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Vol. 234 No. 4760 10 – 23 January 2025

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CIG81216	4.9 x 3.7 x 2.5m	140613574	£319.00	£394.80	
CIG81020	6.1 x 3 x 2.4m	140613572	£349.00	£418.80	
CIG81220	6.1 x 3.7 x 2.5m	140613576	£389.00	£478.80	
CIG81224	7.3 x 3.7 x 2.5m	140613578	£489.00	£598.80	
CIG1432	9.7x4.3x3.65m	140613594	£1099.00	£1318.80	
CIG1640	12x4.9x4.3m	140613596	£2599.00	£3118.80	



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MARTIN EVANS
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DIANE CARNEY
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Garden Rail Show

Martin Evans can be contacted on the mobile number or email below and would be delighted to receive your contributions, in the form of items of correspondence, comment or articles.
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MEeditor@mortons.co.uk

Bradford Cup

The Bradford Cup is awarded to the author of the best article or series, by popular vote, published in *Model Engineer* during the previous year.

Last year's winner was Ron Fitzgerald, for his series on the stationary steam engine, who was presented with the cup at the Midlands Model Engineering Exhibition last October, by Mike Chrisp, president of the Society of Model and Experimental Engineers.

The organisers again invite nominations for the award of the trophy, to be submitted to the editor of *Model Engineer* by the end of March 2025, which should relate to articles published in *Model Engineer* during the year 2024. Readers will then be invited to vote for one of the top three nominations. Submissions should include the following:

- * The author's name;
- * The title of the article or series;
- * The issue number in which it starts;
- * Contact details for the person nominating the article.

You may not, of course, nominate your own work!

The Joy of LECs

Now is the time for considering the possibility of pitting your wits, and your locomotive, against your fellow model engineers. The coming year offers a series of locomotive efficiency competitions for virtually any size and shape of locomotive. These events are always very exciting and lots of fun so I would recommend going along, even if only just to watch proceedings.

The original, and perhaps biggest, event is IMLEC (International Model Locomotive Efficiency Competition), founded



nearly 60 years ago by my distinguished predecessor and namesake Martin Evans (MkI). This competition covers 5 and 3½ inch gauge locomotives and is being held this year at the Fareham club. Details are on page 154. For smaller locomotives (5 and 3½ inch gauge, under 50lb) there is LittleLEC at the Tiverton club. Details are on page 156. For narrow gauge and industrial locomotives (again, 5 or 3½ inch gauge) there is NGLEC, to be held this year at the Oswestry club, for which details are given on page 157.

Garden Rail Show

Plans are 'on track' for the 2025 Midlands Garden Rail Show taking place on Saturday March 1st and Sunday March 2nd at the Warwickshire Event Centre. This show is one of the leading model railway events dedicated to garden rail. The event features the 'larger' gauges of O Gauge, G Scale, Gauge 1, 16mm and more.

There will be over 15 layouts and clubs at the event - plenty of inspiration if you are planning your own garden railway, whether it's live steam, gas or coal fired.

Over 30 leading suppliers will also be at the show to help you create your dream garden railway, selling everything you could need including locomotives, rolling stock, track and accessories. For further details on the exhibition and suppliers attending see www.midlandsgardenrailshow.co.uk. Advance tickets are on sale now!

Conundrum

John Arrowsmith from Hereford wonders if any reader



can help solve this mystery – 'I am attaching a photo of a safety valve which is being fitted to our new club Romulus loco. We have a problem as to why it has a plug in the bottom end of the valve and holes around the periphery of the main body which screws into the boiler. Can anyone enlighten us why the plug is there? We have a number of theories but no definitive answer - perhaps the readers could help.'

The editorial theory is that this arrangement may help to minimise the chances of squirting hot water out of the safety valve of an over-full boiler but I am quite sure other theories are available. The editor will be pleased to pass on any more credible theories to John.

Cock-up Corner

Issue 4757 (November 29th) contained an account of the highlights from the Midlands Model Engineering Exhibition. Photograph 1 showed an excellent example of a 7¼ inch gauge Black Five locomotive. Unfortunately the owner was wrongly credited. The actual owner is Jeremy Dunn, to whom I offer our apologies.





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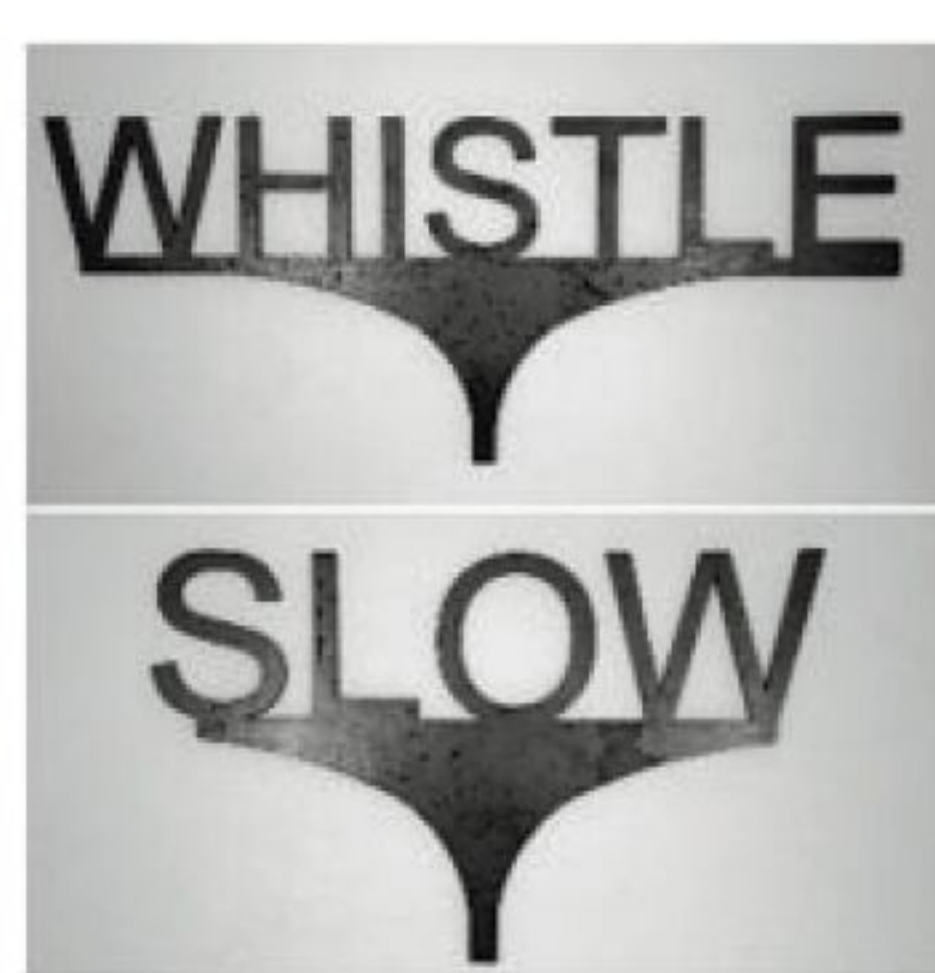
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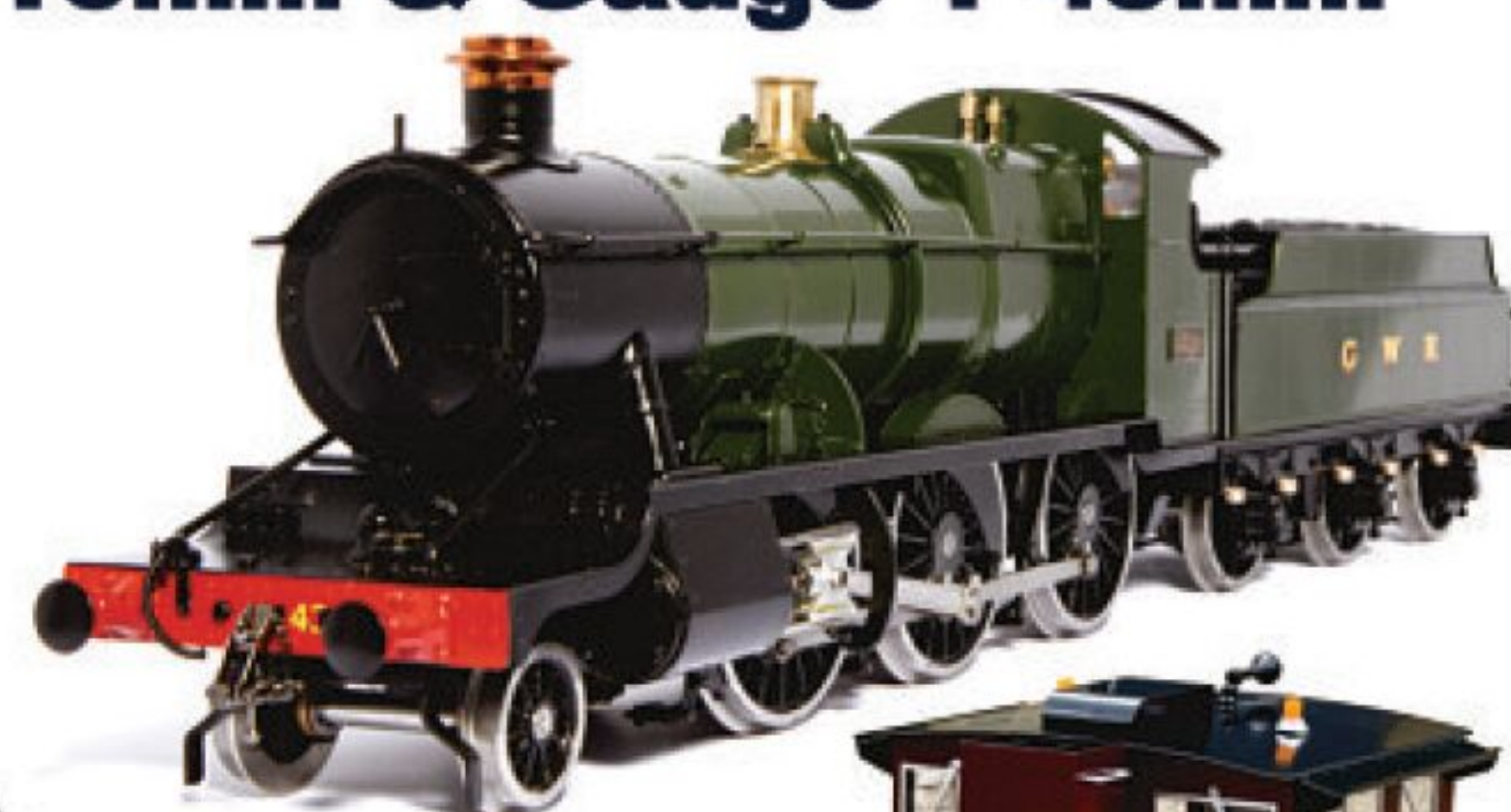


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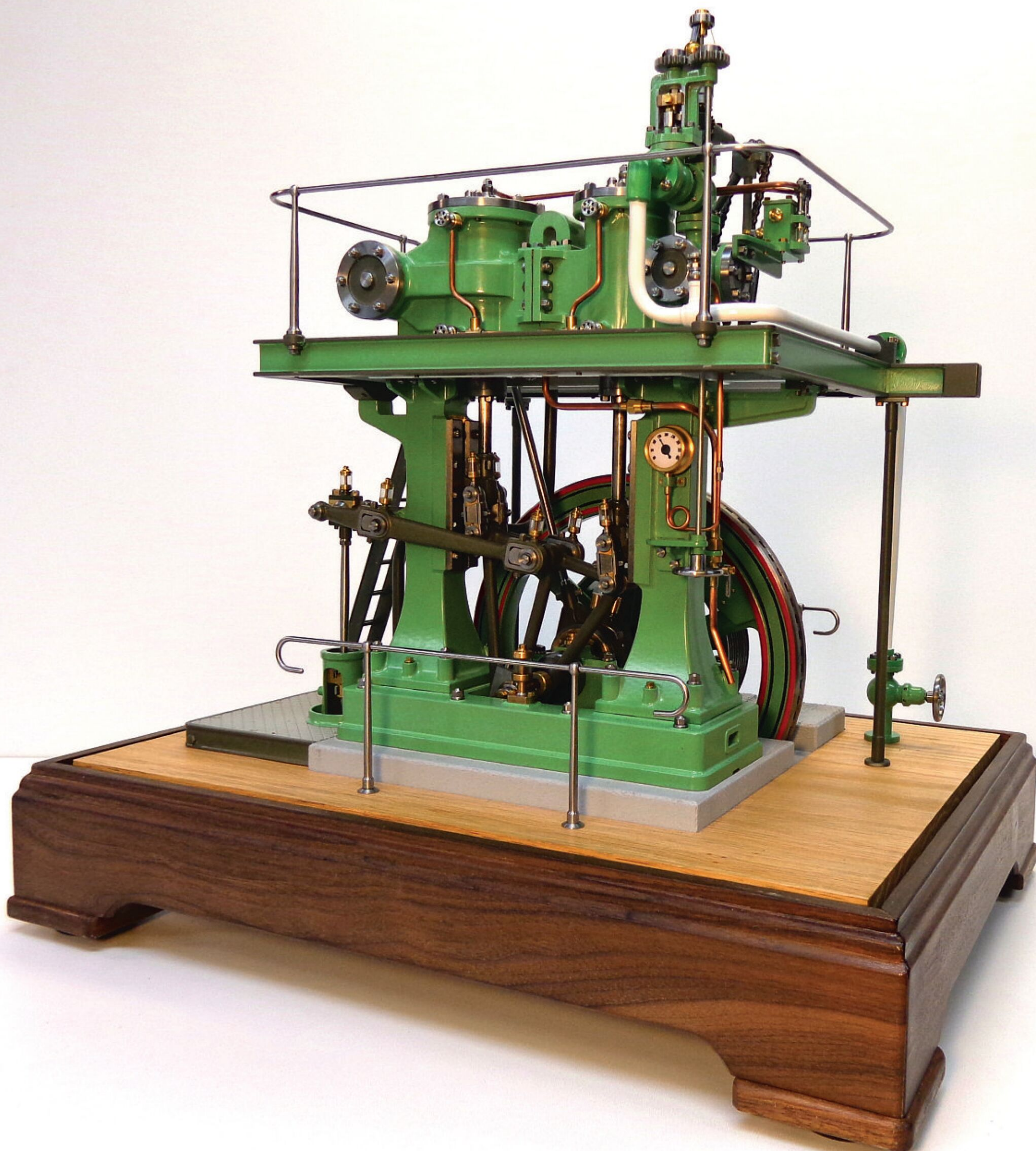
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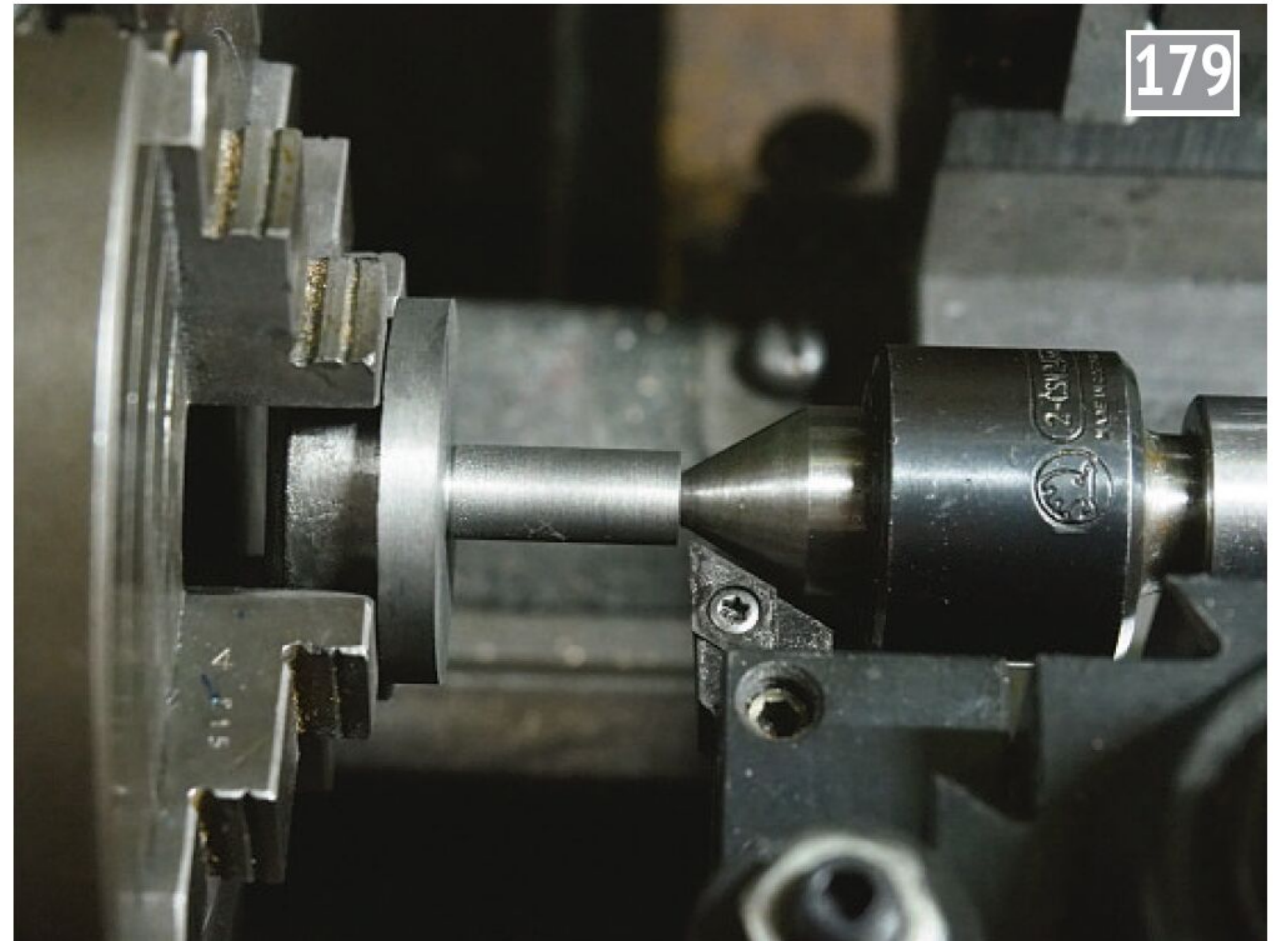
A Tandem Compound Mill Engine

PART 11

David Thomas builds Arnold Throp's model of a Corliss mill engine.



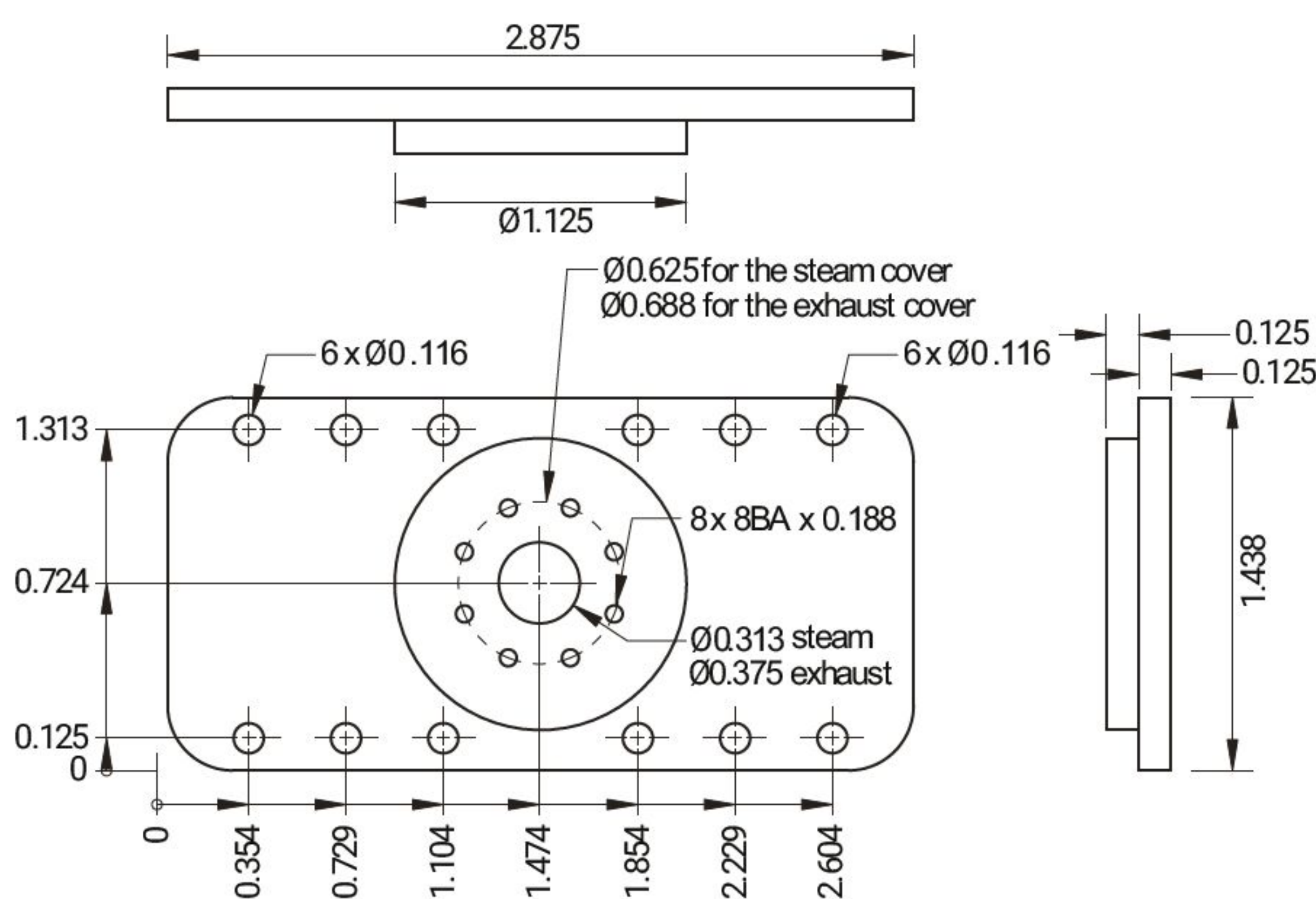
The cylinder end cover (fig 29) castings were pretty rough but once centred as well as possible in the four-jaw chuck they were centre drilled to allow tailstock support. That way, even if the chuck's grip isn't that secure, they can't work loose. In **photo 179** the outer surfaces and the chucking spigot are being turned. With the turned spigot gripped in a collet the flange was brought to thickness and the cover turned to fit the bore (**photo 180**). The covers were drilled for the piston rod and the rear one counterbored to give the



Cleaning up the chucking spigot and outer surfaces of a cylinder cover.

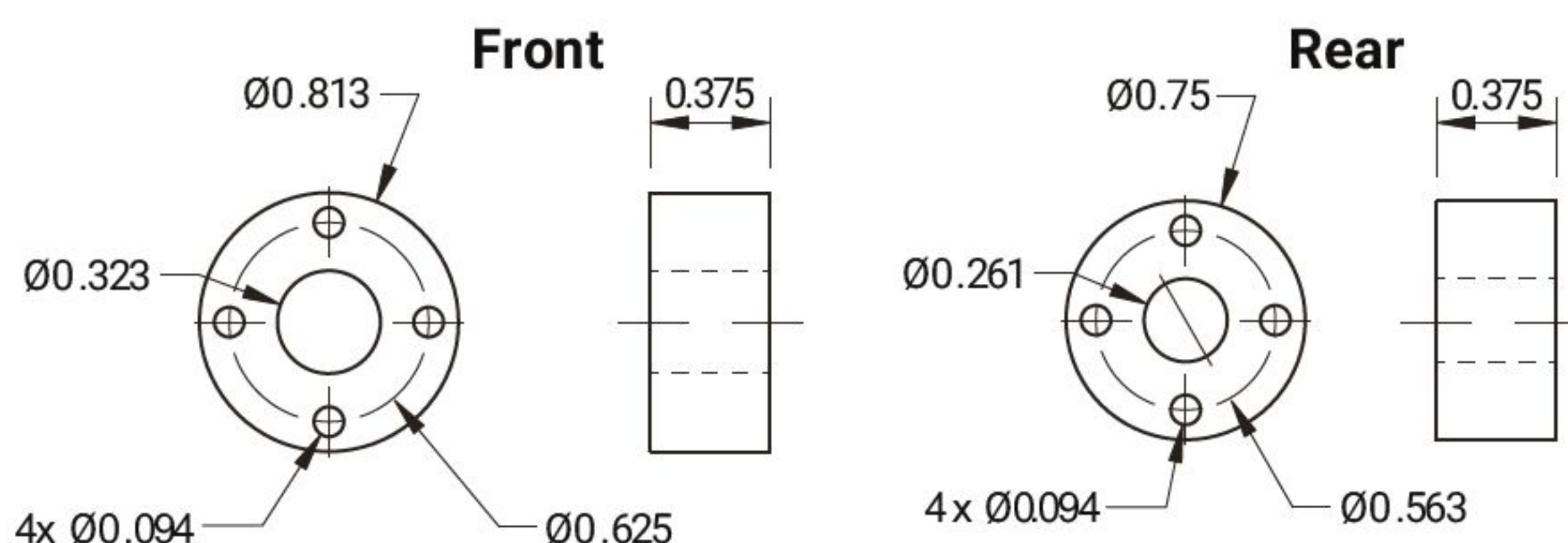
Continued from p.96
M.E.4759 December 27

Fig 29



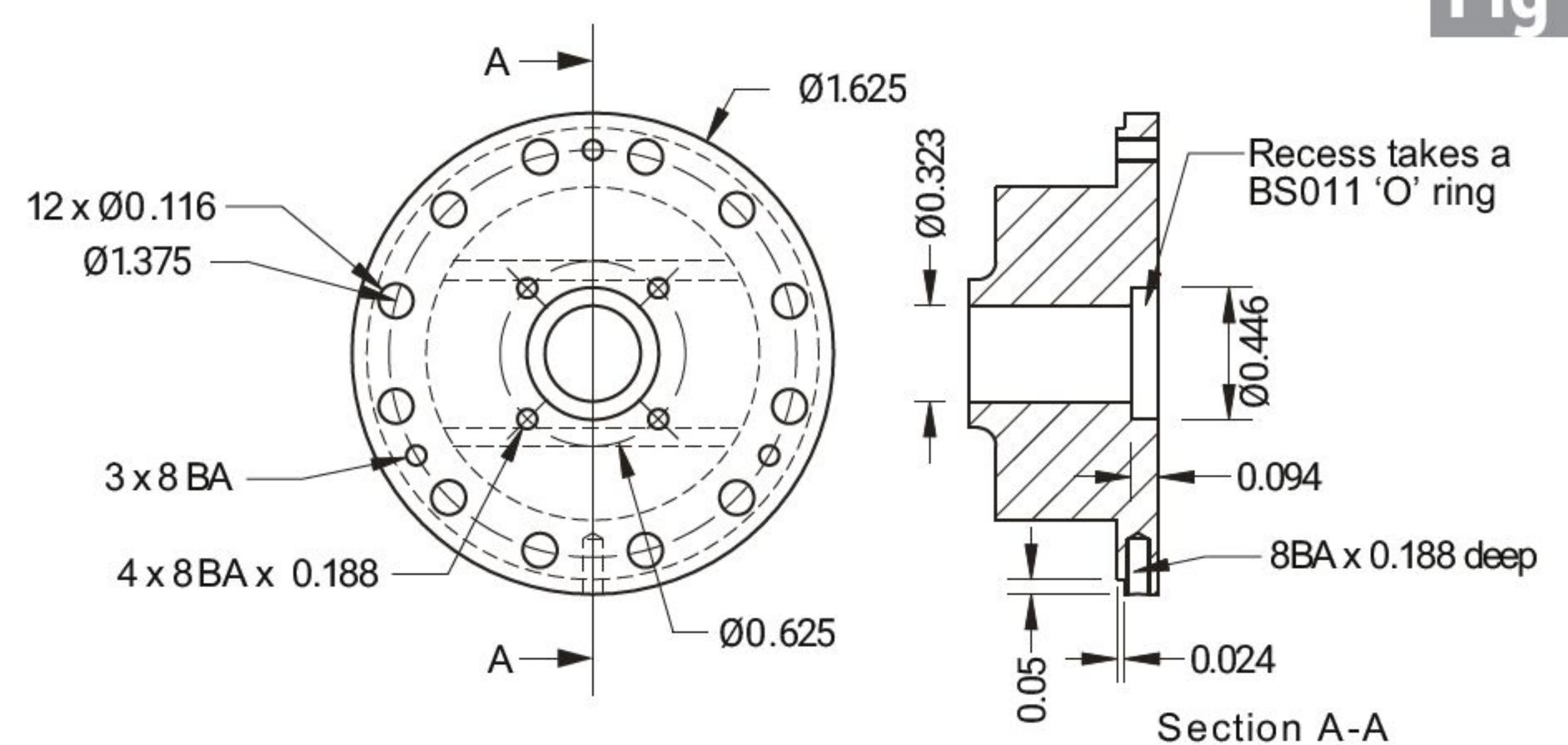
Steam And Exhaust Covers

Mat'l: C.I.
2 off



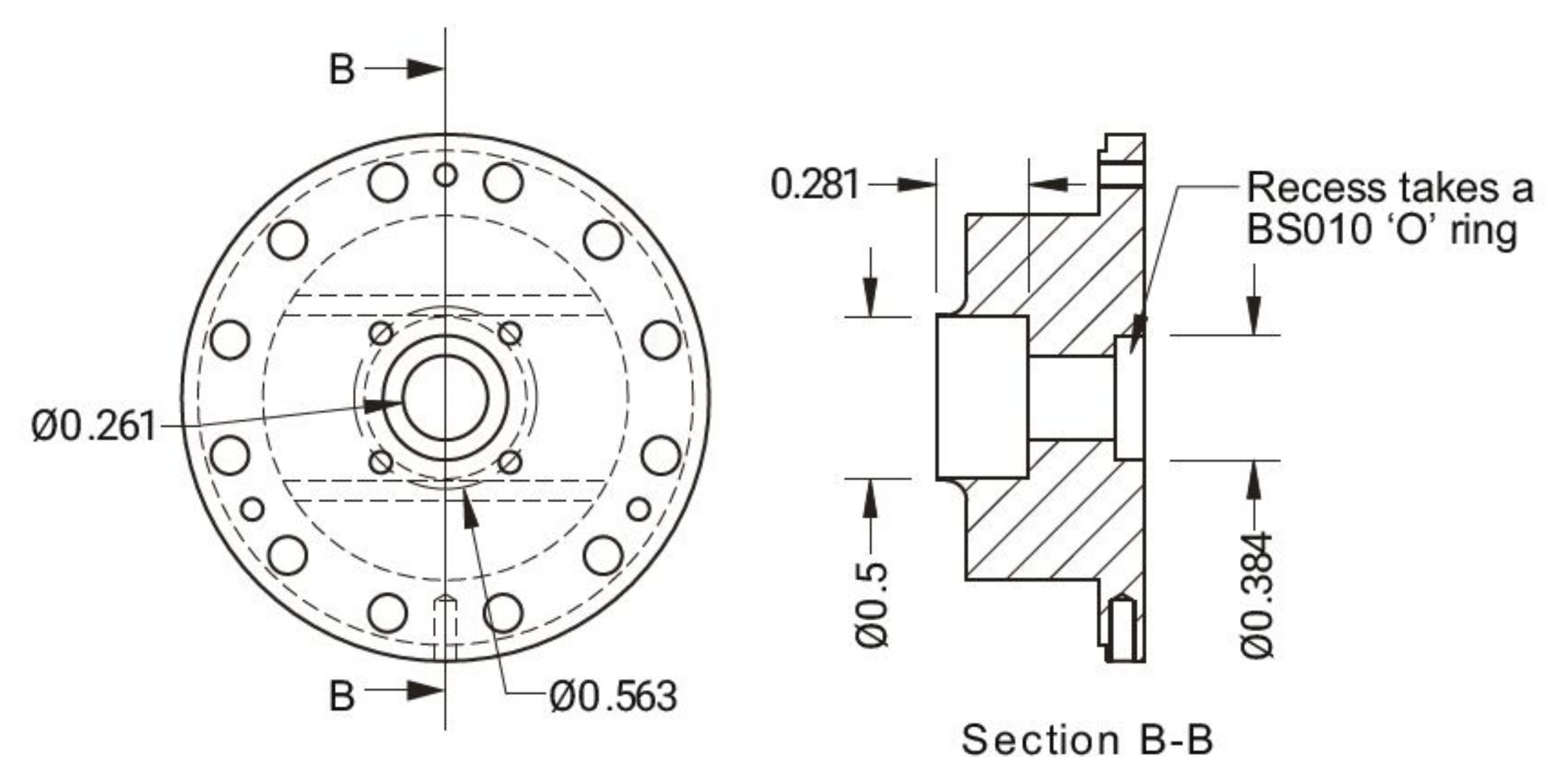
Dummy Metallic Packing

Mat'l: M.S.
1 off each size



Front Cylinder Cover

Mat'l: C.I.
1 off



Rear Cylinder Cover

Mat'l: C.I.
1 off
Other dimensions as for front cover

Cylinder covers and the imitation metallic packing for the piston rod seals.



Then the bits that fit inside the bore were turned.



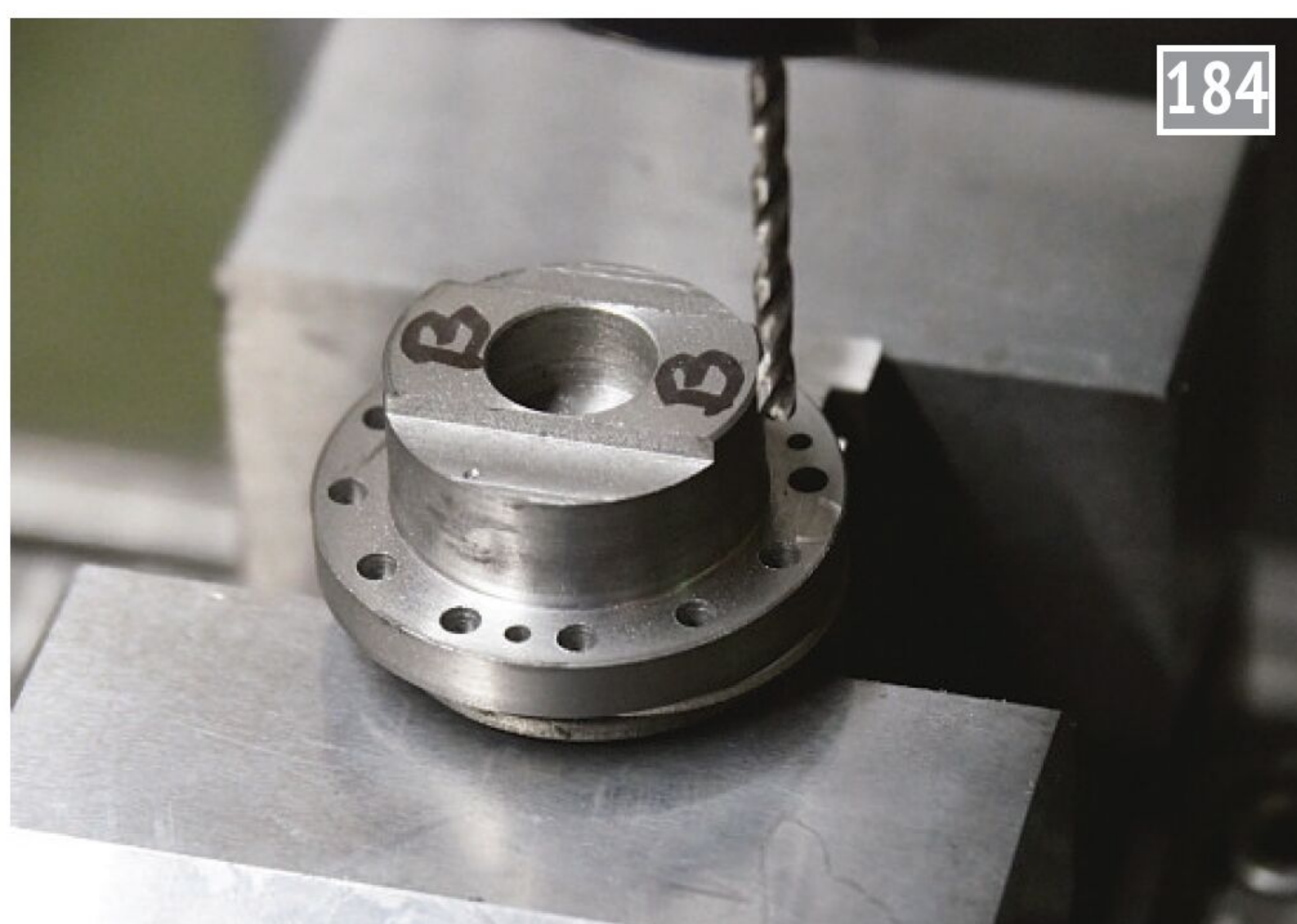
The rear cover needs clearance for the piston locking nut.



The chucking piece is left attached and is held in a V-block so that a edge finder can be used to align the axis of the with that of the mill spindle ...



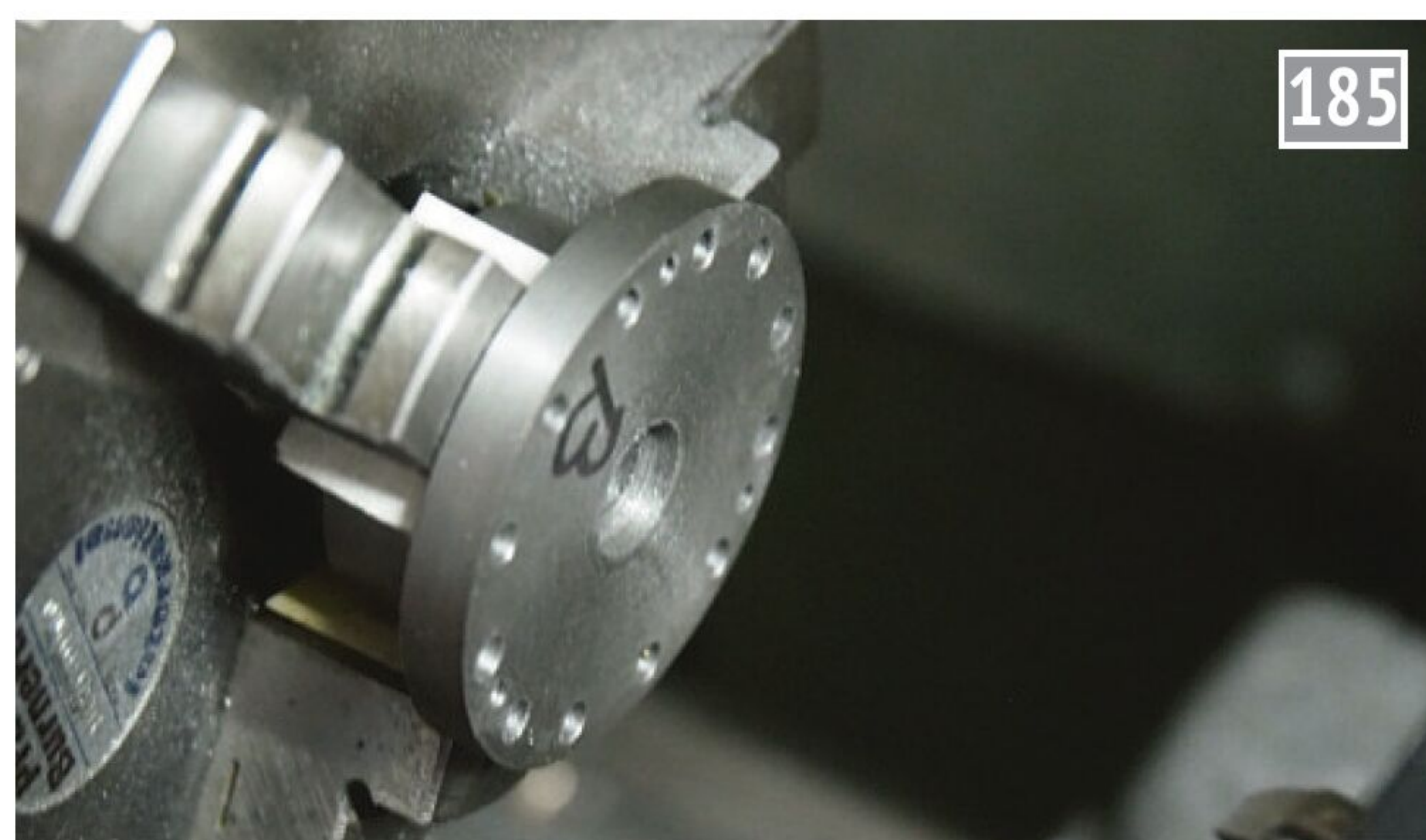
... after which the steam spaces ...



... and the fixing holes can be located with the DRO.

piston locknut somewhere to go at the rearward end of the stroke (**photo 181**). In the next three pictures, it's difficult to see but the chucking spigot is

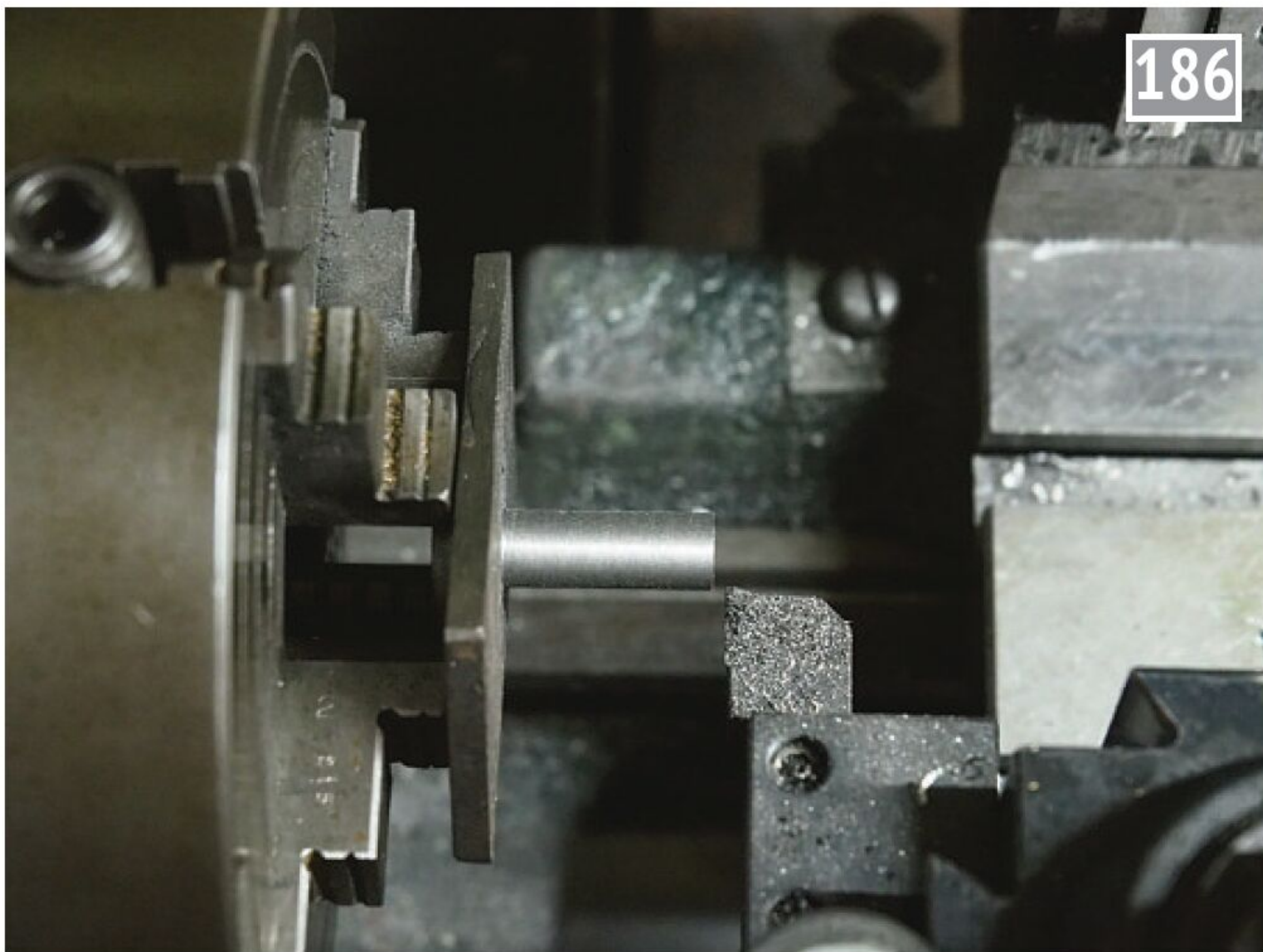
still attached and is gripped by a small V-block in the vice. The part can then be aligned with the mill axis using an edge finder and the DRO (**photo 182**), some clearance milled for the



Both covers need a recess for an O-ring seal.

steam to get from the ports into (and out of) the cylinder (**photo 183**) and the stud holes and forcing screw holes drilled using the DRO hole spacing feature (**photo 184**). Before I'd made any of these bits I thought that the forcing screw holes were only there

to be faithful to the original engine; this isn't the case and they are very necessary when, inevitably, the cylinder has to be dismantled. The final operations on the covers were to counterbore for O-ring seals for the piston rod glands (**photo 185**) and drill and tap



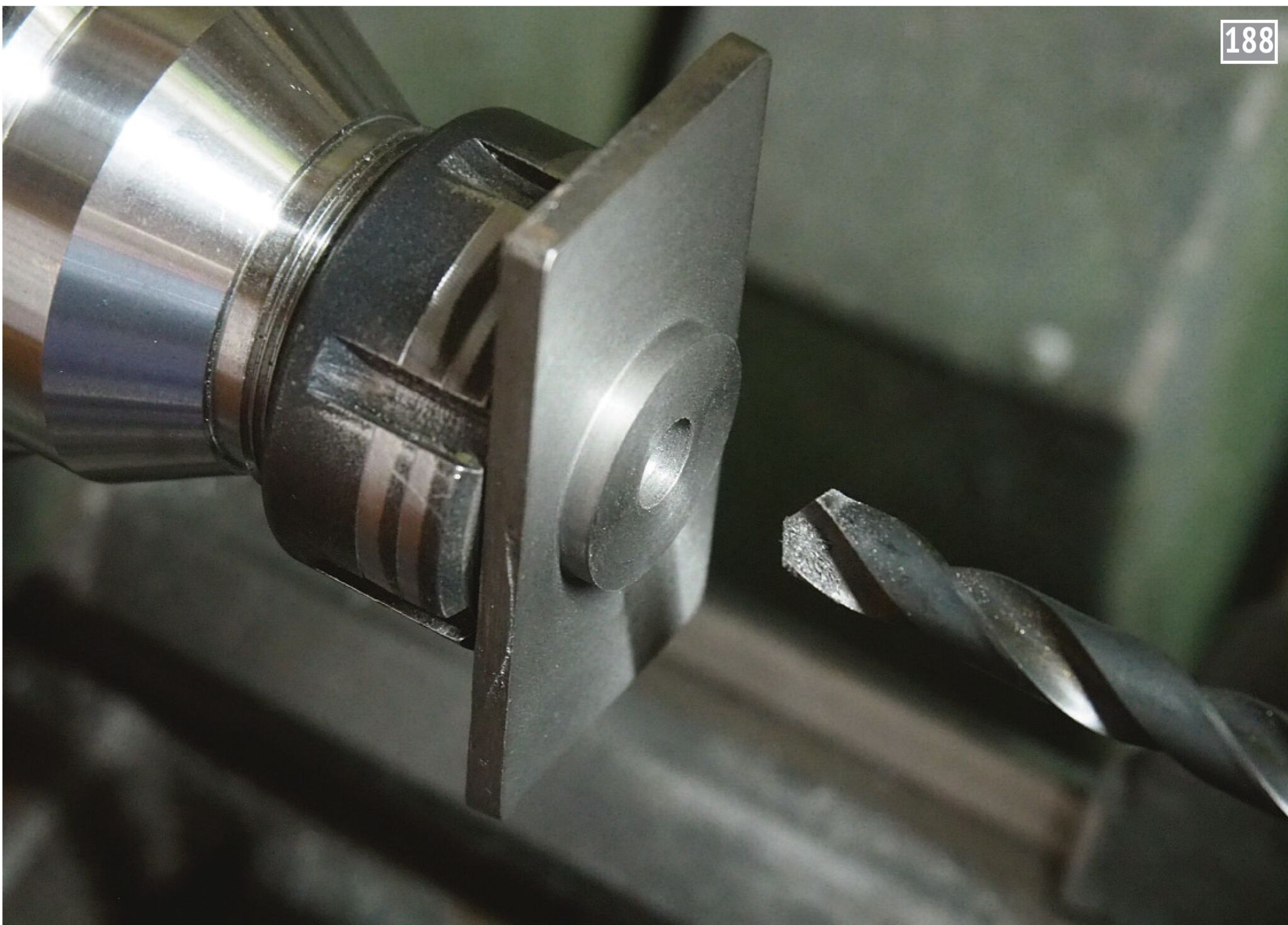
186

Getting hold of the top and bottom covers for machining is tricky with only a very rough 1/8 inch bump on one side to grip in the four-jaw chuck.



187

With a clean chucking spigot, holding the piece to machine the outer surfaces is easy.



188

The steam passage was then pilot drilled, but the chucking spigot was again left intact ...

the stud holes for these (no photo). The dummy metallic packings look very plain but, apart from a small oiler, the real things look just the same.

The top and bottom plates were more difficult to get hold of for machining. There was

plenty of metal in the rough chucking spigots, which was fortunate as these weren't well centred on the plate or on the boss that would become the pipe flange. There looked to be two ways to grip the casting in a four-jaw; by the edges or

by the pipe flange boss. The 'least worst' of these was to use the boss after it had been filed smooth(er) (**photo 186**). If I also centre drilled the spigot and provided tailstock support, then I forgot to take pictures or make notes - but

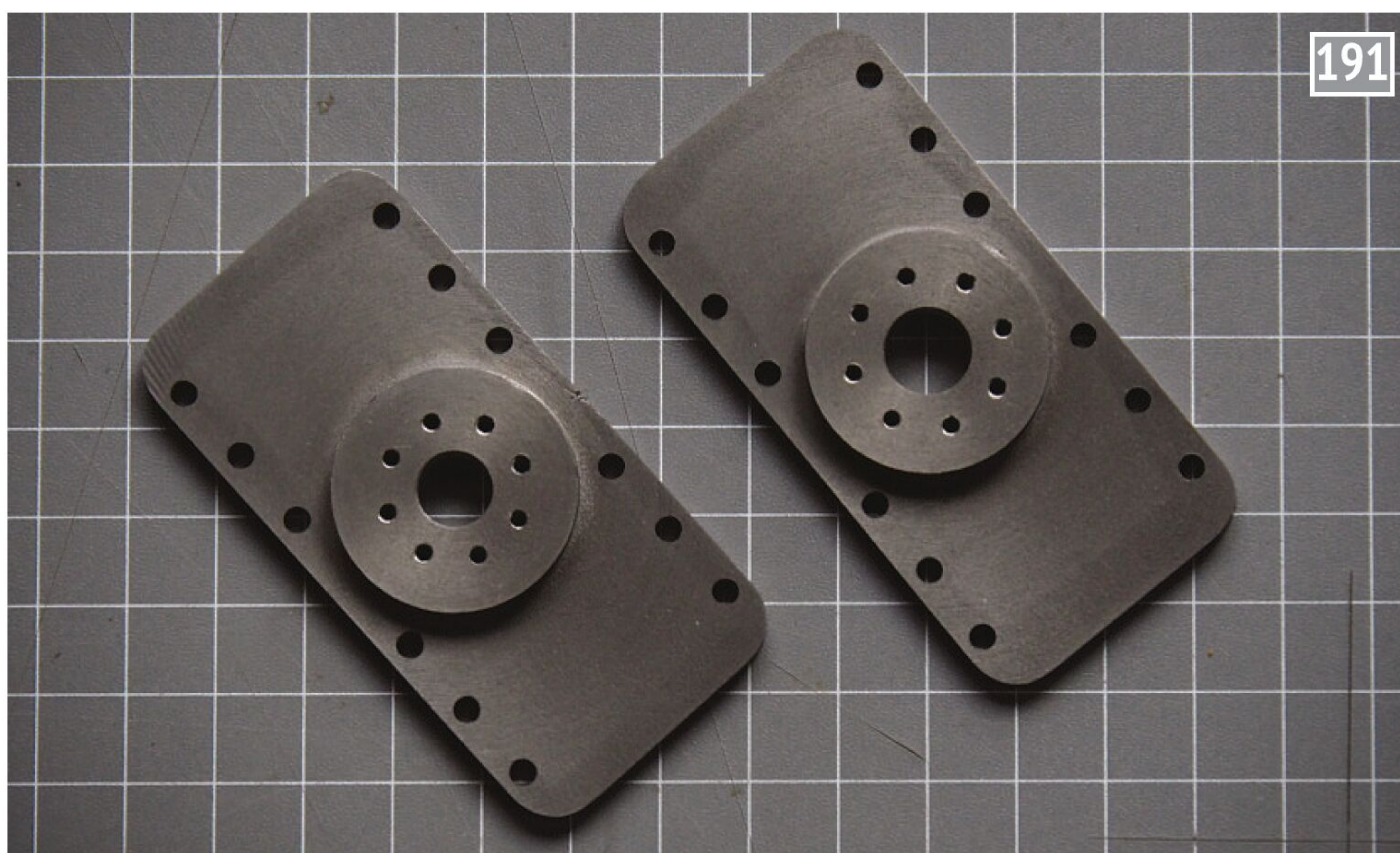
it might well be worth doing. The chucking spigot and underside of the plate were turned with this set-up and clamping was easy from then on (**photo 187**). In **photo 188** the outside of the plate and pipe flange have been finished



... so that it could be used to align the part for milling the edges square and drilling the securing holes.



Drilling through released the chucking spigot and the part was brought to finished thickness.

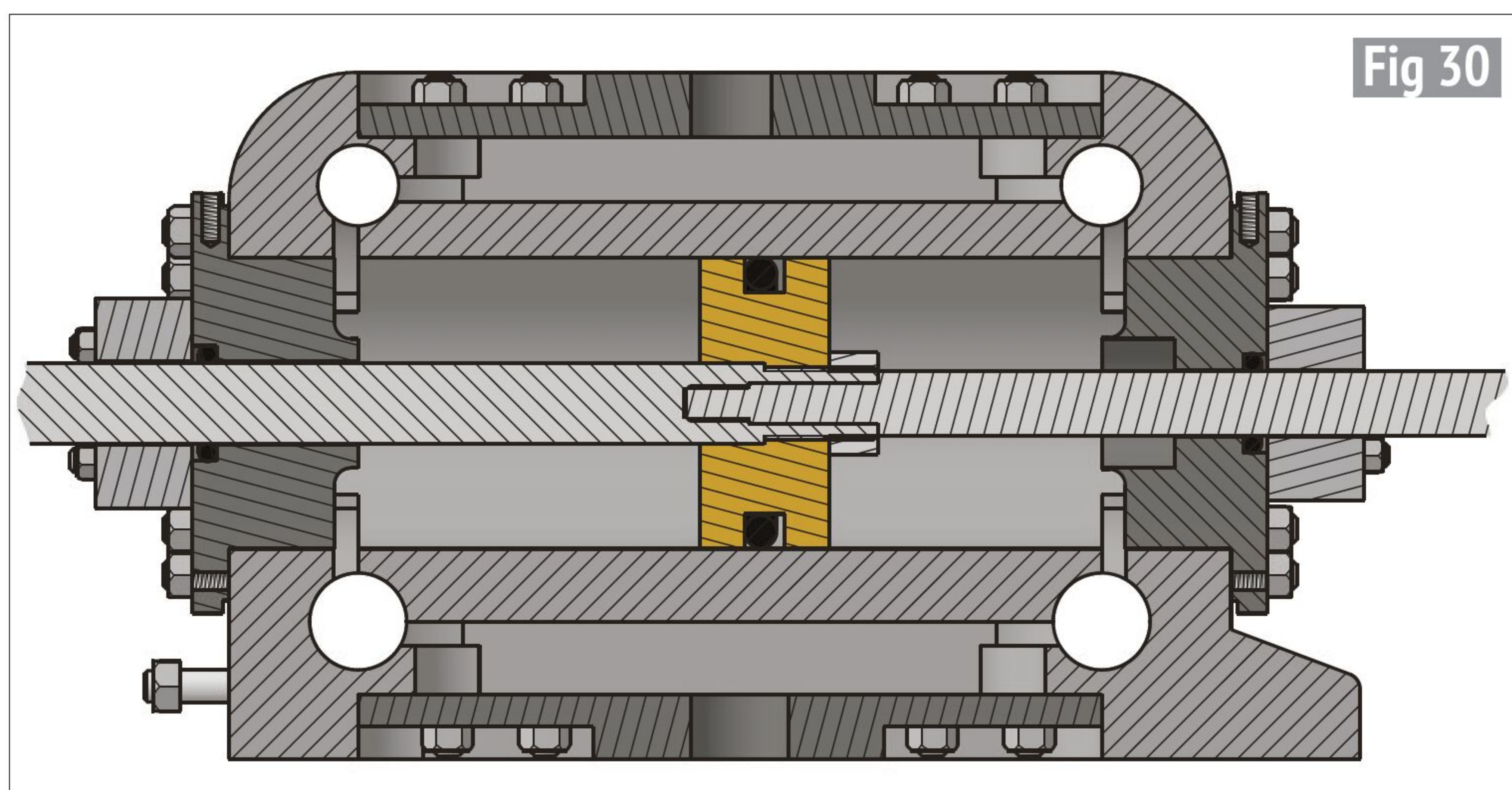


The only differences between the top and bottom covers are the size of the steam passages and the pitch circle diameter of the flange stud holes.

and the hole drilled part way through, far enough that when the spigot is cut away and the plate brought to thickness then it will penetrate fully. For now, the spigot is kept and clamped in a V-block to finish the outer edges (**photo 189**). Cutting away the spigot and milling the part to finished thickness reveals the hole, nicely centred in the flange and the plate (**photo 190**). The corners were filed by hand to fit the curved corners of the steam spaces and another 40 holes drilled, 16 of them tapped with 8BA threads (**photo 191**). **Figure 30** is a cross section view from the CAD model showing the progress so far.

With the cover plates finished, that is the end of the cast iron machining and time to give the machines a thorough cleaning and oiling. My everyday workshop routine starts with a bit of a clean-up but now is the time to get rid of the grey dust properly. Cast iron is my favourite material for machining but without the workshop vacuum (Karcher), cleaning the machines would be difficult.

● To be continued



Progress so far on the HP cylinder assembly.

An Engineer's Day Out

Austria's Zillertalbahnhof

Roger Backhouse recalls a holiday to the Austrian Tirol.



Despite being home lovin' types, Mr. and Mrs. Backhouse ventured abroad once again, this time to Austria's Tirol on a Great Railway Journeys holiday. A trip on the Zillertalbahnhof (ZB) from Jenbach to Mayrhofen was a highlight (**photo 1**).

History

The Zillertalbahnhof opened in stages from 1900-1902 along 32km (20 miles) of the Ziller Valley from Jenbach to Mayrhofen. It was built to 760mm gauge (2 foot 6 inch), a gauge the military required for minor non-electrified railways in the former Austro-Hungarian empire. Railways built to the same gauge included the Belgrade to Dubrovnik line, completed later by the Yugoslavian Government. Sadly, many minor railways were closed in the 1950s and 60s with privately owned railways generally surviving better than their state-owned counterparts.

This 760mm gauge was the same as that of the Welshpool and Llanfair Light Railway opened in 1903, something that led to useful, collaborative working years later.

The railway today

Unlike some narrow gauge railways, the ZB is a year-round commercial operation owned by the Zillertal Verkehrsbetrieb AG which also runs buses. The ZB terminus at Jenbach adjoins the Austrian State Railways (ÖBB) station and also that of the Achenseebahn rack railway.

Those who remember run down Welsh narrow gauge railways in the 1950s and 60s will find the ZB a remarkable blend of excellent track,



Compound locomotive No. 3, Tirol at Jenbach station. This hauls many heritage steam trains during the summer months.



Tourists' view of the Zillertal from the Heritage Train.

modern signalling, comfortable coaches and yet retaining fascinating traditional trains.

The journey

Steam trains with heritage four wheel coach rolling stock run a return journey from Jenbach to Mayrhofen three days a week during the summer. Much of the single track route follows roads through the valley, though not a roadside tramway (**photo 2**). It is a scenic run but, unfortunately, the valley is marred by ribbon development along the main road.

On our journey the

locomotive was the 0-6-2 Uv class compound No. 3, *Tirol*. With open balcony rolling stock, passengers smell the smoke. By riding in the front balcony they are close to the locomotive; a great experience much enjoyed even by those who are not natural steam enthusiasts (**photo 3**).

At Mayrhofen the engine took water while the crew had a break, before running round the train to return to Mayrhofen (**photo 4**). On this tour our return journey was made by diesel railcar offering an excellent ride using

modern rolling stock and on well maintained track. There is continuous welded rail almost throughout. The line has dedicated track maintenance vehicles (**photo 5**). As an Alpine railway it has snowploughs, although new snow clearing equipment is expected to be introduced (**photo 6**).

There is little major civil engineering apart from girder bridges at Rotholz and Zell am Ziller. Locomotive sheds and workshops at Jenbach are comparatively modern and station buildings are substantially built (**photo 7**).

Signalling is colour light and locomotives are fitted with balises so train location is known precisely (**photo 8**). Thanks to electronic signalling systems there are no physical token exchanges for single line track.

Goods traffic

When opened, the Zillertalbahn had transporter wagons to take standard gauge wagons and retains these vehicles (**photo 9**). There was magnesite (magnesium carbonate) traffic from a now closed mine near Mayrhofen. Some timber traffic goes to a local factory using transporter wagons (**photo 10**). These vehicles have long connectors between them to avoid problems with the overhang on standard gauge vehicles.

Steam locomotives

Austria's minor railways were less likely to be electrified than those in Switzerland and



View into No. 3 cab from the balcony coach behind. Almost as good as a cab ride!



No. 3 takes water at Mayrhofen before the return journey to Jenbach.



Ballast wagons contribute to the high standard of track on the Zillertalbahn.



Snowplough - this will be replaced with more up to date equipment shortly.



Stations like Schlitters Bruck are well built and maintained.



Balises like this are fitted to locomotives to enable exact locations to be known.

generally retained steam into the 1970s. Locomotives were mostly built between 1888 and 1930 by Lokomotive-

Fabrik Krauss of Linz and the Weiner Lokomotive-Fabrik AG Floridsdorf, Wien.

Two 0-6-2 U class tank

engines were built at Linz for the line's opening. No. 1, *Raimund* is displayed on a plinth in Jenbach and No. 2



Standard gauge shunting locomotive on a transporter wagon. The ZB has a short length of standard gauge track at Jenbach.



Timber wagons carry wood to a local factory.



Cab picture No. 3 - note the weight on the cut off lever.

operated on the Welshpool and Llanfair Railway but will return to Austria in 2025. These were followed by No. 3, a Uv class compound built in 1902 by Krauss which hauls most steam services (**photo 11**).

No. 4 is owned by a group of enthusiasts (**photo 12**). The engine is a 0-8-2 with small side tanks and a four-wheel tender built for military use by Krauss in 1909. It worked in

Bosnia. Even in the confined space of the Jenbach shed it was most impressive, though too large for most ZB services (**photo 13**).

Like other locomotives, the valve gear is described as Heusinger von Waldegg. Although some claim major differences between the two valve gears, to a non-expert it looks similar to Walschaerts and was independently



0-8-2 tank and tender engine No. 4 with train. (Photo courtesy Günter Denoth and ZB 2024.)

invented around the same time. Heusinger takes less space and is more suitable for tank locomotives.

It is fitted with a spark arresting chimney. Austrian coal was not good quality and sometimes briquettes were used and even wood fuel. During my visit engines used Welsh steam coal but that source has closed. Locomotives are fitted with

substantial steam turbine electric generators and large lights (**photo 14**).

In some cases, the locomotives showed innovation: No. 5, Gerlos was also an 0-6-2 tank engine built by Krauss at Linz that used Caprotti valve gear, but this was replaced in 1941 with Lentz valve gear. The locomotive is now named *Castle Caereinion* but is currently out of service awaiting new boiler tubes (**picture 15**).

The ZB acquired locomotives and coaches from other railways including the Salzkammergut-Lokalbahn (SKGLB) which closed in 1957. Probably the largest ZB engine was the ex SKGLB 0-10-0 tender tank engine built by Borsig in 1939 but which is now elsewhere.

The ZB has offered driver experience trips in the past



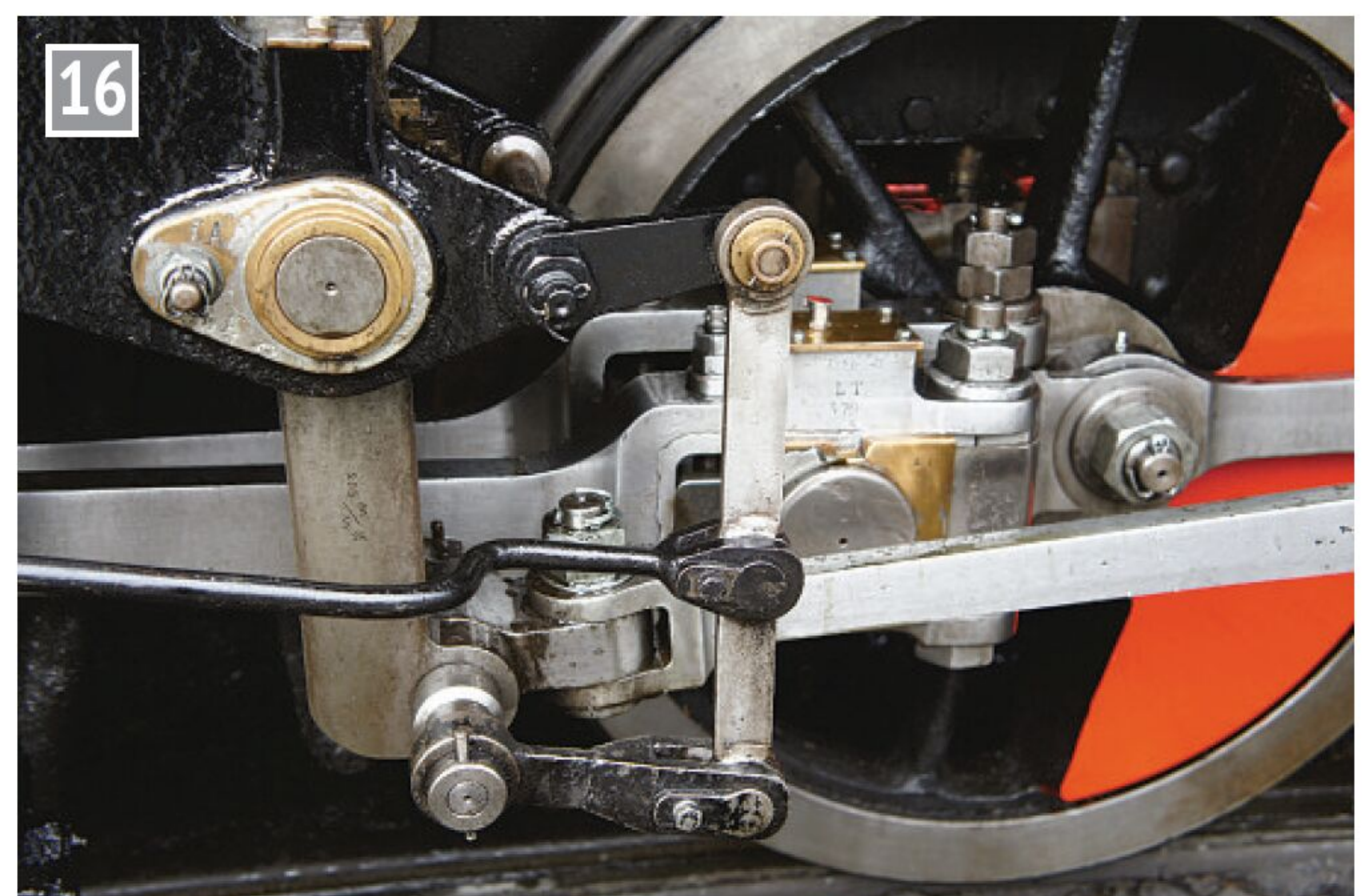
No. 4 on shed at Jenbach. It is owned by a group of enthusiasts and not the ZB.



Locomotives have substantial boiler mounted sandboxes and turbo generators as seen on No. 3.



No. 5, Gerlos on train to Mayrhofen with classic motor transport alongside. (Photo courtesy Günter Denoth and ZB 2024.)



Close up of motion work - believed to be Heusinger von Waldegg type, used instead of Walschaerts where there are height restrictions, as there are on many tank engines.



Three Lupo class diesel hydraulic locomotives like this operate most passenger trains and freight. The decoration advertises a tourist attraction near Mayrhofen.



Locomotive D40 was built in the 1940s and used on the SKGLB. It is owned by a group of enthusiasts.



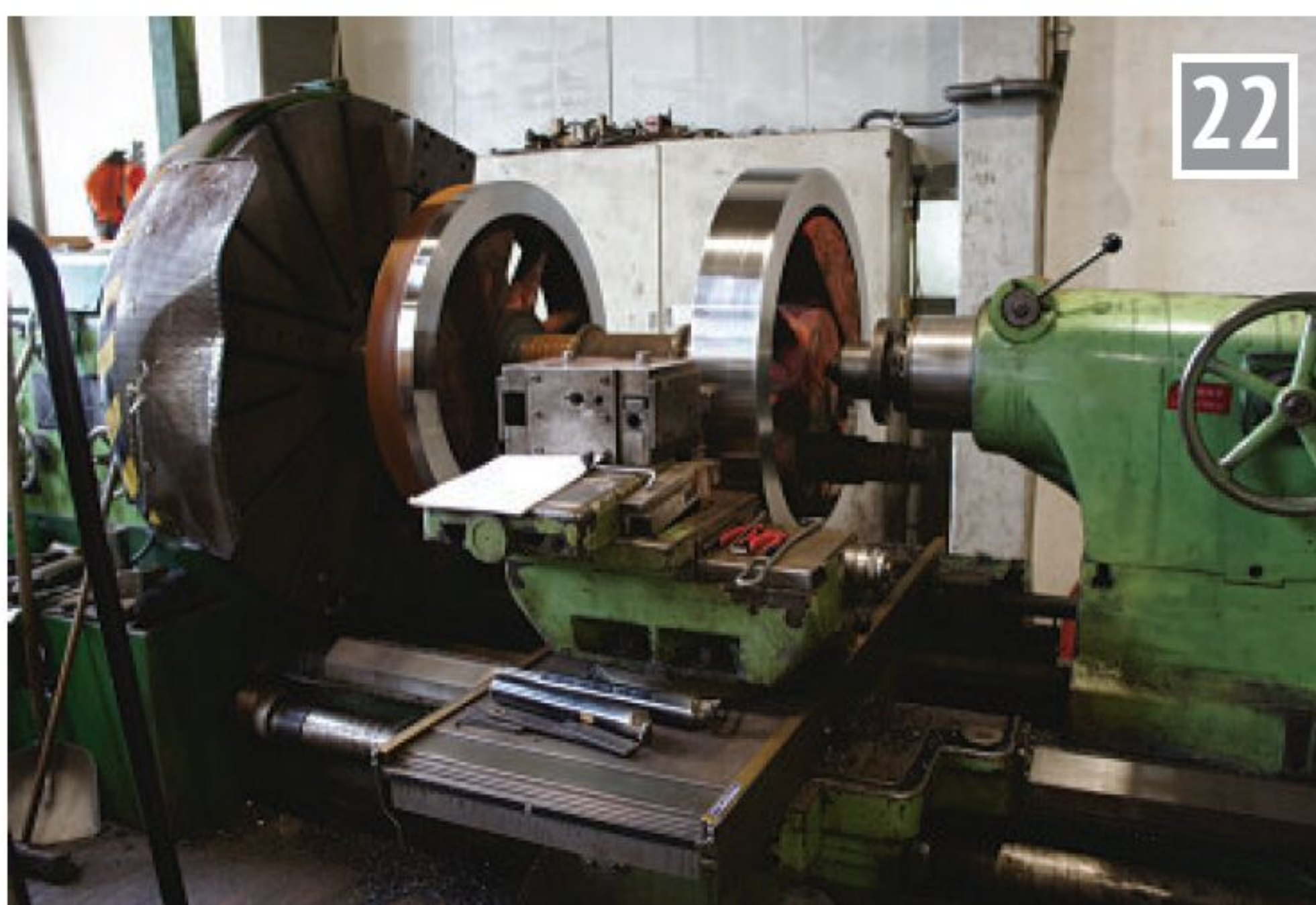
Older wooden four wheel Zillertalbahn coaches used on the heritage train. End balconies are popular with passengers.



Interior of the four wheel coaches with their wooden seats.



A more modern, open carriage gives a superb ride on a fine day.



The wheel lathe inside the workshop. This came from SNCF.

hard wooden seats (**photo 20**). Some coaches have been converted to a children's carriage and a buffet car. Many Austrians enjoy leisure cycling and there is a bicycle carriage to accommodate those; indeed the ZB has a cycle hire service.

Most passenger services are operated by modern bogie coaches. Although not as picturesque as the older stock, they offer a remarkably smooth ride. At least one is fully open, ideal for warm sunny days (**photo 21**).

Workshop

Thanks to a visit arranged by Günter Denoth, I visited the running shed and locomotive workshop though the carriage workshop was not visited. The workshop is well equipped with machine tools including a large radial drill, a wheel lathe obtained from SNCF (**photo 22**) and an hydraulic press. I was told that the workshop can make any part for a steam locomotive although boiler repairs are carried out by a nearby company. The ZB also does work for other Austrian narrow gauge railways.

The Achenseebahn

Unfortunately, it wasn't possible to travel on this lovely railway to the Achensee this holiday. It opened in 1889 using the Rigenbach rack system with three 0-4-0 tank locomotives, two of which are still in operation. It is 7km long with gradients of up to 1 in 5 (**photo 23**).



Demonstration of how a rack locomotive works at Jenbach. The Achenseebahn uses the Rigenbach system with a ladder like rack in the centre of the track.

using a lightweight charter train with an 0-4-0 tank engine built by Krauss in 1916, unofficially known as *Der Hobbyzug* (**photo 16**).

Diesels

Most work is now carried out by diesels. Three 'Lupo' class diesel hydraulic locomotives operate freight trains and also many passenger trains in a push-pull set-up with railcars. Built by GLG Gmeinder Mosbach with CAT 3412 engines, they were introduced in 2007. At the time of our visit, the locomotives had vinyl decals advertising *Mountopolis*, a tourist attraction near Mayrhofen (**photo 17**).

D40

This diesel is believed to be unique and during my visit was

at Jenbach for repairs. It was built in the 1940s and used on the SKGLB. It is now operated by the voluntary (Club 760) Taurachbahn heritage railway near Salzburg (**photo 18**).

There is also a small locomotive (D1) built in Switzerland by Diema used for yard and workshop shunting.

Coaching stock and railcars.

The ZB retains original four wheel wooden coaches for heritage steam trains (**photo 19**). With end balconies they are popular with passengers despite having



Zillertalbahn No. 2, Zillertal descends from Sylfaen towards Castle Caereinion on the Welshpool and Llanfair Light Railway. (Photo courtesy of Andrew Charman 2024.)

The Zillertalbahn in Wales

The Welshpool and Llanfair Light Railway and Zillertalbahn have enjoyed good links and it's thanks to this relationship that the Welshpool and Llanfair Light Railway received three

ex-Zillertalbahn and one ex-SKGLB four wheel coaches in 1968. They were pressed into service almost immediately, such was the shortage of coaching stock. These distinctive coaches have been

restored and remain popular.

The Zillertalbahn locomotive, No. 2, *Zillertal* was delivered to Welshpool in August 2019 with W&L style Grondana couplings already fitted by ZVAG before despatch and it was immediately moved to Llanfair (**photo 24**). After a full boiler examination the locomotive made its first full round trip test run later that month and it entered passenger traffic on the first day of the annual steam gala.

Following commissioning at Llanfair, the locomotive completed 8800 miles on the W&L up to June 2024 when it was withdrawn with a failed firebox stay. It has been agreed that the locomotive will return to Austria at a mutually convenient time.

Another Austrian locomotive there is No. 10, *Sir Drefaldwyn*. The locomotive is an 0-8-0 tank engine built in France by the Societ  Franco-Belge and supplied to the German Military Railways in 1944. It worked on the SKGLB and then in Styria before coming to the W & L in 1970.

After a substantial overhaul, *Sir Drefaldwyn* re-entered passenger traffic in June 2023 at the '60 Years of Preservation' event. At the end of August this year that painting and lining-out was fully completed. Despite its size, this locomotive has a shorter wheelbase than *The Earl* or *Countess* and has an unusual arrangement for the front axle allowing lateral movement on curves.

Austria holiday

This was a Great Rail Journeys tour led by Julia Hartke. Although a general interest holiday GRJ generally use rail travel to Europe supplemented by coach excursions. Ffestiniog Travel offer Austrian holidays aimed more at rail enthusiasts.

Further reading

Adrian Garner visited several minor Austrian railways in the 1960s. His excellent black and white photographs included pictures of the Zillertalbahn and Achensee lines published in:

Austrian Narrow Gauge Twilight; Tours in the 1960s and 1970s. Adrian Garner. Lightmoor Press. 2017. Paperback. 136pages. £12.50. ISBN978-1-911038-30-6

For pictures from the same period but including standard gauge steam see:

Steam in Austria. 1955-1975. Andrew Fox. Unique Books. 2021. Hardback. 160pages. £29.99. ISBN. 978-1-913555-00-9

Also in the National Railway Museum library (Search Engine) *Bahn im Bild Band 5. Die Zillertalbahn.* Frank Kleindel. Verlag Posposchil. 1978 (This publication includes a photo of an unusual valve gear repair using wire and a builder's hammer!)

Austrian Narrow Gauge. John Organ. Middleton Press. 2003

Other engineering interest in the area

- Tirol Transport Museum near Innsbruck (not visited) has a fleet of heritage trams and other transport. Open on summer Saturdays only. www.tmb.at/en/museum
- The GRJ holiday included a coach excursion over the amazingly engineered Grossglockner mountain road, a holiday highlight. www.grossglockner.at/en. The main line journey from St. Johann to Zell am Zee is an attractive ride included in, as was Salzburg (with modern trolleybuses and Christian Doppler's birthplace. His discovery of the Doppler effect gave rise to

radar.) Mozart's birthplace too and the cathedral organ he played - the concerts are excellent!

Thanks to

- G nter Denoth (Zillertalbahn)
- Ron Fitzgerald (Bradford Model Engineers)
- Richard Gibbon (York Model Engineers)
- Julia Hartke (Tour Leader, Great Rail Journeys)
- Bettina Klotz and Jacqueline Lechner (Achenseebahn)
- Peter Thorpe (NRM Search Engine)
- Bruce Webber and Andrew Charman (Welshpool & Llanfair Light Railway)

Further information Great Rail Journeys

www.greatrail.com
01904 734154

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www.zillertalbahn.at

Achenseebahn

Austrasse 1
6200 Jenbach, Austria
www.achenseebahn.at

Welshpool and Llanfair Light Railway

www.wllr.org.uk
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Great Rail Journeys



Zillertalbahn



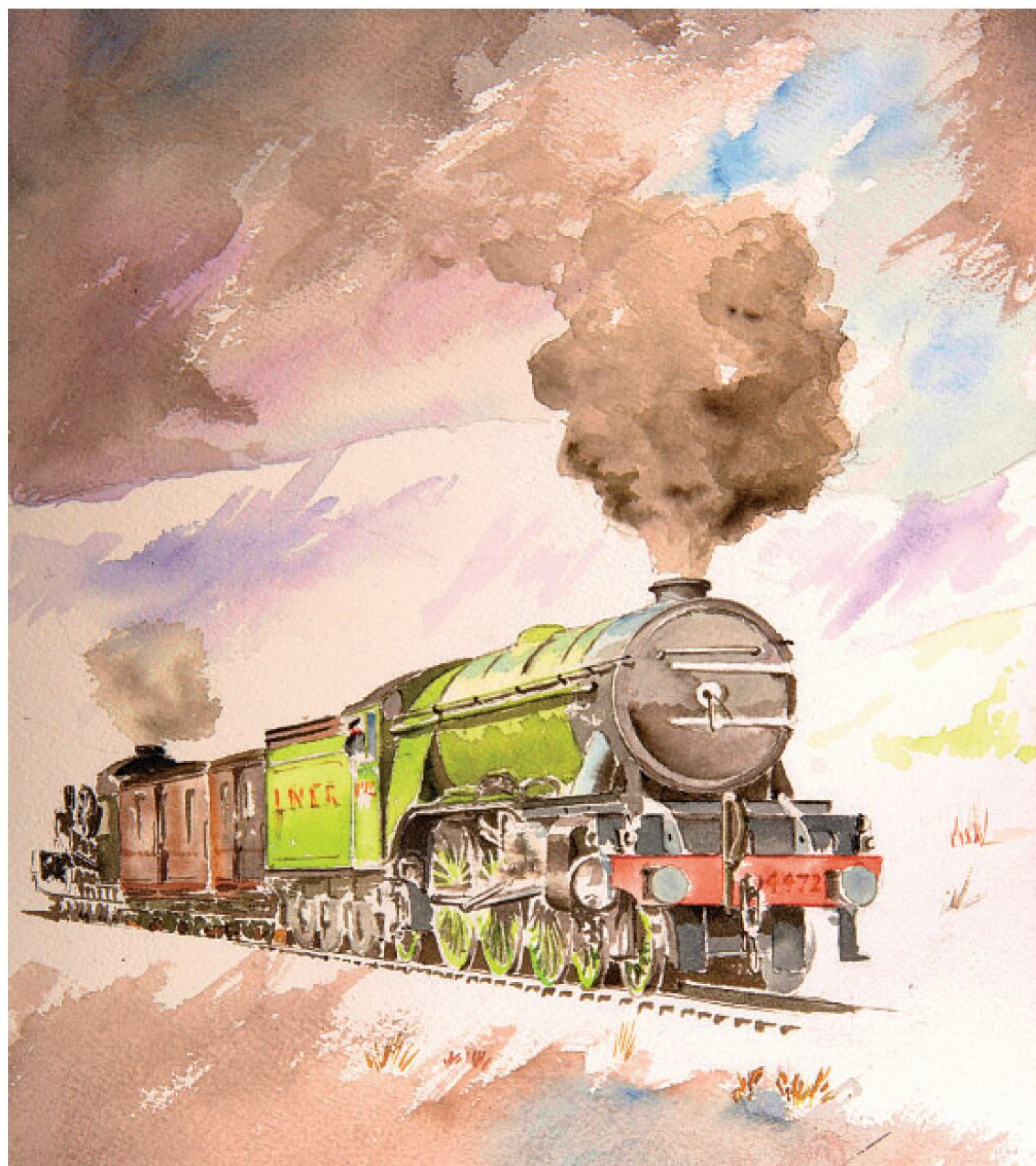
Achenseebahn



Welshpool and
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Flying Scotsman in 5 Inch Gauge

PART 64 – REACH ROD



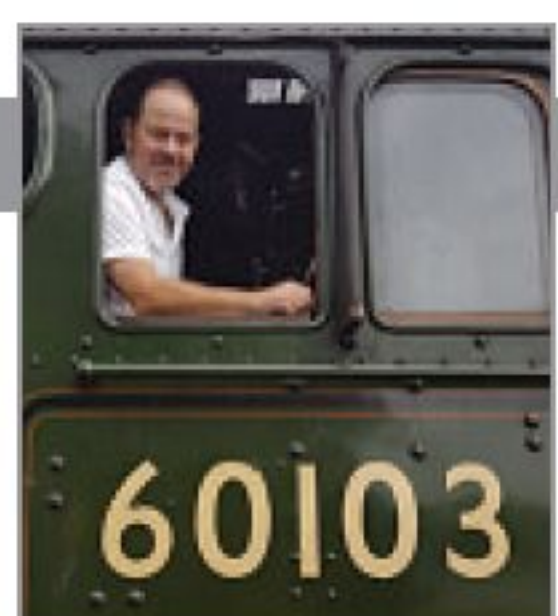
Painting by Diane Carney



Jig for relocating the reverser stand holes.

Peter Seymour-Howell

builds a fine, fully detailed model of Gresley's iconic locomotive to Don Young's drawings.



Continued from p.88,
M.E.4759, December 27

With the reverser dealt with it is now time to take a look at the reach rod, but before doing so, I decided it would be wise to do some checks on the reverser's position, to make sure it was correct, as the length of the reach rod is very dependent on where the reverser sits.

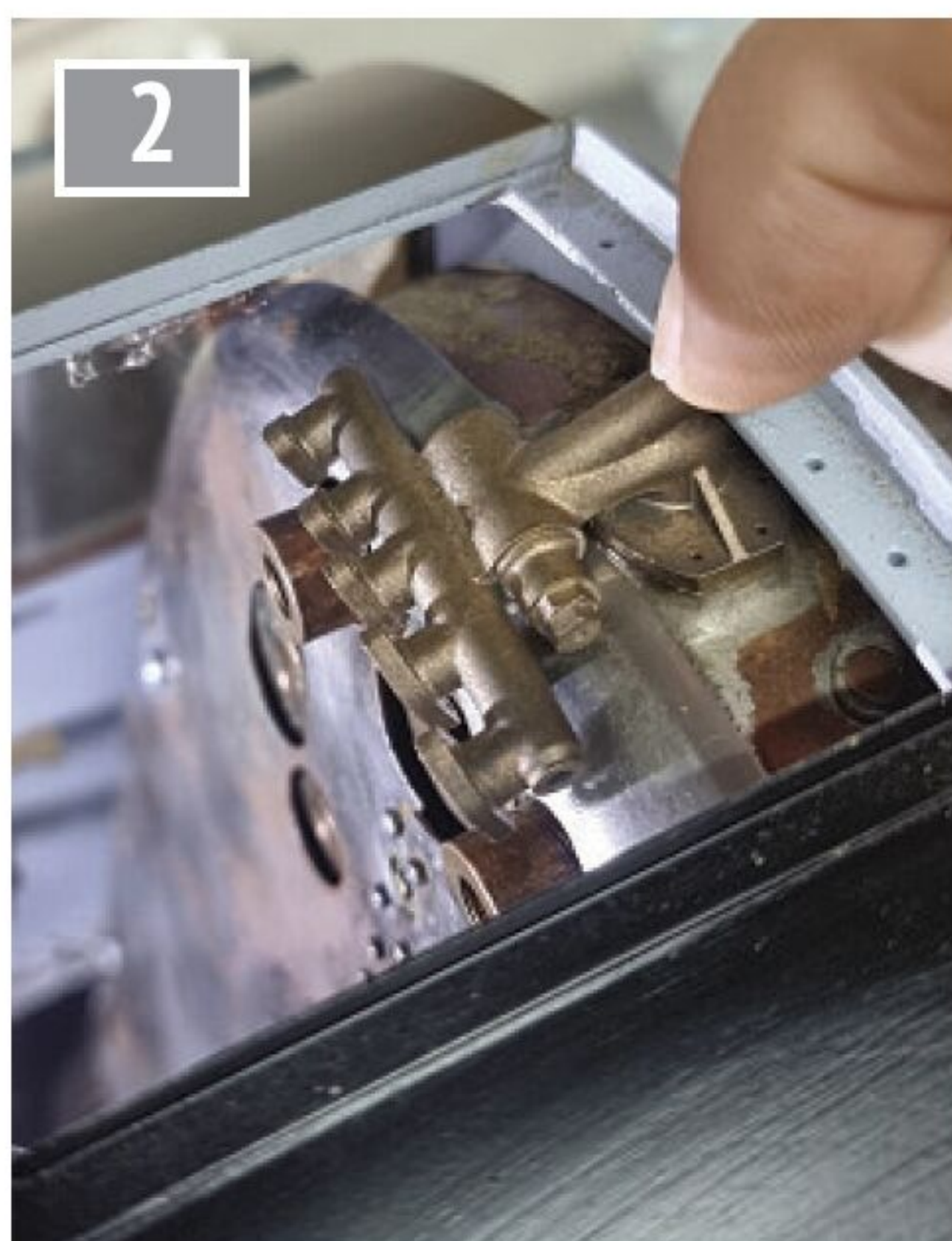
I needed to check a few things such as that the boiler was in its correct position. To do this I needed to temporarily fit the cab and the smokebox to see, when added, how the boiler sat in relation to the rear main drivers, the ashpan and whether the smokebox was sitting in its correct location

on the saddle. I found that the cab was very tight against the manifold bush and at first thought about moving the cab a fraction forward to give room. This worked, and the smokebox could still be fitted in its correct position on the saddle but I wasn't happy until I discovered that the boiler was being forced a little too far forward to clear the reverser, requiring me to move the cab a little. Everything fitted like this but it wasn't right and I knew that it would always bug me, even if it wasn't something that anyone was likely to notice; we were, after all, only talking a few millimetres.

There was only one thing to do and that was to move the reverser back a few millimetres. My approach was to make a drilling jig from a scrap piece with the holes drilled to tapping size only and, with the job still held in the machine vice, to drill the holes to drawing using the DRO. Before removing the part from the vice I drilled two extra holes a few millimetres forward of two drilled holes along one line, which were drilled to clearance sizes. All I had to do then was drill through the jig and then tap the new 6BA holes (**photo 1**).

Another check done before doing the above was to dry

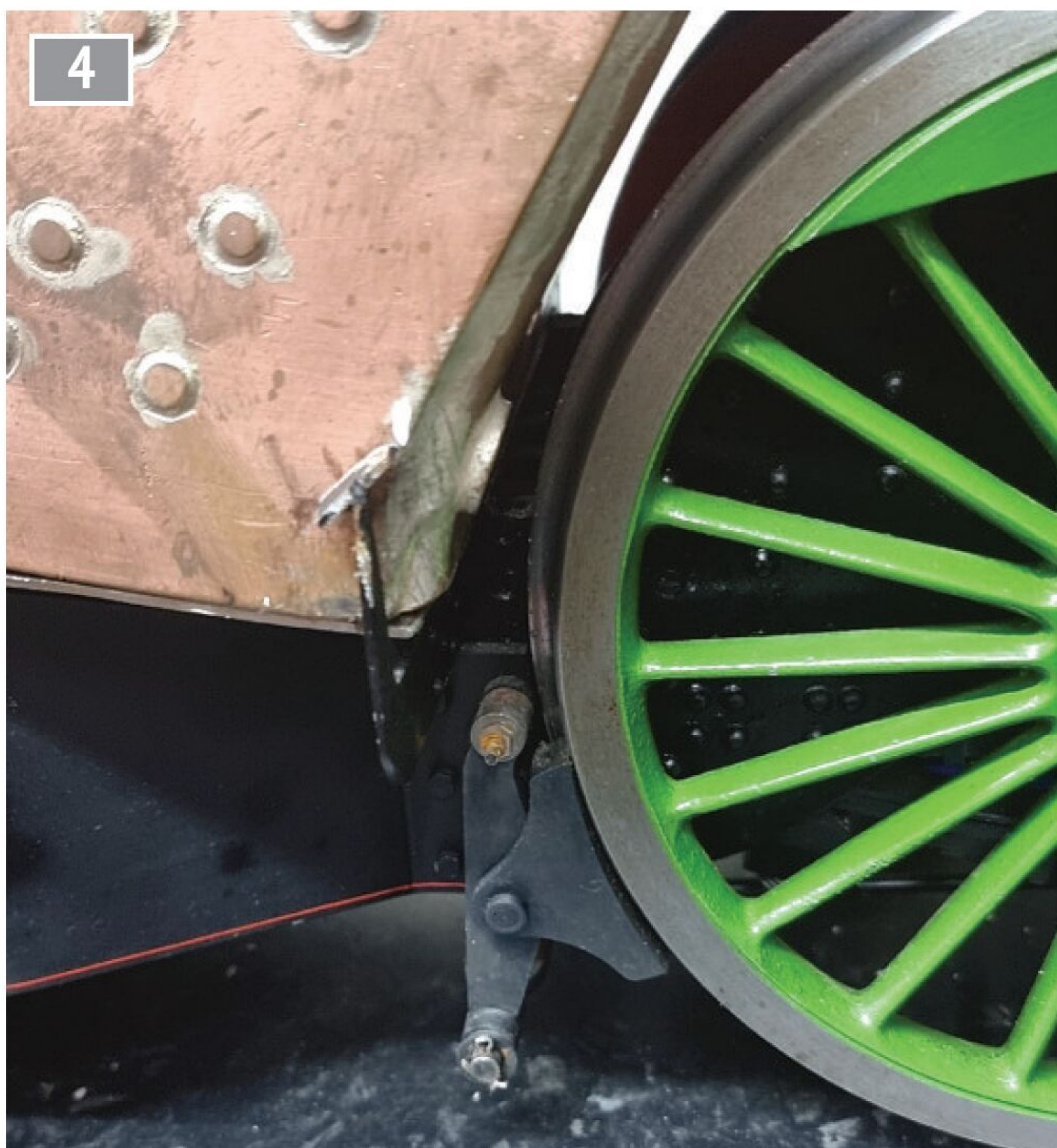




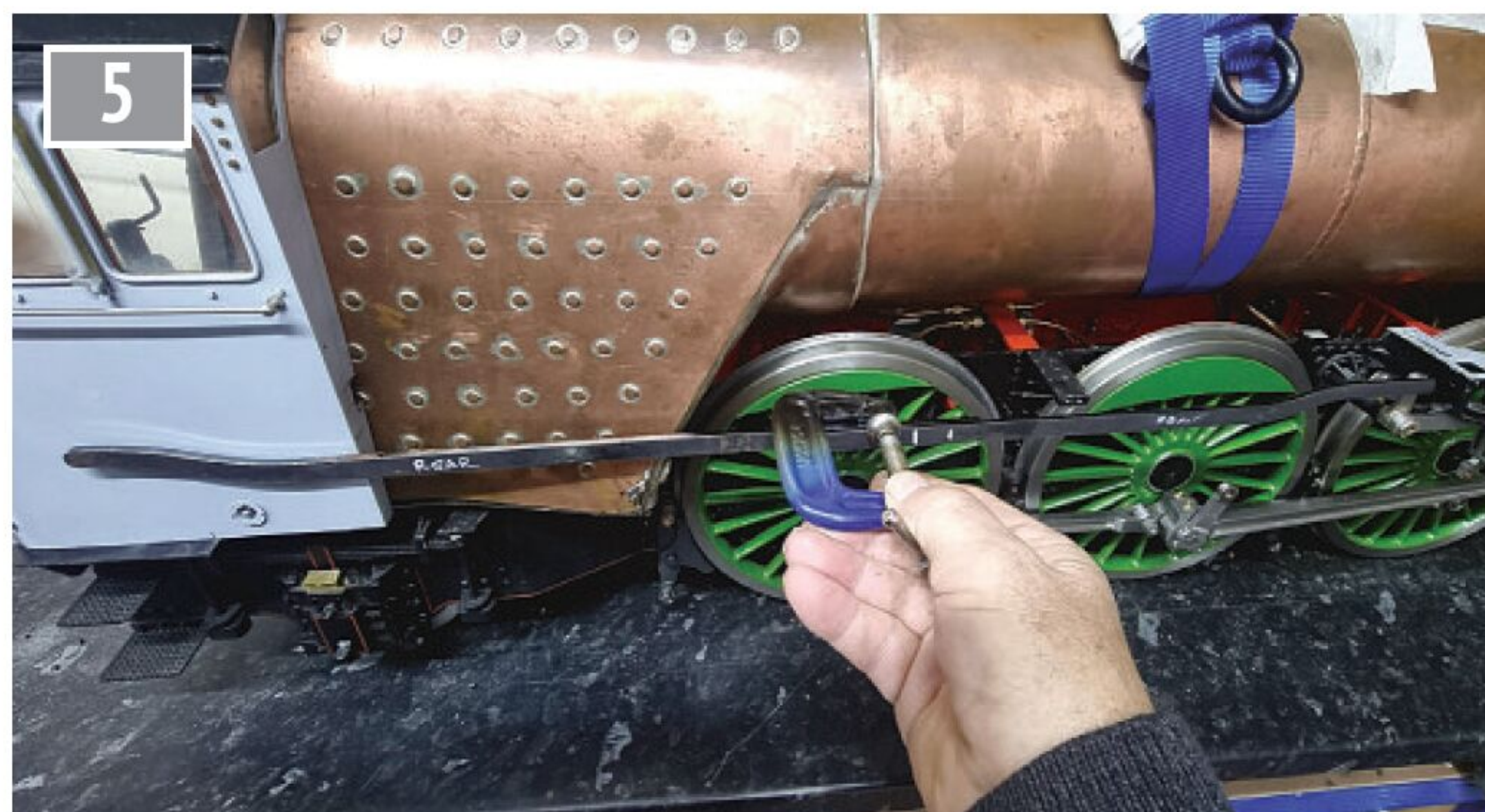
'Dry fit' of the manifold to check clearance.



The reverser correctly located in the cab.



Marking the final position of the boiler.



Test assembly of the two halves of the reach rod.

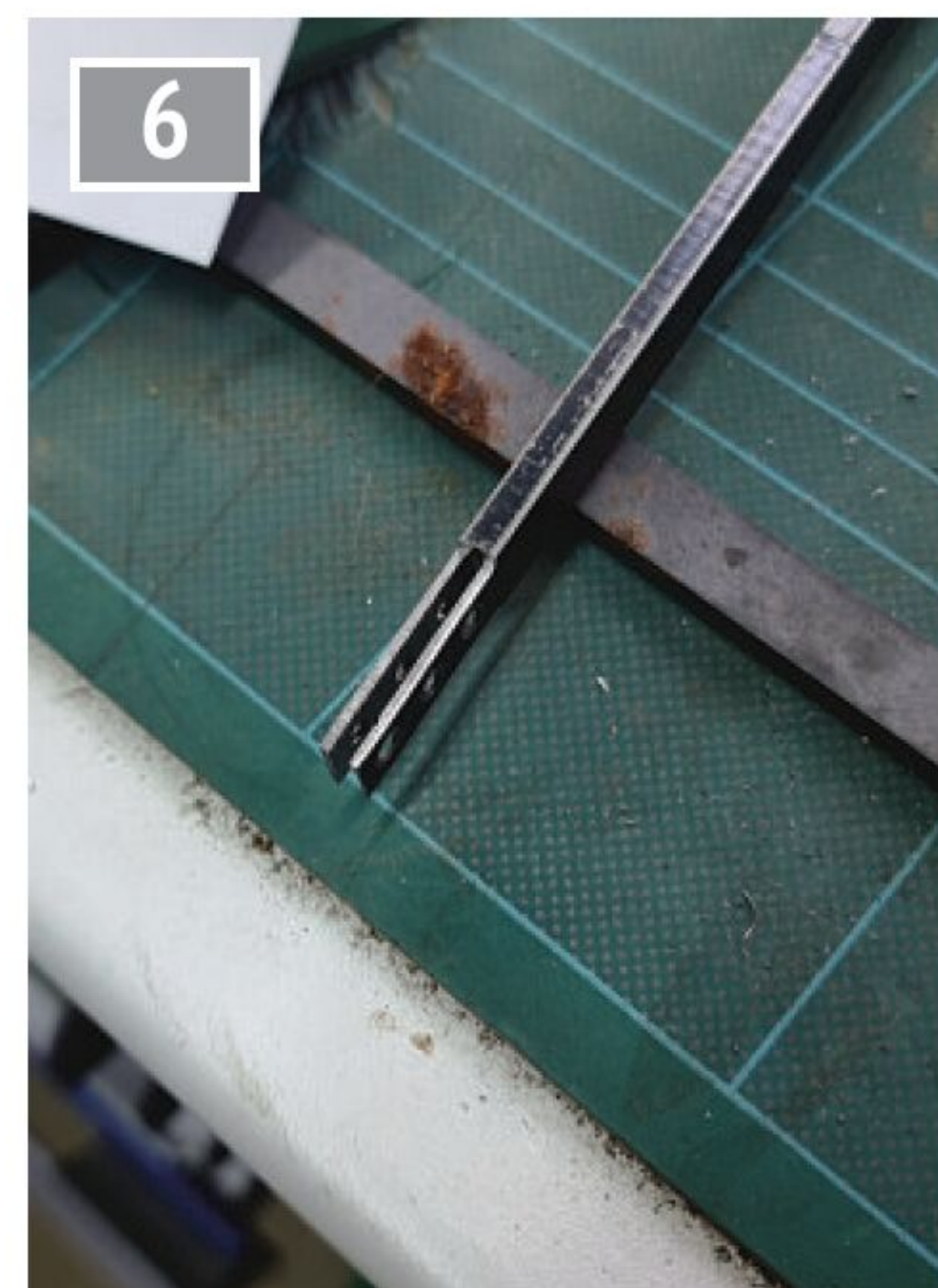


Front half of the reach rod, showing the tongue with the extra pieces added to the sides.

fit the manifold as it was this part's bush that was sitting a bit close to the spectacle plate (**photo 2**). This is a true scale item, as will be the other backhead fittings once I get to machining them. All of these were kindly drawn by Adam of Cro Fittings and then cast in New Zealand by Michael Jack. They are all superb and will enhance the backhead beyond what could be done by hand.

Here we see the reverser now in its new position - much better (**photo 3**). Now that I was happy with the boiler position I placed a mark on the boiler to make it easy to find it again (**photo 4**).

On to the reach rod itself. The two main components

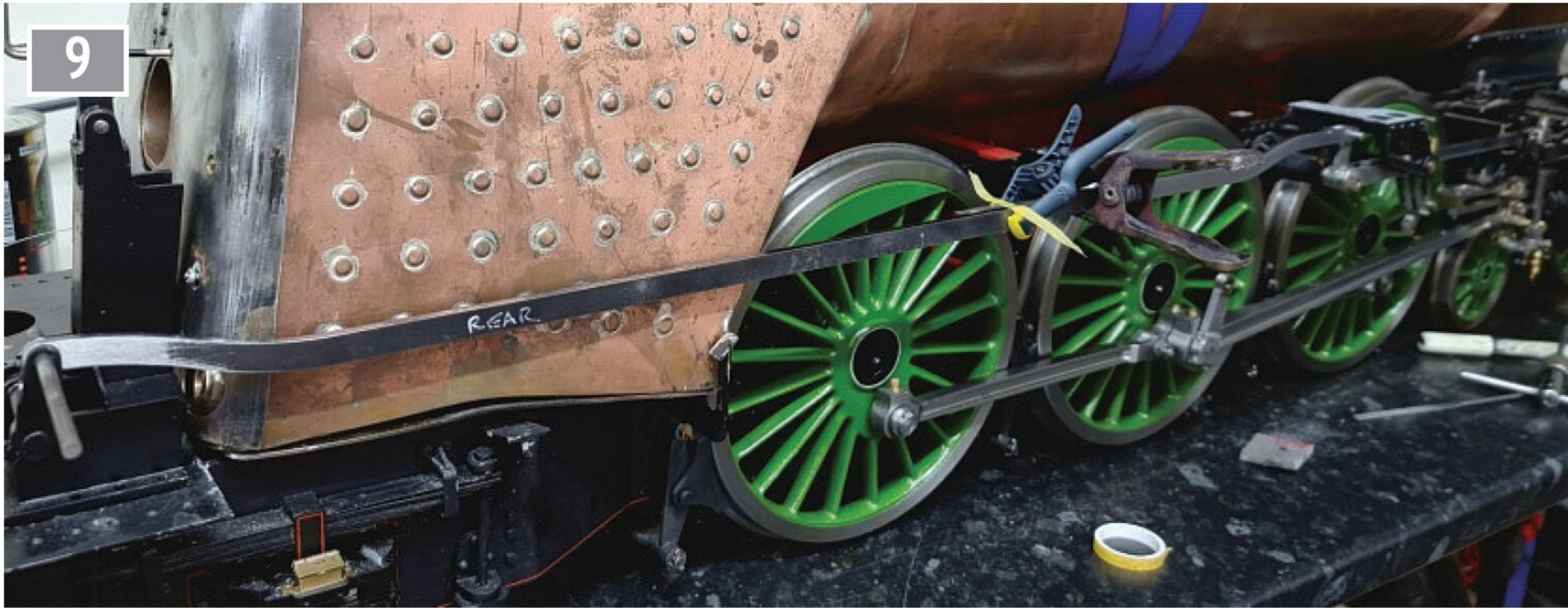


Tongue machined in the front half of the reach rod.

were laser cut for me by Ed Parrott (Model Engineers Laser) many moons ago so most of the boring work has been done. I still need to make the fork on the front section and the sleeve that strengthens the joint. Following Don's overall dimensions (he does say 'check to place') I clamped the two sections together. With the two parts clamped I did a quick check alongside the model itself - it looks pretty much there to me (**photo 5**).



Test fitting the front end of the reach rod.



Clamping the two sections of the reach rod to check the fit.

Following Don's overall dimensions, I cut the front section to length (both sections had been laser cut over-length at my request). I'll make the front to drawing and check the rear length in place - I need to be on the ball here as there is no adjustment in the design. The first job was to drill the three holes and then machine the step down for the tongue, so far following Don's drawing (**photo 6**). For the tongue width I chose a size in between Don's and the works drawing - to make life easier I chose a width to match a suitable cutter to

hand making the required slot to the rear section easier. The photo shows that I have cut a 2mm wide slot down the middle of the tongue. If I'd had my head properly engaged before machining this slot I would have first added the extra metal required to either side to represent the step as seen on the full-size. No big deal but it meant extra work as I needed to drill both extra side pieces before silver soldering them in place. Silver soldering was done by holding the parts together with two 6BA bolts/nuts which were first heavily

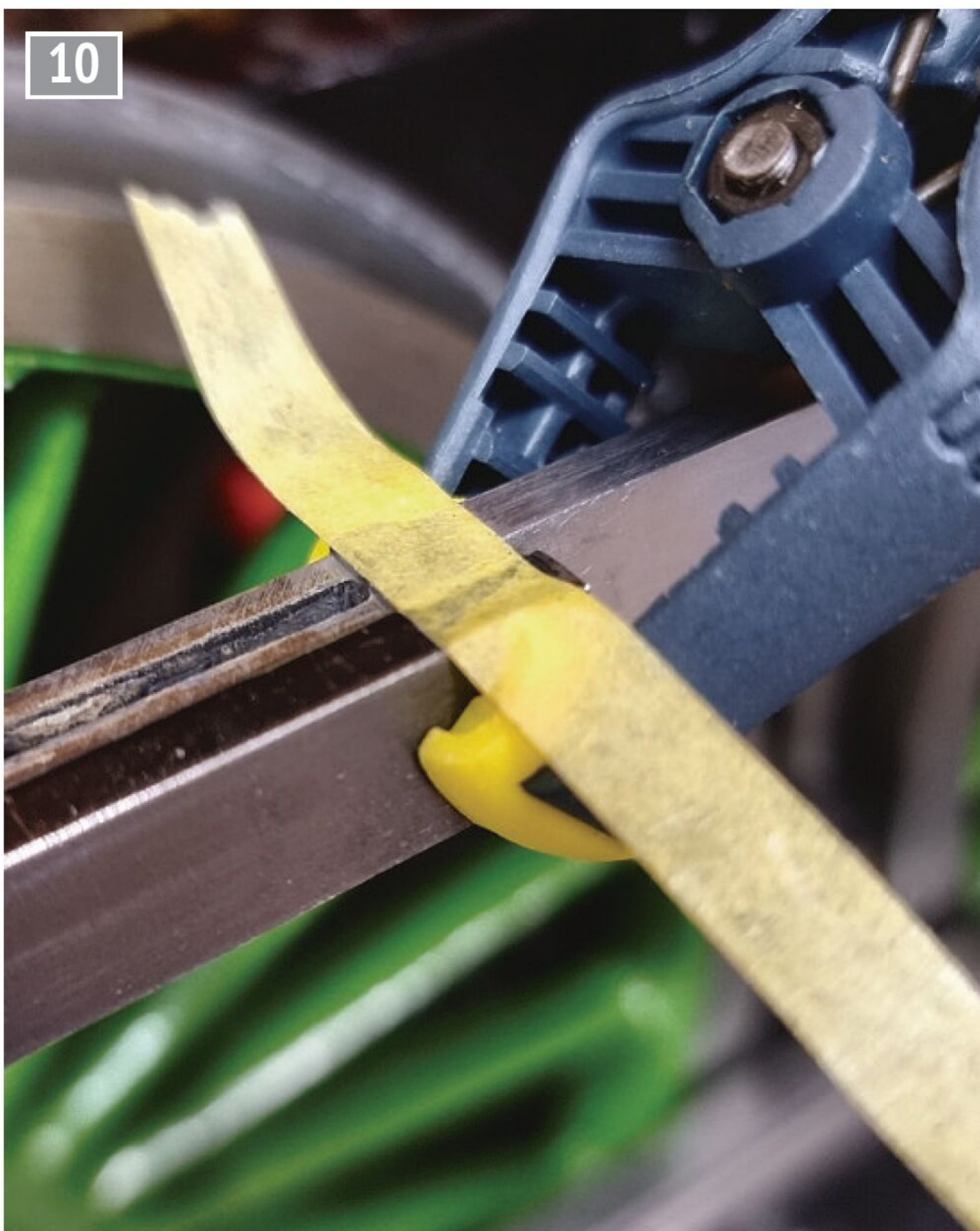
coated in bar soap to stop them from becoming part of the part during heating, which worked perfectly. Here we see the finished front section after being cleaned and polished (**photo 7**).

Before moving on to the rear section I first test-fitted the front end to the lifting arm as seen here (**photo 8**). All looks good so far but I will need to make the 'hoop' type bracket that's attached to the running board main stay that the rod runs through. I also realised that I needed to finish off the lifting arm as I had yet to fit its

taper pin. Using a couple of clips and checking that both the reverser and lifting arm were in 'mid-gear' I clamped the two reach rod sections together. The reach-rod sections are lining up nicely (**photo 9**). **Photograph 10** shows the two sections lined up for marking where to cut.

Now it's time to tackle the rear section and the two pins required for fitting of the reach rod. There's no 'fork' to worry about this time and one might think that this would mean a speedy construction for the rear but we do have the 'I' beam type joint to construct which actually is more work than a simple fork.

After setting up the rear blank in the machine vice and clocking the centre I set about machining the slot on both sides to create the 'I' beam required for the front section tongue to engage with. I marked out the length of the tongue and machined to the line. In **photo 11** I am checking the tightness of the fit between the 'I' beam and the tongue. Of course, I can't fully engage



Marking the position to cut the rear section of the reach rod.



Test fit of the reach rod joint.



The reach rod joint on the full-size engine.

the tongue here until I cut the corners, which I did first with a suitable chisel followed up with the Dremel and a small cutter.

Next up were the bulges seen top and bottom around the joint on the prototype's reach rod (**photo 12**). I approached this by creating a channel in a piece of steel bar that I first machined down to a size required to match the full-size scale and then cut in two to give both top and bottom sections. The

channel was cut to a depth that when fitted would also engage with the tongue, the width of the channel matching that of the reach rod itself. In **photo 13** we see the two sections ready for brazing to the rod. Once fitted they were then machined to length.

Once the bulge sections had been fitted I could shape them and push the two rod sections together and drill through the three holes. In **photo 14** we see

the holes being drilled. Note that I have already done some of the profiling to the bulge, i.e. the concave recess seen on the left-hand side.

Photograph 15 shows the general shape of the joint very close to its final stage, just needing a final polish. The 6BA bolts have been fitted with washers on both sides and then cross-drilled to accept 1/32 inch split pins. I reshaped the pin heads to make them



Two pieces cut to form the bulge in the joint.

closer to scale size, a simple job for long-nose pliers. I used a suitably sized PCB high-speed drill at more than 1000rpm to ensure a hole that stayed on track and not deviate from the planned route close to the 6BA nuts.

One question to answer is whether 4472 had a painted reach rod as she does today, back in the late 1930s. She certainly didn't in 1934 when she did her 100mph run as we have the famous photo showing the record-breaking crew standing in front of the unpainted reach rod. I'll see if I can find more pictures closer to 1938 to confirm my belief that the rod remained unpainted for my era.

●To be continued.



With the bulges added, the fixing holes are drilled.



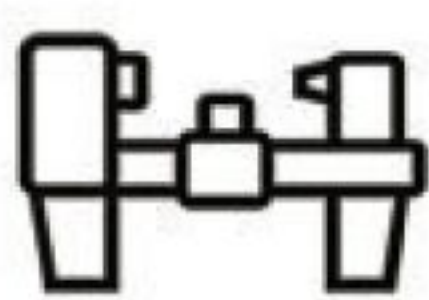
The completed reach rod joint.

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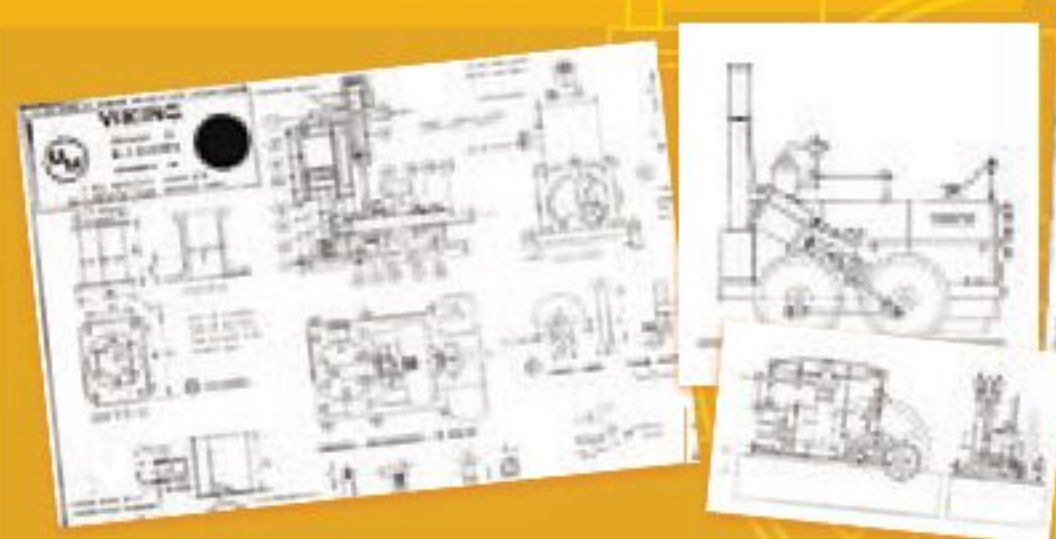
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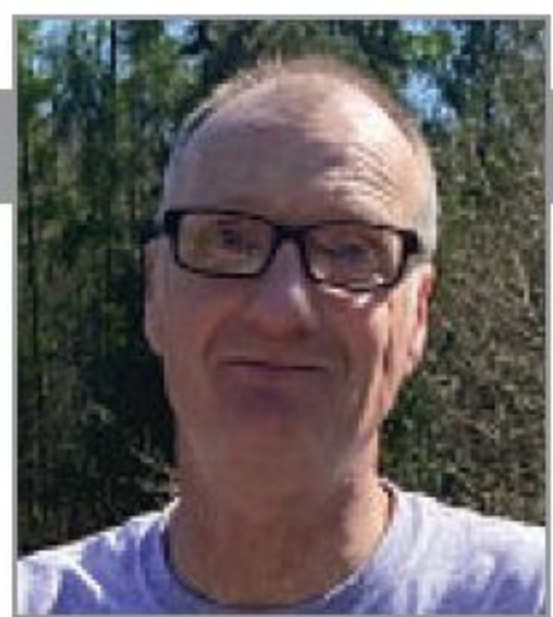
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Working on the lathe: drilling and boring

PART 2

Neil Raine explains how to create holes using drilling and boring in the lathe.



Continued from p.85
M.E.4759 December 27

Drilling in the lathe

To drill a precisely central bore that is perfectly aligned to the cylinder wall, the lathe cannot be surpassed. It is the engineered slideways of the lathe that underpin such precision and also enable a quick setup time. Apart from the difference in orientation, the procedure for drilling metal on the lathe is quite similar to drilling using a pillar drill or a milling machine. The method described here is, in fact, applicable when using most machine tools for drilling.

To drill a component in the lathe, the drill bit can be held either in a chuck (collet chuck or jaw chuck) mounted onto the lathe spindle and more commonly in a Jacobs chuck or a quick release chuck positioned in the tailstock (**photo 12**). There is also the option of powered drilling from the tailstock using a lathe accessory (**ref 8**) and from the tool post by mounting a small rotary tool such as a Dremel®. If the component is large and/or it will be unbalanced if rotated, it can be secured to the cross-slide using an appropriate holding method, e.g. an angle plate or a vertical milling slide and drilled from the headstock of the lathe. According to Bradley, the order of preference for holding a drill bit on the lathe spindle is: 1) collet chuck, 2) four-jaw chuck, 3) self-centering jaw chuck (**ref 9**). The collet chuck will afford better accuracy and rigidity. Compared to using the tailstock for drilling, the disadvantage of holding the drill bit in a chuck on the lathe spindle is there is no automatic



A quick release chuck mounted in the tailstock.



Drilling the lathe is carried out horizontally.

alignment between the drill bit and the part, in either the X-axis or the Y-axis. Alignment between the drill bit and the component must be setup manually.

Drilling in the lathe is always performed horizontally (**photo 13**). When drilling from the tailstock, the drill bit remains motionless and the energy for drilling is provided by the rotating work held either in a chuck or attached to a faceplate on the lathe

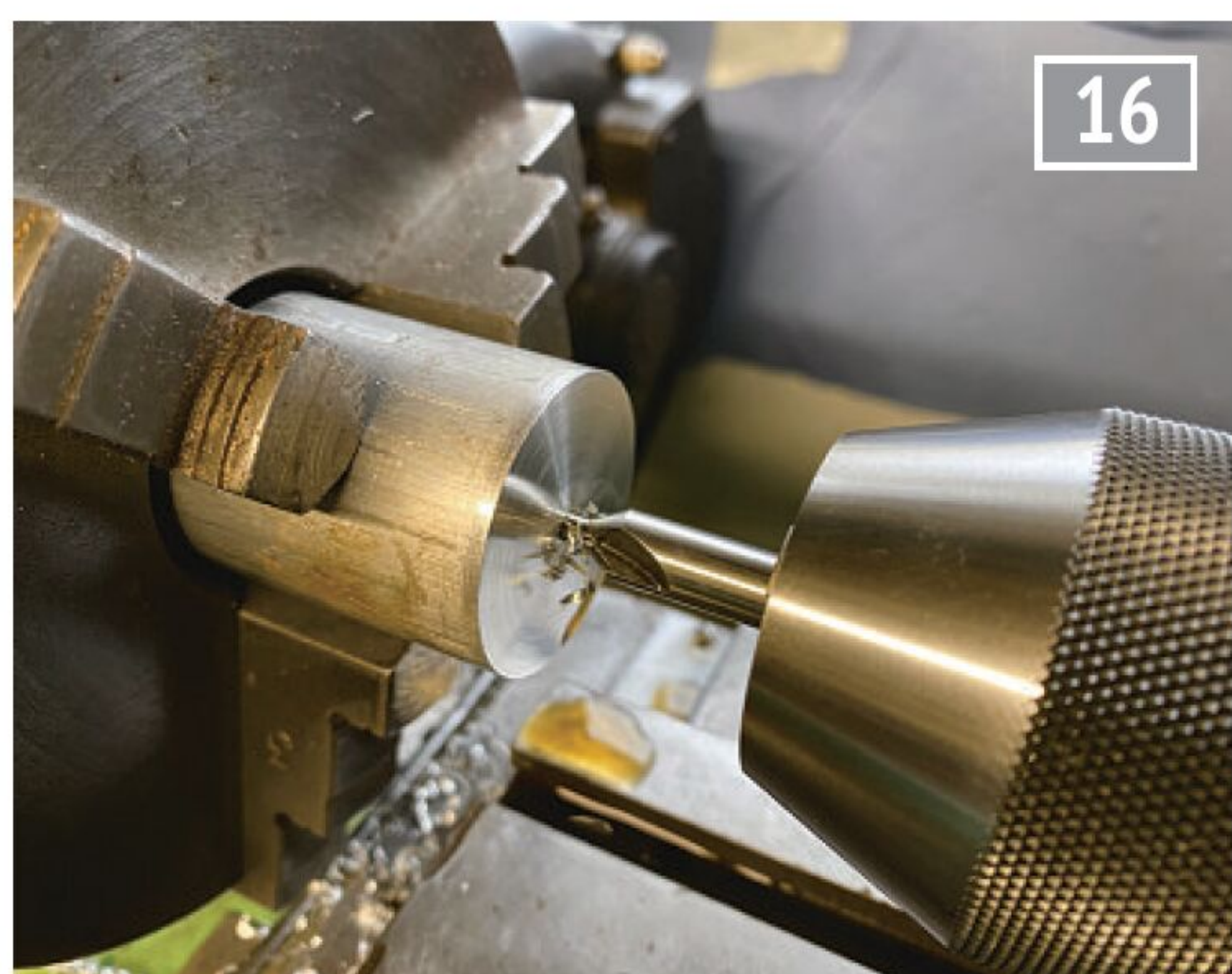
spindle - the exception is using a tailstock high-speed drilling attachment (**ref 8**). Therefore, drilling speed (rpm) is equal to the lathe spindle speed. Using any other machine tool to drill, the drill bit rotates and the work remains motionless. Regardless of the source of energy when drilling, the drill bit is always advanced into the work and is, therefore, under control of the operator or the machine if this is automated. When drilling on the lathe,



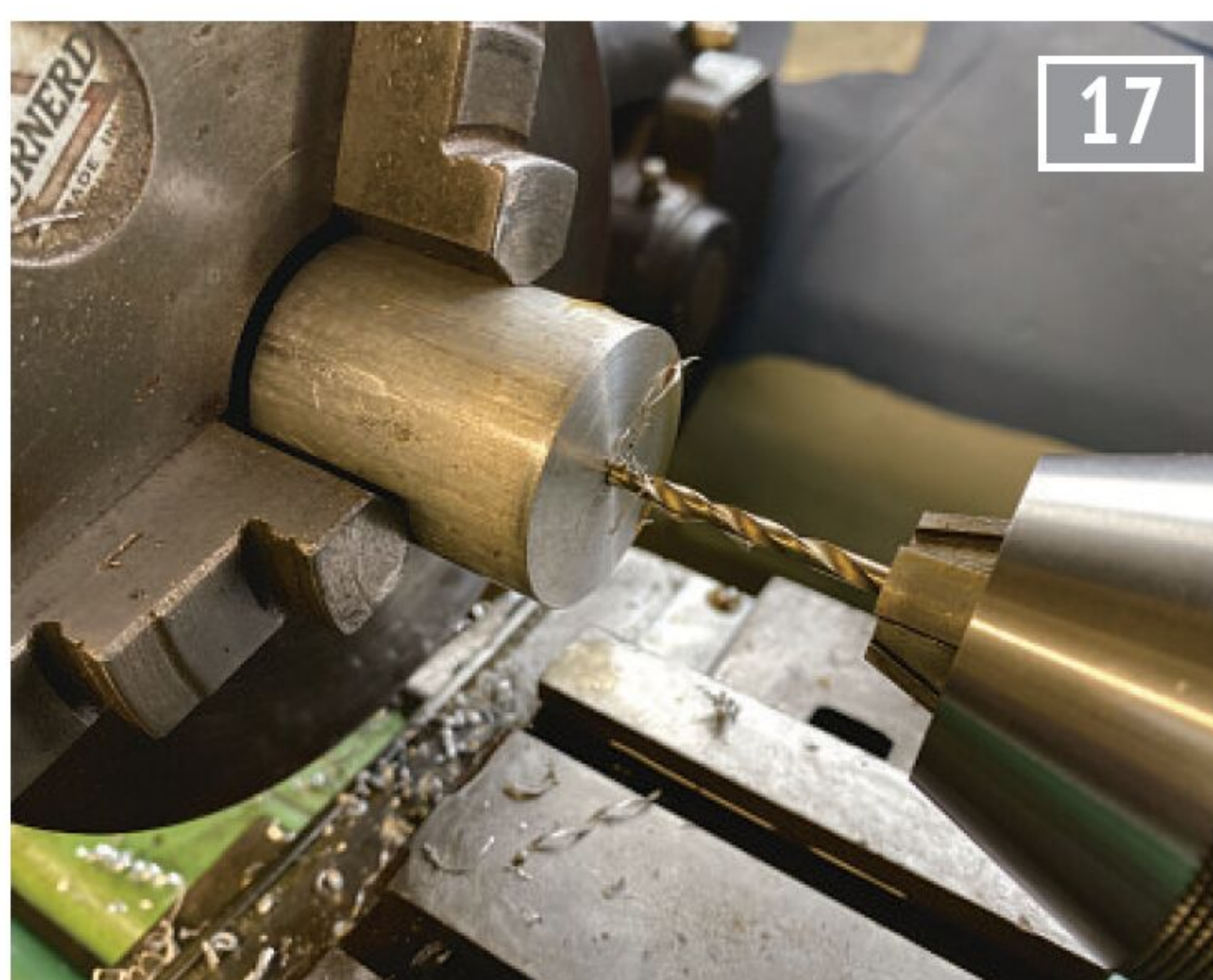
Squaring off the end of the work before drilling.



A selection of Slocomb drills.



Using a Slocomb drill to centre a hole.



Drilling the centred hole to the required depth.



Using the Slocomb drill to form a countersink.



A countersink formed by a Slocomb drill.

neither of these individualities of orientation or source of power fundamentally affect the process or the end result.

To begin the process of drilling on the lathe, the work is first securely mounted in a jaw chuck, a collet chuck or faceplate, before a facing cut is taken to square the end of the bar or the component (photo 14). Ensuring the drill bit makes contact square to the face of the work optimises initial cutting. The first tool

used to begin making the bore is the centre drill (photo 15). It is not necessary to first centre punch the work when both it and the drill bit are firmly fixed in position in the lathe, except for motion in the axis of drilling. The centre drill must be held in a Jacobs chuck positioned in the tailstock of the lathe since it does not have a tapered shank. The centre drill is a relatively recent and successful innovation that is associated with the toolmaker

J.T. Slocomb Company, Prov. R.I. U.S.A., and was advertised as a combination centre drill. Because of this, the typical centre drill is sometimes called a Slocomb drill although this reference is less common nowadays (ref 8). Despite manufacturing the tool, of which many examples remain that are clearly marked with the company name, there does not seem to be a recorded patent for the centre drill attached to J.T. Slocomb Company.

The centre drill is a two-stage step drill that has an initial pilot drill followed by a wider countersinking cutter (photo 15). It is a uniquely double-ended drill bit and this contributes to its durability. The broad main shank of the centre drill is what gives it the strength to resist flexing and wandering off path whilst drilling. For the centre drills shown in photo 15, the ratio of the diameter of the pilot drill at the tip expressed relative to the diameter of the main shank is = 1:3.14. The pilot drill at the tip of the centre drill has a typical point angle of 118 degrees. Beyond the narrow pilot drill, the cutting edges that define the countersink widen progressively at an angle of 60 degrees until the maximum diameter of the shank is reached. Imperial size centre drills are graded from BS1 to BS7 whereas metric size centre drills are simply graded according to their measurement in millimeters (ref 10).

To penetrate the metal precisely centrally is such a vital stage of drilling any bore. Once this is achieved the trajectory is set for successive drill bits to follow. Until the drill bit penetrates the material and becomes stabilised, the risk of it wandering off centre is high. Bradley recommends using the following procedure that can be adapted depending upon the size of the bore needed. This procedure was used in the example shown here. To begin, a BS4 size centre drill with a 1/8 inch point diameter was introduced to sufficient depth to create a short section of parallel bore (the point length of a BS4 centre drill is 5/32 inch) (photo 16). The centre-drill was then replaced by a 1/8 inch twist drill and the bore was drilled to final depth (photo 17). Using a BS5 centre drill, the opening to the bore was then countersunk to a depth slightly shy of maximum (photo's 18 and 19). This was so the tip of the final size drill bit (11/32 inch) was supported centrally before it penetrated the work. The final size drill

bit (11/32 inch) was then used to complete the bore to dimension (**photo's 20 and 21**).

In circumstances where quick repetitive drilling of multiple components is necessary, the lathe can once again excel. The attachment

that enables this is called a rapid collet closing system. A lever fitted to the headstock is used to rapidly tighten or loosen the collet fitted to the lathe spindle. When the pressure on the collet is released, the component

stops rotating and is quickly exchanged for the next one by the operator without the need to stop the lathe. Pulling the lever tightens the collet and the rotating work is then drilled to size and tapped if necessary. The cycle then continues.

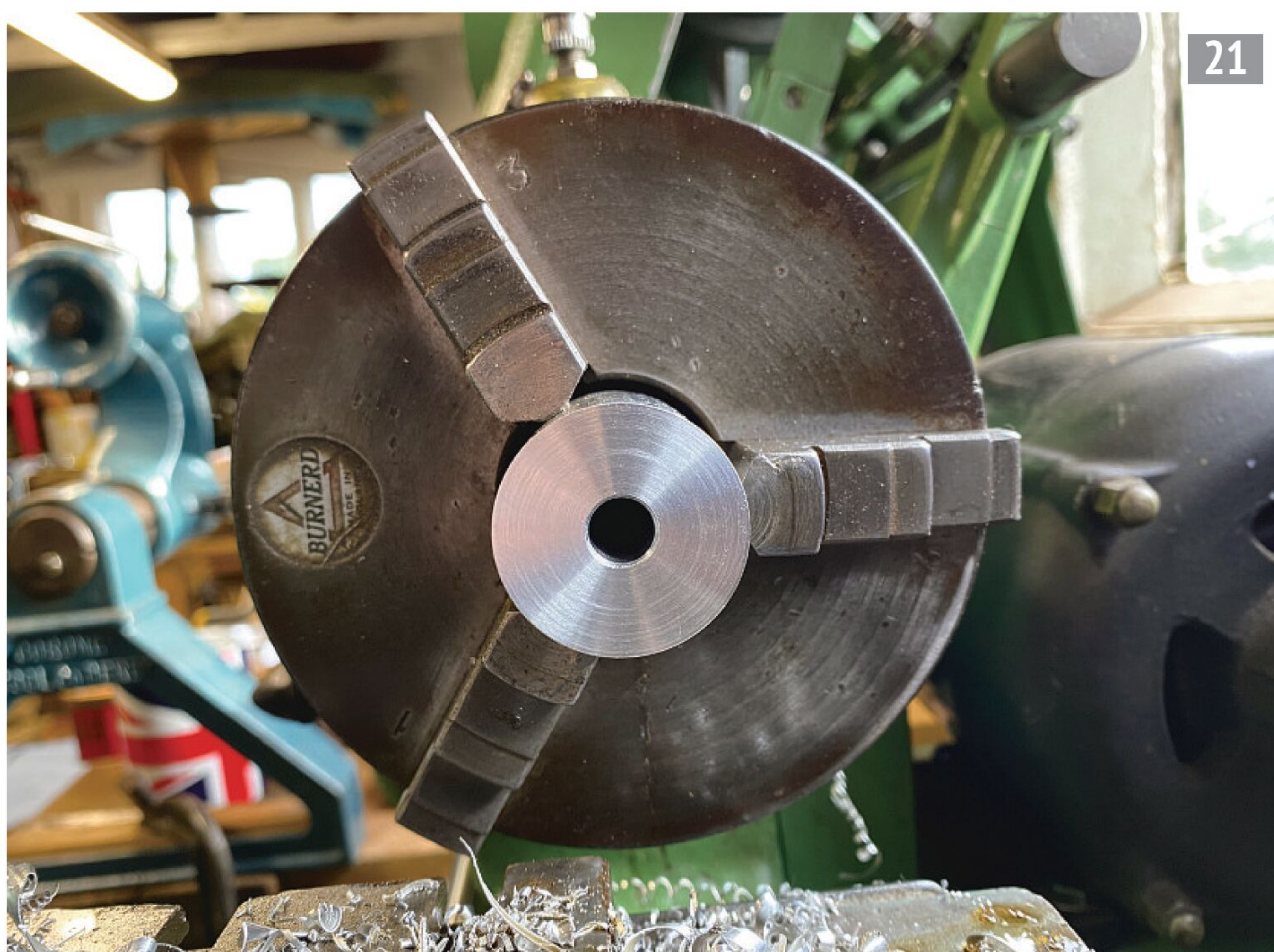
The accuracy of drilling

It is not uncommon to believe that drilling using a twist drill bit will make a precisely round bore. For many applications the dimension and shape of a purely drilled bore will meet the requirement of the component or the machine to function normally. For other applications, however, solely drilling a bore to size will not be sufficiently accurate. Among engineers and machinists the process of drilling is not considered to be a highly accurate operation. Of course this does not mean that drilling is undervalued or is considered a second rate operation. Rather, drilling is only one of the vital steps toward cutting a precise bore to a close tolerance. The process of drilling can be categorised as one of rapid removal of material. Among engineers, this variable is commonly referred to as the material removal rate (MRR). In fact, drilling is often used solely to remove material quickly, such as when cutting a square-shaped pocket, before progressing to another stage such as milling. After drilling, the next and usually the final stage in making a precisely round bore is to use either a reamer or a bore cutting tool such as a boring bar.

●To be continued.



The countersink centres a large drill.



The finished hole.

REFERENCES

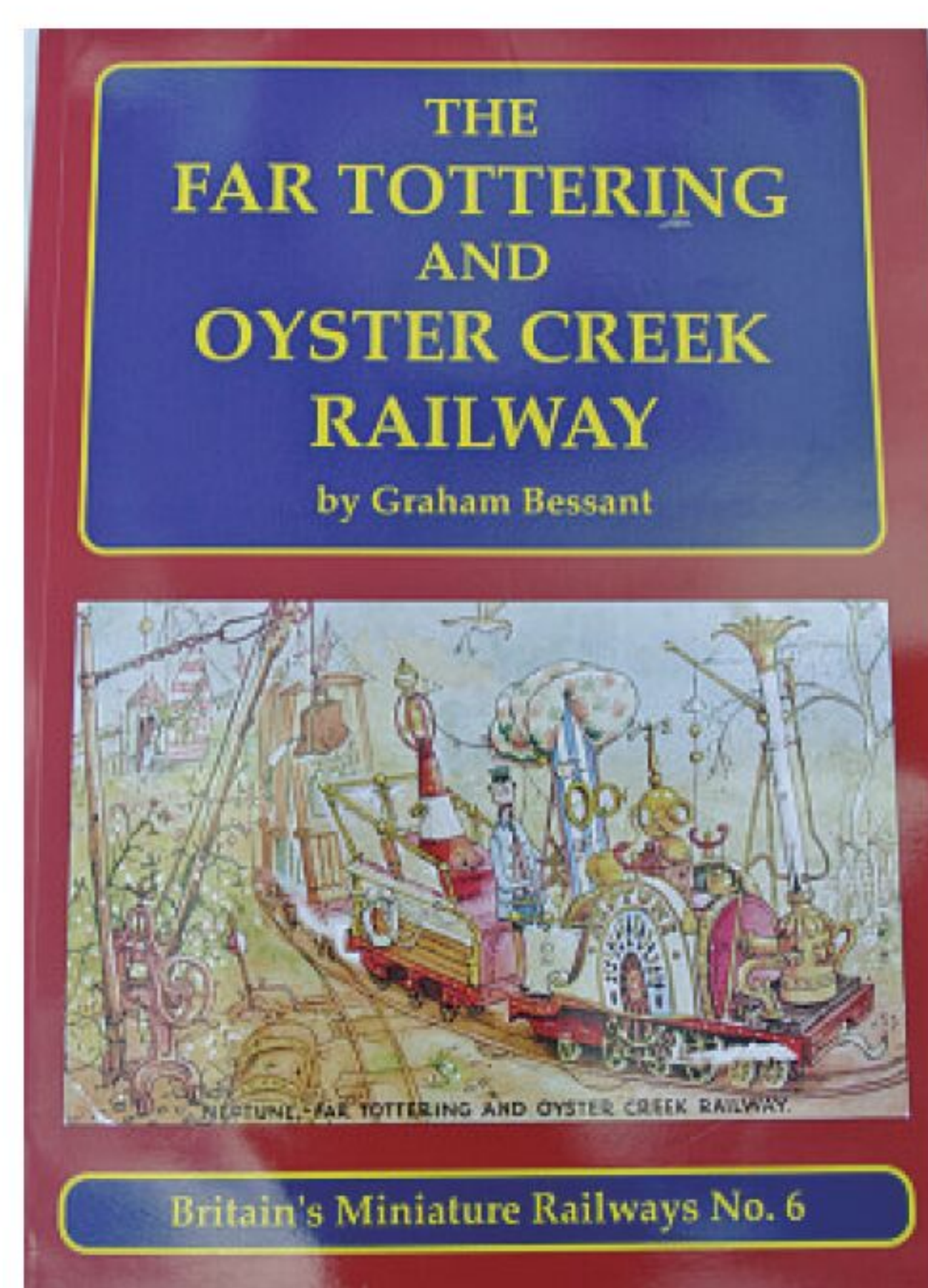
(Where an online version of the publication is available the link is shown beneath)

- Ref 8** Bradley, I. & Hallows, N.F. (2010), *Lathe Devices - their Construction & Use*, TEE Publishing, Leamington Spa.
- Ref 9** Bradley, I. (2022), *Myford Series 7 Manual*, Special Interest Model Books Ltd., Poole, UK.
- Ref 10** Hall, H. (2019), *Metalworker's Data Book*, Workshop Practice Series, Special Interest Model Books Ltd., UK.

Book Review

Far Tottering and Oyster Creek Railway

Graham Bessant



Miniature railways have always appealed to a wide cross section of the population and this book tells the story of how their magic was used to revive the spirits of the nation after the second world war. The struggle to raise funding to build the line was as hard in those days as it is today and so this book should inspire modern day builders to follow their dreams and find ways to overcome all difficulties.

The text describes the design and construction of one of the lesser-known British lines about which very little has been written, so this book is a very welcome and fascinating read. It is full of a wealth of technical details and background information which would be very helpful to anyone modelling the line. The author was fortunate to travel on the railway as a child and this created a lifelong fascination about its unusual and unique designs. Ultimately this led to him enjoying a very successful career in Civil Engineering and finally, this book.

One quickly realises that the author has gone to great lengths to provide such depth of detail about the creation, design, construction and operation of this intriguing railway. This is to be expected from such an eminent and outstanding Civil Engineer, who has been the Head of London Underground's Bridges and Structures Department for many years.

The unusual initial origins of the line are described as well

as the reasons for its creation and location. The senior designers and contractors of the railway are also described in some detail together with the challenges of funding the railway in a period of austerity. Each of the members of the design and construction team were quite specialist in their own fields and it is this unusual combination of skills that led to the creation of this extraordinary railway. Although few original photographs of the line have survived, the author has complemented these with his own original sketches together with postcards of the day and recent photographs. The author has also produced excellent maps of the line, as well as his own drawings of the infrastructure, rolling stock and earthworks.

The railway was originally planned to be laid to standard gauge, but spatial constraints forced the change to narrow gauge at a very early stage.

The author has researched the initial costs for the railway as well as the various challenges in obtaining funding. The railway was not expected to make a profit, but it proved to be so popular that it enjoyed great financial success during its very short life. The line not only made a profit but recovered its costs in much less time than had been anticipated.

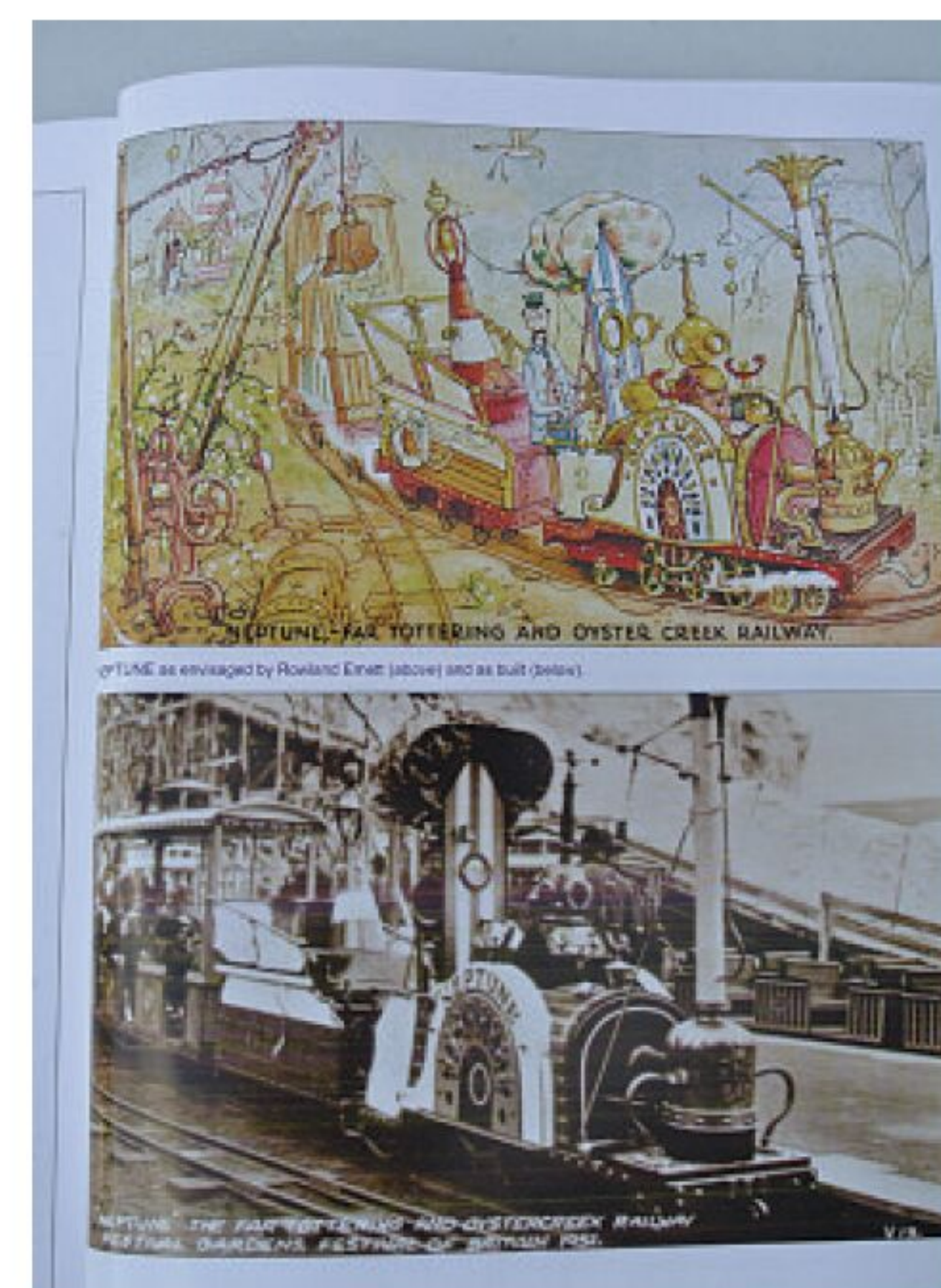
The normal service operated with three trains each day, but the line did not use a conventional signalling system. Instead, it operated a very simple, if unorthodox, means

of controlling train movements which depended on the train drivers following simple instructions. This was basically to wait in a platform of a station until the train travelling in the opposite direction had arrived at the adjacent platform.

Unfortunately, human error led to a serious accident which caused several injuries as well as the death of one female passenger. Surprisingly, although two locomotives were damaged in the accident, the railway opened to passengers the following day, with just one train in service. Clearly such an incident today would be followed by extensive investigations before the service would be allowed to resume.

This book is a fascinating read and clearly captures the enthusiasm and spirit of this charming miniature railway, whilst highlighting the dangers of unconventional means of controlling train movements.

Paul Carpenter



Published by Mainline & Maritime, 2024
ISBN 978-1-91379-726-3
56pp, softback, £11.95

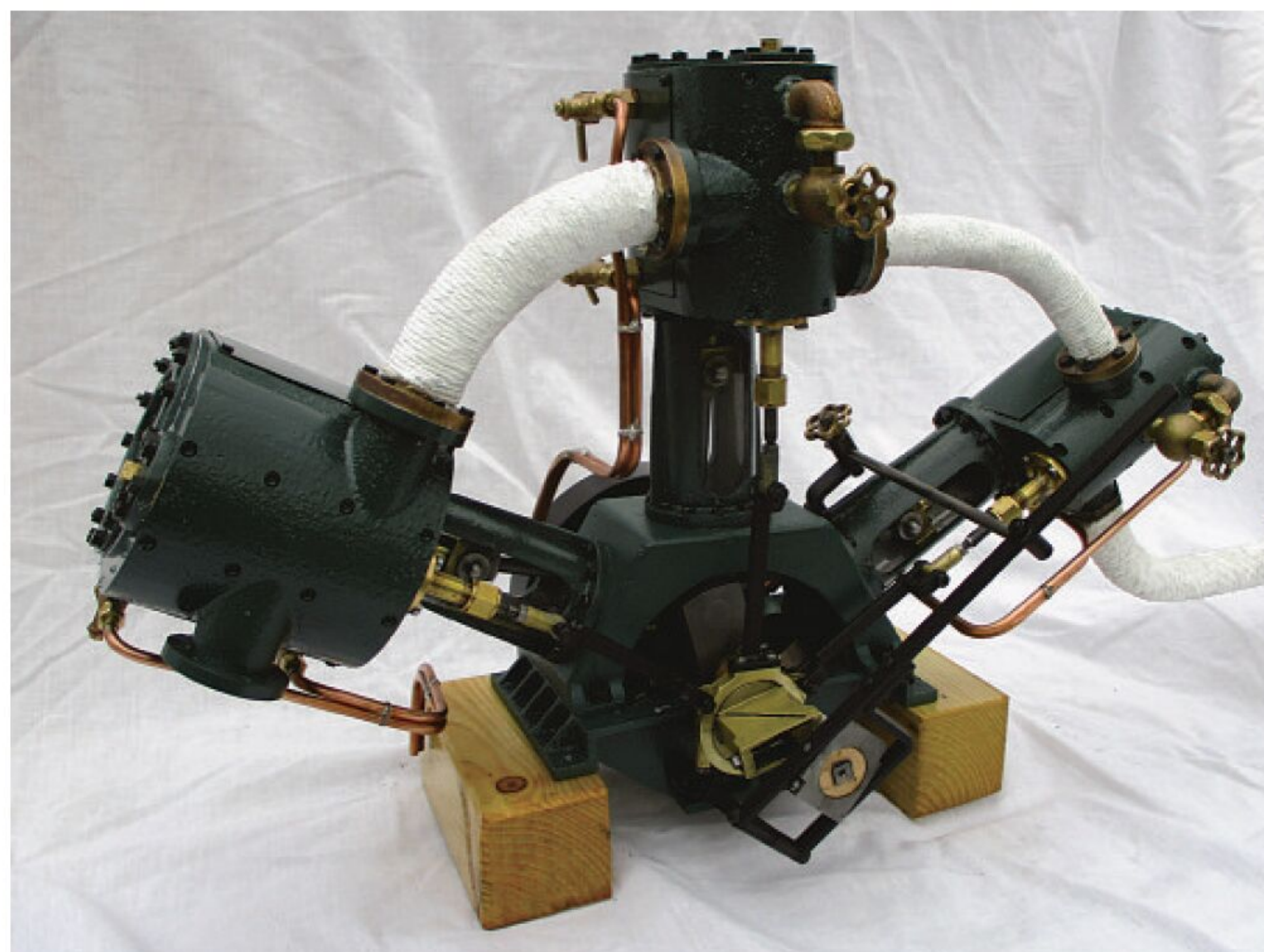
A Radial Marine Steam Engine

PART 5

Ian Couchman builds a rather unusual 'quasi radial' triple expansion engine.



Continued from p.114
M.E.4759 December 27



Simpling valve.

The final bits

The last bits we need are the simpling valves for the first two cylinders (**photo 84**) and the cylinder drain valves (**photo 85** - these are miniature versions of the try-cocks on my 1905 Merryweather fire engine).

Photograph 86 shows an exploded view of a simpling valve. Since both connections to the valve chamber are parallel, it is necessary to make the valve in two sections, which can be individually screwed into the casting, then connected together with the olive and nut. The olive can be screwed in and out to line up with the seat in the elbow, then locked with the nut when the connection is tightened. The upper connection links up to the incoming steam supply within the valve chamber and the lower to the exhaust, allowing steam to feed through to the next cylinder for starting (since the low and intermediate cylinders are fed from the exhaust of previous cylinders, there's no steam available until the feeding cylinder is running).

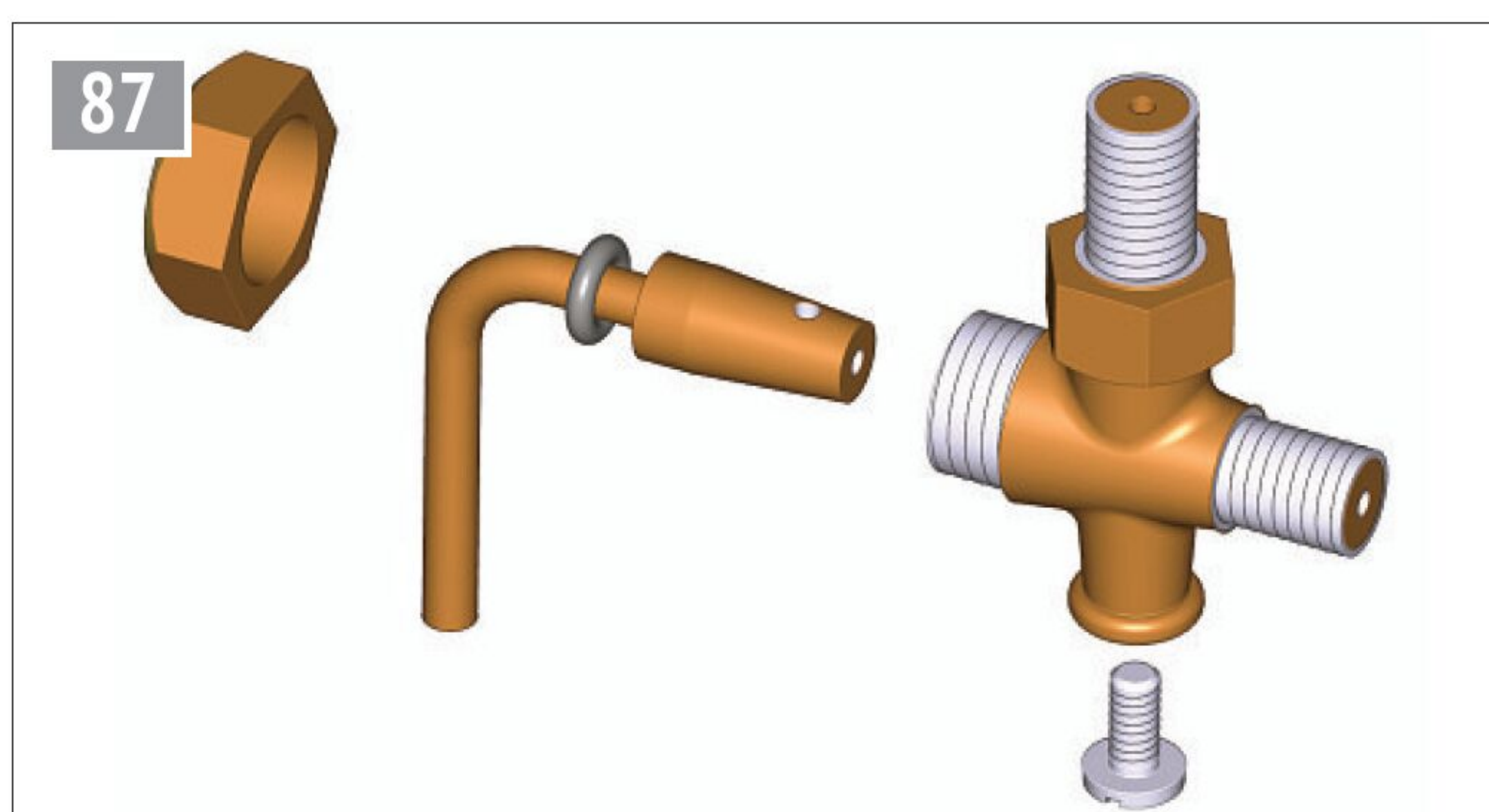
The drain valves are straight forward, as seen in the exploded view in **photo 87**. The steam flow is via the hole in the side of the conical plug and out of the hole in the end. The gland is sealed with an O-ring.

Run time!

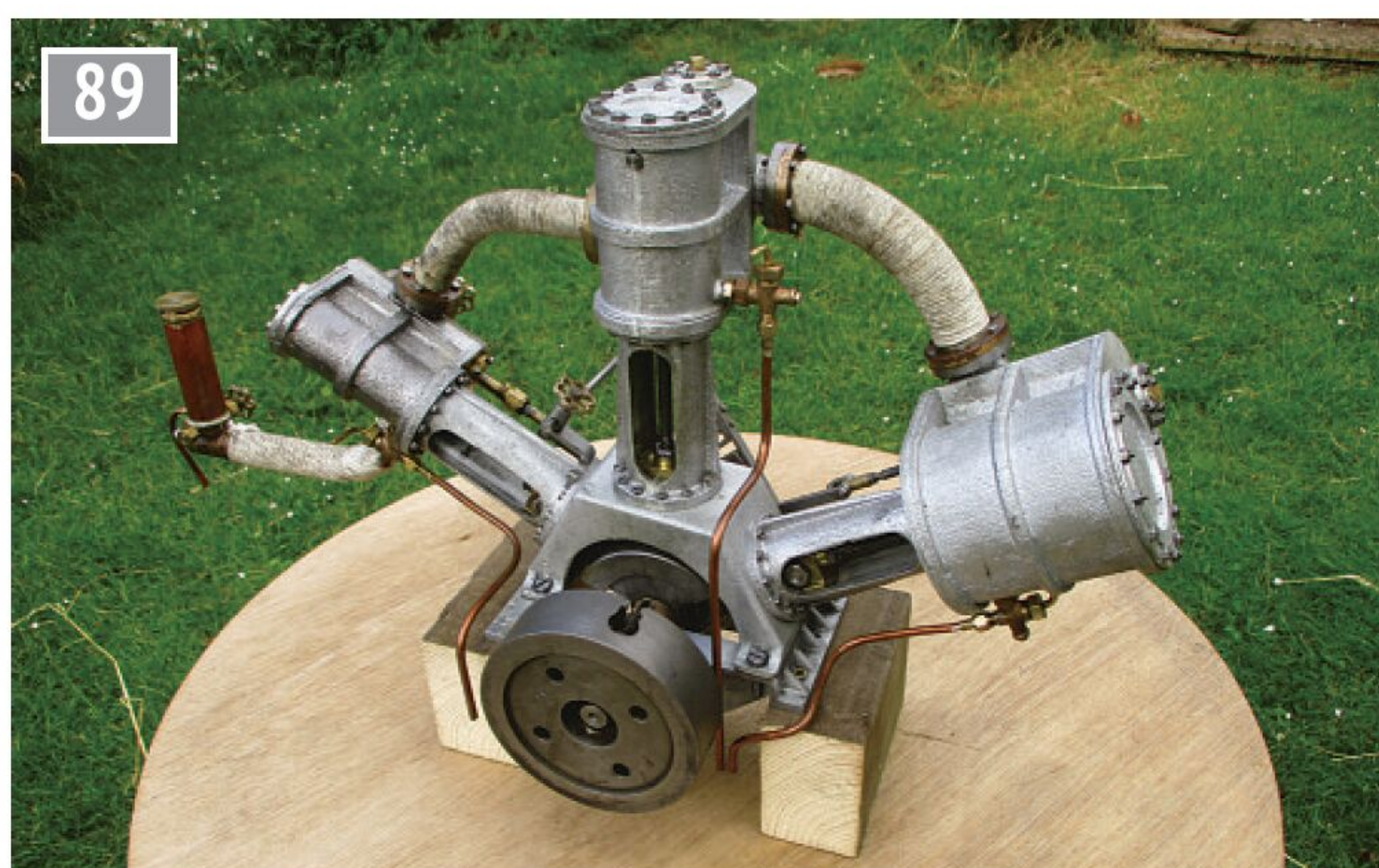
Time to try running on steam! Using a Yarrow boiler I built some years ago (**photo 88**), I raised steam and away we go. First lesson: drain valves are needed at the top of the cylinders, as well as the bottom...



Drain cock.



Exploded view of a drain cock.

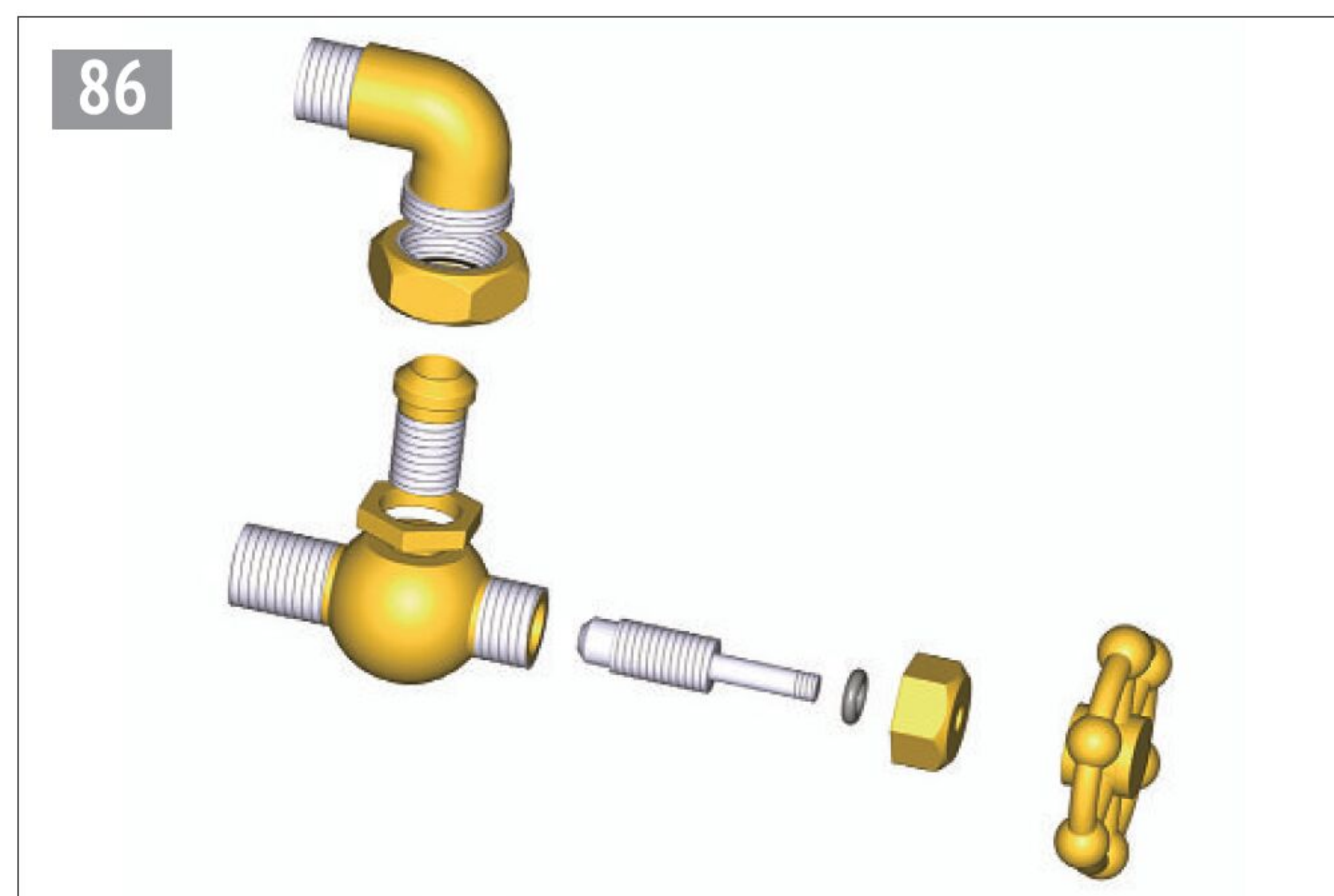


Chuck as a makeshift flywheel.

Apart from that, after getting the cylinders hot enough, all worked as expected, except that the lumpy running was still an issue. Time for a re-think.

I checked the valve timing and found that the valve movement was not exactly equal around the ports. Since you can't see the lower ends of the ports, it's not easy to know when you are moving equally. Using a dial gauge to measure the travel, I tweaked the valve position and crossed my fingers.

Next, I considered a flywheel. While the prototype didn't have one, it did have a large propeller, which would act as a flywheel, as well as applying a reasonably constant load. I feel that the lumpyness is due to the rapid acceleration of the piston, with no load or inertia to restrict it, as the inlet port opens, followed by the collapse of the pressure as the supply of steam runs out, with the crankshaft slowing fairly rapidly. Both the inertia of a flywheel and the resistance of



Exploded view of a simpling valve.



Steam is supplied by a Yarrow boiler.



Flywheel casting.

a constant load should reduce the effect. I certainly saw an improvement when applying a load. Unfortunately, I don't have any suitable flywheels. However, I do have a 4 inch four jaw chuck... (**photo 89**).

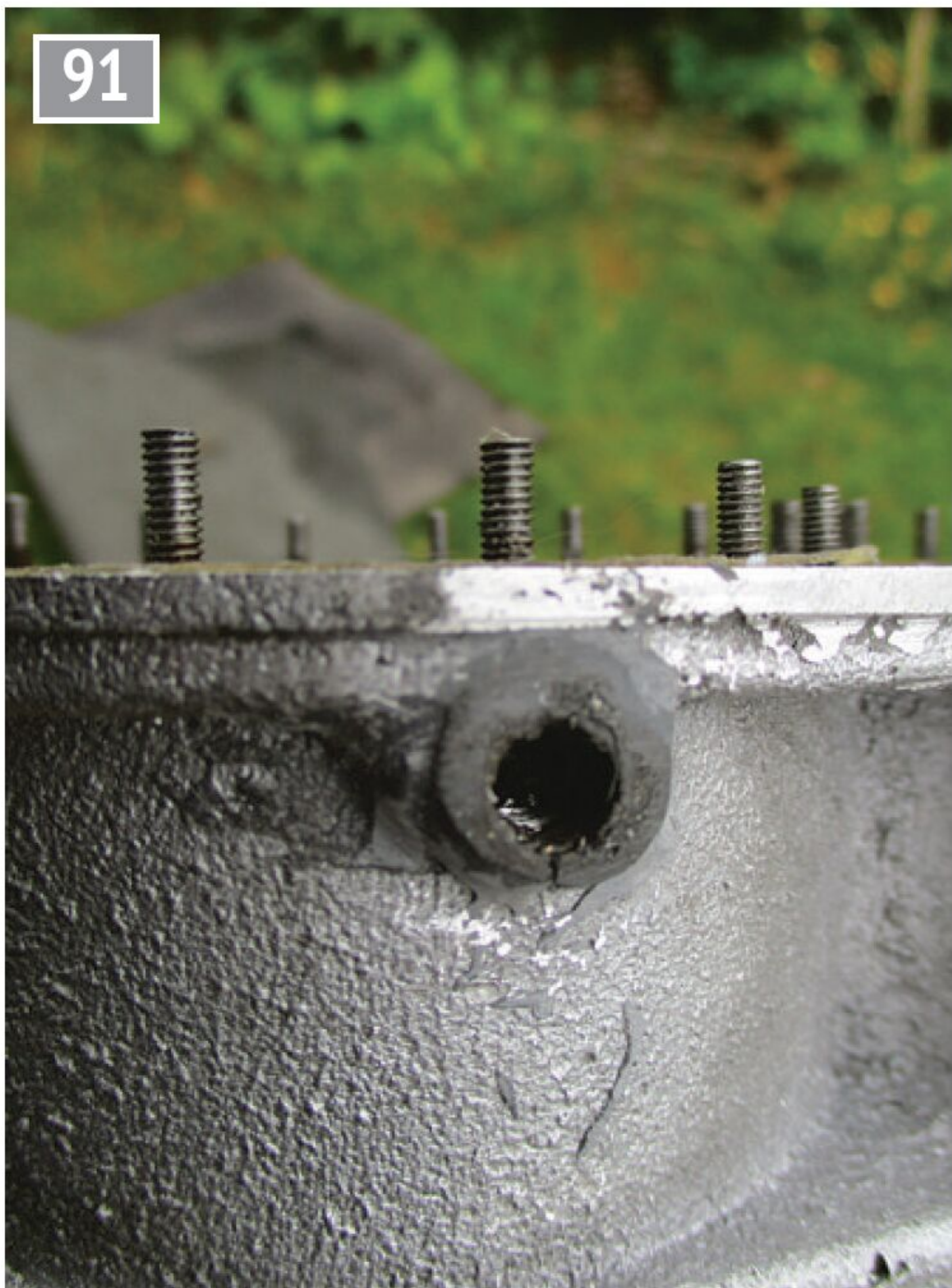
A quick run on air showed a marked improvement in running, so out with the boiler and more steam! While the issue with top drain cocks remains, once it was hot enough, I was happy with the results, which you can see here:

<https://pudmog.org.uk/videos/ward.html>

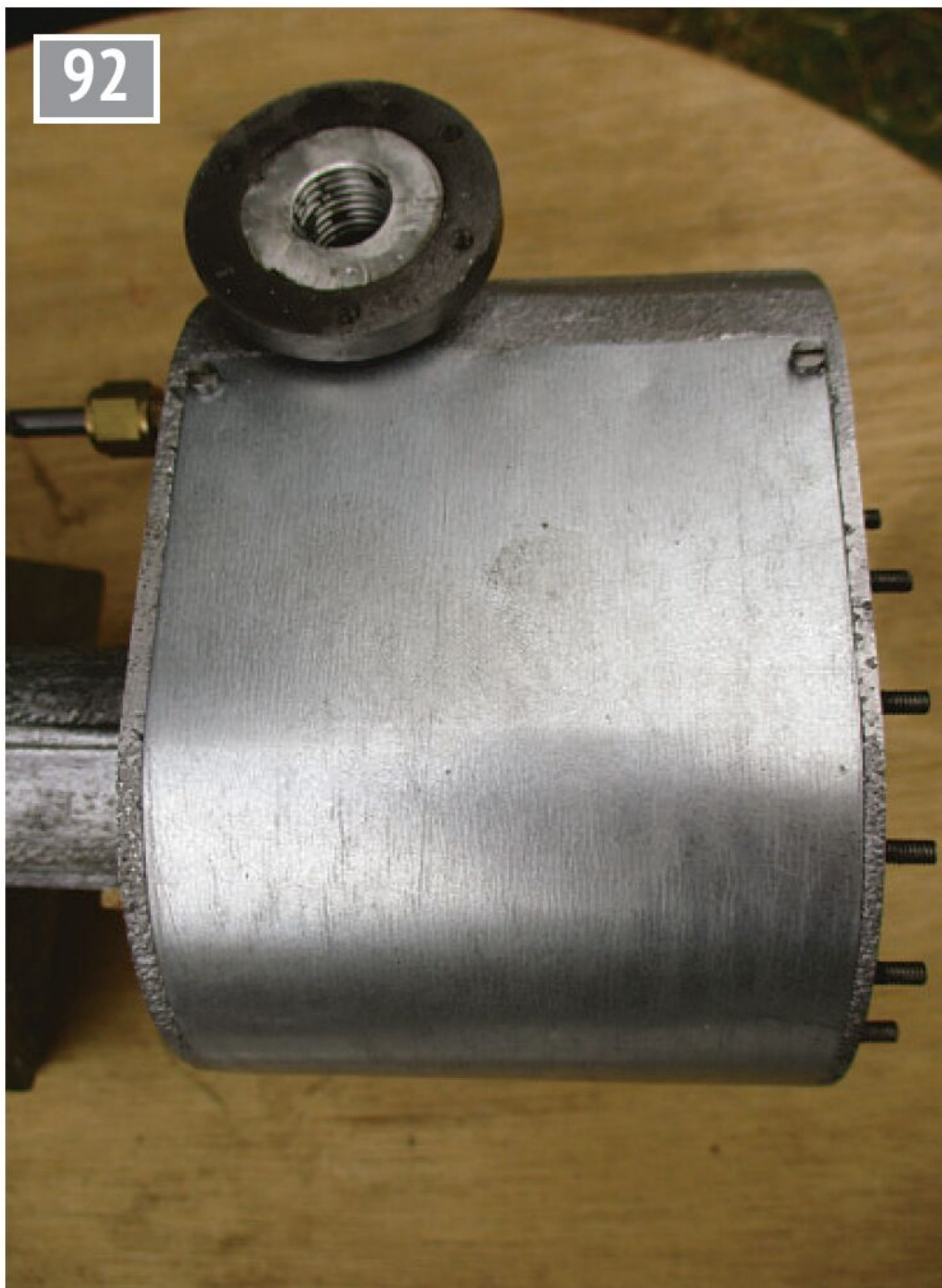
Finishing off

So what's next? A proper flywheel and top cylinder drains are a must. Then it's cosmetic; cylinder cleading then a strip-down, a good clean and a coat of paint.

Starting with the flywheel, I've gone for a brass casting (**photo 90**). Two reasons: 1) weight and 2) I had a lot of brass scrap! It's about 1 inch larger on the diameter and



Using JB Weld to make the boss for an extra drain cock.



Cylinder cladding.

weighs slightly less than the chuck I was using (at about 1.8kg) but the weight is mostly on the rim, making it more effective.

Now, the extra drain cocks. The cylinder castings had a boss for the lower drain cock, but there's nothing for the upper cocks. However, the cylinder wall is (just about) thick enough for about four threads to screw the cock into. To support the cladding under the cock, I built up bosses with JB Weld (**photo 91**). Not pretty, but it won't be seen ...

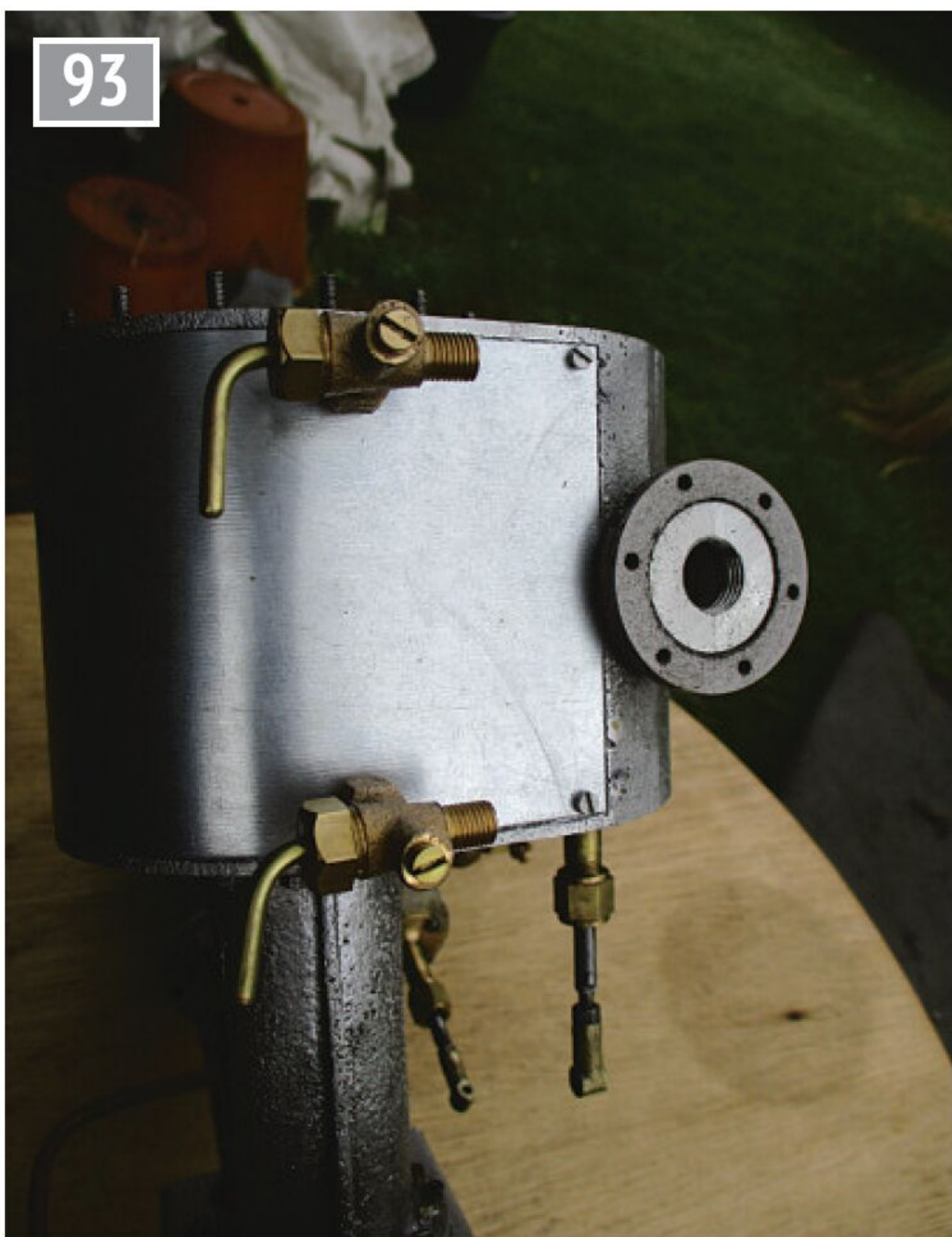
A little thought is needed as to how to connect the discharge from the drain cocks so let's wait until the engine's back together.

The cladding is made from thin galvanised steel (because I had some!). The castings have a recess for the cladding to sit in so it's a simple matter of bending and trimming a piece of steel to fit. After an hour or two, I got a reasonable fit (**photo 92**) with a couple of fixing screws at each end. Just the holes for the drains to drill and we have **photo 93**.

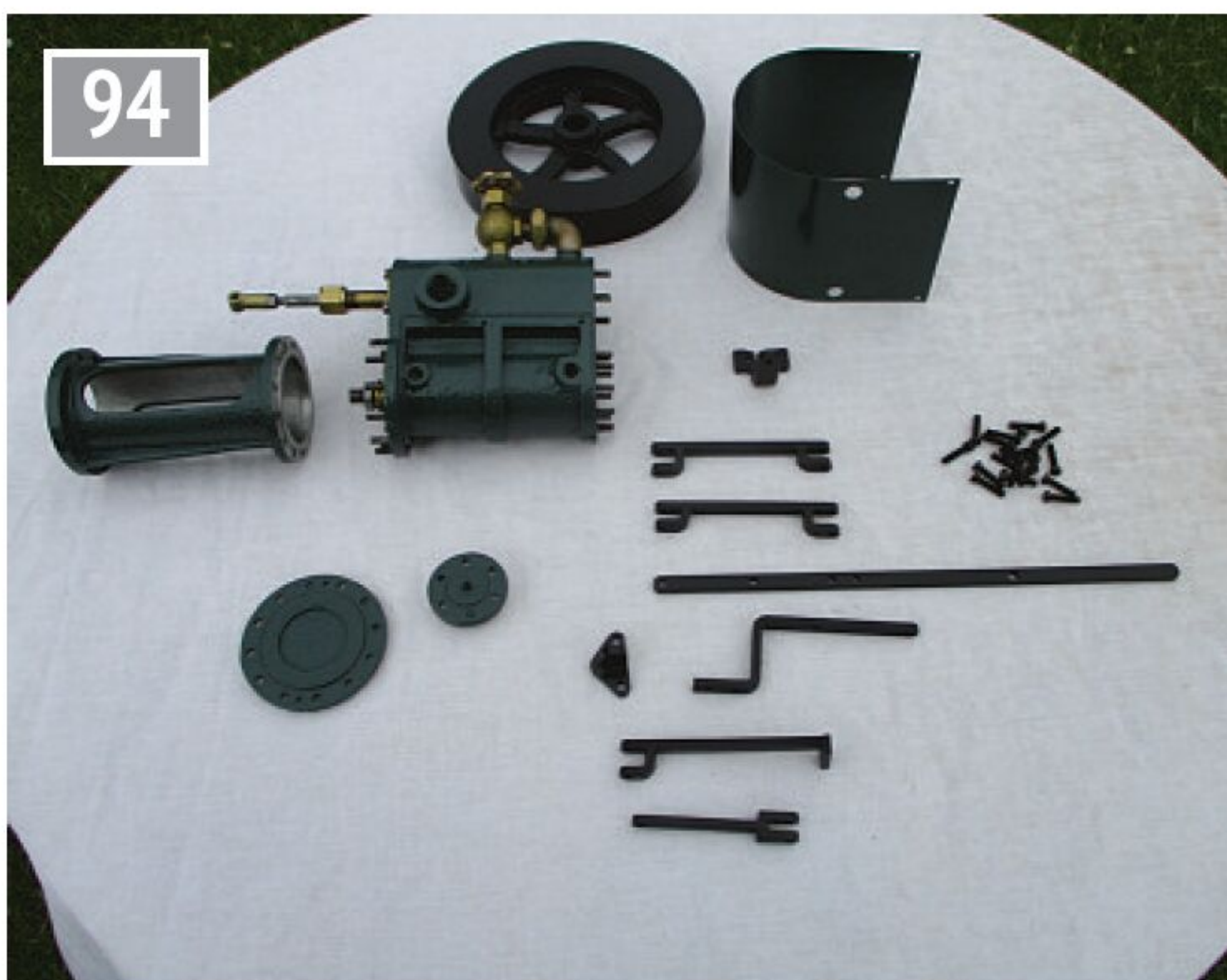
Painting

The finishing scheme I've decided on is as follows:

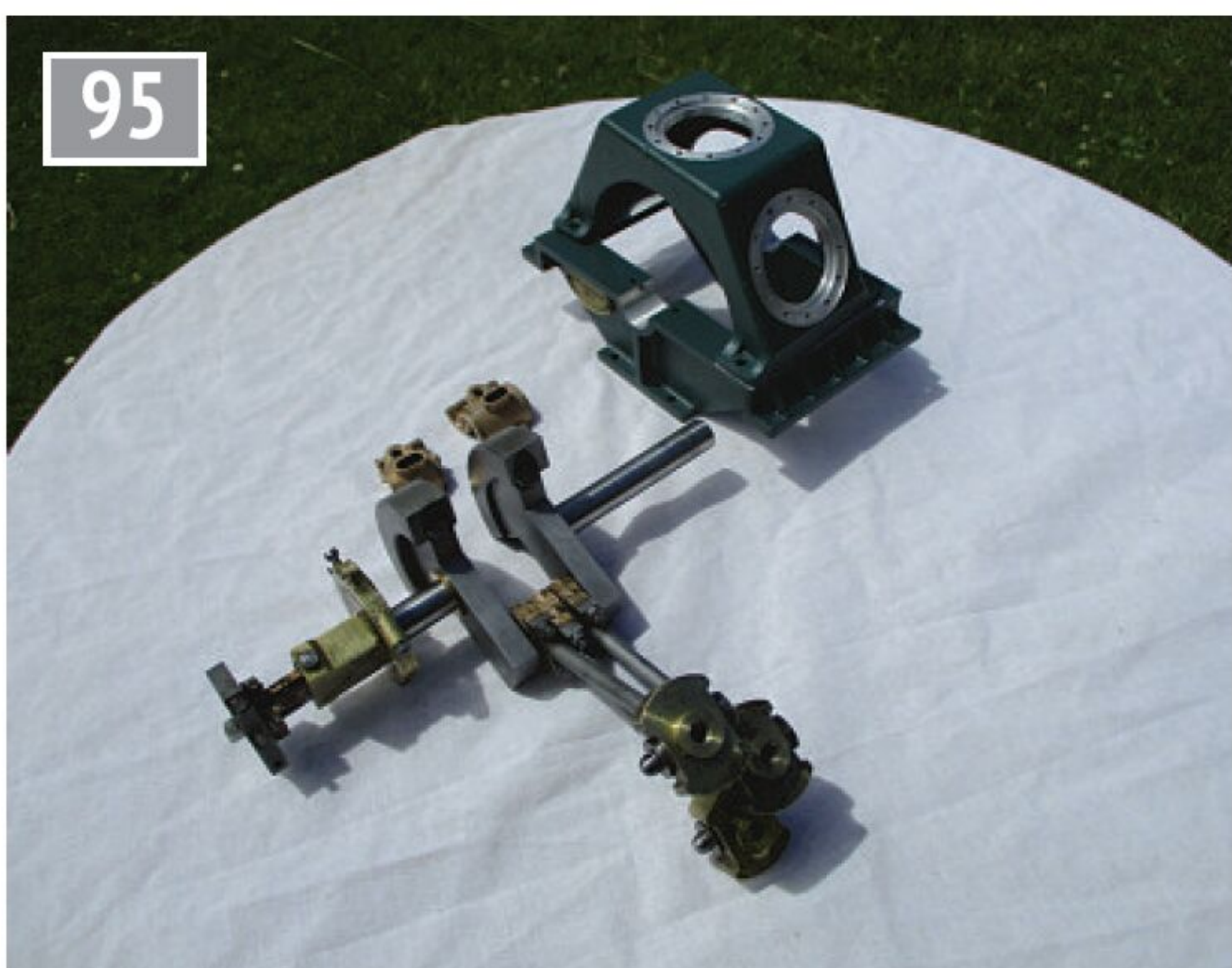
Plain steel parts such as eccentric rods: black, satin finish.



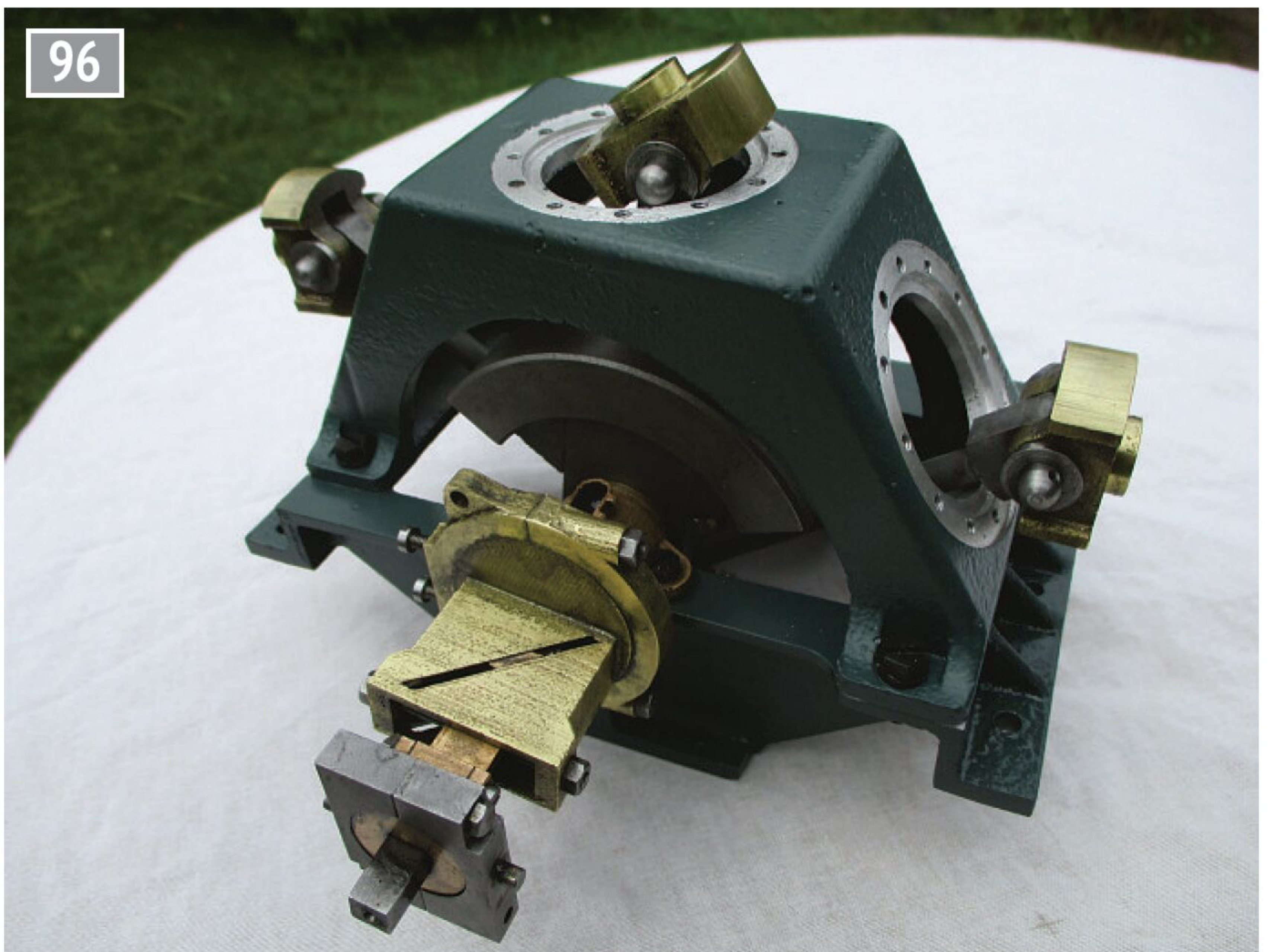
Holes are added for the drain cocks.



A selection of painted parts.



The frame and crankshaft ready for assembly.



Ready to add the cylinders.

97



Two down, one to go...

Castings and cleading: dark green, satin finish.

Nuts, screws and other small steel parts: oil blacking. To black small parts, nuts, screws etc., I heat the parts in a stainless kitchen sieve (the mesh type) then tip them into a tin of old engine oil when they are dull red hot (this is best done outside. It gets a bit smokey!).

I'm spraying the castings un-assembled. To avoid damage to the paint when it goes back together, I'll be using washers under nuts and screws. I've been using lashings of paint-on liquid masking, which works well. The only problem I find is that it dries very quickly on the brush. The best way I've found to apply it is by using a cocktail stick. No, honest! And here's a selection of parts (**photo 94**),

including some cleading, oil blacked screws, cylinder casting and a nicely painted flywheel. I'm not making any attempt to smooth the surface of the castings, preferring to leave a natural, as cast, finish.

Painting is not my favourite pastime but putting lots of smart, shiny parts back together is very satisfying, tinged with sadness that this beautiful machine will soon be covered in oil, water, soot and who knows what else when it's fired up...

However, let's get on with it. Here (**photo 95**) we have the frame ready for the crankshaft assembly and with the crankshaft installed (**photo 96**). In **photo 97**, we are making good progress, with two cylinders fitted. In the original assembly I had quite a job

getting the link pipe between the two cylinders in place with the flange gaskets, so this time I fitted it before I bolted down the intermediate cylinder, so I still had some movement to get everything lined up. (Since you ask, the pipe is lagged by winding piping cord around

the pipe, then painting with emulsion paint, simulating the asbestos lagging of days gone by. I couldn't get any asbestos for this.)

One issue I found was the problem of getting a spanner on both the piston rod glands and the piston rod lock nuts. The answer was these 3D printed spanners (**photo 98**), which can access both gland and lock nut via the slot in the rear of the crosshead guides.

Finally, what to do with the cylinder drain discharge? Looking at the video, I believe the fittings used are not original, so I won't try to copy them. I considered a number of options, none of which were particularly elegant, so I went for the simple option: a pipe from each cock, wired and soft-soldered together in pairs as in **photo 99**.

And that's it. All finished. I just need a tug boat to fit it to. Back in the day, most of the tugboats working in the West Virginia area were paddle steamers, so this engine, with a propeller, was cutting edge!

Happy boating!

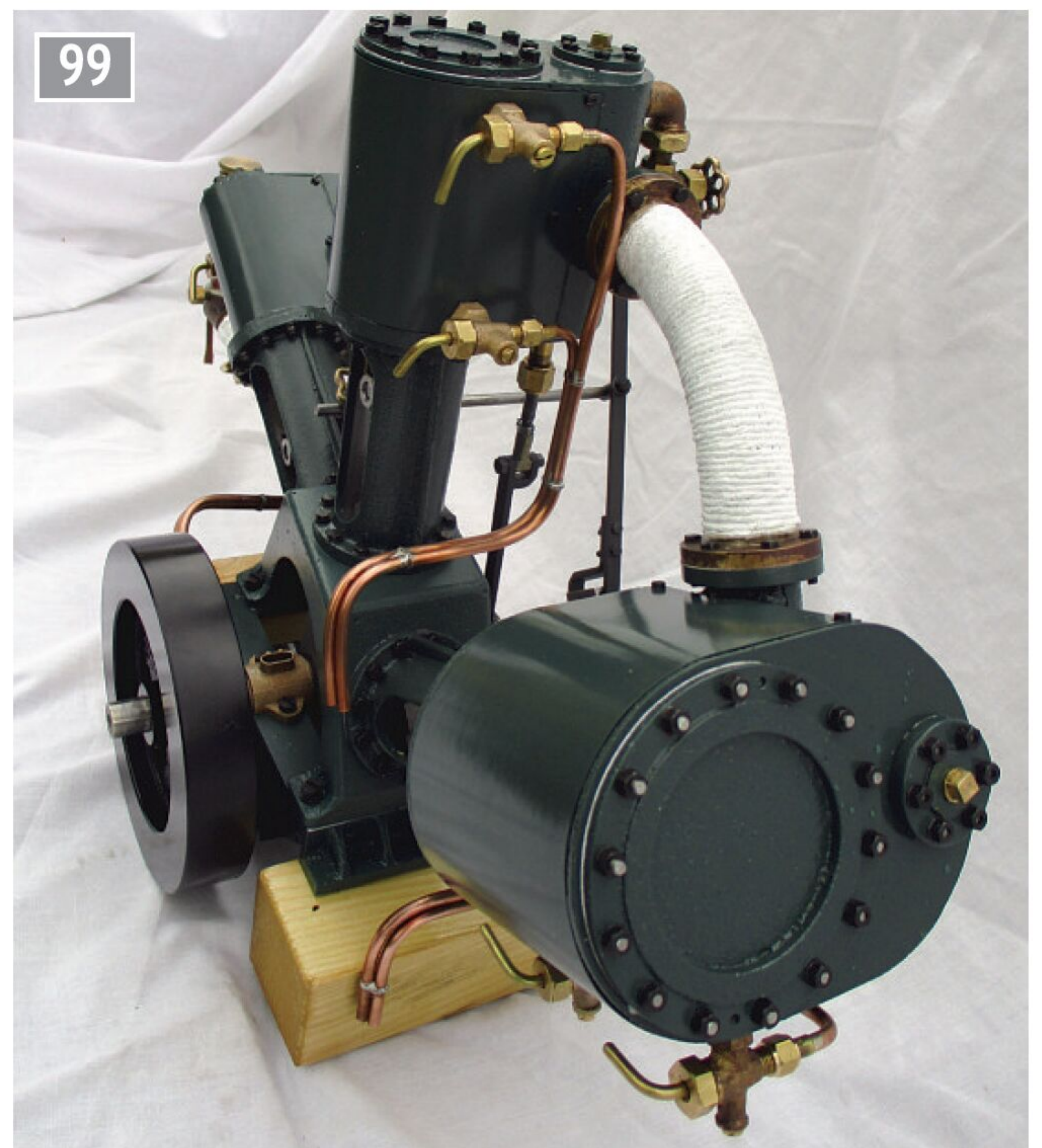
ME

98



3D printed custom spanners for gland nuts and lock nuts.

99



Complete, with the drain cock plumbing added.



CJ18A Mini Lathe - 7x14 Machine with DRO & 4" Chuck

SPECIFICATION:

Distance between centers: 350mm
Taper of spindle bore: MT3
Spindle bore: 20mm
Spindle speed: 50-2500mm
Weight: 43Kg

Price: £595



AMABL210D BRUSHLESS MOTOR 8x16- LARGE 38mm spindle bore

SPECIFICATION:

Distance between centers: 400mm
Taper of spindle bore: MT5
Spindle bore: 38mm
Number of spindle speeds: Variable
Range of spindle speeds: 50~2500rpm
Weight: 65Kg

Price: £1,185



AMABL250Fx750 Lathe (10x30) Variable Speed - Power Crossfeed - Brushless Motor

SPECIFICATION:

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

Price: £1,904



VM25L Milling & Drilling Machine Belt drive & Brushless Motor

SPECIFICATION:

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

Price: £1,431

W DRO – Price: £1,921

W DRO + PF - Price: £2,210



XJ12-300 with BELT DRIVE and BRUSH-LESS MOTOR

SPECIFICATION:

Gas Strut
Forward Reverse Function
750W BRUSHLESS Motor
Working table size: 460mm x 112mm
Gross Weight is 80Kg

Price: £725

W 3 AXIS DRO- Price: £955



VM18 Milling Machine Belt drive & Brushless Motor

SPECIFICATION:

Model No: VM18 (MT2) / (R8)
Max. face milling capacity: 50mm
Table size: 500x140mm
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W 3 AXIS DRO - Price: £1,627

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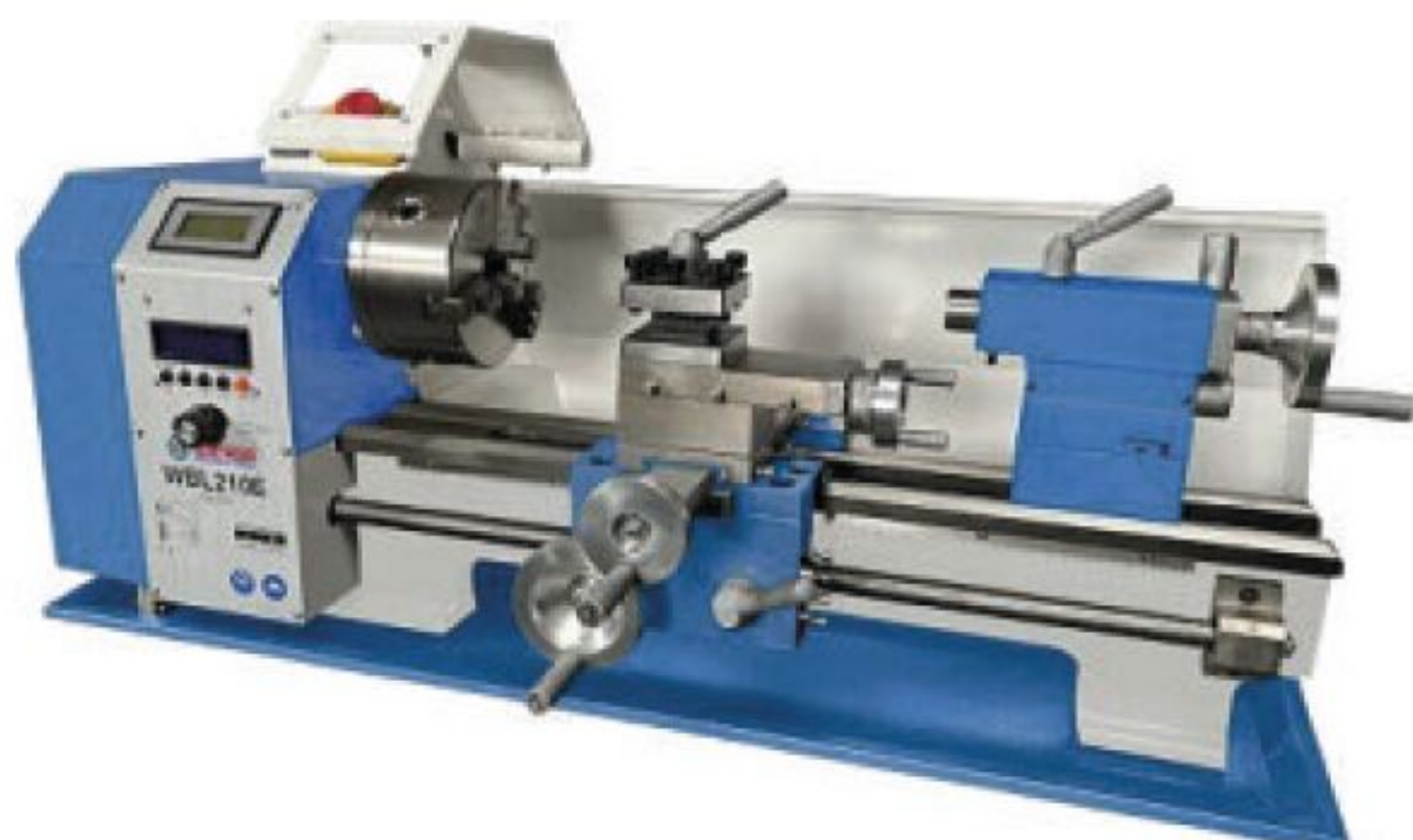
VM28L-Ball Screw Type
Milling Machines



VM48H HIGH SPEED MILLING MACHINE



VM32H HIGH SPEED
MILLING MACHINE



AMABL210E
With Electronic
Change Gear System



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The Stationary Steam Engine

PART 65 – THE ULTIMATE FATE OF THE PATENT

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

Continued from p.752,
M.E. 4757, November 29

It is difficult to estimate accurately the total number of high-pressure engines that were working by the beginning of 1805 but it must have exceeded one hundred and the future held promise for many more. By the nature of the arrangements that Trevithick had made the income that he and his two partners in the patent received was entirely derived from premium payments rather than manufacturing. In theory, the patent revenue should have been substantial but this proved to be far from the reality. Andrew Vivian's account book, made up to November 1804, showed only £1250 in received premiums (**ref 368**). From another source it is known that the premium charged on the smaller engine averaged approximately 12 guineas per horse power (**ref 369**). If for the sake of a notional assessment the assumption is made that all of the engines built were below 10 horse power then Vivian's figures amount to only 105 engine/horse power built up to this time and this is over-generous as a substantial proportion of engines were larger and hence paid a greater premium. The fact was, as noted above, the total number of engines in operation was far larger and the implication must be that much of the premium money was going unpaid. In addition, Trevithick's profitless speculative ventures must have represented a massive drain on resources. The patent

partnership was drifting into deep financial trouble.

Of the three partners William West, the original minority two-tenths shareholder, was financially insulated as he was permanently employed as manager at the Hayle Foundry but Andrew Vivian with a four-tenths share was more vulnerable. He was beset by troubles with the mines that he was managing and in May 1805 he also suffered the tragedy of losing his eighteen-year old son, Andrew. A heartbroken letter to Trevithick tells of his son's death and other misfortunes but the letter also contains the information that his financial position had forced him to take steps towards selling his share of the patent. Trevithick, it transpired, was acting as broker between Vivian and Sir William Curtis, a baronet, Member of Parliament and Lord Mayor of London, who was a member of the Trinity House Board. Vivian's first asking price was £5,000 but Curtis prevaricated on the grounds that the patent was being threatened with a legal challenge. This compromised the sale value and Vivian was forced to revise his offer to £4,000 with the additional £1000 deferred until any legal action found in favour of Trevithick. Curtis does not seem to have been persuaded and ultimately Vivian's share was sold to Samuel Homfray's London agent, Robert Bill (**ref 370**).

Trevithick, constitutionally incapable of managing his

financial affairs, was in an equally parlous financial situation but additionally he was now being assailed from other directions. Dixon, Rabey and Davey were contesting the patent and by some means, now unknown, Davey succeeded in having Trevithick thrown into prison for a period of time in 1805. These pressures caused Trevithick to look for a buyer for his share of the patent. Although his son's account of this period in the *Life* is confused (even beyond the *Life's* usual standard) it would seem that Trevithick had at first approached a now unknown party whose legal advisers, Blagrove and Walter, had written to Homfray enquiring whether there were any financial encumbrances attached to the shareholding. Homfray had been an exponent of the high-pressure engine from the earliest days and at some point he had become directly involved in the ... *engine business*... In September 1804 he spent thirty days in London followed by ten days in Staffordshire on engine business (**ref 371**). Similar trips, including one to Liverpool, followed in 1805. Homfray's support included personal loans to Trevithick and this seems to have culminated in some sort of mortgage for, in his reply to Blagrove and Walter, Homfray says that he had no objection to Trevithick disposing of the shares but that he, Homfray, held a deed of assignment (mortgage?) and expected that the debts owing to him to be discharged

prior to the sale. Foreclosure of this deed may have led to Homfray's ultimate acquisition of Trevithick's shares, for Trevithick wrote to Homfray on June 26th 1807, that a deed of transfer was ready to be signed and asks that a settlement of the outstanding debts be made.

The details of the developments that followed are not recorded in the *Life* but a *Statement of Account* (ref 372) which was countersigned in July 1807 has a pencil note recording that the distribution of the shares was then: Homfray five-tenths, Trevithick two-tenths, Bill two-tenths and West one-tenth. These figures are repeated by Francis Trevithick in the *Life* but for the date February 1808. Apart from Vivian's sale the redistribution seems to have been largely at the expense of Trevithick's shareholding which has fallen from two-fifths to one-fifth but West's share has also halved. Homfray was now the majority shareholder in the patent with half of the shares in his hands directly and probably also Robert Bill's one-fifth which may have been held by proxy to Homfray (ref 373).

In February 1807, prior to purchasing Vivian's share of the patent, Homfray had called for an audit of the financial situation from which two documents survive today (ref 374). One is the *Statement of Account between Messrs. Richard Trevithick & Co. and Samuel Homfray Esq.*, dated February 1807 and July 1807. On the debit side, £1278.5.3 had been disbursed. The largest individual sum was £400 paid to Andrew Vivian ... *on account of the patent premium* ... whilst Homfray's expenses amounted to £252. Legal costs of £357 had been expended. Richard Trevithick received £150 in expenses and William West, £17.3.0 for unstated reasons. The remaining £102 was paid out in minor sums. The credit side consisted entirely of engine premiums totalling £1230.7.9 and credits less debits gave net positive balance of £47.17.6.

As the account commenced in June 1804, the sum accruing from premiums would have accumulated since Andrew Vivian had totalled separately premium payments of £1250. Thus over the intervening three years the total of premiums received was about £2480. The final dividend taking the period to July 1808 was £254.15.5 distributed as Homfray £127.7.8½, Richard Trevithick £50.19.1, Robert Bill £50.19.1 and William West £25.9.6½. The premium creditors listed are dominated in money terms by the amounts due from Homfray, £250.19.0 for ... *a large engine* ... and £63 for a small one and a further £339.3.0 for another large engine with a 23 inch cylinder. Homfray's account is thus responsible for 51% of the total premiums.

A more comprehensive summary of premiums due was prepared separately which survives in draft and final versions although names are included in some versions that do not appear in others (ref 375). The final draft has four columns. The first column is a numbered list of names followed by the amount that Homfray identified as owing. A second column was headed ... *Received by Mr Bill* ... which shows the amount that individuals had paid to date. The third column was amounts supposed good or received by Mr. Homfray and the last column was a list of objectors to the payment. The total under the first column was £6085 and under the final column £3392.2.0. Thus 64% of the total sum that Homfray claimed as due was listed under those refusing payment.

From the first column of the list, Homfray's statement of sixty premium debtors, it is apparent that the premium was to be mainly paid by the purchaser of the engine but three manufacturers can be identified. Numbers 31 to 39 are allotted to D. Whitehead, owing £659.8.0, listed under *Object to Payment*. Fawcett is allocated numbers 40 to 44 totalling £280.7.0 but also

listed under *Object to Payment*. These manufacturers could have been building engines for stock and may have been asked to make payment prior to sale, hence their objection to paying. Hazledine does not appear in the main list but the firm is included in a separate rough copy of *Mr. Bill's account of Suppos'd Good Premiums*. Hazledine's amount is £579.

Amongst sums due from individuals, the engine users, the largest single entry is for Samuel Homfray who is debited with £339.3.0, the sum payable on the 23 inch engine and duly acknowledged as received by the same Mr Homfray. Andrew Vivian is now listed on the wrong side of the balance sheet owing a total of £705.12.0, three of the constituent sums, probably individual engines for his Cornish mines, being £184.16.0 and two more debited at £75.12.0. Vivian also owed £50.8.0, listed under *Mr. Bill's Account of Good Premiums*. Trevithick himself is now a mere creditor with two entries on Mr. Bill's list, for £60 and £184.16.0 but additionally liable for £63 on a third rough list.

Many of the names on the list require additional research to identify but several are recognisable. Surprisingly, Robert Bill appears against a sum of £63, apparently acquiring an engine for his own purposes. There are two entries 'Farraday' or 'Ferriday' which could possibly be Michael Faraday. Entry 26, John Burlingham was a Worcester glove maker for whom the Dale Company built an 18 inch machine and upon which Trevithick had carried out extensive work applying the engine to driving leather machinery and its waste heat for process steam. Burlingham was an objector. There were a number of Cornish names including Penberthy Croft mine and Sir Charles Hawkins who had two engines, one built by Hazledine. There is also an entry for the Archway Company, for £150.

The system of devolving the onus for paying the premium directly upon the final user of the engine clearly has parallels with Boulton and Watt's practice. There were however, important differences; Boulton and Watt were building their own engines whereas Trevithick's engines were being built indiscriminately by several builders. It was also the case that Boulton and Watt had a national network of agents who provided both intelligence and debt collecting facilities. Furthermore Trevithick and his partners lacked the resources and the prestige that Boulton and Watt could mobilise in intimidating defaulters.

By a nice turn of irony Trevithick now found himself confronted by patent pirates whose most effective argument was to question the validity of the patent, a position he had occupied for the last decade and half with respect to Boulton and Watt. At least three individuals, Rabey, Davey and Dixon, had mounted a challenge and it is possible that this was the basis of the legal costs listed above. Appealing once more for Giddy's advice, Trevithick wrote:

I have received a letter from London saying that an engineer called Dixon has two (engines and he maintains that) Mr. Watt's specification is enough to indemnify him from my threats. ...counsels Marratt and Gibbs principally treated on the construction of the engine Erskine was principally on the principle ... they all say the words in Mr Watt's specification will have no weight...

From this it would seem that the attack was twofold. There was the matter of high-pressure steam which was probably Erskine's concern. Here the Court would probably have judged that the patent did not make any claim to this as the master issue. Marratt and Gibbs had the stronger case which devolved upon the specific form of steam engine described. Unless this type was closely adhered to it could

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IMLEC 2025

Fareham and District Society of Model Engineers

Howard Atkins,
chairman
of Fareham and District
Society of Model
Engineers (FDSME)
invites entries for this
year's IMLEC.



The Fareham IMLEC website



The Fareham club website

The 55th International Model Locomotive Efficiency Competition is to be held at Fareham and District Society of Model Engineers on Friday 20th, Saturday 21st and Sunday 22nd June 2025.

Fareham and District Society of Model Engineers (FDSME) was formed in 1971 by a group of twenty model engineers and has 130 members. The club hosted IMLEC 2006, our first IMLEC event, when Les Pritchard won the competition driving his LandY 0-6-0 Class A Aspinall with an efficiency of 1.641%. We are looking forward to this year's event and are pleased to host IMLEC 2025 - I am sure we will see new and familiar faces.

FDSME Club

Our interests consist of numerous model engineering disciplines including steam, electric and ICE locomotives, marine, 16mm garden railway, miniature road steam and mini 4x4 off-road. FDSME has both a ground level 7¼ inch and a raised 5 inch and 3½ inch track. Members run both live steam and electric locomotives. Throughout the running season, there are a number of member events and visits from other model engineering clubs and societies using the track. At our annual Open Weekend, our members take great pride in running their trains, providing rides to members of the public. The FDSME 7¼ inch ground level track is some 940 feet in length and includes a station

bypass loop and third size level crossing gates. Sidings include a turntable, carriage stable, water tower and inspection pit.

Marine Section We have an active marine section who build and run electric and steam powered model boats, ranging from warships to work boats and paddle steamers to submarines. You will often see some strange models on the pond, such as the floating train and radio control crocodile with working mouth! The pond water depth ranges from 10 to 12 inches, making it impossible to sail yachts with keels. Members of the public can have a go manoeuvring small radio-controlled boats during our open weekends.

Garden Railway FDSME has an extensive 16mm garden railway layout with two mainline tracks and separate two track loops. Our members run both miniature steam and electric locos. At open weekends members of the public can have a go driving trains on our short track.

Miniature Road Steam Our members enjoy steaming, driving and displaying their road steam vehicles at the club site steam fairs and at our annual open weekend held in July. Other societies and colleagues often visit for road steam events held at FDSME.

Mini 4x4 Off-Road In 2022 a number of members got together to create the rock crawling and 4x4 radio control off-road vehicle section. A course layout was designed and built containing off-road

obstacles, rock walls and bridges. At open weekend members of the public can have a go on our course using one of our purpose-built 3D printed 4x4 model trucks.

Our facilities include a large club house, kitchen, wheelchair accessible toilet, library and adjoining workshop.

FDSME track layout

The FDSME raised track layout includes a covered steaming bay for 3½ and 5 inch gauge locomotives. Steaming bay services include 6, 12 and 24-volt DC power supplies for your steam raising blowers, mains power, water and Welsh Anthracite coal specifically for this IMLEC event. Locomotive loading tracks, both 3½ and 5 inch gauge, are easily accessible and a hydraulic lift is available for larger/heavier



The Fareham club track.

locomotives. The hydraulic lift allows for locomotives to be easily removed from the owner's vehicle, onto the hydraulic lift platform and subsequently the locomotives are pushed into the steaming bay in readiness for firing up. A traverser aids locomotive loading into the steaming bay.

The 3½ and 5 raised track is 1565 feet in length, has a maximum gradient of 1 in 77 and a minimum bend radius of 45 feet. For the IMLEC 2025 competitors the Fareham track creates quite a challenge and may catch a few out!

A lap of Fareham raised track

Leaving the IMLEC 2025 competition start point the track descends for a few yards at 1 in 193 before curving to the right and ascending at 1 in 107. Following the ascent the level track curves through the tunnel. After leaving the tunnel the track curves to the right, descends initially at 1 in 270 and then 1 in 129. This is followed by a 1 in 210 descent approaching the normal station which is virtually level. Passing straight through the station the next 300 feet of track descends at 1 in 120, curves left, levels and then straightens whilst climbing at 1 in 77 and then 1 in 105; this is followed by a 1 in 210 ascent. The track levels for a short distance prior to rounding the boating pond. From here the track descends at 1 in 350, then 1 in 125 and with a final descent at 1 in 81 to the competition finish point. A video lap of the track is available at imlec2025.fdsme.org

Our location

FDSME is located close to Titchfield Abbey, Titchfield village and The Solent is a short drive away.

Titchfield Abbey First built in the 13th century, Titchfield Abbey in Hampshire was the home of a community of Premonstratensian canons. The canons lived communally, like monks, but also preached and served as priests in the local community. After the Suppression of

the Monasteries, Henry VIII gave the abbey to Sir Thomas Wriothesley, Earl of Southampton, who transformed the buildings into a grand Tudor mansion called Place House. The most impressive feature of the abbey today is a grand turreted gatehouse, which was built across the nave of the church.

Titchfield is a village and former civil parish in the Fareham district, in southern Hampshire, England, by the River Meon. The village has a history stretching back to the 6th century. During the medieval period, the village operated a small port and market. Near to the village are the ruins of Titchfield Abbey, a place with strong associations with Shakespeare, through his patron, the Earl of Southampton.

The Solent is a major shipping lane for passenger, freight and military vessels. It is also an important recreational area for water sports, particularly yachting, hosting the Cowes Week sailing event annually. It is sheltered by the Isle of Wight and has a complex tidal pattern, which has benefited Southampton's success as a port, providing a 'double high tide' that extends the tidal window during which deep-draught ships can be handled. Spithead, an area off Gilkicker Point near Gosport, is known as the place where the Royal Navy is traditionally reviewed by the monarch of the day. The area is of great ecological and landscape importance, particularly because of the coastal and estuarine habitats along its edge. Much of its coastline is designated as a

Special Area of Conservation. It is bordered by and forms a part of the character of a number of nationally important protected landscapes including the New Forest National Park and the Isle of Wight area of outstanding natural beauty.

Local Community Interactions

Fareham and District Society of Model Engineers supports the local community by holding closed events for charities, schools and other volunteer organisations. FDSME members take pleasure in opening the Society's facilities on certain days throughout the year free of charge to visiting parties of children and adults, many of whom may have special educational needs and disabilities. This gives the children, adults and carers much pleasure, allowing them the chance to enjoy attractions without the pressure that a general public open day would bring. Through these community closed events, each year many hundreds of local children and adults are able to enjoy the facilities on our site. We see these complementary events as an opportunity to 'give-back' to the local organisations that do so much good for all of us in this area of Hampshire.

Submitting your entry

IMLEC 2025 Entry forms are now available on the FDSME IMLEC 2025 website: imlec2025.fdsme.org

Click on the link or scan the QR Code to access your IMLEC 2025 entry form. Further details including the FDSME location, competition rules, your key contacts for this year's event,

local caravan/camping and accommodation information is also given on the FDSME IMLEC 2025 website.

Our Location

Fareham and District Society of Model Engineers
Segensworth Road (East)
FAREHAM
Hampshire
PO15 5DZ
www.fdsme.org
1 mile M27 J9

How to Find Us

Enter our postcode of **PO15 5DZ** into your sat-nav. Our site is off **Segensworth Road**, between Cartwright Drive and Mill Lane near to the historic Titchfield Abbey.

what3words: ///bypassed.
totally.slips

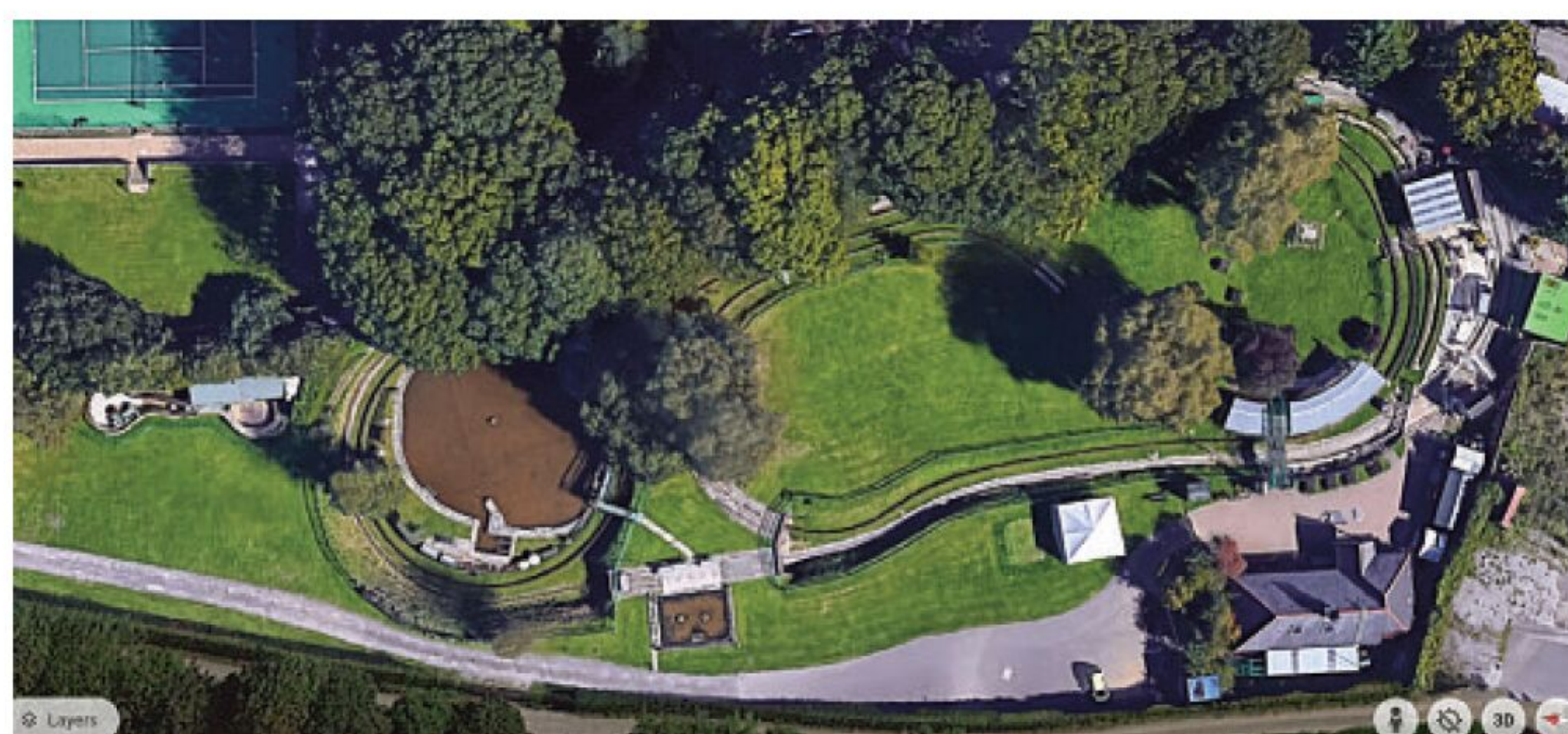
FDSME has an IMLEC 2025 website imlec2025.fdsme.org where up to date information about IMLEC 2025 will be available along with your key contacts: Peter Hollands 07842 403 395 and Phil Boswell 07425 168 959.

FDSME IMLEC 2025 Email: imlec2025@fdsme.org

IMLEC 2025 Visitors entrance fee is £5 per day or £10 for the weekend.

Members of FDSME welcome all IMLEC 2025 entrants as well as family and friend spectators.

ME



The Fareham club site from above.

Announcing LittleLEC 2025 – at the Tiverton and District MES

Adrian Newson invites entries for this year's LittleLEC.



LittleLEC



Tiverton club

LittleLEC is a light-hearted annual locomotive efficiency competition for coal fired model steam locomotives weighing less than 50lb dry and is open to all. New contestants are welcome. All the information about LittleLEC can be found on the LittleLEC website www.littlelec.co.uk/home

The Tiverton and District Model Engineering Society is pleased to announce that they will be holding this year's Annual LittleLEC on September 13th & 14th 2025.

About Us

The club was founded in the 1960s at Blundell's School, Tiverton. It moved to its current location in 1986 near the village of Rackenford which is about 8 miles from Tiverton. The Club is fortunate and owns our 1.25 acre site known as Worthy Moor which on the edge of Exmoor in a very rural and peaceful location - cuckoos can be heard in the spring. Current membership is around 45, so we are not really a big club.

Track

The track at Worthy Moor is circular, elevated dual gauge 3½ and 5 inch with anti-tip rails and is approximately 925 feet in length. Over its length

the track runs in cuttings, embankment and level ground. The maximum gradient is 1:95. There is a station currently being extended and covered. It is also signalled which is not required for LittleLEC. There are five steaming bays which are accessed via a turntable and a spur from the main track using a swing point. Each steaming bay has a removable section for dropping fires for 5 inch gauge locomotives and has a 12 volt supply to power electric blowers. There is a hydraulic platform for loading and unloading locomotives which links to a spur that runs down to the main track via the swing point. The Club is willing to provide a riding trolley.

Facilities

We have a 240 volt mains supply.

There is no running water at the site as such, so water for locomotives and hand washing is provided courtesy of our neighbour's well. Water for locomotives is provided at the steaming bays and station. Drinking water is brought along by members or from our neighbour's well filling a large water container.

We have a club room that can accommodate (seat) about 12 people with power points for

a microwave, kettle etc. There is seating area in the station and the club has around 10 plastic garden chairs.

Our toilet facilities comprise of a urinal, wash basin with hot (on demand) and cold water from the well. For solid toilet matter we have an electric toilet designed for occasional use so we are considering two alternatives for LittleLEC. These are hiring a Portaloos for the weekend or using the public toilets at a diner a mile from the club on the A361.

Parking

We have a hard standing which would accommodate around 10 - 12 cars if carefully parked. We can also park around 12 cars on a grassy area on our site. Above this two or three cars can be parked on a nearby layby or alternatively we can use the public parking in the diner.

Finding Us

We are about a mile from the previously mentioned diner, which is just off the A361 North Devon Link Road. We would recommend all visitors come this way and not through the county lanes from Tiverton. We will be placing 'TDMES' signs on the exit off the A361/diner and on the road approaching our track.

Entry Forms are only available from the LittleLEC co-ordinator: littleLEC@gmes.org.uk

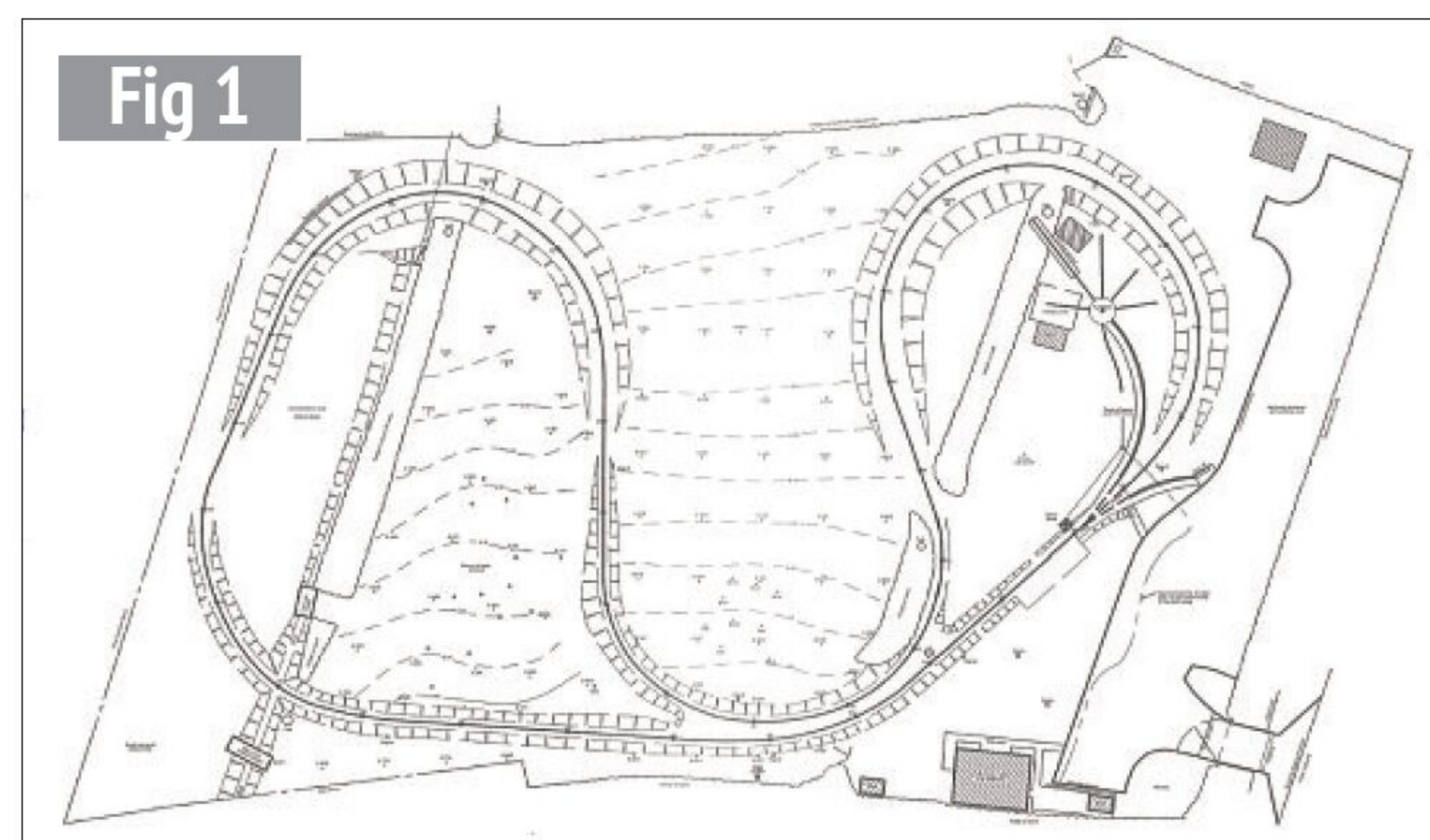
The closing date for entries is 15th August

Tiverton Contacts:

Website: www.tivertonmodelengineering.org.uk

Email: tdmes.secretary@gmail.com

Telephone: TDMES Liaison
Adrian Newson 01363 83274



The Tiverton track.

ME

Narrow Gauge Locomotive Efficiency Competition (NGLEC) 2025



Glyn Davies invites entries for this year's competition



Oswestry club



Northern Association

Oswestry MES and Shrewsbury DMES amalgamated under the name of Oswestry and North Shropshire MES in February 2015 and now invite competitors to our track for the 2025 Narrow Gauge Locomotive Efficiency Competition. The competition will be held on 28th and 29th June at the Oswestry Show Ground SY11 4AB.

This year, some 27 years since the first event was held at the Show Ground, Oswestry and North Shropshire MES invite you to enter your 3½ or 5 inch gauge industrial/narrow gauge locomotive. This event is a challenge to win the NAME trophy for the most efficient drive on the day and also the 3½ inch gauge trophy. A load

made up of slate wagons would be selected by the competitors prior to the run. With the coal available and with a reasonable head of steam the competitor embarks on a half hour run, load in tow and an observer with a keen eye on the speed. We can't have any runaways or slate breakages therefore a max speed of 5 mph needs to be maintained - also mind the rabbits or the odd squirrel in the long grass.

The track at the Show Ground is about a ¼ mile long and runs through landscaped areas with varying gradients following the contour of the land allowing for a safe dismount at any point.

For those who wish to drive at the end of the first day of competition, driving trucks

will need to be 9½ inches maximum from rail height to the underneath of the running board.

Camping will be available on site and a small fee has been arranged with the Showground administrators.

The Showground is near to the town of Oswestry where many hostels and restaurants may be found. The village of Whittington with its castle and The White Lion pub (where we meet every second Wednesday of each month) is also nearby.

Contact glyn.davies@oswestry-mes.co.uk for any enquires.

Entry forms may be downloaded from the Oswestry and North Shropshire Model Engineering Society web site (oswestry-mes.co.uk) or the Northern Association of Model Engineers web page (www.name-1.org) under Events.

ME

Continued from Page 153

be argued that there was no prerogative. This extended to the road coach and rolling mill applications which could not be defended if the type of engine specified in the patent was not used.

There was no examination of

patents application for novelty until 1883; before that time only the formalities were checked. As a consequence it rested with the individuals concerned to challenge or defend their position, a process that usually cost on average between £600

and £1000, famously more if the case went forward to the Court of Chancery. Samuel Homfray doubtless gave very careful consideration to this matter.

●To be continued

NEXT TIME

Locomotives – the next steps.

REFERENCES

Ref 368 *Life...* Vol I. p.229

Ref 369 *A Treatise on the Steam Engine...* John Farey. Vol II. p. 12.

Ref 370 *Statement of Account between Messrs. Trevithick & Co. & Saml Homfray Esq. February 1807.* Note at foot of sheet 4 reads: *This Accot passed and allowed by Mr. Andrew Vivian at the time he sold his share to Mr. Bill. Penyardren. Mar. 4th 1807.* Science Museum Railway Reference Collection. R. 341. Again I am grateful to John Liffen for sight of this document.

Ref 371 *Statement of Account...* op. cit. P. 4, p.I.

Ref 372 *Statement of Account...* op. cit. 4, p. II

Ref 373 *Life...* Vol I. p.234. Dickinson and Titley, op. cit. page 113, believed that Trevithick had sold his share to Messrs. Haynes and Douglas, cotton merchants of Tottenham Court Road but the first Haynes and Douglas letter in the *Life* concerns the sale to them of Trevithick's two-fifths share in a sugar-milling machine then on the premises of George Bowdey in Blackfriars Road (*Life...* p.233). Subsequent letters from Homfray to Haynes and Douglas can be assumed to refer to a premium due on an engine which Robert Bill had been trying to collect from them. This is confirmed by reference to a summary of premiums (discussed below) where *No. 20. Haynes & Co.*, on the main list and *Haynes & Co.*, (D crossed out) on the rough list were debited under premiums for £94.10.0.

Ref 374 Science Museum Railway Reference Collection. R. 341

Ref 375 Science Museum Railway Reference Collection. R. 341

LOWMEX 2024

Julie Williams

offers an account of East Anglia's biggest and fastest growing model engineering exhibition.



Lawrie's Miniature Marvels



LOWMEX

The hour had changed, the nights were pulling in, the weather was gloomy but dry and the schools were on half term; time for the LOWMEX weekend. Organised by a sub-committee of the Halesworth and District Model Engineering Society (HDMES) the ninth Lowestoft model exhibition, the largest in the East of England, had become even bigger and better than before as an all-encompassing model exhibition with (very) few trade stands, rather than a trade exhibition with a few models – and no more than half the price of other model exhibitions.

There were the usual trains, cranes, traction and stationary engines, boats, planes, steam and R.C. lorries. There was a nod back to the Steam Punk days and then forwards to futuristic robotic dogs, daleks and droids – as well as 3D printing. The full Monty, really.

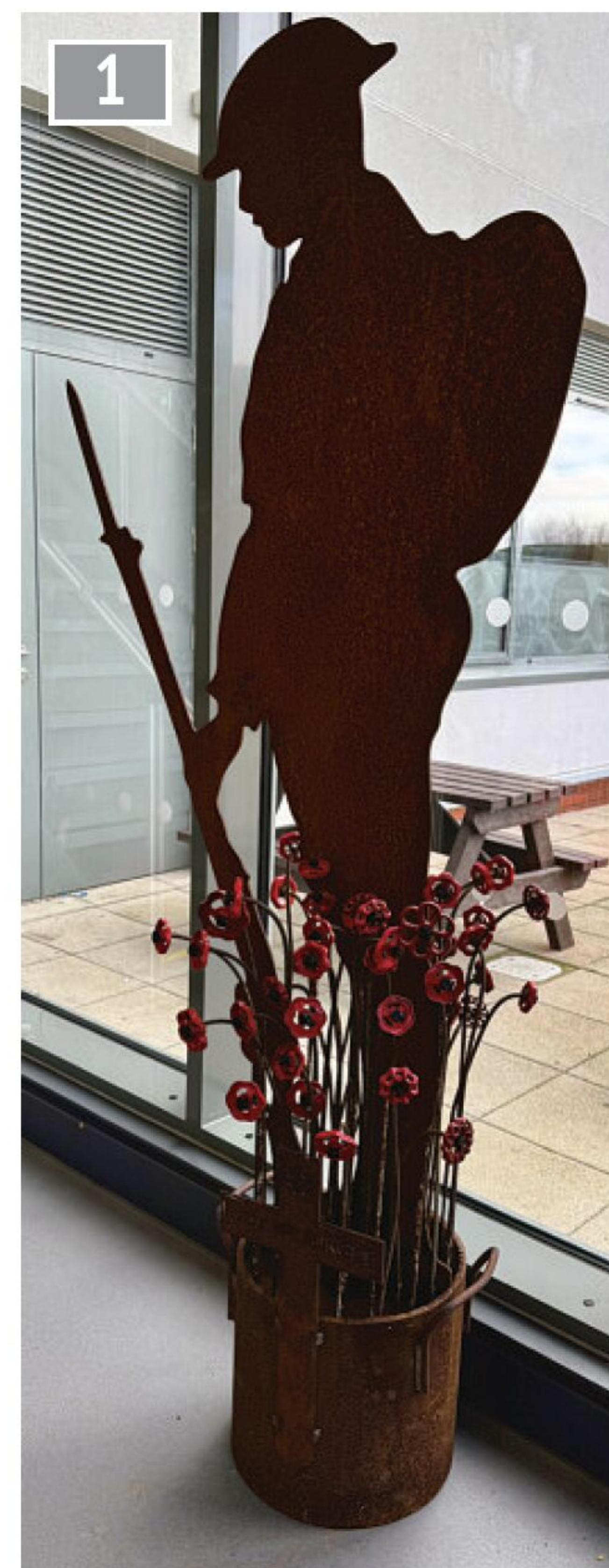
As you entered the East Coast Energy Building there was Tommy (**photo 1**), newly created by Gary Edwards as a Remembrance tribute. Gary makes large (and I do mean large) models from scrap. Tommy is made of rebar from old fence posts, plumbers valve handles, old nuts, an offcut from a large pipe (the base) and Tommy himself was laser cut from 5mm scrap plate.

A little further on into the entrance was a model as

different as you can get from Tommy, an engine which had never been exhibited before – Clive Randlesome's 3 inch Fowler R3 showman's engine *Princess* (**photo 2**). After a 6 year build, completed in 2001, it was sold on to another owner, who then took 18 months to re-paint and re-line it. He then sold it to Clive in order to fund another project. Clive has re-wired it so it can run from a 12 volt mains supply, made and fitted new amp and volt register detail plates, a crane tower and a drawbar pin, fitted to the front drawbar.

Inside the main hall HDMES had their large, varied, impressive display with some models running on air as well some on steam. **Photograph 3** shows one section of their display – so let's look at a few of their models, as well as some from other clubs and societies who were invited to exhibit.

Colin Walton displayed his newly restored 0-6-0 Charles Kennion designed *Butch* (**photo 4**). The engine had been a part built HDMES club loco, which had sadly not survived previous attempts to re-build it. When club member Colin took on the project earlier this year, only a proportion of the total loco parts were in two small cardboard boxes and the only advice given to him was that the boiler was

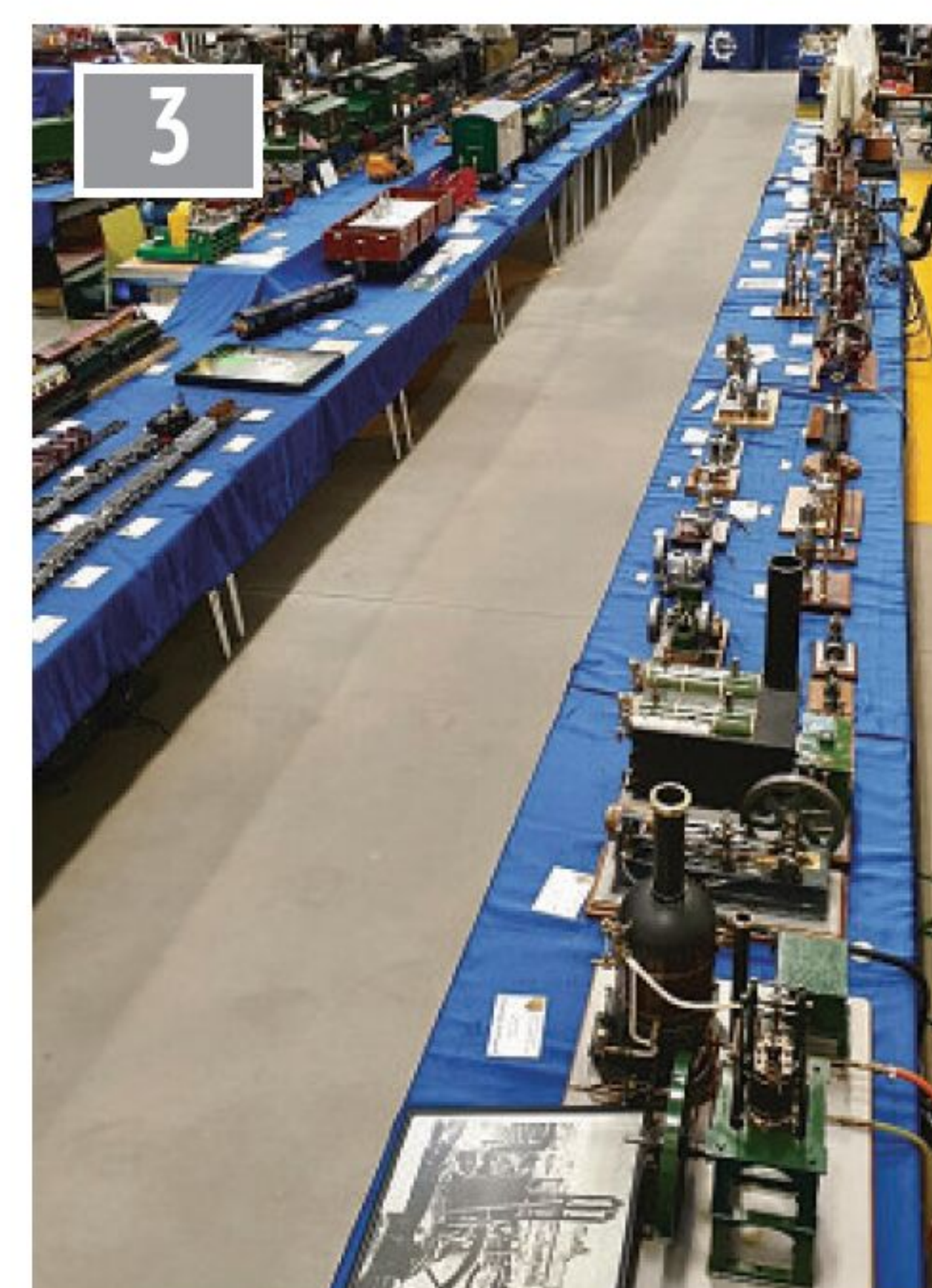


Tommy.

sound – he worked wonders. Colin also displayed some of his many hand-made clocks and you can see two of his clocks in **photo 5**. The rolling ball Congreve clock on the right, built by Colin to John



3 inch Fowler showman's engine.



HDMES display (photo by Kevin Rackham).



Butch



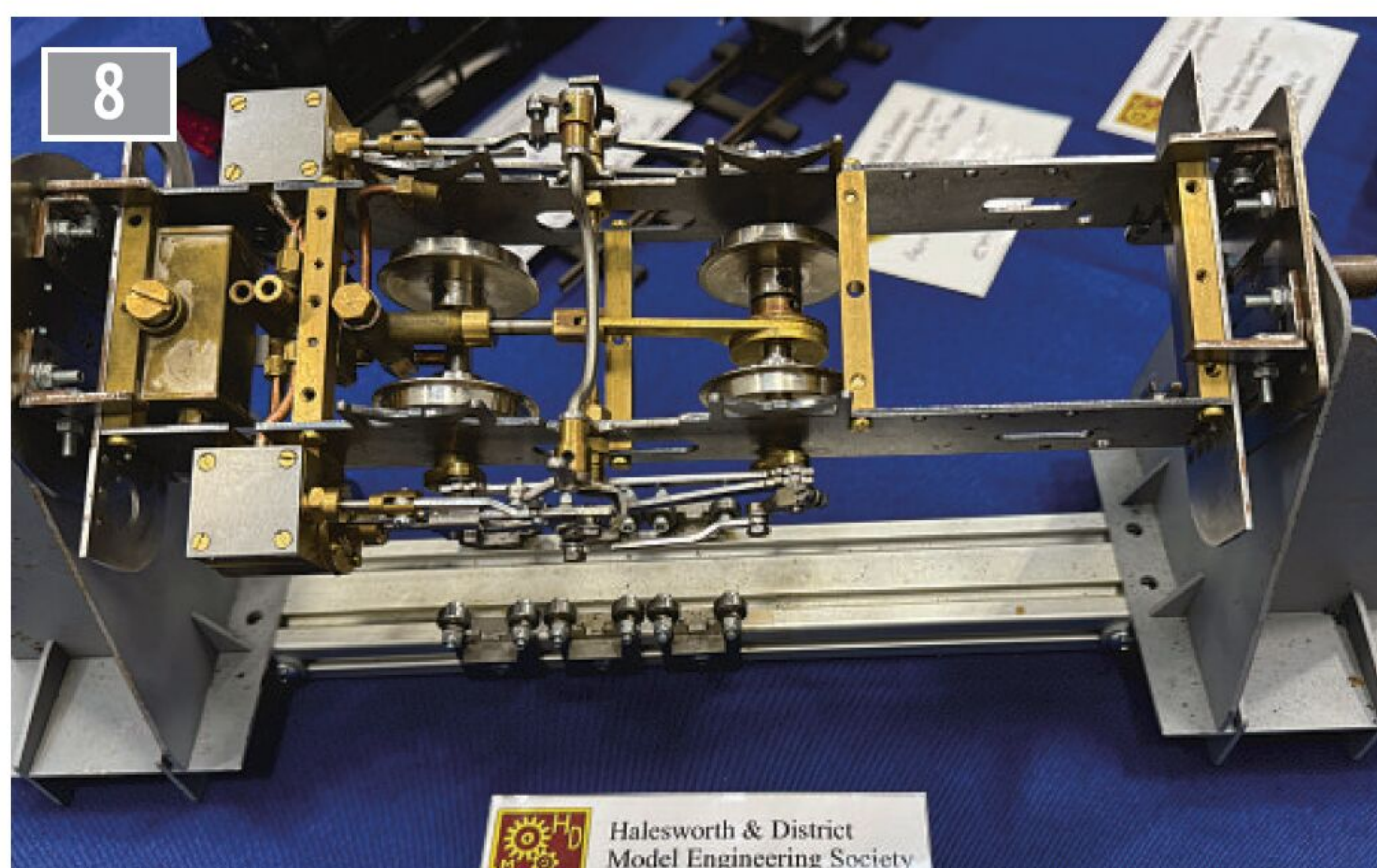
Clocks and B1 locomotive.



7½ inch gauge Cowan's crane.



South African shunter.



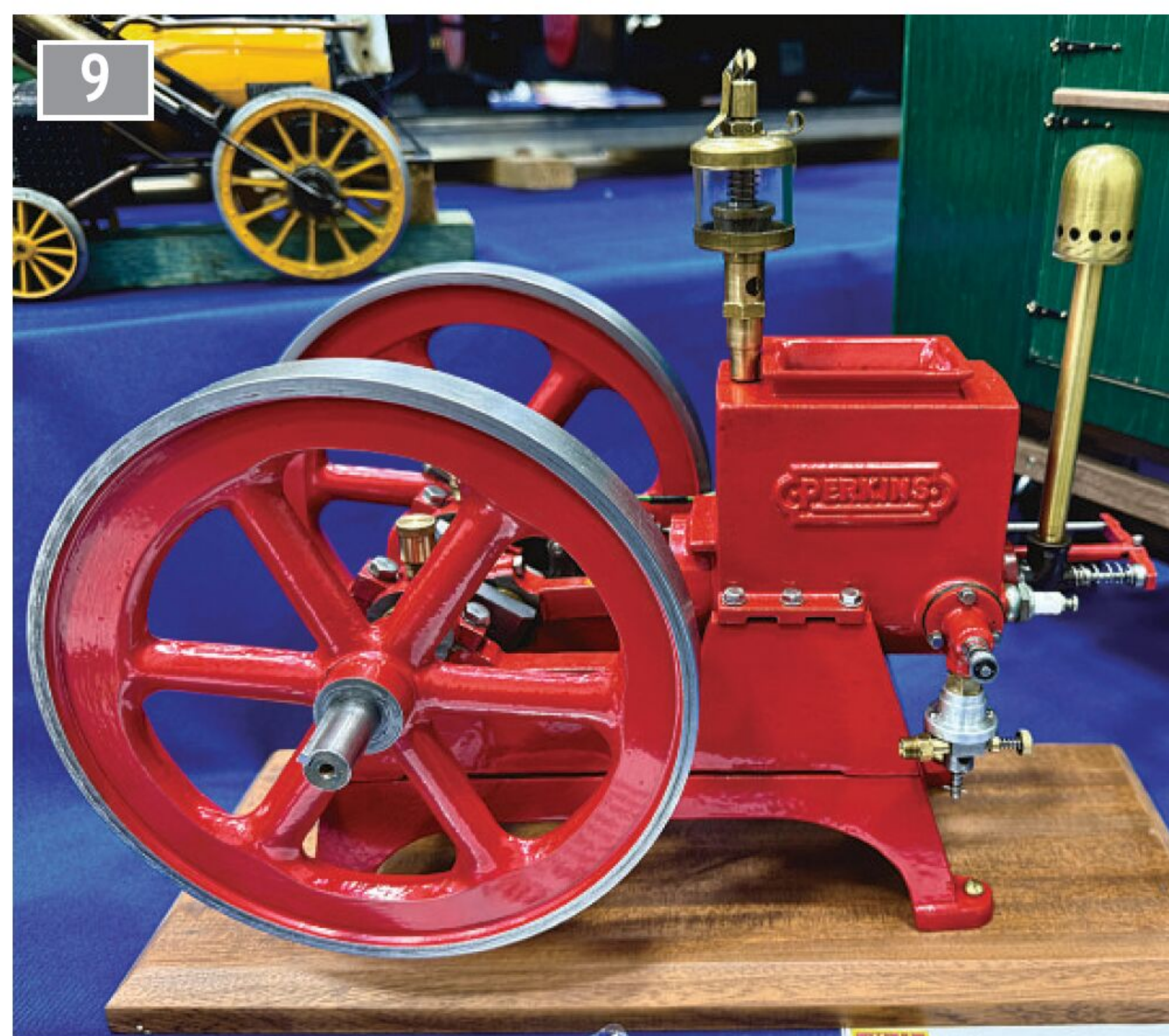
16mm scale locomotive.

Wilding's design, attracted a lot of interest. You can also see Colin's 5 inch gauge B1 Class 4-6-0 loco in the background.

There was large – dominating one corner of the room was Phoenix Model Engineer, Charlie Lovett's enormous 7½ inch gauge model of a Cowans 75 ton crane (**photo 6**). Still under construction from last year, the jib alone is 8ft long and the whole construction is extremely

heavy but it is now working. Charlie demonstrated it over the weekend using a cordless drill to demonstrate. Glyn Ford displayed the progress on his enormous 7½ inch 0-8-0 'S1' South African shunter (**photo 7**). Many regular visitors to LOWMEX have closely followed Glyn's progress over subsequent exhibitions.

There was small – Chris Nobbs displayed his new project of a 16mm scale,



Hit and miss engine.

coal fired loco which is under construction (**photo 8**) and Mr Harding displayed his internal combustion engine - **photo 9** shows his Perkins 'hit and miss' engine, a single cylinder open crank engine, fuelled by gas with ignition provided

by a conventional points and condenser arrangement. It has a hit and miss governor arrangement, allowing the engine to rotate without compression once it reaches the required speed, and was made from a casting kit.



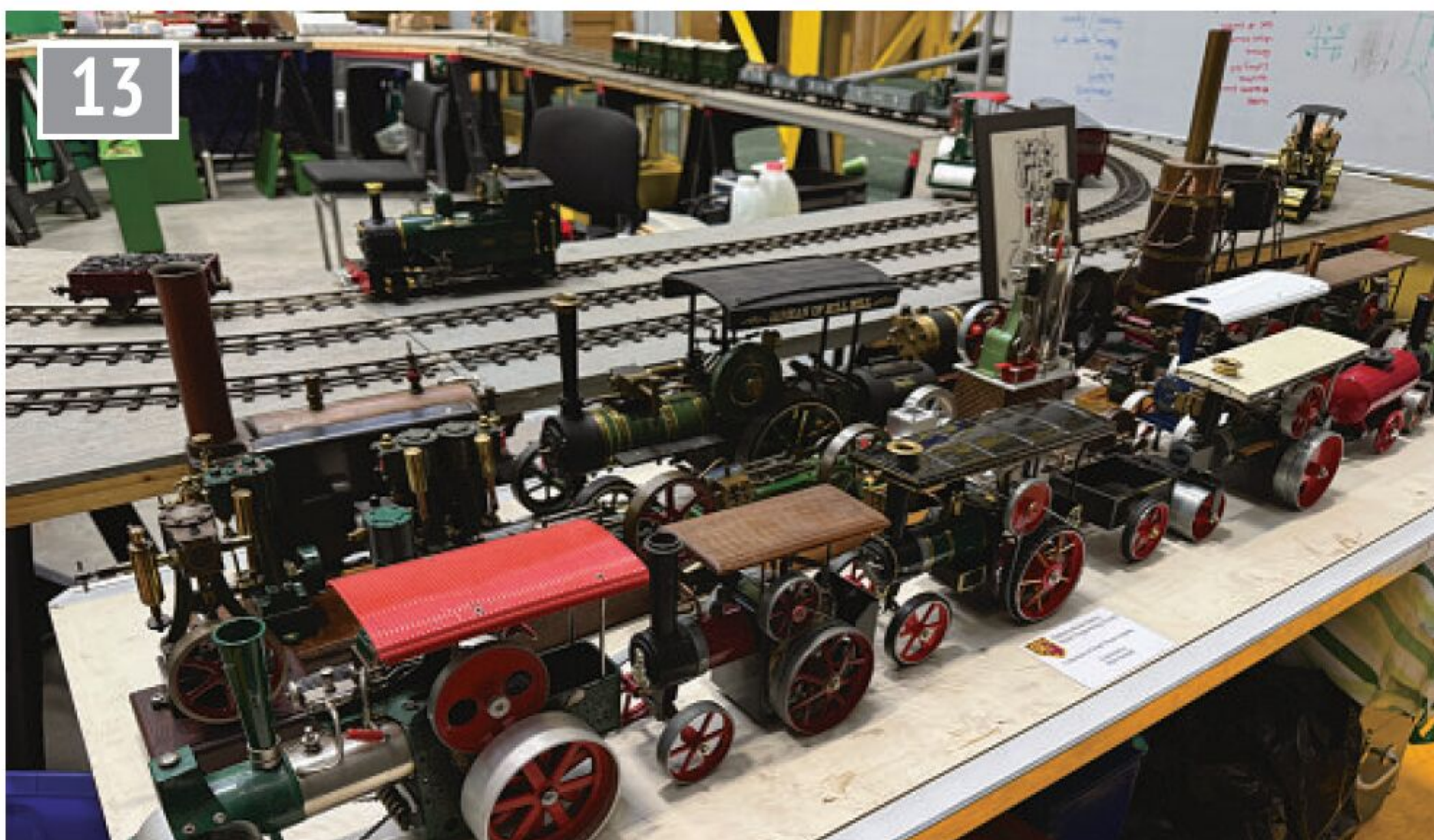
Carbide lamp.



Foden steam wagon.



Glen Garry.



Garden railway layout.



Perspious.



Norwich Droids.



Paper galleon.



3D printing.

Then there was the working miniature carbide lamp (**photo 10**), which was a Midlands award winning component of an award-winning, beautiful, Foden steam wagon. Brian Baker displayed this newly acquired 3 inch steam wagon (**photo 11**), which had won awards for its previous owner and builder, John Dickinson at a past Midlands exhibition. From the Ipswich M.E.S. Terry Woodward displayed his very impressive 4-4-0 5 inch *Glen Garry* (**photo 12**), which won a Second in Class at this year's

Midlands Exhibition. Terry started it at the beginning of lockdown in 2020 and completed it this year. Built mainly from the Don Young drawings, Terry changed to an earlier version of the D34 with wingplates, another earlier braking system.

LOWMEX will never have the footfall of the national exhibitions, even though the variety, quality and number of exhibits compare favourably - purely because of its location. However, encouragingly, almost a quarter of the visitors who did come were under 18

years old and they were very enthusiastic – the future of all types of modelling is in their hands.

There was a constant group of youngsters watching the 16mm scale live steam layouts and the 32mm and 45mm gauge garden railway layouts - **photo 13** shows Mike Kendall's display of small engines by the side of one of these. The youngsters loved the updated automaton *Perspious* and his dog (**photo 14**), which had returned to LOWMEX after a few years absence. However, the biggest group of youngsters was to be found surrounding the Norwich Droids. **Photograph 15** shows some of the static models - the rest were moving around and entertaining people, like Nathan Ward inside his Dalek, high-fiving and interacting with visitors.

All models are delicate - even the 'macho' traction engines can break - but perhaps the most delicate models on display were the impressive paper models made by Adam Walus. His galleon (**photo 16**) showed youngsters that you don't need machinery or engineering skills to make

amazingly beautiful models - and for the youngsters who were computer as well as model minded, Mathew Rackham demonstrated how 3D printers are now playing a major part in model making (**photo 17**).

Each year Lowmex has donated its modest profit to a local charity, which has now been taken under the umbrella of a larger charity. This year, any profit will benefit a well-known local youngster who has very special needs, helping to fund some very highly specialised equipment.

If you want a closer, wider look, then make a cuppa and visit - www.youtube.com/watch?v=9M3JZK-3jPo - and enjoy 15 minutes of a LOWMEX tour on YouTube's Lawrie's Miniature Marvels. Then keep an eye on lowmex.co.uk for the date of next year's exhibition and come and say 'hello' - I'm usually on the tombola stall!

ME

A GWR Pannier Tank in 3½ Inch Gauge

PART 9 – CYLINDERS

Gerald Martyn
decides to
build a locomotive that
he can lift.



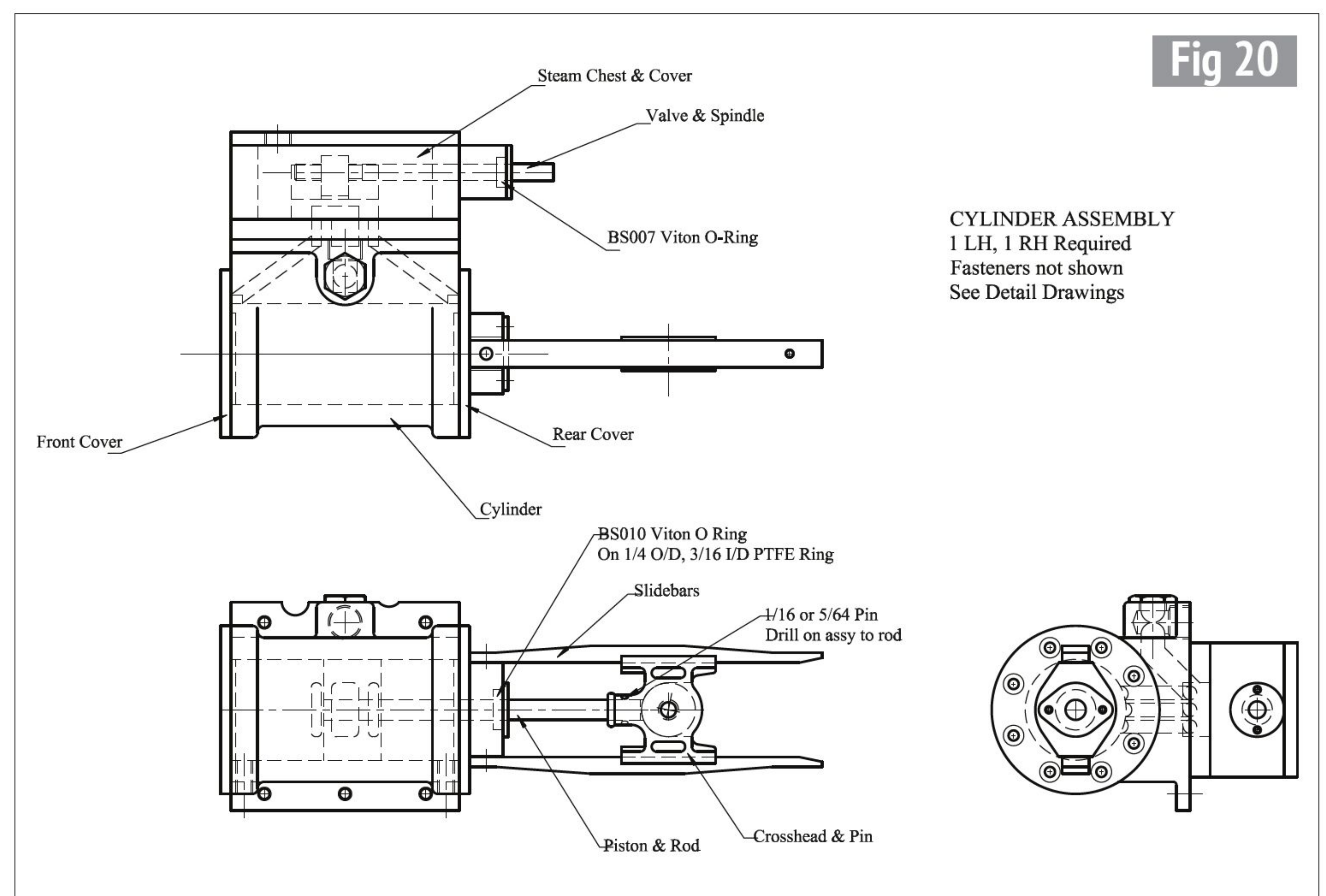
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The cylinders are similar to Rob Roy, with just a few minor changes, and so a set of Rob Roy castings is the next materials purchase. The

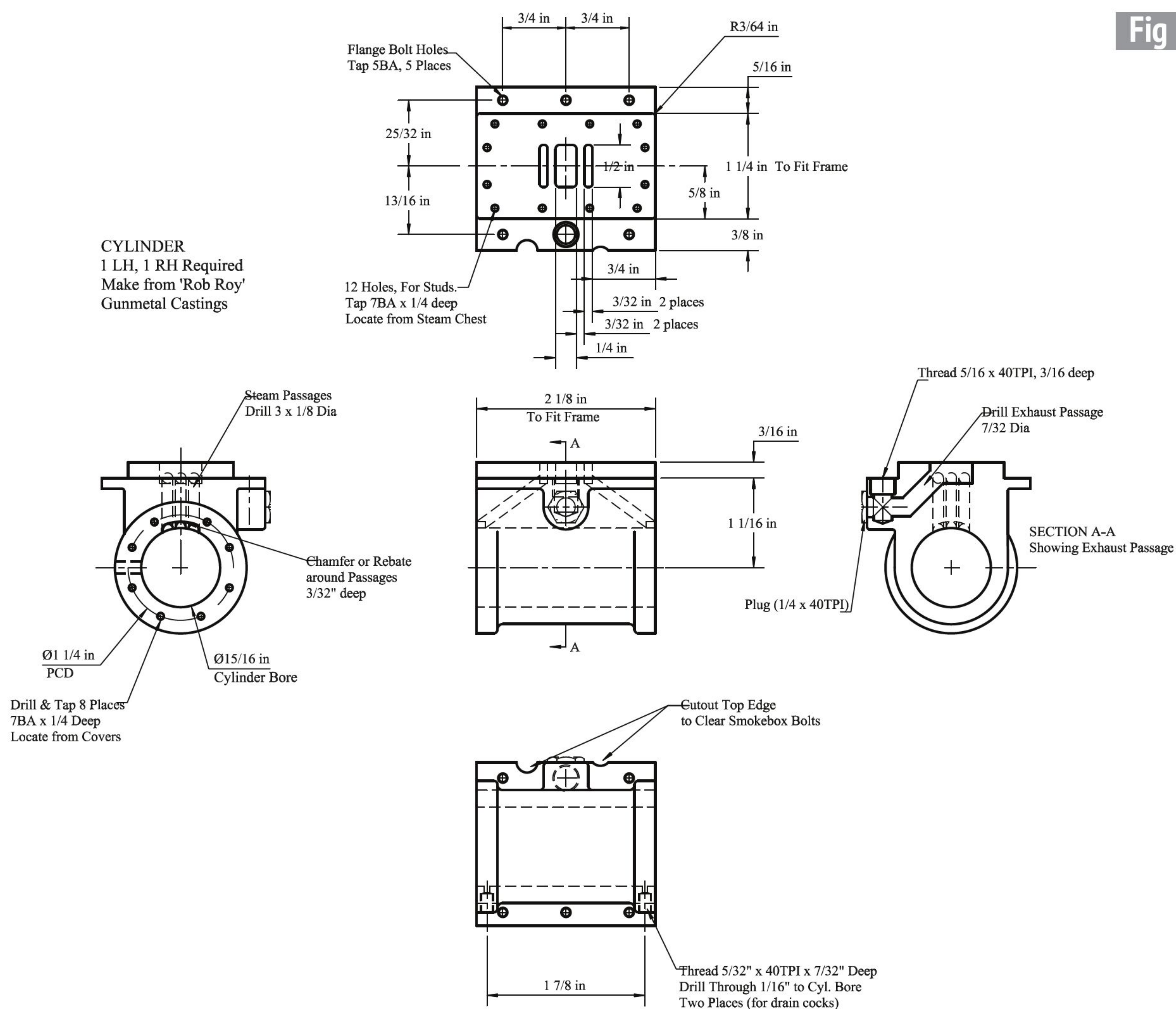
cylinders assembly is shown at **fig 20**. I've shown 'O'-ring seals, as it's a neater job and 'modern' but I have to say they are a high friction solution. To

reduce this and for less wear I've shown capping rings of PTFE where there's space. I specify Viton 'O'-rings as they have the closest match of properties for our requirement. Nitrile rubber is not sufficiently temperature resistant and silicone rubber not oil resistant. Viton rings are easily obtained these days and if our usual suppliers can't provide the sizes then there are plenty of sources on the internet. If this sounds complicated then in reality there's not a lot wrong with soft packing and you could follow the Rob Roy design except keep the one for the valve rod extra short - overall not exceeding the boss height dimension I give. During



Cylinder assembly.

Fig 21



Cylinder block.

the pandemic I brought one of my smaller and older engines out of retirement, last used 20 years previously, as it's easy to run and maintain and the soft packed glands all worked a treat.

The main cylinder casting drawing is shown in **fig 21**. The Rob Roy book suggests starting by machining the bore but I don't think this a good idea. This is my way - firstly, remove the worst of the flashing and check that everything is reasonably square and correct and if not then make it so. Now tap a slightly too large rectangular (so a tight fit on the corners) piece of wood into the bore. Cut a little rectangle of steel sheet and fold the corners over to make spikes and tap it into the wood to give something

to blue and mark out onto. The finished bore needs to be reasonably concentric with the outer diameter, as this is the bit we see, so mark its centre on the blued steel using oddleg ('Jenny') calipers, and centre-pop it. Then use the calipers to find the centre of the port face block just above the bolting flange, scribe a centre line up the casting and mark out the bolting flange face and the port face as measured from the centre pop (**photo 53**). This revealed two potential problems. Firstly, the bolting flange faces have barely enough metal to machine and, secondly, the port face has way too much so a lot of swarf will be created. Finding this sent me back to checking my drawings but in these respects they are exactly Rob Roy. Have



Finding the centre of the bore and marking out the port face.

54



Machining the port face.

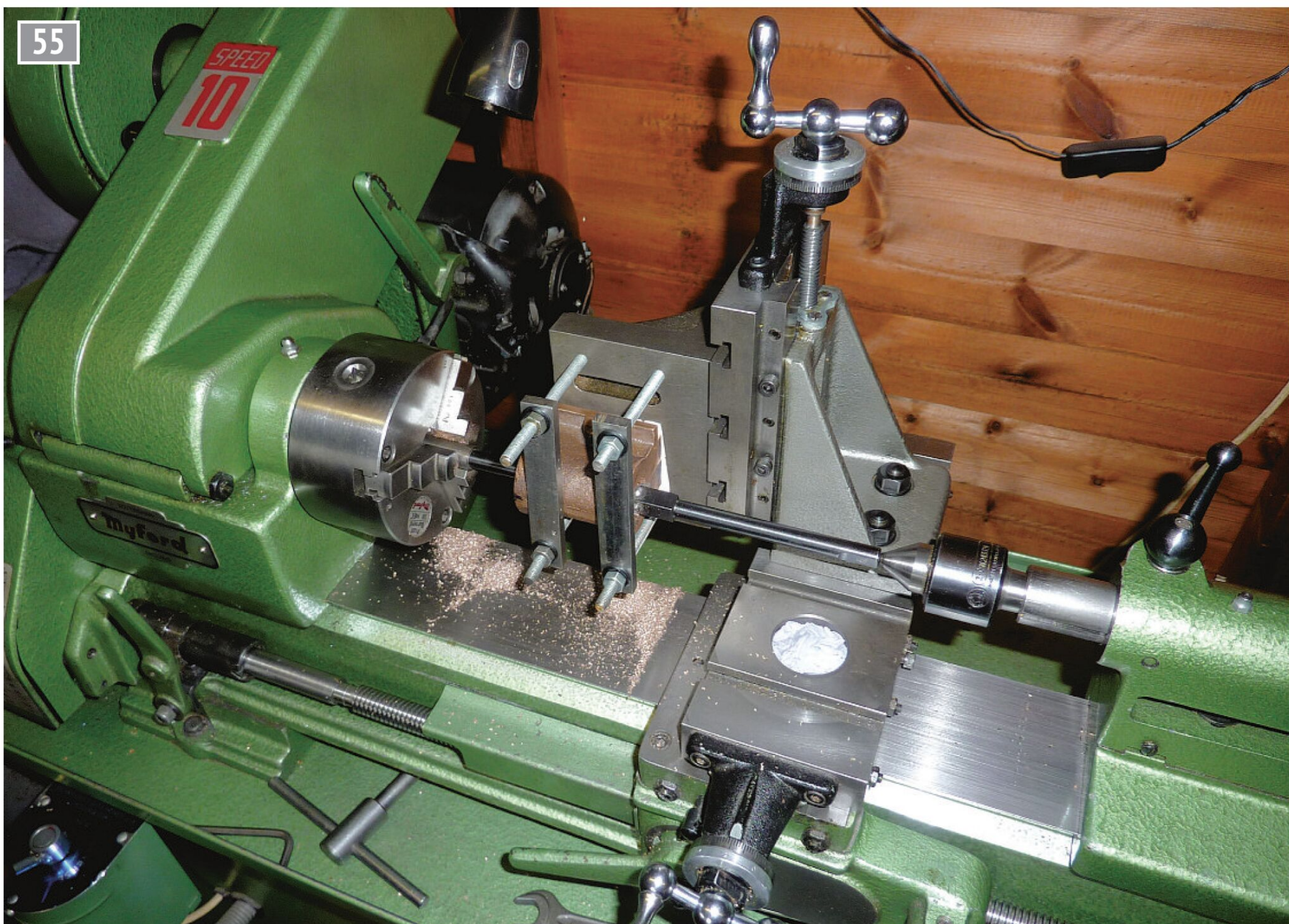
the castings always been this way? Perhaps. They are also used for 'Juliet', for which the flanges would have plenty of (too much) material but the extra at the port face would still be there. Perhaps they're also used on other designs that need the extra metal - can anyone clarify this?

Over to the mill and clamp the casting (plywood packers) with the centre line vertical, lined up to a square by eye, with the two lowest edges of the outer diameter horizontal. Machine the port face and bolting faces and get them all to width and centralised as in the drawing (beware of burrs when measuring) - see **photo 54**. Note that the port face width should be a couple of thou' undersize so it will fit in the frame cutout. This has created a set of flat faces and edges that can now be used to accurately position and align

the finished bore. Remove and replace the little rectangle of steel sheet used for marking and accurately scribe the horizontal and vertical centre lines using the bolting faces as one datum and one edge of the port face as the other. Where they cross is the desired centre of the cylinder bore.

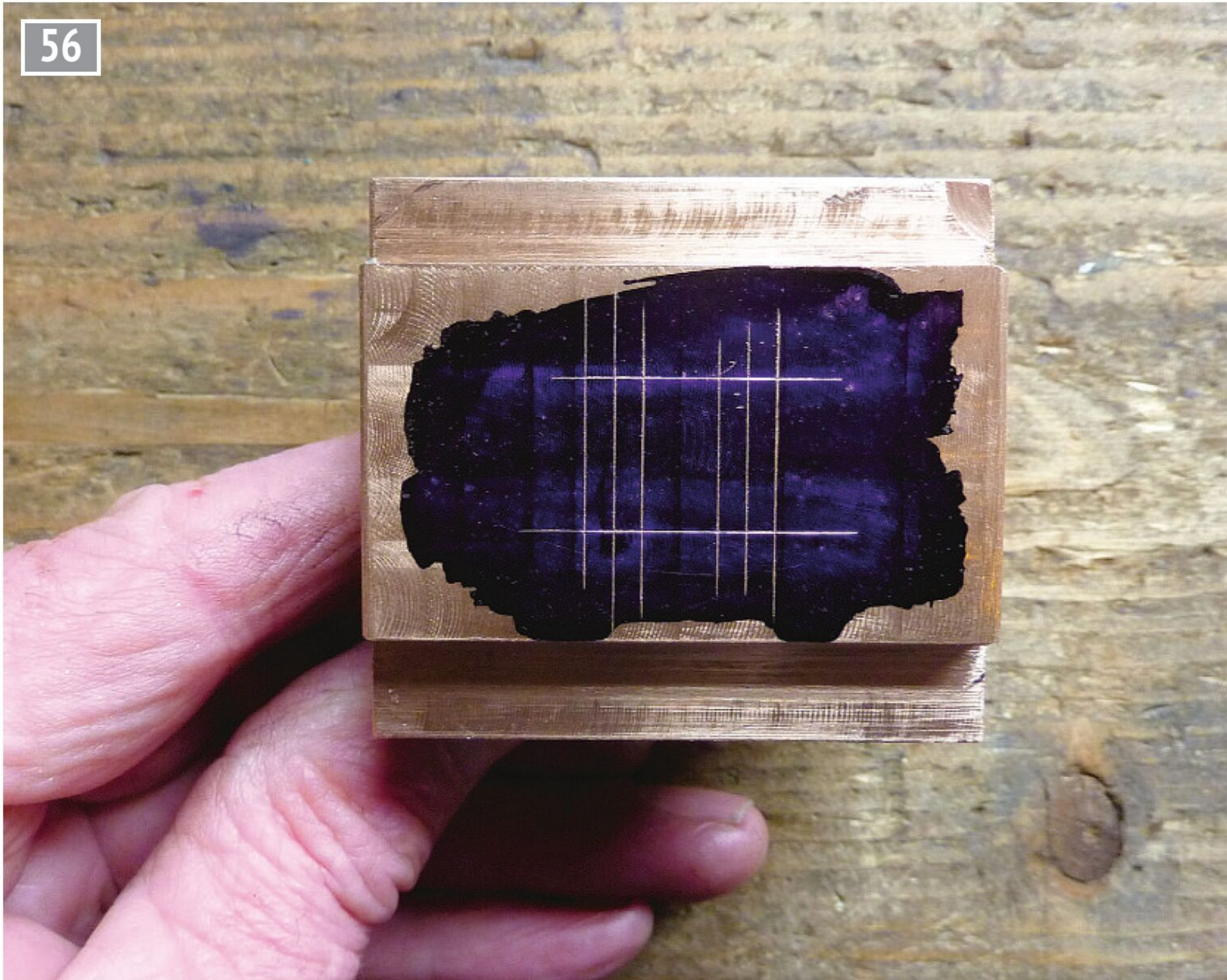
I'm not a fan of twirling large offset lumps of metal on a faceplate and my preferred way of boring cylinders is to mount them on the vertical slide and use a between centres (or between chuck and centre) boring bar. It can be difficult to get the size exactly right with one of these as it has to be taken off to measure the bore and setting the cut is a bit hit and miss. This hardly matters because so long as the diameter can be measured then the piston and covers can be made to suit. Even if using a reamer to finish the hole then

55



Boring the cylinder.

56



Marking out for the ports.

there will be a certain amount of trial and error making the piston so nothing much is lost by being a thou' or three over or under size on the bore, so long as it's known. For these little cylinders I can just get the travel I need on the vertical and cross slides to get the cylinder bore on centre and subsequently to mill the end face using an end mill in the chuck. This gets one end fully square with the bore. For larger cylinders I would clamp them to the cross slide with packers and shims to get the right height. This is better in some ways as there's less flexibility in the system but the cylinder end must be done as a separate job. My setup this time is shown in **photo 55**. Note the slip of paper between the port face and the angle plate. This protects the face and improves grip. Does this setup flex? Yes, a bit, so I use a sharp cutter and take sensible cuts.

Set the cylinder with the bolting flanges aligned with the lathe axis and securely clamp it. Next set the marking where the scribed centre lines cross

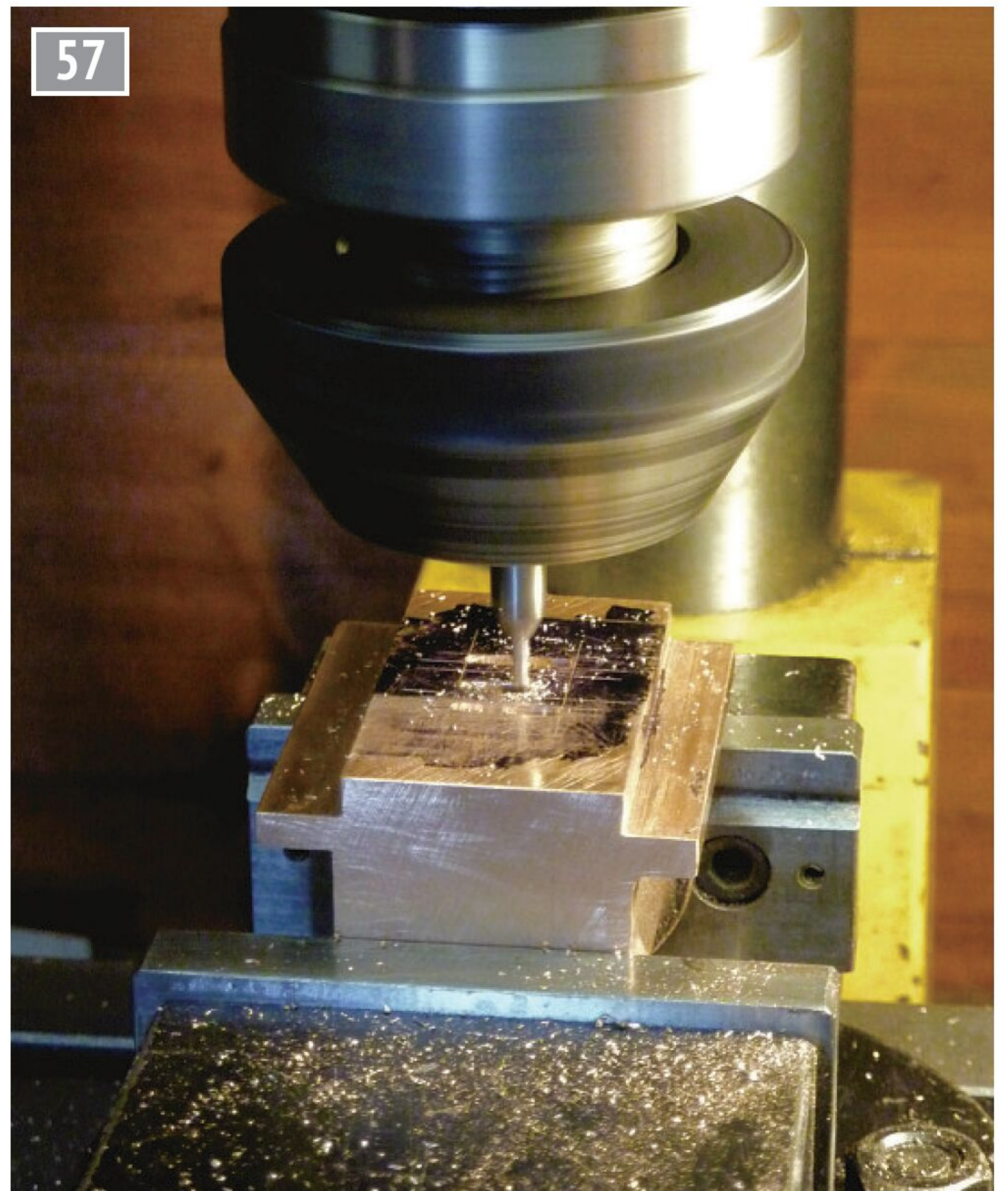
on lathe centre and clamp the vertical and cross slides tight. Knock the wood out and start boring. The hole will now be, so far as it can be made, in the right place and on the right axis. Again, to note, there's excess metal to remove as the core size seems to be $\frac{3}{4}$ inch so leaving a generous $\frac{3}{16}$ inch on diameter to come off (and even more for Juliet), so it's a slow job. To finish then use a round nose tool and no more than a light rub with fine emery will be needed to get a good finish. With a mill in the lathe chuck machine the end face to take off half the excess cylinder length, then the cylinder can be turned and the other end faced to final length. Once again this should be a couple of thou' under so it fits in the frame. Deburr all around and put a small radius on the port face corners and trial fit in the frames. The cutouts to clear the smokebox bolts can now be filed and this 'hands' the cylinders.

Now who enjoys cutting ports and drilling passages? Thought so. It's one of those jobs that's always worrying

but has to be done and it's fair to say mostly turns out right in the end. Here I started by marking out (**photo 56**). Those

scriber lines will not seriously damage the port face and will not leak steam providing the face is fundamentally flat. Some small spaces to retain oil are no bad thing anyway. It would be wrong to expect a slot drill to cut exactly to size and if a $\frac{3}{32}$ inch one is used for the steam ports then they will almost certainly end up oversize, not to mention the difficulty in getting the positioning exactly right first go. So, I always use a smaller size, in this case $\frac{5}{64}$ inch or 2mm will do. Cut to the full depth of the cutter between the marked lines (again, I plunge cut, but remembering to repeatedly clear the chips on the first plunge as the flutes are not full length). Then skim the edges to size using careful measurement to get things right. The final size bit need only be perhaps $\frac{1}{16}$ inch deep - below that can stay as was, as the port face edges are what controls the steam. For the exhaust port then a slightly larger cutter can be used to speed things up a bit (**photo 57**). Having said all that I must add that the exact port

57



Milling out the ports.



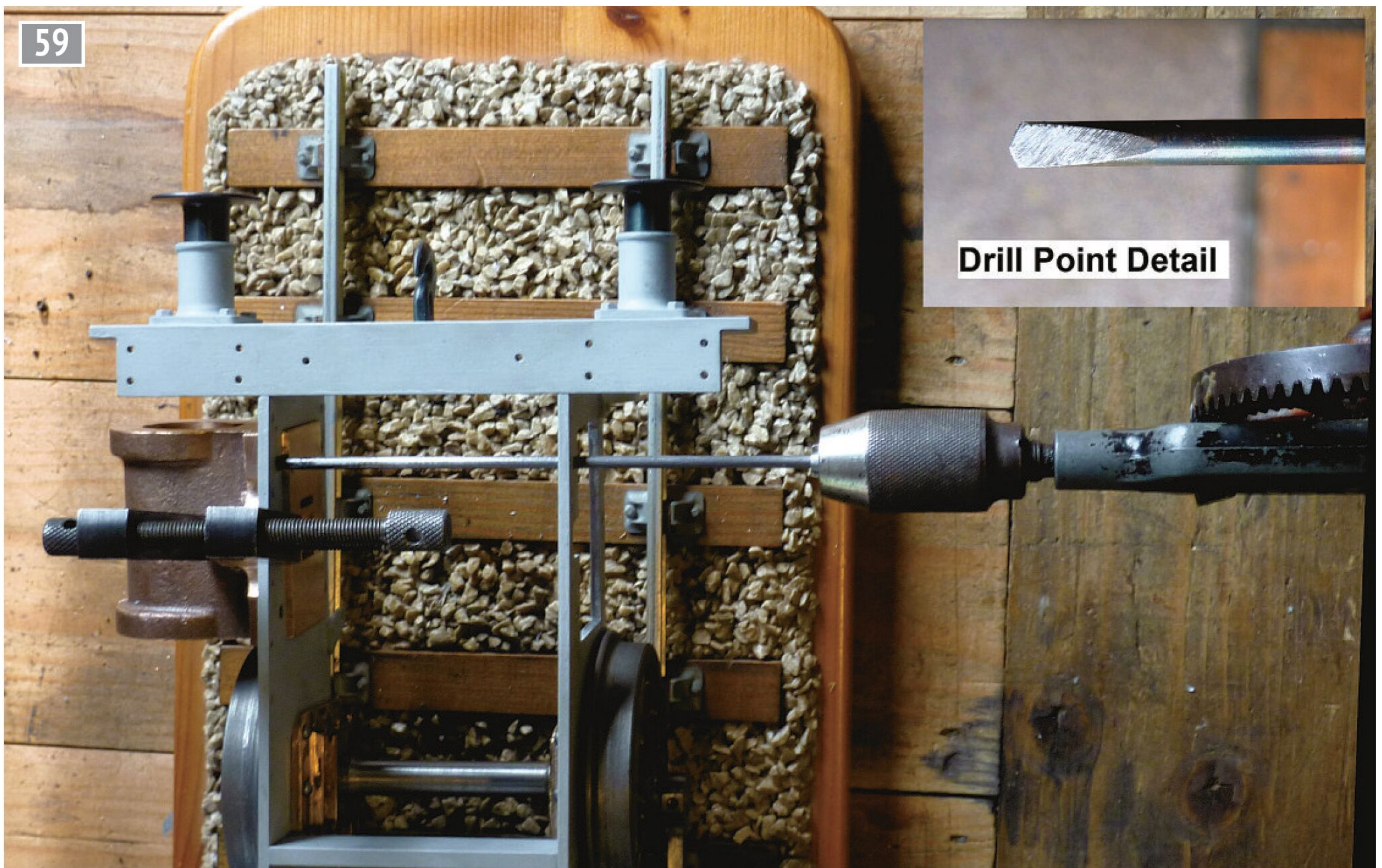
Lining up for drilling the passages.

width and spacing are not so important as getting things symmetric about their centre line as this is one of the things that controls the (hopefully) regular 'chuff' we all want to hear. For the steam passages either start with a chamfer on the edge of the bore, as Martin Evans describes, or I used a slot drill to start the holes in the mill/drill then finished them using a 1/8 inch drill in the drill press. Why move to the drill? A depth stop is an essential, and my drill has one that is much easier to adjust than my mill. Careful alignment is the key (**photo 58**) and there's plenty of scope for parallax error but I've now done six sets of cylinders this way and they all worked fine. The exhaust passage is a breeze after the worries of doing the steam passages.

To hold the cylinders to the frame I've specified 5BA fasteners, which are plenty strong enough. The 4BA specified for Rob Roy are a bit big for the space available, in my view. Either way the bolts

must be screwed into the flange from inside the frames as the casting leaves no room for heads or nuts outside the flanges. If the cylinders are a nice snug fit in the frames then these holes can be put in now. I spot through the frame with a long drill made from 1/8 inch silver steel and using grandad's hand drill for that sensitive touch (**photo 59**). This should not go deep and is only for getting the hole centres in the right place, then the full drill and tap job is done in the usual way. If the cylinders rattle about a bit in the frame it may be best to save this job until the slidebars and crosshead are available to aid alignment. The cylinders can now be put aside (or bolted to the frames to show the members down at the club) and the other bits made, leaving the covers and steam chest attachment holes until these parts are finished and can be used for positioning.

● To be continued.



Spotting through onto the cylinder block.

A BR Standard Class 4 Tender Engine

PART 11

Doug Hewson describes a 5 inch gauge version of the BR Standard 2-6-0 tender engine.



Continued from p.103
M.E.4759 December 27

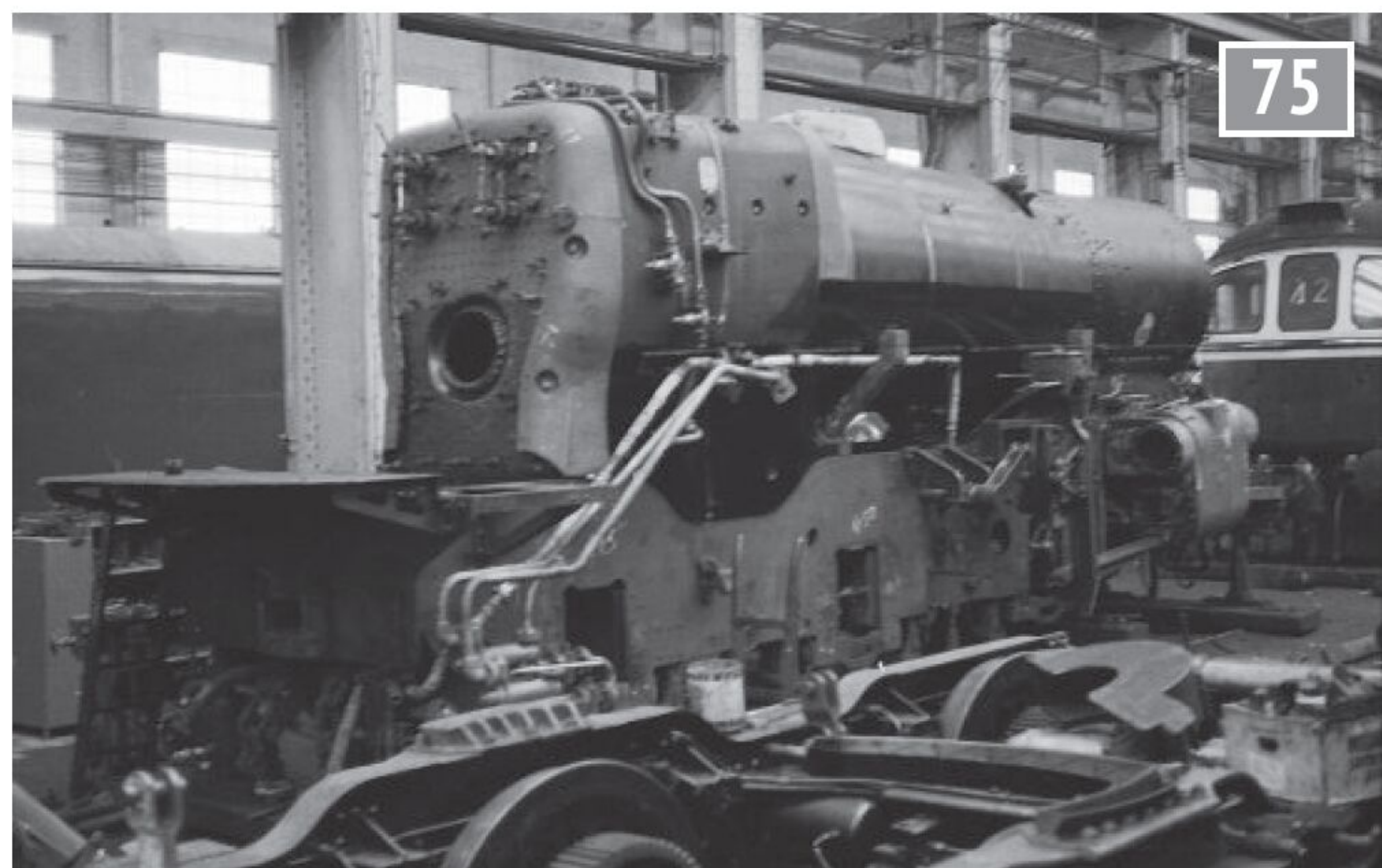
This time we will start with a couple of views of two of the Class 4s in action – well, the second one is hardly in action as it was undergoing overhaul at an unknown location, but most likely at Eastleigh. Anyway, **photo 74** is 76110 with a very short train on a pick up goods working with an acid tank and eight BR 16 ton mineral wagons and brake van. **Photograph 75** is the idle one as described above.

Injector carrier

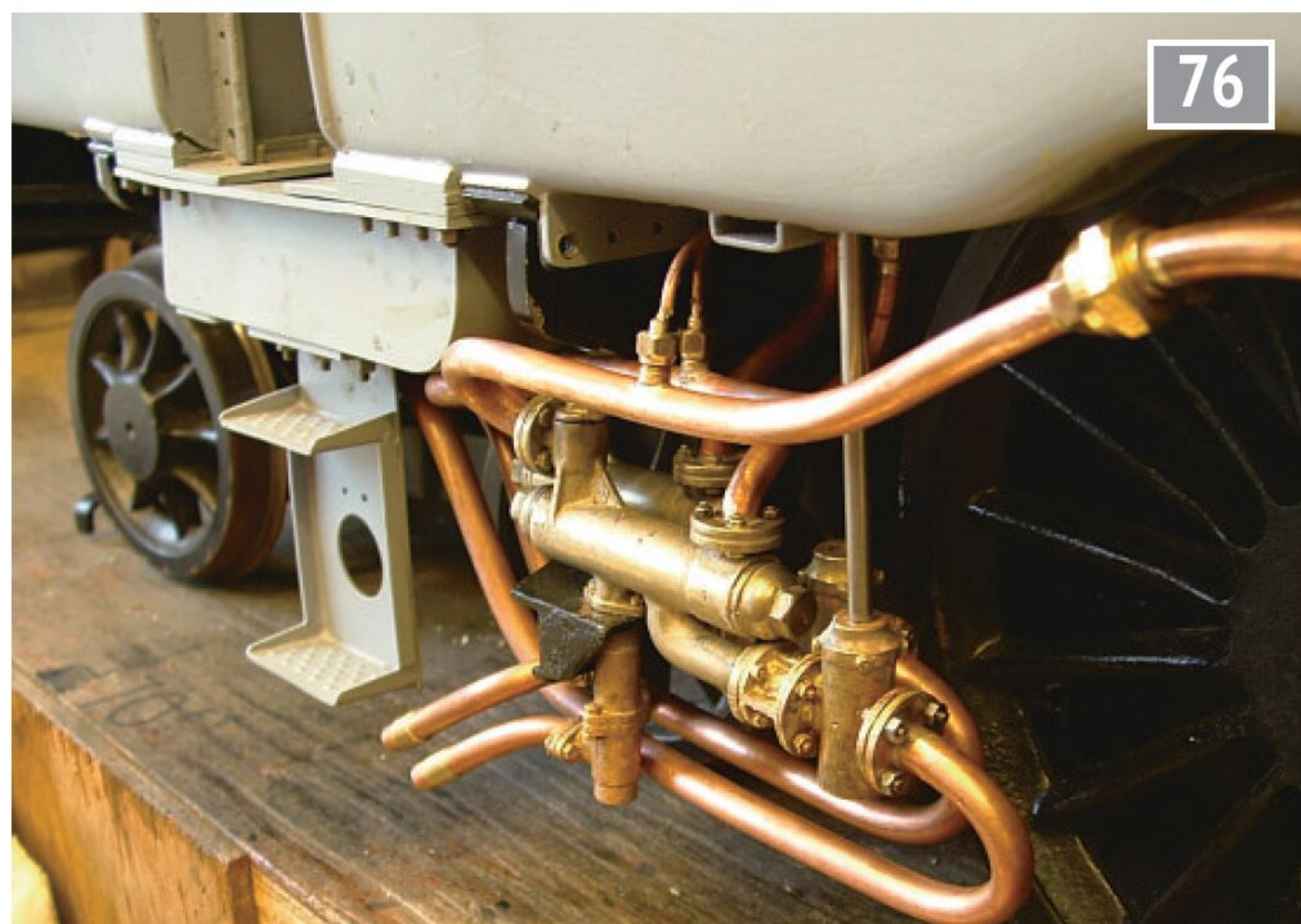
First of all, I am going to describe the injector carrier which has two injectors side by side mounted thereon. However, you will need to buy your injectors before you can make much progress with these as you will need them to mark out the platform. You really need to buy a couple of BR Standard 10X injectors which will be quite adequate for the Class 4. In fact, **photo 76** shows the two injectors which I bought for my own BR 4MT and they were slightly overscale but they fitted nicely. We will come the pipework later in the series as I made easy work of those tight bends in the delivery pipes. The set of parts for the carrier are all laser cut and if you buy the kit you will need to do a bit of forming which I have allowed for in the kit. The bracket is held on with six 10BA bolts (nuts inside). On the outside of the bracket is a smaller bracket with a 90 degree bend in it and that is to carry the tender water pipe connection. There is a similar bracket on the left-hand side of the engine as the water



76110 with a pick-up goods (photo by Rail-online).

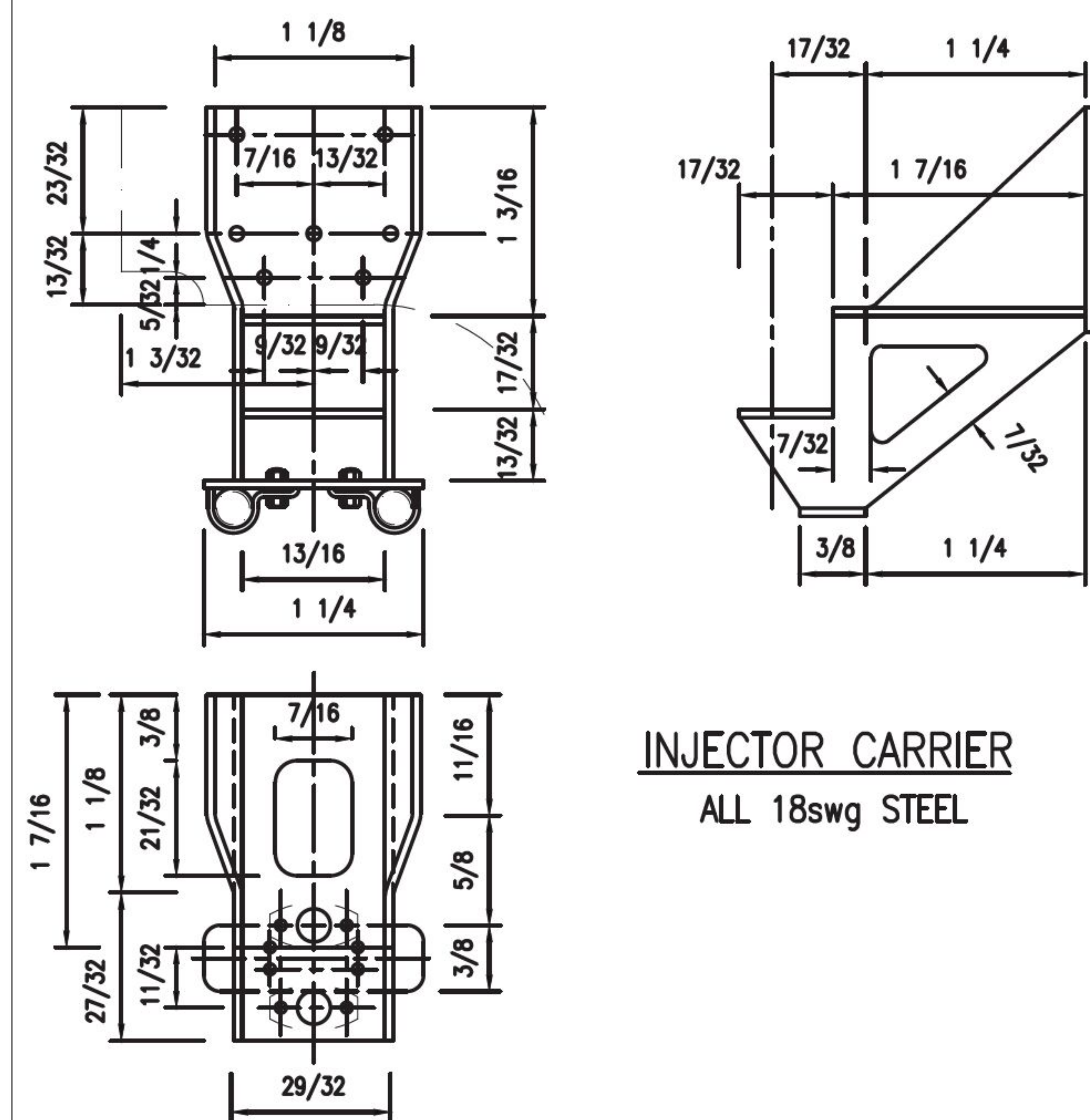


76110 receiving attention in the works (photo by Rail-online).



Injectors on the author's 4MT.

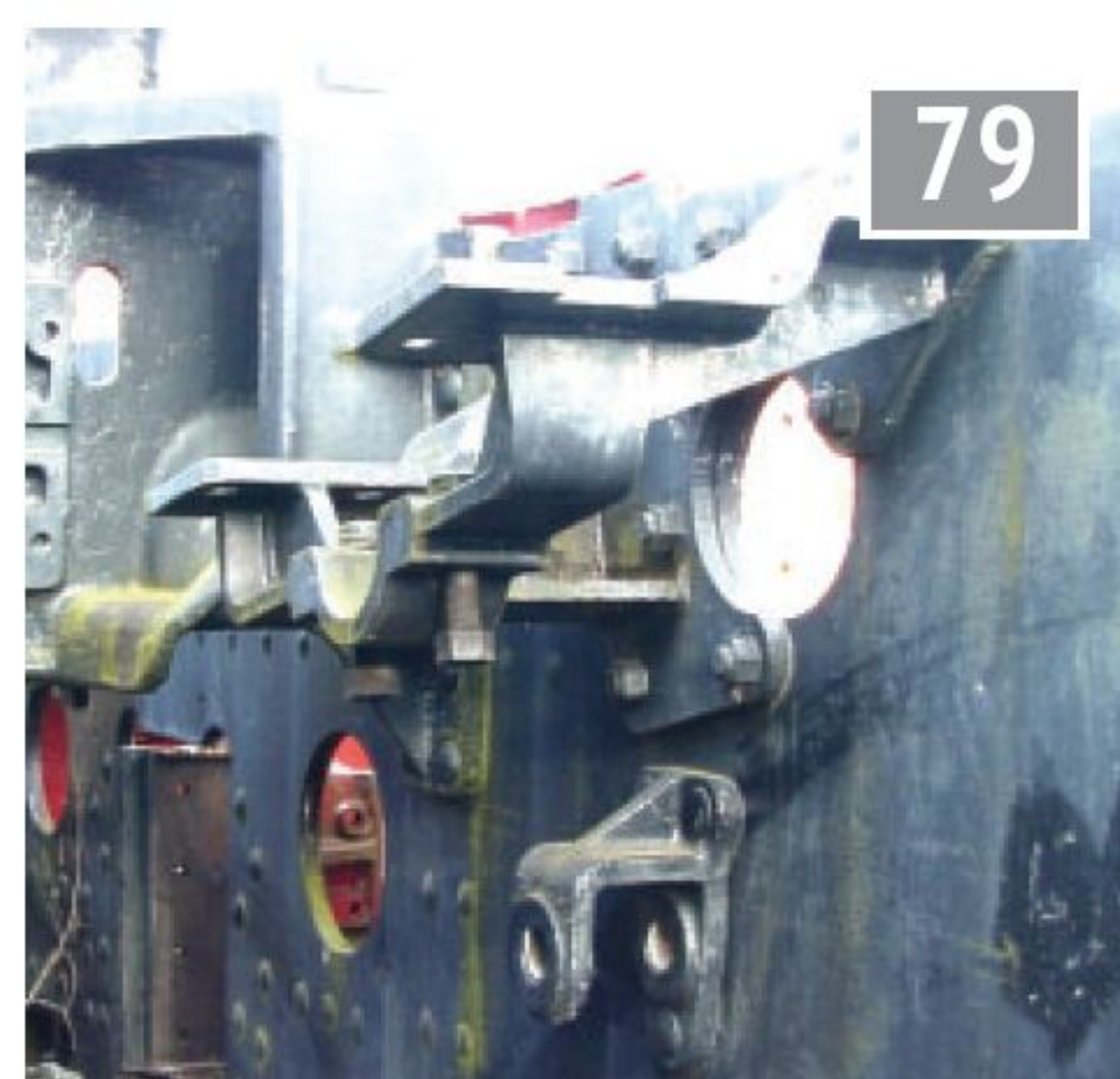
Fig 36



Injector carrier.



Right-hand injector bracket (Toddington Standard 4MT).



Brake hanger bracket (Toddington Standard 4MT).

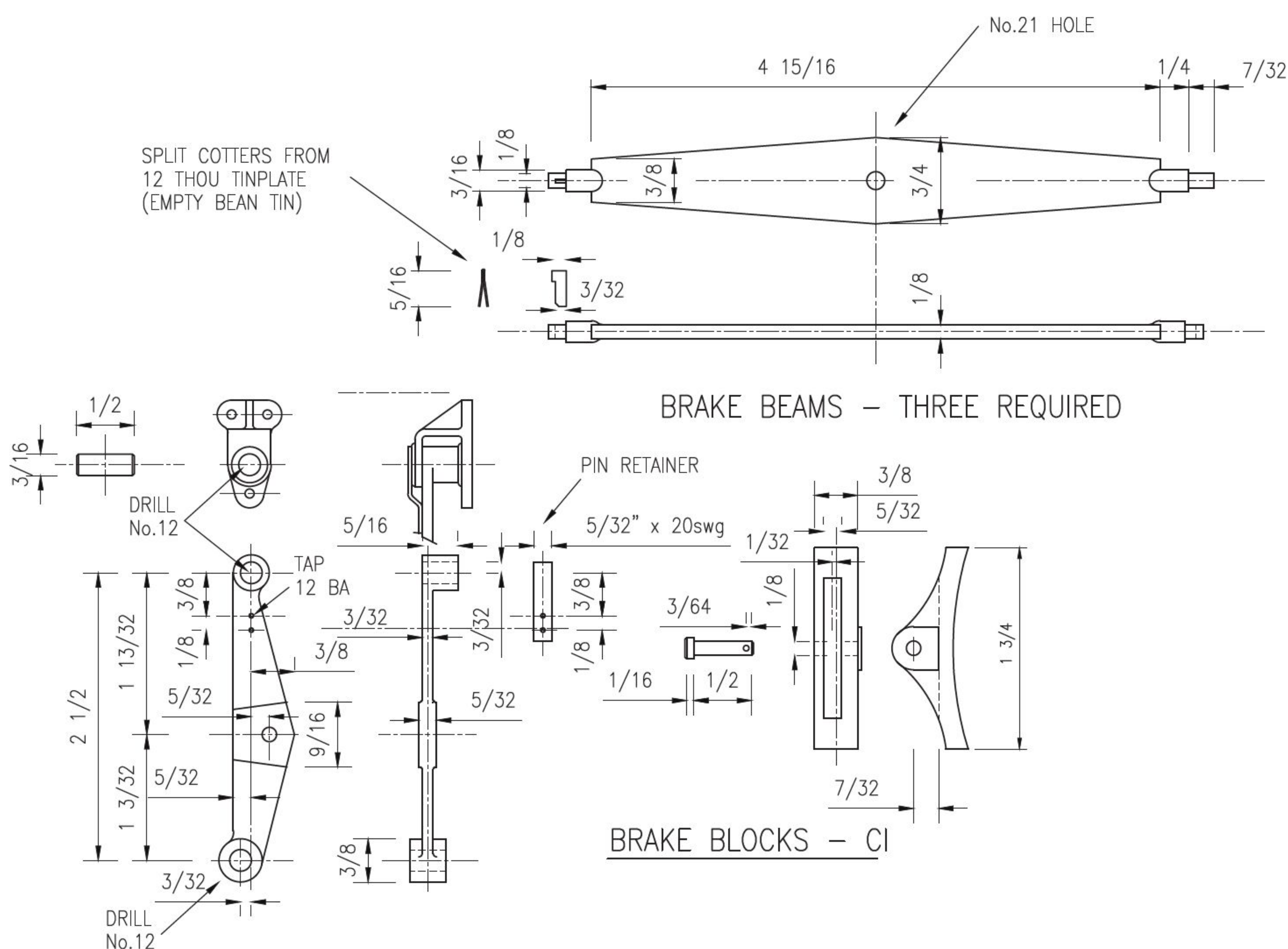
pipes for the tender are one either side. **Photograph 77** shows the right-hand bracket for the injectors and it also has the bracket on the side for the brass casting for the water elbow on the rear of the engine. **Photograph 78** shows the same bracket from a different angle and there is a bracket shown on the underside which is for the overflow pipe from the inner injector.

Another little job that you can be doing is to fit the brake hanger brackets. These are castings - the patterns were made by me many moons ago and they are fixed with three 2mm oval head rivets. **Photograph 79** shows the brake hanger bracket.

Brake gear

We can now have a look at the rest of the brake gear and all the rest of the photos were sent to me by Andrew Meredith, CME of the rebuilding of 76077. Before we go on to the brake gear, we will just have a word about that. I cannot drive an engine that hasn't got a good set of brakes. I was first told to use the brakes by Ron Bray who at that time was my mentor. I knew how to drive an engine as I was taught to drive an engine by a chap called Henry Hartley in 1974 and never looked back. Ron told me that I should use the brakes to prevent digging two heels in the ballast as he had a ground level railway in 1952. I have therefore always used the steam brakes on any engine. I would certainly miss them on my Y4 had I not got

Fig 37



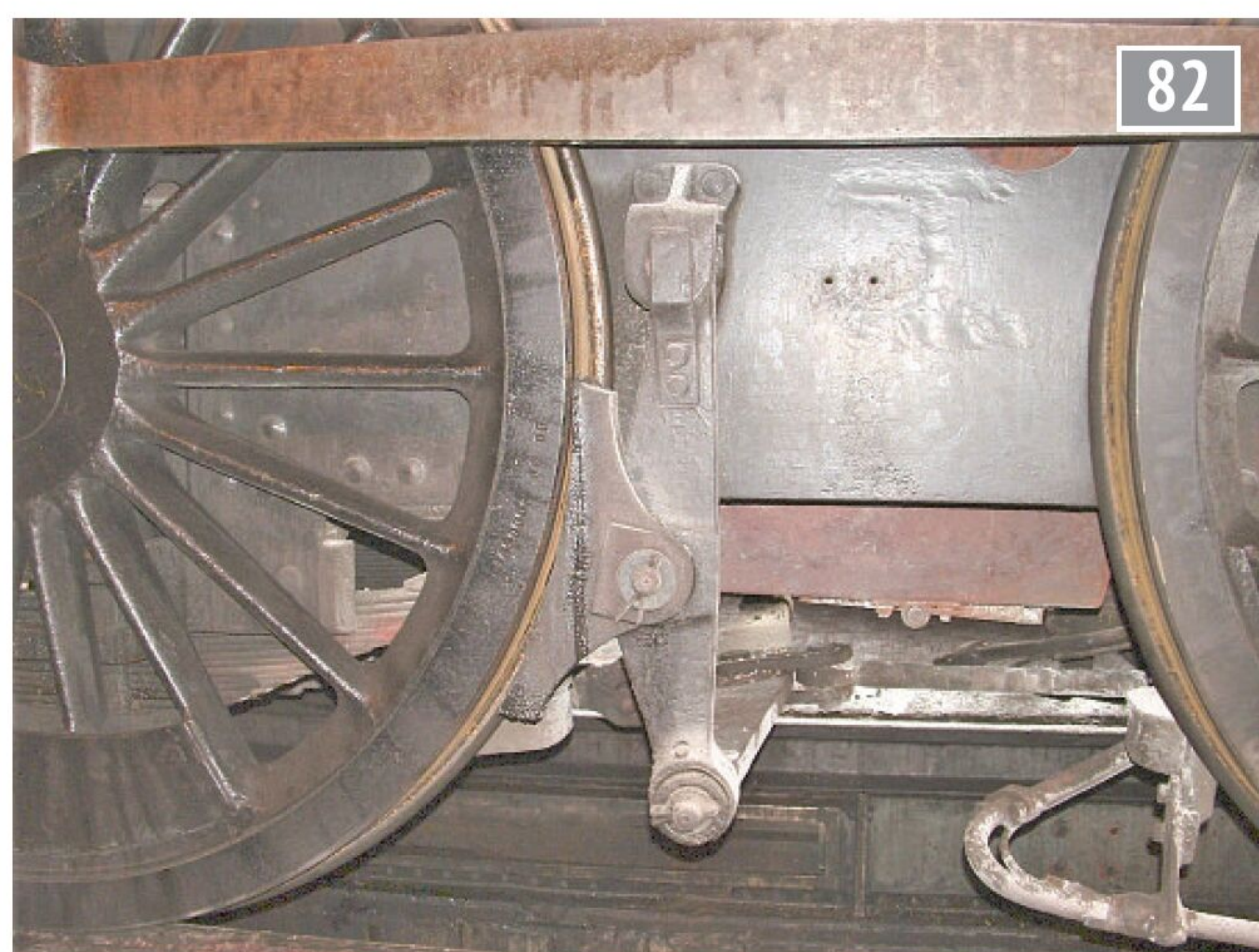
Brake beams and brake blocks.



Brake cylinder.



Brake hanger.



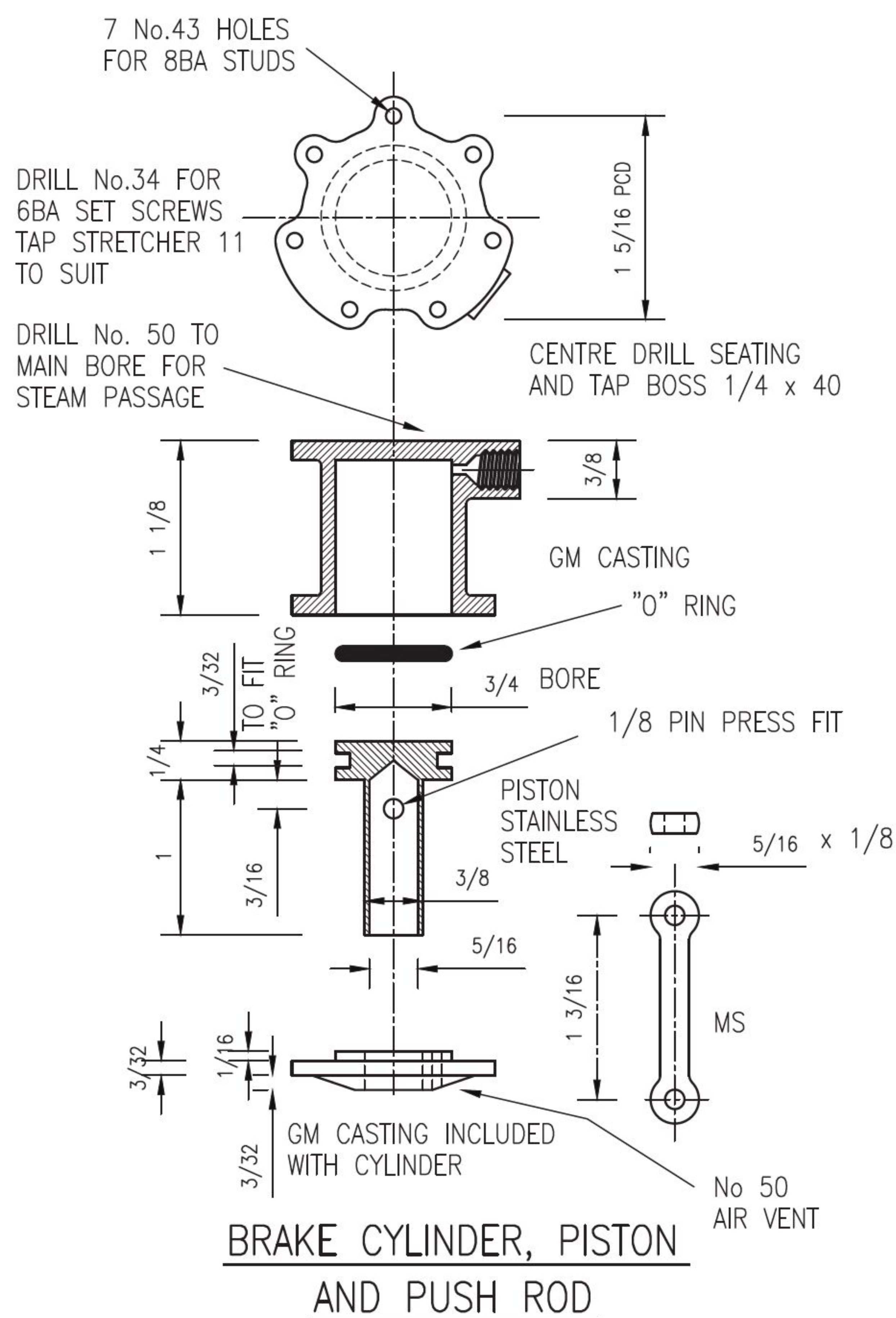
Brake block and hanger.

them on there. I couldn't do any shunting without my brakes! I once started building a railway around the house I built and to get to the top station there was a 1 in 60 gradient and the drill

for coming down the hill was just to dab the brakes a little at a time and you could get down safely.

Photograph 80 is of the brake cylinder and all the bits

Fig 38



Brake cylinder.

that go with it. It has been re-bored and with it are the two piston rings and for these I have substituted an 'O' ring. You need to tap the inlet 1/4 inch x 40 tpi and when you make the piston you need to drill a No. 50 air hole in it otherwise you might wonder why it doesn't work! There is also a connecting rod to complete the outfit.

In **photo 81** there is a brake hanger which is in the midst of being re-bushed and ready to go on 76077. Finally (**photo 82**) there is a brake block and hanger shown on a different engine (exactly the same) so that you can see what it should look like once complete. The brake hangers are handed so therefore so are the patterns. You need to cut the top boss off one side or the other to make them left or right-handed. The brake beams are made

from 3/4 x 1/8 inch flat bar but they need a scallop cutting in both ends to drop a piece of 3/16 inch welding rod in there. Each of these need turning down to 1/8 inch to leave a spigot as shown my drawing and then you silver solder the two ends in. Once that is done you need to make a couple of fine vertical saw cuts in each insert and join them together to make room for a slotted cotter. This will be very prominent on your finished engine, and I shouldn't wonder if you won't lose a few points if you enter your engine in a competition without it. Very important that. It is a bit like using set screws for fixing buffers - that is a real no no!

● To be continued.

Midlands Model Engineering Exhibition – Club Stands and Fosseway Steamers

John Arrowsmith reports on the club stands from the Midlands show.



A tremendous display of excellent model engineering and associated skills were to be enjoyed on all the club stands and outside displays at the MMEX in 2024. There were over 30 club displays and combined with the Fosseway Steamers outside, together with flying displays by the Association of Helicopter Aerosports, there really was something for everyone. The competition for the Best Club Stand is always keenly contested and it has a long standing tradition that the stand holders themselves consider and then vote for the best. This year was no exception and the award for the Best Club Stand display went to the **Hereford Society of Model Engineers** who had a very wide range of exhibits covering most disciplines (**photo 1**). In Second place was **The Harlington Locomotive Society** who provided a very innovative and interesting display of a locomotive workshop which had been sectioned showing off the inside workshop activities (**photo 2**). The Third place went to the **Coventry Model Engineering Society** who also had a very eclectic mix of models and equipment on show. These three displays set the tone for the rest of the exhibition which overall was a marvellous window on the world of model engineering. Unfortunately space within the magazine is limited so I will have to be selective in the choice of illustrations I use in my report.

The **Birmingham SME** attend regularly and once



First prize in the Club Stand Competition went to this display by the Hereford SME.



The innovative and excellent display by the Harlington Locomotive Society.

again produced a good looking stand with plenty of interest (**photo 3**). Locomotive models ranged in scale from Gauge 1 up to 5 inch gauge with a very nice LNER 4-4-2 taking centre stage. Some excellent rolling stock was also on show and the GWR Toad brake van was a particularly good model. A smaller display from the **Model Road Vehicle Society** (**photo 4**) had a range of traction engines on display from a 6 inch scale Burrell to a 3 inch scale version. The Steam Apprentice

Club display also showed what the young people of the Society can do. The display from the **Welwyn Garden City SME** covered a wide range of models from a small range of popular horizontal and vertical stationary engines to a radio controlled tank with a very nice 1½ inch scale traction engine completing the array. Regular attendees at the exhibition are the **Eastleigh Young Engineers** (**photo 5**) led by their mentor Patrick Hendra. These young people always



The Birmingham SME display.



From the MSRVS came a selection of traction engines and information about the Steam Apprentice Club.



The colourful display by the Eastleigh Young Engineers.

produce a colourful display of work covering a whole range of topics. It is always of a high standard, from youngsters aged 8 and 9 and above, and one of their older members continues to enter into the competition classes and had on display his model of an F1 steering wheel. To me this just shows that from simple beginnings with the right encouragement and help young people can go on to deliver some excellent work.



A 1/4 scale model of a Westland Gazelle HT2 helicopter built and flown by Glen Davies.

The **Erewash Valley Society** are another regular member of this show and again provided a wide range of models to admire including some scale miners' cottages from their extensive garden railway layout. Meccano is not as popular as it once was but that does not stop the **Midlands Meccano Guild** from producing a fine range of models using this modelling system. As usual it is always very colourful and interesting. At the **Hereford Society** club stand visitors could enjoy a whole range of models and equipment ranging from 3D printed '00' gauge scale trees to 5 inch gauge locomotives and some fine machine tools. The club's young engineers

had some of their work on display including a large 3D printed and working dogs head, which will be part of a much larger fantasy model when completed.

A new display this year was by the **Association of Helicopter Aerosports** where there was a superb display of high precision helicopters showing many of the types used by both military and civilian groups. They also laid on some high speed flying demonstrations outside and in the blustery conditions it was quite a sight to see these machines being put through

their paces by experienced pilots, an excellent addition to the show (photo 6).

The **Bromsgrove SME** had a well presented selection of quality models on show ranging from the ubiquitous Stuart stationary engines through to a 5 inch gauge model of the infamous 'Lickey Banker' (photo 7). A very useful large vertical boiler also caught the eye. From the **Melton Mowbray & District MES** came a colourful and interesting presentation with a good open attractive stand displaying another wide range of quality models. Three excellent traction engines were complemented by a fine Black 5 chassis and boiler. The **Gauge 3 Society**, representing the scenic side of the 2 1/2 inch gauge, had a prominent display of fine rolling stock and locomotives showing what can be achieved in this scale (photo 8). Next to this display was that by the **National 2 1/2 Inch Gauge Association** with a good display of their gauge with some excellent



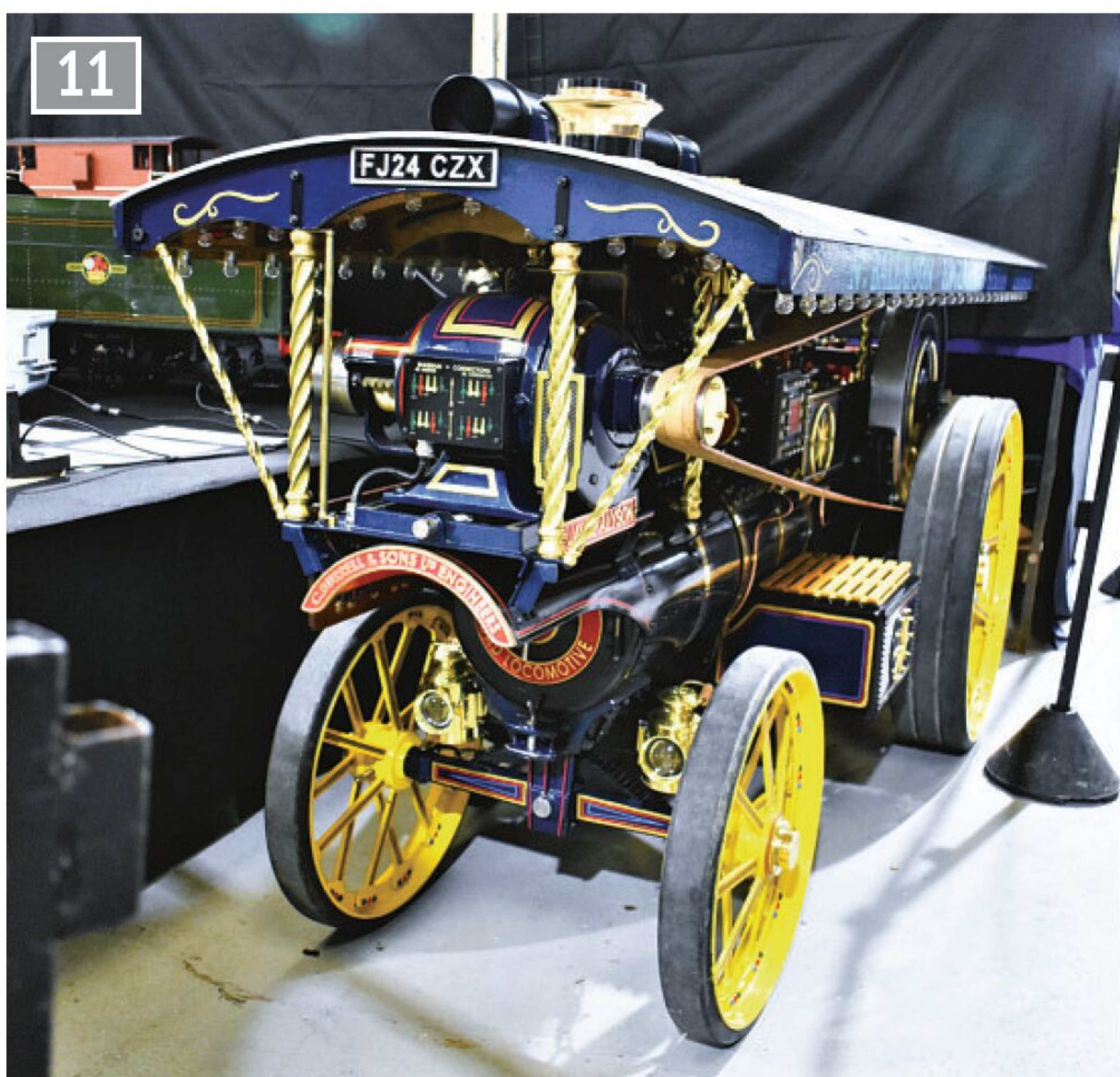
The 'Lickey Banker' in 5 inch gauge from the Bromsgrove Society.



What the scenic side of 2 1/2 inch gauge looks like from the Gauge 3 Society.



The City of Oxford SME provided a good display of locomotives.



Nigel Bell's 4 inch scale Burrell showman's engine was built in 3 years.

finished locomotives, some part built and various other details including a selection of available castings with which to build something in this gauge. Adjacent to the National stand was the display by the **City of Oxford SME** (photo 9) which featured some excellent locomotives and steam road vehicles. The 7¼ inch gauge Collet 0-6-0 was a fine centre piece together with an excellent 5 inch gauge Stirling Single which also stood out as did the fine 2 inch scale undertype steam lorry. Third prize in the Club Stand competition was the **Coventry MES** and once again an abundance of excellent models were on display including some fine machine tools and fittings. I thought the pair of universal tapping and drilling machines were extremely well made and

looked to be a really useful addition to any workshop (photo 10). The display also included road vehicles, both steam and internal combustion engines, and locomotives.

The club won a well deserved accolade for their presentation.

On the **Nottingham SMEE** stand was a good selection of well made models including very nice Super Sentinel tractor unit and a 4 inch scale DCC Burrell showman's engine (photo 11) built by Nigel Bell in just 3 years. **The Harlington Locomotive Society** display was placed Second in the Club Stand competition and rightly so, as it contained some beautifully made locomotives all located within the confines of a railway repair shop, some not quite finished but all to a very high standard. On the stock road to the rear of the



This pair of excellent universal tools was on the Coventry display.



An excellent selection of marine craft from the Knightcote Model Boat Club.



Part of the large Wolverhampton & District MES display stand.

shed was another line of excellent locomotives and rolling stock.

If boats are your forte then the display by the **Knightcote Model Boat club** was right



The huge 5 inch gauge boiler for a GWR Great Bear locomotive.



The busy workshop area of the SMEE stand.

up your street (photo 12). A fine display of lifeboats complemented the assorted marine craft and small boats on display. A large double sided display by the **Wolverhampton and District MES** (photo 13) provided a wide range of models and equipment to show off what the club can offer. The boiler for a 5 inch gauge GWR *Great Bear* locomotive (photo 14) looked absolutely huge compared to others in the same scale. The **Model Engine Makers** formally known as the I/C Builders Group provided a wide range of internal combustion engines which they changed after two days so a different selection of engines was then presented for appreciation by visitors. All were built to a very high standard.

The **Echills Wood Railway** was represented by the latest club built locomotive with a selection of photographs

showing the railway and its environs. The locomotive is based on a Bagnall 0-4-4 which was built for the Canton and Kowloon railway in Hong Kong. The chassis was found on site in the back of a storage space and one member said he would complete it. He set to and did so and the No. 50 was arrived at because it was finished in time for the railway's 50th anniversary and it is named *Douglas* after their president Doug Kempton (photo 15). The **Federation of Model Engineering Societies** provides clubs and societies with information and paperwork to cover the various activities organised by clubs and societies including insurance and boiler testing.

The **Society of Model & Experimental Engineers** had a large stand to demonstrate what the Society has to offer in terms of workshop projects, the advantages of membership



Douglas, the latest club built locomotive from the Echills Wood Railway.



A superb example of a GWR 1400 tank locomotive from the 10 1/4 Inch Gauge Society.

and the wide range of activities available for members to participate in. Formed in 1898, it is the oldest model engineering club in the UK and has amongst its membership some of the country's finest model engineers. The stand workshop demonstrated various aspects of work for visitors (photo 16) to see how things are made and had a full team available every day to answer questions.

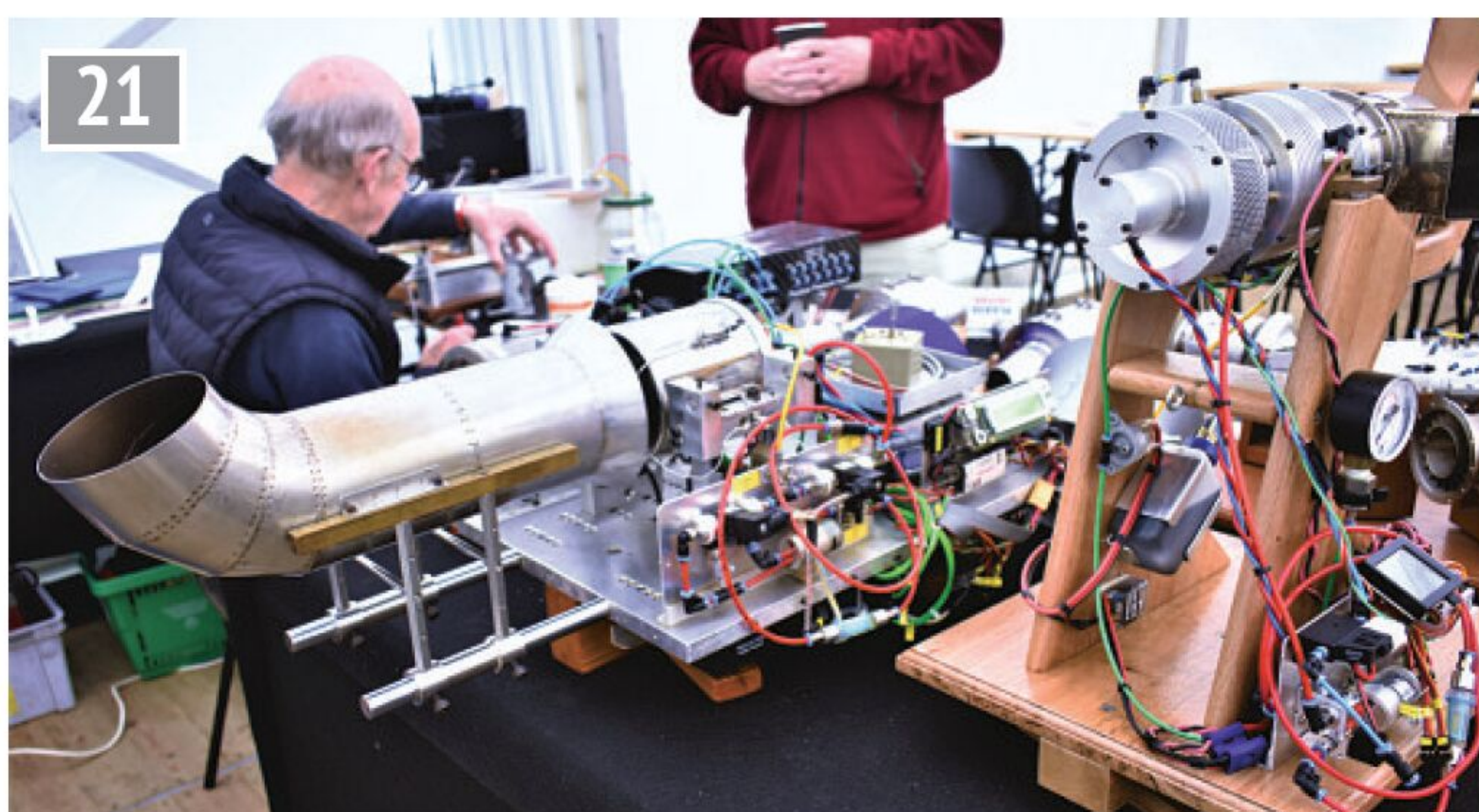
The **7 1/4 Inch Gauge Society** provided a display of locomotives both complete and under construction to demonstrate what the Society has to offer. In addition to the practical side of model engineering the Society offers a Proficiency Scheme which can offer guidance and information

about how miniature railways operate. This enables members to be clear about what all the various railway terms mean and how they relate to railway operations.

The other large gauge society taking part was the **10 1/4 Inch Gauge Society** who posed a splendid example of a GWR 1400 0-4-2 tank locomotive and guards van on a stand (photo 17) so that visitors could get up close and see what this scale has to offer. On the well laid out stand of the **Northampton SME** was a good range of models of many different types all showing some quality engineering and finishes. The LMS Ivatt Mogul in 3 1/2 inch gauge with a double chimney was of particular note. The **Society of Ornamental**



The interesting display by the Society of Ornamental Turners.



Part of the Gas Turbine Builders Association display.



The turbo-electric locomotive No. 18100 almost complete.



The Fosseway Steamers in action sawing wood.

Turners (photo 18) display is always interesting with the intricate shapes and details they can produce. They were operating a venerable old lathe from 1837 to demonstrate what they could do. I wonder what present day machine

tools will look like in 187 years time!

The **Stirling Engine Society (photo 19)** always have something interesting on their display, and again this year it was no exception with a pair of replica hot air engines, the



No model exhibition would be complete without Julian and Graham from the Stirling Engine Society being in attendance.

originals of which were built by Robert Stirling himself along with his brother (**photo 20**). One now resides in the University of Edinburgh and the other in the Hunterian Museum in Glasgow. Both were built as engineering demonstration models.

The **Gas Turbine Builders Association (photo 21)** had a very high tech display of these interesting engines which demand high levels of skill to build. The turbo-electric model of the 18100 class locomotive (**photo 22**) started some years ago is being completed by members of the Association and very good it looks as well. In complete contrast to the Gas Turbine group the **Gauge 1 Model Railway Association** presented a well filled display along with a short demonstration layout to illustrate the wide variety of models and materials available in this gauge. The **Northern Association of Model Engineers** had a display of paperwork along with a small collection of models to publicise what they do within the model engineering fraternity, including the various awards they present each year. The **London & North Western Railway Society** provided a good display of photographs covering the operations of this pre grouping railway along with a couple of very nice models.

Outside of course **The Fosseway Steamers** again provided the live steam aspect of the exhibition with their members operating range of working engines with



One of a pair of replica models built by Chris Simms of the original built by Robert Stirling.

demonstrations of threshing and wood sawing using steam power to drive the machinery (**photo 23**).

Well, dear readers, that brings me to the end of my reports on the Midlands Model Engineering Exhibition 2024. I hope I have conveyed to you what a good and varied show it was. Space precludes many more excellent examples of fine model engineering on show being published but I hope you understand. My thanks as usual to all the clubs and societies who attended because, without your considerable input, there would be no show at all. To all the traders who attended sincere thanks, because again without you supporting the event it would not be able to continue. Thanks also to the organisers, who did a splendid job in getting everything together and of course to all the people and members I spoke to - it just seems to get better every year. Let's do it all again in 2025 as it will be 127 years ago since Percival Marshall first published a magazine called *Model Engineer*. There are not many magazines that have lasted that long on the same subject matter, so model engineers of today have a lot of history to enjoy in this most fascinating of hobbies.

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Geoff Theasby
reports on
the latest news from the
clubs.



How do I begin this column? Well I wouldn't start from here... "Start at the very beginning", said the Red Queen, "and go on until you reach the end, and then stop." So I did, and lo! there did issue forth another Club News for your delectation.

In this issue, 'Thomas', internet meeting place, granite, a steep railway, a US inventor, a poor boiler and Frank Whittle.

Sydney Live Steam Locomotive Society, Newsletter, November, opens with James Sanders who built a 'Thomas' for his granddaughter. After a lengthy resumé of the recent week's activities, profusely illustrated, James asks the question, 'Why Thomas?'. The short answer is that his little girl wanted a Thomas themed birthday party. Making the crank axle first, it showed only a few 'thou' runout, so that bade well for the future... Making the rest, apart from that essential 'face', was straightforward. He scaled it up (or down) to get the right size for his locomotive, having found plans for a 3D print online, but the material would melt in service, insulated from the wind of passage, and a hot smokebox behind it, so he used it as a former to hand beat one in copper. Then all he needed was a tin of blue paint. On test, it was very jerky and hesitant but he soon diagnosed it - the gaskets on the cylinder ends had not been trimmed far enough and were acting as flap valves, restricting the flow of steam. After cutting back, it was a different engine! Simon Collier writes in 'A mystery solved' that he obtained a LNER 2-6-2 in 2½ inch gauge. On test, it proved to be a better garden sprinkler than a locomotive, so a new boiler was required. Meanwhile, sharp-eyed Andrew Allison spotted that a photo of the locomotive on page 71 of Eddie Castellan's new book on 'LBSC' was the very loco that Simon had just bought. Contacting Mr Castellan about the engine brought feedback that the book



Preserved locomotive Minør in Reykjavik (photo courtesy of Victor Croasdale).



Cabin car from Luggies (taken from the internet).

has generated much comment and has sold well in OZ and NZ... An interesting sideline: 'LBSC' was in receipt of a food parcel for which he thanked his benefactor, in letters which are now on Curly's Facebook page. **W.** www.slsas.asn.au

Icelandic locomotive *Minør* - at Reykjavik I could only snatch a quick shot out of the coach window in passing. Victor spent three days in Iceland this summer (**photo 1**).

Bournemouth & DSME sends *B&DSME News*, which begins with an obituary for Dick Ganderton and wonders why we use so many forms of communication to keep

in touch. Remembering the day when personal communications were more simple, there is now a significant cause for people to feel left out, despite various internet meeting locations. Listing the various 'apps', he overlooked one - Club News! Ron Barson laments the lack of mechanical toys as a child. He was always dismantling clocks and radios although they never worked again. He was taken to the Festival of Britain in 1951 and there saw his first model railway. Want one! Having a January birthday, he shared the celebrations with Christmas. (I amusingly recall

that my brother and father had birthdays in February and March, and one year my mother decided there would be a joint celebration. She never heard the last of it, as they both pretended to be hurt and overlooked – Geoff)

W. www.littledownrailway.org.uk

Steam Whistle, from **Sheffield & District Model & Experimental Engineering Society**, November, has a good picture by Harry Walker of a Woolf compound beam engine, at the London Museum of water and steam, visited by Harry who wrote it up for SW. Editor Mick Savage discusses briefly whether engineering in the 21st Century is still in the stone age. After that provocative question, he explains that precision measuring machines use a granite flat-bed block made to precise dimensions (down to a micron). The granite is homogeneous, free from internal stresses, is harder than steel and dimensionally stable. Mike Peart writes on bats in the Colwell tunnel. The mystery rock carvings in last month's SW are for watering the grouse on Stanage Edge.

W. www.sheffieldmodelengineers.com

Luggies 'Cabin Car' - no licence required, only a fat wallet. £6-10,000. Taken from a posting in Gmail (**photo 2**).

Model & Experimental Engineers, Auckland, *Newsletter*, November, has member Cameron Webb showing two French micrometers, one of which, a bench micrometer circa 1900 by the ateliers Barquand and Marre of Paris, is one of only three known. Michael Cryns had a clock movement that would not run. Repairs had been attempted but to no avail. Observing it closely, Michael noted a wheel not running true and rubbing against the spring drum. Graham Quayle sends, separately, Murray Lane's four page write up of his Monosoupape engine from WWI and asks readers to proofread it. Murray points out that a valve in the piston had

a habit of sticking open, which then caught fire. This was not good news for a wooden aircraft covered with cloth. Lubrication was by Castrol 'R' which, it is claimed, had a laxative effect on the pilot.

Stamford Model Engineers Society Newsletter, November, features John's new acquisition, a miniature lathe which was found in a Brussels market, and a vertical steam engine he has had for many years. Keith is a collector of Mamod engines but not their workshop power tools. He was given a Mamod workshop press from a collection dispersal. The Swiss Stoosbahn is the world's steepest railway. It climbs 2500 feet in 1 mile. The cabins rotate on the horizontal axis to keep the passengers level despite changes in gradient.

I just acquired a new radio receiver made to a design which is 'state of the art', at least as far as amateur radio is concerned. At the rear is a UK made, all band receiver, a KW 202, circa 1971, and costing £140. The small black receiver will tune all bands up to 30 MHz, battery powered, Chinese built and resolves all but the latest type of digital signals for £12 (**photo 3**).

Hot Iron, the online magazine of the **Constructors Club** is available but it is about radio and electronics so, apart possibly from the Henley Solon Appreciation Society members, it is not relevant here. So there!

Welling & District SME, December/January, has editor, Tony Riley visiting the Western Approaches museum in Derby House, Liverpool, where the Battle of the Atlantic was planned and fought. The Society Open Day attracted 32 guests and 26 members, with 11 people bringing seven engines. Member Toy Cornell told of his uncle's account of the D-Day landings 'cos he was there! Bob Underwood writes of one Isaac Dripps, US railway engineer extraordinaire, who invented the spark arrestor, tender, cab and pilot (cow catcher). He began work for Robert Stevens, of the



Radio receivers 50 years apart.



Gainsbrough Old Hall, roof.

Camden & Amboy Railroad. He also favoured Crampton locomotives, as they ran well on indifferent track, common in the US at the time and still is - see Facebook 'shorts'.

W. www.wdmes.co.uk

Gainsborough Old Hall - the frame of the building is held together by nuts and bolts, not to any recognised screw thread standard in 1430... I tried

photographing one, but it didn't come out well (**photo 4**).

Kingpin, from **Nottingham Society of Model and Experimental Engineers**, featured the Society's stand at MMEX. This event is the only survivor of such exhibitions in the UK, although Lowestoft is coming up fast on the inside. The Federation of Model Engineering Societies Annual



Satellite phone BMEG.

Rally, MMEX, after a break of four years, took a stand at MMEX, which was organised by Mike Firth. Editor, Jayne Ball reported on the MMEX, and helping on the Blackgates stand was very tiring, but enjoyable, says Jayne. The GCR main line has recently been tamped by Volker Rail as a training exercise and it has also realigned the Nottingham track section. Terry Hawley writes on how NOT to build a steam engine. Having decided on the boiler, one was ordered, which turned out to have 32 steam leaks and he rejected it. This led to long-drawn-out discussions on a refund, that a replacement was demanded, and this was also wrong! Next, the paint. According to the seller the requested shade did not exist. Not only that, but it ran out before the job was finished. The seller blamed him for not ordering enough...

W. www.nsmee.org.uk

Marconi Marine satellite phone, BMEG (photo 5).

I recently attended a Newcomen Society talk by Fred Starr on myths surrounding Frank Whittle and his jet

engine. It was fascinating. The speaker said he would show that Frank in his 1930, 88 page thesis on high speed flight, did not start with the design we now know. His thesis also contained his original thoughts on aero engines, in that a i/c engined compressor exhausted into a pressure tank from which a jet of released air and exhaust gases would be used to drive a turbine, and ultimately a propellor (a turboprop, in fact). This design would have been far too heavy for flight. Only later did the concept of 'flow' begin to form in his mind and his original idea was discarded. Mr Starr did not mention that Whittle had solved many problems by realising that a vortex is created at each turbine blade tip. The same thing happens at aircraft wingtips, which is why modern aircraft have winglets (UK Patent No 307246). Mr W. had competitors in Germany in the shape of Hans von Ohain, who adopted the straight through design, but was hampered by materials shortages. It is sometimes suggested that lack of high temperature



Papplewick - when your final cost is below the budget, decorate it!

alloys was the cause. Mr Starr said that this was not so, as the temperature inside the engine did not approach the critical temperatures for the materials available at the time. In addition to the thesis, we can also read an eight-page summary of FW's notes, in an old school book, which is quite clear on the chronology and the fact that engines could be built with alloys available in 1930.

W. www.frankwhittle.co.uk and www.aerosociety.com

Shoulder to Shoulder, November, from **UK Mens Sheds Association**, celebrated 'Shed of the Year', at a reception in Speakers House in the House of Commons. Mr Speaker hosts his own Parliamentary Shed in the HoC, one of the most popular events in the yearly calendar. Shrewsbury MS were announced Shed of the Year. In only three years of existence, they have contributed heavily, offering support to those with dementia, cancer, wood turners and horticulturalists. Mark Mantle of Ludlow Mens Shed was nominated Volunteer of the Year. Mark had his own problems as, due to anxiety, he had not left his home for 20 years before joining the MS. He is now their key volunteer. Currently, they have learned to build a coracle and are running a ferry service across the river (The Teme, I believe – Geoff). They are also working with the local Afghan community,

involving crafts and cookery. Chris Oldfield of Bethlehem community shed has been celebrated for his work with a convicted criminal, currently in his 46th year of confinement. In 2016, he became eligible for escorted leave and asked to join the MS. He now works with others, discussing his feelings of fear and isolation after 38 years of imprisonment.

W. www.ukmsa.org.uk

Papplewick - When you have paint left over after your final cost is within budget, decorate the place (photo 6)!

On the Home Front, one of the gas struts holding up the car tailgate parted company with its mounting and inspecting it I discovered that the end pieces were a snap fitting on to a ball. I went to the nearby car spares emporium to see if they had any. They confessed that they did not, and seemed unaware of their availability anywhere. Returning home, I checked with Amazon and after a little difficulty in discovering the right name for these things, I obtained two for less than £5 ('eyes', would you believe?).

And finally, this sentence contains exactly three errors.

ME

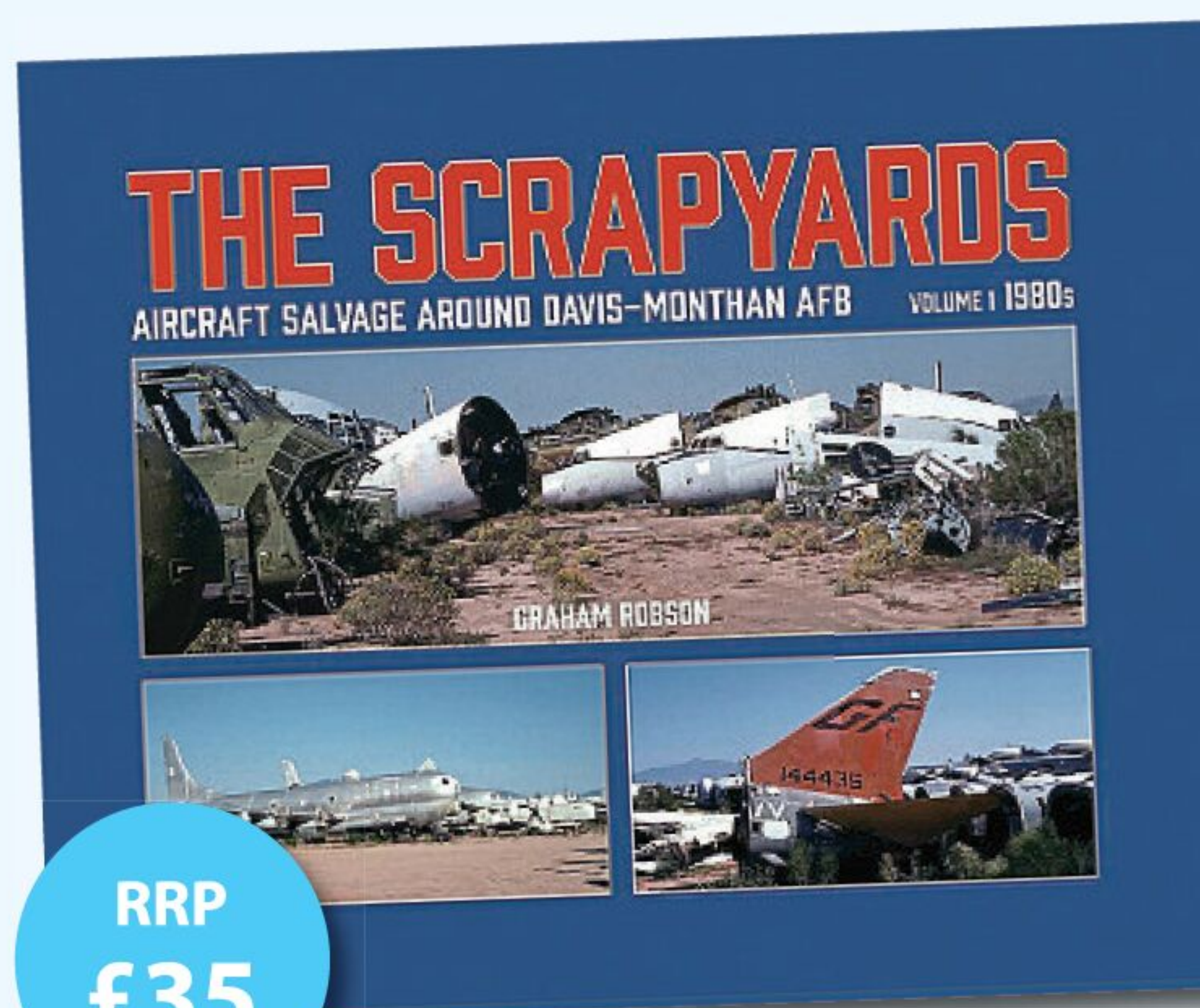
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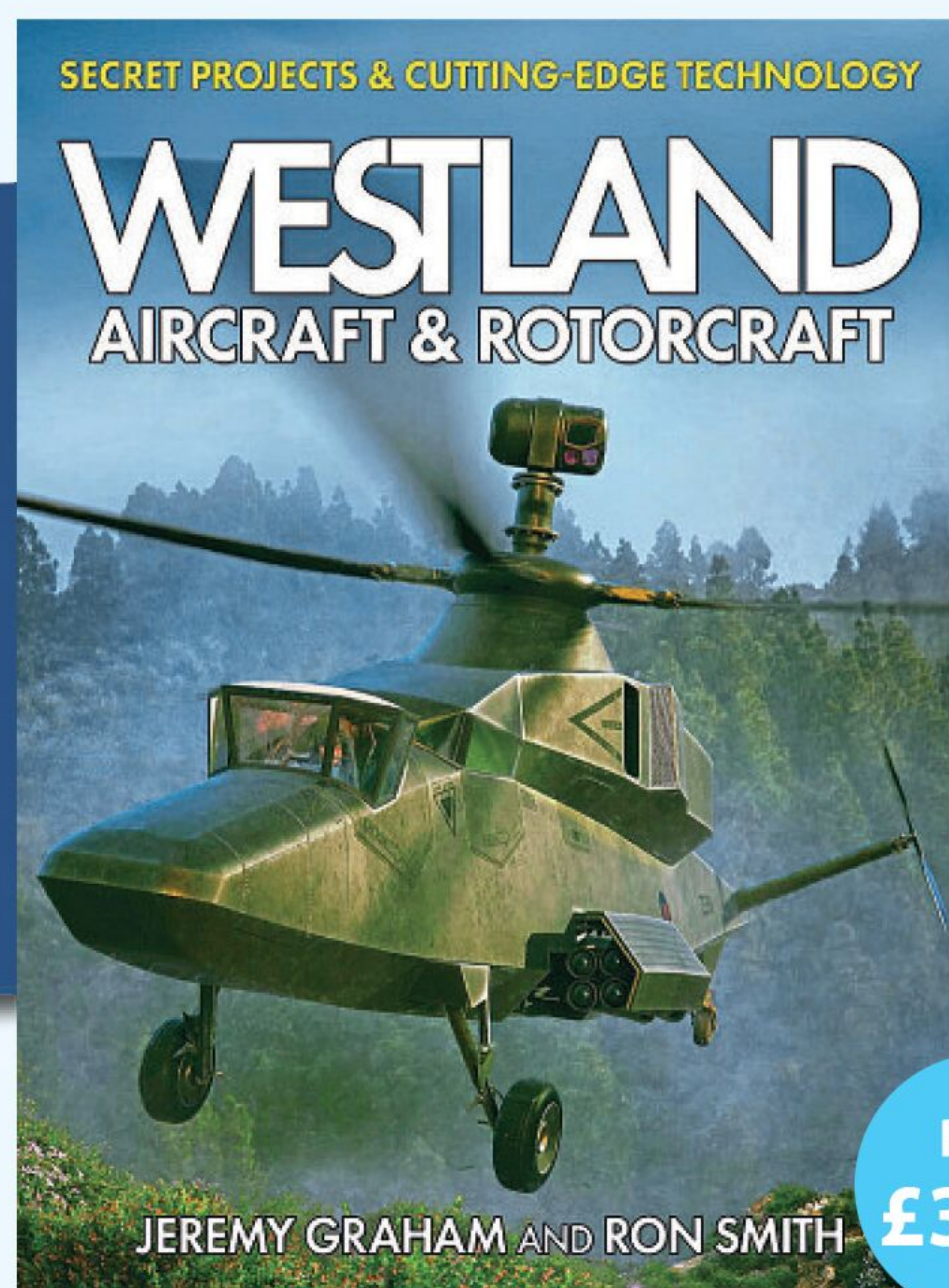
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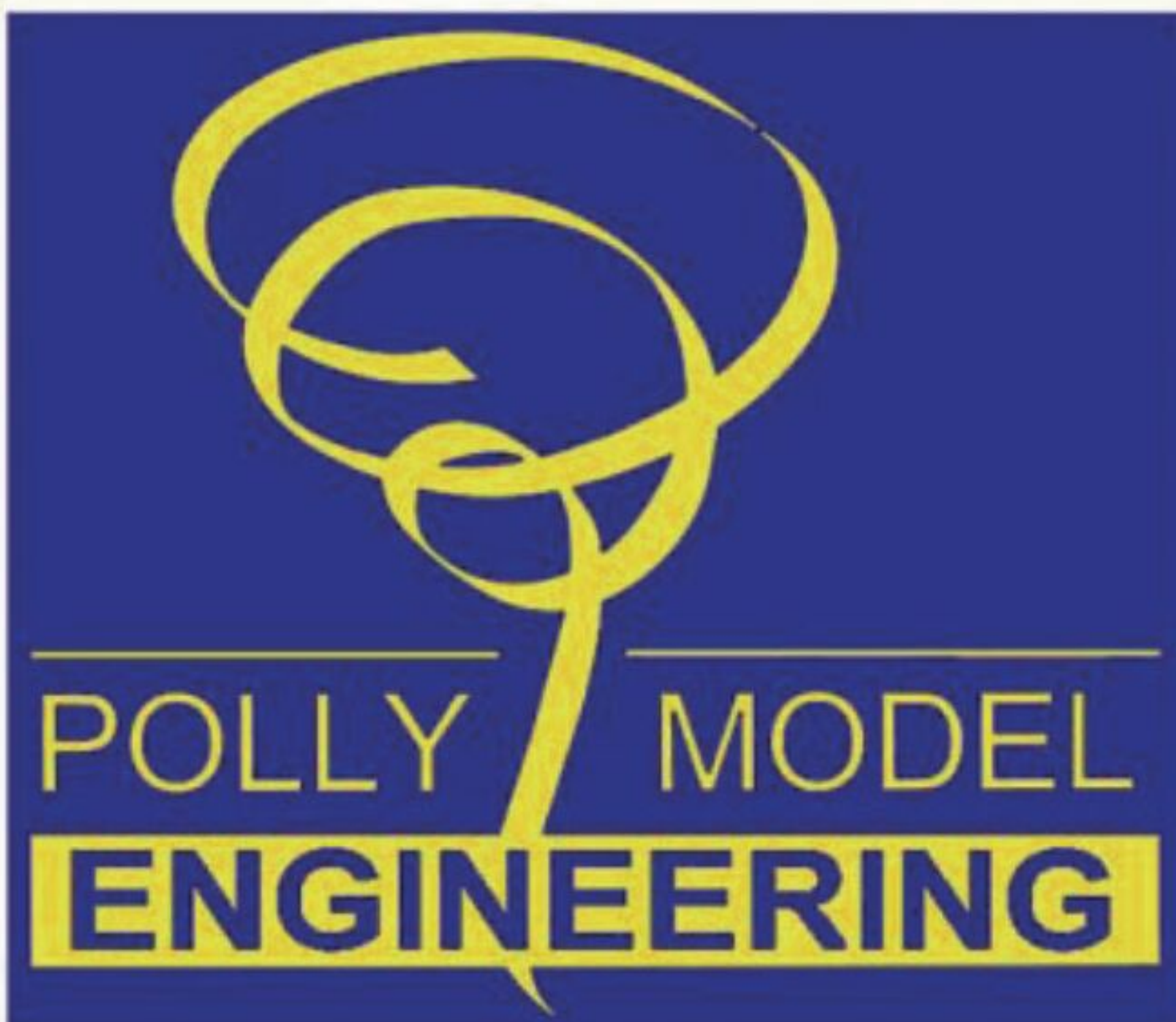
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