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The Ottoman line

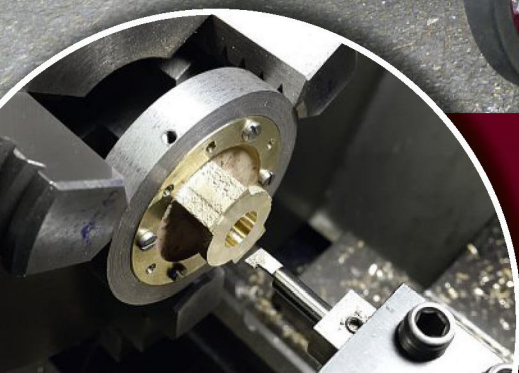


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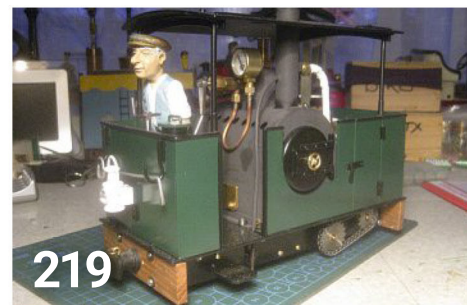


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Andy Potter's *Savage traction engine Gavroche*, seen ticking over by the steaming bays at the Parklands Railway Week (photo: Brian Baker).

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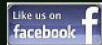
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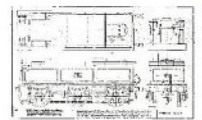


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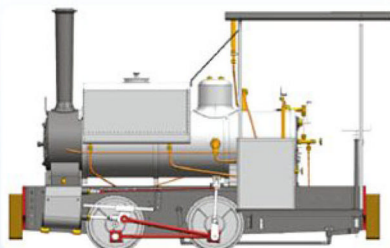
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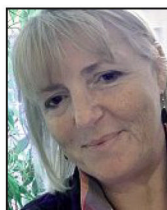
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MARTIN EVANS
Editor



DIANE CARNEY
Assistant Editor

NAME Awards

The Northern Association of Model Engineers (NAME) presented their Newsletter Award trophy for 2022 to the editor of the Polly Owners Group newsletter, Richard Taylor, at their recent AGM held on the 13th May 2022 at the Andover Society's track site. The award given was a suitably engraved cup, and was presented by Denis Mulford, chairman of NAME.

The reason this newsletter was chosen was for the clear pictures, clear and very clean text plus the fact that Richard writes most if not all of the articles himself.



Denis Mulford (left), chairman of NAME, presents their newsletter award to Richard Taylor (right), Polly Owners' Group Newsletter editor (photo Ian Mortimer).

A couple of weeks later at the Whitwell and Reepham Model Engineering Club track, next to the Whitwell and Reepham railway station, on Sunday the 2nd July NAME presented their Junior Engineers Awards for 2022.

The winner in the 8 to 10 years old category was Archie Munnings. Archie is dedicated to helping to run the railway and helps out with any jobs that are going on, including track work. He shows a good ability to be around locomotives and miniature railways.

In the 14 to 17 years age group the winner was Charlotte Munnings. Charlotte is also dedicated to helping at this miniature railway and other

heritage lines. Charlotte is happy to muck in when there is work to be done and is able to undertake most if not all jobs around the track and locomotives.

The awards were presented by Denis Mulford, who said "I'm sorry I did not get both their ages - Archie is now 11 years old but it was improper to ask a young lady's age".

Many thanks to Bob Hayter for sharing this news with us.



Archie receives his award (photo Sue Mulford).



Charlotte receives her award (photo Sue Mulford).

Rob Roy Rally

Ian Horsfield from the Bromsgrove club has asked me remind you of the forthcoming Rob Roy Rally.

This year's rally will be held on Saturday 16th September, 2023 - a date for your diary! The event is to be held at the Bromsgrove Society of Model Engineers, next to the Avoncroft Museum, Bromsgrove, B60 4JR.

I hope that we can have a good turn-out of Rob Roy engines, working or not. There is still time to do some fettling if needed!

Refreshments and a light lunch will be available.

If you know someone at your club with a Rob Roy please persuade them to come along too.

Please let Ian Horsfield know if you are able to attend (07857-336425 or 01386-792628).

Tony Walshaw

We were very sorry to hear that Tony Walshaw died in April of this year. He was the son of Tom Walshaw, also known as 'Tubal Cain', and was a professional model engineer. He carried out a lot of work for the Guinness collection in Ireland and his work featured frequently in *Model Engineer*. Our condolences go to his wife Anne and daughter Karen.

Unknown Engine

Richard Siddall, of the Leyland SME, asks if anyone can identify this engine (see photo), which he would like to complete. Its vital statistics are: base $10\frac{7}{8} \times 5\frac{1}{2} \times 2\frac{1}{8}$ inches; cylinder 2 inches bore and stroke; flywheel 6 inches diameter $\times \frac{7}{8}$ inch wide; disc crank 3 inches diameter. Any information gratefully received!



Can you identify this engine?

Martin Evans can be contacted on the mobile number or email below and would be delighted to receive your contributions, in the form of items of correspondence, comment or articles.
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Parklands Railway Week 2023

Brian Baker reports from a regular and very popular event on the Norfolk coast.



Kevin Brown, on holiday from Echills Wood Railway, eases Black 5 No. 5026 out of Parklands Central, aiming to get a quick few laps in on Saturday before the crowds appear.



Nigel Surman had barely unloaded his Hunslet, before George Witheridge, a local lad, had it in steam and on the track. We don't think Nigel got many driving turns in during the week.

One problem that we face at Parklands Railway, located in the village of Hemsby in East Norfolk, is that we are never quite sure how many, or if any at all, locomotives are going to turn up for our annual Railway

week. We could, we knew, rely on our regulars, some already booked into bungalows on site, or 'locals' visiting for one or a few days, but we are never sure about the other visitors, many of whom just seem to come on the spur of the



Another early bird was Martin Parham from Maidstone with his NER single No 1.



A regular runner on the track, enjoying his first visit to Hemsby, was Baldwin Lyn, owned by A. Hall, and attracting the interest of Don Witheridge Jnr. in its striking Southern livery.



Chris and Mick Jones are regular visitors to Parklands and this year they alternated between this elegant Southern Schools class No. 901 Winchester and their GWR Collett.



Conner Duncan showing dad Jamie how to drive this GWR Prairie 5552.

moment. However the numbers this year, including 43 visiting locomotives, meant that everybody was bound to have a great time ... and so we did.

Locomotives were already unloading on Saturday morning for this year's event, the 43rd,

and within a very short time five were circulating. Later on in the day they were joined by four or five others and we were still unloading arriving visitors' engines at 5.00pm. This year everyone seemed to want to bring rolling stock as well and



The weather turned cloudier later in the week but that did not put off Alan Beasley with his wonderful shay, or B. Henley with his Stafford Kitty, visiting from Chelmsford.



There's always lots of advice and comment around any steaming bay but I am not sure Pete Lawson appreciated it, lighting up his LMS 4F.



Sophie B is a regular visitor to Parklands and is well known on the 7½ circuit, fresh from starring on the 7½ Inch Gauge Society's stand at the Midland Show.

we had, at one point, an extra 18 coaches to find space for. Nevertheless, we did fit them all in and although, in theory, the railway usually operates with a maximum of 8 locomotives on the track at any one time, thanks to the smart operators in the station keeping things

moving, we did manage it, even though there was regularly double that number circulating. Sunday and Monday were very busy but everyone got a run more or less when they wanted to and although some left at the end of the Bank Holiday they were instantly replaced by



As usual with road works, despite the signs there is little activity surrounding this splendid roller and owner, John Dalton from Chelmsford, is trying to explain why this is.



We had a total of three traction engines this year and Andy Potter brought this fine Savage, which looked nicely settled in by the steaming bays.



Parklands Railway has a maximum permitted axle weight limit and when I heard that Tom Rolt from Echills Wood was coming I was a bit worried, but this excellent model, owned by Andy Spencer, didn't worry us at all.

newcomers who all seemed to enjoy running on our enticing and delightful railway.

A look at the railway

The railway was started as a hobby line by the late Don Witheridge in the early 1970s and recently some of his early videos have been refurbished to show how different the railway was then from as it is now. Initially a quarter mile

out and back railway, the track length is now about 4/5 of a mile and although one section is single track the rest is mainly double track with a very large reversing loop. The line includes two bridges, a viaduct, a tunnel, a through station (Laurel Green) and the main terminal, Parklands Central. I am sure that Don would have been delighted to see how enthusiastic people were



I have to admit that I spent many hours watching the full sized Schools pulling out of Margate, Whitstable and other Isle of Thanet stations, and they were one of my favourites, which is what I plead when I submit a second photo of Chris Jones' No. 901 Winchester.



Nigel Surman visits every year when he and Pete Lawson help us so much with the operation of the railway. However, Nigel's decision to dress as the Fat Controller is not on our wish list, however grand he looks.



We had two of these GWR 0-4-2 tank locomotives with us this week; Matt Gunn brought this one, No. 4863 from Echills Wood Railway and ...

about his lovely railway and he would have really enjoyed the company of the visitors.

During the week the variety of the locomotives visiting was such that I have elected to show captioned photographs to illustrate this - much easier than wordy descriptions. For part of the week the Chair of the 7¼ Inch Gauge Association, Janet Royston, visited the railway

for the first time and enjoyed herself so much that she said she would be returning next year, as did our worthy Editor, Martin Evans, who returned to us and, as ever, enjoyed his visit (or was it just the cake?)

The railway does not and never has charged for rides. Its operation is funded by the members' subscriptions, donations from the public and



16 ... Andy Spencer brought 5806.



17 Apart from assisting with the railway, Nigel also brought his Model T Ford again and enjoyed taking our gallant Editor for a ride round the local villages. One day all cars will be like this.



18 How does he keep that jacket clean, wandering round steaming bays and close to dirty steam locomotives? Martin and Martin (Parham) deep in conversation, no doubt about the contrast in GNR express passenger and freight locomotives on display.



19 A contrast in Holmside. Dawn Smith and Husband Paul are regular visitors to Parklands with their side tank version, whilst ...



20 ... D. Smith displays his saddle tank version, Bess; the full sized version also had both types of tank on offer.



21 That's quite a load for Jessie to pull up Dabson bank, particularly when the track becomes oily later in the week, but she managed just fine in the capable hands of Chris Day.



22 This is a rare model in 7 1/4 inch gauge but this is the second one to grace Parklands. Jordon Andrew brought this one from Yorkshire and enjoyed a good spell of running.



23 Despite the best efforts of the Platform Staff, you just cannot avoid a jam of locomotives and stock in Parklands Central, but perhaps they were wondering if a Great Western Locomotive should be pulling Pullman stock?



All the way from Somerset, 7¼ Inch Gauge Society Chair, Janet Royston brought her Maxitrack Simplicity, where it enjoyed a few days of bracing East Coast weather.



Without the valiant efforts of these ladies and the members and friends who made delicious cakes, every one would be hungry and thirsty but they managed to feed and water more visitors and members than ever.



GWR Phenrhos Grange No. 6868, lifts a well loaded rake of Pullman cars ready to tackle Dabson Bank in the capable hands of Simon Duncan.

the modest profits that our catering volunteers earn for us by serving hot drinks, bacon rolls and cake during the whole week. This year we were very pleased that their efforts resulted in an excellent contribution to our funds which will negate the need for the subscriptions rising at the end of the year.

For some time the future of the railway has been uncertain but, just prior to the week starting, we learned that the owners of the site had regretfully found themselves unable to continue holiday letting after the

end of 2024 and that changes would be necessary. So we now know that next year will be the last Parklands railway week which is sad but inevitable given the changes. As so many will be sure to want to attend next year, it has been decided to give priority to those staying on site and to those regular past visitors who have supported us over the years. Consequently, we will have a locomotive booking system in place next year.

ME



Bob Whitfield brought his C19 Denver & Rio Grande 2-8-0 No. 407 to visit us again and, as usual, handled much of the passenger traffic. Sadly, I did not get the name of the driver, a Canadian enthusiast who seemed to be enjoying himself.



First run at Parklands a few years ago, Eric Church's Pet class locomotive ran well but there seemed to be no takers for the 'Suicide Seat'.



Over the years Parklands Railway have been supporters of the 7¼ Inch Gauge Society Proficiency Scheme and this year Bob Whitfield represented the committee and presented three Silver and three Bronze awards to successful candidates who passed their final test during the week. Here he presents a Silver award to Harrison Frosdick.



George Witheridge, a previous Silver award winner, coaches Kyle Oliver, who passed his Silver this year, in driving a Hunslet steam locomotive, whilst owner Nigel Surman still hasn't had a drive.

Radial Valve Gears Again

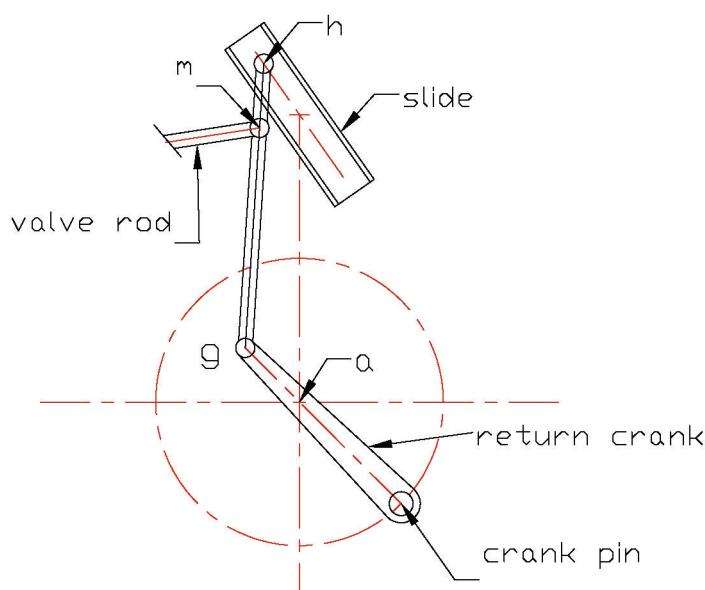
PART 5 – HACKWORTH VALVE GEAR

Duncan Webster sheds light on what is often seen as a complex subject.



Continued from p.147
M.E.4721 July 14

Fig 19



Layout of the Hackworth valve gear.

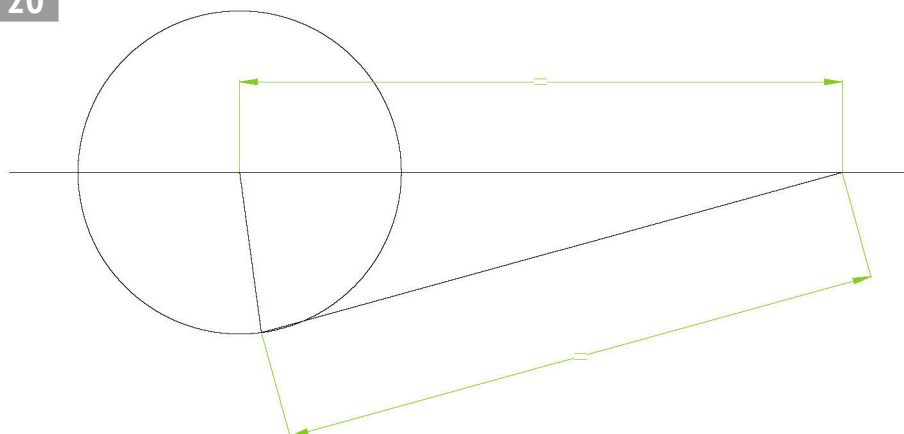


Edward Thomas (photo by Peter Broster - Edward Thomas, CC BY 2.0, commons.wikimedia.org/w/index.php?curid=49576914)

Excepting slip eccentric this must be the simplest valve gear available. The gear was patented in 1859 by John Wesley Hackworth (1820-1891), son of Timothy Hackworth who designed *Sans Pareil* of Rainhill trial fame. It is based on the principles outlined in Part 1 (M.E.4718, June 2) but, as will be seen later, it has certain shortcomings which have restricted its use except where extreme simplicity is required at the expense of performance.

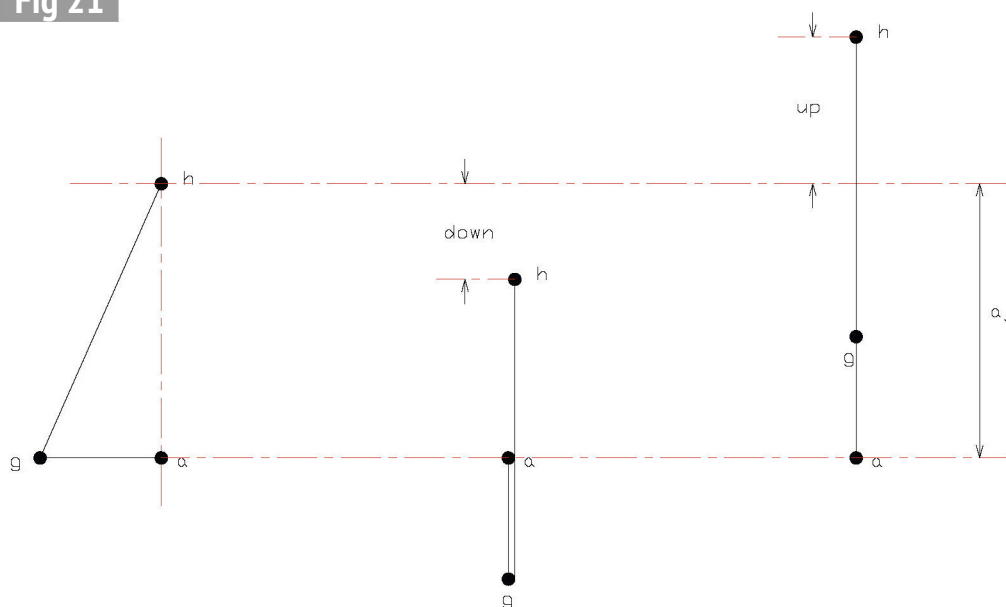
The layout of the gear is shown in **fig 19**, and a photograph of the locomotive *Edward Thomas* shows the valve gear (**photo 1**).

Fig 20



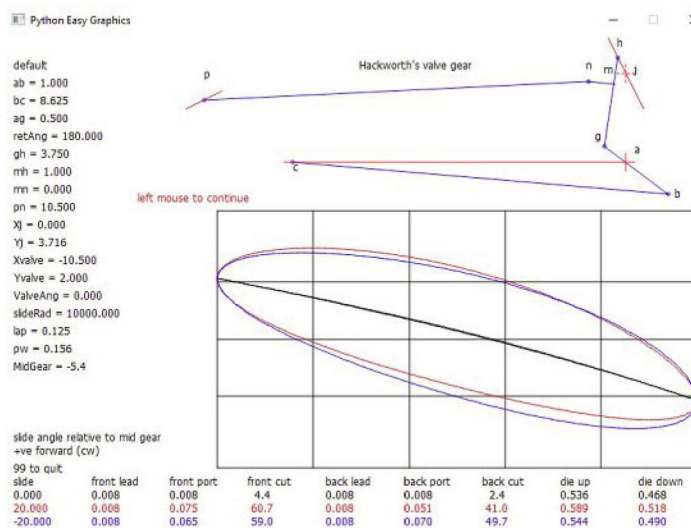
Connecting rod error.

Fig 21



Asymmetry in die block travel.

Fig 22



Valve travel vs. piston travel – straight slide.

All of the drive is provided by the return crank *ag* which extends to the opposite side of the axle to the crank pin. Attached to the return crank pin is the vibrating lever *gmh*, the top end of which, *h*, is free to run up and down the slide. With the slide vertical, when the axle rotates, the magnitude of the horizontal motion of point *m* can be seen to be in phase with, but in the opposite direction to the piston motion, whereas the motion up and down the slide of point *h* is 90 degrees out of phase with the piston motion. If the slide is tilted, some of this vertical, out of phase, motion is translated into horizontal motion which will be added to the in-phase motion, thus fulfilling the requirements above. The linkage is arranged such that point *h* is coincident with the slide rotation axis, *j*, at TDC and BDC so that slide inclination has no effect in these positions.

This all seems delightfully simple, so why wasn't this gear more widely used? There are three main problems.

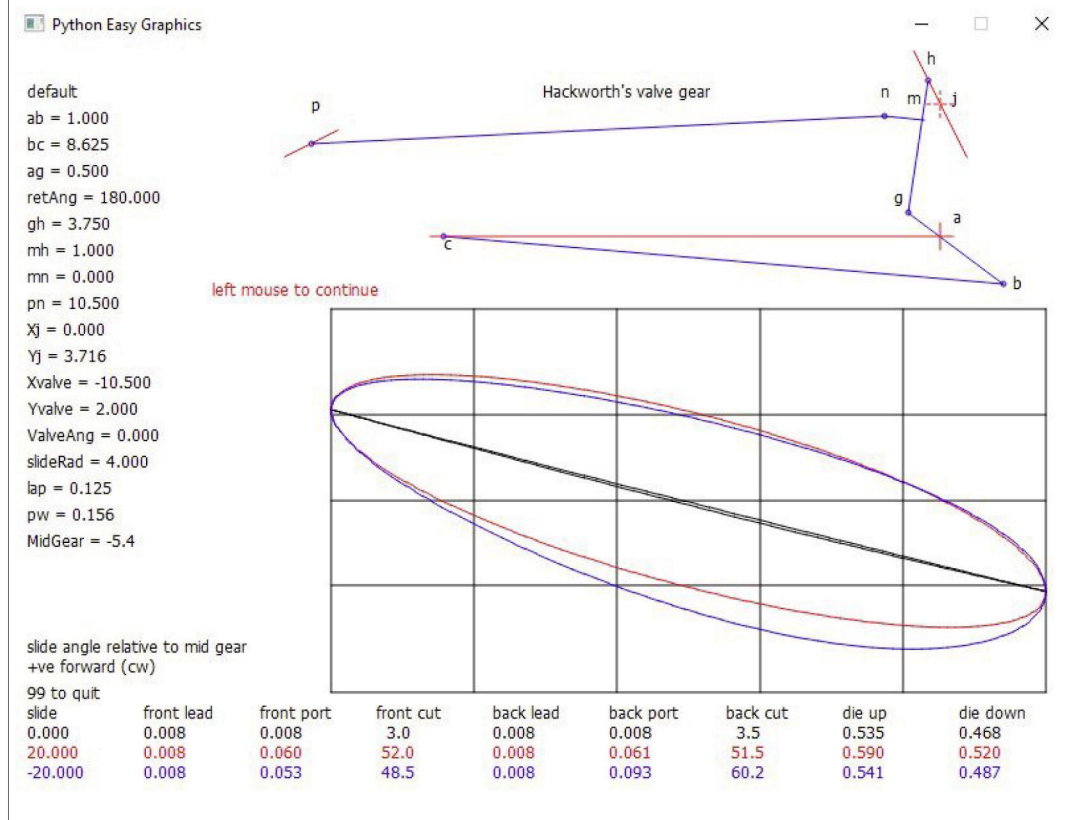
Firstly, as the crank turns, the connecting rod is displaced from the centreline and its effective length changes. This is shown in **fig 20** (exaggerated for clarity).

Using the dimensions of the well-known Sweet Pea model, when the piston has travelled half stroke the crank has only rotated 86.7 degrees, and when the crank has rotated 90 degrees the piston has travelled 1.06 inches rather than the 1 inch crank radius. This distorts the relationship between valve and piston and is part of the reason for the curved mid gear line in **fig 22**. Compared with some locomotives, Sweet Pea has a long connecting rod compared with its stroke, so this effect is not as severe as in others.

Secondly for the same reason, the die block will travel further up the slide from its mid position than it will down, as shown in **fig 21**. This puts a second distortion into the relationship.

Thirdly, as the axle moves up and down on the suspension ➤

Fig 23



Valve travel vs. piston travel – curved slide.

it will affect the out of phase component - on a tank locomotive, the ride height is higher when the tanks are empty.

Fourthly the straight slide causes a small error. Even with no slide inclination the front end of the valve rod would move back and forth as the die block rose and fell. Ideally it would be curved but that would cost more.

Figure 22 shows the output from my computer model of the Sweet Pea valve gear. The valve motion has been plotted vertically against the piston travel horizontally. Results are not good - strangely they are better in back gear. A good gear would have the same results in forward and reverse and a very good gear would have the shape of the ovals the same in the bottom half as the top (i.e. rotational symmetry). Deviation from the events which would be obtained from the idealised gear in Part 1 are not necessarily a bad thing, for instance a larger port opening could be obtained. Comparing

these results with 'ideal' would not be fruitful. Back gear being better was exploited in **ref 12**, where an extra rocker was inserted in the valve rod linkage to reverse the valve motion.

Note to get these results I changed the height of the slide slightly to ensure that points *m* and *j* coincide at dead centres.

Design

I had hoped to avoid any sums and do it all on CAD but this was not to be. Again, avoiding the working out, the radius of the return crank *ag* is given by:

$$ag = \text{inphase} + (\text{outphase} / \tan(w))$$

Various authors have recommended that the maximum slide angle (*w*) should be restricted to 20 degrees. Once you have positioned the slide above the axle, the CAD can be used to determine *gh* and vertical lines displaced either side of the vertical between crank centre and slide pivot will give *mh*. Further work on the CAD will give the valve rod length. There is a little program *hackDesign*

which will do the sums for you.

In almost all applications of Hackworth gear, the valve rod slopes down towards the cylinder end with the crank on centres. This is unavoidable as one wants *j* to be high to maximise *gh*. At the very least it has to be high enough to clear the wheels at full-up suspension travel. The computer model allows for this and sets the slide angle appropriately, in the case of Sweet Pea to 5.4 degrees anticlockwise from vertical. Slide angles quoted in fig 22 and **fig 23** are measured from this mid gear position, positive clockwise.

Slide design

In most applications the slide is a single sided tee slot arrangement with the connection to point *m* outboard of the slide. This is not a terribly good feature and wear is reported to be fairly heavy. It would be better with a slide either side of point *m* as used in Joy gear (see later episode). The original

designer Jack Buckler came up with an arrangement of links which he called 'Jacob's Ladder' which gave a very good approximation to a straight-line motion (**ref 13**). This will be explored in the next episode.

One of the beauties of a computer model is that it allows one to change things easily and see what the effect is. Taking the Sweet Pea dimensions and changing the slide from straight to a 4 inch radius curve gives the results shown in fig 23.

This is much better. Note I haven't built this for real but I'd be very surprised if the sums were wrong. The Jacob's Ladder straight line linkage could be modified to produce a curve but there is a suggestion that it might then foul the cab, so don't leap in yet. In the next episode straight line linkages in general will be discussed.

There are many other manifestations of Hackworth. Marshall gear, also known as Klug, uses a radial link to replace the slide but it is usually too short so does not give good events. Bremme gear turns the linkage through 90 degrees and has a radial link instead of a slide. It then has a bell crank to connect the end of the vibrating lever *gh* to the valve rod. As this allows *gh* to be long, and the radial link is a similar length to the now vertical *pm*, quite good events can be obtained. This is very similar to the Strong/Southern gear used on quite a lot of USA locomotives. The computer model will cope with Marshall gear and it would not be difficult to make it do Bremme etc. Brian Remnant won IMLEC some years ago with a Sweet Pea fitted with Bremme gear.

●To be continued.

REFERENCES

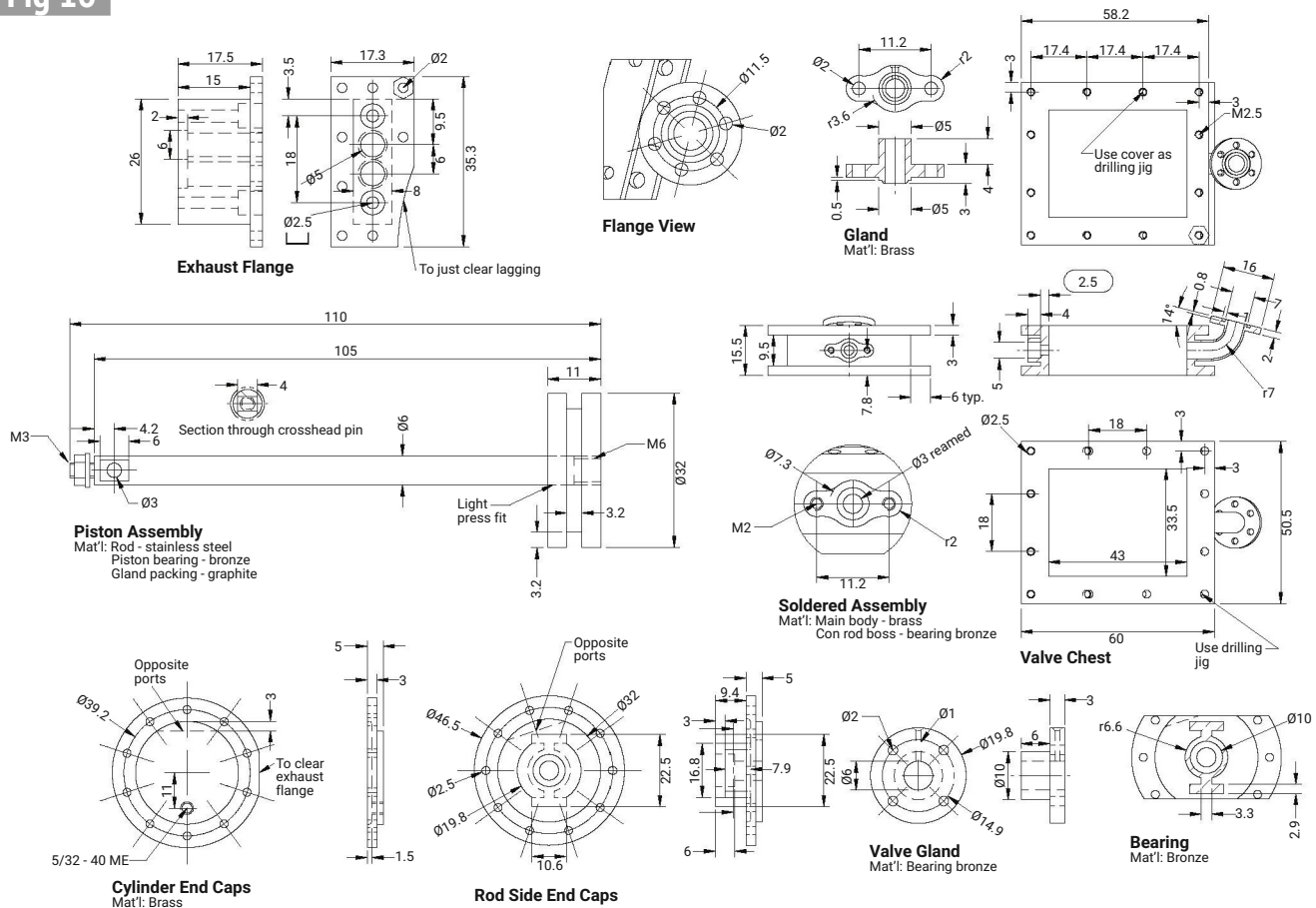
- Ref 12.** Simon Bowditch in *Engineering in Miniature*.
Ref 13. Jack Buckler in *Engineering in Miniature*.

A Five-Inch Gauge

0-4-0 Padarn Railway Tender Locomotive

PART 8

Fig 16



Pistons and end caps.

Luker builds a five inch gauge model of a Welsh slate quarry locomotive.



The pistons

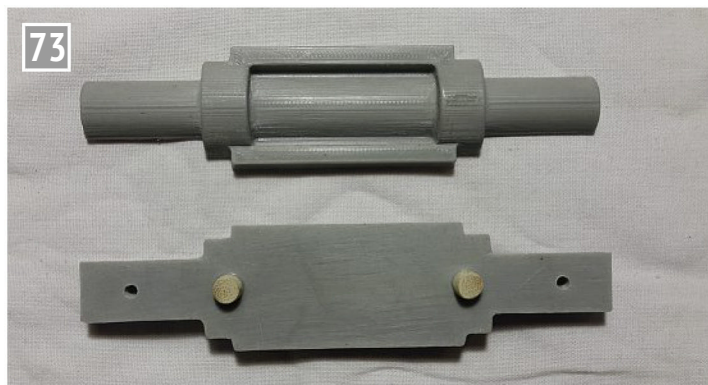
One of the common themes in this series has been taking up tolerance between components in the assemblies. This is nothing new for model engineers. In the previous article I mentioned how the original pistons in 1848 had adjustable rings to take up wear; thankfully, our little models are a little more forgiving with the piston design and manufacture.

The tolerance take-up on the bores needs to be done with the pistons (**fig 16**) and they, in turn, need to be perfectly concentric to the rods. I normally start by rough machining the piston, leaving at least 0.5mm on all dimensions to skim to size when assembled on the piston rod. The rod is a simple turning exercise and requires little description other than to keep an eye on the press

fit tolerances of the shaft. The rod is assembled to the piston by clamping the piston in the chuck and the rod in the tailstock and turning the piston rod home by hand. I always punch the end of the rod on the thread as an added measure to make sure the piston won't turn loose.

The whole assembly can be placed in a collet on the lathe and the piston machined to drawing. Keep the cylinder on

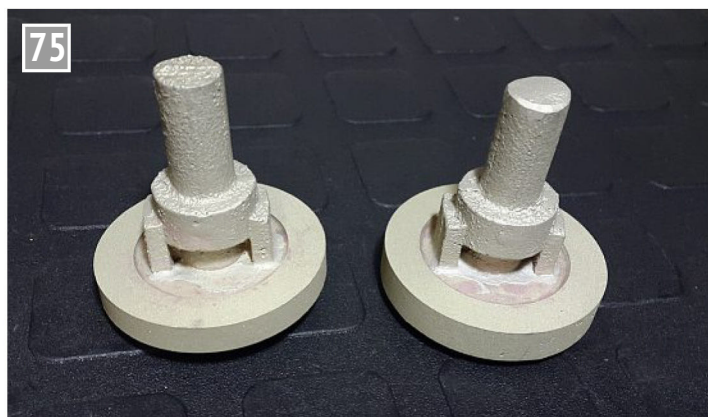
Continued from p.171
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73
Piston side end cap gland pattern, including two end cap flange bosses as well as the glands.



74
Piston side end cap components before soldering. With this configuration the piston rod slides on the stronger AlBr only.



75
Piston end cap final assembly. Note the detail (undercuts) that would be very difficult as a one piece sand casting.

hand to check the fit. You are looking for a mechanically free but steam tight fit. An easy way to check is to drop the piston down the cylinder with the bottom open; it should drop down easily (no piston ring or oil - that is cheating!). Then place the cylinder on a flat piece of granite (or

something similar like glass); the piston should sink down slowly. The other method is to 'seal' the end of the cylinder in the palm of your hand and pull the piston and release; it should bounce back. Don't be too pedantic about this fit; it's nice to get it perfect but practically, with the soft

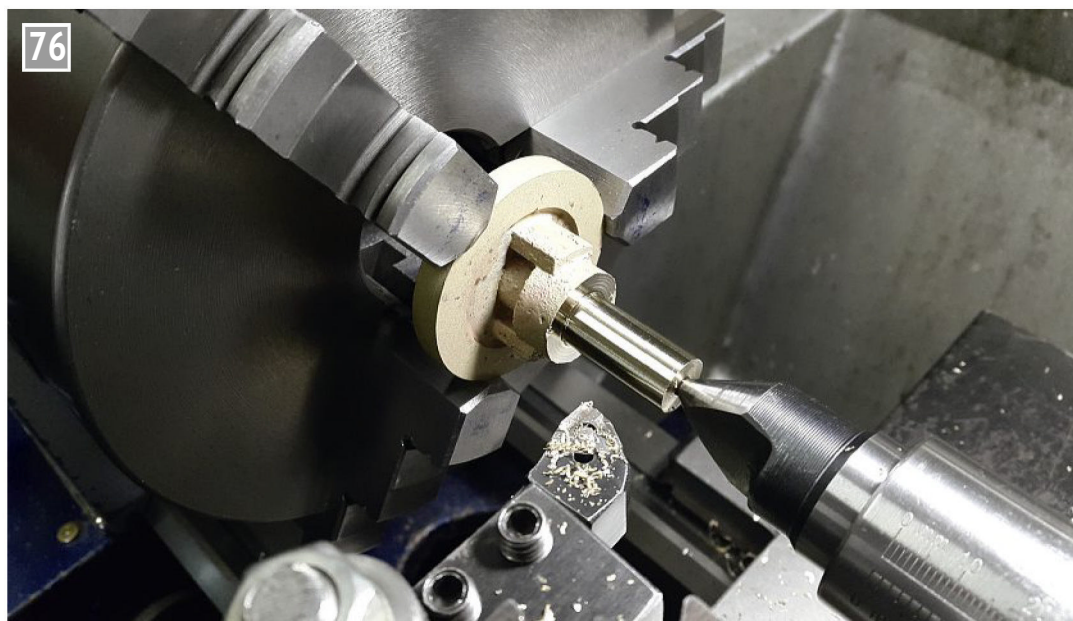
packing for rings and a thick steam oil, un-superheated cylinder, you would need a substantial rattle fit before you'd notice blow-by.

The cylinder end caps

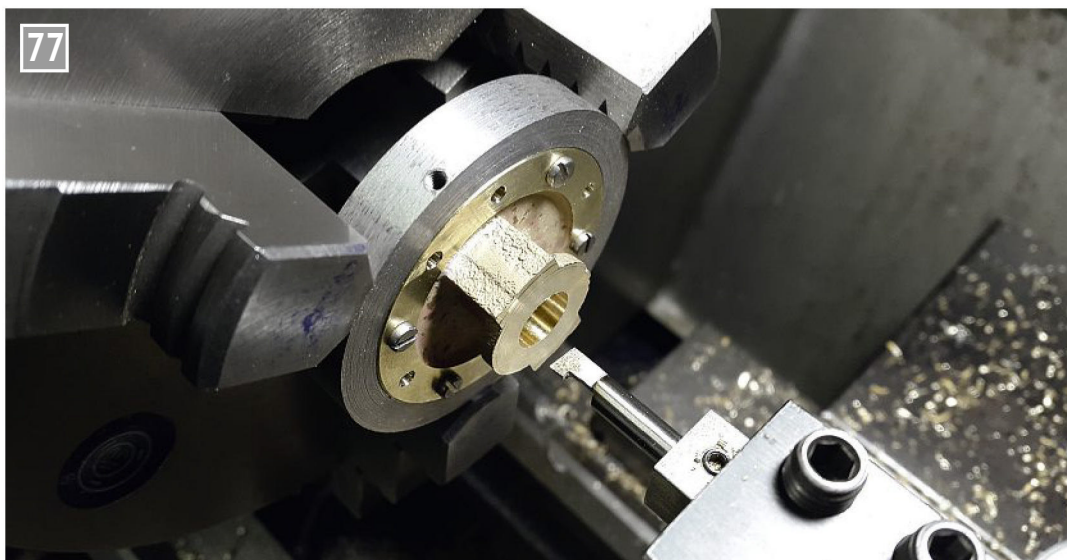
The piston side end caps are unique for this little locomotive and because they aren't hidden under running boards they tend to catch the observer's eye. It would have been much easier to get rid of all the recesses and make the gland mounting flanges thicker, but I decided to keep them perfectly to scale. This forced the use of my new AlBr to improve the shear strength for the gland studs and I also had to split the component for easier de-moulding (**photo 73**). The end cap gland bosses and flanges were then silver soldered to the end cap disk (**photos 74 and 75**).

All end caps should have a spigot to make the machining easier. Generally, it makes sense to add convenient hold points to patterns to streamline machining. Regardless of the quality of the as-cast surface, I will always skim these spigots before machining the rest of the casting. Clamping an as-cast surface is something I try to avoid, especially with softer alloys. The easiest method to line up the casting is to hold the spigot in the tailstock and clamp the rest of the casting in the chuck; this will ensure the casting is reasonably parallel to the lathe axis. From there the machining can proceed as normal (**photo 76**).

The rest of the machining is simple turning operations but here are a few tips. The piston rod bore is best reamed and this should be done in the same set-up with the cylinder bore lip, i.e. without re-chucking the part. The front caps can be loose in the cylinder bore, but the piston rod side needs to be a tight fit; the reason being, any misalignment to the cylinder bore and the piston will become tight when it's closest to the cap. Keep the cylinder handy and when you're close to size, take small cuts, checking the fit to the bore as you go. Also make sure there are no burrs on either the cylinder or the cap that might lead you to believe you still have a way to go. This is where holding back on the bore steam ports pays off. All corners can be broken and a very slight lead in on the lip can be filed using a fine file. Make sure you hold the file safely to avoid an



76
Cleaning the spigot for a more secure hold when machining the larger outside diameters of the cap.



77 Facing the piston side end cap and boring out the gland hole.



78 Checking the alignment of the centre hole with a pointer; if everything is a blur except the pointer, you're good!



79 Machining the guide bar flats using a guide collar fitted to a shaft, slipped into the piston rod hole.

the distance over the flats perfect. The dimensions will be spot on and the flats will be symmetrical and parallel around the piston shaft hole, making the later fitment of the crosshead and guide bars much easier.

The cylinder gland

The cylinder gland was part of the end cap casting and, after sawing it off, only required skimming the outer face and the spigot parted off to the correct length. The stud holes can be drilled with the gland assembled to the end cap in the holding jig using an M6 screw to keep it from moving. The stud clearance hole and tapping hole should be drilled as an assembly with the holes tapped using the clearance hole as a tapping guide.

Drilling the steam ports

Finally, I could come back to the drilled steam ports. To match the prototype cylinder cap stud layout, these holes aren't the same at the back and the front of the cylinder, so I would make a point of leaving little crib-notes on what is needed. The theoretical angles for all the steam ports are given in the cylinder drawings but I would check the angles to the side of the cylinder as per the norm (**photo 80**).

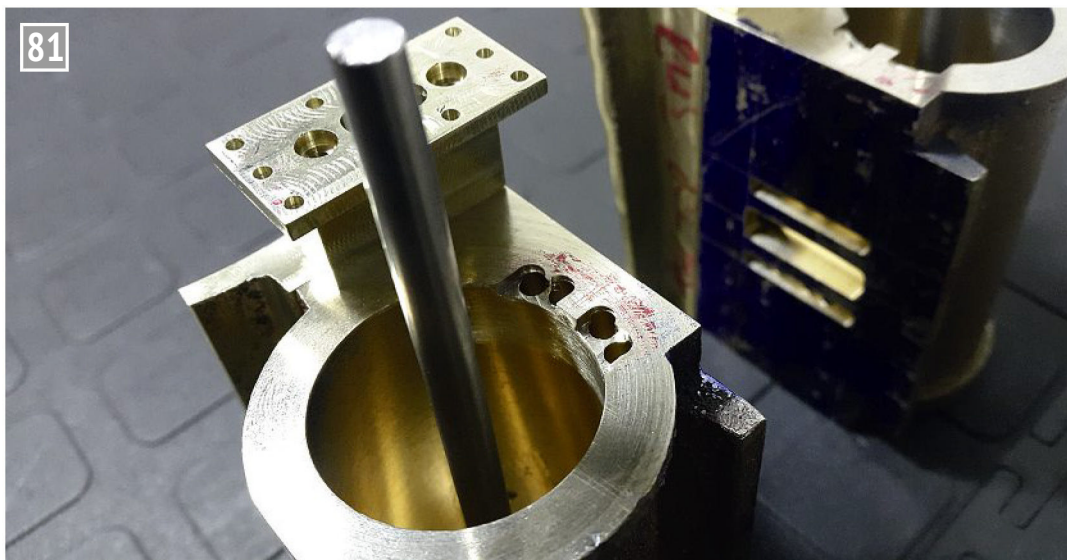


80 Checking alignment of the steam ports to the valve slots.

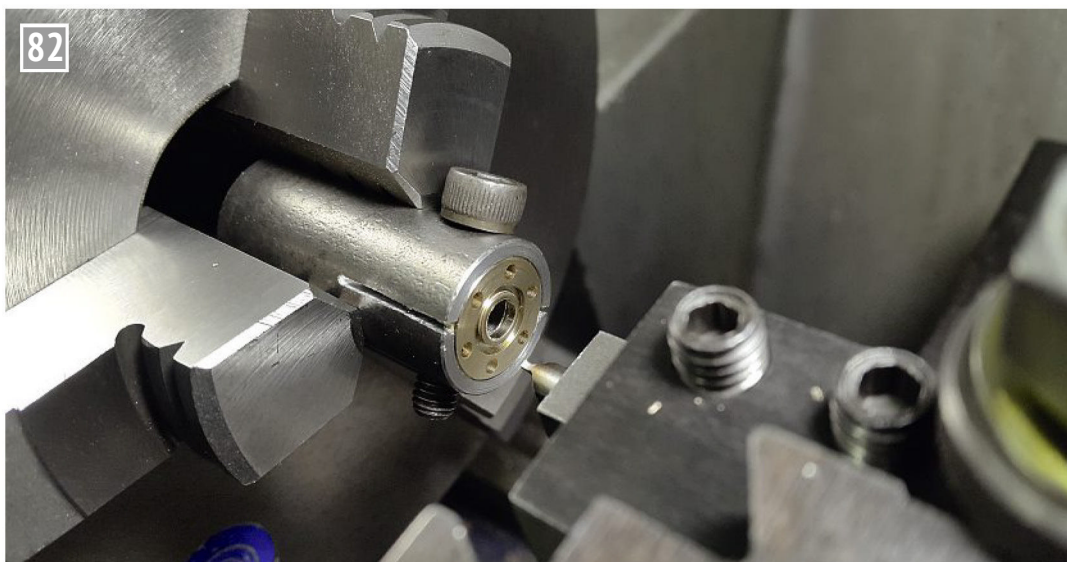
embarrassing hospital visit because you stabbed yourself with the file tang!

The final machining is done in a holding jig. A bottom recess (to clear the end cap lip) is needed to ensure the flange seats nicely in the jig. The stud holes for all the caps can be drilled for interchangeability using the steam port positions as reference. These same holes can be used to hold the end caps in the jig for the remainder of the machining operations. With the jig in the three jaw, the back of the end caps can be faced and the gland seal machined using the piston hole for alignment (**photo 77**). If the jig is machined properly a 6mm pointer pushed in the piston shaft hole will have no wobble when spun in the lathe (**photo 78**).

With the end cap still in the jig and a reference flat pressed on the fixed jaw of the milling vice (aligned with the table axis using a DTI) the flats for the crosshead sliders can be milled. I couldn't be bothered using the dial gauges to machine these flats; the chance of making a mistake is too great. The easiest way to machine them is using a guide collar (**photo 79**). This is just a cylinder with the OD machined to the across flats dimension with a spigot that fits into the piston rod hole. Taking light cuts across the flats until the collar is just touched will leave



Steam ports drilled and milled to the cylinder bore. Note the centre land for the end cap stud.



Valve chest steam flanges, groove machined in a simple clamping jig.

The exhaust ports are simple drilling operations with the cylinder assembled and - other than checking the depth and making sure the holes clear the reference hole drilled previously - posed few problems (**photo 81**).

Final flow through the steam ports and cylinder exhaust flange

The steam path through these cylinders is rather unconventional when compared to other locomotives. The steam inlets are pipes like some of the Crampton locomotives and the exhaust does a few twists and turns to get to the smokebox from the cylinder assembly. I paid careful attention to the flow dynamics, with the flow

paths specifically designed for these cylinders. The original locomotive actually had very well proportioned as-cast steam pathways and was probably a good steamer when the pistons were adjusted properly. There are a few notes on the drawings where corners need to be removed, specifically the exhaust channels, to decrease flow impedance.

After fitting the end caps and using them as drilling and tapping jigs for all the studs, the cylinder and boiler pads can be fixed together using RTV silicone. After curing, a drill should be turned by hand in all the steam channels to remove any flash from the silicone. Before painting the cylinders, any trace of silicone needs

to be removed by wiping with a solvent to get proper paint coalescence and adhesion.

The valve chest

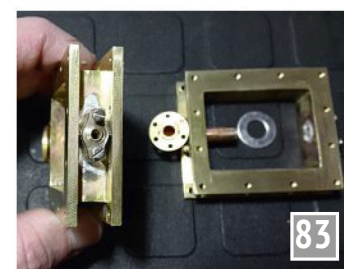
The valve chest is proof that I can fabricate certain components rather than being lazy and just cast them. In fairness though, it was much easier to solder brass square bar together and machine the general profile. The valve spindle insert and gland were made from leftover AlBr risers. The outer surface was filed using engineering buttons and radii guides, with the rest of the job simple lathe turning. The gland should have a distinct round and step on the valve spindle, if the full size components are followed pedantically, which

of course, they should be! This is easily reproduced using a forming tool in the tailstock, ground to the centreline similar to a simple D-cutter. If you don't want the bother of heat treating silver steel, any broken HSS tool with a round shank would make an excellent cutter. To get a perfect round recess at the centre of the HSS blank, it is clamped in a hand drill, which is in turn clamped down (safely). This is set to run as fast as possible and a second drill or micro-grinder with a small spherical grinding wheel (or diamond bit from the next visit to the dentist) is used to grind the recess. It's surprising how the two rotating parts tend to find the centre. The rest of the grinding is done the usual way.

The steam line flanges for the valve chest follow the prototype with an O-ring as sealing, suitably shielded from the live steam (**photo 82**). A number of these flanges were needed so it made sense to drill all the bolt holes in a stack of two or three using a drilling jig. The slot for the O-ring was cut using a simple clamping fixture in the lathe with the grooving tool ground from a broken centre drill.

The flanges were silver soldered to a suitably bent piece of copper and this was soft soldered (high temp, i.e. Pb free) to the valve chest. Similarly, the spindle insert was also soft soldered with the gland studs tapped through both the gland boss and the valve chest sides, to make up for any strength shortfall due to the solder running at elevated temperatures (**photo 83**).

●To be continued.



Valve spindle insert and steam inlet piping and flange soft soldered to the valve chest.

Book Review

The Hejaz Railway

James Nicholson

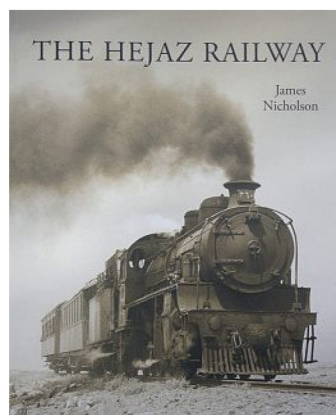
Published by Déjà vu Publishers (67 Normanhurst Ave, Bournemouth, BH8 9NW), 3rd Edition, 2022 ISBN 978-0-9558359-3-3 £27.99 + £2.85 p&p, 218pp, hardback (order through the website thehejazrailway.com)

For most British readers the story of the Hejaz Railway is indissolubly linked to Lawrence of Arabia and his Arab allies' attacks on the line. This book, in a new edition with an additional chapter, shows a rather different aspect of the railway. It was a remarkable feat of engineering not as well appreciated as it deserves to be.

From conception the Hejaz Railway was intended to bolster the prestige and reach of the Ottomans. Sultan Abdulhamid's empire was under threat by the late 19th Century with Russian conquests, the British occupying Egypt and breakaway elements in Arabia itself. As the Sultan was the protector of the annual Hajji (pilgrimage to Mecca) he would gain prestige from Muslims worldwide by building a railway to make the holy cities of Medina and Mecca more accessible. As Muslims are expected to make a pilgrimage to Mecca at least once in a lifetime, there would also be enhanced revenues from pilgrim traffic, which had declined during the 19th Century.

The line was built inland, mainly to stimulate trade and mineral exploitation, but partly to keep it away from any incursions by the Royal Navy. As the author points out the railway was largely Ottoman funded and built, not using the foreign loans that funded the Egyptian railway system, though it received donations from Muslims worldwide.

Construction was largely by labour from within the empire, including many conscripts



from the army. Though early attempts foundered, European specialists, notably Heinrich Meissner, a brilliant German engineer who deserves to be better known, ensured the line was finally built. He was helped by the Chief of Construction, Kazim Pasha, who mobilised resources from within the Ottoman empire.

The terrain was desert or semi desert so water supply was a problem, hence windpumps at most stations. Photographs in the book show just what desolate and spectacular scenery it traversed. There were rock escarpments to cut through and dry valleys ('wadis') to cross. These became dangerous torrents when rains did fall so engineers had to construct substantial stone viaducts. Almost the whole line was built on low embankments to minimise problems from drifting sands. Wood sleepers dried out and cracked in the extreme heat so steel sleepers were mostly used.

In the remarkably short time of just eight years the 1005mm gauge line was completed to Medina, though never to Mecca. Some

branch lines were built. Most locomotives were German built by Hartmann, Hohenzollern, Jung, Borsig and Krauss but others came from SLM of Winterthur. These were fuelled by limited supplies of Turkish coal supplemented by wood. Arabia's oil was then unknown.

Sadly, the line enjoyed only a brief successful operation. The First World War saw Britain and France pitted against an Ottoman Empire in alliance with Germany and Austria. The Hejaz Railway was a vital link for the Ottomans to their garrisons in Arabia where local tribes were restive. Allied military operations against the line could tie down large numbers of Turkish troops.

Although Colonel T.E. Lawrence is the best-known commander he never claimed sole credit for attacks on the railway, mobilising tribes resentful of Turkish occupation. The book summaries well raids on the railway which finally ended services despite valiant attempts by Turkish troops to maintain the line. Postwar it was never fully rebuilt and later 20th century rebuilding plans came to nothing.

This book is an attractive and informative work, a good example of what an amateur publisher can achieve. There are copious illustrations of the line under construction, trains in operation and the route today. Although I would have liked more engineering detail, particularly about the locomotives, it is an engaging and enjoyable railway history.

Roger Backhouse



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Signals

Dear Martin,

I have been following the recent articles by Mike Hanscomb on the Beer Heights Light Railway signalling. I must say I am somewhat disappointed that the opportunity was not taken in the upgrade to make the colour-light signals more suitable for those of us who are colour blind. This disability affects around one in twelve of the male population and one in two hundred of females, so around four million have the disability in the UK. It is the colour detecting nerve cells called cones which are sensitive to red, green or blue light that people who are colour blind either don't have or do not work properly. It is often hereditary but it can also develop later on in a person's life. It may be caused by certain diseases or illnesses, people getting older and also particular types of medication. To my knowledge there is no known cure. Contact lenses and special glasses have been talked of in the past but I am yet to see any of these and my optician knows of none that work.

So what can be done? Well the obvious is to steer clear of the most common colours that a person with colour blindness cannot distinguish properly, namely red and green. Personally, I have problems with distinguishing between reds, greens, browns, oranges, blues and purples. Currently I rely on the green light being at the top of the colour-light display, which it is at my local track. Visiting another track can bring problems if all the green lights are not at the top, then one has to remember which are top and which are bottom. It can get confusing. Club members are always helpful in putting me right on this, but many are surprised at my question and have never heard of the disability. Neither

have Sky and many others. Red/green LEDs should be banned!

With the use of LEDs it should be possible for the red light to be a cross, say, and the green an arrow in the direction of travel. The amber in that case could just be a circle. This would certainly help me and I am sure others who are also affected by this disability. Maybe other clubs thinking of upgrading their system could consider this.

Finally, I would suggest if you have children or grandchildren get them tested for colour blindness. You can find suitable test cards on the internet. I went through junior school with my teachers thinking I didn't know my colours and it wasn't until I was twelve that I was tested and the real reason discovered.

Malcolm High
(Doncaster)

Dear Martin,

In his interesting article (M.E.4717, May 19) Mike asks for help in sourcing 'unusual

relays'. Let me be the first in the queue to offer an idea - electronics can help.

Before he dies of shock I hold my hand up to having a modest interest in electronics, admiration for the folks who contrived to get mechanical items to exhibit such behavior as the relays he has been using and a reluctance to have too much electronics in this magazine.

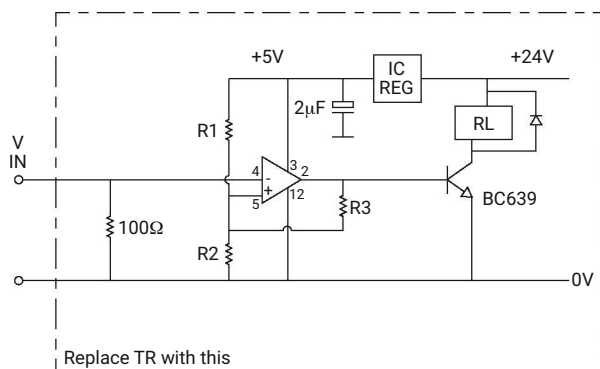
I offer an outline of two options that would be cheap to build and I am sure others could offer more.

The trickier part is the hysteresis he requires.

A voltage comparator is easily made using an operational amplifier as the switch and a reference voltage using a combination of a zener diode and two resistors giving either the 3.2 or 2.0 volts he requires (or any other voltages). These cause the op-amp outputs to flip from off to on. Fed into a simple Transistor Transistor Logic (TTL) array to provide the logic this could easily give the required action with buffered output via a relay providing as many volt

Fig 1

Electronic 'Relay' With Hysteresis



Comparator type LM339 or equal

RL 24V relay
Contacts not shown

All resistors kΩ

R1	10	10	10	10
R2	10	10	10	12
R3	20	13	18	20
V IN	2.0	1.8	1.96	2.1 = Relay ON
	3.0	3.2	3.04	3.2 = Relay OFF

free contacts as required to interface with the rest of the signalling system.

Alternatively, a lower component count system can be developed with a single op-amp and resistor network. Search the web for 'voltage comparator with hysteresis' - the maths is a little more tricky.

I offer the attached circuit as the simplest solution I can come up with. I cannot quite match the present switching voltages but hope the various alternatives offered are close enough.

Components are not critical and the suggested types are cheap. A suitable supply voltage would be 12V to 24V with relay coil to match. Standard resistors of 5% tolerance I normally find are within 1% and more than adequate.

The relay current will be turned off at the higher input voltage (Vin) and turn on at the lower voltage. With standard changeover contacts this will interface with the existing signalling.

This is not a difficult circuit to build if you are reasonably familiar with electronics.

Kind regards,
F. Wilson

Gauge 2

Dear Martin,

I was interested to read John Arrowsmith's article in a recent *Model Engineer* (M.E.4717, May 19) about the possible revival of interest in Gauge 2. David Viewing is certainly doing his best to promote interest in Gauge 2, as described in John's article and is busy employing the latest technology to bring this scale and gauge back to life after its demise, with activities involving 3D printing and radio-control of battery and steam powered locomotives hauling trains of

vinyl-covered coaches based on the tinplate rolling stock that was manufactured more than a century ago.

An equally interesting 'Gauge 2 Revival' comes down to us via the life and work of someone for whom Gauge 2 never disappeared. This modeller was Francis Ashley (1910 – 1991), whom I was lucky enough to get to know when growing up in Ilford during the 1950s. Francis decided he would collect vintage Gauge 2 equipment and would start building a layout on which it could be run. I was invited to his home every Tuesday evening where he had begun building an 18 x 32 foot Gauge 2 layout, presumably with the intention of eventually exhibiting it. Work was proceeding on two heavy 8 x 4 foot boards resting on trestles. I was invited to be his apprentice and in return he would teach me all I needed to learn about railway modelling.

Although Gauge 2 had been provided by the trade in the first decade of the twentieth century, much of it was in the 'tinplate' and 'toy-like' tradition. Francis was of an artistic temperament and was much influenced by a railway modeller named John Ahern who was ahead of his time in promoting the concept of 'scenic modelling'. Ahern's famous Madder Valley Railway, now preserved at the Pendon Museum, demonstrated that model railways should not just be about trains; they should show the environment in which the railway existed. This was a practical idea in 4mm ('00') scale but, when Francis applied the idea to the Gauge 2 layout he was building, it took on mammoth implications.

Francis disliked tinplate coarse scale track and therefore many hours were consumed in building a 'fine scale' track on which the Gauge 2 trains would run.

Francis also disliked model railways that were nothing more than simple circles of track – as far as he was concerned a railway had to go from one place to another. His concept of the Smoghampton & Greenhills Railway was therefore hopelessly ambitious – it was more like a club's project than an individual's endeavour. To run this railway Francis had spent the post-war years buying and collecting the locomotives, coaches and wagons that had been manufactured before the First World War. He was a member of the Gauge 1 Society and bought quite a lot of equipment from Gauge 1 enthusiasts who had bought Gauge 2 models by mistake – the difference in size being fairly minimal. It is also believed that some Gauge 2 rolling stock had been regauged in the 1920s to dispose of unsold stock – stock that was even more obsolete once it became clear that Gauge 2 no longer had the backing of firms like Bassett-Lowke.

Unfortunately, life's twists and turns meant that Francis never completed The Smoghampton & Greenhills Railway, and therefore it was never exhibited. He was an accomplished violinist and something of a showman and it is sad that he never had his public moment of presenting Gauge 2 trains to the public – nor did enjoy the fame that was rightfully his as the world's only modern-day modeller to be working in this obscure and obsolete gauge and scale!

As Francis faced the problems of growing older, he reluctantly decided he would have to place his Gauge 2 collection in the hands of an auction house to raise funds to pay for his care. He did offer me the entire collection at a very reasonable price but at the time I was not able to respond positively to the generous offer.

Although most of the collection was placed into the hands of Christies, and earned him reasonable funds with which to face old age, Francis decided to retain a small collection of some of his favourite items. Later he told me he had decided to bequeath this small collection to me on condition that I did my best to build a version of The Smoghampton & Greenhills Railway and would exhibit it.

All this came to pass. After Francis' death, in 1991, I acquired the Gauge 2 equipment and had to consider how to make the best possible use of it. I assembled a reduced-size version of The Smoghampton & Greenhills Railways as a simple terminus-to-fiddle-yard layout which I took to several shows – achieving some of the plans Francis had devised to share the wonders of gauge 2 with others. I found myself making one compromise of which Francis may not have approved. Francis was firmly committed to clockwork propulsion and 90% of Gauge 2 locomotives built before the First World War were indeed spring driven. I could not bring myself to fit electric motors to the three Gauge 2 locomotives I had inherited from Francis and to bring the railway to life I have commissioned brand new locomotives built in the 'Bing for Bassett-Lowke' style. David Viewing has taken this idea further by using radio-controlled battery or live steam propulsion.

'Gauge 2' is too close to the popular scale 'Gauge 1', and is unlikely to ever be revived commercially or individually but there are a few of us who have carried on as Francis Ashley would have wished and have kept the flag flying.

Best wishes,
Ned Williams
(Wolverhampton)

LNER B1 Locomotive

PART 25 – COUPLING RODS

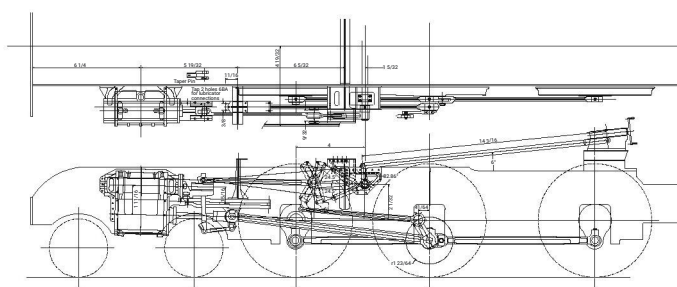
Doug Hewson

presents an authentic 5 inch gauge version of Thompson's B1 locomotive.



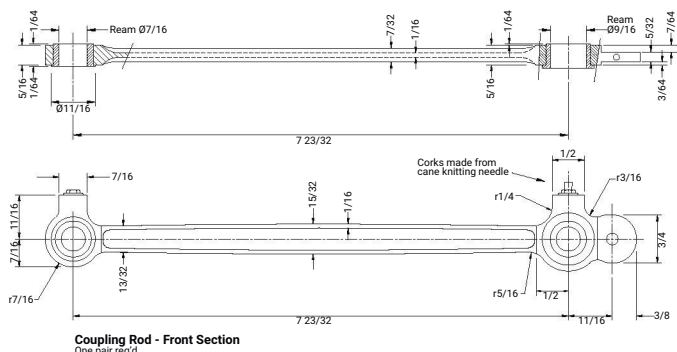
Continued from p.156,
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Fig 88



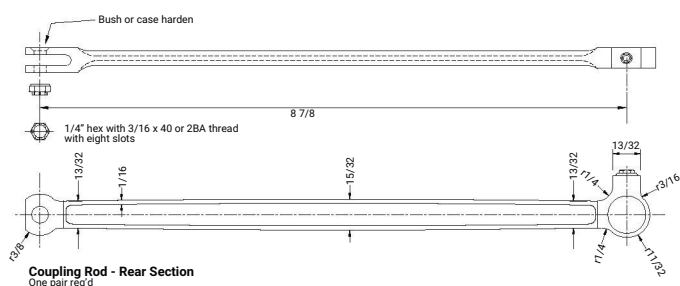
General arrangement of the motion.

Fig 89



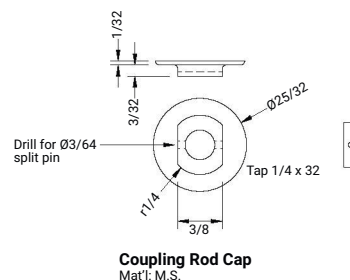
Front coupling rod.

Fig 90



Rear coupling rod.

Fig 91



Coupling rod cap.

I thought that this time we would have a look at the valve gear for the B1 and I have heard excellent reports of the Martin Evans valve gear so I have just drawn it out as is (hopefully) so the only alteration I have added is some detail on the crossheads and oil boxes (**figs 88 to 91**). Whether the lap and lead movement are the same or not I don't know but from what I have learnt from Eddie Gibbons commissioning my 4MT I may have added a little lead as it made such a difference to my own engine. He said it has now got its 'chuff' back. I do know that Eddie added about 15 thou overall. I have heard a friend's engine running and this particular engine does not have much 'chuff' at all so I do hope my B1 has a bit.

I have made a start on the coupling rods but have copied the prototype as nearly as possible which means adding the oil boxes on the ends rather than just putting an oil hole in the tops (**photo 173**). As you will see I have stamped the locomotive number on my connecting rods as it is just another way to deter someone from stealing my engine. The frames are also stamped elsewhere on my engine. I have also used cast iron for the big



Rods correctly fitted with oil boxes.



Coupling rods made by Mike Jack.

end bushes as it lasts about four times longer than bronze. When I was in business, I always cut the sprues off the castings so that I had a little stock of them handy. The oil box tops are just a press fit in the rods. The felt padding was an offcut which I happened upon when I was replacing the rods on the full size 75069.

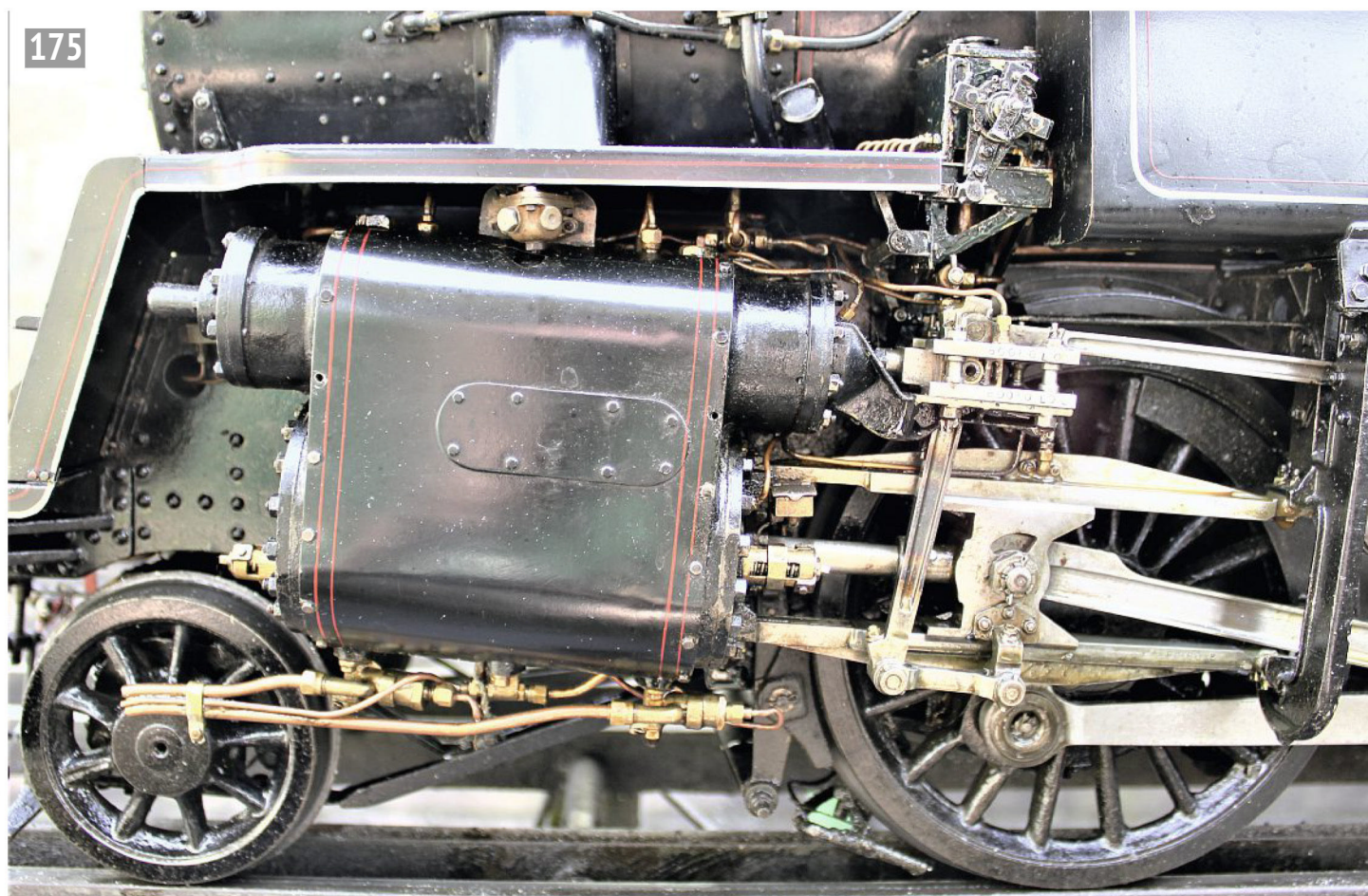
Photograph 174 shows a set of rods which Mike Jack in New Zealand made for me which I sent to another customer. They were made with flutes in them

as they were built for one of the earlier locomotives. They are just as they arrived from NZ so all I had to do was to fit the bushes and give them a bit of a polish. The same source is available from Geoff Stait at G & S Supplies. **Photograph 175** is my own valve gear assembled on 80080 as it was taking water at Gilling one day.

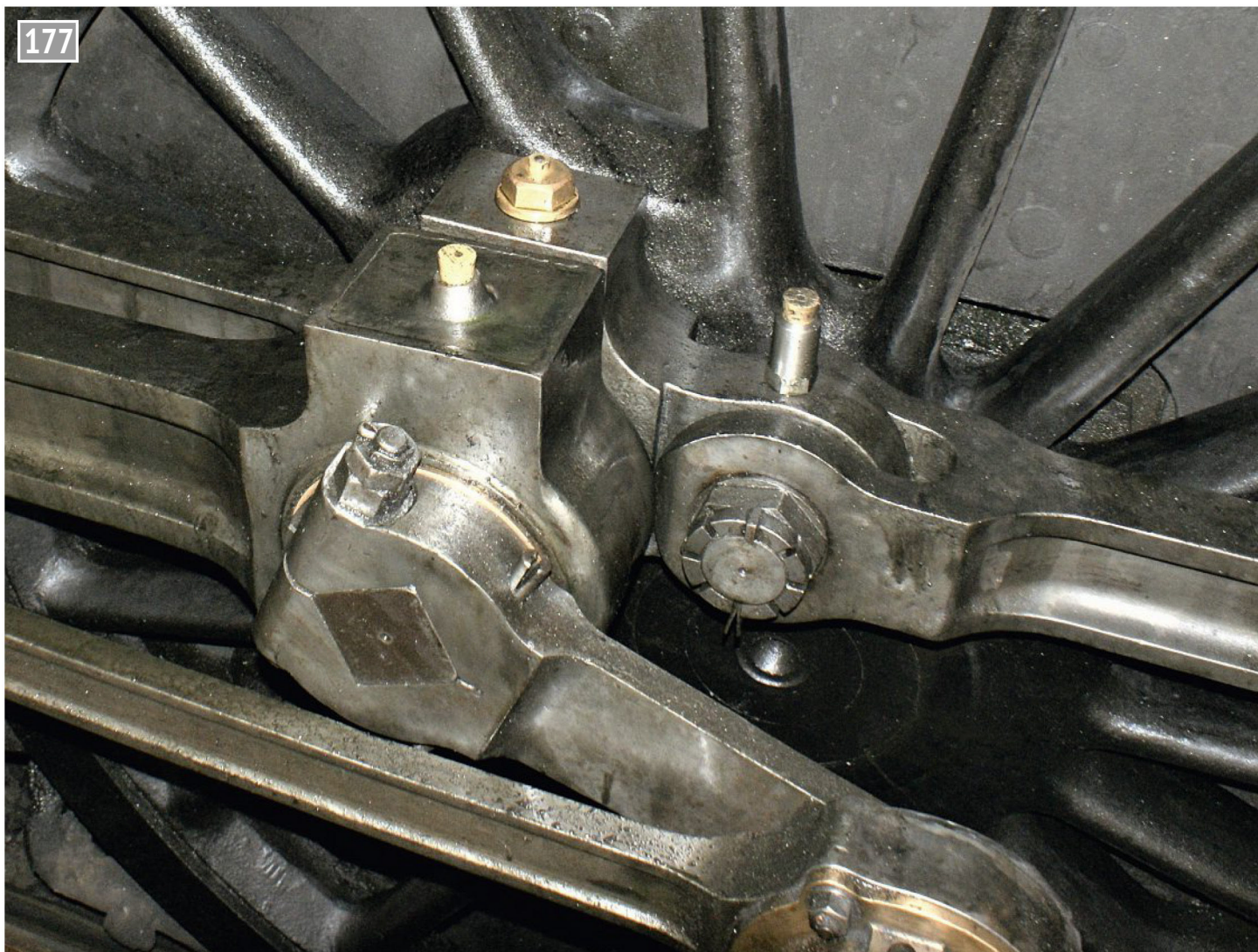
I have made the gradient pins correctly for the knuckle joints in the B1 rods and **photo 176** shows what they should look like. There is a



Detail of the knuckle joint.



Valve gear on the author's 4MT 80080.



Detail of the oil boxes.



Detail of the retaining collar.

castellated nut of course but note that they should have eight slots across, not just six as one might expect. You can see from **photo 177** the big ends of the rods on 61264 and, as you will see, there is a plate which is made to lift out on top of the oil box but most people I am sure will not have noticed this. The whole top of the box is made to lift out so that it can be cleaned out occasionally (very occasionally I shouldn't wonder!). That was why I simplified it as I didn't think that you will be running your B1 to London and back. You can now see the nut on the gradient pin with its eight slots and its split pin through. I notice that the gradient pin also has its own little lubrication pipe to it so it wouldn't hurt to add that as well and then you will be ahead of me!

Photograph 178 shows the trailing end retaining collar for the rear rod on 61264 which is quite visible so it would be very nice to see this kind of detail on your engine. Now, after all I have said on this subject on detailing your own engine, I wouldn't be very surprised if adding this detail will add up to a day's work to make a proper job. So just have a think about this.

●To be continued.

NEXT TIME

We move on to the crossheads, slide bars and connecting rods.

William Spence

PART 15

Cliff Almond continues his description of a potential unusual narrow gauge 0-4-0T for 7¼ inch gauge

Continued from p.93,
M.E.4707 December 30 2022

Cylinders and steam chest design

Followers of my articles may recall how I came across a set of prints of the original Guinness drawings, and that many of these had shown signs of damage, caused when the brewery suffered a flood before they could be copied. These, despite being invaluable in developing the design for *William Spence*, have given me considerable challenges, due to many areas of most of the drawings being smudged or blurred due, I have been reliably informed, to water damage.

This has been particularly challenging during the designing of the cylinders and steam chest.

The art of producing Victorian engineering drawings

I am sure some readers may be asking how it was that the drawings were not totally destroyed by the flood water? After all, paper will just breakdown and eventually degrade in water and form *papier mâché*.

The answer lies in the fact that engineering drawings in Victorian times were produced on a heavy, waxed linen sheet by tracers. This is probably why a set of the original drawings survived the flood, although the ink was affected by the water.

Drawings produced on waxed, lined sheet were quite robust and could be stored for many years. Also, if one is lucky enough to have access to either original drawings, or prints from them, you would notice that, unlike the modern practice of revising or superseding drawings and including a revision letter or

number, and new drawings produced, drawings 'traced' onto these linen sheets would often be updated or revised with areas of the previous design redrawn or simply notes added.

The tracers were responsible for transferring the original design drawings, created by the draughtsmen in the drawing office, to the final production drawings that would be printed and then sent to the shop floor.

Working from, typically, flat tables (unlike the angled drawing boards of the draughtsmen), the process involved 'tracing', in ink, the original pencil design onto the heavy, waxed, linen sheet. In addition, many old engineering drawings were 'coloured-in' to identify different parts; this was quite a common practice on general arrangement or complex sectioned drawings, with water colour being used, which was translucent and enabled the black ink outlines to still be visible. It was traditional that tracing would have been carried out by women as they were considered to possess the patience and dexterity to work quite quickly.

This tradition, in fact, carried on through to when I began working in the drawing office in the mid 80's, where a number of women were still being employed to trace drawings and were referred to as 'tracers'. However, the materials used had changed to polyester sheets or tracing paper. To some degree, these materials allowed manual updates, by 'scraping' the surface of the material with a sharp scalpel to remove the ink and allowing the drawing to be revised or updated. However, if

changes were made on the less robust tracing paper, it was very easy to 'scrape through' the paper and ruin the whole document!

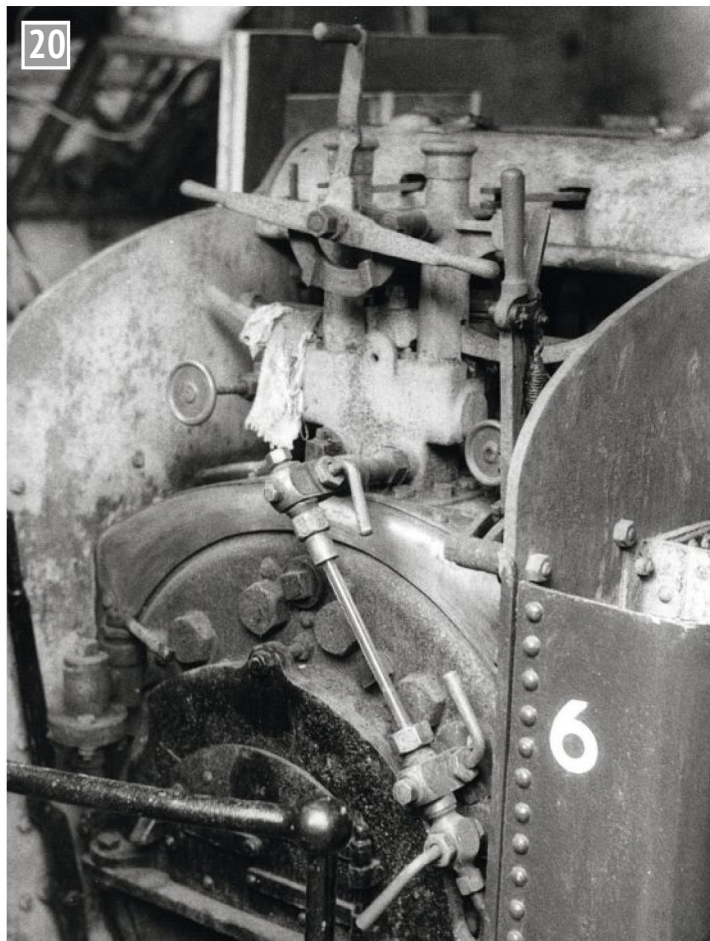
Another thing I quickly discovered was a disadvantage with tracing paper was its susceptibility to changes in temperature and humidity. Whilst this wasn't a problem in the climate of a drawing office, I once was working on a set of valve drawings for a nuclear power station being constructed in South Korea and was working from a very hot and humid portakabin in a car park. Overnight, as the temperature and humidity changed, the drawing you were working on could 'ripple' or even pull away from the masking tape or clips holding it on the drawing board!

The practice, and name 'tracer', finally faded away into history with the advent of Computer Aided Design (CAD), which started to become common from around the mid 1980's, although I was tasked with training the last 2 tracers employed in a company I was working for, on CAD. Although their method of producing drawings changed from actual tracing to draughting with a computer and then printing the design on paper via a plotter or printer, they were still referred to as tracers by many in the drawing office – although, sadly, this term was used in a mildly derogatory way by some 'old timers'. This phase then changed to 'CAD Jockeys'. However, the reality was that they did not trace anymore but reproduced the designs from the draughtsmen onto the computer, therefore needing quite a high degree of knowledge about the particular

➤



Scrapped William Spence front view.



Scrapped William Spence footplate view.

part or component they were given to work on.

An interesting further diversion to the history of tracers, I have discovered, was the exclusive employment of women in the tracing office at the end of the design office on the top floor of the Supermarine Spitfire works at Woolston, near Southampton in the late 1930's.

Not only can these women be credited with carrying out a very important job in the development of, arguably, one of the most famous fighter aircraft in the world but this skilled profession would have also been found across all of the companies that developed so many of the aircraft of World War 2, and, indeed, the 'machinery of war'.

Of course, as well as this, women would have also been employed, almost exclusively, in the design offices of the GWR, LNER, SR and so on, right up to the end of the steam era and, to some extent, through into the diesel era.

Anyway, back to the business of designing the cylinders and steam chest for *William Spence*.

A good friend of mine has recently made contact with a person on an internet forum who said he had a set of prints and photographs, as well as a manuscript relating to the prototype Guinness engine.

Further communications took place and the owner advised they had been his father's, who was in the process of building a Guinness locomotive himself but had sadly passed away. They had, therefore remain untouched for some time with them looking for a worthy new home.

To my amazement, when I acquired them, there was an almost full set of 62 prints in good condition, with no water damage! At this point, I should advise that the prints appear to have produced from microfiche.

Unfortunately, I have been unable to establish whether any progress was actually made with this gentlemen's project or to what scale he was

intending to build it. However, I suspect it never progressed much beyond some initial thoughts as there was no mention in correspondence about any drawings produced or parts made.

Accompanying the drawings was also a set of black and white photographs of one of the Guinness locomotives looking in quite a sorry state, in what looks to be an old building, surrounded by junk. It would appear that it may have found its way to a new home, with a view to restoration at some point. The photographs also came with a set of negatives and a receipt, dated 1980 for £3.91, and the recipient's name of Snowden.

With this great acquisition (for which I am very grateful) I have now been able to consider, in detail, the cylinder and steam chest design (photos 19 and 20).

First reviews of the cylinder general arrangement suggested a very complex set of castings, comprised of three principal parts, viz. the left and right-hand cylinders which 'sandwiched' a single steam chest (figs 13 to 15).

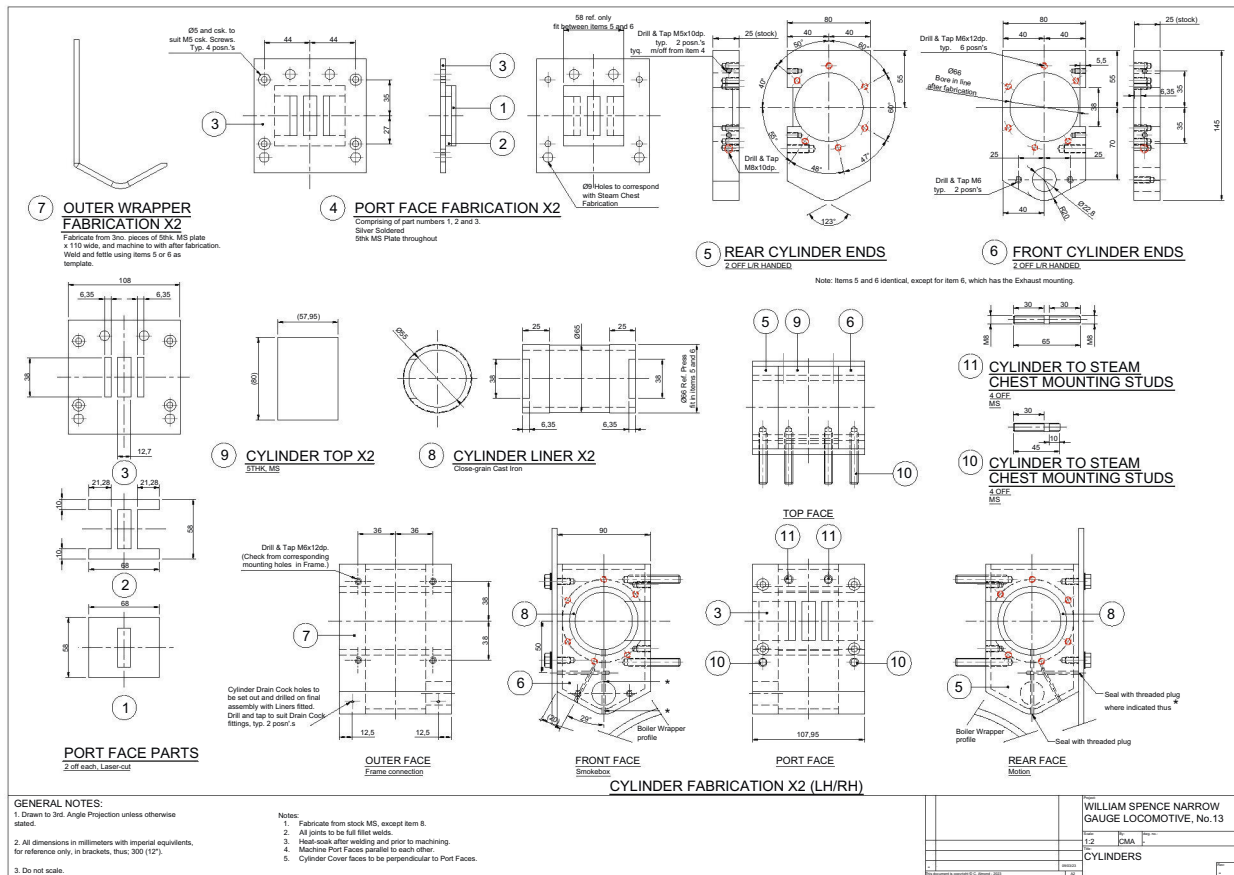
All three castings bolted together and were then, in turn, bolted between the frames, thus forming a structural component, or stretcher, giving the frame great stability.

The steam chest was fed with steam from the boiler via a connection from the underside of it via a regulator mounted on the top of the steam chest, from where it was distributed to the cylinders.

It would appear that the adjustment of the valves could only be done via a cover, or access plate, on the front face of the steam chest. However, the close proximity of the chimney would have made this a challenge and would be almost impossible to rely on in 1/3rd scale as a means of setting up the valves, both in terms of adjustment and visibility.

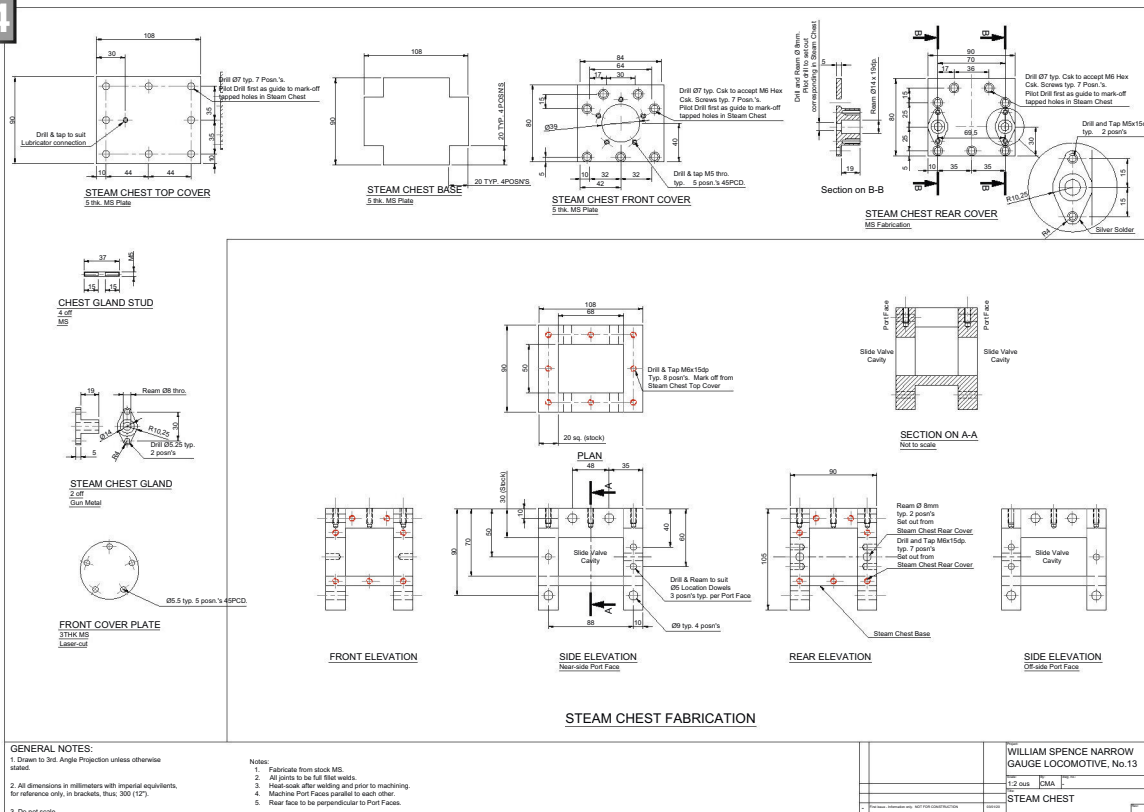
On the prototype, this arrangement *would* have been usable, despite the close proximity of the chimney. However, others have

Fig 13



Cylinders.

Fig 14



Steam chest.

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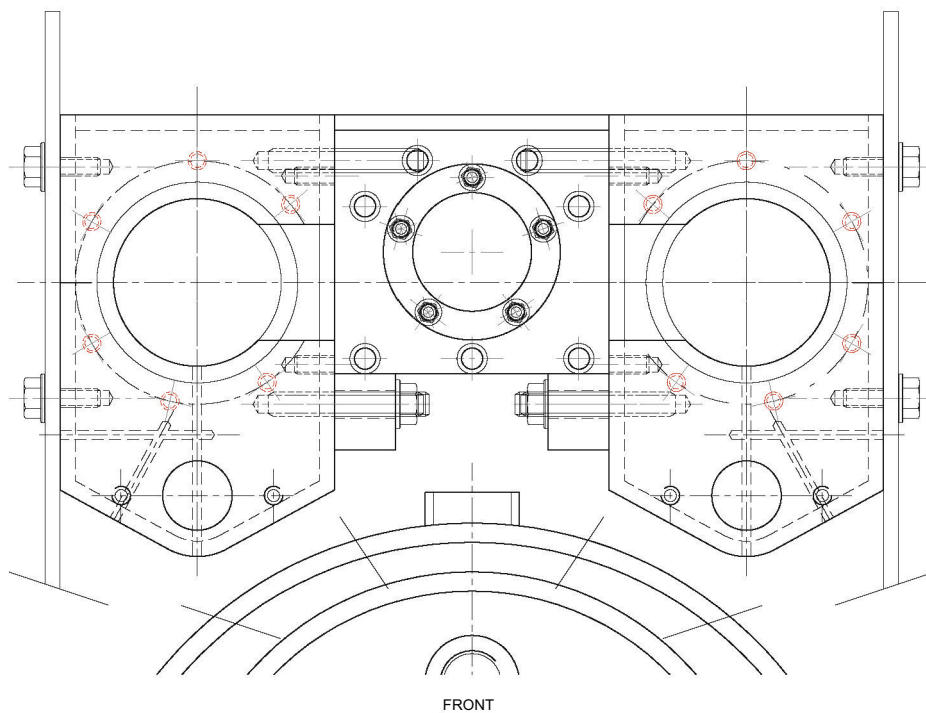
AVXLIVE ICU

AvaxHome - Your End Place

We have everything for all of your needs. Just open <https://avxlive.icu>

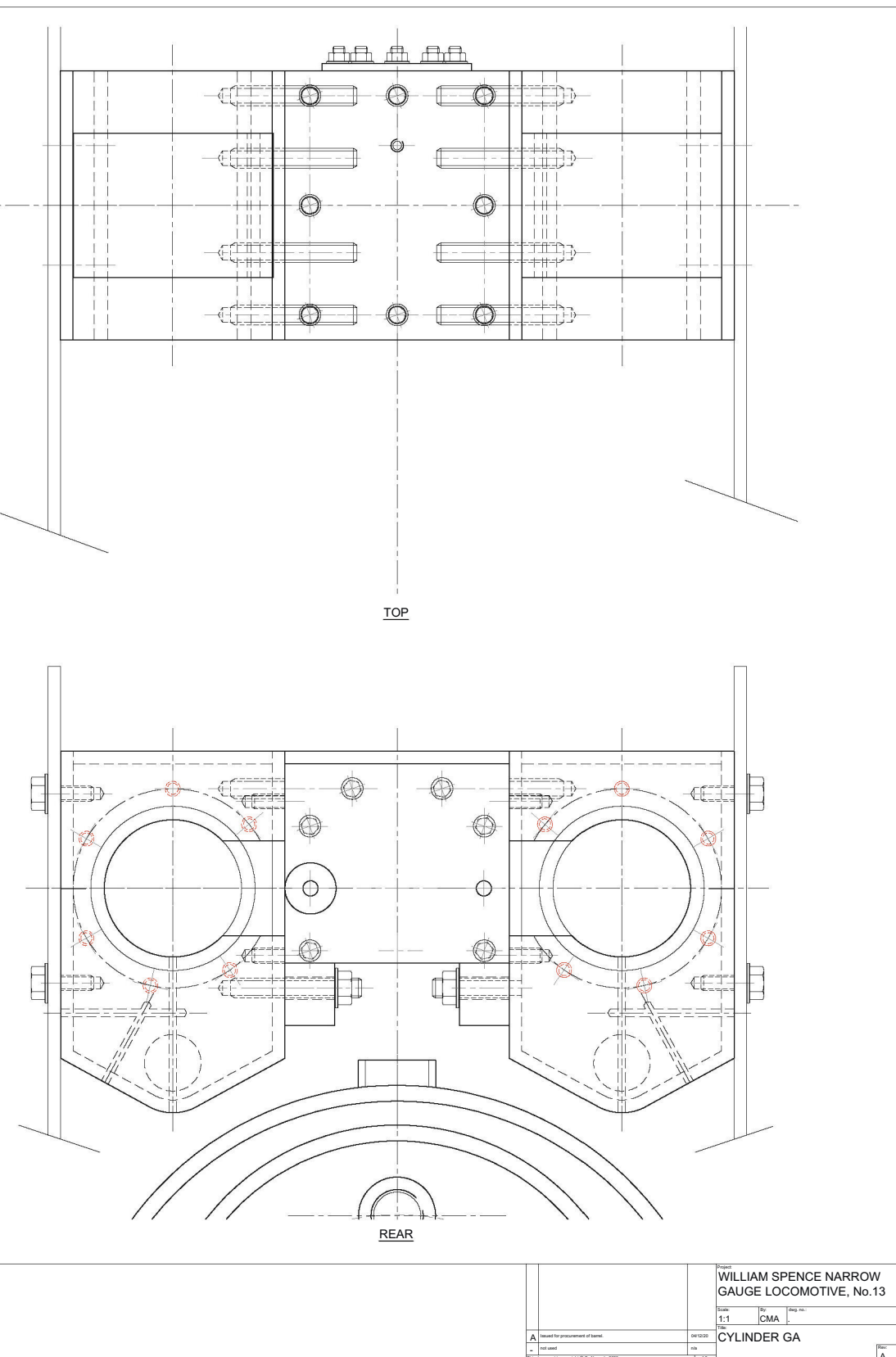
Fig 15

Notes:



GENERAL NOTES:

1. Drawn to 3rd. Angle Projection unless otherwise stated.
2. All dimensions in millimeters with imperial equivalents, for reference only, in brackets, thus; 300 (12").
3. Do not scale.

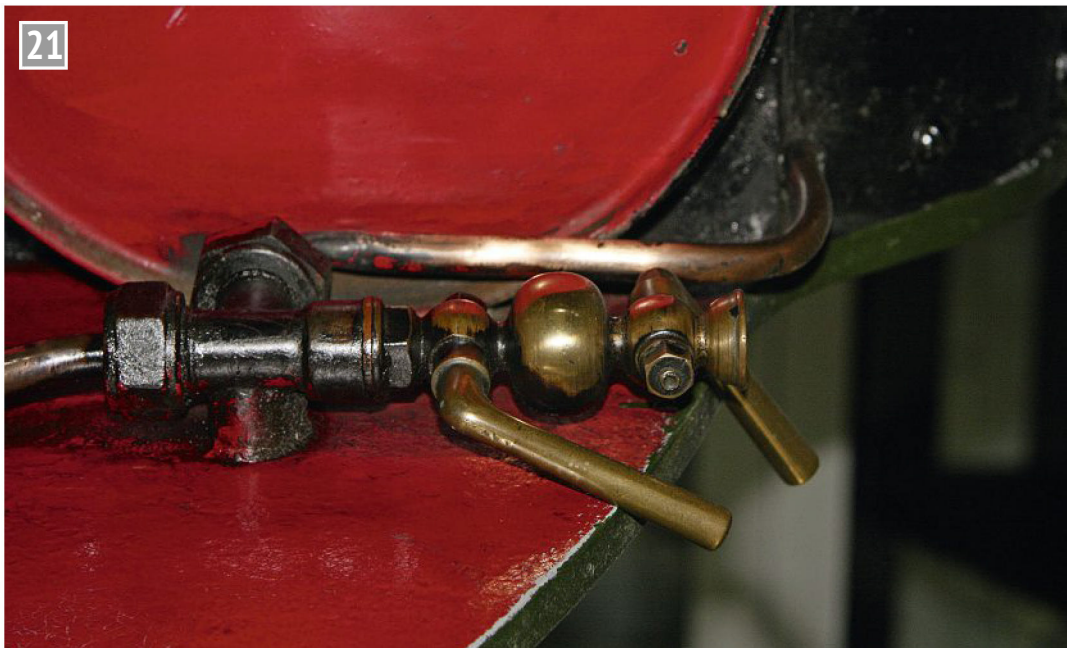


commented on the ability to gain useful access to the valves. But, if one refers back to the general design principles of the locomotive by Samuel Geoghegan, the boiler and the associated smokebox and chimney were able to be relatively easily removed from the frames for maintenance. Therefore, reversing this ability tells us that the cylinders and motion would have been assembled into the frame, then the wheels and associated bar frames would have been fitted, followed by the boiler. This implies that the valves and timing could have been set without the interference of the boiler, smokebox and chimney. Then the steam connection from the boiler to the steam chest and regulator would have been made once all the three sub-assemblies were brought together.

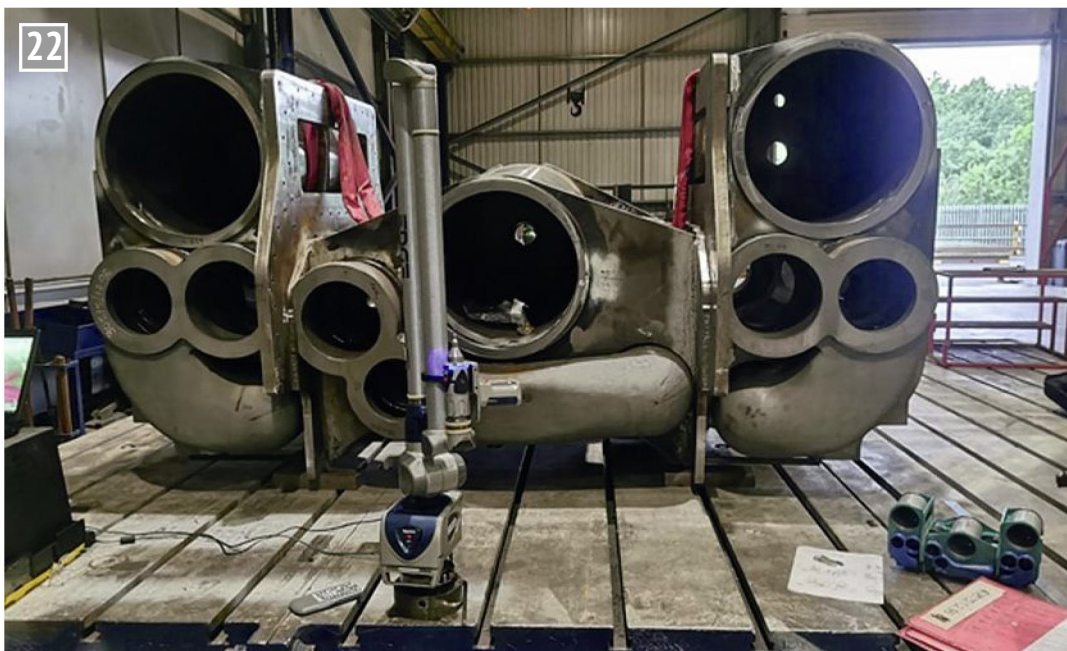
Despite this, I have taken a different approach in the model, where steam will be taken via a manifold and an external regulator and steam pipe into the steam chest. This will allow a removable access cover on top of the steam chest, giving direct access to the valves during setting up.

Those readers who are now, perhaps, thinking that the arrangement of the cylinders on top of the boiler is similar, or has been 'taken' from the arrangement used on traction engines i.e. being directly bolted over an opening in the top of the boiler, may be wondering why I have made references to needing to route the steam from the boiler and into the steam chest? The reason for this is that, unlike in a traction engine, the cylinders and steam chest are not connected to the boiler.

Therefore, apart from the advantage of being able to, relatively easily, 'strip' the locomotive down into three principal sub-assemblies, not having any stresses needing to be taken by the boiler, via a strengthening saddle on the boiler, means the boiler is not stressed in operation, other than by the steam pressure. Additionally, the boiler would



Drain cock on No. 13.



Prince of Wales cylinder fabrication (photo courtesy of the A1SLT).

have been cheaper to produce and would not have relied upon a sound steam seal between it and the steam chest when being built and during boiler testing.

With a valve setting and steam distribution strategy established, thoughts turned towards the manufacture of the cylinders and steam chest.

My early thoughts considered making the cylinders from either a casting or a cast iron billet. However, in the case of a billet, I would be looking at needing something in the order of 4 x 5 x 4 inches. Moreover, this would need a considerable

amount of machining (and wasted material), given both the outside profile and the bore.

I then considered a casting. Although, of course, an option for a one-off model, this would make for a very expensive choice. In addition, the amount of mass would mean that the whole assembly would take a considerable amount of time to warm up; with a resultant large amount of condensate from the cylinders via the drain cocks.

Again, referring back to general traction engine design principles, with the cylinders bolted directly to the boiler

top, the 'block' heats up as the boiler gets hotter, meaning less reliance on the drain cocks after a period of being 'at rest'. On the locomotive the gap on top of the boiler means there would be little heat transfer.

An interesting side note, on the subject of drain cocks, is that I have found no reference on the original drawings to them! Further reference to photographs I took when I first surveyed No. 13 revealed a manually-operated tap on the cylinders (**photo 21**). This suggests that the issue of condensate had not been

addressed in the original design - indeed, even in the drawings for No. 13, there appears to be no provision in the design. This suggests that there may have been a supplementary drawing produced that described retro-fitting drain cocks, which required the driver or fireman to alight from the footplate to open the tap before setting off with relatively cold cylinders and then alighting again during the trip to close them again!

This has left me with only one other option - fabrication.

It will not have gone unnoticed that I have a preference for adopting fabrication over castings for *William Spence* for a number of previously described reasons, with the cylinders and steam chest being no exception.

After quite a few hours and with much 'head scratching' over the prototype drawings for these parts, I have developed total admiration for the work of the pattern makers! It quickly became apparent that to reproduce these in 1/3rd scale to anything approaching a resemblance of the full-sized ones would be a challenge.

Although, at first, I was quite disappointed to have come to this conclusion, I was warmed to learn that fabrication has been adopted in the development of the cylinders for the new P2 locomotive *Prince of Wales* with the cylinder block having been fabricated in three sections - a centre cylinder and two outside cylinders, with the parts being welded together (**photo 22**).

As with the design of the *Prince of Wales* cylinder block, careful consideration has had to be given to the assembly of the parts in the right sequence, so as to enable access to each joint, minimise the distortion risk caused by the heating and contraction of the parts, and the need to provide excess material in the right places to enable final machining to be carried out after heat treatment, to relieve any stress build up during welding.

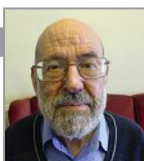
● To be continued.

Beer Heights Light Railway Signalling

PART 7 – MISCELLANEOUS

The following notes should be read in conjunction with the track diagram given in Part 1 (Fig 1, M.E.4716, May 5).

Mike Hanscomb,
Hon. Signal Engineer, BHLR, explains the workings of the signalling system at Pecorama.



Continued from p.144,
M.E.4721 July 14

Lineside plungers

These allow drivers to request routes while moving. Large plungers (ex-BR block-shelf bakelite-type) are provided (**photo 16**). As the system defaults to the main route (from Much Natter station and back), drivers have to request only for diverging routes. Plungers should normally be located at the signal immediately to the rear of the junction signal. However, if it is necessary to locate a plunger at the previous signal, a train destination stick relay (TDSR) is provided, to ensure that the system 'remembers'

the destination of the train concerned while it is in the intermediate section.

All main-line signals are 'first-wheel replaced' to danger. Plungers are effective only while the signal on which they are mounted is at proceed, so this prevents miscreants on the train having a chance to re-route a train, when the driver did not request it!

Pushbuttons

Where routes are requested while stationary (by the driver, stationmaster, shedmaster etc.) small white push-buttons are provided (**photo 17**). One white LED for each request button is provided to indicate that the pressing of the button has been effective in the interlocking.

One red cancel button per group of request buttons is provided.

At Much Natter station, a green LED indicates that the stationmaster has pushed the appropriate lever.

Mines branch train staff

The Mines branch is not track-circuited, so it is protected by a one-engine-in-steam (OES) train staff. This hangs on a microswitch-detected hook at the entrance to the branch (**photo 18**). When a driver requests the branch, by



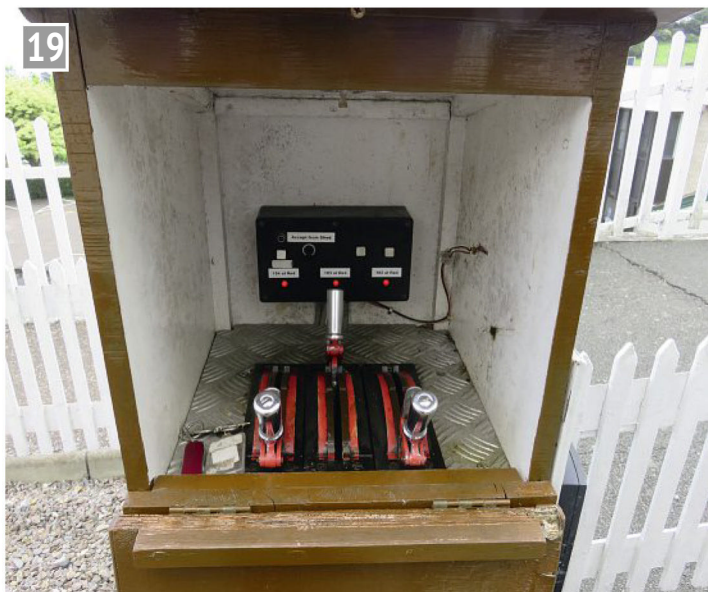
The plunger on Much Natter 119 signal allows drivers to request to go to shed.



This pushbutton is Much Natter 109, 117 and 120 signals. The white buttons are 120, 117, 109 bay and 109 arrival.



The train staff allowing access to the Mines branch.



The red LEDs show when 104, 103 and 102 are at danger.

pressing the plunger on TE2 signal, TE23 points motor reverse and TE4 signal goes to green. When the train occupies CR/1 TC, TE 11 signal goes to green but only if the staff is on the hook and TE7 is at red. The driver then proceeds onto the branch and removes the staff from the hook. This re-picks 11HOLDSR (see Part 6) and allows the TE7 signal to clear when the next main-line train approaches. If the driver forgets to pick up the staff (not happened yet, except on test!), 11HOLDSR would remain down, locking TE7 at red. The driver of the next main-line train would then stop and have a 'suitable conversation' with the branch driver!

Westinghouse miniature 3-lever frame

This is operated by the stationmaster (**photo 19**). Each lever is 3-position, being centre, pushed or pulled and controls movements into and out of each platform - lever 1 for bay, lever 2 for departure and lever 3 for the arrival platform. When pushed they allow a train to leave their platform but only if a driver's push-button has been pressed.

When pulled, they allow a train into their platform, i.e. from Much Natter 102 to arrival, Much Natter 103 to departure and 104 to bay. None of these requires a pushbutton to be pressed.



TE13 signal, now showing white as train has just cleared CM track.

Quarry siding barrier and exit signal

There is a low barrier fitted across the Quarry siding which does the job, in effect, of a trap point. When in place, this is detected by a reed switch fitted on the sleeper, which operates when a bar magnet on the underside of the barrier is very close. With the barrier removed, signals TE4, TE7 and TE12 all



Barrier removed, to allow shunt out of siding.

remain at red so that no train can be signalled that would conflict with the shunt move.

TE13 is the siding exit signal, though it's actually a barrier indicator. Its red and white LEDs are normally out. When the driver presses the button to request permission to lift the barrier, the red LED lights. Then, if there is no train using the TE4, TE7 or TE12 routes,

the red will go out immediately and the white will be lit. The driver may now lift the barrier and leave the siding. When CR/1 is occupied, TE13 reverts to red, and the barrier must now be replaced. The red will then go out.

ME

A New Workshop

PART 2

Peter Seymour-Howell

builds a new workshop before continuing work on *Flying Scotsman*



Continued from p.82
M.E.4720 June 30

While the mortar was left to cure over a few days I moved on to other tasks, one of which was to work out what section to build to reconnect the new concrete with the old. Yes, it would involve another six inch square piece of timber but it wasn't as simple as that for I wanted to fit a door here. When the donor garage was delivered by my sons it included the two large garage doors and also a smaller side door. One of the large doors was rotten beyond repair, the other was only rotten along the bottom and the smaller side door looked brand new. After giving this some thought (I had decided early on to ditch the up/over garage door fitted to the original building due to it being more difficult to keep the damp out) I decided to fit the smaller door in the opening left between new and old and change the front of the original building to have a smaller opening using just one of the large doors. I wanted the front door to be large enough to clear a bigger mill at a later date if I acquired such. I was also giving some thought to security, which I'll cover later.

With a plan in my head I made a start on a door frame to fit the opening between new and old. **Photograph 10** shows



Small door frame.

the basic framework ready to install. In **photo 11** we see the frame dry fitted. Before going any further, I first covered the bottom length of timber in a waterproof membrane as added protection.

With a good idea now of where I was heading a lot seemed to happen all at once. Now that the mortar had cured the second layer of panels could be erected onto the first, the door frame was fitted and the asbestos roof was removed and taken away by a professional environmental



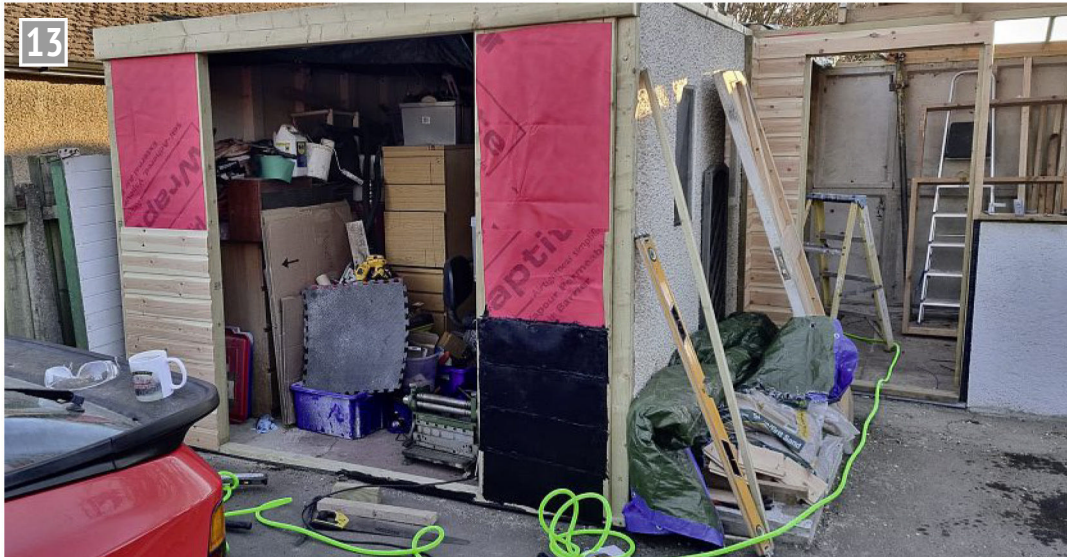
Frame dry fitted to check the fit.

company. A start was made on the roof which would include a hip and the up/over door was removed. We hadn't planned to take the door off yet but our hand was forced when removing the roof and the front concrete truss - basically it all began to fall away and proved to be rather heavy but we managed and got it down to floor level safely, the only casualty being a broken fence panel which was duly repaired.

Now in **photo 12** a lot has happened so I'll try to go through what has occurred.



The extension to the garage is now well advanced.



The large door opening has been narrowed.

You can see the concrete panels are up, as is the doorframe and even some cladding over the frame opening and a start has been made on the window frames. As you can see the front concrete panels with door have been removed and a 3 x 2 upright frame added along with a 6 x 2 crossbeam above. Note that the crossbeam sits above the height of the concrete panels to butt up against some 3 x 2 laid on its side which goes around the entire structure. This was added for two reasons, firstly to give a good squared base for the roof trusses/rafters

to sit on, which is important as we are building a hip roof which would be exceedingly difficult if the corners weren't square. The other reason is that the original structure is a long way from being square and thus the timber surround would be made to sit on this structure as equally as possible to help with the roof – if that makes sense!

You can see that the first part of the roof is up. I have used the donor end trusses to determine the pitch. The two buildings had different pitches and I chose to use the timber trusses rather than the much heavier concrete trusses on the original structure

which would have required a lot more work to take the weight. I used one of the wooden trusses as a template to make two others to fit each end of the 8 x 4 foot x 19mm exterior ply sheets which would form the start from either end. First the trusses were positioned at a spacing which suited the ply sheets allowing for an overhang over the truss and then a ridge beam was fitted between them, which was left overlength for now until the other ridge beam was in position. Lengths of 3 x 2 were placed upright between the trusses for the rafters to sit on and the rafters, which were spaced at 500mm starting from

the inner truss, had notches cut in them to sit over these uprights keeping them at the same height as the end truss. Life was made much easier thanks to the availability of my eldest son's nail gun - it's heavy but makes this job a lot quicker.

We now come to the doors and their associated frames. For the smaller side door we have already seen the bare framework but not the more substantial front door.

First I built the frame, the sides from 3 x 2 and the top beam from two lengths of 6 x 2 which was doubled up to make a beam 6 x 4. This beam supports the front truss when fitted later. Both door frames have a length of timber below a step which is wrapped in a waterproof membrane. There is also a membrane stretched over the frame before it's covered in cladding. Rockwall insulation will be inserted into the spaces in the frame before it's later covered with 19mm plywood.

Photograph 13 gives some idea of what's involved. You can see the membrane behind the partially clad frame, and note also that the small door frame has also now been clad and thus making the building one and will thus be secure for the first time once the doors and windows are fitted.

In **photo 14** we see that both



Further progress – doors fitted.



The main door is quite secure.

doors are now fitted, along with the roof. The large door is one of the donor doors which has been shortened in height and had extra strengthening timbers added for the new hinges to bolt onto. You can just see that the top and side of this door have cladding added which overlaps the opening joint. This is to reduce draft and keep the warmth in during winter. There will be insulation material fitted to the inside of this cladding so that it seals against the door frame. Window frames have also been added and the sizes noted while I look for suitable windows to fit.

I have included this picture (photo 15) which is out of sequence but it's a good one to show what I meant by the cladding around the door opening. You can also see the new hinges - I'm using two instead of the original three, as these are much heavier gauge metal and able to hold more weight.

This might be a good time to say a word or two about security, something that has been on my mind throughout this build. Doors are always the weak spot, more so here as you'd need a serious bit of kit to get through the concrete panels if one tried that route,

and even if that was managed there's still the 19mm plywood to tackle. I took the decision that the largest door should only be opened from the inside. To that end, it will have a strong beam across the opening, a bit like that seen on a castle door. The hinge plates are covered by the cladding but even if that was removed the door cannot be opened as it sits within the opening and would have to be pulled directly outwards, which isn't possible with the interior 4 x 2 beam. There would be no point in ripping the cladding off to get to the beam as the interior of the frame will be

covered with 19mm plywood, not something that can be broken through without power tools and by then the security camera would have alerted me - in fact, the alert would sound as soon as someone entered the property and their every movement would be captured on film. The smaller door is also well-protected with 3 locks for extra security.

Returning to the inside (photo 16), I made a start on the industrial mastic sealing of all panel gaps. This stuff is ultra-strong, and I wouldn't like to be the one who tries to dismantle this building in the future. Note the 6 x 6 treated fence post which was used to join the two different types of panels together. The bottom join will also be sealed before the levelling compound is laid.

The last item for a secure building is the windows. Having fitted frames around the openings I was left with the following sizes: 1760 x 900 and 1150 x 900. I was helped greatly here by another of my son's friends who was in the middle of doing a house that included new windows. He kindly sorted out some which would fit my openings and they were fairly close, just requiring a little more timberwork to be added.

●To be continued.



Progress with the interior.

A Drive Unit for a Milling Machine Table

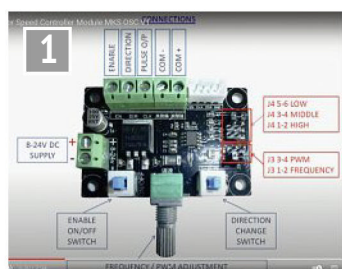
Iain Haile
adds a power feed to his
milling machine.

Setting up a basic workshop from scratch is something of a daunting task, with so many decisions on how to prioritise the spending of your precious cash. Once the big ticket items i.e. lathe, milling machine, bandsaw, pillar drill etc. are selected then there's all the tooling and accessories which can add almost as much again.

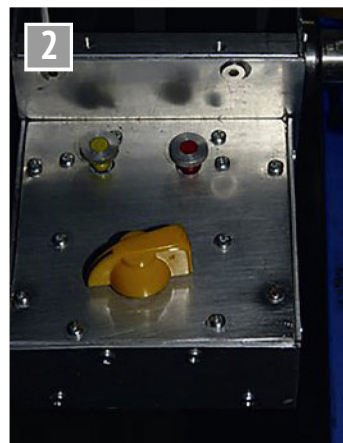
When you begin to use all the equipment you then find out that there are features you wished you had purchased from the start. In my case this was a power feed for the mill table.

Buying an after-market unit can set you back £200 or more so being a Yorkshireman I set about making one. Several prototypes were made but they lacked the fine speed adjustment desired and torque at lower speeds.

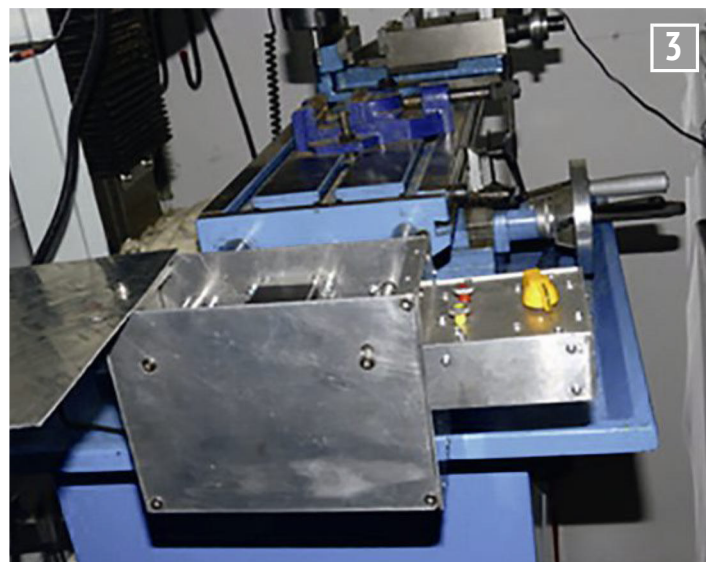
My final design was based on a stepper motor. One of the key features of a stepper motor is that the torque is almost constant irrespective of the rotational speed. This enabled the unit to have very fine low speed high torque adjustments to drive the mill table accurately.



Stepper motor speed control module.



Mill drive control panel.

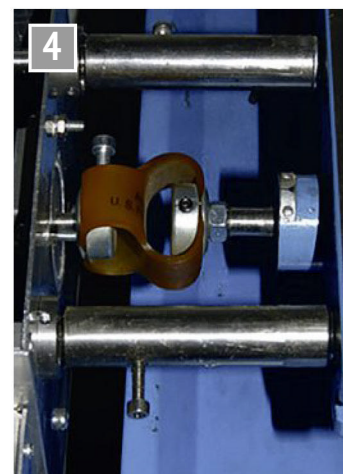


Mill drive end view.

The drive unit I made, based on a commercial stepper motor speed control module (**photo 1**), does all the things I require. With it, the table can be moved forward and reversed instantly at the touch of a button and the motor stop/start is the only other control button (**photo 2**). The speed control knob gives excellent control of the mill table's rate of travel.

Excluding the power supply which can be external there are three items in the drive unit: a stepper motor, the drive unit and the control module, which has the two buttons for forward/reverse and motor stop/start. The speed control potentiometer is also on this board and needs to be removed to be mounted remotely on the control panel. Some experience of desoldering would be a distinct advantage for this task.

The choice of stepper motor will primarily decide the size of the housing to be used. The unit I made is approximately 170 x 170 x 80 mm. The unit



Mill drive coupling.

is mounted onto the end of the mill table using two steel tubes with 8mm threaded ends to bolt directly onto the table (**photo 3**). The two steel bars on the drive unit slide into these tubes and are secured in place with two 4mm machine screws.

A flexible coupling connects the motor shaft to the table lead screw (**photo 4**).

ME

Finishing *Ellie*, the Steam Tram

PART 2

Tony Bird
adds a
boiler, gas
tank and bodywork to
complete the project.



Continued from p.136
M.E.4721 July 14



The top coat is added.



The gas tank fits neatly into the cab.

The last part needed for the model to be run on rails was a gas tank and while making it the body and roof were painted, first with an etch primer then a couple of top coats of enamel (**photos 14 and 15**).

The gas tank is probably the most complex that I have made. It is intended to look like a water tank and its control valve like a brake handle. The tank itself is made from 1.5mm thick square section brass tube

with 1.5mm end plates, which are hard soldered in place with a stay with threaded ends that goes through the centre of them and is secured with nuts, which are also soldered in place. The tank is held to the footplate by two lengths of threaded rod which are soldered into it.

The tube for the filler valve was machined from the solid and has an internal shoulder for the filler valve end plate and an external shoulder to go into

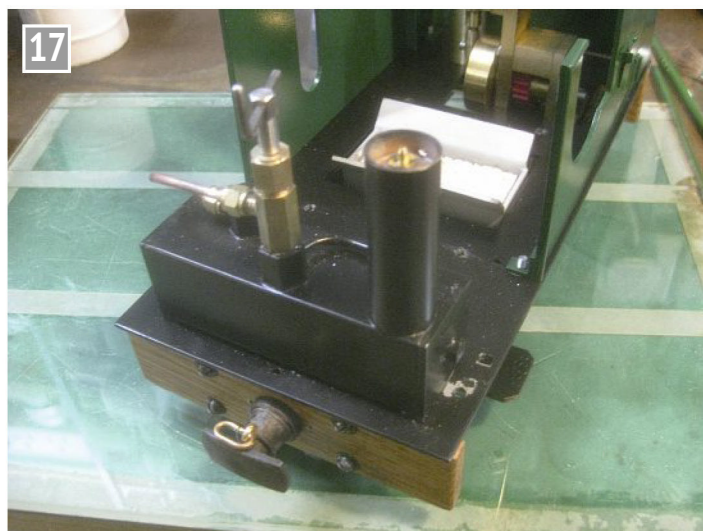
the tank. There is a gas pipe from the top of the filler valve tube that goes to a blind thread bush soldered to the top of the tank. This bush is to hold the gas control valve, the gas pipe from which is connected to a tube that goes through the gas tank to a union for the gas pipe going to the jet for the burner. The tank and its pipe work were tested at 400 psi for ten minutes.

The tank fits into the bunker, the driver's legs both have holes drilled in them to fit over the vertical brass rod - these two holes allow the driver to face in either direction (**photo 16**).

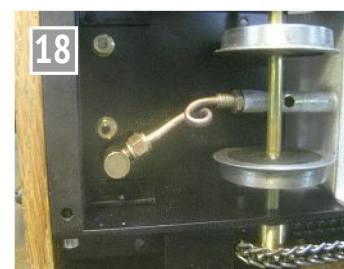
Photograph 17 shows the gas tank painted and ready to use and **photo 18** shows the connection to the burner.



The body in etch primer.



The gas tank after painting.



The connection to the burner.



The driver appears satisfied with the first run.

Photograph 19 records Ellie's first steaming on the track as a complete model. The first run can be viewed at youtu.be/PolM3LaWRcQ (QR Code 3).

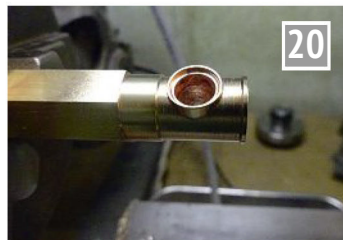


Ellie's first run.

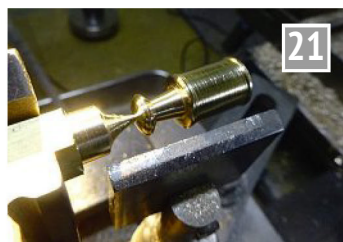
The model performed very well but it did have two issues; the ceramic burner, even when the gas was turned as low as possible, produced too much steam to the extent that the semi-pop safety valve blew a raspberry every few seconds; the other issue was with the filler valve as it was very easy to burn your fingers while trying to push the nylon tube of the hand pump into it.

Before trying to address these issues, though, I decided to make a lamp to put on the

brackets that were already made. A piece of hexagonal rod was drilled to accommodate a tube with a shoulder turned inside one end. After being drilled, the hexagonal rod was turned so it was round and the tube soldered in place (**photo 20**). What was to be the top of the lamp was turned to shape by hand (**photo 21**). The part of the lamp that was going



The lamp starts to take shape.



Turning the top of the lamp.



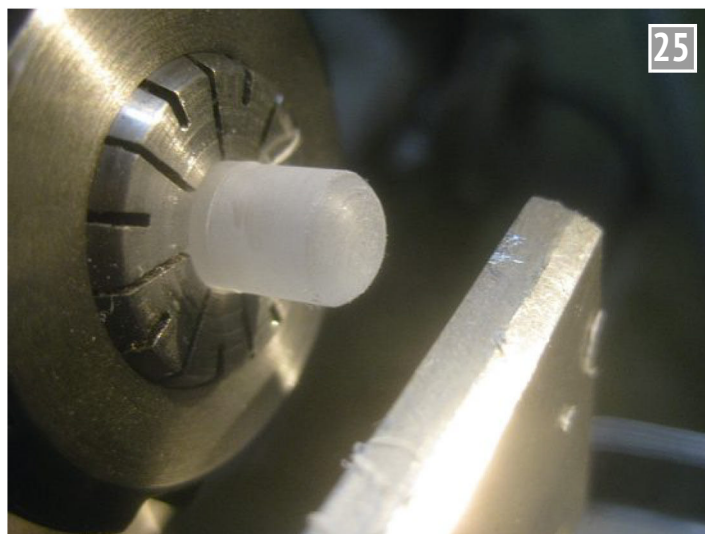
Forming the socket for the lamp iron.



Painting the completed lamp.



Donor acrylic brush for the lamp lens.



Doming the lamp lens.

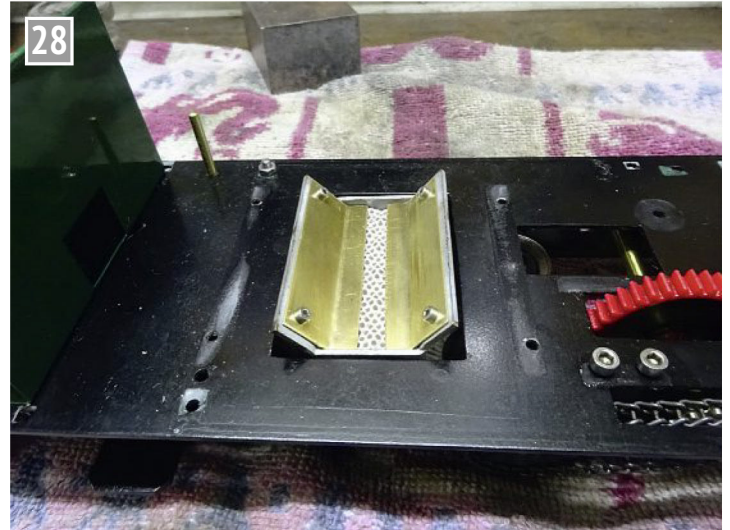
to fit over the lamp iron was also made from hexagonal rod which was first drilled to the same diameter as the lamp body. Then two slots were milled to the width and the thickness of the lamp iron on opposite faces of the hexagon. Then the two points of the hexagon between the machined slots was milled until it nearly broke through to the hole that had been drilled. A sheet of thin brass was then soldered over the slots (**photo 22**). After both slots had been covered the part was cleaned



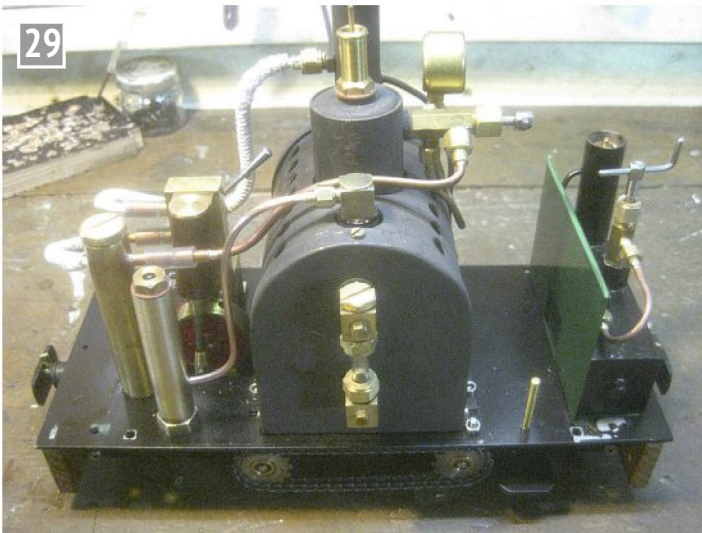
The lens is added to the lamp.



Ellie acquires her accessories.



The two plates restrict the area of the burner.



Revised filler.



Ellie with a healthier looking driver.

up before being cut into two using a piercing saw. One of these pieces was when soldered on the back of the lamp, a 'U' shaped wire handle was soldered in place and the lamp painted (**photo 23**).

The lens for the lamp was made from a brush with an acrylic handle. The piece above the hole at the end of the handle was cut off and another hole drilled lower down (**photo 24**) - nobody as yet has noticed this surgery. The piece of acrylic was then turned until it fitted into the lamp and had its end domed (**photo 25**). After cutting off and polishing it was glued into the lamp (**photo 26**). A firing iron was bent from some steel rod and fitted onto the hooks made (**photo 27**).

The model was taken apart to access the burner which

would have to be made smaller, but by how much? The burner made has raised angle sides which allows the easy fitting of two sheets of brass to reduce the area of ceramic that can be lit. The area was reduced to about a third of the original size, the thinking being that it could be increased if necessary. As it turned out it was just about right (**photo 28**). It is probable that a smaller ceramic burner will be made at a later date.

The issue with the filler valve was solved by removing it from the boiler (**photo 29**). As the model had been taken apart the body was masked for painting the beading and other fittings. Also, the opportunity was taken to paint the driver (**photo 30**).

With the model finished, a box was made for it that had a



Ellie neatly installed in her box.

removable section that allowed it to be steamed off the track (**photo 31**).

All in all, I am very pleased with Ellie's performance. It runs for over 20 minutes if the

water isn't topped up and it will run slowly pulling a heavy load, probably due to its own weight, which is considerable.

ME

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The Eating of Elephants

PART 19 – THE LURE OF THE WONDERLAND DRAGONS

Steve Goodbody finds some things are best tackled in small helpings



Continued from p.151
M.E.4721 July 14

With her chassis, boiler and smokebox painted and reassembled, and having acquired two extra family members in the preceding years, we pick up the story in 2011. The author's painting booth has been disassembled and his workshop dragged into its new and well-windowed location in the basement where he is preparing for the final phase of *Elidir's* construction.

Wonderland revisited

Should you cast your mind back to earlier parts of this series, long-suffering and ever-patient Reader, you may recall that, from *Elidir's* earliest moments, the author allowed his mind to wander into the dangerous and time-consuming region where *What ifs?* are born and allowed to evolve - the *What if? Wonderland*, if you remember - which henceforth I'll refer to simply as *Wonderland*, if you don't mind, because we should all strive for economy and efficiency wherever possible and I'm sure that Alice won't mind.

Back in the dim distant days of Part 15, and being a more experienced model engineer than I, and recognising the dangers posed by the minefield-strewn region of our *What if?* imaginations, you perhaps shouted at the pages of your magazine in a valiant attempt to warn the author of the hazardous path he was treading as he contemplated the off-piste addition of steam and vacuum brakes to *Elidir*. But, alas, it was to no avail, for the reported events all occurred many moons before you read of the danger and the written word is, like time, a one-way street. But thank you for your concern, nonetheless.

But let's not kid ourselves because, although we may

suffer its consequences in a unique way, *Wonderland* is not a destination uniquely attended by model engineers; I believe it is a facet of the human condition writ large, a fundamental part of our psyche no less, and the following familiar scenario, I suggest, proves the point.

Posit; a typical member of genus *Homo*, species *sapiens*, let's call him Colin, is sitting behind the wheel of his car on a long and tedious journey home. Spotting some interesting scenery in the middle-distance, and bored with A-road tedium, an unbidden suggestion magically floats through Colin's mind; the *Wonderland* dragons, sensing an opportunity, have begun to stir.

"Hey, Colin" they begin; "*what if you ignore the boring old GPS and turn left here?*"

Colin, secretly interested but knowing he's expected home for supper at 7pm sharp, ignores the idea.

"Listen, it won't add much time to the journey, and I bet you'll enjoy the diversion" they whisper, undeterred.

Colin, warming to the suggestion, begins to expand upon the proposal himself. "*That's a jolly good point!*" he exclaims to himself, "*I've always wanted to see Possibility Peak close up and it's probably somewhere amongst those hills, and it's not much of a detour, so why not give it a go?*"

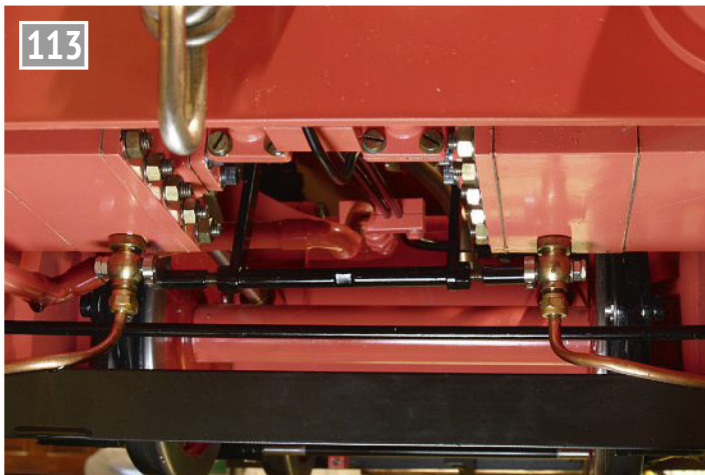
And, with that, the *Wonderland* dragons know they have clinched the deal.

And so, after checking in the mirror and activating the indicator before manoeuvring, all in proper accordance with the Highway Code, Colin heads off in a new direction, while Gertrude the GPS (for that's her name), after recalculating the unexpected situation several times, and imploring Colin

in ever-more frantic tones to turn around while he still can, is rudely muted into silence. Gertrude, voice of reason that she is, understandably seethes.

But of course, the story doesn't end there. Colin, after navigating the well-signposted B-roads for several miles with confidence, then decides to follow his instincts. And with mounting anxiety, for the next five miles he heads down a succession of unmarked lanes, ever narrowing and with hedgerows increasingly high, until, eventually, even the lanes lose the will to go on. Now worried, Colin bounces along a washboard-smooth cart track, one which has never appeared on any map, until, jostling for pole position amongst a herd of uncomfortably full Friesians on their evening stroll to the milking parlour, and with no remaining hope of reaching Possibility Peak, he decides that the original route held a definite attraction after all. And so, with a tacit apology to his electronic co-pilot, Colin unmutes the still-fuming Gertrude who, after suggesting several desperate alternatives requiring a hovercraft and a helicopter, at last plots a practical route back home through the surprisingly busy hamlet of Disappointment Dell. And so, emerging at a junction no more than fifty yards from where they left the main road five hours previously, Colin and Gertrude resume their journey in silence and, by the time he arrives home, Colin's supper is long in the dog.

And that is, to wrap things up with a neat ribbon, the inherent danger of the *Wonderland* and its attendant dragons to humankind in general. Yes, it brings the potential for an attractive diversion but, while the consequences might not be as cow rich as Colin's, the



Elidir's steam chest draincocks, operated through a series of linkages back to the cab, were an early foray into What if? Wonderland.

diversion will surely take longer than you expect and the path will often be uncertain and bumpy, and you may well end up back where you started without much to show for the experience other than a visit to Disappointment Dell and a rumbling stomach. I'm not saying don't do it because where would the fun be in that? I'm just advising caution because we're all at risk of succumbing and sometimes the straight-and-narrow is the prudent path. Or so I've heard.

Caution, ignored

However, with her boiler and smokebox and chassis all painted and assembled and finished, *Elidir* already sported cab-operated steam-chest draincocks (photo 113) and steam and vacuum brake equipment, and a non-regulation mechanical lubricator and drive, none of which appeared on any of her published drawings. And, as you may have guessed, this was only the tip of the *Wonderland* iceberg which hovered beneath the surface because, while the act of painting had been an exacting task, it was also a process rife with tedium. The tools must be thoroughly cleaned after each use and each coat of paint must have time to dry after each session, and it was during those idle-minded periods, spread across the entire year of 2010, that the *Wonderland* dragons had worked their seductive magic.

And here is a taste, by no means complete, of their Siren song.

"So....", they began, as I flushed a shot of thinners through the spray gun at the end of a long painting session, "you're building an engine designed for the Welsh quarries and expect it to run happily in New Jersey, is that right?"

Sensing that they had aroused my subliminal interest, they continued without pause.

"And the New Jersey climate is, to paraphrase the great Douglas Adams, almost, but not quite, completely unlike Wales, isn't it?" Oh dear, please don't misquote *Hitchhiker's* I thought, but I had to agree with their statement.

"And the water in that saddle tank, sitting atop the boiler, and exposed to the beating sun on a typical New Jersey summer's day, where it's thirty-five degrees Celsius in the shade, is not going to stay cool for long, is it?" they continued, while I mentally conceded the point.

"And the injectors won't like that much, will they?" they added, Perry Mason-like in their argument, before concluding, innocently, "So what if you build two tanks, a real one inside a fake outer, with lots of insulation in between? Wouldn't that be cool?"

Rolling my eyes at their awful pun, I had to agree; a double-skinned saddle tank would certainly make sense to combat the New Jersey heat.

"Oh yes", they continued, clearly on a roll, "and since



Laurie Lawrence's four-jet blower arrangement and the commercial ball valve to shut off the main steam pipe for boiler testing, pictured during a trial assembly to check that everything fitted and the blast pipe was concentric with the chimney. Fortunately, it did, and it was.

both injectors feed from the same tank, what if you add a handpump as an emergency backup just in case the water is still too warm for the injectors? Wouldn't that be wise?"

Another fair point, I allowed.

And then, having found their stride, the suggestions came thick and fast.

"And don't forget, quarry Hunslets had their injectors mounted just below the saddle tank in front of the cab. So, what if you make your own injectors and ball valves so that everything is in its proper place and works as it should?"

"And, since the landscape gets so parched in the summer, what if you hide a spark arrester in the smokebox to prevent fires?"

"And, while you're in the smokebox, what if you modify the blower arrangement just as you did with the *Allchin*, and include a shutoff valve on the steam pipe to make pressure testing easier?"

"And, as we're on the subject of valves, what if you make a set of scale globe valves, all evenly laid out in the cab?"

"And, while you're in the cab, and since we've got a vacuum brake pipe and a reservoir, what if you build a duplex vacuum gauge?"

"Anything else?" I asked sarcastically, feeling sure their list was already exhaustive.

"Well, since you mention it, what if you make a proportioning steam brake valve based on Martin Evans's design for *Highlander*; you know the one. But instead of a rotary control, what if you adapt it to lever control, one where you pull the lever to increase the pressure and push it to decrease. You've always fancied that, haven't you?"

At this point, I felt the blood draining from my face.

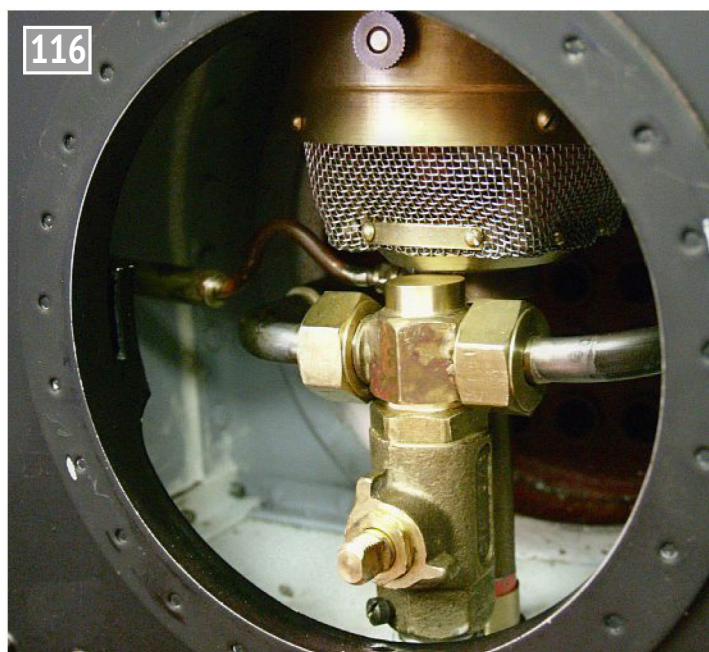
"Oh, and what if the water gauges were three-cock devices with proper glass protectors?"

"And what if there were two whistles?"

"And what if the firehole door were based on the *Allchin's*, which is a darned good design?"



The removable spark arrester cartridge.



116 The spark arrestor cartridge in place, held securely to the petticoat pipe by a knurled thumbscrew at the upper front and ready for the engine's first steaming. The spark arrestor's removability was a good thing, for it did not last long.

"And what if the cab floor was made from oak planks?"

"And what if you make an oak toolbox for the running board while you're at it?"

"Anything else?" I repeated, this time in a menacing hiss, hardly believing their cheek. In the background, I heard the dragons whispering among themselves, realising that the mark which should not be overstepped was now in their rear-view mirror, and clearly fearing for their future.

"Well perhaps, if it's not too much trouble, and if you have the time and all that, what if you make a rocking grate? It would be much easier to drop the fire and replace the firebars if the grate's hinged in place".

"Is that it?"

The dragons traded glances in silence, wondering who would be brave enough to utter the next words.

"Well, there was one other thing. It's not a big deal, and we only suggest it because we think it would finish things off nicely. But if you don't want to, that's okay with us. We don't mind, really"

"What?"

"Well, what if you add a plate with your name on it somewhere subtle? That way, people in the future would know who built the engine."



118 The steam-dome and its Ramsbottom safety valves, ready for installation over the regulator valve. A locknut will be added to the adjuster once the safety valves are set.

"That's not a bad idea" I admitted, "What's the catch?"

I crossed my arms and tapped my foot impatiently, my mind's eye seeing two of the dragons shuffling away from the third who had obviously drawn the short straw.

"W-w-well, what if the builder's plate were gold plated?" the third whispered, voice quaking in the process.

"Alright, that's it. Get out of here you lot and leave me in peace. Gold plated builder's plates indeed!"

Wretched Wonderland dragons, they always take things too far.



117 The three-cock water gauges, assembled and enclosed by their gauge-glass protectors, straddle the regulator quadrant. The top of the Stroudley-style regulator pokes through the dome flange above.



119 After much filing and emery cloth rubbing, the cast dome cover is mounted on the lathe's dividing head to mill the manifold slots.

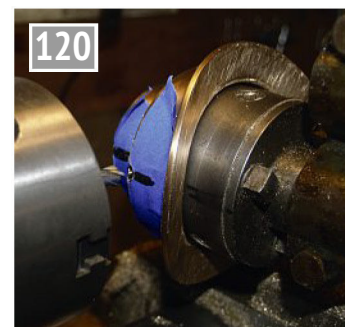
The Home Stretch

But of course, you can guess what happened, can't you?

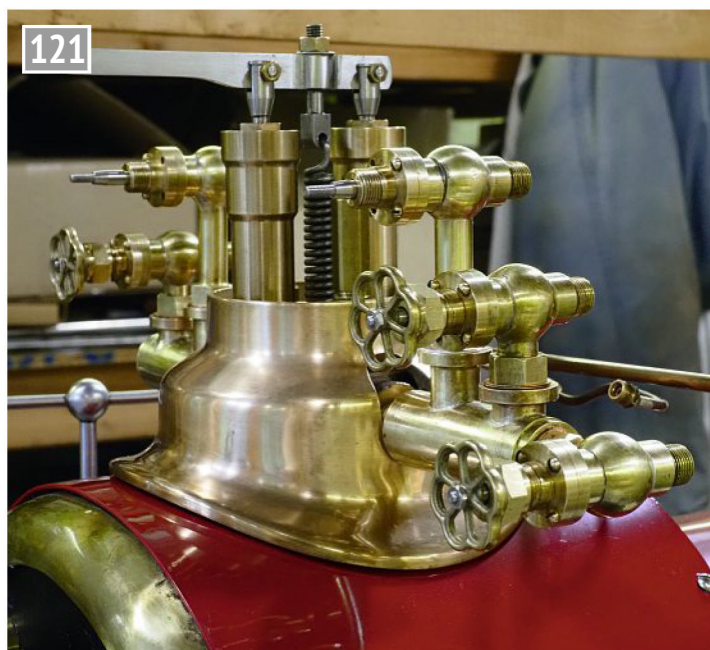
First came the smokebox modifications, with a hidden shutoff valve for pressure testing, a removable spark arrestor cartridge to help keep the brushfires at bay and a four-jet blower arrangement based upon the recommendations published in these pages by Laurie Lawrence, editor of this fine magazine in bygone days (**photos 114, 115 and 116**).

Next items from the dragon's list were the three-cock water gauges (**photo 117**) and then, with the regulator in place, the steam dome and safety valves

complete (**photo 118**) and the dome cover filed and polished and machined to shape (**photos 119 and 120**), along came a batch of fabricated



120 With everything tightened and double-checked, the first slot is ready to be milled.



The finished dome cover, with manifold and steam valve installation underway, during final assembly.

globe valves, concocted and arranged in an orderly fashion around two steam manifolds, one manifold on either side of the dome (photo 121). But we weren't done yet, for the biggest deviation was still to come.

L'eau temperature engineering

For then, of course, there was the double-skinned saddle tank, a major project in its own right as it turned out and the subject of no small amount of head-scratching along the way.

Firstly, a baffled inner tank of copper and brass sheet, rudely battered into shape with the aid of yet another wooden former (photos 122 and 123), was thoroughly caulked with plumber's soft solder and leak-tested with hot water because

I was not about to make the same mistake that I had with Rob Roy several decades earlier (photo 124).

Next, with the inner tank watertight, a steel outer shell was hacksawed and filed and bent to fit around the copper core, leaving a decent gap for insulation to be added later (photo 125). And then, with dozens upon dozens of false rivets tediously turned and threaded to hold everything together (photo 126), cover plates were added to the bottom edges of the tank to help complete the illusion (photo 127).

Next, to cap it all off, a flange was turned to a push fit over the inner tank's filler pipe and secured snugly to the outer shell with a dozen 8BA brass



The wooden former for the saddle tank.



The completed inner tank, ready for its steel outer shell.



The inner saddle tank during construction, with flanged brass baffles and endplates and the rest in beaten copper.



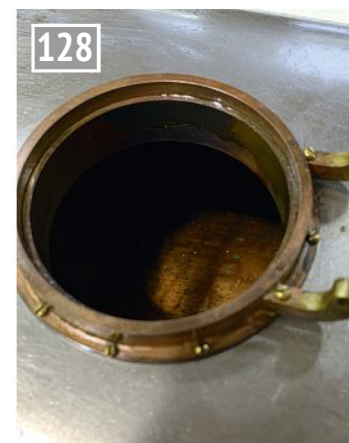
The inner water tank in its shell, a gap all around for future insulation.



Some of the dozens of false 3/16 inch rivets, screwed and nutted inside.



Cover plates enclose the bottom of the tank.



The flanged water filler in place, a push-fit over the inner tank's filler tube.



129
The filter housing with its three cam-shaped clamping lugs which secure it to the inner tank.

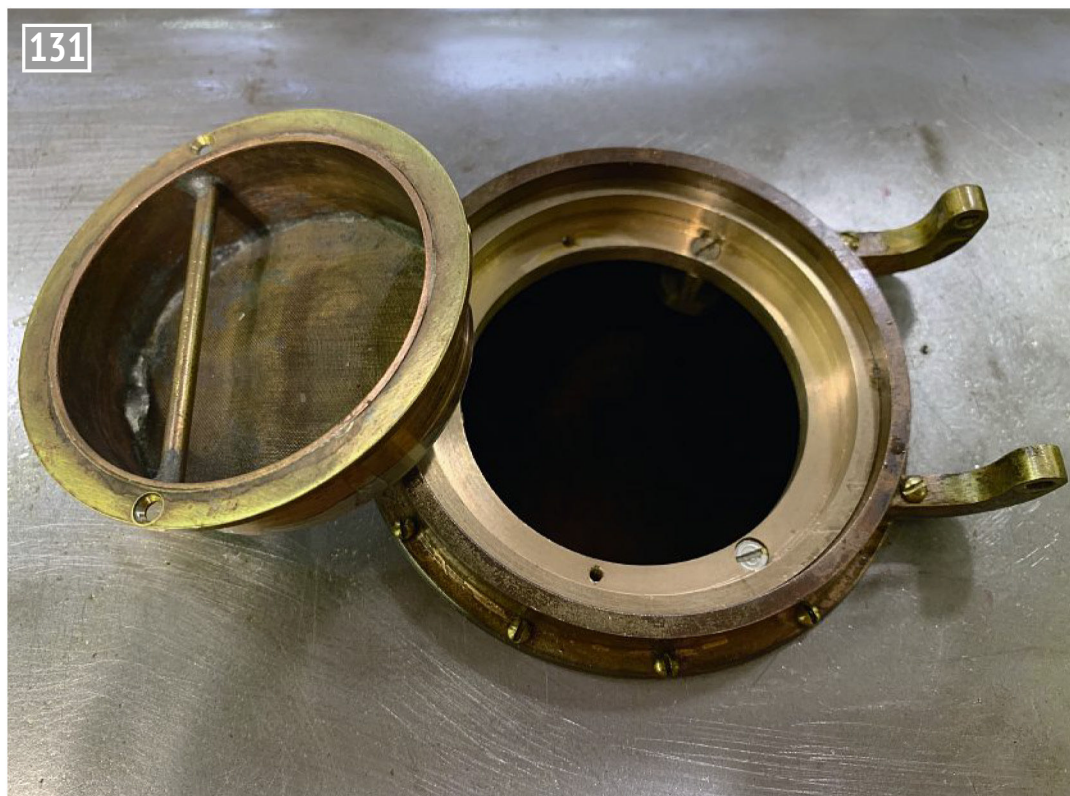


130
The filter housing in place. The cam-shaped lugs are rotated inwards during installation, then outwards once the housing is installed, then each is tightened to secure it against the underside of the inner tank's filler tube.

screws to ensure that no water could seep into the void between the tanks, dampen the insulation, rust the steel from the inside out, and make me cry (**photo 128**). Then, a clamped ring was added to provide a secure housing for a filter (**photos 129 and 130**), and, lastly, the filter itself, having a fine-mesh brass gauze at the bottom of a short length of copper tube to give a few seconds warning when the now-invisible tank is nearly full, was provided to keep the dirt out (**photo 132**).

And all of this because I had chosen to live in a hotter-than-Wales summer climate, wanted to store water and inject it into the boiler in the prototypical manner, and wished to maintain the appearance of a conventional saddle tank and leave the casual observer none the wiser to my subterfuge. What a palaver!

Damn and blast those *Wonderland* dragons.



131
The filter ready to be installed and screwed in place. The crossbar provides something to grip during insertion and removal, and an attachment point for the filler lid's chain.



132
A more recent picture of the finished product, now with a snorkel to let the air out of the tank while filling!

Postscript to Part 19

As some of you will have foreseen, the saddle tank's water filler arrangement, as depicted in photo 117, contained a definite flaw, which I soon realised when I came to fill the tank through the filter for

the first time and found that I couldn't.

Clearly, for water to get into the tank air must get out and the first time I tried to fill it with water the filter's fine brass mesh became completely covered, trapping the air inside and preventing any water

getting through. And so, since I would hate for anyone to read this episode in isolation, copy what's shown, and curse me because it doesn't work (there are plenty of other reasons to curse me, after all), I've added the more recent **Photo 132** which shows a solution - a snorkel whose top is slightly above the water filler's outer rim and which is connected to a vent hole drilled through the filter's sidewall near the top of the inner tank.

Additionally, while the spark arrestor seemed like a good idea at the time, and its proportions and the size of the stainless-steel mesh were based upon an article published in this very magazine in the 1980's, at every use it quickly became soot-clogged and rendered the engine unsteampable after less than an hour. It now resides, banished and unloved, in the thriving community of Disappointment Dell, that suburb of *Wonderland* recently visited by our good friend Colin.

See, it always pays to read the postscript!

●To be continued.

RECYCLING PART 1

A 3½ INCH SOUTHERN SCHOOLS LOCOMOTIVE

Robert Hobbs takes a box of bits and turns out a Schools Class 4-4-0



Since my first venture into model locomotive engineering, many of the projects have started with the purchase of uncompleted models and components from eBay; the Southern Region Schools or V Class is a continuation of this principle. My 'next' project has usually been sourced and placed under the bench well before the 'current' project is finished. This ensures continuity and that there's never a rush to find the next locomotive. In the past my choice was informed by the wheel arrangements as I was trying to build locomotives from the humble 0-6-0 through to the majestic 4-6-2 Pacifics, in 2½ or 3½ inch gauge, however the Schools, whilst it was a second 4-4-0, was undertaken because I had not built a Southern Region locomotive before, despite living near the Southern Region's works at Eastleigh, Hampshire. This is my ninth locomotive project.

The Schools were the most powerful of all the 4-4-0s built for our railways and were the favourite of many drivers and firemen. More powerful than the larger 4-6-0 King Arthur Class, the Schools were extremely versatile and were used on the twisty Sussex routes as well as the London - Bournemouth expresses. All in all the class was one of the best on the Southern Region and a real success for its designer, Richard Maunsell.

Recycling half built or discarded projects is not only satisfying but it keeps the mind active whilst coping with Imperial machines, metric drills and BA threads. The research necessary to resolve the problems inherent with some of these designs and drawings - many of which date from around seventy years ago and have never been updated - keeps the grey cells busy. Obtaining the 'words and music', as LBSC called them, from old

copies of *Model Engineer* or reprints from the component suppliers like Blackgates Engineering and Reeves 2000 etc., are also very useful when dealing with old designs.

Hopefully some readers will remember that my locomotives are built for my pleasure and display only, they are not intended to run, and to this end the 'boilers' are just casings and some of the fittings are incomplete. When finished I have often been fortunate enough to sell the locomotives on, typically covering the cost of materials and a little for labour, but not fully reflecting the hours put in. This process usually enables the next project to be financed and maintains my pleasure in this wonderful hobby of ours.

That is the end of the history and philosophy lessons so now back to the other School!

Photograph 1 shows my completed Schools class locomotive, *Winchester*.



End product - Schools Class, Winchester.



Box of bits tipped out across the bench.



Other castings.

The collection of frames, castings and wheels arrived in the workshop towards the end of 2021 and it was immediately apparent that far more arrived than I had expected! There were some additional boilerplates, cylinder castings and loose fittings. These are shown laid out on the work bench in **photo 2**.

The Schools is a three cylinder locomotive and the size and weight of these three castings was quite a surprise, indicating that this was going to be a very heavy locomotive and would take some serious handling when nearing completion.

Photograph 3 shows the two sets of cylinder castings. The frames were checked over against the set of new drawings and 'words and music' purchased from Reeves 2000 and were within tolerance for my project to continue and the frames are shown in **photo 4**. The wheel castings which were part machined are shown

in **photo 5**. The motion bracket castings, together with tender springs, stretchers and other castings, are shown in **photo 6**.

Front bogie

When starting a project, I like to get an item well under way and, in this case, rather than start the tender which, in the past, has been my normal procedure, I plumped for the front bogie. The wheels were removed from the axle and machined in the lathe to clean off the surface rust, the spokes being cleaned with a file and wire brush. The horns for the axle boxes were fabricated from steel angle and riveted to the frames. The axle boxes were then machined to fit the appropriate horns. The central brass casting for the bogie was tidied up and re-tapped to suit the holes in the frames. The spring beam castings were cleaned up and their eight lugs made from quarter square mild steel bar. The lugs were



Cylinder castings.



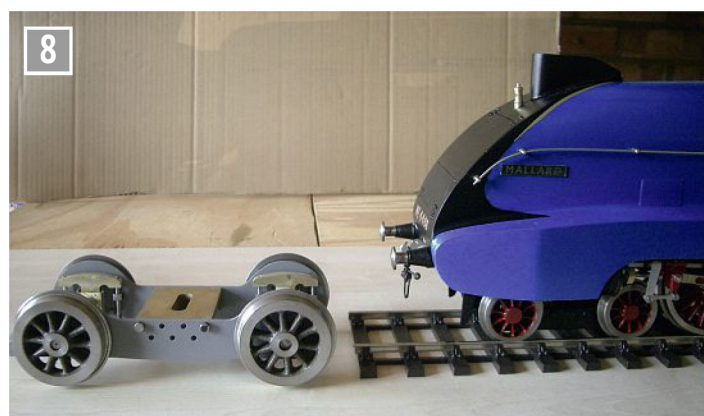
A set of frames.



A set of wheels.



Bogie parts ready for assembly.



Schools bogie confronts Mallard.

riveted to the bogie frames and the spring pins were replaced.

Photograph 7 shows the components of the front bogie. The frames also had a few holes out of place and these

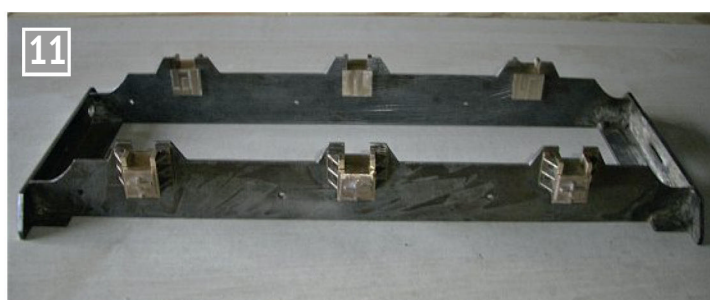
were filled with countersunk rivets and carefully filed flush prior to spraying with etch primer. **Photograph 8** shows the loosely assembled Schools front bogie adjacent to the



Squaring up the milling vice.



Machining an axlebox.



Tender axleboxes in place.



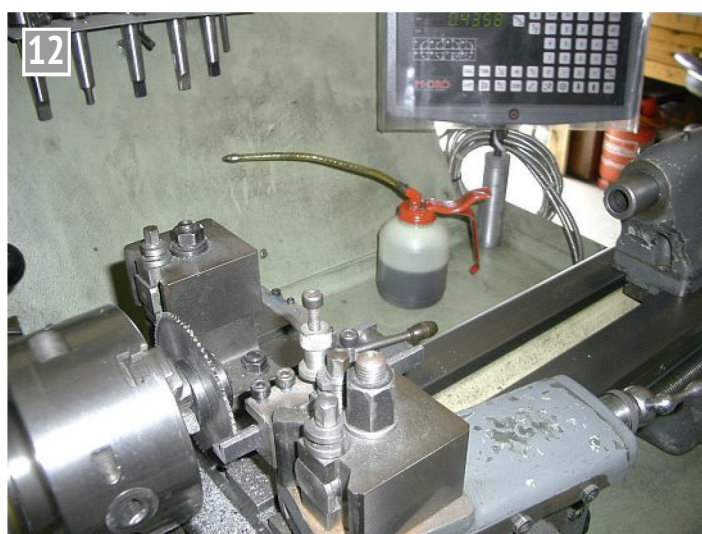
A set of spring hangers.

recently finished 2½ inch LNER A4 *Mallard*. This photo has been included because it really emphasises the size difference between the 2½ and 3½ inch gauges of our hobby.

Tender

Having whetted my appetite with the bogie the next project was the tender, which came welded up with the frames

joined to the front and rear beams. The assembly was cleaned up with rust remover and put to one side. Over some time, as most of us do, I have collected numerous bits and pieces and castings in my spares drawer and fortunately I had a rather nice block of six axle boxes suitable for the tender frames so I set about cutting them to length with the



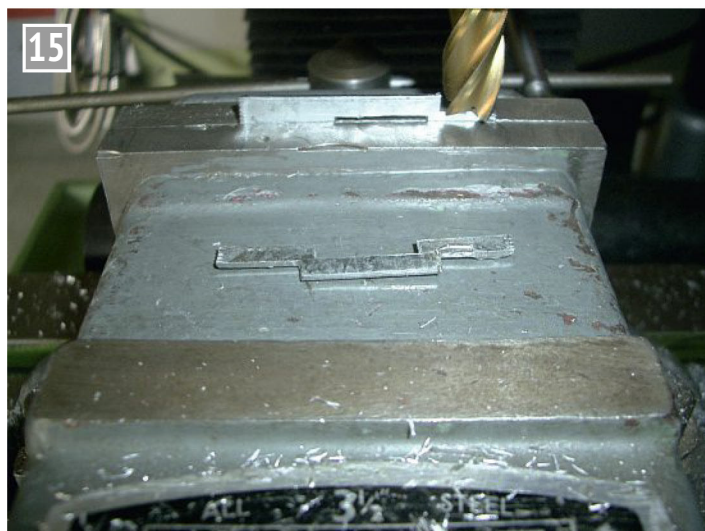
Slicing up hanger brackets.

hacksaw before machining them in the milling machine. Prior to working on the axle boxes in the mill, the vice was carefully tracked to see that all was square and in line. **Photograph 9** shows the dial gauge in position whilst tracking the vice. The axle box castings were squared up in the mill and the slots for the horns machined. **Photograph 10** shows the set-up in the mill with my adjustable end stop in use to help maintain position of the subsequent horns. **Photograph 11** shows the cleaned up tender frame and the six horns in position. Twelve hanger brackets were required for the tender springs, and these were cut to length from mild steel angle using a slitting saw in my trusty Myford (**photo 12**); the photo shows this set-up; note the use of

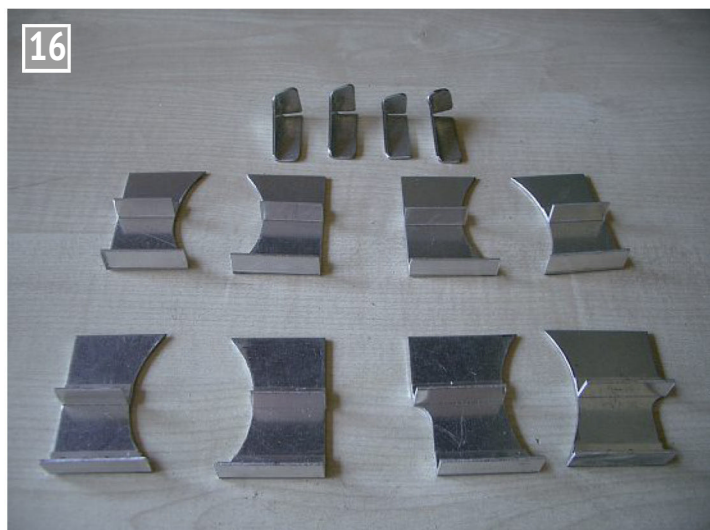
the DRO to keep the lengths of each hanger the same. The brackets were shaped using the six inch rotary sander and then drilled for the spring pins and the fixing holes for the rivets, which would hold the brackets onto the frames. The twelve spring pins themselves were made from turned buttons riveted onto one end of a threaded mild steel rod. **Photograph 13** shows the twelve spring pins and their brackets. The leaf spring castings are shown in **photo 14** and were cleaned up using a file, ready to be drilled to take the spring piston and spring pins. The tender horn stays were roughed out in the vertical mill ready to be hand finished with file and rotary sander and finally being drilled for their fixing bolts. **Photograph 15** shows a horn stay in the



Cast springs for the tender.



Shaping a horn stay.



Steps for the locomotive and the tender.



Slotting the brake blocks.



Brake column.

milling machine vice. The steps were made from galvanised steel sheet and angle, riveted in position and, at the same time, the engine steps were also fabricated and are shown in **photo 16**. The brake block, hangers, brake shaft and pull

rods for the tender were simple machining operations and soon dealt with. The slotting of the brake blocks in the mill is shown in **photo 17**. The tender hand brake column is shown in **photo 18**. A nice little project in its own right is the water cover



Water filler.

which is shown in **photo 19**. The cover top and hinge posts were turned from mild steel bar and the upstand utilises a length of brass tube from my scrap box, the sheet metal

hinges being simply riveted in place. The tender body was next and will be a good place to start the next part of the series.

● To be continued.

Geoff Theasby reports on the latest news from the clubs.



Put not thy faith in electronic media, until the human element has been removed. To explain: I wanted to retrieve an article in M.E. so I consulted one of the indices and it gave me the volume, issue number and page number, all of which were WRONG! This left me with no option to search, issue by issue, in the archives until I reached the one I wanted. Let me

be quite clear, there was no fault with the M.E. archives, which produced the correct issue, readable, copiable and printable, as required. This relates to the AI discussions which are currently flavour of the month. Devices using AI can make lightning fast decisions but if their data records are incorrect, there will be tears before bedtime. Garbage in = Garbage out.

As for those who think that AI will be smarter than we are, I say, bring it on! We have wreaked immense damage on the planet and killed off many species in the last few hundred years, so to make something in our own image only means we will get a result that is as stupid than we are. As for machines 'taking over' there is nothing produced by the wit of man that the wit of another man cannot counter. So, future wars may be fought by drones, meaning service personnel or even ourselves would not be killed or injured. In a military aircraft, much of the content is there to keep the pilot and crew alive and informed. No pilots means no ejector seats, no cockpit, no instruments, no air supply, no windscreen, to say nothing of the ability to exceed human endurance in 'G' forces, mission length and so on.

Odd concepts, Hmmm - Left over food? In case of night starvation. Left over wine? Sorry, don't understand the question. Left over articles, Ah! I have the very thing, concealed about my person for just such an eventuality.

In this issue, more on AI, a Mamod, a clock, a locomotive is 'poetry in motion', a guide dog which doesn't like pipe organs,



Mamod conversion at Stamford. (Photo courtesy of editor, Joe Dobson).



The original Sweet Pea.

a big museum and a telescope, quick change Gandy Dancers and a tram less travelled.

Stamford Model Engineering Society, May Newsletter has some good photos of Mick Brigg's 5 inch gauge (?) locomotive plus Keith's severely modified Mamod, which rather took my fancy (**photo 1**). Keith has converted it into a Showmans engine - very well done, Keith! The Unofficial Mamod Forum shows this model and also a monochrome picture of one such.

Bradford Model Engineering Society June *Monthly bulletin* begins with the sad news that Eric Dean has died. He had an interesting life; born in the shadow of Bradford's Lister's Mill chimney (see YouTube), magistrate, poet, painter, singer, author, engineer, gardener and lots more. One of his poems was about a

locomotive, now preserved (which one of my friends, Jonathan, has driven - Geoff). Jim Jennings became a reluctant horologist due to the discovery of an old Vienna Regulator wall clock in a cupboard. He dismantled it, cleaned and reassembled it (no bits left over) with new lines for the weights and made it work reliably. That was 50 years ago and it's still going! **W.** www.bradfordmes.uk

Another sad loss is John Brandrick of the Old Locomotive Committee. He was about to begin making his own model of Lion, having finished his workshop after much time and effort. He was a mine of information and enjoyed meeting visitors and working on the OLCO stand at exhibitions. Finally, he arranged the Lionsmeet in Birmingham this year, on 1st July.

W. www.lionlocomotive.org.uk



Alan Thorpe's pipe organ.

Her worship and I visited the Sweet Pea rally at **Sheffield & District Society of Model & Experimental Engineers**. I first wrote on one of these rallies 14 years ago, almost to the day (issue 4343 - 2009). Then, it absolutely siled it down. The rain fell in buckets, which was very noisy and there was some damage. On this occasion, the weather could not be more different. Sunny, warm and dry, with a light zephyr wafting over the *Lathyrus odoratus*. A display on the origins of the design by Jack Buckler (**photo 2**) was adjacent to Alan Thorpe's musical box collection. His guide dog, Velvet, doesn't like the noise and hides upstairs when it plays (**photo 3**). Where was I? Oh, yes, The Rally! Bob Potter won the Jack Buckler Trophy, photo later. I counted 12 Sweet Peas on the Sunday morning of this two day event, from this little waif put aside for some misdemeanour, to this highly polished version, which really caught the sun. One group had arranged to take their

lunch on the train, each with a plateful of food before them. 'A moveable feast', said Ernest.

W. www.sheffieldmodelengineers.co.uk

Gauge 1 North, Yorkshire Group is all ready for G1 North at Bakewell. They are FULL with trade stands, so this will be their biggest and best show yet and could be very busy.

W. www.gauge1north.co.uk

Shoulder to Shoulder, May, from **UK Mens Sheds Association** has made its Shed of the Year awards. There were many; it is gratifying to see the useful work they do. Shed of the Year was Bootle Town Shed, awarded by Broadstairs Town Shed, last year's winners, who made the magnificent gift itself. Chris Lee, an ex-trustee of UKMSA, wrote about his plans for time spent in retirement and keeping out of the social care system.

W. www.menssheds.org.uk

The News Sheet, from **North London Society of Model Engineers**, all 44 pages, tells us that a considerable amount

of work has gone into the 00-gauge tracks, as explained by Geoff Howard, which is followed by an item regarding Paul McGee, all the way from Queensland SMEE, in OZ. Spending a month in the UK visiting preserved railways, he arrived on 16 April, having a spare day, so took the train to Tyttenhanger, then taxi to the site declaring himself ready for a day's work! Stout fellow, what? www.qsmee.com.au reciprocates. Some 29 members of NLSME express an interest in Gauge 1, 20 of whom visited in the last few months; the maximum on any occasion being 14.

'Bookworm', reviews the latest publication from Christian Wolmar, *The Subterranean Railway*. Mr. Wolmar's name will be familiar to most readers of M.E. Readers expecting a thoroughly researched and well written book will not be disappointed. As an aside, the name of a certain Mr. I. K. Brunel is hardly mentioned in this book. Finally, the ultimate question, "Why does everything have to be motivated by profit?" (My simple and, I think, unbeatable answer, is that 'It works' - Geoff). An April meeting was devoted to 'interesting equipment', Omah MkII says the mind boggles at what it might bring forth and it did. Paul Godwin began a series entitled *Railway Signal Oddities*, which is followed by Roy Verden's item on his model boat collection, covering four pages. This contains two Billings 'Mary Ann' fishing boats, the kits for which have been on the market since 1958. (The 'Shetland Bus' to give it the correct title, used these boats in the clandestine communications with Norway during WWII. - Geoff.) That was the May issue, The June issue follows next time.

W. www.nlsme.org.uk

A good friend of mine - in fact, best 'man' at my wedding - tells me of a collection she visited in Norfolk, of steam and vintage vehicles and machinery near Sandringham in Norfolk. This turns out to be the Thursford Collection, the

biggest such collection in the world and I've never heard of it! Looking at the website, it is huge and must not be missed if you find yourself close by. (The Orkneys, New Zealand?)

W. www.thursford.com

GMES News, from **Guildford Model Engineering Society**, May, has an article on Roger Curtis' fine 6 inch reflecting telescope. I can see a dilemma here, when indoors constructing the telescope, you cannot be outside exploring the nocturnal welkin, the telescope's main purpose. His grandson has taken an interest in star gazing so is likely to inherit said Newtonian invention in due course. Roger's most difficult operation was grinding the parabolic mirror, which he carried out over a month whilst watching evening TV. Editor, Trevor Combes suggests inviting older school children to the club to show them what we make and how we make it. (I do not think we will see the end of white-collar superiority, as he suggests, since the designers and thinkers will always have a place - Geoff.) Ivan Hurst has tracked down details of a GWR shock-absorbing goods van and it is now under construction.

W. www.gmes.org.com

On Track, from **Richmond Hill Live Steamers**, said Dave Bray had a heart-stopping moment, involving his Sweet Pea. When rebuilding his BR 08 shunter, his jacket caught the SP and sent it crashing to the floor. (Oh, calamity!) Inspection revealed that it was mostly undamaged. The chimney broke off and a few springs popped out but it was soon restored to normalcy.

W. www.richmond-hill-live-steamers.tripod.com

Reading Society of Model Engineers' The Prospectus, June, relates that Alec Bray, then at school, managed to see the *Titfied Thunderbolt* being filmed. He then saw the completed film at his local cinema. TTT was the first Ealing Comedy to be shot in Technicolour. The mechanics of the process were revealed and the information that in



A brick exhibition, property of Carl Andre?

UK there were only 4 Tech cameras, half of which were used on this film. Terry Wood continues with the building of his 7¼ inch gauge locomotive. Chairman, John Billard and Stephen Millward spent a day exploring the rail-based transport of the metropolis. An auspicious occasion, for John had not travelled by tram since 1952. In need of a 'proper' pint, they found a 'proper' pub; no baseball hats allowed and there was no food. Lunch in the Dockland area was a shared

pizza. Finding the area too impersonal and international they crossed the Thames flu and so to Greenwich, then made their way home.

W. www.rsme.uk

More pictures from Pleasley Pit; a collection of bricks, all different ... (photo 4), the Hot Seat, winding controls from another mine (photo 5), another model, severely neglected (photo 6).

Graham Astbury updates the archives of the Henley Solon Owners Club, with his purchase

of three more, as yet untested. Strike whilst the iron is hot, Graham.

Tyneside SMEE sent details of their open days but unfortunately the event will have taken place as you read this. Negotiations over access to the club site, which is over local council property, are in progress and discussions take months!

Ryedale Society of Model Engineers tells us of Steve, who noticed a 'knock' over a set of points, whilst riding his

B1. Inspection showed that the 'frog' was heavily worn and it was replaced within 35 minutes. Rail found, measured, drilled and milled, reattached to its check rail and fastened down. Good work by the track gang! Arriving one day, by way of friendly banter, editor, Bill Read told Mike, "get your dirty arms off the counter" only to find that a council hygiene inspector was present, on an unofficial visit. Oops! Still, they were awarded a 5-star rating.

W. www.rsme.org.uk

St Albans & District SME.

Dave Batchelor spoke on his making of model jet aircraft. He has a Sea Vixen and is building a jet powered Lancaster. He was a member several years ago and his talk was received so enthusiastically that he is to rejoin. Editor, Mike Collins bought a book on railway signalling, which proved disappointing. An article by Alan Asbury on the subject from a newsletter of 10 years ago (June 2013) was much better and is repeated here. Roy Verdon discusses Air Sea Rescue launches. The mystery object last time was a Portuguese tram coupling. The latest such object is cylindrical and appears to be ribbed. What is it?

W. www.stalbansmes.com

And finally, Deborah tells me about a telepathic air freshener now available. It makes scents when you think about it.

ME



The 'hot seat' from another mine.



A severely neglected model winder.

Club Diary 27 July – 10 September 2023

July

27 Newton Abbot and District MES

Track evening at club site. See nadmes.org.uk

27 Sutton MEC

Afternoon run from 12 noon. Contact: Paul Harding, 0208 254 9749

30 Bristol SMEE

Public running at the Ashton Court Railway BS8 3PX, noon-17:00. Contact : secretary@bristolmodelengineers.co.uk

30 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

30 North Wilts MES

Public running at the Coate Water Railway, 11:00-17:00. See www.nwmes.info

30 Warrington and District MES

Running day at the club track. See www.wdmes.org.uk/events

August

1 Taunton Model Engineers

Meeting, West Buckland, barbecue night, 18:00-23:00. See www.tauntonme.org.uk

2 Bradford MES

Evening running and social, Northcliffe, 19:30-22:00. Contact: Russ Coppin, 07815 048999

3 Sutton MEC

Bits and Pieces evening 20:00. Contact: Paul Harding, 0208 254 9749

4 Rochdale SMEE

General meeting, Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

4-6 Gloucestershire Vintage and Country Extravaganza

South Cerney Airfield, Cirencester. See www.glosvintageextravaganza.co.uk

5 Tiverton and District MES

Running day at Rackenford track. Contact: Chris Catley, 01884 798370

5 Wakefield Model Engineers

Annual open day. Contact: Blackgates at 01924 466000 or Dennis Halstead at 01924 457690

6 Bristol SMEE

Public running at the Ashton Court Railway BS8 3PX, noon-17:00. Contact : secretary@bristolmodelengineers.co.uk

6 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

6 North Wilts MES

Public running at the Coate Water Railway, 11:00-17:00. See www.nwmes.info

6 Small Model Steam Engine Group

Open meeting. 14:00-17:00. See www.gmes.org.uk

6 Warrington and District MES

Running day at the club track. See www.wdmes.org.uk/events

8 Taunton Model Engineers

Club evening, Vivary Park, 18:00-21:00.

See www.tauntonme.org.uk

10 Guildford MES

Open day, 10:00-13:00. See www.gmes.org.uk

13 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

13 North Wilts MES

Public running at the Coate Water Railway, 11:00-17:00. See www.nwmes.info

13 Sutton MEC

Track Day from noon – 16:00. Contact: Paul Harding, 0208 254 9749

13 Warrington and District MES

Running day at the club track. See www.wdmes.org.uk/events

16 Bristol SMEE

'Anything Goes' meeting, Begbrook Social Club BS16 1HY, 19:30. Contact : secretary@bristolmodelengineers.co.uk

18 Rochdale SMEE

Quiz night, Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

19/20 National Tramway Museum, Crich

Model Tramway and Railway Exhibition, 10:00-17:00. See www.tramway.co.uk

20 Bradford MES

Public running day, Northcliffe, 13:30. Contact: Russ Coppin, 07815 048999

20 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

20 Guildford MES

Open day, 14:00-17:00. See www.gmes.org.uk

20 North Wilts MES

Public running at the Coate Water Railway, 11:00-17:00. See www.nwmes.info

20 Taunton Model Engineers

Public running, Vivary Park, 14:00-17:00. See www.tauntonme.org.uk

20 Tiverton and District MES

Running day at Rackenford track. Contact: Chris Catley, 01884 798370

20 Warrington and District MES

Running day at the club track. See www.wdmes.org.uk/events

24 Newton Abbot and District MES

Track evening at club site. See nadmes.org.uk

24 Sutton MEC

Afternoon run from 12 noon. Contact: Paul Harding, 0208 254 9749

26 Brandon and District SME

Running/family day, Weeting track. See www.brandonanddistrictsme.com

27 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

27 Warrington and District MES

Running day at the club track. See www.wdmes.org.uk/events

27/28 Bristol SMEE

Public running at the Ashton Court Railway BS8 3PX, noon-17:00. Contact : secretary@bristolmodelengineers.co.uk

27/28 North Wilts MES

Public running at the Coate Water Railway, 11:00-17:00. See www.nwmes.info

31 Guildford MES

Open day, 10:00-13:00. See www.gmes.org.uk

September

2 Bromsgrove SME

Open Day – all gauges welcomed, 5, 3½, 2½, G1 and 16mm. See www.bromsgrove.co.uk Contact : Doug Collins, 01527 874666

2 Tiverton and District MES

Running day at Rackenford track. Contact: Chris Catley, 01884 798370

2/3 Canterbury MES

Open weekend. Contact : ginapearson@btopenworld.com

2/3 Sale Area MES

Open weekend at Walton Park, M33 4AG, from 10:00. See www.waltonparktrains.co.uk

3 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

3 Newton Abbot and District MES

Autumn BBQ at club site. See nadmes.org.uk

3 North Wilts MES

Public running at the Coate Water Railway, 11:00-17:00. See www.nwmes.info

3 Taunton Model Engineers

Public running, Vivary Park, 14:00-17:00. See www.tauntonme.org.uk

3 Warrington and District MES

Running day at the club track. See www.wdmes.org.uk/events

5 Taunton Model Engineers

Meeting, West Buckland, 'bits and pieces', 19:30-21:30. See www.tauntonme.org.uk

6 Bradford MES

Talk – Roger Backhouse, 'King Cotton', Saltire Methodist Church, 19:30. Contact: Russ Coppin, 07815 048999

7 Sutton MEC

Bits and Pieces evening 20:00. Contact: Paul Harding, 0208 254 9749

7 Warrington and District MES

Projects/natter night, St Mary Magdalene Church, WA4 3AG, 20:00. See www.wdmes.org.uk/events

9 Polly Owners' Group

Rally at the Rugby MES, from 10:00. Contact : Neil Mortimer, 07900 133201 or neilmortimer@gmail.com

10 Canterbury MES

Public running. Contact: ginapearson@btopenworld.com

10 North Wilts MES

Public running at the Coate Water Railway, 11:00-17:00. See www.nwmes.info



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: £2,782

W 2 Axis DRO - Price: £3,150



AMAVM25LV

SPECIFICATION:

Model No: AMAVM25LV (MT3) / (R8)
Max. face milling capacity: 63mm
Table size: 700x180mm
T-slot size: 12mm
Weight: 120Kg

Price: £1,431.00

W AXIS POWERFEED - Price: £1,659

W DRO - Price: £1,921

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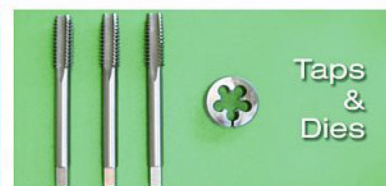
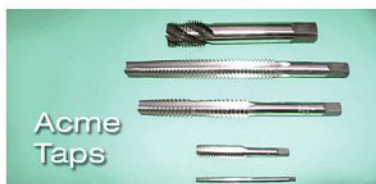
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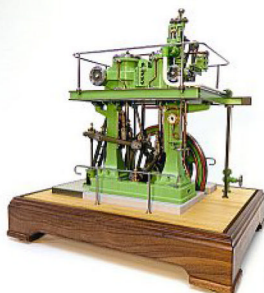
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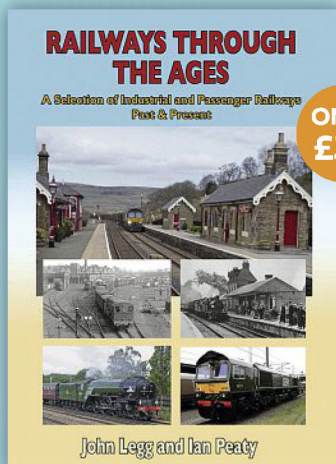
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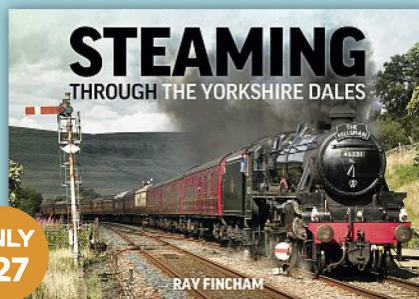
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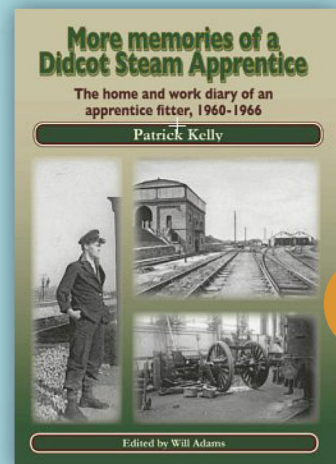


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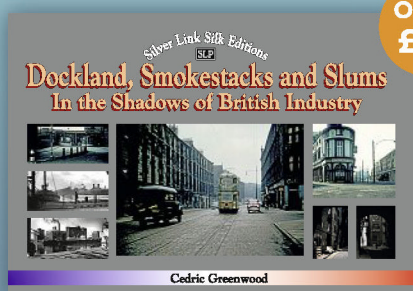


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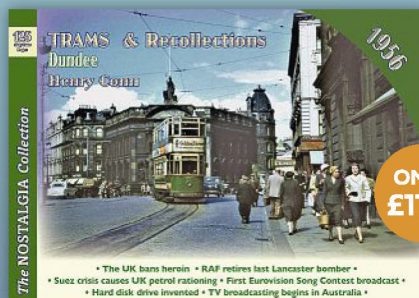


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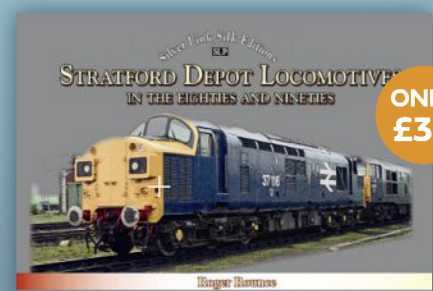


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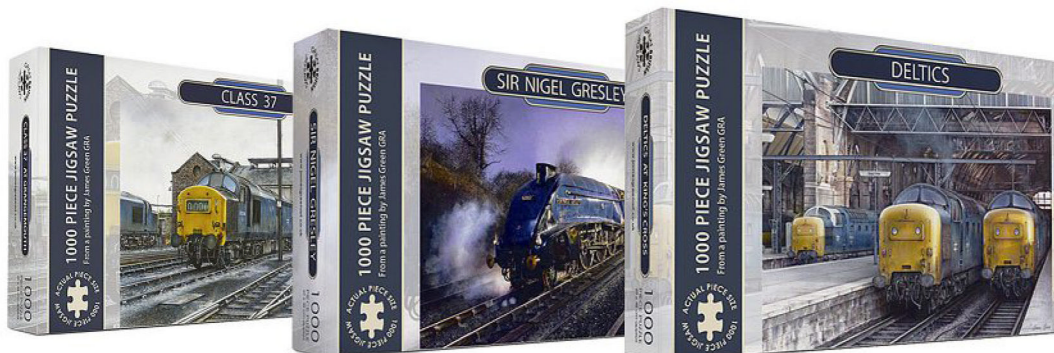
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