MODEL ENGINEER

THE ORIGINAL MAGAZINE FOR MODEL ENGINEERS

Vol. 232 No. 4735 26 January – 8 February 2024

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Spindle Taper	**MT3**
Draw Bar Thread	**12mm**
Spindle Feed	**50mm**
Head Tilt	**+/-90°**
Number of Spindle Speeds	**Variable Speed Control**
Spindle Speed Range	**50–2250 rpm**
Table Surface	**500×180 mm**
Maximum Longitudinal Table Travel	**480mm**
Maximum Transverse Table Travel	**175mm**
Maximum Vertical Travel	**380mm**
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T-slots Dimensions	**10mm**
Motor Power	**750 W, 230V**
Weight	**110kg**

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Manufacturer	**Cormak**
Model	TYTAN 500
Condition	New
Swing over bed	200mm
Swing over cross slide	140mm
Centre width	500mm
Bed width	100mm
Spindle bore	21mm
Spindle tip	MT3
Spindle speed	100-2500 rpm
Metric thread	(14) 0.3–3 mm/turn
Inch thread	(10) 10–44 Gg/1"
Tool holder	4- slots
Maximum cross support travel	55mm
Maximum transverse support travel	100mm
Maximum longitudinal support travel	376mm
Tailstock spindle travel	60mm
Tailstock quill taper	MT2
Motor power	500 W / 230V
Dimensions (without base)	900×390×340 mm
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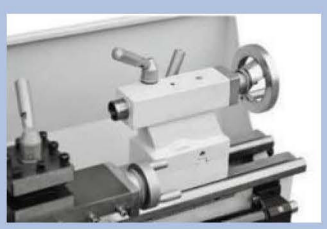

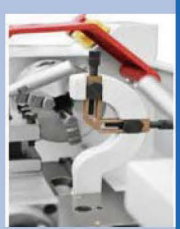

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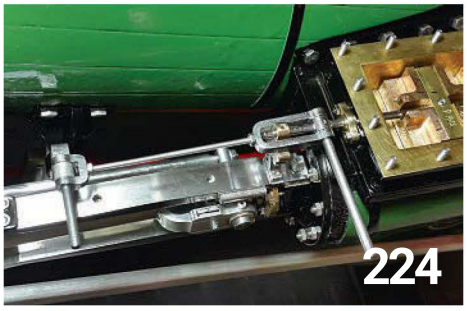

ON THE COVER...

A beam engine to the K.N. Harris design of 1946 built by Geoff Walker (photo Geoff Walker).

This issue was published on January 26, 2024. The next will be on sale on February 9, 2024.

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SMOKE RINGS

MARTIN EVANS
Editor

DIANE CARNEY
Assistant Editor

Models

We generally think of model making as the creation, to a greater or lesser degree of *verisimilitude*, of a miniature of the 'real thing'. So, we take a look at the full-sized article, think 'I like the look of that' and then spend a substantial chunk of time creating our own miniature version of it. It is then displayed on our mantelpiece (or down at the club) for all and sundry to admire.

It occurred to me, though, that the traffic is not all one way. Models are also used in engineering and architecture in order to show what the full-sized article is going to look like. After all, if you are going to sell something expensive to someone, it makes a lot of sense to build a model first and say 'If you give me a lot of money, you can have a full-sized version of this' rather than build the thing and have the customer say 'I don't really like that'. Major architectural projects invariably start with a model of the proposed development and ships are another good example. A model of a ship, in three solid dimensions, gives a much better idea of the look of the design than a drawing of the ship's lines. There is a whole gallery in the Science Museum, London, for example, filled with models of ships, many of them produced by the ship yards before construction started.

Just like a miniature of the full-sized article, the full-sized article may well turn out to be a rather inexact reproduction of the miniature. After all, the main point of the model is to sell the product. A fine example is St Paul's Cathedral. Sir Christopher Wren made a model (the 'Great Model', which can still be seen at St Paul's) of the proposed cathedral to sell the idea to King Charles II, who was invited to sit inside the model in order to appreciate the grandeur of the interior. It worked and the go-ahead was given but what was eventually built (it took 35 years) bore only an approximate resemblance to the model – a classic case of 'bait and switch' perhaps – but the result was a case of 'what you got is even better than what you saw' and St Paul's became the crowning glory of the rebuilt City of London.

SMEE

As most readers will know, our magazine and the Society of Model and Experimental Engineers (SMEE) are cut from the same cloth (as the saying goes), having both been founded by Percival Marshall back in 1898. Both the Society and the magazine, of course, have been key players in the hobby of model engineers, not just here but all over the world, for the last 125 years. Consequently, we thought that it would be a nice idea to keep the magazine's readers informed about what the club is up to. So, in this is issue, we have the first of what I hope will be a regular series of reports from SMEE. We're getting off to a good start with Martin Kyte's look back at the SMEE's 125th anniversary cruise up the Thames on a steam boat, appropriately enough, the same age as the society. Martin's report is on page 219.

Matt Roberts

Doug Hewson needs your telephone number! Doug tells me that he has been meaning to ring you back after your recent conversation but didn't get a good copy of your telephone number. So please give him a ring…

Club Secretaries

Just a reminder to make sure I have details of your events for the coming year for the Club Diary. Please send details of any club events to which readers of *Model Engineer* are welcome. Please also include details of the time and place of the event and also contact information for any queries. Time marches on and the spring will soon be here (yes it will).

Cover Price

I am sorry to say that the cover price of *Model Engineer* will rise from £4.95 to £5.10 from the next issue. The good news is that this rise is well under the rate of inflation!

Wren's 'Great Model', St Paul's (The National Churches Trust, CC BY 2.0 https://creativecommons.org/licenses/by/2.0, via Wikimedia Commons).

Daniel Gooch's Firefly *model (Geof Sheppard, CC BY-SA 4.0 https://creativecommons.org/licenses/by-sa/4.0, via Wikimedia Commons).*

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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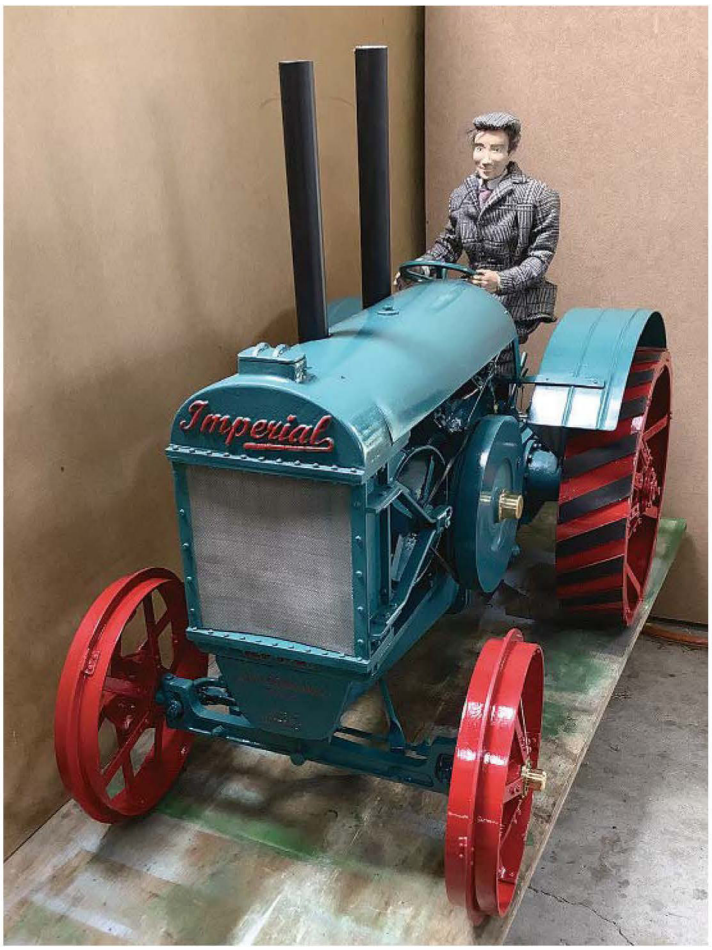
1934 McDonald Tractor

A working one-fourth scale model

PART 2



George Punter is drawn to another tractor project.

Continued from p.159
M.E.4734 January 12

The chassis on the full-size tractor is a U-shaped casting and on my model is cast in aluminium. For my workshop this is quite a large and complex part to make. The photographs help to explain the process as there is not only a need to make a pattern (**photo 5**) but also a core for the inside. My casting skills are self-taught and there will be professionals out there who may question the how and why I did it this way but as the song says, 'I did it my way' and for me it worked (**photo 5**).

For this casting I used Petrobond for the outside (**photo 6**) and resin mixed sand for the inside core. The core box is laminated from MDF of different thicknesses and it is not glued together but held with long threaded studding and nuts on each end (**photos 7** and **8**). This

The chassis pattern turned upside down and made from MDF.

The sand mould showing the name plate at the front.

The outside of the laminated core box.

The inside of the core box, with removable parts.

This shows the pattern – the core is ready for the upper box to be placed on top.

The front end of the full-size tractor.

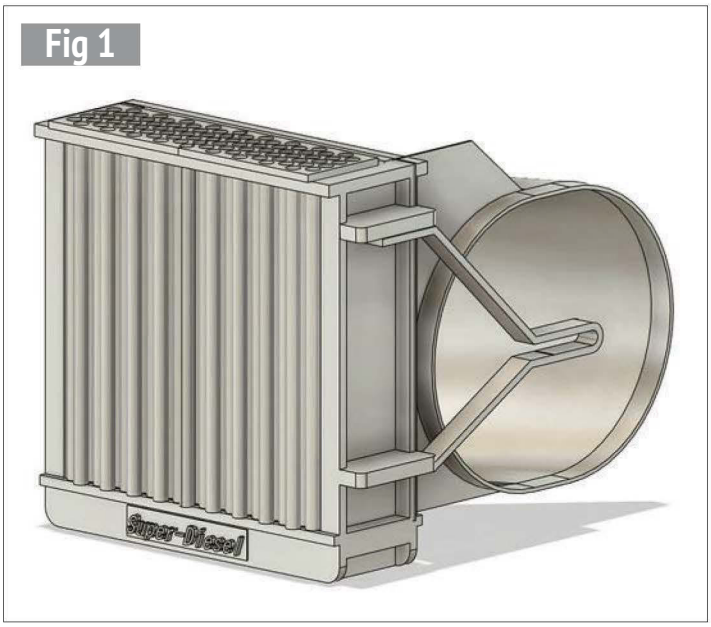
The patterns for reproducing the lettering.

The radiator top as cast and before cleaning up.

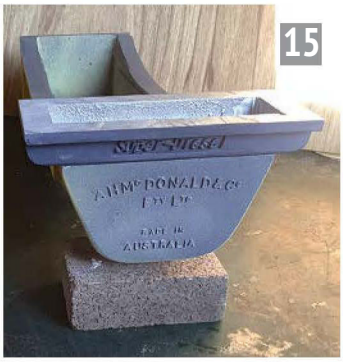
This is a 70bhp two stroke Mc Donald engine and looks very much like the tractor engine only larger.

enabled me to take the box apart should any modifications be needed. The core was made using resin sand and can be seen in **photo 9**. The front end of the chassis has the maker's nameplate cast into it and on the model, this was achieved adding a separate core with the lettering embedded into it. The printing on this part was made using a 3D printer. At this stage of the proceedings, I had a small 'UP2' 3D printer capable of work that would fit within a 120mm cube and it

Pouring an aluminium casting with my mates John and Ray doing the heavy work while I take the photograph.



Radiator core.



The finished casting of the chassis and radiator base showing the lettering detail. The tray part on top of the chassis is the base casting of the radiator.

was this machine that I used for this part of the process (**photos 10** and **11**). It was a lovely but quite expensive machine and has only recently been replaced, after many years of work, by a printer that has a larger working table and cost half the price. How times have changed! I also used this system for the front of the radiator, the *IMPERIAL* shown in **photo 12**. I was able to find the correct font and it is this type of detail that adds to the finished model but is easy to do. A good coating of parting dust helps to give a clean profile. On some parts that require letters or numbers I use Slater's plastic letters bought from a model shop and often would have been used by fellow model railway enthusiasts to make small signs for stations. These moulded plastic letters are then glued onto the pattern using PVA wood glue.

With the chassis cast in aluminium (**photo 15**) it was time to begin the machining process. On this casting there is not a great deal of machining to be done, which is just as well as it is not the easiest of shapes to hold onto in the milling machine!

The radiator is composed of a top header tank and a base tank, both cast in aluminium with the radiator core sandwiched between them (**photos 16** and **17**). The core is made up from 85 thin walled 6mm diameter brass tubes soldered into top and bottom plates and strengthened by brass side plates (**fig 1**). The whole unit is then attached to the top and base tanks. A sheet metal cowl helps direct the air that is being sucked through the radiator by a side mounted fan. The shape of this cowl being figured out by a process of origami in thin cardboard. The fan unit runs on two small ball races and sits in between the two horizonal rails, these giving room for belt adjustment - this being driven by a belt from a pulley attached to the back of the flywheel.

I now had the satisfaction of being able to bolt the radiator to the chassis – the building had begun.

●To be continued.

Now I can almost visualise the rest!

We Visit the Bournemouth Model Engineering Society

John Arrowsmith takes a break from his holiday to visit a seaside club.

My visit to the Bournemouth & District SME coincided with a short holiday break in Bournemouth and a visit to the society fitted in nicely with the break arrangements.

This well-established society was formed in 1924 and the first track was built at Southbourne, a district of Bournemouth on the east side of the city. This lasted until after WWII when the club made a move to a sports ground at Kinson. It was officially opened in 1958 and operated for four or five years when the land they were on was needed for other purposes. Following an approach to the Bournemouth local authority they were offered a number of different locations before deciding on Kings Park. Here, a track and clubhouse was created in 1965 and officially opened in 1966 by the Mayor of Bournemouth. This move enabled the club to establish itself and provide an interesting model engineering club and railway.

However, they were again compelled to move when Bournemouth AFC football club wanted to build a new stadium and following yet another approach to the local council, who were more than helpful in the negotiations with the football club and with a very professional presentation by the club, they were offered their present site in Littledown Park along with a very nice re-settlement grant. There were some conditions required by the council - it had to be a raised track, no ground level was allowed and no major earth works or tunnels could be built. However, the club developed the site as they wished whilst having an excellent relationship with the council. This did lead to some additional earthworks because of the slope of the ground. The 4 inch steel box section track support lengths differed from about 1 metre long to 2 metres which made the track look rather high up, but tons of material was supplied by the council at no charge to reduce this unevenness so that today, now it has matured, it is a very pleasant and good looking track layout. As it is in a public park they have lots of interest by families and people attending the park which is good for their operations and fortunately they do not suffer from vandalism as many other clubs do.

A corner of an extensive garden railway layout.

The passenger view of the long straight after leaving the station.

It was here that I met longstanding member Dick Ganderton and a number of other club members for a very pleasant afternoon.

The society have developed an excellent model engineering facility in the park with a large multi-gauge track which supports and includes 3½, 5 and 7¼ inch gauges. It is rare to see an elevated 7¼ inch gauge line as they are normally ground level. However, having

This little steam powered loco is a Roundhouse 'Billy' about 12 years old now and going well with a short goods train.

The traverser moves on the steaming bays.

The portable water softening plant for the track.

the larger gauge available does provide a very stable journey for passengers. The 1/3rd mile track is laid in heavy duty rail section on plastic sleepers in a dog bone shape, with good 17 metre radius curves at both ends and these are joined by two very long straights which provide drivers with a good opportunity to exercise their engines (**photo 1**)! The extra width also provides a good anti-tipping feature so it is a very safe track to ride. I was given a locomotive to try and I can safely say it was an excellent and comfortable experience. The club also have an extensive 16 mm garden railway (**photos 2** and **3**) which is proving popular, particularly with younger visitors and the lady members of the club. They have a membership of about 140 which includes about 40 lady members which in itself is different to many other clubs. Unloading and locomotive handling equipment is well catered for with robust hydraulic lifts and traverser (**photo 4**) whilst the connection to the main line is via a moveable bridge section. Because the local water supply is very hard the club provides a portable water softening plant for the steamers to reduce the usual carbonate build up (**photo 5**).

The main club house and steaming bays.

The members' lounge and clubroom with comfortable reclaimed seats.

A happy group of members enjoy a trip behind the Class 59 on what was labelled the 'Senile Express'.

The members have built a good-sized clubhouse (**photo 6**) which is extremely well fitted out with some very comfortable seating (**photo 7**), courtesy of a scrapped full size railway carriage with the usual fittings and displays, to provide a good environment for members, and a small kitchen unit looks after the catering needs. There is a good selection of locomotives available to the club when they are public running and the one in use whilst I was there was a Class 59 built by Neil Horder to a design by the club's oldest member Ron Challener (**photo 8**).

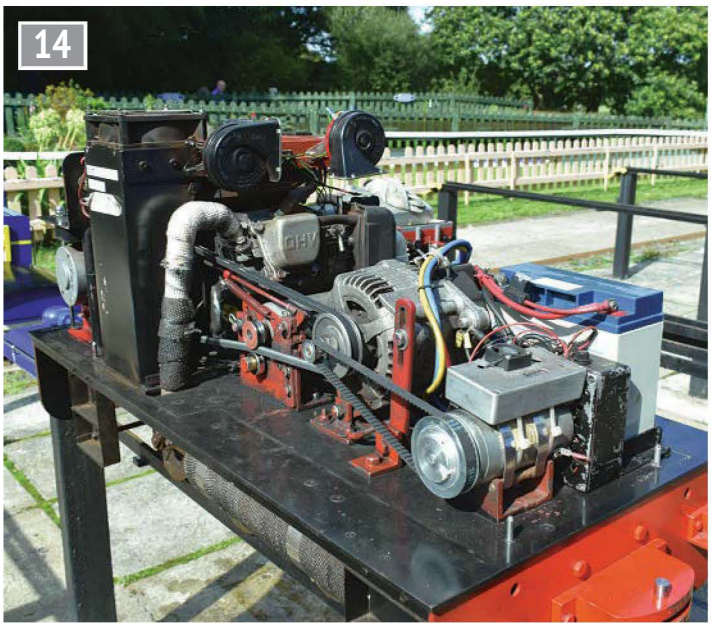
Ron Challener with Neil Holder and one of the three Class 59 engines he built.

The GWR pannier in operation on the track.

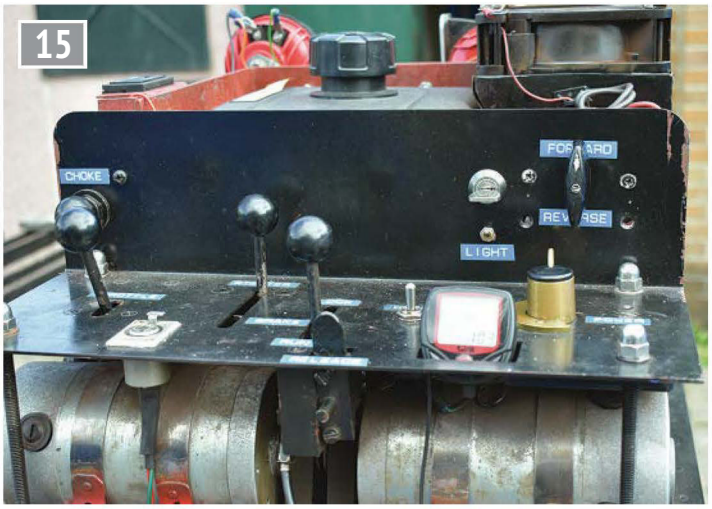
Cock o' the North *is going well past the station.*

A good example of Simplex operating on the track

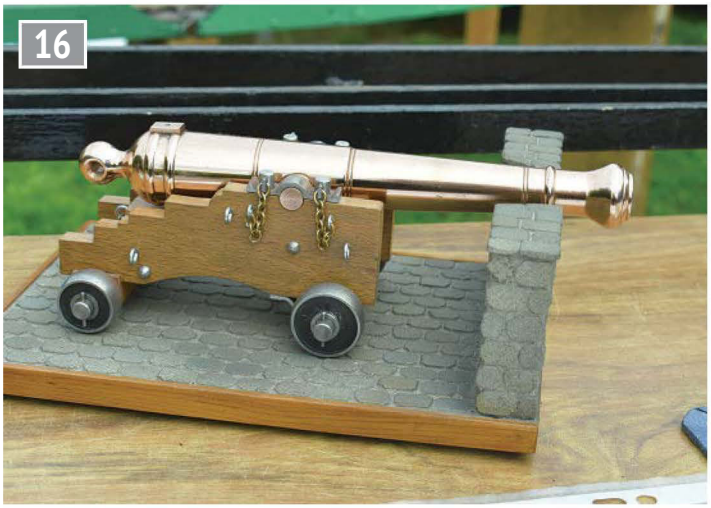
Built by club members, the petrol/electric locomotive Littledown Castle.



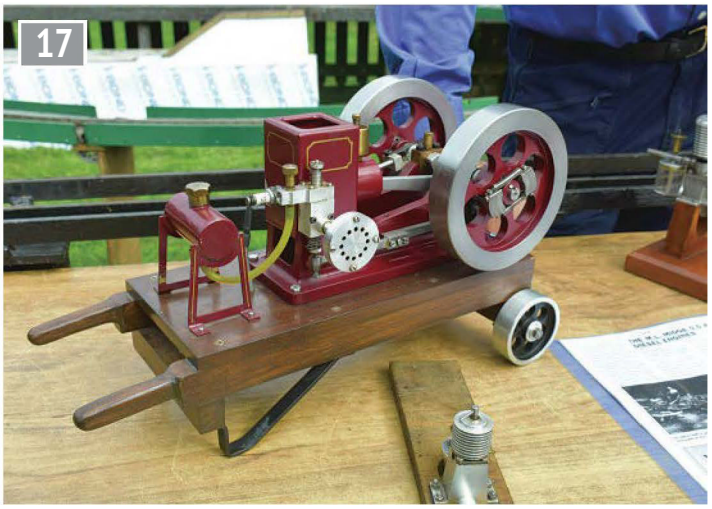
More details of the locomotive.



Details of the driving position.



In the display of members work was this fine-looking cannon.



A small Hit & Miss engine along with its barrow was an excellent piece of work.

An ML Midge aero engine.

This venerable gentleman (now sadly deceased since my visit) actually built three of these engines with help from other members and Neil Horder, who eventually ended up owning one of them (**photo 9**). Ron made all the chassis which include a 24V drive motor on every axle. They are splendid looking modern locomotives with a carbon fibre body shell and in operation they are very powerful. Under normal public running conditions they use three passenger carriages per locomotive and these types of loads are no problem. They have tried them on bigger loads and again they coped admirably with the loadings. Also running on the track was a very nice 5 inch gauge pannier tank with an interesting water tank wagon attached (**photo 10**) and a very nice 3½ inch gauge LNER *Cock o' the North* was performing very well with a good head of steam (**photo 11**). A very nice Simplex in LMS livery was also going very well (**photo 12**).

The other very reliable club engine built by members is *Littledown Castle*. This petrol/electric powered machine has some novel features and again is very powerful (**photo 13**). It was explained to me that it is a true petrol/electric with a Kawasaki 100 cc petrol engine driving an alternator rescued from a Range Rover (**photos 14** and **15**). All the alternator electronics were removed and the drive for the axles is direct from this source with the petrol engine driving the alternator. There was an interesting story about the petrol engine because when the club were sourcing a suitable engine, they approached the local company, Kawasaki, about one of theirs and it just so happened that the company had received a large order for 1000 lawn mower engines identical to the one the club needed. I was told that either there was 1001 made or only 999 were delivered - they never found out. It has an electric start mechanism but needs a delicate hand to balance between the petrol engine and the alternator, although it is very easy to start and drive. It can be driven by anyone but for best results it needs this careful hand on the throttle.

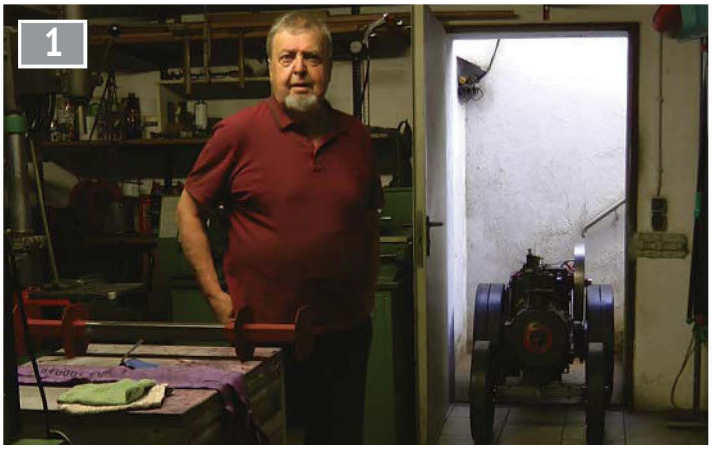
Members had laid out a small display of work for me to have a look at and I have to say there were some interesting exhibits. The bronze cannon in **photo 16** is based on one at the Tower of London and is made out of bronze, like the original. The Hit & Miss engine (**photo 17**) was based on a model designed by Philip Duclos and was built because the builder always wanted one whilst the aero engines (**photo 18**) were made because, in his younger days, flying model aircraft was his passion.

In concluding my notes, I would as usual like to thank Dick Ganderton and all the Bournemouth members for all their help in providing information about the club and its activities. They certainly use their facilities regularly and host national events like the Polly Rally and Lionsmeet. Public running takes place every Sunday and Wednesday from 11am until 3pm and members can also take part in Tech Meetings using Zoom. All in all, this is a very successful club with a warm welcome and excellent facilities. I thoroughly enjoyed my visit and I hope I can do so again in the future.

ME

Transport of a four inch Garrett Traction Engine

Werner Schleidt watches a friend's latest project emerge from his basement workshop.



Jürgen Stein with his engine ready for transport.

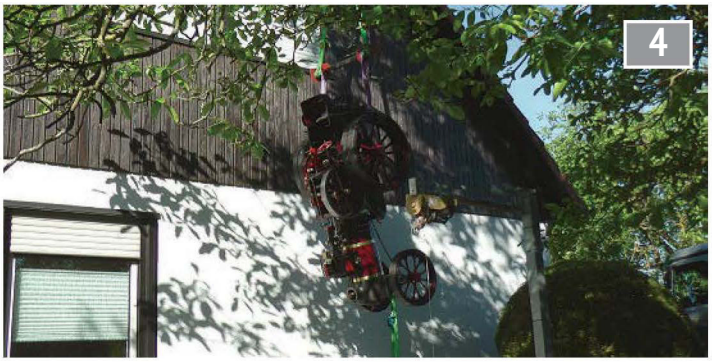
The creative solutions that model makers find often amaze me!

Jürgen Stein started building models when he was still a teenager. At first, his favourites were ship models. As a schoolboy, he would travel long distances by bicycle to the pond to build them. Later, he became enthusiastic about aeromodelling. As it was still common at that time, a lot had to be built by himself. The remote controls and batteries did not yet have the quality of today and so there were also setbacks but he was enthusiastic about building model planes and creating them himself and success followed.

Then he discovered his metalworking skills. A two inch scale Fowler traction engine had taken his fancy. He was able to prove his skills on it. The basement workshop was built, lathe, milling and drilling machine were acquired. He even made his father's pillar drilling machine usable again with transmission pulleys.

A bit of a squeeze.

Up and away!



Half a ton dangling from the hook a foot from the roof of the house.

Presenting an unusual view from the window.

Since his motto is 'can't be done - doesn't exist', he also decided to build the boiler himself according to plan. But boiler construction requires a lot of experience and he had to acquire this. Unfortunately, the first boiler did not seal. A large amount of silver solder had to be disposed of with the boiler. Jürgen, though, was not discouraged and successfully made a second boiler. With the amount of silver solder he used, he was always served very courteously by the dealer. The Fowler became a beautiful machine. But even with this size of traction engine, which could still be described as 'manageable', transporting it out of the cellar was tedious. This spurred Jürgen on to construct a crane so that the transport could be carried out more easily. He had his crane construction statically recalculated to be sure of the design.

He had a lot of fun with the Fowler for a while but then he realised the two inch scale is good in handling and weight but a three inch machine would suit him better.

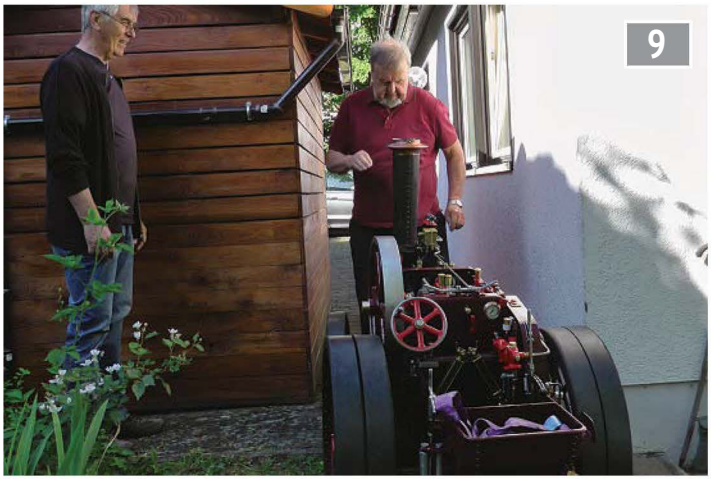
As so often happens when skills grow, the models get bigger and bigger too.

With the three inch Fowler, he was a welcome guest at the driving days of the Dampfbahnclub Rhein-Main e.V. and did his rounds in the car park in front of the site. Jürgen enjoyed taking advantage of the extensive driving opportunities that presented themselves. Not only is it possible to ride in the car park but there is also

Not much clearance from the wall and the roof.

Now turned and aligned.

Back on the wheels.



Complete with chimney.

the possibility of riding with little traffic, to the Mainspitze, the junction of river Rhine and Main, 2.3 km there and back, and to the Kostheimer water gate, 3.6 km there and back.

His enthusiasm led him to attract other road steamers and to the idea of manufacturing his own machine. Nowadays, five road steam engines regularly run at the DBC Rhein Main driving days. And a sixth traction engine is under construction.

At some point Jürgen surprised us with the news that he is building a Garret traction engine in four inch scale. If you look at the weights again, the two inch Fowler weighs 80 kg, the three inch Fowler weighs 250 kg and the four inch engine weighs about 500 kg. It was clear to all the street steamers that Jürgen would also master this project. He put all his energy into this new project, which took him about four years to complete. At the same time he was still dependent on his boiler maker and castings supplier. Some of the parts were so large that he could no longer process them with his own machines. That's why they worked on a division of labour basis. He did the preliminary work and then he sent the parts back to England for finishing.

Some parts were also machined by a model maker friend on his large machines. Jürgen, as his own project manager, manufactured and assembled the parts bit by bit. He told us a few times at our meetings about the size and weight of the parts and how he struggled with the heavy lumps. To be honest, I didn't really have an idea of how big his machine was. It was only when he described how difficult it is to fit a 45 kg rear wheel, where the boiler has to be jacked up with a car jack, that I got an idea of his problems.

In the spring of 2020, he announced to our circle of friends that he was now ready with his Garrett so that the machine could be taken out of the workshop and the remaining work and commissioning under steam could then take place.

When asked how he would get it out of the cellar, it was clear that he would need to use a crane. Unfortunately, the crane he used to move the smaller machines was not strong enough. Jürgen then went in search of a truck-mounted crane company to take over the transport.

An employee of the company took a close look at the location and a proposal for the execution was worked out. Jürgen planned everything with the help of a hand model and measured all the free spaces at the doors and the house wall. There was a little space everywhere - only a few centimetres at the door, and ten centimetres between the banister and the house wall.

The crane truck driver was quite cool and professional. However, when the crane was extended for the first time, it became clear that the angle between the tree and the roof of the house would be too narrow. This problem was solved by moving the crane truck. Now everything fit. Jürgen had made a lifting beam with the correct distance between the rear wheels especially for the transport. This allowed the heavy-duty belts to be placed around the wheels and hooked onto the lifting beam. From there, the straps went to the crane hook. The Garrett was then slowly lifted and held by the front wheels by a helper in the cellar. So that the machine could support itself against the cellar staircase wall during lifting, boards were placed in between. It turned out that Jürgen had measured everything correctly. The crane was lifted slowly and steadily until the Garrett could be turned over the stair railing. By moving the crane boom, the machine could be moved five metres forwards in front of the house. There it was slowly lowered until the front wheels made contact with the ground. Two steam friends then tried to turn the Garret traction engine in the right direction with straps on the front wheels.

Due to their efforts, this worked out quite well. Finally, the transport action was successful and the remaining work for completion could be done.

Next, the water pumps will be tested and a water pressure test can be carried out. The first test drive is eagerly awaited by all of us who were present during this transport.

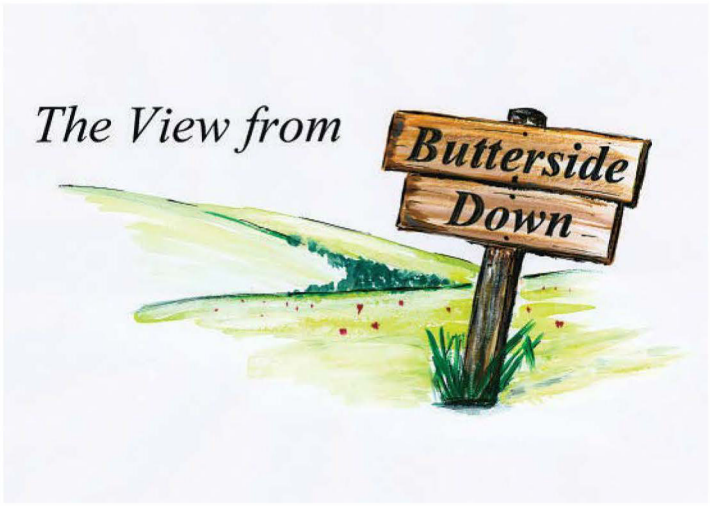
The entire process can be viewed on YouTube: youtu.be/fd7_qS08TyQ

ME

YouTube Video

Job done!

The View from Butterside Down
Kicking Things Off, Part 3: Measuring Up



Hello there, persistent but frustrated Reader and yes, I did it to you again, didn't I?

Just when you were getting into the plot, with the murder weapon revealed and the SWAT team about to do their thing, away I went, abandoning the story mid-stream and leaving you poised on the edge of your seat in eager anticipation. Or perhaps not, but suggestion is a powerful force, and you can't blame me for trying to influence your memory to my advantage.

Now I'm not going to bore you with the details but, suffice to say, because of a small group of clever folks whose expertise spanned numerous fields and several continents - and aided and abetted by yours truly who doesn't fit that description at all - and after an intensive year of effort and, thankfully without wrecking any more lenses, the methane problem was eventually resolved. Deep ultraviolet photolithography became a practical proposition and the door was opened to a world filled with an endless variety of cat videos.

Please, don't mention it. You're very welcome.

After revealing that ending, I want to focus our attention upon just one aspect of the problem, if you'll pardon the pun, which for me was the cleverest bit, because it has some relevance to our hobby activities, so please bear with me.

Let's re-join the tale where we left off, with an extremely

Steve Goodbody takes a random walk through model engineering.

Continued from p.149
M.E.4734 January 12

Windermere, England's largest lake, in all its pristine glory (Photo credit: lakedistricttravelguide.co.uk)

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expensive lens, recently relegated to the role of sooty paperweight, and the author and his merry band engaged to prevent it from happening again - and this time, we'll reach a conclusion.

Well … probably.

The measurement problem

As with all projects, the first and most important job is to establish a clear picture of what you intend to accomplish, an exercise formally referred to as *setting the specification*, and informally as *engaging in wishful thinking*. And it really doesn't matter the nature of the project, whether baking a cake (specification: it must be light and fluffy and taste nice) or building a photolithography machine, for the same rule applies: if you don't have a specification then you can't make a plan and without a decent plan your project is, sadly, unlikely to succeed. It really is that simple.

In the case of our project, while we knew we had to get the atmosphere within that machine under control, one of the first things we needed to determine, for it would obviously be a crucial part of the specification, was this: what level of hydrocarbons in total, and methane specifically, could be present in the atmosphere without damaging the lens? The clever scientists sucked their pencils, tapped their calculators, prevaricated back and forth and eventually the answer to those critically important questions emerged. Respectively, if the hydrocarbon content in the machine were more than 100 parts per trillion, or the methane level exceeded 10 parts per trillion, then the lens would be damaged. And that, trust me, is not very much of either.

To put this into perspective, and ignoring the usual choices of double-decker buses (height), football fields (length), Olympic swimming pools (volume) and Wales (area), which are the typical units adopted by the media for such exercises, here's what those figures mean.

Let's say you are standing beside Windermere (**photo 3**), all 300 billion litres of it, the largest lake in England and the size of 120,000 Olympic swimming pools (sorry, I couldn't resist) and someone were to pour three one-litre bottles of Ribena concentrate - just three – into its otherwise pristine waters (**photo 4**). Having seemingly enjoyed the experience, this environmental vandal then adds a further 27 litres of Robinsons Lemon Barley concentrate to the lake, giving 30 litres of sugary squash in total, and mixes everything together so that the blackcurrenty and lemony flavours are fully and evenly diluted within the waters… Hopefully you're with me so far but, for heaven's sake, please don't try this yourself for you'll only get into trouble.

Now, believe it or not, with just three litres of blackcurrant juice and 27 litres of lemon squash distributed within its volume, Windermere now contains exactly 10 parts of Ribena, and 100 parts of squash concentrates overall, for every trillion parts of water. And you're right, you probably won't be able to taste the juice, but if you dislike Ribena and Lemon Barley Water as much as my wife, then you'll still refuse to go anywhere near the lake for a long time afterwards.

That's all well and good but now suppose you are visiting this fine tourist destination the following morning, unaware of the preceding day's dirty deed. Picture yourself happily admiring the view while your substantial pub breakfast goes down, when some joker sidles up and tells you that the lake *might* contain a tiny bit of diluted squash, the squash *might* include a teensy bit of Ribena and that your job is to determine *exactly* how much squash is in there in total and *exactly* how much of that squash is Ribena. Oh, and by the way, there will be a million-pound penalty every time you get the answer wrong.

Three litres of Ribena concentrate, equivalent to 10 parts per trillion of Windermere, but please take my word for it and don't mix the two.

And remember, even though you don't know how much concentrate was put into the water, you must be able to confidently detect and measure less than three litres of Ribena, amongst 30 litres of squash in all, amongst 300 billion litres of Windermere.

And to bring things back to our little project, that was exactly the problem that we faced in the early part of the twenty-first century. How, for the love of all things holy, could we measure the atmosphere in that photolithography machine with sufficient accuracy to confidently ensure it contained no more than ten parts of methane, and less than one hundred parts of all hydrocarbons in total, for every trillion parts of everything else, all the while knowing that, were we to get it wrong, there was a darned good chance there would be over a million pounds of damage every time?

Sounds like a tough challenge, doesn't it? But fortunately, we had a Paul.

Paul to the rescue

Now, as you may already have discovered from *The Eating of Elephants* - and if not then you eventually will - there is a lot to be said for a Paul. In my experience, and thus far without exception, all Pauls are highly motivated, highly skilled, extremely clever, and will never let you down. And if you yourself are a Paul, then jolly well done and keep up the good work.

Honestly, what's not to like about a Paul?

Anyway, in the case of this particular Paul, Principal Scientist, gas measurement expert and all round good egg, after a few months of careful thought and a few more of dogged experimentation - and a not inconsiderable sum invested on the resulting instrument's development - Paul determined that, if the sampled atmosphere were cooled to the point where all the hydrocarbon molecules were turned into a liquid, and if the sample was then slowly heated to allow each type of hydrocarbon molecule – methane, ethane, propane, butane, *et cetera* - to boil in turn and be separated one at a time from its still-liquid peers, and if the resulting trickle of escaping molecules were fed into a hugely accurate and custom-built gas chromatograph with mass spectrometer (don't ask), then it should be possible, in theory, to determine exactly how much of each hydrocarbon was present in the sample and hence achieve our goal. That, put simply, was the plan.

And, sure enough, the day arrived when Paul and I, clad as usual in our cleanroom bunny-suits and each holding our breath, witnessed the first ever accurate measurement of methane at single parts-per-trillion levels, within a total hydrocarbon concentration only one order of magnitude higher, in an otherwise pure gas. Or, to put it another way, for slightly less than half-a-million dollars, we had discovered how to measure three litres of Ribena, within 30 litres of squash, within Windermere's 300 billion litres of water.

And whichever way you look at it, we were extremely pleased with the result and at least one patent came out of the project. I am sure that Paul, like I, remains proud of his contribution to cat videos everywhere.

Next time, I'll explain what on earth any of this has to do with model engineering. I promise.

●To be continued.

The Stationary Steam Engine

PART 53 – JAMES WATT JUNIOR vs RICHARD TREVITHICK JUNIOR

Ron Fitzgerald takes a look at the history and development of the stationary steam engine.

Continued from p.685, M.E. 4730, November 17 2023

Boulton and Watt had issued their first injunction against Edward Bull on March 22nd 1794. This seemed to be a firm prohibition but Boulton and Watt's legal justification was not as secure as they might have wished. The matter was complicated by a succession of ambivalent legal judgements. Bull's case was brought to court in February 1795, but the decision was deferred until May. Even then, no clear ruling was obtained as the judges were divided. The injunction against Bull in June 1795 was an expedient made possible by a legal caveat that allowed action to be taken distraining potential infringers pending the patent being validated or disqualified. The matter ultimately rested upon whether it could be demonstrated that the patent was valid in law and this argument was to continue until mid-1799.

The legal ebb and flow encouraged the Cornish mine owners to harden their attitude. An increasingly serious depression in the face of growing copper output from Parys Mountain mine in Anglesey, where the mineral was largely quarried and did not require the costly pumping commitment, stiffened their resolve. The mine owner's offensive was to follow a twofold strategy; withhold premium payments until the patent was denied or confirmed but also encourage alternative engine builders to enter the field. Bull and Trevithick were part of this covert plan.

With Bull at least nominally restrained James Watt Junior's attention narrowed down upon Trevithick but in this he was to meet a determined and devious opponent. In one case at least, Trevithick may have been disposed to temporise with Boulton and Watt. A Mr. Kevil had considered installing a Bull engine. Wilson had written to Soho advising James Watt junior that Kevil wished to employ Trevithick to erect this engine and asked if he might legitimately employ Watt's condenser and air pump. Watt junior replied to Wilson on the 9th of May 1796:

We shall agree to Mr. Kevil's erecting one of Bull's engines on the terms you mention but as we are situated respecting Trevithick Jr. we cannot consent to his being employed nor do we think it is in Mr. Kevil's interest to have anything to do with him… As Trevithick Jr. is defendant to some of our bills and has never made an answer nor suffered the injunction to be served upon him we should injure ourselves very materially were we to countenance his being employed in any way unless he first makes his peace by a full and fair confession of the facts in his power to prove. Nor can we in justice thus give him preference over Mr. Murdock who has served us faithfully and is perfectly qualified to do the engine justice. If we have any right to the business we have right to employ our agents in the most essential part, the erection.

Under the terms of this letter Watt appears to be prepared to agree to the erection of the Bull engine including the use of the condenser but it reserves to Boulton and Watt the right to control who erected the engine. It is questionable whether having granted permission to use patented elements Watt junior could then extend his prerogative to dictating who should be employed to erect it. The use of a Boulton and Watt erector was a matter of traditional practice rather than a right. In truth, if Watt junior was becoming more insistent in his personal vendetta against Trevithick, his father was notably more restrained. Watt Junior urged Simon Vivian, their man in Cornwall, to try to get substantive proof of Trevithick and Bull's collusion but Trevithick remained slippery.

There followed a somewhat enigmatic shift in Trevithick's position. Soho received a letter from Capt. Thos. Gundry of Goldsithney which was close to the Wheal Virgin mine. He wrote:

Gentlemen, I have taken the liberty to trouble you with this by desire of Richard Trevithick Jr. who have (sic) *been for some time past employed by Edw. Bull in mechanism. He desires not to continue in opposition to you and is ready to give up everything in this county and be under your direction. If you should employ him you will certainly find him possessed of good abilitys* (sic) *in mechanics, natural as well as acquired and is of an honest and peaceable disposition.*

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He will be glad to serve you either in Cornwall or Soho, the latter place in particular. If this step were taken I think the opposition in Cornwall would in great measure subside. I would esteem it a peculiar favour if you would take this matter into consideration…

Gundry was influential and respected by Soho. James Watt junior's reply to Wilson was dated July 19th 1796; he says that he has conferred with his father and also with Wilson who was prepared to give Trevithick a good character. In the light of these affirmations Watt Junior was disposed to withdraw the suit and agree to Trevithick's employment. Whilst he continued to be disparaging about Trevithick and his abilities Watt saw two possible advantages in employing him. By stationing Trevithick in Cornwall he might go some way towards assuaging the feelings against Soho held by the county's mine owners but more importantly Trevithick would be effectively neutralised until the patent expired as his employment was to be conditional upon regular articles of service for three and preferably five years. '*Old Trevithick'* was to be called upon to stand surety for his son. The final decision however was to be rest upon Murdock's approval as the senior resident engineer in the county. Watt's next letter to Wilson makes Murdock's position unambiguously clear and shows that Trevithick himself was prevaricating:

... Mr. Murdock has no wish for Trevithick to be employed and he is himself indifferent about it and has not had the good manners to answer our letter we shall give up the idea of taking into our service, more particularly as we see no reason for augmenting the wages we mentioned… which are the utmost we give to putters up of our engines ... the only capacity in which he might be useful to us. We are however not inclined to renew hostilities against him notwithstanding his setting us at defiance unless he commits some flagrant act of contempt in which case the Injunction must and shall be served even if one of us comes down in person to do it.

Needless to say, Trevithick did commit this *…flagrant act of contempt…* Twelve months later Boulton and Watt's correspondent R. Mitchel informed them that Bull and Trevithick were making overtures to the United Mines (a combination of Ale and Cakes and Poldory mines, already in conflict with Soho over non-payment of premiums) with a view to erecting their new engine. Watt's response was to leave them undisturbed in order to give the partners sufficient rope *…to entangle themselves* ... at which point the injunction would be enforced. Whether Trevithick anticipated their strategy or not, he pre-empted it by approaching Soho to obtain their consent to his erecting the engine with their patents but Watt rejected this outright unless what he considered to be all outstanding arrears of premiums were fully paid up.

As to Bull's threats we know the Rascal is too well-tied up by the injunction to dare to move a step … the moment he breaks down the fence … we will have the scoundrel secured and the Adventurers put under similar restriction. … This is all you have to say from us to Trevithick. This repentance for past offences comes too late and his promises for future good conduct meet here with little credit.

Trevithick persisted and a more conciliatory letter from Watt to Wilson was sent in June:

Trevithick's present proposition appears to us to bear a more likely aspect than the preceding one, because it is certainly in his interest to pay our premiums & erect one of our engines in preference to any other. However it is necessary for us to be extremely guarded in our proceedings with him and we have therefore resolved that you should acquaint him verbally from us … that we had received his request… that it appears strange, if he meant fairly that he did not himself write on the subject; that after the repeated proofs he had given us of his inimical disposition to us we must naturally receive with caution and distrust any proposition coming from him unless seconded by persons of known respectability … You may add that upon a satisfactory letter being written to us by himself … seconded by one from his father offering security for him, his application would probably meet with attention from us. You may add that a letter from Mr. Kevill or other letter from our Cornish friends in his favour would have a considerable influence…

James Watt senior adds … *If T. means fairly he should be fairly dealt with…*

A meeting followed in October between Trevithick, Vivian and Watt Junior in the course of which it emerged that the Ding Dong engine was not only still in service but that it was giving 30% better performance than a Boulton and Watt engine of the same size of cylinder. The meeting collapsed with further threats of legal action to recover premiums which Watt considered due on the Wheal Treasury engine and Trevithick maintaining that he could erect atmospheric engines that would work more cheaply than Watt's engine with its premium. The negotiations were intermittently resurrected over the next six months with equal measures of bad faith on both sides. Watt Junior was arrogant and over-bearing but more than matched by Trevithick's truculence and duplicity.

At the beginning of August 1797 Trevithick's father died and in November Richard was married to Jane Harvey, the daughter of John Harvey who had recently started the Hayle Foundry. In the same month as his marriage, Fox of the equally recent Perran Foundry informed Boulton and Watt that Bull and Trevithick proposed to erect an engine at Prince William Henry Mine (later Wheal Chance and then re-named Roskear). The rumour was that this was to include Watt's condenser and that the firm's permission had been given. In reality Trevithick had again approached Soho for permission and again been rebuffed by the demand that he pay the arrears due elsewhere. Again, negotiations were terminated without a satisfactory outcome for either party; mutual recriminations followed accompanied by a determination on the part of Watt to secure the premiums on the Ding Dong engine and other engines. By this time Trevithick had decided to convert Ding Dong from single-acting operating to double-acting. He was also engaged in erecting an engine at Seal Hole Mine St. Agnes Head. Trevithick was forewarned that Boulton and Watt were not prepared to tolerate this unless their terms were met.

Undeterred Trevithick continued until Watt finally succeeded in serving the injunction upon him. Trevithick seems to have been characteristically headstrong or even provocative in providing Watt with his opportunity. Whilst in Cornwall Trevithick was protected by distance and local loyalties but in December 1797 he went to Birmingham on business for Wheal Treasury. What followed is described by Matthew Boulton writing to Wilson on December 26th 1797:

Woodward found Trevithick and his friends at a publick house facing my manufactory & delivered him ye injunction which he received with much surprise particularly as he thought nobody knew him. He seemed much agitated and vexed however he afterwards went with Bull and Andrew Vivian to dine with Simon at the Foundry where he found our men firing cannons & rejoicing at our victory (Watt v. Hornblower and Maberley) *which took away his appetite … It is rather curious that although the Injunction could not be served in Cornwall T. should*

Continued on Page 204

Oil Blackening Steel

Graham Astbury explains the science of oil blackening.

I recently made a set of small clamps for the milling machine. These were thinner than the ones supplied as a set with the machine and I made them that way so as to avoid fouling the milling chuck when I was milling a long, narrow slot in a drill-sharpening jig that I was making. The four clamps are shown in their as-machined condition along with one of the smallest clamps provided with the milling machine in **photo 1**. I decided to give these new clamps an oil-blackened finish to protect them from rust and make them look the same as the other clamps.

I had previously oil-blackened some small items by heating them to a dull red heat and then plunging them into a small tin of rapeseed oil to quench them. I had noticed that, despite the small size of these blackened parts, the oil was rather warm after dunking the hot parts in it. Therefore I decided that, since these clamps were much larger than anything I had dunked before, I ought to check that there was sufficient heat capacity in the oil to avoid the oil getting too hot. This appeared to be a problem that others had found recently (**ref 1**). There were shades of Lord Kelvin here, who is quoted as saying: '*I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind.*' (**ref 2**). Therefore I decided to investigate the magnitude of the problem.

Home-made clamps after machining.

Firstly, I looked up the specific heat of a typical mild steel (**ref 3**) which is about 0.107 cal/gm/degree C, or 0.45 J g^{-1} K^{-1}. The difference in specific heat between different grades of carbon steels is less than the variation of specific heat with temperature when heating up to around 700 degrees C. I was making an educated guess that the temperature from which I would be quenching would be around 700 degrees C, which is a 'dull red' based on the colour of the steel and the words of wisdom of Tubal Cain (**ref 4**). As the clamps weighed about 120 grams each, the amount of heat to be removed from one clamp when quenched can be determined.

I found the specific heat of rapeseed oil to be 2.0 J g^{-1} K^{-1} (**ref 5**), but as this varies from 1.833 at 40 degrees C to 2.319 at 180 degrees C, I used a value of 2.0 which corresponds to 55 degrees C, as I assumed that I would not want the oil to get to above 100 degrees C and assuming a start at 15 degrees C and a final temperature of less than 100 degrees C, say 95 degrees C, a value of 55 degrees C would be in the middle. I had 2 litres of rapeseed oil salvaged from 20 litre cooking oil drums that I obtained from a local coffee shop for the tinplate. As Tubal Cain suggests, 'cooking oil' can be used, as can *clean* SAE 20 motor oil. He didn't specify what type of cooking oil could be used. As I had 2 litres of rapeseed oil, I found the specific gravity to be 0.9 at 20 degrees C (**ref 6**), meaning that I had 1800 grams of oil. As I now had some data, I could calculate the likely temperature rise on quenching one clamp.

Assuming that the oil is at a temperature of 15 degrees C; the clamp is at 700 degrees C and the quenching process is adiabatic (i.e. no heat loss or gain from the oil/clamp system), then the heat gained by the oil must equal the heat lost by the clamp. If the resulting temperature of the oil and metal together is be defined as T, then setting up a heat balance gives:

$$C_O \times M_O \times (T - 15) = C_M \times M_M \times (700 - T)$$

where C is the specific heat, M is the mass, and the subscripts O and M refer to the oil and metal respectively. Substituting in the data that is available gives:

$$2 \times 1800 \times (T - 15) = 0.45 \times 120 \times (700 - T)$$

and those of you that are a little rusty on their maths, the solution is arrived at by multiplying out the brackets as follows:

$$3600T - 54000 = -54T + 37800$$

and collecting terms (do you remember your maths teacher saying that?) gives:

$$3654T = 37800 + 54000$$

so T is therefore

$$T = \frac{91800}{3654} = 25.12 \text{ degrees C}$$

giving a temperature rise of 10.1 K. From this, it is obvious that I could quench all four clamps and the temperature

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Home-made clamps after blackening.

rise should be 40.4 K, so the oil would end up at around 55 degrees C. This would be satisfactory, as I realised that if the oil temperature did not exceed about 60 degrees C, it would avoid the risk of any splashes burning me. Consequently, I was happy to go ahead and quench out all four clamps in one go (**photo 2**).

Just to confirm my calculations, I measured the oil temperature before and after the quenching and the temperature rose from 12 degrees C to 51 degrees C, a rise of 39 K - pretty well in line with the prediction. I remembered to allow the oil to cool completely before pouring it back into the plastic bottle - plastic doesn't seem to take too well to hot oil.

Conclusions

When oil-blackening steel, it is acceptable to quench into rapeseed oil.

For safe quenching, the weight of oil should be about four times the weight of steel to be quenched.

This article has previously appeared in the *Journal of the Society of Model and Experimental Engineers.*

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run into the Lyon's mouth & afterwards go to dine with the man that they had banished from Cornwall. They afterwards went to Coalbrookdale…

Whether this injunction was any more successful than the previous ones is questionable. Captain Samuel Grose offered the following statement to Francis:

My first occupation after leaving school was as a young assistant engineer for Mr. Trevithick. In 1802 an engine worked for the Herland Mine which had been erected by Bull junr. and Trevithick about 1798 whose cylinder, 60 inches in diameter, was placed over the shaft; the piston rod attached to the pump rods; it had an air pump and low pressure boilers…

Herland must have been one of the last engines erected by Bull who died on the 30th of March 1798 aged 36.

Francis gives the impression that Trevithick continued to build Bull engines after the death of his de facto partner:

(Trevithick) *used and improved the Bull engine after the death of its inventor and in conjunction with Edward Bull junr., erected engines to compete with Watt during the very height of the acrimonious and long pending patent lawsuits…*

(The son of Edward Bull was to be associated with Trevithick throughout his life. He died in South America whilst acting as an engineer for Trevithick.)

This may have been so but Trevithick was increasingly forced to make concessions to Boulton and Watt. At Ding Dong mine he attempted to evade further legal measures by altering the engine to atmospheric operation but this cannot have been satisfactory as it then reverted to condenser working and finally it was converted to the double-acting cycle. Premiums were accordingly paid to Boulton and Watt. He had also succeeded in commissioning the St Agnes Head engine after Wilson arrived at some settlement with Trevithick.

Further payments followed at irregular intervals and with much prevarication, in part due to the mine owners refusing to pay. On July 16th Trevithick told Boulton and Watt that the Wheal Abraham adventurers had not authorised payment of the premium. There are further letters between Trevithick and Wilson regarding the premiums at Wheal Leeds and an interview in November involving Trevithick and Captain Hodge of Wheal Leeds with Wilson shows that Boulton and Watt had extracted more money. A letter to Wilson sent in the name of James Watt senior but in the hand of Watt junior dated the 30th November 1798, indicates that the struggle was not over:

We think you have shown rather too much lenity to Trevithick and his colleague Hodge. Our obligation … was to be with Trevithick and by no means with the Adventurers of Wheal Leeds or their representative Hodge. Trevithick was acquainted with our terms before the engine was or ought to have been erected and he had therefore sufficient grounds for his agreement with the Adventurers. From the many repeated instances of his duplicity we are rather incredulous to his pretence for a modification of the arrears. We are rather inclined to think that the positive assurance of an attachment being the consequence of this transgression would have induced him to comply with the original terms.

Apparently, Hodge continued payments on account of the Wheal Leeds engine but even after 1800 Trevithick was still in arrears.

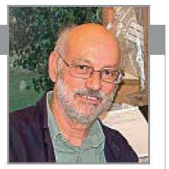
●To be continued.

NEXT TIME

We take a look at pump technology.

LNER B1 Locomotive

PART 37 – VACUUM BRAKE EJECTOR



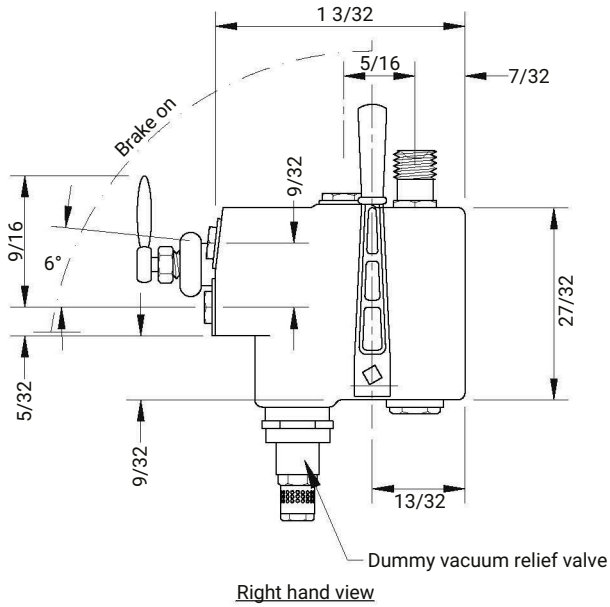
Doug Hewson presents an authentic 5 inch gauge version of Thompson's B1 locomotive.

Continued from p.165, M.E.4734, January 12

Now, at long last I have found someone who has made a vacuum brake ejector but who has also been a great help in designing one for the B1. He is Bob Bramson, who wrote an excellent article in *Model Engineer*, and I just can't tell you what a great help he has been to me. This is a slightly simplified version as I have tried one or two and on Ballan's K1 the recovery of the vacuum is instant even with just one ejector. You can hold your finger over the last fitted vehicle in the train and then release it and I found it very rewarding to see all the brakes drop down and release. When I put my finger back over the last vehicle once more the pull on my finger was so hard that I couldn't let go of it. I am told that all the other hidden internal pipework inside the ejector is only needed for double heading! I am going to send a copy of this drawing to John Holroyd at The Steam Workshop to see if he can make a lost wax casting for the body and the handle. I have attempted to make the body as near to scale as possible so that it is not obtrusive in the left-hand side of the cab although I have refused to use any 64ths in my dimensions except for the cones.

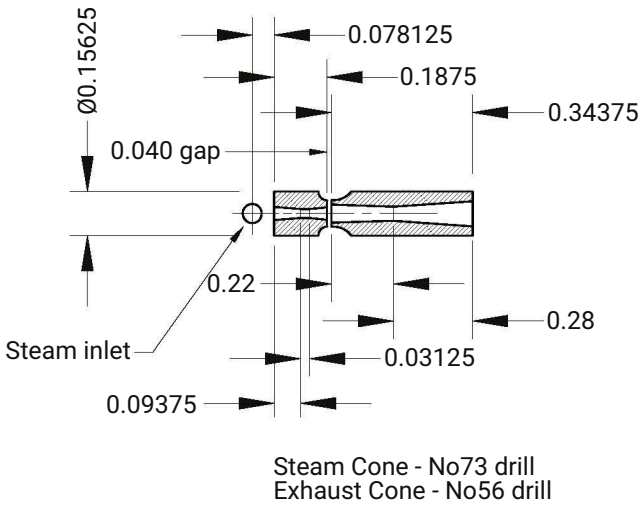
This is a Gresham and Craven 'SJ' vacuum brake ejector and was a standard fitting on a lot of LNER locomotives (**figs 139** and **140**). I began by using a vacuum ejector designed by Brian Hughes of the Birmingham Society and that seemed to work very well. In fact, I had several phone calls from satisfied customers who were amazed to tell me that they that it would draw a vacuum of 21 inches, the same as the full-size locomotives (GWR engines excepted). I then had occasion to go and visit D.A.G. Brown and he told me that he had been experimenting with vacuum ejectors ready to go on his A4 and that had different angles for the ejectors as he said that it would also draw 21 inches of vacuum but at something like 30lb boiler pressure. However, Bob Bramson then came up with different angles for the cones, but it also draws 21 inches so my conclusion is that the cone angles are not an issue here. I have used cone angles the same as D.A.G. Brown in my ejector. However, I would recommend that you make the steam cone with the small parallel section in there to smooth out the flow before it hits the delivery cone. I will briefly explain why. Some years ago, we were asked if we would fit vacuum brakes on to a customer's GWR Hall. It was a beautifully made engine and the vacuum ejector was all there so we tried it but it would not play ball. We had to take it to pieces on numerous occasions to try to find out what the problem was. It was a source of exasperation. I then had the idea that there must be two holes inside which have merged

Fig 139



Dummy vacuum relief valve.

Fig 140



Ejector steam cone and exhaust cone.

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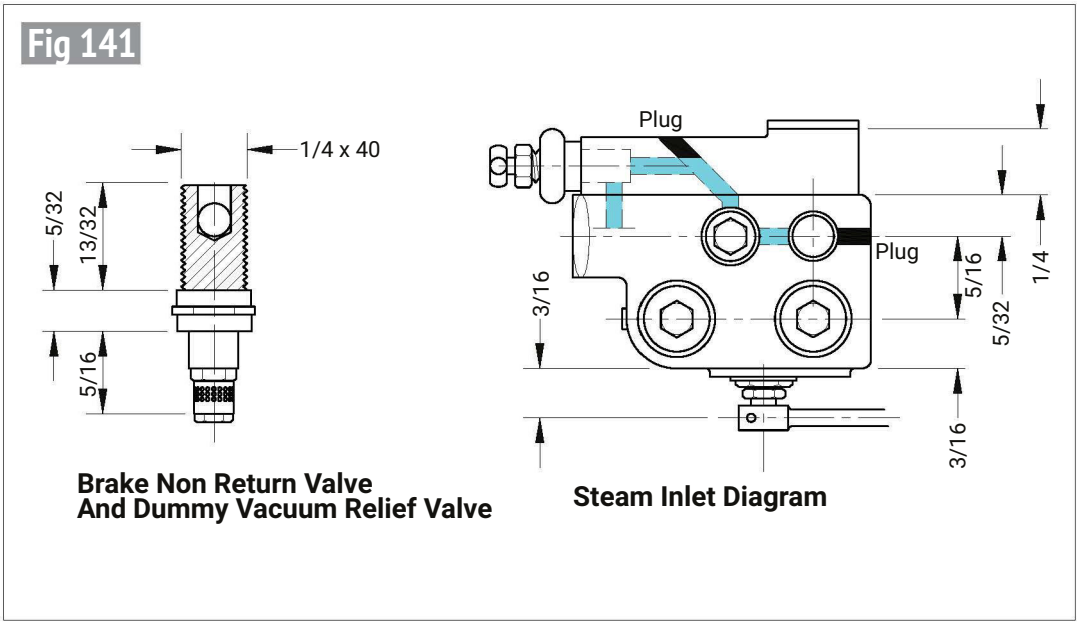


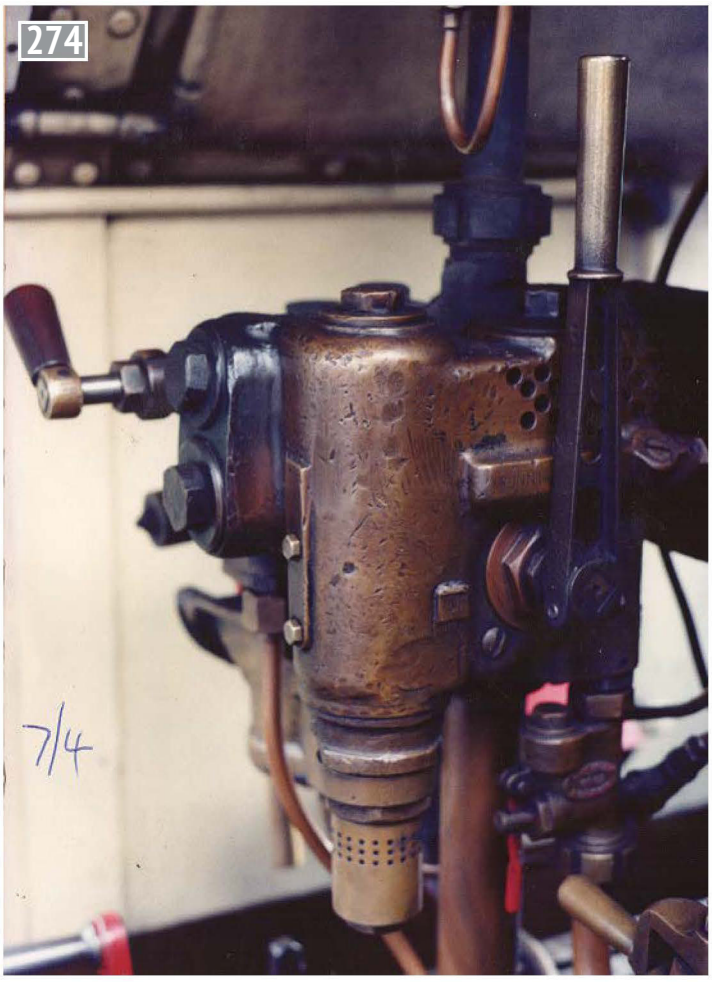
Brake non-return valve.

into one. Bang on! We found that problem and fixed that but then it still would not draw any vacuum beyond about 9 inches. Malc removed the cones yet again and could see that there was no parallel section inside the steam cone, so he made a new one (being used to injectors, which he made by the hundred). He put that in and - hey presto - it worked brilliantly. We had 21 inches of vacuum.

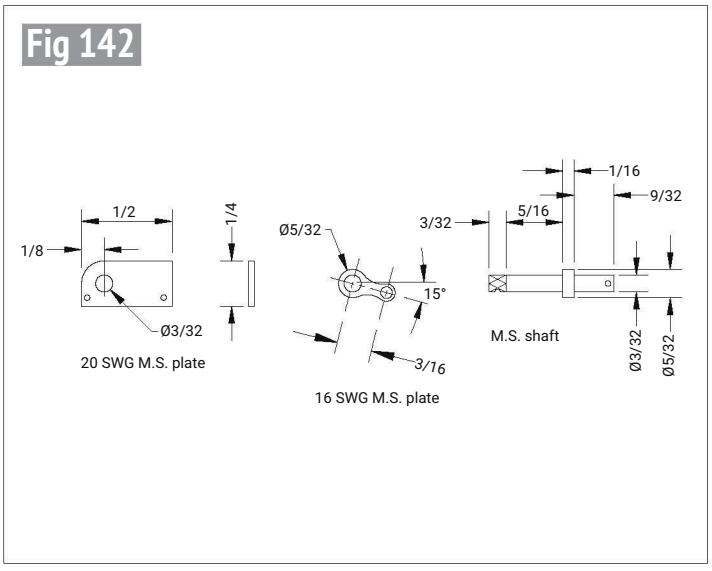
I have tried to separate out the different layers of the ejector in the hope that it will make it clearer, so I have drawn it with three imaginary vertical layers through the ejector body to make it into one solid piece. This means silver soldering the inlet steam valve to the back of the body. The next section (**fig 141**) houses the ejector on an angle of 6 degrees, give or take a few degrees, but beware, it also has holes to drill in it to connect the steam inlet into the ejector and another one into the steam inlet. I have shown these with chain dotted lines and you will see the connections on the plan marked in blue. In the next view (**fig 142**) I have shown the 'Spool Valve' and that regulates the amount of vacuum applied to the brakes. This is operated by the handle (**fig 143**) and it is a pulled back to operate it as on any LNER locomotive. **Photograph 274** shows the ejector.

Tucked up in the top left-hand corner of **photo 275** is the vacuum release valve which I have included on the ejector but due to demands on space I have had to move it along the body by about 3/16 inch due to the different layout inside the ejector. I hope people will not mind this. Below the ejector is the vacuum release valve held up by a couple of black elbows to make it more accessible for the driver. I have tried to show the approximate position of it on one of my drawings to the right and slightly below the ejector body. I do like these fittings to be as near as possible to where they should be. In any event if I were to move it somewhere else the something else would have to move and that just wouldn't do would it? I read in one of *Luker*'s articles recently, where he says that he likes things as near as possible and - if it isn't clear to you yet - I am an unadulterated rivet counter! I do like to see everything in its proper place if you are building a 'scale' model. I just cannot see the point of making something that is knowingly wrong.

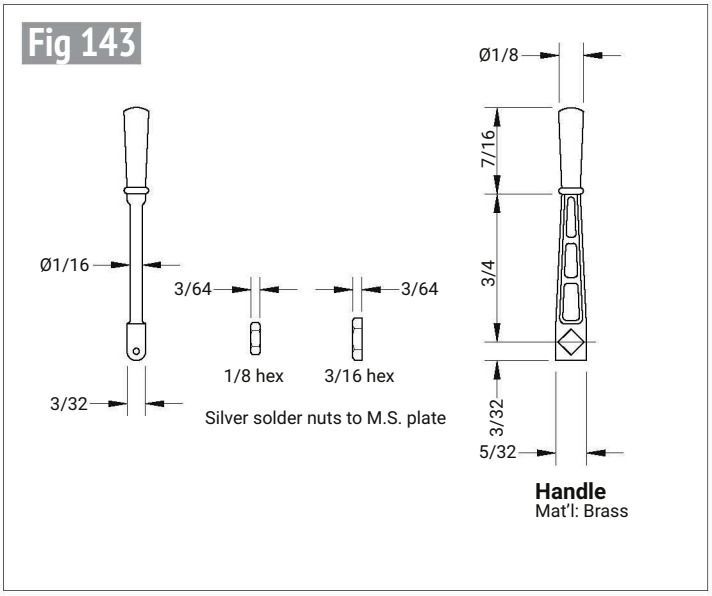
Anyway, we will continue. The next plan view (**fig 144**) shows the vacuum passageway in green, and



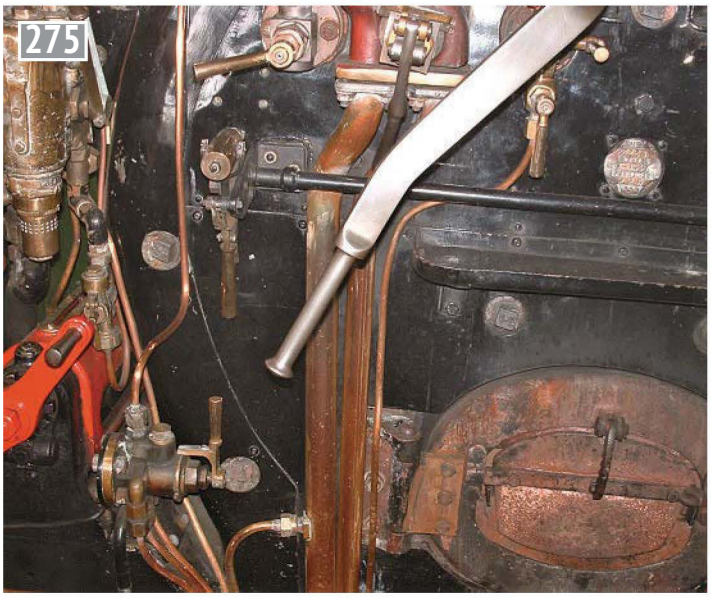
Vacuum brake ejector.



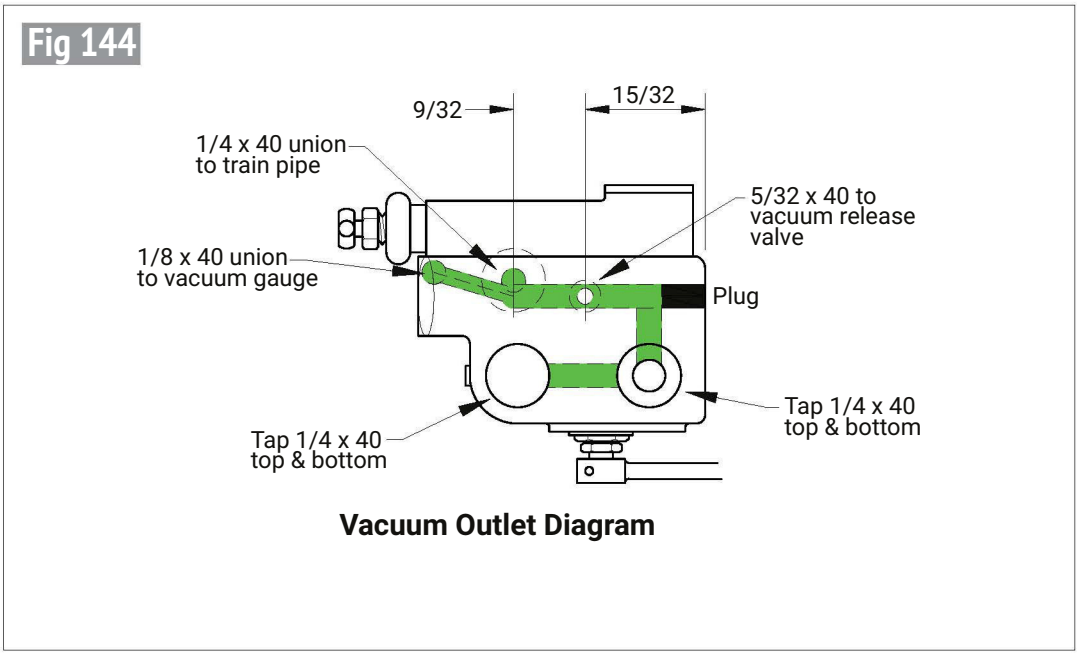
Spool valve.



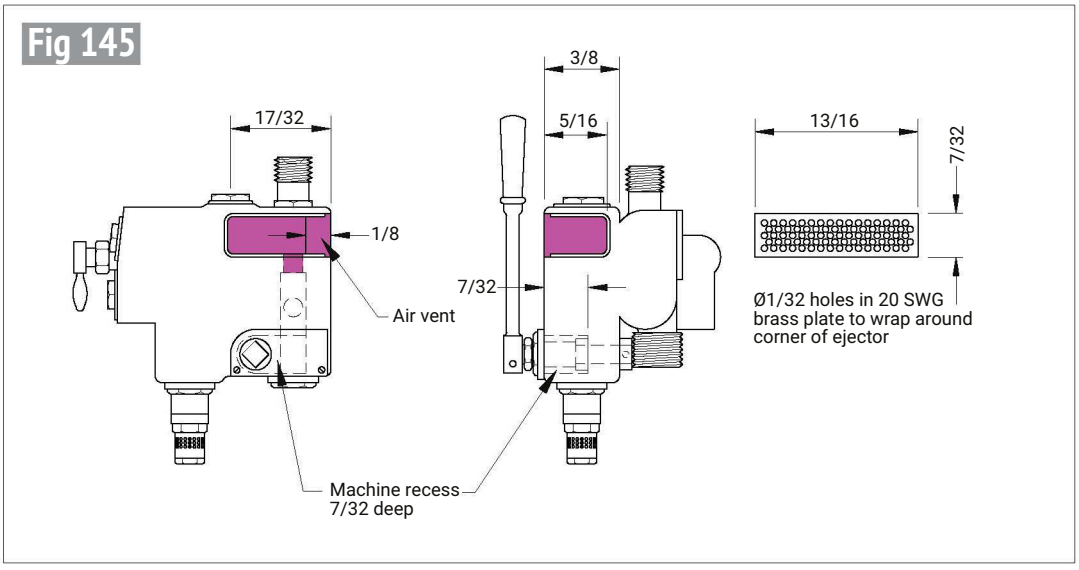
Spool valve.



Vacuum release valve.



Brake valve passages.



Brake valve air inlet.

you will see that this needs drilling and plugging in places. Most of the passageway is on one level except for the 5BA union and the ¼ inch x 40 union which need drilling up from the outside into the passageway before any fittings are silver soldered on. Make sure everything is drilled before anything is silver soldered on as these passageways will never see the light of day again. I hadn't encountered a 'Spool' valve before but it won't work without it (**fig 145**). This calls for a bit of delicate work, to say the least. This is what controls the level of vacuum which gets as far as the cylinder on the driving truck and train and above that is the air inlet which on the full-size ejector is where all those holes on the top right-hand corner of the body are. I am suggesting that all the holes are drilled in a brass plate and that is then silver soldered on to the body to disguise it as part of the body. Below the top of the spool valve is a hole down and across to the train pipe and above that is the air inlet which I have shown in magenta.

●To be continued.

NEXT TIME
The safety valves.

Buckeye Couplings

Dear Martin,

I found the first part of Jonathan Buck's articles about the American invented buckeye railway coupling very interesting (M.E.4729, November 3rd 2023). This coupling is of course an automatic type of coupling so when the locomotive is shunting onto a rake of coaches etc. the couplings automatically make - this of course lessens the danger to the shunter supervising the connecting as he or she doesn't have to be between the engine and lead coach to hook up with a chain or screw coupling. They still of course have to go between to check that the couplings have connected and connect the brake pipes and heating connections but this type of coupling has vastly reduced the injury or indeed the fatality rate of shunters getting crushed between buffers while coupling up with the old type of screw or other non-automatic types of coupling.

Most modern-day passenger rolling stock especially on the British Railway system have couplings between sets that not only make the coupling of two sets a lot safer but also make the brake and heating control connections as well. On the newest four coach sets in multiple units the individual coaches have bar couplings so they are semi uncouplable apart from when they are in the sheds for servicing but when you want to couple two sets together the outer ends have all the connections in the couplings.

Another example of this is on the London underground trains when two four car units couple together to form an eight car train the coupling devices used automatically give both the physical coupling as well as making the control circuits etc. so again they don't need a shunter to go between the two sets. They have had these for years I understand but then again there is still a lot of freight stock that, although of fairly modern build, still relies on the older type of screw coupling to connect to the locomotive so they still need to get between the locomotive and the train to connect the coupling and brake hoses etc.

It is interesting that both the LNER and Southern Railways adopted the buckeye coupling on passenger rolling stock along with the Pullman company but it was it seems the formation of the nationalised railway system In the country that led to the general adoption of the buckeye coupler for passenger rolling stock. Funnily enough though I believe that the standard mark 1 non-corridor suburban stock wasn't fitted with the buckeye couplings and kept the screw couplings. Even the multiple units mostly kept to screw couplings, although I believe that some of the later inter-city diesel multiple units had buckeye couplings. I believe they were of the drop head type on the outer ends so they could couple to non-buckeye fitted stock, for instance if they needed a tow back when broken down. The end views of an A4 tender show this perfectly.

Yours sincerely, J.E. Kirby (London)

Corpet 242

Dear Martin,

I would like to expand on what Mark Smithers has to say about the Corpet no. 242 locomotive in his article about the Richmond Light Railway (M.E.4732, December 15th 2023).

Corpet et Bourdon Works no. 242 *Lilliput* made its first public appearance at a competition for fire-fighters at Compiegne in May 1877, according to a report in Le Figaro (the French 'Times'), on May 28th 1877.

Of 500mm gauge, it had a novel cylinder arrangement as shown in the figure. The V-twin cylinders operated on a central crank in the leading axle, as briefly described in *Revue Industrielle* November 20th 1878, page 475, in a report on the locomotives at the 1878 Expo – 'MM Corpet et Bourdon also exhibited a very small machine for 500mm gauge, made for Decauville'. Long- and cross-sections of a similar locomotive for 1 metre gauge were in *Revue Industrielle* April 3rd 1878 pages 130/131. These drawings and a more concise report were in *Engineering* May 3rd 1878, pages 351/352, which clearly show the 1 metre gauge. Both of these locomotives had slip-eccentric valve gear, adustable from the footplate.

Although working on a Decauville railway in May, it was not formally taken over (and paid for?) until November 1877. Try before you buy? Normal terms of business were payment before despatch.

Scaling from a drawing is bad practice but in the absence of an alternative the dimensions I have added, based on the 500mm gauge, can be taken as indicative but not definitive.

Corpet was a well-established firm of locomotive builders, the history of which is covered by an article by K.W. Clingan in the Industrial Railway Society *Record* issue 27.

Charles Bourdon was the son of the inventor of the Bourdon pressure gauge and an inventor in his own right. He seemed to be focusing on military applications after the siege of Paris during the Franco-Prussian war of 1870 -71, where troop movements of the invading forces were facilitated by railways.

Decauville's catalogue for 1882 includes 'Liste des 16 locomotives vendues' (vendues = sold, not built). The first on the list is *Lilliput* – 'The first locomotive built for the Decauville railways was *Lilliput*, a one ton locomotive which at the Compiegne competition ran on a 50cm portable track of 4.5kg/metre rails pulling 60 people at a time from one end of the competition (field) to the other. Since at that time it had to be recognised that such a small locomotive could not do serious service and *Lilliput* was used for the entertainment of the Dutch on a circular railway in Rotterdam'. All the others are of Couillet pattern.

The Decauville 1890 catalogue includes some examples of the uses of their

portable railways which include the well-known illustration of another 'Lilliput' pulling a train of four-wheel Type 68 coaches. The caption claims that this 'application' was used at Compiegne in 1877, du Jardin d'Acclimatation in 1878 and at Casino d'Arcachon. Although we could interpret the 'application' as including a locomotive, as shown, Decauville did not have locomotive building facilities until the opening of the new works down by the River Seine, around 1880. Their main focus then was supplying railway plant and rolling stock. I have not found any reliable report of *Lilliput* having worked at du Jardin. Roger Bailly describes trains of two Type 68 coaches being pulled by ponies there but does not include *Lilliput* in that context. It may have been demonstrated to the authorities there, and ruled out, possibly for fear of frightening the animals in the zoo.

A search on-line for 'Decauville locomotive Lilliput' will bring up three illustrations in Wikipedia Commons. The two photographs are believed to be the Corpet works photographs and match the figure; the drawing is obviously of a different outside cylinder locomotive, of Coullet pattern. The 'Lilliput' nameplate does not prove anything. The recycling of an illustrious name is not uncommon. How many *Ark Royals* has the Royal Navy had? (5, so far).

There are three versions of this illustration:

The first, by an unknown artist, is from *La Nature* 1881, embedded in an article on Ffestiniog on pages 227 – 230. The signature in the bottom left corner is indecipherible. The caption reads 'Chemin de fer voie etroite de 50cm à Petit Bourg' ie at Petit Bourg.

In the second the signature of Victor Rose, who did many catalogue illustrations for Decauville, is included. He also added a gardener plus other details, possibly to avoid charges of plagiarism.

The third, which is a mirror image of the Rose version in green ink, appears on the fly papers of Decauville's 1953 'Centenary' catalogue.

A 500mm gauge line was built between the new works at the riverside and the old works up at the château to test the practicality of lines for passenger traffic laid directly on the ground, without ballast. It took an indirect route with sharp bends and gradients of up to 1 in 15 and was also used to impress potential customers visiting the works. This is the line shown in *La Nature*. An American visitor describes his experience of it as 'a steam steeple chase' after it had been upgraded to 600mm gauge.

This is an interesting phase of railway development of which little has been written in English. The French language journals cited are available on-line from the French National Library at bnf.fr and have been translated using Google Translate. Any improvements of the translation and pointers to further contemporary sources would be most welcome.

Dick Paterson

Injectors

Dear Martin,

Perhaps Doug Hewson was trying to provoke a debate with his letter about injectors (M.E.4733, December 29th 2023). Whether or not this was the case, here's my tuppence worth.

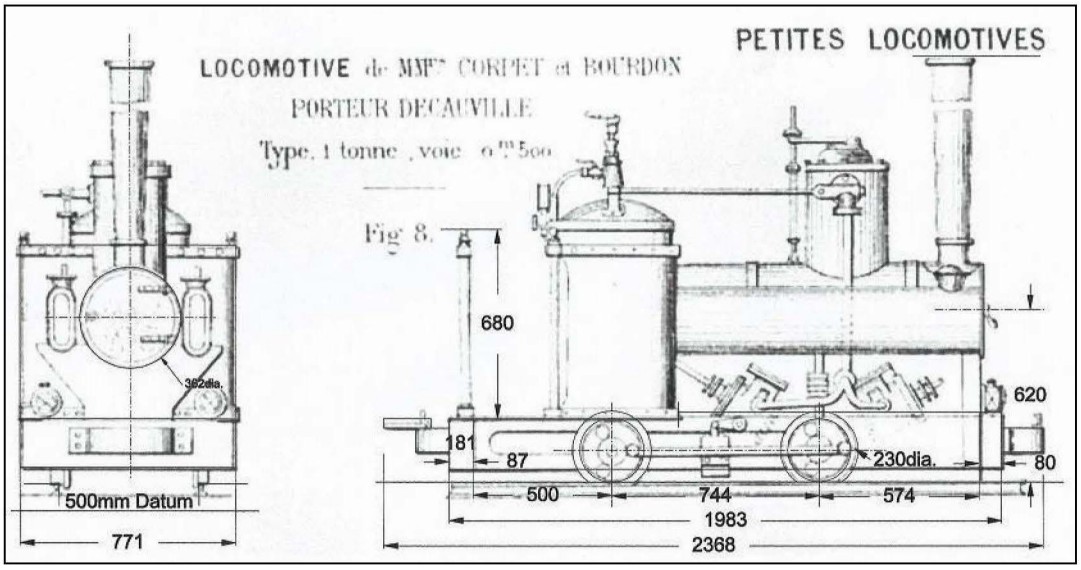
Injectors are wonderful things and mostly work very well but in my view their use should be considered as 'horses for courses'. For me the ideal is an axle or crosshead driven pump with an injector for back-up. I've built three locomotives in 3½ and 5 inch gauge using this configuration, one 5 inch with two injectors and two small 3½ inch gauge with driven pump and hand pump. The big advantage of a driven pump is that the water input can be adjusted to reasonably match the usage, so giving long periods when no attention is needed. This is especially useful on smaller models where water levels can change very rapidly if not attended to.

Moving on from this argument I will mention size. An injector should be as small as reasonably possible and one of 11oz/min size will provide sufficient water for most models whilst minimising loss of pressure. My two-injector engine is quite happy and will make pressure with the 11oz injector running and I only use the larger 16oz one when testing it. There really is little need for whacking pints per minute of cold water into a boiler on anything other than the very largest engines and if you have let the level get so low that you think you need to then the damage is already done. The other aspect of size is physical bulk. Like most people I buy injectors from our suppliers. In the old days the smallest available injector, 11oz/min, made to the LBSC layout would be quite tiny and I managed to squeeze one in crosswise between the rear well tank and the boiler of my 3½ inch gauge Beattie well tank (in full size the injectors were well hidden on these locomotives). Nowadays it seems a common body is used and the smallest I could find (for a different project) would have no chance of fitting in that space. Perhaps this was initiated by D.A.G. Brown who, in his book, provides a design with the same body size for everything from 8oz to 26oz/min by just varying the cones. Well that's fine if all you want is an injector but if one is needed to fit in a small model then it can be either unsightly or no use at all.

Finally, there's water temperature. Injectors will not work with hot water, especially on a small model tank engine then the tanks may be closer to the boiler than on a large one and there is probably less insulation (none at all on many LBSC designs!). So here we have a situation where an injector may not be suitable, like it or not. Separate water tank on the driving trolley? Well yes, maybe. But I like my engines self-contained, like the real ones, and consider a separate tank a sign of defeat (and something else to forget when you load the car).

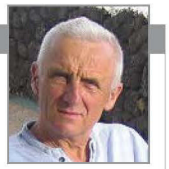
So there you have it. Just use whatever you think will be most suitable for the model you are making. There are no fixed rules.

Best wishes, Gerald Martyn (Haverford West)



K.N. Harris Beam Engine

PART 2



Geoff Walker revisits a beam engine first described in *Model Engineer* in 1946.

Continued from p.152
M.E.4734 January 12

A front view of the 2023 engine can be seen in **photo 6** and a front view of the 1946 engine from model engineer issue 2337 in **photo 7**.

The 2023 cylinder is made from cast iron with the steam block and port trunks bonded in place with JB Weld adhesive (JBW). **Photograph 8** shows the three parts before assembly and **photo 9** the three parts assembled. **Figure 3** is a detailed drawing of the cylinder with the trunks and block drawn assembled but also drawn detached. The steam block could be made a little longer allowing for machining the outer face after assembly to 25mm from the cylinder centre line. The 8 and 18 mm dimensions shown for the base could be increased accordingly as shown by the dashed line.

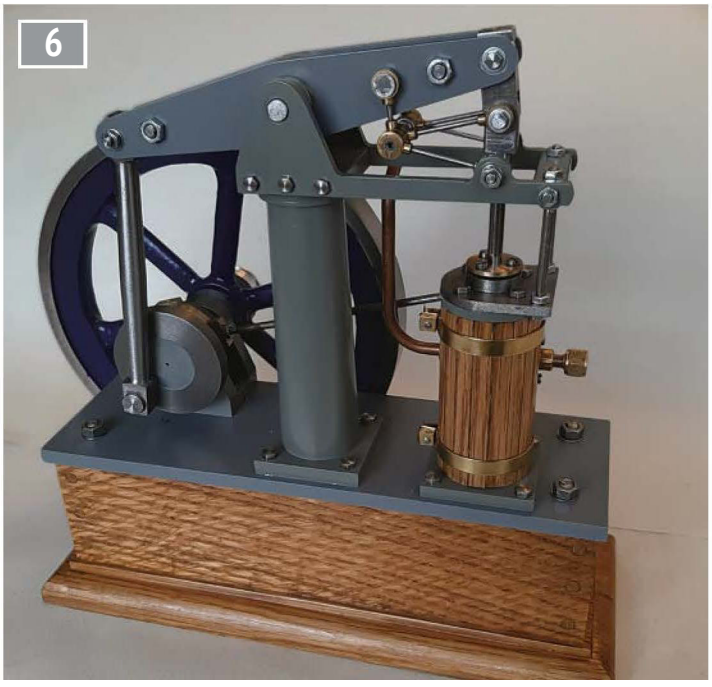
The auxiliary exhaust port referred to in part 1 is drawn in red. All the port holes are 3mm diameter - note the red plug in the access hole of the auxiliary port. The piston, piston rod, big end and gland cap are shown in fig 1, part 1 (M.E.4734, January 12). The piston is a turned fit in the cylinder waisted in the centre and with four squared oil grooves. The piston rod holes in the cylinder cap and the gland cap are a loose fit to allow for any minor lateral movement of the piston rod. PTFE plumbers' tape is used as a seal under the gland cap.

The base of the cylinder is mild steel and the four base holes are for 4BA screws. It is attached to the cylinder from the underside with four 3mm countersunk head screws. The base also has a shallow spigot 19mm diameter to locate the cylinder. The cap is attached with four 6BA screws and the two holes for the entablature stays are 3mm diameter.

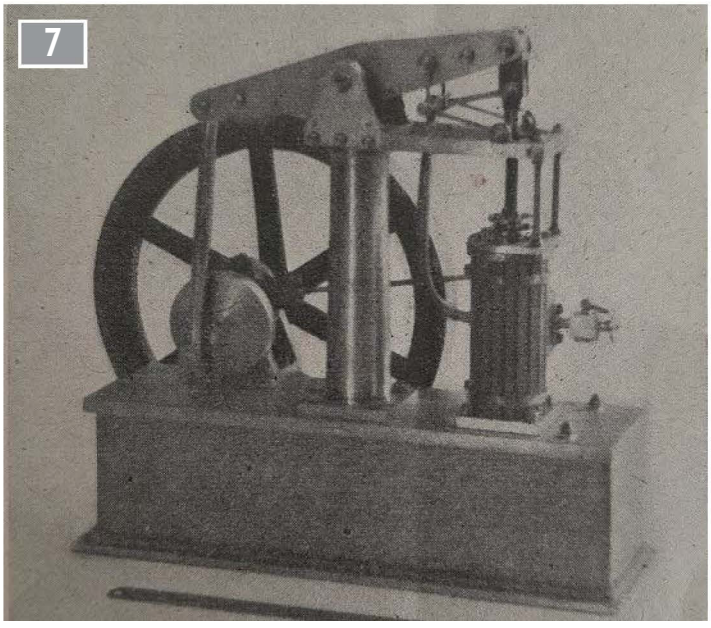
The cladding is made from oak. Each strip is approx. 5.5mm wide and 1.2mm thick and they are attached with superglue. The brass bands are 6mm wide and 24g./0.6mm thick. The tension screw and square brass nut are 8BA.

The 1946 KNH engine has a semi rotary valve which is described by KNH as an unusual feature. To use his words this was adopted for the following reasons:

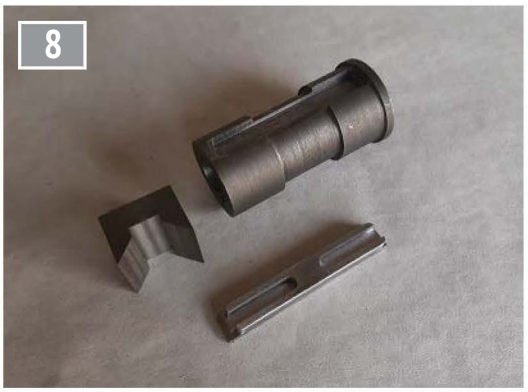
* It abolishes the need for a steam chest and valve rod gland.
* It can be driven direct from the eccentric rod, avoiding the use of bell cranks and links.
* By provision of a curved slot and an adjustable eccentric on the crankshaft various valve settings can be obtained.



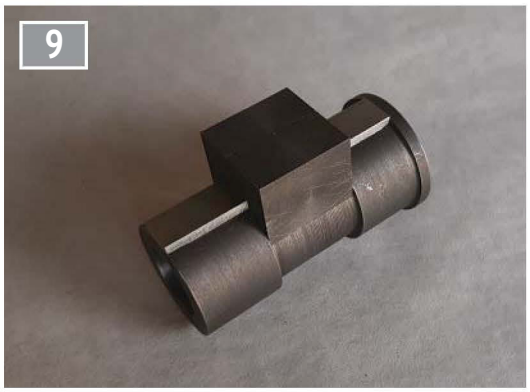
Front view of the 2023 engine.



Front view of the 1946 engine.



The three cylinder parts.



The assembled cylinder.

Fig 3

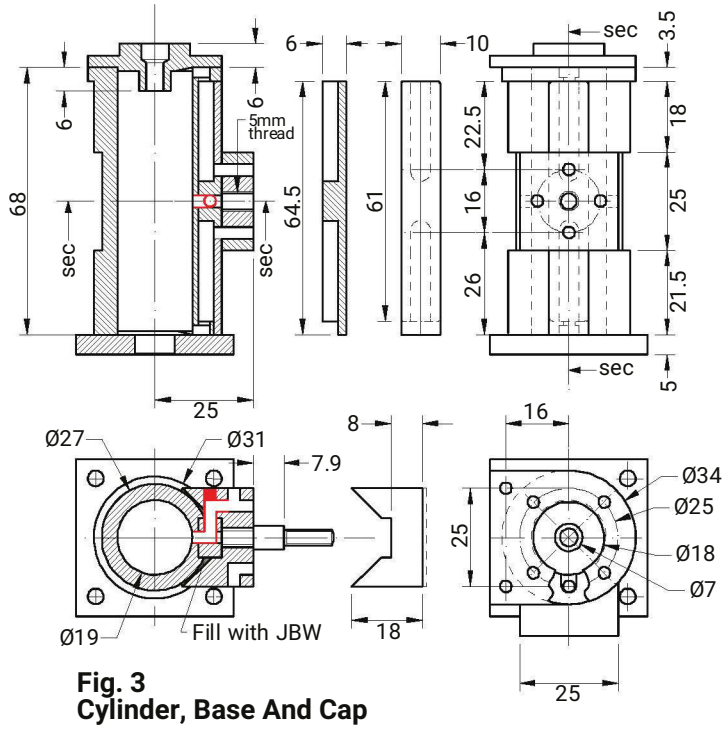


Fig. 3
Cylinder, Base And Cap

Cylinder, base and cap.

* By having a removable valve cover the setting and the action of the valve can be studied therefore a student can follow the exact sequence of events.

KNH further adds that the great advantage of being driven by a separate and adjustable eccentric is that it can be made to cut off steam *before* the end of the stroke and give an *earlier* exhaust.

I gave a lot of thought to the design and setting of the valve on this engine. What you see and read in this article is just my take on it. It's unlikely that it is the best solution but it is one that serves its purpose and therefore contributes to a smooth-running engine at moderate and slow speed. The main differences on the 2023 valve from the 1946 valve are the radius arm, which is straight, and the spaces between the ends of the port channels, which are closer together. For the latter I decided on a small overlap of approximately 0.6 mm on either side of the upper and lower port face holes. Regarding the 1946 valve with the 5 inch radius curved arm, this is desirable as, when the length of the eccentric rod has been adjusted and set, there is no need for readjustment should the rod pivot link be either raised or lowered in the slot. The straight radius arm in **fig 4** is easier to make but

Fig 4

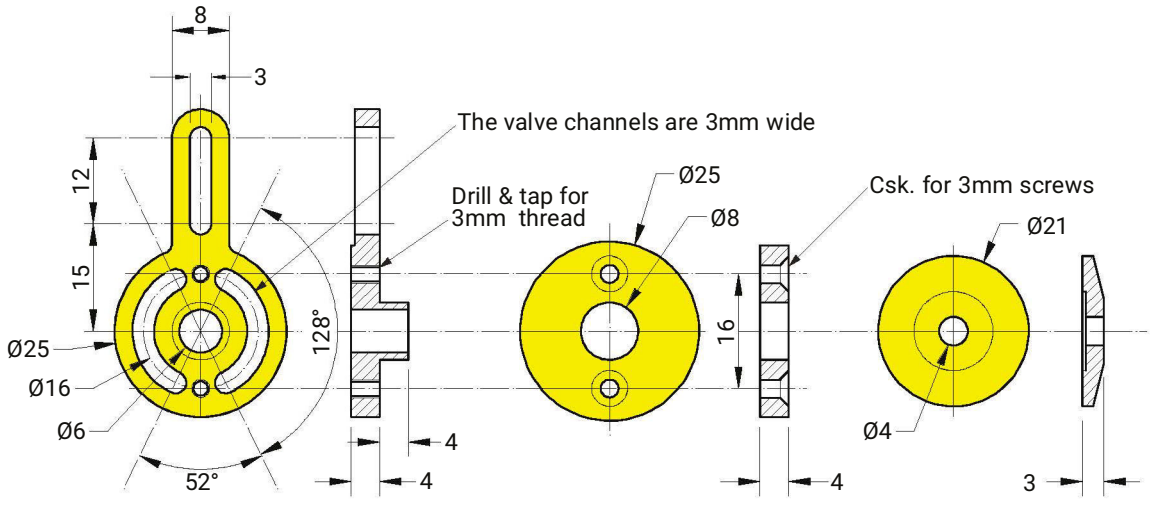
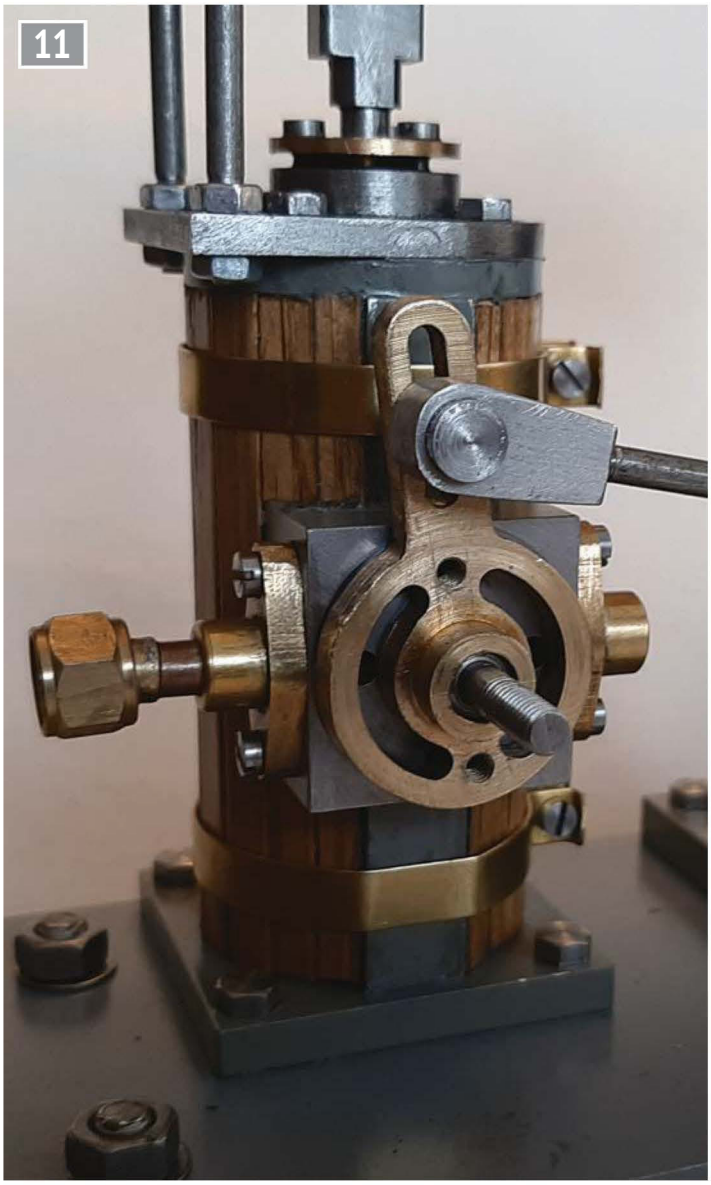


Fig. 4
The Rotary Valve, The Cover And The Disc Washer

Rotary valve.

The valve and cover.



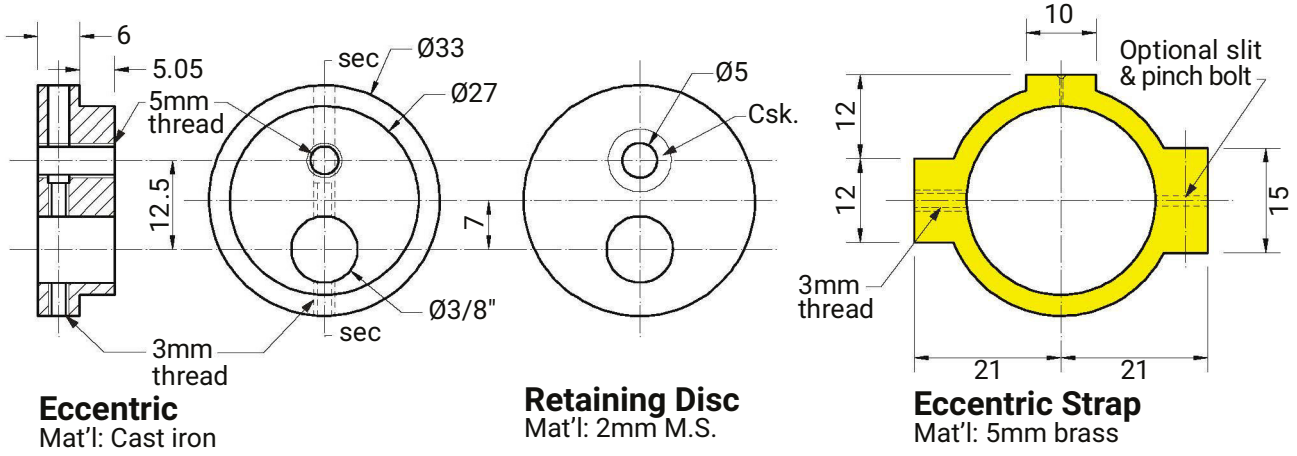
Setting the valve timing.

to retain the valve settings any raising or lowering of the pivot would require a minor length adjustment of the eccentric rod.

The valve in fig 4 and **photos 10** and **11** is made from a brass section 25 x 8mm. A 6mm hole is drilled for the valve pivot and a boss is turned 8mm diameter and 4mm long. The remainder of the machining, the channels, the threaded holes, the radius arm slot and the outer profile, can be done at one set up on a rotary table. The workpiece should be mounted and secured on a shouldered stud and held in a lathe chuck with the stud initially positioned centrally under the milling head. The semi-circle on the end of the arm can be finished by hand shaping. The face of the valve should ideally be lapped up to the port face of the cylinder. The spring is just a simple spring washer sandwiched and compressed between two slim flat washers.

Fig 5

Fig. 5



Eccentric
Mat'l: Cast iron

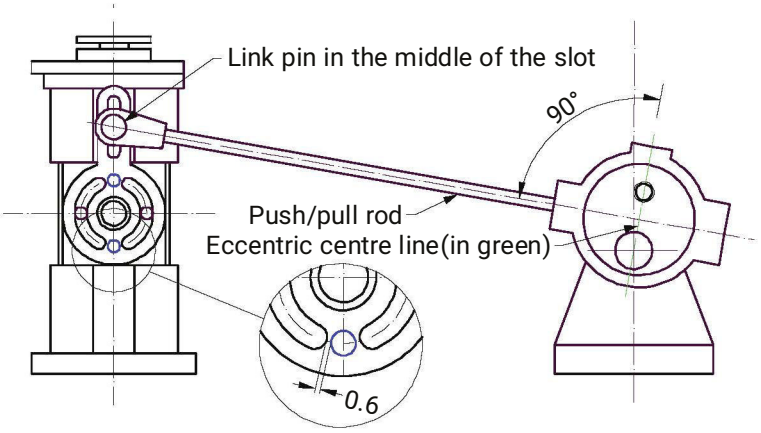
Retaining Disc
Mat'l: 2mm M.S.

Eccentric Strap
Mat'l: 5mm brass

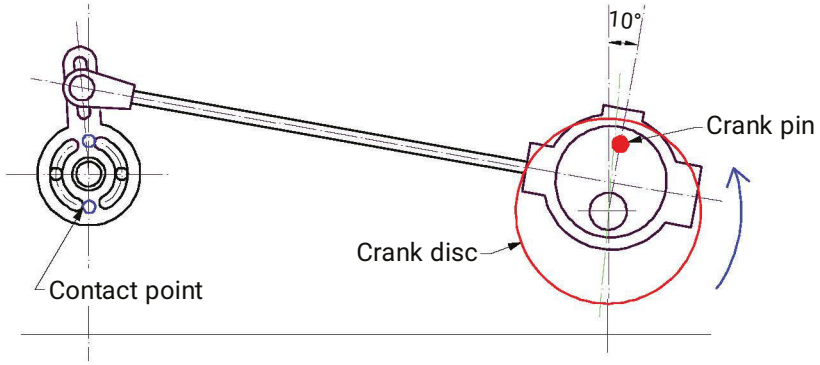
Eccentric.

Fig 6

Fig 6.



A Setting the valve at a mid-point in its angular movement
Adjust the length of the push/pull rod to give the setting shown above
The lap on each side of the port holes is approx. 0.6mm



B Setting the valve with the engine assembled & the crank pin in the position shown
Note the contact points where the valve channels align with the perimeter of the top & bottom port holes

Valve setting.

The eccentric in **fig 5** is made from cast iron and has the crankshaft hole offset by 7mm. The cover plate is mild steel and secured with a single countersunk head screw. There are two 3mm grub screws for convenience and security. The eccentric strap is made from 5mm thick brass and can have a slit and pinch bolt if so desired.

Valve setting

Figure 6 shows the way to set up the 2023 engine.

In 'A', the valve is set at a mid-point in its angular movement with both the upper and lower ports closed. Before commencing remove the crank pin as the position of the engine parts is irrelevant at this setting. The eccentric rod length needs to be adjusted to achieve the setting shown. A mid-point for the pivot in the radius arm slot is given as a starting point but this could be higher or lower if deemed necessary. The green line passes through the centre of the crankshaft, the centre of the eccentric and its maximum peripheral distance from the crankshaft centre of rotation. Rotate the eccentric to this position so the green line is at 90 degrees to the centre line of the rod with the rod coupling in the position shown, then temporarily secure in place with the accessible grub screw.

In 'B', the eccentric has been further rotated to advance forward the valve position. The engine must be assembled at this stage and the crank pin should be approximately 10 degrees from its highest point of rotation. Remove the valve cover as shown in photo 11 so the setting can be observed. At this setting the lower port will open, for air/steam, just before the piston reaches the end of its downward stroke and simultaneously the upper port will open *earlier* for exhaust on the return upward stroke. It can also be observed that the upper port has closed *before* the end of the downward stroke. When the crank pin passes through a further 180 degrees an opposite sequence of events to the above will apply which can also be observed with the valve cover removed. On completion, secure the eccentric in place with both 3mm grub screws.

....and finally

In photo 1, part 1 the engine has a globe valve fitted. This type of valve is a good investment as after initial trials and generous time running in the engine (with lots of oil!), the valve is perfect for regulating the supply to give medium and slow speed running.

I added the auxiliary exhaust port to the 2023 engine simply because there was one on the 1946 engine but it is interesting to note that KNH in his book states that it is a 'moot point' as to whether the exhaust is of any use at desirable slow and medium speed running. It's probably fair to say the additional exhaust does not have a detrimental effect on the engine performance.

The engine has a two-tone grey spray-painted finish. The darker grey is Halfords industry grey and the lighter grey on the base and beam is a grey undercoat with a spray lacquered coating. The oak base and cladding have an initial varnished and then wire wool wax coated finish. The colour on the flywheel spokes is hand painted with Revel 350, dark blue silk.

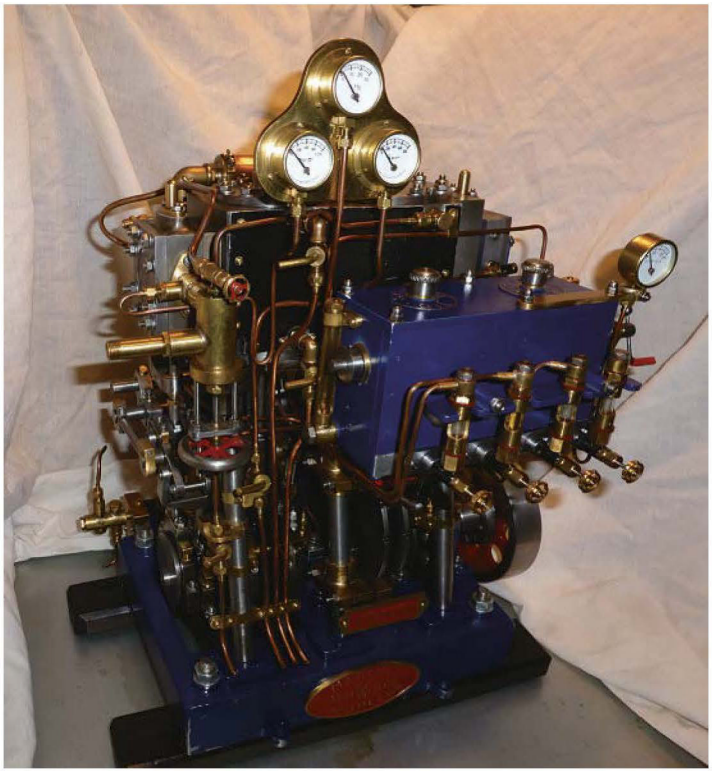
All the sealing washers at both ends of the cylinder and under the valve cover are made from PTFE sheet 0.1 mm thick. All the bearings, brass or cast iron, should have small access holes for a regular oil supply.

Do have fun if you make this engine and, yes, I know some details have been omitted, principally because I understand that space in *Model Engineer* magazine is at a premium but also as I wanted the article to be in no more than two issues. Any questions? If you know me, please contact directly, if not I can be contacted via the editor.

ME

HERCULES

A twin cylinder compound condensing marine steam engine. PART 6



Chris Walter builds an engine described in *Model Engineer* 100 years ago.

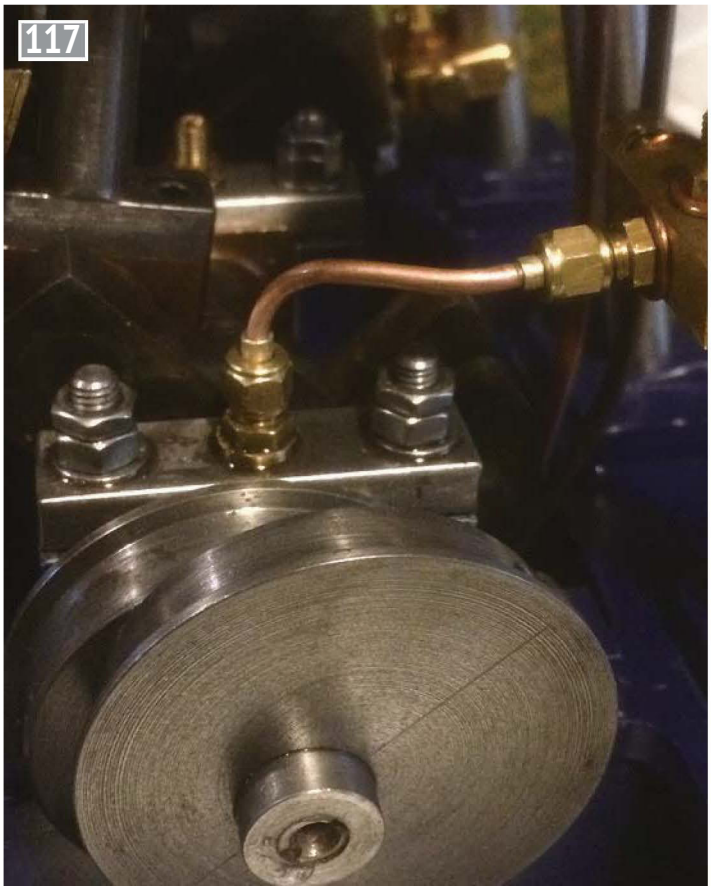
Continued from p.169
M.E.4734 January 12

Eccentrics

It was my original intension to have split eccentrics so that they could be removed at any time without having to dismantle the main bearings and remove the crankshaft. The crankshaft was hollow and had a limited wall depth making it difficult to accommodate a key way. Because of this I had also decided to use saddle keys to secure the sheaves or, failing that, just a grub screw of the largest size that could be managed.

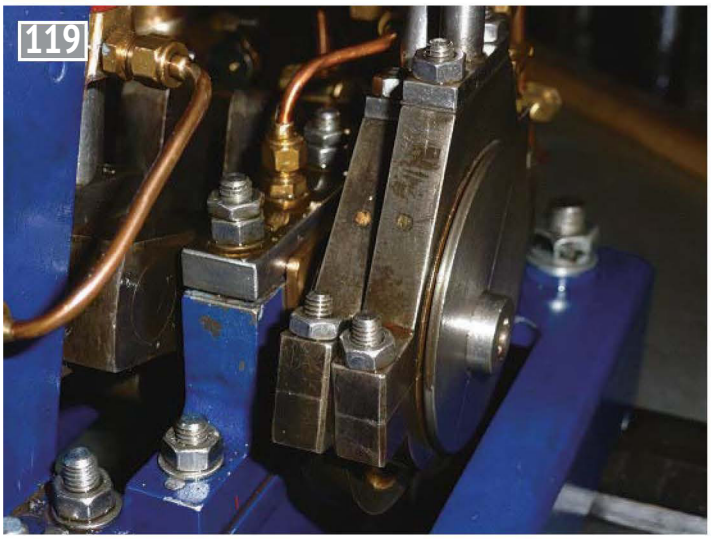
I did in fact make the four eccentrics to the split design but eventually found that they weren't completely suitable. Although the two halves were joined with two locating dowels in addition to the two fixing screws, there were occasional slight movements which caused binding between the sheaves and the straps. Because of the small clearances in the two voids, and despite making a number of different shaped spanners it was impossible to tighten the two bolts to a sufficient degree. In addition, with my brilliant design (!) the more the grub screws to secure them to the crankshaft were tightened the more the two halves of the sheaves were forced apart. Not good!

I decided that, on this occasion, simplicity was best, and so I reverted to plain disc eccentrics with a flange on one side, so that when paired the two eccentric straps would run located between them (**photo 117**). In the end I had to rely on plain grub screws to secure them to the crank shaft and, so far, this has been

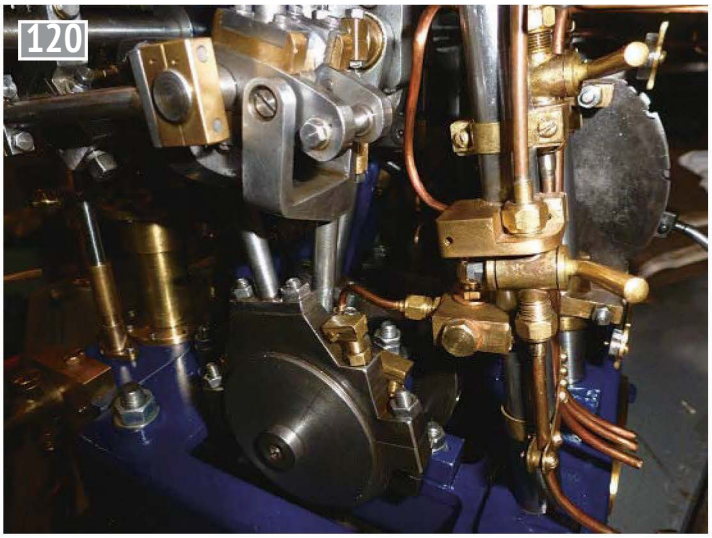


Plain disc eccentric with a flange on one side.

Plain disc type.



The completed eccentrics with straps on the high-pressure end of the engine.



Eccentric straps on the engine.

sufficient (**photo 118).** This also allowed me to have the inside bearing area of each steel eccentric strap sleeved with a bronze bearing bush, which would have been difficult to achieve if I had used the more common tongue and groove system for location (**photo 119).**

The eccentrics were made in steel and were a relatively easy turning job following the methods that have been related in this magazine many times. I designed them to have as large a diameter as possible as this gives a larger bearing surface and the straps seem to sit better when running.

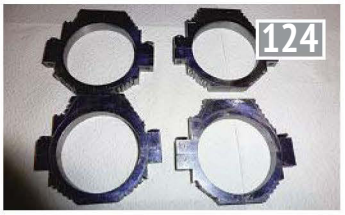
Eccentric straps

These are quite conventional steel straps with bronze bearing liners to run on the steel eccentric sheaves but, as already mentioned, there is no locating tongue or groove, which allows a larger bearing surface area. With this in mind I had also made the diameter fairly large and each strap had its own lidded oil cup for lubrication (**photo 120**).

The straps are ⅜ inch steel and two blanks were cut for each strap to form the upper and lower halves, the sides being chain drilled to assist later milling. After placing all four pairs in a block in the milling vice they were machined as one piece down to the overall dimensions (**photo 121**).

The next job was to drill and tap all the separate halves so that they could be assembled into their respective straps. Each pair was then centered in the four-jaw chuck and bored out to dimension, followed by a bit more chain drilling (**photos 122, 123,124).**

Jig made up to hold the two halves for milling on the rotary table.



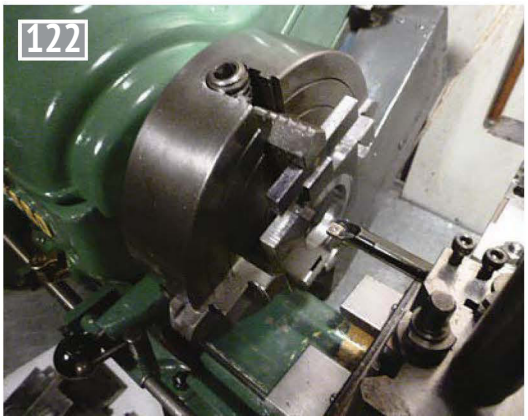
More chain drilling.

A simple jig was made, from bits of aluminium, so that each strap could be mounted in turn on the milling machine rotary table to finish machine the profile. The easiest way to do this was to mount the jig in the four-jaw chuck first and then transfer this *en masse* to the rotary table which is fitted with a nose thread for the chuck. Once this was completed it was back to the bench to finish off and clean up by filing (**photos 125, 126).**

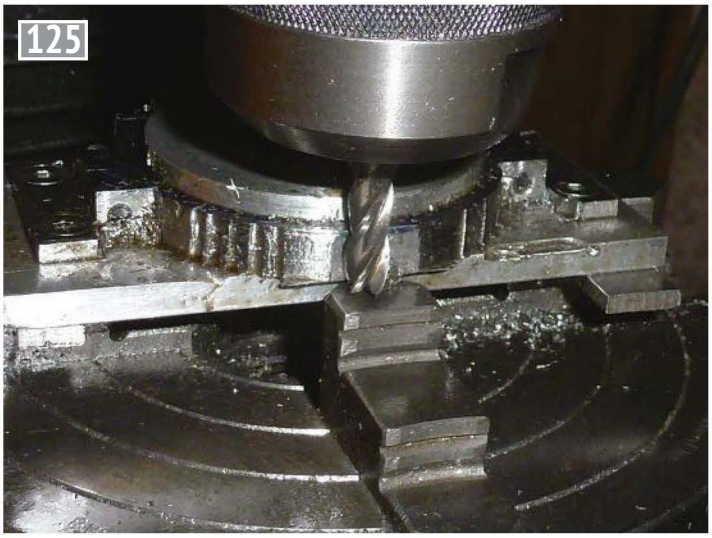
For the bearing liners a tube was formed in bronze and the four liners parted off to size (**photo 127**).

The bearings were initially held in position in the straps using high strength retainer ≫

Milling all four halves as a block.



Boring out the centre.

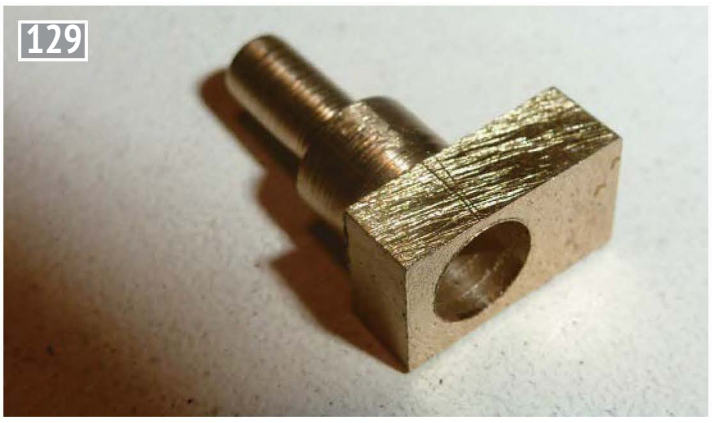


Milling the curve on the rotary table.

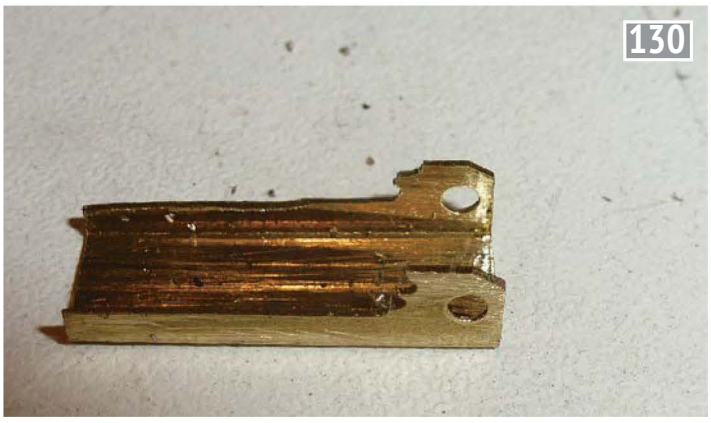
The four straps minus the bronze bearing liners.

Parting off one of the four bearings.

The four straps with rods and expansion links.



Completed oil cup body.



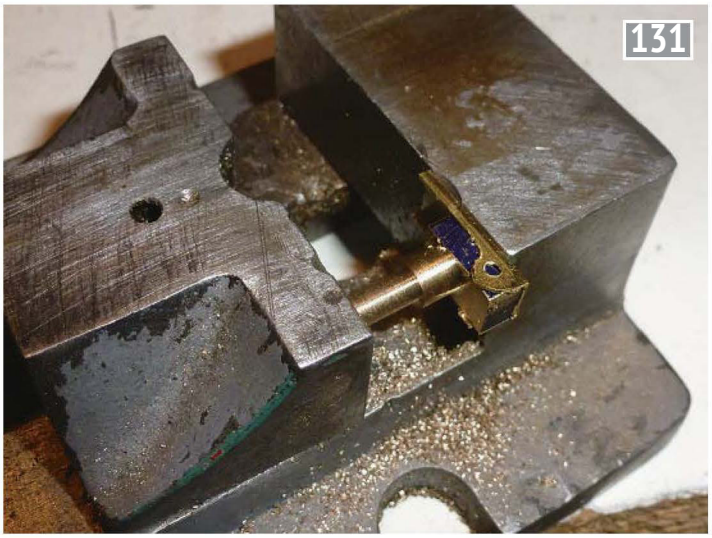
Rough lid.

and after curing four 3/32 inch holes were drilled around the periphery of the strap, both through the strap and liner. Into these holes were inserted brass 3/32 inch dowels, again with retainer, being filed flush to finish.

Once cured each strap was put back in the four-jaw chuck on the lathe and carefully bored to suite its individual eccentric sheave. The rest of the straps were made of ¼ inch steel rod having a bolting flange at its base and a fork above which encompasses the expansion link. The lateral orientation of the fork and rod are different for each individual eccentric, to accommodate the position of the eccentric relative to the valve rod centre line (**photo 128).**

I was determined to have some sort of viable oil cup for each individual strap but making something with a lid was going to be a problem. Watchmaking is great for those that can do it but, with both poor eye sight and large arthritic fingers affected by advancing age, it was a case of do the best you can.

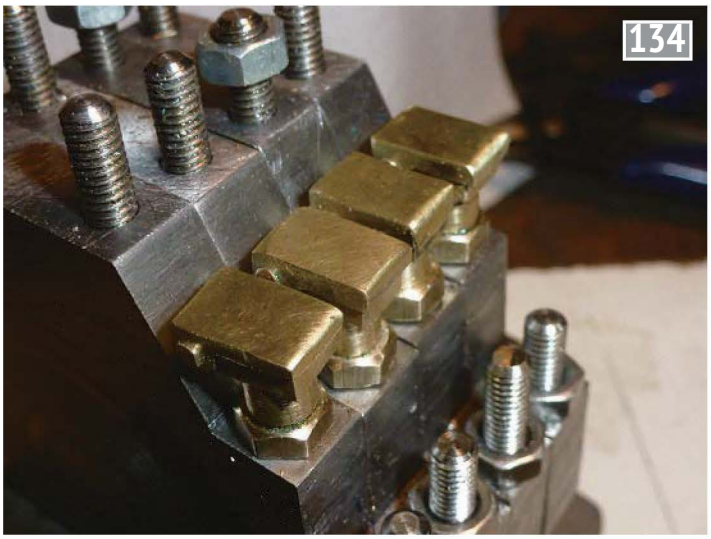
Initially a length of ¼ x 5/16 inch brass was drilled to accept a round brass rod which formed the stem of the cup. Once secured together



In a small vice for drilling the hinge pin.

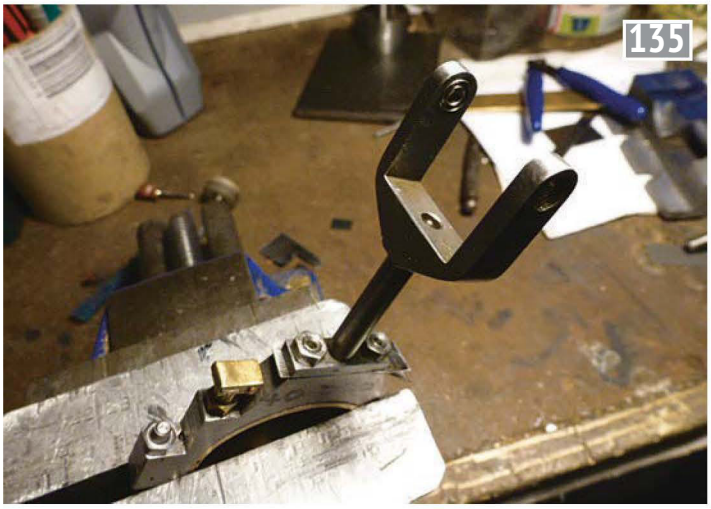
Complete oil cup.

All four cups and lock nuts.



All the straps with cups.

Strap on a measuring jig to ensure all are the same length.



Held in a vice to fit shims under the foot.

with retainer, the block could be opened out to form the cup. The lid was formed by hammering 18g sheet brass over a former and the sides so formed drilled for a hinge pin (**photos 129, 130).**

Photograph 131 shows the body and lid in a small vice ready for drilling the hinge pin hole. Once fitted the brass pin can be lightly peened over and all the edges cleaned up with a file. I found that when mounted on the straps their appearance was enhanced by putting a hex shaped flange on the stem. This just seemed to finish them off (**photos 132, 133, 134**)!

In order to ensure that the length of all the straps were exactly the same a small measuring jig was made and shims were placed under the rod flanges as necessary (**photos 135, 136**).

●To be continued.

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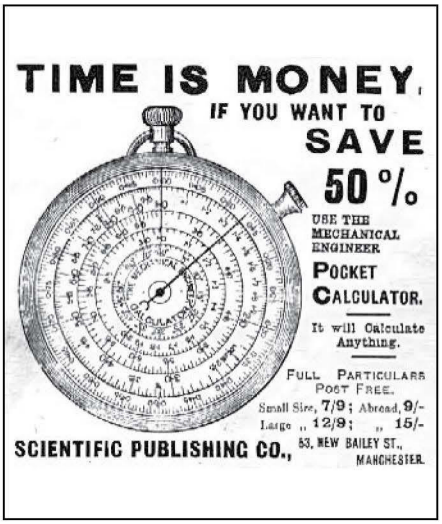

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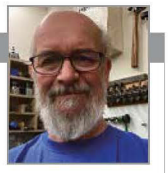
SMEE *125th Anniversary* Steam Cruise



Martin Kyte sees SMEE take to the water *en masse*.

From the middle ages England enjoyed the freedom to form unincorporated associations without the need to obtain permission, save that of the participants. This freedom perhaps explains why we are such a nation of groups, clubs and societies. Indeed, when Charles Dickens writes of the proceedings of the Mudfog association in *Master Humphrey's Clock*, he was describing an established aspect of society that in his day was growing fast in both number and variety.

So it was that when Percival Marshall, in October 1898, responding to requests from enthusiastic readers of *The Model Engineer and Amateur Electrician* calling for their own club, he was adding to a long tradition of such beginnings. His actions in calling together a meeting in the Reading Room of the *Model Engineer* publishing office resulted in the formation of a new Society, adding yet one more to the growing number. Originally called the Society of Model Engineers, it soon added Experimental to its name to become SMEE. Take up of membership was rapid and by the end of the year the Society could count 67 members which was pretty good for less than three months of existence back in an age of postal letter and printed handbill.

We read that objectives of the new Society were stated as follows:

The encouragement of craftsmanship, the bringing together of all people interested in the design and construction of models, engines, tools, and the like, holding meetings, exhibitions, talks and discussions, the provision of a workshop and library, and the regular publication of information of interest to members.

Whilst it is unlikely that Percival Marshall, Jim Crebbin and their fellow founding members would have dreamed that their nascent but enthusiastic entity would still be going 125 years later, they would certainly have recognised the SMEE of today as still embodying the principles with which they had endowed it. With Marshall House in South London providing a base for activity, endowed with its large meeting room, an extensive library and a very well-equipped workshop, SMEE now spreads across the UK and the world. Covid presented our Society, like many organisations, with serious challenges, but the pandemic did force us to fully adopt modern communication practices which we find has brought many positive results. Today, almost 10% of members are now based outside the UK and a large proportion of UK members are some distance from London. Members now enjoy the choice of using Zoom for participation in live meetings or personal attendance at Marshall House and can maintain other contact via the Society Journal and its website.

So, with 125 years passed from our beginnings, and with the society still going strong, some way of celebrating the occasion was called for. With the welcome return of the Midlands Model Engineering Exhibition, participation and provision of a much expanded SMEE stand was an obvious way to include the wider model engineering community in our birthday. We achieved a much larger stand than our normal offering and we hope many of you saw and enjoyed it back in October of 2023. We showcased items from the whole of our existence as well as displaying our current activities alongside live demonstrations of machining techniques. The stand has been well covered in the November editions of *Model Engineer* and I encourage you to take a second look.

Another event to mark the occasion involving just our SMEE members was felt to be required which caused much head scratching. The general feeling was that the tried and trusted annual trip and lunch on the Bluebell Railway, which although being very enjoyable, did seem a little routine for a 125th birthday and we sensed the need for something a little different. Peter Haycock, a long-standing member, made the original suggestion of a cruise from Windsor on one of French Brothers' steam launches, something he had done and enjoyed. When we found that one of their boats *SL Nuneham* had entered service in 1898, the very year of our founding, and when Steve Bill, who owns the Tom Jones boatyard in Windsor, added the offer of parking and a tour of the boatyard, which specialises in the repair and maintenance of wooden boats, the die was cast and the booking made. Roger Backhouse then chimed in and informed us that SMEE ≫

www.sm-ee.co.uk

www.frenchbrothers.co.uk

SL Nuneham *setting off.*

Brick plaque at the boatyard.

SL Nuneham *engine room.*

had undertaken a similar cruise back in its infancy in 1904 which he discovered through his recent research into the life of Jim Crebbin.

And so the idea of a sort of re-enactment was born and, although it would be easy to imagine some strange but benign influence of the ghosts of SMEE past having some eerie influence on our deliberations, a perhaps more reasonable notion would be that we still are drawn to and like the same things as those early members of SMEE. Plans were put in motion and on a thankfully dry Saturday in August we embarked on the French Brothers' Steam Launch *Nuneham* for a four-hour cruise from Windsor to Runnymede and back (**photo 1**).

This may be a good point to elaborate on details of the Steam Launch *Nuneham* which, according to the French Brothers' website, under details of their fleet, is described as a 100% genuine steam boat. It is finished to an extremely high standard with polished natural wood and teak decks with brass fittings. The boat was built in 1898, the same year as SMEE's foundation - another strange coincidence - ghosts again? (In fact that number seemed to crop up everywhere that day including on a wall at the boatyard - **photo 2**.) The boat has a covered forward deck which serves to protect the engine, boiler compartment and steering position (**photos 3** and **4**), a saloon aft on the same level but sensibly apart from the engine room and an open upper deck over the top of the saloon and extending to the stern. The funnel is hinged to provide clearance under bridges and the length is 85 feet with a 14 foot beam in old money. Propulsion is provided by a Sissons triple expansion engine (**photo 5**) which also served to supply the required 'aromatherapy' of hot oil and coal at levels that were evocative rather than overpowering.

The website also mentions two distinguished Elizabeths as past charterers, Taylor and Windsor.

The reference to the hinged funnel reminded me of a story in an old issue of one of the waterways magazines. During the war some of the Thames steam launches were put to use to convey wounded servicemen from the London Hospitals to convalescent homes further up river and one such boat which I believe was owned by Salters was undertaking such a trip. Having completed the loading of her charges with their attendant nurses the boat then proceeded back upstream following, I think, a Scandinavian freighter. Just below Tower Bridge the freighter gave a whistle code which was either incorrect or wrongly interpreted by the bridge. All traffic on the river used whistle codes to signal intended movements. The bridge crew believed that the freighter was requesting to pass under and so raised the bascules accordingly. Unfortunately, the freighter had meant to signal a turn to port to tie up, a manoeuvre which it carried out leaving the much smaller steam launch alone on the approach to the now open Tower Bridge. To add insult to injury the skipper of the steam launch ordered the funnel to be lowered to the hilarity of the crew and those passengers fit enough to realise what was happening. Apparently, the story earned many a free pint for years afterwards on its re-telling.

As mentioned earlier the society had undertaken a cruise in the past as testified in our archives which include this note:

'In June 1904 Society members went for a Saturday afternoon trip from Richmond to Weybridge on the steam launch May Queen*. They enjoyed strawberries and cream, "an excellent tea and a substantial supper" returning to Richmond at 9.30pm. The journey back was enlivened by an impromptu concert "with songs given by Messrs Beken and Crebbin" plus recitations.' Model Engineer and Amateur Electrician. Vol 11, no 167, July 7th 1904 p 266.*

In deference to others on the river and the wildlife, on this occasion we did not sing! However, we did enjoy

SL Nuneham *boiler.*

Sissons engine.

Trainee stoker.

Getting details of the boat from the crew.

SMEE members' group photograph for the archives.

a delicious afternoon tea with sandwiches, cakes and strawberries and cream along with many other delights accompanied by liquid refreshment in the form of tea and coffee or selections from the bar.

Many members investigated the workings and operation of the boiler and engine with some adventurous souls descending the short ladder for a closer look (**photo 6**).

French Brothers were more than willing to talk about the boat and its management (**photo 7**) and passage through the Thames locks punctuated the trip with interesting activity to observe between periods of serene progress along the river. The French Brothers' crew treated us to an occasional commentary itemising particular things of note along the river bank as we passed. Rare views of the royal 'back garden" at Windsor Castle were accessible at a range only possible from the river. Other sights of particular interest were several 'little ships' at their moorings which had taken part in the Dunkirk evacuation, the American and Commonwealth war memorials and of course the field and memorial to Magna Carta at Runnymede.

Once 'half time' had come and gone and we had turned upstream again the atmosphere evolved from a sense of expectation and excitement to a more measured peaceful state with the company intent of finishing off the splendid afternoon tea, settling down to chats with long term friends and making new ones amongst the newly joined members. SMEE is as much about social contact as it is about the engineering that provides our Society with its reason for being.

Waterways are never the same when travelling in the opposite direction and with the sun lower in the sky all the things we had seen on the way down acquired a new freshness, making the return journey just as interesting and delightful as the outward. At last the boatyard at Windsor came in sight and we tied up completely satisfied with a day well spent. A group photograph (**photo 8**) and a dawdle in the yard to say goodbye to each other and we all trickled off to our homes.

I think the 'ghosts' would have been pleased with us and will rest easy until the next big birthday.

ME

A Simple Add-on Guarding System
For the home milling machine or similar use

Calder Percival describes a simple safety feature for a milling machine.

Having spent the last thirty-five years working in industry in a number of different roles within workshops and factories, guarding techniques are accepted and common place. Indeed, they are a legal requirement under the legislation laid out by the HSE under PUWER, the Provision and Use of Work Related Equipment Regulations 1998. All machinery within workshops and factories has to meet the strict and at times laborious standards to make operation of such machinery safe but also practicable. Time and time again the words Health and Safety are frowned upon in model engineering circles and it is my assumption and experience in some cases that the person with whom I am speaking has little knowledge of the injuries that can happen from the machinery we use daily in our hobby. Cuts, abrasions, entanglement, stabbing, blinding, puncture are but a few. Injuries can be small and embarrassing and in the worst cases can result in loss of a digit or limb and, in the worst scenarios, death. By the general rule we operate machinery in outhouses, garages or workshops on our own and this increases our vulnerability.

I have had the fortune in life to visit many home workshops of some very experienced model engineers and some professional ones too; I do however cringe when I see guards designed with purpose for a piece of machinery on the floor or tucked away behind a machine. It never ceases to amaze me the lengths people will go to in order to bypass a safety switch in order to make things easier for themselves.

Handle and 'T' nut for securing the guard.

The guards are in place – easily adjustable to avoid clamps, vices etc.

Good guarding works properly when the operator is both protected and not inhibited whilst performing a task or operation. We see time again numbers of photos of operations being performed within our magazines and

The guards are equipped with handles for easy adjustment.

Pipe clips secure the Perspex and allow easy adjustment.

never really see guards fitted, I do accept that in some cases this is for clarity of the set up being shown.

I recently purchased an additional milling machine of older design for my own workshop at home. The machine is an AEW Viceroy vertical mill. Upon arrival I noticed two fixings on the side of the milling head and was curious as to the purpose. It transpired looking through old machine photos on search engines and in the machine manual from the manufacturer these were for some simple guards. The guards had obviously been removed and lost or thrown away. After studying the original machine guards I could fully understand why. At the time the machine was built guards would have been required for the audience the machine was marketed to, which was education establishments, schools / universities etc. The guards were crude, obstructive and provided little enthusiasm for their use. It was at this point I decided to manufacture some very simple but effective guards. The criteria decided upon was as belows:

* Functionality had to adaptable for multiple changes to operations including vice set ups, division heads and rotary tables.
* Ease of manufacture.
* Ease of maintenance.
* Availability of suitable materials at affordable cost.
* Design adaptable for use on other milling machines

For the guards to be functional they had to be adjustable to multiple positions and quickly so as not to be a hindrance. By design they had to be simple as this allowed quick manufacture so the project would not be put to one side and its very purpose lost. The ease of maintenance is to allow their correct and safe use without the guards themselves becoming a danger. The materials used need to be items that are readily available should something become damaged and the cost has to be such that they do not become overlooked for this reason. In the design I looked for something that I could adapt to suit my Centec milling machine by scaling down the concept and then not re inventing the wheel and costing further workshop time.

I have deliberately not produced drawings for the design as this is something you can adapt for your own needs but have provided approximate sizes within the parts list as a guide and reference for your own adaption to your specific needs.

* 'T' nuts are to fit your own milling table.
* Base plate 50mm x 40mm x 10mm.
* Column 250mm x 12mm diameter stainless steel.
* Shatter proof plexiglass/ Perspex 200mm x 150mm. Available cut to size.
* 12mm bulkhead air pipe clips.
* Ratchet type clamp levers (female) M6.
* Simple door handles.

All these items I purchased from the well-known auction site online. Finished parts were coated in a simple cold bluing material used for repairs to gun barrels, in order to give a more professional look. The 'T' nuts are furnished with studs glued into them. The ratchet handles allow for rapid movement of the base plate along the bed of the milling table, to different slots on the table or to allow a different set up completely. The pipe clips fixed to the guard screen by cap screws allow the guard to be opened quickly and easily for set up, measurement and tool changes. However, they also allow easy vertical movement when changing operations, for instance working over the vice or lowering the guard to suit a rotary table. The clamp screw underneath is fixed in a manner that prevents dropping of the guard. The clamp screw head also acts as a stop to prevent the guard being accidentally swung backward into the path of the tooling.

It can be seen that, with the simplicity in manufacture and numerous possibilities to position these guards in every situation, they will prove to be a useful addition to any milling machine and in every size, providing for a safer experience and hopefully preventing the possibility of accidents. I hope readers will find this simple article useful and that it inspires you to manufacture suitable guards for your own machinery, allowing you to operate safely. The guards themselves were manufactured in one evening and have been used now for many hundreds of hours with no noticeable deterioration.

ME

The guards can easily be swung away for setting up.

A Five-Inch Gauge 0-4-0 Padarn Railway Tender Locomotive PART 21

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

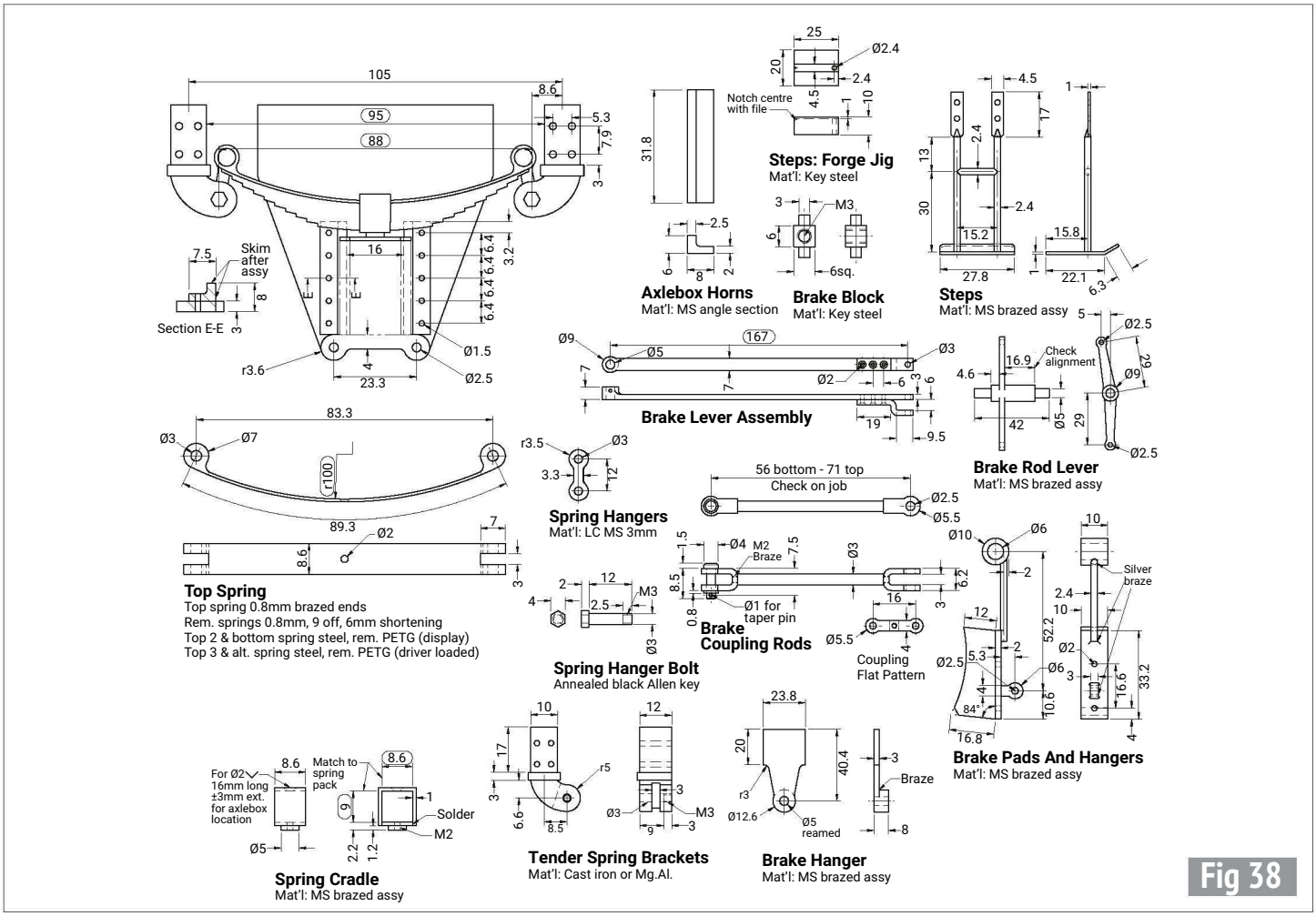
Continued from p.143
M.E.4734 January 12

Brake assembly

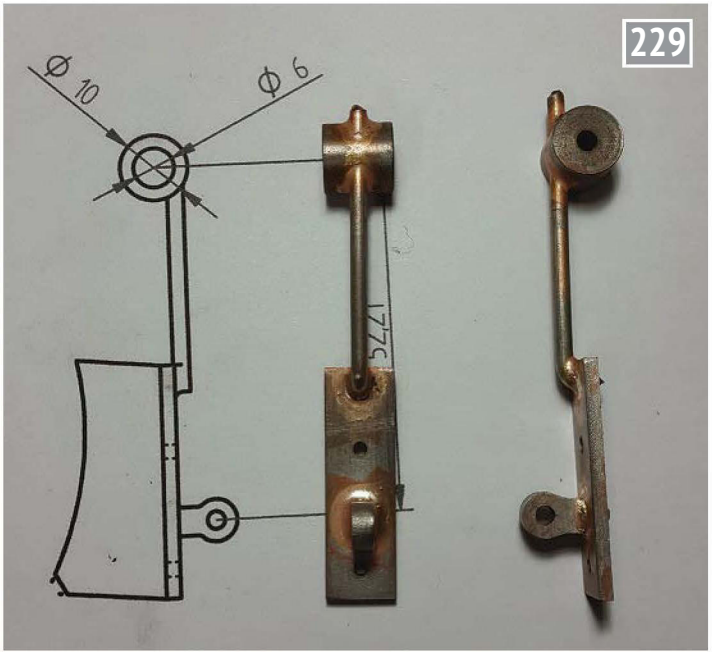
As I mentioned at the beginning of this mini-series, one of the oddities of the tender is the position of the braking system (**fig 38**). Design intent is one of the things I look for in the large scale. If you can picture why the designers or builders made a system in a specific fashion, you can almost time travel back to those pioneering days, understanding some of the problems they encountered. Normally there's a reason for doing something a certain way but on the odd occasion it may have been just half chance. I think the position of the braking system was such a case, because the two Dinorwic Quarry locomotives had similar tenders but the braking was on opposite sides. Both were likely bought out, so it may have been a legacy of the original lines. I suppose we'll never know!

Brake hangers

The design of the brakes is very close to scale below the frames but has been simplified behind the frames to make life a little easier and more functional. The brake hangers are a brazed



Suspension and brakes.

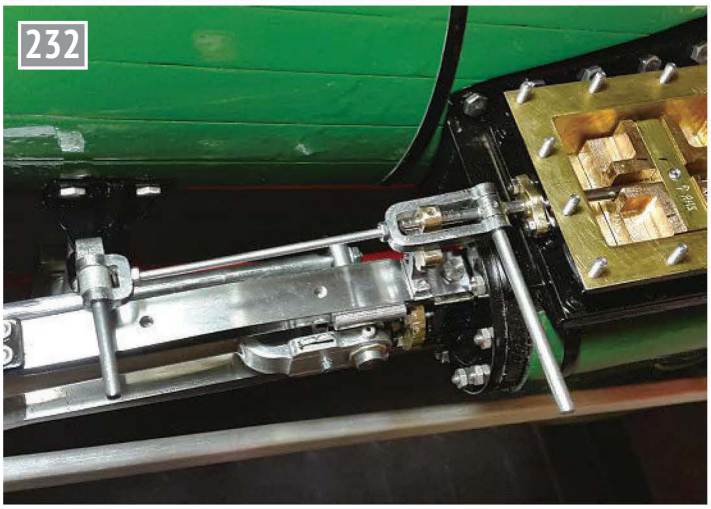


The brake hanger brazed assembly.

The original brake coupling rods removed from the large Fire Queen *(photo courtesy E. Lander).*

Filing the brake coupling ends using radius guides. Note how they are stacked to decrease manufacturing time.

assembly (**photo 229**) with a few tricks. The individual components that make up the assembly are easy enough to turn, mill and file into shape. To keep the piece of rod in place when brazing, I drilled a hole at the top of the brake backing plate and bent the end of the rod 90 degrees in the vice. This also gives the end assembly a natural curve that matched the scale model beautifully. On the top side, the cylinder is drilled along the length undersized and cross drilled for the hanger rod. This required an easy fit for the solder to penetrate but the centre lightly punched from the outside to create an interference fit for holding while soldering. With everything manoeuvred into place, and all the fits holding the lot in place for soldering, the job becomes easy. All that is left is to clean the assembly and drill out the pivot holes to drawing.



Checking the distance of a brazed assembly before making the middle rod. In this case it was for the engine valve connecting rod. The valves can be seen just cracking open with all other valve gear in the normal set position. This is the same method to check the brake connecting rod lengths.

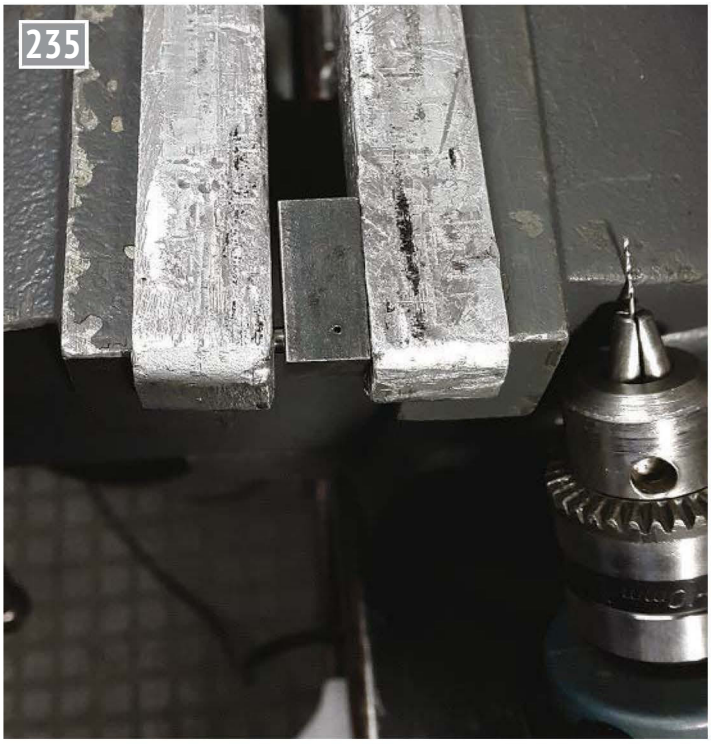
A completed coupling rod brazed and ready for chemical blackening.

Brake coupling rods

The brake coupling rods are also a brazed assembly; I'm guessing they were forged for the large scale as was normally the case for links in those days (**photo 230**). Back to the model; the ends are given in the drawings as a flat pattern for filing and bending into shape (**photo 231**). I've found bending flat plate to look much better than milling a solid piece; the chances of drifting a fraction in the mill is rather high and it only takes 30µm for something to visually look wonky (that's the technical term). (Disclaimer: this is highly dependent on age of inspector and quality of visual apparatus!)

When the brake pads are made, the complete brake assembly can be fitted and the lengths of the coupling rods checked. Similar to the engine valve coupling rods (**photo 232**), the easiest way to get the correct lengths is with pieces of threaded rod adjusted until both brakes engage evenly. This effectively moves all the tolerance stack-up to the centre rods of the coupling rod assemblies. There is no adjustment on the brakes so they need to be manufactured to the correct lengths for them to work properly. When confident with the fit the centre rod can be turned and the rods brazed, fixing their length (**photo 233**). Finally, the rods can be chemically blackened for final assembly to the frames. ≫

A simple drilling jig made to standardise on the pin lengths, making them interchangeable. One or two spares are worthwhile with such small components that can get lost on the track.



Hand drilling the pins with a small hand drill and the drilling jig. This gives more control than a drill press, especially with smaller drill bits.

The brake pins

The brake pins are just as fiddly and small as all the pins on the model. They follow the same design as the rest of the model with a taper pin (**ref 5**) keeping the assembly in place. As with the engine, a simple drilling jig was made to standardise on the pin lengths (**photo 234**). This leaves any adjustment to the washer behind the taper pins and only one or two spares are required. I mention spares for these small components because nothing is worse than setting up everything to replace one single pin that was lost on an otherwise enjoyable steaming day.

The drilling jig is used with a small hand drill (**photo 235**) which gives far more control than a large drill press, which tends to break the drills when they push through the back end. Something that is not clearly visible in the pictures is the clearance hole at the rear of the jig, which is normally drilled larger than the front guide hole. Doing this has two benefits; the drill is less likely to break if it drifts a fraction and it makes drilling and hitting out a broken drill from the back much easier.

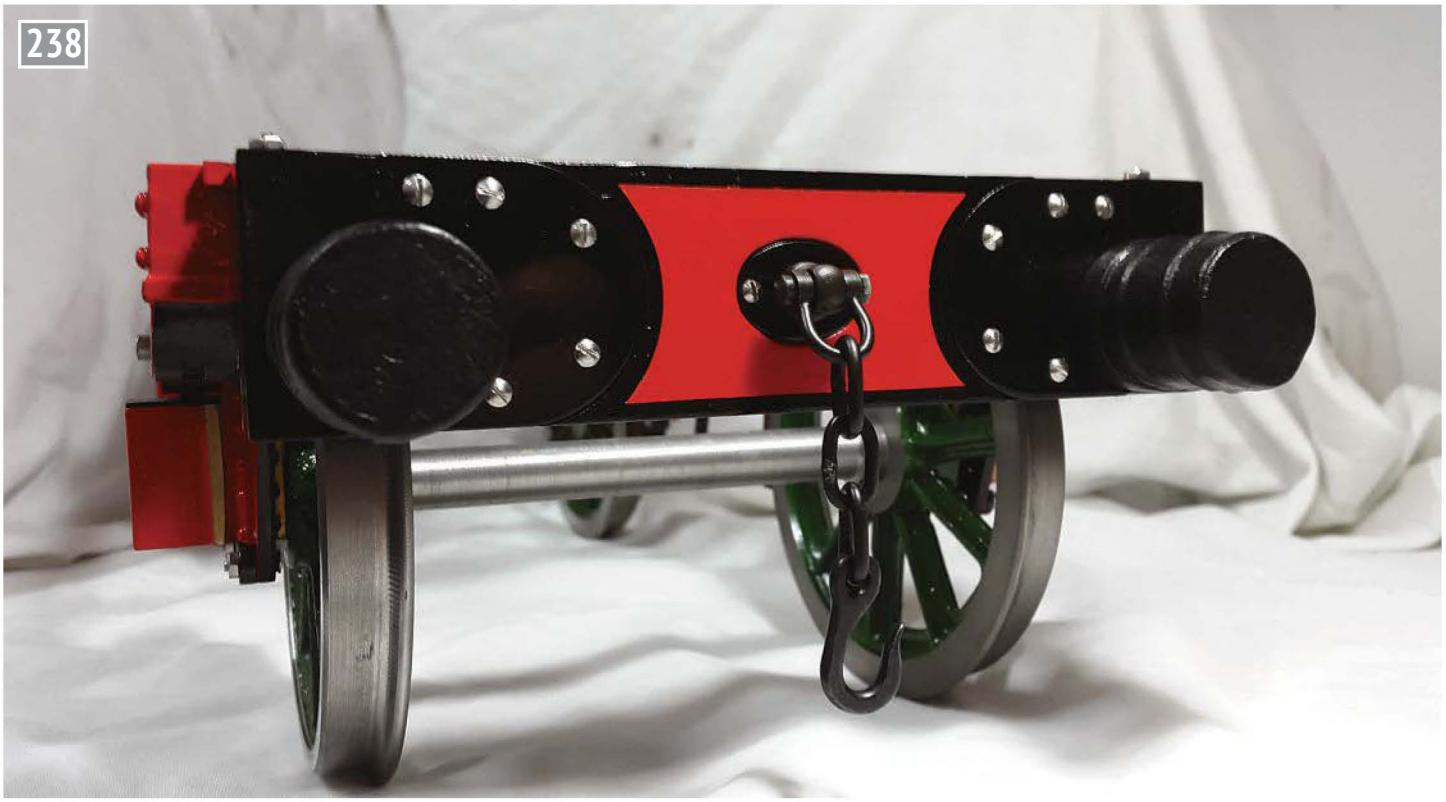
Brake lever assembly and brake block

In Part 10 (M.E.4724 August 25 2023) the reversing arm block was made as a bronze/silver steel brazed assembly. It works well enough but in hindsight I would have made it as a solid keysteel component. This is how I made the brake block for the tender. It was much quicker and easier to make. The machining is made even simpler if a cross corners collet is used to hold the square bar in the three jaw chuck. Concentricity of the two spigots is assured, provided the part is not moved between machining those two geometries (**photo 236**).

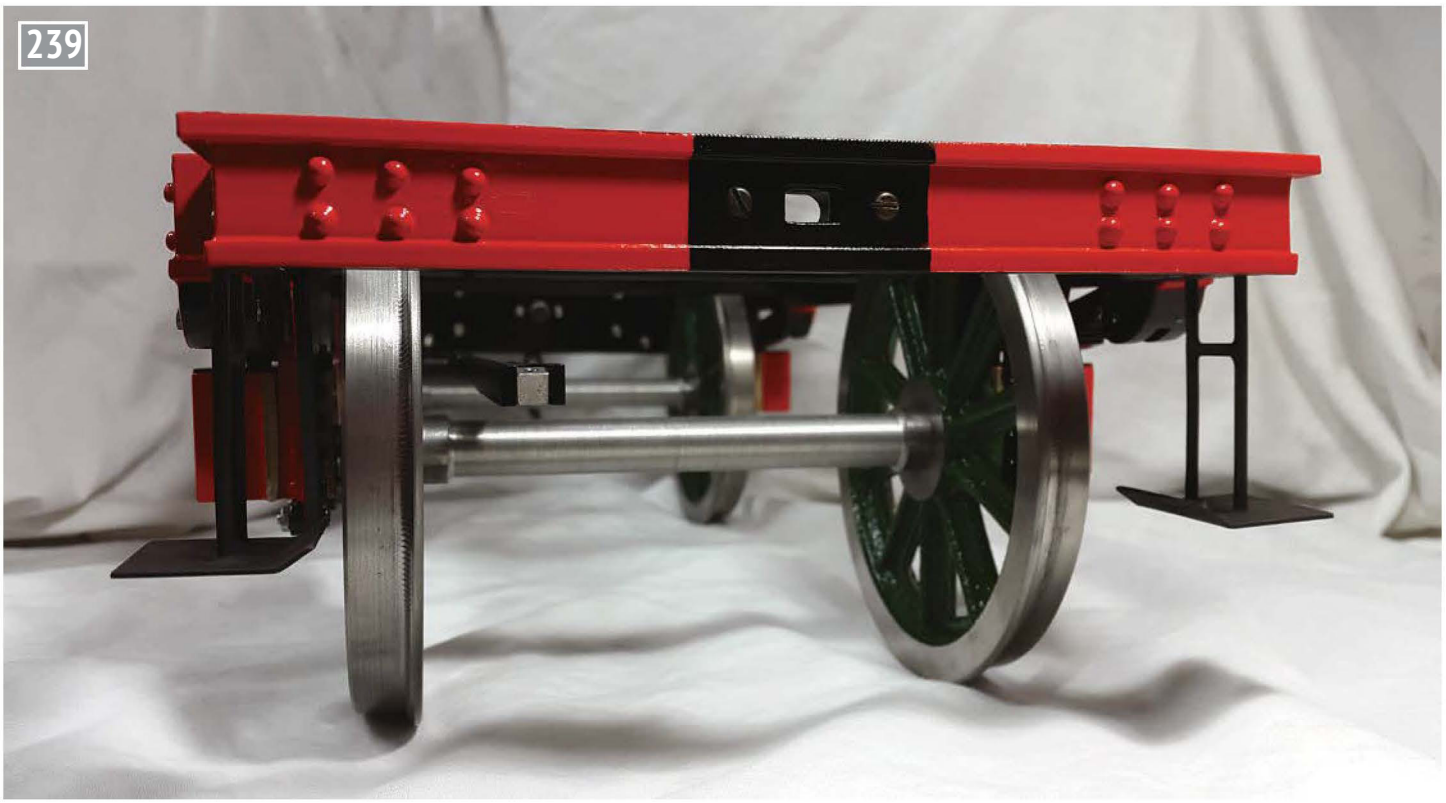
The brake lever assembly is very similar to the reversing

The brake block machined from one piece of key steel for improved strength.

The tender frame completed and painted ready for the tank.



Rear of the tender frame as seen from the buffer beam. Note the handsome leather buffers.



Front view of the tender frame.

arm described in Part 10, so I won't bore you with a recap; it's really just a few dimensions that are altered and obviously considerably longer. The brake lever is not a perfect scale replica but it would take a very keen historian that has personally worked on the original exhibit at Penrhyn Castle to spot the indiscretion.

That's the frame and brake fittings done and dusted and, in my humble opinion, they turned out great (**photos 237** to **239**); this considering I was looking at forgoing the design and construction of this tender. Next is the tank and all the interesting fittings that aren't commonly seen on the miniature railway scene.

●To be continued.

REFERENCES

Ref 5 *The Budget Way to go Nuts about Fastener Detail, Luker*, Model Engineer, M.E.4702, October 21 2022

Biscuit Tin Steam Engine PART 3

Tony Bird says you never know what you might find in a biscuit tin.

Continued from p.157
M.E.4734 January 12

Reversing valve

The reversing valve had previously been cleaned up and had the two pipes that had been soldered to it removed. This had been done when the other parts of the engine had been cleaned (**photo 48**).

This type of reversing valve works well but isn't the easiest to mount and the pipe connections being at 90 degrees to each other would make it a bit more difficult to connect the various components together inside the wooden base. To be able to mount the valve under the engine base plate, a shoulder was turned on the valve body and it was hard soldered into a square of sheet brass bored to accept it.

The operating arm was made narrower and shortened and a pair of stops were fitted to limit the travel through which the valve could be moved.

Four commercially available spacers were used to mount the valve assembly on the engine base plate (**photo 49**).

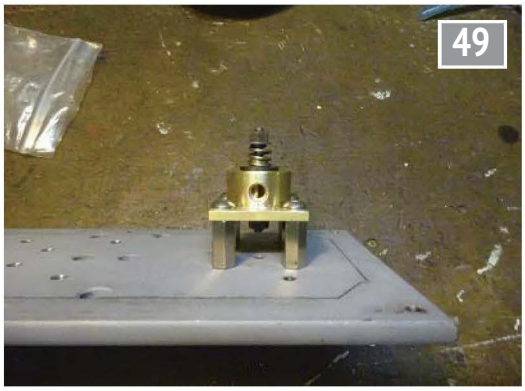
To operate the valve a long nut was glued onto the threaded portion of the valve and a shaft with a lock nut was screwed in place. A larger hand wheel than previously used was fitted to the shaft. The completed valve assembly was fitted onto the engine base plate (**photo 50**).

To improve the appearance of the valve shaft, a cover to fit over it was turned by hand (**photo 51**). More work would be needed on the reversing valve to connect pipes to it.

Lubricator

If the engine was ever to be run on steam it would be sensible to have some form of lubrication. I didn't want a lubricator fitted above the base plate, preferring one that was unobtrusive, which didn't appear to be a lubricator. It was decided that the lubricator would be fitted inside the wooden base and filled

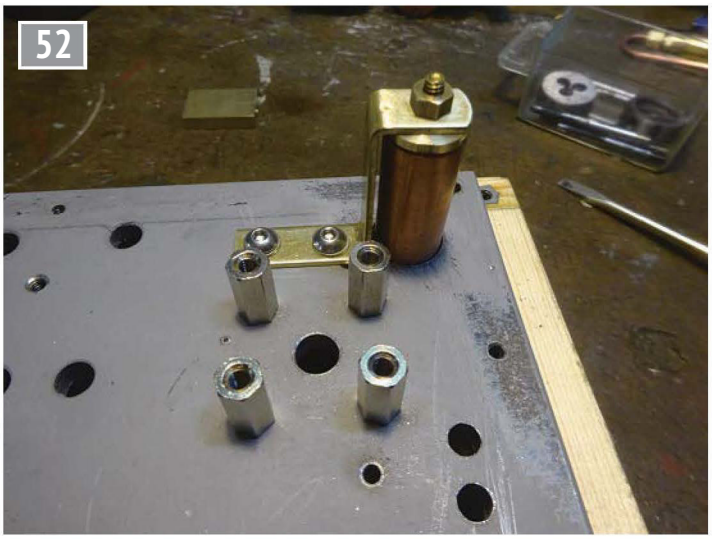
Reversing valve cleaned.



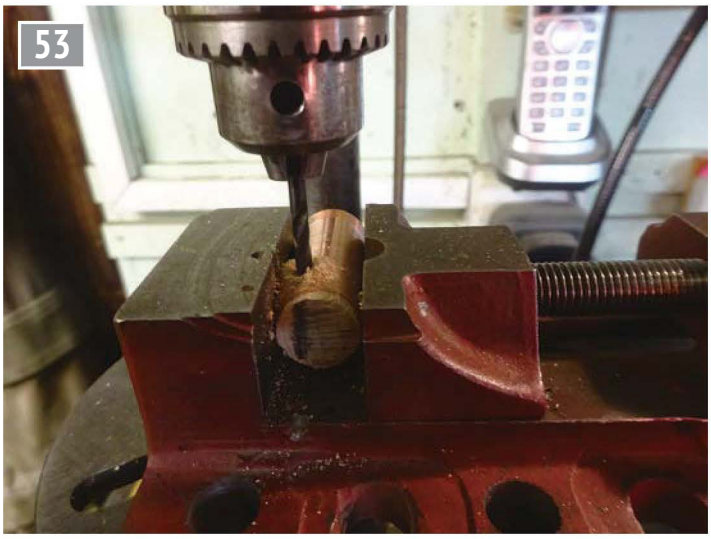
Columns fitted.

Valve fitted to base plate.

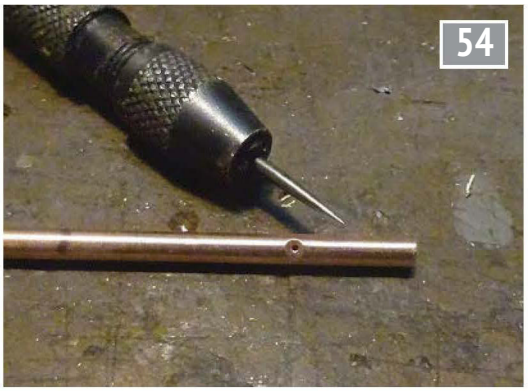
Reversing valve finished.



Lubricator bracket.

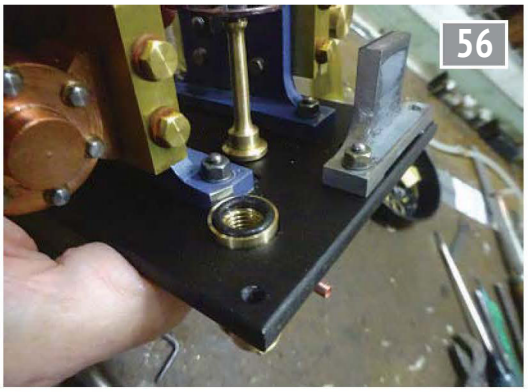


Drilling for the steam pipe.



Hole in the steam pipe.

Soldered together.



Top soldered in place.

Inverted supports.

Screw cover for the lubricator.

via a hole drilled in the engine base plate. As there wasn't very much room in the base to accommodate all that would be in there, it was decided that a dead leg displacement lubricator would be the most compact. I am not very fond of drain valves on lubricators as they can be quite messy in use. I prefer to remove the water from the lubricator from its top using a syringe; the advantage, I feel, is that it is possible to just remove the water, leaving the unused oil behind. To allow the syringe to get to the bottom of the lubricator the steam pipe needs to be off-set. But before starting on the lubricator itself a 16mm hole was drilled through the engine base plate to accommodate the 15mm copper tube that would be used for the body of the lubricator.

Some of the corner reinforcement of the wooden base had to be filed away to give clearance for the copper tube. More clearance was needed above the engine base plate, namely removing the corner of one of the cylinder brackets.

The base of the lubricator was made with a securing thread at its centre. A bracket was made to secure the lubricator to the engine base plate (**photo 52**).

How was the off-set hole for the steam pipe drilled in the copper tube? First, a wooden plug was fitted in the copper tube and an under-size hole was drilled square to the tube. The tube was then turned in the vice to create the off-set and the hole drilled through (**photo 53**). The wooden plug was burned to remove it.

To make the small hole in the steam pipe, a small round file was used to partially file through it, then a needle was used to create a small hole (**photo 54**).

One end of the steam pipe was sealed, the holes in the copper tube were enlarged with a broach to fit the steam pipe and then the lubricator body, its base and the steam pipe were hard soldered together (**photo 55**).

The 'O'-ring recess in the top part of the lubricator was turned by hand. The top of the lubricator was hard soldered in place and the now completed lubricator body could be screwed to the engine base plate (**photo 56**).

Some of the commercially made spacers were screwed together to hold the engine upside down to work on it (**photo 57**).

A cover fitted with an 'O'-ring was made for the top of the lubricator (**photo 58**) and a brass nut was hard soldered to the lubricator cover, so it could be tightened in place

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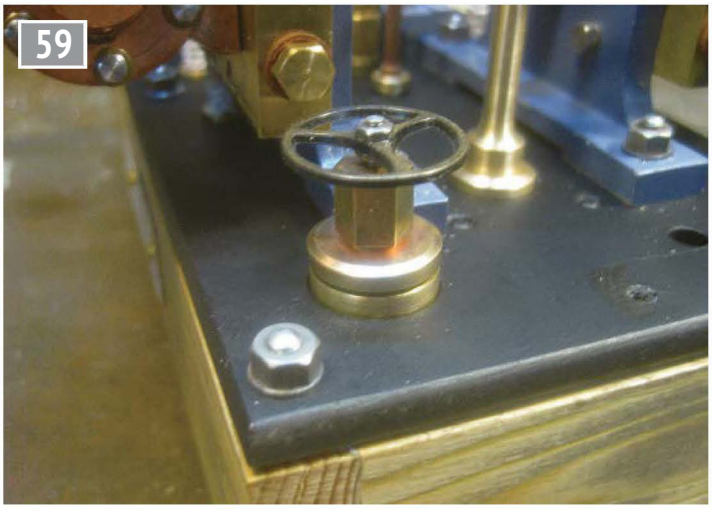
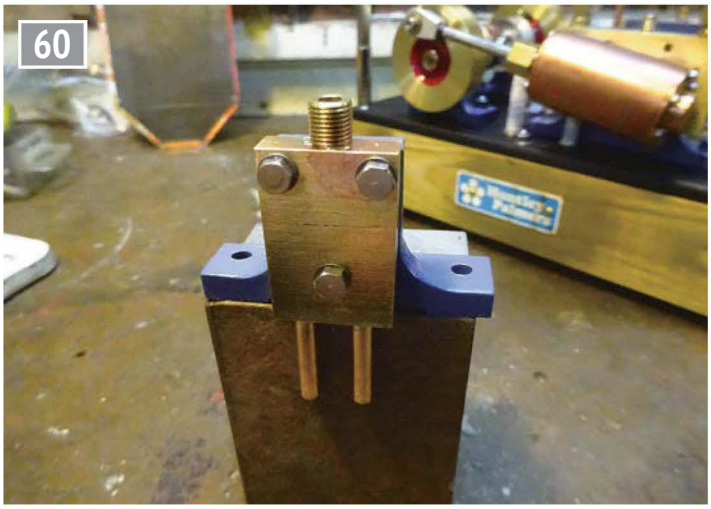
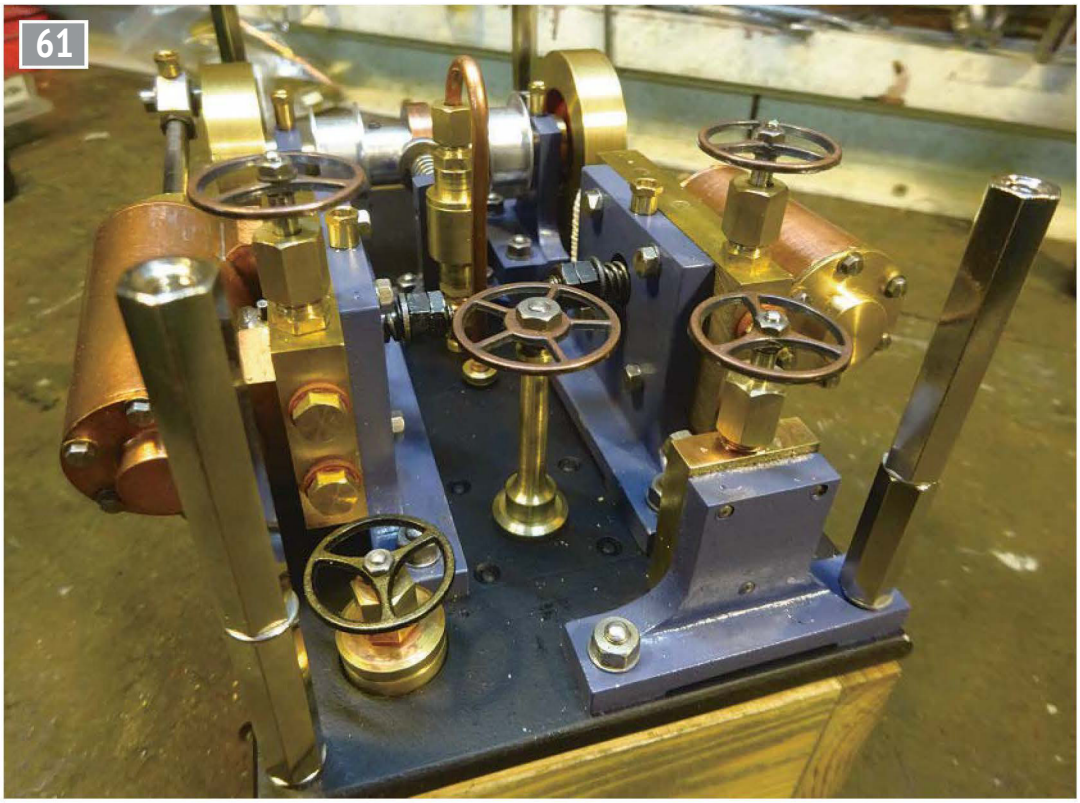


Lubricator finished.



Regulator.



Regulator fitted.

and removed. To finish off and alter the appearance of the lubricator, a hand wheel was fitted to its cover (**photo 59**).

Regulator and finishing

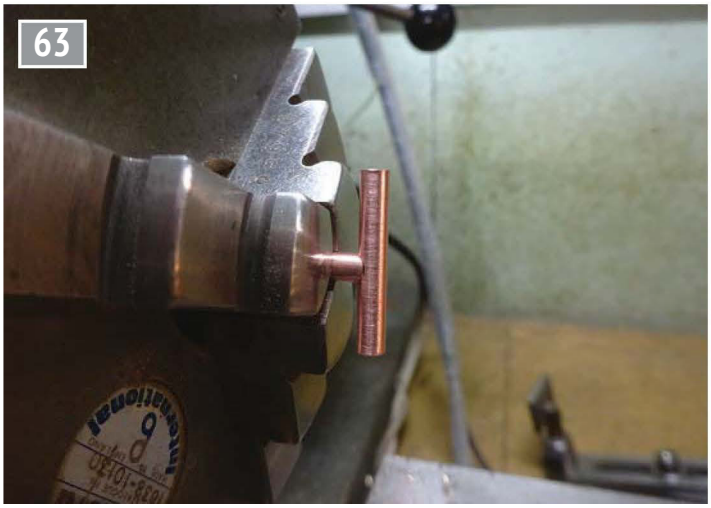
The same type of bracket that had been used for all the other fittings was made to hold the regulator. The construction of the regulator body is very similar to that of the cylinder port block with its warm up valve. It was attached to its bracket and when fitted to the engine the steam pipes will go through the engine base plate (**photo 60**).

With its valve rod, gland nut and hand wheel fitted, the regulator assembly was fitted to the engine base plate (**photo 61**).

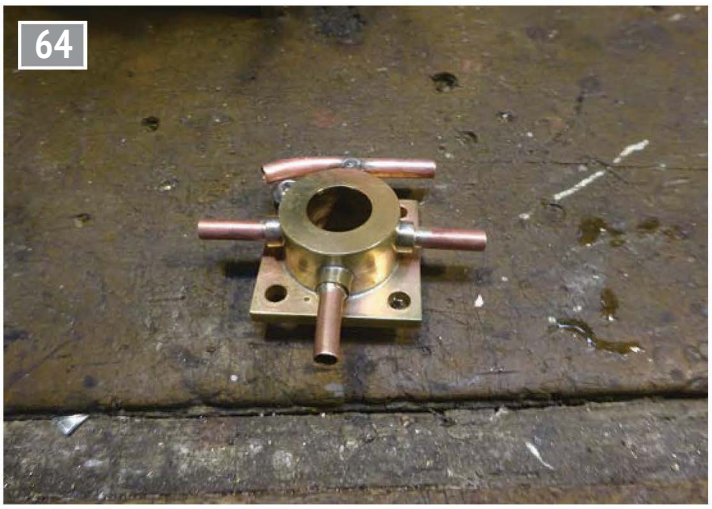
As yet, there was no means of connecting a pipe to the reversing valve so three inline connectors were made.

Also needed were three 'T' connectors; two to connect

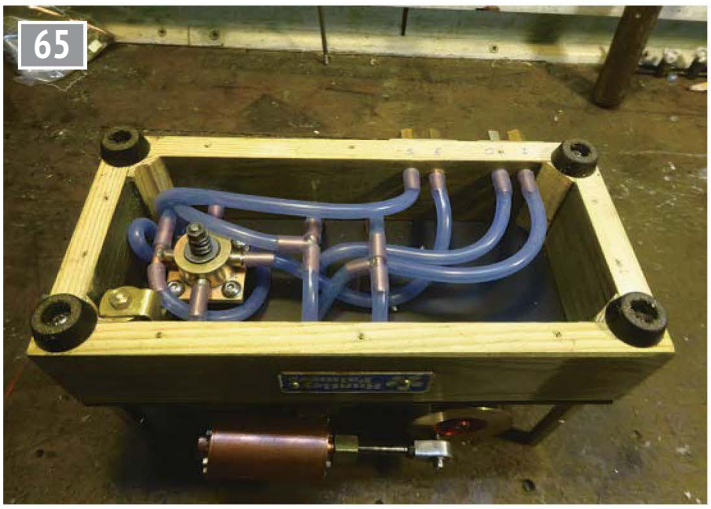
'T' connector parts.



Wringing 'T' connector parts together for soldering.



Reversing valve with connectors.



Pipe work.

Cover.

the cylinder steam pipes and another to connect the steam pipe from the regulator to the lubricator and the reversing valve. These connectors were made from two pieces of 5/32 inch K&S copper tube, one 20mm long the other 10mm long, the longer length being filed half way through with a round file and the shorter length having a slight taper filed on one end (**photo 62**).

The shorter length of copper pipe was mounted in a lathe chuck with its tapered end outwards. The hole in the longer length pipe was presented to the pipe held in the chuck and pushed onto it while slowly moving the chuck back and forth. With any luck this would hold the two pieces of pipe together well enough for them to be soldered (**photo 63**).

With the 'T' connector soldered together and cleaned up, a round file was used to remove any projections of the shorter pipe into the longer pipe. Finally, being turned by hand, a drill was run through both pipes to remove any further debris.

The reversing valve had three straight connectors and one 'T' connector soldered to it (**photo 64**).

With the engine base plate fitted to the wooden base, the silicone tubes could be fitted to both the water and steam unions in the wooden base (**photo 65**).

A cover was made to house the silicone tubes in the wooden base and it seemed appropriate to use a part of the biscuit tin to make this cover (**photo 66**).

After about four months of on and off work, the bits found in the biscuit tin have been made into a reasonably attractive stationary engine that works well and is quite powerful. When a suitable boiler large enough to power it is available, it will be run on steam. The finished engine with 'Owen the Oil' in charge is shown in **photo 67**.

Well, it was an unexpected, inexpensive and interesting build with, I think, a reasonably attractive model at its end.

Finished.

ME

CLUB NEWS

Geoff Theasby reports on the latest news from the clubs.

This is a significant issue! Not the 100th, or the 25th, but the 4735th. As we humans look for meaning in all things, the supposedly numerically significant are noted, often with a special event. In reality though, one number is no more meaningful than any other. The cabside number on locomotives is only a serial number. 4472 is not famous because of its number, it only became so after the number was allocated, 'the next on the list'. It was the locomotive which attained fame, not the number. Similarly, 4F No. 44444 had nothing of note about it. Some people believe strange things at times. The Flat Earth, for one. (If the Earth were so, the cats would have pushed everything off the edge by now.)

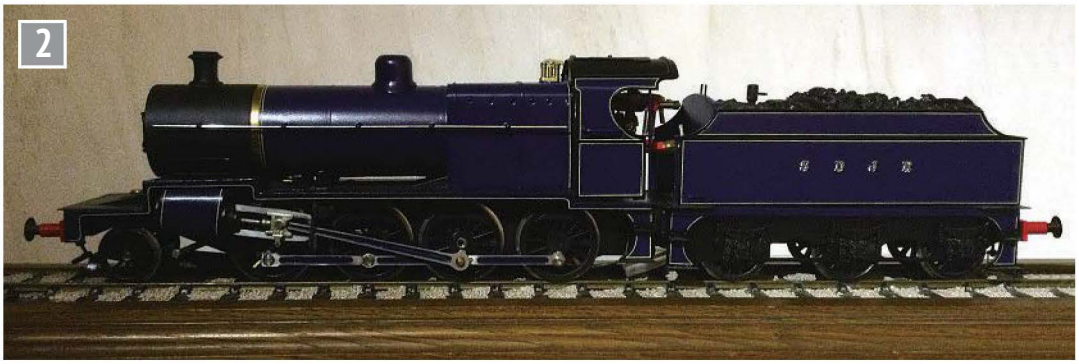
At the doctor's yesterday, there was some sort of machinery running, including a slow metallic stamping noise, about once per second. Speculating on its purpose, I thought… automated flu injection - line up the vict... patients and set it going, like an automatic brick-laying machine, or a rhythmic prostate examiner? Perhaps blood tests *en masse?* Sample collection While-U–Wait? A surgeons 'pound of flesh' examiner.? I've got it! Anaesthetics tester! "Can you feel this?" Thunk. "How about this?" **Thunk. "**On a scale of 0-10, ….."

In his issue, not counting the above (I'll just have the one cup next time….), numbers, new editors, Movember, numbers, consolidation, a world class collection, non-magnetic engines, P.G. Wodehouse, numbers, patent medicines and small cars meet small engines. Did I mention numbers?

I begin this latest farrago with Graeme Quayle reporting on **Model & Experimental Engineers, Auckland** activities for November, Murray Lane having retired from the editorship and Graham having assumed the position. Ray Brown is building a Fowler Z7 ploughing engine from the articles in *Model Engineer* in the 1980s. He is certain that the author did not build the model as several items contradict in reality. Brian Baker discussed carbide tools, advising that they are intended for deep cuts on lathes with plenty of power and the normal model engineers' lathes won't do. Chris showed a portable coffee maker. It has a capacity of one cup, but otherwise seems like an ordinary cafetière. Michael Cryns has a 'Grande Sonnerie' striking clock, in a travelling clock style. It sounds the chimes at the quarter hours and has an alarm, and is quite complex. It was made in France in the 1800s. Murray has almost finished his Monosoupape engine and a series of photos show its development. Fine work Murrray!

Shoulder to Shoulder reaches its 100th edition! **UK Mens Sheds Association** is proud to announce this and thanks all the volunteers and others who have made Mens Sheds so successful. The Woodwork and Powertool Association show in Harrrogate sounded interesting but I was not aware of it at the time. Apparently, the woodwork fraternity and model engineers do not mix and I think they should. UKMSA had a stand and met 43 shedders from 16 sheds. Maybe it was the free Kit-Kats! Chris Lee (Letchworth shed) writes on 'Movember'. In the spirit of its origins, rather silly, this involves growing the most outrageous facial topiary in support of Mens Health. Long live silly! Chris has form in this matter, once winning a moustache growing contest. He won a moustache-shaped doormat to prove it. He

Denver & Rio Grande C-19 (Gauge 1 Newsletter & Journal).



Somerset & Dorset 2-8-0 (Gauge 1 Newsletter & Journal).

Martin's P2 at the FMES rally (photo courtesy of Phil Weaver).

persuaded his fellow tenors in the local choir to join in, which they did, but have since declined to repeat the exercise. A number of photos depict Chris in a variety of neatly trimmed fizzogian shrubbery, but not yet a set of 'Bxxxxxx's Grips'.
W. www.menssheds.org.uk

Gauge 1 Newsletter & Journal, December, from the **Gauge 1 Model Railway Association**, is as good as ever. The cover pictures a young Danish enthusiast, Jonas Lundsfryd, firing a locomotive on the rolling road at the Danish Model Railroaders Union Exhibition in Copenhagen. As this is N&J No. 280, a bit of number crunching enables editor, Rod Clarke, to focus on the 'Consolidation', a 2-8-0 wheel arrangement under the Whyte notation, Among the many photographs are these two (**photos 1** and **2**) from the Denver & Rio Grande C-19, and in contrast the clean lines of the Somerset & Dorset version. John Boyson discusses BR Mk 1 carriage designing and 3D printing, whilst Alan Beasley is taken to his 'Leader'. Tony Armstrong makes clerestory coaches, Hans Wierenga deals with a broken steam pipe and Peter Davis builds a freelance 'Storkleg' 2-2-2 toy to a design from the early 20th Century. John Perkin tries a Redlake tramway engine. The originals ran between Bittaford and Redlake on Dartmoor from 1911 to 1932. Editor Rod visited a very large Gauge 1 collection at the Workshops Rail Museum in Ipswich, Queensland, Australia. It was the largest single private collection in Australia, possibly the world. There are maybe 3,000 models. See collections.qm.qld.gov.au/highlights/modelrail/objects and www.youtube.com/watch?v=87A2LvFCTPg. Not forgetting the everyday infrastructure, Clive Young makes a gallows lattice post signal.
W. www.g1mra.com

FMES rally, anonymous Class 20 & inspection carriage (photo courtesy of Phil Weaver).

The Frimley Flier, November, from **Frimley & Ascot Locomotive Club**, opens with two fine photographs from their recent hosting of the Federation of Model Engineering Societies Rally, a P2 by Martin Parham of Maidstone MES and a Schools by Paul Norrington of Romney Marsh MES. The P2 was awarded winner by all three judges in the rally 'beauty contest' (**photo 3**) and I also liked the anonymously driven Class 2 with inspection coach**.** Such coaches are rarely modelled, in my experience (**photo 4**). Brian Garland writes on track calculations, i.e. rail cant on curves and with respect to speed limits. Editor Andrew Douglass has built a 3½ inch gauge Princess Marina and a 7¼ inch gauge BR Class 2 tender locomotive and is currently proceeding slowly with a 7¼ inch gauge Adams radial tank.
W. www.flmr.org

The **Society of Model & Experimental Engineers**' sub groups have recently been busy. Matthew Waterhouse spoke on automotive R-R engines, with an enjoyably comprehensive video tour of the factory. One highlight was a Foden-designed, all aluminium engine with a copper cylinder head (non magnetic) for minesweepers.
W. www.sm-ee.co.uk

The Link, November-December, from **Ottawa Valley Live Steamers & Model Engineers,** opens with Graham Copley's 5 inch gauge *Florence in the Garden*, an Emmett. Note the Diane Carney nameplates. Editor Graham's 'Track Report' gave lots of

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Rio Grande 'Mikado' (SAG Catalogue).

Brass kit road locomotive (SAG Catalogue).

information in graphical form, quite different from the normal club presentation. The late Roger Leigh's garden railway has been acquired by the club. Many members are keen garden railway enthusiasts so an extended Gauge 1 track will be welcomed. (I must say that the woods through which the 5 and 7½ inch gauge track runs are green and lush in the newsletter photographs. It appears to be a very enjoyable track. - Geoff)
W. www.ovlsme.com

On Track, December, from **Richmond Hill Live Steamers**, reports on the CPKS *Holiday Train*, a month long, trans-North America, fund-raising charity train organised by the CPKC, formed from a merger of Canadian Pacific and Kansas City Southern Railways. It claims to be the first and only transnational railway network in North America. To date, the Holiday Train has raised $22million for charities.
W. www.richmond-hill-live-steamers.tripod.com

Norwich & District Society of Model Engineers' winter *e-Bulletin* has Barry Steel's *Boxhill* on the cover. One of the long-gestating models, it has taken 40 years to complete. In an article by Janet Steel, who writes, due to Barry's ill heath, he was unable to complete the model but new member Malcolm Pettitt, who has experience in building 'Terriers', took it on and has and now finished it, to the pleasure of all concerned. In Engineering in Art, one of Claude Monet's paintings of Gare Saint Lazare in Paris is discussed. More commercial art features the Train Guard, who, it is suggested, takes *Dr Tibbles' Vi-Cocoa* (laced with cocaine, then quite legally), which was touted as brain food, restorer, pick-me-up, etc. (Not Mr. Mulliner's *Pick-U-Uppo* – Geoff) There was never any evidence found of his medical qualifications… (If I may digress, my childhood ills were treated with Fenning's Fever Cure, which tasted thoroughly vile. Not surprising since it was dilute Nitric Acid, with no therapeutic effect, unless it was to deter us from claiming to be ill.)

Bournemouth & District Society of Model Engineers' December *B&DSME News*, contains the unwelcome news that editor Brian Merrifield is editor no more. No one has yet stepped up to replace him. Thanks Brian for all your hard work. Furthermore, there is currently no treasurer. To whom will members pay their subs, and ensure the Society's insurance premiums are up to date? Above and beyond the call, etc. Mark Harris arranged to buy a locomotive advertised in the newsletter. When he arrived to collect it, and saw it 'in the flesh', he increased his offer. Mark, Sir, you are a gentleman. (There are not many of us left… - Geoff)
W. www.littledownrailway.org.uk

This is the saga of the struggle between the electric kettle and the circuit breaker, in which the kettle came off worst. Are you sitting comfortably? Then I'll begin.

I was drinking my morning coffee before the rigours of the day, surfing t' interweb (baht 'at) when the lights went off. Debs asked, "What have you been doing?" I was untangling some wires by my bedside cabinet last night but that was six hours ago. I consulted the distribution board in the basement (the workshop lights were still on) and found one circuit breaker out and it wouldn't reset. Returning to my bedchamber, I had a rest and thought for bit. What was the last electrical thing I used? Hmmm, the electric kettle? I unplugged it and returned to the basement where the RCB would now reset. Bingo! So, Household Technical Consultant strikes again! Remotely diagnosing an electrical fault from my bed. "Oh, thank goodness you're here, HTC-man!"

Stockholes Farm Miniature Railway, December newsletter, begins with an apology from proprietor Ivan Smith. Normally, other railway company's products do not sully the fine lines of the LMS (it says here) on his railway, but he allows an exception for the Great Western or Great Central at times. More depressing news, in the November storms, the cutting and the tunnel were flooded (the site is only a few feet above sea level). A return visit by the *Micro Maniacs,* North Lincolnshire Bubblecar Group, enjoyed their day, in which the model locomotives were not the ones that looked out of scale.

In the Sheffield auctions, a number of 'O' gauge, Gauge 1, 'G' scale and 'LGB' live steam locomotives and rolling stock were offered in the first 100 lots, including a live steam 3½ inch gauge 0-4-0 Hunslet and a live steam 2-6-4 LMS 4MT locomotive, asking price around £2,500 plus for each. If you fancy a bit of restoration, an Aristocraft ,'G' scale 2-8-2 Denver & Rio Grande locomotive with the electronics and other bits missing, is offered with a guide price of £80-120 **(photo 5).** An all-brass kit-built live steam road tractor is available for a similar price **(photo 6).** Other similar models**,** as unmade kits**,** are also listed. A railway clock by Potts of Leeds marked 'BR_E' (LNER on the back) may set you back about £150-250 but an LNWR example by Joyce rather less. The usual 'OO' gauge offerings follow. I could fancy the Rio Grande model but I have just bought another oscillloscope.

And finally, the children of Israel wandered the desert for 40 years. Even then, men wouldn't ask for directions! (Numbers 14:34)

ME

Club Diary 1 February 2024 – 25 March 2024

February

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

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

4 Warrington & District MES
Running day at the club track. See www.wdmes.org.uk/events

7 Bradford MES
Talk – Derek Rayner, 'Leeds Engine Builders', Saltaire Methodist Church, 19:45. Contact: Russ Coppin, 07815 048999

11 Sutton MEC
Track Day from 13:00. Contact: Paul Harding, 0208 254 9749

11 Warrington & District MES
Running day at the club track. See www.wdmes.org.uk/events

15 Warrington & District MES
Talk: Michael Moore on 'East Lancs Railway', St Mary Magdalene Church, WA4 3AG, 20:00. See www.wdmes.org.uk/events

18 Warrington & District MES
Running day at the club track. See www.wdmes.org.uk/events

21 Bristol SMEE
Talk: 'Meccano Model of the USS Missouri', Begbrook Social Club BS16 1HY, 19:30. Contact: secretary@bristolmodelengineers.co.uk

25 Warrington & District MES
Running day at the club track. See www.wdmes.org.uk/events

March

3 Warrington & District MES
Running day at the club track. See www.wdmes.org.uk/events

6 Bradford MES
AGM, Saltaire Methodist Church, 19:45. Contact: Russ Coppin, 07815 048999

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

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

10 Sutton MEC
Track Day from 13:00. Contact: Paul Harding, 0208 254 9749

10 Warrington & District MES
Running day at the club track. See www.wdmes.org.uk/events

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

17 Warrington & District MES
Running day at the club track. See www.wdmes.org.uk/events

20 Bristol SMEE
Talk: 'Goliath, a model of a 1903 French tug boat', Begbrook Social Club BS16 1HY, 19:30. Contact: secretary@bristolmodelengineers.co.uk

21 Warrington & District MES
AGM. See www.wdmes.org.uk/events

22 Warrington & District MES
Running day at the club track. See www.wdmes.org.uk/events

25 Sutton MEC
Afternoon run from 13:00. Contact: Paul Harding, 0208 254 9749

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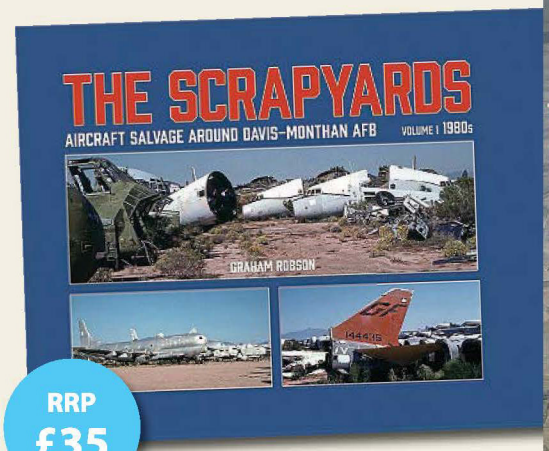

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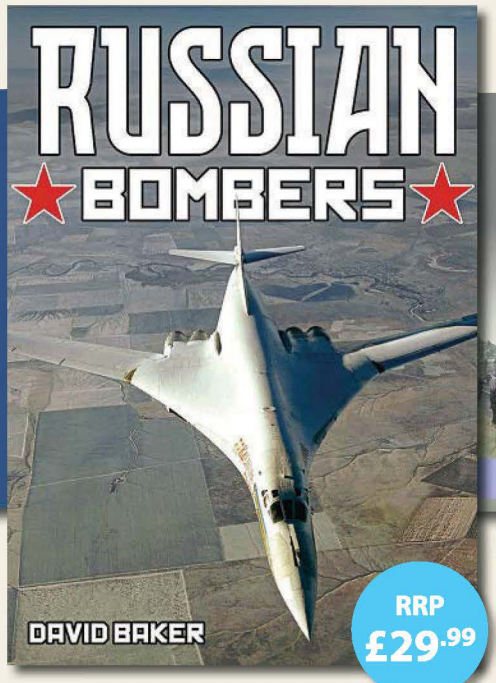

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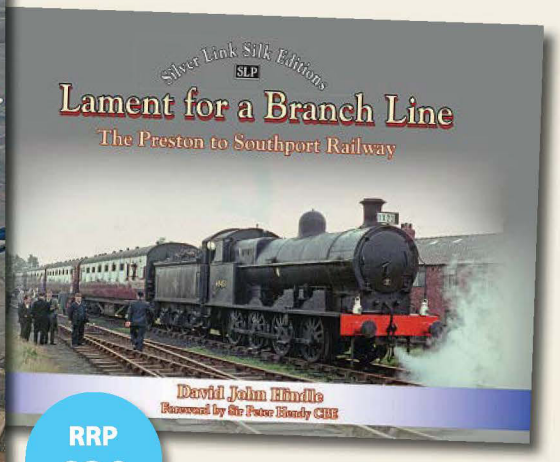

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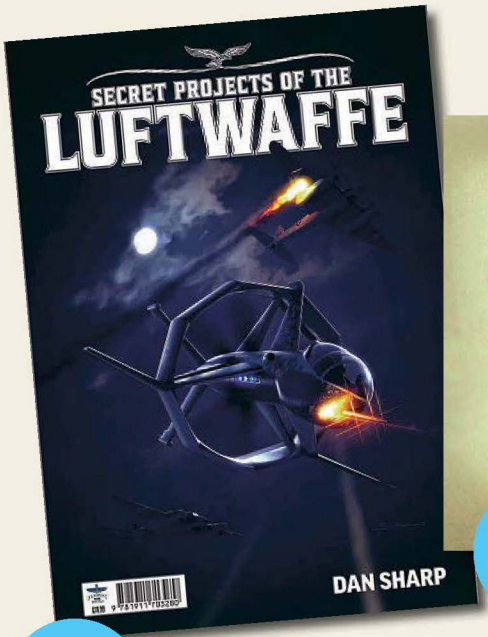

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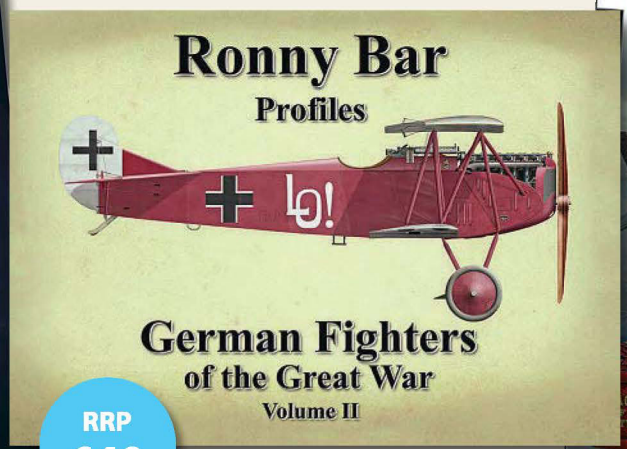

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