

FIRST STEAMING OF 6-INCH FODEN ● 7.25-INCH AGM ● LUBRICATOR DESIGN

THE MAGAZINE FOR MODEL ENGINEERS

ENGINEERING in Miniature

NOVEMBER 2023 | £5.49
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**Open
road...**

**Lincoln marks
90 years enjoying
model engineering**



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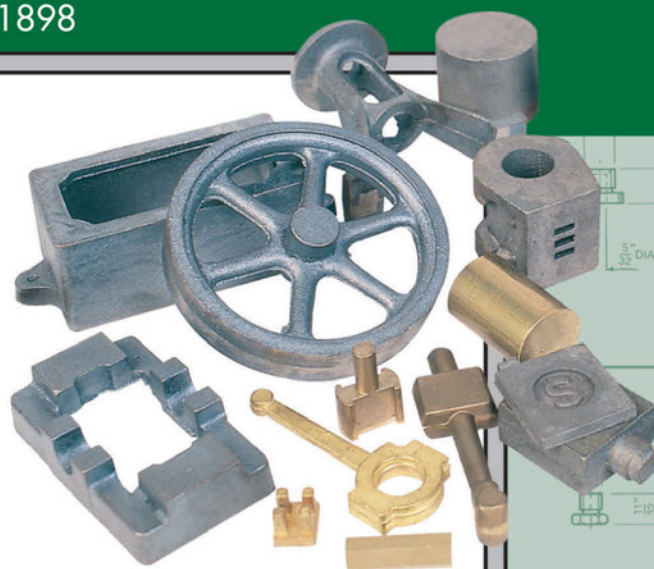


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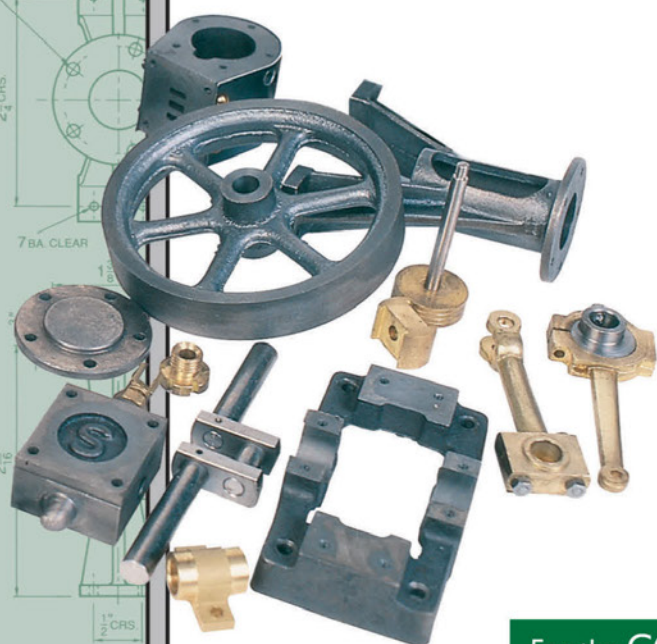
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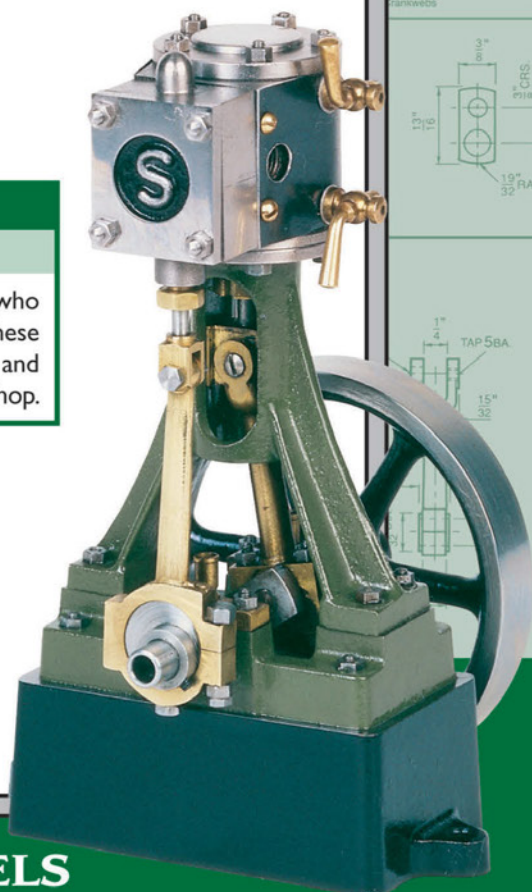
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ENGINEERING
in Miniature



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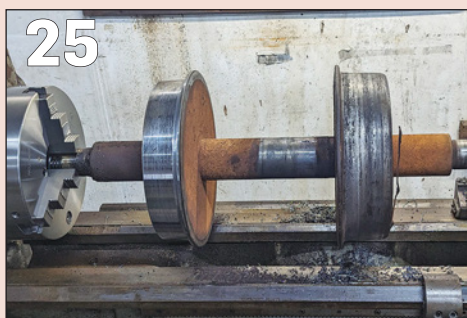
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EDITORIAL

Taking a welcome and long overdue road trip...

Welcome to the November edition of **EIM** and I must begin by offering an abject apology. In the last issue we promoted on the front cover our traditional pull-out guide to the Midlands Model Engineering Exhibition and indeed it was in the magazine – it's just that it wasn't right in the middle, so you couldn't pull it out...

The error was partly (though not entirely!) my fault, a wrongly placed page at the height of the production process, and I can only apologise. Thankfully there are usually copies of the guide available to pick up at the show – which is less than two weeks away as I write these words – so if you needed the help of a guide you should have been able to get one. And rest assured that we will be publishing our usual full and detailed reports from the show in the December and January issues – John Arrowsmith is sharpening his pencil as this is written!

The highlight for me in recent weeks has been actually being able to get out and visit a model engineering Society, in this case the Lincoln club, celebrating its 90th birthday and with my friend from the Welshpool & Llanfair Light Railway Tony Cass in the chair. It was a highly interesting and eye-opening visit, as you can read in the feature starting on page 9 – Lincoln has a really nice setup, it just needs more members to come and enjoy it!

Elsewhere in this issue we have the latest episode of Peter Malim's 6-inch Foden build. Peter felt confident enough to have the engine in steam at the Welshpool & Llanfair railway's Gala in early September – watching him charge about Llanfair station car park on it and deep in conversation with fellow miniature road steam runners trying to sort its teething troubles, I reckon the next episode will be well worth reading too!

Meanwhile the ingenuity of the father-and-son Keningtons never fails to amaze me. I mean whoever would have thought of converting a massage couch to make a hydraulic loco lift! Well they did, as they describe this month and next.

Then there's our Harry, trying so hard to get deep into overhauling a diesel loco at the Fairbourne Railway and being thwarted at every turn. I've said before that so many readers describe *Harry's Game* as their favourite feature in the magazine – I'm not sure if that's a compliment or they just like watching someone being served up far more challenges and dramas than he deserves! Enjoy your **EIM**. **Andrew Charman – Editor**

The December issue of **Engineering in Miniature** publishes on 16th November

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Publisher monthly by Warners Group Publications Plc,
The Maltings, West Street, Bourne, Lincolnshire PE10 9PH.

Articles: The Editor is pleased to consider contributions for publication in *Engineering in Miniature*. Please contact us to discuss your work.

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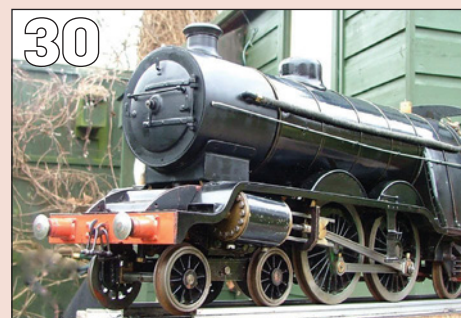
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Engineering in Miniature – ISSN 0955 7644

FRONT COVER

Our editor reports in this issue on his visit to the 90th anniversary open weekend of the Lincoln Model Engineers, where a line of visiting and resident road locomotives certainly made a stirring sight – especially when they went on a road run into the village and stacked out the pub car park!

Photo: Andrew Charman



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Building a 6-inch Foden C Type wagon

In the latest episode in his occasional series Peter describes the fitting of the cab bodywork and the load deck, running on air and steam and the first attempt at a drive.

BY PETER MALIM OBE Part Five of an occasional series



At the time of writing the last part of this series, the safety valve assembly of my Foden kit had been returned to manufacturer Steam Traction World (STW) for a second time for them to get the valves to seat. The assembly was returned to me shortly after and I refitted it. Using my hobby compressor I was able to pressurise the system to about 110psi and the valves remained shut.

With this test proving successful I arranged to take the lorry down to my local steam railway in order to run it on their workshop compressor – this has a much greater capacity and operates at 130psi, meaning I could run the engine harder and for longer than at home. **Photo 36** shows the engine on its trailer at the railway with the air line connected using the connection where the whistle is usually installed as this is a convenient place, feeding into the chamber where the regulator is situated.

This run was also successful, with the engine running relatively smoothly for 30 minutes or so. I didn't run it longer as I wasn't sure that the steam-oil lubricator was operating and the engine was inevitably a bit tight.

First steaming

The successful tests on air gave me the confidence to light a fire, as seen in **Photo 37**, and get steam up which I did a few days later. I struggled to get the fire going initially – I had bought a piece of stainless-steel flue pipe (**Photo 38**), which is a perfect fit in the top of the chimney, to improve the draught when the boiler is cold. Using it I have found that this also helps to direct smuts and smoke above my

"I opened the regulator and there was a loud bang and everything stopped dead..."



head when driving so I will probably use it most of the time.

To light a fire I had used diesel-soaked charcoal as suggested by an experienced model-engineer friend but the charcoal was reluctant to light once the diesel had burned off. I then tried wood kindling which proved more successful. In subsequent steamings I have found that plenty of wood is required to get enough heat to produce the required draught.

Once the wood was really going I added small lumps of coal and

gradually built up the fire. As this was the first steaming I wanted to take it slowly anyway to be in a position to safely deal with any leaks. In the event there were just a few minor ones, mainly on pipe connections which were easily nipped up.

Once there was about 20psi on the gauge, I opened the blower and this had a dramatic effect on the fire with pressure building up steadily thereafter. I have since found that a good deep fire at the back of the grate and sloping down to the front gives



the best results. The firebox is quite deep so it is easily possible to over-fire and some care needs to be taken to manage the depth of the fire.

Once I had 100psi on the gauge I tested the injector which worked fine, and then ran the engine so that I could test the mechanical pump which is driven by a chain from the crankshaft. This pump shifts a good volume of water so care is needed to avoid overfilling the boiler and causing priming – as I discovered on a subsequent steaming!

As everything was looking okay I decided to continue to build pressure to test the safety valves. The working pressure is 200psi, which is high for a miniature but necessary to effectively operate as a compound engine. On this first test the indicated pressure went past the red line, which was slightly worrying but then the valves lifted at 210psi (**Photo 39**) which is within allowable tolerance.

On subsequent steamings the valves have lifted at about 190psi, and next time I have the safety valve assembly off the cylinder block I will adjust them. In the meantime that is an acceptable pressure as I have found the engine runs well enough at 170psi for light work.

First drive

I steamed the engine in stationary form for a second time, just to check everything was still okay. Inevitably there were a few different leaks but nothing significant, and some of the leaks self-sealed as the whole engine warmed up and expanded.

A few days after this successful second steaming I decided to try driving the Foden for the first time. I am fortunate that there is hard standing all the way round my house, so I have a suitable track to run round.

I got steam up and engaged first gear – the three gears are selected by sliding one of two gears on the crankshaft to align with their respective secondary gears and transmit power to the chain which is on a sprocket mounted on the second

shaft. The first and second primary gear slides both ways, with the third gear sliding just one way.

I opened the regulator and there was a loud bang and everything stopped dead. Subsequent investigation showed that when I engaged first gear the rod that operates the first and second primary gear had moved into the space that the high-pressure cylinder big end rotates in, so the crankshaft had hit the rod, bent it and stalled the engine. **Photo 40** shows the problem.

As the rod was bent, I couldn't disengage the gear so it wasn't possible to move the lorry. I had to remove the gear cover which is held on with more than a dozen bolts, and completely dismantle the gear-change mechanism to enable me to disengage the gear.

When I raised the issue with STW I was told that this had been a problem with the first batch of kits and that this part had been shortened to prevent it happening. Somehow or other they had managed to supply me with one to the original drawing – they were not clear whether this was out of the bottom of the parts bin or whether it had been made to the old version of the drawing in error. Either way it is another example of poor quality or stock control. Fortunately no other damage was caused.

A replacement correctly made part was supplied and I was able to rebuild the mechanism, re-install the cover plate and touch up all the paint on the fixing bolts. It is a good thing that this happened before I fitted the cab bodywork, as this would have been a far more difficult job to do with the cab side in place.

Having carried out the repair, I steamed the lorry again and successfully drove it round the house a couple of times. The mechanical side of the build was complete, so I could return to the bodywork.

Cab bodywork

Whilst waiting for the safety valves to return I had made a start on the bodywork. At the time of writing the



PHOTO 36:

Running on air at the railway.

PHOTO 37:

Milestone – the first fire is lit.

PHOTO 38:

Extension for the chimney.

PHOTO 39:

The safety valve lifting over pressure.

PHOTO 40:

The bent gear selector shaft, jammed on the big end.

PHOTO 41:

The complete roof – a good-looking finish.

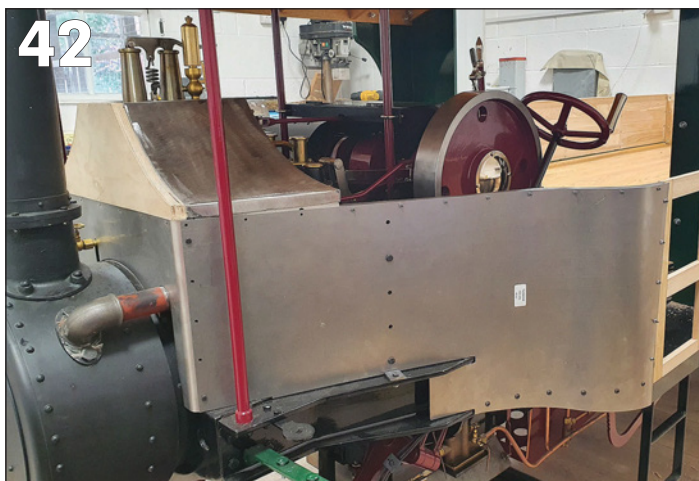
last part of this series I had assembled the roof and varnished the underneath. A sheet of calico is supplied to form the roof covering and this is to be glued to the roof.

I initially covered the roof in three layers of waterproof PVA to seal it, and then I applied a full coat and with the help of my wife stretched the calico over the roof. Once it had stuck, I then went round the edges, sticking them down before trimming off the excess.

The roof on some full-size engines has several ribs but these are not supplied with the kit. The local timber merchant provided me with lengths of hardwood half-round moulding which I cut, shaped, glued and nailed through to the ribs. I then applied three coats of smokebox black satin paint followed by three coats of satin varnish. I have to say I am pleased with the result (**Photo 41**) and, despite the calico having a rough finish, it is very easy to wash off any dirt and smuts due to the varnish.

Having installed the roof I turned my attention to the cab sides, which





had been back to the factory to be reshaped, as described in the previous episode. I offered them up and found that, although they were nominally the correct shape, when I attached the uprights on both sides that support the hinges for the doors they were not at the correct angle. I sent the panels back again with the door frame uprights and this time on their return they fitted (Photo 42).

Having painted the panels and

their fixing bolts on the bench I installed them with the front panel as seen in Photo 43. I have subsequently refitted the brass strip around the top which was a very frustrating job, getting the strip, the steel angle and the holes in the cab sheet to line up.

The doors are made of a wooden frame with a metal skin. I have started to build these up and I will fit them in due course. The cylinder-block cover is of hybrid construction of sheet



PHOTO 42:

A trial fit of the cab bodywork.

PHOTO 43:

The painted cab sides have been fitted and are awaiting installation of their brass trim.

PHOTO 44:

The load-bed structure, here being assembled, is of substantial construction.

PHOTO 45:

The load-bed metalwork painted and ready for fitting.

metal with a plywood front. Getting this to all line up and blend the two together required some patience and a fair bit of filler, but the result is satisfactory. This cover is removable to gain access to the cylinder block.

Load bed

The Foden's load bed is of substantial construction – the basic layout can be seen in Photo 44. The cross members are glued and screwed to the longitudinal beams which are in turn bolted through the chassis. This means the whole load bed can be lifted off to gain access to water tanks and such if required.

The bed is made of tongue-and-groove planking, which I glued to the cross members one at a time, using clamps to ensure that they were tight both against the next board and down to the cross members. With a day between each for the glue to harden, this was a drawn-out exercise.

I found that I had to plane off a small amount of the last board to get it to fit. The whole assembly went very smoothly and looks good. I assembled it off the chassis so I was able to turn it upside down to apply three coats of yacht varnish to the underneath before bolting it to the chassis. It was definitely a two-man job to turn it over and lift it onto the chassis!

I purchased the optional side and back kit which, like the load bed, is made of American White Ash (not Oak as I erroneously said in the last part) but also contains a large number of metal bits as shown in Photo 45 – these all had to be painted with six coats, except the hinge pins and their retaining clips which I nickel-plated.

The timber was all cut to size and jointed so it was 'just' an assembly job. I assembled the tongue-and-groove inset panels first, and then assembled the sides and back (Photo 46). Again I had to do a small amount of planing to get the inset panels to fit, but overall the assembly was fairly easy and the results very pleasing.

The next task was to drill for and

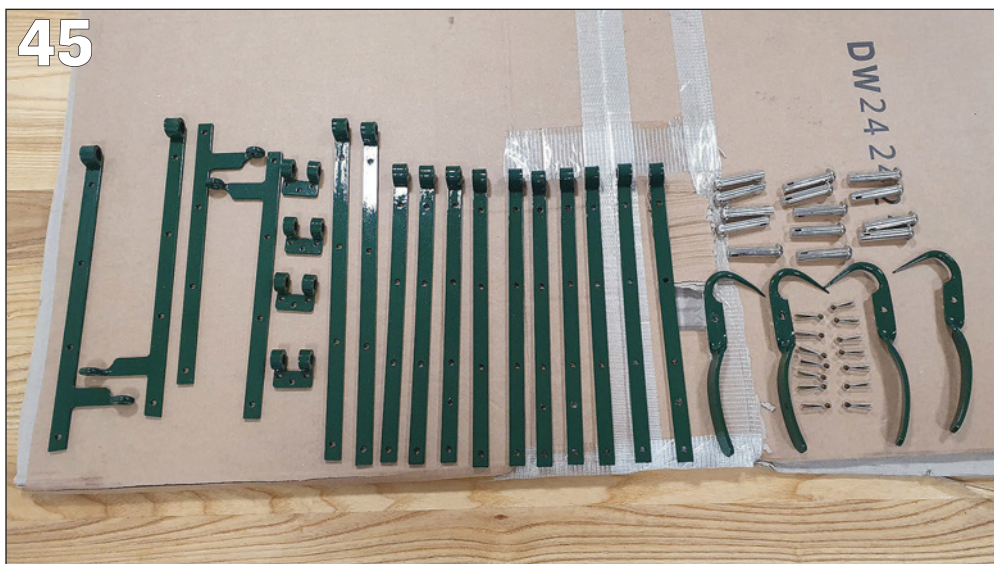


PHOTO 46: Firm clamps necessary as one of the load-bed sides, made of American White Ash, is being assembled.

PHOTO 47: Additional pieces had to be added to the front load bed ends to ensure they fitted the cab.

PHOTO 48: The front load bed ends fitted to the cab rear panel.

PHOTO 49: The completed and varnished load bed with the optional sides and back kit fitted.

Photos by the author except where stated.

attach all the metalwork which was a mammoth task, but everything fitted. I then removed the metalwork and put on three coats of gloss yacht varnish on the woodwork, before reassembling.

Oddly the small panels that attach to the cab to form the front of the load bed have a plywood insert rather than tongue-and-groove boarding. The kit also does not include any way of fixing them to the cab, and the instructions simply say "You may want to think of a way to tie the two front sub-assemblies to the cab". The corner of the cab has a moulding to cover the joint between the two sheets, so the panels cannot sit flush against the cab.

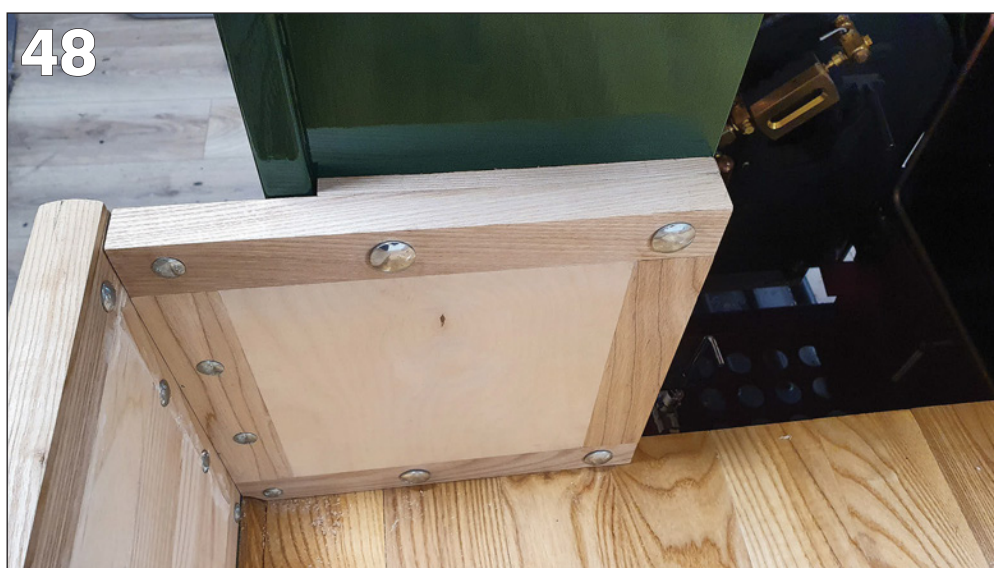
A talented carpenter friend of mine made up some spacer and filler pieces for me, as shown in **Photo 47**, so that the panels fit neatly on the cab rear. I used coach bolts to fix them through the rear cab sheets so that they can be removed if required (**Photo 48**). The overall finish of the back is shown in **Photo 49**, and I think it is one of the highlights of the lorry, and well worth the extra cost to fit the sides and rear.

Adding upgrades

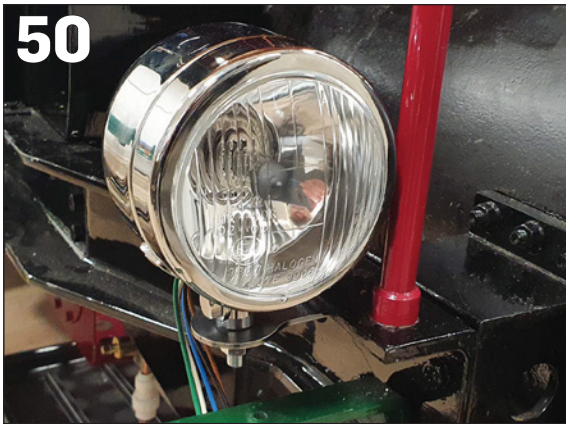
There are no lights included with the kits, so it is up to the individual builder to customise as they see fit. There are a wide range of different lights to be found on the full-size lorries in preservation, so the owner has a free choice. As I intend to road-register the Foden, I felt that practical lights would be essential so I have sourced chrome headlights that have standard 55/60W halogen car bulbs fitted as well as built in sidelights (**Photo 50**). These are mounted on the supplied brackets just above the front mudguards.

For the rear lights I have gone for a discreet but visible installation of red LED lights under the rear chassis, and I have made a bracket with two small white LED lights to mount and illuminate the number plate when fitted (**Photo 51**).

I installed all the wiring on the



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chassis before fitting the load bed – the cable will come up into a box I intend to make that will sit at the back of the load bed to provide seating for passengers and storage for the battery and other tools, oils and such underneath. This storage will be

accessed by opening the load-bed rear panel. The controls for the lights will be in a panel on this box. A decent-sized leisure battery will provide adequate power for sufficient time, so I do not plan to fit a generator.

The rear drum brakes are operated

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**PHOTO 50:**

Halogen headlight will be useful on a vehicle Peter intends to register for road use.

PHOTO 51:

The rear lights and bracket for the number plate.

PHOTO 52:

A stainless-steel return spring has been added to the footbrake lever.

PHOTO 53:

The water lifter and hose mounting bracket.

PHOTO 54:

First public outing – Peter and the Foden at the Welshpool & Llanfair Light Railway Steam Gala in September. Photo: Andrew Charman

by a foot pedal in the cab. The springs on the shoes are not strong enough to overcome the friction in the system and return the pedal once released. Therefore I have fitted an additional stainless-steel spring on the pedal, attached to an existing bolt on the chain casing, as seen in **Photo 52**. The brakes are very effective.

A steam-powered water lifter is supplied, mounted on the nearside just behind the cab. However as supplied it is supported just by the copper pipes. A hose support and mounting bracket is supplied, which is designed to fit under the cab floor, but I decided to mount it under the rear load bed. I constructed a bracket that is fixed to the bed cross members and supports the hose bracket and also the water lifter. The plastic hose supplied didn't look that good so I bought a more authentic wire-wound hose and some leather straps. All this can be seen in **Photo 53**.

Next steps

As I wrote these words I was planning to take the lorry to the Welshpool & Llanfair Light Railway annual Steam Gala which is always attended by a small number of miniatures (*which he did, see Photo 54! Ed*). This would give me an opportunity for some shake-down trials near to home and with access to the railway's workshop. No doubt I would expect some issues – hopefully nothing too serious – which I will report in the next part of this series.

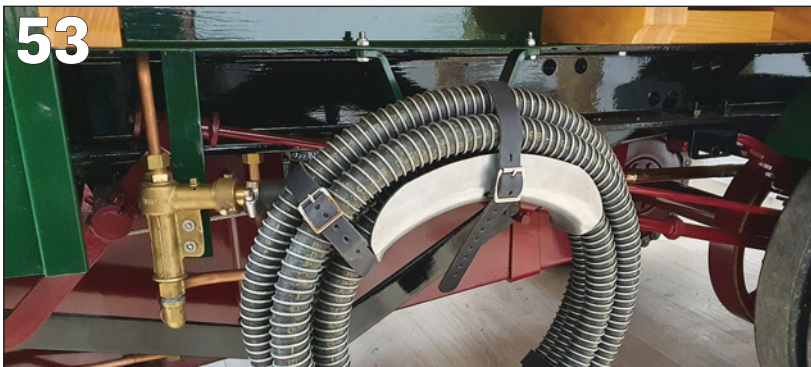
As the bodywork is nearly finished, thoughts have turned to lining out and signwriting and decisions will need to be made as to how elaborate to make it. Once this is done I will be able to take the necessary pictures to send to the DVLA for road registering. **EIM**

■ The first four parts of this series appeared in the June and October 2022, and the February and July 2023 editions of **EIM** – you can download digital back issues or order printed copies from www.world-of-railways.co.uk/store/back-issues/engineering-in-miniature

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Lincoln ME 90th Anniversary Weekend

Andrew escapes the editorial computer to head north for an annual open weekend with a little extra celebration at the Lincoln ME.

BY ANDREW CHARMAN

Editing and designing **EIM** and its sister magazine *Narrow Gauge World*, together with having a completely separate career as a motoring journalist, means that unsurprisingly your editor does not get out to visit nearly as many model engineering clubs as he would like.

Therefore I was determined to make time in my schedule to respond to an invitation to join the Lincoln & District Model Engineering Society for its open weekend on 23rd September, particularly as this one had a little extra hook in being promoted as the 90th anniversary weekend.

Excuse for a do

Now 90 is not often regarded as a much celebrated milestone but I was intrigued by club secretary Neil Grayston's matter-of-fact comment, "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 – as would seem to be the norm in our hobby, the age profile is now very much weighted in favour of the 70-plus brigade."

Lincoln is indeed one of the oldest clubs in the country and for many years had its track in the city's Boultham Park, a raised line catering for 1¼, 3½ and 5-inch gauge. Issues with vandalism saw this abandoned more than 20 years ago and a search

PHOTO 1:

Bedford member Alan Gildersleve takes his LNER B1 and its teak carriage set into the wooded section of the oval track.

PHOTO 2:

The line-up of road engines, members and visitors, was particularly impressive.

Photos by the author



for a new site brought the Society to its current location in the village of North Scarle, where they were welcomed by the village's Sports & Social club and allowed to lay a new ground-level 5 and 7¼-inch track around the edge of the playing fields. This gives a run of around a third of a mile through two

stations, a tunnel and a steam-up area with lifts for unloading models from cars, the Society commenting that; "no longer do members arrive on a bike with their loco under their arm – it is now necessary to have a large hydraulic lift to unload locos from the backs of 4x4s."



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The club also benefits from car boot sales that are held every other Sunday on the playing fields – trains are operated giving rides to visitors while the sales are on, earning useful revenue for club funds.

Getting to North Scarle demonstrated one of the challenges that faces clubs such as Lincoln. The village is out in the countryside a fair distance from any major centre of population – I even went over a level crossing on the main line from Newark to Lincoln that still had old-style gates and a man coming down from the signal box to shut them each time a train needed to pass. When you are ‘out in the sticks’ attracting sufficient numbers of both visitors and members will always prove to be a challenge.

Mind you on arrival and crossing over the club track into the parking area I viewed a sight to behold, with a seriously impressive display of road engines of varying scales, as can be seen from this month’s **EIM** front cover picture. Apparently around half of the Lincoln membership is of the traction engine variety, which I

suspect is above average compared to other clubs.

Stealth steamer

Led by Dave Pierce, a stalwart Lincoln member who has built five 6-inch scale Burrell traction engines and was driving the first-built that he owns, the line-up boasted both members and many visitors, and as they lined up for the photo I had asked for, one engine in particular intrigued me. Driven by young Marshall Harrison, it looked just like a normal agricultural tractor of the internal combustion variety, but that was definitely steam coming out of the exhaust...

A glance over Marshall’s shoulder into the cab confirmed the suspicions, as the bodywork neatly concealed a vertical boiler and steam engine with a long history.

Marshall’s dad Lloyd Harrison, an engineer, found the engine for sale in the middle of the Covid pandemic and as soon as he was allowed to, he went up to view it and bought it. As soon as Marshall saw it he fell in love with it and it quickly became his engine.

It needed plenty of work though. “When we got it the engine was completely seized,” Lloyd told me. “The previous owner had steamed it then put it away with water in the boiler, a fire in the grate and not even the draincocks open. The pistons were stuck in the cylinders, and it had been stored in a damp environment, so the motion had completely seized.

“We separated it into two projects, one to sort the engine and the other the boiler. It had steel washout plugs in a boiler left full of water... The plugs rusted on the water side and we couldn’t get them out – we ended up boring out the whole lot and Station Road Steam welded in some new bosses for us, while we made some new plugs, the boiler getting a clean bill of health.”

Once the engine was back in operational form Marshall designed a riding truck to go with it – wheels to match those on the engine were

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acquired via eBay; “we built the truck over the summer.”

Since rebuilding the engine the Harrisons have been able to get in touch with its original builder Eddie Lancaster, a well-known model engineer, while the world of social media has revealed two more previous owners of the engine, enabling the family to put together a full life-history. Happily progressing across the rally field Marshall looked very happy at the control of his unusual engine.

The full set

The rail tracks were busy too of course, without doubt topped by visitor Alan Gildersleve on his LNER B1 4-6-0, complete with teak carriage set. Alan has been a member of the Bedford Model Engineers since 1987 and chairman in his first year. “I turned up to my new club and the President said it was his legal duty to wind this club up, as no-one had been ▶



PHOTO 3-4: Marshall Harrison's tractor is not quite what it seems

PHOTO 5: Jim Bailey demonstrates model engineering in action.

PHOTO 6: Lincoln Chairman Tony Cass welcomes visitors to the weekend.

PHOTO 7-8: Generations – Colin Bowes from Doncaster and member Hugh Kelly.

PHOTO 9: Well our man couldn't visit and not have a ride...

PHOTO 10: Rob Brown fires up his King.

PHOTO 11: Waiting for the road.



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12



nominated to be Chairman – ‘without a chairman we can’t run’. So I said I’ll do it and everyone said who are you? I was Chairman for about 12 years!”

The B1 was specifically modelled as ‘Gazelle’ which was one of the Royal Train engines. The model was built by Great Northern Steam in Darlington, the town the original full-size locos came out of, and finished in 2002.

A set of sit-aside teak carriages to run with it were made between 2002 and 2004 – the combination looked particularly effective when on

the circuit with no passengers. “I wanted a proper train rather than pulling typical big sit-in carriages.”

Other rail locos giving good accounts of themselves included GWR 4-6-0 ‘King George V’ of Chesterfield member Rob Brown, who has owned the engine for around eight years. He shared turns with plenty of variety of diesel traction while more locomotives arrived as the day went on.

Among the young members getting their full turn on the track it was particularly pleasing to see 11-year-old member Hugh Kelly

“We need to get a little bit moving, to get some new blood in the club...”

PHOTO 12:

Impressive motive power of much variety on the Lincoln steaming bays.

PHOTO 13:

The road engines went off for a road run into the village...

PHOTO 14:

...and it was probably no real surprise where they all ended up!

enjoying himself with his diesel shunter – to the degree that when he was asked if he wanted to go home for Saturday lunch he politely declined...

I had a chat with Lincoln chairman Tony Cass, a man I know well as a fellow Welshpool & Llanfair Light Railway volunteer – we have on more than one occasion shared 2ft 6in gauge footplates. Tony does not shy away from the challenges that are facing model engineering clubs in today’s world but he is keen to progress the Lincoln Society; “We need to get a little bit moving, to get some new blood in the club.”

Planning progress

One hoped-for innovation next year will be to open on certain Saturdays in addition to the current boot sale runs. “We are a miniature railway type of club rather than a model engineering one – we don’t have extensive workshop facilities but we do have plenty of model engineers among our members,” a point neatly emphasised by former Royal Naval engineer Jim Bailey, who spent the weekend showing visitors, and continuing to work on, his part-built loco project.

As we talked, it dawned on me that the road engines had disappeared, off on a road run into the village. As I took my leave I came upon the village pub, with two 6-inch traction engines parked on the road outside and the rest of the road contingent packing out the car park, clearly enjoying their weekend and looking forward to heading back to the rally field in time for an evening hog roast.

I too had enjoyed my visit to the Lincoln club, a group of enthusiasts with an excellent setup and worthy of progressing even with today’s challenges. Let’s hope that Tony can find a way to bring more new blood into the club to ensure that in 10 years time there is another big celebration. But I hope I’ll again be heading to Lincolnshire and back over that old level crossing long before that... **EIM**

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Sub500 – a pair of 5-inch gauge electric locos

Julian to the fore again this month, describing the control systems on the budget project he and Rich came up with to provide something for their grandchildren to drive.

BY RICH WIGHTMAN & JULIAN HARRISON Part Six of a short series

This month we move onto the locomotive's control systems. We are aware that electrical systems and components for quite a lot of people are something they are either scared of or unsure of if they don't understand them. Because of this the electrical instructions have been broken down to simplify the process. If you are happy with electrics please bear with us. We will describe all the components and the circuit and then give a list of wiring instructions.

The motor

The motor used for this locomotive is the 24-volt 270 watt motor employed on many shop mobility scooters and similar. They can be picked up quite cheaply on auction sites or by speaking to one of your local mobility scooter suppliers. It is rare they are faulty as the most common part to fail on the scooters is the main control board, which renders them beyond economical repair. Complete scooters can often be acquired fairly cheaply which can provide you with a motor, multi-wire connectors and if you are lucky a decent pair of batteries.

Be aware that the motors required for this project are the ones that turn at about 4000 to 4300rpm. Some only turn at 3000 revs per minute. My earlier calculations for the transmission depend on this upper speed as a higher-revving motor geared down gives very acceptable torque and a decent top speed. If you choose to buy a 3000rpm motor you will need to change the sprockets, especially sprocket two.

Our locomotives have pulled two riding cars with five men on them totalling probably around five hundred kilos, but we would not recommend this as normal work. As mentioned earlier be sure to use the 24-volt motors. Twenty four volts and 270 watts gives 11.25 amps – this is calculated by dividing the watts by the volts. If you use 12-volt motors the amps jump to 22.5 so you will need considerably larger cables for the whole loco, adding to the cost. If you do go with 12-volt motors you will need to modify the wires. We will not

describe this and will only describe the 24-volt wiring.

Speed controller

You will need a speed controller for this project to control the speed of the motor and consequently your locomotive. There is not much point finding a scooter controller that works as they can be complicated beasts and often need software to program or adjust them – they are also designed to work only with all ancillary components and sensors fitted and wired in.

The motors are 24 volt and nominally around 11 amps when not under strain, so all you need buy a simple 60-amp soft-start pulse wave modulated (PWM) speed controller from the usual auction sites. They are almost always of Far Eastern origin but work exceptionally well. Pick one that has soft start, is rated at 60 amps, accepts 24 volts (most automatically take up to 48 volts), has an on/off switch, forward/reverse switch and often a digital display. There are many available for under £20.

You may now be asking "If my motor uses under 12 amps why are you telling me to buy a 60-amp controller? Why can't I buy a 20-amp model?". The easy answer is that the motor is only nominally rated at 270 watts or 11.25 amps. Under extreme

"Soft-start helps to remove the starting strain and gives a nice smooth getaway..."



load they can momentarily spike to 40 or 50 amps.

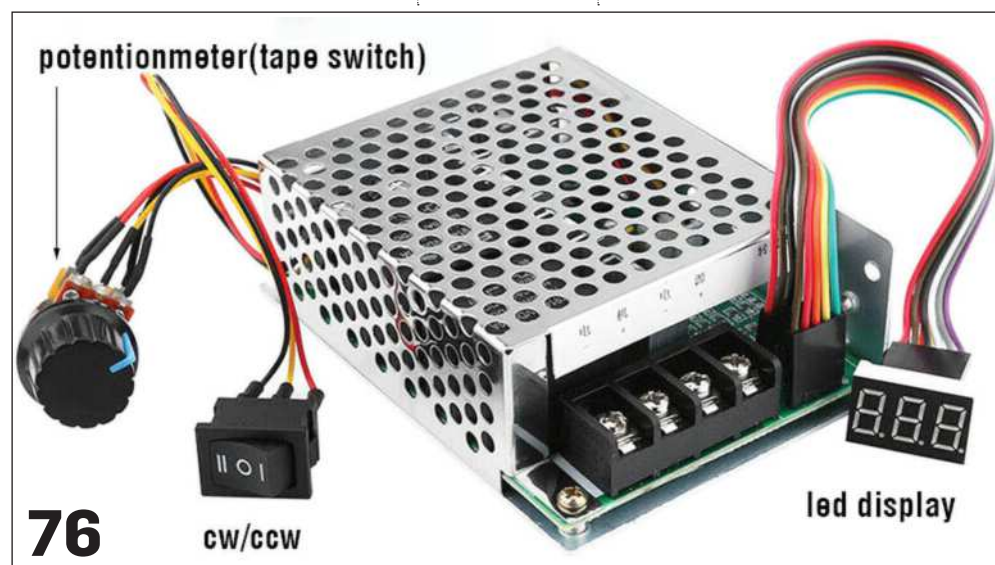
On the lower-rated controllers the fuses will keep blowing under strain. This strain can be harsh starting, steep gradients, heavy loads and similar. Soft-start helps to remove the starting strain and gives a nice smooth getaway. I have, on previous projects, used the slightly cheaper 20-amp controllers but from experience this is false economy and I recommend buying the 60-amp model like ours shown in **Photo 76** rather than trying to save a couple of pounds.

The speed control and on/off switch is all within a rotary variable-resistor pot with a knob to turn. The main box is normally made from perforated metal with four large screw-down electrical connections. Normally the speed pot, direction switch and digital display are pre-wired. The display does not give

PHOTO 76:

Typical speed controller that is suitable for this loco project

Photos by the authors



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your speed but tells you the percentage of power the controller is sending to the motor – your speed is governed by your motor speed and the gearing that has been chosen.

Just a comment now about controlling the speed of a motor. Before the advent of cheap electronic components the way to control the speed of a motor was with a variable rheostat. These reduced the speed by reducing the voltage to the motor and were large variable resistor coils. They also decreased the amperage which meant that as your motor slowed with the lowering of the voltage you also lost power. They created a lot of heat as they resisted the voltage so consequently had very big heat sinks.

Nowadays we use Pulse Wave Modulated (PWM) controllers. The voltage and the amperage remain

“The locomotive has just as much power at its slowest as it does when running flat-out and there is very little heat generated...”

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constant throughout the full range of speeds. They control the speed by switching the power to the motor on and off very quickly but still maintaining the voltage and amperage. The speed is controlled by the circuit changing the frequency at which it turns the power on and off and so the length of time the power is on.

The frequency is so high (about 60,000 times a second) that there is no feeling of start and stop when it turns on and off. The locomotive has just as much power at its slowest as it does when running flat-out and there is very little heat generated so no wasted energy. Our locos will happily roll along on their minimum speed setting.

We fitted a battery condition indicator as in **Photo 77**. These are available online for around £5. They display the voltage of the batteries and have a bar indicator that ‘suggests’ the condition of the batteries.

Warning horns

The horns we fitted are a pair of cheap 12-volt car horns. They came off the internet for less than ten pounds and just need a cheap horn relay to control them. The horns come as a set of two. Each has a slightly different tone but when sounded together they create a sort of harmony.

I had an article published in the January 2023 issue of **EIM** detailing the design and building of a two-tone system controlled by an Arduino microprocessor. We have used these controllers on our locos but they are outside the scope of this article though in reality they do not add too much to the cost.

Control Dashboard

Before we can start wiring everything together we need a control housing with a dashboard for the controls. If

you wish you can do away with the dashboard and put all the switches on a hand-held control box but this is beyond the scope of this project so will not be described and we will go with a fixed control system.

The control box and dash are fitted to the top plate near to the rear edge. The exact size and position will depend upon what body you decide to build on your loco. I will describe ours and this will probably suit most bodies you may build. **Photo 78** is a view of ours.

Your dash should be large enough to accommodate all buttons and switches including the speed control, forward/reverse switch, speed display, battery-condition indicator, horn button, 24- and 12-volt isolation switches, a key (more on this later) and any other controls you may decide to add at a later date such as lights, bells, different horns and such. You should also leave space for your chosen labelling of controls.

The control housing can easily be constructed from three pieces of ply and a top of thin sheet metal such as aluminium. The top needs to slope to give good hand access and a good view of all the controls. To save congestion on the dash I cut the battery indicator display, speed controller digital display and the ‘key’ into the top of the rear panel.

For this ‘key’ choose a plug and socket of some type. The easiest are either a large mono audio-jack plug or a large mono power-jack plug and their matching panel socket. I suggest you buy the biggest you can partly so the key does not get lost in your pocket or tool box – the bigger ones are also stronger.

Drill the front wood panel to accept your chosen socket. Because the wood is too thick for the panel

sockets you will need to remove some of the wood inside the housing to make it thinner. Panel sockets have a nut on the back to fix them in place but can only cope with a thin panel. It will be wired later.

The cutting of the holes for the components on the front panel is best done before gluing the control box together. We cannot give you the sizes of the holes as you need to take these measurements from the components you use. The control housings for our locomotives are about eight inches wide and just under three inches deep. They are self-contained units fixed to the top plate so they remain in place when the body is removed.

The rear panel is about six inches high while the sides slope up to about eight inches high. Our dashboards' fascias are a couple of 8-inch by 3-inch pieces of 2mm aluminium sheet. These dimensions give enough room for all the controls while leaving enough room to fit and remove the cab and body. If you wish you could build the dash as a permanent part of the cab but only if you are not making the cab removable.

Control box

Cut three pieces of 8mm or 10mm ply to the shapes required – **Photo 79** shows a set of ours. They are fastened together to make a three-sided box with a sloped top. Either glue and clamp the parts together or glue and hold with some small screws. Once drilled the metal top can be screwed onto the top to form the slope.

Sit the control housing on your loco in the correct place and mark a line along the inside bottom edges onto the top plate. Remove and cut two pieces of wood approximately 20mm by 20mm and a length to match the control housing sides. Screw these down on the top plate on the inside of the lines just drawn. Once the control housing is fitted later it will drop over these blocks and screws will go through the sides into the blocks to secure it.

This is the control housing completed. Do not fit it to the loco yet as it is easier to do most of the wiring first with it laying on the top plate. I found it easier to fit most of the controls before attempting the wiring.

First fit the main box for the speed controller to the inside of the control box. Some come with small angle brackets but ours did not. I made three small aluminium angle brackets to suit. The controller has some threaded holes on the ends and sides for this purpose.

Ensure you use some very short bolts to fit these angles. If they are too long they could contact the circuit board and either damage it or cause a

"If they are too long they could contact the circuit board and either damage it or cause a catastrophic short circuit..."

PHOTO 77:

A battery condition indicator is a very useful addition at minimal cost

PHOTO 78:

Overview of the control panel set-up on Julian and Rich's locos.

PHOTO 79:

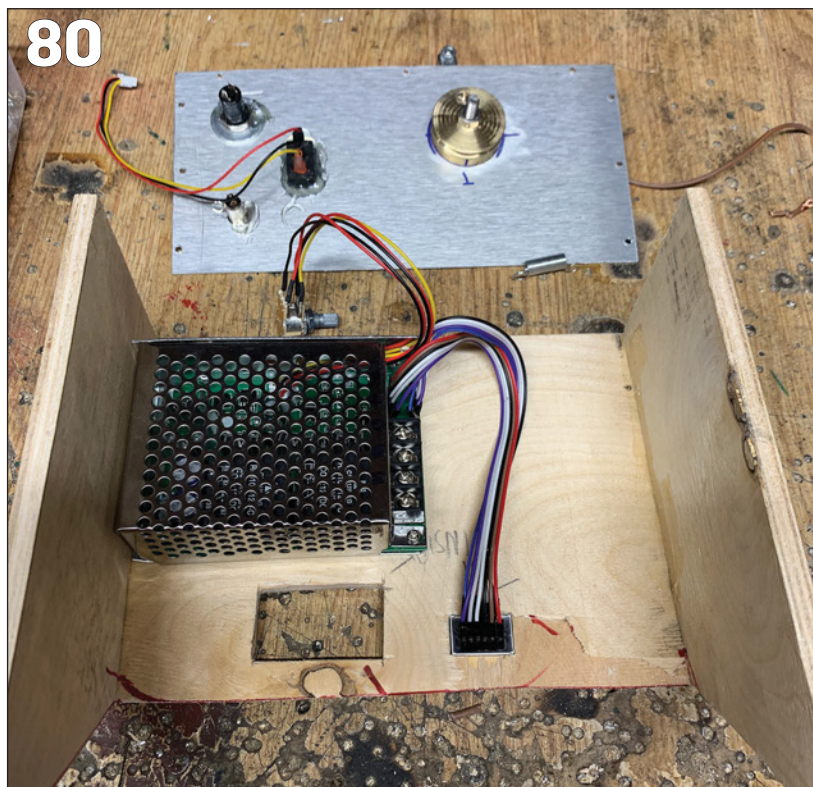
Sheet ply used to build the sides of the control box housing.

PHOTO 80:

Control box installed in its protective wooden box.

PHOTO 81:

Wago-type connectors are easy to use and provide a firm grip on the cable.



catastrophic short circuit that will require the enforced purchase of a replacement circuit board!

Using some very short screws through the angles fit the controller to the inside of the front panel of the control box. Looking into the housing the best place is in the bottom right corner but allow room for the baton previously screwed to the top plate.

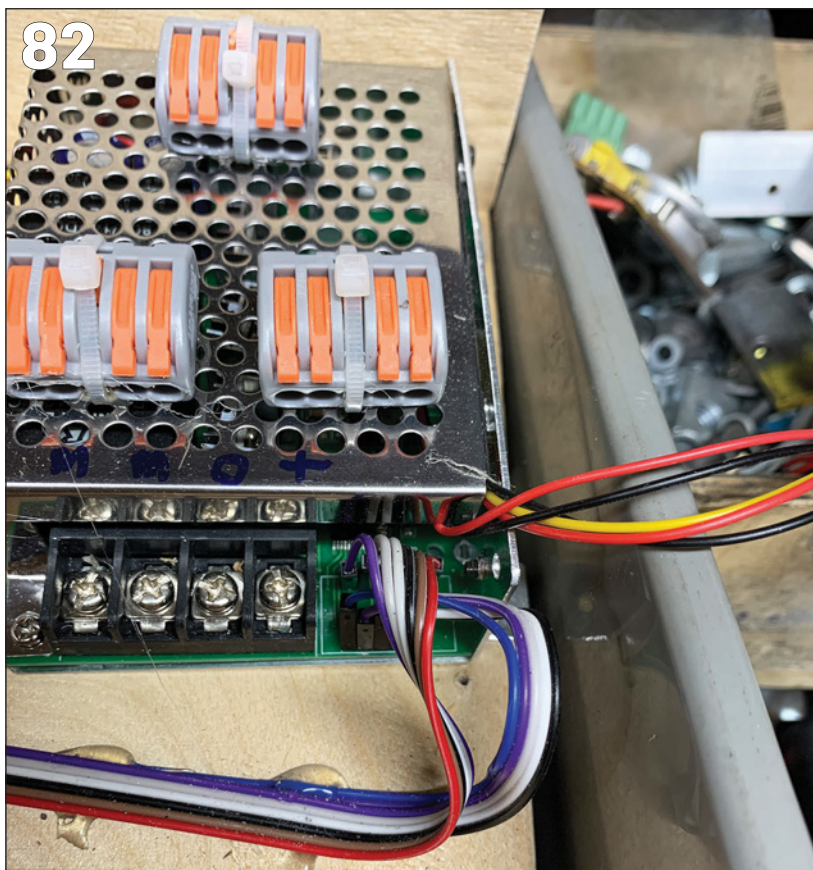
Photo 80 shows an installed control box. I used the perforated casing of the controller to fit three connector blocks for the later wiring of the system – each needs five or six connections. The choice of connector is your choice but I recommend the new 'Wago' style connectors as in **Photo 81**. This is a double but they are available with up to five connections and have a lift lever for each entry port. Once the stripped end of a wire

is inserted the lever is flicked back down and provides a very secure and positive connection.

As can be seen in **Photo 82** we glued them to the surface of the controller with a hot glue gun and also used a small thin electrical zip tie for added security. Three five-port blocks shown in **Photo 82** will be needed for 0-, 12- and 24-volt supplies so from now on we will refer to them as the supply blocks.

Fit the various controls into their chosen mounting places in the control box. Most are either glued in with hot glue or fixed with their own fixings. The two controls for the speed controller will need extra attention – firstly the forward reverse switch. You will need to remove the perforated top from the controller to unplug this switch. Once unplugged





pass the plug and the cable through the top dashboard panel and secure the switch which generally just clips itself into the square hole you have already cut. You can now plug the lead back onto the controller and replace the lid.

We now need to fit the speed

control pot. How you fit this is to some extent your choice. You could just fit it into the dash and push on the knob that came with it. You could adapt the knob to have a lever on it to make it look more typical of most full-size locomotives. We chose to make a rotary lever that has the ability



PHOTO 82:

Wago blocks glued to surface of the speed controller to ensure a solid fixing.

PHOTO 83:

Control lever designed in a dead man's handle format.

PHOTO 84:

Parts required to make the control lever.

PHOTO 85:

Rotating parts of the control lever after machining.

PHOTO 86:

Battery box completed and ready for installation in the locomotive.



to become a 'dead-man's handle' if required as shown in **Photo 83**. This is standard on full-size electric or diesel locomotives and is a safety device that has to be held at all times by the driver. If they let it go for any reason the handle returns to its off position and the locomotive comes to an almost immediate halt.

Control lever

Photo 84 shows all the completed parts required. A collar was turned from brass to fit in the hole drilled in the dash. This hole was about 20mm diameter – the brass collar fitted this and protruded about 5mm above the face of the dash.

Behind the dash the collar has a flange wide enough to accept two fixing bolts – it has a hole through it about 15mm in diameter. Some 2-inch brass has a spigot turned in the lathe to be a sliding fit in the collar and which pokes about 2mm out of the face of the collar when fitted.

The rear face is machined to leave a disc of the original 2-inch material about 6 to 8mm thick and a shallow groove machined into the edge. This groove can eventually be used to hold a spring to give the auto rotation of a dead-man's handle if you wish. We have as yet not fitted this spring.

Before removing from the lathe drill a 5mm hole through the middle and tap M6. As this part needs to rotate freely ensure that it is a good fit in the collar that holds it in place while allowing rotation.

The lever for the throttle is a short piece of 10mm wide stainless bar about 2mm thick. The length is your choice but we opted for 40mm to give some realistic detail but not to take up too much space on the dash. We used stainless but brass or steel could also be employed.

One end is drilled 6mm and the other end is drilled and tapped M4. A piece of 8mm rod about 20mm long is drilled and counter-drilled to take an

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M4 cap-head bolt. Do not tighten too much but use a small M4 nut on the opposite side to lock it so the handle can rotate.

The face of the rotating brass part needs a channel machining in its face to locate the handle. It need only be deep enough to retain the handle and to hold the brass in the collar but just allow it to rotate. This channel needs to match the width of the lever.

Once assembled the rotating parts are held together with a stainless M6 cap-head bolt long enough to take a locknut with an excess of about 20mm. We will make and fit the rest later as it requires a bracket that could be in the way of wiring your control box. These two components are shown in **Photo 85**.

Batteries

These are two 12-volt 12ah lead-acid sealed batteries as used on the majority of mobility scooters. The 12 amp-hour items are the best compromise for size, capacity and cost – they are the largest of the smaller-capacity batteries. The next size up (20ah) are physically a lot bigger and cost at least twice as much. If you go to 50ah each battery is physically bigger than two of the 12ah so you will struggle to fit two in your loco body.

The 12ah are readily available online for about £36 a pair. You need two because they will be connected together to give both a 12- and 24-volt supply. It is worth buying two pairs as one set will hopefully power your loco for more than four hours. When they stop they will need recharging so a second set allows you to carry on driving while they charge up.

To protect the batteries build a box to hold them. This also allows all the connections to be protected and with

a plug system they are easy and quick to fit to the loco. Our boxes were built from some 6mm ply cut to size but 6mm MDF will do just as well.

Use the batteries as a template to cut the wood. Build the box so there is a 10mm gap all around the sides of the batteries and a 20mm gap above. Choose some form of clip to secure the lids.

The sides and base are pinned and glued together. If you have a hole saw available drill a couple of holes in each side about an inch or so in diameter. These make decent hand-holds and allow air into the box.

Using a bit of polystyrene from any packaging you may have around cut some pieces 10mm thick and about 30mm square – the shape is not important. Push one centrally down each side of the batteries to hold them in the box. The gap is to allow airflow around the batteries when in use and to allow for any slight expansion that may occur.

The batteries must be installed with the terminals of both batteries adjacent to each other. **Photo 86** shows a completed battery box – as you can see the wiring code is written on the lid as a reminder. The connections can all be seen in this photo.

The wire used for these locos is 13-amp household flex readily available at any hardware or DIY shop. This cable has adequate capacity to handle the loads we will have. Another good reason for using this cable is that it gives us three different colours. We have used the same colours throughout the wiring system – brown for 24-volt, green/yellow for 12-volt and the blue for 0-volt.

Ensure you buy 'Flex' as it is made up of many strands of copper and is able to resist vibration and movement.

Errata...

Julian tells us that a reader who is following the series and building this loco has pointed out a typo in the September issue's episode, regarding the explanation of the maths. The calculations were correct but anyone wanting to fit different-size wheels or different speeds of motors would have a problem working out the change in gearing.

The paragraph at the top of column two on page 24, converting feet in a mile to revolutions of the wheels in a mile should have read "Now as we know there are 5280 feet in a mile so if we divide by 0.91 it gives us 5802 revolutions of the wheel per mile." Not "multiply by 0.91" as was published. Apologies for the error.

"If you go to 50ah each battery is physically bigger than two of the 12ah so you will struggle to fit two in your loco body..."

Solid single-core wire will be very stiff and will eventually break, especially on the battery plugs. **EIM**

■ Julian will move onto wiring everything up in the next part of this loco build series.

Parts one to five of this series appeared in the June to October 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.



Just don't do it! In more detail...

By request, Dave describes the mystic workings of the Jim Ewins design of locomotive lubricator in more depth.

BY DAVETHESTEAM

In the August issue of **EIM** I described how I had fitted a pair of excellent lubricators made by Steam Fittings on my rebuilt Sweet Pea locomotive, one on each of the cylinders with a clack valve on each cylinder – a method that apparently several people were advising against at the time.

I described how these lubricators use the Jim Ewins style of controlling the delivered oil by means of 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.

Well, reader feedback tot his first article suggests that a more detailed explanation of this type of lubricator might be useful. I am not surprised really, it took me a long time to work it out in the first place!

So I have produced a more in-depth description and included

more diagrams, which will hopefully help readers understand how everything works. I have not tried to produce 'engineering' drawings, nor have I shown unnecessary detail – the spacer is not shown separately and the delivery pipe is very short!

Let us start with **Figure 1** which is generally as per the image in the first article, though some dimensions have been added. This shows the general layout of the important parts of the Ewins lubricator.

FIGURE 1

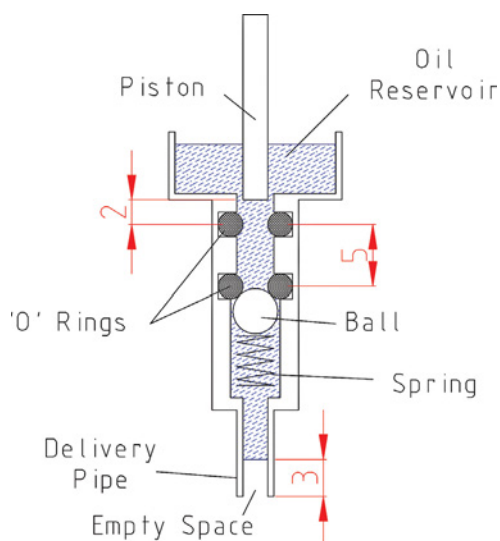


FIGURE 2

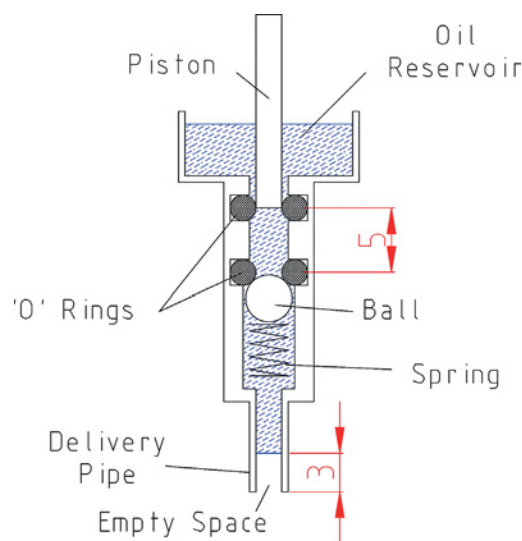


FIGURE 3

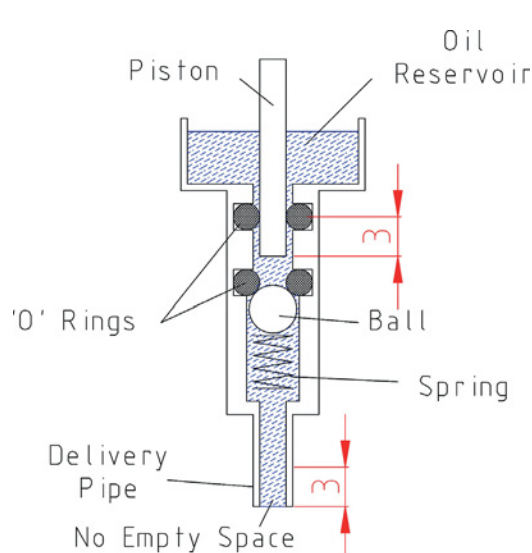
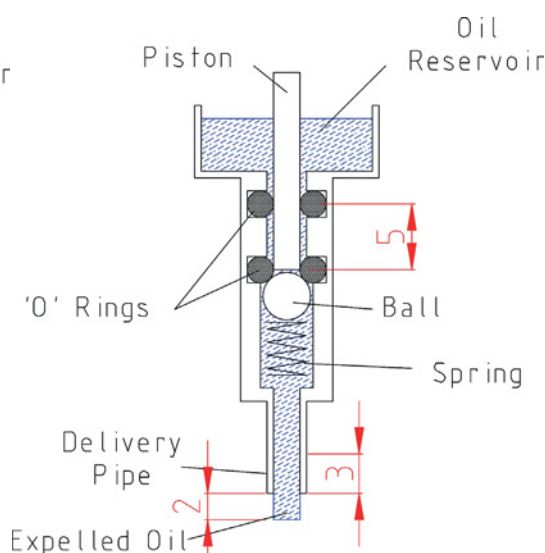


FIGURE 4



Drive options

The piston can be driven by a few different methods – Mr Ewins' original had, I think, a Scotch Crank, while the Steam Fittings version has a disc driven by a peg on a disc with a return spring. As long as the end of the piston travels above the top O-ring and below the lower one the method of moving the piston and its travel are irrelevant. There is always some kind of guide to keep the piston in line with the cylinder – I haven't shown this as it is not critical to the explanation of lubricator operation.

In order to avoid a lot of thinking about dimensions and volumes of oil I am going to assume the delivery pipe is the same inside diameter as the piston, so that if the piston travels five units then the oil column in the delivery pipe travels five units, in other words the same distance.

I am going to think of the units as mm, but what they are is again not relevant to the explanation, they could just as easily be inches on a very large lubricator or thousandths of an inch on a very tiny one. You can also think of them as fractions of an inch if it's easier, it really doesn't matter – just imagine whatever units you are comfortable with.

Figure 1 shows the starting position. We shall assume the cylinder and delivery pipe are full of oil, apart from the last three units of the delivery pipe. This is how things will be after a complete stroke of the piston during normal operation with the dimensions as shown. The reason for the three units of empty pipe will become clear later, if I am

*All diagrams
in this feature
by the author*

making my description successfully!

In **Figure 2** the piston has descended by two units until it contacts the upper O-ring, displacing oil into the reservoir as it goes as there is no pressure to push the ball off the lower O-ring. No oil is pushed into the delivery pipe.

In **Figure 3** the piston has now descended by three units, pushing three units of oil past the ball as it is sealed by the top O-ring and can now generate some pressure. Remember the three units of empty pipe? These three units of oil fill the delivery pipe but no oil has been expelled from the end of the pipe.

In **Figure 4** the piston has now travelled a further two units to the lower O-ring, pushing two units of oil out of the end of the pipe. For the sake of the explanation we shall pretend that the oil stays hanging at the end of the delivery pipe.

In **Figure 5** the piston has now travelled a further three units to the bottom of the stroke, pushing another three units of oil out of the end of the pipe. The total oil delivered from the end of the pipe is now three units, which is the same as the distance between the O-rings.

In **Figure 6** nothing has moved inside the lubricator but the oil which has been expelled from the delivery pipe has now gone to do its job.

In **Figure 7** the piston has risen three units until the ball seats on the bottom O-ring. As it does so the oil in the delivery pipe retracts up the pipe by the same distance, three units, matching the three units of empty pipe we started with.

In **Figure 8** the piston has continued to rise but as the ball is sealed on the bottom O-ring no oil can get from the delivery pipe into the space between the O-rings, creating a vacuum in that space. When the piston clears the top O-ring the vacuum draws oil from the reservoir into the vacuum between the O-rings. When the piston reaches the top of its stroke we are back at Figure 1.

Please go through the diagrams and sequence a few times and hopefully it will make sense.

A little arithmetic

I apologise that the next couple of paragraphs might look a bit like a maths lesson! Let us now consider that the lubricator is delivering too much oil – the first instinct will be to reduce the stroke but this will, unfortunately, not work!

If you reduce the stroke to nine units all that happens is that the empty part of the delivery pipe at the end of each stroke becomes two units – five units of oil is still delivered on

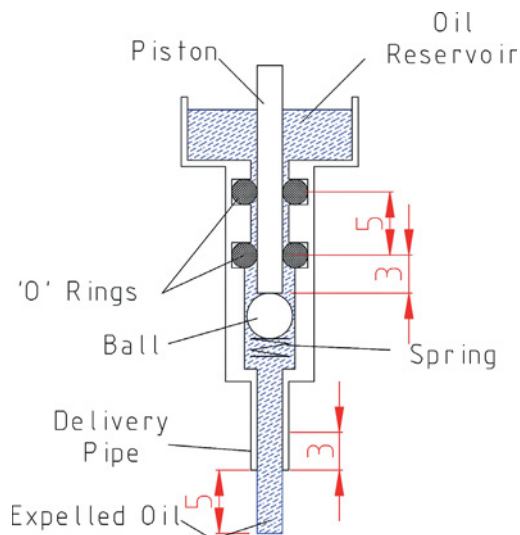


FIGURE 5

each stroke. If you go through the sequence using the reduced stroke and amending the dimensions on Figure 1 this should become clearer.

If we now think about increasing the stroke to 11 units, which again may seem logical if we need more oil, then the empty space becomes four units but five units are still delivered from the end of the pipe.

The only way to reduce the delivery is to reduce the distance between the O-rings and to increase the delivery by the same as the distance between the O-rings must be increased. Run through the sequence reducing the distance between the O-rings to four units. Without changing the total piston stroke the part of the stroke after contacting the bottom O-ring will become four units and the empty space in the delivery pipe becomes four units.

Finally back to the original problem – if you fit a check valve in

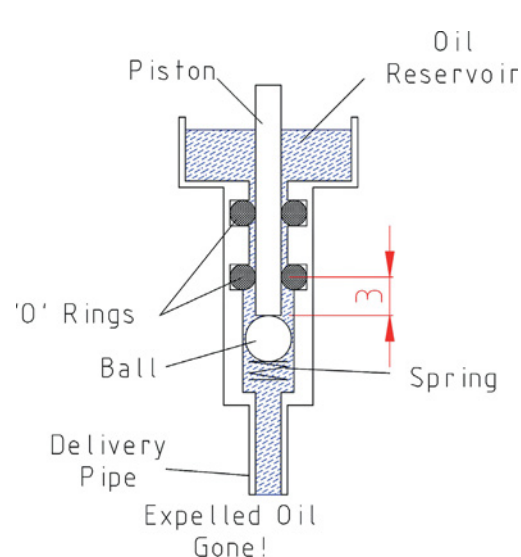


FIGURE 6

“These three units of oil fill the delivery pipe but no oil has been expelled from the end of the pipe...”

the delivery pipe the oil cannot retract back up the delivery pipe, as shown in Figure 7, so that not only is the gap between the O-rings empty but also the top three units of the delivery pipe. This volume is filled with oil when the piston clears the top O-ring and the next stroke of the piston pushes eight units of out of the delivery pipe, in this example 60 per cent more than intended.

It is true that if you have a check valve and reduce the stroke you will get less oil but the whole idea of the design is that the lubricator will deliver a precisely measured and finely adjustable amount of oil on each stroke. In practice the O-rings are separated by a spacer, adjusting the thickness of which adjusts the distance between the O-rings.

I hope this explanation is more thorough than the first but I concede it is not easy to get one's head round it. More happy lubricating! **EIM**

FIGURE 7

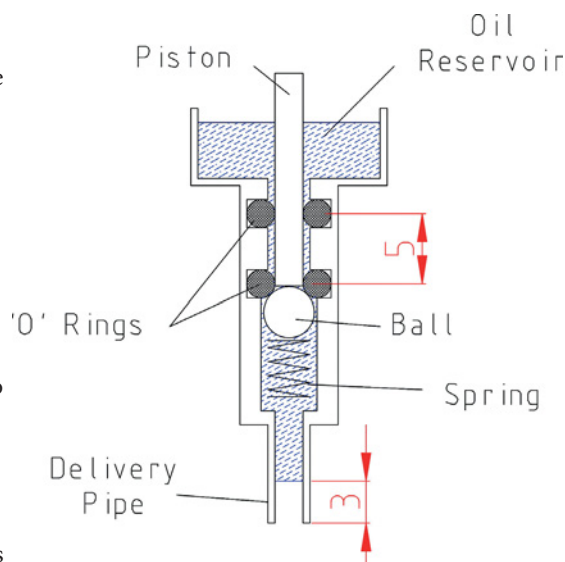
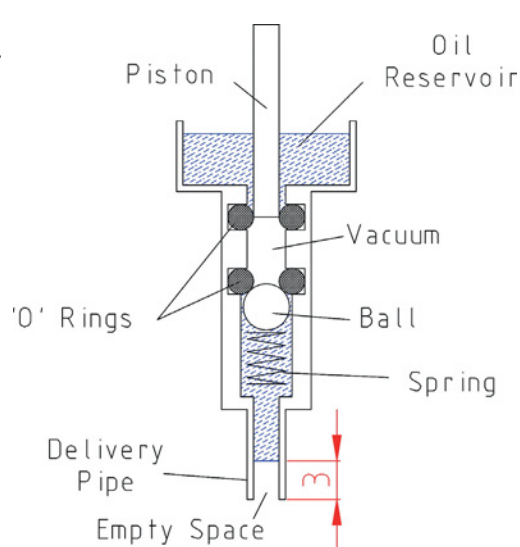


FIGURE 8



A loco lift for less

Regular readers will know the Keningtons are renowned for their innovation and a loco lift made from a massage couch is certainly innovative! Are you sitting comfortably?

BY PETER AND MATTHEW KENINGTON Part one of two



LEFT: The completed lift, with occupant.

PHOTO 1: The original Ebay listing.

PHOTO 2: The couch as delivered.

PHOTO 3: Ready to accept a patient, but not yet a loco...

PHOTO 4: Post-elevation – part of the former loco-moving solution (a pallet truck) can also be seen in this photo.

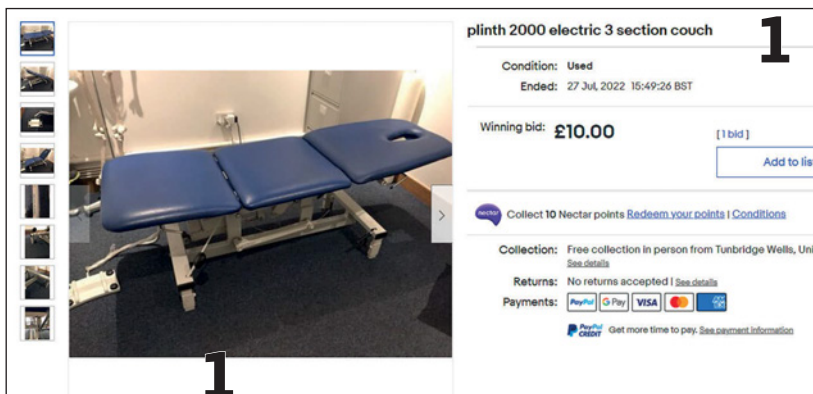
Photos by the authors

Matthew and I have been looking around for a solution to a number of loco-related 'housekeeping' problems for quite a while now. There are three problems of concern, which I'm sure are common to all loco owners:

- 1) How to move a loco around the workshop (if only to get it out of the way when working on other things)
- 2) How to position a loco in a convenient location (and at convenient height) for working on or testing
- 3) How to move, and then load, a loco into its transport, for taking off to a club track.

Our 5-inch gauge 'Super Simplex' locomotive is relatively easy to live with, in this regard. It lives in a wooden box, with locking castors on its base, and is light enough to be moved around the workshop, up onto a bench or into a vehicle without too much difficulty (assuming two people are available for the task). Our 7¼-inch gauge loco, on the other hand, is heavy (are there any light 7¼-inch locos? – a Tich perhaps...).

Our original solution to the above problems, for our 7¼-inch gauge loco, is sub-optimal in the same way that a traction engine is sub-optimal as transport to an alpine skiing holiday – usable after a fashion, but very far from ideal. We have an awkward combination of a chunky piece of 'track' in a frame (which we inherited



– it's a long story), a pallet-truck (for moving the loco/track around the workshop) and a piece of 'transfer track' (to get the loco from this into our trailer). We didn't really have a solution to problem 2 above, and carrying out any work on the loco involved a lot of kneeling down on a solid concrete floor, which was not very satisfactory.

Borrowing with pride

I once knew a former police officer-turned-consultant who described plagiarism as: "borrowing with pride" and he did so regularly in his presentations, liberally 'borrowing' photographs, graphs and such from anywhere he could find them, usually without acknowledgement. He is still at liberty, so far as I am aware...

Taking a leaf out of the same book, I undertook some research into how others solved the above problems (or any given subset of them). There seem to be three main solutions:

1) Design and build your own trolley, perhaps with a bottle-jack as a means for providing lifting functionality. Indeed, such designs have appeared in these esteemed pages in the not-too-distant past. This would be a fun project, but we have a long list of 'fun' projects and only one lifetime in which to fit them all

2) Buy a pump-up trolley/table (search for 'hydraulic lifting table' on your favourite search engine). This is a common solution and I know a number of people who favour this option but it has a couple of problems:

a) They tend to be quite short (~0.8m) and adding overhanging track, to accommodate a larger loco, feels a bit risky.

b) The wheelbase is relatively short, making them a little more precarious when moving a large loco (the centre of gravity of the combination being somewhat higher than would be ideal, especially in the 'raised' position)

c) They undergo a step-change in price if more than about 150kg of load-bearing capacity is required – our loco would probably exceed this figure and new examples (for a 300kg load) are around £500.

3) Buy a motorcycle lift – these are even more expensive (~£650), but do have the advantages of a long 'bed' (~2m) and a low base-height (making it easier to get a loco on and off the floor, if needed).

Overall, we favoured option 3, but even secondhand motorcycle lifts remain quite pricey and we hadn't got around to a serious search (I'll again draw your attention to the long list of projects referred to above).

One day Matthew, observant chap that he is, pointed out that Hereford

SME doesn't use any of the above options. HSME is building a Romulus as a club loco (although at the rate it's going, Antarctica may be a savanna by the time it is finished) and this sits on an unusual trolley. It has all of the right attributes:

- A large (long) table area
- A large wheelbase, making it stable when moved around
- A good range of height adjustment on it, by means of a hydraulic 'pump-up' arrangement

This, we thought, would be an ideal solution and we set about finding one for ourselves.

Retail therapy

For once, this term is entirely apt: we bought a (used) therapy/massage couch, for a whole £10 (Photo 1) – and no, this isn't a typo, we paid ten pounds sterling as can be seen in the copy of the listing. What is more, it is an electrically-adjustable model – no need to pay for a gym membership to build up those calf muscles, in preparation for all that pumping.

Sadly, delivery added somewhat to this cost (we arranged a courier via Shippy, which was good value), but even so, the delivered unit was an absolute bargain. What is more, I had great fun telling my wife, with a completely straight face, that I had just purchased a massage couch. I did offer her the option of trying it out before we set about dismantling it, but she wasn't keen.

A few days later, it arrived (Photo 2) and we immediately set to work on it – our haste was not due to an especially urgent need, more that it was occupying too much space in the 'garage' part of our workshop and we needed the room.

To be strictly accurate, we didn't immediately set to work on it. We couldn't resist the temptation to have a play (sorry, check its functionality and capabilities in a thorough and dispassionately-scientific manner). It can go quite low (Photo 3) and pretty high (Photo 4) – we will more precisely define these rather loose (and unscientific) terms a little later, as the exact height of the couch, when it is still a couch, is not especially relevant to a loco-builder/owner.

Unwanted angles

The couch is mains-powered and came with a controller (Photo 5). This allows the couch to be raised and lowered (very helpful) and tilted at quite an alarming angle (visions of a *Carry-On* film spring to mind here) – this is obviously somewhat less helpful when considering its use as a loco trolley!

Fortunately, it is a simple matter to disable this latter 'feature' and thereby

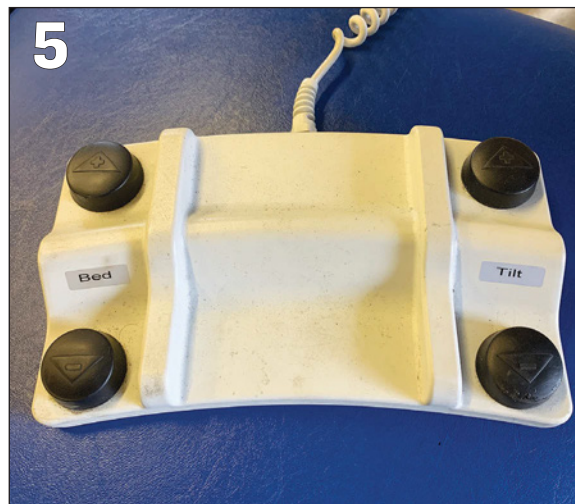


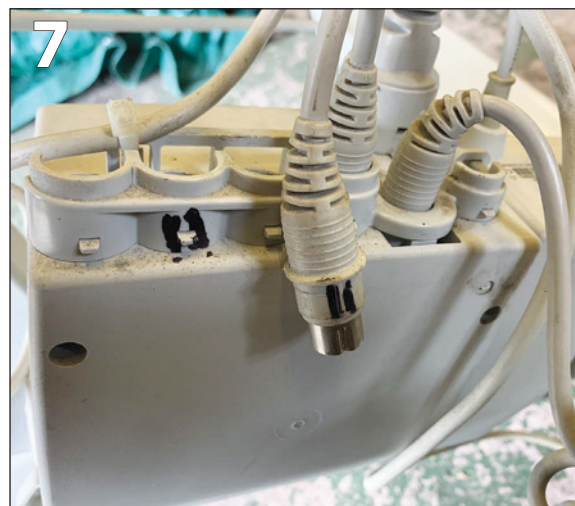
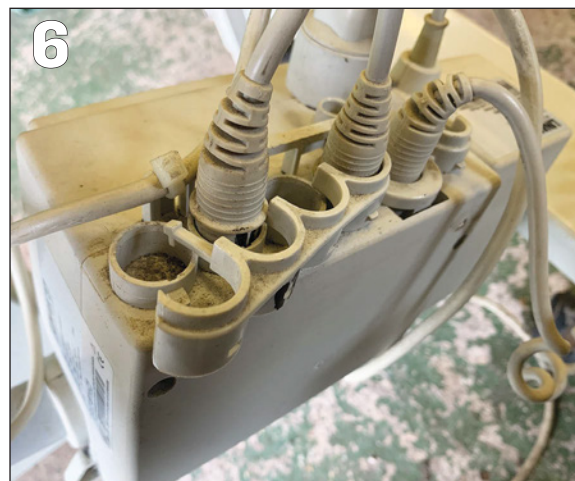
PHOTO 5: A simple and robust controller.

PHOTO 6: Interface unit with locking mechanism disengaged.

PHOTO 7: Plug removed and marked. Note that the locking collar has also been reinstated.

prevent accidental calamity from befalling our valuable pride and joy. Firstly the 'tilt' feature should be used to ensure that the couch is level – this is straightforward as it comes to rest in a surprisingly accurate approximation to 'level'. We checked this with a spirit-level (on the frame) and it was as close to perfect as makes no difference.

Once the couch is level, the 'tilt' motor needs to be disconnected from the control system. To do this, a locking collar needs to be disengaged from the plugs which connect to the top of the interface unit (Photo 6) and





the relevant plug can then be removed (Photo 7). We marked both the plug and its socket, just in case we ever felt the need to reinstate this feature.

The whole system is mains powered, taking around 1.5A maximum (Photo 8). Note that the duty-cycle is not high, so you'll need to resist the temptation to play with it too much...



The main actuator is capable of 4000N (around 900 lbf) of force (Photo 9), running off 24 volts derived from the interface unit. I'm pretty sure that the controller also runs on 24V (or less), although I haven't verified this – this means that there shouldn't be any fireworks if its cable gets accidentally sliced in the mechanism somehow! It's hard to see anywhere

where this might be in danger of happening, however.

The main actuator pivot, whilst not a precision bearing, is quite chunky (Photo 10). It should be more than capable of handling the loads we will need.

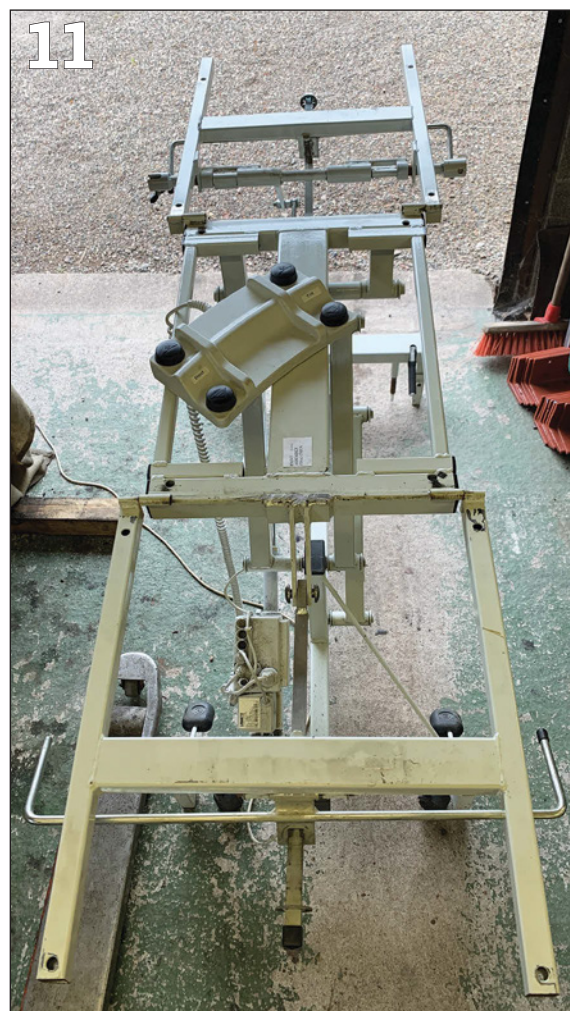
Covers off

Having disabled the tilting mechanism, the next step is to remove the padded sections. These simply unbolt and may be discarded (or 'disposed of in an environmentally-friendly manner' as is required these days). The resulting bare frame is shown in Photo 11.

There is a hinge-like protuberance in the centre of the cross-member, where the foot-section hinges. This protuberance is not a part of the hinge, nor is it structural, and this can be removed (Photo 12). My guess is that this would form part of a hinge on a different model of couch, with the same basic frame accommodating a number of models in the range.

We needed to remove this part because the section of 'track' we planned to use was pre-made (more on this later) and one of the sleepers fouled on this part, when the other sleepers were lined up with suitable parts of the superstructure to allow them to be bolted in place.

"This allows the couch to be raised and lowered and tilted at quite an alarming angle..."



Added support

We needed to add some further support for the track at the ends of the 'bed' of the trolley, as there are no cross-members at these extremes of the frame (as can be seen in Photo 11). We used some 30mm angle-iron for this and opted for bolting (rather than welding) these parts in place. We wanted to be able to remove the track and replace this with a continuous flat surface, as a future enhancement, to accommodate a rolling-road, for example, hence opting for the flexibility of a bolted solution.

In order to allow the angle iron to abut the ends of the tubular frame, it was necessary to round the upper corners of the square cross-sectional tubing to match the internal radius of the angle-iron (Photo 13).

The ends, as supplied, were also a little sharp (having originally been protected by end caps) and so these were dealt with at the same time. The angle-iron can then be securely bolted in place (Photo 14).

Vital statistics

With the padding removed and the cross-members installed, it is possible to generate a specification for the now-former couch, as a loco table:

Overall length (able to accommodate 'track', without overhangs): **171cm**

Supported width (able to support a table-top, for example, without overhangs): **45cm**

Height to top of frames (i.e. table-top height minus its thickness), when lowered: **49cm***

Height to top of frames, when raised: **96cm***

Wheelbase: 44cm x 117cm (approx)

*Based upon using 100mm diameter castors, as discussed below. If smaller castors are used, then the difference in the radii can be subtracted from these figures, to provide a revised height estimate. For example, 75mm diameter castors would yield a lowered height of a little under 48cm.

Armless frames

The couch came with short, stubby, armrests, of the sort you might find on a standard office chair. These can be rotated out of the way or removed entirely. Obviously, our loco doesn't need such luxuries and so we removed them – they simply unhook from the tubular structure shown in Photo 15. We also decided to remove this tubular structure, since it no longer serves a useful purpose and could impede access to the underside of the loco were it to remain in place (Photo 16). An angle-grinder made short work of this task.

For our 'track' upon which the loco will sit, we were fortunate to have

"It no longer serves a useful purpose and could impede access to the underside of the loco..."

PHOTO 8:

Interface unit parameters.

PHOTO 9:

The main actuator ratings.

PHOTO 10:

The main actuator bearing

PHOTO 11:

All superfluous padding removed.

PHOTO 12:

Hinge-like protuberance (effectively a section of steel tube) having been removed from the bed superstructure by means of an angle-grinder.

PHOTO 13:

Rounded ends to accommodate the radius on the angle-iron's internal corners.

PHOTO 14:

Cross-members installed on top.

PHOTO 15:

The armrest mechanism (the armrests having been removed).

PHOTO 16:

Arm tubes and structures removed to allow easier access to the underside of a locomotive.

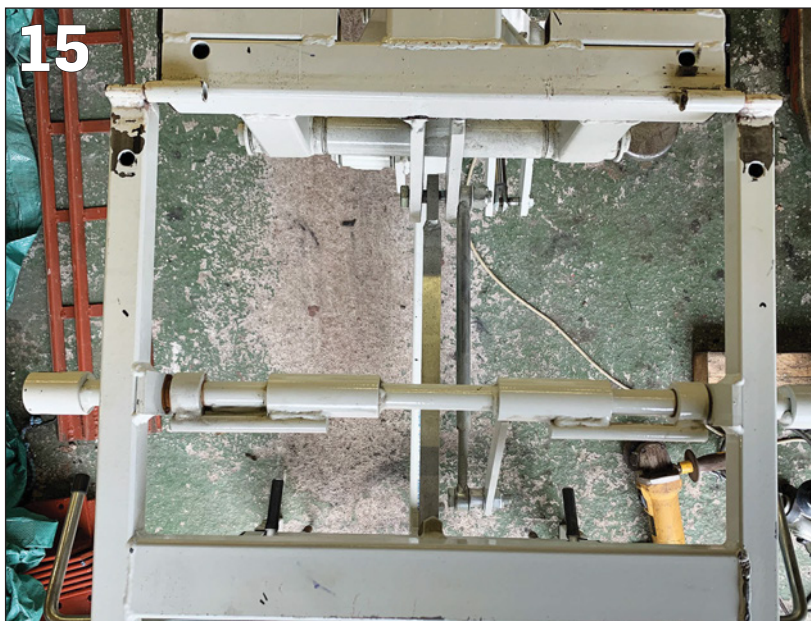




PHOTO 17: Track in position, ready for clamping, drilling/bolting and welding.

PHOTO 18: Some TIG welding practice...

PHOTO 19: ... and the result (not too bad a job).

PHOTO 20: End-section of track welded in place – this section is tapered (from its former life) and hence interfaces better with a flat surface such as the bed of an unmodified trailer.

PHOTO 21: It's satisfying to see that even the professionals sometimes produce less-than-perfect welds!

PHOTO 22: Track cut to length.



something suitable 'off-the-shelf'. We had some time ago inherited a section of welded angle-iron based track (dual gauge, which was even better) and it had been cluttering-up our workshop for a while – one of those “it's too good to throw out and will come in handy one day” items. Its day had finally arrived.

Welded rail

This track (**Photo 17**) started out life as a means to transfer locos from a car boot onto a semi-raised section of track – having a pivot arrangement to perform this function. We began by removing the pivot arrangement and then welded the track section to the two cross-members we had installed (**Photo 18-20**).

Photo 21 shows that even the professionals don't always do a perfect job! At a guess, it looks like the torch ran out of shielding gas part-way

through the weld, but I'm not an expert in such matters and so may have guessed wrongly.

We also bolted the track, using its 'sleepers', to the central section of the frame at a number of convenient points. Indeed, the exact positioning of the track on the frames was chosen to accommodate some convenient attachment points. Of course, if you are constructing your track from scratch, then it is easy to place sleepers at convenient locations for this purpose.

Finally, the track was cut to length (**Photo 22**). The length was chosen to interface with our trailer, directly, as we will be discussing later (hence the short overhang). **EIM**

■ Next time Peter and Matthew complete their budget loco lift, including improving the wheels for easier portability.



A bit of everything...

Tech-ed Harry hopes for some serious time on a loco overhaul at the Fairbourne Miniature Railway this month – but of course it's never that simple...

BY HARRY BILLMORE

After the excitement described last month and the end of our peak season with two steam engines in operation every day for seven weeks, I was looking forward to some uninterrupted time working on the overhaul of our Hunslet diesel 'Gwrl'. Of course this didn't happen, but I did make a start machining the wheels, taking an inch off the thickness of them to bring them into line with the rest of the fleet and stop them making a mess of various bits of trackwork and themselves.

In between watching the lathe trundle back and forth I kept myself entertained by pressing the old bearings and seals out of the axleboxes – the seals had worn the axle ends quite impressively, I suspect due to not enough lubrication, which you will see is a theme on this engine as we go through everything!

Locking locos

On one of my days off I got a phone call to say the Simplex had stopped suddenly – the engine couldn't turn over and the gearbox wouldn't go into neutral. Later that day I got another call to say our 6-inch scale Darjeeling Himalayan loco 'Sherpa' was moving most of a revolution then locking up solid... Over-the-phone consultation diagnosed the issue as the nut having come off the piston rod, preventing the piston doing a full stroke.

Fearing the worst when I arrived at work the next morning (a seized engine or exploded gearbox) I went and had a look under the Simplex. Various things had indeed gone wrong, but the cause of it all was simply the chain breaking at the connector and wrapping itself around

PHOTO 1:

Starting to thin down the first of the wheels on Hunslet diesel loco 'Gwrl'.

PHOTO 2:

Pressing out the bearings and seals from Gwrl's axleboxes.

PHOTO 3:

Back under the Simplex now the parts have arrived to turn it into a two-axle drive loco again.

PHOTO 4:

One of the grenaded taper locks in need of replacement.

PHOTO 5:

There are some very hard spots on the faces of Gwrl's wheels.

Photos by the author

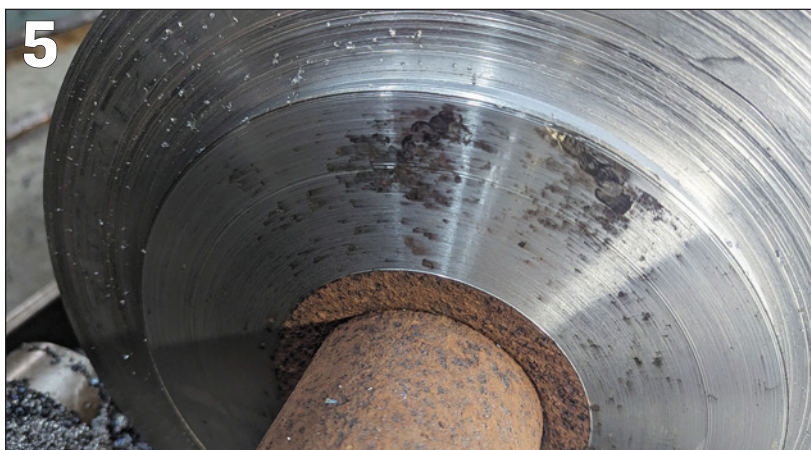


the gearbox output shaft until it wedged under the gearbox input shaft, locking everything solid so you couldn't get it out of gear or turn the engine without the clutch in.

Thankfully the loco was still only single-axle drive at this point, which

probably contributed to the chain breaking, but also meant that when it did, it was still movable as the other chain was not connected to the gearbox output shaft.

With another stroke of luck, all the components for putting the drive



6

**PHOTO 6:**

Machining new keyway positions to match the positions on the new sprockets.

PHOTO 7:

The broken chain having wrapped itself around the drive sprocket and then wedged against the gearbox input shaft.

7



8

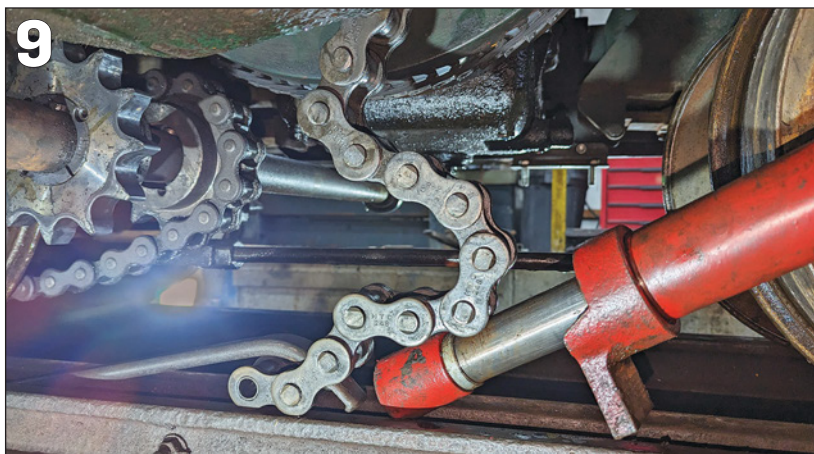
**PHOTO 8:**

A hands-free clutch compressor.

PHOTO 9:

With the aid of a Porta-Power hydraulic ram braced between a bar through the chain and the chassis, the chain came free.

9

**PHOTO 10:**

Extremely lucky there was no damage caused to the cylinder internals of Darj loco 'Sherpa'.

PHOTO 11:

New nut fitted and rod end peened over.

PHOTO 12:

This oval nut was the only casualty of Sherpa's piston coming loose.

back to both axles arrived at this point, so I could crack on with all of the jobs in one go. I first disassembled all the drive components to remove the layshafts. These needed their keyways machining into a different position to match the two sprockets on the gearbox output shaft, replacing the triangular single drive-chain.

I then set about freeing off the trapped chain – this ended up requiring some ingenuity. I used a bar slotted through the chain, with its end wedged under one wheel and a ram from a porta-power hydraulic body kit on the other end and braced against the chassis. This allowed enough force to be applied to the chain to pop it free from the input shaft.

Two lucky escapes

A thorough inspection of everything followed and thankfully, there was no other damage done apart from the broken link. With new taper locks, new links, readjusted chains and Loctite in some strategic places (specifically the tightening bolts on the taper locks), the Simplex was back in action the following morning.

I then turned my attention to Sherpa, again fearing the worst. I took the cylinder end cap off to discover the only real damage was to the nut that holds the piston to the rod – this had been turned into an oval. I'd been very lucky once again, the incident having happened at slow speed in the station with no train behind it.

I fitted a new nut, peened the end of the rod over to lock it in place, closed the cylinder up again and put Sherpa back in traffic the next day.

The new chuck for our Colchester lathe turned up from RDG Tools while I was working on Sherpa so I took the opportunity to fit it as I was at this point turning the half-machined wheelset around in the lathe. This new chuck has made such a huge difference to the machine, the old chuck must have been so out of whack and balance!

The first bit of turning was to

10



11



12



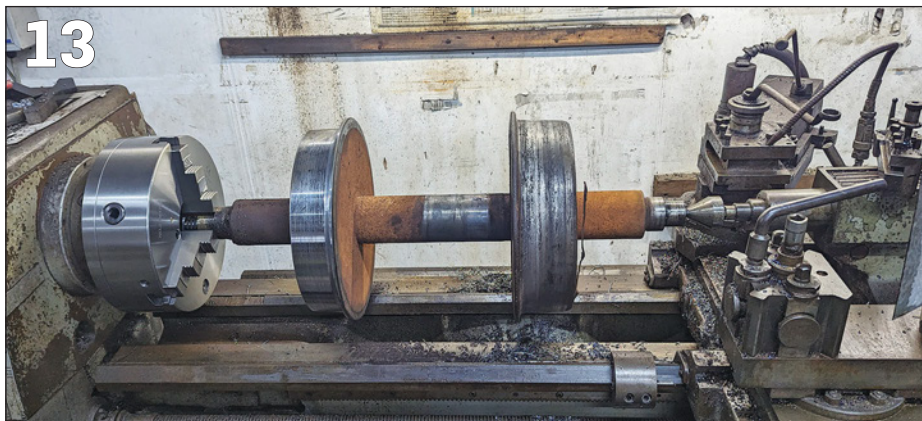


PHOTO 13: New chuck on the lathe with its first job being to turn Gwrl's wheels.



PHOTO 14: Ring of steel pushed over by the wheel running on the 15 inch rail on its edge.

remove the rolled-over edge of the wheel that had been running on the 15-inch gauge rail of our dual-gauge track. You can see the results in photo 14 – it's always a bit exciting when something like that finally parts company with its parent part.

In photo 15 you can see the really hard spots created by the welds on the faces of the wheels – these chewed through a few tool tips before they were machined through. If anyone has any suggestions as to why there are these welds on all of the wheels I am definitely interested – the loco originally ran on the Channel Tunnel construction lines before going to Singapore, but there was nothing attached to the welds when I started to work on them.

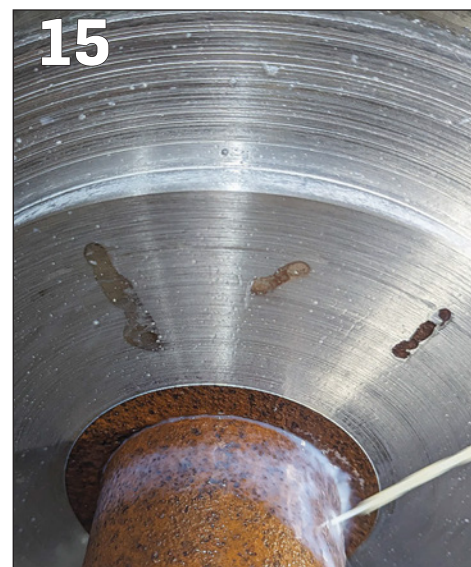
PHOTO 15: Extremely hard spots visible where there was weld on the face of the wheel.

PHOTO 16: A road-rail Unimog on route to move the new spans for the Barmouth Bridge into place.

PHOTO 17: Disintegrated Simplex starter motor.

PHOTO 18: The result of a meeting with the push bar of the sector plate outside the carriage shed.

PHOTO 19: A blower pipe that's slightly the worse for wear and some extremely difficult to remove fire cement in the smokebox.



Impressive hardware

At the end of the summer, the world-famous Barmouth railway bridge was closed for the replacement of its corroded steel spans with new and visually identical ones. In this period some really interesting bits of plant have been dropped off in Fairbourne, which is close to one end of the viaduct. In this picture you can see a road-rail Unimog with the increased air capacity to run multiple trailers – there is some fascinating footage of two of these moving the new spans into position on the internet (<https://bit.ly/3PH3Ixx>).

Those with a keen memory will





remember I fitted an electric starter to the Simplex by putting a permanent magnet motor and a belt drive onto the flywheel – this has pretty much been a wild success apart from when the motor decided it wanted to spit all of its brushes out, which was a bit

inconvenient. I think this was due to the lack of the battery-charging set-up from the generator, combined with a small amount of overspeed from some enthusiastic driving. For the short term, until the charge controller finally arrives, I have simply removed

PHOTO 20:

Weight prevents tool vibration on final cut.

PHOTO 21:

The coolant pump decided to take a swim...

PHOTO 22:

Sprocket end support bearing has obviously not been greased for years – old grease is like toffee.

PHOTO 23:

Hydraulic motor hard up against the chassis with the motor cradle bolts all removed and not wanting to move at all.

PHOTO 24:

Porta-power ram handy again to free off rusted motor cradle.

PHOTO 25:

Hydraulic bungs from one of Harry's previous jobs as a heavy equipment fitter.

the starter motor and belt so it is back to hand starting.

On the same day, one of our staff members was hand-shunting a carriage to strengthen the set in traffic, but had forgotten to move the depot traverser to the correct road, so unfortunately they ran the carriage end into the traverser push rod, puncturing the vehicle's end panel and moving the seat base inside. Thankfully this is not a huge problem at this time of year as we have plenty of spare carriages when we are only running one set so this one will simply wait until our carpenter has the time to deal with it.

Painful reminder

The incident has served as a reminder that it is easy to make mistakes like this and to always check the way that points, turntables and sector plates are set before moving onto them. I have seen a couple of very nice model locomotives take nasty plunges into turntable pits after a moment's inattention!

A couple of days later and I was back to work on Sherpa again – the loco had been failed by the driver on the day before with a perforated blower pipe. Thankfully this was a relatively easy fix, just chip out the fire cement, undo the union on the bottom of the smokebox, cut a new length of pipe and re-fit. But unfortunately the fire cement proved to be incredibly tough and took me nearly two hours to chip off! Once that was done however the repair was pretty swift.

It was then back onto machining Gwrl's wheels – in photo 20 you can see the final finishing pass being taken on the hydraulic copier. I am using a reasonably large weight on the bottom of the tool to reduce vibrations to almost nothing to get a good surface finish. The vibrations in this case were due to the hardness of the wheels and the large hang-out of the tool that I needed in order to use the copier.

Halfway through the last wheel, I was emptying the swarf drawer and





heard a splash – looking over the back of the lathe I saw the coolant pump submerged in the coolant tank... I finished off the wheels using a hand bottle having fished the pump out of the water and I am now hoping that with a bit of time it will dry out and I will be able to use it again!

Once all the wheels had been machined, I then turned my attention to removing the worn-out sprocket from the hydraulic motor in the middle of the chassis. I ideally wanted to remove the motor without having to remove the pump, hydraulic tank and diesel tank as that would have required unnecessarily draining the hydraulic system.

The first step to this was to remove the support bearing from the non-motor end of the sprocket carrier. I used several shims and the rear cover plate to push the bearing out. Writing that down makes it sound quick and easy, when in reality it was about six hours of cursing and carefully making just the right-sized shims to allow the cover to push the bearing out without locking up solid on the shims.

Anyone for toffee?

The other bit of entertainment in this particular job was the ancient grease that had seemed to have never been topped up – the bearing itself was dry but the toffee-like grease clung to everything else with great tenacity.

With the bearing removed I then took all the motor mount bolts out to

shift this across enough to be able to lift the motor out of the mount. When the loco was regauged the motor must have been moved across until it was tight against the frames to get the chains to line up with the sprockets on the axles, so to remove it means it must come up a bit before coming out of the motor mount.

The motor mount did not want to move, however, despite being asked nicely with various implements. I ended up having to resort to the Porta Power once again to break the rust-bonded motor mount free.

Once the mount was free it was a simple matter to plug off all the lines and ports from the motor and then lift it out. I then removed the sprocket carrier from the motor and again that sentence does not convey the two-and-a-half-day struggle to remove it.

The wooden bung in the end of the carrier came off easily with a wood screw. What followed was an exercise in making bigger and stronger pullers until once again I had to resort to the Porta-Power and a piece of 4-inch channel which still ended up bending. So I had to apply a reasonable amount of heat as well before it finally released from the splines and came off.

With this victory I then set about cleaning up the underside of the locomotive before giving it a coat of paint, a slightly different shade of blue to the others it had previously been painted in its varied life! **EIM**

PHOTO 26: The motor lifted out of its cradle.

PHOTO 27: Wooden bung in end of the sprocket carrier.

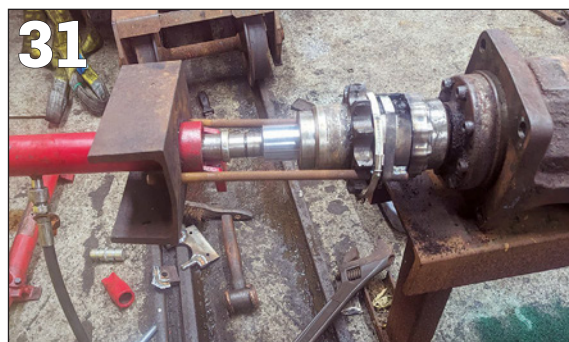
PHOTO 28: Bung and rubber shims pulled out with a screw.

PHOTO 29: Splined shaft on the end of the motor that did not want to let go.

PHOTO 30-31: Pullers mk1 and 4...

PHOTO 32: Hydraulic motor divested of its sprockets

PHOTO 33: With the motor out of the way the entire underframe could be painted



An improved Schools – building a Roedean

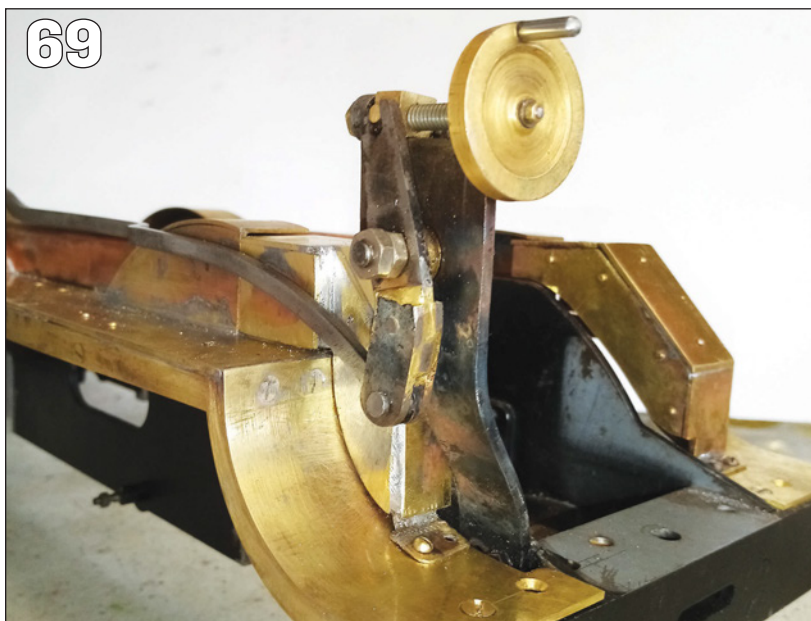
An apparent significant regulator reach-rod error and draincocks and their effective operation keep Nick busy on his 3½-inch gauge loco project this month.

BY NICK FEAST Part Nine of a short series



In the most recent episode of this series I described the construction of the valve gear of my 3½-inch gauge Schools class project, and some small corrections that were needed to try and equalize the valve travels. However the biggest failing of the original design was the short travel of the reach rod, so that it was not possible to go from full forward to full reverse gear.

"I was surprised just how much vibration was transmitted back up the reach rod from the valve gear – the reversing wheel was being rattled around much more than I expected..."



Beefing it up

This lack of operational flexibility was simply a result of the geometry of the reversing mechanism in the cab and not that hard to rectify. I had already decided that it would be beneficial to strengthen the lever by having two arms on the lower part, with the reach rod then placed centrally between them. I also beefed up the top section by having a longer

pivot and doubling up on the top lever as well.

Some years ago I had a footplate ride on Maunsell S15 No. 828 with a similar design of reverser and was surprised just how much vibration was transmitted back up the reach rod from the valve gear – the reversing wheel was being rattled around much more than I expected! It is provided with a locking catch on



the full-size locomotive and it was clearly needed.

Photo 69 shows the finished job with some of the platework in position to check clearances of the modifications, while **Photo 70** is the rear view. **Figure 8** shows the original and modified details. LBSC gave the lower lever a length of $\frac{3}{4}$ -inch, so I have increased the length by more than 60 per cent which seems a lot. This is still barely sufficient to provide the full travel needed, I have checked and rechecked all the other dimensions in the train of levers but cannot find any other discrepancies. It would appear to be an unusually large error for LBSC, perhaps other Roedean builders could comment?

Unfortunately the knock-on effect is that the reach rod is moved downwards so it needs a different curve to set it parallel to the loco axis. This was one of the many laser-cut components I bought, which proved a great time-saver.

There was still work required, **Photo 71** shows the reach rod being milled to the correct thickness. I have rummaged under the bench to find a substantial piece of steel angle as a mounting plate – holding the work as rigidly as possible is essential to getting a decent surface finish.

One final addition to the reverser assembly is the small bracket to support the steam brake valve shown in **Photo 72**.

Drain dilemma

Further items of the locomotive's controls to cause a bit of chin rubbing were the cylinder

"Holding the work as rigidly as possible is essential to getting a decent surface finish..."

PHOTO 69:

The stand is unaltered but the throw of the reach rod has been increased by more than half.

PHOTO 70:

Top and bottom halves of the mechanism have been beefed up.

PHOTO 71:

Substantial support is needed to get a good finish. My Mini Mill has provided 25 years of service for a modest investment.

Photos by the author

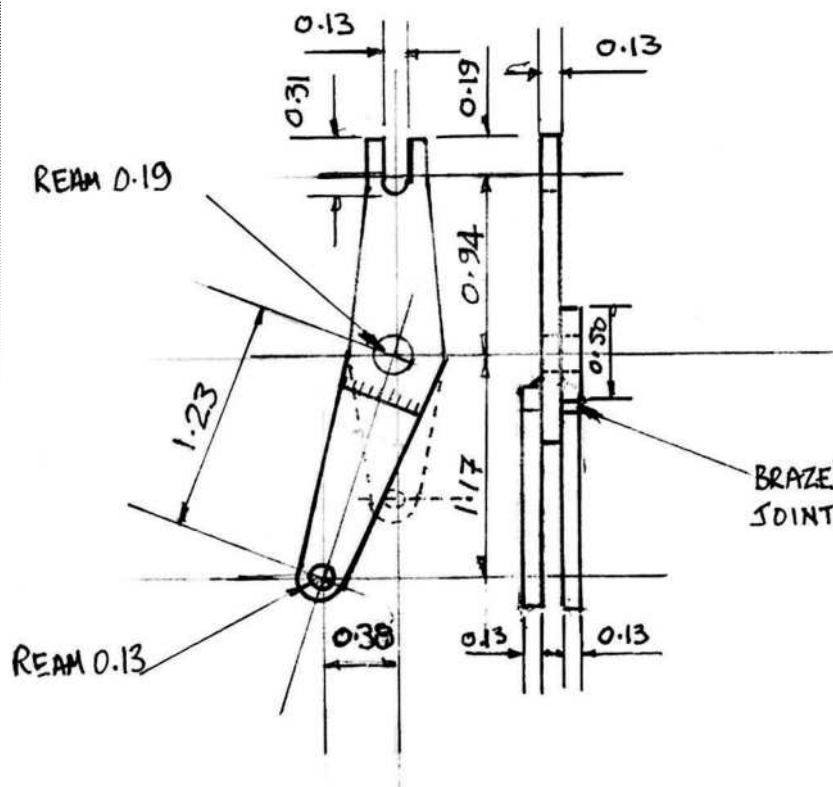
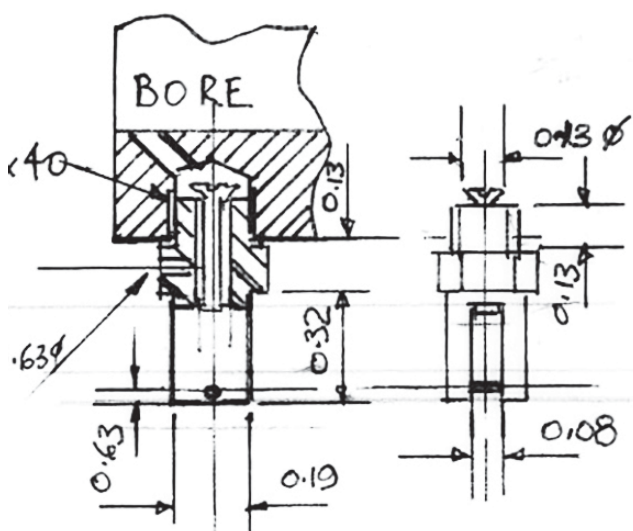
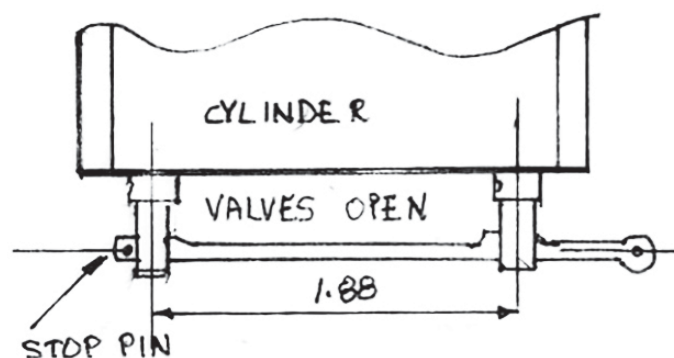


FIGURE 8
(Approx full-size)
Modified reversing lever
(Original shown dotted)

FIGURE 9
(Approx full-size)
Cylinder draincocks



Poppet-type cylinder draincocks



Cylinder drain valve operation

72



draincocks. I don't usually bother with these on slide-valve engines such as the Charlie design – water in the cylinders is blown out of the exhaust automatically and the slide valves are designed to lift slightly thus avoiding potentially disastrous hydraulic locking. However with piston valves the water has nowhere to go so cylinder drains are a must.

Tight on space

There are two particular issues on the Schools to deal with. Firstly there is very little room between the bottom of the inside cylinder and the frame stretcher to which the leading bogie is attached, and secondly there needs to be three sets of two drains and the linkages to operate them.

I like to keep things as simple as possible so I decided that automatic spring-loaded relief valves, instead of the complicated rod-operated taper draincocks specified on the LBSC

drawings, would be the way to go. The Clarkson design is for a slide-valve engine so cylinder draincocks are omitted.

My first thought was to use a simple ball-and-spring design. This is comparable with the pressure-relief valves fitted to the cylinder end caps on full-size locos, intended to deal with sudden carry-over of water into the cylinders when running, usually when the boiler has been overfilled or for some reason the locomotive begins to prime.

I made a set of these and fitted them, set to relieve at around 80psi, the locomotive's maximum boiler pressure. However after more chin rubbing (it was getting a bit sore by now) I decided that I didn't trust these to pass the volume of water that was required and also to reseal reliably. The middle set are not easy to access in case any adjustment was required while in service and so

I decided to try something else.

An internet search came up with an even simpler design, a small horizontal chamber with a ball free to float about within and sealing a hole in the end of the chamber when under steam pressure, but allowing a certain amount of water to escape.

Inconclusive trial

I duly made one and the claim was that by blowing a mouthful of water into the valve the water would be expelled but the valve would shut under air pressure. Having spent my working life in pumps and pump-related items, this valve seemed too good to be true – it resembles a reflux valve which is intended to prevent backflow in pipelines. My tests were not conclusive, and I did not want to risk wrecking three sets of valve gear so needed to think of something else.

I would have liked to use

"The claim was that the water would be expelled but the valve would shut under air pressure..."

PHOTO 72:

The reverser stand also provides a convenient mounting for the driver's brake valve bracket, in around the correct location.

73



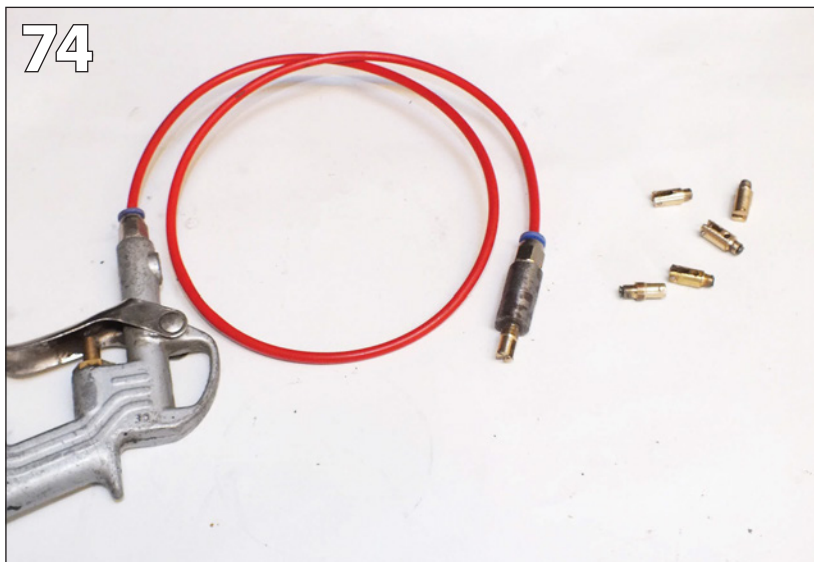
PHOTO 73:

Nick's Maisie, built some years ago in the style of a Brighton H2 Atlantic. The cylinder drains proved unnecessary, slide valves will lift to clear excess water.

PHOTO 74:

Grinding in the poppet valves using fine grinding paste.

74



75



steam-operated drain valves as standardized by British Railways on its locomotives, but space for a reliably sized scale design was not available although I know these have been made to work in the larger scales. The design I used on the South Eastern & Chatham Railway L-class locomotive that I recently completed, with all drains connected to a cable-operated rotary valve would involve too much plumbing.

I then remembered LBSC's design for 'Maisie', the Great Northern Atlantic. This has small poppet valves that are held shut by cylinder pressure and lifted off their seats by a sliding bar. I had a set of drawings to hand having built a Maisie some years ago, although I had not bothered to fit cylinder draincocks at the time. Being a slide-valve loco it performed perfectly well without them (Photo 73).

Thin-wall challenge

Figure 9 shows the principle – the dimensions used by LBSC for Maisie will make the valve too tall to fit the middle cylinder even with the mounting holes in the cylinder set at an angle, so I have reduced the height accordingly. The cylinder walls are not as thick as they would have been if I had used castings instead of fabrication, so there is barely enough wall thickness to allow sufficient thread and also allow some headspace for the valve to lift. If you run into trouble here it is possible to silver solder the valve body to a curved pad and use a couple of 8BA screws to secure it to the cylinder.

The valve bodies are simply ¼-inch round or hex brass bar, threaded one end to fit the cylinder and with a hole drilled no. 51 right through and reamed out slightly at the top to allow a slack fit for the

"There is barely enough wall thickness to allow sufficient thread and also allow some headspace for the valve to lift..."

PHOTO 75:

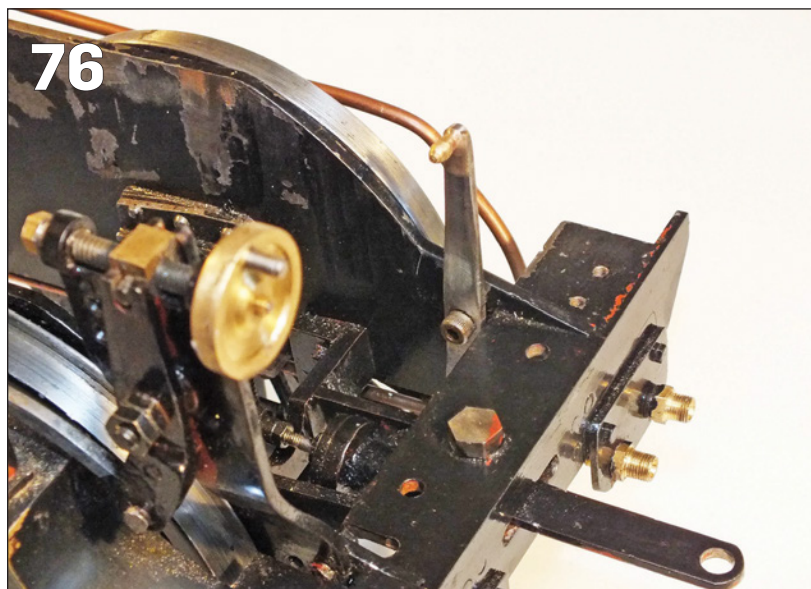
Testing the poppet valves after grinding using an air line.

PHOTO 76:

The draincock operating lever mounted in the cab of the loco.

PHOTO 77:

In this shot the overhaul of Schools-class No. 925 at Eastleigh has not yet reached the stage where the con rod and valve gear will get in the way so the bracketry for the draincock rods is on full view. Note also the front sandbox, which is rarely visible.



valve. You will then need a holder turned up from a piece of round material with a tapped hole to suit the valve body, in this case 3/16-inch x 40. This is used to set the valve up in a vice on the mill, a 1/16-inch mill or slot drill is used to make the slot for the operating bar.

The poppet valve is made from 1/8-inch round stainless rod, turned down to 1/16-inch diameter with a bevel at the top to full diameter for the moment. Part off and cut a shallow slot on the head with a junior hacksaw. This will not only provide a flow path for expelled water but also allow the valve to be ground in to its seat using a screwdriver (Photo 74). The valve stem needs to be long enough so that when shut 1/16th is protruding into the slot.

To make sure that these little valves seal against pressure I tested them with the same holder mentioned above, drilled and tapped to take a push-in air-line fitting. A few psi will be enough (Photo 75).

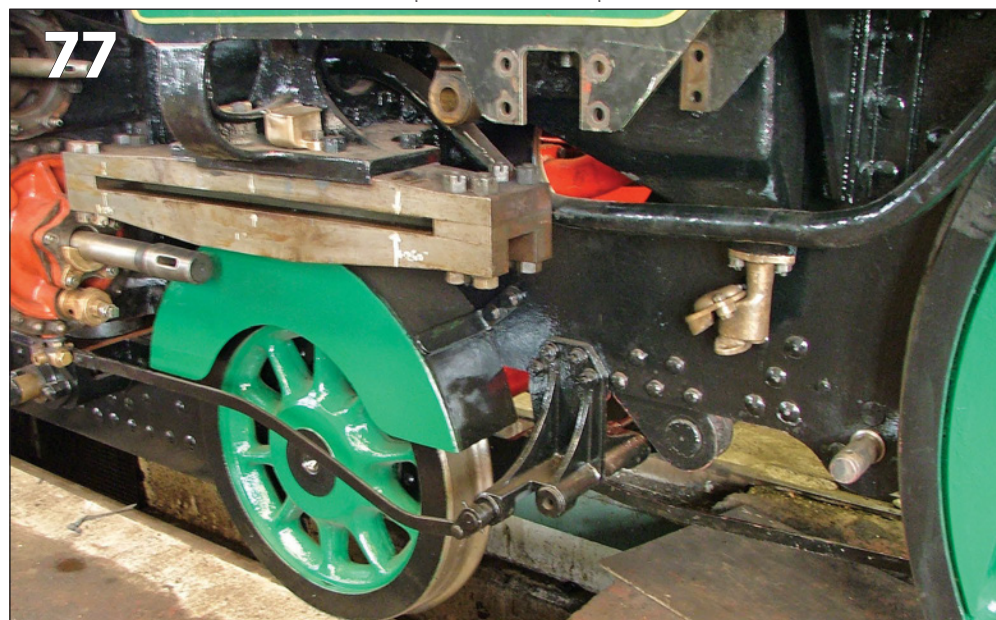
Assemble the valves on the loco and with the loco inverted rotate the driving wheels. Each valve should lift by air pressure in the cylinders. If not it may be necessary to reduce the valve-head diameter slightly so that it does not foul on the threaded hole in the cylinder.

On the bar

Next items on the cylinder drain assembly are the operating bars, which are also shown in Figure 9 – make these to suit your valves using 1/16-inch thick material, brass or stainless is best as there will be plenty of water around.

The bars are moved back and forth by a lever in the cab, this is made to the LBSC drawing and shown in Photo 76. The draincock operating shaft and support bracket on the full-size Schools-class loco 'Cheltenham' are shown in Photo 77, the version I have made for the model will be described next time. **EIM**

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



7¹/₄" Gauge Society 50th Gathering & AGM

The essential business of the Society's annual meeting was interspersed with lots of fun with varying types of loco on the Bedford club's track, as John reports.

BY JOHN ARROWSMITH



The 7¹/₄" Gauge Society's 50th annual gathering and AGM meeting took place at the Summerfield Miniature Railway, the home of the Bedford Model Engineering Society over the weekend of 15th-17th September 2023. It was a well-supported event with a good and varied collection of locomotives from different parts of the UK.

Friday and Saturday were bright warm days with plenty of sunshine while Sunday was also a good dry day to start but after I left just after lunch I ran into some very heavy rain on my way west, so I expect it didn't remain dry all day.

The BMES site is located about six miles south of Bedford and features a good fully signalled ground-level track. It is an unusual end-to-end track (see map below) with all the main facilities being located at the station at Haynes End.

As long as you like

At the Hammer Hill end of the track, however, is an extensive continuous circuit including several interconnected loops with automatic signals and driver controlled points to enable drivers to enjoy an extended run for as long as they want before returning back to Haynes End.

The total length of track available to drivers is about 5000 feet so with the natural inclines on the land it is a challenging drive for all. Along the drive from Haynes End to Hammer Hill there are a couple of small

PHOTO 1:

The not quite what it seems Rocket built by Andrew Hobbs leaves Haynes End station.

PHOTO 2:

Brian Sharpe from Bridgend waits at Hammer Hill with his LMS Black Five.

BELOW:

Map of the Bedford track.

Photos by the author



1. Haynes End Station
2. Ticket Office & Station Entrance
3. Station Exit & Disabled access ramp
4. Haynes End North Signalbox
5. Buffet & Club room
6. Carpark
7. Rook Tree Crossing
8. Badgers Holt Station

9. Reg Saunders Memorial Bridge
10. Winterfields Viewing area
11. Footbridge
12. Hammer Hill Stations
13. Winterfield Railway
14. Springfield Railway
15. Garden Railway
16. Wiltons Wiggle





stations to add to the scenic attractions of the site and the outside top loop has a wonderful view out over the Great Ouse valley towards Bedford. With the weather being so good it was a real treat to be there.

Light rail

There was one drawback to the track because being laid in 22mm aluminium, it could not take the larger types of engines such as Tinkerbells or Thomas 2s. That was not a big problem, however, as there were 29 locomotives booked in, from a diminutive Stephenson's Rocket (Photo 01) to a very smart LMS Black 5 (Photo 02) and some interesting additions both standard gauge and narrow gauge mixed in.

As with all these events the atmosphere was excellent with the host club pulling out all the stops to ensure everyone had as much track time as they wished, while carriages were available for passengers should they wish to experience the layout. It was also very encouraging to see the number of younger society members being involved in all aspects.

The catering side of the event was also first class with tea, coffee and cold drinks always available to participants and pre-booked packed lunches completing the daytime

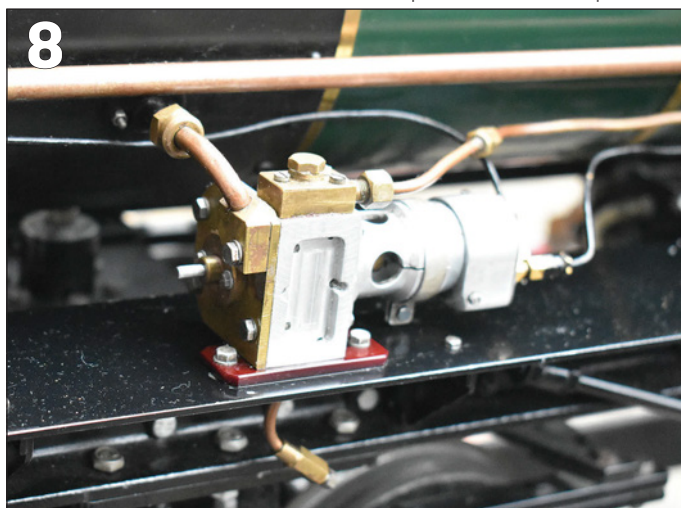
PHOTO 3-4: Society Chair Janet T. Royston presents Frank Lewis with the Brian Reading Trophy for his immaculate Southern S15.

PHOTO 5: 16-year old George Harrison receives his Junior award.

PHOTO 6: Mat Rainer is belatedly presented with the Charles Simpson Award he won in 2019.

PHOTO 7-8: Alan Beasley's superb B Class Shay loco on the steaming bay. It has a small, neat steam generator

PHOTO 9: Pete Chapman wins the Egg Box trophy.





arrangements. Early morning breakfasts were also available on Saturday and Sunday with a barbecue on Saturday night adding to the event. A number of members also took part in some spirited night running at Hammer Hill which I think they all enjoyed, judging by the conversations on the following morning.

Of course along with all the operating and renewing of friendships and such, the important part of the gathering is the Annual General Meeting. As the clubhouse is not quite big enough to host this part of the day the Society had arranged for the

meeting to be held in the nearby Haynes Village Hall.

Chair Janet T. Royston opened the meeting by thanking all the members for attending and remarked about the great welcome and facilities provided by the Bedford club. The stood for one minute's silence for all the Society members who had passed away over the last 12 months. Then after the committee members had introduced themselves and indicated their role in the Society the members approved the minutes of the previous meeting which had been circulated to everyone prior to the meeting. Neither the

minutes or Annual Report attracted any questions and were duly signed off while the Chair did mention that the Society online shop was now open and has been very successful.

With no new nominations all the current committee were re-elected, except for the News Editor which remains a vacant position. The annual subscriptions have been maintained at the present level, again there were no objections to this proposal.

Society secretary Anthony Siddall updated the meeting on committee discussions regarding the reintroduction of a members address book – one member pointed out that while it is a good idea to have contact details for fellow members, it was perhaps not so good to have actual addresses published, as this might lead to direct information regarding the location of locomotives and stock. It was agreed that this is a difficulty – the committee would look at it and consult with the membership again on this important valuable asset point.

Awards acclaim

The presentation of Awards followed, firstly the Brian Reading Award made by the society following an assessment by the host club of all the locomotives present at the gathering for their appearance and presentation and workmanship.

This year the award was made to Frank Lewis (Photo 03) for his superb example of a Southern S15 locomotive with its rare eight-wheeled bogie tender (Photo 04). The loco was built over a six-year period including lockdown and during which Frank lost his wife – he received his award to the acclaim of the meeting.

The Charles Simpson Award is made to a member who has given outstanding service to the Society over the year and the recipient this year was Terry Robinson – he set up and provided a great selection of models and equipment for the Harrogate Show back in March in a very limited time span. Terry could not attend this gathering so a separate presentation will be made to him at a later date.

There were four nominees for the Junior Award, and it must have been a difficult task deciding the winner. The accolade went to 16-year old George Harrison who has been attending these events with his younger brother, dad and grandad for several years. The meeting heard that George is a very accomplished young man who is always willing to look after anyone's locomotive and could always be relied upon to ensure it was oiled, watered and serviced ready for the driver to continue operations after a comfort break for example – he was a worthy recipient of this award. (Photo 05).

PHOTO 10:

A happy pair with Ivan Hewlet from Riverside with Barry Green from Grimsby behind their Groudle Glen electric loco.

PHOTO 11:

George Harrison with a 'Stafford' 0-4-0 and mixed goods stock heads towards Haynes End.

PHOTO 12:

The steaming bays were busy all weekend.



Because of the Covid lockdown an award from the 2019 year had not yet been made so to enable the society to catch up it was presented at this meeting. Mat Rainier was the recipient of the Charles Simpson Award for 2019 (**Photo 06**) for all his hard work in promoting the Proficiency Award scheme for members over the years which he is continuing to do so.

Six members were tested at this year's event and all passed so the pool of Bronze and Silver award winners continues to grow, the real test will be attaining the Gold award which I understand is very close to being implemented. Knowing Mat I bet that will sort the men out from the boys!

The production of the 50th Anniversary magazine by Nick Deytrikh was acknowledged as being a very special record of the Society's activities over the years and has no doubt brought back some special memories for many members. Steve Gosling proposed a vote of thanks to Nick for producing the magazine.

Next year's AGM meeting will be held at the splendid site of the Rugby Society over the weekend of 20th-22nd September. Rugby's Chairman Aubyn Mee was present to tell the assembled members about the club and all its facilities including caravan hook-ups and the 2-tonne hydraulic and traversing unloading feature for the heaviest of locomotives. I am sure it will be a tremendous setting for this annual meeting.

Top gear

Sunday dawned a bit grey but the sun soon brought a smile to event attendees and with it a couple of new locomotives to enjoy. The three-cylinder two-truck Shay locomotive built and owned by Alan Beasley was a fascinating locomotive to look at (**Photo 07**). Superbly built the engine featured a small steam generator (**Photo 08**) to provide power for the headlight and a Southwold vertical pump for water supply to the boiler. The cab was a masterclass in practical layout, with smart etched labels for all the main operating valves. Needless to say it went as well as it looked with quite a surprising turn of speed.

The other new locomotive and train was as mentioned earlier the original Stephenson's Rocket. This familiar engine was not quite what it seemed, however, as a drift of white smoke from the chimney proved. In order to provide sufficient power to pull more than one passenger builder Andrew Hobbs has fitted the first carriage with two traction motors and concealed the batteries in the second passenger vehicle.

A steam generator and blower provides the emissions from the



PHOTO 13:

Grandad and grandson Stuart and Will Harrison in the station with locomotive 'Gunga-Din'.

PHOTO 14:

Top and Tailing at Hammer Hill with Sol Johnson on a Hunslet and Adam Daskin at the back on an American 2-4-0.

chimney and a suitable sound card does the rest. The well-finished wooden loco wheels took Andrew six months to make and a fine job he has made of them too. The train worked very well around the entire circuit.

He saw the yolk

One final amusing bit of nonsense happened on Sunday when Bedford member Pete Chapman was presented with the 'Egg Box' trophy for getting the most egg yolk down his shirt when attending the barbecue (**Photo 09**). All good fun!

In concluding my notes I must

thank the Chairman and all the members of the Bedford Society for their excellent organisation and hospitality, the whole weekend was relaxed, interesting and most enjoyable and I am sure the 7¼" Gauge Society would thoroughly endorse that comment. In particular I must thank the ladies of the club for all their very hard work in producing excellent lunches on both days as well as having tea, coffee available all day together with a small bar in the afternoon and evenings. It was all very much appreciated by all the visitors and members. Thank you all. **EIM**

PHOTO 15: Bradley Tubbs from the Riverside Railway brings his 0-4-4 Sweet William back into Haynes End station.

Photos by the author





■ The Rhyl Miniature Railway ended its 2023 season in style on 23rd-24th September with four Barnes Atlantic locos in steam together for the first time since 1968. The Atlantics joined other visiting engines to provide an eclectic line-up at the main station, and the weekend concluded with a quadruple-header run. *Photo: Justin Bell*

15-inch lines to join forces

The Evesham Vale Light Railway is to be taken over by the owners of fellow 15-inch gauge line the Perrygrove Railway.

Husband-and-wife team Adrian and Sandra Corke put the EVLR up for sale earlier this year, having decided to retire. The new owners will be another family team, David and Kat Nelson-Brown who run the Perrygrove line in the Forest of Dean.

The EVLR runs for 1¼ miles within Evesham Country Park in Worcestershire. Carrying just under 50,000 passengers a year, it is one of a number of activities within the park, also known as 'The Valley'.

The line has three resident steam locos and currently operates trains on 170 days a year.

"We believe that this move will be good for the EVLR given the similarities between the two railways," Adrian said. "Perrygrove and the EVLR share many traits and characteristics which will allow for inter-operability of rolling stock and people."

David and Kat will continue to live at Perrygrove and are seeking a manager to operate the EVLR for them. Their plans for the line are detailed in a feature in the October edition of our sister magazine *Narrow Gauge World*.



Garden show sets '24 date

Midlands Garden Rail Show organiser Meridienne events has confirmed that the 2024 show for the smaller-scale end of the hobby will take place in its traditional venue, the Warwickshire Exhibition centre on 2nd and 3rd March.

The show traditionally attracts workers in Gauge 1, O Gauge, G Scale and 16mm and we are told there will be more than 15 layouts and clubs at the event, providing plenty of inspiration to those planning their own garden railway be it live steam, gas or coal fired, i/c or battery.

Around 40 specialist suppliers are also expected to be present offering a wide range of items to bring garden rail plans to reality.

Details on the exhibition and suppliers attending will be updated over the coming months at; www.midlandsgardenrailshow.co.uk and on Facebook – search for Meridienne Exhibitions Ltd.

Francis Nigel Thompson 1937 – 2023

Nigel Thompson, member of the L&NWR Society and The Erewash Valley Model Engineering Society, passed away peacefully on 28th September from the terrible disease Alzheimer's and with a chest infection he had caught earlier in the week, which contributed to his passing.

Nigel was very well known among the model engineering fraternity of the UK and had served as secretary of The Northern Association of Model Engineering Societies from 1996 until 2006.

He had been a model maker all of his life "making all sorts of things" to quote him. His father was a 'Premium Apprentice' at Crewe Works from 1915 to 1918 under C. J. Bowen Cooke. It was his father who taught Nigel to use all kind of tools for both metal and wood, Nigel credits this period of his life as being able to "take a job some years later in an engineering company making springs of all kinds". He retired in 2000 from the position of Quality Manager.

Nigel had a lifelong love and connection with the L&NWR as, aside from his father, his grandfather was a 'Top Link' Driver at Crewe North Shed and both he and his fireman were part of the two crews allocated to drive No. 2222 'Sir Gilbert Claughton'. During the late 1970s, using a general-arrangement drawing that he had acquired, Nigel designed a 5-inch gauge model of the loco and built it in his home workshop.

This model turned out to be very successful and he built several other



L&NWR types over the preceding and succeeding years including an 18-inch 'Watford Tank', a George V 'Ptarmigan' and a Class D goods engine. This model was described as a construction series in *EIM* between September 2006 and January 2012 – it has turned out to be a very successful design with several being built.

Nigel built several models to a scale of 0.750-inch – 1ft for 3½-inch gauge including a 'Prince of Wales' and a 'Jumbo'.

Over the years at the various model engineering exhibitions that we as a Society have attended Nigel was always there offering the loan of a model to grace our stand and helping as a steward too.

In Nigel the society has lost a very good friend who helped to publicise our existence. He was last active on the occasion of the annual steam up at the South Cheshire Model Engineering Society headquarters at Nantwich in September

2022 when he joined members on a lovely sunny day for social interaction and to see and observe the models running.

Sadly, a few days later he was taken into hospital for a few weeks and eventually transferred to a nursing home where he lived until his passing.

Speaking on a personal note, I have lost a very good friend of over 30 years duration after the late Rodney Weaver introduced us. We found that we both had interests in common, a love of all things L&NWR, model engineering and the society too, to name a few.

The picture that I took in July 1996 at the conclusion of the 150th anniversary of the formation of the L&NWR on 16th July 1846 shows Nigel's Claughton, a model of his grandfather's engine.

Nigel will not be forgotten as long as there are people who knew him keeping his memory alive.

Kenneth Wood

Colonel Stephens Light Railway Locomotives

By Brian James

A clutch of new releases from Pen & Sword this month and this one will be of great interest to many a model engineer as it is full of information on small locomotives, mostly of tank engine format, the kind of engine that many novice readers of this magazine might consider for a first project.

Colonel Holman F Stephens was renowned as an operator of light railways, building up an empire of eclectic lines across the UK which he ran on basically a shoestring. He went all over the place for his locos and they are all detailed here, from ubiquitous Stroudley

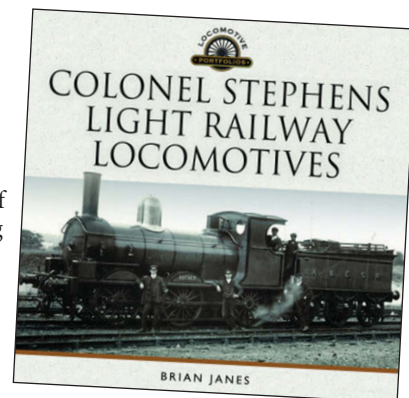
Terriers to saddle tanks, a wide range of Manning Wardle product and a host of more unusual types, right up to the petrol shunters that ran on the Weston, Clevedon & Portishead line and

basically looked like garden sheds on very large wheels.

The various narrow gauge engines the Colonel made use of are not forgotten either, ranging from the historic Ffestiniog Railway engines to war surplus Baldwin tanks. Even the Dick Kerr petrol loco tested on the Welsh Highland Railway and currently under restoration gets an entry.

Unfortunately there are no drawings but the photo coverage is prolific – all in mono but used large and reproduced well. This is a book that will act as inspiration for anyone seeking ideas for their next new build project. AC

ISBN: 978 1 39902 343 6 Price £25.00 Published by Pen & Sword
Email: enquiries@pen-and-sword.co.uk Web: www.pen-and-sword.co.uk



Gresley's Master Engineer Bert Spencer

By Tim Hillier-Graves

This is something a little different – most model engineers will know very well who Sir Nigel Gresley was, producing some of the most iconic LNER locomotives such as the A3s and A4s, but far fewer have likely heard of Bert Spencer.

For 16 years Bert was Gresley's assistant at a time of the engineer's greatest work – he had just as much knowledge and experience as his master but remained in the background as the reliable confidant over

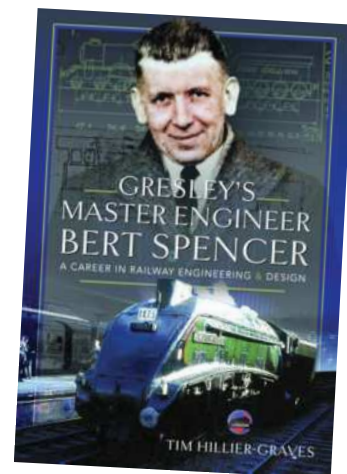
his entire career with Gresley.

This is a story of Bert's life, much of it told in his own hand, and provides a real inside view of the cutting-edge technology of the time that was under development in railway workshops

between the wars. But it also goes beyond the workshop and design office to place the work in its context – there is a detailed description of the issues caused by the General strikes of the mid 1920s for example.

There are many pictures, railways and beyond, engineering workings, back of a notepad calculations and more. What results is a fascinating tale that proves that just when you thought there was nothing more to be told regarding the great railway engineers, there is always something new to discover. AC

ISBN: 978 1 39904 507 0 Price £28.00 Published by Pen & Sword
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Four-coupled Tank Locomotive Classes absorbed by the GWR

By David Maidment

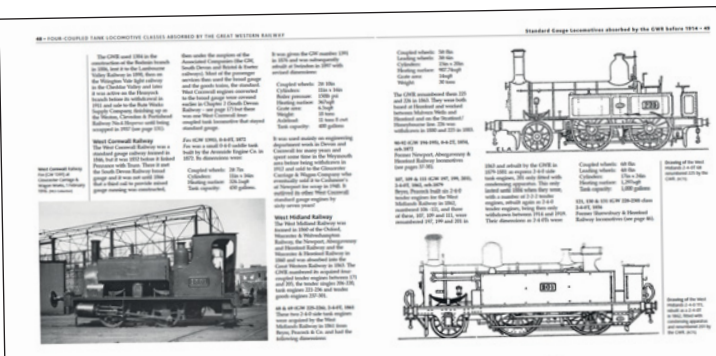
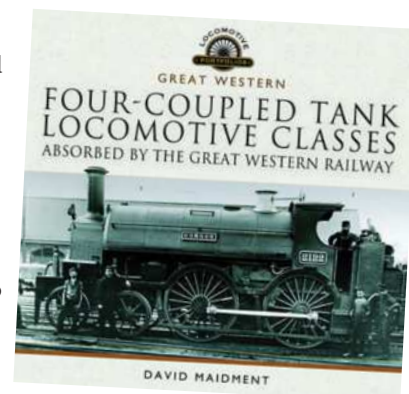
It would not be a reviews round-up without yet another new entry to David Maidment's reference library of locomotive classes – the man's level of output is astounding... This time he again turns his attention to less high-profile locomotives, focusing on the various tank engines absorbed by the Great Western Railway when it came into existence 100 years ago.

Of all the titles in this series yet produced EIM readers might well find this one the most interesting and useful – not only because the

breadth of locomotives involved is fascinating with some distinctive and unusual shapes included, but also because the descriptions of most of the classes are accompanied by general arrangement drawings – not the biggest, but especially in the older classes easily able to be scaled up for a potential model project.

Drawings in the book's appendices include some useful dimensions, while again the quality of the photo reproduction is excellent. Even if you are not about to build a new model locomotive any time soon, this is the type of book you'll get a lot from by just thumbing through it. AC

ISBN: 978 1 39909 543 3 Price £28.00 Published by Pen & Sword
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Road runs and rail fun

Events aplenty this month as clubs and tracks rush to get in some running enjoyment before the winter indoor season really gets going...

COMPILED BY ANDREW CHARMAN

Welcome to the monthly round-up of what's happening around the clubs and tracks, and while the outdoor season is definitely coming to an end (it's distinctly chilly in the mid-Wales location of **EIM** Towers as I write this at the very start of October, and I did admit defeat last night and put the heating on...) it's clear that as many model engineering enthusiasts as possible have been getting some runs in, as we've had lots of pictures in this month's round-up!

Mind you, they've again mostly come from our regular photographers rather than the clubs themselves – if you have a special event, unusual occurrence, something new or simply a really enjoyable running day, send in a picture or two as we'd love to see them and then very likely use them on these pages...

Competent at the controls

The heading picture on this page bucks the trend as it's come in from Bill Smith, who is Events Co-ordinator at the **Manx Steam & ME**. It's also the kind of picture that guarantees an appearance in this column as it shows just what we like, young people getting seriously in to their miniature engineering.

Bill tells us that the person in question is James Archer Salvador-Garvin, aged almost seven and from Douglas, the Isle of Man capital. Here he is driving 0-6-0 loco 'Maurice' on the 7¼-inch gauge Orchid Line at the Curragh's Wildlife Park on the island – Bill also sent in a second shot of James at the controls of the club's second i/c loco 'Odin'.

"James showed great competence whilst driving the locos, including slowing at the right places and



ABOVE: Very competent in what he's doing, nearly 7-year-old James takes a train round the Manx Steam & ME line on the Isle of Man. Photo by James's mum Ana

BELOW: The South Downs MR summer Gala featured a meeting of Big-Four superpower...

BELOW RIGHT: Liverpool & Manchester loco 'Lion' was a new arrival at the South Downs line. Photos by Rob Barnes

sounding the horn. He was well supervised by Ian Beech the chairman of the Manx Steam and Model Engineering Club which built and now operates the track but it was wonderful to see someone so young totally absorbed in the railway." Amen to that...

Bill adds that the two locos are owned by the club, Maurice being petrol-hydraulic and Odin petrol-electric, the latter having been built by members. There is 950 metres of run available for owners of 7¼ and 5-inch gauge stock. Various privately owned steam locomotives are based at the club, which is alongside the route of the Isle of Man Steam Railway, and the steamers assist the petrol locos on an ad-hoc basis.

Excellent stuff – it's nice to get some details about a club we don't hear from very often. And if you are wondering why *your* club never appears in these pages, it's likely because no-one has ever sent in anything to us – hint hint!

South-east based photographer

Phil Barnes is a regular contributor to these pages, though this time he let his son Rob do the pictures at a highly interesting Summer Gala, which was held on the 10¼-inch gauge **South Downs MR** near Pulborough in Sussex over the bank-holiday weekend of 26th-28th August.

The Lion in Sussex

The event featured the debut of a recently purchased loco, an example of the world famous Liverpool & Manchester Railway 0-4-2 'Lion'. Phil tells us the model was bought at auction in North Yorkshire and then transported south to its new home.

At the Gala Lion joined in with other stock which appears to show the South Downs line staging its own unofficial celebration of the centenary of the formation of the London North Eastern Railway and London Midland & Scottish Railway, as has happened recently further north at Stockholes (see over the page).

At one point during the weekend the blue Princess Coronation 4-6-2,





representing the LMS, was running alongside surely the most famous of LNER express passenger locos, the A4 4-6-2, and a fine sight the pair of them made. Phil adds that the Gala also featured a Southern Railway S15 4-6-0 No. 771 and the Great Western-style 4-6-0 No.27 'The Railway Mission', a model that itself has a chequered history dating back to 1947. So a full set of big four representatives then...

Phil was back behind the camera for his annual visit to the Miniature Steam Weekend held at **Amberley Museum** in Sussex. Those who have been to Amberley will know there is a great deal to interest and indeed fascinate anyone with an engineering bent visiting the museum's former chalk pit location, and the miniature weekend simply adds quite a lot of extra icing...

Something for all

Phil tells us that the event, held on 9th-10th September, saw not only a plethora of 'small scale' road steamers in action, but displays of model boats, aircraft, railways, stationary engines such as Mamods and such like, radio-controlled road vehicles and WW2 tanks to name but a few!

Some 58 miniature road engines too part, ranging in scales from 3 to 6-inch and their owners enjoyed visiting all areas of the museum; "It was amazing what roads and paths they could be found traversing!"

The main route was a basic dumb bell, from near the Limeburners café to the Railway Exhibition Hall and back, with watering points strategically positioned along the way. The way the engines were dotted around the large site gave visitors

TOP & ABOVE

LEFT: Plenty of road action at the Miniature Steam Weekend held at Amberley Museum in Sussex. We particularly like the rain cover on the loco in the left-hand photo...
Photos: Phil Barnes

BELOW:

Stradbally is one of the larger steam rallies in Ireland and the miniatures play a vital role in it as there two shots from *Ian Lake* clearly show.

plenty of reason to wander round and find the different engines and owners.

A 12-inch to the foot scale traction engine was also in action while on the museum's 2ft gauge railway recently overhauled 0-4-0ST Bagnall 'Peter' was running and its trains well patronised throughout the day. Definitely an event to put in the diary for next year, one thinks...

Maintaining what appears to be a prolific road steam theme in this issue, and again going 'beyond our shores', Ian Lake sent in some pictures of the miniature road engines at the **Stradbally Steam Rally** in County Laois, Ireland on 7th August. Ian tells us that this is one of the larger steam rallies in Ireland – it is held at Stradbally Hall and run by the Irish Steam Preservation Society which is based in Stradbally and also has a 3ft gauge railway running in the grounds of the hall.

With our special report on the Stockholes LMS weekend starting over the page there's not as much room as usual to delve into the selection of club magazines and newsletters we receive each month (even with an extra page added to the *Club News*), but please keep sending them in as they are really informative and we'll no doubt be back to our usual style of report next month.

We've space, however, to mention a couple of interesting things we've spotted – and we do read all the journals we are sent, you can be sure of that.

Oil burning future?

We haven't reported on the ever-busy members of the **Rugby ME** recently, and the latest edition of their monthly newsletter describes what they dub "a month of firsts", starting with one member bringing along his steam locomotive 'Pushmi-Pullu' which he has experimentally converted to oil burning, using red diesel. While still very much at an experimental stage the loco apparently gave a spirited performance while creating a lot of interest among fellow members – no surprise with the ever-looming

Continued on page 44



Celebrating LMS 100



In the September issue we carried a report on the successful rally at the Stockholes Farm Miniature Railway in Lincolnshire, celebrating the 100th anniversary of the London North Eastern Railway – the obvious next step was an event marking 100 years of the other northern member of the 'big four', the London Midland & Scottish Railway! **Ivan Smith** reports.

I was brought up in the small town of Eastwood close to the Nottinghamshire/Derbyshire border. In the 1950s we were served by two railway lines – the busiest by far was the Midland main line running from London St. Pancras to Sheffield Midland station and further north.

The second was a branch line running from Nottingham Victoria to Pinxton, and which fell foul of the Beeching cuts in the mid 1960s. The Midland main line was quite busy especially with coal trains heading south from the Nottinghamshire/Derbyshire coal fields.

The majority of my train-spotting time was spent on the Midland main line with a diet of Jubilees, Black Fives, 8Fs and 4Fs, plus the occasional Royal Scot and Britannia thrown in.

With 2023 being the 100th anniversary of the formation of the big four railway companies and also as the majority of the home-based locomotives here at Stockholes are of LMS origin, we could not allow this significant anniversary to pass

ABOVE: LMS super power on show outside the Stockholes shed. The inset shows the cake produced by Barbara Smith for the event.

BELOW LEFT: Nick Wright enjoying himself with his 0-6-0 Caledonian tank engine as he shunts one of the home-based 4-6-0 Black 5s.

BELOW: Nick Harrison with his 0-6-0 Derby 4F and Roger Hopkins on a 4-6-0 Black 5 at Stockholes Central. The smile on Nick's face says it all.

Photos by the author

without some form of celebration, therefore we decided to hold a LMS Rally. The date chosen for the event was 1st July which also happened to be my birthday.

The weather for the day was fine and warm and with five visiting locomotives we were determined to have a busy and exciting day.

I should perhaps point out at this stage that although we can operate on four separate independent circuits, due to the track layout and control systems that we employ we are limited to the number of trains we can easily and safely accommodate. In the past I have always adopted the policy of having a few visiting locomotives and drivers and giving them plenty of operating time in preference to having more visitors and having to allocate running slots.

Scale-orientated

To allow for a lot of our scale stock to be operated the LMS event was run primarily as a scale stock event with limited passenger carrying, although a semi-scale passenger-carrying vehicle was included in the make-up of some of the trains so that visitors and members could enjoy a ride around the railway.

We were able to put on a display of LMS artefacts, jigsaws, books, DVDs, paintings and such and my wife Barbara made a celebratory cake especially for the occasion which was suitably decorated.

Prior to the cake being cut by one of our young members, Annabelle, thanks were extended as follows; first of all to the politicians who in 1921 passed the Railway Act which became law on 1st January, 1923. Can you imagine how dull our hobby would have been without this legislation? There would have been no inter-company rivalry (although the railway companies did co-operate, for example the LMS and LNER and the



creation of the Rugby Testing Station). In addition where would we have been without being able to discuss the merits or otherwise of say the LMS Black Five, LNER B1, GW Hall, SR H15 or even a BR Standard Five?

The second thanks went to Stockholes members who have spent a lot of time and effort transforming the site, after nearly three years with very little maintenance activity, and thirdly to the visitors, some of whom had travelled considerable distances to be present and finally to Jordan Andrew, one of our younger members for actually organising the event.

There were five visiting locomotives that attended the rally which together with the (unbiased!) home fleet made for an impressive display of motive power.

The visiting locomotives were headed by the Caledonian tank of Nick Wright. This was completed in around 1991 and is based on the Caledonian 498 class – for the model engineering fraternity it is effectively a Rob Roy times two.

Nick Harrison, former Chairman of the Nottingham Society of Model Engineers, brought his Derby 4F. This was originally acquired by Nick as a miscellaneous box of bits and he says he wasn't expecting it to be a Derby 4F. The model was completed by Steve and Mack Andrew.

John Foxton, who is well known at the Gilling track in GL5 circles, brought along a re-boilered Black 5 No. 45036, travelling from Perth, while another Black 5, No. 45157, was in the hands of Jason Paterson who recently acquired the locomotive in almost-new condition.

The final visitor was Nick Clifford with his Mogul. This is actually a freelance design built by his father in the 1970s-'80s, but equipped with a standard Stanier tender and painted in Midland Red which produced a very convincing appearance.

On display from the home fleet were 4-6-0 6100 'Royal Scot', 4-6-2 Princess Coronation 6234 'Duchess of Abercorn', 4-6-2 Princess Coronation 6261 'City of Doncaster', 4-6-4 Improved Princess Coronation 6310 'Earl Mountbatten of Burma' and 4-4-0 Midland Compound 40921.

As far as the non-steam was concerned there was the forerunner to the ubiquitous Class 08 diesel shunter, LMS 7130 and the pioneer mainline diesel 10000.

Family affair

The two non-steam locomotives have interesting histories. The diesel shunter was built by Grandfather and granddaughter Mike May and Bethany Forsyth. Bethany first came



to the railway when she was about two years of age and able to hold on to a passenger carriage, and she enjoyed the ride. As she got older she became more involved in the operations and at about eight years of age (obviously supported by grandad) expressed a wish to start attending the junior workshop nights that I ran and commenced building the locomotive.

The ensuing years saw the locomotive develop to an operational state. The vast majority of the work was done by Bethany with Grandad Mike providing the essential taxi service. In 2010 Bethany was awarded the Southern Federation Trophy and the Polly Engineering Prize for the work she had done on this locomotive and also supporting the Society and operating the railway.

The second non-steam loco, Co-Co no 10000, was acquired some years ago as a petrol-mechanical locomotive. This was subsequently changed to battery-electric operation on two counts, one the difficulty in starting the engine at times and secondly and perhaps more importantly, I don't think petrol and steam engines are a good mix.

Super power

There were a few highlights for myself from the day the – first of these was the photographic line-up of all the visiting locomotives. As mentioned above the majority of running was done with scale stock. Towards the end of the day the trains being hauled by the 4F and one of the Black Fives

ABOVE:

Mack Andrew in charge of Nick Harrison's Derby 4F with one of the semi scale passenger carriages on the new circuit. In the background is a goods train.

BELOW: This model of the true forerunner of the British Railways class 08 loco was made by member Bethany Forsyth, starting it when she was eight.

BOTTOM:

Group photo of visitors and Society members.

were combined and a series of double-headed runs undertaken.

The loco owners kindly allowed a couple of us to have a drive including myself. I must admit that double-heading up the 1 in 50 spiral incline with a large load behind was a thrilling experience. It was also good to see our scale stock in use.

Nick Wright and his Caledonian tank engine spent a lot of time running on the branch line, in particular shunting around the scale goods shed. Nick was also thrilled that he was able to shunt one of our Princess Coronations 'City of Doncaster'.

From the comments made by the visitors they all fully enjoyed the event, particularly as they did not have to contend with general public passengers, and all expressed a wish to return again in the future. As a birthday present I was very satisfied with the event but maybe I would swap it for a footplate ride on a Duchess over Shap! **EIM**



Continued from page 41

spectre of what we are all going to do when coal supplies finally go away...

Rugby also enjoyed a first-time visit from the members of the **Polly Owners Club** for one of their popular rallies, which apparently produced very busy steaming bays! The next day saw yet another rally, this time for the **National 2½-inch Gauge Association** – no time to rest then... Locos in action included a very unusual 4-12-2 tender engine.

As a final 'first' a couple of Rugby members have been experimenting with casting loco nameplates in aluminium. September saw their first pour, which while not a complete success provided a lot of data to work on. Sounds like a feature that would suit the pages of **EIM** chaps...

Have camera will travel

Finally this time, we know that miniature railways are a global passion but apart from occasionally South Africa and Australia we don't hear a lot from beyond the UK. So we are lucky that Jonathan James, miniature railways editor of the **Narrow Gauge Railway Society**, sends in images from his regular visits across Europe.

This month Jonathan has been to Luxembourg, where at Esch-sur-Alzette the **Railway Club Lankelz** operates the 7¼-inch gauge Chemins de Fer Lankelz. The society was formed in 1997 and opened the first section of the railway in 2001.

There are currently two routes totalling just over 1.3km, although the second is not used on a regular basis due to the gradients. The main route is 1000m long and includes a tunnel, passing loop and three bridges.

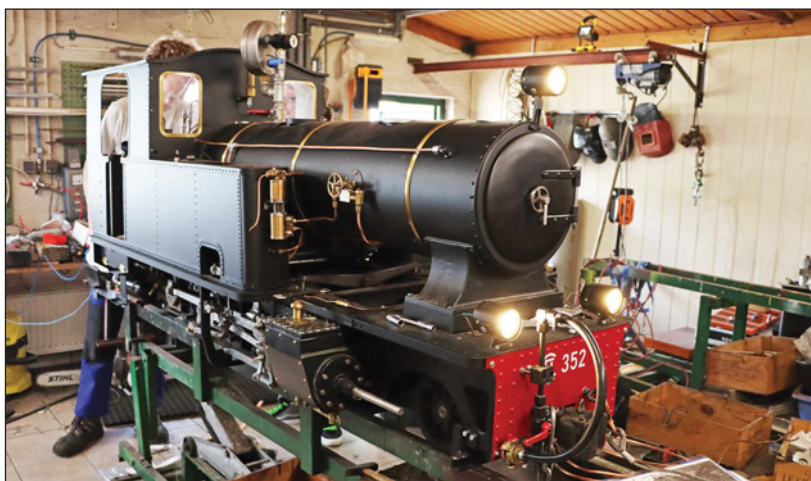
Trains operate on Sundays from May to October using four engines – Mardyke diesel and petrol locos, a battery tram and steam loco CFL 352,

"The loco apparently gave a spirited performance while creating a lot of interest among fellow members..."

TOP RIGHT: 1/C power in charge at the Chemins de Fer Lankelz in Luxembourg.

ABOVE RIGHT: The Lankelz line's steam loco was receiving some TLC in the workshop when our photographer paid a visit.

BELOW: Some remarkably extensive and impressive civil engineering on the Stoomgroep Turnhout's line in Belgium. That is one in-your-face station canopy...



built by Ray Hammond. More details are at chemindeferlankelz.wixsite.com/cflankelz/en

Jonathan's second visit was to a miniature line with some serious civil engineering! **Stoomgroep Turnhout** was established in 1981 and operates a track in the Belgian city's park. There are separate 5 and 7¼-inch gauge routes with some sections of dual-gauge track, providing a run of 428 metres on the 5-inch and 768 metres of 7¼-inch gauge track.

Trains operate from the impressive main station, which has

four covered 7¼-inch platforms and two open-air ones on the 5-inch.

Jonathan adds that the railway provides a pleasant journey through the park, with several level crossings and bridges, including a suspension bridge. He visited on 12th-13th August when a 'Summer Steam Event' was underway with an impressive collection of locos on display and in operation, including a number of visiting engines.

More details if you fancy a visit next year are on the group's website at www.stoomgroep.be/ **EIM**



DIARY

EVERY SUNDAY

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

Gravesend MM&E public running, Cascades KLesiure Centre, Gravesend DA12 4LG, 1-4pm (Santa Runs 10 and 17 December)

King's Lynn DSME public running, beside Kaset skatepark, Greenpark Avenue, King's Lynn PE30 2NB, 11am-3pm (also Wednesdays)

Norwich DSME Pop-up trains, Eaton Park, Norwich 11.30am-3.30pm

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

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

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

NOVEMBER

1 Bradford ME meeting, Autumn auction, Saltaire Methodist Church, 7.30-10pm

1 Bristol SMEE meeting, Use of machatronics at Crofton pumping engines, Begbrook Social Club, BS16 1HY, 7.30pm

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

1 Leeds ME meeting, members' favourite tools and gadgets, Darrington Golf Club, Pontefract WF8 3BP 7-9pm

1 Rugby ME half-term public running, Onley Lane, Rugby, CV22 5QD, 1-3pm

1 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

2 Welling DSME meeting, chat night, Hall Place Gardens, Bexley

3 Rochdale SMEE Garden Railways by Roy Holt, Castleton Community Cntr, Manchester Rd, Rochdale, 7pm

4 Ryedale SME night run, Pottergate, Gilling East, YO62 4JJ

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

4 Worthing SME Saturday Steam-up, Field Place, Durrington, Worthing

4 York ME Bonfire night public running, fireworks, North Lane, Dringhouses, York YO24 2JE, 3pm-9pm

4 Small Gauge Festival, Sydney
5 LSLS, Anthony Road, West Ryde, Sydney, Australia, details at www.sls.asn.au

5 Tyneside SMEE public running, Exhibition Park, Newcastle, NE2 4AA

6 Lancaster & Morecambe ME meeting, informal evening to discuss engineering topics of interest, Cinderbarrow Miniature Railway, Tarn Ln, Carnforth LA5 9RX, 7.30pm

7 Romney Marsh ME meeting, Bits & Pieces & Bring & Buy, Rolfe Lane, New Romney, Kent, 7.30pm

8 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

9 Welling DSME meeting, OO night, Hall Place Gardens, Bexley

12 Worthing SME meeting, subject tba, Field Place, Durrington, Worthing 7.30pm

14 Bristol SMEE meeting, Meccano a history, Begbrook Social Club, BS16 1HY, 7.30pm

15 High Wycombe ME meeting, subject tba, Rossetti Hall, New Pond Road, Holmer Green, 7.30pm

15 Leeds ME meeting, models of Jim Crebbin, Darrington Golf Club, Pontefract WF8 3BP 7-9pm

15 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

16 Welling DSME meeting, The Berlin Telephone Tap by Bob Gibb, Hall Place Gardens, Bexley

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

18 Welling DSME public running for Hall place Christmas Craft Fair, Hall Place Gardens, Bexley, 11am-3.30pm

19 Tiverton ME Sunday running at Rackenford track. (See 4 Nov)

19 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

20 Lancaster & Morecambe ME meeting, subject tba, Cinderbarrow Miniature Railway, Tarn Lane, Carnforth LA5 9RX, 7.30pm

21 Romney Marsh ME meeting, Railways of Colonel Stephens by Doug Lindsey, Rolfe Lane, New Romney, Kent, 7.30pm

22 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

23 Welling DSME meeting, Bits & Pieces, Hall Place Gardens, Bexley

25 Westland & Yeovil DME Track Running Day, Westland Leisure Centre, Yeovil.

26 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

27 Canterbury DMES meeting, Bits & Pieces Evening, Kingston Barn, Kingston, Canterbury.

29 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

30 Welling DSME meeting, Gauge 1 night, Hall Place Gardens, Bexley

DECEMBER

1 Rochdale SMEE meeting, talk by Bob Hayter, Castleton Community Centre, Manchester Road, Rochdale, 7pm

2 Tiverton ME Saturday afternoon/evening running at Rackenford track. (See 4 Nov)

2 Worthing SME Saturday Steam-up, Field Place, Durrington, Worthing

3 Guildford ME public running, Stoke Park Railway, London Rd, Guildford, Surrey GU1 1TU, 11am-3pm

3 Tyneside SMEE public running, Exhibition Park, Newcastle, NE2 4AA

4 Lancaster & Morecambe ME meeting, informal evening, Cinderbarrow Miniature Railway, Tarn Ln, Carnforth LA5 9RX, 7.30pm

6 Bradford ME meeting, The Spitfire by John Hawkes, Saltaire Methodist Church, 7.30-10pm

6 Bristol SMEE meeting, Ladies Night, Begbrook Social Club, BS16 1HY, 7.30pm

6 Leeds ME meeting, Quiz night, Darrington Golf Club, Pontefract WF8 3BP 7-9pm

6 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

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

10 Worthing SME Santa public running, Field Place, Durrington, Worthing

13 High Wycombe ME meeting, Bits and Pieces evening, Rossetti Hall, New Pond Road, Holmer Green, 7.30pm

13 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

14 Worthing SME meeting, subject tba, Field Place, Durrington, Worthing 7.30pm

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

17 Tyneside SMEE members day, Exhibition Park, Newcastle, NE2 4AA

17 Westland & Yeovil DME Track Running Day, Westland Leisure Centre, Yeovil.

20 Bristol SMEE meeting, look back at the year, Begbrook Social Club, BS16 1HY, 7.30pm

26 High Wycombe ME Boxing Day Steam-up, Holmer Green Sports Association, Bucks

27 Bradford ME Mince-pie steam-up, Northcliffe track, Shipley, BD18 3DD, 12.30pm until frostbite sets in.

PLEASE NOTE all outside events and public running are 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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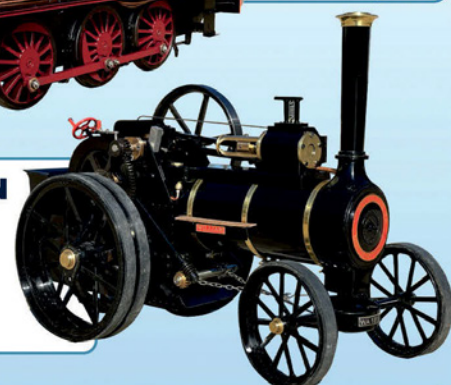


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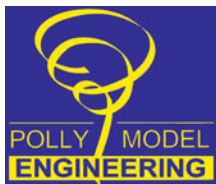
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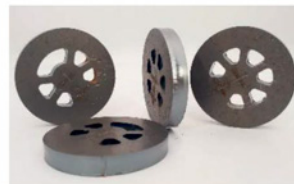
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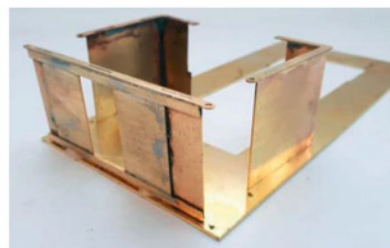
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5 INCH NARROW GAUGE HUNSLT 0-4-0ST

A 5 inch narrow gauge "Alice" class Quarry Hunslet, the work of a highly skilled engineer. Built to an exceptional standard, fit and finish is excellent throughout, the platingwork neatly formed and riveted together, the cab and fittings a work of art. The chassis runs beautifully on air with clear, square exhaust beats; the silver soldered copper boiler has had a twice working pressure hydraulic test

Stock Code 11421 £8,750



7 1/4 INCH GAUGE C19 2-8-0

A 7 1/4 inch gauge Baldwin C19 2-8-0, built to the Milner Engineering design by a prolific model engineer. Having seen regular club running, a boiler inspection in 2016 noted a damp stay in the firebox, with a one year hydraulic test certificate issued. A new boiler was immediately ordered from Bell Boilers and fitted. Since that time it has been steamed on a handful of occasions. Fastidiously maintained by its last owner, the engine steams freely and - with little wear evident in motionwork or valve gear - runs very quietly.

Stock Code 11486 £11,500



5 INCH GAUGE BR STANDARD CLASS 7 NO.70004 "WILLIAM SHAKESPEARE"

A 5 inch gauge BR Standard Class 7 Pacific No.70004 "William Shakespeare", what it lacks in pristine paintwork it more than makes up for in barnstorming performance. Built by Geoff Gregson, a prolific and highly talented model engineer responsible for many high quality. The engine runs well in either direction, the chassis is immensely free-running.

Stock Code 112346 £11,500



7 1/4 INCH GAUGE BRIDGET 0-4-2T

A well-made 7 1/4 inch gauge 0-4-2T to Ken Swan's excellent "Bridget" design. An older engine with some age-related wear to the paintwork, but in good running order with free-steaming and runs exceptionally well, notching up close to mid gear in either direction.

Stock Code 11336 £6,750

7 1/4 A2 PACIFIC NO.60525 "A.H.PEPPERCORN"

A 7 1/4 inch gauge LNER A2 Pacific No. 60525 "A.H Peppercorn", a well-known and much-rallied engine, both in the UK and throughout Europe by its ex-BR driver owner. An older engine, it came to us having had a new commercially built CE-marked boiler fitted in 2021 - steamed once for the boiler inspector, the engine had been unused since that time. On test the engine - built as a two cylinder locomotive - ran sweetly, the newly rebushed bottom end very quiet with a definite feeling of pent-up power behind the regulator handle.

Stock Code 11394 £21,500



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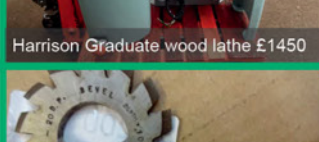
Wadkin wood lathe 6" centre height x 32" centres + 14" rear face plate on the rear end + 6 3/4" 3 jaw chuck £1150



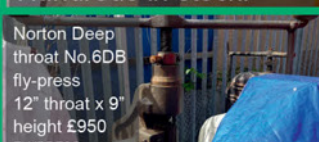
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Harrison Graduate wood lathe £1450



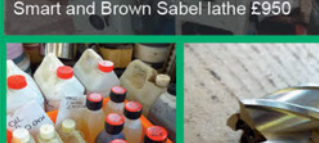
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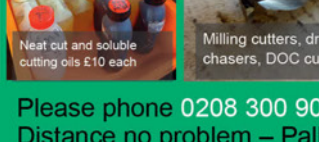
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Smart and Brown Sabel lathe £950



Neat cut and soluble cutting oils £10 each



Milling cutters, drill bits, chasers, DOC cutters etc.



Colchester Bantam 2000 lathe (long bed) metric leadscrew, Dickson post £4950



Stanier precision vice 55mm jaw New / New Zealand £195



Jet JWL 1442, 14" swing wood lathe x 42" centres, 240 volts £1000



X-Y 12" x 6" table £525



ART METAL LONDON SW1 £150

Loads of tooling just in;
Jones and Shipman arbor press
Record No.23 Filters vice
Flat Gauge plate
Boxford AUD lathe
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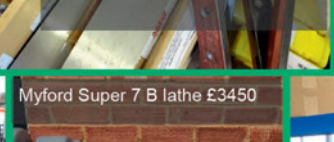
Harrison L5 M250, M300 / Colchester Student 1200 / 1800 lathe change wheels + A&S 1ES milling machine table gears



Transwave 4HP & 5.5HP Rotary converter £750 / £850



Myford Super 7 B lathe £3450



Creuson Morrisflex 240V 8" polisher buffers £825 each



Myford bridge & rifle felts £6.75



Meddings L1 MK.V drilling machine £2250



Clarke 917 vacuum former £495



Myford 3/4HP 240V resilient mount motor configured to match a Dewhurst reversing switch already wired + instructions £226



Boxford ME10A lathe + Tesla Inverter, very nice example £3950



RJH Bison 10" pedestal grinder complete with light £450



Tripus 240v switch £90



Myford gearbox unused £1000



Crown Windley Brothers 6ft x 4ft cast iron surface table £1425



HME Hearth just arrived from education 3PH / mains gas £500



Sedgewick 10" planer thicknesser 240V and 3PH £1150 each



RJH 6" bandfacer / finisher 1.5HP, 3PH quality £425



Harrison M300 lathe £3950



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