INSIDE MIDLANDS MODEL ENGINEERING EXHIBITION SHOW GUIDE – 13TH-16TH OCTOBER

MIDLANDS MODEL ENGINEERING EXHIBITION

THE MAGAZINE FOR MODEL ENGINEERS

ENGINEERING in Miniature

OCTOBER 2022 £5.49

Heat of the moment

Boiler making for a 5-inch 'Single'

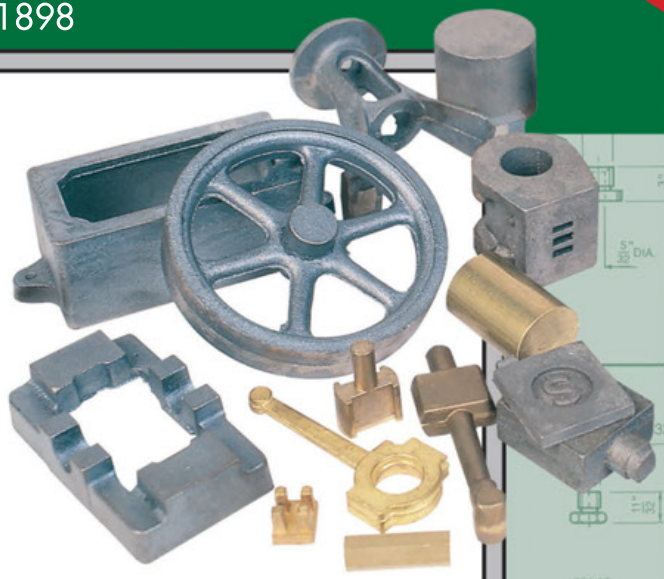
WILL IT WORK? DIESEL I/C ENGINE CONVERTED TO PETROL

ON ITS WHEELS – 6-INCH FODEN KIT BUILD PASSES A MILESTONE

SEE US AT THE MIDLANDS MODEL ENGINEERING EXHIBITION THURSDAY 13TH TO SUNDAY 16TH OCTOBER STAND 46/47

STUART MODELS

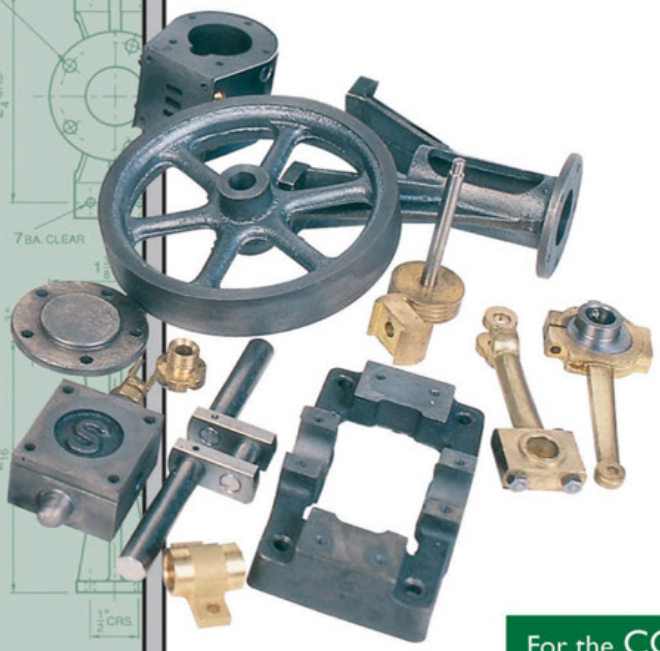
FOUNDED 1898



For the MODEL ENGINEER

SETS OF CASTINGS

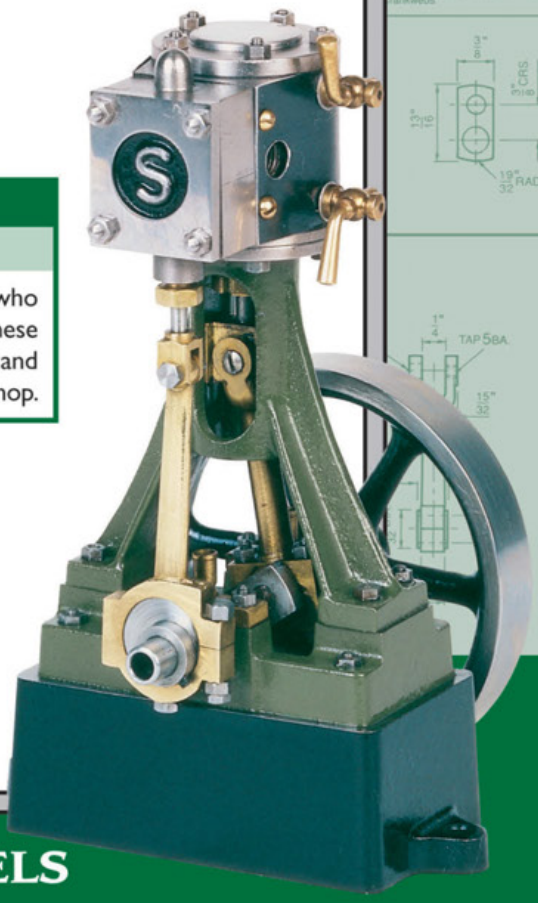
We offer Sets of Castings suitable for both those starting out in model engineering as well as those looking for a new and challenging project.



For the ENTHUSIAST

PRE-MACHINED KITS

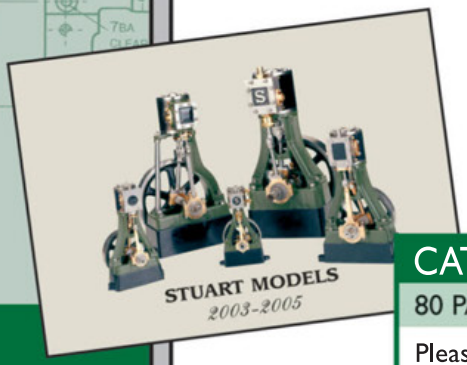
Many of our engines are available as Pre-Machined Kits allowing you to finish the model with a set of spanners and simple hand tools.



For the COLLECTOR

READY TO RUN MODELS

The perfect choice for anyone who has an interest in steam. These models are assembled, painted and thoroughly tested in our workshop.



CATALOGUE - £6.00

80 PAGE FULL COLOUR

Please send £6 for our eighty page comprehensive full colour catalogue which covers our entire range of models and accessories.

STUART MODELS

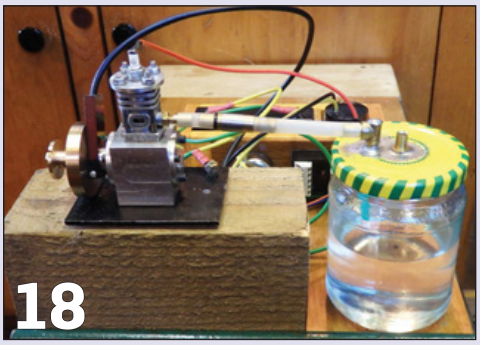
GROVE WORKS, WEST ROAD, BRIDPORT, DORSET, DT6 5JT

• TEL 01308 456859 • FAX 01308 458295 • www.stuartmodels.com •

CONTENTS

OCTOBER 2022 Volume 44 Number 04

THE MAGAZINE FOR MODEL ENGINEERS
ENGINEERING in Miniature



FRONT COVER

Boiler making, a particular skill – Bruce Boldner tells how the boiler for his Stirling Single came together in this issue, while Peter Malim describes big progress on his 6-inch Foden kit build project.

EDITORIAL

Show time at last as we prepare for winter projects

Welcome to the October edition of EIM and I'm delighted that for the first time in three years we carry our traditional four-page pull-out guide to the Midlands Model Engineering Exhibition, because for the first time in three years the EIM-sponsored event is actually happening!

Your editor has really missed the shows that the Covid pandemic put paid to, and in my humble opinion there's no better time to be able to return to the exhibition halls. With so much less than positive news around at present and so many pressures on all of us, where better than to lose oneself for a few hours viewing a host of excellent models. And of course chatting with fellow model engineers! We all love to chat and where better at a show, with so many models on display to discuss and argue over? I'm very much hoping to meet many of our readers at this year's event between 13th-16th October.

Admittedly, however, this show will be different as there will be one chat I'm no longer able to have. I won't be catching up with Chris Deith, EIM's founder and stalwart custodian for so many years, following his passing earlier this year. Ever the enthusiast Chris was always keen to chat, and I'll miss his experienced words of wisdom that were always welcomed.

Of course we'll need to take our funds with us too – winter is around the corner and with the tracks in hibernation many of us will be planning our workshop projects. With so many traders gathered in one place the show is the perfect opportunity to obtain everything needed to take those projects from drawing board to working model.

Of course we at EIM hope that if you are planning a winter project you will include in your component parts notepaper and a camera. Why not write up what you build, and send it in to the magazine? We'd especially like to see some more workshop equipment articles, and on the less obvious subjects such as the welcome feature on internal-combustion trials and tribulations by Patrick Cubbon in this issue. Whatever you are building, write it up for us, and earn some funds to spend at next year's show!

Andrew Charman – Editor

The November issue of **Engineering in Miniature** publishes on 20th October.

Editor: Andrew Charman Technical Editor: Harry Billmore
Email: andrew.charman@warnersgroup.co.uk Tel: 01938 810592
Editorial address: 12 Maes Gwyn, Llanfair Caereinion, Powys, SY21 0BD
Web: www.engineeringinminiature.co.uk
Facebook: www.facebook.com/engineeringinminiature
Subscriptions: www.world-of-railways.co.uk/Store/Subscriptions/engineering-in-miniature

FOR SUBSCRIPTION QUERIES call 01778 392465 – the editor does not handle subscriptions.

Publisher: Steve Cole
Email: stevec@warnersgroup.co.uk
Design & Production: Andrew Charman

Advertising manager: Bev Machin
Tel: 01778 392055
Email: bevm@warnersgroup.co.uk
Advertising design: Amie Carter
Email: amiec@warnersgroup.co.uk
Ad production: Allison Mould
Tel: 01778 395002
Email: allison.mould@warnersgroup.co.uk
Marketing manager: Carly Dadge
Tel: 01778 391440
Email: carlyd@warnersgroup.co.uk

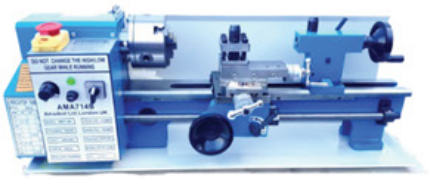
Published monthly by Warners Group Publications Plc,
The Maltings, West Street, Bourne, Lincolnshire PE10 9PH.

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

Engineering in Miniature – ISSN 0955 7644

Amadeal Ltd.
Machine Tools

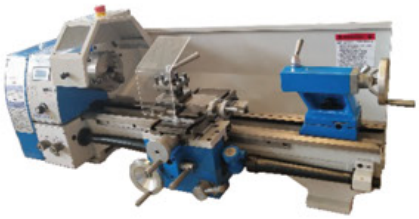
Call: 0208 558 4615
WWW.AMADEAL.CO.UK



AMA714B Mini lathe
Brushless Motor

SPECIFICATION:
Distance between centers: 350mm
Taper of spindle bore: MT3
Spindle bore: 20mm
Number of spindle speeds: Variable
Range of spindle speeds: 100-2250mm
Weight: 43Kg

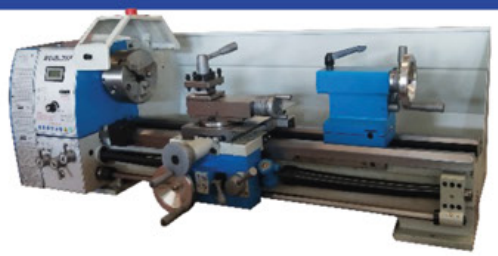
Price: £694



AMABL250Fx750

SPECIFICATION:
Distance between centers: 750mm
Taper of spindle bore: MT4
Spindle bore: 26mm
Number of spindle speeds: Variable
Range of spindle speeds: 50~2500rpm
Weight: 140Kg

Price: £1,904
W 2 Axis DRO - Price: £2,280



AMABL290VF Bench Lathe (11x27) - power cross feed - BRUSHLESS MOTOR

SPECIFICATION:

Distance between centers: 700mm
Taper of spindle bore: MT5
Taper of tailstock quill: MT3
Motor: 1.5kw
Weight: 230Kg

Price: £2,395
W 2 Axis DRO – Price: £2,787

AMAVM25LV

SPECIFICATION:
Model No: AMAVM25LV (MT3) / (R8)
Max. face milling capacity: 63mm
Table size: 700×180mm
T-slot size: 12mm
Weight: 120Kg

Price: £1,360.00
W AXIS POWERFEED - Price: £1,659
W DRO – Price: £1,730
W DRO + PF - Price: £2,045

E3 Mill R8 Metric Brushless Motor

Direct drive spindle.
No gears. No belt

SPECIFICATION:
Max. drilling capacity: 32mm
Max. end milling capacity: 20 mm
Max. face milling capacity: 76mm
Motor: Input- 1.5KW
Packing size: 1050x740x1150mm
Net weight: 240kg

Price: £2,560.00

AMAVM32LV

SPECIFICATION:
Model No: AMAVM32LV (MT3) / (R8)
Max. face milling capacity: 76mm
Table size: 840×210mm
T-slot size: 14mm
Weight: 240Kg

Price: £1,962.00
W AXIS POWERFEED - Price: £2,081
W DRO – Price: £2,363
W DRO + PF - Price: £2,856

See website for more details of these machines and many other products including a large range of accessories that we stock

Prices Inc VAT & Free Delivery to Most Mainland UK Postcodes

www.amadeal.co.uk

We Accept

|Call: 0208 558 4615 |Email: info@amadeal.co.uk|

SILVER CREST models

MARKET LEADER IN LARGE SCALE, READY-TO-RUN, LIVE STEAM

ONLY 6 MODELS AVAILABLE

5" GAUGE 3F "JINTY" CLASS

ORDER NOW

DELIVERY WITHIN 28 DAYS

The 3F "Jinty" Class

Some 425 of these locomotives were manufactured between 1924 and 1931. Mainly allocated to shunting and station pilot duties they also undertook occasional branch line work. The "Jinties" were frequently used for banking duties with up to three at a time seen assisting express passenger trains up the Lickey Incline on the Bristol-Birmingham line near Bromsgrove. They were frequently seen banking trains out of London Euston up to Camden - a particularly demanding task!

Designed by Sir Henry Fowler for the London, Midland and Scottish Railway they were based on earlier designs by S&W. Johnson.

Some of the locomotives were loaned to the War Department in WWII, providing welcome logistical support to the allied war effort.

A majority of locomotives enjoyed long service with the final "Jinty" withdrawn in 1967, right at the end of the steam era. The locomotives were always painted in un-lined black livery. Before nationalisation in 1948 LMS initials were carried on the tank sides. In BR service either lion crest was carried according to period.

£5,495.00 + p&p

Summary Specification

Approx length 33"

- Stainless steel motion
- Boiler feed by cross head pump, injector, hand pump
- Etched brass body with rivet detail
- Two safety valves
- Choice of emblems
- Painted and ready-to-run
- Coal-fired live steam
- 5" gauge
- 2 inside cylinders
- Slide valves
- Stephenson valve gear
- Drain cocks
- Mechanical Lubricator
- Silver soldered copper boiler
- Multi-element Superheater
- Reverser
- Approx Dimensions:
  Length: 33"
  Width: 9.5"
  Height: 14"
  Weight: 44kg

Request your free brochure today

Request your free brochure today by e-mail, telephone, or by returning the coupon opposite.

Telephone: **01327 705 259**

E-mail: **info@silvercrestmodels.co.uk**

Find more information at **www.silvercrestmodels.co.uk**

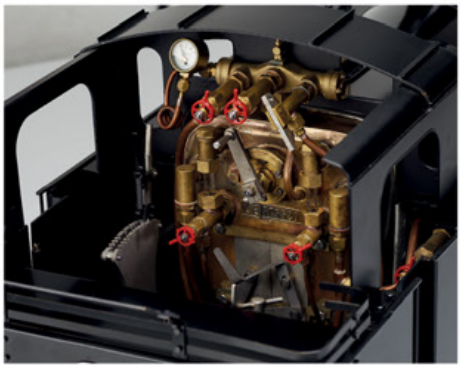
The 5" Gauge Model

We have introduced the "Jinty" to our growing range of models due to requests received from a number of customers who are keen to own one. At just £5,495.00 + shipping this 5" gauge model offers unbeatable value-for-money. The model is coal-fired and its 0-6-0 wheel arrangement provides a powerful locomotive capable of pulling a number of adults. Its ability to negotiate tight curves makes it a perfect candidate for your garden railway. The model is delivered ready-to-run and painted with your choice of LMS lettering, or BR crest.

Each is complete with a silver soldered copper boiler, hydraulically tested to twice working pressure. All boilers comply with the latest regulations and are appropriately marked and certificated. The locomotive's compact size makes this an ideal model to display, transport and drive. As testament to our confidence in the high quality of this model we are pleased to offer a full 2 years warranty. Our customer service is considered to be second-to-none.

The "Jinty" is a powerful locomotive for its size and can negotiate tight curves, making it ideal for a garden railway. It incorporates our latest technical improvements including mechanically operated drain cocks. As an award winning professional model maker I am delighted to have been involved in the development of this first class live steam locomotive"

Mike Pavie



Delivery and Payment

Save £195.00. Free p&p for any order received within 28 days.

Delivery is now imminent and we are happy to accept your order reservation for a deposit of £2,747.50 (50%).

The balance of £2,747.50 will be due as soon as your model is ready for delivery (please allow approx 28 days). Total price £5,495.00.

VISA MasterCard

FREE BROCHURE REQUEST FORM

Please send, without obligation, my free 5" gauge "Jinty" brochure.

Name: _____

Address: _____

_____

_____ Post Code: _____

Please send to: Silver Crest Models Limited, 18 Cottesbrooke Park, Heartlands Business Park, Daventry, Northamptonshire NN11 8YL EIM

Company registered number 7425348

Building a 6-inch Foden C Type wagon

In this second part of his occasional series, Peter describes the highs and lows of building the Steam Traction World kit to rolling chassis stage.

BY **PETER MALIM OBE** Part 2 of an occasional series

Photo above of the prototype engine by Steam Traction World. All kit-building photos by the author.

Most builders of these engines buy their kits on a monthly basis and have them delivered, so the kits have to be packed to withstand the rigours of being handled by couriers.

Each kit is packed in one or more substantial cardboard boxes secured with plenty of reinforced tape, with a label on each giving the kit number, box number where there is more than one box per kit, and importantly the weight of the box as some of the boxes weigh more than 25kg.

Inside the box, or in box 1 where there are multiple boxes, there is a clear plastic wallet which has a packing list, assembly instructions and hints, and isometric drawings. The individual components with their appropriate fasteners are wrapped in bubble wrap or in clear plastic bags with a part number and description, so it is easy to check on unpacking that all parts are present. The isometric assembly drawings have the part numbers clearly marked and the assembly instructions refer to these same part numbers. Photo 7 shows the contents of a typical smaller single box kit – this includes the steering mechanism and handbrake.

As I am buying through the fast-track scheme rather than monthly, I picked up the first 11 kits from the Steam Traction World (STW) factory in Daventry. I haven't therefore seen how well the packages survive courier delivery, but some of the heavier boxes with odd-shaped items in did suffer a bit on the journey in my trailer back to mid Wales.

Having at the time of writing completed these 11 kits, it is worth reviewing the tools I have used to date. STW's publicity states that it is possible to build the vehicle with just hand tools, not requiring any machine tools such as a lathe or milling machine. Later I will describe some issues which would have been much more easily rectified with access to such machines.

In general, however, I have used hand tools and portable power tools. I have also employed a set of metric spanners and sockets, hex keys, and screwdrivers. A set of good quality files – triangular, square, round and half-round – and a de-burring tool have been extensively used to tidy up machined components. I have found it worth investing in good quality files that won't blunt and will leave a tidy finish on the material.

I have made extensive use of a 115mm angle grinder with a good wire cup brush for rust and millscale removal particularly on the chassis rails, and an abrasive disc for deburring the larger items and modifying some plates and pins. This is pretty much an essential tool.

I have also used a cordless power drill for cleaning out drilled holes and for enlarging some of the holes. A set of good-quality HSS twist drills has been a wise investment. Copious quantities of emery cloth are needed, for fitting bearings to shafts – more of this later. I use 3M emery that comes on a roll as a 25mm wide strip.

Painting and plating

I was in two minds about whether to spray or brush paint. Instinctively brush painting seemed to be the way

PHOTO 7: Contents of a typical kit package, this one including the steering mechanism and handbrake.

to go, as it was how the original would have been done and I like the slight unevenness of a really well-brushed surface. On the other hand spraying would be a lot quicker.

I am using Craftmaster coach enamel paint as recommended by STW, and this is really designed to be brush painted, though it can apparently be sprayed with care and the firm will sell you an aerosol can for the enamel. Craftmaster recommends using Purdy brushes, so I purchased a set and did some experiments. The suggestion was two coats each of primer, undercoat and enamel, with rubbing down between coats – this has turned out to be essential in getting a good finish. I have used tack cloth to remove sanded dust rather than white spirit and this has been very successful.

Painting this way is fairly laborious and time consuming but I have found that with care a really good finish is achievable. I have had no prior experience of spray painting and my workshop is not set up for spraying, with the need for extraction. The quality of finish I have achieved with brushing is at least as good as I was hoping for, so I have decided not to do any spraying.

The Foden's leaf springs were particularly time consuming as only the edges and ends of each spring have to be painted, which meant that the three spring sets had to be dismantled and each of the 31 springs masked up individually. Fortunately the low-tack masking tape I use was exactly the right width making the job slightly easier. Photo 8 shows just some of the springs before painting commenced while Photo 9 shows some of the smaller components in the paint booth located in the corner of my workshop.

I have chosen to paint the chassis and boiler horn plates Black, the axles, water tanks and wheels Manchester Red, and the bodywork and mudguards Classic Green. The wooden load deck will be varnished. I will have the signwriting done by a professional as this is beyond my ability and so important to the look of the finished vehicle.

There are a number of parts that will be subject to significant wear in use, such as the steering wheel knob and the gear-change levers. Paint on these items would soon rub off so I have decided to nickel plate these, along with elements of the motion which I don't think will look right painted. I have purchased a comprehensive bright nickel-plating kit from Classic Plating Ltd and I will report on how I get on with this in the next part of this series.

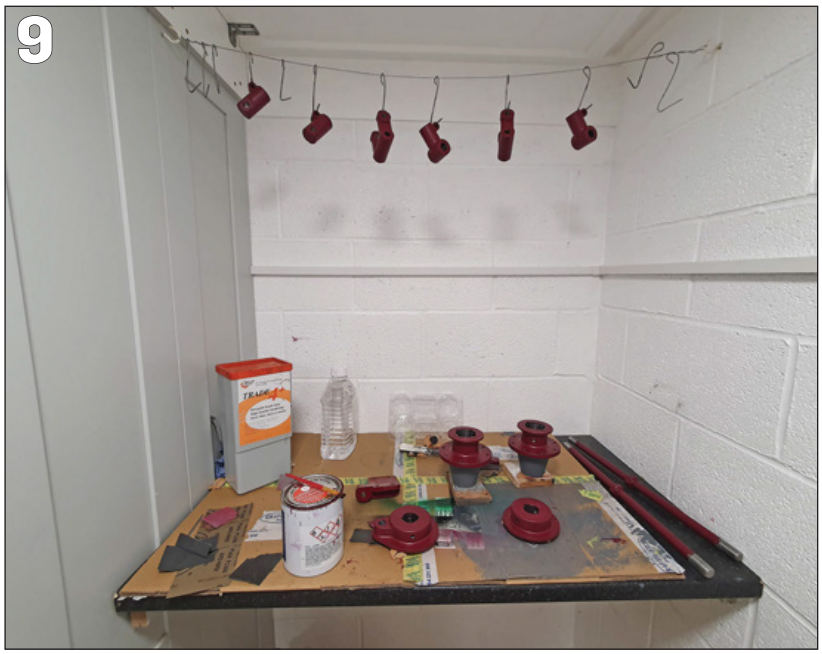


PHOTO 8: Some of the 31 spring leafs before painting was begun.

PHOTO 9: Setting up a dedicated painting booth helped with the quality of finish.

PHOTO 10: The spur gear shafts on the differential needed some shortening.

Tolerances and errors

I had expected to need to do a certain amount of 'fettling' of the kits – deburring, cleaning up holes and some fitting of parts. The instructions for some of the kits also suggest that some holes might need to be elongated to allow things to line up, although so far I have not had to do much of this. What I didn't expect to have to do was major work on the rear axle to get the bearings to fit.

The bearing surfaces were substantially oversize for the bearings supplied – in one case by about 0.4mm. Putting this right required very time-consuming use of emery cloth strips to reduce the diameter to get the bearings to fit. This is where access to a lathe would have been extremely useful.

I have had some issues with parts, mainly on the rear axle, not fitting. There is a true differential that has three spur gears which engage with bevel gears on the axle. The shafts for attaching these to the sprocket were too long and required shortening and radiusing. This can be seen in Photo 10. A lathe would have been useful for this too, but I did it freehand using the angle grinder which worked but is not a particularly elegant solution.

One of the bevel gears is attached to a hollow shaft which fits over the main axle to provide the differential action. There are two Oilite bushes which have to be fitted, but the shaft had been bored slightly oversize which meant the bushes were a drop-in fit. Machinery adhesive is supplied but the bushes ended up glued in not quite ▶

in line due to the loose fit. Again this required a lot of work with the emery to achieve a fit.

The differential covers – visible on the completed rear axle sub-assembly in Photo 11 – are pressed steel and when I fitted them, they stopped the differential from operating as the centres were pressing on the back of the bevel gears. Fortunately I have access to a hydraulic press and I made up a wooden tool to press the covers to their correct shape.

When I came to assemble the front axle I discovered that the rod connecting the two stub axles was about 15mm too long. This can be seen in Photo 12 of the completed front axle. Around this time I had fitted the rear axle and discovered a couple of issues, one being that the centre of the offside wheel was too thick to enable the hub cap to be fitted, which on this side is crucial as the cap is fixed to the axle which must be able to move relative to the wheel to allow the differential action.

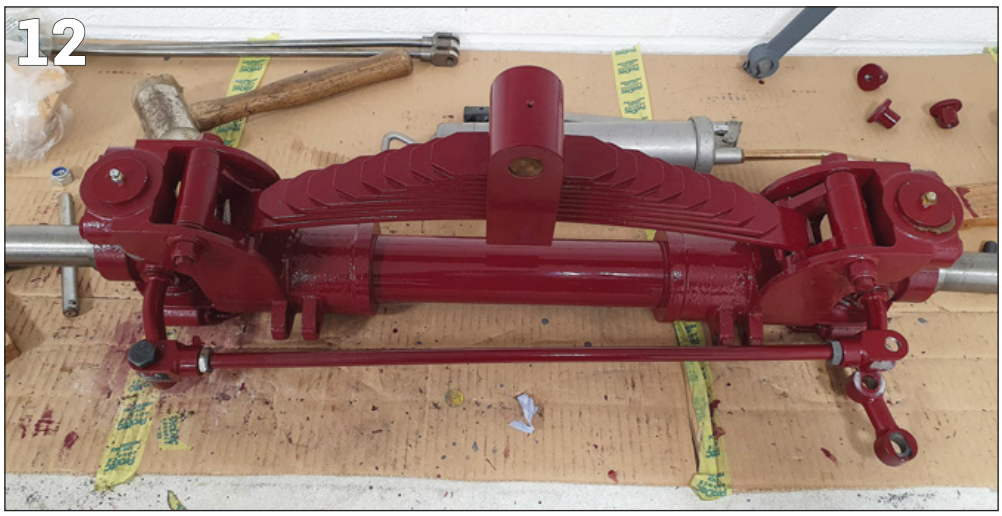
The second issue was that the bottom bracket that holds the brake shoes on was too long and was fouling on the brake drum on both sides. I contacted STW and the firm arranged to collect the wheel, steering connecting rod and the brake brackets for remedial work. They were returned a week later and all installed.

STW support is available by email or phone, and I have found the team there to be generally helpful and quick to act when problems have arisen. On a couple of occasions items have been missing from a kit and they have been sent the following day when I have let STW know. I was also put in touch with an experienced model engineer who is a little ahead of me in his build and I have been able to get some useful hints from him. I have also discovered that he has had a number of the same issues with parts not fitting, suggesting there is a manufacturing error in the batch. As he is experienced and has a well-equipped workshop he has just got on and re-machined parts, rather than letting STW know there is a problem.

PHOTO 11: Rear axle sub-assembly completed and painted.

PHOTO 12: More shortening needed on front axle assembly

PHOTO 13: The chassis complete, engine on its wheels – a major point in the project.



Build lessons

I built up and painted a good deal of the rear axle assembly including the differential and then discovered the issue of the bearings not fitting. It was going to be very disruptive to disassemble it to get the axle out to machine the journals, so I decided to hand modify them with emery cloth. Had I not done all the painting I would probably have taken the axle out and had it machined – I volunteer at the local steam railway which has a well-equipped machine shop. STW also offered to do the work.

Subsequently I have dry-assembled sub assemblies such as the front axle and steering box, and then disassembled them for painting. This has paid off as I discovered the steering box was not at the correct angle to align with the bearing at the top of the steering shaft which fits on the handbrake bracket. I was able to correct this by removing the box mounting brackets and re-welding them at the correct angle – fortunately I can weld.

I constructed and painted most of the chassis upside down on hand-made trestles, as most components hang down from the chassis. This definitely paid off, but it did require the chassis – which is not light – to be turned over and lowered onto the rear and front axles. Fortunately I persuaded three of my fellow railway volunteers to give up their lunchtime to help me.

I then completed the painting of those bits of the chassis I could not easily get at when it was the wrong way up. The finished rolling chassis is shown in Photo 13 – note that I am yet to finish preparing and painting the wheels.

I have discovered there are some advantages of having a batch of kits already delivered and available for work at the same time. I have done some of the assembly in a slightly different order, and been able to carry out larger batches of painting.

One specific advantage was the fitting of the brackets that support the cross rod that joins the brake systems on each side. The chassis rails are raw C-channel which is not exactly square so the brackets were not in line. As I had the cross rod from a later kit in the build sequence I was able to fit it to hold the brackets square with some car body filler underneath. This meant that I could paint the brackets and their mounting bolts with the rest of the chassis.

Of course the other advantage of having several kits in hand is that I have been able to build the chassis in four rather than 11 months! Having the Foden standing on its four wheels is a great encouragement (Photo 13).

The next batch

I finished this batch of kits just in time to travel to STW to pick up the next ten kits including the boiler, smokebox and chimney – except the cylinder and water tanks were not completed, so I am currently waiting for those to be sent, along with front mudguards as STW has supplied rear ones in error.

I have work to do on the house in the better weather so building the Foden will be a wet days only pastime for a while. With this batch of kits it will begin to look like a steam lorry, so I am anxious to progress. I'll report in the next episode how I get on. EIM

■ Part 1 of this series appeared in the June 2022 edition of EIM – download a digital back issue or order a printed copy from www.world-of-railways.co.uk/store/back-issues/engineering-in-miniature

Ready Steady...

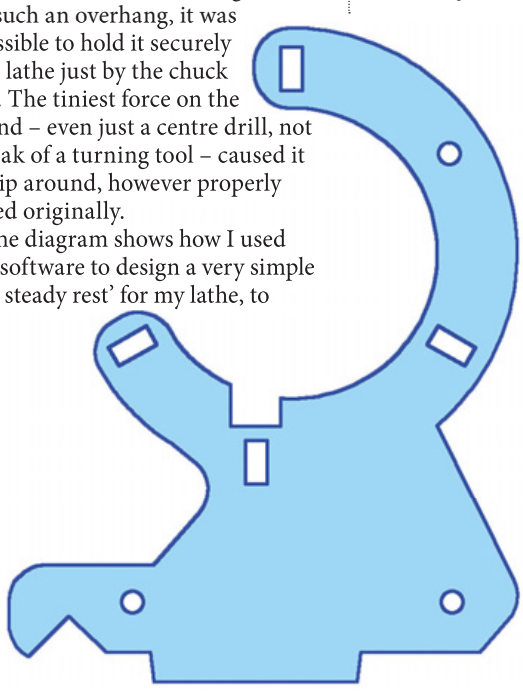
Jan-Eric solves a lengthy holding issue in this workshop...

BY **JAN-ERIC NYSTRÖM**

With a small, inexpensive '9 x 18' lathe which has a rather limited mandrel bore, I needed to figure out how to machine the ends of the hind axle of the traction engine I'm currently building and which has been serialised in recent issues of EIM – the axle needed to be reduced in diameter at both ends in order to accept the ball bearings in the wheel hubs.

The axle is almost 2ft long, and with such an overhang, it was impossible to hold it securely in the lathe just by the chuck alone. The tiniest force on the free end – even just a centre drill, not to speak of a turning tool – caused it to whip around, however properly centred originally.

The diagram shows how I used CAD software to design a very simple 'fixed steady rest' for my lathe, to centre-drill and turn the axle, or any other long objects. This steady can centre an object of well over three inches in diameter.



RIGHT: The steady in use during centre-drilling of a long axle.

BELOW: CAD drawing for the two identical plasma-cut plates used to make the fixed steady rest.

Elegant solution

I could of course have built a simple but functional steady rest from strips of flat or angle iron roughly welded together, but I preferred to do it more elegantly with CAD, having access to my model engineering friend's home-brew plasma-cutting Service.

Measuring the bed of my lathe, taking into consideration the V-shape of the front way, and its distance to the rear way, I could draw the outline for two identical plates that would form the steady. They are held together by three bolts with three nuts each (two of nuts between the plates, to provide a suitable space between them).

The rectangular holes enabled me to weld in four 'extended', almost 1-inch long nuts in the proper position between the plates to hold three adjustable bolts spaced 120 degrees apart, and another bolt which attaches the steady to the lathe bed using a piece of flat iron under the ways. This bolt is tightened with a ratchet socket wrench, fitting in the cutout around the bolt head.

By adjusting the three centring bolts so that the axle centre coincides with the centre of the tailstock, and of course oiling the bolt tips (so as not to score the workpiece), I could then centre-drill the long axle, as seen in the photo.

Once a workpiece has been centre-drilled, it can be turned 'between centres', or by holding one end in the chuck, and the other end on a revolving centre.

An improvement to the steady would be to use bronze tips on the centring bolts, or even provide them with ball bearings – but, considering that the steady has worked quite well for drilling and turning, even without the use of a tailstock centre, I think I won't bother... EIM

A GNR Stirling Single in 5-inch Gauge

Australian engineer Bruce's second locomotive construction project focuses on building the heart of the engine, its boiler.

BY **BRUCE BOLDNER** Part Four of a short series

Next it was time for what to me has always been the elephant in the room – the boiler.

Boiler making is a complete departure from all the skills required to construct a locomotive to this point. There is no machining, just annealing , hammering, bending, drilling and soldering copper with lots of heat and frustrating leaks en route to the finished product.

My friend Mike has a penchant for boiler design and thus completely redrew the boiler plans of the original Piddington/Scarf design, following the parameters of Henry Greenly and Jim Ewan. The fire grate area remained the same but the boiler, a seamless copper tube of 4½-inch diameter, now has:

- 13 tubes of ½-inch outside diameter (OD) x 13-inch long, 20 SWG
- Two superheater flues of ¾-inch OD x 13-inch long, 20 SWG
- Two stainless steel superheaters with arrowheads (TIG-welded by friend and fellow club member Chris Murray)
- Two palm stays from backhead to the top of the boiler shell approximately at throatplate level
- Two solid copper longitudinal stays of 3/16-inch diameter running from backhead to smokebox tubeplate.

The boiler had to be constructed in accordance with our Australian Copper Boiler Code. The number of stays and their ligature spacing will therefore differ from the British codes. However detailing of these differences will have little relevance to British readers, so I will not waste time by elaborating further.

Photo 35 shows the boiler tube being sectioned so that the two halves in the foreground can be opened and straightened to form the firebox sides (with added extensions to achieve the full depth).

Photo 36 shows the backhead with regulator bush top centre, flanked either side by blind bushes for the longitudinal stays. Directly below the regulator bush is the blower valve bush and to the immediate left of this is the lower water-gauge glass bush. The twin holed bushes either side are for the injector water clacks while the two bottom bushes are for water clacks into the boiler.

Photo 37 shows the firebox assembled (held together with sacrificial copper screws) and the fire tubes positioned through the smokebox tubeplate.

Photo 38 shows my friend and fellow club member Chris Murray bronze brazing the throatplate to the boiler seam. Chris is a qualified professional welder. It never ceases to amaze me what torture copper can withstand and come out of it stronger than ever! (Photo 39).

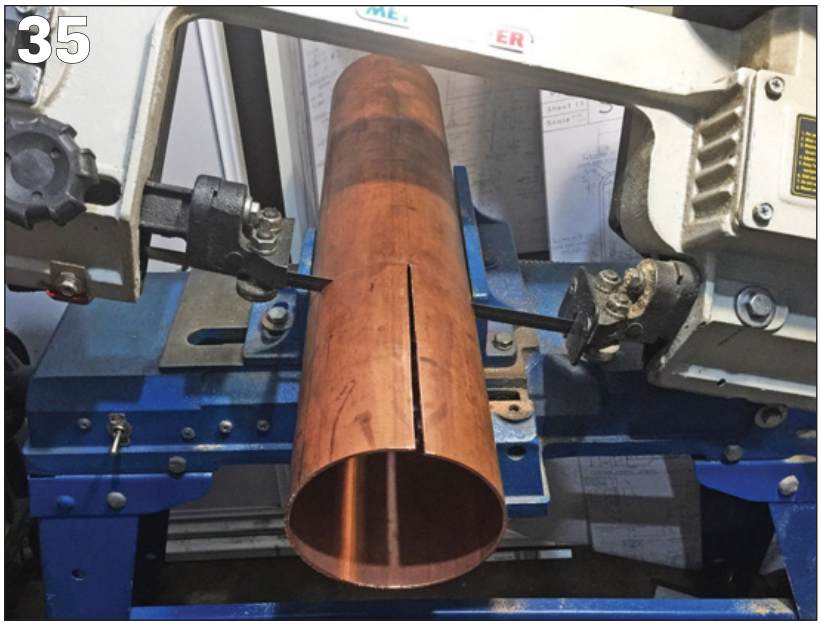


PHOTO 35: Sectioning the boiler tube to form the sides of the firebox.

PHOTO 36: Backhead made up with its various bushes.

All photos by the author

Prime concern

I was concerned about the method of steam collection in the boiler. The plans proposed a hollow tube enclosing the regulator actuating rod, leading from the backhead to the smokebox. The tube was to collect steam via perforations throughout its length. Although the pipe lies along the apex of the boiler, it wouldn't take much to swamp the tube with water, leading to disastrous priming of the

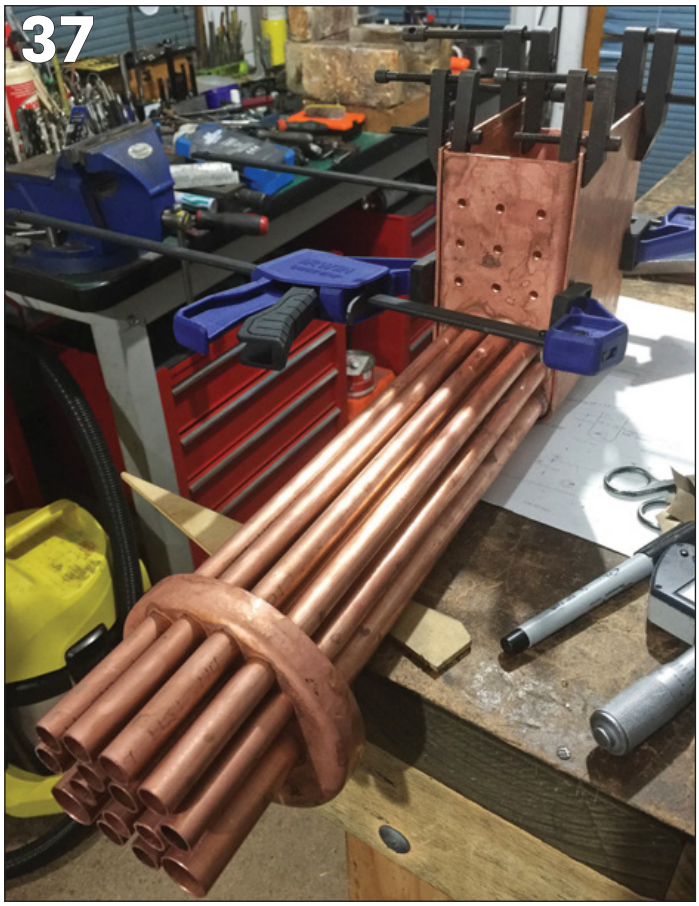


PHOTO 37: Firebox held together with screws and boiler tubes placed in position ready for final assembly.

PHOTO 38: All projects benefit from skilled friends – Chris Murray bronze-brazes the boiler.

PHOTO 39: A lot of brazing later, the assembled boiler.

PHOTO 40: Another colleague came up with an improved design of regulator, here complete and ready to be fitted.

cylinders. I briefly considered bringing my model into the Ivatt era by adding a steam dome, but if I was to do this then the distinctive straight-back look of the Stirling would be lost.

Mike therefore drew up a design which replaced the perforated tube with a sealed one. A short vertical tube was drilled and tapped into this, extending upwards vertically into the base of the safety valve bush. This placed the steam entry point above the boiler outline, but not too close to the underside of the safety valve , where it might scavenge the water from the boiler.

Regulator redesign

The regulator on the Stirling is a push-pull affair, rather than a rotary format. I noted on internet chat groups that some Stirling builders were less than enthused with the regulator as then designed, with its propensity to leak and not provide very smooth, progressive control. Once again, Mike came to the rescue with his own design of regulator, which I constructed from his dimensioned CAD drawing.(I know, what would I do without him?)

Photo 40 shows the completed regulator – it is very compact. The flange bolts onto a bush on the ▶

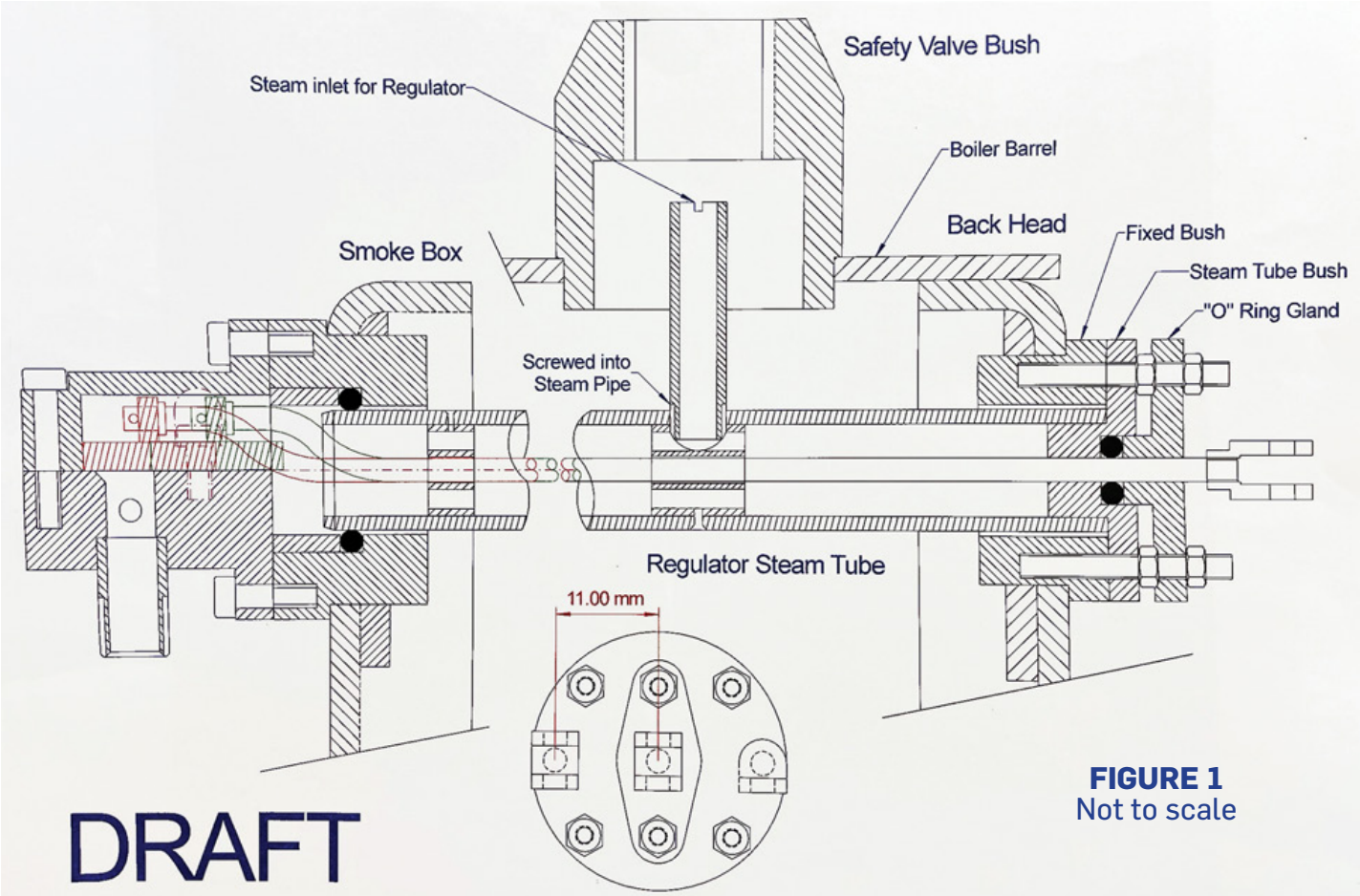


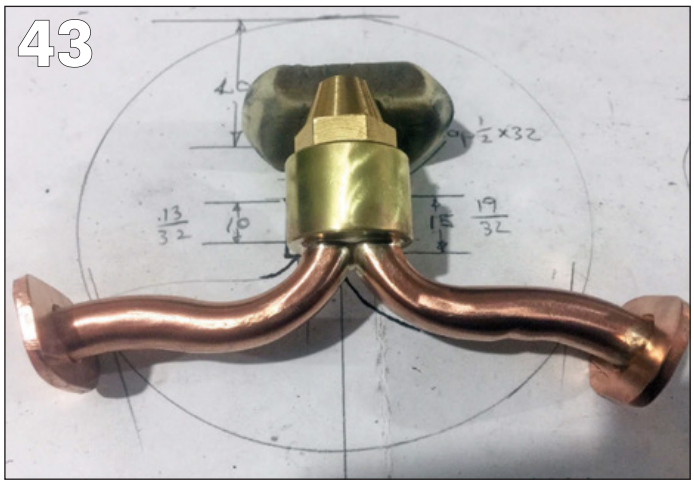
FIGURE 1
Not to scale

smokebox tubeplate – the large tube is to the wet header and the smaller one to the right is to the snifter.

The small tube of brass to the right almost out of picture is one of the collars that slip inside the regulator tube and guide the regulator actuating arm. The large hole on the near side of this collar is tapped to hold the vertical steam pickup tube beneath the safety valve.

There is a radius of holes drilled around the circumference of this collar to permit steam to traverse the length of the regulator tube. Two more collars spaced evenly along the regulator tube support the actuating arm throughout its length.

The regulator arm with sliding shoe attached is in the foreground. The spring ensures that the sliding



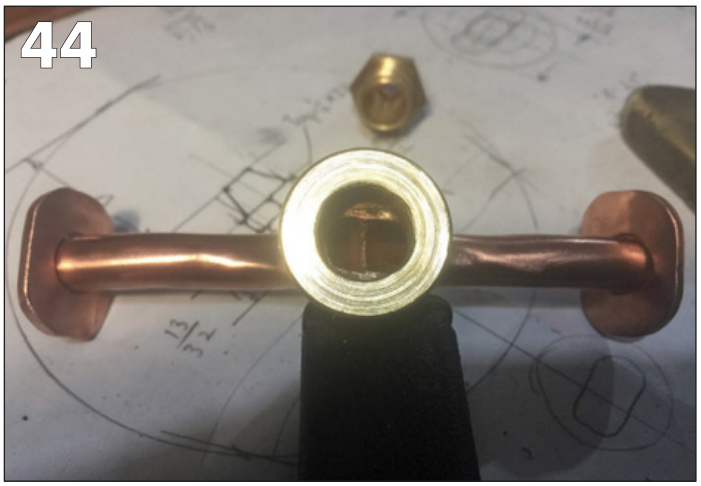


FIGURE 1: Draft diagram of improved regulator and steam drafting design.

PHOTO 41: Regulator bush mounted in smokebox tubeplate – note the cavity which accommodates a sliding shoe.

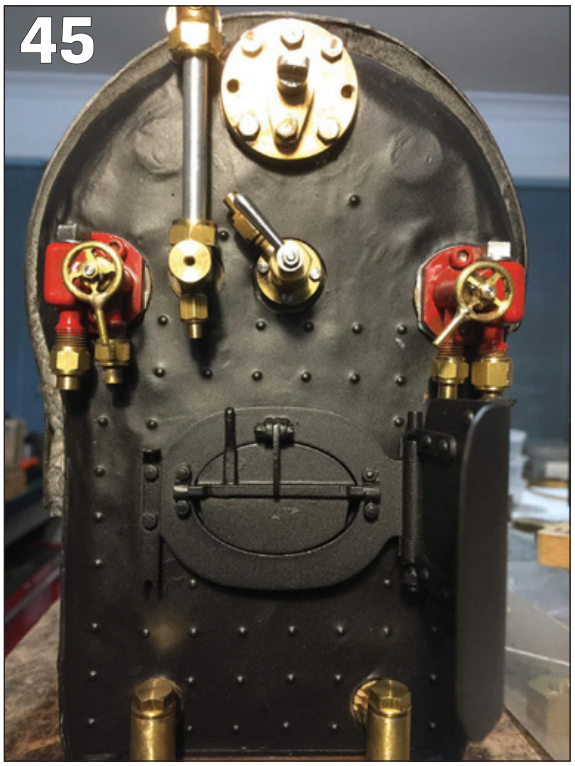
PHOTO 42: Original design of commercially manufactured exhaust manifold, which it was decided to replace

PHOTO 43-44: Side and above views of replacement exhaust manifold which redirects the blast – bending the sharp radii on the large copper pipes was a challenge.

PHOTO 45: Backhead complete with fittings attached. Appearance greatly improved by facing of thin sheet of copper with rivets impressed with a punch.

PHOTO 46: The chassis of the Stirling Single, all ready to receive its boiler.

PHOTO 47: Tight dimensions meant that applying cladding or lagging to much of the boiler was out of the question.



shoe adheres to the port face. It uncovers the port to the header by degrees with a fore-and-aft movement. When the Stirling was complete I drove a few laps of our track before dismantling it for painting and the regulator works beautifully – smooth and progressive, and it doesn't leak!

Photo 41 shows the regulator bush in the smokebox tubeplate, with its cavity to accommodate the sliding shoe. With Mike's permission, I am also able to show a draft of his regulator and steam pickup design (Figure 1).

Having a blast

Photo 42 shows the cast bronze exhaust manifold as received from Reeves, with blast nozzle and fittings. I'm sure it would work to some extent, but I wondered how efficient it would be with each exhaust pipe blasting directly into the other at the manifold. Mike surmised that it would be more efficient to direct each exhaust pipe upwards towards the blast nozzle as it came beneath the centre line.

Photo 43-44 show Mike's remodelled blastpipe arrangement. It was an extremely difficult task to bend these relatively large copper pipes within such short distances, a task beyond my arthritic fingers, but I am convinced it will be more efficient.

Before installing the unit in the locomotive, I held one exhaust under the water tap. Virtually all the water was redirected out through the blast nozzle, only a few drops emanating from the opposite exhaust pipe.

To return to the rear of the boiler, Photo 45 shows a view of the backhead, clad in a thin sheet of copper, with rivet impressions produced with a punch. Both the outer and inner ovals of the fire door were water-cut.

I later removed the heat shield that is hinged to and sitting to the right of the door, because it kept getting in the way when I was driving and blocked access to the right-hand oil box of the rear axle.

Photo 46 gives a final view of progress before fitting the boiler and Photo 47 shows just how little of the boiler could be clad, let alone lagged. There is virtually no clearance behind the driving wheel rims and the boiler. I let the rear sandboxes cover the boiler at the rear, which also gave me more clearance for the reach rod. EIM

"I drove a few laps of our track before dismantling the loco for painting and the regulator works beautifully – smooth and progressive, and it doesn't leak..."

■ Next month Bruce moves onto the platework and tender.

Parts 1-3 of this series appeared in the July to September 2022 editions of EIM – digital back issues can be downloaded or printed copies ordered from www.world-of-railways.co.uk/store/back-issues/engineering-in-miniature or by calling 01778 392484.

Maintenance and (yet) more woes of Yeo...

Harry thought that in the peak holiday month of August he would spend much more time on a Fairbourne Railway footplate than in the workshop – how wrong he was...

BY **HARRY BILLMORE**

Once more the last month on the Fairbourne Railway has been much more about the operation of the line as opposed to engineering, as one might expect in the peak season of August. Though operating the railway does create some interesting engineering problems in itself!

Before we get onto these though, the Simplex that I described re-gauging in the September EIM had a series of gauging trials and then load testing. It performed extremely well with all of these, careful measuring meaning that even the tightest loading gauge didn't cause any problems.

Unfortunately however the trials did uncover an issue with the loco's wheel profiles, I had hoped to leave them as they were but certain sections of the main station pointwork are ⅛-inch under gauge, specifically the dual-gauge stub point we have near the station throat. This causes the loco to start climbing up out of the track in the inner edge of the flange which is somewhat unnerving.

Due to this I am dropping the wheelsets back out and borrowing the big lathe at the Kirklees Light Railway, which has a hydraulic copier on it, to machine them to the standard Fairbourne Miniature Railway profile.

While I have spent a lot of time this month shunting stock in the mornings, opening up, pointing passengers in the right direction, fitting automatic toilet flushers and other wildly glamorous jobs to keep the railway ticking over smoothly, there have been a few volunteers in working on progressing the overhaul of our 6-inch scale North Wales Narrow Gauge Railway 0-6-4T 'Beddgelert'. This has mainly been focused on the extraction of the wheel sets and rear bogie, which necessitated the removal of the brake gear and coupling rods.

Not at all accessible

The rear bogie it turned out did not release itself from the large nut placed in the bottom of the driver's footwell, and due to the lack of access underneath the bogie, the entirety of the driver's footwell had to be unbolted to in order to extract the bogie. This will provide an interesting challenge to another of our volunteers who has offered to overhaul the bogie in its entirety.

The brake gear provided a further bit of interest as the design sees the pull rods split and go down either side of each wheel before coming back together and acting on the brake hangers. One set of these hangers were hung on very stiff bearings from the weigh shaft which seemed to apply the brakes when you put the locomotive into full gear...

Of course the bolts holding all of this together were not accessible by

PHOTO 1: Checking the clearances on the railway's newly acquired Simplex loco.

PHOTO 2: Tightest spot on the line, entry to the carriage shed – a good 1.5 inches of clearance from the front column.

PHOTO 3: Volunteer Jack working on removing the wheels from Beddgelert.

All photos by the author

PHOTO 4: By the end of the day the frames were sat up on accommodation bogies with all of the wheels out.

PHOTO 5: Whoops – the broken spring on 'Yeo'.

PHOTO 6: The spring hanger pins are accessed through a special cut out in the tank sides, but with the grease nipple in place you cannot take out the pins with the tanks on.

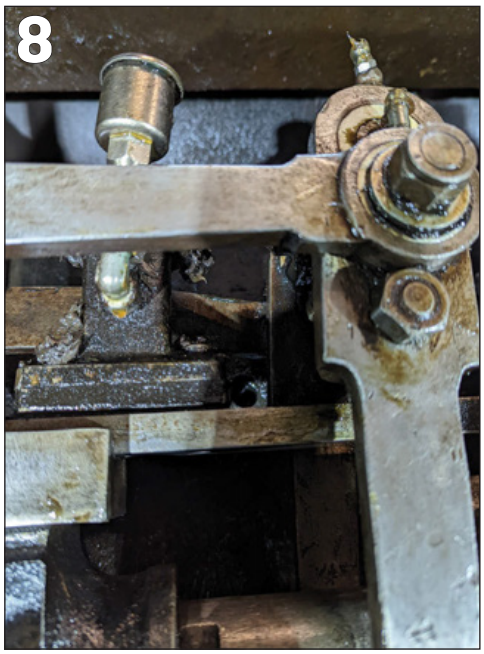
PHOTO 7: The broken brake block hanger on Yeo – the partially removed hanger pin at the top is fouling on the front pony truck pivot.

PHOTO 8: The hole in the frames needing enlarging is hidden right at the back of the valve gear, if you are extremely careful, you can just get everything lined up to get access.

one person, so it required two of us to strip the brake gear off. I think I will modify this system when it goes back together but it will require some thought due to the tight space it all has to occupy.

As we lifted the frames from the wheel sets, there was a lovely tinkling sound as a variety of brass shims fell out from what seemed to be every horn face, so presumably there had been some issues with the fit between the horns and the axleboxes. This is critical on an engine fitted with roller bearings in the coupling rods such as Beddgelert, as any slight misalignment will terminally affect the bearings.

The next thing to do now the wheel sets are out is to remove the eccentrics and clean the paint from all of the welds between axle and wheels before getting them Magnetic Particle Inspection (MPI) tested to check for any microscopic cracks that might be present, and then work out how to inspect the axlebox bearings.



Unfortunately work on Beddgelert then had to stop as our Lynton and Barnstaple Manning Wardle 2-6-2T 'Yeo' was reported to have a broken spring, half of which had been found at the side of the track. Our Welsh Highland Railway-style 2-6-4T 'Russell' was lit up quickly while our ailing diesel 'Gwril' took a shortened set to keep the service running until Russell could take over for the final two services of the day.

On close inspection, the spring that had broken was that on the rear right driven axle – this is of course the most difficult spring to access, requiring the rear axle to be dropped out two inches to even see the springs over the wheel. Then the wheel set needs to be dropped a further four inches to actually be able to reach in and change the spring.

I only discovered this, however, after spending a fruitless couple of hours trying to remove the spring carrier retaining pins – these have been modified at some point in the past to have grease nipples fitted which then means that the pins do not come out of their sockets into the slots cut into the inside bottom edge of the locomotive's tanks. You also cannot actually get a grease gun onto them due to that cut out. I suspect that the pins were fitted before the tanks and boiler were fitted.

Braking point

Once I had discovered the necessity of dropping the wheel set, I then had to strip off the connecting rods and return cranks and then I could access the knuckle joint to remove the rear rod. I then had to disassemble the brake gear which led to another delightful discovery: the right-hand side leading brake hanger had broken.

Having dropped the wheel set out it was a relatively quick job to replace the spring and inspect the others on ▶

PHOTO 9: The offending hanger with its spacer – Harry had to cut the pin with a gas axe to get it and the brake block off.

PHOTO 10: Checking the other hangers – none had as little material on the front edge of the pin hole.

PHOTO 11: The initial hint at the problem with the weed killing pump engine.

PHOTO 12: Surprisingly little damage to the piston from the valve falling out!

PHOTO 13: The weigh shaft to lifting link crank on 'Sherpa', now secured by a grub screw key.

the axle for any cracks. What followed was a lesson in patience and creative swearing, in total it took me a little over 12 work hours to remove the six brake blocks, inspect the hangers and remove the broken one.

You cannot swing...

The difficulty was due to the access arrangements for the brake block pins, combined with the pins themselves being tapered with the bigger diameter towards the tail end of the pin which were an interference fit with the hangers. So the pin would come out of the brake block, then wedge itself firmly in the hanger in a place that I could not swing a hammer or get a drift in to punch it out, or have enough space to lever the head of the pin out either... Perseverance, lubrication and some very small taps with the little space I had to swing a hammer eventually yielded the results.

The pins were then machined back parallel with a sensible amount of play for the brake gear before being refitted in the crack-checked hangers.

The broken hanger needed removing and replacing. This proved to be a difficult task, the hanger being welded to a tube spacer piece to hold it at the correct distance from the inner edge of the frame and a shouldered pin passing through an angle bracket bolted to the frame stretcher, then through the hanger before the shoulder buts up against the frame and a nut is wound on from outside the frame to hold it in place.

This arrangement would have worked fine except that the nut was behind the inner set of the combination lever and once I had got the nut off, the pin then fouled the pivot for the front pony truck.

I ended up using the oxy-acetelyne torch to cut the pin, after I had pulled it out as far as possible. This then allowed me to drop out the old hanger. I then moved the valve gear around and used the radius rod that had been

taken off the return crank to over travel the valve gear and allow me access to drill out the hole in the frames to take a new pin.

This was fitted with a new spacer and a new hanger with more material where the old one had failed. With that done the brake gear could be re-assembled and readjusted and the loco put back into traffic.

Seize the chance

When I had finished the work on Yeo, I had a couple of hours spare before needing to shunt the stock at the end of the day so I took the opportunity to investigate the seized engine from our weed-killer wagon.

The problem turned out to be a dropped valve which had bent its push rod and put a mark in the top of the cylinder. This engine is a little over 15 years old and the bore is very worn so it made sense to simply replace it, so we now have a new one on order.

I then turned my attention to 'Sherpa', our Darjeeling Himalayan Railway 0-4-0ST, which required a washout and a bit of attention to its valve gear and safety valves. The washout was done with little fuss, a day's worth of work including changing the safety valve springs for new ones and the job was completed.

PHOTO 14: An 8mm spacer under the right-hand weigh shaft bearing allowed equal valve events from side to side.

PHOTO 15: Die block now sitting in the centre of the pivot of the expansion link on both sides.

PHOTO 16: Left-hand weigh shaft bearing with no shim, note new grub screw keyway plus previous attempts at securing the crank, taper pins and grub screws.

PHOTO 17: New safety valves fitted to 'Russell' at its washout.

The valve gear on the other hand proved much more interesting – the weigh shaft had been held in place with its cranks using a series of taper pins, but these had worn over time in the cranks allowing them to rotate around the weigh shaft.

I could have reamed the holes out a load more and fitted bigger taper pins, however the problem would just have happened again over time so instead I drilled and tapped an M6 hole using a number 2 tap so the thread in the bottom of the hole gets tighter, then drove a grub screw tight into the hole. This forces the crank against the weigh shaft tightly and acts like a keyway.

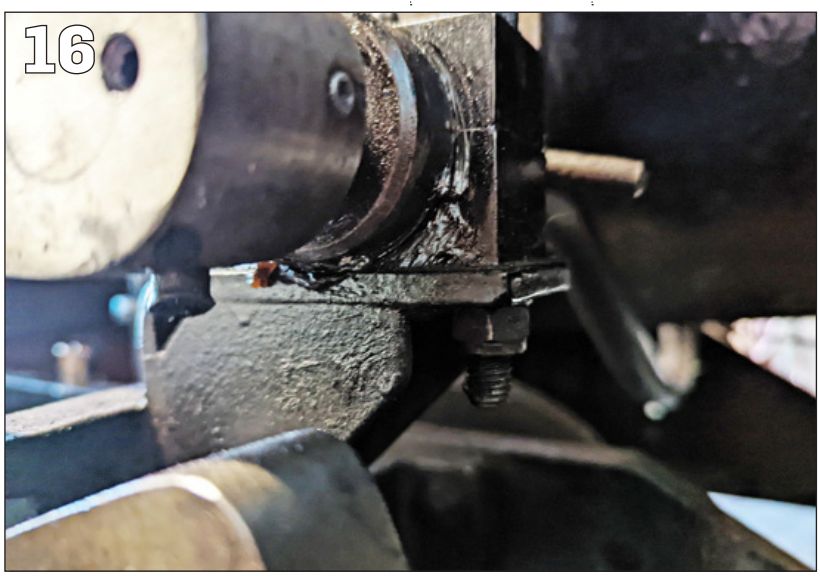
Once this was done I could then accurately measure the positions of the die blocks on either side – this showed there was an 8mm difference in position. This meant that when set in mid gear, the left-hand side was indeed in mid gear but the right-hand was slightly in forward.

An 8mm shim under the weigh shaft bearing corrected this error and now that the valves were in the correct position I reset them. This has evened out the valve events considerably and means that you can notch up the valve gear almost to mid gear in both directions depending on the load you are pulling.

The final job for the month was a washout on Russell and fitting new off-the-shelf Bailey safety valves to replace the old, very tired and leaky Nabic valves that were on the loco before. These two jobs proved very satisfying after the troubles with just about everything else this month! EIM

■ Ever fancied working on 6-inch scale locomotives? The Fairbourne Railway is always keen to welcome new volunteers, particularly those with engineering skills – mind you the Ed's done it and enjoyed it and he doesn't have very many engineering skills!

Meanwhile the railway is running an appeal to help fund the restoration of Beddgelert, with the latest stage focusing on the retubing of the boiler. Around £40 buys each new tube required but any donation to the fund will be welcome – more details are at http://www.fairbournerailway.com



Farewell - for a while...

Regular contributor Jan-Eric recalls his achievements in the hobby before taking a break.

BY **JAN-ERIC NYSTRÖM**

The very first article I wrote for this magazine was published in January 2015. The following article series, starting in November that year, described my entry into the Live Steam hobby which had actually started in September 2000, with the building of a simple 4-4-0 'American' engine, completed in 724 days.

During these years, I've had the privilege of sharing my experiences with you readers, 'successes as well as mishaps', as I once described my hobby. Due to the fact that I've had very little free time to pursue the hobby during the past two or three years, what with the health issues mentioned last time (I'm already 71 as you read this!), having other simultaneous hobby projects, and, to boot, catching Covid in April this year, I've really had too little time to get very far with the final steps of building the traction engine.

Thus, as I have not yet done all the remaining cosmetic work, I'll return when it is finished so far that I can take some nice photos. I feel that continuing the build description in every issue until then would lead to too much repetition (there has been some already, as you may have noticed), so I'd better stop my monthly ramblings here and now... for a while.

Nevertheless, I hope you will allow me in this issue to present a short, and very 'egocentric' trip into the past, showing the catalysts and inspirations for my entire hobby; a little photo essay highlighting what many other live steamers may have experienced, giving them the impetus to start and continue a hobby that often consumes a lot of time and possibly also money, at least for the tools involved – lathe, mill, welder and such.

Material gain

Materials can be scrounged, bought as scrap, rescued from recycling, even obtained for free – 'sponsoring', as an engineering company owner said when donating a hefty amount of bronze and brass offcuts... That's why my ten-wheeler steam loco cost me less than £2,000 to build – of course not counting the tools already in the workshop!

Having been a regular contributor to EIM for more than seven years, I have had e-mail and 'snail-mail' contact with many readers, while a few fellow live steamers have even come all the way up here, into the far north European corner (a visitor once told me we apparently only have two seasons here in Finland; a white winter, and a green winter...)

I would still like to stay in contact with you, so if you have any questions, or, especially, if some of you have built something inspired by my articles, I'd love to hear from you. My e-mail is easy to remember: steam@sci.fi – it is a fortunate coincidence that two of my interests are combined in my e-mail address! You can also view my old webpages (not updated since 2007) at http://tinyurl.com/animatosteam, or watch some of my YouTube videos at https://tinyurl.com/JEsteam

Now, with a pick of pictures from my many photo albums (old-fashioned albums are a tradition I maintain, despite the fact that we now live in the 'digital age'), starting with the very first album, which was compiled by my father in the early 1950s, I wish you Many Happy Steam-ups and bid you all a fond farewell – for now!

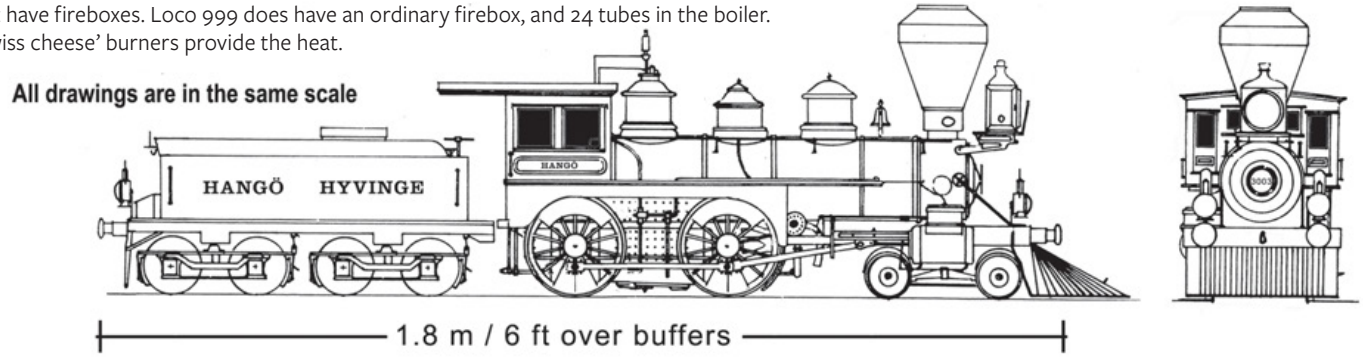
PHOTO 1: You've got to start young in order to become a steam loco engineer! Here I am barely three years old, running my very first 'train' in the bedroom – note that I have three cars coupled after the engine, and also a lot of passengers; in fact, virtually all of my belongings. There appears to have been a railroad accident recently, a decapitated pig and some debris can be seen lying under the train...

PHOTO 2: Aged five, I received my first 'real' train for Christmas. The bright-red engine had a wind-up mechanism, a tin-plate circle of track, a red tender and a green passenger car. Here, in 1956, I am already running my train around the world! Other educational toys are also visible including one of the then ubiquitous British Meccano construction sets – I've already built a little crane, seen at right on top of my major Xmas gift: a steerable sled! I was a lucky child; in the 1950s, Finland was still recovering from two devastating wars against the Soviet Union during WWII, so foreign-made toys were quite expensive, when obtainable at all.

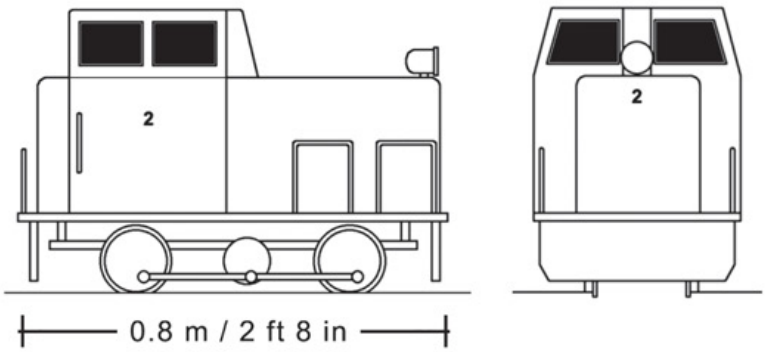
PHOTO 3: Five years later, another Xmas train: a mishmash of new rolling stock by British Tri-ang (later re-branded as Hornby) and secondhand Italian Rivarossi (acquired by Hornby in 2004), all running on standard HO track. I still have the complete Tri-ang set in its original factory box! Though it is a British set, the rolling stock is typically American; especially the caboose.

During the following couple of years, I built a modest, U-shaped point-to-point layout on a shelf my father had put up around the walls of my room. I built several houses from plastic kits and cardboard ones of my own design and installed 'grain-of-wheat' electric bulbs in them all. Soon, however, other hobbies took over: magic tricks, chemistry, electronics, photography, 8 and 16mm movies and finally animation – the latter becoming my profession for almost 40 years. ▶

■ During my 22 years in the hobby so far, I have built five iron horses – three of them steamers and two 'diesel-outline' running on battery power. The drawing shows the order they were built, and in the same scale. Number 2, 'Quickie', is a product of my own imagination but all the others are based on prototypes that have run on Finnish rails over the years. All the steamers are propane-fired, No.3003 has three 2-inch diameter flues in the boiler, while 666 has two larger ones, 3-inch in diameter. The burners blow their flames into the flues; these locos do not have fireboxes. Loco 999 does have an ordinary firebox, and 24 tubes in the boiler. Six 'Swiss cheese' burners provide the heat.

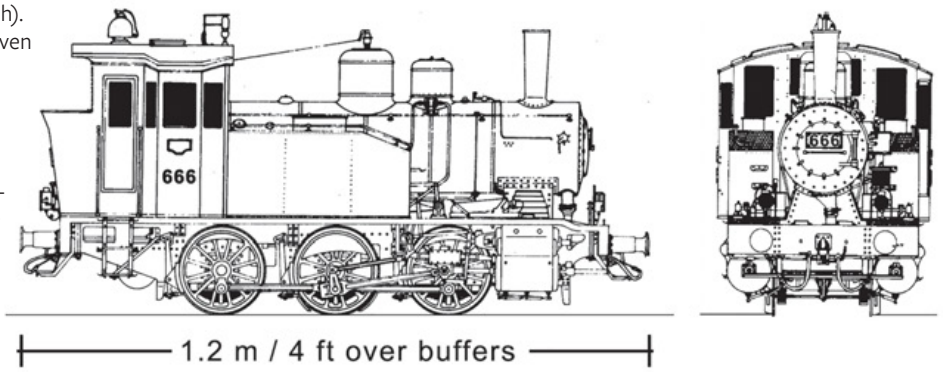


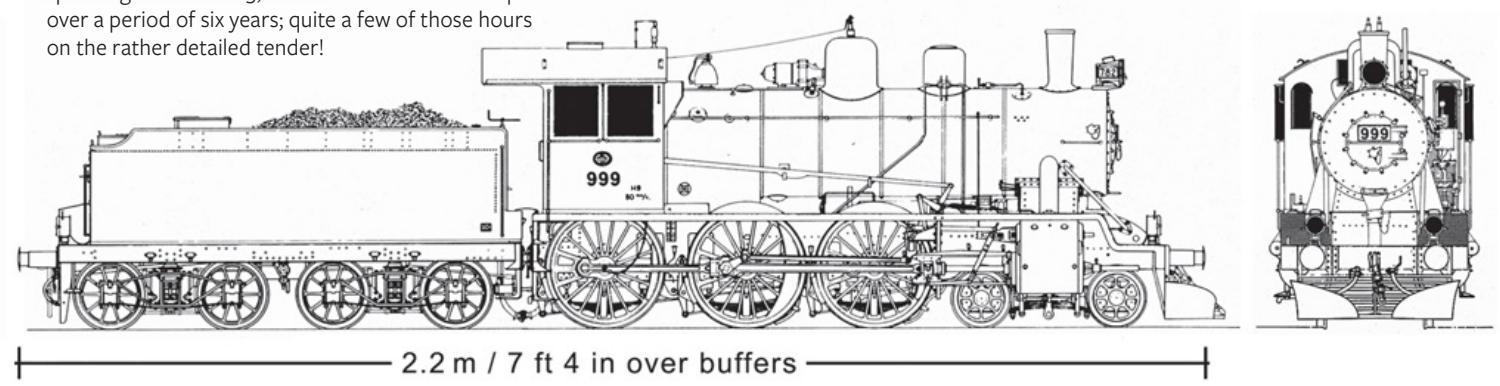
ABOVE: The Baldwin 3003 was my first foray into live steam, featured in EIM November 2015 to January 2016. I started building it in September 2000, and it was ready for its first steaming in the summer of 2002. It took some 1,500 hours altogether to construct; everything is built from scratch, even the patterns for the cast-iron wheels had to be fabricated according to prototype.



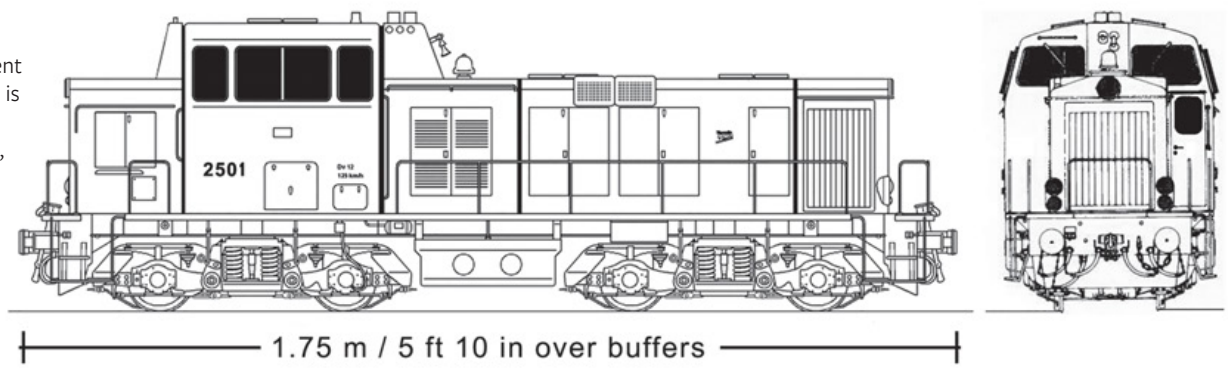
RIGHT: 'Quickie', my second engine (EIM Sep - Nov 2016), got its name because I spent only 48 hours in the workshop building it! From conception to first test on rails took about a month – but it shows; it is only a 'plywood box on wheels'. The motor was originally a windshield wiper motor from a bus and runs on 24 volts – two car batteries provide the power. The loco got a new motor and a radio-controlled electronic drive in 2013. The maximum attainable speed can now be adjusted in the cab (between 0 and 10 mph). At a low speed setting it is safe to let children ride it, even operating the remote all by themselves.

RIGHT & BELOW: The 'Chicken', No.666 (EIM May - Aug 2016) and the 'Ten-wheeler', No.999 (EIM Feb 2020- May 2021) were both built using laser and water-jet cut parts. Scanning prototype drawings into a CAD program enabled me to design these engines almost like three-dimensional jigsaw puzzles – tab-and-hole fitting of the parts speeded up assembly. #666 only took about 750 hours during ten months to build. I worked more leisurely on the more detailed #999, spending a little over 3,000 hours in the workshop over a period of six years; quite a few of those hours on the rather detailed tender!





RIGHT: The most recent completed loco project is the #2501 Dv12-type battery-powered diesel, described in EIM June - Oct. 2019. This project took me around 400 workshop hours over a period of four and a half months to complete.



18+

WHAT IS AVAXHOME?

PHOTO 4: My railroading hobby was re-invigorated in 1985 during a temporary lull in animation work; in just over two months, I built the pictured layout in Z-scale (1:220, the smallest commercially available at that time), cramming almost 30 ft of 6.5 mm (¼-inch) gauge track into a space of 2.8 feet square. This is in fact my living room coffee table – the trains, landscape and buildings are normally protected by a 5/16-inch thick plate glass tabletop resting on acrylic edges enclosing the layout. The almost 100 trees were painstakingly hand-made from copper wire and coloured sawdust held together with glue.

In 1985, I had the honour of demonstrating this layout to the Disney animator and live-steam veteran Ollie Johnston (1912-2008) when he visited Helsinki; he was fascinated by the tiny engines which, even though they weigh only a little over one ounce apiece, are still able to pull several wagons.

PHOTO 5: A visit to Ollie Johnston's backyard railroad in the USA in 1993 kindled my interest in outdoor railroading. Here I am running Ollie's 1-inch scale 'battery diesel' during an unforgettable outing at his track in Flintridge, CA (this can be seen on video at http://tinyurl.com/Olliestrack) – then and there, I decided I wanted a backyard railroad!

Ollie also had two 1-inch scale steamers, a Pacific 4-6-2 (built by Lawrence Hiney), and an intricate 3-cylinder Shay logging engine, mostly home-built. These engines are now owned by his sons. His full-size, 3ft gauge Porter 0-4-0 steam engine, 'Marie E.' painstakingly restored in the 1960s, was in 2002 sold to animation producer John Lasseter. A surprise was arranged for Ollie in 2005, when Marie E. was trucked to Disneyland, and was run on the track circling the park (http://tinyurl.com/OlliesPorter)

PHOTO 6: This 4-4-0 is modelled after a Baldwin built in 1872. Nine such engines were imported to Finland to the very first private railroad company in our country, where the government had begun its own operation in 1862. The model took me 724 days to build, and was my first live-steam endeavour.

This is also my favourite photo! Everything is perfect: the lighting, the exposure, the sun in the steam, the impression of speed, and last but not least, the expression on the faces of the neighbour's grandchildren – it truly is live steam at its best! *Photo by Thomas Westerholm*

PHOTO 7: Something just for the children – 'Quickie', a battery engine built in 48 workshop hours, the picture taken after some of its later modifications. This engine has accumulated the most mileage of all the engines run on my own 350ft-plus home track; it has been driven for hours on end by friends' and neighbours' children – and yes, by many adults, too!

Two car batteries provide power for at least 10, maybe even 15 hours of running. It is of course advisable to charge the batteries more often than that, especially if they are not of the 'deep discharge' type.

PHOTO 8: In total mileage, on all tracks, my 0-6-0 'Chicken' no. 666 still holds the record. Thanks to laser and water-jet cutting of the steel, it was built in less than a year. This loco has participated in all public run days at the Finnish Railway museum ever since it was completed in 2004, pulling up to 500 passengers per day on the museum's 1,000ft-plus track – which has over 4 per cent grades in the 45-ft radius curves! Thanks to the modern materials used in construction (such as Viton and Teflon) it has been virtually maintenance-free, except for a couple of O-rings, some flaking paint – and a lot of dirt and gunk in the motion...

PHOTO 9: The newest addition to my steam-horse stable, the 4-6-0 ten-wheeler no. 999, is named 'Heikki' after the full-size prototype. It was built over a six-year period and completed in 2012. The convertible wooden coaches, hiding benches under their 'hoods', were described in EIM between Dec 2016 and Feb 2017.

This photo is from the first inaugural test run at the museum; some teething problems in the loco still had to be addressed. But that's a part of what makes this hobby so interesting; you get to test your own designs and builds, and modify and rectify whenever necessary. If there were no problems, you would never have any reason to go back to the workshop!

PHOTO 10: The Dv12 battery diesel, completed in time for the summer season of 2013, and also described in previous issues, has quite some pulling power, thanks to its two hefty 24-volt motors, totalling almost one and a quarter horsepower, and also due to its high tractive weight (the total mass of almost 500lbs includes four full-size car batteries and 160 lbs of lead in its 'belly tank'). This engine is now permanently stationed at the Finnish Railway Museum, and, weather permitting, runs daily during the summer months.

PHOTO 11: My small-scale train layout (HO, 1:87, expanded over the years) on display this year during the 'mini-train meet' at the Finnish Railway museum (held every year except for 2020-2021 due to Covid). The layout is 3.3 feet wide and 30 feet long. There are 24 'interactive' functions that the visitors can start by themselves; children especially like the funfair, the self-driving automobiles (trackless 'Faller Car-system'), the police siren, and the 'live steam' mini-train (Z-scale, 1:220) circling around a playground with four carousels. All these are actuated by pushing buttons on the front edge of the layout.

PHOTO 12: A test run of my still unfinished traction engine, the building of which I've described in recent issues of EIM. It still needs a lot of mostly cosmetic work before it is completed, but here I'm taking our neighbour's grandchildren on a trip around the yard - they clearly enjoy the ride!

PHOTO 13: With this photo of antique steam whistles, taken many years ago at a steam festival – and admittedly, slightly animated' by yours truly – I toot you all a fond farewell (for now...) Keep the steam pressure up, but don't ever forget: Safety First!

A two-stroke petrol engine from diesel components

Patrick tries out a "will-it or won't it" project with a pair of model aero engines, and experiences several trials and tribulations... Does he succeed?

BY **PATRICK CUBBON**

This article describes the construction of a 1.4cc two-stroke petrol engine utilising Milford Mite model aircraft diesel engine components, combining these with parts from a second engine both owned since the late 1950s. Selected parts are shown in **Photo 1**.

The result of this project is shown nearing completion in **Photo 2**. 'Mite' is stamped on the cylinder block flange, a Hall Effect sensor is in place.

The Milford Mite is described by model engine expert Adrian Duncan in great detail on the internet (www.modelenginenews.org/ad/m_mite.html) and seems to have been judged as England's worst-ever of its type. Its capacity is 1.409cc with a bore diameter of 15⁄32 inches and a stroke of ½-inch. The project incorporates the Milford cylinder block, cylinder, piston and cylinder head.

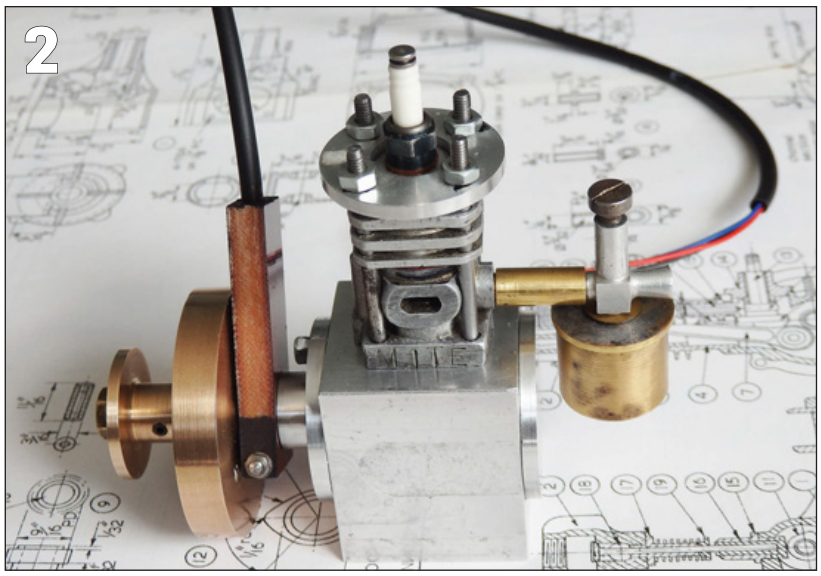
The crankshaft, con rod and carburettor come from the second engine with a stroke conveniently of ½-inch as with the Milford, and a capacity of 0.91cc, shown in **Photo 3**. This engine was the work of a family member and given to me at the time of a very brief spell with a control-line model aircraft. The aircraft, however, was fitted with an ED Bee engine and later sold.

Before commencing workshop activity the engine compression ratio, port timing, and component condition were to be considered in relation to the project's feasibility. The compression ratio was set at around 7:1. Port dimensions and position within the cylinder were measured then multiplied by four and transferred to a paperwork exercise.

The timing results, in crank degrees, were found to be broadly in line with published data for petrol engines, the results are shown in the table below.

The wear of cylinder bore, piston, big and little ends is significant to this build. The project was judged to be viable but also very much identified as a 'will it or won't it work' engine. Workshop activity was thus begun.


1


2

"After countless attempts the engine still refused to reward the builder by running..."

Construction

An aluminium block measuring 2½ x 2 x 1½ inches was cut by band saw from bar stock. Accuracy in marking out the cylinder and crank centre lines, to ensure intersection, and doe the crank pin to be central to the cylinder bore was essential.

The crankcase was through bored with additional material removed to accommodate the crankshaft ball race. Again the cylinder location height, above the crank centre line, was critical in relation to porting and events timing.

A trial assembly of the crankshaft, cylinder, piston and con rod, demonstrated that the ports were fully open for the exhaust at bottom dead-centre (BDC) and the inlet at top dead-centre (TDC).

Next the crankcase was drilled and tapped 6BA for clamping the

	Milford	E T Westbury
Power	TDC - 111 degrees	TDC - 115 degrees
Exhaust	111 - 249	115 - 245
Transfer	116 - 244	25 - 235
Compression	249 - TDC	245 - TDC
Induction	308 - 52 ATDC	310 - 50 ATDC
It is anticipated that exhaust ports will be fully open at BDC, and inlet at TDC		

Westbury engine figures taken from Model Petrol Engines *by Edgar T Westbury, published by Tee Publishing. Port timings page 75,*

cylinder head, cylinder, and the cylinder block with four studs.

A circular aluminium collar was machined to fit over the plug boss to increase assembly loading. The cylinder head top fin had collapsed below the securing holes – the collar will improve cooling and adds to the aesthetics of the model. A further consideration is that a petrol engine will run hotter than in diesel form.

The plug boss was re tapped to suit the spark plug thread of ¼ins X 32 TPI. Progess on the engine is shown in Photo 4, note the collar and the collapsed fin.

The aluminium crankcase front cover, which also acts as the crank support bearing, is attached by six 6BA cap crews. The cover boss was later reduced in length to ensure the flywheel butted up against a step in the crankshaft and not the cover.

A reduction in length of the hardened steel cylinder (a contra piston is not required) proved unexpectedly tricky. A tungsten-carbide tipped tool was necessary for this operation. Material was removed to give clearance between the piston crown and cylinder head at TDC. The aluminium cylinder block length was also shortened.

The partially built engine was then dismantled to allow further work on the crankcase. This involved milling the transfer passage and filing clearance slots to accommodate con rod motion.

A brass flywheel and separate cord starting pulley were joined using Loctite with the addition of two grub screws. The assembly was then mounted on a stub mandrel for final machining to give true running.

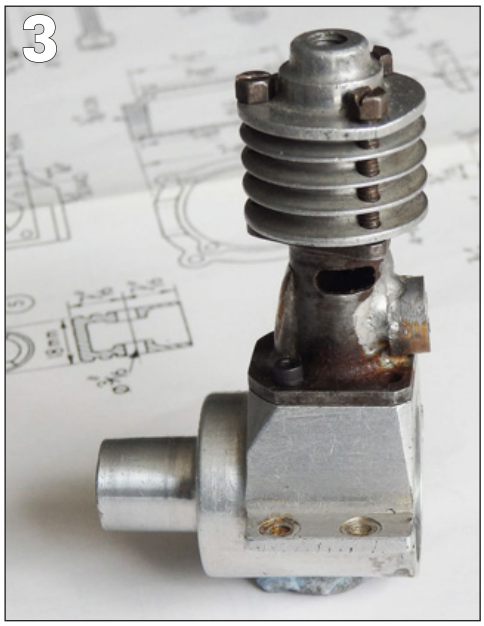
The rear cover plate extends into the crankcase to meet up with the end of the crank pin, thus ensuring minimum crankshaft end float. As the cover is not load-carrying, security is sufficient with three 6BA cap screws.

The ignition system components are supplied by Minimag. A 3mm earth magnet is held captive in the rear of the brass flywheel using Loctite. The Hall Effect sensor is positioned in a strip of Paxolin which in turn is clamped to the crank case front cover boss. Adjustments to ignition timing become a simple task.

A missing carburettor cover was replaced, and a brass extension added to avoid a crankcase foul.

The decision to use Granville Instant Gasket, to save having to make paper joints, was a mistake. It was found difficult to strip the engine and the compound does not like petrol. Subsequent rebuilds were with paper joints on the crank case covers.

At this late stage it was discovered that on clamping down the cylinder head on top of the cylinder and into the crankcase, there was a gap between the cylinder block and the head. The solution was to insert a length of flattened solder wire!



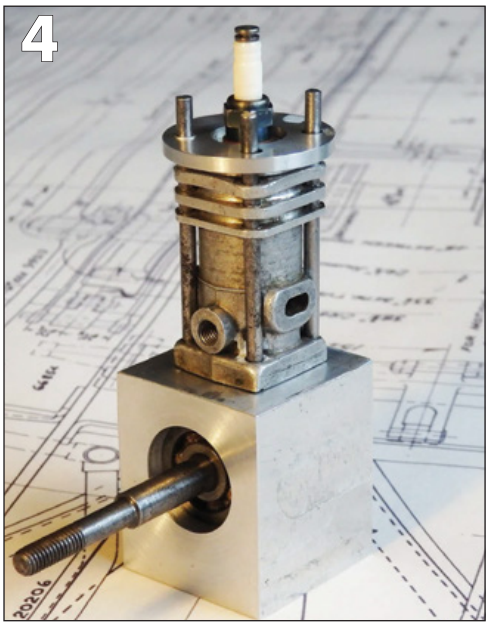


PHOTO 1: The various components at the project start.

PHOTO 2: The project engine nearing completion but retaining its original 'Mite' identification.

PHOTO 3: A second, smaller engine donated some parts to the project.

PHOTO 4: Progress on the build, note the collar and the collapsed cooling fin.

PHOTO 5: On the test bench and about to cause much head scratching...

Testing

The engine was ready for test after six months of hobby time and is shown in Photo 5 complete with electrics, a rather diminutive fuel tank, and pulley for cord starting.

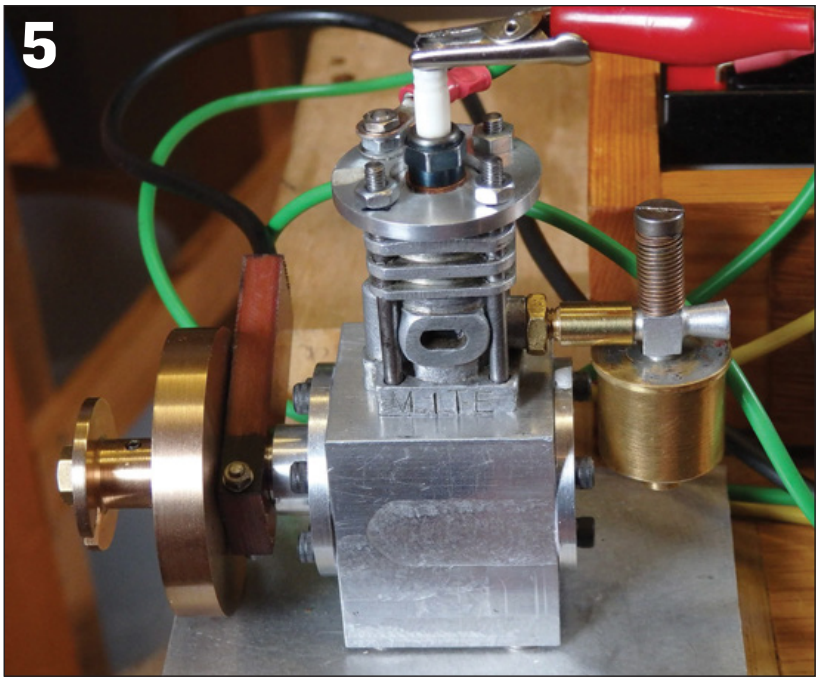
Testing commenced with a healthy ignition spark, and good suction at the carburettor entry – however compression was decidedly poor.

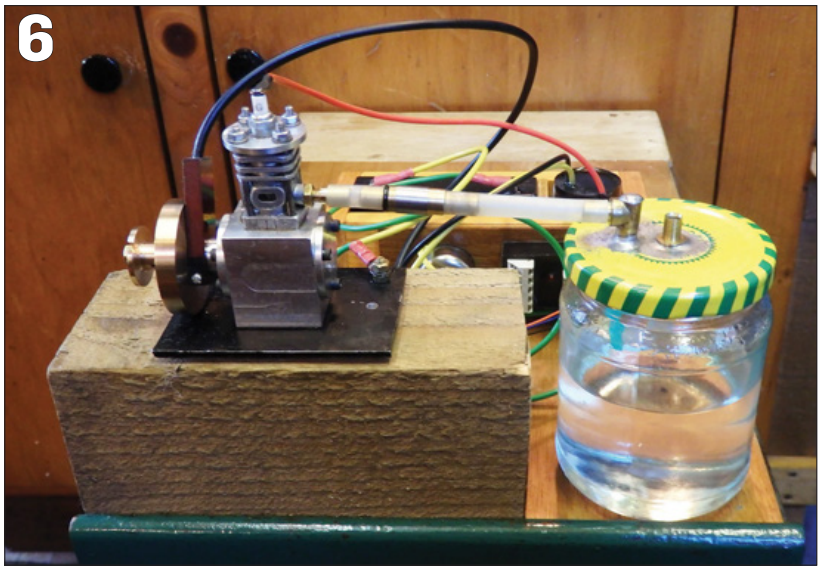
Next, the original Milford piston was replaced by a new piston machined from mild steel. In excess of 0.002ins reduction in piston to bore clearance was achieved by lapping. Brass buttons were added to the ends of the gudgeon pin.

At this point by chance it was discovered that the piston crown was contacting the spark plug boss, thus cutting off access to the combustion gas. To rectify this issue the boss was machined flush to the underside of the cylinder head.

Excessive clearance between the crankshaft and aluminium front cover was rectified by boring out the cover and pressing in a brass sleeve. The cover was immersed in boiling water before sleeve fitment.

Investigating lubrication as a means of raising compression was examined by putting drops of oil past the plug entrance, and by a 4:1 petrol oil mix as recommended on page 159 of *Model Petrol Engines* by Edgar T Westbury (published by TEE Publishing). This approach ended with too much oil on the cylinder bore surface and the spark plug oiling up as a result. Conversely, using too rich a fuel mixture washes the bore surface ▶





dry with loss of compression and unsatisfactory lubrication.

The compression pressure was still not good enough. But hidden from view, the engine assembly had created a gap between the cylinder rim and head and this explained the continuing low compression. To rectify this the following actions were taken;

1) Cylinder length reduced by 1/32-inch from rim
2) Solder wire removed from between cylinder block and head and replaced by a paper gasket
3) Annealed strand of copper wire, taken from a length of electric cable, inserted between cylinder and head
4) Paper joint placed between cylinder block and crankcase.

After all this was completed acceptable compression was achieved. I concluded no benefit would be gained by lapping the cylinder bore and matching with a new piston. However, silicon carbide powder, in grit sizes 360g and 600g, was purchased through Ebay for possible future usage.

The starting technique employed was 20 rapid spins of the engine through a string cord wrapped round the flywheel pulley. But after countless attempts the engine still refused to reward the builder by running.

After a pause for thought the following further modifications were deemed necessary:

1) Crank disc rubbing crankcase wall. The front cover was attached to the crankcase and gripped in the three-jaw chuck round its rim (this is preferable to using a four-jaw). The open end gave access to machine extra clearance for the crank disc.
2) The clamping screw for the Hall Effect sensor arm was changed from steel to brass as the head and nut lined up with the earth magnet located in the rear of the flywheel. The pull of the magnet was clearly noticeable on engine hand rotation.
3) Leakages were found (be means of the application of soapy water) around the plug boss, between the cylinder block and head and the cylinder block and crankcase. The plug boss was re-machined and the plug assembled with a new annealed copper washer.

The paper joint between head and block was changed back to solder wire. The required wire thickness was obtained by squeezing the wire in the milling machine vice to a feeler gauge setting. Clamping studs and nuts should apply equal loading at three key positions – cylinder rim to head, head to block, block to crankcase, but this is difficult to achieve in practice.

"The relationship between crank and piston movement must therefore be disruptive for the two-stroke cycle to function correctly..."

PHOTO 6: Trialling surface carburation, but all to no avail....

PHOTO 7: The engine joins a model engineering display, but being a non-worker, relegated to the back row!

Testing recommenced but again, disappointingly, the same result was a non-starting engine. Thinking that the original diesel carburettor might be to blame a switch to a surface method was tried, as shown in Photo 6 but to no avail.

A distinct ignition knock, around TDC, was investigated by lowering the compression ratio from around 7 to 5 and the engine was again tested but also with a specialist fuel, Optimix20.

Annoyingly the intensity of knock remained the same, and the knock was eventually found to be due to excessive wear between the crank pin and con rod.

Significant movement of the flywheel around TDC and BDC resulted in no movement of the piston. The relationship between crank and piston movement must therefore be disruptive for the two-stroke cycle to function correctly. This explains why the engine has so far failed to run.

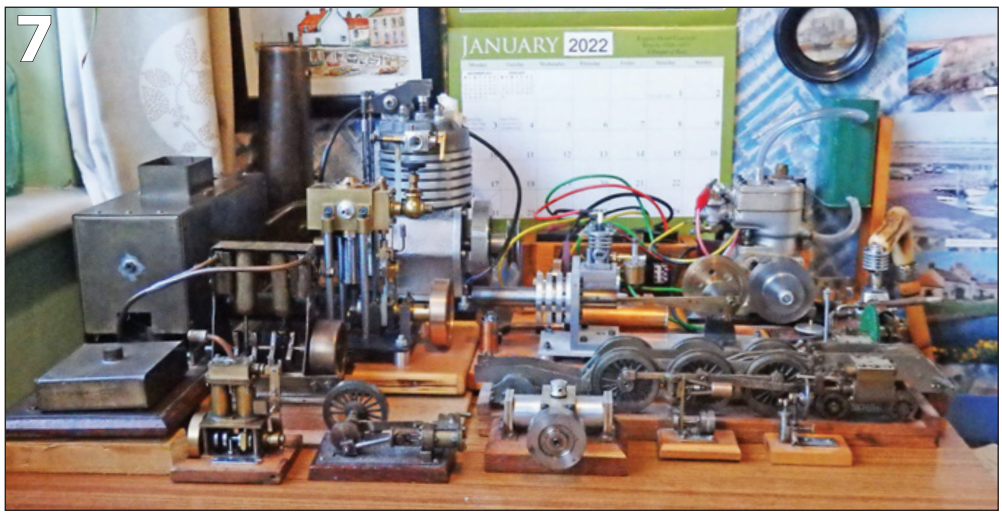
Summary

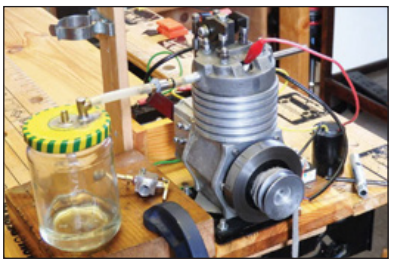
A two-stroke 1.4cc petrol engine, with spark ignition, has been constructed and tested utilising a mixture of diesel parts. Despite a great deal of effort the engine has refused to function. A new con rod and crank to eliminate excessive wear is required but perhaps for some future date?

The project has been most enjoyable and thought-provoking but was always seen as a "will it work?" exercise, given the parts to begin with.

The Milford engine now takes a position on the centre back row of my model engineering table-top display shown in Photo 7. EIM

■ Patrick adds that readers may recall his petrol engine article 'Not always a happy ending' in EIM Feb 2020, which as the title suggests also described a trying time of experimentation! He tells us the engine (pictured below) was revisited and coaxed into running after attention to leaky valves. Many thanks to him for his article on a subject we don't see enough of in EIM – even this ardent enthusiast knows model engineering isn't all about steam engines, so if you've created something interesting in the i/c line why not share it with fellow readers?





MIDLANDS MODEL ENGINEERING EXHIBITION

SHOW PREVIEW

THE SHOW FOR MODEL ENGINEERS

PREVIEW OF THE MIDLANDS MODEL ENGINEERING EXHIBITION 2022

We look forward to welcoming you to the 2022 Midlands Model Engineering Exhibition, sponsored by Engineering in Miniature – One of The Premier Modelling Events in the UK.

The Exhibition returns after a two-year absence caused by the COVID-19 pandemic and its reappearance gives visitors an opportunity to at last see not only their fellow enthusiast's models, but also a vast range of specialist suppliers – a pleasure denied to you by the absence of exhibitions during the pandemic.

The exhibition is gearing up to be yet another superb display of model engineering in all its fascinating variety. With hundreds of models of locomotives and rolling stock, traction, stationary and hot air engines, boats plus workshop equipment – virtually every interest is represented. We will have over a thousand models on display for your enjoyment on over 30 club and society stands as well as the competition and display classes.

We also have a full complement of specialist suppliers with nearly 40 companies represented so, in addition to viewing the model displays, you'll be able to purchase virtually anything you might need for your modelling activities.

We hope that you will join us and enjoy the exhibition, meet old friends and renew acquaintances.

THURSDAY 13th to SUNDAY 16th OCTOBER 2022

Thursday - Saturday: 10.00am-4.30pm
Sunday: 10.00am-4.00pm
Last admission 1 hour before closing

WARWICKSHIRE EVENT CENTRE

Meridienne Exhibitions LTD
@MeridienneEx

Sponsored by
THE MAGAZINE FOR MODEL ENGINEERS
ENGINEERING in Miniature

Presented by
Meridienne Exhibitions

www.midlandsmodelengineering.co.uk

SPECIALIST SUPPLIERS

ABBOTS MODEL ENGINEERING
Unit D7, Haybrook Industrial Estate, Halesfield 9. Telford, Shropshire, TF7 4QW
T: 01952 879607
E: peter@ametrains.co.uk
W: www.ametrains.co.uk
Home of battery electric locomotives, coaches & rolling stock.
Stand: 6

AEROSPACE SURPLUS TRADER
Engineering tools
Stand: 50+51

ALUTIGHT/PERMAGRIT
Tennisgatan 8, 27150, Ystad, Sweden.
E: alutighteurope@hotmail.com
Stand: 59

BB ENGINEERING SUPPLIES
VMB 18 Bretton Street Enterprise Centre, Dewsbury, W Yorks, WF12 9DB
T: 07976 539675
E: bbeng@btinternet.com
W: www.bbengineeringsupplies.co.uk
General engineering supplies and boxes.
Stands: S1+S2

BEUGLER PAINT PINSTRIPING TOOLS
P O Box 183, East Grinstead, West Sussex, RH19 1GJ
T: 01342 317363
E: info@beuglereurope.com
W: www.beuglereurope.com
Beugler paint pinstriping & lining tools & accessories (from USA).
Stand: S6

BLACKGATES ENGINEERING
Unit 1 Victory Court, Flagship Square, Shawcross Business Park, Dewsbury West Yorkshire, WF12 7TH
T: 01924 466000
E: sales@blackgates.co.uk
W: www.blackgates.co.uk
Model engineering products, drawings & castings.
Stands: 81+82

BRUSHES 4 MODELS
The Maltings, Carr Head Lane, Cowling, West Yorkshire, BD22 0LD
T: 07768 663358
E: brushes4models@gmail.com
Model makers brushes.
Stand: S8

CHILTERN MODEL STEAM ENGINES
6 The Pingle, Slitting Mill Rugeley, Staffs, WS15 2UR
T: 07941 800103
E: modelsteam@btinternet.com
W: www.chilternmodelsteam.co.uk
Fully machined model steam engine kits.
Stand: S5

CNC 4 YOU
18 Alston Drive, Bradwell Abbey, Milton Keynes, MK13 9HA
T: 01908 315011
E: sales@cnc4you.co.uk
W: www.cnc4you.co.uk
CNC machine parts and machines.
Stands: 64+65

COLLEGE ENGINEERING SUPPLY
Unit 1, Barnfield Industrial Estate, Speed Road, Tipton, West Midlands, DY4 9DY
T: 0121 530 3600
E: sales@collegeengineering.co.uk
W: www.collegeengineering.co.uk
Brass, steel, aluminum, cast iron, phosphor bronze, stainless steel.
Stand: 22

CUP ALLOYS (METAL JOINING)
154 Mandalay Road, Pleasley, Notts, NG19 7TJ
T: 01623 707955
E: sales@cupalloys.co.uk
W: www.cupalloys.co.uk
Brazing & soldering materials and ancillaries.
Stand: 2

ENGINEERS EMPORIUM/L. A. SERVICES
Bramcote Works, Bramcote, Warwickshire, CV11 6QL
T: 01455 220340
E: info@theengineersemporium.co.uk
W: www.theengineersemporium.com
Designers, manufacturers of live steam locomotives & kits, model petrol stationary engines, machined kits, castings & engineering services.
Stands: 58+61

GLOFORCE
81-83 Stokes Croft, Bristol, BS1 3RD
T: 03335 777505
E: enquires@gloforce.com
W: www.gloforce.com
Specialist LED lighting company .
Stand: 60

GS MODEL SUPPLIES & WESTERN STEAM
Unit 4A Westmans Industrial Estate, Love Lane, Burnham on Sea, Somerset, TA8 1EY
T: 01278 788007
E: westernsteamltd@gmail.com or info@gssmodelengineers.com
W: www.westernsteam.com or www.gssmodelengineers.com
Suppliers of model engineers materials and manufacture of copper boilers.
Stand: 87

HJH TOOLING
Unit R15 Marshall Way, Commerce Park, Frome, Somerset, BA11 2FE
T: 07785 717004
E: info@hjhtooling.co.uk
New & used engineering tools & equipment.
Stand: 56

HOME AND WORKSHOP MACHINERY
144 Maidstone Road, Foots Cray Sidcup, Kent, DA14 5HS
T: 020 8300 9070
E: sales@homeandworkshop.co.uk
W: www.homeandworkshop.co.uk
A selection of Myford lathes, milling machines & a wide selection of genuine lightly used machines, accessories, tools & measuring equipment.
Stands: 78+79

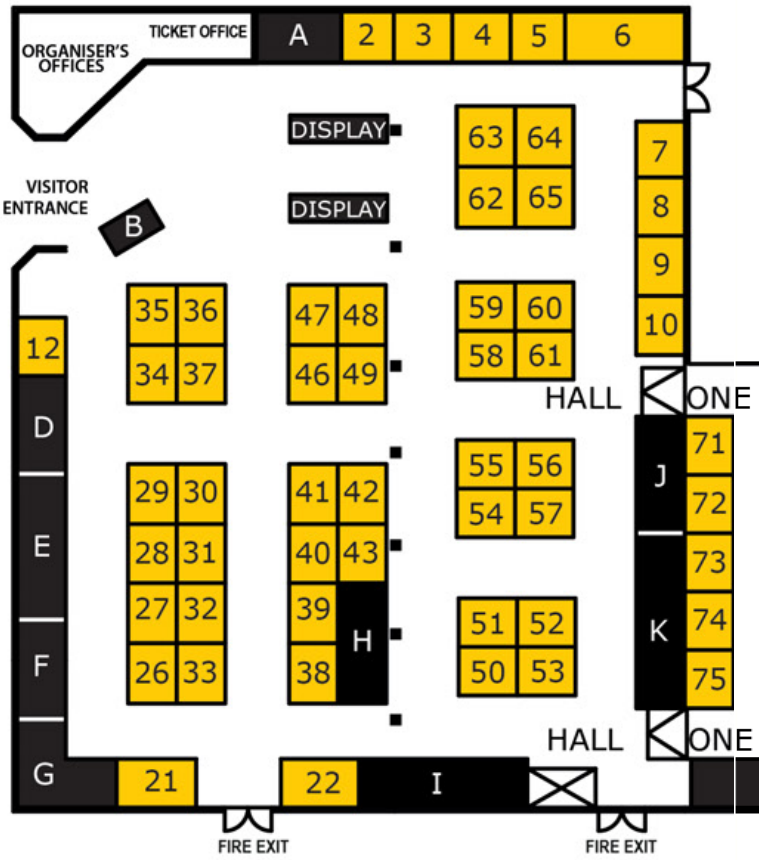
JB CUTTING TOOLS
8 Avon Close, Dronfield, Sheffield, S18 2FL
T: 07875 757523
E: Jenny.blackwell60@hotmail.com
Engineering cutting tools.
Stands: 42+43

JLD FITTINGS
Unit 1, Albion Drive, Thurnscoe, Rotherham, S63 0BA
T: 07917 793563
E: jldfittings@sky.com
W: www.jldfittings.com
Steam fittings for miniature steam engines.
Stand: 55

KEITH ROBINSON ENGINEERING TOOLS
52 Hopefield Avenue, Sheffield, S12 4XB
T: 0114 2651352
E: keithnmarian@hotmail.com
Engineering Tools.
Stand: 36

KONTAX ENGINEERING
Unit 6 Maidenhead Enterprise Centre, Cordwallis Street, Maidenhead, Berkshire, SL6 7BE
T: 01452 905001
E: kontax@stirlingengine.co.uk
W: www.stirlingengine.co.uk
Stirling and hot air engines.
Stand: 57

FLOOR PLAN



LARGE SCALE LOCOMOTIVES
12 Lake Road, Port Talbot, SA12 6AF
T: 07368 254382
E: contact@largescalelocomotives.co.uk
W: www.largescalelocomotives.co.uk
Locomotives, rolling stock, motors, controllers, loco design.
Stand: 71+72

LE TONKINOIS VARNISH (DA AND BE MURKIN)
81 Northumbria Road, Maidenhead, Berkshire, SL6 3DQ
T: 01628 548840
E: mail@letonkinoisvarnish.co.uk
W: www.letonkinoisvarnish.co.uk
UK main imports for Le Tonkinois varnish & flexidisc sander.
Stand: 52

LIVE STEAM MODELS
Unit 7, Old Hall Mills, Little Eaton, Derbyshire, DE21 5EJ
T: 01332 830811
E: info@livesteammodels.co.uk
W: www.livesteammodels.co.uk
Specialists for drawings, castings, machining and fittings inc. boiler fittings for a range of 3" – 6" traction engines.
Stand: 53

MACHINE DRO
Pindar Road, Hoddesdon,EN11 0BZ
T: 01992 455921
E: sales@machine-dro.co.uk
W: www.machine-dro.co.uk
Measuring tools, ultrasonic cleaners, cases, arts & crafts.
Stands: 76+77

MODEL ENGINEERS LASER
T: 07927 087 172
E: sales@modelengineerslaser.co.uk
W: www.modelengineerslaser.co.uk
Laser and water jet cut parts and kits for over 100 different locomotives, traction engines etc.
Stand: 80

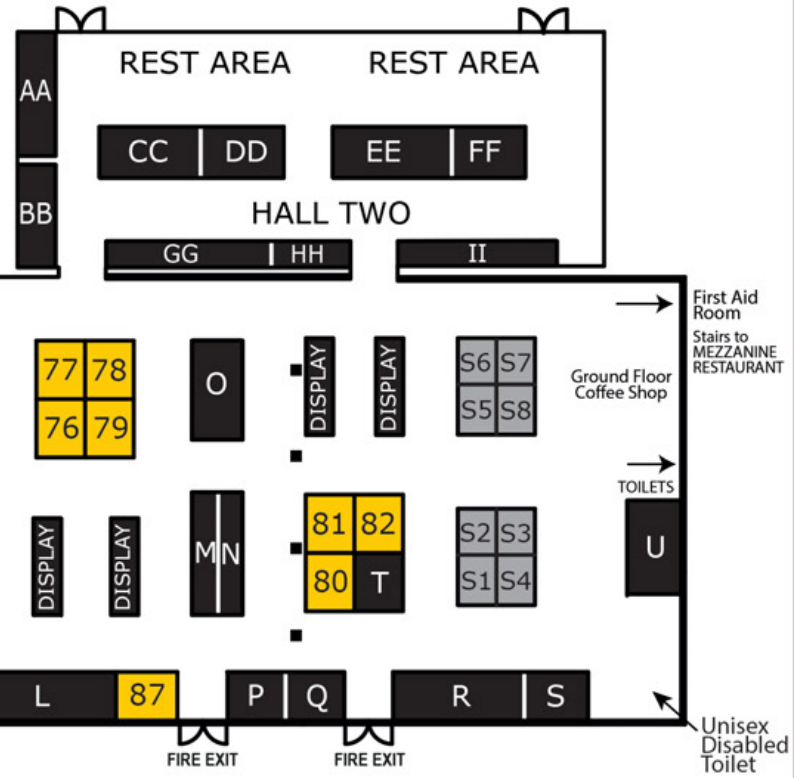
MYFORD
Unit 7-8 White Lee, Caldene Business Park, Mytholmroyd, West Yorkshire, HX7 5AD
T: 01422 885766
E: orders@myford.co.uk
W: www.myford.co.uk
Engineering lathes & tooling.
Stands: 34+37

NOGGIN END METALS
Ashdown, 10 Boon Hill Road, Bignall End, Stoke on Trent, ST7 8LA
T: 07375 958713
W: www.nogginend.com
Raw materials.
Stand: 63

PNP RAILWAYS
Unit S5 Inchbrook Trade Estate, Bath Road, Woodchester, Stroud, GL5 5EY
T: 01453 833388
E: enquiries@pnplastics.co.uk
W: www.pnp-railways.co.uk
Vacuum brakes, track work. Parts for rolling stock and locomotives.
Stand: 21

POLLY MODEL ENGINEERING
Atlas Mills, Birchwood Avenue, Long Eaton, Nottingham, NG10 3ND
T: 0115 9736700
E: sales@pollymodelengineering.co.uk
W: www.pollymodelengineering.co.uk
5" gauge Polly locomotive kits, stationary engine castings, steam fittings, books and practical scale range of drawings and castings.
Stands: 7-10

POWER CAPACITORS (TRANSWAVE)
30 Redfern Road, Tyseley, Birmingham, B11 2BH
T: 0121 7084522
E: transwave@powercapacitors.co.uk
W: www.transwave.co.uk
Operate three-phase machinery from your single-phase supply.
Stand: 41



PROXXON
Unit 10 Weycroft Avenue, Axminster, Devon, EX13 5PA
W: www.proxxon.com
Supplier of Proxxon Tools.
Stand: 38+39

RDG TOOLS
Unit 7-8 White Lee Caldene Business Park, Mytholmroyd, West Yorkshire, HX7 5AD
T: 01422 885069
E: orders@rdgtools.co.uk
W: www.rdgtools.co.uk
Quality engineering tools & supplies.
Stands: 26-33

SOLDERS & FLUXES
Unit 5, Severn Link Distribution Centre, Chepstow, Monmouthshire, NP16 6UN
T: 01291 624400
E: sales@soldersandfluxes.co.uk
W: www.soldersandfluxes.co.uk
Soldering materials & consumables including legacy products bakers soldering fluid, fluxite and easyflo.
Stand: S3

STUART MODELS
Grove Works. West Road, Bridport, Dorset, DT6 5JT
T: 01308 456859
E: sales@stuartmodels.com
W: www.stuartmodels.com
Model steam engines and accessories.
Stands: 46+47

TEE PUBLISHING
The Fosse, Fosse Way, Leamington Spa, Warks, CV31 1XN
T: 01926 614101
E: info@teepublishing.co.uk
W: www.teepublishing.co.uk
Leading specialist supplier and publisher of technical and modelling books for the model engineer and modeller worldwide for over 60 years.
Stands: 3-5

THE CRAFTLIGHT COMPANY
32 Gunton, Church Lane
Lowestoft, Suffolk, NR32 4LF
T: 01502 587598
E: info@craftlights.co.uk
W: www.craftlights.co.uk
Lamps magnifiers and worklamp.
Stand: S7

TRACY TOOLS
Unit 1 Parkfield Industrial Estate
Barton Hill Way, Torquay, Devon, TQ2 8JG
T: 01803 328603
E: info@tracytools.com
W: www.tracytools.com
Engineering cutting tools, taps & dies, reamers, endmills etc.
Stands: 73-75

TURBOTRADE UK
T: 07926 256551
E: turbotradeuk@gmail.com
Stainless steel nuts & bolts, engineering tools, abrasives, engineering tools.
Stand: 35

WALKER MIDGLEY INSURANCE BROKERS
Floor 5, Derwent House, 150 Arundel Gate, Sheffield, S1 2FN
T: 0114 2502770
E: enquiries@walkermidgley.co.uk
W: www.walkermidgley.co.uk
Insurance.
Stand: 12

CLUBS AND SOCIETIES

7¼" GAUGE SOCIETY
Stand: J
www.sevenandaquarter.org

10¼" GAUGE SOCIETY
Stand: B
www.tenquarter.org

BIRMINGHAM SOCIETY OF MODEL ENGINEERS
Stand: M
www.birminghamsme.com

BROMSGROVE SOCIETY OF MODEL ENGINEERS
Stand: U
www.bromsgrovesme.co.uk

CITY OF OXFORD SOCIETY OF MODEL ENGINEERS
Stand: D
www.cosme.org.uk

COVENTRY MODEL ENGINEERING SOCIETY
Stand: I
www.coventrymes.co.uk

EREWASH VALLEY MODEL ENGINEERING SOCIETY
Stand: II

FEDERATION OF MODEL ENGINEERS
Stand: T
www.fmes.org.uk

GAUGE 1 MODEL RAILWAY ASSOCIATION
Stand: A
www.g1mra.com

GAUGE 3 SOCIETY
Stand: DD
www.gauge3.org.uk

HEREFORD SOCIETY OF MODEL ENGINEERS
Stand: N
www.hsme.co.uk

IC ENGINE BUILDERS GROUP
Stand: HH

KINGSBURY WATER PARK MODEL BOAT CLUB
Stand: O
www.kwpmbc.co.uk

KNIGHTCOTE MODEL BOAT CLUB
Stand: CC
www.kmbcmodelboatclub.com

LONDON & NORTH WESTERN RAILWAY SOCIETY
Stand: BB
www.lnwrs.org.uk

MELTON MOWBRAY & DISTRICT MODEL ENGINEERING SOCIETY
Stand: E
www.mmmes.co.uk

MIDLANDS MECCANO GUILD
Stand: AA
www.midlandsmeccanoguild.com

MODEL STEAM ROAD VEHICLE SOCIETY
Stand: GG
www.msrvs.co.uk

NATIONAL 2½" GAUGE ASSOCIATION
Stand: F
www.n25ga.org

NORTHERN ASSOCIATION OF MODEL ENGINEERS
Stand: K
www.normodeng.org.uk

REMAP (COVENTRY & WARWICKSHIRE)
Stand: S
www.remap.org.uk

SOCIETY OF MODEL & EXPERIMENTAL ENGINEERS
Stand: H
www.sm-ee.co.uk

THE SOCIETY OF ORNAMENTAL TURNERS
Stand: G
www.the-sot.com

STEAMBOAT ASSOCIATION
Stand: L
www.steamboatassociation.co.uk

STIRLING ENGINE SOCIETY
Stand: R
www.stirlingengines.org.uk

TRAIN 4 RAIL
Stand: FF

WELWYN GARDEN CITY SOCIETY OF MODEL ENGINEERS
Stand: P

WOLVERHAMPTON & DISTRICT MODEL ENGINEERING SOCIETY
Stand: EE
www.wolverhampton-dmes.net

THE YOUNG ENGINEERS
Stand: Q
www.eyeclub.co.uk

All details correct at time of going to press. Subject to change. Please check website for up to date information.

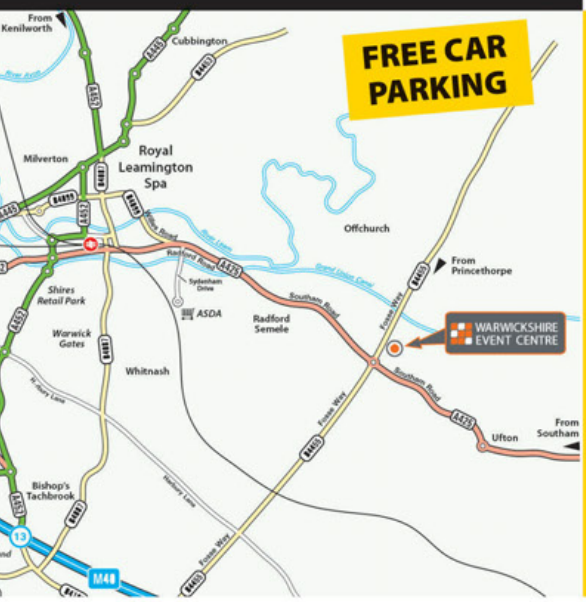
HOW TO FIND US

We are conveniently located at the centre of the national motorway network with the M1, M6, M40, M42, M45 and M69 all within easy reach.

The venue is located on the junction of the A425 and B4455 Fosse Way.

The Visitor Entrance is off the Southam Road (A425). The postcode for this entrance is CV31 1FE.

The Fosse Way Entrance is for exhibitor use only (CV31 1XN).



BOOK YOUR TICKETS NOW!

Tickets are available in advance via this website or on the day of your visit from the ticket office.

Please ensure you have the correct change ready or pay by card at the event.

Advance tickets will be a faster entry to the show.

TICKET PRICES

£11.00 Adult

£10.00 Senior Citizen (65+ yrs)

£5.00 Child (5-14 yrs)

Meridienne Exhibitions cannot process any telephone bookings. If you have event specific enquiries, please call 01926 614101.

Meridienne Exhibitions Ltd will continue to monitor and act on advice from the Government.

Please make sure you visit our website for the latest information prior to your visit.

VISITOR INFORMATION

Cash Machine

Cash machine is not available for 2022 the closest cash machine is at the local supermarket CV31 1YD which is 4 miles away.

Exhibition Bus Link

This service operates between the exhibition and LEAMINGTON SPA Railway Station. Check website for timetable.
The service runs continuously at 30 minute intervals. Journey time is approximately 10 minutes. There is no service on Sunday. Charges are £3.50 each way.

First Aid

If you require first aid please see any member of our security staff or go directly to the first aid room which is situated in Hall 1 at the foot of the stairs to the restaurant.

Lost Property

Please go to the organisers' office at the main entrance or see any member of our security staff.

Organisers' Office

Located by the main entrance.

Places To Eat And Drink

Hall 1 has a first floor restaurant and ground floor coffee shop. Outside catering is also available on outdoor display area.

Toilets

Ladies and Gents facilities are located underneath the mezzanine in Hall 1 and outside behind Hall 2. There is also a disabled toilet at the end of Hall 1.

Opening Times

Thursday – Saturday: 10.00am – 4.0pm, Sunday: 10.00am – 4.00pm
(Final Admissions 1 hour before closing)
Should you require any assistance whilst at the exhibition, please contact either the organisers or a member of the security team or go to the main entrance.

Book your tickets at www.midlandsmodelengineering.co.uk

All details correct at time of going to press. Subject to change. Please check website for up to date information.

Restoring a Gauge 1 Midland Compound

Anthony continues employing a host of workshop techniques to restore a very tired Gauge 1 electrically-powered locomotive bought on the used market.

BY **ANTHONY WHITE** Part 7 of a short series

At last I was going to be able to start the last part of my locomotive restoration project, renovating and improving the locomotive bodywork, but first I had to get the paint off and get back to bare metal. The problem was the paint was extremely thick and covered in a thick layer of varnish that was all very difficult to remove.

It took several sessions with paint stripper, each with a 24-hour soak, an oven cleaner and even more work with paint brush restorer liquid before I was getting anywhere near a state that I could start work on it. In the end it was a boring and tedious job and I was surprised how thick the paint was as a lot of the fittings looked more detailed and delicate after the paint had gone.

My first disappointment was that everything was made from brass – I had anticipated this as the tender was brass, but it was very thick, making soldering more difficult and there were again a number of major joints coming apart that were going to need early repair. That was my first task.

The backhead turned out to be a fairly basic whitemetal casting and to remove it I applied heat from a small blowlamp to the cab front from inside the firebox, my guess being that it was glued in like many other major parts of the loco.

Applying as much heat as I dare without wishing any soldered parts of the cab to come apart, I hooked a piece of metal behind the backhead from within the cab and joy of joys I was lucky, – the whole backhead casting came out in one piece. This meant I could now make a new backhead with detailed fittings including a proper opening firebox door, from which to display my proposed LED flickering fire effect.

Loco Steps

The loco steps were missing on one side and at the same time as remaking these I modified the remaining ones as my chosen prototype, 1086, had plain steps with no corners or sides turned up during the period that I was modelling her.

The replacement set of steps was cut from scraps of nickel-silver of the same thickness as the other, and I made it an exact outline copy of the one existing on the other side.

It was at this stage I thought it would be nice to have a photograph of the loco to see if it was beginning to look and sit right (**Photo 45**), as I find a photo useful in showing up major faults in appearance.

Steam Dome

The existing steam dome was a whitemetal casting glued in position and although of reasonable size the shape and dimensions were not quite correct, so I replaced it with a brass casting obtained from Barrett Steam Models. This required quite a bit of sawing, burring and filing to get rid of the sprue from the side but then with a sheet of emery wrapped around a metal bar of the same diameter as boiler things moved on more quickly and more easily, the base soon to the correct shape.

Rather than glue or solder it in position I modified it with a bolt silver soldered in from below into a suitably sized brass disc for alignment, so that it could be mounted with a nut into a new hole in the top of the boiler.

My first impression was that the new dome looked a little large so I decided to recheck this by seeing if I could find the prototype dimensions I had researched earlier. It turned out I was correct, in spite of my earlier check on the size, it was about 1mm too high, so a little modification was going to be necessary.

I also thought it looked too fat but in fact it was if anything a small amount undersize – what had drawn my attention and deceived me was the diameter of the bottom of the skirt. When reduced to scale size this caused an increase in thickness at the edge. This meant the reduction in height would need to come from the under surface, a tedious filing job.

Eventually all this was achieved although the rounded edge did require much modification and a lot of work with some fine emery wrapped around some half-inch rod to get the curves to all blend in. Perhaps I should have kept the original cast dome...

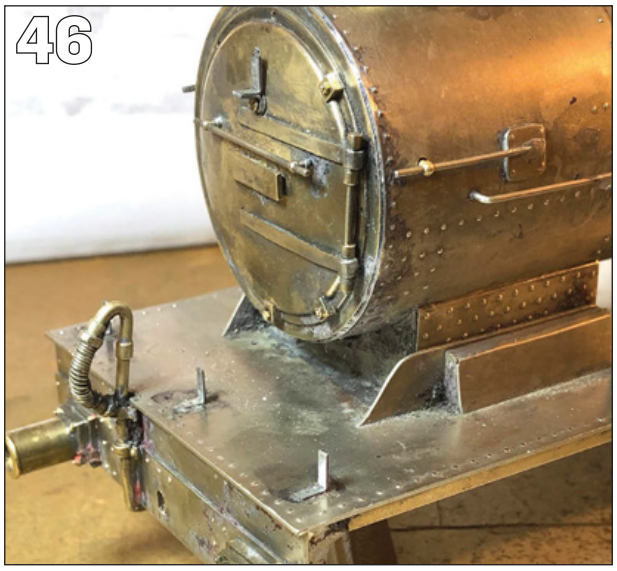
"Everything was made from brass – I had anticipated this as the tender was brass, but it was very thick, making soldering more difficult..."

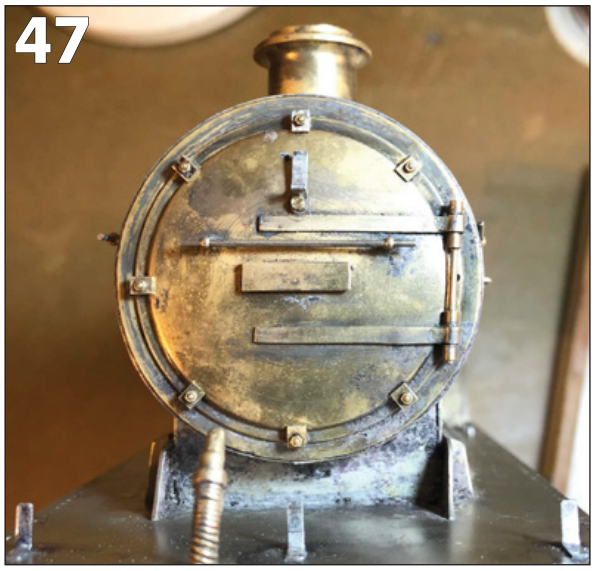
PHOTO 45: First trial re-assembly of the main loco parts. A long way to go still.

All photos by the author

Chimney

I wasn't sure about this as literature on this locomotive class makes much of the great variations, but there is a dearth of dimensioned drawings. I decided to stay with what I had although the skirt on one side was badly dented. This I filled with soft solder and after a lot of work with Wet and Dry wrapped around various ▶





"Whenever I had one correctly in position ready for the RSU, they would flick off and I could never find them again..."

sizes of dowel, I was reasonably happy with the result.

Lamp Irons

I took a small blow lamp to the lamp irons, they were twice the thickness they should be and the two outer ones were in the wrong position. I made the replacements with a 2mm strip of ½-mm thick tin-plated steel as previously described for the tender.

Although I only needed three irons I ended up making seven, because whenever I had one correctly in position ready for the RSU (resistance soldering unit), they would flick off and I could never find them again.

While at it I decided to do the lamp iron on the smokebox door and this proved to be a lot more trouble. Making the shape was not difficult, it was fixing it. The smokebox door is a mighty chunk of brass and I couldn't get the RSU to melt solder on it.

There was a hole where the iron was supposed to fix that would have been ideal for a 16BA bolt, but the hole was oversize. In the end I settled for a 12BA screw to assist the fix, although grossly oversize. After fixing I reduced the size of the head with a file and burr and Photo 46 shows these lamp irons in position.

Smokebox Door Fittings

There are lugs all around the door representing the prototype fittings. The prototype styles seem to vary but as all but four of the fittings were still present, I made some identical ones to replace the missing four.

This required a length of 3 x 2mm brass strip with holes tapped 16BA to take a piece of 16BA studding and a cosmetic nut on top. Each piece is 3mm long and has a piece milled away 1 x 1mm to form the projection over the edge of the door.

The final result with them all in position and all the lamp irons fitted including one on the door is shown in Photo 47. The brass is all a bit stained but it is beginning to start looking like the real thing in detail.

Although I dealt with this problem much later it is worth writing about it here under smokebox door fittings – I am referring to the number plate as the existing plate that originally had plastic numbers glued to it was too thick and prominent. I decided that an etched number plate alone would be better although it would require provision to ensure it sat flat on the curved door surface.

Before getting the number plate etched I had to decide on the number style, with serif or sans serif, as there is a considerable variation in styles of this plate. I also needed to decide whether to have raised beading around the outside that was usually painted white.

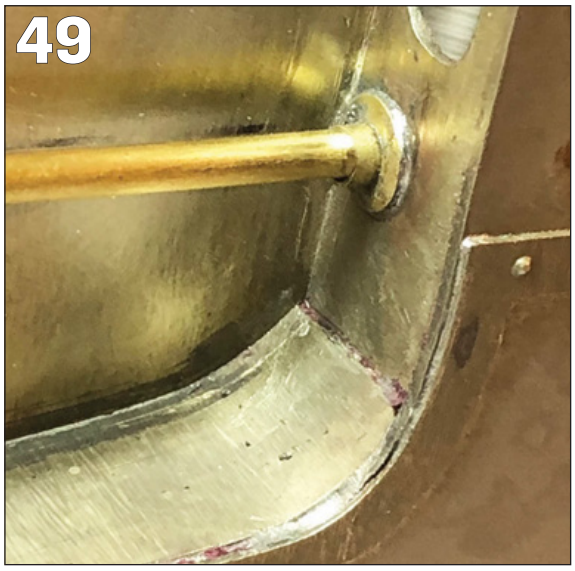
Looking through photos and trying to correlate them with dates was not easy and, on the images of 1086 I had, the detail of the door was often hidden in shadow. In the end the most common style for the time and livery I was making seemed to be serif-style numbers and no beading.

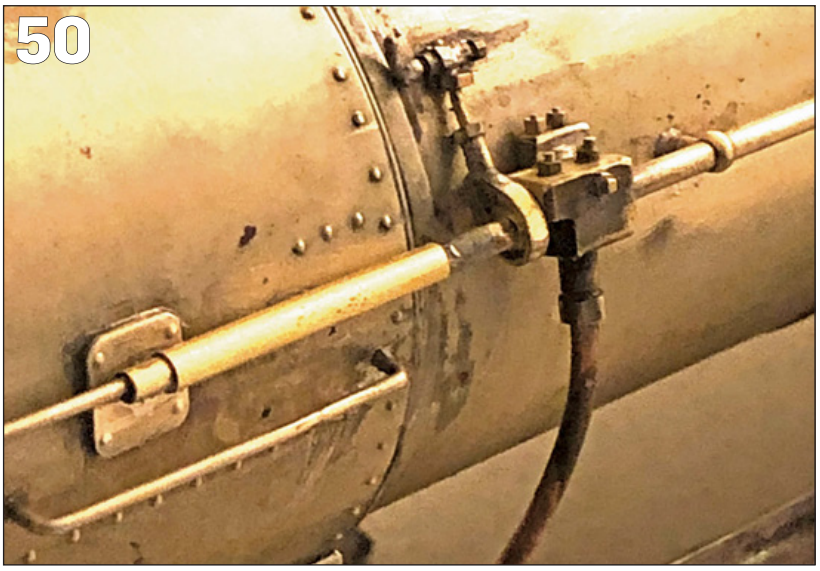
Model locomotive plate specialist Diane Carney made me various etched plates on various thicknesses of brass. I cut, filed and painted the smokebox door number plate in a variety of styles and sizes, still undecided on what looked correct, and on one soldered two 1mm nickel-silver rods behind it, using the jig that had been previously employed on the smokebox door to drill mating

PHOTO 46: Replacement of the lamp irons...

PHOTO 47: ....followed by rebuilding of the smokebox door.

PHOTO 48: New fixture for attaching etched numberplates to the smokebox was trialled using a temporary test plate.





"After I had fitted one I thought the disc looked rather too thick compared to photos of the prototype, so I ended up making even more..."

holes. This setup held the plate in position while a drop of Super Glue would later fix it when everything had been painted.

The temporary fixing and positioning of this plate is shown in Photo 48. I couldn't help thinking it looked a little chunky and it was ever so slightly off level, so I replaced the two rear rods with a single central rod soldered on the back. This allowed it to be adjusted to be level while the glue was setting.

While painting, polishing the lettering and filing the edges I also prepared the etches for the works plates on the front splashers, the shed plates and the tender plates that are just glued on after painting.

Boiler Handrails

The handrails on the two sides of the locomotive are different – on the fireman's side is a simple rail and I formed this using Gauge 1 handrail knobs. On the driver's side, the left hand in my example, the diameter of rail is 3 inches, about 2.5mm to scale, so I used reworked Gauge 3 handrail knobs to take this diameter. On this side also is the ejector pipework.

To employ the gauge 3 knobs, I opened out the hole from 1.5 to 2.0mm to take the rod and in a watchmaker's lathe removed the base flange, so as to allow for the slight difference between the ones attached to the firebox and to the boiler.

At the cab end the existing rail was situated up against the edge of the firebox where it entered the cab but it needed to be about 1.5mm outwards. This was a tedious filing job in the cab front to get the hole moved and correctly placed, the now slotted gap being conveniently hidden by a newly made fitting as per the prototype. This was constructed using two brass washers and a short length of brass tube 2.5mm outside diameter and 2.0mm internal diameter (Photo 49).

The biggest reconstruction task was the detail around the ejector tube at the front end. There's a helpful dimensioned drawing in the Roche 4mm loco drawings book that I scanned and printed to 10mm scale. The result can be seen in Photo 50, I could not manage all the detail or even to exact scale but enough to give a good approximation. I can also take comfort from the fact that this detail seems to vary in assorted photos of the prototype in different years and from loco to loco.

The fitting was scratchbuilt from pieces of brass, lots of 16BA and a few 14BA screws and nuts, along with various oddments of brass tube I had in my spares box. On the fireman's side things were much easier and I used the existing handrail knobs but increased the hole size from 0.9mm to 1.2mm to allow a more prototypical diameter rail to be fitted.

Washout Mudholes

The mudhole washout fittings were totally wrong on the model for this class of loco so I applied the blowlamp to each of the incorrect mudhole covers and lifted them out and off. They had been made from washers with a central steel domed rivet. Again they were glued in so not much heat was required before they lifted out.

I was compelled to fabricate new ones from discs of nickel silver with a 16BA screw up the centre from below ans a nut on top. This gave a better representation of the prototype as visualised from photographs as I could find no dimensioned drawings of this component.

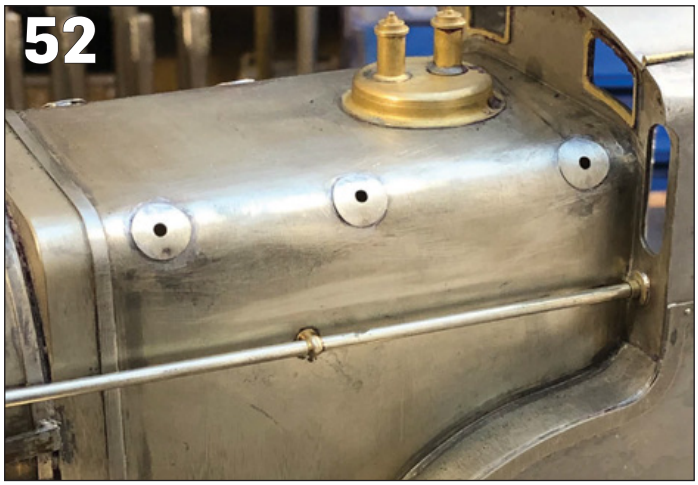
There were a number of ways I could have fitted them – it was important to ensure they all sat centrally over the exiting 3mm holes. To achieve this I made a small jig to hold them in place for soldering and made a set of eight (again including a couple of spares). I started with squares in 0.3mm nickel silver centre drilled, screwed and soldered to a stub of brass rod so that they could all be turned to 7.3mm diameter.

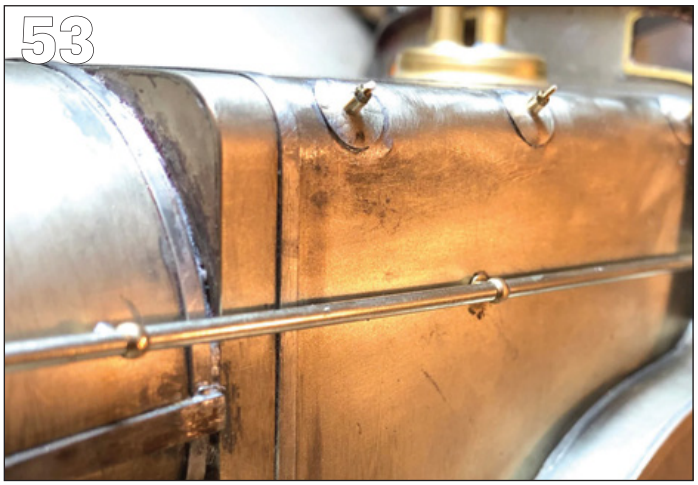
In spite of my effort with the spares two pairs of discs refused to separate with unsoldering, so I was ▶

PHOTO 49: The driver's side handrail and cab fitting arrangement.

PHOTO 50: Detail recreated at the front of the handrail and ejector.

PHOTO 51: The new discs for the firebox with the jig for soldering them in position – making several spares proved necessary!





forced to make some more. Once separated into individual discs they all had to be bent to fit the curve of the firebox – Photo 51 shows some as turned some curved ready to fit and one on a jig for holding in position centrally over the existing holes in the firebox. It was all a terrible fiddle and a very laborious job to get them aligned and looking correct.

After I had fitted one I thought the disc looked rather too thick compared to photos of the prototype, so I ended up making even more, numbers 16 to 24 from thinner 0.15mm nickel silver. It was as well I was making spares as one disappeared while I was cleaning it up. Photo 52 shows the result after all six had been fitted to the body.

Now I could concentrate on the central fittings – these were made from 2.5mm brass rod turned down to 1.6mm for a length of 2mm and centre drilled to take a 16BA stud with a nut.

These fittings too proved quite a fiddle to insert from within the firebox and worse to hold centrally and vertically to the curve while soldering. I ended up having to glue them and when happy that they were all lined up symmetrically added Araldite inside to make them more solidly fixed. Photo 53 shows them all in position but still needing the 16BA studding filing down a little and before the Araldite fixing, as I was still assessing them from time to time for correct alignment.

These fittings would have been so much easier to make if there hadn't been such large holes already existing in the firebox.

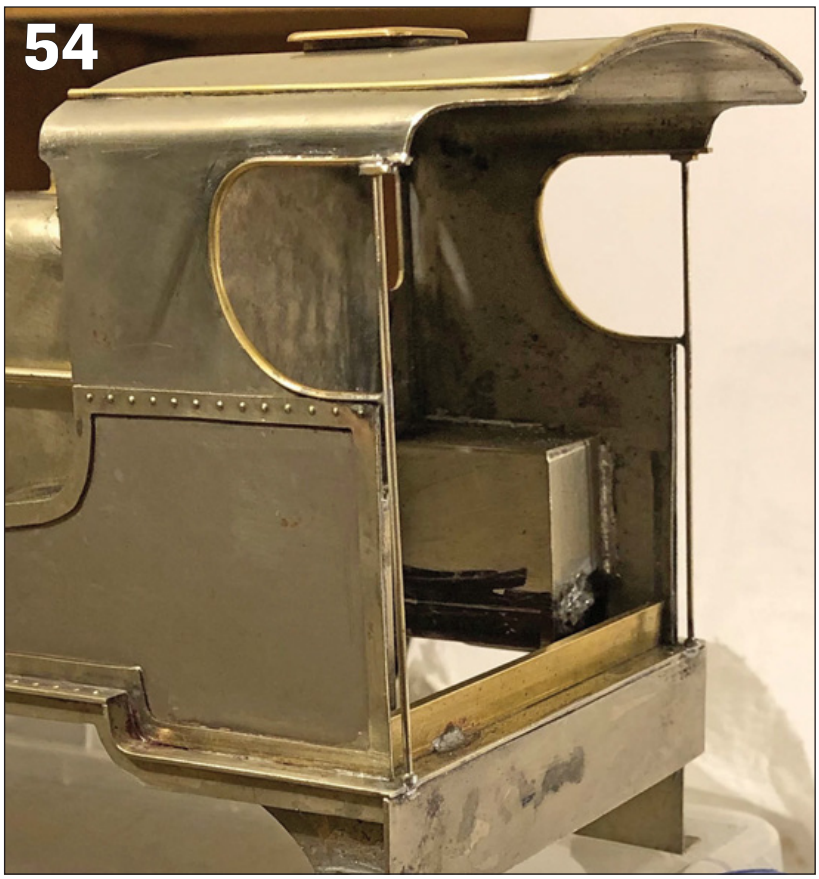


PHOTO 52: The discs all soldered in position on the firebox.

PHOTO 53: The washout plugs prior to trimming the 12BA studding.

PHOTO 54: Repairing the cab handrails.

PHOTO 55: Rebuilding the steam pipes – the new fitment and soldered in place on the buffer beam.

PHOTO 56: A new turned brass whistle provided a major visual improvement.

PHOTO 57: New lubricator castings bought in but needed modification.

PHOTO 58: The new lubricators fitted in position on the loco's running boards.

Cab Handrail repairs

Next up was a relatively minor job, re-affixing the left-hand cab handrail and making the rail for the right side plus its fittings on top and bottom. The latter was to prove easier as on the former the cab beading had to re-fitted and this proved a troublesome soldering job to get the alignment correct – it also had to be repeated several times (Photo 54).

The other problem was that the footplate was a little short, so that fitting the handrails in their correct position relative to the cab sides meant that the bottom fitting, a 'washer' of 2mm diameter and 0.75mm deep hung slightly over the rear edge – this is possibly difficult to see in the photo. Without undertaking a major task to either replace the cab floor or make a small addition for the moment I decided to leave it.

Steam Pipe

The order of things was at this point largely decided by looking at what was left to do and making my random choice. Having decided to tackle the steam pipe next it was a question of going through the reference books, trying to find one or two clear pictures and photographing in close-up onto my phone, so that I could study them at leisure and decide on what was required.

The original steam pipe was incorrect in several respects and a little crude in the representation of the flexible pipe, so I decided to unsolder the whole assembly and replace it with a scratchbuilt item using some parts I had for the flexible pipe and its end fittings.

The main length is really quite long and plain and the basis was a length of 2.4mm nickel-silver rod. Photo 55 shows the main pipe with the bent top and its 10BA threaded hose fitting, along with the end-of-hose static fitting silver soldered in position, and not forgetting the little plate that fixes it to the top of the

running plate and needs to go on first.

There's another fixing that needs to go near the bottom of the buffer beam and which is made from a piece of larger diameter brass soldered in position and then turned down to size. I needed to be careful that I did not hit the fixture just above with the turning tool.

To finish it a neat right-angled bend at the bottom was required – such a small diameter bend is quite difficult to do with 2.4mm nickel-silver rod, but I didn't have any suitable-size brass. So I cheated and made the job easy by filing a 90-degree angle out at the rear of the bend about three-quarters of the way through and after bending filling the tiny gaps with solder.

It still has to be soldered in position with the lower part using the aforementioned brass ring up against the buffer beam and at the top with the little plate. It goes without saying that this is easier if you tin all the mating surfaces first. The right hand of the three photos shows the pipe in position but without the coil spring for the flexible pipe, as I prefer to fit this after painting.

I did not need to make a vacuum pipe to fit on the tender as photographs of my prototype loco didn't show one.

Whistle

The whistle is a simple brass turning as most pre-cast examples are a little oversize while a turning is much crisper. All that is required is a drawing showing the main dimensions. Photo 56 shows it in position fixed in position screwed from below with a brass 10BA screw and connected through to the cab. I think it looks a bit big but it is exactly to scale dimensions taken from an LMS drawing.

Lubricators

On the original model there was a lubricator fitted on one side only and not entirely like the prototype photograph I had of 1086 – this showed a long lubricator on the driver's side and a short one on the other. The closest match I could find were castings in two sizes from Walsall Models.

Even with these there was still a problem, both of them as cast had too many pipes, so I had to reduce one of them from eight each side to six by milling off the outer pair. The fireman's side version I had to reduce it from four to two by milling off the central pair.

Having done that and tidied up the castings I drilled a hole for each pipe with a 0.5mm drill – it's a good idea to use a new drill for a job like this. I tidied things up by aligning the holes each side with a fine reamer through both – the result with wires through all the holes can be seen in Photo 57.

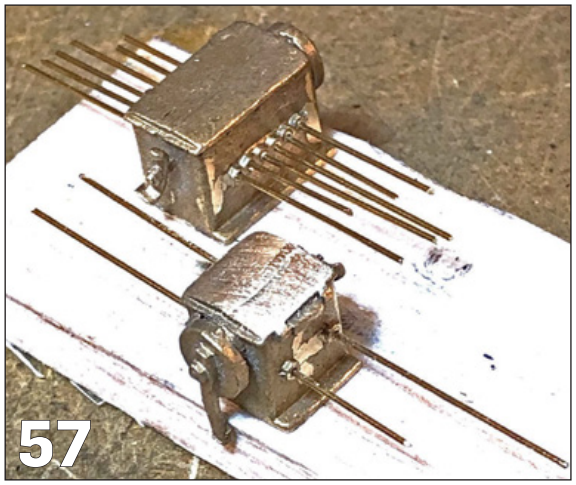
In the prototype the lubricators seem to sit on quite a thick plate, and this was not present on the castings. So I made mine from some nickel-silver sheet with a footprint as per the base of each lubricator plus a 3mm flange on each long side, as visible in the photo.

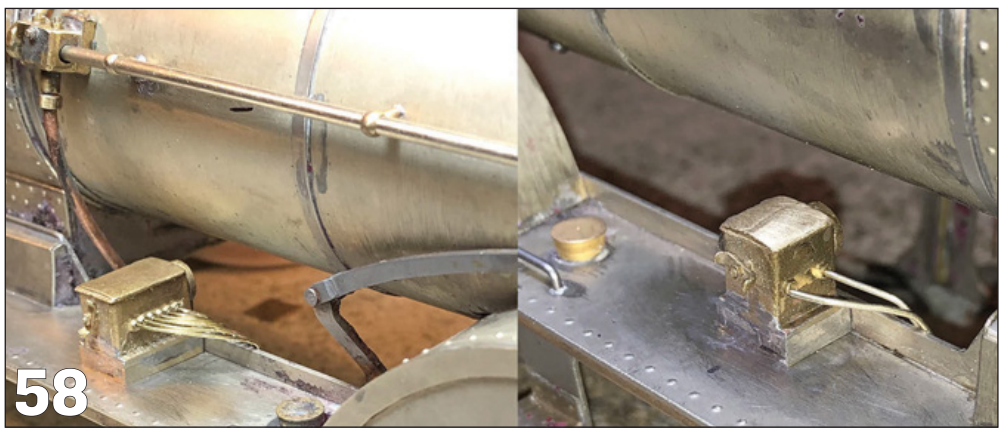
The next job was to tack solder just these bases into the appropriate position on the running plate, then to mark and drill through from underneath so they can later both be screwed into position with 10BA screws from below.

The lubricators can then be soldered to their base plates so that the complete assembly can be screwed into position. The tricky job is arranging the pipework, not difficult but it needs to look neat and tidy and that was quite time-consuming, particularly on the larger one with its 12 pipes. The result can be seen in Photo 58. EIM

■ Next month Anthony tackles the cab interior, as ever a more major task than he originally expected.

Parts 1 to 6 of this series were published in the April to September 2022 editions of EIM. For details of how to order printed or digital back issues see page 9.





Unseizing a regulator

Edward describes his trials and tribulations sorting out the regulator of a 7¼-inch gauge locomotive on his local Rugby track.

BY **EDWARD PARROTT**

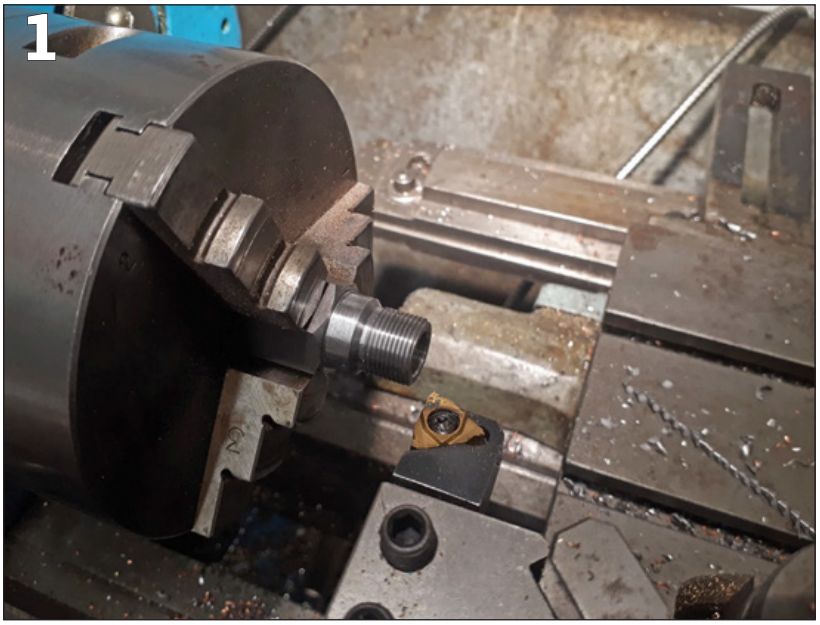
One of the jobs I have been working on recently is the regulator of a 7¼-inch gauge express passenger locomotive, which had come in with this particular control seized following two years of Covid-induced storage. It's fair to say that I have a love-hate relationship with this engine – it's been in service for around 10 years now, supposedly being in a fit condition to run, but we just keep finding problems with it!

We are gradually working our way through the list, starting with correcting the draughting on it, having discovered that half the exhaust was just filling the smokebox and not going up the chimney, unsurprisingly resulting in very poor steaming characteristics.

One of the most concerning items has been the regulator, something to which we have no access without major stripdown, and which was installed when the loco arrived with us, with no accompanying drawings, sketches, description or photographs.

For a long time we've been concerned about the amount of lost motion that was apparent between the actual regulator handle and any indication that the valve had opened – it was also noted that never once on a dry rail had the engine been known to slip despite heavy trains and cylinders as big as they are.

"Had this actually failed with the regulator in an open position it would have been impossible to stop the locomotive..."


1


2

We've been monitoring the situation and feel that the lost motion has been getting worse, so attention to the issue was due anyway, and the seizing during storage has presented the opportune moment in time to attack the job.

Being an LMS express passenger locomotive, the regulator is housed in a very shallow dome, totally the opposite of my own Hunslet with its nice tall brass dome. Having had the dome off to carry out previous remedial work we knew we were dealing with the pretty standard ¼-inch BSP ball-valve type regulator, with a weird arrangement of fittings to lower it and get it directly in line with the regulator spindle.

Hidden issues

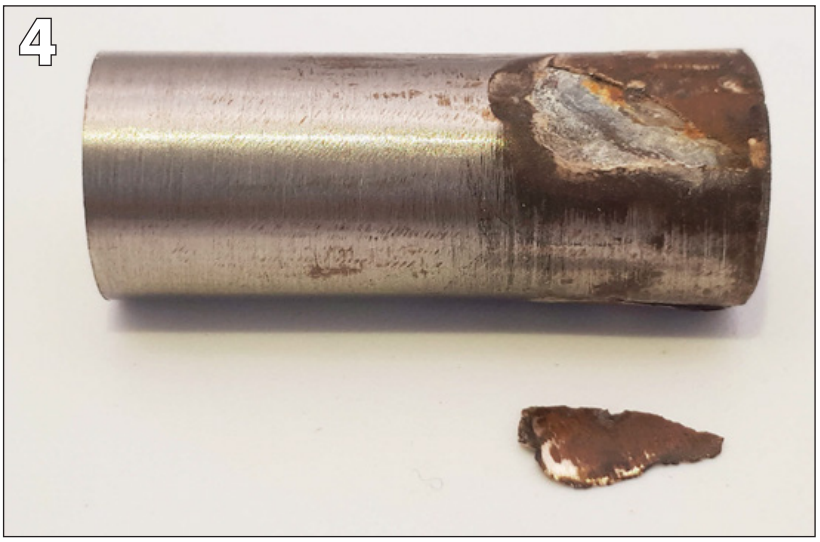
Unfortunately, the regulator had been installed in such a way that the bulk of the operating mechanism was completely out of sight within the boiler barrel to the rear of the dome, hence us at this point having no clue how it was all made to work. Getting to it however, was the beginning of a whole other saga...

When the regulator had been installed, the rear flange had been fitted using M4 stainless steel cap-head screws. Not a problem in itself, however the person responsible had fitted them into counterbores in the bronze that were all but the same size as the head of the screw...

Many years later, and getting those screws out proved to be something of a challenge. Three came out without much of a fuss, two required a significant amount of heat to release, but the last, he was not going to come quietly. Heat was applied, liberal soakings of PlusGas, shock therapy, even hammering a ⅛-inch hex key into the 3mm socket before it went round, but nothing was shifting that screw.

Eventually the only option was to drill through the socket and into the fitting, effectively removing the head from the bolt, and even once removed the head was still firmly stuck in its counterbore, but the stub of screw in the boiler bush unscrewed by hand. So there's your first take-away from this article, if you are putting cap-head screws into counterbores, do not make the counterbores the same size as the screw head, provide some room for the inevitable!

Once removed... hmm... makes it sound easy... That was a whole other saga before we finished. The bronze regulator gland had been made virtually size-for-size to the stainless steel regulator spindle, an amount of limescale had managed to build up



even in that very slight space, and had jammed everything up solid having nowhere to go. With the securing screws removed we were still unable to withdraw the gland, and at this stage still completely unaware of what was lurking within.

Having got to a point where no amount of pulling would remove the gland and the spindle from the boiler, it was time to apply a puller to try and force the gland out (an interface we knew wasn't stuck) by jacking it off the end of the spindle, and hopefully doing no damage to the regulator in the process. Some late night turning to produce a fitting that screwed into the follower threads (Photo 1), with a tapped hole for a jacking bolt, and an attack was made the following morning (Photo 2). The net result was many choice words about the parentage of the person responsible for the assembly!

Having jacked the gland off the spindle around ⅜-inch, the spindle promptly dropped off the ball valve and the whole assembly came out of the boiler. Why it had chosen to put up such a fight we don't know, nothing was actually holding the spindle to the regulator ball valve, it was just being stubborn.

Failure to stop

Anyway, having the thing out and on the bench, our worst fears were confirmed, and it was indeed beginning to fail. Whoever had done the job had opted to manufacture a very poor interface between spindle and valve, on what is probably one of the most important features of the boiler – had this actually failed with the regulator in an open position it would have been impossible to stop the locomotive. It's not easy to see but in the photo (Photo 3) you can just about make out the crack at about 11 o'clock that has begun to form up the side of the socket.

As I'm sure most people know the spindles of 90-degree ball valves as used for regulators have a threaded section for the handle securing nut, followed by a section which has two flats milled on it.

The person who had fitted this regulator had attempted a crude manufacture of a rectangular socket by drilling the end of a piece of stainless bar, and then crushing it in a vice. This is a very poor way to form a rectangular driving socket on such a short length, as only the very end would have been the desired size, and it rapidly gets bigger towards the full diameter of the bar, so only the very tip was actually to size and driving. The crack has most likely started to form as a result of cold working the stainless bar.

Interestingly, as I was preparing the piece for photographing for this article, my eye was drawn to another hairline crack, and on investigating, I found it to be some silver solder, which had obviously been applied to try and stem the crack, but had failed to adhere to the spindle. It seems apparent that the person fitting it was aware of the crack and tried to bodge the bodge even further (Photo 4).

Obviously this was totally unacceptable and a proper repair needed to be made. Luckily I have a simple trick up my sleeve for creating these types of sockets, something that is easy to produce, and is as follows.

These new parts are made in stainless steel, I'm equipped for working with it so it's no issue for me. It would be equally possible to produce these parts in phosphor bronze and substitute silver soldering for TIG welding, but mild steel or brass should not be used at all.

I choose to make separate end pieces on a vertical mill using an end mill for this job, but you could also achieve the same results on the end of a long spindle using a side and face cutter in a vertical spindle, or using a horizontal mill – it's very much about using what you're comfortable with and equipped for.

To begin with, a slot is milled in the end of a piece of bar which fits snugly to the flats on the ball valve (Photo 5). Because we were working completely blind we had to make a best guess at what we needed and a mild steel test piece was first made, stuck on the end of a length of

PHOTO 1: Fitting turned to try and extract regulator spindle.

PHOTO 2: The extraction process proved somewhat of a challenge...

PHOTO 3: Tiny crack on regulator spindle shows failure was likely soon.

PHOTO 4: Silver solder evidence of further poor attempts made at a repair.

PHOTO 5: Replacement begun by milling slot in end of piece of bar..

All photos by the author

allthread. With the valve on the bench this would be much easier, and I would actually drill a hole first to clear the threaded spindle, and then mill the slot just long enough. Even with our boiler inspector's camera we could not establish any sizes to work to on this locomotive.

Having milled the slot, the next step was to turn a simple tube to fit over the bar (Photo 6). Having a ⅝-inch diameter hole in the boiler flange gave me room to work, so I actually turned down the slotted piece from some 16mm bar, and turned the end down to 11mm diameter. The tube was made from the same 16mm bar and drilled 11mm to fit. The hole came out a thou or two undersize, which meant a lovely press fit on assembly to.

The final step is to press the tube over the slotted piece, weld the two together at the joint where I'd added a weld prep during manufacture, and then weld those to the end of the existing regulator spindle (Photo 7) which had already been shortened to suit by the amount in the first photo showing the crack. I've actually turned over the top of the fabrication now to make it all neat and tidy, and to make certain it will fit through the boiler bush.

I've actually made the whole ⅛-inch longer than it previously was, as there wasn't actually enough regulator spindle sticking out the gland follower at the back. We'd had to really compact the packing so that the follower was far enough in to get the regulator handle on and it's securing nut on sufficient thread, in fact I think it's actually rubbing on it, so the extra length on the spindle should just give us a little room.

PHOTO 6: Tube turned to fit over the bar.

PHOTO 7: The finished item – tube, bar and regulator spindle have all been welded together.

Tight accuracy

With this method of manufacture, the sides of the slotted end can't spread apart, so provided it's accurately made to begin with, and the tube is a tight fit over the diameter, there's no reason why it should spread open and work loose on the valve spindle.

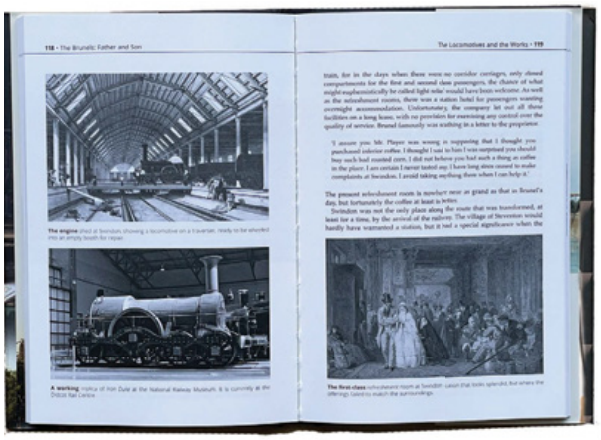
The same method can be used for components such as injector water valves too and can be found on the tender of my Romulus locomotive, and of course you could use steel or brass for these things that are outside of the boiler space.

We have almost got the engine back together now, the last job is to try and mill out the counterbores in the gland so the screws don't get stuck again, then we can carry out the boiler test and see how the engine performs with the regulator now opening properly. EIM

The Brunels – Father and Son

By Anthony Burton

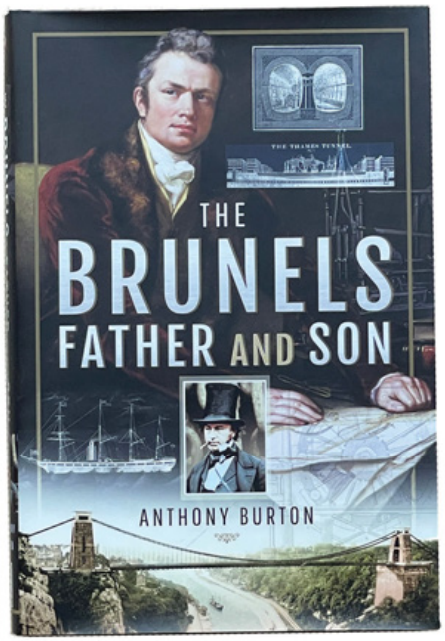
Biographies of renowned engineers can make for interesting reading, and they don't come much more renowned than the Brunels – well at least partly. While Isambard Kingdom is widely regarded as a 'Great Briton', his father Marc is much less well known – yet he played a vital role in his son's rise to fame.



In this highly readable account, Anthony Burton describes how Marc, a refugee from the French Revolution, pioneered mass-production technology, especially for sailing ships, and was responsible for major engineering achievements of his own, most notably the first tunnel bored under the River Thames in London.

Isambard spent his early years of employment working with and for his father, and once it is highlighted in these pages the older Brunel's influence is highly evident in many of his son's most renowned works, especially the Great Western Railway viaduct at Maidenhead which was directly based on an earlier design by Marc.

Plentiful illustrations, in the form of pictures, engravings and drawings, of the creations of both father and son add a great deal to what is an interesting and informative book that likely many EIM readers will enjoy. ***AC***



ISBN 9781 52678 699 9 Price £25.00
Published by Pen & Sword Transport
Email: enquiries@pen-and-sword.co.uk
Web: www.pen-and-sword.co.uk

Railway challenge trophy heads to Germany

German Team, FH Aachen & Reuschling emerged victorious in the annual Railway Challenge staged by the Institution of Mechanical Engineers and held at the 10¼-inch gauge Stapleford Miniature Railway on 23rd-26th June.

The Railway Challenge pits teams of students, apprentices and young professionals against each other, tasked with following a system-engineering process to develop, build and test a railway locomotive that meets specific competition objectives.

Runner-up of the seven entrants in this year's event was the team from Transport for London while Alstom & University of Derby took third spot.

Aachen & Reuschling topped a series of on-track challenges, including reliability, traction, maintenance, noise, ride comfort and energy storage, and off-track ones ranging through design, innovation, technical poster and the best business case.

Organising committee chairman Professor Simon Iwnicki welcomed the opportunity to run the competition again after the disruption of the pandemic.

"The teams who participated got the full experience of managing the design and operation of a locomotive as well as dealing with all the competing demands of a real-world problem," he said.

"The Railway Challenge provides a fantastic learning experience and many of the participants take these lessons with them as they progress in their careers."

Photo: Institution of Mechanical Engineers

■ This remarkable 15-inch gauge locomotive has been up for sale in the USA – the Arborway TT & Northwestern Railroad 4-8-4 no 801 was built by Merrick Locomotive Works in Wisconsin in 2006 and its original owner planned to ship it to the UK for guest turns on the Romney or Ravenglass lines, but was killed in a motorcycle accident soon after the loco was completed.

Described as "to museum quality" the oil-fired loco has 5½ x 8-inch cylinders and a boiler with a 200psi working pressure. Discover Live Steam, which is handling the sale, had the loco priced originally at some $310,000, which was reduced to $249,000 on condition the loco was sold by 15th October, at which point it would have to go into long-term storage. EIM understands a tentative deal has been done with an unnamed buyer though the sellers told us; "This locomotive is a beast that is meant to pull heavy loads over distance and the railroads in the UK are only ones that would ever give it a proper life..."

James Rizzo 1932 - 2022

James Rizzo died on 17th July 2022 at his home in Malta, a country he had served over his working life in its foreign service, including a spell as Minister for Tourism.

James had two great passions in life; Scouting in his younger years - he was Chief Scout of Malta at one time, and modelling Stirling engines in his later life. He was extremely resourceful and most of the engines he made came from scrap metal he found. All of his three sons turned out to be engineers, but he was of a different breed.

Just like his father before him in the wartime years, he was completely self taught and self-made; learning everything in a cluttered workshop and never setting foot in a classroom.

Most model engineers and proponents of the Stirling engine will have known James through his writings on hot air engines, both articles in the model engineering press and the five books he wrote, from *Modelling Stirling and Hot Air Engines* published in 1985 to *Stirling Engine Projects Volume 1* published 31 years later. In all these contain nearly 40 designs, the vast majority of which James had designed and built himself. His books awoke an interest in hot air engines amongst many model engineers, and continue to do so.

James was elected the first President of The Stirling Engine Society when it started in 1997, and was always busy answering questions, whenever he was on the Society's stand at exhibitions.

His Christian faith was deep and helped him through his final illness. He will be much missed by those who had the pleasure of knowing him, and especially by Stirling Engine enthusiasts worldwide. Our condolences go to his three sons and his wider family.

Adam Harris

John Ellerton

John Ellerton, who purchased the 15-inch gauge Fairbourne Railway in 1983 and subsequently converted the mid-Wales beach line to 12¼-inch gauge, died in early August.

At the time the conversion, which enabled Ellerton to employ four steam locomotives built for his short-lived Réseau Guerléden Railway in France, was controversial with many enthusiasts. But today he is considered to have saved the line which previous owner John Wilkins had run since 1946 in the face of declining passenger numbers.

Ellerton poured much investment into the railway before selling it on in 1995 and without his intervention many believe the railway would have closed. The four locos still work the line today, as described in Fairbourne chief engineer Harry Billmore's monthly EIM column.

Heating up on the rails...

August heatwaves have brought yet another challenge to many of our clubs this summer but the news remains upbeat, with more than one opening to celebrate.

COMPILED BY **ANDREW CHARMAN**

Welcome to this month's *Club and Track News* and as I write these words the impossibly hot weather of earlier in August has thankfully abated. No doubt some model engineering societies suffered in the same way that full-size heritage railways did, forced to leave their steam locomotives in the shed in favour of internal-combustion or battery-electric traction, in order to avoid any risk of setting fire to the parched surroundings – unfortunate at what is traditionally the busiest time of the year, peak holiday season.

One event that fell victim to such concerns was the revived Standard Gauge Rally at the Rugby ME. Due to be held on 13th-14th August, it was cancelled on advice from the local Fire Service. Edward Parrott from the Rugby club told us that it was planned to hold a one-day event on 25th September, if space could be found between booked birthday parties, "and we get a decent amount of rain."

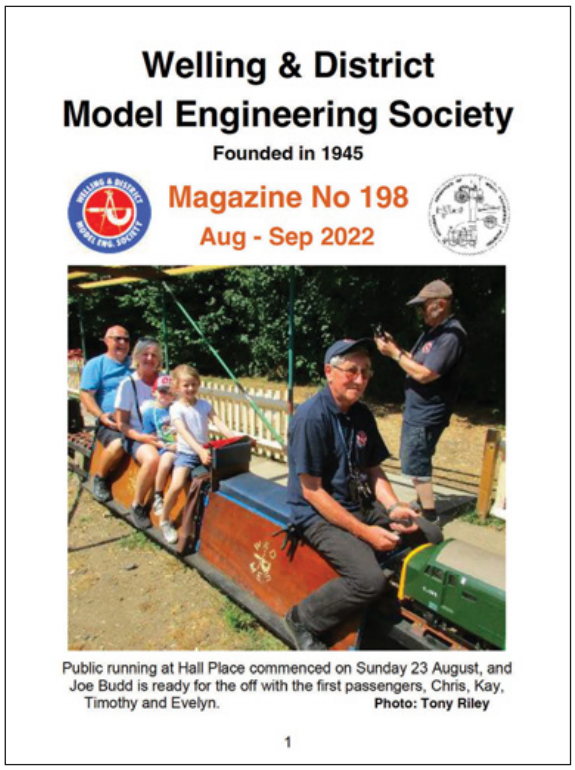
Lights, camera, action...

The prospect of our enjoyed vocation appearing on TV often strikes as much fear into model engineers as it does anticipation but a part for the York ME on Channel 4's new series, *Hobby Man* appears to have worked well.

The series features comedian Alex Brooker and celebrities trying different hobbies from homebrewing to knitting, and salsa to – model engineering, which was featured in the final episode due to be screened on Friday 9th September at 8pm.

ABOVE RIGHT: Having a lot more fun than he probably expected to, comedian Alex Brooker drives on the track of the York ME, club secretary Bob Lovett keeping things in control. *Photo: Channel 4*

BELOW: Good news on the cover of the latest Welling magazine as the club returns to running trains at its new home.



Roger Backhouse of the York club told us that secretary Bob Lovett features in the episode, successfully instructing Alex how to drive a live-steam locomotive. Filming took place on the Society's Dringhouses track in York – according to Roger both enjoyed themselves at the track and members are looking forward to the programme being aired.

York chairman Brian Smyth commented; "It was considerable work for members to set this up but fascinating to see how the TV crew operated – everybody was clearly having fun. We hope that this programme will encourage more interest in model engineering".

We agree with that – at the time of writing your editor had seen a trailer for the episode and Alex appeared to be having a lot of fun! And while we were unfortunately informed too late to alert EIM readers ahead of the screening, Channel 4 has a 'catch-up' service these days and hopefully the episode will be available there.

In the August issue we reported how delays in connecting electricity and water supplies to the new home of the Welling & District ME at Hall Place in Dartford, Kent, had raised fears that the club would not be able to run any public trains in 2022.

So it was highly pleasing to receive the latest edition of the Welling club's magazine with the front cover proudly bearing a photo of the first official public train preparing to depart on what the caption says is Sunday 23rd August, but likely should be the 21st (*the Ed only knows that as on Tuesday 23rd he became another year older!*).

Unofficial services actually began on 23rd July, the magazine editor Tony Riley reporting a steady stream of visitors giving the club an opportunity to "find our feet in our new home."

This is good to see, and Welling is certainly active, updates elsewhere in the magazine showing progress on the workshop, kitchen, station area and even a Gauge 1 raised track on which two circuits have already been laid.

Other clubs are busy on smaller-scale tracks too – the latest edition of the St Albans DSME newsletter shows excellent progress on the construction of the club's new joint 45/32mm gauge garden railway track. The 24ft x 4ft loco preparation area is complete as is the wooden structure for the circuit, the club hoping to have at least one of the tracks ready for use "within the next few weeks."

Feeding the mind

Talking of openings... the latest edition of the Bradford MES's *Monthly Bulletin* opens with news of "3rd August 2022, a date which will go down in the history of our Society." Track extension? Particularly interesting loco made its debut? Nope, the official reopening of the club's refurbished and fully refitted kitchen!

Demonstrating how all model engineers operate on copious supplies of tea and other refreshments, the opening ceremony, club president Jim Jennings writes, was "appropriately performed by the ladies who provide

us, visitors and the public with food and refreshments... it was fitting that the formal ceremony was performed by those who use the facilities and had waited patiently for so long."

Joking apart, Jim's quite right – we sometimes lose sight of those vital behind-the-scenes souls who help us to fully enjoy our hobby...

The latest edition of *Kingpin*, the magazine of the **Nottingham SME**, drops through the editorial inbox, and opens with editor Jayne Ball seeking to solve the perennial problem of finding suitable pictures to grace the magazine cover by challenging members to send in their four best pictures. Your editor read this and thought "welcome to my world!"

Returning briefly to the subject of hot weather, I smiled at the comment from Nottingham chairman Nick Harrison in his column that visits to local venues such as the **Echills Wood Railway** during the heatwave had seen locomotive injectors "pushed to the limit." Not all **EIM** readers may know that hot weather affects injectors, as I have found to my cost in the past using rather bigger ones on the 2ft 6in gauge Welshpool & Llanfair Light Railway. "I was once told by a friend in GL5 that 'happiness is two working injectors' and how right he was," says Nick and I definitely concur!

Even more interest to be found in a noticeably full edition of *Kingpin*, with member Sophie Harris describing the construction of a Lister diesel-powered, fully portable stone crusher! Just the kind of unusual build we'd love to see in our pages, hint hint to all readers out there...

Close to revival

It's always good to hear of a closed miniature railway revived and the latest newsletter from the **Southampton SME** includes a full progress report towards reopening the **Poole Park Railway** in a neighbouring seaside location, you guessed it, Poole!

This 10¼-inch gauge line dates back to 1949 and operated until a tenancy agreement with Poole Borough Council ended in 2017. Initially it was ruled that the track must be taken up but a public backlash ensued and the council allowed the rails to remain while a new operator was sought.

This proved a labourious process, with more than one new potential operator appointed and then running into trouble, before Covid stopped everything. But since the end of last year Shropshire-based Track Systems Ltd has been relaying the line.

A suitable loco still needs to be acquired – the former Wells Harbour Railway loco used in the track renewal and now owned by the Lappa Valley

THIS PAGE: These pictures were sent in by *Neil Mortimer* following a reportedly highly successful Polly Owners Group rally on the Isle of Sheppey in June. "The host club was very friendly and welcoming, a great day was had, and we extend many thanks to Sheppey MEMS for having us," Neil told us.

We don't hear from the Sheppey club at **EIM** – certainly the surroundings of the track look rather picturesque.

Unfortunately Neil's email arrived too late to publicise the next rally, scheduled at Urmston & DMES on 10th September. Polly owners who want to know about future rallies can contact Neil on 07900 133201 or Neiljmortimer@gmail.com

ABOVE & BELOW: The redoubtable *Phil Barnes* has a habit of coming across miniature railways that many of us have probably never heard of and the latest was discovered while he was on holiday on the Channel Island of Guernsey!

The Sausmarez Manor Railway is a 7¼-inch gauge line running through the woods surrounding a country house, and while according to Phil aimed firmly towards families and especially children (the circuit is adorned with cuddly animals 'living in the jungle'), it also now holds the title of the only passenger-carrying railway on the island.

The 400-yard long oval route was extensively restored over the winter of 2005-2006 and today trains are operated from May to September at weekends and daily during school holidays, and from September on Saturdays, all weather permitting.

The locomotive, named 'Remus' was built in 1989 by Terry Leigh and is based on a British Railways Class 25 diesel. It is powered by a Briggs and Stratton petrol engine (below) with an electric starter and the motor drives the wheels via a hydraulic forward neutral and reverse transmission module with the final drive by chain, the loco being designated 4wPH.

More details of Sausmarez Manor and the railway operating times can be found at www.sausmarezmanor.co.uk

Railway in Cornwall has undertaken loaded test runs and apparently the climax of what has reportedly been a £480,000 project is not far away – hopefully someone will send in some pictures for these pages of the reopening when it happens?

Meanwhile at Southampton a lot is going on, notably involving a three-man team who are close to the finish of their project, to replace all the sleepers on the club's 7¼-inch gauge ground-level track. On any outdoor track that's a lot of sleepers...

Fired by – teabag?

Possibly the most fascinating feature in this month's selection of club journals features on the cover of the latest *e-Bulletin* from the Norwich & District SME. What your editor thought were pancakes being cooked in the firebox of a loco, and what the newsletter editor suggests look like savoury biscuits, are actually teabags, an exercise in recycling by innovative club member Brian Parker.

Apparently Brian dries out his teabags in an oven, then gives them a good long soaking in paraffin. Kept in an airtight container, they are then used to light-up steam locos! Apparently they work better than traditional kindling because they hold more paraffin – clever...

Good to hear of yet another popular show making a comeback after being stymied by the fallout from the Covid pandemic. 'Lomex'. the seventh Lowestoft Model Engineering and Model Making Exhibition, organised by Halesworth DMES, will take place this year at the Energy Skills Centre at East Coast College (formally Lowestoft College) over the weekend of 29th & 30th October.

We are told that this year's event will again be showcasing local and not so local clubs and societies with a range of modelling disciplines.

Traditional model engineering in all guises will be on show, including boats, aircraft, model railways, clocks and extending to sci-fi, doll's houses and even Steampunk!

Organisers expect this year's event to be as big as the last show in 2019 with live steamers and other displays outside (weather permitting). Funds raised will go to SOLD, a local charity that helps disabled people access a workshop environment, and further information on the show and the charity is at www.lowmex.co.uk

Trying something different is always a good idea for clubs and at the Ryedale SME on 23rd July it was in the form of a diesel day, according to the club newsletter suggested, perhaps not surprisingly, by the younger members. It seems to have been a popular event, also involving members of GL5, the Ground Level 5-inch Gauge Mainline Association, with a variety of locomotives running on Ryedale's Gilling track. "Everyone I spoke to enjoyed it," reported newsletter editor Walter Rinaldi-Butcher.

Miniature aids narrow

No less busy at the clubs beyond the UK's shores – the latest edition of *Maritzburg Matters*, newsletter of the Pietermaritzburg ME in Kwa-Zulu Natal, South Africa, reports on a continuing successful season, and highlights an interesting example of miniature rail helping out the rather larger. The Society has donated "the princely sum of R16k," (equivalent to about £800) to help fund track repairs at the Umgeni Steam Railway, a 3ft 6in gauge line described as 'the home of steam locomotive preservation in Kwa-Zulu Natal'.

Staying in South Africa, *The*

Workbench of the **Durban SME** reports that the price of copper is relatively low at present, at $7-8000 per tonne, having been closer to $11,000 per tonne, "so now would be a good time to get hold of the 'semi-precious' stuff..." We wish – the price of materials these days I feel dissuades more than one model engineer when considering a new project...

A wry smile also crosses this correspondent's face when the Durban newsletter editor reports to making good progress on the build of his LBSC Britannia locomotive; "It's hard not to when you are chivied along by your son who wishes to inherit completed locos only!"

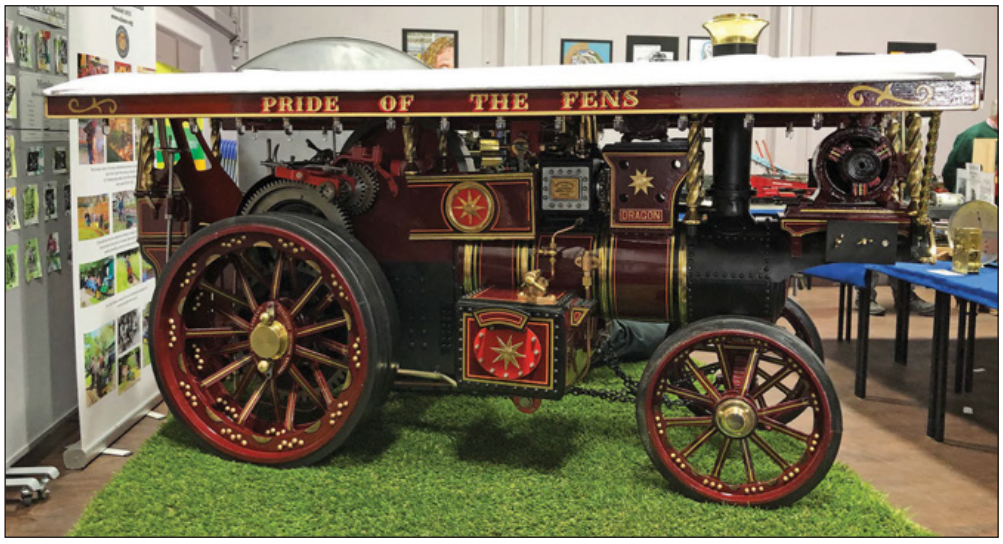
Meanwhile even further afield at the **Sydney LSLS** in Australia, they are busy making preparations for the annual Small Gauge Festival, scheduled this year for 29th-30th October. This event focuses on locomotives of 2½ and 3½-inch gauges (a note in bold states firmly "No 5-inch gauge locos running on this day please!") and is held on the club's 380-metre long raised track in West Ryde, Sydney.

Access issues

The Sydney newsletter features another huge locomotive on its cover, a South Australian Railways 628 class 4-6-2 built by member David Thomas, while the editorial highlights a potential issue possibly not thought of by members of many a club, new visitors not knowing how to safely board and alight from the passenger carriages of trains. "Usually by the end of the day they have started to master the system, hopefully to remember for the next time they visit," the editor comments, while adding that this is another reason why a good turn-out of members is essential during public running days.

Club magazines and newsletters are always full of interesting little snippets, if you read them closely. I note from the latest edition of *B&DSME News* from the **Bournemouth & District SME** that carriages are still occupying the mind of many a club, after we reported in the August issue on the latest Health & Safety Executive guidance regarding filling the gaps between vehicles on passenger-carrying miniature railways, following an incident on one raised track when a member of the public got their leg trapped between two of the carriages.

At Bournemouth the discussions has moved beyond pure safety upgrades, to the extent that the club is trialling commercially available bogies on one of its vehicles to analyse the smoothness of ride and the interface between wheel and rail.



ABOVE: This 2-inch scale Burrell scenic showman's engine, built by Nick Gratton, was the pride of not only the Fens but the last Lowmex show, at which it debuted in 2019. Photo: *Julie Williams*

According to the newsletter the bogies were being fitted, we look forward to reading the conclusions of the trials.

Notable too in the Bournemouth newsletter that the chairman Peter Burton has decided to stand down at the AGM in December, because he has no model engineering skills and his interest is "in merely playing trains". He feels someone with such skills is needed to take the Society forward and boost that side of the hobby.

It's a laudable and understandable sentiment, and I personally know of clubs that have seen splits with the model engineers feeling they no longer had a role in organisations focusing on running trains for the public. I think there is room for all, however, and clubs that try hard to ensure that, such as it appears Bournemouth is, are the ones that will prosper.

Meanwhile the latest newsletter from the **Lincoln & District ME** tries to put a positive slant on the recent heatwaves, despite reporting that there is no news from the workshop because "it is summer and our gardens are taking priority, or has it been too hot in our workshops?" Editor Neil Grayston observes that while the mixed-up weather has resulted in two builder's bags of fallen leaves being collected up in mid July, he adds; "the weeds seem to have given up the ghost – if only temporarily..." **EIM**

"It's hard not to make progress when you are chivied along by your son who wishes to inherit completed locos only!"

DIARY

EVERY SUNDAY
(Weather permitting)

Grimsby & Cleethorpes ME public running, Waltham Windmill, DN37 0JZ, 12-4pm (until 5th Nov)

Kings Lynn DSME public running, Lynnsport, Greempark Ave, Kings Lynn PE30 2NB, 11am-4pm (3pm in Nov) also Wednesdays

North Wilts ME public running, Coate Water Country Pk, East Swindon, SN3 6FG, 11am-5pm

OCTOBER

1 Chingford ME public running day, Ridgeway Pk, Chingford, London 1.30pm-5pm

1 Gauge 1 MRA 75th Anniversary Show, Bicester Heritage, OX26 5HA, full details at g1mra.com

1 Tiverton & Dist MES running, Rackenford, EX16 8EF

2 Bristol ME public running, Ashton Court Railway, BS8 3PX, noon-5pm

2 Guildford ME Small Model Steam Engine Group open Meet, Stoke Pk, Guildford GU1 1TU, 2-5pm

2 Plymouth MS public running, Goodwin Pk, Plymouth, 2-4.30pm
4 Romney Marsh ME Track Meeting, Rolfe Lane, New Romney, from noon

2 Rugby ME Members Running, Onley Lane, Rugby CV22 5QD

2 St Albans ME Club Running, Puffing Park, St Albans, 1.130pm

5 Bradford ME meeting, 'Things that go bang in the night' by Ian McKay, Saltaire Methodist Church, 7.30pm

5 Bristol ME meeting, On the table, Begbrook social club, BS16 1HY

5 Leeds ME meeting, History of rechargeable batteries by Malcolm High, Mid Yorkshire Golf Club, Darrington, WF8 3BP 7pm

6 Cardiff ME meeting, Black Vein mining disaster of 1860, by Stephen Lyons, Heath Pk, Cardiff CF14 4AW

8 Brighton SME public running, Hove Pk Railway, BN3 7RB, 1.30-4.30pm

9 Cardiff ME open day, Heath Pk, Cardiff CF14 4AW

9 Havering MRC public running, Lodge Farm Park, Romford. RM2 5AD, 11am-4pm

9 Hereford SME public running, Broomy Hill, Hereford HR4 0LJ, https://hsme.co.uk/ noon-4.30pm

9 Plymouth MS Members Sunday, Goodwin Pk, Plymouth, 2-4.30pm

9 Worthing SME final summer public running day, Field Pce, 2-5pm

11 Romney Marsh ME Track Meeting, Rolfe Lane, New Romney, from noon

12 High Wycombe ME club meeting, The Metropolitan Railway by Colin Brading, Rossetti Hall, Holmer Green HP15 6SU, 7.30pm

13 Cardiff ME Bring & Buy, Heath Pk, Cardiff CF14 4AW

13 Norwich SME meeting, Miniature Railways over Time by Simon Cole, Ipswich road URC, Norwich

13 Worthing SME meeting, Austin Nippy restoration by Christopher Gould, Field Pce, 7.30pm

13 Midlands Model Engineering
16 Exhibition, Warwickshire Exhibition Centre, full details at www.midlandsmodelengineering.co.uk and in this issue's centre pages

16 Bradford ME Public running, Northcliff, BD18 3DD Members 11.30am, public 1.30-4pm

16 Guildford ME Open Day, Stoke Pk, Guildford GU1 1TU, 2-5pm

16 Plymouth MS public running, Goodwin Pk, Plymouth, 2-4.30pm

16 Rugby ME Public Running, Onley Lane, Rugby CV22 5QD, 11am-1pm, 2-4pm

16 St Albans ME Club Running, Puffing Park, St Albans, 1.130pm

16 Tiverton & Dist MES running, Rackenford, EX16 8EF

18 Grimsby & Cleethorpes ME members meeting,Hartley Lodge, Waltham Windmill, DN37 0JZ, 7.30pm

18 Romney Marsh ME Track Meeting, Rolfe Lane, New Romney, from noon

19 Bristol ME Zoom meeting, talk by Holden F5 Locomotive Trust – contact secretary@bristolmodelengineers.co.uk

19 Leeds ME AGM, Mid Yorks Golf Club, Darrington WF8 3BP, 7pm

20 Cardiff ME AGM, Heath Pk, Cardiff CF14 4AW

22 Brighton SME public running, Hove Park Railway, BN3 7RB, 1.30-4.30pm

22 Cardiff ME Steam Up & Family Day, Heath Pk, Cardiff CF14 4AW

23 Bristol ME public running, Ashton Court Railway, BS8 3PX, noon-5pm

25 Romney Marsh ME Track Meeting, Rolfe Lane, New Romney, from noon

26 North Wilts ME Halloween running, Coate Water Country Pk, East Swindon, SN3 6FG

27 Guildford ME Open Day, Stoke Pk, Guildford GU1 1TU, 2-5pm

27 Worthing SME club auction, Field Pce, 7.30pm

28 Brighton SME meeting, Mick's Video Pictures, West Blatchington Windmill, Hove BN3 7LH, 7.45pm

29 Brighton SME Fun Day, Hove Pk Railway, BN3 7RB

29 Hereford SME public running, Halloween, bonfire & fireworks, Broomy Hill, Hereford HR4 0LJ, https://hsme.co.uk/ 2-6pm

29 North Wilts ME Halloween public running, Coate Water Country Pk, East Swindon, SN3 6FG, 11am-5pm

29 Romney Marsh ME boiler testing, Rolfe Lane, New Romney, tests 9am, running from noon

29 Halesworth &DME Lowmex –
30 Lowestoft Model Engineering & Model Making Exhibition. East Coast College, Lowestoft, more details on page 41

29 Sydney LSLS Small Gauge Festival,
30 Anthony Rd, West Ryde, Sydney, Australia, 8am-6pm both days

30 Bristol ME public running, Ashton Court Railway, BS8 3PX, noon-5pm

30 St Albans ME Club Running, Puffing Park, St Albans, 1.130pm

NOVEMBER

1 Romney Marsh ME Bits & Pieces/ Bring & Buy Evening, Rolfe Lane, New Romney, 7.30pm

2 Bradford ME meeting, 'Annual Auction, Saltaire Methodist Church, 7.30pm

2 Bristol ME meeting, Talk on the Camerton Line, Begbrook social club, BS16 1HY

2 Leeds ME meeting, The Myford Lathe by Geoff Shackleton, Mid Yorkshire Golf Club, Darrington, 7pm

5 Tiverton & Dist MES afternoon/ evening running, Rackenford track, EX16 8EF

10 Cardiff ME meeting, Five Boys and A Pasty by John Sheen, Heath Pk, Cardiff CF14 4AW

10 Norwich SME meeting, Ipswich road URC, Norwich

10 Worthing SME club meeting, Field Place, 7.30pm

15 Grimsby & Cleethorpes ME members meeting,Hartley Lodge, Waltham Windmill, DN37 0JZ, 7.30pm

16 Bristol ME meeting, via Zoom, 'on the computer' – contact secretary@bristolmodelengineers.co.uk

16 Leeds ME meeting, 'Record'and other vices by Jack Salter , Mid Yorkshire Golf Club, Darrington, 7pm

19 Cardiff ME Steam Up & Family Day, Heath Pk, Cardiff CF14 4AW

20 Tiverton & Dist MES running, Rackenford, EX16 8EF

24 Cardiff ME meeting, members' projects, Heath Pk, Cardiff CF14 4AW

24 Worthing SME club meeting, Field Place, 7.30pm

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.

ADVERTISERS' INDEX

STATION ROAD STEAM

ENGINEERS · LINCOLN
LOCOMOTIVE BUILDERS · BOILERMAKERS

Full-size and miniature engines of all types bought, sold and part-exchanged

We keep a large, constantly-changing stock of second-hand engines in all scales and gauges.
We are always interested in buying engines - from part-built through to exhibition-winning models.

4 INCH SCALE BURRELL SCC TRACTION ENGINE
A finely built Burrell SCC traction engine, in excellent condition throughout. Commercial boiler by Franklin & Bell, complete with canopy and driver's seat. The boiler has had a recent cladding off inspection, hydraulic and steam tests with new certification issued.

ref 10703 JUST ARRIVED

7 1/4 INCH GAUGE GWR 14XX 0-4-2T
An exceptionally well built 7 1/4 inch gauge GWR 14XX 0-4-2T. Overhauled and painted some years ago by a professional model engineer, it has been on display in the owner's house, unsteamed since that time. Built to Martin Evan's well-regarded "Dart" design using castings supplied by Reeves, standard of workmanship is to a high standard throughout; fit and finish of valve gear and motionwork is good, the platework neatly fitted. Free-steaming, it goes as well as it looks, running nicely in either direction

ref 10517 £14,750

3 1/2 INCH GAUGE "ROB ROY" 0-6-0T
Unsteamed from new, the locomotive is turned out beautifully, paintwork and lining both to exceptional standard. Fit and finish of motionwork and valve gear is excellent, the chassis runs well on air in both directions. ref 10716 £2,350

FAIRGROUND GALLOPERS
A set of fairground gallopers, an older model in need of some restoration work to the electric motor drive house in the base.

ref 10299 £1,250

7 1/4 INCH GAUGE "BRIDGET" 0-4-2T
A well built 7 1/4 inch gauge 0-4-2T to Ken Swan's popular "Bridget" design. The engine itself still runs well on air, we were impressed by the way it ran on the rolling road

ref 10056 £4,250

3 1/2 INCH GAUGE CALEDONIAN RAILWAY "DUNALASTAIR" 4-4-0
A 3/12 inch gauge Caledonian Railway "Dunalastair" 4-4-0 with bogie tender, an old engine with fabulous history. Professionally repainted in recent times, the engine has otherwise changed remarkably little in the last eighty years. The engine rolls freely, however given its age and history we've made no attempt to test or steam it.

ref 10526 £5,950

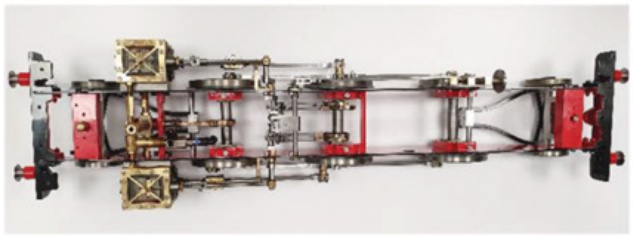
5 INCH GAUGE LNER B1 4-6-0
A 5 inch gauge LNER B1 built to Martin Evans' "Springbok" design. The engine is in running order - although requires a variety of jobs attending to. Pistons and/or valves leak, axle pump is ineffective (although injector and hand pump both work), the cab roof is missing. The boiler has had hydraulic and steam test, with new certification issued. ref 10356 £5,750

We are always interested in acquiring engines of the type that we sell. If you know of a steam engine for sale, in absolutely any condition, please let us know. Engines bought outright, or we are happy to take them on a commission sale basis, or pay you a finder's fee if you put us in touch with an engine which we later purchase. All engines listed are on our premises, available for inspection by appointment. Please do contact us, even if all you have is a rumour of an engine being available!

For full details, high resolution photographs and video see our website
Unit 16-17 Moorlands Trading Estate, Metheringham, Lincolnshire LN4 3HX
email: info@stationroadsteam.com www.stationroadsteam.com tel: 01526 328772

POLLY MODEL ENGINEERING LIMITED

Find us on



Build your own 5" gauge coal fired 'POLLY Loco'

Buy with confidence from an

Established British Manufacturer

Supplied fully machined, assembly requires hand tools only – no riveting, soldering or other complex processes. Kit includes **British** made boiler UKCA & CE stamped and accepted under Australian AMBSC regulations.

Model is supplied as a succession of kit modules. Spare parts easily available.

12 models to choose from, tank engines, tender engines, standard gauge/narrow gauge – something for everyone! Prices from £5999 including VAT and UK carriage. Build & cost is spread over 12 months.

Catalogue £3.00 UK £8 international posted (or download for free!) and enquire for further details or visit our website where you will find other Polly Locos, Kits, drawings and castings for scale models and comprehensive ME Supplies.

Polly Model Engineering Limited
Atlas Mills, Birchwood Avenue,
Long Eaton, Nottingham,
NG10 3ND, United Kingdom

www.pollymodelengineering.co.uk
Tel: +44 115 9736700

email:sales@pollymodelengineering.co.uk