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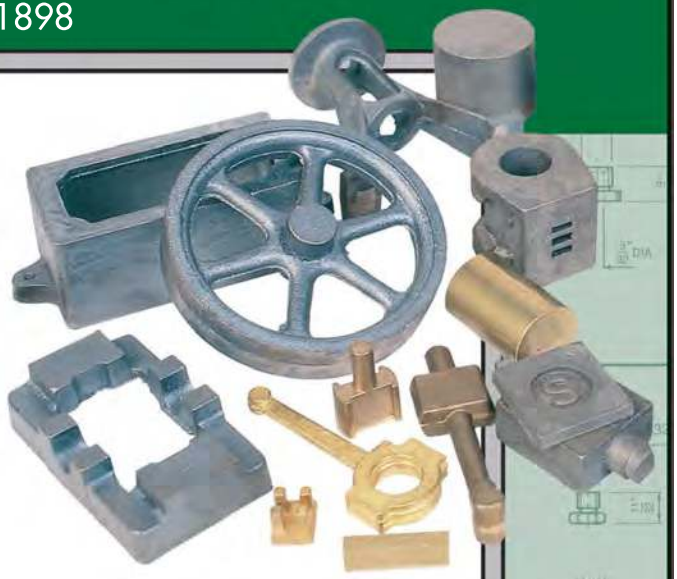

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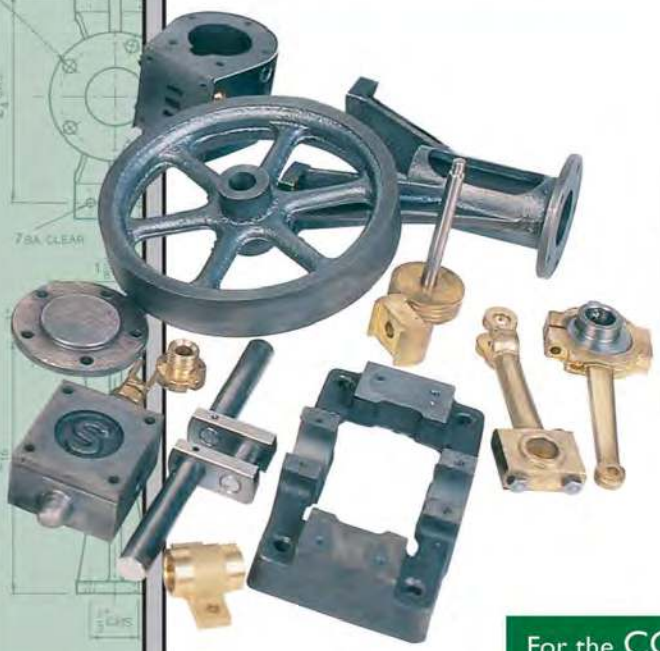

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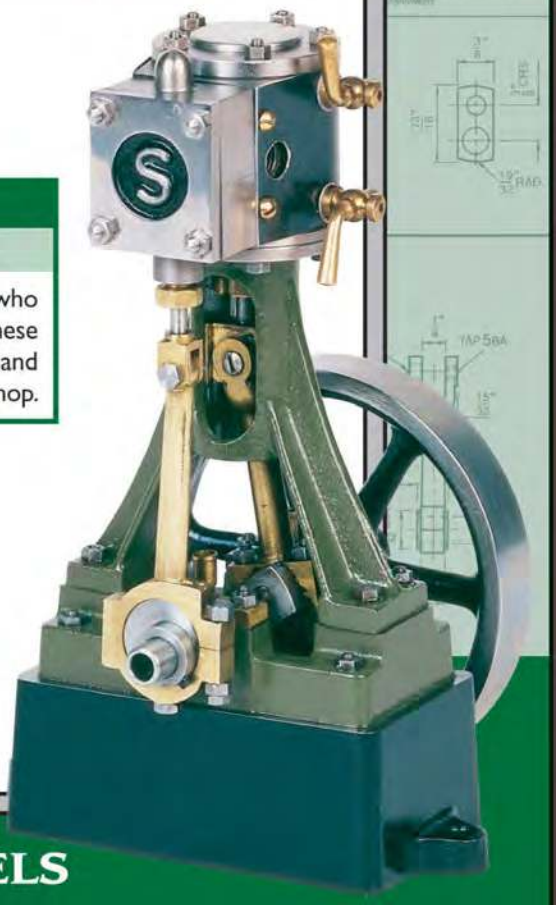

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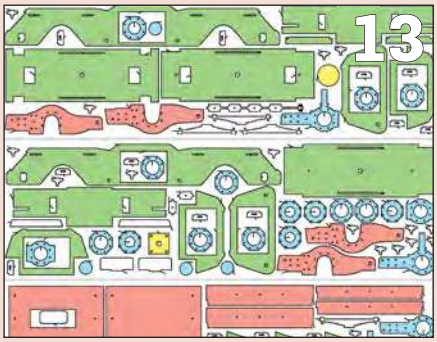

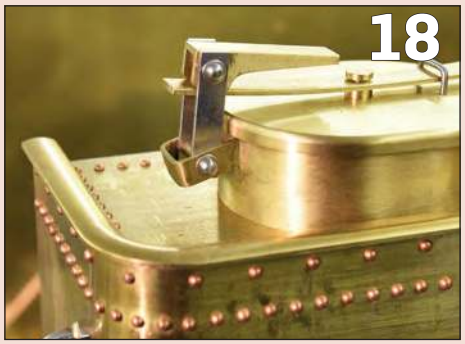

FRONT COVER

Of course you can have a 7¼-inch ride-on railway in your garden – Simon Mace shows you how in this issue. *Photo: Simon Mace*

EDITORIAL

You can put a railway in your garden...

Welcome to EIM as we go into the high season of hopefully warm temperatures and busy club tracks – and judging by the reports we are highlighting in our *Club News* pages the tracks are pretty busy, which is great to hear.

This month we start yet another new series, but just a short one, showing you how you can build your very own garden railway. Now the first magazine your editor took charge of was that of the Association of 16mm Narrow Gauge Modellers, and that was all about building garden railways, mostly live-steam powered. We are not talking anything as small here, however – Simon Mace has built a 7¼-inch ride-on railway in his garden, and over the next six issues will be describing how he constructed everything, from moving earth to building, track, two battery locos and rolling stock. I can hear what you are saying; "All right if you have a massive garden..." Not at all, Simon did all this in a length of around 100 feet...

A new hopefully regular feature we are debuting this month is *Bench Talk* – the concept is simple, recreating the atmosphere in the club workshop where model engineers swap anecdotes and especially advice – not necessarily for beginners like John Smith's *Top Tips*, but little ways of doing things gathered from years of experience. Have a look at our first offerings and if you think you have something suitable for the page, then send it in! As I've said before we do pay for articles you know...

Finally the editor makes no apology at all for taking a little space to feature the efforts of his daughter Megan. I'm writing this a week after Megan staged her first 'Women teaching Women' event on the Perrygrove Railway in the Forest of Dean. She discovered a passion for engineering around five years ago when she was persuaded to "have a go" and now she wants to encourage other women to have a go too – whether it be driving rail locomotives, steering a traction engine or welding two pieces of metal together. It's an excellent initiative that in the process could produce some more female model engineers – and that's certainly a good thing.

Andrew Charman – Editor

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Building the Apple Valley Railway

Simon describes how he put a 7¼-inch ride-on railway into his garden. Future episodes will detail the building of track, locos and rolling stock.

BY **SIMON MACE** – Part one of six

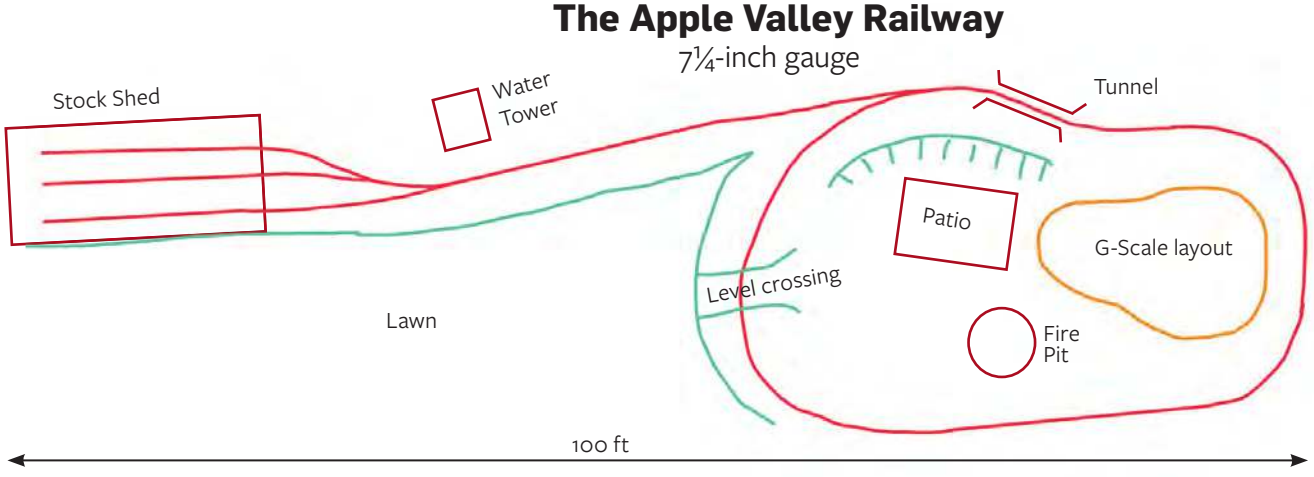
All photos in this feature by Simon Mace

In the summer of 2010, my wife and I finally purchased our own house. Being on a corner plot, one of the main attractions of the property was the large (and very overgrown) garden. Even on the first viewing, hacking through the undergrowth had me imagining the possibilities for railway building!

As a youngster, I had built a couple of 16mm scale railways in the gardens of my parents' houses, as well as helped out with friends' lines. I had also been exposed to large-scale railway building through my father's 15-inch gauge Woodlands Light Railway (now dismantled).

As school years gave way to university, and university moved on to a career, regular house moves prevented the building of a permanent track of my own (although there were a few temporary layouts created), so finally having a 'green field' site to transform was an exciting prospect.

Being in Cornwall, the garden was far from level – it had also been liberally planted with shrubs, trees and pampas grass. Clearly a previous owner had taken great pride in their



horticultural efforts, but years of neglect had left me with a jungle to tackle. The most promising area for railway building was a flattish space, measuring about 20 feet by 40 feet.

Interestingly, undergrowth clearing revealed a few sections of concrete blocks laid on edge, with what looked like track imprints in mortar on the top. Chatting to the neighbours revealed that the previous occupier (now deceased) had "a train in the garden"! I wonder if this type of accidental redevelopment is a first for garden-railway building?

By winter, a G-scale line had been completed. I was pleased to have my own railway, but somehow it had all been too easy.

Cheaper than you think

Some online research turned up the fact that rail for the 'ride-on' scales is surprisingly cheap, a nine feet length coming in at about £10. Some quick calculations showed that (assuming timber could be scrounged for sleepers) track could be built for about £7 per yard. That was less than I was paying for G scale!

Over the next few weeks, much time was spent pacing around the garden, measuring out possible curve radii and calculating gradients. Imaginative use of a spirit level and bits of string proved that by making use of eight-foot radius curves, and some steep 1 in 30 gradients, a ride-on sized line could be built.

With the logic that getting the hard part over with would prove that the rest was possible, I started building at the lowest point of the route. In order to maintain a manageable gradient, the track at this point needed to be about two feet above ground level – and deep into a bamboo thicket.

January found me digging out foundations for concrete block piers that would eventually support the full-sized railway sleepers that made up the trackbed at this point. This was a long way from building railways in G scale, and my poor old Volkswagen Golf was starting to feel the strain of carting the building materials home from the builder's merchants (the combination of railway building and Cornish hills may have led to the new clutch that was needed a few weeks later).

With the high-level section complete, I was away. An eight-feet long timber bridge led onto a low embankment that marked the start of the ground-level track building.

Trackwork

At this point I should probably mention the trackwork itself. Much of my railway is laid with 16mm

HEADING: You too can have your own ride-on line. Here loco No. 1 heads a mixed rake of goods wagons.

TOP: Garden overview from west – even a very large-scale railway can squeeze between the established greenery.

ABOVE RIGHT: Driver's eye view shows by avoiding too much straight track, and being careful to maintain the view breaks, makes the fact that the railway is only a short loop not too obvious.

RIGHT: Stock shed and loco facilities have intentionally been built in a style designed to blend in with the garden. The concrete wall, where construction began, needs blending work.

TOP LEFT: An unusual feature is this bottle wall (inspired by the 15-inch gauge driving creek railway in New Zealand) built using 'left overs' from a family wedding.

UPPER LEFT: In places the track has evolved into a realistic impression of the industrial narrow gauge.

LEFT: This view of the east end of the railway shows how the track loops around the raised G-scale layout.

BELOW: A simple bench to watch over operations on both the 7¼-inch and 45mm gauges.

(⅝-inch) tall aluminium alloy rail, purchased from either Maxitrak or The Miniature Railway Supply Co. Later sections use 21mm rail, the heavier section being easier to bend smoothly, and more resistant to an uneven trackbed.

I am very fortunate in that my father works at a local college that teaches roofing, resulting in a regular supply of 3-inch x 2-inch timber, of odd lengths and full of nail holes. When cut down to 14-inch sections, and treated with wood preservative, this material makes excellent, nearly free sleepers. Rail is screwed down with M6 x 25mm coach screws (obtained in bulk from Screwfix), using a cordless drill.

It is surprising how quickly the construction materials needed seem to multiply, even on a very small line. Each 9ft length of track on my railway needed two rails, four fishplates, 15 sleepers, and 60 screws. That's a total of about 1200 screws that needed driving in.

The ground-level track was constructed much like a smaller-scale garden railway. First, a trench was dug, and lined with landscaping fabric to deter weeds. Concrete blocks were then laid crossways to form a substantial 'path' for the trackbed (more heavy loads for my poor car). Track was then laid directly onto this, with ballast added afterwards.

Naturally in this scale, the track does not need to be pinned down in any way, as its natural bulk is adequate to prevent excessive movement. Later sections of permanent way also did without the concrete blocks, the laying of a shallow layer of 20mm granite chippings providing a quick and easy base instead.

A question of gauge

I started out unsure of whether to build my line in 5-inch gauge, or go for 7¼-inch. I initially decided on 5-inch due to the better, and cheaper, availability of ready-to-run rolling stock in this size. However, as I became more confident with building my own stock, and after a couple of close calls with visitors overbalancing on the narrower gauge, I decided to go with the extra stability & peace of mind that 7¼-inch offers.

Either way, the scale is unchanged, as I have stuck with 1:5 to give a 3ft gauge prototype on the 7¼-inch track (it was equivalent to 2ft gauge on the 5-inch).

It was about this time that I started building my locomotive. This was completed for about £300 expenditure, with no use of machine tools – but that, as the Reverend Awdry would say, is a story for another day...

As the trackbed slowly grew, the big obstacle of the project was reached. In order to ensure an acceptable curve radius, and to avoid the larger trees in the garden, a cutting had to be dug. The finished excavation was about 15ft long, and up to three feet deep, dug entirely by hand. Later calculation indicated that about four tonnes of earth and rocks had been moved; a good portion of it being transported in a wheelbarrow perched on a 5-inch gauge wagon!

I was assisted in this part of the work by an old university friend, although I'm not sure he realised quite what he was getting into when I described a bit of model railway building to him...

One 'highlight' of the dig was discovering a telegraph pole buried just below the surface. This was removed by shaving and splitting vertically with a hatchet and club hammer until reduced to matchsticks. The last inch to trackbed level was burnt away by building a small bonfire on top of it.

After the cutting, track laying at ground level proceeded rapidly. One section passed very close to some apple trees and in order to prevent damage to the trees, I was forbidden from digging through any roots in this area. Instead, I dug a minimal depth trench (approx two inches deep), and laid the track straight onto ballast, with no blockwork, for about eight feet. I've kept a close eye on this section to assess long term stability, but it appears to have held up as well as everywhere else.

An embankment was built using the spoil dug from the cutting. It was retained using discarded scaffold planks, arranged to make a wooden wall that faces onto the lawn. The finished appearance, once stained, is surprisingly attractive.

The final job was to construct a point to close the loop. Commercial point kits in this size are (justifiably) very expensive, so instead I went for a simple 'stub' design. By purchasing a commercial cast aluminium frog (about £20 from The Miniature Railway Supply Co), the construction of the whole point can be completed with nothing more technical than a hacksaw and tape measure. I made up a simple lever mechanism from scrap steel strip, and the loop was complete!

The finished track plan is an irregular oval approximately 120ft long with a long siding back to a raised decking area (approx 40ft long). Curves are sharp, but speeds are low. Keeping all rolling stock with fixed wheelbases below 12 inches ensures that derailments are rare.

Once the line was complete trains were run at a few barbecues, and for ▶

UPPER RIGHT: Yes, there is steam on the Apple Valley Railway too. A 'Marie Estelle' design is seen by the water tower. While the line offers only a short run, it is nice to not have to always make the trip to a club track to fire up.

RIGHT: A sloping garden means that the railway is effectively 'upstairs' – this requires a degree of ingenuity to bring any rolling stock in and out.

BELOW: Loco No. 2 emerges from the tunnel (which at the time was due to be rebuilt).

UPPER LEFT: Having a built-in transport system can come in useful when there are heavy loads needing moving across the garden...

LEFT: Proof that it is not always sunny in Cornwall! No. 2 braves a light snowfall.

BELOW: Motive power line up outside the shed. The building of the two battery locos will be described in forthcoming issues of EIM.

visiting friends and family. I have been amazed at the positive reaction that I get from people when they see the railway, far from the expected trainspotter accusations, most people are pretty keen to have a ride, or a drive, themselves.

Projects since building of the railway have included construction of rolling stock, and the improvement of lots of small details. There will always be something to do – a single carriage is five feet long, 15 inches wide, and weighs enough to be a two-person lift, small projects rapidly grow into big projects in this size.

I can highly recommend joining the 7¼-inch Gauge Society to anyone who is tempted to make a start in this size. The society newsletter is an excellent resource for technical know how, and inspirational writing. Membership includes access to the full back catalogue of issues in PDF format via the society website. EIM

More information

As is usual in these sorts of articles, it is probably worth me saying that I have no connection to any of the suppliers mentioned, apart from as a satisfied customer. For products, prices, and information yourself, the following links may be useful:
www.rideonrailways.co.uk/
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■ Next month – Simon discusses methods of making track.

A diesel-outline battery loco

Jan-Eric makes the bogies for his easy-to-run battery loco project, using novel plasma-cutting techniques..

BY **JAN-ERIC NYSTRÖM** Part three of a short series

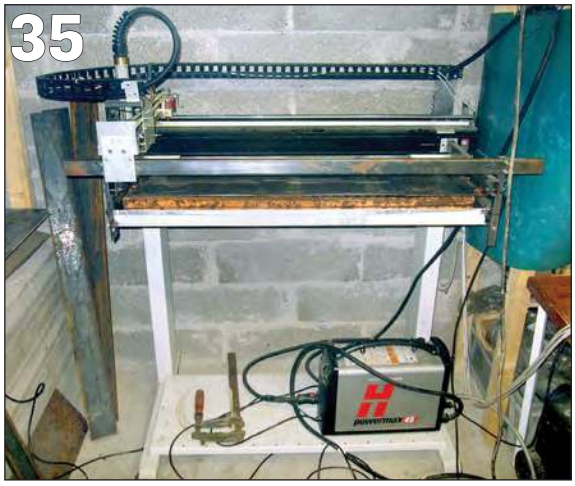
My previous engine project, the 'Chicken' 0-6-0 (described in the May to August 2016 issues of EIM), used laser-cut steel plate for the frame and most other structural components. At that time, I got a very good deal at a laser cutting company – the owner was very interested in my projects. Alas, the owner has changed since then, and I would have had to pay a bundle for all the parts for this new loco project...

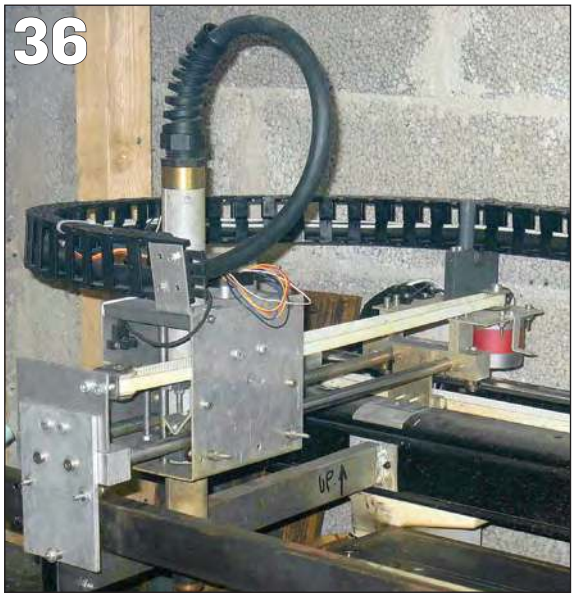
However, my good friend and fellow model engineer Kustaa Nyholm has constructed a home-brew CAD/CAM plasma-cutting system, which he described earlier this year in the April and May editions. His first tests proved that this would indeed be a viable solution for my project, though the precision would not be quite as good as with a professional laser cutting system – the tolerance with his machine would be ± 0.5 mm or so, while laser cutting is accurate to within ± 0.1 mm, five times better. But that did not bother me – none of the parts would need to be that exactly cut. Any dimensions that needed to be exact would be machined anyway.

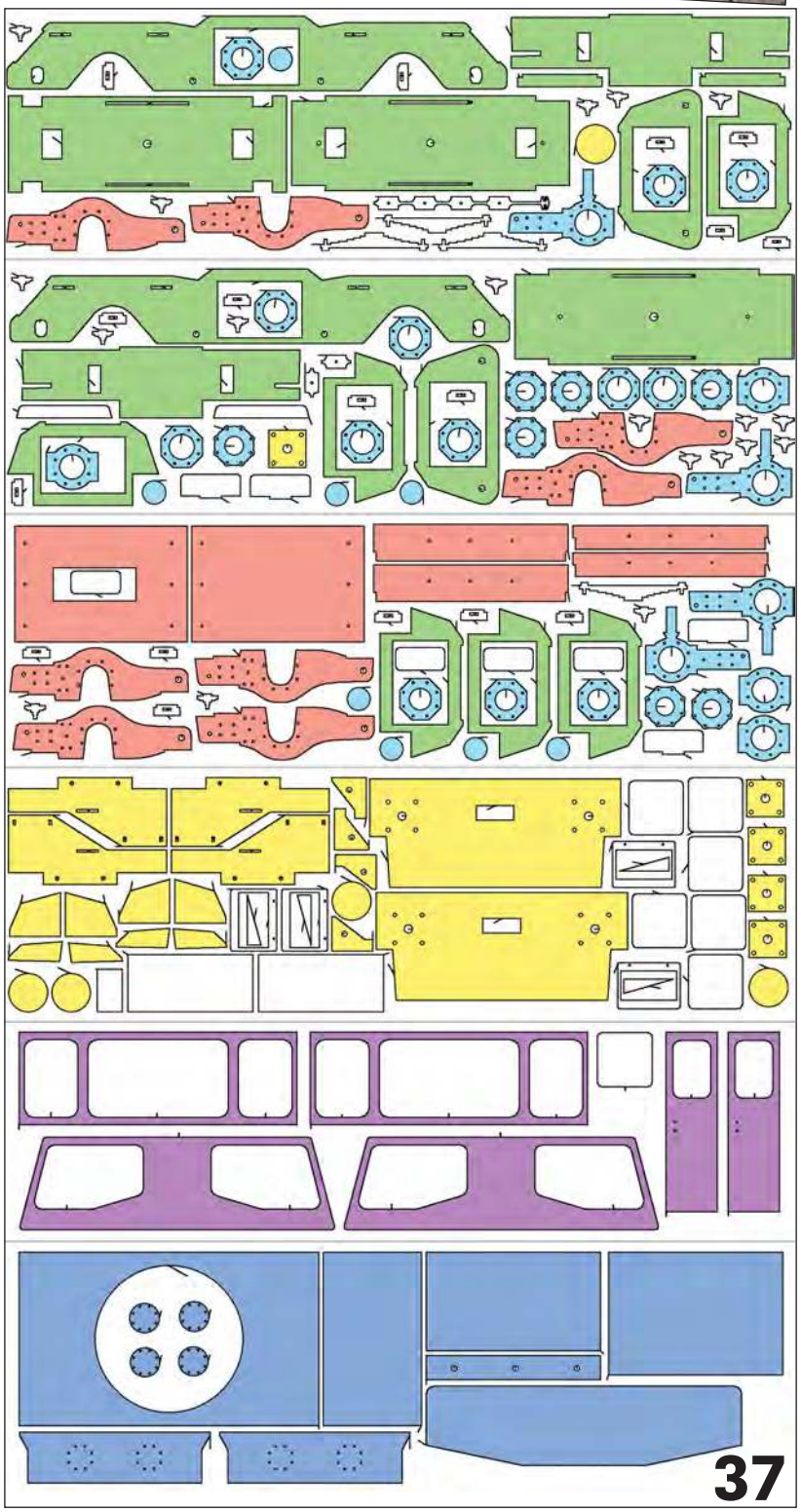
PHOTO 35: Kustaa's home-brew plasma cutter setup. Plate to be cut placed on rust-brown bed.

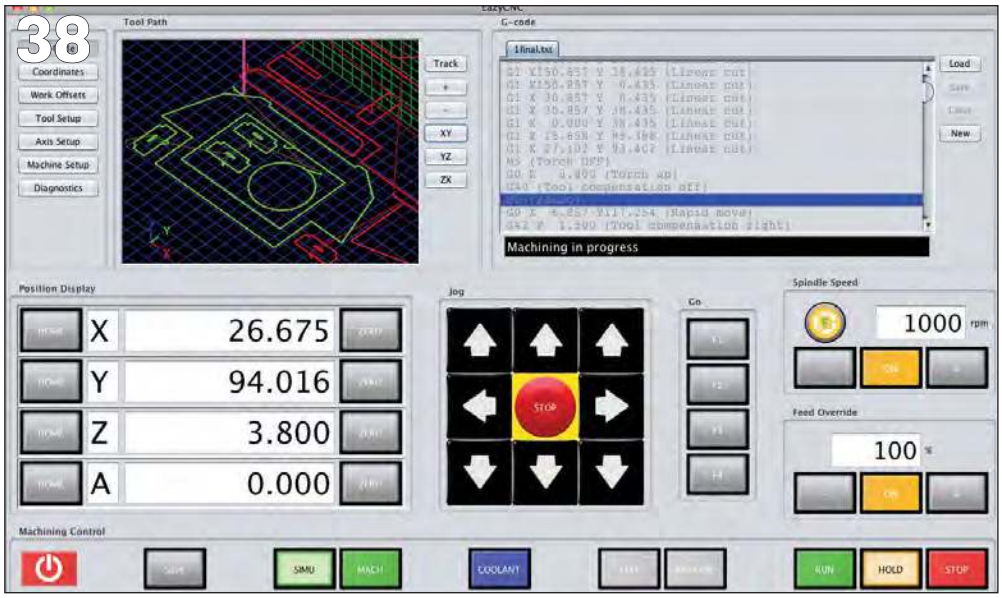
PHOTO 36: The plasma cutter's carriage.

FIGURE 37: The CAD drawings for most of the parts for the locomotive.









The equipment

Kustaa also wrote his own drafting software, 'jDraft', based on the Java programming platform. This software is compatible with PC, Mac and Linux platforms, and is available at Kustaa's website www.sparetimelabs.com for free. The program can also generate oh-so-important G-code used in most CAD/CAM machining operations.

His home-brew plasma cutter is shown in Photo 35 – the actual plasma machine is situated under the table, while the cutting torch is positioned on a movable carriage on top. A flexible cable conduit provides power, control signals and compressed air to the torch, shown in detail in Photo 36, where you can also see the belt drive for the Y-direction, with its red stepper motor at right.

The torch also has a Z-axis movement, necessary for starting a cut, in other words piercing through the steel. This motor is right behind the plasma torch itself. The longer belt for the X-axis movement is behind the carriage, while the table contains a shallow water bath, to catch the sparks generated during cutting. This machine is controlled by another piece of software that Kustaa also has written himself, 'EazyCNC'; it is similar to many other programs using the ubiquitous G-code.

The CAD drawings

In order for me to get the outline of my bogie parts converted to this G-code, I imported a factory drawing of the original prototype loco into the drafting software – an easy task. Then, I traced the outline of the parts, and used the program's measuring tools to adjust the position of every hole and detail on the part to its exact position. This took several weekends and evenings of work in front of the computer screen; originally, I thought that I'd manage with just a few parts for the bogie frame and bolster, but, as is usually the case, while drawing these parts, I thought of additional parts – some of them not even belonging to the bogies – that could also be cut with CAD/CAM... Figure 37 shows what I finally came up with – and not even all of it!

Since Kustaa's cutter accepts raw material no larger than 1000mm by 300mm, I broke down the layout to sub-drawings of this size; in the drawing, they are separated by grey lines. The three top sections form the parts for just one bogie, so two of each will have to be cut. The fourth section shows the parts for the buffers and buffer beams, while the fifth section contains parts for cab windows and doors. The bottom section contains parts for the fuel tank – of course, no fuel is needed in my electric-drive miniature, but the tank will be filled with 60 kilograms of lead to increase the adhesive weight of the engine!

Looking at the top of the drawing you immediately notice the characteristic shape of the engine's bogies in the top left part – the two curved cut-outs on the bottom will accommodate the axle boxes. The rectangular parts in the two top sections of the drawing form the top and bottom of the bolster, as well as an intermediate layer. Top right is a part, which, together with its twin in the second section, will form the front and back sides of the bolster.

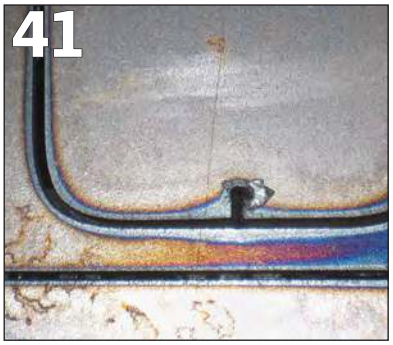
The rest of the green parts (with large rectangular holes) are plates that will be at the outer ends of the bolster; they provide a gap and a bearing for the pivoting 'sub-bogies', made from the parts marked in red. These hold just one axle each, and are individually sprung. This will make the entire bogie assembly very accommodating to any bumps or unevenness in the track.

FIGURE 38: 'Operator's console' in Kustaa's EazyCNC software.

PHOTO 39: Cutting in progress.

PHOTO 40: Windows for engine's cab cut from 1000 x 300mm piece of 3mm thick steel plate.

PHOTO 41: All cuts are started from outside the part. Here a window frame is being cut, thus it has started in discarded window area.



The light blue parts will form axle boxes for the ball bearings. I need this many of them, since the plate is only 3mm (⅛-inch) thick. Enough of these parts will be stacked to accommodate the bearings and their retaining nuts.

The parts coloured yellow in the drawing form the buffers and buffer bars. These will be TIG-welded together, to form one complete unit at each end of the engine. The purple-coloured parts are 'masks' for the cab windows – in the previous issue, you saw how the cab was constructed of plywood, but in order to get nice-looking windows, I used steel insets in the walls, giving nicely formed window openings.

Finally, the parts in dark blue are for the lead-filled fuel tank, already mentioned. All parts not coloured are non-functional, and serve only for detailing the bogies and the hood of the engine.

Cutting the parts

After the G-code was generated in the jDraft software, it could be imported into EazyCNC for the actual cutting. Figure 38 shows the software's display while cutting is in progress; the coordinates for the torch are shown, as well as a graphic isometric representation of the cutting; all lines in green have already been cut, lines in red are waiting in turn.

The cutting speed can be adjusted, and is automatically decelerated when a change in direction occurs. A long, straight cut can be performed at a speed of over three inches per second! This is just as fast as the laser cutting used for my previous locomotives. Every time the plasma beam needs to start a new cut, it waits in place for a little under a second, to ensure that the piercing of the steel has proceeded properly. Then, it can accelerate to maximum speed, according to the instructions in the software.

Photo 39 shows the cutter in operation. A few sparks are flying around, but most are collected in the water tray below the plate being cut. The result, after just a few minutes of the torch see-sawing back and forth over the plate, can be seen in Photo 40. Imagine the amount of time this would take to do by hand!

Photo 41 shows how the plasma torch has started the cut inside a window opening. The cut itself is only around one millimetre wide. The software takes this in consideration, so that the size of the part is correct, and not too small. Photo 42 shows the quality of the cut – pretty good, considering that the plate is only 3mm thick - less than ⅛-inch!

Only a few parts needed to be machined to a better finish, among them the axlebox parts – the holes for the ball bearings were cut undersize, and finished on the lathe, after the 'package' of plate pieces was assembled. The slight amount of slag protruding from the cut edges was easy to chip off with a hammer and a chisel or just broken off with pliers; then the parts were ready for cleaning and assembly!

Over a period of no more than a couple of weeks, Kustaa had cut all the parts with his machine. There were well over 200 of them, some seen in the box and on my workshop floor in Photo 43. Cleaning them up with a sanding 'flap' disk in my angle grinder, I got rid of the slight rust that had discoloured the parts. Photo 44 shows a heap of parts to become axleboxes, and Photo 45, parts for the ▶

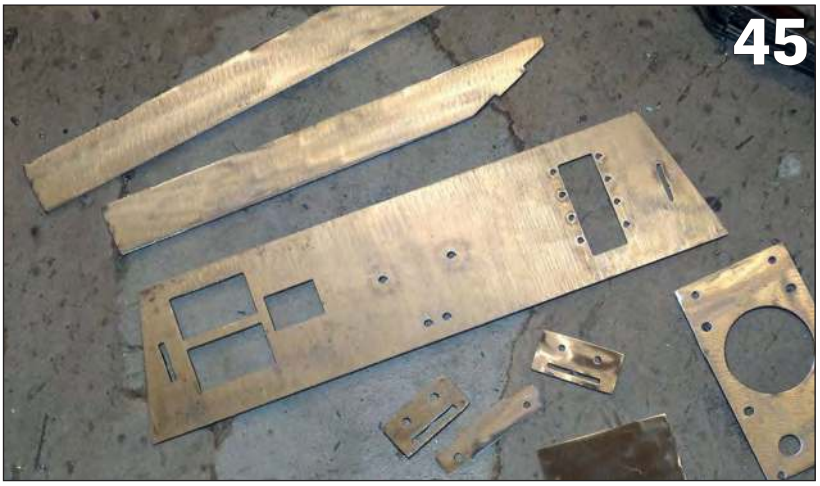
PHOTO 42: Plasma-cut edges needed little further machining, most parts could be used as-is, after removal of slight ragged slag on edges.

PHOTO 43: Boxful of plasma-cut parts, all made from 3mm plate.

PHOTO 44: 'Flap disk' made of overlapping strips of 80-grit sandpaper is practical for cleaning large areas – and infinitely more durable than using simple, 'one-ply' sanding disks.

PHOTO 45: Parts for display panel and main switch box. Marks left from sanding will all disappear under paint.

Photos by Kustaa Nyholm & the author.



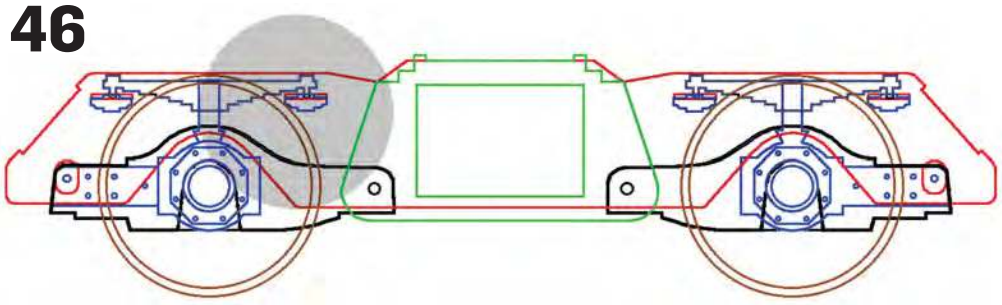


FIGURE 46: Bogie, seen as combination of several CAD-designed components.

PHOTO 47: The first TIG welds in assembly of bogie bolster.

PHOTO 48: One of the two bogies is assembled and placed on workshop track. Fake leaf springs just for looks!

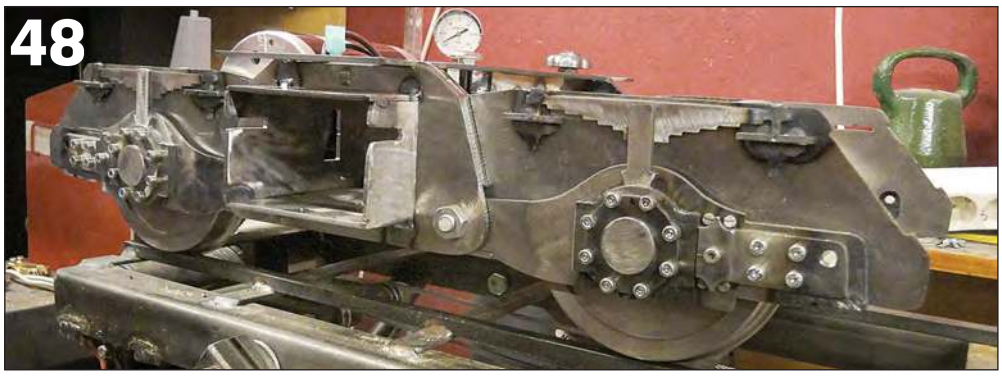
PHOTO 49: Motor is tight fit inside sub-bogie. Chain and sprocket at left.

display panel and the main switch box. Now I was ready for the next step...

Assembling the bogies

Figure 46 is a CAD composite of the outlines of the main parts for the bogie. The largest part, marked in red, is the side of the bogie. Two of these are held together by the parts in the bolster, marked in green. The thick black outlines represent the two sub-bogies, which are hinged to the frames and bolster. This makes the entire bogie very accommodating of unevenness in the track, since the sub-bogies, and thus the axles, are individually sprung. Coil springs will be hidden inside the frame – the parts resembling leaf springs are only cosmetic, cut from steel plate. The other parts marked in blue are also mostly cosmetic, only the central octagonal shape has a function, being a cover for the bearing in the axlebox.

The large, grey circle represents the motor. It has a 24-tooth gear wheel, meshing with a 114-tooth wheel attached to the inside of the right-hand wheel. The motor protrudes a bit above the bogie frame, but it will fit between the sides of the engine's main frame. Power is transmitted to the other axle via sprockets and a chain. These parts are ordinary bicycle spares, thus low-cost and easily procurable. The chains can certainly handle the power output of this loco's electric motors. A much larger engine might benefit from heavier chain, such as the type used in motor bikes.



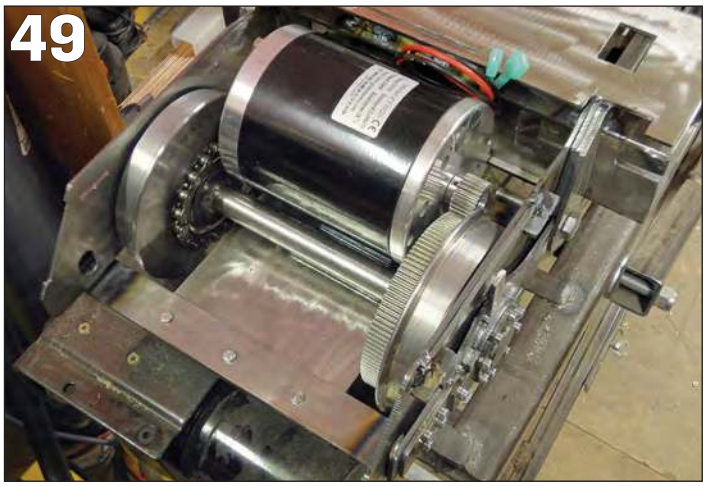
The bogie parts are welded together with a TIG machine. Making good-looking welds with TIG equipment is easy, after just a little experience doing test welds on pieces of scrap steel. Contrary to stick welding, ordinary steel wire (sometimes copper-coated) is used as a filler, but in many cases, the parts can be joined without any filler at all; they are simply fused together. The TIG technique is also completely devoid of spatter or slag; the joins usually need no cleaning or grinding whatsoever, unless they are on visible surfaces that need to be completely smooth.

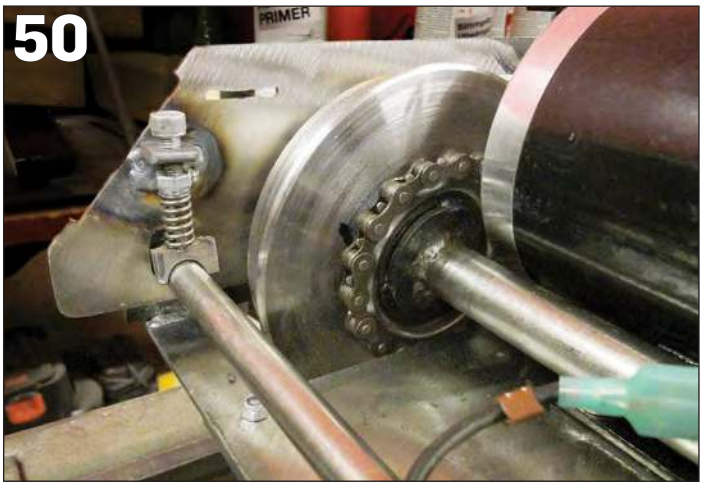
Tab-and-hole joins can be designed in the CAD software, then the assembly can be put together almost like a jigsaw puzzle. Photo 47 shows the very first welds on the bogie bolster – note that I've in fact only 'spot' welded the parts together – thanks to the tab-and-hole construction, many seams that will take little stress do not need to be welded all over the length of the tab and this also saves a lot of the rather expensive Argon gas...

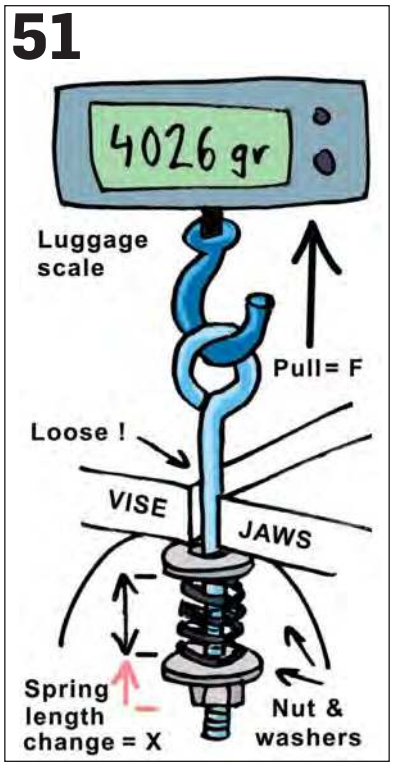
In Photo 48, I have completed the main parts of the first bogie. The axleboxes are constructed of several parts, all cut from the same 3mm thick steel plate as all the other components of the bogie. Socket-head bolts of M4 size keep everything together, and slightly mimic the look of the prototype – I'm not a stickler for absolute accuracy, so I didn't bother getting special model engineer-size bolts, which would also have cost a small fortune. Thus, the hardware-store bolts sold for just a few quid per kilogram were good enough for me.

The motor, producing a little over one-half horsepower, sits comfortably and snugly in the sub-bogie, Photo 49. Note the gear wheels, and the chain sprocket on the other side. The chain passes through holes in the bolster plates.

Springing is very simple, one coil spring in each of the four corners of the bogie, Photo 50. A 'saddle' under







the spring transfers the force to a round bar connecting the left and right sides of the sub-bogie. The bar passes through oval holes in the sides of the main bogie, enabling the sub-bogie to move a little over 6mm. The stiffness is adjustable with an M6 hex-head bolt in a piece of angle iron welded to the main frame.

Thanks to the lever action of the sub-bogie sides, the springs need to be only about half as stiff as they would if placed right over the axle boxes. I tested my springs with the simple setup shown in Figure 51. A cheap electronic luggage scale is used to pull on the spring, and the 'spring constant' can be determined by measuring the reduction in spring length at a certain upward pulling force. The formula is very simple: k=F/X, where F is the force, X is the change in spring length, and k is the resulting spring constant. Go online to https://en.wikipedia.org/wiki/Hooke%27s_law for more information on this 'Hooke's Law'.

I have used bicycle spare parts for a braking mechanism – Photo 52 shows how I have adapted a cantilever tyre rim brake (also called a 'linear' or V-brake) to work on a thick steel disk welded to the middle of the axle. A Bowden cable transmits the braking force from a foot pedal to the brake pads, which are both adjustable and exchangeable, should they wear out. I don't expect them to, because normal speed reduction will be carried out by the mechanical resistance of the motor when the speed is reduced. The disk brake can be used as a parking brake in addition to downhill and emergency braking.

PHOTO 50: Very simple, adjustable coil springing.

FIGURE 51: Measuring spring constant, k=F/X.

PHOTO 52: Disc brake mechanism made using low-cost bicycle spare parts. 'Noodle' allows Bowden cable to curve 90 degrees in tight space.

PHOTO 53: Ball bearings in bogie bolster eliminate friction against frame when bogie pivots around king pin.

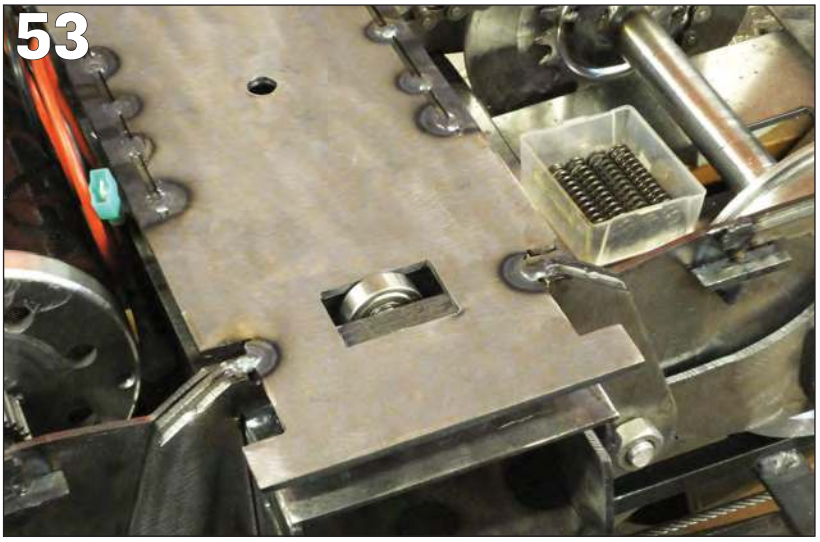
PHOTO 54: The frame, a simple weld of square tubing.

PHOTO 55: Test assembly of bogies, frame and cab provides inspiration for further work!

Two ball bearings (one shown in Photo 53) on the central bolster ensure that the bogie will rotate freely around the king pin. A 6mm thick washer of slippery nylon, PTFE or similar plastic between frame and bogie functions as a thrust bearing. When the superstructure is completely horizontal, both ball bearings are just one millimetre from the underside of the frame, which is a simple weld of 30mm square tubing, shown in Photo 54. Running on an uneven track, the top of the loco can tilt only a minute amount, and yet there will be no friction between the top and the bogie bolster when the bogie needs to pivot while moving from straight track to curved, or vice versa.

The first assembly of the as yet unpainted bogies, the frame, the buffer bars, the fuel tank and the cab and hoods in Photo 55 inspired me to continue building – as this stage the premier run at the annual Miniature Loco Meeting at our railway museum was only six weeks in the future... Next: The electrics! EIM

■ Parts 1 & 2 of the series appeared in the June and July issues. For back issues go to www.world-of-railways.co.uk/engineering-in-miniature/store/back- issues/ or call 01778 392484.



Making model beading

The latest in John's series of techniques for those less-experienced in the workshop.

BY **JOHN SMITH**

Beading says the title but I'm not talking in this month's column about half-round brass beading, which is available from our suppliers. This Top Tip is specifically about making and applying Great Western Railway style beading. For a 7¼-inch gauge loco, I use the cross-section shown in Figure 1 – a little overscale in thickness, but stronger than scale and a little easier to make and apply.

To make beading for a 7¼-inch gauge loco, anneal a two-foot length of ½-inch x ¼-inch brass flat. You don't *have* to anneal the brass, but it does prevent the eventual beading from being shaped like a banana.

Mill both edges with a 3/16-inch radius corner rounding cutter, clamping the flat to a swivelling angle plate set at 45 degrees. Then mill a ⅜-inch wide slot in both sides, 1/16-inch deep on one side and ⅛-inch deep on the other.

Saw the workpiece in half and you have four feet of nearly-finished beading; a hacksaw can be used, but access to a metal-cutting band-saw makes the sawing a lot easier. I made a simple jig to hold the beading for milling the 'leg' to size (Photo 1A/1B).

FIGURE 1: Cross-section of the beading for a 7¼-inch gauge GWR locomotive.

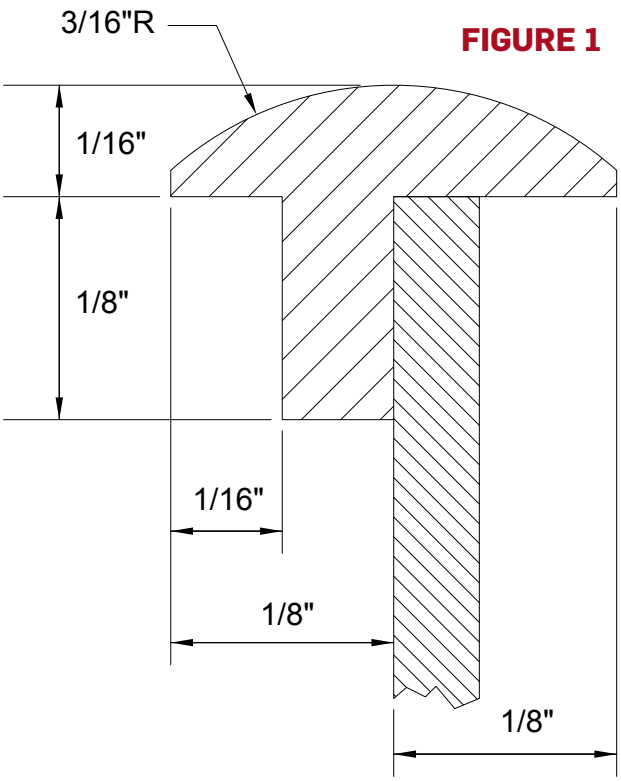
PHOTO 1A: Simple jig for milling beading leg to size

PHOTO 1B: Jig mounted on the mill.

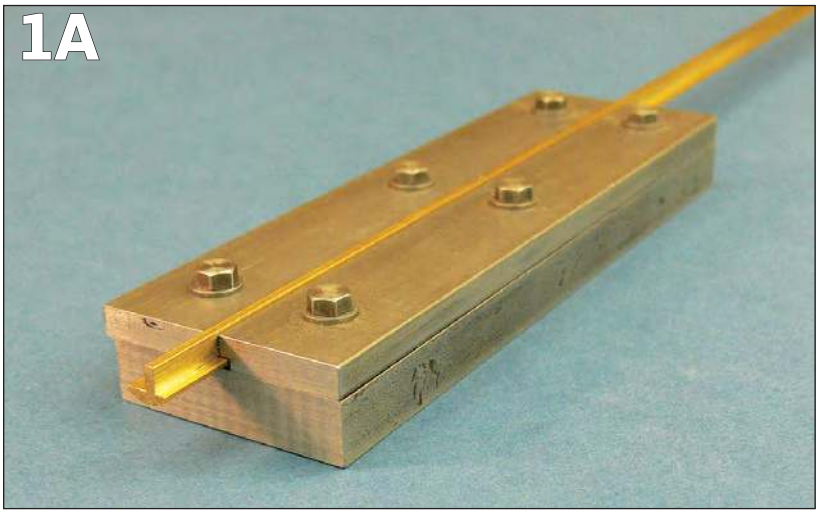
PHOTO 2: Annealing assists in persuading beading to follow large-radii curves.

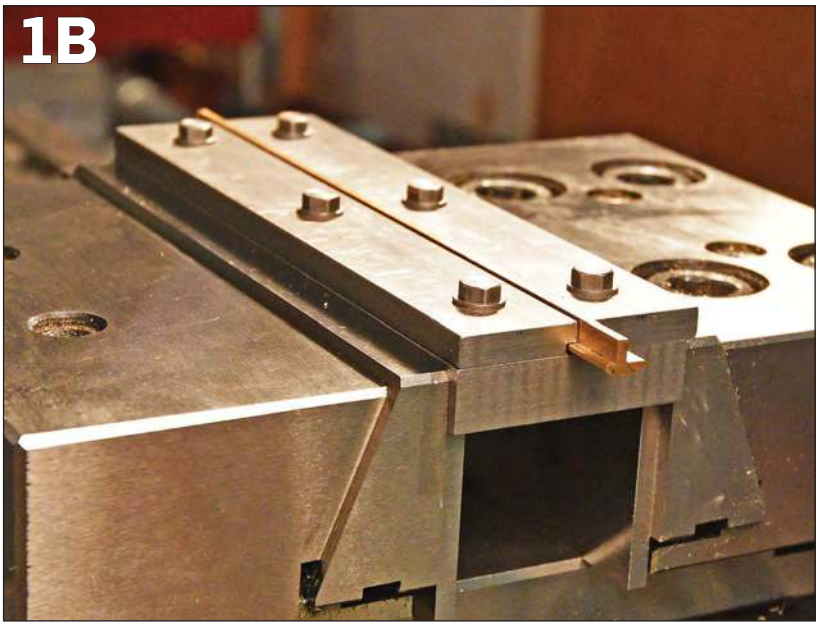
All photos and diagrams by John Smith.

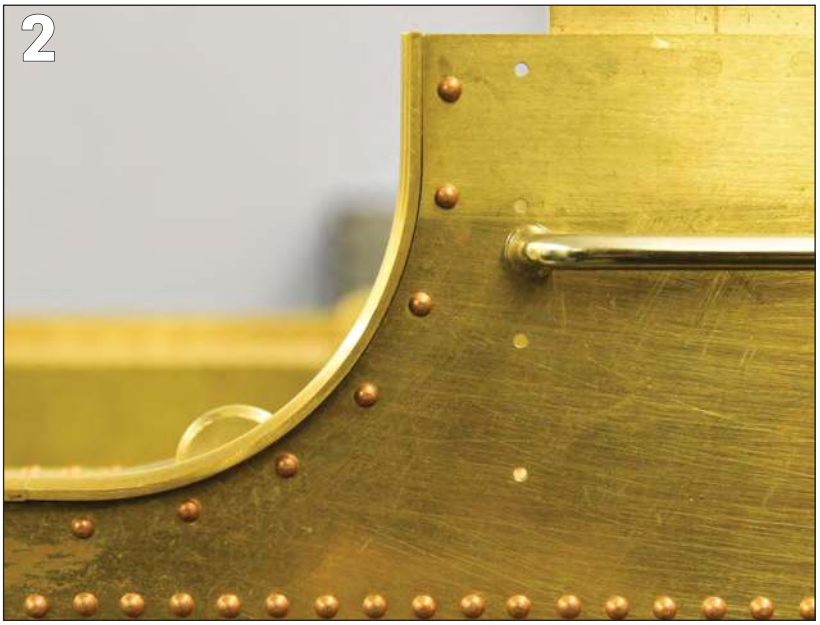
FIGURE 1

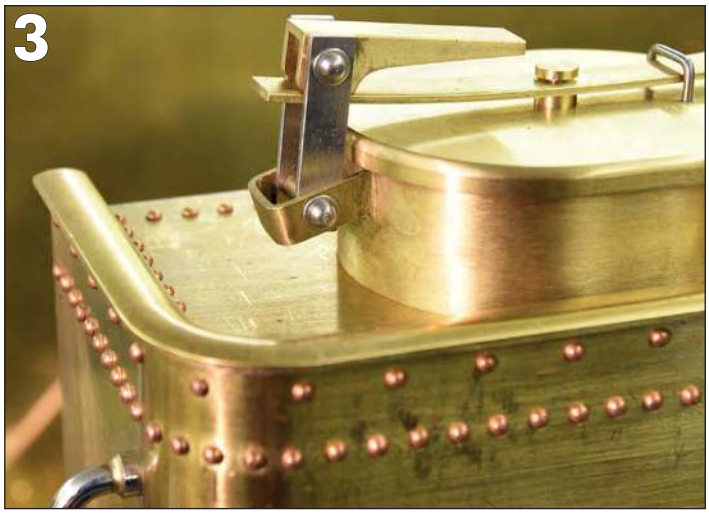


7¼-inch gauge GWR beading









It is a simple riveting job to apply straight lengths of beading to a side tank or bunker. Annealed beading can be bent by hand to follow large-radii curves, such as those on a tank side (Photo 2). Just bend the beading around an object of suitable radius, no hammering is required, but it makes the job easier if you anneal the brass again halfway towards achieving the desired radius.

A really tight bend in beading, such as that on a bunker or tank corner (Photo 3) might be achievable by means of a bending jig and several annealing heat treatments, but I have never attempted it. What I do instead is to turn a ring of beading in the lathe (Photo 4) and then cut and mill the ring to create two corner pieces of beading with short projections on them to make halved joints with straight pieces of beading. These are then riveted and silver-soldered to the straight pieces. The result is an apparently seamless section of beading which fits the tank or bunker corner perfectly.

For beading around the door of a cab (Photo 5), the process is similar, the shape of the ring needed is just different – perhaps a job for the rotary table rather than the lathe. The same technique can also be used to produce tight-radius curves in brass angle (Photo 6), the shape of the ring to be turned or milled changing yet again (Photo 7). EIM

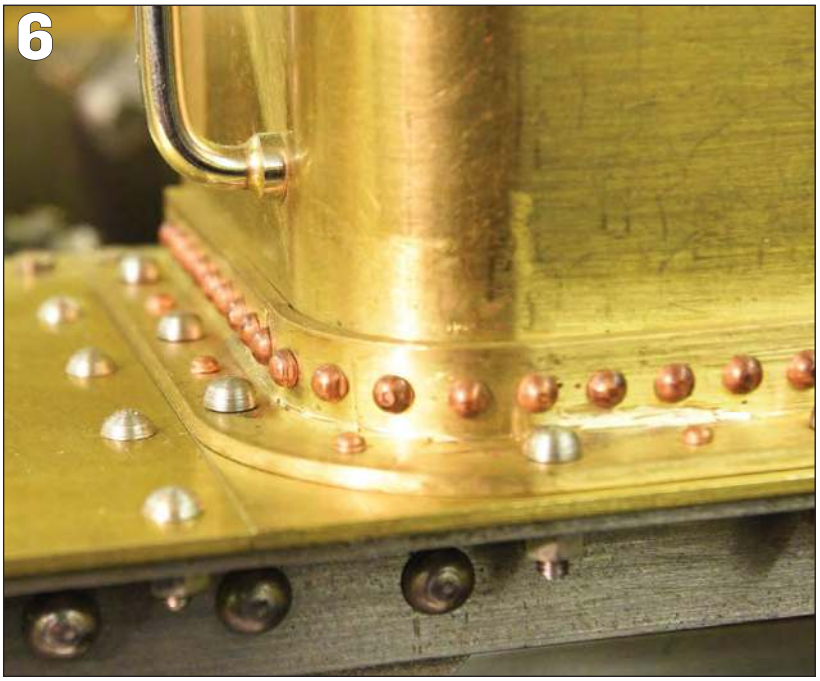
PHOTO 3: A bend that is too tight for bending round a former.

PHOTO 4: Beading ring produced in the lathe and ready for cutting.

PHOTO 5: To bead around a cab door requires slightly change in technique.

PHOTO 6: Same method used for tight radius curves in brass angle.

PHOTO 7: For above technique shape of ring to be turned is revised.



Dougal – a 5-inch Barclay

Backhead fittings occupy young Sussex engineer Andrew's attention in the latest episode of his entry-level locomotive construction project.

BY **ANDREW STRONGITHARM** – Part Fifteen of a series

Next, I turned my attention to the backhead fittings and began by making the steam manifold. This was a fairly simple construction based around two lengths of ⅜-inch diameter PB102 phosphor bronze.

The vertical piece was 1-inch long, drilled 5.5mm (7/32-inch) throughout and half of which being threaded externally ⅜-inch x 32tpi to screw in to the manifold bush in the top of the boiler. A 3/16-inch deep radius was then machined in to the top using a ⅜-inch diameter ball-nose slot drill which was the same diameter as the material that would sit within it. This was a clever way of forming a neat joint between two pieces of material at right angles to each other which could then be silver soldered together.

The horizontal piece was 1⅝-inch in length, once again drilled 5.5mm (7/32-inch) throughout and threaded externally ¼-inch x 40tpi x ¼-inch at both ends to accept the blower and injector steam valves once they had been made.

At the same time as soldering the main halves together, a small 3/16-inch x 40tpi fitting was drilled and silver soldered in to the left-hand side of the vertical piece to provide a steam supply for the pressure gauge. Likewise a ¼-inch x 40tpi fitting was also soldered at right angles in to the back of the vertical piece of the manifold for what would become the steam shut-off valve for the vacuum ejector. (Photo 1)

Steam valves

The blower and injector steam valves are visually identical to each other but importantly one was left-handed and the other right. They were both made from ⅜-inch diameter PB102 with the steam inlet from the manifold silver soldered part way down the valve using the ball-nose slot drill technique described above.

The valve bodies were initially drilled out 5.5mm (7/32-inch) and threaded throughout with a ¼-inch x 40tpi tap. At this point each valve became individual and so starting with the easier injector steam valve I made the removable seat which the valve spindle would screw up against. This seating also incorporated a length of copper pipe which acted as a support for the yet-to-be-made front section of spectacle plate and thought had to be given as to how this would work.

The removable seat started life as a piece of 0.324 thou' (2BA) AF bronze and I began by drilling a ⅛-inch hole through its length. Next, I turned down a ¼-inch length of the outside to ¼-inch and this was externally threaded ¼-inch x 40tpi to screw in to the back of the body of the valve. A 1/16-inch thick hexagonal head was left on this fitting and a piece of 3/16-inch 26swg copper pipe was then silver soldered in to the end with a special flanged fitting on the other that the spectacle plate would slide up against. This would then be clamped in position by the nut from the corresponding steam pipe.

The valve spindles were made from 5mm stainless hexagon and both were initially turned down to a diameter of 140 thou' before the full length was threaded 4BA. Next, all bar ⅛-inch of the 4BA threads were removed as I continued to turn down the stainless to 86 thou' and cut an 8BA thread in its place.

I then went on to turn the front fittings which house the stuffing glands from 0.324 thou' AF bronze. Similar to the removable seats, these had a 1/16-inch thick head and were externally threaded 5/32-inch x 40 tpi x 3/16-inch long and internally 8BA throughout. The 0.324-inch AF material was chosen deliberately as the top of the 'sharps' of the hexagon did not exceed the outside diameter of the ⅜-inch valve bodies. The front fittings were then counter bored from the inside with a ⅛-inch slot drill and internally threaded 5/32-inch x 40tpi x ¼-inch deep. This was to accept the stuffing glands which were made from 5mm stainless, externally threaded 5/32-inch x 40tpi x ¼-inch long and internally 8BA throughout. These screwed inside the front fitting and created a void to hold a piece of stranded graphite packing to seal the valve spindle.

The final components to make were a pair of blind drilled and tapped stainless-steel conical-shaped ends and lock nuts which screwed on to the end of the spindles to seal against the valve seats. These are fairly self explanatory and were fitted by holding them in the lathe chuck to ensure they were secure on the spindle together with the addition of some Loctite 271. By screwing these pieces on to the end of the valve spindles they also helped to prevent the entire spindle being unscrewed from the body of the valves, thus making them captive.

The other advantage of making the valves in this way is that the whole assembly can be removed from the body by unscrewing the front fitting, meaning the conical seat can be easily taken out and adjusted or replaced if it's not sealing perfectly.

Blower valve

The blower valve was a slightly different design as the steam outlet

The prototype 'Dougal' loco is a 2ft 6in gauge Barclay 0-4-0 built in 1946 for the Provan Gasworks in Glasgow and today resident on the Welshpool & Llanfair Light Railway in mid Wales.

PHOTO 1: The steam manifold – "a fairly simple construction..."

was underneath rather than at the back and therefore the fitting which screwed in to the back of the valve was adapted accordingly. This was ⅜-inch long with a 1/16-inch hexagon head and the threads deliberately blocked the steam inlet from the manifold. I then drilled a ⅛-inch diameter hole ¼-inch long up the threads before inserting it in to the valve body and cross drilling through from the steam inlet.

A 3/16-inch x 40tpi bronze fitting was drilled and threaded in to the bottom of the valve body just in front of the cross-drilled fitting described above. This fitting also contained a deep 60-degree countersink ready to accept the nut and olive on the copper pipe which would take the blower steam to the longitudinal stay, which in turn carries it through the boiler.

Ensuring that the back fitting was screwed in tightly, I marked on the head which side of the hexagon stopped at the bottom of the fitting so that I knew where to waste the threads away to allow the blower steam through to the outlet pipe. I held the fitting on the hexagon so that the marked side was facing up in the vertical slide in the Myford lathe and using a small end mill, I took a number of cuts until I had removed a depth of 15 thou' by a length of ¼-inch. This was just enough to take the threads off while ensuring that there was still sufficient land to the centre hole.

One problem that I came across with this design was that the back fitting had to be sealed against the valve body when it was screwed in and I struggled to achieve this 100 per cent. This was mainly because I was trying to seal over threads and the gap between the cross hole and the end of the threads was very small. Any steam leaking around the threads would also by-pass the valve and go straight to the outlet pipe. During tests on compressed air I regularly found that air (or steam) was leaking through to the blower and I eventually established that it was coming past the threads on the back fitting. It is not the end of the world if the blower has a small leak of steam but that's not the point so I continued until I achieved a better seal.

Sub-assembly

With the completion of these valves, I could assemble them together with the manifold on to the loco (Photo 2). The exact position of where the valves stopped was critical so a number of ¼-inch bore copper washers were bought to assist with this task.

The two longitudinal stays were fitted upon completion of the boiler construction and therefore a short length of ⅛-inch copper pipe was required to connect the blower valve to the stay. After annealing and being bent to shape, I added two 3/16-inch x 40tpi nuts before silver soldering a pair of olives on to both ends. The pipe was then fitted between the blower valve and the left hand hollow longitudinal stay.

PHOTO 2: Completed manifold in position on the locomotive.

PHOTO 3: Backhead fittings – connection on left-hand longitduinal stay will be piped to blower valve on manifold.

Water gauge

The gauge glass was an interesting design as the top fitting screws into a bush in the outer wrapper of the firebox as opposed to one which is more commonly located on the backhead. This essentially consisted of two parts, an elbow and a right-angle fitting, which were required to achieve an angle that held the gauge glass vertical. The combination of threads on these fittings meant this angle could be easily adjusted to ensure the glass was vertical on the backhead and more importantly that it lined up and was straight with the bottom fitting.

The first part to manufacture was a ⅜-inch diameter bronze elbow that was made with the aid of a ⅜-inch ball-nose slot drill to create a recess for the other half of the elbow to sit in. I turned a small flange on one end to tighten down against the boiler bush, which was followed by cutting a ¼-inch length of ¼-inch x 40 tpi external thread to screw in to the bush. The other end was internally threaded ¼-inch x 40 tpi for the right-angle fitting to screw in to and both halves of the elbow were then silver soldered together and the steam passages drilled out at right angles with a ⅛-inch drill.

The right-angle fitting which supports the top of the glass was made by silver soldering a ⅜-inch length of ⅜-inch diameter PB102 bronze on to the side of a further ¾-inch length of ⅜-inch diameter PB102 bronze. Prior to this, the shorter length was recessed with a ⅜-inch ball-nose slot drill to give a tight joint while ¼-inch of the opposite end was turned down to ¼-inch and externally threaded ¼-inch x 40 tpi to screw in to the end of the elbow fitting.

The whole length of the shorter piece was then drilled ⅛-inch throughout. The main body of the right-angle fitting was drilled throughout with a 5.5mm (7/32-inch) drill and the top 3/16-inch was internally threaded ¼-inch x 40 tpi to accept the top cap. The bottom ¼-inch of this fitting was reduced in diameter to 5/16-inch and externally threaded 5/16-inch x 32 tpi for the top ▶

gauge-glass nut.

Both halves could now be carefully silver soldered together, making sure that the recessed piece on the side was flush with the top of the main body. This was then cross drilled using a ⅛-inch drill before I turned the top cap from a piece of 0.324 thou' bronze hexagon. I used this material because the outside diameter of the sharps on the hexagon is just less than ⅜-inch and therefore they do not protrude over the body of the main fitting when it is screwed down on top.

The bottom fitting of the gauge glass was manufactured from a 1-inch length of ⅜-inch diameter PB102 bronze. I started by drilling the full length 5.5mm (7/32-inch) before internally threading it ¼-inch x 40 tpi throughout to accept the valve components at one end and the valve seating at the other.

The latter was a simple design made from a 1 3/16-inch length of 0.324 thou' bronze hexagon which I turned down and threaded one end ¼-inch x 40 tpi by ¼-inch long. I then took this out of the chuck, turned it round and repeated the process on the opposite end but this time turning down a ½-inch length, leaving a 1/16-inch thick head in the centre which I used to tighten the seat in to the main valve body.

To avoid clamping the newly cut threads in the lathe chuck, I found an off-cut of internal ¼-inch x 40 tpi threads which I used to hold the fitting in whilst threading the opposite end. The reason for the longer threads in the valve body was because they would have to be cross drilled so the boiler feed to the gauge glass was before the valve and as such permanently open to live steam. When the valve is opened, this allows water to be blown out of the down pipe by steam pressure to clear away air bubbles and potentially small particles of debris which may appear in the glass. I finished this off by drilling a ⅛-inch hole through the centre and I then turned my attention to the valve mechanism which was made in a similar fashion to the blower and injector steam valves.

As with the other two valves, the blow-down valve had the advantage of being mounted in the front stuffing gland so I could easily remove the entire assembly without the need to remove the body of the valve from the boiler.

Next, I turned the vertical piece which retains the glass that is mounted at right angles to the main valve body. This was made from a ⅜-inch length of ⅜-inch diameter PB102 bronze and I started by recessing one end with a ⅜-inch ball-nose slot drill prior to being externally threaded 5/16-inch x 32 tpi to accept the bottom gauge-glass nut. The whole length was then drilled out ⅛-inch and before I silver soldered it on, I machined a ⅛-inch deep x 7/32-inch diameter counter bore for the glass to sit in.

Next, I cut a ¼-inch length of 3/16-inch x 40 tpi threads on a piece of bronze to screw and solder in to the body of the valve to attach the down pipe for the gauge -glass blow down. I had to be very careful when silver soldering these parts to the valve body as their positioning was critical.

I soldered the glass retainer first as I could use this to hold the whole fitting by in the vertical slide on the lathe to ensure that the blow-down outlet was drilled and threaded 180 degrees from the glass retainer. The precise position of where these two pieces were placed on the valve body was determined by the top fitting and the distance of the glass from the backhead. I used a length of 7/32-inch steel rod to check the position of the

PHOTO 4: Water gauge fitment – when photo was taken regulator handle position was being set, the large nut at the end of the handle/rod was a temporary measure.

PHOTO 5: Completed water gauge – the use of blue-lined glass aids easy viewing of water level.

bottom fitting in relation to the top one and to ensure that the gauge glass was parallel to the backhead.

After soldering, I screwed the valve seating in tightly and holding the bottom fitting in the vertical slide again, I drilled through from the glass retainer in to the threads of the seat with a ⅛-inch drill.

The final pieces to make for the gauge glass were a pair of identical nuts to secure and seal the glass in both the top and bottom fittings. Two pieces of ⅜-inch diameter x ¼-inch long PB102 bronze formed the start of these nuts, which were drilled 9/32-inch throughout and then internally threaded 5/16-inch x 32 tpi. Using an off-cut of 0.324 thou' hexagon bronze I turned two hexagonal caps that would be silver soldered to one end of each nut which would allow a 2BA spanner to be used to tighten them up with.

A 1/16-inch long x 9/32-inch diameter step was turned to fit inside the nuts and prior to parting them off to leave a 1/16-inch thick head, I drilled a 5.6mm hole to allow the glass to slide through. These were then pushed in to the round nuts and soldered in position. I inserted two 4.5mm diameter x 1mm section silicone O-rings to seal around the glass and should mean the nuts only need to be tightened gently, however the O-rings do give the nuts a bit of a 'spongy' feel when screwing them up.

During the assembly of the gauge glass I fitted a length of 5.5mm blue lined glass, which I acquired from a model engineering supplier in Australia. The benefit of using glass which contains a blue line on top of a white background is that the line appears enlarged when filled with water. It therefore helps to improve the clarity of the water level in the boiler.

I sealed the top cap with Loctite 243 along with the valve seating piece which had to be sealed in to the valve body and boiler bush and I also had to make sure that the cross hole to the glass lined up. (Photo 3, 4 & 5) EIM

Drawings in this series reproduced by kind permission of A J Reeves. Drawings, castings and material for this project available from A J Reeves.

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Previous Episodes of the build...

Introducing Dougal, **April 2018**; Building the boiler, **May 2018**; Frames, axleboxes, **June 2018**; Wheels, eccentrics, **July 2018**; Rods, boiler saddle, **August 2018;** Machining the steam chest, **September 2018;** Adding the eccentrics, **November 2018;** Machining cylinders, **December 2018;** Cylinder covers & slide bars, **January 2019;** finishing the motion, **February 2019.** First run on air, **March 2019;** Building the brakes, **April 2019.** Smokebox pipework, **May 2019;** Making the regulator, **June 2019**

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Next Month...

"It soon became apparent that a scaled down ⅜-inch diameter brass tube was not going to produce the desired sound..." Andrew makes a whistle for his loco.

Cutting threads with no tailstock dieholder

How do we fill an irritating gap when a feature is just too long for one page but not long enough for two? With a useful workshop tip of course...

BY **DAVID CONEY**

I have been enjoying Keith Appleton's recent articles in EIM offering technical tips for beginners. Even though I have been engaged in model engineering for a number of years, I still regard myself as a beginner as I am largely self-taught, although I have in the past attended a couple of excellent courses run by the SMEE (Society of Model and Experimental Engineers).

I would like to pass on a technical tip here, a technique I used for cutting threads, before I purchased a tailstock dieholder. Reading Keith's latest article on the use of a standard dieholder along with an adaptor sleeve (EIM June 2019) reminded me of the technique I used before I purchased said tailstock dieholder.

With the workpiece in the three-jaw, the tailstock chuck or whatever removed from the tailstock, and the tailstock locked in position, locate the dieholder as shown in the photo on this page.

Apply pressure on the dieholder against the workpiece as you rotate the three-jaw chuck to cut the thread, by screwing along the tailstock. The dieholder is stopped from rotating by its arm resting against any convenient part of the top-slide, which will need moving now and again, as the threads are cut.

"Even though I have been engaged in model engineering for a number of years, I still regard myself as a beginner as I am largely self-taught..."

Incidentally I use the chuck key placed in the three-jaw to enable one to rotate the chuck easily, but no doubt those who like making accessories will have available some proper attachment for this!

Keith's use of the adaptor is more sophisticated than mine, however a tailstock dieholder is undoubtedly the best route to go. EIM

The Ed writes: We hope to be publishing more features from Keith Appleton soon. One of EIM's prime editorial aims is to make it easier for model engineers to make things, so technical tips such as provided here by David will always be welcome. Why not send in some of your own, especially for our new Bench Talk feature that starts on page 31? We do pay for submissions too! Our editorial contact address is on page 3.

RIGHT: David's lathe thread-cutting technique, fully described in the text.

6-inch Foster – ‘a desire for something bigger’

Alan describes a three-year project to turn a ‘pile of bits’ into a pristine engine that is a favourite at rallies.

BY **ALAN BARNES**

Turn the clock back 40 years and you may well have seen Colin Hudson riding one of his classic motorcycles around the arena at vintage rallies. Nowadays his ventures into the arena are rather more sedate as he is now the proud owner of a superb 6-inch scale Foster agricultural traction engine.

Having attended various vintage rallies over the years Colin’s interest in both full-sized and miniature steam engines grew steadily and a few years ago he decided to acquire an engine of his own. He opted for a 4-inch scale Foster which he rallied for a number of years but he really wanted something a bit larger which would be more suited to road runs.

He had been impressed by some of the larger 6-inch scale engines which he had seen and some of the Burrell miniatures were particularly impressive. However Colin wanted something a bit different and his search for a suitable engine continued until 2014.

Collection of parts

It was at the Trevithick’s Dartford Steam event in May of that year that he was told about some parts for a 6-inch scale Foster traction engine which were being advertised for sale. This seemed to tick a number of boxes for Colin in that it was an unusual prototype with few, if indeed any, on the UK rally scene and it would provide the opportunity to acquire a larger engine. In addition,the fact that it was just a collection of parts meant that he would have control over the building of the engine.

Also a regular at the Dartford event was experienced scale steam engineer Mick Harrington and Colin took the opportunity of discussing the Foster with him. What was on offer was a collection of parts from an abandoned project rather than a complete kit. There would always be drawbacks to taking over such a project and Colin would also be faced with having to make the rest of the parts required to complete the engine. He would be looking at a lengthy project but during his search for an ‘unusual’ engine this was the only

Foster that he had come across.

During the course of their discussions Mick agreed to help Colin with the build if he decided to go ahead and buy the parts which were being advertised on the Preston Services website. Colin made arrangements to view the part-completed Foster and following the inspection of the components arranged to buy the engine.

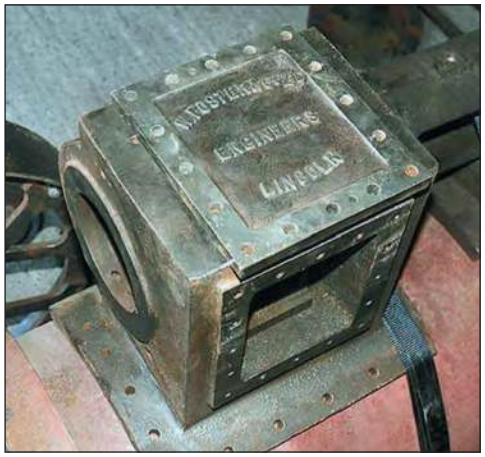
The parts comprised a completed boiler with the cylinder, the chimney, tender and the front wheels in place. The cylinder block was mounted on the boiler although held on with ratchet straps rather than bolts. The rear wheels were partially built but did not have any spokes or tyres and the motion was a pile of unfinished gears though some had been machined.

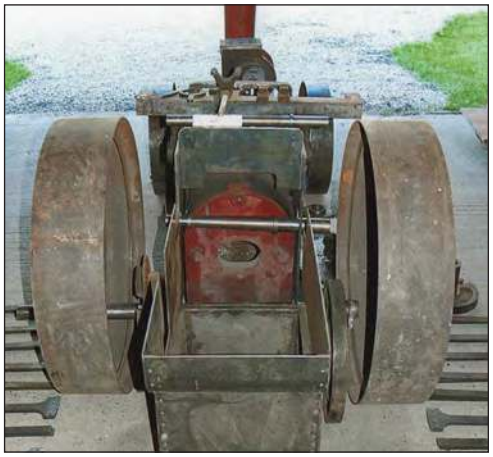
Mick had agreed to provide workshop space for the project so the part-built engine and the other components were duly moved there for the build to begin. In the meantime Colin had drawn up a list of further parts which would be needed and he immediately started work on filling his 'shopping list.'

Colin trained as a plumber and has been interested in engineering all his life but his experience with scale steam engineering was limited. He had a small workshop in his own garage which was equipped with a lathe, a small pillar drill and a selection of tools. He intended to work on some of the parts himself as the project progressed with Mick handling most of the build and dealing with the problems which arose from time to time.

Finding a flywheel

One of the major components which was missing was the flywheel and Colin contacted the Gloucestershire Steam and Traction Engine Company for assistance with this and the other parts which were needed. This company had built a 6-inch scale Foster traction engine which was rallied in the south west of England in ▶

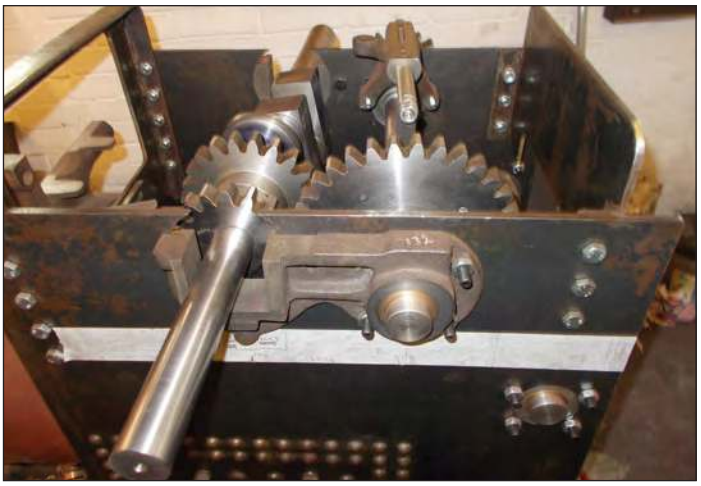




All photos of current engine by Alan Barnes. All other photos courtesy of Colin Hudson, Mick Harrington and Preston Services

ABOVE & UPPER RIGHT: The 'collection of parts' that awaited Colin and Mick when they went to view the for-sale project at Preston Services in 2014.

RIGHT: The first step was to move the engine into Mick's workshop, which would serve as base for the build.



1997 and now resides in Ireland. This model was similar to the 4-inch scale Foster produced by Live Steam Models but was based on new 6-inch scale drawings of an 1896 Foster agricultural traction engine.

GSTEC cast a new flywheel, in fact the firm had to cast two of them as the first one displayed some problems with pitting, but the second flywheel was fine. Colin also obtained a few other parts from the firm and additional components including the injector, sight glasses and whistle were supplied by R A Barker Engineering in Chelmsford, Essex.

Mick's first task was to check over the work which had already been carried out on the boiler and firebox and fortunately these were found to be in good order. As Colin was eager to have the engine completed as quickly as possible some key jobs were contracted out with B H Leake & Sons Ltd in Birmingham being used to vulcanise the wheels, while he also arranged for Percival Engineering in Colchester to rivet the rear wheels.

With Mick making steady progress with the main build Colin worked on some of the smaller components in his garage and made innumerable visits to Mick's workshop to deliver parts and to see how the engine was taking shape. While his scale engineering experience may be limited Colin finally came into his own with the formation of the 'pipework' bringing his years of plumbing experience to the project.

"Colin finally came into his own with the formation of the pipework bringing his years of plumbing experience to the project..."

TOP LEFT: The crankshaft was not among the parts and one had to be machined.

TOP: Crank and gearing mounted on the hornplates.

ABOVE RIGHT: Close-up of the Foster's gearing.

CENTRE LEFT: Colin and Mick work on the engine – Colin was targeting a rally appearance so there was a deadline.

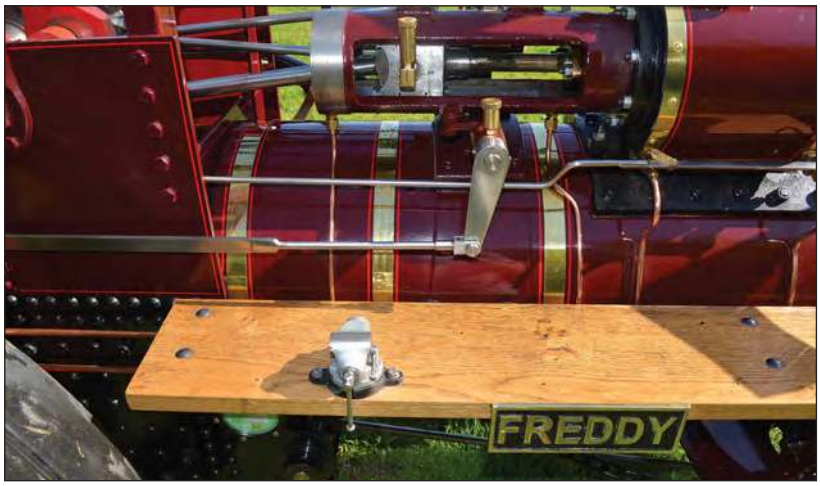
LEFT: Colin with the engine in January 2017, just seven months before its planned debut at the Weald of Kent rally.

Facing a deadline

The major part of the build was completed in a little over three years and in January 2017 the Foster was moved from Mick's workshop to Colin's back garden where the work would be completed. There was still a great deal to do, including the painting but Colin had targeted exhibiting his engine at the Weald of Kent Rally in August 2017.

At a very early stage of the build it had been decided that the new engine would be painted maroon and fully lined out. Some of the components including the flywheel and tender had been painted when the engine was dismantled and Colin spent the next few weeks cleaning, priming, undercoating and topcoating all the parts before final assembly began.

Colin did the painting and lining himself and he has achieved an excellent finish with the maroon paintwork of the boiler and tender nicely offset by the subtle red lining and brass boiler bands. The wheels were painted red and the varnished



running board is fitted with a small workbench vice which is a nice touch. Other details include a smart set of front headlamps and the 'Freddy' nameplate – the engine being named after Colin's grandson.

By this time the Foster had already been steamed gently, warmed through and test run and the passed its tests with no trouble at all. After some final 'fettling' it was ready for its rally debut. At the Weald of Kent Rally Freddy was christened and a 'steamy weekend' enjoyed by Colin and his family with generous amounts of liquid refreshment. The family had watched the 'pile of bits' slowly take shape over three years and now the completed engine was out and about for the first time in all its glory.

The Foster steamed well and ran very smoothly during its public debut, there were only a couple of tight spots which was understandable for such a new model but more importantly there were no leaks, a testament to the care and attention taken by Mick and Colin during the building.

Recalling the three-year project Colin remarked that once the engine was steamed all the problems and headaches during the build were immediately forgotten; "I shall always be grateful for all the hard work that Mick put in getting the Foster completed. Without Mick's involvement I rather think that the engine would still just be a collection of parts.

"It is still the only 6-inch scale Foster that I have seen in steam so I have realised my ambition to have an engine that is a bit different. It is quite a beast and weighs in at close on three tons but it does handle very easily and steams quite freely and only takes an hour to raise steam from cold. It is also quite economical in terms of water and coal." EIM

■ Alan gratefully acknowledges the provision of information and photographs by Colin, Mick Harrington and Preston Services.

"All the problems and headaches during the build were immediately forgotten..."

THIS PAGE: Detail views of the completed and pristine Foster engine.

RIGHT: Colin is justifiably pleased with his engine, an example of a rarely modelled prototype.

Gas-fired vertical boiler for the EIM Steam Plant

Martin makes and mounts the chimney for the EIM Steam Plant project.

BY **MARTIN GEARING** – Part eleven of a series

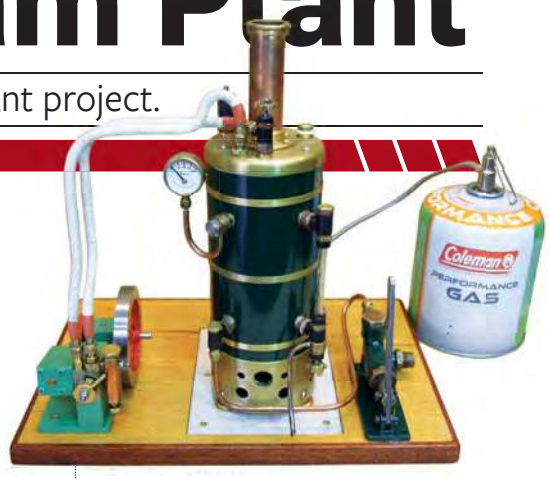


PHOTO B92
Machining the chimney base.

PHOTO B93
Parting off, note the 'catcher rod' mounted in the tailstock to ensure the piece does not fly off.

PHOTO B94
Chimney base mounted on a mandrel.

PHOTO B95
Checking the position before base is finally clamped down.

All photos by Martin Gearing

Chimney Base

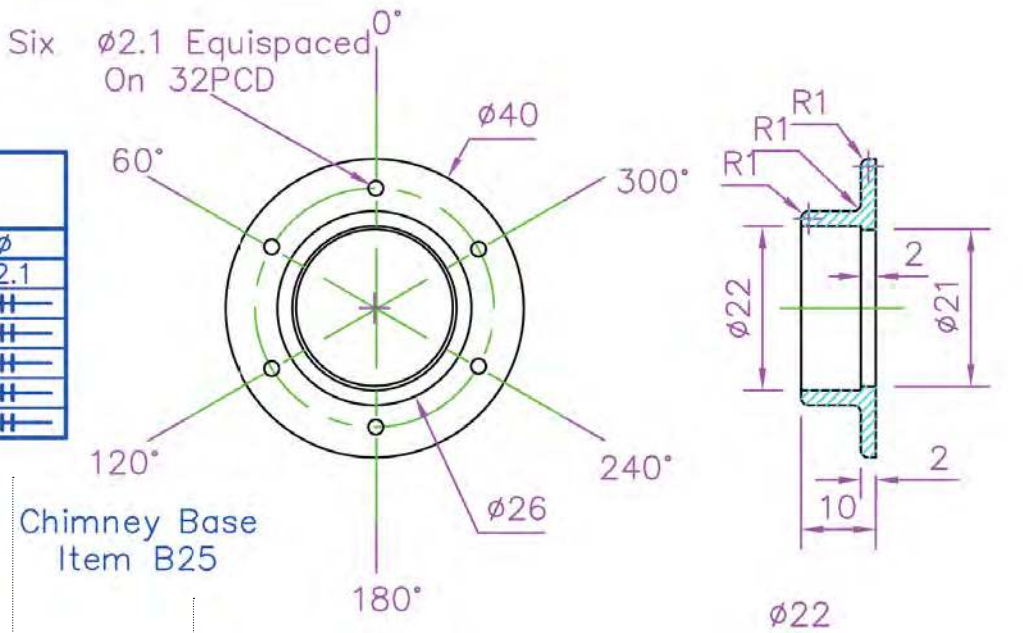
Item B25 – Ø40 Brass – Refer to Drawing B25

Stage one

Hold the 40mm diameter brass in a self-centring chuck with 15mm protruding.

1) Face off, centre drill and drill out in stages to 13mm diameter x 12 deep.
2) Bore out to 21mm dia x 12 deep.
3) Bore 22mm diameter +0.15mm –0.00mm x 8mm deep (check against the tube).
4) Machine 26mm diameter x 8mm deep with a right-hand knife tool having a 1mm radius at the tip.
5) Machine the 1mm external radius at the two points indicated.
6) Part off 10mm overall (Photo B92). Note that the chance of damage to the chimney base will be reduced if a 'catcher' rod is held in the tailstock chuck –Photo B93 shows the rod when parting off the chimney top.
7) Deburr the ends of the bore and outer edge of the mounting flange.

Chimney Base Drilling			
OP	RADIUS	DEGREE	ø
2.1	R16	0	ø2.1
2.2	〃	60	〃
2.3	〃	120	〃
2.4	〃	180	〃
2.5	〃	240	〃
2.6	〃	300	〃



Stage 2 – Chimney Base Drilling
Holding the chimney base can be done in many ways but can be quickly completed if you have retained the setup of the mill/rotary table used to produce the smokebox cap as suggested. You only need to produce a simple fixture to locate the chimney base onto the rotary table. This can quickly be made from one of the backing discs having an undamaged diameter and 3mm diameter hole at its centre.

Hold the disc in a self-centring chuck with about 3mm protruding, pulling the front face against a tailstock drill chuck (with the jaws retracted) to ensure that it runs true before tightening the chuck. Skim 1mm across the face to produce a 22.5mm diameter x 1mm spigot. By trial and error reduce the diameter of the spigot until the chimney base is a 'snug' fit (Photo B94).

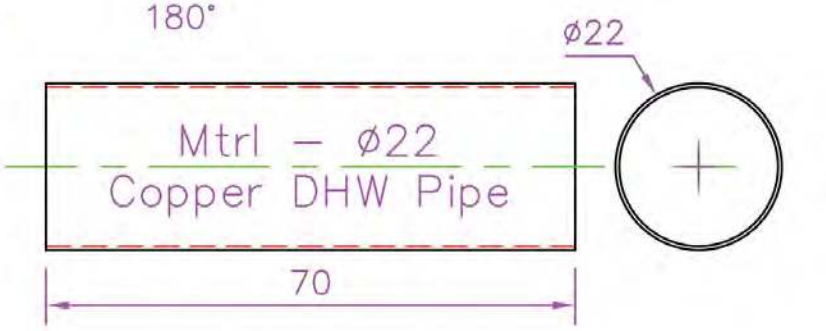
The following assumes the index device and spindle centres are in line and all feed dials zeroed – if not line them up before securing, clamping the slides and zeroing the index device, mill table X & Y axis feed dials.

Secure the chimney base to the wood 'fixture' using two wood screws passing through washers on opposite sides of the base. Transfer the assembled fixture onto the rotary table locating it on the wood disc secured to the table, by means of the 3mm diameter pin passed through the fixture and on into the 3mm hole-secured wood disc to provide alignment. Fit a 2.1mm drill in the spindle chuck and rotate the fixture assembly to ensure that the drill will clear the washers before clamping the fixture to the rotary table (Photo B95).

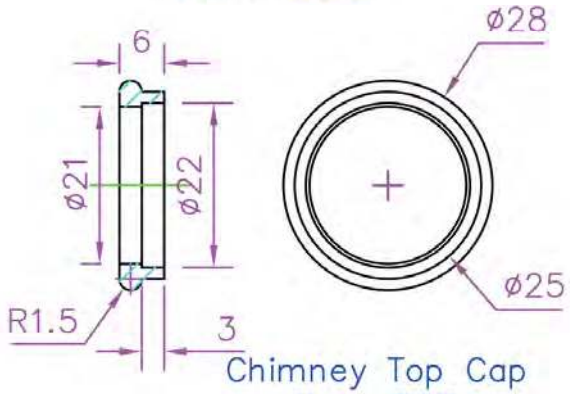
This assumes the settings of the mill and rotary table have not been altered since last used, otherwise reset the rotary table centre true to the machine spindle, and then move the table 16mm on the X axis and clamp both the X and Y axis slides.

1) Starting with a centre drill having a pilot less than 2mm diameter – drill at the six radial positions indicated in ▶

"The easiest method I have found is to use one of the mounted grindstones intended for sharpening chain saws..."



Chimney
Item B26



Chimney Top Cap
Item B27

PHOTO B96
Drilling of the chimney base completed.

the table on Drawing B25 – OP2.1 through to OP2.6, clamping the table at each position.
2) Leave the table clamped at OP2.6.
3) Change to a 2.1mm drill. Drill at the six radial positions going from OP2.6 on to OP2.1 continuing on through to OP2.5 (Photo B96).
4) Remove and deburr the holes on both sides of the chimney base flange. Put to one side.

Chimney

Item B26 – 22mm diameter domestic hot water pipe – Refer Drawing B26.

Beg, steal, borrow, or as a last resort purchase (!) sufficient length of 22mm diameter domestic copper water pipe to allow the production of a 70mm length after having both ends faced off. This size pipe should present no difficulty holding in a self-centring chuck with about 15mm protruding for the facing operation. Deburr both ends, bearing in mind previous comments on safety when deburring thin material.

Chimney Top Cap

Item B27 – 30mm diameter Brass - Refer Drawing B27

Before starting if you don't already have a suitable profile tool you need to produce a tool having a 3mm diameter semicircle ground at one end. The easiest method I have found is to use one of the mounted grindstones intended for sharpening chain saws, which happen to be 3mm diameter, in a Dremel-type device. Failing that make creative use of the worn corner of a grindstone found on the average bench grinder! (Photo B97).

Hold the 30mm diameter brass in a self-centring chuck with 25mm of the rod protruding.
1) Face off, centre drill and drill out in stages to 13mm diameter x 8 deep.
2) Bore out to 21mm diameter x 8 deep.
3) Bore 22mm diameter +0.15 –0.00 x 3mm.
4) Machine 28mm diameter x 8 with a right-hand knife tool.
5) Machine 25mm diameter x 3 with a right-hand knife tool.
6) Using the form tool produced earlier machine the 1.5mm external radius, the centre of which is 4.5mm in from the end face, plunging in 1.5mm using the cross slide.
7) Part off 6mm overall. I would recommend using a 'catcher' rod that is held in the tailstock chuck. Refer back to Photo B93 to see the results of profiling. Carefully deburr the bores and outer edge.

Silver soldering chimney

55 per cent Silver Solder

Use a fine abrasive paper – clean up at least a 10mm length at each end of the 22mm copper tube.

Form two rings of 0.7mm diameter (55 per cent) LT silver solder to fit the 22mm tube snugly. Lightly coat one end of the tube with flux and fit one ring. Lightly coat the 22mm x 3mm recess in the chimney cap and fit onto the tube, pushing down the silver solder ring against the chimney cap.

Stand the chimney cap on the edges of two fire-resistant blocks placed about 20mm apart. Heat from below, directing the flame upwards through the gap towards the chimney cap, and occasionally playing the flame on the tube, just above the silver-solder ring, but avoiding the silver-solder ring itself.

Continue heating until the silver solder flows and is drawn into the gap between the tube and the chimney cap, briefly passing the flame over the joint to ensure full penetration (Photo B98).

Allow to cool before placing in the pickle for about 10 minutes, rinse and lightly coat the free end of the tube and the 22mm x 3mm recess in the chimney base with flux. Fit the remaining silver-solder ring to the tube before fitting the tube and base together. Push the silver-solder ring against the base. Position the two fire-resistant blocks about 30mm apart and stand the chimney base on the edges of the block.

Heat from below, occasionally playing the flame on the tube just above the silver-solder ring, but not directly onto it.

Continue heating until the solder flows and is drawn into the gap between the cap and tube (Photo B99).

Allow to cool before pickling, rinsing and cleaning up. Put the assembly to one side. EIM

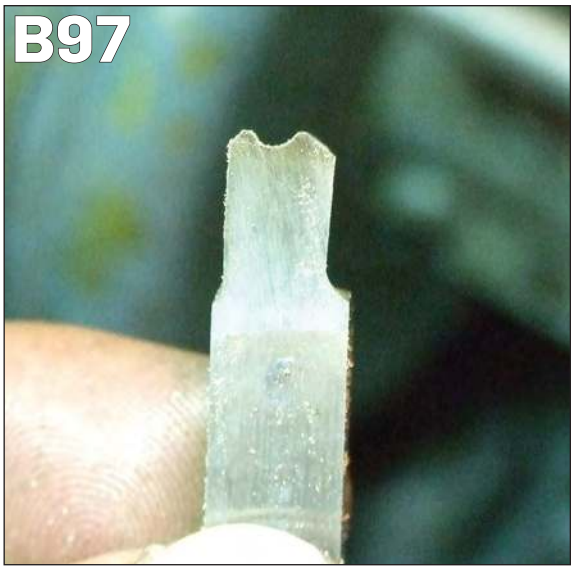


PHOTO B97 Profile tool for forming chimney cap.

PHOTO B98 Cap soldered on to the chimney tube...

PHOTO B99 ...followed by the base.

NEXT MONTH...

Martin makes fittings and adaptors for the smokebox and tubeplate.

■ Parts 1 to 10 of this series appeared in the October 2018 to July 2019 issues of **EIM**. Digital back issues can be downloaded or printed versions ordered from www.world-of-railways.co.uk/engineering-in-miniature/store/back-issues/ or by telephoning 01778 392484.

Pipe problems and solutions

William Moore kicks off a new hopefully regular feature highlighting the kind of discussion, and advice, that flows around the workbench at a typical club night.

How to effectively straighten copper pipe

A while ago I watched a friend of mine trying to straighten out a length of copper tube, that he had cut from a coil ,to be formed into an injector water feed pipe – he was at a wooden bench using a wooden mallet to hammer out the kinks.

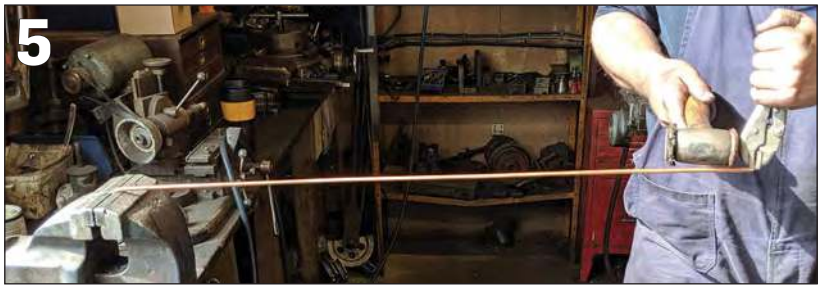
While this method does give you a reasonably straight pipe, it is both time consuming and never quite produces a perfect bar-straight tube, such as that required for external blower pipes or any long pipe runs that are on view. The following method that I showed him gives a perfect straight pipe every time:

1) First you measure how much pipe you need, then add on a couple of inches for any miscalculation in bend radii or pipe-fitting length.
2) Cut the rough length of pipe and clamp half an inch tightly into the jaws of a sturdily mounted vice, crushing the tube fully.
3) Clamp the free end into an old pair of vice-grips.
4) Holding vice grips vertically, strike them with a soft-headed hammer sharply until the tube is bar straight.
5) Remove from vice and vice grips and trim off the bent ends before bending to desired shape.

William Moore

Smart way to straighten tube (Photo 1). Crush one end in a vice (Photo 2), the other in some vice grips. Give the grips a good whacking with a soft-faced mallet (Photo 3) and, hey presto, the curvy pipe (Photo 4) will straighten out (Photo 5).

Photos on this page by William Moore



Cutting large round tube or bar

This is a method I discovered a few years ago when I was struggling to fit a large tube into a small band saw. I did not have a lot of excess from the tube so needed a pretty accurate perpendicular cut.

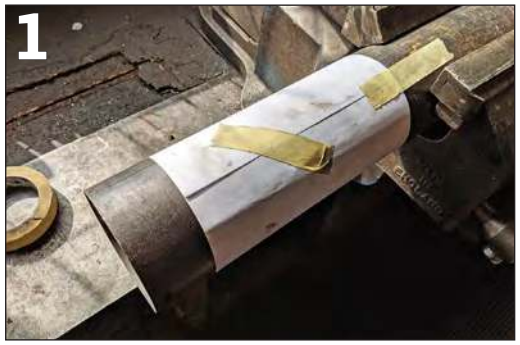
As the tube wouldn't fit in the band saw, I resorted to trying to mark out a perfect straight line to follow with a slitting disc in an angle grinder, this proved somewhat difficult, until I wrapped a piece of A4 paper around the tube and lined up the edges.

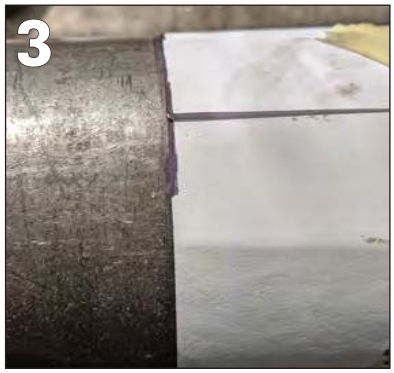
Doing this provides a perfect line to mark on the tube that is perpendicular to the length of it. I usually use some masking tape to hold the paper in place while using a permanent marker partially on the paper to give a crisp edge. If you need to, tape two pieces of paper together with a large overlap to line up the edge easily then wrap it around the tube.

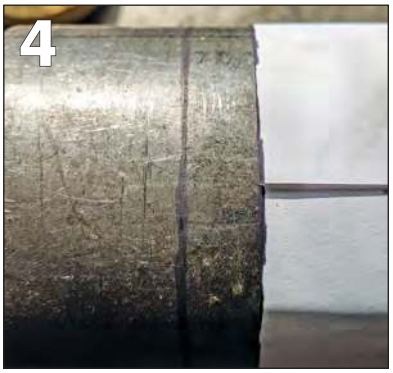
William Moore

For a perfectly perpendicular cutting line on tube or bar, wrap a sheet of paper round the metal (Photo 1) and line up the ends (Photo 2). Shade in the edge with a felt marker (Photo 3), remove the paper and there is your straight line (Photo 4).

Have something suitable for 'Bench Talk'? Send it in to the address on page 3...







A V-Block Drill Jig

Another example of a useful time-saving workshop tool conceived by an EIM reader.

BY S J HOULDER

The drill jig described here is intended to make the cross drilling of round rod easy. I use two other arrangements to achieve this but they both require the lathe – via a cross slide V-Block (Photo 1) or a tailstock V-Block (Photo 2). Both these methods work well but the lathe is often set up for another operation, and it is therefore inconvenient to set up to drill cross holes. The V-Block Drill Jig instead uses the drilling machine, a drill vice and square. A drill vice with a horizontal V-groove is an asset but not necessary.

The V-Block Drill Jig reproduced here drawing is simple and shows the dimensions of the device in the photos. The drawing shows tapped holes through the steel block while the block in the photos has blind holes, simply because I didn't have a tap long enough to tap right through the 25mm block. The dimensions used in my drawing were chosen because the material was to hand, of course other dimensions could be used to achieve the same end.

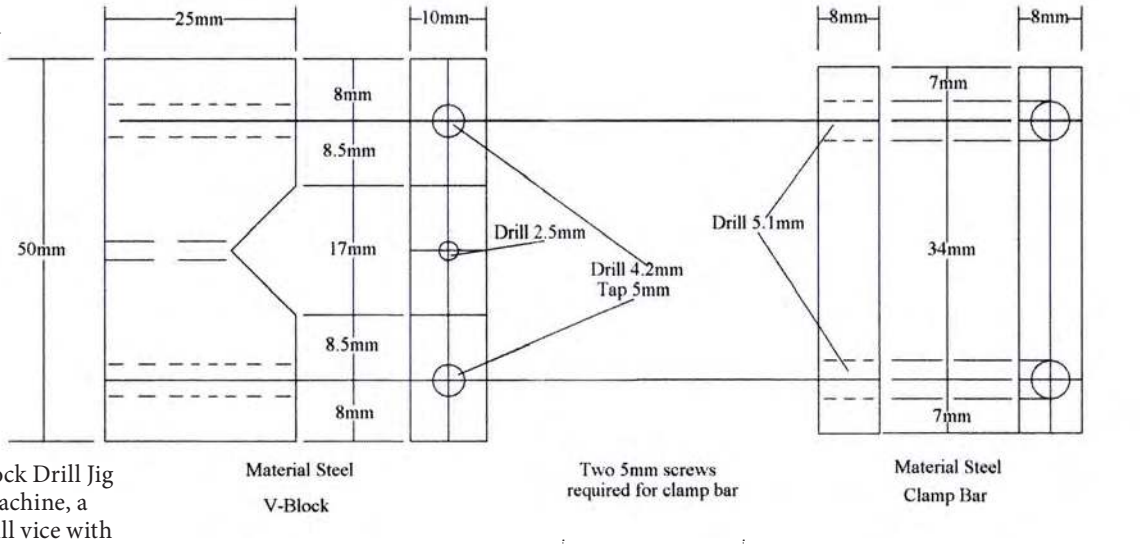


PHOTO 1: Traditional ways of drilling holes in round rod – using a cross-slide V-block...

PHOTO 2: ...or a V-block in the tailstock.

PHOTO 3: Machining the V-block jig.

Diagram and all photos by S J Houlder

If you have a milling machine with a tilting head, the method of machining the V-Block is straightforward. Currently I don't have a milling machine so the lathe and a vertical slide is used for such operations. The drawing shows a block of mild steel measuring 50mm x 25mm x 10mm. These dimensions can be varied, but the faces must be flat and square.

Photo 3 shows the set-up. Each cut is on the rear side of the cutter so the cutting should take place on the down movement of the vertical slide.

If a cut is put on during the up movement of the slide the job is likely to be grabbed by the cutter and the slide forced upwards.

In the picture of the setup you will notice thin aluminium strip around the shank of the milling cutter. This is because it was found that the cutter would slide forward, even when the chuck was tightened to maximum. But by wrapping thin aluminium (which I obtained from a drinks can) around the shank of the cutter a better grip was obtained (Photo 4). Despite this, light cuts should always be made.

The drilling of the 2.5mm centre hole is straightforward with the device held in a vice, I recommend a centre drill is used before the 2.5mm drill. The 8mm x 8mm clamp bar should pose no problems, note that the bar is 48mm long so that it doesn't interfere with the square when setting up the jig. Note also that the vice should have a base that extends beyond the jaws of the vice (Photo 5), this prevents the work tipping.

Using the jig

The complete drill jig is shown in Photo 6. To use it is first positioned on the rod to be drilled (Photo 7). The rod is now positioned in the vice – if the vice doesn't have a V-groove it may be necessary to introduce a strip of metal as a platform to bring the rod higher in the vice.

With the drill jig close to the vice jaws and set horizontal using the square (Photo 8) the 2.5mm dimple may be drilled. The jig is now removed making sure that the rod doesn't move in the vice. It is recommended that a centre drill is used (Photo 9) before the final drill size, and then final drilling carried out (Photo 10). EIM

PHOTO 4: Note the thin aluminium strip wrapped around cutter shank to improve grip.

PHOTO 5: The machine vice should have body extending beyond jaws.

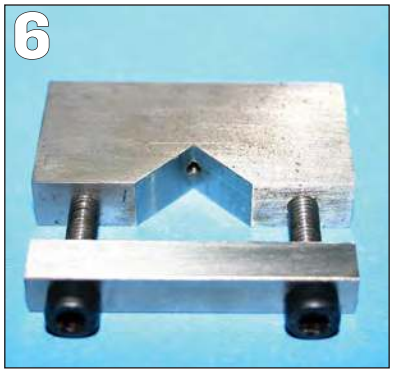
PHOTO 6: Completed drill jig.

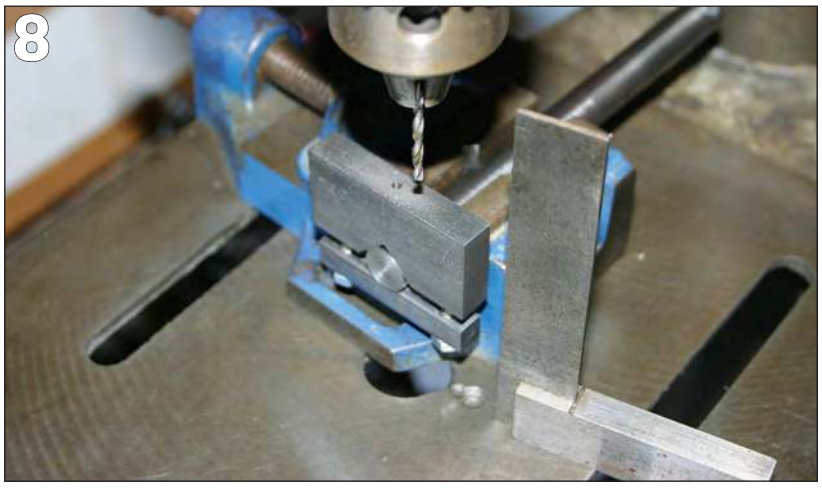
PHOTO 7: Jig positioned on rod to be drilled.

PHOTO 8: Use square to set horizontal.

PHOTO 9: First pass with centre drill.

PHOTO 10: Drilling to final size.





National Model Engineering & Modelling Exhibition 2019

In his second report from the Doncaster show John focuses on the club stands.

BY **JOHN ARROWSMITH**

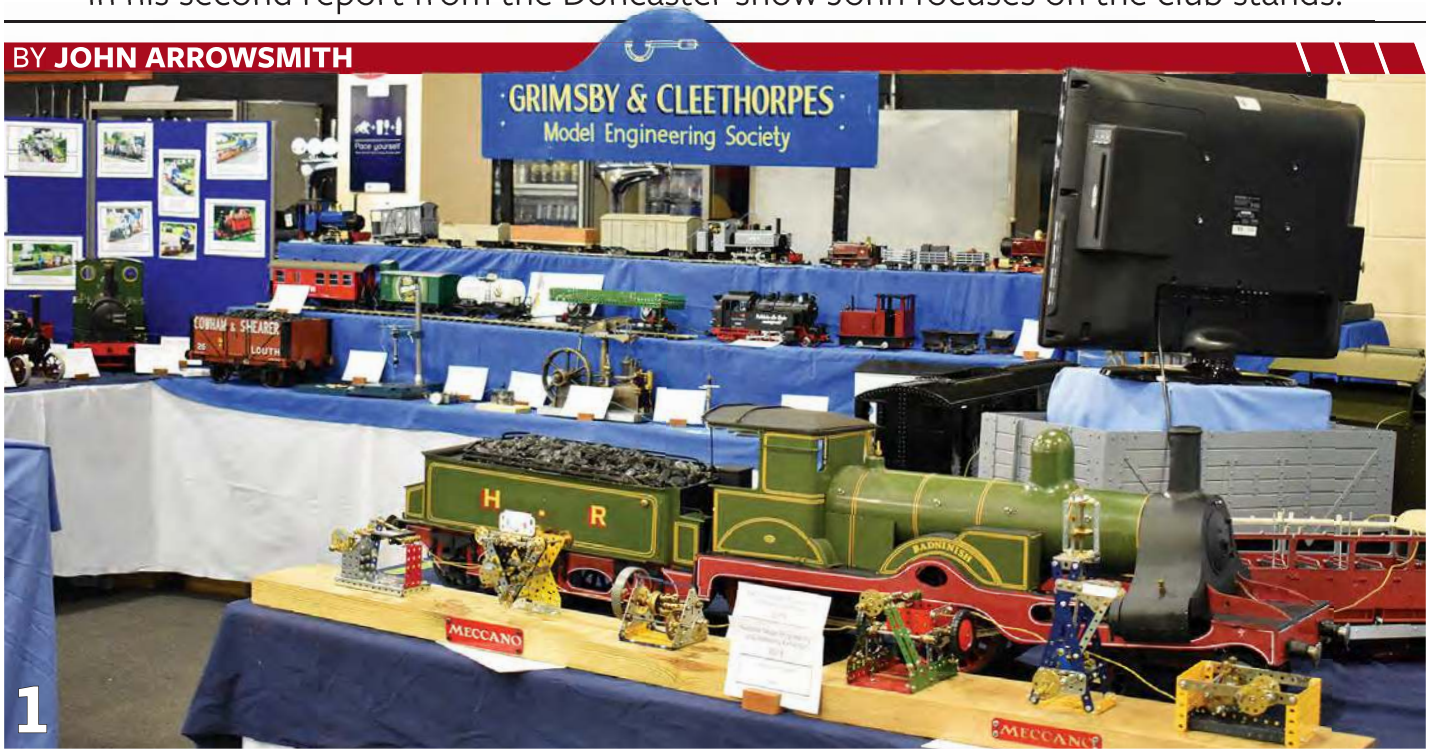


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PHOTO 1: Grimsby & Cleethorpes MES took the Club Shield for best stand.

PHOTO 2: A well-made 7¼-inch gauge Bridget on the display by Grimsby & Cleethorpes.

PHOTO 3: Star of the Pickering club's display was this superb 'Birkin' Bentley built by Mike Syers.

All photos by John Arrowsmith

This fine exhibition has developed over the years to become one of the best presentations of model engineering skill you can see in the UK. The extra attraction this year of the SMEE trophies added that little extra once again. Now in its 26th year the range of models and skills on show was excellent with a great deal of diversity combined with the excellent traders section, it was a show for everyone.

There was, however, one less positive aspect, one that I was asked by the organisers to highlight – the problems associated with entered exhibits not turning up to be displayed. This not only causes difficulties for the organisers but does leave visitors wondering where certain displays, advertised in the show guide, are located.

No-show nightmare

Organisers Lou and Gavin Rex told me that over the last 26 years the average non attendance rate has been well over 100 models. In many cases there is not even a word of apology or reason for the no show. A request therefore, if you register a model or display please let the organisers know in good time if you cannot make it, at least then they have a chance to include someone who can attend. End

of the first lesson! Now, on with the club displays and presentations.

All the clubs and societies provided an excellent selection of models, both finished and in progress, some were outstanding and could easily have been included in the competition sections. Some of the workshop equipment was of superb quality and shows what can be achieved if the need is there.

As I mentioned in my previous report the winner of the Club Shield was Grimsby and Cleethorpes Society (Photo 1), the stand including a wide range of models and equipment. The Stockport Tram Layout presented by Greg Marsden was also included so they really did have a good selection of exhibits to enjoy. A well made model of a 7¼-inch gauge Bridget 0-4-2 was displayed on a useful building stand. (Photo 2).

The Pickering Experimental Engineers & Modelling Society (PEEMS) had a large display of work and models with the 'Birkin' Bentley and its many tools and accessories built by Mike Sayers taking centre stage (Photo 3). Another fascinating model was 'Pete's Folly', a Wooden Wheel Fabrication Centre (Photo 4) and the 'Brenda 2-inch scale freelance 20cc OHV twin I/C engine (Photo 5).

Also presenting a large display was the Bradford MES with a wide range of quality models. A rare 7¼-inch gauge model still under construction of a Danish prototype by John Mills was showing some excellent workmanship (Photo 6).

On the large Scunthorpe SME stand a very nice Foden C Type steam wagon was accompanied by an equally well-built 2-inch scale Minnie traction engine (Photo 7). A useful set of riveting tools by Vic Crossman was also included.

Keeping smiling

During the exhibition it was learnt that the Leeds SMEE had been given notice to leave their site at Eggborough but that bad news did not detract from an excellent display of members work here (Photo 8). Locos, workshop equipment, boats and traction engines made up a fine display.

A different approach was taken by ▶

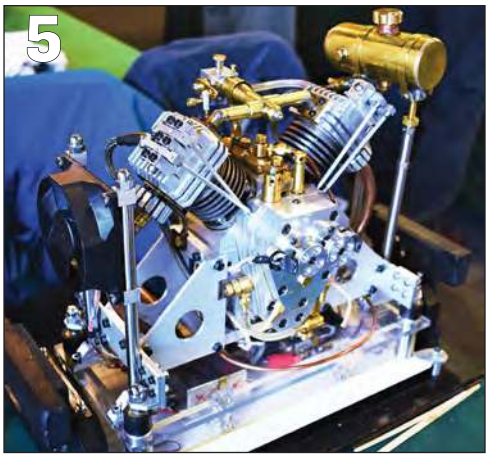


PHOTO 4: 'Pete's Folly', a wooden wheel fabrication centre, also shown by the Pickering club.

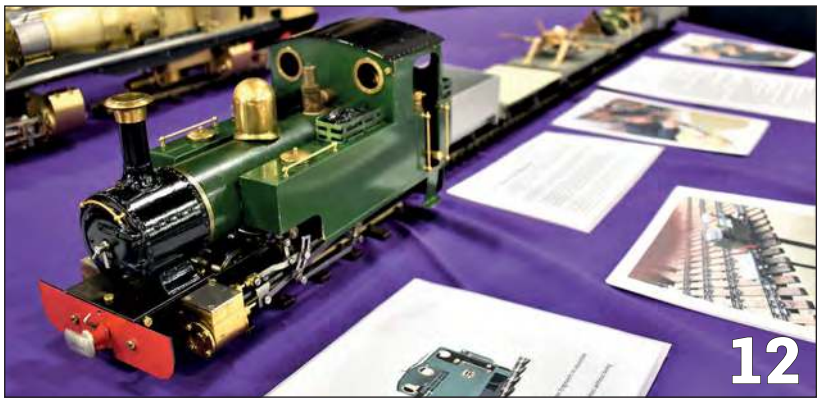
PHOTO 5: Brian Rees built 'Brenda'. a freelance 20cc OHV V twin i/c engine.

PHOTO 6: The 7¼-inch gauge Danish Litra loco on the Bradford MES stand.

PHOTO 7: A fine Foden steam lorry and 2-inch scale Minnie displayed by Scunthorpe.

PHOTO 8: Leeds SMEE's stand – lots of variety.

PHOTO 9: York City & District SME displayed a working diorama of their club site.



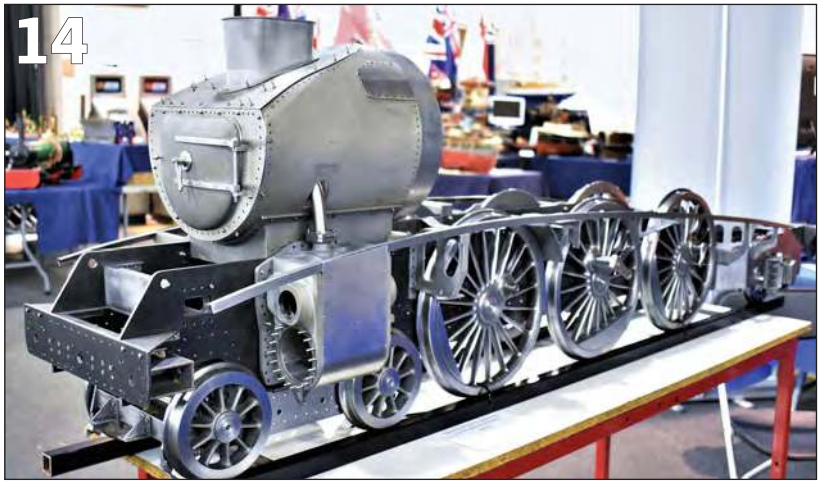


PHOTO 10: A representative display by members of the GL5 Association.

PHOTO 11: This Southern 'Terrier' under construction was on the Tyneside SMEE stand.

PHOTO 12: Works by the Junior members of Tyneside SMEE.

PHOTO 13: John Rowley's superb 3-inch scale Fowler R3 road loco, also on the Tyneside stand.

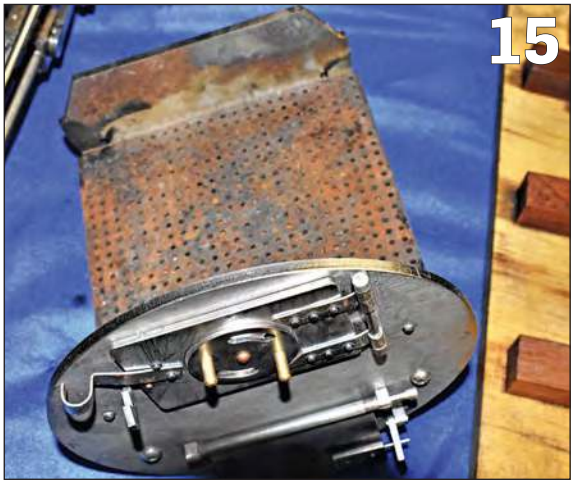
the York City & District SME who targeted their stand to attract new members (Photo 9). As well as an interesting selection of models, the club had provided a diorama of their site complete with working railway and an invite to consider joining.

The Northern Association of Model Engineering Clubs had a good display of models, photographs and information all relating to model engineering activities.

Locomotives were the main feature on the Spenborough Model & Experimental Engineers stand. Included in the display was a modern Class 66 on a rolling road, a couple of Rob Roys in 3½-inch gauge and a 3½-inch gauge Princess Royal pacific under construction.

The Ground Level 5-inch Gauge Mainline Association (Photo 10) provided a full range of rolling stock and locomotives with some excellent examples of carriage and wagon building to show visitors what the organisation is all about.

A regular feature of this exhibition is the contribution made by the Gauge 1 Model Railway Association and again this year their 'Ridings' layout provided a full service of many different types of locomotives, rolling stock and trains.



There was some excellent work on show on the Tyneside SMEE stand with a 5-inch gauge Terrier under construction by J. Scott (Photo 11) being presented on a building stand and showing first-class workmanship. The Junior section of the club also had a nice display of their work which deserves a lot of credit (Photo 12). John Rowley's 3-inch scale Fowler R3 road locomotive was another outstanding example (Photo 13).

Grate results

On the Wakefield SMEE display one locomotive caught everyone's eye and that was the superb 7¼-inch gauge model of the Gresley A4 'Silver Fox' (Photo 14). Under construction by Tony Bickerstaff this locomotive was showing some exemplary workmanship and detail and hopefully we shall see it in one of the competition classes in the future. Another interesting exhibit on this stand was the Rosebud grate from a 7¼-inch Sweet William 0-6-0 (Photo 15). I understand that it works very well in this type of locomotive (*Any reader out there want to write us a piece explaining why? Ed*).

Sweet Pea is a popular easily built locomotive and has many variants, some of which were well displayed on the Sweet Pea Locomotive Group stand. Visitors gained a good impression of what was needed to build a loco of this type (Photo 16).

A varied mix of exhibits on the Hull & District SMEE stand included a good selection of stationary engines, lathe fittings and locomotives. The steeple engine with Robertson boiler was a fine example (Photo 17).

A wide variety of exhibits was the feature of the SMEE display with both individual members' contributions and archive models from the society's collection. This gave a good balance to the stand with some modern technology items mixing well with the older examples (Photo 18).

An interesting and working display by the Stirling Engine Society ensured there was something for everyone to see on the stand. These fascinating machines can be used in so many different ways to explain how they work.

From the Southport MEC (Photo 19) came a wide variety of fine model engineering covering locomotives in most gauges combined with a couple of marine models and fittings to show the versatility of the club.

Outside the main hall the Doncaster Steamers were operating each day with a variety of steam-powered road vehicles which with the damp atmosphere at times produced some excellent effects (Photo 20). There were also a couple of large-scale ▶

PHOTO 14: A superb 7¼-inch gauge A4, centrepiece of the Wakefield SME stand.

PHOTO 15: A Rosebud grate for a Sweet William locomotive, also part of the Wakefield SME display.

PHOTO 16: The popular Sweet Pea Locomotive Group stand.

PHOTO 17: A Steeple engine with Robertson boiler on the display by Hull & District.

PHOTO 18: Part of the varied selection from the SMEE.

PHOTO 19: Southport ME produced a large, varied selection of work from its members.

PHOTO 20: Plenty of steam on tap as some of the Doncaster steamers entertain outside the show halls.

PHOTO 21: An attractive Danish Service Launch on the Kirklees Model Boat Club stand.

PHOTO 22: A fine French Bautier was shown by the York Model Boat Club.

PHOTO 23: Information and models featured on the OLCO stand.

PHOTO 24: The impressive Coronation class 4-6-2 from the Sale Area Model Engineers.

PHOTO 25: On the Southern Federation stand was this fine working water mill.

PHOTO 26: A nice 3½-inch gauge A4 was displayed on the stand of the West Riding Small Locomotive Society stand.

electrically powered trucks enjoying the space outside. Richard Foster, he of the Delorean car in competition, told me that he built one and then sold it and missed it so much he had to build another. They are based on discarded invalid electric carriages.

A couple of model boat clubs put on a splendid display of marine craft, everything from small inflatables to mighty naval ships were featured. The Kirklees MBC won the Ship Model Society Trophy with a varied display including a Dutch service tender circa 1900 which was a well made and good looking model (Photo 21). Another aspect of the Kirklees club is the military vehicle section which covers the wide range of radio-controlled military vehicles which are currently available and which were put through their paces over a small testing circuit.

Visitors who enjoy watching r/c vehicles were also able to see the large range of trucks, lorries and other commercial vehicles being used on the well-built road layout by the Durham Model Truck & Construction Club.

The York MBC also had an interesting selection of vessels on their display covering the older style of craft, both steam powered and sail. The French Bautier (Photo 22) was particularly well made.

For those with model aircraft as a passion then the Doncaster Model Flying Club offered an excellent display of many different types of aircraft from large military types to the small Autogyro.

Pacifics popular

Back to steam and displayed by the Old Locomotive Committee (OLCO) were some examples of the Liverpool & Manchester Railway's 'Lion' both complete and under construction with one of the detailed works drawings to illustrate the workings (Photo 23). Locomotives were also the main feature of the Sale Area Model Engineers stand (Photo 24) with the 5-inch gauge streamlined Pacific 'Coronation' taking centre stage. A very nice 5-inch gauge GWR Small Prairie still under construction by J. Chappell looks like it will be a fine model when complete.

Concluding with the remaining clubs and societies who helped to make this the fine show that it is – the Southern Federation of Model Engineering Clubs had a good display of all the necessary paperwork needed to operate a model engineering club these days, alongside a fully working model of a water mill which had been built by Bob Polly from York (Photo 25). The West Riding Small Locomotive Society provided a good display of locomotives in all the smaller model engineering gauges and

I liked the 3½-inch gauge A4 'Sir Nigel Gresley' which looked just right in its Garter Blue livery (Photo 26).

A nice selection of photographs and information were augmented by a selection of models on the London & North Western Railway Society stand illustrating the activities of the old company and the Society. A compact presentation by the Erewash Valley Society showed off some interesting and detailed models which demonstrated the wide range of interests within the club.

Some nice work by the younger members of the Rotherham Society reminded everyone that there are young people who want to learn and be involved in model engineering which can only be good for the hobby. The little four-wheel shunter built by nine-year old Jordan Allen with help from senior members was quite a task for such a young man (Photo 27).

A small display by the 7¼-inch Gauge Society indicated the range of activities enjoyed by members and finally a colourful display by the Guild of Model Wheelwrights provided a nostalgic glimpse into the past and showed how transport needs have changed over the years.

Finally can I thank the organisers Lou and Gavin Rex for their hospitality and help during the show along with all their ancillary staff, who make the show what it is. The clubs and traders work hard to provide the displays and services visitors need and their work is much appreciated. EIM

PHOTO 27: A nine-year old built this small shunter which was part of the Rotherham & District club's show display.

Hands-on engineering for women

Megan Charman may be the editor's daughter but until five years ago she had not the slightest interest in steam locomotives or engineering subjects.

Then one school summer holiday, she mentioned she was bored to the Welshpool & Llanfair Light Railway's workshop foreman and he invited her to give him a hand.

Very shortly Megan was spending several days a week in the workshop and soon after she followed her dad onto the locomotive footplate, training to be a fireman. Today she regularly crews trains on the line.

Megan receives great support from her fellow volunteers but she has also experienced misogynistic comments from some visitors, including one 'enthusiast' who told her "The footplate is no place from a woman."

All of which made Megan determined to encourage other females to follow a similar path to her. "I didn't know I would so enjoy steam locos, and engineering in general, until I was made to try it," Megan said, "so I wanted to give others the opportunity to try it too."

The first 'Women Teaching Women' event was held on the 15-inch gauge Perrygrove Railway in the Forest of Dean on 22nd-23rd June. Experienced female engineers were on hand to offer visitors a wide range of have-a-go activities, from driving two steam railway locomotives and a traction engine, to welding (Megan can weld, her dad can't...).

The event attracted high profile support, including a visit from Nicky Morgan MP, chair of a Parliamentary Group representing heritage railways.

Visitors were surprised at how hands-on they got, and within hours of the event's conclusion Megan was fielding enquiries from several venues wanting to stage Women Teaching Women events. There will be more...

Yes, dad is proud of his daughter, but there's a wider point here. So many people, male and female, have no idea that they will enjoy engineering, and of course that includes model engineering, until they actually try it. So as we try to find the next generation of model engineers to keep our hobby vibrant, the crucial thing is – get them to have a go!

RIGHT: Megan Charman, founder of the Women Teaching Women initiative, in a happy place at the first event.

BELOW LEFT: You've never welded before? No better time to start...

BELOW: Perrygrove's locomotives proved popular with visitors.

Portable tracks and busy events

Another packed round-up from the UK's vibrant club scene, with many clubs seeing record numbers at their public running days this season.

COMPILED BY **ANDREW CHARMAN**

Welcome to this month's Club News and the editor has been enjoying browsing another super selection of club newsletters and journals – so much fascinating content and we can't mention it all because we don't have enough room!

We start with the rather nice picture on the right, sent in by the City of Oxford SME, and showing a train on the club's recently completed extension to its Cutteslowe Park miniature railway. First mooted during 25th anniversary celebrations in 2013, the 230-yard extension to the ground-level 5-inch 7¼-inch gauge track was completed over the winter, but the challenges don't end there as the latest edition of the club newsletter describes the complex signalling required for the new layout.

Now, this picture came in with the Oxford newsletter, editor Joy Brown commenting that members had complained that the club doesn't get mentioned in EIM any more – "we seem to have dropped off your contact list...." Well for Oxford and any other readers out there wondering why their club doesn't get a mention, our contact list is simple – send in your newsletter and if it's interesting we'll highlight it. Send in your event dates and we will ensure they are in the diary pages!

Arriving too late for the latest diary, but worthy of mention here is that the Oxford club has its 'Dreaming Spires' rally event at the Cutteslowe Park site on 26th-28th July.

Also new to these pages in recent times is the Lincoln & District ME. A mention for the open weekend which this year is on 21st-22nd September at the Society's permanent 5-inch/7¼-inch ground-level track at North Scarle, Lincolnshire (LN6 9ER), around 10 miles from both Lincoln and Newark. The event looks set to be an enjoyable one to attend with lots of trains on the track, model engineering displays and traction engines – for more details the club has have a website at www.lincolnmes.co.uk and a Facebook page.

Portable points

Browsing the latest edition of the newsletter from the York City & Dsitrict ME our attention was caught by a discussion on the pleasures and problems of operating a portable track. There are a few clubs that supplement the income that results from offering public rides on their fixed track by taking a portable track to events, such as fetes, carnivals and the like.

Such undertakings are not done lightly – York vice chairman Richard Gibbon, who is responsible for organising the portable track programme, points out that it is difficult and demanding to carry out with fewer than a team of four reasonably fit adults, adding; "lugging sections of track and the heavy rolling stock is not a recommended activity for elderly members."

Richard makes his point in a bid to persuade more members to join the team, as the potential advantages are high to both club and participating members. "Portable track events can bring in between £1000 and £2000 a year depending on weather and venue," Richard says, adding that there are jobs for all from helping with the track to, for trusted members, driving

ABOVE: Interesting times at the city of Oxford SME with a new extension to its ground-level track in use for this season. *Photo: Ron Head*

RIGHT: Smiling City of York members Jason Edwards, Brian Smyth, Tony Simons and Roger Enzor with the club's portable track at a fete – such tracks are potentially big fund raisers, but need some effort to run. *Photo: York MES*

the locos; "And who doesn't want to drive a steam loco?"

Newsletter editor Roger Backhouse, who recently helped out with just such an event, adds another, very up-to-date potential advantage. "You can imagine those riding putting their snaps on Instagram (or whatever); 'Young Johnny/Katie enjoys a first steam train ride thanks to York Model Engineers.' Some might grow up to be model engineers, we have to start somewhere..."

The impressive photos on this page were sent in by Simon Bowditch and show two 7¼-inch gauge models of the Kerr Stuart 0-4-2Ts that ran on the Metropolitan Water Board railway at Kempton Park, London from 1915 to 1947, when the line was closed and all three locos scrapped. As an aside the line is now the subject of a preservation effort – details at www.hamptonkemptonrailway.org.uk.

The two models made their first appearance together at the Coate Water Park , Swindon track of The **North Wilts ME** on Sunday 2nd June. The model of 'Hampton' was built to works drawings by Alain Foote of Rugby and first steamed about six years ago while 'Kempton' was built by Brian Minter of Market Lavington using only copies of two works drawings and a minimal number of castings. It was completed in 2018.

We are told that both locomotives performed well on this busy railway until rain stopped play mid-afternoon – there's been a lot of that this year....

Leeds on the move

Tumultuous times for the **Leeds SME** – as briefly reported in this month's Doncaster show feature the club needs a new home as its current site at Eggborough Power Station has been sold for redevelopment following the closure of the power station.

Thanks to an agreement signed some 42 years ago the club has been given a full six months to vacate the site. There will be no public running days this year as the track was dismantled within days of a final three-day running session staged over 4th-6th May, during which a commemorative cake was cut.

All the material is being carefully stored, the rolling stock at members' homes, and the good news is that this is by no means the end of the club. Members have arranged a busy summer which involves many visits to other clubs and outings with the portable track.

Meanwhile discussions for a new club home are underway with the owners of six potential locations, all within reasonable distance of Eggborough. Watch this space, as chairman Jack Salter writes in the *Leeds Lines* newsletter, "Our Society continues and thrives..."

ABOVE & BELOW: The two Hampton & Kempton Kerr Stuarts working together certainly provided a fine sight at the North Wilts ME. *Photos: Simon Bowditch*

Good to hear from the **Stockholes Farm Miniature Railway** that the public season has started with three of the busiest open days on record. Ivan Smith, who compiles the newsletter for the private 7¼-inch standard gauge prototype line in north Lincolnshire, described the running on 27th May as "another extremely busy open day with more passengers carried and trains run than the previous two." And just to give a measure of what this means, Ivan adds that 59 passenger trains were run and in excess of 200 fare-paying passengers carried; "When you consider that a typical journey takes approximately nine minutes and as we only run one or two-coach trains, that gives an indication of what was involved..."

It really appears that the public are appreciating the attraction of a ride behind a miniature locomotive. In its latest *Offcuts* newsletter **Bromsgrove** ME reports that its recent open day on 27th May was the club's "best ever" with more than 600 passengers carried. All very positive news.

Last year we reported on the creation by the **Northern Association of Model Engineers** of the NAME Editor's Cup. Prolific model engineer Alan Bibby left a sum of money which was to be used 'to provide a suitably engraved trophy to be known as The Editor's Cup with a cash prize, to be awarded annually to the editor of the best model engineering club newsletter as determined by the officers of NAME'.

First winner is David Barlow, who edits the **Furness MRC**'s *Turntable* newsletter. While he has only been editor for a very short period, as an ex-submariner he was also previously involved in the production of the Submariner's Association magazine *In Depth*. As well as a cup, he receives a cheque for £50.

NAME is also reminding clubs that the Editor's Cup is an annual award and editors wishing to enter for 2019 should send a copy of their newsletter to NAME Chairman, Frank Cooper, either by email to yorkhouse.flyer@btinternet.com or by snail-mail ▶

to 47 Holmes Road, Stickney, Boston PE22 8AZ. Entries for 2019 will close on 30th November.

We also reported last year on the novel annual competition run by the **Bradford ME**, for rubber-powered and radio-controlled locomotives. This year's competition produced three entrants but four entries, thankfully two in each category.

In the first, rubber powered section, Roger Short's magnificent streamlined locomotive pictured in the August 2018 **EIM** took on John Coppin's somewhat smaller, but no less powerful, tubular loco, the pair competing for two awards – fastest from a standing start over a 30-metre straight and the furthest distance travelled on one winding.

After both locos had run honours were even, John's three efforts setting a best standing-start time of 8.2 seconds, while Roger's engine travelled the furthest, about 1½ laps.

In the radio-controlled section Derek Round's 'Winged Wonder' (also pictured last year) was again successful, this time driven by Michael Hawkridge. The two large 'wings' sported by the loco are basically designed to try and end a previous habit of flying off the track on curves... *Bulletin* editor Graham Astbury described the competition as "a good social evening with a dose of fun" and expressed a hope for more entries next year...

ABOVE LEFT: Debut winner – Furness MRC's David Barlow (right) receives the first NAME Editor's Cup. *Photo: NAME*

LEFT: Fun and games at Bradford. John Coppin uses a hand-drill to wind his rubber-band locomotive.

BELOW LEFT: John also produced a tiny radio control locomotive.

BELOW: Entrants and their novel locos. *Photos: Graham Astbury*

Just as we closed for press the latest update from the busy **Rugby ME** dropped into the editorial inbox, and catching the eye was an impressive new carriage constructed by the club for wheelchair-bound visitors. Recently completed, the carriage has been sponsored through the local Rugby Rokeley Lions Club – an excellent example of two organisations working together to improve facilities for the less able.

Station bows out

Rugby's most recent running day proved a special occasion as it was the last time the club's existing station is intended to be used for public events – operations are set to move to the newly built station, progress on which we have covered in these pages over recent months.

The old station got a good send-off, hosting two five-carriage trains, a four-carriage and a three-carriage working, and three 'diesel' hauled trains each rostered with two carriages. The Ed is looking forward to checking out the new station at Rugby's 70th anniversary celebrations, watch out next time for a full report.

Your editor is well known for his passion for matters narrow gauge (he does after all edit **EIM**'s sister magazine *Narrow Gauge World*) but less well known is his interest in the earliest of railways, so the arrival of *Lionsheart*, the newsletter of the **Old Locomotive Committee** (OLCO) is always very welcome. But the latest edition raises the ground-shaking possibility that the locomotive that was the reason for OLCO's coming into existence might not actually be what it purports to be!

OLCO honorary member Anthony Dawson has long been carrying out

research in advance of a book concerning 'Lion', the Liverpool & Manchester Railway locomotive built in 1838. OLCO's aim is to 'promote activities, foster research, encourage communication, preserve artefacts and publish relevant information associated with this locomotive.'

Identity issue

Lion is now in the Museum of Liverpool – or is it? Anthony's research suggests that the loco in the museum may not be Lion at all. The problem is the engine was rescued for preservation from Mersey Docks and Harbour Board's Princess Graving Dock Pump House in 1923, where it had been used as a pump, but the new research shows that five locos were originally bought by the Harbour Board in 1859.

Lion was one, two others can be discounted due to their dimensions, but a scarcity of information on the final two, built by Thompson and Cole of Little Bolton, means either could be the loco today known as Lion – especially as the only known dimensions of the Thompson & Cole locos, of driving wheels and cylinders, match those of the Liverpool & Manchester engine...

The OLCO chairman still believes the locomotive in Liverpool Museum is likely to be the real thing, "but Anthony's comments serve to remind us that there is much we do not know, much that we assume is true from secondary sources and to emphasise the importance of going back to original sources as Anthony has done."

Fascinating stuff, and no doubt this will be a hot topic of conversation for the annual 'Lionsmeet' gathering of those interested in this period, which this year will be at the Bournemouth SME track on 17th August.

The main purpose of Lionsmeet is to allow OLCO members and other interested parties to exhibit models of Lion and other pre-1850 locomotives and, where possible, to enjoy running them on an unfamiliar track.

Locomotives of any scale are welcome – Bournemouth has a raised track of 3½-inch, 5-inch and 7¼-inch gauges, while there is also an indoor display area and visitors are encouraged to bring models (finished or under construction), drawings and railway memorabilia relating to Lion, other early locomotives and the Liverpool and Manchester Railway. More details of the event can be had from organiser Andrew Neish at lionsmeet@neish.org.uk EIM

ABOVE RIGHT: Rugby's new wheelchair carriage is a well-built piece of rolling stock.

RIGHT: One last time – the Rugby club's current station bows out. *Photos: Rugby ME*

Information on a long-lost miniature railway...

I am wondering if you can direct me to any source of information regarding the railway that once operated in Sutton Park, near Birmingham, around 1949/50?

At that time I believe the railway was operated by my grandfather, Frederick Mills.

When I was around four or five I made my only visit to him with my father – the family situation was difficult – at the railway and I ended up driving a loco with him.

I understand that the railway was dismantled not too long after that and that the locomotives and rolling stock went into storage. What happened after that I do not know but would love to hear if any of the railway still exists somewhere.

Also, are there any archives available that may have photographs of my grandfather at that time and any other details regarding him and the railway?

I realise this is along shot but any help would be appreciated.

David L Mills

The Editor writes: This letter was originally sent in to our sister magazine *Narrow Gauge World* but we think it's worthy of reproduction here as many model engineers have been involved with their local miniature lines over the years.

An online search reveals that the Sutton Park Miniature Railway was a quite well known line, built in around 1907 to 10¼-inch gauge but soon converted to 15-inch and running through a large park in Sutton Coldfield. It appears to have been closed in 1960.

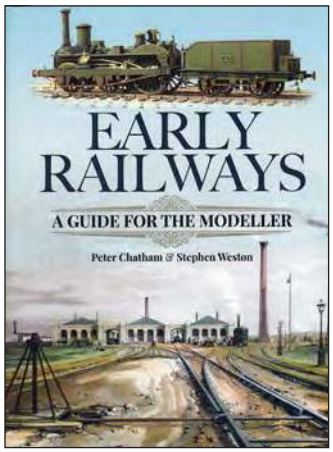
Can any readers provide more information for David? If, so please forward to the editorial address and we will pass it on.

Model engineering query to have answered or point to make? Email or write to the address on page 3.

REVIEW

Early Railways – a guide for the Modeller

By **Peter Chatham & Stephen Weston**



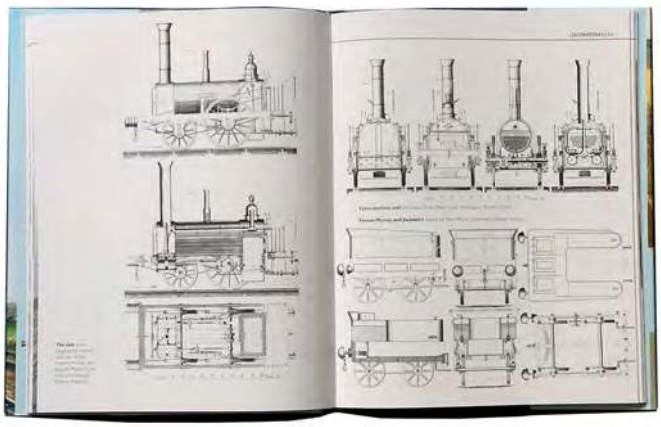
This is not a core model engineering book, as it is aimed at modellers in smaller scales. But those in our hobby with an interest in the earliest days of railways will find this book fascinating and potentially useful. This is because it is packed with well-reproduced period photographs of railways and their stock, plus fine models of them, but crucially, a great many highly detailed general arrangement drawings.

Clearly taken from original plans, these drawings include many types of locomotive, from the earliest racked-Blenkinsop types to later types such as the 'Jenny Lind' but also including oddities such as an Adams combined locomotive and carriage and a broad-gauge Vale of Neath 0-6-0 that even includes sectional drawings through the frame and motion.

There is so much more, however – designs for passenger carriages and goods stock, even track and signals, drawings all carefully reproduced on high-quality gloss paper.

The book is a delight to leaf through and anyone with an interest in early railways will want a copy, no matter what their modelling scale.

Published by Pen & Sword
E-mail: enquiries@pen-and-sword.co.uk:
Web: www.pen-and-sword.co.uk
ISBN: 978 1 52670 016 2
List price: £19.99



AUGUST DIARY

EVERY SATURDAY
(Weather permitting)

North Wales ME public running, West Shore, Llandudno, from noon

South Lakeland MES public running, Lightburn Pk, Ulverston, pm

Sussex MLS public running, Beech Hurst, Haywards Heath, 2-5pm

EVERY SUNDAY
(Weather permitting)

Bournemouth SME public running, Littledown Pk, BH7 7DX, 11am-3.30pm

Canterbury SME (NZ) Public running from 1pm at Halswell Domain

Fylde SME Public running at Thornton Cleveleys from 1pm.

Grimsby & Cleethorpes MES public rides, Waltham Mill, DN37 0JZ, 12-4pm

Harrow & Wembley SME public rides, Roxbourne Park, Eastcote, 2.30-5pm

Kings Lynn & District SME, Lynnsport Miniature Railway, 11am-4pm

Kinver MES public running, Marsh Playing flds, High St, Kinver DY7 6ER.

Lancaster Morecambe ME public running, Cinderbarrow Railway, Tarn Lane, near Yealand Redmayne, trains from 10am

Leicester SME, public running, Abbey Pk, LE4 5AQ, 1-5pm

Maidstone MES public running, Mote Pk, ME15 7SU, 2.30-5pm

Norwich SME public running, Eaton Pk, 1-5pm, NR4 7AU

North Wilts MES public rides, Coate Water Railway, Coate Water Country Park, Swindon, 11am-5pm

Portsmouth MES public running, Bransbury Pk, Portsmouth PO4 9JY, 2-5pm

Rochdale SME public running, Springfield Park, Bolton Road (A58), Rochdale, pm

Southampton MES public running, Riverside Pk, SO18 1PQ, 1-4pm

Southport MES Public running at Victoria Park 11.30am – 4.30pm

Sussex MLS public running, Beech Hurst, Haywards Heath, 2-5pm

Urmston MES Public running in Abbotsfield Pk 11am – 3.30pm

Vale of Aylesbury MES Public rides, Quainton Rly Centre, from 12 noon.

West Huntspill MES public running, Memorial playing fields, 2-4.30pm

Wigan MES public rides, Haigh Woodland Pk, School Ln, Haigh, Wigan, PM

Wirral MES Public running, Royden Pk, Frankby, 1-3.30pm.

EVERY TUESDAY
(Weather permitting)

Romney Marsh MES Track meeting, Rolfe Ln, New Romney from 11am

TUESDAY-THURSDAY
(Weather permitting)

Bromsgrove SME public running, Avoncroft Museum of Historic Buildings, B60 4JR 11.30-3pm

EVERY WEDNESDAY
(Weather permitting)

Bournemouth SME public running, Littledown Pk, BH7 7DX, 11am-3.30pm

Grimsby & Cleethorpes MES public rides, Waltham Mill, DN37 0JZ, 12-4pm

Kings Lynn & District SME, Lynnsport Miniature Railway, 11am-4pm

1 South Lakeland MES meeting, Pavilion, Lightburn Pk, Ulverston, 7.30pm

2 Portsmouth MES club night, 'playing trains', Bransbury Pk, Portsmouth PO4 9JY, 6.30pm

2 Rochdale SME meeting, 'Irene the white engine at Elland Road' by David Pope, Castleton Comm Cntr, Rochdale OL11 3AF, 7.30pm

3 Ickenham SME public rides, Coach & Horses pub, Ickenham, UB10 8LJ, noon-5.30pm

3 North Wilts MES public rides, Coate Water Railway, Coate Water Country Park, Swindon, 11am-5pm

3 Tiverton MES Running day, Rackenford, contact Chris Catley, 01884 798370

4 Bristol SMEE public running, Ashton Court Railway, Bristol, BS8 3PX 7.30pm

4 Halesworth District MES Steam-up, Reydon, nr Southwold

4 Northampton SME Public Running, Delapre Park, Northampton, NN4 8AJ, 2-5pm

4 Plymouth MS public running, Goodwin Pk, PL6 6RE, 2-4.30pm

4 Small Model Steam Engine Group open meeting, Guildford MES, Stoke Pk, 2-5pm

4 Wimborne DSME public running, Wimborne, Dorset, BH21 3DA, 11am-4pm

4 York ME Open Day, North Lane, Dringhouses YO24 2JE

5 Lancaster Morecambe ME members evening running, Cinderbarrow Railway, Tarn Ln, nr Yealand Redmayne, from 5pm

7 Bedford MES public running, Summerfields' Railways, High Road, Haynes MK45 3BH, 10.30am-3.45pm

7 Bradford MES evening running and social, Northcliff, BD18 3DD, 7.30-10pm

7 Bristol SME meeting, 'Getting the Sentinel back into service', Eric Miles, Begbrook Social Club, BS16 1HY, 7.30pm

7 City of Oxford SME public running, Cutteslowe Park, OX2 8NP, 1.30-5pm

7 Harrow & Wembley SME members meeting, Roxbourne Park, Eastcote, 2.30-10pm

8 Cardiff MES Members Projects Day, Heath Park

8 TIME meeting, Pipers Inn, 70 Bath Road (A39), Ashcott, Somerset TA7 9QL, 7pm

10 York ME Summer Meeting, 'First Train in Spain' North Lane, Dringhouses YO24 2JE, 7pm

10 Leeds SME August Rally, Eggborough
11 Pwr Stn, DN14 0UZ, from 10am

10 Northern Association of ME Northern
11 Rally, Oswestry ME, Oswestry showground, from 10am

10 Rugby MES Big Four Rally, Onley Ln,
11 CV22 5QD, 10am-5pm

11 Bracknell RS public running, Jocks Ln, Binfield Road, RG12 2BH, 2-6.30pm

11 Cambridge MES Public Running, Fulbrooke Rd, CB3 9EE, from 1,30pm

11 Cardiff MES Steam Up & Family Day, Heath Park, 1pm-5pm

11 Harlington Loco Society public running, High St, Harlington UB3 5ET, 2-5pm

11 Welling MES public running, electricity station, close to Falconwood rail station, Kent, 2-5pm

12 Bedford MES talk, 'Finest Quality Model Boat Building' by Peter LeSeuer, Summerfields' Miniature Railway, MK45 3BH, 7.30pm. Contact meetings@bedfordmes.co.uk

12 Cambrian ME meeting, for details of venue contact Robin King, robinking@newbury.net 10.30am

13 Tiverton MES meeting, Old Heathcoat comm ctr, contact Chris Catley, 01884 798370. 7.30pm

14 Bedford MES public running, Summerfields' Railways, High Rd. Haynes MK45 3BH, 10.30am-3.45pm

14 Stockholes Fm Miniature Railway Bacon Butty Evening, Doncaster DN9 1PH, 6-9pm

15 Halesworth District MES club night, Reydon, nr Southwold

16 Rochdale SME general meeting, Castleton Comm Cntr, Rochdale OL11 3AF, 7pm

17 Old Locomotive Committee Lionsmeet 2019, Bournemouth SME, Littledown Pk, BH7 7DX

17 Midlands Minimal Meet, Leicester SME, Abbey Pk, LE4 5AQ

17 York ME Club Maintenance Day, North Lane, Dringhouses YO24 2JE

17 Leyland SME Open weekend, Worden
18 Pk, Worden Lane PR25 1DJ

18 Bristol SMEE public running, Ashton Court Railway, Bristol, BS8 3PX 7.30pm

18 Guildford MES Stoke Park Railway open day, Stoke Park, Guildford GU1 1TU, 2-5pm

18 Halesworth District MES Steam-up, Reydon, nr Southwold

18 Plymouth MS public running, Goodwin Pk, PL6 6RE, 2-4.30pm

18 Rugby MES public running, Onley Ln, CV22 5QD, 2-5pm

18 Tiverton MES Running day, Rackenford, contact Chris Catley, 01884 798370

18 Plymouth MS public running, Goodwin Pk, PL6 6RE, 2-4.30pm

18 Wimborne DSME public running, Wimborne, Dorset, BH21 3DA, 11am-4pm

18 York ME visit by 16mm Association Yorkshire Group, North Lane, Dringhouses YO24 2JE

20 Model Steam Road Vehicle Society Meet, 'Warship on the Rails' by Alan Drewett, Longford Village Hall, Longford Lane, Gloucester, GL2 9EL, 8pm

21 City of Oxford SME public running, Cutteslowe Park, OX2 8NP, 1.30-5pm

21 Leeds SME Summer evening steam-up, Eggborough Pwr Stn, DN14 0UZ, 12.30pm-late

24 York ME Summer Meeting, North Lane, Dringhouses YO24 2JE, 7pm

25 Harlington Loco Society public running, High St, Harlington UB3 5ET, 2-5pm

25 High Wycombe ME public running, Holmer Green,HP15 6UF, 11am-5pm

25 Pimlico Light Railway public running, Pimlico, Brackley, NN13 5TN

25 Welling MES public running, electricity station, close to Falconwood rail station, Kent 2-5pm

25 Bedford MES public running,
26 Summerfields' Railways, High Rd. Haynes MK45 3BH, 10.30am-3.45pm

25 Bristol SMEE public running, Ashton
26 Court Railway, Bristol, BS8 3PX 7.30pm

25 Cardiff MES Open Day, Heath Park,
26 1pm-5pm

25 Norwich SME public running, Eaton Pk,
26 1-5pm, NR4 7AU

26 Bracknell RS public running, Jocks Ln, Binfield Road, RG12 2BH, 2-6.30pm

26 Cambrian ME meeting, for details of venue contact Robin King, robinking@newbury.net 10.30am

26 Lancaster Morecambe ME public running, Cinderbarrow Railway, Tarn Ln, nr Yealand Redmayne, from 5pm

26 Maidstone MES public running, Mote Pk, ME15 7SU, 2.30-5pm

26 Northampton SME Club run day, Delapre Park, Northampton, NN4 8AJ, from noon

26 North Wilts MES public rides, Coate Water Railway, Coate Water Country Park, Swindon, 11am-5pm

26 Portsmouth MES public running, Bransbury Pk, Portsmouth PO4 9JY, 2-5pm

26 Stockholes Fm Miniature Railway Open Day, Doncaster DN9 1PH, 11am-5pm

26 Sussex MLS public running, Beech Hurst, Haywards Heath, 2-5pm

27 Wigan MES meeting, Ince Methodist Church, Manchester Road, Ince, Wigan, WN1 3HB 7pm

30 Cambrian ME exhibiting at Welshpool
01 & Llanfair Light Railway Gala, Llanfair Caereinion station, SY21 0SF - details from www.wllr.org.uk/

31 City of Oxford SME public running, Cutteslowe Park, OX2 8NP, 1.30-5pm

31 Romney Marsh MES Track meeting, Rolfe Ln, New Romney from 12 noon

Details of events for inclusion in this diary must be received at the editorial office (see page 3) at least EIGHT weeks prior to publication. Please ensure that full information is given, including the full address of every event held. Whilst every possible care is taken in compiling this diary, we cannot accept responsibility for any errors or omissions in its content.

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Opening Times: Monday-Friday 9am-5.30pm • Saturday Morning 9am-1pm

10 minutes from M25 - Junction 3 and South Circular - A205


Taps and Dies


£425 Clarke 917 vacuum forming machine


£20 each Just arrived!


£2950 Harrison M300 lathe + gap


Very nice! £1575 Myford Speed 10


£375


£425 Harrison lathe vertical slide


Aluminium!


£625 Micrometers Various! 0-16"/300mm

RJH linisher


£100 Denford Viceroy 10" chisel grinder


£195 Back in! Stanier 55mm precision swivel machine vice from NEW ZEALAND 'Finest Engineering'

MYFORD GENUINE PARTS
Running out fast!
Purchased from Nottingham
Check the web site for full list!


£1250 Sedgewick TA315 12" sawbench


£4950 Myford Super 7B lathe hardened bed


240 volts! £425 Kerry 8 speed (back geared) drill


£625 Like new! Worcester 3 TON power press


£325 Hegner fretsaw (German)


240 volts! £3750 Harrison M250 5" centre lathe


Very nice! £950 Morgan Rushworth 50" x 16g


£950 Boxford AUD lathe


Myford non standard wheels £10-£49


£625 Union 12" pedestal grinder


Myford Super 7B lathe + inverter £4250


£10 Each Cora 'neat cut'


Blacksmiths anvil (tinmans) stakes!


£625 Q & S Terrier 8" hacksaw


£425 Jones and Shipman (8" throat) arbor press


£345


£245 Milling spindle, 1/4" collet (Myford spacing bolt holes)


£345 original as new! Burnerd D13 8" 4 jaw chuck


Colchester steadies to fit Student, Master, Bantam 2000, Triumph, Mastiff!


nice selection Blacksmith tooling


Tipped tools + tips


£1475 Union buffer + built in extractor


£3250 Mitchell 10 1/2" x 72" + gap lathe


£375 Union buffer

Just arrived!
Myford gearbox, leadscrew and guard **£725**
Adept No.2 hand shaper **£245**
Harrison M300 large 18" faceplate **£295**
Emco Unimat accessories Boxed!
Startrite 275 12"saw bench cuts up to 4 1/8" thick! **£1275**
123 blocks **£30 each**
R8 collets 6mm 10mm 12mm 16mm set **£40**
R8 collets ¼" 3/8" ½" 5/8" set for **£40**

Myford dividing heads; choice!
Harrison L5 L5A L6 travelling steadies **special £40 each**
Colchester student travelling steadies side and bottom mount **special £40 each**
Colchester Bantam 2000 fixed steady **£375**
Colchester Student 1800 / Master 2500, Triumph, Mastiff fixed steadies

Coming in;
Myford VMB mill
Rhodes shaper
Scheppach Basato 3 & Record BS300E bandsaws
3 metre bar rack £145
Record No2 & No3 bench vices £20 & £30 each **More details on Web Site**


12"x 12"x 24" Angle plates (pair) £345


£45 Each Bridgeport coolant trays


£1475 Wadkin BL150 wood lathe


£845 Clarkson tool and cutter grinder

£495 3.5 TON 9ft forks pallet truck £495

240V £425 RJh buffer

WD-40 £20 each

£845 Tom Senior Mill

£3250 Colchester Colt 6.5" x 40" centres

£3950 Denford Turn 270 Pro CNC

CRAWFORD COLLETS LTD 6899 A 6MM New Myford chuck & nose collets £30 each

various! Angle plates + surface plates

Special 5 for £20 Myford ML7/ Super 7 Rifle/ Bridge bed felts

£90 Tripus (German) on/off switch

£525 Union 10" pedestal grinder

Please PHONE 0208 300 9070 to check availability or to obtain our list

DISTANCE NO PROBLEM! • DEFINITELY WORTH A VISIT • ALL PRICES EXCLUSIVE OF VAT

Just a small selection of our current stock photographed!

We are currently seeking late 'Myford Super 7B' & 'Super 7 large bore' model lathes!

SHIPPING WORLDWIDE