

BATTLE OF THE BOILERS – 100 YEARS ON

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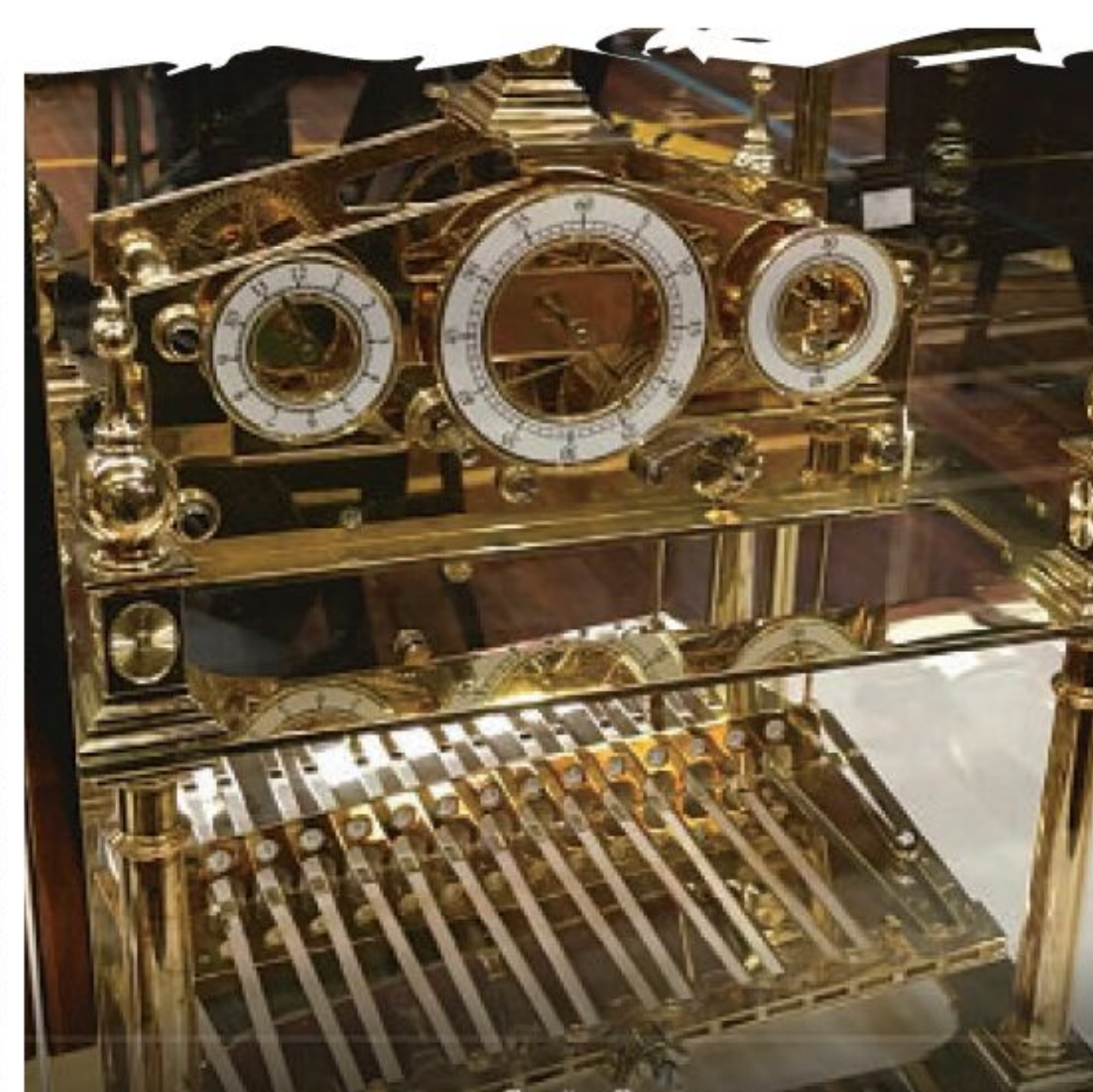
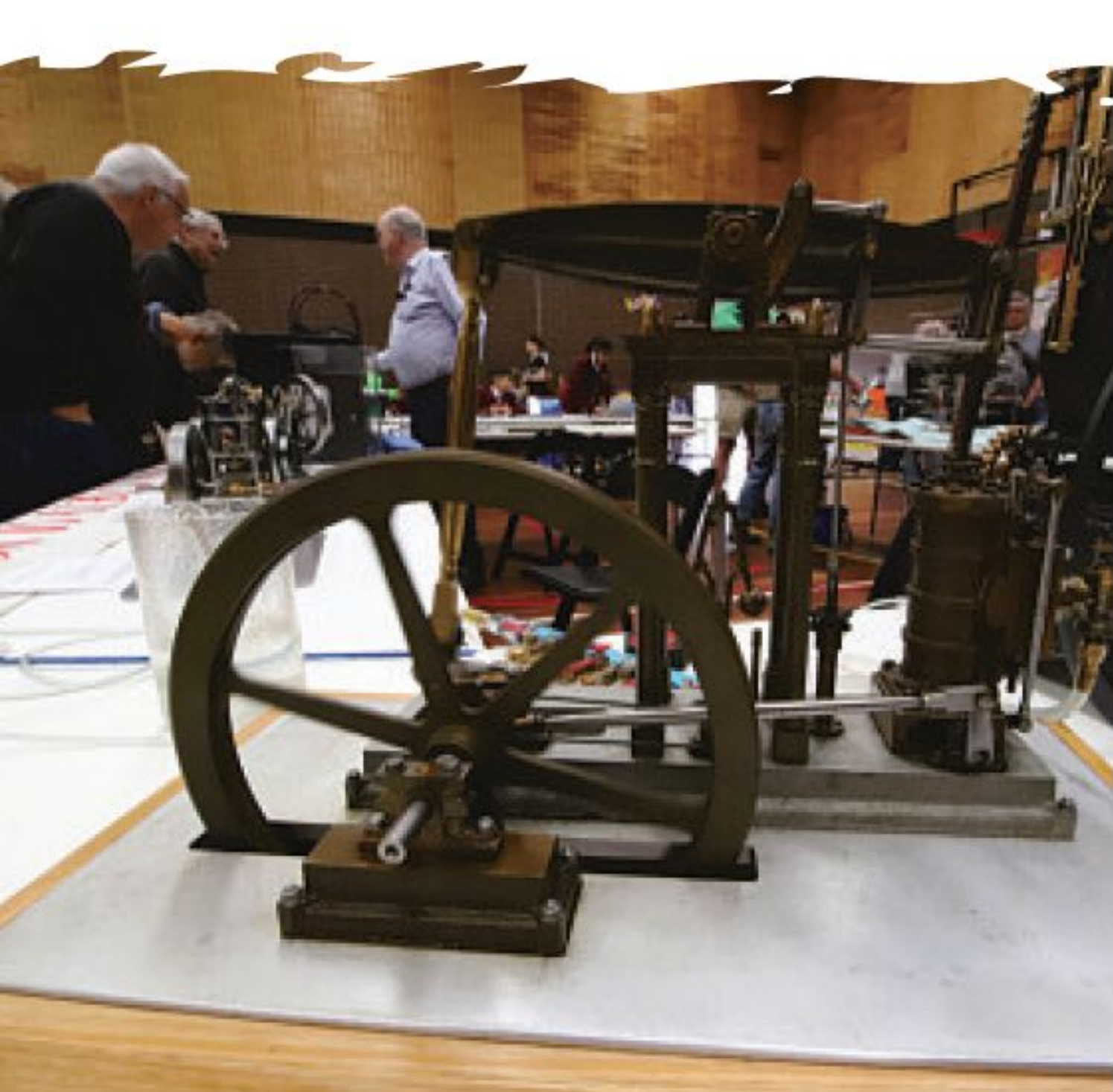


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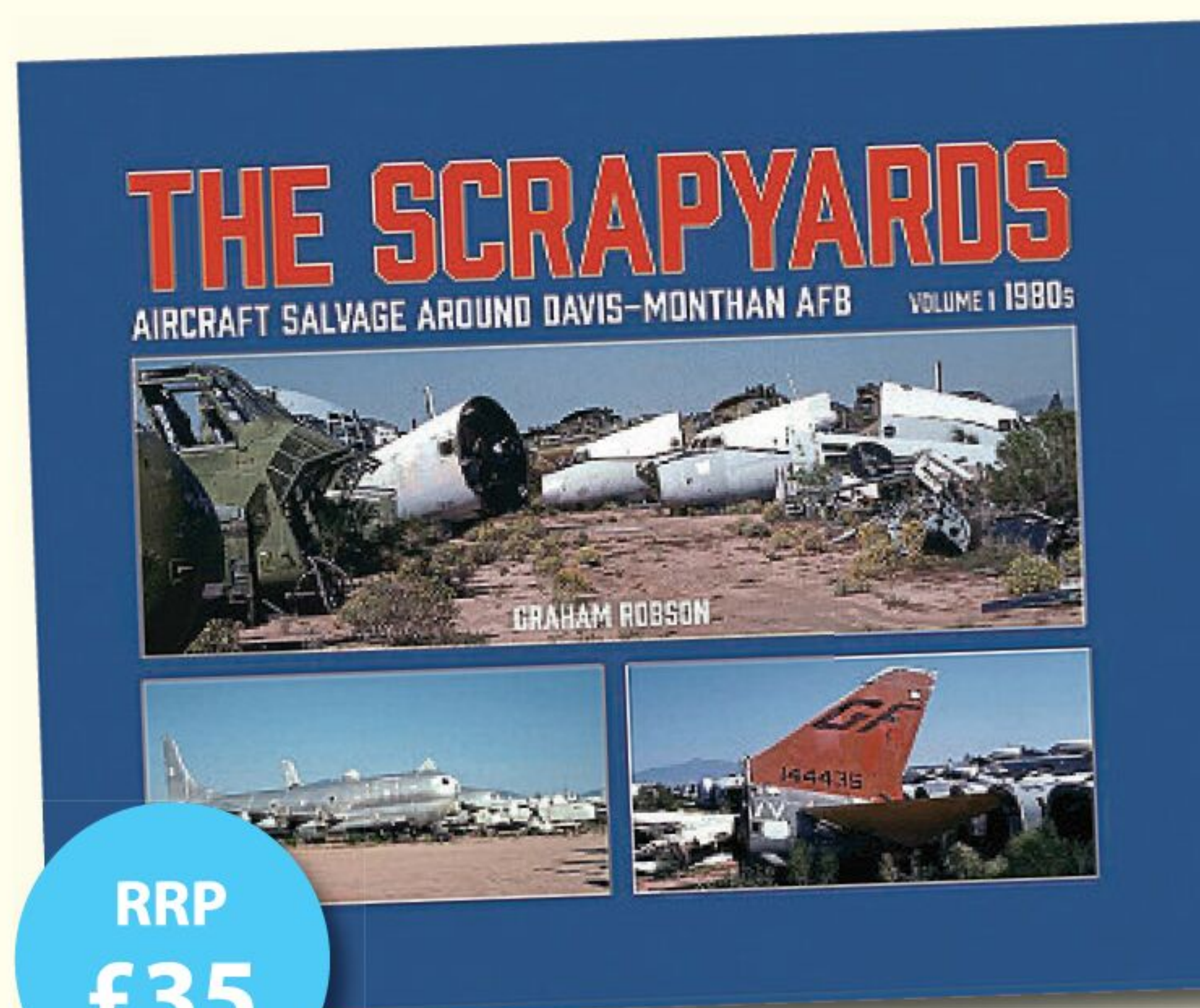


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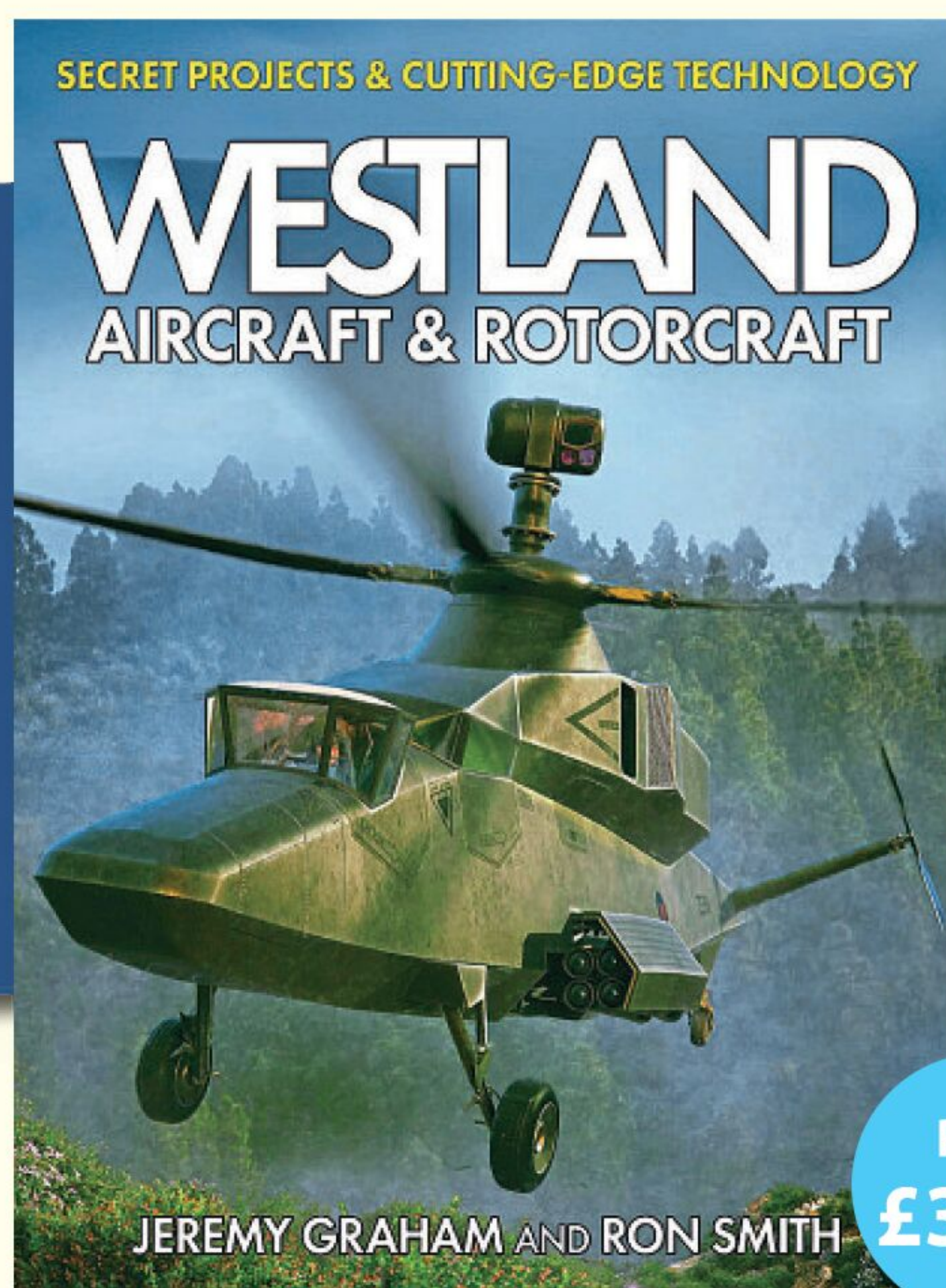
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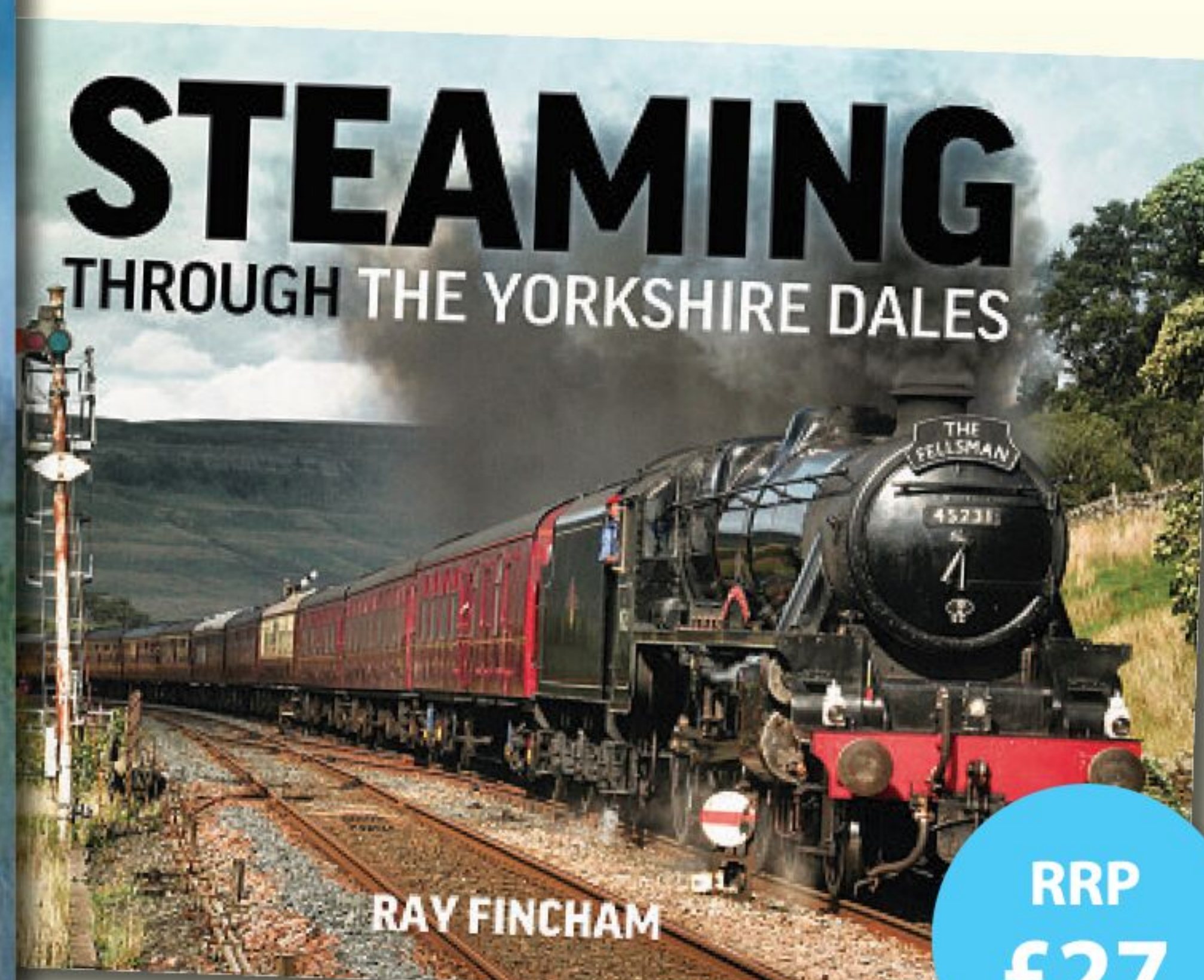
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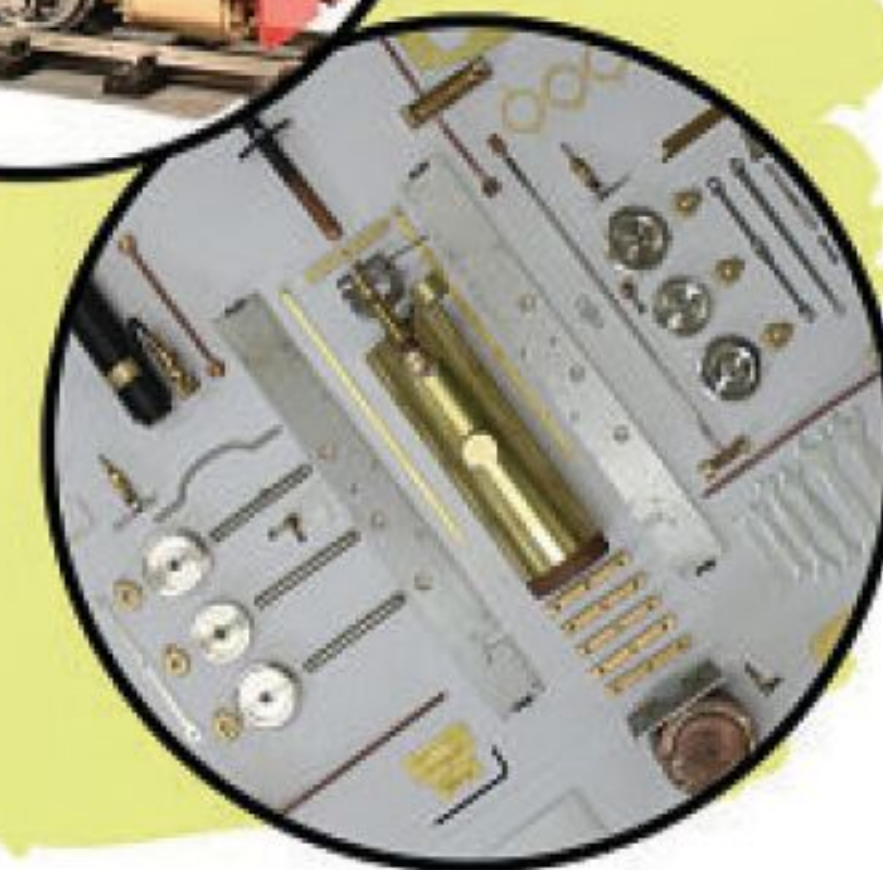
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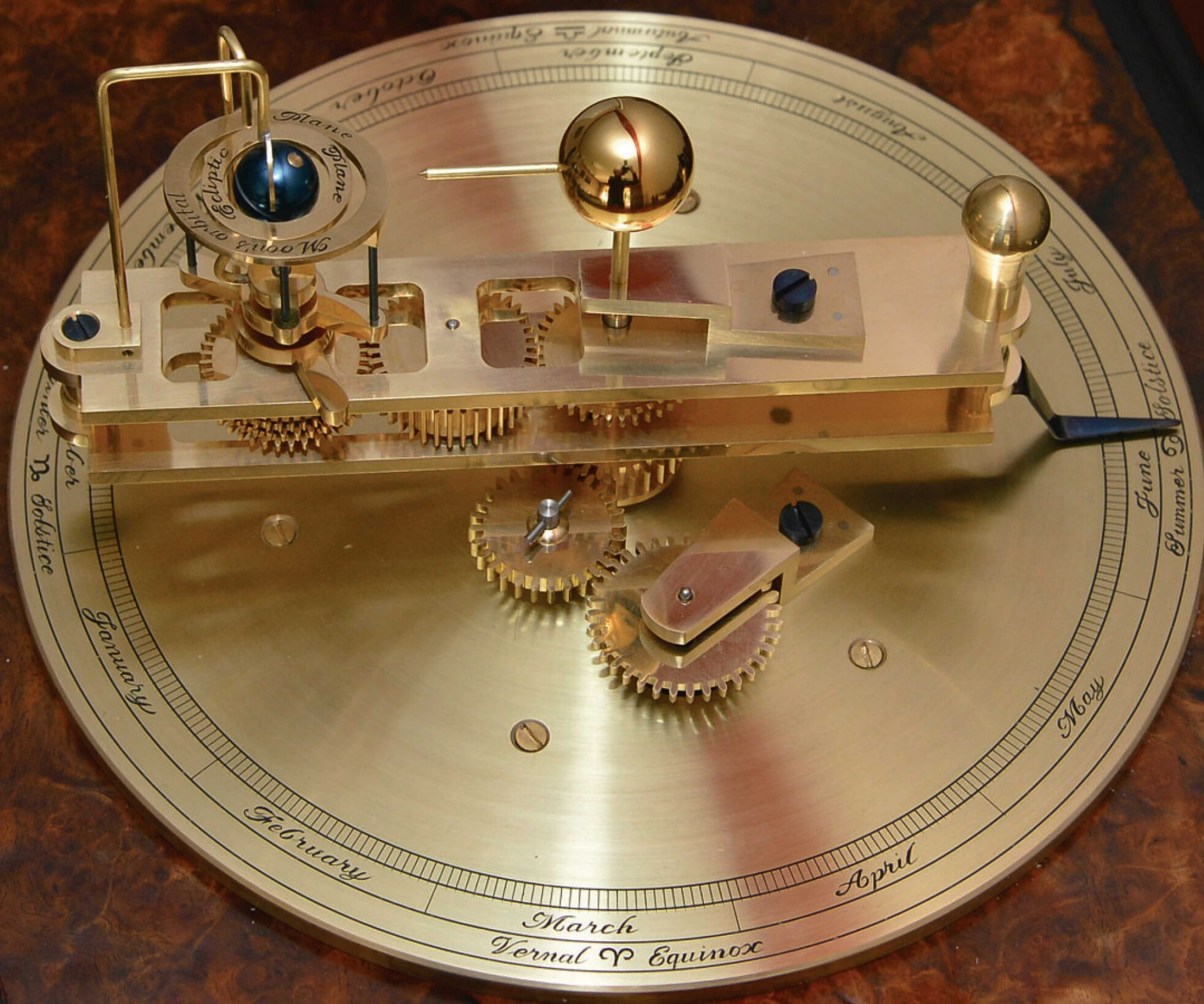
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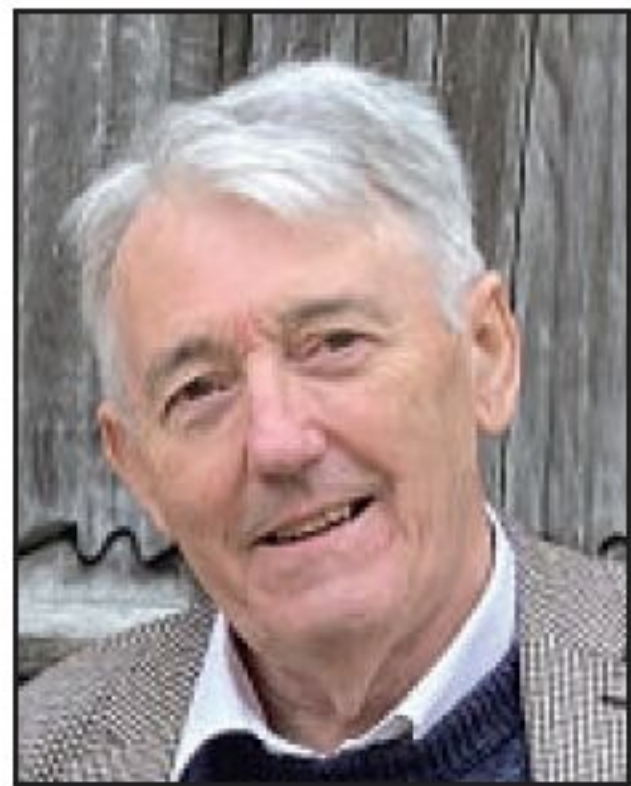


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MARTIN EVANS
Editor



DIANE CARNEY
Assistant Editor

Southport

In the last issue I was celebrating the IMLEC event (International Miniature Locomotive Efficiency Competition) at the Southport club. Of course, I was not to know then of the truly appalling events that were to follow just a week later. As I write this, the aftermath of Axel Rudakubana's inexplicable rampage is still very much underway but I hope, by the time you read this, that some degree of sanity shall have been restored.

My thoughts and prayers are with everyone in Southport and the surrounding area as they try to deal with what has happened.

IMLEC

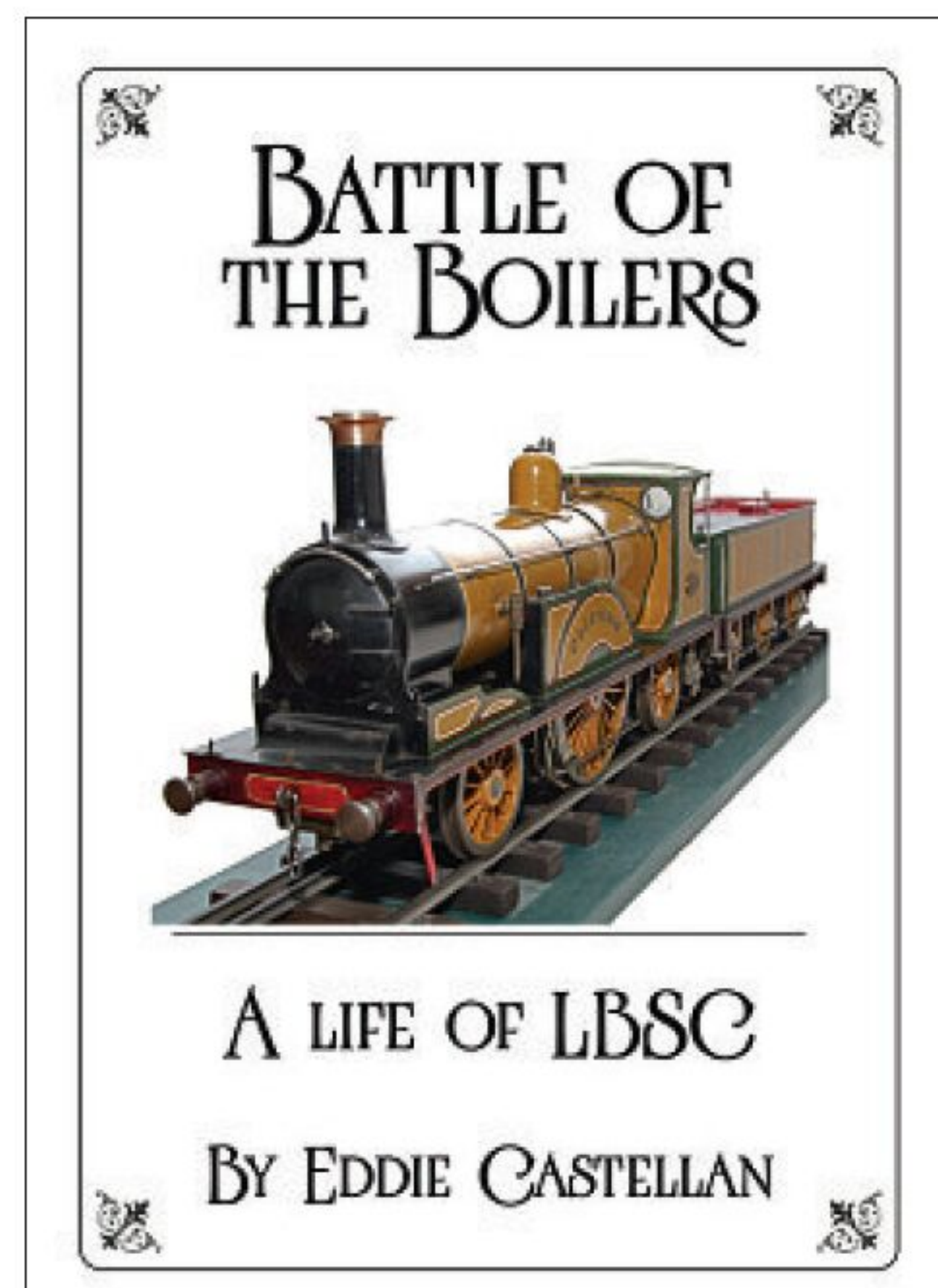
I was hoping to include a report on IMLEC in this issue but I think to do so just now would be inappropriate.

Life of LBSC

I have mentioned the 'Curly Bowl' competition before, otherwise known as the LBSC Memorial Bowl competition, which takes place at the Cheltenham SME on



The 'Curly' bowl.



Eddie Castellan's new book on LBSC.



'DAG' Brown is presented with his certificate by Alan Hopwood.

September 1st. Nicely timed to coincide with this is the publication of Eddie Castellan's book on the life of LBSC, *Battle of the Boilers*, the title reflecting possibly a pivotal event in LBSC's career. Eddie writes about the battle in this issue (page 334) and Steve Eaton gives us a preview of the 'Curly Bowl' competition on page 333. I can't resist including a picture of the trophy here – don't you think the shape of the handles nicely reflects its nickname? This must surely be deliberate...

Eddie's book is published in a limited edition of 500. It is a beautifully produced book and I am sure it will be much sought after so do be quick if you want one! It is available from LBSCbook@proton.me or from GS Model Supplies (info@gssmodelengineers.com or 01278-788007). The price is £30 plus £3.80 UK P&P. We hope to include a review of the book in *Model Engineer* shortly.

Rob Roy Rally

This year's Rob Roy Rally takes place at the Bromsgrove SME on Saturday September 14th from 11am. If you have a Rob Roy locomotive please do bring it along! Even if you don't but have a different 3½ inch gauge locomotive, please do feel free to bring that instead. You can find out more about the Bromsgrove club at bromsgrovesme.co.uk. If you plan to attend please contact Ian Horsfield on 01386-792628.

Derek Brown

On Saturday 27th July at the York City and District

Society of Model Engineers Alan Hopwood on behalf of SMEE was pleased to award Derek A.G. ('DAG') Brown with an Honorary Membership Certificate in recognition of his long service to the Society of Model and Experimental Engineers.

Alan referred to Derek's wide knowledge of engineering matters and his demonstrations of drill sharpening at shows using the Quorn Tool and Cutter Grinder by the six facet method. Derek had developed this technique for the Quorn and in particular has invented a setting jig which makes this procedure very much quicker and more effective.

A hearty round of applause marked the moment from the York Society, where he is much appreciated.

Cock-up Corner

In Ron Fitzgerald's article on George Forrester two issues ago (M.E.4748, July 26) part of the text towards the end of the article somehow ended up beneath a figure and thus hidden from view. My apologies for this. This issue's instalment overlaps the previous, in order to include the missing text.

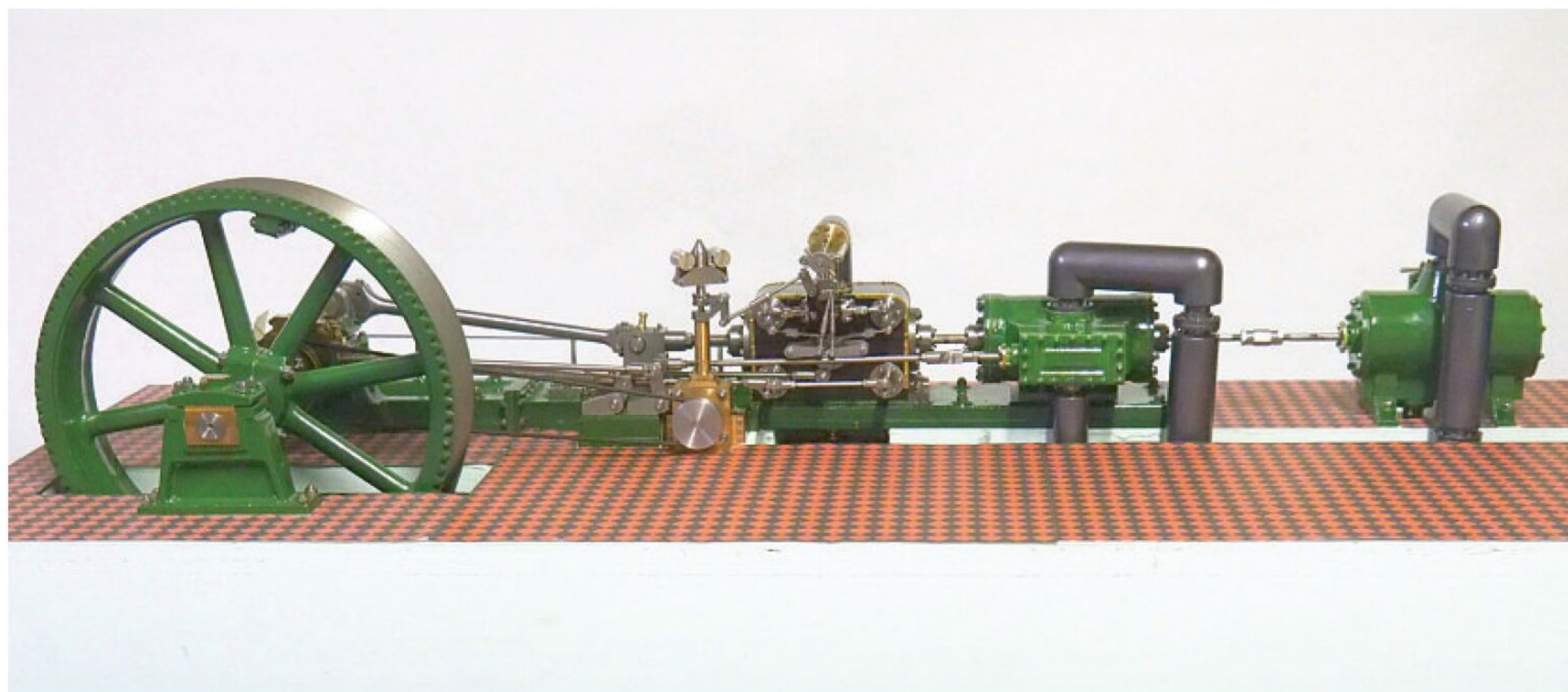


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Martin Evans can be contacted on the mobile number or email below and would be delighted to receive your contributions, in the form of items of correspondence, comment or articles.
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A Tandem Compound Mill Engine

PART 1



History; the origin of the model

Arnold Throp, who was an apprentice with Cole, Marchent & Morley, engine builders in Bradford (Yorkshire, UK) described a model of a typical small-to-medium sized mill engine in *Model Engineer* in 1982 (**ref 1**) but didn't give any construction details and, as far as I know, no such details have been published. Throp described it in general as '... representative of the smaller types which were made in great numbers from about 1860 onwards in this country for driving textile mills ...'. The original model was sold by Christies in 1984 to the Powerhouse Museum in Sydney and is still held by them (**ref 2, photo 2**). Throp also described his experiences in the industry in a book first published in 1988 and this book has a lot of useful information on the construction and details of mill engines (**ref 3**). The design of the

David Thomas
builds

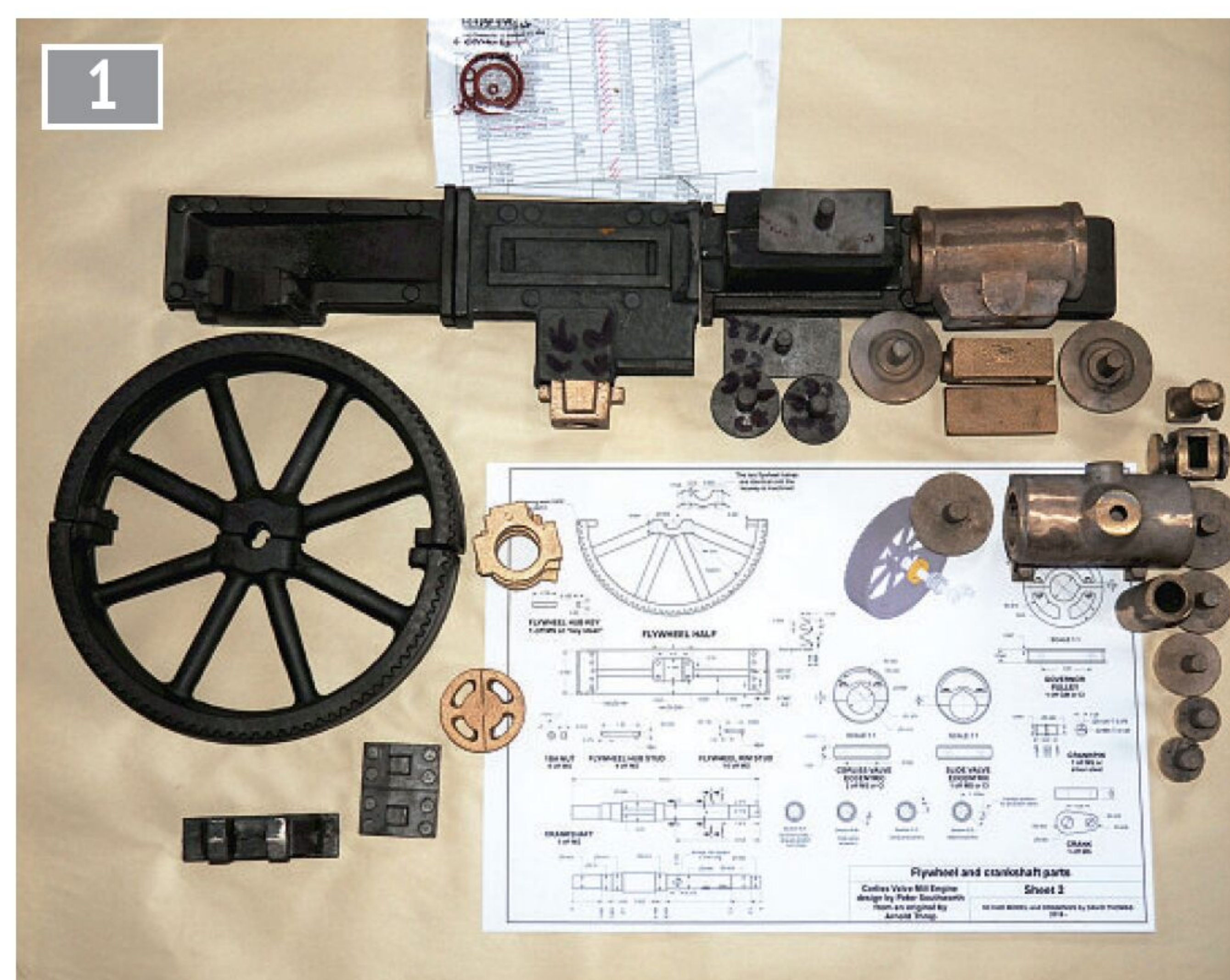
Arnold Throp's model of a Corliss mill engine.



Introduction

This series of articles will describe the building of a model of a tandem compound, condensing mill engine, typical of those that drove textile mills in Britain and around the world up to the 1960s. For the author this provided both a challenge to improve his workshop skills and a link back to his family origins in Burnley, Lancashire. One side of the family, there, were road builders ('Paviors and Contractors' in a Burnley directory of the early 20th Century), the others were brush manufacturers, and all of them were people who made things. The brush making business produced every sort of brush from ladies' hairbrushes to rotary brooms for road sweeping machines but to a large extent they were dependant on the cotton industry for their survival. The loss of the cloth-making industry to overseas competition finished off much of the manufacturing work that had been needed to support it and the brush makers were no exception. By the 1970s the cotton industry had gone and

most of the equipment was scrapped; it's difficult to move and house anything as big and heavy as a mill engine and only a few of the thousands of engines were preserved. Scale models are less impressive than 2000 HP full size machines, but they can at least show something of the look and feel. The building of the models also helps to preserve a little of the skills that once existed for their manufacture.



The castings as received.

model was worked on by Peter Southworth and he evolved five or six versions and made (or modified) patterns for castings.

In his build log on the Model Engine Maker forum ([ref 4](#)) Tug Wilson gave a short history of how the model originated and evolved over time, reproduced below with his permission:

'The engine was originally designed by Arnold Throp for Terry Fleet of Fleet Engineering Services who offered castings for varying versions for sale.

'It was not a scale model of an original prototype but Arnold had designed it on basic engine principles learnt as an apprentice and subsequent engine fitter in one of the last firms of engine makers, Cole, Marley and Marchant. He produced his own patterns for a single cylinder condensing version that was described in the August and September 1982 issues of Model Engineer.

'Unfortunately Terry lost all his patterns and castings when the foundry he used shut overnight and the design was fundamentally lost to the ME world.

'Several years later during a conversation with Peter Southworth this design cropped up. He told me he had Arnold's original patterns for the left side engine and also a full set of drawings. He had bought them at the sale of Arnolds estate but had no intention of selling them commercially. The conversation developed much further and the upshot was that Peter kindly made patterns for the other side engine and the castings then became commercially available again.'

Later on, Bob Potter bought the Southworth Engines business along with all Peter's designs and continued to sell castings from those patterns. More recently still, the Southworth range has been taken over by Blackgates Engineering and they now tell me (June 2023) that castings for the big Corliss engine are available again.

History; George H. Corliss

The Directory of American Tool and Machinery Patents ([ref 5](#))

shows George H. Corliss as having been granted 19 patents between 1849 and 1880. US Patent No. 6,163 of May 10th, 1849, 'Cut-Off and Working the Valves of Steam Engines' describes a trip gear applied to conventional slide valves. In No. 24,618 of July 5th, 1859, ([fig 1](#)) Corliss describes the 'Rotary Steam Valve' combined with a trip gear - or, as Corliss names it, a 'liberating gear'. He describes the combination as providing both a reduction in the forces that have to be provided by the governor ('regulator' in his terminology) and a reduction in the necessary range of movement needed for full control.

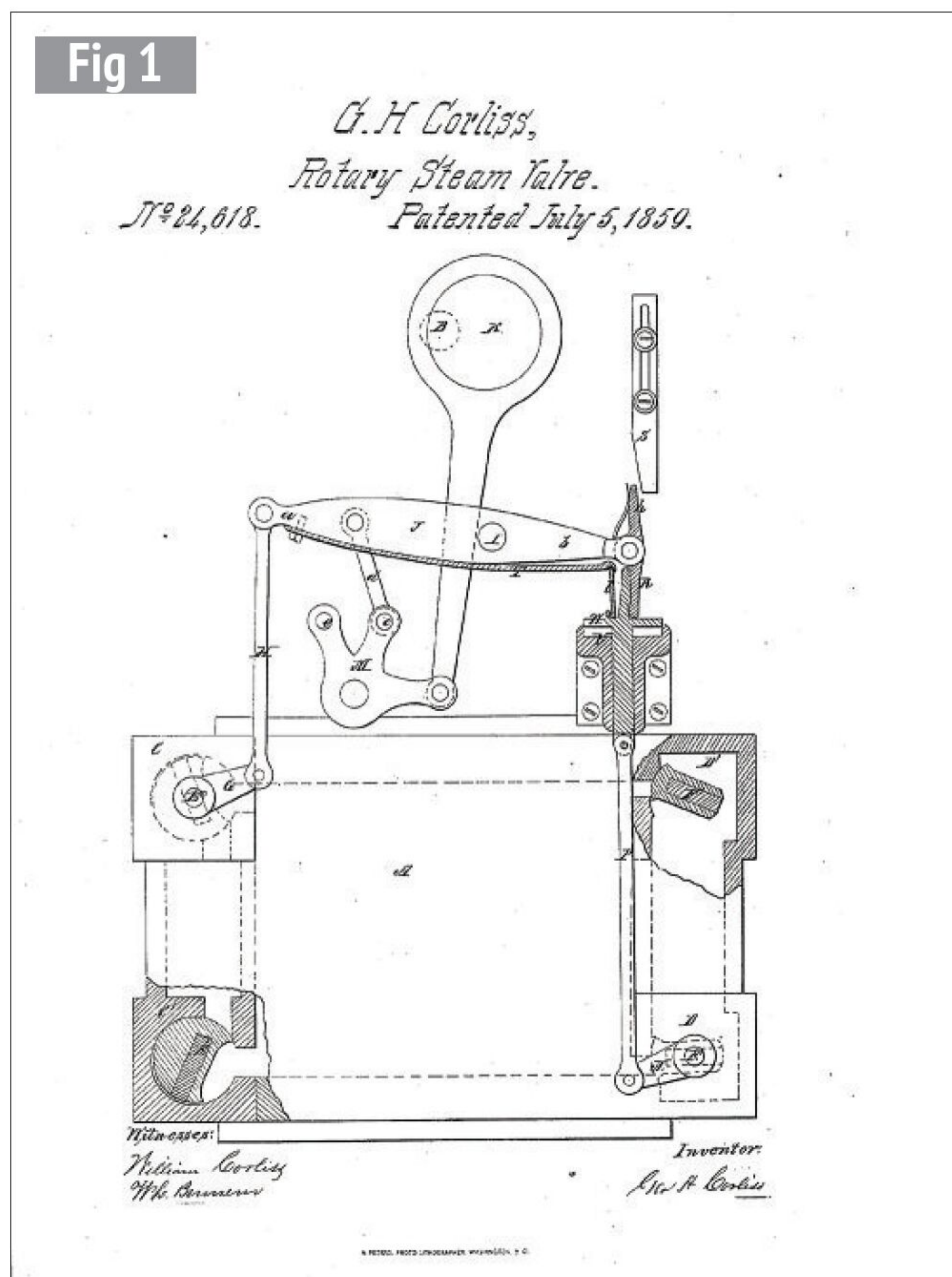
In the 1859 reissue of his 1849 Patent [Reissue No. 763 12th July 1859] Corliss writes:

'A liberating valve-gear presents, as I have discovered, peculiar features of adaptation for working in combination with a regulator, as it has the capability beyond other species of valve-gear of reducing the amount of power required of the regulator in controlling the periods of closing the valves, and also of reducing the range of movement, required of the regulator in fulfilling the requirements of regulation; and though the regulator possesses a very limited amount of available force within the limits of variation in velocity consistent with proper regulation, yet that force may be so applied to a liberating valve-gear as to be felt at each stroke of the engine, and vary the period of cut-off to correspond with the changes in velocity.'

These ideas in the two patents made possible the development of steam engines with reduced steam consumption and which provided the tightly controlled speed necessary for driving textile mills.

The rotary valve has always been known as a 'Corliss' valve and was very difficult to re-design to evade the original patents. The idea of a trip gear however was taken up by many companies and implemented in many different ways. Bob Potter included with

Fig 1



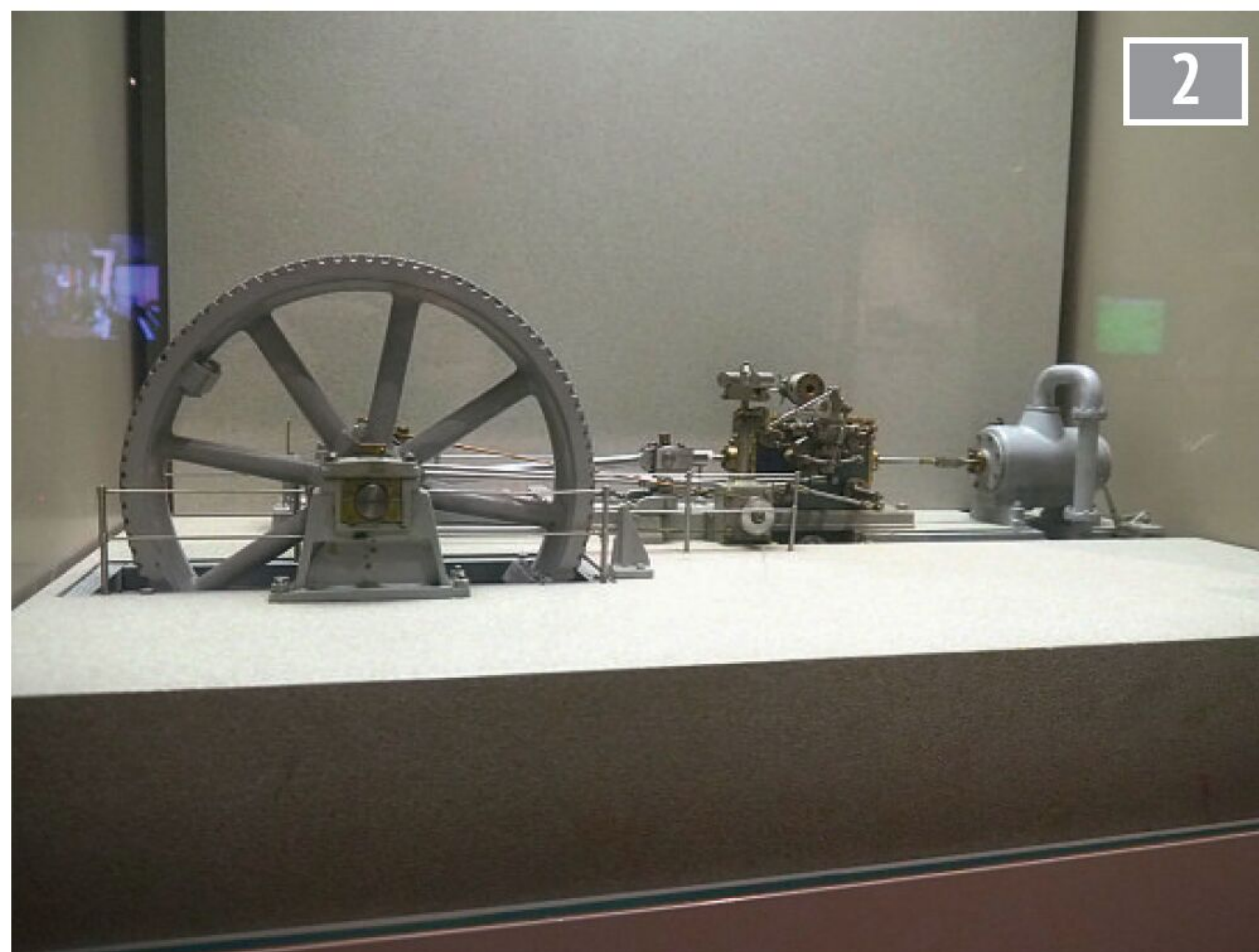
George Corliss' patent for a 'Rotary Steam Valve'.

the drawings a copy of a figure in the book, *Valves and Valve Gearing* describing one made by Messrs. Musgrave which looks to be the source for the gear on the model.

This version of the model

After two successful IC engine builds (Len Mason's 'Mastiff' and an ET Westbury 'Wyvern')

I was ready for a steam engine project for the next model. I described both the petrol engine builds on the Model Engine Maker forum (MEM) and had had a lot of help and support from the other builders there. The choice of engine for this project was the result of my interactions with MEM, particularly Tug Wilson



Arnold Throp's original model. Now displayed at the Powerhouse Museum in Sydney, NSW.

who wrote up his building of one of these engines (thank you Tug!). At the Forncett Industrial Museum's 'Model Engineers Day Out' in October 2018 I saw Tug's progress with his all-Corliss valve tandem compound version and was impressed with it (both the design and the workmanship!). At that time Bob Potter was running 'Southworth Engines' and supplying drawings and castings for the mill engine and he sent me a set of drawings. The engine was - just - within what my machines could deal with and I was very taken with the idea of building one, so I parted with the money. Bob had given up on sending castings via the post/couriers but he, very kindly, delivered the 23 kg of metal to friends of ours 'to await collection'. Customer service indeed! Nearly a year later we were in the UK again and I was able to pick up the castings from our friends near Huntingdon. After collecting the castings, I re-packed most of them into a small trolley case and spread the smaller ones out among our other bags. On checking in for the flight back to Australia I don't think the person on the check-in desk had ever had a case so small that weighed 23 kg, but she accepted my explanation of the contents - without much idea of what they were, I suspect (**photo 1**).

Of the various versions shown on the Southworth drawings, my choice was the tandem compound with Corliss valve HP and slide valve LP cylinders and a combined air pump and spray condenser (**fig 2**). The cross-compound versions were attractive but too bulky for easy storage, transport or display. The tandem is nearly a metre long but will at least fit on a shelf. It would be possible to build the model without the air pump and save some space, but all the full-sized engines exhausted to vacuum and the model would look incomplete in that form. If it were necessary to save space, weight, or money it would be possible to omit the LP cylinder as well and still

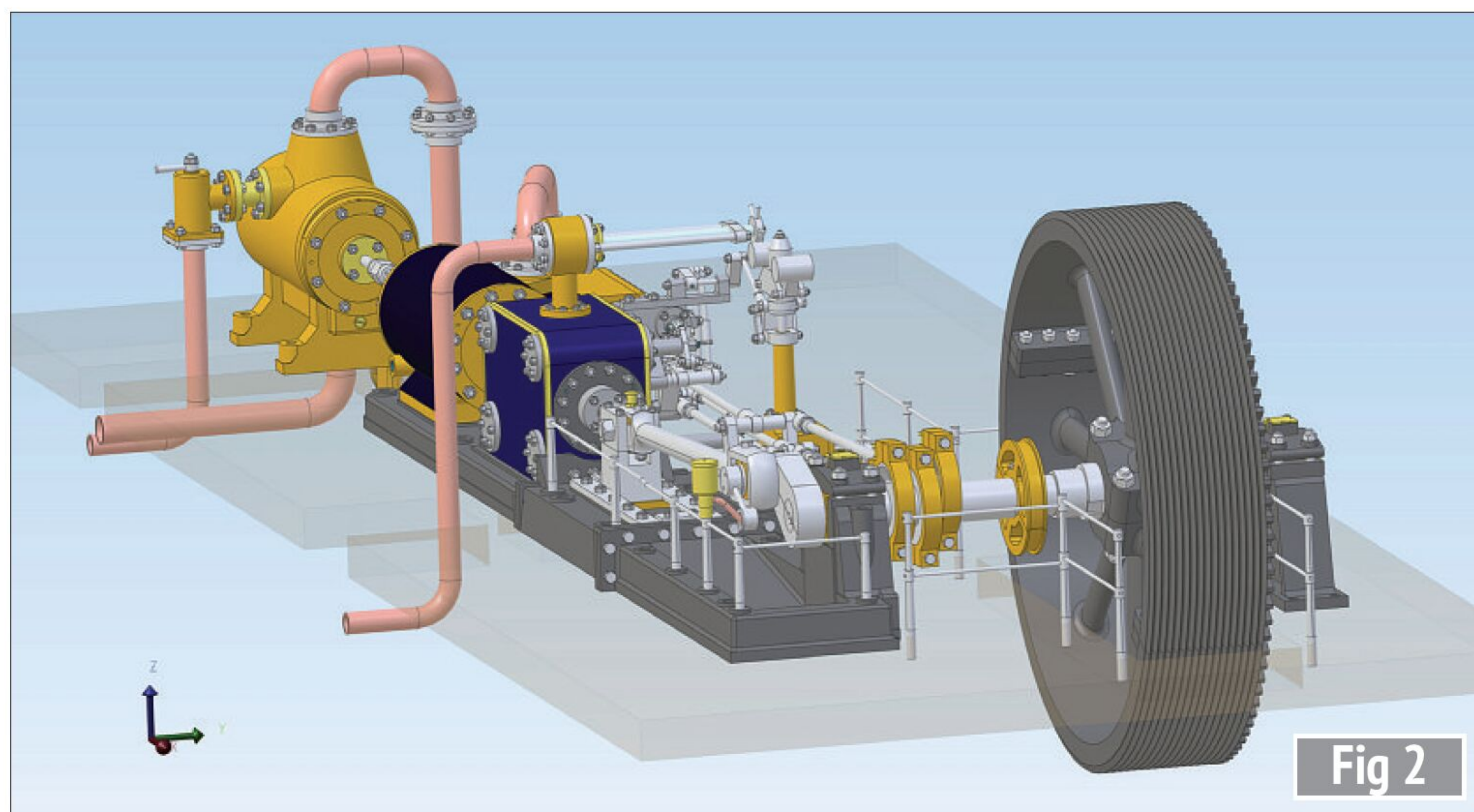


Fig 2

A screen capture of the 3D CAD model (Alibre 27).

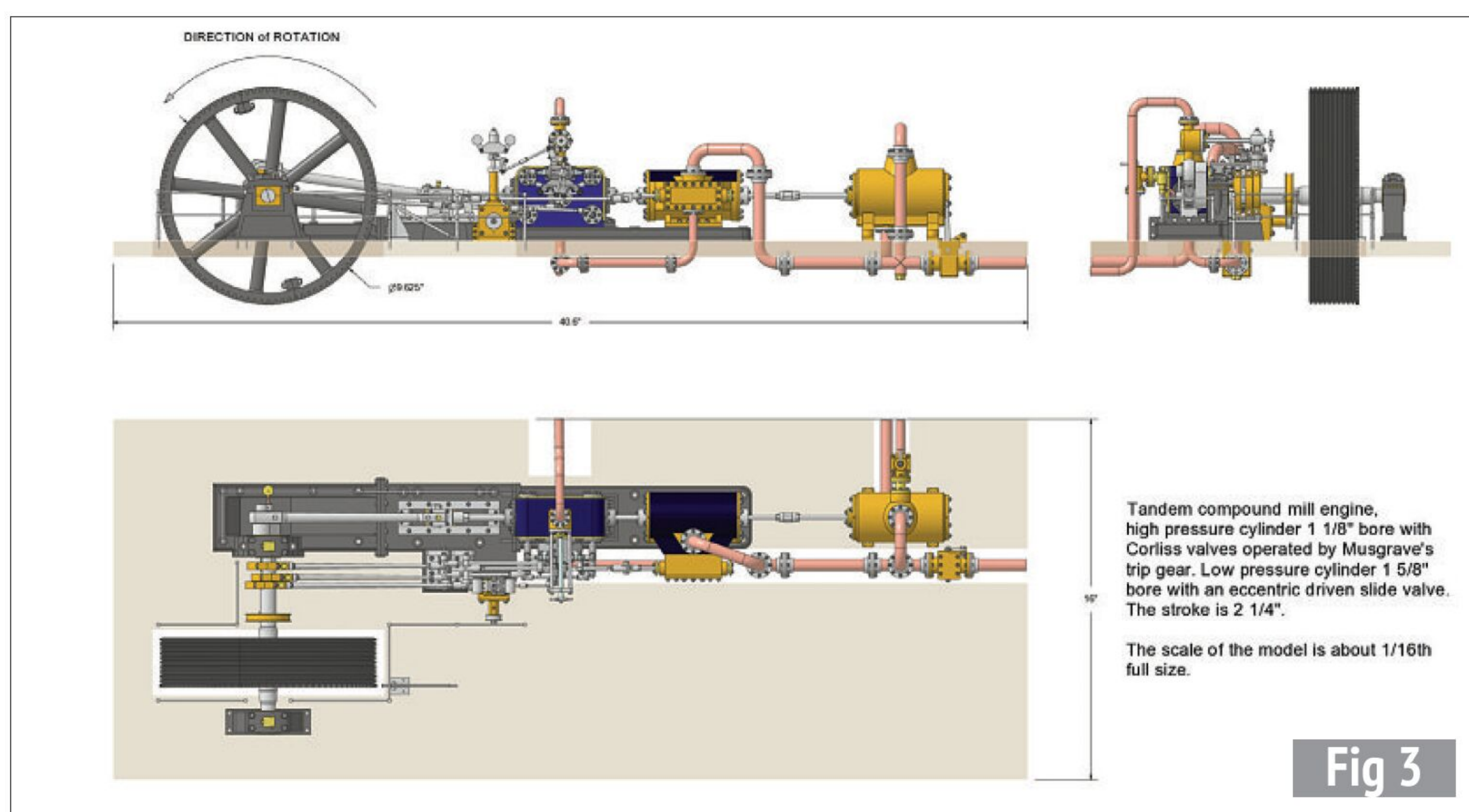


Fig 3

A general assembly drawing of the model.

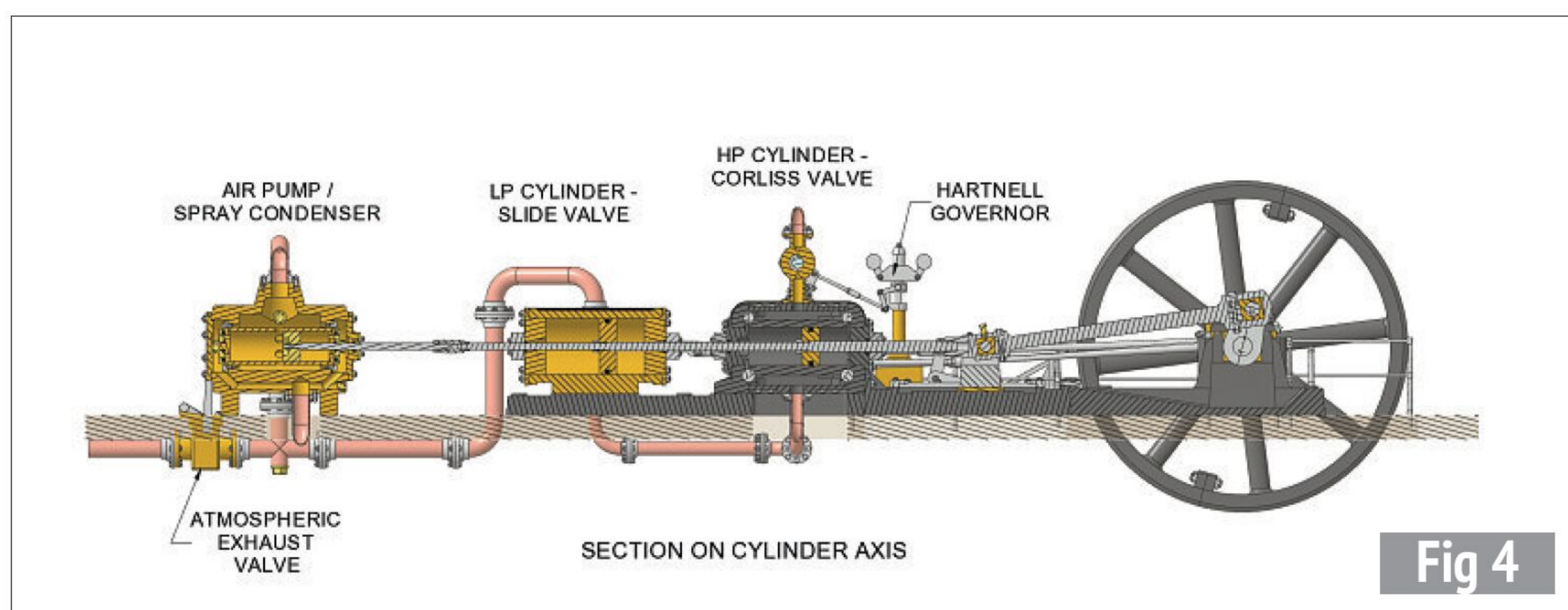


Fig 4

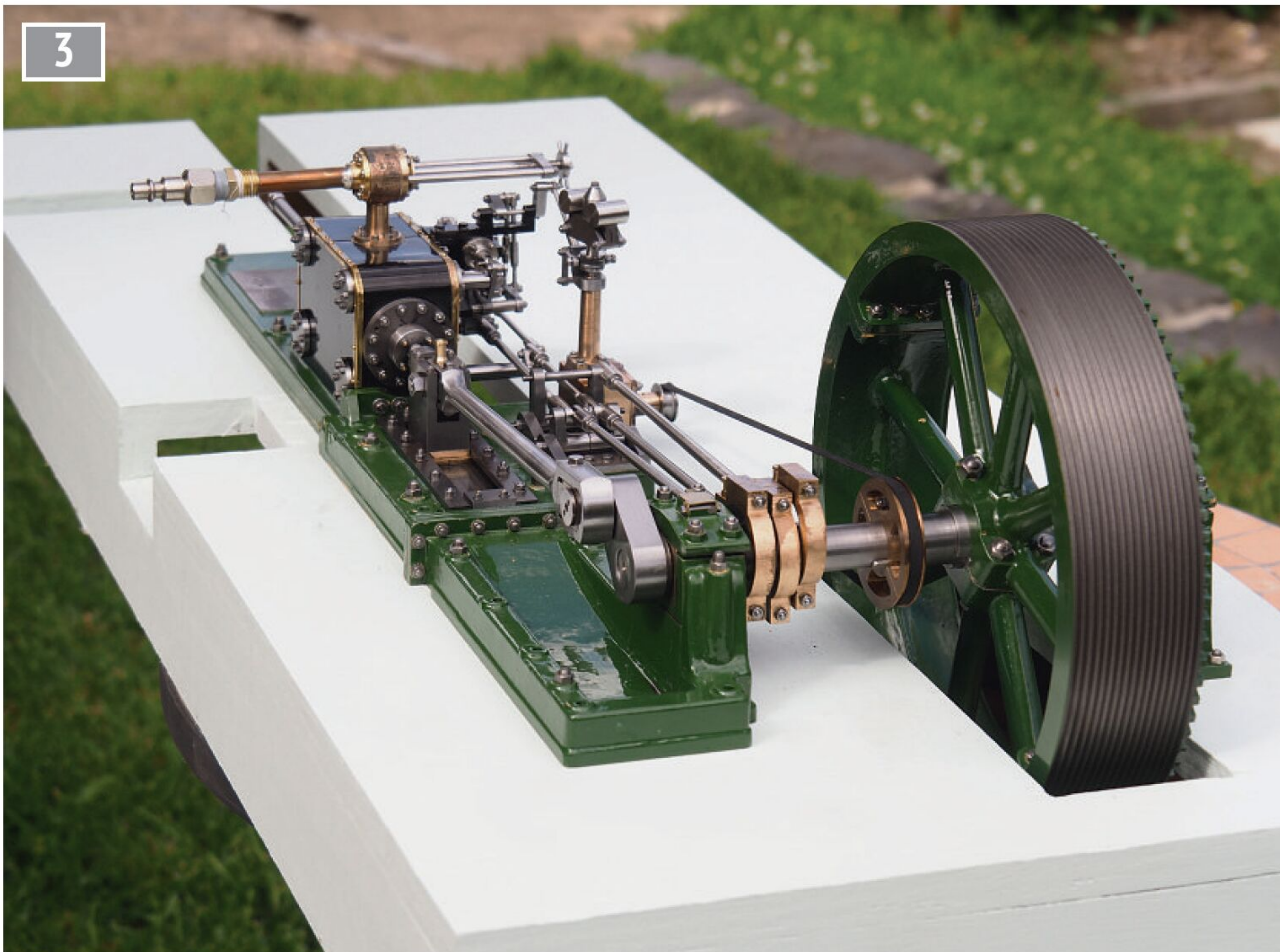
Cross-section drawn on the cylinder vertical centre line.

have a working engine; after all that was the form that Arnold Throp first described in *Model Engineer* in 1982.

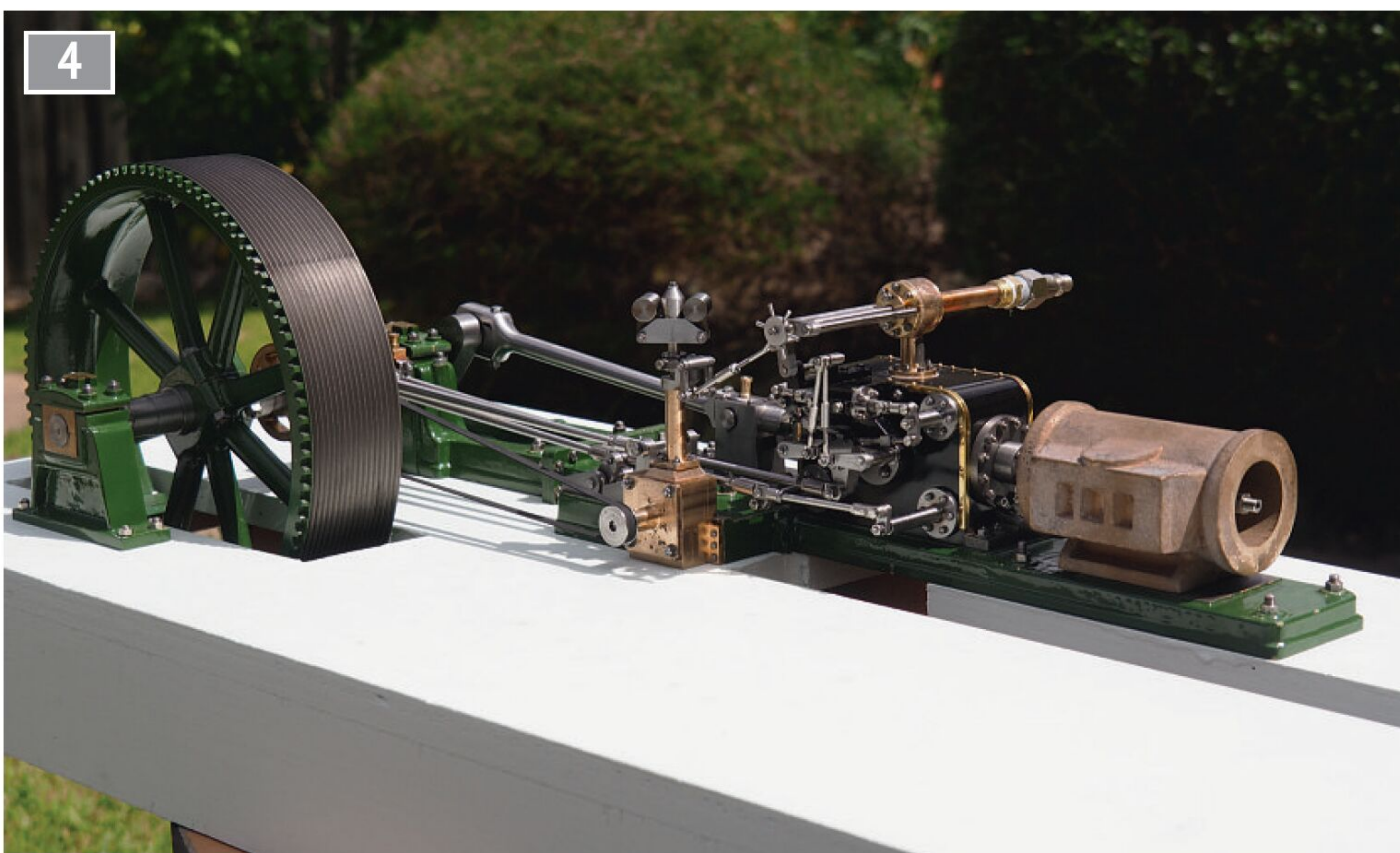
On the drawings provided by Bob Potter all five versions

of the model were detailed together. The information is all there, but I needed to see for myself exactly what I was going to build so I modelled the parts needed for the

tandem compound in the Alibre 3D CAD package. From the CAD model I have been creating detail drawings as I go along, then building from these (**figs 3 and 4**). I know



The current state of the new model – 1.



The current state of the new model – 2.

it's difficult to prove your own drawings, but I think I'm finding most of the problems (e.g. missing dimensions) as I go along. There were a few minor problems in the original design, which I hope I've dealt with, and I've also made a few detail changes, mostly to simplify the manufacture of parts.

The largest component of the model is the flywheel at 9 5/8 inches diameter by 2 3/16

inches thick. It was only just possible to machine this on the author's Hercus 260 (10 1/4 inch swing) lathe with some extreme and chatter-prone set-ups; a 12 inch swing lathe isn't essential for building this engine, but it would make things a lot easier. All the necessary milling operations were within the 300 x 135 x 260 (x, y, z) mm range of the Aciera F3 universal mill which

has a DRO fitted. The DRO isn't essential, but it did make a lot of operations much easier, particularly when drilling rows and circles of holes of which there are many. Most of the time the mill was in the vertical mode and that is probably the only essential set-up, but a few operations used the slotting head. A rotary table and dividing head are essential, and a sine table or sine vice

will be very useful. There are several hundred small holes to drill and tap, lots of 6 and 8BA plus 10BA and 12BA, these last convincing me to make a George Thomas Universal Pillar Tool - something I should have done a long time ago. The Pillar Tool is an interesting and instructive build in its own right and tapping 12BA without it would have been close to impossible for me. The iron castings were all fine grain and uniform in their properties with very few hard patches, all of which were on the outside, and machining these was pleasant.

At the time of writing the model is running on air but only completed as far back as the HP cylinder (**photos 3 and 4**). The LP cylinder and air pump have many fewer bits than I've made so far so, barring disasters, I should be able to stay ahead and keep the series going to completion.

● To be continued.

REFERENCES

- Ref 1** *Throp, A; A Model Condensing Corliss Engine; Model Engineer Vol 149 No. 3687 20 August 1982 and No. 3689 17 September 1982.*
- Ref 2** *Model Corliss valve steam engine 2022, Museum of Applied Arts & Sciences, accessed 22 June 2023, <<https://ma.as/231080>>*
- Ref 3** *Throp, A; The last Years of Mill Engine Building; International Stationary Steam Engine Society 1993; ISBN 1 872986 07 2*
- Ref 4** *Tug's Corliss Tandem Compound Project (modelenginemaker.com) Retrieved 04/02/2023*
- Ref 5** *Patents for George H. Corliss (datamp.org) Retrieved 06/02/2023*

Enhanced By Vehicles PART 3

How introducing road vehicles improved a model tramway

Ashley Best
realises
that a
typical street scene is
not all trams.



Louvres

Louvres are an important feature on any vehicle. I gave a lot of thought to this as a bit of a problem. In the end, I devised a simple jig tool that works well. For this, I made use of my very first lathe and combined drill press, Unimat S.L. This has a small machine vice which was fixed to the cross slide and allowed very fine positioning to be achieved beneath the drill chuck. I made a simple slotted bed and adjustable width side guards to accommodate

possible widths of the louvred panels. Some mild steel stamping cutters of different widths were made to be held in the drill chuck which was then aligned exactly in position so that brought down firmly it punched a louvre in the thin aluminium sheet. The cutter could then be raised, the panel moved forward and eased back gently for the cut louvre to be held against the spacer, thus making the next cut in the right position. This manoeuvre could then be repeated until

the required total was achieved (fig 5).

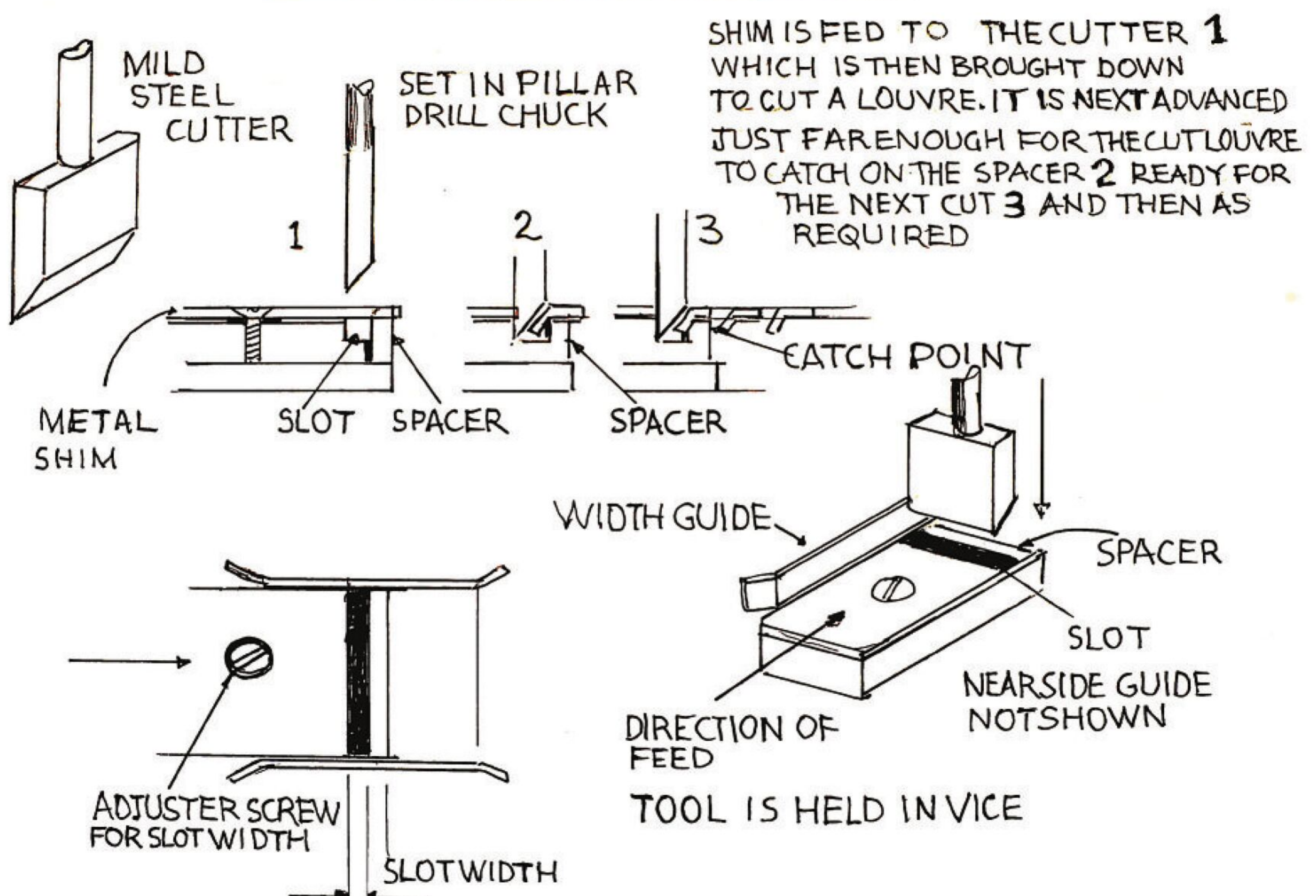
Radiator

This is a most important and defining feature of any road vehicle from earlier days. Mine are made from brass and require use of a piercing saw. The front shape is most important. It is cut from marked-out sheet brass and then a narrow annealed strip wrapped round the front of the engine block. As an accurate fit it can then be silver-soldered

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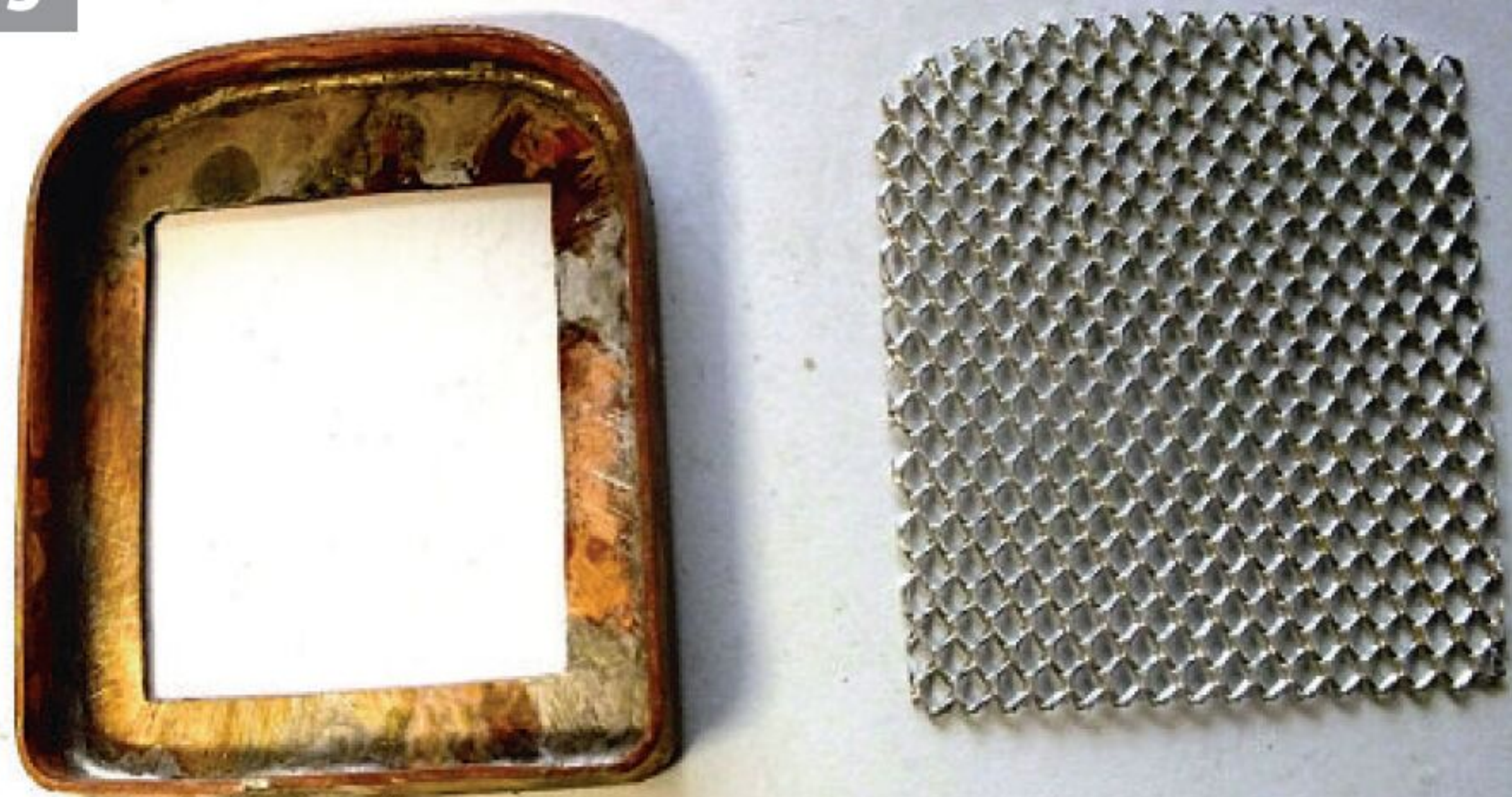
SKETCH OF LOUVRE TOOL

Fig 5



Louvre tool.

23



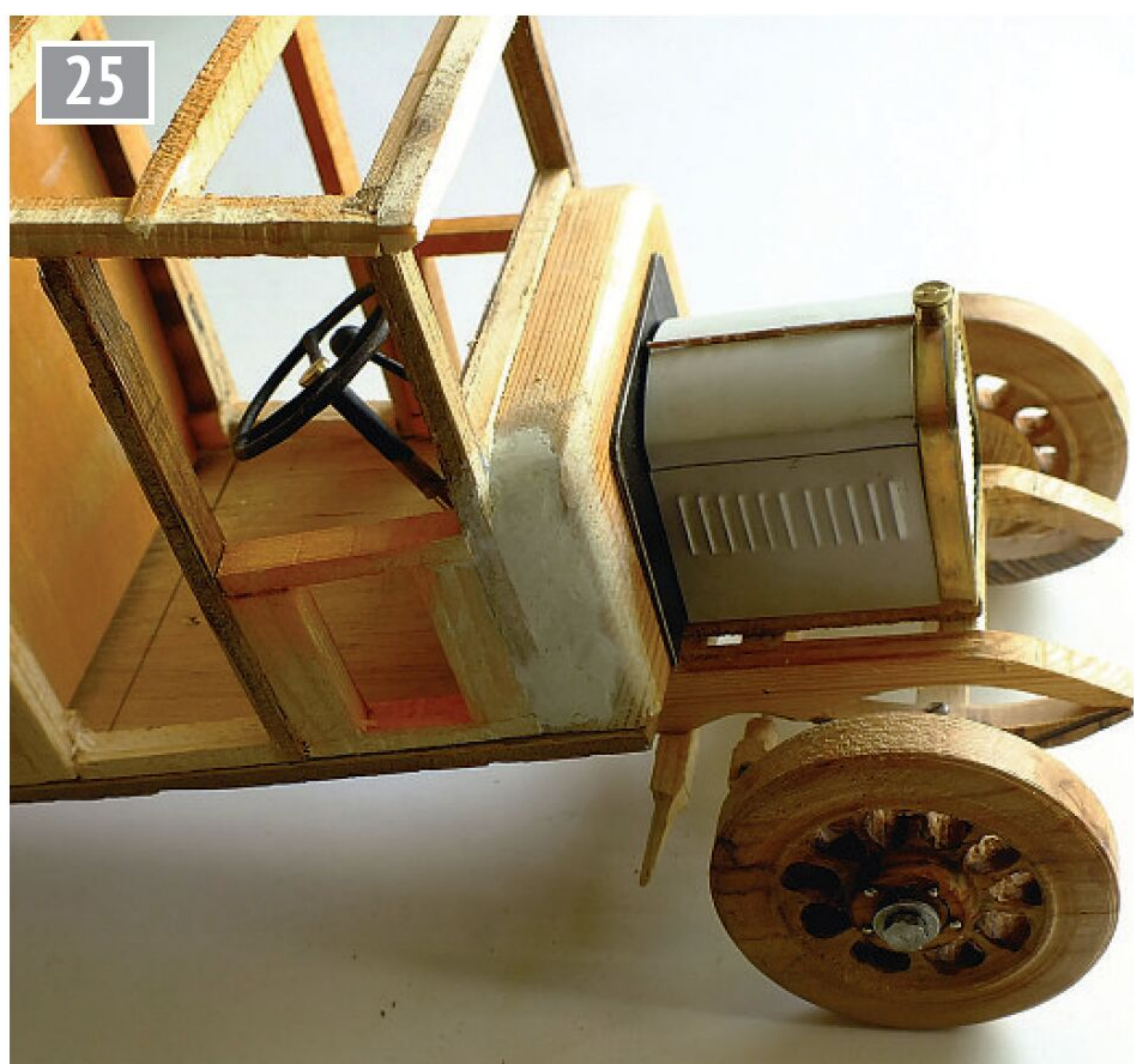
Radiator cowl and grille.

24



Radiator in position.

25



The scuttle is separate on the Morris commercial lorry.

26



Wooden framework for the bodywork.

27



Main panels are thin ply or aluminium.

28



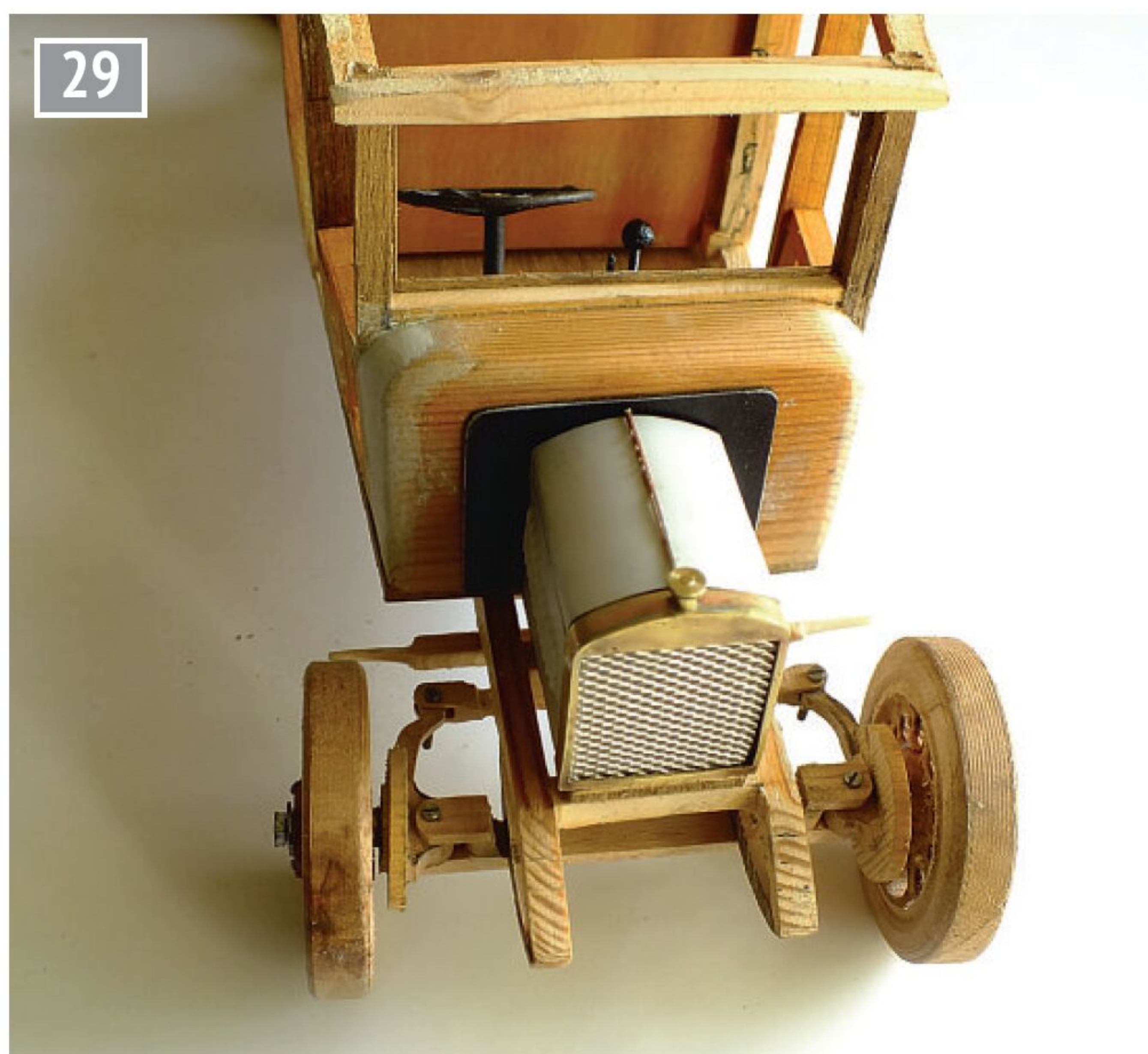
The signwriting goes on before assembly.

to the front part which is cut slightly oversize to allow it to be filed to size (**photo 23**). This, when finished should be a perfect push fit. Suitable gauze is situated behind the front to simulate the radiator grill (**photo 24**). Only at the end of construction is the filler cap fitted and a starting handle can also be added. I make this whole engine block

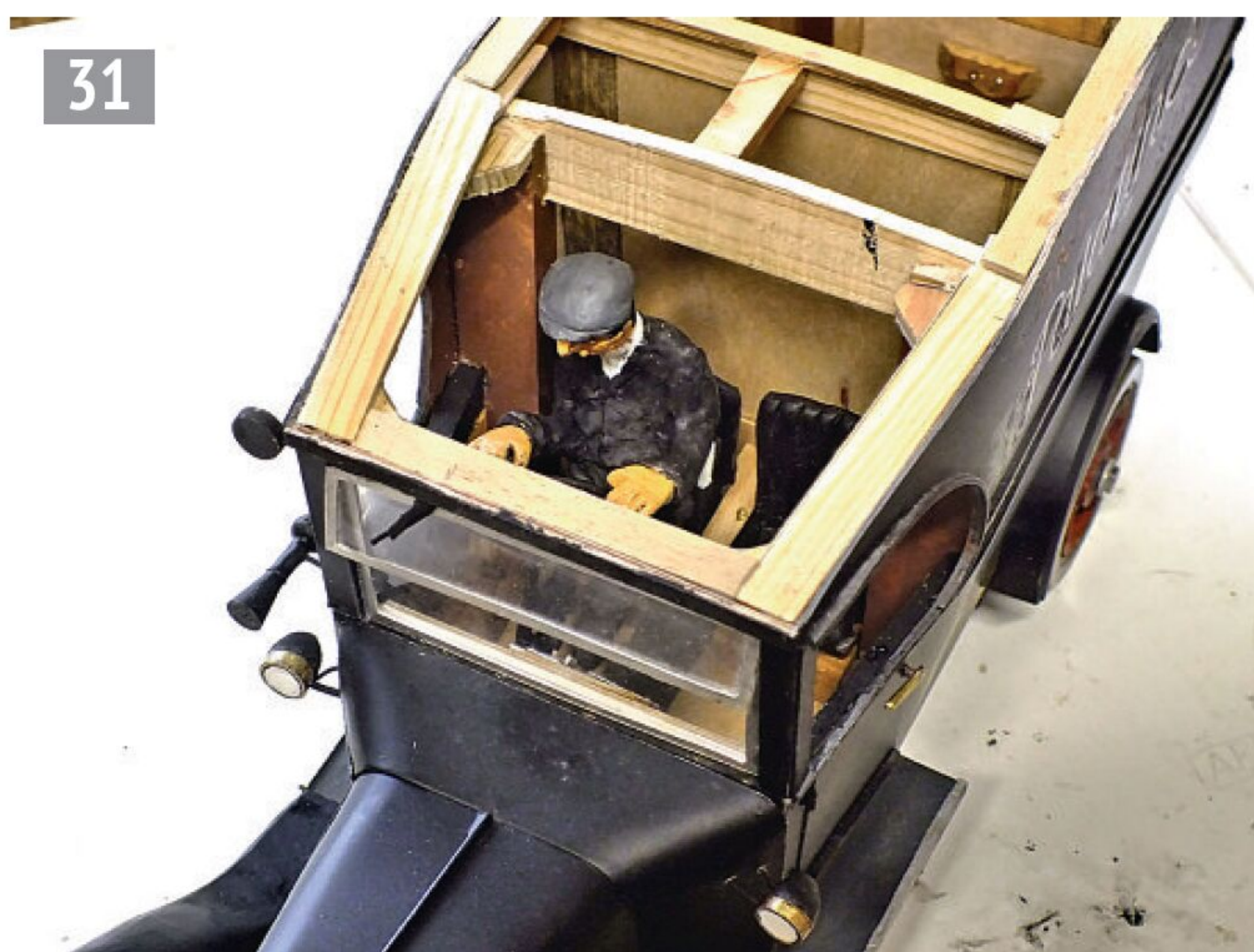
from beneath and then the main bodywork fitted to butt up against it. The scuttle might be attached as part of the engine block or made as a separate item. On the early Morris commercial lorry of 1927, the scuttle was a distinctly separate item (**photo 25**).

Bodywork

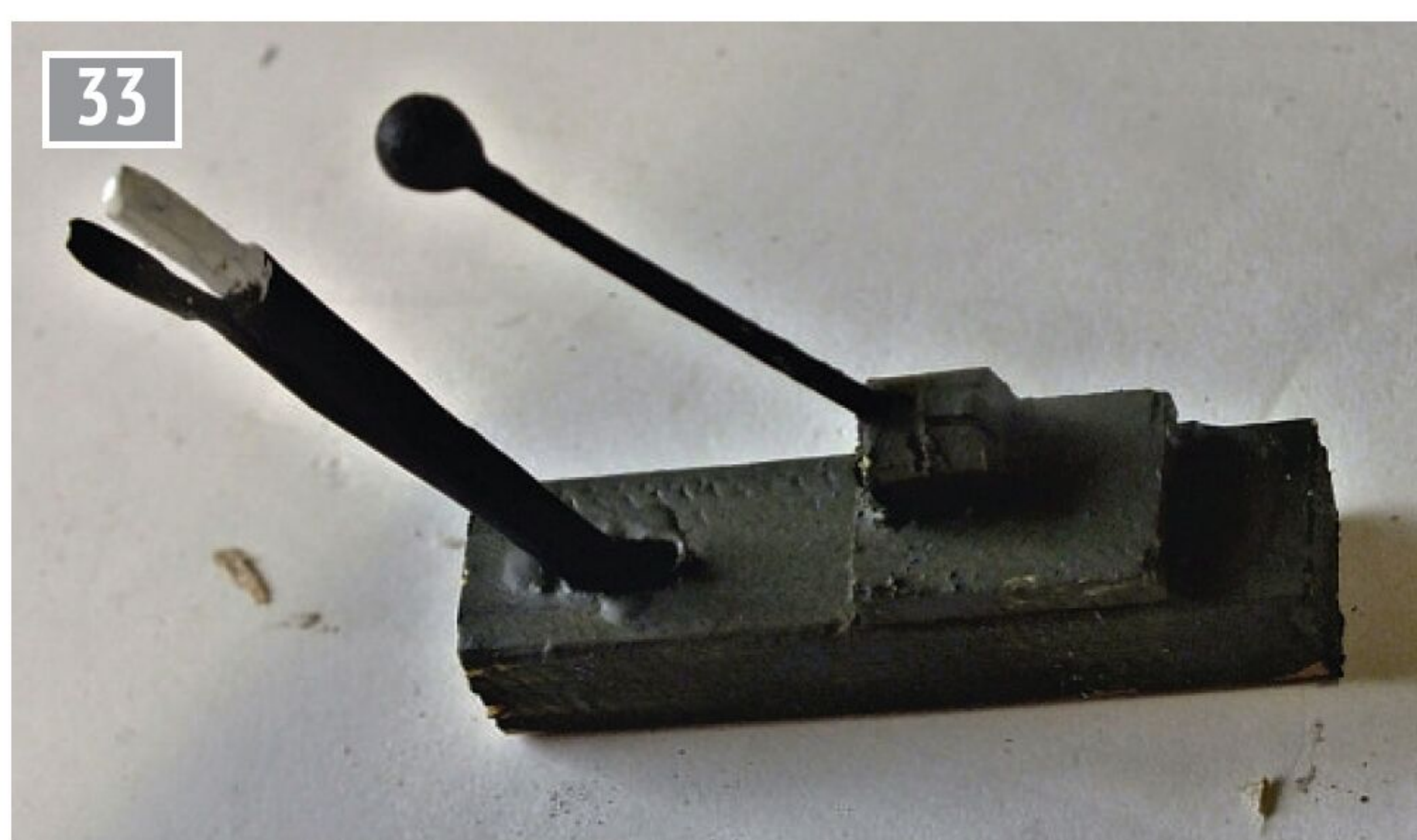
The main bodies of the vehicles made so far follow the same



The finer parts are carefully sanded.



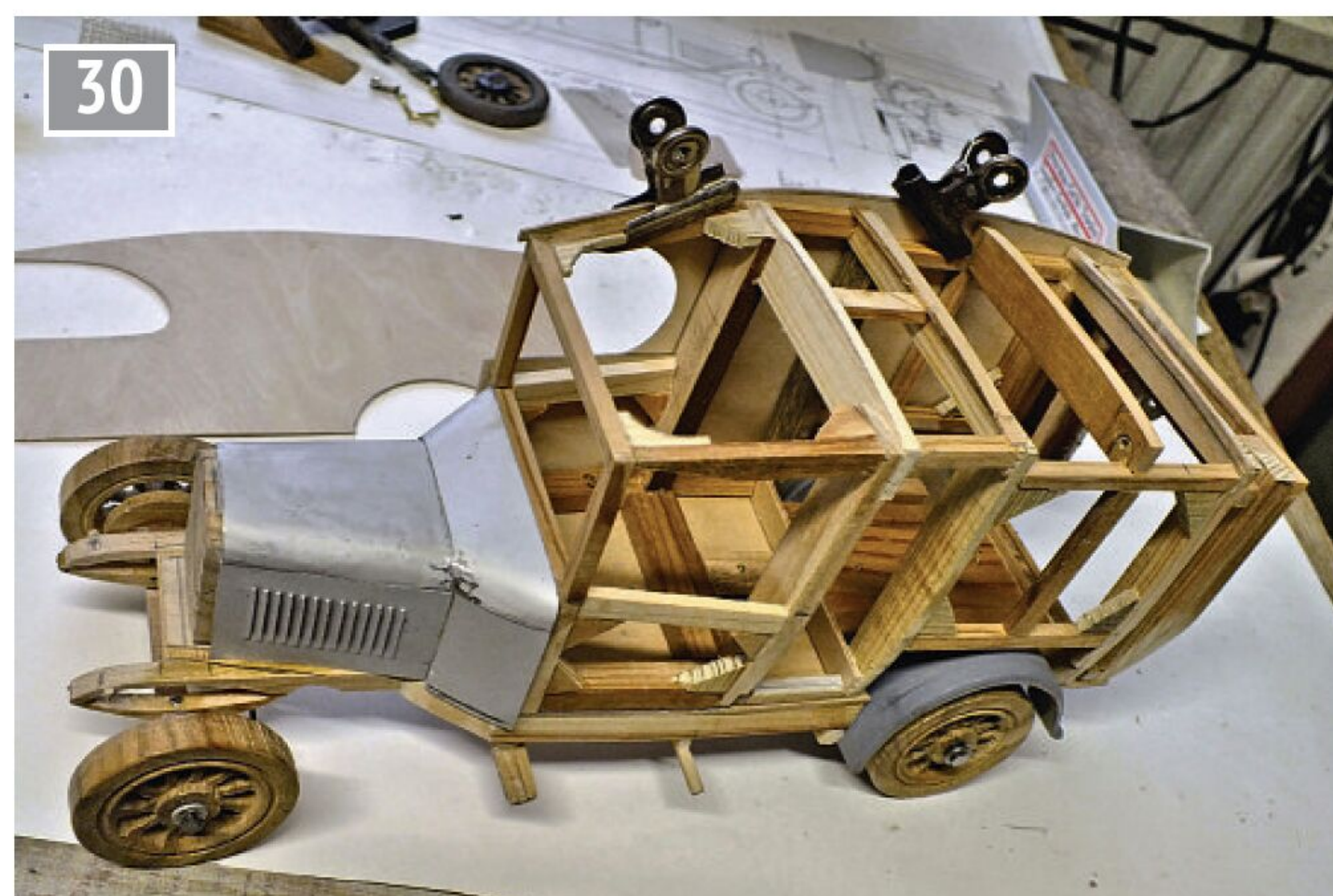
Seats are provided for the driver and his mate.



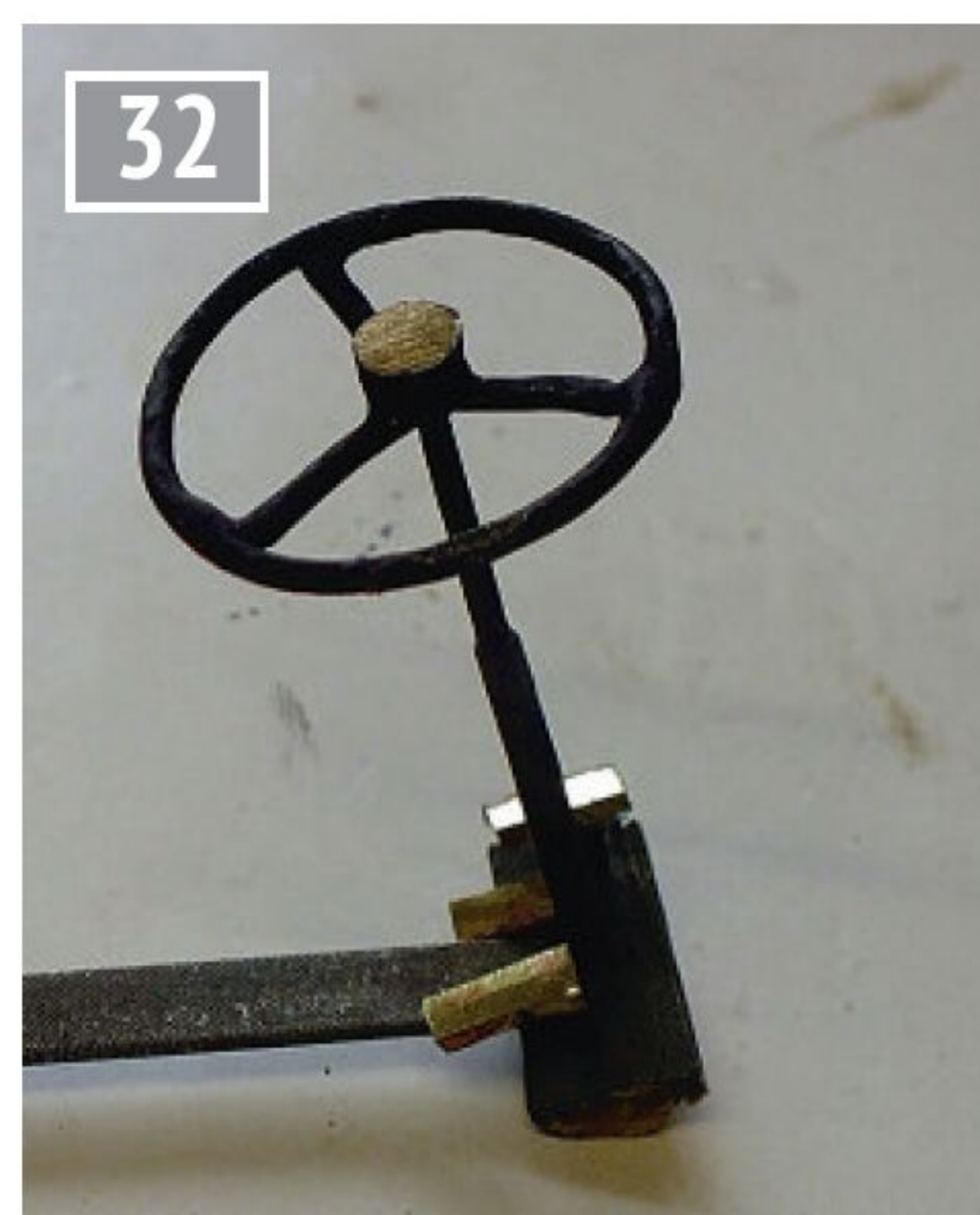
A handbrake is even more important.

construction. A framework is made to follow the profile of the floor and can be fixed in place with the screws beneath (photo 26). This makes it possible to remove and re-fit

the frame if required. The next stage is the main panels for the sides and rear. These are first developed as paper patterns and then cut from either thin ply of 0.9mm or from thin



Attaching the panels to the framework.



A steering wheel is a vital asset.

aluminium sheet (photo 27). Any moulding can then be applied. Painting is done before fitting to the framework and this includes any sign-writing as it is so much easier than on a finished model (photo 28).

Metal sheeting can easily be primed and sprayed with the desired colour. However, when plywood is used, painting is a bit more demanding and it needs a lot of preparation and much rubbing down after the application of filler primer. Whichever material is used, one difficult problem is the cut-out required for the rear mudguards as these recess into the structure. A paper or card profile drawn round the mudguard is essential and is then used to outline the shape to be cut out. This has to be done with great care and slowly.

I use a piercing saw on whatever material is being used. It needs a fine tooth blade. Tiny adjustments can be carefully made, if required, by sanding. It is one of those

things which is frequently overlooked, or assumed to be a minor difficulty, but actually is of major importance as a botched effort looks awful. Some details that are part of the construction process can be seen in photos 29 and 30.

Interiors

Only in a car model is there the need for at least some interior detail. Vans or lorries need a little just at the front end. The main things required are seats (photo 31), a steering wheel (photo 32), foot pedals, gear lever, handbrake (photo 33) and a dashboard. Again, unless making an exhibition standard model, a large degree of simplification will do nothing to detract from the general appearance. I could find very few picture references of interior details, so I employed a bit of creative imagination with some dredged up from memories drawn from my early motoring experiences in my 1932 Austin Seven.

Seats are straight-forward and are simply a wooden frame and then black Milliput, shaped to represent the upholstery. Steering wheels were constructed from thick brass wire with spokes and centres silver-soldered. Gear levers and handbrakes were easily made from scrap bits of metal. Dashboards were kept very simple – my Austin had few basic dials and I assumed that this would probably be true of most 1920 era vehicles.

● To be continued.

Part 18:

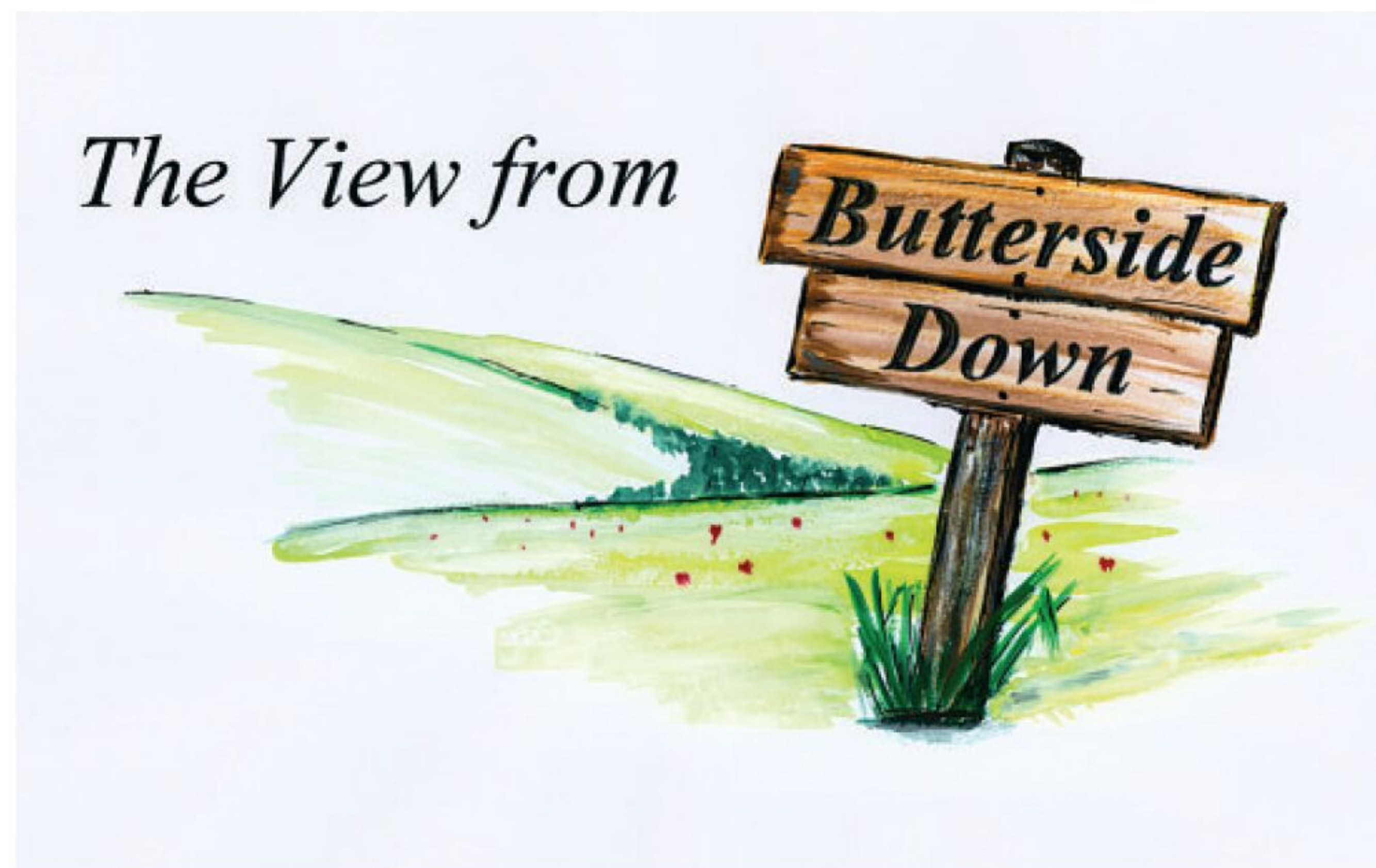
Pastures New - Part 2

Barn Raising

Steve Goodbody takes a random walk through model engineering.



Continued from p.276
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In Part 1 of the latest missive, a mechanical mule unwittingly entertained a member of the local constabulary sipping a hot beverage (the policeman, not the mule). Having fulfilled his

civic duty and bidden farewell to the pseudo-wildlife, your fearless author was left with a strange formation in his back garden which was, worryingly, decidedly single storey in its overall appearance.

Three-dimensional puzzles

As with many space-constrained cities, New York - and the island of Manhattan in particular - has made remarkably creative use of its limited footprint. Of course, there's the subway system which, like the London underground, is a work of engineering genius largely hidden from view, and Grand Central Terminal, with its simultaneously spectacular, soothing and cathedral-like above-surface spaces (which, being both free to enter and far more impressive than many of the here today/gone tomorrow tourist-traps, should be on everyone's must-see list in my view) is an almost wholly subterranean edifice when you get right down to it, so to speak.

Once above ground of course, the city rises to an almost miraculous degree, as all who have visited will attest and all those who haven't will surely know from the endless stream of movies and television shows which continue to feature its resonating streets and penetrating skyscrapers and whose production once disturbed my daily commute with tedious regularity. Yes, Manhattan's skyline, streets and avenues are *déjà vu* familiar to every new arrival; they have seen them all a thousand times before.

Now the reason I mention this is that, in my opinion, we model engineers share a feature which is common to the professional engineers and architects who visualise these



The newly arrived shed, bearing a disturbingly single-storey appearance.



Fortunately, by the end of the following day, a second level had magically unfolded.

multi-level possibilities and turn them into reality, a feature which, while you may take it for granted yourself, is not as well developed in many other folks as you might believe. To wit, we, just like those city-building experts, tend to be rather good at thinking in three dimensions, don't we? And, as I stared at our newly arrived two-story shed sitting proudly on its fortunately right-sized concrete base (**photo 95**), one rather non-trivial question was in the forefront of my mind: where's the upper half?

The gang's all here

On the dot of seven o'clock the next morning a knock at the door announced the arrival of a small but dedicated band of Pennsylvanians, all bearing a remarkable resemblance to our driver of the previous day and all primed to get on with the job. With the coffee order taken – cream and four sugars in every cup once again – and carrying a tray bearing the result, I emerged from the house to a remarkable sight for the shed, in the space of just fifteen minutes, was now much taller than it had been when the kettle was switched on. In fact, as I watched, the last of the upstairs walls magically unfolded from its flatpack position and was hauled upwards to abut its now-vertical neighbours, a set of hinges at its base ensuring

that it ended up exactly where it should. Moments later it was securely and permanently attached by its base to the lower structure. What a relief!

As the day wore on, the speed at which the shed continued to take shape was simply dizzying. With the second-floor walls in place the roof was added, followed by underlayment and weatherproofing shingles atop, so that, as the late autumn sun dipped below Butterside Down's treeline, the single-story box of that morning was now transformed into a two-story structure closely resembling the drawings which we had approved several months prior (**photo 96**).

The following day, a seven o'clock tap-tap-tap on the door heralded the team's return once again, all looking far more cheerful than could reasonably be expected after yet another hundred-mile early morning journey, and by the time I emerged with that morning's coffee, several sheets of vinyl siding had appeared on the weather-wrapped walls and more was clearly on its way. With work now focused upon the outside and after checking to ensure it was okay, I stuck my head through the yet-to-be-installed doorway, marvelled at the substantial bracing which had kept the shed solidly square during its interstate truck journey and subsequent

mule ride, and gazed inquisitively around. These folks, I concluded gratefully, really knew what they were doing (**photo 97**).

By the end of that second day the shed was, believe it or not, complete - and never have I seen such a rapid transformation from box-on-a-truck to fully formed building - all thanks to a remarkably clever flatpack design and an incredibly hardworking and good-natured team of installers. After shaking their hands and waving them off with a decent tip, I turned to admire our new edifice, the realisation slowly dawning that this unpowered, unlit, un-insulated, unheated, un-airconditioned and internally incomplete structure represented the start of another substantial serving of *elephant fricassée* for yours truly (**photo 98**). In short, I now needed to turn this basic shell into a year-round habitable building.

Brass tacks

Now I'm not going to bore you with all the details of the ten months' largely solo effort that followed, relieved Reader, but over the last few years I've noticed occasional correspondence in various Internet forums relating to workshop construction, especially regarding the prevention of that ever-present

nemesis - rust - and while some of it is undoubtedly accurate, I am sorry to say that there is the inevitable smattering of wishful thinking, questionable economics and (with apologies for being so blunt) downright rubbish. And while I don't profess to be an expert on the subject, it is fair to say that a great deal of thought and planning went into the fitting out of my new workshop-cum-office, with the aim of making it simultaneously comfortable, energy-efficient and hostile to the formation of the dreaded ferrous oxide upon the precious contents within, in a climate that is both hot and humid in the summer and bitterly cold in the winter. In short, if a pleasantly habitable and rust-free workshop can be created in a shed in New Jersey then I see no reason why the conclusions and solutions would not apply equally well to other less climatically extreme locations, wherever they may be.

Of course, there's no such thing as a free lunch and it is true that the decisions and solutions which I arrived at were targeted upon their long-term payback and benefits, and that meant that they were not the cheapest in the short-term, but (I reasoned) I would be spending a lot of time in this building, year-round, regardless of the weather and I really did not want to skimp now and end



Within the shed, substantial cross-bracing kept everything ship-shape during the shed's long interstate journey and much shorter mule ride.



Although depicted a few months later with the electrical system by then installed, forty-eight hours after its November arrival the shed was externally complete!

up regretting it later. So, with that squarely in mind, let's get down to business.

The stuffing within

For many years I was fortunate to run the operational side of a solar energy company in the United States – focused upon the big systems producing electricity measured in tens or hundreds of MegaWatts and occupying vast tracts of real estate (you know the type) – and in the early days, before such systems were commonplace, I would often visit prospective clients, typically municipalities and the larger institutions and corporations interested in buying cheaper energy than was otherwise available from the electricity grid, to explain the technology, address their questions and concerns and put a face to a corporate name. Believing that honesty was both the best policy and the surest path to trust, I would always begin by stating, unequivocally, that the very best way for them to save money on a *sustainable* basis was not to purchase cheaper electricity from us! No indeed (I would continue), the

surest way which they could reduce their energy bills was to *use less energy in the first place*, it really was that simple. So, if their windows were double or even triple glazed, their lighting high efficiency, their buildings well sealed, their ceilings and walls properly insulated and their thermostats both programmable and under close supervision, then our sunlight-sourced electrons would be the icing on their cake. Inevitably, each organisation would assure me that they had already done all those things; surprisingly, some even had.

Sadly however, as you may well imagine, the truth was often otherwise, for changing windows and lights, sealing cracks, improving insulation and updating energy-management systems are all labour-intensive, expensive, time consuming and invasive tasks, especially in an already-complete-and-operational building and, even worse, they are all *dull* activities which neither excite the readers of corporate prospectuses nor garner votes from local constituents. Put simply, solar power was new and exciting,

ticked the green sustainability box and could be achieved by simply signing on our dotted line – a far less taxing proposition. But at least my conscience was clear and, I reasoned, I had sown the seeds which would hopefully result in some of their saved money being ploughed into less exciting but ultimately more beneficial energy efficiency projects in the future. I lived in hope.

So, with these reminiscences running through my mind, I stood, caulk-gun in hand after sealing every tiny gap to the outside world, and surveyed my bare-bones shed, deliberately purchased with high-efficiency windows and doors as a part of the package, preparing to put those years of energy-efficiency advocacy into practice and determined that there would be no accusations of half-measures or hypocrisy levelled in my direction. Those Wonderland dragons would garner no leeway this time, I vowed.

Postscript to Part 18

If you haven't yet read it, I can heartily recommend

Anthony Robins' 2013 book *Grand Central Terminal* which, in addition to outlining the fascinating story of New York City's early development and the importance of the railway in its northbound expansion, details the many engineering and architectural innovations that made Grand Central a truly one-of-a-kind railway terminus. In fact, if you are considering a trip to New York City then you really *must* read this book - take my word for it - and when you arrive, I promise that you will make a beeline for that remarkable station and its surroundings to behold what you have discovered with your own eyes.

Now, to return to the overpoweringly three-dimensional architecture of my nearest city, while I hope that many of you will indeed read and then visit Grand Central Terminal, gaze in awe at its jaw-dropping architecture and visualise the rabbit-warren of tunnels and passageways beneath your feet, the same cannot be said for the city's main bus station, the uninspiringly named Port Authority Terminal which, despite its equally space-clever design - its buses arrive at and depart from a level several stories in the air - is a bit of a fleapit if the truth be known. Despite its sanitary flaws, however, the Port Authority Terminal has a fond place in my heart for one reason and one reason only – it features prominently in one of the best dad-jokes in my repertoire, one taught to me several years ago by my daughter which left me both proud, grateful and optimistic for the youth of today. And as my parting gift, here it is for your benefit too:

Q: What's the difference between the Port Authority Terminal and a well-endowed lady lobster?

A: One's a crusty bus station, and the other's a.....

I'll leave you to fill in the rest. Don't mention it, you're welcome.

●To be continued.

The Leufortin Project

PART 4

Ian Bayliss
presents
an internal
combustion G-scale
locomotive.



Continued from p.255
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Chassis assembly

Wheels were fitted and secured as detailed at the correct back to back distance. The gear had been keyed and fitted. Finally Leufortin 1 is up on own legs (**photo 22**).

The fly cranks quartered well and were just temporarily grub-screwed (for any adjustment). This was based on the view that this was the slowest part of the transmission and would last long enough to check the running before the final strip down ready to paint. The same judgment was made for plain axle box bearings in brass, well lubricated.

The subsequently infamous forward/reverse gear tumbler mechanism had to be assembled and installed with the jackshaft into the chassis. The jackshaft went in with its gears and tumbler assembly. Gear meshing was good and very smooth. I think the pictures are self explanatory (**photos 23, 24, 25 and 26**).

Excited by now to have a chassis up on its own legs,



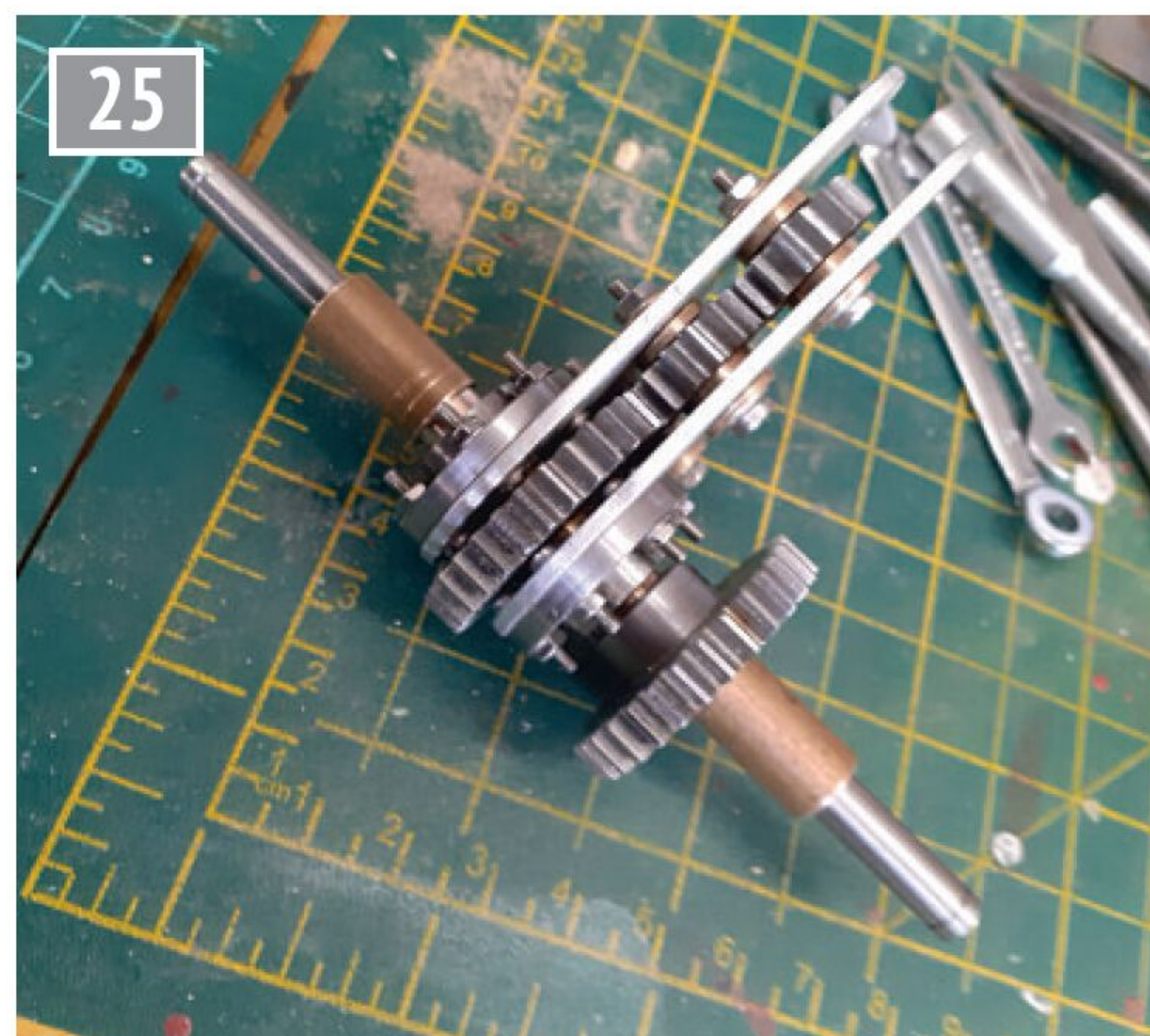
The chassis on its wheels having been 'dry run' assembled to get axle centres for coupling rods.



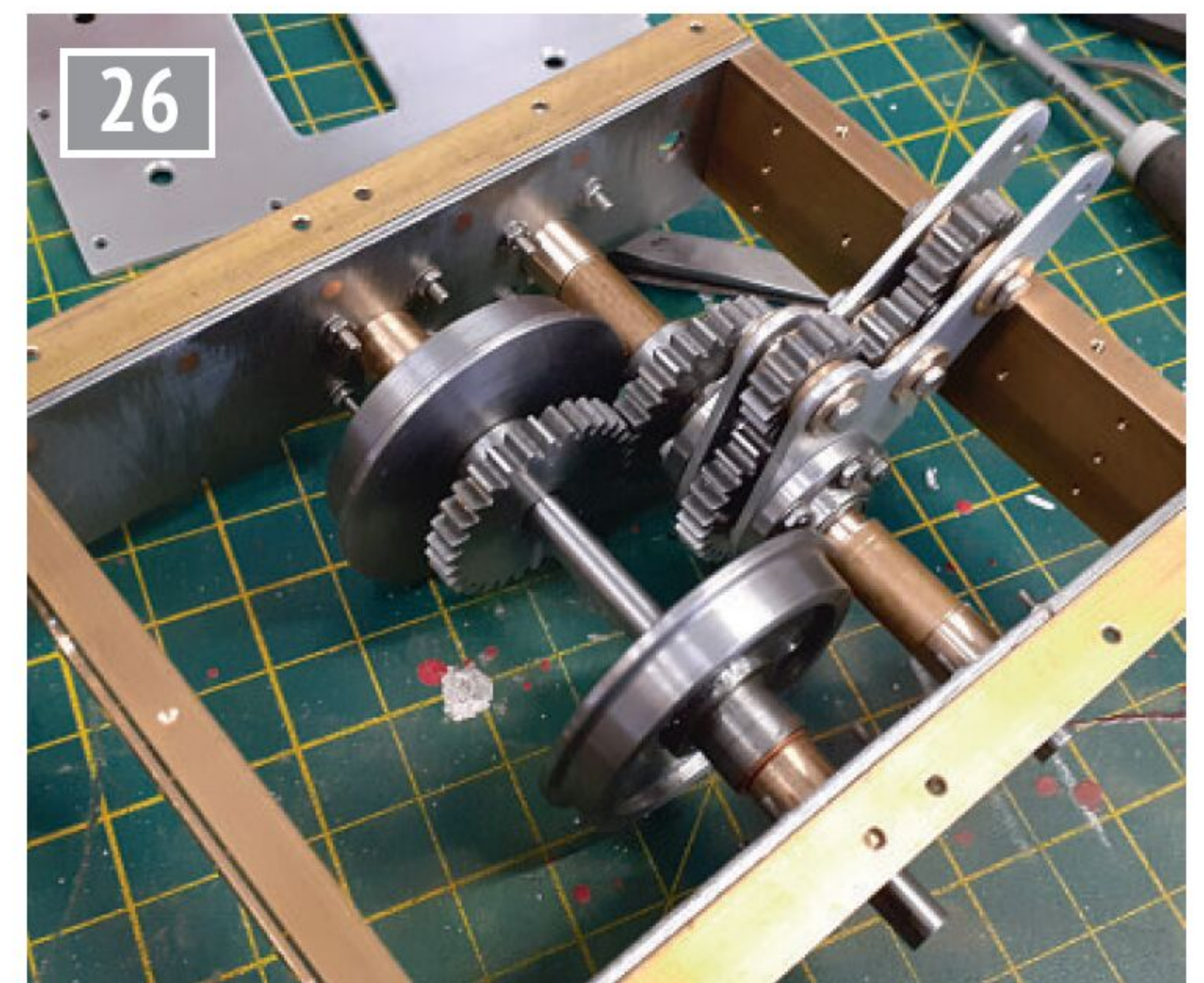
Assembly of forward/reverse tumbler gear yokes.



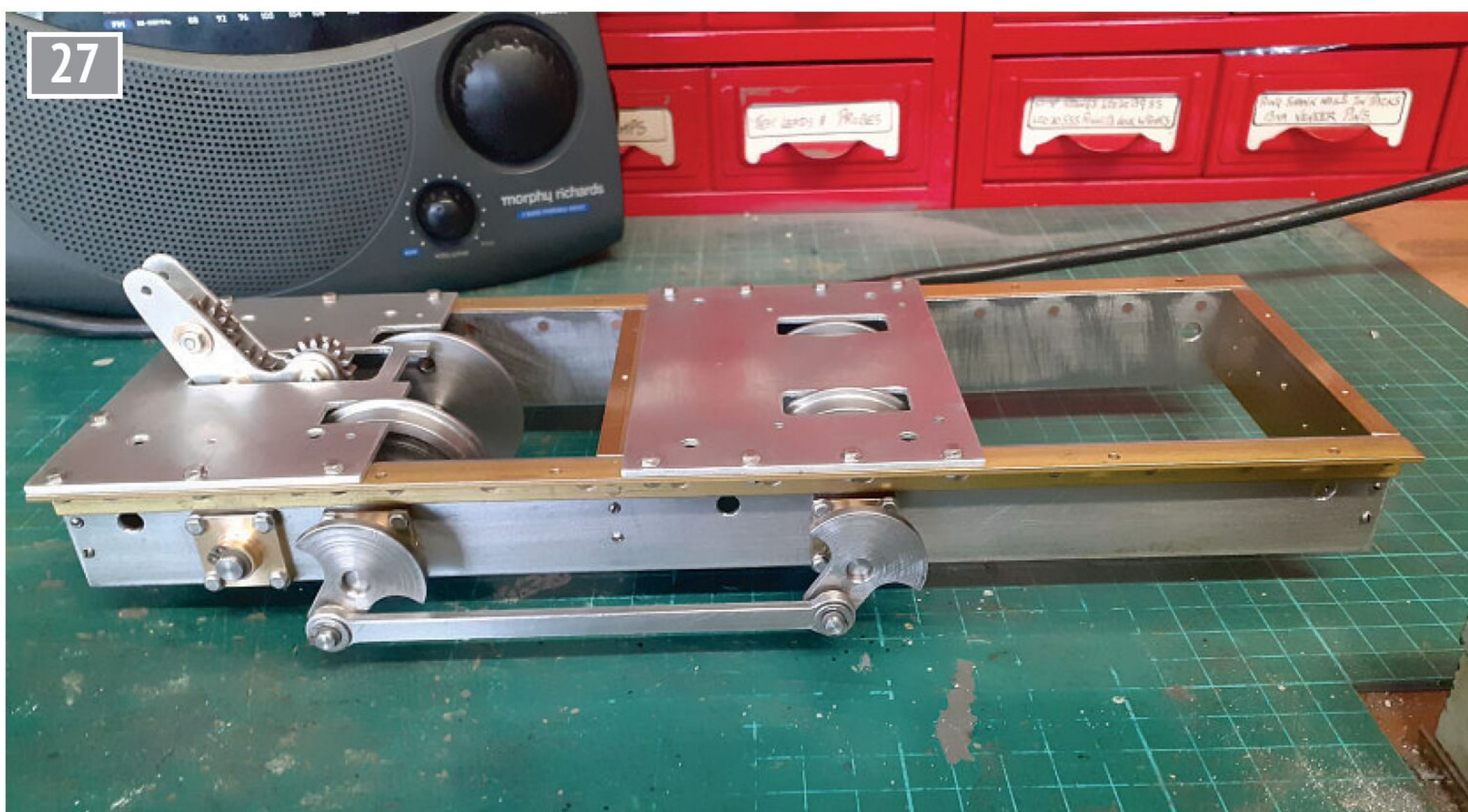
Jackshaft and gears assembled.



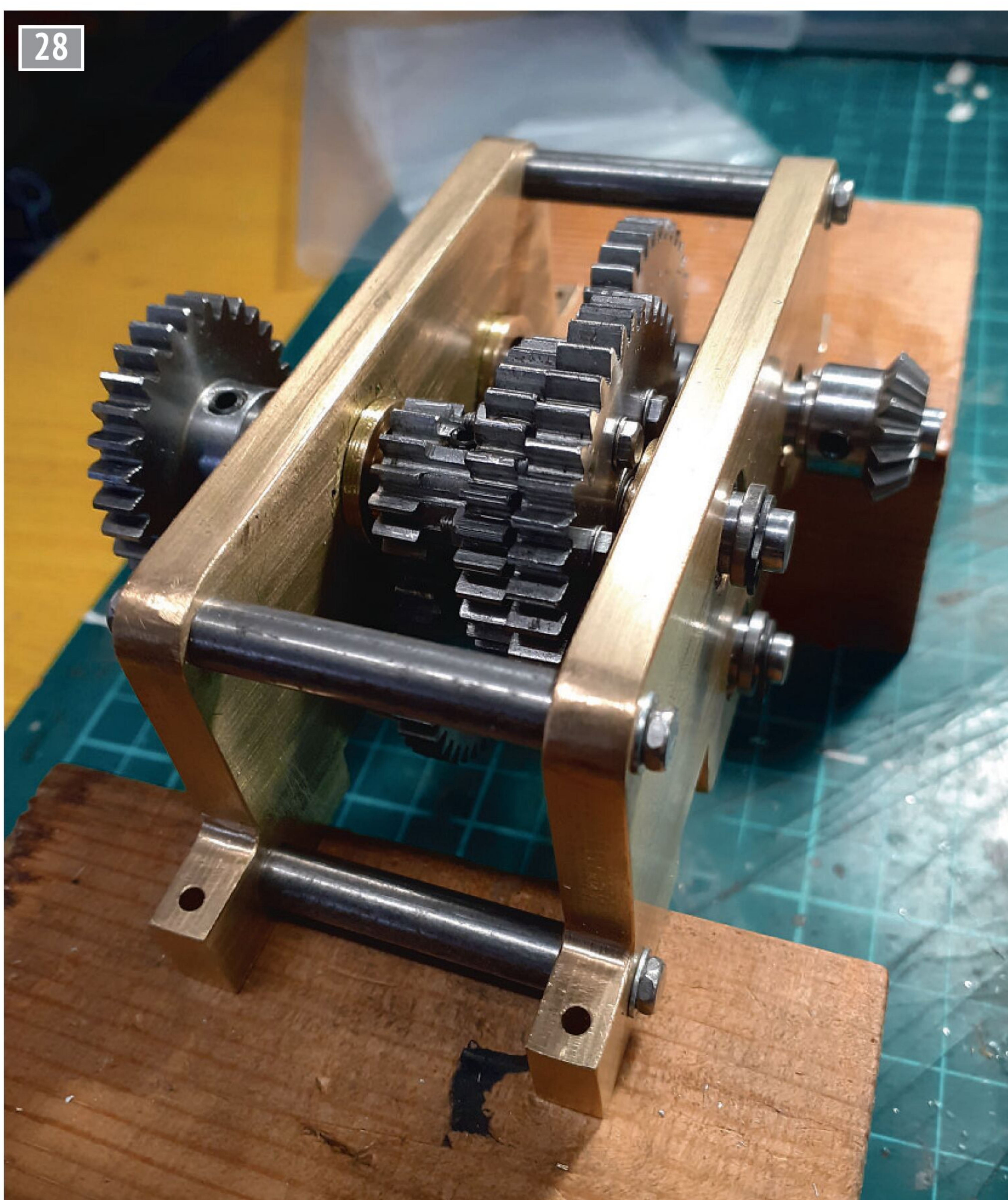
Clarification of text for tumbler assembly.



Assembled output transmission into chassis meshed with axle and jackshaft,



27 Taking shape with flycranks, coupling rods, motor mounting plate and footplate.



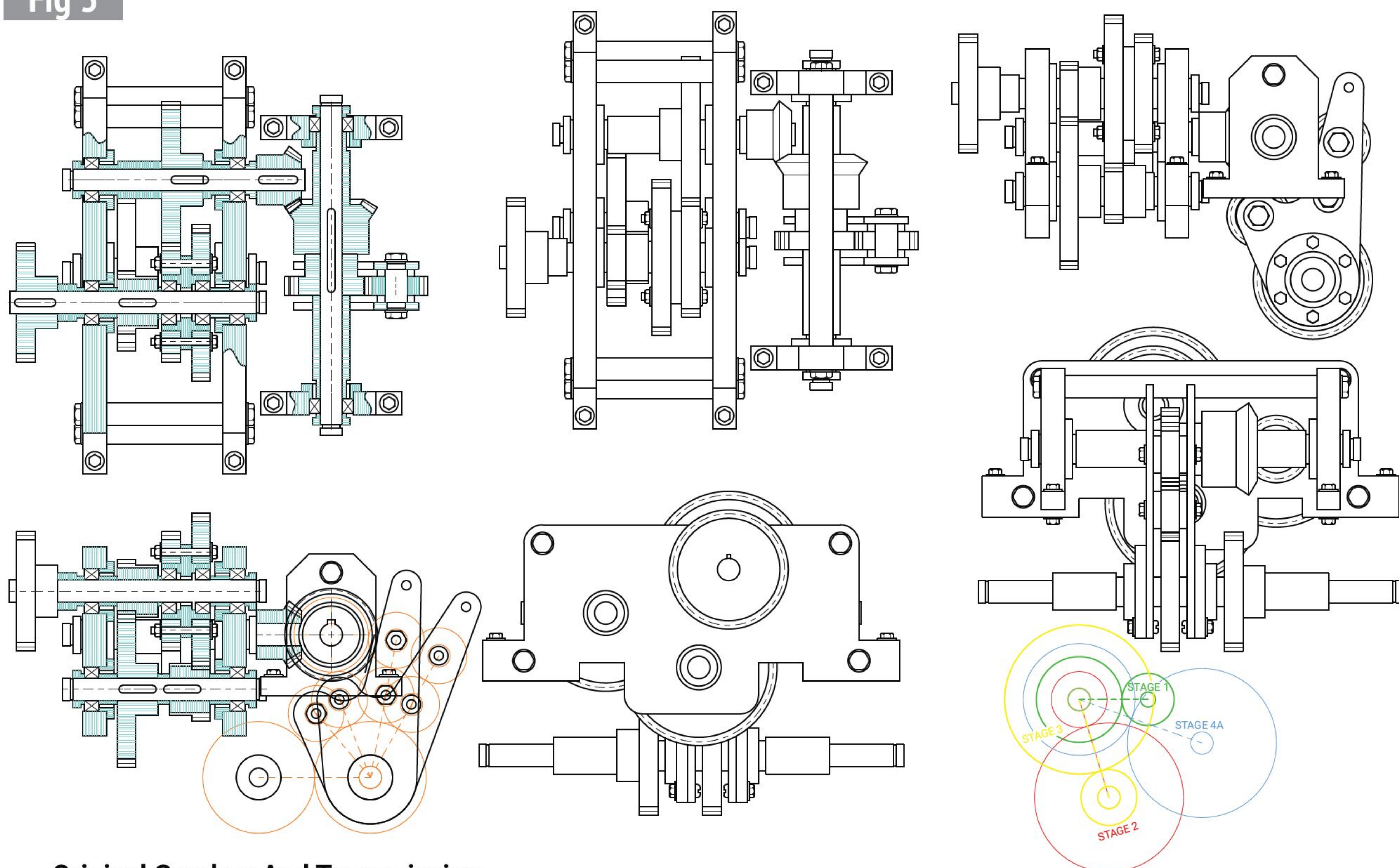
28 Rear view of the main reduction gearbox shows the output bevel gear.

little did I realise that I had already built in a load of trouble for the future of this model and more was to come. It pushed along so smoothly it felt really good.

Moving swiftly on, next up came the engine mounting plate, footplate and engine mounts themselves. The engine mounting plate and footplate were to be from 2mm thick aluminium alloy sheet. Each has a number of drilled holes besides being set square and - yes - I had forgotten that the wheels came above the angle mounting surface of the chassis, fouling these plates. Back to the drawing board. The cut-outs were milled out and they were mounted up. A disappointment was that the machining and drilling was made difficult due to the softness of the basic alloy and low melting point. It fouled up all the cutting edges and the only way to ease the situation was to use paraffin as the coolant - suds oil was not good. It was a messy business or, alternatively, go slowly and clear the tool regularly (**photo 27**). I had not experienced this quite this badly before when cutting alloys.

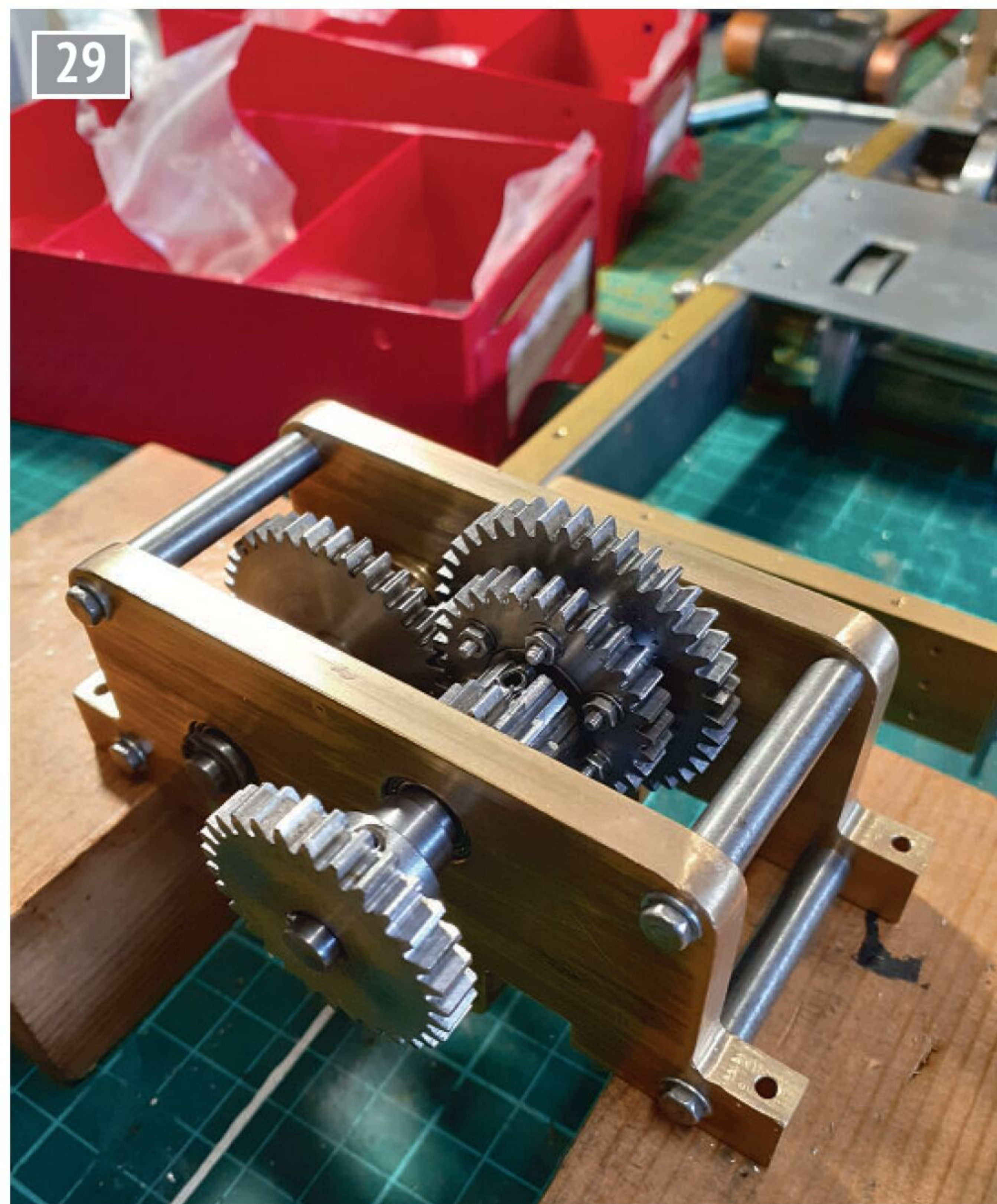
I had now reached a critical point in the design and the build - that of the main reduction gearbox. Fortunately as it turned out I had judged that in keeping with model car practice all shafting would have to run in ball races. As 6mm precision ground silver steel was being used as the shafting then fits would be a lot easier to deal with, and so it was. Reference to the Leufortin Gearbox 01 (**fig 3**) gives a clear view of the original arrangements. By now it was evident that nitro model cars of 1/10th scale and 1/8th scale have lots of space and I was rapidly running out of room. I felt I needed a magic figure beyond the 25:1 ratio suggested by collective wisdom to make the locomotive run slowly enough as I had decided not to reinvent the wheel and use a centrifugal clutch not a home-brewed plate clutch. I really needed a fourth

Fig 3

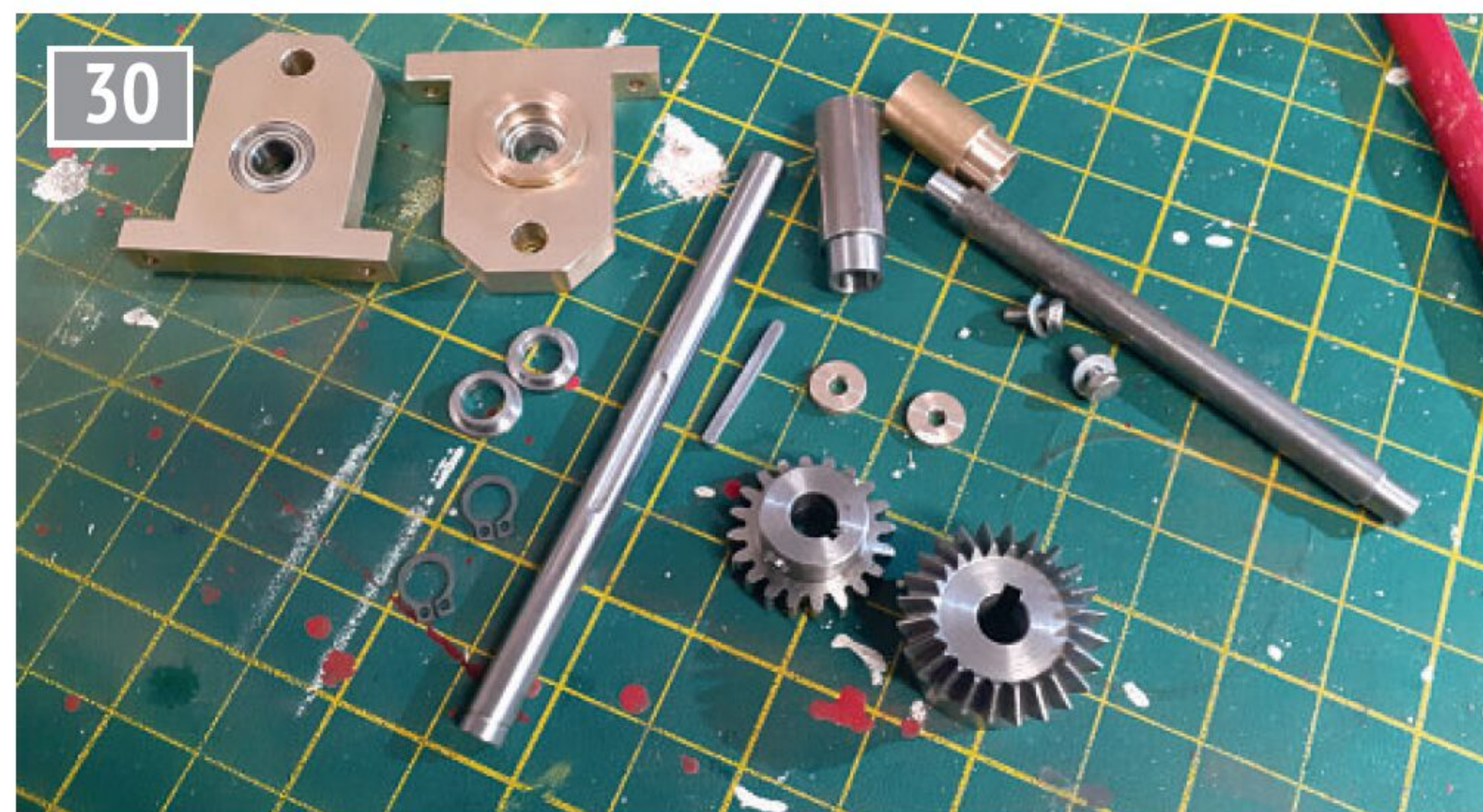


Original Gearbox And Transmission

Original gearbox and transmission.



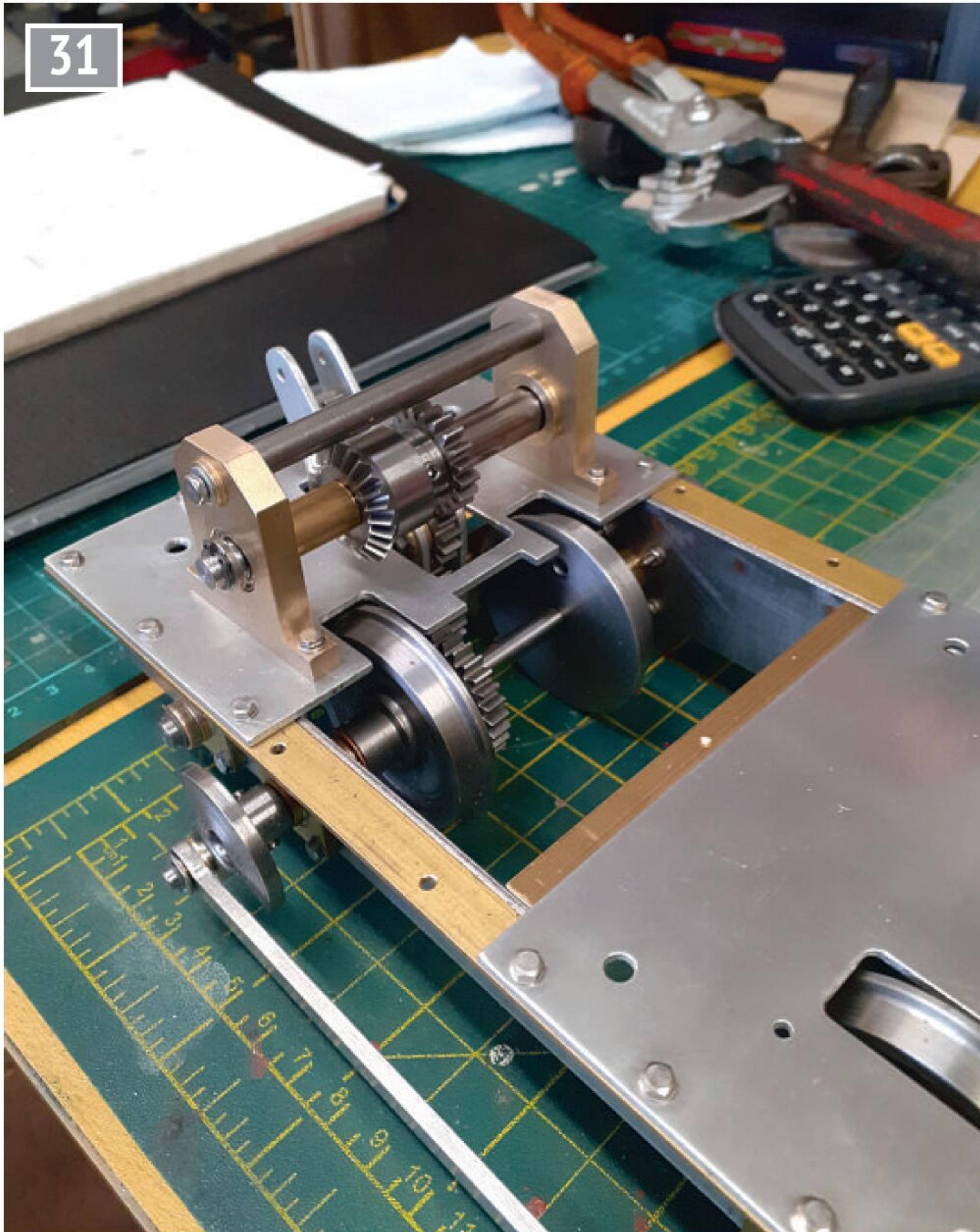
Front view of main gearbox with prominent input spur gear, which meshes with engine bell housing gear.



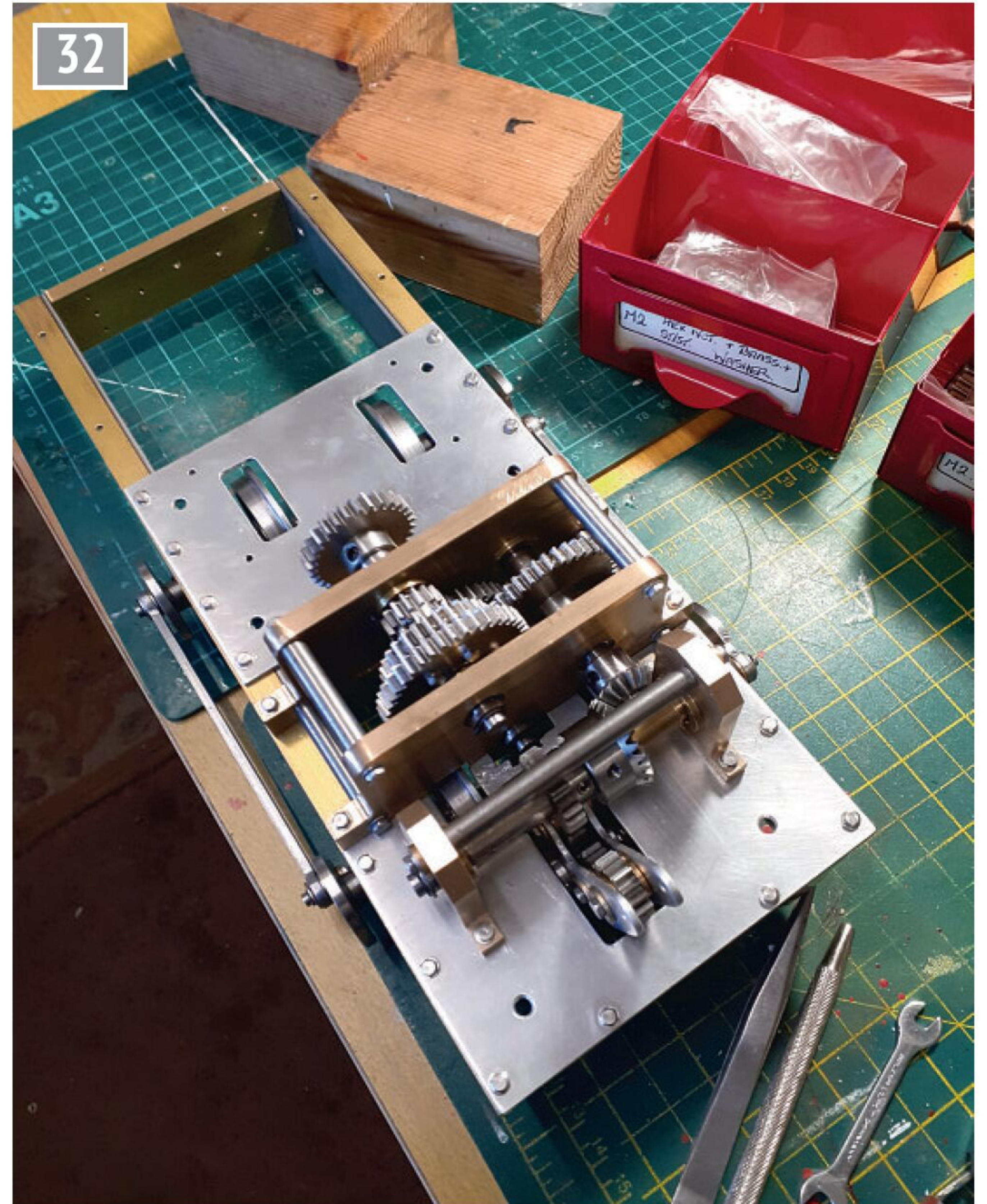
Parts required for original transmission output with single bevel.

shaft for the intermediate stage but had to make a gear carrier running on ball races on the first input shaft giving me a final drive of 35:1 reduction from clutch bell to axle final drive gear. All this was made robust with nothing if possible left to chance. All gears were keyed onto the shafts except on the said carrier acting as an intermediate shaft where they were held by six bolts through the carrier flange, dabbed with Threadlocker (**photos 28 and 29**).

The bevel gear final output shaft ran across the chassis carried in ball bearings supported by trunnion supports, with gears all keyed in place and locked with ubiquitous grub screws. And now comes the next load of unrealised built in trouble after the main box had been installed. Design of the forward/reverse gear had stretched my ideas. By now room was a real issue despite all the planning. The solution decided upon proved to be a gross error. I totally missed it.



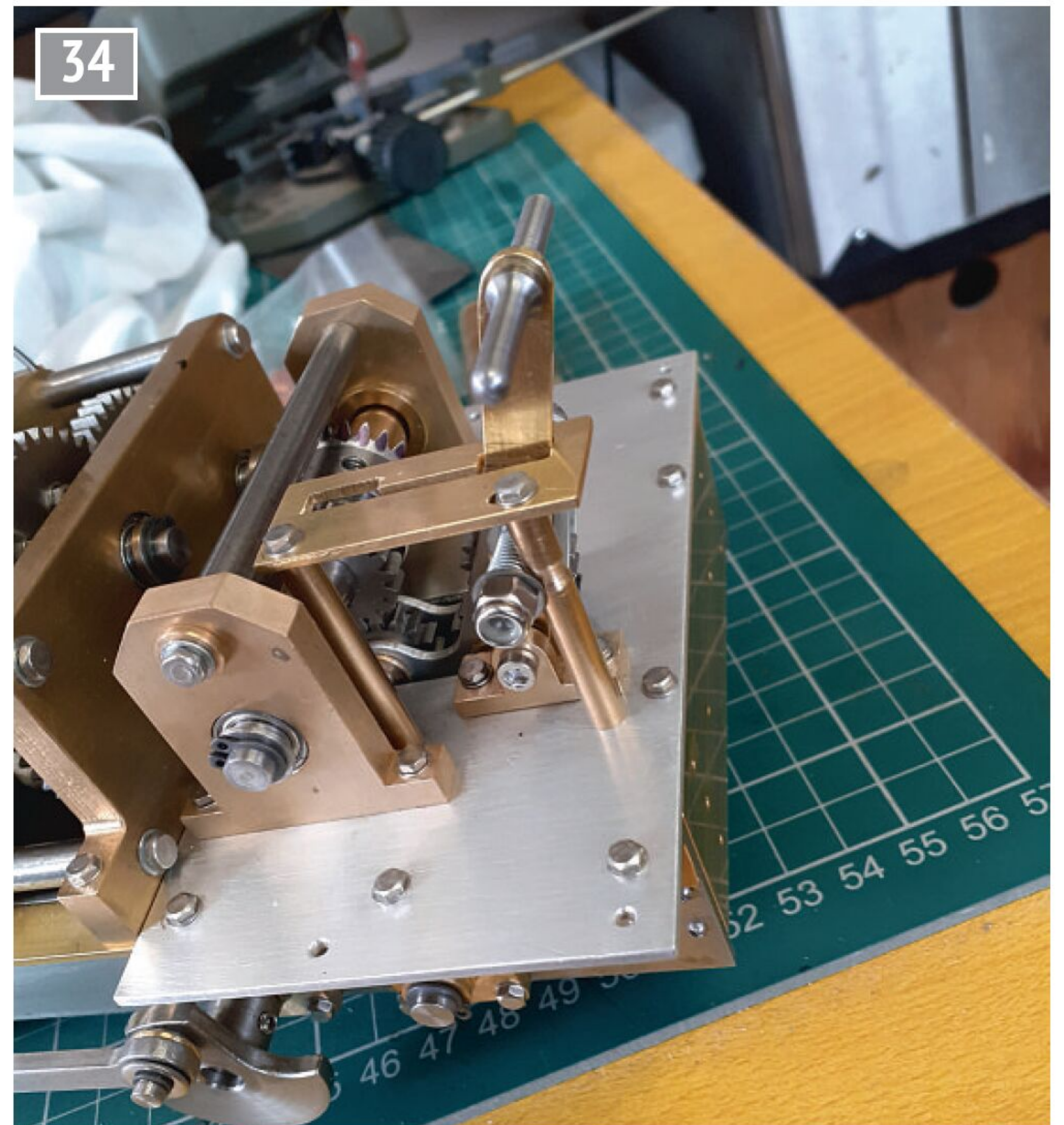
Output assembled and meshed with Fwd/Rev tumbler.



Main reduction gearbox installed.



Right hand side view of Fwd/Rev change mechanism.



Left hand side view. Change mechanism.

Another factor was that when I looked at the separating forces entrained within these gear trains compounded by the torque magnification with such

a reduction gear overall, it was all seriously under-estimated (photos 30, 31 and 32). I could not find a standard radio control servo that

would hold the yokes in place accurately and sustain the load. It had to be a spring loaded manual locking lever in a notched gate of some sort (photos 33 and 34).

You may note that in these pictures the footplate has been replaced to accommodate the cab.

●To be continued.

SMEE News

SMEE and West Dean College (The General and the Particular)

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



Situated in its home on the West Dean estate near Chichester the college (**photo 1**) was set up by the estates owner Edward James. James expressed his fear in a letter to Aldous Huxley that after the war the techniques of many crafts would be lost and conceived the forming of an educational community on the estate to preserve and encourage these crafts and skills. Today West Dean situated in 65,000 acres offers MA degree and Diploma programmes in Conservation, Visual Arts and Historic Crafts along with over 700 short courses aimed at the wider amateur enthusiast community.

SMEE attended West Dean's open day on the week of this

years graduation ceremony where the students on the two year conservation courses had the opportunity to display their work and skills. If I can only portray a fraction of the enthusiasm and quality of the students and their work you will be encouraged that the younger generation is still gaining the skills and abilities to produce exemplary work by traditional techniques. You really had to have been there to appreciate the delights of what was on display.

My first area to view was the metals department which ranges from silversmithing to blacksmithing and from jewellery to bronze-casting. Quality work was on display including a large hand made padlock which the students



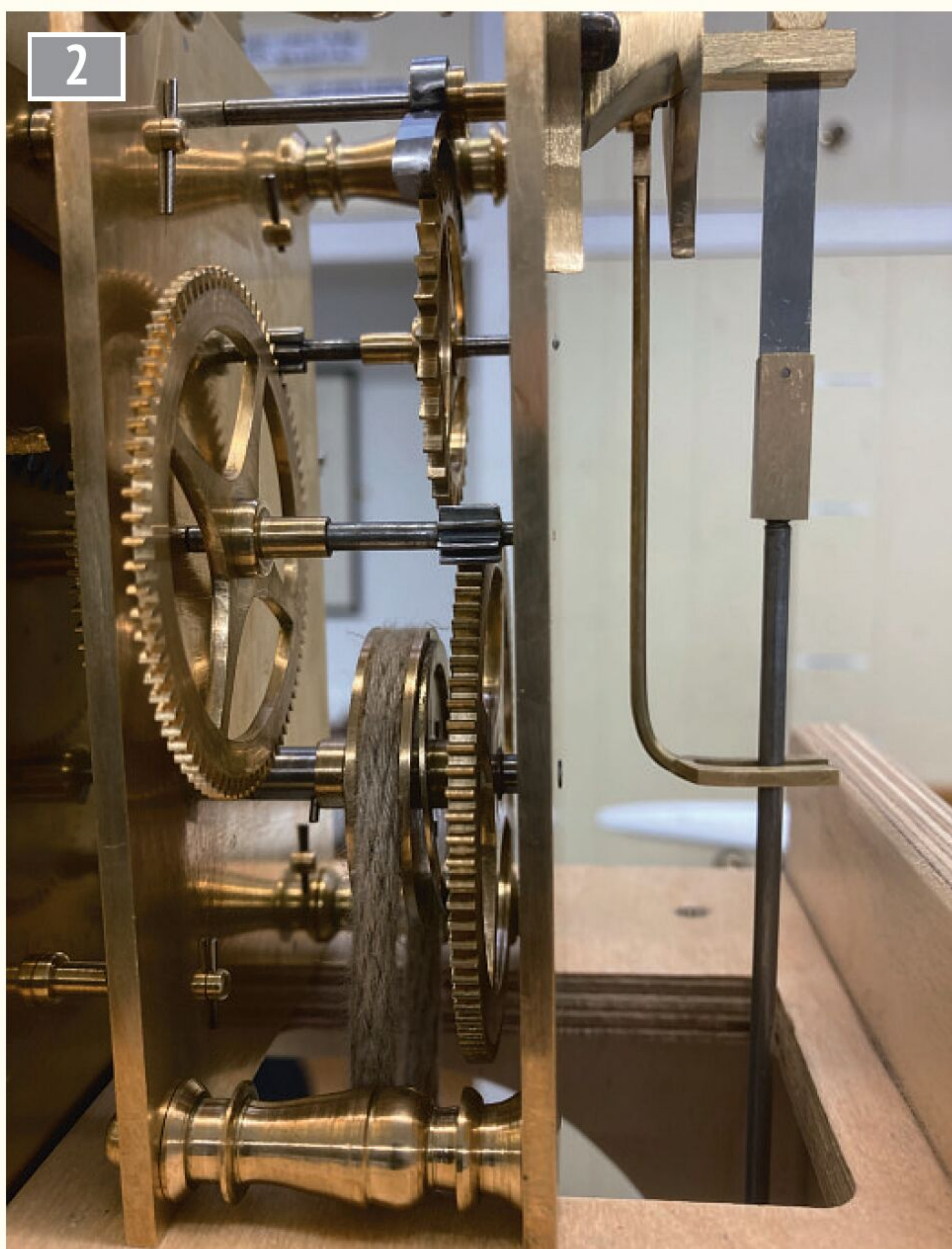
SMEE



West Dean College



West Dean College.



Two examples of clocks made at West Dean.

have to produce for themselves to understand the workings of the lock and all the techniques involved in making one. I understand that the locks are then immersed in brine for a few months to produce objects for restoration dealing with corrosion removal. As you can imagine a lot of conservation of metal objects is given over to dealing with corrosion and there were a number of test plaques on display which had been used for the students to learn about how this occurs and ways of removing corrosion once it has, with the least damage to the substrate metal.

I was particularly interested in a large slush cast lead elephant which had sustained significant damage. It was a challenging object in as far as the legs were solid whilst the shell of the back was very thin reflecting the way the lead had set in the mould before being tipped out to create the hollow object. As you can imagine, repairs to

the thicker part were easier to achieve but the damage to the thin back was more difficult without doing damage. Some incomplete repair was possible and exterior armatures were fitted on the insides of the legs to strengthen the elephant against further damage. This eloquently illustrated the overarching question in conservation of 'how far do you go without starting to create more damage'.

As a clockmaker myself I spent some time in the clock department. Each student had produced a clock from scratch both to understand the techniques involved and to create a real understanding of how timepieces function. A couple of examples can be seen in **photos 2 and 3**. I particularly liked the pillars in photo 2. Simon's clock in photo 3 shows a budding talent for engraving with a tulip motif incorporated into his variation of the basic bracket clock design. (They are intended to have only an hour hand.) There



Restored clock cases.

where skills in action with parts for a carriage clock being turned on a watchmaker's lathe with a graver and escapements being laid out.

Case restoration is important, as seen in **photo 4**, and students are encouraged to talk to others in different departments to gain knowledge. In this case the furniture and cabinet

makers provide a wealth of ideas. In their working life as conservators the students will have to network extensively with others to tap into skillsets outside their own specialisms and we witnessed a high degree of collaboration across the college. Other departments included ceramics, tapestry, furniture and cabinet making and I include a couple of



The furniture department.

pictures to whet your appetite (**photos 5 and 6**).

In all it was a fascinating day and I hope to go another year to see some of the things I missed.

And so on to the Particular. A week after the open day we were delighted to welcome a tutor and three students to Marshall House to recount the conservation of a rather splendid triple expansion engine. This engine had been discovered in a skip at the Institute of Engineering in a very poor condition by one of our members and had been passed on to West Dean as a teaching project. The talk started by Kate Jennings a tutor the Metals Department describing some of the factors which affect how and to what extent conservation work can be carried out on different objects.

Kate, who has a background in law and politics before getting involved with conservation (she is also a keen blacksmith), told us that the engine had been worked

on by three generations of students, which is actually quite normal where the work required needs various different skill sets.

She stressed the different approach needed for the care of working or dynamic objects and, as a matter of course, the documentation produced needs to include a Significance Statement, Conservation Plan, Treatment Records, an Operating Manual and Maintenance Plan and an Operating Log. To aid preventive conservation, notes are included to highlight storage conditions and particular deterioration agents such as atmospheric pollutants, dust etc.

Sam then spent some time explaining what had been done to the engine. He was the last student to work on it and the three students that preceded him had completely stripped it, taken copious notes and photographs and then carefully cleaned off all the corrosion and residues that encrusted it. The engine is quite large



A repair to a ceramic figure.

at around 18 inches long and shows a groove pulley as a take off drive to take cotton line which would then drive line shafting in a mill or similar. The engine was complete with nothing missing but the major issues were the rotten wooden base and damaged teeth to the bevel gears driving the valve timing. In fact it appeared that the deterioration of the base had allowed the gears to move out of mesh and that had resulted in tooth failure.

New gears were manufactured and as a stop gap additional support pillars were added to the gear shaft brackets to hold the alignment. The engine would then turn over. Fittings were made to allow compressed air connection but unfortunately the engine just failed to run. This showed the degree of specialisation in the conservation side and maybe something of a lack on the engineering side. However a helpful SMEE member on the previous open day pointed out that the steam needed to go to

the high pressure cylinder first and not the low. After this small adjustment was made the engine ran very well. It would be easy to criticise the lack of engineering know-how but the students are however intended to be conservation specialists and in practice they will go on to be part of a working team with all the necessary skills. I'm sure my approach would be to overly focus on fixing the engineering and maybe even yearn to improve things which would result in a loss of 'history' for the object - so each to his own. The wooden base remains to be dealt with and is waiting for a good 'wood' student.

I believe we owe a debt of gratitude to West Dean and the young people it produces who will ensure our heritage of objects, which enrich us all, is not lost. Well done them.

For those interested in more details of West Dean or SMEE the links are below:

www.sm-ee.co.uk

www.westdean.ac.uk

Driving Trolley for a Battery Locomotive

PART 1

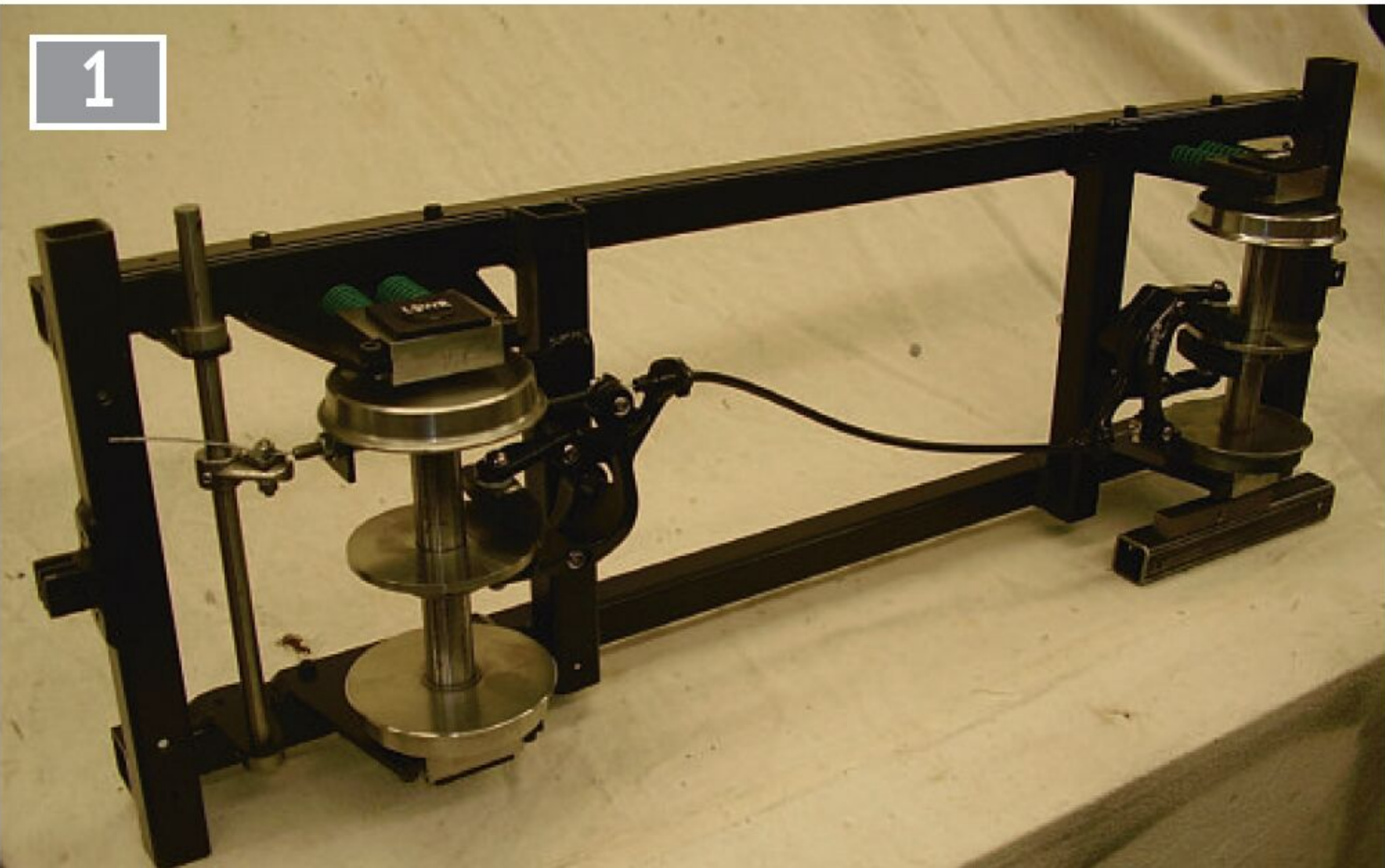
Mike Joseph builds a trolley for his locomotive *Zahia*, previously featured in *Model Engineer*.



This little trolley was based on that written up in the *Model Engineer* on 13 June 2014 by Linda Gearing (M.E.4484). Mine is somewhat simpler (I think) partly because I am and it is intended for my battery locomotive *Zahia*, previously described in *Model Engineer* (M.E.4716, 5th May 2023). However, as in previous articles, I have to use a mix

of Imperial and metric units having been dragged up with (in order) Imperial, CGS, MKS, SI and then Imperial with American volumetric variations! As a result, for length it has to be inches, etc, except when dealing with metricised slabs of steel, heat in Watts, weight in pounds and so on. BTUs do not even register. At least students today usually only deal in one

set of units unless dealing with their parents or am I wrong? Oh, I forgot the pub's pint and our roads are in miles. What a mess. The genesis of this project was a near miss when real brakes were needed. The battery locomotive has regenerative braking on its 4QD controller and, while excellent, is not enough in an emergency.

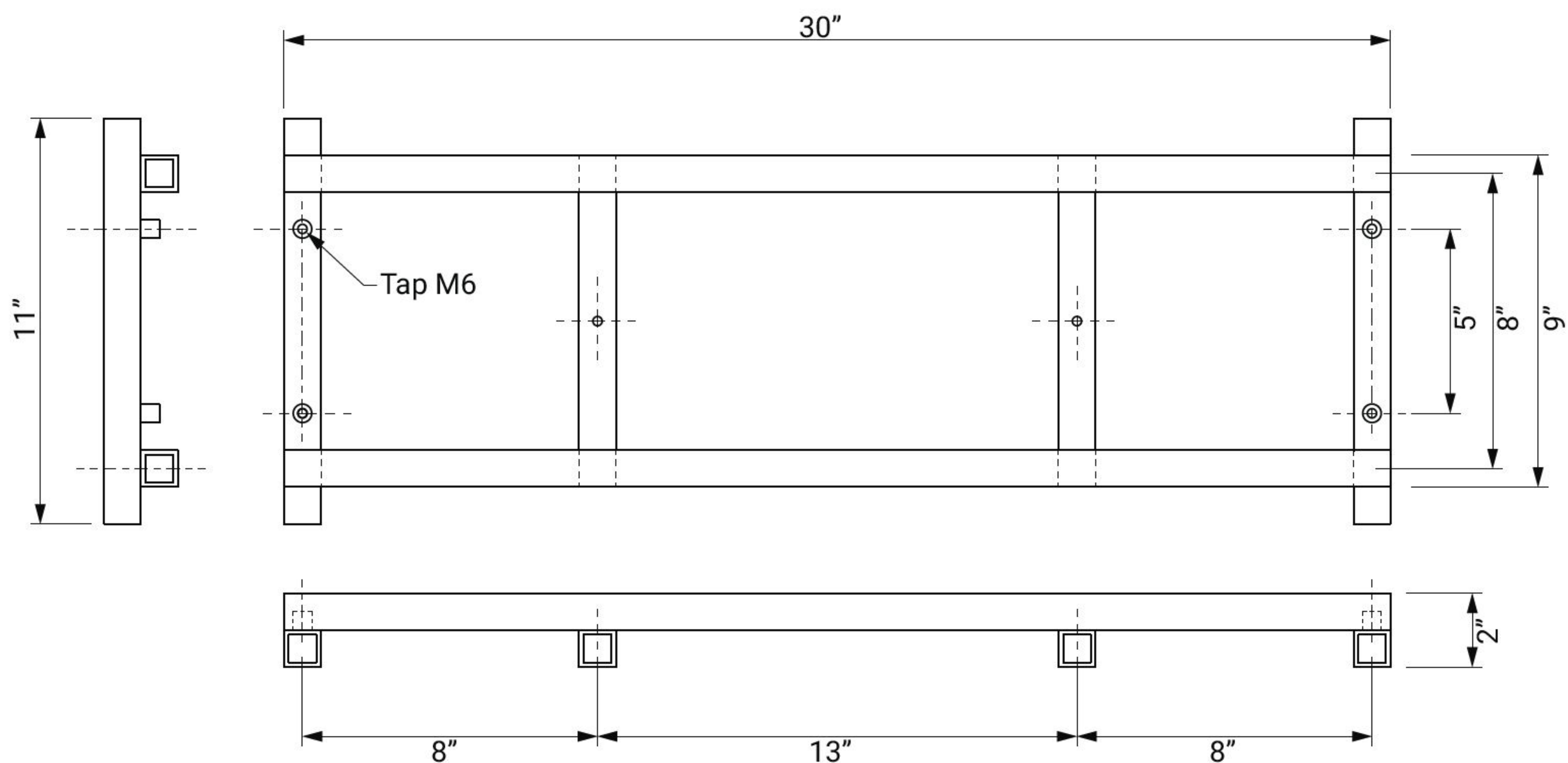


Chassis.



Disk brake and wheel.

Fig 1



Chassis
Fabricated from 1" sq. section tube
1 off - fortunately!

Chassis.

So I happened across Linda's article and it started something.

Being well aware that I am a fully paid up member of The Gob Welders and Spatterers Union, I needed a welder to do the job properly. After all, I did not want it falling apart under me part way round the circuit – the embarrassment of it... So, planning ahead a little, I had to find a welder and also someone prepared to cover the seats. I wanted a decent job of it – I have to look at it almost daily after all. Thus I went to my local independent car spares shop and asked. I got both the recommendations I needed – if in doubt, ask someone in

the trade, in this case it was Phil at Apsley Motor Spares, (apsleymotorspares.co.uk). I bought most of the paint there anyway – a big selection.

The steel square section tube was ordered in specially by a local fabricator who added it to one of his orders. Unfortunately, I found out the hard way, after having assembled the chassis (figs 1 to 3) with M4 fixings prior to welding, that although the square section tube is sold as 'square', it ain't! Not by a significant amount. The W-irons had to be packed out by 15 thou to make things line up. Had I been aware of this problem, the tube could

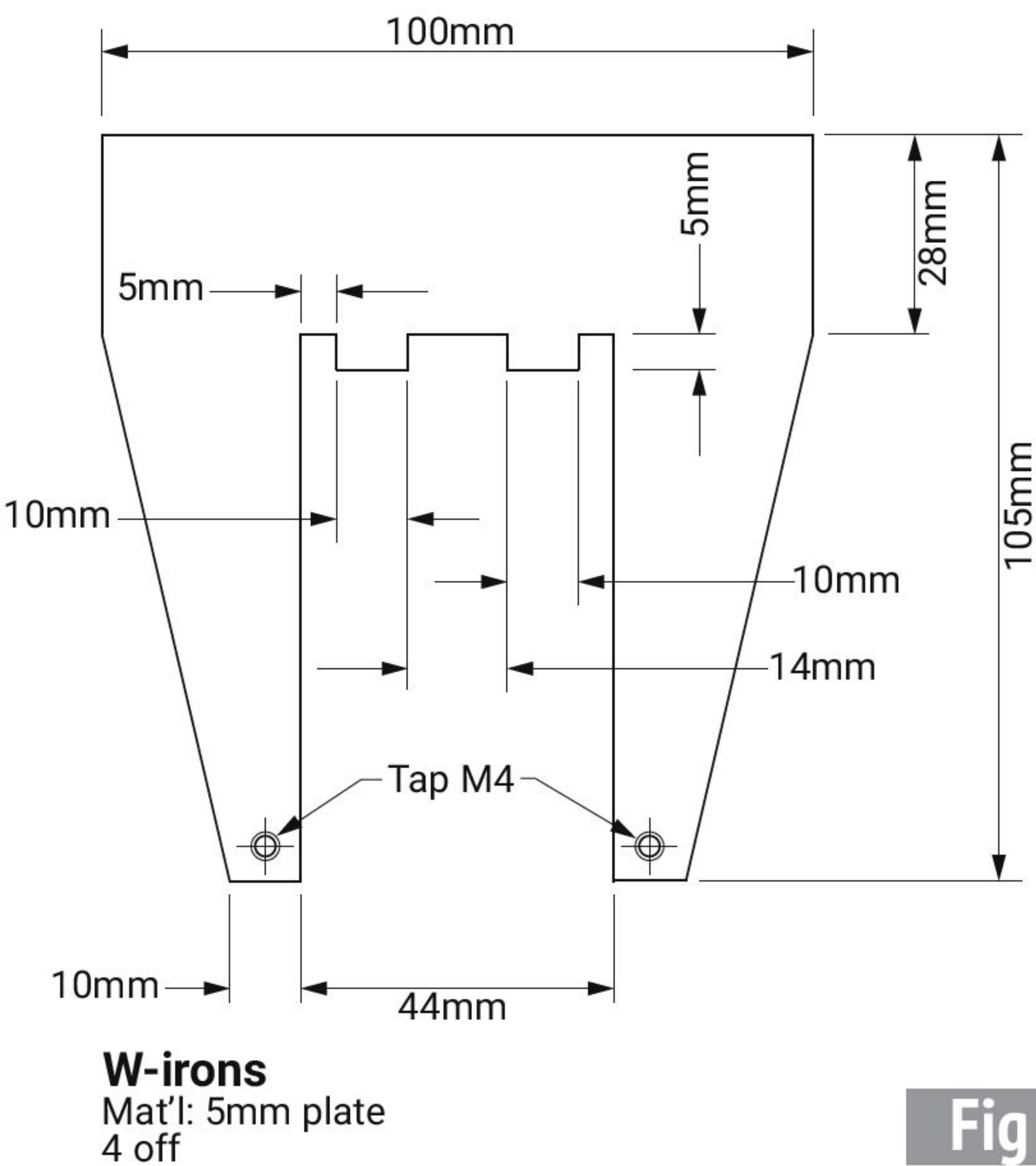
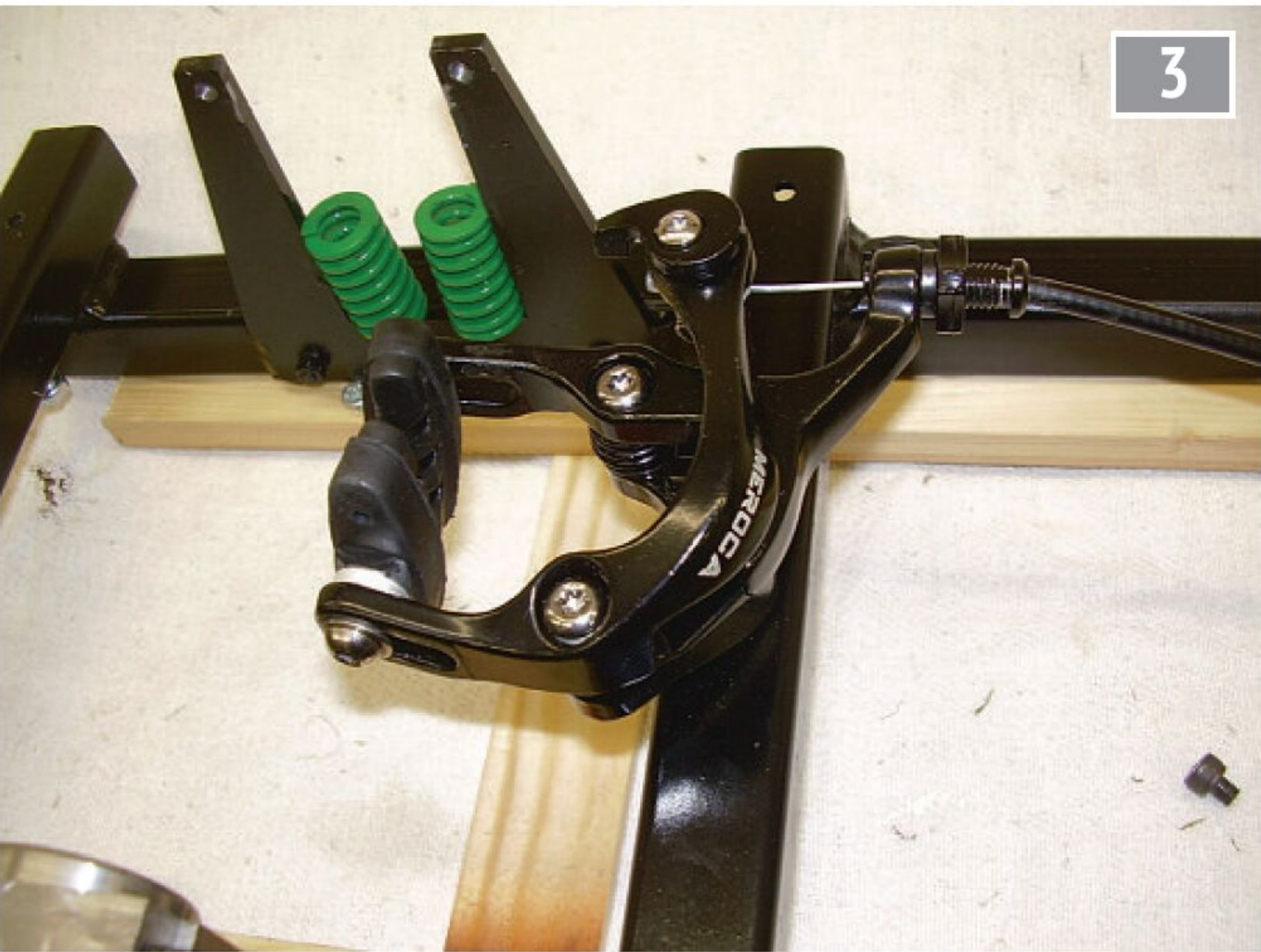
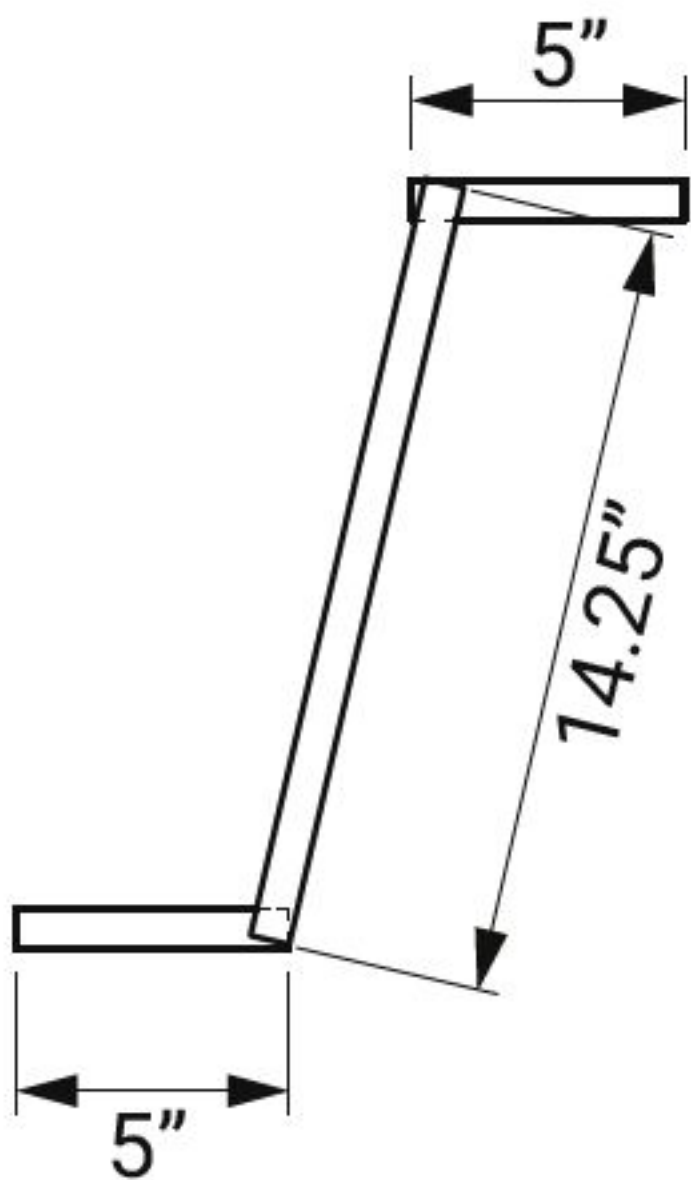


Fig 2

W irons.



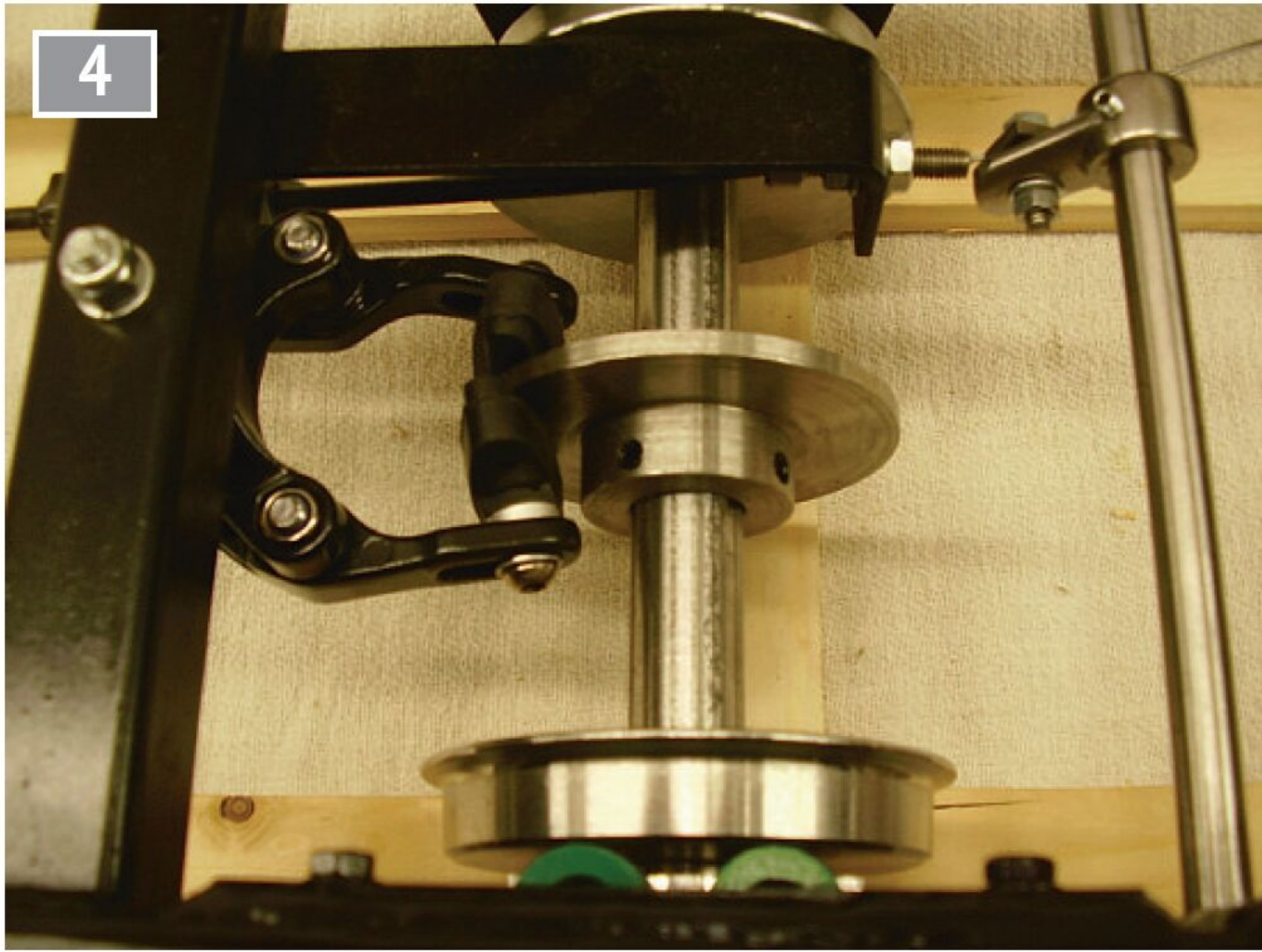
Brake caliper and W iron.



Side Panel Brackets
Mat'l: 20mm x 20mm angle
set to 103°

Fig 3

Side panel brackets.



Calliper brake, wheelset and lever.



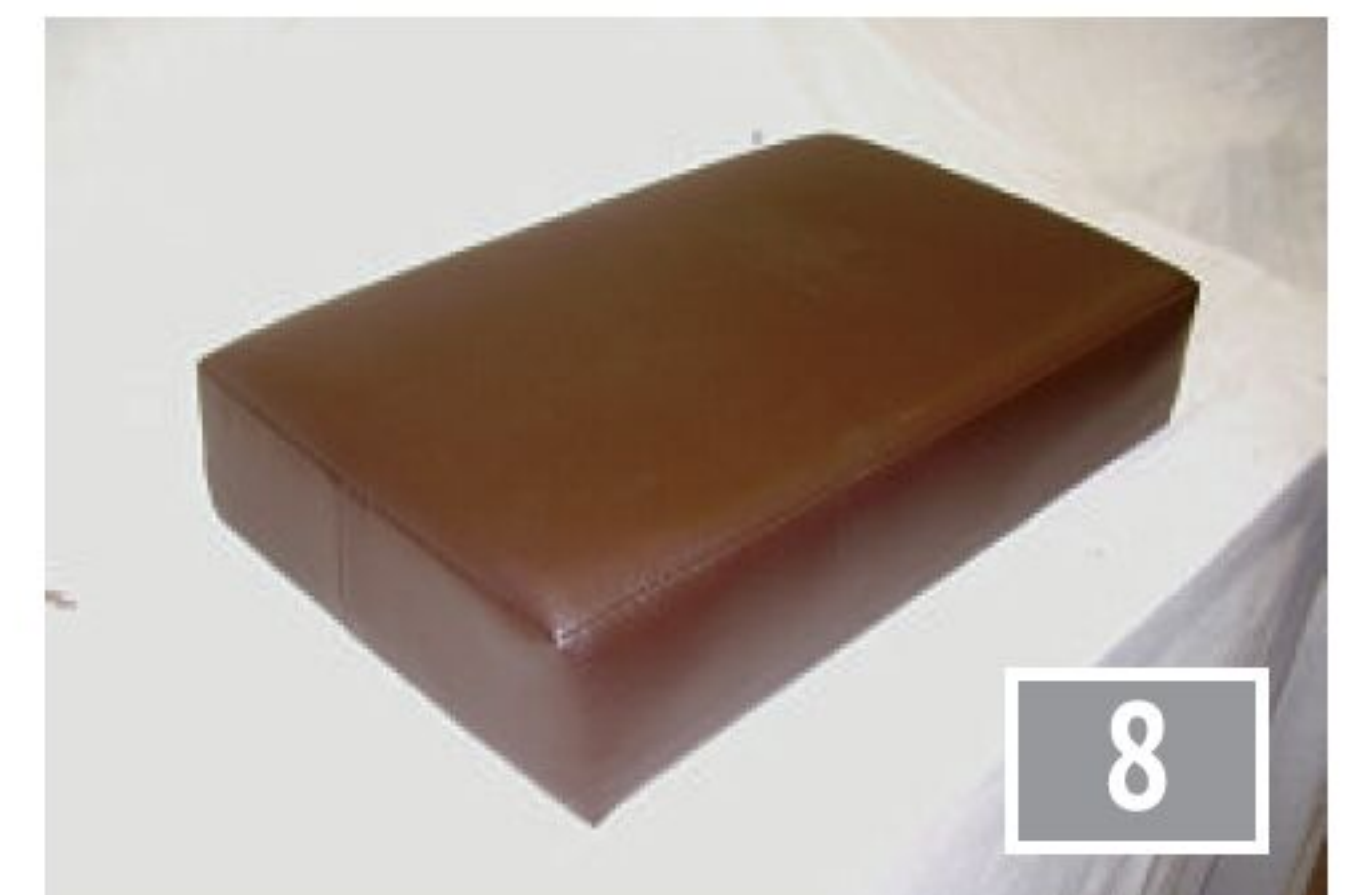
Brake actuating lever.



Bodywork.



Corner plate.



Seat.



Underside of seat.

have been placed in another orientation since it actually resembled a parallelogram. In fact my welding bod told me that very little steel can be relied on for dimensional regularity (for want of a better term). I think that his views might fairly be termed 'scathing'.

The W-irons were a gooboo. That is they were meant to be longer with keep plates. I forgot. But it was a gooboo, i.e. a good booboo – one that could be rectified even if not looking like that which had been intended. Basically, I took 1cm off the slide guides and fitted the Allan screws shown in the photos. If anyone wants to fit keep plates instead, then the W-irons will have to be lengthened appropriately. The springs came from flexosprings.com who very kindly sized them for me.

And I do find that if you take your project along (as complete as possible) these specialists get really interested in what is being done and can make some very constructive

suggestions. It is something outside their regular line and a change is as good as a rest for them. They 'buy in' to the project and get quite keen about it – and I try to take the completed job along to show that I have not been wasting their time, even if I have paid them for it. For example, the seats have two grades of foam. The lower layer is very resilient and the upper is softer. The fabric is that used for motorcycle seats and is waterproof but breathes. All were suggestions from Hukes and they know more about the job than I do so I was more than happy for them to do it *their* way. Why go to a specialist and ignore their experience*? If I had attempted to make the seats, they would have been at the least somewhat utilitarian and definitely not as neat.

The caliper brakes and Bowden cable came from eBay. The brakes were £10 and I seem to recall paying the same amount for calipers for my pushbike in 1976 when a pint

of bitter was about 25 pence! The remaining bits came from my stock or the scrap bin. For example, the lever for the brake cable came with the purchase of parts for a Stent cutter grinder but was nothing to do with it. Twenty years later I used it! The Bowden cable was mounted into a fitting welded on to the chassis to pull the two callipers simultaneously. I had not realised that because of the configuration that one side of one calliper will rub very slightly. I can live with that. Most importantly, the action is very positive. A pair of small brackets were welded onto one end of the chassis for the actuating arm and lever. The brake lever is detachable to prevent it snagging during transportation - it screws in place using an M6 thread. The lever's Bowden bracket was aligned as accurately as I could with the adjustment screw of the first calliper. There has been a lot of adjustment built in – just in case.

The brake details have not been drawn up because it

will depend on the precise dimensions of the brakes obtained and it was a little complicated so I copped out. So there. And, anyway, it would have been a better solution to have bought some centre pull brakes so that they could be accurately set not to drag on one side when open.

* When working as a 'Part P' qualified electrician I did get a customer trying to tell me how to do the job – some of his ideas were anything but safe. He knew nothing about electrical work or the regulations. He cost himself a whole extra day in costs by wasting my time simply by arguing, so a little four day job became five. I completed the job but never went back.

● To be continued.

A BR Standard Class 4 Tender Engine

PART 1

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



No, I haven't given up just yet! I thought that I would just have to describe this engine as I know that all the castings apart from the driving wheels are available from The Steam Workshop, and Rachael or Elizabeth will have them in stock well before you read this. The castings are mostly identical to my 4MT and the 4-6-0 Class 4 tender engine.

The engine was a direct development of the LMS 2-6-0 as designed by Ivatt, so you can build one of those if you like as almost all the stretchers are very near to the BR ones and all they did to the engine was to put BR Standard fittings on it and alter the plating around the front end. These engines were very powerful and earned the nickname 'The Pocket Rocket', though I don't think that this was what BR called it! They kept the rocking fire grate and after the success with mine (now that Eddy Gibbons has made some modifications to it) I have used a similar rocking

fire grate in the 2-6-0. There is also an ordinary fire grate on the drawing as well. I have also used the high superheat boiler on the 2-6-0 as I just don't think that people use half enough superheat on 5 inch gauge engines anyway. There is round about 120 feet of superheater elements in the boiler inside eight superheater flues and the header is tucked up in the roof of the smokebox so all the tubes can be rodded through, including the ones with elements inside them. I used my 4MT as a test bed for all sorts of ideas that I had not read about before in any of the model engineering magazines and my experiments paid off.

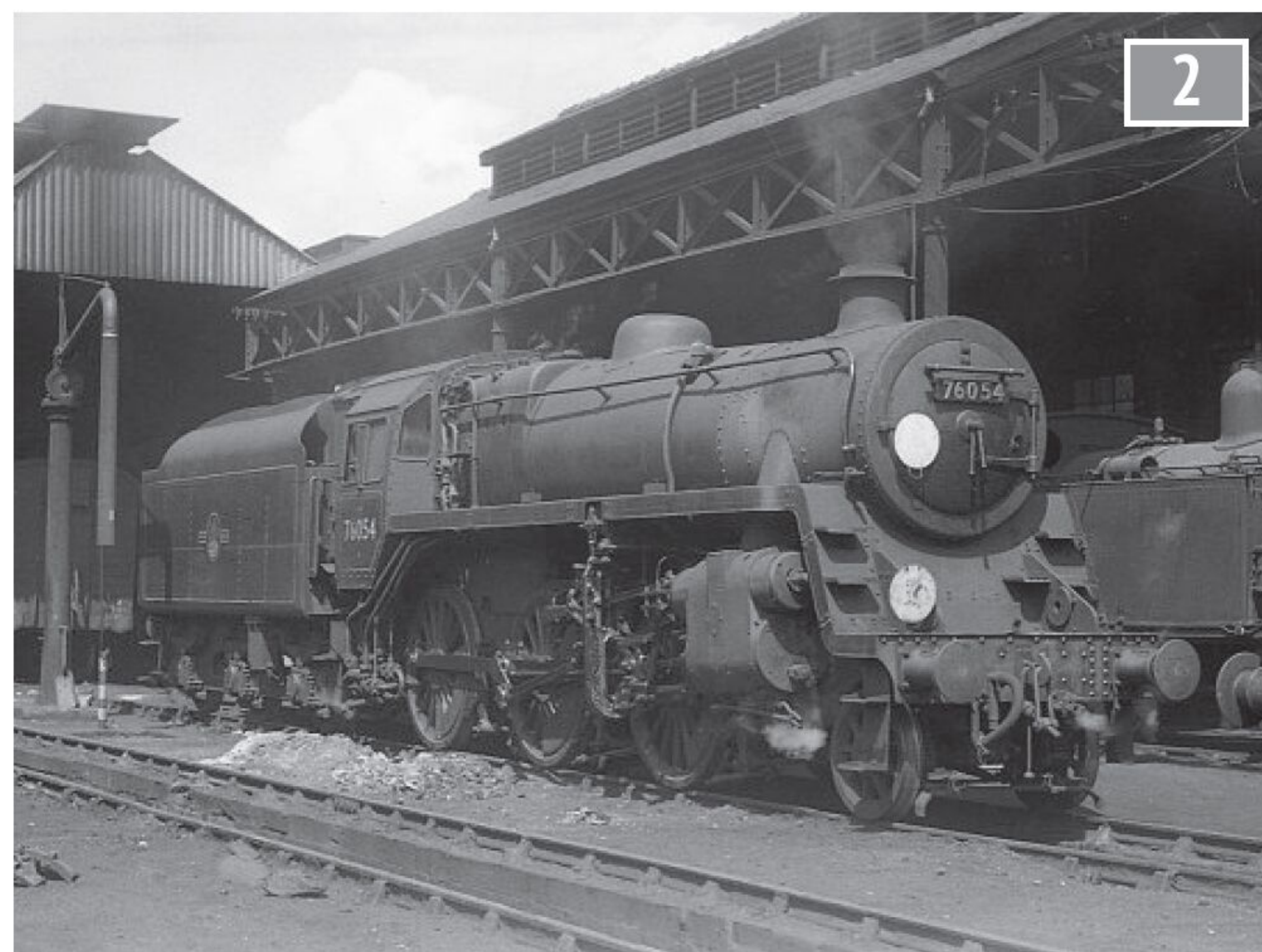
The BR ones were built with two different tenders, or three actually. There is the BR1B which holds 7 tons of coal and 4,275 gallons of water. These were mainly used on the engines allocated to the Southern Region where there were no water troughs. The other tenders were the BR2 and the BR2A. The 2A tender

was all but the same as the BR2 but it had draught screens added and a tender fall plate. This time I will be describing the tenders at the end of the locomotive articles so that you have plenty of time to decide which one would best suit your engine. I have already drawn up the BR1B tender and provided a laser cut brass kit for it. Geoff Whittaker proved the design works as with a few minor alterations he put his tender together in a few weeks. I have not quite completed the drawings for the BR2 tenders but by the time you read this I should have finished it off. As I say, all of the drawings are available now.

Photograph 1 shows the engine I am going to describe so I hope that you enjoy building it and as usual if you get into trouble with anything please do not hesitate to email me at the address given below. This locomotive has the small tender on it. **Photograph 2** is 76054 which is paired with the BR1B tender.

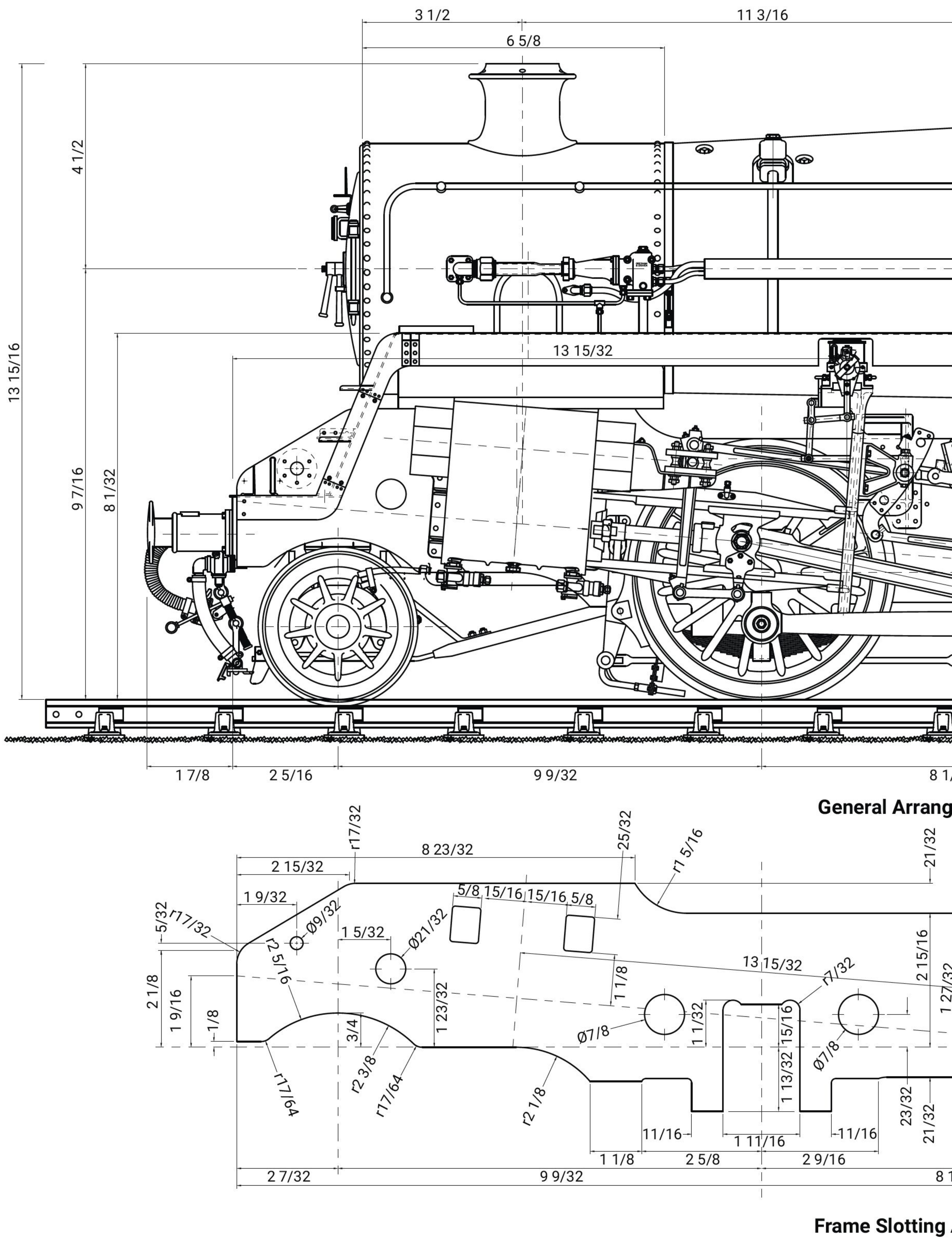


The subject of this series.



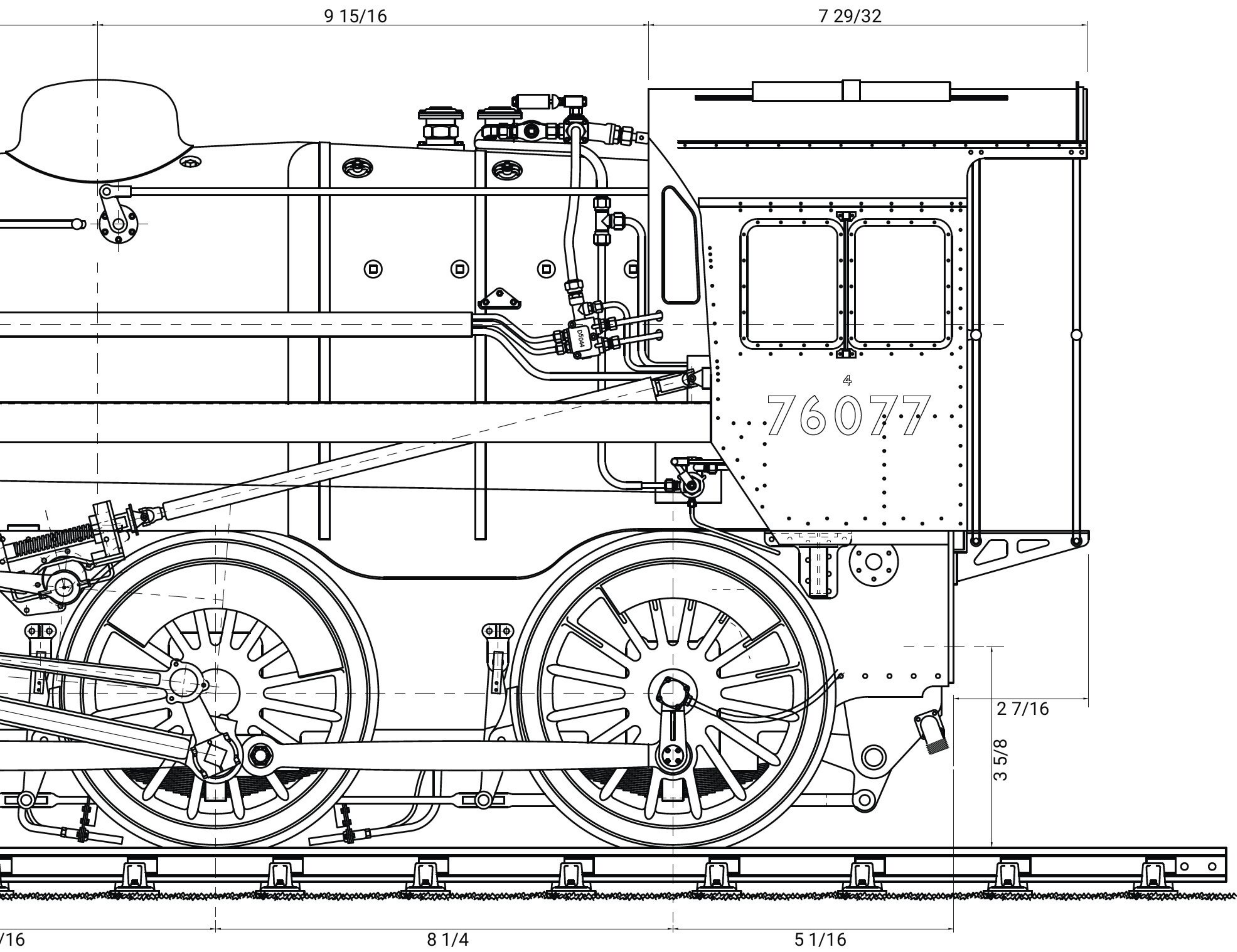
BR Standard Class 4 76054 with a BR1B tender (photo: Rail Online).

Fig 1

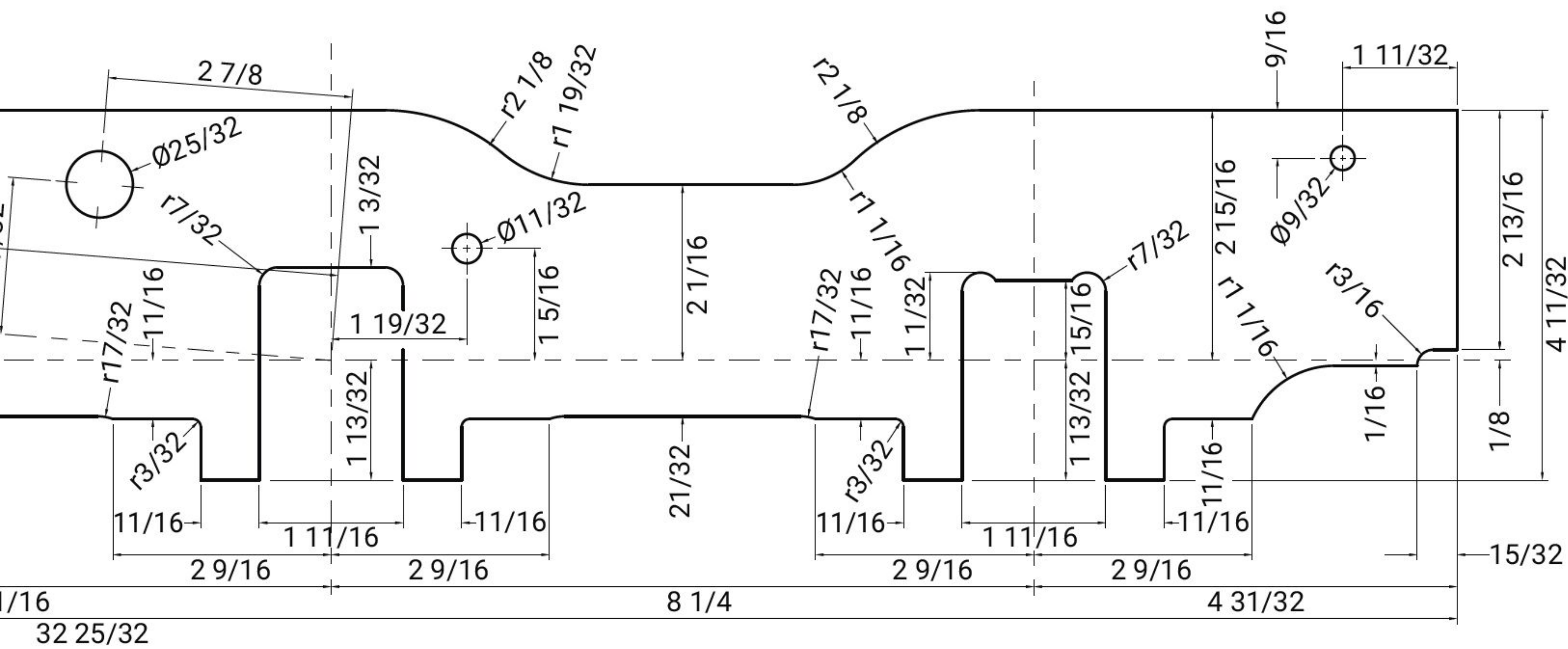


BR Standard Class 4 2-6-0 Tender Locomotive

General Arrangement Drawing LH Side And Frame Slotting Arrangement



ement Drawing LH Side



Arrangement

3



BR Standard Class 4 76079 with a BR2A tender on the NYMR.

Matt Roberts made a start on working on the drawings and provided me with quite a few of them, and they were all to the works drawings, so I carried on where he left off. All of the cylinders and valve gear are identical to my 4MT and so is the pony truck. All of the fittings like the vacuum brake gear and the boiler feeds are also identical and most of the cab fittings are the same.

I produced the first lost wax castings for 5 inch gauge and there was quite a row about this at the time as people accused me of cheating or not playing

the game, but all of my castings were authentic replicas of the actual fittings and are there to do an actual job. Anyway, I needed lots of vacuum brake fittings as I wanted vacuum brakes on my next engine so I later I made patterns for all of the fittings - nothing wrong in that is there?! They are all made to work - yes, including things as small as the sanding gear! They are usually castings that people just botch up or are happy to miss the fittings off their engines altogether.

Fortunately, most people now accept this nowadays as all I

was trying to do was to use a method that had been used by the Chinese for 6,000 years so I thought that I would just copy suit.

There is a BR Standard 2-6-0 being resurrected from Barry condition at the Gloucester and Warwickshire Railway at present, so if you want to have a look at what they are working on just now go and have a look down there. However, the engine may not be at Toddington just now so I would ring them first to find out where it is. The chief engineer there is Andrew Meredith and I am sure that he would be pleased to see you. I am obviously a big supporter of this project. I called in at Toddington some years ago and took lots of photographs on the engine looking rather forlorn out the back of the shed and since then I have bought numerous other ones, as I do, to illustrate these articles. My email address is doug@doughewson.co.uk and if anyone starts building one, I would love to hear from you as I try to keep a record of builders. I did the same when I was selling castings for my 4MT and people from all over

the world sent photographs so that I knew how people were getting along. As for the design of the 2-6-0 I am going to stick to what I have done with my 4MT and so I will be using atomisers to feed cylinder oil under live steam into the cylinders, two rows of superheater flues in the boiler and of course a rocking fire grate. All these features have been well proven on my 4MT with the modifications done by Eddy Gibbons. These modifications have all been copied on the 2-6-0 design. On the 2-6-0, the driving wheels are a lovely size at 5 feet 3 inches and the cylinders are the same size as my BR 4-6-0. The boiler is obviously rather shorter and so is the firebox, but the flanging plates are all the same.

I have produced as much as I can by laser cutting as I don't think that builders really want to be hacksawing bits out nowadays. Anyway, if anyone wants to do so then all of the dimensions are on the drawings. I have also used the scale frame thickness of 2.5mm CR4 steel as I have done for my last few designs. This is more than adequate and once all the stretchers are in, you will see how stiff the frames become.

Photograph 3 - now this is 76079 which also has the BR2A tender on it and will be familiar to anyone who has visited the North York Moors Railway. However, it has now just been taken out of service as its boiler certificate expired a couple of months ago. **Photograph 4** shows the present state of our subject locomotive which has been fitted with its new cab. It also has all the coupling rods on it, and they are now working on the valve gear.

● To be continued.

4



Subject locomotive with a new cab.

LBSC Rose Bowl Competition

2024 Preview

Steve Eaton looks forward to the 'Curly Bowl' competition in September



Cheltenham SME

This year sees the return of this unique event, sponsored by *Model Engineer* and hosted by the Cheltenham Society of Model Engineers, on Sunday September 1st 2024

For those new to the event, this is not just a competition but also a show of appreciation for the contribution LBSC made to our fantastic hobby. It's a chance to come and meet likeminded people, both beginners and advanced modelers alike, who know that without the massive input of LBSC's designs and ideas our hobby may never have even taken off!

Visitors are more than welcome to bring along their LBSC locomotives to put on display, built or part built to help showcase the variety of LBSC designs.

The competition itself is a relaxed event and consists of about six entries, that are locomotives that have been either constructed to LBSC published designs, doubled up versions (**photo 1**), of which he did many, suggestions in his articles or modified engines using his designs and principles and even super scale looking versions (**photo 2**).

The entrants' locomotives are studied by the three judges, brought into steam and driven by each judge in turn. Each locomotive is marked on several different aspects from making, running, appearance and even personal feel of how the locomotive best fits the aspirations of LBSC's ideals. The owners are then free to run on the host track for the appreciation of the visitors.

When all the locomotives have been judged the LBSC trophy (**photo 3**) will be awarded to the locomotive that the judges feel best embraces



7 1/4 inch Virginia - Nick Allsopp.



3 1/2 inch River Darent ('Betty') - Peter Wardropper.

the ethos of what LBSC tried to bring to our hobby. Each entrant receives a medal and the winner also receives a small replica trophy to commemorate their win.

Please come along to our celebration of LBSC, chat, mingle or just watch - everyone is welcome. Information on the Cheltenham society and how to get there can be found on their website (www.cheltsme.org.uk). For those without access to the internet their track address is Hatherley Lane,



The Rose Bowl.

Cheltenham, Glos. GL51 6PN. The day starts at 9.00 am.

See you there !

ME

The Battle of the Boilers – a Centenary Celebration

Eddie Castellan

looks back at a pivotal event in model engineering history – 100 years ago.



2024 marks the centenary of the most famous contest in model engineering history: the 'Battle of the Boilers' - leading model railway professionals W.J. Bassett-Lowke and Henry Greenly versus Lillian 'Curly' Lawrence alias LBSC.

Amazingly both competing locomotives are still with us: Curly's coal-fired Atlantic *Ayesha* is maintained in working order by the National 2½ Inch Gauge Association while Greenly's spirit-fired *Challenger* 2-8-2 has recently been restored by owner Simon Hudson and The Steam Workshop.

The contest took place at the 1924 Model Engineer Exhibition following two years of debate in the magazine over the relative merits of coal and spirit firing. It is usually considered to have started when James Leeming wrote to the *Model Engineer* in January

1922 complaining about the poor performance of his spirit-fired Great Central 4-6-0. LBSC replied, in the first technical opinion he ever expressed in the magazine, advising Leeming 'to put his water tubes in the dustbin' and fit a coal-fired boiler.

However research for my new biography – *Battle of the Boilers, a Life of LBSC* – reveals that the battle had been brewing for some years and was as much about costs as efficiency. Methylated spirits ('meths') became expensive, costing 12/6 (today £41) per gallon and sometimes unobtainable at the end of the World War. Commercial locomotives were inefficient and thirsty so the price of meths became an issue.

The alternatives were paraffin at 1/6 (today £5), petrol (the mind boggles.) and coal costing pennies. Against this, coal-fired loco-

type boilers were more difficult and expensive to build than the simple Smithies water tube design.

In fact, Curly wasn't the only person on the trail: C.M. Keiller, a leading locomotive builder of the inter-war period, produced his first coal-fired 4-4-0 in 1919, gaining an enthusiastic response from Henry Greenly. Ironically Greenly always preferred coal-firing despite designing the spirit-fired contestant.

Keiller was an engineer who had been a pupil of Churchward at Swindon. In 1920, he produced a really outstanding 4-4-0 with long lap, long travel valve gear – astonishing stuff as this extremely important development was then little known outside Swindon and Ashford. Keiller beat Gresley by five years!

Keiller's General Arrangement appeared in the *Model Engineer* and it can be plausibly argued that he beat Curly to the efficient coal-fired 2½ inch gauger. However Keiller stated that he didn't try passenger-hauling until after *Ayesha*'s success.

Ayesha was still only a chassis when the discussion started and at first Curly was very much a lone voice against opponents who claimed success with meths and paraffin, arguing that the extra complication of a loco-type boiler was not worth the bother.

However after Curly reported on 4 May 1922 that *Ayesha* 'works very well indeed' and on June 8 that she had hauled two adults, everybody wanted to know more and leading figures joined the debate. Competent professionals like the model engineer Eddie Meers, later a good friend, joined the coal-fired faction.



Ayesha at Rugby MES for her 100th birthday rally 11 September 2022.



John Baguley steams Ayesha at her centenary rally staged by the National 2½ Inch Gauge Association 11 September 2022.

Greenly joined in on 15 June, mainly to claim credit for pioneering small scale coal-firing back in 1913, though diplomatically praising water-tube boilers for the inexperienced. M.J. Barnard of Bassett-Lowke claimed on 22 June, naturally, that spirit-firing was best.

The affair turned sour but assumed considerably more importance on 3 August when W.J. Bassett-Lowke wrote to the *Model Engineer*, dismissing Curly's claims for Ayesha: 'As regards hauling capacity, we are inclined to doubt the ease with which 'LBSC's 2½ inch scale loco hauls a person weighing 13 stone'. Bassett-Lowke undoubtedly had a nasty streak, being a rather unpleasant stirrer. In fact Ayesha had already been demonstrated to the SMEE at Caxton Hall, London, on 19 July and the attack only produced an indignant defence of Curly from leading SMEE members James Crebbin and W.B. Hart. Curly never forgave Bassett-Lowke for implying that he was a liar.

Bassett-Lowke first suggested a contest on 14 August though the event would not happen for over a year. Curly replied that he was perfectly willing to meet in open competition.

The debate had its lighter moments: Mrs Rose Brown had a go at Bassett-Lowke over the mess that meths-fired locos made on her carpets while a

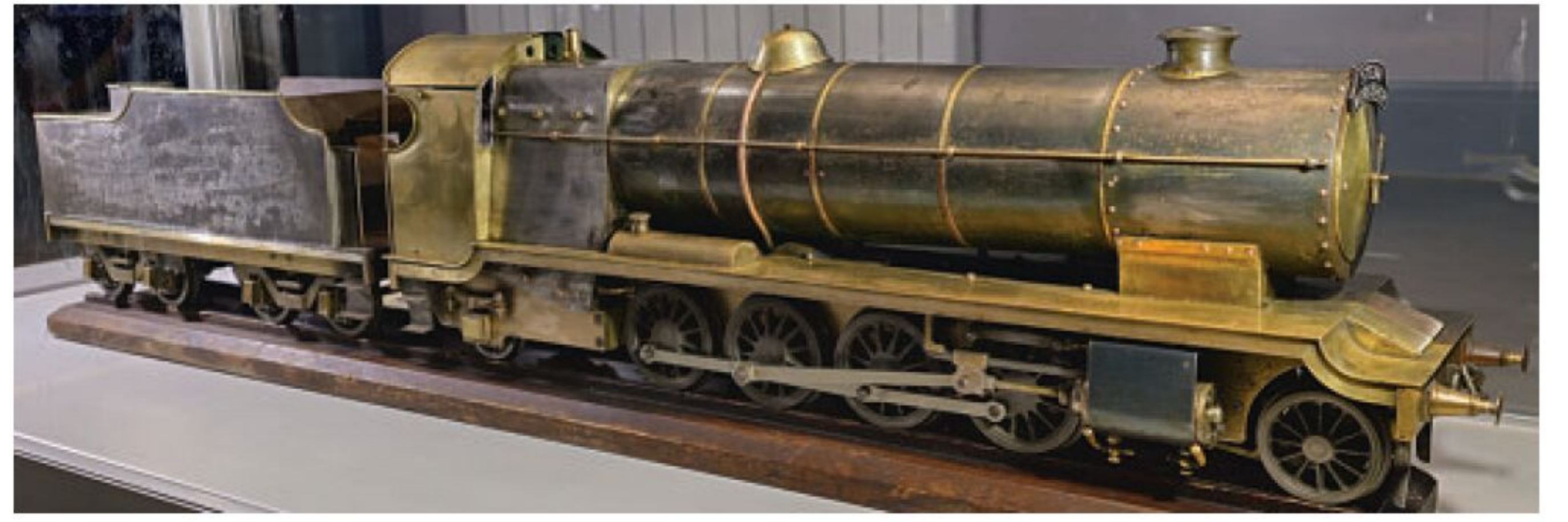
hoaxer calling himself Linkhead made extravagant claims for the fictional spirit-fired locomotives on his equally non-existent scenic railway. The then unknown K.N. Harris was typically caustic, saying that the only real value of spirit-firing was that it was commercially profitable – surely the only time he ever supported Curly...

The broad conclusions were that solid fuel loco-type boilers were more difficult and expensive to build but much cheaper to run than spirit-fired. Solid fuel was more realistic and better for live passengers while spirit-firing was more suitable for beginners and scenic railways. Things are not a lot different today though modern spirit-fired boilers are infinitely more efficient than the Smithies.

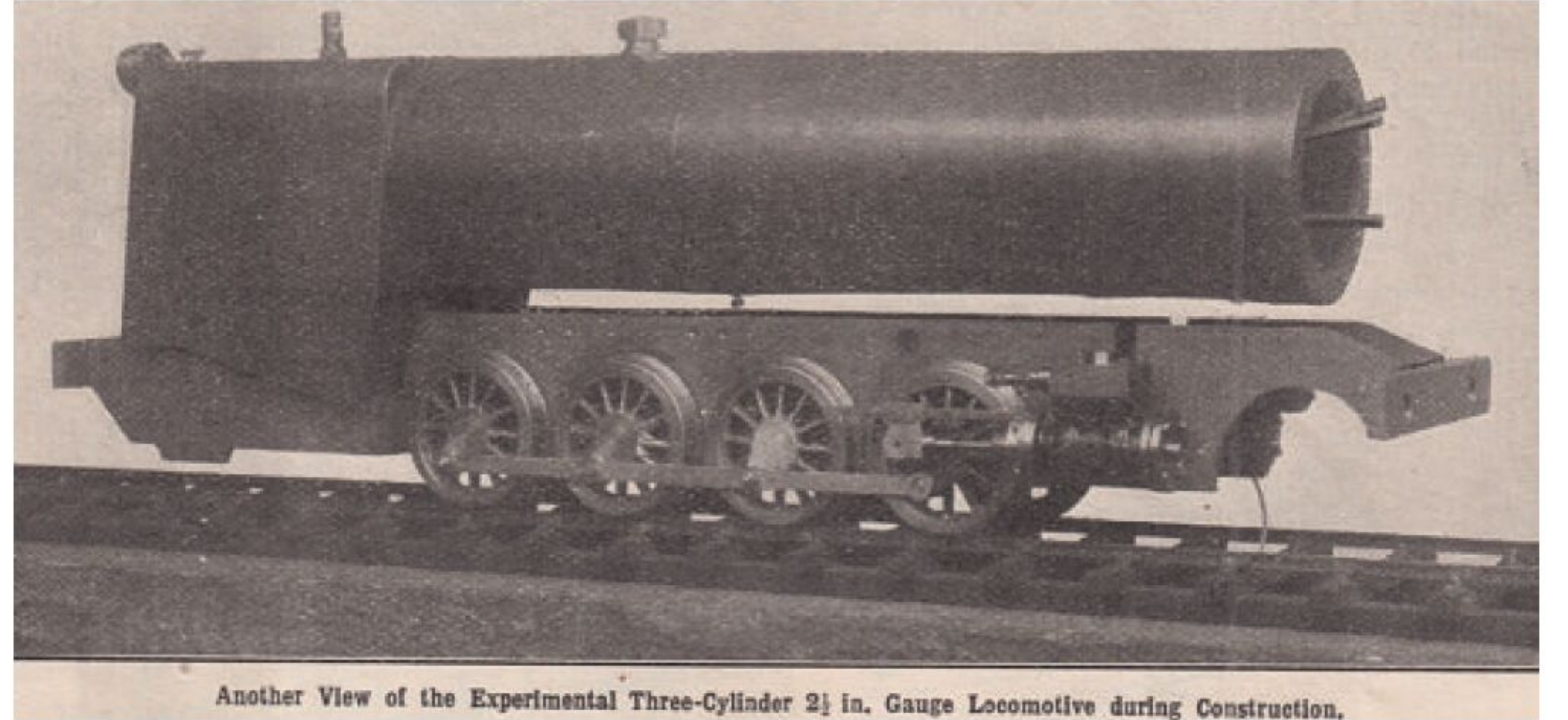
But Bassett-Lowke's challenge hadn't gone away. It is not clear whether he was concerned for his business or more maliciously just wanted to put the little man in his place. Greenly was puzzled at Bassett-Lowke making such a big deal about it but produced *Challenger* at short notice. The locomotive resembles a baby *River Esk*, which he was also designing at the time.

Both engines celebrated their 100th birthdays in late 2023 and *Challenger* has been on display in the Ravenglass Railway Museum as part of the Esk centenary exhibition.

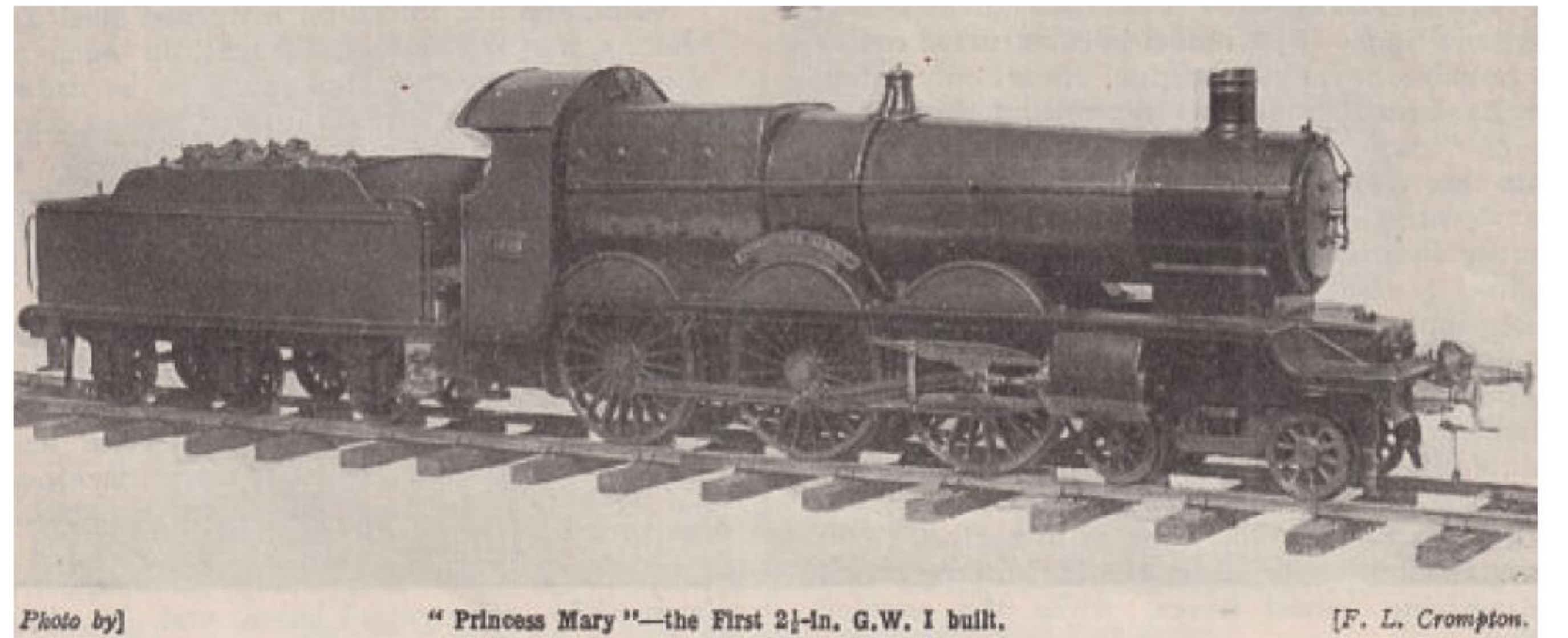
Curly wanted to compete with his brand new 4-cylinder



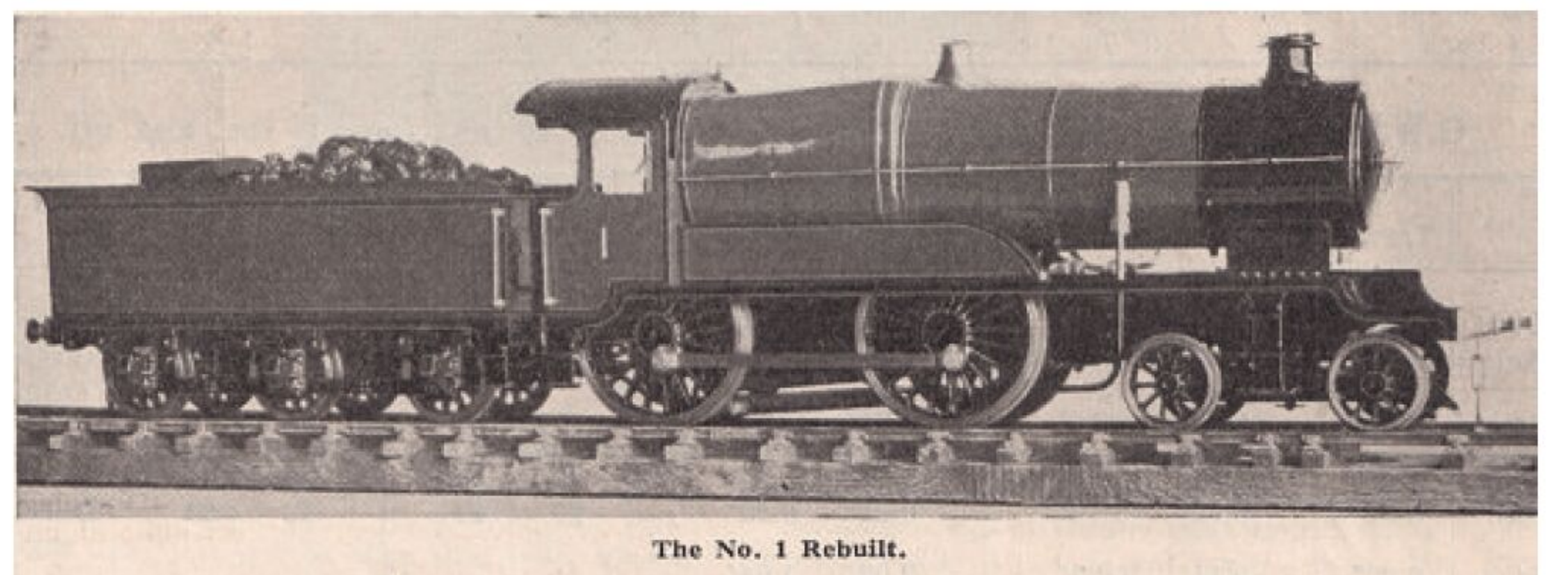
The restored *Challenger* currently on show at Ravenglass Railway Museum. (Photo: Will Sands Ravenglass Railway Museum collection.)



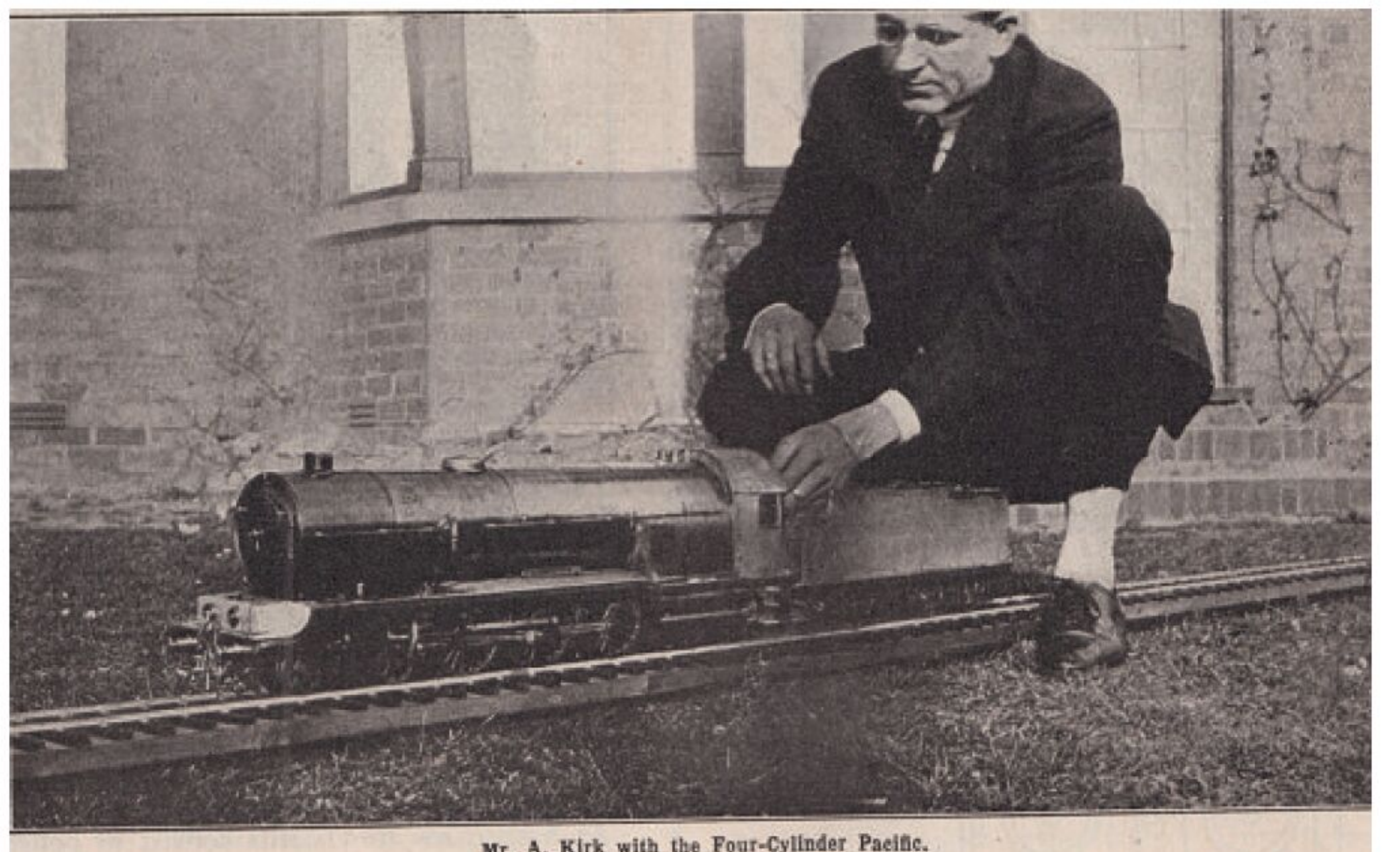
Challenger under construction.



In 1923, only a year after Ayesha, Curly was already breaking new ground, building for a client the 2½ inch gauge GWR Star class Princess Mary which he could have run against *Challenger*.



C.M. Keiller's first coal-fired 4-4-0 No1 built in 1919.



Magnus Opus, which was barred from the contest, driven by Arthur Kirk who commissioned the engine from Curly.



Model Engineer readers had their first glimpse of the unfinished Ayesha on 6 July 1922 plus a rare sighting of her elusive builder...

pacific *Magnum Opus* but the opposition objected that she exceeded the British loading gauge so he had to use *Ayesha*. It was a bad call by the BL team as it turned a battle of equals into a David and Goliath affair.

The contest was obviously a stunt, intended to allow Bassett-Lowke to claim victory under any circumstances except a complete failure of *Challenger*. This may be why Percival Marshall gave the event very little advance publicity and generally seems to have been less than enthusiastic. BL's driver only weighed nine stone against Curly's 12 while no attempt was made to measure fuel consumption.

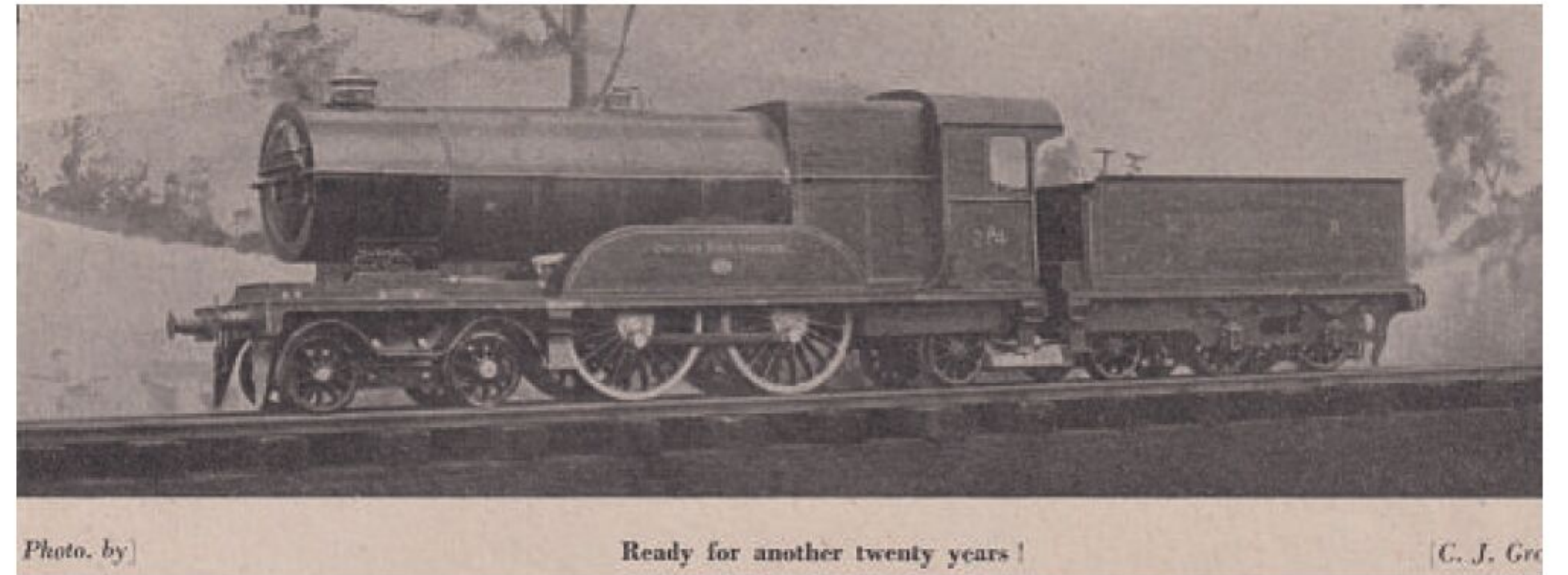
Bassett-Lowke claimed victory by virtue of a slightly longer run but it was obvious that Curly had hauled a bigger load very nearly as far with a much smaller engine. His defence was that a big goods engine ought to be able to pull far more than a modestly-proportioned atlantic and he challenged Bassett-Lowke to

beat him with a same-sized engine. In fact he could have used the GWR Star Princess Mary, built in 1923 for a client, also at the show, but chose wisely to stick with *Ayesha*.

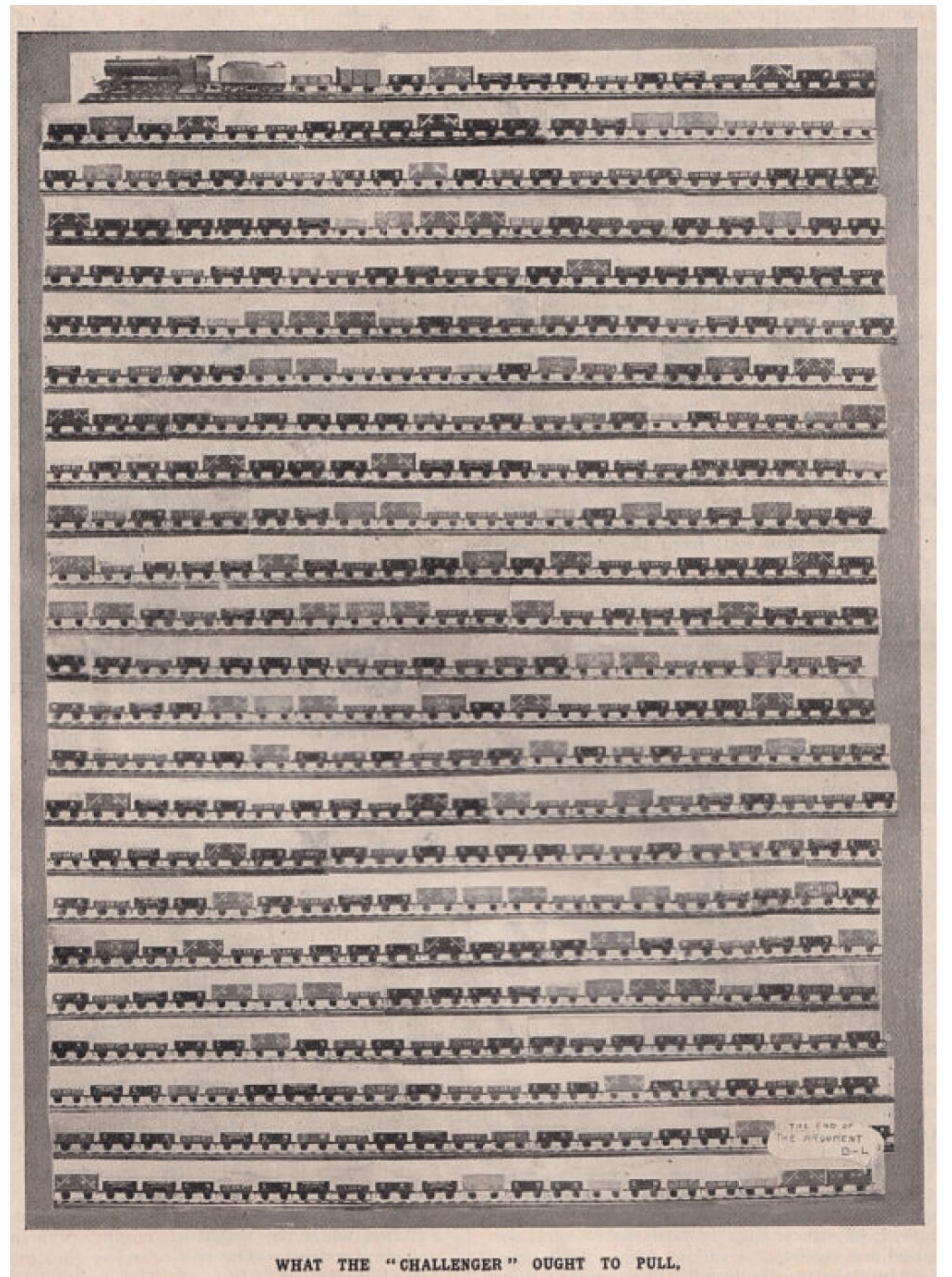
Nonetheless it is a shame that there are no proper photographs. The sole surviving picture is the well-known shot of *Challenger* with three passengers, including Greenly. However this is a posed Bassett-Lowke publicity photo as both locomotives hauled only their drivers during the contest.

Greenly had first shot in the PR battle with a detailed article about *Challenger* in the *Model Engineer* on 10 January. It contains excellent drawings, quite sufficient to build a replica.

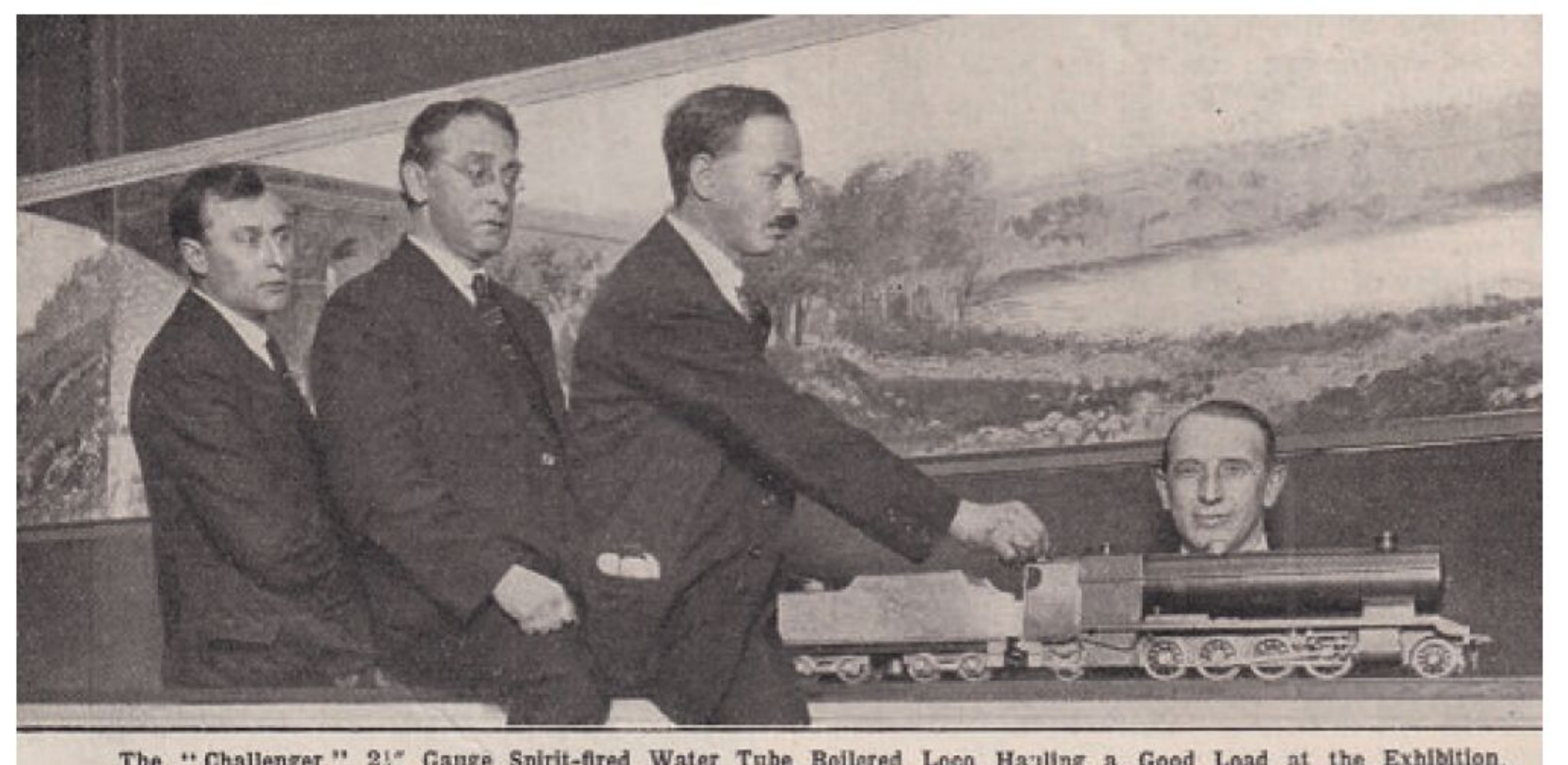
Percival Marshall commented on 17 January that Bassett-Lowke had proved his point that a spirit-fired, water-tube boiler engine could maintain a continuous power output and congratulated the BL team. However he studiously avoided declaring either side



Another contributor to the Boilers debate was '184', actually Curly's friend William Briggs, builder of the spirit-fired atlantic Charles Rous-Martin, for which Curly made valve gear parts before World War 1. Curly always claimed that the engine was the first 2½ inch gauger to haul a live passenger in 1921. The locomotive is today owned by The Steam Workshop.



Greenly's 476-wagon PR stunt, captioned 'What the Challenger ought to pull'. It's a pity that Curly never challenged him to actually try it!



Challenger with three passengers at the 1924 Model Engineer Exhibition. Greenly seems remarkably apprehensive behind the 'only nine-stone' driver while W.J. Bassett-Lowke looks plain odd.



C.M. Keiller.

the winner. 'In attempting to make a comparison between two totally dissimilar things', he noted that 'no-one disputes the fact that a pennyworth of anthracite will do as much as a shillingsworth of methylated spirit'.

This was a highly pertinent point given *Challenger's* stated (and distinctly thirsty) one pint of meths consumed for the warm-up and 15-minute run. Imagine the fuel bill for a whole afternoon... His editorial was otherwise a determined sit on the fence.

Greenly replied with a photograph of *Challenger* and 476 wagons and the curious defence that *Challenger* had consumed 115 units of steam against *Ayesha's* 45 for the same job. He later changed his story, claiming a similar steam consumption and only half a pint of meths. It would today be possible to restage the contest and determine the true facts.

Meanwhile Bassett-Lowke wrote to the *Model Engineer* on 21 February to claim that he had proved his arguments to his own satisfaction and generally congratulate himself. He marketed the *Challenger* design for several years though apparently without any outstanding success while the original was sold to Dennis Fry of the well-known chocolate-making family.

The most important outcome of the contest was to set Curly firmly on the road to fame as the originator of amateur loco-building and running as we know it today. His *Shops Shed & Road* column began in the *Model Engineer* on 18 September 1924 and



A gathering of Ayeshas at the 100th birthday rally at Rugby SME 11 September 2022.



Curly's own 2½ inch gauge 4F Harriet, a late build completed in 1964, made a welcome return to steam in June this year. The engine, in close to original condition and owned by Bryan Luxford, is seen at the North London SME track, being driven by Jack Shawe. (Photo: Owen Chapman.)

he remains one of the most important contributors in the history of the magazine.

Hopefully the Battle of the Boilers centenary will

bring a bumper turnout of Curly locomotives to the LBSC Memorial Bowl rally at Cheltenham SME on Sunday 1 September, especially some his

own originals which have not been seen together in public for many years.

ME

An Engineer's Day Out

Newcastle upon Tyne - Engineering and Art

Roger Backhouse

finds a place where art meets engineering.



Laing Art Gallery



Discovery Centre

Never let it be said this series isn't wide ranging. This time Mr and Mrs Backhouse had a cultural outing to an art exhibition - *Turner: art, industry and nostalgia* at the Laing Art Gallery in Newcastle upon Tyne (**photo 1**).

After the gallery they found much other interest in Newcastle, a city dating back to Roman times when it was on Hadrian's Wall and a bridge crossed the Tyne with settlements on either side. Some of this history is described in the city's castle, an ancient area of great interest but vandalised by the Newcastle and Berwick Railway, pushed through in 1847. Luckily the Black's Tower entrance survived and the keep roof offers superb views of the river, city and bridges if you can manage the steps up (**photo 2**).

From late mediaeval times Newcastle sent coal to London and other places. Coal seams outcrop along the steep sided Tyne valley and as these became exhausted coal owners built wooden wagonways taking coal from more distant mines down to quaysides for onward transport. Wooden wagonways were converted to cast iron tramroads with extensive networks around Newcastle. There was even a tunnel beneath Newcastle taking rope hauled chaldron wagons at 5 minute intervals, an intensive service for the time.

Exporting coal gave rise to

a major shipbuilding industry, now closed. Mining and shipbuilding along the Tyne created a large engineering industry and other specialist firms developed. Newcastle was a centre for scientific

and engineering innovation. Growing prosperity and civic pride saw central Newcastle rebuilt in the mid 19th century and it remains 'the most handsome city centre in the north' (Simon Jenkins).



J.M.W. Turner's *The Fighting Temeraire*. (© The National Gallery, London)



Newcastle castle gatehouse with cathedral beyond. The railway to Berwick destroyed much of the castle area but the keep is a great viewpoint over the river, bridges and railway.



Newcastle Central Station has a magnificent overall roof.

Railway station

An early steam railway developed by William Hedley and Timothy Hackworth operated further up the Tyne at Wylam with the pioneering *Puffing Billy*. George Stephenson was born nearby where his birthplace is owned by the National Trust.

Newcastle was rail linked to Carlisle, Darlington and York early in railway history and the central station with its magnificent overall roof is a good starting point for a city tour. Simon Jenkins awards it five stars in his book *Britain's 100 best railway stations* (Viking 2017). It was designed by John Dobson in 1848 though subsequently altered. For railway opulence visit the Centurion Bar on the concourse. Formerly the first class dining room, it is a riot of murals and Burmantofts tiles, all beautifully restored and tempting even a teetotaler to imbibe (**photo 3**).

Robert Stephenson and his works

George's son Robert was born near Newcastle at Willington in 1804. He was educated at Dr Bruce's school in Percy Street Newcastle but extended his learning by borrowing books from the Newcastle Literary and Philosophical Society.

Robert opened his Newcastle Forth Street locomotive works in 1823, notable as the first such works in the world and the first employing a draughtsman. Robert Stephenson and Co. made locomotives for many early railways and their engines saved the Great Western from



High Level Bridge pillars are hollow to save weight. They are made of ashlar built on wooden piles driven into the river bed.

disaster when Brunel's designs failed to work properly. The firm went on to develop large export markets. The firm closed in 1960 and there is little left on the site.

High Level and other bridges

Robert Stephenson's lasting triumph on Tyneside is the innovative High Level Bridge. Stephenson was helped by Thomas Harrison who prepared working drawings and later became the Chief Civil Engineer of the North Eastern Railway.

Opened in 1849 it was the first railway bridge in the world to cross a major river valley and was the first designed to carry both road and rail traffic in a double deck arrangement (**photo 4**).

Piers were built on foundations of wooden piles driven into the river bed. First, test piles were driven in and loaded to see if they sank further. It was an early use of



Robert Stephenson's remarkable High Level Bridge seen from the riverside.



High Level Bridge span seen from the riverside Two decks carry road and rail traffic.

Nasmyth's steam pile driver, a derivation of his steam hammer.

Wood was imported from America and each pile was fitted with an iron point. Several dozen piles together formed a pier support. The five ashlar piers are hollow to lighten the load (**photo 5**).

Stephenson had several batches of cast iron from different iron works tested to find the strongest but he knew that cast iron is weak in tension so the bottoms of each of the arches are tied together with wrought iron rods which counter the lateral forces that would otherwise cause the arches to fracture.

In 1893 the cast iron cross girders were replaced by wrought iron and in 1922 the road deck timber cross girders were replaced with steel to allow the passage of trams. The bridge still carries regular rail traffic though there is a weight limit for the roadways.

Even so, buses cross regularly (**photo 6**).

Newcastle has a remarkable range of bridge types in a short distance. The newest is Gateshead's Millennium Bridge for pedestrians and cyclists with a parabolic arch lifted for river traffic.

Next, the Tyne Bridge was opened in 1928. Though of a similar type with the steel arch built out from each bank it was not a prototype for Sydney Harbour bridge. Unusually for the time a woman engineer, Dorothy Buchanan, was part of the design team (**photo 7**). It is now undergoing a major refurbishment.

The swing bridge is still operated by Armstrong's original oscillating cylinder hydraulic motor mechanism installed in 1876. It is open to the public occasionally (**photo 8**).

After the High Level Bridge came the steel truss girders of the Metro bridge opened in 1981 (**photo 9**) and then the



7 Tyne Bridge opened in 1928. Although not the prototype for Sydney Harbour Bridge it used the same construction techniques.



8 The Swing Bridge, opened in 1871, still uses the original Armstrong built hydraulic machinery.



9 The Metro bridge seen from the castle keep with the King Edward VII rail bridge and Redheugh road bridge just beyond.



10 Newcastle Literary and Philosophical Society lecture theatre as it was. Here Joseph Swan gave his first demonstration of incandescent electric lighting. (© Newcastle Literary and Philosophical Society.)



11 Newcastle Literary and Philosophical Society building. The society is still active and was crucial in advancing scientific understanding in the 19th century city. Nearby Mosley Street was the first in the world to be lit by Swan's incandescent electric lights. (© Newcastle Literary and Philosophical Society.)

Warren truss King Edward VII bridge opened by the North Eastern Railway in 1906 so through trains could avoid reversal in Newcastle station. Last, the Redheugh prestressed concrete bridge, opened in 1983, takes the A189 over the Tyne.

Lord Armstrong and hydraulic power

William Armstrong was a Newcastle solicitor and keen fisherman who became interested in water power during a fishing trip. He noted the inefficiency of a water wheel and developed hydraulic machines, creating the world's first distributed power supply to supply hydraulic cranes on Newcastle quaysides. This success led to hydraulic systems soon used worldwide with his Tyneside legacy the swing bridge.

He then moved into making armaments, managing a large works at Elswick just west of Newcastle, which branched out into shipbuilding. His firms made warships for navies and Armstrong helped start an arms race. Ennobled as Lord Armstrong, his house at Cragside near Rothbury was the first to be lit by hydroelectricity. It remains a fascinating place in National Trust ownership. (See *Model Engineer* Vol. 201 No 4337 Pp 495-497 24th October 2008.)

Joseph Swan and electric light

Joseph Swan lived across the river in Gateshead but worked for a Newcastle chemist. He experimented with electricity and realised the potential of using a heated filament in a vacuum tube to produce an electric light. Previously electric

illumination had been possible only through arc lights which gave a very bright light, difficult to control and unsuitable for domestic use.

After many experiments he produced a filament from cotton thread partially treated with sulphuric acid to make cellulose which produced a satisfactory glow in an evacuated tube. Thomas Edison was working on a similar filament but Swan was first and he later combined forces with Edison to produce the Ediswan electric light.

Swan demonstrated his new lights in public at the city's Literary and Philosophical Society lecture hall, another Newcastle first (**photo 10**). Although the lecture hall has been drastically rebuilt the building still stands and is open to the public (**photo 11**).

In other experiments he

produced artificial threads, precursor of rayon, which his wife made into doilies. Examples are held at the city's Discovery museum.

Swan was a friend of another electrical pioneer R.E.B. Crompton. Visiting Swan's laboratory he saw twenty incandescent electric lights burning steadily. Crompton had earlier made improvements to the Gramme dynamo and realised the dynamo and lamps could revolutionise illumination so he encouraged Swan to put his lightbulbs into production. First shown at an exhibition in Glasgow, orders followed with an early major electric lighting installation at London's Law Courts in 1883.

Charles Parsons and the steam turbine

Mike Tilby has outlined the history of the steam turbine in his *Model Engineer* series (Vols 218-224). Steam turbine development was due to the unlikely figure of the Honourable Charles Parsons. He was born into the Anglo-Irish aristocracy but instead of their huntin', shootin', governin' pursuits combined intellectual curiosity, acute theoretical understanding and practical knowledge.

As an apprentice at Armstrong's Elswick works he considered the possibilities of a steam turbine and realised that if steam was compounded, passing from one rotor to another as it expanded, power would be maximised.

Seemingly incredible speeds could be obtained with his first

turbine revolving at 18,000 rpm. This was much faster than the speeds then required for dynamos so Parsons redesigned a dynamo to cope. Parsons turbines soon became chosen for most electricity generation, taking over from the previous high speed reciprocating engines.

Parsons' turbo-alternators were first installed at Forth Banks power station in Newcastle in 1892. Though output was only 75 kW their obvious efficiency led to their rapid installation in most of the world's power stations. By the end of the 19th century one of 1000 kW output had been installed in Germany.

Turbinia and the Discovery museum

Parsons wanted to develop marine applications for his turbine forming the Marine Steam Turbine Company in 1894. For complex patent reasons he used a radial type turbine rather than the parallel flow type he pioneered. He tried resistance experiments with two models of the pioneering ship *Turbinia* but found that with a single propeller shaft rotating at 1600 rpm speed was well below expectations (**photo 12**).

After further research using a specially designed torsion dynamometer (**photo 13**) he discovered that the pressure drop behind the propeller blades caused air dissolved in water to form cavities, an early demonstration of the cavitation effect. The propeller could

not absorb the power being produced.

After various experiments at his home Parsons redesigned *Turbinia* with three parallel flow turbines and different propellers (**photo 14**). *Turbinia* ran at 32.75 knots in February 1894 and later appeared at the Naval Review later that year. (Some sources suggest Parsons and *Turbinia* were not invited to the Review. That is incorrect, but *Turbinia* astonished the world by her speed, demonstrating engineering showmanship from Charles Parsons.)

Turbinia had a chequered preservation history. It was cut in half with one part retained by the Science Museum and the other shown in Newcastle. The vessel is now displayed complete at Newcastle's Discovery Museum, surely one of the most significant exhibits at any British museum. A Parsons turbine is displayed nearby (**photo 15**).

Aircraft joystick

Among other Tyneside inventors, Arthur George is often credited with inventing the aircraft joystick, giving pilots single stick control of roll, pitch and yaw through rudder and ailerons. A remarkable inventor, he taught himself to fly in 1909 and with a colleague built a biplane in 1910. Others have also been credited with the invention but there is little doubt that George made flying easier and safer. This also features in the Discovery Museum.

Art, industry and nostalgia

For a change from industry and engineering there is the Laing Art Gallery and their fascinating current exhibition *Turner: art, industry and nostalgia* (to September 7th).

Turner's *The Fighting Temeraire*, painted in 1839, is deservedly one of the most popular pictures in the National



Pioneering *Turbinia* restored in the Discovery Centre.



Torsion dynamometer developed by Charles Parsons to help development of his revolutionary steam turbine.



In a later form Turbinia had three propellers on three drive shafts.
(© Mike Tilby 2024.)

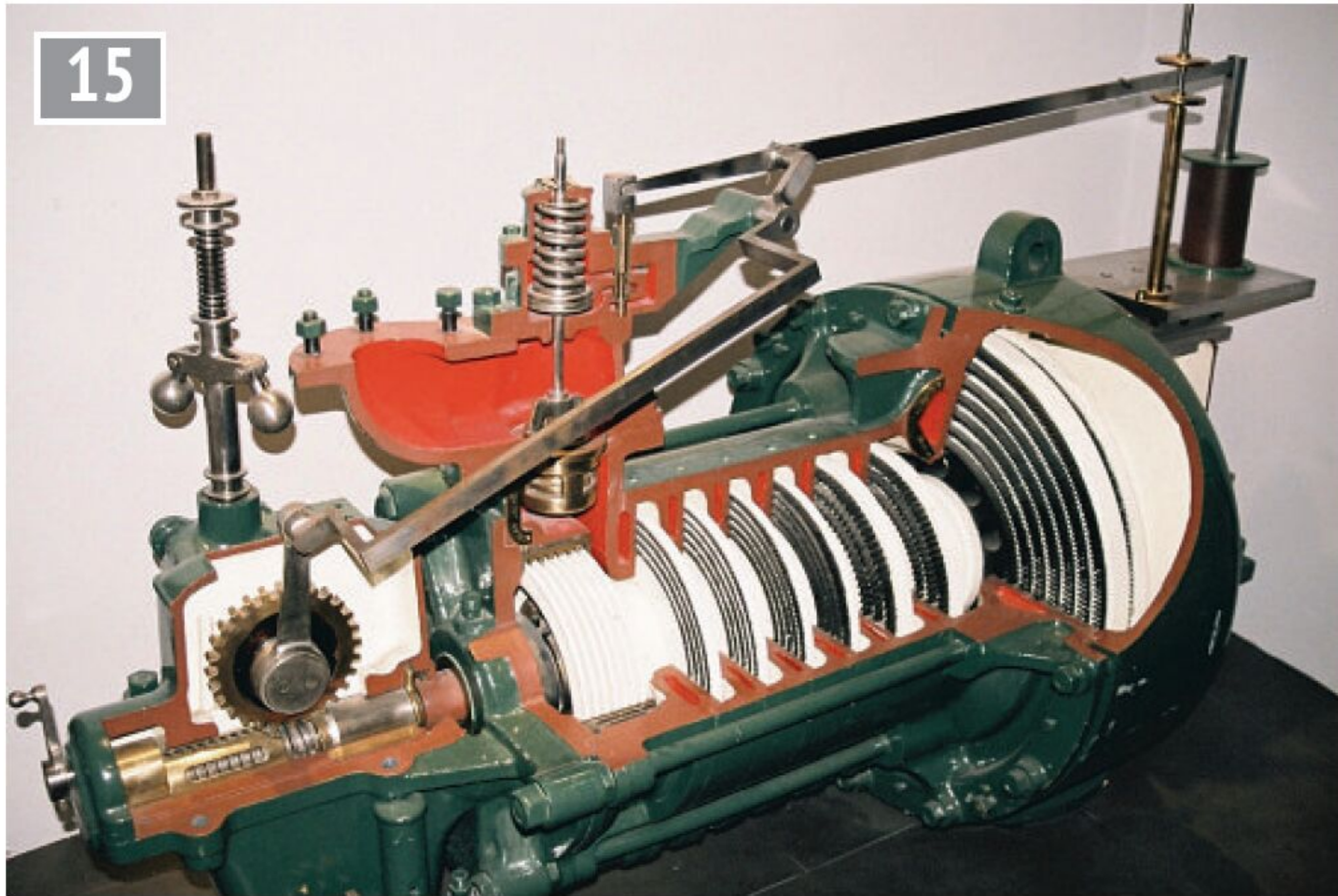
Gallery. One of twelve pictures loaned out by the Gallery this summer, it has great appeal.

The painting shows the final Thames journey of *HMS Temeraire* towed to ship-breakers at Rotherhithe. Reputedly Turner's favourite painting, it features on the Bank of England £20 note. There is something symbolic about the almost ghostly depiction of *Temeraire* with near white masts and yards contrasted with the black and smoky image of the paddle wheel tug. It marks a transition from the age of sail to a time when steam ships would dominate

the oceans.

Turner took artistic liberties with his painting. Ships going to the breakers were stripped of masts and yards but *Temeraire* is depicted with them in the picture. Two Tyne built paddle wheel tugboats, *Samson* and the *London*, towed the ship. However, the tugboat depicted in the painting was John Rogers Watkins' *Monarch* with her funnel shown impossibly far forward but enhancing the pictorial effect.

If Turner took artistic liberties so did the engraver, James Wilmore. He added much more rigging to *Temeraire* and moved



An example of a Parsons turbine in the Discovery Centre.

the tug's funnel back behind the mast. Turner did not approve, but the engraving brought the painting even wider attention.

Turner featured smoke and steam in several paintings. He found atmospheres of industrial areas fascinating, also producing a remarkable watercolour of Dudley held in the Walker Art Gallery Liverpool.

The exhibition also explores Turner's life and career, the role of *Temeraire* itself, Turner's other depictions of steamboats and industrial subjects, and the continuing story of industrial landscapes in art with works by artists including Tacita Dean, L.S. Lowry, James McNeill

Whistler and photographer Chris Killip (**photo 16**).

The exhibition includes a fine model of *Temeraire* made by French prisoners of war and a model of an 1830's steam tug, showing that tall funnels depicted by Turner were not exaggerated.

So there is much artistic and engineering interest around Newcastle, a city not usually on the tourist trail but well worth exploring. It's hoped to feature other places of interest nearby in future articles.

Thanks to the following for their help with the article:

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Jack (Newcastle Literary and Philosophical Society library)

Laing Art Gallery

New Bridge Street, Newcastle upon Tyne, NE1 8AG
Open Monday to Saturday 10am - 4.30pm. Closed Sundays and Bank Holiday. Gallery free but entry charge for exhibition.
www.laingartgallery.org.uk.
Tel 0191 278 1611.

Discovery Centre

Blandford Square, Newcastle upon Tyne, NE1 4JA
Open Monday to Friday 10am - 4pm, Saturday and Sunday 11am - 4pm. Closed bank holidays. Free admission.
www.discoverymuseum.org.uk. Tel 0191 232 6789.



Shaping the keel plate of a corvette. (Leslie Cole. 1942. © Laing Art Gallery.)

ME

Boxers to Polkas

The Story of George Forrester's Locomotives PART 3

Ron Fitzgerald explores the history of George Forrester, a little known but influential locomotive engineer.

Continued from p.224
M.E.4748 July 26

In Forrester's adaptation of Carmichael's gear he discarded the use of two eccentrics as used on *Swiftsure* and relied upon a single one for each cylinder in the 2-2-2. The eccentric rods were shortened and the levers lengthened to produce a greater angle of movement. By splitting the single eccentric rod of Carmichael's gear into two diverging arms, the distance moved to engage alternate pins was greatly reduced. The arm that was in engagement was pressed into contact with the fork of the gab by a roller on the reversing rod which was also responsible for raising the pin into its appropriate position to lock into the gab seat. The gear had two disadvantages. The disengaged rod tended to lash whilst working as it lacked positive control but more seriously the rise and fall caused by the springs of the axle altered the valve movement and with the short valve travel then universal a situation could arise where the ports only opened partially.

Forrester's vertical gear mounted on the side of the boiler was a short-lived arrangement but the contribution that it made to the wider evolution of the gab gear was fundamental. Gab type gears became the first generation of reversing valve gears used in locomotives and from the Forrester gear sprang a number of variants including two gab motions by Stephenson in 1838 and 1840. Ultimately the gab gear was to evolve into the Howe/Williams

valve gear that became known under Stephenson's name for the rest of the life of the steam engine, in all its forms. The basic Howe gear was first applied to the North Midland Railway long-boiler locomotive No. 71 and the developed Stephenson link motion was first fitted to another North Midland long-boiler locomotive, No. 359, delivered on the 15th October 1842 (**note 40**).

Equally influential was Forrester's system of cylinder arrangement and frame construction, initially on the design of the Grand Junction Railway's locomotives but later spreading elsewhere. *Herod* and *Odin* entered service on the GJR just as the line was experiencing a formidable engineering crisis. As the more powerful *Patentee* class entered service, so the incidence of crankshaft failures grew to epidemic proportions. Brian Reed, in his history of Crewe Works, records that by the summer of 1839, of 55 inside-cylindered locomotives, all had either broken their crank axles or had them replaced within the space of 13 months. Reed quotes Charles Todd of Todd Kitson and Laird, the Leeds locomotive builders, who recalled that he had once seen the wheel of a GJR six-wheel engine running at about 35 mph on straight track suddenly rise some 18 inches in the air, drop back on the rails and continue bouncing *decrescendo* for some distance (**note 41**).

Until the introduction of Nasmyth's steam hammer in 1843, crank axles had been

forged under the tilt hammer which was limited in the power of the blow that it could deliver. The steam hammer was far more powerful and the blow was controllable over a wide range, leading to better forging technique but equally importantly improving the quality of the basic wrought iron as it came from the ironworks. The Low Moor Ironworks in Bradford was the first to acquire Nasmyth's hammer and both their wrought iron and their crankshafts rapidly gained a premier reputation. In spite of this advance in manufacturing technology there was to be no complete solution to the problem of defective crank axles and this component remained one of the most treacherous parts of the steam locomotive (indeed of any reciprocating engine).

The course of events following the introduction of *Herod* and *Odin* on the GJR is reasonably well documented but the engineer responsible for solving the railway's problem is contentious (**note 42**). Joseph Locke, the engineer who had undertaken the building of the railway was retained by the company in what was effectively the position of consulting engineer. His attention to Grand Junction affairs must have been restricted as he was concurrently engaged in the construction of the London and Southampton, the Sheffield and Manchester, the Lancaster and Preston and after 1841, Paris Rouen and

the Rouen Le Havre railways. He delegated authority for the Grand Junction Railway to William Barber Buddicom who was twenty four years of age when he was employed by the GJR. Buddicom had been apprenticed to Mather, Dixon & Co., of Liverpool from 1831 to 1836, after which he became resident engineer under Edward Woods on the Liverpool and Manchester Railway. His association with Locke had begun when he held the post of resident engineer on the Glasgow, Paisley & Greenock Railway. On the 3rd March 1840 he became locomotive superintendent for the Grand Junction Railway and he had occupied the post for three months when the Board instructed him to prepare a report on crank axle failures. At the same time he was to evaluate the two locomotives that Forrester's were offering. Ten days later, having received Buddicom's report, the Board authorised the purchase of the Forrester machines; *Herod* was in service by the end of June and *Odin* in the month following.

Possibly before, but certainly after, Buddicom's appointment (**note 43**) the GJR workshops on the Liverpool and Manchester Railway at Edge Hill, Liverpool, began to modify the *Patentees* by removing the inner Y-shaped frame between the firebox throat plate and the rear of the cylinders along with the intermediate crankshaft bearing. In replacement, a thicker iron plate was located just inside the driving wheels, extending from the firebox throatplate to a newly inserted motion plate behind the cylinders. This permitted the crankshaft bearings to be reduced from five to four, relieving the crankshaft of some stress. With the example of the Forrester locomotives before them, the Board then asked Buddicom whether the railway should build any of the same outside-cylinder type and in the minute of June 10th he was instructed to substitute straight axles for the broken crankaxles in four engines.

No immediate action seems to have followed and the *Patentees* continued to undergo frame alterations whilst retaining their crank axles.

Herod and *Odin* had been in service for six months when Buddicom wrote to the director, Hardman Earle, on January 6th 1841 saying that the two Forrester locomotives:

...do not work as effectively as the crank axle ones but there are reasons for this in the faulty construction in some of the principle [sic] parts ...we are altering 2 old crank axle ones into outside cylinder ones so as to give the principle a fair trial and I have no doubt of the results being favourable...

It is difficult to determine whether the proposed alterations of *Patentee* type crank axle locomotives to straight axles went ahead but by the beginning of February, Buddicom was writing to Locke to tell him:

...More crank axles breaking. I have a glorious scheme for straight axles—you will like it I'm sure...

Some further, now lost description must have followed

from Buddicom to Locke for the latter had sufficient information to write on April 19th 1841:

...Having determined to have 5 ft. 6 in. wheels and being very anxious to keep 3—6 for the front, I would consent to the slight inclination you mention—believing that it would not materially prejudice the engine. Be good enough then to proceed at once and let us have the Engine in hand and soon on the line...

Locke had another reason to spur on Buddicom in that he was planning to use the new design on the Paris-Rouen Railway with which he was now heavily involved. Moreover, Buddicom himself was to transfer his services to Rouen, resigning from the GJR on 16th June 1841 and leaving England in September with William Allcard to set up workshops at Sotteville in the suburbs of Rouen.

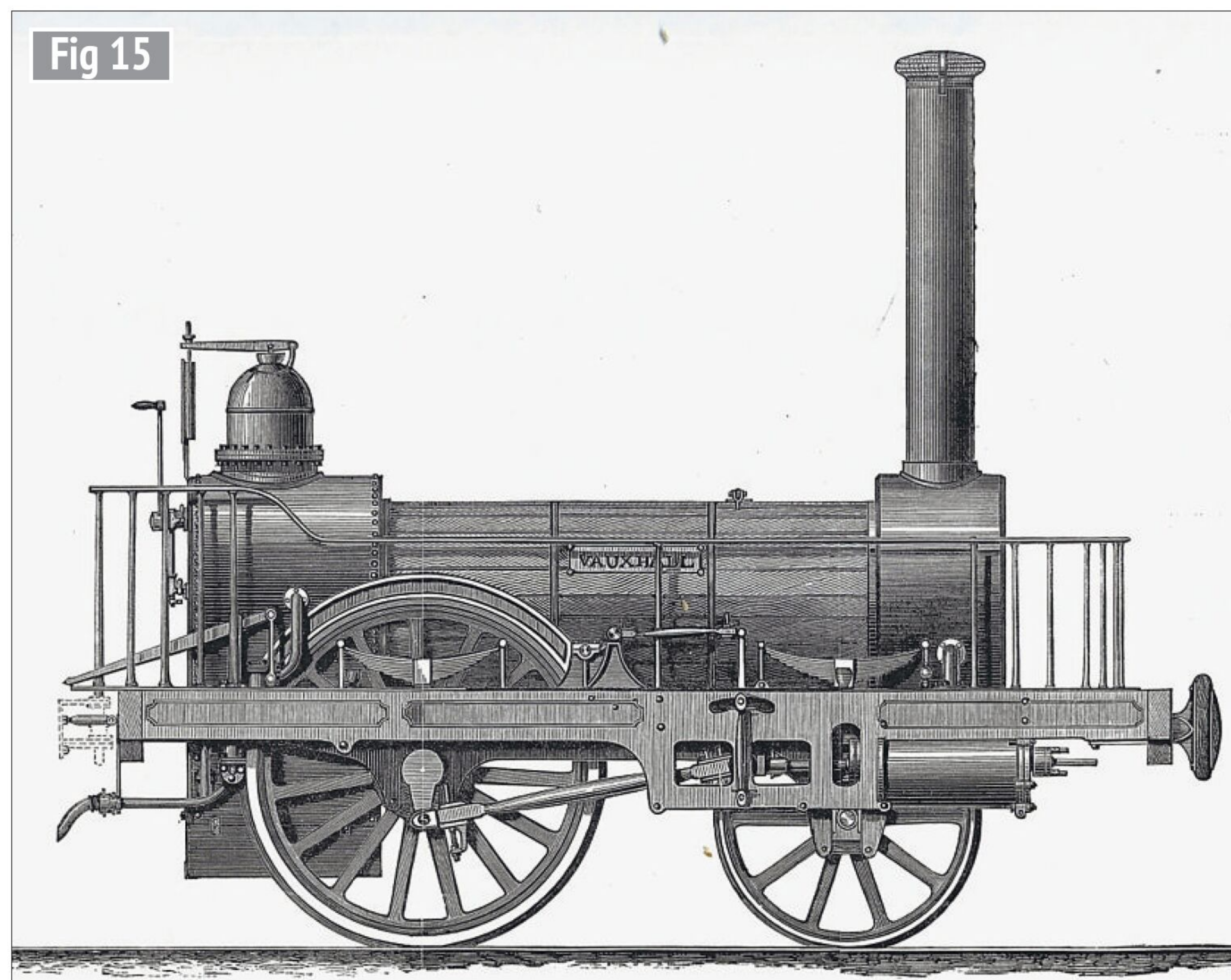
According to Stuart and Reed, the first locomotive to follow this new design was a rebuild of *Aeolus* which they maintain was one of the first batch of GJR Stephenson built *Patentees* of 1837 (**note 44**).

Baxter however lists it as No. 26, the first of the second batch delivered in 1838 with 5 foot 6 inch diameter driving wheels as opposed to the 5 foot diameter of the 1837 batch (**note 45**) and leading and trailing wheels 3 feet 6 inches in diameter *vide* Locke's letter quoted above. Baxter also says that it was rebuilt in 1840 with outside cylinders whereas Stuart and Reed say that the exact date of conversion coming into service is not on record:

...but it was around August 1841, just before Buddicom departed for France...

What seems to have been an identical locomotive was built or possibly rebuilt alongside *Aeolus* at the Edge Hill workshops for the Paris Rouen Railway, which shared directors with the GJR.

The English and the French locomotives were the only machines of the Forrester type to be built whilst Buddicom was in office at the GJR. The position as he left in mid-June 1841 was that the railway had in service the *Herod* and the *Odin*, built by Forrester in 1840 and the *Aeolus* rebuilt at Edge



The Artizan's plate showing the one of the two GJR locomotives built at the company's Edge Hill workshops.

Hill, probably later in the same year. Mark Huish reported to the board of Trade on 28th October 1841:

...The Company has three engines with straight driving axles and outside cylinders; one of them, unlike any of the others, has bearings on the inside only of the driving wheels but on the fore and hind wheels the bearings are outside...

From the above it is clear that the deep attached horn guides carrying the outer driving axlebox, shown on outside frames in the Kinnear Clark illustration (fig 9 – M.E.4748, 26th July) which had been used on *Herod* and *Odin* were abandoned when *Aeolus* was built. The *Aeolus* arrangement must have been nearer to *Swiftsure*, bearing in mind that Allen had criticised the position of the cylinders in the Kinnear Clark drawing as wrongly shown outside the frames. Presumably the *Herod* and the *Odin* were still operating with the gab valve gear mounted on the boiler side whereas *Aeolus*, equally presumably, had its gab gear between the frames.

After Buddicom left the GJR he was succeeded by Francis Trevithick, the youngest son of Richard. Trevithick assumed his new post on the 1st September 1841. Locke, who continued to be party to the GJR's affairs, recommended in the first week of February 1842 that three of the 1837 and one of the 1838 series of *Patentees* be sent to Messrs. Jones Turner and Evans, later Jones and Potts of Newton-le-Willows, to be scrapped. Such parts as would be suitable for building into four more of the new type of locomotive were to be salvaged. Two other engines were to undergo the same treatment at Edge Hill. The Edge Hill locomotives were the first to enter service, in June 1842 and the Jones and Potts locomotives followed in November. The two Edge Hill locomotives retained the names of their cannibalised predecessors *Tartarus* and *Sunbeam* whilst the four Jones and Potts locomotives also

memorialised their begetters, *Vizier*, *Centaur*, *Sirocco* and *Pegasus*.

In July 1843, the *Artizan* published an engraving and description of the GJR locomotives (fig 15). The debt to the Forrester locomotives is very evident. Most obviously, the cylinders are outside and the driving axle is straight. The three continuous frame plates on each side in the Forrester locomotives have now been reduced to two continuous plates running the full length of the machine. An additional shortened frame plate is interleaved between the outer plates at the front and rear but terminating in a stretcher between the outer and inner frames. The shorter frames carry the bearings for the leading and trailing wheels but the driving wheels sit between the inner and outer frames in a clear space with the axle supported by axleboxes sliding in horns formed by a second subsidiary frame plate located inside the inner main frame plate. The cylinders had external flanges by which they were bolted between the two outer leading frame plates. They also differ from the Forrester locomotives in that they are inclined rather than horizontally placed on the centreline of the driving wheels. Unfortunately the specification that is presented by the *Artizan* as:

...Six-wheel passenger engine with 13 inch cylinders 18 inches stroke cylinders, 5 feet driving wheels and leading and footplate wheels 3ft 6ins...

is clearly not for the machine illustrated as the text mentions cylinders 2ft 4ins apart which can only be inside cylinders and the frames are of the wood sandwich type.

Despite a dispute concerning nomenclature, this group of machines were the prototypes for the famous *Crewe Type*, distinguished by its outside cylinders flared into the smokebox and its frame construction, ultimately refined into two plates at each side of the machine. As long as Francis Trevithick was in

office the class continued to proliferate and a 2-4-0 variant was produced, commencing with *Hecla* built in October 1844. *Hecla* was the first GJR locomotive to be fitted with Stephenson valve gear which thereafter began to replace the gab gear. A few *Crewe Types* were built as tank engines but many more were converted as they grew older. After 1857, when Ramsbottom succeeded Trevithick, the design ethos changed. Multiple frames were supplanted by single frame plates and whilst Ramsbottom retained the outside cylinders up to and including *The Lady of the Lake*, he eventually reverted to inside cylinders.

Two of the *Crewe* class are preserved in Britain, the older being *Columbine* which Stuart and Reed maintain was built in February 1845 whilst Baxter dates it to July of that year. Stuart and Reed believed it to be the 20th locomotive to be built at Crewe. Jim Clark in his articles has given an account of the other survivor, *Cornwall* and summarised the complex history of the prototype (note 46).

If the Forrester-inspired design expired on the LNWR it enjoyed continuing popularity in Scotland, migrating with Alexander Allen to the Scottish Central Railway and thence to the Caledonian. Here both Sinclair and Connor were exponents. In France it was considerably more influential; Buddicom and Allcard at the new Sotteville works on the Paris-Rouen Railway imported the design not only for service on the P&RR but also for the successor Paris-Bordeaux line which became the core of the Paris-Orleans. In addition, Jones and Potts, Hawthorn's and Kitson's supplied identical locomotives to the line (note 47). The Nord, although pre-eminently a Crampton line, was bequeathed thirty through its acquisition of the Amiens-Boulogne line (note 48) but it also formed the basis for the important Clapeyron series of four-coupled express locomotives. The Rouen-Havre-Dieppe company had forty-

eight which began as 2-2-2 express tender locomotives and then were converted to tank engines in which form they survived for eighty years (note 49). No. 33, *St Pierre*, built in 1844, is preserved today, the earliest survivor of the *Crewe Type*, albeit twice rebuilt. Along with the Crampton, the Forrester model of construction undoubtedly contributed to the ascendancy of the outside-cylindered locomotive in France.

The French locomotives were universally referred to as *Type Buddicom* whereas in Britain it became variously the *Crewe Type* or alternatively the *Allan Type*. Other historians have called it the *Trevithick Type*. Kinnear Clark was probably the first to adopt Allan's name in the literature and the plates in his book illustrating the LNWR passenger and goods locomotives are both entitled: *...by Alexander Allan, Crewe for the London and North Western Railway*.

When Francis Trevithick published his biography of his father (note 50) he used the opportunity to include a folding plate of a *Crewe Type* 2-2-2 and in the text he implies that he was responsible for the design. Eight years later, on the occasion of the opening of the extension to the works at Crewe a supplement in the *Crewe Guardian* illustrated:

...One of Mr. Trevithick's engines built soon after the opening of Crewe Works in 1843...

Allan, then aged 73, challenged this accreditation and wrote to *The Engineer* laying claim to the design (note 51). After outlining his personal history with Forrester's he continues:

In February 1840 I was appointed Assistant Superintendent of the locomotive department of the Grand Junction Railway, under Mr. Buddicom. ...Very short experience of the locomotives... induced me to attempt a design in which the quick moving parts should be more in view and easier of access and by which the expense of crank axles and

much connected therewith might be reduced. ...The drawings of this design were submitted to Mr. Buddicom and to Mr. Locke, engineer in chief on the Grand Junction Railway and permission was obtained for the expenditure to make the experiment on three engines having fair boilers but requiring new frames, new valve motions and crank axles. These three engines, Aeolus, Sunbeam and Tartarus with 5ft. 6 in. driving wheels then valued at £239 each were reconstructed to my design. The Aeolus at work at the end of 1840 was valued at £1300 and in 1831 had run 26,000 miles. ...At the first opening of the Crewe works in 1843 Mr. Locke at the banquet gave the toast of the Locomotive Department and spoke of the success of the of the straight axle engine associating my name alone with it...

Allan then goes on to recall his association with the proposed Crampton locomotive which resulted in the building of the three competing machines, *Courier* by Crampton, *Cornwall* by Trevithick and *Velocipede* by Allan.

Stuart and Reed take strong exception to this version of events, discounting Allan's role almost entirely. Their argument occupies several pages at the beginning of the *Profile* publication and three pages at the end but what they have to say is not always as objective as it might be. The reader is best advised to form his/her own judgement after reading the *Profile* in question but this author believes that whilst there are certain inconsistencies in his account, Allan probably did play a central role in the transition from *Patentee* to *Crewe Type*. The process was almost certainly similar to way that David Joy was responsible for the design of the first *Jenny Lind* in 1847 at E.B. Wilson's Railway Foundry in Leeds. Wilson was the titular head of the company and the *Jenny Linds* were sometimes known as his engines, James Fenton the works manager was also credited and his role was doubtless equivalent to

that of Buddicom. It remains the case that the design of the *Jenny Lind* was the result of a dialogue between Joy and Fenton with Joy translating the result on the drawing board (**note 52**). As I have pointed out elsewhere, from a very early period the emergence of the formal drawing office in engineering made design an increasingly collegiate matter.

Whilst the Grand Junction Railway locomotives were enjoying their first flush of popularity Forrester's locomotive building was atrophying. None of the company's characteristic outside framed engines were built for sale in this country after 1840. Instead the firm joined in the prevailing fashion for the long-boiler locomotive which, in Britain at least, consistently had inside frames with either inside or outside cylinders. The concept of the long-boiler locomotive, as developed by Stephenson in 1841, has been discussed in a previous article (**note 53**) but the history of this important but ultimately notorious class of locomotive might be excused some repetition.

It had been observed that when the earliest locomotives were working hard the smokebox glowed red-hot indicating a large amount of heat was being rejected to the atmosphere rather than being used to boil water. In response Stephenson lengthened the boiler which allowed longer tubes a better opportunity of transferring the heat to the water. To accommodate this lengthened boiler all of the wheels were grouped in front of the firebox, largely to fit the wheelbase to the limited turntable diameters then common. The boiler was deemed successful but at the expense of stability; the compact wheelbase encouraged oscillations in the horizontal plane (**note 54**). At the Gauge Trials the Stephenson's Type A class 2-2-2-0 was condemned by all who rode on the footplate at above 45 mph and it ultimately disgraced itself by jumping

the track, taking with it the Astronomer Royal, Sir William Airey (**note 55**), who was on the footplate (Airey subsequently had to retire for a period to the spa town of Wiesbaden to recover his shattered nerves). Although the circumstances of the accident were contested it was universally considered in Britain that long-boiler locomotives were lively at speed and as David Joy recalled, they acquired the nickname *Polkas*.

Forrester's first *Polkas* seem to have been three for the London Brighton and South Coast Railway, running numbers 32, 33 and 34 (**note 56**). These 2-4-0s were intended for goods traffic where the long-boiler was to retain some credibility. The consulting engineer to the line, John Rastrick, reported from the Vauxhall Foundry on the 29th August 1842:

...I have been with Messrs. Forrester's and have had the steam up in the locomotive engine for our luggage trains and have found the workmanship very good but have ordered several alterations and additions. In the course of ten days or a fortnight the first will be ready to be sent off...

Two engines were given trials hauling luggage trains on the Grand Junction Railway and then sent south. These cost the LBSCR £3,850 and the third, £1,790. They had outside cylinders with 14 inch by 18 inch cylinders and 5 foot diameter driving wheels.

Although the LBSCR had no further Forrester long-boiler locomotives the line seems to have initiated its neighbours into the cult. In 1844 the London and Croydon Railway took delivery of two 14 inch by 18 inch cylindered 2-4-0s with 5 foot 6 inch diameter driving wheels, LCR running numbers 76 and 77 (**note 57**). The subsequent somewhat Byzantine company history of the London and Croydon Railway resulted in the locomotives being transferred to the Joint Committee that administered the locomotive stock and numbers 76 and

77 ultimately passed into the possession of the South Eastern Railway (**note 58**). The SER followed up with a further order in October 1844 for six 2-4-0s purchased through the agency of Robert Browne of Liverpool, a firm that had a family connection with Forrester's. Three years later the SER acquired fifteen more of the same type.

These twenty-one SER machines constituted the largest single order for locomotives known to have been received by Forrester's but it proved to be a swansong. There followed a brief and inauspicious dalliance with the patent of John McConnochie and Louis James Claude (**note 59**), an omnibus patent of four unrelated parts one of which gave birth to the locomotive *Spitfire* which was sold to the desperate Liverpool, Crosby and Southport Railway and subsequently became Lancashire and Yorkshire Railway No. 125 (**note 60**). She then passed to that great locomotive resurrectionist, Isaac Watt Boulton who converted her to a stationary engine from whence she was consigned to the timber merchant S. and W. Wilson of Barnsley.

Having gone from '*Boxers*' to '*Polkas*' the firm seems to have decided to abandon railway work after *Spitfire*, possibly under the influence of new management. In 1847 Walter Fergus MacGregor became head of the firm and although his brother, James, was General Manager of the South Eastern Railway there were no further orders from that line (**note 61**). The Vauxhall Foundry now had a growing reputation for large marine engines and secured some notable orders. It was to continue in business until 1890, having had several employees who became eminent in the engineering world including John McFarlane Gray, for some years their chief marine engineer and later, the creator of the entropy diagram in its form familiar to engineers today.

FOOTNOTES

Note 40 *The Development of the Locomotive Valve Gear*, James Dunlop, *The Engineer* July 2nd P.16.

Note 41 *Derby Works and Midland Locomotives*, J.B. Radford, Pub. Ian Allan 1971. P.18.

Note 42 Locomotive Profile No. 15 The Crewe Type, Stuart and Reed.

Note 43 Ibid. *Locomotive Profile No. 15 The Crewe Type*, P.51.

Note 44 Ibid. *Locomotive Profile No. 15 The Crewe Type*, P.52.

Note 45 Op. cit . *The British Locomotive Catalogue 1825-1925*, Baxter. P.19.

Note 46 *Building 3020, Cornwall in 5 inch gauge*, Jim Clark, *Model Engineer* No. 4738, 8th - 21st March 2024. P.369.

Note 47 *Un Siècle de Matériel et Traction sur le Réseau D'Orléans (1838-1940)*, L-M Vilain. Pub. Tardy-Lengelle Paris, 1983. Pp. 69 and 70 and 192.

Note 48 *Dix Décennies de Locomotives sur le Réseau du Nord (1845 - 1948)*, Lucien-Maurice Vilain. Pub. Editions Picador, Levallois-Perret 1977. Pp. 51 and 53.

Note 49 *Le Matériel Moteur et Roulant des Chemins de Fer de L'État du Paris-Saint-Germain (1837) au Rachat de L'Ouest (1909) et a la S. N. C. F.* L-M Vilain. Pub. Editions Dominique Vincent Parius n.d. P.33.

Note 50 *Life of Richard Trevithick*, Francis Trevithick. Pub. E. & F. N. Spon, London. 1872. Vol I. P. 215.

Note 51 *The Engineer*, 25th May 1883. P.405.

Note 52 David Joy's correspondence in the *The Engineer*, May 22nd 1896.

Note 53 *The Montparnasse Accident*, Ron Fitzgerald, *Model Engineer* Issue 4720.

Note 54 For a penetrating analysis of the stability of the long-boiler locomotive see *Stephenson's 'Long boiler' locomotive and the dawn of railway vehicle dynamics*, A. H. Wickens. *Transactions of the Newcomen Society*. Vol. 87. No1. January 2017, pp. 42 - 63.

Note 55 Sir William Airey in addition to being the Astronomer Royal was one of this country's leading mathematicians and had carried out fundamental work on dynamic stability problems including the governor used in stationary steam engines. His presence on the Gauge Commission was due to the latter work rather than his astronomy.

Note 56 *Locomotives of the L.B.& S.C.R.*, Vol. 1, D. L. Bradley. Pub. R.C.T.S. 1969. p.26.

Note 57 *A History of the Southern Railway*, C. F. Dendy Marshall. Pub. The Southern Railway Company 1936. P.62.

Note 58 Ibid. *A History of the Southern Railway*. P.429.

Note 59 McConnochie John and Claude Louis John. Patent 12089 of March 8th 1848.

Note 60 *Early Locomotives of the Lancashire & Yorkshire Railway*, E. Craven. *The Stephenson Locomotive Society Journal*. Vol. XXXIII. May 1957. No. 383. P.139.

Note 61 Ibid. *A History of the Southern Railway*, C. F. Dendy Marshall.

NEXT ISSUE

Parklands
Brian Baker mourns the end of an era as the Parklands railway in Hemsby faces its last days.

Mill Engine
David Thomas begins construction of Arnold Throp's Corliss engine model by tackling the crankshaft.

Swansea
John Arrowsmith drops in to the Mumbles to visit a long established club in Swansea.

LittleLEC
Les Brimson and Owen Chapman report from this summer's LittleLEC at the North London SME.

Butterside Down
Steve Goodbody gets down to the long task of equipping his new workshop.



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ON SALE SEPTEMBER 6 2024

Marketing and Publicity for Model Engineering Societies

Roger Backhouse

reminds us that 'getting out there' is the key to survival.



Model engineering is dying? A familiar theme today but that's what people told Percival Marshall when he launched *Model Engineer and Amateur Electrician* in 1898.

Yet *Model Engineer* flourishes, joined more recently by *Model Engineer's Workshop*.

Fewer people these days complete full engineering apprenticeships, schools rarely teach any kind of metalwork and social media distractions eat up huge swathes of time from what might otherwise be dedicated hobbies time. Sadly, some model engineering societies have folded, although some other model engineering clubs are attracting members.

Both the Society of Model and Experimental Engineers (SMEE) and York Model

Engineers attracted new members in different ways. They are both fortunate to own their premises with well equipped workshops and York has various running tracks, helping to attract members (photo 1).

Increasing membership provides funds for development whereas falling numbers can lead to a downward spiral. Indeed, York Model Engineers' membership had declined to around 130 members but with a sustained marketing approach, membership has now reached over 200.

Open, friendly clubs?

In his *Model Engineer* article (No. 4738, 8 March 2024) Luker pointed out ways in which clubs can welcome new members but even the best marketing and publicity won't

work if existing members are hostile to any newcomers once they arrive. Thankfully, most are helpful to new members.

Marketing

It's important that 'marketing' takes a strategic approach to attracting members. A dedicated team of York members ran a strategic vision workshop aiming to increase membership by 15% from the 2018 base. Problems identified included:

- falling membership
- fewer younger members
- a relatively small proportion of active members
- reduced membership meant less income

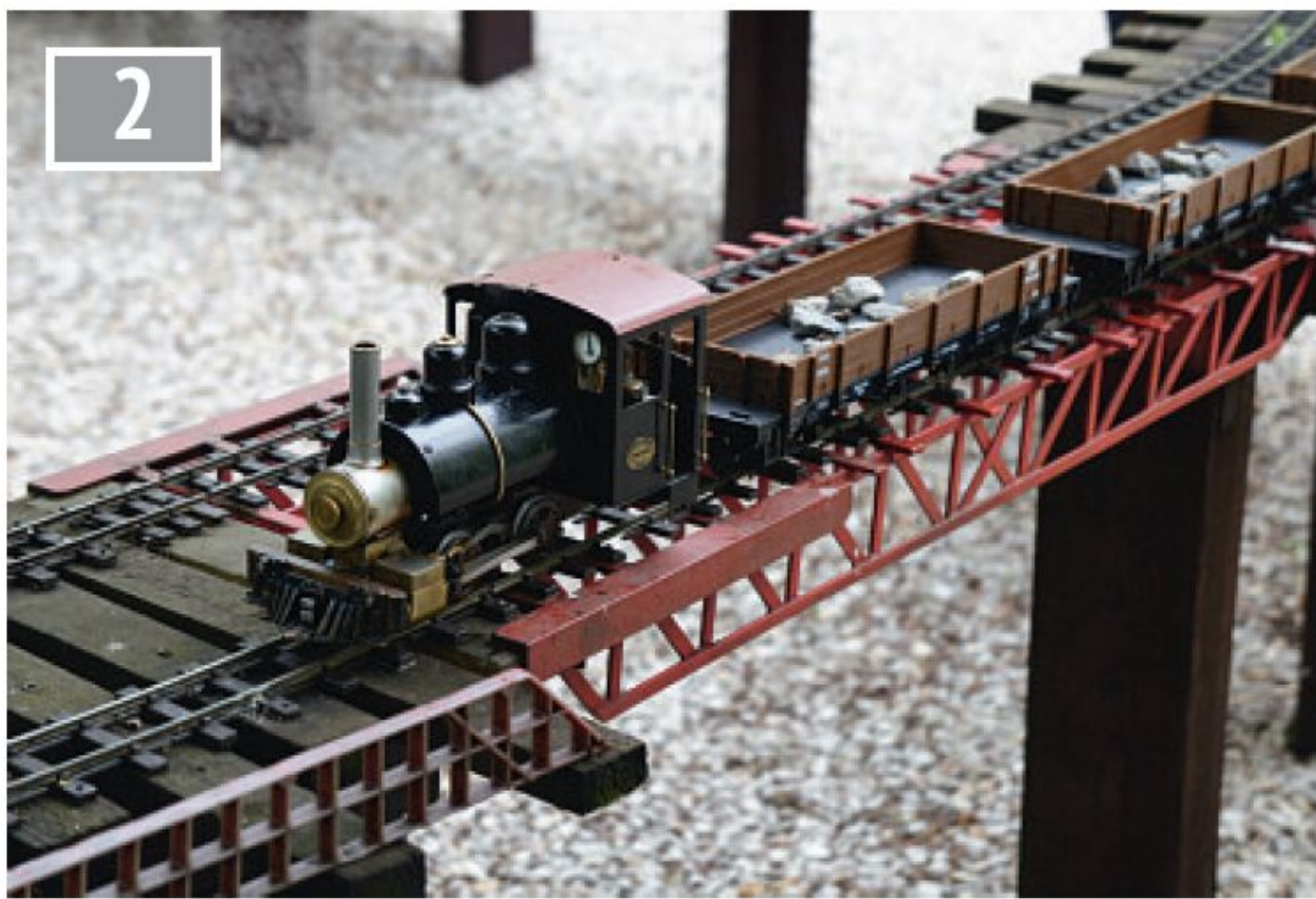
The team proposed a new member campaign achieved through a marketing plan and considered who might be attracted. They identified:-

- experienced and new model engineers not already in a club who might also use club workshop facilities,
- those enjoying track running without necessarily making items,
- people interested in engineering generally - York holds varied talks regularly and has a well-stocked library,
- those enjoying the significant companionship and supportive side of a club,
- more women and young people - model engineering isn't only for older men!
- attracting visitors, perhaps with children, who'd come to open days and make donations.

Ideas tried included a new membership leaflet, website enhancements, social media activity and a different presence at exhibitions. These ideas succeeded beyond expectations and may help other clubs.



Activity at the York Model Engineers track next to the East Coast main line. This was the Society's April 2017 'Le Mans' style non stop run to raise money for Martin House children's hospice. The locomotive is Richard Gibbon's Wren. Charity fundraising is a good way for societies to attract publicity as well as help local causes.



York's garden railway has attracted members from as far away as Tyneside.



York's display at the Easter Model Railway Show at the Racecourse, Easter 2023.

Club facilities

York's site and facilities appeal to established modellers but are probably not the reason many people, new to the hobby, might join.

Earlier, York developed a new garden railway for a growing number of members interested in operating 16mm scale live steam trains (**photo 2**). York already had 2½, 3½, 5 and 7¼ inch gauge tracks in an attractive woodland setting and the garden railway has proved popular, attracting members from as far away as Tyneside. Identifying interest in 45mm gauge live steam operations, members built a track which was opened in 2024 (to feature in a future article).

Using publicity

York used different publicity for the varied audiences they hoped to attract. Mentions in *Model Engineer* and *Model Engineer's Workshop* reached a wider audience of model engineers.

Sending copies of the society newsletters to Geoff Theasby for *Club News* ensured many mentions. Geoff reports that

some clubs never send him newsletters and yet it is so easy to do. Even if your club has no newsletter as such, why not send occasional items of information or updates to the magazines? Editors like to be informed, even if they cannot publish all the information received. Magazines like *Garden Rail* or the O Gauge Guild and Gauge One Society newsletters are happy to publish relevant information too.

Magazine articles written by members are also good publicity for their Society. Currently, Martin Kyte writes for *Model Engineer* about SMEE's models and activities. York's members, Paul Tanner and Richard Gibbon have featured ideas and techniques in *Model Engineer* (**refs 1 and 2**). Articles in society magazines are often also appropriate for wider publication.

Local media and news releases

Model engineers are ordinary people doing special things they enjoy, which is a good story in itself! Despite suspicions you may harbour



Excellent newspaper coverage for York Model Engineers in the Yorkshire Post. That paper often features models and modelling in its pages.



Dave Foster's ingenious model of York's tracks in the foreground always attracts attention at exhibitions. It packs away easily.

of the press, local reporters aren't in the business of trying to catch you out. For example the *Yorkshire Post* often features models and makers. Contacting Ruby Kitchen, a *Post* feature writer, brought York Model Engineers a half page spread in the paper (**photo 3**)! Ruby didn't visit but conducted telephone interviews with chairman Brian Smyth and other members. A *Yorkshire Post* photographer visited, taking some excellent photos of members and filming track activities that later featured on the *Post* website.

Local newspaper and radio journalists like 'easy to understand' (and maybe, 'easy to write') stories! Sending a news release improves your chances of a good write-up. There is guidance available online (eg. [www.cambridgecvcs.org.uk/group-support/Working with the media](http://www.cambridgecvcs.org.uk/group-support/Working%20with%20the%20media)). A good story might even be worth sending to regional TV too.

News releases should include :

- what's happening? - e.g. opening a new clubhouse/ extension or a public

running day

- why is it happening? - e.g. the portable track is out raising funds for a charity
- where? (*very important!*) - e.g. if your track is out of the way, send clear directions to any journalist or photographer who may not be familiar with your area.
- when? - e.g. it's sensible to give local weekly media ten to fourteen days' notice of an event but allow eight weeks or more to publicise in a monthly magazine
- who to contact; including their phone number/ email
- include a quote; quotes enliven a story and are helpful if journalists cannot interview anyone in person.

Letters to newspapers also provide publicity. On one occasion, York's chairman, Brian Smyth wrote to the *Yorkshire Post* about the Society's new workshop heat pump. He also wrote following a newspaper article about a model railway show with a letter promoting what York offers for modellers in larger gauges.

Exhibitions

Many societies mount well presented displays at exhibitions, helping gain members. Model engineering shows often reach existing model engineers so York SME also exhibit at Ebor Model Railway Exhibition and the Easter York Model Railway Show (**photo 4**). Both attracted new members and interest, particularly from families unaware of the club site.

Something moving on a stand is a good attraction. Several clubs show videos of journeys round tracks, which are always fun. Thanks to Dave Foster, York Model Engineers have an attractive model of their club track with locomotives running on N and Z gauge tracks, which always attracts attention (**photo 5**).

Noting the overlap between restorers of old motorcycles and model engineers, SMEE have exhibited at classic motorbike shows at Kempton Park, which have always been



Bradford MES recently bought this as a display tent. Chair Adrian Shuttleworth says it is easy to put up with just two people and can be used at short notice. Bradford's members promote their society at local industrial museums and the Embsay Transport Festival among other events. (Photo, Dominic Scholes 2024.)



Daniel Precious is responsible for York's Facebook page. It has attracted considerable interest. Daniel is seen here in the cab of the North Eastern Autocar during a York Model Engineers visit to the Embsay and Bolton Abbey Railway, also the subject of a Model Engineer article. (Photo, Mike Pinder 2023.)

an enjoyable experience. Bradford MES promote at local industrial museums and the Transport Festival at the Embsay and Bolton Abbey Railway. Thinking laterally pays off (photo 6).

Developing member skills

Attracting members who are already model engineers is good but what about those who might lack skills?

Noting declining membership and that fewer newcomers had had any kind of metalworking

training, SMEE developed training courses which were also available to non members. The Part 1 course was a three day introduction to model engineering and the Part 2 (or Polly course), run over six days, showed participants how to build a Tubal Cain design stationary engine. Since courses started in 2005 over 180 have participated and most have remained members of SMEE. Courses are presently in temporary abeyance but could restart (photo 7).

Other societies might consider following SMEE's example, perhaps collaborating with other nearby societies to offer training. Courses need careful planning and are labour intensive but worthwhile in attracting and retaining members. York recently held training courses aimed at members only.

Social media - Facebook

Besides having a good Society website, which has generated considerable interest in the club and has encouraged members to join, York's unexpected success came from Facebook. For those unfamiliar with it, Facebook allows users, who sign-up for free profiles, to connect with friends, work colleagues or people they don't know, online. Users can share opinions, images, music, articles and videos with however many people they like. Under Daniel



SMEE's training courses have helped many develop model engineering skills. Peter Haycock demonstrates machining on the Polly course where members learned how to make a Tubal Cain stationary engine.

Precious's supervision, York Model Engineers' Facebook page has attracted over 550 followers and 400 likes. ('Liking' is the conventional way of recommending.) Daniel says "I am kept busy with people privately messaging the page about when our next events are or how to join the club. Where exactly we are is quite a common question. I've seen quite a few names from the messages then appear at the club and join us, which is very nice".

He adds, "We have had two customer reviews, both of which were positive. I've learned, while doing this, that most people will prefer to either 'private message' the page with thanks or comment on the advertisement they saw rather than write proper reviews, so that's why we have so few" (photo 8).

Facebook gave Daniel a break down of followers. Currently most users are from York but there is a good spread around the country and even abroad. 47% are men and 53% are women. A surprisingly high percentage are female users in the 35 - 44 age group - probably mothers looking for an enjoyable children's activity. Another popular social media platform, Mumsnet, has not yet been used by York but it might also be a suitable website. York's family day at Easter is always well attended. (Never overlook the unlikely - Ed.)

Lessons from TV

York Model Engineers had most publicity thanks to Channel 4's Hobby Man series which offers lessons for handling other media enquiries. The TV production company, North One asked York's Society to participate at short notice; it was certainly a new experience but chairman, Brian Smyth says the committee saw an opportunity to publicise the hobby. So if your club is approached for a television programme (or other media) what would help production companies or journalists?

Presenters, comedian Alex Brooker and celebrity chef Andi Oliver visited Yorkshire trying hobbies like gliding and salsa dancing, admired the work of Ebor Model Railway group and then visited York Model Engineers.

North One TV did their filming in April 2022 but getting the best from the experience required planning at very short notice - but Society members rose to the occasion. Brian's briefings to the production company helped enormously, as TV researchers often come to a subject knowing nothing about it. As he says, it was a case of 'selling the dream' ... and it worked.

Before the programme, Bob Lovett suggested emphasising key messages, useful for any media publicity:

1. fun and personal achievement - how we



As seen on TV: comedian Alex Brooker concentrates on driving with co-presenter Andi Oliver and York's Bob Lovett behind. (Photo, North One TV 2022.)



Good posters always attract attention - these are two used at exhibitions by York Model engineers.

- derive great enjoyment and personal satisfaction/achievement from making working models in miniature using engineering skills and then playing with the items because they really do work - offering a great sense of achievement which is important for people,
- 2. socialising - the positive social and mental benefits of socialising with like-minded people and exploring new challenges,
- 3. promoting engineering - engineering in miniature is still engineering - by getting others interested, especially younger people.

Following initial phone calls by Brian to explain what

York offered, a site visit was rapidly arranged with the North One Director and Production Manager, an eye opener for them as they didn't realise the scope of our members' activities and skills. Their team arrived on a site maintenance day where members were in attendance and willing to act as 'extras' in filming.

Following a safety briefing, filming included locations at the Garden Railway, in York's new workshop and a steaming bay. After lunch Alex learned how to drive a locomotive on the ground level track. The result showed members busy in the workshop but most action took place outside. No-one should expect TV to give a

detailed account of how model engineers make models but workshop scenes included a good shot of milling a cylinder casting.

Dave Foster displayed his Class 08 shunter to general admiration and then Bob Lovett showed Alex how to drive Richard Gibbon's Wren steam locomotive. Presenter, Alex then drove round the track under Bob's supervision (photo 9). Alex liked driving, saying afterwards 'It's as much fun as it looks' and co-presenter Andi enjoyed the experience.

The film crew were interested and impressed with York's activities. Alex Brooker and Andi Oliver showed great enthusiasm by their smiles and warmth of their comments.

On screen Bob followed his briefing giving a justification for model engineering, explaining pleasures of scratch building and the sense of achievement. He pointed out that 'it's not wrong to use the word love for the dedication that goes into making a model' - something the presenters recognised. Most importantly, Bob also pointed out model engineering's value for mental well-being, picked up by Alex Brooker who commented later that 'the human side was a real surprise'.

Despite concerns about whether the Society should co-operate with film makers, this was good publicity for model engineering generally. Unfortunately our hobby rarely makes headlines or television programmes. Producers and presenters showed real interest and enjoyment during the programme. As Alex said on TV, he and Andi had 'found joy, creativity and craftsmanship we never knew was there'.

A good result but with one drawback. Due to the death of Queen Elizabeth II the programme went out too late for most viewers, on 6th October 2023. It is, however, still available on Channel 4's 'on demand' service. www.channel4.com/programmes/hobby-man/on-demand/73157-004.

Be flexible

Brian Smyth comments that effective publicity may need a rapid response to media enquiries.

"For the TV programme I received the first call just two days before the TV team wanted to film". He advises being prepared for all media enquiries, not just TV appearances. Ideally, societies should have a named member as their media contact.

Ignoring the importance of publicity can lead to stagnation or even closure but good promotion helps a society develop. Societies should try a variety of approaches to winning publicity, including social media. Most ideas suggested in this article are low cost or even free (photo 10). Give them a go!

Going beyond what individual societies can manage, is there scope for a wider marketing campaign to promote the pleasures and benefits of model engineering? It is a great hobby and deserves to attract many more people. Perhaps other societies use more innovative methods to attract new members? If that's the case then your editor will be pleased to know more.

The fee for this article will be donated to the York Model Engineers Workshop fund.

ME

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- Ref 1 Paul Tanner. *Siding lockout device. Model Engineer*, Vol 225 No. 4644 page 214. (31 July 2020 to 13 August 2020).
- Ref 2 Richard Gibbon. *Recovering LBSC's Speedy's performance through overhaul of the piston valve assembly. Model Engineer*, Vol 228 No. 4691 pp 685-687 (20 May 2022 to 2 June 2022).

Geoff Theasby
reports on
the latest news from the
clubs.



When writing this piece, and reflecting on our holiday to Iceland/Faroes, I was thinking of the events here in December 1943, when the Scharnhorst was sunk at the Battle of the North Cape. Only a handful of men were saved from the Scharnhorst - the rest died in awful circumstances in the icy waters of Norway's North Cape - and the ship lies about 30 km north of the North Cape itself. Brave men, mostly conscripts, on both sides, fought and died in this region, from which the Bismark was also hunted down and sunk - December 1941 in this case, 300 miles west of Brest in Normandy.

In this issue: sings 'My Bolide is Over the Ocean', wheel repair, finished, an A7 and a Shay, the prodigal godson, battling swarf, motorbikes and a suit of armour.

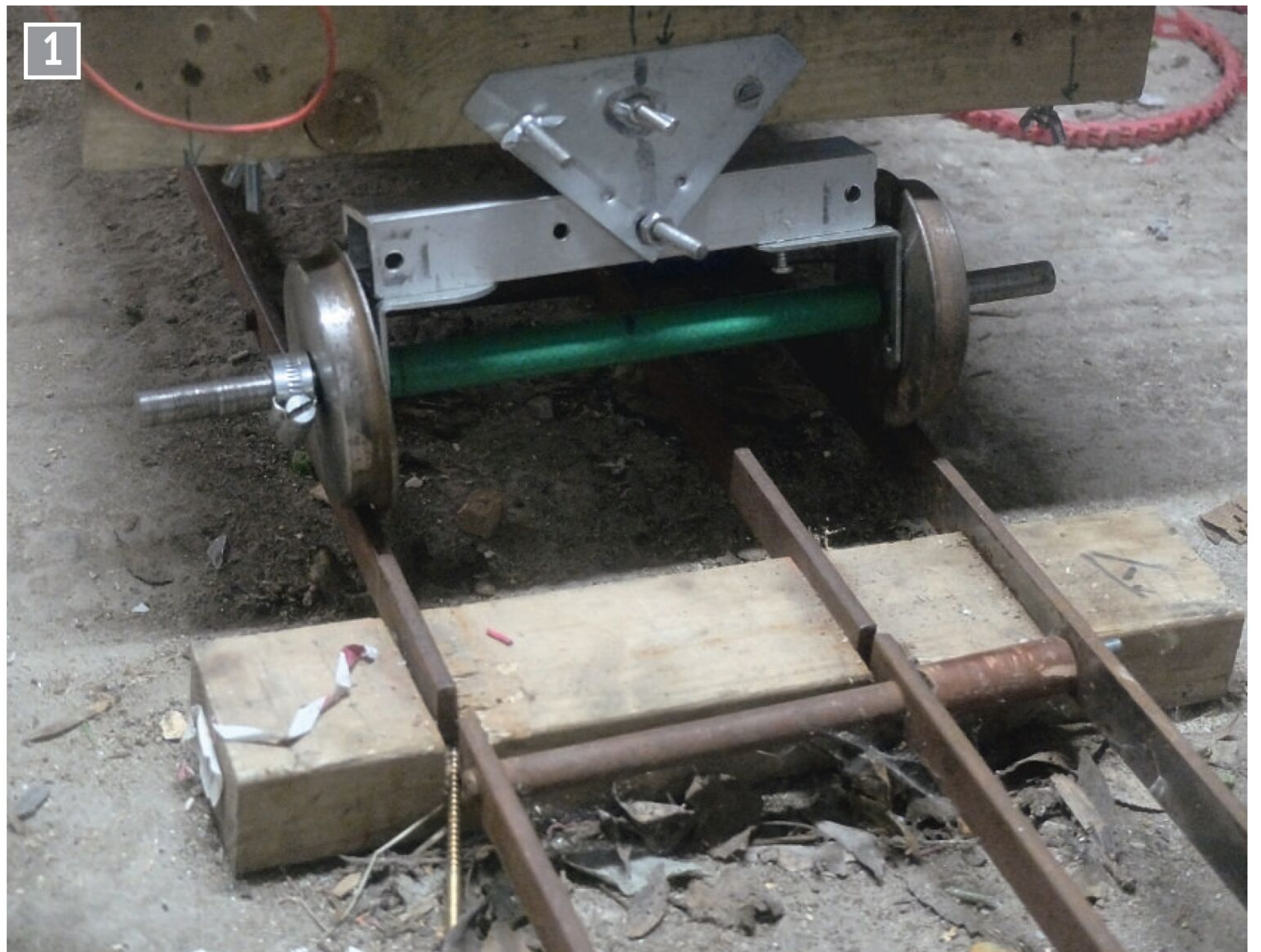
Further progress on my electric locomotive and driving trailer. I mentioned last time that the trailer was derailing frequently and put this down to having no suspension, both

rigid axles being fastened to the chassis. I have now fitted it with a transverse beam to support and locate the front axle. Time for another attempt to tow me back and forth on the track in the garage, after which, if successful, off to the club track again. I did think about mounting springs at each end of the transverse beam but thought that a free-to-move system may be preferable. 'Unsprung durch technik' as you might say (**photo 1**).

I've just spent a happy half-hour (when I should have been writing this magazine column) reading up about gamma ray bursts, in Wikipedia. They can originate from very distant stars and galaxies or in the heart of a thunderstorm. So, if you are taking a break from engineering, try some particle physics.

It has been brought to my attention that all was not well in the state of **High Wycombe Model Engine Club**. Their excellent newsletter *Criterion*, which had spent some time on the dining room table minding its own business, was suddenly found to be damp and pages were stuck together, as glossy

paper is wont to do when the humidity rises. "Qu'est-ce que c'est?" I enquired and it came to pass that one who wishes to remain anonymous was the culprit and she apologises. It was English Breakfast tea, it seemed, so if I'm thirsty from producing these literary masterpieces, I can suck on a corner, just as Ford Prefect did with this towel. Anyway, the content remains mostly readable. If I write what appears to be rubbish, apart from the usual of course, I will blame it on the God of Rain, Zeus. (Perhaps this is why Zeus tables come with laminated pages...) An offer with a difference is mentioned in editor David Savage's piece, in that for £350 you can spend a day as engineer on board the steam yacht *Gondola* on Coniston Water. David also writes on Beckonscot Model Village and railways. The latter had its origins in Wenman Bassett-Lowke and Henry Greenly. This is followed by an article on Liverpool Overhead Railway, much of which was completely new to me. A motorised carriage is preserved in Liverpool museum. Vehicular



My driving trailer suspension.

access to part of the site on their public running day in March was likely to be a problem in the wet weather so branches and fronds of the recently trimmed Leylandii were laid in the most likely places, like the main entrance. Ian, whose identity is lost amid the tea leaves, which, according to my psychic friend, predicts bad tidings, writes from his own observations on certain aspects of the Stephenson valve gear.

W. www.hwmecc.co.uk

Stockholes Farm, Miniature Railway News Sheet of 17 June reports that the Wakey Wakey Day and AGM had one of the best attendances ever. David Goyder, editor of the Federation of Model Engineering Societies newsletter, and his brother visited and also Ivan and Barbara's Godson, who has not been seen onsite for 15 years in which time he has found a job, a house and a partner, not necessarily in that order. The Narrow Gauge Society visited in May and a full day's running was possible for the first time in about 6 months. The practical aspects of bringing CoSHH substances onsite, whatever they are, should be notified to Ivan or Barbara. The nature of these 'substances' is not immediately identifiable but those who use them should be aware of their nature. They are listed in the foreword to the free download of chemical charts etc. at <https://books.hse.gov.uk>

Steam Chest, July, from the **National 2½ inch Gauge Association** begins with John Baguley writing on mending a damaged wheel. In this case, a chunk from a wheel flange was missing due to a violent impact of some sort. Roughly attaching a filler piece, by drilling and tapping, the item was then covered with JB Weld and gently turned to match the flange profiles. Next, an article on 'wobbly wheels' (technical term) by Warwick Allison. Editor Cedric Norman adds a tip for mill owners, viz. cut a vinyl floor tile to fit on the mill table. This

will prevent swarf getting into the slots and, by lifting the tile carefully off, the swarf can easily be swept into the bin. (A couple of locator pegs might be useful too, locating it on the mill bed - Geoff) Mike Boddy found problems with his mechanical oil pump. Differential action meant that one feed got lots of oil, and the other, none at all. Adjusting the throw of the eccentric seemed to cure it. Please note that Sydney LSLS is to hold a Small Gauge Festival on 7th and 8th November.

W. www.n25ga.org

Steam Whistle, May, and June, from **Sheffield & District Society of Model & Experimental Engineers**, features a photograph on the front page of Cllr. Roger Barton, chair of the Recreation Committee, and a fitter by trade, formally opening the 7¼ inch gauge line, by driving a train through a tape held at one end by Ivan Law, later to be Society president. This event was 43 years ago and reported in the 18th December 1982 edition of *Model Engineer*. Mike Peart's column in the June issue goes off down an obscure branch line with Mike discussing smokebox number plates. A video has been unearthed by Mike, featuring J.N. Maskelyne and covers the model steam railway in 1947. A visitor fell and an ambulance was called but explaining to the ambulance controller exactly where the site was impels Mick Savage to publicise the 'what3words' concept. The Sheffield track site is 'grape.slang.town'.

W. www.sheffieldmodelengineers.com

Richard Lunn sends *The Bristol Model Engineer*, the newsletter of **Bristol Society of Model and Experimental Engineers**, and he asks how many motorcycles (fishing rods, shotguns, radio transmitters) should I have, and the answer is N+1, where N is the number you already own. He asked a friend "why have you got 11 motorcycles?" and he replied "because I sold one last week". Another friend had

some explaining to do when a parcel of goods for his AJS motorcycle arrived with the invoice on the outside fully visible to all. Chris Castlement discusses transfers (or decals), mainly 'waterslide' types. Mike Williams found a picture of *Otto*, taken in 1975. This was named for the creator of the 4 cylinder i/c engine combustion process, the Otto cycle.

W. www.bristolmodelengineers.co.uk

In the **Model Experimental and Engineers, Auckland** newsletter for June, Graham Quayle reports that we say farewell to Peter Phelan. Peter and Graeme were building a Foden 3 inch scale steam lorry. Trying to run it on air, and to check progress, numerous problems were encountered and attention focussed on the gears. Ray Brown had the safety valve parts for Salter valves and Ross Purdy showed his almost complete 'Nome' nine cylinder aero engine. It is noted that Ross, who began by making simple steam engines, has now progressed to a point where his work is well regarded by his peers. Chris Radcliffe showed a brass iris, a variable aperture component from a submarine, perhaps the periscope. Michael Cryns brought a book on the building of Holland's sea defences, much of which was done manually. He answers a question that has been in my mind for some time, i.e. how to deal with the salt left in the soil after it is drained. The answer is that it is washed away by the rain over several years. Research was also conducted on which plants could grow in salty land. Murray's Monosoupape engine is now in Omaka museum in Blenheim. He has abjured further model making and will limit his activities to writing about his models. Graham has been asked to rescue a Stutz Victrola as the owner cannot get it to run. Graham noted several conflicts between parts in the valve gear and will report back when he has applied himself to it. (Valve gear in a record player? - Ed.)

PEEMS, June, from **Pickering Experimental Engineering and Model Society**, is mostly concerned with the Bradford Challenge. A lengthy report, Q&A and the results reveal that Pickering Experimental Engineering and Model Society won, with the *Pickering Flyer*. Three classes of the competition were: fan, electric motor direct drive, and all-comers, and were won by PEEMS in the Fan section, lap times 25 seconds-ish. Lenny Cresser's electric drive won the direct drive section, 30 seconds-ish lap times, and Jim Jennings, who won by default, being the only entrant despite his lap time being of the order of 5 minutes...

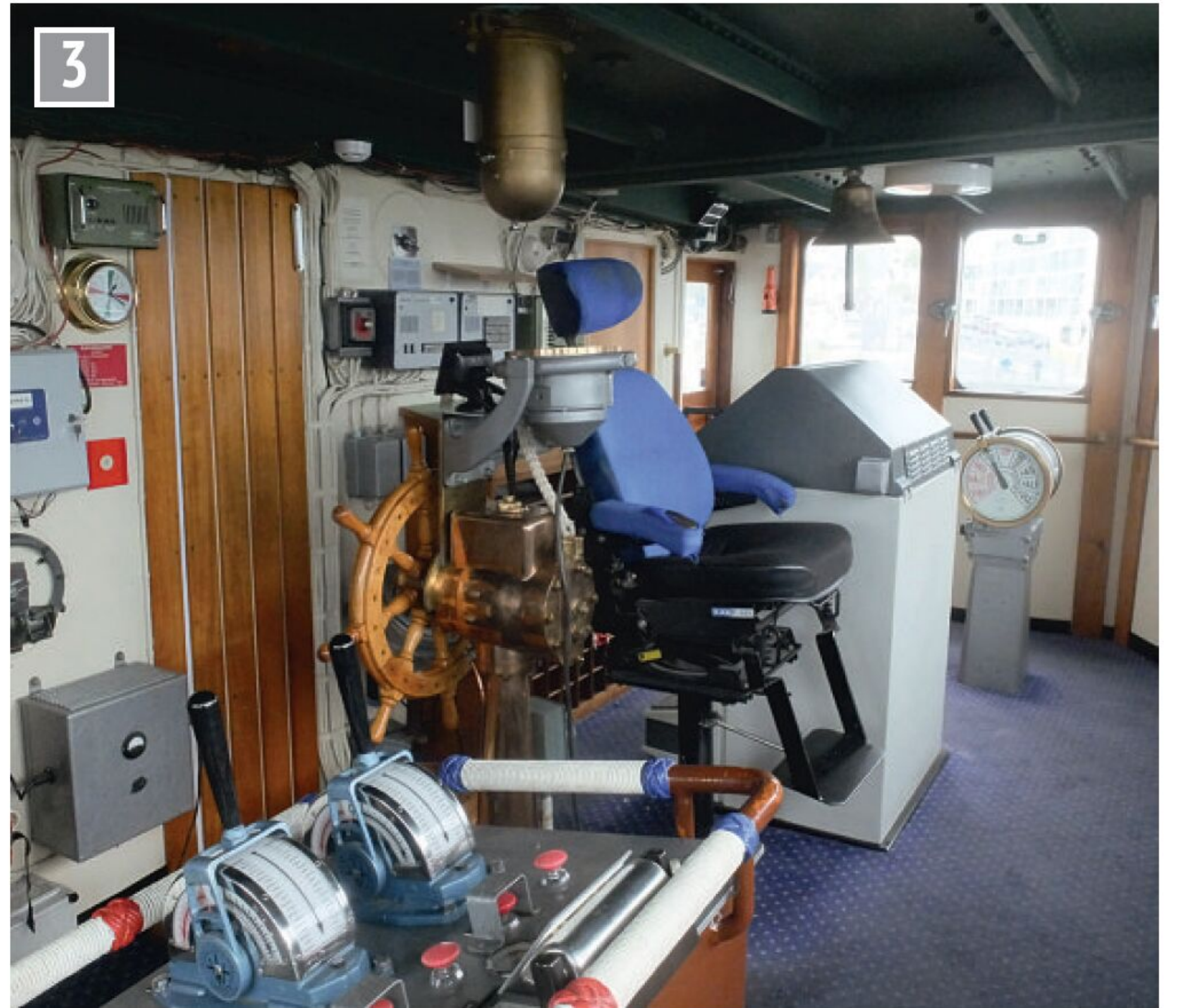
W. www.peems.co.uk

CoSME Link, June, from **City of Oxford Society of Model Engineers**, introduces the new editor, Jon Pottter, Welcome to the House of Fun, Jon. The Sweet Pea rally was at Leyland SME this year and a lengthy report showing shiny locos and smiling passengers ensues. Phil Ashworth won the Best Locomotive award. He bought his engine as a bucketload of rusty bits and says he had to strip it down to every last nut and bolt to see it as it now is. Tim Trotman spends 'A Day on the Footplate' working the new Fairlie *James Spooner* on the Welsh Highland Railway. Jon presents a few photographs taken on a fine, sunny day in May. I must say that the grass resembles a bowling green, so full marks to the cutting crew. Mick Barlow has died. He was a huge asset to the Society, and was responsible for all the electrical work on the site and the signalling system, which remains his memorial. Mick was a member of the Eynsham Morris Men and was danced on his way over the Styx by his colleagues in the Morris side (that's Eynsham, E-y-n-s-h-a-m). Simon Dawson has built his own Tich - "everything but the pressure gauge" he says. However, this article isn't about that. Having just built a locomotive, he fancied something different and so he has started a long case, 8 day

➤



Odinn, in Maritime Museum, Reykjavik.



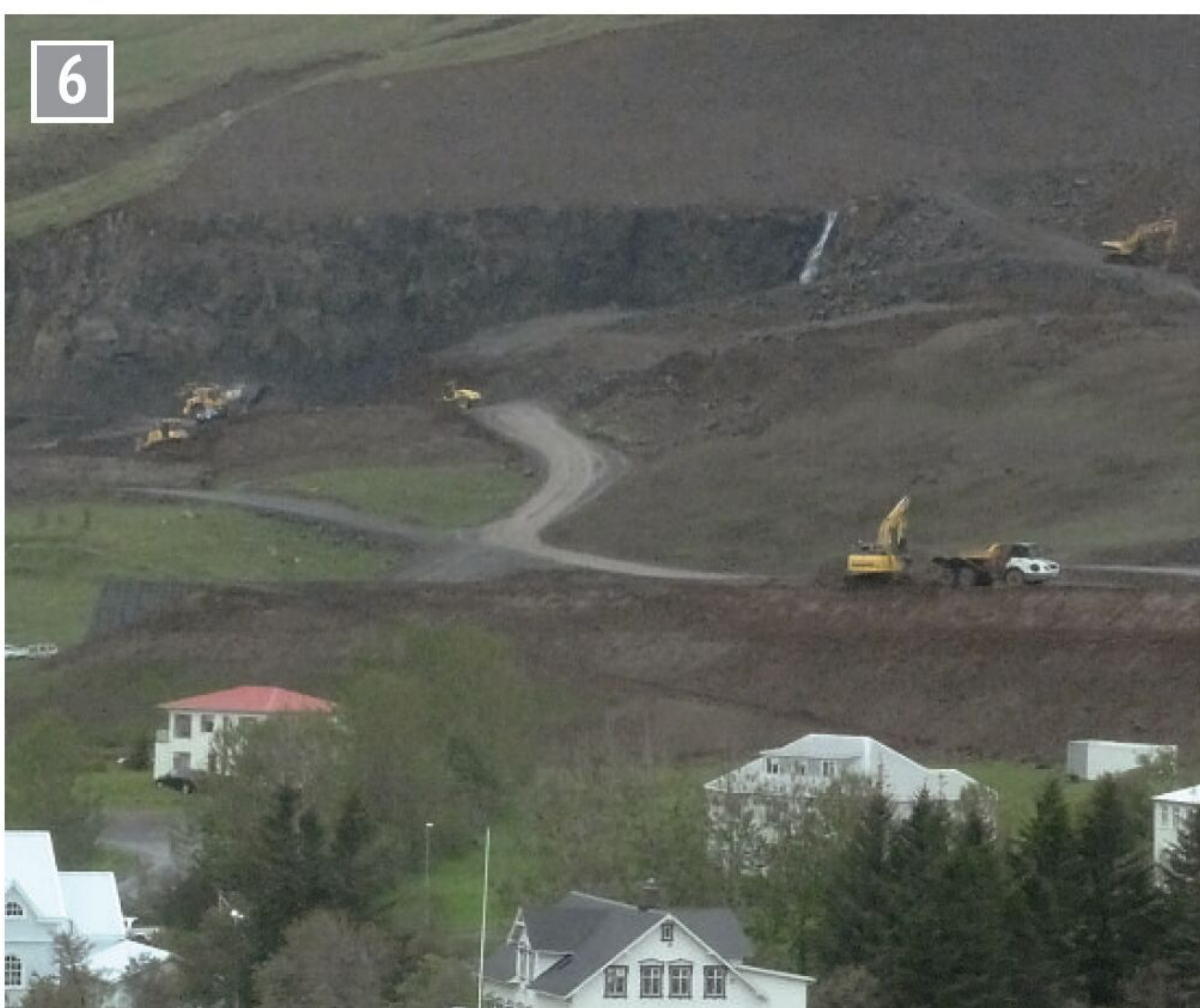
Captains chair in Odinn.



Net cutter on Odinn from the 'Cod Wars'.



Danish Lowenør lathe.



Coal mine, Seydisfjorder.

clock. Ron Head deals with electrolysis and its part in rust removal.

W. www.cosme.org.uk

Well, here we are at the end of another Club News, and I have newsletters to spare, so I expect no problem with the next issue, In'sh Allah. To aid this effect, I have been wearing my writing trousers, which seem to work. As before, the photographs are all on the theme of Iceland. So trail your net cutter across your 'Readers' nets and inspect its contents. I shall spread them liberally across the piece. The coastguard ship *Odinn* is now in Reykjavik maritime museum (**photo 2**). Here is

the captain's position on the bridge (**photo 3**). Here's a net cutter onboard *Odinn* (**photo 4**). A lathe in the museum hit by landslip. There is no trace of its name on the *lathes.uk* website. V Løwenor is still in business, in Denmark (**photo 5**). Opencast coal mine at Seydisfjorder (**photo 6**).

And finally, two gentlemen meet in their club, "That chap Einstein has written a book on relativity". "About time too".

ME

Club Diary

22 August 2024 – 8 December 2024

August

22 Sutton MEC

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

25 Westland and Yeovil MES

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

25-26 Cardiff MES

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

27 Westland and Yeovil MES

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

29 Guildford MES

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

31 Westland and Yeovil MES

Track running day 11 :00.
Contact : Michael Callaghan,
01935 473003

September

1 Cheltenham SME

LBSC Memorial Bowl. Contact:
csme@cheltsme.org.uk

1 Westland and Yeovil MES

Running the track at Yeovil Junction – Steam Train Day and Snakes & Bugs.
Contact : Michael Callaghan,
01935 473003

4 Bradford MES

Meeting: 'Talgo - Rolling Stock Manufacturer' by Colin Smith, 19:30, St James' Church, Baildon, BD17 6HH. Contact: Russ Coppin, 07815 048999.

5 Sutton MEC

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

5 Westland and Yeovil MES

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

8 Cardiff MES

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

8 Sutton MEC

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

14 Bromsgrove SME

Rob Roy Rally and 3½ inch gauge friends. See
www.bromsgrovesme.co.uk

15 Bradford MES

Public Running Day. Members from 11:30, public from 13:30, whatever the weather, Northcliff. Contact: Russ Coppin, 07815 048999.

15 Westland and Yeovil MES

Running the track at Yeovil Junction – Steam Train Day and Comic Corn. Contact : Michael Callaghan, 01935 473003

20 Rochdale SMEE

Auction Night. Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

22 Cardiff MES

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

22 Guildford MES

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

26 Sutton MEC

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

28 Bromsgrove SME

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

28 Westland and Yeovil MES

Track running day 11 :00.
Contact : Michael Callaghan,
01935 473003

28/29 St Albans MES

Club exhibition, Townsend School, St Albans. See stalbansmes.com

29 Sutton MEC

Diamond Riding Centre Fete.
Contact: Paul Harding,
0208 254 9749

October

2 Bradford MES

Meeting: 'Bits and Pieces', 19:30, St James' Church, Baildon, BD17 6HH. Contact: Russ Coppin, 07815 048999.

3 Cardiff MES

An evening with Tony Bird.
Contact : secretary@cardiffmes.co.uk

3 Sutton MEC

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

4 Rochdale SMEE

Models Competition Night. Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

6 Bradford MES

Public Running Day. Members from 11:30, public from 13:30, whatever the weather, Northcliff. Contact: Russ Coppin, 07815 048999.

6 Guildford MES

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

10 Cardiff MES

Bring and buy. Contact : secretary@cardiffmes.co.uk

13 Cardiff MES

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

13 Sutton MEC

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

17-20 Midlands Model

Engineering Exhibition

Warwickshire Events Centre, See www.meridienneexhibitions.co.uk

18 Rochdale SMEE

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

20 Guildford MES

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

24 Sutton MEC

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

26 Cardiff MES

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

27 Westland and Yeovil MES

Track running day 11 :00.
Contact : Michael Callaghan,
01935 473003

31 Guildford MES

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

November

1 Rochdale SMEE

Talk – 'Re-building the Ellenroad Beam Engine'. Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

2/3 Halesworth and District MES

LOWMEX 2024, East Coast College, Lowestoft. See www.lowmex.co.uk

6 Bradford MES

Meeting: Autumn Auction 19:30, St James' Church, Baildon, BD17 6HH. Contact: Russ Coppin, 07815 048999. Note: Only Members may bid on lots.

7 Cardiff MES

Talk : 'Temperance Town', Richard Britton. Contact : secretary@cardiffmes.co.uk

16 Cardiff MES

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

17 Rochdale SMEE

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

21 Cardiff MES

Members' projects. Contact : secretary@cardiffmes.co.uk

23 Westland and Yeovil MES

Track running day 11 :00.
Contact : Michael Callaghan,
01935 473003

December

1 Guildford MES

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

4 Bradford MES

Meeting: 'Film Night', 19:30, St James' Church, Baildon, BD17 6HH. Contact: Russ Coppin, 07815 048999.

5 Cardiff MES

Talk : 'Old Pictures of Cardiff', David Green. Contact : secretary@cardiffmes.co.uk

6 Rochdale SMEE

Talk – 'Railway to Bacup'. Castleton Community Centre, 19:00. See www.facebook.com/RochdaleModelEngineers

8 Guildford MES

Open day, 11:00-15:00. See www.gmes.org.uk

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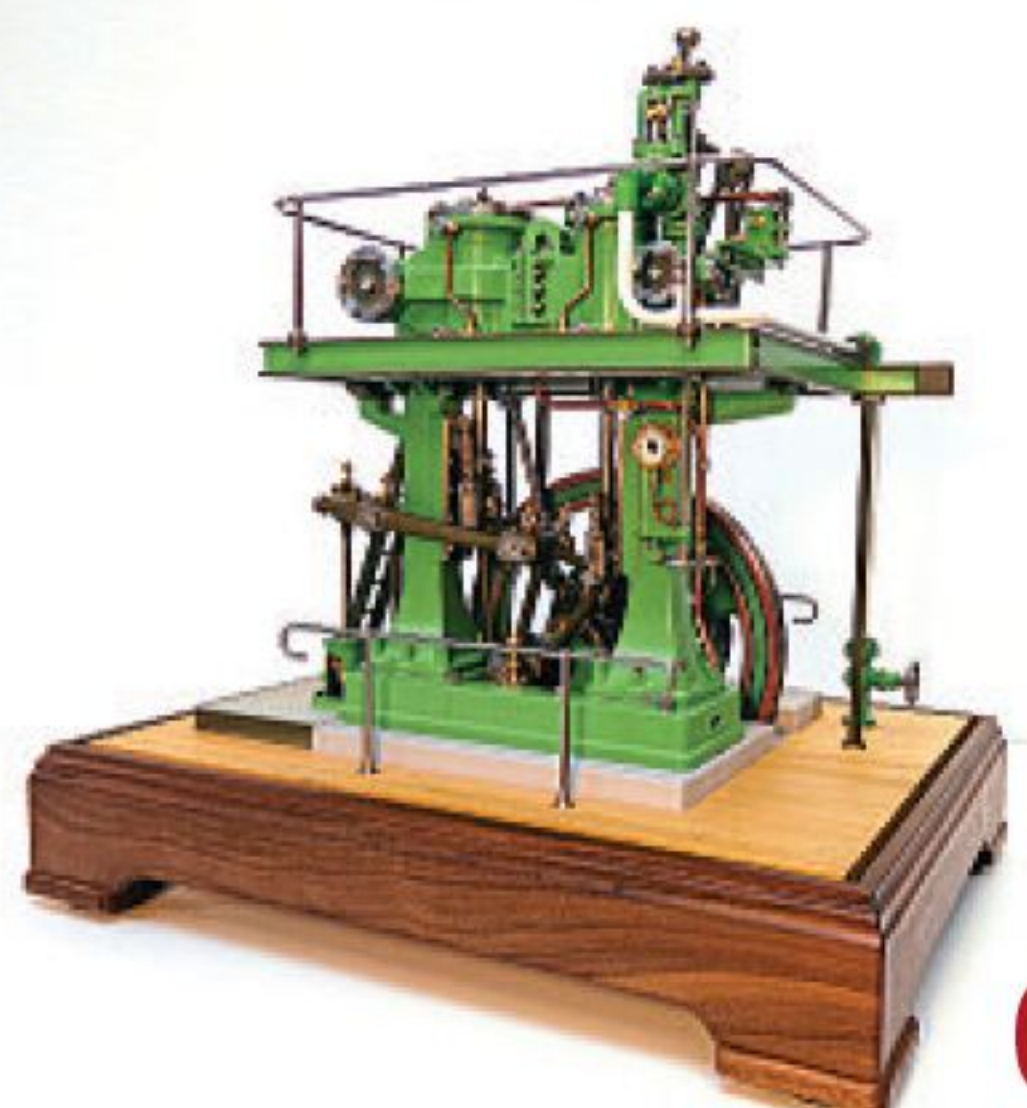
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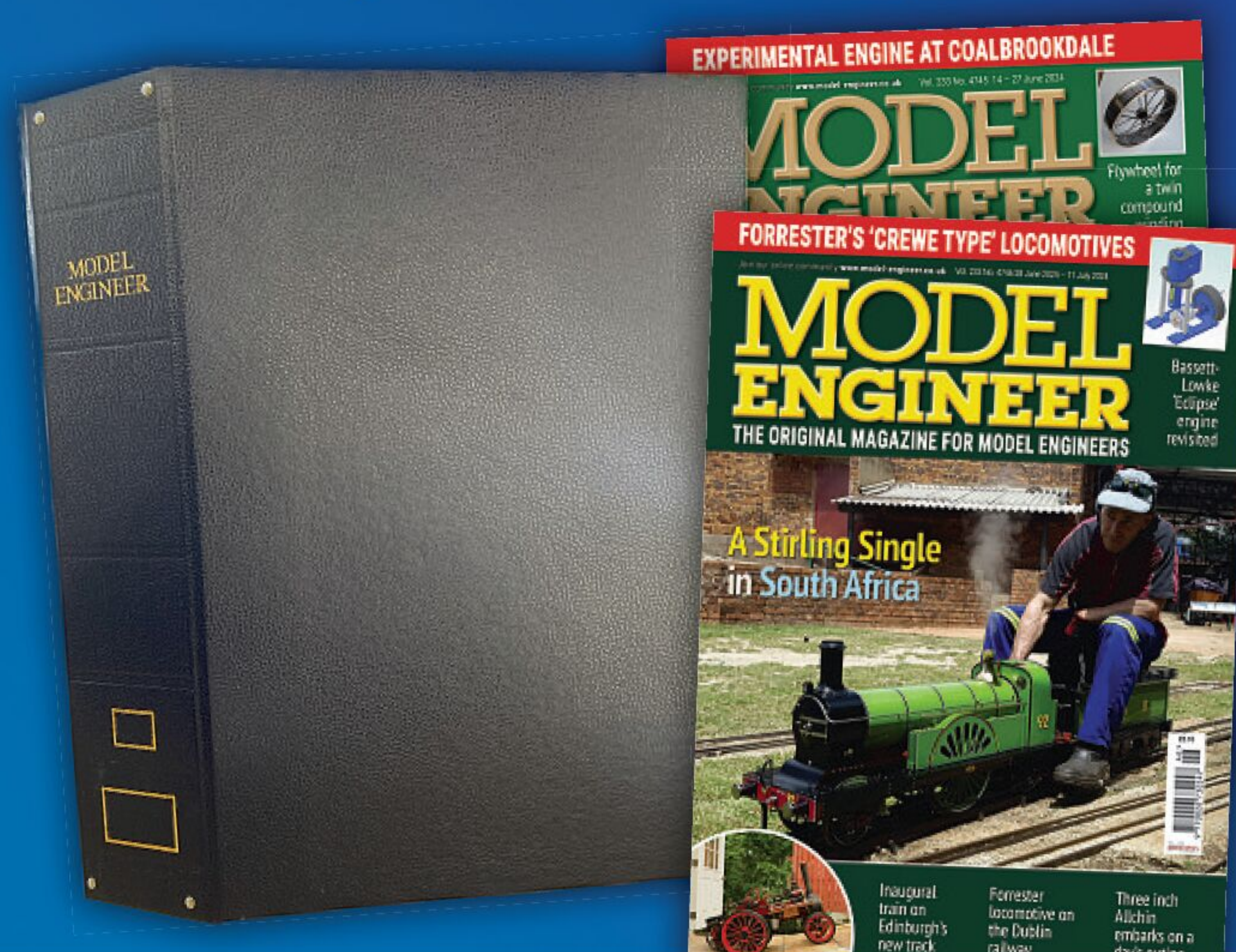


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CHAPELON also wrote a number of books, of which the two editions of *La Locomotive a Vapeur* are the most famous, but are very rare, and have only previously been available in French. Our translation was of the 1952 edition, so it really covers the steam locomotive at its zenith.

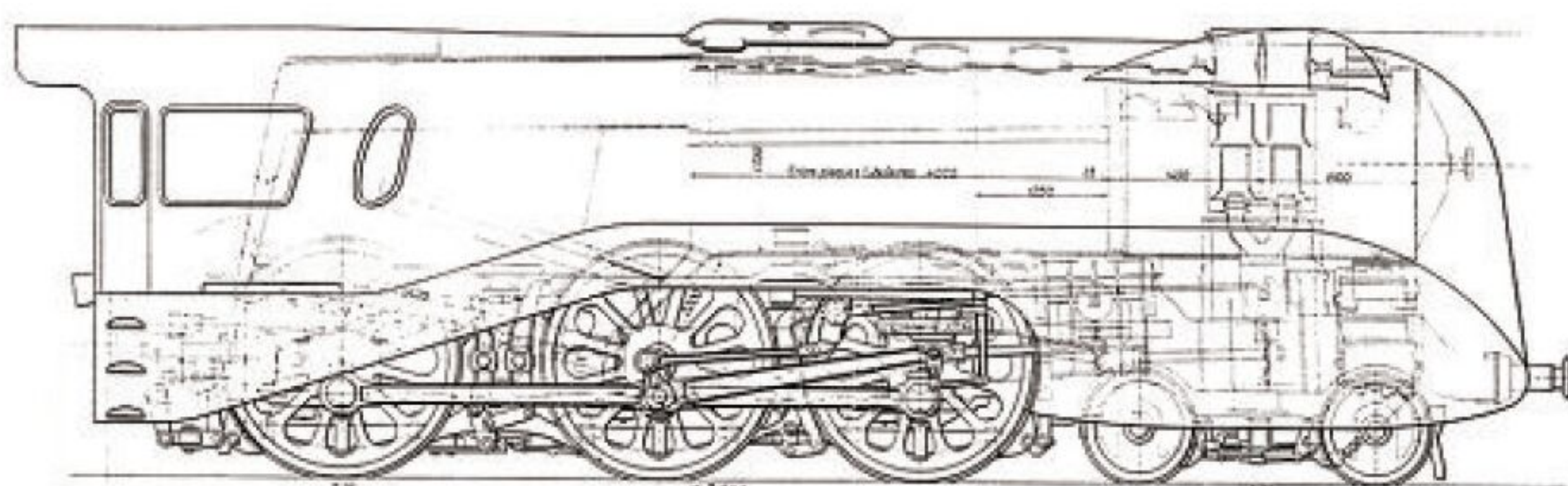
The first third or so of this book reviews in detail developments in the design and construction of all major parts of the steam locomotive, and compares the merit of simple and compound expansion. The rest of the book is devoted to a review of locomotives around the world, grouped by use/wheel arrangement, and French, British, America and German practice in particular are covered in detail.

Translated by Mr. GEORGE CARPENTER, himself a locomotive engineer and friend of Andre Chapelon, who added a fascinating chapter on the Chapelon designs which were never built, but which would have been the most advanced steam railway locomotives ever. There is also a small colour section looking briefly at the work of others who have pursued Chapelon's ideas as the basis for the continued development of the steam locomotive.

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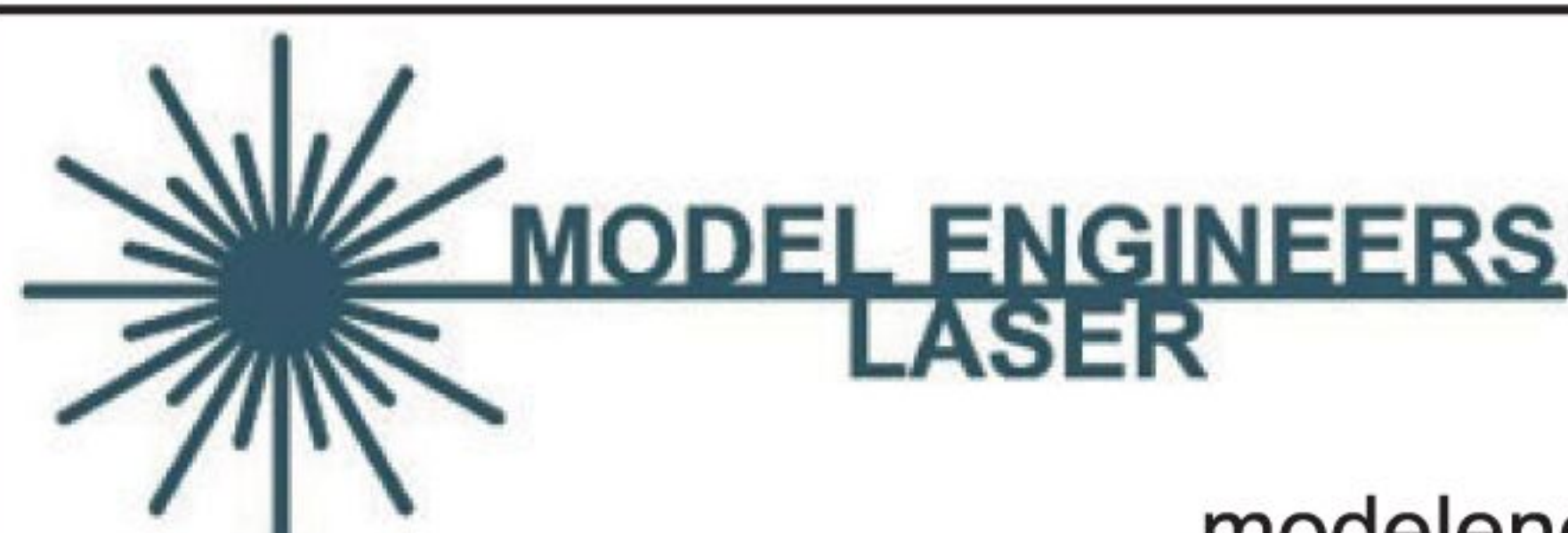
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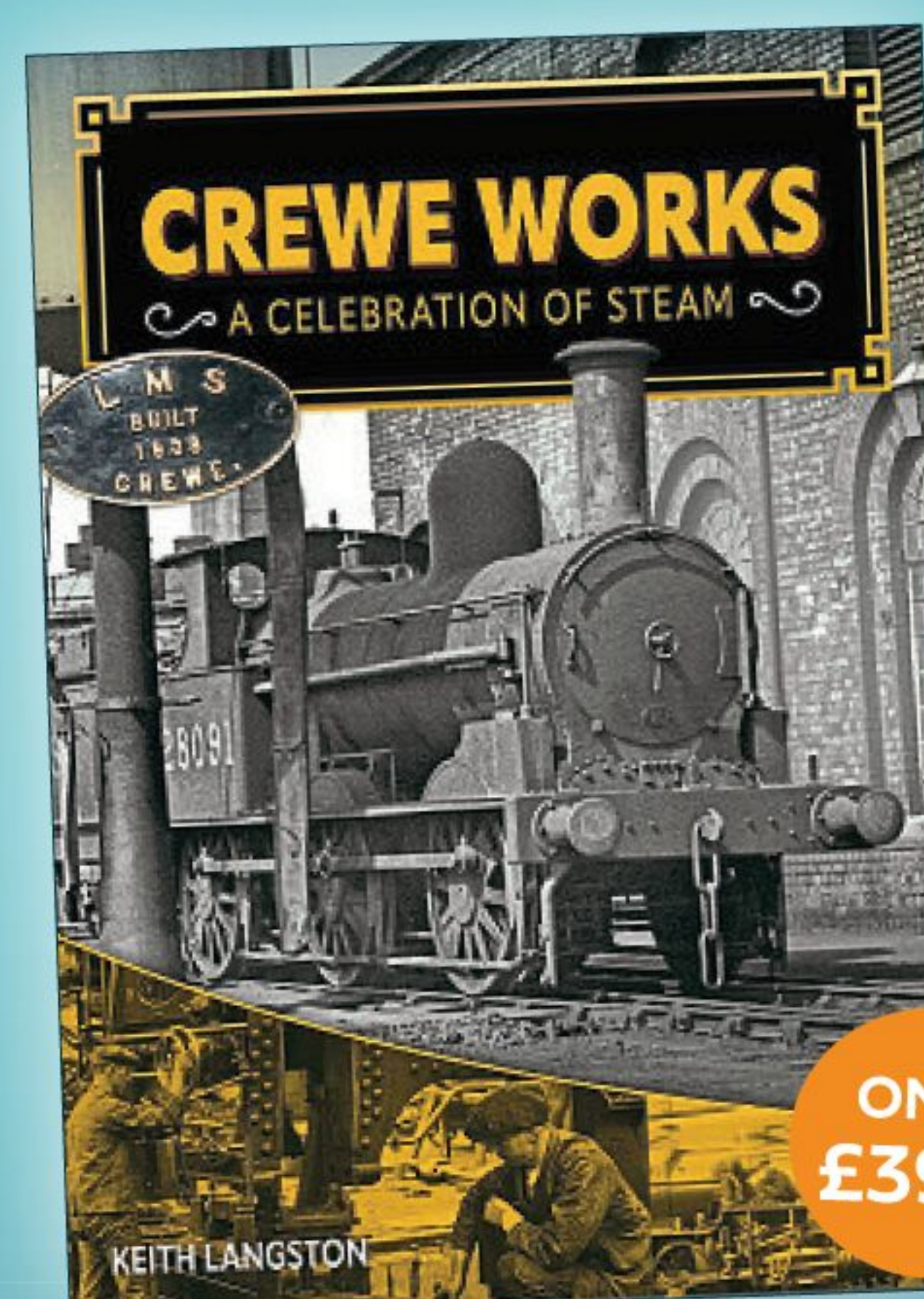
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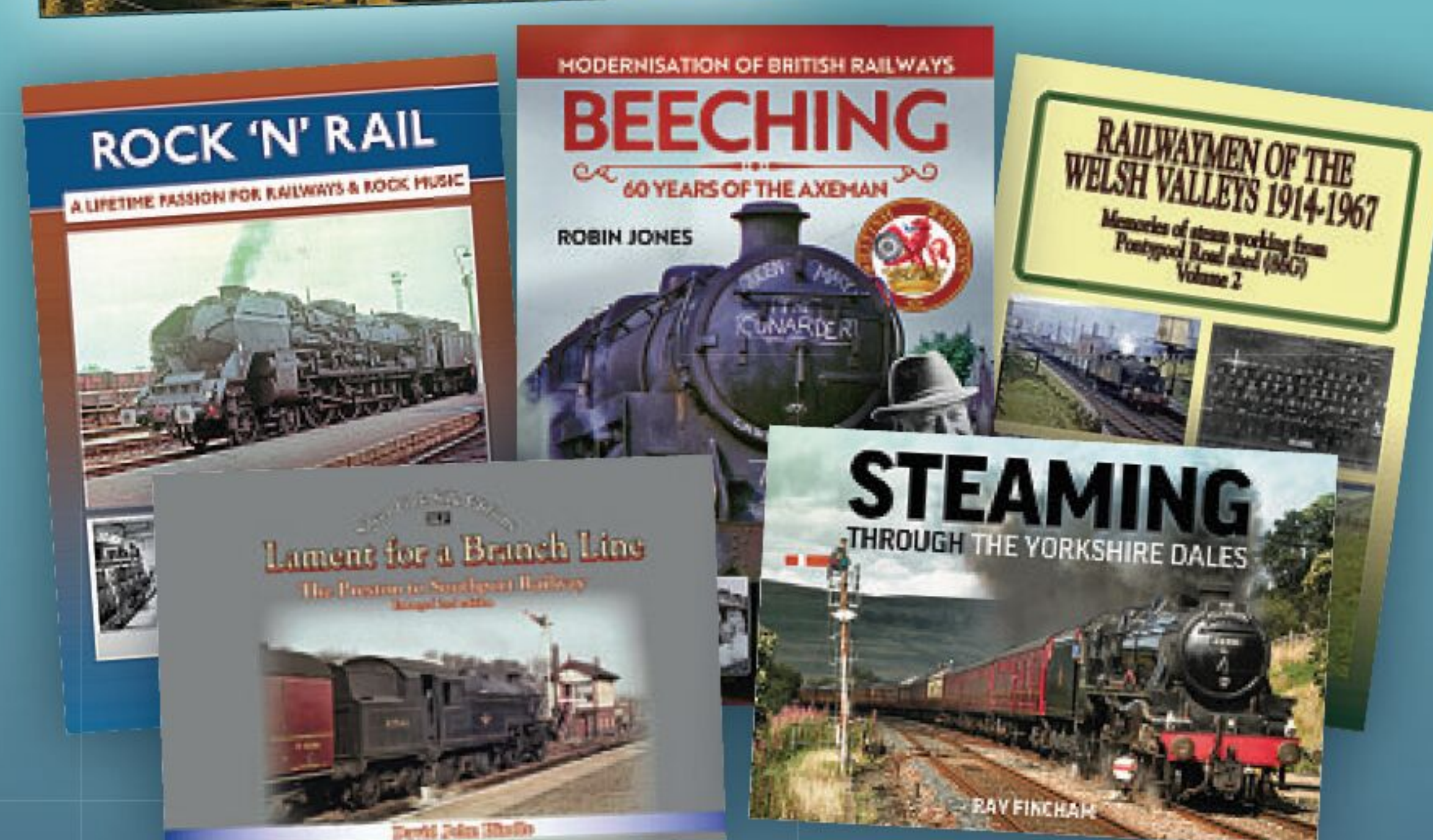


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