

THE ORIGINAL MAGAZINE FOR MODEL ENGINEERS

Vol. 227 No. 4674 • 24 September - 7 October 2021

MODEL ENGINEER

Join our online community www.model-engineer.co.uk

Tools

**We Visit
West Huntspill**

**Barclay
Backhead**

Draughting

COVER FEATURE

**Simple
Turbine**





Brushless Mini Lathe WBL1835

SPECIFICATION:

Distance between centres: 350mm
Taper of spindle bore: MT3
Number of spindle speeds: Variable
Range of spindle speeds: 100 - 2250rpm
Weight: 43Kg

Price: £642



AMABL250Fx550

SPECIFICATION:

Distance between centres: 550mm
Taper of spindle bore: MT4
Number of spindle speeds: Variable
Range of spindle speeds: 50 - 2500rpm
Weight: 140Kg

Price: £1,732

With 2-Axis DRO - Price: £1,986



**AMABL290VF Bench Lathe
(11x27) power cross feed -
BRUSHLESS MOTOR**

SPECIFICATION:

Distance between centres: 700mm
Taper of spindle bore: MT5
Taper of tailstock quill: MT3
Motor: 1.5kw
Weight: 230Kg

Price: £2,395

With 2-Axis DRO - Price: £2,787



AMAVM25LV

SPECIFICATION:

Model No: AMAVM25LV (MT3)
Max. face milling capacity: 63mm
Table size: 700 x 180mm
T-slot size: 12mm
Weight: 120Kg

Price: £1,354

With X-Axis Powerfeed - Price: £1,659

With 3-Axis DRO - Price: £1,723

With 3-Axis DRO + PF - Price: £2,028



AMAVM32LV

SPECIFICATION:

Model No: AMAVM32LV (MT3)
Max. face milling capacity: 76mm
Table size: 840 x 210mm
T-slot size: 14mm
Weight: 240Kg

Price: £1,870

With X-Axis Powerfeed - Price: £2,081

With 3-Axis DRO - Price: £2,180

With 3-Axis DRO + PF - Price: £2,610



**Amadeal Vertical Milling Machine
AMA5015**

SPECIFICATION:

Max. face milling capacity
(End milling): 20mm
Work table size: 660 x 156mm
Weight: 265Kg

Price: £3,894

See website for more details of these machines and many other products including a wide range of accessories that we stock

Prices inc. VAT & Free Delivery to most mainland postcodes

www.amadeal.co.uk

| Call: 020 8558 4615 | Email: info@amadeal.co.uk |
Unit 20, The Sidings, Leytonstone, London E11 1HD

We Accept



MODEL ENGINEER

Published by **MyTimeMedia Ltd.**
Suite 25S, Eden House, Enterprise Way,
Edenbridge, Kent TN8 6HF
www.model-engineer.co.uk

SUBSCRIPTIONS

UK - New, Renewals & Enquiries

Tel: 0344 243 9023

Email: help@me.secureorder.co.uk

USA & CANADA - New, Renewals & Enquiries

Tel: (001)-866-647-9191

REST OF WORLD - New, Renewals & Enquiries

Tel: +44 1604 828 748

Email: help@me.secureorder.co.uk

CURRENT AND BACK ISSUES

Tel: 01795 662976

Website: www.mags-uk.com

EDITORIAL

Editor: Martin R Evans

Tel: +44 (0)7710 192953

Email: mrevans@cantab.net

Assistant Editor: Diane Carney

Club News Editor: Geoff Theasby

PRODUCTION

Designer: Yvette Green

Illustrator: Grahame Chambers

Retouching Manager: Brian Vickers

Ad Production: Andy Tompkins

ADVERTISING

Advertising Sales Executive: Angela Price

Email: angela.price@mytimemedia.com

MARKETING & SUBSCRIPTIONS

Subscription Manager:

Beth Ashby

MANAGEMENT

Group Advertising Manager: Rhona Bolger

Email: rhona.bolger@mytimemedia.com

Chief Executive: Owen Davies

mytimemedia
print & digital media publishers

© MyTimeMedia Ltd. 2021

All rights reserved ISSN 0026-7325

The Publisher's written consent must be obtained before any part of this publication may be reproduced in any form whatsoever, including photocopying, and information retrieval systems. All reasonable care is taken in the preparation of the magazine contents, but the publishers cannot be held legally responsible for errors in the contents of this magazine or for any loss however arising from such errors, including loss resulting from negligence of our staff. Reliance placed upon the contents of this magazine is at reader's own risk.

Model Engineer, ISSN 0026-7325 (USPS 24828) is published fortnightly by MyTime Media Ltd, Suite 25S, Eden House, Enterprise Way, Edenbridge, Kent, TN8 6HF, UK. The US annual subscription price is 136USD. Airfreight and mailing in the USA by agent named World Container Inc, 150-15, 183rd Street, Jamaica, NY 11413, USA. Periodicals postage paid at Brooklyn, NY 11256. US Postmaster: Send address changes to Model Engineer, World Container Inc, 150-15, 183rd Street, Jamaica, NY 11413, USA. Subscription records are maintained at DSB.net Ltd, 3 Queensbridge, The Lakes, Northampton, NN4 5DT, UK. Air Business Ltd is acting as our mailing agent.

<http://www.facebook.com/modelengineersworkshop>

<http://twitter.com/modelengineers>



When you have finished with this magazine please recycle it.

Paper supplied from wood grown in forests managed in a sustainable way.



ISSUE IN THIS ISSUE IN THIS ISSUE IN THIS ISSUE

Vol. 227 No. 4674 24 September - 7 October 2021

428 SMOKE RINGS

News, views and comment on the world of model engineering.

429 ZEN AND THE ART OF MODEL PAINTING AND LINING

Luker offers us his own perspective on this often rather daunting task.

432 DARLINGTON'S NARROW GAUGE DREAM FACTORY

Mark Smithers explains Darlington's move into the production of narrow gauge locomotives.

434 A RADIAL BORER

Philipp Bannik designs and builds his own radial boring machine.

438 A SMALL STEAM TURBINE FROM CASTINGS

Bob Hayter makes a turbine from a set of castings supplied by Luke Cringle.

442 LOCOMOTIVE DRAUGHTING

John Hill explains how important it is to get the draughting right and how to achieve it.

445 AN ASTRONOMICAL BRACKET CLOCK

Adrian Garner makes a bracket clock inspired by Tompion and Banger's regulator of 1708.

449 A NEW GWR PANNIER

Doug Hewson embarks on a mission to improve LBSC's half century old GWR Pannier Tank design.

453 WE VISIT THE WEST HUNTSPILL MODEL ENGINEERING SOCIETY

John Arrowsmith finds a well established club in Weston-super-Mare.

456 MY FAVOURED AND FAVOURITE TOOLS

Mike Joseph maintains that tools are much more than just things to make things with.

458 INTERNATIONAL MODEL LOCOMOTIVE EFFICIENCY COMPETITION 2021

Tom Parham reports from the Maidstone Model Engineering Society at Mote Park.

463 THE GREAT WEALDEN RAILWAY AT BIDDENDEN

Hugh Topham traces the history of Michael Cadiz's garden railway.

467 THE BARCLAY WELL TANKS OF THE GREAT WAR

Terence Holland describes the 0-6-0 version of his 5 inch gauge Barclay well tank.

470 CLUB NEWS

John Arrowsmith compiles the latest from model engineering clubs around the world.



ON THE COVER...

Bob Hayter's small steam turbine made from a set of castings from Cringle Model Engineering (photo: Bob Hayter).

Tracy Tools Ltd.
Unit 1, Parkfield Units,
Barton Hill Way,
Torquay TQ2 8JG



Visit our brand new website

We ship anywhere in the world

www.tracytools.com

PRODUCTS

- Taps and Dies
- Centre Drills
- Clearance Bargains
- Diestocks
- Drill sets (HSS) boxed
- Drills
- Drill set (loose) HS
- Endmills
- Lathe Tooling
- Reamers
- Slot Drills
- Specials
- Tailstock Die Holder
- Tap Wrenches
- Thread Chasers

Acme
Taps

Reamer

Taper Shank Drill
HSS

Taps
&
Dies



Tracy Tools Ltd

Tap & Die Specialist, Engineer Tool Supplies

Tel: 01803 328 603
Fax: 01803 328 157
Email: info@tracytools.com
www.tracytools.com



THE MULTI METALS SHOP

The Multi Metals Shop, all your metal requirements in one place, we have over 3000 items in stock ready for quick dispatch, with FREE delivery on all orders.

Check out our webshop www.themultimetalsshop.co.uk

Alternatively call us on **01143493625** or email sales@themultimetalsshop.co.uk
Unit 7 Newhall Industrial Estate, Sanderson Street, S9 2TW

MAXITRAK.COM

The best of model rail and road.

Tel: 01580 893030
info@maxitrak.com



5" Gauge Planet

Kit From £1,195

Ready to Run £1,295

**NEW FOR
2021!**

5" Gauge Austerity J94

Painted Kit From £4,995

Ready to Run £5250



Finance available
Terms and conditions apply



**TIG
Welded
Boilers**

MAIDSTONE-ENGINEERING.COM
Brand New Website Live Stock System

One stop model engineering shop
Leading suppliers of fittings, fixings,
brass, copper, bronze and steel

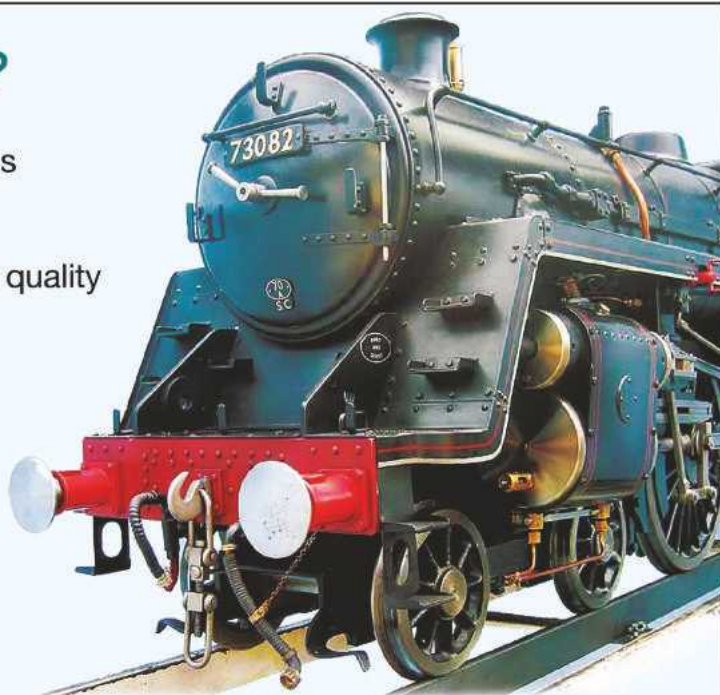
Call us on 01580 890066 info@maidstone-engineering.com

Visit us 10-11 Larkstore Park, Lodge Road, Staplehurst, Kent, TN12 0QY

**MAIDSTONE
ENGINEERING
SUPPLIES**

Don't know what it's worth?

- Good prices paid for all live steam models
Locomotives from gauge 1 to 10¼ inch
Traction engines to 6 inch scale
Part-built or broken through to exhibition quality
- A no-obligation offer and firm decision
over the telephone
- Fully-insured collection nationwide
- Payment in full on collection



Speak to the experts

STATIONROADSTEAM.COM

Build, buy & sell all types and sizes of locomotives, traction & stationary engines

Call Mike or Jayne Palmer on 01526 328772

Station Road Steam Ltd, Unit 16 Moorlands Industrial Estate, Metheringham, Lincs LN4 3HX

Open daily Monday to Friday from 8am to 6pm, visitors welcome by appointment

DIRECT DEBIT SUBSCRIPTIONS (uk only)

Yes, I would like to subscribe to *Model Engineer*

☐ Print + Digital: £18.25 every quarter

☐ Print Subscription: £15.25 every quarter (saving 41%)

YOUR DETAILS must be completed

Mr/Mrs/Miss/Ms Initial Surname

Address

Postcode Country

Tel Mobile

Email D.O.B.

I WOULD LIKE TO SEND A GIFT TO:

Mr/Mrs/Miss/Ms Initial Surname

Address

Postcode Country

INSTRUCTIONS TO YOUR BANK/BUILDING SOCIETY

Originator's reference 422562



Name of bank

Address of bank

..... Postcode

Account holder

Signature Date

Sort code Account number

Instructions to your bank or building society: Please pay MyTimeMedia Ltd. Direct Debits from the account detailed in this instruction subject to the safeguards assured by the Direct Debit Guarantee. I understand that this instruction may remain with MyTimeMedia Ltd and if so, details will be passed electronically to my bank/building society.

Reference Number (official use only)

Please note that banks and building societies may not accept Direct Debit instructions from some types of account.

CARD PAYMENTS & OVERSEAS

Yes, I would like to subscribe to *Model Engineer*, for 1 year (26 issues) with a one-off payment

UK ONLY:

☐ Print + Digital: £77.99

☐ Print: £65.99

EUROPE & ROW:

☐ EU Print + Digital: £104.99

☐ EU Print: £92.99

☐ ROW Print + Digital: £117.00

☐ ROW Print: £105.00

PAYMENT DETAILS

☐ Postal Order/Cheque ☐ Visa/MasterCard ☐ Maestro

Please make cheques payable to MyTimeMedia Ltd and write code ME2021 on the back

Cardholder's name

Card no: (Maestro)

Valid from Expiry date Maestro issue no.

Signature Date

TERMS & CONDITIONS: Offer ends 31st December 2021. MyTime Media collects your data so that we can fulfil your subscription. We may also, from time to time, send you details of MyTime Media offers, events and competitions but you always have a choice and can opt out by emailing us at unsubscribe@model-engineer.co.uk. Please select here if you are happy to receive such offers by email ☐ by post ☐ by phone ☐ We do not share or sell your data with/to third parties. Details you share with us will be managed as outlined in our Privacy Policy here <http://www.mytimemedia.co.uk/privacy-policy>. Please visit www.mytimemedia.co.uk/terms for full terms & conditions.

POST THIS FORM TO:

MODEL ENGINEER SUBSCRIPTIONS, MYTIMEMEDIA LTD,
3 QUEENSBRIDGE, THE LAKES, NORTHAMPTON NN4 7BF

CODE ME2021

**OFFER
CLOSES**
31st DECEMBER
2021


PRINT + DIGITAL SUBSCRIPTION

- 26 Issues **delivered to your door**
- **Great Savings** on the shop price
- **Download** each new issue to your device
- A **75% discount** on your Digital Subscription
- Access your subscription on **multiple devices**
- Access to the **Online Archive** dating back to August 2001


PRINT SUBSCRIPTION

- 26 Issues **delivered to your door**
- **Great Savings** on the shop price
- Never miss an issue

SUBSCRIBE TODAY

MODEL ENGINEER

SUBSCRIBE TO MODEL ENGINEER TODAY AND SAVE!

SAVE up to 41%**

Model Engineer is a great way to stay informed of everything to do with working mechanical models. With over 100 years of experience to draw on, Model Engineer covers everything from classic steam locomotives to cutting-edge modern developments in scale engineering. Regular content includes constructional articles, features on the best techniques and tools available and profiles of full-size modelling subject prototypes. Model Engineer magazine publishes 26 great issues a year.

**So subscribe today,
make great savings
and never miss
an issue!**



SUBSCRIBE SECURELY ONLINE

 <https://me.secureorder.co.uk/MODE/ME2021>

CALL OUR ORDER LINE

 **0344 243 9023**

Lines open Mon-Fri 8am - 8pm GMT & Saturday 9.30am - 3.30pm GMT

Quote ref: ME2021

Calls are charged at the same rate as standard UK landlines and are included as part of any inclusive or free minutes allowances. There are no additional charges with this number. Overseas calls will cost more.

**DIGITAL
SUBSCRIPTIONS
AVAILABLE ONLINE!**



MARTIN
EVANS
Editor



DIANE
CARNEY
Assistant
Editor



YVETTE
GREEN
Designer

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.
07710-192953
mrevans@cantab.net

Measurement

An interesting topic that has featured prominently in Postbag lately is that of measurement – the units we use, how those units are defined, whether dividing by ten or powers of two is superior and why, oh why most of our drawings still use imperial units. Two readers have – quite independently – recommended the same book to me, so I resolved that I should buy a copy and read it.

This is Ken Alder's book *The Measure of All Things*, which tells the story of the measurement of the Paris meridian, carried out by two of France's top astronomers in order to define the length of the metre, as part of the establishment of the metric system just after the French Revolution.

This book is a true work of scholarship and perhaps rather forbidding at first sight. Ken Alder, though, has the advantage of an alternative life as a novelist and so this book reads like an adventure story, full of drama, success, failure and tragedy. To flog an old cliché (yet again), I couldn't put this book down.

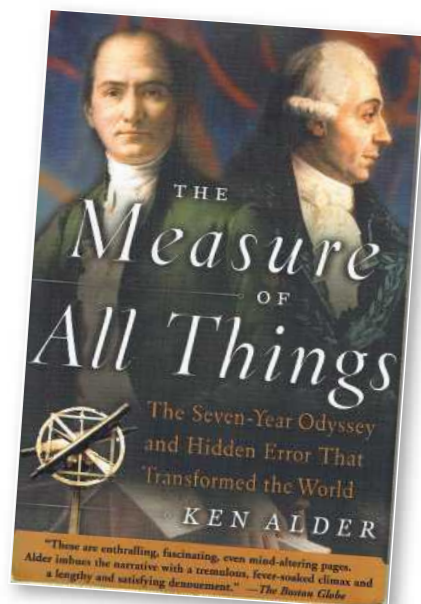
The metre was to be defined as the 10 millionth part of the distance from the North Pole to the equator, measured along the Paris meridian. This required that part of the meridian needed to be surveyed and so it fell to two leading astronomers, Delambre and Méchain, to measure the earth from Dunkirk to Barcelona. The task was expected to take perhaps a year but ultimately it took seven years to complete. The primary reason for this is that a time of social upheaval, war and revolution was perhaps not the best choice for carrying out work of this kind.

In the summer of 1792 the two men set out in opposite directions, Delambre towards Dunkirk and Méchain towards Barcelona. The two men were also quite the opposite in temperament. One, Delambre,

was the optimist, a man of 'wry equanimity', a 'connoisseur of human absurdity'. The other, and more senior of the two, Méchain, was the pessimist, paranoid, melancholic and consumed by self-doubt.

The supporting cast includes many of the most powerful minds of their time – Lalande, Legendre, Laplace, Lavoisier, Cassini, Fourier, Gauss and Voltaire. (Lavoisier, of course, had the misfortune to lose his head during the 'Terror'.) They lived in a time of 'enlightenment', during which *savants* became scientists and the mathematics that underpins modern science was still being developed. They lived in a time where it was supposed that God's creation must be perfect. Newton had already established that the earth cannot be spherical but it was assumed instead that it must be a perfect oblate ellipsoid. Delambre and Méchain's measurements would demonstrate that this was false. Unfortunately, this discovery undermines the entire basis of the measurement, as it had been thought that a meridian through Paris would be 'as good as' any other because all meridians must surely be the same length. They now knew that this could not be true. It also, in a sense, invalidated the methodology of the survey as they could no longer be sure that simply scaling up the distance from Dunkirk to Barcelona, according to the latitudes of the two places, would yield the correct value for the distance from pole to equator.

It got worse. Once Méchain's papers were finally handed over to Delambre, after Méchain's death from malaria,



he discovered that Méchain had 'fudged' his results in order to conceal observational errors that he thought he had made. In particular he believed he had found a discrepancy in his measurements of the latitude of Barcelona, which he had then tried to conceal. This of course was the reason for the delay in handing over the papers, as Méchain worked desperately to hide the errors and produce a set of data that agreed with the observations of his colleagues. This explained Méchain's evident reluctance to come home – both Delambre and Méchain's wife (also a very capable astronomer) had to travel down to the French border to persuade him to finish work and return to Paris.

To his great credit, Delambre reworked and corrected Méchain's work and, in his account of the project – the *Base du Système Métrique Décimal* – took great care to minimise Méchain's faults, describing him as 'an astronomer ever worthy of our admiration'.

Despite the best efforts of the two astronomers, then, the definition of the metre turned out to be just as arbitrary as, for instance, measuring the circumference of a Camembert cheese.

The Measure of All Things, Ken Alder
Published 2003 by Free Press. 450pp., ISBN 978-0743216760
Available from Amazon at about £17

Zen and the Art of Model Painting and Lining

PART 3

Luker tackles the task from first principles.



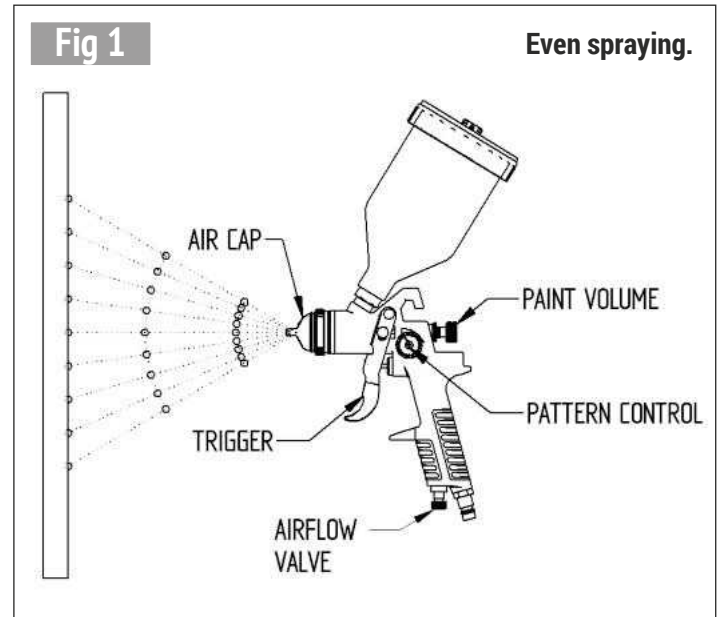
Continued from p.349
M.E. 4672, 27 August 2021

The art of spray-painting

The single most important rule: don't touch wet paint. It may seem like a good idea but it always ends up in disaster.

I'm not going to go through all the various valves because that particular nugget of wisdom is everywhere on the Internet and, to be honest, if the instruction manual is difficult to understand just put some coloured water in the gun and see what each valve does spraying onto some paper. I keep the air flow valve fully open and control the pressure at the water trap/filter (but then my line isn't very long so the pressure drop is negligible). The paint volume is always set to fully open with the amount of paint controlled by feathering the trigger (which is what that knob does anyway). In that way at least two knobs are fixed and I don't need to worry about them.

For an even paint pattern the gun needs to be parallel to the surface being painted, both vertically and horizontally (**fig 1**). Any angle will result in the closest area receiving more paint than the farther areas (**fig 2**). The same happens when the wrist is used to paint

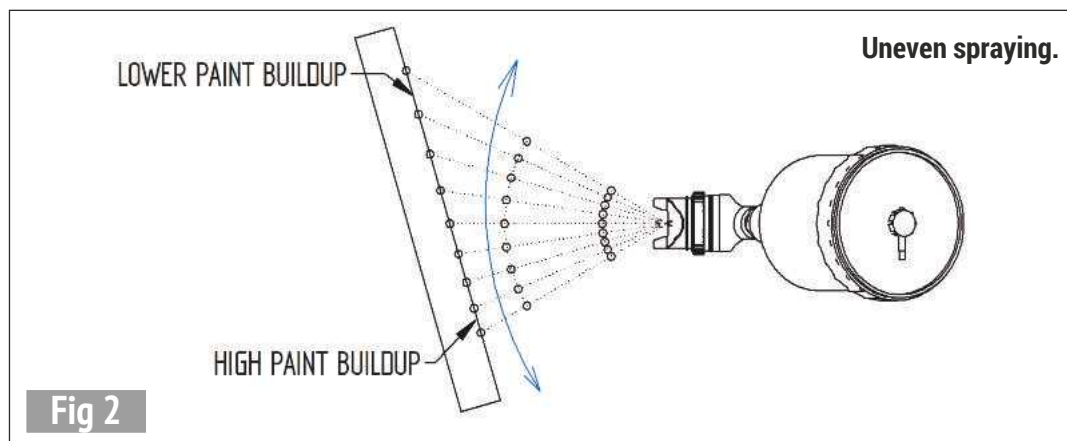


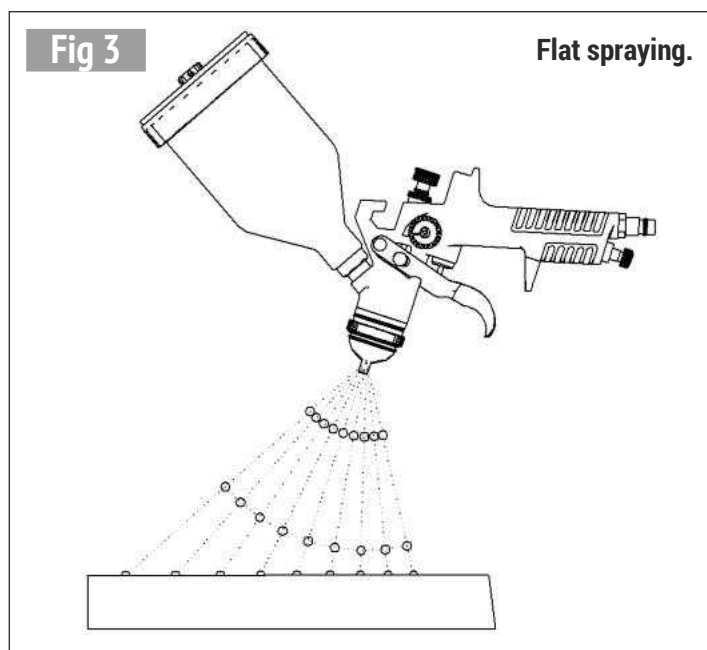
instead of moving your whole body or arm across the part being painted. The principle is the same as drawing a straight line, if you use your arm rather than a wrist action the line will come out true. The distance from the part should be between 6 and 12 inches (open your hand like a Vulcan greeting and the distance from your small fingertip to your thumb is about right) but this changes with the gun, area being painted and the type

of paint being sprayed. The spray action should be started *off* the part being painted and not *on* the part itself. You also shouldn't change direction midway on the part because you're doubling up on the paint being applied in that region. If you go past the edge, then change direction; you're less likely to have areas of high paint build-up. Alternatively, you could back off on the trigger at the end of each stroke, but that's easier said than done.

The most common mistake with spraying is overdoing the amount of paint sprayed in one go, resulting in runs, pinholes or bubbles. The trick here is to give the paint a minute to coalesce. Immediately after the sprayed pass it looks like you haven't sprayed enough, but if you wait a few seconds the paint will flatten out nicely on its own. If you had done another pass it would have been too much.

One of the better orientations for spraying is with the



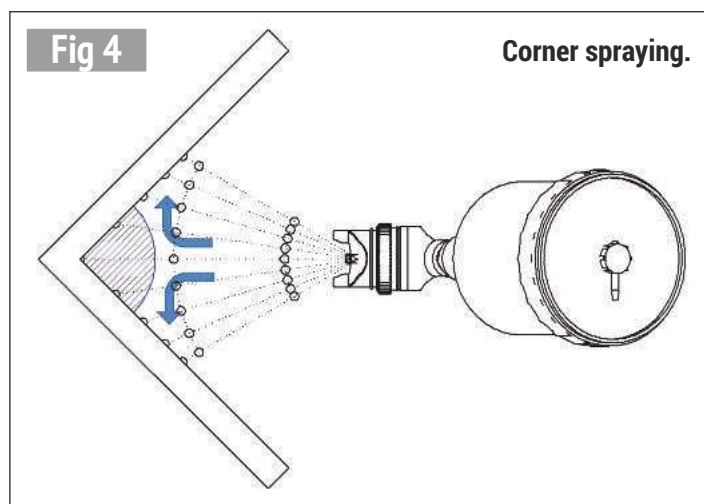


component flat (**fig 3**). It allows a higher build and you're less likely to get orange peel or runs. When spraying in this configuration you are limited by the angle so you will invariably have some build-up at the bottom of the spray area. In this case I prefer to spray from the furthest point towards me so the amount of paint build-up is decreased as you overlap. Don't overdo the amount of paint sprayed; if the solvents cannot flash off before the paint skins you will get bubbles or pinholes in the paint. There is a fine line between getting a flat surface and overdoing the individual paint layer causing pinholes. This is especially true when using a fast hardener in a warmer climate.

I once read that paint has a tendency to bounce off 90 degree corners making painting in these areas a challenge. When I read that I wondered how a sticky viscous drop could bounce off anything; that's a little like saying you can play tennis with a Velcro racket. Well, maybe Federer could, and he'll make it look easy. I prefer to think of these paint droplets being carried by the air from the spray gun; how that air behaves determines the path and final resting place of the paint droplet. From a flow point of view, you are likely to form what the CFD guys

like to call a stagnation point. Basically, the air particles have nowhere to go in the corner so they just stop (blue cross-hatched area in the sketch). The upstream air flows over this stagnant pocket and carries the paint to the sides rather than traveling in a straight line. Combined with this, you can also see that if the spray pattern is wide the distance between the particles is less at the sides (points closer to the gun) which translates to more paint to the sides and less in the corner. I get around this by turning the pattern control to a narrow pattern, and angling the gun in line with the corner (**fig 4**). The air can now flow along the corner and not get stuck like lemmings. The principle is easily illustrated by spraying a hosepipe in a corner and seeing what effect changing the angle has on the flow paths. In terms of corners you don't get much worse than the front end of a tender; with the picture showing that getting a flat, even paint distribution by careful consideration of the spray pattern and gun angle is very much achievable (**photo 9**).

Sometimes it's easier to spray vertically rather than horizontally. A good example is a boiler. In this case the air cap is flipped 90 degrees so that the spray pattern is horizontal



and the job can be sprayed up and down. The Stirling boiler and cladding was sprayed using this method to avoid any overspray on the bottom of the barrel if it were to be sprayed horizontally (**photo 10**).

With a little practice, changing the orientation and pattern becomes second nature and while spraying a single component, different settings can be used to get into corners, flats, tops and sides.

Multiple coats can be applied in a day, but you need to allow the solvents time to flash off before recoating. These times depend on the hardener used and the ambient temperature, with all this information given in the data sheets for the specific paint used.

It's good practice to spray a couple of small test samples on scrap metal. These you spray before the actual job to check settings, mixes etc. They come in handy if you want to do temperature tests on the

paint system or to practise lining techniques, which will be tackled later.

Some items are just not worth spray painting; wheels are a good example. All the paint ends up on the tips of the spokes with very little paint between. All my wheels are painted using the same 2K paint systems but applied using a brush. The paint is not thinned but, in most cases, it is still too thin for brush application. To get around this I mix a little paint in a container and leave it in the fridge for a couple of hours; this tends to thicken the paint making it more suitable to apply with a brush. It also allows time for some of the solvents to flash off which could cause problems when applying thicker coats of 2K paints.

Cleaning the gun

Boring! But this is something that can spoil an otherwise decent spray job, and normally



Some corner spraying on the Stirling tender.

the final coat. Obviously, the gun needs to be cleaned after each use, but what they don't tell you is that after using the primers (especially the high build primers) the whole front end of the gun should be stripped and cleaned out properly. The heavier filler material tends to build up in the chamber behind the needle seat and if not cleaned properly can contaminate the final layers. The supplied brush won't get to this area through the top cup fitting (gravity feed gun). I like to plan my painting, bringing a batch of components all to the same point in the spraying process, i.e. the final filler coat. The gun should then be stripped and properly cleaned before moving on to the colours.

The guns can be cleaned with cleaning thinners or lacquer thinners, but after cleaning I always swirl a little 2K thinners in the cup and blow a little through the nozzle to get rid of any residue from the cleaning thinners. I spoke to a paint expert some time ago and he recommended I make this a habit because the thinners' quality is not getting any better, and some of the solvents in the cleaning thinners will cause issues with the 2k paint systems.

Symptoms like spray fluttering or spitting and uneven spray pattern can be traced to a dirty gun or something stuck in the ports. When spraying high fill primers you need to keep an eye on the pattern jets; they can develop build-up if a wide pattern is used.

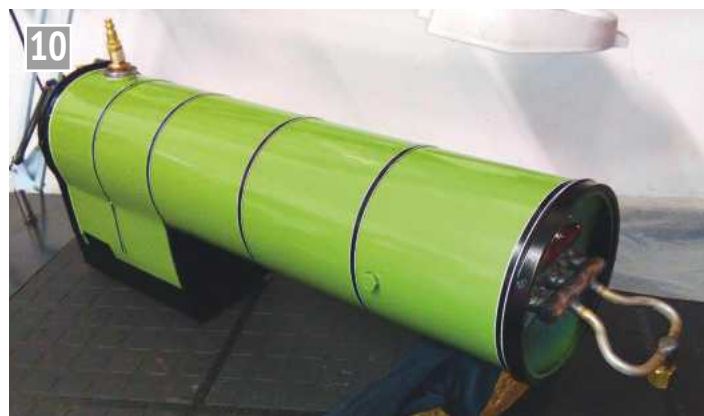
Combinations of paints for different components

When it comes to paints one size does not fit all. The paint combination needs to match the conditions the component will see during steaming. In general, normal etch primer doesn't work in high temperature regions; a special high temperature etch primer should be used and I suggest testing a painted test piece in the oven before spraying the

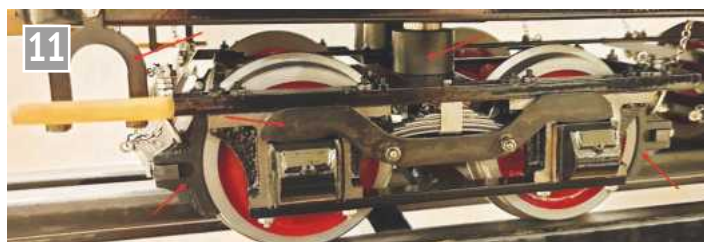
model. Obviously, when the cook is out! All the 2K paints I have used in high temperature places have worked well, from the cheapest to the most expensive. The high fill 1K etch primer won't take heat and I suggest saving that for components that don't get too hot. **Table 2** gives some of my combinations that I have found to be successful.

Oil blackening small components

Strictly speaking, oil blackening components isn't really painting but for model engineering you don't get a better method of making a component black in a flash that has a measure of rust protection. All the carbon steels and cast irons can be oil blackened - and no, you won't harden the cast iron unless the chemistry was wrong and there was not enough FeSi. The method is incredibly simple; heat up the component to red hot and dunk it in some used motor oil. The process deposits an incredibly thin, hard wearing carbon layer to the part, with minimal detriment to the visual detail



Stirling boiler.



Oil blackened components.

of the component. The high carbon steels will harden, but the low carbon steels will have little to no through hardening with some case hardening. With cast iron I tend not to use this method with long, slender components with very thin sections. The thermal shock may just crack the component.

Personally, this has never happened to me, but you never know. This method will not work with any brazed, soldered or non-ferrous metals. The arrows in the picture show a variety of components that were oil blackened on a tender bogie (**photo 11**).

●To be continued.

Component	Etch primer	Filler primer	Colour 2K	Comments
Smokebox/ cylinder assembly	✓ (High temperature)	✗	✓	☐ The high temperature etch primer must dry completely before 2K colour.
Boiler	✓ (High temperature)	✗	✓	☐ The high temperature etch primer must dry completely before 2K colour.
Tender	✓	✓	✓	☐ If body filler is used the etch primer must be removed in that area.
Chimney	✓ (High temperature)	✓	✓	☐ The high temperature etch primer must dry completely before 2K filler. ☐ Filler primer is only used to flatten casting surface, and can be sanded down to etch primer. A little thinning of the filler primer is warranted here.
Frame	✓	✗	✓	☐ Painted as a partial assembly for easier assembly later. ☐ Avoid high build paint layers; it tends to make assembly difficult.
All small ferrous and cast iron components				☐ Oil blacken

Darlington's Narrow Gauge Dream Factory

Mark Smithers explains how Scarborough's North Bay locomotive works found itself relocated to Darlington.



Most readers of *Model Engineer* will no doubt be familiar with the new-build A1 Pacific locomotive *Tornado* and the embryonic P2 Mikado *Prince of Wales*, both of which are Darlington-based projects. What may be less familiar to some readers are the current efforts to establish Darlington as a base for narrow gauge new-build steam locomotives.

The story of the company concerned, North Bay Railway Engineering Services Ltd., can be traced back to 23 May 1931 with the opening of Scarborough's 20-inch gauge North Bay Railway. The N.B.R. runs from a southern terminus at Peasholm Park, where the railway's shop, booking facilities, sheds and workshops are situated, via the currently disused Beach Station, a distance of approximately 1500 yards, to the northern terminus at Scalby Mills. It was operated by the local authority from its



One of the earliest projects undertaken by the company was the construction of this 7 1/4 inch replica of Sir Arthur Heywood's 15-inch gauge 0-4-0WT Effie of 1875. It is seen here, nearing completion in the Scarborough workshops on March 16th 2015.



The company originally had two workshops: one located within Scarborough and the second, the larger of the two, located in the nearby village of Burniston. This is the sign-board that once greeted visitors to the larger workshop.

inception, except for a period of forced idleness from 6 June 1940 until Easter 1945, until 2007 since when it has been operated by a new company, the North Bay Railway Co. Ltd., until recently under the directing hand of railway entrepreneur David Humphreys (it is now under the same ownership as the Cleethorpes Coast Light Railway).

For most of its history, the N.B.R. relied exclusively on miniature outline Gresley-inspired Hudswell Clarke diesel locomotives for its motive power but, as early as the immediate post-World War Two era, the Local Authority approached Hudswell Clarke with a view to purchasing a steam locomotive. Such a move proved to be impracticable on the grounds that locomotive reversal at Scalby Mills at this stage was accomplished by means of a balloon loop partly enclosed in a tunnel, rather than the present turntable, and the mere 3-inch uppermost clearance would have prevented the use of a steam locomotive as a consequence of interference

with its draughting.

It is interesting to speculate as to what form any steam locomotive would have taken at this stage. Given that 'narrow gauge' aesthetics had yet to gain widespread popularity in the pre-Tallylyn Railway preservation era, one's immediate thoughts turn to a steam version of the makers' Princess Royal Pacific for Blackpool Pleasure Beach. Local loyalties, though, may have dictated a new design based on the Gresley Pacifics but - unlike the line's original locomotives - suitably proportioned to take a proper steam boiler and firebox.

During more recent times, the urge to produce a steam locomotive suitable for operation on the North Bay Railway's revised track configuration proved irresistible and in 2013 a new company, N.B.R. Engineering Services Ltd., was set up as a subsidiary to the N.B.R. in connection with the Heritage Skills Initiative, then running in the North-East and Yorkshire. The intention was to offer new-build and repair facilities

to external customers. Two apprentices were initially trained and then taken on by the company during 2014-5, whilst engineer Mark Ashton joined in October 2014.

Suitable workshop facilities were procured and these consisted of two buildings, the smaller of which served as a machine shop and the larger as an erecting shop. The machine shop was located close to the North Bay Railway's Peasholm Park terminus and the facilities available allowed for the turning of items up to 25 inches in diameter 'in-house' whilst larger items could be sub-contracted. The erecting shop was a somewhat larger building located on the outskirts of the town. It was therefore possible for construction and restoration projects ranging from standard model engineering work to conventional narrow-gauge locomotive and marine and traction engine work to be undertaken.

One of the company's early projects was a half-scale model of Sir Arthur's first 15-inch gauge locomotive *Effie* running on 7¼ inch gauge track. This project has proved to be a somewhat protracted one but the locomotive has now been completed, along with a suitable Heywood-pattern driving tender, and is currently for sale. The largest steam locomotive to have received attention in the early erecting shop was 2 foot gauge Avonside-pattern Hunslet 0-4-2T *The Green*

Dragon from the Tynedale Railway, which was extensively overhauled by N.B.R.E.S.L. prior to its return to Cumbria in the latter part of 2016. In addition to this, other railway-related work took place on components for 'S160' 2-8-0 3353, 'S15' 4-6-0 30825 and the new-build *Lyn* 2-4-2T for the Lynton & Barnstaple Railway.

In choosing a design of steam locomotive for use on the Scarborough line, David was of course not bound by any previously recognised convention in favour of 'miniature' pretensions and instead he turned to the sphere of small, functional purpose-built narrow-gauge designs. One class that caught his attention was the tiny Bagnall *Sipat*. This specification was the smallest of the standard 'Bullhead' Bagnall 0-4-0ST designs, being produced in three sizes: 10 HP, 15 HP and 20 HP (all 7½ inch cylinder stroke, respectively 4, 4½ and 5 inch bore) weighing between 3¼ and 3¾ tons in working order. This generic type of locomotive was labelled the *Sipat* class by Bagnall after W/N 1868 of 1908, although the ancestral form of the specification can be seen in certain 1890's products including W/N 1560 of 1899 of 18 inch gauge for Brede Waterworks in Sussex.

Construction work on *Georgina*, as the new locomotive was to be named, was begun by the railway, being taken over by N.B.R.E.S. Ltd. in 2014. By late November of that year



Effie has now been completed and the engine is seen here in the N.B.R.E.S.L. office in Darlington. Note the Heywood-inspired driving trailer.

many components had been completed and the chassis was in the N.B.R.E.S. Ltd.'s erecting shop in readiness for finishing and compressed air trials. One early 'boon' to the project was the fact that a cylinder pattern, initially manufactured in Australia for a 2 foot gauge replica of New Zealand's Bagnall 0-4-2T *Annie* (the 'original' of which was Bagnall 1922 of 1911 built to 2 foot 6 inch gauge for Gisborne Borough Council's Gentle Annie Tramways and whose remains are now preserved at New Zealand's East Coast Museum of Technology at Makaraka near Gisborne).

These were subsequently imported for use by Richard Booth in the Groudle Glen Railway's own (more accurate but still 2 foot gauge) replica of the same locomotive, completed in 1998, and the cylinders cast from them became available when Richard decided to replace these items on its own *Annie* with a new pair. These are a closer match for those fitted to the original engine. Although this measure meant a small element of compromise in relation to the original *Sipat* design, it reduced construction time and *Georgina* was largely mechanically complete by October 2015 when a successful compressed air test on the chassis was carried out. After this stage, the finishing touches were applied to the boiler, including the fitting of the 'dry' firebox backhead. By early December

2015, the cab 'waist sheets' had been fitted and by the end of January most of the paintwork had been accomplished but the smokebox front, chimney and saddle tank remained to be fitted.

Georgina eventually undertook its first steam test on 2nd March 2016 and its public 'launch' took place at 11.00 a.m. on Wednesday 23 March. Certain refinements were introduced into the new-build that were not present in the original specification, including a mechanical lubricator and roller bearings for the axles. The ability of these latter components to reduce rolling resistance is very evident from the locomotive's free running properties.

Following the completion of *Georgina*, the decision was taken in 2016 to construct another *Sipat* locomotive, this time to 2 foot gauge. Unlike *Georgina*, the new locomotive was not initially constructed with a particular customer in mind and for this reason its construction proceeded on very much a 'stop-start' basis over a period of three years, being fitted in as other jobs permitted. Much of the chassis was completed by the middle of 2017, but lack of an immediate market ensured that there was to be a relatively long pause until completion of the remainder of the locomotive.



Georgina is seen in this view posing with a train at Scalby Mills on the North Bay Railway, Scarborough on April 23rd 2016.

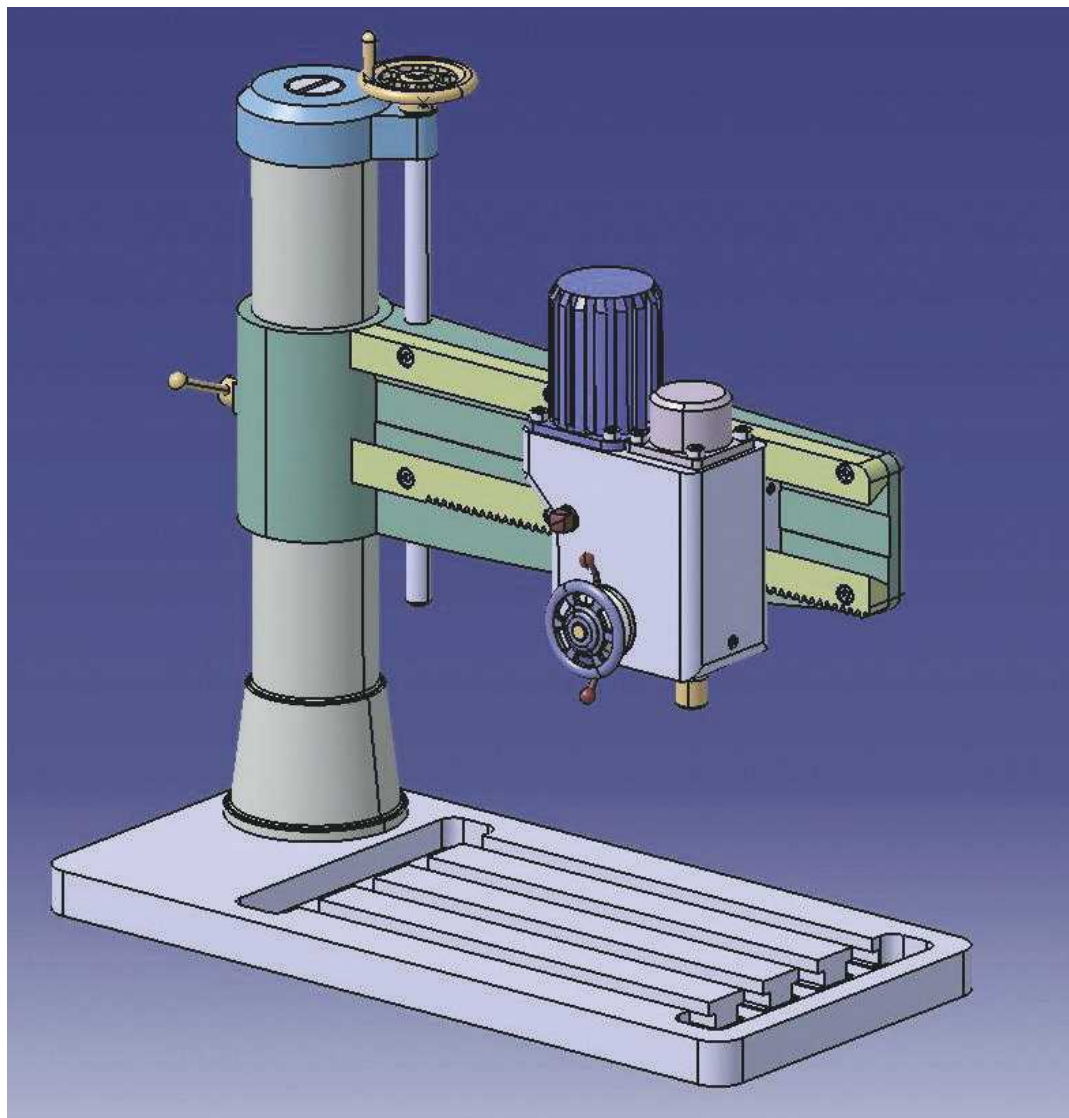
●To be continued.

Philipp Bannik
presents his
own radial boring tool.



A Radial Borer PART 5

Continued from p.377
M.E. 4673, 10 September 2021



A solid base

The base of the machine has to be heavy enough to balance the rail and thick enough to include some 'T'-slots. So, I chose 15mm mild steel. The rough shape was cut on my CNC-Plasmacutter (**photo 31**). All sides were cut on the shaper, but the surface finish was rather rough, being mild steel (**photo 32**). However, I think the stripes of the shaping process give it a more authentic look, being a machine table.

The 'T'-slots were cut in three steps, after doing some professional art-work (**photo**



Base cut roughly to shape.

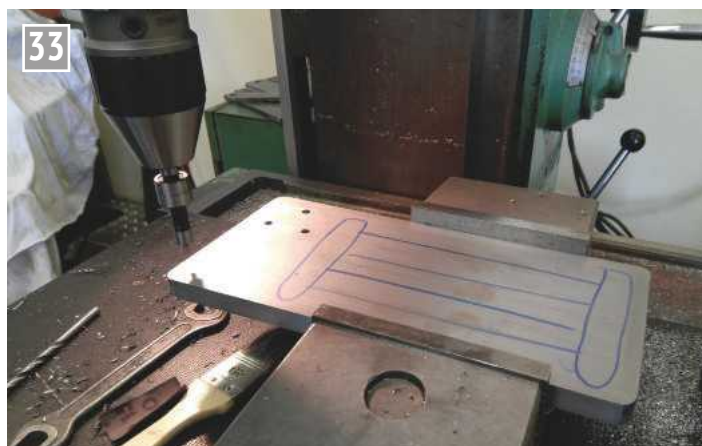


Improving the surface finish on the shaper.

33). I took a roughing end mill to cut the grooves 0.1mm smaller all around. The second step was a finishing end mill to cut the final size and get a nice finish. The last step was to cut the 'T'-slots. I used a

lot of cooling fluid, leaving me blind to the cutting process, but hoped there would be still a complete mill in the chuck at the end of the cut (photo 34).

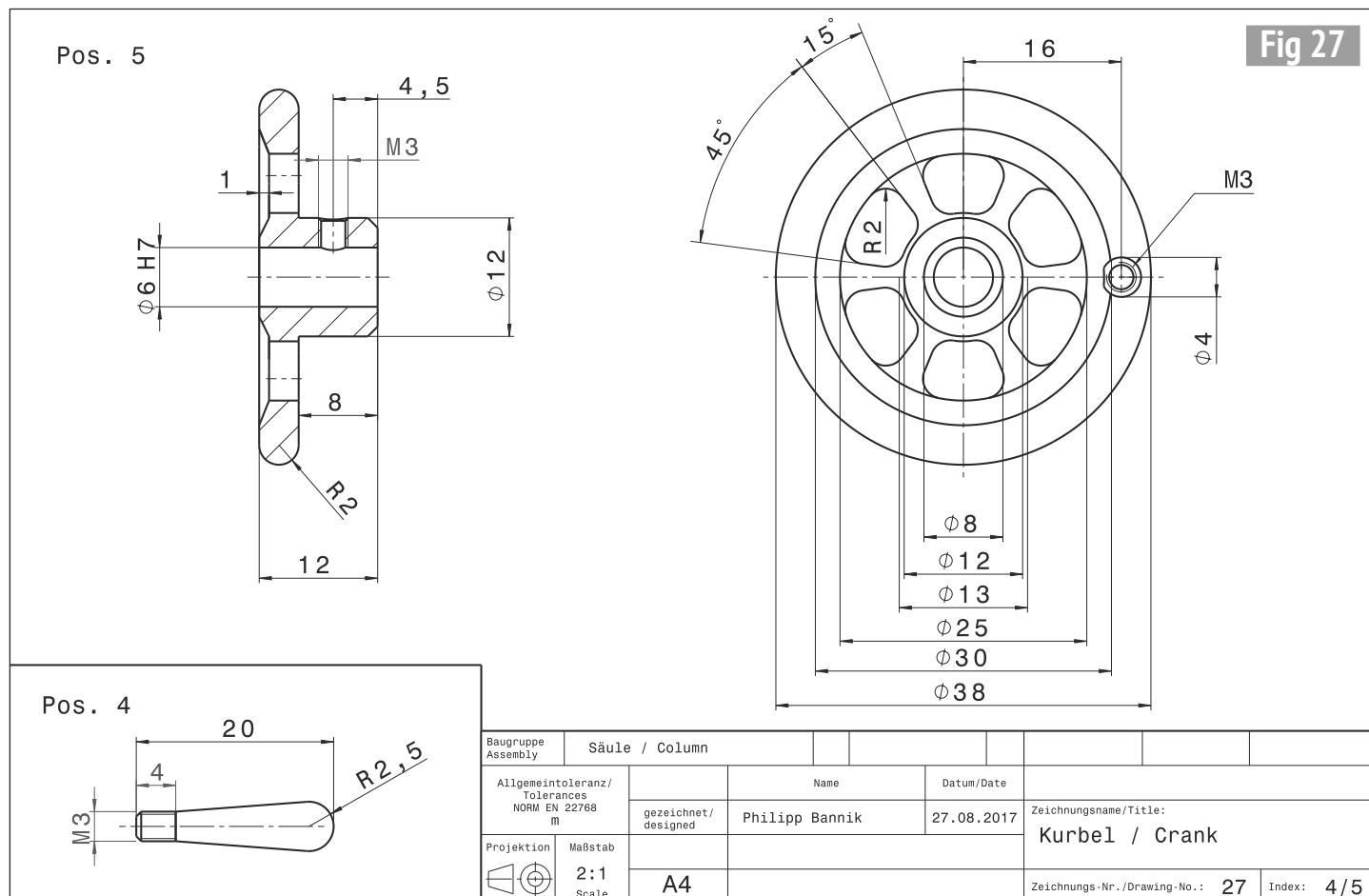
●To be continued.



An accurate drawing is a good starting point.

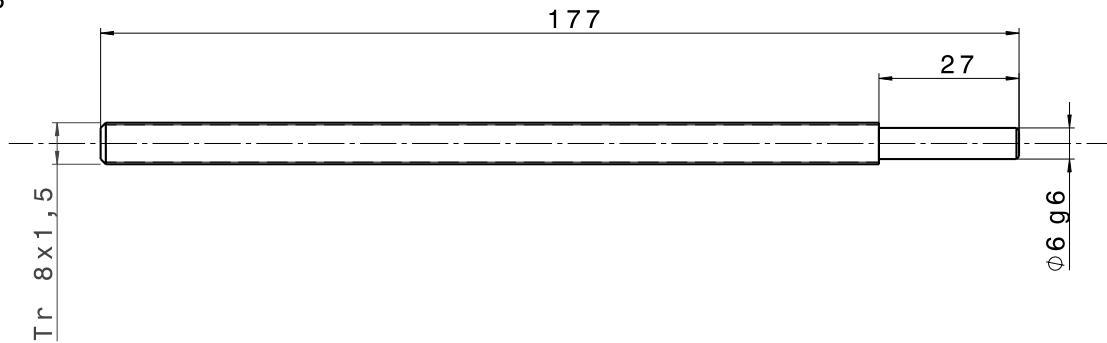


There's a 'T' slot cutter in there somewhere!

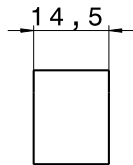
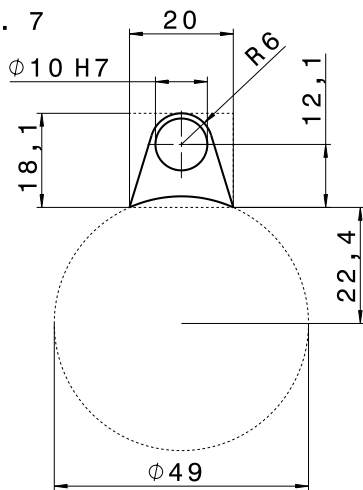


Pos. 8

Fig 28

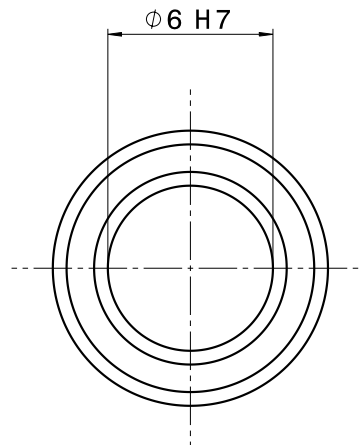
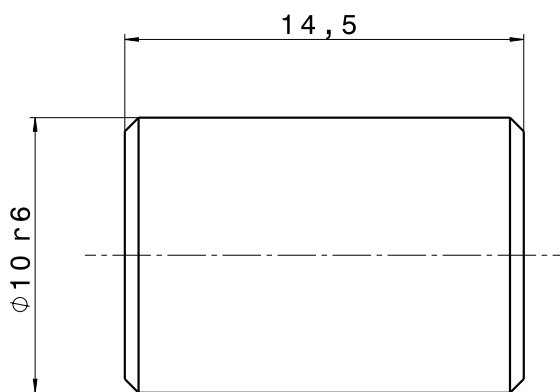


Pos. 7



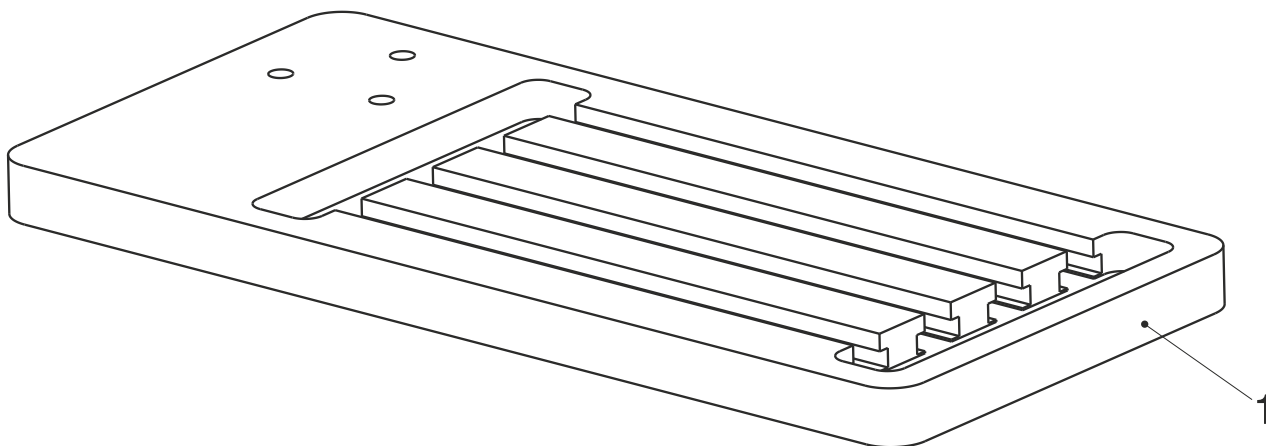
Baugruppe Assembly		Säule / Column							
Allgemeintoleranz/ Tolerances NORM EN 22768 m			Name		Datum/Date		Zeichnungsname/Title: Spindelblock/Spindel Block Gewindespindel/Thread Spindle		
		gezeichnet/ designed	Philipp Bannik		27.08.2017				
Projektion	Maßstab						Zeichnungs-Nr./Drawing-No.: 28		
	1:1 Scale	A4					Index: 7/8		

Fig 29



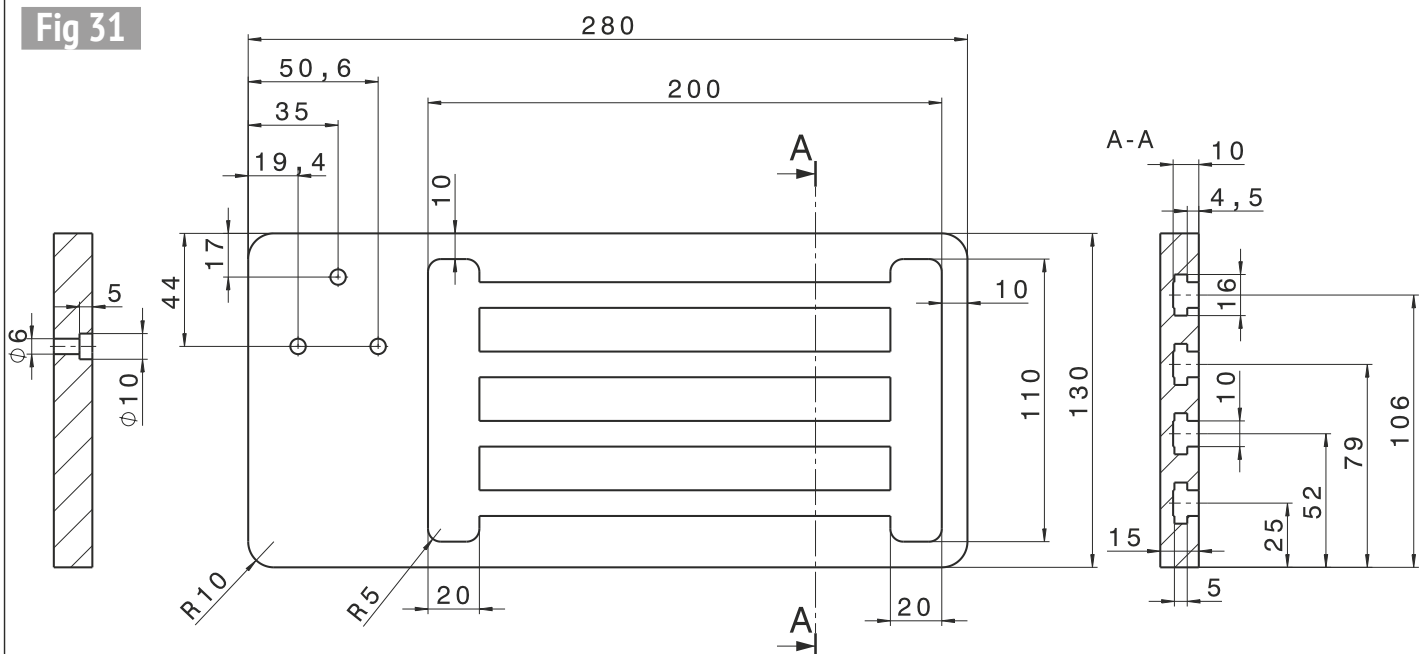
Baugruppe Assembly		Säule / Column							
Allgemeintoleranz/ Tolerances NORM EN 22768 m		Name		Datum/Date		Zeichnungsname/Title: Buchse / Liner			
		gezeichnet/ designed	Philipp Bannik	27.08.2017					
Projektion	Maßstab					Zeichnungs-Nr./Drawing-No.: 29			
	5:1 Scale	A4				Index: 9			

Fig 30



Baugruppe Assembly		Bodenplatte / Ground Plate						
Allgemeintoleranz/ Tolerances NORM EN 22768 m		Name		Datum/Date		Zeichnungsname/Title: Bodenplatte / Ground Plate		
gezeichnet/ designed		Philipp Bannik		27.08.2017				
Projektion 	Maßstab 5:7 Scale	A4		Zeichnungs-Nr./Drawing-No.:			30	Index: 4

Fig 31



Baugruppe Assembly	Bodenplatte / Ground Plate							
Allgemeintoleranz/ Tolerances NORM EN 22768 m		Name		Datum/Date		Zeichnungsname/Title: Bodenplatte / Ground Plate		
	gezeichnet/ designed	Philipp Bannik		27.08.2017				
Projektion 	Maßstab 1:2 Scale	A4						



Set of castings and material.

A Small Steam Turbine from Castings PART 1

Bob Hayter makes a small turbine from Luke Cringle's castings.



I've always been fascinated by steam turbines; it probably comes from working in the electricity generating industry where turbines were enormous. I have often considered modelling a small turbine so when I saw a casting set advertised on a well-known internet sales site I ordered a set. What I received was a complete set of aluminium castings, materials, bearings and fasteners together with drawings (**photo 1**). This is a modern design by Luke Cringle of Cringle Model Engineering; it and other designs can be purchased directly from Luke's website at

www.cringlemodelengineering.co.uk. Castings are made in batches so the full range is not always available. They have made up into a turbine that spins up well on just 15psi and screams away at 60psi.

A study of the drawings shows that this is a typical small turbine, being simple and a fairly straightforward model with only one moving part (**fig 1**). The 50mm diameter solid aluminium rotor has buckets machined into the periphery. A little care is required to ensure free running of the rotor within the casing but otherwise this should be a good model for most model engineers. The

castings are in aluminium, easily machined with just the main shaft in steel and fittings in brass. They have a generous amount of material so there is quite a lot to come off during machining. Access is required to a lathe and drilling machine plus the facility to mill flat surfaces and the buckets plus a method of indexing the rotor whilst machining. The design is in metric but could be adapted to imperial dimensions if desired. A small range of taps and dies plus hand tools are needed.

I will describe the order in which I made the parts and give the key machining

features, precautions and any problems that I encountered.

Rotor housing

The rotor housing is central to the whole assembly so I started by cleaning the casting of surplus material. A little care is required here - use soft jaws or aluminium pads so as not to mark the casting and don't overtighten, just a firm hold and steady cuts are the order of the day with aluminium castings (**photo 2**).

The first requirement is to define a reference centre and a surface from which everything will be measured, not always easy on a complicated shape like this. The casting does, however, lend itself to holding in the three-jaw chuck on the lathe. Adjust to run as true as possible. It is then possible to drill the centre and face the exposed side.

Refer to the drawing (**fig 2**) and machine the inside of the housing to depth and the 51mm diameter (**photo 3**). With

Fig 1

Turbine exploded view.

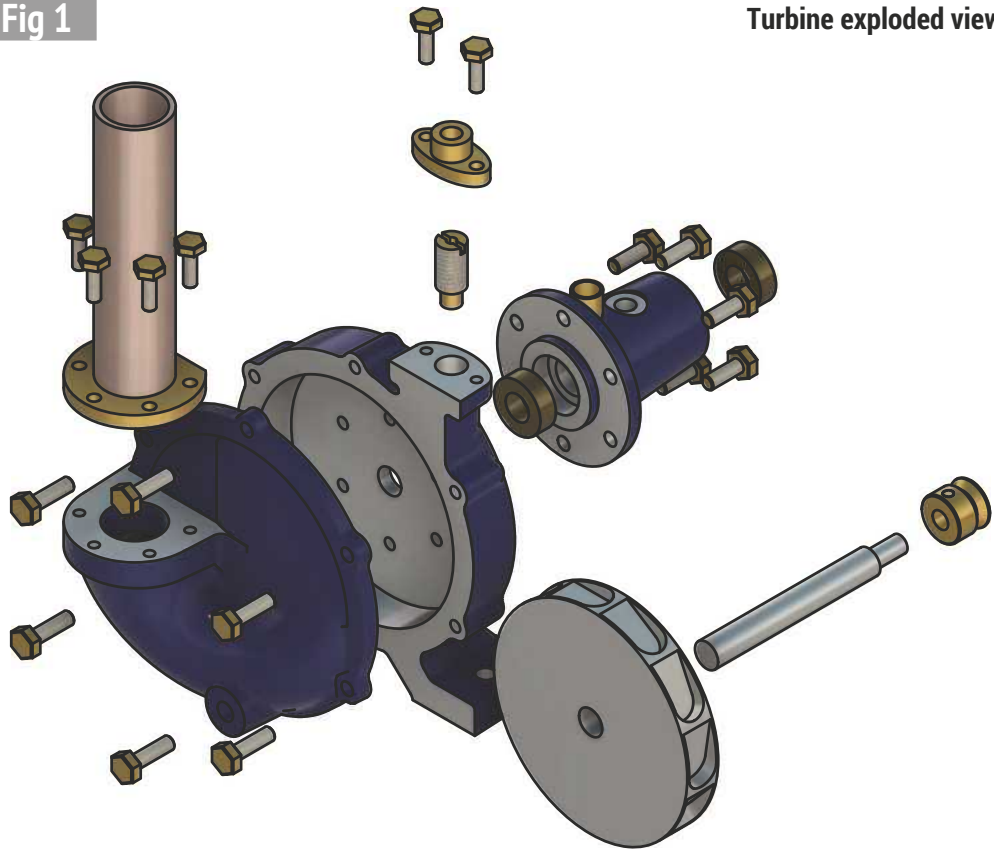
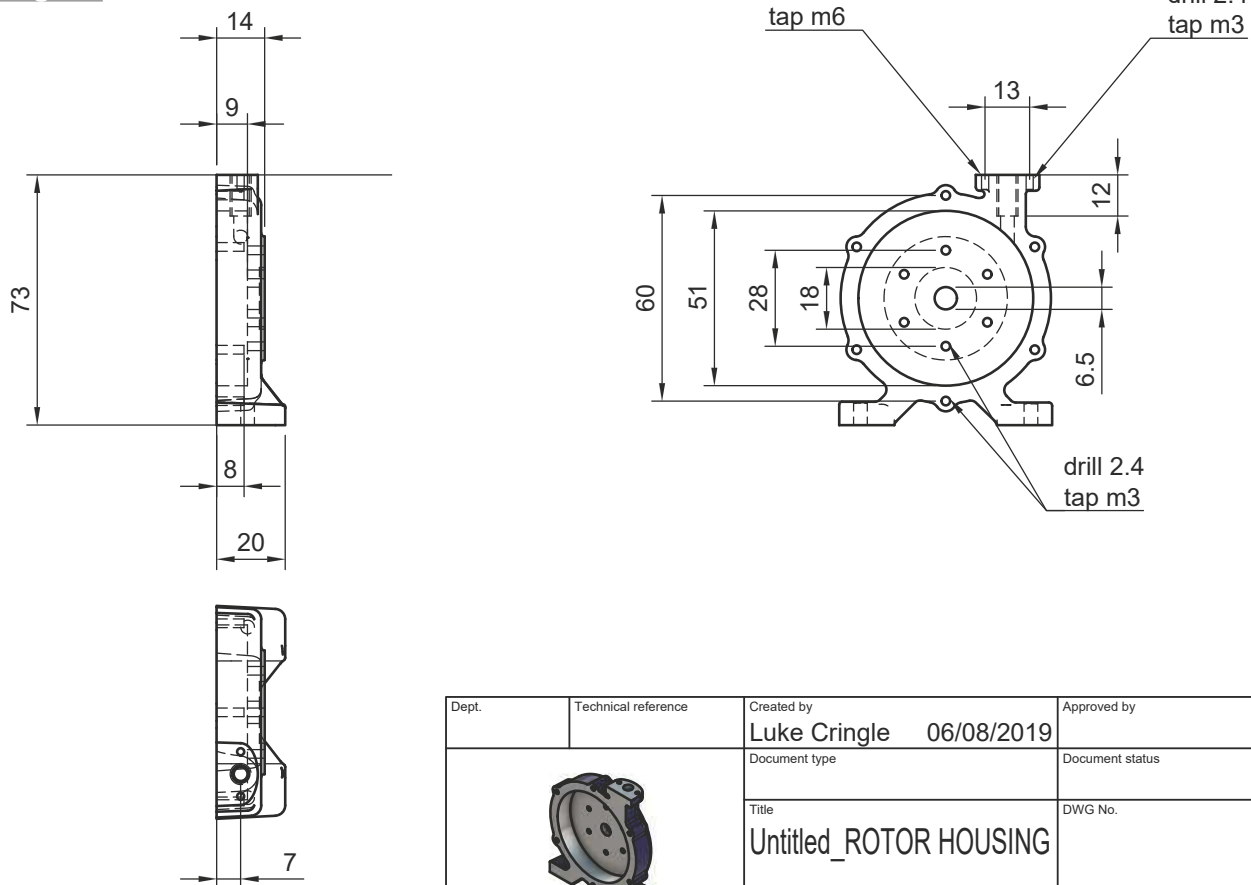


Fig 2



Rotor housing.

Dept.	Technical reference	Created by Luke Cringle 06/08/2019	Approved by	
		Document type	Document status	
		Title Untitled_ROTOR HOUSING	DWG No.	
			Rev.	Date of issue

the face and interior complete the casting is then reversed to machine the opposite face. To maintain concentricity, I used the central hole to mount the casting on a mandrel.

Once finished in the lathe the only critical hole to be drilled is the steam inlet which is tapped to take the jet. This needs to be aligned with the buckets on the rotor.

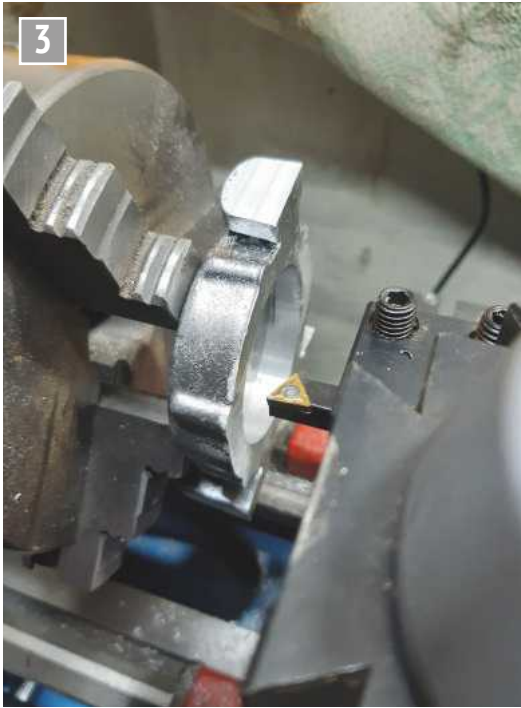
The mounting holes in the feet can be drilled to suit your application. I left the mounting for the bearing housing and rear cover undrilled until I had made these parts and could spot through the holes to ensure accurate alignment.

Rear cover

The rear cover is straightforward, though again a bit of thought and care

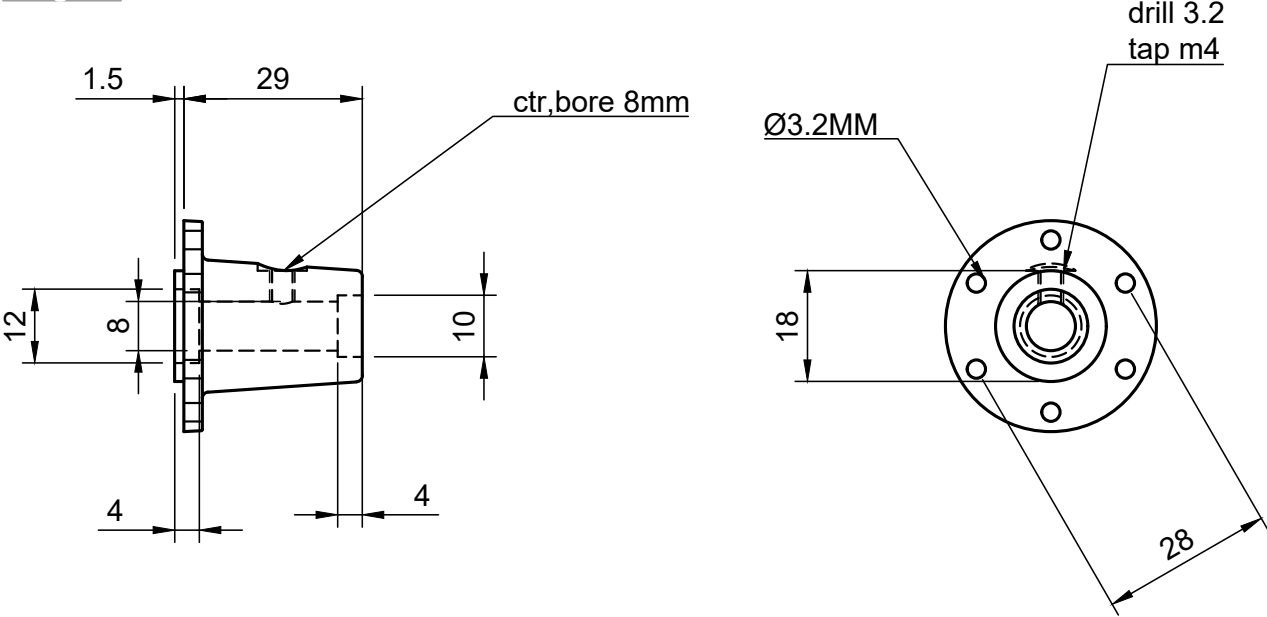


Preparing to clean up the rotor housing.



Machining the inside of the housing.

Fig 3



Bearing housing.

Dept.	Technical reference	Created by Luke Cringle 28/04/2019	Approved by		
		Document type	Document status		
		Title Untitled v11_BEARING HOUSING	DWG No.		
			Rev.	Date of issue	Sheet 1/1



Levelling up the rear cover.

is required to grip it on the mill (**photo 4**). Note that the casting is dimpled to mark the holes for attaching to the main casing. I used these as my guide for drilling as they are quite accurately marked. I drilled them at the tapping size of 2.4mm and increased the size to clearance of 3.2mm after spotting through to the main casing. The same method was used for the bearing housing screws and a good alignment was obtained each time. I also left the

exhaust flange and drain cock holes until I had made those parts.

Bearing housing

The one-piece bearing housing maintains bearing alignment and ensures smooth running up to the high rpm attainable from a turbine (**fig 3**). Holding the bearing housing in the three-jaw chuck on the lathe, I machined the face to mate with the main housing first. I made the recesses for the bearings a gentle push fit to



Spotting through the fixing holes on the bearing housing.

maintain the integrity of the bearings when fitted.

Once the mating face is complete the housing can be located into the main casing and the fixing holes drilled through 2.4mm. After drilling the first hole I used a spare drill as a pin to prevent the two parts moving whilst drilling the other holes (**photo 5**). Once removed from the casing the holes can be opened out to 3.2mm clearance and the outer face squared off. The opposite end of the housing takes the

smaller bearing. The hole in the housing top forms a vent for the bearing interspace. I made a small brass bush to fit here using the final remnant of the brass material after having made the fittings.

● To be continued.

NEXT TIME

We tackle the main shaft and rotor to complete the turbine.

NEXT ISSUE

IMLEC

Tom Parham completes his report from Maidstone's Mote Park on this year's IMLEC.

Painting

Luker assures us that lining a locomotive is nothing to be scared of.

Astronomical Clock

Adrian Garner assembles the remontoire release mechanism for his astronomical bracket clock.

Draughting

Having looked at the blast pipe and smokebox draughting, John Hill turns to the other end and discusses the grate.

Ballaarat

Luker offers his own approach to turning wheels.

Content may be subject to change.



ON SALE 8 OCTOBER 2021

Locomotive Draughting

John Hill reminds us that the draughting on a locomotive can have a dramatic effect on performance.



Preamble

The draughting on a steam locomotive is just as critical as on a human being but we are, with the locomotive, able to set it up for optimum performance really quite simply, something not so often carried out in the modellers' world. I have never tried to re-draught a human - it's a different trade.

For the locomotive, the vital requirements are, firstly, that the blast pipe should be concentric with the chimney and, secondly, that the blast pipe cap be at the appropriate height to enable the cone of the blast ex-cap steam (16 degrees) to enter the chimney base cleanly without 'catching' the lower edge. Thirdly, the chimney should be of sufficient height that the plug of steam should fill it completely - no problem with a tall chimney. Short chimneys need to be let into the smokebox to give a suitable length, probably needing the blast-pipe to be shorter.

Also critical is an air-tight smokebox - no unplugged holes, gaps sealed and a close-fitting smoke box door. If we see that the blast pipe is out of true with the chimney, this will prevent the chimney from being filled with a 'plug' of steam and may enable, hard as it may seem, outside air to be drawn back down the side of the exhaust steam column into the smokebox, one of the reasons for the use of a 'Jimmie' to split the blast by full-size locomotive footplate crews with an indifferent steamer. The 'recognised' Henry Greenly proportions will

often prove unsuitable when drawn out and fail to fill the chimney, for locomotives, like humans, are all different.

It should be clear that, under these circumstances, however hard you work the locomotive, the draught will not draw the fire, you won't get steam to cope with the demand of the cylinders and your going will stop - very embarrassing with three other locomotives on the track behind you. However hard you put the blower on, if its column of steam is not filling the chimney, it will not do its job and draw up the fire. The jet/jets from the blower pipe or ring must also follow the same rule as the blast and fill the chimney to be fully effective. I have given up multi-jet blower caps on my small locomotives (3½ inch gauge) because the smaller the jet, as in multiples, the more likely it is to block with residual steam oil and ash. What is important is to have its cone of steam filling the chimney in the same way as the blast does, so a single small jet as close to the blast pipe and as near in line to it as can be will usually 'do the doings' as Curly used to say.

If you have a multi jet ring blower, this can also be ineffectual if the steam from the ring of jet cones does not 'cleanly' enter the chimney, or petticoat if fitted as on short chimneys, causing turbulence. The ring of jets should be tilted radially inwards a little to try and avoid this.

Our small locomotives usually have no natural draught and the fire soon goes out without a blower when



Blast pipe alignment tool.

stationary. Your blower pipe will probably be nudged out of alignment if the jet is not rigidly mounted as you clean the boiler flues after each running (as I'm sure you all do) and should be checked and corrected if necessary. Eyeball Mk.1 down the chimney will usually suffice once you know how it should be but a number drill popped in the jet will make misalignment obvious. This is done before closing the smokebox door up tightly after cleaning the seating to eliminate air leaks which will destroy that precious vacuum - having removed the number drill of course. I suppose I do all these things without thinking much about it as steam has been in my life for the best part of it, so it is good for me to sit back and try to explain to you what some of the basics of successful small locomotive practice are, hopefully in a clear manner so you too can enjoy successful performance 'on the road'.

Blast pipe alignment

Find a piece of rod stock, steel or brass a bit bigger than your blast pipe cap internal diameter and long enough to be turned down to fit in the blast cap snugly and have a few inches out of the top of the chimney (**fig 1** and **photo 1**). Put an in-line mark on the rod just above the shoulder you will be turning down to and align it to the number one jaw of your chuck. The reason? - to put it back in the same place each time you take it out. (This is worth making a habit of in all that you turn in the lathe.) Then turn it down until you have, say, an $\frac{1}{2}$ inch long shoulder on the rod that will be a fit in the cap, trying for fit as you go - you are looking for a snug fit. You may

be able to make use of the drill you used for making the cap if your chimney is short, using the shank, and it will remind you of the actual size of your cap hole.

Old hands will know this one - if you put the top slide of your lathe over to about 45 degrees and lock it, turning the toolpost to the normal cutting position, increasing of the depth of cut using the angled approach enables you to take off much more delicate cuts than with the saddle cross slide to give you as near that snug fit as possible.

Insert the rod in the chimney and blast pipe cap and you will then see if your blast pipe is in or out of alignment with the chimney top centre. If out, thumb pressure on

the top of your rod should move the pipe into its correct alignment. Job jobbed. Bear in mind that if it won't move, the whole assembly may be a solid structure on the steam chest and not a tube which will flex. Then you have (soluble) difficulties!

Blast pipe cap height

You need to make a visible representation of the cone of steam (now known to be 16 degrees) that comes out of the blast pipe cap. Find a bit of material to fit or turn to fit the internal chimney diameter, - aluminium or a bit of an old (good wood) broomstick, no need for steel or brass - no load and so long as to rest in the cap and a shank to protrude out of the chimney and act as a turning piece to hold in the lathe chuck. Set over the toolpost top slide to 8 degrees the other side of the lathe centre line, lock the saddle and turn a 16 degree cone (near enough) on the diameter you have made (**fig 2** and **photo 2**) similar to a dunce's cap (me), wizard's hat (Harry Potter fans) or maiden locked in castle tower ('save me!') if you are a romantic.

This will do if your chimney is parallel. If it is tapered, then that diameter will need to be at the point of smallest diameter - the 'choke' of the chimney (remember your 'bike' carburettor). Bevelling the bottom edge to move the choke - in effect - up a bit will be helpful if no petticoat. Dropped down the chimney with the taper sitting in the blast pipe cap orifice, you should be able to see inside the smokebox that the taper of the 'steam' cone is entering the base of the chimney and, with a tall one, can go up a $\frac{1}{4}$ inch or so. If the parallel part past the cone/top of the cone is showing below the chimney internal diameter then the cap is too low and must be raised until it is at such a height that the head of the taper is inside the chimney.

If the taper top is near or out of the top of the chimney, then the blast pipe cap is too

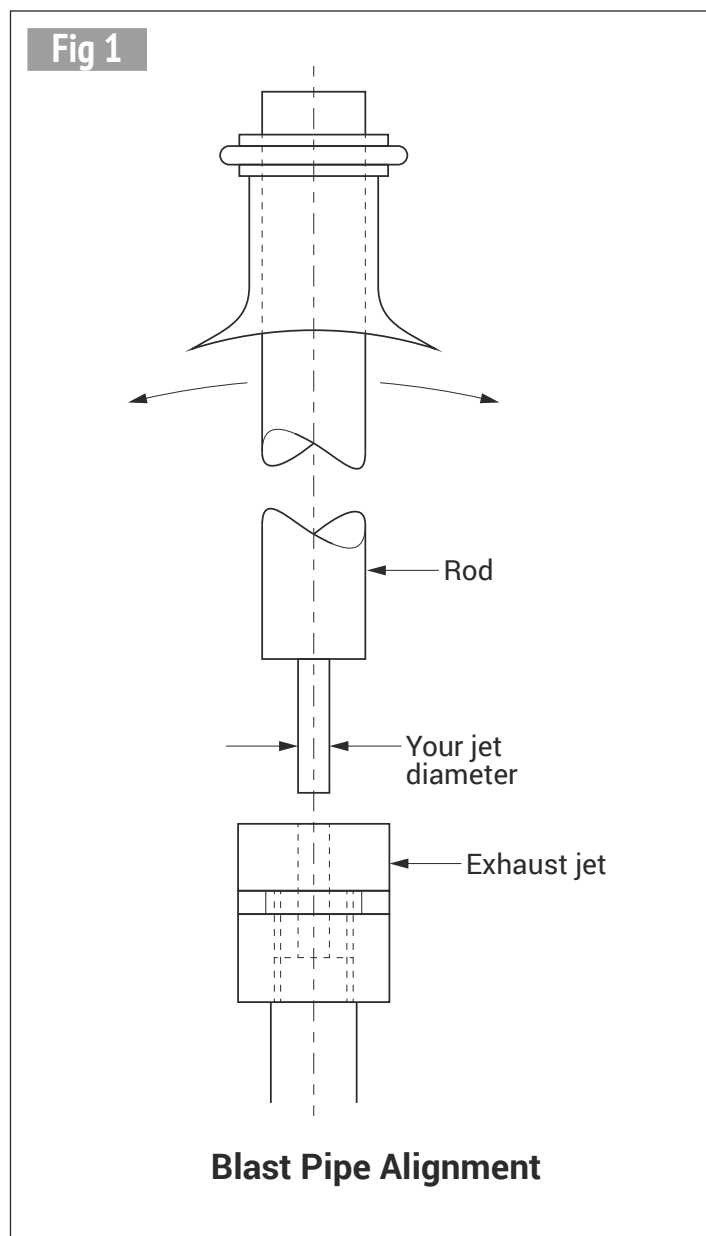


Blast pipe height gauge.

high. What you are aiming for is for the column of exhaust steam to - in effect - plug the chimney. Any steam deflected internally to the top of the smokebox by mis-alignment will help to destroy the vacuum that you need. It will be well worth your while making these two simple jig tools (photos 1 and 2) for your locomotive for its future good health and a useful bit of lathe practice as well and saves doing any maths to establish the height. Eyeball Mk. 1 again! They should be made up for each locomotive you have to run and so marked.

Blast pipe cap orifice

When I did my first locomotive build, the excellent, practical, simple Don Young $3\frac{1}{2}$ inch gauge Derby 4F, I did not have much experience with making small locomotives. I had been a member of the old Exeter & District M.E.S. from age 13 (1947!) and had been kindly mentored, particularly by the late Bill Manley. The 4F went okay but when I started to



travel with it to Birmingham Ilshaw Heath and Llanelli, Pembrey, I found that it ran short of steam on these long tracks and realised that other locomotives didn't. Discussion, reading and research led me to understand the blast pipe cap/height diameters as being critical and, about this time, the late Harold Barton had done two wonderful articles in *Model Engineer* for 21st July and 18th August 1989 which put me on the right track (yes, alright...).

This practical, empirical approach to locomotive draughting together with my own efforts gave me what I needed to put things pretty well right. I had a couple of chats on the phone with Harold, who was most helpful and generous with his acquired knowledge. Empirical methods and common sense (now getting uncommon) are usually all that is needed for this primitive machine that so many of us love - maybe valve gear design excepted. There is poor work on some published designs - ask Simon Bowditch, recognised expert in this art.

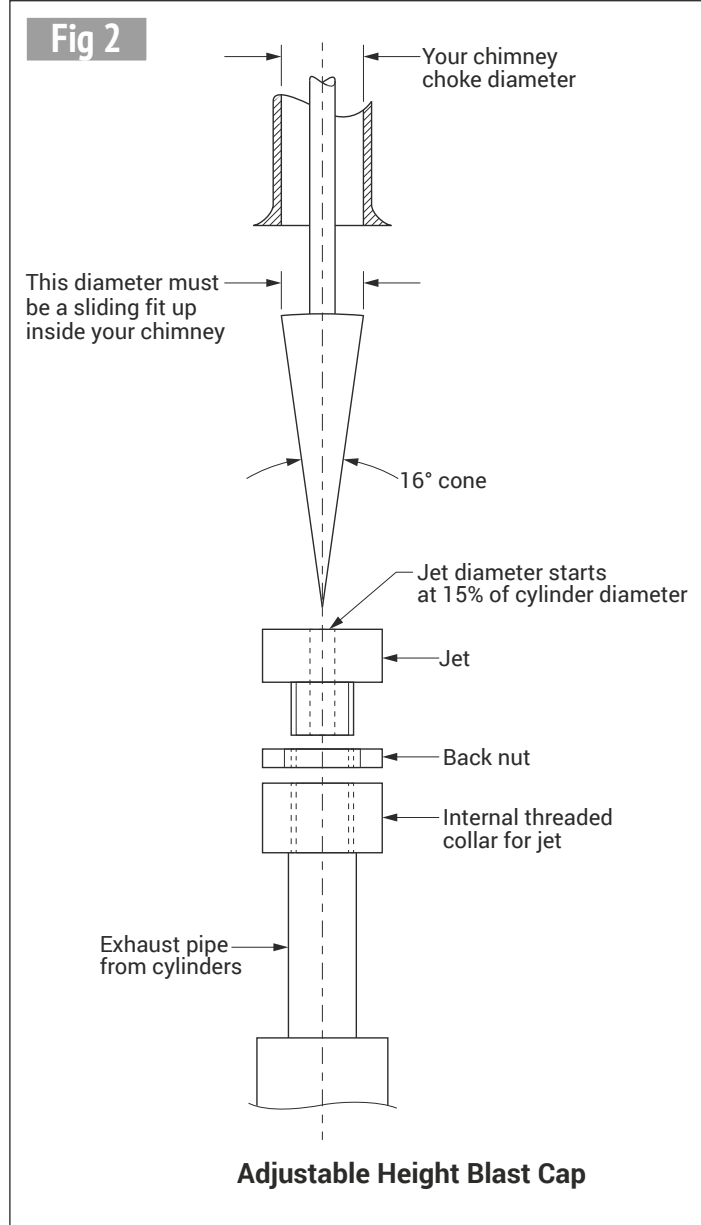
Many offerings in the *Model Engineer* letter pages claimed to show that, mathematically, Harold's ideas were not that good but I am sure that G.J. Churchward would have approved of his approach as much of G.J.C.'s early experimental work was done this way. I adopted Harold's empirical dimension of 15% of the cylinder diameter for a starter for a blast pipe cap dimension and this produced a startling improvement, although the blast was now a bit fierce. I had made a tapped thread in the blast pipe head and made three caps with a screw thread and a progression of hole diameters to thread into it and so was able to change the diameters and also adjust the backnuted height of the cap/cone up to allow for the steam cone now starting lower in my case.

There seems to be no need to internally taper the cap. A clean drilled parallel hole does the job although I like to radius the sharp edge of

the hole at the bottom of the jet from a gas flow point of view (motorcycles again). When I built *Miss Peckett* (see *Model Engineer* issue 4166, 5th April 2002, p.184), I set up the smokebox using all the ideas above and, from the first steaming, never had to adjust anything, it was just right for her. Being a lady, when under very light steam, she would puff perfect steam doughnuts into the sky which showed there was not much wrong there. I have to say that I have never noticed any steaming difference between parallel and internally tapered chimneys - useful with the anguish involved in turning a gentle taper inside a long tube not proving worthwhile - and also finding that one had turned down the wrong end for the smokebox chimney base fitting ('OH dear me!', I said) thus putting the aforesaid taper at the wrong end of the job. He who never made a mistake etc.

I have tried for years to gently place this knowledge with people; lack of it is not unique - many of the mainline railway companies in steam days seem not to have made these important needs clear to their maintenance staff, or indeed to some drawing offices, thus condemning thousands of locomotive firemen to shovel millions of tons of coal needlessly in attempting to make locomotives produce the steam that the driver needed to time the trains.

Even Swindon, who were better at it than anyone else, got the new Manor wrong in 1938 by using a draughting established for the highly successful std. no. 1 boiler for this new, smaller no. 14 boiler and the proportions just did not suit. Perhaps those who should have been checking these things were busy preparing Swindon for war work? Post war, work similar to but obviously much more professionally and scientifically done than that I have described above, by the remarkable Sam Ell, Ernie Nutty and their team,



literally doubled the steaming capacity of the no. 14 boiler and put the Manor ahead in ability of the then-new BR Standard class 4, behind which (up to that time) it had sadly lagged and the lessons learned were carried forward to the std. nos. 1, 8, 12 and 15 boilers.

The Manor cylinder block, introduced for the lovely Grange in 1936 were the most efficient conventional cylinders ever used in the UK. They went back to G.J.C.'s steam chest volumes with the new pattern which had been reduced with the practical Collett outside steam entry chests, possibly prompted by the older drivers who insisted that the amazing 2900 locomotives had lost their sparkle with the later

replacement Collett cylinders. Those Welsh firemen and drivers who got good work out of the Manors for the next ten years on the demanding Central Wales lines, with an inadequate supply of steam for those fine cylinders before improved draughting, were masters of their craft indeed. See the Manors at work in preservation today!

●To be continued.

NEXT TIME

We go to the other end and consider grates.

An Astronomical Bracket Clock

PART 12

Adrian Garner makes a bracket clock showing both mean and sidereal time.



Continued from p.388
M.E. 4673, 10 September 2021

Assembly

I am hoping that those making this clock will have resisted drilling the plates other than for the six pillars.

There are two separate trains to assemble – the time train running from the spring barrel, through the fusee and great wheel and up to the escapement, and the astronomical train and features which are mounted on the front plate. The linkage between these allows for small errors in positioning.

Planting the remontoire

Start by coating the working area of the rear plate (**fig 24**) with layout blue. Once dry, mark out the position of the escape wheel hole and draw a line horizontally across the plates where the double 60t wheel will eventually be planted. Draw another line at 30 degrees from the escape wheel hole for the double cock 4BA securing screw and mark its position. Drill and tap 4BA (I am assuming that, as previously described, the 4BA clearance holes in the cocks have already been drilled). On the mill align a drill (or preferably a point held in the chuck) with the mark for the escape wheel centre. Loosely secure the lower portion of the cock with the 4BA screw and rotate so that the centre line of the cock is positioned under the drill/point. With the cock held in this correct position the lower two No. 56 holes for the taper pins can be drilled through the holes already made in the cock into the plate.

If you have a microscope that fits the quill of your machine the above alignment will be very easy.



Open up the holes with a broach to take the taper pins. Once fitted, these must be filed flush so that the upper portion of the double cock seats fully down. The dodge for doing this is to punch a round hole in a piece of celluloid with a paper punch normally used for making holes to place paper in files. Place the celluloid over each pin and file. This will avoid the file touching the brass. When flush with the celluloid, a few careful strokes can be made without this protection to file flush to the brass.

The upper cock now needs to be registered on the lower cock with taper pins (but these do not go into the clock plate, just the lower cock). This can be done in a similar way in the mill.

With the double cock in position it is time to drill the holes for the concentric arbors. All are drilled No. 56 and the best description is that they are drilled in layers with the rear plate secured in position under the mill. Start with the escape wheel arbor hole. Align the drill over the marked position on the plate,

secure the plate and drill. Then add the lower cock. Drill. Now add the upper cock. Drill. By not moving the plate all will be aligned (**photo 61**).

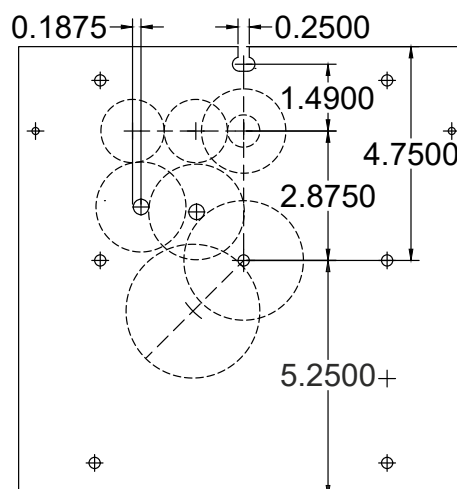
The pendulum bridge is next. Mark the position of the pallet pivot hole on to the rear plate using the depthing tool which has previously been set. My experience is that it is very difficult to mark and drill this with sufficient accuracy and therefore the pallets are pivoted between adjustable bushes. With the front and rear plates registered together the needed holes can now be made ensuring that the adjustable bush is offset from the clock centre line of the clock *but the that the pivot hole is at the correct distance from the escape wheel hole when the collet is 'set square'.*

With the escape wheel and pallets/crutch arbors correctly planted the next job is the swing arm assembly. Marking the position of the holes on this assembly is no different to laying out wheels on the plates using a depthing tool. Arrange the tool so that the 30t and 60t wheels mesh smoothly and mark on to the swing arm. Whilst the depthing tool is set also mark the rear clock plate to show the arc traversed by the arbor of the 60t wheel on the swing arm. This will be needed when it comes to laying out the position of the double 60t wheels.

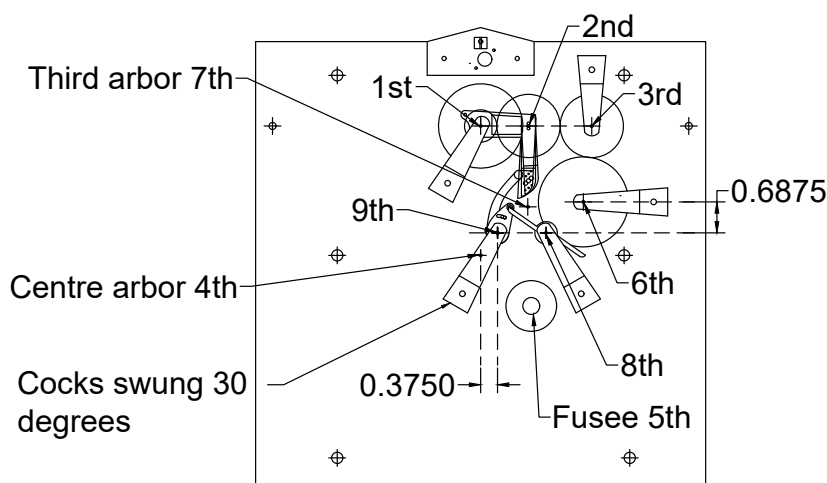
The swing arm assembly could flex during drilling

Fig 24

Rear plate: Remontoire viewed from front of clock



Rear plate: Order of positioning arbors by measurement/depthing



Drilling the double cock in situ.



Drilling the swing arm assembly, using a spacer to avoid flexing.



Remontoire in position.

Drilling the double wheel cock.

causing misalignment of the needed holes. To prevent this, I turned a small cylinder which could slip between the cock and plate of the assembly (photo 62).

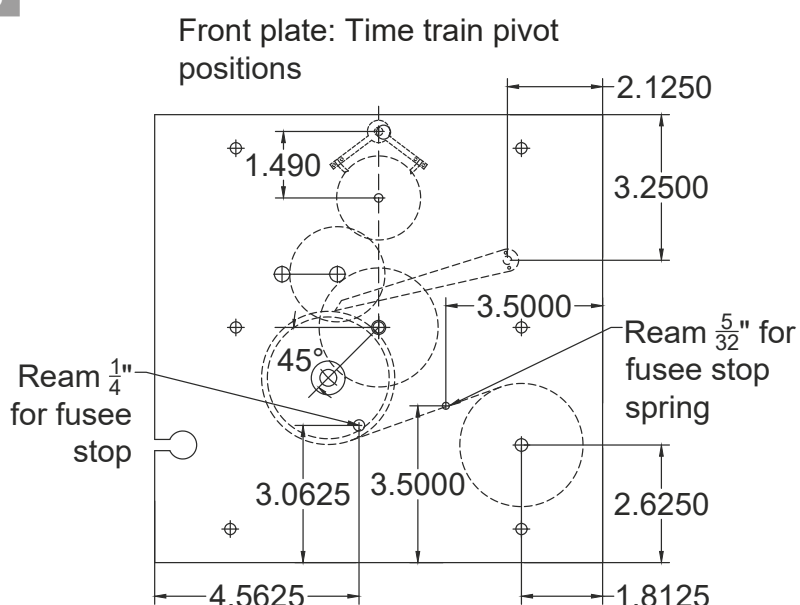
One can now proceed to the 60t double wheel. Make a small punched centre dot where the arc mentioned above crosses the horizontal line. Set the depth tool so that the swing arm 60t wheel and one of the 60t wheels on the double wheel assembly mesh smoothly. Mark the rear plate. Draw a line vertically up from this mark for the 4BA screw for the cock. Position the cock, drill and tap the 4BA hole, then add taper pins etc. as described above. Use packing to support the cock whilst drilling (photo 63).

This picture shows the remontoire in position (photo 64).

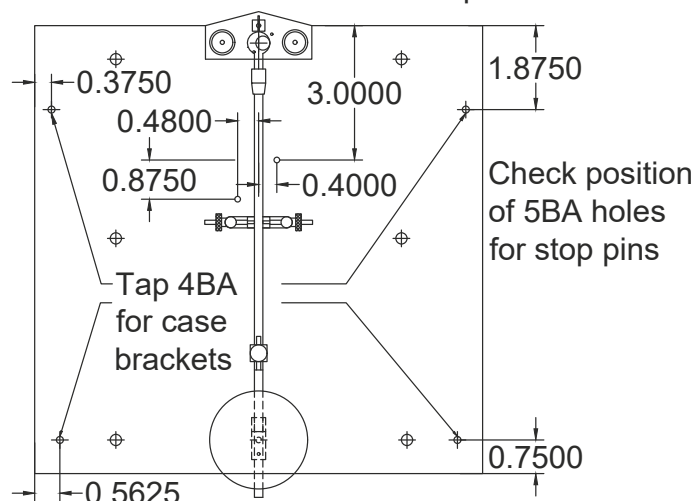
Planting the time train

After removing the remontoire parts the position of the centre arbor should be marked (fig 25). This is central across the plates but $5\frac{1}{4}$ inches up from the bottom. Also, lightly scribe a line at 45 degrees from the centre arbor position for the fusee arbor. There are two options for drilling centre arbor holes. The holes can be drilled with the plates registered together in which event they should be drilled through with a No. 48 drill, the plates separated and then the front plate opened up with

Fig 25



Rear plate viewed from rear:
Case brackets & Pendulum stops



a No. 23 drill. Alternatively, the plates mounted on their pillars can be positioned on the milling machine so that after drilling the smaller hole in the rear plate, the rear plate is removed and the front plate drilled. This avoids opening up pre-drilled holes, a process that can lead to inaccuracy. In either event the holes will need to be slightly opened up with a five-sided broach so that the arbor pivots fit and arbor drops from one side to the other with a small click when the clock is turned over.

The fusee ball race mounts are next. Use a depthing tool to determine the required separation of the 90t great wheel and 6t pinion and mark its position along the 45 degree line previously drawn. Mount the two plates registered together on top of a sheet of flat wood on the milling table and align the spindle. I used a microscope attachment. Centre drill and open up in stages to $\frac{3}{8}$ inch. Above this size it is best to bore. I used a boring head running at 700rpm to open up the hole to about 0.7350 inch (photo 65). Ream $\frac{3}{4}$ inch at 130rpm.

The three 8BA holes for the securing screws were

coordinate drilled and tapped at the same setting.

Now mount the spring barrel. Unlike the wheels, the position of the spring barrel is not too critical. After marking out the position with a scribe, drill and ream the hole through both plates with them registered together. The tapped hole for the click should be horizontal with the spring barrel hole.

The last items to plant in the time train are the intermediate and third arbors. The cock for the intermediate arbor should be fitted first. The position of the intermediate arbor is the intersection of the arc scribed by the wheel depthing tool in the double 60t wheel pivot hole and a vertical line 0.1875 inch nearer to the centre line of the clock. With the cock secured to the rear plate it can be drilled No. 54 for the intermediate arbor and then removed so that the plates can be drilled at the same set up. After separating the plates, the rear plate hole is opened up to $\frac{7}{16}$ inch in stages, initially with drills and then boring. The size is not critical provided it allows the 12t pinion to pass through freely.

The third arbor is planted at the intersection of two arcs made with the depthing tool,



Boring the hole for the fusee ball race mounts.

set with the appropriate pairs of wheels/pinions, from the positions of the centre and intermediate arbors. The only complication is that the hole for the intermediate arbor on the rear plate has been opened up to $\frac{7}{16}$ inch diameter to allow the pinion to pass through this plate. A disc of brass with a centre hole and a shoulder to fit this hole is therefore needed to allow the marking out if this is done on the rear plate.

The position of the detent arm which engages with the Harrison maintain ratchet is not critical but must clear all the time train arbors. Check that the tip of the arm securely locks the ratchet.

The two holes for the stop work which prevents the clock from being overwound can be drilled at this time into the front plate.

●To be continued.

No.308

**Look out for the October issue,
helping you get even more out of your workshop:**

**MODEL ENGINEERS'
WORKSHOP**



Stewart Hart presents a high speed drilling attachment.



Mike Cox details a spindle back stop.



Stuart McPherson explores his scrap box.

Pick up your copy today!

A New GWR Pannier

PART 35

Doug Hewson decides that LBSC's well-known GWR pannier tank design needs a make-over.



Continued from p.332
M.E.4672, 13 August 2021

Now, I think this will be it for the rebuilding of these two pannier tanks. However, as you will see, these drawings (figs 59 to 61) give you the details of the cab for the pannier tanks for the 8750 class. There is quite a bit more headroom in this type of cab but, as you will see, the front and rear windows are different. With these cabs the windows are of the square type and may be available from Polly Models. I am sure that Frank made his own windows for his cab.

Photograph 288 (photograph by The Transport Treasury) shows pannier 4616 with, what I call, all mod cons on it. I have the later style injectors, the later type tank fillers and to the rear of the right-hand cab step there is a box for the AWS gear. There is also



Pannier tank 7754, with the earlier type of cab roof.

a top feed on this engine. There are still some remnants of the previous livery on the tank side where the transfer for part of the previous livery still exists. **Photograph 289**

also shows another engine, 9726, with nearly all the mod cons on it but for the old type tank fillers. It has the Lion and Wheel emblem on the tank, and it does have the later type whistle shield. Note, this is one of the engines which has both water valves on the left-hand side of the locomotives as there is not one on this side! It is 3673 and was photographed at Tysley by Brian Tickle on the 4th October 1959.

Now, as you will see from this (photo 290, also by Brian Tickle) there is no injector water valve on this side of the engine. That is because it has both water valves on the left-hand side of the engine which quite a few members of the class had. You will also see that the tool box on the 8750 Class is completely different from the one on the 5700 (see photo 291). I have shown the correct one on my drawing and it also comes in the laser cut kit. Lastly there is one of my own photographs of the front right-hand side cab window which is shown in photo 292 but I don't think that this frame is of brass as it looks more like steel to me. The one on Frank's locomotive is shown on photo 293 which obviously is brass. ➤



Pannier tank 4616 with the later style cab.



Pannier tank 9626 with the later cab but the earlier water fillers.



Right-hand injector on 3673 but no water valve.



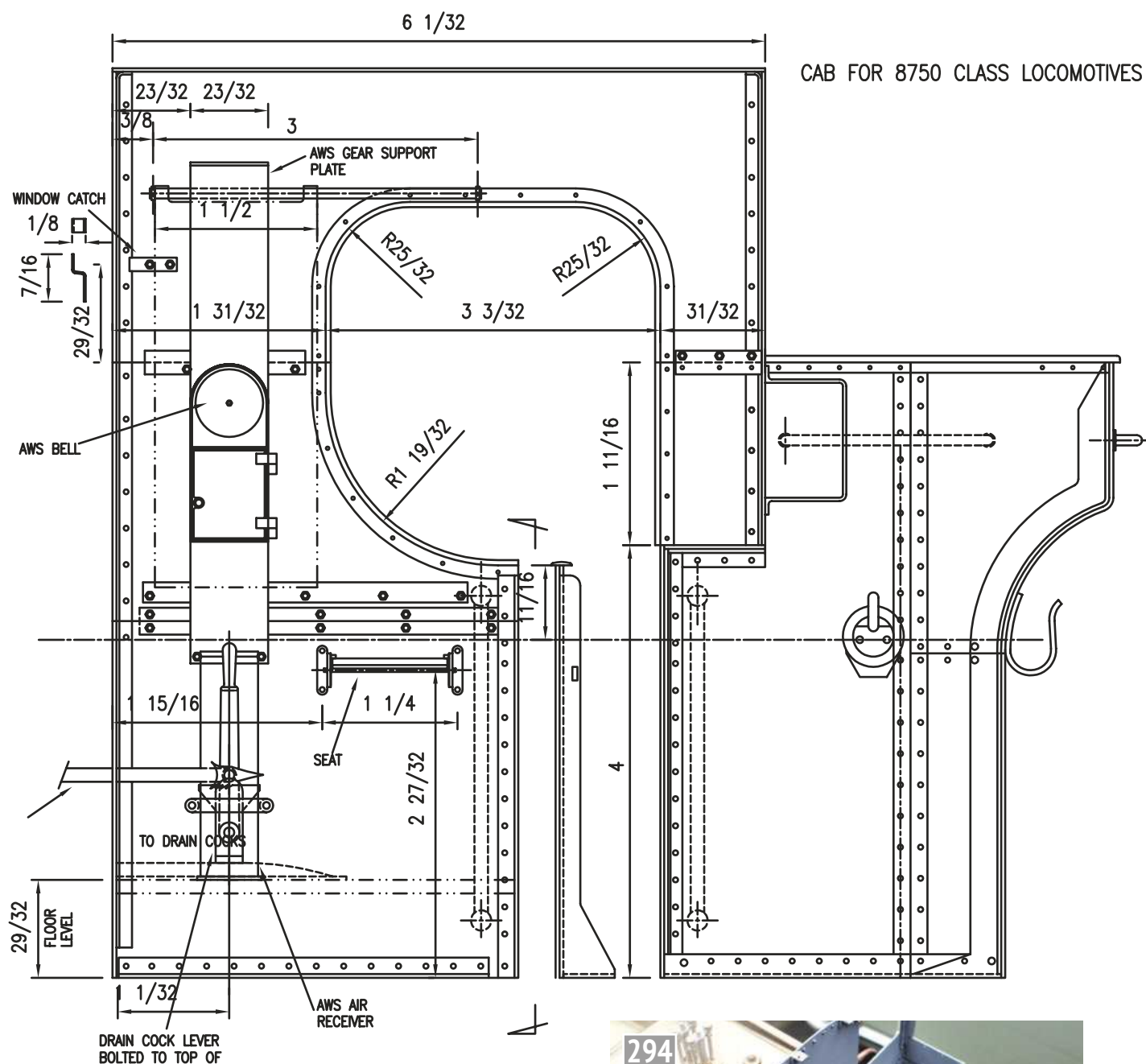
8750 class tool box.



The later cab window.



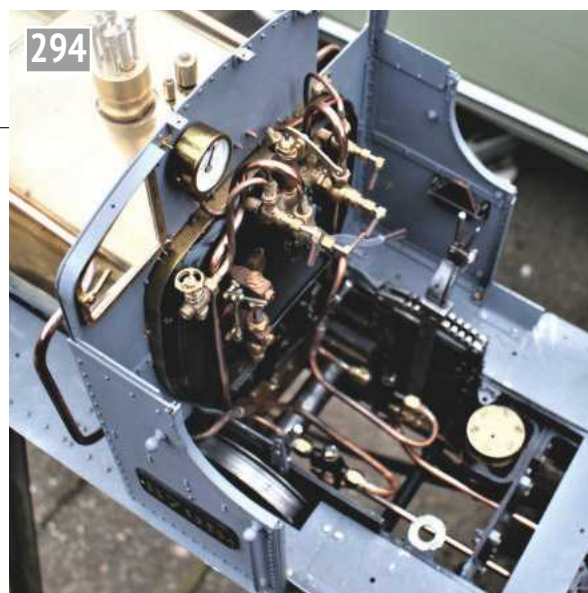
The later cab window on Frank's pannier.



I would just like to say a few words about the injectors for the pannier tanks. I have shown two injectors on the engine and that is exactly what Frank has done on his engine. I was told that the tanks get too hot to work the injectors but, as Malc Gregory says, all that is required is to remove the steam cones and fit a 5 thou washer behind the flange on the cone for working during the summer months and that will generally cure the problem.

The thing which I do on my Y4 is just run with half a tank of water (which is enough to run for 20 minutes or so) and then go to the water column and fill the tanks half full again with cold water. Mind you it has to be an extremely hot day for me to have to do this. Generally, I just fill the tanks full to the top and work for 45 minutes or so.

Frank has actually fitted his two injectors in a very accessible place, under the cab floor (photo 294)! However,



Frank's injectors are under the cab floor.

Fig 60

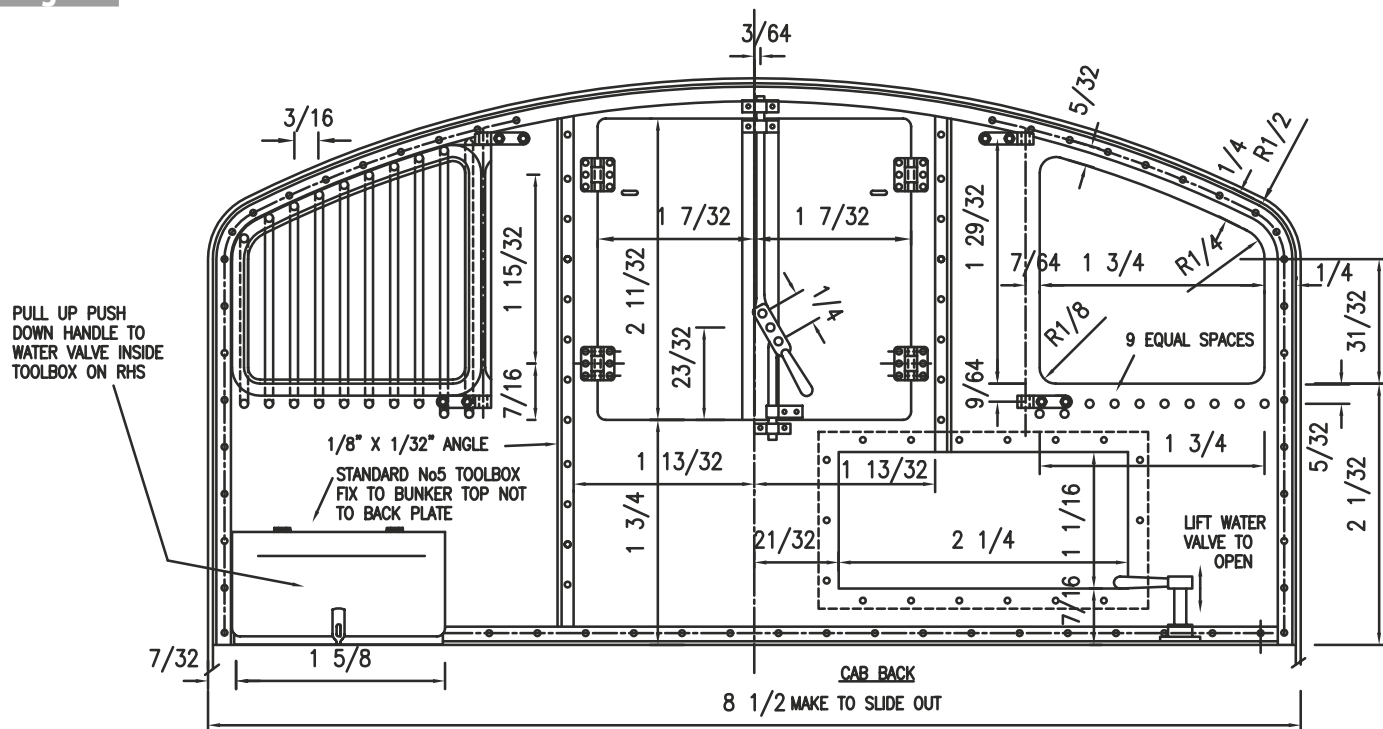
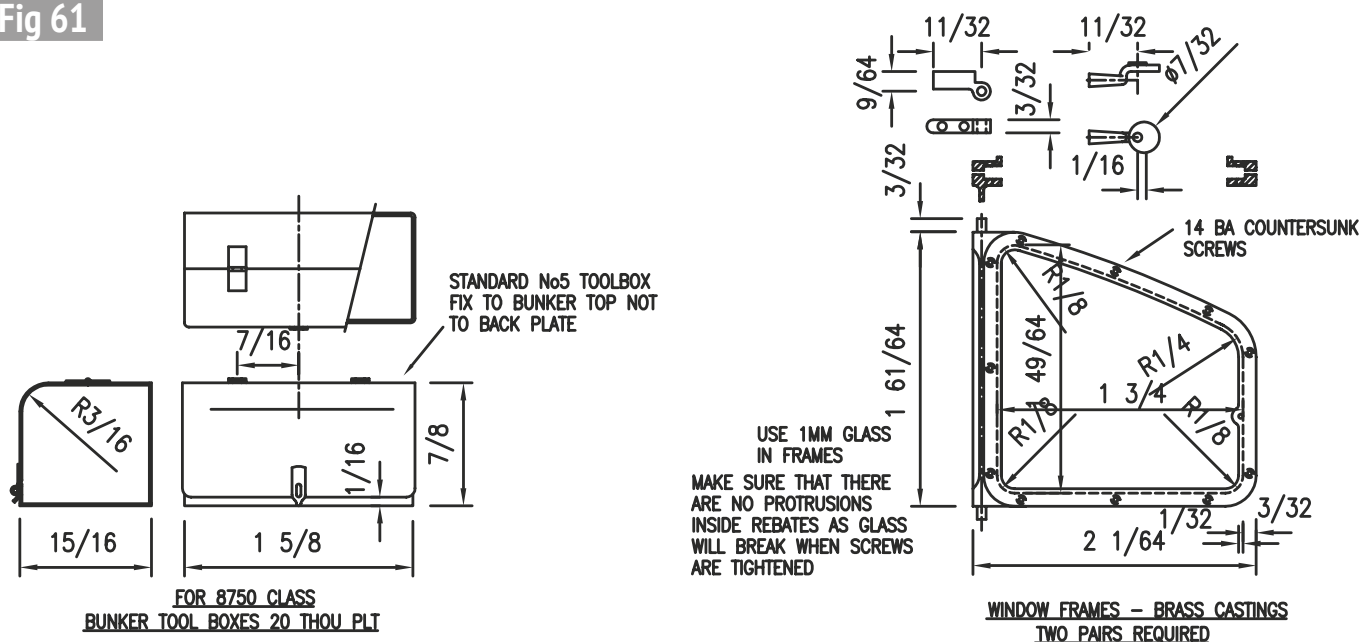


Fig 61



the only thing I didn't like about his arrangement is that he has taken his water pipes out to the buffer beam and he has his water valves on his driving truck. I prefer my engine to be all self-contained and mine are on my engine. Just a matter of preference really. I will not use an additional water supply anyway as I love my visits

to the water column as it all helps build a proper picture of a proper working railway. It is quite amazing how many photographs people take of me on my engine when I visit the water column.

I hope that you have enjoyed the series and I am indebted to the several people who have sent me all the lovely

photographs before the series started and also during this series and also to the Transport Treasury who really did me proud with the photographs that they supplied. I haven't finished yet as I am going to carry on and describe a suitable driving truck for the pannier and, come to that, it will do for any small tank locomotive. We

have been using driving trucks like this for over sixty years now with no trouble. It was originally designed by Ron Bray for his railway on which I cut my teeth; Ron was my mentor from the 1960s. It is designed to look as if it belongs to a railway and will fit in with any scale rolling stock.

ME

We Visit the West Huntspill MES

John Arrowsmith finds a thriving and enthusiastic club down in the south west.



This was my first visit to a model engineering club since my trip to Yorkshire in October 2020. The West Huntspill MES is in Somerset, near to Highbridge, and was established in 1967. Located in a lovely rural area not far from the Severn Estuary members here have built up a very smart and well made track site. Like so many clubs and societies, this club evolved from their beginnings in a different location and with a different name. They were known in the 1960s as the Weston-super-Mare Live Steam Society and held their meetings in local hostelrys, together with more regular meetings at the home of one of their founders, Morton Street. This gentleman had a large work shed which was used for the club, as well as a 3½ and 5 inch gauge 'up and down' track in his garden. With quite a steep gradient you needed good brakes, apparently!

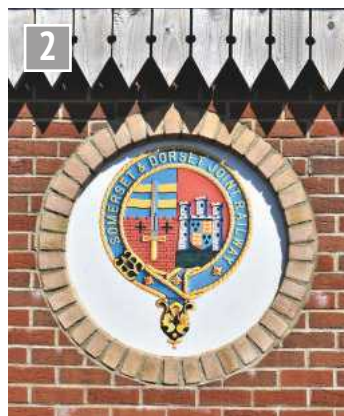
Again, like so many clubs of those days the hunt was on for a more permanent



The club house has lots of useful features.

site and this resulted in a number of different ones being considered before the West Huntspill Parish Council offered them an area in the Memorial Playing Field at West Huntspill. This offer was accepted in 1967 with a 100 year lease and it has been their permanent home since that time. They also changed their club's name to reflect this, becoming the Weston-super-Mare and West Huntspill Live Steam Society.

The area they had been allocated was previously occupied by a defunct tennis club which provided them with some covered accommodation and asphalted area which they could use. An elevated 3½ and 5 inch gauge track some 520 feet in length and with a minimum radius of 42 feet was built and was known at the Somerset and Dorset Joint Railway Memorial Track, hence the large plaque shown on their present club house building (photos 1 and 2). With a number of members being ex-S & D railway men it was, and still is, a tribute to them. Continuing the S & D theme, most of the materials used in the construction of the track came from the old station and works at Highbridge. Shortly after this the station building was acquired from B.R. and came from the down platform at Evercreech. It has recently been refurbished to an excellent standard and provides a good and useful space for train passengers (photos 3 and 4).



Built into the end wall of the clubhouse is this fine Somerset & Dorset Railway plaque.



The excellent ex S&D station building.

Following all this work and having established a good working relationship with the local authority the club proceeded with a further extension which increased the length to 732 feet which was well received by everyone concerned at the track. It was opened by that well known railway personality, O.S. Nock who duly cut the ceremonial tape (**photo 5**). Further pressure to increase the track length again resulted in yet another extension in 2010/11 and this was completed in time for the Easter opening of the new season. This extension increased the length to 1072 feet, and this is how I found the site on the day of my visit (**photos 6 and 7**).

On a beautiful Summer morning I was met by chairman Roger Flower and treasurer Ashley Edwards who proceeded to show me the track and its facilities as well as explaining their plans for the new 7¼ inch gauge ground level track which is currently under construction (**photos 8 and 9**). The existing raised track is fully fitted with



A good size water tower serves the station area.

colour light signals which are controlled using magnets under the driving carriage so that after passing a signal it automatically changes back to red before the next train is due. Track circuiting is planned to be installed to improve the system and will be included on the new ground level track when this is completed.



O.S. Nock with members of the club at the new track extension opening.

Some careful planning has gone into the development of the new ground level track and its position on the outside of the existing layout will provide members with a good operating experience. It will have a minimum radius of 50 feet which should accommodate most locomotive prototypes. Walking round the new construction you get the

impression of spaciousness in that you cannot see all round the track from one position, I think this will give the drivers plenty to concentrate on as they will not know what is round the next bend. The new track will include a road crossing and they are still considering the best way of ensuring a workable and safe method of controlling the gates. They have not announced a completion date for the track as too many have been missed before!

It really is a lovely site and talking to the members I gathered that it is a happy club with an enthusiastic approach to looking after it and maintaining the grounds in an environmentally acceptable way. There were a number of activities ongoing and member, John Lamb was out on the track re-painting some sleepers (**photo 10**). He is one of those members who does not own a locomotive or any other railway items, he just likes to be at the club and help with the jobs as needed. All clubs need that sort of member so well done John!

Long time member, Vernon Farrow had his example of a 7¼ inch gauge 0-6-0 diesel engine on the first short length of the new ground level track (**photo 11**). This locomotive was very well made and was based on a prototype built



A ubiquitous steel container provides a useful storage arrangement for carriages.



The steaming bay traverser for access to the running line.



This will be an interesting passing place with three trains in view all going to the same station area.



The prepared track bed approaching the proposed road crossing.

between the wars by Harland and Wolff in Northern Ireland. Eighteen of them were built and two were tried out by the LMS but, ultimately, were not what was needed and they were returned back to NI. All were scrapped by the 1970s. This model was originally described by Ray McMahon in *Model Engineer* some years ago. Ray had access to the original drawings and Vernon's example looked to be a useful engine for a model engineer to build. He made all the panel louvres which looked very neat and the front headlamp was made from a stainless steel egg cup. Model engineers are very good improvisers! Another locomotive sitting quietly in the sunshine was the 5 inch gauge GWR 0-4-2 tank engine owned and built by Roger Flower from a Kingscale kit; it looks good and runs very well (photo 12). Operating on the elevated track was a very nice battery powered Class 27 locomotive built by Clive Wilton from a basic kit (photos 13 and 14). Clive has incorporated some interesting features on his engine, for example he has displayed the battery voltage condition in the engine destination panels on the top, so the driver has a regular indication of how the battery is performing. Wired through a relay, the locomotive can be stopped immediately by pressing one of the red buttons on the display panel should the voltage drop suddenly. Fully charged it will passenger haul for about 2½ hours. Clive kindly drove me round the circuit (photo 15) and I have to say it was a pleasurable experience on a fine track which rides very well.

I will conclude my notes by thanking Roger, Ashley and all the members I met for their hospitality and making it an interesting visit (photos 16 and 17). It is a well run club that, once the ground level track is completed, will have a splendid set-up which will be the envy of many. I hope I can return and try the new track out in the not-too-distant future.

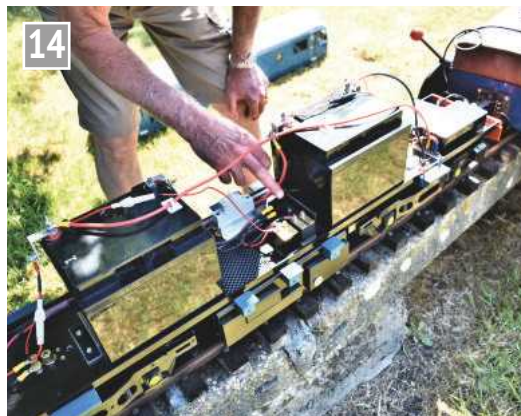
ME



Member, John Lamb busy painting sleepers on the elevated track.



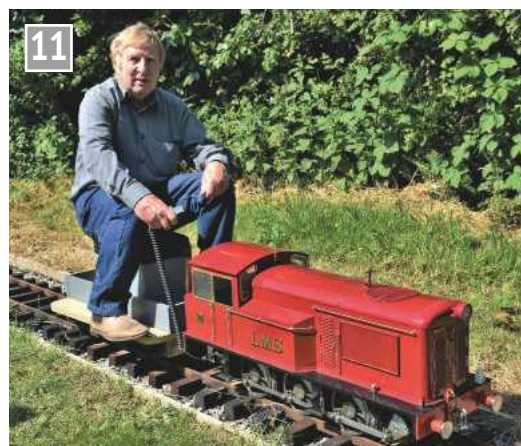
This fine 5 inch gauge GWR 14XX tank loco was built by Roger Flower.



The well laid out wiring on the Class 27.



Clive Wilton and fellow members working on carriage couplings.



Vernon Farrow on his 7¼ inch gauge locomotive, the original of which was built in Northern Ireland.



The Class 27 drifts through the station with the driver concentrating on the line ahead.



A passenger's view approaching the station.



What model engineers do best, sorting out problems with a mug of tea close to hand.

My Favoured and Favourite Tools

Mike Joseph talks about a few of his favourite tools and leaves us guessing.



This is to be one of two short articles about tools, why I appreciate them and some in particular. We use them in our workshops but often do not give a thought as to why we have them or from whence they came. I hope to nudge you to appreciate them for what they are and not merely for their utility.

We all have one or more tools in the workshop that we favour, often in preference to a similar item. Here are a few of mine – those that I favour in that they do a job well and those that are favourites of mine, usually with a back-story to them.

● To be continued.



The oldest and newest tools of my own tools herein. The Stanley screwdriver has been with me for over 50 years and on a model engineering course I saw this rule, a Starrett C604RE - Imperial units in different fractions and decimal, very, very useful.



This Rabone level (No. 1394) came with a little folded box for protection. I am fairly certain that this is an addition, as it is much thicker than any ordinary tinplate that might have been used. I am sure that the original owner wanted to protect their investment, much like the combination square (see opposite).



Laser alignment tool – invaluable on the milling and drilling machines, very quick and easy to use.



A calculator – invaluable again and in the big print edition! I do have a scientific calculator as well (and an old programmable HP25C – vintage 1975 – that I am trying to get back to life!).



The tap holder is so easy to use, putting the stem into the vertical drill or mill – they should all have one! The jenny calipers I use frequently to get a centre line and the jeweller's tweezers to pick up small items and remove metal splinters....!



Now we are entering the realm of the real favourites... These three tools – scribe, centre punch and square - belonged to my paternal grandfather Alphonse Joseph, Belgian, a sniper in WW1 during the siege of Liege*, one of the earliest speedway riders in the 1920s, a toolmaker and a mechanic of racing Bentleys in the 30s. The little 2 inch Starrett square was made from 1902 to 1952, a little gem! It was viewed very covetously by a friend. The punch leaves a very good dimple and I love the look of the scribe.
* And he was banned from all the local visiting funfair shooting galleries because he always won!



Another of my grandfather's tools - the vernier caliper is calibrated in mm and (look closely) fractional inches. I confess to be not too good at reading them!



Finally we come to something a little different... A combination square set with a little something extra. It is marked H.J. Fox and made by LSS Co. (i.e. Starrett). The wooden box is very much an engineer's woodworking effort but is still effective. I must have had this for 20+ years and only now have I discovered its extra secret, which, in the best tradition of cliffhanging episodes on TV etc., I shall reveal in the next article!

Tom Parham reports from the first IMLEC since the start of the covid crisis, which was held at the Maidstone Model Engineering Society's track at Mote Park.



International Model Locomotive Efficiency Competition 2021 PART 1

I suppose it is worth a reminder, for those who are not familiar with the event, of what IMLEC is; an annual competition for steam locomotives of 5 and 3½ inch gauges. Each competitor is given the chance to run for around 30 minutes with a load of their choice. Drawbar load is measured and coal usage monitored throughout the run. With these assessments, the total thermal efficiency of the locomotive can be determined. It should be noted that this

is a driver/loco combination and either could cause a bad outcome, the overall result being a true reflection of man (or woman) and machine working together.

It has taken several years for the possibility of hosting this competition to be agreed by the club committee at Maidstone, but with a few more keen members it had finally been accepted and we were offered 2020 to play hosts... However, 'something' got in the way of anything being able to happen last year so, just like the Tokyo 2020 Olympics, we were able to finally host the competition here in 2021. Traditionally the event has been held in early July, but with the world the way that it was at the start of the year, we decided to wait until the end of August to see the best prospect of being able to continue.

One of my happiest feelings of the weekend was just being able to look around and see happy faces, friends reuniting and chatting, and just a

general happy buzz around the club, something which has been lacking over the previous 18 months.

Planning took a while and a dedicated few met regularly to discuss plans and innovations that we may be able to introduce for our turn to host the event. The main innovation that we introduced was the website built by one of our members, Luke Bridges. This was available in the build-up, containing much useful information, along with a downloadable application form. The website also provided a live scoreboard throughout the competition. I know that a few were watching this avidly when not at the site. There were also relay screens dotted around the site (much to the displeasure of my wife as the bedroom TV disappeared for the weekend), which displayed the scoreboard from the website so, as soon as the data was inputted into the spreadsheet, the results were calculated and everyone could see them



Preparing for competition.

straight away. I hope that this was appreciated by all!

In order to help make the event run to time, we decided that it would be best to re-introduce a rule that has been seen recently, whereby the maximum run time was set at 35 minutes. In addition to this, a rule was also introduced whereby passengers may not be unloaded after 25 minutes of a run had elapsed.

So, on to the event weekend...

A fair amount of preparation had been started on Thursday evening but there was still more to do on Friday morning, with members being on site from 7am. Unfortunately, the day took a significant change in atmosphere early on with the news that Karl Midgeley from Gravesend club (who had contacted the day before to apologise that he would not be able to attend due to having had Covid for a few days) had passed away in the early hours of the morning. His uncle, Andy Healey, asked to take Karl's run instead of his own entry, which we were happy to accept in these tragic circumstances.

It should be noted that on the previous running day, a degreasing wagon (built and adapted by one of our club members) was in use in order to prepare the track for the weekend. In addition to this, the wagon was in constant use over the weekend, running behind every locomotive, in order to maintain the best

possible condition for every competitor.

The dynamometer car was built by Charles Darley, using the commercially available Station Road Steam unit. Charles had worked on developing his own version as well, which had been progressing well until the wiring loom was accidentally pulled out and proved impossible to repair in time. Thus, the trolley with the SRS unit was in use over the entire weekend.

For the purpose of this report, all passenger and trolley loads are in addition to the compulsory load of the driver, observer and dynamometer car (the track cleaning wagon and brake van also followed everything).

Run 1 – Matt Butler

The first run of the weekend was by Matt Butler from Guildford, using the Guildford club locomotive, a B1 which had been entered in two previous competitions. This was Matt's first IMLEC and also his first visit to Maidstone. Maybe this is telling in the optimistic decision to take 12 passengers across 4 trolleys. Matt set off controlling the slip well, but only a short way into the first lap came to a stop, unloaded 3 passengers and backed up for another run at the hill. As many local members know, it is a deceptively long and steep climb at Maidstone and, as a result, Matt was forced into another stop and



Matt Butler.

dropped another 3 passengers. Unfortunately, this proved to still be too much of a load and Matt ultimately retired without completing a lap. We hope for better luck for him in future competitions.

Run 2 – Michael Porter

The second run of the weekend was not an easy one to report on as it was a good solid run without any issues. The 5 inch gauge Atlantic was rebuilt in 2007/2008 by Michael Porter, who has been regularly passenger hauling with it since then. Michael set off with a conservative 3 passengers, maybe less of a load than intended, but understandably cautious following what had just been seen. Michael set off comfortably and ran at a steady pace for a good clean run, finishing just after the half hour mark. It was a solid, but uneventful run.

Run 3 – Andy Healey

This was the time for Andy Healey to take Karl's Britannia *Apollo* for a run. Karl had completed this locomotive in 2016 having bought it as a rolling chassis in 2002. This is the 4th entry for the locomotive and would have been Karl's 16th IMLEC. Sporting the headboard 'RIP KARL', Andy set off with 8 passengers made up of family members who had made the brave effort to come along in memory of Karl. It was an emotional run and I am sure Karl was keeping a watchful eye as Andy set off at a steady, fast pace, covering the second highest distance of the weekend. Another uneventful run, followed by a minute's silence in memory of Karl.

Run 4 – David Shephard

This was the second time that David Shephard has entered



Michael Porter.



Andy Healey.

his Polly V in IMLEC, the first being 2018, shortly after it was completed. With a load of three passengers, David set off well but pressure was slowly dropping. After almost 10 minutes the first stop to recover steam was made, followed by another almost 10 minutes later, at which point the passengers were dropped prior to completion of the run.

Run 5

For the benefit of any that may have looked at the programme, run 5 should have been Andy Healey's Britannia and the reason for the withdrawal has previously been mentioned.

Run 6 – John Williams

John Williams's entry of a Southern 'U' class had been a bit touch and go as to whether it would be ready in time for the event, having been rebuilt. The locomotive was finally assembled in time for a boiler test on Thursday, with final adjustment of the valve gear

being made during the journey from Southport. John set off with 4 passengers across 2 trolleys. Unfortunately, this proved a touch too heavy, the train coming to a stop within sight of the crest of the hill. John opted to back up to get a run at the hill, although to get to level ground or even to give a run at the hill meant heading right back to the station. Then, entering the bottom bend at speed caused a derailment, possibly due to the driver and observer sitting at an odd position to see behind. After a successful run up the hill, John continued until a mechanical lockup of the locomotive caused a second stoppage. It was unclear as to what had caused the lock up as the locomotive started to roll again and so the run continued up to its completion.

Run 7 – Stephen Harrison

Next up was Stephen Harrison with his 3½ inch gauge *Doris*. Stephen acquired this

locomotive in 2008, following the passing of its previous owner. At around 60 years old it may well be the oldest locomotive taking part in this year's competition. Stephen comfortably set off without any passengers. It looked to be a comfortable performance until a stoppage towards the end, although this did not prevent the locomotive from completing the run after regaining steam. The locomotive certainly seemed to enjoy taking coal, burning a generous quantity. I say 'burning' - a lot went into the firebox and a fair bit also came out of the chimney, almost setting light to the observer's paperwork...

Run 8 – Andy Pope

The last run of the day was Andy Pope from Southport and unfortunately this did not quite go to plan. Part way through the first lap, one of the leg guard welds on the dynamometer car failed. Andy was invited to run again

the following day, which he accepted.

Friday evening

A handful of competitors made use of the track during the evening, while a couple of the Maidstone members repaired the broken weld on the dynamometer car. Unfortunately, it showed that the original weld quality was not quite what would be hoped for and so all similar joints were cleaned up and re-welded in a bid to prevent a recurrence.

The competition then resumed the following morning.

Run 9 – Danny Hayward

Danny Hayward kicked off proceedings on Saturday with his recently commissioned 3½ inch gauge *Netta*, built to LBSC drawings without any embellishments. Danny set off confidently without any extra passengers, making the track look easy with only minor slipping, which was dealt with



David Shepherd.



John Williams.



Stephen Harrison.



Andy Pope.



Danny Hayward.



Roger Holland.



Paul Tompkins.

easily. It appeared that Danny had had a clean run (despite the look of the locomotive, driver and observer which were all a much darker shade with a covering of oil at the end of the run). Danny mentioned that at one point he had been down to 15psi but recovered the boiler pressure on the move, keeping going, and had a convincing run.

Run 10 – Roger Holland

Roger Holland of Chesterfield took to the rails next, with a load of 8 passengers. This is the 8th appearance in IMLEC for Roger's stunning A4, since he finished building it in 2012. Roger appeared to be slightly down on pressure for the first couple of laps but soon recovered and had a steady run maintaining around 6mph. The observer commented that the driver/locomotive may have been more used to larger loads which would have helped get the fire burning sooner.

Run 11 – Paul Tompkins

Paul Tompkins was next up with his 3½ inch gauge

Duchess, which he bought late in 2019. Paul set off with 2 passengers but this proved to be just too much without the benefit of a run at the hill. Half way up the climb Paul slipped to a stop, decided to reverse back to the station to get a fresh run at the hill but there was an issue where the locomotive would not set off in reverse. After a few minutes of fiddling, it started to move, which allowed Paul to get back to a position to get a run at the hill. This time around he managed to keep going and from there on had no issues on the run.

Run 12 – Harry Wilcox

Next up was Harry Wilcox from Ickenham who was driving David Tompkins's 5 inch gauge *Netta* (Dave being Paul's uncle, just to add a bit of family rivalry to the morning...). Harry opted to take 4 passengers, pulled away nicely without any visible issues and was heading off on a confident and solid run until... the left-hand side, rear gradient pin came loose and fell out, resulting in the rear

coupling rod dropping down, fortunately not doing any serious damage but bringing the run to an end nonetheless.

Run 13 – Marcus Peel

Defending champion Marcus Peel brought the morning session to a close with his B1. Marcus made a good start with 6.5 passengers, pulling steadily up the hill to set him up for a solid run with no stops. I am informed that pressure was generally around 30psi and, masterfully, a couple of the descents were

tactically slowed in order to give time to rebuild pressure on the move.

Run 14 – Geoff Moore

Following a break in proceedings for lunch, Geoff Moore then took to the rails with his 5 inch gauge LNER P1. This turned out to be quite an eventful run. Geoff pulled away well with 10 passengers. The locomotive handled the load comfortably but just after the first curve the tender derailed. Following a short delay while this was rectified, Geoff set



Marcus Peel.

WHAT IS AVAXHOME?

AVAXHOME-

the biggest Internet portal,
providing you various content:
brand new books, trending movies,
fresh magazines, hot games,
recent software, latest music releases.

Unlimited satisfaction one low price

Cheap constant access to piping hot media

Protect your downloadings from Big brother

Safer, than torrent-trackers

18 years of seamless operation and our users' satisfaction

All languages

Brand new content

One site



AVXLIVE ICU

AvaxHome - Your End Place

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

off again, this time without the assistance of a run at the hill which made for a slow ascent. This was another locomotive that suggested that it would have run better with a bigger load as it stopped for a blow up after a couple of laps. A short while later the tender derailed again at the top bend. Once this was sorted, the run was completed without further incident.

Run 15 – Nick Taylor

Nick Taylor was next up, running the WD 2-10-0 that his father built, who sadly passed away last winter. Nick made the load of 13 passengers (the highest of the weekend) look easy, with the locomotive pulling away nicely with a loud crisp bark. Although a slow ascent of the hill ensued, Nick managed the climb without the need to stop, even though at times he was down to walking pace. After a couple of laps Nick stopped to rebuild

steam but soon got under way again, to finish without any more incident.

Run 16 – Robert Hurst

Robert Hurst was next up with his S&DJR 7F, built by his father Ivan who was watching from the crowds. He set off comfortably with 6 passengers, steadily building speed over the first lap and maintaining about 8 mph for the rest of his run (bar a couple of slightly slower laps to rebuild the fire). During his run Robert had 2 speed warnings, just to test the limit...

Run 17 – Duncan Stagg

Duncan Stagg made the next appearance, with his Polly IV. Duncan pulled away nicely with 3 passengers. He had a strong and confident run, maintaining a steady speed. He would have to have the award for the greatest usage of the whistle during the weekend (and perhaps any IMLEC in history).



Nick Taylor.



Duncan Stagg.



Geoff Moore.

Duncan was just having fun and had a smile on his face throughout. Unfortunately, he pushed his run for 1 lap too many and stopped near the top bend having run out of steam. He was not able to regain in time to complete the run and had to retire.

the 3½ inch gauge S15. Without any passengers he was quickly up to speed and spent much of his run at the speed limit. With one stop in the station to rectify an injector issue, Andy completed his run with little else to mention.

Run 18 – Andy Pope

Once again Andy Pope finished off the day running

●To be continued.



Robert Hurst.



Andy Pope again.

The Great Wealden Railway 1995-2020

End of an Era

Hugh Topham

traces the history and development of Biddenden's railway, right up to the end of the line.



Michael and Carla Cadiz took the difficult decision to close the railway operationally from 1 June 2020 owing to health concerns and understandably wanted to figuratively 'put their house-in-order sooner rather than later', reverting the area to garden and paddock once again. This did not come as a complete surprise to the co-founders of the railway, Max Dunstone and Dick Dickson (Michael being the third) and myself as, up until the coronavirus pandemic lockdown and since being retired, we have maintained the railway together twice a week for regular running days on the first Saturday of each month and had seen at first hand Michael and Carla struggling for a while. If truth be known, we had been exceptionally lucky with Michael and Carla's generosity and perseverance over the years and particularly for a good year-and-a-half more than we had expected back in 2018. Sad as it has been, Max, Dick and myself have, with considerable help of regulars, notably Paul Carpenter and Matt Hyner, dismantled the railway sympathetically for second-hand use. Michael's generosity continued by donating a vast majority of the trackwork and recoverable infrastructure he built to the Kent & East Sussex Railway (K&ESR) nearby and Matt arranged the logistics of transportation and storage off-site. The K&ESR's personnel have had a long association with The Great Wealden



Haffenden Junction signalbox.

Railway (GWR) and hope to develop another attraction at the railway. Matt is keen to replicate, if possible, a bit of the old GWR, while the rest will help finish another private 5 inch gauge ground level railway in East Sussex. Max has given a considerable number of his signals, and myself my buffer stops, to both concerns too. The K&ESR has also benefited from the donation of Michael and Max's jointly owned Baby Deltic battery locomotive which was instrumental in the first phase of the GWR's development, the design of which benefitted greatly from Max's railway operating experience with the K&ESR.

The railway made it into its 25th year - a grand achievement - conceived in October 1995 by Michael, Max and Dick and starting construction in November of that year. Michael, Max, Dick and the late Harry Warner, also with help at times from Miles Sadders and Derrick Bilsby, built phase 1 of the railway around the rear paddock and branch line loop out at the front of the property in little over two years; an operational railway of no mean distance in its own right before the later additions when even more people got involved. I will elaborate on the different phases of development of the railway a ➤

little later in the article. My son Mike's and my introduction to the railway came through a recommendation by Doug Hewson in late October 1998, when building our 14XX, to contact Michael about his 'wonderful garden railway near you'. And the rest is history for us; we were 'hooked' after our first visit in May 1999. Nobody knew us from Adam ... but we were made so welcome. Lucky us!

The railway evolved further after phase 1's completion and was added to, year by year, from 1998 through to and including 2006. Everyone who had been associated with the initial build had, by the time Mike and I started to get involved during phase 2, already been joined by Jonathan Peck, a local dentist, and Matthew Bilsby, Derrick's son doing sterling work on that project. Post 2006 all of us enjoyed running the full railway operationally as close to prototypical railway practise as possible. The GL5 ethos with real trains with a purpose; the whole railway being covered by Max's interlocked signalling and pointwork except in the yards. It was controlled and run from two signalboxes talking to each other by bell codes, at Haffenden Junction (**photo 1**) and Bugglesden. I won't go into the detail of running by block bells here, other than to say it was fun and at times could get very hectic, with as many as six trains out on the mainline and running between the two sections controlled by the two signalboxes at peak time.

The GWR crowd entertained many visitors from local clubs, other private railways or GL5 members over the years, often over an extended weekend and we'd like to think we always gave them a good time. Some travelled very long distances but kept coming back for more punishment and some of the local youngsters like Dick's son Daniel and Matt Hyner have gone onto the K&ESR as engineering apprentices and progressed through their ranks to become drivers and firemen,



Trackwork at Haffenden junction.

undoubtedly benefitting from the railway experience at the GWR. Matt is now on the K&ESR Board. Thanks to Dick for promoting that process (being a driver inspector there), Adrian Landi, the CME and Henry Mowforth, now at The Bluebell, both regulars at the GWR.

As it happened and quite unknowingly at the time, we saw the GWR's last running day on Saturday 1 February 2020. The January run had seen our last visitors. The March running day was cancelled due to flooding which persisted into the middle of March, then the lockdown for the coronavirus pandemic struck and the railway had, in the 10 weeks before Michael and Carla's decision to close, reverted very quickly to nature, looking like a long-lost 'Beeching Cut' abandoned branchline. Had the circumstances been different we would have had a go at getting the railway back; it would have been a slog and none of us are getting any younger - but it wasn't to be. Our energies will now hopefully deflect to pastures new!

There have been numerous references to, and articles written on, The Great Wealden Railway in *Turnout* over the years (*Turnout* is the GL5 club magazine). (Readers of ME are unlikely to have access to this magazine.) Some of Ron Bray's former railway made it to the GWR at Haffenden Junction (**photo 2**, his double slip) and a yard was named after him, as were two other yards named respectively after Ken Linkins of Romney



Haffenden junction.

Club and very generously after me. In the year I was between jobs I suggested it might be good to have a turntable, shed, coal stage and another yard somewhere on the railway. I was told to 'get on with it then' and everyone joined in with gusto at Bugglesden, down at one far corner of the paddock! The names around the railway - Haffenden (**photo 3**), Haffenden Junction (the hub of the railway), Bugglesden, Dashmonden, Frittenden, Goldwell and Duesden were chosen by Michael Cadiz from nearby landmarks on the Ordnance Survey map!

In brief, the railway evolved gradually in four phases between 1996 and 2006 - from a piece of portable track in November 1995 for the new arrival of a 4-4-0 LNER Apple Green Class D49 Shire locomotive - to a fully developed railway thereafter. We ran the first Saturday of the month, come rain or shine (but not floods and snow!). The hand-drawn sketch (**photo 4**) should explain the various phases of development.

Phase 1

Firstly, a long loop around the perimeter of the paddock at the rear, with a passing loop at Bugglesden Station at the bottom of the paddock monitored by video camera and then secondly, out to a one-way return loop through Duesden Wood Station, over three bridges, onto an island and over the lake at the front of the property; a considerable civil engineering project by Michael, Max, Dick, Harry and Miles. This front garden

branch was linked omnidirectionally with a triangle at Haffenden Junction, the main through station, where a bay platform and sidings were also built, and a yard, Bray Yard. A passing loop and two sidings were added out at Duesden Wood. It goes without saying Max had the railway fully signalled and interlocked even in these early days!

Phase 2

An inner circuit linked to the main rear paddock circuit at Haffenden Junction, with a branchline up to Dashmonden terminus from Goldwell Junction, and Linkins Yard off the inner circuit. Jonathan's dedication digging out the groundwork in the most dire, wet conditions at Dashmonden was very memorable! Subsequently a cross-over linking the outward and return legs of the dumb-bell shaped circuit made for ease of operationally reversing train direction and making Dashmonden accessible from both approaching directions off the main circuit. The station there with run-round loop and three sidings was a very popular shunting or lunchtime break spot while the rest of the railway could operate undisturbed. We 'lost' people up there for hours and they often had to be called up on the dedicated phone to find out what was going on!

Phase 3

Bugglesden Locomotive Shed area adjacent to Bugglesden Signalbox, with turntable, fully functional coal stage (modelled on Carnforth!),

an operating water column donated by Clive Young, two disposal pits and Michael's single-road shed built scale brick by brick added later. This area sat a good 10 inches higher than the mainline so it took driver skill to get onto the turntable up the inclined entrance road.

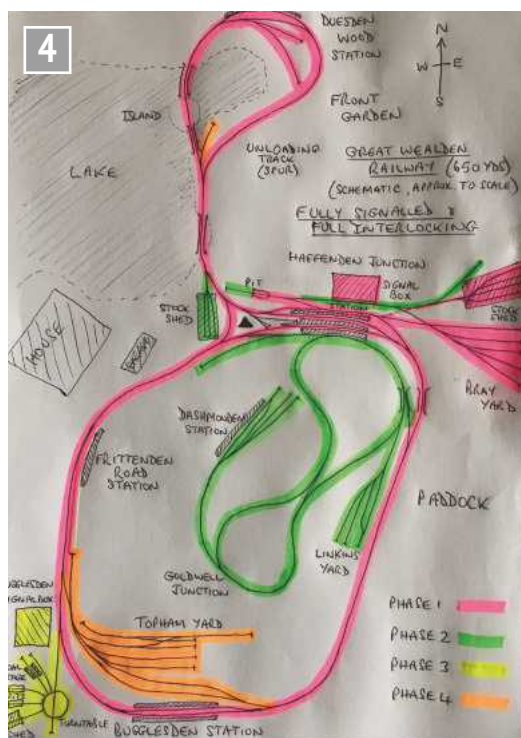
Phase 4

Bugglesden upgrade with station avoiding line and Topham Yard consisting of initially three long sidings into a warehouse and a separate exit road onto the freight line. The yard headshunt was on and off the freight line and controlled by the box signalman. This yard was subsequently extended at a later date to four sidings by using a crossover and two headshunts to overcome what would have otherwise been too sharp radii curves. This made for some interesting manoeuvres!

It's worth noting that Michael, aided by Max's carpentry and wheel and axle turning skills, was a prolific wagon builder in the early days and he finished over 40 wagons which were in general use in the railway's heyday. All have found homes, some countrywide, with either the regular attendees of the first Saturday-of-the-month Running Days or visitors, so a lot will be seen in circulation again on the GL5 circuit.

In the 25 years of regular monthly running and other special events I estimate, from my photos or videos, we have lost fewer than 20 running days through inclement weather. Six of those were between October 2000 and April 2001 when we had dreadful flooding, so over 300 official running days were held with many additional themed weekends through the years, and fun running maintenance days amongst ourselves. We have had over 60 classes of locomotives visit the railway but I won't bore you with a list!

I have dug out some photos taken over the years to give you a flavour of the railway.



Plan of the railway.



One of the railway's signals.



21st Anniversary Haffenden Junction 2016. (We somehow missed the 20th!) From left to right, Max Dunstone, Dick Dickson, Michael Cadiz and the author.



Dashmonden.



Bugglesden.



Bugglesden locomotive shed.

I hope these help you to visualise what I have been writing about if you were never fortunate enough to run at or just visit the railway. We always tried to give everyone who ran there the best railway experience. Master signalmen

were of course Max, and when Mike T. and Derrick were on duty too, things really flowed! Max was always there with his soldering iron and pliers or explanation of interlocking for the rest of us if ever we got in a quandary! Particularly the time

and effort put in signalling by Mike Cox and the late Don Dawe was much appreciated (photo 5).

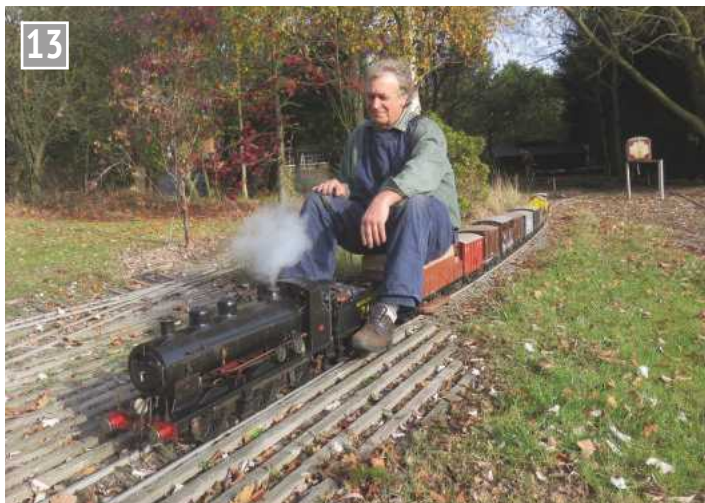
I am obviously biased, but a tremendous railway it was and, while not a mainline railway, it must surely go down ➤



Across one of the front garden lake bridges.



Locomotive on Bugglesden single road shed.



Freight on inner circuit opposite dumb-bell crossover.

in the GL5 annals as one of the most extensive, varied and prototypically operated garden railways in the country. Sadly no more but savoured forevermore. Here's wishing Michael and Carla as good health as possible into the future and thank them so much for all the good times had by us all. In acknowledgment of their kindness, generosity and tolerance with us all over the years we threw a little farewell

gathering and presentation on Friday 3 July 2020 at the very spot where, nearly 25 years ago, the railway was hatched (**photo 14**). Michael's ex-loco SR 0-6-0 C2X Class No. 2445 was in steam on the last remaining track in the concrete for the last train to Duesden Wood, aptly signalled off by one of Max's signals (**photo 15**).

ME



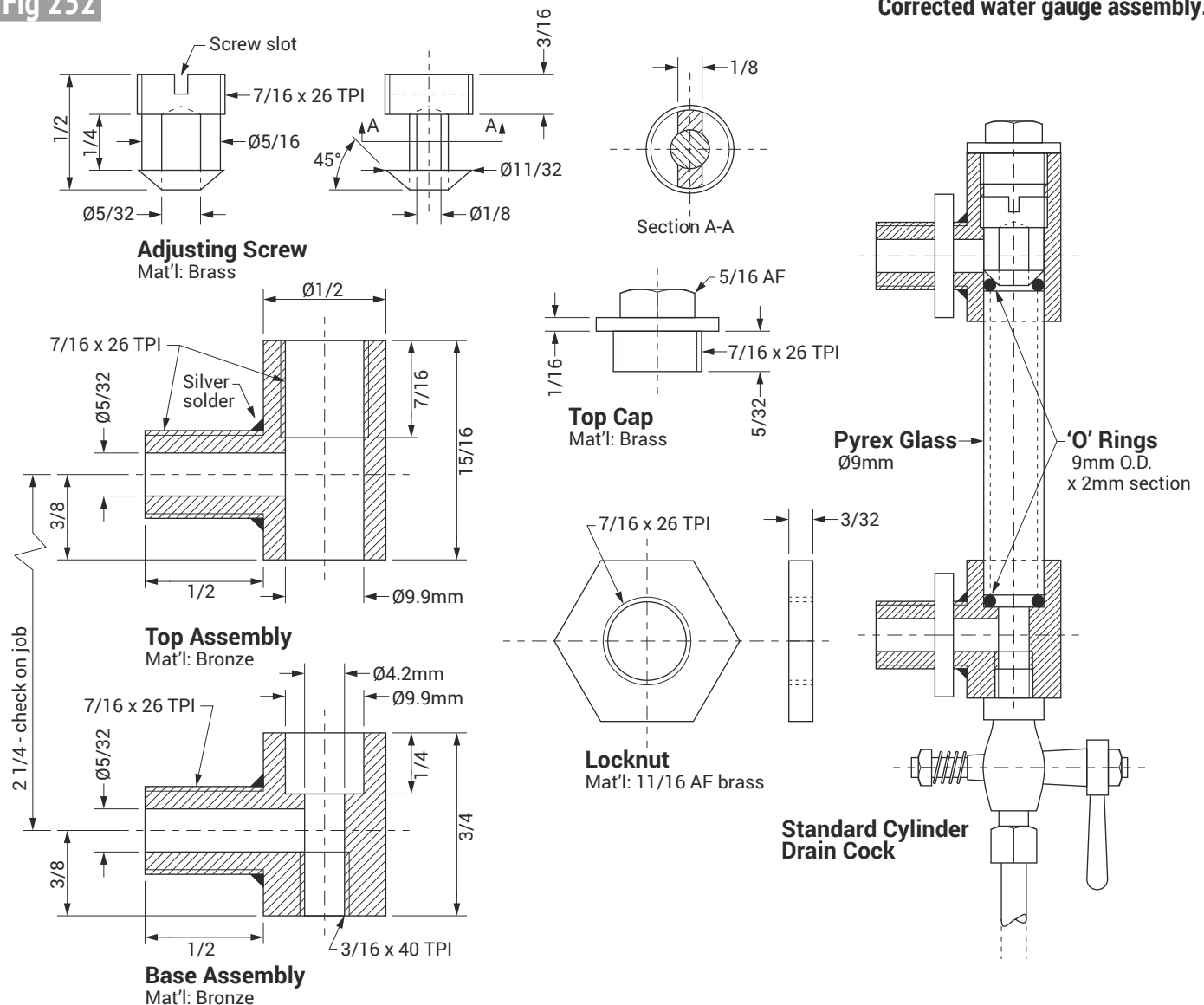
Locomotive coaling under the coal stage, Bugglesden Shed.



Farewell celebration.



The last train departs.

Fig 252**Corrected water gauge assembly.**

of 1/8 inch diameter is more appropriate and is less likely to do damage to the ozone layer!

Water gauges

Again no separate design is needed for the 0-6-0 water gauges, but some clarification of 'what's gone before' in the series may be helpful.

Two separate designs were published for the 0-4-0 in *M.E.* 4606 (February 2019); the first was an adaptation of the original Barclay gauges (fig 141) followed by a more functional design, fig 142, which, without nuts on the glass, has a greater water range. This design of gauge is also shown in the backhead drawing, fig 251. Unfortunately, the drawing for this, fig 142,

had an error but this was corrected in fig 164 (*M.E.* 4616). **Figure 252** presents the design shown in fig 142 with the correction applied. Note that both designs are suitable for all three locomotives. Also note that, although the drain cock design is a standard item, it should be drilled at 90 degrees to that shown in the cylinder cock drawing (fig 57). In operation, with the valve shut, the spindle will then lie flat against the boiler front as shown in fig 251.

In fig 252 the drain is shown at 90 degrees to the correct position.

The firedoor

The simple, round firedoor design, as detailed in *M.E.*

4608, is the one to use (figs 145 and 146). Note, however, that the steel backplate can be used, which bolts into the four small boiler bushes designed for the sliding-type door.

The grate

As with the 0-4-0, the grate sits inside the firebox and partially overhangs the frame plates (an original design feature I hasten to add!) and, therefore, no means of support is required, such as pins fore and aft under the bars as is often the case with 'normal' model locomotives. It is exactly the same as the 0-4-0 grate dealt with in *M.E.* 4592, August 2018, which also addressed the reasons for the lack of the familiar 'dropping grate'

mechanism, as fitted to most working model locomotives (fig 116).

Ashpan

The construction of the ashpan etc. was addressed in *M.E.* 4592, 3 August 2018 (fig 117). Although identical to that for the 0-4-0s, the ashpan should be made to fit 'on the job'; that is, it must fit inside the frame. It is located there by four bolts threaded 2BA into the frame with extension pins that support the pan. Figure 222 details the location of these tapped holes into the 0-6-0 frame.

Safety valves

The safety valves on the 0-6-0 are completely different from



The 0-6 -0 dome and safety valves.

those on the 0-4-0 (fig 122, *M.E.* 4596, Sept 2018,) and are fitted at right angles across the dome. But the good news is that they are a lot simpler to make and fit, as they are self-contained (fig 253 and photo 347).

Figure 253 shows an adjusting screw with six holes; it wasn't too difficult to make these using a dividing head on the mill and they do look the part. This provides a total vented area of 0.042 square inches, compared with the four-hole design of valve with 0.028 square inches. The similar-sized Simplex design has a total area of 0.027 square inches.

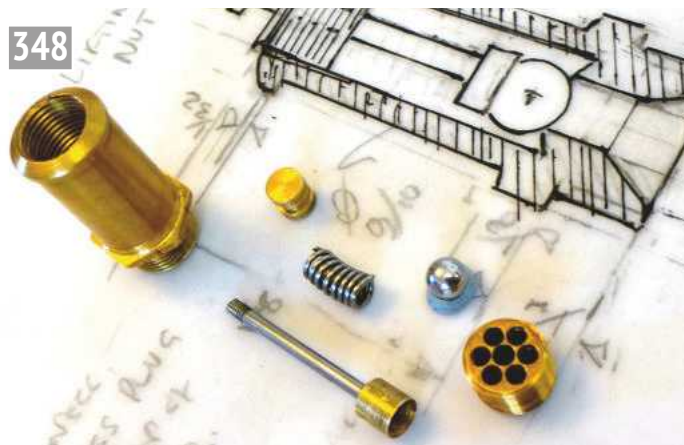
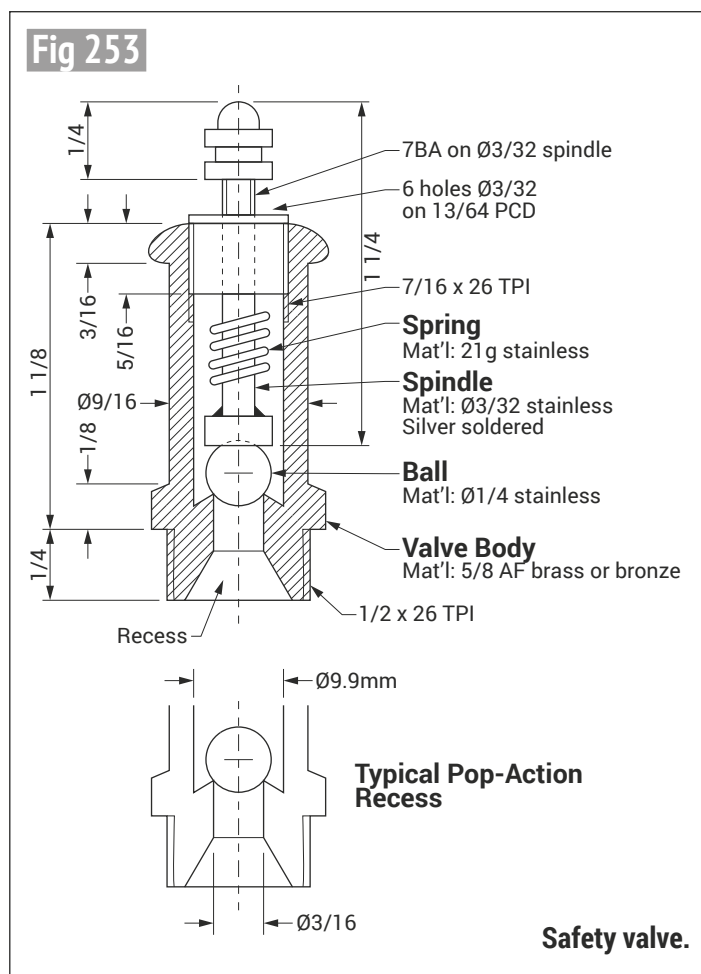
The component parts of a safety valve from photo 347 are shown in **photo 348**.

There is no lifting 'feather' linking the two valves as on the 0-4-0 and, therefore, I have added small bobbins which screw to the top of the valve spindles. These tidy up the ends of the spindles and make it possible to lift each valve when the boiler is in steam.

I was thinking that it might be a good idea to fit one plain

valve and one 'pop-action'; with the pop valve set to open after the plain unit. However, thinking back, I remembered the problems I've had in the past with pop-action valves – mainly that they refuse to close cleanly after opening and spray all and sundry with hot boiler water so with my engine I've stuck with plain valves, which will no doubt receive the occasional clout from the fireman's shovel in the interest of good behaviour. However, I did manage to find a useful piece on the web, which nicely summarises the situation ([ref 70](#)). The article identifies Martin Evans's solution, which blanks off the base of the valve and redrills inlets from the side of an extended portion beyond the thread.

LBSC apparently recommended using a stainless ball below the spring, which has never worked for me! The author of the article, Roger Stephen, concludes that the designs of Gordon Smith of Burton-on-Trent Model Engineering Society have more or less cracked the problem. Gordon's designs, components



Safety valve components.

and finished valves are currently available from Polly Engineering.

I note here a minor correction to the dome drawing (part of the boiler drawing, fig 213) – the top flange should be tapped 2BA.

not drilled 2BA clear. This is not of major importance but it will make fitting the top plate and the dome cover a bit easier using standard bolts.

●To be continued.

REFERENCE

70. stalbandsmes.com/wp-content/uploads/2019/01/The-black-art-of-safety-valve-design.pdf)

CLUB NEWS

John Arrowsmith reports on the latest news from the Clubs.



Well, doesn't time fly when you are kept busy and unfortunately confined.

I cannot believe it was over two years ago that I prepared this column while Geoff and his wife Debs went on holiday. Well he is at it again so you have me to take a look around the club scene in 2021. What a period it has been with all the personal restrictions, no exhibitions or rallies, but talking to model engineers at many clubs they seem to have survived and at last the cloud appears to be lifting with lots of activities either going ahead or planned. The Midlands Exhibition in October has unfortunately been cancelled as the organisers could not be 100% sure that they could present an exhibition that was acceptable to everyone. Very reluctantly they have cancelled the Midlands exhibition and the London Exhibition in January. I hope along with everyone else that this situation will change in 2022 and the exhibition circuit will again be in full swing so that all of us can enjoy those events once again.

The **Bromsgrove SME** magazine *Off Cuts* notes that members have been busy in recent weeks but their first running weekend was cut short due to vandalism at the adjacent museum. Fortunately, the club only suffered minor damage which was quickly repaired. They operated during the Father's Day

weekend when the museum fired up their Nail Makers Forge. In addition, there were a number of small traction engines working round the site. Member Peter Dawson describes the history of his 5 inch gauge S160 Austerity locomotive that was originally built by Eric Guest. Peter has been the custodian of the engine since 1991 when Eric offered it to Peter because of his poor health. Eric built the locomotive after completion of his National Service in the 1950's. It was steamed at the opening of the Wolverhampton & District Society's new track in 1962. Peter has completed all the modifications Eric had wanted to carry out and following a successful boiler test the locomotive can steam again for its 60th birthday. The club have a couple of interesting events planned starting with the Modern Traction Day this month followed by the Rob Roy Rally on 11th September.

I note in *The Lobby*, the club magazine from the **Brighton & Hove SMLE**, that they have had a railway in Hove Park for 70 years - that is quite an achievement these days. During the Covid lockdown time there was an attempt at a break in at their site but their locking system held firm and no entry was gained. The magazine contains an interesting article about Dr John Bradbury Winter who was a lifelong excellent model engineer and who, when he was about 12-13 years old, started a model of a LBSCR 0-4-2 Class D2 locomotive named *COMO*. Having completed the chassis he decided that he wanted a model that was complete in every detail so he started again. The original chassis was fitted with a boiler which ran in a back garden in Montpelier Road. It featured in the very first issue of *Model Engineer* magazine in 1898. The new locomotive was to take him around 18000 hours of work. Today I cannot think of anyone who would be so meticulous in building a model

like this when every nut and bolt was made by hand and some bolts were even cross drilled No. 70 drill, to take retaining pins. The hexagons were planed from square stock using a treadle powered machine. This amazing model can be seen in the Brighton Museum and Art Gallery. The Society are hoping to celebrate their 70th Anniversary at the club on Monday August 30th if government restrictions allow.

Over on the west side of the country the **Hereford SME** have had quite a torrid time with, as you have seen in these pages, three major floods on their site which has caused serious disruption and damage to both the site and facilities. However, with a tremendous effort by a lot of people these difficulties have been overcome and they are back to full operations again. Members enjoyed a Training Day in June to ensure everyone who is involved with operating the railway is fully aware of the safety requirements needed to open for public running again. The signalling system has been overhauled along with the trackwork.

The new public toilet block has seen a new cladding protection added to the outside walls so that it matches the adjacent clubhouse. A new site drainage system has been installed which, following the last flood, worked very well and drained the site in a couple of days, not the couple of months it used to take. The Summer Steam Weekend in July was the first operated since lockdown and it attracted a wide range of locomotives from a number of different clubs to the track as well as a large number of boats and yachts on the boating lake. The rare model of *Agenoria* built by Chris Wilson from the Vale of Aylesbury club was an impressive model which operated very well on the track.

At the **Nottingham SMEE** they are slowly getting back to some sort of normality with the club resuming operations on the 7¼ inch gauge railway. They have started training new drivers again so that will



A new driver Mat Lee learning the skills on the Nottingham track.

help with their public running days (**photo 1**). They will be operating again with two trains running with members working hard between each run to clean the coach surfaces. They have found that the public are very appreciative of this and have not complained about the short but additional waiting times this procedure has caused, so that's a positive as well. However, they do not anticipate organising any rallies at the club until sometime later in the year. In May this year they did entertain four members of the fledgling Cromer Light Railway at Ruddington who came to see the facilities on offer at the club. Another interesting idea from member Joe Hoy was a Thomas Themed Day on their outdoor model railway layout. It had been a long time since this layout had operated for the public so with some recently purchased locomotive and rolling stock the day was organised. The club were extremely pleased with the popularity of the idea and the number of people who attended. Not main stream model engineering I am sure you would agree but it attracted many people to the club who could also see the main attractions, so hopefully they will return when the club opens on a regular basis. Mike Firth reflects on the rallies that have been held at the club over the years which provides an interesting look into past activities at the club. As they are adjacent neighbours to the GCRN at Ruddington they enjoy a good working relationship with the railway and they are hoping that with some new building activity at the diesel depot they can again support the railway with another NSMEE gala as they used to do.

The **Leeds Society of Model and Experimental Engineers** have had quite a difficult time over the last couple of years with the loss of their track at Eggborough. However, there does seem to be a note of optimism in the latest club magazine. A face to face meeting of the committee took place for the

first time in 12 months. Six committee members met outdoors as permitted by the Covid restrictions and many topics were covered but the main one was the new track. Discussions have been taking place with the developers who are keen for the club to return to the site, albeit at a new location around the surface water drainage pond. How all this will work out has yet to be decided, and the club will not be able to access the site until the groundworks have been completed, but as yet no starting date has been agreed. Whilst this is perhaps a little disappointing, to members at least it is positive progress and hopefully it will not be too long before Eggborough again has the sight and sounds of steam locomotives operating on their new track. They will not be operating their portable track this year as they cannot ensure social distancing - perhaps the lifting of restrictions will enable them to re-consider. Maintenance on the track and trailer has been completed and the track did operate for the annual members BBQ and boiler testing day and it will again be used for a similar day this month. Apparently there has been some excellent 'Work on the Table' from members which has kept the engineering side of things ticking over and the return of Monday morning breakfast meetings is imminent which should enable members to start getting together again.

Down in the West Country the **East Somerset Society of Model & Experimental Engineers (ESSMEE)** have, during the Covid restrictions, had a regular small group of both committee members and members regularly attend their site in the Royal Bath and West Showground to maintain all their major assets like locomotives, rolling stock and the track site itself to ensure that when the restrictions are removed they will be ready to welcome visitors and the public back to their railway. During this period as well they have constructed a

splendid tunnel at the bottom end of the track which adds a great deal to the area. The approach portal resembles an old style mine entrance (**photo 2**) which must make passengers wonder where they are going. The exit portal is a beautifully built Mendip stone construction based on the nearby Brunel Box tunnel - in complete contrast to the other end. Their latest newsletter has one or two useful workshop tips including the use of linseed oil liquid soap to clean paint brushes. When the brush has had the excess paint removed using rags or paper a few drops of this soap worked into the brush and then rinsed in cold water clears the remaining paint from the bristles. After drying the bristles are soft and separated ready for the next coat. The new club engine under construction is a 7¼ inch gauge Black 5 and good progress is being made. The frames are assembled and the wheels have been machined and are now waiting for the steel tyres to be fitted.

In the December 2020 news sheet from the **Stockholes Farm Railway**, Ivan Smith expressed his thoughts that the situation then was like travelling through a long tunnel. In his latest publication he now thinks there may be some light at the end of that tunnel with some sort of normality returning. I think a lot of clubs may be thinking that way as well. The railway will not be re-opening in the near future but hopefully a few operating days for members only will take place. With the restrictions supposedly being lifted in June, Ivan decided to give the *Royal Scot* a try out on the track. Having raised steam, the regulator promptly failed and this could well mean a boiler off job to fix it. Just more work on top of the already large backlog. If that was not enough the Q1, having passed its hydraulic test, was steamed up but would not start. On examination it was found that one of the rear wheels had slipped on the axle.



The new 'mine' tunnel entrance on the East Somerset SMEE track.

However, on a more positive note, the recently acquired tank engine *Hercules* did pass its boiler test as did the V2 of Richard Priestly so not all bad news. The new carriage shed, which is attached as a lean to on the large storage shed, is making good progress (**photo 3**). Ten tree stumps have been removed from the site which has made grass cutting a lot easier. In addition to this good work the final sections of the concrete track edging boards have now been completed, thanks to Rick and Steve. The railway will be incorporating the new HS2020 documentation into their procedures.

At the **Northern District MES** in Perth in Australia, their club magazine reports that one of their founder members, Steve Reeves, celebrated his 60th birthday at the club in Balcatta. His close family and friends (**photo 4**) along with many club members joined together to enjoy the hospitality at the club. There were about a dozen steam locomotives and a couple of battery powered engines operating during the day so everyone had a great time and really gave Steve a birthday to remember. The club answered a call from the Bassendean Rail Museum Expo in June who were holding this event but had no operating steam locomotives with which to entertain the visitors. The club stepped in with their portable track which provided some steam and atmosphere for the day. Some working stationary engines also added ➤



Ivan Smith poses with his Duchess alongside the new carriage shed at Stockholes Farm.



Tyneside young engineer learning to drive a 7 1/4 inch gauge steam locomotive.

to the display. Towards the end of the day, one member, Jim Clark, found himself in the classroom with some parents, grandparents and about eight children to show them how steam engines work. Many of the visitors were unaware of the club's existence so some very good publicity came from the event as well as a useful amount of revenue. It was a very successful event for both the club and the museum. They have signed an agreement with the Department for Communities to receive a grant to enable them to build a BBQ and gazebo at the site which they hope to complete by the end of August. Their first public open day in May was another successful event where they had no fewer than seven locomotives in operation with a Black 5 on standby that was not required. The garden railway as well has woken from

its slumber and in June seven locomotives were in operation. This club sounds to me to be a very active one and judging by some of the photographs in their magazine it also looks to be a happy one as well.

The latest edition of *Inside Motion*, the newsletter of the **Tyneside SMEE**, refers to the club's AGM which was held online. All the committee posts were filled with Peter Newby as chairman. The magazine contains a useful breakdown of what boiler inspections should cover. They list four different areas of examination which are relevant to all boilers from 16mm gauge to 7 1/4 inch gauge. There is also a reminder that LPG tanks need a safety check not greater than every four years. The club have a very good Junior Engineers section and one of them, Sam Yeeles, is becoming a very accomplished railway photographer. One of his latest photographs has



The family birthday party for Steve Reeves at the Northern District club in Perth.



Another Tyneside youngster with a 5 inch gauge A4 in steam.

been published in *Heritage Railway* magazine and it really is an excellent photograph. Other members of their young engineers group take part in club activities. On these club days they are taught how to drive steam locomotives and they have sent me some photographs showing these young people in action. One shows a 12 year old driving what looks like a 'Wren' and the other is a 14 year old driving a nice A4 class engine, so they are making good progress (**photos 5 and 6**). One member, Jim Nolan, has tried out a new way of bending angles because, as he says, it is always a bit of challenge to get it right. He turned to technology to give him a helping hand. The need was some curved angles for the tender of the Berkshire locomotive he is building. He describes the working method which used a CNC mill and Fusion 360 software.

He also wanted to use tabs on the components to try and cut out the second operation machining. The angles are 1/16 inch thick and were milled successfully from a 4 inch square block. After trying different methods he eventually produced four well-fitting curved angles for the tender. Adrian Morley reflects, I think with his tongue firmly in his cheek, about how Staffa got its hexagonal columns. Editor Mike Maguire comments that variety is the spice of life and the members certainly have that in these issues.

Geoff Theasby returns in our next issue.

CONTACT

geofftheasby@gmail.com

HURRY! EARLY BIRD SAVINGS - UP TO 41%

CHRISTMAS GIFT SUBSCRIPTIONS!



ONLY £39.99!

PATCHWORK & QUILTING
10 issues

STAMP
12 issues

TOTAL CARP
13 issues

THE WOODWORKER
12 issues

HI-FI NEWS
13 issues

HI-FI CHOICE
13 issues

HOME CINEMA CHOICE
10 issues

MATCH FISHING
12 issues

MODEL ENGINEER
26 issues

MODEL ENGINEERS' WORKSHOP
12 issues

MODEL BOATS
12 issues

RCM&E
12 issues

- Huge Savings!
- Perfect Christmas Gifts!
- Greeting card supplied with gift subscriptions
- Annual subscriptions starting with the first issue of 2022
- Delivered to your door

Digital & Bundle Subscriptions also available online at www.mytimemedia.com/xmas21P1

SUBSCRIBE SECURELY ONLINE WWW.MYTIMEMEDIA.COM/XMAS21P1
CALL 0344 243 9023 AND QUOTE XMAS21P1**

LINES OPEN MON - FRI - 9.00AM - 5.00PM GMT & SAT - 9.30AM - 3.30PM GMT.

Calls are charged at the same rate as standard UK landlines and are included as part of any inclusive or free minutes allowances. There are no additional charges with this number. Overseas calls will cost more.

TERMS & CONDITIONS: Offer ends 26th December 2021. *UK print subscriptions offer only. Subscription will begin with the first available issue in 2021. MyTime Media collects your data so that we can fulfil your subscription. We may also, from time to time, send you details of MyTime Media offers, events and competitions but you always have a choice and can opt out by emailing us at unsubscribe@pandmagazine.com. Please select here if you are happy to receive such offers by email ☐ by post ☐ by phone ☐. We do not share or sell your data with/to third parties. Details you share with us will be managed as outlined in our Privacy Policy here www.mytimemedia.co.uk/privacy-policy. Issue frequency is subject to change. Current yearly term is 10 issues. Please visit www.mytimemedia.co.uk/terms for full terms & conditions.

CLOCK CONSTRUCTION & REPAIR

Books by:

John Wilding MBE
FBHI, E. J. Tyler,
John G. Wright, Eric
Woof, John Tyler
and others.

SPRINGS
BEARINGS
FRAMES
DIALS etc.

**FREE
Catalogue**

Telephone: +44 (0) 1420 487747

www.ritetimepublishing.com



POLLY MODEL ENGINEERING LIMITED



Find us on 



Build your new 5" gauge coal fired 'POLLY Loco' and be ready to enjoy running in the new season.

Supplied fully machined, assembly requires hand tools only – no riveting, soldering or other complex processes. Kit includes boiler CE/UK CA certified and accepted under Australian AMBSC regulations. Model can be supplied as full kit (unpainted) or a succession of kit modules.



10 other models, tank engines, tender engines, standard gauge/narrow gauge – something for everyone!

Prices from £5715 including VAT and carriage.

Build & cost optionally spread over 12 months.

Buy with confidence from an established British Manufacturer

144 page Catalogue £2.50 UK E8 international posted (or download free!) and enquire for further details or visit our website where you will find other Polly Locos, Kits, drawings and castings for scale models and comprehensive ME Supplies.



Polly Model Engineering Limited
Atlas Mills, Birchwood Avenue,
Long Eaton, Nottingham,
NG10 3ND, United Kingdom

www.pollymodelengineering.co.uk
Tel: +44 115 9736700

[email:sales@pollymodelengineering.co.uk](mailto:sales@pollymodelengineering.co.uk)

LIVE STEAM MODELS LTD

Drawings & Castings for
3" – 6" Traction Engines including
Burrell, Foster, Fowler, Marshall, and
Ruston-Proctor.



Full engineering services, technical
support and wheel building available. Horn plates,
tender sides and wheel spokes laser cut.

Comprehensive range of model
engineering materials plus BA & BSF screws, nuts,
bolts, rivets, boiler fittings & accessories.



Phone - 01332 830 811
Email - info@livesteammodels.co.uk



MODEL MAKING METALS

1/32in. to 12in. dia. bright steel, stainless
steel, bronze, spring steel, brass, aluminium,
silver steel, steel tubes, bolts, nuts & screws,
tap dies + drills, white metal casting alloys.

Fine materials, chain, plastic.

Lathe milling machines and equipment,
new and secondhand.

Mail order nationwide and worldwide callers

Mon.-Fri. 9 - 5pm. *All cards welcome.*

Send now for a FREE catalogue or phone

**Milton Keynes Metals, Dept. ME,
Ridge Hill Farm, Little Horwood Road, Nash,
Milton Keynes MK17 0EH.**

Tel: (01296) 713631 Fax: (01296) 713032

www.mkmetals.co.uk

email: sales@mkmetals.co.uk

A.m.€ 01952 879607

Abbotts Model Engineering
Makers of fine 5" & 7 1/4" Gauge
Locomotives & Rolling Stock

See Website for up to date info.
Please re-fresh your website browser.



Home of 5" & 7.1/4" g battery electric locomotives and rolling stock.

**Selection of locomotives
to suit all budgets & requirements.**

**The largest selection of
driving and passenger trucks anywhere.**

Most ready within 2 weeks

**Find us on Facebook for latest info,
videos and some fun stuff.**

**You are most welcome to visit our
showroom, please phone first.**

Unit D7, Haybrook Ind Est, Halesfield 9, Telford, Tf7 4QW

Shop open Mon to Fri 9.00am to 4.00pm
Locomotives, Coaches & Trucks all on display
(See website for products & updates)

www.ametrains.co.uk

Camden

INFO! PROJECTS! IDEAS!

Marvelous Magnetic Machines Friedrichs • £29.30

"Building Electric Motors from Scrap" or how to build electric motors, or more accurately, to turn solenoids into electric motors of varying shapes and types. There are five of these, but the author starts with 24 pages covering safety and principles. The descriptions of the models are clear, but note that they are all built from scrap, so that there are no detail dimensions to work from - it all depends on the size of what scrap you can beg, borrow, steal or scavenge. A really interesting book and projects; 155 hardbound pages full of drawings, diagrams, photos mainly in colour, and maths.



DIGITAL EDITION Miniature Injector Studies - Testing, Measurement and Theory • Preston • £ 5.95

Much has been published about miniature injectors over the last century and on how to make them. However, there has not been any systematic documentation of how varying the many different critical dimensions of an injector can influence its performance. And, as far as we know, there has not been any relatively simple theoretical model published that can predict the injector performance when critical dimensions are changed; these were the driving forces behind this book. Whilst both useful and interesting if you want to build a highly efficient injector, not surprisingly, this book does contain a considerable amount of maths! 125 pages with some photographs, and graphs and diagrams.

NB: this is a Digital Edition and can only be read on a computer, laptop etc. Individual pages may be printed, but not downloaded.



Making Small Gas-Fired Boilers for Steam Models • Weiss • £21.24

Alex Weiss's second book on building small gas (LPG) fired boilers. Compared with 'Building Small Boilers for Gas Firing' the major difference is that the boilers described, here whilst still meeting the UK three-bar litre requirements, are more complex to make, some with straight fire tubes, another has fire tubes curving to the bottom of a horizontal boiler and another - a Galloway boiler, has cross tubes in a large central flue. The construction of all these is described in step-by-step stages, with text, drawings and all-colour photographs. Also covered are burners appropriate to each boiler. If you want to make small gas fired boilers for model boats, traction engines, or railway locomotives, this book will be indispensable. 160 hardbound and very well illustrated pages.



The Multipurpose Model Steam Turbine Jeggli • £17.10

Fancy building a successful working steam turbine driven loco in Gauge 1? Werner Jeggli has been building steam-turbine driven models in that gauge for many years, including two free-lance locomotives to begin with and then scale models of the LMS Turbomotive and the massive Pennsy PRR-S2. He described his experiments, failures and successes in 12 issues of the GIMRA Newsletter; all reprinted here preceded by 30 pages on all the steps Werner has taken in building small turbines, including a Tesla one. For the experienced model maker/engineer a steam turbine locomotive makes a splendid project, but this book is also a splendid read for the mechanically minded armchair modeller. 64 pages full of diagrams, drawings and colour photographs.



KERR, STUART Water-Tube Boiler Geared Drive Steam Locomotives • Baker • £11.10

After WWI Kerr, Stuart & Company introduced a design of narrow gauge diesel powered locomotives for industrial use, which enjoyed some success. A steam design was also introduced, based on a water-tube boiler with chain drive, using the same underframe and running gear; and it is these which are covered here. Whilst embodying a number of clever ideas, these were outweighed by design flaws, and only five were built. The design and modifications are reviewed in this book, which has a good number of B&V photos, and drawings of main assemblies, the engine, and boilers. But whilst these designs may not have been a success, they are ideal for the model engineer looking to build a small and compact steam locomotive, from 16mm narrow gauge up to 7 1/4" gauge, perhaps using a more conventional boiler. 52 page paperback.



Prices shown **INCLUDE U.K. Post & Packing**; buy two or more items and **SAVE** on postage. Savings, and overseas postage, automatically calculated if you order online.

SEE OUR FULL RANGE AT WWW.CAMDENMIN.CO.UK

If ordering by post and paying by cheque or Postal Order please make this payable to our name below:

CAMDEN MINIATURE STEAM SERVICES

Barrow Farm Rode Frome Somerset BA11 6UB UK

Buy online at: www.camdenmin.co.uk

or phone 01373 830151 to order



eptsoft STEM: eLearning Platform for your School & Home Study



*Hi, I have been using this
for a while now and love
using it, it's so handy
for my coursework
etc. thanks I would
hate to lose it.*

Free: Science Technology Engineering and Maths Online eTextbooks

With optional Interactive Content login

Accounting | Mathematics | Computing |
Digital | Electronics | Electrical | Mechanics

www.eptsoft.com

Engineers' Cabinets

Tel 07534 458664 or email mark@cassey.co.uk

- * Brand new and Hand made in the UK (Lincolnshire)
- * Solid English Oak locally sourced (no veneers)
- * Grain of oak "wraps" around the cabinet (i.e. a single board is used for the carcass, where the start of the new side has a continuation of grain pattern from that of the previous side).
- * Drawer fronts are all from a single board, so the grain pattern "flows" across the front of all drawers
- * Made to exacting standards
- * Fashioned on the iconic Moore & Wright cabinet
- * Size 17" x 8.25" x 11.375" (430x210x290mm) approx
- * Bespoke commission undertaken to your dimensions

I currently make two styles, a 5 full width drawer cabinet for £550.00 and a 7 drawer cabinet at £600. Delivery at cost or collection welcomed. Cost of bespoke cabinets depending on size and details.



NEWTON TESLA

SMOOTH, QUIET, HIGH PERFORMANCE VARIABLE SPEED CONTROL FOR LATHES AND MILLING MACHINES

Supplier to industry since 1987 of high power speed control systems from 100W to 2,200,000W,

MITSUBISHI INVERTERS from £122 inc VAT

VARIABLE SPEED CONTROL PACKAGES



HIGH PERFORMANCE INVERTERS

For serious machining duty. 240V 1-phase input, 220V 3-phase output, for you to run a dual voltage (Delta wired) three phase motor off your 1-phase supply. Six sizes from 0.1kW (0.12hp) to 2.2kW(3hp). Built-in user keypad, display and Speed Dial. Unique Integrated Emergency Stop Function. Advanced Torque Vector control for optimum performance. High Reliability.

Fully CE Marked and RoSH Compliant. Compatible with our Remote Control station Pendants. Supplied pre-programmed at no extra cost.

The 'original' & best lathe speed control system.

Pre-wired systems, and Inverter, Motor, Remote packages available to suit wide a range of metal and wood turning lathes, including; **MYFORD ML7**, Super 7, **BOXFORD**, & **RAGLAN** lathes, Wood turning lathes including; ML8 and MYSTRO and **UNION GRADUATE**. Pre-wired ready to go! Power Range: 1/2hp, 1hp, 2hp and 3hp. Super smooth control across entire speed range, giving chatter free machining and excellent finish unattainable with 1PH motors! Powered from domestic 240V Single Phase mains supply. Made in the UK, ISO9001:2008 Quality Assured.



Our Pre-wired Lathe Speed Controllers are now covered by a 10-Year Warranty

REMOTE CONTROL STATIONS from £66 inc VAT

Remote control station Pendants suitable for use with all our Mitsubishi Electric and IMO iDrive Inverters. Industrial grade push buttons and controls. Featuring START, STOP, FORWARD, REVERSE, RUN/JOG, & Variable Speed potentiometer. 3-wire control - Behaves like a No-Volt-Release. Beware of low quality copies of our original tried and tested controls. Fitted with 2-metre length of control cable ready for connection to drive, and supplied with wiring diagram.



Newton Tesla (Electric Drives) Ltd,
Warrington Business Park, Long Lane, Warrington,
Cheshire WA2 8TX, Tel: 01925 444773 Fax: 01925 241477
E-mail: info@newton-tesla.com
Visit www.lathespeedcontrol.com for more information.



M-MACHINE
Unit 6 Forge Way, Cleveland Trading Estate
Darlington, Co. Durham. DL1 2PJ
Metals for Model Makers
Contact us for Copper, Brass, Aluminium,
Steel, Phosphor Bronze, etc.
PHONE & FAX 01325 381300
e-mail: sales@m-machine.co.uk
www.m-machine-metals.co.uk

Meccano Spares
New Reproduction and
Pre-owned Original
Meccano Parts.
www.meccanospares.com
sales@meccanospares.com
Tel: 01299 660 097

Cowells Small Machine Tool Ltd.
Cowells Small Machine Tools Ltd.
Tendring Road, Little Belfrey, Colchester CO7 8BH Essex England
Tel/Fax +44 (0)1206 251 792 e-mail sales@cowells.com
www.cowells.com
Manufactures of high precision screwcutting lathes,
8mm horological collet lathes and
milling machines, plus comprehensive accessory range.
Talk directly to the manufacturer

WESTERN STEAM
Model Engineers
Founder Member Assn of Copper Boiler Manufacturers (ME)
COPPER BOILERS
For Locomotive, Traction, Marine &
Stationary engines, to PER cat 2. All
copper construction, silver soldered
throughout using quality materials to the
standards required by the APCBM(ME),
PER, & relevant Model Engineering
Associations. CE marked and certificates
of proof test and conformity supplied.
Write or phone to Helen Verrall:
Unit 4A, Love Lane, Burnham-on-Ses
Somerset, TA8 1EY
Tel: 01278 788 007
Visit our website: www.westernsteam.co.uk

GB BOILERS
COPPER BOILERS FOR LOCOMOTIVES AND TRACTION ENGINES etc.
MADE TO ORDER
Constructed to latest standards. UK CA stamped.
Over 20 years experience
Enquiries, Prices and Delivery to:
Telephone: **Coventry 02476 733461**
Mobile: 07817 269164 • Email: gb.boilers@outlook.com


FOR SALE
Myford ML10 Lathe, comes with Myford cabinet
on heavy duty wheels, Dewhurst switch for
forward and reverse motor, self centering 3 jaw
Pratt Burnerd chuck, change gears, cutting tools,
extra four way toolpost plus more bits to get you
up and running.
The lathe has been serviced and runs brilliantly
as it should, circa 1984.. it's a fantastic machine!"
Price **£1750.00** for collection from
West Yorkshire, cash on collection.
Telephone Gordon on 07812418899 or email @
golfuniform02@hotmail.com

FOR SALE
**3½" Buffalo 2-8-0 (Caribou +
Pony truck) - Martin Evans.**
**3½" LMS Tank – Stanier – 2-6-4t
Martin Evans Jubilee**
**3½" Rob Roy chassis + boiler.
By Martin Evans**
**5" Maid of Kent (unfinished)
By LBSC**
Complete workshop – lathe, mill,
drills, linishers, Warco 7025, bandsaw,
T & C grinder, compressor, tooling, etc.
EMAIL: john.avon3@gmail.com
For Photo's And Details

**Complete home
Workshops Purchased**
Essex/Nottinghamshire locations
Distance no object!
Tel: **Mike Bidwell**
01245 222743
m: 07801 343850
bidwells1@btconnect.com

**THINKING OF SELLING YOUR
LATHE, MILL OR COMPLETE
WORKSHOP?**
and want it handled in a quick
professional no fuss manner?
Contact Dave Anchell,
Quillstar (Nottingham)
Tel: 0115 9206123
Mob: 07779432060
Email: david@quillstar.co.uk

webuyanypworkshop.com
Re-homing model engineers' workshops across the UK
It's never easy selling a workshop that has
been carefully established over a lifetime. I
will buy your workshop so you don't have to
worry about finding a new home for much
loved workshop equipment and tools.
Please email photos to
andrew@webuyanypworkshop.com
Or to discuss selling your workshop, please
call me on **07918 145419**
All equipment considered: Myford, Warco, Chester, classic British brands etc
Polly steam locomotives also purchased, especially those needing a bit of 'TLC'

MODEL ENGINEER

BECOME PART OF
THE ONLINE
COMMUNITY FOR
MODEL ENGINEER MAGAZINE



- Get access to exclusive competitions and giveaways
- Exclusive articles and advice from professionals
- Join our forum and make your views count
- Sign up to receive our monthly newsletter
- Subscribe and get additional content including Online Archives dating back to 2001*
- Register for free today and join our friendly community!

WWW.MODEL-ENGINEER.CO.UK

* only available with digital or print + digital subscriptions

FOLLOW US



MARKET LEADER IN LARGE
SCALE, READY-TO-RUN,
LIVE STEAM

5" GAUGE CORONATION CLASS

OVER 90% OF BATCH NOW SOLD!



£14,995.00 + p&p

The Coronation Class

Designed by Sir William A. Stanier the first locomotives out of Crewe works were originally built as streamliners. Later some were built without streamlining.

All of the streamliners were finally re-built in un-streamlined form, and all eventually featured double chimneys. The model offered here is representative of the class as re-built. The locomotives were produced in a variety of liveries in BR days including maroon, blue and lined green.

"This is an exceptional model in so many respects. It is the largest 5" gauge locomotive we have manufactured to date and has the benefit of four cylinders to re-create that distinctive exhaust beat. It will be available in a variety of BR liveries and a wide choice of famous names to include Coronation and Duchess of Hamilton. A challenging model, but well worth the extensive development effort. As an award winning professional model maker I am delighted to have been involved in this very special project"

Mike Pavie



Request your free brochure today

Request your free brochure today by e-mail, telephone, or by returning the coupon opposite.

Telephone: **01327 705 259**

E-mail: **info@silvercrestmodels.co.uk**

Find more information at
www.silvercrestmodels.co.uk

Summary Specification



Approx length 80"

- Stainless steel motion
- Choice of liveries
- Piston Valves
- Superheater
- Boiler feed by axle pump, injector, hand pump
- Painted and ready-to-run
- Walschaerts valve gear
- Reverser
- Etched brass body with rivet detail
- Coal-fired live steam
- Drain cocks
- Approx Dimensions:
- Mechanical Lubricator
- (L) 80"x (W) 10"x (H) 14"
- Silver soldered copper boiler
- Weight: 116 kg
- 4 Safety valves
- 5" gauge
- 4 Cylinder

The 5" Gauge Model

This magnificent model is built to a near exact scale of 1:11.3.

Although a 4 cylinder model of this size and quality can never be cheap it certainly offers tremendous value-for-money. You would be hard pushed to purchase a commercial boiler and raw castings for much less than the £12,495.00 + VAT we are asking for this model. Certainly a one-off build by a professional model maker would cost you many fold this with some medal winning examples changing hands at auction in excess of £100,000.

This model is sure to be a real head turner on the track pulling a substantial load, or when on display in your home, or office.

The model comes complete with a silver soldered copper boiler, hydraulically tested to twice working pressure. All our boilers are currently CE marked and supplied with a manufacturer's shell test certificate, and EU Declaration of Conformity. As testament to our confidence in the models we provide a full 12 months warranty on every product. **We've presently booked sufficient factory capacity for the manufacture of just 25 models.**

Order reservations will be accepted on a first come, first served basis. We are pleased to offer a choice of names and liveries.

Delivery and Payment

Save £195.00. Free p&p for any order received within 28 days.



The build of the batch is now well advanced and the order book must close soon. However, there is still time to order and you can reserve your model for a deposit of just £1,995.00.

We will request an interim payment of £5,000 in September as the build of your model progresses, a further stage payment of £5,000 in October and a final payment of £3,000 in November 2021 in advance of shipping from our supplier.

Please send, without obligation, my free full colour brochure for the 5" gauge Coronation Class.

Name: _____

Address: _____

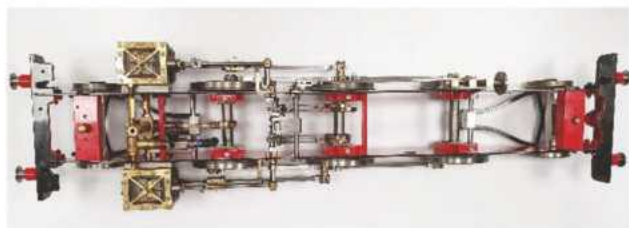
Post Code: _____

Please send to: Silver Crest Models Limited,
18 Cottesbrooke Park, Heartlands Business Park,
Daventry, Northamptonshire NN11 8YL

FREE
BROCHURE
REQUEST FORM

ME

Company registered number 7425348



Polly Model Engineering's Open Day

Saturday 16th October 2021 10.00am-4.00pm

Workshop tours throughout the day

10% off all shop purchases made on the day (all bar stock must be pre-ordered)

Polly locos steamed outside with 100ft of demonstration track

Please call or email our office if you'd like to attend

Launch of new Polly loco!

FREE goodie bag on the day for any Polly loco kit order

Limited blue badge holder parking spaces available in our yard, please do not park on Birchwood Avenue or Berkley Avenue. Please use Long Eaton Train station car park.

144 page Catalogue £2.50 UK £8 international posted (or download free!) and enquire for further details or visit our website where you will find other Polly Locos, Kits, drawings and castings for scale models and comprehensive ME Supplies.



Polly Model Engineering Limited
Atlas Mills, Birchwood Avenue,
Long Eaton, Nottingham,
NG10 3ND, United Kingdom

www.pollymodelengineering.co.uk

Tel: +44 115 9736700

email: sales@pollymodelengineering.co.uk