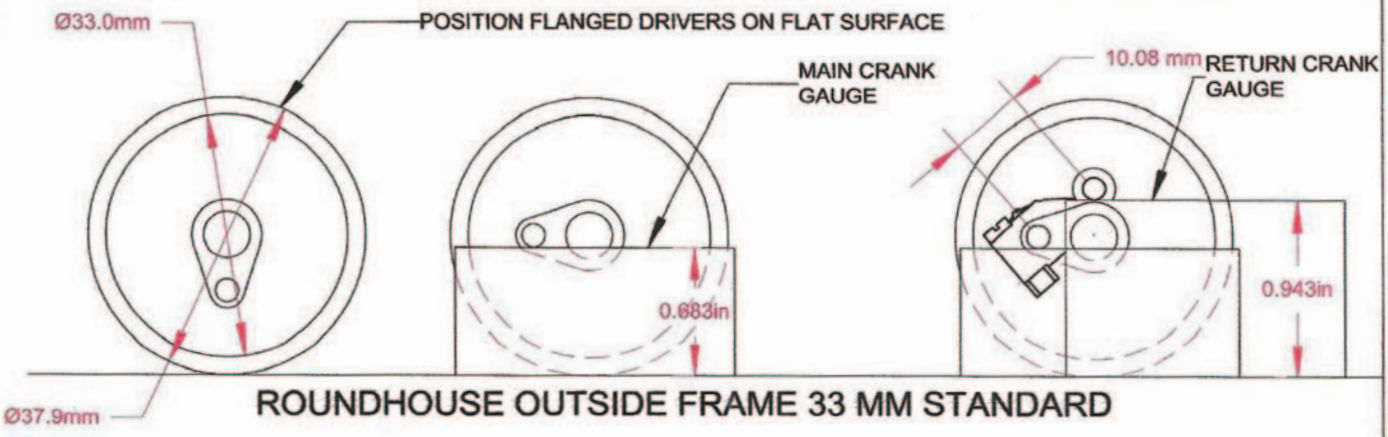
ROUNDHOUSE WALSCHAERT VALVE GEAR TIMING FIXTURES

$$\text{CRANKPIN GAUGE} = \frac{(\text{FLANGE DIA.} - \text{CRANKPIN DIA.})}{2}$$

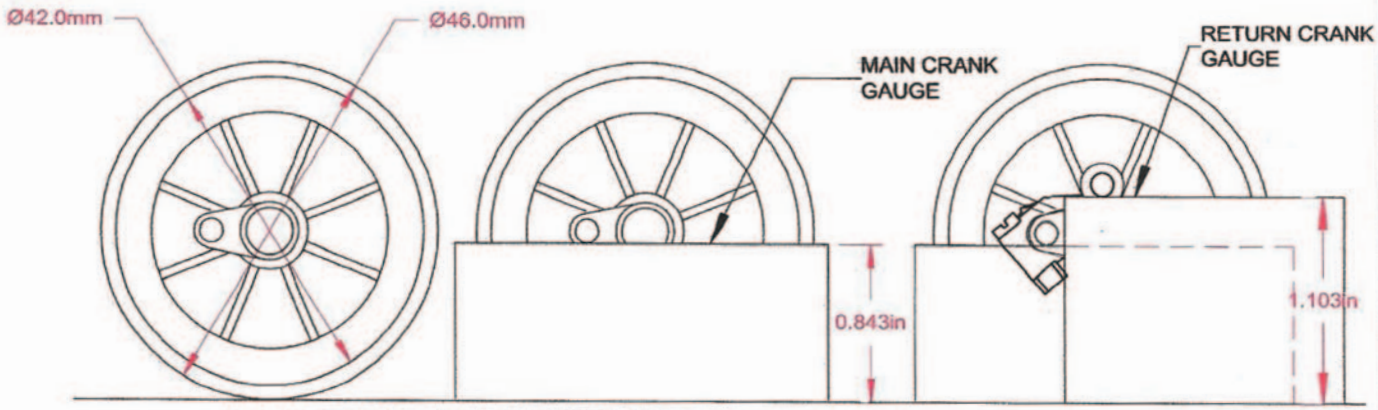
$$\text{RETURN CRANK GAUGE} = \text{CRANKPIN GAUGE} + \sqrt{\text{RETURN CRANK LENGTH}^2 - \text{CRANK THROW}^2}$$



ROUNDHOUSE OUTSIDE FRAME 42 MM AS ON SANDY RIVER OR OUTSIDE FRAME CONSOLIDATION PROJECT LOCOMOTIVE



ROUNDHOUSE OUTSIDE FRAME 33 MM STANDARD



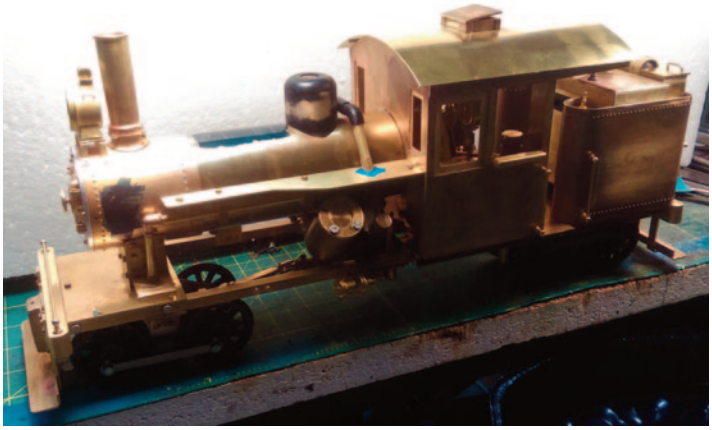
INSIDE FRAME CONSOLIDATION PROJECT WALSALL WHEELS

Figure 1

THE CUPOLA VIEW

Projects on the Workbench

It is always heartwarming to get positive feedback on the projects that we have been able to bring to the live steam community. Many of our readers are finishing up their Freelance Heislers from the 2019 series and are now excited about starting a Freelance Consolidation Project.



Your editor's Freelance Heisler on the workbench of Mike McCormack. Mike is detailing the project and it is close to being able to haul 1:20.3 borax on the Calico & Potomac Railway in Virginia.

Mike McCormack Photo

And let's not forget Marc Horovitz's marvelous Minitram. Many of those are in the works as well, so once we are able to get back together at steamups, we'll see these creations gracing the tracks to enjoyment of all.

For this issue, even though we continue with our two build series, from the table of contents you would think that this edition is smaller than normal. But not so, we've packed a lot of information into this issue which fills as many pages as previous issues. Plus there is information that overflows into our web presence with additional downloads for those who need more information for their build. Access to the Workshop Plans is free, you just need to be a registered user of the website.

If you are following along and building a project from the pages of SitG, whether recent or maybe something from the archives, we would love to share your efforts here in the pages of the magazine. Our Steam Scene has unfortunately been vacant because of social distancing and the loss of so many steamups this past year. Even if you have been solo steaming in your backyard, send us your photos and a brief note about your socially distant steam.

Happy Steaming!

Scott

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

Special or Annual Meets

International Small Scale Steam Steamup. January 17-23, 2021 - 103 Live Oak Drive, Diamondhead, Mississippi. Visit *www.diamondhead.org* for more information.

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

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

National Summer Steamup, July 2021 - Lodi Grape Festival and Events Center, Lodi, California. Visit *www.steam-events.org* for more information.

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

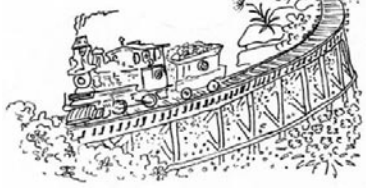
Regular steamups

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*



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.

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

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

Ross Schlabach - Ross developed an early interest in trains, and even got a steam locomotive cab ride before he was five. His first models were an American Flyer set, and by his early teens, half of his bedroom was taken up by an HO layout. During high school and college, classical guitar got in the way. Upon graduation from Virginia Tech, Ross joined the Air Force and piloted the F-106 Delta Dart. This gave him the opportunity to fly cross country on a number of occasions, including to Colorado where he got his first exposure to narrow gauge -- which has been a major focus of his railroad modeling ever since (with a bit of 1:32 thrown in for good measure). Since his retirement in 2007, the absence of quality kits pushed Ross into custom modeling and LS locomotive bashing to create the models he wants.

What's on Your Workbench?

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

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

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May/June 2021

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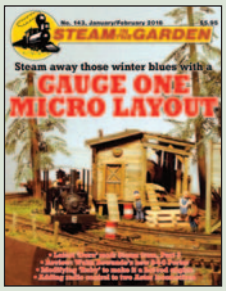


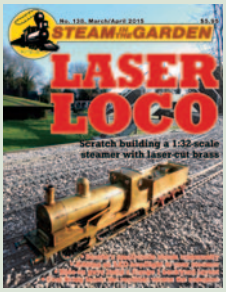
Vol. 26, No. 1; Issue 143; Jan./Feb. 2016
Micro layout: Building an indoor Gauge One track • Review of Wuhu Bowande Porter • Hot-rod 'Ruby': Hopping up a 1:20.3-scale engine • Rolex Asters: Adding radio control • Learning to model in tinplate with a 'Dora' modification, Part III • Latest waybill: Llagas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

Vol. 25, No. 6; Issue 142; Nov/Dec 2015
In memoriam: Andre Anderson, Wuhu G5: Locomotive review — 1:32-scale, 4-6-0 , Topaz: Alchemy, building an Accucraft 'Ruby' kit, Tram: Learn to model in tinplate, Sacramento stationaries: NSS 2015 highlights miniature machinery. WWI car: Creating a 7/8ths-scale Fort Benning railroad observation car.

Vol. 25, No. 5; Issue 141; Sept./Oct. 2015
Mamod's latest: 'Brunel' • Learning to model in tinplate with a 'Dora' modification, Part I • Live-steam group makes sixth appearance at Maker Faire • Adding mesh to Accucraft burner • Salute to Tom King • New products: Aster 0-4-0, Wuhu Bowande German 2-6-2T, Train Dept. with two 7/8ths-scale.

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

Vol. 25, No. 3; Issue 139; May/June 2015
Steaming amongst the magnolias: Diamondhead 2015 • Laser Loco: Aspinall 0-6-0 (series Part Two) • Workshop: sample tools and equipment • Wicks: A new material • Open cab 'Dora' • Latest waybill: Swiss, U.S. locomotives on the way; a new version of Saxonian in 1:20.3 scale.



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

Vol. 25, No. 1; Issue 137; January/February 2015
Expand Accucraft cylinder ports • Casey Jones: a new 10-wheeler from Wuhu and the engineer's history • R/C J-bar: adding steam controls to transmitter • Dummy cylinders: Give 'Dora' a more realistic look • Railroad librarian: 'Great American Railroad Stories'; 'The State Belt.'

Vol. 24, No. 6; Issue 136; November/December 2014
Sacramento steams. The 2014 National Summer Steamup provides a fun time for more than 150 steamers • Replacing axles • Scratch-building the four-cylinder Heisler, Part Three • The backyard Rivendell & Midland Railroad, Part Two • 'Dora' gets a snow plow (and a bell and a ...).

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

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