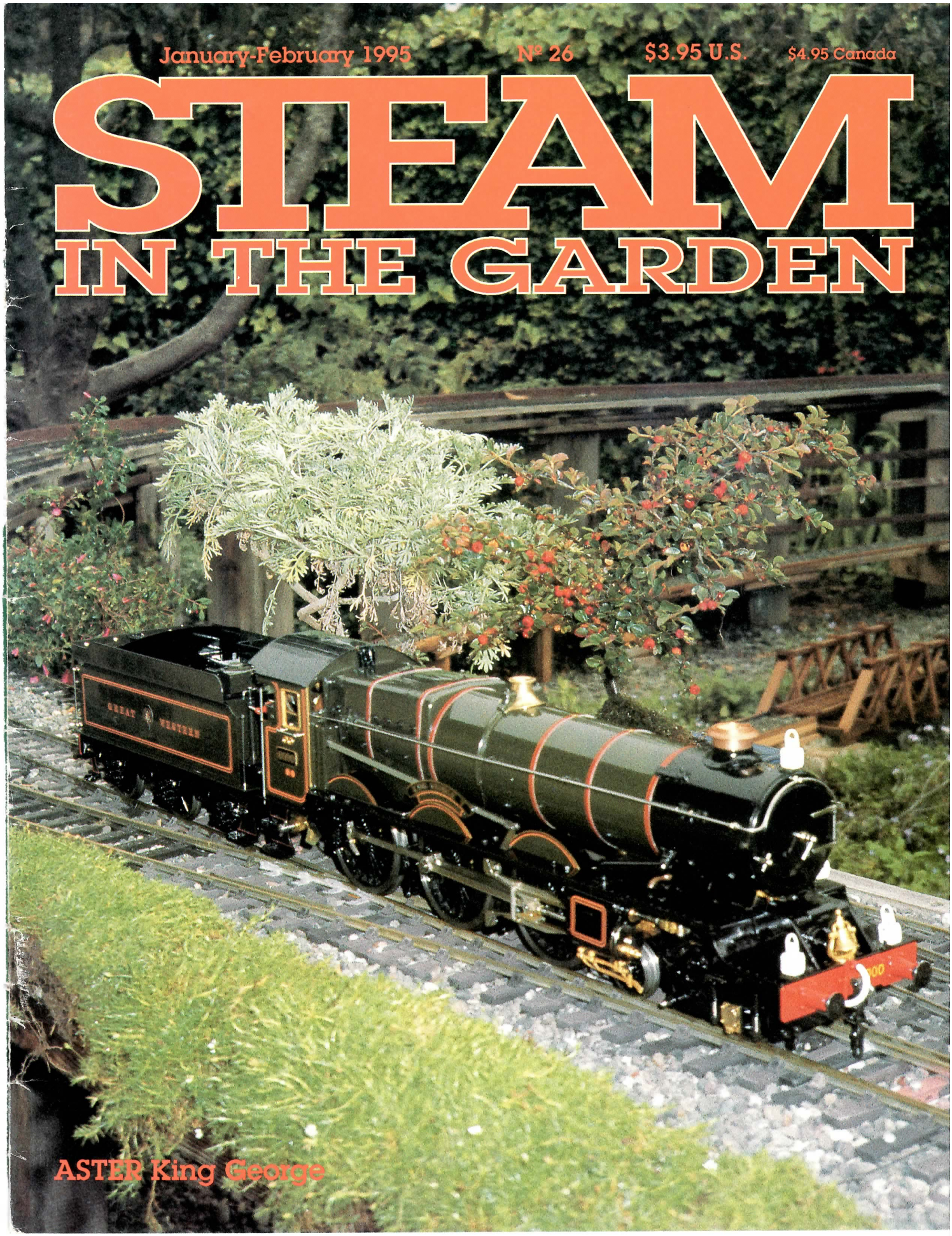
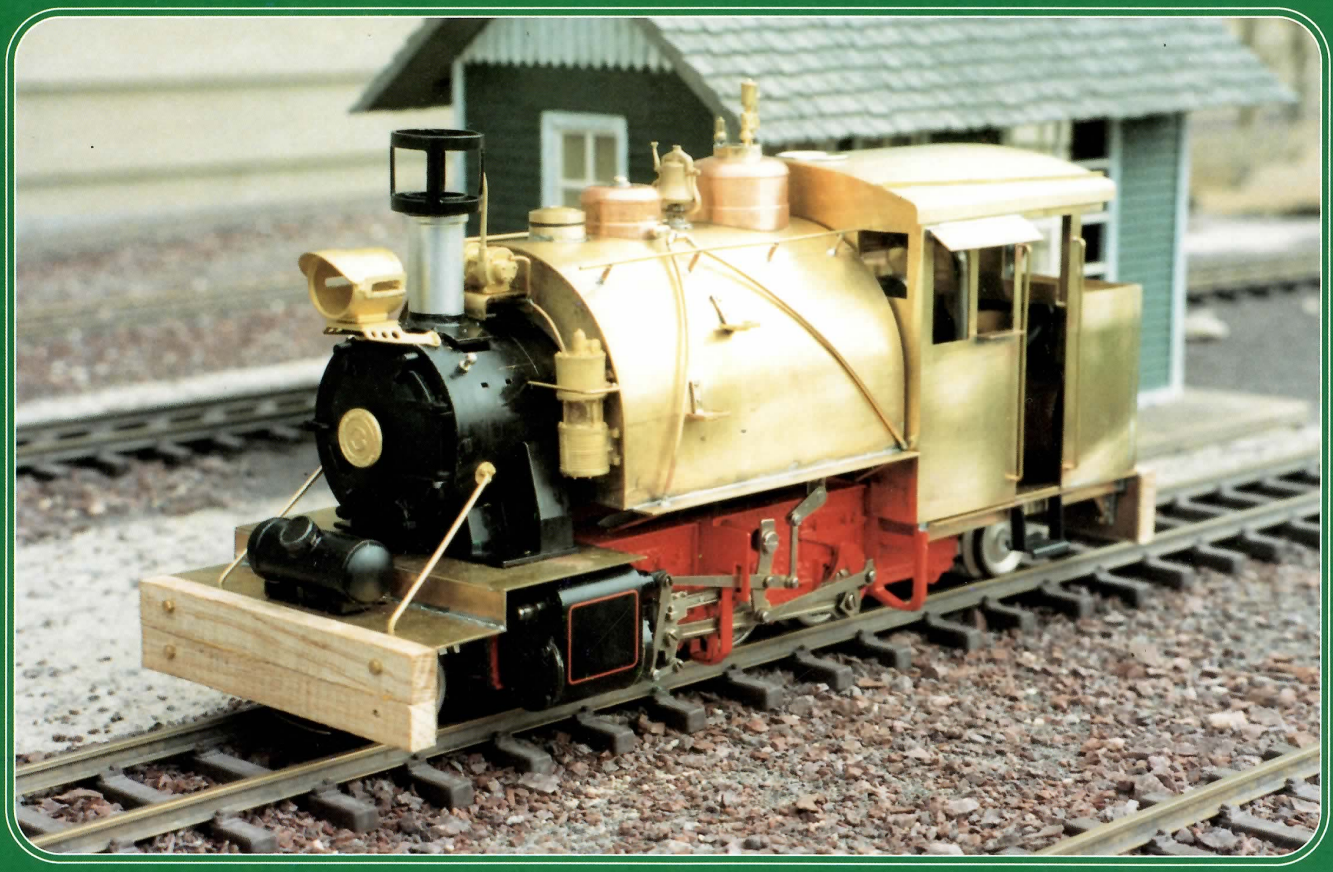
January-February 1995 N° 26 $3.95 U.S. $4.95 Canada

STEAM IN THE GARDEN



ASTER King George



ON THE COVER:

Geoff Spenceley's beautiful Aster King George V shimmers in the California sunshine while posing for a Royal Portrait. Read Geoff's review of this magnificent locomotive in this issue.

Photo by Geoff Spenceley

Photo, opposite page, top:

This 1:20 scale 18-ton Climax locomotive, under development for over a year and anxiously awaited by 1:20 scale loggers and model steam locomotive enthusiasts all over North America, was photographed by the builder before going into the paint shop.

The pilot model of this locomotive was seen at the National Steamup in Diamondhead, Mississippi in '94, and, after further development and a long list of changes, will be back again in final form for Diamondhead '95.

Photo by Mel Ridley

Photo, opposite page, bottom:

Frank the Tank, a clever and unexpected conversion of a Teutonic LGB Frank S. into a superb North American logging and/or firefighting loco by Jim Hadden, that prolific Master Modeler at Poison Creek Model Works. This outstanding steam locomotive will also be on display and under steam at Diamondhead. See what you'll be missing if you aren't planning to join us there?

Photo by Jim Hadden

We wish all of our readers, contributors, distributors and supporters a Happy, Healthy and Prosperous New Year! And may we all find ample time to spend in the workshop and at the steaming bay in the months to come.

Happy Steaming!

Ron + Marie

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1995

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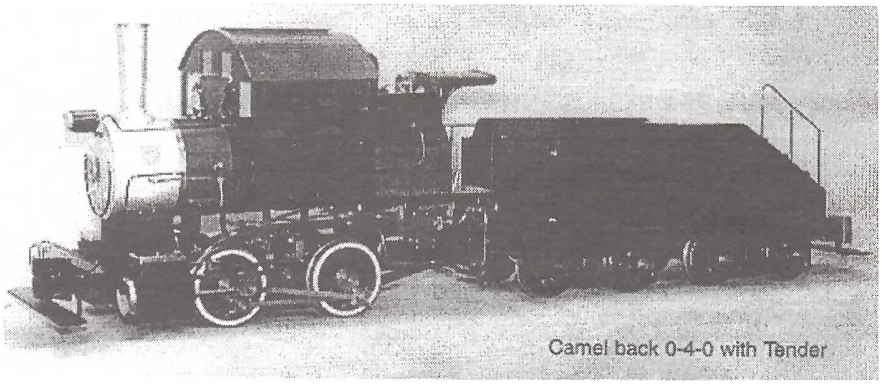
Questions or comments? Call us at 607-642-8119 before 9:00 p.m. Eastern time, please - or FAX us at 607-642-8978.

WHAT'S NEW?

John Masters, the Maxitrak specialist at 12 The Curve, Lovedean, Nr. Portsmouth, Hants P08 9SE, UK -- phone 011-44-705-593334, tells us that the good folks at Maxitrak have just introduced a Camelback version of the very popular American Lil'Jo 7.5" gauge locomotive for the American market in 1.5" Scale. The model represents one of the 4 foot 8.5 inch Standard Gauge 0-4-0 Tender Loco's which ran on the Reading RR.

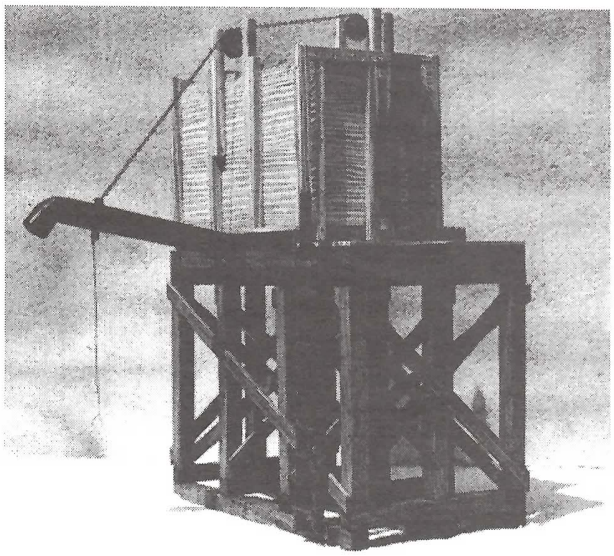

Camel back 0-4-0 with Tender

Because of the very poor quality local coal available to the railroads locally it was necessary to build locomotives with very wide, shallow fire boxes which could burn this type of coal efficiently. With these wide fire boxes the Engine Driver's (Engineer's) view of the road ahead was severely restricted, so it was then decided to put the driving cab over the midsection of the boiler, hence the look of a camel. The poor fireman had to make do with a small screen for protection against the elements.

For ease of operation the model locomotive has compromised on a few items -- for example the reversing lever (Johnson Bar) is on the rear right hand side of the loco and the regulator is fitted in the fireman's shelter rather than in the cab as on the full size loco. A high capacity hand pump is provided on the rear left hand side to supplement the axle pump, and an injector can be offered as an optional extra. A seat is provided on the eight wheel tender for the Engineer to sit on with foot rests on the front sides of the tender. Write to John for prices and more information.

Doubleheader Productions, 3725 Pageant Place, Dallas TX 75244 -- phone/fax 214-247-1208 announces that they have added JD Models to their line of steam and battery powered locomotives. JD Models of England are a high quality line of battery powered locomotives; ideal for the person who cannot afford a steam locomotive -- or who wants a fun and reliable loco to run when raising steam is not feasible.

Each JD Models loco is built to 16mm scale (1:19) and is perfectly at home in the world of American garden railways. Included in the line are a Port Class Hunslet and an Alice Class Hunslet (0-4-0's), a Kerr Stuart diesel, two Hunslet diesels, and a Glyn Valley Tram locomotive. Except for the Hunslet 0-4-0's, all the locos can be gauged for 32mm or 45mm track. All will operate easily on 24" radius curves, and will operate in train service for several hours on one battery charge. No more concerns for dirty track; no more rail cleaning. Contact Doubleheader for more information on their entire line of steam and battery locomotives.



Rio Pecos Garden Railroad Co., 27136 Edenbridge Court, Bonita Springs FL 33923 -- phone 813-495-0491 or fax 813-495-7264, has introduced a new Backwoods Water Tank (Plan #115). Listed as 1:20 scale (which should make you narrow gauge guys happy), the tank is of a size that would look good with any of the garden scales. It's small and funky and just right for your backwoods, branch or logging line. Like the other structures from Rio Pecos, this water tank is available as plans, or built and ready to slake the thirst of your little steamers. The built up version is made of the same quality materials and to the same high standard as the other structures we've reviewed in the Rio Pecos line. The moveable spout, pulleys and other hardware are also quality items, and help to give the tank an authentic appearance. If you choose to build your own, you will be pleased with the construction packet, which consists of 4 sheets of blueprints and a booklet of construction tips. Contact Bob or Fran at Rio Pecos to order your tank, or for more information on their complete line of model railroading structures, steam engines and more.

THE PORTERS

The good news for the customer is that our Agents have Porters (as reviewed in the March/April issue of SitG) in stock, ready for shipment on receipt of your telephone order. If, due to an overwhelming response, the unforeseen happens and our Agents run out of stock, we have more stock on hand in England which can be shipped immediately to our agents.

We are receiving a great response from customers who have bought the 1994 New Model Porter, saying that not only is the quality first class, it steams and steams and steams along.

The radio controlled whistle works very well, and is now fitted to the engine as standard equipment. It's great fun to whistle your arrivals and departures -- and even grade crossings if you have them!

The price of the Porter is $1675.00 delivered to your door, excluding local taxes.

OGWEN is now available in Gauge 1 -- $1485.00 delivered to your door, excluding local taxes.

U.S Agent:

Bob Osterhoudt
Rio Pecos Garden RR Co.
27136 Edenbridge Ct.
Bonita Springs, FL 3392

Phone 813-495-0491
Fax 813-495-7264

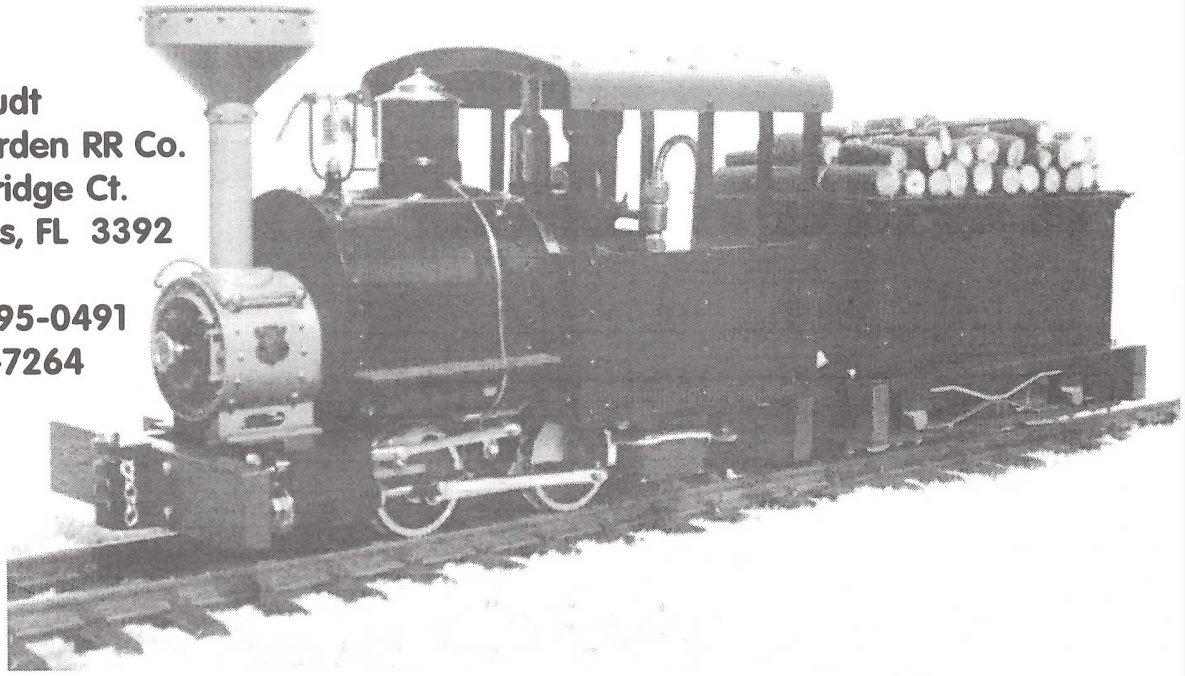


Photo by
Bob Osterhoudt

Maxwell Hemmens International Ltd., Thorganby, York, North Yorkshire Y04 6DA
Phone 011-44-904-448-331 --- Fax 011-44-904-448-841

R P O Mailbag

Letters from all over

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.

* * * * *

Lansdowne, Pennsylvania

Dear Ron,

Another tip for your readers..... I quite often need to knurl a cylindrical surface, usually on a filler plug or a small finger nut, and here's how I do it. I use the flint wheel of a disposable cigarette lighter as the knurling wheel. One may need to make a simple holder for it, but quite often on a narrow surface it doesn't even need to be removed from the lighter. Not all lighters are equally suitable, but a look at the wheel will tell which are. Some wheels are in fact a helix of profiled wire and those are not much use.

I suppose you've read the "Garden Rail" editorial, written from the convention in Denver. There's no doubt the development in the UK is totally different from here in the USA; there are goods and bads to both scenes. I'd like to see a strong move to scratch building, particularly of locomotives and rolling stock, but up to now I haven't seen it. Most of the constructive people I know are older than I am...the young blood is buying ready to run plastic.

Around here the hobby shops are dying and those that remain carry less and less for the scratch builder. I have to work from my own stock and replenish by mail order.

All the best,
Murray Wilson

Tacoma, Washington

Dear Ron,

It is with regret that I tell you effective immediately I am ending my association with *Steam in the Garden* magazine. The time has come to move on and expand. It has been a wonderful 4 years and I wish nothing but the best for you and your magazine.

Regards,
Rick Drescher

San Diego, California

Sirs:

I was recently made aware of your publication by a garden railroader; I was asking around to find a train buff in small gauge live steam. I am currently working on an 0-gauge 2-8-2 Mikado locomotive and would like to find someone who is doing live steam in that size, or find literature that covers related details of firebox, burner & fuel source and control (butane).

It sounds like your magazine may have articles appropriate and sources of some components. Therefore, I submit a check for a one year subscription.

Bruce Kott

How about it, readers? I know there must be a few of you out there who can help Bruce. I would be happy to publish any responses -- or will put you in direct contact with Bruce -- ed.

Morgan Hill, California

Ron,

Just had to write to let you know how well #25 was put together. Lots of interesting reader comments, news, general good stuff, and a great cover photo. The timing was perfect. A good rain storm outside, a toasty warm wood stove inside, a fresh cup of coffee, a rocking chair and the latest issue of SitG!!!!!!

Regarding Mike Chaney's letter requesting more information on the loco speed control device: I read of a similar "centrifugal device" that was installed in a box car at the end of a train, and used with the smaller indoor scales. Its purpose differed a bit in that there was a ratio worked out to increase the speed of a flywheel driven from a wheel set on the car. The spinning mass of the flywheel would act to give the train a more realistic momentum. The device would make jackrabbit starts and stops difficult, as well as adding a bit of operational interest in that if one stopped too quickly, you could wind up with your train bunched and in the ditch. I've always wanted to build one, and now Mike has got me to thinking again. Also glad to hear that Mike is going with 1:20 scale on his C-16.

Best,
Gary Broeder

Thornton, Colorado

Dear Marie & Ron,

Oops! I goofed and did not include the names of the photographers whose pictures I sent with the 10th Annual Convention report (SitG, Nov/Dec '94)!! Please let your readers know that two of the pictures (pg. 31) were taken by Margie Hadden, and Alan Olson thinks he took the third (page 30). Sorry Margie and Alan!

Morgan Jennings

Video Review

by Terry "Stumpy" Stone

Title: *CHOO CHOO TRAINS—*
Close Up and Very Personal

Time: 30 minutes

Price: $14.95

Available from: Hobby Shops, Train Stores, or direct from Stage Fright Productions, PO Box 373, Geneva IL 60134-0373 -- (800) 979-6800

When Ron handed me this tape to review and I read that it was for ages 1 to 5, I thought that there was a message for me. He thinks I'm a big kid! (Well, he's right, but I don't let many people know it!)

I expected this to be a boring kiddie tape. Boy, was I surprised! There is a lot of neat footage in this tape, and enough variety to make any train lover happy -- from steam fans to modern rail watchers.

Indiana Transportation Museum ex-Nickle Plate 587 starts the tape off running home to Noblesville, including running down the center of the street in town. Then it's off to Illinois to the museum with ex-Burlington E-5 and Budd Zephyr cars -- including a shot from the cab. Blue Mountain & Reading, 4-6-2 #425 is up next, followed by a Cumbres & Toltec rotary plow train.

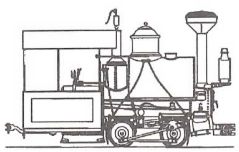
There is also Norfolk & Western 611, a Metra commuter train, Durango & Silverton, the Hawaii Sugar Cane Train, track work with a Burro crane, and a lot more.

The Cumbres & Toltec is returned to several times with double heading on freight and passenger trains, rear end helper service, and a quadruple header shot. Trains are seen coming out of tunnels, running along mountain sides, fireman filling the tender with water, and a loco pacing shot.

Modern railfans get a heavy dose of Chicago & North Western running with some Union Pacific thrown in. This includes "hump yard" operations and the handling of truck trailer and container unloading.

There is a lot of footage here that I've not seen anywhere else, and the price was right. If there is a drawback to this tape, it's that most of the bits are too short! However, given the short attention span of kids, this is probably a good idea. Your kids will love it, and you will too!

(We've lent this tape to several friends of ours who have young children or grandchildren, and they all love it -- even the very young ones and the old-enough-to-be-creaky. Get a copy for your kids and grandkids...and one for yourself - ed.)



The Fitter's Bench

by Crankpin

Alas, compadres, one more year has passed us by and I hope you have made the best of it that you could, just as Yours Truly always tries to do. This year, more so than usual, I was so deeply immersed in making the best of it that I failed in our last issue to wish to all of you a happy holiday season and prosperous New Year so I will take the opportunity to pass those belated wishes on to you now. If I were a resolving man (which I am not - I simply do what needs to be done at the moment, resolved or not!), my resolution for the new year would be to spend more time in the workshop and get on with making the chips fly on some of those projects that so far have only been penciled in on the list of things to do. So let it be written - so let it be done! Let us now get on with the first of our adventures in tooling up the lathe so that we can start you making chips in your own shop.

Lathe Tooling Essentials: The Chuck - Which One?

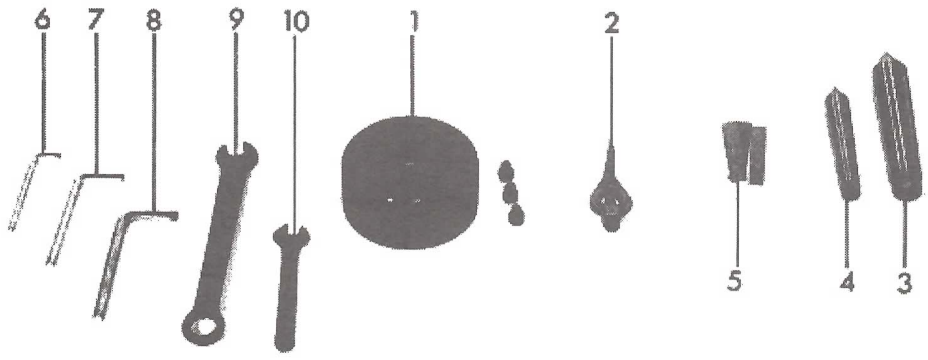
There are two schools of thought concerning the outfitting of a lathe as supplied new from its makers. The first of these, the ancient and traditional practice, is to provide virtually nothing in the way of tooling with a new lathe. The "basic machine" has always been supplied with only those tools, such as various spanners or wrenches, required to make basic adjustments to the machine itself. This remains for the most part true of a number of the better quality old-line machine tool makers in the UK and the USA. The little bit of what might be called working tooling provided with these basic machines invariably consists only of those accessories which will enable the owner to turn between centers. It's as if the manufacturers feel that since you have bought from them a "center" lathe, the only machining function for which they are obligated to outfit you is turning between centers.

Therefore the traditional machine will at best come equipped only with a tool post, two "dead" centers, an adapter sleeve if required to enable one of the centers to be fitted to the headstock spindle taper, a drive plate for the spindle which is used to drive whatever item is being turned between centers, and possibly a motor drive belt (but no motor), although motors are now becoming more common as standard equipment. The array of tooling shown in Figure 1 is from an Emco Compact 5 lathe and is an example of the traditional basic tooling package.

Of course one can do virtually no beneficial work on a lathe so equipped, so in order to actually become productive you must buy additional tooling. All of the established traditional machine lathe manufacturers will have readily available a wide range of attachments and accessories purpose-built for their own machines, at extra cost of course. In addition, virtually any piece of lathe tooling is available from numerous sources other than the manufacturers; a significant advantage in that one may tailor the selection of tooling to meet one's specific workshop needs and depth of one's pocketbook! This then is the starting point for the process of "tooling up" which I described briefly in SitG issue #14 (September/October 1992).

The second approach is one that has become increasingly visible and popular in recent years since the appearance of a more aggressive import (oriental) machine tool market. The prevailing practice, as indicated in Figure 2 is to equip machines from the makers with an expanded tooling package included "Free" with the base price of the machine; these then are touted as "Ready to go! - Nothing else to buy!".

Fig. 1



BASIC EQUIPMENT: 1 - Safety driving plate; 2 - Lathe dog; 3 - MT 2 center; 4 - MT 1 center; 5 - Tool spacers; 6 thru 8 - hex keys; 9 & 10 - wrench.

Although most of us will see right through this "free" nonsense, this stratagem is calculated to appeal to those buyers who want a machine that is sold all-inclusive and ready for action for one attractive lump sum price.

In addition to the basic necessities listed in the preceding

Fig. 2

paragraph, these machines will usually include the motor and controls, a faceplate, an indexing tool post, rotating (live) center, a steady rest, and a 3-jaw chuck. This now brings us around to the subject at hand - the selection of the chuck. Outfitted with a 3-jaw chuck, this "Ready to go!" business might very well be true as long as the material stock you were required to turn was round. But when it came time to bore a locomotive cylinder casting (usually irregular in shape and covered with all sorts of little bumps and lumps), or a square block of brass, you would be sent scurrying for the nearest tool catalogue to pick out a 4-jaw because these irregular items cannot be held securely in a 3-jaw chuck and the so-called ready to go lathes almost never come with a 4-jaw.

The 4-jaw chuck is often referred to as an "independent" chuck because each of the four jaws can be moved independently of the other three. The jaws are tightened by using a T-handled wrench (usually supplied with each new chuck) which is inserted in each of four threaded adjusting screws. The jaws are normally stepped and can be reversed in their slots so that each one has an inside and outside holding position (see Figure 4), likewise independent of one another, thus allowing dozens of different jaw configurations.

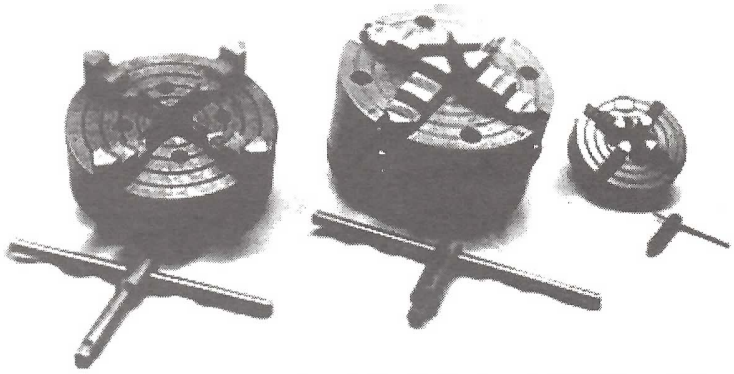
Although I don't normally think of myself as one who goes about telling folks their business I will make an exception to that rule here; for our purposes I strongly recommend that the 4-jaw chuck be placed first on your tooling acquisition list. For those of you who must make do with only one chuck (and many of us do) the 4-jaw must be that only chuck. This is an essential item, and one that the so-called "Ready to go" machines usually fail to supply with their machines making them not so ready to go after all.

Why, some of you may ask, should not the 3-jaw chuck be first, since so much of what we machine, wheels, axles, rods, etc., is circular in shape? Very simple. The three jaw chuck is very handy for holding and quickly centering round work, however it is only able to securely grip and center two primary shapes: rounds, and bar stock with multiples of three sides (triangle, hexagon, etc.). (I emphasize "securely" because A workpiece must be gripped really well to resist the forces of the cutting tool.)

Furthermore it will hold these only to the limits of accuracy of the chuck itself, which is usually not better than +/- .003" TIR (See Issue #13 for an explanation of TIR). So what is the problem with that, one might ask? Plenty, I would respond.

A four jaw chuck not only has the ability to hold both round and polygonal bar shapes, but it will hold many other irregularly shaped workpieces with great security and accuracy. By careful use of the independently adjustable jaws, work of almost any shape can be held with an accuracy of +/-.001" with little difficulty, and with a wee bit more care,

Fig. 3



4-Jaw Chucks, L to R: South Bend, Brainerd (British made) and Emco Compact 5.

accuracies of +/-.0001" can be had, although this is well beyond the normal limits of accuracy for the average hobbyist's lathe. One uses a 4-jaw chuck when the work must be located and held to dead, soot-on center!

Bigger is not Better:

In GB and the USA, chucks have traditionally been specified as to size by their outside diameter in steps of 2", 4", 6", 8", etc. But since the emergence of several lines of quality chucks from the European and far Eastern manufacturers, the tendency is now for a great many of the chucks on the market to be made to Metric dimensions and sold in nominal Imperial sizes. The metric models are rarely spot-on for Imperial size and may be over or under equivalent

Imperial sizes, for instance a 100mm chuck will be sold as a nominal 4" chuck but will actually measure only around 3.9". But fear not, you are no being mislead and the difference in size is of little consequence in actual practice.

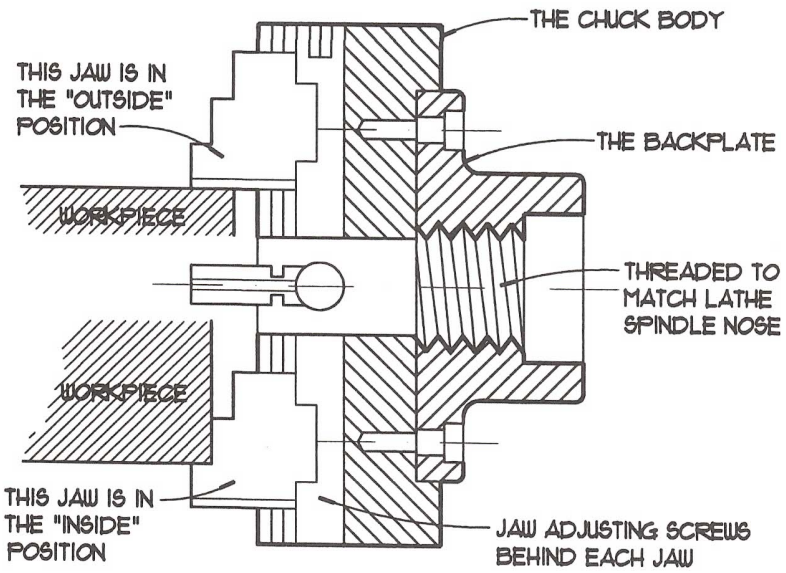
In making the decision about the proper size 4-jaw chuck to purchase, a large chuck can in some cases be good to have, but larger is not always best. You should avoid being caught in the trap of bigness. A good rule of thumb to follow is that your 4-jaw chuck should be approximately four (nominal) inches smaller than the swing of your lathe, so that a 12" lathe wants a maximum 8" chuck; a 10" lathe wants a 6" chuck, and so forth. For those of you who are more familiar with lathe size expressed as center height, the 4-jaw chuck should be 1" more than the nominal center height so that a 3" lathe wants an 4" chuck, a 5" lathe wants a 6" chuck, etc. Use these sizes as a starting point and go larger or smaller depending upon the nearest standard chuck size and the type of work you will be doing.

Remember, this is only a guideline, but it is based upon the two very important factors which should be considered when making your selection. The first of these is that you want to get the smallest chuck that will handle the majority of work you will be doing. It is a mistake to base your selection upon the largest piece of work that you are likely to have to turn, say a drive wheel or flywheel (which might be better worked on the faceplate, but let's save that for another day). Base your selection on the average size of the work you will face which I'll wager will be something on the order of 2" dimension or smaller. When you do inevitably run up against that rare piece that is just outside the capabilities of your chuck (and all of us do), you will find that there are many brethren out there who will be willing to help you out with a big job.

The second consideration is that you should get a chuck that is matched to the physical capacity of your lathe. Avoid a chuck that is too large, or more specifically too heavy, because your lathe motor must start and swing both the weight of the chuck and the work being held, which in the 6" or 8" sizes can approach 25 pounds or more. A 6" chuck and workpiece that weighs in at a total of 20 pounds, turning at 500 rpm, represents a dynamic force of approximately 2500 ft./lb. at its edge. Your lathe spindle bearings are required to absorb the loads of starting, running, and cutting, sometimes involving impact, and the increased load of an oversized chuck is one that can result in accelerated wear on the motor and spindle bearings.

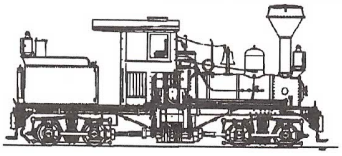
As for prices, currently a perfectly adequate 4-jaw chuck in 3", 4", or 5" nominal sizes of European manufacture can be had for under $125, excluding the mounting plate, or backplate, (shown in Fig. 4) which may add a further $25 to $40 to this price. Chucks of 6" and 8" diameters are priced some $30 to $70 above this, but British and American chucks although superb are priced, as may be expected, well above this level. Be advised that the backplate is a part that can be made on your lathe; it is not too difficult and a little time invested can result in quite a savings. When I acquired my own first lathe I remember that the first article that I made, with some help from my mentor, was the backplate for a 4-jaw chuck which still serves me well.

Fig. 4



I can also highly recommended keeping an eye peeled for a previously owned 4-jaw chuck. A bit of looseness in the working parts does not hurt a 4-jaw much and unless what you are offered has been very badly treated with jaws or jaw slides that are wobbly or cracked they will by their very nature still be accurate and serviceable, and can often be had with a mounting plate included at reasonable prices. Many years ago I was offered and accepted an old but very nice little 6" chuck and backplate of American "South Bend" manufacture, surplus to someone's needs, for less than $25. It has served me well for all these years and in fact sits within my view at this moment and I would not part with it for many times that price.

Do not make the mistake of thinking that I am against the 3-jaw chuck; these certainly have a place in the workshop and next issue we will take up where we left off with a discussion of the 3-jaw and its variations and a few other bits of lathe chuck lore.



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Gazing Into the Fire

by Peter Jones

Trackwork & Steam Locomotives

It may be possible that the steam engine has inadvertently got a bad press. There is a feeling stalking the land which states that a steam locomotive will only run on superb track. There is a danger that this might cause some to throw up their hands in horror and retreat to the infallibility of electric trains on LGB track.

So perhaps it is time we gave this subject an airing. Certainly there are cases where someone has laid poor track and then got a slow moving battery loco to stay on for a complete circuit, whilst a steam engine just keeps falling off. They look at flawless LGB running round and declare that steam locomotion can't possibly work. In the UK there is also the added refinement of the argument that 32mm gauge is completely unstable, and only 45mm gauge gives the path to True Salvation.

Now then, what sort of language is this? It isn't English, that's for sure. I wonder what it can be ? Ah yes, I know: it's baloney!

Inevitably, when you come to investigate trains which keep falling off the track, you find no fault with most of the rolling stock (although, in fairness, there is always the chance of one rogue vehicle); the problem is that the track is badly laid. You find that it is not uncommon for someone to landscape a lovely garden railway and to spend a lot of time and money with the hardware, but who begrudges spending a dollar on getting the track reasonable. There are still cases of fine scale track just being laid on loose gravel or on a few bits of wood pushed into the earth. No amount of advice will get them to believe that it will all end in tears a few months later. The track is twisted and dog legged, whilst the weeds have encroached.

Now regular readers will know that it is unusual for me to criticise so openly; tiz something I don't like in others and even less in myself. But there have been times when I have almost wept with frustration at seeing the same old mistakes being made and being able to forecast that, twelve months down the road, someone else is going to lose heart, possibly give up the hobby and, at the same time, add to the unfounded reputation that steam in the garden is for the experts only.

I'm sorry to say that I am unrepentant in one aspect of our hobby: it is that getting the foundations and the track right comes head and shoulders above everything else. This holds good whether you are planning for a railway to last three years or thirty. It is just so easy to quickly shove something down and find it works, and then to write up the fact in the press.

One example is a chum who decided on a huge and ambitious layout. He hired a digger and driver to come in and landscape a magnificent topography...using soil that was riddled with long grass and weeds. "Oh, a dose of weed killer will take care of that." Track was built using the cheapest system, despite money being no object in other departments. This was going to be a layout to shake the world. Twelve months later the whole thing was completely overgrown and the track had started to disintegrate. The owner had the site levelled and left the hobby, utterly disillusioned. This is but one example; sadly, I can recount many. The problem isn't with this or that bit of hardware. It is usually based on skimping the basics and indulging in "short termism". LGB track is overscale and has an increased rigidity to it that makes it more tolerant of poor foundations. Moreover, the overscale flanges help overcome poor tracklaying. Good luck to LGB; it is a well established system and I'm not going to criticise it. Long may it flourish. But the bottom line still remains that the basics should be got right first.

So perhaps it is worthwhile running over these basics and getting them into perspective. They may be important but they don't require a degree in engineering or the sacrificing of young goats or virgins (both of which may be in short supply in some areas). This is not the place to repeat detailed descriptions of layout building, but forgive me if I repeat a couple of points.

Track wants to be as flat as possible, without twists. It doesn't want to have dog legs. The curves want to be as large as can be fitted into the site and the grades as shallow as possible. But, most important of all, it wants to be in the same condition in twelve months or ten years time. I'm sorry, but you won't get that by nailing track down to a few skinny offcuts of wood and hiding it with some chippings. Therein lay tears. T'would be nice to say otherwise but it would be doing no service. No, if you are new to the hobby, read up just how others have built successful layouts.

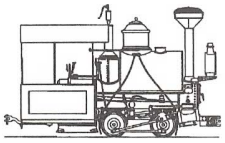
Don't just read about one method. We are all human and have egos that can make us suggest that whatever we do is the only way. But, whatever you do, make sure that you get your foundations and track laid well. It is better to divert the funds destined for a couple of extra passenger cars into proper building materials. A cheap, secondhand box car should run reliably on properly laid track for years. A superdetailed, very expensive vehicle won't do that on skimpily laid track.

So far, all of this could equally apply to steam and electric propulsion, so I turn now to my main point: live steam doesn't demand some sort of super track; it just shows up faults in bad track more often than 2 rail or battery. A little electric loco will switch slowly up and down and when

it isn't being asked to move, it sits there, conveniently dead.

A steam engine is a living thing. It asks for more interaction with the driver and it is at its best when sweeping unrestrained around long, level circuits. If it derails, the wheels keep spinning round and it is hot and antisocial to the unskilled touch. We don't want lots of derailments; particularly if the track is down at ground level. Derailments are caused by twists in the track causing wheels to clamber up over the rails, by the gauge being wrong or by obstacles in its path.

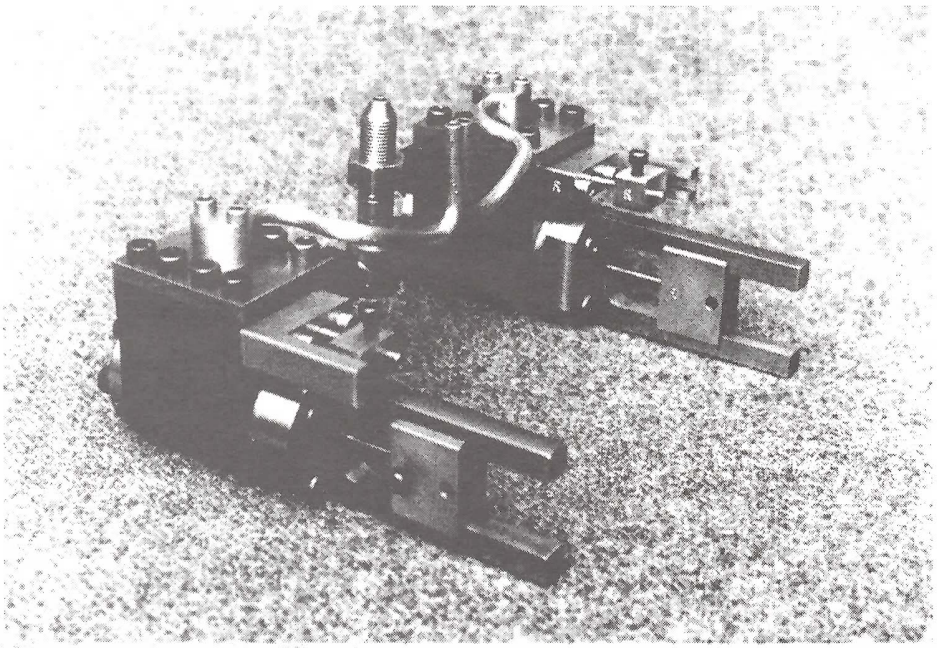
In conclusion, I suggest that live steam locomotives don't demand super track and foundations; all they require is the sort of standard one would reasonably expect of a decent HO layout indoors. If they don't get it, they let you know quicker than an electric train might. In this cause I have just preached an uncharacteristically pessimistic message. In reality, life is usually jollier. I have strayed into this shaded path in the paradoxical hope that it can set the record straight and stamp out the evil of avoidable disillusionment.



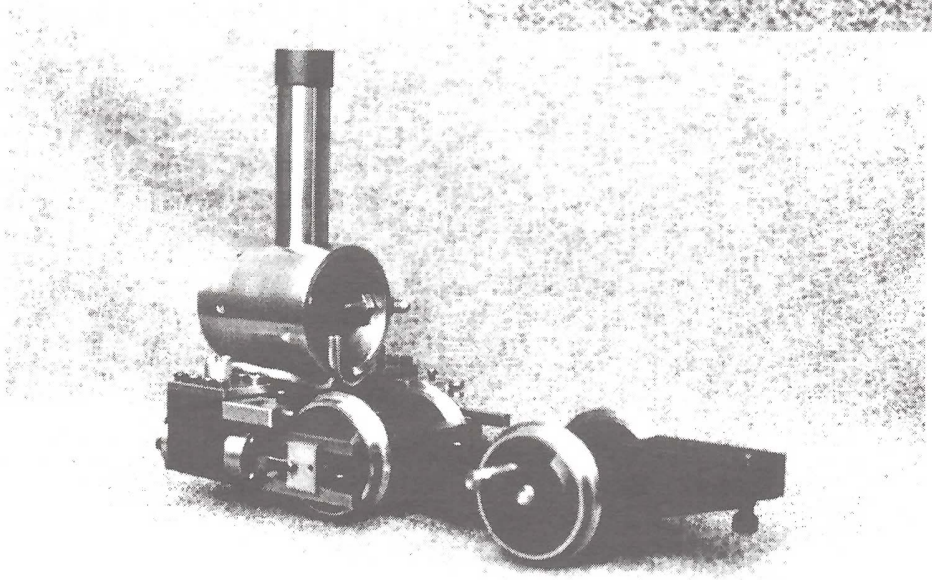
Build Your Own Locomotive

by Charlie Mynhier
all photos by the author

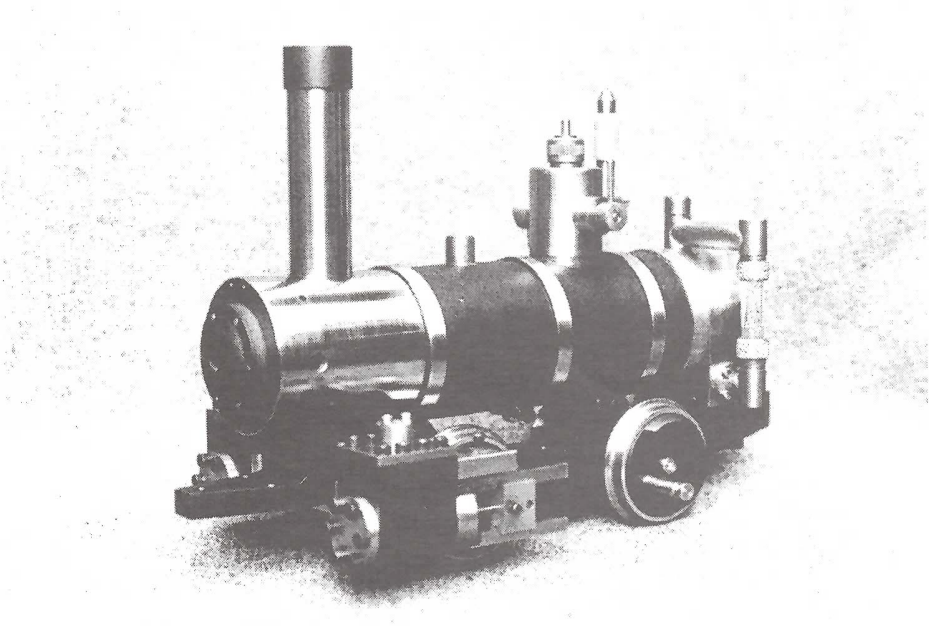
This month, while Charlie is getting ready to attend the National Steamup in Diamondhead, Mississippi, we will tickle your fancy with some photos of the beautiful cylinders he has designed and built for this little engine. The cylinders will be featured in our next issue. Also included in this month's segment are some photos of the chassis, boiler and smokebox. Please take particular notice of the two drawings in this issue. These were inadvertently left out of the boiler segment in the last issue. Our apologies to Charlie, and to any of our readers who may be wondering why their boiler isn't working just like it ought to be! By the way, Charlie will have this little engine up and running at Diamondhead this year, so be sure and look him up and ask to see it -- up close and personal. And be sure to give him a big THANK YOU for all the time and effort he has put into the engineering, R&D, writing, drawing and all the other things it takes to put together a series like this one. It's a monumental task, and it is being done purely for the love of the hobby and to share with his fellow live steamers. THANKS, Charlie!



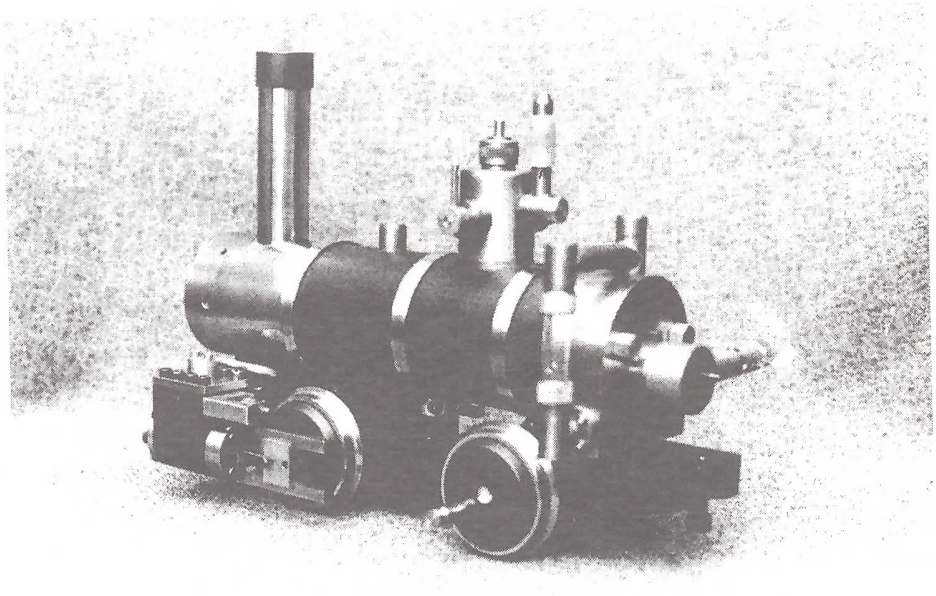
Right: This left rear angle photo gives us a good look at the very sturdy crossheads and crosshead guides. This is the first model engine I've ever seen that used a guide on the valve rod, as well as on the piston rod. Also clearly visible are the steam admission and exhaust lines and fittings.



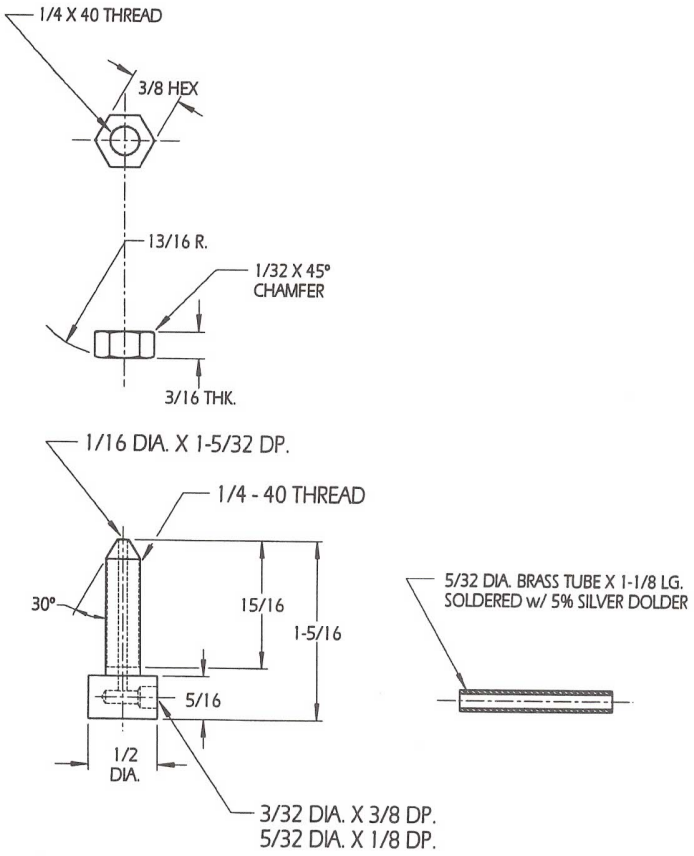
Left: The rolling chassis with cylinders and smokebox mounted. Note the massive frame. No flex here!



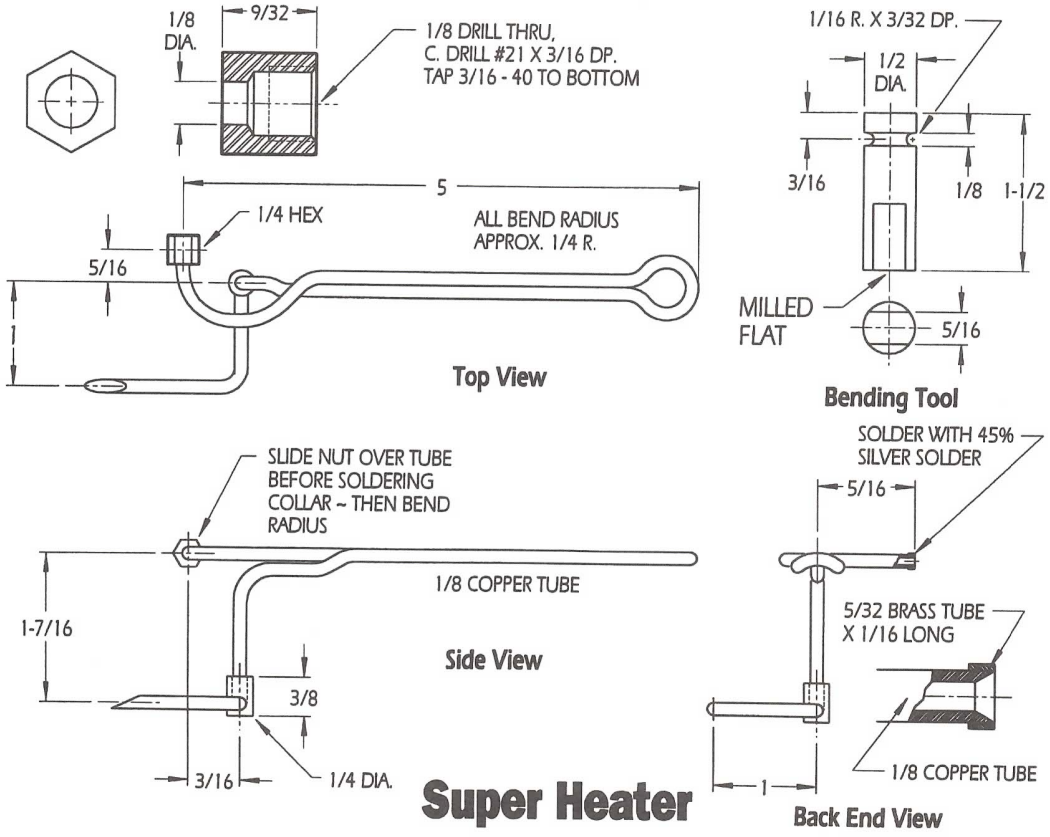
Both photos this page: Here we have a close look at the rolling chassis with cylinders, smokebox and boiler mounted. Also visible are the water glass, steam turret, safety valve and regulator. The rear angle shot below shows the back end of the burner. Check out the hefty backhead and smokebox front. This is no lightweight, wimpy locomotive, folks! Charlie designed it to haul the freight -- or pull stumps, if necessary.



Drawings Not To Scale



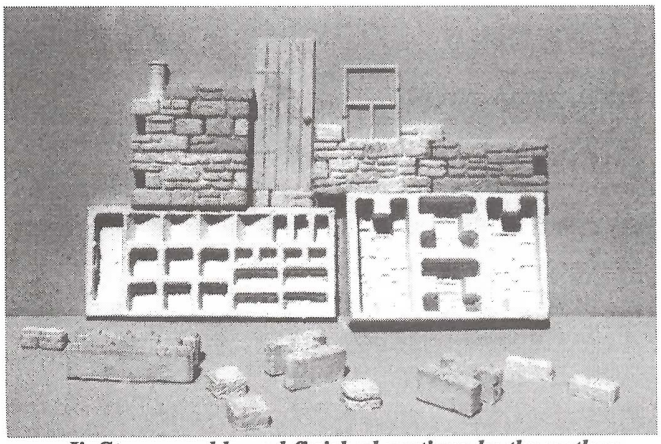
Exhaust Nozzle w/ Nut



Super Heater

Product Review -- JigStones
by Chip Rosenblum

Are you as tired of the same plastic buildings as 1 am? Here's a possible answer for you to enable you to custom-tailor your building requirements. An interesting new product came my way in the past few months. JigStones molds. These are silicone-based molds that produce modular construction components for stone, brick, or slate construction and associated building parts.



JigStones molds and finished castings by the author
Photo by Chip Rosenblum

The individual molds are used to cast components of whichever building system you chose. Then it's a matter of combining the pieces to create whatever small or large building you'd like. I was reminded of playing with blocks as a kid, or with my own kids, and had a ball creating miniature walls and entries until I was satisfied with a layout

The molds themselves are quite flexible, and easily released anything I tried casting in them. A warning on storage, however, would be to store them flat, as silicone based molds tend to have a "memory" over time, and if allowed to rest for any length of time in a curved state, would most probably result in curved building components.

The detailing in the molds is superb. The resulting castings had some porosity because of my casting technique, not because of any flaw in the materials. The castings would be best for outdoor use made from Fastcast exterior cement, which is weatherproof when mixed with an equal volume of fine sand (sandblaster's sand would be excellent to maintain fine details) when not designed in such a way as to hold water, or fine mortar mix.

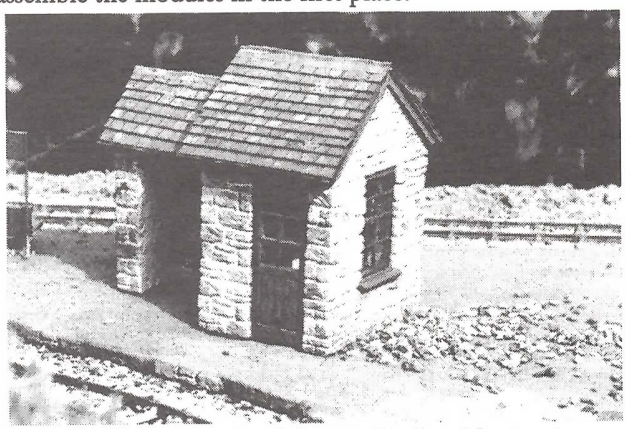
The molds are available not only in the basic building units, but also for wall caps, doors, windows, arched and flat lintels, chimney pots, roof tiling and drainpipe fittings. This allows you to provide as much or as little detailing as you like.

The casting process itself is quite simple for the building blocks. It helps to have a vibrating surface to place the mold on while pouring to minimize porosity. This could be easily accomplished by turning an electric sander upside down in a vise and covering it with a baggie or, for less overkill, a hand-held massager pressed lightly against the side of the mold would do the same thing.

The casting process is NOT quite so simple for the window units, however. The first time I tried it with cement I obtained many tiny, broken window parts. The obvious solution is to use a casting plastic. Many types are available at craft stores and auto parts stores, but I elected to use Alumilite casting resin, as that's what was lying about. I'm not too good with this stuff, and the majority of the mix set in the container, and not in the mold. The two windows I did manage to pour prior to the untimely set of the rest of the material turned out great however, and so I have great confidence that with a little practice "Windows 'R' Us" would be an operative term. Regardless, the plastic released from the mold very nicely.

All of the molded products came out with a little flash, but with careful pouring (try not to overpour) the flash was minimal, and could almost be rubbed off with a finger to provide a good fit. The window castings were easily trimmed with a sharp knife, and looked as good as any purchased product I've seen.

Assembling the modules for outdoor use will require some trial and error and another article in time. I've heard from people who have used this system that they have used waterproof PVA glues. This may work, but I'm not sure that I'd have great confidence in it over time. I think that would work well for initial assembly, but I'd have more confidence if, prior to painting, the interior was coated with a cement-based product to permanently bond the units together. If I was building a bridge or wall that wouldn't have an "inside", I'd be more inclined to use a slow-setting mortar or grout to assemble the modules in the first place.



Loaded with character and charm, this lineside structure was built entirely with JigStones components.
Photo by Peter Chandler

On the plus side, this is the most innovative and potentially versatile building system I've seen for our use. I can't imagine anyone being disappointed with the results. On the minus side, I'd like to see a mold that could produce a large wall section in one go, eliminating the need to build the whole thing up if that size was desired. In all, a pretty minor whine about an entirely new building system that should be tried!

JigStones molds and other building parts are available from: ***Peter Chandler, 19 The Cravens, Smallfield, Surrey, RH6 9QS, England. For information and prices, please send 3 International Reply Coupons.***

Loco Review -- Aster's King George V

by Geoff Spenceley

Technical Specifications

Description:	G.W.R. "KING" CLASS No. 6000 -- "KING GEORGE V"
Scale:	1:32, 45mm gauge
Weight:	6kg
Dimensions:	Engine 412mm -- Tender 239mm -- Length coupled 664mm
Width:	90mm
Height:	130mm
Wheel arrangement:	4-6-0, stainless steel wheels, insulated
Radius:	2 meter minimum
Cylinders:	4 -- 11mm x 20mm
Valve Gear:	Walschaerts with screw reverser
Boiler:	"C" Type, Water capacity 270cc at 80% full
Pressure:	3.5 to 4.0 kg/cm
Feed water pump:	Axle driven, hand pump in tender
Firing:	Methylated alcohol -- 3 tube wick burner
Lubricator:	Roscoe displacement type
Fittings:	Safety valve, regulator, blower valve, water gauge, pressure gauge, whistle, bypass valve, water check valve
Price:	Mfg. suggested retail -- R.T.R. $6990.00, Kit $5990.00
Available from:	Your friendly Aster dealer *(see the Aster ad in the November/December 1994 issue for a full list of dealers)*

Well, here we go -- it's been awhile since I assembled this fine engine, so my memory is a little rusty on the difficulties encountered--just the enjoyable parts of the assembly are best remembered. Possibly because this engine, once completed, is such a very fine runner with excellent speed control.

The prototypes were developed for the Great Western Railway by Locomotive Superintendent G. J. Churchward and his successor, C. B. Collet. No. 6000, which Aster has modeled, was named "King George V" in 1927 when it was sent to the B&O RR Centennial Exposition. The "Liberty Bell", a gift from the USA, is faithfully included.

The assembly of this model is typical of most Aster kits, with the usual filing and fitting. Reading the instructions thoroughly before assembly will save a great deal of frustration later on! The assembly of the frame and cylinders went very well and I found no necessity for shims on the rear end of the inside connecting rods or valve eccentric rods as the instructions suggested might be necessary. The outside cylinders also assembled easily, although in Section 2 covering this assembly there was an exploded view of the parts showing the #18 & #19 slide bars reversed with the #20 stay bar on the inside of the slide bars. A fair amount of filing was required on the valve motion, especially on the expansion links in order to ensure that the die blocks moved smoothly.

After the assembly of the engine and the valve timing was completed, the two sets of cylinders were air tested individually and then as a unit. The outside valve motion is controlled by the inside valve spindles through linkage as in the prototype, and Aster has done a great job on this because the outside valve motions were correct despite the short travel required in a model of 1:32 scale. I really expected some movement to be lost in the linkage -- doubting Thomas that I am!! However, it would be wise to keep this linkage well lubricated.

The engine ran smoothly and well with no binding or rough spots, and I believe it's worth noting that I attempt to assemble Aster engines in such a way that they need little or no "breaking in". For example, if the crossheads bind in the

Aster King George V rolls over a handbuilt steel bridge with a rake of scratchbuilt British coaches on the railway of Comley & Son in Southern California, as seen in the video ***TrainsThrough the Garden***. An impressive sight!
Photo by John Weiland

slide bars (a common occurrence) it may cause the pistons to cock slightly in the cylinders with resultant scoring of the pistons and cylinders walls.

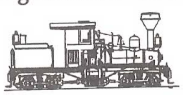
The trickiest part of the whole assembly was the boiler casing, running boards and cab. It's quite a job to reach inside the boiler casing to attach the nuts to the threads of the stanchions. The threaded ends of the stanchions should also be filed down to ensure that they do not interfere with the installation of the boiler. There was some difficulty mounting the running boards #17-01 & #17-02 after the boiler and casing had been assembled to the frame (as the instructions stated), and I found it much easier to assemble the running boards first. It was quite a task to obtain a nice close fit between the boiler casing, splashers and cab. However, with a lot of fiddling and some strong verbal encouragement it was accomplished. I was somewhat relieved to find out that others had the same problems, so perhaps I'm not the duffer I thought I might have been! The space in the cab is very limited and I found it necessary to do a lot of adjusting to the boiler fittings to make them fit the interior of the cab.

It was fun and games attempting to attach the ornamental sashes that fastened to the edges of the running boards. Adhesive is transferred from patterned papers, as Aster calls them. I found the kit included two left hand patterns instead of right and left so I took the easy way out and used epoxy. So far they haven't become detached! These sashes appear to be rivet detail and unless one is a stickler on detail or accuracy to the prototype they could be omitted without spoiling the appearance.

Some kits have questions or difficulties that are common to all those kits, yet it appears there are also problems that are peculiar to an individual kit (especially mine!). The kits do vary somewhat, as does the expertise of the assemblers, so who knows??

When the King was completed and track tested, I had one of those pleasant surprises -- it ran magnificently!! With steam being admitted to four cylinders, control is excellent and the loco will run very successfully at slow speeds. It is by far the best controlled Aster in my possession. Steam pressure was just right with the safety valve blowing very short kinglike raspberries every few seconds or so. There was some trouble with the pilot truck derailing on the 11 foot radii, and upon examination I discovered the hex head screws fastening the pilot rear beam were striking part of the frame when negotiating curves. I exchanged these with flat head screws, which appears to be the solution -- no pilot truck derailment since, even if the track is allowed to become a little rough!!

Aster is to be congratulated on this fine model, it is indeed a King!



Merlin Mayflower Mods

by Tag Gorton
drawings by Harry Wade

The Wizard works a little magic...

The Merlin Mayflower/Monarch is a nice little four-coupled locomotive that looks good and should run well. It is, however, an elderly design that hasn't been improved over the years and here in the West of England, efforts have been made to improve the basic product. It also has to be said that logistical back up from MLW has been, at best, erratic in recent years, and I therefore include instructions for simple checking and setting of the timing on Merlins *(Courtesy of Ian Pearse of Pearse Locomotives).*

Tools required are fairly basic and you probably have them already. You will need a set of needle files (or buy them individually), a set of watchmakers screwdrivers/nut twirlers/ spanners (mine cost eight quid from a local discount store), a junior hacksaw, a drill and a millimeter rule. Specific tools are mentioned in the text (with sources). There is nothing radical here, just minor modifications that are comparatively simple to undertake and that will either improve appearance or user friendliness . Pick and choose as you wish!

One of the first changes that I made was to move the radio on/off switch from the body shell to the chassis. This has the advantage of making the body quickly demountable for maintenance, and also removes the wiring from the cab where it is visible through the spectacle plate.. The wiring loom can be rerouted under the boiler, and the best place for the switch I found to be under the servo on the offside. There isn't much space, bearing in mind that the battery box has to be demountable and you may need to cut back the brass clips that hold the box in place. No short cut to mounting the switch I'm afraid, I drilled holes using the switch face plate as a template, then it was time to get out the needle files to turn the centre hole into an oblong to facilitate using the switch!

You will be glad you did the above mod first, because if you do the rest the body shell will be on and off several times. A point that should also be made here is that the failure of the fixing lugs on the body shell seems a common problem. When this happened to me, I was very wary of re-soldering the lug into position for fear of damaging the paintwork. You can avoid this by resting the external paintwork of the body shell on wet cardboard and using a large iron to make the joint. I haven't tried using low melt solder but it might well be effective. Anyway I have soldered several lugs using this method and haven't damaged any paintwork yet!

Timing

If your locomotive is a poor performer this is perhaps the most important area to check. I have seen articles describing the setting of this valve gear which necessitates removal of the cylinders and setting each one up whilst the loco is in steam! Happily for us this is not necessary at all. Locomotives were timed during manufacture primarily by measurement, and our check is undertaken in the same way. It is suggested that a 'dry run" is conducted a couple of times in conjunction with the diagrams before adjustments are made.

If your locomotive is a non-runner, check that when the main (connecting rod) cranks on the starboard side are at six o'clock your port side cranks are at a quarter to twelve. If they are not then someone has wrongly reassembled your loco and you will need to requarter your wheels on the squared axles (unscrew the screw on the main cranks, lift off and reposition).

1. Lay the locomotive on its side and check that when the main cranks are at top dead centre, the valve crank is angled towards the rear of the locomotive (see Fig. 1). If this is not the case then the valve crank will need to be repositioned. Merlin have a nasty habit of snipping of the end of the locking grub screw, I suppose to stop people "tampering" with the timing, but it is a pain in the fundament if the timing needs to be adjusted. On one loco I had to drill out the screw and re-tap the hole. Don't panic though - if the valve crank is not loose then it's probably in the correct position!

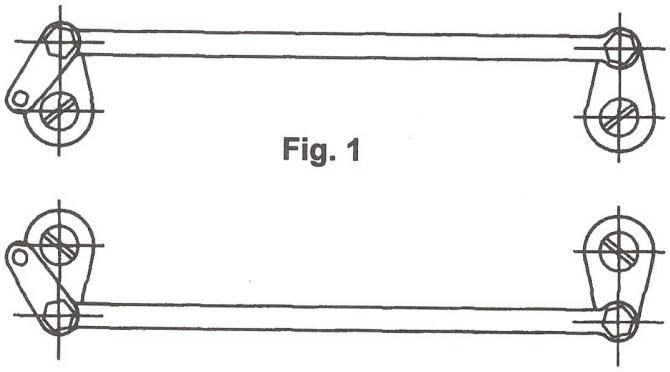


Fig. 1

2. With the locomotive still on its side, move the wheels in any direction. If the valve crank is in the correct position you should get a 4mm movement of the piston valve in and out of the valve chest (see Fig. 2). The movement in and out is controlled by the throw of the valve crank, which of course needs to be altered if the movement of the piston valve is more or less than 4mm. Secure the crank with the grub screw on completion of any adjustment.

3. To check the correct position of the piston valve, the main connecting rod cranks need to be in the 9 o'clock

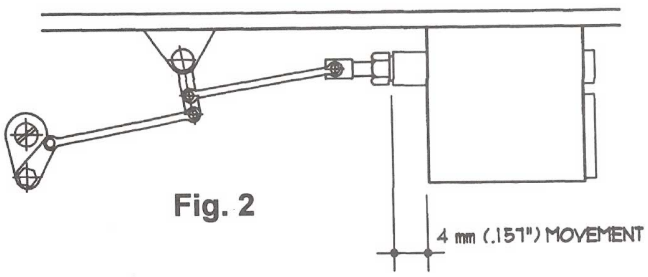


Fig. 2

position (see Fig. 3). There should then be a measurement of 3.5 mm from the back of the valve chest to the end of the piston valve rod (see Fig. 4). This may be adjusted by loosening the lock nut at the end of the piston valve and turning the valve in or out on the screwed rod. Check this measurement with the main cranks at the 3 o'clock position and it should be the same.

Finally, put the engine into steam whilst on blocks and run the loco in both directions. Run the engine fairly slowly

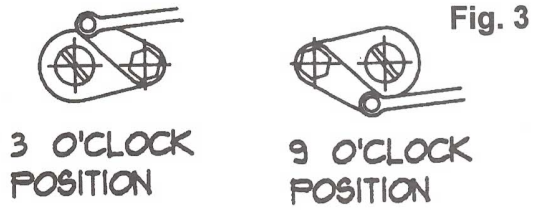


Fig. 3

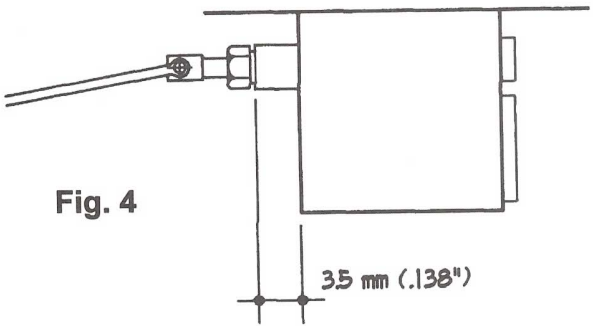


Fig. 4

and fine tuning of the loco can be achieved by putting a finger on the piston valve crankpin and "assisting" the valve movement both forward and backwards. If smoother running is achieved by doing this then a final small adjustment may be made to the valve position on the screwed thread. All these procedures should of course be conducted to both sides of the loco concurrently! ! Your engine is now correctly timed and is ready for further improvement.

Slow Running

This, or lack of it, is a problem mentioned by several correspondents and is quite easy to improve. There is nothing wrong with the rotary valve arrangement provided by Merlin (My slowest running loco is a well run in Merlin Meteor which uses exactly the same valve as the Mayflower). However, I have noted on many locos that the spring pressure is far higher than that required to keep the port faces together. With Merlins' habit of using the maximum throw of the servo arm, this can produce an unacceptable strain on the servo and batteries resulting in jerky "stop/go" running. Before making these adjustments it is recommended that the timing is checked in accordance with the diagram and notes.

Firstly, undo the lock nut on the rotary valve spring, then loosen the nut to lessen the spring tension on the assembly. Experience has shown that this may be loosened quite a lot before the port faces are blown apart under steam. A matter of trial and error on each individual loco.

There is a bell crank across the chassis as part of the servo drive linkage to the rotary valve. There should be two holes on the lever arm, and it is a simple matter to move the clevis closer to the fulcrum to provide less throw. On locos that are fitted with a whistle this will not be possible, but don't despair. The change can be affected at the servo arm. On my loco I have used the third hole in from the end, thereby reducing the throw quite considerably. Ensure, when making this change, that the clevis does not foul the chassis. If this happens, move the lever arm down the servo shaft slightly.

If you don't have a whistle valve, it may still be worthwhile to make an adjustment at the servo lever as well as the bell crank to provide the best running. These simple adjustments on my loco have provided me with excellent slow running characteristics, and it's perfectly possible to use this engine for shunting. I would state here that Merlin locomotives require running in, so if your loco is new or little used then expect further improvements with sustained use. Its worth mentioning as well that it is possible to reduce the movement of the rotary valve too much! You will get your slow running but lose power and speed. It's again a matter of trial and error but the positioning detailed above should produce results.

Gas Firing

A common problem with these locos is of course the blocked jet! You will be aware of the trick of blowing the jet clear with your gas can, but it is a pain, particularly as it always happens when one wishes to "show off" ones loco! Try putting part of a cigarette filter tip into the jet block. Don't pack it too hard or you will slow down the gas flow. It doesn't need much - all we are doing is "catching" any impurities before they reach the jet. Don't forget that the banjo bolt, by virtue of the hole through the body, is not so strong as it looks, and care needs to be taken when retightening.

Blast Pipe

Exhaust arrangements on later Merlins consist of a simple tube up the stack. This is fine of course, but does result in a

mess of oily condensate all over your loco on steaming up. To avoid this, it's a fairly simple job to fit a "blast pipe" (see rough sketch). The smoke box is removed by undoing the bolts on either side of the rotary valve, easing away from the boiler and sliding up over the exhaust pipe. Cut off the exhaust pipe, leaving around a two inch stub, and file the end smooth.

A "blast pipe" is manufactured by using a section of copper tube that will just fit over the exhaust stub. Length isn't critical but you may wish to have it long enough to remove and replace with a pair of long nose pliers, without the nuisance of removing the smoke box. Cut an "organ pipe" slot in the tube at least an inch down from the top of the chimney but above the level of the smoke box and seal the top shut by squeezing the tube or, preferably, with a dab of solder. Slide onto your exhaust stub.

This will ensure that: condensate will drop down between the frames, keeping your engine clean; the oil in the condensate will burn off, improving your exhaust display and yielding a better "chuff". This last can be improved further by experimenting with different size slots in your tube.

Lubricator

The Merlin lubricator has always been a pain in the fundament and, in fact, the later models are even worse. Using a screwdriver or a spanner to fill and empty the oiler is awkward and a solution was slowly evolved over several garden meetings that addresses this problem.

The accompanying photographs show my locomotive. There are other loco's where the job was completed in a rather more elegant manner. This, of course, is the advantage of garden meetings with the pooling and improving of ideas!

Apart from the appropriate spanners, screwdrivers etc., you will require a four mill tapping drill and a 3/16"x 40 tpi ME tap. (if unobtainable locally, Tracy Tools Ltd of Mayors Avenue, Dartmouth, South Devon TQ6 9NC can supply, their telephone number is 0803 833134). The draincocks are in fact cylinder draincocks from larger scale locomotives and are available from: A. J. Reeves & Co. Model Engineers, Holly Lane, Marston Green, Birmingham B37 7AW. Telephone 021 779 5831. You will also need one or two extra PTFE or copper washers for your drain cock.

Remove the steam unions from the lubricator, ensuring that the respective PTFE washers remain with their banjos. It may be necessary to temporarily remove the servo to allow a bit of space in which to work, and it's best to remove completely the steam pipe from the lubricator to the superheater pipe. The lubricator is then unscrewed from beneath the footplate, putting the screws and spacers to one side. There may not be room to replace both spacers, but one screw/spacer is perfectly adequate for the job of supporting the lubricator.

Remove the filler plug. If you have one of the earlier screw tops it is a fairly simple matter to solder an appropriately shaped piece of brass into the slot, using a large iron or a gas torch. I'm sure I don't need to remind you to remove the rubber seal before undertaking this operation! Owners with the newer (and nastier) bolt headed plug will need to cut a slot with the hacksaw prior to soldering.

Remove the drain plug from the carcass of the lubricator. Turn the block upside down and place in a vice, protecting the metal with card or ply. Centre tap the work and drill with the 4mm tapping drill. Please remember that the steam pipe crosses the lubricator inside so, while it is at the other end, and away from the centre of operations, take care not to put to much pressure on your drill. You can't be less engineering minded than me, or more cack-handed, and I managed all right, but if you feel safer, jam a few matches in and around the steam pipe to protect it. Don't worry if you do hit it - it's a fairly hefty brass tube.

Tap the threads in your nice new hole, again taking care not to foul the steam pipe, then clean thoroughly with spirit, followed by WD-40.

We are now at the stage where we are ready to fit the drain cock and we have a choice to make. The lubricator block may be fitted to the loco with the now redundant drain screw facing inside, which is neater -- but it may necessitate drilling an extra hole in the footplate. Another hole will be required in any case to allow the drain pipe through the plate.

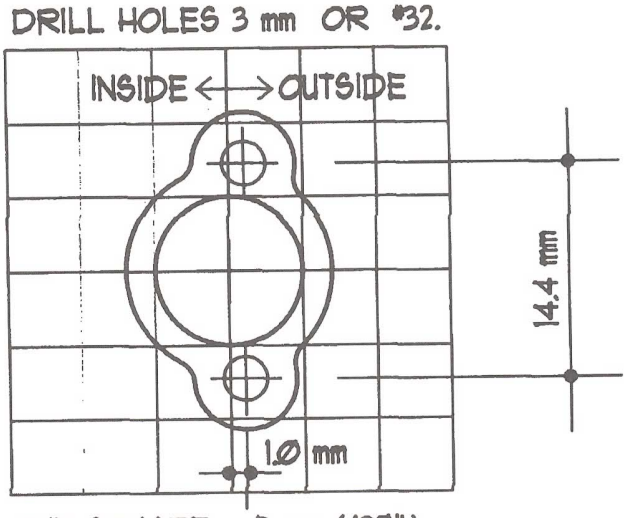
Having decided which way round you want your lubricator, screw in the drain cock. You may need to add a washer to get the lever to point out of the cab (check whether the cock is on or off by looking up the drain). You will find it easier to open and close the drain cock once it's in situ if an extension is soldered to the lever and a drain tube will need to be soldered into the cock to allow the oil to drain below the footplate.

This is a very worthwhile mod that allows you to service the loco without recourse to tools, and the lubricator can be tidily drained using the last few pounds pressure to blast out the oil at the end of a run.

Slidebars, Bracket and Crosshead

This is a purely cosmetic modification which Merlin said couldn't be done. However, there are six or seven of these so modded Merlin Mayflowers/Monarchs in the West Country, and it really isn't difficult or tool intensive - just lots of filing, a little soldering and lots of time. The drawing and photographs will tell you most of what you want to know.

All the brass rod, bar and strip is available from the rack in your local model shop *(maybe in your part of the world, Tag, but not in the States! -- ed)*. Sizes you will have to work out from the measurements on the drawing and, to be honest, its not something I'm very particular about. I get some stick locally for rarely measuring anything, but I do get both sides exactly the same!! The best way of effecting this result is to bolt two sections of plate together so that drilling and filing produces two identical brackets. These are of course handed by bending in the opposite direction. You will note that my "slide bars" are approximately 4.5mm centres. If you have the more modern Merlin cylinder assembly, with the nut on the cylinder back plate, then I would suggest a wider spacing and consequently a longer bracket. The ring at the cylinder

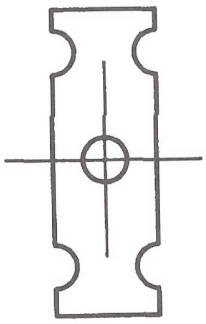


SLIDEBAR BRACKET

end would obviously have to be larger to fit over the nut. I would state here that these dimensions are not carved in stone. The assembly is cosmetic only – as long as the bars are square with the chassis, and the bracket does not foul the running gear, then it is right! You may find, for instance, that you have to file more off the internal dimensions of the bracket to avoid fouling.

There are slight differences to all these locomotives. For instance, on one loco the cylinders might be set one washer/spacer lower than another. Therefore, when producing your brackets it's a good idea to offer up the work to the loco as you go, and also to slightly elongate the fixing holes to allow some small adjustment for square.

The crossheads are just off cuts from a strip of brass. Mine are 5mm by 1mm thick, and again they



CROSSHEAD

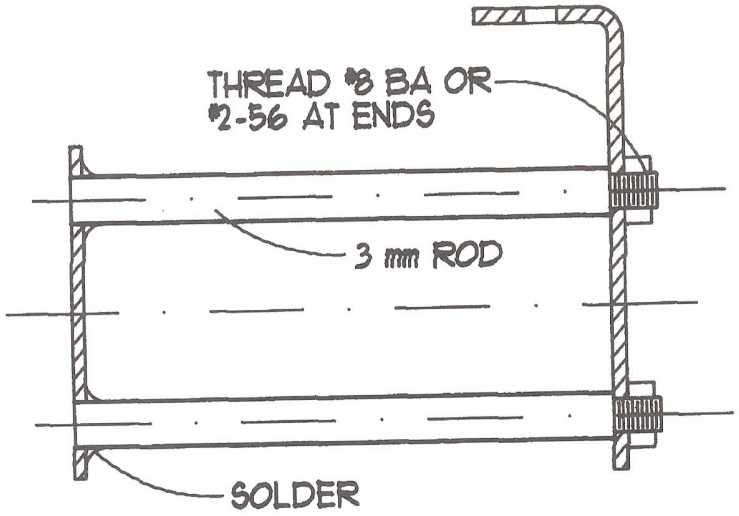
are manufactured together by bolting through. File to shape according to taste. I wouldn't make them any thicker than mine because of course they are bolted into position using the crosshead crankpin.

Once you are happy with the construction of your slide bar/bracket assembly and crossheads – and they fit without fouling the running gear – you will wish to do something about the bare brass finish. I use a resilvering solution to plate my brightwork. LIBERON 'RENOV' Silver is the one that I use. It's £10 a bottle, so everyone uses mine!

A couple of points. The completed assembly will slide into place after removal of the crosshead and valve rod crankpins. Depending on the shape of your completed assembly, it may be necessary to remove the crankpin from the end of the rear eccentric. It's a good idea to temporarily replace these pins in position whilst working, to lessen the chances of losing them. I don't want to tell anyone how to suck eggs, but do not use force on these shouldered crankpins when replacing them! Just finger and thumb tight and use a dab of Loctite Lock'n'Seal or similar to secure.

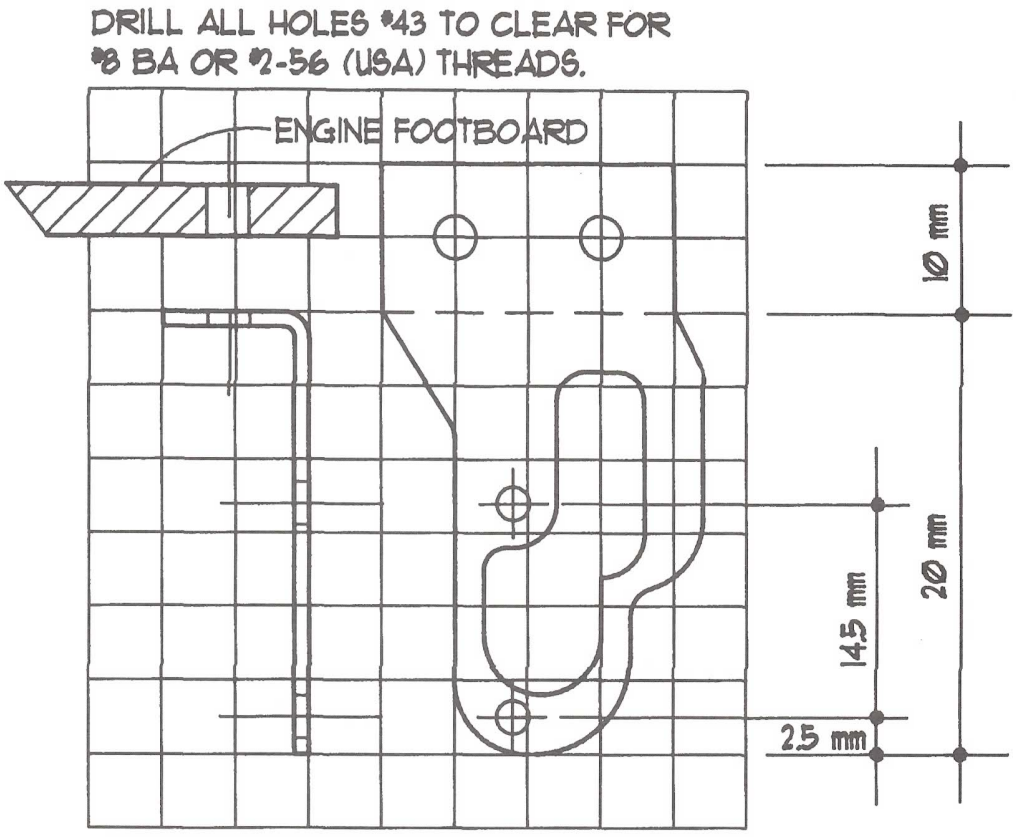
When drilling the running plate for the bracket securing bolts (or for tapping if preferred), either drill from the top down or, if like me your drill is too big and awkward, slide a piece of wood between the boiler and frame to protect your boiler paintwork.

Notes for USA



SLIDEBARS

Merlin Owners in the United States and elsewhere will have a far greater logistics problem than in the United Kingdom when it comes to trying to deal with Merlin Loco Works. No doubt many people will have given up! If you have a problem not addressed by these rough notes, or require



further clarification, do not hesitate to get in touch with me and I will do my best to help you.

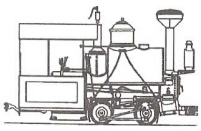
Tag Gorton
58 Beatrice Avenue
SALTASH
Cornwall PL12 4NG
United Kingdom
Tel 0752 845938

Addendum

Since this article was written the Merlin company seems to have sunk without a trace. Myself and fellow 16mm Association members in the West Country have been attempting to address the problem of spare parts and logistical back up for this marque - with the help of the estimable Pearse Locomotives Ltd. and Finescale Engineering.

One of my Merlins has been fitted with new steam chests/ piston valves from Pearse. All other locos have Pearse "O" ringed cylinder backplates which I have fitted with square section single slide bar. It is also possible (but unlikely to be necessary) to fit the complete steam chest cylinder assembly. These items are of far better quality than the originals, particularly so in the case of engines manufactured in the last three or four years. There is a modification required before the assemblies will fit and it is therefore suggested that, if you consider that your loco requires replacement of these items, you contact me and we will do our best to sort things out. Note that the symptoms of a badly timed loco are similar to an engine with worn out valves, so please go through the timing routine described in this article before considering spending money. Batches of new safety valves can also be made to order and will therefore be available intermittently. Other items may be available, depending on what is required.

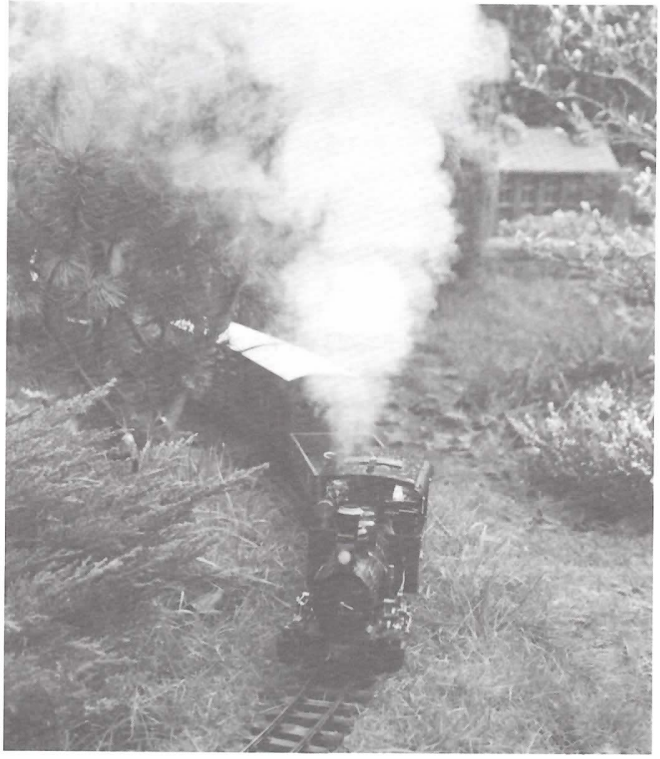
We will try to assist fellow Merlin owners as much as we can. Do please remember however, that we may not respond as quickly as a manufacturer and our motive is solely to help people who have spent a considerable amount of money on a steam engine that no longer works.



Welsh Nuts and Other Black Diamonds

by David Pinniger
all photos by the author

The technical description of coal fired locomotive boilers by Marc Horovitz in SitG No. 21 raised some interesting points. As Marc rightly pointed out, coal firing can be the most rewarding or frustrating way of operating small scale steam locos, depending upon the design of the loco and the fuel available. I would recommend that you also read Marc's earlier article on running "CEYLON" in SitG Vol. 3 No. 5 as this gives a very evocative account of his first experience of steaming a 16mm coal fired loco. As readers may know from my review of "BLACK ADDER" in an earlier issue of SitG, I am totally hooked on coal firing and have been lucky enough to have had the pleasure of operating 8 different G and 16mm scale coal fired steam locos over the years. All of the locomotives have had very different characteristics, and all have generally been much more difficult to operate on the first few runs and tend to be very unforgiving of a tentative beginner. However, once you get to know an engine and begin to understand it's good and bad points, loco performance picks up and your enjoyment increases in direct proportion. This, combined with a supply of good clean coal for the first few runs, will get you off on the right foot. It also helps to have good advice from someone who knows about coal firing in the smaller scales [rather than one of the many armchair experts who have never actually got their fingers burnt]. The larger sized passenger hauling steam locos are much more forgiving, and well meant advice from owners of these locos can sometimes be misplaced.

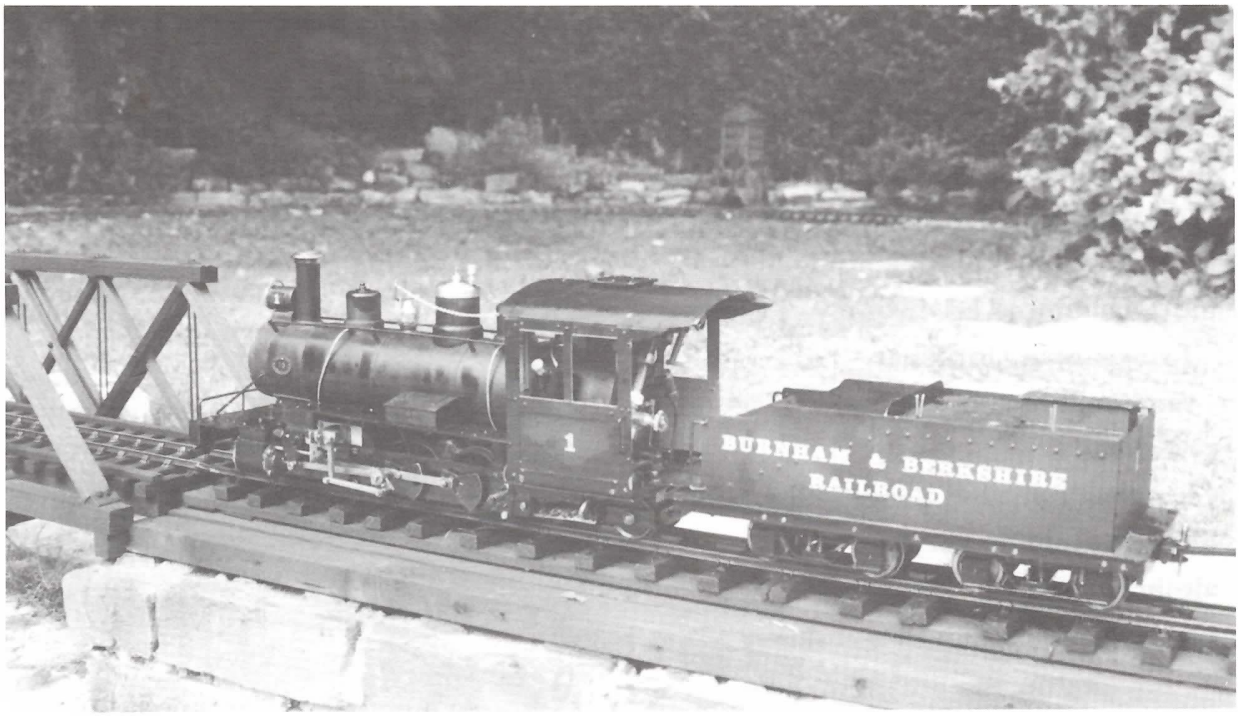


Plenty of clag! John Shawe's "Black Adder", running on the author's AVR with some soft, aromatic coal.

Most people recognise the advantages of a deep grate and the need to keep the fire as far up to the fire door as you can so that it does not burn through. The problem with such a small thin fire is that once you have a hole in the bed of coals the air will go through the gap, and it is then very difficult to keep the fire burning. I have one locomotive built by Mike Gaskin which is based on a Baldwin 2-6-2 built for the Wiscassett, Waterville and Farmington Railroad and is irreverently known as "Wissie" on my Burnham and Berkshire Railroad. This is a great runner and the boiler is a great steam raiser, but because there was very little clearance between the rear trailing truck and the bottom of the firebox, Mike fitted a grate which slopes downwards towards the front. In practice this means that as the loco runs the fire tends to move to the front of the grate and unless the coal is kept topped up at the back, the fire will go thin and then bum through. Until I discovered this I had a number of very frustrating runs where the engine was running really well and then, after I had stopped for a few minutes to take a photograph, I could not get the fire to pull up again as it had burnt through at the back. Now that I know about this, I make sure that I keep the fire really topped up to the bottom of the firedoor and I get somebody else to take the photos!

This feature of Wissie also rather limits the type of coal which I can use in the engine to clean hard anthracite, which burns very hot and very steady and produces very little ash or clinker. This is available in the UK as anthracite grains for use in domestic heating systems and, although I know that it used to be mined in the USA and was used by the anthracite burning railroads in the northeast, I am not sure how easy it is to get hold of in the States these days. *(It's still easy enough to get here in the northeastern USA -- we buy it by the ton and use it to heat our old farmhouse -- ed.)*

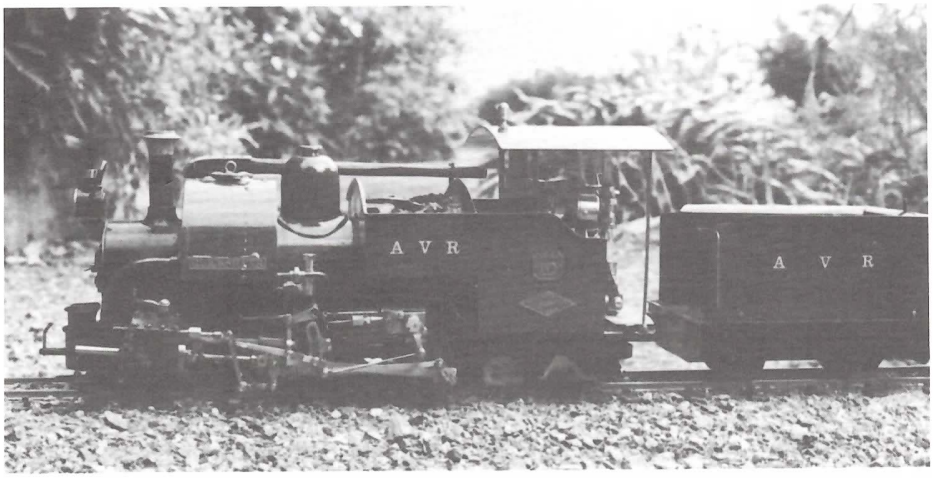
Some of the other locomotives like John Shawe's "Black Adder" and Marc's "Ceylon", which have deep fireboxes, are much more tolerant and you can get away with burning some really smelly softer coal. After Mike Gaskin built "Ceylon" I had fun testing it out on the AVR and knocking out any gremlins before it was sent on to Marc. I found that with this locomotive the best combination was 50-50 mixture of hard anthracite and softer smokeless fuel, as the two seem to balance heat production and fire retention very well. The big firebox on this engine will burn most varieties of coal, and I can tell you that on one occasion "Ceylon" ran for half an hour on a diet of old creosoted track sleepers [ties]. I would not recommend this other than as a daft experiment, as after the run the tubes were clogged with soot and the smokebox was half full of ash! With "Ceylon" and many other coal fired locos it is important to remember that after a 20 or 30 minute run the ash and clinker can start to build up on the grate and a quick and careful rake with a fire tool can work wonders in livening up the fire. All you need is a 1/16" dia.



"WISSIE" going well on the Burnham & Berkshire RR. Note the ash on the ashpan under the cab.

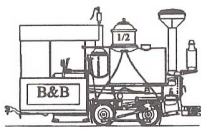
steel rod bent at right angles for about 1/2" at the end, and if you want to be fancy you can fit a wooden handle on the other end. Do not be too enthusiastic with raking a thin fire or you will make it bum right through and put the fire out. If you use some really rough and smelly coal you will need to sweep the tubes clean after a run and you may also need to break up and get rid of lumps of clinker before they weld onto the grate bars. It is not wise to leave old ash in a smokebox for any length of time as it can be pretty corrosive, and always remember to make sure that the smokebox door is well sealed when it is replaced or the fire will not pull properly next time you light up the engine and use the blower.

One last point is that until you have run coal fired engines you do not appreciate how much water they use compared to gas or meths fired locos. This is because the heat source is much less controllable and to get the best performance from a coal fired steam loco you tend to run it with a good hot fire, which makes the safety valve lift most of the time. This of course wastes a lot of water and increases the consumption and is why it is so essential to have an axle or crosshead driven pump which delivers water to the boiler while the loco is running. Even so, when the loco is running really well on a heavy train it is all too easy to forget to top up the water tank at regular intervals and you suddenly realise with horror that the water has disappeared off the bottom of the sight glass. There is then a frantic stop and a mad session with the hand pump to top up the boiler before it runs dry. My Darjeeling B class 0-4-0ST built by Hugh Saunders is an engine that needs careful watching as the capacity of the saddle tank is very small and when the loco is working hard and blowing off hard at 60psi, the water will need topping up almost as frequently as the coal in the firebox. The real Darjeeling locomotives have additional well tanks between the frames but even so they stop at regular watering points. There is no place for water troughs and scoops on the narrow gauge!



Ambledown Valley Railway No. 10 "QUICKSILVER", Hugh Saunders-built Darjeeling B Class 0-4-0ST. Note small saddle tank capacity.

I still thoroughly enjoy the relaxation of running a meths-fired pot boiler on the AVR but nothing quite matches the "buzz" you get from a good run with a well designed coal fired loco.



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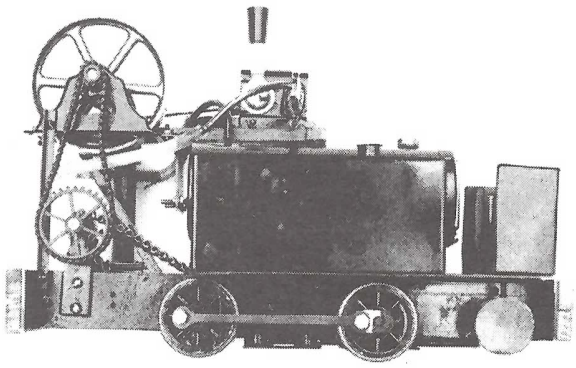

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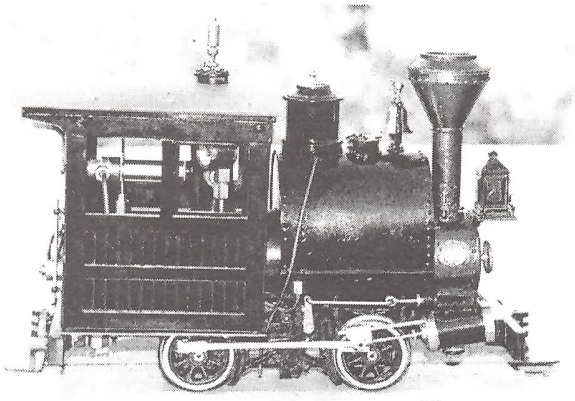


WRIGHTSCALE'S NEW 8-TON PORTER with full working Stephenson's valve gear and radio control.

Read the review of this great little loco in the Nov/Dec '94 issue of Steam in the Garden magazine, then call or write us here at Sulphur Springs Steam Models to reserve one for you at the super introductory price.

LETTERS FROM THE OLD CURMUDGEON

"Attempt only what you are able to perform."

Cato

The Old Curmudgeon

Dear Gene -

I saw that picture of your 4-8-4 loco frame with the 72 hex bolts and I thought you might like to do as I did and make yourself a set of mini hex wrenches. It's a snap. Allen head capscrews and setscrews can be used to make a nice set of small hex wrenches.

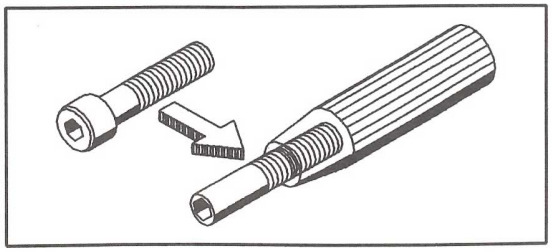
You can sort through your box of assorted machine screws to get a set of Allen heads which will fit everything from small 0-80 hex heads to the larger sizes. Alternatively go down to your hardware store and pick out a set. For the smaller hex heads the Allen head setscrews are suitable.

While you're at the hardware store also pick up a length of 1/2 inch diameter aluminum rod for making the wrench handles. You could use any suitable plastic rod of about the same diameter if you choose.

In order to fit into tight places machine down the heads of the machine screws to make thin wall sockets. Now, use the aluminum or plastic rod to make a set of handles. Turn a taper at the wrench end to permit a good view of the work area when you use the wrench. (see my sketch below) Drill and tap each handle to fit the appropriate screw thread size, clean the threads in the handle and on the machine screw with alcohol or acetone and epoxy each screw into a handle. There - you have a set of minihex wrenches!

Another suggestion; while you're out on the town stop into any film processor's shop, tell them you are a model builder and ask him for some of those plastic containers that 35mm film comes in. Customers bring their films to be developed in these containers and the shops usually have a large quantity for which they have no use. The clear ones are great for storing small parts such as those hex head 0-80s.

Keep turning - Marv



The Lathe-Free Locomotive

by Rob Kuhlman

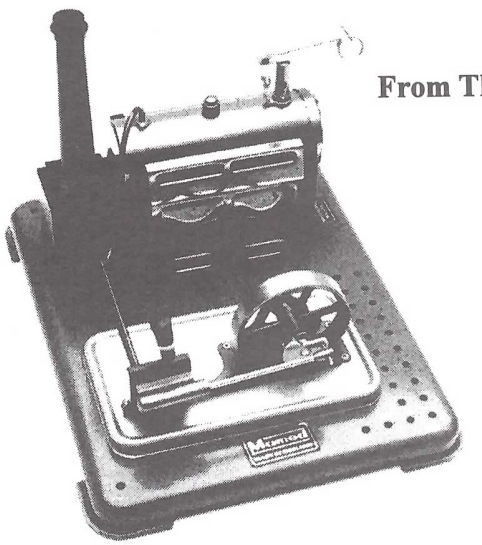
A loco construction project series for fellow mechanical neophytes and klutzes

Introduction

Steam In the Garden has been around for several years now; it's getting sophisticated — a reflection of the growing sophistication of the adherents of this wonderful hobby. But let us not forget that we all started at one time from scratch, with little knowledge about steamers and few mechanical skills. With that kind of background, and with a burning desire for a steam locomotive, but perhaps limited financial resources with which to purchase one, how does a newcomer break into this hobby? Why, he or she builds that first steamer, that's how. It may be mechanically crude, it will surely be ugly, but I guarantee it will be loaded with charisma and will be cherished as much as a first born — which, in a way, it is. This, then, is what this series is all about. Together we'll build that first engine, without a lathe, with common hand tools and commoner materials, with grunts, groans, and skinned knuckles. The project is based upon my "Linwood Tram Engine", several copies of which I've offered for sale. It's easy, it's relatively cheap, and the engine is reliable.

We will take advantage of inexpensive commercial boilers and cylinders (I can't fabricate them yet, myself). The Linwood Tram Engine was built from a Mamod SP-4 stationary engine. Mamod makes other stationaries, one of which I've used in another project (SitG, Vol 3, #1). Saito offers a marine boiler and oscillator which works real well (SitG, Vol 3, #6), and I've got a Jensen stationary in a box waiting its turn. Wilesco also offers several stationary engines and marine application engines which should work very nicely. I chose the Mamod SP-4 because it's one of the few reversible oscillators, it uses the same boiler as the Mamod steam loco and several retrofit accessories have been made expressly for it, and, most important, I got 5 of them cheap. Write to SitG's advertisers who mention these various engines, get their catalogs, and educate yourself about the commercial goodies which are out there. I'll be giving measurements and dimensions appropriate for the SP-4; adjust things accordingly if you choose other hardware. The bottom line? I spent $125 to build this locomotive; depending on which boiler/engine you choose you shouldn't be too far from that figure yourself.

I always get intimidated by construction projects which list a bill of materials at the outset. So let me just say that we'll need some steel, some brass, and a bunch of nuts and bolts. I'll mention specifics as we come upon them. There are some tools, however, which I think you'd be hard pressed to do without. A drill press is one of these, preferably a regular table model drill press (read Crankpin in SitG Vol. 3, No. 1) or, at the least, a modified drill stand (SitG Vol. 3, No. 6). Hobby shop tools include a pin vise, a razor saw and miter box, a small screwdriver, needle-nose pliers, tweezers, and those neat reverse-action tweezers (squeeze-to-open). You'll need drill bits (I still use fractional bits from the hardware store — shows you what kind of a machinist I am), a hacksaw, good fresh files (smaller sizes are useful also), a center punch, and, if you can swing it, an optical center punch as well (this tool is amazing — treat yourself to one). A small metal square



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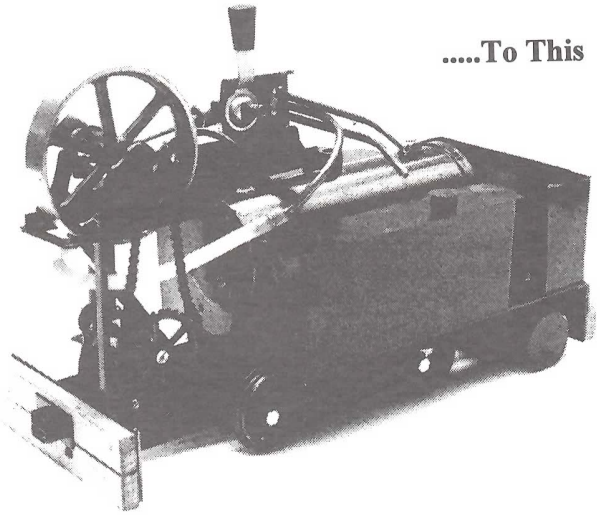


.....To This

is nice, but for several years I followed Peter Jones' advice and used my kid's Lego pieces to make a very serviceable T-square. If you don't have a scriber, get a 3-pack of darts; unscrew the tips and use these for scribing, pin pricking, and threatening those who distract you from your workbench. Small vice grips, small C-clamps, and/or parallel jaw clamps will be invaluable in holding pieces together for marking, drilling, and filing. Finally, you'll need a propane torch and a heavy duty soldering iron or gun.

As far as fittings go, the loco will run better on track if we give it wheels. I've always used MSR Mamod-replacement spoked drivers, though with the unfortunate death of Jim Wilson, they may be hard to get before too long. Mike Chaney offers Mamod replacement drivers, Roundhouse makes solid wheels, and perhaps our editor can suggest other sources. *(If you don't care about spokes, you could use Gary Raymond metal wheels -- ed.)*

This locomotive uses a chain drive, so from whomever you order your drivers ask that one wheel be left off its axle so that you can slide on a sprocket and then press on the wheel yourself. We'll talk about how later. We'll need some chain and sprockets. I've used Serv-O-Link's Delrin sprockets and chain for the power takeoff and for gear reduction. Up away from the flame they are quite satisfactory. Down closer to the fire, however, I use Chicago Gear Works steel ladder chain and brass sprockets. Meccano gearing components are starting to show up on our shores, and other manufacturers' chain and sprocket offerings may work just as well. The operation of the locomotive will be improved by embellishing the Mamod boiler with a Goodall or Mike Chaney safety valve and a Goodall water injection valve (Mike Chaney and Salem Steam Models, among others) specifically designed for this boiler. We'll also build ourselves a displacement lubricator and an alcohol burner, but that comes much later.

Common 1/16" steel sheet is what we'll use to build the superstructure. I hacksawed and filed mine from a derelict circuit breaker box. Lacking one of these in your basement, try your local hardware store or home center for the steel sheet. Various 1/4" brass angles will be used to join the chassis pieces; they and various brass tubings can be obtained from your hobby shop, but one foot each of good, sturdy brass angle in 1/4" and 3/16" sizes is needed in a couple of places. I got mine from Coles Power Models. Body work is folded and soldered up from tinplate; I use empty Coleman camp fuel cans. Brass from the hobby shop would work just as well, but that's just something more to purchase.

Well, your homework is to get literature and prices for the components, bits, and pieces, and go ahead and order 2 pairs of drivers (don't forget to ask that one wheel be left off). Next time, we'll prepare our steel strip, layout and drill the chassis pieces, and begin to assemble the chassis. See you then.

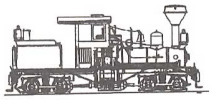
Here are the addresses of Useful Vendors/Manufacturers cited above who might not be advertising in SitG. Be sure to tell them where you saw them mentioned.

Coles Power Models
Box 788
Ventura, CA. 93001

Chicago Gear Works
1805 S. 55th Ave.
Cicero, IL 60650

Serv-O-Link
P.O. Box 100542
Fort Worth, TX 76185

With manufacturers who sell primarily to the industrial trade you may be facing a minimum purchase figure. Either purchase enough for several engines (you'll probably use them; the bug bites hard) or assemble an order with some friends.



Pot Boilering

by John Wenlock

Recent endeavors in the workshop have involved the rebuilding of "Sarah Ponsonby" my oldest live steamer, plus the construction of a couple of Mamod based locomotives. I thought that SitG readers might appreciate some notes on model boiler work, as many home constructors are of this side of engine building - and that is what I'm doing at the moment.

The pot boiler at its most basic is a simple copper or brass tube with the ends sealed and some kind of steamproof plug to allow for water filling. A safety valve (often used to 'plug' the filler bush) is essential of course, but a steam valve (regulator) and pressure gauge may also be added on for greater control and efficiency -- although simple oscillating engines of the Mamod type function perfectly well without them.

Heat, which could be either a spirit lamp or a gas flame, is applied to the outside of the boiler drum, hence the term "externally" fired with no forced draft arrangement being necessary, although a "firebox" (some kind of wrap-around heat shield) is required, both to direct the flame and to prevent too much heat being lost into the atmosphere due to stray breezes.

Materials

The boiler barrel should be seamless copper tube. Seamless brass tube may be used. Many Merlin locomotives have brass boilers, as do the majority of Mamod steam engines, but copper is reckoned to be a better material. For one thing, it has the ability to soak up the heat more efficiently - the best domestic water heaters are made from copper. Even so, I have made an all brass boiler for the rebuilt "Sarah Ponsonby" -- partly because I happened to have some 22 gauge seamless tube handy, which was the right size, and partly because I wanted to try a brass boiler.

The brass or copper tube selected should, as I have said, be seamless. Make sure that is what you have. Seamed tube could give way under pressure. Seamless tube is drawn from a solid lump, so will be very strong.

As for thickness, there is some dispute as to the merits of thinwall vs. thickwall boilers. The former takes up heat quicker, whilst the latter holds the heat longer but will take more time to heat up. Believe me, there is no danger in boilers exploding when using thin wall tube in our scales, but a really thick wall boiler will always be a little steam shy because so much of our meager heat source will be needed just to warm it up.

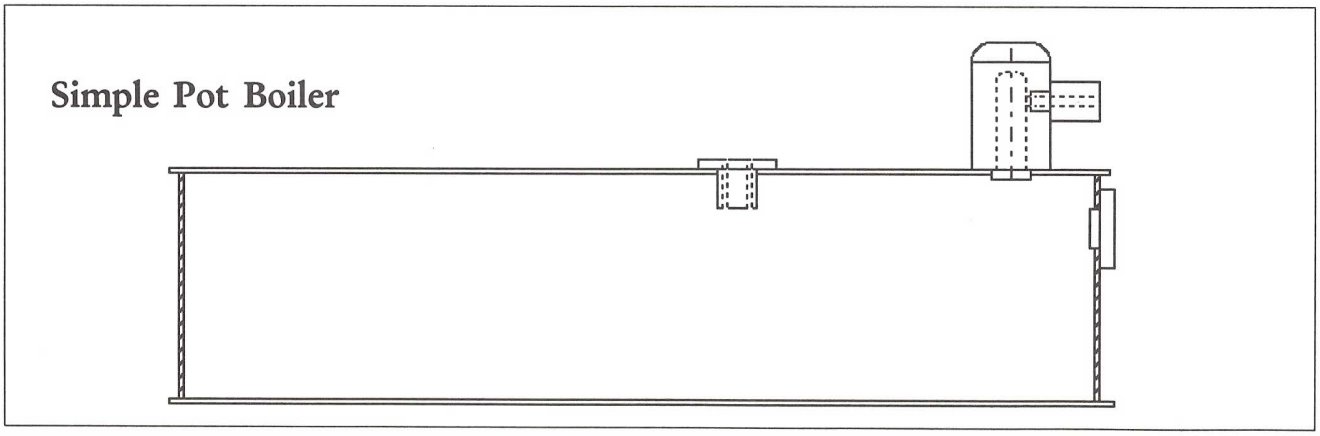
For boilers 1-3/8", 1-1/2", 1-5/8" and 1-3/4" diameter x 22 gauge is fine, although 20 gauge will do. Boilers of around 2" diameter use 20 gauge or possibly 18 gauge. My Roundhouse Lady Annes have massively over-engineered boilers of 16 gauge and they work excellently. In contrast, my Mamod has its original boiler of very thin wall copper, about 26 gauge. (This only operates on about 15psi. My rebuilt Mamods have more robust specifications.)

It is recommended that the end plates be made from thicker material. I use 16 or 14 gauge copper. I do not think that it is necessary to flange the end plates for these small boilers. Even at 75psi the ends will not give out. Nor do you really need to stay such a small boiler.

My early Roundhouse Lady Annes have flanged end plates and are stayed. This is why I am happy to uprate their safety valves to 50psi. (See *The Two Ladies*, SitG No. 13). Although a few of my early boilers were built this way, I have now built seven boilers with plain disc ends and no stays. They all operate at 40psi. Even the new light gauge boiler for Sarah P. was made this way and was hydraulically tested to 80 psi with no bulges.

Fittings

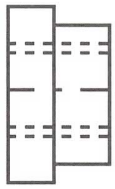
The other components of a boiler will be simple "top hat" shaped bushes which allow safety valves, fillers and various steam outlets to be connected up. Ideally these items should be of bronze, although brass seems OK. There is a phenomenon referred to as dezinctification, where the zinc component of the brass alloy is leached out, leaving behind porous copper. It has been suggested that using deionized water actually encourages this. Anyhow, some of my boilers have brass



bushes and some bronze. One boiler with brass bushes has been in service for over ten years with no sign of failure, but I would still recommend bronze.

Bushes, whether brass or bronze, may be bought in or made in the home workshop - if you have a lathe. The safety valve bush will have to be threaded to suit the safety valve, of course. The rear end plate of the boiler, sometimes called a backhead (although not a true backhead in a pot boiler), has a couple of bushes too. One takes a plug for a water level plug or vacuum tap, whilst the second bush provides a take off for a pressure gauge if you want one.

Typical Boiler Bush



A regulator of some type is desirable. Once again such items can be purchased or made. There are basically two types: internal and external. The latter is the cheaper and easier to set up. This may be arranged to tap the boiler steam from a small collector dome or turret. The idea is to take steam from as high up as possible so as to avoid priming (that is, water in the steam). I have made a couple of boilers with steam domes and internal collector pipes, but the steam turret is easier. I turned mine from a piece of 1/2" dia. brass as shown. If you do not have a lathe, then an alternative collector pipe arrangement is shown.

The second boiler I made (the original Sarah Ponsonby boiler) was given two 3/16" dia. circulating tubes which were designed to protrude into the spirit flame in the hope of increasing the steaming rate. I'm of the opinion that they made no difference. I do not reckon to hedgehog spikes and various other appendages below either, as this could disrupt the normally efficient combustion of the simple spirit burner.

You can add other fitments such as water gauges, check valves and the like if you want but you will have to fit in more bushes to the back head. This can result in a lot of end clutter on a small boiler. A water gauge can be a rather tricky thing to set up and can give a lot of trouble. Frankly I do not think such a gizmo is worth the bother on a silver soldered pot boiler. Steam is generated at a more or less fixed rate which means that the boiler will be empty after a predictable time period. A check valve allows for more water to be introduced into the boiler by way of a suitable axle driven water pump, or a hand pump mounted in the side tank or tender. An additional complication, perhaps more for your internally fired model rather than the simple pot.

A check valve and hand pump is required for the purpose of hydraulic testing of boilers of course, but a simple "Goodall" type valve can be used to top up a pot boiler under steam -- if that is what you want to do.

Making or Obtaining Bushes and Other Fittings

If you have a lathe, then you can make every single boiler fitting that you will need, including steam unions, safety valves and regulators. I am not going to describe exactly how to make these. Well, not at the moment, anyway. Perhaps another time, if Ron doesn't mind ***(Please do, it would be very useful information, and would be welcomed with glad hearts by our readers -- ed.)***. Safety valves, regulators and unions are available from Roundhouse, Salem and Mike Chaney to name but three. I am sure that there are other suppliers listed in the pages of this magazine. You should also be able to obtain the correct bushes for the fittings from them.

Now, if you have a lathe and would like to have a go at making bushes (which would be a good first project for a beginner), here's what to do. Put some brass, gunmetal or bronze 5/16" dia. bar in your chuck, face off and turn down to 1/4" dia. for the first 3/16" (See drawing). Put a small center drill in the tailstock chuck and turn the speed up. Drill with the center drill and then change to a No. 22 or 4mm. Drill in about 3/4". Take care drilling bronze, as the material is hard and unkind to drills. Feed the drill in so far and then take it out to clear the swarf. Use cutting oil on bronze or gunmetal, but not on brass. Now SWITCH OFF your lathe and put a 3/16"-40 taper tap in the tailstock chuck. Put some cutting compound on your tap if you are working with bronze or gunmetal. Introduce the tap into the hole by sliding the tailstock along the lathe bed with the right hand whilst rotating the chuck gently. The tailstock should be loose on the lathe bed. Feel the tap biting the metal as it starts to turn and then rotate it backwards for about 1/3 of a turn. This is to "break off the chip", as it is called. This means to clear out the metal cut by the tap. Now rotate the chuck 2/3 of a turn, pushing the tailstock in gently once again. Then reverse the operation, turning back 1/3 of a turn. Repeat until you feel that the tap will not go any further. Don't force it however, as a broken tap is both inconvenient and expensive. Remove the taper tap and repeat with the second tap. Remember, turn forward 2/3 and back 1/3. You will only need to go in so far. Now take the tap out and remove it from the tailstock chuck. Taps, by the way, are available in taper, second and plug. The plug tap is only required for "blind holes", so for a lot of the time you will not need the plug, or bottoming tap, unless you want to make your own union nuts. M. E. (Model Engineer) thread is based on the old Whitworth thread form and is available in 40 TPI (threads per inch) and 32 TPI.

Now to complete your bush, either use a parting tool, or saw off the bush. If you do the latter you will have to face off the cut surface to make it smooth. The remaining bar is partly threaded, ready for you to make the second bush. Bigger bushes for safety valves and the like will require 3/8" dia. bar and bigger taps and tapping size drills. For a Mamod safety valve or a Chaney replacement type a 1/4" x 26 thread is required. The more recent Roundhouse safety valves are threaded 5/16" x 32, so you would probably need larger round stock to make your bush. Otherwise 1/4" x 40 or 1/4" x 32 are common sizes.

To make a turret refer to the drawing. You may use 1/2" diameter brass (or bronze) bar. At a pinch you could use 3/8" dia. A hole at 90° has to be drilled near the top to take the screwed shank of the regulator. The hole must therefore be tapped to suit the regulator's threading. When silver soldering up the boiler make certain that the threaded hole faces backwards so that the regulator may be located correctly. By

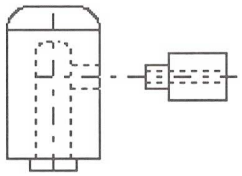
the way, this screws in with the aid of a few aluminum washers as packing. The union on the regulator must point downwards to allow the steam delivery pipe to take a dive through the "fire box" and reach the Mamod steam reversing valve.

Making a Start

So...take your piece of copper tube, determine the length required and cut it slightly longer than you actually need.

A Mamod takes a boiler 1-1/2" in diameter. You can get away with adding at least one extra inch to its length, giving extra water capacity and a longer running time. It is also possible to increase the boiler diameter, but to do this will also mean that you have to modify the "fire box" enclosure. Of course, the superstructure will require a certain amount of rebuilding. Obviously, seriously increasing the Mamod boiler size will result in much more work; possibly a total rebuild. If you intend to radically alter the Mamod outline then fine. But if you only want to reboiler, then stick to the original diameter. Alternatively, just use a Mamod "chassis", or make a new locomotive.

Steam Turret



However, not being so ambitious at the moment, let us continue with the new boiler. Measure out the required length of copper tube and mark with a felt tip pen or pencil. Here's a tip! Working around the circumference of the tube, mark out at least four points. Then, using these marks as a guide, stick around a piece of masking tape. Then carefully, with a fine blade in the hacksaw, cut the tube using the tape as a guideline. Now use a file to remove burrs and file the cut end reasonably square. Set the tube up on end on a flat surface and with a square see if the tube stands up truly at 90°. If it leans, then the end is not square. File more off.

Of course, the traditional method for truing up is to make two wooden bungs and then run the tube between centres in a lathe. You can do that if you have a lathe and have the patience to make the two wooden bungs...

You can also make the boiler end plates with a lathe. Soft solder the roughed out end plate onto a suitable chunk of half-inch diameter brass bar to use as a "chucking piece". Set up in the three-jaw and make light cuts. Check the end plate diameter with calipers and by offering up the tube (sans any internal burr) from time to time. Aim to get a good, tight fit. If you do not have a lathe, or cannot be bothered (like me), then saw and file away at the blank until you have a nice round end that fits tight, as before. Start off with a square piece of copper; draw in, with a pencil, two diagonal lines to give you a centre and then mark out a circle of the required diameter with dividers, or a school-type compass. Incidentally, a little piece of masking tape stuck in the centre allows one to inscribe the circle without the compass or divider point slipping.

Next, mark out, centre-pop and drill any holes required for bushes. Use of the centre punch is recommended in order to dimple the material exactly where you want the drill to make the hole. No dimple (or centre-pop) and the drill will wander off. Also, use a light hammer, or even a wooden mallet, to hit the centre punch as the copper is very soft.

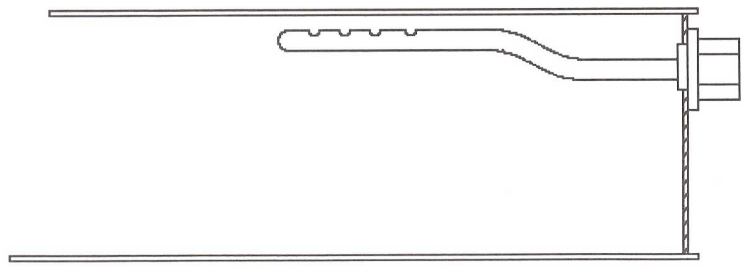
To drill the boiler end plate, either clamp down to a flat piece of chipboard (or some other scrap wood) and drill using the workshop drill press -- or set up in a vise so that the end plate is supported, again by the flat wood, and then drill with your hand drill or portable electric drill horizontally. In both cases use a small drill bit first, followed by the one of the correct size. **Do not attempt to drill using any power tool with the material loosely held with the other hand.**

The work piece must be clamped (using a 'G' clamp or toolmaker's clamp) to a board as described above. Thin material will always "snatch" and possibly jam up, resulting in the work spinning around slicing at your fingers. And do not stick thin material in a machine vise either, as it will distort, leaving you with a chewed-up end plate and a hole of roughly triangular shape.

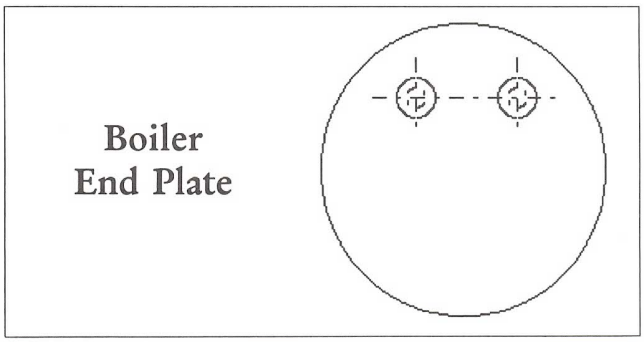
Now to mark out and drill the boiler shell

If you have a set of Vee blocks, a surface plate and scribing block, you will not need to read this bit. Come to think of it, if you are that well equipped then you probably know how to use everything else in your workshop so do not need to read this anyway. But, if you are still with me and ready to go, then do this: find a length of brass, steel or light alloy "L" angle about six to nine inches long and tidy it up with a file. The

Internal Steam Collector Pipe



two sides of the "L" need to be about one inch wide. What you have is a handy aid for helping you to mark out parallel



lines along a tube. (You can pay many $, £, DM, etc. for such a gadget in expensive tool stores) Our gadget is not accurately graduated in mm or inches along its edges, of course, but we can surely live without such minor luxuries - can't we?

Now with your pencil or felt-tip pen, draw a line along your boiler, holding the angle against the tube. It works fine, see? Now measure out where you want to insert your safety valve, filler plug, steam take off or whatever. Okay, don't reach for your centre punch and hammer at this moment, as obviously to hit the tube will distort it. What you need is a length of round bar, about one inch diameter, which is held firmly in the vise. One end projects out, of course. Slip the tube over the projecting bar, place the centre punch in position and gently hit it. Yes, it does slip - you could really do with three hands at this stage. By the way, if you haven't got a round metal bar then an odd length of broom handle will just about do.

Now for the drilling. Unless you have a vise with mega-wide jaws, you have to attempt to hold the tube without it slipping, or squeezing out of shape whilst you drill. One answer is to use a piece of round wood (bigger broom handle?) very slightly less than the internal diameter of the tube as packing inside. There are special pipe vises and adaptations to grip round tube, but quite often you can lightly grip the tube in the lower part of the vise. The tube is held by the lower, curved parts of the vise jaws and supported by the bottom of the vise. When you apply downward pressure to drill, the fact that you are pushing against a curved surface is enough to resist deformation. Take care; use a hand drill or slow running power drill. Once again start with a small size drill bit, about 3mm, and open out with bigger drills. For larger holes, such as would be required for steam domes or turrets, you could use the technique referred to as "chain drilling". That is, drilling a series of small holes like a chain going around in a circle. The remaining metal between the holes can be cut away with something like a broken hacksaw blade and then the aperture filed to a good smooth circular hole.

On a boiler as small as our Mamod replacement, such activities would probably not be necessary. A 7/16" drill will do the job for the fitting of a 1/2" diameter turret or simple steam dome.

Silver Soldering

Now comes the fun part – assembling the bits to make the complete boiler. But first a few thoughts about equipment and brazing hearths. You can get away with using a D. I. Y. butane blowlamp of the type used for home plumbing. You might even be able to use the domestic gas cooker. Whether you will get away with that depends on your domestic authorities! I can't say that the silver soldering will be successful, although you might end up firing the kitchen. A better answer is to get one of those propane torches that run off a separate propane cylinder. Usually you are able to substitute a larger or smaller size burner depending on the job. A small "pencil flame" burner is available for soft soldering small jobs, whilst paint stripping and probably house igniting, too, can be achieved with a much larger version. Be careful.

The hearth can be improvised using an old baking dish and a few odd bits of fire brick. Better to make something more technically innovative and aesthetically satisfying involving refractive fire bricks and sheet metal. Sometimes a scrap domestic fire grate will provide useful refractive material. The idea is to make a flat heatproof surface with two simple walls of fire brick to conserve and direct heat onto the work, as well as acting as a possible means of support.

Silver Solder and Fluxes

Silver solder -- an alloy of silver, copper and zinc -- is available in various grades depending on the melting temperature. The theory being that one can use a high temperature grade for initial assembly work, and then add extra bits using the lower temperature grades. In this way it is hoped that the previously soldered joints do not fall apart. This can be most useful when, say, making a coal fired boiler with internal tubes and firebox, but for our simple pot boiler it is quite possible to complete the job using one grade of solder only.

My Reeves Model Engineering Catalogue lists the following silver solders and gives their melting points:

Silver-flo 16	**(B6)**	**790° - 830° C**
Silver-flo 24	**(C4)**	**740° -- 780° C**
Easy-flo		**620° -- 630° C**
Easy-flo 2		**605° -- 617° C**

Looking at the above list it is clear that Easy-flo and Easy-flo 2 will probably do for our purposes. Just one word of caution. Easy-flo contains cadmium, so avoid breathing any fumes. Work with your workshop door open. For flux, common household borax is the traditional choice. However, there are better commercial fluxes available to suit whatever silver solder you intend to use. These will be more reliable.

Cleaning the Work and Applying the Flux

All metals to be soldered must be very clean, free from corrosion, oxidation, grease, paint or anything else. This is best done with clean emery cloth. Polish the areas forming the joints, but avoid touching with fingers once clean. Recently machined components should have a good clean surface.

The flux, usually a powder, can be mixed up with a little water to make a creamy paste. It is then applied with something like a small brush or a popsicle stick. Make sure that there is flux above, below and inside the joint. When first heating the workpiece, the water will boil away. This must be

done with care, as the little bits of solder can be dislodged, or there can be gaps in the flux which will result in poor joints and possible steam leaks. For this reason some authorities suggest using alcohol (as used to fire pot boilers) rather than water, to make the flux into a paste. This is certainly useful for small joints, but remember that the alcohol is flammable.

"Pickling" in an Acid Bath

Once the silver soldering has been completed, the work piece will need to be "pickled" in acid to remove oxides and vitrified flux. Failure to remove the flux can result in corrosion, whilst oxides, carbon and flux within the boiler or steam piping can cause blockages or, indeed, can cause damage to cylinders. I use a weak solution (1 part sulphuric acid to 15 parts water) and soak the work for about 30 minutes to one hour. You can obtain "battery acid" from garages (motor car repair shops). If you make up your own solution, be sure to ADD THE ACID TO THE WATER. Traditionally, the acid bath was a lead-lined wooden box. I use a plastic ice-cream container and about a pint of weak acid solution.

You can use also citric acid to pickle your boilers. It will take longer, but it might be considered safer. You could, I suppose, even use vinegar.

Wash your work well in water after it is pickled. Avoid splashes and do not contaminate your pickle with anything of iron or steel. Use plastic or copper tongs to manipulate your work in the acid. Plastic tongs may be obtained from a photographic supplier.

Assembly of the Boiler

STEP 1: Silver solder bushes to rear end plate with the higher temperature solder. To do this, clean up, apply flux and then arrange end plate on the hearth so that it is supported by bricks (or bits of brick) by its edges only. Do it this way and you will find that it takes a lot less heat. The "top hat" bushes are usually soldered on with their flanges on the outside. A few tiny snippets of silver solder (pillons) are placed on the joints. Heat is applied, slowly at first, until the flux paste dries and then it is full blast with the torch, so that the flux melts, followed by the solder. By now, the metal will be a dull red. Concentrate the heat on the actual area of the bushes. The solder should flow into and around the joint. Do not keep the heat on for too long as the flux will overheat and break down. There is also a danger that anything of brass will melt away, should you raise the temperature to above 800° C.

Turn off gas. Allow work to cool. Pickle in the acid solution.

STEP 2: Silver solder safety valve bush and steam turret to boiler barrel. Clean and flux as before. Apply solder in pillons. Rest boiler tube between bricks (take care if they are hot). Make sure that the heat can be thrown back by the other bricks, as you need more heat for this operation. Check that the steam turret is correctly aligned before you solder. Heat up the tube evenly, then concentrate first on the safety valve bush until the solder flashes into the joint. Then move on to the turret. Let it cool down and pickle.

By the way, if you are soldering a pipe into the turret, rather than screwing in some fitment, do this first with a higher melting point alloy.

STEP 3: Front end plate into boiler tube. The tube should be pretty clean after its acid pickle and will not need to be cleaned with emery cloth. Apply flux to the inside of the tube around the end. Now push the end plate into position. There should be a gap of about a mm or so between the end plate and the edge of the boiler tube. Apply a little more flux and then add the silver solder, either as pillons or, if you have some, as a ring of fine wire (O.5mm dia.). Wrap this once around the boiler. Snip off to make a ring slightly less than full diameter so that it can spring into position around the joint. Take care not to get flux all over the end plate as this could cause the solder to run toward the middle rather than to flow into the joint. Arrange the boiler tube so that it sits vertically on the hearth. Now heat up slowly, concentrating the heat onto the end plate at first. Once this is warm, start to heat up the boiler barrel itself. The idea is to avoid the boiler barrel expanding so much that the end plate disc drops down. Once everything is hot enough, the solder will flash into the joint. You should not need to pickle at this stage.

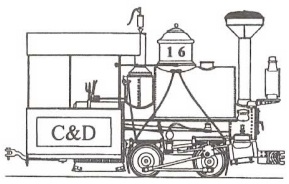
STEP 4: Silver solder rear end plate. If you have been lucky the other end of the boiler will not have become dirty. Even so, slight cleaning with emery cloth might be needed. Repeat Step 3, but make sure that the bushes in the rear end plate are in the correct alignment in relation to the top of the boiler. Once you have completed the soldering, allow the boiler to cool (DO NOT put a hot piece of work into the acid) and then pickle. Make certain that the acid pickle reaches inside the boiler and into any tubes. Thoroughly wash the boiler inside and out in cold water after pickling.

If you have any unsuccessful silver soldered joints, clean up, reflux and try again. Poor joints are due to dirt, lack of flux or not enough heat. Sometimes a joint can be re-soldered during a later assembly stage.

When you become more expert, it is possible to do the whole job in one shot, or at least two! But take your time when making your first boiler. This is a learning process, after all.

Try not to use too much solder. Besides looking amateurish, it is wasteful and expensive, and does not make the boiler any stronger. For that reason do not apply silver solder directly onto the joint by holding the silver solder rod in the flame. The end will probably make a large blob and fall off. Apart from that, silver soldering is easier than using soft solder.

John Wenlock is the editor of 16mm Today, the official publication of The Association of 16mm Narrow Gauge Modelers.



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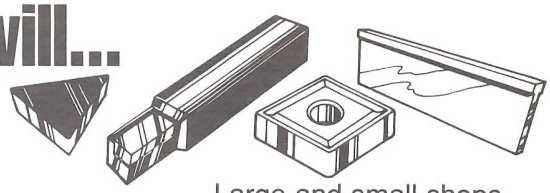

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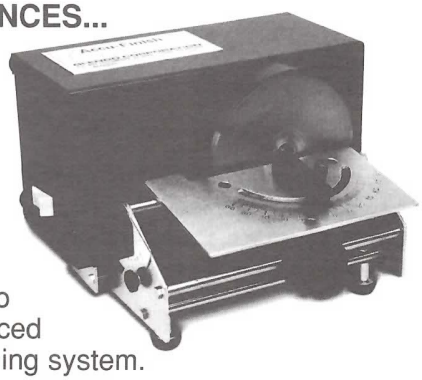

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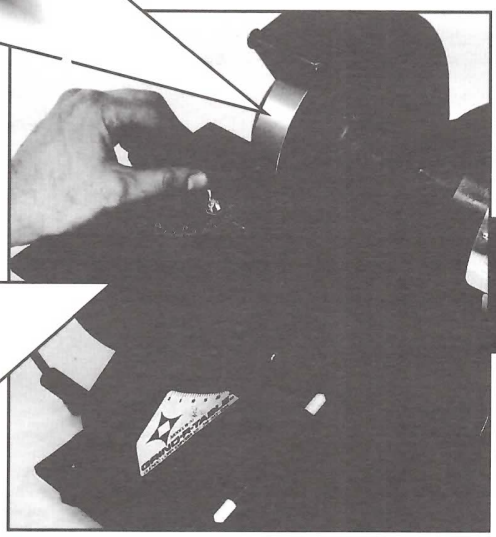

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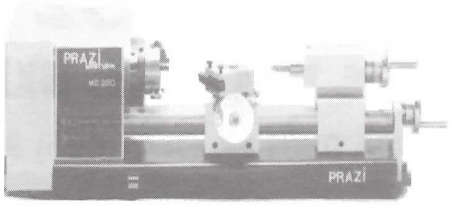

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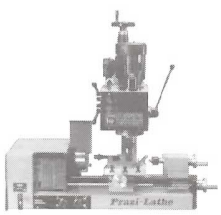

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Center Height	2 1/2 "	Spindle Capacity	7/16"
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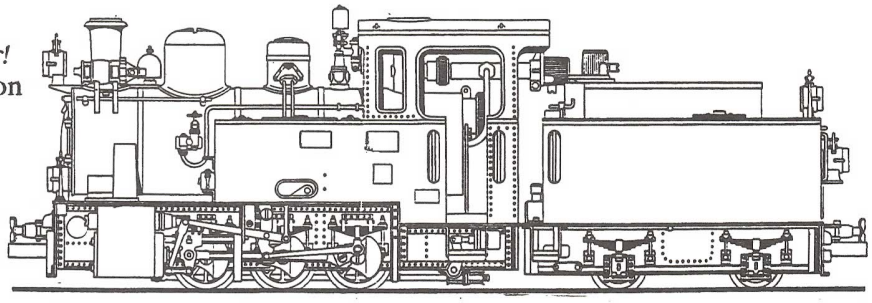

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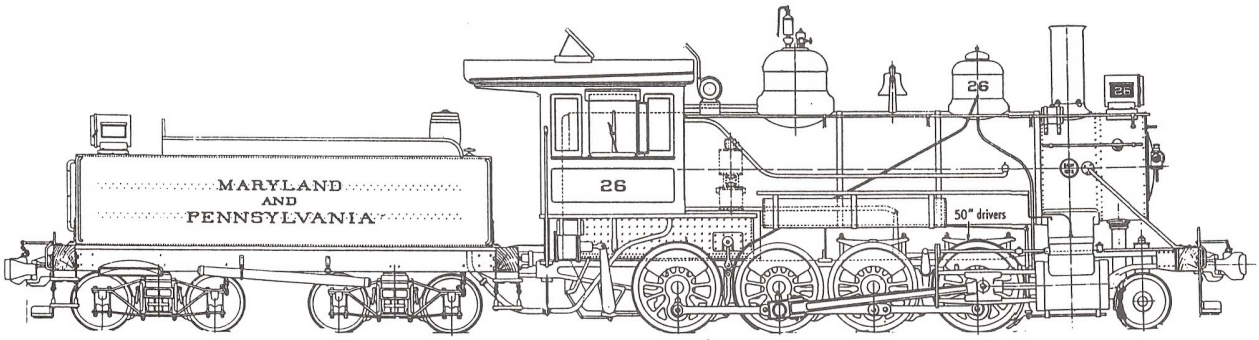

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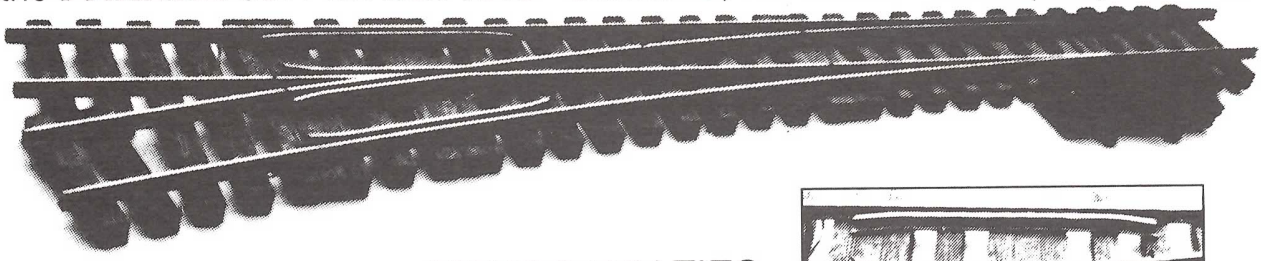

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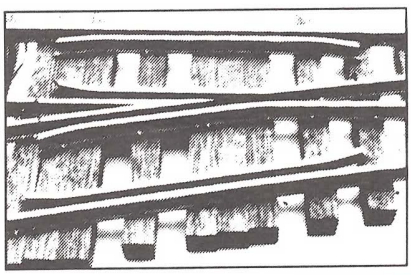

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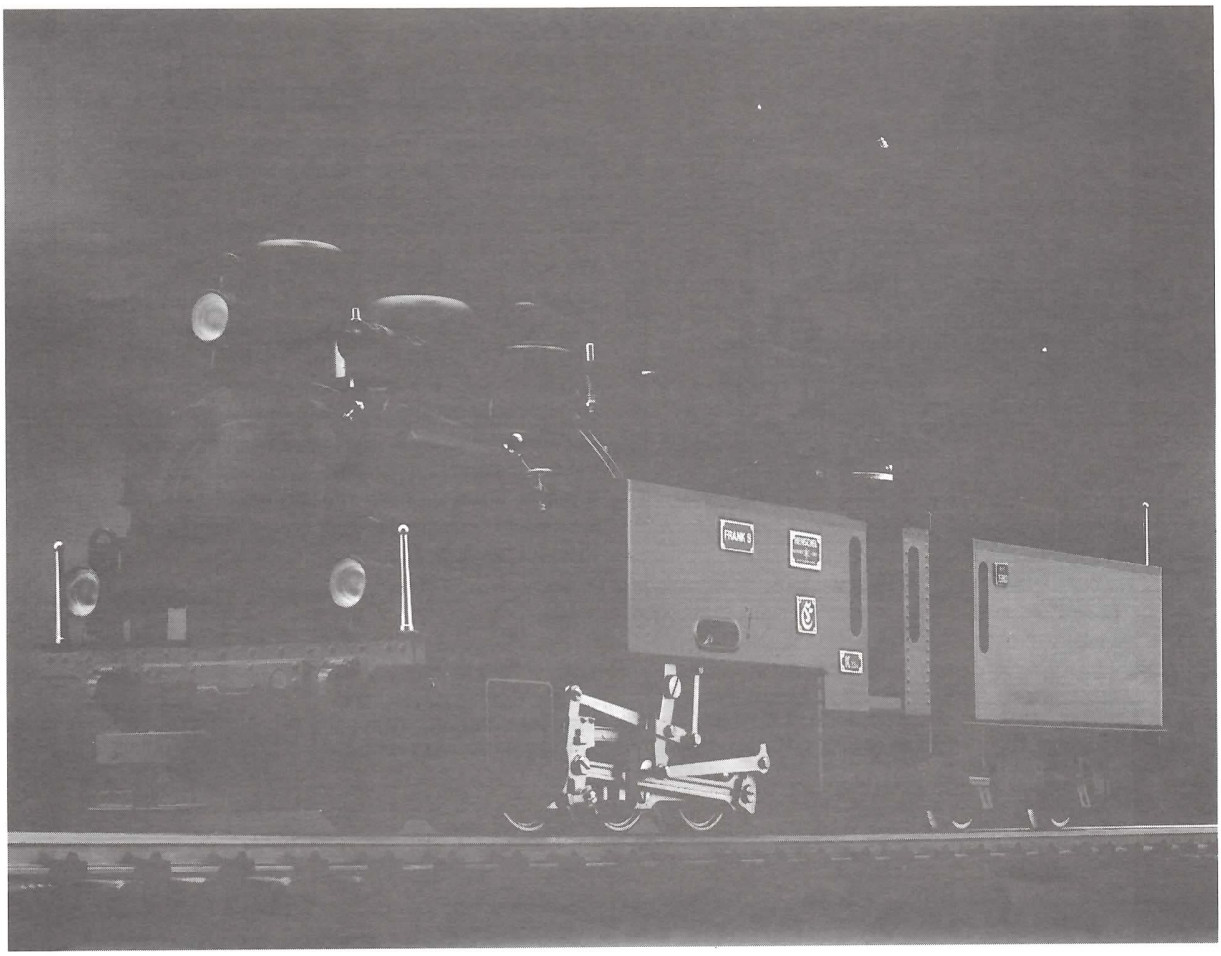

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Swap Shop ***listings are offered at no charge as space permits. No phone-in ads, please! Send to SitG, P.O. Box 335, Newark Valley NY 13811. Ads must contain sellers name and address - phone number recommended Non-commercial only, please.***

1995 Calendar of Events

January 13-15, 1995 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.

January 21, 1995 – Port Townsend Miniatures Show and Swap Meet, 10AM - 4PM, Fort Worden State Park. Admission, $4 adults, $2 children under 12. For more info, contact Larry Mulvey, 118 Harrison St., Port Townsend, WA 98368...phone 206-385-1904.

May 19-21 – THE EAST COAST HOBBY SHOW will be held at the Fort Washington Expo Center in Suburban, Philadelphia. This will be a FULL LINE hobby show and the only one of its kind on the East Coast. Friday, May 19th, is for the trade only. Saturday and Sunday, May 20th and 21st, will be opened to the public as well. The Show will include model railroading, radio control, games, models, die-cast, kites, miniatures, collectibles, slot cars, rocketry, tools, and other exhibiting manufacturers. With 150,000 sq. ft. of exhibit space, demonstrations, seminars and support from celebrities and corporate sponsors, this event will attract dealers from the entire East Coast. With over 5 million consumers within a 30 mile drive, the action at this show will be nonstop. For more information, contact Scott Pressman, THE EAST COAST HOBBY SHOW, 4400 North Federal Highway, Suite 210, Boca Raton, FL 33431 at 407-338-3177, FAX 407-338-5066.

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.).

Steam Scene.....Along the Rails

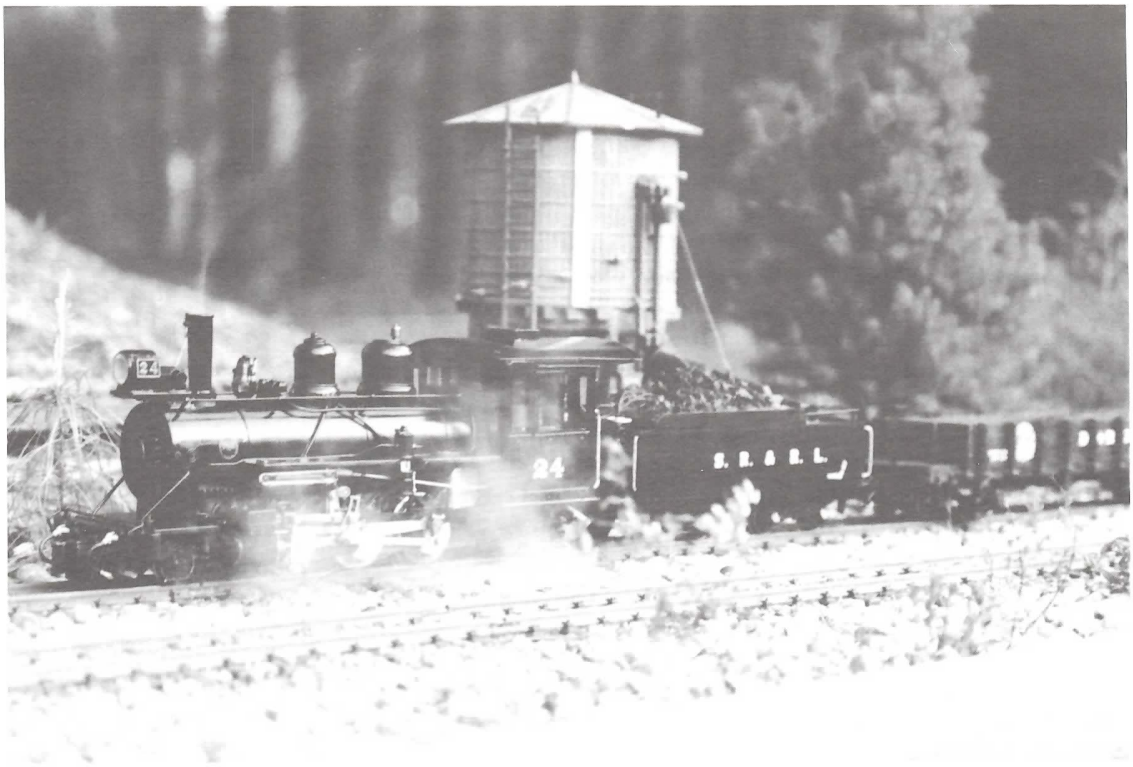
We invite you to send in your favorite photos for this feature, always labeled with vital information like photographer, subject, where, when and why. Mail them in to SitG, P.O. Box 335, Newark Valley NY 13811. Please include a SASE with sufficient postage if you'd like your photos returned.

Above: A diminutive Maxwell Hemmens Porter clatters over a massive wood arch bridge as it leaves Big Woods in mid-afternoon with a load of logs headed for the sawmill at Doe Mountain. The crew is hot, tired and hungry, but there's a lot of work to be done before they can rest.

Coalport RR photo by Bob Nowell

Below: An Americanized LGB Frank S. coasts downgrade with a mixed freight on Hans Huwyler's railway at the edge of a pine forest in South Carolina. Hans tells us that the Frank S., which has become a very popular engine for Americanization because of its availability, high quality and reasonable price, easily handles the 4% grades on his railway. Hans also mentions that a steam powered K27 Mikado would really make his day.

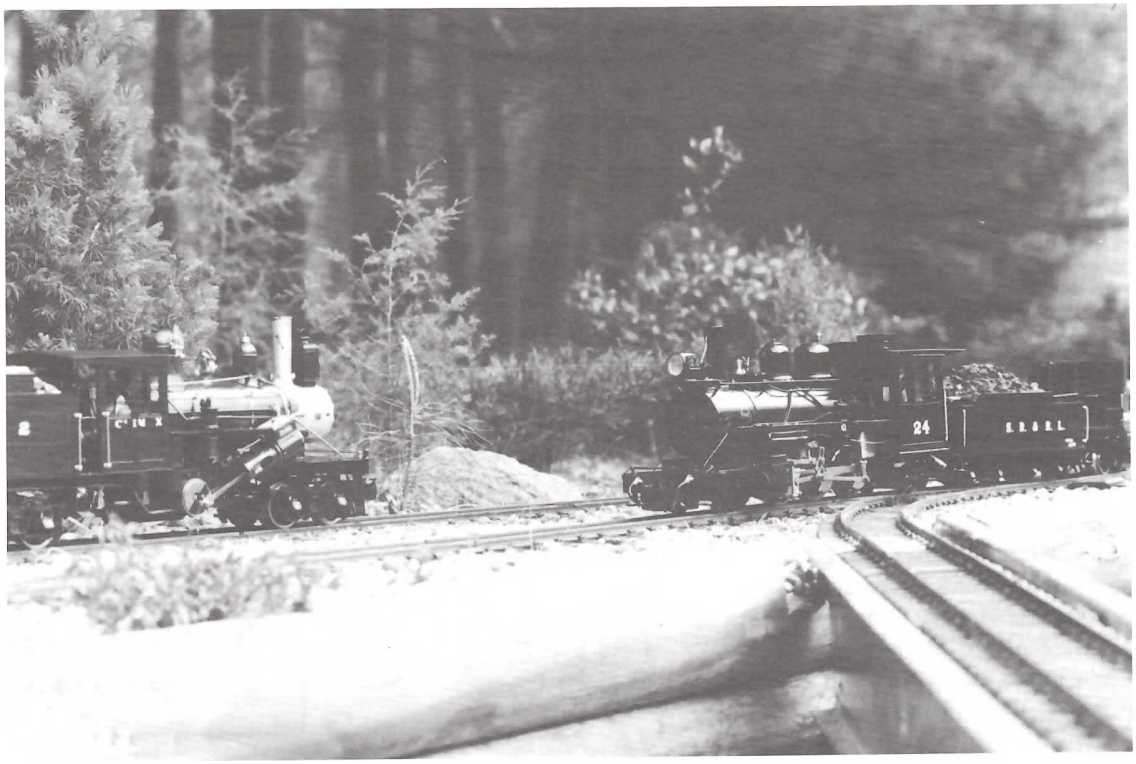
Photo by Hans Huwyler



Above: A Roundhouse SR&RL #24 hauling a mixed freight stops to take on water before tackling the 4% grade ahead on Hans Huwyler's South Carolina garden railway.

Both photos this page by Hans Huwyler

Below: An Aster Climax, headed for the woods with a string of empty log cars, waits patiently on a siding for the mixed freight behind a Roundhouse SR&RL #24 to pass. Narrow gauge and backwoods railroads didn't enjoy the luxury of double tracked mainlines!



GUEST EDITORIAL

by Chip Rosenblum

There is a very fine line between machinery and art. In my experience, no such line actually exists! As an artist who also does crafts, I get a huge kick out of the critics that valiantly attempt to separate the blended creation into one specific category or another. I also get a kick out of those technical wizards who deny that they are artists in either the creation, modification, or operation of a steam engine. The kick is in watching them squirm in denial of obvious talent simply because they are uncomfortable with the label, Or watching them squirm when they wish to tackle something that they haven't tried before because it doesn't come with a warranty.

Nothing in life that matters comes with a warranty. The realization that you simply want to try something or make something will gnaw at you until you let it out. And let it out you should.

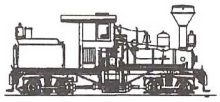
I enjoy steam engines. And yet, ask anyone and they'll say that if I can run one anyone can! One manufacturer actually went so far as to turn one over to me at the steam track at the last Convention with the assumption that if people saw me running it, they'd buy it as a foolproof commodity! And they're correct! That's not an intuitive area for me, but I want it. Badly enough to give it my best shot. Fortunately, not unlike the character in the Tennessee Williams play, **A Streetcar Named Desire**, "I live by the kindness of strangers". In other words, it is through those in the hobby who choose to teach that I have attained even a modicum of knowledge of how to make the spitting little beasties work. And loved every minute of it.

So I will take this opportunity to return to you a suggestion for a fun creation. I spent the morning making little custom tools for my steam engines. No, I'm not a toolmaker, but you'll notice I said that I simply made them. They're not up to any specification standard, but they are up to the artistic creativity standard! I had gone downstairs to run some engines on bricks on the top of the freezer, it being the equivalent temperature outside in Ohio this time of year, and noticed that it would be really nice to have wrenches to fit the various pieces and parts without having to root through the toolbox each time. So I went out to the welding shed and gathered up an old set of sockets that my dad had bought from the 49¢ bin in the 50's, and which I was saving as "art supplies". I found the right size socket or wrench cutoff for each one, and soldered them to a brass "found object" handle. A brief polish on the wire wheel left me with a neat set of tools for each engine. Including, I might add, a plumbing connector with an internal reducer fitted to the end of a chrome plunger and ring knob from a dental syringe to obtain one Cricket whistle blower that avoids the perfect 1/8" diameter 3rd degree burn.

So you see, I will attempt to return the support I have received from all of you. I have never learned anything from something that I've gotten right the first time. I've only learned through trial and error. My return, in appreciation, is to suggest that you try simple projects out of your field just because you want to. There is no right or wrong. But there is the pleasure and satisfaction in both trying and sharing.

Chip Rosenblum is an artist, sculptor, musician, master gardener, model maker and, last but certainly not least, certified live steam nut. He also writes a regular gardening column for Garden Railways magazine and is well known and recognized throughout the live steam community for his energy and enthusiastic participation.

The ideas and philosophies set forth by Guest Editorialists are not necessarily the same as those of the editor and publisher of this publication, but we recognize that there are many different ways to approach and to enjoy our hobby -- and many different points of view concerning it. Thus we will be happy to accept Guest Editorials for publication, but reserve the right to edit or refuse those that may be offensive, in poor taste or otherwise unacceptable -- ed.



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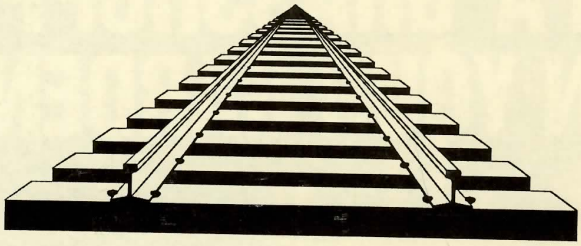

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