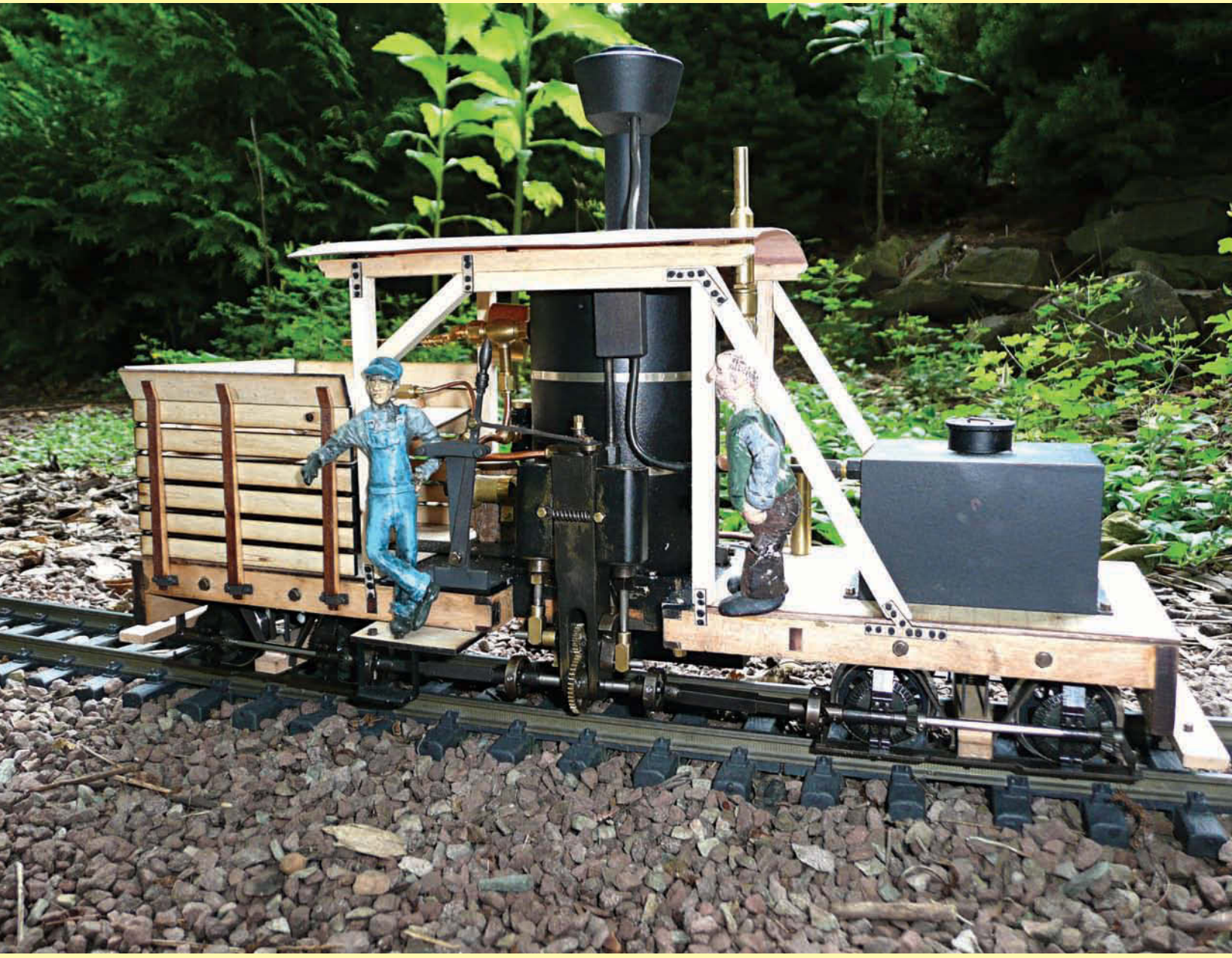
№ 107 September/October 2009 $6.00 U.S. $7.00 Canada

STEAM IN THE GARDEN



In this issue.....

National Summer Steamup

Accucraft Earl/Countess Review

Regner #10 Shay Kit Review

and lots more.....

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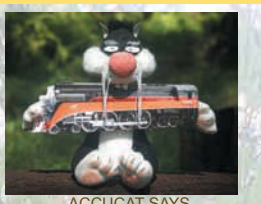

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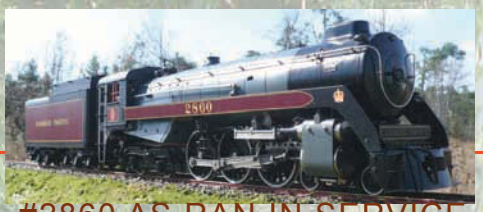

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STEAM IN THE GARDEN

Vol. 19, № 5
Issue № 107

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

Articles

Departments

FRONT COVER:

Slim and Shorty, the Bowdler Brothers Lumber Company engine crew, check out their new "office" recently arrived from far off Ohio. The boss saved a few bucks by purchasing the loco "unfinished" so the boys figure they'll be mixing up some lamp black and creosote to protect the wood frame from the elements before putting the Shay into service.

Photo by Tom Bowdler

Editor
Ron Brown

Magnificent Assistant
Marie Brown

CAD & Other Drawings in This Issue
Dan Rowe, Howard MacCulsay,
Jim Fainges

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We're back online! Due to popular demand, our web site is back..... www.steamup.info

CALENDAR OF EVENTS

Southern California Steamers - contact Sonny Wizelman for dates, places and any other pertinent information. 310-558-4872 - sonnyw04@ca.rr.com

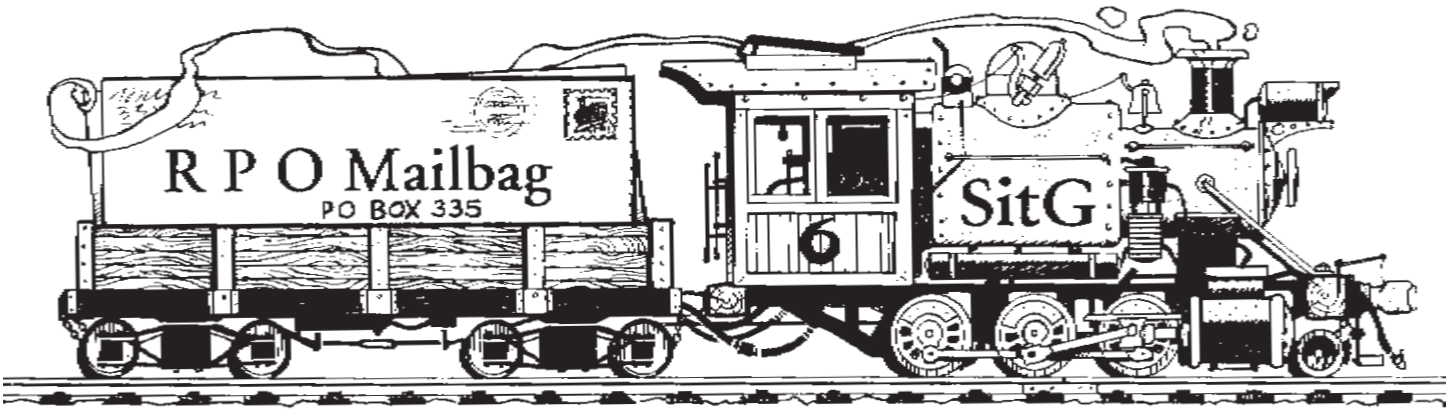
Michigan Small Scale Live Steamers (MSSLS) hosts a large number of steamups. For details on What, When and Where, go to their web site at http://www.mssls.info/

Upstate Steamers, upstate New York steamup calendar. If you are in the area, come out and join us! http://gold.mylargescale.com/Scottychaos/upstatesteamers/

Puget Sound Garden Railway Society steamup schedule: We have 2 steamups per month, one at the Georgetown Powerplant in Seattle on the second Saturday of every month, and a steamup at a member's track on the fourth Saturday of the month. Here is a link to our steamup timetable. http://psgrs.org/livesteamtimetable.html

January 15, 16, 17, 2010 - International Small Scale Steam Up, Diamond Head Resort, Diamond Head, Mississippi. For more information, contact Jerry Reshew, 228-225-1747 or e-mail reshew_j@bellsouth.net Multiple, elevated portable tracks, 45 and 32 mm and HO, @4 hour steaming, dealers and clinics.

Check our web site < www.steamup.info > for up to the minute Calendar of Events.



Austria
via e-mail

Dear Ron,

I read the article on firing a live steamer in issue #106 and must tell you that I totally disagree on the order of preparation on the following grounds. The gas temperature falls as it is transferred from the can to the gas tank. If the gas valve is now opened, the chances of liquid gas flowing out of the tank and through the jet is high. Any dirt in the gas tank can be transported with the liquid, causing a blocked jet. Liquid gas can also cause surging. Refilling the tank after the gas has already spurted out of the connection can aggravate this situation. Manfred Regner instructs all users to press the gas valve down to release all liquid gas before lighting the burner. The loco does not run for a shorter period after this.

Bert Horner

* * * * *

UK
via e-mail

Dear Ron,

Reference Carl Weavers letter in the last SitG on the fitting of Water gauge Glass.

After reading his letter I felt that I needed to write to you and offer my advice on the clearances required when making and fitting water gauges.

Carl's clearance of 1 thousandths of an inch is much too tight and could lead to the glass being broken, the manufacturing tolerances for each part would take up that amount and more, plus the alignment of the top and bottom fittings must be very accurate, and this is not achievable with the threads used on the fittings, the best alignment that can be achieved is within 1/2 of a thread pitch on the fitting where it is screwed into the boiler, if you are lucky it could be spot on but at the worst 1/2 a pitch out.

So I would suggest at least .020" on the diameter of the glass as being a reasonable clearance, also never tighten a gland nut with a wrench, finger tight is all that is required, that is why on our gauges we supply gland nuts with a knurled outside and not a hex nut.

I have spoken to another well known UK manufacturer and he uses a similar clearance.

The above comments apply to round clear glass, if you are using red or blue line glass then more clearance will be required as this type of glass is not round and varies a lot over a length, it is best to measure the glass first and then decide on the size of your gland nut.

I will just add that we have never to my knowledge had a gauge glass fail using the above clearances.

David Bailey

The author responds.....

Ron,

Thanks for sending me David's reply to my posting.

It is nice to have his input because he is very experienced in issues like these. I must now admit that when I reamed out each gland nut, I merely eyeballed it knowing my result was more than Ryan recommended. I just measured it this morning and it actually came out to be .022, close to what David recommends. I did not measure at the time. I do a lot of eyeballing and it sometimes it gets me into trouble.

As for the wrench, I did not know not to use one and probably would not have, had I used thin Accucraft glass. I used a thicker Pyrex glass instead, so Ryan's suggestion sounded safe. Luckily, my using a wrench did not seem to stress the glass, just the O-ring. In my original letter, I did not mention alignment of the upper and lower fitting. I used a round, snug fitting brass rod for that and it seemed to work fine.

Since repairing a broken sight glass is a frequent occurrence and common to Accucraft, Roundhouse

and Aster locomotives, it might be a good SitG article. In this case, the article should be a step-by-step explanation (even the simple, intuitive ones) and be accompanied by a few photographs. I'm not sufficiently knowledgeable to write it, but perhaps David might consider it. I am willing, however, to test fly the article to make sure all the steps are adequately explained.

Since I am volunteering David, I am copying him on this email. My apologies, David.

Cheers,
Carl Weaver

* * * * *

Washington
via e-mail

Greetings Ron,

This is the manufacturer and source for the small pressure gauges we use. I thought that your readers would like to know.

http://www.minipressuregauge.co.uk/

Cheers,
Jim Montgomery

Arnold Hoffman passed away April 25 at the age of 92. He had been quite active in the San Louis Obispo California area gauge 1 railroad scene until his eyesight began failing several years ago.

He was an entrepreneur in many fields during his long and active life. Among his many endeavors he had an oceangoing steam launch, ride-on steam railroads in both 7-1/2 and 15 inch gauge, and was the proprietor of a working chicken ranch and market.

His nimble wit, playful sense of self deprecating humor, and inquisitive mind endeared him to many. One of Arnie's observations was, 'When the Good Lord passed out brains I thought he said trains, and I asked for a narrow gauge one."

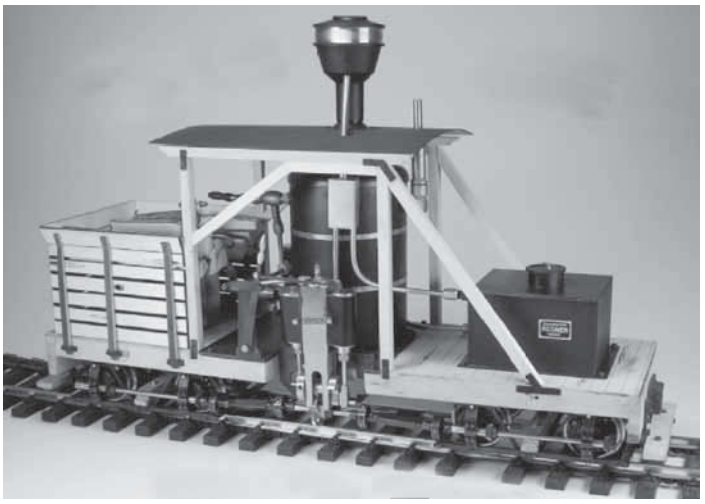
I am sure that when contemplating his demise, Arnie would have come up with a humorous anecdote. He is survived by his wife of sixty seven years, Marian, three children, three grandchildren, and three great grandchildren.

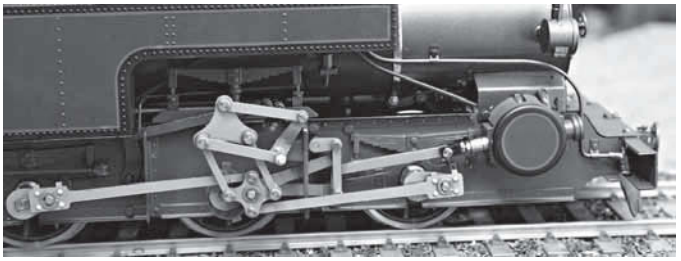
He will be sorely missed.

submitted by Larry Bangham

WHAT'S NEW?

The Train Department and Steam in the Garden magazine are once again joining forces to sponsor a kitbashing contest for SitG readers. See what you can do with the new Regner #10 Vertical Boilered Shay kit and send us your photos, along with a writeup on what you did, how you did it and why you did it. A back story always adds interest. Winners will be awarded cash and merchandise prizes. Judging will be conducted by a panel of judges. All entries must be received by December 1st, 2010. That gives you more than a year, so let's see what your imagination and skills can come up with in that time! The #10 Shay is available in kit form or fully assembled. For more information or to place your order, contact The Train Department at 757-855-6364 or go to their web site at www.traindept.com





The unusual valve gear on the Saxonian IIIK adds visual interest to this model.

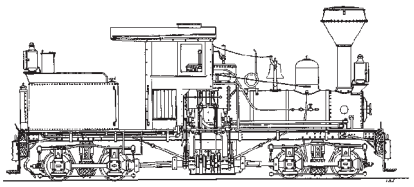
MBV Schug is pleased to announce the Saxon IIIK, produced by Accucraft in China with a production run of 100 units as a ready-to-run Live-Steam-Model exclusively for MBV Schug, The model was designed using the original drawings for this engine. The only materials used in the construction are brass, copper and stainless steel. The assembly, finish and lettering reflect the high quality Accucraft is known for. A full review of this live steam locomotive will appear in the December issue of SitG. See the MBV Schug ad in this issue for contact and ordering information.

REGNER #10 SHAY KIT REVIEW

Review and photos by Tom Bowdler

Technical Specifications:

L/B/H: 380/100/180 mm
Height over chimny: 245 mm
Weight: 2.5 kg
Gear reduction: 4: 1
2 cylinders
Cylinder bore: 10 mm
Stroke: 14 mm
Vertical Standing flue boiler
Boiler water contents: 130 ml
Boiler refeeding valve (Goodall type)
Pressure gauge
Track width adjustable: 30, 32, 45mm



Regner Dampftechnik, through Ken Johnson's Train Department in Virginia, has released a live steam model of an early vertical boiler Shay originally purchased from the Lima Machine Works by G. and J. Backus of Oscoda, Michigan. The locomotive, completed on November 13, 1880, came equipped with 8"x8" cylinders and 24" drivers mounted on trucks attached to a wood framed chassis at 36" gauge. Since only one photograph of the original locomotive exists and photos of early vertical boiler Shays in general are scarce, Regner has done a nice job of recreating this locomotive in 1:20 scale to run on 45mm track representing 3' narrow gauge.

As is typical, I heard about and ordered the kit for this locomotive some time ago and waited for its availability. On opening the box I discovered Regner's normal attention to detail with parts in numbered bags for each construction sequence wrapped in tissue paper. The boiler/burner assembly and steam motor are factory assembled and tested and many parts are blackened to look better than raw metal right out of the box. The frame is laser cut wood and glue is provided to assemble the parts. I was at first concerned that construction method wouldn't be strong enough then discovered there are truck-mounting metal plates that fasten to the chassis side members and a central plate to which the boiler and steam motor attach that provide more than enough robustness for the running gear and power production.

Standard equipment is commendable, including a water gauge glass, pressure gauge and boiler water refeed system. Steam oil and a squirt bottle are packed with the kit so once construction is complete fuel and distilled water will be all the additional supplies needed to fire the locomotive.

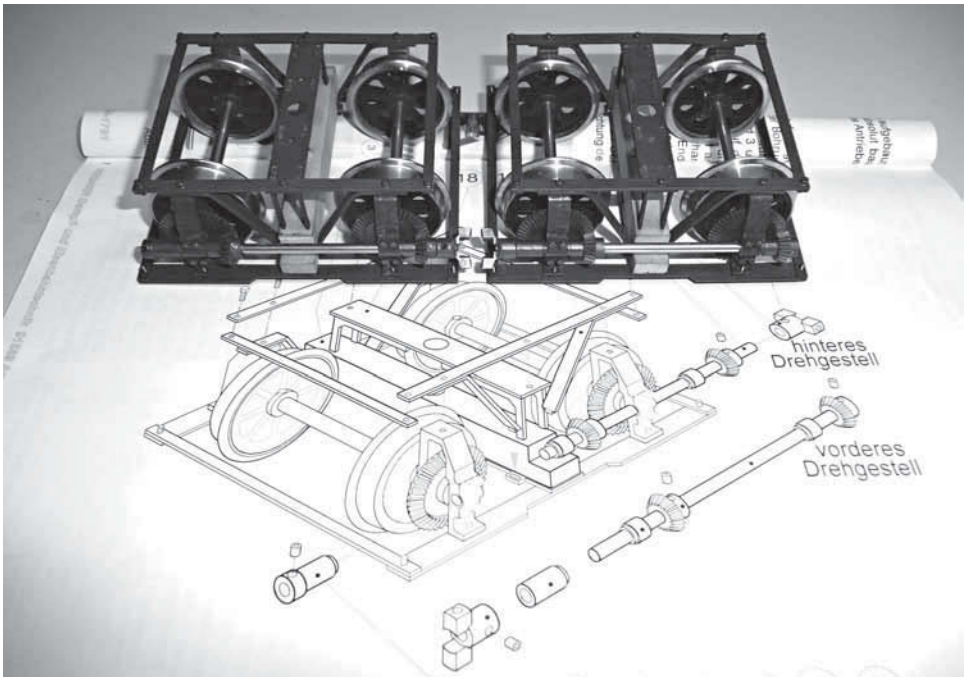
Another early concern was that the construction manual was supplied only in German. I had some of that language in school but that was many years ago so fortunately Ken provides a CD of English language instructions, photographs and notes that ease construction immensely. The instructions are a very literal translation, but along with the pictures, parts lists and Ken's suggestions the pages printed on my home computer were invaluable during assembly.

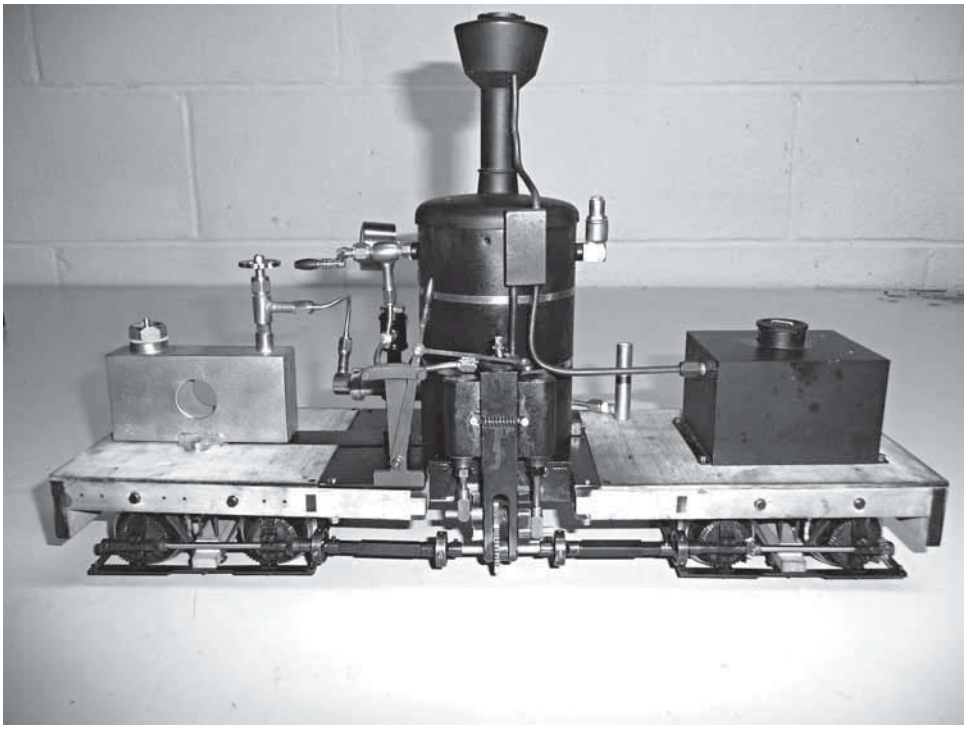
So, you ask, how difficult is this kit to assemble? You can't shake the box and have it running, but with careful attention to detail and reading the manual any reasonably mechanically inclined person should be able to assemble a running locomotive. I have heard from several other builders during my efforts at construction and we all experienced minor problems but we all have locomotives to be proud of. Let me mention that you

The whole kit and kaboodle.

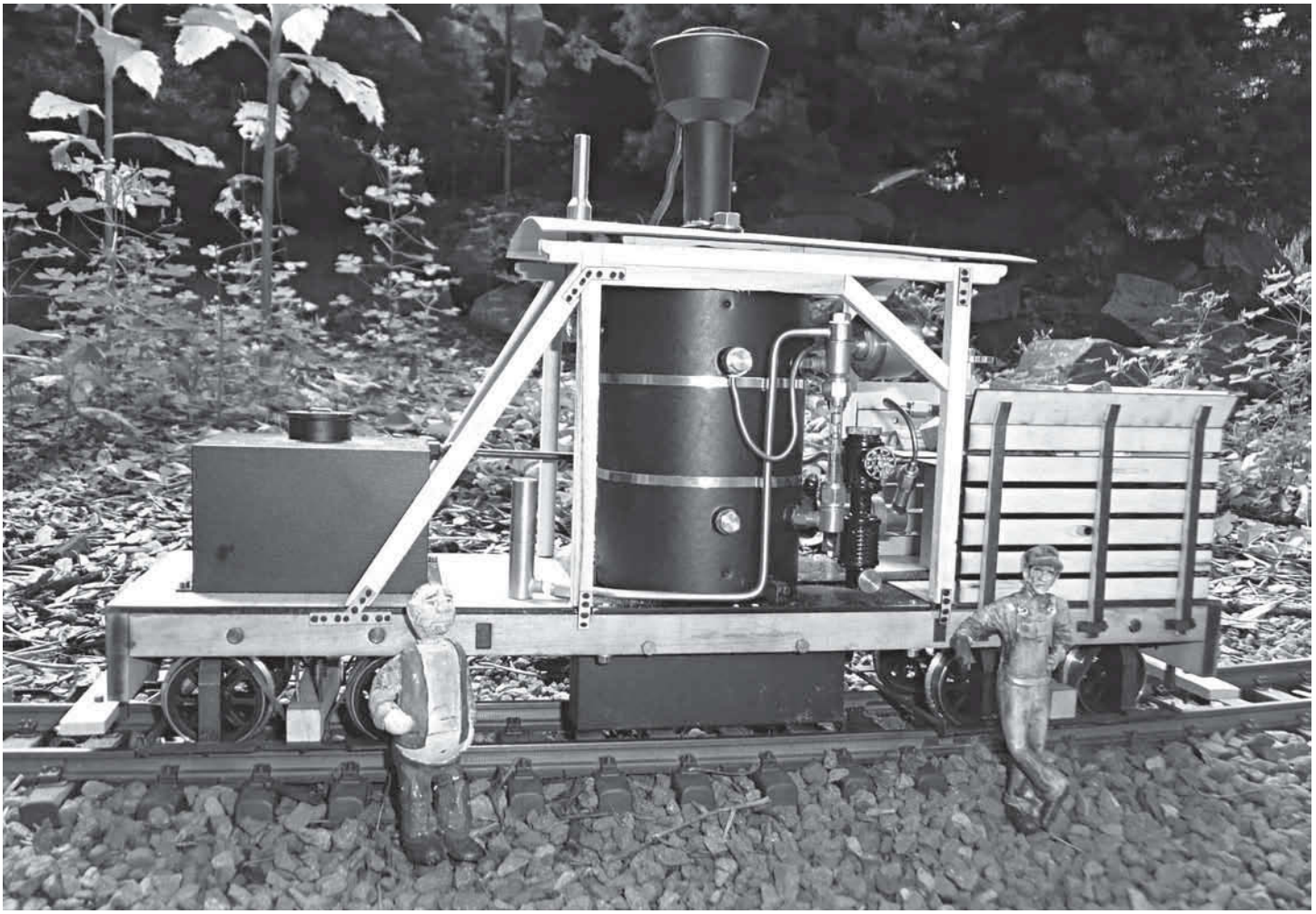
The assembled trucks and frame with metal truck mounting plates in place.

Nicely detailed trucks and gear drive components with one of the excellent assembly drawings.





Chassis, boiler, steam motor, gas and condensate tanks assembled for a test run before body work installation. The condensate tank has no drain so water will need to be dumped or syringed out of it.



Shorty and Slim check out the boring side of the Shay and the mysterious "Behalter" suspended beneath the boiler. The vertical tube to the left of the boiler is the water refeed receiver which connects to the top of the sight glass. The small handwheel on the lubricator allows oil flow to be adjusted.

can also buy a ready to run version of this loco; fuel, oil and water it, light it up and run it... but what fun would that be? Especially if, like me, you plan to make modifications to personalize your Shay you'll know how it went together and how to take it apart and reassemble it for changes.

Enough introduction, let's build this locomotive! Regner provides glue and tools and a list of things you may still want to order. I would recommend you procure a good quality 0.9mm allen wrench as the one supplied with the kit rounded out early on and wouldn't tighten the screws required for driveline assembly.

Construction begins with the very impressive truck assembly. The scale metal parts are held together with small 1mm screws and have a wooden spreader bar. The axle carriers and gears are easily assembled following the excellent drawings in the assembly manual. I have not seen a more scale-looking set of Shay trucks in live steam. The wooden frame pieces are glued together taking care to achieve a square relationship and I found it best to glue the slightly warped laser cut deck pieces with the frame weighted upside down to avoid distortion since the buffer beams are deeper than the frame members are wide. After glue drying time and frame sanding the truck support platforms are bolted to the framework and the spring suspended trucks can be installed.

Mounting the steam motor to its frame and the base plate came next and gave me my first real assembly problem. The factory applied blackening solution had filled the mounting holes on the frame of the steam motor and since I didn't have the appropriate metric tap to clean them I used dental tools and a mini sandblaster to remove the blockage. I had to Loctite™ the motor to its mount since I may have rounded the threads with my poking, but once I did so it stayed put and I found some filing of the mounting bracket necessary to mount it to the base plate and allow free turning of the crankshaft mounted counterweights. I had experienced a similar problem with my Regner Lumberjack kit so it wasn't a surprise to me. The motor mount plate requires four holes to be drilled in the frame for which I would recommend a small drill press to keep them square. I did not have the 3mm drill bit the plans called for but I found a 1/8" bit satisfactory.

The Universal Joint/drive shaft assembly is next. I found the parts and fasteners small and "fiddly" but they do look very good, function well and match the detail of the trucks. The drive line was very tight which I traced to the factory assembled steam motor. My Lumberjack kit also exhibited this same symptom, so I oiled it profusely and turned the gears by hand. Steam running loosened the Lumberjack motor and I hoped it would do the same for the Shay.

The directions say to push the chassis down the track, which was not possible with the steam motor attached, though the chassis with trucks rolled as expected. I skipped ahead in the directions to assemble and install the boiler, gas tank, lubricator and catch tank with related plumbing so I could test the chassis on steam before building the body work.

I experienced a problem lighting the burner through the stack but achieved success when the stack and boiler top were removed. I also experienced the flame extinguishing when the throttle was opened allowing steam to the cylinders. I don't know the reason for this as the exhaust from the cylinders was kept independent of the stack during early testing. Perhaps things will improve as the engine is run in. I really like the reversing lever and linkage which is almost to scale size and will allow full size hands to control the direction of the locomotive without getting burned trying to manipulate the valve on top of the steam motor.

Bodywork assembly came next and was eased by the use of squares, clamps and the flat surface of my work space, the former kitchen counter top in our home. The wood parts provided are cut to size so they merely need to be glued together. I found a good bit of trimming was needed for the removable roof frame to fit the top of the boiler cover. I also had to enlarge the cutout in the plywood roof to clear the boiler filler valve. I wet and bent the ply roof around a spray can secured with elastic bands while it dried to preform it before gluing to the roof frame. Laser cut wood connectors representing metal reinforcing brackets are supplied. I use drops of paint applied with a toothpick point to represent bolt heads holding said brackets in place. Roof "patch panels" are also supplied along with copper rivets to hold them in place. I didn't install them as I plan to remove the roof for detailing later.

The couplers are easily bolted in place. Two-pocket link and pin receivers are pre-blackened as are the step support angles, hardware and link holding pin. Wood pilot steps are included cut to length and are bolted to the support angles. A very versatile coupling system is the result; links and pins could be used or knuckle couplers could be adapted depending on the rolling stock that is expected to be hauled. The engineer's side of the frame receives a wood platform and step on which the driver may stand. Lots of room is provided on the locomotive deck for adding detail parts and the condensate tank is drilled and tapped to receive headlight brackets which Regner can provide if required.

The last part to attach is the "Behalter" a metal box bolted to the fireman's side of the frame. My search of German-English dictionaries on the internet revealed no direct translation for this word. My limited German says it might have something to do with braking though I would have expected to find the bottom of the firebox

and ash pan in that space.

We now have a completed locomotive and you'll want to know how it runs. In a word, stiff though it is loosening up with each run. I have no doubt, based on my experience with other Regner products, that it will continue to loosen up over time and will be a great, smooth runner. The gearing provided should make it nice and slow when required and, combined with the supplied twin cylinder motor, a substantial load should be able to be hauled. As for me, it was difficult to assemble this kit in stock form since my research has resulted in many ideas I can use to modify and personalize this locomotive to suit my taste and preferences. My suggestion would be for you to order a kit or R-T-R locomotive from the Train Department and build and run it then decide how far you wish to go to personalize it for your railway's use. I know you'll enjoy the process!

Workshop Project

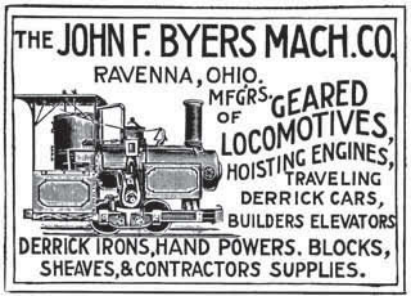
A Mark II Cricket Looking for Its Ancestry Part I

by Howard Maculsay

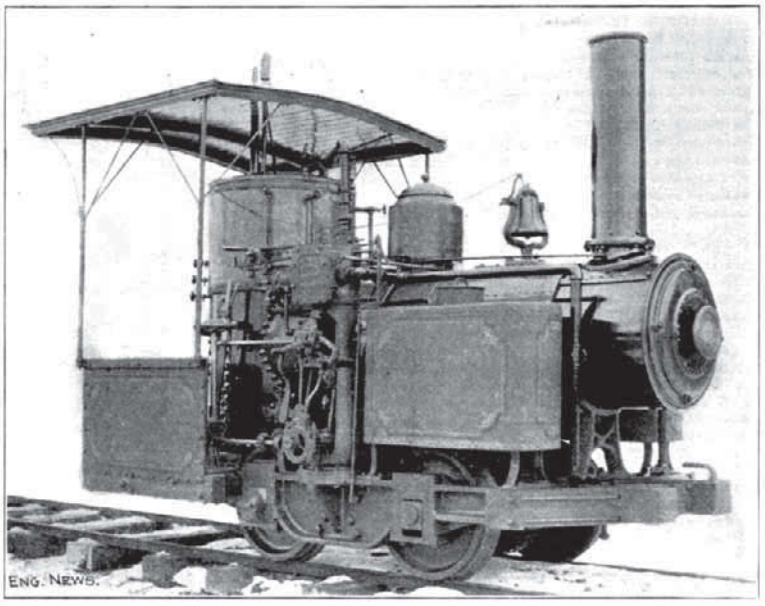
An Attempt to Mimic the John F. Byers Geared Locomotive

In November 2007, I took delivery of my Cricket Mark II, WLW #12, built by Mike Krionderis of Westminster Locomotive Works http://www.cricketlivesteammotor.com It has run like the champ it is, and I've enjoyed running it this past year and a half, but now I'm going to make some modifications to more simulate the look of the original John F. Byers Geared Locomotive.

I'll be using an original Byers Mach. Co. advertisement, an old picture of this little engine, to identify tank and side frame details and an elevation drawing found on the Geared Steam Locomotive Works at http://www.gearedsteam.com



Advertisement appearing in "Engineering News"- January 6, 1896



Engineering News May 21, 1896

The Plan

I plan to add a fabricated brass facing on the sides of the Cricket's existing under-carriage to represent the old engine's cast iron frame, a new matching front buffer assembly and a new rear end beam & coupler. The side frame facing will extend under the cab structure to the rear end beam. A short oak beam will be placed between the new side frame and the cab floor. The front buffer will feature 2 forward-protruding oak beams held in place by a pair of truss rods terminated at the front of each side frame. The rear end beam will have matching rear-protruding oak beams. In addition, I will construct a pair of non-functional brass side tanks. The side tanks, along with the existing cab's sides and back, will get a matching scrollwork decoration. The scrollwork is gold colored vinyl transfers acquired from Del Tapparo of G-Scale Graphics directly from my CAD software's .dxf export file. http://1stclass.mylargescale.com/DelTapparo/index.htm

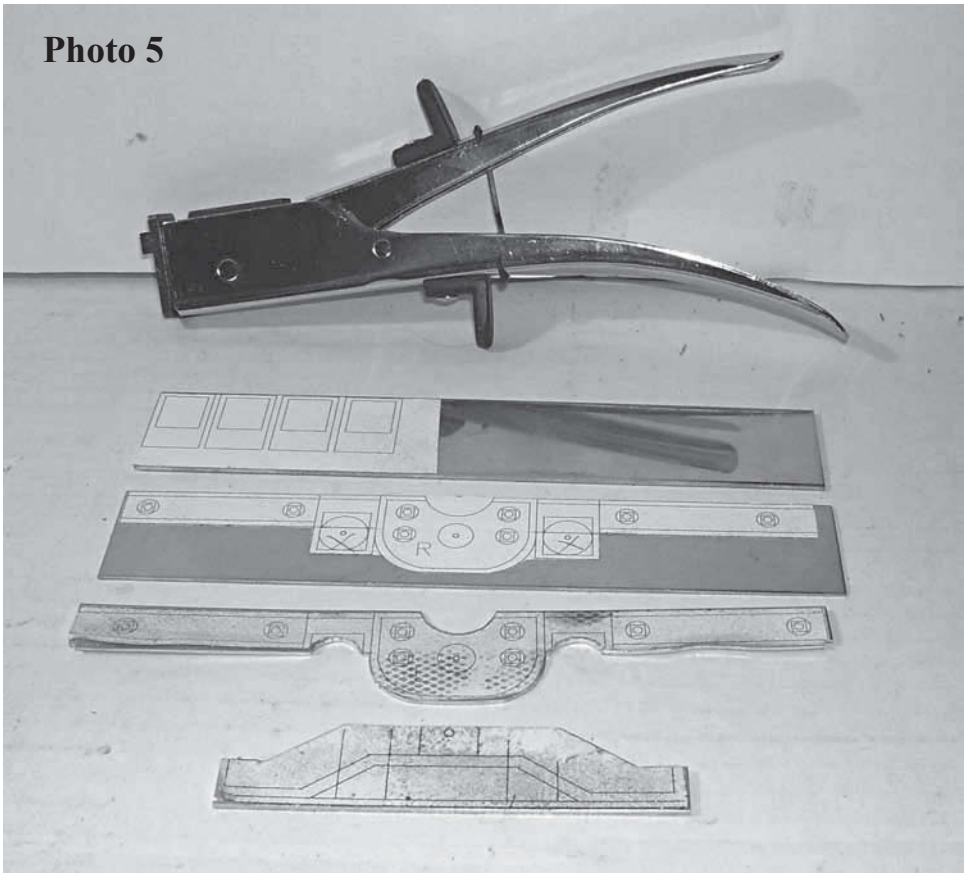
Del is extremely helpful and it was a pleasure doing business with him. And lastly, I will be hiding the top and sides of the existing under-carriage, so that only the new side frames will show. To do this, I will add deck beams made from poplar.

Constructing the Side Beams & Front Buffer

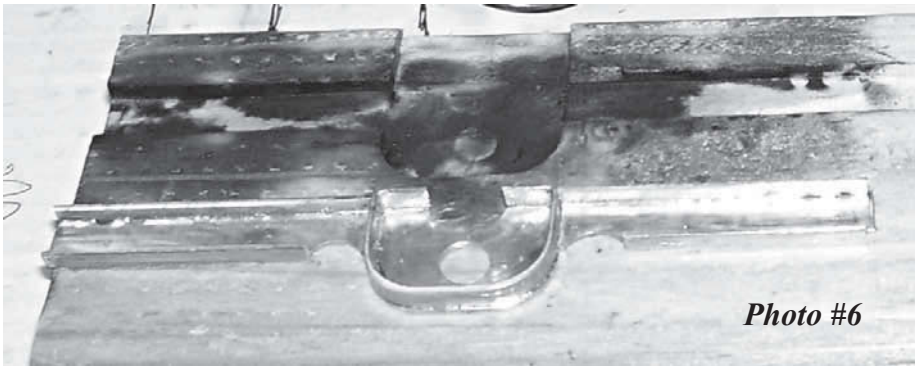
The critical dimensions for the side beams are the clearance holes for the 2 existing journals, the jackshaft and 4 existing under-carriage frame rivets. The center section thickness cannot interfere with the crankshaft on the one side and the flywheel on the other. The half-round cutout at the top of the center section is made to clear the concentric on the crankshaft. Other than that, the rest of side beam is merely a facade.

Using an actual size drawing printout mounted with artist's adhesive, I did the brass cutting using either my hand nibbler or my drill motor powered "Rodman" Nibbler. ***(see Photo #5)***

The side beams are 6.305" long x .4375" wide with the center section at 1.430" wide x .981" deep. The C-channel portions are built-up by soldering .125" wide x .05" thick brass strips on edge along the beam's long sides. The



Using Patterns to Guide Cutting



Side Beam Soldering Jig

Photo left:

Front Buffer Pieces Fit Check with Side Beams

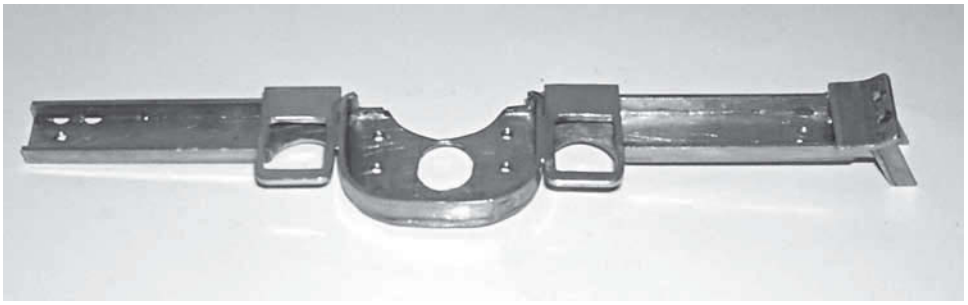
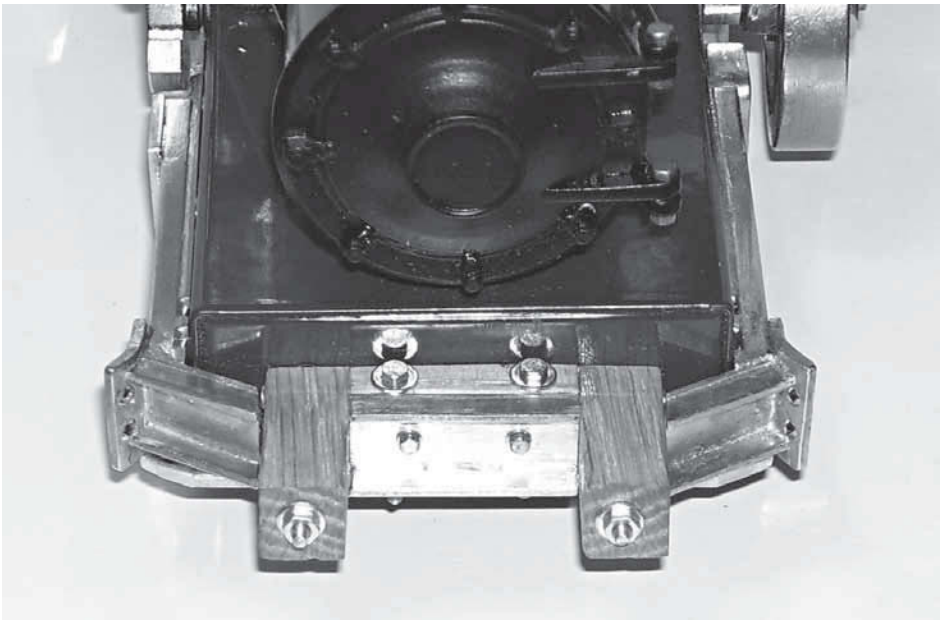


Photo left:
Completed Side Frame

Photo right:
Front Buffer



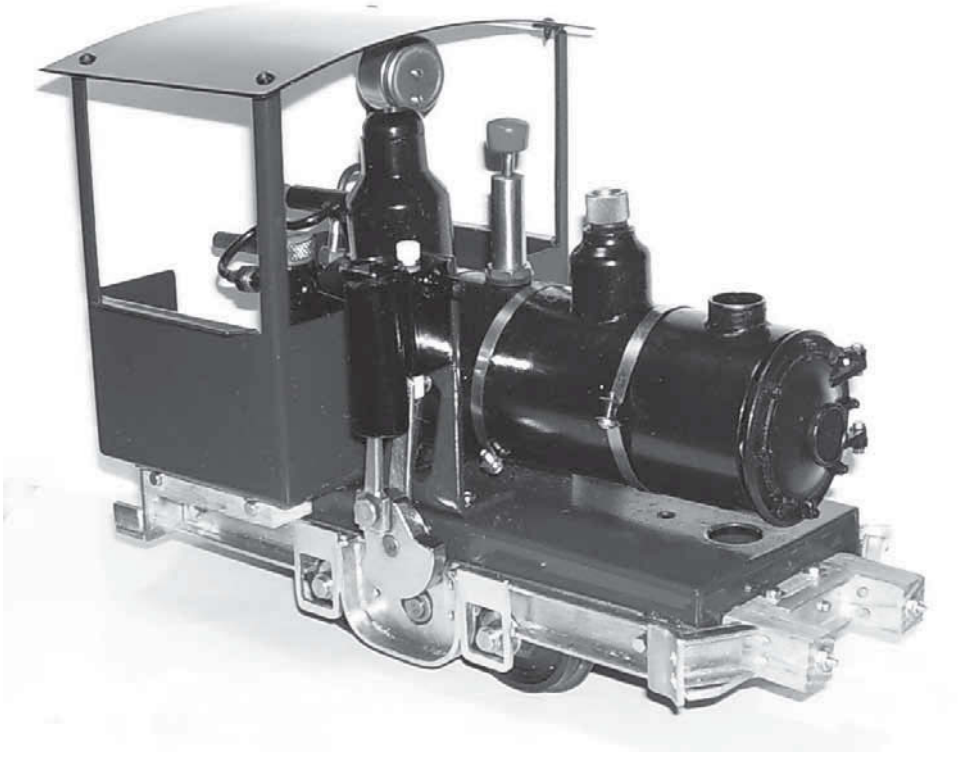
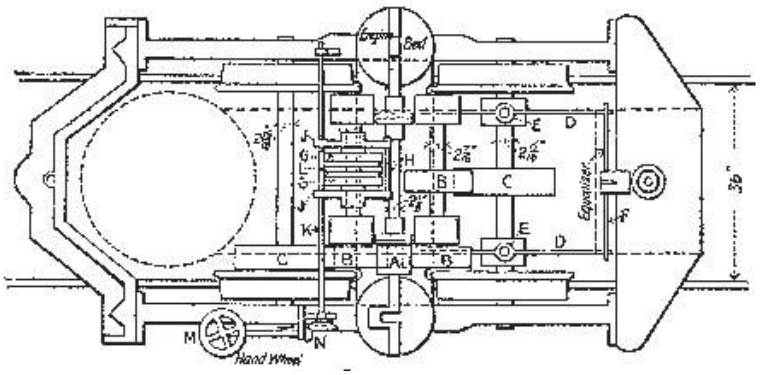


Photo left:

Side Beam Fitted
with Front Buffer



Overhead Elevation Drawing from Geared Steam Locomotive Works

center section is built-up by soldering .1875" wide x .05" thick brass strip along the section's edge. The side beam's journal is brass plate .563" wide x .832" deep x .0625 thick with a .3750" hole at the appropriate place to clear the real journal. The hole for the jackshaft is .3125" diameter. To facilitate the soldering, I made a soldering jig by routing out the outside shape of the side beam in a piece of wood. The on-edge brass strips were cut to length and held in place by short pieces of doweling. The sides of the dowels were trimmed to create an oval shape; by twisting the dowels in between the brass strips, they were jammed in place for soldering.

At the front edge of each side beam, there is a front beam support plate .4375" wide x .561" deep x .0625" thick. Once it has been bent to shape and drilled for the 2 truss rods, it is soldered to the front of the C-channel. The side beams are held in place by 2-56 hex head screws, one at the angle plate connector to the rear end beam, one at the forward end and four in the side beam's center section, all drilled and tapped into the under carriage.

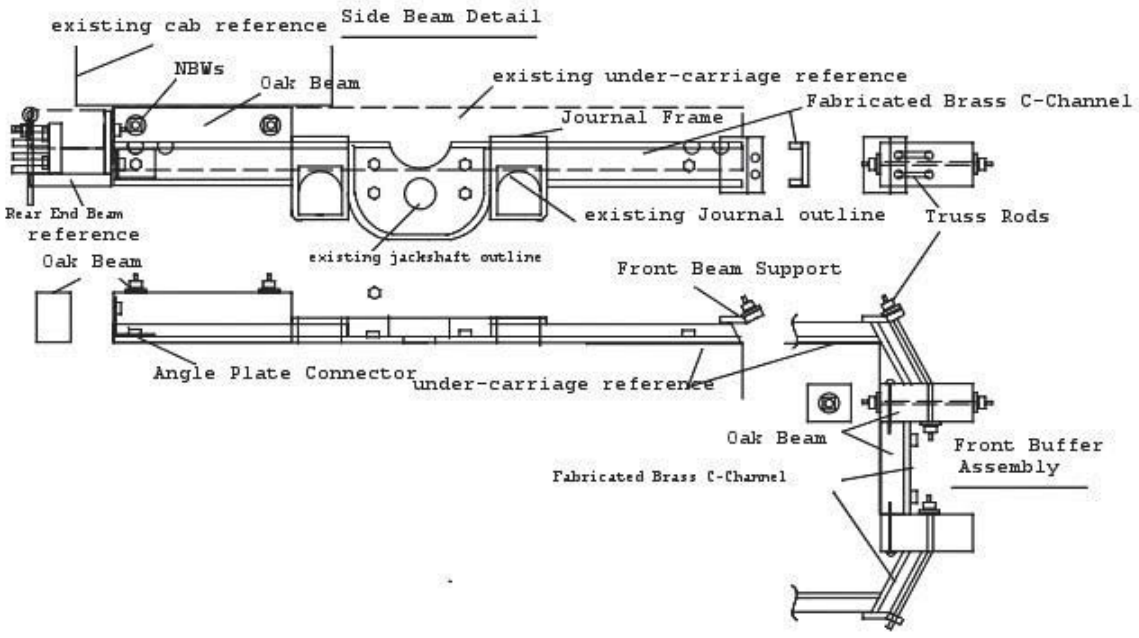
The Front Buffer Assembly

The front buffer assembly is made from 3 short built-up C-channel pieces .4375" wide x .05" thick, 2 oak beams drilled to receive the 2 lateral truss rods and 2 brass rods, shaped to the front buffer pattern and each end threaded for 2-56 nuts. The brass rods are .086" diameter.

I did an extensive fit checking for this step to get the angles right. I cut a piece of wood to represent the dimensions of the Cricket's under carriage. All of the oak beams and C-channel pieces were milled on my Sherline vertical mill to get the proper dimensions and angles.

While everything was still held in place, I soldered the 2 outside C-channel front buffer pieces to the side beam C-channel and the front beam supports, making for an easier disassembly, if needed. Also the Journal Frames were soldered to the side frames at this point.

The center section of the front buffer is made from 3 oak pieces, escutcheon pinned and CA'd together. The center C-Channel piece is attached to the adjacent oak piece, using hex head lag screws.



Side Beam Detail & Front Buffer Drawing.

Through the end of each of the oak beams is a hole drilled its length for a rod, threaded for 2-56 nuts and washers. Matching holes are drilled & tapped through the under-carriage for these 2 rods; attaching the front buffer assembly to the under-carriage.

(End of Part I)

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2009 National Summer Steamup

or

A Novice's Journey of Discovery

by Pat LaTorres
Photos by Rick Parker

As a brief introduction, my name is Pat LaTorres and I'm a model railroader. I started out the same way many of my generation did, a toy train set that appeared under the Christmas tree.

In my case it was an AC Gilbert/American Flyer set, my better off neighbors across the street had Lionel, but that Flyer set had two rails – just like the real trains and it has never been away from my memories. Over the years I wandered away from trains into slot cars and any number of other interests (girls, cars music, girls, a job, bicycle racing, girls, sports car acing, girls, marriage, etc), but trains always seemed to be hanging around in the background, whether miniatures or full sized. I'm sure that having a father who worked as a switchman with the Southern Pacific caused some of this imprinting in my mind, and I can only thank him for planting that seed.

As time moved on, I finally admitted that the hobby was in my blood and got back into model trains in HO scale in 1980. Over the years I joined a couple of model railroad clubs, started a few home layouts, collected American Flyer toy trains for a while, looked into garden Railroading and started yet another home layout – this time in On30. But, the real bolt of lightning came when I got married to my lovely wife, Ronnie. She has been a supporter and a participant in the hobby since very early in our relationship (and has actually dispatched at a couple of model railroad operating sessions) and to tie things up, we got married at the 2007 NMRA/ Pacific Coast Region convention in Santa Cruz by another model railroad friend of ours who happens to also be a Methodist minister.

As a wedding present, some twenty -plus friends of ours presented us with an Accucraft live steam S.P. 0-6-0 switcher. These are REAL friends! Thus began the approach to that steep, slippery slope of live steam modeling.

Over time we have had the opportunity to fire and run this locomotive a few times, mostly when the Bay Area Garden Railway Society (BAGRS) would set up their live steam running tracks at the San Leandro Historical Railway Society in conjunction with our semiannual open houses.

The BAGRS live steam group is a selection of really nice people who are more than willing to encourage anyone's vices. They also proved to be quite open and willing to provide advice and suggestions for this ignorant novice steamer.

In July of 2009 we moved the first seven yards of dirt as part of a major modification of the side yard at our house (at least another seven to ten yards still to

move) for a future garden railroad and then in April of 2009 the SLHRS started the construction of a Gauge 1 and O gauge outdoor garden railroad in the yard behind our primary building – the former San Leandro, Southern Pacific depot, now located at 1302 Orchard Ave. in San Leandro, California. Both our home railroad and the SLHRS G&O railroad will be large enough to operate smaller 45mm gauge live steam locomotives. With both of these projects moving ahead, I figured it was time to gain some serious operational knowledge of small scale live steam equipment. Enter the **National Summer Steamup.**

Over the past few years I have seen many articles, in a number of publications covering both the Diamondhead meet and the meet in McClellan/Sacramento, CA. Diamondhead always seemed too far away, but Sacramento was "just up the road" from the S.F. Bay Area and I had thought about it pretty hard the past two years. This year there were no conflicting events and I couldn't come up with any good excuses to dodge it, so I sent in my money. Ronnie wasn't sure that she wanted to commit to it (her nervousness was worse than mine, which was pretty bad), plus we didn't know if she could get the time off from work so I signed up by myself and convinced another steamer friend of mine to make the trip up with me each day – to help save hotel costs. As things turned out, Ronnie got the time off, though she figured to just watch and learn for this year. Also, our friend had to cancel, because of a trip out of town, so Ronnie and I made the trip up planning to stay over Thursday night. Since the first day of the event didn't really kick off until 9:00PM, we decided to pass on Wednesday and head up slightly before the crack of dawn on Thursday. This allowed me to spend Wednesday doing some final prep work on our 0-6-0, Ronnie's Ruby (a Christmas present from our cats), worrying about what I might be forgetting, and generally let my nerves run wild. As things turned out, most of our worries were totally unfounded and what nervousness remained was quickly set aside due to the friendly and helpful community we discovered waiting for us at McClellan.

First thing in the door we were greeted by Sonny Wizelman, one of the organizers, and it was like we had walked into a family member's home (more on this later). While talking with Sonny and getting a feel for what we'd gotten into, up walked another of the folks that put this together, Dave Cole. This worked out quite well, because I had already been in touch with Dave since I'm on the planning committee for the National Model Railroad Association 2011 national convention, which will be held in just down the road from McClellan in Sacramento. I've been working on Dave to get some small scale live steam involvement, including a couple of clinics for the convention. I see nothing wrong with spreading the gospel of Live Steam to a wider audience of unsuspecting modelers.

After taking some time to look around the main room and get a feel for the way things were set up we retrieved our trains from the car and staked out some table space adjacent to one of the four steaming loops. Three of the four loops had two steaming tracks (one being dual gauge), while the fourth loop had three tracks including another dual gauge. We then ran into the next "new friend" of the weekend, Seth Abrahams. Seth would give both Ronnie and I so much helpful information and, especially for Ronnie, support over the weekend. Again, it was like getting together with family for a good time. Later on in the weekend I heard a great quote from Dave Hottmann which probably really nailed the atmosphere at the event, "This is like a family reunion, with only the people you like and all of the really neat toys." I can't think of a better way to put it!

After we got our table space set up, I signed up for a couple of time slots, a half hour on each of the two larger loops. While we were waiting for the first slot to arrive, we decided to run Ronnie's Ruby on the smallest of the four loops (which was a run-when-there-was-space, as opposed to a signup arrangement). What I was unaware of (OK, guys can be a bit dense at times) was that Ronnie was REALLY afraid. There were three things that were bothering her, first the fear of doing something to look stupid, second was of the concept of getting burned by touching a hot locomotive and third, a fear of the actual flames which come out the smoke box when initially firing a butane fired locomotive. While we were in the process of getting things together one more of our new found "old friends" showed up to help. Debbie Smith is VERY knowledgeable where the Accucraft Ruby is involved and she immediately took Ronnie under her wing to help her get the locomotive debugged. This allowed me to take a step away, so Ronnie wouldn't feel intimidated by her husband hanging over her shoulder (OK, I do have some smarts).

After they got the Ruby running correctly, another new friend stepped in to give Ronnie lots of tips on actually running her locomotive. Travis Kim is twelve years old, but having helped build his own Ruby from a kit, he is quite comfortable with the running of these steam engines. Over Thursday and Fri-

day he and Ronnie spent several hours running, both as single locomotives and double headed and by the end of the day Friday, she was looking forward to more opportunities to run. She is now looking into installing radio control on her Ruby, so I think the hook is well and truly set.

While Ronnie was having fun learning about her loco and picking people's brains about anything and everything live steam, I was taking my own time to get a feel for this new experience and running the 0-6-0 that we'd received as a wedding present. The first run on Thursday was on the #2 track (in size) and then a bit later I had a chance to run on the Green Track, the largest of the four. Between these two session I had the opportunity to learn much more about this locomotive and the poor soul who was acting as engineer. In between times I made an effort to look at what was going on around me and to pick up information about the hobby in general wherever I could. After going out for dinner, Ronnie was a bit burned out and decided that there was a pillow with her name on it, while I went back to the main hall for a bit more fun. I managed to get one more run in that evening and enjoyed watching all the other wonderful equipment that showed up.

On Friday we headed over to the main hall early to get some more running time on both our locomotives and the engineers. While Ronnie was getting more comfortable by the minute, I was having some issues which I couldn't quite get a handle on. After talking with Cliff Luscher from Accucraft, it seemed like there was a valve timing problem with my S-12 and he suggested that I talk to Dave Hottmann about it. I was to learn that Dave is a true guru where Accucraft locomotives are involved. This man has so much information stocked away and has a gift for presenting it in a way which is easy to comprehend. It helps that I have 24 years in the mechanical trades, but still I was close to over my depth at the beginning of things. In the meantime, I also got to eavesdrop on him consulting with someone else on their locomotive, with even more to learn there. It turned out that the eccentric had worked loose and there was an issue with one of the cylinder heads. Since I had to run Ronnie back down to the Bay Area so she could go to work that night at midnight I didn't have time to run it Friday evening, this would have to wait until Saturday.

While we were having a grand time with our own locomotives, there were quite a few other activities to keep us involved. The swap meet table in the lobby had LOTS of tempting little items to entice the unwary. Ronnie actually picked up a couple of free cars on Thursday morning, so she now has some projects to work on.

When the vendor room opened up at 1:00 there were all kinds of wonderful things to draw money out of our pockets. I picked up a nice rail bender (which I had been hoping to find, having seen a twin to it at the National Narrow Gauge Convention last October), as well as two small gondolas to go behind Ronnie's Ruby and a few neat tools to start her own steam tool box.

Earlier in the day, after noting all of the Accucraft PFE reefers being pulled by various locomotives, a group of slightly twisted people decided to try and get 100 cars behind an Accucraft AC-12 Cab ahead locomotive. Try as we did, we could only come up with 74 cars and three SP C-30-1 cabeese. For a short period there was a second AC-12 coupled ahead of the cabeese, but the one AC-12 on the head end (a totally stock piece, by the way) managed to pull the entire train quite well. After seeing that, some other folks decided to triple head with Garretts and then hang as many two axle passenger carriages and goods wagons as could be found behind them. It made for a wonderful series of images. And while I didn't get around to trying it, there was a length of multi gauge track set up outside the hall, so folks could hook their 45mm gauge locos up to a 15in. Gauge riding car and see if their loco could pull them. During all of this folks were just having a grand time and it seemed like one big party with lots of neat trains to watch.

I made the run back up to McClellan on my own Saturday morning, arriving around 8:30. To start with, I set up the S-12 on the smallest track, to just run it in a bit and see how Dave's work from the day before affected it. It was nice early in the morning, because there wasn't a big crowd in the room yet so I had some time on my own to run. I also signed up for some time on both of the larger tracks, which turned out to be a wise thing since the Saturday crowd would be a bit larger than what we'd had the previous two days. While running my engine, another S-12 was fired up on the other track, so we got to enjoy two sister locomotives running next to each other – this also made for a nice photo op.

Ronnie's Ruby had been having a problem with the safety valve popping at just above 10psi, so when the vendor room opened on Saturday I picked up an adjustable safety to install. Once I got it set, this made all the difference in the world to the running of the loco. I got it set to pop at exactly 40psi and picked up close to five minutes of running time. I took the opportunity to run Ruby a few more times, including a

half hour session on the #2 loop and it seemed to get better with each run.

I also got two more runs with the S-12, once on each of the larger loops and it was nice to see this loco stretch it's legs, even with a short train behind it. I did find that it was a bit wearing on the engineer after a while, but it was great fun anyway.

After dinner I had the opportunity to watch Dave Hottmann's "Ruby on Steroids" pull a train loaded with 120lbs. of prototype rail on four flat cars. This locomotive was truly amazing, just walking away with the train from a dead stop – on a curve – with no wheel spin and no drama at all. This little beast has got to weigh at least 25 or 30 pounds!

To wrap up the evening for me, there was the ever popular Shay-up. As anyone who has ever seen this activity will attest, there ain't nothing quite like it! After this debacle, I had to pack up my gear and head back home since there was work to do around the house on Sunday.

As I headed down the highway towards home I took some time to reflect back on the previous three days, the people that I met and the experiences that I was fortunate enough to share with these folks. What can one say. This hobby has the potential to be a very class conscious activity, this equipment is not inexpensive, yet I had a true sense that everyone was there to simply have fun. There was no, "I've got more, or bigger." Just, "what do you have, can

I see it run, why don't we try running them together." To go back once more to that quote from Dave Hottmann, "A family reunion, with just the people that you enjoy and a bunch of REALLY neat toys!"

I can only say THANK YOU! to all of the people that I've already mentioned and add to that list so many other folks that I had the opportunity to meet during those three days of escape from the real world.

Yes, Sonny, we WILL be back next year. And we will try to convince as many of our friends as we can to join in the party. If there are any errors in my recollection of this event, I take full blame. As for the good times, the credit goes to all who attended. To all of you reading these words, if you haven't made one of these steam ups, you don't know what you're missing. It was a wonderful weekend and a grand time was had by all!

The Grand Ballroom at the Lyons Gate Hotel was the home of the 2009 NSS. You can see the three large tracks, and the small track is in the upper right corner.

Steve Shyvers, Rob Lenicheck and Jerry Reshew with Rob's D&RGW K-27 #452.

Richard Murray & Geoff Spenceley.

Bruce Sherman with his K-28 Mikado.

Rich Threlkeld and his Aster Berkshire.

Mark Kelley & Joel Tayler with their #779 Berkshires.

Jim McDavid and his Aster Castle class loco.

Lon Brunken's Aster Reno.

Jim Gabelich and his coal fired 2-6-2 Porter Tank loco, built by John Shawe.

Sonny Wizelman and his Steeple Cab loco, featured in a recent issue of SitG.

Harry Gray with his Accucraft Shay.

Travis Kin and Ronnie LaTorres doubleheading their Accucraft Ruby locos.

David Wegmuller, Stan Patchet & Chris Scott fire up their Accucraft Garratts for a triple-header.

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Accucraft "Earl/Countess"

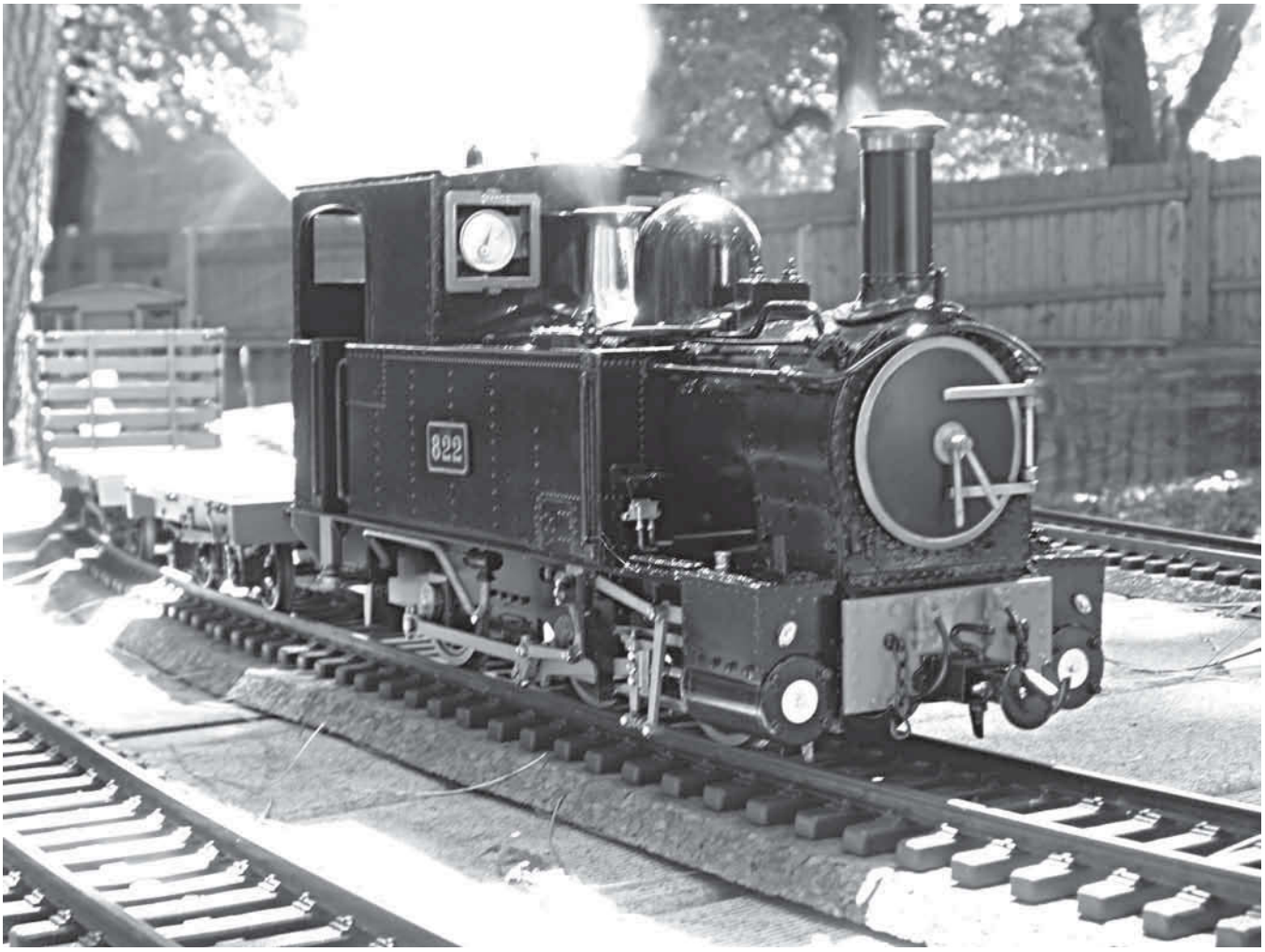
by Joel Novis

Technical Specifications:

Scale/Gauge:	16mm = 1' (1:19.05), gauge adjustable between 32mm and 45mm
Minimum Radius:	30" (Recommended)
Fuel:	Butane
Dimensions:	Length over buffer beams: 11 3/8" (290mm) Width: 4 1/8" (105mm) Height from top of rail to top of stack: 6 1/8" (156mm)
Valves and valve gear:	Slide valves driven by modified Walschaerts valve gear
Cab Controls:	Regulator, reverse lever, gas valve
Boiler:	Single-flue, poker burner
Boiler Fittings:	Water gauge glass, Goodall valve, displacement lubricator, accessory fitting

A Brief History

The Welshpool and Llanfair Light Railway was opened in 1903 between the Mid-Wales town of Welshpool and the village of Llanfair Caereinion, eight miles to the west. Unlike other Welsh narrow gauge lines, it was not built to carry slate or other minerals. Its main traffic served the livestock market in Welshpool – one of the largest one-day markets in Europe – and transported coal and other goods on the return trip. It was also unlike other Welsh narrow gauge lines in that it was built to 30" gauge. Initially owned by the Cambrian Railway, the WLLR passed to the Great Western Railway in the 1923 Grouping, then to the nationalized British Railways in 1948. BR kept the line going until 1956, by which time a preservation society was waiting in the wings. The society started running trains for the public again in 1963,



Accucraft "Countess" under steam.

and re-opened all but the easternmost mile in stages starting from Llanfair Caereinion, reaching Welshpool in July, 1981.

During its entire working life, the WLLR owned only two engines, identical 0-6-0 side tanks built by Beyer, Peacock in Manchester. Weighing in at nearly 20 tons and having 11 1⁄2" x 16" cylinders, these are powerful engines for so narrow a gauge. All this muscle is necessary, as there are few level spots on the railway. Even today, the WLLR features the steepest adhesion-worked grades in the UK.

The line's major patrons, the Earl and Countess of Powis, lent their names to the engines. The GWR renumbered them from 1 and 2 to 822 and 823, respectively, while retaining the names. The Great Western also reboilered the two engines in 1929 and 1930 at its Oswestry works, and took the opportunity to upgrade boiler fittings to give them more of a corporate look; comparison with GW standard gauge tank engines (for example, the Metro Tanks or the 633 Class 0-6-0T) shows the strong family resemblance. Both engines survived into preservation in this condition and can be seen in operation on the WLLR today.

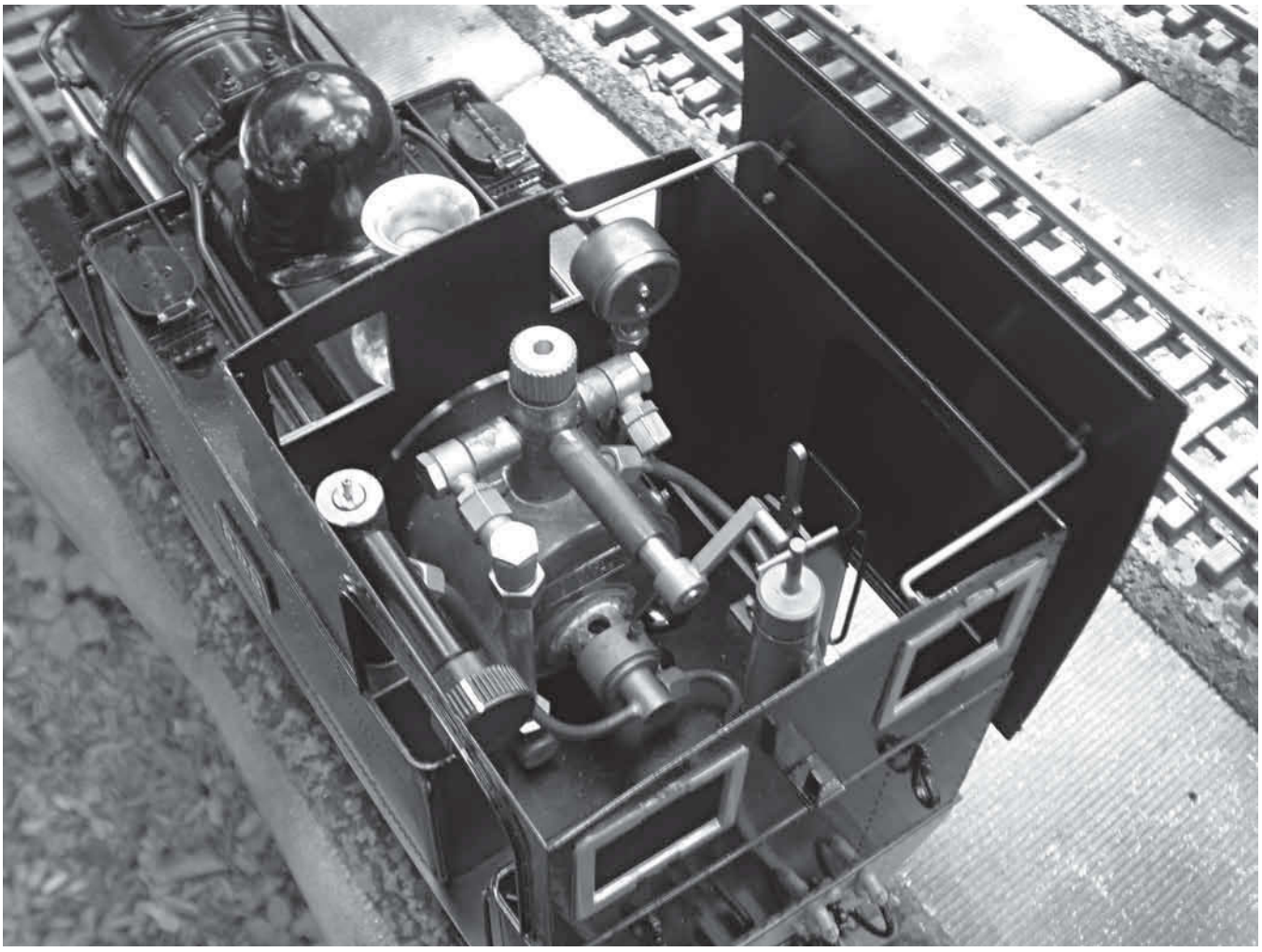
The Model

My locomotive was shipped in Accucraft's now-legendary bombproof packaging, and arrived from Sunset Valley Railroad in excellent shape. The characteristic GWR safety-valve trumpet is a substantial brass casting, and is packed separately. On my example, the inner bore of the casting was about a thou undersize, and needed brief attention from a Dremel tool to get it to fit over the safety valve.

Accucraft UK's Ian Pearse has a long familiarity with the "Earl" and "Countess", having produced a 16mm=1' scale model of these engines under the Pearse Locomotives name. In fact, the WLLR might even be considered Ian's "local" narrow gauge railway, as it's located only some 40 minutes from his home in Shropshire. The Pearse model was notable in its day as combining a then-unheard of level of

detail with first-rate running capabilities, although some compromises were necessary to use running gear components common to other models in the Pearse range. Accucraft UK was able to start from a clean sheet of paper, benefitting from the cooperation of the WLLR Preservation Society and access to prototype working drawings. As with their earlier Garrett and WD Baldwin, this approach has paid big dividends: nearly every detail of the engines in their preservation-era form has been reproduced, and all the proportions look exactly right. The model's main dimensions where checked against a set of erecting drawings, and all scaled to within a couple of millimeters of the prototype. Etched brass sheet with accurate rivet detail is used extensively for the platework. The modified Walschaerts valve gear is reproduced to scale, with many finely detailed castings; the drivers have spokes and counterweights, not usually seen in outside-frame models. The few scale compromises are minor – the buffer beams have been made slightly deeper than the prototype to put the chopper couplers at standard height, and the chimney sits a little forward of the smokebox centerline to make room for the exhaust. Neither detracts from the appearance of the locomotive in any way. As with some other Accucraft models with outside valve gear, the radius rod and combination lever have a common pivot point, so "notching up" is not possible without some modification.

The engine is offered in either GWR green or gloss black, and includes nameplates, number plates and "GW" transfers to allow the owner to customize the engine's appearance. There was a great deal of variability in how the engines were painted and lined out over the years, likewise in the mounting and position of name and number plates. The history of the railway, its rolling stock and their appearance is well-documented in text and photos, should you wish to model a specific engine and period. I chose to have my engine represent the unlined black GWR No. 822



A peek into the cab interior reveals a well designed layout of the controls, fuel tank, lubricator, etc.

as it looked in the early 1950s.

The cab is snug but not crowded, with a regulator, pressure gauge, reverse lever, water-level gauge and lubricator. There's a blanked-off fitting on the right side of the filler pipe that could be used for a whistle or other accessory. The right-hand cab side bunker pushes the lubricator out onto the footplate, so clearance between its T-handle and the regulator handle can be a bit tight when the latter is fully closed. This becomes inconvenient when everything in the cab is hot, so Accucraft has included an extension handle in their toolkit. The lubricator's drain line is routed under the floor between the rear buffer beam and the cab step, ending in the usual Accucraft threaded fitting. This is an unobtrusive location, which adds to the clean look of the model. However, it also means that there isn't a lot of room to work this control, another little wrench being provided to get some purchase on the nubs (and to keep one's fingers clean). These tools give you quite a bit of leverage, so the usual caution is needed to avoid overtightening.

Fitting radio control should be uncomplicated in this model, with ample room in the rear bunker, side tanks and under the footplate for servos, a receiver and batteries. Holes for a sliding switch have been let into the bunker, and there's a rectangular hole in the cab floor to allow an undermounted servo to reach the regulator handle. However, unlike my last Accucraft model (an "Edrig") there are very few pre-drilled holes in the footplate – which runs three-quarters the length of the engine – to mount servos, servo brackets or to route wiring.

Firing and Running

The first few runs were on rollers. Compared to my experience with Accucraft's more basic engines, lighting the burner was notable for its lack of drama. The flame caught immediately and relatively quietly. The burner assembly has an adjustable collar to regulate airflow, which was set at the factory to half-cover the air holes. This fuel-to-air mixture wasn't optimal, however, and the burner would start to run a bit rough after about ten minutes. The collar was pushed all the way back to completely uncover the holes, which appeared to fix the problem. The burner remained quiet and very economical on fuel -- with the engine lightly loaded, it easily maintained 40 – 50 psi with the valve barely open. This economy means that the water gauge glass needs to be watched closely, so Accucraft's recommendation to top up the water supply every 10 minutes is advice well taken. Note that the engine does not come with a spray bottle, although Accucraft did ship a Goodall valve separately.

The boiler steams very easily. I'd been taught when firing a 12"=1' scale locomotive that pressure vessels are stressed less when temperature and pressure change slowly, so I try when possible to apply the same practice to small-scale boilers and take my time when raising steam. Even at a very conservative burner setting, pressure came to 20 PSI within eight minutes. Once pressure was up to 20 PSI, the needle then continued to climb briskly and visibly, reaching 40 PSI only three or four minutes later. At that point, I cut the burner back even farther – almost to complete shutoff – and was still able to maintain around 40 PSI during running in. The boiler is lagged with about 1/8" of insulation all the way around its circumference. This makes a big difference in maintaining pressure when compared to the uninsulated boilers on more basic UK-outline engines.

While the engine was running on rollers, I noticed some slight movement in the bracket supporting the crosshead slides and the expansion link trunnion. This was due to a loose bolt on a lower crosshead slide, which after tightening with a M1.6 nut driver, gave no further trouble. There is a large number of scale-sized hex-head bolts and Phillips head screws on this model, so it's a good idea to check tightness before running the engine – even the very first run.

The engine was given its first outing on the track at a recent Downeast Steam Railway Guild steamup. The fuel-to-air setting which worked so well before wasn't the last word, as the burner wouldn't light out-of-doors until the collar was reset to just barely cover the air holes. Once adjusted, this ratio continued to work reliably throughout the rest of the day. Performance was slightly better than indoors, 40 PSI being reached in six or seven minutes. The gas was turned down a bit more, the engine put in forward gear and the throttle opened slightly. The expected hot water and oil geyser from the stack was absent at startup (although this is possible if an over-eager operator puts a little too much water in the boiler). In fact, the exhaust was always very clean while running, with little spatter on the engine or its train.

The engine consistently started slowly and smoothly, a testimonial to Accucraft's choice of slide valves; there was no hint of any binding in the running gear. Overall performance was excellent, both in forward and reverse, with the engine easily maintaining scale speed, lap after lap. This is noteworthy for a brand-new engine, and not the usual expectation for most Accucraft steamers, which (to my knowledge)

are not run-in at the factory. Boiler pressure stayed at a consistent 45 – 50 PSI with the fuel valve at a minimal setting. Radio control hasn't yet been fitted, but to my surprise this didn't turn out to be a disadvantage. Once the ideal throttle setting was found, there was never any danger of the engine running away, and it would only slow slightly on the less-than-level sections of the layout.

The "Earl" is the first engine I'd owned with a water level gauge glass, and it proved to be as finicky as the full-sized ones. With a boiler this size, it's really more of a fail-safe. It proved to be easier and less worrisome to simply stop the engine every ten minutes or so and add water. For the first few runs, the engine was allowed to keep going until the gas ran out, adding water through the Goodall valve. The gas supply lasted about 20 – 25 minutes (no exact timings were taken). With Murphy's Law firmly in effect, the fire would die out precisely when the engine was located on the most inaccessible part of the layout. Subsequent runs were done with continuous operation in mind, water being replenished about every ten minutes, gas and oil at about twenty to twenty-five minute intervals. Using this method, it's easy to keep the engine in steam for as long as you like, or you can decide to stop running whenever (and wherever) convenient.

This has been an eagerly-awaited model of a popular prototype, and both by informal accounts from other new owners and my own experience it is a brilliantly-engineered locomotive, combining a high level of scale authenticity with excellent performance. Although there were a few details to tidy up when first out of the box, the engine immediately settled down to become a reliable runner and a joy to drive. It is a worthy successor to the Pearse "Countess", and no doubt will shortly become a classic in its own right.

The Nuts and Bolts of Shays
Water Tank

By Dan Rowe

The most interesting thing to me about the water tank drawing is what is missing. There are no rivets or rivet holes on Lima drawing card 15116. Also, the thickness of the tank steel is not listed. I believe that this type of information is on the material order for the later drawings. Fortunately I have some of the early water tank drawings which list the material to make the tank on the drawing.

Lima drawing card 4511 is for a 400 gallon box tank that lists the tank steel as 8 gauge. The U.S. standard iron and sheet gauge thickness for 8 gauge is 0.172 inch. The rivets for the seams at the top and bottom are 3/8î spaced with a 1-3/8îî pitch. The rivets for the middle brace angles are also 3/8î on a 4î pitch. I could not locate a number for the tank ring and cover. Card 4335 is an extended version for a wood rack. The ones used for coal are only 9.5î inches tall and use 21 rivets to fasten them to the tank top.

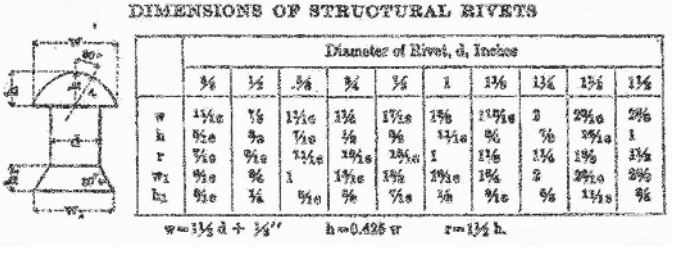
The tank valves and the siphon are bolted to a flange riveted to the tank steel. The drawings will be in a future issue.

It is not always obvious what is going on with all these drawings by just looking at them. In the process of redrawing them I think about each line and what that line defines. On the tank drawing, you might not notice at first that the top view shows only the middle sections of angle iron and the wall cross bracing. Another piece of missing information is on the box tank card 4511, which shows 1/2" bolts connecting the flat brace bars to the middle angle irons. The top and bottom angle iron is continuous around the whole inside length of the top and bottom of the tank as shown on the side view.

Sometimes printed dimensions do not match the image on the paper. The corner radius is dimensioned as 8î but this will not work with the length of the middle angle irons. The actual drawn radius is 5î. The early tanks had a 5î radius and later ones had an 8î radius so I think the drafting department changed the dimension to upgrade the drawing and simply traced the old lines.

I was looking for rivet squeezers and found a tool for spacing rivets. This is an expandable lattice that looks like a small version of the temporary fencing used to keep small dogs and children from dangerous areas. I think this tool has been around for a long time to layout rivet holes to a specified pitch. Some of the rivet notes will give the number of rivets equally spaced between two points. This type of tool will make that layout neat and simple.

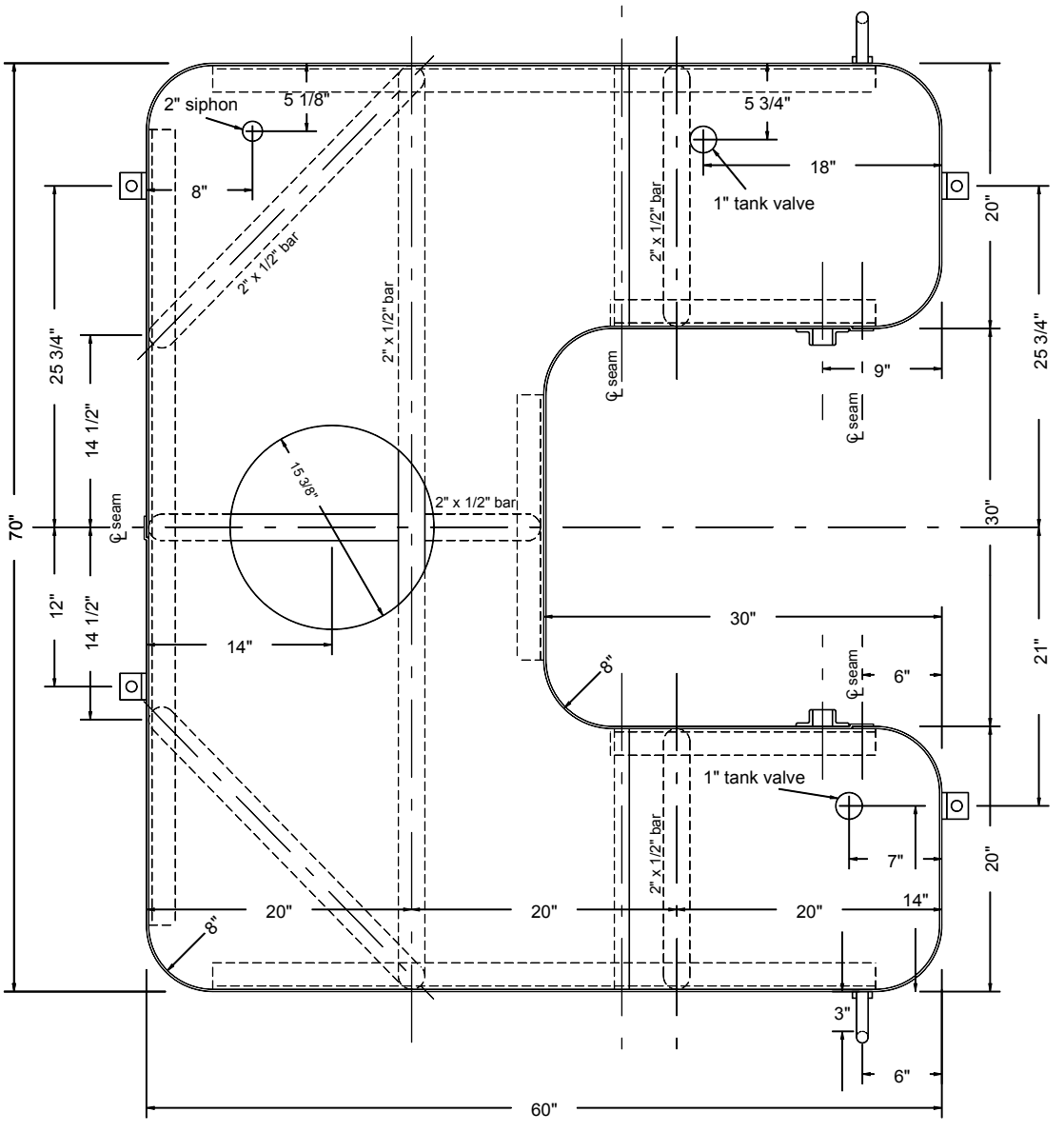
Here is a handy table for rivet head dimensions. It is difficult to make miniature dies to the exact specification, but they can be approximately made with a ball end mill that is twice the body diameter.

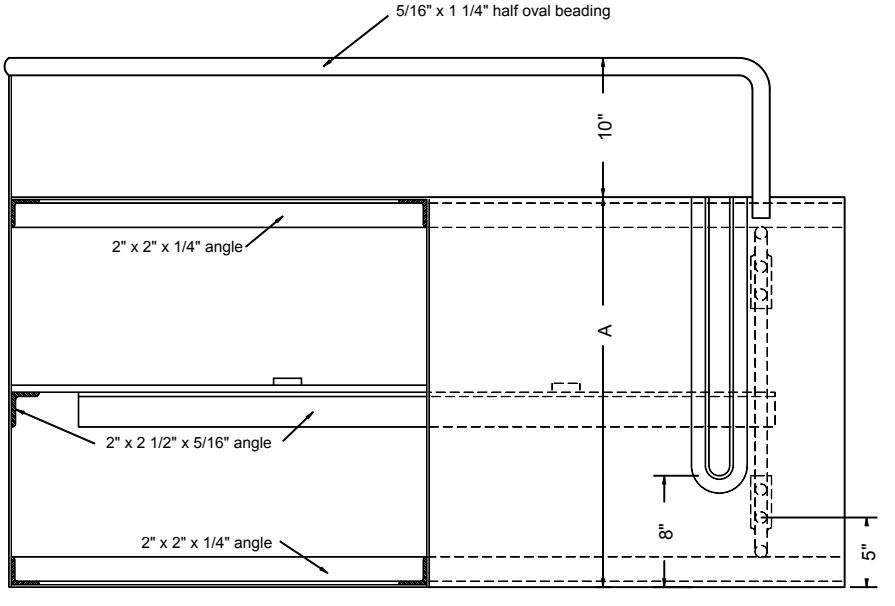


DIMENSIONS OF STRUCTURAL RIVETS

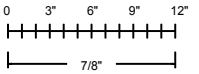
	Diameter of Rivet, d, Inches									
	⅝	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½
w	1 1/16	⅞	1 1/16	1 1/16	1 7/16	1 5/8	1 13/16	2	2 3/16	2 3/8
h	5/16	3/8	7/16	½	9/16	11/16	⅝	¾	13/16	1
r	3/16	9/16	11/16	13/16	15/16	1	1 1/16	1 1/16	1 1/8	1 3/16
w_1	9/16	⅝	1	1 1/16	1 1/8	1 3/16	1 5/16	2	2 1/16	2 3/16
h_1	9/16	¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾

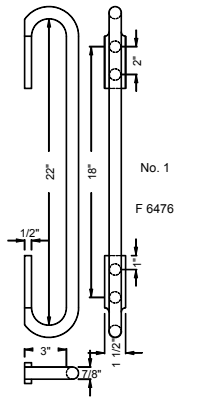
$w = 1\frac{1}{16}\,d + \frac{1}{16}''$ $\quad h = 0.425\,w$ $\quad r = 1\frac{1}{16}\,h.$



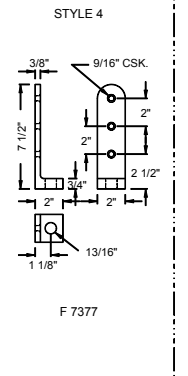


SCALE 7/8"=1'

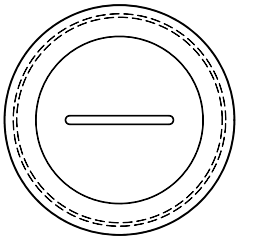


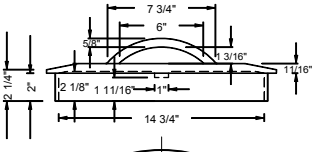


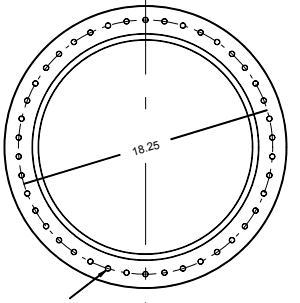
15158 TANK
GRAB IRONS



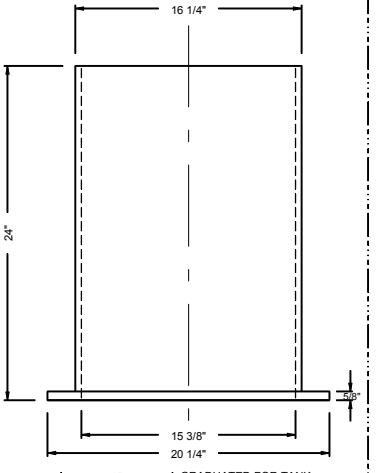
A-15139 TANK LUG

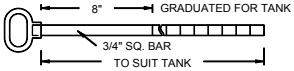


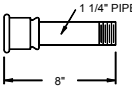




42 HOLES 3/8" RIVETS







CARD 4335
TANK RING & COVER

400 & 500 GALLON TANK

15116

PLAN 961
PLAN 1536
PLAN 1553

MATERIAL LIST #117

LINE	A	CAPACITY	COAL GATE ANGLE
1	28"	400 GALLS	SK# 88-E-5010
2	36"	500 GALLS	SK# 88-F-5010

Building and Operating Aster Locomotives Part 2

by David Stick
Photos by the author

BUILDING YOUR LOCOMOTIVE

The Aster kit comes in a large reinforced cardboard box containing all the parts in separate smaller boxes and packages. Included is a large format manual of superb isometric drawings of your locomotive, each one covering a different stage of the building process. The drawings show all the part numbers required at a particular stage of construction and the numbering system for the parts follow the assembly order. The original number is retained where parts like unions and special nuts are used in more that one stage. Also included is an instruction manual with a detailed 'blow-by-blow' account of what to assemble and when. It has to be said that, although the order in which things are put together is clearly indicated, the English is sometimes a little odd, but then, how is your Japanese? Occasionally, the assembly of a part might be missed but if you are reading the drawings as you go (as you should), you will quickly pick this up.

The Berkshire. A massive engine capable of enormous haulage.

The JNR C62–3 has a new type of manual that includes the drawings, part numbers and assembly instructions all in one. Each drawing addresses the assembly of a particular section or sub section starting with an 'exploded' view and then progressing to the fully assembled section. I'm as yet undecided as to whether I prefer this method or not.

Also in-

cluded in the kit are some essential tools. Those not included are usually found in every modeler's toolbox. Most kits have always include cross head screw drivers, Allen keys, silicone sealant, paint touch up, fine emery paper and at one time, even a pair of gloves! To these tools I would add some really good tweezers of two or three sizes, a set of metric nut drivers, a pair of side cutters, two or three sorts of pliers including a square ended and needle nosed pair, 2mm and 5mm taps and dies used for cleaning up the occasional paint filled thread, small slot head screw drivers, a set of fine Swiss files, a small tube of screw-lock and a sheet of glass perhaps 12 inches by 4 inches. I've probably forgotten something – but you get the message I'm sure.

Back in 1984

Before assembly of the locomotive begins it is very important to read and digest the instructions right through. Then as you begin each section read these again in advance. Always remember that it is essential to assemble the engine in the order recommended by Aster – failure to do so will almost certainly cause trouble. Of course, if you wish to 'get your eye in' you can always build the tender first, as this is a separate vehicle. I found this an advantage when I built my first Aster kit back in 1984, and it taught me about using the drawings and instructions to maximum advantage.

Normally when building the model, you will begin with the cylinders and, as for all assemblies, this first requires the removal of all the parts necessary for the assembly only from their packaging in preparation. This is the time to do an inventory check to make sure everything is included and it should be remembered at each and every stage. I have rarely had a problem with parts missing but you must check before starting. If things are missing, damaged or incorrectly machined you should contact your distributor immediately.

As you do this inspection, you should examine each part to ensure you understand how it will be used and to ensure that nothing is damaged. I would stress that this would be very unusual because everything is so well packaged. However, on one occasion when building a Nord 231E, I did find the steam drillings to one end of the inside cylinder casting to be missing. Since Aster use CAD/CAM and CNC machines it is difficult to understand how this could have happened but was obviously a very rare quality assurance problem.

To maximise the performance of your locomotive, the careful assembly of the cylinders is essential. The valve running surfaces must be very carefully lapped using the fine emery paper provided to ensure a good seal and no steam leaks. This is where your sheet of glass first comes into use. Lay the glass on a FLAT surface and tape enough 1000 grade emery to it to enable lapping to take place. Holding the piece to be lapped face down on the emery, and using short straight strokes away from you, lap the surface until all tool marks disappear. It usually takes about fifty to a hundred strokes per piece to achieve this. When all of the surfaces to be lapped have been treated, remove the emery from the glass. Polish all running surfaces using a lint free cloth and store safely to avoid ruining all your hard work.

Diametrically Opposed

The fitting of the Rulon piston rings is a simple task, but some people have expressed doubts about the effectiveness of these seals. Every one of the thirty or so Aster locos I have built have these seals fitted and I have never had a failure yet. It is important to ensure that the gap in each piston ring is not in line with the second ring and is simple task to ensure they are diametrically opposed before carefully pushing the pistons into the cylinders. A dribble of steam oil helps with sliding them into place and should also be applied to all 'O' ring seals on piston and valve rods. The rest of the assembly is straightforward so long as care is taken not to use too much silicone sealant on gaskets. For some while now I have been soaking cylinder gaskets in machine oil for five minutes before assembly and have found this to be entirely adequate. If you decide to use sealant, be particularly careful not to allow any into steam passages or port faces.

Ensure that when fitting the slide bars the rear cylinder end cover bolts are loose. Slide the piston in and out to ensure free sliding movement and nip the bolts up. Check free movement again after.

When you attach the crosshead I recommend a little nut-lock be applied to the piston rod thread to ensure that there is no movement here. I once had a nasty experience of a piston rod slowly working its way out until eventually the piston struck the front cylinder cover! Luckily it did little damage but had I not noticed the ticking sound it might have been a different story!

Assembly of the main frames and stretchers should be completed without difficulty but be sure to do this on your glass sheet to ensure the frame is

straight and true. Failure to do this may result in sticking axle-boxes and an engine prone to derailment. Assembly of the wheels to the frames is straightforward as the axle-boxes are already mounted. Turn the frame upside down and make sure that the spring pockets in the axle-boxes are uppermost. Put a little grease into them to hold the springs in place as you slide the axle down the horns.

Pump Performance

The horn keeps are usually held in place with two counter sunk bolts that have to be fitted through the spokes of the wheels. Now, the axle-box springs are trying to push the axles out as you fit the keeps and you really need another hand growing out of your chest to hold everything in place! I manage by putting a little silicone sealant on the end of the screwdriver to hold the screw and, whilst holding the keep down in place, thread the screw through both the spokes and the keep and into the frame. When all are in place turn right way up and ensure that the axle-boxes move up and down smoothly in the horns without binding.

The axle pump is normally fitted at about this stage and is pretty straightforward. When assembling the pump, care should be taken to seat the clacks correctly. Measure the diameter of the ball to be fitted and obtain a spare ball of the same size. Place the spare ball on the valve seat and using an alloy or brass rod against the ball, strike it once or twice with a light hammer. This should form a nice seat for the balls in the kit and prevent any leaks. Pump efficiency is greatly affected by this, the lift on the ball allowed and the diameter of the inlet pipe to the pump. The lift on the ball is usually controlled physically by a stop and should allow approximately. 0.30in lift. This is important and can usually be arranged by careful adjustment of washers under the seat. For a few years I have been replacing the balls provided in the kit with ones made of Nitrile rubber. This has the advantage of conforming to the seat perfectly and providing more reliable long-term pump performance.

The inlet pipe inside diameter should be approximately. 1/8 inch or the metric equivalent. Check to make sure that there are no fittings between the pump inlet and the tender that have a bore significantly less. If there are they should be drilled out as far as possible or the fitting changed for a larger one.

When assembling the pump into the main frame make sure that the pump ram end and the matching fork end on the pump eccentric are in alignment and that the screw hole faces down. The eccentric is held onto the axle with a setscrew and this can be slacked off to allow side movement of the eccentric. Fitting the attachment between eccentric and pump ram will be much easier if you face the hole downward. However, remember that when all is in place the ram must be rotated through 90 degrees to allow the fork end vertical movement as the axle-boxes move in their horns.

Fine Swiss Files

Assembling the cylinder and motion to the frames is usually a comparatively simple task, although there is quite a lot to do and, once again, I can't over emphasize the need to build in the order shown. Take your time and do things in order and there should be no problems. Probably the most difficult task is assembling the expansion links. It is imperative here that the trunnion slides in the slots of the links without any resistance. However, it is equally important that there is no fore and aft slop – which will make for poor reverser performance. The parts are laser cut and only require careful use of fine Swiss files to ensure a good smooth fit.

The assembly of the 'sandwich' of parts is a fiddle and once again the use of some assistance is of benefit. Make sure you have the correctly handed parts available and separate the right and left hand expansion link sets. I then take the outer link face and position all four of the corner screws through the holes, holding them in place with a touch of superglue. Add the tiny spacers and other parts, including the radius rod and the trunnion, and then fit the inner link face. Lock the nuts on the inside using a tiny dab of screwlock. This is highly recommended as there is a great deal of vibration here and loose nuts will soon result in an expansion link assembly coming to pieces. Not a happy prospect.

When assembling the weight shaft it is very important to make sure that the crank that will be attached to the reverser stand is at right angles to the cranks that provide the drive to the radius rods. With the reverser stand screw in the mid position the radius rod must be in the mid point of the expansion link, usually right behind the link support bearing. This will ensure that when you are setting up the valve timing using the eccentric crank in both forward and reverse, you will have equal movement.

Setting the valve gear of a loco is not a difficult task if taken slowly and methodically. You set one side up first and then move to the other. In a three or four cylinder engine the same applies except that

since in most cases the inside cylinders have valve actuation derived from the outer, the outer left and right are completed first.

In Walschaerts' gear the angle of the eccentric crank to the horizontal is about 34 degrees, and to aid setting it's a good plan to make yourself a little angle gauge out of a stiff piece of card. Position this gauge by the crank and set it by locking the screws.

Set the reverser on the stand to mid gear. Rotate the wheels and watch the movement in the left hand valve chest. As you will have seen during assembly, there are three ports in each valve chest. The two outer are inlet ports to each end of the cylinder and the one in the middle is the exhaust. With rotation, we are looking for equal valve movement on either side of the mid position of the ports. This is achieved by adjusting the position of the valve by releasing the setscrews holding the valve to the valve rod. In mid gear no ports should open. If they do, and you are sure that the valve rod movement is equal either side of mid position, you must adjust the crank eccentric a little. It will not be much, so move it a degree or two and try again.

A Good Dose of Steam Oil

When you are happy that this is set properly, reset the reverser to the full forward gear position. This is set when the radius rod is near the bottom of the expansion link. Rotate the wheels through 360 degrees whilst watching the valve movement and the ports being opened as the valve moves. Position the left hand piston at forward dead centre and see where the left hand valve is with respect to the front edge of the forward port. We are aiming for a 'line for line' position for the valve and if you don't have it, reset the valve with the setscrews so that this is achieved. Now, rotate the wheels until the piston is at back dead centre and check that the rear edge of the valve is line for line on the back edge. Small adjustments must be made between the crank eccentric and valve position on the piston rod until you reach the optimum position. When you are happy that you have the best possible setting, repeat the process for the right side.

The inside cylinder[s] are next examined. Here only the valve may be adjusted but if the geometry hasn't been altered, this should be all that is necessary anyway.

With the valve chest covers in place and connections made to an air supply such as an air compressor you can now test your handiwork. The last few Aster kits I have built have all been provided with the necessary test connections to make this easy.

Before putting the chest covers on, give the chest a good dose of steam oil and rotate the wheels to get plenty down through the ports to the cylinders. Also you should oil all the axle and motion bearings thoroughly using good quality machine oil. Although the air test will be but a brief one, we don't want to damage the bores or valves, and running on air is potentially damaging if you run too long without proper oil feed facilities. The first test is static and should be run at an air pressure of around 10psi with the reverser set in mid gear. You are looking for any leakage and rectifying where necessary. This test should be followed by rotating the wheels by hand in mid gear to ensure there is no airflow through the ports. Then you should follow up by tests at full forward and reverse gear position.

If you have been careful with your setting procedure you should get good results. If the run isn't successful you will need to remove the steam chest covers and repeat the valve setting procedure again. It is an iterative process in which you narrow down the errors in setting the eccentric crank angle and the slide valve position, and a patient approach pays huge dividends.

Dummy Backhead

Fitting out the Boiler. The boilers developed by Aster have already been described and by far the most common is the C type designed by our old friend and mentor in G1MRA, John Van Riemsdijk. There have been some detail refinements to this in the past few years, the most important of which is the inclusion of a dummy backhead. The A4, 'King' and one or two German locos didn't have this, but a rather ugly footplate resulted! The hot gas flow was reversed from the top of the burner via a box mounted on the back of the combustion chamber in which is located the burner. This box then sits on the back of the boiler and protrudes onto the footplate. In the later examples after the mid 1990s this is disguised by a dummy backhead simulating the prototype and including details such as the firedoor and surrounds. This has provided for a much-improved appearance. The combustion chamber is lined with insulation material and should be mounted carefully as at the top edges it provides a seal against the boiler.

There are very few wrinkles in finishing the boiler and its mountings. The fittings are very straightforward and only fitting the regulator and blower assemblies through the boiler backhead and front tube plate

is likely to cause any problems. The easy method is to take a piece of piano wire and push it through both holes and then push one end into first the regulator. This can be pushed down the wire until it gets to the forward tube plate where it can be carefully guided through and fixed in position at the backhead. Before you have assembled it in its final position you will need to fit the steam flow restrictor in the top of the regulator tube under the dummy steam dome. Great care is needed here as you can easily drop it into the boiler and getting it out would be tedious! The safe way is to thread it on to a short piece of wire and then push the wire into the regulator hole with the boiler horizontal and the dummy dome hole on the side. The restrictor can be teased into place and the slot in its top used to engage the thread. Once started, the wire can be removed and a screwdriver used to drive the restrictor home. Remember that the restrictor must be positioned at the top when the regulator body is finally screwed home and the lock nut tightened.

Fitting the water sight glass sometimes causes people strife though it shouldn't. Don't put the glass tube anywhere near the assembly until you are quite sure the top and bottom fittings are in perfect alignment. You can use the pump handle provided in the kit to do this and it should be a nice sliding fit before you fit the glass.

The Bulleid 'Pacific'

Next the boiler is mounted in its cladding, with or without insulation material. I always used to fit this without fail, but have discovered that for some locomotives, where a good cladding exists right around the boiler, this isn't essential. There is no difference in the steaming qualities of the C type boiler with and without the insulation on, for example, the 'Duchess'. Take your choice. However, there is one place where it must be fitted and that is at the front end of the boiler where it acts as a seal with the smoke-box. Usually two or three rings about one inch wide are required and should by glued on using the silicone sealant provide in the kit. The boiler should be a nice push fit at the front end when installing it in the cladding.

Whilst not seemingly of any advantage in some boiler casing, the Bulleid 'Pacific' being an exception, in the smoke-box the addition of inside insulation is imperative. It acts as a very effective seal to all the joints around the inner wall and the joint with the smoke-box door surround. Great care should be taken over fitting the insulation in this assembly, as more steam locos fail first time out because of leaking smoke-boxes than probably anything else – other than badly fitted wicks and blast pipes not properly adjusted. More of which anon!

As the whole loco is constructed from parts machined using CAD/CAM, the build up of tolerances is carefully controlled. It needs to be – particularly at the front end, as the position of the blast pipe relative to the chimney centreline is extremely important. It is imperative that they are exactly concentric and that the height of the blast pipe nozzle, relative to the throat of the chimney, is also spot-on. Since, in most Aster locos, there is no method of adjustment other than re-machining or shimming, the kit must be manufactured very accurately. Make yourself a small gauge made like a very long equilateral triangle so the taper is 1:6. With this resting in the top of the chimney the tip should sit in the blast nozzle. As yet I have never found one to be out of alignment if assembled correctly.

Unlike the blast nozzle, the blower however can be adjusted if the nozzles] is (are) not quite right. The method of checking alignment of both is to insert a fine brass wire into the hole in the nozzle and see where it passes in the chimney. In both cases it should pass through the centre of the chimney venturi. This is possible for the blower as it is offset in the smoke-box with the nozzles pointing at the middle of the chimney throat. However it should not encroach into a cone of 1:3 between the blast nozzle and the petticoat at the base of the chimney.

Pipes are Pre-Annealed

Final assembly. If there is one area that causes some tooth sucking it is probably the fitting of the boiler to the chassis. I have heard several people say how they have had to file away the bottom of the firebox of, for example, the 'Flying Scotsman', to get the boiler to fit. Well, all I can say is I have never had to modify any of the boiler cases I have assembled. They aren't easy to assemble but usually careful study will reveal where a little 'springing' of the case with the loco held vertically will get you out of trouble. Force should NEVER be applied for any reason at all. It will fit, believe me!

Pipe bending should be done with a set of small pipe benders or carefully and gently in the fingers. Again, for both the 'Duchess' and the 'Flying Scotsman' the backhead pipe-work needs to be bent quite acutely in order to clear the cab walls and roof. The copper pipes are pre-annealed and should bend easily with care. Just take it slowly and carefully to avoid a

kink.

Now to the burner and, as I have alluded before, this needs to be assembled to the drawings to ensure a good performance. Most have a three-tube arrangement and each tube needs to have the wicks loaded so that there is 10-12 mm of wick sticking out of the tube top. Carefully measure the distance from the top of the burner wick tube to the top of the fuel tube in the bottom of each burner and add 10-12 mm. Take the hank of wick material provide and measure off this distance so that you have about 30-35 strands of wick for each tube and a nice sliding fit in the tube. Carefully push the wicks into the tubes avoiding any curling up at the bottom by stopping when there is the required 10-12 mm at the top. Turn the burner assembly upside down and tap the tube base closure and the wicks shouldn't fall out. Put the burner to one side until the tender is completed. Because the wicks tend to swell in use there may be a need to remove a few after some running. Also, hot or cold weather may require adjustment of a few strands.

Good steaming qualities are a blend of tuning the front end and the wicks, plus the need to minimise the primary air access to the burner. Some locos need more insulation material added to the inside walls of the combustion chamber to decrease this air and prevent ingress of cold air to the boiler. Be careful to seal the top edge of the joint between the combustion chamber and the boiler to avoid any possibility of flame getting through and a possible fire if meths 'wicks' through to the insulation. This has reportedly occurred to one Bulleid 'Pacific'.

Silicone Sealant

The tender is an assembly job and little needs to be said about it other than in the supplied instructions. Tenders are usually fitted with a hand pump these days and the clack valves need to be treated as you did for the axle pump. Joints in the water tank need to be carefully sealed by running a neat bead of silicone sealant around them...but be careful not to get any sealant in the pipe work or feed problems will result. When the assembly is complete, fill the water tank with water to check for leaks and rectify where necessary. Also check the fuel tank for leaks, though this is very unlikely.

When you are satisfied, fit the tubes that connect the tender to the engine and couple the burner to the meths tube. Mount the burner at the same height as it will be in the engine and put some meths in the fuel tank. Turn the fuel tap about one turn open and allow the burner to prime with meths. After two to three minutes, light the burner and check that you have a nice blue flame with an orange tip about four to five inches high. Extinguish the flame if the test is satisfactory and turn the tap off. Drain out the remaining spirit and make the final assembly of the tender to the engine after fitting the burner.

More to come in Part 3...

Photos by Author

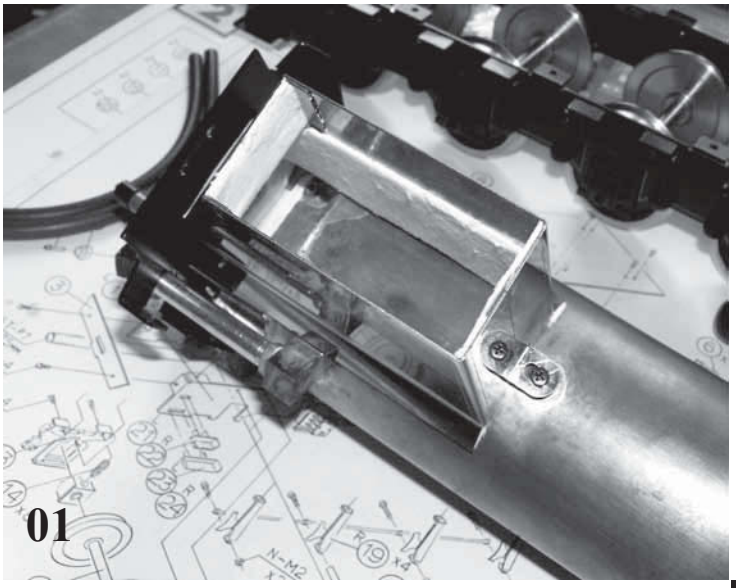
-01 – The combustion chamber. Under the boiler is mounted the combustion chamber or firebox. This is a stainless steel box lined with insulation and into which will be mounted the burner assembly of three burner tubes with wicks installed. The extra insulation material thickness is one way of reducing the primary air access should it prove necessary to preclude cold air ingress.

-02 – The 'Berkshire' boiler backhead. The enormous size of the Berkshire boiler may be seen in this view, which also shows the firehole through which the burner wicks must be ignited. Note also the addition of a whistle valve and large whistle to this loco.

-03 – 'Berkshire' front tube plate. The boiler is shown mounted inside the casing in this view. Note the sealing of the boiler to the cladding with a generous caulking of silicone sealant. The flue tubes will be fitted with a large superheater fed from a cold header attached to one of the two threaded unions mounted on the tube plate above.

-04 – Bulleid 'Pacific' smokebox. This view shows the unusually shaped smoke box with its chimney. Mounted on the boiler tube plate behind can be seen the cold header for the superheater. This fits over the end of the regulator steam pipe and steam passes through the flues in the superheater tubes and back to the hot header which can be seen in front of the smoke box. Here the lubricating oil is injected through the U shaped pipes from the reservoir mounted below the front footplate the filler for which can be seen on top. Steam delivery pipes to the outside cylinders can be seen fitted to the end of the hot header. The steam connection under the smoke box is the exhaust from the middle cylinder.

-05 – Bulleid 'Pacific' backhead. The reverser can be seen on the left of the footplate and the open cop-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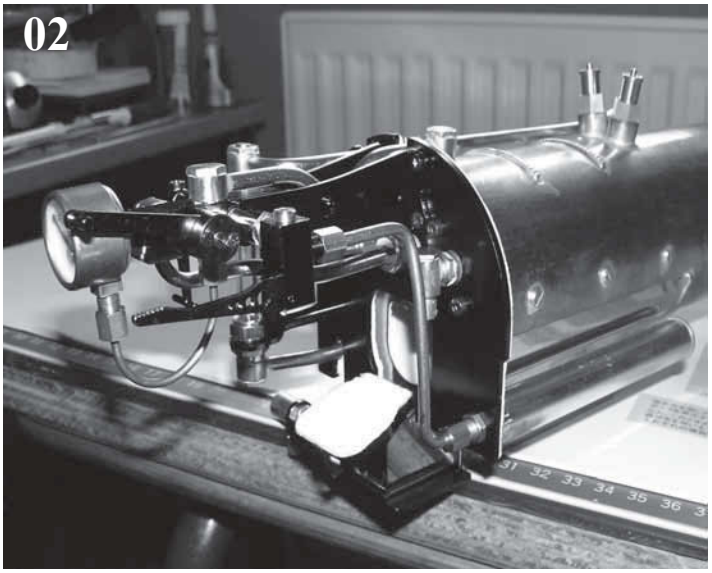
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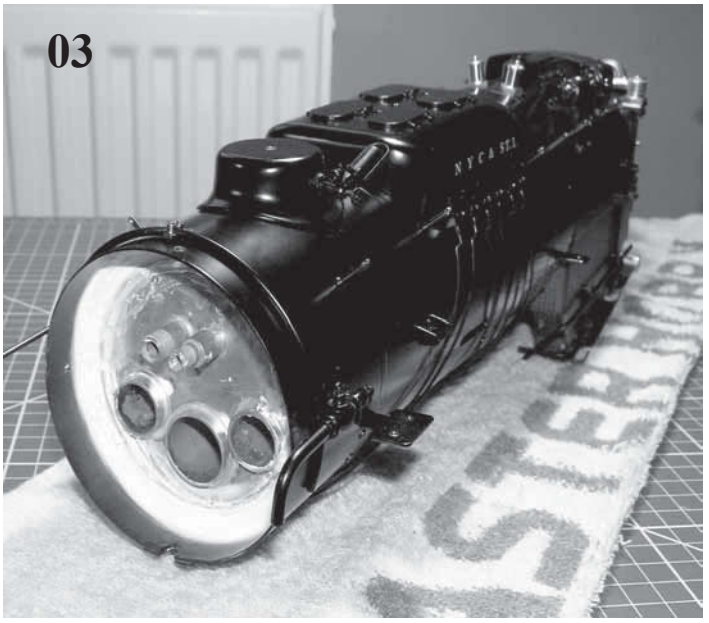
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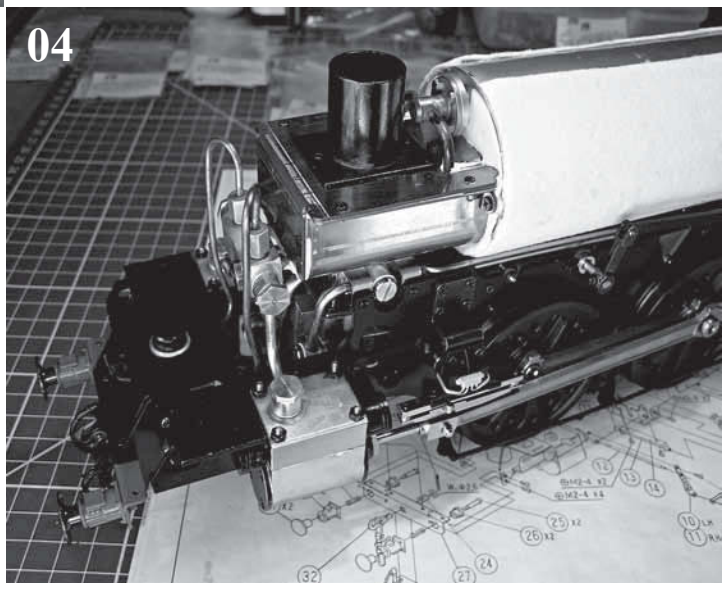
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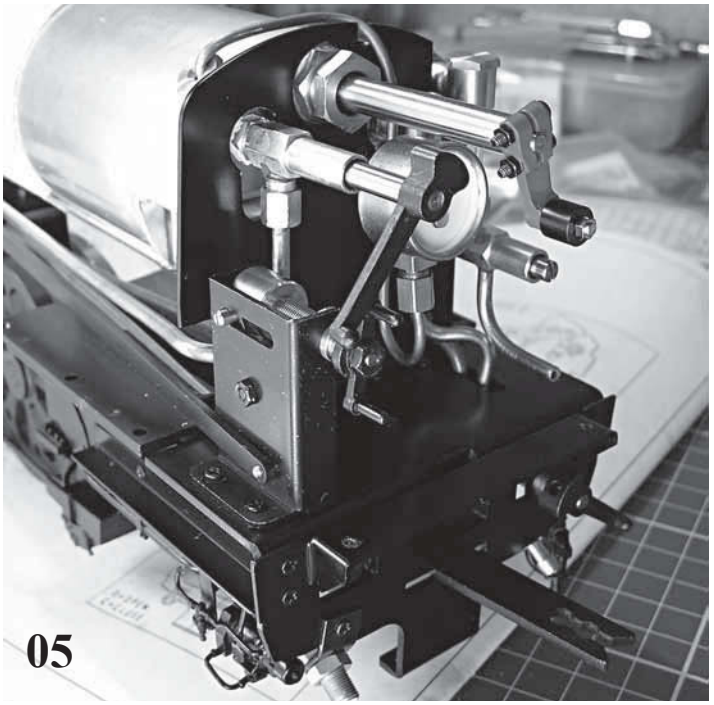
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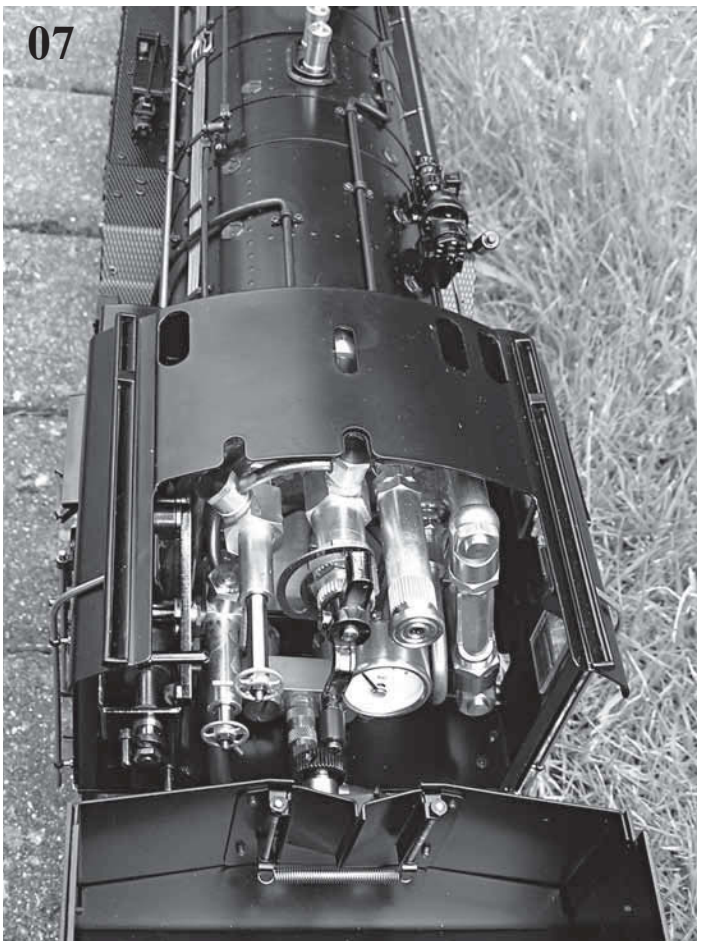
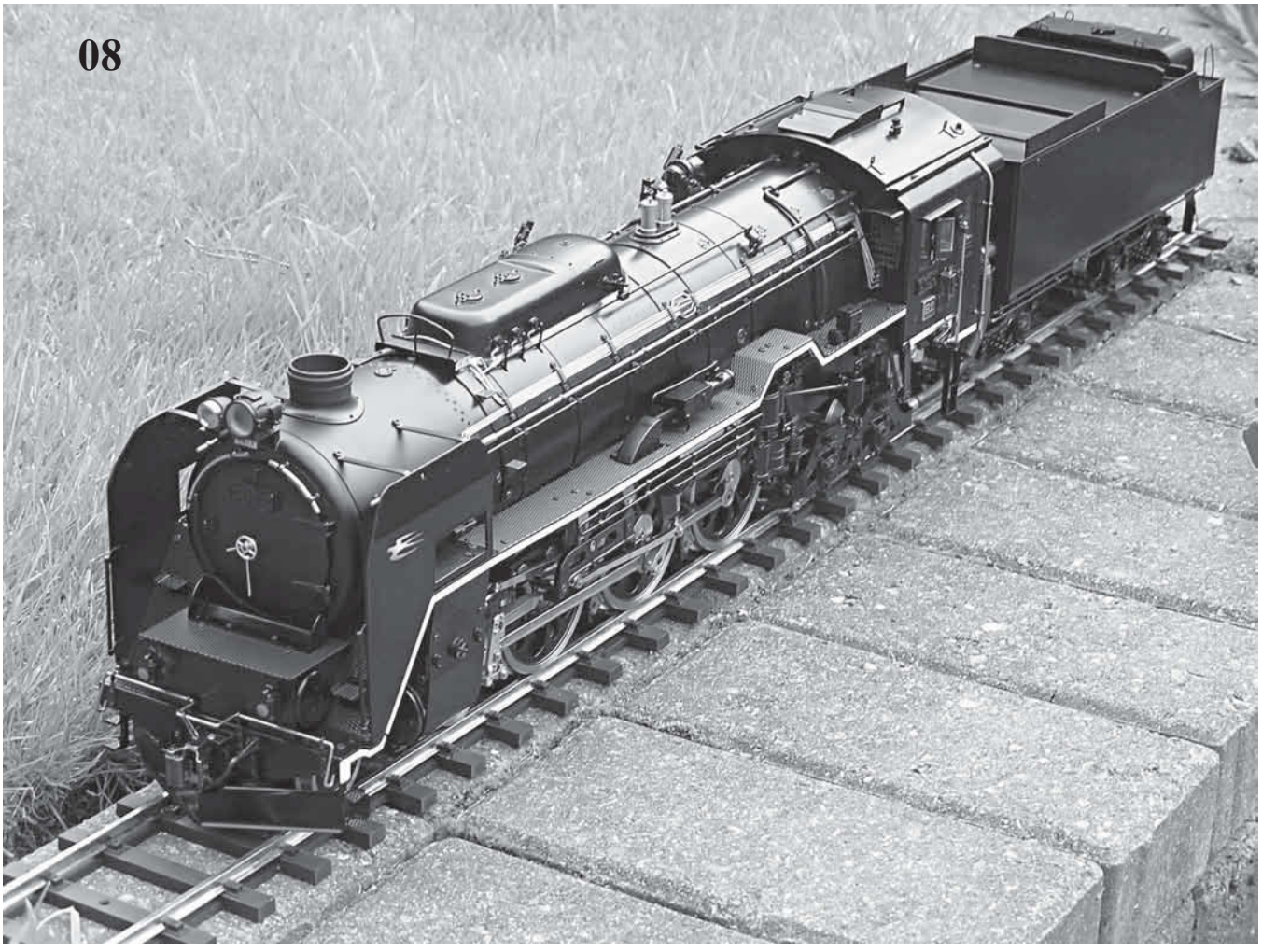


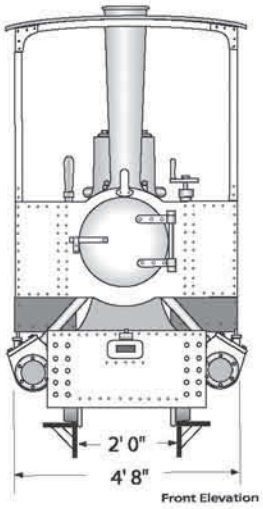
per pipe on the right is the blow down. This will be fitted with a length of neoprene pipe and will project water down to the track. Black lever is the blower and the red the regulator.

-06 – A3 cab. The very compact cab is shown and in the bottom left hand corner of the footplate can be seen the oil reservoir. Below almost at track level is the bypass valve.

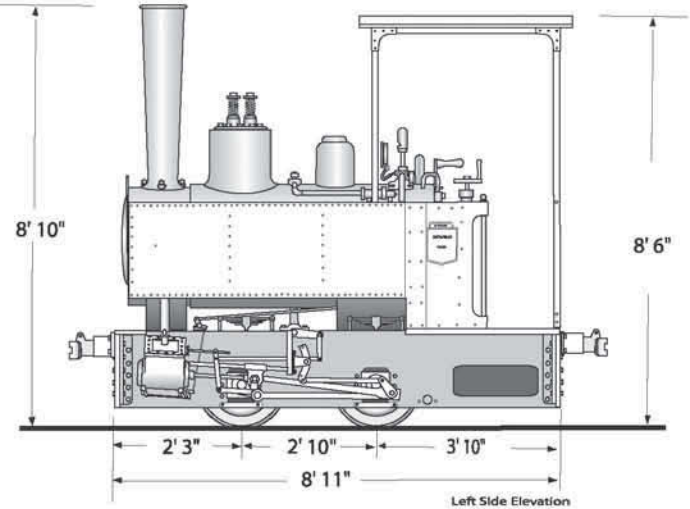
-07 –Aster Japanese C62-2 cab. This view shows the very complicated footplate of this loco. This loco may be gas or coal fired and in this view is shown set up for gas. Included in the controls are cylinder drain cock operating lever mounted above the reverser, gas control, blower control, regulator, pressure gauge, whistle and water gauge glass. The end of the gas burner may be seen just above the footplate.

-08 – The C62-2. The massive proportions of this magnificent engine can be seen in this view.

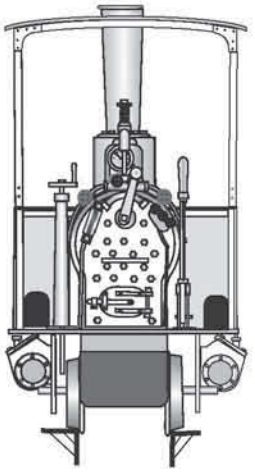


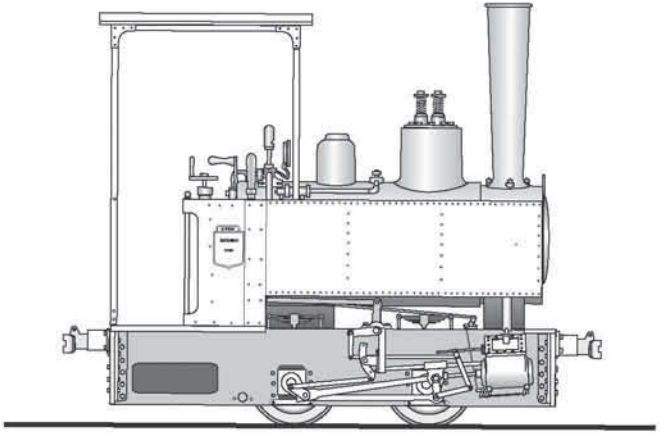


Front Elevation

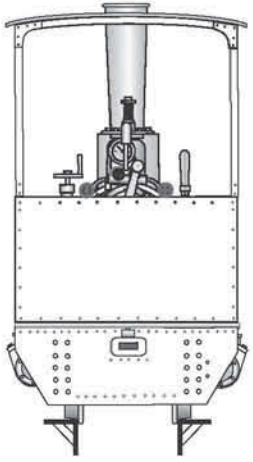


Left Side Elevation





Right Side Elevation



Rear Elevation

Scale 1/4 inch = 1 foot

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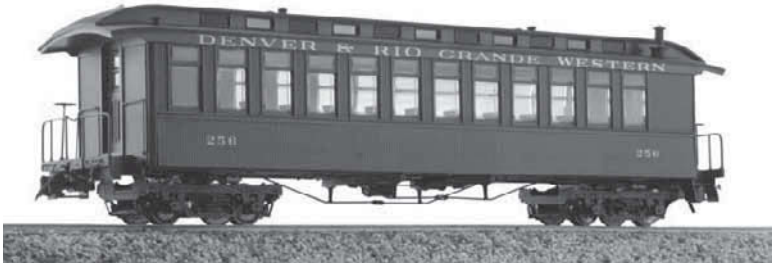

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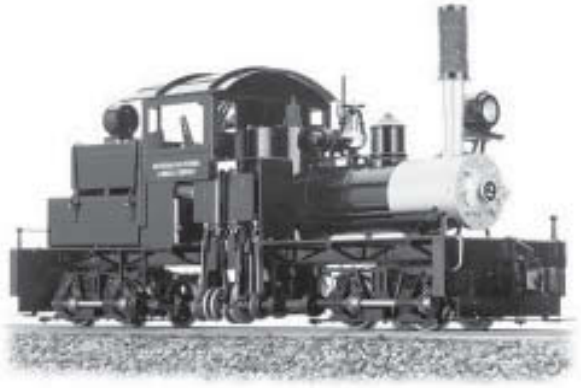

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