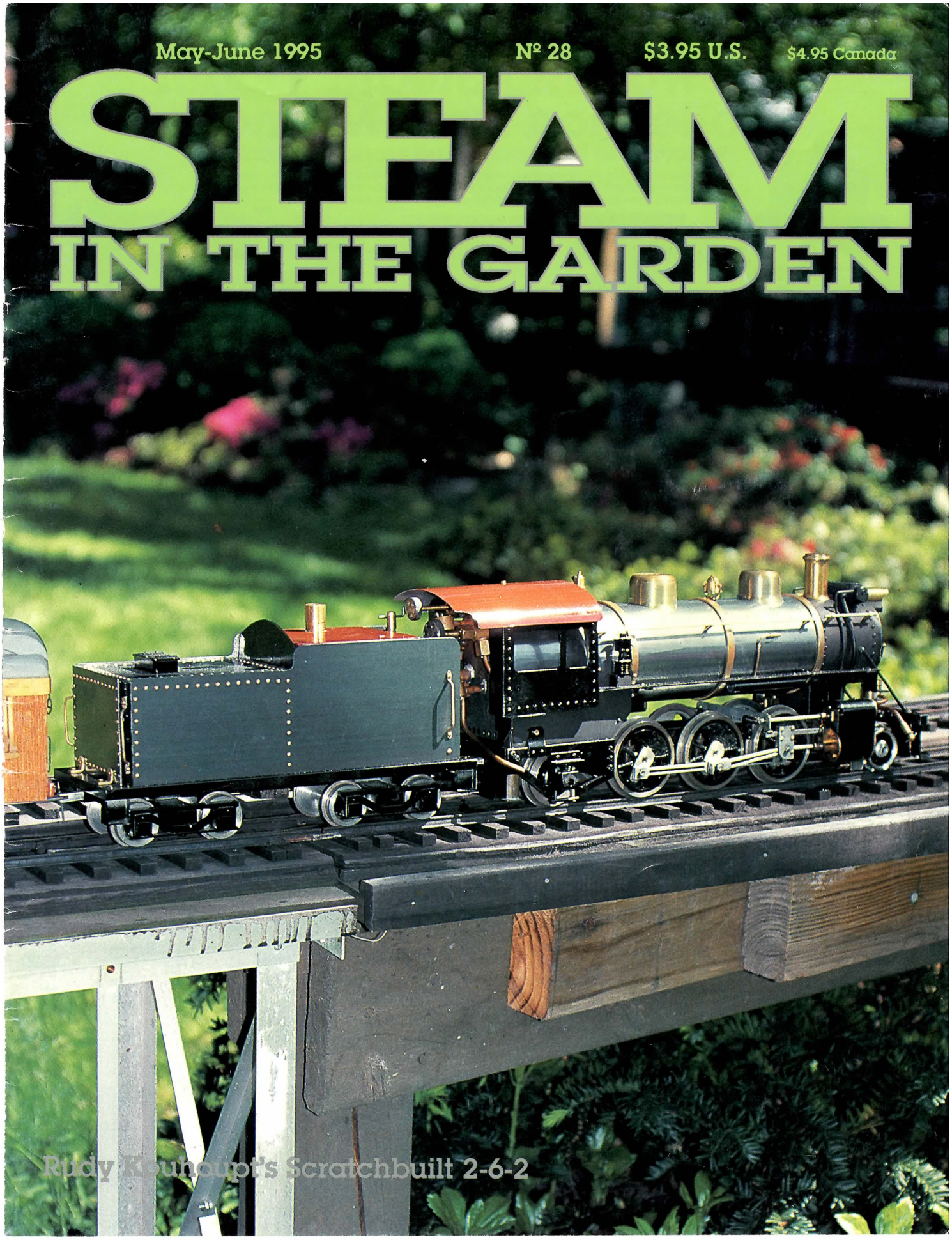
May-June 1995 Nº 28 $3.95 U.S. $4.95 Canada

STEAM IN THE GARDEN



Rudy Kouhaupt's Scratchbuilt 2-6-2

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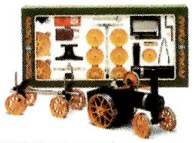
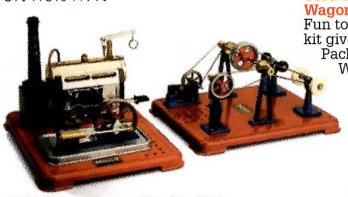
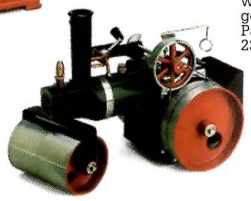


1400 Tractor and Wagon Kit TWK1
Fun to build and when built this kit gives hours of enjoyment.
Pack: 600×290×80mm. Gr. Wt. 2500g.
23⅝"×11½"×3⅛"

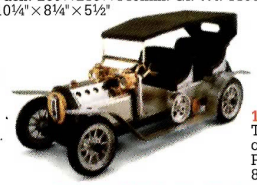


1334 Steam Power Engine SP4
Versatile unit capable of driving larger models.
Pack: 260×210×195mm. Gr. Wt. 1650g.
10¼"×8¼"×7⅝"

Accessory shown with SP4.
Quote reference 1336 WORKSHOP WS1.
Pack: 260×210×140mm. Gr. Wt. 1100g.
10¼"×8¼"×5½"



1312 Steam Roller SR1a
A Superbly realistic model of an early road roller.
Pack: 285×150×185mm. Gr. Wt. 1940g.
11¼"×5⅞"×7¼"

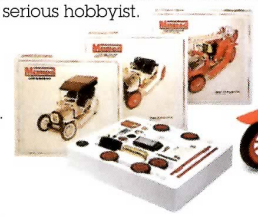


1403 Four-seater Limousine SA1L
This unique and realistic working model captures the realism of years gone by.
Pack: 475×195×240mm. Gr. Wt. 2750g.
8¾"×7⅝"×9½"

1405 Fire Engine Kit FE1K
This kit enables the user to build a fine example of an early Edwardian fire truck. Finished in typical bright red with brass and chrome trim.
Pack: 585×540×100mm. Gr. Wt. 3450g.
23"×21¼"×4

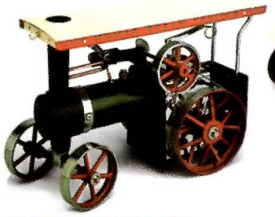
1406 Steam Roadster Kit SA1K
This kit enables the user to build a magnificent working model of a steam car which captures the elegance of the Edwardian era.
Pack: 585×540×100mm. Gr. Wt. 3050g.
23"×21¼"×4

1407 Four-seater Limousine SA1LK
This kit enables the user to build a unique and realistic working model which captures the realism of years gone by.
Pack: 585×540×100mm. Gr. Wt. 3455g.
23"×21¼"×4

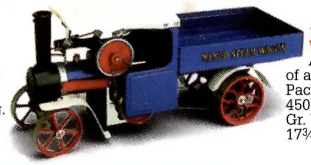


1404 Fire Engine FE1
Fine example of an early Edwardian Fire Truck. Finished in typical bright red with brass and chrome trim.
Pack: 490×185×250mm.
Gr. Wt. 2970g.
19¼"×7¼"×9⅞"

1319 Steam Roadster SA1
A magnificent working model of a steam car which captures the elegance of the Edwardian era.
Pack: 450×150×210mm.
Gr. Wt. 2450g.
17¾"×5⅞"×8¼"



1313 Traction Engine TE1a
Attractive working model of traditional English traction engine.
Pack: 285×150×185mm. Gr. Wt. 2000g.
11¼"×5⅞"×7¼"



1318 Steam Wagon SW1
A robust model of a steam wagon.
Pack:
450×180×210mm.
Gr. Wt. 3070g.
17¾"×7"×8¼"

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❑ SM	1312	$199.95	Steam Roller-SR1A
❑ SM	1313	$199.95	Traction Engine Steam Tractor-TE1A
❑ SM	1318	$299.95	Steam Wagon (Truck)-SW1
❑ SM	1319	$299.95	Steam Roadster-SA1
❑ SM	1403	$309.95	Steam Limousine-SA1L
❑ SM	1404	$324.95	Fire Engine-FE1
❑ SM	1400	$229.95	Traction Engine Kit
❑ SM	1405	$299.95	Fire Engine Kit-FE1K
❑ SM	1406	$249.95	Steam Roadster Kit-SA1K
❑ SM	1407	$279.95	Steam Limousine Kit-SA1LK
❑ SM	1350	$6.95	Single Pack of Solid Fuel Tablets (20 tablets per pack)-SF
❑ SM	1351A	$3.95	Bottle of Steam Oil

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STEAM IN THE GARDEN

Vol. 5 No. 4
Issue No. 28
May/June 1995

Articles

Departments

ON THE COVER:

Rudy Kouhoupt's scratch-built 2-6-2, based on the Burlington 'R' Class, but with a round top boiler, poses on the elevated track at Marty Maloy's Gauge 1 steamup in May, 1994. This beautiful engine, which runs as well as it looks, was built using no castings. It weighs in at 15 lbs., including the tender. It was 4 years old at at the time of the photo, is alcohol fired and has an operating pressure of 75psi.

Photo byRon Brown

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&
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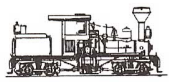


1995 Calendar of Events

May 27-28 -- Pennsylvania Live Steamers Memorial Day Steamup. Rt. 29, 1 mile north of Rt. 113, Rahns Pennsylvania (25 miles NW of Philadelphia). Elevated gauge 1 double track mainline with steaming bay, turntable and storage yards will be in operation. Also available -- ground level tracks for 1/2", 3/4", 1" and 1-1/2" scale trains. Bring your engines! Food available on site, lodging available nearby. For more information contact Harry or Paul Quirk, PO Box 215, Springtown PA 18081 -- phone 610-346-8073.

July 14-16 --Blue Mountain Gas & Steam Engine Association, Bangor, Pennsylvania, will host their 24th annual show. Harry & Paul Quirk will have their Gauge 1 track in operation and you are invited to come and run. Other activities in addition to the gas & steam engines include a saw mill, antique construction equipment, antique cars and much more. Good home cooked food and a flea market are on site. For more information contact Harry or Paul Quirk, PO Box 215, Springtown PA 18080, or call 610-346-8073.

September 2-3 -- Pennsylvania Live Steamers Labor Day Steamup. A repeat of the Memorial Day Steamup.

September 15-17 -- The Third Annual Indiana Transportation Museum small-scale steamup is to be held outdoors on the grounds of the museum in Noblesville, Indiana, a suburb of Indianapolis. Five elevated 380' loops for gauge 0 and gauge 1, plus steaming tracks and storage tracks for gauge 1, will be operating. Water and fuel will be provided. Registration fee is $30.00. Checks may be made payable to Collett Park Railway. For motel accommodations call Holiday Inn Express, Fishers IN direct at 317-578-2000. For further information contact John W. Bloxdorf, M.D., 2540 North Ninth Street, Terre Haute IN 47804 -- 812-466-1007.

September 16 -- Sixth Annual Steamup on the former Silo Falls Scenic Railway in Upstate New York. The Silo Falls has unfortunately succumbed to the depradations of the bean counters and, after a period of downsizing, has gone bankrupt. The trackage has fortunately been purchased by the Catatonk Log & Lumber Co., a prosperous logging company whose owner, a kind and generous lover of steam himself, will continue to honor tradition with an annual steamup. Ground level gauge 1 trackage with 10' minimum radius curves and 3% grades. Meths, steam oil, water and lunch provided by hosts. A total track replacement project is slated for this summer, so check with the hosts before heading for this one! For more information contact Ron & Marie Brown, PO Box 335, Newark Valley NY 13811 -- 607-642-8119.

September 22-24 -- Associazione Modellisti Foligno Citta Ferroviaria organizes STEAM MODELING INTERNATIONAL FESTIVAL, Center Italy, Foligno -- Valtopina. Steam Locomotive Exhibition and Demonstration, scale 1:32 and 1:11. We speak English & French languages. Please contact Dr. GUIDO MATTOLI, Via Roncalli 11, I-06034 FOLIGNO, ITALY. Phone 0039-342-212485 or FAX 0039-742-358449 (24 hr.).

January 12-14, 1996 National Gauge 1 Steamup in Diamondhead, Mississippi. This is the BIG event for small-scale live steamers in North America, so don't miss it! Gauge 1 and Gauge 0, 1:32 scale through 1:19 scale, mainline through logging -- a wide variety of steam locomotives in many different sizes and types will be running during this event. The venue will be the same as previous years - the indoor Atrium at the Days Inn in Diamondhead, Mississippi, just a one hour drive from New Orleans. For more information or to register, contact Jerry Reshew, National Gauge One Steamup, 5411 Diamondhead Drive East, Diamondhead, Mississippi 39525. Phone or fax 601-255-1747.

Because of publication lead time, please send info for Calendar of Events well in advance. Include name of host and location of event, with address and/or phone number to contact for complete information. Some basic info about the site is also useful (ie. ground level or elevated, minimum curve radius, ruling grade, etc.).

CORRECTION

Dear Ron,

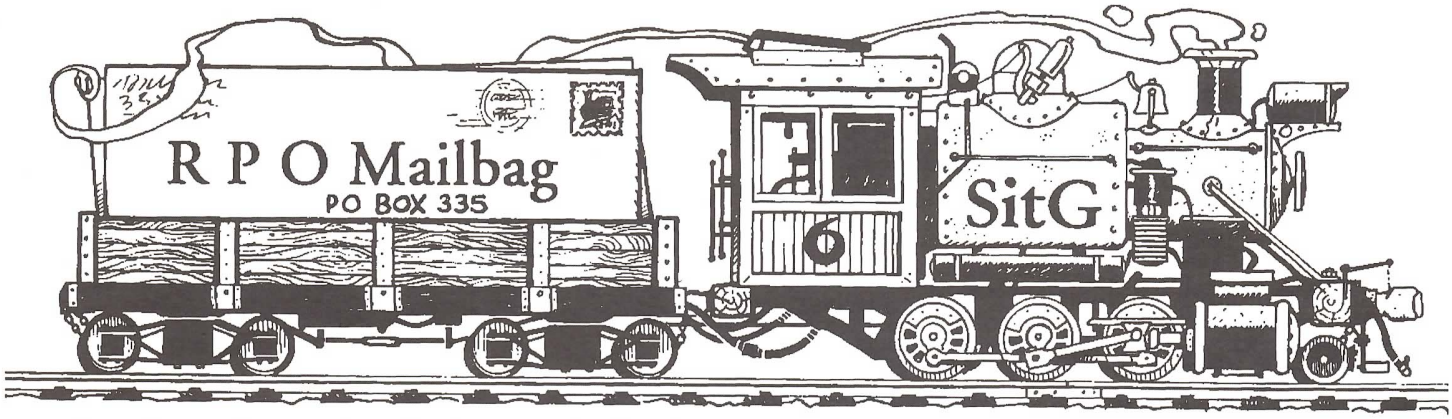
There is always a bug in the system, isn't there! I note that the photographs accompanying my article on the Merlin Mayflower Mods (№ 26, January/February 1995) seem to have gotten lost, which must have been confusing for people looking for the shots mentioned in the text.

More seriously, Fig. 2 has been incorrectly redrawn from the original (Sorry Harry). The measurement of four millimetres is the amount of movement in and out of the valve chest when turning the wheels. It is <u>not</u> measured from the back of the valve chest, but is a measurement of the distance traveled by the valve. If the valve is set up to travel four mill from the back of the valve chest as per Fig. 2, it will strike the end of the bore during the revolution of the wheels. It is there for suggested that anyone using these instructions should ignore Fig. 2 and follow the written word. Anyway, should anyone be having any trouble, then please do not hesitate to contact me.

Having got that off my chest, I did like the King on the cover of № 26, despite the fact that it is a standard gauge prototype! It may interest you to know that two days ago my wife Toni and I were walking the sea wall at Teignmouth alongside the old Great Western main line when we were passed by a full size member of this class on a special train. "KING EDWARD I" was just as shiny as Geoff Spenceley's KG5, and was a superb sight in the winter sunshine. I wasn't aware that the train was running, so it was a particularly pleasant surprise, although Toni was sure that I had engineered the time and date of that particular walk!

I especially enjoyed David Pinniger's assay into the exotic world of coal fired locomotives. I anticipate that the next step for me will be coal firing and, now that Mike Gaskin is just ten miles up the road, I look forward to having a go with CEYLON II -- just as soon as it stops raining! I do hope that David can be persuaded to provide further articles for SitG on this subject.

Yours Aye,
Tag



Letters from readers are welcomed and encouraged. Offer advice, encouragement, suggestions or constructive criticism. Tell us about your current project (and don't forget the photos!) or just share live steam experiences. But please keep your letters to a reasonable length so everyone has a chance to use this forum. Send your contributions to: SitG, Dept. RPO, P.O. Box 335, Newark Valley, NY 13811, USA. Letters may be edited for clarity and space considerations.

* * * * *

Plymouth, Minnesota

Sir:

I am wondering if through the magazine or one of the advertisers a set of plans might be readily available. I wish to machine my own engine, as over the past years I did one Case steam tractor and an engine which was 1-1/2" scale. Please send information to:

David M. Halverson
17625 13th Avenue N
Plymouth MN 55447

Thank you.
David Halverson

Readers, can you help David in his quest for plans or drawings for a locomotive? -- ed.

Kenai, Alaska

Dear Ron,

Many thanks for your note. That low elevated railway you noted was going to be an embankment, but I never did get around to the job. One of the decisions that I have made is due to the extreme climate, the regular damage from moose and other wild animals, and the rather short running season, I will not extend the railway in any way. The only thing I might do is to move the run round loop to the elevated section so I don't have to bend down so far. I'm glad I didn't fill it in.

My next layout will be four feet up, but will have to wait until we move to a more civilized part of the country.

Glad to hear your winter is mild, ours is not. We have four feet of snow so far, it is up to the windows. I am building a Tenmille L&B coach as a winter project.

All the best in 1995!
James Ritson

Steam Power is alive and well in Alaska, as we can see in this scene from James Ritson's back yard. There are no moose or grizzly bear in sight, but that tall grass could be hiding just about anything.

Orchard Park, New York

Gentlemen:

I enjoy reading your magazine and find something new to learn in each issue. I look forward to more construction articles like the series by Mr. Charlie Mynhier. I have started construction but am having difficulty getting the type "L" copper pipe. Do you know of any mail order houses that stock it?

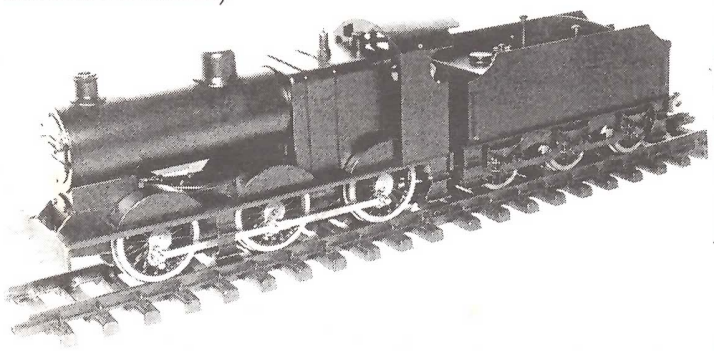
Very truly yours,
Ed Szczepanski

Thanks for your letter, Ed. Glad to hear that you are enjoying the construction series by Charlie Mynhier, and especially that you have started construction. The type "L" copper pipe can sometimes be found at recycling centers or plumbing supply houses. For short offcuts of the size we're dealing with, try a local plumber or boiler repair shop. -- ed.

Kitchener, Ontario, Canada

Dear Ron,

Enclosed is a photo of my first attempt at building a live steam locomotive in Gauge 1. It is a model of the "PROJECT LOCOMOTIVE", for which plans and step-by-step instructions are available in book form. The plans are part of the package received when you join the Gauge 1 Model Railway Association in England (also available from LocoSteam).



It took me approximately two years to complete and it has been a real learning experience. There were a few problems encountered along the way, but thanks to Dick Abbot of Toronto (who is very experienced when it comes to Gauge 1 live steam) they were easily overcome. The only real change I would recommend to those not greatly experienced in silver soldering would be to build a 'C' type boiler, as I did, instead of the centre flue type in the instructions (plan available from LocoSteam).

The locomotive is designed to be built using only a lathe and various common hand tools, etc. A kit of basic materials (wheel castings, boiler tubing, cylinder block, etc.) is available from LocoSteam in England if you do not have a local source of materials.

Sincerely,
George Cockburn

Beautiful locomotive, George. Obviously much care was taken in crafting, fit and finish, and you have something you can be rightfully proud of. You didn't mention anything about the running characteristics, but I understand that the PROJECT LOCOMOTIVES run very well. I hope your letter will encourage some of the armchair modelers amongst our readers to get off the couch and into the workshop. Listed below is source information for LocoSteam and the G1MRA. -- ed.

LocoSteam Model Engineers, "Wyndwood", King Street, Neatishead, Norwich NR12 8BW, ENGLAND. Phone 011-44-692-630683. Catalogue £2.00 overseas.

Gauge 1 Model Railroad Association, Mrs. Laura Foster, 32 Roberts Road, Poole, Dorset BH17 7HF, ENGLAND.

San Francisco, California

Dear Ron,

Issue No. 27 apppeared yesterday. Very good. The Peter Hicks profile by Jerry Reshew is excellent. Please see what you can do about more pieces on the history of small-scale live steam and the personalities and firms involved.

One small grump. Wayne Slaughter's review of the IMP 4-wheel Goods/Brake could have used a photo and listing of the principal dimensions. A simple lack of space, maybe?

Cheers!
Reg Stocking

Thanks for your comments, Reg. Jerry Reshew has promised to continue his series on Master Builders, which has generated much positive comment from our readers. Yes, the whole magazine suffers from a chronic shortage of space and time. Wayne did a fine job on the IMP review and I dropped the ball by not doing my part as well as Wayne did his. Sorry about that. What we need around here is a volunteer office assistant willing to work long hours for no pay and combining skills in photography, CAD, printing and desktop publishing with the patience of a saint and a cheerful telephone persona. Know anyone who meets or exceeds these qualifications? -- ed.

Freeville, New York

Dear Ron,

My classified advertisement in the last edition of Steam in the Garden was an overwhelming success! First, I sold my Mamods.....but I got so many calls that I met new friends from as far away as Washington State, Mississippi and Maine. I haven't had so much good conversation since your last steamup.

Maybe you should consider a reader's forum or "Personals" section in the classifieds. There are a lot of very interested and interesting garden steamers out there!

Keep on steamin'!
John J. Kelleher

Sierra Madre, California

Dear Ron,

Enclosed is my check for a subscription. Have enjoyed the four issues I've bought, the most recent being #27.

I'd like to suggest that you do an article on the late Jack Wheldon in your great loco builders series (Master Builders by Jerry Reshew). I had the pleasure of a fairly lengthy correspondence with him that led to my ordering a POOTER from him.

It arrived, having been built by Roundhouse. Jack had shifted POOTER production to them, but wrote assuring me that I'd be satisfied. I was/am.

My original railroad (garden variety, that is) was built with the largest size 0 scale rail I could get, hand laid on redwood ties that were glued with Resorcinol to redwood 2x4's set on a graded right of way. It was a simple loop around the yard with a hand-built stub switch for a siding.

The line required a lot of maintenance. Ties came unglued and spikes worked out. I suspect this was due to the 30° fluctuation between daytime high and nighttime low temperatures that is characteristic of Southern California here on the edge of the Mojave Desert. We don't, however, have frost heave.

Because these are real locomotives and not electrically powered models, prototype and scale seem much less important to me than atmosphere and whimsy. I like the quaintness of British 2' gauge lines and am sufficiently ignorant of them to be comfortable with a freelance railroad. It is, after all, a real railroad, not a model.

Anyway, I enjoy your magazine enough to subscribe. Yours is the first model railroad magazine I've ever subscribed to, and I've been reading them since Railroad Model Craftsman ran Ulrich Graff's articles and plans on the SP narrow gauge. So, please keep at it for at least that long.

In which issue did Part I of "Lathe Free Locomotive" appear? As an aspiring machinist I really appreciate the technical articles. Let's keep 19th Century technology alive!

Sincerely,
Gurdon Miller

Thanks for writing, Gurdon, and for your suggestion for Jerry Reshew's Master Builders series. Jack Wheldon certainly stands larger than life when looking at those who have had a positive impact on our hobby, and Jerry and I agree with you that he would be an excellent subject for a future article. Jerry is already gathering information and photos, and we hope to have an article later this year. -- ed.

Hampton, New Hampshire

Dear Ron,

I haven't written in a while, so maybe an update from the coast of New Hampshire is in order.

The winter was milder than usual compared to last year (non-existent). Spring flowers are now beginning to bloom and shortly the 73 home improvement projects will get underway, followed by the occasional flurry of activity on the CATSKILL MOUNTAIN LINES, Garden Railway Division. Sometimes I feel like I'm building the Carlisle & Settle Line....any Navies out there?

Two significant programs are underway on the CML. The first is an indoor G1 loop in the garage...an around-the-walls affair with appropriate bridges spanning the doors. This was the result of some idle chat at one of our New Hampshire Round-Robin Model Railroad get togethers...a whole 'nuther story.

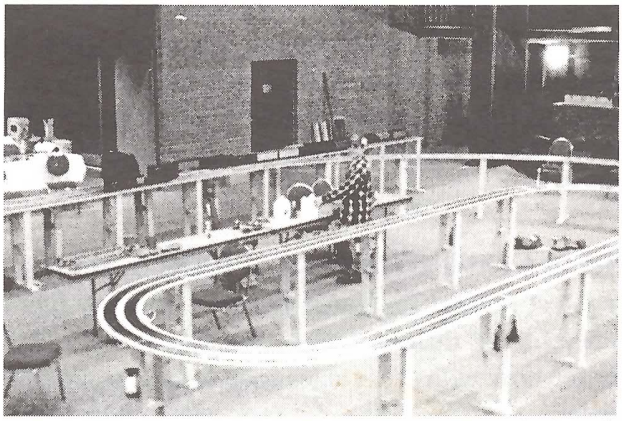
Anyway, a waist high loop with passing sidings will give me and guests a dead level, all weather venue. The wall supports are going up and I expect to be laying track shortly with the help of the above mentioned NHRRMR crew...right guys?

It may be of interest that the rail used will be Old Pullman code 190, reclaimed from Wayne Slaughter's abandoned Idlenot Light Railway, a 16mm gauge 0 garden line. Wayne gave it all up for standard gauge, 1:48, steam-diesel transition, New England prototype *(worst of all -- it's electric trains! -- ed)*. I pray for him every night.

Guess this will be called the CML, Garage Railway Division...any suggestions?

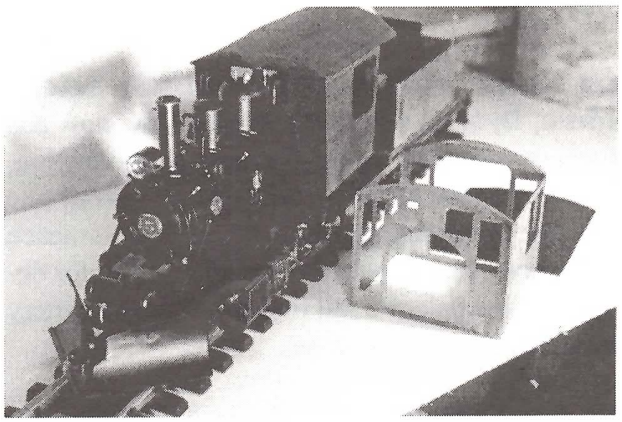
The real CML, GRyD has been undergoing significat r.o.w. changes over the past two years. You'll remember the sketch I sent a few months back, which showed the line elevated with an operating pit and the track plan an out and back configuration. Well, all the heavy work was done last fall and the earth left to settle over the winter. This spring I'd like to get the basics done with the track laid to West Barrow, and the terminus completed at Lostock. We'll see. I've learned that a garden railway is more a state of mind and is somehow diminished when "done".

Anthony and I attended Jerry Reshew's National Steamup in Mississippi last January. Thanks, Jerry, for a superb event. The enclosed photo verifies that "The Steam Kid" did get about 23 minutes of solo time on the High Line. Dad was sleeping behind the camera.



It's 0:Dark:30 in the morning in Diamondhead, Mississippi, and Anthony Chiodo (The Steam Kid) is running his Creekside Baldwin on the High Line, in a flagrant violation of the Superintendent's Rules.

My Frank S. conversion is entering its third year of rework. The enclosed photo shows the progress to date. Jim Hadden and I shared the tribute that he liked my conversion and I liked his Frank the Tank. Jim works in some other time contiuum than the rest of us mortals! It's great to see all the high quality engines now available, and all the creative things being done. Are we in the golden age of small scale live steam, or what?

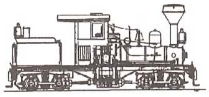


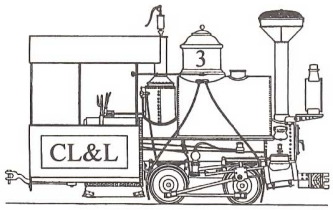
FRANK S. meets Mr. Baldwin. Rich Chiodo gave a fine seminar on his LGB FRANK S. Americanization project at Diamondhead '95.

Several other projects are on the waiting list, and these include, but are not limited to, a scratch-built Shay, a Project, a Saito tram, building an Aster JNR Mogul from a kit, a b/o shunter or two, a rail car and various and sundry rolling stock. Sound familiar?

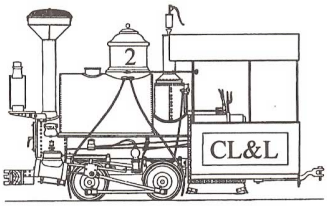
That's it. The magazine has become a top notch publication. Keep up the good work.

Rich Chiodo





WHAT'S NEW?



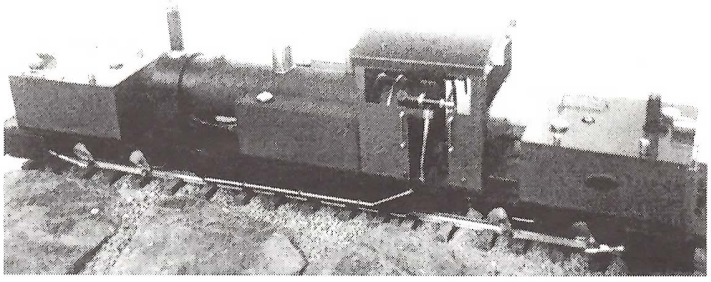
LGB Telegram magazine will sponsor a 10-day tour to Europe for LGB fans in December. The tour will combine a trip to the Lehman factory with rides on eight different trains and visits to four traditional open-air Christmas markets in Germany and Austria. The 1995 LGB Telegram Tour will depart from Boston's Logan International Airport on Friday, December 1 and will return on December 11. For information on joining the tour, contact Mireille (Mimi) Petit, Petit Travel Consultants, 46 Mendon Street, Worcester MA 01604-4824 -- phone 800-223-2502 or 508-755-2750. Group size is limited to 45 and reservations will be taken on a "first-come, first served" basis.

GARY RAYMOND METAL WHEELS, PO Box 1722-S, Thousand Oaks CA 91358 is pleased to announce their latest release for Large Scale. Their new line of **BLACK BEAUTIES™** wheelsets feature their proven advanced tread design with a new Black Steel Finish. G scale wheelsets for LGB, Bachmann, USA, etc. are available now with other sizes soon to follow. Price is $3.95 per axle. Contact your local dealer or Gary Raymond Wheels.

Sulphur Springs Steam Models, Ltd., PO Box 6165, Chesterfield MO 63006, has a new locomotive catalog and price list available now, filled with lots of wonderful toys from Argyle, Wrightscale, Roundhouse and Locomotion. Send a SASE to the address above to get yours.

Potomac Steam Industries, 5595 Saint Charles Drive, Dale City VA 22193-3503, exclusive US Agent for WADA Locomotive Works of Yokohama, Japan, announces that they now have a dedicated FAX line for the convenience of their customers. The FAX line number is 703-590-9399. Their voice number remains the same at 703-680-1955.

Salem Steam Models, BRYNGLAS, Salem, Llandeilo, Dyfed SA19 7HD, Wales U.K. now has their steam powered **Beyer-Garratt** in production. Ross Dwerryhouse of Salem tells us that runs of one hour are commonplace, and the power and performance are even more than they had hoped for. Write for details on this and Salem's full line of steam and battery powered "Diesel" locomotives.



CS Models, 612 Carnarvon Street, New Westminster, B.C., Canada V3M 1E5 -- phone/fax 604-524-6664, has moved to a new location and changed their name from the former C&S Models. Best of all, they've lowered prices on their G WALLS, a quality line of large scale brick-style buildings. Check CS Models ad in this issue and write, fax or phone for more information or to order some new structure materials for your railroad.

Gentec Industries, 435 E. Hereford Street, Gladstone OR 97027 -- phone 503-657-5999 or FAX 503-657-0595, announces their line of cast wheels in 1:32 scale. Cast in white bronze in 33", 36" and 40" scale sizes, these wheels are available as a machined wheel/axle set or as rough (unmachined) wheel castings. Check their ad in this issue and write, fax or phone for more info or to place an order.

The Fitter's Bench

by Crankpin

Drawings by Harry Wade

More Good Stuff Concerning Chucks

In the previous issue or two I have suggested that handy though they are, the typical three jaw chuck does have a shortcoming which has to do with its accuracy, and there are times when the three jaw chuck should be used and times when you would be better advised to use something else. The average three jaw chuck should not be considered a true precision tool (or attachment) but rather a tool of convenience which is generally used to hold things "close" but not spot-on.

In this episode I am going to explain the reasons for my cautions and, by describing the conditions under which these shortcomings exist, allow you to decide for yourself when and where to use the different chucks at your disposal. I have found this concept to be a bit awkward to verbalize clearly so bear with me if my explanations seem a bit muddled. I will do my best to set it all out in an easily understandable sequence. The first thing to be done is to set out a definition, or rather to describe a set of standard conditions that will set the parameters of precision as applied to the three jaw chuck.

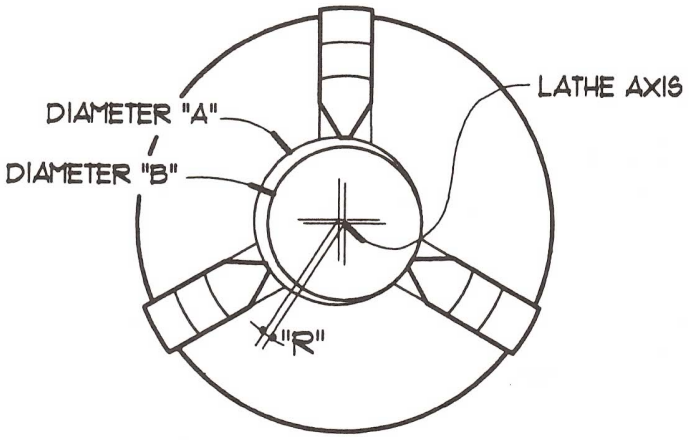


FIG. 1 - "RUNOUT"

In passing it might also be helpful for you to know that the word "chuck" can be used as both a noun and verb. For example, "chuck" a piece of steel bar does not mean to throw the rascal out but rather to put it in the chuck and tighten the jaws. You may also surmise from this that "chucking up", which is a commonly used phrase around most workshops and in writings such as these, has nothing whatsoever to do with losing one's lunch. Now back to the business at hand.

For those of you with access to past issues, you will find a very brief but serviceable explanation of terms TIR and "runout" in issue #15, November/December of 1992. The terms TIR and runout are interchangeable and for those of you who have recently joined us you should be aware that in workshops round the world these are the terms that are used to quantify the presence of eccentricity in a revolving mass and is therefore also the measure by which the accuracy of the revolving parts of machine tools or accessories is defined. The definition for chuck accuracy should read roughly as follows: The precision of a three jaw chuck is determined by its ability to hold a (perfectly) round test bar of a single given size (usually 1" diam.) repeatedly to a predictable standard of eccentricity at a distance of one inch (1") from the face of the jaws and is stated as T.I.R., or Total Indicated Runout. This is a recognized standard by which manufacturers can certify the relative precision of their products to the consumer.

TIR is the amount of "wobble" present in the piece being held in the chuck; it is the measure of the maximum distance from dead center the chuck will hold a piece of round bar. For example, if in a given chuck you were to chuck up a 1" diameter round test bar, the chuck's accuracy rating would be the expected variation in the eccentricity of the bar encountered during repeated chuckings. The key words here are "repeated chuckings". For a chuck that was certified by its makers to have a TIR of .003" the test bar is then expected to indicate (as measured by a dial test indicator) as little as .000" or as much as .003" eccentricity when rotating, and this should be expected every single time the same size piece is chucked up. Unfortunately this rating is only valid for any one given size of bar as the runout could potentially be different for each different diameter of material as I will now explain.

The physical appearance of runout should be made more clear to you by Figure 1. The chuck shown holds a piece of round bar stock which has had its original diameter (Diameter A) turned down by some small amount to (Diameter B). The difference in diameters A and B has been exaggerated so that you can more clearly see that the two are not concentric, meaning that they do not have the same center point. Diameter A is a circle whose center point is determined by the location of the gripping faces of the chuck jaws. Diameter B is a circle described by the tip of the cutting tool and has as its center point the central axis of the lathe, which of course

is a given for any round object turned in a lathe. The eccentricity, the "total indicated runout", is the difference "r" between the central axes of diameters A and B, which is the difference between the lathe center axis and the chuck gripping axis. There you go, plain as the nose on your face.

The accuracy of a three jaw chuck is directly dependent upon the precision of the spiral of its scroll. You all should remember the scroll from last time as being the "radial screw which when turned pushes the chuck jaws outwards or inwards at the same rate." If the teeth of the spiral vary by say .002" or .003" at any point along their path, then the chuck can be no more accurate than .003", therefore the scroll needs to be made with as much precision as is possible. Furthermore, as the scroll wears from repeated chuckings the centering accuracy of the chuck will deteriorate; only slightly of course, but wear does occur and eventually has a small effect on centering accuracy.

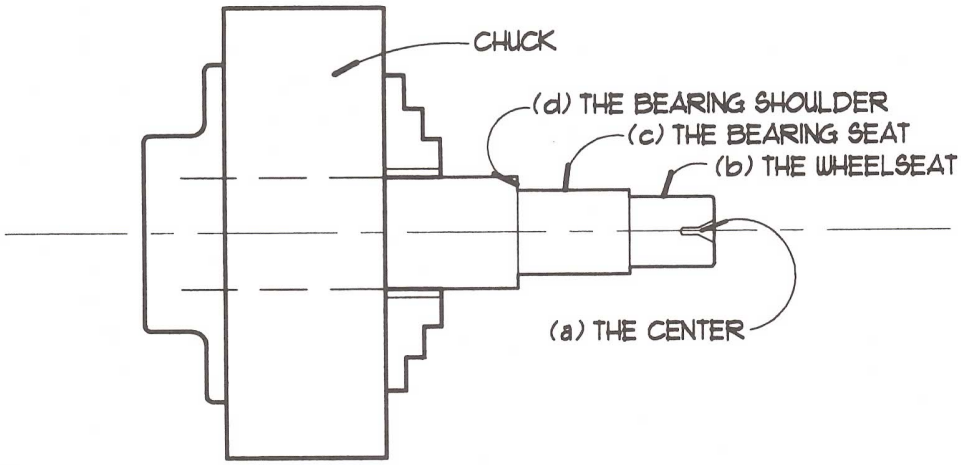


FIG. 2 - SINGLE SETTING

The scroll of the average shop grade chuck is cut on a milling machine which is programmed to cut the spirals and these are as accurate as the miller on which they are cut. Some scrolls are milled and then hardened resulting in approximately the same accuracy but a longer life of accuracy. The scrolls of the best and, not surprisingly, the most expensive three jaw chucks are milled, hardened, and then precision ground to very close tolerances. This technique produces scrolls which are not only highly accurate but which resist wear and hold their accuracy indefinitely.

Because of the way their mechanisms are made, specifically the scroll, the garden variety 3-jaw (the kind usually found in the amateur's workshop) historically usually had not less than .003" TIR (eccentricity) and often ranged as high as .008". Since writing my article for last issue I have taken notice, while thumbing through some recent tool supplier's catalogues, of the tolerances currently being claimed for garden variety three jaw chucks and I have been pleasantly surprised. For some years now the countries of eastern Europe such as Poland have become primary producers of lathe and drill chucks and they have become quite good at it. I was surprised to see that quite a few of the models, which because of their size and price are sure to be headed for home workshops, now have tolerances of as little as .0015" TIR. This is a substantially improved egg altogether from the .003" or more that I quoted in my last article. This is not to say that our old British and U.S. standbys no longer produce quality products, they very much do, but as in other areas sadly cannot keep pace with the bargain sale prices now being asked for generally excellent European goods.

As I have preached in previous articles, when precision increases, so does cost due to the skill and care necessary to produce highly accurate tools. A chuck with a repeatable accuracy of .0005" TIR is five times more accurate than a chuck rated at .0025" and therefore should be expected to cost more. You will have to make your own choice as to whether the increased accuracy justifies the additional cost. For the average model engineer however, it is my experience that it is very often deemed not worth the additional cost; when extreme accuracy is called for we generally take to the trusty four jaw where the accuracy obtainable is a function of how much time you are willing to spend centering the work using a the clock gauge or dial indicator.

You may now be asking, what has all this to do with me? The problem this presents can be illustrated in the following way: Let us say that you require a length of round bar, say 3" long, turned parallel for its entire length. If you turn a bit more than half its length from one end and then reverse the bar in the chuck and turn the other end back to meet the previous cut, you will be regularly disappointed to discover that the two surfaces do not meet exactly because the chuck actually holds the workpiece off-center, and even a weensy smidgen is enough to make the difference. In the case of a chuck that has a runout of say .0025" (not at all out of the ordinary) these surfaces could possibly miss each other by as much as .005". Can you now see the dilemma? The ends will not match up and a shaft with such a "step" in it would not slip through a nicely fitted bearing or gland, nor if it were an axle would it run true.

There is one way to work to absolute concentricity in the garden variety three jaw chuck and that is to machine as many of the surfaces of a workpiece as you are able at ONE SETTING, that is, without removing the piece from the chuck before all is done. This will insure that all surfaces

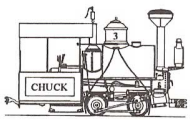
which must run concentrically will do so. I can best illustrate this by showing you the end of a typical locomotive axle (Fig. 2) on which the drilled center (a), the wheel seat (b), the bearing seat (c), and the bearing shoulder (d) must all be truly concentric. If you should have to remove the axle from the chuck for some reason, and this may sometimes be necessary, regaining true concentricity will require that the four jaw chuck and dial indicator be called into the fray.

This seems a good place to mention one of many theories that have been bubbling around in my head for a few years and that is what I will call Crankpin's Corollary #12, or, the "weakest link in the chain" analogy of lathe accuracy. A machine tool and its parts are much like a chain which, as we all have so often heard, is only as strong as its weakest link. A lathe is likewise only as accurate as the least accurate part. If precision lathe capable of working to say .0001" tolerances is shackled to a chuck which is at best capable of only .003" +/-, then .003" +/- is the most precision you can reasonably expect to extract from that machine. Conversely, even the most accurate chuck will gain you little if used on a lathe that has badly worn ways or spindle bearings or is otherwise poorly adjusted.

This is not to say that superb work cannot be coaxed from a machine with any combination of the aforementioned shortcomings; it certainly can since as we all well know the ultimate responsibility for quality and accuracy rests squarely in the hands of the workman, not in his or her tools. What I am saying is that if you expect the installation of an expensive chuck to miraculously cure the ills of a sloppy lathe you will be sorely disappointed. Likewise if you install a badly made chuck on your otherwise finely made machine you will wonder, oftimes out loud and in words unprintable here, where its precision has got off to.

I think it would be appropriate to remind you at this point that all of this chuck business is about precision and the making of parts that must fit and run together very closely, and for that reason I feel that I generally must address the most demanding aspect of the work. There are, as you all surely recognize, a great many circumstances where we are not concerned at all with a great degree of precision and simple shaping is all that is required. Let us all acknowledge that many different degrees of tasks will come our way and the three jaw chuck will serve nobly for most of them. As I have said, there is a time and a place for all our tools.

That's it mates, I'm all done for this time out. Spring is here and you all know what that means; there's sufficient weeding, cleaning, and ballasting to be done to keep us all busy for days on end. Until next time out, when I will finish up with a few words on the care and feeding of chucks in general and then move on to new ground, I'll see you in the garden.



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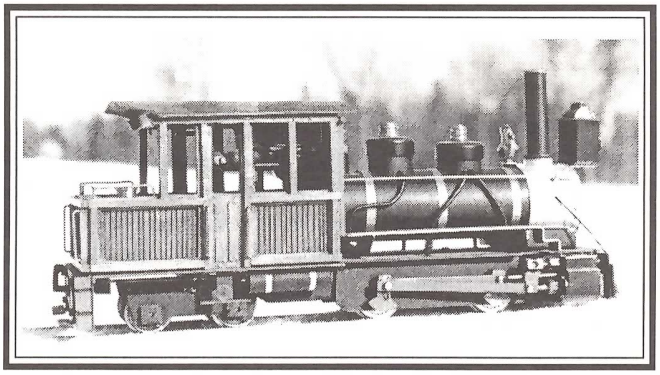

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Gazing Into the Fire

by Peter Jones, Doctor of Approximate Engineering

Let's be honest right from the start; the advice I am about to give, strictly speaking, is bad advice, There is a right way to build a steam engine, and there is a wrong way. Other people in these pages and elsewhere tell you the right way. Study, learn and inwardly digest, for they are absolutely right.

So why am I going to tell you the wrong way to build a steam engine? The answer is that it is better than not building an engine at all.

The best automobile drivers don't necessarily make the best driving instructors. They see things so clearly from their perspective that it can be easy to forget that there are other ways of looking at things. Right now I have quite a useful shop with lots of shiny tools and, most of the time anyway, I stick to bashing the metal using the right techniques. But it wasn't always thus. There was a time when I couldn't afford all the toys. So I built my first stationary steam engine just using hand tools. It wasn't a great model, but it worked and I have it still, forty years later.

My first steam railway engine was also a runner on a calm evening. It was not a pretty sight and, thankfully for my ego, has long since disappeared into oblivion. But I am grateful to it for encouraging me in the art of Bush Engineering.

As the years unfurled I slowly got one or two useful tools and eventually achieved the dizzy heights of a miniature lathe. I managed to build a 3½" gauge tank engine on this, with a certain amount of low cunning. It only had a 3 jaw chuck, coz this was all I could afford. But it gave me valuable experience in needing to be ingenious and devious to get jobs done.

I came to several conclusions, The first is that lots of machinery is not essential to build a loco; it just makes the job quicker and easier. A lathe isn't the most difficult tool to learn to use properly. I give that honour to the humble file. Owning machine tools doesn't make you a good engineer. Most engineering is about knowing a straight line and a true right angle when you see it. I offer the weird suggestion that probably the most difficult material to build precision models in is cardboard. If you are a neat person who works well in one material, then you have usually got the right temperament to be good in another. On both sides of the water I have met modelers who make superb models in wood, but have no confidence in being able to use a lathe. They are frightened by talk of thousandths of an inch What a precision machine tool does is to make 'thous', and even 'ten thous', easier to find. But such tools aren't essential. You can turn out precise work on a battered old lathe with a doubtful three jaw chuck as your only accessory. You could even manage without this and just turn between centres as old time craftsmen used to do. It is still favoured for some work today. You can do it BUT IT TAKES LONGER. And that is different from not being able to do it at all.

When it comes down to it, as an old watchmaker once told me, there are only three sizes to make things: Too xxxxing big, too xxxxing small or the right size. You can bore out and ream a cylinder to a dimension plus or minus ten thou, measured on the vernier caliper. You then machine the piston to equally precise limits to give the correct clearance. That is the right way to do it, but you could drill it and then ream or hone it to whatever size your nearest reamer is. You then turn down the piston until it will just go into the bore, offering it up frequently as you go. It doesn't matter what the exact size of the bore is, as long as the one on the other side of the engine is the same and that both pistons are the right fit. The engine will work just as well.

From this, you will see that when I argue that you don't have to use precision machine tools to do a job, that this means our work is sloppy. Let me give another example. If you want to turn a profiled axle on a lathe that has worn slides and only a dodgy three jaw chuck, one way of doing it is to get a length of bar that is thicker than the fattest dimension.

Taking into account the slackness in the handwheels, you then turn the entire axle down, making a note of the various handle settings. By having a bit too much material in the first place, you turn out all of the possible error. What you can't do is to take a half finished job out of a dodgy chuck and then expect to be able to return it to the right place again. You have to do the entire axle without disturbing the setup. But because you made a note of the settings, you can repeat the exercise with another piece of oversize metal. The loose ends are centre popped as accurately as you can manage and the tailstock has a centre to support the wobbly bit. It would be nice if you could afford a live centre on roller bearings, but if you can't, you can turn up a dead centre out of an old bolt and use plenty of oil. Again, it isn't right, but it does work.

The method of turning wheel castings or blanks has often been described and usually involves turning up a small jig out of a bit of steel: a sort of one-off mandrel The bored and reamed hole in the middle of the wheel goes onto this jig, which has lain undisturbed in the chuck since you turned it. The rim of the wheel can't be anything but true to the bore. This is old news, but it does indicate the basic principle behind what I erroneously call ***Approximate Engineering***. If

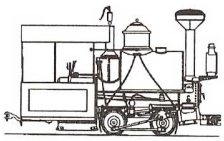
you haven't got the right tool for the job, then you have to think up some way of doing it that automatically means that it has to end up being exactly right. It's not the end result that is approximate, it's the hardware you use to get there.

There are more ways to kill a cat than boring it to death by reading engineering manuals to it. If you want to get a true flat surface on a block of steel, you can mill it. These days I have a milling machine, but for years I had to do the job in the lathe. There was a time when I didn't have a vertical slide and so I had to clamp jobs to a faceplate or glue them to a jig. Yes, glue. In generations past, craftsmen used wax and shellac. These days, two lumps of metal hold together nicely with Superglue. When the job is finished, a whiff of the blowlamp will break the joint. My years of using a tiny lathe taught me the valuable lessons of feel and not being too greedy with the cut.

I also learnt about keeping tools sharp. With a certain amount of ingenuity, you can get away with murder building a steam engine, but you learn that sharp edges and proper angles of cut are things you don't skimp. A big lathe may have enough power to allow for a certain amount of abuse, but a small lathe doesn't.

If readers are interested, I will write more about building steam engines with limited equipment. I doubt that many will want to know how to do it with hand tools only. You can take self flagellation too far! But for now, I think it is time to sum up. Please don't write to me telling me how despicable I am. That's what family and friends are for. Fiddling round with little jigs and a worn out lathe is not the best way of engineering in metal. But it can work if you want the end product enough. If you can afford all the right gear, get it and read up on how to use it properly. Best of all, put the books to one side and hack bits of metal until your fingers and eyes get happy with the processes. But if you can't, don't let anyone talk you into despair. There are times when I need a truly flat face on a bit of metal. More often than not, it is just as quick to do the business with a file and finish it off with a bit of fine wet and dry paper laid on a piece of glass as it is to set up the milling machine for the job.

When someone watches your steam engine steaming merrily through your garden, they may ask if you built it and how long it took. They rarely ask if it was machined on a Mitohondosaki CNC controlled machining centre. As the song went; "If you can't be with the one you love, love the one you're with."



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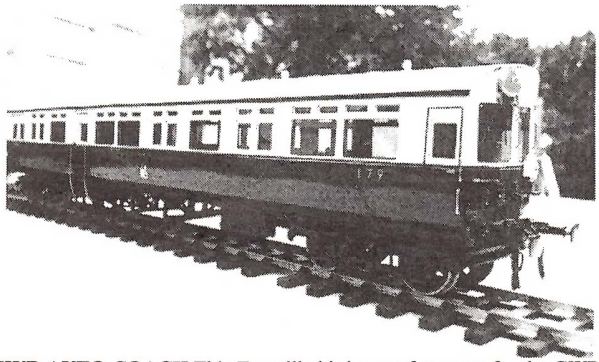

GWR AUTO COACH This Tenmille kit is a perfect mate for the GWR Pannier Tank loco. Used on branch/suburban service, the Auto Coach had mechanical controls which enabled the engine driver to operate the Pannier's controls from the driver end of the coach when running coach first -- thus the fireman remained alone in the cab. When running engine first, the driver returned to the cab.

KITS, PARTS, TRACK: 10mm (3/8") Scale Gauge 1; 16mm Scale (NG) Gauge 1 or 0. PRICE LIST, with illustrated leaflet, $2.00 postpaid.

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P.O. Box 24728 LYNDHURST OH 44124 TEL. (216) 464-8126

PRODUCT REVIEW

"DIAMONDHEAD '95" videotape

Price: $29 postpaid

Available from: Hyde-Out Mountain Live Steam
89060 New Rumley Road
Jewett, Ohio 43986
phone 614-946-6611

For those of us who couldn't make it to the National Steamup in Diamondhead, Mississippi this is the next best thing! As you well know, the Diamondhead event has become the biggest meet of its kind in America and is rapidly developing an international following as well. Jerry Reshew does a fine job putting it all together every year, and Jerry Hyde has done a good job covering the 1995 event on videotape.

This video shows the locomotives and the people who made the Diamondhead Steamup what it is. It's like being there, and you don't miss a thing. It's all here; Charlie Mynhier is seen running the loco he designed for Steam in the Garden magazine, plus he runs his 0 scale and HO scale live steamers.

Kosaku Wada of WADA Locomotive Works is shown running his steam turbine, his gas electric, and his new Reading 0-4-0 camelback in 1:32 scale.

Larry Herget's "Dunkirk" geared loco, as seen on the cover of the March/April '95 SitG, is run for the camera. Jim Hadden and Pete Olsen are seen running a lash up of Jim's steam powered rotary snowplow pushed by two Aster C&S Moguls and trailed by Jim's beautiful scratchbuilt flanger. Murray Wilson's antique live steamers roar around the track. Plus there are more Aster locomotives than you'll ever see in one place!

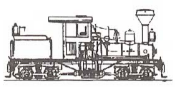
There seem to be hundreds of locomotives on hand and you get to see most of them running. All makes and models are on hand; Aster, Argyle, Roundhouse, Hemmens, Pearse, Catatonk, Wrightscale, and many more.

I especially enjoyed the many super pacing shots, which really show off a steam locomotive at work!

While the tape gets generally high marks over all, there were a few things that bugged me. Some of the closeups are out of focus and some narration would have been helpful in many places. I also felt that the early and final parts of the tape which include the trip to and from Diamondhead were overly long. But these are minor gripes.

The overall product is quite good and at least there is no funky music -- the locomotives are allowed to speak for themselves! This one is a must for steam fans!

-- Stumpy Stone



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Product Review

Sierra Valley Enterprises 24' Boxcar

Description: Accurate 1:20.3 scale model of a 24', 8-ton narrow gauge boxcar built by Carter Brothers in Newark, California in 1874 for the Monterey & Salinas Railroad. It was sold to the Nevada Central Railroad in 1879 when the Southern Pacific bought the M&SV and standard gauged the line. This car still exists at Ardenwood Park in Newark, California.

Order #BCE, R-T-R price $219.95 + $10.00 S&H per car.

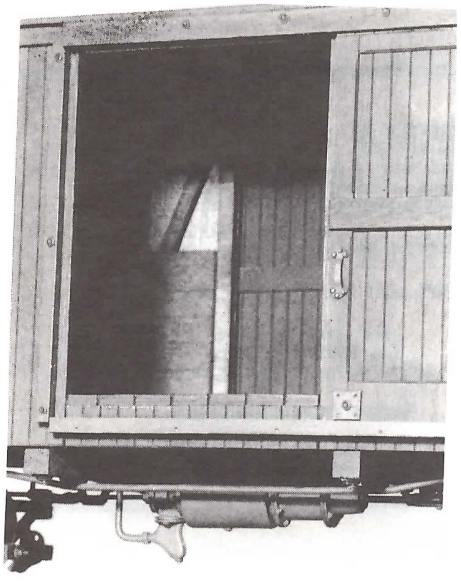
Options: Gary Raymond metal wheels, $7.50; Kadee couplers (#820, #830 or #835), $5.00; outside hung brake beams and shoes, $8.50.

Available from: Sierra Valley Enterprises, 2755 Saratoga Ave., Merced, CA 95340. 100% designed & built in the USA.

A few months ago, in issue Nº 24, we reviewed a Sierra Valley Enterprises flatcar. It received high acclaim from us as one of the finest examples of the builder's art we had seen. Based on this experience, when Gary Watkins of Sierra Valley Enterprises told us he was sending a sample of his new boxcar for our review, we had high expectations. But when the shipping carton arrived and we opened it up, we weren't prepared for the model that was now sitting on a table in our office.

My first impression was.....this thing is really big & chunky! The narrow gauge look, feel and flavor is immediately apparent. The boxcar is everything the flatcar was.....and much more. It's not a toy train or a model train, it's a miniature railroad car.

Get a firm grip on the door handle and slide the door open. Climb up inside and look around. Yep, everything is here! The floor is worn from all the freight movement...a bit more wear near the doors than at the ends, which is as it should be. The roof and wall structures are constructed like the real thing. The builder is obviously a real craftsman in every sense of the word.



A peek in through an open door gives us a glimpse of the interior detailing.

Let's clamber back outside and look around. The paint is neatly applied, with no overspray. The lettering and giant S.P.C. herald (all by Larry Larsen Graphics – ours is lettered for the South Pacific Coast) is clean and sharp and nestled down into the siding. Perfect.

Grabs, steps, coupler lift bars (with chains), corner straps, door handles, nbw's, and all the other hardware is crisp and neatly applied. Joints are a perfect fit and the structure is square. I couldn't find a single stray dab or smear of glue anywhere. Not one! Sure wish I could build models this well.

Trucks are modified by Sierra Valley to represent correct Carter Brothers trucks, even the little Carter Brothers star on the journal box cover is there. The outside hung brake beams and shoes are by Sierra Valley Enterprises, and they really add a lot to the appearance of the trucks...and the boxcar.

The brake cylinder is also by Sierra Valley, and Gary has added all the underbody detail you would expect to see on a high-quality model, including brake levers and brake rods with proper clevis ends.

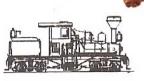
As with the Sierra Valley 28' flat reviewed in Nº 24, the dimensions and graphics for this car were taken from drawings done by Herman H. Darr. Our sample model is based on the way the car appeared on the South Pacific Coast RR after the Federal Mandate of 1906 was enacted concerning air brakes and automatic knuckle couplers. The boxcar is offered in six versions: two for the South Pacific Coast, two for the Nevada County Narrow Gauge and two for the Nevada Central R.R.

The list of features and options is lengthy, and includes such important items as distressing and weathering of all wood parts and metal parts, complete interior detailing including stud walls, horizontal sheathing and roof purlins and carlins.

Standard couplers supplied include both the basic hook and loop and in-line RO/USA Trains knuckles, which match USA Trains, Bachmann, Lionel, Delton and D.A.N. Kadee couplers are available as an extra-cost option.

Thank goodness that in this age of plastic-everything there are still craftsmen working with real wood and metal. Gary Watkins of Sierra Valley is an extraordinary craftsman, and his models are available at very affordable prices for all of us to admire and enjoy. His miniature boxcar is so beautiful that it belongs in a glass display case, but it's rugged enough for everyday use on your railroad. Do yourself and your locomotives a favor.....show some class at the next steamup by giving your engines an accurate and realistic train to pull. Write or call Gary Watkins at Sierra Valley Enterprises today and ask him about his boxcar and his whole line of accurately scaled, highly detailed and beautiful miniature narrow gauge railroad rolling stock. Tell him Steam in the Garden sent you.

reviewed by Ron Brown
Photos by Uncle Russ Reinberg, courtesy Outdoor Railroader



Product Review

Lone Star Bridge & Abutment's King Post & Queen Post Truss Bridges

Description: Two small wooden truss bridges with plenty of metal castings.

Price: King Post Truss, $75.00, Queen Post Truss, $145.00. Both prices include shipping to the lower 48 states.

Available from: Lone Star Bridge & Abutment, 1218 A-8 Colorado Lane, Arlington TX 76015 -- phone 817-548-5656.

Does your railroad have some small creek crossings that need to be spanned? Perhaps you've been carrying the track across on a bit of plywood or a wooden plank. Or maybe you're looking for something to dress up your railroad for those photo opportunities.....or you've been lusting after a big bridge or trestle but your budget is very limited.

If this sounds familiar and close to home, read on! Mark Smith at Lone Star Bridge and Abutment has the cure for your garden railroad blues!

Mark has been building super high quality wooden bridges, stone abutments, viaducts and turntables for 6 years now. The only bridge builder we know of that comes close to Mark in bridge building skills is the beaver working behind our house -- and even the beaver doesn't measure up to the quality of materials and the high level of craftsmanship that Mark puts into his products.

The latest items we have had the pleasure of reviewing are the smallest bridges in the Lone Star lineup -- the King Post Truss and the Queen Post Truss.

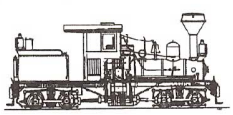
These little bridges are built to the same high standard of quality as all the other bridges by Lone Star, they're just smaller.....and less expensive.

The King, based on a branch line bridge, is the smallest of the two at 12" long x 5-1/2" high x 7-1/2" wide. The Queen, a generic composite and classic Queenpost, comes in at 17-3/4" long x 6-3/4" high x 8-1/4" wide. Both bridges are built of hand finished, oiled mahogany and feature functional, chemically blackened brass hardware and numerous detail castings. These castings, by the way, are as clean and crisp as any we've seen.

Even the smallest garden railway can find a spot for one of these two little gems, and there's nothing like a bridge to add interest and life to a railroad in any scale.

We used up our entire stock of superlatives on previous Lone Star reviews, so you'll just have to settle for our enthusiastic stamp of approval and an A+ rating for both the King Post Truss and the Queen Post Truss.

Check the Lone Star ad in this issue for a look at both of these bridges. Better yet, you can get a catalog with color photos of these bridges and the whole Lone Star lineup by sending $3.00 to the address at the top of this review.



reviewed by
Ron Brown

Steam...Just Half-a-Bubble-Out-of-Plumb

by Anonymous

The first day that Fred was chief engineer on the excursion train is the day we discovered that he wasn't completely at home upstairs. He did a fine job of readying the engine and loading the passengers and heading off for the first stop. Then, just about the time we expected a call that the first leg of the trip was successfully completed, we hear this wild whistling and see belching smoke and some very uncomfortable looking tourists looking wildly about as the train was backing full speed into the station. Fred had barely stopped the train when he jumped off and ran full bore down to the Sheriff's office, with us not too far behind him. "I found it, I found it!", he kept yelling repeatedly. When we finally calmed him down enough to ask what he found, he kept pointing down the road and shouting that it was big and yellow and in the woods. Well, things didn't get straightened out for a bit, but we finally calmed him down enough and he said, "You know, what everyone's looking for! They've got signs up all over the state roads about it." The yellow signs that say 'Watch for School Bus'.....

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BOOK REVIEW

Valves and Valve Gears for Steam Locomotives

By C. S. Lake and A. Reidinger

First published in 1940

Reprinted in 1981 by TEE Publishing, England

Available in U.S. from Sulphur Springs Steam Models Ltd.

Valves and Valve Gears for Steam Locomotives was originally published in 1940 and covers a variety of steam valves and valve gears. The authors had some advantage since it was written near the end of the era when steam engines were being built in quantity (the full sized ones, that is). A good example of this is the chapters on poppet valves and rotary gears. These are developments in steam engines that aren't always discussed in earlier valves and valve gear books.

Included are basics of cylinders, rods, cranks and eccentrics. A chapter each is devoted to slide valves and piston valves. Two chapters discuss the cycle of events, and limiting and regulating cutoff. Other chapters cover link motion valve gears, radial valve gears, Walschaerts type gears, 3 and 4 cylinder engines, poppet valve gears and rotary cam gears.

While the book is based primarily on British equipment, there is still plenty of application to equipment that was built elsewhere. Many of our favorite little steamers are built by manufacturers in the U.K., so it couldn't hurt us Yankees to be conversant with the various valve gears that we might run into. A few months ago, I had the fortune to see a 7-1/4" gauge, 1-1/2" scale British engine running at a track in Pennsylvania. This particular engine had Joy valve gear, and my experience was much more enjoyable since I had some vague notion of what I was looking at. I really have Messrs. Lake and Reidinger and this book to thank for my knowledge about that particular valve gear.

As was previously mentioned, rotary and poppet valve gears are also discussed in this book and this was my first opportunity to learn the details of Caprotti valve gear. This is a particular rotary valve gear with poppet valves that I had often seen in photographs of locomotives but I had never been able to learn much more about.

I must admit that some of the reading was slow going. The text and drawings are generally good, but occasionally it took me a while to match the ideas in the text with what was illustrated. It seemed that the 1940's British engineering terminology didn't immediately get through to the 1990's American Engineer, so a little perseverance may be in order.

I feel that this book would be of interest to any student of steam and that there are a number of strengths in this book that recommend it. The detail and variety of valve gears that are covered make it a valuable resource. The explanation of basics and theory of valves and valve gear are thorough and adequate as an entry level text for beginners.

Reviewed by Edward R. Kabak

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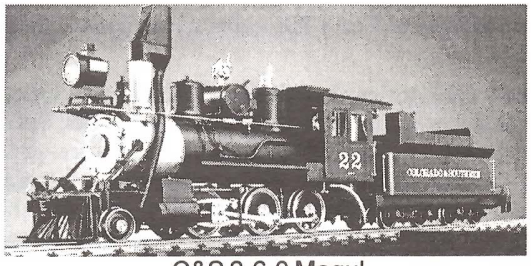

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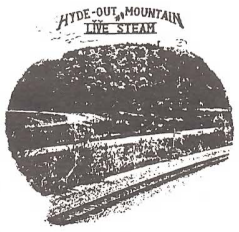

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Build Your Own Locomotive

Part VI of a series
by Charlie Mynhier
drawings by Ed Warren

The Cylinders

These cylinders are packed with viton "0" rings, and if made properly they are very free running. Your engine can run on as little as 3 or 4 PSI -- that's lung pressure if you are up to it.

You may notice that these cylinders have drilled holes for the steam ports instead of rectangular slots. Small scale engines have a tendency to run too fast by nature -- or should I say physics. The drilled steam ports will accomplish two things for you. First, they are easier to do. Second, the small steam ports will help the engine run slower without sacrificing torque.

I made the steam chest cover, front cylinder head and crosshead guide out of stainless steel. Brass could be used and nickel plated by your local gunsmith. They would look and work just as good.

The first part we will tackle is the CYLINDER BLOCKS. Our draftsman, Ed Warren, has given us dimensions from the absolute center of the block so we can use the machining techniques we talked about in the March/April 1995 issue.

Cast iron makes the best cylinders, and it is easy to machine. Bronze is also good. I do not think brass or aluminum make good cylinders, in case you are considering using those materials. Brass is too soft and aluminum does not hold the heat.

I made the STEAM CHEST out of cold rolled steel flat bar, 5/16 x 1-1/4 x 11/16. You will need 2 of these. Brass could also be used to make a good steam chest.

The STEAM CHEST COVER was cut from 1/8 thick stainless steel plate.

The CROSSHEAD GUIDES were milled out of a 7/8 diameter stainless steel bar. Start with a bar 4" long, drill and counterbore each end for the piston rod in the lathe, take to the mill and mill away the sides for the 3/16" wide guide bars, then mill out the 1/2" wide crosshead opening. Saw the bar into 2 parts and finish each part 1-7/8" long. Drill the bolt holes and mill away the back side as shown in the end view. This will provide clearance for the front driver side rod.

The BACK PORT PLATE is made from 1/16" thick brass -- you will need two. Let me tell you two different ways you can make them.

1. Stand a short length of 1" diameter brass bar in your milling machine vise, use your indicator to find the center, drill and tap all holes at least 1/4" deep. Put the bar in your lathe and part off two 1/16" thick pieces.

2. Put a short length of brass bar at least 7/8" diameter in your lathe, mark the #1 jaw on your chuck and mark the bar where that jaw holds it (very few chucks run absolutely true, so when you take the bar out of the chuck and put it back in it will not run the same unless you mark it and put it back with the same jaws in the same place). Drill with tailstock a 5/64" hole about 3/8" deep in the end of the bar, insert a 5/64" pin into the hole so it protrudes about 1/4".

Let me give you a tip on drilling a tight 5/64" hole so it will be a snug fit for the pin. Drill one size smaller, and then follow with the 5/64" drill. Don't forget to start your hole with a #1 center drill.

Remove the bar from your lathe, stand it on end in your milling machine vise with the pin sticking up, indicate the spindle over the pin and, using your dial travel indicators, drill and tap the four 4-40 UNC holes. Put the bar back into the lathe using the marked jaw to put it back the way it was. Now cut two 1" square x 1/16" thick brass plates. Use a saw...don't be tempted to use tin snips as they will warp the plates. Put the plate into the milling machine vise and drill all holes. Now the plate can be bolted onto the bar and turned to the 7/8" diameter called for in the print.

The FRONT CYLINDER HEAD was cut from 1/8 thick stainless steel plate. You can use the same technique for making it as you did for the back port plate, or it could parted off from a bar in the lathe.

The PISTON is brass, soldered on a 5/64" diameter high speed drill blank. These drill blanks can be bought from most mail order tool houses. They are very hard and are rust resistant. The "O" ring for the rod is #004. The "O" ring for the piston is #012.

The CROSSHEAD is milled from 11/16" diameter round brass bar.

The VALVE ROD GUIDE is made from 1/4" x 3/4" flat brass bar.

The VALVE ROD is made from a 5/64" diameter drill blank with a 5/32" diameter stainless steel ball silver soldered 7/32" from one end as shown. The "O" ring for the valve rod is #004.

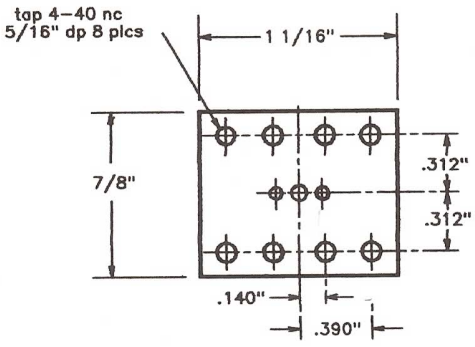
The TRUNNION is made from 1/4" square x 3/8" long brass bar with a 3/32" diameter pin.

The GLAND PLUG is made from 1/4" diameter round brass bar.

The VALVE is made from 3/8" diameter round bronze bar.

The INLET CONNECTION is made from 3/8" diameter round brass bar and 1/8" copper tube.

.125 + .125 + .65 = .115



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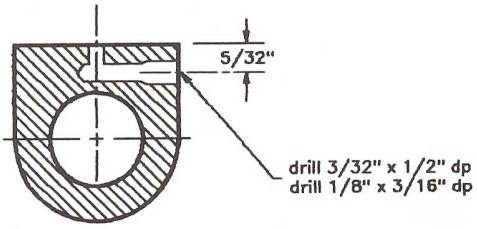

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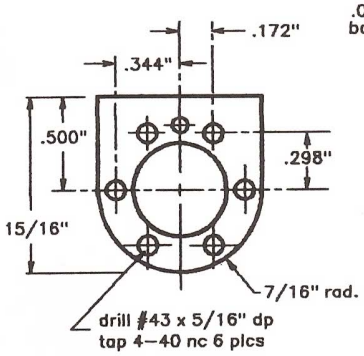

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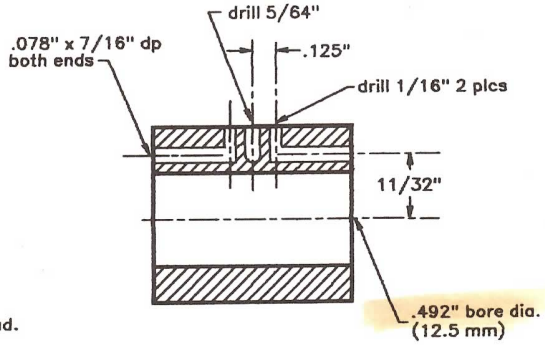
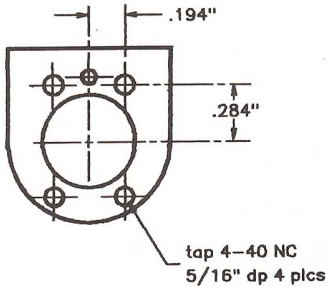


CYLINDER



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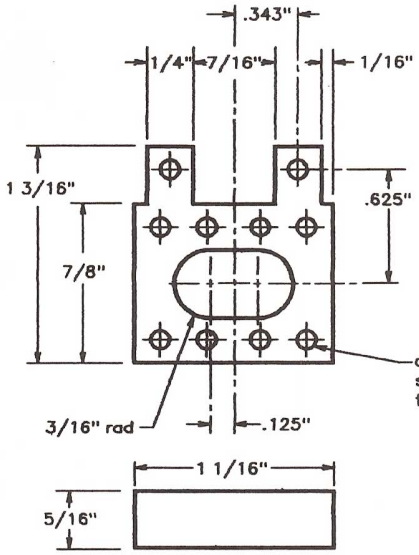
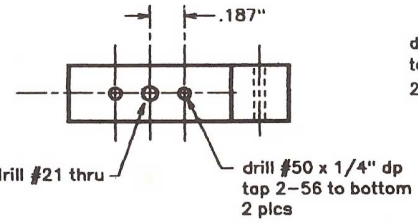
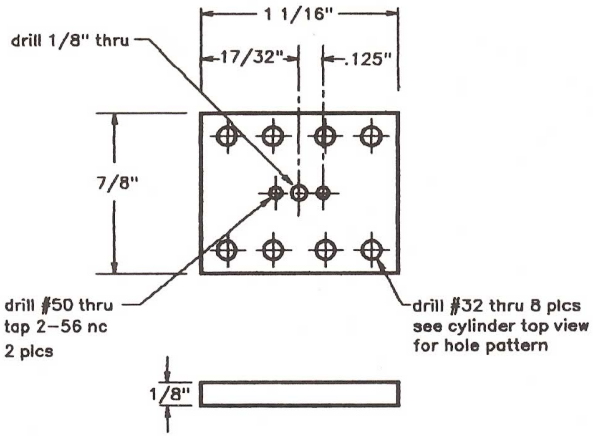
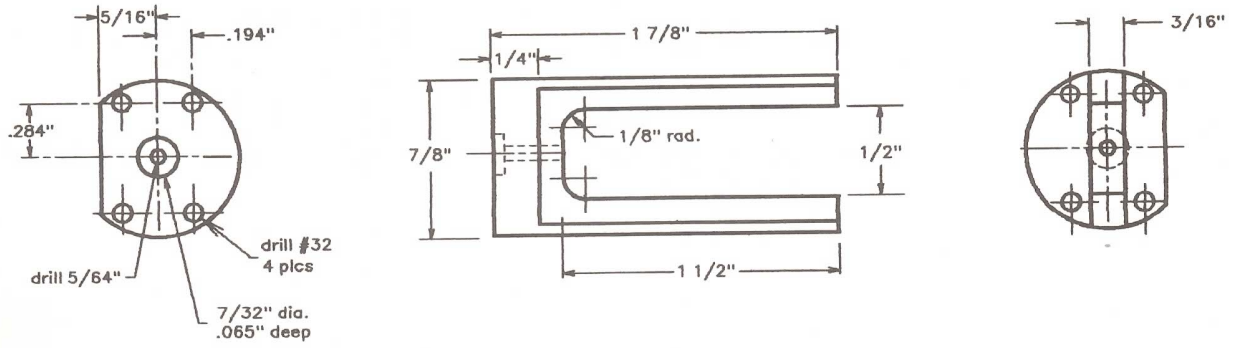




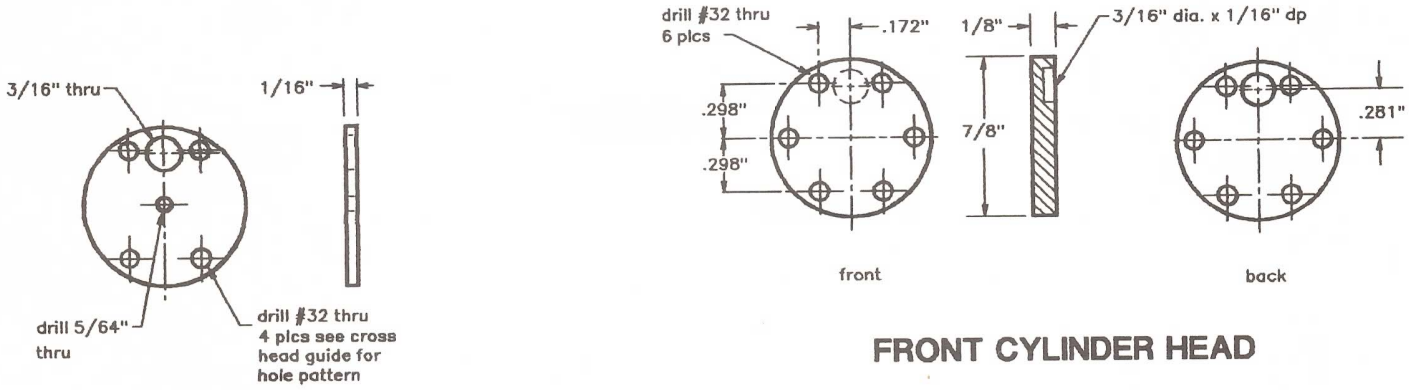
STEAM CHEST



STEAM CHEST COVER

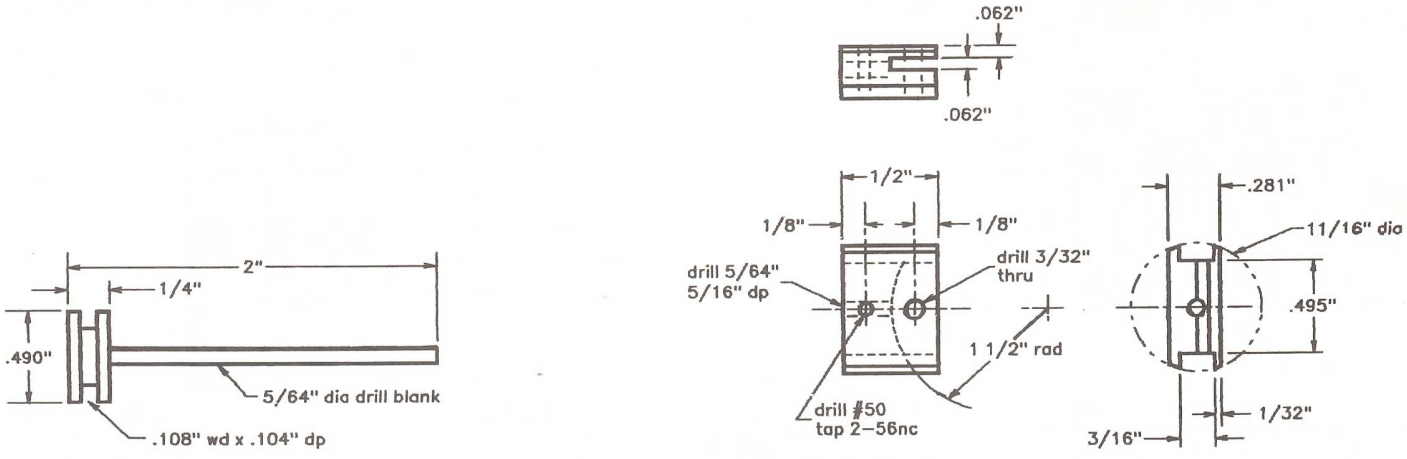


CROSS HEAD GUIDE



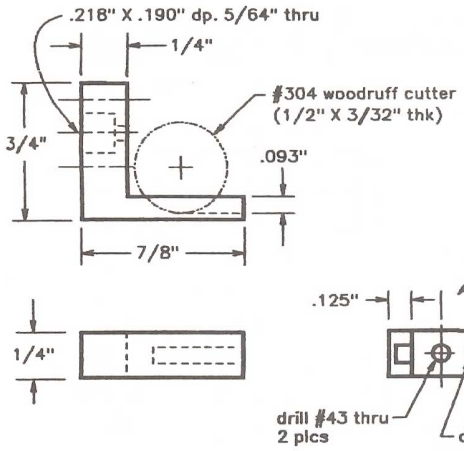
BACK PORT PLATE

FRONT CYLINDER HEAD

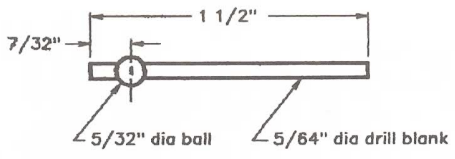


PISTON

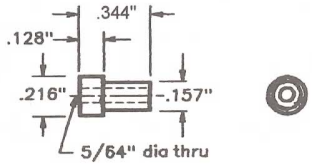
CROSS HEAD



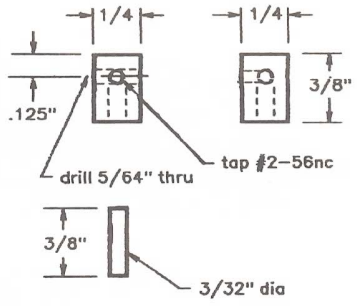
VALVE ROD GUIDE

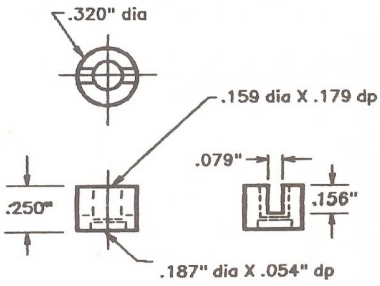


VALVE ROD WITH TRUNION



GLAND PLUG





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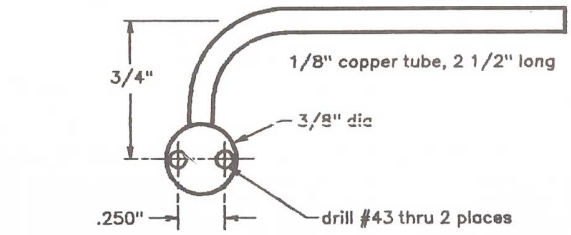
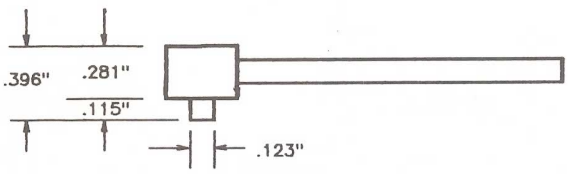
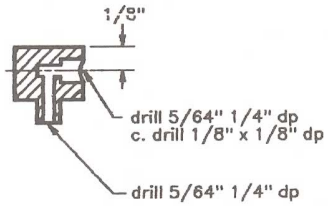






INLET CONNECTION

Glossary of Terms

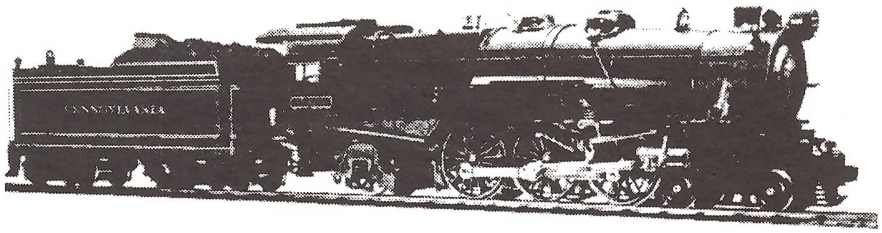
commonly used by steam engine builders

First, we must understand that Steam Engine Builders do not live in the same time plane of the universe as the rest of us. Thus, though their language may sound familiar, the words have a different meaning.

"On Time" could mean anywhere from a month to several years late.

"Ready To Ship" means that you might get it this year.....but probably not.

"In Stock" means that the builder has the raw materials on hand to build your engine.....or is at least thinking about ordering them.



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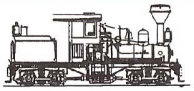
SHAY! 

Good news for those of you who have been waiting patiently for word on the Catatonk Shay. Some of you saw the pilot model at Diamondhead and were pleased with what you saw. The first production models are on their way from Australia as this is written, and they are even better than the pilot model. We hope to have photos available for the next issue, and will be contacting everyone on the reservation list with more info soon. Thanks for your patience!

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If you have a brass button Goodall boiler fill valve and you would like to get away from that dirty oxidized look, I will professionally surface blacken it to match Frank's boiler color with no charge for labor or material. Just pack it up and send it to me, including two dollars to cover return postage and packing. This is a limited offer based on my current workloand and may be withdrawn by me at any time. I will soon be offering kits, or shop installation, of the boiler fill axle pump that I demonstrated on my Frank S. at Diamondhead "95". I have on hand a limited supply of the Frank S. tender dummy coal loads that disguise the fifties "appliance look" butane gas valve wheel, as well as some "peep, peep" steam whistles that mount inside the cab. The whistles are available in kit form, or shop installed, with a hardwood button for manual actuation through the cab window; R/C operation is an option. I will also fit Frank S. with two channel R/C on both the throttle valve and motion bar. This fit provides velvet smooth operation of Frank S. at all speeds, and in all maneuvering situations. Please send a large SASE for more information on pricing and availability of products and services. Keep steam up!!!!!!

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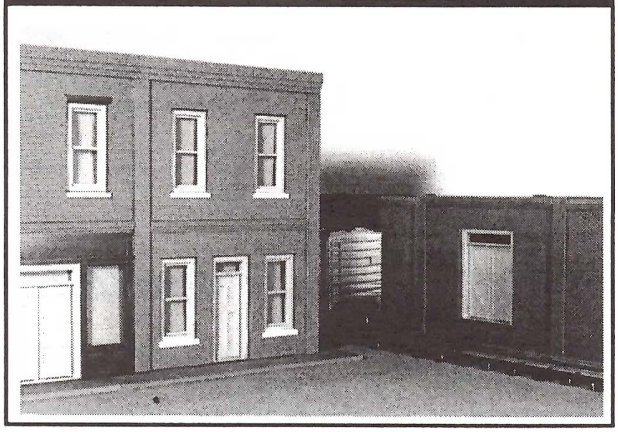

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The Lathe-Free Locomotive

Part III -- Preparing the Boiler

by Rob Kuhlman

A loco construction project series for fellow mechanical neophytes and klutzes

Welcome back! Have the scrapes and cuts on your fingers healed up yet? Place the Mamod SP-4 stationary engine in front of you and notice how many rivets and twisted metal tangs hold everything to the bright red base. You Wilesco or Jensen folks probably have some similar fasteners to attack. We need to untwist the tangs and drill out the rivets so we can disassemble the works. Let's start with the engine base. The SP-4 has four aluminum rivets holding the cylinder/flywheel support to a gray sub-base and the red base. With a 7/64" drill chucked in a pin vise, gently drill down from above; soon the rivet head will pop free and the bottom will pry away.

Now take your razor saw and saw through the steam line (the center copper tube; it runs from the boiler to the engine) at about the midpoint between where it attaches to the boiler and where the two exhaust lines join it. Put the cylinder assembly aside for later. Now, turn the base upside down and drill out the three rivets holding the boiler firebox to the base. Untwist the two tangs, and the firebox and chimney base should separate from the red base. The firebox should now be pulled apart leaving one piece still riveted to the boiler. These two copper rivets should be filed off; since they're copper, it won't take long. Now drill out the remaining four rivets securing the firebox end piece to the chimney base and the job is done.

Let's prepare the boiler. Remove the whistle, the Mamod safety valve, and the sight glass assembly and set these aside. Take a #50 drill (my one concession — it's midway between a 1/16" and 5/64") and with the pin vise drill down into the two remaining copper rivet stubs on the end of the boiler about 1/8" to 3/16". Now take a 2-56 tap (a special T-handle tap wrench is great, but a pin vise will work in a pinch) and tap these holes. Use your oil and go in straight and gentle. Twist a quarter turn, untwist an eighth; twist a quarter, untwist an eighth. Unscrew your tap from the hole from time to time to clear out the chips and grunge. If the tap becomes quite difficult to turn, STOP! You've gone in far enough and you've probably bottomed out. At all costs, don't break the tap in the hole. Now take two 3/4" 2-56 bolts and screw one into each hole. Nice, isn't it?

Now we want to solder them in place. We're going to use silver-bearing solder because regular old solder isn't as strong. Get a coil of silver-bearing solder from the home center and, if you can find it, special zinc chloride flux to go with it. In the absence of the special flux, good old "Nokorode" soldering paste has worked for me. Back the screws out and wash out the holes and rinse them with some cheap rubbing alcohol (isopropyl) to clean the oil off. Similarly, clean your bolts and then wipe through the threads with some fine grit abrasive paper. Put a drop or dab of flux on the holes and screw the bolts in.

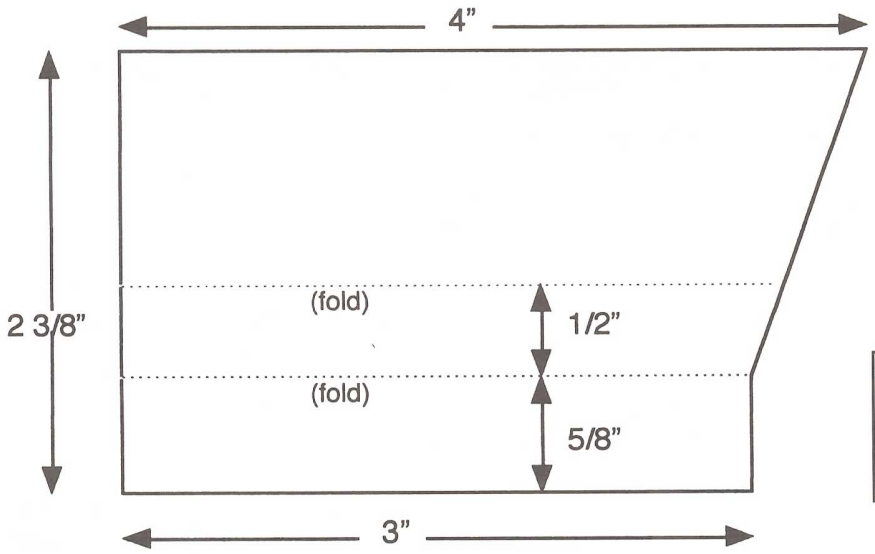
Advocates of torch soldering talk about a firebrick hearth and so forth; I support my work by using two 8" offcuts of 2x6 placed on the workbench at right angles to one another with two old slate roofing shingles resting against them to protect the wood. Alternatively, for this job, you could gently grip the boiler with your vise.

Light your propane torch and adjust it to a gentle flame, then bring the outer portion of the flame onto the soldering site until the flux bubbles and churns. Now, touch your solder to the joint. A piece of solder will probably melt off and blob up there. That's OK. When the joint gets hot enough the solder will seemingly lose surface tension and flow down into the joint. Great. Now do the other one. Let things cool down and then wash off the joint and anything else the flux dribbled on — it's pretty nasty stuff. If your joint looks ugly with lots of lumps of brittle solder and black char, (or if the joint wasn't entirely coated with solder) polish things up with fine sandpaper, flux again, and reheat. When you're satisfied with the joints cut the heads of the bolts off, dress the ends with a file, and spin a 2-56 nut down the threads. We've effectively turned the bolts into studs (sounds like what they do to race horses).

Something nasty may have happened to you along the way when you were drilling out the boiler rivets — the other end of the rivet head got pushed into the boiler. This has happened to me four times. Once I was able to retrieve it and push it back into its hole from the inside; I then silver soldered it in place before tapping. The other three times I instead fished (through the sight glass opening) a 1/2" long brass 6-32 bolt into the hole from the inside, attached the brass nut on the outside, and silver soldered the assembly to the boiler. I then cut off the bolt flush with the nut, centerpunched it, drilled it #50, and tapped it 2-56. No problem.. .you can handle adversity by now.

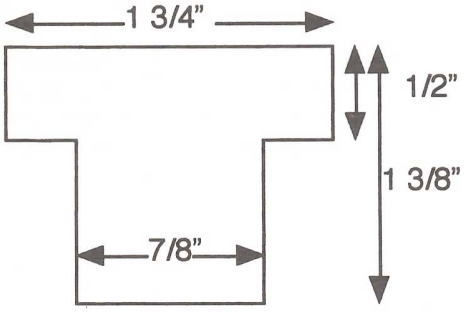
While you've got the torch handy, melt the blob of soft solder holding the short steampipe to the boiler and pull the pipe free. Wipe off the old solder, clean and flux both pieces and silver solder the steampipe back in place — but this time have the curved end directed towards the engineer's side of the boiler instead of the fireman's side. Replace the Mamod safety valve and whistle. Grab ten to twenty small brass nuts/bolts/screws and dump them into the boiler through the sight glass slit. Add about 5-10 ml of rubbing alcohol and, with the heel of one hand covering the slit and a fingertip covering the end of the steampipe, shake the silly boiler (sounds and looks like a cocktail shaker) for five or ten minutes. This technique, published by Deryck Goodall long ago in SitG, will clean out the grunge that the Mamod folks left inside your boiler. When your arms give out, pour the cocktail into a container — notice how yucky the

Side Shields (make 2)

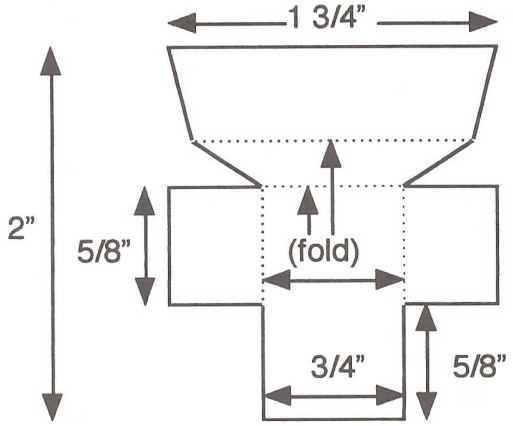


FLAME SHIELDS
FIG. III-1

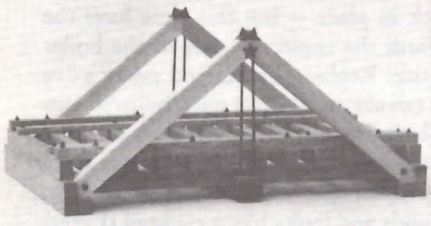
Rear Shield



Front Shield



KING POST TRUSS



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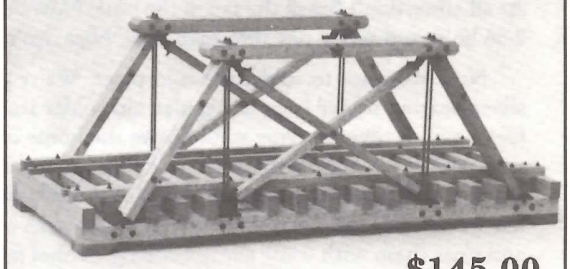

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alcohol is? That stuff would have been forced through your steamlines and cylinders! Remove all the nuts/bolts/screws you put into the boiler, unscrew the Mamod whistle and safety valve and set the boiler aside; we're done with it for a while.

It's time to alter the firebox. Take each of your two black end pieces and scribe a horizontal line 1/2" below the cusp of the curve. We'll cut along those lines which effectively reduces the firebox height by 1-1/4". Similarly cut 1-1/4" off the bottoms of the chrome side pieces. We'll need to bolt these four pieces together, so take a point 1/4" up from the bottoms of the folded vertical flanks of each end piece, centerpunch, and drill 3/32" these four holes.

"Dry assemble" your firebox and transfer the locations of these end piece holes to your side pieces and drill them out. Mark a point 1/8" up from the bottom of your side pieces at each end, 1/8" inside of the adjoining end piece. Centerpunch and drill 3/32" these marks. Now cut two 3-1/2" long pieces of 1/4" brass. Place the upright edges of the brass angles inside of the firebox side's bottom edges. Transfer these four holes to the brass angles. When they're drilled 3/32", attach the brass angles to the firebox sides. These angles will now be used to attach the firebox to the chassis deck.

Assemble the firebox and place it on the chassis (forward is determined by the end piece with two leftover rivet holes), centered from side-to-side and with the forward end flush with the front ends of the deck pieces. Scribe around the edges of the brass attachment angles so you won't lose your place. Now transfer the locations of the mounting holes from underneath the deck up to the underside of the brass angles. Drill out the angle pieces, and then bolt the firebox to the chassis (bolt head underneath the deck, nut on top).

When you look at the sides of your firebox you'll see two oval exhaust openings. When we ultimately cover the firebox with side tanks, the firebox will become constipated. So we need to take a razor saw and slice through the uppermost horizontal lip at each end of the side pieces just where they adjoin the end pieces. With pliers, crimp the horizontal segments down onto the inside of the sides leaving the 1/4" wide tang at each end for later. We've just created a nice 1/4" wide exhaust slot between the firebox sides and the boiler.

I like to add another metal inner layer to the firebox to serve as a flame shield. Cut tinplate (empty Coleman fuel can or maple syrup can) or thin brass pieces according to Figure III-1. When the inner shield sides are bent, slip them into the firebox, slanted end forward and upper edge just up against the inside tops of the firebox ends, and mark the locations of the four chassis side-to-deck mounting bolts. Drill these holes out and slip the shields over the bolts. Run on additional 2-56 nuts to hold them in place. Now crimp down the 1/4" wide horizontal tangs at each upper end of the firebox sides to clamp the upper edge of the shield in place. The rear heat shield just slips down between the side shields and the firebox rear. The front piece has a complicated bend to it. The two side extensions get bent 90 degrees and drilled out so they slip onto the chassis bolts. Lock them on with nuts. The upper segment of it gets mashed down and frontward when we slide the boiler in place; the bottom stem needs to be bent to clear the driver's chain sprocket.

Well, that should be enough to keep you busy for a while. Next time, we'll turn our attention to the engine. Think about how your railroad is designed and what your desires are towards the use of this tram engine. If your line is level and you want to maximize speed we'll gear it differently than we would if your line has grades and/or if you want to maximize hauling capabilities. For the speed demon, we'll end up gearing the engine about 6:1; you'll use one of Serv-O-Link's 8103 sprockets (10 teeth, 3/8" arbor) and one S323 sprocket (32 teeth, 3/8" arbor). For the snail's pace stump puller, the gearing will be about 12:1; we'll use two S103s, one 8323, and one 8203. Everyone will need one foot of the C1227 chain. I recommend that you order at least twice what you need in case you have an alcohol fire which melts the Delrin. The more gears you order, by the way, the more tram engines you'll want to build to use up your inventory. Nothing wrong with that! See you next time.

Sources for items mentioned in this construction series:

Diamond Enterprises, Dept. SitG, Box 537, Alexandria Bay NY 13607. Phone 613-475-1771 FAX 613-475-3748. Mamod & Wilesco Stationary Engines, Traction Engines & lots more. Phone, fax or write for catalog & information.

Micro Fasteners, 110 Hillcrest Road, Flemington NJ 08822. Phone 800-892-6917. Great source for fasteners of all types and sizes. Ask for their FREE catalog.

Sulphur Springs Steam Models, Ltd., PO Box 6165, Dept. RB, Chesterfield MO 63006. Phone/fax 314-527-8326. Excellent source for many scratchbuilder and kitbasher items, including soft-soldering and silver-soldering torches and supplies, hard-to-find items like BA fasteners, taps, dies, Goodall valves, safety valves, wick packing and lots more. Send $2.00 for their catalog.

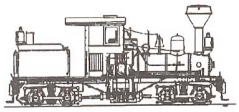
Berkeley Locomotive Works/Brandbright, 2821 Hillegass Avenue Nº 22, Berkeley CA 94705. Phone/fax 510-849-9284. Wide range of valves, wick packing, pressure gauges, and everything under the sun. Send $5.00 for their catalog.

Mike Chaney, 116 Vicarage Road, Chelmsford, Essex CM2 9BT, England. Phone 011 441 245 260 096. Mike manufactures and sells safety valves, Goodall valves and just about every other kind of valve you can think of. Also wick packing, steam regulators, replacement boilers, lubricators and a whole lot more. Send a $1 bill for a catalog.

Serv-O-Link, PO Box 100542, Ft. Worth TX 76185-0542. Phone 817-732-4327. Source for chain & sprockets, as mentioned in text.

Stock Drive Products, Box 5416, New Hyde Park NY 11042-5416. Phone 516-328-3300. Great source for chain, sprockets, gears, belts, bearings, couplings, etc. **Their catalogs are a wonderful reference.**

When contacting any of these firms, please mention that you saw it in Steam in the Garden magazine. Thanks!



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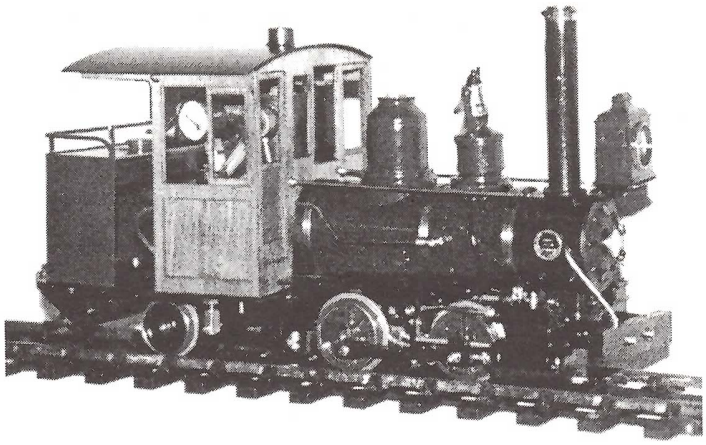

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Argyle Loco Works -- Please Note: New address as of 25 May, 1995 -- 241 Belgrave -- Gembrook Road, CLEMATIS 3782, VICTORIA - AUSTRALIA

R/C Tips & Hints

by Douglas Smith

Eliminating those pesky glitches

The Maxwell Hemmens Porter is a fine engine, but, like most everything else in the world, there is room for improvement. One problem that really bugged me was "glitching", or undesired movement of the servos. This can result in changes of speed or direction -- or unexpected blowing of the whistle.

One of the most serious sources of glitching in model trains comes from the signals generated by metal wheels on metal rails. The MH Porter radio receiver and antenna are located in the tender, so I modified the tender to help eliminate radio glitching and chatter by changing from metal wheels to a non-metallic wheel.

A side benefit to this modification is improved tracking of the tender over rough and uneven trackage. The stock tender wheels on the MH Porter have finescale flanges, which means they tend to derail with wild abandon if the trackwork is less than perfect. Not that yours would be imperfect, of course, but there are all those other guys out there.....

Okay, let's get to work. I installed non-metallic wheelsets from Paul Culp Jr., which are larger in diameter than the stock wheels and required the following modifications.

Step #1

Dismantle the tender truck. Be sure to save all the parts.

Step #2

Remove the Hemmens wheels from the axles. Drill or ream the axle hole on the Culp wheel sets so that the Hemmens axle is a tight press fit.

Step #3

Make up four (4) 1/16" x 1/4" x 5/8" brass spacer plates, per diagram.

Step #4

Make four (4) 1/16" x 1-3/8" bolts from 1/16" brass rod threaded on both ends.

Step #5

Reassemble the tender truck, using the original bolts for the axle bearing blocks. Install the 1/16" brass spacer plates at the bottom of the bolts and put the nuts on. Make sure that the axle bearing blocks are aligned for smooth running.

Step #6

Cut two (2) 6-13/16" lengths of 3/32" x 3/16" rectangular brass tubing. Drill six (6) holes as per diagram.

Step #7

Install the brass tubing over the bolt heads of the axle bearing bolts as per diagram.

Step #8

Install the tender floor. Install the four (4) 1/16" brass bolts in the buffer beams as per diagram.

Step #9

Oil the axle bearings. Hook the tender up to the locomotive and you are ready to run...with fewer glitches and much improved tracking over less-than-perfect track sections. I found a fringe benefit in added running time of 5-10 minutes per run. Apparently that much steam was being wasted by unwanted operation of the whistle and throttle!

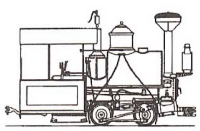
Optional Extras

Another step that could be taken to eliminate additional metal-to-metal contact and to electrically isolate the tender from the locomotive is to replace the metal drawbar with one made of plastic, nylon or some other non-metallic material.

Sources

Culp wheels are available at your favorite train shop or mail order house -- or you can order them direct from the manufacturer: Miniature Railroad Products, RR 4 Box 411, Perkasie PA 18944 -- 215-249-9163.

Editor's Note: Any model steam locomotive fitted with R/C could benefit from the elimination of metal-to-metal contact and the noise generated thereby. In upcoming issues we will dig into other methods of eliminating annoying -- and potentially disastrous -- glitching.



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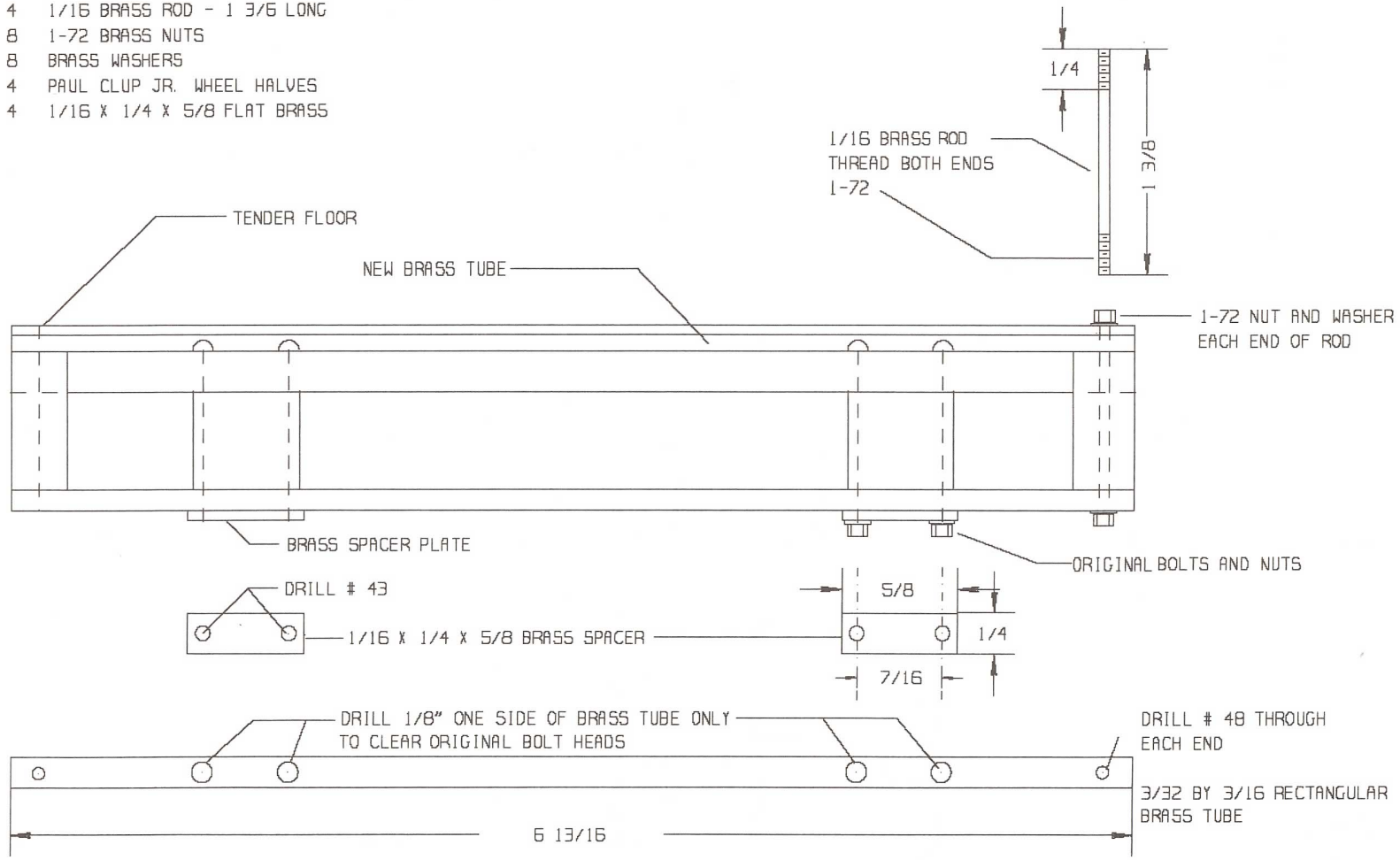

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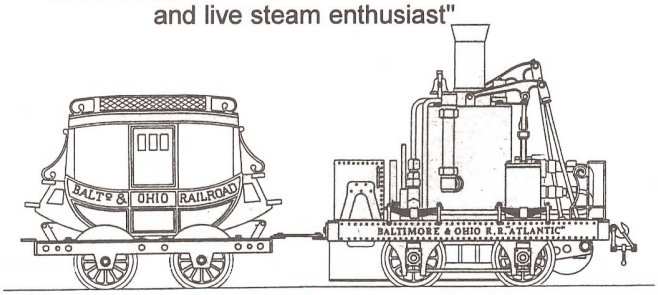

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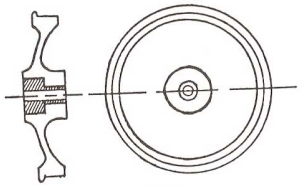

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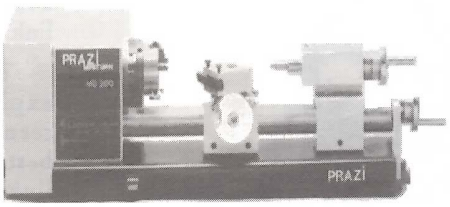

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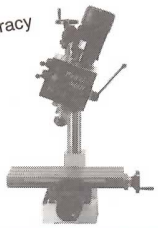

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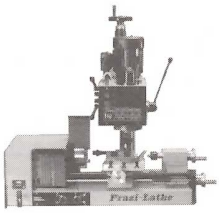

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Radio Control for the Porter

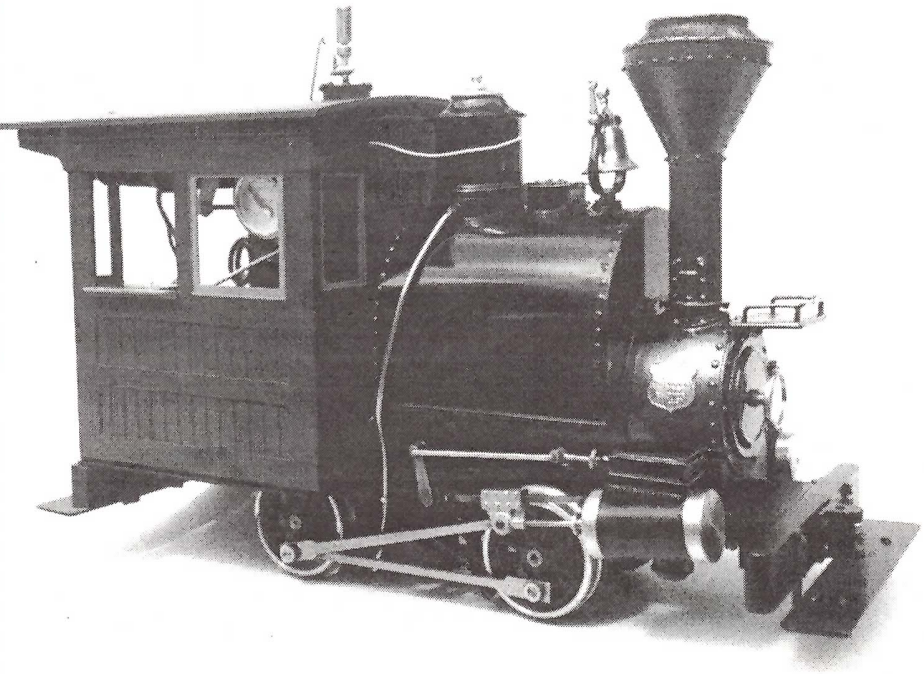
text and photos by Malcolm Wright

A Builder's Point of View

It is always hard for the builder of an engine to see its faults, so it was only slowly that I realised that my Porter locomotive was not ideal for the U.S. market. The problem was a simple one. The direction of the engine could not be changed without touching the engine. This was because it was fitted with slip-eccentric gear.

American locomotives of this era had a neat arrangement of Stephenson's gear. The die pin was on the bottom of the crank that transferred the drive from inside to outside of the frames. Further, an economy was effected by lifting the link from the point where the lower eccentric rod was attached. Now, although it keeps parts to the minimum, it should according to the books provide poor running in reverse since the suspension point is not optimal. However, I felt that if it was to have valve gear it should have a copy of the real thing, since fidelity to the prototype is the niche in the market that I attempt to fill.

BELOW: The finished Porter, showing full Stephenson's valve gear and all the radio control equipment on board and ready to go. The production model will sport a large, old-fashioned box headlight where you now see only a bracket. Note the bell pull aerial mentioned in the article.



The first stage of building any valve gear is to draw it out. The idea of this is to check the geometry of the gear. This stage was difficult since the only book there is on model valve gears dismisses the American arrangement as highly suspect and not worth considering for a model. In other words, the book dismissed models of U.S. locomotives. I resorted to the works drawings, laid out the model gear as they had, and it appeared to work.

This is the stage at which metal is cut. I make my valve gear parts by profile milling. You make a pattern in scrap laminate and as you push a follower round this a cutter cuts the piece from metal. Once all the parts were made the eccentric sheaves were machined up. Even if I am making only one engine I make a simple split chuck jig to impart the correct throw to the sheaves. It is much faster than messing about with four jaw chucks.

Having made the parts they were assembled onto an old slip eccentric chassis I had. It was not going to be easy. The Stephenson links would not move the die pin easily, and worse still there was no mid-gear position. What had gone wrong? My first thought was that I had made the radius of the Stephenson link wrong -- but no, it was not that.

My second thought was that the eccentric rods were too close together on the Stephenson link. This was because I had made a launch type, rather than a loco type Stephenson link.

The last explanation seemed the best so new links were made. Even worse, the wheels would hardly turn as there was so much resistance. Back went the first links and I packed it in for the day. The next morning I had a fresh look at the calculations and drawings. I could find nothing wrong so I thought to myself, "It's time to start experimenting."

The first experiment was the length of the lifting arm. This part is on the shaft that crosses the engine from side to side and converts the pull from the rod in the cab into a lifting movement

of the valve gear. It became clear as different arms were made that the longer the arm the better things felt. Then the insight. The lifting pivot on the arm had to be on the radius of the link.

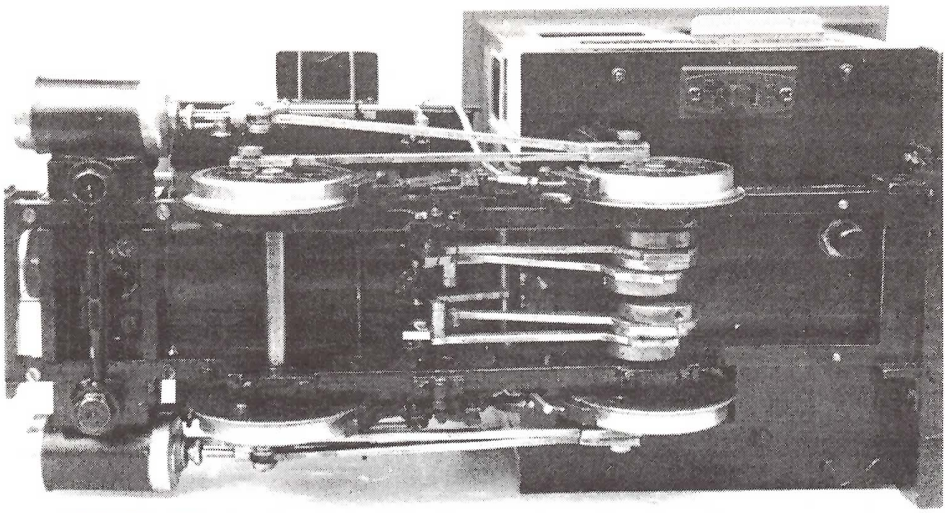
The last problem was the length of the lifting link that joins the arm end to the bottom of the Stephenson link. The length of this did not effect the operation of the system but did effect the valve movement. Longer and shorter links were tried and eventually, after four attempts the right length was found. The valve gear now looked as though it should work.

A cylinder set was mounted on the chassis and the valves connected up. It is then that you need to remember what is supposed to happen – the respective valve should start to open just before the piston reaches front or back dead centre. It is easy to arrange the gear so the right side engine is trying to go forwards while the left goes back. First, though, the die pin is put in the middle of the link and the wheels are rotated. As this is happening the valve is watched on its face. It is moved back and forth on its rod until the ports are seen cracking open equally at each end of the valve's stroke. If all is well the ports should only just open. Indeed this is what happened.

The last thing to check is that this equal behaviour is seen whether the wheels are turned clockwise or anti-clockwise with the Stephenson link in the relevant position.

Now the British book suggested that the events of the valve should be OK for one way but not the other. Let me tell you that the book is wrong. The valve events were equally good in forward and reverse.

The last stage in setting the gear is to move the eccentric sheaves back and forth until the port opens just before forward or back dead center. Normally this is tedious since the setting on one sheave upsets the timing of the other and one can fiddle for a long time. I know this to my cost from the Hunslet locomotives I built. Surprisingly, this valve gear did not have this problem. It seemed that the setting of the sheaves were independent of each other. Therefore finishing off the valve setting was very quick. On with the covers and switch on the compressor.



ABOVE: The underside of the locomotive, showing the near-prototypical arrangement of the valve gear and the various components that needed so much experimentation.

Applying air for the first time to a new design is always either a high or a low point. Sometimes both. The engine starts, then runs for a second tying itself in knots in the process. Yes, this even happens to professional builders. The thing is you just have to get up and start again. However this was not to be. A squirt of oil all round, on with the air line and whirrr! The wheels went round and round, nothing fell out and nothing broke. With the engine running the next thing was to move the link. It was hard to believe but the exhaust note changed, the engine stopped, started again and when the die reached the other end of the link, the engine was running happily in reverse. What is more, moving the link was effortless. Backwards and forwards it went. It was quite exciting to have overcome the problems.

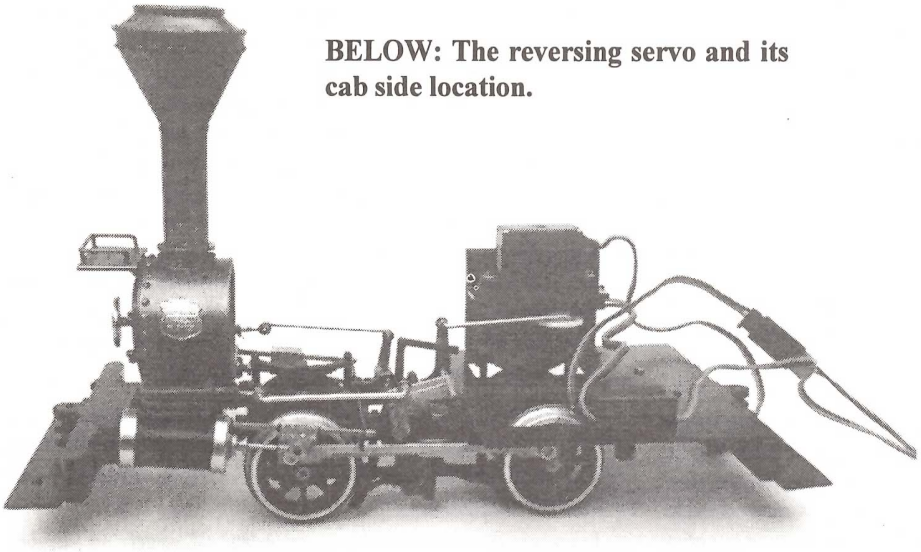
One point to remember if you are tempted to scratch build a similar valve gear is to avoid slackness that would allow the link to tip at an angle to the drive. If it can, it makes the link difficult to shift.

I thought the rest would be easy. After all, nearly all builders offer a radio controlled option. However, as I looked at the other products I saw it was not easy. So many lovely models had cabs cluttered with bent up servo holders of all sizes, with bits of wire contorted into all sorts of shapes to get the pull into the right place. The problem seemed to be that the radio control was generally an after thought. Consequently it had not benefited from the care that was obvious in the rest of the product. Foolishly I decided I could do better and decided to design the radio installation carefully.

The first problem was where to put the servos and how to mount them. If I used the standard size of servo the whole cab would be filled with them and their mounting plates. I decided to use micro servos. Although expensive, they were a nice size. One servo complete with its mount tucked down on one cab side.

Remove four bolts, off comes the cab and you can fit or change the servo. Also it was out of sight. Behind it in the rear cab side was a space. By moving the servo forward a few millimetres, a neat home was found for the receiver. Again tucked away but easy to get at for plugging in power and servos. I thought this looked good, so I joined up the reversing gear to the servo. It worked. There I was in the pouring rain outside the workshop making the engine run forward and back on the air line as if by magic. These radio things are really good, I thought. They say the most recent converts are the keenest!

The remaining problems were where to put the batteries, and where to put the second servo to operate the regulator (throttle). This second servo could be mounted on the cab floor,



BELOW: The reversing servo and its cab side location.

but if I did this it would make cleaning the burner jet a major task. There was no room on the other side of the cab as that was filled by the gas tank position. Then it struck me...in the roof.

On went the boiler and the regulator. A look showed that the second servo should fit.

Before this could be done the engine was readied to run on steam. The boiler was tested, an enlarged gas tank was made, and when ready this and the burner were tested. Everything was OK and the engine ran for the first time on steam, reversing successfully by radio. I was then stuck by where to put the batteries. In the water tank seemed a solution. The Porters up till now had used the water tank and vacuum filling. However, if I used my filling valve that had proved on the Wren locos I would have a large space available.

The servo was mounted across the roof of the cab on a bracket similar to the first servo. The family resemblance helped make the installation look much more designed – to my eye at least.

When the cab was on, I found that by trimming the edge of this bracket the servo too could be made to disappear.

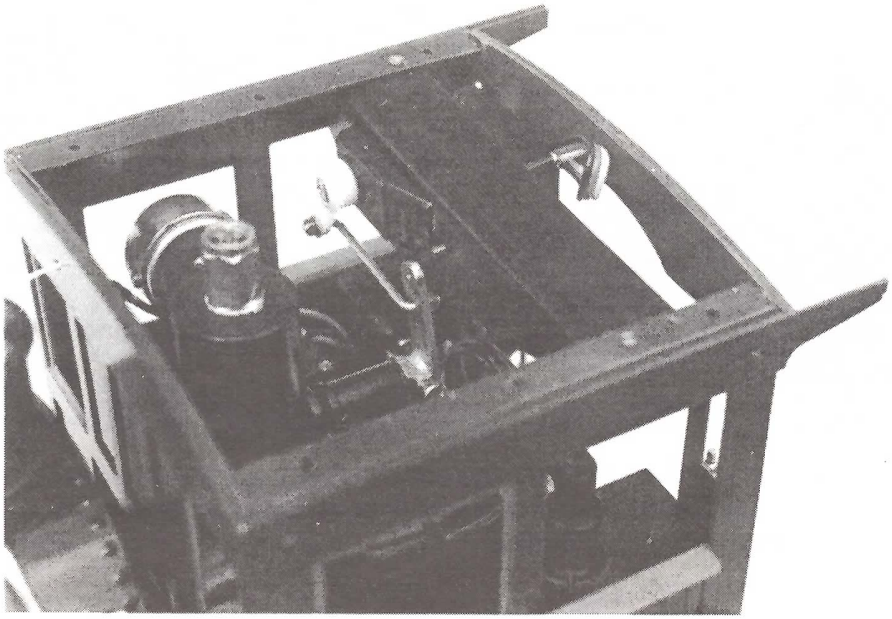
A trial run with the batteries on the cab roof showed everything was well. The last job was to make up the tank and fit the batteries. It was here I made hopefully my last mistake. I decided to put the batteries into holders since these fitted into the tank so well. Alas, on the first run all power failed after twenty minutes. I thought it was the hot environment of the tank causing the batteries to lose charge, but when I went to recharge them it was open circuit. Off came the tank, out came the batteries, and then the problem. The batteries were still charged. What had gone wrong?

Back everything went, and on the next run the power went after five minutes. This time I carefully took the tank off when the engine was cold. Poking one of the batteries with a point suddenly restored the power. The problem was no more than a poor connection in the battery clip. So that idea went in the bin and the batteries were soldered together and protected from shorts with heat shrink sleeving. The third run was without problem, the batteries holding their charge for at least three runs.

With the last problem overcome the engine was stripped, painted and put back together. Often readjustments are needed when this is done but not with this engine. In its new coat of paint it looked its best and ran just as well. The final touch was to extend the aerial, using the bell pull as an aerial wire. Now that I call design!

We published a review of this locomotive in SitG № 25. The builder offered to give our readers some insights into the development process, and we are pleased to be able to present this additional information. We were very impressed with the loco we reviewed, but noted that it did have some minor shortcomings. Mr. Wright has indicated that all these problems will be resolved on the production locos – an impressive and satisfactory response by this highly regarded builder – ed.

BELOW: The cab roof location of the throttle servo. The reversing servo, receiver and gas tank can also be seen.



LETTERS FROM THE OLD CURMUDGEON

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Honoré de Balzac

The Old Curmudgeon

Dear Gene -

Remember I told you to keep you eyes open when in a hardware store for odd things which are useful to us hobbyists? Well I found something useful at, of all places, a sporting goods store! Every shop needs a low profile, heavy, dead blow hammer...preferably one which is also non-marring. To get one cheap, go to a sporting goods store and get a one-pound lead rock cod sinker. Its already the perfect size and shape for your hammer. They're cheap. Buy a couple of them.

Remove and throw away the eye that the fish line would attach to. You can make a handle out of a piece of metal rod or from hardwood dowel. Drill a hole in the sinker for a tight fit with your handle and epoxy and pin them together. Do a good job...you don't want a pound of lead flying across your shop. I discovered some cheap import rubber mallets in my hardware store which were so low priced that I bought a couple, took the rubber head off of one and used the hickory handle for my lead hammer.

While you are in the sporting goods store, pick up a bag of lead bird shot that shotgun shell loaders use. Better yet, contact a friend who is into reloading and he may give or sell you a small amount of shot. If you do have to buy it at the store, you may have to buy ten pounds or more, but you will be able to use the shot to make a couple of useful shop tools.

First will be another type of dead blow hammer for tapping center punches or tapping a workpiece into final position before clamping it down. I've enclosed a drawing of it.

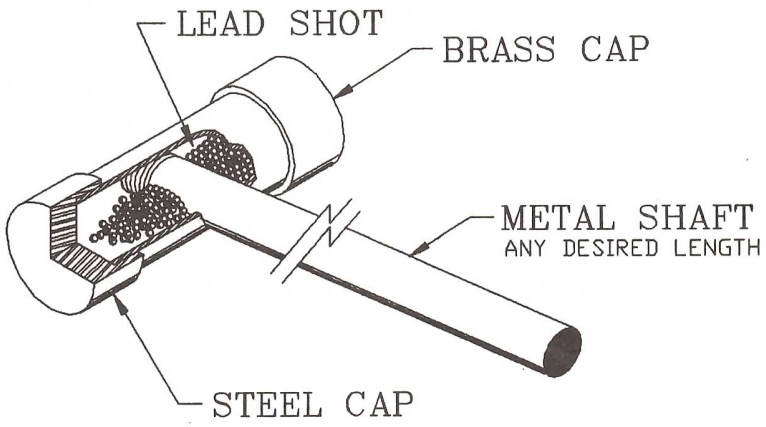
Now get a short (about 2") length of 3/4" brass water pipe from your Inexhaustible Scrap Box or the local hardware store. Cross drill it in the middle with a "Q" drill, which is the tap drill for a 3/8-24 thread. File one hole to a full 3/8" diameter and tap the other 3/8-24. Now insert a length of 3/8" rod threaded 3/8-24 on one end and you have a handle.

Make a tight fitting, mild steel cap for one end of the pipe and a brass cap for the other end. If you have a good tight fit for the caps you can attach one cap now using one of the many "instant glues". With one cap in place, half fill the hammer head with the bird shot and attach the other cap. Now you have added a neat precision dead blow hammer to your tooling. If you want to expand on this hammer idea, I suggest you try threading each end of the 3/4" pipe so you can screw on various caps to suit the job at hand. Besides steel and brass caps you might want to make caps of plastic and aluminum.

Any surplus lead shot that you have can be used to make up one or more 6 inch square, shot filled, leather "bean bags". Get some soft leather or a car washing chamois and cut it into 6 inch squares. Double stitch the edges together leaving an opening about 2 inches long. Turn the bag inside out to get the seam edges inside then pour the bag about half full of shot. Finish by stitching the opening shut.

Bags such as these are used by jewelers and engravers to steady odd shaped pieces when being worked on and can serve to press down odd shapes when soldering or gluing where clamping would be difficult or could mar the work.

DEAD BLOW HAMMER



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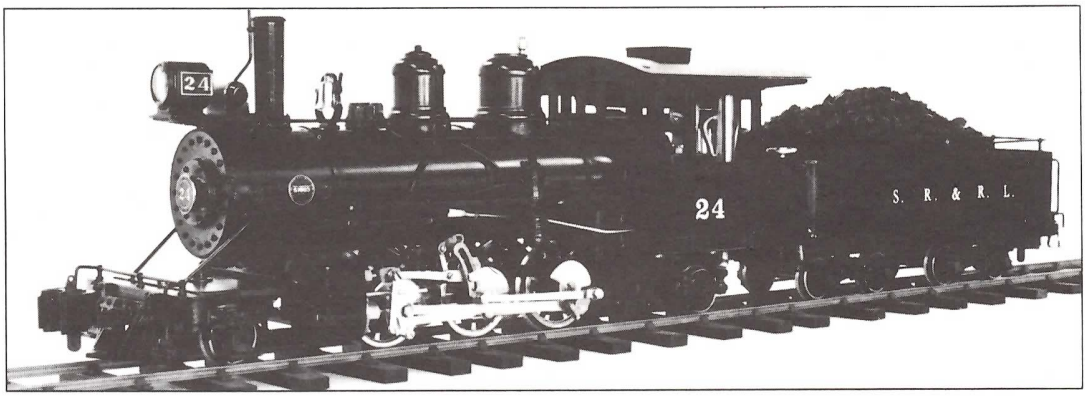

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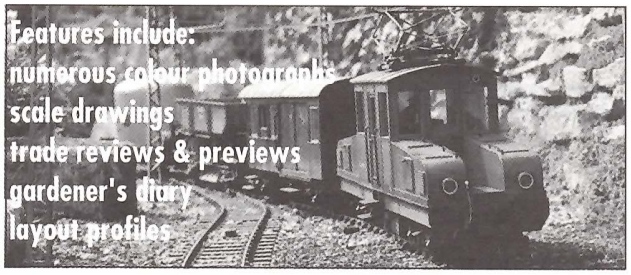

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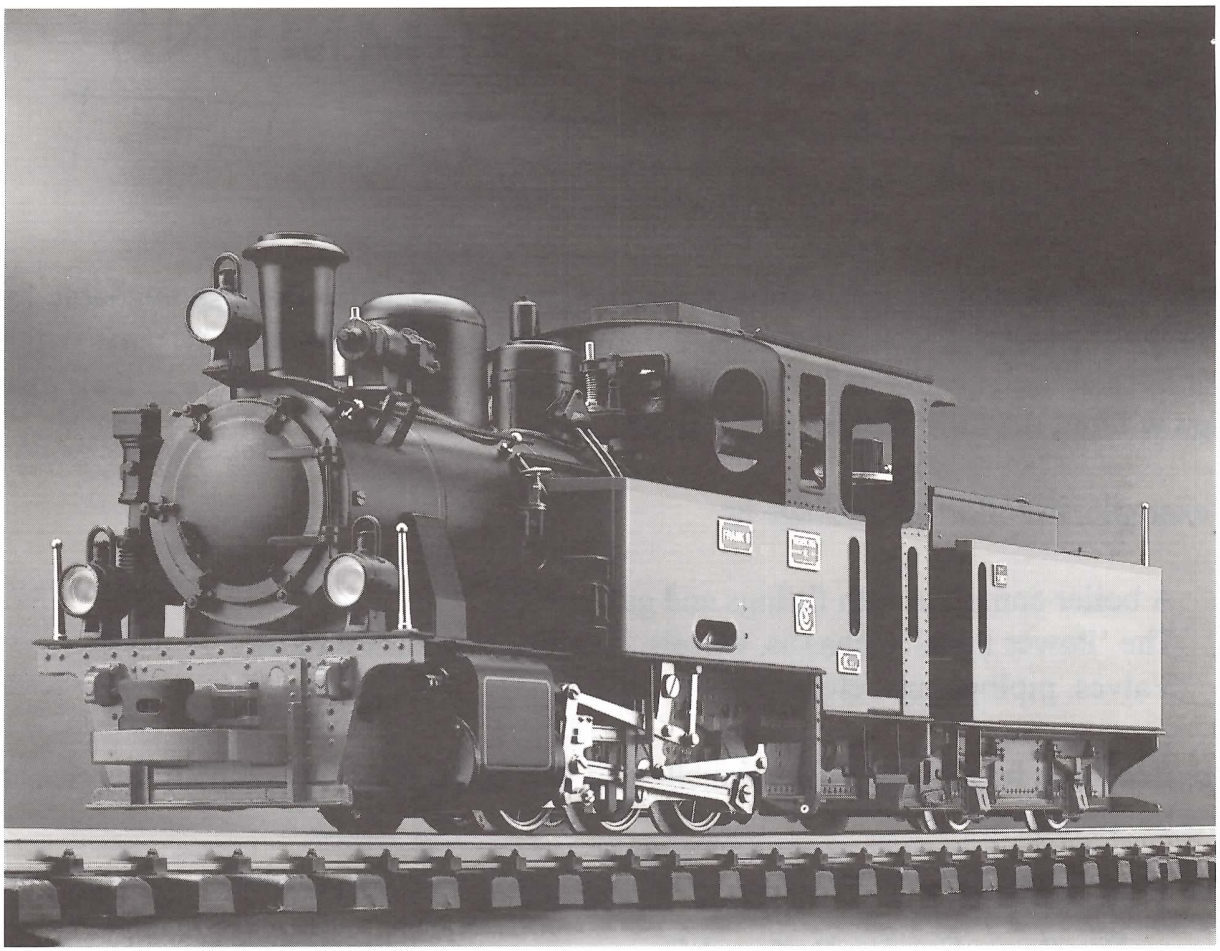

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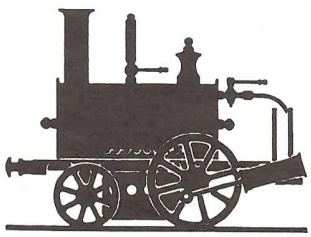

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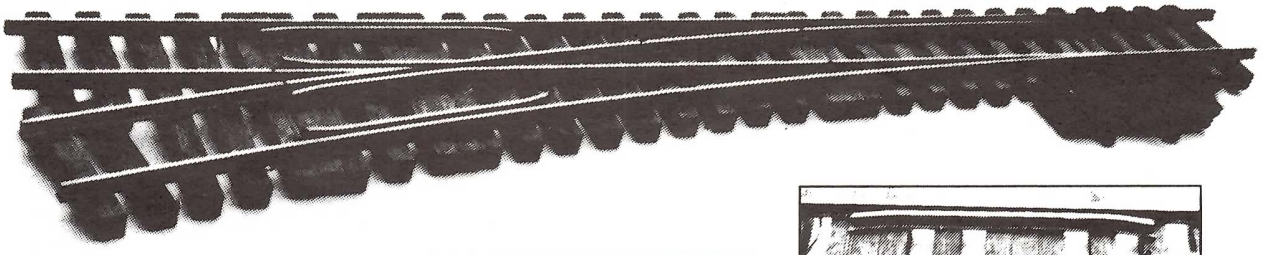

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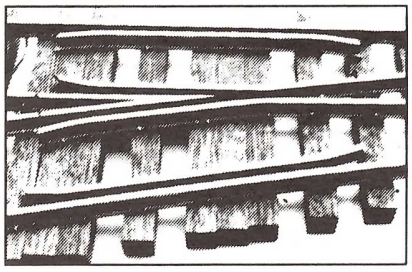

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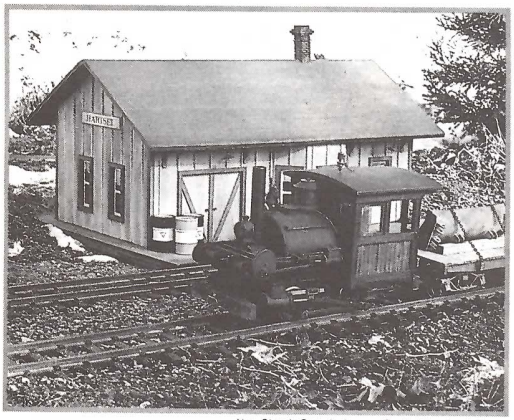

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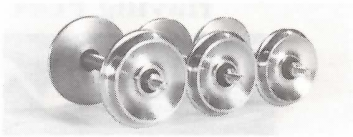

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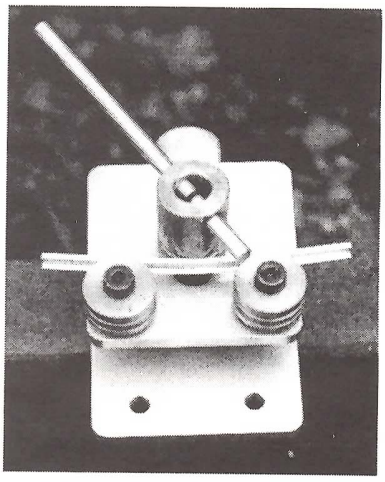

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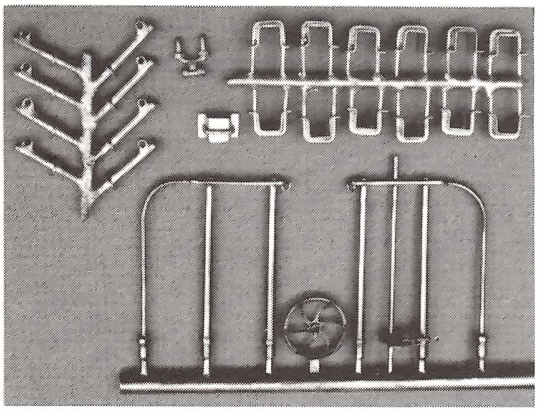

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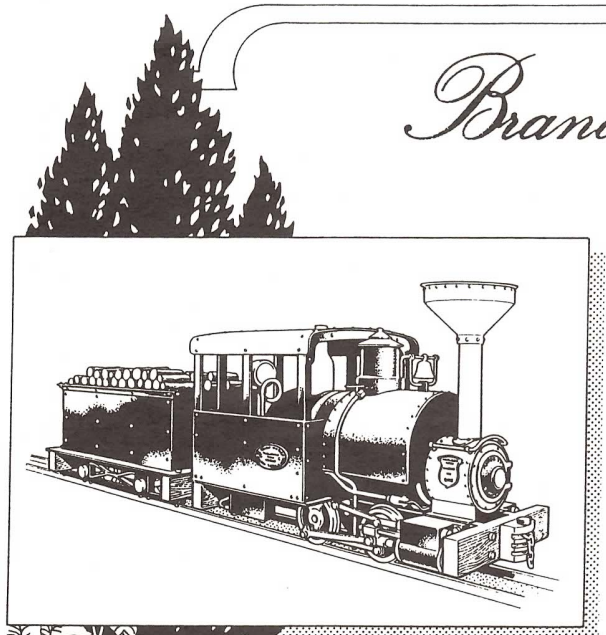

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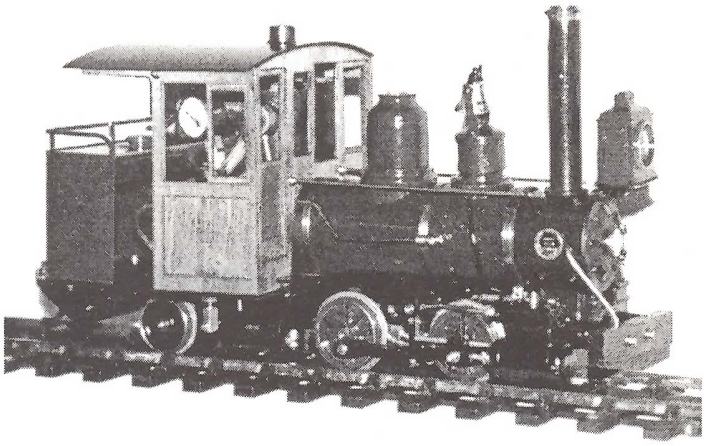

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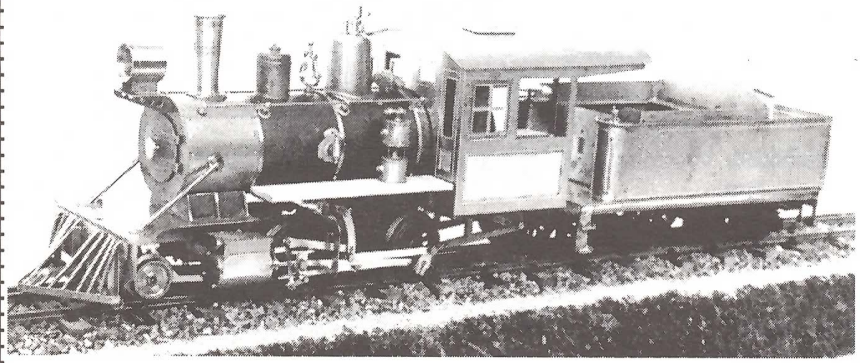

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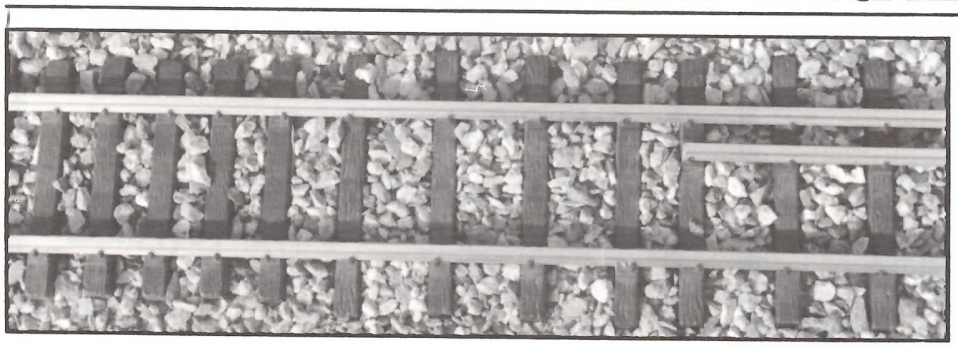

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Swap Shop ***listings are offered at no charge as space permits. No phone-in ads, please! Send to SitG, P.O. Box 335, Newark Valley NY 13811, or fax to 607-642-8978 (24 hours). Ads must contain sellers name and address - phone number recommended.***

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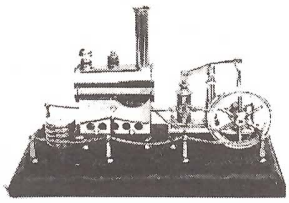

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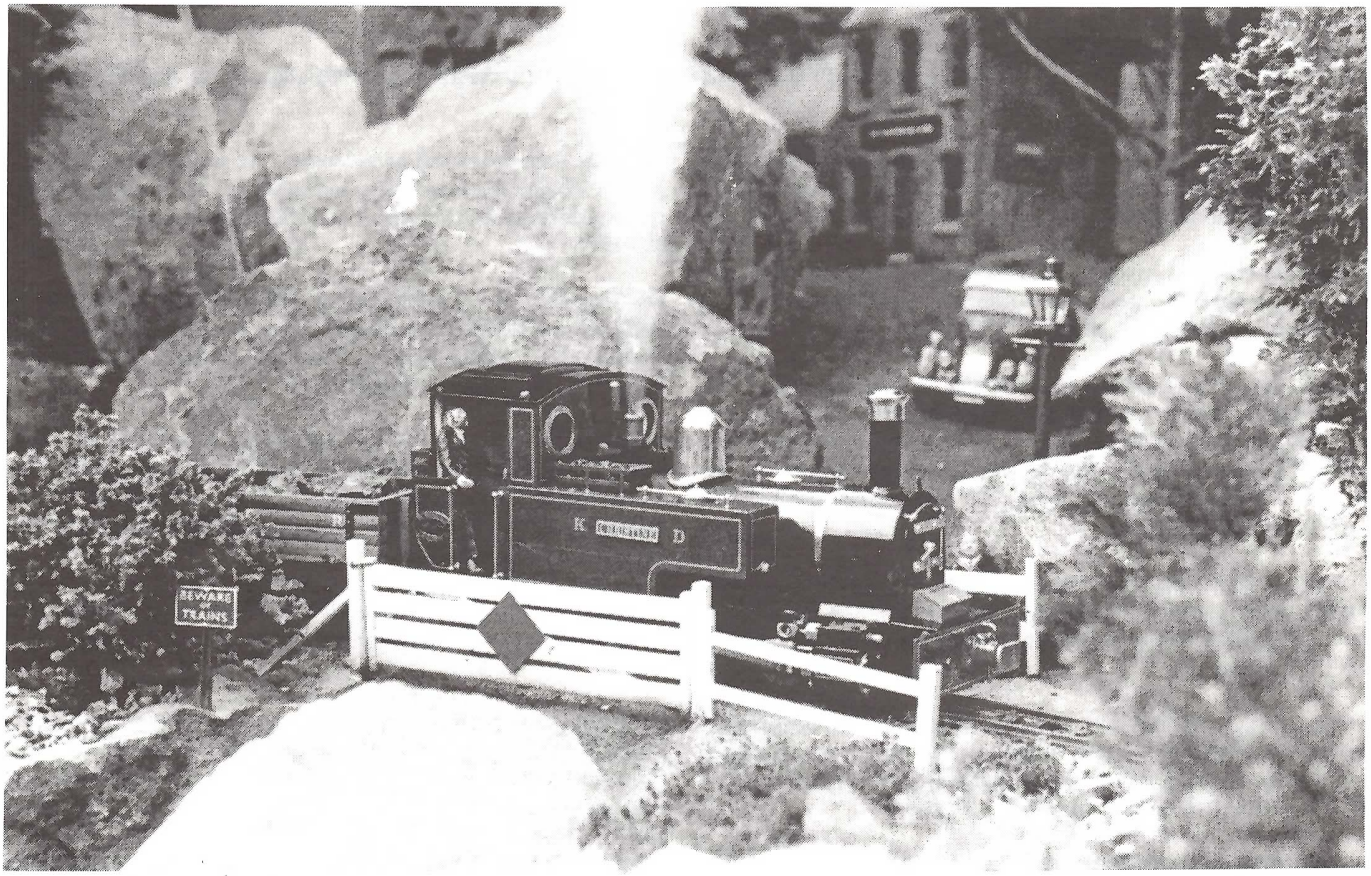
Steam Scene.....Along the Rails

We invite you to send in your favorite photos for this feature, always labeled with vital information like photographer, subject, where, when and why. Mail them in to SitG, P.O. Box 335, Newark Valley NY 13811. Please include a SASE with sufficient postage if you'd like your photos returned.

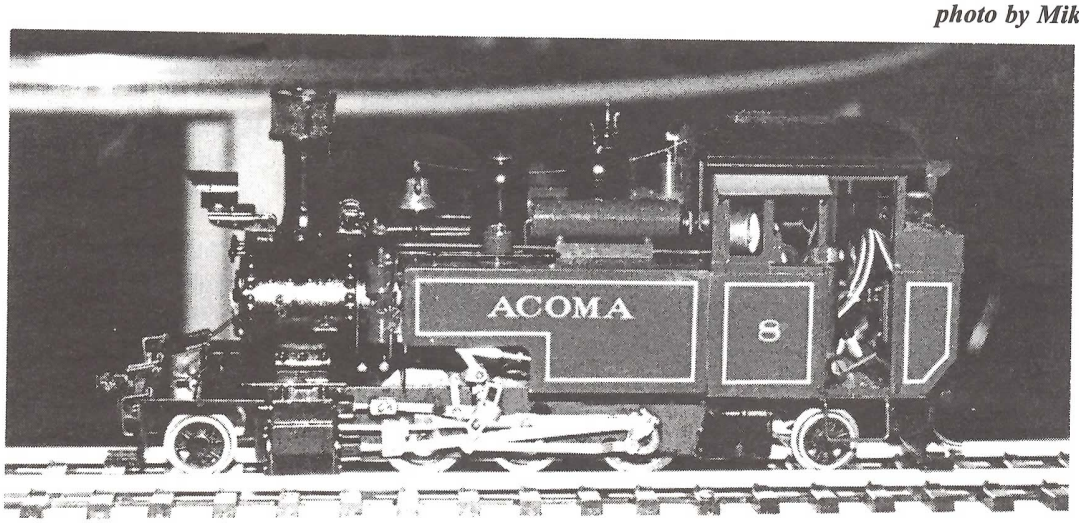


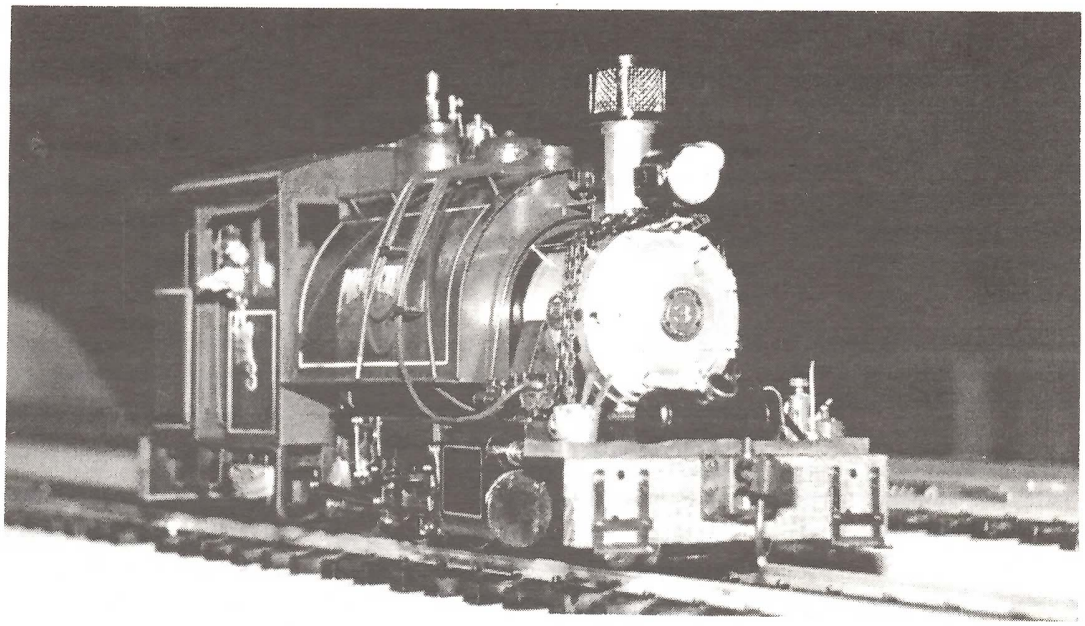
Above: A visiting Roundhouse loco -- Chuck Kennedy's CHRISTINE at Trematon Crossing. That's the village pub in the background. Another beautifully composed photo by a real Renaissance Man.

photo by Tag Gorton

Below: Alan Olson, a fine modeler and recent convert to small-scale steam, brought his ACOMA № 8 to Diamondhead '95. № 8 was kitbashed by Alan from a Roundhouse Lady Anne. He rebuilt the cab, extended the pilot and rear deck, added lead and trailing trucks from a Bachmann loco (!) and added lots of detail parts from Trackside Details and Precision Scale.

photo by Mike Buster



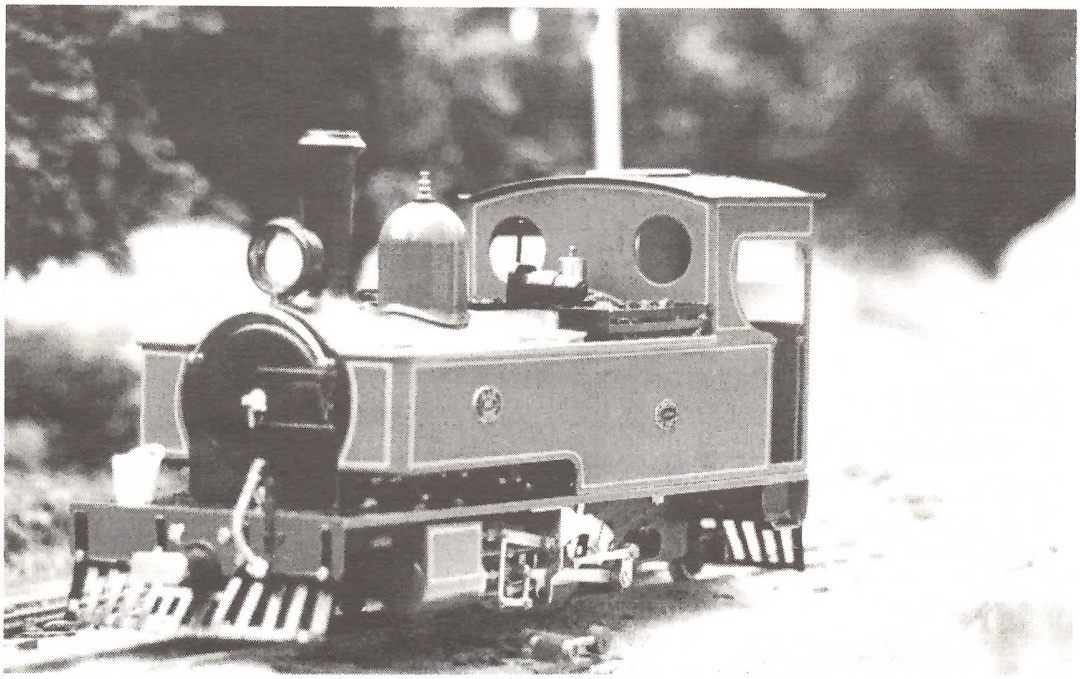


Above: FRANK the TANK, last seen in these pages sans paint and details, was seen at Diamondhead '95 in full dress. An excellent job of kitbashing the LGB FRANK S. by Jim Hadden.

photo by Mike Buster

Below: Another interesting loco, this one is "Chippy Joe", an early Merlin Hunslet by Tag Gorton. Tag has modified this loco so that it can be serviced without removing the body shell, a big improvement over the original. The lights are functional, and get their power from the radio batteries. Note the use of identical "cowcatcher" pilots front and rear. Also note the large headlight, a rarity on locos in the U.K. Additional details include a vacuum pump, sandboxes, toolbox and vacuum pipes. Tag bought this loco as a "bag of bits", and he has obviously invested a great deal of time and effort into turning a sow's ear into a silk purse.

photo by Tag Gorton



End of the Line

by Ron Brown

Yes, we're a little late with this issue. Sorry about that. It took longer to recover from some surgery I had back in March than I expected, and I couldn't use the keyboard for several weeks. By the time the July/August issue rolls around we should be back on time again. Thanks for your understanding and your patience!

New Talent, New Look!

If you haven't noticed the new artwork heading up the RPO - Letters department, turn to page 6 right now and take a look. We'll wait til you get back.

Pretty neat, isn't it? Always wanted to be able to draw like that myself, but I was standing in the wrong line when that particular talent was passed out.

That excellent drawing is the work of Jim Elliott of Bay Village, Ohio. Jim is a longtime subscriber, and every time he sends us a letter, the envelope is covered with his wonderful and imaginative artwork. We've been trying to persuade him to do something for the magazine for a long time, but he is a very busy guy.

We think the result is worth waiting for, don't you? Eventually we hope to have his artwork adorning more of our regular departments and features, but for now we're delighted to have a new look in the RPO department. Thanks, Jim!

Redundancy...Or is it Just Deja Vu All Over Again?

Sorry to do this to you, but it's time to make our biannual plea for photos. HELP! We need your photos!

Color, b&w, slides.....we can use them all. But (and here comes the picky-picky part) they should be sharp and clearly focused, with good depth of field and interesting composition. That last means no dogs, kids, garbage cans, fences, etc. in the background, please.

If you'd like to submit a shot for the cover, it must be a 35mm color transparency in vertical format, and you should be using film with an ASA of 64 or slower. All of the above criteria apply to cover shots, and we're even more picky-picky about those.

You would soon get tired of looking at shots of nothing but our locos on our railroad in Steam Scene and on the cover, so send us your best!

Contest! Win Free Stuff!

Okay, we've already established that we need your photos. So we're putting our money where our mouth is (so to speak) and are offering a one-year subscription (or extension) for any cover shot we use, and a 2-issue extension to your subscription for any photos used in Steam Scene.

STEAMTOWN, USA

Friends came to visit for a few days recently, and we decided to take a day off and drive down to Scranton, Pennsylvania to see what our tax dollars have done for Steamtown, now a National Historic Site.

We came away mightily impressed, and determined to visit more often. A date that no serious steam aficionado should miss is the July 1st Grand Opening of Steamtown, which is shaping up to be a very impressive event.

Steamtown has 29 steam locomotives, but only 3 of them are in running condition. Those engines will all be in steam, plus 8 or 10 visiting steam locos from all over the country.

A Shay had just arrived from upstate New York the day we were there, and it was undergoing some minor repair to get it ready for July 1st.

There will be a grand parade of steam into the Steamtown Yard, with all available engines in steam for that one. Other features will include double-headed tourist runs, tours of the refurbished roundhouse (nice!), tours through the new museum, the yard area where lots of interesting goodies are stored, the backshop and lots more. Write or call Steamtown for more information. Hope to see you there!

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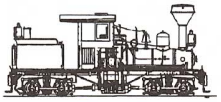
Happy Steaming!

Ron



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Scale/Gauge: 1/30,45 mm, Weight: 0.94 kg, Length O.B.: 172 mm, Width: 80 mm, Height: 141 mm, Wheel Arrangement: 4 wheeler (0-2-2), Driving Wheels: Dia. 31.0 mm spoked type, Cylinders: 2 Cylinders, Bore 9 mm x Stroke 15 mm, Valve Gear: Piston valve with reversing block, Boiler type: Verticle type with 4 fire tubes, Water Capacity: 45 cc at 80% full, Pressure: 0.8-1.00 kg/cm^2 at normal working, Fittings: Safety valve, pressure gauge, check valve, water plug, Lubricator: Roscoe displacement type, Fuel: Methylated alcohol, Fuel tank capacity: 30 cc.,Burner: 4 wick type burner, Minimum radius: .55 meter

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