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STEAM IN THE GARDEN

In this issue.....

Accucraft K-36 Review

Sabre Coal Fired Steam Loco

and lots more.....

Mike Chaney and his grandson, Jack. Jack was being taken to his first exhibition and had insisted on going round twice, enjoying every minute of it. He'd just spotted a train on the layout when his dad clicked the shutter.

STEAM IN THE GARDEN

Vol. 20, № 4
Issue № 112

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

Articles

8.....**Sabre Steam Coal Fired Loco** *-- Assessing Annette*
by Willard Lindley

13....**A Flying Scotsman's Tea Party** *-- Bringing a little culture to the colonies*
by Jim Pitts

18....**Accucraft's K-36 –** *Loco Review*
by Joe Hall

27....**Building the Saugus Highline RR** *-- Part 3*
by Eric Strauss

35....**Nuts & Bolts of Shays** *-- Trucks for the s/n 2800 Mapleton*
by Dan Rowe

39....**Building a Steam Powered Model T Railtruck Part 2** *-- Workshop Project*
by Howard Maculsay

Departments

4 .....Calendar of Events *-- What, When & Where*

5 .....What's New - *Exciting new products*

45 ...Swap Shop *-- One man's trash..*

46 ...End of the Line *-- Blah, blah, blah*

46 ...Advertiser Index *-- Wish List...*

FRONT COVER:

On its initial run an Accucraft K-36 thunders past the golden crowned tunnel outside the town of Cedar Valley, headed towards its last stop at Rosebud Central.

Photo by Joe Hall

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Check out our web site...
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

Sep 3-5, 2010 - PLS Labor Day Meet, Rahns, PA. For more info, http://www.palivesteamers.org/

Sep 24 & 25, 2010 - Fall ECLSTS, York Expo Center, York, PA. For more info,
http://www.tbto.org/calendar/ca20100924.html

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

WHAT'S NEW?

The Train Dept. announces that, due to a lack of interest and/or participation, the Shay Bashing contest has been cancelled. A new contest will be announced at some future date.

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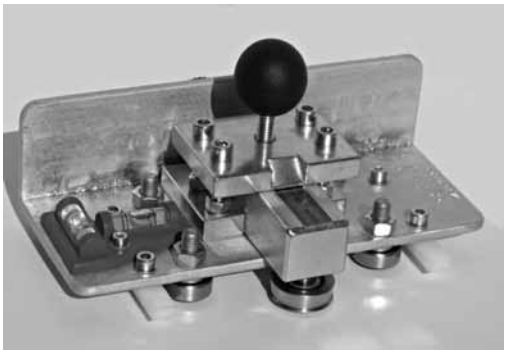

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Sabre Steam
Coal Fired Locomotive Annette

by Willard Lindley
photos by author
video by Tom Myers

TECHNICAL DETAILS and FEATURES

Boiler: Certified, Silver Soldered Copper
Boiler Manufacturer: MJ Engineering
Boiler Test Pressure: 120 PSI
Six Boiler Flues [4 large & 2 small]
Goodall Valve
Sight Glass
Axle Water Pump
Displacement Oiler with Drain Valve
Blower Valve
Bypass Valve
Manual Reverse Lever
Pressure Gauge
Drop Down Fire Box Door***
Full Complement of Tools

Instruction Manual with Clear Photos
Dropdown Ashpan
Servo Driven Regulator Valve

*****The drop down door may be one of the most user friendly features of the locomotive as it catches stray pieces of coal and keeps it off the cab floor. The door opens easily, stays open and closes easily, and you don't have to bother with a latch.**

Over the past couple years, I had thoughts of either buying a coal fired locomotive or converting one of my own locomotives to a coal burner. In early February of this year, I heard a rumor about a gentleman by the name of David Cooper in the U.K. who advertised that he was beginning the manufacture of a coal fired conversion of a Roundhouse Lady Anne. Since I already had three Roundhouse locomotives that I was very happy with, this seemed a natural.

The unknown in my equation was David Cooper, the owner of Sabre Steam and the builder of the models. David required a deposit of approximately $1,600, and since he had not yet built a production model, I was somewhat concerned. I contacted Roundhouse and Tag Gorton [editor of Garden Rail in the U.K.]. Roundhouse stated that they had known David for a long time and that they thought him to be an "honest chap". They also confirmed that they had granted trade terms to David, but that they had not yet seen one of his conversions. Tag acknowledged on "G Scale Central" that he knew David was in the process of building the locomotive but that he had not yet seen one. Tag described the boiler, cab design and water filling features David was building by saying he thought it should steam well. Tag even stated he was converting his coal fired Fowler water fill system for one patterned after David's.

On the basis of the above, it was time to call David. Thank goodness for inexpensive international telephone rates as my first call to David lasted more than an hour. What impressed me most about the call were the fact that he picked up personally and of the questions asked, aside from the standard preference items such as color and R/C, David got into quite a bit of detail as to how I would be running the locomotive. He wanted to know all the details of my layout, in particular whether it had any substantial grades. As my layout had originally been built for LGB equipment, grades were not an issue, but with steam, I've had to do quite a bit of work to make those grades that remain more friendly to live steam. Since I still have significant grades, David strongly suggested that I consider going R/C for the regulator only. I didn't understand the importance of this issue, but David stated that for R/C, he would install a regulator with a different thread pitch than the manual version so as to enable it to go from closed to fully open in only 90 degrees.

When we agreed to the buildout details, I gave David my deposit by credit card. David then said the model would be available in about eight weeks and that he would like me to come to his layout for a coal steaming tutorial. When I explained that I wouldn't be able to do that, he simply asked "Why not?" It wasn't as if he was offended, he seemed to expect acceptance of the offer. Only then did David learn that I wasn't from the U.K. Although some other builders won't ship to the U.S. that made no difference with David other than he still wanted to provide a

tutorial. Over the next few weeks, I let David do his thing without further interruption. Then after about six weeks, I couldn't resist a call for a status report. I learned that the locomotive would in fact be done on time, and for me that was important as the Michigan Small Scale Live Steamers were scheduled to work on a fund raiser for a group that trains service dogs for their handicapped owners. David then said that he thought I would be able to run it at the meet. Back to the tutorial, David provided two very detailed sets of instructions about operating the Annette, and along the way as well.

I was impressed with the delivery, and now I couldn't wait to unpack Annette. Having previous negative claims experience with another carrier, I photographed everything as I removed it from the package. First, Annette was double boxed with lots of insulation between the inner and outer boxes. The only container damage was a small hole in the inner box made by a front corner of the locomotive. When I opened the inner box, other than the front bumper poking the hole in the box, everything was perfect. I still

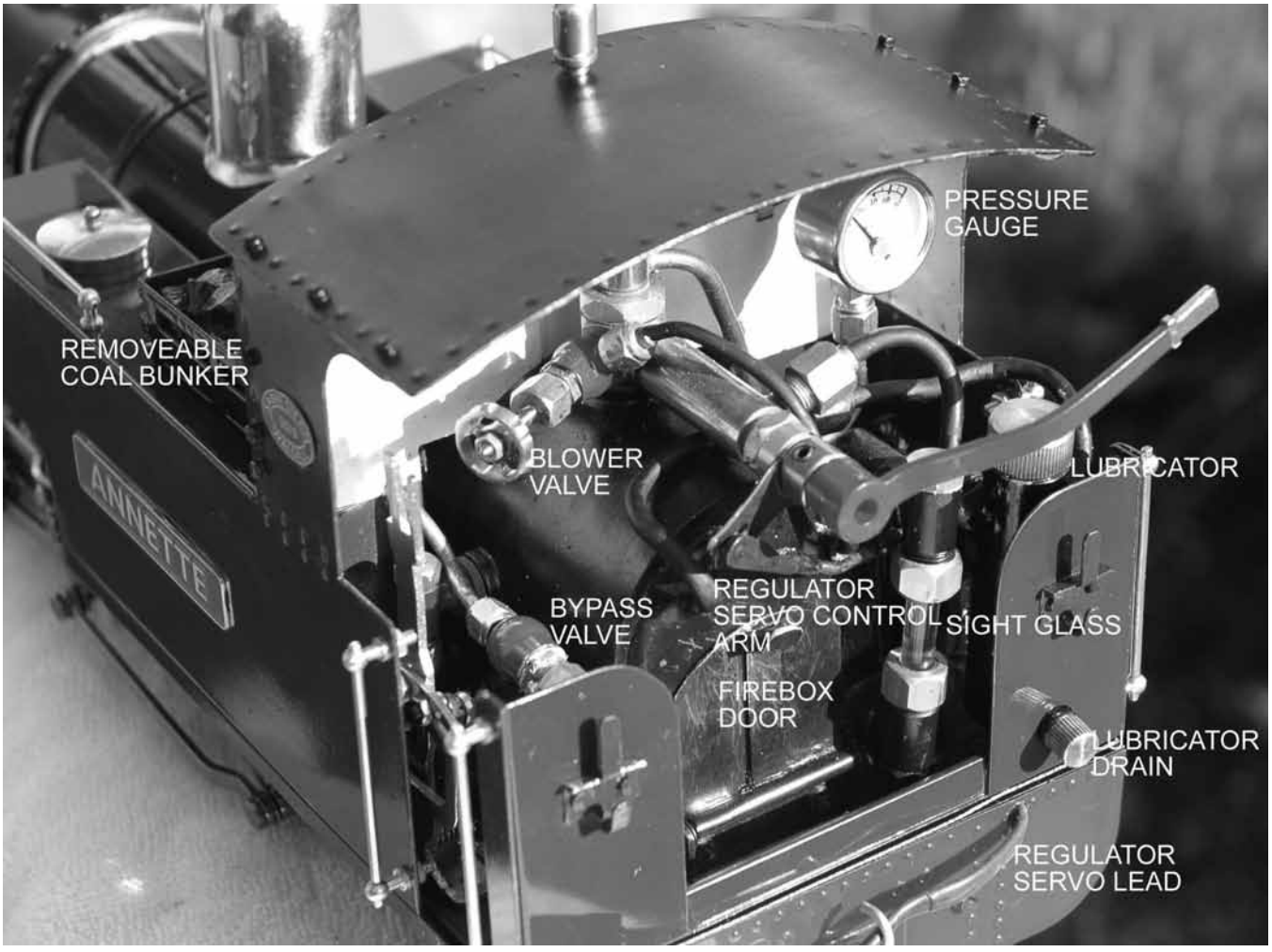
The author's SABRE STEAM ANNETTE

I was only too anxious to read it all, several times.

The first Sabre Steam locomotive to arrive in the U.S. has Serial No. 006. It arrived in the U.S. at the FedEx Customs Depot in Memphis, TN, the next Friday, in seven weeks, not eight. I had to give FedEx authorization as they were my "Importer's Agent", and that held up Customs clearance by an extra day. The locomotive cleared U.S. Customs without a hitch on Tuesday next, and it arrived from FedEx at about 8:30 a.m. Wednesday morning, not in a truck, but by car as a single item delivery. FedEx said they knew how valuable it was and this was standard procedure. I presume that meant more gentle handling all don't believe U.S. Customs inspected the locomotive as there weren't any fingerprints on her.

I knew David had run the model for several hours on his own layout, and with that, I expected some grunge from his testing, but the model was sparkling. Everything looked like it was new. Now it was time to get ready for its maiden trip.

I know it's a macho thing, but you SHOULD READ THE MANUAL. David wrote a clear, concise manual which covers all operating issues from lubrication to firing and operation of the bypass valve. Regarding the bypass valve, it needs to be primed, and since there is no hand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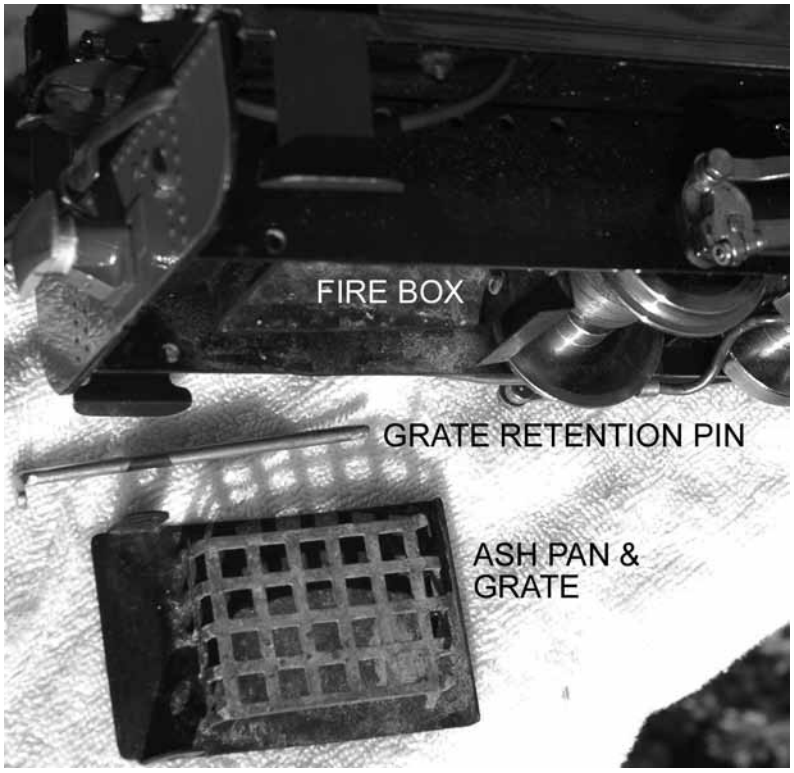
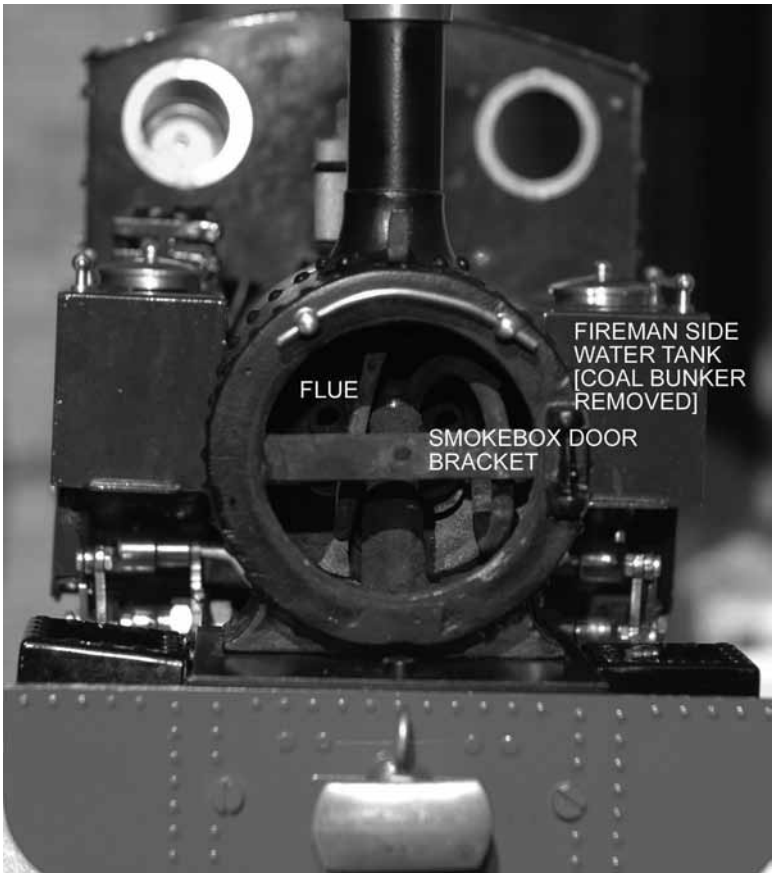
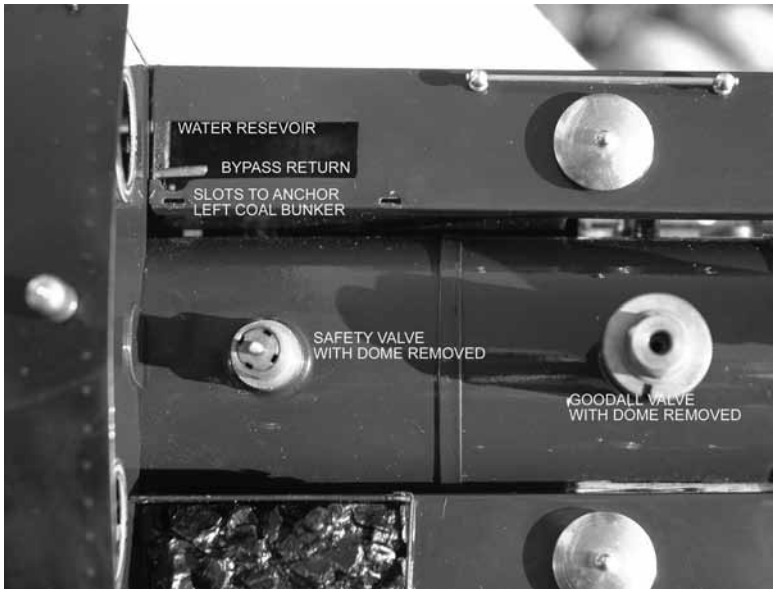
BLOWER VALVE
LUBRICATOR
BYPASS VALVE
REGULATOR SERVO CONTROL ARM
SIGHT GLASS
FIREBOX DOOR
LUBRICATOR DRAIN
REGULATOR SERVO LEAD


REGULATOR SERVO LEAD
PIN FOR REMOVING ASH PAN
ASH PAN
ECCENTRIC FOR WATER PUMP
WATER PUMP
WATER FEED LINE
WATER LINE TO BYPASS VALVE







pump, the locomotive must be run for a couple minutes with the bypass valve open in order for the pump to be primed. Only then should you adjust the bypass valve to maintain a proper water level in the sight glass.

I had already bought 20 pounds of Welsh coal from Coles Model Products in Texas, a bag of hardwood charcoal and a bottle of lamp oil from a local Lowes store. I didn't know how small to break up the coal and charcoal, so I guessed that if the lumps fit in the shovel provided, they would be good. David had offered to provide 5 pounds of Welsh coal, but the shipping cost would have been an extra $60, so I opted to buy coal from Coles and save on shipping.

After working with our club to set up the layout, my turn to run came along, and here is where the results of David's work would show. He suggests filling the side tank and then filling the boiler to within 50 milliliters of the top, rather than the top of the sight glass. This is because I was told coal fired locomotives make and use far more steam than do those running on butane. I gradually built up a fire with lamp oil soaked charcoal, and in less than five minutes the safety valve was blowing at about 50 pounds. With a hot charcoal fire, I slowly added coal until I had a good fire. Pressure held at about 50 pounds. I then connected Annette to my work train, topped off the boiler through the Goodall valve and prepared to send Annette on its maiden voyage. With no warning, the pressure dropped to about 20 pounds, and I couldn't get it to move at all. Nobody knew what the cause was, so, through the trial and error process, we attempted to solve the problem. On about the fifth attempt, I took the poker with the 90 degree bend at the end and fiddled with the grate from underneath. Lots of powder came out, and almost instantly the fire took off and held at a steady 50 pounds. Surprise! Surprise! A fire needs to breathe! The cylinders were quickly cleared of condensate and Annette pulled away without a hitch. The exhaust was strong enough to spew a few sparks from the fire box, but other than that the run was uneventful. After a couple laps, I slowed her down so that I could close the bypass valve to replenish the boiler with water, and then added a couple shovels of coal and off she went again. Again, because there is no onboard hand water pump, Annette has to run a few laps with the bypass valve open in order to prime the axle pump. After a couple additional laps, the axle pump had replenished the boiler and now the fire needed coal and the side tanks needed refilling. Off she went again. It was on this part of the run that my friend Tom Myers took a short video. I may be biased, but I think that video is one

of the best short videos of a coal burner around. The link to the video is:

http://www.youtube.com/watch?v=J9o6-36tn90

When I learned how to build and maintain a proper fire, Annette ran flawlessly. Servicing was easy, controls were logical and very easy to adjust and it pulled a moderate load without difficulty. In particular, I like the large handles on both the Blower Valve and Bypass Valve. I'm waiting for a rake of coaches now to complete my train.

Next was my first experience with post operation maintenance of a coal fired locomotive. David supplies required tools [brushes], so with the smoke box door removed and a vacuum cleaner handy I started what I had previously been told would be a time consuming job. On removing the smoke box door, there were only a few ashes at the bottom of the smoke box, and they were easily removed with the vacuum. On inspecting the flues using a flashlight at one end and looking into the smoke box, there were no visible ashes. Regardless, I ran the brush through each flue while holding the vacuum at the smoke box door end. Next, I removed the ash pan and cleaned Annette from underneath. Again, this process took very little time. By removing one pin, the ash pan comes out and the grate is fully exposed. It goes together as quickly as it comes apart. If you had a clinker [I didn't], it would be particularly easy to remove with David's system.

I had only one problem with the locomotive, and that was a small interference with the water line from the axle pump to the bypass valve. David ran the model at 32mm, so I had to adjust the gauge to 45mm [gauge provided]. When I adjusted the drivers to 45mm, one of the drivers touched this tubing. The fix took all of 15 minutes as I simply moved the hanger from the inside of the frame to the outside. I explained this to David and got an apology. He doesn't have 45mm track to run on, so he never experienced the interference on his own layout. I've been told that this has been resolved for all future models.

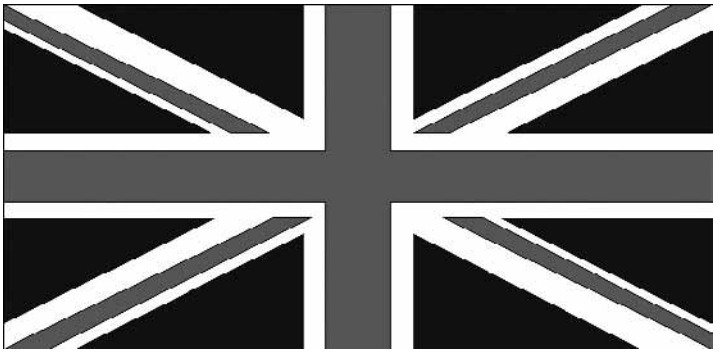
The locomotive comes with a 12 month warranty and a boiler certified by MJ Engineering [Little Loco Company].

If you are in search of a coal fired locomotive and like British style locomotives I don't think you can do better than this. You get everything Roundhouse has to offer with their running gear, a boiler built by a specialist and a locomotive designed and built by someone who is genuinely interested in the buyer enjoying the fruit of his work. So far, although David has done no advertising yet, he has about 31 on order. He has completed work on and now offers a coal fired version of the Roundhouse Billie, which is called Annabel. These conversions of the Roundhouse Lady Anne, their most popular locomotive, and now Billie, another very popular locomotive, are excellent choices for a coal conversion. I asked David when we should expect Andy. He was a little miffed, but when I explained that with Annette and Annabel, an Andy/Andrew would be a natural - I expect we'll see an Andy or Andrew in the near future.

On the basis of my opinion, and those who have seen Annette operate, I think Sabre Steam is a company we should expect to see for a long time.

A Flying Scotsman Tea Party

By Jim Pitts



Spring signals an invitation to come outside and celebrate in the warming sun. Always looking for a reason to party and to share the experience of steam in the garden, while spring 2010 was in full bloom a tea party was planned.

Now this was not to be a tea party as a political protest in the tradition of Boston 1773 or the partisan "us against them" political banter of 2010. This tea party was to be a convivial and relaxed moment in Travelers Rest.

A full contingent of G1MRA membership for the colony of South Carolina was involved in the planning and hosting: Steve Baker and Jim Pitts. G1MRA members here in the southern colonies are a minority in the garden rail scene.

Recreating the scene of May 1928 at London's King's Cross to Edinburgh's Waverley station, the 392 miles of non-stop glamour, romance and elegance rolled past an appreciative audience of world traveled guests. The train featured an Aster A3 locomotive with a full complement of eleven Flying Scotsman coaches custom crafted by Pete Comley at Sunset Valley Railroad.

Along with tea and crumpets, shortbreads and biscuits, Geoffrey Humphreys shared memories of the UK railway scene of his youth. Both his father and grandfather worked for the London Midland region.

His grandfather was signal man on the high level. His father started at the Tamworth station, but later worked at the headquarters in nearby Birmingham. Since his family did not own a car, they traveled exclusively on the train.

Emotionally moving was Geoff's recounting the history of his mother, Ruth Ofner. Her railway journey to the UK was on the Kindertransport, a rescue mission which began nine months prior to the start of World War II. Predominantly Jewish children were sent by their parents out of Nazi Germany, Austria, Poland and Czechoslovakia to safety in Great Britain. His mother, now 81 years of age and one of twenty-six survivors, last year participated in the 70th anniversary observances of the Winton Train.

Geoff shared that his family were "publicans." That is not to be confused with a political party, but the name given to the proprietors of a pub. A pub is a public house, a tavern, a bar and inn or hotel. In British society, the pub is often the social center of the community, where everyone gathers to eat, drink and discuss the issues of the day. It is obvious that his career as a broadcaster was enhanced by his social orientation at the Star Inn in Tamworth, Staffordshire, England.

In addition to the Flying Scotsman locomotives both in LNER apple green 4472 and BR dark green 60103, to introduce the tea party guests to other UK rail locomotives on display were an LMS Duchess of Sutherland, LMS Jumbo, GNR Stirling Single, Southern Bulleid and an L&M Lion.

Steve Baker, not content to have the American railway scene go unrecognized, provided his Aster classic Reno with classic passenger coach. So the Wild West met our refined British heritage from across the pond for a good time of boiling water for tea and small scale live steam. Truly a lovely way to spend an afternoon in the garden!

Above: While waiting for the Flying Scotsman to steam, Geoff Humphreys remembers his grandfather's and father's lifetimes of service with British Rail.

Below: Steve Baker proudly stands behind his Aster Reno, while Ray Rambler - one of the designated drivers for tea party guests - waits for the water to boil.

Above: Remembering and making history, world travelers from the Cascades Verdae community pause for a group photo with the Flying Scotsman and V&T Remo.

Below: BR 60103 in dark green livery was one of two Flying Scotsman covering the Southern Steam Trains circuit. Also, the classic LNER apple green #4472 locomotive, which initiated the legendary service from King's Cross to Waverley, was on display.

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Accucraft's K-36

by Joe Hall

TECHNICAL SPECIFICATIONS

Scale/Gauge - 1:20.3 Scale/ 45mm Gauge
Minimum Radius - 1.2 M, 48 in.
Fuel - Butane
Cylinder - Two Cylinders w/ D-side valve
Valve Gear - Walschaerts valve
Fittings - Throttle, Check vlave, Water level gauge, Pressure gauge
Limited Production

So it finally came! With a Ruby, a Shay, an American and a Climax in my roster I had decided that a K-36 had to be next. I really was not prepared for the actual method of arrival though.

Perhaps the UPS guy was running behind or had more deliveries than he could manage. Whatever it was about, I was seated on my living room couch when I heard odd noises coming for a few seconds from my front porch, just a few feet from where I was seated. By the time I got up, he was out of sight. I headed to the back door when I heard a loud "WHUMP". Mr. UPS had sauntered around to the back, decided that he didn't need to open the door to my back porch and launched the 76 lb. box over the 6 foot fence onto a two foot snow drift!

Could have been worse, I guess. The front truck on the tender was broken beyond repair and one of the levers that control the right side drain cock was missing. A call to Cliff Lusher was in order and I received the parts at no cost by return mail. Cliff & Accucraft are great about customer support.

It is a beautiful and imposing engine! The engine that I bought was #483 with its green boiler. Apparently this color existed only in photographs but, for me, this was just the right one!

In 1925 the K-36 class of 10 engines was ordered by the D&RGW Railway from the Baldwin Locomotive Works. Designed for narrow gauge track from the outset, the engines were designed to be used to haul freight over the railway's passes with as much as 4% grades to be conquered. With drivers inside the frame and rods outside, the boiler and firebox had more space.

These engines followed the K-27 class which had been built in 1903 and with an addition of 9,000 pounds of tractive effort the K-36 promised much better service.

The K-36 engines gave excellent service and received well deserved praise as the workhorses of the time.

Although one engine of the ten had been scrapped after a fall into a turntable, the other nine all survive today, many of them still running.

By the 1960s the engines were past their useful life and 5, including 483, were sold to the Cumbres & Toltec Scenic Railway. The remaining 4 engines were sold later to the Durango & Silverton.

I still have a vivid memory of my visit to the Cumbres & Toltec Scenic when early in the morning at Antonito I could watch as one was being fired.

When you unpack your engine, you will surely be prepared for the extensive protection that you must remove. When you get to the tender you should first fix the gas jet line to the tender body. If you don't, the jets can quickly find their way downward. This line is the right length to reach the engine and also just long enough to plunge the jets into the track below.

Accucraft has added several welcome features. The steam lubricator has an adjuster on the front side and there is a drain at its base. There is also a boiler blow down valve on the right side.

The cab has an R/C fitting on the throttle. The warmer for the tender water bath is controlled by a valve operated by a handle that stretches out towards the back. Steam will move into the tender when this handle is depressed.

There is no provision for radio control of the reverser lever but the cab has enough room for one.

At the bottom of the cab are the receivers for the jets which have adjustable collars; a nice addition.

The engine has much of what we expect to find.

Above: The K-36 crosses the arch bridge near a waterfall.

Below: A view of the tender with gas jets clipped securely at the top by the author, and a small but easily operated water pump with its black tube extended towards the boiler. At bottom is the generous gas tank. The gas control valve on the front of the tender has an R/C lever attached. This area of the tender is water tight.

Above Two views of the backhead. The blue tube, which appears here in storage position, supplies the tender bath area with water from the boiler. Directly above this tube is a hand operated valve activated by pressing it downward. The reverser lever is on the right with room behind it for an R/C servo. The throttle is near the top of the backhead, here with an R/C lever attached. On top of the boiler is the water filler plug.

There is a brass bell with a brass clapper inside. A line is provided for the bell and the whistle. There is a coupler at the front. The windows are remarkably versatile with movement to open or slide so that you can, if nothing else, see the pressure gauge. The cab has a roof which opens easily and stays out of the way.

The line that connects the tender's water pump has a screw-on fitting that needed some alteration. The line is rubber and too much of it lapped past the clamp, inhibiting the movement of the threaded collar. I had to cut most of that excess rubber away to allow the collar to move. Make sure that you check this out before you screw it on as the room in the cab for this device is very limited and if it won't move you'll have to devise a way to get needle nose pliers at it.

The tender contains the gas tank, the water bath area, a water pump with a connection to the boiler and a return line which is intended to direct boiler steam into the water bath thus warming the gas tank. The gas tank valve has an R/C fitting.

Atop the tender is that distinctive doghouse. This little cupola was built to give the brakeman a warm spot in the winter we're told, and perhaps a nice place to sit.

You have the option of couplers for the tender. It comes with a fitting for a link and pin but a knuckle coupler is provided which fits into the bolster.

On the first nice day we had, I took the engine outside, oiled all around, and filled the engine with fluids. The gas tank is large and took almost all of a 300 ml butane cartridge.

Finally, I lit the burners. The fire flashed back to the jets and burned the first time that I steamed. The second time I fired up, the left jet was determined to burn inside the flue so I flipped the jets over and they burned reliably. Looking down the flues at the burning jets will be no problem if you have a raised track. It was a bit of work for me since I run on a garden railway which is about 12" above the ground, so knee pads were called for. The cylinders are fitted with drain cocks which allow you to let the condensed steam to escape before moving the engine. Just open them up before opening the throttle, and the water will drain freely. After a few seconds, close the drains a quarter turn (upwards, please) and you should be able to run easily.

The engine ran beautifully and smoothly from the very start. It took right off without hesitation. It would have been perfect sailing if I had a raised track. Since, as I said, I have a garden railway and winter had FINALLY ended, the trackwork was not in perfect shape. The loco is heavy and found every bad spot on my pike. The biggest surprise for me was that it was quite comfortable negotiating the curves. It had no problems, even though my track has curves as tight as 5' radius. Changes in elevation were another matter. The trials of winter had removed some of the ballast and several spots required attention. The second running was much more successful regarding track issues and the run lasted about 40 minutes until the gas was gone. The engine has a delightful chuff note that is noticeable even when the train is across the pike.

As you can imagine, it is a very powerful machine and is one that I will spend some time trying to challenge. So far the record is thirty cars which it pulls with ease. How many more? Stay tuned.

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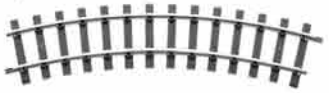

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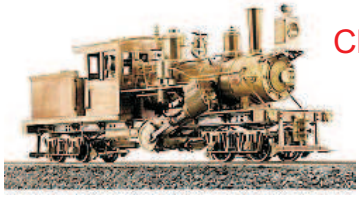

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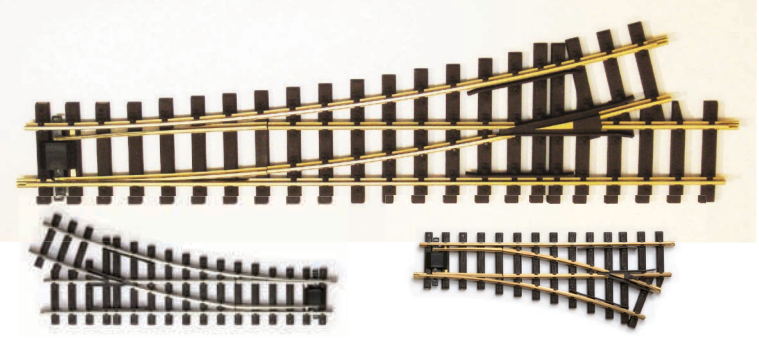

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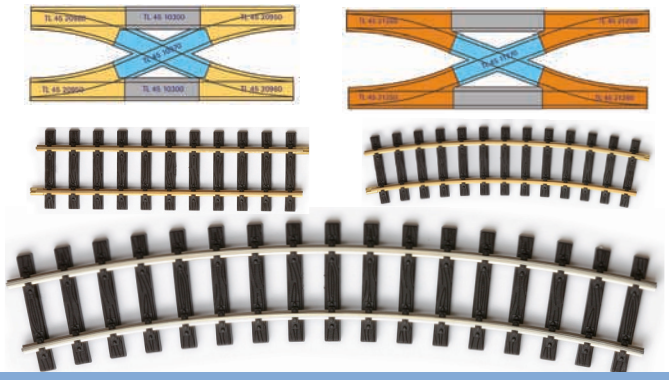

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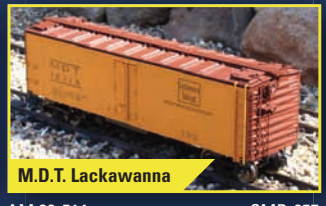

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Building the Saugus Highline Railroad Part 3

by Eric Strauss
photos by Rick Parker

Some of the drawings and photos referred to in Part 3 can be found in Parts 1 and 2, SitG #110 and #111 - ed.

Thermal Expansion Compensation

The temperature here can vary from freezing to over 100 degrees F and thermal expansion of the rail was a needed consideration for the straight portions of the railroad. In order to determine the temperature range which the rails might experience, I purchased a thermocouple thermometer (Model DT8852 from Mannix Testing & Measurement, see www.mannix-inst.com). I then bonded one of the included thermocouple junctions into a small hole in the web of a short length of rail and left it in the summer sun on the railroad platform. From this I learned that on a calm, 102 degree F, cloudless day I can expect mid-day summer rail temperatures as high as 160 degrees F! Since it can also get to freezing here, my rails may experience a 130 degree F temperature excursion.

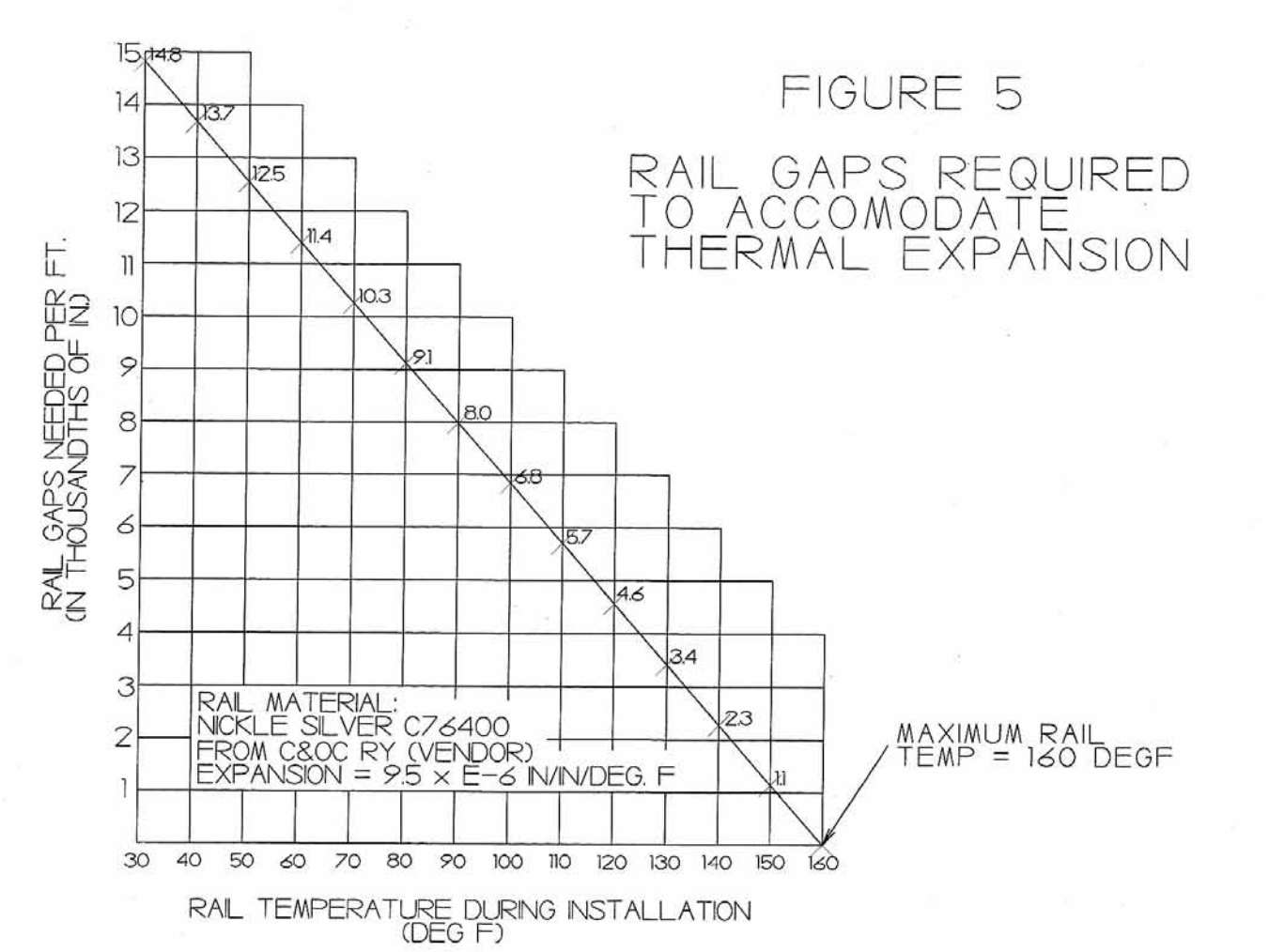
The expansion coefficient for my nickel silver rail is about 9.5xE-6 in./in./degree F. This means that each 1 degree F temperature change will change the length of a 1" length of rail by .0000095". This may seem insignificant, but multiplying this by 130 for the expected temperature change and again by 12 to get the length change per foot shows I could expect a change in length of .0148" (almost 1/64") for every lineal foot of track, or .0889" (almost 3/32") for a 6-foot section.

To accommodate the expected changes in rail length, I simply installed rail gaps with joiners (aka fishplates) to join/align the rail ends at the gap positions. If the gap is adequate, the rails slide in the joiners and are free to expand/contract with thermal changes. The wild cards here are the friction between the rail and the tie strips at the molded-in "spikes" which hold the rails, and the expansion properties of the tie strips themselves which, according to my vendor, are made of Nylon 6,6. This material is about 5 times more thermally expansive than the rail but much weaker, and the tie strips are configured to allow movement.

Keep in mind that the size of the installed gaps needed to allow for expansion will depend upon the actual rail temperature at the time we are laying track and the rail length between gap positions. Clearly, for example, if I were laying track whose rails were at the maximum 160 degree F temperature, no gaps at all would need to be installed since the rails could only cool and shrink from that point. Of course, joiners would still be required to allow the rails to shrink freely. To simplify things during construction, I prepared the graph shown in Figure 5 depicting the gap required per foot of my nickel silver rail during construction as a function of the measured rail temperature. By moving cars over track gaps of various sizes, I also decided that I could live with the 3/32" rail gap that a 6-foot section of my track would have when operating at 32 degrees F – freezing (I know I'm not the only one foolish enough to do this!). This then, established the maximum distance - 6 feet – which I could allow between gaps without having gap sizes larger than my 3/32" limit. The track laying procedure then, involved checking that the distance between gaps was less than 6 feet, measuring the nearby sample rail temperature with the thermocouple thermometer, looking up the gap size required per foot of rail on the graph, multiplying this by the distance, in feet, to the next gap to determine the gap size, and then using a feeler gauge (and my rail saw, if required) to install a correctly sized gap with a rail joiner at the interface. I know at this point you're thinking "this fellow has some serious issues", but this is not as tedious as it may sound. After following this procedure a few times we could install a controlled gap in less than five minutes.

Rail Anchors

The dual track drawbridge at the garage corner allows access to the inside running area of the railroad. Since thermal migration of the bridge rails or approach rails could eventually cause damaging interferences when operating the bridge, I decided to anchor these rail ends to the fixed platform structure. At the center of the bridge the rails are gapped to alleviate any thermal stresses which may arise between these fixed anchors. Similar gaps are provided in the approach rails. An anchor (see Figure 6 and photographs 6A, 6B and 6C) consists of a small aluminum bar which fits within one of the molded hollow ties. The bar has two protruding lands to which the rails are bonded and holes are provided for screws which secure the bar to the platform. At installation the bar is placed in position and secured to the platform with #6 machine screws and lock washers/nuts under the platform. The rails are then bonded to the lands of the bar using Armstrong A-12 adhesive. The



bonding fixture shown in Figure 7 and photos 6A and 6B holds the rails and anchor in position while the bond is curing. After the bonds are fully cured the anchor is covered with one of the molded ties which have been cut to provide the necessary clearances (again, see Figure 6 and photographs 6A, 6B, and 6C). Finally, the anchor covers are secured in place with clear Silicone adhesive.

After anchoring the bridge rails, it occurred to me that strategically locating rail anchors in the other straight portions of the railway could prevent the uncontrolled migration, over time, of rails and gaps - eventually leading to oversize gaps or gap closures which would create more track stresses. Hence all straight portions of track were anchored at a point approximately midway between each pair of gaps.

Since the coefficient of thermal expansion of the platform board is less than that for the rails (the manufacturer quotes a high value of 7.65xE -6 in/in/ degrees F in the width direction of the board), platform thermal effects should not aggravate interferences of the anchored rail sections. Generally, platform effects will only make the minimum (hot) gaps slightly larger and the (cold) maximum gaps slightly smaller. I am happy to report that after over a year of operation, the result of all this has been straight runs of track which have stayed truly straight over an ambient seasonal temperature excursion from 104 degrees F to 38 degrees F.

Drawbridge

While the hinged drawbridge does provide convenient access for people and equipment to the central area of the railroad, I confess it is my biggest concern. The horrifying thought of a guest's prized steamer plummeting into the abyss of the open bridge drove me to devise an electromagnetic bridge lock-down system and visible bridge position indicator lights triggered by a microswitch. Additionally, I have installed an alarm sound system with crossing gate bell sounds triggered by the bridge microswitch with an adjustable time delay so that the alarm sounds only after a period of 20 or 30 seconds which allows normal access operation. My other concerns here were to make the bridge easy to use and to provide enough structural stability to maintain long-term reliable track alignment during operation.

At over 18 pounds, the bridge is too heavy to operate easily and safely without counterbalancing. To determine the counter balance torque required, I simply lifted the bridge at a known distance from the hinge with a digital fishing scale. While the idea of attaching a long hori-

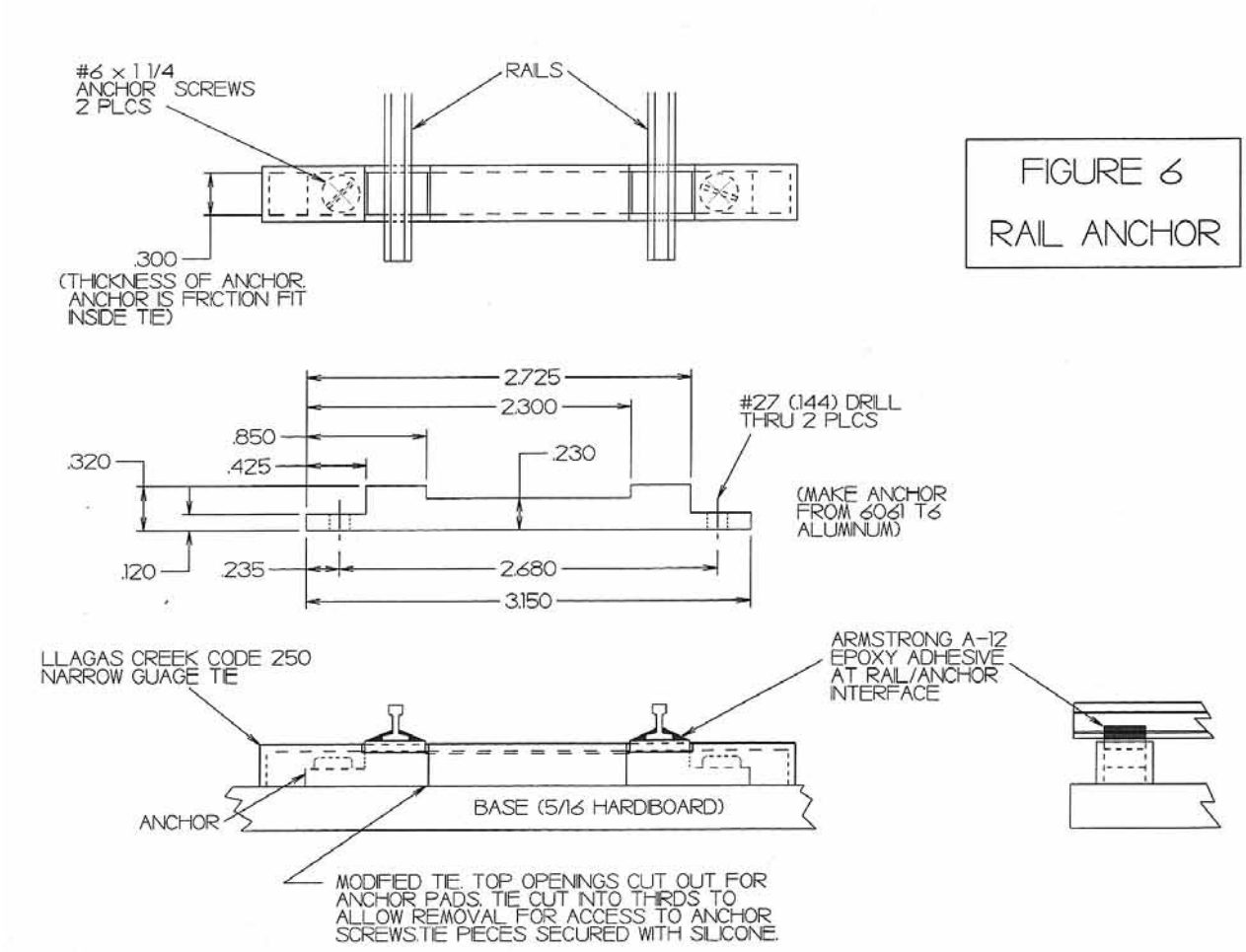
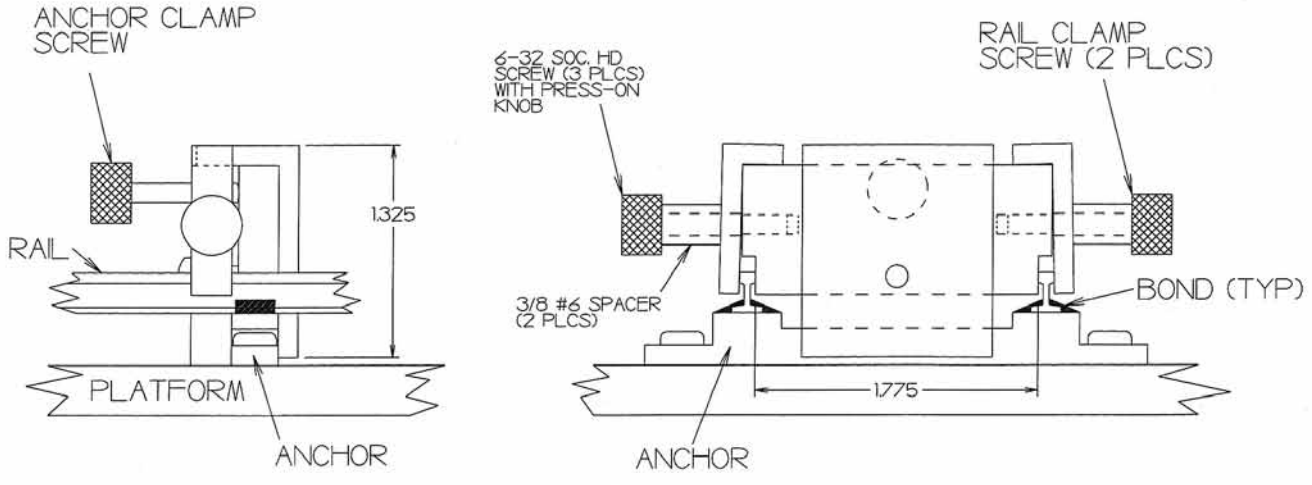


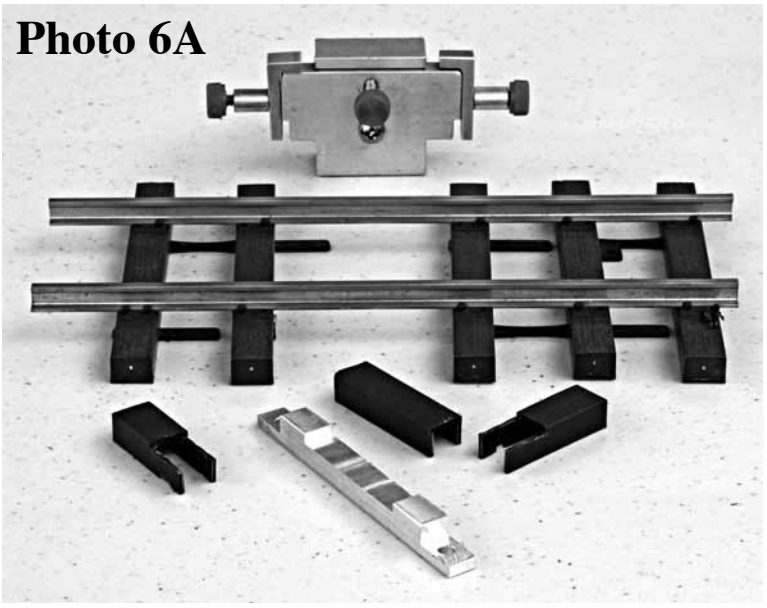
FIGURE 6

RAIL ANCHOR

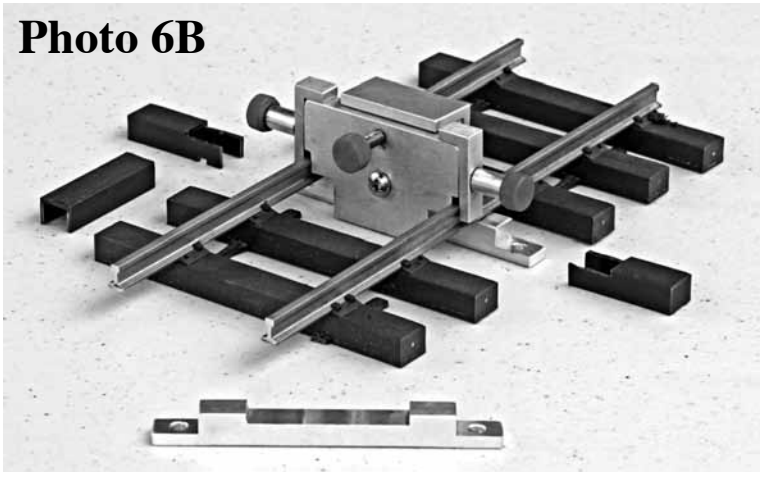
FIGURE 7

RAIL ANCHOR
BONDING FIXTURE

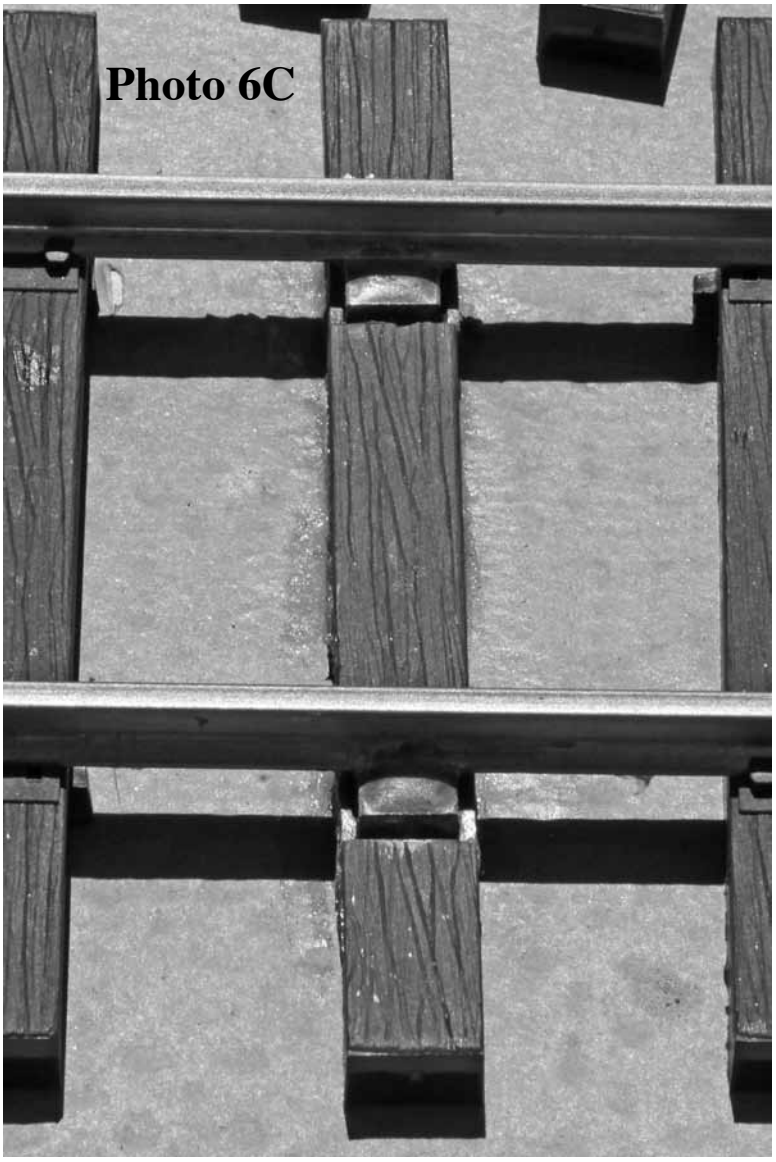




Rail anchor and bonding clamp.



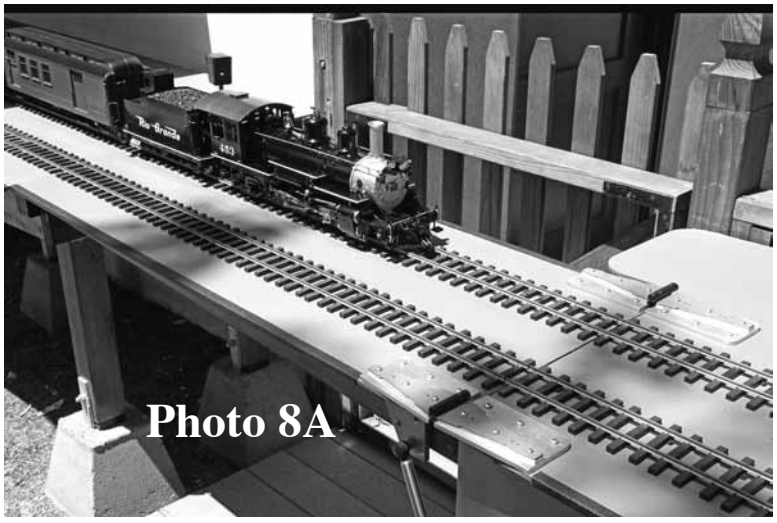
Rail anchor clamped to rail during bonding.



Finished anchor installation.

zontal rod with sliding weights to the hinged end of the bridge seemed feasible for counterbalancing the bridge in the lowered position, in the raised position these weights would wind up under the bridge and acting downward on the same side of the hinge, thus aggravating the imbalance. What was needed was a dogleg offset in the balance rod to move the weight over so that it acted on the opposite side of the hinge when the bridge was up. Using my CAD skills, I tried unsuccessfully to develop this "dogleg" geometry, but whenever the offset appeared sufficient to balance the raised bridge, in the lowered position the weights clearly interfered with the platform structure and would prevent full closure of the bridge. What to do?! I decided to try everything out with real hardware (brackets, rods, weights, etc.) to see if I had overlooked anything and Hey Presto! In the bridge down, horizontal position the weights caused the rod to bend down sufficiently to clear the benchwork. Figure 8 shows the counterbalanced bridge configuration, bent rod and all. In the raised position, the bridge balanced – but just barely. Finally, in order to achieve reliable operation, I added two 10 pound (force) gas springs to impart an additional lifting force. I configured the gas spring bracket geometry shown in Figure 9 experimentally to obtain an adequate additional lifting force on the raised bridge without causing an excessive lift in the lowered position which would prevent closure. With everything in position, a very minor adjustment of the weight on its threaded rod resulted in ideal operation with both fully reliable support and positive closure. I procured the gas springs from McMaster-Carr (their catalog no. 4155T7). I obtained the weights from my local telescope store complete with 1⁄2" central holes and thumbscrews. The rods are 1⁄2"-13 threaded stainless steel with black PVC sleeving for appearance. The rod bracket is homemade. Photographs 8A, 8B, and 8C depict the finished bridge structure.

The electrical portions of the bridge setup (electromagnets, indicator lights and alarm system) are all 12 volts dc and are powered by a small 1.5 amp plug-in adapter from



Access bridge in lowered position.

Raised access bridge.

Bridge airsprings and counterweights.

Radio Shack. The circuits are shown in Figures 10 and 11. The system is activated by a microswitch as the bridge is closed. Two 12 volt electromagnets (P/N 70A0004 from Adams Magnetic Products) are mounted in the bridge seat (see Figure 10 and photo 10A) and are energized when the bridge is closed. This provides an additional downward force of about 16 pounds to secure the closed position. The bridge can be raised by first depressing one of the release buttons on either side of the bridge (see again Figure 10 and photo 10A). Green light-emitting diodes (LED's) mounted in the small signal stand adjacent to the track indicate the safe/locked position of the lowered bridge. Red LED's signal that the bridge is not in its locked down position.

I found the simple alarm circuit shown in Figure 11 on the Internet. A 555 integrated circuit (IC) is used here as a timer. This is a small 8-pin chip which should be mounted in a mating socket when constructing the circuit. You will need a finely pointed tip for your soldering iron, since some of the wiring connections will be very small. With

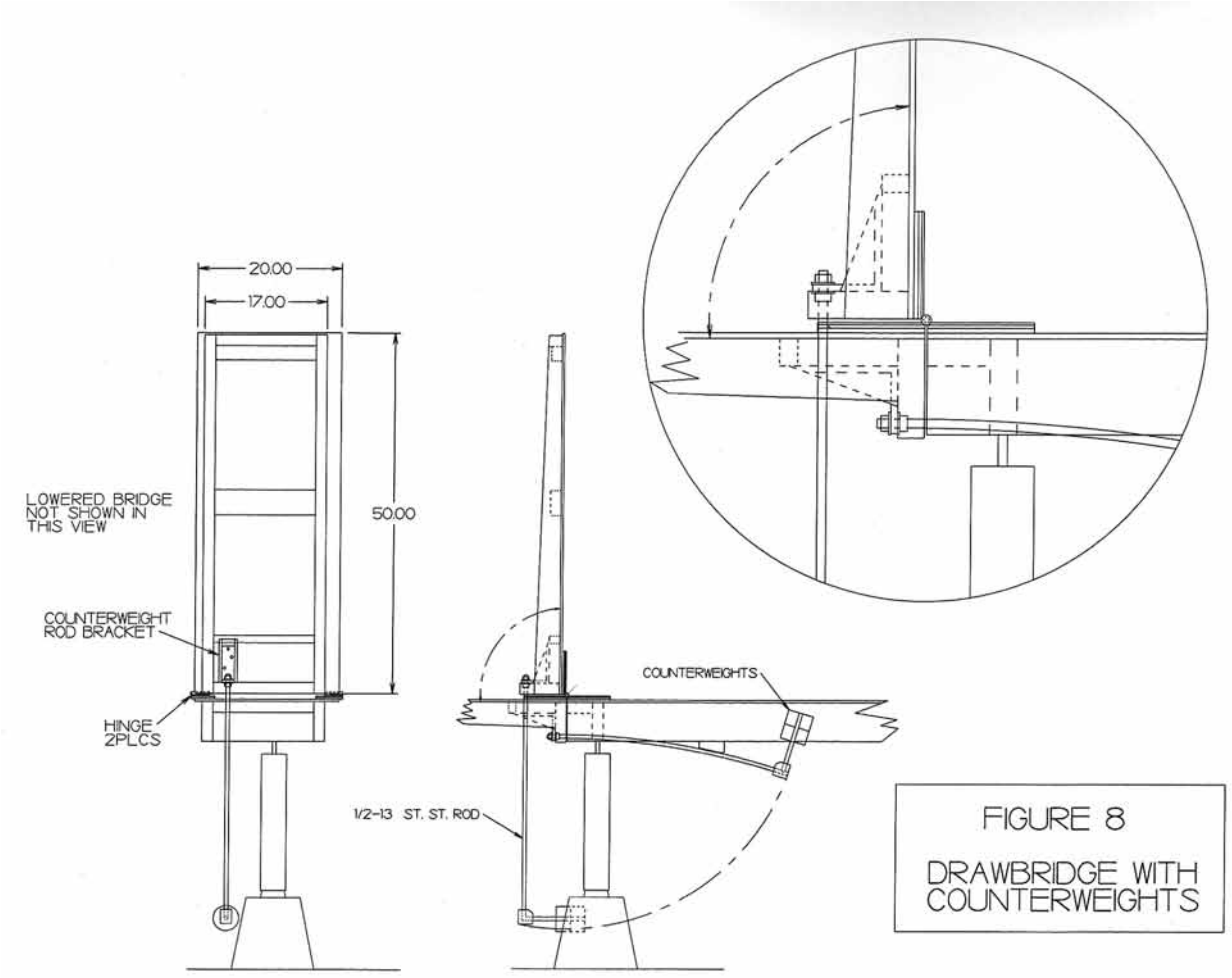


FIGURE 8

DRAWBRIDGE WITH COUNTERWEIGHTS

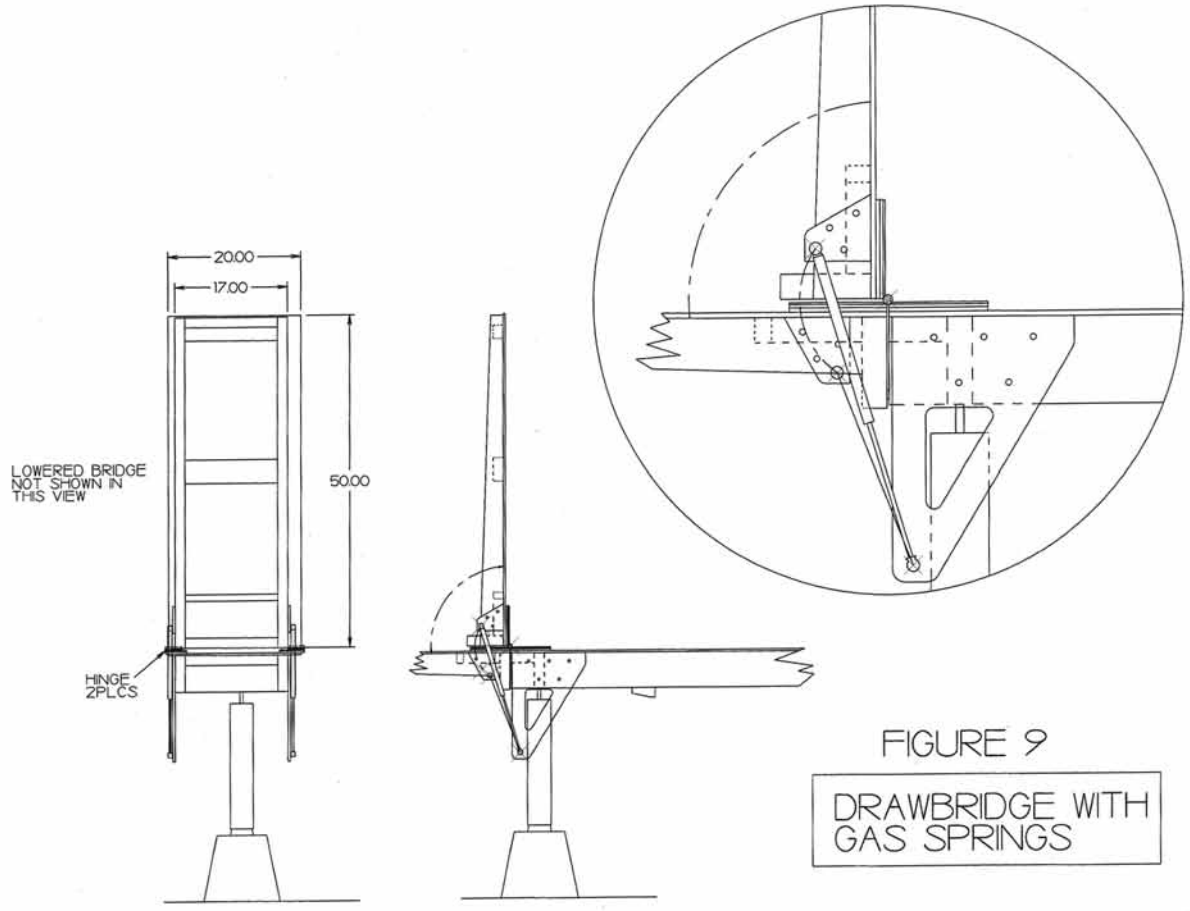


FIGURE 9

DRAWBRIDGE WITH GAS SPRINGS

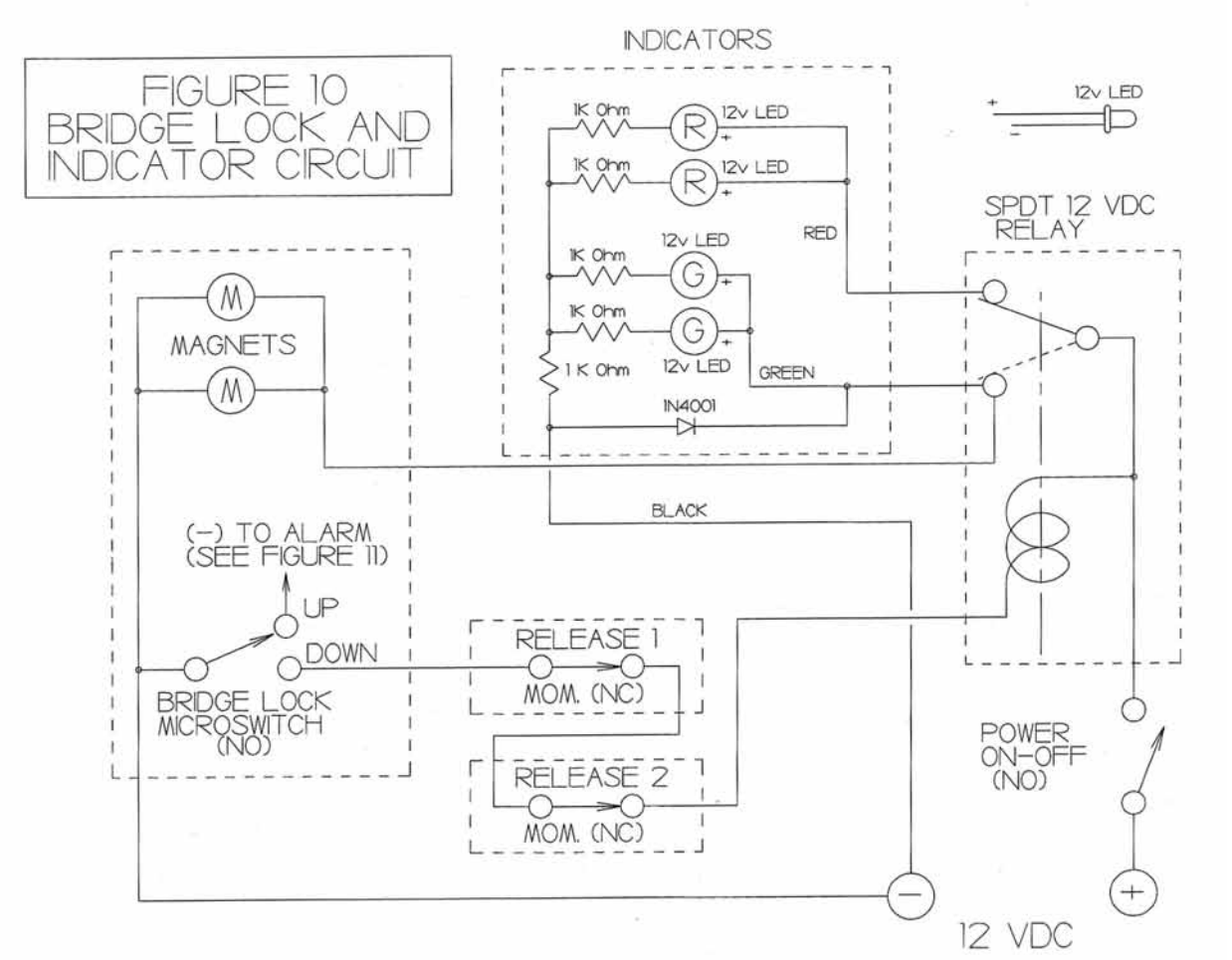
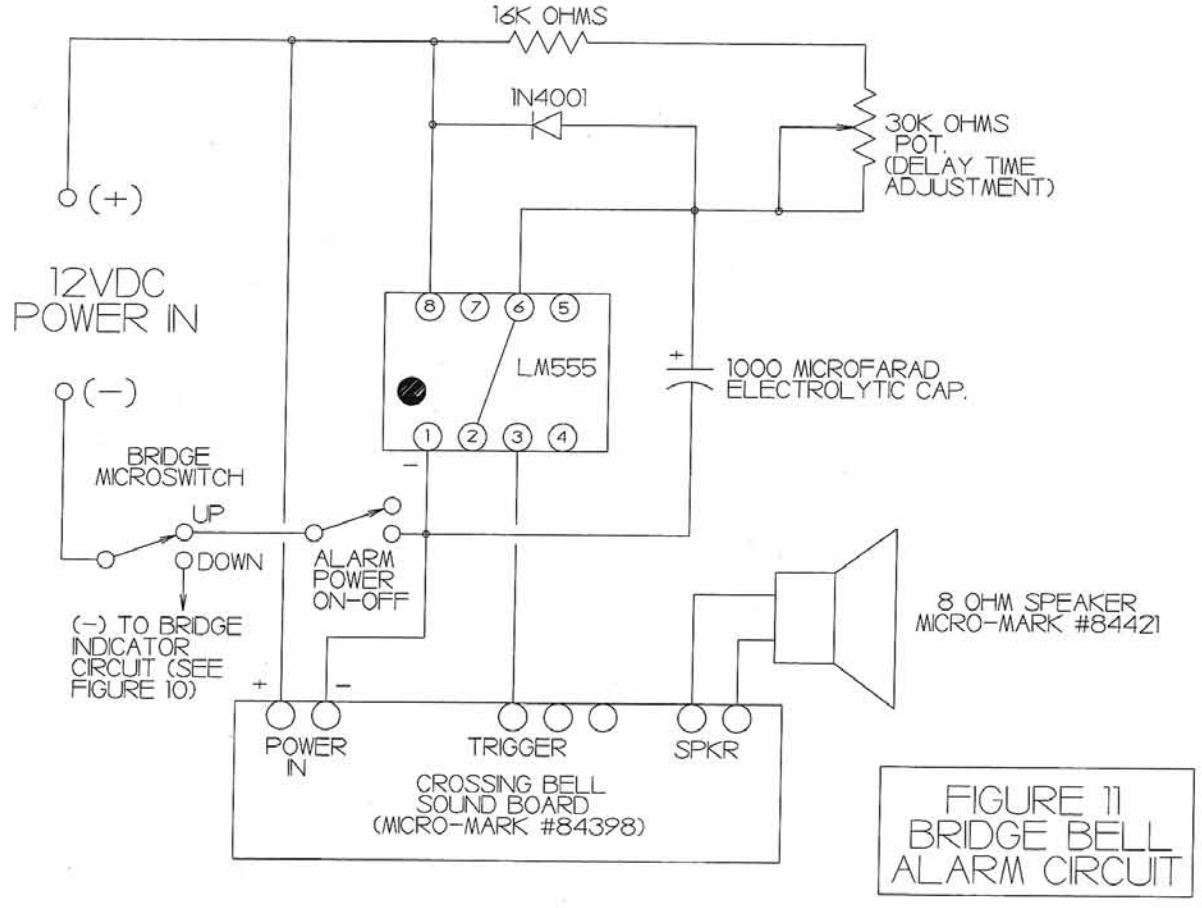


FIGURE 10
BRIDGE LOCK AND
INDICATOR CIRCUIT
INDICATORS
1K Ohm
12v LED
R
1K Ohm
12v LED
R
RED
12v LED
1K Ohm
G
1K Ohm
G
1 K Ohm
12v LED
GREEN
IN4001
12v LED
SPDT 12 VDC
RELAY
M
MAGNETS
M
BLACK
(-) TO ALARM
(SEE FIGURE 11)
UP
DOWN
BRIDGE LOCK
MICROSWITCH
(NO)
RELEASE 1
MOM. (NC)
RELEASE 2
MOM. (NC)
POWER
ON-OFF
(NO)
12 VDC


16K OHMS
1N4001
30K OHMS
POT.
(DELAY TIME
ADJUSTMENT)
(+)
12VDC
POWER IN
(-)
8 7 6 5
LM555
1 2 3 4
1000 MICROFARAD
ELECTROLYTIC CAP.
BRIDGE
MICROSWITCH
UP
DOWN
ALARM
POWER
ON-OFF
(-) TO BRIDGE
INDICATOR
CIRCUIT (SEE
FIGURE 10)
8 OHM SPEAKER
MICRO-MARK #84421
POWER
IN
TRIGGER
SPKR
CROSSING BELL
SOUND BOARD
(MICRO-MARK #84398)
FIGURE 11
BRIDGE BELL
ALARM CIRCUIT

the resistor and capacitor values shown, I am able to obtain alarm delays of from 18 seconds to 75 seconds. I obtained the circuit components from my local electronics store and a Radio Shack outlet. I mounted the speaker in a small plastic enclosure from Radio Shack to protect it from the weather and to slightly improve the sound quality. The speaker unit is removable and attaches to one of the bridge support posts with a Velcro pad. With the volume turned all the way up on the sound board, the small speaker may be heard easily from anywhere in the yard without making the neighbors complain (so far!). I am sure that many of you didn't sign up for all this electrical work and may have to enlist the help of a friend, but if you use or plan to use a lift bridge, these safeguards will make your steamups more relaxed and you will be able to sleep at night.

The bridge hinges are mounted on plate aluminum riser pads which raise the hinge axis above the rail head (as required to avoid jamming the rails together during operation). The hinges were carefully selected to insure a minimum of play and axial movement in order to maintain track alignment. As an extra precaution, to insure alignment, a slotted fixture mounted to the free end of the bridge engages an alignment pin on closure. This pin may be seen at the right end of the bridge seat in photo 10A. The result has been consistent, excellent rail alignment during more than a year of operation.

Lighting

I mounted small 12 volt ac, 11-watt, yard lights around the inside perimeter of the railroad which provide a gentle illumination for safety in the yard at night.

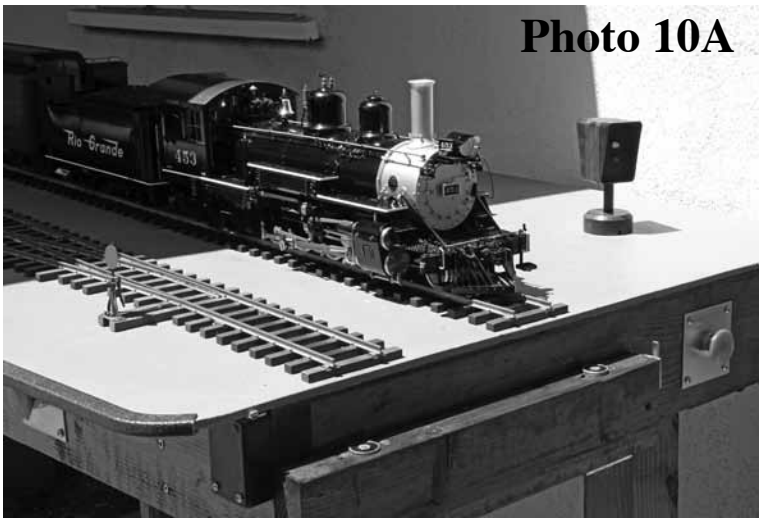
Maintenance

Leaves, dust, bird poop, and steam oil accumulate slowly on the railroad. Every couple of months I use a sponge and a spray bottle of 409™ general purpose cleaner and clean things up. Then, using a hose, I spray off the platform residue and let it dry – this seems to work just fine. Although the trees provide welcome shade while operating, they also necessitate more frequent cleanup in the Fall. I am configuring vinyl track covers for areas under the trees to ease preparation for steaming. Twice annually I will recoat the wood structure as needed but the platform serves to protect this from the sun and weather. Periodically, I oil the bridge hinges. I checked the leveling of the railroad recently using a water level and the whole thing appears rock-stable so far. Earthquake "compensation" may be a future challenge, but we shall see.

Future Plans

Our grand plan for the future includes covering the block wall along the south side of the railroad with small-leaf Creeping Fig and landscaping the yard. Since we are periodically under mandatory water rationing, that may have to wait a bit. Buildings such as a station, water tank, coaling tower and store fronts will eventually grace the area by the garage.

Looking back, I can see the effect that planning and building the railroad has had on my life. It started small - with a dream and a pencil and a piece of paper and ideas gleaned from local steamups, and of course periodically the arrival of Steam in the Garden to fan the flames. I dreamed and doodled for years in rare quiet moments while family and work and other cares were given their deserved priorities. Then, slowly, the dream became a plan with decisions and tradeoffs to be made. When I could afford the time I took CAD/CAM night classes and started the drawing package. I put in a small machine shop. That beginning dream led in unexpected but rewarding directions – new skills, new interests, and lots of new (very nice) friends! What an adventure!



Bridge seat with electromagnets and alignment pin. (release button and signal also shown)

Please feel free to forward any comments or questions to my e-mail address at: ltlsteamer@roadrunner.com . I will enjoy responding as time permits.

The Nuts and Bolts of Shays Trucks for S/N 2800 "Mapleton"

By Dan Rowe

A lot of the truck parts shown in the last issue on the Dulong trucks are also used for the Mapleton trucks. The two main differences are the Mapleton had steel bolsters instead of wood, and the right truck box has been redesigned for gear #23. I have included almost all of the drawing notes for this article so the truck can be built with the same parts in several popular gauges.

It was common practice at the Lima Locomotive Works to have several alterations to parts with a dimension table. Up to this point, I have drawn the version of the part needed for the project. In this set of drawings I modified the drawings to show the part needed, but I added the tables so the drawings can be used for the different gauge combinations. It is common to see CD on Lima drawings; this is not part of the drawing number, it is short hand for "card" which is how it is used in these articles.

I did not find a Lima record that indicates truck plan 16033 was the correct plan. Plan 16033 does have a line for 2' gauge so I used it to assemble the first draft of the truck shown in issue #100. The distance between the arch bars is column A. On CD 16033 for 2' gauge this distance is 36 7/8". The detail drawings for the cross bars, diagonal bars, and bolster plates all indicate the distance is 36 1⁄2". Well, here's the rub--the wheel fit for axle #49 sets the wheel hub back to back distance at 31 1⁄2" and the arch bar distance sets the back to back of the truck box and pedestal at 31 3/8". In other words: it does not fit. I have found other mistakes in the drawings and have speculated on how this might have been resolved on the shop floor.

I have not mentioned one of the notes on the drawings because it is a tool reference; these are drilling jigs, gauges, mandrels or any other type of special tooling. None of the tooling drawings survived so I have never mentioned the R.T. numbers before. I know the drilling jig for the truck box R.T. 2725 is listed on all the versions, so the parts were interchangeable. I think the arch bar drilling jig might have been made with the holes for the truck box and pedestal shifted 1/16" to solve the problem.

The new columns for the steel bolsters CD 9420 still have the same inside brake rigging and the lower section bolts to the bottom bolster channels. The springs are between the bottom bolster channels. This space is limited on the 2' gauge channels, and only 8 springs will fit instead of the usual 10 springs per truck. The springs are only listed as 3⁄4" x 31⁄2" x 6". Stronger springs must have been made for the 2' versions of this truck.

The difference in the truck box CD 9262 is slight and the same bearings and cover are used for the new design. The only visual change in the truck box is the upper section of the vertical ribs where the gear cover support bar is bolted. The new design does not stick out and it is a bit wider at the top for the bolts. The note on the side ribs is interesting because it states to tap 5/8" for steel gear covers and to drill only when special ordered. The builders photo of the Mapleton in issue #100 shows full gear covers in place. The drawing card index on the truck box line states "Drill and Tap for Gear Covers".

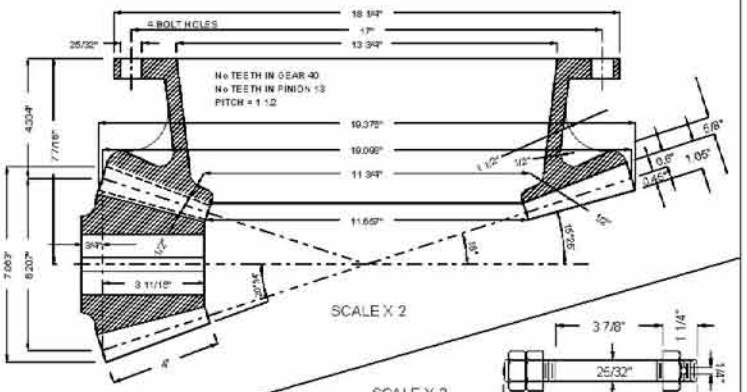
There is another note on the drawing card index for S/N 2800 on the bottom tie bar line "R. Bottom Tie Bar Drilled for Gear Covers". The drawing used for the arch and tie bars, CD 9772, has two versions of the right bottom tie bar. I chose the one with an extra set of holes with a note stating "For Steel Gear Covers Drill Only when Specially Ordered." I have checked all the Lima records for this Shay plan and the Mapleton is the only one that has notes for special gear covers.

I drew the diagonal braces and cross tie bars on CD 9785 to line 7. S/N 2800 has a note on the diagonal brace bar CD A-9780. The note is a simple "#2800" but this indicates that S/N 2800 was the first loco to use the drawing. The top cross tie bar on CD 9785 has a note for the new drilling pattern. There is another note on the drawing card index regarding the center plate. It states to cut the sides of the plate down 1⁄2" to clear the side bearings and to use pattern 9701 in the future. I cut center plate pattern 6975 down to fit. There is a note to change the center plate hole spacing after S/N 2800 on CD A-9513.

The tire for the Mapleton is interesting as it has only 2 simple radii for the flange, not the more complex system used in the US. The wheel center cross section CD 9935 is very slightly different. The side view is the same as shown on CD 9982 last issue. The flange to hub distance is listed in the table on CD 9785. This dimension is also on the end supplement plan drawings.

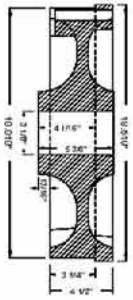
The next issue will have Plan 1553 end supplemental drawings for 2', 3' and standard gauges.

8803 GEAR # 23

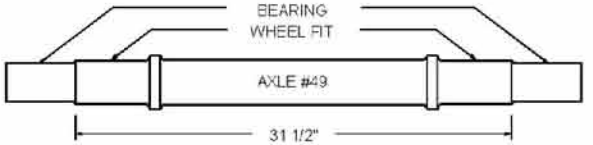


8818 GEAR BOLTS

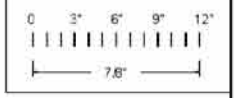
9935
WHEEL
CENTER

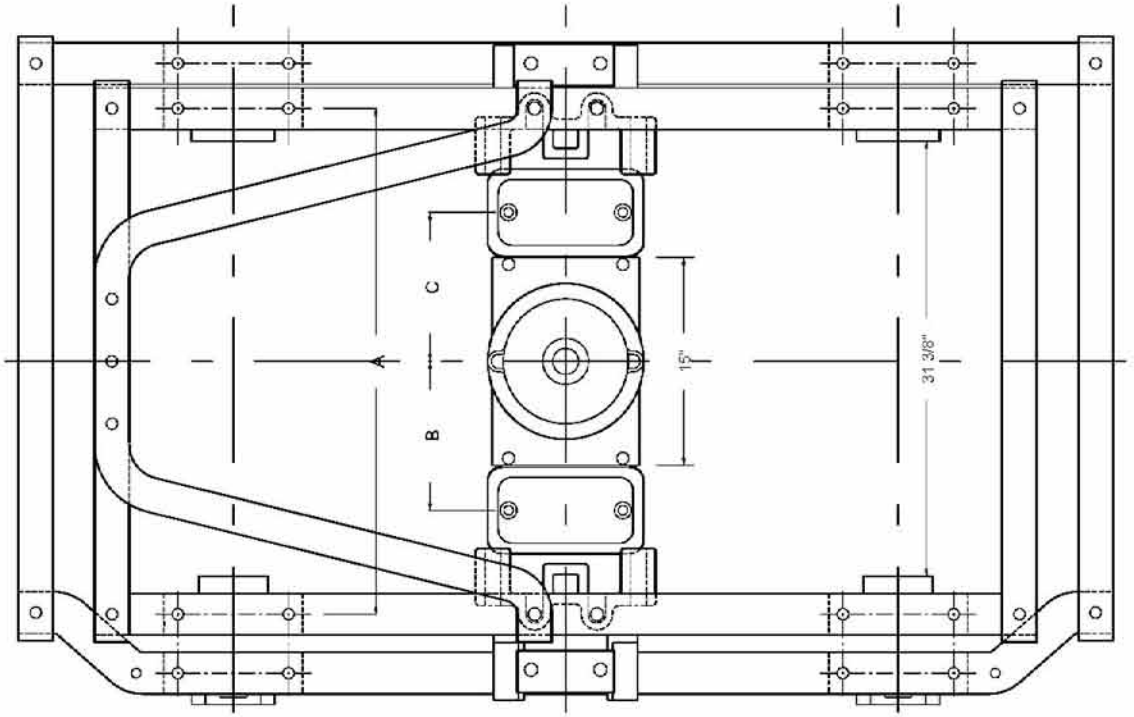


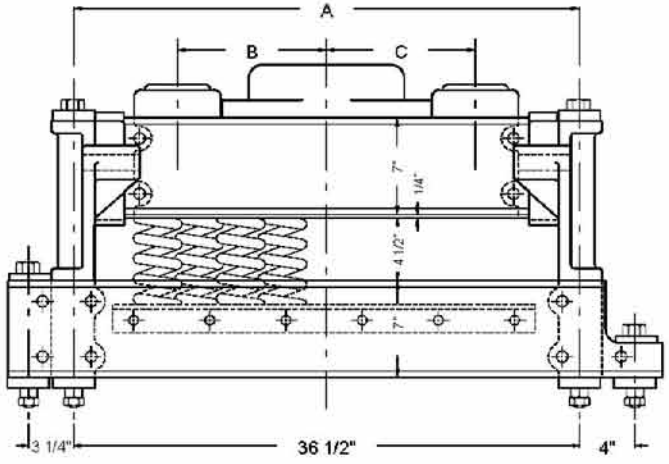
LINE	GAGE	A	B	C
1	56 1/2	69 3/8	16	16
2	24	36 7/8	10 3/4	10 3/4
3	36	48 7/8	16	16
4	30	42 7/8	12	12
5	39 3/8	42 7/8	16	16

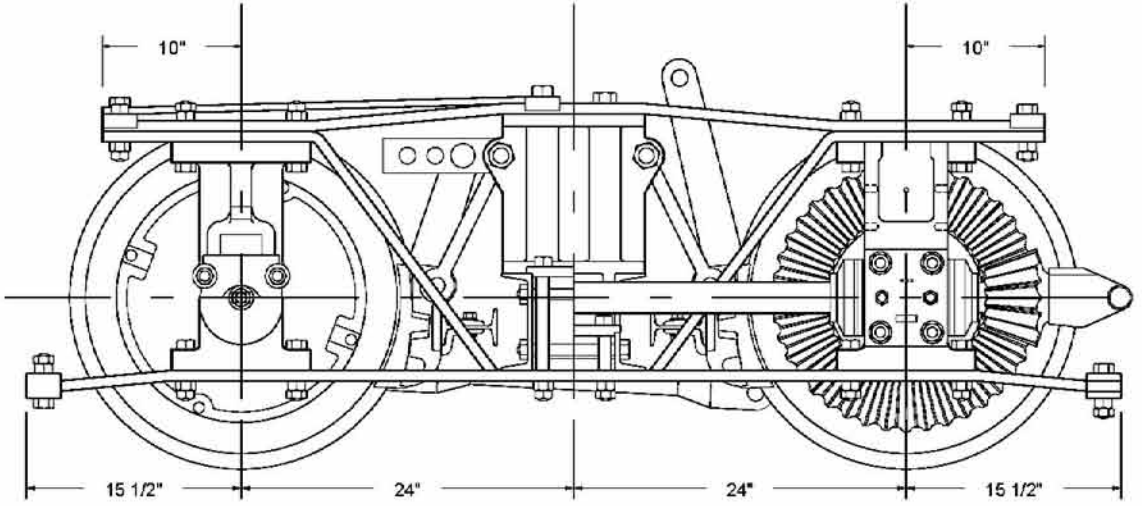


SCALE 7/8"=1'

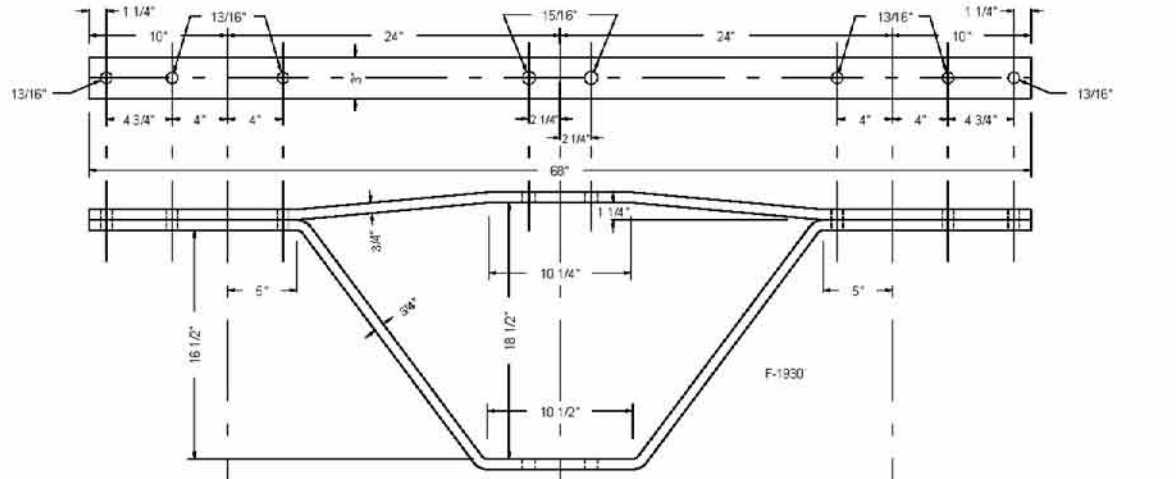


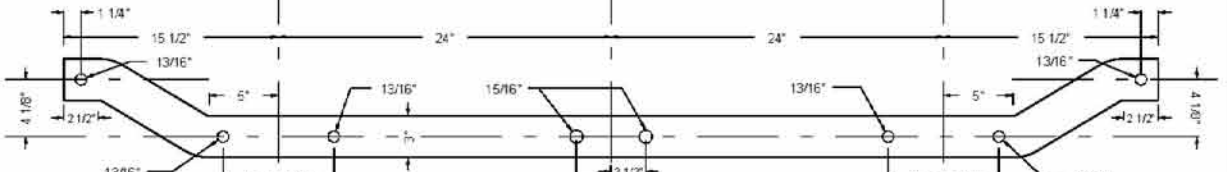


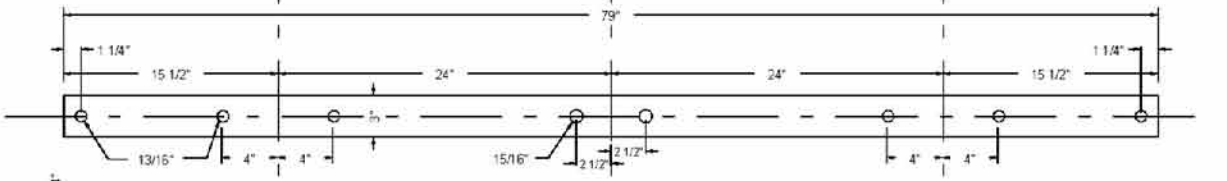


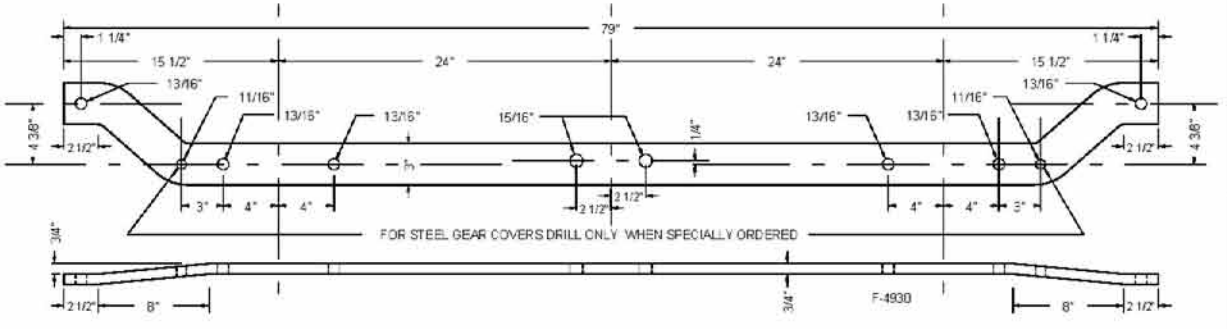


16033 TRUCK PLAN 2-6"x10" LOCO REDRAWN FOR S/N 2800

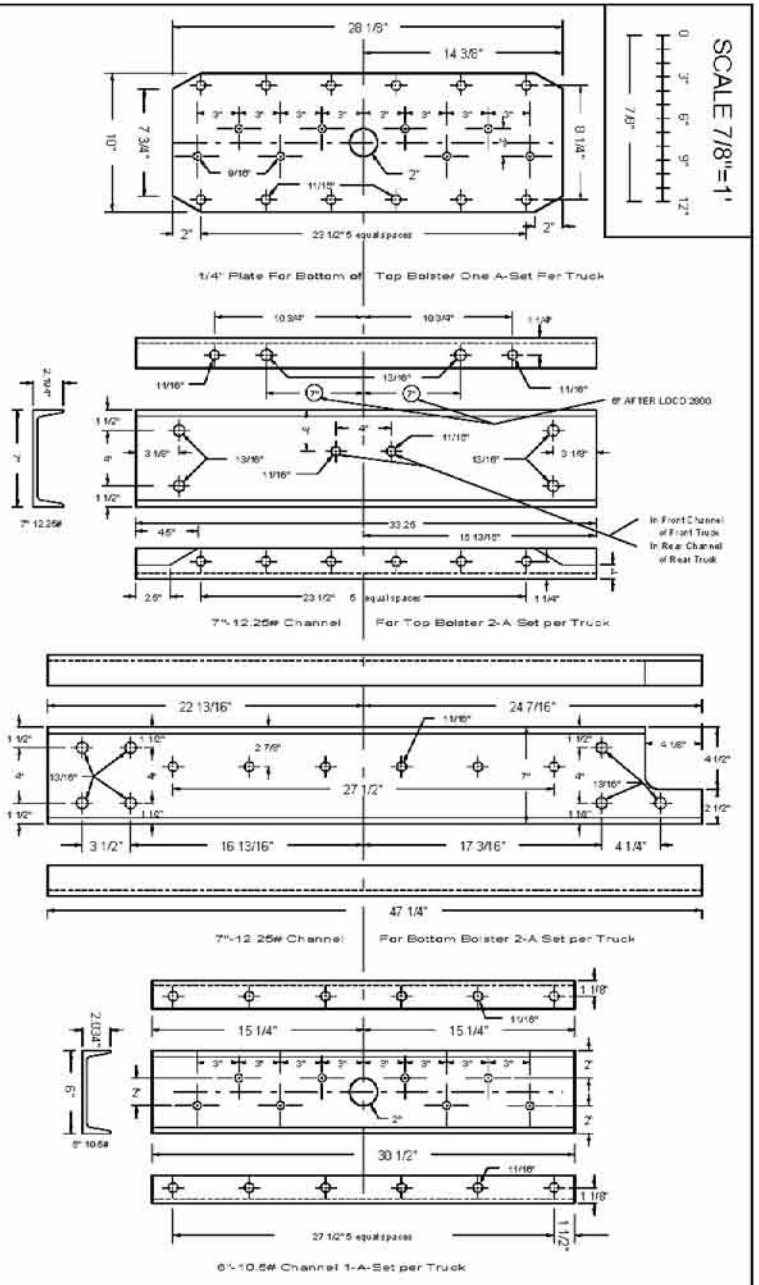




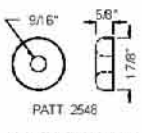




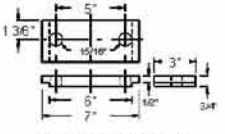
9772 ARCH & TIE BARS



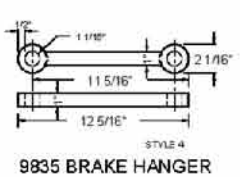
A-9513 TRUCK BOLSTERS & PLATES



SPRING CENTER
A-9548 SCALE X 2

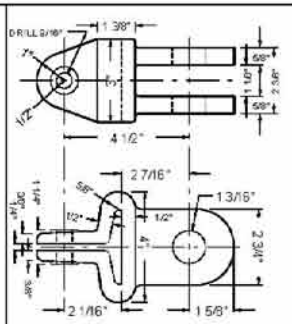


9534 BOLSTER &
TIE BAR WASHER

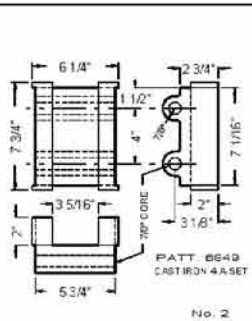


9835 BRAKE HANGER

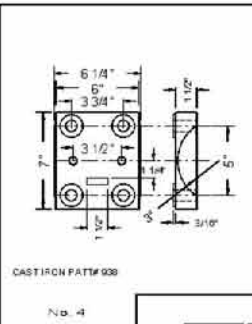
LINE	GAGE	HUB TO FLANGE	A	B	C	D	E
1	56 1/2	4 1/4	69 3/8	72 3/8	72 1/2	75 1/2	
2	36	4 1/4	48 7/8	51 7/8	52	55	
3	56 1/2	7 1/2	75 5/8	78 5/8	78 3/4	81 3/4	
4	23 5/8	7 1/4	32 1/2	35 1/2	39 5/8	42 5/8	
5	36	5 3/8	50 7/8	53 7/8	54	57	
6	30	4 1/4	42 7/8	45 7/8	46	49	
7	23 5/8	4 1/16	36 1/2	39 1/2	39 5/8	42 5/8	



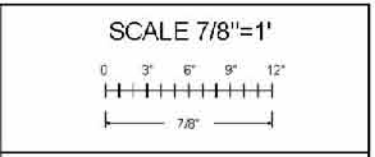
9846 SCALE X 2
BRAKE BEAM FULCRUM

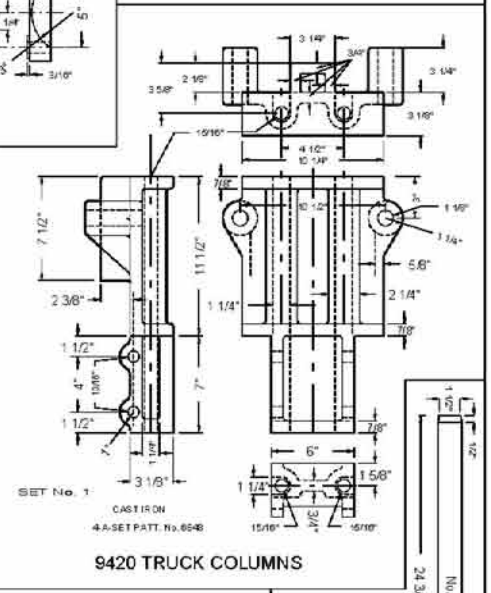


9414 TRUCK BOLSTER
END SEPARATOR

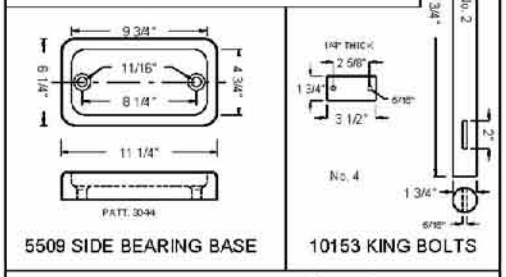


9255 TRUCK
BOX CAP





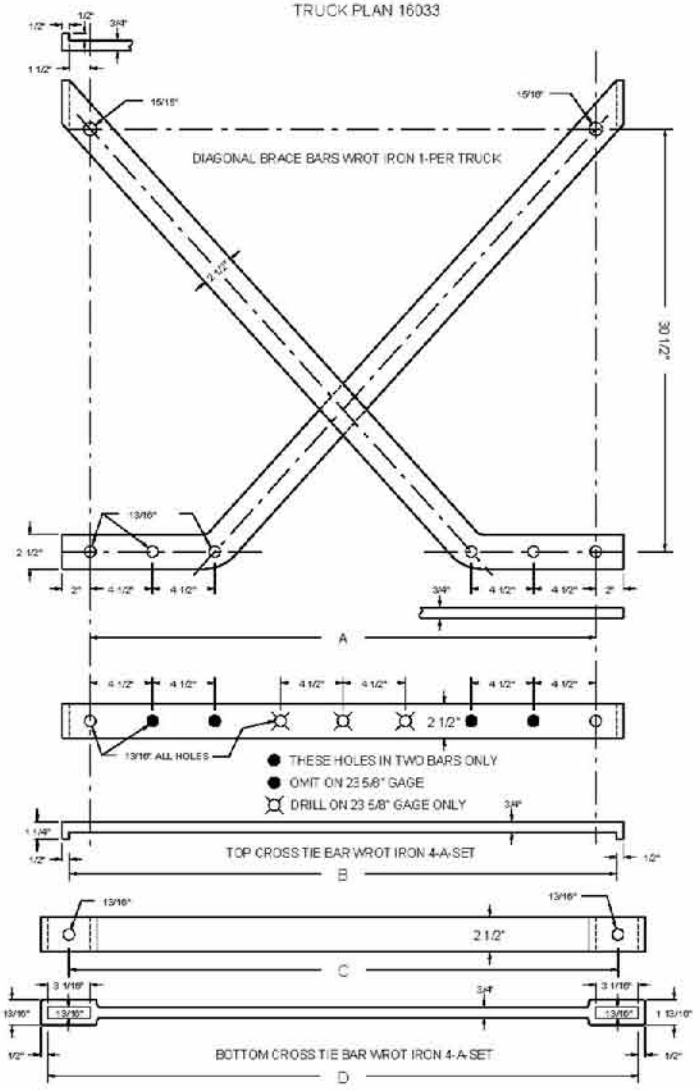
9420 TRUCK COLUMNS



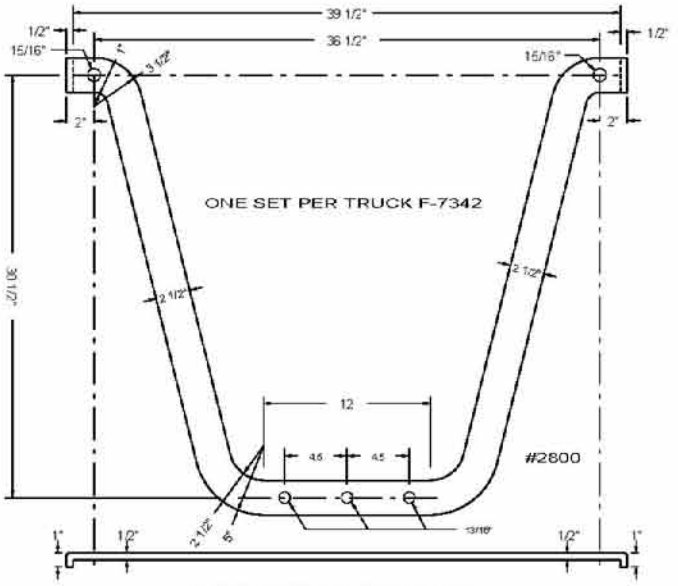
5509 SIDE BEARING BASE

10153 KING BOLTS

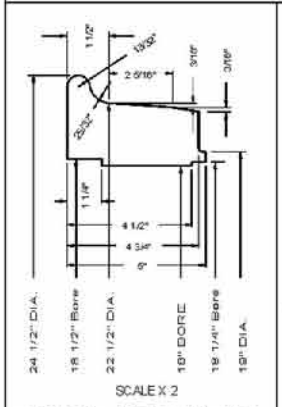
TRUCK PLAN 16033



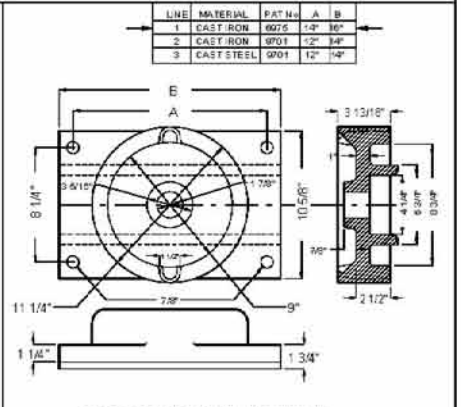
9785 DIAGONAL BRACES & CROSS TIE BARS



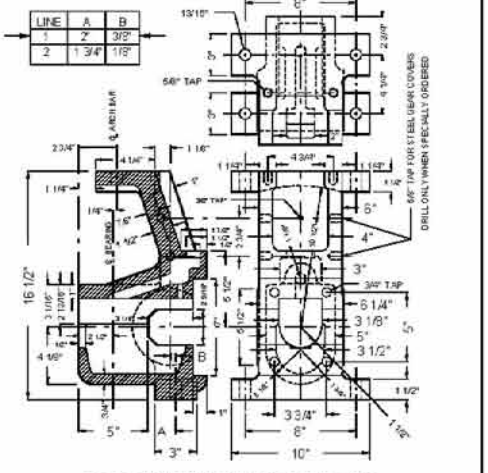
A-9780 DIAGONAL BRACE BAR



A-9978 No. 107 STEEL TIRE



9634 TRUCK CENTER PLATE



9262 TRUCK BOX FOR GEAR #23

Workshop Project

Building a Steam Powered Model-T Rail Truck Part 2

By Howard Maculsay

A 1925 Tin-Lizzy should have been so lucky

Now, "Let there be Fire"

For an initial burner test, I took the coupled butane tank, feed hose w/jet, and burner to see how the burner and gas flow controls performed. Like most needle valves, it has a very small range between all-on and all-off. I was also going to have to make bracketing to hold the spring-loaded-off valve in an "on" position when running.

The General Arrangement Drawing

So now that I have the steam component assembly dimensions understood I set out to make a General Arrangement Drawing with the goal to answer the question; "will it all fit"? The small steam motor, boiler, and butane tank will fit into the Model-T truck design with only a quarter inch here, quarter inch there added...for an overall extension of 3/4" in total length, and 3/8" added to the width. The planned model will be 10 1⁄2" long, 4 3/8" wide.

The Under-Carriage/Frame

The basic under-carriage was made from .032" thick brass plate and 1⁄2" x 21/64" oak for the 2 truck bed beams. Along the length of the brass under-carriage at the widest part, the outer 1⁄4" has a 90 degree downward bend for strength. I used my sheet metal brake to make this bend.

I decided early-on that because the steam motor was so small I had better use ball bearings on the axles to keep friction in the drive train to a minimum. The drive wheels [rear] will have external ball bearing journals to minimize friction. The front wheels will also have ball bearings, but the journals will be on the inside of the frame. At this point, I decided to make a 3-D general under-carriage drawing using Google's SketchUp. I had yet to decide on what rear journals to use, since they had to have enough meat around the axle to accept the small ball bearings. So for now I just drew in a simple block journal. The motor support is shown as an integral part of the frame.

The Insulation Layer & Cab/Hood Connector

I decided I had to add a 1/8" layer under the cab/hood/boiler to facilitate raising the deck beams to help clear the rear wheels. To kill 2-birds-with-1-stone, the layer is high heat circuit card material (Garolite G 10-FR4)...hence an insulation layer between burner/boiler and the rest of the brass undercarriage. Additionally, the cab & hood will be made to be connected together so that it'll lift off the under-carriage in one piece.

The middle picture on page #40 shows the insulation layer mounted to the brass undercarriage using three 2-56 screws which also attach the boiler. Each of the oak deck beams are attached to the 1/8" thick insulation layer by 2-56 NBWs. The deck's oak crossbeam is escutcheon pinned and CA'd.

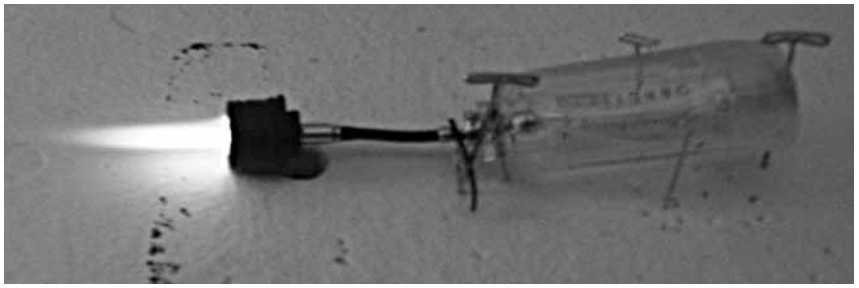
At the front of this .015" thick brass base connector is a piece bent 90 degrees vertical and shaped to fit the back-side of the radiator casting.

The bottom picture on page #40 shows the wood cab floor positioned to be attached to the brass cab/hood base connector along with the front hood support soldered to the backside of the vertical radiator backing.

At this point I went on to work out some of the initial planning for the Front Pivot Bolster Journals & Wheels, Rear Journals & wheels, and their interfaces with the brass under-carriage and the hardwood truck bed beams, basically enough planning to figure out sizing to get my ball bearings ordered..

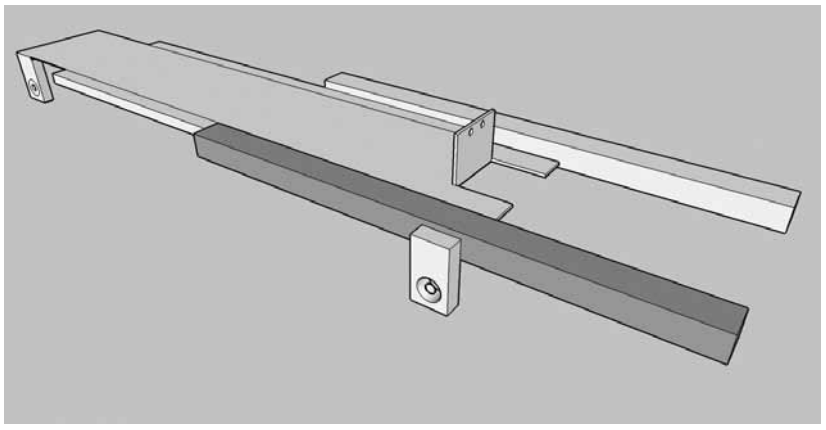
I found miniature 2.5mm I.D. x 6mm O.D. ball bearings from www.bocabearings.com and got them on order. I also ordered the 2.5mm & 6mm drill bits & reamer for making a snug home for the bearings in my journals and for drilling the wheel hubs for the 2.5mm axles. At this point, in an evolving design, I planned on using modified "Ozark Miniatures" fully sprung Journals, part #1010, but it would take quite a bit of modification to accept bearings. Then at the June 2008 Big Train Show in Ontario, CA. I picked up alternate rear journals from Ozark Miniatures. The replacement journals are Ozark's Coil Spring Braced Journals, part# 1011. These new journals have a larger surface surrounding the axle hole; enough to allow for counter-drilling a hole to accept the 6mm O.D. ball bearings.

I decided on 12-spoke wheels to match the wood-spoke wheels of the prototype Model-T and with an outside

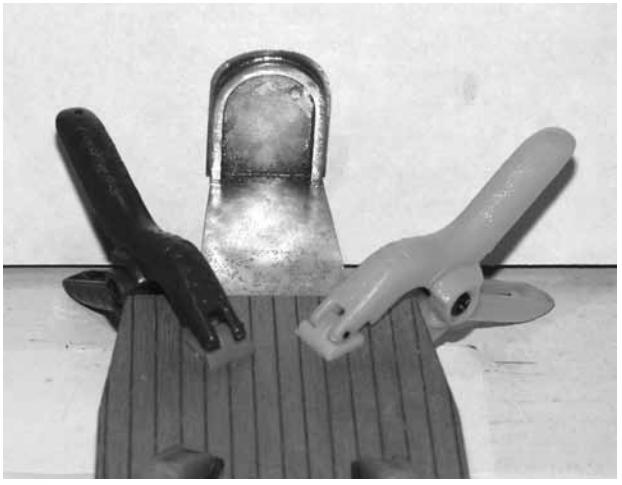


Burner Test

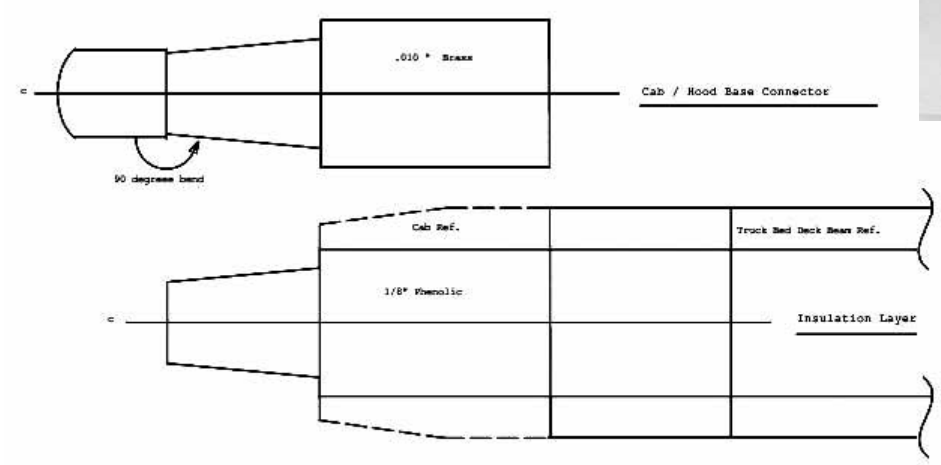
Boiler, burner and butane tank assembly.



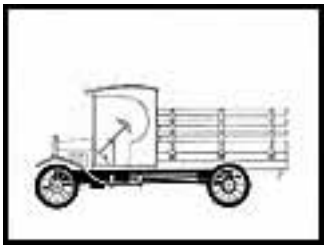
Under-Carriage & Bed Frame Beams



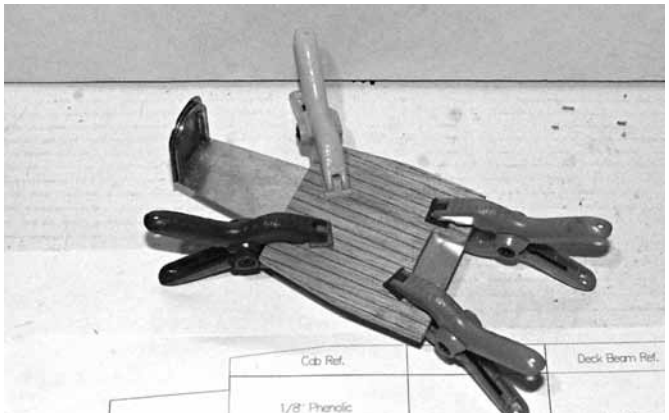
Front Hood Support



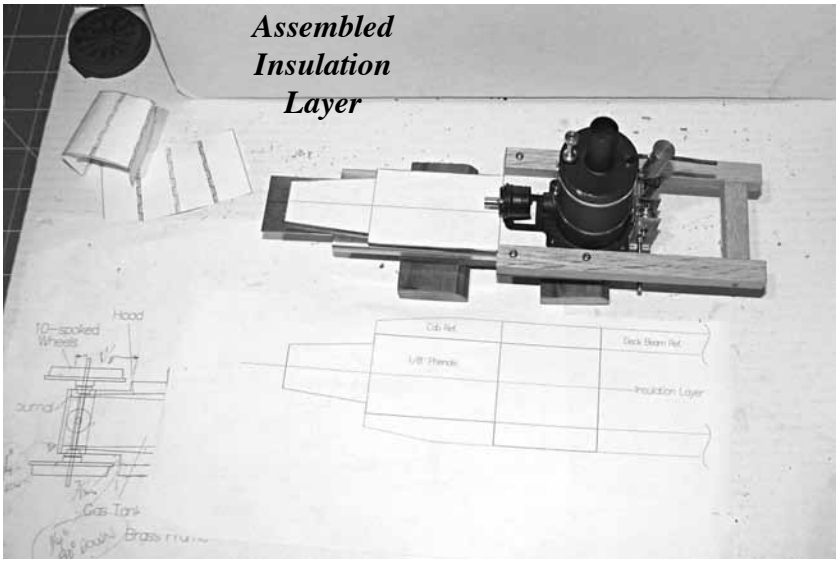
Cab/Hood Base & Insulation Layer

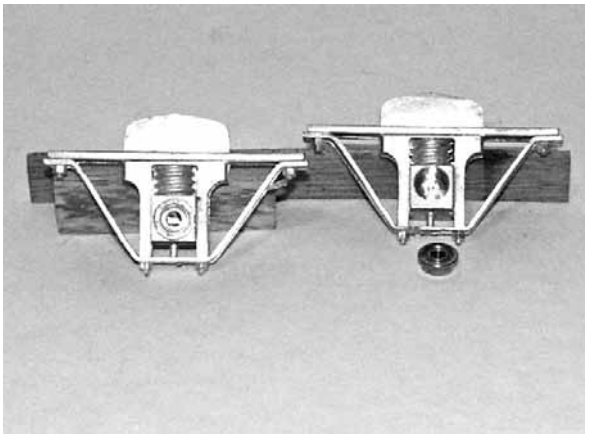


Assembled Insulation Layer



Cab Hood Attachment



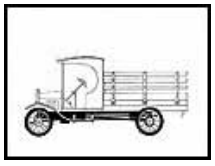


Modified Coil Spring Braced Journals

flange diameter of 1.563"

The Tin Lizzy kit arrived from NE Model Products, so I'll be using the radiator, headlights and steering wheel castings. I got some wheel castings from Diana and Tom at Sulphur Springs. They aren't quite the size I wanted, but I'll be able to machine them to close to the size I want. They are cast iron.....this would be my first attempt at machining cast iron.

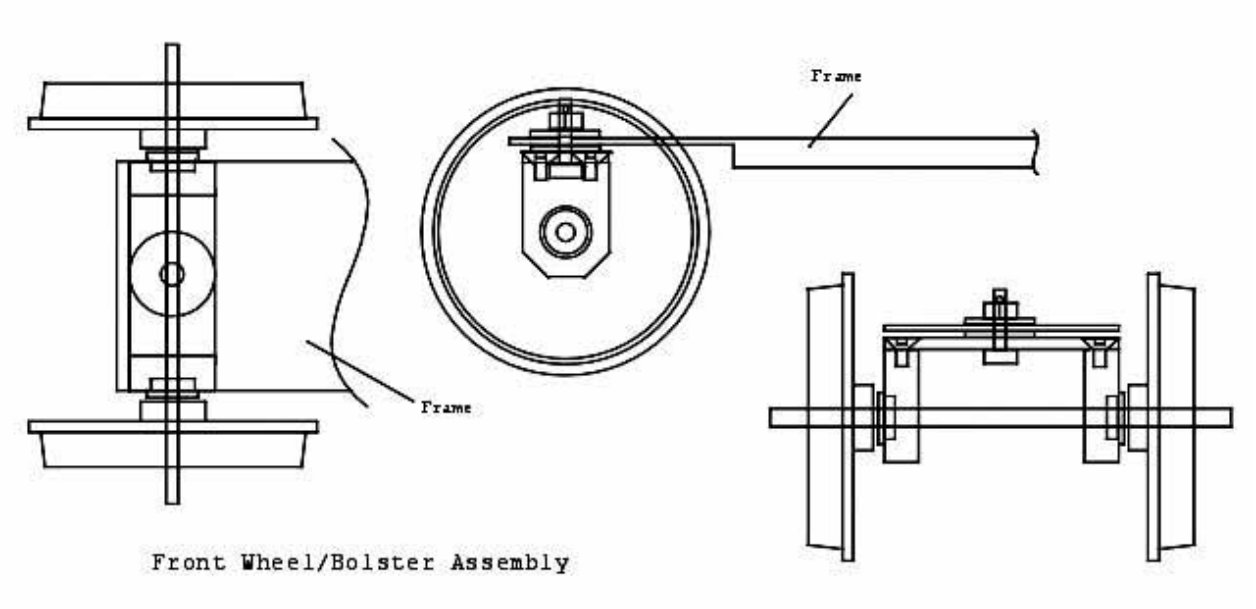
In the next issue, we'll move on to the Cab.



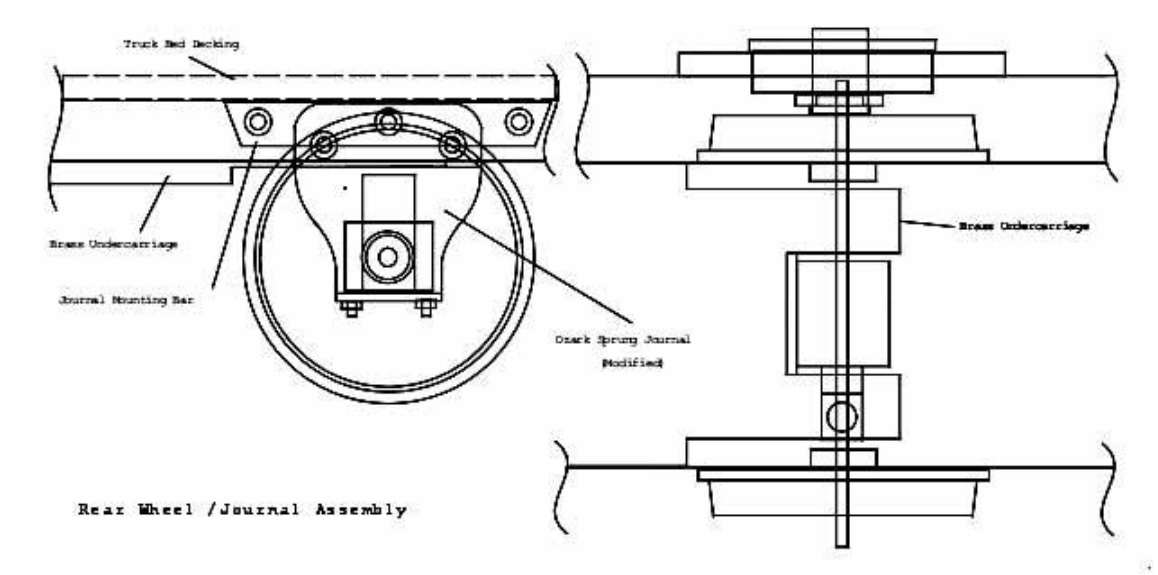
Cast Iron Wheel Castings

About the Author

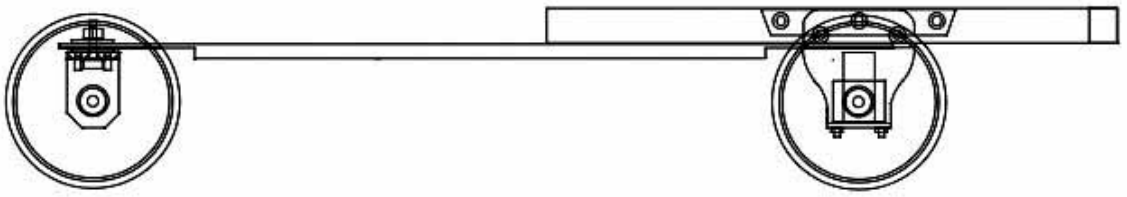
I, like many others, started in G-scale with the train running around the base of the Christmas tree. It still took years after our two sons grew up and out on their own to get any additional G scale locomotives and rolling stock. Still it was limited to static displays around the house. After I retired, I ran head long into the live steam topic after reading a copy of the magazine of the same name. Still I was only dreaming. Once I found the G scale forums on the internet, I was off to the races. The selfless sharing of expertise and ideas was most encouraging. I started, like others, with a Ruby kit, but was intrigued with bashing the kit. Many thanks go to folks like Vance Bass and Kevin O'Connor for getting me through my first live steam kit bash project. During this time I also acquired many back issues of SitG, trying to catch up with the hobby and to gain even more ideas and inspiration.



Front Pivot Bolster



Rear Bolster



Frame/Truck Bed Beams

My Modeling Environment and Methodology

I & my wonderful wife Gail, do most of our modeling/crafts together in our living room. We are always playing ideas and progress off of each other...being in close proximity just makes sense for us. My larger tools are out in the garage and my small Lathe & Mill share space in a utility room.

- **Disc Sander, Band Saw, Bench Grinder, Sheet Metal Brake**
- **Mini butane torch & other small hand tools**
- **Sherline Lathe & Mill**
- **CAD Software -eMachineShop.com, Google SketchUp**

Living Room Work Space & Friend

From my previous life in the Computer Software Development Industry, I used the credo, Plan, Plan, Plan, then Plan again. That has just carried over into my modeling. I've added computer aided design software from eMachineShop.com and Google SketchUp, to my bag of tools. I've learned to use card stock mock-ups to discover fit-check problems and to get a good perspective of how the model will look when completed. And being a novice machinist, I started out by writing out the setups and sequential machining steps to help me think through the process and to be sure of what I was doing. "Think Thrice, Measure Twice, Cut Nice" works well for me.

Mill & Lathe Setup

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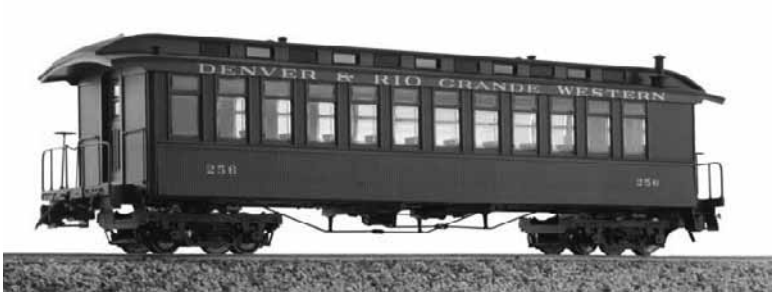

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END OF THE LINE

The Train Dept. announces that, due to a lack of interest and/or participation, the Shay Bashing contest has been cancelled. A new contest will be announced at some future date.

It's time to beg, plea and wheedle again...we need steamup reports, photos, articles, reviews, etc. Fill up my inbox and gladden this editor's flinty old heart!

Happy Steaming,

Ron

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NGT Models 45
NRRR Inc 5
North Jersey Gauge One Co 46
Ozark Miniatures 45
Reindeer Pass Railroad 4
RCS of New England 41
RC-Steamers.com 7
RLD Hobbies 21
Roundhouse Engineering Co. Ltd. 48
Schug, MBV 2
Silver State Trains 23
Southern Steam Trains 5
Steam in the Garden Back Issues 45
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Trackside Details 4
Train Department, The 22
Train-Li-USA 24
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