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THE MAGAZINE FOR MODEL ENGINEERS

ENGINEERING in Miniature

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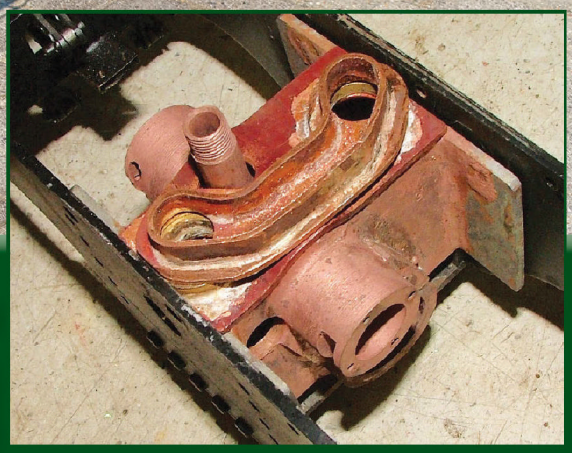

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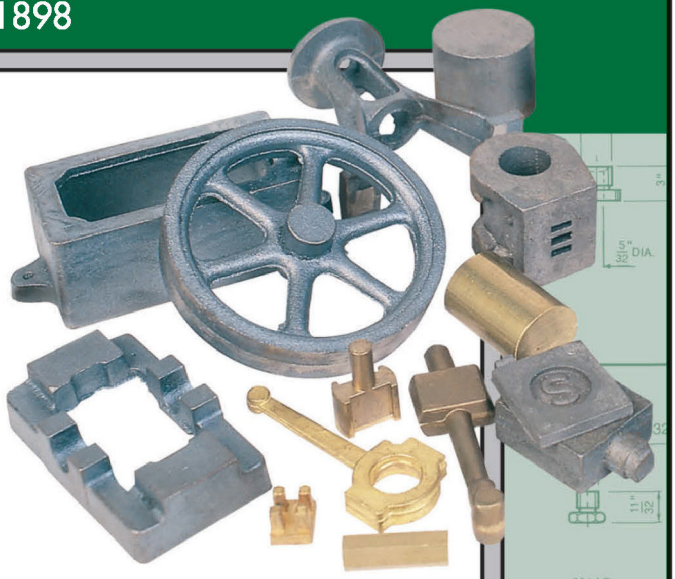

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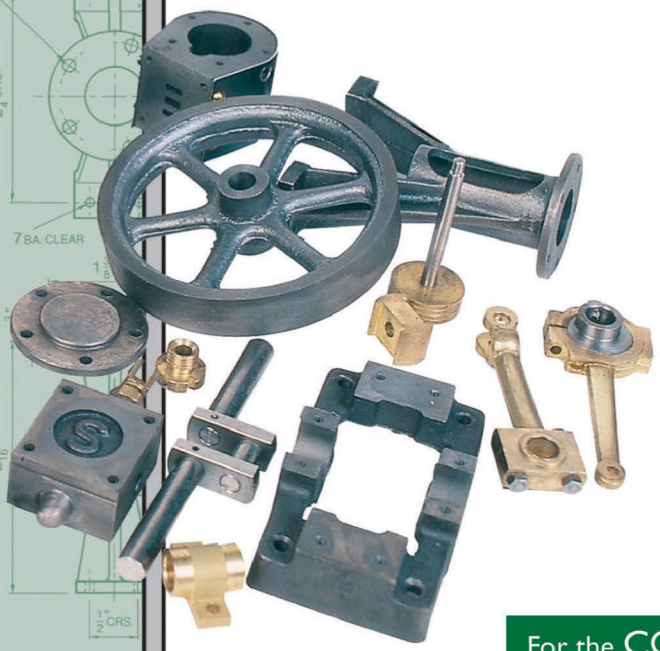

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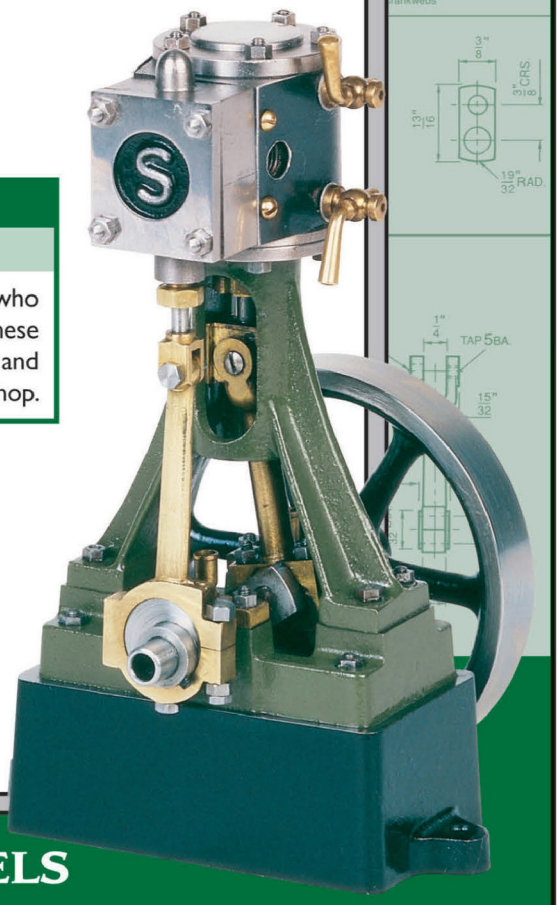

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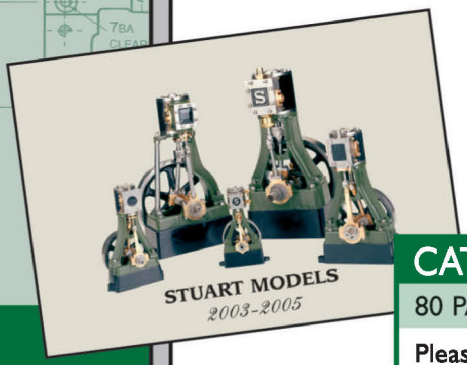

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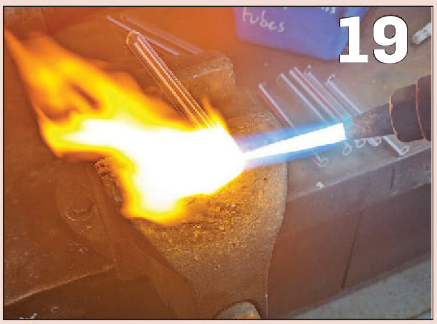

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FRONT COVER

'Ernest Henry Upton', a 4-4-2 Atlantic built in 1937 and normally resident at the Eastleigh Lakeside Railway in Hampshire, sits at Marine Parade on the 10¼-inch gauge Hastings Miniature Railway on 4th June, one of two of the UK's historic lines celebrating 75th anniversaries within weeks of each other and reported in this issue. *Photo: Jonathan James*

EDITORIAL

If the publicity machine calls, then answer it...

Welcome to the August edition of EIM and looking out of the window of a somewhat frantic home office in early July when these notes are being written it certainly feels highly summery – time to get out on the track one thinks...

We have a pleasing mix of model engineering subject matter for you this month, despite the feature file perennially running low (yes, you know it by now, hint hint...) and a piece that stood out for me was one by Roger Backhouse of the York club, describing the recent occasion when they were asked to take part in a TV programme – called *Hobbyman*, it involved TV comedian Alex Brooker trying out new pastimes, and of course someone came up with the idea of model engineering and driving miniature locomotives.

What really emerges from the piece compiled by Roger and his fellow York members is that before arriving at the club's site the TV people had no idea what to expect, and in fact they were pleasantly surprised and seriously impressed with the depth of our vocation, the dedication of those doing it and the highly impressive, detailed working models that result.

Basically, model engineering is something that the average person in the street has no idea about and misunderstands as a result. They don't realise that it's not "old men playing trains" but a highly skilled pastime enjoyed by people of all ages and genders, learning and passing on skills and techniques that even today's electronically dominated world remain highly useful.

Reading the piece I immediately thought of several model engineers who would have baulked at any approach from a TV company, convinced that they would get everything wrong and belittle everything that we do. In my experience, that's seldom the case – most people making these kind of programmes want to show the skills and dedication involved.

As many readers know I also edit EIM's sister title *Narrow Gauge World* and a few years ago we were approached about being the 'guest publication' on the satirical BBC news quiz *Have I Got News for You*. My publisher at the time was horrified; "They'll make fun of us," he said. He only relented when I pointed out how much a minute of advertising at 9.30pm on a Friday night on the BBC would be likely to cost, if you could buy it...

It's often said that there is no such thing as bad publicity, and while that's not always true any approach from the TV should be welcomed, especially at a time when we really need to attract new blood to our vocation. Enjoy your EIM.

Andrew Charman – Editor

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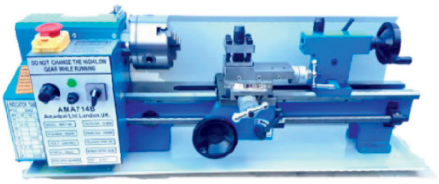

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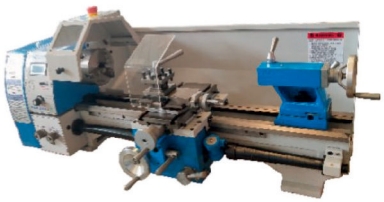

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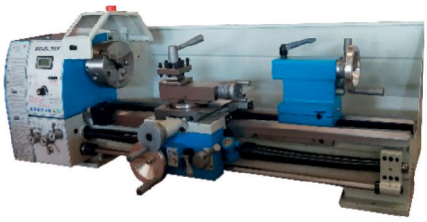

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T-slot size: 12mm
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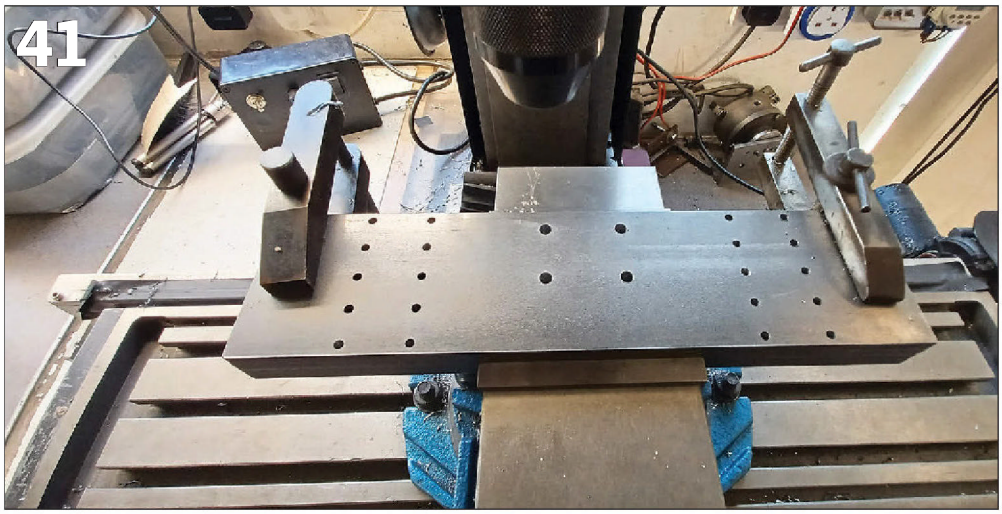
Sub500 – a pair of 5-inch gauge electric locos

This month Rich and Julian complete the frame construction of their budget build battery loco project, inspired by a need to have something for their grandchildren to drive.

BY **RICH WIGHTMAN** & **JULIAN HARRISON** Part Three of a short series



Continuing the construction of the frame components for our 5-inch gauge budget loco project, we come to the buffer beams. The two buffer beams (**Figure 12-13**) are identical so can be machined and drilled as a pair (**Photo 41**).

Once again we have shown two drawings of the buffer beams so as not to clutter them up too much and to make clear as much detail as possible. One drawing shows the holes to be drilled for the buffer beam to frame angles and the other shows the hole positions for the body mounting angles and the couplings.

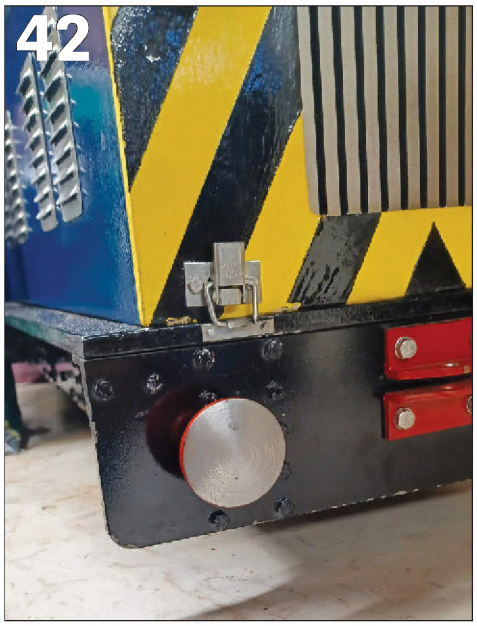
"Steel angle is very rarely a true 90 degrees so its best to check it with a square..."

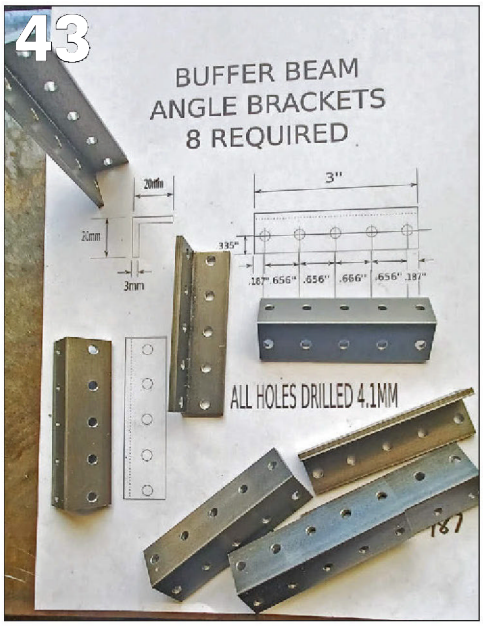
The beams are made from the same steel as the frames, this being 3-inch x ¼-inch flat steel bar. Either mark out or use the DROs to locate all the hole positions. Not shown on the plans are the lower corners rounded off which I did on the grindstone afterwards (**Photo 42**).

I have also submitted plans of the buffer beams to Model Engineers Laser which will cut a pair for £17.00 (price correct at time of writing) for those who wish to speed up the job.but there is a slight difference to note here.

We have used ¼-inch thick steel for the frames and the buffer beams. Model Engineers Laser cuts them from 6mm thick steel which is slightly thinner by about 0.013-inch or 0.3mm for the metric-minded. It's not a lot but enough to pull the frames out of square when tightening the bolts. You could use shims to take up the difference or increase the buffer beam angle bracket outer hole size in the buffer beams to 4.5mm, which should put things right.

The critical bit here is that the internal distance between the frames remains the same regardless of the construction method used. Bolt up the frames using the inner bolt holes only as this will keep the frames the correct distance apart. If you now run a 4.2mm drill through the outer holes the outer bolts can then be fitted.





True angle

Speaking of buffer beam angles eight are required, as per **Figure 14**, machined from 20mm x 20mm x 3mm steel angle. **Photo 43** shows them. Now steel angle is very rarely a true 90 degrees so its best to check it with a square as in **Photo 44**. If it is slightly out it's best to hold one face against the fixed jaw of the mill vice and give it a skim over the other face to square it up. Even a few thou out of square is enough to pull the frames out of true.

Five holes are drilled in each side. I used my DROs but alternatively you can spot through from the frames or spot the frames through from the buffer beam angles. Mark each piece's position – a black marker pen will do, FLI for front left inner, FLO front left outer and so on.

Next on the list are six axlebox guide pin angle brackets, (Figure 15), which also act as spring brackets. They are made from the same 20mm x 20mm x 3mm steel angle. The steel angle must firstly have both sides reduced in size as per the plans one side 0.47-inch and the other 0.625-inch (⅝) to give clearance to the wheels (Photo 45). then have the three mounting holes drilled either by using the DROs or spotting through from the frames.

The two 5mm holes for the axlebox guide pins must be in the correct position in relation to the mounting holes so that the guide pins will move freely up and down in them. In actual fact on final assembly I had to re drill some of the guide pin holes to 6mm to gain the required free movement. The official phrase for this is fettling and fitting...

Next are the horns, (Figure 16), of which 12 are required, (the photo shows only six). These are made from ⅜-inch x ⅛-inch flat steel bar (Photo 46). We could possibly have got away without these but we figured it would be better to increase the frame width to ⅜-inch to give better support to the axleboxes. They are simply cut to length and three holes drilled in each.

The body baseboard support angles come next (Figure 17). There are six along the frame sides which are mounted using the same holes as the axlebox guide pin brackets, plus four smaller ones (Figure 18 and Photo 47) mounted on each corner of the bufferbeams. All are made as per the plans from the same 20mm x 20mm x 3mm steel angle. We were using 8mm plywood as the body baseboard so there was no need to skim these angles square, just cut and drill. If you use any other material for the top I suggest the angles are squared before fitting.

The coupling brackets, (Figure 19), are also made from the 20mm x 20mm x 3mm steel angle as per the plans and four are required. Making these is a simple cut-and-drill operation (Photo 48).

Coupling compromise

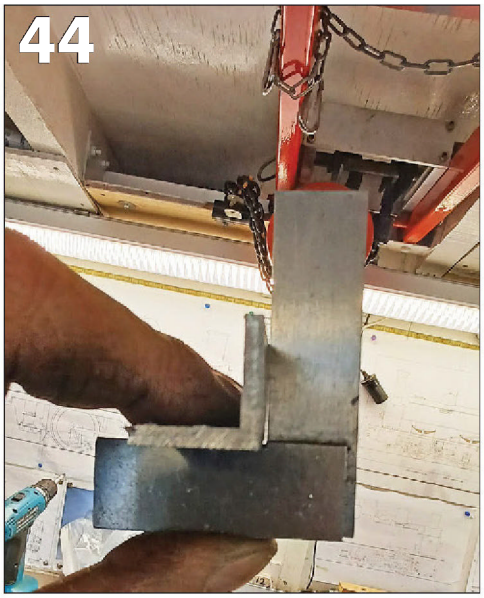
The position of the brackets on the buffer beams was a bit of a compromise for us. All our club riding-car towing eyes are at different heights so we have made a selection of tow bars bent at varying angles to accommodate them. It would be worth checking your own or your club's riding cars to ascertain the ideal position for the brackets.

Well that just about covers all the parts needed to make the frames, wheels and axles so it can all now be put together.

Bolt the 12 horns onto the frames with M4 bolts (Photo 49). Make sure the bolts do not protrude through the frames as the axlebox runs up and down on the inside of the frames. File the horns flush with the horn cut-outs in the frame and check the axleboxes work smoothly up and down.

Find something reasonably flat to do the frame assembly on. If you use the kitchen worktop make sure you have permission from the higher authority! With a tray of 4mm bolts and nuts (or whatever you are using) close to hand, loosely fit the buffer beams to the frame sides with the

Continued on page 10



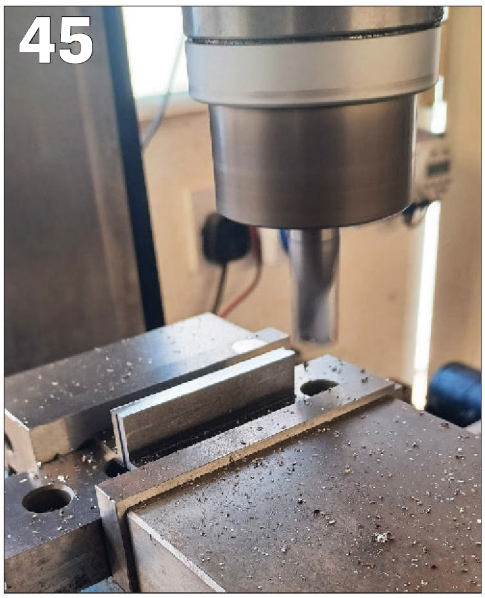


PHOTO 41: Drilling the buffer beams – these were machined and drilled as a pair

PHOTO 42: Corners of the buffer beams were rounded off using a grindstone

PHOTO 43: Complete set of eight buffer beam angles

PHOTO 44: Check that the angle is exactly 90 degrees - little mass-produced angle actually is!

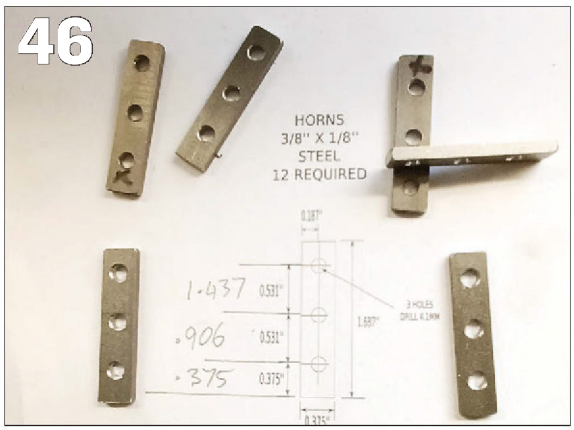
PHOTO 45: Spring guide pin angle brackets reduced in size on the mill.

PHOTO 46: Completed set of hornplates for one side of the loco.

PHOTO 47: Next up, the buffer beam body support angles.

PHOTO 48: Final parts to be made are the coupling brackets.

Photos by the authors



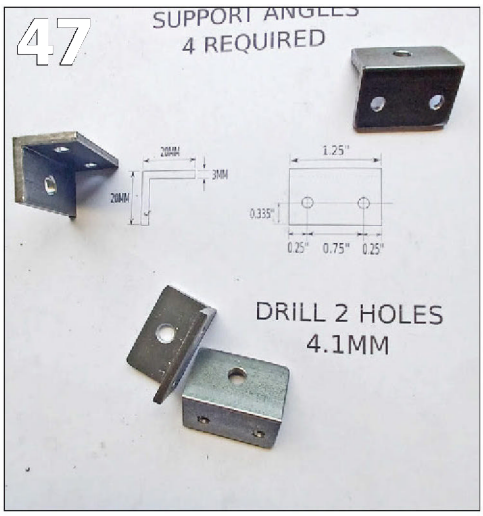


FIGURE 12
Buffer Beam – 2 off, steel
(drawing approx half-size)

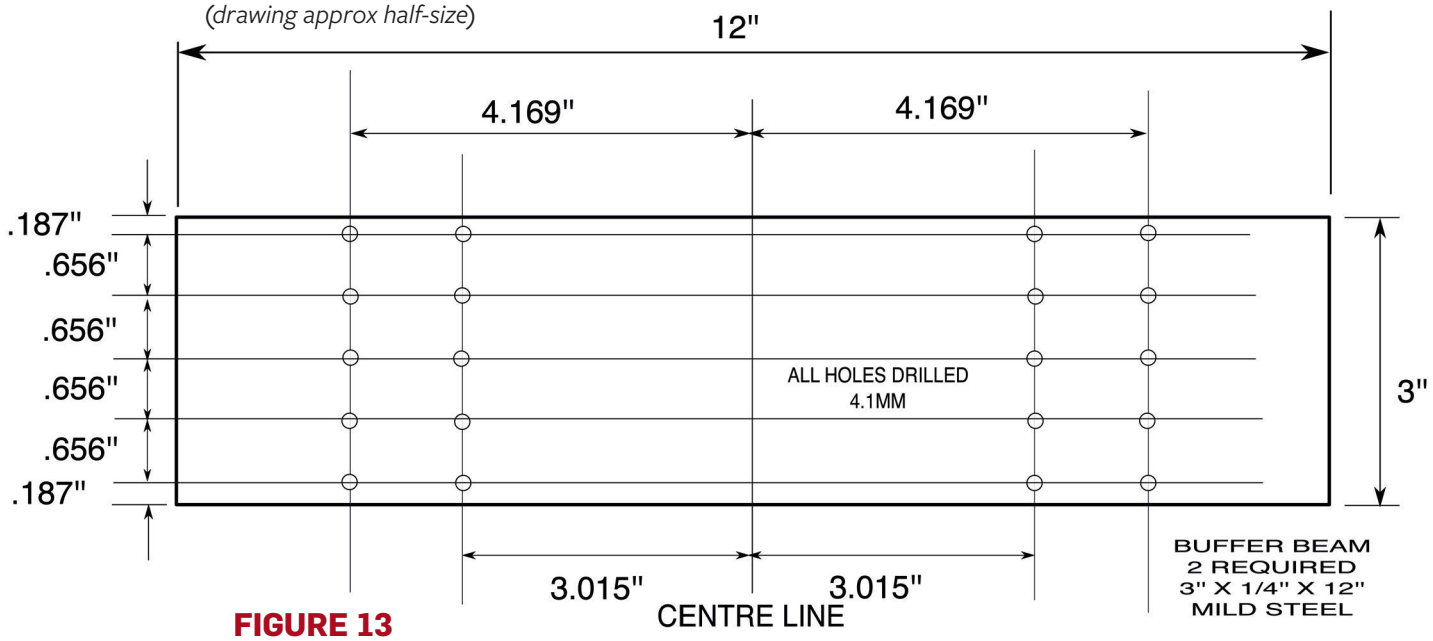


FIGURE 13
Buffer Beam showing hole drilling positions for couplings and body support angles
(drawing approx half-size)

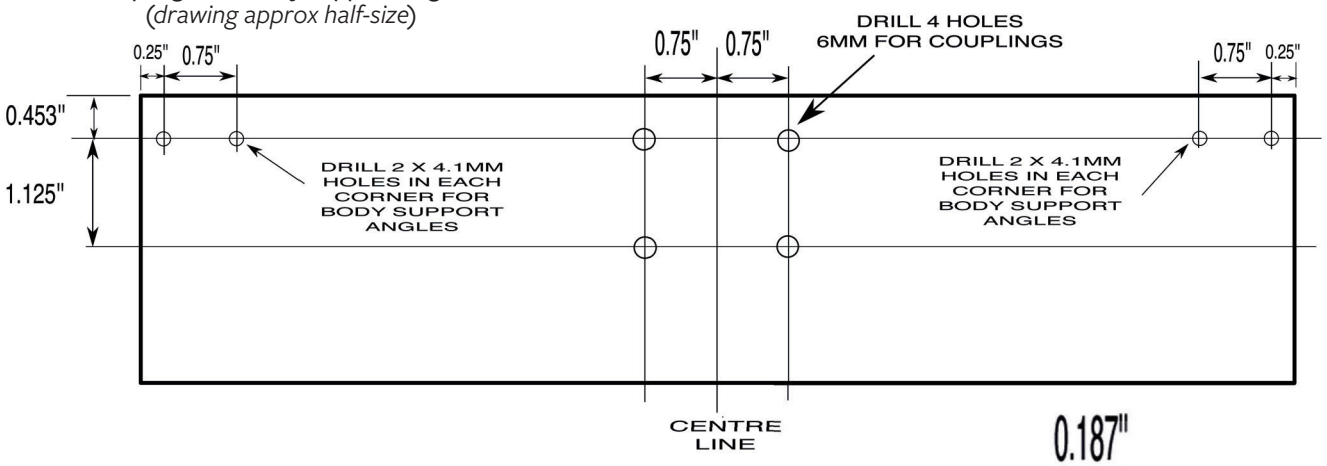


FIGURE 15
Axlebox guide pin angles –6 off
20mm x 20mm x 3mm steel angle
reduced to 0.47" x 0.625" x 3mm
(drawing approx full-size)

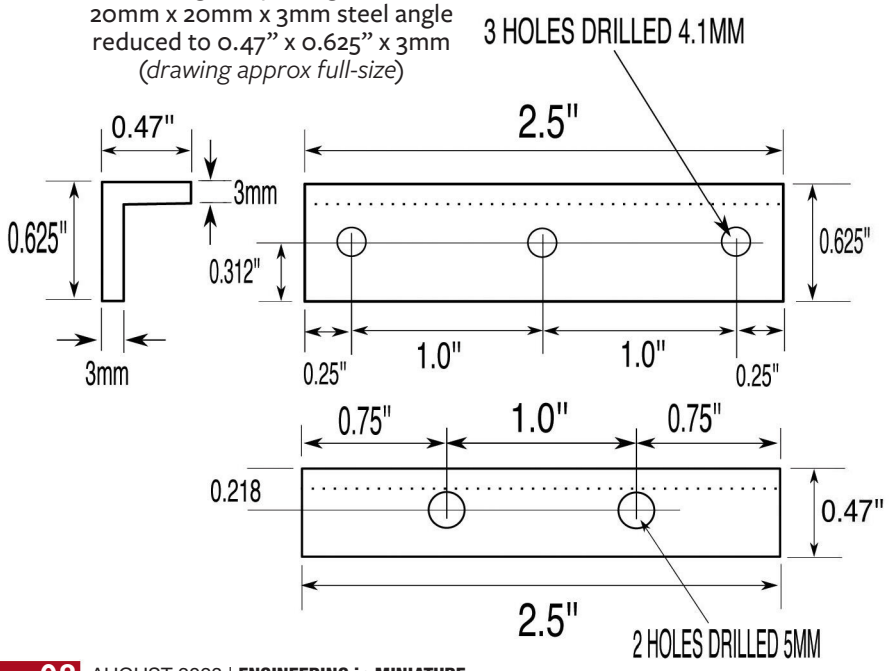
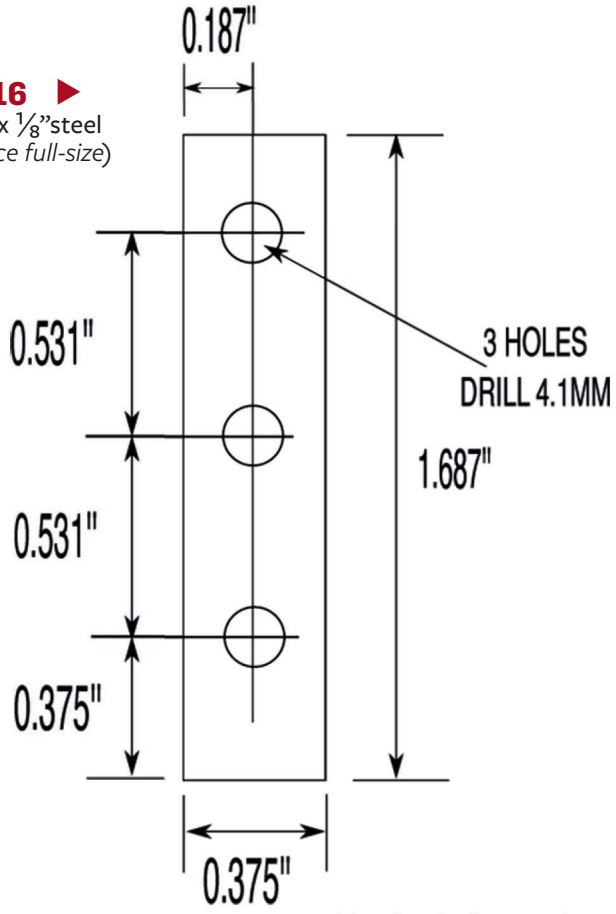


FIGURE 16 ▶
Horns – 12 off, ⅜" x ⅛"steel
(drawing approx twice full-size)



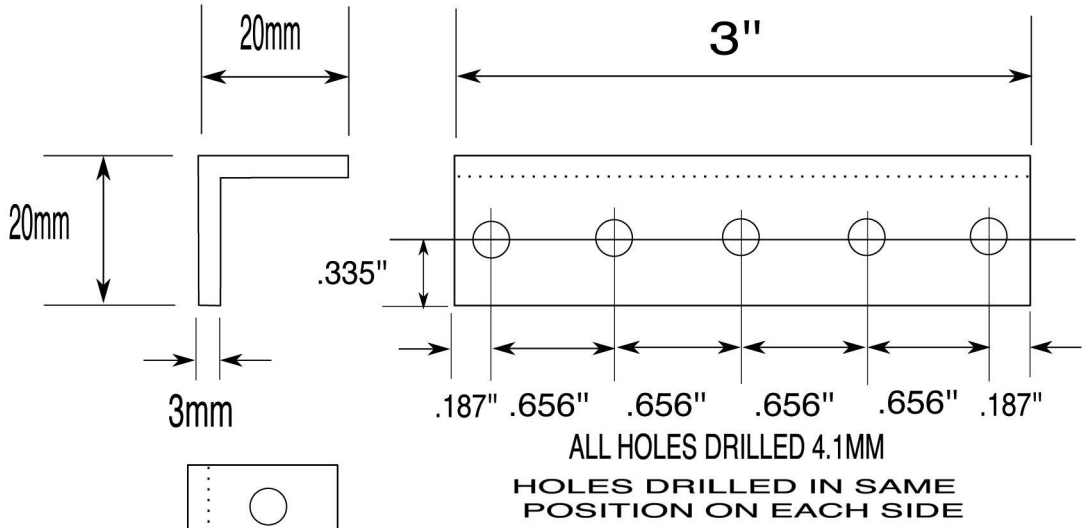
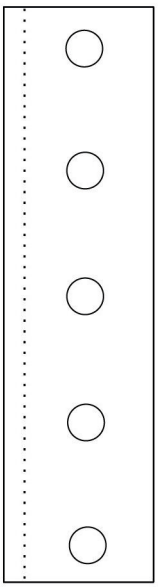


FIGURE 14
Buffer beam angle brackets –8 off
20mm x 20mm x 3mm steel angle
(*drawing approx full-size*)



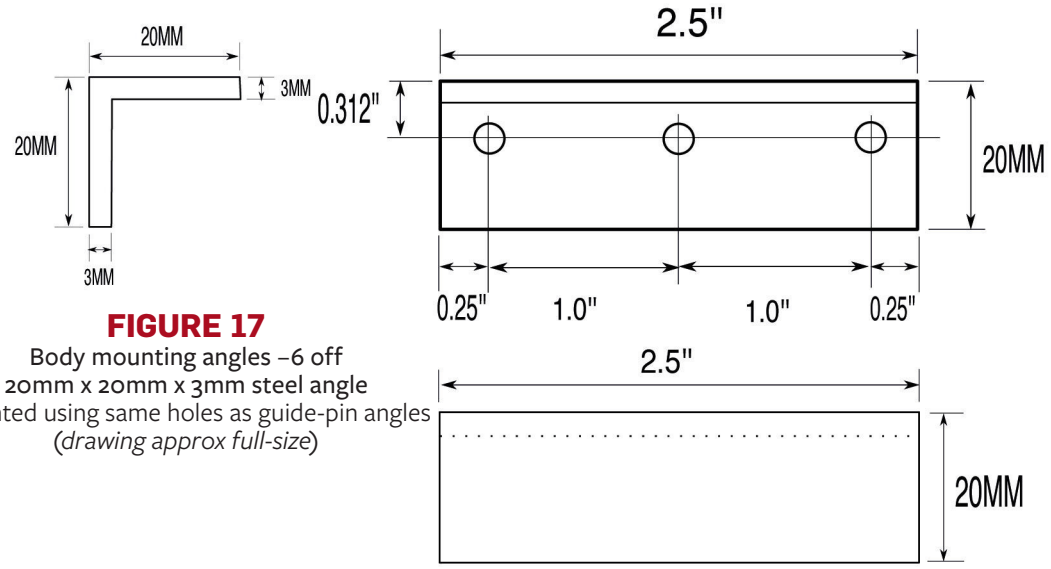
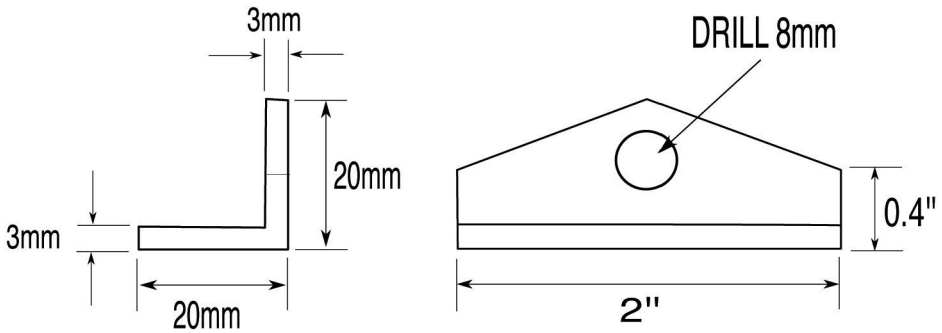


FIGURE 17
Body mounting angles –6 off
20mm x 20mm x 3mm steel angle
Mounted using same holes as guide-pin angles
(*drawing approx full-size*)



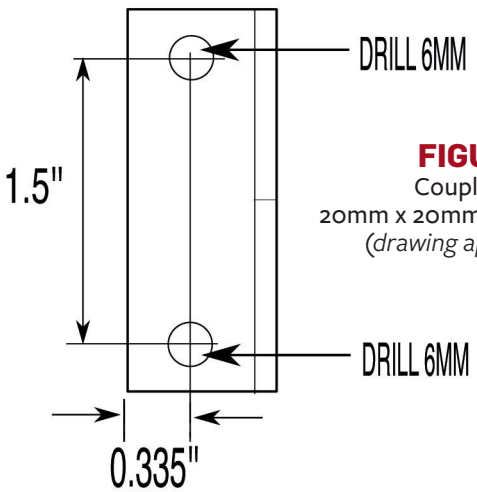


FIGURE 19
Coupling –4 off
20mm x 20mm x 3mm steel angle
(*drawing approx full-size*)

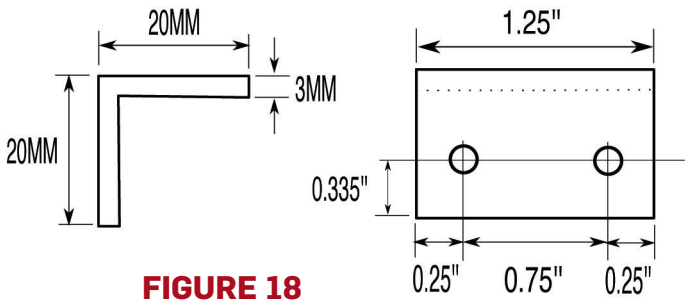
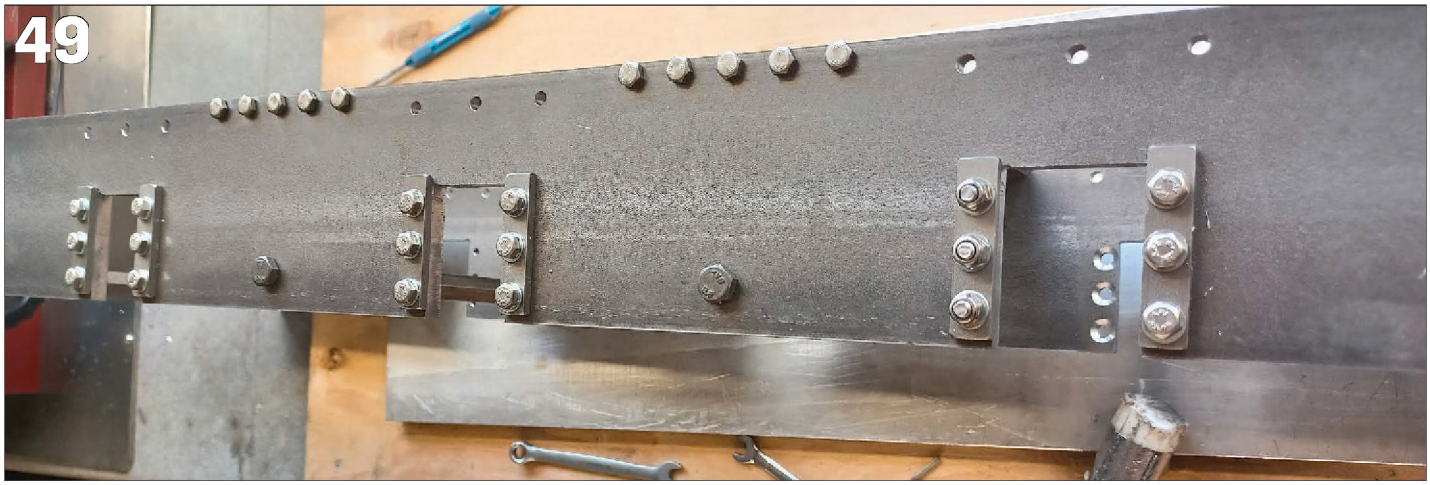


FIGURE 18
Buffer beam angle brackets –4 off
20mm x 20mm x 3mm steel angle
(*drawing approx full-size*)



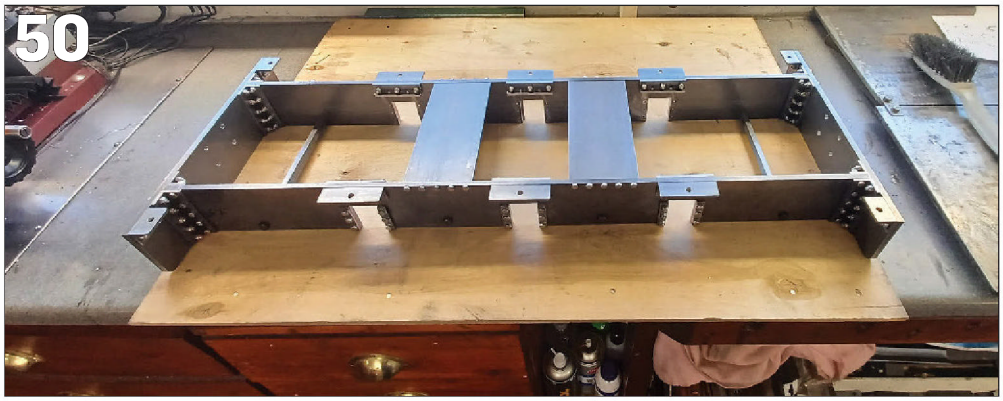


PHOTO 49: First step in assembling the frames is to bolt the horns on to the side of the main plates.

PHOTO 50: The frames are then assembled with the stretchers and buffer beams – a flat surface is essential here.

PHOTO 51: This is a good point to paint the frames, starting with a spray of primer, here hung outside to dry (on a nice day...).

PHOTO 52: The top gloss coat can then be applied – Rich and Julian chose black for their locos.

Continued from page 7

eight buffer-beam angles, followed by the two top stretchers and the four lower stretchers.

Tighten the bolts, going around the frames checking as you go that all remains flat and square. The guide pin brackets and body support brackets, which use the same holes in the frames, can then be fitted, followed finally by the four body angles on the front and rear buffer beams (Photo 50).

Position the frames upside down, in other words with the horn openings upwards and try each axle for fit. You will probably have to skim a little off the axle spacers to produce a little side play and maybe fettle the horn openings a little until the axles fit and move freely.

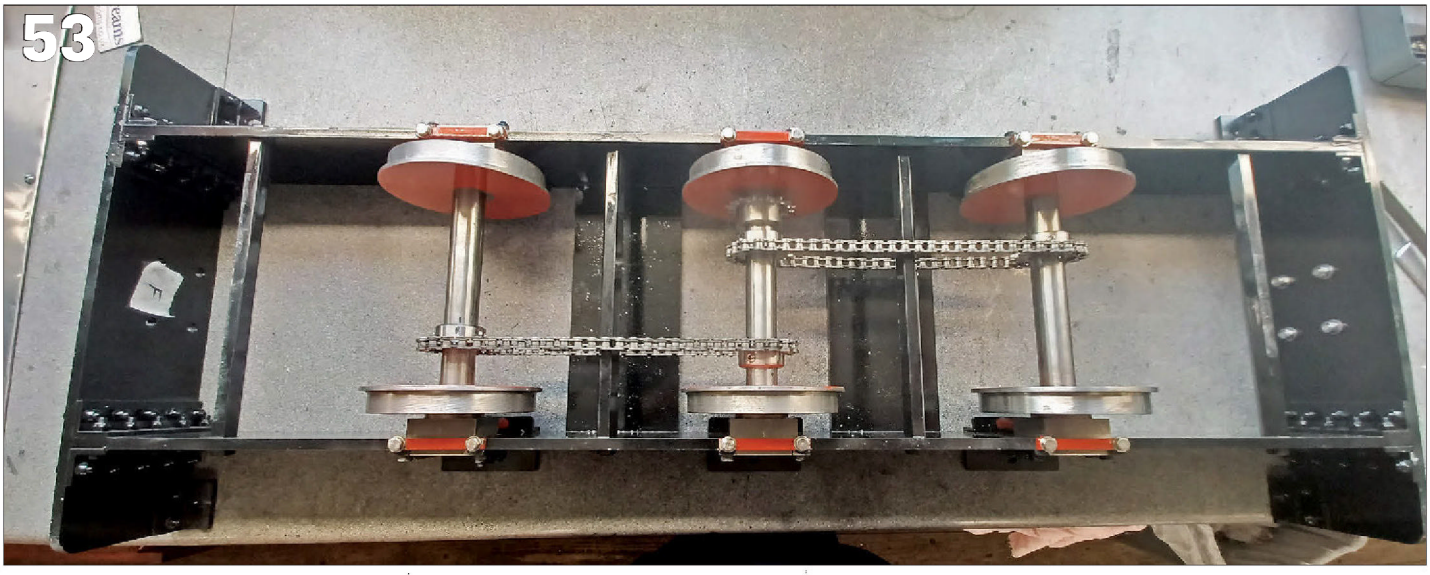
Now is the time to paint the frames. Clean off all the oil and marks. Mask off the horns and a little inside the frames where the axle boxes fit. We used aerosol etch primer (Photo 51), followed by black gloss (Photo 52) but the choice of colour is yours.

When dry the axles can be dropped back in with 12 springs followed by bolting on the horn keeps and a trial fit made of a couple of chains (Photo 53). Finally bolt on the towing brackets.

Spring solutions

I need at this point to talk about the springs. Initially we used springs from our spring assortment box. Reasonably stiff ones were chosen – at this stage we were unsure of the all-up weight of the loco so guessed at it. As it happened we were about right in our estimation but a problem arose. On the track, if the regulator was opened a little too fast or going up a slope the torque from the motor would lift the centre driven axle, resulting in the chain becoming slack and slipping.

We initially adopted two methods to cure the problem. Julian fixed his centre axle solidly in the mid position by making a block that slipped over the guide pins while Rich bought



some strong springs as pictured in Photo 54. These are known as die springs which are easily available from Ebay – Photo 55 shows the springs fitted to the axle.

Both methods worked and cured the chain slip problem with no effect to the way the locos ran, but after a while my chain had stretched slightly so I also adopted the fixed solid centre axle method.

I machined two pieces of hard plastic to size and drilled two holes spaced the same as the guide pins. A piece of brass machined to fit on each horn keep kept the axle raised a little. This fixed axle needs to be two or three millimetres higher to force the suspension on the others to compensate. Photo 56 shows the plastic block preventing the axle from lifting – I have not had an issue since.

Idle thoughts

We discussed an alternative method for the chain drive which would cure the problem but would require more work. The idea was to move the transmission forward a little and instead of the chain driving the centre axle to have the chain drive an idler shaft situated between the front and centre axle – the idler shaft being on the same level as the axles. A chain from the idler shaft would then drive the centre axle. From the centre axle two chains would drive the front and rear axles as before.

So that's our chassis built and now it's time for Julian's area of expertise – next month he will go into the detail of the gearbox/transmission and the electrics. EIM

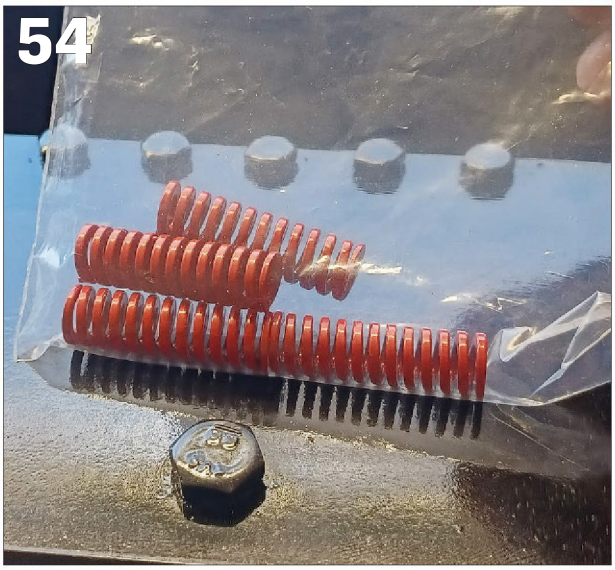
■ Parts one and two of this series appeared in the June and July 2023 editions of EIM. To download digital back issues or order printed copies go to www.world-of-railways.co.uk/store/back-issues/engineering-in-miniature or call 01778 392484.

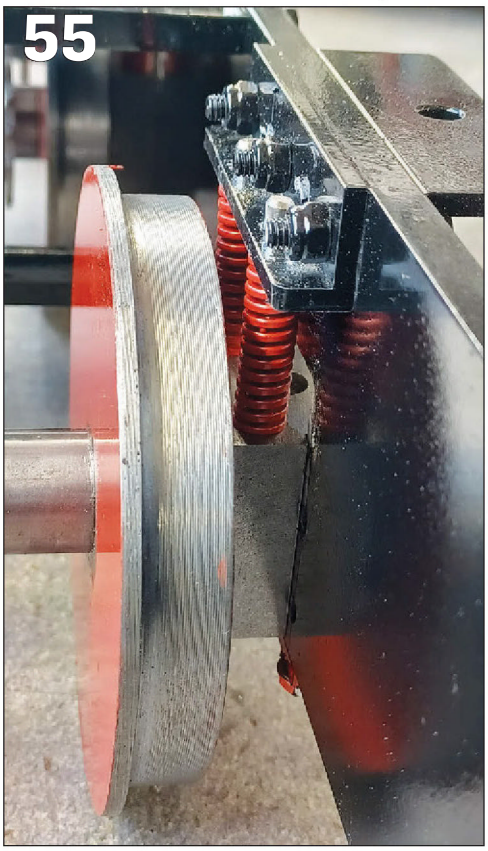
PHOTO 53: Once the paint is properly dry assembly can be completed, here with the axles and drive chains fitted.

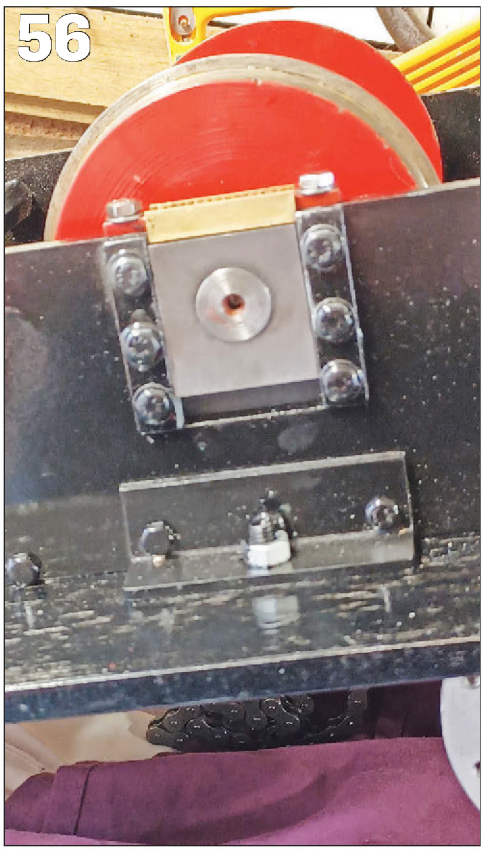
PHOTO 54: A set of commercially available die springs – deciding the stiffness to buy is a matter of trial and error for the builder.

PHOTO 55: The springs fitted above the axleboxes on the chassis.

PHOTO 56: Brass spacer and a block of plastic fitted to the centre axle horn keeps to solve an issue of chain slip.







Normal service resumed

This month Fairbourne Railway chief engineer Harry's constant battles with matters 6-inch scale and others centres on the mid-Wales line's annual Gala.

BY **HARRY BILLMORE**

Readers of these musings each month will be aware that last time I had needed to sort the coupling rods of our Welsh Highland Railway-style 2-6-4T 'Russell' and with the loco back in action I could concentrate on taking delivery of the rest of the attractions for our Gala at the end of May and making sure they all worked well on our line.

The first loco to arrive, to run on the 15-inch gauge demonstration line, was 'Prince Edward of Wales' a class 10 Atlantic built by Bassett Lowke in 1911 for the railway around the Marine Lake in Rhyl, where it ran until 1920. Then it was sold to the line running at the Kent resort of Margate where it stayed until 1968 when it was bought by a pair of enthusiasts. It ended up in a lot of pieces before being acquired by Austin Moss and rebuilt, eventually returning to work at Rhyl. The Fairbourne Railway also had a class 10 Atlantic as its first loco after being converted to 15-inch gauge from a 2ft gauge horse tramway – this is a different one but curiously carries the same name!

PHOTO 1: 'Prince Edward of Wales' loaded onto the trailer in Rhyl. Scale 15-inch gauge locos can be fairly portable...

PHOTO 2: The Prince has a first test steaming outside the workshop in Fairbourne.

PHOTO 3: Residue from the tender gunking up the injector.

PHOTO 4: Jack of all trades – a bench added to Beach Halt.

PHOTO 5: In disgrace – the Sutton railcar on view. *Photo: Andrew Charman*

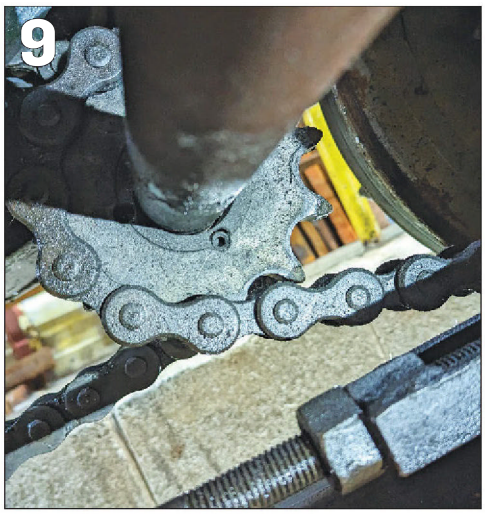
Photos by the author unless stated

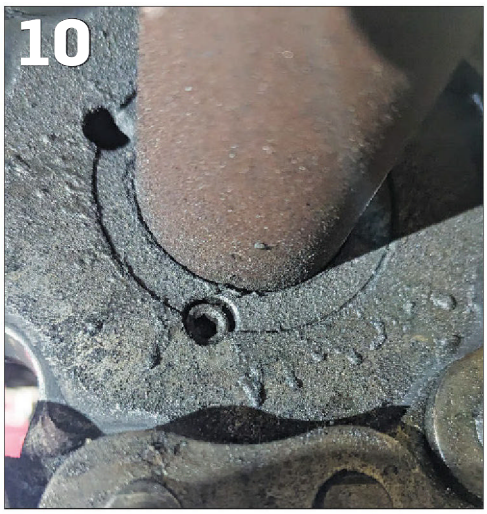
Testing times

A trip up to the sunny north coast of Wales with the trailer soon had Prince Edward of Wales onto Fairbourne metals and the following day it was steamed to make sure the transport hadn't affected anything. As it turned out, the shaking around and draining of the tender mush have allowed some sediment to get pulled through into the injectors and these needed cleaning out, but apart from that it was good to test.

Once we got the loco out on our 15-inch gauge line we discovered the tender wheels didn't like one of our points and required very careful driving over – a very useful thing to find out before an event rather than during it...

Among the many other little jobs





that crop up just before a Gala was to put a bench that had been donated to the village out at Beach Halt for everyone to enjoy – not the most technical task for an engineer but yet another little job necessary to keep the railway going and improving!

The other visiting 15-inch gauge motive power arrived on the Friday before the gala – this was the Sutton Railcar, a beautiful loco based in looks on the GWR railcars. Unfortunately this had some major carburettor issues and wouldn't run, despite being absolutely fine the weekend before!

In the end I ended up bringing in an old Morris Minor carb that I had lying around at home to rebuild and try on the railcar. Of course the first screw I attempted to remove snapped off in the float bowl casting requiring some careful machining to remove successfully and make it all work.

Over-speed

I managed to get it all together and the engine would then run but it wouldn't get anything close to an idle, the large six-cylinder lorry engine being somewhat larger in displacement than a Morris Minor... The railcar had a single trip out but was running just too fast to be used comfortably with its high idle speed so unfortunately spent the rest of the weekend on display. The custodians of this engine have since sorted the carb issues and it has since run at the recent Tyseley Works open day held in Birmingham.

Unfortunately the Fairbourne's home 12¼-inch gauge fleet did not get through the weekend unscathed – our Simplex, which regular readers will remember started ife as a 2ft gauge loco, was double-heading with the Littlehampton Miniature Railway's diesel electric 'Albert' which suffered from overheating while going backwards, so the Simplex took the weight of the train going in one direction and Albert took it back the other way.

PHOTO 6: Machining out the broken bolt on the carburettor float bowl.

PHOTO 7: New carburettor and pump ready to be fitted to the Sutton railcar.

PHOTO 8: Taking the strain – 'Albert' and the Simplex 'double-heading' while actually working singly... *Photo: Andrew Charman*

PHOTO 9: Simplex failure with the taper lock bushes spinning on the layshafts.

PHOTO 10: Clearly visible is all the cast-iron filth that has leaked out along with the gap onto the shaft.

"The taper locks spun to the point where the cast iron wore away and they just spun on the shaft..."

PHOTO 11: Failed welds in the bottom of the plate of the Barmouth Ferry point.

PHOTO 12: Once the Simplex layshafts were dismantled a closer study showed that the sprocket itself and the machined taper lock still looked good.

PHOTO 13: Fixing the issue involved machining a keyway into the layshaft and fitting new taper locks.

PHOTO 14: A sleeve for the pillar drill machined and ready to heat up.

PHOTO 15: The pillar drill sleeve shrunk on, you can clearly see the temperature gradient.

PHOTO 16: All assembled onto the stand that formerly sat in the Editor's garage and working well.

This strain of hauling a train of eight carriages and Albert caused two of the taper locks to start spinning on the layshafts on the Simplex. My initial response to this was to crank the taper locks as tight as I could but unfortunately the taper locks spun to the point where the cast iron wore away and they just spun on the shaft. This final indignity happened on the Sunday afternoon so it wasn't too bad, but just added to my work over the next few days.

Point to the problem

The final interesting issue at the Gala was the discovery of a welded-on tapped sleeve that held the point lever to the sleepers at Barmouth Ferry station had parted company – the last train of the day went over the point with it clamped to the correct direction while we came up with a solution to the problem.

Drilling out the welds, chiselling the timbers out and fitting much larger bolts was the best and easiest answer and with some help from our friends at the Talyllyn Railway who supplied the bolts (we had the nuts, just not any bolts of the right length) the point was back in action correctly by the time the first train ran over it on the Monday morning.

Once the excitement of the Gala was over and I had taken a couple of days off to recuperate, followed by returning Prince Edward Of Wales to its home line at Rhyl, I could then start repairing the Simplex. I removed the layshafts, machined the keyways into them that I should have done to start with and then re-fitted the sprockets with new taper locks and new keys to prevent the same thing happening again.

I then spent a few hours on one of the jobs to finish of the workshop upgrade, which was to sleeve a floor-standing pillar drill base we had been donated by our Editor to take the better drill head from an existing half-height pillar drill.

I machined the adaptor on the lathe as a simple turning and boring job, before heating it up to a grey temperature and dropping it onto the top of the base. Once it had cooled and set solid I then fitted the head and another job was ticked off the list of workshop improvements.

Can't see the wood

I was then asked to do a bit of woodworking – this is not one of my favourite tasks but I have been known to do a bit in the past, so a pair of decorative posts were knocked up using a router and some patience so the pair of rotten supports for the front of the museum building canopy could be replaced.

If you are in Fairbourne any time soon you will be able to tell the first face I machined as it has all the mistakes in it... These were mostly caused by me forgetting which way the router tends to pull when cutting and not compensating correctly.

I then set to and washed out our Darjeeling Himalayan Railway loco 'Sherpa', which revealed the need for a set of new gauge glasses – the method for cutting these I have described elsewhere in this issue.

I also investigated the strange occasional squeak that could be heard coming from the tender – this turned out to be a tired bearing housing

Woodworking is not one of my favourite tasks but I have been known to do a bit...

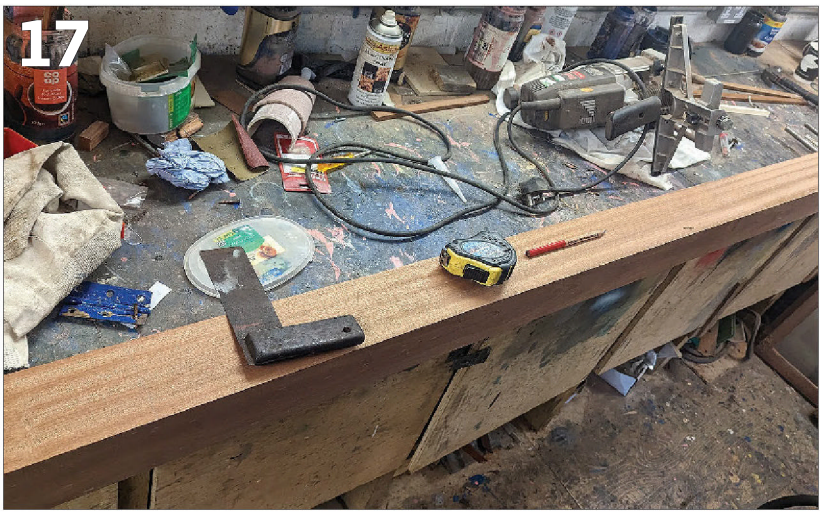


PHOTO 17: A bit of wood butchery making decorative pillars for the museum building canopy.

PHOTO 18: The pillars ready to be fitted – don't look too closely at one of them!

PHOTO 19: The source of a squeak on 'Sherpa' – a gap where there should be no gap between the axlebox and wheel centre.

PHOTO 20: Amazing what you might find when you remove a wheel set – or any part, from a locomotive...

so I decided to change them all.

This wasn't as easy as expected however as they all needed machining and modifying before they could be fitted and before I could start on this, one of our track gang handed me the side-control spacer from the inside of Sherpa's axlebox. So I had to put the tender back on its wheels and prep the loco to drop one of its axles.

Due to actually having some time off and running another event at the Welshpool & Llanfair Light Railway, that's all I have achieved this month, which has been a significantly less stressful time than the last few! EIM

■ For readers who want to see the fruits of Harry's labours first-hand the Fairbourne Railway is running daily during August – details and timetables are at www.fairbournerailway.com

Party time on the rails

Several miniature railways have held Galas in recent weeks and some celebrated significant anniversaries. Our three-way focus starts with Tech-Ed Harry's line at Fairbourne...

ABOVE: As described in this month's *Harry's Game* 'Prince Edward of Wales' was the big 15-inch attraction at the Fairbourne Gala on 27th-29th May.

LEFT: With the Sutton railcar misbehaving, historic Fairbourne Lister i/c loco 'Gwril' took the other end of the 15-inch gauge top-and-tail train.

BELOW: "Ooh how big you are..." Visiting Littlehampton diesel 'Albert' rests on the turntable at Fairbourne.

BOTTOM: 'Albert' and the Lister, double and single-heading on the 121/4-inch gauge, (see *Harry's Game*...) are ready to leave Penrhyn Point as 'Sherpa' takes a break.

BELOW RIGHT: Through the forest – of signs! 'Russell' behaved itself all weekend after Harry's recent ministrations.

Photos: Andrew Charman

The Littlehampton Miniature Railway celebrated 75 years of entertaining visitors to the Sussex seaside resort over the weekend of 24th-25th June, and marked the anniversary in style with a pair of visiting steam locomotives.

The line opened over the Whitsun weekend of 15th-17th May 1948, having been built by Billingshurst miniature railway specialist H G Cookson. There were several 12-inch gauge lines operating in the UK at the time but Cookson chose the then highly unusual gauge of 12¼-inch, arguing that the extra width would add stability. Today Littlehampton is the oldest of a small number of UK lines to this gauge.

Chequered history

The line has always operated over a route of around half a mile between Norfolk Gardens and Mewsbrook Park, and always in conjunction with the local council. At one point the line became very run-down and more than once faced closure, most recently in 2015. However a new Littlehampton Heritage Railway Association was set up and has run the railway ever since, its volunteer members making many improvements – the LMR is enjoying its brightest times for many years.

Visitors helping the line celebrate its big birthday included Exmoor Steam Railway-built 'Rosemary' from the Exbury Gardens Railway, and 'Mad Bess', the Penrhyn Hunslet-style loco that is the only steam engine on the Ruislip lido Railway in north London and which was built over 12 years by the line's supporting society.

Mad Bess is also actually 12-inch gauge, but proved well within allowed tolerances when working services alongside Rosemary and resident Littlehampton steam loco, the also Exmoor-built 2-6-2T 'St Christopher'.

TOP: 'Rosemary', visiting from Exbury, runs past the Littlehampton swimming pool (behind the photographer) working a morning service from Mewsbrook Park to Norfolk Road.

ABOVE: 'Mad Bess', the Ruislip Lido Railway's Penrhyn/Ffestiniog-style resident steam loco, has just brought an afternoon service to a stand at Norfolk Road, in glorious weather.

BELOW: The Littlehampton line has likely never previously had such an impressive locomotive line-up on shed at its Mewsbrook Park headquarters.

Photos by Phil Barnes

Remarkably, two UK miniature lines celebrated the same anniversary within a fortnight of each other, and in neighbouring counties! Some 55 miles east of Littlehampton in Kent, the 10¼-inch gauge Hastings Miniature Railway has also clocked up 75 years, and celebrated the milestone over the weekend of 3rd-4th June.

This line can trace its origins back to a couple of 10¼-inch locos owned by Captain Howey, who built the 15-inch gauge Romney, Hythe & Dymchurch Railway. Howey ran his locos on a short 10¼-inch line which he established at St Leonards-on-Sea but complaints by local residents saw it closed within a year, relocated to Hastings and sold, its buyers including railway book publisher Ian Allan.

The line was established in 1948 at Rock-a-Nore, adjacent to a historic fishing village, running along the beach and later being extended to Marine Parade, giving it a full length of 600 yards.

ABOVE: The resident Hastings 0-4-0ST 'Firefly', carrying the name of the line's pioneer locomotive, at Marine Parade.

CENTRE LEFT: The 0-6-0 'Pilgrim', built originally for the Wells & Walsingham Light Railway, pauses at East Beech Loop.

LOWER LEFT: An eclectic selection of non-steam motive power was to be seen on shed at Rock-a-Nore, here the similarly gauged but very differently sized 'Uncle Jim' and 'Meteor V'..

Photos by Jonathan James

Rescued from decline

Seasoned miniature railway reporter Jonathan James, who took the photos here and on our cover, tells us that after a period of decline, the current operator has fully refurbished the railway, reinstalled the passing loop at the former East Beach Street station and built up an interesting collection of rolling stock and locos.

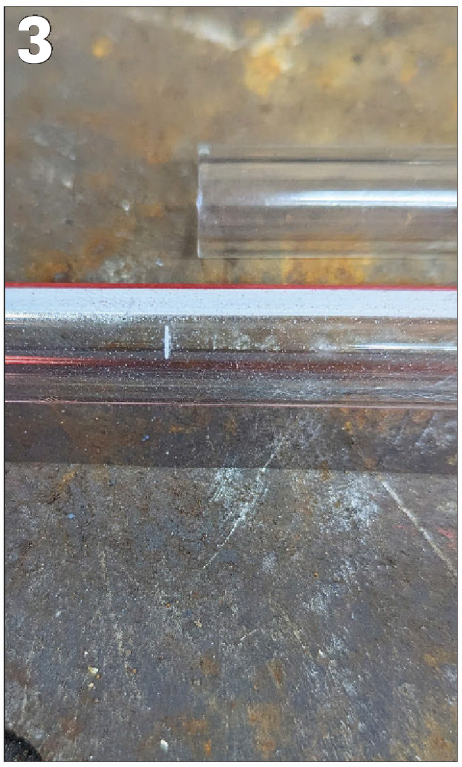
Trains were running at frequent intervals over the anniversary weekend, passing each other on the loop, with various special workings continuing right into the evening.

There were also a number of visiting locomotives at the event from the Ropley Miniature Railway at the standard-gauge Mid Hants Railway and the Eastleigh Lakeside Railway near Southampton Airport. EIM

A delicate matter

Sooner or later you will need to replace a locomotive water gauge glass – Harry describes an effective and simple way to arm yourself with a set of spares.

BY **HARRY BILLMORE**



Over the years I have been asked quite a few times the best way to cut glass tubes for use in locomotive water gauges – what follows is the best way I have found of doing it. This works for any sized tube, from the tiny ones on my O-gauge locos to those on full-size locos as well.

I have included at the start a picture (Photo 1) that shows why it is a good idea to regularly check your gauge glasses. At the 12¼-inch gauge Fairbourne Railway where I work the water gauge tubes are taken out and inspected every time that a boiler washout is carried out. The tube in the photo was extracted from our 6-inch scale Darjeeling Himalayan Railway 'B Class' 0-4-0ST 'Sherpa', and you can see that it is badly necked where the steam has worn away the glass and thinned it down.

Score on the tube

When preparing a new tube you will likely obtain a length of suitable diameter tube from a glass supplier (Photo 2). The first thing to do is to file a small score or notch into the glass at the correct full length of the glass you need (Photo 3) – a triangular needle file is highly suitable for this task.

PHOTO 1: The reason for replacement, necking caused by steam pressure is visible at the end of the tube.

PHOTO 2: A length of gauge glass tube as it comes straight from the supplier.

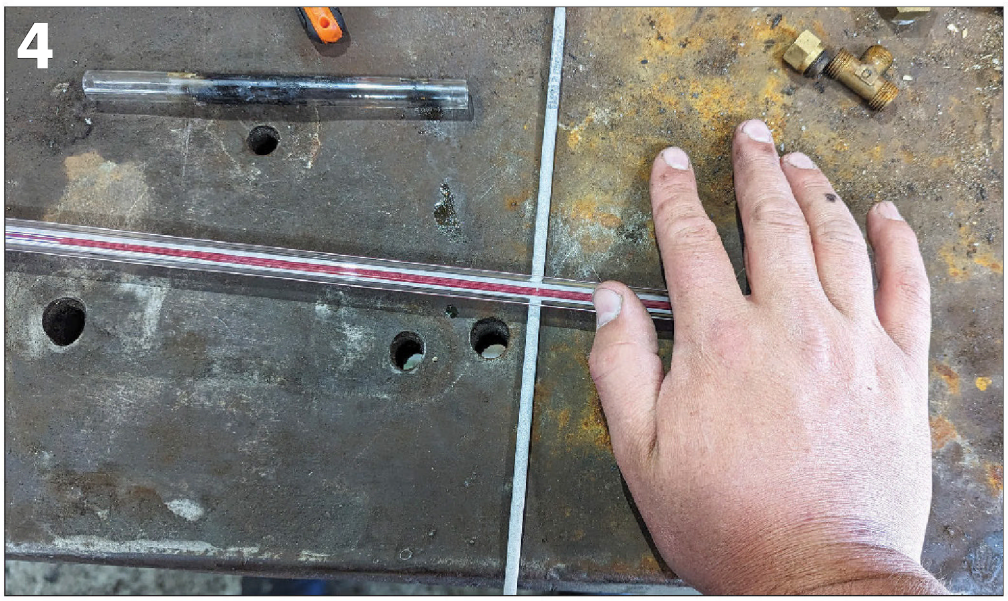
PHOTO 3: Using the old glass to get the correct length, scoring the new glass with a triangular needle file.

PHOTO 4: Pressing down gently on either side of the score mark with a welding rod providing a fulcrum.

Photos by the author

Once you have done that, place the length of glass tube on a piece of wire or other small lump to act as a fulcrum – I have used a welding rod – with the score facing upwards directly over the rod. Then apply gentle pressure equally on both sides of the rod (Photo 4) until the glass breaks at the score mark (Photo 5).

Once you have your glass to the correct length, it will likely have sharp edges (Photo 6). ▶



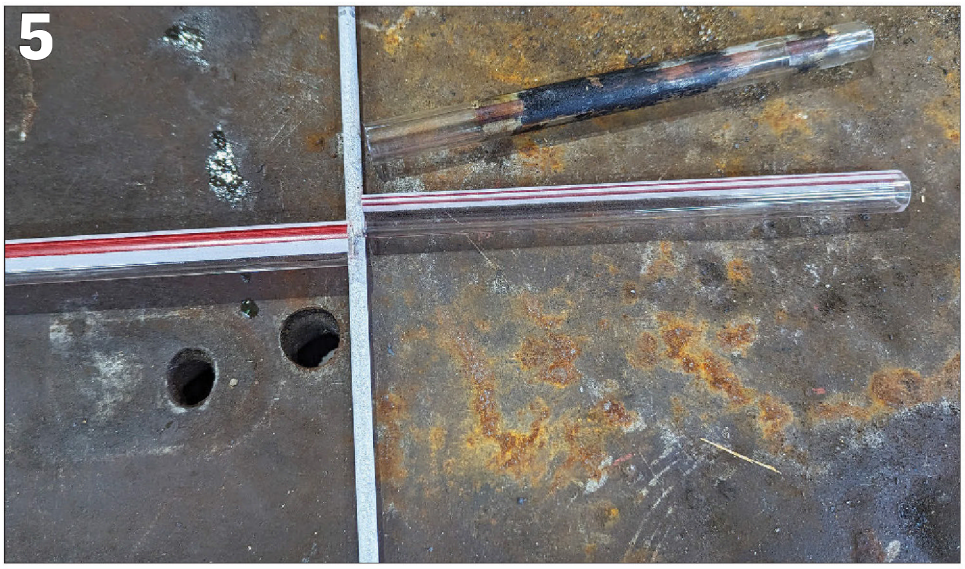


PHOTO 5: The glass tube breaks cleanly around with the break propagating from the score mark from earlier.

PHOTO 6: The freshly split tube – note the sharp edges.

PHOTO 7: Using a torch to gently heat the end of the tube up until the broken edges are just glowing.

PHOTO 8: The resulting glass finished, with the edges rounded off to prevent cracking and tearing up of the seals.

PHOTO 9: A spare set for each of the locos in the Fairbourne fleet.

It is then a good idea to round over the ends – this both prevents cracks forming and then propagating down the glass from the sharp broken corners and ensures that the sealing rubbers don't get torn as you insert the glass.

I use an oxyacetylene torch to heat the end up just until you see the sharp corners glow red then let cool in air (Photo 7).

With this task complete you will have a gauge glass the correct length and ready to fit (Photo 8). Since I had a long length of glass to hand and was set up for doing the job, I then made a spare set of gauge glasses for each of the locos in the Fairbourne Railway's fleet (Photo 9). EIM

Enjoyed this feature but reckon you could have written it? *Engineering in Miniature* has a constant need for new contributors and new features on all subjects involving model engineering, events to workshop techniques, locomotive builds to road and stationary engines, clocks and marine.

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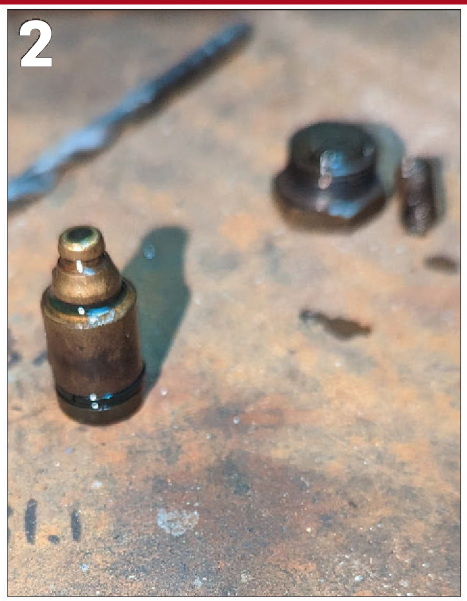
Seat of the problem

More cutting from Harry as he chases a pair of persistent steam leaks – as ever his techniques are as relevant to Gauge 1 steamers as they are his 6-inch scale locomotives.

BY **HARRY BILLMORE**



There have been a pair of niggling little steam leaks that have been affecting two of the locos at the Fairbourne Miniature Railway in recent times, one being a leak from the left-hand side trailing draincock of the Darjeeling Himalayan Railway 'B class' 'Sherpa' and the other a persistent leak that was producing a persistent wisp of steam from the left-hand side clack on our Welsh Highland Railway-style Hunslet 2-6-4T 'Russell'.

These two problems each took a slightly different approach to resolve to my satisfaction – the draincock required the seat to be re-machined as well as the shuttle before lapping them together, while Russell's clack only required the seat to be re-machined but in somewhat of a creative way.

Suitable sink

The drain cock I discovered had a bore size that was a perfect sliding fit for one of my countersink bits, so I used this to re-cut the seat before setting it up in the lathe to match the cutter angle in order to re-machine the shuttle.

This turned out to need the lathe's cross slide setting to 45 degrees, and I confirmed this after removing the bit using a square. I could then machine the shuttle to match the body and then I drilled and tapped the back end to allow me to lap the two parts together easily. With that all done I could then

"Russell's clack only required the seat to be re-machined but in somewhat of a creative way..."

PHOTO 1: The draincock body with the sealing seat located a long way down.

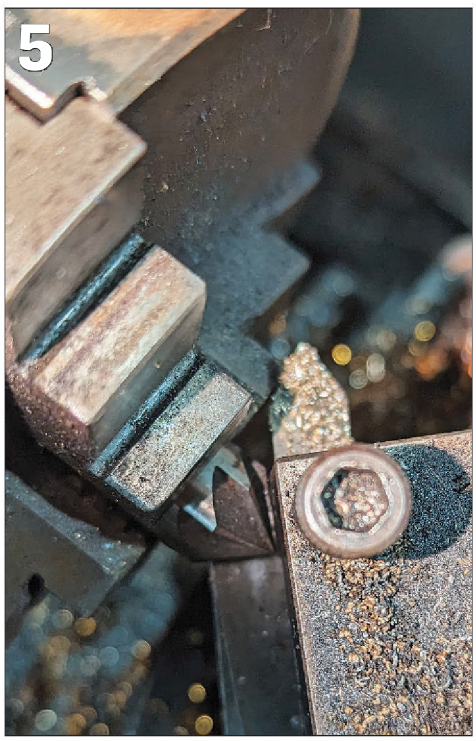
PHOTO 2: The draincock shuttle with its random groove for an O-ring.

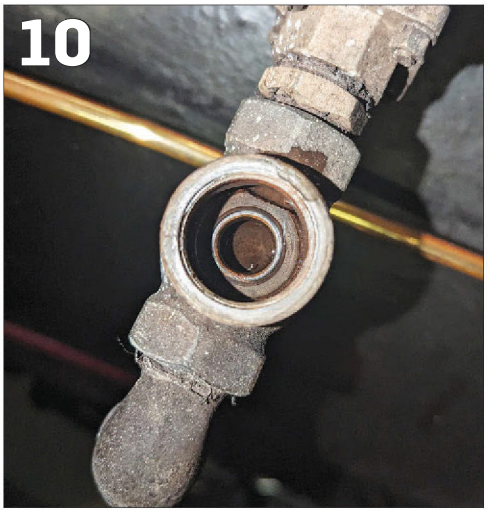
PHOTO 3: This countersink bit proved to be a very nice fit down the bore of the draincock body.

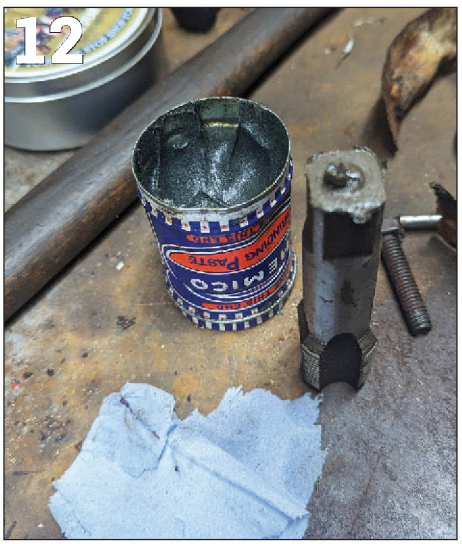
PHOTO 4: The freshly cut seat can be seen shining in the bottom of the hole.

PHOTO 5: Setting the lathe's cross-slide angle to matchthat of the cutter.

Photos by the author







reassemble it all and put it back on the locomotive.

Creative thought

Russell's clack required a little more creativity as there was no easy way of holding the body to re-machine the sealing face. So I decided to use a large milling cutter to re-cut the seat by hand which worked well.

I then used the ground flat back end of a large tap to lap the seat flat – I couldn't use the clack follower to do this as it is a Teflon seal.

With this all done I could then reassemble the clack and test it, with the satisfaction of no longer having to endure unwanted steam wisping out of the injector! EIM

PHOTO 6: Double-checking the angle of the cutter.

PHOTO 7: The sealing face of the shuttle was re-cut to match the angle of the cutter.

PHOTO 8: A hole was then tapped into the back of the shuttle to allow for lapping.

PHOTO 9: With a decent lapped ring on the sealing face, the draincock can be reassembled and tested.

PHOTO 10: The clack in position with the offending sealing seat showing the pitting that is causing it to leak.

PHOTO 11: A little work by hand with a large milling cutter removes the bulk of the offending material.

PHOTO 12: Using the back end of a large tap with a ground flat surface to lap in the sealing face.

PHOTO 13: The resulting seal, all good to go back together and to be refitted to the locomotive.

Just don't do it...

Dave describes a lubrication issue that meant after 30 seconds, he couldn't see..

BY **DAVETHESTEAM**

When I got my Sweet Pea loco running after its intermittent (over the preceding 10 years or so) rebuild, I fitted a couple of the excellent lubricators made by Steam Fittings – one lubricator per cylinder with a check valve on each valve-chest cover.

At the time everyone seemed to advise fitting check valves in the oil delivery line. These lubricators use the Jim Ewins style of controlling the delivered oil using two O-rings and different widths of spacer between them, to adjust the amount of oil delivered. They are piped into the middle of the valve chest covers, to accurately drop oil on top of the valve.

I have had lots of trouble with this engine – the only part of it I have not fixed or modified is the boiler, so it took a while to get much 'go' out of it. This was the result of buying an engine without running it on a track pulling passengers, another 'Don't' really... – references to rice pudding and its skin were appropriate.

No vision express

When I got it so that it would actually run for more than a couple of wheezy chuffs I found that my spectacles quickly became quite difficult to see through, something like slow 'custard pie in the face' syndrome. My track is a bit over 200 feet in length and I was emptying the lubricators in a couple of circuits. Clearly this was wonderful for the valves and cylinders but not for seeing where I was going!

Since it was not obvious why this was happening I decided that in order to find out what was going on I needed to understand how the Ewins lubricator worked rather than just fitting it. The mode of operation was not anything like I expected. The diagrammatic representation of the lubricator (Figure 1) should be examined in conjunction with the following description.

The lubricator works as follows – we start the sequence with the piston at the top of its stroke and with the lubricator full of oil to the bottom O-ring and the delivery pipe full of air. This situation will only apply to a new engine since as soon as it has travelled far everything is filled with oil, but I think considering this 'new' state makes explaining things a bit easier.

As the piston descends it displaces oil into the reservoir until it seals on the top O-ring.

The piston then pushes oil past the bottom O-ring and the ball, which is lightly sprung onto the bottom O-ring, into the steam pipe and it will continue to do so until the bottom of the stroke, pressing the ball off the O-ring when it reaches it. This means that the amount of oil pushed into the delivery pipe is equal to the displacement of the piston from the top O-ring to the end of the stroke.

The piston then retracts, and this is the clever bit – whilst the ball is held off the O-ring the oil retracts up the delivery pipe!

When the ball re-seats the oil left in the delivery pipe stops moving and the retracting piston creates a vacuum in the cylinder, so that when the piston clears the top O-ring the oil is drawn into the cylinder.

The cycle is now complete and if you visualise repeatedly pumping out the amount of oil displaced by the piston and then subtracting the amount of oil drawn back up the delivery pipe you will see that the amount of oil actually 'delivered' on each stroke is equal to the amount of oil between the two O-rings.

The oil will go along the delivery pipe in a series of forward and reverse pulses and when it reaches the end of the delivery pipe the measured amount of oil is pushed from the end of the pipe, followed by the retraction of the column of oil in the delivery pipe.

No checks required

That's how it is supposed to work, however if you put a check valve in the delivery line all the oil displaced by the piston is pushed past said valve and therefore cannot retract up the delivery pipe. Therefore when the piston clears the top O-ring the vacuum in the empty cylinder and the empty part of the delivery pipe between the lubricator and check valve is filled with oil. The amount of oil delivered under these conditions is of course somewhere between several and many times the amount intended.

As I had fitted check valves on the valve chest-cover I had created an incorrect operation sequence. So don't fit a check valve with a Ewins-style lubricator, the ball on an O-ring is the best type of check valve you can use for oil and it's already part of the design.

The amount of oil delivered is adjusted by changing the length of the spacer between the two O-rings and the lubricator is capable of delivering extremely small amounts of oil reliably. Our small engines are generally considerably over-lubricated, but the additional oil and cost is a small amount of inconvenience and does help to prevent corrosion in the cylinders in the relatively long periods of inactivity between visits to the track. However when you can't see, it has got a bit out of hand!

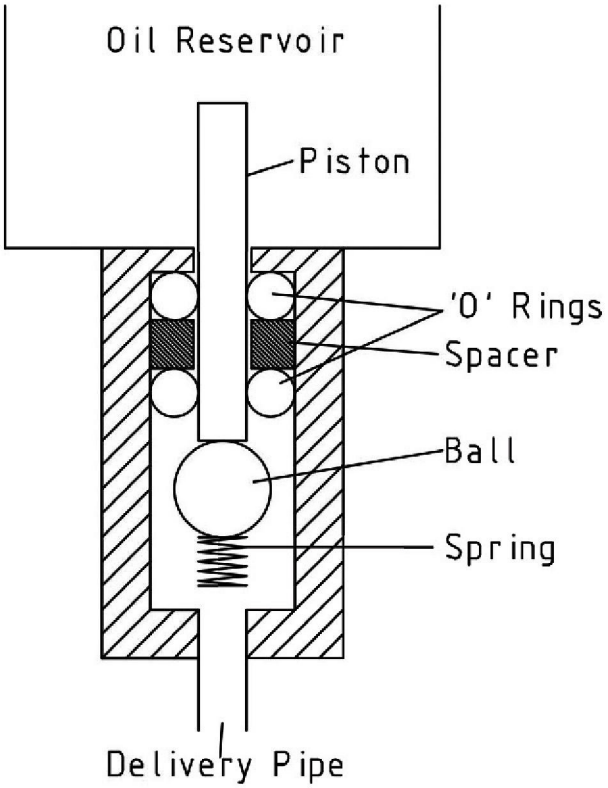
"When I got it so that it would actually run I found that my spectacles quickly became quite difficult to see through...

I hope this explains the operation of Jim Ewins's lubricator satisfactorily. The only critical maintenance points are to use clean oil (grit of any sort won't do anything any good) and to replace the O-rings every now and then – a winter strip-down, clean and new O-rings is a good plan.

When the rings wear or if they are an incorrect size they can leak oil in either or both directions, reducing the oil delivered and eventually letting steam back into the tank. If you have made your own lubricator make sure that you know the size of O-ring and stick to it and if you are using a commercial design it might be best to get them from the manufacturer.

Happy lubricating! EIM

FIGURE 1
Diagram of a Ewins-type lubricator



An improved Schools – building a Roedean

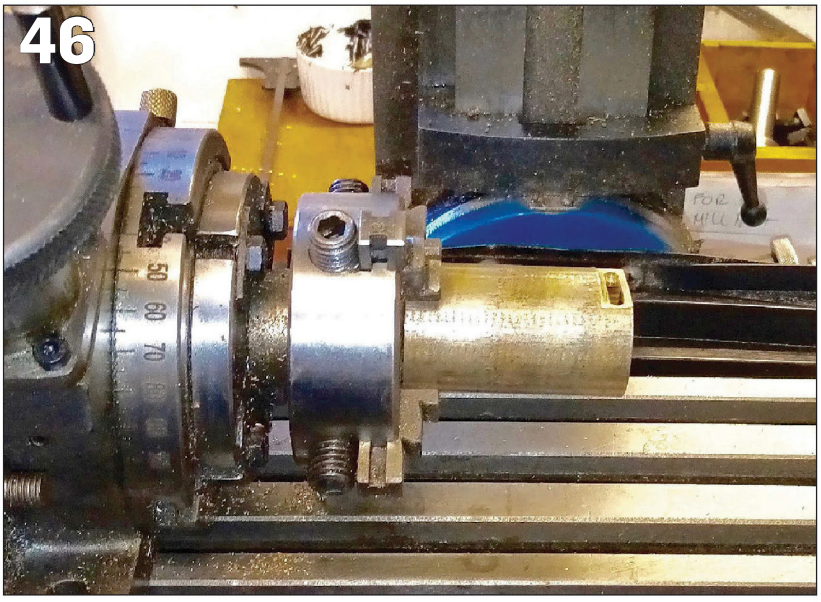
Nick constructs the cylinders of his 3½-inch gauge locomotive project, deciding on a fabricated approach rather than investing in expensive castings.

BY **NICK FEAST** Part Seven of a short series

PHOTO 46: The rotary table is not necessary for this milling operation, but made it easier to hold the work. The flat dimension matches the size of fillet shown on Figure 7.

FIGURE 7: A section of material is needed to connect the ports on the valve housing and cylinder bodies together. This is drilled and milled out to match the porting before assembly and soldering.

Photos by the author



There were a couple of reasons for deciding to fabricate the cylinders for this locomotive. Firstly there was the opportunity to make the steam passages much larger and closer to prototype proportions, thereby improving efficiency and hopefully performance.

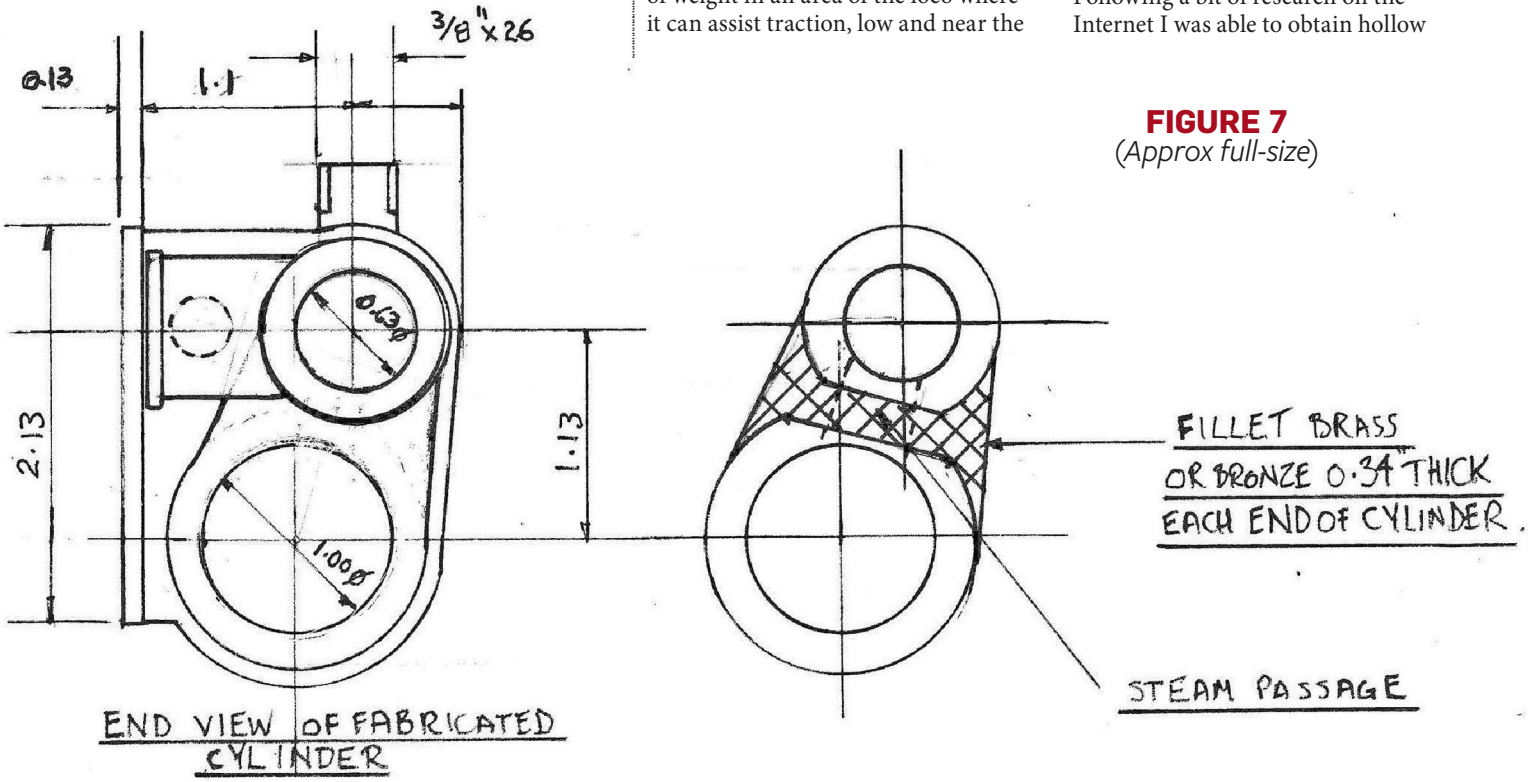
There would also be less mass of material, so the time and energy taken to get the machine up to operating temperature would be less. Continuous running on a club track is a rarity, stop-start operation is the norm, so a quick warm-up and well-insulated cylinders are an advantage. Cost should be less; a set of proprietary castings is now nearing £500 without postage!

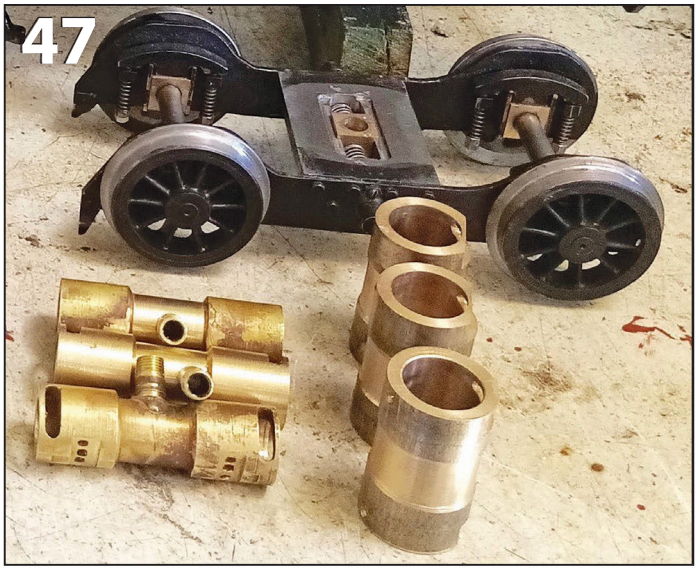
The only real drawback is the loss of weight in an area of the loco where it can assist traction, low and near the front. I have countered this by using heavy-gauge tube for the smokebox and adding weight wherever possible, although there is not much spare room on this small locomotive!

Bronze benefit

Following a bit of research on the Internet I was able to obtain hollow

FIGURE 7
(Approx full-size)





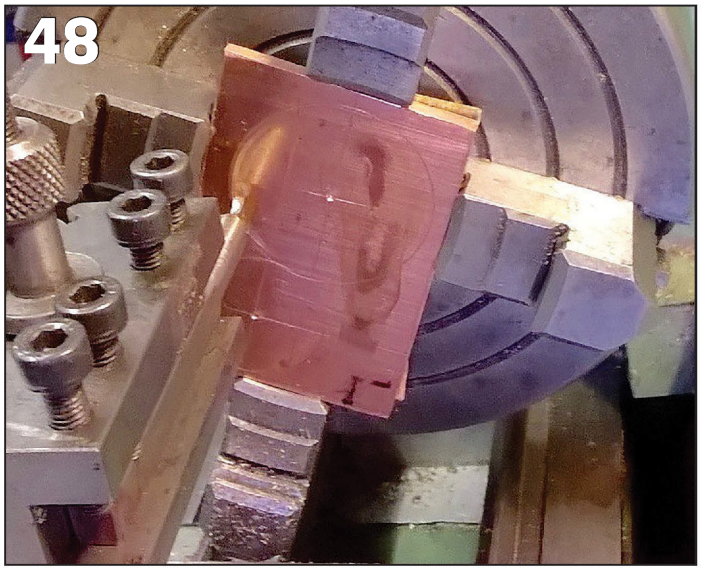


PHOTO 47: The use of hollow cast bar reduces cost and machining time considerably – a wide choice is available. As much surplus material as possible is removed to reduce the amount of mass that has to be heated up in operation. The completed bogie in the background is similar to the 'Lord Nelson' design that was later used with very few changes on the Bulleid Pacifics.

PHOTO 48: First stage in cutting out the frames with a piece of ⅛-inch copper plate in the four-jaw chuck. The tool has a thick knife profile and care is needed to avoid overloading it.

PHOTO 49: A set of frames for an outside cylinder brazed up with the hole for the exhaust pipe drilled in the mounting plate.

PHOTO 50: A set of frames for the inside cylinder.

PHOTO 51: This collection of parts shows the valves and spindles already made and the valve and cylinder parts during machining. Piston rings were made from glass reinforced PTFE and fitted later.

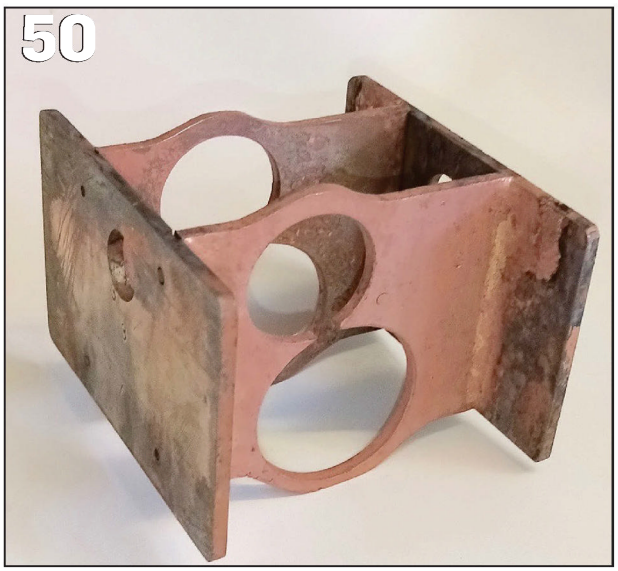
cast bronze bar for both the cylinders and valve housings. This saved a lot of time and money as very little machining was required to achieve the required diameters.

Figure 7 shows how a fillet of material, either bronze or brass, is used to make the passages between the parts of the fabrication.

Photo 46 shows one of the cylinder tubes held in rotary table for milling the steam transfer passage; a flat has already been milled across the end of the cylinder. In Photo 47 we have completed the milling operations on the cylinder and valve chamber parts and silver soldered the steam pipes onto the valve bodies. Note the size of the exhaust ports. Any material not essential for strength has been turned away.

The frames that hold the two cylindrical parts together were cut from ⅛th inch copper plate, along with the mounting plate. These can be profiled by cutting and chain drilling; alternatively as shown in Photo 48 the lathe can be used to cut the profile. Low speed and the use of plenty of lubricant is required.

Photo 49 shows one of the outside cylinder frames brazed together; Photo 50 is the middle cylinder, or 'middle engine' as a railway workshop would call it. It would also have been possible to use brass plate for these



18+

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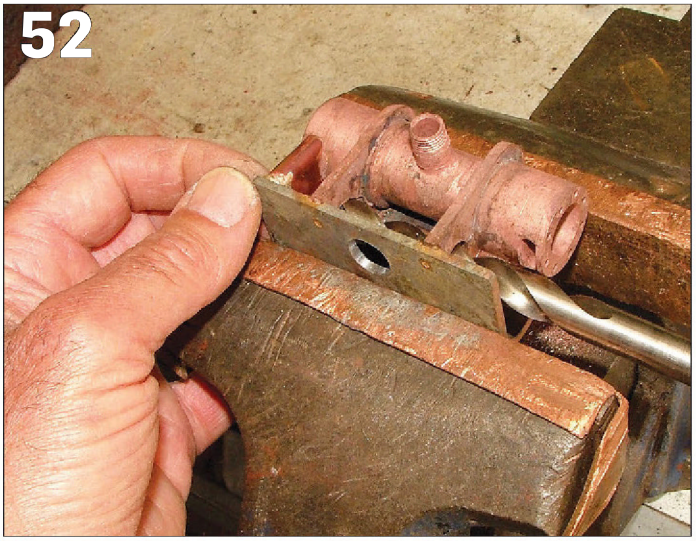
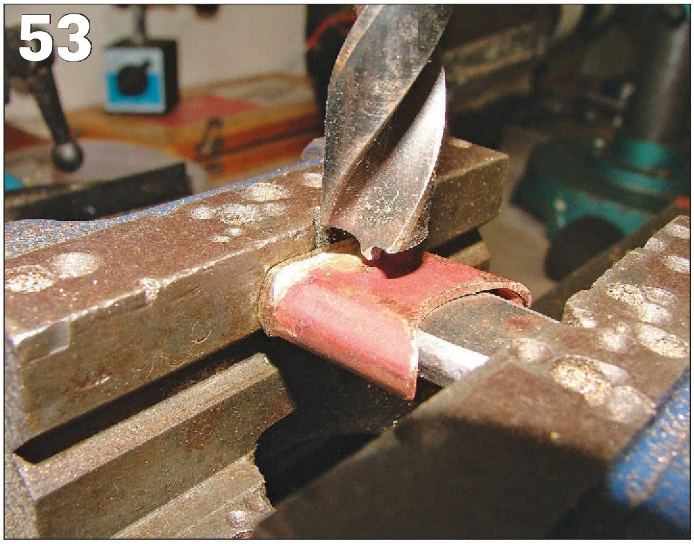
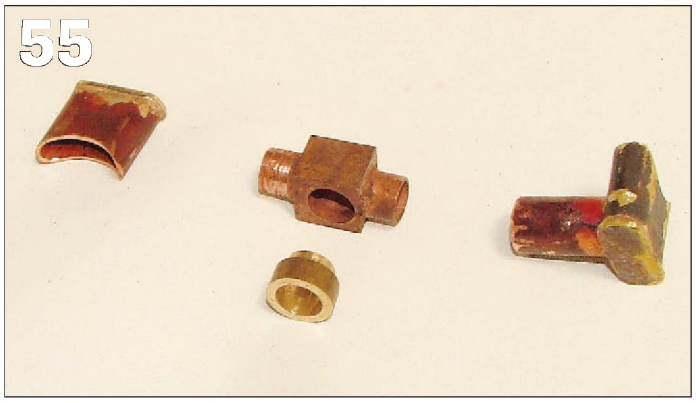
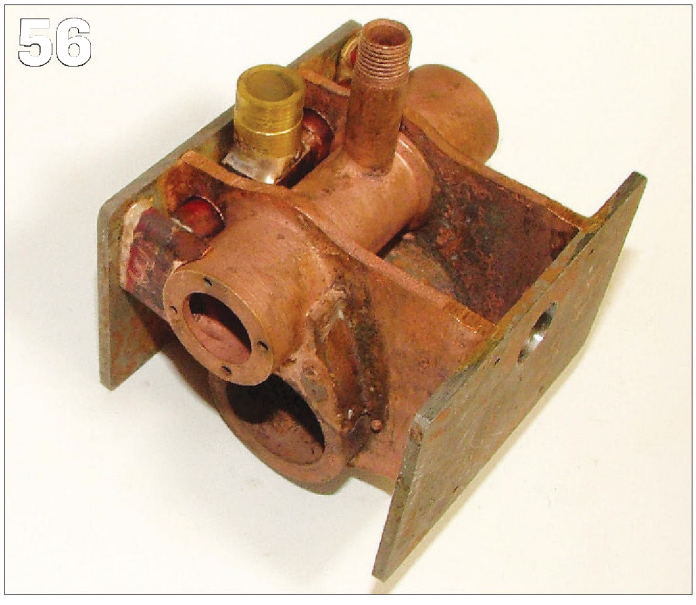








"I decided that once hardened with age, the material would be hard enough to withstand bolting up in the frames as long as adequately sized fasteners were used..."

PHOTO 52: Checking the fit of an exhaust manifold and marking the centre for drilling the hole for the connecting pipe.

PHOTO 53: Drills ground in this form will be familiar to anyone who has made a copper boiler; they make a neat job of drilling large holes in thin soft material.

PHOTO 54: Old storage radiator bricks are not the most efficient as a hearth but they are cheap and durable. I do have the correct insulating blocks for more demanding jobs!

PHOTO 55: Almost all the parts for one set of exhaust pipes shown here.

PHOTO 56: The middle cylinder with most of the pipework completed. The next stage is to fit the top plate and join the exhaust pipes together.

frames but then the whole kit would have to be assembled in fewer stages than I was able to use by selecting copper. Although soft when first annealed, I decided that once hardened with age, the material would be hard enough to withstand bolting up in the frames as long as adequately sized fasteners were used, with washers if necessary.

Photo 51 shows the cylinder parts in various stages of production. There was a certain amount of trial and error involved as this was the first time I had tried this method of construction. The cylinders are not yet started; valves are completed and fitted to their spindles. Valve spindle glands were fitted to the end caps later to make sure that there are no leaks of exhaust steam, which might spoil the draughting in service.

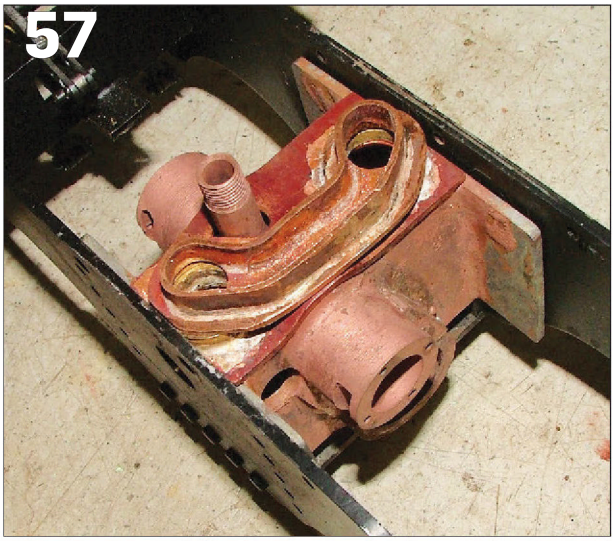
Figure 7 shows how the steam passages between the valve chest and the cylinder body are formed. The ports are milled through these fillets, one for each end of each cylinder, before the cylinders and frames are silver soldered together. I used 10BA brass screws to hold them in place. There will be bit of refacing required on the cylinder ends to ensure there is a good mating surface for the cylinder end caps.

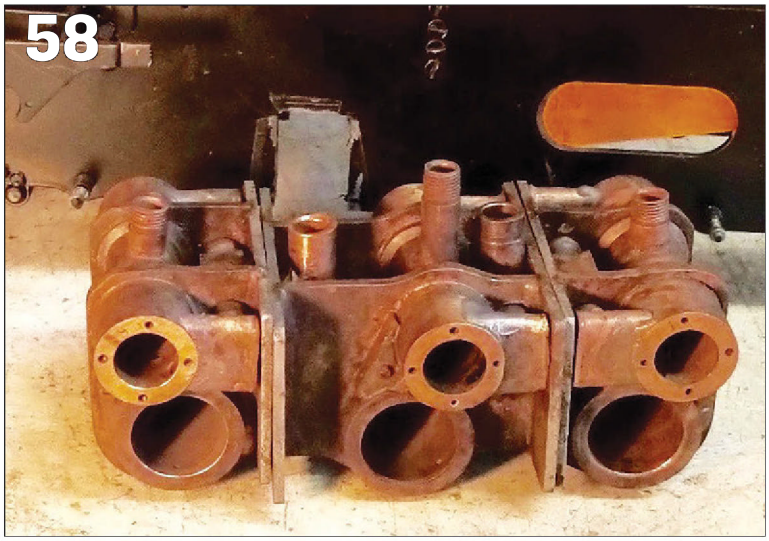
Exhausting progress

The next step is to fabricate the exhaust passages. Photo 52 shows one of the outside cylinders in the vice with the holes already drilled for the pipes to be fitted. I am marking the position of the opening needed in the little manifolds I have fabricated for each end of the valve chest with a suitable-sized drill.

Photo 53 shows how to make the circular hole needed to fit the exhaust pipe. A suitable sacrificial piece of mild steel is clamped tightly in the vice as shown and a drill ground as shown for copper boiler work is used.

Photo 54 shows the large-diameter





exhaust pipe ready to silver solder to the manifold. It is much easier to keep everything square if the pipe is left well overlength.

The exhaust from the left cylinder will be led through the frames and exit via a 90-degree bend up to the blast pipe manifold. However the right-hand and middle exhausts will need to be joined, and Photo 55 shows the parts before assembly. Some of the final soldering on the exhaust system was done using high-temperature soft solder to avoid melting some of the earlier silver-soldered joints. I doubt I will get enough superheat into the cylinders to cause any problems here!

Photo 56 is the middle cylinder with exhaust piping in position. In Photo 57 I am trying the blastpipe mounting for size, the location of the chimney on the LBSC design was accurate to the prototype so I am using the position as per the drawings, although I will be using the Bulleid modification of multiple jet blastpipe and Lemaitre chimney.

Photo 58 shows the finished cylinder set, ready to install on the frames, a satisfying use of many lockdown hours!

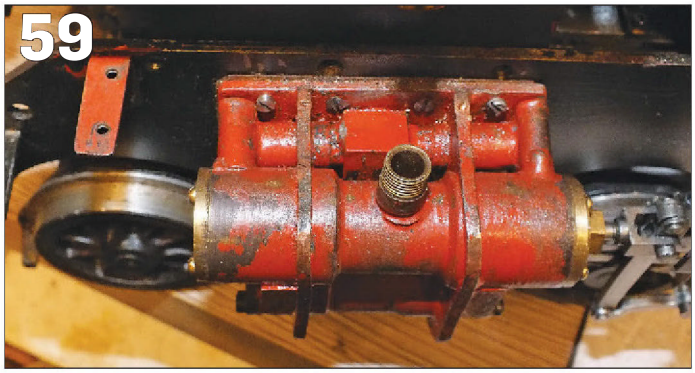
Photo 59 shows the finished left-hand cylinder in position; an extra row of fasteners has been added along the top of the bolting flange to supplement the front and rear rows.

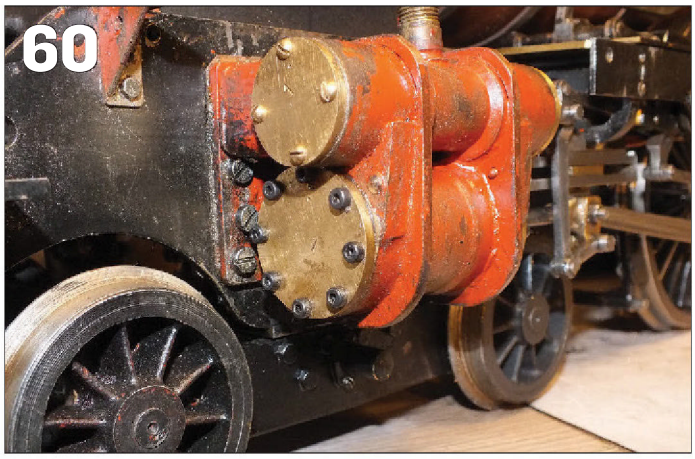
Photo 60 shows the way the fillet was fitted with the small fixing screws used during soldering visible.

Photo 61 is the rear view; insulation and cladding now need to be added. Spring-loaded cylinder drains will also be added instead of the usual drain cocks and linkages. EIM

■ Parts one to six of this series appeared in the February to July editions of EIM. To download digital back issues or order printed copies go to www.world-of-railways.co.uk/store/back-issues/engineering-in-miniature or call 01778 392484.

"I doubt I will get enough superheat into the cylinders to cause any problems here..."





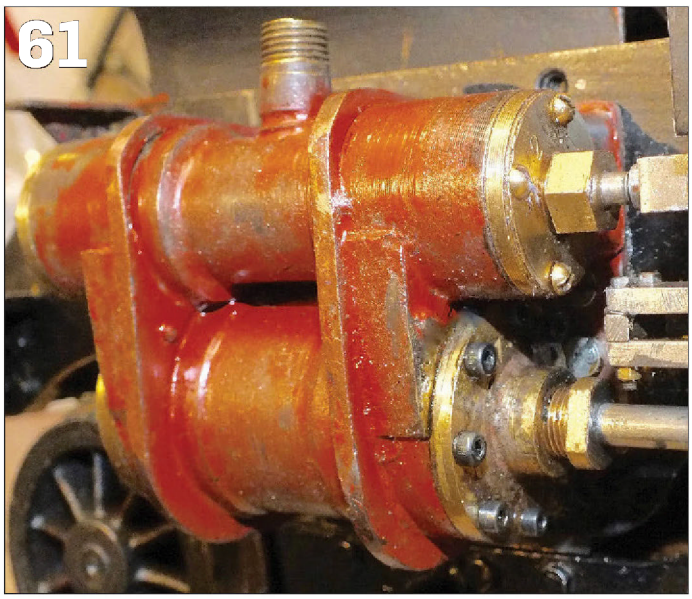


PHOTO 57: Looking from the front of the loco the nearest (right-hand) cylinder exhaust will join with the middle cylinder exhaust. The left-hand cylinder will have the far connection into the manifold.

PHOTO 58: A view from the back end of the three cylinders before mounting on the frames.

PHOTO 59: The left cylinder in position after testing on air, hence the coating of oil. The steam pipe connection on the smokebox is also visible.

PHOTO 60: The left cylinder from the front clearly showing how the fillets were used to create the transfer ports – the 10BA screws used to retain them during soldering are also visible.

PHOTO 61: Another view showing the cylinder glands. These were also fabricated and silver soldered rather than being turned from castings.

As seen on TV...

What happens when out of the blue a model engineering club is given an opportunity to take a starring role in a TV programme? Well it happened at York...

BY **ROGER BACKHOUSE, BOB LOVETT** AND **BRIAN SMYTH**

York Model Engineers recently enjoyed the sort of publicity most can only dream of with an appearance on Channel 4's *Hobby Man* series. The programmes took comedian Alex Brooker, best known for his regular appearances on *The Last Leg*, and friends around Britain looking for hobbies to try. These included home brewing, knitting, fly fishing, chess and lawn bowls.

For the programme originally due to be screened on 9th September 2022, but postponed due to the death of Queen Elizabeth II, Alex and celebrity chef Andi Oliver visited Yorkshire. They went gliding at the Yorkshire Gliding Club, tried dancing at Leeds Salsa Club and admired railway modelling first at the National Railway Museum and then with the Ebor Model Railway group. The programme makers also visited the York Model Engineers but due to an embargo on any publicity placed by the programme producers it wasn't possible to publicise the programme far in advance.

Television production company North One TV made the programmes with filming taking place at our clubhouse and track on 27th April 2022. These included scenes of York members busy on activities inside the workshop but most of the action took place outside.

Dave Foster displayed his Class 08 shunter to general admiration and then Bob Lovett showed Alex how to drive Richard Gibbon's Kerr Stuart Wren 0-4-0ST steam locomotive. Alex then drove around the track several times under the supervision of Bob, sitting behind with Richard in close attendance as guard. On one of the trips Alex stopped to pick up his celebrity companion Andi.

Atmospheric experience

Alex obviously enjoyed the experience of driving the engine saying afterwards, "It's as much fun as it looks". Andi also had fun and liked the smell of coal smoke (not something anyone under 50 is likely to have experienced) with Bob explaining that it was Welsh steam coal making the smoke.

The Society was first approached in March 2022 to ask if we'd be willing to participate. This was short notice as some of the production company's original plans had to be changed and the location logistics planning for the programme was already at an advanced stage. These were quite complex as the production company had an unusually big crew – extending to three camera operators, one sound engineer, the Director and a couple of assistants.

ABOVE: TV comedian Alex Brooker having rather more fun driving Richard Gibbon's Wren than perhaps he expected, with York ME's Bob Lovett keeping a close eye and TV presenter Andi Oliver enjoying the ride.

Photos in this feature courtesy of North One TV , Brian Smyth and Bob Lovett

York Chairman Brian Smyth noted that the committee saw this as an opportunity to earn good publicity for our hobby and hopefully attract new members to the society.

Following initial phone calls by the Chairman to explain what we had to offer and why model engineering was significant, a site visit was rapidly arranged with the programme's Director and Production Manager. This proved to be an eye-opener for them as they had not realised the scope of our members' activities and skills nor the comprehensive nature of our site and facilities. Ideas for the episode were discussed with the aim being to show many aspects of our activities and of course give Alex the opportunity to drive a steam loco.

Supporting roles

North One's team arrived bright and early on a Wednesday. As this was a normal site-maintenance day several members were in attendance and acted as 'extras' in some of the filming. After a safety briefing and rapid site tour the filming schedule was devised with locations at the Garden Railway, in the club's new workshop and on the raised-level track steaming bay.

After lunch attention would turn to live steaming on the ground level track with the celebrity presenter learning how to drive Richard Gibbon's Wren.

The day proved busy with several takes being mnade of various scenes, but the entire film crew were obviously interested and impressed with our activities – Alex Brooker was clearly excited and energised by the whole experience and showed a warmth of feeling and empathy with what we all did. To say that he enjoyed himself was the understatement of the century. His celebrity friend Andi Oliver also showed a great deal of interest and respect for our activities. This was to be made very clear in the subsequent episode from the smiles on their faces to the warmth of their observations and comments.

Bob commented that the whole day had proven to be great fun for him and pleasurable for all concerned. He was pleased to help somebody gain a new skill and help promote the club and the benefits – not always tangible – of model engineering.

Given the triviality of most TV this was good entertainment. Filming was a new experience for the York Model Engineers as it would be for most clubs. So if your club was to be approached to appear in a television programme what steps can you make to help the TV production companies and lead to better programmes ?

Plan for success

Getting the best from filming took considerable planning at short notice and Society members rose to the occasion. Brian's briefings to the production company obviously helped, bearing in mind that TV researchers often come to a subject knowing nothing about it. As he says it was a case of "selling the dream" and it worked.

No-one should expect a TV production to provde a detailed account of how model engineers make models but there were workshop scenes with a notably good shot of milling the top of a cylinder casting.

Before the programme was made Bob suggested focussing on key messages including :

1) Fun and personal achievement – how we derive great enjoyment and personal satisfaction/achievement from making working models in miniature using high-grade engineering skills and then playing with the items because they really do work. It's a great sense of achievement which is important for people.

2) Socialising – the positive social and mental benefits members get from socialising with like-minded people and exploring new challenges.

3) Promoting engineering – engineering in miniature is still engineering – getting others interested, especially younger people.

On screen Bob followed his briefing, providing a first-class justification for model engineering, explaining the pleasures of scratch building and the sense of achievement that follows. He pointed out that "it's not wrong to use the word love for the dedication that goes into making a model," something that the presenters recognised. Alex and Andi showed unfeigned enthusiasm for the hobbies they tried and model engineering was no exception.

Perhaps most important Bob also pointed out the human side of model engineering, saying that it was often important for mental health. This was picked up by Alex Brooker who commented later that "the human side was a real surprise".

Fears not realised

Despite some forebodings about the programme and whether the Society should co-operate with film makers this experience proved to be good publicity for model engineering. There was never any sense that the presenters were belittling the hobbies they tried – Both showed real and genuine interest and enjoyment during the programme.

Even better, the programme publicised model engineering generally. Unfortunately our hobby rarely makes headlines or television programmes. As Alex Brooker commented at the end of the programme, he and Andi had "found joy, creativity and craftsmanship that we never knew was there".

So a very good result – there was just one subsequent drawback. Due to the untimely passing of Queen Elizabeth II the programme idn't go out until 6th October and at 11.05pm, rather late for most viewers. However, it's still available on Channel 4's on-demand service at www.channel4.com/programmes/hobby-man/on-demand/73157-004. EIM

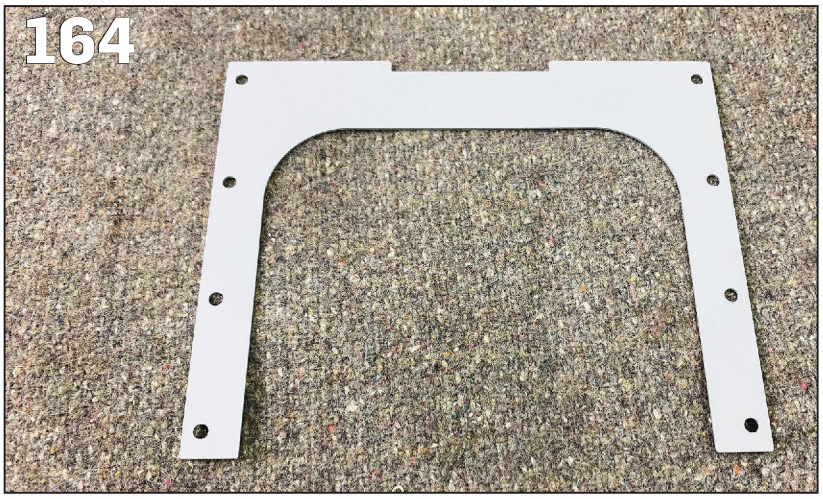
ABOVE: The filming for the programme underway in the York club's steaming bay.

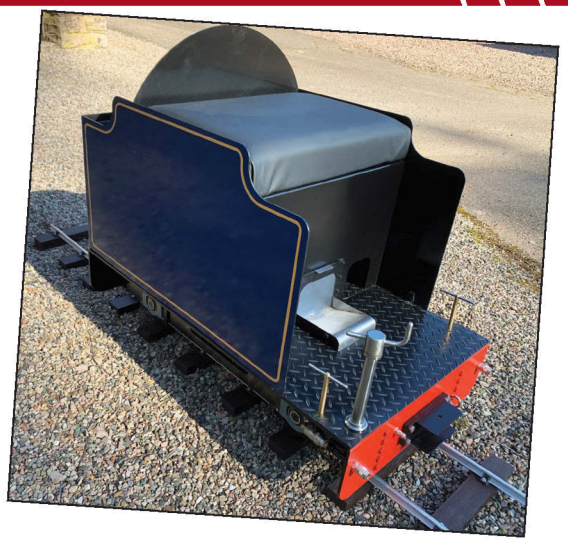
BELOW: Pleased all around – the presenters Alex Brooker and Andi Oliver with some of the team from the York club.

Building a ride-on tender from scratch

Peter and Matthew are approaching the end of their 'beginners' project 7¼-inch gauge ride-on tender, this month assembling the chassis.

BY **PETER AND MATTHEW KENINGTON** Part Ten of 11





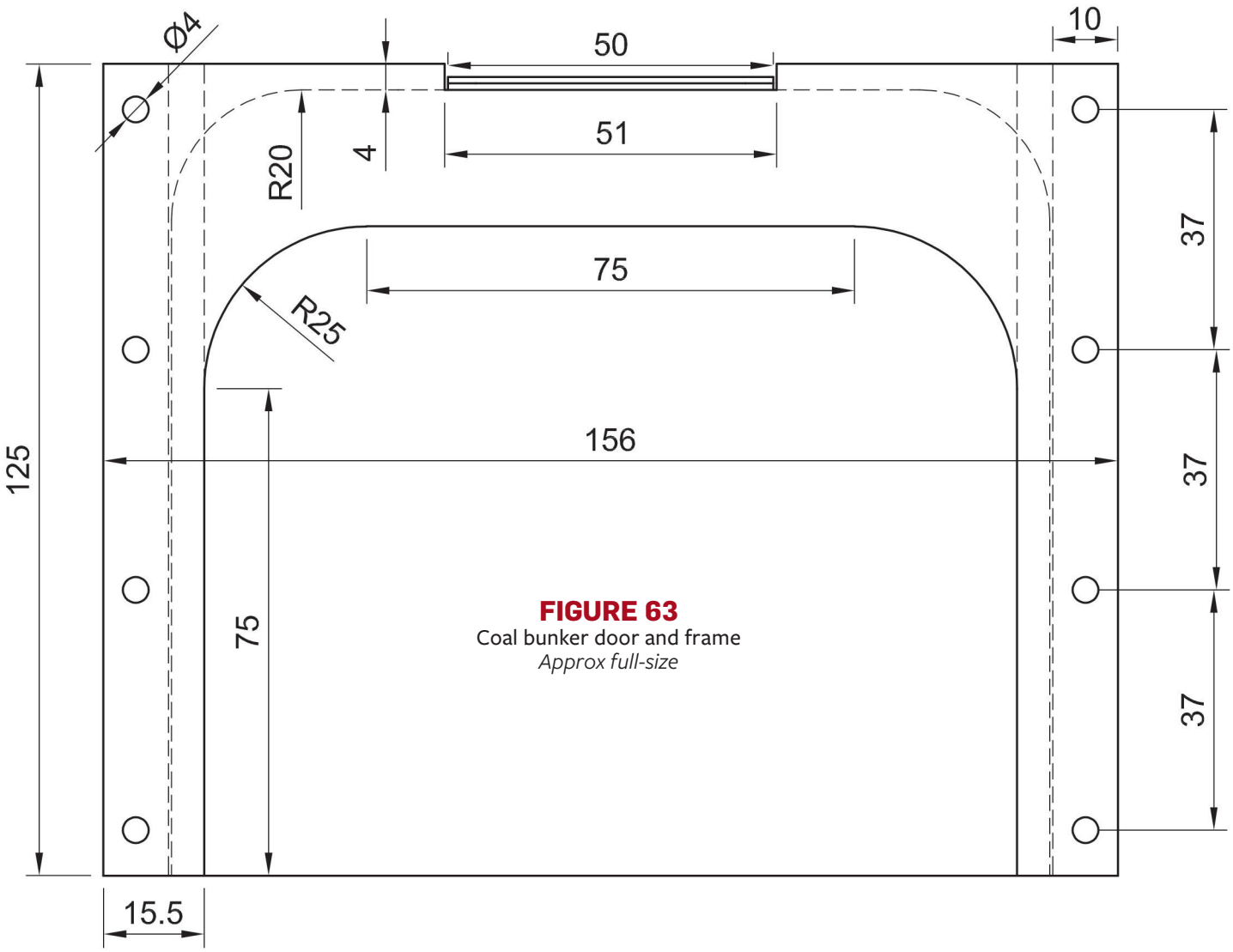
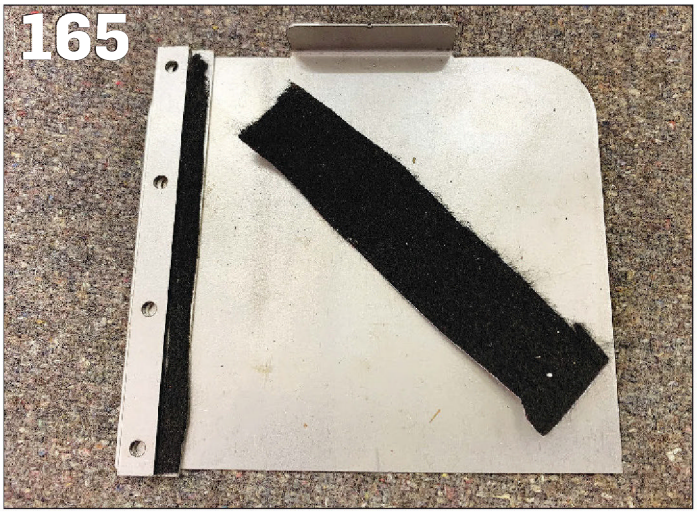


FIGURE 63
Coal bunker door and frame
Approx full-size



Among the final parts to be made for our ride-on tender is the coal bunker door. The door and the door-guides are made from stainless steel – stainless was chosen for these parts as it was felt that they are likely to suffer some (accidental) abuse, at the hands of the driver and their shovel and hence the paintwork may well get damaged, thus removing any protection from the elements and consequent rust.

The arrangement consists of five components: the door, the door frame (Photo 164), the front runners, the spacers, and the rear runners. The dimensions for all of these parts are captured in Figure 63, with Figure 64 showing an exploded diagram of the assembly. All parts are laser-cut from 1mm stainless steel, with the exception of the spacers, which use 2mm stainless steel.

In the photo you will see that the parts have been etch-primed. Yes we know that etch-priming of stainless steel is not usually very effective, but few methods of painting stainless are, to our knowledge. If anyone knows any good techniques, the letters-page or even better an article (*yes please! Ed*) awaits…

The front and rear runners have thin strips of felt attached (Photo 165). These serve two purposes:

1) They prevent the door from being scratched during operation (especially if it is painted). The influx of coal dust, over time, may negate this function, but it is worth a try!

2) They have sufficient friction to hold open the door, at any position, while in use.

The felt used is of the type that is widely available to stick on to the base of ornaments, to prevent them from scratching furniture. It is both self-adhesive and very thin (~1mm uncompressed).

The door itself (Photo 166) is formed from a flat sheet of 1mm stainless steel, with the handle being bent at an angle of 90 degrees to the plane of the door. It also has a small bolt tapped and Loctited into the bottom of the part, with any excess being trimmed – this serves as a 'stop' to prevent the door from (accidentally) being completely removed during use.

The arrangement was test-assembled (Photo 167-168) and proved very satisfactory; the friction-holding idea of the felt works particularly well – it's not too tight, but tight enough to stay securely in place at any opening height. Whether this will still be the case after significant use remains to be seen!

Chassis Assembly

At long last, we're ready to assemble our riding truck! It is clearly a good ▶

PHOTO 164: Coal-hole door frame (after etch-priming).

PHOTO 165: Parts of door assembly, including self-adhesive felt to ensure smooth operation and prevent scratching.

PHOTO 166: Coal-hole door after bending operation to form handle and with the 'stop' bolt inserted.

PHOTO 167: Test-assembly of door frame.

PHOTO 168: Complete with door – this stays in place at whatever height set, due to friction of felt runners. Later a small (M3) Allen-bolt was tapped into bottom of door, to act as a stop and prevent door from being accidentally removed, when opening.

Photos by the authors

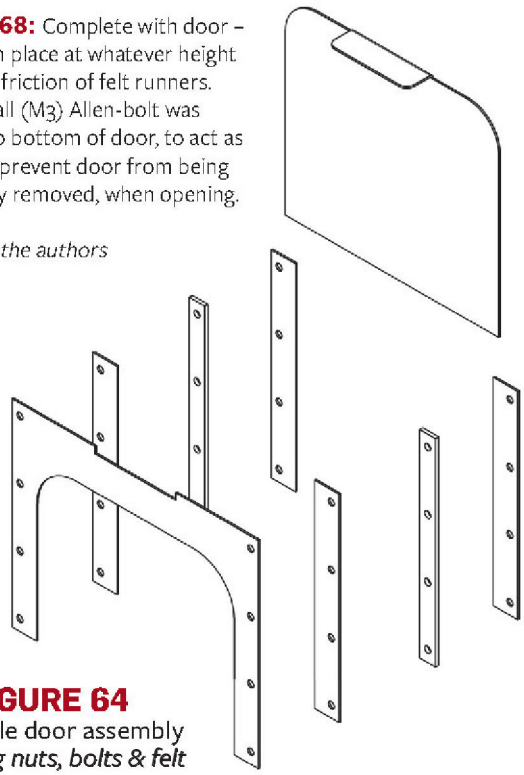
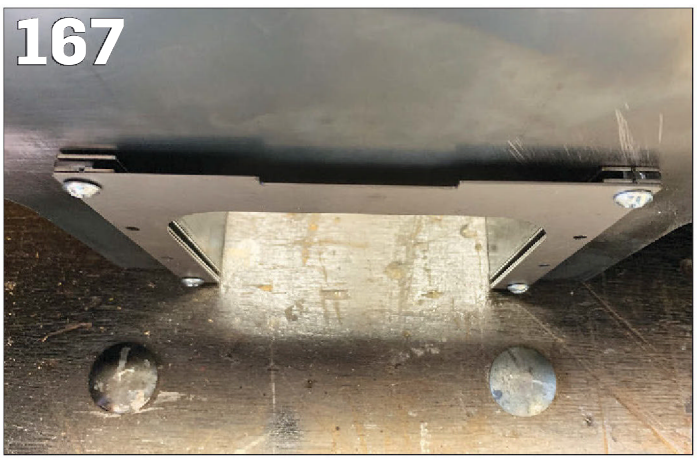


FIGURE 64
Coal-hole door assembly
Omitting nuts, bolts & felt



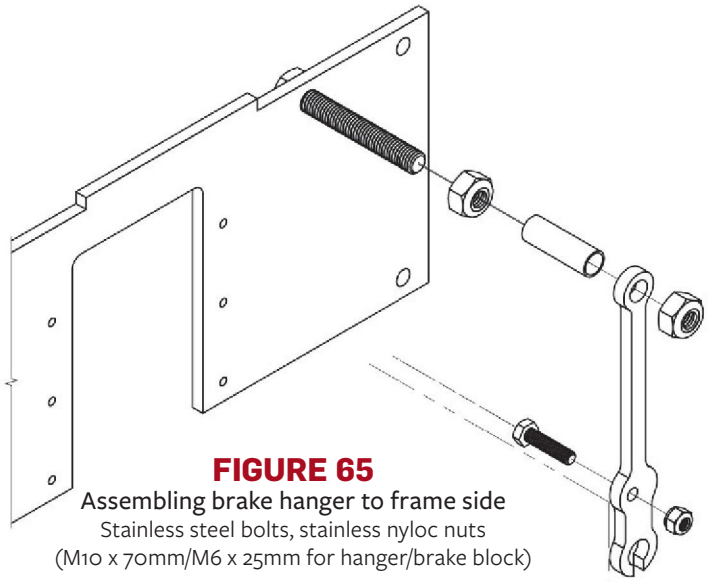


FIGURE 65
Assembling brake hanger to frame side
Stainless steel bolts, stainless nyloc nuts
(M10 x 70mm/M6 x 25mm for hanger/brake block)

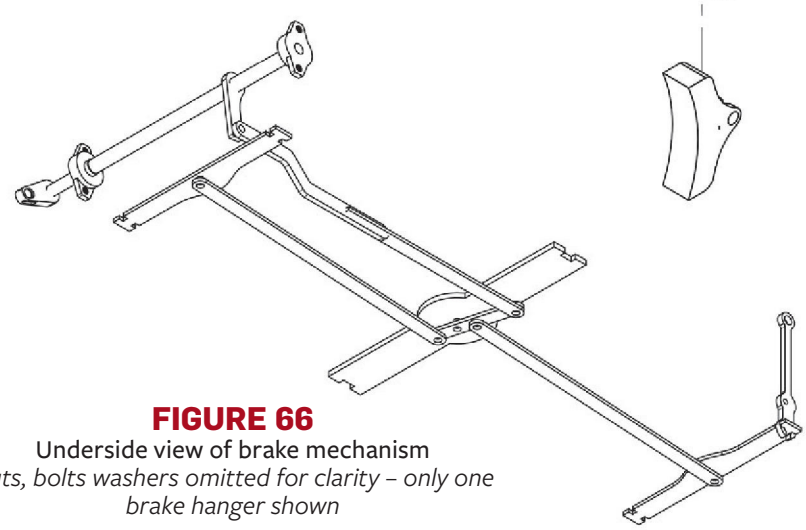


FIGURE 66
Underside view of brake mechanism
Nuts, bolts washers omitted for clarity – only one brake hanger shown

PHOTO 169: A little on-track testing, before fitting brakes – safety-goggles optional, depending upon the speed at which testing is undertaken! (yes, he is facing backwards on the chassis).

PHOTO 170: Installing the brake cam and pivot nut in preparation for setting its angle.

PHOTO 171: Tapping the brake-cam for its grub screw.

PHOTO 172: Required position for cam can be marked as shown. Whole can then be removed, transferred to vice and necessary (deep) indent drilled in brake shaft to locate grub screw.

PHOTO 173: Installing the coupling (bolt insertion underway in photo, not complete) – holes tapped and locknuts added once bolts tightened, to provide maximum security for this essential component! Brake-hanger bolts can also be seen in this picture.

PHOTO 174: Matthew tightening the bolts on the coupling.

PHOTO 175: The hornstays will need a little 'persuasion' to slide in place (which will take off the paint in places, some necessary to remove for the suspension to work!).

PHOTO 176: One wheel set in place (along with the coupling).

idea to assemble everything, prior to dismantling and painting, to ensure that no 'modifications' are needed which might ruin a beautiful paint job, thereby necessitating stripping back to bare metal and starting again.

The first parts to assemble and install are the wheels, their associated bearings, spring top-plates, springs and hornblocks/hornstays (which are one and the same item in this design). The hornblocks should slide into place fairly easily and are held in place with M4 Allen bolts; once all are in place, the springing and bearings can be tested – Matthew enjoyed this bit (Photo 169). The axleboxes should move freely under load (sitting on the baseplate and indulging in a little bouncing up and down is a good test here – our resident test-expert also enjoyed that part).

Installing the Brakes

We are now ready to test-assemble the braking mechanism, starting with the brake hangers and brake shoes (Figure 65). The remainder of the system is then shown in Figure 66 and should be largely self-explanatory. Some detailed photos of the installation will be provided a little later as these were taken once the chassis had been painted.

It is worth saying a few words about the brake cam (Photo 170). The angle of this needs to be set such that the brakes are fully released when the cam-nut is at the lower end of the thread on the brake-rod and fully applied well before the nut reaches the top of the thread. The thread itself is generous in length, so this should not be too difficult to achieve.

The first thing to do is to fix the internal cam, which pulls the main brake rod, onto the brake shaft. This needs to be in-line with the brake rod (obviously) but can be positioned at any point, rotationally, around the shaft. It can be welded in place or a roll-pin (or even a grub-screw) can be used to hold it in position.

The brake cam itself is held in its correct location with a grubscrew (Photo 171), the location for which can be determined as discussed above and the correct cam position marked as shown in Photo 172.

Note the clearance hole in the frame through which the brake-shaft passes. This is intentionally generous, both to ensure that the ball-bearings are, indeed, the bearing surface for this part and also to allow the shaft to be manoeuvred out of the frames when needed (and without the need to disassemble the frames).

Chassis Painting

The chassis and buffer beam can now be painted by whatever means you prefer. We are not (yet) well equipped for spray-painting using two-pack paint and so opted to use spray cans instead. We used a Rustoleum industrial paint called 'Hard Hat' which, whilst living up to its name, is quite difficult to apply successfully. The coats needed are unusually thin – applied 15-20mins apart – and you need to accept the fact that each coat is a glorified 'dusting' (and not opaque until coat 3, typically).

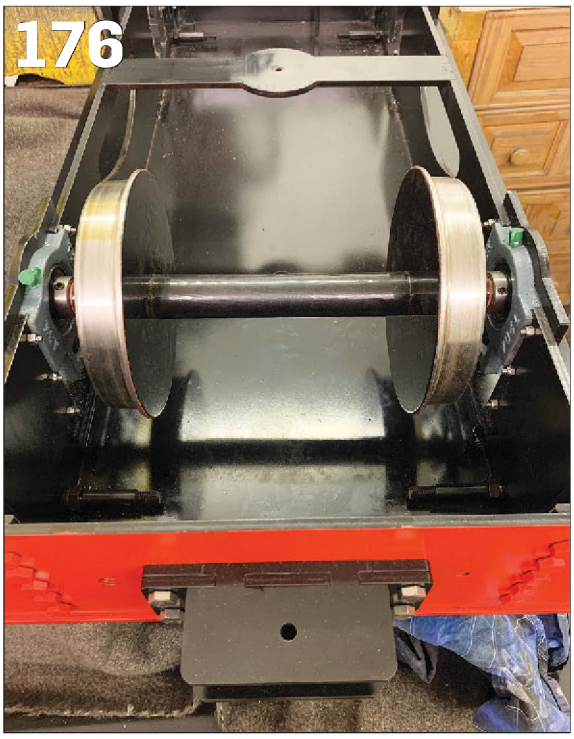
Failure to do this results in rippling, with the whole lot then having to be removed and re-applied. We learnt this the hard way and noted the many complaints from other frustrated users online, prior to getting it right. It is a lovely paint, if used correctly!

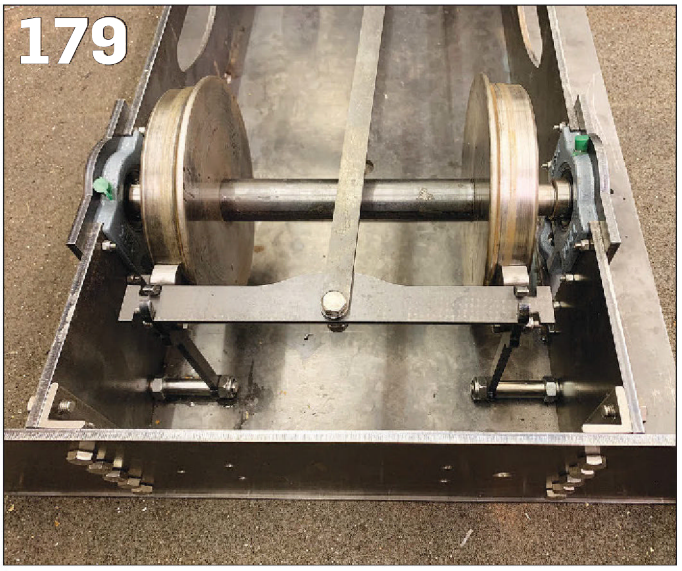
With the chassis and couplings painted, the latter can be installed (Photo 173-174). The holes in the buffer beam, intended for the coupling-attachment bolts, are threaded to provide additional strength to this essential fastening point; the pulling force for the whole of the train and its passengers is borne by the threads on these bolts. Once the bolts are in place, locknuts can be added. The combination of threaded holes and locknuts results in a large number of threads sharing the load.

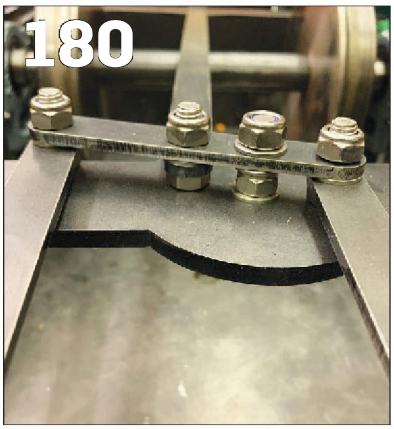
Fitting the wheel sets

(Re)-Installing the wheel sets is straightforward: firstly, the spring-retention plates are installed on the horns, with the springs already in place. Separately, a wheel set, its associated take-up bearings and hornstays are then assembled.

The whole assembly is then slid onto the chassis – it may need a little 'persuasion' to fit in place (Photo 175), due to the thickness of the paint (it should be a smooth fit, prior to painting). The hornstay bolts can then be added (Photo 176).







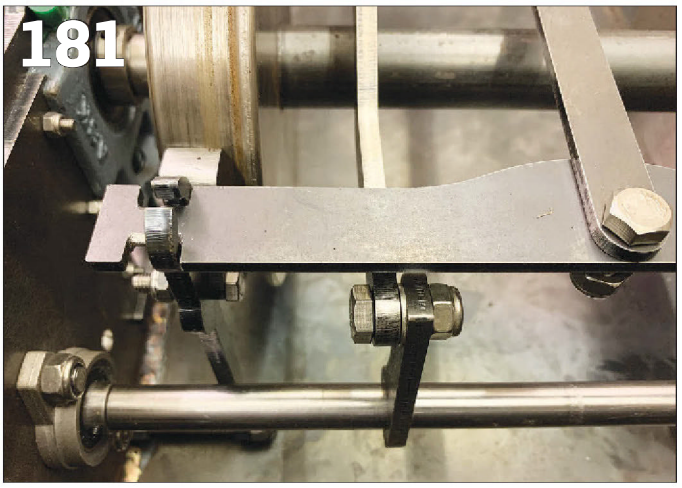


PHOTO 177: Brake-hanger attached to supporting bolt with spacing-tube installed. Lock-washer and nut holds bolt into frame and nyloc-nut holds hanger itself in place. This should be tight enough for hanger to move freely.

PHOTO 178: Brake-shoe on hanger – nyloc-nut again used (pictured after some painting).

PHOTO 179: Rear brake cross-bar installed.

PHOTO 180: Brake pivot-bar installation – note use of washers between pivoting parts. Again, nyloc nuts should allow easy free movement of parts.

PHOTO 181: Brake-rod, cam and pull-bar. Cam can either be pinned (with a roll-pin) or TIG-welded in place.

PHOTO 182: Complete view of front of braking system. Flange ball-bearings for the brake rod ensure smooth operation and are so cheap these days!

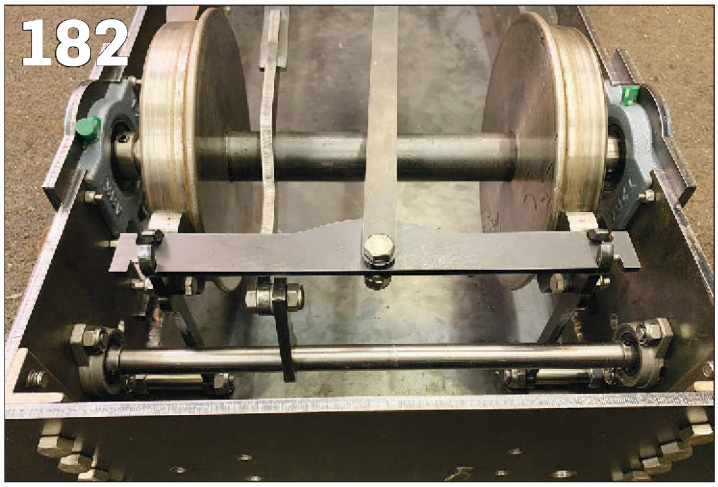
PHOTO 183: Completed view of the whole mechanism.

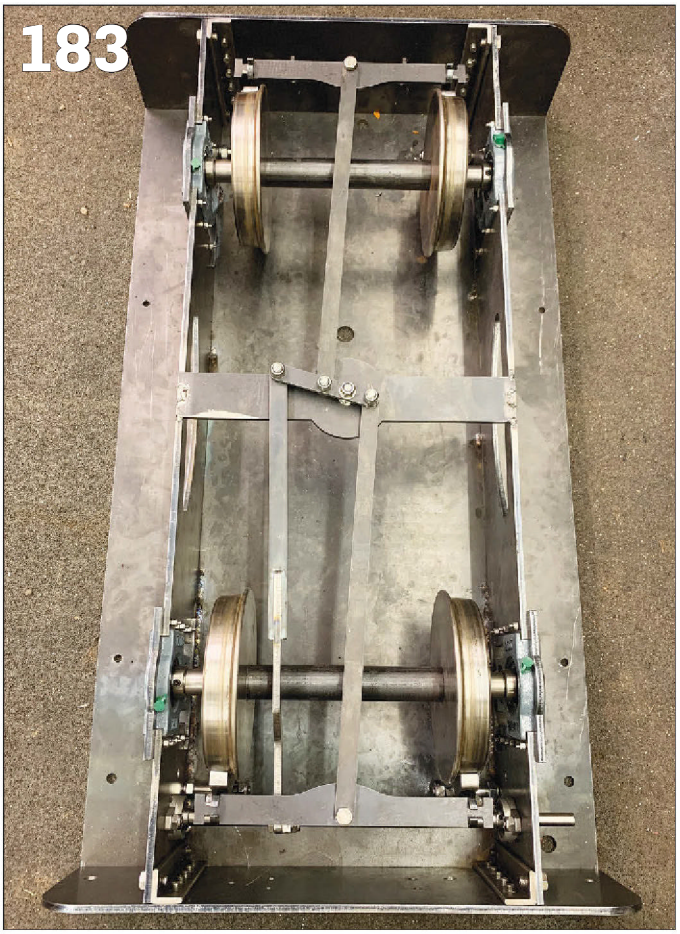
The suspension may need a little 'exercising' at this point (not forgetting to add some oil) to ensure it moves freely.

The braking mechanism can now undergo its final installation, which is straightforward – it is simply bolted together referring to Figure 65 and Figure 66 (on page 1 of this feature) and Photo 177 to Photo 183. EIM

■ Next month Peter and Matthew complete and test their tender.

Parts 1 to 9 of this series appeared in the November 2022 to July 2023 editions of EIM. To download digital back issues or order printed copies see page 9.





The Tank Engine that never was...

When not working on his 3½-inch gauge Schools class currently serialised in **EIM**, Nick has been creating a Southern Railway 'might-have-been' which he begins describing this month.

BY **NICK FEAST**

Have you driven a new car lately? I needed to get my 2½ year-old electric van serviced recently, not because it really needed it as the mileage covered since the lockdown period was quite low, but a minor issue needed investigation before the end of the warranty period. Plus the fact that when the time comes to sell dealer stamps in the service book are always a plus point.

Thus I came to be driving an almost new Nissan Leaf for the day. I am familiar with electric vehicles, I've been driving them for six years now, but I hated this experience – noises and vibration when you go close to the middle or the edge of the road, plus lights on the dashboard signifying all sorts of things I didn't understand. Even smooth braking was difficult, as the car's 'brain' would occasionally take over and apply more pedal!

My first car had vacuum-operated wipers and I class the switch to electric wipers as true progress but a lot of this latest generation of so called 'driver aids' I feel is just more things to go wrong, and certainly doesn't make me feel any safer or improve the driving experience.

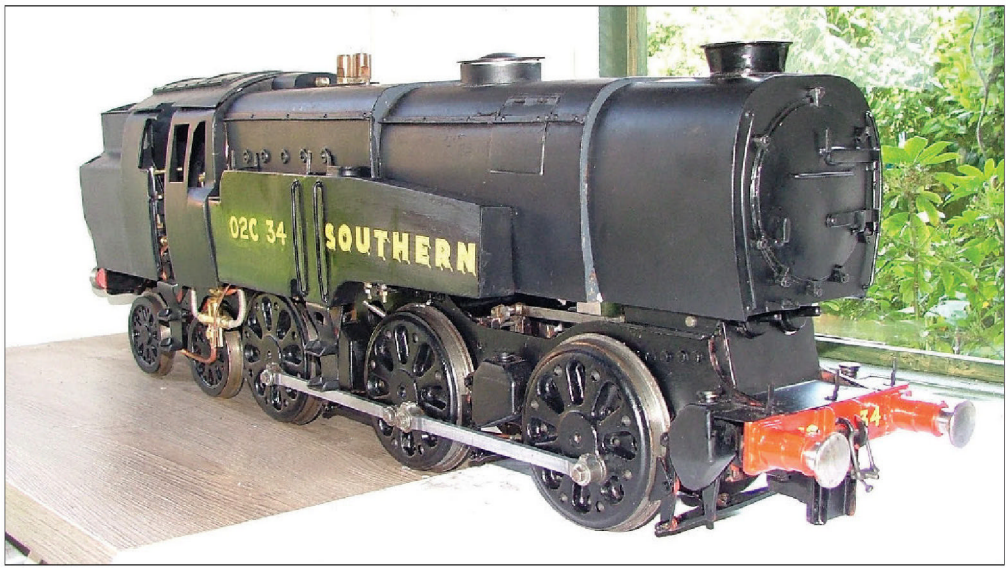


FIGURE 1: Outline drawing of the J class, The Q1 tank would have been of similar weight but with 50 per cent more than the J's 20,000lb tractive effort.

I have a similar disposition to steam locomotives – I like Austerities. No-frills designs are my favourites, which is how I came to design the Southern Railway Q1 'Charlie' 0-6-0 tender loco published a few years ago. Since then quite a number have been constructed, including a very nice example as far away as Tasmania that I saw recently on YouTube.

I have built two examples myself and when a fellow club member decided to dispose of his part-built one I took it on. Part-built models are always interesting projects, you never quite know how good the engineering is going to be. The bloomer on this one was the outside cranks and the inside con rods in line instead of at 180 degrees!

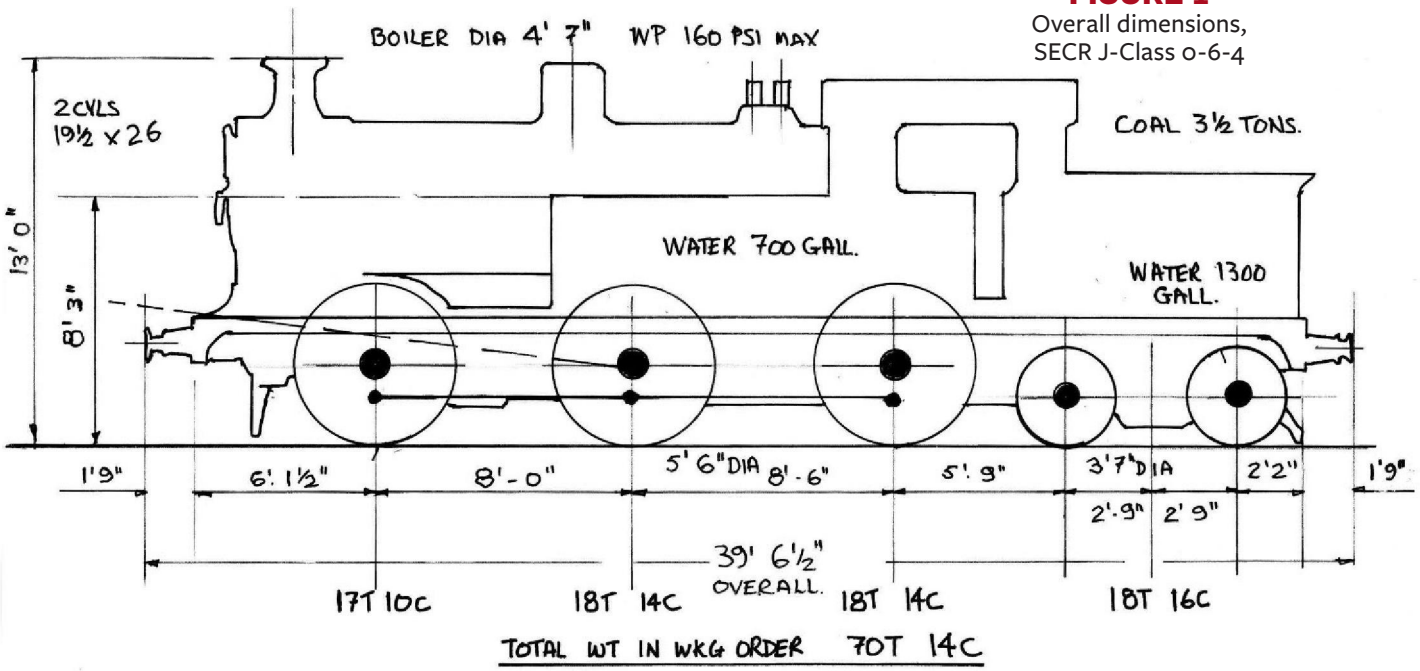


FIGURE 1
Overall dimensions, SECR J-Class 0-6-4

A few other things needed fixing such as the cylinder bores were slightly different diameters, but this gave me the opportunity to fit bronze liners to the cast iron bores. Long-term storage can result in seized iron bores unless plenty of oil is poured in after use.

I didn't really want a third loco to the original design – somewhere in the past I had seen a proposal for a tank-engine version of the Q1 as an alternative to Bulleid's proposed 'Leader' design. Unfortunately common sense didn't prevail and the Leader went on to be constructed whereas the Q1 tank remained a drawing-office proposal.

There is an Eastleigh drawing in HAV Bulleid's book *Bulleid of the Southern*, SR drawing number W5975 dated September 1944. This shows the weight diagram and outline of a proposed 0-6-4 tank loco intended to replace many of the outdated engines in use on the Southern Railway system at the time. Investment in the electrification of the Southern's extensive commuter network immediately before the Second World War starved the steam fleet of investment, and some engines that were 50 years old then continued until almost the end of steam operation in the 1960s!

More than thought

Although the 0-6-4 wheel arrangement seems an odd choice to those accustomed to tank engines with a leading truck such as the GWR 'Prairies' and LMS and BR Standards, there were in fact quite a number of these produced and most seemed to be successful. After all, the 0-6-0 tender engine was by far the most numerous in the UK and to graft a four-wheel bogie onto the back end to carry coal and some of the water supply seems quite logical.

A constituent company of the Southern, the South Eastern & Chatham Railway built five J-class 0-6-4 tanks for mixed-traffic use in 1913, these each covered over one million miles and lasted into the BR era. Other locomotives of this wheel arrangement were built by various factories for the Highland, Midland, Barry and other smaller companies in the UK and were also employed in Ireland, France, South Africa and New Zealand.

I had been researching the history of Wainwright and his locomotives for the SECR in connection with the 3½-inch gauge L-class 4-4-0 that I had been working on for some years. The weight diagram of Wainwright's J class of 1913 (Figure 1) showed driving-axle spacing of 8ft/8ft 6 inches as on the Q1 and many other British 0-6-0 designs, and trailing bogie wheel size of 3 ft 7 inches, same as the Q1 tender wheel. Two inside cylinders of similar size to the Q1 and comparable overall dimensions made it a good parent for the ugly duckling that was to follow!

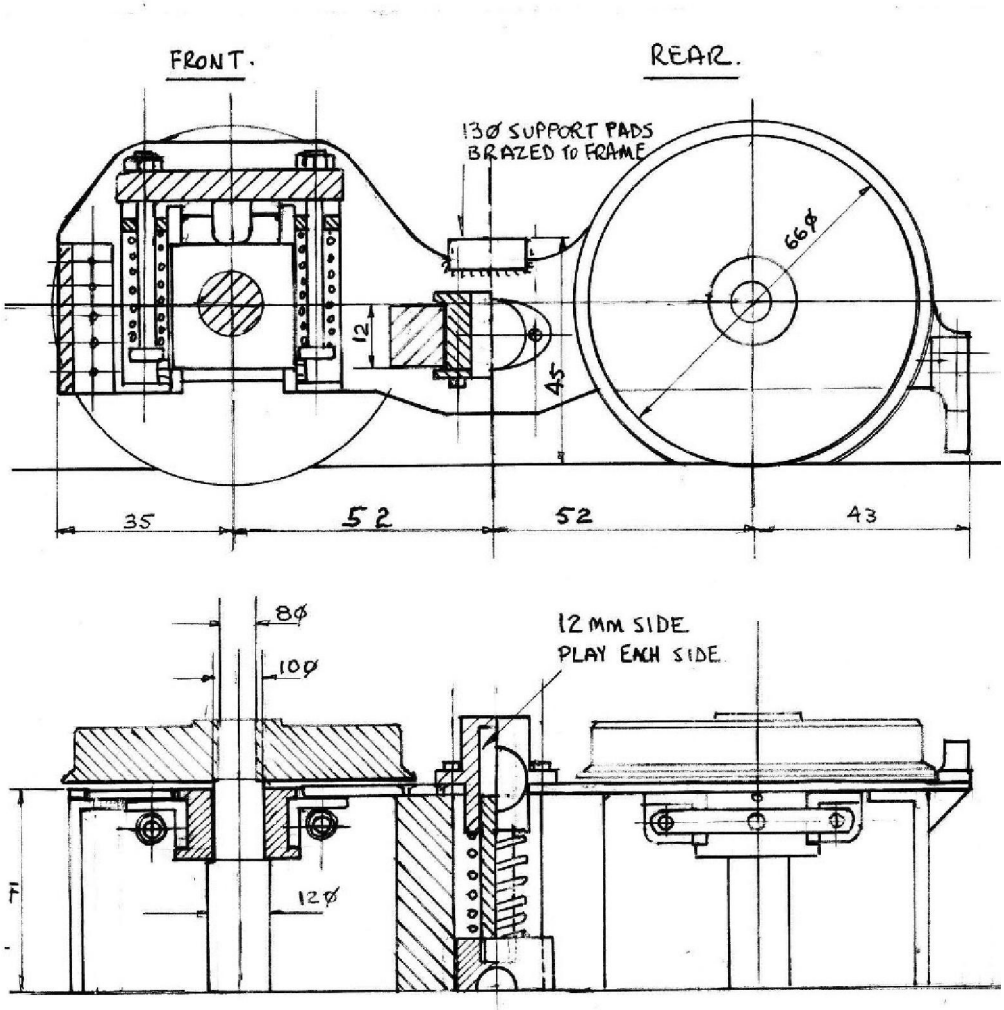
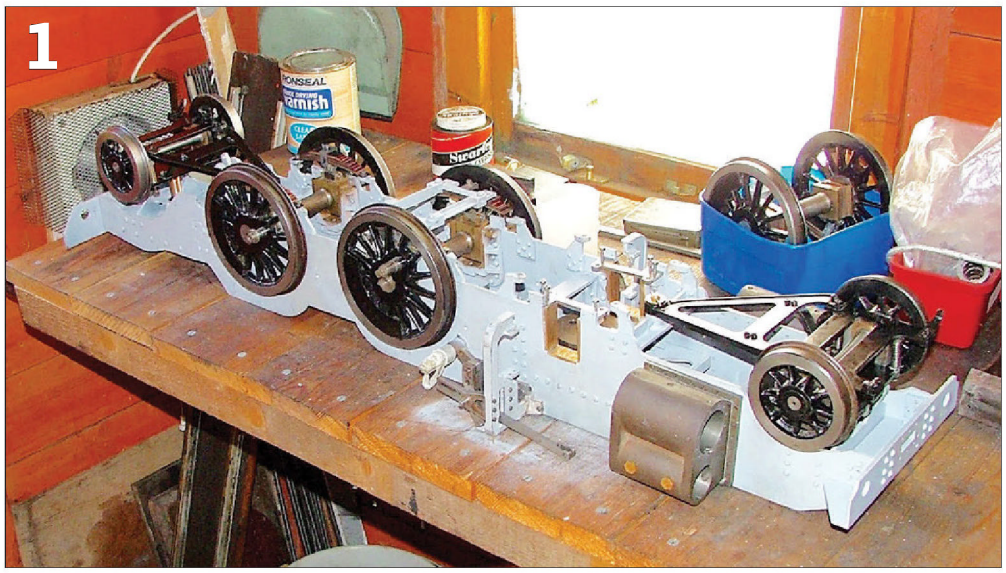


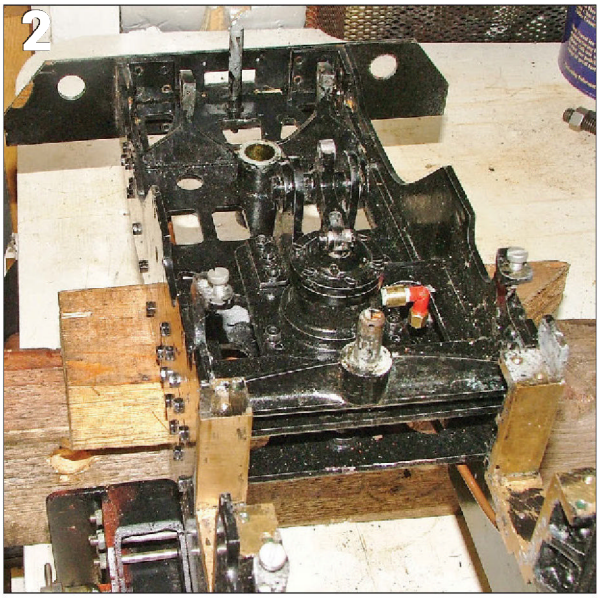
FIGURE 2
Q1 tank loco trailing bogie, part sectional

FIGURE 2: The bogie design is as per the Bulleid pacifics, thrust pads on the side frames transfer the static load to the rails via the side frames rather than the central pin.

A few sketches and a bit of research soon produced a suitable design of bogie (Figure 2) and then some consideration was needed as to how to extend the main frames back to accommodate the bogie mounting, a rear buffer beam and the necessary coal and water spaces.

A few years ago I had started a similar project to build a 5-inch gauge LMS Ivatt 2-6-2 tank based on Don Young's 2-6-0 tender engine design. A nicely made part-built model turned up on an online auction site, its relatively remote location in Aberystwyth and the potential cost of carriage helping to keep the bidding down. Collection of the loco was fitted in with a business trip to the area (well





it was only a detour of about a hundred miles or so!) and the extra drawings for the tank engine version were purchased.

Frame extensions and a trailing truck were made and welded on, all fairly straightforward (Photos 1-2) but unfortunately as the build progressed and the boiler was made it soon became apparent that even though this is quite a small prototype, a 5-inch gauge model is still quite a hefty item to move around. Transporting it to and from the workshop would have been much more of an issue than with 3½-inch gauge locos so it had to go. There are a couple of short videos of the engine running on air on my Youtube channel – search for nick33006.

Two wheels short?

I decided that this imaginary Q1 tank loco would have certain design features. Firstly the rear bogie would be a Bulleid design as fitted to the leading end of the Merchant Navy and West Country classes. The Pacific bogie uses a 3ft 1-inch BFB wheel whereas I used a 3ft 7-inch diameter as employed on the trailing truck of the Merchant Navy and all the Bulleid tenders. Polly Model Engineering was able to supply these from stock although the team there did wonder if it was a mistake that I only ordered four of them!

Photo 3 shows a Bulleid Pacific leading bogie awaiting cleaning and overhaul at Ropley a few years ago, showing the relatively simple construction. It's important to note that the weight of the locomotive is not carried on the central pivot but through the load-bearing pads on the frame side members. The frames can therefore be made lighter overall as only the side loads are taken through the central pin.

Photo 4 shows the Q1 tank bogie, I have used a plate stretcher at the outer (trailing) end and a round bar stay at the inner (leading) end, as on the full-size loco. A beam was attached across the loco frame extensions to support the weight at the rear; the exact position was determined after the loco was completed to set it at just ▶

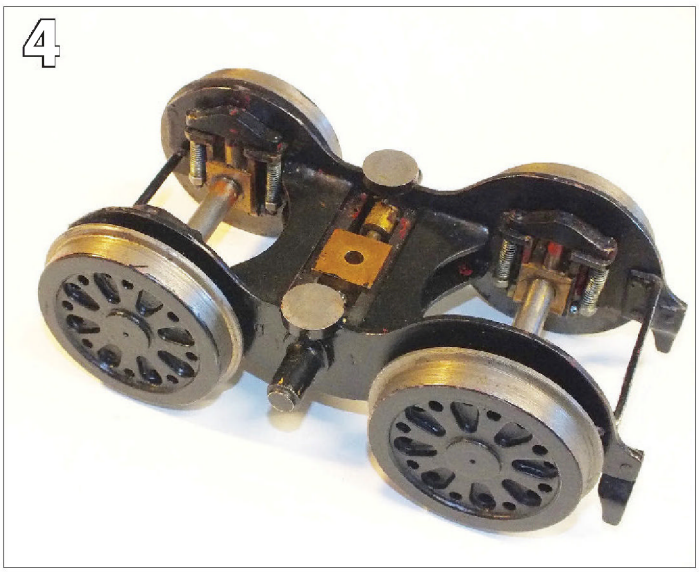
PHOTO 1: The frames for the 5-inch gauge Ivatt tank lie inverted on the bench waiting for the wheel sets to be assembled. The join was made just behind the rear driving wheel, the BR/LMS 2-6-0 tender and 2-6-2 tank engines are similar in almost every respect.

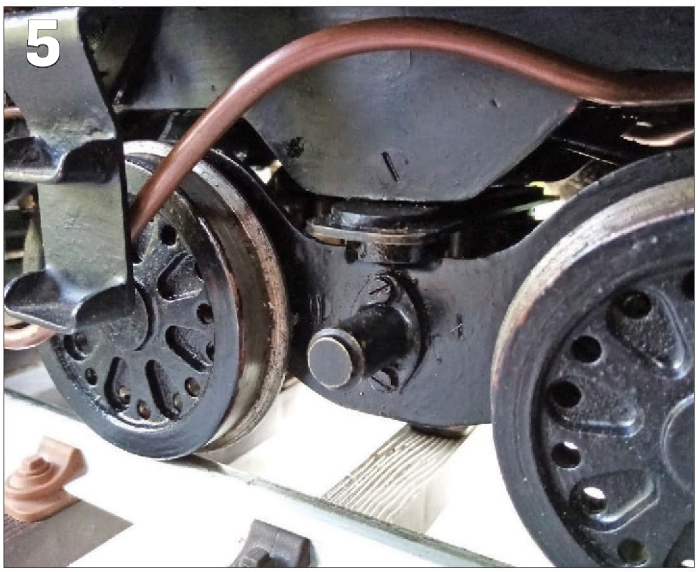
PHOTO 2: A new stretcher needs to be fabricated to include the pivot for the new trailing truck, shown in the foreground. A large spring-loaded plunger is mounted in the hole further back to support the rear of the loco onto the bearing plate on top of the truck.

PHOTO 3: The glamour of working at a heritage railway shown here. This bogie is believed to belong to Merrchant Navy 'Canadian' Pacific as the front stretcher has a bracket to hold the AWS pickup.

PHOTO 4: The Bulleid tender wheels and details of the bogie construction are shown in this photo. The bogie axles are deliberately fitted with rather soft springs to minimize the weight taken off the drivers. Side-control springing is also light, enough to stop the rear end oscillating on straight track.

PHOTO 5: This is the area around the bogie support, showing the transverse plate that supports the rear end of the loco. The pipe is the water feed to the left (driver's side) injector. The water supply is from a separate tank carried on the driving truck.





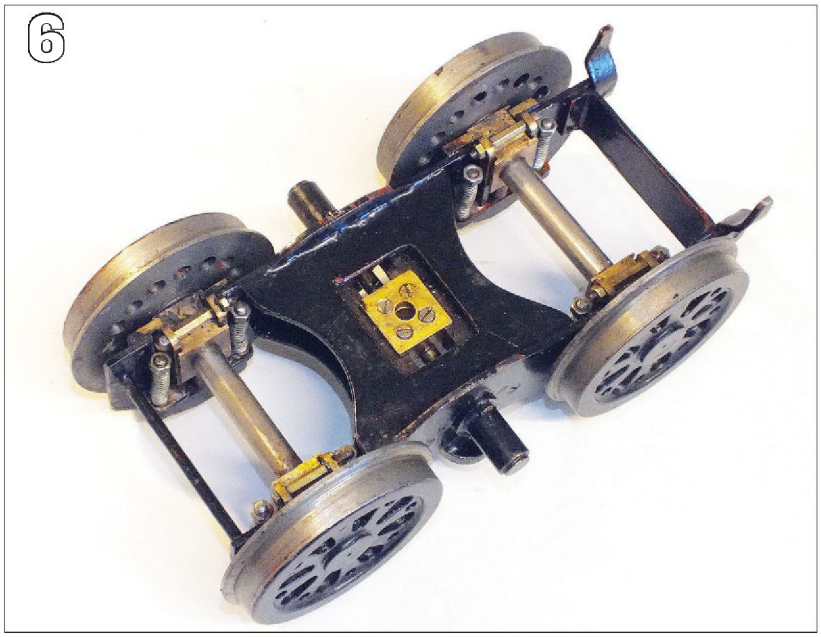


PHOTO 6: View under the bogie. The nuts on the spring pillars must be either secured with locking compound, fitted with locking nuts or the pillar studs drilled and fitted with split pins.

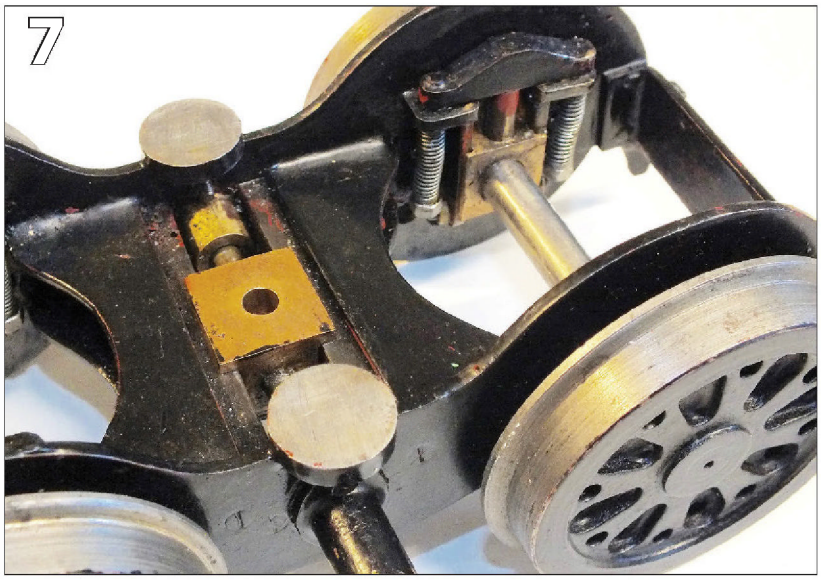


PHOTO 7: Bogie details – stretchers and side frames are brazed or silver soldered for strength. Angle material and screws or rivets could be used if gas equipment is not available.

PHOTO 8: Exeter St. Davids is about to experience the noise of bankers' whistles and the exhausts of four steam locomotives at full power. The extended bunker was replicated on the model; Nick decided to have steps and handrails on both sides.

the right height to support the back of the engine without taking too much weight off the drivers (Photo 5).

Photo 6 shows the bogie from underneath, the four screws retain the bottom plate of the side-control bearing assembly. The hexagon bars retain the axleboxes in the hornguides.

Photo 7 shows a closer view of the axleboxes and suspension; this design began with Maunsell's Lord Nelson class, continued through the Schools class and was then used on all the Bulleid Pacifics. My construction is mostly brazed, with rivets or screws used as necessary for initial assembly. The brazing doesn't work loose with heavy use!

I wanted the overall look to be of a credible loco that might actually have been built to satisfy the needs of the Southern at the time. It would need to be capable of handling passenger, freight and shunting duties, be capable of operating in both directions and be easy to operate and service.

The Q1 is I am sure the only utility design to have curved sides to match passenger rolling stock, and this theme was continued on my tank variant. After all it would hypothetically have been a product of the Brighton drawing office that successfully produced the BR class 4 tank engine also with curved side profiles. I looked around existing Southern tank engines for bunker details and decided the W class 2-6-4 tanks would be suitable.

Witnessing super power

Photo 8 shows a pair of these powerful three-cylinder Maunsell-designed engines at Exeter St Davids in summer 1962. These are banking engines for the daily Meldon quarry ballast train, which is hauled by an N-class 2-6-0 at the front with a Standard class 4 tank as pilot. This represents a total of 111,000 lbs of tractive effort, or nearly 50 tons, all of which will be required to lift this train up the curving 1 in 37 climb to Exeter Central! This was one of the most spectacular sights and sounds of the steam era, fortunately I was able to witness and photograph it as a 12-year old with his first camera, a Kodak Brownie 127, hence the imperfect picture quality.

I wanted to be able to drive and fire the loco without too much interference from the modified tank-engine profile so the rear bunker was left open at the front, ignoring the usual bulkhead and lockers that would have been needed on the full-size loco. The appearance at the rear end is an amalgamation of the W class and BR Standard 4 bunkers, with an inset high-top bunker to allow good rearward vision (Photo 9). Similarly the front of the cab has been cut away

as on the later Bulleid Pacifics to give a wider view out.

Dummy side tanks (filled with concrete for extra adhesive weight) were mounted on brackets fixed to the mainframes, with tank tops sloping down at the front for a better view when coupling up. Steps and handrails are included for the fireman's access to the tank filler caps. The unique Q1 boiler cladding remains exactly as per the original tender version.

More details of the conversion, and its eventual incarnation, will follow next time. EIM

PHOTO 9: The finished model, water connections visible on the rear buffer beam. An explanation of the numbering will follow next time!

Photos by the author

10¼-inch P2 loco to star at Midlands show

Midlands Model Engineering Exhibition organiser Meridienne Exhibitions has announced that this year's show from Thursday 12th to Sunday 15th October will feature John Wilks' newly completed 10¼-inch gauge LNER P2 locomotive 'Cock O' The North'.

John was a prolific locomotive builder who sadly passed away in November 2022. The P2 is the last of five exhibition-standard scale steam locos he completed, built entirely from works drawings and original research.

The loco reflects Gresley's most advanced express passenger 2-8-2 with Lentz poppet valve gear, Kylchap exhaust and ACFI feedwater pump as built in its unique semi-streamlined form in 1934. The three-cylinder model, based at the Stapleford Miniature Railway, features a TIG-welded steel boiler with superheaters.

The 2023 exhibition, again sponsored by EIM, will also see the return of the popular lectures, a full range of talks from leading exponents of model engineering on the programme.

Other highlights of the show include daily demonstrations of the still new technology of 3D printing.

Details of the show are at www.midlandsmodelengineering.co.uk. Our usual preview will be in the October issue.

Rallying call for Rob Roy

Plans are well underway for this year's Rob Roy Engine Rally and organisers are hoping to attract many more examples of the famed six-coupled tank engine to the event.

The 11th edition of the rally will again be held at the Bromsgrove SME track at the Avoncroft Museum of Historic Buildings in the Worcestershire town, postcode B60 4JR, on Saturday 16th September. between 11am and 4pm. Information about the venue can be found at www.bromsgrovesme.co.uk

Martin Evans designed the loco more than 60 years ago with a challenge to make and enter completed locos in a competition held 17 months later. Today the rallies are more about owners getting together to swap experiences and advice about their locos and generally have a good time on the track.

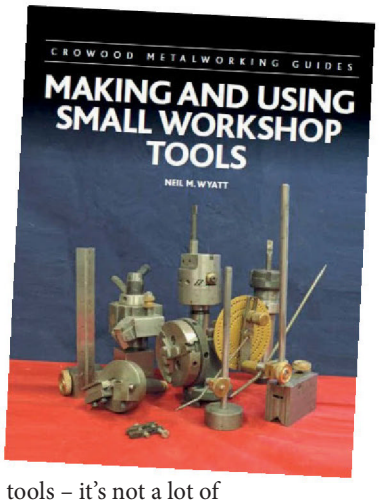
"We are determined to attract more engines to the event this year," organiser Ian Horsfield told EIM. "We offer one of the smoothest tracks in the country including a 'Lickey incline' to make it more interesting."

A light lunch will also provided to participants and any Rob Roy owners interested can contact Ian on 01386 792628 or via the Bromsgrove SME website.

Photos: Ian Horsfield

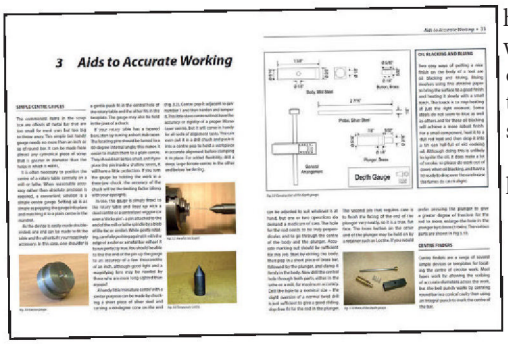
Making and Using Small Workshop Tools

By Neil M Wyatt



Another of those useful little publications to have around the workshop, this inexpensive guide covers quite a wide spread of subject matter within its 128 pages.

Beginning quite rightly with some words on safety, the author then focuses on an area which is essential to get right, measuring and marking out, and also offers some aids to accurate working.



Techniques such as heat-treating and workholding aids are covered in detail, as is the bang up-to-date subject of 3D printing.

If you think, however, that the book is mostly about producing basic hand tools you'd be very wrong. Subjects range from a simple milling cutter holder up to the making of toolpost spindles, gear-cutting tools and even a dividing head.

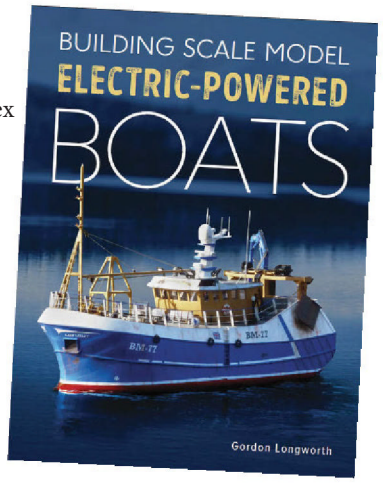
As is typical of this series of books the information is provided both in terms of detailed text and plenty of colour photos, along with several dimensioned drawings to enable even the quite novice model engineer to produce a number of tools which will find many uses around the workshop.

It's good to see too that the final chapter deals with looking after one's tools – it's not a lot of use going tothe trouble of making something if you then have to make another because it hasn't been properly cared for... ***AC***

ISBN 9780 71984 143 9 Price £16.99 Published by Crowood Press
Email: enquiries@crowood.com Web: www.crowood.com

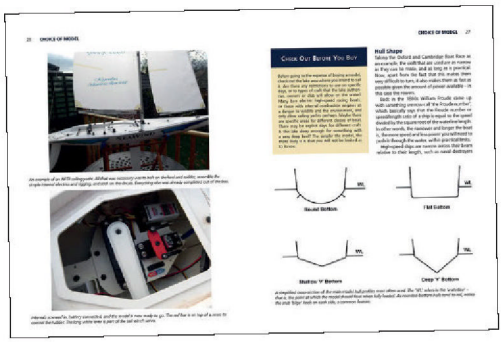
Making Scale Model Electric-Powered Boats

By Gordon Longworth



Back in Feburary we reviewed a sister title to this new work, on the subject of steam-powered model boats, and this latest publication caters for those who don't want the complexity of the steam route.

Like its sister this is a compact but comprehensive guide, running to 192 pages and starting with the tools needed before moving on to the choice of model, power and control including choosing the correct radio unit. It then describes adding the essential fittings to make your scale model look like a miniature version of the real thing, along with some less-essential ones too.



The author, who has an easy-to-understand but informative writing style, then describes the construction of an off-the-shelf kit for a steam yacht, followed by the more complex challenge of scratch-building a model lifeboat.

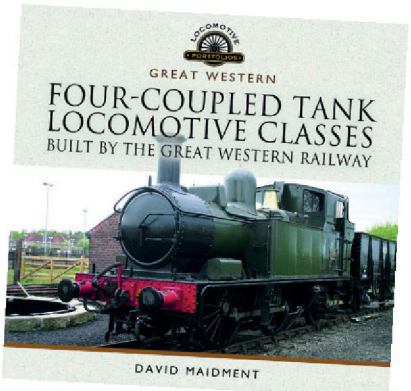
The final chapter is notably entitled 'Making life easier' with tips to ensure the novice builder stays enthused by his new hobby.

We know a number of EIM readers like the idea of making a diversion into building model boats, and with its easy explanations and plentiful colour pictures this book will certainly help any model engineer who is considering branching out onto the boating pond. ***AC***

ISBN 9780 71984 116 3 Price £20.00 Published by Crowood Press
Email: enquiries@crowood.com Web: www.crowood.com

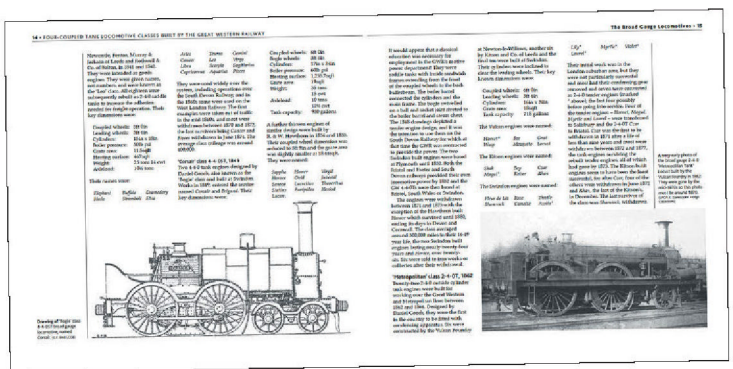
Four-coupled Tank Locomotive Classes built by the GWR 1960-1965

By David Maidment



David Maidment's ever-growing reference library of locomotive classes this time focuses on something more 'ordinary' compared to his previous large express locomotives, the workhorses that were vital to the Great Western Railway.

Not surprisingly this as now expected extensively researched title follows the style of previous editions in the 'locomotive portfolios' series, starting with a study of the engineers behind the loco designs and then focusing on a subject not widely studied, the early locomotives of the GWR's broad-gauge years.



The narrative then moves on to standard-gauge locos built by the GWR before 1923, and afterwards when it became one of the 'big-four' companies. As well as detailed information there are very plentiful photos all well reproduced and including a number of colour images all grouped together in one chapter.

The appendices include more general arrangement drawings than previous titles in this series, which while necessarily quite small do in many cases include the more important dimensions which will aid the model engineer. ***AC***

ISBN 9781 39902 256 9 Price £30.00 Published by Pen & Sword
Email: enquiries@pen-and-sword.co.uk Web: www.pen-and-sword.co.uk

Thinking beyond the boundary

Plenty of activity and lots of help between clubs feature in this month's round-up.

COMPILED BY **ANDREW CHARMAN**

Welcome to this month's club and track round-up and it's a month when we have been absolutely inundated with newsletters and journals! This is of course very pleasing, clearly demonstrating the strength of the model engineering environment.

I had absolutely no doubt what to lead on this month – step forward the members of the **South Cheshire ME**, a club we don't hear from that often, who recently held a public running day at their Peacock Railway in Nantwich with the pure aim of raising funds to help fellow club the **Rugeley Power Station SME**.

Regular readers of these pages will know that the Rugeley club was recently allowed back to its site following the demolition of the former power station in the grounds of which the club track is located. But developers of the land are now trying to force the club to either cut its running line in half or relocate it entirely, and as a result a 'Save the Rugeley Miniature Railway' campaign is underway.

The running day on 21st May at the Peacock Railway, which is located behind the pub of the same name in Nantwich, saw all proceeds from the fares plus donations given to the Rugeley Club. "This represented a sum of £560, which will go a little way to help them," Peacock spokesman Ken Grubb told **EIM**.

This kind of story, with one club going out of its way to help another, is really pleasing to read. The Rugeley club were delighted with the donation and very grateful for the generosity of all involved.

There but for the grace

Ken added that what the South Cheshire members wanted to achieve was to encourage other clubs to take the initiative and help a club in need; "We are all model engineers, examples like this, where the developers want them off their land, just shows how easy it is to lose your track."

He added; "I am sure there are a lot of societies that don't own their land, like our society, and we are all vulnerable to the way that owners react especially if they can get greater revenues." Sobering thoughts indeed.

A newcomer to the various club publications that we receive is *The News Sheet*, a monthly production of the **North London SME**, and a very fine and packed publication it is too. The cover of the May edition certainly sets the tone with member Derek Drover enjoying a good head of steam with his newly-completed and very fine L1 tank loco which he has spent many hours building, with his dad sitting behind and according to newsletter editor Keith Hughes offering a little advice and some "back-seat driving"... The loco is said to be free-steaming and powerful.

The issue includes a heartwarming story of model engineer Paul McGee, originally from Yorkshire but for many years a member of the **Queensland SMEE** in Australia, who was in the UK for a tour of heritage railways. With a spare day in London he found the North London Society online, and by means of train and taxi turned up at the club's track, introduced himself to members and asked what he could do to help! A worldwide community...

Mamod memories

The North London club also clearly makes good use of social media and has its own club WhatsApp group, on which according to chairman Les Brimson there has recently been an interesting diversion into Mamod engines; "clearly many members have had these tucked away for some years."

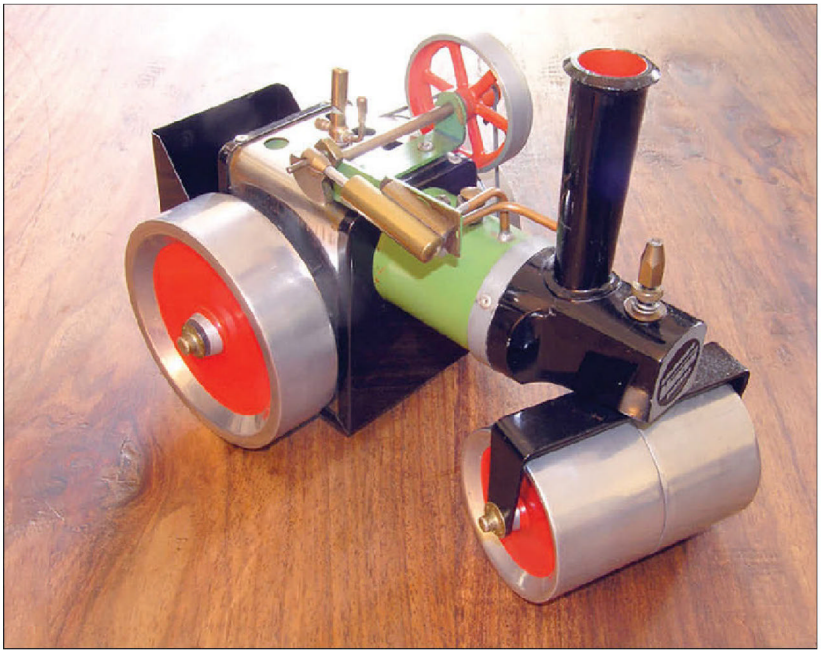
Les illustrates his point with a picture of a slightly rusty Mamod steam roller which instantly brings back memories for this particular model engineer. As a child I had multiple Mamods, the original traction engine, a roller and a steam lorry, only missing out on the steam car. Later when I got into 16mm scale garden railways I quickly acquired the Mamod railway loco, and just as quickly realised its limitations!

In those childhood days I used to have competitions to see just how far I could get down the street with one before the meths in the tank ran out ▶

ABOVE: Smiles on the Peacock Railway during the laudable day raising funds for the Rugeley club.

BELOW: Good head of steam and happy crew, that's a cover...

You can see this News Sheet in colour by visiting our web site at www.nlsme.co.uk



"I used to have competitions to see just how far I could get down the street with one before the meths in the tank ran out..."

ABOVE LEFT: Who doesn't love a Mamod. The fond memories of these engines expressed by North London members are shared by our Editor... *Photo: Wikipedia Commons*

BELOW: Scale stock can still very much be a part of model engineering. We hope to describe the building of these excellent wagons, the work of *Dan Yeates*, soon.

– no silly health-&-safety conscious solid fuel tablets in those days! I was experimenting with model engineering, even before I knew I was into model engineering...

I also had a Mamod stationary engine or two but what really got me into model engineering was in metalwork classes at school, when having completed our first project, a trowel, we were set the task of building our own stationary engines.

Only much later did I discover that this engine was quite renowned. It was designed by Geoffrey Weller and Roger Williamson, the metalwork teachers at the time at the Court Lodge Secondary School in my home Surrey town of Horley, next to Gatwick Airport, and was quite impressive, powered by a single oscillating cylinder and with a cast base. Sadly mine was lost some time ago – if anyone has more details or even better pictures we'd love to see them at EIM.

Always impressive is *Turnout*, the magazine of the Ground Level 5" Gauge Mainline Association – being famed for recreating the operation of full-size railways, this club is of course as enthusiastic about the stock it runs behind its locomotives as the locos themselves. The latest edition certainly shows this, with the front and back colour photos featuring impressive tank wagons and the opening feature continuing the impressive build of an LMS 20t brake van. Which reminds me, we hope to feature some impressive wagons in these pages soon – one of our readers has sent in the pictures, we are just waiting on the words explaining how be built them...

Rewarding excellence

It seems to be a month for awards, with two separate emails highlighting recently presented accolades. One we at EIM are certainly fully behind is among those presented by the Northern Association of Model Engineers, NAME, to encourage younger people to develop themselves by getting involved in model engineering. To that end NAME makes several awards of this type every year.

The Association's boiler registrar Bob Hayter told us that this year's presentations had been delayed following the sudden and untimely death of the NAME chairman, Frank Cooper, someone your editor knew well as a fellow member of the Welshpool & Llanfair Light Railway. But recently the Junior award was made to Alfie Dunning, a member of the Wrexham & District SME, and presented to young Alfie by the club's Chairman John Bennett. I know I've stated this many times before but I'll never tire of doing so, encouraging new young members is essential to the future of model engineering, and awards such as this help a lot...

The second presentation we've been alerted to this month is also on behalf of NAME, and is the award to a club newsletter editor.

This is another essential role in our vocation – as an editor who knows how much effort is involved in producing any publication (and of course I get paid to do it) I reckon those that take the time to compile club publications when they could be spending their time running on tracks or in their workshop deserve everyone's thanks for ensuring everyone is kept in touch. And of course at no time was the importance of such publications better shown than in the recent Covid pandemic.

Judging by the very high standard of the newsletters we receive at EIM Towers each month the judges of the award must really have their work cut out to decide a winner of this trophy. In the end the 2023 award has gone to Richard Taylor, editor of the Polly Owners Group newsletter.

Bob Hayter tells us that this particular newsletter was chosen "for the clear pictures, clear and very clean text plus the fact that Richard writes most if not all of it himself." Richard received his trophy on 13th May during the Polly Owners Group AGM meeting at the track of the Andover & District ME.

Golden days

Another organisation that the late Frank Cooper was heavily involved in was the 7¼ Inch Gauge Society – at the time of his passing in May 2022 he was the Society's Chairman. This year the Society clocks up its 50th anniversary and among the celebratory items marking the occasion is a rather splendid album of photos and stories drawn from a half-century of activities on the 7¼, and distributed with the latest edition of the magazine *7¼" News*. The

mainly photographic content includes coverage from AGM gatherings going back to the earliest years and shows just how much variety there is on this gauge and how weird and wonderful some of the motive power can be – so much so that some examples earn a spread of their own.

Your editor, however, particularly liked the spread on Garratt locos – in 7¼-inch gauge a Garratt in any scale is a big beast, and a picture showing examples in 7¼ and 15-inch and 2ft gauges lined up together is particularly impressive (and not just because I've driven the 15-inch one in the picture and footplated the 2ft gauge one – seems I need to get on a 7¼-inch regulator!).

Meanwhile the challenges that constantly befall any Society are illustrated in the 7¼-inch magazine itself, with the AGM meeting scheduled for 16th September having to be moved at short notice due to the original venue of the Mizen's Railway near Woking in Surrey being no longer available. Thankfully the Bedford ME have come to the rescue.

On the subject of forthcoming events, which as our diary on page 45 shows are always plentiful, the Lincoln SME is very much into the planning of its open day, which is set to take place on 23rd-24th September at its track in North Scarle Village, near Lincoln and will celebrate the 90th Anniversary of the club.

"Why 90?" EIM asked. "We want to do something a little special and we are all being sensible in so much that 10 more years may not see many of us fit to do anything like this then," adding that the club's age profile is now very much weighted in favour of the "70-plus" brigade. Yet more evidence of that subject I keep banging on about, the need to attract new young blood to our vocation!

Anyway at the Anniversary event we are promised the usual traction engine road runs and parades as well as lots of activity on the club's third-of-a-mile long ground level 5/7¼-inch gauge track. Sounds like a fun weekend and we hope to get along to Lincoln.

Rallying the Federation

One week earlier will see the annual rally of the Federation of Model Engineering Societies (FMES), which is being held at Frimley Lodge Miniature Railway in Hampshire, on Saturday 16th September 2023.

The FMES tells us that the venue is set in woodland and within a country park and includes a kilometre-long multi-gauge (3½, 5, 7¼-inch) ground-level track, and a raised track for owners of smaller locomotives of 2½, 3½ and 5-inch gauges. Over the winter the Frimley and Ascot Locomotive Club have invested a great deal of time and effort on the infrastructure for the rally and members are looking forward to welcoming visitors to this event.

The rally is open to all members of clubs affiliated to the Federation and details are on the club website at www.flmr.org/page-9/index.html. On the day visitors with eligible locomotives are invited to enter the two competitions that will be held – the regular Australian Association of Live Steamers (AALS) trophy (for FMES affiliated club members only and yes, this is in the UK...) and the newly launched Federation Autumn Rally Competition. Rules for both competitions are on the FMES ▶

"How much variety there is on this gauge and how weird and wonderful some of the motive power can be..."

TOP RIGHT: Award time one – Wrexham member Alfie Dunning poses proudly with his NAME award with his family and fellow members.

ABOVE RIGHT: Award time 2 – Polly Owners Group newsletter editor Richard Dunn proudly holds his NAME trophy at the Andover club site. *Photo: Ian Mortimer*

BELOW: The Frimley & Ascot club will be the venue for this year's Federation rally in September.

website, https://fmes.org.uk/project/fmes-autumn-rally-at-frimley/.

There will be club running on Sunday 17th September and attendees and families will be invited to take part. Organisers emphasise that if you want to join the event to check the administrative requirements on the website and to get your entry in early.

Another newcomer to the selection of received newsletters is the *eBulletin* from the Norwich & District SME, and the latest issue reports how the club's Eaton Park Railway has post-pandemic recently resumed fundraising running days for EACH, a local charity that cares for children and young people with life-threatening conditions. The charity has recently moved into a new hospice called The Nook, replacing a previous smaller unit, and fundraisers on the railway have so far raised £3250 for EACH – a rewarding way to enjoy one's hobby...

The Norwich newsletter certainly has a wider remit than most that adds to its interest, extending to the likes of railway art, advertising and mystery pictures, and I also like the way news from the track is collected under the heading *From the Tearoom* – sounds like my kind of club!

Clocked out

I always enjoy each issue of *Criterion*, the newsletter of the High Wycombe ME, and the latest June edition is particularly pleasing as it provides proof that someone out there actually reads my page 3 editorials!

High Wycombe member David Savage admits to having been intrigued by my recent construction of a pendulum clock from a wooden kit, and duly Googled the subject, buying and building the same kit as me.

Clocked out

David's conclusions mirror my own, including the temperamental nature of the running mechanism, but sadly I have a postscript to my clock. Like David experiencing some issues in getting it to run for extended periods, I placed it on display on one of the bookcases in my narrow gauge railway library on the landing, intending to spend some time setting it up properly.

Then I went in the loft for something and forgot just how directly over said bookcase the loft hatch was – I drop something out of the hatch and now I have a clock with several broken bits... I have wondered about remaking everything in metal, using the left-behind sheets that I pressed the parts out of as patterns. Mind you I've also seen a different and very interesting looking wooden clock kit online, which I'm trying not to buy. I do find clocks fascinating...

Oh dear, we are out of space again. The quality and variety of the many club publications is so good we could fill an issue with extracts – please keep them coming! EIM

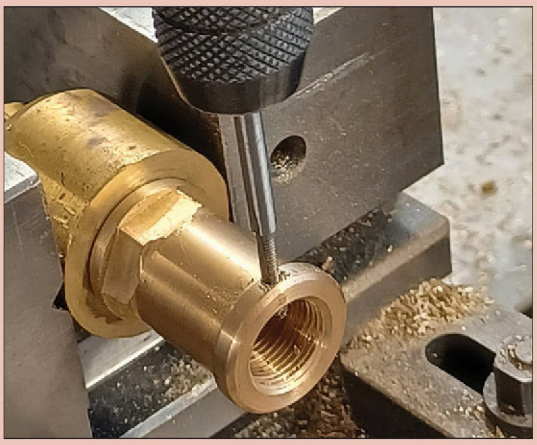
ABOVE LEFT: Well that's not going to keep very good time... The sad state of the Editor's wooden clock kit, after he dropped something from the loft on it...

BELOW: While at the Hastings Miniature Railway in June for the 10¼-inch gauge line's 75th anniversary, reported in this issue, *Jonathan James* also photographed the separate 7¼-inch gauge line that the railway runs in the nearby Alexandra Park. Jonathan tells us that this railway was operated by a model engineering group until a few years ago, when the Hastings Miniature Railway stepped in after a period of closure. The new owners have gradually upgraded the line and have recently re-built the station area and added a crazy golf course. There are also longer-term plans for an extension.

Coming next month in...

THE MAGAZINE FOR MODEL ENGINEERS

ENGINEERING in Miniature



- Safety valves; don't buy, make them...
- Completing the ride-on tender
- Budget battery loco electrics
- Grades of steel, what's the difference?
- ...plus the Q1 tank project, the latest from the Clubs and much more!

September issue on sale 17th August

Contents correct at time of going to press but subject to change

DIARY

EVERY SUNDAY

Bournemouth DSME public running, Littledown Pk, Bournemouth, 11am-3pm (also Wednesdays)

Canterbury & Dist ME public running, Bretts Quarries, Fordwich near Canterbury, 2-4pm

Gravesend MM&E public running, Cascades Leisure Centre, Thong Ln, Gravesend, Kent DA12 4LG, 1-4pm

North Wilts ME public running, Coate Water Country Park, Swindon SN3 6AA, 11am-5pm

Rochdale SMEE public running, Springfield Park, Bolton Rd (A58), Rochdale, pm.

Teeside SGR public running, Preston Hall museum, Stockton-On-Tees, 1-4pm

Wakefield SMEE public running, Thornes Pk, WF2 8UD. 1-4.30pm

Welling & District ME public running, Hall Place Park, Bourne Road, Bexley, Kent DA5 1PQ, 12.30-4pm

EVERY TUESDAY

Romney Marsh ME Track Meet, Rolfe Lane, New Romney, Kent, from noon

EVERY WEDNESDAY

Bromsgrove SME public running, Avoncroft Museum of Historic Buildings, Stoke Heath, Bromsgrove, B60 4JR 11am-3pm (August only)

AUGUST

2 Bradford ME Evening Running & Social, Northcliff Railway, Shipley, BD18 3DD, 7.30-10pm

4 Rochdale SMEE general meeting, Castleton Community Centre, Manchester Road, Rochdale, 7pm

5 Tiverton ME Saturday running at Rackenford track. Contact Chris Catley 01884 798370 (www.tivertonmodelengineering.org.uk)

5 Wakefield SMEE open day, Thornes Pk, WF2 8UD. Details from Dennis Halstead (01924 457690) or Phil Owen (01924 466000). 11.30am-6pm

6 Bristol SMEE Public running day, Ashton Court Railway, BS8 3PX noon-5pm

6 Guildford ME Small Model Steam Engine Group open meeting, Stoke Park, London Rd, Guildford, Surrey GU1 1TU, 2-5pm

6 Rugby ME members running, Onley Lane, Rugby, CV22 5QD

6 Ryedale SME public running, Pottergate, Gilling East, YO62 4JJ, 12.30-4.30pm

6 Worthing SME Saturday steam-up, Field Place, Durrington, Worthing

10 Guildford ME public running, Stoke Park Railway, London Rd, Guildford, Surrey GU1 1TU, 10am-1pm

10 Worthing SME meeting, Field Place, Durrington, Worthing 7.30pm

12 Rugby ME Standard Gauge Weekend, **13** Onley Lane, Rugby, CV22 5QD, from 10am each day

13 Lincoln ME public running for car boot sale, North Scarle playing field, LN6 9ER, 8am-12pm

13 Ryedale SME public running, Pottergate, Gilling East, YO62 4JJ, 12.30-4.30pm

13 Worthing SME public running, Field Place, Durrington, Worthing 2-5pm

16 Bristol SMEE meeting, Anything Goes, Begbrook Social Club, BS16 1HY, 7.30pm. contact secretary@bristolmodelengineers.co.uk

18 Rochdale SMEE meeting, quiz, Castleton Community Centre, Manchester Road, Rochdale, 7pm

20 Bradford ME public running, Northcliff Railway, Shipley, BD18 3DD, members from 11.30am, public 1.30pm

20 Guildford ME public running, Stoke Park Railway, London Rd, Guildford, Surrey GU1 1TU, 2-5pm

20 Rugby ME public running, Onley Lane, Rugby, CV22 5QD, 11am-1pm, 2-4pm

20 Ryedale SME public running, Pottergate, YO62 4JJ, 12.30-4.30pm

20 Tiverton ME Saturday running at Rackenford track. (See 5 Aug)

24 Worthing SME meeting, Field Place, Durrington, Worthing 7.30pm

27 High Wycombe ME Public Running, Watchet Lane, Holmer Green, HP15 6UF, 11am-5pm

27 27 Lincoln ME public running for car boot sale, North Scarle playing field, LN6 9ER, 8am-12pm

27 Worthing SME public running, Field Place, Durrington, Worthing 2-5pm

27 Bristol SMEE Public running day, **28** Ashton Court Railway, BS8 3PX noon-5pm

27 Cardiff ME public running, Heath **28** Park, King George V Drive East, Cardiff CF14 4AW, 1-5pm

27 Ryedale SME Main-line Rally, **28** Pottergate, Gilling East, YO62 4JJ

28 Bromsgrove SME public running, Avoncroft Museum of Historic Buildings, Stoke Heath, Bromsgrove, B60 4JR 11am-3pm

28 North Wilts ME public running, Coate Water Country Park, Swindon SN3 6AA, 11am-5pm

28 Teeside SGR public running, Preston Hall museum, Stockton-On-Tees, 1-4pm

30 Rugby ME holiday midweek public running, Onley Lane, Rugby, CV22 5QD, 1-3pm

31 Guildford ME public running, Stoke Park Railway, London Rd, Guildford, Surrey GU1 1TU, 2-5pm

SEPTEMBER

2 Bromsgrove SME Open Day, gauges 2½, 3½, 5, G1 and 16mm all welcome. www.bromsgrovesme.co.uk, contact Doug Collins 01527 874666.

2 Tiverton ME Saturday running at Rackenford track. (See 5 Aug)

2 Canterbury & Dist ME Open Day, **3** Bretts Quarries, Fordwich near Canterbury, details from secretary ginapearson@btopenworld.com

3 Rugby ME members running, Onley Lane, Rugby, CV22 5QD

3 Ryedale SME public running, Pottergate, Gilling East, YO62 4JJ, 12.30-4.30pm

6 Bradford ME meeting, 'King Cotton' by Roger Backhouse, Saltaire Methodist Church, 7.30-10pm

6 Bristol SMEE meeting, Midsummer Norton Station & the S&DJR, Begbrook Social Club, BS16 1HY, 7.30pm

6 Guildford ME Small Model Steam Engine Group open meeting, Stoke Park Railway, London Rd, Guildford, Surrey GU1 1TU, 2-5pm

9 Polly Owners Group rally at Rugby ME, Onley Lane, Rugby, CV22 5QD

9 Bromsgrove SME public running, **10** Avoncroft Museum of Historic Buildings, Stoke Heath, Bromsgrove, B60 4JR 11am-3pm

10 Bristol SMEE Public running, Ashton Court Railway, BS8 3PX noon-5pm

10 2½" Gauge Association Rally at Rugby ME, Onley Lane, Rugby, CV22 5QD, from 10am

10 Worthing SME public running, Field Place, Durrington, Worthing 2-5pm

15 Rochdale SMEE auction night, Castleton Community Centre, Manchester Road, Rochdale, 7pm

16 FMES Rally 2023, Frimley Lodge Miniature Railway, Hampshire, open to affiliated clubs, public running on Sunday. Details www.fmes.org.uk

17 Bristol SMEE Public running day, Ashton Court Railway, BS8 3PX noon-5pm

17 Cardiff ME public running, Heath Park, King George V Drive East, Cardiff CF14 4AW, 1-5pm

17 Guildford ME public running, Stoke Park Railway, London Rd, Guildford, Surrey GU1 1TU, 2-5pm

17 Rob Roy Engine Rally 2023 at Bromsgrove SME, Avoncroft Museum of Historic Buildings, Bromsgrove B60 4JR, 11am-4pm (see page 39)

17 Rugby ME public running, Onley Lane, Rugby, CV22 5QD, 11am-1pm, 2-4pm

17 Ryedale SME public running, Pottergate, Gilling East, YO62 4JJ, 12.30-4.30pm

PLEASE NOTE all outside events and public running subject to weather – please check with Society concerned before travelling to an event.

Details 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 being held. Whilst every possible care is taken in compiling this diary, we cannot accept responsibility for any errors or omissions in these listings.

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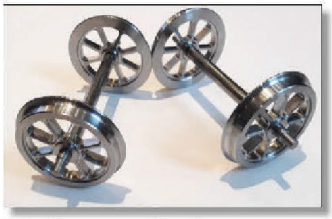

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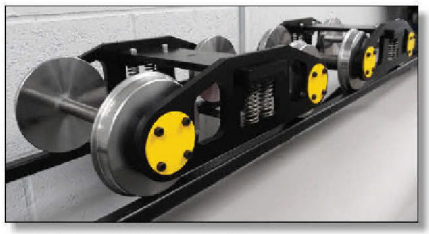

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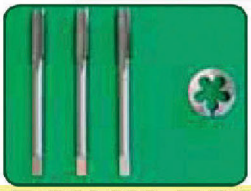

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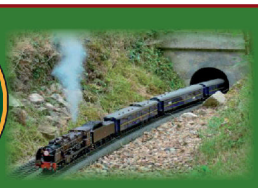

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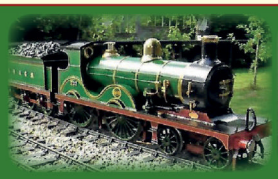

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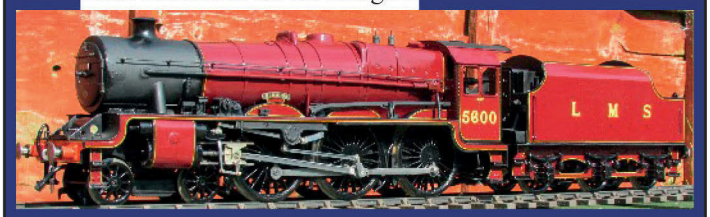

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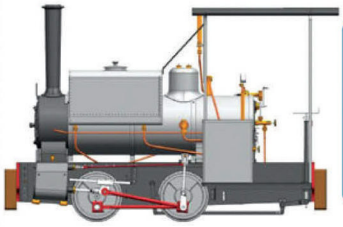

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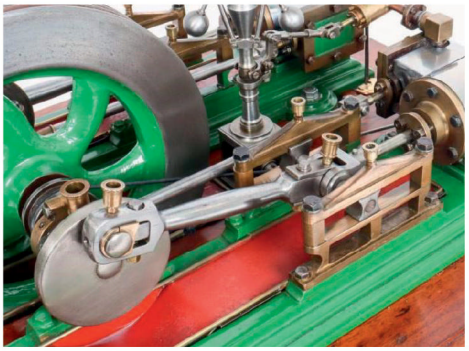

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