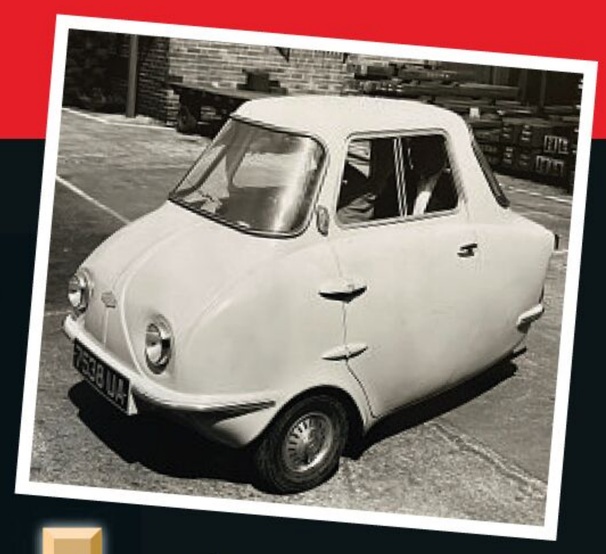
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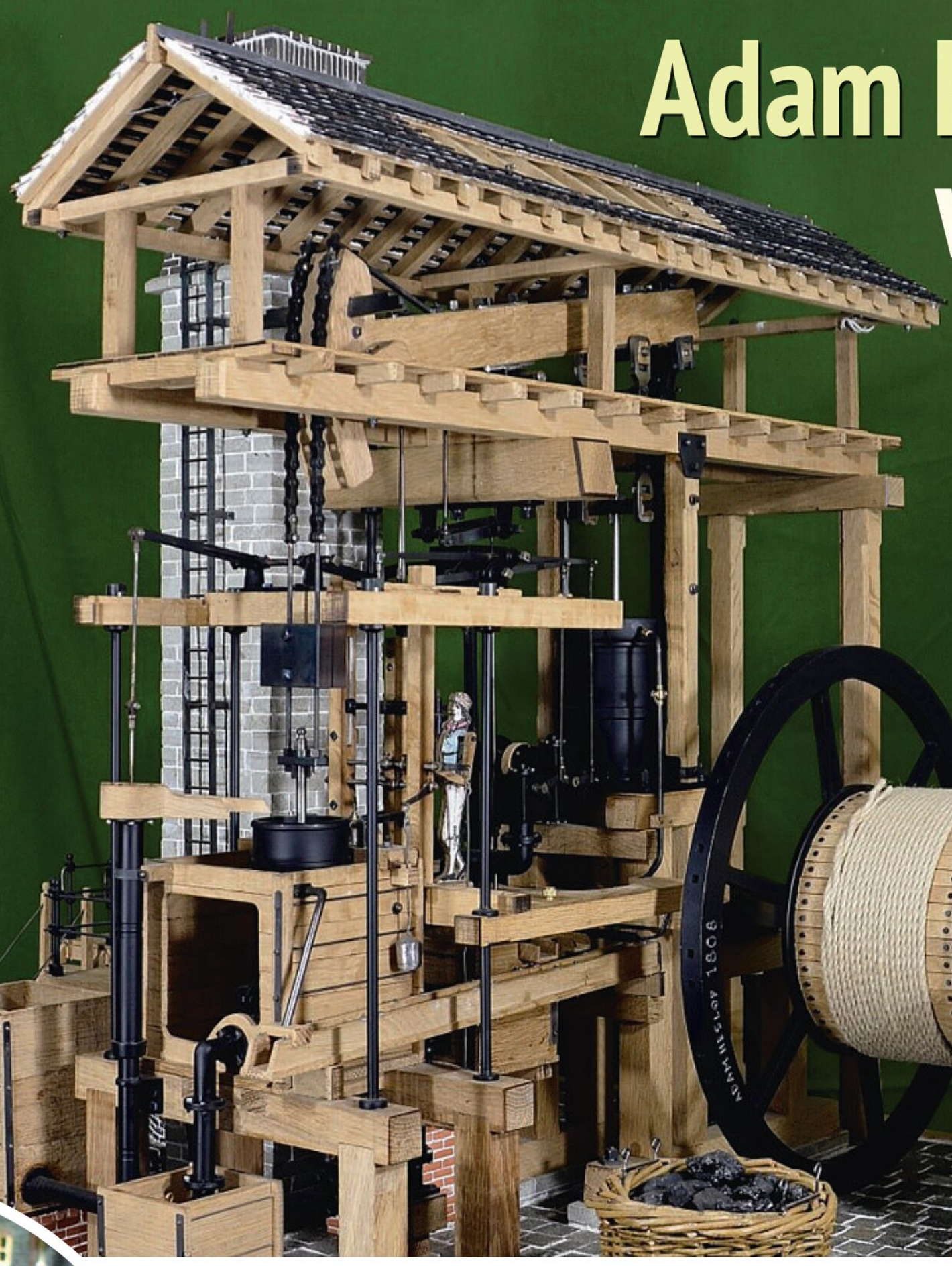
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Adam Heslop's winding engine





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Platforms for a 5 inch gauge model

Garden Rail

Getting going with the garden gauges

Clock Case

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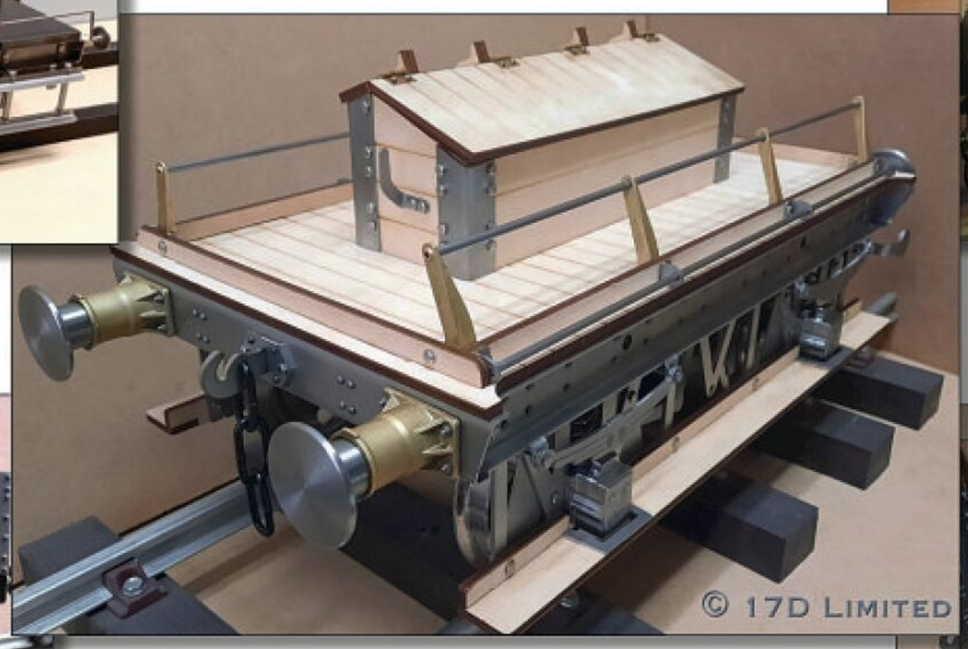
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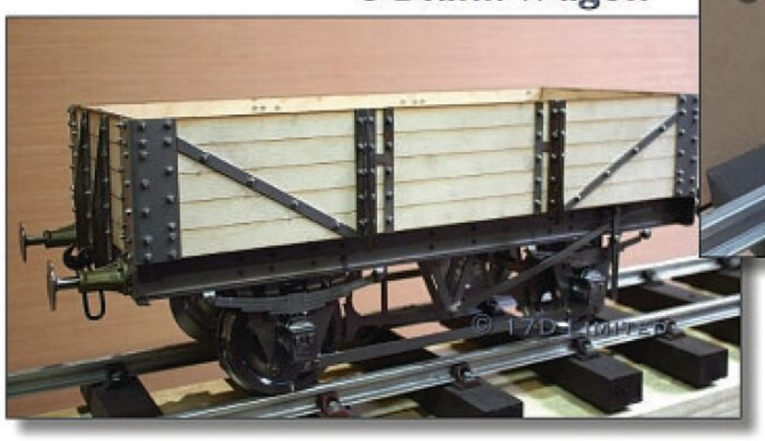
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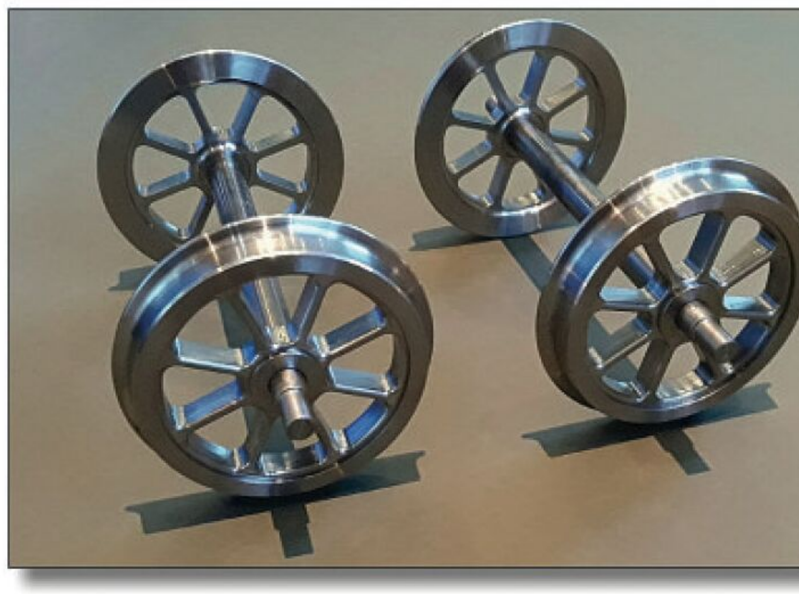
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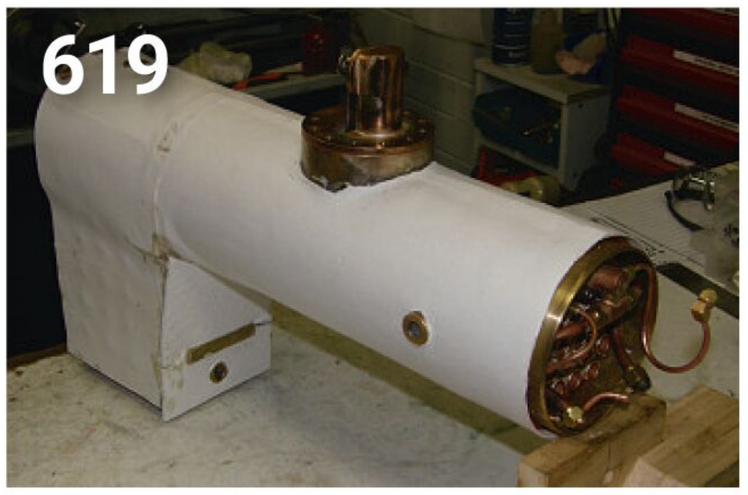
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Adam Heslop's winding engine of 1806 built by David Hulse to one sixteenth scale (photo by David Hulse).

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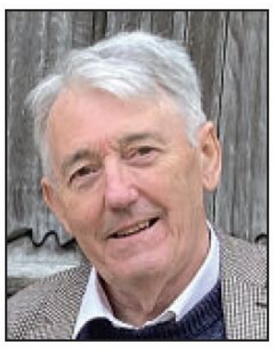
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Atmospheric Engines

I know many readers have been following with interest Ron Fitzgerald's excellent series on the development of the steam engine. Up to now, of course, the story has really been that of the *atmospheric engine*, rather than the steam engine, as in the former case the power is derived from the pressure of the atmosphere acting on a cylinder evacuated by condensing steam. The story is now moving into the realm of the *real* steam engine, where the power comes from the pressure of high-pressure steam and Ron's series will soon move onto the story of Richard Trevithick's development (and patenting) of the high pressure steam engine. It was this development that made the steam locomotive a viable proposition as a high-pressure steam engine requires much smaller cylinders than an atmospheric engine.

The story of the atmospheric engine spans more or less the whole of the eighteenth century, from 1712, when it was invented by Thomas Newcomen. It was later improved by James Watt with the addition of the separate condenser. All this will be familiar to readers of Ron's series!

David Hulse has spent much of the last half century building one sixteenth scale models of eighteenth century engines, covering the entire history of atmospheric engines. He presents them in this issue, starting on page 629. These engines were used mostly for pumping and winding in mines and were generally built into the engine house. The authenticity of David's models extends to the construction of the buildings using individual bricks – by the thousands. I saw one of David's models at the Midlands Model Engineering Exhibition a few years ago and I can confirm that they are indeed very impressive pieces of work. You can see all the models at the Dartmouth Museum. If that is too far to go there are lots of good photographs on David's website. More details are available in David's article.

Thermodynamics and More

Many years ago I had the good fortune to study for an engineering degree. You could argue that what you learn in an engineering degree is not *actual* engineering but rather the science behind the practice of engineering – more slide rule than spanner. Perhaps the course should more properly be called 'engineering science', as indeed it is at Oxford (I wasn't at Oxford – the other place where I studied called it simply 'engineering', although it had originally been called 'mechanical sciences'). Nevertheless, I spent many happy hours in the thermodynamics lab running various gas engines, dismantling diesel engines and throwing coal into a furnace. All in the interests of science of course as were trying to determine the efficiency of the engines and compare them to the theoretical maximum. My university had a very nice collection of various kinds of engines – almost as good as the London Science Museum – so it was a fascinating place to be.

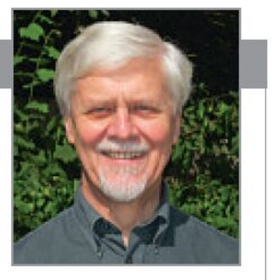
What I didn't realise fully at the time was how recent a lot of the science underpinning engineering is. I suppose we all thought it was engraved in stone. Electromagnetic induction, for instance, had only been discovered 140 years before (1831) by Faraday (and also by Henry, in 1832). Consequently, electric current could be generated rather than derived from voltaic piles (did you know that the word 'battery' was coined by Benjamin Franklin?). Current electricity, when I was a student, had only been generally available for a century or, for many, far less than that – when I was an infant our house was lit by gas. The science of thermodynamics was only about a century or so old when I studied it and – like many areas of engineering science – was formulated after the creation of many of the machines depending on it. (I believe I have 'smoked' this subject before…)

We spent some time proving that ancient rules of thumb were actually correct. For instance, the medieval cathedral builders had what was called the 'middle third' rule. They used geometrical methods to plot the lines of force through structures to ensure that what they were building would stay up – it was vital that these lines did not leave the confines of the stonework. In particular, a column would only be stable if the lines of force passed through the middle third of the cross section of the column. Otherwise it was at risk of buckling. I remember Mr Frankl taking us through the mathematics and – lo and behold! – the middle third rule is exactly correct. Our mechanics lecturer demonstrated mathematically how the trailer of an articulated lorry should be loaded to avoid the hazard of 'snaking' where the trailer becomes uncontrollable – well known (I imagine) to any haulier but nice to have it confirmed mathematically.

Practical engineering does not always precede the elucidation of the science though. A nice example is orbital mechanics. The principles were established by Isaac Newton in the seventeenth century and elaborated by Halley (of the comet) and Gauss, amongst others. Its application to engineering, though, had to wait until the twentieth century when it was used to take men to the moon and to sling shot the two Voyager probes out of the solar system and into deep space.

So – engineering and science – chicken and egg – which came first? Hard to answer as each inspires or begets the other. Perhaps, as in the riddle, there is no simple answer - it depends on which chicken, or which egg, you're referring to.

An Admiralty Case for a Regulator PART 1



Adrian Garner makes a simple but good-looking case for a regulator timepiece.

The regulator timepiece is a popular workshop project both for horologists and model engineers. The design needs only a few wheels to be cut and has the added appeal of precision time keeping. Many descriptions of their construction have been published in the *Model Engineer* as well as other journals (**table 1**).

The emphasis of most of these articles has been on the mechanism. The case, usually of classic shape, has nearly always been described last and often in far less detail. This is unfortunate. The case needs to be attractive to display all the work put into making the mechanism and, importantly, it needs to be rigid and allow access to the mechanism for setting up and adjustment. In many of the designs published access to the mechanism is restricted. Indeed, it is often more restricted than for the typical long case clock where the complete hood can be removed by sliding it forward.

This was obviously a concern when the makers of the regulator for the admiralty in Portsmouth set about their design as described by Derek Roberts (**ref 1**). In this design an extended hood consisting of the sides, door and top can be lifted out of the base unit leaving just the back and base secured to the wall. Normally only the door would be opened for winding but when required two people can easily lift off the hood using one hand on each handle and one on the top to ensure it is balanced. This makes access to the movement a pleasure.

Being a model engineer rather than woodworker, the design (**photo 1** and **fig 1**) does not involve dovetail joints or similar. There is a surprising amount of metalwork involved.



The completed admiralty case.

The bezel of the face on my regulator is 11.125 inches in diameter. The case dimensions will need to be increased if your

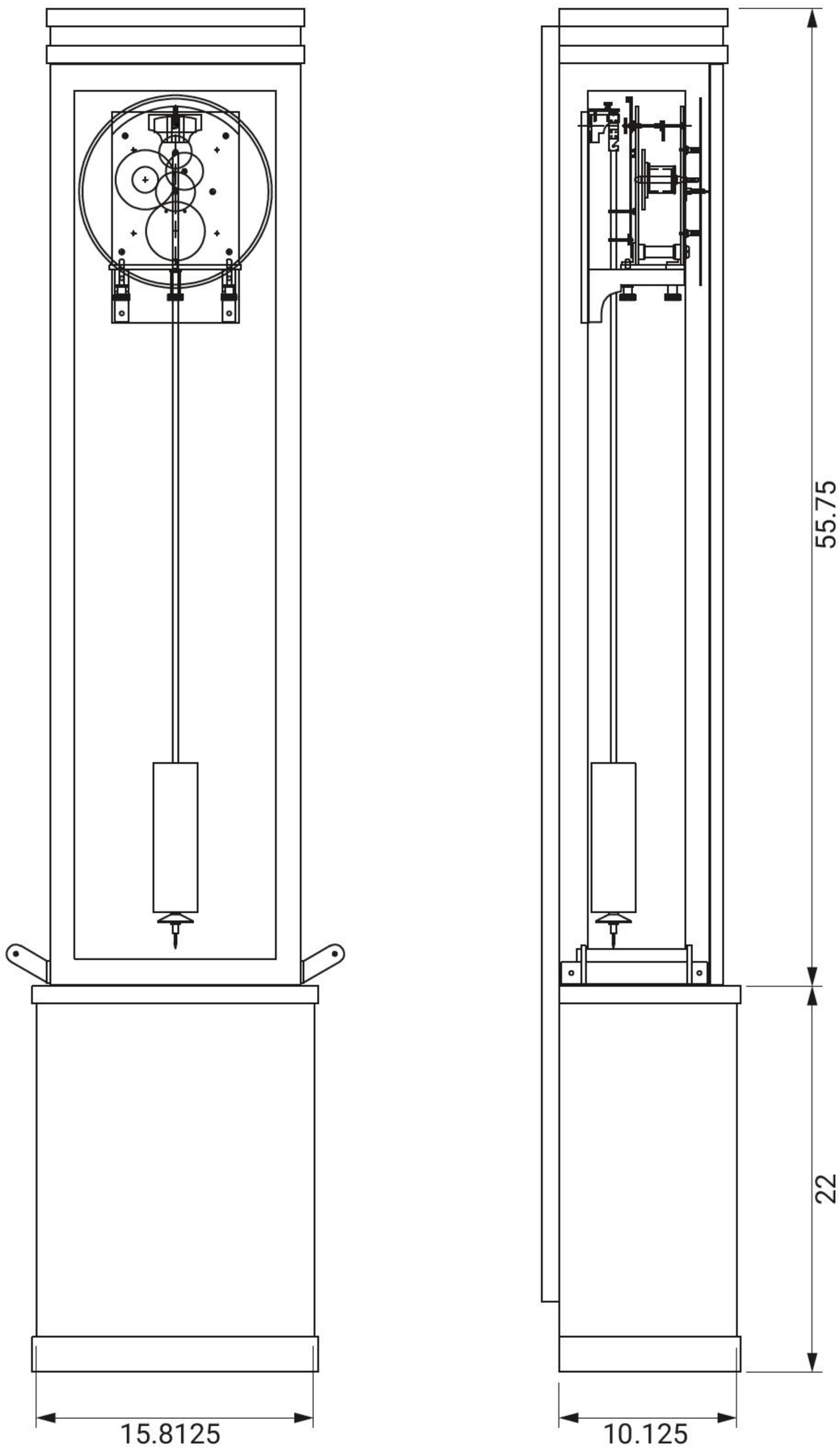
Table 1

Gravity Escapement Clock	Claude B. Reeve	*Model Engineer*	26 May 1960 to 21 July 1960
A Weight Driven Regulator Timepiece	Claude B. Reeve	*Model Engineer*	6 May 1966 to 7 October 1966
A Watchmaker's Workshop Regulator	Alan Timmins	*Model Engineer*	March 1981 to March 1983
An English Regulator, Machined and Constructed	John Wilding	*Model Engineer*	November 1981 to October 1982
A Regulator Clock	Peter Heinmann	*Model Engineer*	12 February 1999 to 24 September 1999
Month-going Regulator Clock	Peter Heinmann	*Model Engineer*	28 November 2002 to 11 July 2003
Making a Regulator to a New Design	John Reynolds	*Model Engineer*	January 2015 to February 2016

Examples of published construction series.

≫

Fig 1



Case General Arrangement

General arrangement.

bezel is larger. The maximum swing on a Myford lathe is 10 inches which has often been used as the bezel size in descriptions of regulators. This might look a little small in this case and, in my view, is a little 'mean'. Either the case dimensions could be adjusted or one could break out and use the milling machine to generate a larger face and bezel. (A description of how I did this for my regulator is with the editor of the sister magazine, *Model Engineers Workshop*.)

Construction

The back/base section of the case should be made first (**photo 2**).

The typical long case is essentially a box structure which provides rigidity to the back on which the mechanism and pendulum are mounted. In this design the back of the case is free standing and it is therefore essentially a beam supported at just one end (the base). Without further support it will bend. Such support could be provided by bolting the back to the wall at a number of points. Indeed all long cases should be secured to a wall at one point, at least, to avoid them being toppled over. It is, however, inconvenient to have to pass multiple bolts through the back into a wall in a domestic environment,



The base with the hood and regulator movement removed.

especially as most walls are neither flat nor vertical.

It is unclear from the pictures how the back of the Admiralty clock was supported. There are clearly visible bolts through the back of the case but it appears that the back was structurally rigid even when not against a wall.

To ensure rigidity I took two actions. First, the back consists of two plywood boards, one 12 x 1895 x 340mm and one



The C beams mounted on the back of the case.

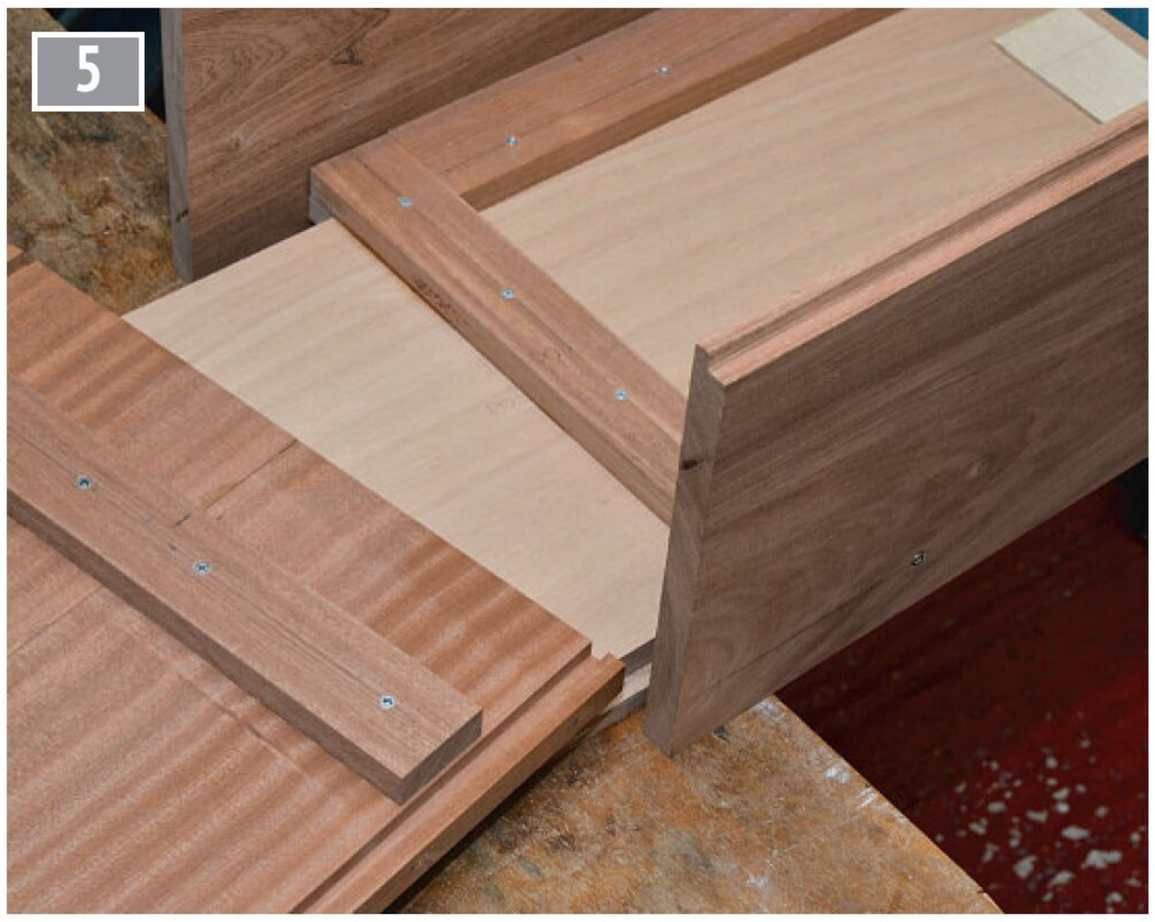
18 x 1895 x 321mm secured together by glue and screws leaving an equal lip on each side. Boards this size were too big for me to cut accurately from sheet material so I had them cut to size. Block board would be a good alternative and arguably more rigid and less inclined to warp.

Second, I have bolted two C beams to the rear of the back (**photo 3**).

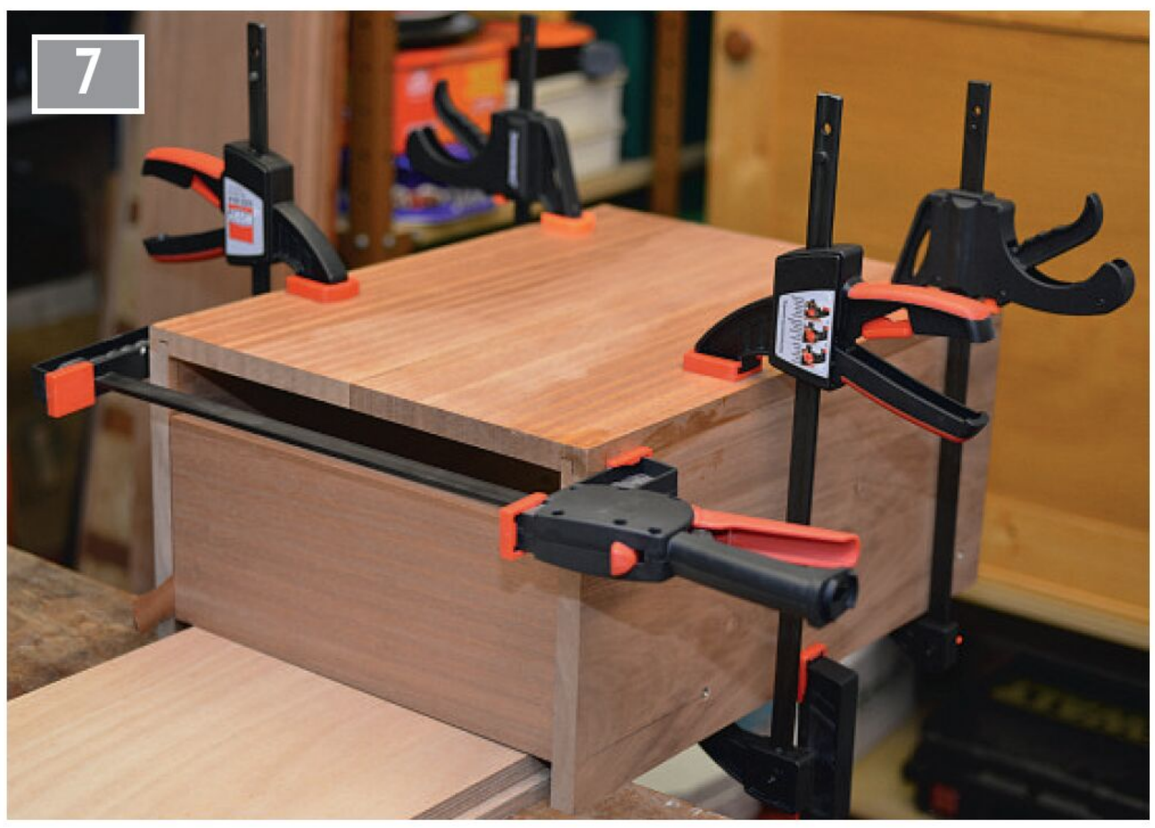
These beams are made from 2.5mm thick mild steel and measure 20 x 40 x 2.5mm. They can be obtained in two metre lengths (**ref 2**) and are easily cut with a hacksaw to the needed lengths. It is essential that these beams are



One of the C beam securing nuts with 6mm thread, turned brass washer and acorn nut.



The base sides, front and case back ready for assembly.



Lots of clamps needed to glue up the base. Note the temporary rectangle of wood wedged with veneer strips to ensure all remains square.

mounted with the open section of the C facing the case back in order to optimise rigidity. The suppliers of these beams can provide matching channel nuts threaded 6mm for this purpose. I used Loctite to secure short lengths of 6mm studding into these nuts which mate with turned brass washers and blackened acorn nuts at the front (**photo 4**).

I cut the beams about four inches short at the bottom to allow the case to be set back to the wall whilst avoiding skirting boards. In any event the iron work cannot be seen from the side as the C beams are hidden by two edging strips (see drawing).

It will be found that these C beams not only provide rigidity but also will correct most of any warp in the ply boards.

Base

I used 19mm 'planed all round' Sapele for the base structure (**fig 2**). The front of the base is too wide to be made from one board and so I glued two boards together with five No. 20 biscuits to provide strength. Before gluing these together, I routed the grooves on the sides of each to fit the tongues routed on each of the sides. This routing could have been done after gluing together but the boards are easier to handle whilst smaller.

The rails inside the base which support the hood were then cut, glued and screwed to both the rear of the front of the base and the case back. I also added the vertical supports to the back that secure the side panels of the base (**photo 5**). It will be noted that these extend over the back. One problem with not being able to cut my own ply sections is that the lower section of the back would ideally be wider at the base. This is not, however, a big problem. After gluing the base together, I cut ply filler pieces and glued these in place (**photo 6**).

A dry run fitting the base to the back established that all assembled correctly (**photo 7**).



The filler piece glued between the case back and base sides.

Four screws (two each side) were added to at this stage to ensure alignment during gluing.

A few notes about gluing the base to the back:

- At least five clamps are needed to ensure all is tight.
- As for the dry test, the case back needed to extend out over the bench to allow easy access. To avoid the whole over balancing the case back was clamped to the bench.
- To ensure all was square a piece of wood was cut dead square to fit the base. It was left slightly short allowing packing to push the base square whilst gluing.

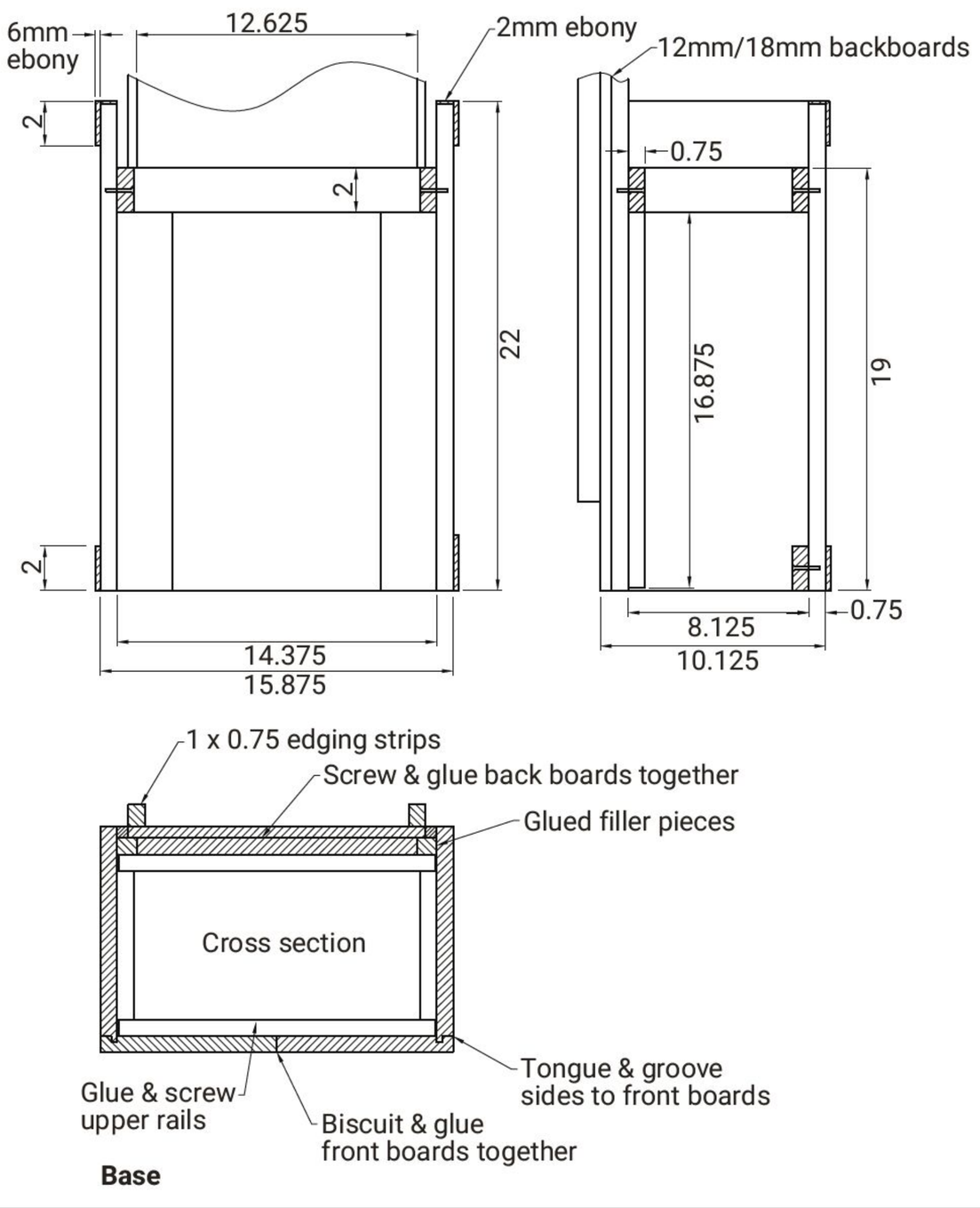
To be continued

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Ref 1 *English Precision Pendulum Clocks*, page 256, by Derek Roberts published by Schiffer Books.

Ref 2 Direct Channel Support Systems, www.directchannel.uk.com

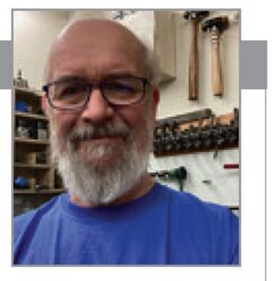
Fig 2



Base.

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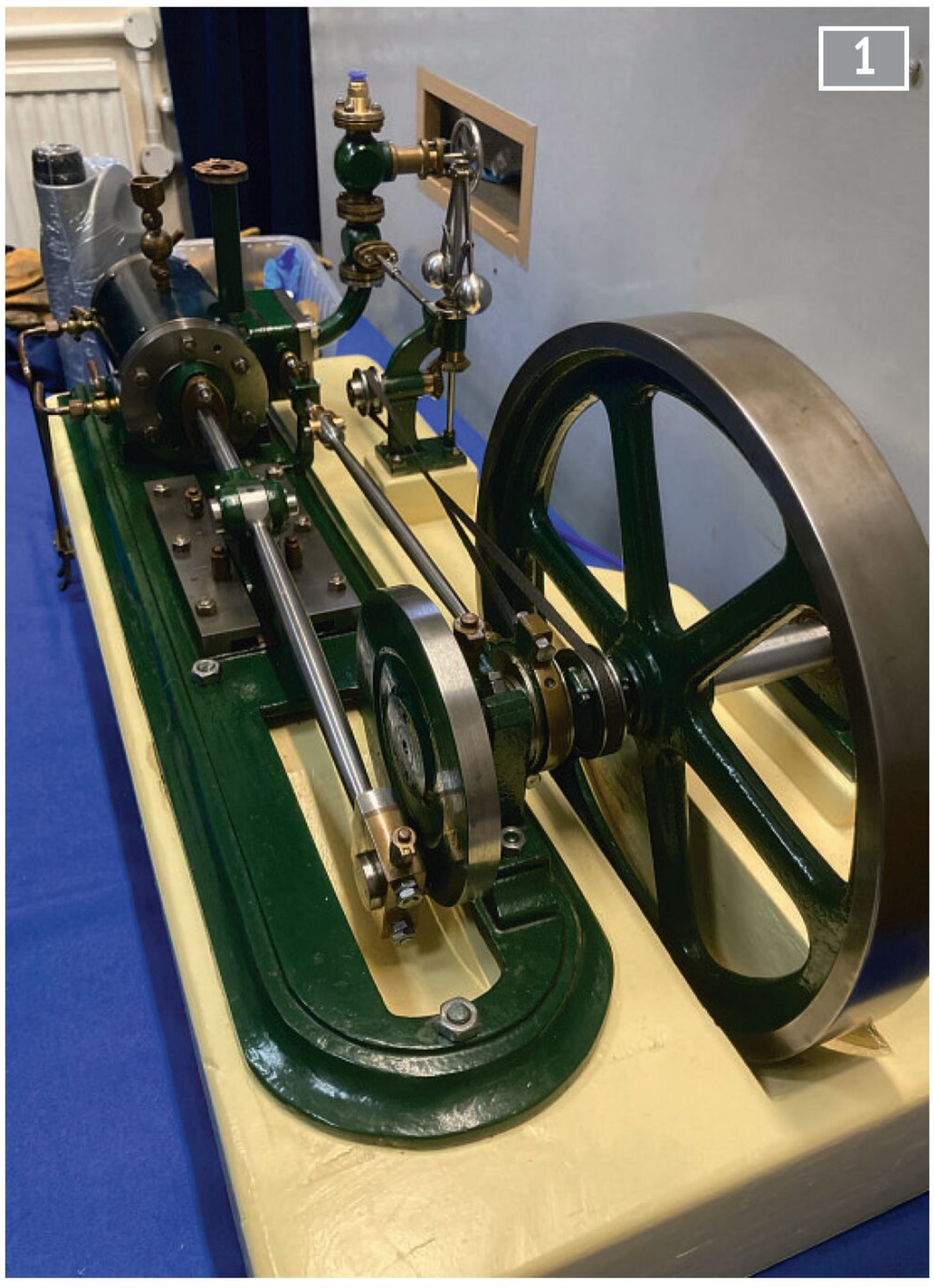


Martin Kyte has the latest from the Society of Model and Experimental Engineers.

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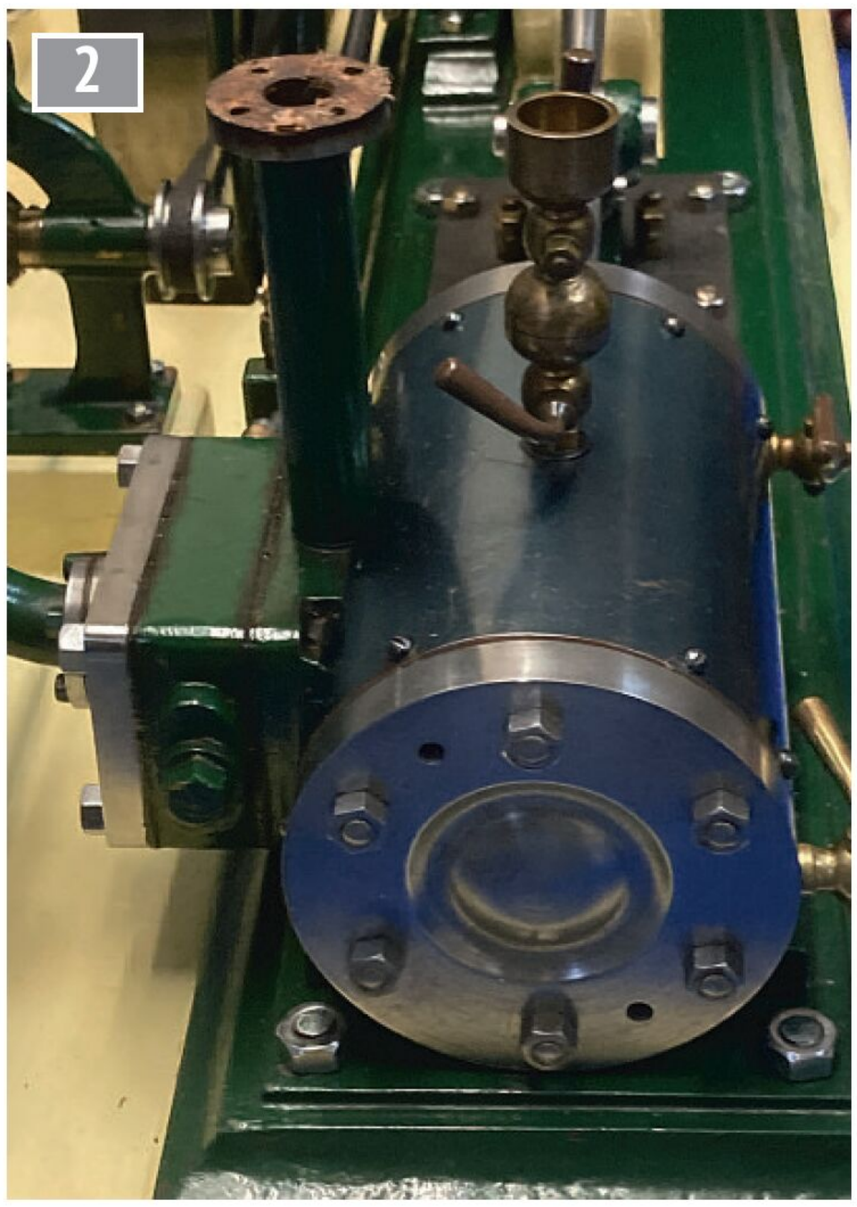
One of the benefits of having a long history is that SMEE has a large collection of artefacts that physically show the activities of model engineers from the early days up to modern times. However, holding such a large collection, some of which are of historical importance to the hobby, comes with a responsibility to keep each item in good condition. This really demands a rolling programme of conservation and we are fortunate to have a few members who are willing and able to carry out this work.

A recent item to be treated to this programme is the SMEE mill engine No. 033 and this process was the subject of our monthly main meeting delivered by Allen Berman, who recently completed its conservation. No. 033 is a fairly large example of a single cylinder mill engine built by Mr H.C. Roughton and donated to the Society in 1984 (**photo 1**). There are 11 models by Harry Roughton in the SMEE collection including a beam engine, several mill engines in various configurations, a couple of brass cannons and a particularly interesting Merryweather three cylinder fire pump. I note the fire pump because Harry worked for Merryweather from 1926 and probably because of that it is particularly accurate and detailed.

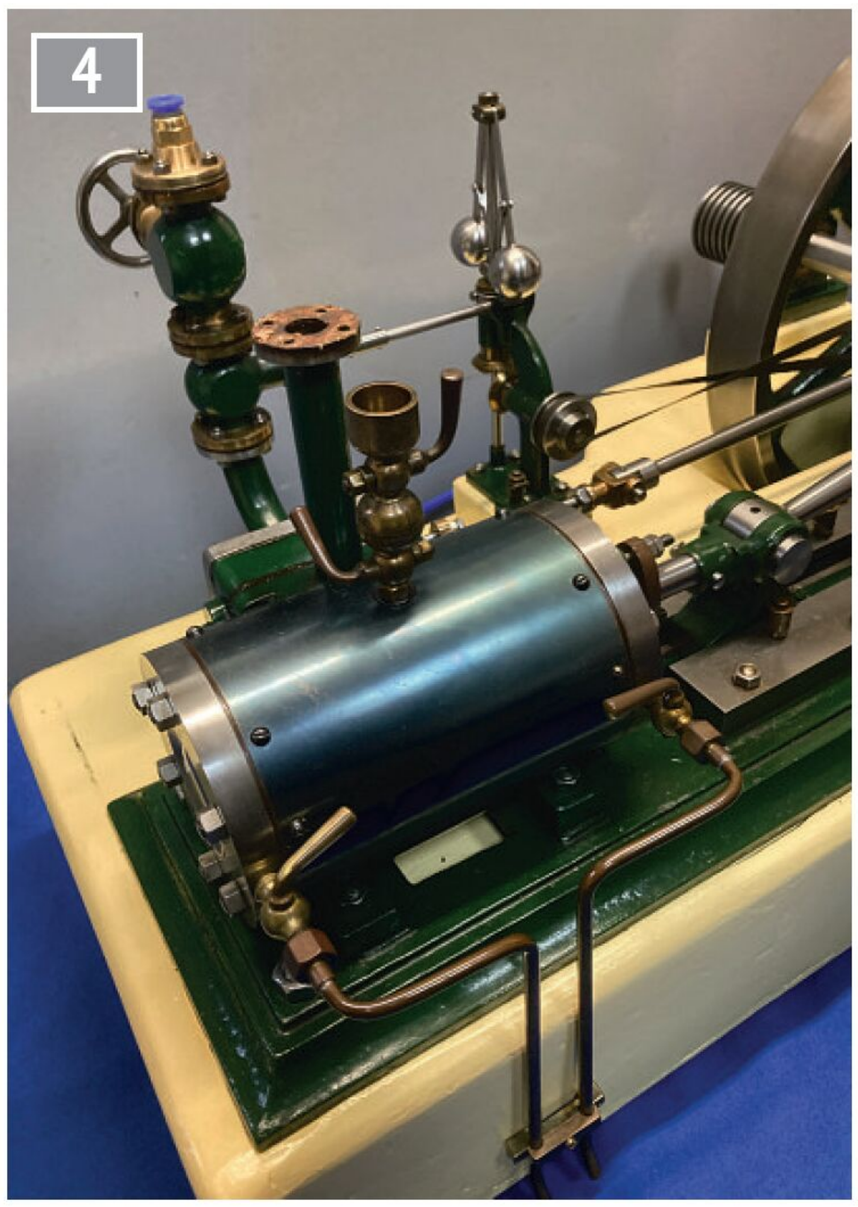


A single cylinder mill engine built by Mr H.C. Roughton.

Our current chairman, Allen Berman described the model as being a well-made, single cylinder mill engine of 2 inch bore (approximately) and 4 inch stroke. It is around 27 inches long and weighs in at approximately 50lb. It has a disc crank driving a six spoke flywheel 11¾ inches diameter. A two-ball governor controls a separate steam valve driven by belt and bevel gears. Main steam inlet is by a wheel valve. There are brass drain cocks on the side of the cylinder. There is a non-reversing eccentric operated slide valve and slipper cross head. The paint scheme is dark green and bright engine parts on a light grey shaped plinth. The engine was in something of a sorry condition having been steamed



Cylinder head showing the locations of the jacking screws.



The flanged connection for compressed air.



The governor.

at various shows where it acquired a liberal coat of heavy steam oil which attracted a fair amount of dirt and grime over the years from being displayed without a case.

All SMEE's models are in the care of our Stationary Engine Committee who lay down some clear rules as to what can and cannot be done to the engines. As the basic aim is the preservation and repair of potentially historical objects, nothing must be done that cannot be undone so any attempt to restore 'like new' must be resisted. No changes or modifications are allowed, documentation of all stages of the process should be kept and efforts to protect the item against further deterioration should be undertaken.

Some initial observations were made and the engine was lubricated and run for a while on air. Allen noted that the engine ran very smoothly and was self-starting on a pressure of 1.5 to 2 Bar. The initial assessment was that a thorough clean was required and the base in particular would benefit from a repaint. Once permission to repaint the wooden base of the engine was given Allen was ready to start. Having noted the valve timing with photographs and text the engine was ready for a strip down and a thorough clean.

Disassembly was reasonably straight forward with Allen taking care to take copious photographs of parts and subassemblies. The engine employs numerous taper pins and gib head keys, the latter requiring a removal tool looking like a thin wedge with one straight and one concave edge. Allen was fortunate that Harry had thought to include tapped holes in the cylinder head for jacking screws as the gasket was holding the head on extremely firmly (**photo 2**).

One adventure in a job like this is identifying the various threads used on the fixings. At one time it was thought that the fittings were UNF but they turned out to be Whitworth to a man with the exception of 4BA. However, one 'special' was the cylinder head fixings which had Whitworth studs with nuts of 1BA hexagons to give the right scale appearance.

The engine itself was in pretty good condition with bright slide bars and well-preserved green paintwork. The engine had however been run many times on steam and, as mentioned, steam oil had done its work in creating grime and attracting dust and dirt. The wooden base had been particularly affected by this and a lot of Allen's work was involved in bringing that back to condition. A product called Strip-It successfully removed all of the old paint once the bed studs had been protected with tubing. The base was given a light sanding and an undercoat and finally a top coat in Ivory to contrast well with the green bedplate. Several months were allowed for the paint to fully dry.

The cylinder bore proved to be in very good condition and removal of the piston revealed an interesting feature in that the steel piston sported a single brass piston ring which was quite wide and diagonally split. All of the paintwork was cleaned using common detergents and plenty of elbow grease. The exposed metal parts were brought back to condition with a mix of wire wool, buff wheels, wet and dry paper and brass brushes. The governor in **photo 3** shows both the excellent workmanship of the model and the glow, rather than shine, of the metalwork. In fact, photo 3 is a prime illustration of good conservancy with the tiny imperfections and patina of time remaining on a nice clean mechanism.

One Engine Committee permitted modification is seen in **photo 4** which is the removal of the plain copper tube to the main steam globe valve which is replaced with a new flange to take a 6mm push fitting for nylon air tubing. It is intended that the engine will only be run on air in the future and this allows simple connection to the compressor. Further work will involve the construction of a display case and the engine can go back on display at Marshall House.

After explaining to us the techniques he used in bringing this lovely model back to proper condition we were treated to a demonstration of the engine running. One lovely feature, which was quickly commented on, was the slow running of the engine, probably helped somewhat by the comparatively large size of the model. It's very nice to see an engine like this running at something like the speed it would have operated at in full size.

Allen has done a few of these conservations now and we, as a society, are very grateful to him for his efforts in preserving our heritage both for SMEE and the enjoyment of many at future shows when the engine gets an outing.

For more information about SMEE and reasons for joining us, please visit our website at www.sm-ee.co.uk

ME

The Midlands Garden Rail Show



John Arrowsmith catches up with what is going on in the smaller gauges.

The 2024 Midlands Garden Rail show opened to visitors on Saturday 2nd and Sunday 3rd March at the Warwickshire Events Centre with good attendances on both days. The prevailing weather provided some soggy parking conditions but as usual this did not deter visitors. There were 12 operating layouts covering every gauge currently in this area of miniature railway modelling. In addition, five static displays by model engineering clubs added to the attractions.

Two large working layouts caught the eye on entering the main hall. The **Midsomer Norton** layout in Gauge 1 standard scale is a layout based on the Somerset & Dorset Joint Railway station at Midsomer Norton just south of Bath (**photos 1** and **2**). This large layout was always busy with all the big four companies represented together with the BR standards and a number of pre-grouping locomotives.



A GWR King waits by the signal box for its next train.

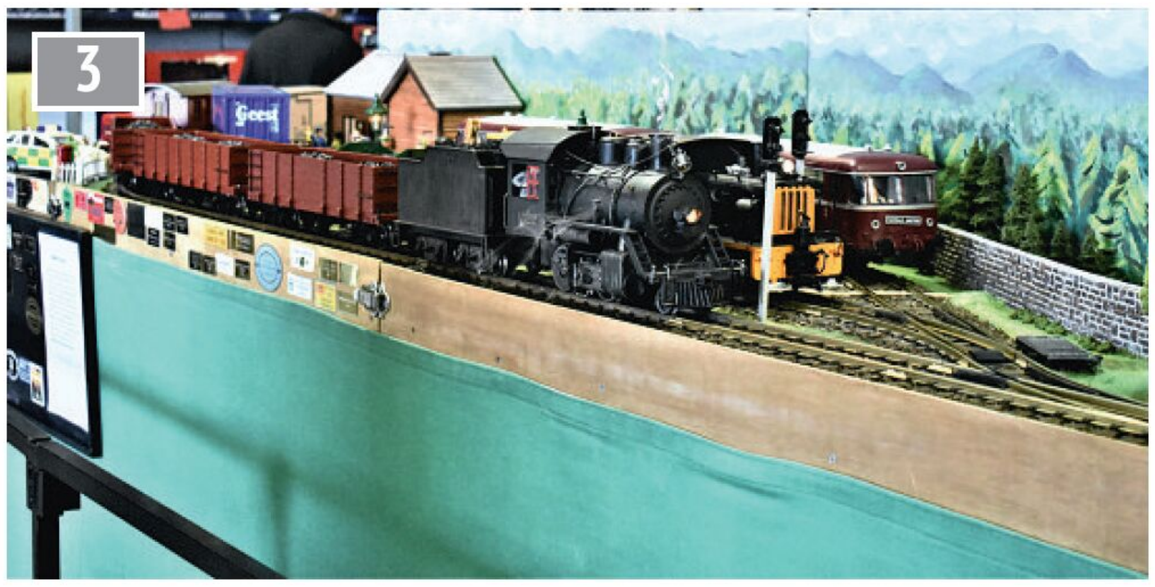
The scenic work around the station area shows off what a typical station of that era should have with buildings and station furniture of the period. The locomotive pool had a variety of large powerful engines in steam and taking typical rolling stock around the track system. These engines cover a wide range of fuel types from coal fired to radio controlled batteries. It all adds to the atmosphere with that familiar hot oil and steam aroma mixing with the methylated spirit emissions from other models. There was always lots of operations and plenty of spectators watching and talking to the operators.

The other large layout to greet visitors was the **Hampton End Branch** line link, serving the village of Hampton End. This colourful layout again has plenty of stock movement to watch (**photos 3** and **4**) and has a wide variety of motive power to provide the services with both British and Continental prototypes in action. The scenic effects are very good with some innovative displays as part of this. For example, the rock climbers scaling a trackside cliff wall - they could have been railway engineers judging by the orange overalls and hard hats (**photo 5**).

A further large layout was that displayed by the **16 mm Association Modular Layout** which was another well detailed presentation with plenty of track action to watch and enjoy (**photo 6**). There was a good variety of scenery



The extensive Midsomer Norton layout in the main station area.



Three types of motive power on the Hampton End layout.



The track gang working hard at Hampton End



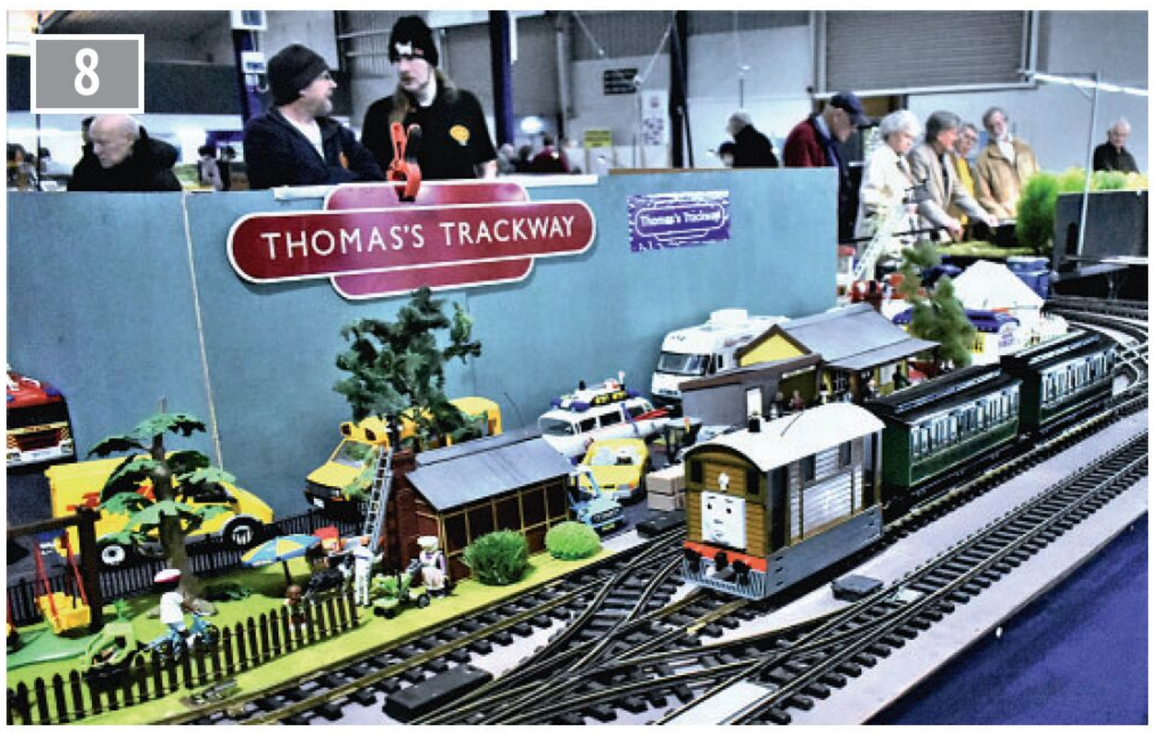
Are these rail engineers or just climbers at Hampton End?



A splendid shed and motive power on the 16mm Association modular layout.



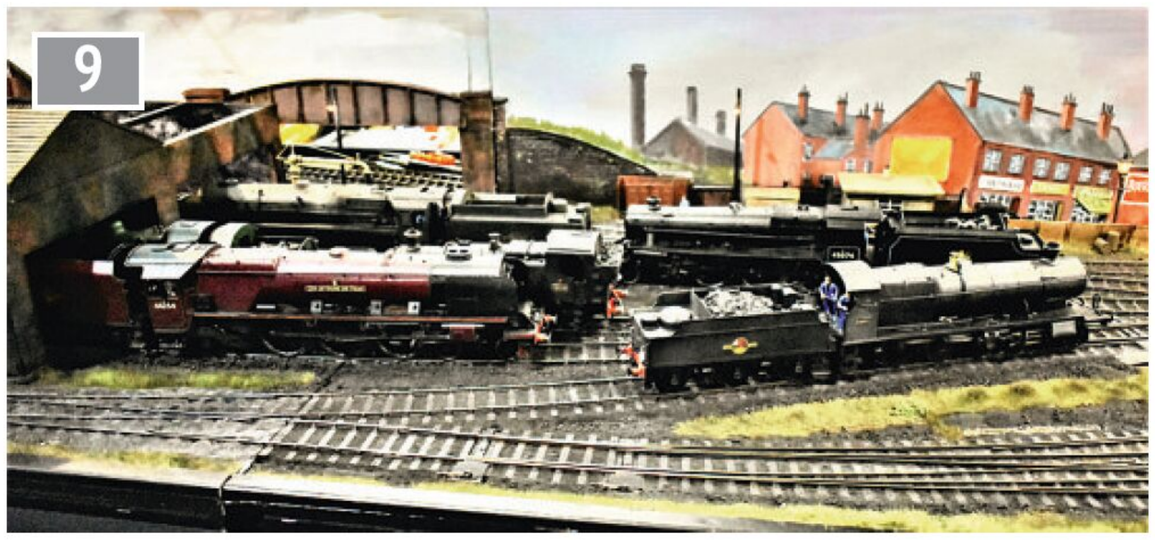
Motive power to spare as these two little saddle tanks drift round the Pen-Y-Bont railway.



One for the enthusiasts was the colourful Thomas Trackway layout.

on this model with some excellent detail. The brewery on one side had a very unusual means of moving wagons which looked like a regular earth mover converted to work on the railway. A delightful smaller layout was the 32mm gauge live steam presentation named **Pen-Y-Bont.** Depicting a small Welsh slate railway, the fascinating detail of this railway was that all the foliage and trees are all real and living plants. The plants have been chosen for their little leaves and flowers. This gives the railway a unique appearance since the colours change with the time of year and month it is seen. The selection of plants is excellent and does make for an impressive little railway (**photo 7**).

The **Loft City Central Railway** is a large layout approximately 7000 ft in G scale showing off a lifetime collection of the vintage 'Playmobile' models. It is full of very colourful detail and is very well presented. With such a wide variety of detail it is impossible to describe everything. It was a real crowd pleaser with so much activity. In a similar guise was **Thomas's Trackway,** a 45mm gauge LGB track built layout representing the railway based on the popular Reverend Wilbert Awdry's *Thomas the Tank Engine* stories. Built to entertain children, it showed many of Thomas's friends and rolling stock in a very colourful and pleasing setting (**photo 8**). A regular layout that always attends this show is the fine scale **Lough Motive Power Depot** which is loosely based on the track plan of Slough MPD as shown in E. Lyon's book of *Great Western Engine Sheds* of 1949. This was inside the Windsor Curve and for the layout has been straightened out to fit the baseboards hence the 'loosely based' description. ≫



Mighty steam power on shed on the Lough MPD layout.



One of two well made 'LION' models on the Bromsgrove display.



A LEGO model re-gauged to run on 45mm track by 9-year old Harry from Bromsgrove.



The Coventry MES provided a wide range of well-built models on their display.

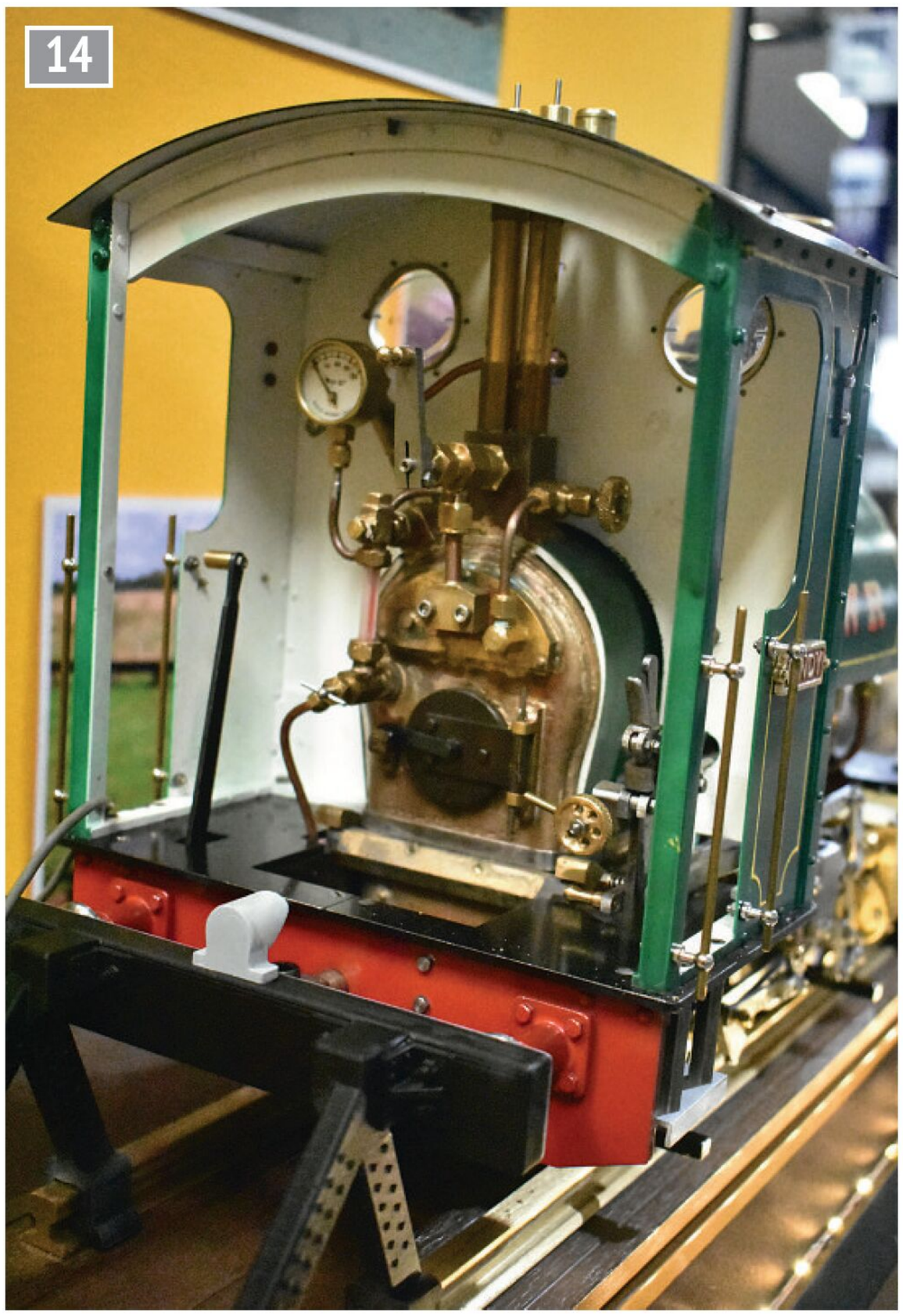


This excellent example of a 3½ inch gauge 'Tich' was built by Terry Timms.

It has some fine detail and very realistic fittings and shows the depot at the end of steam with a wide variety of motive power on shed and at one end the diesel and refilling depot (**photo 9**).

Model engineering clubs do feature in this show as well and both the **Bromsgrove SME** and the **Coventry MES** had some interesting and informative displays to enjoy, showing the interest there is in the smaller scales for model engineers. Concentrating on the garden gauges, the **Bromsgrove** stand had a wide range of models on show, some scratch built and some kit built together with some proprietary models (**photo 10**). There is another interesting little story here as well. One of their youngest members Harry, who is 9, is learning to drive both his father's steam loco and the club's electric locos. In addition, he has an interest in the smaller scales and was disappointed to find that his collection of LEGO engines were not gauged to suit garden railway tracks, so he has started a process of re-gauging them to suit the club's tracks. Hopefully the photograph shows the progress made so far (**photo 11**). The Bromsgrove club are to be congratulated in encouraging this young man to get involved with this sort of project and the information and skills he is learning at the moment will translate into a young engineer who will be really involved in the club as he gets older - perhaps another lesson to be learned there!

On the **Coventry Society** display (**photo 12**) was another fine wide-ranging selection of models built and constructed by members. The little 3½ inch gauge 'Tich' built by Terry Timms was an excellent example of what can by produced from the basic LBSC design and the scrap box. The cylinders were made from hexagon bar and the engine is fitted with Walschaert's valve gear (**photos 13** and **14**). It is beautifully finished and Terry told me it goes as well as it looks. The same builder had some interesting little moulds



The well detailed cab on the Tich.



Terry Timms also built this well detailed Class 8 shunter.

he had made to provide super details to his other garden railway models. The axlebox springs were fine white metal castings for use on his Class 8 shunter. Terry told me he has built 19 locomotives in total so far and uses all the modern techniques to create all his models and equipment. He has his own 3D printing machine which helps with the detail. It was a very interesting conversation with a fine model engineer (**photo 15**).

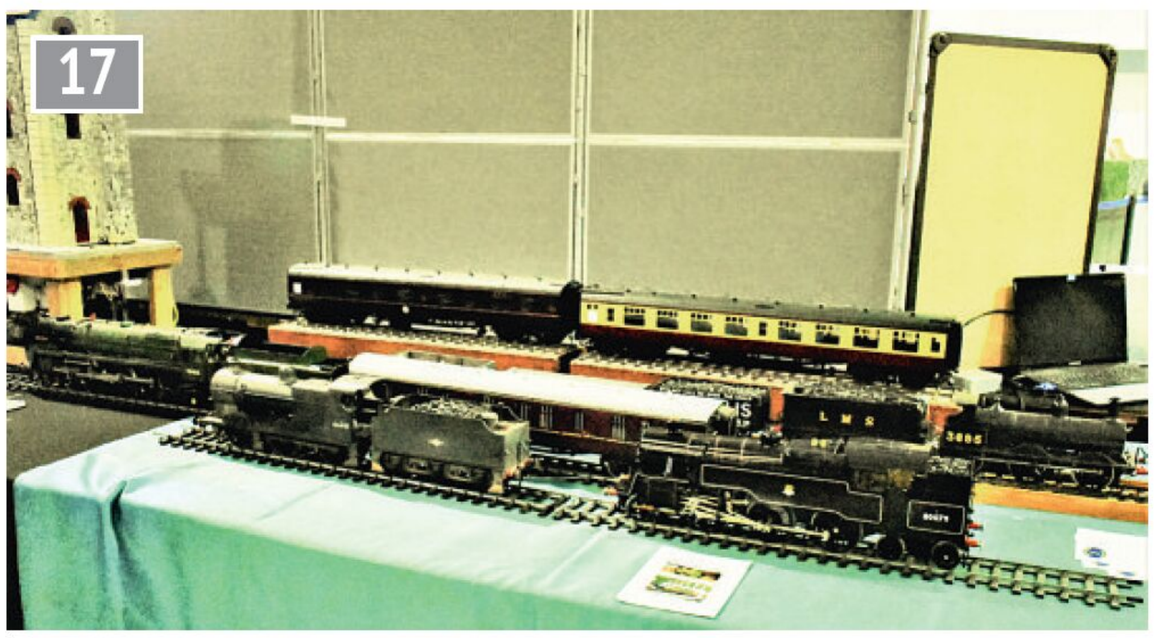
The **National 2½ Inch Gauge Association** had their usual comprehensive display of models and fittings on show to demonstrate what this gauge has to offer for those interested in the slightly larger gauge of models. **The Gauge 3 Society** is the scenic side of the 2½ inch gauge railway enthusiasts and they provided a selection of models and rolling stock and a scale model of a Cornish Engine as the type of building



A Cornish engine model on the Gauge 3 Society display.

that can be used in the layouts (**photos 16** and **17**). Another club which is progressing well with their new outdoor railway is the **Leamington and Warwick Model Railway Society** who, during 2023, have built a new layout not far from the exhibition venue. It comprises about 90 metres of track suitable for operating Gauge 1 and G scale locomotives both steam and electric in a landscaped setting with good access and parking. It will be interesting to see how they progress in the next 12 months. The **Gauge 1 Model Railway Association** did not have a specific layout this year but provided a large display board with details of everything they represent.

Back to the operating layouts now and the popular **G Scale publicity layout** provided a grand show of the way this gauge can operate and demonstrate the range of models and equipment currently available for devotees (**photo 18**). In complete contrast to these large very active layouts, the little 7mm scale presentation **'Common Road'** is a small O gauge layout based on a former wagon works with the same name in Stafford. It was presented as an Inglenook shunting puzzle containing some excellent buildings and trackwork with good rolling



The display of locomotives and stock from the Gauge 3 Society.



The colourful G Scale publicity layout.



Common Road, a 7 mm scale goods yard.



Interesting detail on the Blackgang display



Blackgang, *an Adams Tank 4-4-2, pulls into the station.*



A Gauge 2 LNWR 4-6-2 locomotive and train.

stock and locomotives in a very compact space (**photo 19**).

A new fine scale layout was **'Blackgang',** a fictional station on the Isle of White and based on the track plan for Bembridge. Well made and presented, all the locomotives and stock are either scratch built or kits and it made for some excellent prototypes operating in typical IoW scenery (**photos 20** and **21**).

The Gauge 1 Vintage Trains Group had their usual presentation of these fine models of yesteryear together with a circuit of Gauge 2 railway which made for an interesting layout. It was difficult to see the difference between the two gauges when they were close together but it made for an interesting presentation (**photo 22**). The last layout at the show was that by the Berry Hill Visitor Centre at Catherine de Barnes. Known locally as 'Catney Barnes', this well presented little layout was a representation of the Berry Hill Estate Railway which was based on Sir Percival Hayward's 15 inch gauge railway.

That just about sums up this year's Midlands Garden Rail Show which was well supported particularly on Saturday and I hope this excellent smaller show will be repeated again next year as it is well worth a visit if you are thinking of downsizing from the larger model engineering models. My thanks as usual to everyone who provided information and details.

ME

BUILDING 3020 *CORNWALL* in 5 Inch Gauge PART 5



Jim Clark builds the famous LNWR 2-2-2 – the first locomotive earmarked for preservation.

Continued from p.558
M.E.4741 April 19

Making the boiler

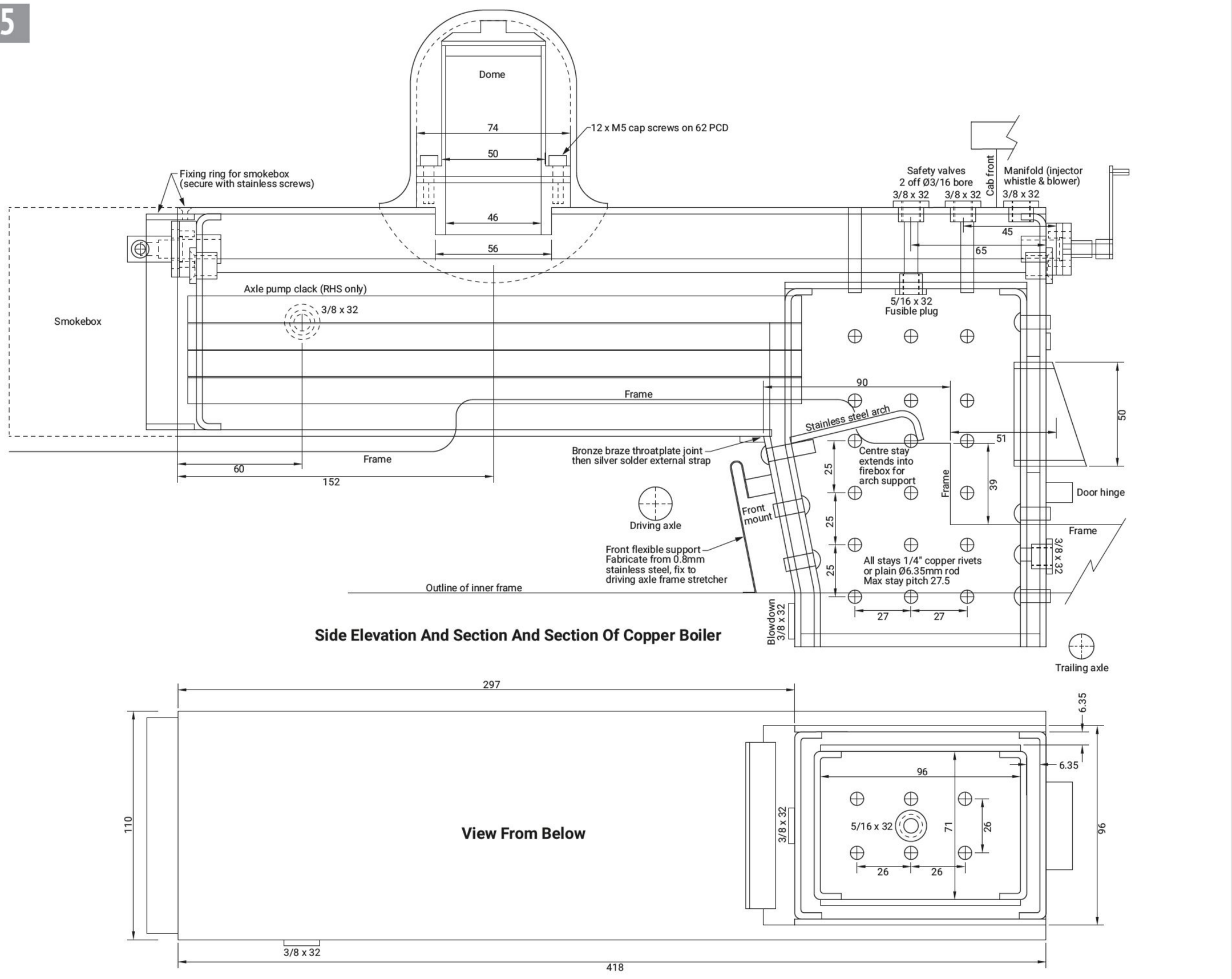
Right from the start of this project, the boiler loomed as significant challenge and has been a limiting factor in many other parts of the design (**figs 15**, **16** and **17**). No doubt I was now asking myself similar questions to those that the designers of the original *Cornwall*, Francis Trevithick and John Ramsbottom, would have been asking all those years ago: how to get the biggest possible boiler in between those huge driving wheels? And how to get it slung as low as possible, to keep the centre of gravity low?

In my case, there was an additional question: How to make it look as much like the preserved *Cornwall* as possible?

Fortunately, the basic boiler design was not difficult – a standard straight barrel copper boiler (**photos 35** and **36**) with a firebox dropping down between the inner frames, designed to the Australian Miniature Boiler Safety Committee (AMBSC) code.

Note to other builders: If you are intending to build this model, please ensure that you check with your local boiler inspector before commencing building the boiler from these

Fig 15



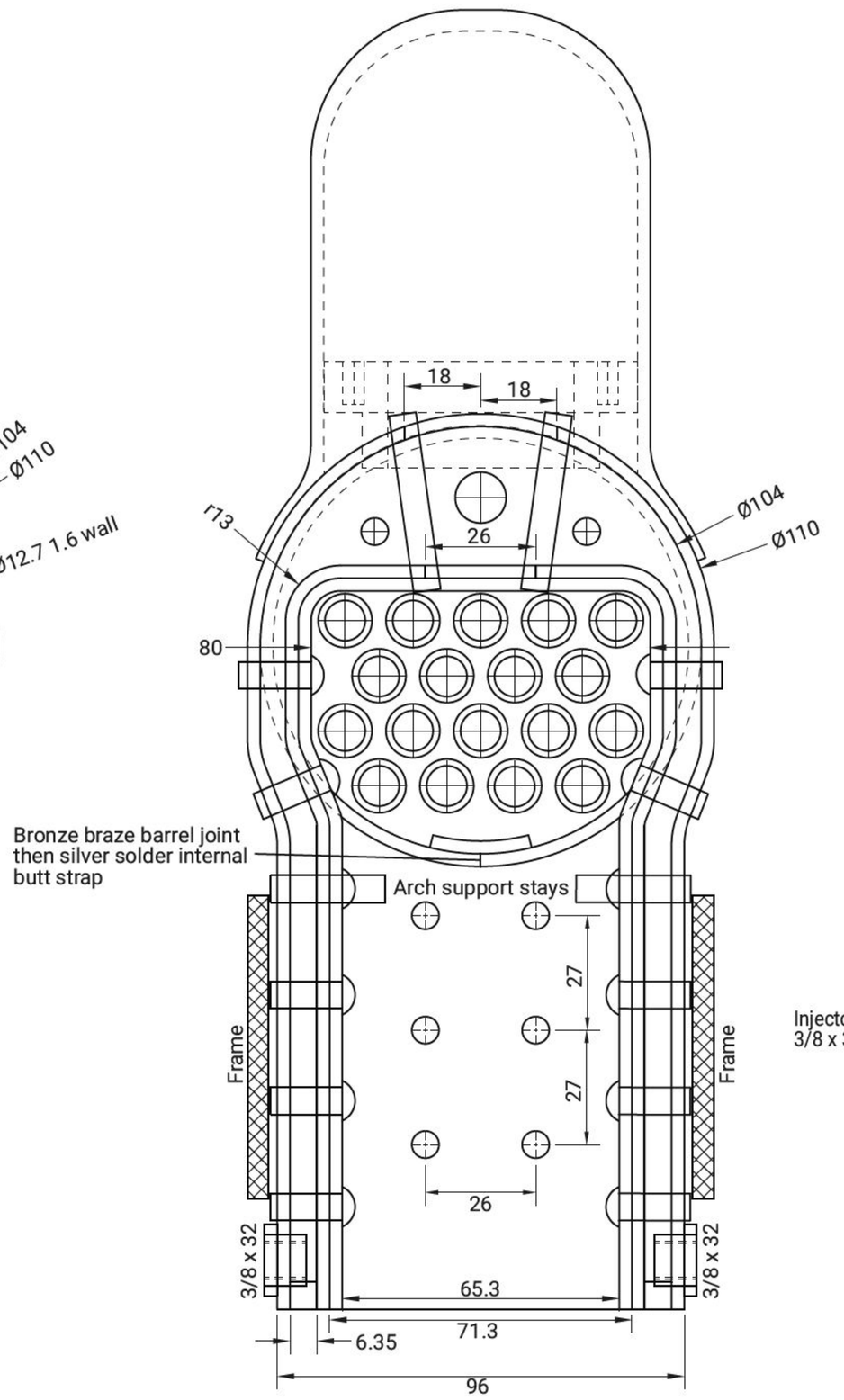
Side Elevation And Section And Section Of Copper Boiler

Side elevation and partial cross-section of the boiler for Cornwall.

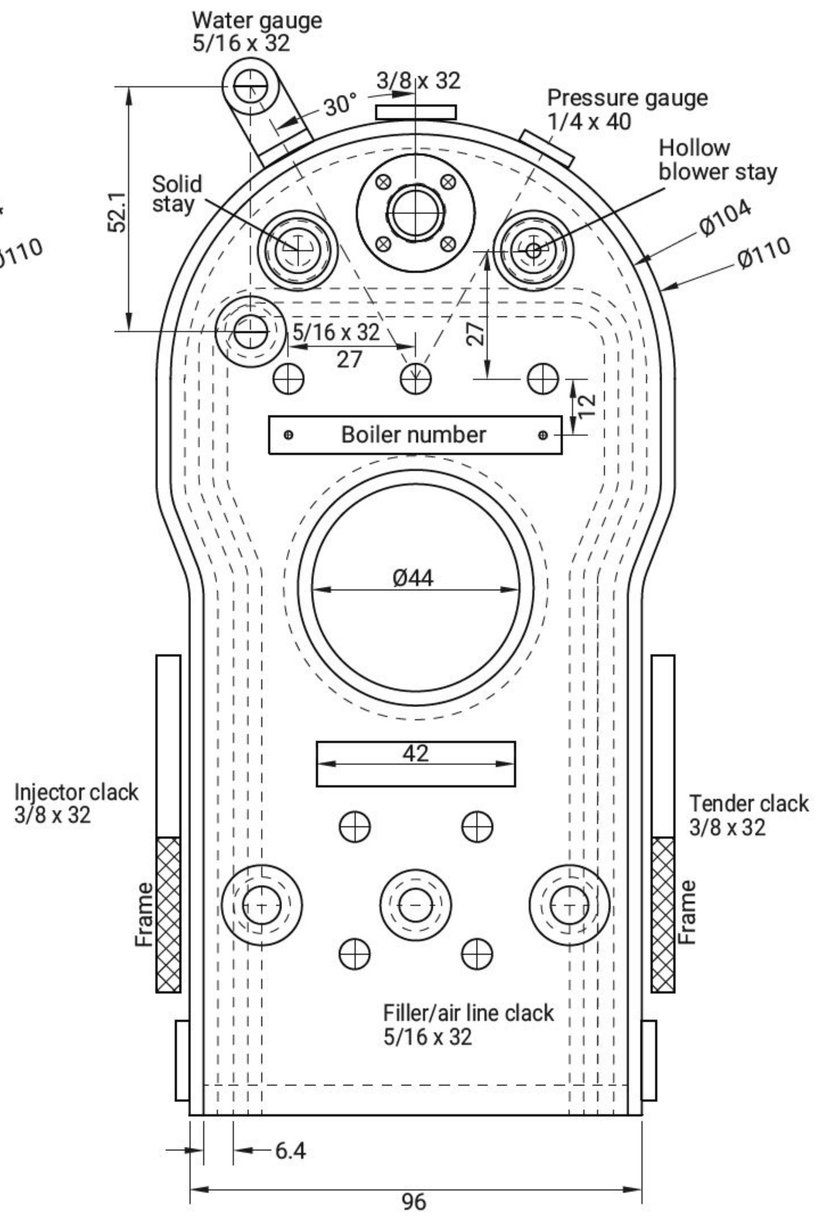
Fig 16



Front Tube Plate Detail

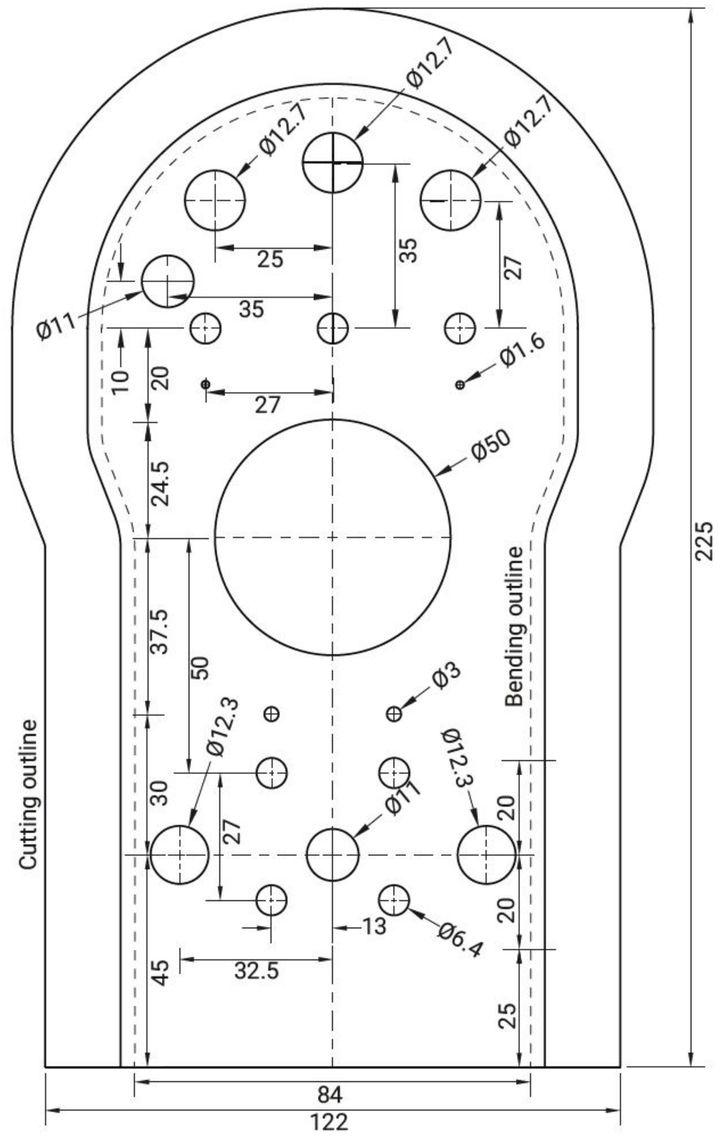


18 off Ø1/2" tubes
Rolled barrel (O.D. 110mm)



Backhead Detail

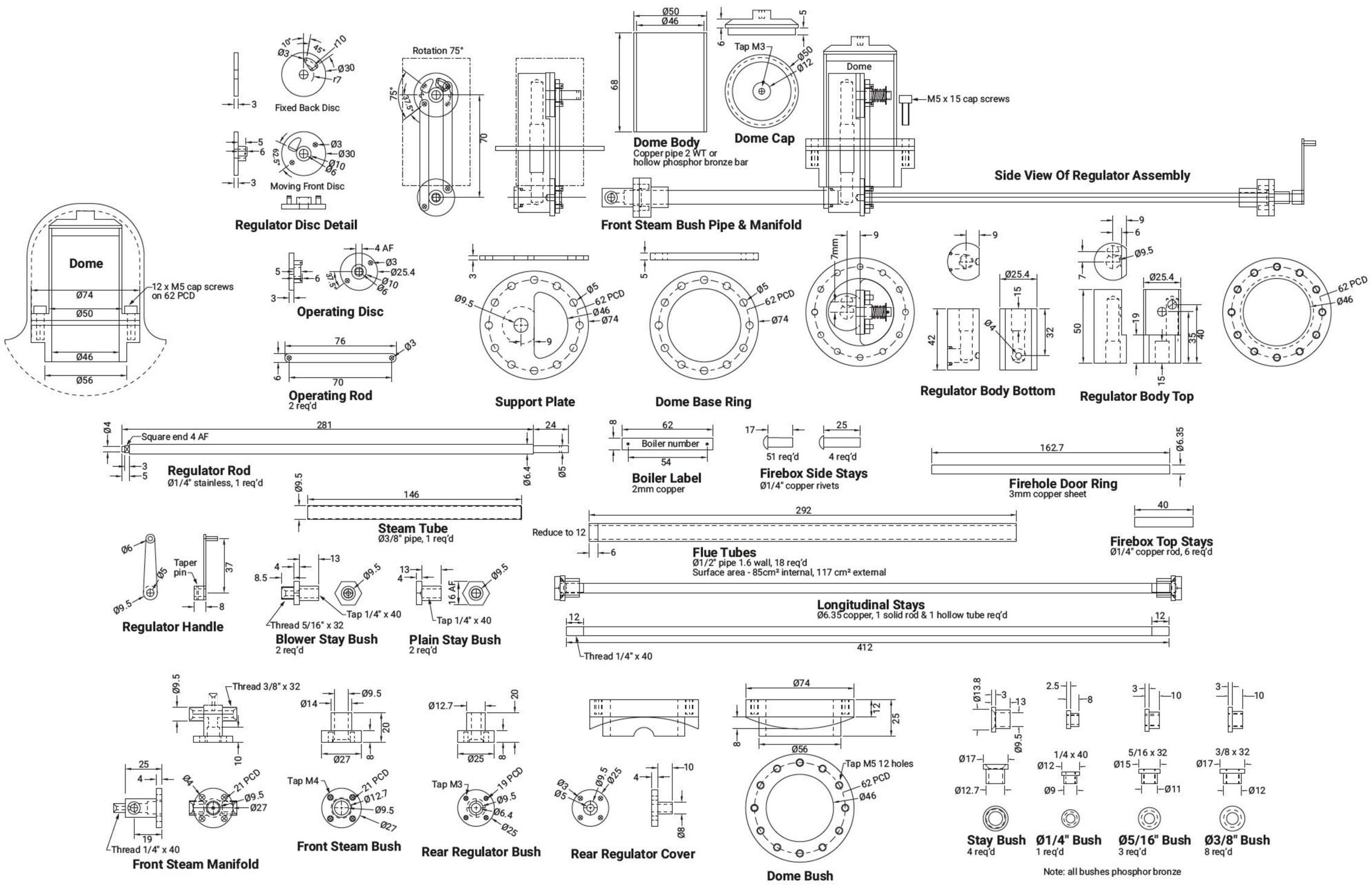
Boiler to be constructed in accordance with
Australian Miniature Boiler Safety Committee (AMBSC) Code part 1, issue 8, 2012.
Working pressure - 700kPa (100 PSI)
All boiler plates - 3mm copper sheet
Stays - Ø6.35 solid copper bar
Blower stay - Ø6.35 x 1.63 WT copper pipe
Firetubes - Ø12.7 x 16 WT copper pipe
Notes:
All bushes phosphor bronze
Boiler working pressure - 700kPa
Boiler flooded water volume - 3 litres
PV value - 0.7 MPa x 3L = 2.1 MPa/L
Approx. heating surface area (flues) - 2010 cm²
Approx. heating surface area (firebox) - 720 cm²
Approx. heating surface area (total) - 2730 cm²
Safety valve orifice diameter - 2 x Ø4.76 (2 x Ø3/16)



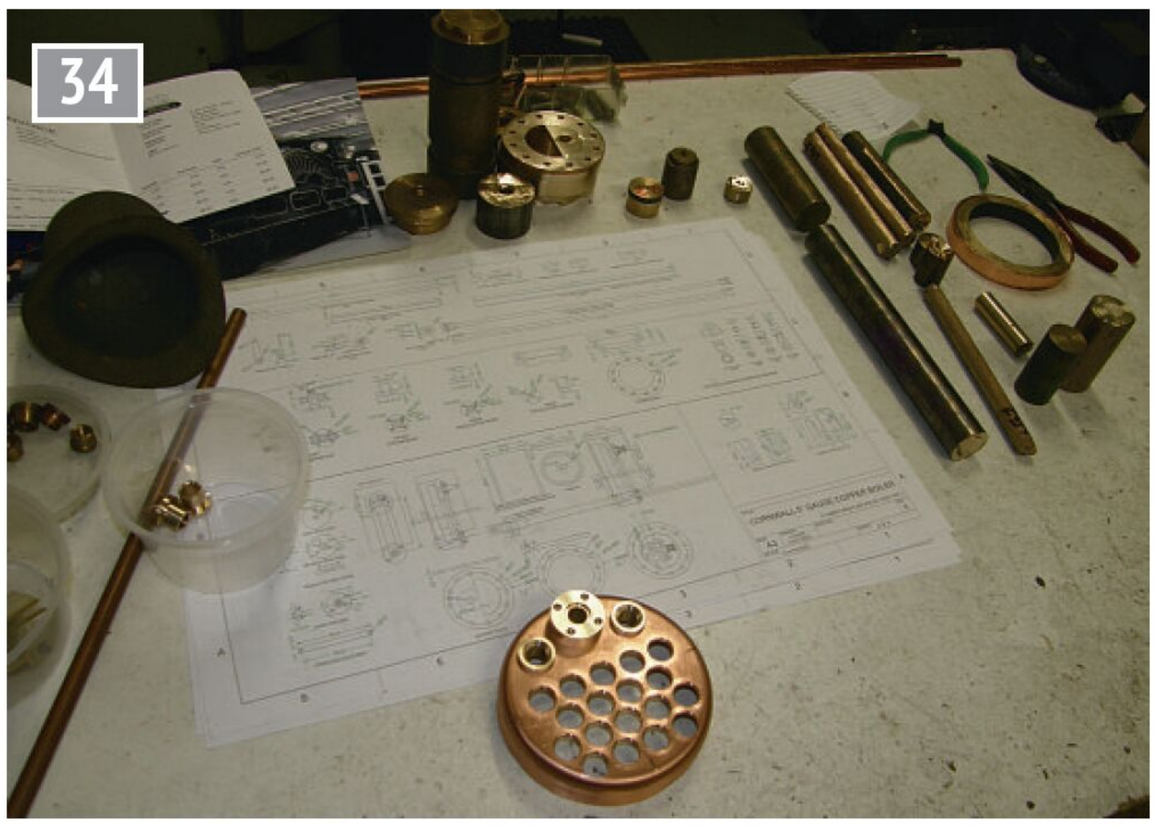
Backhead Development

End elevations of the boiler for Cornwall.

Fig 16



Regulator and other details of the boiler for Cornwall.



Here you can see the front tube plate at bottom centre, almost complete with its bushes ready for silver soldering.

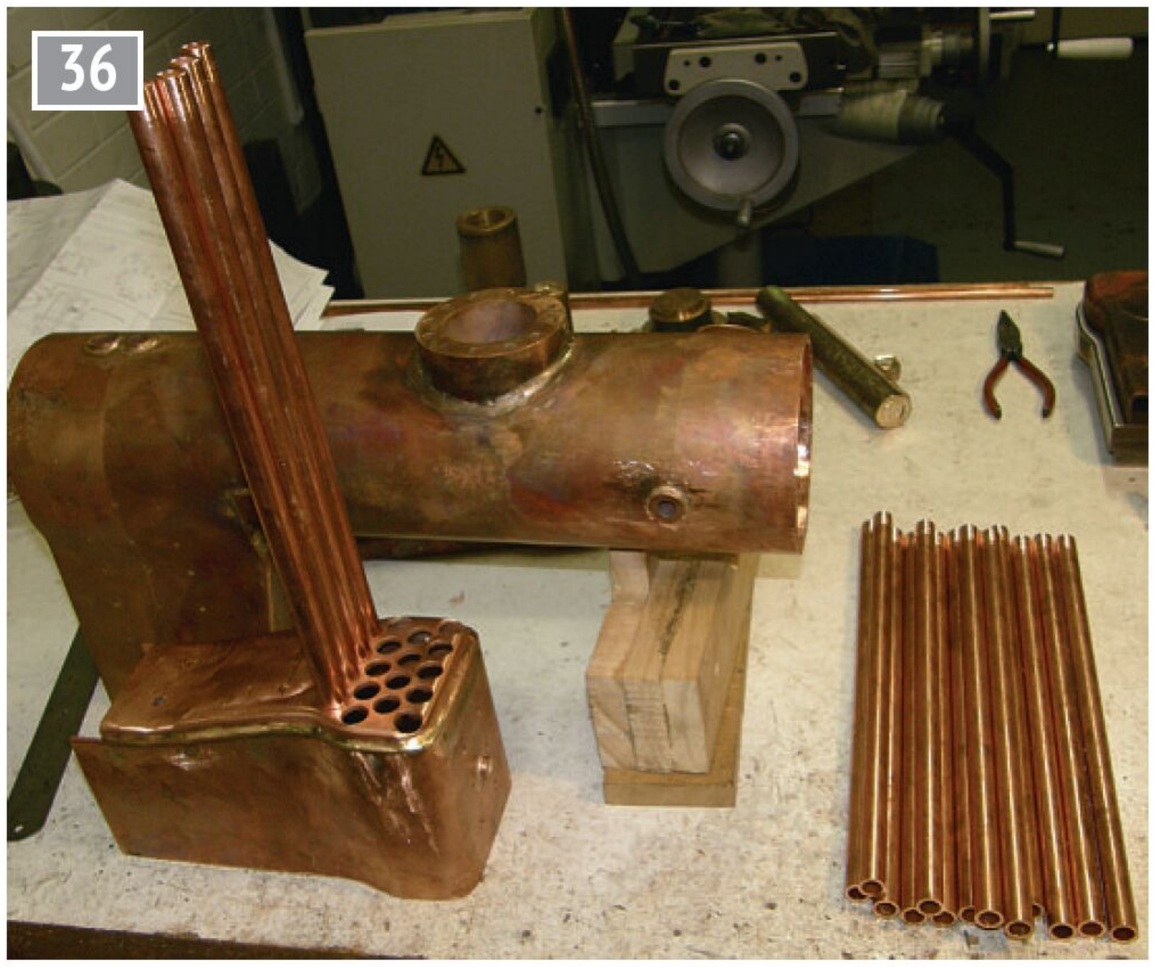


The outer wrapper was cut out of 3mm copper sheet and rolled up, with the outer throat plate bronze brazed in place.

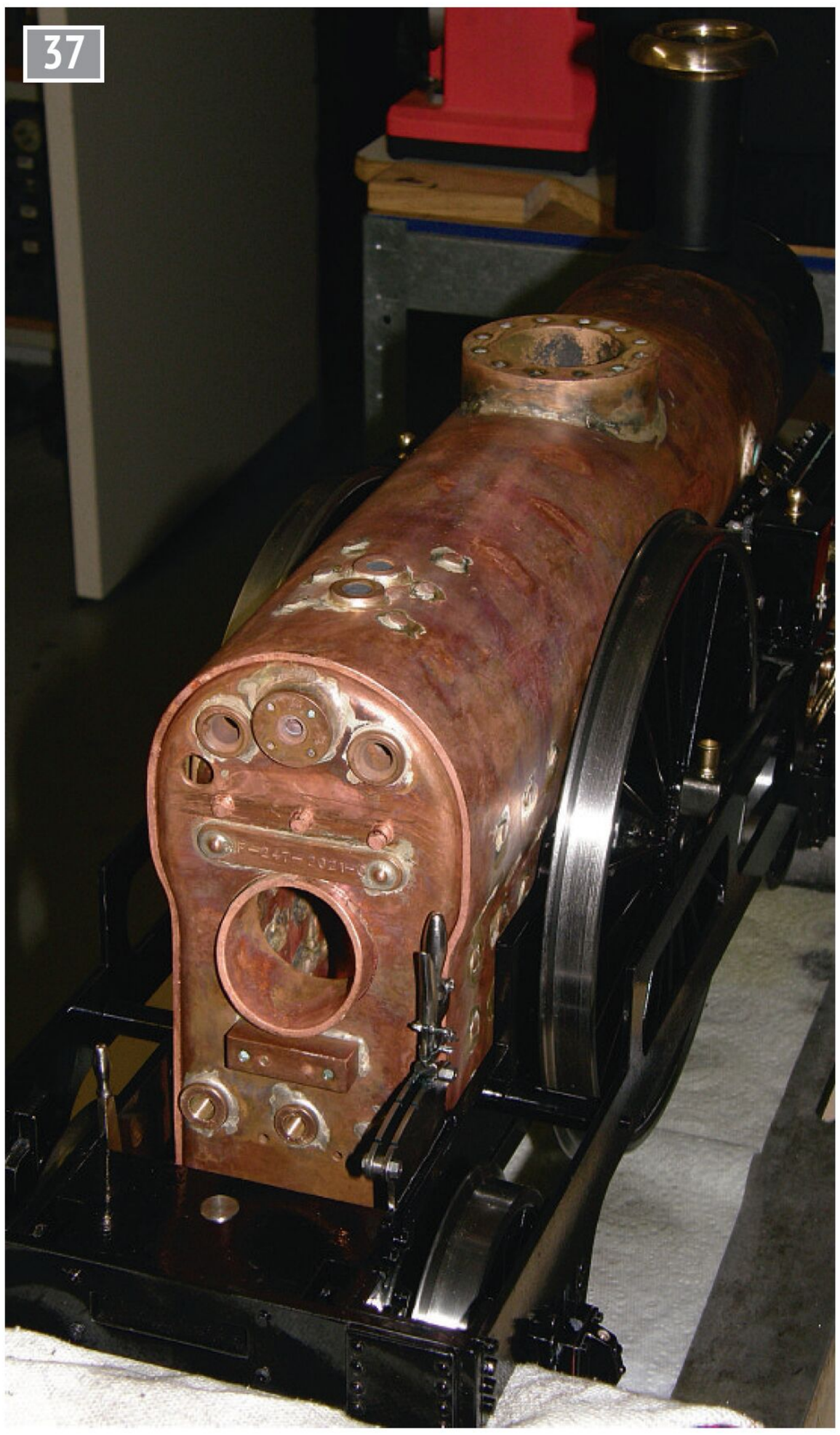
drawings to ensure the design complies with requirements in your jurisdiction and, **most importantly**, that your boiler inspector will approve it when done.

Once I had the boiler design drawings approved by my boiler inspector, Ron Collins and an official boiler number had been assigned, armed with drawings and a collection of copper sheet, copper tube and bronze bar, I started the manufacture.

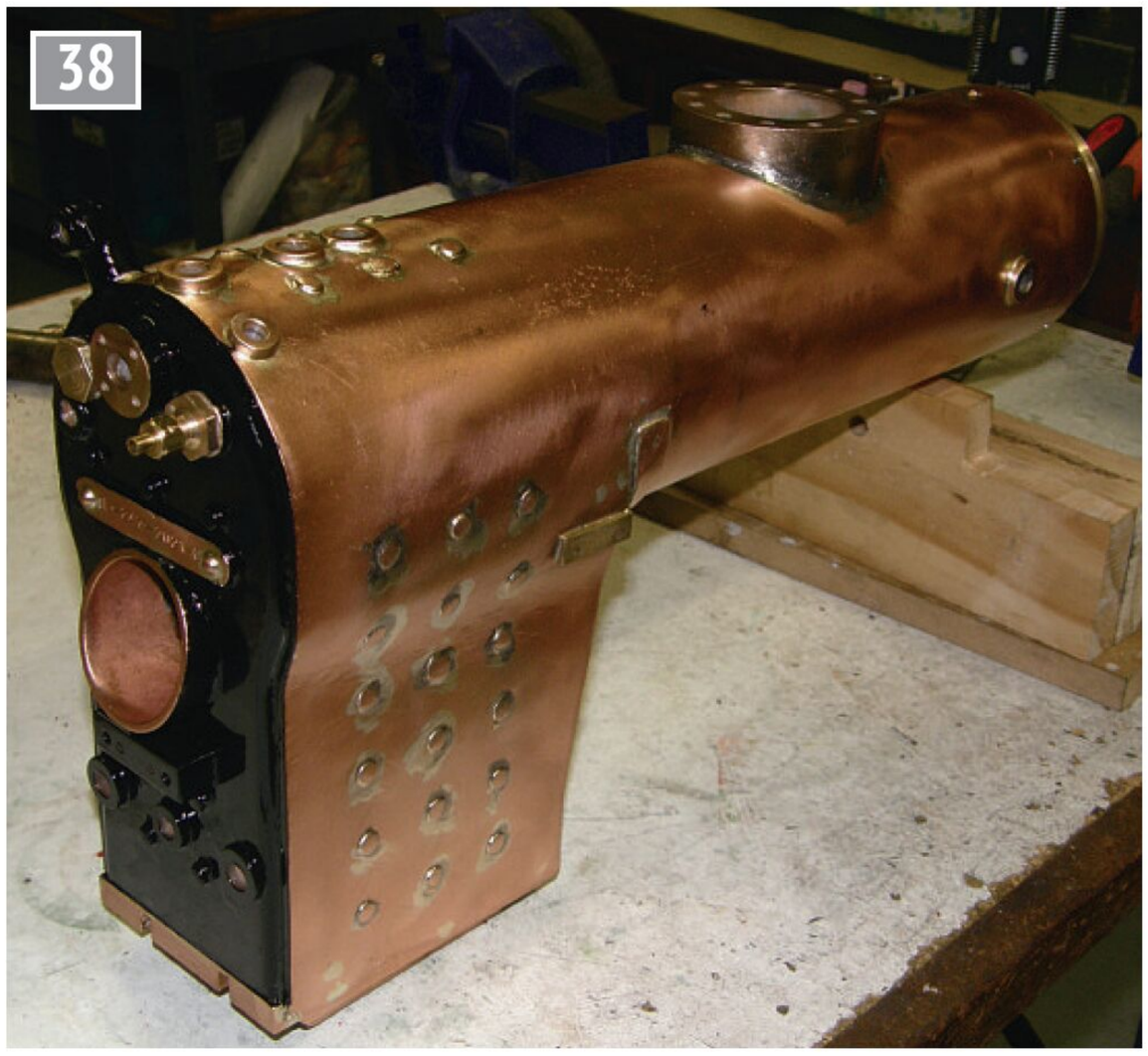
I also found I needed to move the reversing lever (in front of the bottom right corner of



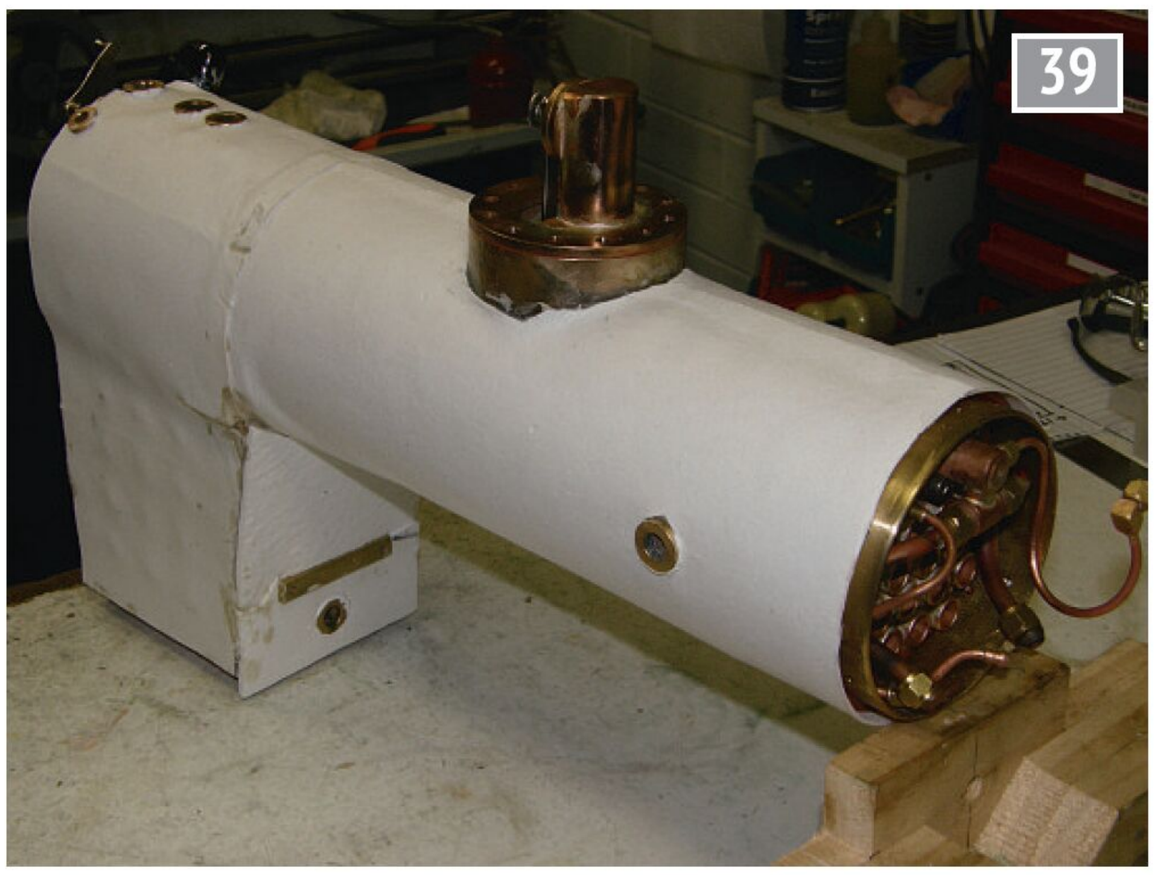
A little further along, and the outer shell is complete, with the inner firebox shell and fire tubes being made.



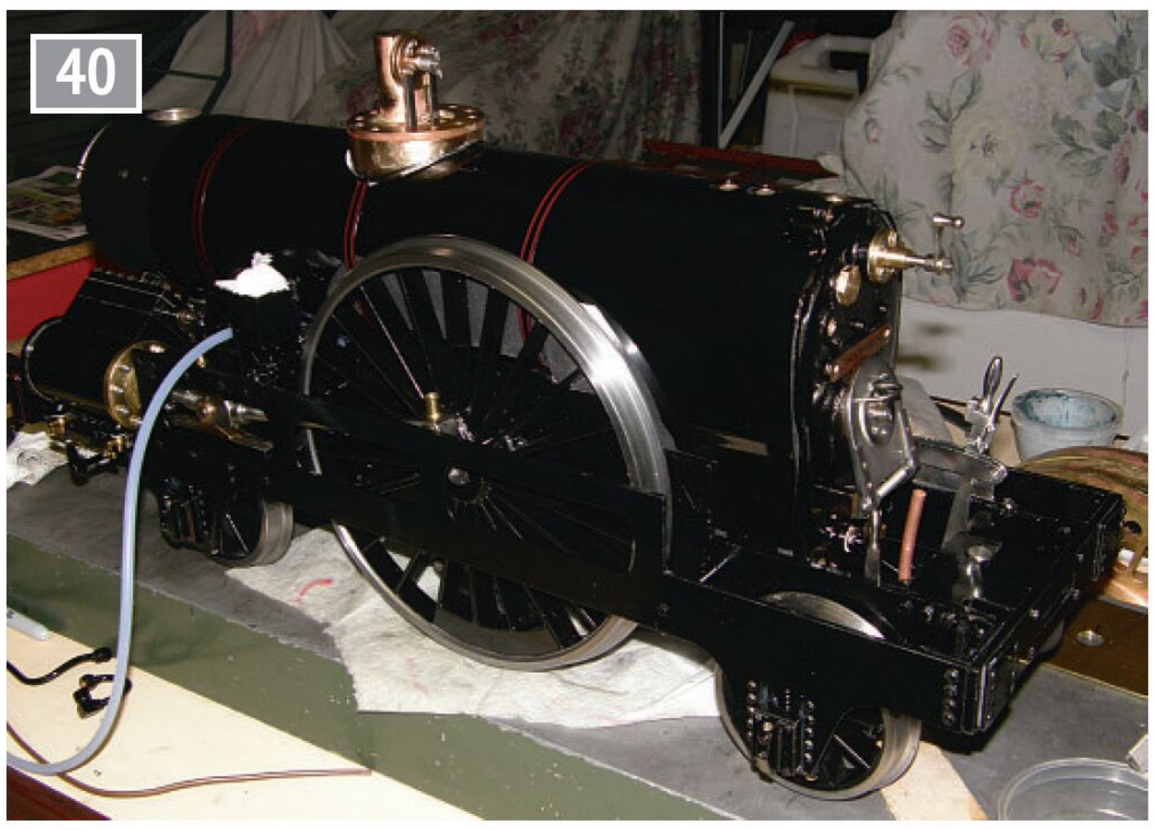
We are checking the boiler for fit in the chassis. You can see how very tight it is in between the driving wheels – not much room left for cladding!



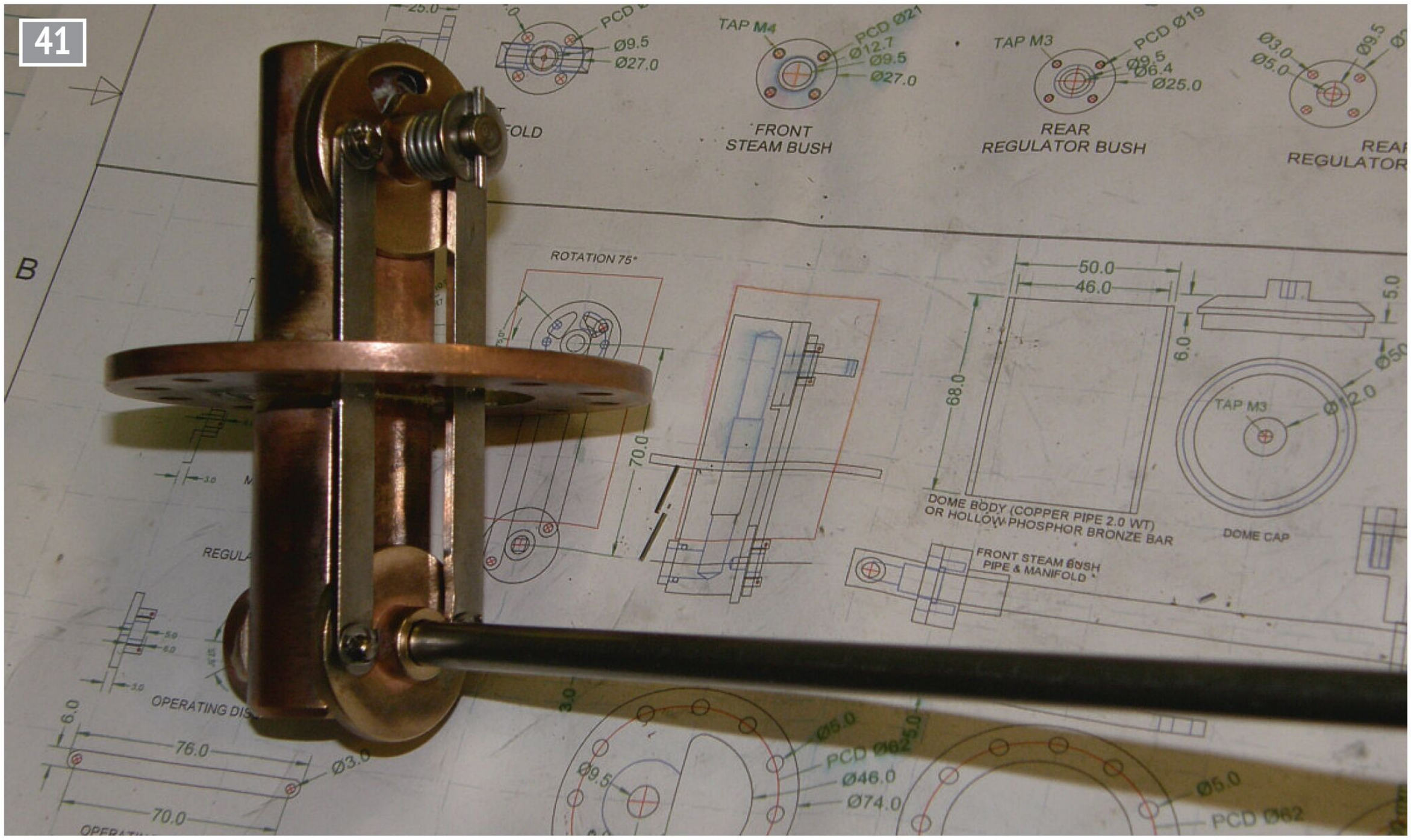
Here is the completed boiler. The backhead is painted black because there is not enough room to fit any cladding over it, so this is the finished surface that the driver will see.



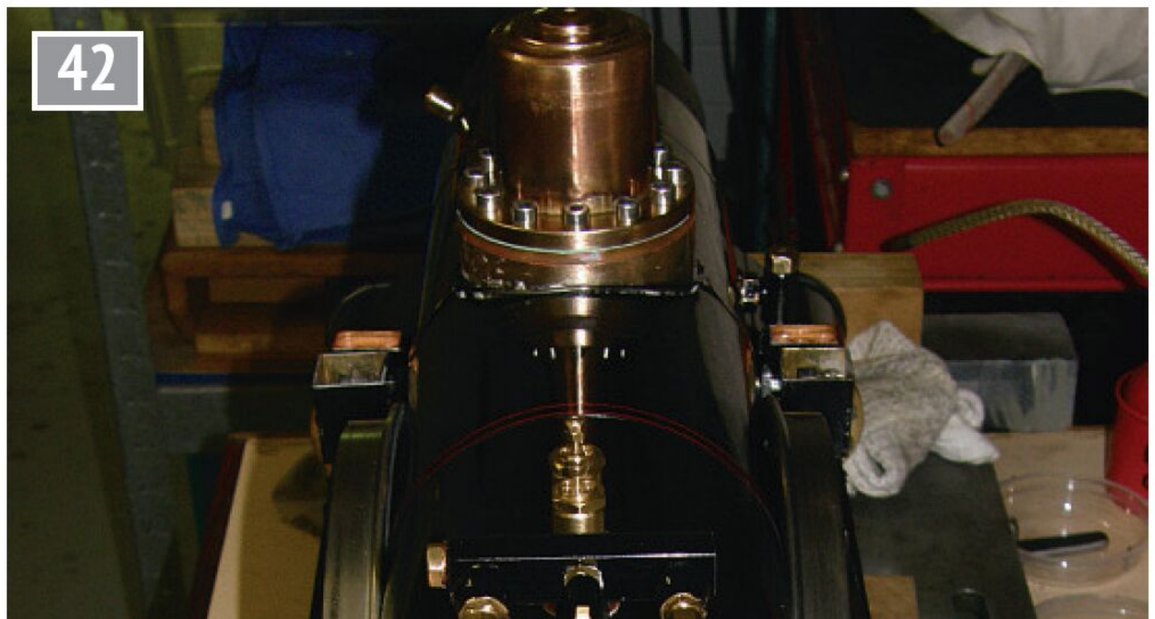
The boiler being clad with ceramic fibre insulation which sits underneath the final stainless steel sheet cladding.



The completed boiler, clad, painted and lined. In the end, I did have to make cut-outs in the cladding behind each wheel so it would fit.



The regulator assembly; a conventional rotating disc at the top operated by the lever arrangement at the bottom, via the shaft, right, which protrudes through the boiler backhead.



This final boiler photo shows the driver's view of the backhead with all the boiler fittings in place.

the boiler shown in **photo 37**) because it was too tight against the boiler backhead. I was able to shift it back a few millimetres, which made it workable.

The completed boiler (**photos 38, 39** and **40**) was hydrostatically pressure tested to 200psi. There were a couple of minor leaks, which were fixed before the final test.

Cornwall has a very large steam dome above the boiler, where the regulator (**photo 41**) can be comfortably accommodated.

At the top of the boiler is the regulator, now mounted in the steam dome. Some of the smokebox pipework is visible at the front (lower right of photo 41).

In **photo 42** the cab floor is under construction, with some of the pipes and floor fittings visible. Beneath this floor is a spaghetti tangle of pipes, valves, injector and tender couplings that took quite a while to sort out – but eventually they were all persuaded to fit within the very limited space.

The boiler dome may present some challenges. Fortuitously, I had acquired a cast brass dome that was almost the right size and, with some doctoring, it was made to fit. Other builders may have access to casting facilities in which case a pattern could be made and a dome cast; alternatively, it is also possible to fabricate a suitable dome. A further possibility is to source a similar sized dome casting from one of the model engineering suppliers and adapt that to fit. As it is a cosmetic cover and not part of the boiler pressure vessel, the chosen construction method is not critical.

●To be continued.

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Tools and Machinery

■ Myford ML7 on makers stand, three and four jaw chucks etc, £1250.
Tel. 01246 277357. Chesterfield.

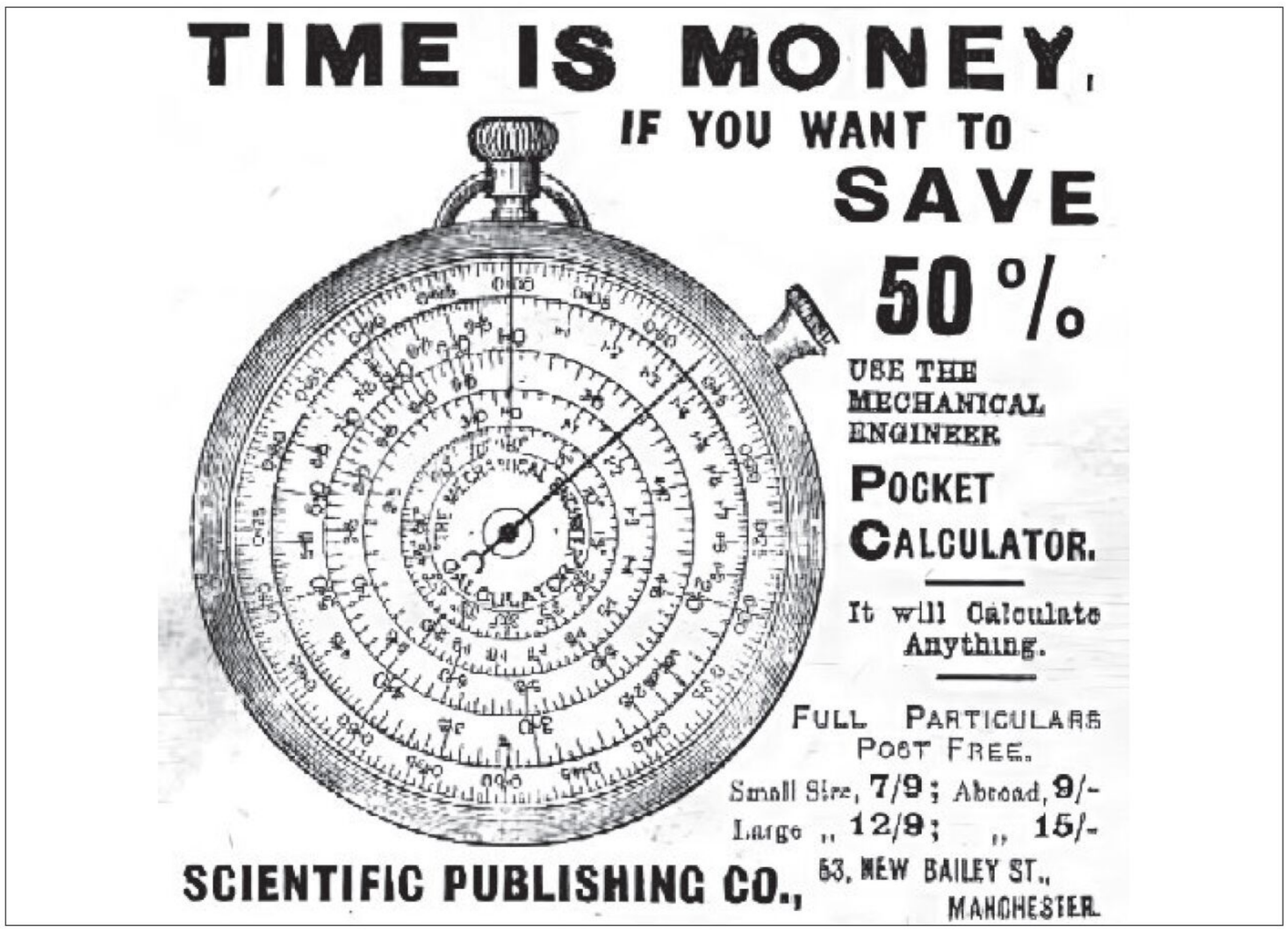
■ Mk.1 Clarkson tool & cutter grinder. 3 phase, slides all in good condition. Very little tooling, hence, £400, or very near offer.
Tel. 01865 820827. Abingdon.

Models

■ Stuart Steam Boiler Feed Pump, factory built, unused, also part machined set of castings for same, stand alignment machined by Stuart Turner, £250 the two.
Tel. 01283 760917. Burton-on-Trent.

Parts and Materials

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Hunslet's Scootacar

A good engineering idea at the time



Hunslet 2-6-2 tank engine built for the Sierra Leone Government Railways and repatriated after that line closed. Seen here climbing the 1 in 29 Golfa incline on the 2 foot 6 inch gauge Welshpool and Llanfair Light Railway.



Model of a 500 HP Hunslet diesel locomotive presented to Hughie Wilkinson on his retirement from Hunslet in 1988. After starting with Hunslet in the late 1930's he worked for the firm around the world helping customers, often on sugar plantations.



Roger Backhouse looks at Hunslet's foray into the motor car market.

Bubblecar Museum

Leeds Museum

Imagine you are a director of a company with a distinguished history of building quality locomotives with wide export markets (**photo 1**). It is the 1950's and you can see those markets are diminishing. How can your firm survive? And rumour has it that a fellow director's wife has had trouble parking her Jaguar car. So the time has come to try something radically different.

It's hard to believe that the Hunslet Engine Company of Leeds, noted for a range of steam and diesel locomotives sold throughout the world, once branched into making something as radically different as a bubble car. But that's exactly what the firm did between 1957 and 1965 when they produced three versions of the *Scootacar*. Their locomotive market was limited and likely to shrink so they saw the *Scootacar* as a way to diversify their output and help their survival (**photo 2**).

There's an example of a *Scootacar* loaned by Stephen Boyd on display at Armley Mills Industrial Museum, Leeds (**photo 3**). That city was once known as 'the city of a thousand trades' and this is one of the more remarkable products among examples of textile and heavy machinery.

During the 1950's several makers developed microcars. Well known makes included Messerschmitt, Bond, Isetta and Heinkel but there were many others; some had just limited production. Microcar engines were under 700 cc and most much less. 'Bubble' cars, holding just one or two people, could be driven in the UK on a motorcycle licence and three wheeled cars were taxed at a lower rate than conventional cars.

It was designed by Harold Brown, who had started as a draughtsman at Hunslet and had several other inventions to his credit. He saw service in Bomber Command during



Scootacar *Mark 1 on loan to Armley Mills Industrial Museum Leeds from Stephen Boyd.*



Scootacar *designer Harold Brown (© Leeds Museums & Galleries/ Henry Brown).*



Hunslet allocated a former pattern shop at their works for Scootacar *construction (Leeds Museums & Galleries/Henry Brown).*

the Second World War and fortunately is still with us aged 100 (**photo 4**). In 1953 he had designed the Rodley 750 car, another microcar, which was not successful due to an overheating JAP engine. Another of his ideas was the *Castra* washing machine.

Nevertheless his three wheeler *Scootacar* was a success with a sale price of £254 in 1957. Part of the appeal must have been fuel consumption of just 80 miles per gallon although at a stately speed of 30mph. Road tax was just £5 a year. It was said to handle well due to a low centre of gravity. Despite wheels of just 8 inch (203mm) diameter it could reach a top speed of 50mph (80kph) though that must have been an exciting ride!

The two stroke Villiers engine was rear mounted and drove the back wheel via a four-speed motorcycle type gearbox and a chain drive. A reverse gear was reportedly an optional extra. As a nod to the motorcycle heritage it had handlebars instead of a steering wheel. There was a toughened glass wrap-around front screen but Perspex rear and side windows. Driver comforts included a heater. As some cars were sold by scooter dealers that perhaps appealed to those who preferred a more comfortable ride to the icy draughts on a two-wheeler.

The driver's seat was mounted on top of the engine. It's claimed that the car shape was decided after Hunslet director and General Manager Rae Fryers sat on a box representing the engine with adjustable controls in front while an assistant drew the shape around him. That might explain the Scooter's comparatively generous dimensions as Mr Fryers was 6 feet 4 inches tall. (Other sources suggest it was Harold Brown who posed on the box.) The firm then developed a full-size wood and plasticine model before the car went into production.

A passenger could be carried behind the driver and sometimes alongside for the *Scootacar* was wide at the base (52 inches wide and 60 inches high). Lockheed hydraulic brakes were fitted. There was a side door.

Hunslet found space at their factory site in a former pattern shop for *Scootacar*



Scootacar *advert for the De Luxe Mark II version.*



Works photo of the Mark II (Leeds Museums & Galleries/Henry Brown).

construction. Light assembly took place on the upper floor. Construction must have been radically different from other Hunslet products which did not have fibreglass bodies! Nevertheless, the firm made the car an engineering success (**photo 5**). Using this innovative material helped the firm to pioneer speciality glass fibre items for locomotive and other use. According to Don Townsley (see reference) the firm used glass fibre on the chimney cowl of some of the firm's Austerity tank engines.

Even if the story about the director's wife having trouble parking her *Jaguar* is apocryphal the *Scootacar* was undoubtedly easy to park and photos exist of cars parked end on to the kerb between other parked cars on London's Park Lane.

The De Luxe Mark 2 version came out in 1960 with a redesigned body (**photos 6** and **7**). This was reported to reach 55mph. Just a year later came the De Luxe twin Mark 3 with the 324cc Villiers engine. Although nearly a thousand *Scootacars* were sold the Mark 3 was not a great success. Only around 30 of this larger engined model sold even though it was claimed to reach up to 68mph (109kph). Poor sales and the arrival of the BMC Mini caused Hunslet to stop production.

What happened to the *Scootacar*?

A *Scootacar* was among other microcars driven from London to Venice in September 1958. They were advertising the three-wheeler and scooter dealer MPHW (Mike Williams). Seen off from Trafalgar Square by the motor racing driver Mike Hawthorn, they went to Southend Airport for transport by the air ferry to Calais. They reached Venice by way of Ardres, Joinville, Basle, Lucerne and Como. Their journey was reported in *The Autocar* on 10th October 1958.

Mike Hawthorn went on to become technical director for York Noble Industries who made the Nobel microcar but wasn't long in post as he was sadly killed in a crash in January 1959.

Harold Brown recalls that the prototype car went to India with all the tooling and moulds but it isn't known whether it ever went into production there. However, it is understood that a different design was marketed in India under the *Scootacar* brand name.

Interest in these microcars has remained and the microcar concept has not gone away. In 2022 the *Microlino* was launched on the market as an all-electric vehicle. Given that most car journeys usually have just one person in the car microcars make more sense in towns than Chelsea Tractors, though could their 8 inch diameter wheels cope with today's potholed roads?

Hunslet diversification

With their main market for diesel mine locomotives gradually disappearing and fewer firms having rail connected sidings Hunslet tried other diversification. Through a takeover of Hattersley-Pickard in 1957 they made hydraulic flat plate presses for over twenty-five years. They were much used in the textile industry and widely exported.

In a remarkable development Hunslet built the first radioactive cobalt therapy machine for a British hospital, developed in collaboration with a Leeds teaching hospital. That appeared in 1958. Although that was not their design Hunslet built it to high standards using their skills (and machinery) derived from complex heavy precision engineering. Later they sold that part of the business to Fairey of Stockport.

Another engineer, David J. Brown, used two standard farm tractors to make a four-wheel drive tractor with a very tight turning circle. Though that wasn't followed up Hunslet then made flame proof tractors, used with some success in mining, and towing tractors for the then new 747 airliners. Unfortunately, these were over-specified and expensive. Only four out of seven planned were made. Hunslet then used experience of flame proofing locomotives to create flame proof Land Rovers.

There was a purchase of MHE and Hunslet moved production of their side loading fork lift trucks to Leeds. Hunslet also supplied parts such as gearboxes to other locomotive manufacturers.

Hunslet did not give up on locomotives. They produced locomotives for Channel Tunnel construction and other railways but the works closed in 1995 although an office is reported to remain in Leeds. Production was moved to Staffordshire where in 2010 the company produced a new three axle diesel hydraulic locomotive for short industrial workings, the DH60C.

In a complex history, the business was sold to the LH group and then to the Wabtec Group, so the name has not entirely disappeared,

Scootacars today

These cars retain a devoted following. Models in good condition are in demand around the world and can sell for around £20,000. The Mark 1 version is considered the most sought after. Even cars in need of restoration are in demand so why not check barns and outbuildings for any leftover wrecks?

Stephen Boyd maintains a *Scootacar Register* and gave considerable help in preparing this article. He also publishes the *Scootacar Handbook* with much useful information for owners and restorers and publishes the newsletter *Scootabout*. See www.scootacar.org.uk or write to Stephen Boyd, 18 Holman Close, Aylsham, Norfolk, NR116DD

Further reading

Don Townsley
The Hunslet Engine works
Plateway Press. 1998

Places to visit

The Bubblecar Museum
Clover Farm, Main Street,
Langrick, BOSTON,
Lincolnshire. PE22 7AW
www.bubblecar museum.co.uk

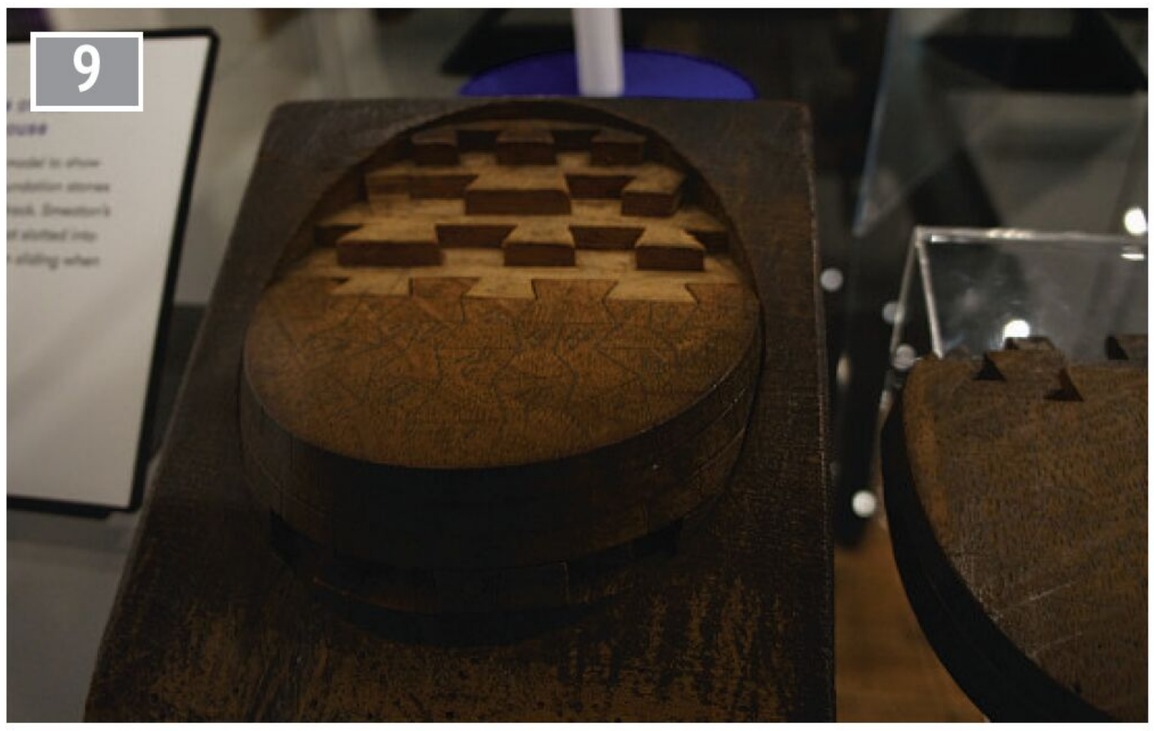
Over fifty examples on display and pre-booked rides are sometime available. Open from 8th March on Friday, Saturday, Sunday and Bank Holidays. 10-5pm



Scootacar *Newsletter*



Miniature power loom in Leeds Industrial Museum made in 1:4 scale by Joe Padgett in 1942. He worked for the Barnsley textile machinery makers Wilson and Longbottom and this demonstrated how their full-size looms worked.



Model of Smeaton's Eddystone lighthouse showing interlocking blocks used to build it.

Leeds Industrial Museum (Armley Mills)
Canal Road
Leeds
LS12 2QF
museumsandgalleries.leeds.gov.uk/leeds-industrial-museum
Tel 0113 378 3173.
Email 0113 378 3173
Open Tues-Fri 10-5,
Saturday and Sunday 12 - 5.
Admission charges apply.

Good textile and tailoring galleries but some others need attention. Don't miss seeing the miniature loom (**photo 8**), an amazingly detailed working model (there are relatively few such working model looms). Many Leeds made products are displayed including film projectors, engines including a mill engine and heavy machinery. (Mill engine runs only on special event days.) Locomotive gallery temporarily closed.

Temporary display *Engineery* inspired by Leeds born John Smeaton, father of civil engineering, says disappointingly little about the man and his achievements. However, it includes an interesting model of Eddystone Lighthouse construction showing the interlocking blocks Smeaton designed (**photo 9**).

Thanks to

Stephen Boyd
(*Scootacar* Register).
Dr Ron Fitzgerald
(Bradford Model Engineers)
John McGoldrick
(Curator of Industrial History, Leeds Industrial Museum)
Peter Thorpe
(Search Engine, National Railway Museum)
for considerable help with this article.

ME

NEXT ISSUE

Llanelli Rally
John Arrowsmith visits the Llanelli club's very popular spring rally.

Flying Scotsman
Peter Seymour-Howell is back in his newly constructed workshop and resumes construction of his fine-scale 5-inch gauge A3 locomotive.

Steam Engine
Ron Fitzgerald relates how Richard Trevithick patented his high-pressure steam engine, dispensing with the need for a separate condenser.

Butterside Down
Steve Goodbody considers a variety of solutions to the problem of moving heavy locomotives from A to B.

Oscillator Design
Martin Gearing considers alternative approaches to the design of oscillating engines.

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ON SALE MAY 17 2024

Atmospheric Engines of the Eighteenth Century



David Hulse presents the series of models he has made of early steam engines.

In 1970 I started a project which was to occupy all my spare time for the next 45 years. I have researched and constructed in miniature the important steam engines which were built in the eighteenth century.

These engines paved the way for the industrial revolution in the British Isles and which spread to many other countries throughout the world. These eighteenth century engines are usually grouped together and called 'steam engines' but they were not steam engines. Steam was used as a means of creating a vacuum against which the earth's air pressure could act. The correct terminology is that they were **atmospheric engines**.



Newcomen engine.

The Newcomen engine

The invention of the steam engine can with justification claim to be the most important event of the industrial revolution. The man responsible was Thomas Newcomen who, in 1712, built the world's first commercial steam engine which helped to remove the flood water from a coal mine at Tipton, in South Staffordshire. This engine removed 120 gallons of water each minute from the mine workings which were 150 feet beneath the engine. This engine was powered by earth's atmospheric pressure, acting against a vacuum that had been created by the condensation of low-pressure steam within the powering cylinder (3.00 psi). This cylinder had an internal diameter of 21 inches with the piston making a working stroke of almost 8 ft., and is the first vertically positioned cylinder on any engine in the world. The brass cylinder is thought to have been cast at a bell founders. In 1736 the engine was dismantled and reassembled at a colliery at Wednesbury. My model is shown in **photo 1**.

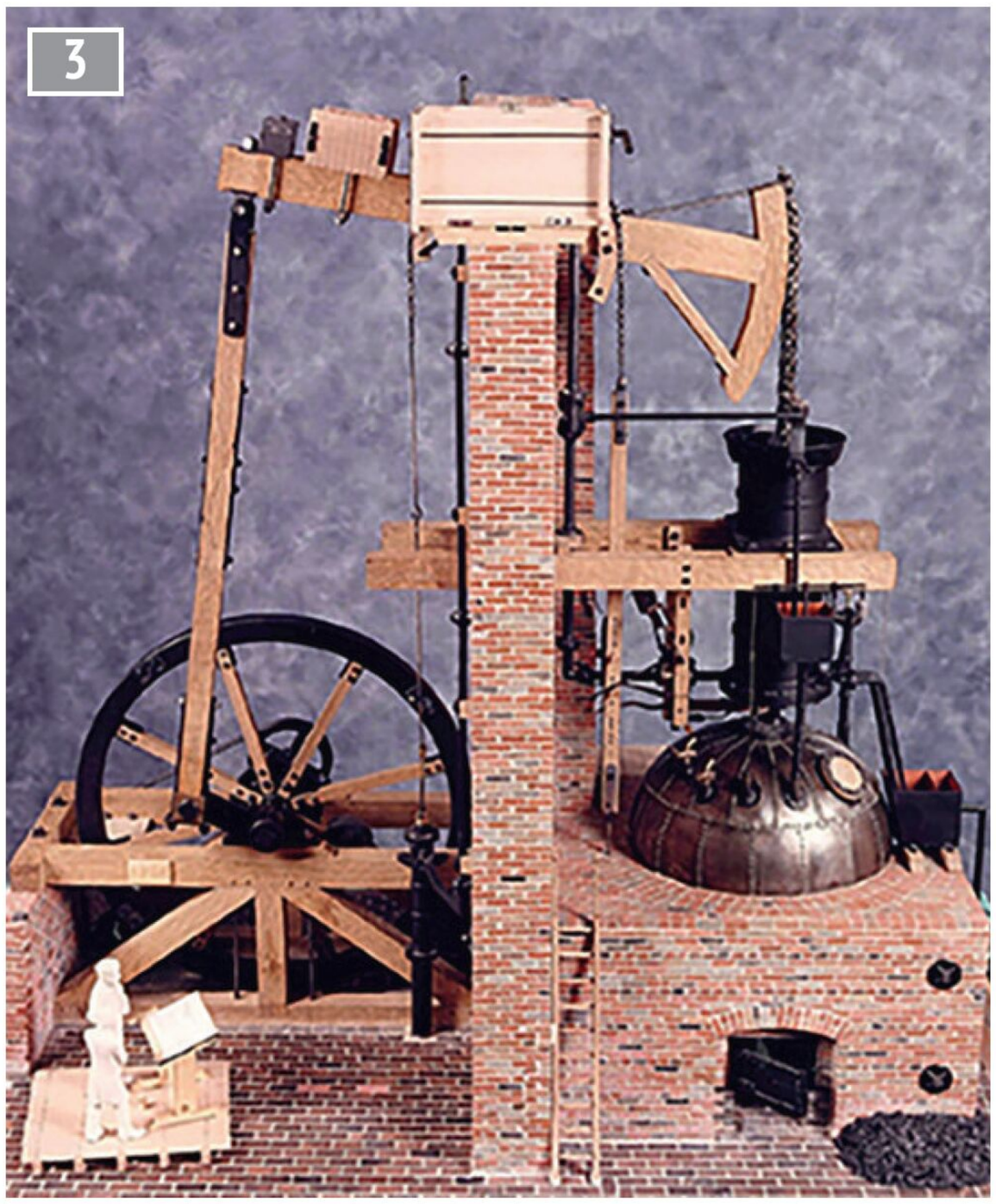
The Smethwick Engine

The next innovation came in 1779 when James Watt designed the Smethwick Engine, an engine used to lift water up a series of locks on the Birmingham Canal at Smethwick (**photo 2**). This design by Watt was more powerful and consumed less coal than the Newcomen engine. James Watt increased

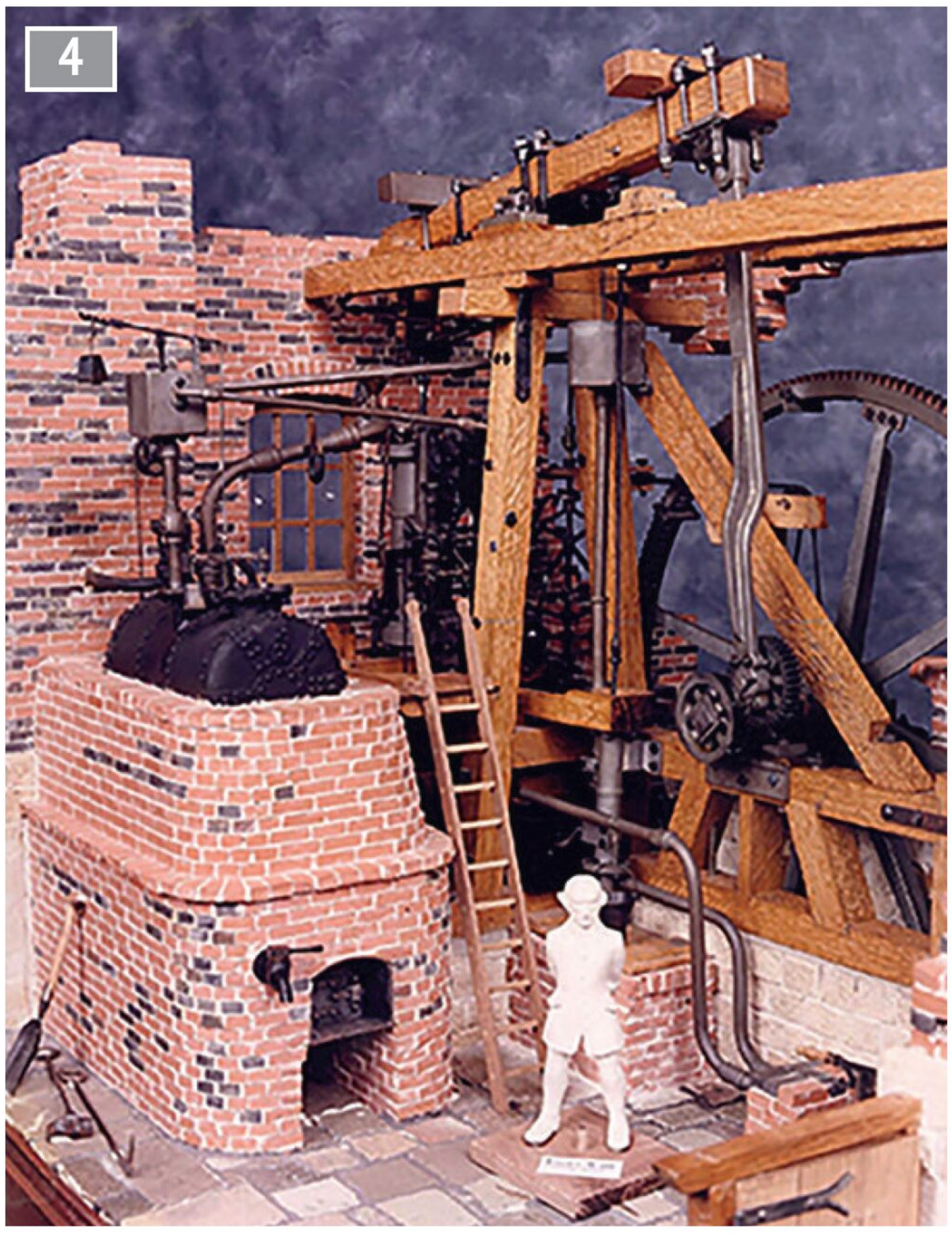


Smethwick engine.

the power output of his engines by separating the creation of the vacuum away from the powering cylinder by his patented invention of the 'separate condenser'. This doubled the power output of an atmospheric engine whilst consuming half the amount of coal. Watt's method of operation was quickly adopted by Cornish mine owners, and within three years the 75 Newcomen type engines working in Cornwall had been replaced by engines working on James Watt's patented method of operation. The Smethwick Engine operated until 1891 and is now preserved at Think Tank Millennium Point Birmingham. It is the oldest working steam engine in the world and is regularly steamed. Working at Smethwick the cylinder of this engine was 32 inches in diameter and the piston made a stroke of 8ft. Operating at 12 strokes per minute, 160 gallons of water were lifted to replenish the canal at the upper lock at each stroke. ≫



Pickard and Wasborough engine.



James Watt's Lap engine.

When complete in 1797 this engine cost the Birmingham Canal Company £2095-14-3d.

Companies using an engine powered by a separate condenser had to pay Boulton and Watt an annual licence; the cost was determined by calculating the amount of fuel consumed had a Newcomen engine been used to complete their operation. A calculation was then made to determine the fuel consumption of a Boulton and Watt engine, this figure was divided into the amount of fuel used by the Newcomen engine. The customer was then charged 1/3 of the difference. The canal company had to pay Boulton and Watt £210 annually in perpetuity to use the Smethwick Engine.

The Pickard and Wasborough Engine

The principle of the overhead rocking beam used on these two engines was adapted in 1780 to provide a rotary drive to the machinery at James Pickard's Manufactory in Water Street Birmingham (**photo 3**). A patent was taken out for this method of operation on 23rd August 1780. This patent gave legal protection to Pickard and Wasborough for the application of a crank to provide rotary motion for the first time by this method. James Pickard was a Birmingham manufacturer and Matthew Wasborough was a Bristol engineer. A bitter dispute ensued between these two men and James Watt who said the idea was given to them by an angry workman employed at the Soho Manufactory.

In Water Street the engine drove a multitude of polishing machines, and also a large stone for grinding gun barrels. However, on the patent James Pickard states his occupation as a button maker.

James Watt's Lap Engine

A second engine designed in 1788 by James Watt became the first of a new generation of rotary steam engines (**photo 4**). The Lap Engine as it became known had its power rated in horsepower, and its rotational speed was controlled by a centrifugal governor. Many of these engines were sold to manufacturers who were unable to drive their factories by the use of water or horse power alone. The granting of a patent for the crank to Pickard and Wasborough set Watt an intellectual challenge. He was not willing to pay these two men for its use so numerous ideas were experimented with. The mechanism he settled upon can be seen on the Lap Engine - the sun and planet (epicyclic gearing).

The term horsepower was calculated by measuring the work done by one horse in one minute which was 33,000 ft.lb divided into the work done by the engine in the same time. The Lap Engine was 10 horsepower. Potential customers would have 10 redundant horses if they purchased one of these engines in 1788 for the price of £800.

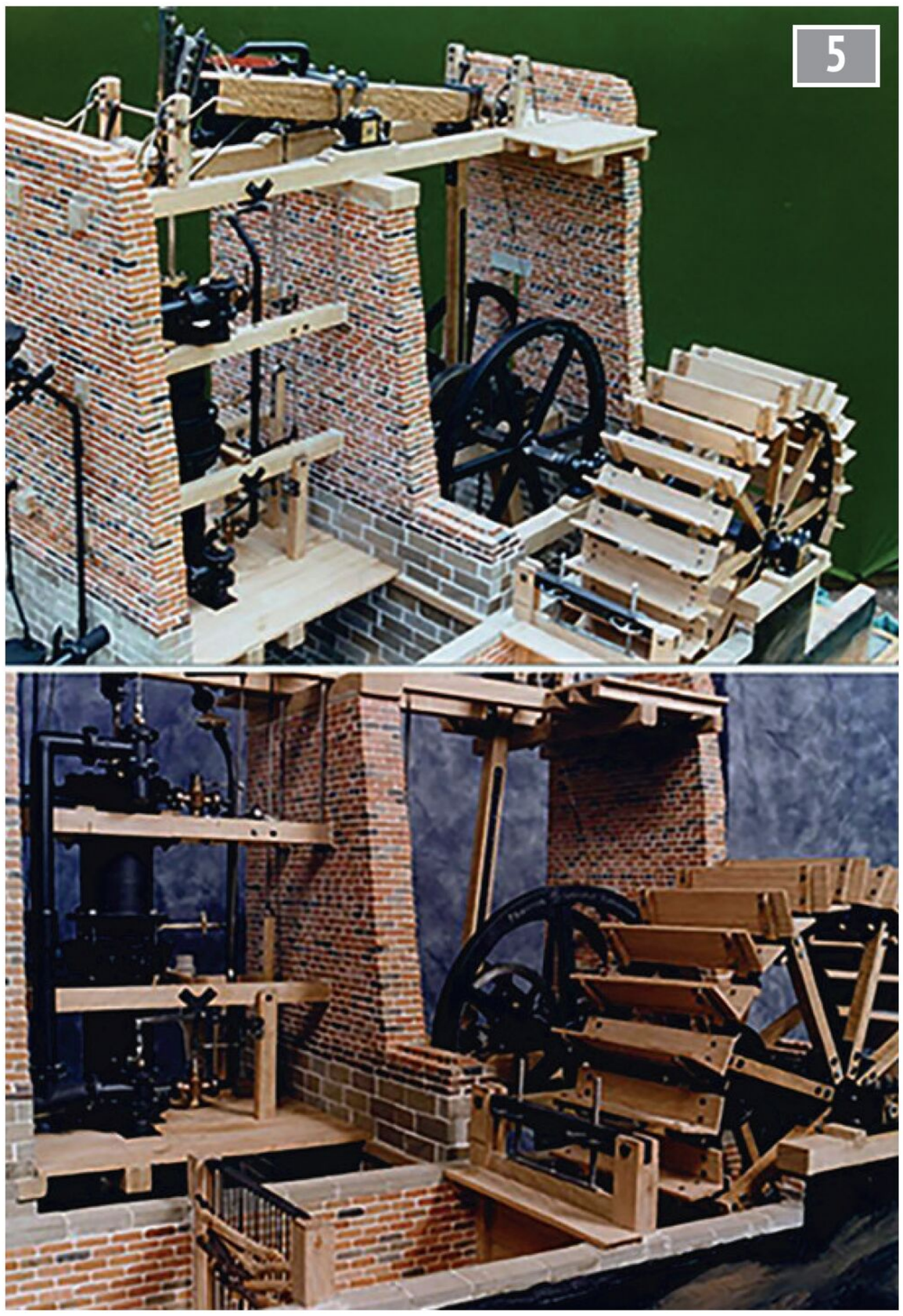
The Lap Engine drove 43 lapping and polishing machines at the Soho Manufactory of Boulton and Watt from 1788 until the manufactory ceased production in 1858. The engine is now on display at the London Science Museum.

The Arnold Mill Engine

In 1797, an engineer from Ashover in Derbyshire, Francis Thompson, was commissioned to design an engine to drive a worsted mill at Arnold on the outskirts of Nottingham (**photo 5**). The Arnold Mill engine drove the machinery when there was not enough water to keep the mill in full production by water power alone. All the engines of the eighteenth-century were powered by the weight of the earth's atmosphere, pressing onto a piston and were classified as atmospheric engines.

A close study of this engine will reveal two atmospheric cylinders were used, one positioned above the other. The combined force from these two pistons exerted a force both up and down onto the piston rod (double acting).

Many unique features of this engine were designed to be successful without infringing



Arnold mill engine.

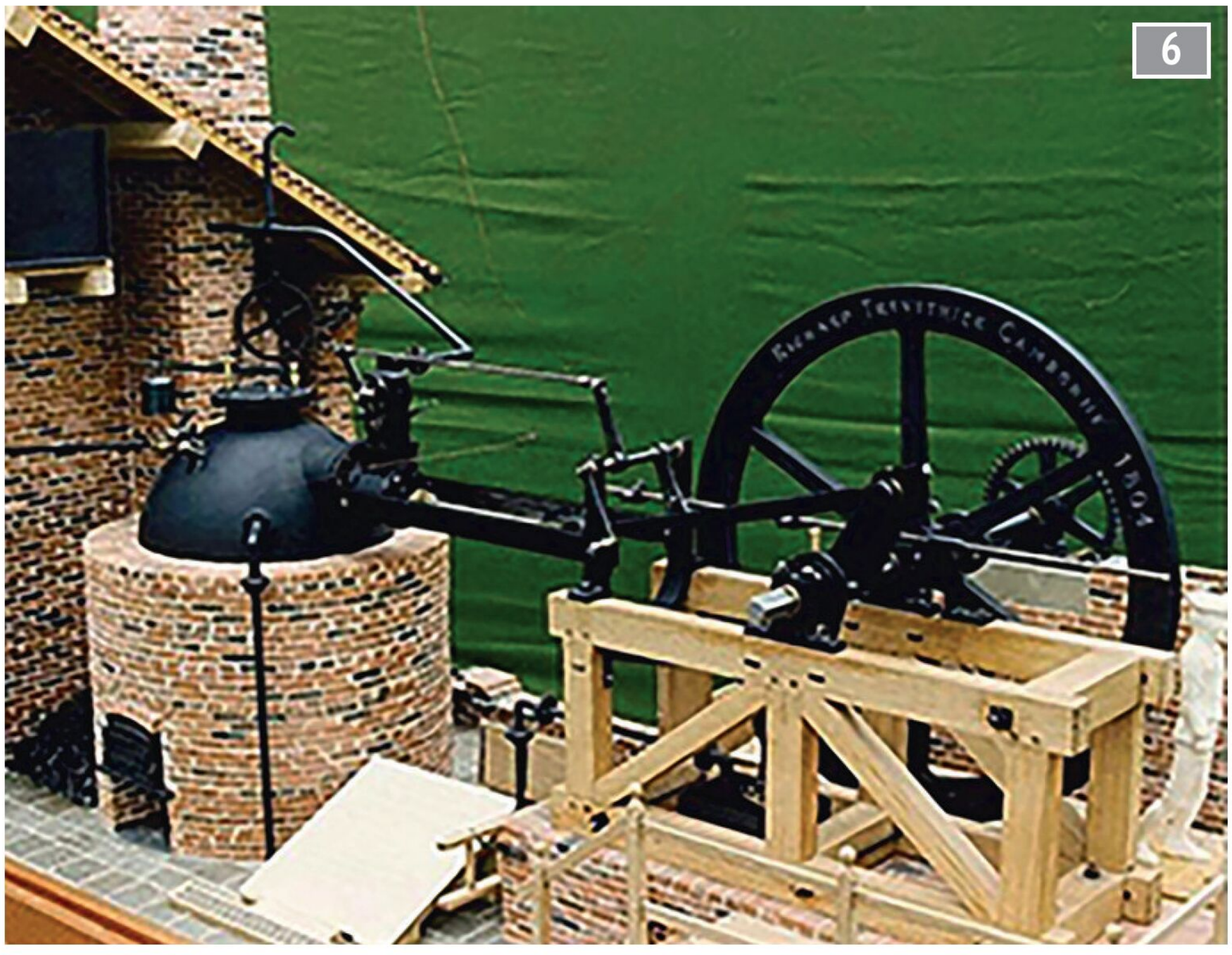
the patents held by Boulton and Watt. The parallel motion to the piston rod is worthy of close study. Three chains are held in tension enabling the combined force from the piston rod to be transmitted onto the main oscillating of the engine. In the late 1790s the mill at Arnold employed 1,000 operatives, 600 of which were apprentices under the age of ten. The engine operated until the mill ceased production in 1808.

The mill at Arnold was owned by John Hawksley and Robert Davison and the workforce at the Arnold Mill were paid with token coinage, which could only be used at the factory owners' shops.

The Lambeth Engine

In 1804 Richard Trevithick, a Cornish engineer, designed an engine which used steam at a high pressure directly from the boiler, and this became known as 'strong steam' (**photo 6**). The Trevithick engine was small and compact without the complexity of the atmospheric engines designed by Newcomen and Watt.

The research into this engine was expensive. Although this engine was designed and built in 1804 it did not become known in modern times until 1970! John Farey wrote a treatise on the development of the steam engine at the beginning of the 19th century. He wrote two volumes; volume one was printed but before volume two was printed John Farey died. The publishers David and Charles in 1971 were asked to reprint his treatise and it was only then a discovery was made that he had written volume two which after his death was deposited in the National Reference Library of Science and Invention. The Lambeth engine details were recorded in volume two. Additional details needed to construct this engine in miniature are from the archives of both the Esterhazy Castle situated between Austria and Hungry and the Technisches Museum in Vienna. In 1804 the castle bought an engine to ornament a lake. Prince Nikolaus II was so pleased with this engine that in 1815 he commissioned a model of the engine to be made which is now in the Technisches Museum. The curator at the museum kindly gave many details which enabled me to construct an accurate miniature of Trevithick's high-pressure engine.



Lambeth engine.

The Pentrich Engine

Francis Thompson (1747-1809) in 1791 designed and built an engine to remove the flood water from a colliery at Pentrich in Derbyshire. This engine is preserved, and is now displayed at the Kensington Science Museum in London. Engines in the eighteenth century derived their power from the pressure of the earth's atmosphere acting against a vacuum that had been created by the condensation of steam beneath the piston, within the powering cylinder. These engines became known as atmospheric engines.

In 1819 the Pentrich engine was dismantled and reassembled at Staveley Lower Ground Colliery, where it was to operate for the following twenty ≫

years. In 1839 the engine was again dismantled and returned to the Pentrich Colliery where it continued to remove the flood water until 1915.

The powering cylinder had an internal diameter of 57.5 inches and the piston completed a working stroke of eight feet, for each minute six working strokes were completed, each stroke lifting 166 gallons of water from the mine workings 360 feet beneath the engine, enabling the miners to work without the constant fear of flooding.

Photograph 7 shows my one sixteenth scale model of Thompson's atmospheric pumping engine. A great effort has been made to recreate the model as the engine originally appeared in 1791, without the modifications that had taken place during the engines working life of 124 years. Originally the overhead rocking beam would have been constructed from a single piece of English oak, which was replaced by cast-iron c1840.

Drawings and photographs by William Thompson Anderson and a drawing made by C.O. Becker in 1919, when the engine was dismantled, made possible the creation of this model.

Every component is individually made from materials available to the engineers of the eighteenth-century. Every metal part is handmade - the 220 links of the operational chains are individually hand forged!

The starting point for the engine in miniature was having the drawing displayed in the Kensington Science Museum enlarged to my chosen scale. From this the overall size of the model could be established. A welded frame was made to support the sectional building needed to house the completed engine. At this stage the steel frame measured 43 x 28 and 24 inches tall, made from square section mild steel tubing.

Unlike my other models this engine house was built from stone. After visiting the Pentrich area of Derbyshire, I concluded carboniferous sand stone was an almost identical match and was readily available from Sycamore quarry, Kerridge, near Macclesfield.

To complete the sectional engine house 1,340 individual blocks were cut using a water-cooled diamond saw. The intricately shaped stones were cut dry using a high-quality face mask and dust extraction.

Adam Heslop and the William Pit winding engine of 1806

Built into the fabric of a substantial engine house, Adam Heslop assembled this unique winding engine, which, on 10th March 1806 hauled the first baskets of coal from the mine workings almost 600 feet below (**photo 8**). This imposing structure standing 40 feet tall was built almost on the shoreline at Whitehaven in Cumbria. Rising from the furnace beneath the boiler was a stone chimney standing 62 feet tall.

This was an enormous beam engine powered by two cylinders; one 44 inches diameter (hot cylinder) the other 28 inches diameter (cold cylinder). These cylinders were positioned at opposite ends of the main oscillating beam. Each piston was powered by the weight of the earth's atmosphere, acting against a vacuum which had been created by the condensation of steam, so it was a double acting atmospheric engine.

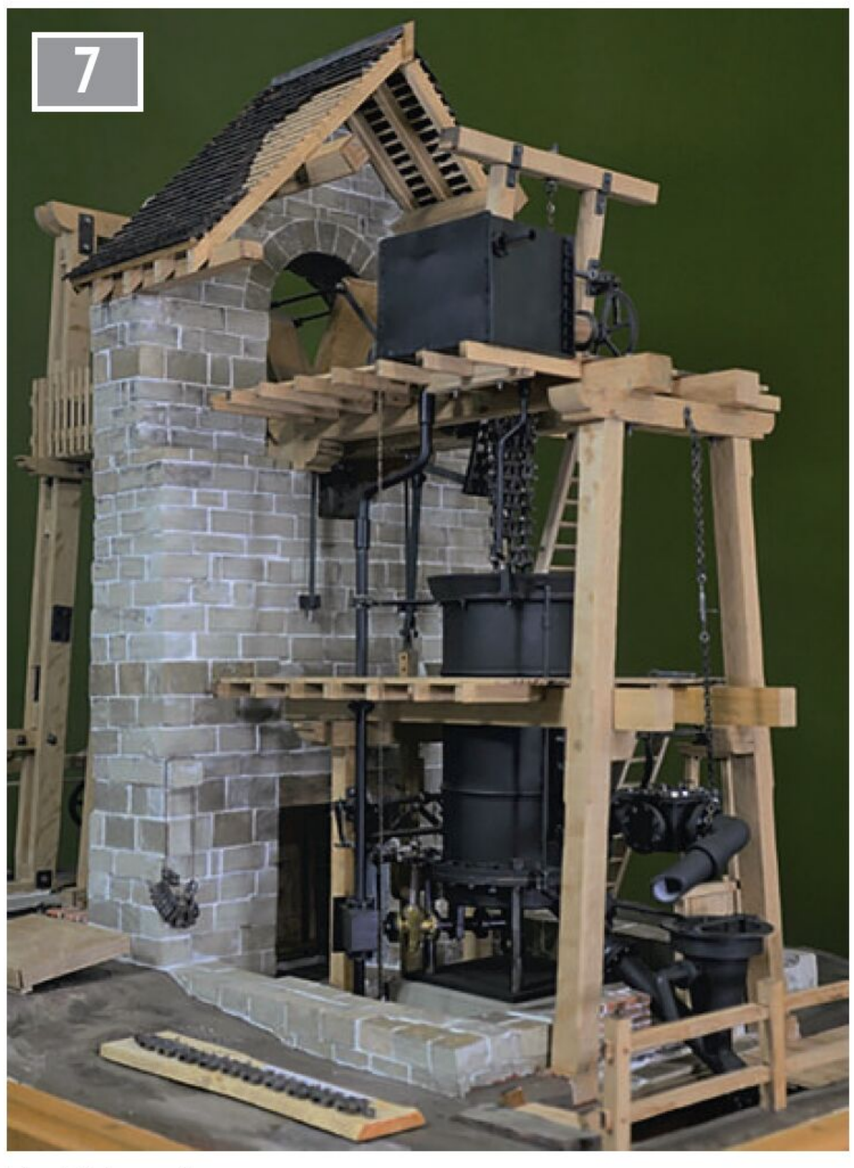
The boiler providing the steam was 13 feet in diameter and 3,000 gallons of water was required before lighting the furnace. The ideal steam pressure was three pounds per square inch. After condensation the vacuum created was applied to the underside of each piston. Enabling the engine to self-start, the expansive force of steam was also applied to the underside of the piston within the 44 inch cylinder. Baskets loaded with 12cwt (610kg) of coal are stated to have taken 45 seconds to be lifted from a depth of 570 feet. The diameter of the rope made from hemp was 1½ inches and, when fully extended, would have added 450lb to the load being hauled by the engine. When the engine started to lift, the combined weight would have been almost 2,000lb.

The engine hauled a loaded basket of coal from the mine workings in 45 seconds. A simple calculation revealed the engine was developing 46 horsepower to have achieved this task.

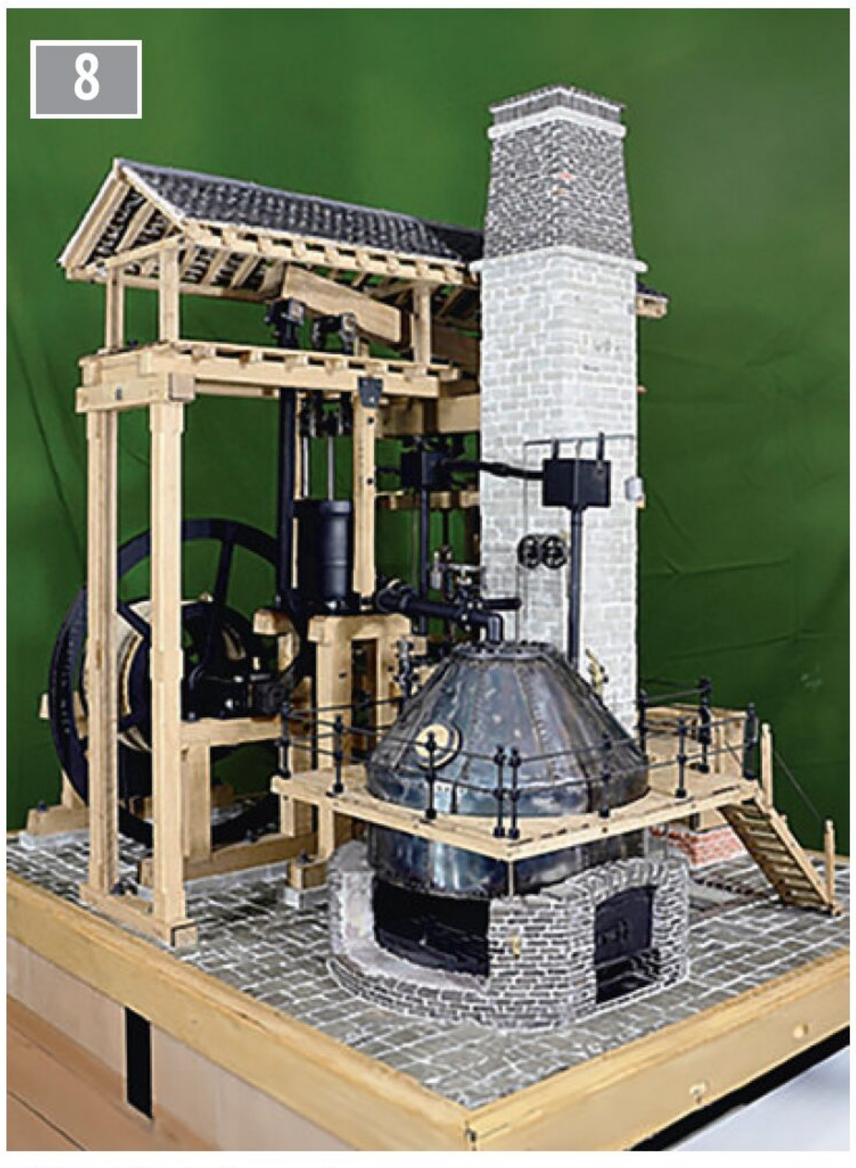
More information

More photographs and more detailed information about these engines can be found on my website (davidhulse.co.uk). If you wish to see the models they are on display at the Dartmouth Museum (www.dartmouthmuseum.org).

ME



Pentrich engine.



William Pit winding engine.

David Hulse engines.

Dartmouth Museum.

A Look at Locomotive 030 T 8157 PART 2

Rhys Owen visits a post-war locomotive made in France based on a German design.

Continued from p.585
M.E.4741 April 19

Moving below the right-hand side of the footplate **photo 11** shows the locomotive's air brake cylinder mentioned previously. This acts on an arm that rotates the brake shaft below (this is just visible through the cut-outs in the frame and the frame stretcher). The spring is there to release the brakes when the air in the brake cylinder is expelled. Bottom right the rim of the right-hand rear driving wheel is visible with, next to it, a sand pipe. Just visible beyond the sand pipe is the right-hand rear part of the ashpan.



Locomotive air brake cylinder.

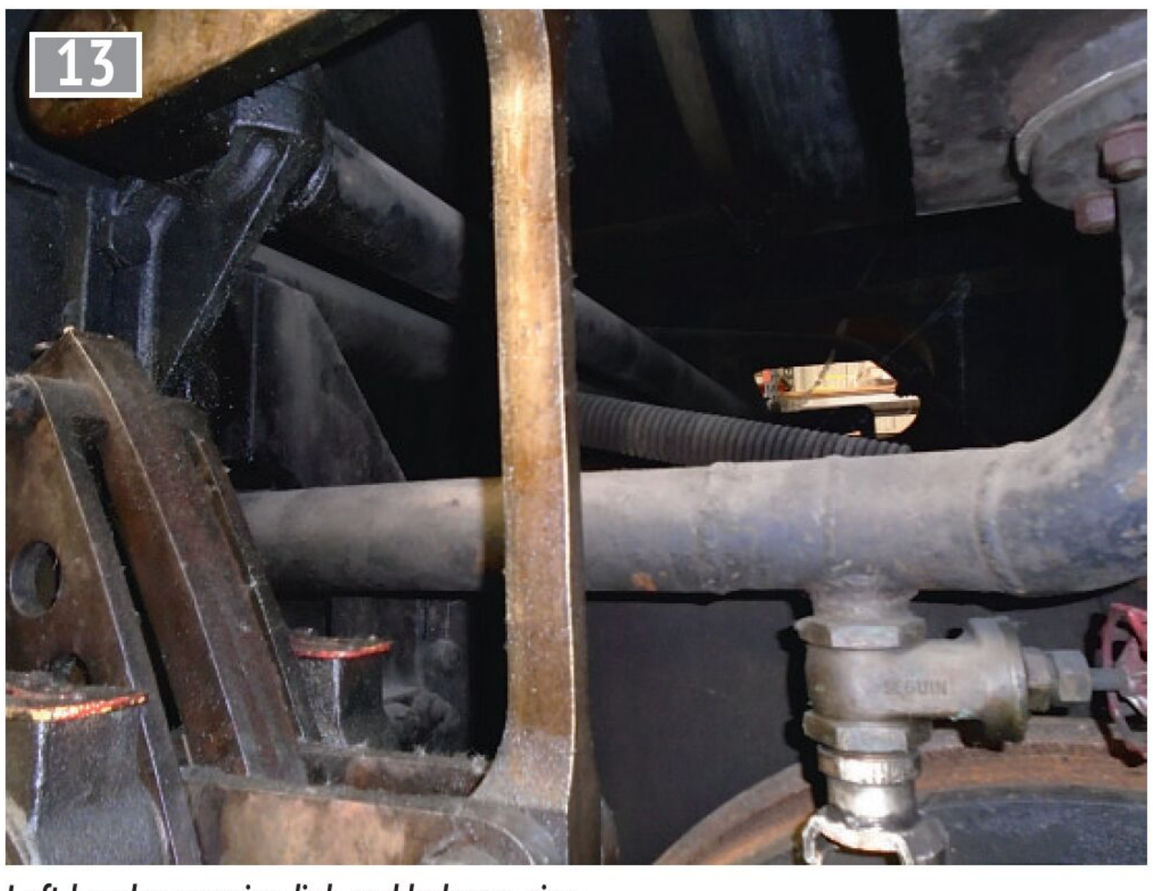
Further forward along the right-hand side of the locomotive we can see (**photo 12**), in the background next to the wheel, the rear end of a coupling rod with, in front of it, the big end of the connecting rod. Both these have nuts for adjusting the wedges that hold the bearings in position. In the foreground is the return crank which is fixed on the crankpin and which is connected to the eccentric rod. The ends of all these rods have oil boxes that have oiling apertures closed by spring-loaded plungers. Through the spokes of the wheel can be seen the axlebox and the right-hand side of the wheel consists of a large counterweight that is there to balance the masses of rotating parts such as the coupling and connecting rods.

Moving over to the left-hand side of the engine, looking through the side tank cut-out we see (**photo 13** - bottom left) part of the expansion link and its trunnions, together with the lifting link that lifts the radius rod when moved by the reversing arm on its shaft (visible top left). The weight of the radius rods and lifting links is counterbalanced by a spring rather than a weight.

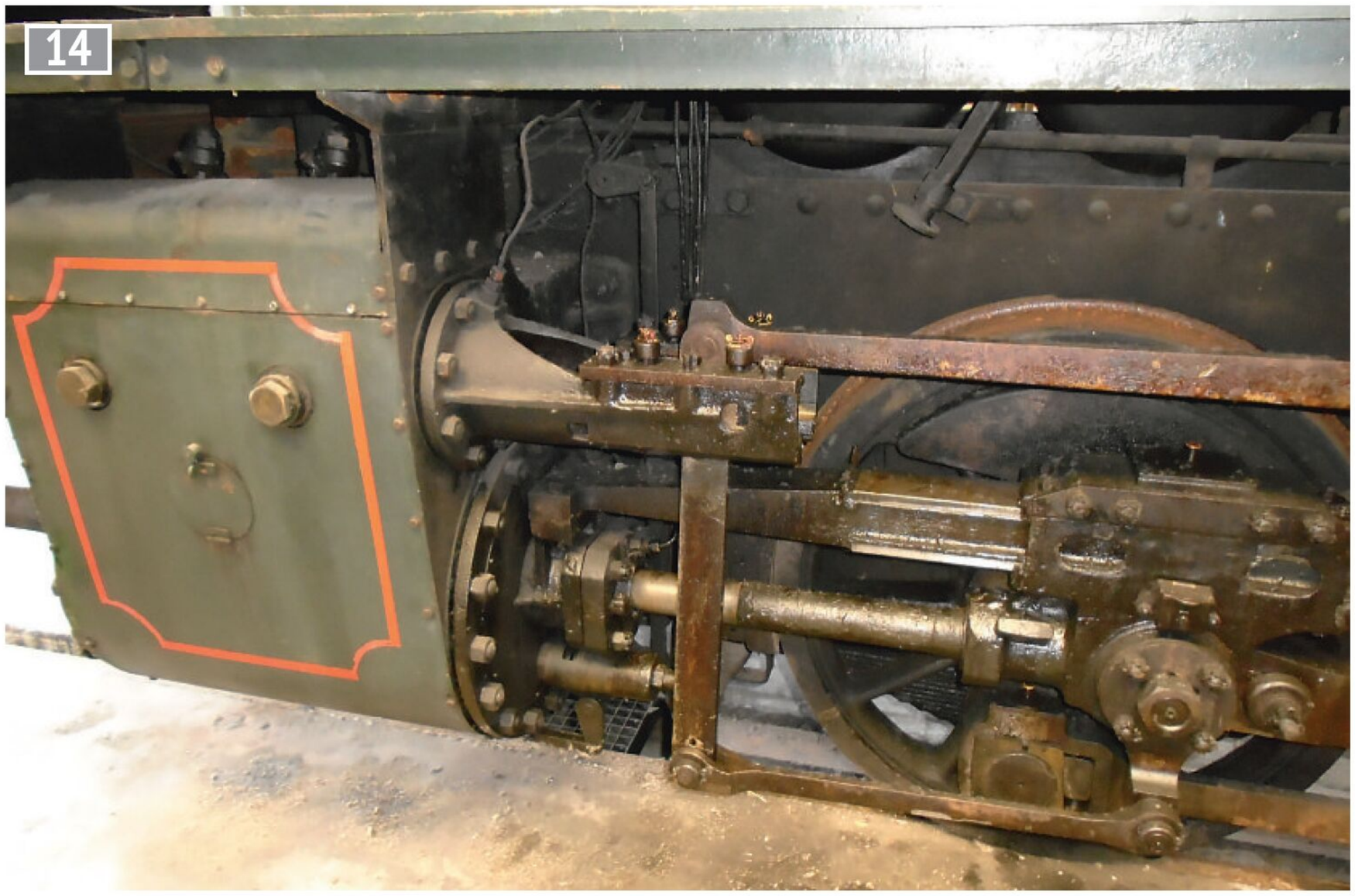
The two wells of the water tank on each side of the cut-out



Right-hand return crank.



Left-hand expansion link and balance pipe.



Left-hand cylinder and crosshead etc.



Inside smokebox.

are joined by a pipe on which there is a drain controlled by the valve with the red handle.

Moving forward we can see on the left (**photo 14**) the cylinders and valve chest.

Although the engine is fitted with piston valves there appear to be no snifting valve or by-pass arrangement.

On the right is the crosshead with, in the centre, looking from top to bottom, the radius rod from the expansion link (not visible) which connects with the top of the combination lever to give it the oscillation ultimately derived from the return crank. This is, of course, Walschaerts valve gear, known in the German-speaking world as *Heusinger-Steuerung* because Edmund Heusinger von Waldegg invented the current arrangement of the gear in 1849 although the principle had been invented in 1844 by the Belgian engineer Egide Walschaerts.

The radius rod is pivoted on the valve rod although the valve rod and this part of the combination lever is hidden by the casting that is bolted to the valve chest (on the left). On this casting are the oil pots, visible on both sides of the



Exhaust steam pipes leading to underside of smokebox.



Right-hand side balance beam axles 1 and 2.



Blowdown exit.



Blow down valve and reverser spring.



Right-hand tank washout doors.

combination lever, that lubricate the slides for the rear end of the piston rod. An oil pipe from the lubricator can be seen entering the casting and this feeds oil to the piston valve rod gland.

Below the valve chest is the left-hand cylinder, the rear cover of which holds (top to bottom) the front end of the single slide-bar, the piston rod gland and a cylinder pressure relief valve which - in theory at least - should relieve the pressure in the cylinder if priming occurs. Below the relief valve can be seen the linkage that leads to the cylinder drain cocks which are there to drain the cylinders of any water. Cold cylinders condense steam!

To the right is the bottom of the combination lever which is joined to the bottom of the crosshead by the union link which passes the fore-and-aft movement of the crosshead to the combination lever.

The crosshead itself joins the piston rod to the small end of the connecting rod (this latter pivots on the gudgeon pin, the outer end of which is within the large nut). The piston rod is joined to the crosshead (which in this case is not in the form of a cross) by a substantial wedge, the thick end of which is visible to the left of the large nut just mentioned.

Within the smokebox we see (**photo 15**) that the locomotive is not superheated, the main steam pipe from the regulator valve in the dome being connected directly by a T-piece to the two pipes that lead ultimately to the valve chests. Although this design is based on the German Class 80 locomotive which is superheated, I expect that in this case the superheater was omitted because of the extra maintenance involved and because the locomotive would not be in continuous service like a shunting engine in a marshalling yard. Since the purchaser was in the coal business, fuel costs were not likely to have been a major consideration!

Also visible in photo 15 are, top to bottom, the petticoat under the chimney, the blower and, just below the blower's ring, the blast pipe which extends upwards from the base of the drum-shaped smokebox. In the bottom right corner of the photograph can be seen part of the smokebox water spray which is fed by one of the injectors and controlled from the cab.

Photograph 16 was taken upwards from the pit over which the locomotive was standing. We see, beneath the smokebox, the pipes that carry exhaust steam from the valve chests on each side to the blast pipe. The bar that can be seen between the pipes transfers the force on the drawhook to one of the frame stretchers (rather than to the buffer beam).

Also taken from the pit, **photo 17** shows that the springs of the first and second axle are joined by an equalising beam (this is a feature shared with the Prussian T3 0-6-0T although in that case the equalising beam is above the wheels).

Again taken from the pit, **photo 18** shows the middle axle, part of the brake rigging together with the frame construction (these are, of course, plate frames). The conical object in the centre is the discharge from the boiler blow down valve and its underside consists of a circular plate with many small holes to reduce the noise from blowing down.

Photograph 19, taken through the cut-out in the left-hand side tank, shows the blowdown valve as well as the other end of the reverser spring. The blowdown valve is located to the front of the firebox, just above the foundation ring. Periodic blowing down disposes of some of the impurities left in the boiler when the feed water is converted into steam. This reduces the amount of washing out required and hence increases the locomotive's availability.

We have already seen a number of washing out apertures in the boiler and **photo 20**, showing the top of the outer firebox, shows two of these apertures with their doors in place. These doors are typical of a German locomotive and essentially consist of an oval head with a spindle attached. The perimeter of the oval head has a recess in which an oval sealing ring fits. The oval head is manipulated throught the aperture, also oval, and is then turned and pulled back so that the sealing ring bears against the lip of the

≫



Sand dome and valves

aperture. A crossbar is then placed over the spindle and a nut tightened on the crossbar so that the sealing ring is pulled tight onto the aperture lip. Care must be taken to ensure that the door does not fall into the boiler and the end of the spindle is not only threaded to engage the nut but also has a hole in the end through which string or wire can be passed to prevent such a fall.

Also visible is the steam fountain (known in French as *la nourrice* which means 'wet nurse'!) on which the manifold valve with the red handle allows its connection to the boiler to be shut so that work can be carried out on, say, an injector steam valve with the engine in steam.

Just visible on the extreme right is the whistle.

Photograph 21 shows parts of the safety valves on the left. To cut down on the noise from blowing off these have many small holes to release steam.

In the centre of this view is the sand dome which has valves with small air pipes leading to them so that they can be controlled by the driver.

On the right the steam dome is visible. Within this is the regulator valve which is (or at least should be!) above the level of the water in the boiler to avoid priming which can occur if the boiler water level is allowed to get too high or if impurities in the water cause it to foam. Priming means that water passes together with the steam into the main steam pipe and hence to the valves and cylinders. Priming should be avoided as, apart from washing the cylinder and valve lubricant away, water in the cylinders may cause considerable damage (this is why cylinder drain cocks are fitted to steam locomotives). Water is effectively not compressible so that the build-up of water in a cylinder may lead to a damaged cylinder cover or to a bent connecting rod. It may also be difficult to shut the regulator which will make controlling the locomotive challenging!

Notwithstanding the lack of a superheater, this locomotive is fitted with piston valves rather than slide valves. Unlike piston valves, slide valves can lift to help water to escape from the cylinders. In this case, the cylinder relief valves are there instead to help relieve any excess pressure in the cylinders.

Photograph 22 shows the two clack valves (i.e., non-return valves) that allow feed water from the injectors into the boiler but (at least in theory!) do not allow steam and water in the boiler to escape. The red valves are there to shut the clack valves if necessary and one clack valve has a fitting that allows hot feed water to be drawn off for other uses (e.g. giving another locomotive a hot water washout).

Visible below the clack valves are some of the pipes that carry oil from the mechanical lubricator to the cylinders, valve chests and their glands.

I hope that this look at the locomotive has been of interest. The fee for this article will go to the CFTV and anyone else interested in contributing funds to the restoration of 030 T 8157 to working order is invited to send a donation to the CFTV at:
CENTRE AFFAIRES ST QUENTIN
8 RUE VADE
80064 AMIENS CEDEX 9
TEL: 09.84 98.10.10

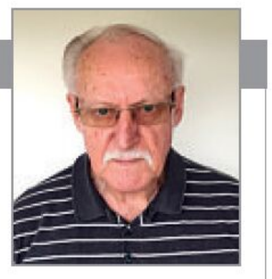
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Clack valves with water connection.

A Twin Tandem Compound Steam Engine

PART 3



Graeme Quayle presents

his own design for a compound winding engine.

Continued from p.553

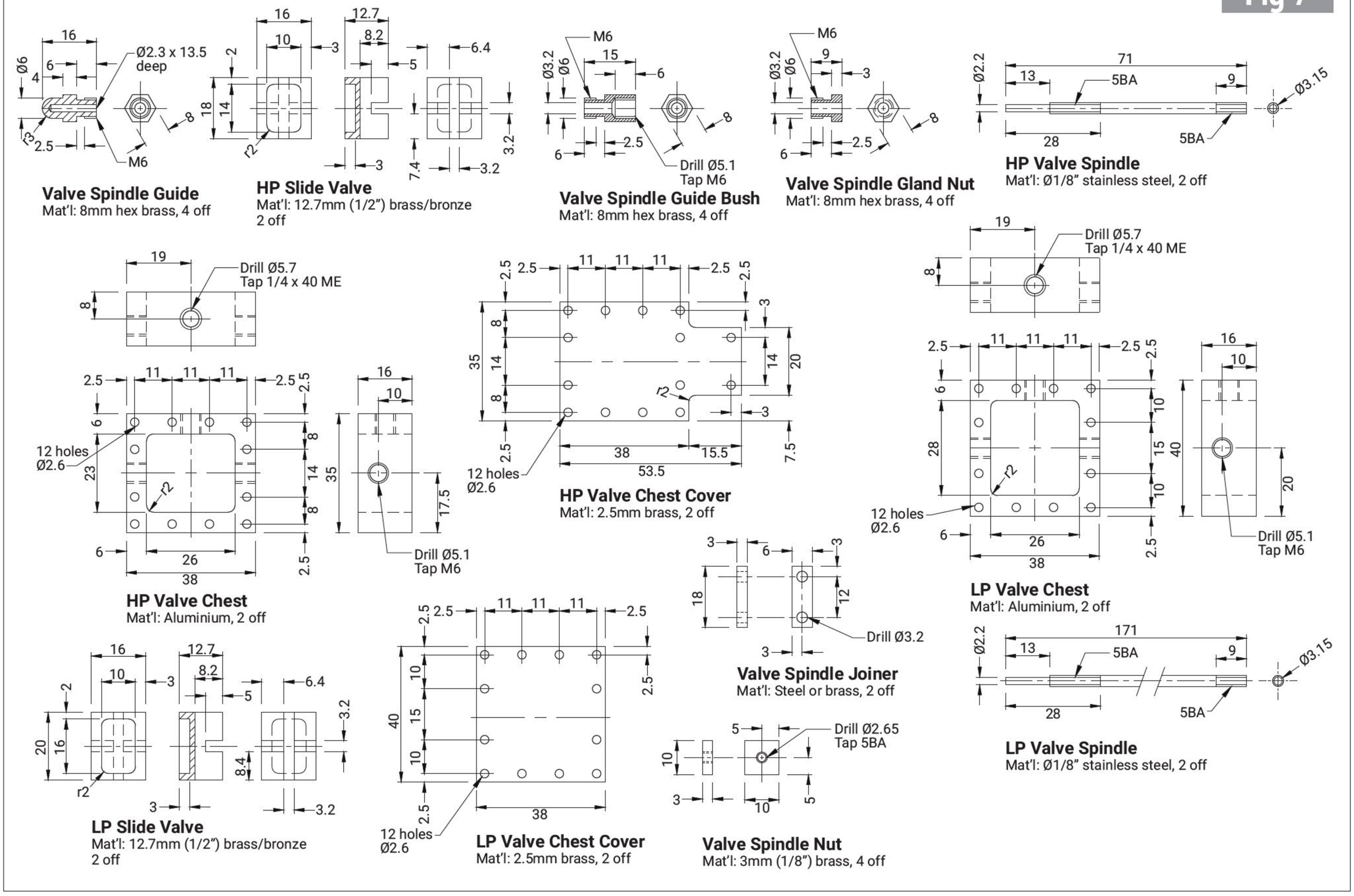
M.E.4741 April 19

The next step was to set the individual cylinders up in the mill and drill the holes for the screws that hold the steam chests to the cylinders, some 48 of them. It is a real blessing having digital readouts on the mill for this sort of operation. Then of course they were tapped.

The next items I tackled were the valve plates, steam chests and steam chest covers. These were all roughly cut out slightly oversize as they will be finished to size when the cylinders are finally machined externally. The valve plates are from 1.6 mm bronze, the steam chests from aluminium flat bar, 16 mm thick, and the covers from 2.5 mm brass (**figs 7** and **8**). These 12 parts were then drilled for the clearance holes. Before the holes were drilled a small centre drill was used to spot the positions. I clamped the valve plates and the covers in pairs for drilling. That's a total of another 120 holes - it does take time to cut out parts, drill holes, deburr and clean up 12 components. The valve chests were then returned to the mill and the rectangular centres milled away (**photo 21**). The valve chests and cylinders were then drilled and tapped for the valve spindle guides and the steam ports. It is important that the valve spindle holes are drilled and tapped dead in line.

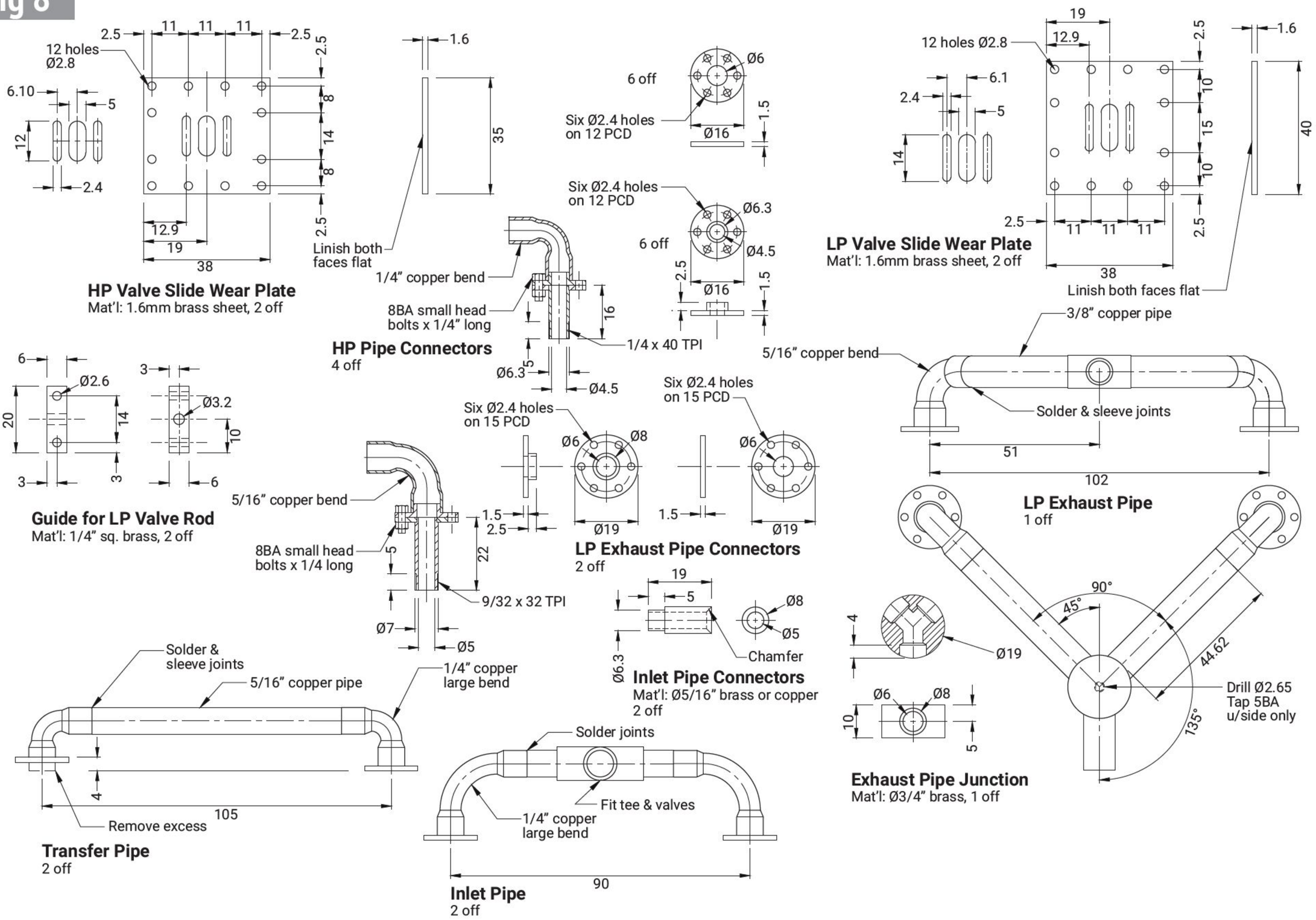
The next step was to screw the valve plates to the cylinders which I did with countersunk head screws to centralise the clearance holes in the plates to the tapped holes in the

Fig 7

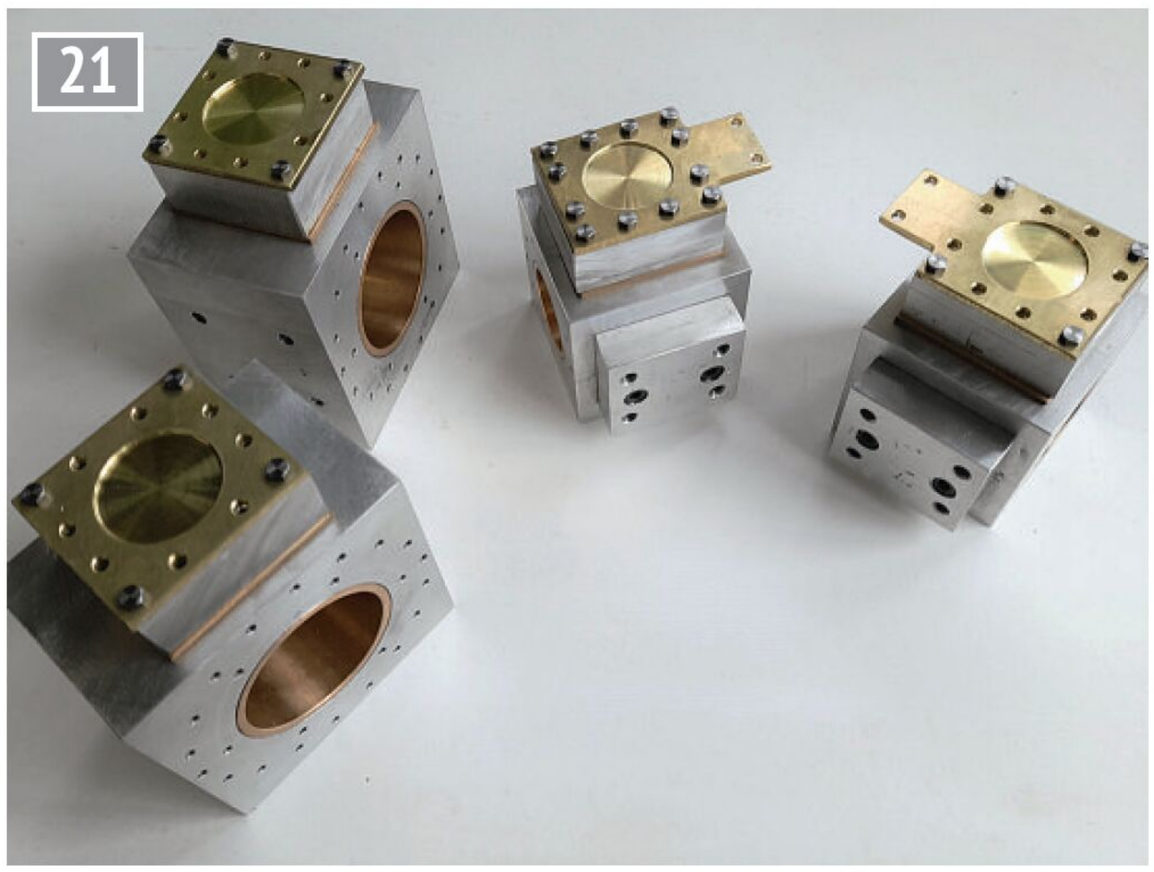


Valve chests, covers and slide valves.

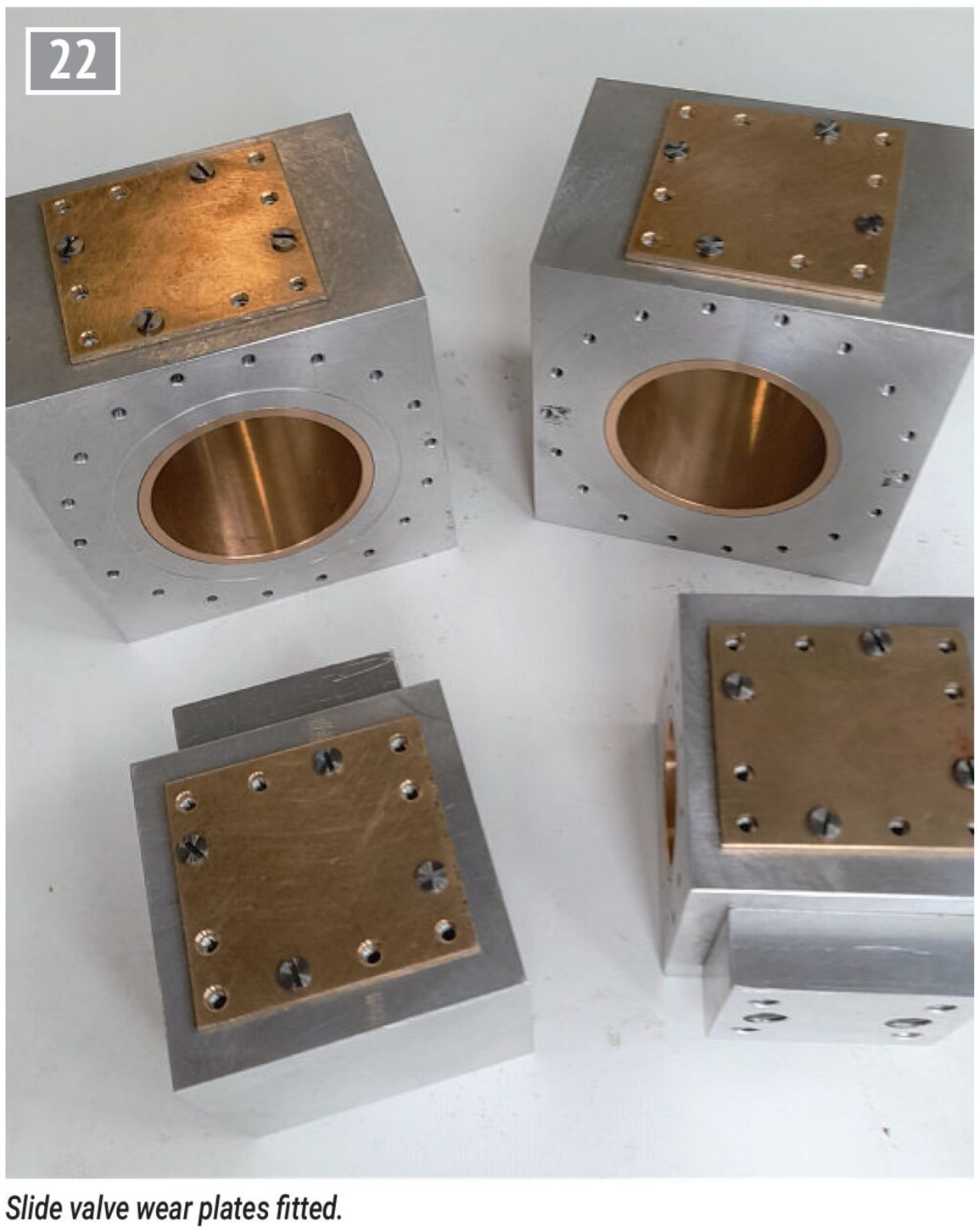
Fig 8



Port face and steam pipes.

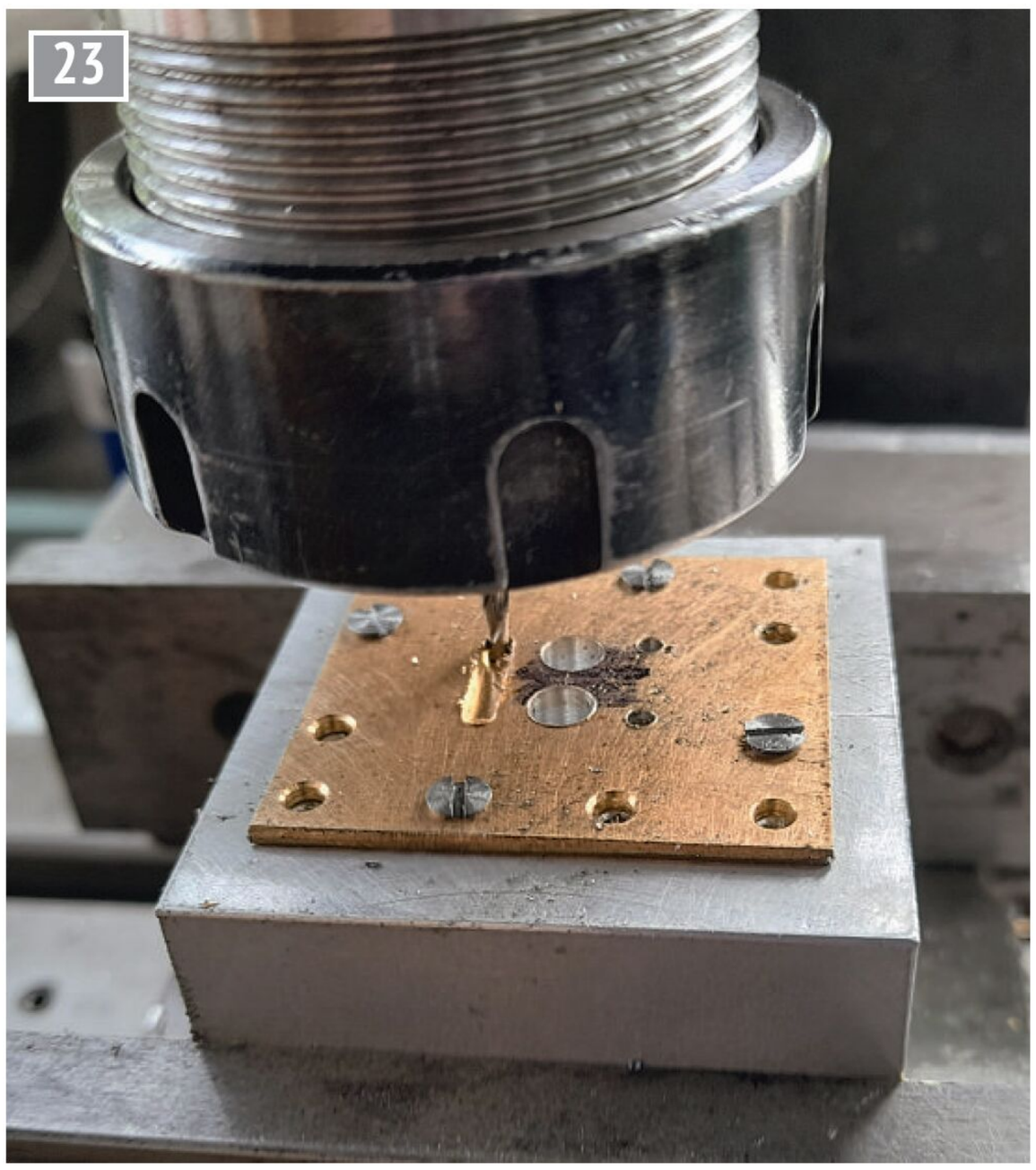


Valve chests and covers fitted to the cylinders.

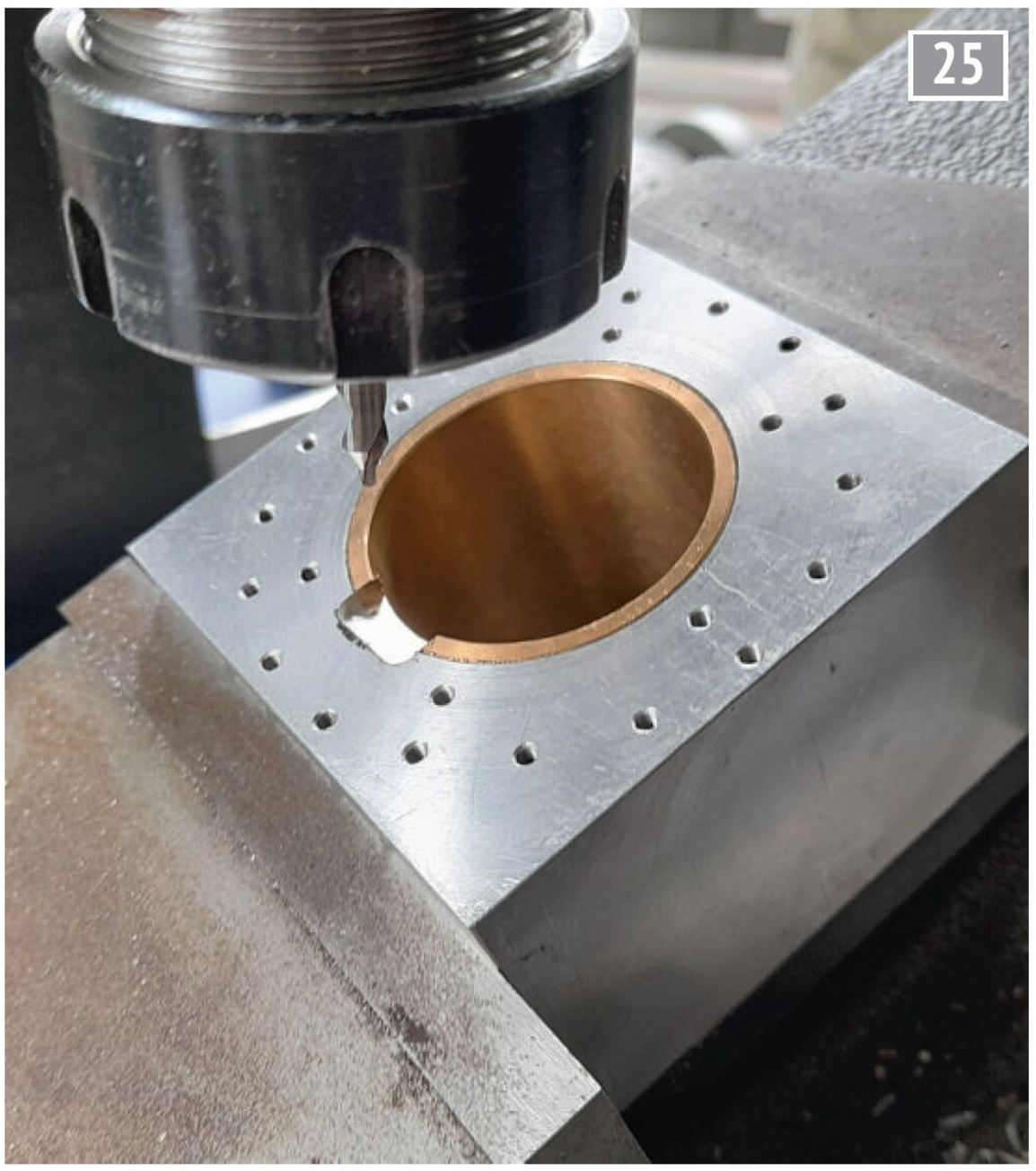


Slide valve wear plates fitted.

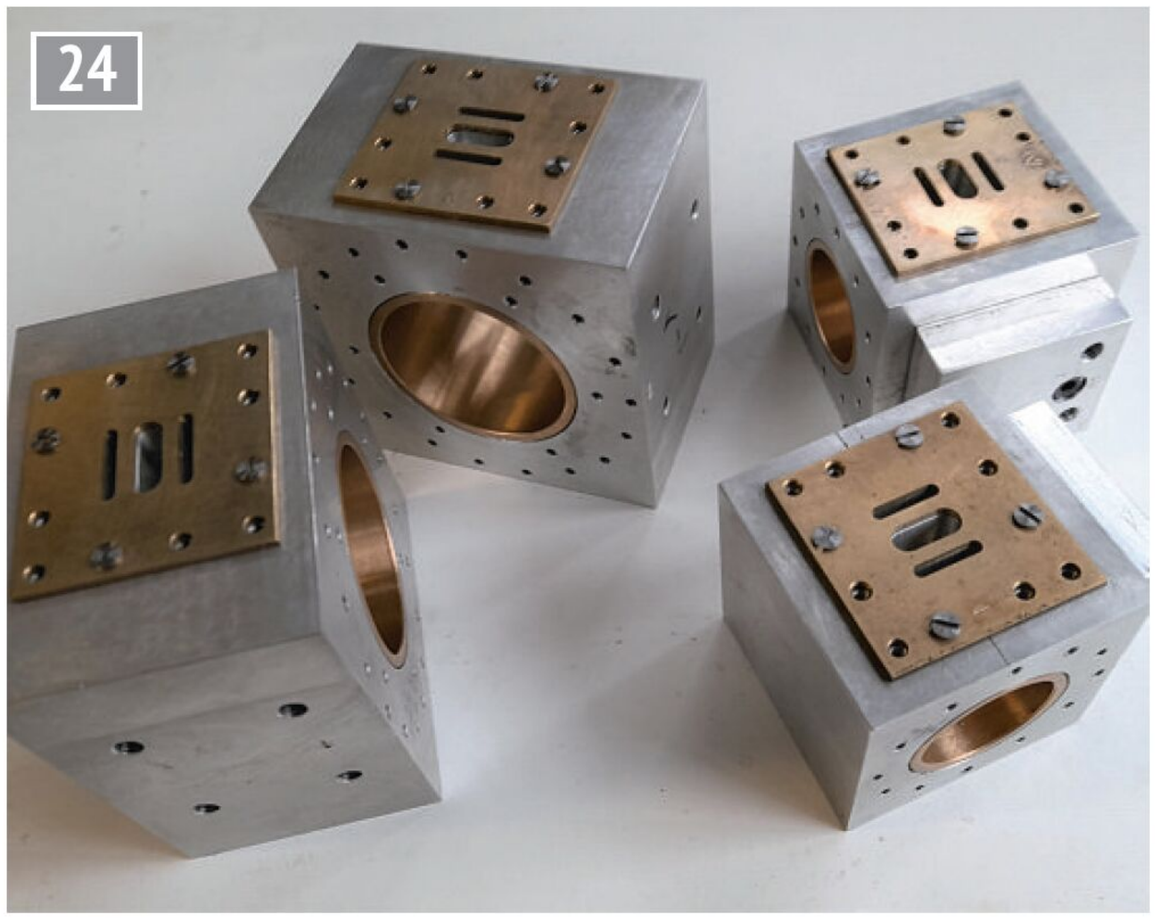
cylinders (**photo 22**). Then it was back in the mill with the cylinders after the centre points had been marked on the plates. From these centre points I stepped out the central radius points of the valve ports and drilled them some 10 mm deep with a 2.2 mm drill for the steam ports and 4.8 mm for the exhaust ports. These were then slotted out with, in the case of the steam ports, a 3/32 inch long series milling cutter and the exhaust port with a 3/16 inch slot drill (**photo 23**). The cutters were used on the fastest speed and hand fed keeping a close eye on the digital readout so that



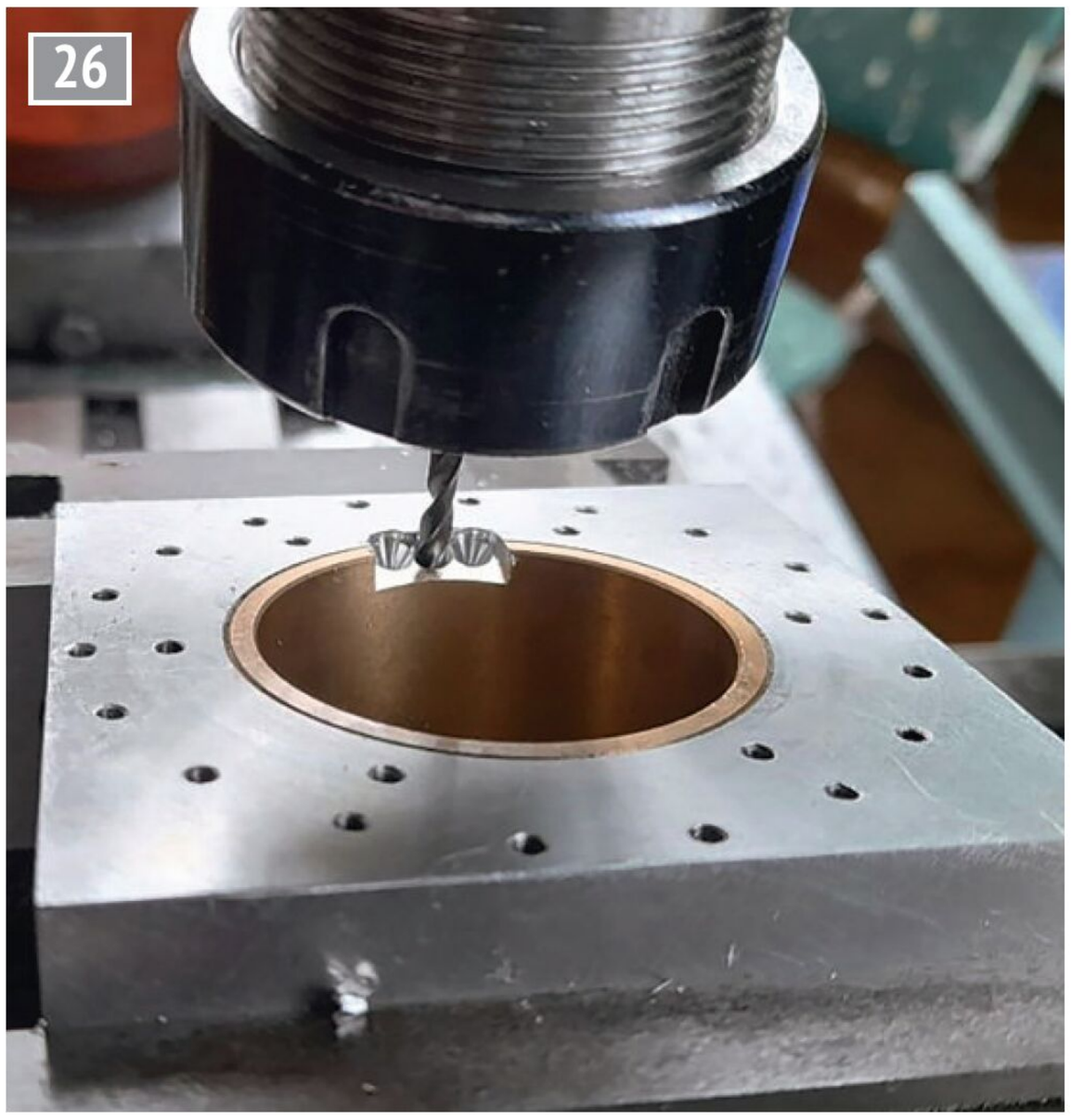
Milling the ports in the wear plates.



Inlet ports to the cylinders.



Finished wear plates.



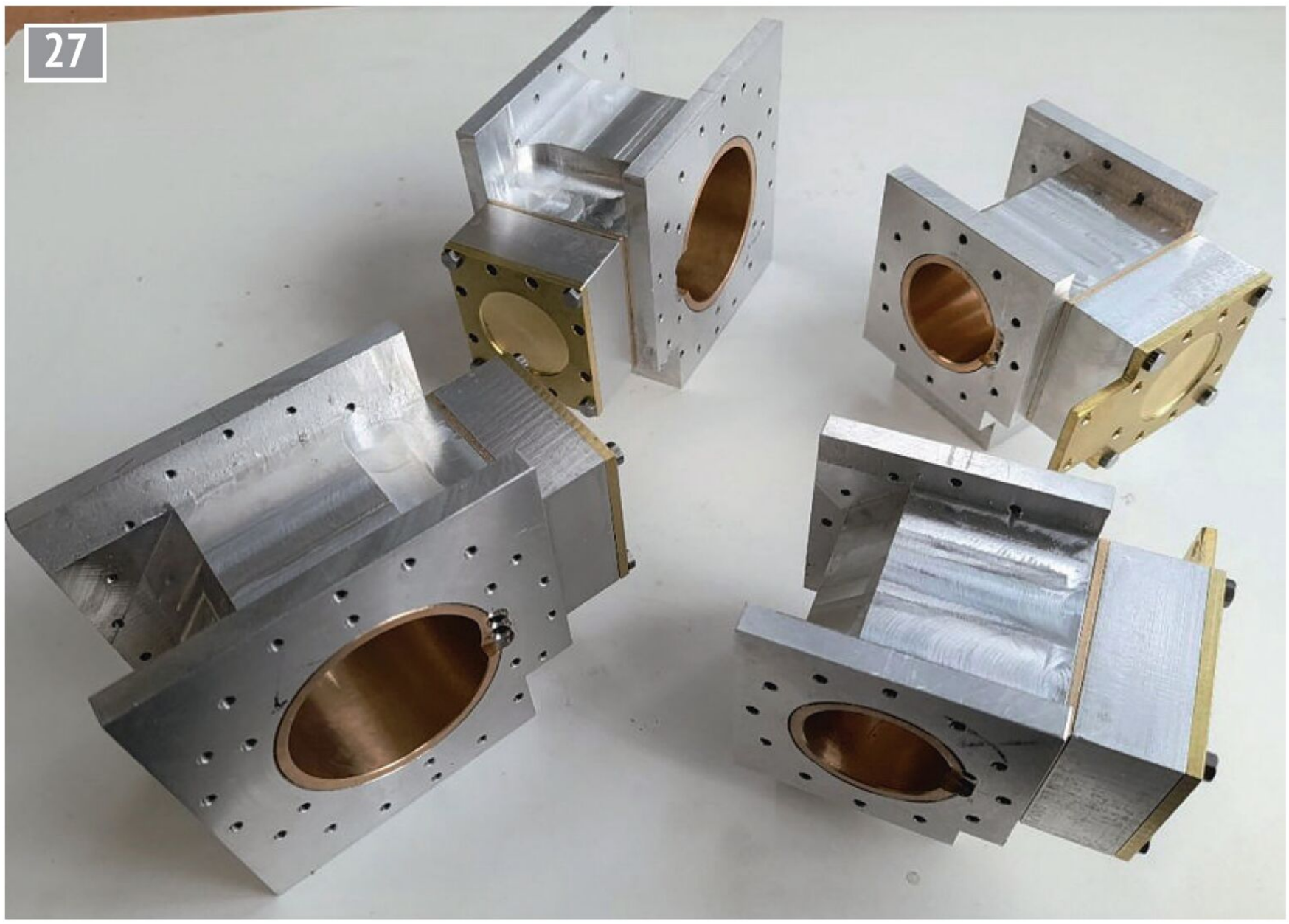
Drilling the transfer ports.

the cutters did not overshoot the holes. They were fed depth-wise 1 mm at a time. That's 120 passes back and forth. Kerosene/oil mix was used to lubricate the work.

The valve plates were removed after milling and linished smooth on a flat surface with fine wet and dry emery paper so they have nice sharp port edges (**photo 24**). The mill needed a good clean up after doing these parts as lots of little bits of swarf were blown about the machine with the air duster.

The transfer ports were then done. I used my angled mill vice to ensure that the angle of these holes was consistent at both ends of the two sets of cylinders. The first operation was to mill the angled flats that form the inlet passage into the cylinder bores. Then with a small centre drill the three holes were drilled deeper than the holes that finally were drilled through to the valve ports (**photos 25** and **26**). This gave a blend into the holes for steam flow. It's a pity that where the holes break through into the valve ports that some sort of blend couldn't be machined in but since the valve ports are only 3/32 inch wide there is rather limited access. As this engine will not be subject to ultimate efficiency it is of minor concern.

Now that the steam passages are established the valve plates, valve chests and chest covers were re-mounted to the cylinders. With the assemblies back in the mill the outside faces of all parts were milled so that the three parts of the valve chests were matching one another, just leaving the ≫

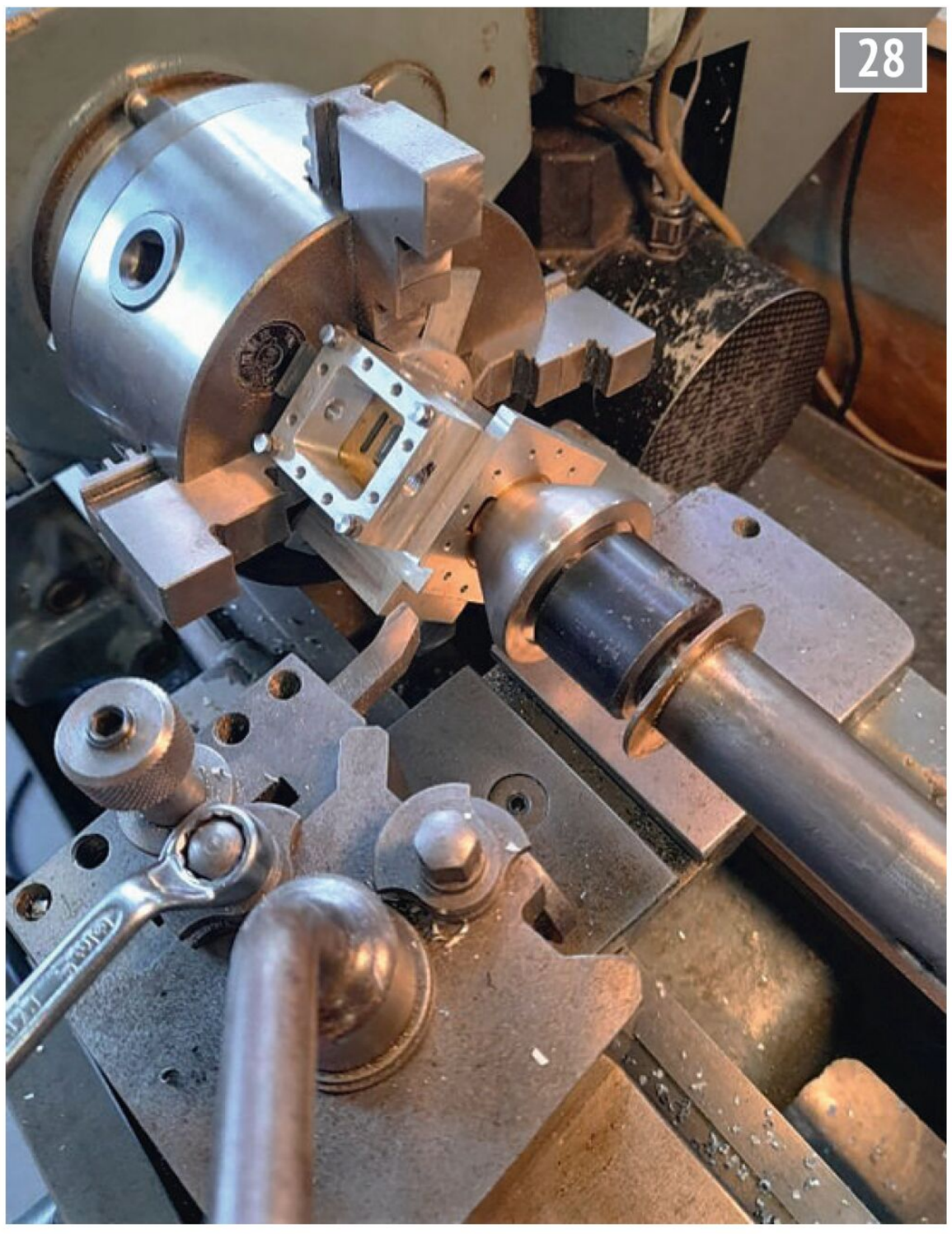


Milled cylinder blocks.

end faces to be machined in the lathe (**photo 27**). They were then dismantled and deburred, stamped with identifying numbers, and reassembled to their same cylinders. This has removed a lot of metal around the cylinder blocks. Lots of aluminium chips were generated in this exercise. The shop vacuum cleaner certainly earned its keep sucking up the chips. Now the square cylinder blocks are close to being finished and must weigh half what they did when I started with them.

I then needed to set the cylinder assemblies up in the four-jaw concentric lathe chuck to machine the end lands round to match the cylinder covers. The step in the chuck jaws was too deep by some 3 mm. It was necessary to have the cylinder assemblies hard against the faces of the jaws as the flanges on the cylinders are only 5 mm wide and I needed to support the assemblies with a revolving centre in the tailstock. Some four pieces of 3 mm sheet metal were fastened to the vertical faces of the chuck jaws with double sided tape, which gave solid faces to press against. I did not have a large revolving centre so I set to and made one up to support the cylinders for machining. The LP cylinders were then turned round at the end flanges and they now look much smaller (**photos 28** and **29**). The HP cylinders had to have the valve chest covers removed as the projection to support the valve rods got in the way of machining one end.

●To be continued



Cylinder setup to machine ends round.



Ends machined.

Re-designing a Gas Burner PART 2



Graham Astbury describes how he updated an old design.

Continued from p.566
M.E.4741 April 19



A selection of jets to British Standard BS720:1948.

The first part of this article described why the change in the type of gas to be used for the burner meant the jet bore became too small for me to make myself.

British Standard jets

There are commercially available jets available in the UK but these jets are calibrated by numbers being the flow in cubic centimetres per second of petrol that flow through the jet under a specific pressure. Unfortunately, there is no specification for the bore, just the flow. The now-obsolete British Standard for calibrated petrol jets (**ref 6**) defines the flow-rate and the physical dimensions of the jet itself. All the jets are threaded 1BA and have 4BA spanner flats on them but some have a chamfer and others do not (**photo 2**). They are calibrated in cubic centimetres of petrol per minute, as they are specified as *petrol jets*. Although the jets are specified for petrol, they are now used as gas jets rather than petrol jets. The jets are numbered but there is no reference to the diameter of the jet itself, as it is the flow, not the hole size, which is defined. However, diligent searching led to a book by Bernal Osborne (**ref 7**) which gives a list of the jet number vs the bore. I plotted Osborne's data on a spreadsheet and derived suitable equations to determine the jet diameter in millimetres from the jet number and the reverse, and also the same in inches. The results were:

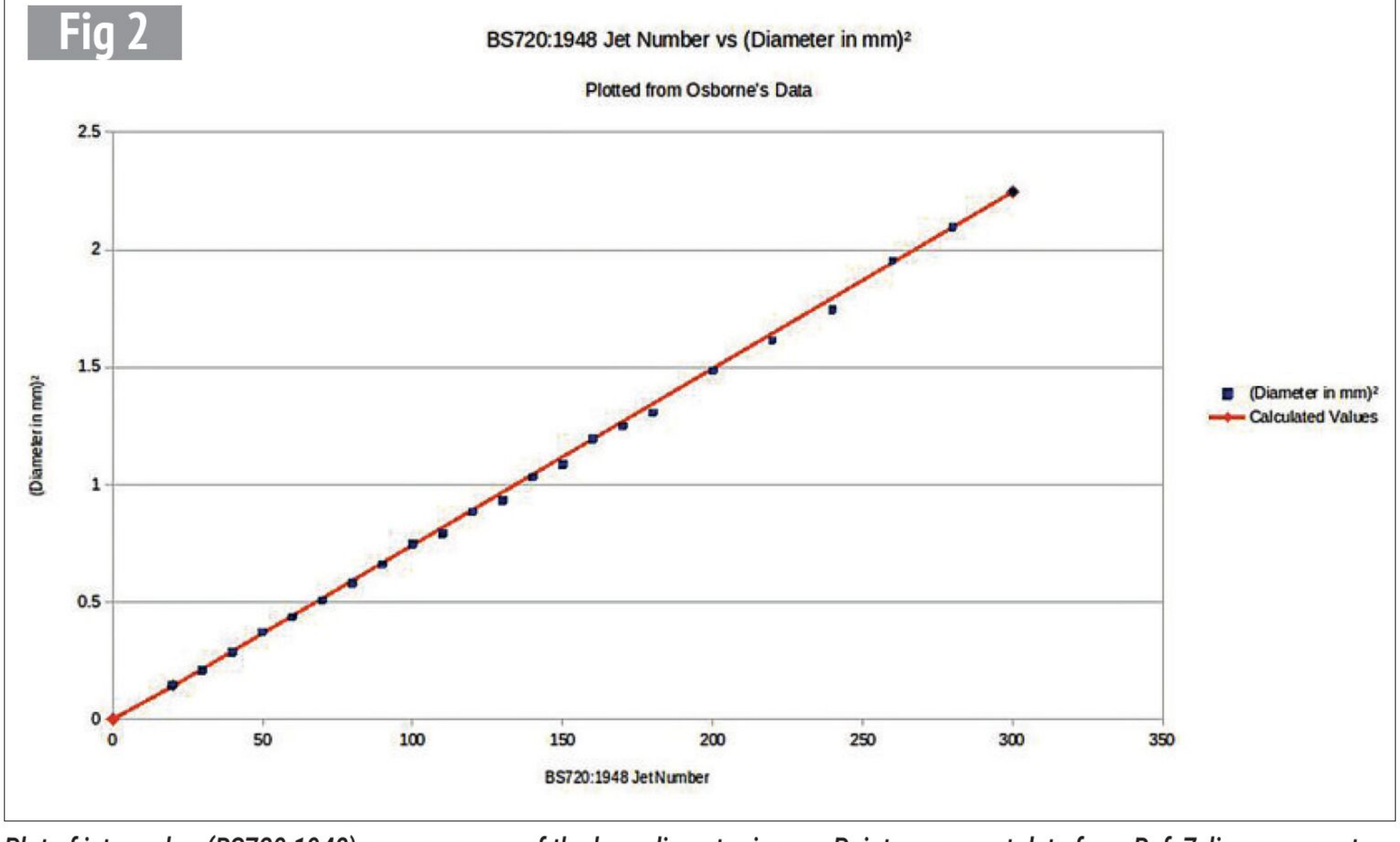
Jet diameter, mm = 0.08636 √Jet No.

Jet No. = 134 x (diameter in mm)²

Jet No. = 86505 x (diameter in inches)²

The (jet diameter)² is plotted against Jet No. in **fig 2**. I tried various exponents between 1.5 and 3, but the best fit to the jet numbers was given with an exponent of 2.0, hence the plotting of the (jet diameter)². I did a cross-check on a No. 160 jet which has a stated bore of 1.092 mm and found that a No. 57 drill (measured at 1.08 mm with a micrometer) would just about enter the bore, whereas a No. 56 drill (measured at 1.19 mm with a micrometer) would not enter, confirming the calculated bore to be close enough to the actual bore. As for the redesigned burner with the jet diameter being 0.315 mm, using the formula above the jet number required is 134 x 0.315² = 13.29 which, not being a whole number, can be rounded to a No. 12 or a No. 14 jet as the jet numbers increment by two at these sizes. As this was rather an imprecise determination, ≫

Fig 2



Plot of jet number (BS720:1948) versus square of the bore diameter in mm. Points represent data from Ref. 7, line represents (calculated values)².

Table 2

Parameter	British Standard jets	Metric jets	American jets
Thread size	1BA	Either: M6 x 0.75 or: M5 x 0.80	¼ inch x 32 UNEF
Numbering method	Petrol flowrate, cc/min	Either: Bore in mm x 100 or: Bore in mm	Morse Drill No.

Comparison of jet numbering systems

ignoring the effect of the jet bore length, I chose to try a No. 10 jet which I already had available as a spare jet for one of my propane gas torches. If this proved inadequate, then a No. 12 or No. 14 jet could be tried instead. As the question of the effect of the length of the jet bore is one which cannot be resolved easily, I decided to work on the principle of starting with a small jet, as the holes in the burner tube can be increased easily if necessary. Whilst it is simple to use a shutter to close off the air inlet hole, the burner port area cannot be reduced easily.

Other jets

At this point, I must bring up the question of 'other jets'. Reasonably diligent searching did not lead me to any other jet *specifications* per se but I have found out by examining my gas cooker (which has Italian-made burners) that it has metric jets which are threaded M6 x 0.75 with a 7 mm A/F hexagon. The number stamped on them appears to be the bore in hundredths of a millimetre, so a jet stamped '77' jet has a bore of 0.77 mm. It appears that the larger metric jets are marked with the actual bore in millimetres, so a jet marked '1.2' is 1.2 mm bore. Sometimes these jets seem to be rated by their nominal heat output as some are quoted on the packaging as being, for example, 'Natural Gas Jet 1 kW 0.72' which is their nominal heat output on natural gas with the bore size as the following number, which is also stamped on the jet.

In America, it appears that their jets are threaded ¼ inch x 32 UNEF and are numbered by the Morse drill size of the bore, so a No. 60 jet has a bore of the same diameter as a No. 60 twist drill which is 0.0400 inches or 1.0160 mm. You will have to check on how jets are numbered and what thread they have in your own locality. These standards are compared in **table 2**. As an aside, I have a genuine Swedish Primus paraffin blowlamp made in 1950 which has an un-numbered jet with a ¼ inch x 40 thread, but it is not easy to check whether it has a unified thread form (UNEF) or a Whitworth (M.E.) thread form. It does not have anything stamped on it.

As I chose to use the British Standard for my jet, from this point onwards all jet numbers to which I refer are those to the British Standard BS720:1948. I should also point out that it is a legal requirement that *all* gas work on *fixed* installations in the U.K., be it natural (mains) gas or liquefied petroleum gas (propane or butane), *must* be carried out by a Gas Safe registered technician. The Gas Safe Registration Scheme does not apply to portable appliances but it would be good practice to refer to a Gas Safe registered technician about any gas work on portable appliances.

From the above, it can be seen that the jet number that I had available was a No. 10 British Standard jet with a bore of = 0.08636 √10 = 0.273 mm. Clearly, as the bore was 0.273 mm, the nearest whole number would correspond to a 0.28 mm bore jet, which if it were a metric jet, would have the number '28' stamped on it. Similarly, for an American jet, the number would be 85, as this is the Morse drill number that corresponds to a 0.28 mm diameter hole. Consequently, the same jet could be described as a No. 10 jet, a No. 28 jet or a No. 85 jet depending on which standard applies to it. It needs care to select the appropriate jet!

The original burner

Haynes designed his burner to use town gas, and the injector was a simple brass nipple drilled $^{1}/_{16}$ inch (1.6 mm) right through. The end of the burner tube had a small saw-cut horizontally across the tube for the flame to sit, directly below the hot end of the engine cylinder. There is no provision for primary air to be mixed in with the gas before it leaves the burner, so all the combustion air will have to diffuse into the flame. However, as the flame would be of a fish-tail shape, i.e. very thin, the distance for air to diffuse into the centre of the flame will be quite small and so there is a possibility that the gas will burn reasonably cleanly without premixing. This is potentially possible as the saw-cut would be typically about 0.8 mm wide. As I never made the original burner and since town gas is now unavailable in the UK, we will never know for sure just how well the secondary air mixed in.

However, the burners for town gas fitted to central heating boilers, from around 1945 until replaced by natural gas burners, had non-aerated burners which relied on a thin fan-shaped flame which would allow secondary air to mix with the flame and ensure complete combustion (**ref 8**). This was because there was a risk that in an aerated burner, any change in the gas composition of the high hydrogen content of the town gas would make it liable to burn back, explode or even detonate inside such an aerated burner, hence the move to non-aerated burners. As the stoichiometric composition of town gas is 17.5%, the balance must be air, so the quantity of air required for one volume of town gas must therefore be

$$\frac{(100-17.5)}{17.5} = 4.71$$

volumes of air. In a thin, non-aerated flame, this could easily diffuse into the flame and so complete combustion can be achieved. However, for propane, with a stoichiometric composition of 4%, the quantity of air required for combustion is

$$\frac{(100-4)}{4} = 24$$

volumes of air. This is quite a significant increase and such a thin non-aerated flame would be unlikely to produce complete combustion. After the change in the UK from town gas to natural gas in the early 1970s, aerated burners were used almost exclusively in domestic gas appliances.

The next and final part of this article will describe aeration, the complete design of the burner and its performance.

●To be continued

REFERENCE

Ref 6 British Standards Institute, BS 720:1948, *Calibration of carburettor jets for petrol engines (all types)*. (This is an obsolete standard but may be available for reference in certain libraries in the UK which keep British Standards).

Ref 7 Osborne, Bernal, *Modern Motorcycle Maintenance*, Temple Press, (1949).

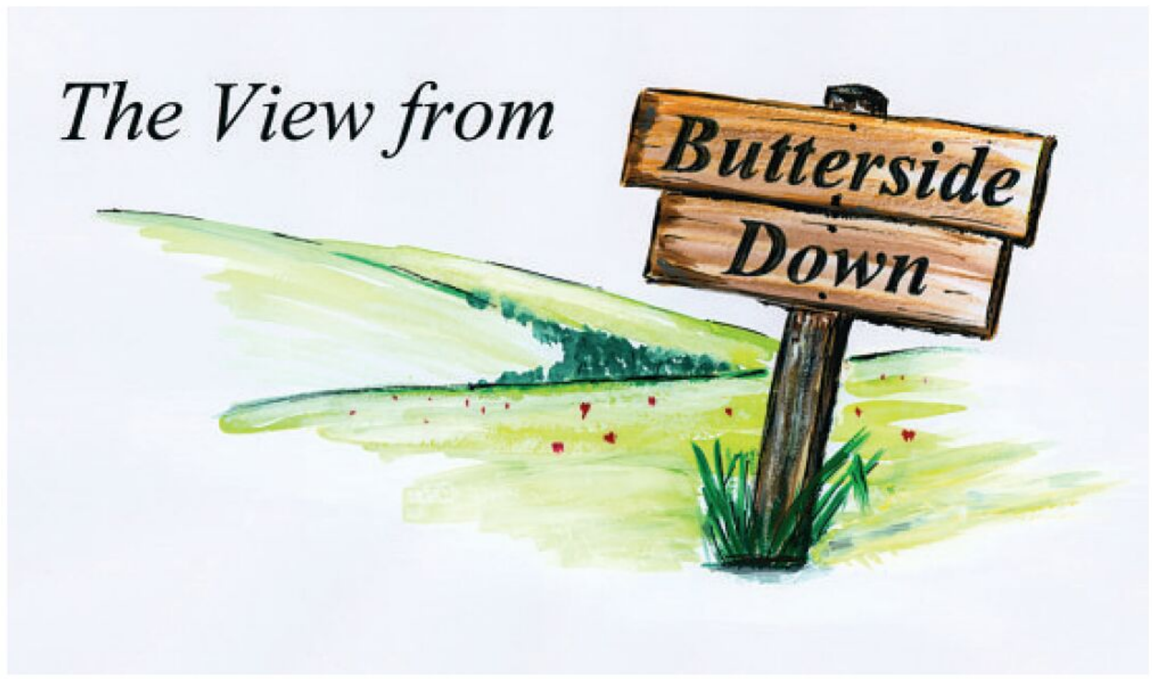
Ref 8 Jones, H.R.N., *The application of combustion principles to domestic gas burner design*, Taylor & Francis, (1989).

Part 10: Privilege and Joy



Steve Goodbody takes a random walk through model engineering.

Continued from p.578
M.E.4741 April 19



In this edition of Butterside Down I must begin with an apology, dear Reader, for if you, unlike sheep, prefer both order and consistency in your world, then I am about to disappoint. You see, as I sit here today, metaphorical pen in hand, the calendar tells me that it is the thirteenth of July 2023 and yet, in just two weeks' time, I will inform you with equal candour and accuracy that it is fully seven months earlier. I suspect you will find this confusing.

In my defence, let me explain that, due to a roughly ten-month backlog of written but yet-to-be published articles, I am afforded the luxury to slot stand-alone *Butterside* episodes between their mini-series brethren should I so desire and this is the first time I am taking advantage of the privilege. So let me once again apologise for any confusion it may cause and get back to the job in hand.

About time too, I hear you say.

The giving of joy

One of my favourite authors by far and one whose books I return to repeatedly for they are simply that good, is Patrick O'Brian CBE, whose magnificent Aubrey/Maturin series, published between 1970 and 2004, spanned twenty-one complete novels, one incomplete one and plunged his readers headfirst into the life and language of the British navy during the Napoleonic wars. From the very first page - and a stroke of pure genius in my view - O'Brian does not pander to his audience; instead trusting that his finely-honed plots, exquisite narrative and subtle humour will overcome the sometimes-unfamiliar phraseology and terminology of the time. He is, of course, wholly correct.

There is one phrase however, oft uttered by O'Brian's characters, which I have always found particularly endearing and which, to me, goes far beyond the word *congratulations* - today's more prosaic equivalent. For in O'Brian's nineteenth century world, at times of personal pleasure or success, the phrase *give you joy* was the appropriate and, to me, far more heartfelt offering and the repeated giving and receiving of joy is something that I feel we could all do with in our more modern times, whenever the opportunity presents.

So, let's be on the look-out for those joy-worthy examples, however large or small or unexpected they may be, for they are an undoubted privilege in an uncertain world. And to kick things off here are a few of mine, gathered over two consecutive days in Yorkshire just a fortnight ago, which I hope you will enjoy as much as I.

Hidden gems

This year, in the magical gap between the end of the American school year in June and the end of the British equivalent in July, when the weather is decent but before the cost of holiday travel and accommodation is pushed into the stratosphere, clan Goodbody packed its carry-on bags and departed for a three-week tour of the English Midlands, its itinerary dictated by a succession of university open days, for our daughter is keen to study in Britain and this was the ideal opportunity to visit her prospective higher education establishments *en masse*.

Our travel plan – a three-week circuit beginning in Buckinghamshire and taking us to appointments in Liverpool, Derbyshire, Yorkshire, Nottingham and Norfolk – covered a lot of ground and we planned to spend several days in each location to relax, sightsee and partake of a few decent walks along the way; for we all enjoy a good tromp in the countryside although, in the case of our offspring, this is contingent upon the provision of an ice cream at some point in the journey.

If you are of a similar bent and live in the UK, then I suspect you think nothing of grabbing an Ordnance Survey map, donning a pair of sturdy boots and heading down the nearest public footpath into the wild blue wonder. I'm correct, aren't I? And I know this because, until we moved to America, neither did we. But for an American, as for the inhabitants of most (perhaps all) other countries in the world, one does not simply walk into the countryside, for, with very few exceptions - the American national parks spring to mind - there are no public footpaths; the landscape is privately owned and you must ≫



A group of ramblers descends a public footpath, a sign silently trumpeting this uniquely British treasure.



Stanier Black Five Eric Treacy *effortlessly restarts her train on the outskirts of Whitby station.*

either keep out or suffer the consequences.

To illustrate the point, when I try and explain the uniquely British public footpath system to my American friends, especially those about to embark on a trip to the UK, I am usually met with an incredulous stare. "You're telling me you can just walk through a farmyard and across a farmer's field if the map says it's okay?" they pout, assuming I am pulling their leg, usually adding the sadly telling addendum "…. and without getting shot?". And while I assure them it is so, I am rarely believed.

I have chosen this example because, sometimes, it is not until we are far away that we gain the perspective to see the gems which have been staring us in the face and I therefore urge you, rambling Reader, to make good use of your ability to roam the British countryside if you are able, for you are afforded a unique privilege, hidden in plain sight and proclaimed by every *Public Footpath* sign you will ever see (**photo 23**).

The unexpected invitation

"Why don't we take the steam train to Whitby?"

Now I must confess that my suggestion, offered with a nonchalant air as we pondered the following day's activity, had been my reason for recommending the Pickering area as the location for our five-day stay in North Yorkshire from the very start. You see, I had fond boyhood memories of the North Yorkshire Moors Railway, last visited with my parents nearly forty years prior when it went no further than Grosmont in the heights of the moors which, while an attractive location, was a somewhat limiting destination. In those days, except for a visit to the engine sheds nestled at the end of a short tunnel, there really wasn't much to see in Grosmont and so, with the line now extended onto the national railway network all the way to Whitby, I really fancied the full trip to the delightful Yorkshire coast behind a steam engine.

"That sounds like a good idea" replied Jenny, casting a knowing look in my direction, reading me like an open book.

And so, bright and early the next morning, with the forecast predicting a gloriously sunny day, we arrived at Pickering station, boarded the first train of the day - sadly hauled by a diesel locomotive to protect the unseasonably dry moorland from immolation but with the guard assurance that it would be replaced by a steam engine at Grosmont for the remainder of the journey - and gently set off in a cloud of black diesel fumes on the long climb towards the summit.

Arriving at Whitby following a spirited downhill run behind the magnificently turned-out Black Five, *Eric Treacy*, named after an Anglican bishop and exceptional railway photographer of yesteryear who, I recalled, was pictured beside this same eponymous locomotive in my much-read Brian Hollingsworth book *How to Drive a Steam Locomotive* (which I had coincidentally purchased from the Pickering station bookshop on my last visit four decades prior). As we watched, our gleaming engine was uncoupled from its train and gently eased down the platform to await the return trip an hour or so later. Basking in the sun, we snapped a few pictures once the crowd had dispersed and I explained some of the engine's finer points to our children who, used to my foibles, tuned out and did their best not to yawn.

"Would you like to come up?" a voice called from the cab.

"We'd love to, are you sure it's okay" answered son and daughter together, sensing an escape from their father's monologue.

"No problem, and please bring your dad along too" the voice replied kindly.

And for the next twenty minutes we stood in that magnificent cab, Emma and Sam taking turns to sit on the driver's seat and pose for photographs, while the friendly fireman explained the controls, the firing technique and the challenge of getting decent coal in today's world. The kids listened attentively and asked questions, something which they would never have done had I been the one talking.

And so, if you were the fireman on the 10:40am train from Grosmont to Whitby on Thursday June 29th then, on behalf of my entire family, I would like to thank you once again for inviting us onto your footplate and patiently answering our questions. It was, for us, an absolute privilege (**photo 24**).

The simple pleasures

Later that day, after ascending the hillside steps to the abbey and consuming the ubiquitous fish-and-chip lunch on the way back down, we began to see groups of teenage schoolboys, all seemingly hailing from somewhere in southeast Asia and all impeccably behaved and immaculately presented in their uniform of black trousers, white shirt and navy school tie. All were laughing and chatting as they wandered around the lower parts of the town, an endearing sight, for they were plainly enjoying themselves and having a lot of fun on their day out.

"They seem to be enjoying themselves and having a lot of fun on their day out" I remarked to emphasise the point, before turning my attention to the mound of strawberry ice cream

about to overtop its edible container and dribble down my left wrist. Jenny, mid lick, nodded briefly from behind her precarious pile of mango sorbet.

Making our way along the harbour towards the sea, we soon arrived at the northernmost of the two piers and, pausing to finish our desserts before they reached a fully liquid state, the sound of unrestrained laughter, interspersed with the unmistakable crash of breakers making landfall, reached our ears. Gazing down to the beach below, we beheld one of the most engaging spectacles of our holiday as, still clad obediently in their once pristine uniforms, with trousers rolled up in a responsible but somewhat pointless manner, a significant contingent of those same teenage schoolboys shouted with glee as wave upon wave engulfed them, sometimes up to their chests, in North Sea water. We, enthralled by their pleasure, watched for ages and I do not think I have ever seen a group of teenagers as unreservedly happy as those sodden young lads on that hot day in Whitby. Sometimes, I realised, a fully clothed dip in the sea with your friends is all it takes to give joy and it was an absolute privilege to witness their moment of carefree pleasure (**photo 25**).

Fleeting moments

As Whitby disappeared rearwards I was, as usual when travelling on a steam train, standing with my head at the window in the third carriage back, savouring the wafting smell of coal-smoke and hot oil, brushing the cinders and unburnt coal smuts from my scalp every now and then and listening appreciatively to the sharp and perfectly even beat from the chimney, the signatures of a well found and hardworking engine. Yes indeed, the collective joys of travelling behind a steam engine in carriage number three are hard to beat. All too soon however we arrived at Grosmont where, in the reverse of that morning's exercise, *Eric Treacy* was removed from our train and the Class 37 diesel reattached for the remainder of the journey to Pickering.

Now I do not normally bother sticking my head out of the window when travelling behind a diesel locomotive - the sounds and smells of a diesel do not have the same sensual appeal as a steam locomotive - but it was a gorgeous evening and, with the warm breeze and the golden hour approaching, I decided to stay where I was, camera at the ready and enjoy the journey southwards from an *al fresco* vantage point.

Crossing over the line's summit near Fylindales Moor, the roar from the front of the train suddenly dropped to a murmur as our driver reduced power and we began our long and winding descent down the valley towards Levisham, the next station on the line. Approaching a steep right-hand curve I moved to the right-side carriage window, readied my camera and prepared to take full advantage of the glorious evening sunlight illuminating the western side of the train and flooding the hillside beyond. And that's when I saw it.

As we rounded the curve, a few hundred yards ahead and standing firmly in the roughly four-foot gap between the rails, a young deer pricked up its ears, stared myopically towards the approaching train and tried to figure out what on earth was going on. Eventually, realising that this was not the brightest of animals, our wise driver sounded his horn, the puzzled animal visibly jumped and, concluding rightly that its present location was not the best, leapt from the permanent way and disappeared into the long grass beyond.

And as I looked along the train, it occurred to me that, while there were well over a hundred people aboard, this brief but magical encounter had been witnessed by just three privileged souls: our driver, the chap in the first coach with his head out of the window just like me, and yours truly a couple of carriages further back.

And I can now add you to that favoured list, lucky Reader, because, fortunately, one of those three participants had his camera at the ready (**photo 26**).

Old friends

York is an attractive city, when the crowds aren't excessive and the next day we paid a visit, unexpectedly spending the entire morning in the Minster: one of the best-presented cathedrals we have visited in any land and one I can highly recommended if you are in the area. However, if you are interested in railways then there is probably only one destination that really matters - the National Railway Museum and, at the risk of sacrilege, I must report that, although free to enter, I was sadly disappointed at its current form.

Now to be fair, a static railway museum is inevitably a hollow shell - there is no way to recreate the sounds, smells, bustle and atmosphere of a working steam railway unless you have a working steam railway at your disposal – but that is to be expected and to direct criticism on that basis would be unreasonable. Furthermore, I do not wish to moan because, as both Mary Torrans Lathrap and young friend Thomas highlighted in Episode 16 of *Elephants* (ME 4719), I have not walked a mile in the museum curator's moccasins and must therefore judge them softly. But as honest feedback and assuming that we weren't simply visiting the museum on a bad day, after wandering the exhibits for a few hours, I was amazed at the almost complete lack of information - contextual, technical, anecdotal or otherwise - presented with the national treasures on display.

To offer one example: before me stood the Stirling Eight Foot Single and directly across the hall sat *Mallard* and next to her lay *Duchess of Hamilton*, each individually and even more so as a collection, silently screaming to tell the story of the rivalry between the LNER and the LMS and their pre-grouping predecessors as they sought to achieve the

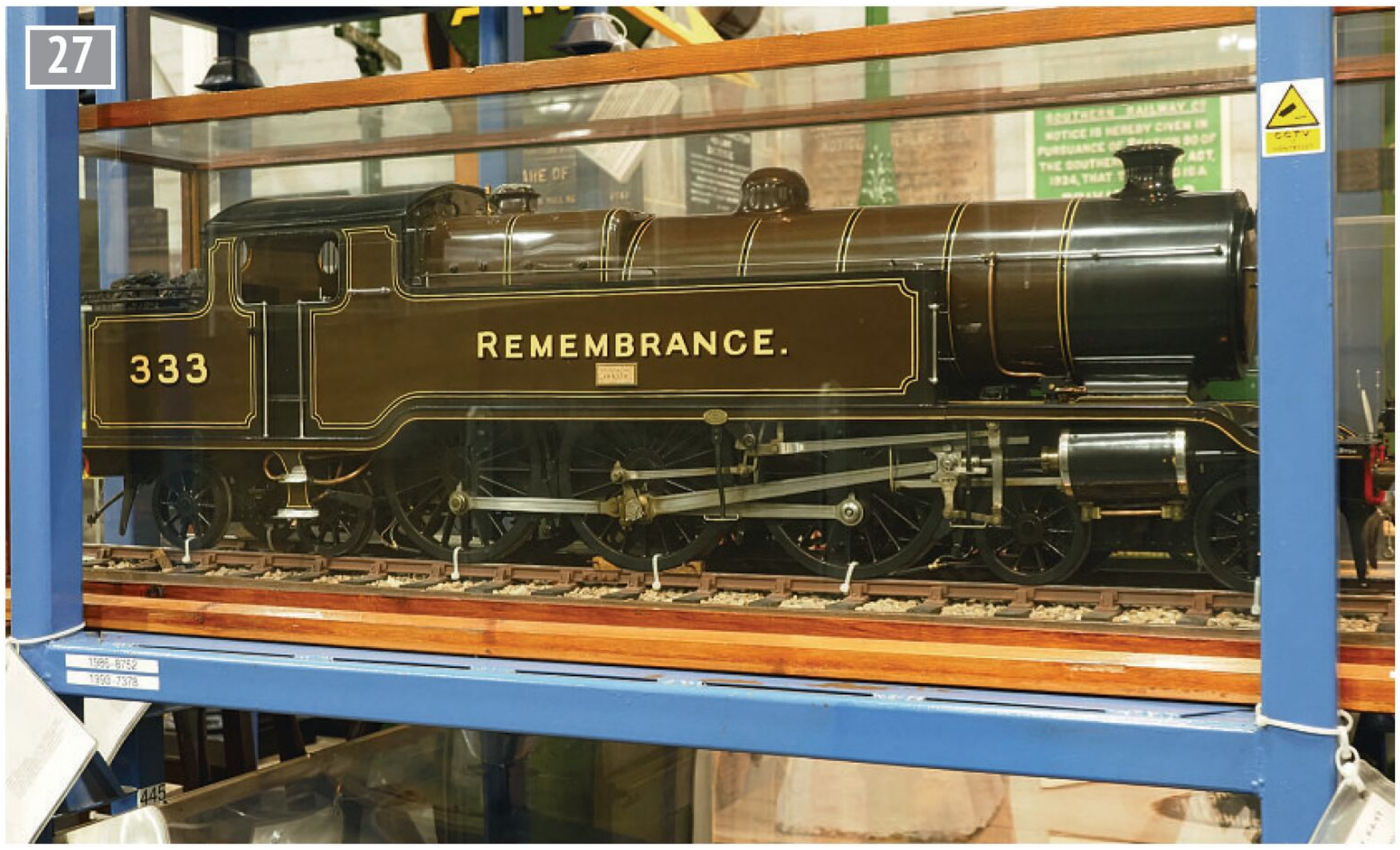


Sometimes, a fully clothed dip in the sea is all we need.



A deer and a diesel, face to face in the early evening golden hour.

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Bert Perryman's famed Remembrance, *in poorly displayed splendour at the NRM.*

shortest possible journey-time between London and Scotland on their competing main lines. Surely, I reasoned, with three key protagonists right here in this hall, this was the perfect opportunity to tell a compelling tale of social change and corporate one-upmanship and to explain the many innovations needed to travel ever-longer distances, non-stop, at increasingly greater speed. Furthermore, I continued, on a roll, if supported by a well-lit selection of the glorious *art deco* advertising posters of the time, flanked by a scattering of TVs running a selection of subtitled contemporary newsreels and promotional films in the background (for the LMS made a lot of those publicity documentaries), surely this was a golden opportunity to draw even the non-railway enthusiast into a historically significant national story. How could it not be so? But no, seemingly it was not and this was just one example. Sadly, the missed opportunities were numerous and if this was the price of free entry then I would argue the price was too high.

As I walked from the main hall into an adjacent space and beheld the plethora of smaller exhibits stacked haphazardly and incongruously upon high-rise shelving with no apparent rhyme or reason and rendered largely impossible to view, my heart sank to new depths. Turning to depart, something strangely familiar but wholly unexpected caught my eye. I looked more carefully. "No way!" I quietly gasped, performing a cartoonish double-take.

And in that brief moment I forgave the museum for its earlier disappointment, for there, nestled among a random tower of otherwise nameless and inaccessible exhibits, stood Bert Perryman's peerless model of the LB&SCR Baltic tank *Remembrance*, a masterpiece which I had read about in this very magazine many, many years ago **(photo 27)**. Furthermore and on a more personal note, I fondly recalled the late builder - a true gentleman - having had the immense privilege of chatting with him at length during a *Model Engineering* exhibition back in the day, all the while studying his equally impeccable model of William Stroudley's elegant *Gladstone*.

With my interest in the museum suddenly rekindled, I began hunting for other treasures potentially hidden among the jumbled mess. Sure enough and with another jolt of recognition as I wandered the haphazard alleyways, on a shelf situated several feet above my head I spied John Hartup's wholly unique Kitson-Meyer articulated locomotive, another superb model which had graced the cover of *Model Engineer* magazine many years ago and one which I had also drooled over at an exhibition at the time (**photo 28**).

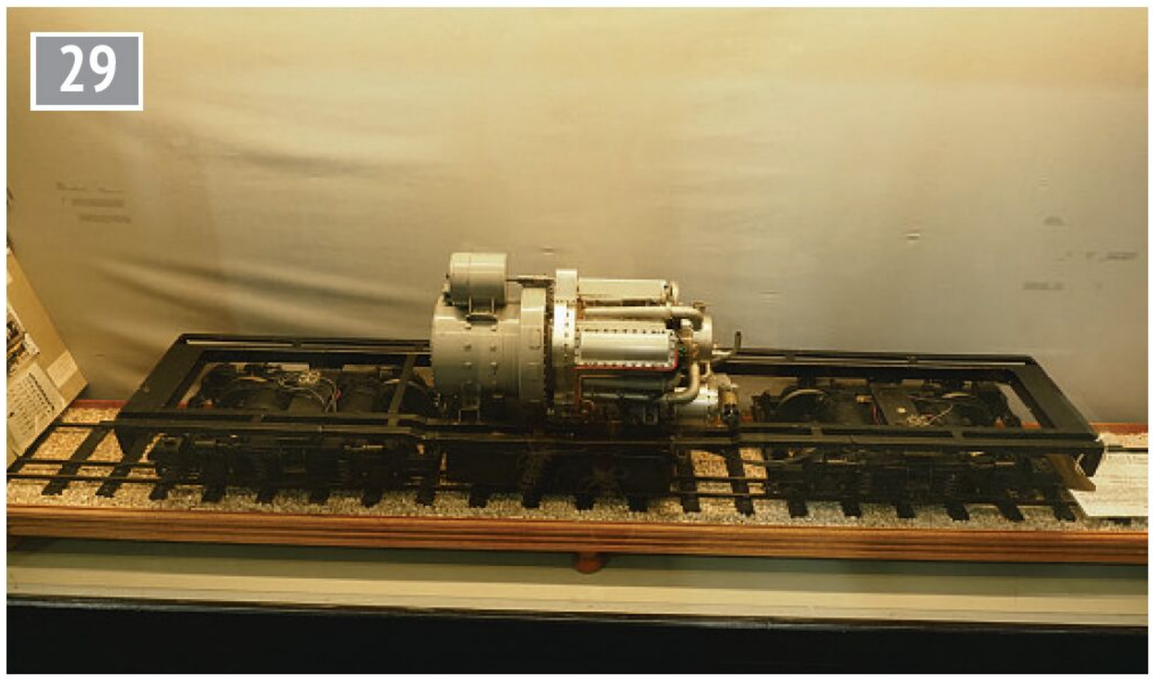
And finally, and fortunately stored at a lower level or I would otherwise have missed it, I spotted the great Roy Amsbury's never-to-be finished Deltic, an absolute whopper of an engineering challenge, sitting silently and wholly ignored by the few other visitors in the room (**photo 29**). And as I wandered between these masterpieces from our hobby's past, each patiently awaiting someone like you or me to recognise and appreciate their significance, I quietly rejoiced in the pleasure of old friends, whether they be long-departed souls or three outstanding models sitting forlornly at the back of a currently sub-par museum, for in each case, knowing them was and is, a true privilege.

So, to conclude this episode dear Reader, I give you joy of all your pleasures and privileges whether they be hidden, unexpected, simple, fleeting or old and trust that you will give me joy of mine in return. I thank you in advance for your kindness.

●To be continued.



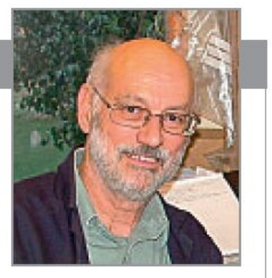
John Hartup's superb Kitson-Meyer, eight feet in the air.



Roy Amsbury's unfinished Deltic, another hidden treasure.

LNER B1 Locomotive

PART 44 – THE SIDE PLATFORMS



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

Continued from p.572, M.E.4741, April 19



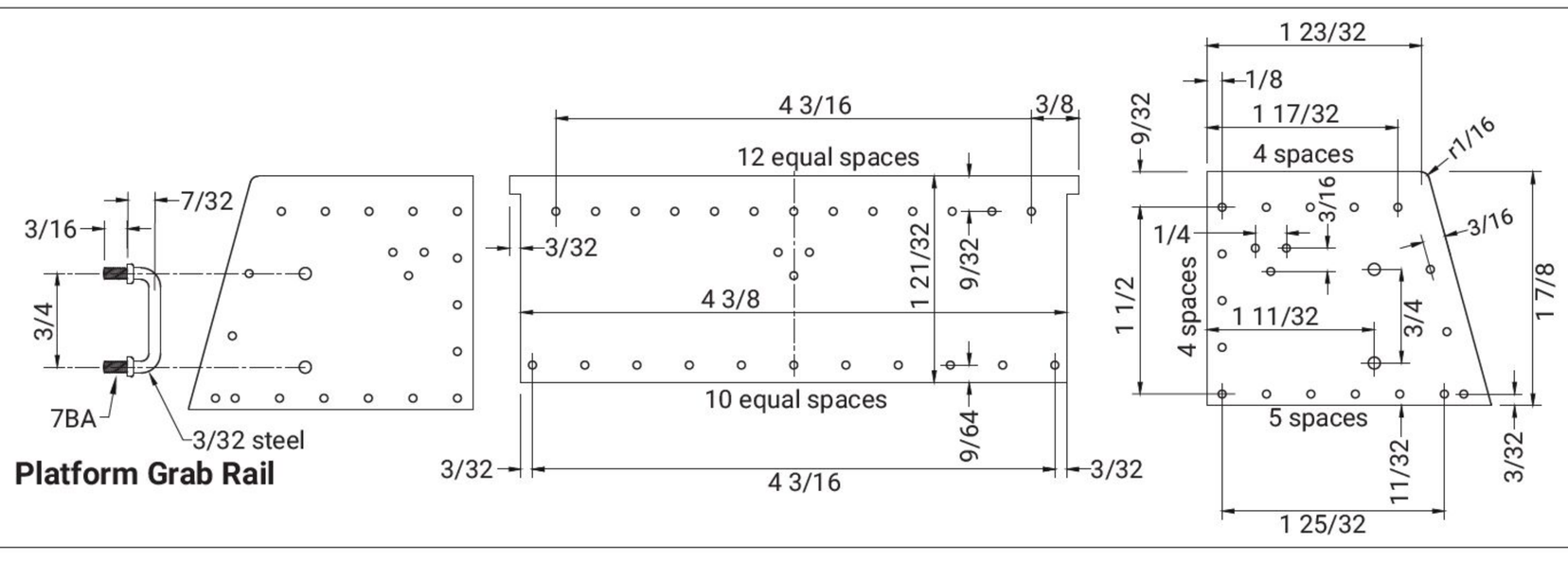
The tapering of the front platform.

What I am about to describe are the 'side platforms' as that is how I am used to describing them, as that is how they are called on all the works drawings I have seen. Never mind 'footplating' or other such names, side platforms are they, so that is what I will be calling them. The 'footplate' is inside the cab and does not extend beyond that (**figs 176** to **182**).

One thing that the previous designer did do was to ignore the fact that the B1 side platforms taper inwards at the front so that when a train is approaching a station platform on a curve it can miss the brickwork. Even at Pickering, it does get quite close. I have copied all sections of the platforms but some of them are permanently bolted together so that they can come off in one piece if you so wish. They are connected together with quite slim fishplates inside the valances (I measured them all myself!) on 61264.

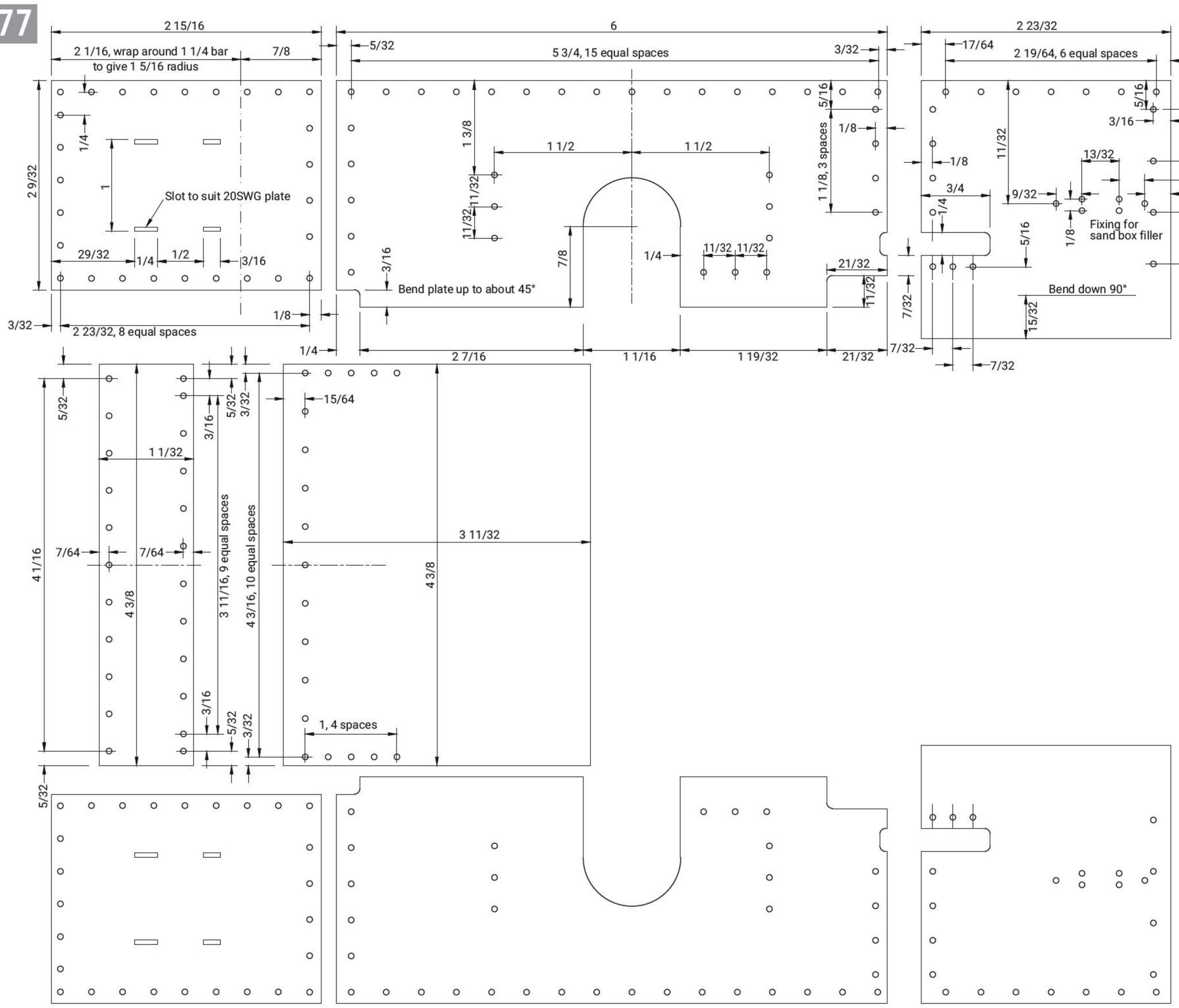
On the front of the platforms there is the first, and only, tapered section and the laser cut kit has all of the rivet holes and bolt holes in it. Also, there are some No.40 holes for some small grab rails for the driver or fireman to get hold of and, again, all of these holes have also been measured by myself. **Photograph 305** shows the front tapered platform on the right-hand side of the engine and it is fixed in place by small headed 10BA bolts, four of which are shallow round headed ones along the back edge of the plate. You could fill the screw slots with soft solder and then turn them down a little to represent the shallow heads. The heads on all of the other bolts are on top of the plate. Note that if you fancy having working lamps on your engine you will just need to drill another 1/16 inch hole immediately behind the positions where the lamp irons

Fig 176



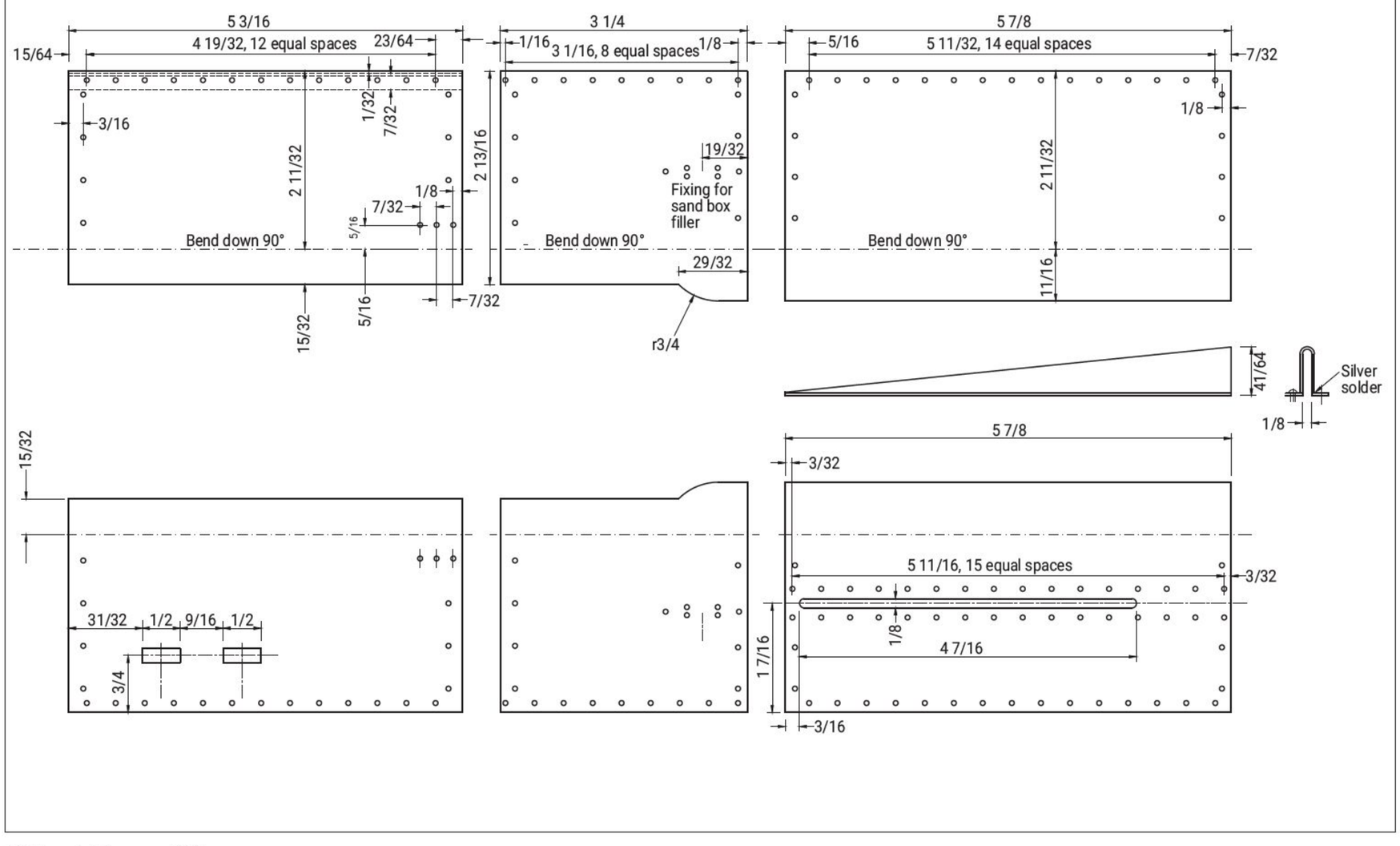
Front platform.

Fig 177



Side platforms (1).

Fig 178

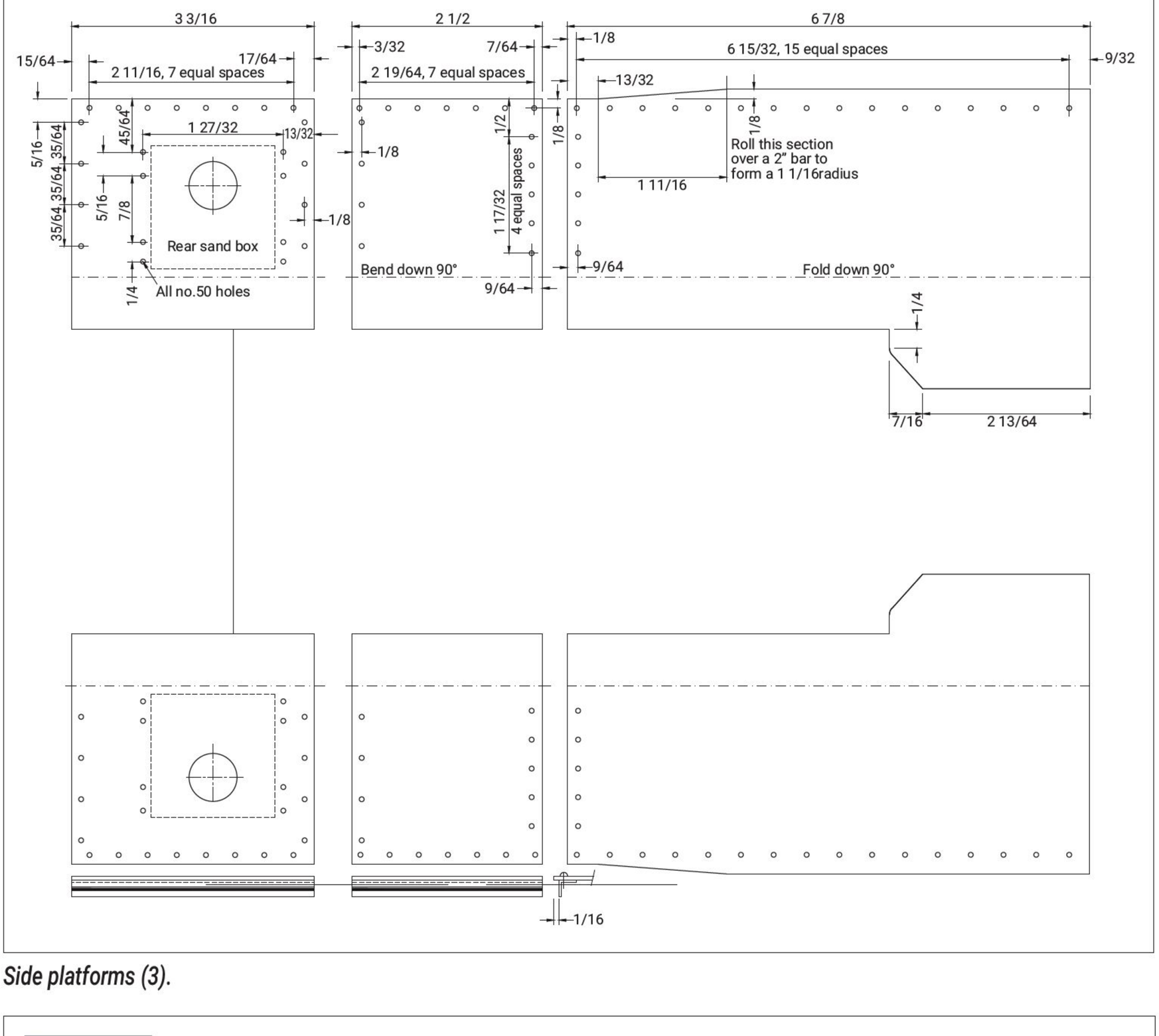


Side platforms (2).

are fitted to thread a small wire through. I will describe the working lamps at the end of the series.

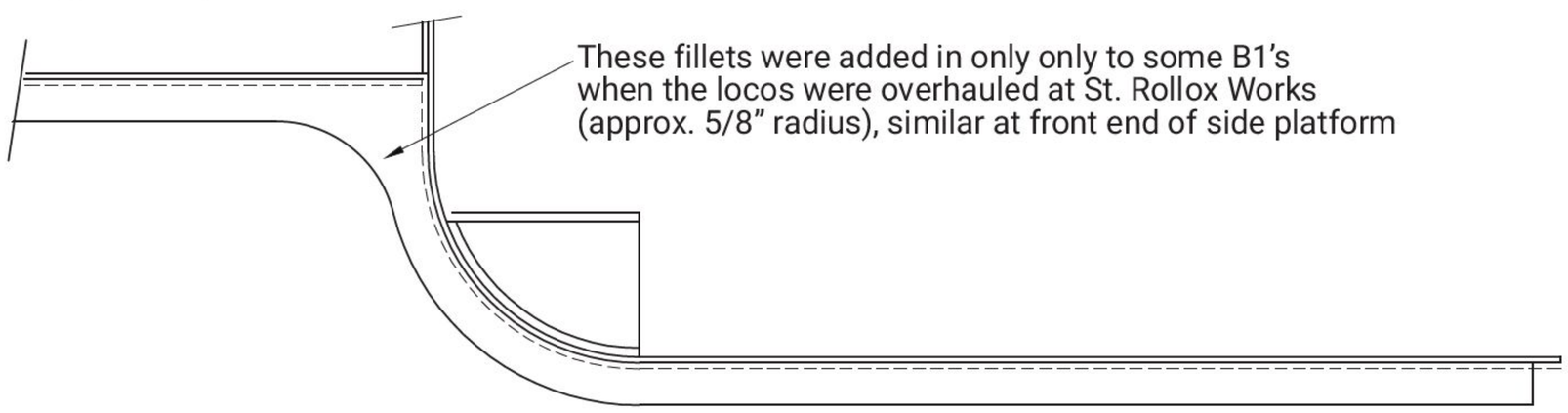
You will need to make up some grab rails and I made mine by using two pieces of 3/32 inch welding rod and then trying to work out where the bends needed to be! This working out turned out to be a dismal failure, so it was largely guesswork. Anyway, what I did was to drill a hole up a piece of 3/16 inch rod to a depth for a little bit for bending. I then threaded enough of the rod for a 1/16 inch collar plus a 7BA nut and bent it to 90 degrees round another piece of 3/16 inch rod. By guesswork, I then bent the rod again by another 90 degrees with a bit more guesswork and - lo and behold - the two bends were just in the correct places.

Fig 179



Side platforms (3).

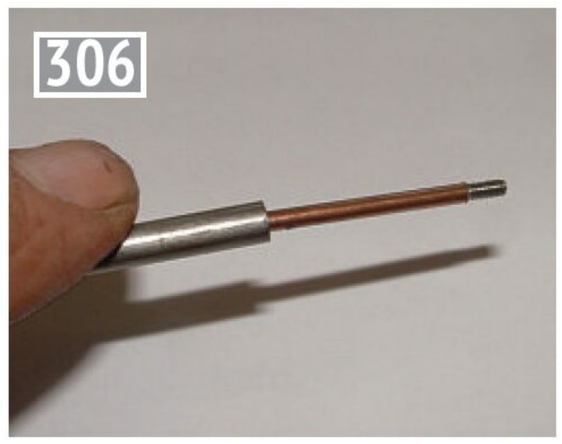
Fig 180



Fillet beneath the cab.



B1 lamp irons.



A drilled rod acts as a bending jig.



A finished grab rail.

Photograph 306 shows the rod drilled up to where the rod needed its first bend and **photo 307** shows the completed article.

Photograph 308 is just there to show the electric lamps and the tail lamp irons to drop a good old-fashioned paraffin lamp on top of the iron. Note that four of the bolts holding the front piece of plating down are round headed but coach bolts have been used which have a much flatter head than the 10BA bolts that you buy off the shelf. They have slightly larger heads than the 10BA hex one so you may have to use 8BA ones so that the heads can be skimmed down and if there is any slot left you may have to resort to a little soft solder to fill them.

Photograph 309 shows the step on the curved section of the plating but remember to



Front step (dimples just visible).

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Fig 181

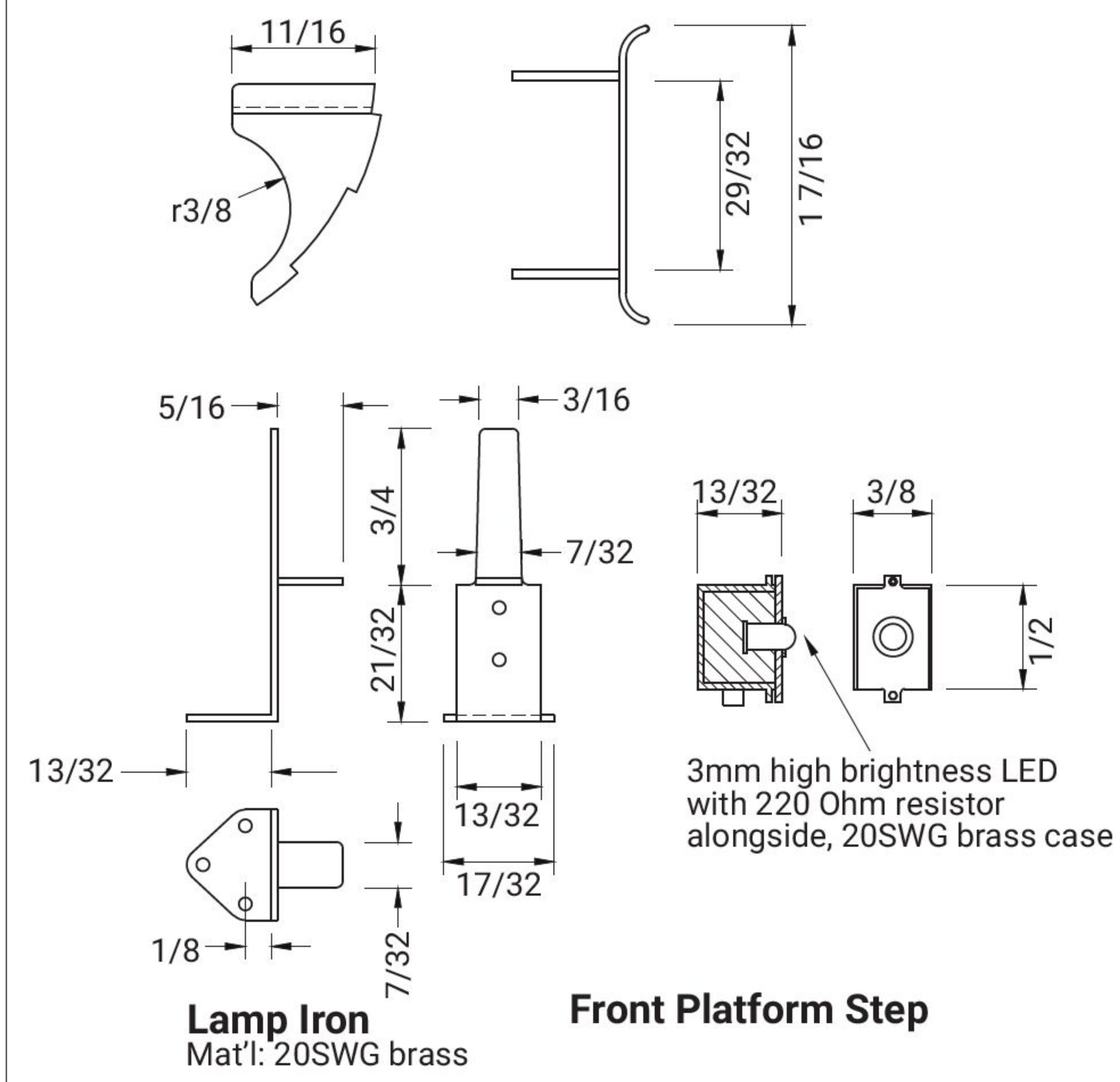
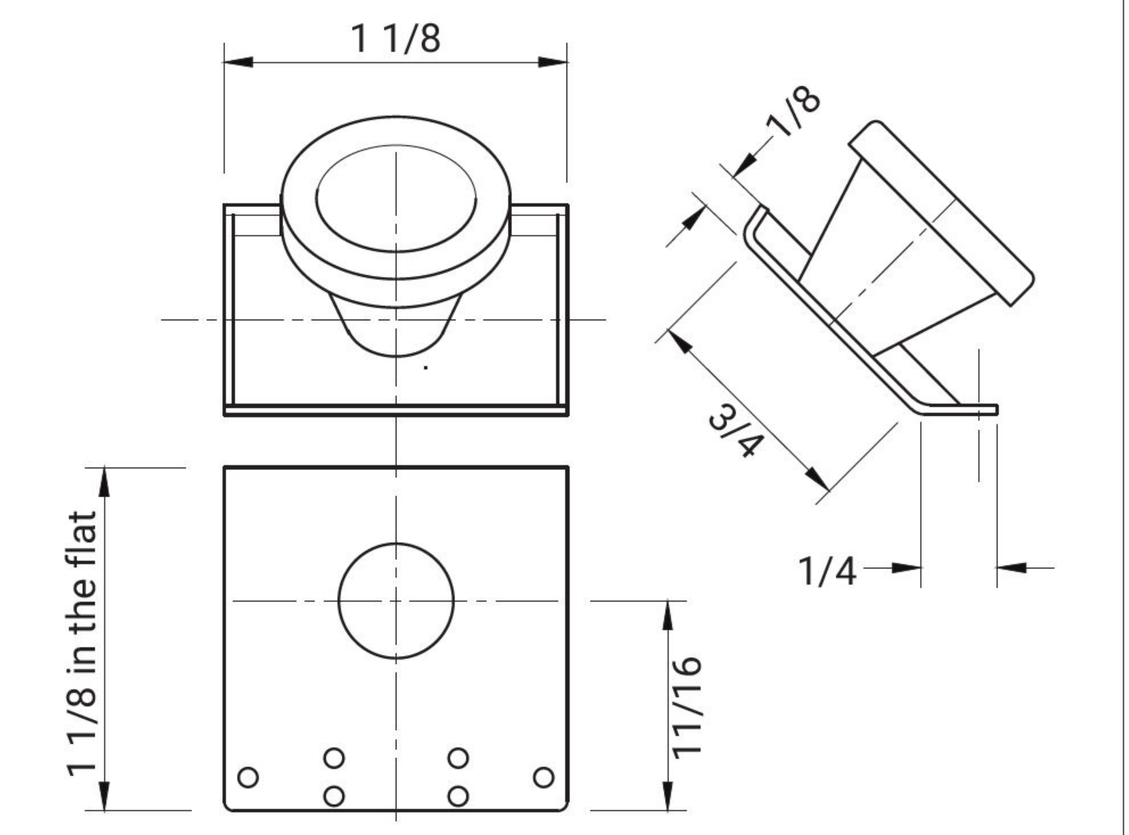


Fig 182



Front step and lamp iron.

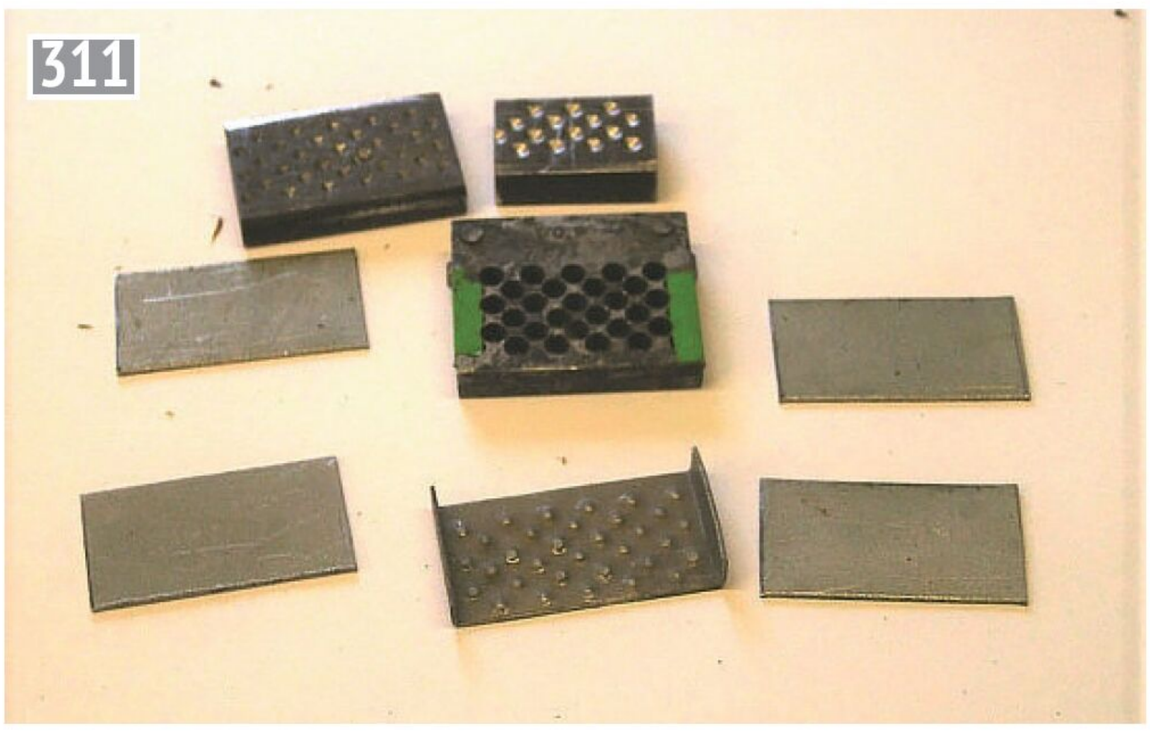
Sand box filler.

310



Dimpling press tool.

311



Dimpling press tools and dimpled plates.

dimple the step before you put it together. Note the works plate and the lifting hole in the left-hand frame plate.

I made up a little press tool for dimpling the steps for my 4MT. This just consisted of a clamp which I spotted in a tool shop one day and I just thought that it must come in useful one day. I welded up two pieces of 4 x 1½ inch channel section into a right angle, bolted the clamp on to it and - hey presto - we had a tool for making steps. We put an advert in the magazines once for 'Dimpled Steps', and we could have had a job for life! This is seen in **photo 310**.

We made up some templates for all manner of steps and it kept Mike busy for ages. Anyway, I digress. I made up a plate with the required number of dimples on a grid and drilled right through the plate. We then made up a second plate which consisted of some countersinks all to the same depth and this acted as a depth stop so that there was no chance of over pressing any of the dimples. These plates are shown in **photo 311**. The main plate was tailored to fit the length of the step so that the ends could just be bent up and filed to shape.

Photograph 312 is to show how the curved angle is riveted to the frame plate and the bolts are well in there! Note that the step treads need curved ends so this means that you can use your press tool template to bend the ends up.

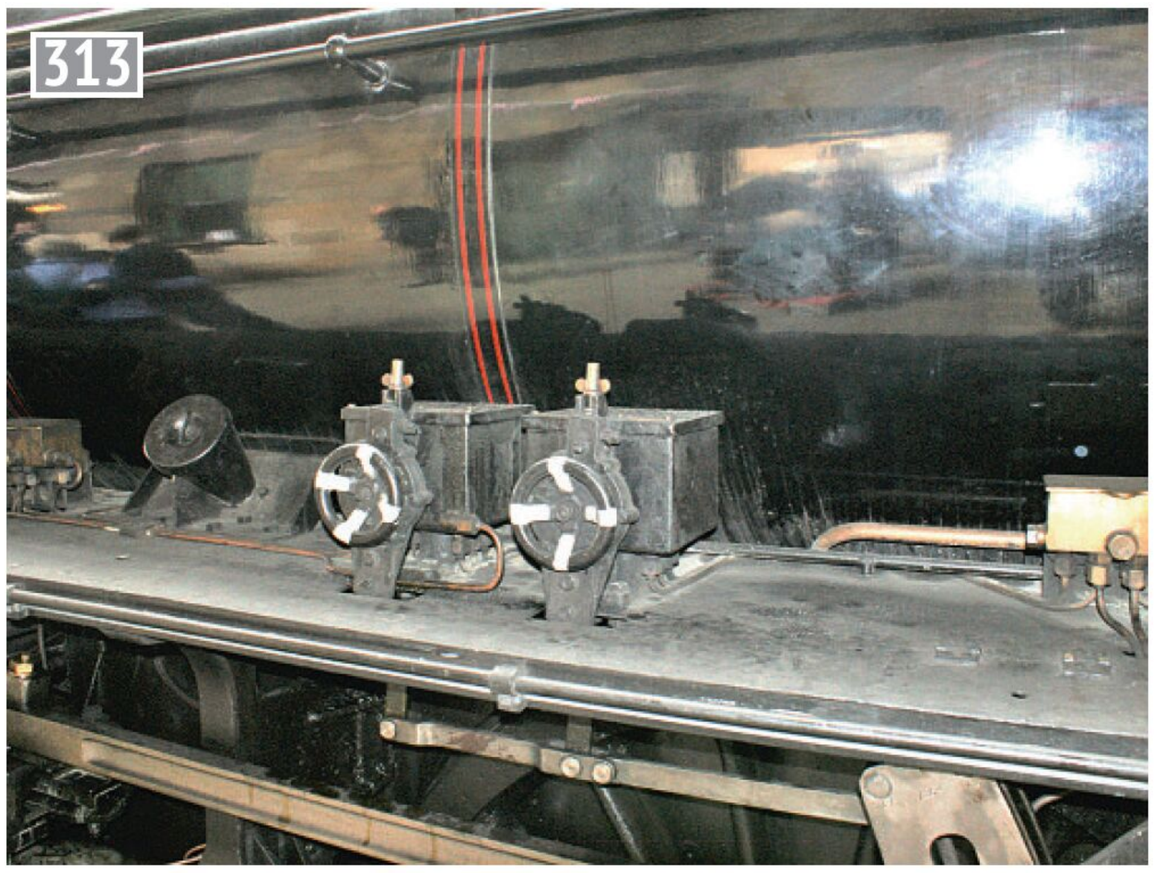
Photograph 313 shows a general view of the left-hand side platform but notice how many oil feeds there are emerging from the swab boxes. There are six pipes emerging from the rear box and eight from the front box. There is also a steam heating pipe to the front lubricator box.

Photograph 314 shows one of the joints in one of the side platforms which has four (10 BA) countersunk bolts fixing it to the slide bar support.

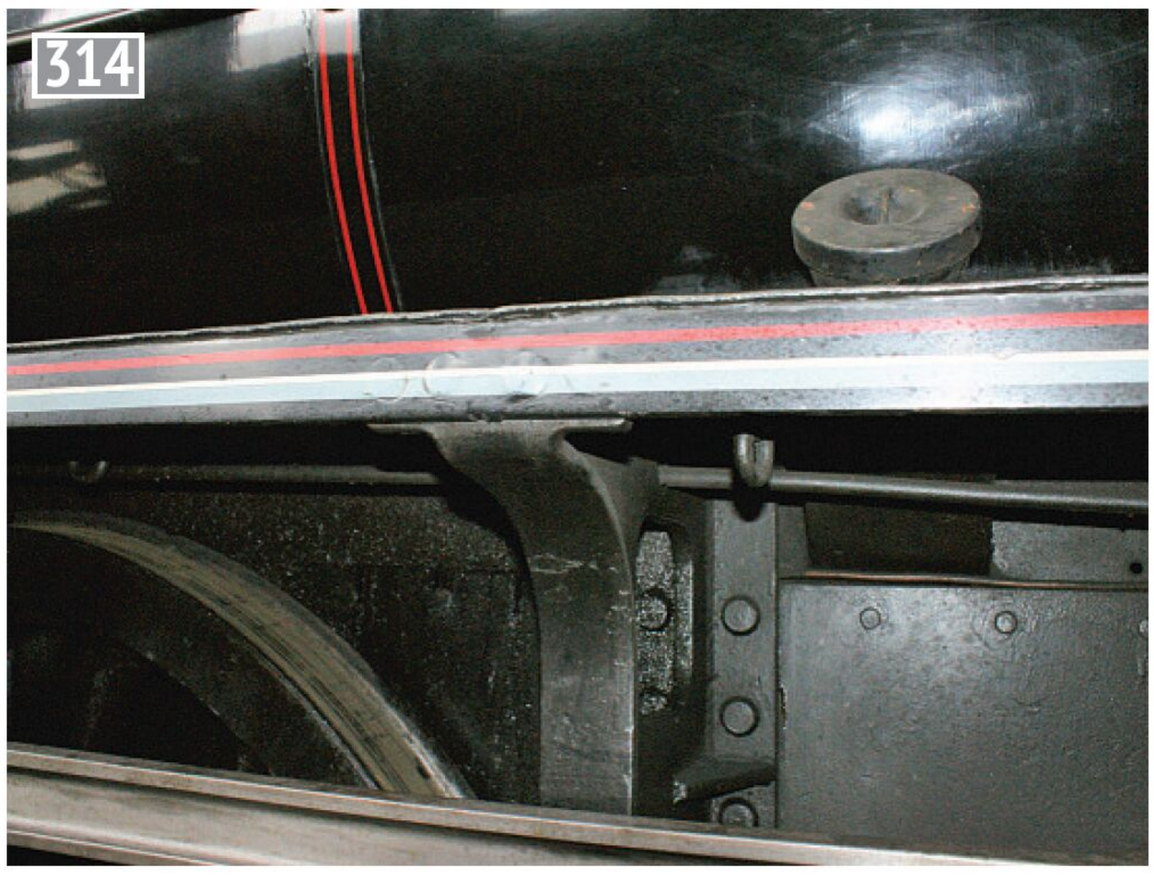
Photograph 315 shows the cover over the reach rod which



Fixings for the curved angle.



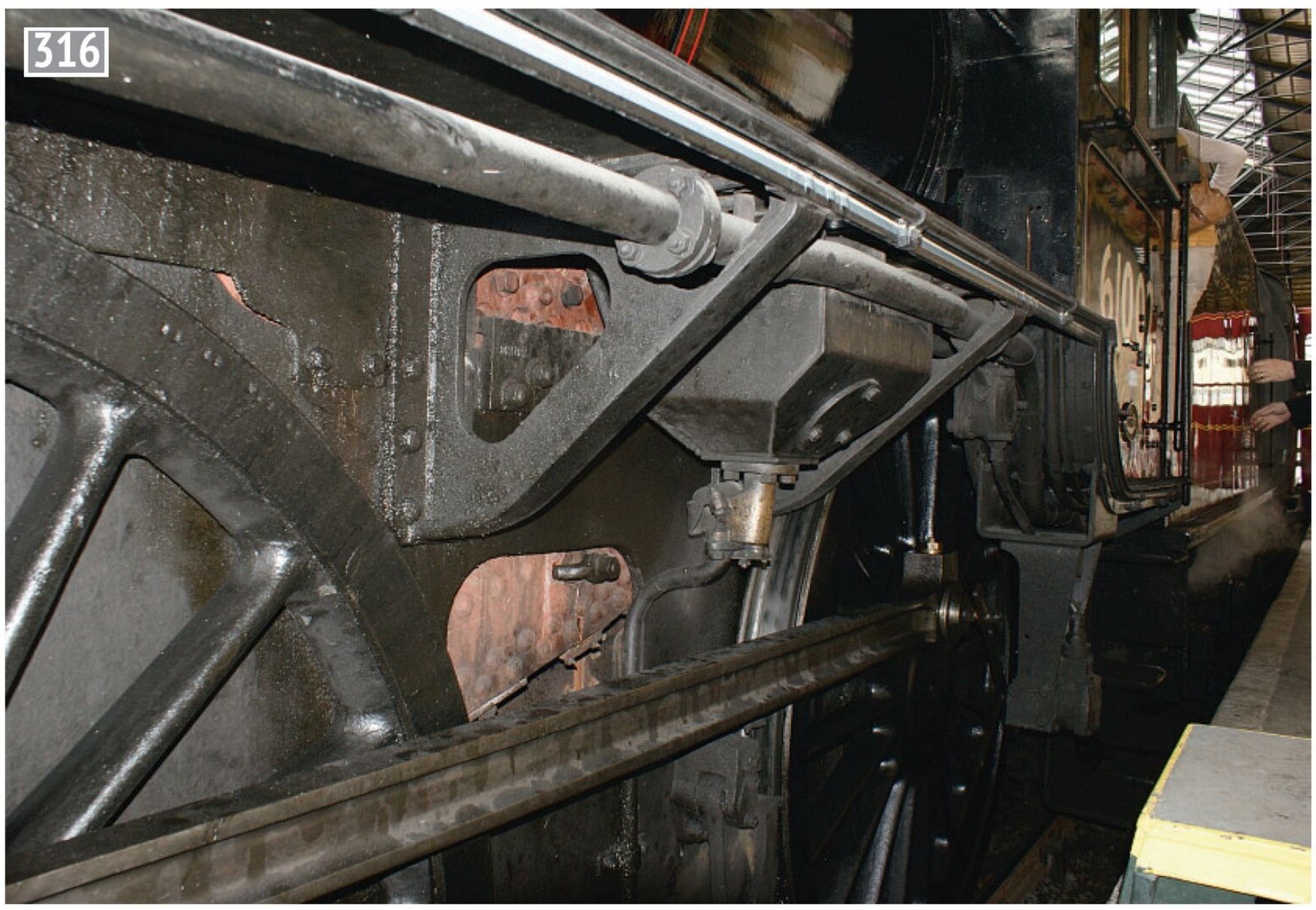
Lubricators and swab boxes.



A view of a joint in the platform.



Cover over the reach rod.



Another joint in the platform.

has a very tight bend over the top and hopefully the bolts will line up with the main platform once it has been bent. It is part of the laser cut kit.

Photograph 316 shows one of the other joints in the platform where it is fixed to the forward stay at the front of the rear sand box. Note that there are two pieces of 2 inch tube which are bent round the outside of the sand box which have four double bends in them with four bolt flanges connecting the pipework together.

To be continued.

NEXT TIME
More about the side platforms.

CLUB NEWS

Geoff Theasby reports on the latest news from the clubs.

Welcome to my TARDIS, or 'Theasby's Amateur Radio Discussion and Intellect Site'. I must relate to you, dear Reader, the events which occurred yesterday. Debs woke with a 'fat lip' (not caused by me, I hasten to add). Looking it up online, it may be a reaction to antibiotics prescribed two days before, so we rang 911 and they said "get thee to a hospital NOW", and asked us to leave the front door unlocked for the paramedics, but before I could get there, they had beaten me to it! After a few measurements they whisked off to the hospital. I resisted the temptation to ask the driver to use his 'Blues and Twos'. At the hospital, we were pronounced DOA or 'Deborah on Arrival' before being prescribed ant-histamines - after a wait of more that four hours. During this period I noticed that a heart monitor behind us was beeping, eventually repeating the Morse code letters 'O' and 'M'. Perhaps this was an attempt to reduce our tensions and help us feel very 'Zen' about the matter. Debs was very taken by this outbreak of levity, and was overcome by giggles. "Only you, Geoff..." she gasped. Altogether, after the eightfold, *"Ommmm..."*

In this issue; Gauge 3 prevails, a poem, coal, a Meccano model, aircraft recognition, a wheel-less 'portable', water, dialect and a mystery object.

Following up the photos requested from Nick Baines, editor of the Gauge 3 Society Newsletter referred to in Club News 4741, David Keeling has renounced Gauge 1 and taken up Gauge 3, producing two wagons from kits.
W. www.gauge3org.uk

Two readers have corrected me on the 'Lynx' helicopter at Bodo Air Musem, Norway, in ME 4737, page 337. They are right, of course - this is actually a Bell Iroquois, UH-1. There are however, two Lynx inside. Well, I couldn't argue with one who identified the machine from its rotor* head.



Joe Izzard's 'Raleigh car' at HDMES. (Photo courtesy of Julie Williams.)

Ivan and Barbara Smith write the March *Newsletter* from **Stockholes Farm Miniature Railway**. The flooding having abated, onward to Christmas. Barbara gave Ivan a railway oriented 'Twelve days of Christmas' poem, which I like, but I'm not printing it here; join the railway and see for yourself! Several bags of anthracite have been located nearby and have been added to stock. I presume Stockholes Farm is not sitting on millions of tonnes deep beneath them, but they were available without digging... Two pictures partly hidden are of a five plank wagon and four wheeled platform porters' trolley. Nice touch of authenticity there. It is a Post Office trolley, I found as I read on.
W. www.shfmr.co.uk

The **Bristol Model & Experimental Engineers'** spring issue arrives, strangely enough entitled *The Bristol Model Engineer*. Steve Briancourt has built the USS *Missouri* in Meccano. It'll never float with all these holes in it! Midsomer Norton station (S&D Rly.) is being improved. The first steam-driven vehicle on site was a roller preparing the track foundation. Andrew Harding discusses the making of locomotive cabs using 3D printing and moulding techniques for British Railways GT2 18100 of 1951.
W. www.bristolmodelemgineers.co.uk

Halesworth & District Model Engineering Society, spring *Newsletter* has a fine shot of Joe Izzard's 1931 Raleigh Monaco. He used to have an



Paul's painting BCSME. (Photo courtesy of Paul Ohannisian.)

Alvis but the Raleigh is easier to drive (**photo 1**). The New Year's Day steam-up produced not only Joe's Raleigh but an electrically-driven model of an electric locomotive. A boiler for an atmospheric pumping engine is the interest of John Child, who used a copper teapot, heated by a camping stove, as the basis of his model, suitably modified with the addition of items sourced from car boot sales, junk shops, and w.h.y. (my philosophy too!). It was pressure tested to 10 psi and the safety valve lifts at 5 psi. Having no boiler certificate for this, he built a better vertical boiler. Together with its engine it was exhibited at LOWMEX 2023. Editor, Julie tried ChatGPT of Facebook fame and asked it about model engineering. (I asked it a similar question, last year and got a very similar answer, probably because they were both using the same sources - Geoff.)

W. www.hdmes.co.uk

The Whistle, March/April, from **British Columbia Society of Model Engineers** arrives, courtesy of their new editor, Brian Ruebottom. The previous incumbent, Paul Ohannesian having resigned. Thank you Paul for all your hard work over the last eight years. Brian only joined the BCSME last year, and dived in at the deep end, as the *Whistle* is the public face of the Society and has a key role in attracting visitors. Brian's first task is to read the 50 year history of the Society, digitised by Paul last year. That will keep him off the streets… A painting by Paul is featured, now where have I seen that image before (**photo 2**)?

W. www.bcsme.org

The **Worthing & District Society of Model Engineers**, *Newsletter*, spring, has discovered that their seagulls don't like teabags. A bag of rubbish was just outside the clubhouse on its way to the bins and was investigated by seagulls, who plainly don't like teabags, as these were discarded on the path and the rest of the bag torn open, just in case there may be more tasty or comestible fare within. Perhaps they should change the tea to Earl Grey**. The very popular David Lewins has died. David produced a Wordsearch puzzle for every issue of the newsletter over the past 15 years and never missed one. In Presidential Ponderings, Andrew Breese explains Ron Humphrey's building of LBSC's *Netta,* and what would the parts cost if it were done today. He comes to a surprising £2000. Andrew says that in his youth he thought that golf was more expensive than model engineering. It may be a moot point. In more ecological activity, Dereck Langridge was taught orientation, reading the landscape, by his Dad. They would walk out to sea at low tide and gather lobsters, crabs etc. He also pointed out that the lobsters clutching their eggs should be left in peace for future generations; ours and theirs.

W. www.worthingmodelengineers.co.uk

An huge issue of *Raising Steam* arrives. This is the newsletter of the **Steam Apprentice Club** of the National Traction Engines Trust and in its winter 2024 issue of 62 pages, editor Jim Huntley thinks it is winter 2023, but studying the forthcoming calendar he is gratified to see so many driving days, including some new names. He also adds his congratulations to Oliver Maunder for winning Apprentice of the Year (again!). This is the second time he has won it; the first was in 2018. Nick Bosworth (acting chair) reports that the living van is taking its final shape, with the body once again fastened to the chassis. Victoria's Tales went for a late road run in November, to a pub about 4 miles away. In January, they took another (st)roll to Petersfield, not realising it was market day. However, everyone was friendly and helpful in the good-natured crush. Forthcoming visits may include a Sailing Day. The Steam Boat Association has offered a sailing experience if there is any interest. Tom Attwood (ex-SAC) writes on his life to date and his first year with a Foden steam wagon of 1920, which worked in the IoM into the 1950s (**photo 3**). Paul Ritchie, of NTET magazine, *Steaming* writes on a Marshall 'Britannia' portable engine (**photo 4**) including a contemporary advert from the manufacturers. We have a chance to identify a seemingly complete boiler and cylinder in one unit. It uses special stands, unlike the wheeled portable engines, so it may be some sort of portable boiler or power source. I shall be pleased to see the answer.

W. www.ntet.co.uk/sac.



IoM Foden. (Raisng Steam; photo courtesy of Tom Attwood.)

Steam Chest, the newsletter of the 2½ Inch Gauge Society has lots to offer us, beginning with an analysis of water. Remember? In pre-steam days, we used to drink it. Here, today, Ron Barson of Bournemouth & DMES describes locomotive lubrication and Norman Almond writes about his life. Brian Finch explains LittleLEC, a locomotive efficiency competition. The Society had a stand at the Midlands Garden Railway Show at Warley and Cedric Norman attended to his *Black Fay*.

W. www.n25ga.org



Britannia advert provided by the editor.



Two US locomotives at Sheffield: One's a 'Shay' and one … isn't. (Photo courtesy of Adam Diskin.)

Steam Whistle, March, from **Sheffield & District Society of Model and Experimental Engineers,** begins with a fine photo of two American-designed locomotives–spot the clues (**photo 5**). The first public running was WET! Very, very wet! However, a couple of hundred people turned up, hardy souls, to be greeted by the hardier souls running the trains. (Mad dogs and Englishmen go out in the midday downpour…) Thank you all. An image of the chairman going water-skiing behind a steam locomotive rises in my consciousness … and is swiftly suppressed. Ian Hutchinson appeared in a hat with '**Chuffin weather'** embroidered on it. Still it makes a change from 'Engine Driver'. A picture of the said hat over Ian's handsome visage adorns the page. Editor Mick Savage explains that the term appears to be local to Sheffield, or at least South Yorkshire. Several other local terms like dee-dar (thee-thar, this 'Quaker style' of speech lingered in Sheffield after other regions had abandoned it) teacakes, lugoyl (ear hole) and nesh (cold). The club track was visited by the local firefighters checking their plans for emergencies. One of the firemen really is called Sam… Neil Ritchie expands on his article about gyro cars and monorails. David and Anita Vere have raised funds for the local hospice, St Lukes, over the years; last year they raised £1500. Well done! An 'artefact' was circulated at a recent meeting; complete baffflement was the order of the day. It certainly looks like a thing o' purpose. A picture shows a whistle bell or 'lynx' with Pete Nash (he's the one on the right, **photo 6**).

W. www.sheffieldmodelengineers.com

Gauge 1 North, Yorkshire Group, has more details of their forthcoming activities, including Gauge 1 North at Bakewell on 20 July. Part 2 of 'Print your own decals' (transfers) adds details and expands on the requirements for success.

W. www.gauge1north.org.uk

A model railway enthusiast in Wakefield sold, at auction on 22 March, his collection of about 300 locomotives by the usual manufacturers. He has also assembled several from kits or scratch-built them, for various gauges and scales, many boxed and never opened. See David Duggleby.

W. www.davidduggleby.com

And finally, *The Thespians,* a travelling railway concert party, could not perform last week, as the locomotive driver had stage freight.



Pete Nash in a 'before' picture. (Photo courtesy of Mick Savage.)

* Rota?

** Lord Grey of Fallodon was a great birdwatcher, writing *The Charm of Birds* in 1927 and he helped found the British Trust for Ornithology.

ME

Club Diary 1 May 2024 – 6 July 2024

May

1 Bradford MES
Meeting: 'Helicopters' by Derek Round, 19:30, St James' Church, Baildon, BD17 6HH. Contact: Russ Coppin, 07815 048999.

2 Cardiff MES
Members' projects. Contact : secretary@cardiffmes.co.uk

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

3 Rochdale SMEE
General Meeting. Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

5 Plymouth Miniature Steam
Public running, 14:00-16:30, Pendeen Crescent, Plymouth, PL6 6RE, Contact: Rob Hitchcock, 01822 852479

6 Sutton MEC
Fete at Lower Kingswood. Contact: Paul Harding, 0208 254 9749

11 Bradford MES
Annual Exhibition & Competition, 12.30 – 16:00, St James' Church, Baildon, BD17 6HH. Contact: Russ Coppin, 07815 048999.

11 Bromsgrove SME
Open Day – all gauges are welcomed – 5, 3½, 2½, Gauge 1 and 16mm. Contact: Doug Collins, 01527 874666. See www.bromsgrovesme.co.uk

12 Cheltenham SME
2½ inch gauge rally. Contact: csme@cheltsme.org.uk

17 Rochdale SMEE
Models Running Night – 17:00 onwards. Springfield Park. See www.facebook.com/RochdaleModelEngineers

18 Bromsgrove SME
Polly Rally. See www.bromsgrovesme.co.uk

18 Cardiff MES
Steam up and family day at Heath Park, Cardiff. Contact : secretary@cardiffmes.co.uk

18 Northampton Society of Model Engineers
Bassett-Lowke Rally. Contact Kevin West at westkev58@gmail.com

19 Bradford MES
Public Running Day. Members from 11:30 public from 13:30 To 16:00, whatever the weather, Northcliff. Contact: Russ Coppin, 07815 048999.

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

19 Plymouth Miniature Steam
Public running, 14:00-16:30, Pendeen Crescent, Plymouth, PL6 6RE, Contact: Rob Hitchcock, 01822 852479

19 Sutton MEC
Annual exhibition from 13:00. Contact: Paul Harding, 0208 254 9749

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

25 Westland and Yeovil MES
Track running day 11 :00. Contact : Michael Callaghan, 01935 473003

26 Westland and Yeovil MES
Running the track at Yeovil Junction – Steam Train Day. Contact : Michael Callaghan, 01935 473003

26-27 Cardiff MES
Open Day at Heath Park, Cardiff. Contact : secretary@cardiffmes.co.uk

28 Westland and Yeovil MES
Running the track at Yeovil Junction – Diesel Day. Contact : Michael Callaghan, 01935 473003

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

June

1-6 Parklands Railway, Hemsby
Parklands Railway Week. To book, contact leighsteamer@btinternet.com

2 Guildford MES
Small Model Steam Engine Group, 14:00-17:00. See www.gmes.org.uk

2 Plymouth Miniature Steam
Public running, 14:00-16:30, Pendeen Crescent, Plymouth, PL6 6RE, Contact: Rob Hitchcock, 01822 852479

2 Westland and Yeovil MES
Running the track at Yeovil Junction – Steam Train Day and Children's Day. Contact : Michael Callaghan, 01935 473003

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

6 Westland and Yeovil MES
Thursday running afternoon and evening followed by fish and chips. Contact : Michael Callaghan, 01935 473003

7 Rochdale SMEE
General Meeting. Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

7-9 Cardiff MES
Welsh Rally at Heath Park, Cardiff. Contact : secretary@cardiffmes.co.uk

8 Bradford MES
Meeting: RC Loco Competition and Evening Running. 19:30, Northcliff. Contact: Russ Coppin, 07815 048999.

9 Bradford MES
The Big Lunch, Northcliff. Contact: Russ Coppin, 07815 048999.

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

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

15 Bromsgrove SME
Midlands Gauge 1 event, incorporating the Paul Forsyth Memorial event. See www.bromsgrovesme.co.uk

15 Cardiff MES
Steam up and family day at Heath Park, Cardiff. Contact : secretary@cardiffmes.co.uk

16 Bradford MES
Public Running Day. Members from 11:30 am, public from 13:30 to 16:00, whatever the weather, Northcliff. Contact: Russ Coppin, 07815 048999.

16 Plymouth Miniature Steam
Public running, 14:00-16:30, Pendeen Crescent, Plymouth, PL6 6RE, Contact: Rob Hitchcock, 01822 852479

16 Westland and Yeovil MES
Running the track at Yeovil Junction – Steam Train Day. Contact : Michael Callaghan, 01935 473003

20 Sutton MEC
Club night – paper aeroplanes. Contact: Paul Harding, 0208 254 9749

21 Rochdale SMEE
Models Running Night – 17:00 onwards. Springfield Park. See www.facebook.com/RochdaleModelEngineers

23 Westland and Yeovil MES
Track running day 11 :00. Contact : Michael Callaghan, 01935 473003

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

30 Cardiff MES
Open Day at Heath Park, Cardiff. Contact : secretary@cardiffmes.co.uk

30 Westland and Yeovil MES
Running the track at Yeovil Junction – Pirate Day. Contact : Michael Callaghan, 01935 473003

July

3 Bradford MES
Meeting: Steerage Trophy Competition, 19:30, Wibsey. Contact: Russ Coppin, 07815 048999.

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

4 Westland and Yeovil MES
Thursday running afternoon and evening followed by fish and chips. Contact : Michael Callaghan, 01935 473003

5 Rochdale SMEE
Members projects/Bits and Pieces. Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

6 Bromsgrove SME
Modern Traction Open Day – all gauges are welcomed – 5, 3½, 2½, Gauge 1 and 16mm. Contact: Doug Collins, 01527 874666. See www.bromsgrovesme.co.uk

6/7 Guildford MES
Gala, 10:00-17:00. See www.gmes.org.uk

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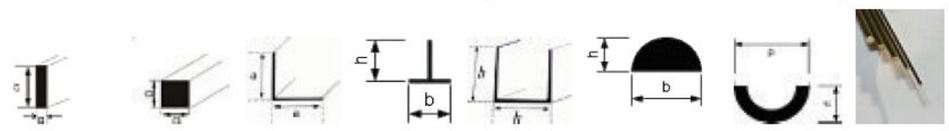
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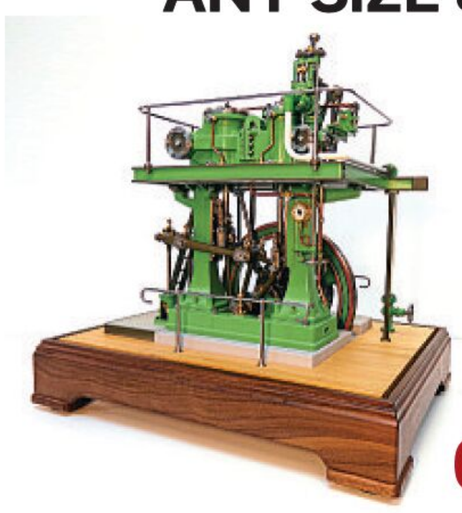
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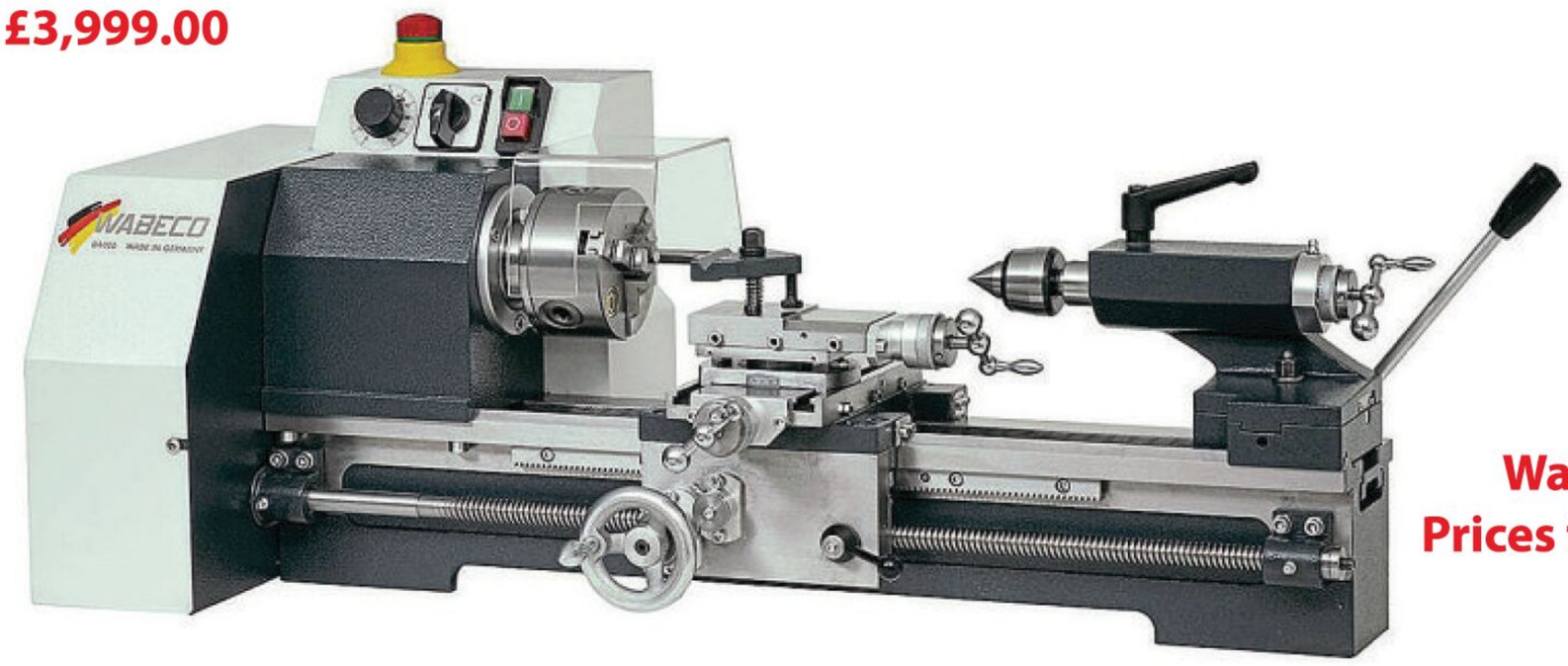
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