THE ORIGINAL MAGAZINE FOR MODEL ENGINEERS

Vol. 227 No. 4679 • 3 - 16 December 2021

MODEL ENGINEER

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

COVER FEATURE

Great Central Railway

Harris Engine

Polly Awards

Clock Chapter Rings

£4.40

mytimemedia ENGINEERING GROUP

9 770026 732223 79

NEW STORE NORTHAMPTON NOW OPEN!

Machine Mart

65 SUPERSTORES NATIONWIDE

Britain's Machinery Specialist! Tools &

NEW 500 PAGE CATALOGUE
GET YOUR FREE COPY!
IN-STORE
PHONE 0844 880 1265
ONLINE www.machinemart.co.uk

GIFT CARD!
BUY AND REDEEM:
✓ IN-STORE ✓ ONLINE ✓ PHONE

Clarke 6 SPEED METAL LATHE WITH 12 SPEED MILL DRILL- CL500M

- 430mm between centres
- Compound slide with 4 way tool post
- Power fed screw cutting facility
- Forward/reverse lathe operation
- Clutch for independent mill/drill operation

£1299.00 EXC.VAT £1558.80 inc.VAT

Floor Stand Including Suds Tray £199.00 Exc.VAT £238.80 inc.VAT

Clarke METAL LATHE

- 300mm between centres
- LH/RH thread screw cutting
- Electronic variable speed
- Gear change set
- Self centering 3 jaw chuck & guard
- Power feed

CL300M

£629.00 EXC.VAT £754.80 inc.VAT

TURBO AIR COMPRESSORS

airmaster

- Superb range ideal for hobby & semi-professional use

FROM ONLY £109.98 EXC.VAT £131.98 inc.VAT

TIGER 16/550

ALSO HUGE RANGE OF CLARKE AIR TOOLS IN-STORE & ONLINE

MODEL	MOTOR	CFM	TANK	EXC.VAT	INC.VAT
Tiger 8/260	2HP	7.5	24ltr	£109.98	£131.98
Tiger 11/550	2.5HP	9.3	50ltr	£149.98	£179.98
Tiger 16/550	3HP	14.5	50ltr	£219.98	£263.98
Tiger 16/1050	3HP	14.5	100ltr	£269.98	£323.98

Clarke MMA & ARC/TIG INVERTER WELDERS

FROM ONLY £94.99 EXC.VAT £113.99 inc.VAT

MODEL	MIN/MAX OUTPUT CURRENT	ELECTRODE DIA. (MM)	EXC.VAT	INC.VAT
MMA80	20A-80A	1.6-2.5	£94.99	£113.99
MMA140	20A-140A	1.6-3.2	£104.99	£125.99
AT133	10A-130A	2.5/3.2	£134.99	£161.99
AT162	10A-160A	2.5/3.2/4.0	£154.99	£185.99
MMA200	20A-200A	1.6-4	£145.00	£174.00
AT135	10A-130A	2.5/3.2	£175.00	£210.00
AT165	10A-160A	2.5/3.2/4.0	£209.00	£250.80

Clarke MIG WELDERS

Quality machines from Britain's leading supplier
See online for included accessories

GAS, TIPS, SHROUDS & WIRE IN STOCK

FROM ONLY £219.98 EXC.VAT £263.98 inc.VAT

135TE

MODEL	MIN-MAX AMPS	EXC.VAT	INC.VAT
PRO90	24-90	£219.98	£263.98
135TE Turbo	30-130	£269.98	£323.98
151TE Turbo	30-150	£309.00	£370.80
175TECM Turbo	30-170	£509.00	£610.80
205TE Turbo	30-185	£539.00	£646.80

Clarke NO GAS/GAS MIG WELDERS

- Professional type torch with on/off control
- Thermal overload protection
- Turbo fan cooled
- Easy conversion to gas with optional accessories

FROM ONLY £139.98 EXC.VAT £167.98 inc.VAT

MIG102NG

BEST SELLER

+no gas only

MODEL	MIN/MAX AMPS	EXC.VAT	INC.VAT
MIG 102NG*	35/90	£139.98	£167.98
MIG 106	40/100	£179.00	£214.80
MIG 145	35/135	£219.00	£262.80
MIG 196	40/180	£259.00	£310.80
MIG 240	50/240	£469.00	£562.80

Clarke MILLING DRILLING MACHINE

- Bench mountable, tilts 45° left & right from vertical
- Table travel 100x235mm
- Table Effective Size LxW: 92 x 400mm

CMD300

£669.00 EXC.VAT £802.80 inc.VAT

Clarke DRILL PRESSES

- Range of precision bench & floor presses for enthusiast, engineering & industrial applications

FROM ONLY £79.99 EXC.VAT £95.98 inc.VAT

B = Bench mounted F = Floor standing

MODEL	MOTOR (W) SPEEDS	EXC. VAT	INC. VAT
CDP5EB	350 / 5	£79.98	£95.98
CDP102B	350 / 5	£99.98	£119.98
CDP202B	450 / 16	£235.00	£282.00
CDP352F	550 / 16	£289.00	£346.80
CDP452B	550 / 16	£299.00	£358.80
CDP502F	1100 / 12	£725.00	£870.00

CDP102B

Clarke 3-IN-1 SHEET METAL MACHINES

SBR610

- Bend, Roll & Shear metal up to 1mm thick
- Min. Rolling Diameter 39mm
- Bending angle 0-90°

FROM ONLY £289.00 EXC.VAT £346.80 inc.VAT

ROLLING, SHEARING & FOLDING

MODEL	BED WIDTH	EXC.VAT	INC.VAT
SBR305	305mm (12")	£289.00	£346.80
SBR610	610mm (24")	£529.00	£634.80
SBR760	760mm (30")	£619.00	£742.80

Clarke TOOL CHESTS / CABINETS

BALL BEARING

FROM ONLY £82.99 EXC.VAT £99.59 inc.VAT

OVER 50 MODELS IN THE RANGE

MODEL	DESCRIPTION	EXC. VAT	INC. VAT
CTC600B	6 Dr Chest	£82.99	£99.59
① CTC900B	9 Dr Chest	£94.99	£113.99
CTC500B	5 Dr Cabinet	£129.98	£155.98
CTC800B	8dr Chest/Cabinet	£144.99	£173.99
② CTC700B	7 Dr Cabinet	£154.99	£185.99
CTC1300B	13dr Chest/Cabinet	£189.98	£227.98

Clarke INDUSTRIAL ELECTRIC MOTORS

- Range of single phase motors suited to many applications
- All totally enclosed & fan ventilated for reliable long-term service

FROM ONLY £69.98 EXC.VAT £83.98 inc.VAT

HP	SHAFT SPEED	EXC. VAT	INC.VAT
½	2 pole	£69.98	£83.98
⅓	4 pole	£74.99	£89.99
1	2 pole	£94.99	£113.99
¾	4 pole	£99.98	£119.98
2	2 pole	£149.98	£179.98
3	2 pole	£174.99	£209.99
4	2 pole	£179.98	£215.98

Clarke TURBO FAN GAS HEATERS

Offering low cost, efficient heating

DUAL VOLTAGE 230v 110 VOLT IN STOCK FROM £214.80

FROM ONLY £89.98 EXC.VAT £107.98 inc.VAT

PROPANE GAS FIRED

MODEL	MAX OUTPUT KW	EXC. VAT	INC. VAT
Little Devil II	10.3	£89.98	£107.98
Devil 700	15	£109.98	£131.98
Devil 900	24.9	£149.98	£179.98
Devil 1600	36.6	£179.98	£215.98
Devil 2100	49.8	£259.00	£310.80
Devil 4000	131	£449.00	£538.80

Clarke MICRO MILLING & DRILLING MACHINE

CMD10

- Bench mountable
- MT2 Spindle Taper
- Face mill capacity 20mm, end mill 10mm
- Table cross travel 90mm, longitudinal travel 180mm

£449.00 EXC.VAT £538.80 inc.VAT

MODEL	MOTOR	SPINDLE SPEED	EXC.VAT	INC.VAT
CMD10	150W/230V	100-2000rpm	£449.00	£538.80
CMD300	470W/230V	0-2500rpm	£669.00	£802.80

Clarke BENCH GRINDERS

FROM ONLY £42.99 EXC.VAT £51.59 inc.VAT

ALSO STANDS AVAILABLE FROM ONLY £47.98 INC.VAT

18 MODELS IN THE RANGE

MODEL	DUTY	WHEEL DIA	EXC.VAT	INC.VAT
CPG75F	DIY	75mm	£49.98	£59.98
CBG6RP	DIY	150mm	£42.99	£51.59
CBG6RZ	PRO	150mm	£51.99	£62.39
CHDBG500	HD	150mm	£99.98	£119.98
CBG8370LW	HD	200mm	£82.99	£99.59

Clarke ROTARY TOOL KIT

NEW

ONLY £33.99 EXC.VAT £40.79 inc.VAT

Kit includes:
- Rotary tool
- Height adjustable stand with clamp
- 1m flexible drive
- 40x accessories/ consumables

CRT130

Clarke ELECTRIC HEATERS

BEST SELLER NEW

DEVIL 7003

FROM ONLY £39.98 EXC.VAT £47.98 inc.VAT

DEVIL 2850

MODEL	VOLTAGE	HEAT OUTPUT KW	EXC.VAT	INC.VAT
DEVIL 2850 NEW	230V	1.4-2.8	£39.98	£47.98
DEVIL 7003	230V	3	£67.99	£81.59
DEVIL 7005	400V	5	£89.98	£107.98
DEVIL 7009	400V	9	£139.98	£167.98

Clarke BOLTLESS SHELVING/ BENCHES

- Simple fast assembly in minutes using only a hammer

150 kg PER SHELF (evenly distributed) Strong 9mm fibreboard shelves

350 kg PER SHELF (evenly distributed) Strong 12 mm fibreboard shelves

CHOICE OF 5 COLOURS RED, BLUE, GREY, SILVER & GALVANISED STEEL

FROM ONLY £35.99 EXC.VAT £43.19 inc.VAT

MODEL	DIMS WxDxH(mm)	EXC.VAT	INC.VAT
150kg	800x300x1500	£35.99	£43.19
350kg	900x400x1800	£54.99	£65.99

Clarke 1 TONNE FOLDING WORKSHOP CRANE

BEST SELLER

ONLY £199.98 EXC.VAT £239.98 inc.VAT

CFC100

- Folding and fixed frames available
- Robust, rugged construction
- Overload safety valve

Fully tested to proof load

Clarke ENGINEERS HEAVY DUTY STEEL WORKBENCHES

FROM ONLY £239.00 EXC.VAT £286.80 inc.VAT

INCLUDES SINGLE LOCKABLE DRAWER

- Sturdy lower shelf
- Durable powder coated finish

Shown fitted with optional 3 drawer unit ONLY £107.98 INC VAT

MODEL	DIMS LxWxH (mm)	EXC. VAT	INC. VAT
CWB1500D	1500x650x985	£239.00	£286.80
CWB2001P	2000x650x865	£259.00	£310.80
CWB2000D	2000x650x880	£299.00	£358.80

Clarke HYDRAULIC LIFTING TABLES

- Ideal for lifting & moving models
- Foot pedal operated

HTL500

FROM ONLY £359.00 EXC.VAT £430.80 inc.VAT

MODEL	MAX. LOAD	TABLE HEIGHT MIN-MAX	EXC. VAT	INC. VAT
HYL300	300kg	340-900mm	£359.00	£430.80
HTL500	500kg	340-900mm	£399.00	£478.80

Clarke BENCH BUFFERS/ POLISHERS

- For a brilliant shine

FROM ONLY £76.99 EXC.VAT £92.39 inc.VAT

MODEL	DIA. (mm)	EXC.VAT	INC.VAT
CBB150	150	£76.99	£92.39
CBB200	200	£97.99	£117.59
CBB250	250	£169.00	£202.80

PAY Monthly

- Spread the cost over 12, 18, 24, 36 or 48 months
- Any mix of products over £300
- 18.9% APR, 10% Deposit*

5 MIN APPLICATION!

VISIT YOUR LOCAL SUPERSTORE

OPEN MON-FRI 8.30-6.00, SAT 8.30-5.30, SUN 10.00-4.00

BARNSLEY Pontefract Rd, Barnsley, S71 1EZ	01226 732297	**EXETER** 16 Trusham Rd. EX2 8QG	01392 256 744
B'HAM GREAT BARR 4 Birmingham Rd.	0121 358 7977	**GATESHEAD** 50 Lobley Hill Rd. NE8 4YJ	0191 493 2520
B'HAM HAY MILLS 1152 Coventry Rd, Hay Mills	0121 7713433	**GLASGOW** 280 Gt Western Rd. G4 9EJ	0141 332 9231
BOLTON 1 Thynne St. BL3 6BD	01204 365799	**GLOUCESTER** 221A Barton St. GL1 4HY	01452 417 948
BRADFORD 105-107 Manningham Lane. BD1 3BN	01274 390962	**GRIMSBY ELLIS WAY,** DN32 9BD	01472 354435
BRIGHTON 123 Lewes Rd, BN2 3QB	01273 915999	**HULL** 8-10 Holderness Rd, HU9 1EG	01482 223161
BRISTOL 1-3 Church Rd, Lawrence Hill, BS5 9JJ	0117 935 1060	**ILFORD** 746-748 Eastern Ave. IG2 7HU	0208 518 4286
BURTON UPON TRENT 12a Lichfield St. DE14 3QZ	01283 564 708	**IPSWICH** Unit 1 Ipswich Trade Centre, Commercial Road	01473 221253
CAMBRIDGE 181-183 Histon Road, Cambridge. CB4 3HL	01223 322675	**LEEDS** 227-229 Kirkstall Rd, LS4 2AS	0113 231 0400
CARDIFF 44-46 City Rd, CF24 3DN	029 2046 5424	**LEICESTER** 69 Melton Rd. LE4 6PN	0116 261 0688
CARLISLE 85 London Rd. CA1 2LG	01228 591666	**LINCOLN** Unit 5, The Pelham Centre, LN5 8HG	01522 543 036
CHELTENHAM 84 Fairview Road. GL52 2EH	01242 514 402	**LIVERPOOL** 80-88 London Rd, L3 5NF	0151 709 4484
CHESTER 43-45 St. James Street. CH1 3EY	01244 311258	**LONDON CATFORD** 289/291 Southend Lane SE6 3RS	0208 695 5684
COLCHESTER 4 North Station Rd. CO1 1RE	01206 762831	**LONDON** 6 Kendal Parade, Edmonton N18	020 8803 0861
COVENTRY Bishop St. CV1 1HT	024 7622 4227	**LONDON** 503-507 Lea Bridge Rd. Leyton, E10	020 8558 8284
CROYDON 423-427 Brighton Rd, Sth Croydon	020 8763 0640	**LUTON** Unit 1, 326 Dunstable Rd, Luton LU4 8JS	01582 728 063
DARLINGTON 214 Northgate, DL1 1RB	01325 380 841	**MAIDSTONE** 57 Upper Stone St. ME15 6HE	01622 769 572
DEAL (KENT) 182-186 High St. CT14 6BQ	01304 373 434	**MANCHESTER ALTRINCHAM** 71 Manchester Rd. Altrincham	0161 9412 666
DERBY Derwent St. DE1 2ED	01332 290 931	**MANCHESTER CENTRAL** 209 Bury New Road M8 8DU	0161 241 1851
DONCASTER Wheatley Hall Road	01302 245 999	**MANCHESTER OPENSHAW** Unit 5, Tower Mill, Ashton Old Rd	0161 223 8376
DUNDEE 24-26 Trades Lane. DD1 3ET	01382 225 140	**MANSFIELD** 169 Chesterfield Rd. South	01623 622160
EDINBURGH 163-171 Piersfield Terrace	0131 659 5919	**MIDDLESBROUGH** Mandale Triangle, Thornaby	01642 677881
		NORWICH 282a Heigham St. NR2 4LZ	01603 766402
		NORTHAMPTON Beckett Retail Park, St James' Mill Rd	01604 267840
		NOTTINGHAM 211 Lower Parliament St.	0115 956 1811
		PETERBOROUGH 417 Lincoln Rd. Millfield	01733 311770
		PLYMOUTH 58-64 Embankment Rd. PL4 9HY	01752 254050
		POOLE 137-139 Bournemouth Rd. Parkstone	01202 717913
		PORTSMOUTH 277-283 Copnor Rd. Copnor	023 9265 4777
		PRESTON 53 Blackpool Rd. PR2 6BU	01772 703263
		SHEFFIELD 453 London Rd. Heeley. S2 4HJ	0114 258 0831
		SIDCUP 13 Blackfen Parade, Blackfen Rd	0208 3042069
		SOUTHAMPTON 516-518 Portswood Rd.	023 8055 7788
		SOUTHEND 1139-1141 London Rd. Leigh on Sea	01702 483 742
		STOKE-ON-TRENT 382-396 Waterloo Rd. Hanley	01782 287321
		SUNDERLAND 13-15 Ryhope Rd. Grangetown	0191 510 8773
		SWANSEA 7 Samlet Rd. Llansamlet. SA7 9AG	01792 792969
		SWINDON 21 Victoria Rd. SN1 3AW	01793 491717
		TWICKENHAM 83-85 Heath Rd.TW1 4AW	020 8892 9117
		WARRINGTON Unit 3, Hawley's Trade Pk.	01925 630 937
		WIGAN 2 Harrison Street, WN5 9AU	01942 323 785
		WOLVERHAMPTON Parkfield Rd. Bilston	01902 494186
		WORCESTER 48a Upper Tything. WR1 1JZ	01905 723451

5 EASY WAYS TO BUY...

SUPERSTORES NATIONWIDE

ONLINE www.machinemart.co.uk

TELESALES 0115 956 5555

CLICK & COLLECT OVER 10,500 LOCATIONS

CALL & COLLECT AT STORES TODAY

31432

MODEL ENGINEER

Published by **MyTimeMedia Ltd**.
Suite 6G, 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

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

recycle
When you have finished with this magazine please recycle it.

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

IN THIS ISSUE

Vol. 227 No. 4679 3 - 16 December 2021

ON THE COVER...

1927 Foster traction engine **Fiery Elias**, *once owned by the Revd. Teddy Boston and the inspiration for* **Trevor**, *featured in the Revd. Wilbert Awdry's railway stories (photo: Graham Gardner).*

SILVER CREST models

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

5" GAUGE GWR 61xx CLASS

£7,995.00 + p&p

The GWR 61xx Class

The 61xx Class locomotives were, like many others, developed from earlier designs. The Class owes its beginnings to locomotive No.99 designed by Churchward in 1903.

The 61xx Class were almost identical to the earlier 51xx and later 81xx Class. They did however, have an increased boiler pressure which resulted in a greater tractive effort.

The 61xx locomotives spent their working lives on the Paddington suburban services and were capable of hauling heavy trains at fast speeds due to their increased boiler pressure. In GWR days standard unlined green livery was carried. B.R. applied both lined black and lined green liveries to the class.

Summary Specification

Approx length 44"

- Coal-fired live steam
- 5" gauge
- 2 Outside cylinders
- Piston valves
- Stephenson valve gear
- Mechanical drain cocks
- Mechanical Lubricator
- Silver soldered copper boiler
- Multi-element Superheater
- Pole Reverser
- Boiler feed by cross head pump, injector, hand pump
- Etched brass body with rivet detail
- GW Pattern Double Safety Valves
- Painted and ready-to-run
- Choice of 3 liveries

Approx Dimensions:

- (L) 44" x (W) 9.5" x (H) 13.5"

"We are constantly upgrading the design of our models and the manufacturing processes we employ. The 5" gauge 61xx Class is the latest model to benefit from this enhanced quality specification. It is a stunning model that is easy to transport and yet capable of pulling a number of adults. As an award winning professional builder I have no hesitation in recommending this to experienced model engineers and to those new to this rewarding hobby".

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**

The 5" Gauge Model

The 61xx 2-6-2 is a large "Prairie" tank locomotive. Similar in size to our extremely popular BR Standard 4 it offers live steam enthusiasts a powerful model capable of pulling a number of adults. It has good access to the cab when driving without the need to reach over a tender.

At just £7,995.00 + shipping this 5" gauge model offers unbeatable value-for-money. The model is delivered ready-to-run and fully painted, with a choice of either GWR Green, BR Lined Green or BR Lined Black livery. Each is complete with a silver soldered copper boiler, hydraulically tested to twice working pressure.

All boilers comply with the latest regulations and are UKCA marked and certificated. The 61xx makes an ideal model to display, transport and drive.

As testament to our confidence in the high quality of this model we are pleased to offer a full 12 month warranty. Our customer service is considered to be second-to-none.

Delivery and Payment

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

The order book is now open and we are happy to accept your order reservation for a deposit of just £1,995.00.

VISA MasterCard

We will request an interim payment of £2,500.00 in January 2022 as the build of your model progresses,a further stage payment of £2,500.00 in April 2022 and a final payment of £1,000.00 in July/August 2022 in advance of delivery.

FREE BROCHURE REQUEST FORM

Please send, without obligation, my free 5" gauge GWR 61xx brochure.

Name: _____

Address: _____

_____

_____ Post Code: _____

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

ME

Company registered number 7425348

MODEL ENGINEER SUBSCRIPTION ORDER FORM

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

DIRECT Debit

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

SMOKE RINGS

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

NRM Workshop

The National Railway Museum is closing its on-site workshop. I believe this is a great pity. For me, a visit to the NRM was incomplete until I had stood in the gallery looking down at whatever was going on in there. Two highlights for me were seeing *City of Truro* and then *Flying Scotsman* being overhauled there (both 100mph record breakers – one unofficially and the other officially).

Roger Backhouse writes with the following.

'Machine tools from York's National Railway Museum workshop are being cleared out following closure of the workshop. Passers-by on 11th November observed an ex-York carriage works Elliott vertical slotting machine and a Webster-Bennett vertical boring machine outside the workshop, both destined for the Strathspey Railway. Though used regularly until recently these machines are now over 70 years old and heritage engineering in their own right.

'Although the Museum has one of the biggest collections of engineered objects in the country it is now without workshop facilities. Previously visitors could see activities in the well-equipped workshop from a viewing gallery. It was always popular, giving a realistic picture of real-life railway engineering, now lacking from a much more antiseptic museum. Many famous locomotives have received engineering attention here, including *Duchess of Hamilton*, *City of Truro* and the LNWR Super D.

'Museum plans are for the workshop and viewing area to be turned into Wonderlab, described by the Museum as "a dynamic, dramatic, and multi-sensory gallery to help visitors think and act like engineers". This will "seek to encapsulate the spirit of the space by inspiring visitors to make things work and make things work better when they play with 20 interactive exhibits".

'The York Press (12th November) reports that Yorkshire based artist Pippa Hale has been commissioned to "create a headline installation for the family-friendly gallery that will feature a collection of large interactive blocks that would encourage visitors… to design, build and play together". Though there will be other interactive exhibits this hardly sounds sophisticated.

'The museum welcomes anyone with a keen interest in helping shape the development of Wonderlab. Those interested in being involved in Team Wonder should contact team.wonder@railwaymuseum.org.uk to find out more.

'It is hard to see how this can make up for losing all the practical engineering expertise at the Museum. Whatever the merits of Wonderlab the loss of these significant workshop facilities is a major loss to British railway heritage and preservation.'

Hear, hear! I believe the workshop was a very important feature of the Railway Museum.

Flying Scotsman *in the workshop 2012.*

Visitor's view of the workshop - a real engineering workshop now closed.

Quorn & Woodhouse station.

Unusual gents.

W.H. Smith at Loughborough.

Loughborough signal box.

Great Central Railway Vintage Weekend and Beer Festival

Graham Gardner goes in search of beer and finds a Vintage Weekend thrown in too.

The railway was first opened in 1897 by Edward Watkin, a railway entrepreneur with the idea of a fast line into London from the Midlands. At present the remaining line is only about 8 miles long but with fundraising ongoing to raise 3 million pounds for two new bridges and other work plus 500 meters of track. Members will then be able to join up with Nottingham Heritage centre giving 18 miles of track and a connection to the Midland main line.

This annual event is always held over the Easter weekend each year but due to the pandemic was cancelled. When the restrictions were eased a little it was decided to hold the event at the end of July, which was great news.

The Great Central is the only preserved line that has got a double track and includes Loughborough, Quorn, Woodhouse and Rothley stations, all of which were putting on the beer festival. There was also a Gin and Prosecco bar if you were feeling a bit upper class!

As well as locomotives running throughout the weekend there was a good turnout of traction engines and vintage vehicles to be seen. One Sentinel tractor owner was going to drive the 200 miles to the show but had to pull out after problems, which was a pity, as this would have been a great sight on the roads.

On the Saturday at 3pm the engines went on a road run through Quorn and the surrounding area. I managed to get a lift on a 1928 Sentinel ≫

Full train heading for Leicester north.

LNER toilet unit.

steam wagon owned by the Johnson family, which was very enjoyable, as was the beer at the pub, when lots of people came over to see us!

At Quorn & Woodhouse station the Benson & Henderson café was serving meals and drinks throughout the weekend as well as providing toilet facilities etc. There is also the 'Tin Shed' bar which was well worth a visit and was kept very busy through the weekend and evenings with two nights of entertainment from the 'Roosters' on the Friday and the Famous DR Busker on the Saturday.

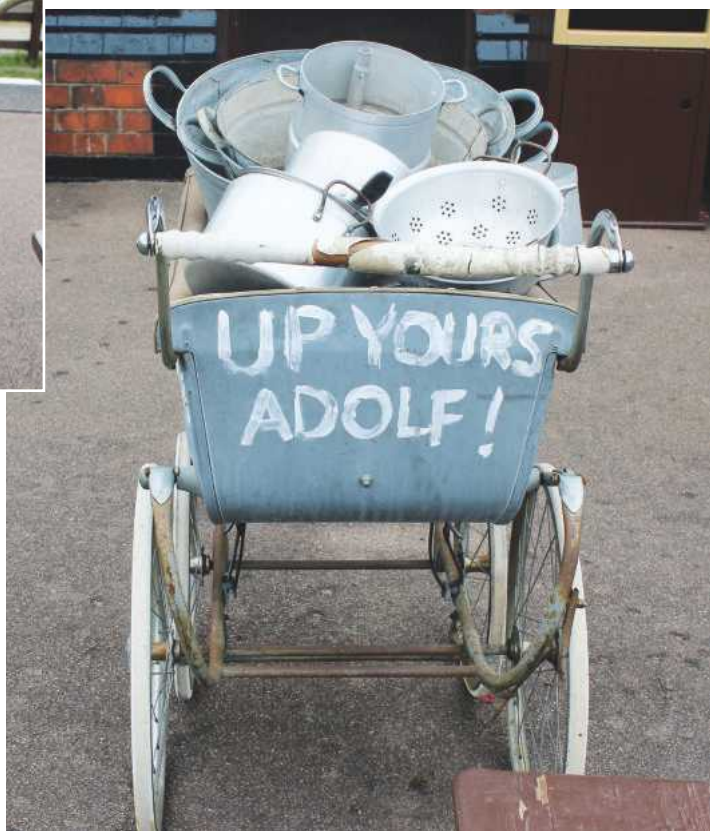
Howards Olde Tyme Funfair had various rides in operation throughout the weekend and was kept busy with their steam powered gallopers which were built in 1866 by Savages of Kings Lynn and provided a great atmosphere with its 54 key Limonaire organ.

Many thanks to Michael Stokes for his help and support and for putting on such a great show. for details of the Great Central Railway and all the events please ring 01509-632323 or visit www.gcrailway.co.uk

ME

"Beer or cider, ladies?"

War scrap collecting.



1937 Vauxhall DX14.

Very nice 4 inch scale Garrett traction engine Betty.

1927 Foster Fiery Elias *brought into preservation by the late Reverend Teddy Boston.*

1919 Mann steam wagon, works no. 1365.

1930 BSA with side gear change and sidecar.

9F no. 925214 City of Leicester.

1886 steam powered gallopers built by Savages of Kings Lynn, owned by Howards fun fair.

Replica '1900' light steam delivery vehicle owned by Mr Tom Attwood.

1928 Sentinel steam wagon owned by the Johnson family.

1952 RTL bus - clocked over 170,000 miles before being sold into preservation in 1965.

An Astronomical Bracket Clock PART 17

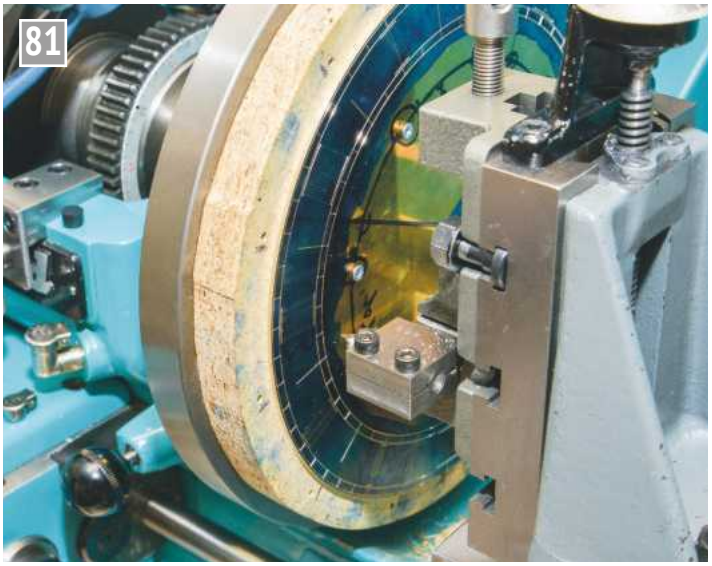
Adrian Garner makes a bracket clock showing both mean and sidereal time.

Continued from p.709
M.E. 4678, 19 November 2021

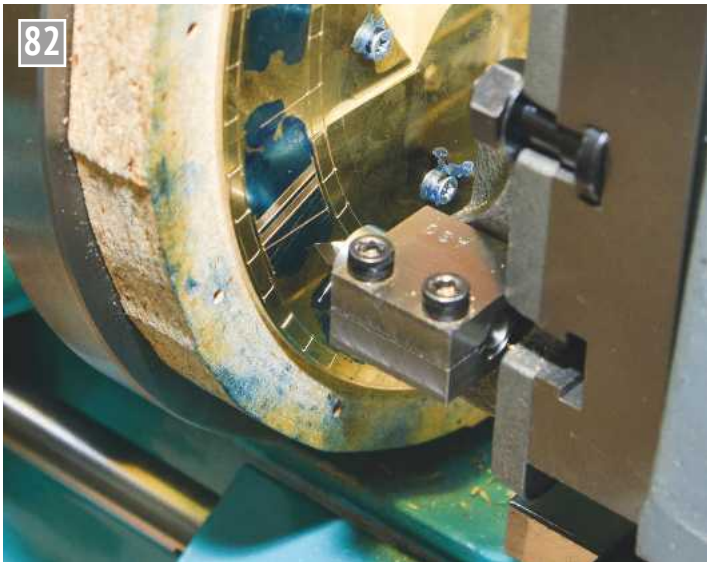
Inner chapter ring

The method of engraving this chapter ring is no different to the outer sidereal chapter ring but it is more complex and the scope for error is therefore larger. It also has to be secured to the inner matted dial in the correct position. The method I followed was as follows:

* Drill a circle of eight holes for screws within the waste central area.
* Mount a wooden disc on the lathe faceplate.
* Mount the brass disc centrally on the wood ensuring all screw holes in the wood are countersunk so that the brass remains flat. Use a dial indicator to check. If there is more than one thou movement indicated, remove the brass and take a fine cut across the wood face. I use a vacuum cleaner to minimize the dust. Remount and recheck. Be fussy as the engraving is relatively shallow and any unevenness will cause problems.
* Turn to size (8⅛ inches). Better to be slightly too small – too big and it will interfere with the outer sidereal chapter ring.
* Engrave the circles with the 60 degree cutter to a depth of about 0.010 – 0.015 inch. These can be cut under power with the faceplate turning slowly and the cutter held on the vertical slide. Ensure the cutter is at centre height before cutting.
* Rotate the cutter ninety degrees and engrave the minutes to about 0.010 inch. Take this in two or three cuts. I find it easiest to cut with the tool facing towards me i.e. cuts on the withdrawal of the cross slide. This allows me to see when to stop! I use magnifying glasses to see what is happening.
* Cut the quarters but before doing so put a dab of layout blue where the 'flowers' will be. On these strokes the cut can be taken fully up the stem. The dab of blue helps prevent cuts being taken where they should not!
* Remove the faceplate from the lathe but leave the brass secured to the wood/faceplate. Apply layout blue to the areas where the numerals will be. Carefully mark out.
* Return the faceplate to the lathe, rotate the cutter again and using the dividing head arm to drive the mandrel, cut the top and bottom underlining of the numerals. Again, all to about 0.010 inch. Note, the bottom of the Vs are not underlined. This is a convention that is so easy to forget (**photo 81**).



Cutting the underlining.



Planing the cross bars of the Vs and Xs.

* Plane the *I*s. I use the marking out as a guide but position the cutter by coordinates. I suspect this is overly pedantic - it just works for me. Take three cuts to reach a total depth of about 0.010 inch.

Plane the cross bars of the Vs and Xs. The former are at 10 degrees and the latter at about 20 degrees to the 'horizontal' (**photo 82**).

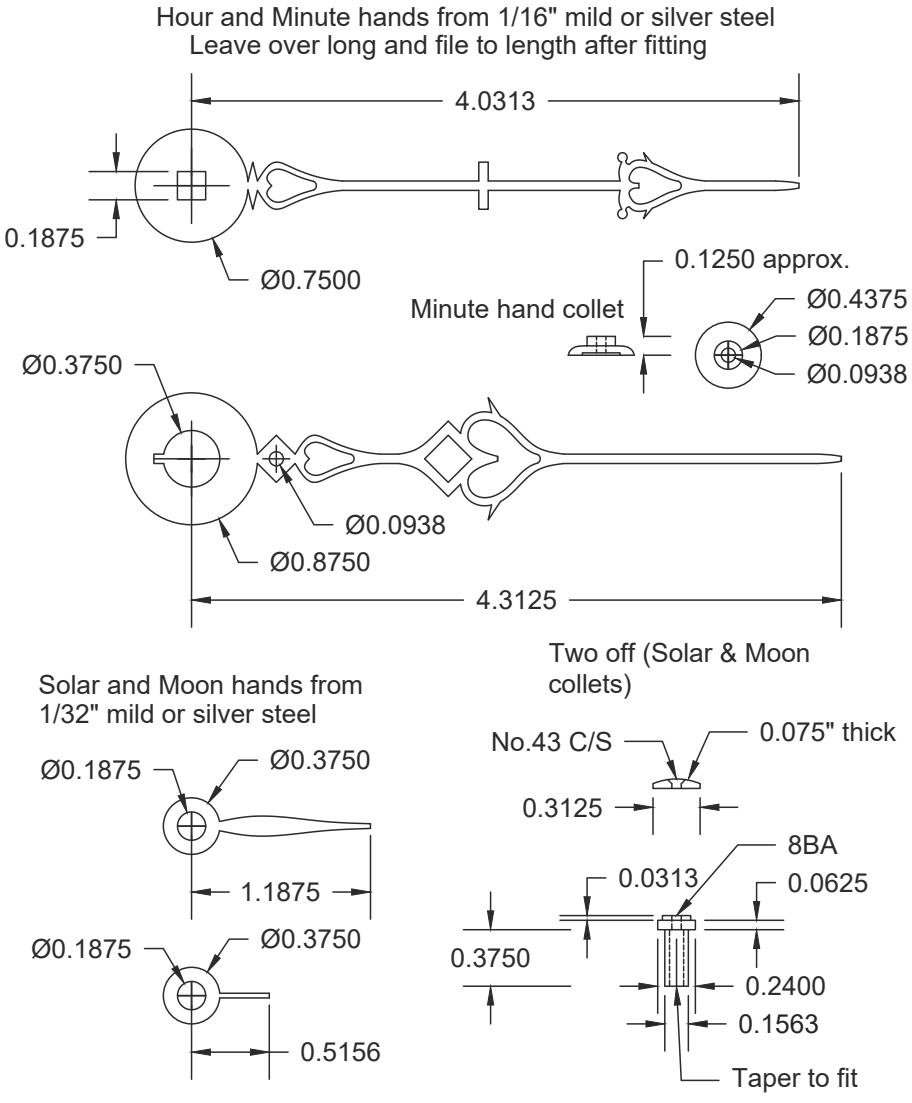
* Remove the faceplate and mount it on a rotary table to drill the flower holes 10BA tapping (No. 54). If you have a drill attachment for the lathe, these holes can be drilled with the faceplate *in situ* (**photo 83**).
* Cut the cross stalks of the flowers with the faceplate on the lathe.
* Secure the outer edge of the chapter ring and trepan (**photo 84**).

With the chapter ring completed, mount a disc of Perspex on the wood on the faceplate. Turn the disc so that it just fits inside the centre of the chapter ring. Drill a central 3⁄16 inch hole. Using your index arrangements and the 60 degree pointed cutter cut two lines at right angles across the disc. (Ensure the cutter is at centre height).

Remove the Perspex and use it, with a 3⁄16 inch steel peg, to bring the matted face and

Fig 32

Hands



As on Tompion's original clock, the hour hand needs to be longer than the minute as it has to project onto the outer chapter ring - the minute hand, as previously explained, is only relevant in relation to the inner chapter ring.

chapter ring into registration. The two cut lines on the Perspex will help align 12 o'clock on the chapter ring to the other holes on the matted face. Drill through the outer flower holes 10BA tapping. Tap the chapter ring holes and open up the holes in the matted face to 10BA clearing.

Shorten twelve steel screws so that they are flush with the chapter ring when screwed home from behind the dial plate. When blued they will look like the black on the rest of the engraving.

Hands

As on Tompion's original clock, the hour hand needs to be longer than the minute as it has to project onto the outer chapter ring (the minute hand, as previously explained, is only relevant in relation to the inner chapter ring). The design is personal preference but they need to not obscure the moon and solar hands. I opted for a variation on the design of hands adopted by many clock makers in Pennsylvania during the latter part of the 18th century.

Both the hour and minute hands were pierced and filed from 1/16 inch mild steel plate. Using layout blue and marking out is tedious with these types of shape so I printed the design onto paper which I then glued to the steel with 3M Spray Mount (**photo 85**). Care needs to be taken not to distort the paper. Once dry the shapes were cut out by hand. At this stage leave the hands over long. They will be shortened to the required length later.

I have a separate set of needle files for steel partly to avoid the blunting effect of the steel on the needle files I use on brass but mainly to prevent the small filings of steel which are inevitably trapped between the file teeth scratching the brass. The files have ground safe edges to allow me to get right into corners when filing. A bright light and additional eye magnification are needed for this type of work.

This is one of the few occasions when the front facing edges of the work need to be rounded over a little to make the hands look more 3-dimensional. Small V's can also be filed where the shape changes to emphasise the shape.

Once filed to shape I polished with 600 grit silicon carbide paper which inevitably showed up some imperfections in the shape. A little further work with files and a re-polish to 600 grit is all that is needed at this time.

The moon and solar were cut from 1/32 inch mild steel plate as they need to be lighter and thinner.

●To be continued.

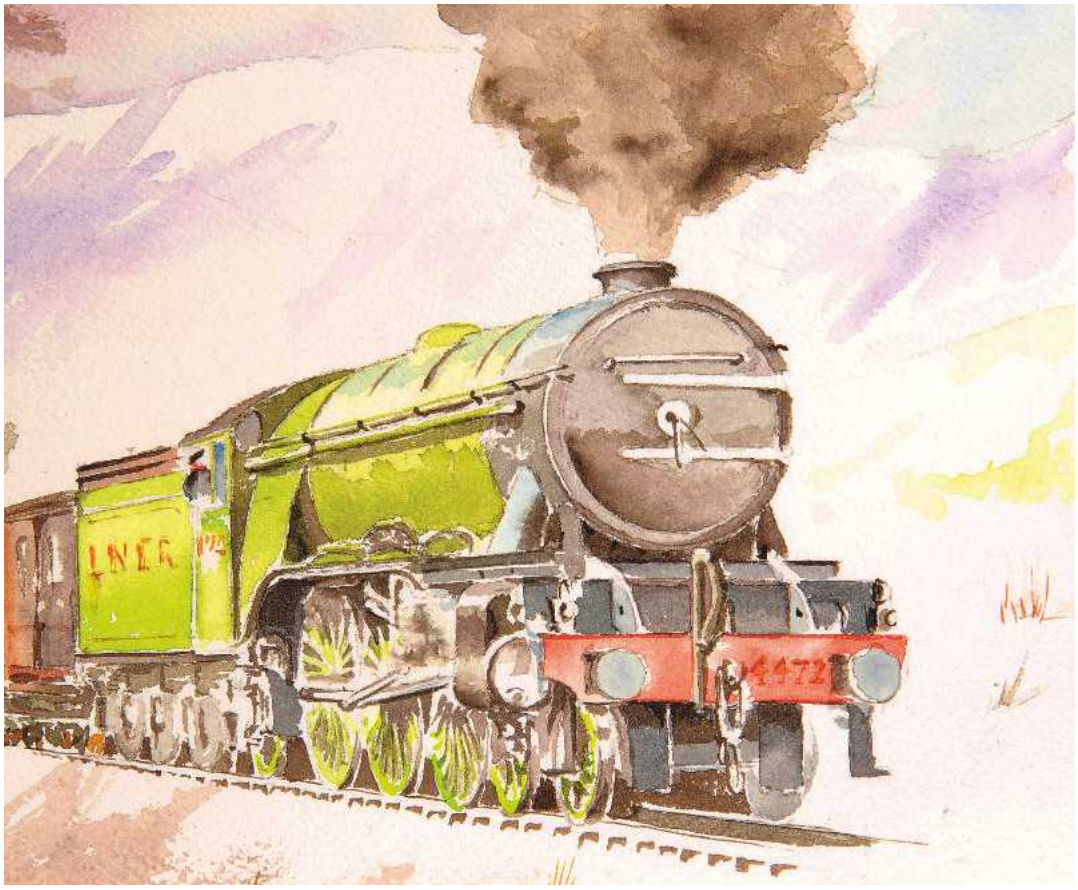
Drilling the flower holes.

Trepanning the chapter ring.

Cutting out the hands.

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

Continued from p.675
M.E. 4678, 19 November 2021



Painting by Diane Carney.

PART 23 - MAIN AXLEBOXES

Flying Scotsman in 5 Inch Gauge

1. Here we have one slot close to size. I machined both sides undersized and checked for fit taking equal amounts of each side until happy. Notes were made of the DRO settings for the other two sticks. I kept the front flange to size and machined from the back until the box was a sliding fit.

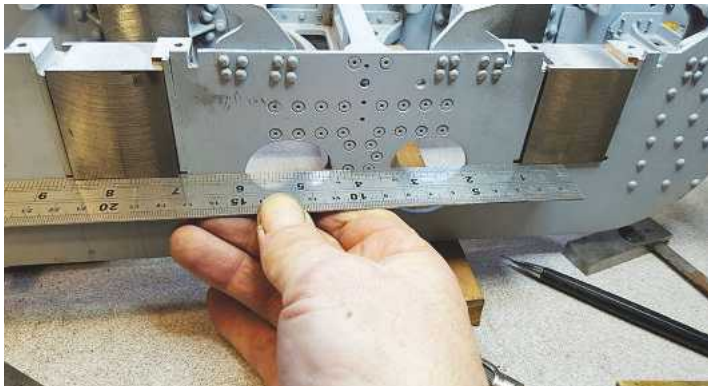
2. Once happy with the fit (driving axle) I parted the boxes on the chop saw and slid them into place. They were tight, which is what I wanted - you could push them up and down, but not easily, and after a few motions the tougher cast iron soon lapped the gunmetal horns to size, which had been left approximately 1 thou over. With the boxes snug in their slots it will make ensuring that the axle centres are correct a lot easier. Note that the boxes will be shorter than shown here when completed - the extra metal is for the pin hinges that are integral with the box.

Axleboxes

Don has followed full size very closely without going too far overboard, such as no machined pattern on the slot faces or some of the smaller parts. His design does look the part though and, of course, is a 'split box' design.

The first job was to cut a cast iron stick into three parts and then face them all to size, using a facemill. I marked each face after the final cut to take away the risk of inserting the stick the wrong way by mistake.

≫



3. Axlebox spacing should be fine but it's always wise to check before machining the boxes for their keeps. If there had been any discrepancy I could have offset the box centres a little to compensate but no need as they are fine - this photo shows a rule showing the correct spacing of 7 11/16 inches.

4. This shows the boxes marked ready for having the keep slot machined. This was a straightforward operation and was followed by drilling the oilways into the axlebox. The spring buckle pin holes are on the same centre line as the oilways so I drilled those too using packing to stop any flexing of the job. The last drilling job in this set-up was the 1/16 holes for the keep retaining pins. At first, I thought of trying to drill these straight through like the spring buckle pins but being so small there would most likely be some deflection. Also, I had no guarantee with the equipment to hand that if I drilled the holes separately through both sides that they would match perfectly the keeps once drilled. Therefore, I decided to just drill one side and when the keeps are machined for a tight fit in the slots I'll drill through these two reference holes, through the brass keep and out of the other side of the box.

5. I then reamed the spring buckle pin hole to size.

6. Next was to machine the oil reservoirs on top of each box. You can just see one of the oil-way holes breaking through as it should.

Keep slots

After all of the boxes had been lapped for a good close fit between the horns, I needed to check how things were going with regards to their accuracy, as axle spacing is a critical step in trying to achieve a good running locomotive. This was a tense moment even if I had done all that I could to ensure they were as planned - there's always that question in the back of your head 'is it right?'

Axlebox keeps

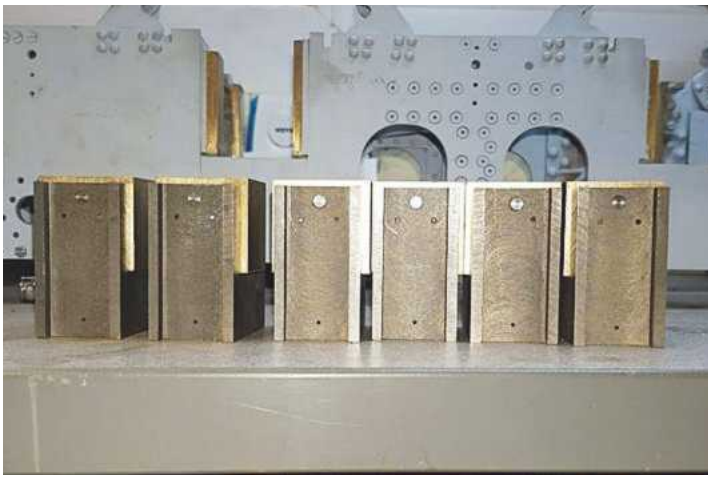
There was a good few hours of work to do here, first machining each stick to within a couple of thou of the slots, then cutting the sticks into individual pieces (oversize for now), filing any machine marks from the slots and finally lapping each keep face until it was a tight fit in its allotted slot.

FAR LEFT: 7. Here are the keep blocks having been machined to size for the axlebox slots. The two extra brass blocks are spares.

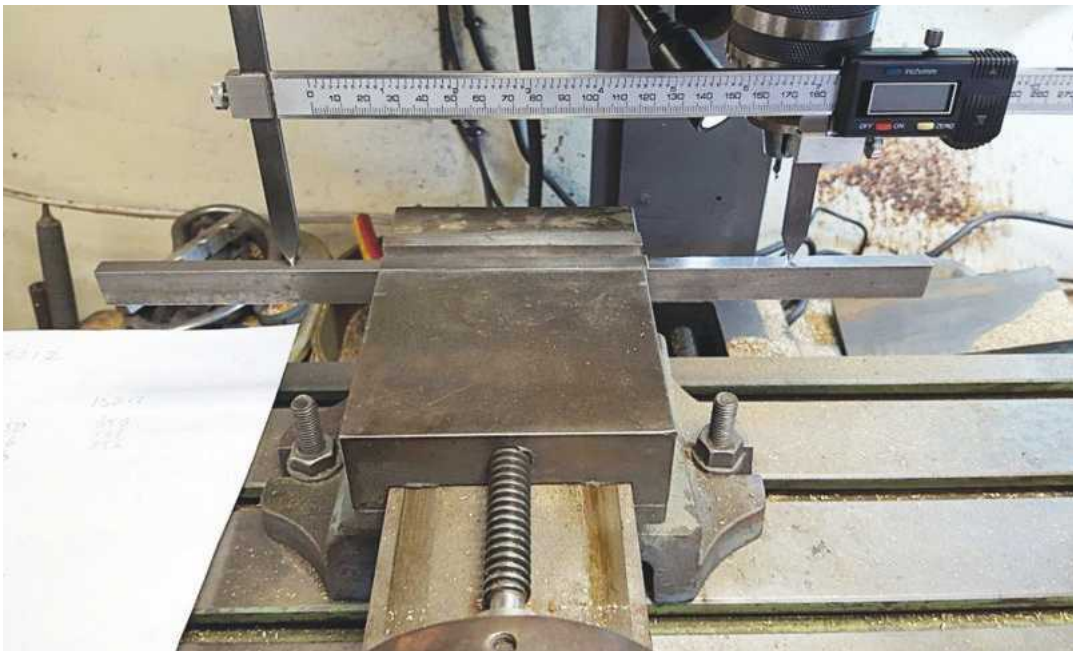
LEFT: 8. On to the drilling of the spring buckle and keep retaining pins. I started with the larger buckle pin which is simple enough or should I say less nerve racking than the 1/16 keep pins. A point to note here is why I left the keeps oversize for both height and width, in this case the height. I wanted to ensure that the keep was held tight against the top of the slot and leaving the keep oversize and the set-up this way around in the machine vice I could do this. Having drilled all of the buckle pin holes, I made up the 5/32 inch pins and fitted them.

RIGHT: 9. Here are all six axleboxes, with keeps, retaining pins and spring buckle pins fitted.

FAR RIGHT: 10. The axleboxes and keeps were then set up in the four jaw chuck to machine the keeps down to match the boxes. The first job was to machine the keeps down to the same width as the boxes. I did the rears first using packing to give me a flat base to position against the chuck face, square bar to fit in the slots and set by eye for centre. I clocked the rear face as shown here to ensure all was square and the rear packing was removed for safety once the box was held tight.

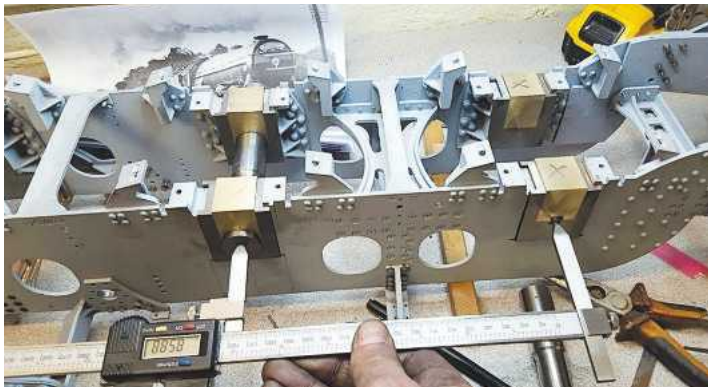


11. After plotting the right-hand side crank box centre (my datum) and then setting the vice, I spotted a small hole with a centre drill, as shown here.



12. I then needed to set the point to point vernier to 7 11/16 inch distance between axles. I didn't want to just trust the vernier for this so chose to use the mill DRO, drilling to spot holes into a length of steel bar and using this to set the vernier, which could then be used as a set of trammels.

13. It was then time to mark the centres for the leading and trailing axles. With the crank axle spotted and all axles having a centre line marked and put back in their horns, I used the vernier to plot the leading/trailing centres which I'm happy to say lined up with the individual box centres that were marked when machining first began.

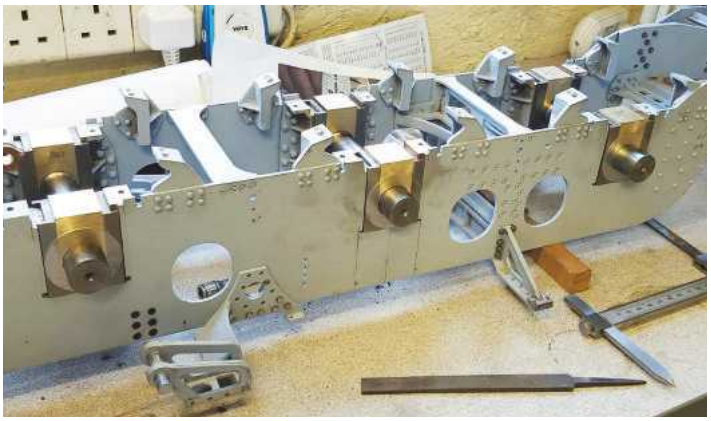


16. Checking the axle spacing.

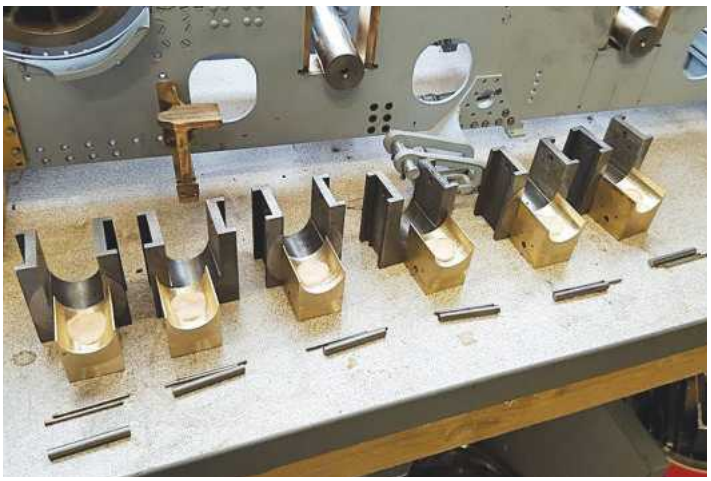
18. After splitting the keeps from their axleboxes, the next job on the list was machining the oil reservoirs in the keeps. I decided to make the recesses ⅝ inch diameter (the largest cutter that I had at the time) and 5/32 inch depth as in the drawing. Having set the mill I first machined the centre using a ground drill that was large enough to get rid of the material in the centre as my cutter is an end mill - not very good for plunging. I drilled this a little deeper than 5/32 inch to ensure clearance for the end mill - it will also make a nice sump central to the oil pad. Next was the ⅝ inch recess for the oil pad; as it was cutting into an arc it cut fairly easily with no drama.

14. It was then back to the four-jaw chuck after first using a larger centre drill to enlarge the centre holes ready for being held with the tailstock for final centring of the box in the chuck. No spacers were needed this time now that the keeps were flush.

15. After some step drilling I bored out to the required ⅞ inch checking with a plug. The plug fits but it's a little tight so I have left it at this until after the boxes are sitting in their slots. This keeps everything tight for now. The bores will be reamed in pairs while sitting in their slots.



17. Here we see the front faces having been machined to leave a raised 1/64 inch centre. Each box was clocked in the four jaw chuck, a suitable cutter was chosen to give the required chamfered edge and machined down until I had 1/64 inch depth and the 1⅝ inches diameter. I did this by eye, cutting until breaking the flat edges to give a complete ring as shown in the drawing. The X-axis was then left set to machine the other five at the same setting.



19. Here are all six axleboxes, keeps and pins, with the oil pads fitted into the keeps.

Spring buckles

These simply needed forming to the correct shape, which was achieved by a combination of machining and filing.

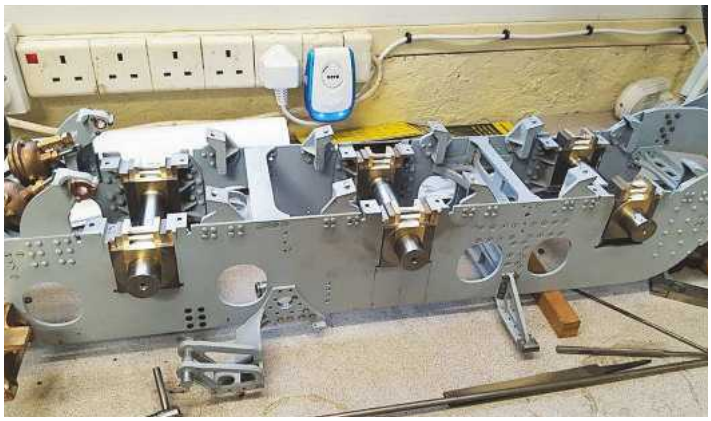
●To be continued.

NEXT TIME

I turn up a set of six driving wheels.

LEFT: 20. The first job was to machine off the front and rear faces. I used an engineer's vice for extra security but it's unlikely that the keep would move - it's a tight fit and the three securing pins are in place. Still, better safe than sorry...

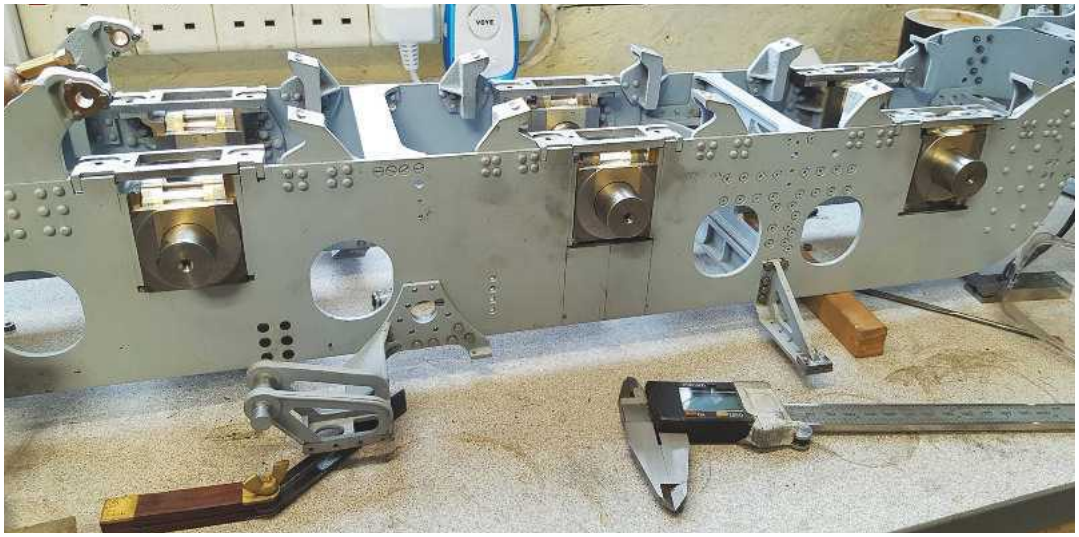
FAR LEFT: 21. This picture shows the set-up for machining the ⅝ inch slots. I very nearly messed up here by forgetting to remove the buckle pins ... twice?... luckily I realised before machining too deep. After the second bout of forgetfulness, I removed all buckle pins just in case.



22. We now see all of the boxes at the same state. A little filing to clean up and the 5/32 inch reamer to clear the pin holes was all that was needed to get to this point. There will be one other exercise to do later which is relieving of the slots to allow the axles to tilt but for all other practical purposes, the boxes are finished. One last job is to face the spring buckles.

23. Here I am marking out of the angles on the bottom of the boxes/keeps. The bottom radius is drawn as 3/16 inch so I turned up a small button at that radius, drilled/reamed 5/32 inch to fit on the buckle pin, and scribed around after first marking each box slot with a marker pen. I then scribed lines from each corner to the ascribed arc as a guide for machining.

24. After some further machining and filing, here we have a completed axle-box. Don did a great job on drawing these as they are very close to full size in looks, operation and lubrication methods.



25. Here we have all the boxes in situ. *I have set the three axles at different heights, leading coupling axle at full depression (for the slot, not operating depression), crank axle set at (I hope) normal running height (I took this off the drawing so it should be pretty close) and lastly the trailing coupled axle at full bounce (for want of a better word). Note that this means the bottom of the box penetrates the horn stay slot itself - quite an intricate affair. Now, according to information on Gresley's Pacifics they have about 1½ inch vertical travel on the axle boxes. Reducing this to 5 inch gauge works out just over ⅛ inch - not enough for model tracks. The actual movement of the model is currently around 5/16 inch - I haven't checked what Don suggests yet but if more is needed this can be remedied.*

Injector Wars! PART 4

Warwick Allison relays the stories of the three Aussie protagonists, James Sanders, Simon Collier and Andrew Allison.

Continued from p.679
M.E. 4678, 19 November 2021

Andrew concludes his part of the story by discussing the testing of injectors and offering some pointers for trouble-shooting.

Testing

A small vertical test boiler seemed like a good idea. I wanted something that was easy to manage, gas fired, quick steaming with an easy to alter pressure range. At the same time I was thinking about designing a suitable test boiler, a tiny 5 inch gauge 100 HP Sentinel shunter came up for sale as a 'project' in the UK. This boiler seemed to fit the requirements, so the locomotive was purchased. A few full days in the workshop had all the vital bits overhauled and appropriate connections for injector testing installed. This has been an excellent purchase and suits the task very well. It has a water tube boiler, which steams like crazy, but the capacity is so small that the pressure can be reduced quickly when feeding water allowing the range of the injector to be observed. I have not gas fired it, as the coal firing has proved very manageable. For water feed during testing I use a direct silicone hose (no water valve) to a container of water held below the injector. Also available is a tin can with a pipe soldered in the bottom that can be used if gravity feed is required.

I had started by making a batch of five injectors, in the hope that one of them might work. I was lucky with two working perfectly! By the end of that testing session (engine in steam and lathe running.) all five were working. Diagnosing the faults, making adjustments and then seeing them lift and feed is more satisfying than having them work straight away. You feel like you are learning rather than just getting lucky. Below is a table of likely faults and fixes for new injectors.

Dramatis Personae

James

James is a young passionate model engineer who works at a furious pace with many locomotives already evidence of his work. He is new enough not to be worried by those things that would make more experienced model engineers shy away from the challenge! He leads with such pioneering enthusiasm that others are left behind in his wake.

Simon

Simon is a meticulous model engineer who can focus on precision and making things correctly. He discards his failures and pushes on to achieve that which is often unachievable! A technical challenge is Simon's big come on! Like a dog with a bone he carries on until the impossible is achieved!

Andrew

Andrew is a model engineer romantic, dreaming of that perfect prototypical miniature that performs superbly. He is something of a wily Mr Fox, hanging back and watching the successes and failures of those that go before him, while simultaneously building up an armament of jigs, reamers and fixtures ready for a late but substantial push into the unknown.

Table 1. Injector troubleshooting

Fault	Fix
Does not feed - Steam out of overflow	Annular gap too small. Withdraw steam cone slightly. A quick method of doing this for testing is to wrap a ring or two of fine fuse wire around the steam cone to space it out.
Does not feed – Water out of overflow	Reduce the water feed (squash the silicone feed pipe with fingers) – if the injector picks up and starts feeding, then the annular gap is too large. Machine off the body side of the steam cone flange to insert cone further into the body.
Feeds well but occasional jets of water out of overflow	The check valve may not be seating properly.
Blows steam down water line	Overflow from combining cone restricted. Ball does not have enough lift or gap between cone halves insufficient.
Feeds but dribbles water	If reducing water feed does not fix, this is difficult to diagnose and fix. It is likely some fundamental manufacturing issue e.g. lack of concentricity, throat diameter ratios not correct, surface finish not good enough.
Working pressure too low/high	If operating range too low, the steam cone throat diameter is too large. Make a new steam cone with a smaller throat hole. Conversely, if pressure range is too high, open out steam cone throat.

A special box for all the injector bits; jigs, spacers and tooling.

Andrew injector testing using a 5 inch gauge model Sentinel locomotive.

It is worth saying that any commercial injector manufacturer with a good reputation would not let an unproven injector out onto the market and the 'failings' of a commercial injector are almost always the associated pipework. The most common failure is an air leak in the water line. I have seen this caused by copper pipe being rubbed through by a wheel, rubber pipe cracking, plastic pipe becoming hard and loose on the pipe it is pushed onto, gland nuts or union nuts loose or O-rings perishing on water valves or brass fittings disintegrating due to dezincification. The best place to start diagnosing is to disconnect the water supply pipework at the injector and feed it from a tin can with a bit of silicone hose direct onto the injector. Faults other than the water line are rare but might include the boiler clack blowing back or a leaky steam valve keeping an injector too hot, leaks in steam piping, valves or glands reducing pressure available at the injector or damage to the injector itself (usually due to enthusiastic cleaning or inserting cones in the wrong ends).

In all cases, being able to test operation is very beneficial. Many locomotives would have two injectors so swapping a questionable injector between sides is a good method of determining whether the problem is the plumbing or the injector. This is a case for ensuring all plumbing and fittings are sized the same on the locomotive, even if the injectors fitted are different delivery capacities.

Conclusion

So far over a dozen injectors have been made, with five 18 oz to the No. 70 size as described by Basil Palmer, with the rest being 14, 10, and 3.5 oz to my own design. They all work (i.e. deliver water to the boiler) but there are some that are definitely more successful than others – I'd say 90% meet all the criteria for success. On the others, a combination of manufacturing errors probably means it is not worth the time to diagnose or alter these any further. I now feel like I'm ready to start trying to design some more prototypical looking injectors!

What has the 'War' accomplished?!

Having seen the individual approaches next to each other, there are areas where all seem to fall in line (e.g. the Palmer/LBSC style body being the easiest) and yet there are other areas where our experiences and methods differ significantly - yet we have all made working injectors. Injectors do not work on dimensional accuracy but thermodynamic principles. If you get the fluid mechanics right, the dimensions can be anything you want. There would seem to be several ways of making successful injectors!

Despite remaining a 'mystery', injectors have been made before by many people in many ways. When one avails themselves of the significant amounts of literature available, the wisdom of past pioneers can be readily applied and a successful outcome is highly probable. ME

One of Andrew's 14 oz injectors test fitted to a 3½ inch gauge Britannia under construction.

Doug Hewson says why have any old driving truck when you can have one that looks the business?

Continued from p.693
M.E. 4678, 19 November 2021

Doug's Y4 coupled to the driving truck.

Building a Driving Truck for 5 Inch Gauge

PART 3

We will now deal with the body.

First of all, you need to avail yourself of some of the best quality ¼ inch birch plywood. There is nothing that I have found better than this. The next thing that I find most useful is a carpenter's marking gauge to scribe the planks on both sides. I have a marking gauge which has the pin ground vertically on what is to be the upper edge of the planks and then it slopes down by 45 degrees on the other side so that when the planks are scribed on they will look correct as though they are made to shed the rain off.

Cut a couple of lengths of birch ply 31 inches long and 3⅞ inches wide and another two more pieces 8½ inches long and the same width – along the grain. Nothing looks worse than if you use the grain vertically! Now, set your marking gauge to scribe a line all round both sides ½ inch wide to form the curb rail at the bottom of the wagon. Next, set your gauge to 1¼ inches, scribe the first plank and so on until you get to the top. You can now pin and glue these together using ¾ inch panel pins into every plank, making sure that everything is nice and square. I would use some good PVA waterproof glue for this.

You then need another piece of ply 8½ inches wide and 30½ inches long to fit snugly into your rectangle. Pin and glue this along the bottom edges. If you wish to make the wagon look right, you need to make this piece with its grain across and scribe it into ⅝ inch planks. I would start in the middle and work outwards. You only need to do this one side of course, unless you are going to show the underside to anyone! I wouldn't imagine they would be that impressed really. One thing you will also need to do is to plane a chamfer all around the outside of the top edge to make a nice finish to the wagon body.

The strapping is all made of 5mm x 20 swg steel strip, preferably Zintec, and then you also need a couple of pieces 2 inches wide x 3⅞ inches long for the corner plates and a couple the same length and 1 inch wide for the centre of the body side. You also need a set to go around the complete top edge of the wagon. I don't know why I am telling you all this really as The Steam Workshop and G & S Supplies do a complete set of strapping. It used to take me an evening to make one body and put the strapping on. One of the last jobs to do is to drill through all the holes in the strapping with a No. 52 drill and then you can press in some 1/16 inch copper rivets into the tight holes and glue them in.

To make the top of the driving truck you need to cut two pieces of ⅜ inch ply to the shape of the top of your driving truck tool box and then cut a couple of pieces to fit along the sides about 1 x 1¼ inches. Make them a good fit inside the box, and I would suggest that you glue and nail it together.

Driving truck disguised as box car.

Driving truck disguised as match truck.

Now you can plane it to match the curve of the roof.

You now need a couple of pieces of 1/16 inch ply which is just about 1/8 inch over the sides of your tool box. Glue and nail this in place and then put another layer on top of that but make sure that this is covered in PVA glue without missing any bits and then nail this on too. I always use 'gimp pins' for these plywood sheets; these are available in those little 'Challenge' blue and yellow boxes which you see in your local DIY stores. Just plane the edges a little to tidy them up and make the sides vertical - it looks so much better.

Now you can upholster the seat with that 1 inch dense foam and then, using a piece of good quality leather cloth of generous proportions, pull it along the sides stapling it as you go along to the underside of the overhanging of the two layers of ply, pulling it tight as you go along. Leave the corners for a while and then make a neat fold in each corner and staple that underneath. Cut off any surplus tight up to the frame and that should be it.

Photograph 16 shows one of our driving trucks built for Diesel locomotives and having room for one passenger. It was built using our bogies. We left it up to the customer to detail it with any strapping that he saw fit.

Photograph 17 is another one built to specification and as you will see, the seat is a little higher to suit the owner's leg length.

Now, **photo 18** shows one of our typical working days with a train which has just arrived at our work site to deliver some trackwork. My new Y4 is on the train with my original driving truck which had the most uncomfortable seat imaginable as I wanted it to look like a railway van. Behind are Mike Earnshaw, Phil Bootland and Malcolm Gregory and behind them is my son Neil. All of the bogie wagons have the same bogies on them as described in the last article. They are all modelled loosely on the LNER 'Flatrols'. When I was building my railway, I insisted that everything went by rail once we had reached the ballast heap and we had such fun building it. 'JGF' as they say on the Ffestiniog Railway! Everyone was taught to drive an engine as soon as they turned up.

Photograph 19 shows another of our working days with trackwork loaded on to two of our wagons with one of the Weltrols and a bogie bolster. The Weltrol has the croquet hoop on it which I told you about in the previous article. Note the makeshift water supply!

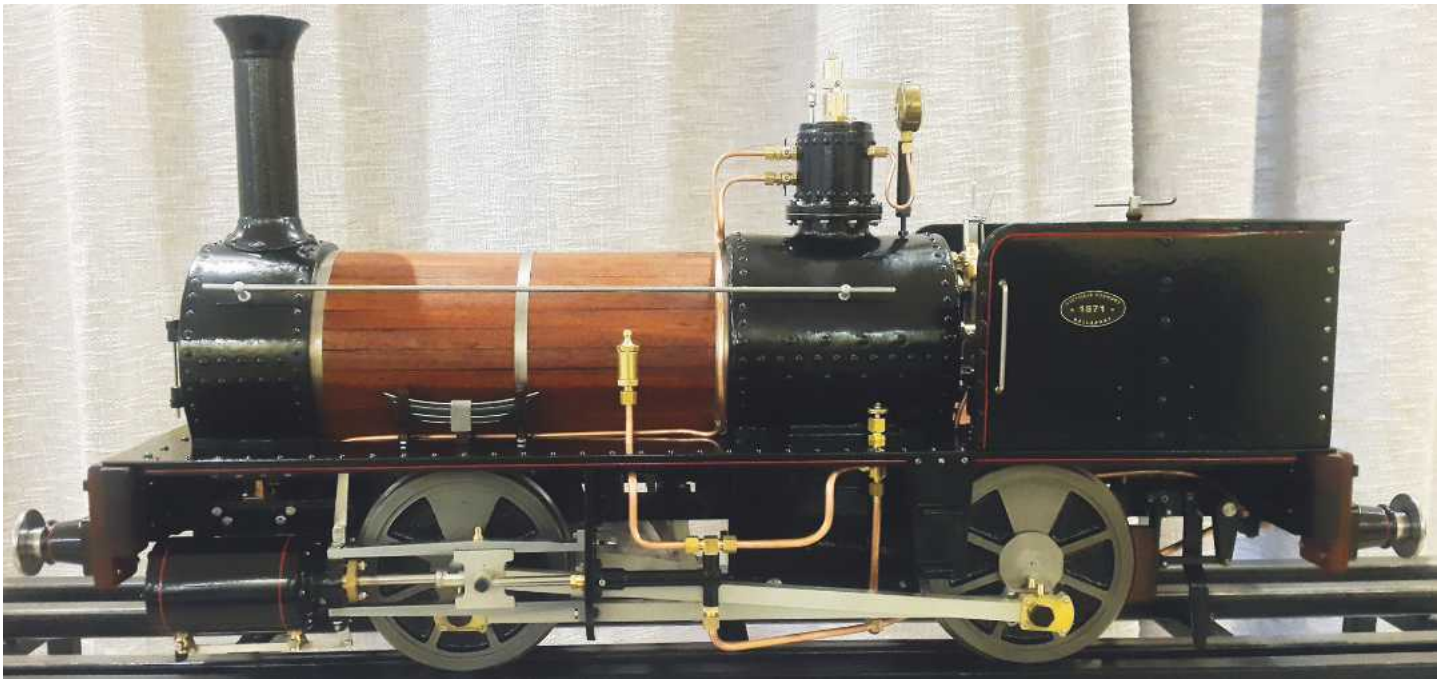
Photograph 20 shows a couple of our passenger trucks which use the same bogies as described. They are also 4 feet long and take three children on them. They were built to go with our portable ground level track. My daughter is sitting at the back of the train as the guard.

ME

The original driving truck (right-hand end of train).

Original driving truck on duty again.

Passenger trucks based on the same bogies.



Ballaarat PART 6

A 5 Inch Gauge 0-4-0 Aussie Locomotive

Luker describes a simple but authentic small locomotive.

Continued from p.625
M.E. 4677, 5 November 2021

The cylinders

While growing up in a small town at the foothills of the Drakensberg I used to work at a department store to earn a little money for my after school (workshop) activities. 'Mr Bean' was one of the videos that was played repeatedly on a small TV above a display stand. The genius that is Rowan Atkinson could pull the ultimate 'disgust face' and I imagine this is what I look like when making the first mistake on a set of otherwise perfect cylinders. Not to worry, as promised I'll show you some repair techniques to fix up the odd disaster; and don't be fooled, even the most seasoned builder makes the odd mistake on cylinders.

The cylinders for *Ballaarat* look particularly complicated, with metal cut-outs around the steam channels and a number of areas thinned and webbed (**fig 10**). The only reason I did this was to improve the castability and decrease the riser size. Incidentally these cylinders (and risers) were originally designed for cast iron but when the young lad joined me in the build I decided to make them from gunmetal (easier to repair and easier to machine). I never updated the risers and ingates so I had draw holes about 6mm from the valve surface which caused problems with the passages. I repaired the draw in my cylinders using the methods to be described at the end of the next article, with no detrimental effects to steaming. These cylinders don't need to be cast; it is quite possible to make them from built-up sections screwed together with brass screws and soft soldered to make the joint steam tight.

Before starting with the cylinders it's a good idea to check that the lathe is set up correctly and that it turns parallel. And no, the lathe bed is not so stiff that the cheap cabinet will just deform without twisting the bed. The geometry and materials of construction all play a part and although it is true the cabinet may deform more, even the slightest deflection of the lathe bed will be noticed when machining accurate bores.

Here's a simple test if you're still not convinced. Take a 1.6mm strip and hold it in the vice. Then using a 0.8mm

Lathe bed twist check - test bar.

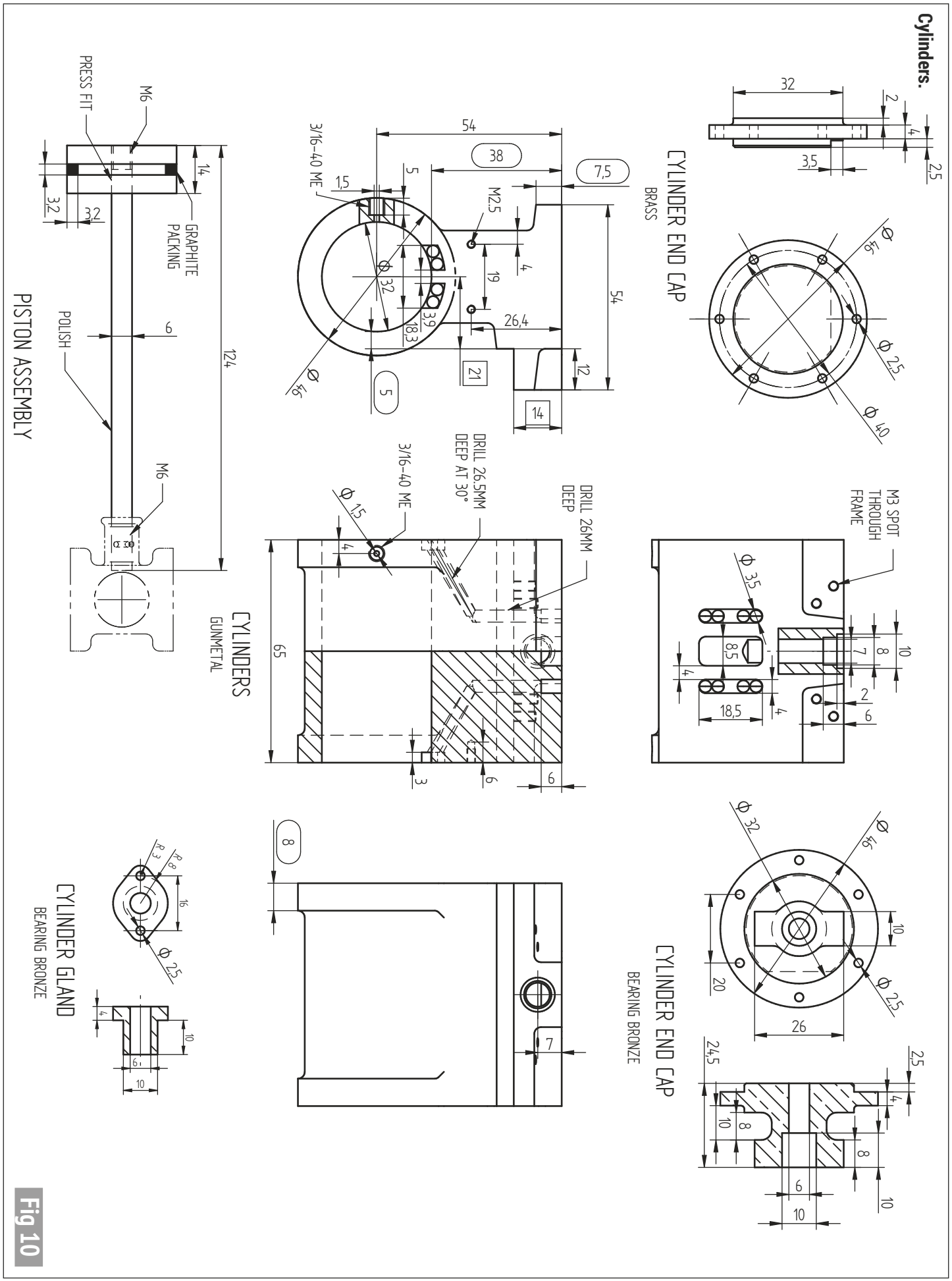
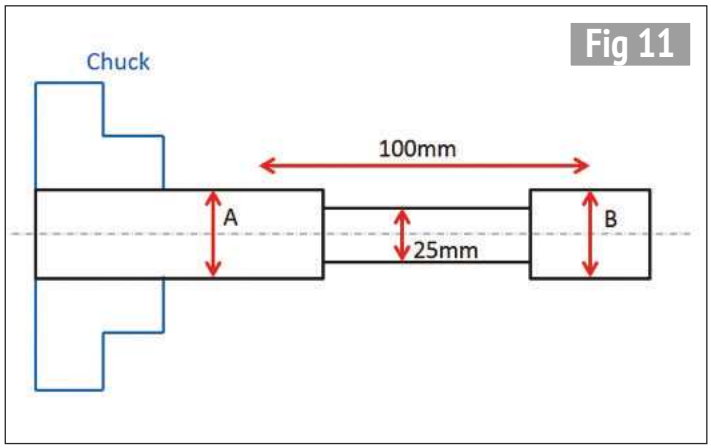
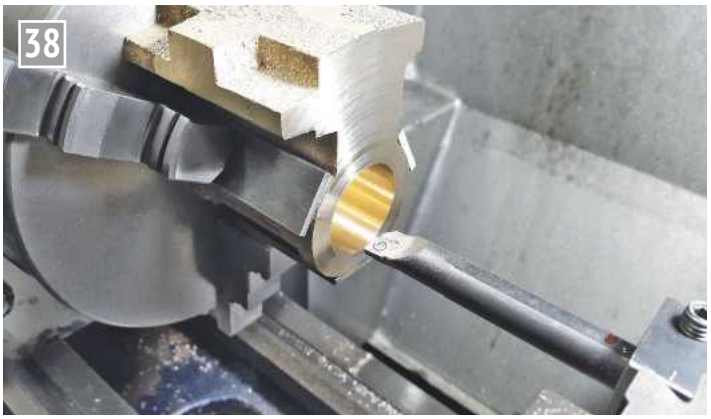

Cylinders.
CYLINDER END CAP
BRASS
CYLINDER END CAP
BEARING BRONZE
CYLINDERS
GUNMETAL
CYLINDER GLAND
BEARING BRONZE
PISTON ASSEMBLY
PRESS FIT
GRAPHITE PACKING
POLISH
3/16-40 ME
DRILL 26.5MM DEEP AT 30°
DRILL 26MM DEEP
M3 SPOT THROUGH FRAME
M6

Fig 10





Boring the cylinders.

shorter strip at a right angle bend the thicker plate; you'll notice it bends no problem because the stiffness of the system is both material and geometry dependent. Back to the lathe bed; with a test piece made up to the sketch (**photo 37** and **fig 11**), the difference in diameter between point A and point B should be less than 2µm when taking light cuts at high speed with a ground HSS finishing tool. A lathe that is set up correctly will machine a parallel bore which ensures the piston will slide uniformly down the cylinder without being sticky on one side. I made a short video for training purposes that goes through the lathe setup in a little more detail - if you're interested please visit www.youtube.com/watch?v=vDa8P7fM2y0

Machining of cylinders is a precise job with each step in the process designed to keep certain critical dimensions and geometric tolerances accurate to minimize piston binding. For example, the piston-rod-side cylinder-end-cap flange needs to be square to the bore to prevent a perfectly fitting piston from locking up close to the end of stroke.

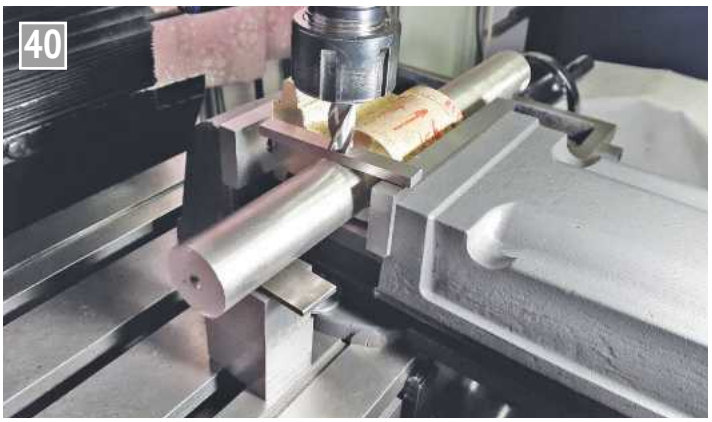
Clamping the cylinder in the three-jaw chuck with spreader bars, one end can be skimmed while keeping an eye on the as-cast material thickness of the end cylinder boss. This is an unbalanced load in the lathe so you will need to cut at lower speeds and it's a good idea to use a fine auto feed. Flip the cylinder around and make sure the surface just machined is square to the back of the chuck. Now the other end can be faced and the bore bored out to size (**photo 38**). You need to keep an eye on the overall dimensions and web thicknesses but don't worry if the cylinder is a little longer. The non-critical side can be skimmed to get the length right but once the bore is done you effectively fix the piston-rod-side-end of the cylinder to the side faced before boring. Note: the piston rod side should not be skimmed once the part is removed from the chuck.

Next, the valve face can be skimmed in the four-jaw chuck (**photo 39**). The clamping points will be the two machined surfaces and the flats behind the cylinder barrel, with spreader bars. Don't hold the cylinders on the barrel; you're likely to deform the barrel or, worse, the job can come out of the jaws because the clamping surface is not ideal, spoiling the job. The valve surface is skimmed, with the distance from the top of the bore to the valve surface a convenient dimension to check progress. For all other setups the three reference surfaces are the bore, the piston rod side face and the valve surface, respectively. Remember, the two cylinders are identical, but once machined the piston side will be mirrored fixing the left-hand and right-hand cylinders.

The cylinder mounting cut-out needs to fit flush to the bottom of the frame and if the centre of the piston is to align with the centre of the wheels this needs to be machined accurately. Luckily, it can be done without too many cumbersome measurements. First, set up a vice in the milling machine by sweeping the DTI along the fixed jaw. The cylinder bore can be aligned to the milling table by slipping a stout BMS round bar through the bore with identical pieces of packing material at each protruding end (**photo 40**). Bring an end mill cutter and a piece of 5mm flat bar to rest on the top of the BMS bar with the flat bar parallel to the top of the vice. That's the exact position of the bottom of the frame cut-out relative to the top of the bore.

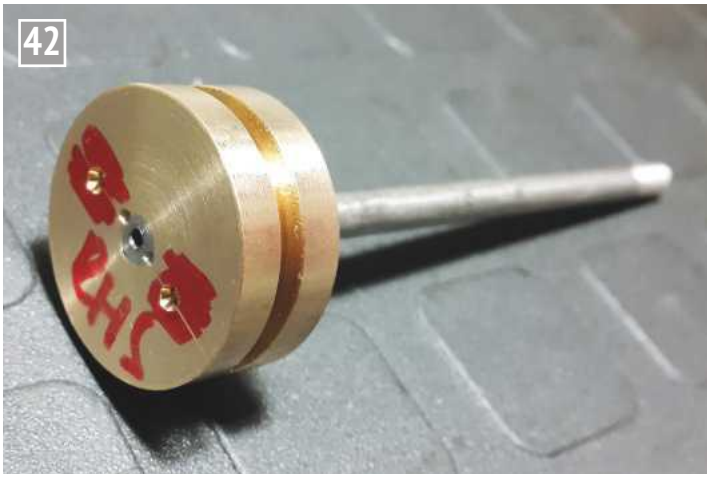
The frame cut-out can now be machined with the spindle locked, in the Z-direction, using the side of the end mill. Because the side of the end mill is used the cutting surface is larger than a normal end milling operation, so use a depth of cut of not more than 0.3mm. The valve surface is a convenient surface to measure to when checking how you're progressing with the slot. If the distance from the bore to the valve surface is spot on, then the frame cut-out will ensure the centre line of the

Facing the valve surface.



Milling the frame cutout.

Cylinders ready to check piston fit.



Machined piston.

Skimming the end cap spigot.

Machining the piston rod side end caps.

piston bore will be the correct distance from the frames. It's all starting to come together nicely (**photo 41**).

With gunmetal this is where you have to pause with the cylinders. It's a good idea to make the pistons and the end caps before drilling the valve port holes. Machining in this order eliminates the issues with trying to get a good fit behind the burrs and metal deformation from the steam port drilling.

The pistons

Making the pistons can be a little tricky. The tolerance take-up on the bores needs to be done with the pistons and they in turn need to be perfectly concentric to the rods. Firstly, rough machine the general piston leaving at least 0.5mm on all dimensions to skim to size when assembled on the piston rod.

The rod is a simple turning exercise and requires little description other than to keep an eye on the press fit tolerances of the shaft. The rod is assembled to the piston by clamping the piston in the chuck and the rod in the tail stock and turning the assembly home by hand. The whole assembly can be placed in a collet on the lathe and the piston machined to drawing. Keep the cylinder on hand to check the fit (**photo 42**). You are looking for a mechanically free but steam tight fit. An easy way to check is to drop the piston down the cylinder with the bottom open; it should drop down easily (no piston ring - that is cheating!). Then place the cylinder on a flat piece of granite (or something similar like glass); the piston should ooze down very slowly. The other method is to 'seal' the end of the cylinder in the palm of your hand and pull the piston and release; it should bounce back. Don't be too pedantic about this fit; it's nice to get it perfect but practically with the soft packing for rings and a thick steam oiled, un-superheated cylinder you would need a substantial rattle fit before you'll notice blow-by.

Don't forget to spot drill two holes off-centre at the end of the piston to screw the piston into the crosshead using circlip pliers. I also punch the end of the rod on the thread as an added measure to make sure the piston won't turn loose.

The endcaps

All my endcap castings have a spigot to make the machining easier with the piston rod side gland incorporated in that pattern to streamline machining. Even so, I will always skim the spigot before machining the rest of the casting - holding an as-cast surface is tenuous at best. The easiest method to line up the casting is to hold the spigot in the tailstock and clamp the rest of the casting in the chuck; this will ensure the casting is reasonably parallel to the lathe axis (**photo 43**).

The rest of the machining is simple turning operations but here are a few tips. The piston rod bore is best reamed and this should be done in the same setup with the bore lip i.e. without re-chucking the part. The front caps can be loose in the cylinder bore but the piston rod side needs to be a tight fit. The reason being, any misalignment to the cylinder bore and the piston will become tight when it's closest to the cap. Keep the cylinder handy and when you are close to size take small cuts, checking the fit to the bore as you go (**photo 44**). Also make sure there are no burrs on either the cylinder or the cap that might lead you to believe you still have a way to go. All corners can be broken and a very slight lead in on the lip can be filed using a fine file. Make sure you hold the file safely so that if something catches you're not going to stab yourself with the file. Do not use a file without a handle on the lathe - or ever for that matter!

Finishing off the end caps is best done in a holding jig (**photo 45**). A recess (to clear

≫

the end cap lip) is needed to ensure the flange seats nicely in the jig. The stud holes for all the caps can be drilled for interchange-ability using the steam port positions used as reference and these holes can be used to hold the end caps in the jig for the remainder of the machining operations. I always machine a flat on the outside of these end cap jigs that aligns with the two stud holes that straddle the steam ports.

With the jig in the three-jaw chuck, the back of the end caps can be faced and the gland seal machined (bored or reamed) using the piston hole for alignment. If the jig is machined properly a 6mm pointer pushed in the piston shaft hole will have no wobble when spun in the lathe.

With the end cap still in the jig and the reference flat pressed on the fixed jaw of the milling vice (aligned with the table axis using a DTI) the flats for the crosshead sliders can be milled. I couldn't be bothered using the dial gauges to machine these flats as the chances of making a mistake are too great. The easiest way to machine them is using a guide collar. This is just a cylinder with the outside diameter machined to the across flats dimension with a spigot that fits into the piston rod hole (**photo 46**). Taking light cuts across the flats until the collar is just touched will leave the distance over the flats perfect. Essentially, you're killing two birds with one stone; the dimensions will be spot on and the flats will be symmetrical and parallel around the piston shaft hole.

End cap machining in jig.

Machining the crosshead slider rests.

The cylinder gland

The cylinder gland was part of the end cap casting and, after sawing it off, it only required skimming the outer face and the spigot parted off to the correct length. The stud holes can be drilled with the gland assembled to the end cap in the holding jig using a 6mm stud (removed from the picture for clarity) to keep it from moving (**photo 47**). The clearance hole and tapping hole should be drilled with the same setup and the hole tapped with the gland in place using the clearance hole as a tapping guide.

●To be continued.

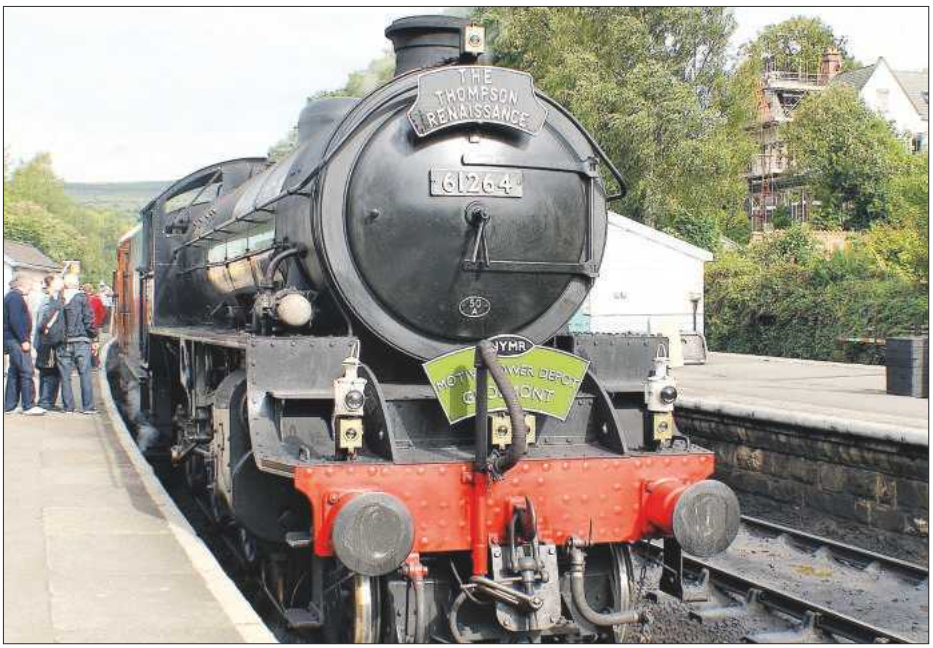
Drilling the cylinder gland stud holes

NEXT ISSUE

Thompson B1
Doug Hewson introduces his next project – a 5 inch gauge Thompson B1 locomotive.

Drainage
Roger Backhouse talks drainage – but on a large scale, in the Netherlands and the fenlands of East Anglia.

We Visit Rugby
John Arrowsmith spends a day in Warwickshire with the Rugby Society of Model Engineers.



Content may be subject to change.

ON SALE 17 DECEMBER 2021

Subscribe!

ONE YEAR OF YOUR FAVOURITE MAGAZINE AND A FREE BOTTLE OF CHRISTMAS CHEER!

FREE!

ONLY £39.99!

LIMITED TIME ONLY!

Digital & Bundle Subscriptions also available online at www.mytimemedia.com/xmas21P2

HOME CINEMA CHOICE
10 issues

HI-FI CHOICE
13 issues

HI-FI NEWS
13 issues

MODEL BOATS
12 issues

RCM&E
12 issues

STAMP
12 issues

PATCHWORK & QUILTING
10 issues

MODEL ENGINEER
26 issues

MODEL ENGINEERS' WORKSHOP
12 issues

TOTAL CARP
13 issues

MATCH FISHING
12 issues

THE WOODWORKER
12 issues

SUBSCRIBE SECURELY ONLINE WWW.MYTIMEMEDIA.COM/XMAS21P2

CALL 0344 243 9023** AND QUOTE XMAS21P2

LINES OPEN MON - FRI - 9.00AM - 5.00PM 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.

Workshop Disposal PART 2

Roger Backhouse tackles what can sometimes be a sensitive subject.

Continued from p.681
M.E. 4678, 19 November 2021

After a death

Dermot O'Brien is aware of problems involved in disposal after a death. In the first case he dealt with the woodworking tools of a man who'd built beautiful wooden models for local charities to sell. The man had an extensive woodworking shop, power and hand tools, of which some were old, rare and expensive to replace e.g. adjustable curved sole hand planes. He also had an extensive collection of bits and pieces, for example every size of slot head screw, all gathering rust. His illness and probate meant that the equipment was left untouched for two years in an unheated garage. Machine tool bedways had surface rust. The family had an emotional connection to his tools and work but did not know what to do. The local 'house clearance' firm had offered '£500 for the lot' and much would go to the skip.

Dermot says: "I went through the workshop in front of the family and being able to name everything and get excited by what I was seeing convinced them that they would rather give it to me than sell to a trader. This was not planned; I was just the kid in the sweet shop. I offered what I could afford - £750 - and agreed to clear the workshop. I kept most tools and disposed of various bits and pieces. Rusty screws and nails went straight into the bin! It was clear, in this case, that for the family having the equipment going to a good home was more important than the money."

Dermot then helped dispose of the workshop belonging to the late Dr. Giles Parkes who was a highly skilled member of SMEE.

"More family members were involved and the workshop contents had been moved from the south coast and put in a damp barn in North Wales. After the chance meeting with one of Dr. Parkes' daughters … I was sent some pictures and could see a Myford that looked in good condition. I served an apprenticeship in motorsport engineering and had been on the hunt for a decent lathe at home.

"There was not enough equipment to interest a machine tool dealer and local house clearers would not offer a fair price. The first issue was to stop any further degradation of the tools/ machines by asking the family to spray a liberal coating of WD40 (more than a large tin) over everything."

Rust

My number one tip is to prevent rust. Consider investing in a dehumidifier and be mindful that prevention can only work if your family are aware of what to do if you become ill. Three months of non-use in a damp environment is enough to ruin good equipment unnecessarily. If you want to give your tools to someone then tell them before they find out in probate. You want that person to make sure they are stored and secured appropriately until probate can release the items or you return to good health.

A large part, namely the job of cataloguing the contents of the workshop, had already kindly been done by one of Dr. Parkes' friends and another family acquaintance.

"We sorted out all the tools and equipment into job lots, cleaned where possible and photographed for selling. I made an offer for the lathe, EMCO mill and some of the tooling. We also created mementoes for the grandchildren from micrometers and hand tools".

Using *Model Engineer* adverts

"The remaining larger items were moved back to London. A friend managed to borrow a works van. From my home we sold them through *Model Engineer* classified ads. This went well and good homes were found at a price that was fair to all".

Perhaps the most important lesson from Dermot is that if an inventory of the workshop can be prepared it makes sorting everything out after death easier for bereaved family members. His other important lessons are:-

1. Protection – make sure tools and equipment are not degrading and ensure protection. As soon as equipment is not being used, coat everything in rust prevention oil, liberally and from every direction. This includes opening and spraying all the little tins, boxes and drawers where cutting tools are kept to preserve their contents too. This should be regularly repeated, especially in the winter and/or under damp storage conditions. He adds; "I am sure any engineer who has recovered from an illness would rather clean off too much oil than rust."
2. Smaller items don't really have value unless one is prepared to use eBay. eBay will work but takes an enormous amount of time – and items have to be disposed of one part at a time. However, these items can sweeten the larger items considerably and act as a good negotiation point. (Gumtree is an alternative online outlet.)

3. Time – be aware that sorting through a small workshop is several days' work.
4. Without finding an enthusiastic teacher, it is difficult to give equipment to colleges etc. or to find a young apprentice to whom tools could be given - unless within one's personal network. Health and safety regulations may also crop up.
5. Be clear what you want first – money back vs. time spent vs. finding a good home.
6. Research on what prices other dealers are selling items for is helpful - but don't forget the price a dealer pays is nothing like the same as the potential sale price!
7. If time is constrained, then the adage of 'it's worth what someone will pay' is very true.
8. Not enough people answered the adverts to create any opportunity to play buyers off each other.
9. For larger machine tools there are bespoke online forums, some of which have market places and/or posting functions.
10. *Model Engineer* is a natural network to find somebody who will look after and cherish a loved one's tools. In my opinion these types of networks are the way to go.

Sales through a society

Many model engineering societies try to help dispose of the contents of members' workshops but this depends on having members available to assist. SMEE, York Model Engineers and other societies run auction sales, usually helping members sell unwanted items, but there are also, sometimes, disposal sales selling workshop contents. These sales are normally restricted to members (**photo 5**).

Prices are not usually high so perhaps not the best method to make money but there is a better chance that goods will go to appreciative homes. Auctions probably work better with larger societies and they are good for disposing of smaller items and metals of less interest to a machine tool dealer. During Covid lockdown York Model Engineers helped dispose of a deceased member's workshop by advertising many items to the membership. This worked well but for the lathe and machinery his widow decided to approach a dealer.

Dealers

Don Paton's poor experience of dealers should be noted but others have found them better and it is worth asking around. One advantage of dealers is that they can usually act quickly and pay cash.

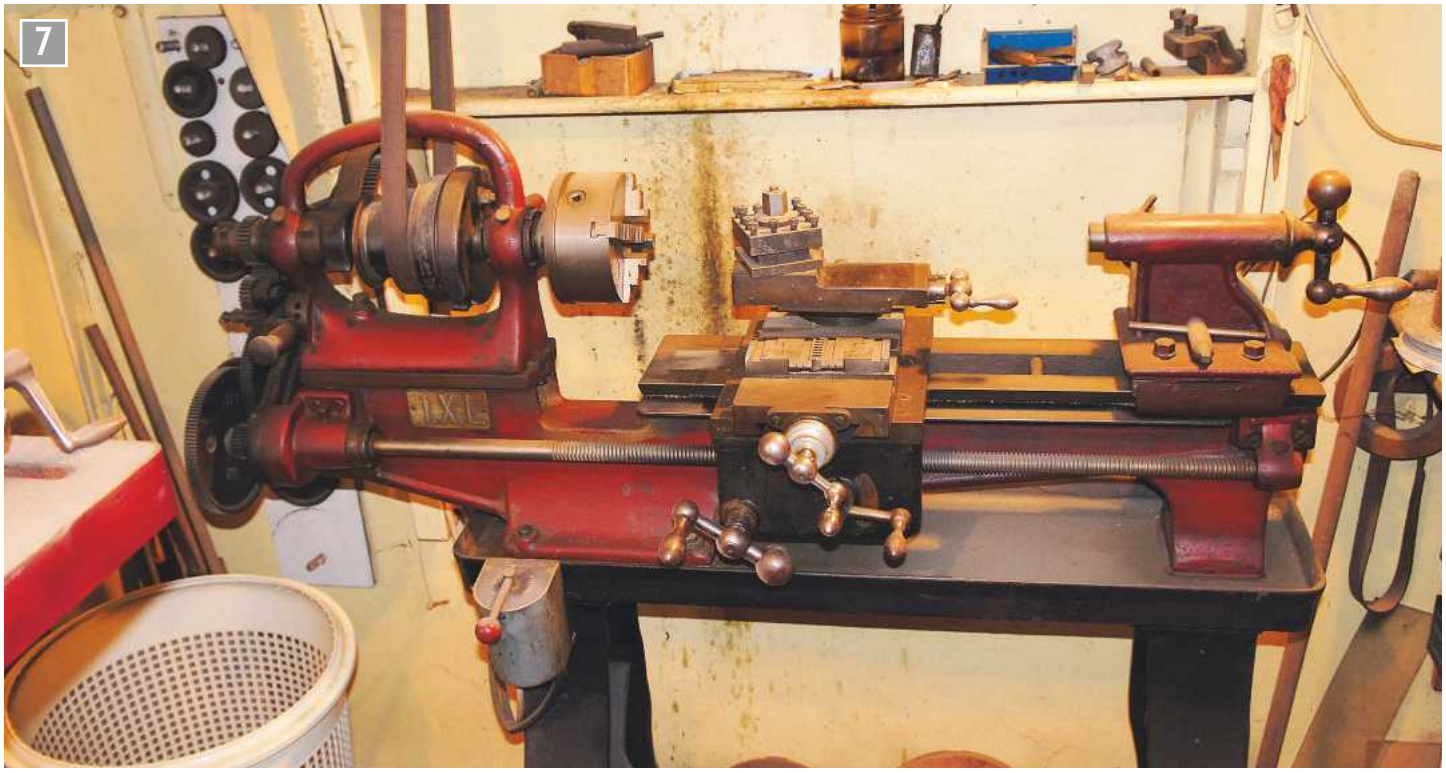
Steve Holder is co-owner of Home and Workshop Machinery, regular advertisers in *Model Engineer* and *Model Engineers' Workshop*. He points out they've been trading since 1980 with universally positive feedback.

When Dennis Major, a member of DELMES, died he left his workshop contents to that Society who called in Home and Workshop Machinery. Society members were pleased with the service offered (**photo 6**). As Steve says, his firm 'has much experience of removing machinery without damage to property' and can take everything from a workshop including what he calls the 'unsavouries' (cleaning out a workshop can be a dirty job!). He says they 'pay promptly by the method the seller prefers', e.g. by bank transfer. By dealing directly they can give customers peace of mind.

Peter Wardropper acts as auctioneer at a SMEE disposal sale. Though usually restricted to Society members club sales can be a good way to sell goods.

Myford lathe owned by the late Dennis Major. He left the contents of his workshop to the Dockland and East London MES who sold it to Home and Workshop Machinery of Sidcup. DELMES members were pleased with the service they offered.

≫



Non indexed IXL lathe from the 1920s was a very solid machine used to make many fine models. Though of no interest to dealers it sold on eBay for £127.

He suggests that potential sellers contact them once they are clear about the need for sale and when goods can be collected. Photographs are helpful as is information about access.

Although dealers are often criticised for buying at well below selling price, running a business with considerable costs like rents, rates, insurances, transport hire and salaries plus the need to make a profit means there must be a differential. They may also be prepared to take unsaleable goods that must go as trade waste.

Local auction houses

Occasionally workshop contents are sold through local auction houses. Prices obtained are subject to what people will pay on the day of the auction but generally tend to the lower end of the range.

eBay and Gumtree

These have largely replaced small adverts as a way to sell goods. As Don Paton points out, eBay has its problems but many millions have used it successfully and there are checks to ensure that buyers pay up (**photo 7**).

Donations

Family members or friends might appreciate donations of tools, equipment or metals. When a member of Ryedale Model Engineers died a son had his Super 7 lathe transported to his Australian home. However, some potential beneficiaries might be getting on in years; will they want to cope with heavier workshop items?

Freecycle

People like something for nothing and a local Freecycle network could be a good place to advertise goods with little value but which someone might want. Placed on Redbridge Freecycle my Ilford neighbour's steel workbench found a taker but unfortunately proved too awkward to remove easily and had to be left behind.

Tools for Self Reliance

TfSR is a leading charity taking and refurbishing tools for distribution in developing countries. With local branches around the UK they are particularly good for woodworking tools and sewing machines. Other equipment is considered but not Imperial measuring tools! Those who've witnessed donated tools being used abroad can vouch for the difference they make to people's lives.

TfSR Ringwood Rd, Netley Marsh, Southampton SO40 7GY
www.tfsr.org
Tel 023 8086 9697

A quick check-list if you need to dispose of a workshop:

- Plan ahead if possible. Itemise principal items and give realistic values. Friends or family members will appreciate them (also useful for insurance purposes - your workshop may be worth more than you thought.
- Make a will and perhaps a letter of wishes but consult with potential executors and beneficiaries - the last thing they might want to deal with is a workshop!
- A planned sale of workshop contents in good time is likely to make more money than a forced quick sale, but allow for buyers' creditworthiness.
- Remember other people's time in disposing of your assets; they might be pleased to do it but may not want the responsibility.
- If selling, take plenty of good photographs to help dealers or other potential buyers.
- Consider your model engineering club or society as a good home for equipment - members would probably like your tools and metals.
- Use dealers who advertise in the model engineering press for a quicker sale; shopping around and learning from others' recommendations can be helpful.
- eBay and the like can be useful but are time consuming - Freecycle can be good if you want to be rid of something quickly.

Conclusion

There are many options for workshop disposal. We all hope it doesn't happen, but the time will come. Planning ahead and consulting with family, friends and model engineering societies can help make eventual disposal easier. It can also help ensure that valued tools and equipment go to those who will use and appreciate them.

ME

An Award Worth Winning

Peter Kenington highlights an initiative by Polly Model Engineering and the Federation of Model Engineering Societies to encourage young engineers.

Some of Hereford's Young Engineers, past and present (photo courtesy of John Arrowsmith).

The topic of Young Engineers is discussed widely in the model engineering community and, indeed, the means of encouraging young people into STEM (Science, Technology, Engineering and Mathematics) subjects and careers in general is a matter of wider debate within the country at large. As model engineers, we probably have a unique opportunity to pass on our skills, enthusiasm and interest to the next generation. We have a large number of geographically dispersed pre-existing sites and associated organisations through which such activities can be arranged and supported (our model engineering clubs up and down the country). Many clubs have the facilities to allow practical engineering activities to take place 'in-house' (machine shops and the like) and, perhaps most importantly, the skilled practitioners (that's you, dear reader) with valuable knowledge to pass on (and for retired engineers, the time to do so).

Make no mistake, this job is no longer being undertaken within schools – even the 'good' ones. Most schools have very limited 'Design Technology' (DT) facilities and, even where good facilities exist (e.g. lathes, milling machines), very few teachers have the skills or experience to teach students how to use them. Equipment is left, gathering dust, and eventually sold to make way for other things. I know of a local comprehensive school, for example, which only has facilities for wood and plastic work and (unbelievably) had to resort to making its GCSE DT projects from cardboard, due to a lack of funds! (And this was before the pandemic shut down all practical DT activities entirely.)

Regular readers will know that my son, Matthew, is a keen model engineer, having written a beginners' construction series for *Engineering in Miniature* among other things. Even his school (which is otherwise excellent) only has facilities for plastic and woodworking. He was forbidden from doing a GCSE DT project involving metalwork because the school did not have the facilities to support it and the teacher didn't have the skills to assess it (his teacher, now retired, was a former cabinet-maker).

Hereford SME proves it can be done

Many of you will know of the work which has been underway, for many years, at Hereford SME, to try and address this issue (**photo 1**). Matthew and I are members there and we have both learnt a huge amount from the diverse range of skills encompassed by the membership. We have been very fortunate in living not too far (some 50 minutes' drive) from Hereford and are very grateful to the members there ≫

for giving up their time to teach us – it will leave a legacy which Matthew, for one, will not forget.

The range of projects conducted there is impressively diverse – at the time of writing, we have: an oscillating engine, a Stirling engine, a 7¼ inch gauge work-along made from parts from an old bicycle, a couple of (different) 7¼ inch electric 'Diesel' locomotives, a wagon made from an old mobility scooter and a GWR tender. Indeed, a large part of the 'learning' comes through the skills others need to acquire to suit their specific project – these 'rub-off' on the other young engineers (and their dads…) present at the time.

Occasional 'workshops' are also run, to teach all of the young engineers particular skills: silver soldering, welding (stick, TIG and spot welding, so far) and engineering drawing spring to mind, as examples over the last couple of years.

Matthew receiving the FMES Polly Award at 'STEAM' in 2020.

Matthew with his completed riding truck.

A noble prize

The Federation of Model Engineering Societies, FMES (until recently, the *Southern* Federation of Model Engineering Societies) has for many years organised a model engineering competition, aimed purely at young engineers and, in recent years, this has been somewhat dominated by Hereford's young engineers (and, sadly, in the last 2 years, by COVID!). Not that Hereford's young engineers are not deserving of their prizes (Matthew was the most recent recipient, so I may be a little biased here… **photo 2**) but it would be good to see a more geographically diverse range of entrants (I am wearing an FMES cap whilst writing this!). The FMES has announced that the 2022 competition is going ahead (after the 'COVID years', meaning an enforced two year break), so now is a good opportunity to show off all that you (if you are a YE) or young engineers have been up to over the various lockdowns.

The winner is awarded the snappily-titled 'Federation of Model Engineering Societies Trophy and Polly Model Engineering Ltd. Prize' at the Federation's AGM (which usually takes place in mid-March), together with a certificate, trophy (which the winner can keep) and prizes in cash and model engineering vouchers (sponsored by Polly Model Engineering Ltd. and the Federation). There are also occasional awards to reward and encourage specific individual efforts.

Past winners have gone on to a diverse range of careers in engineering and/or continued involvement in model engineering or wider heritage engineering activities. Matthew won his school's Physics scholarship for his 6th Form studies and used one of his model engineering projects (a combined ground and raised-level riding truck – **photo 3**) to form his application for a prestigious national engineering scholarship (an Arkwright Scholarship). A maximum of 400 of these are awarded across the UK each year with an estimated 10,000 applicants. Matthew has just been notified that he has been successful. His training at HSME and his winning of the FMES-Polly Award played a huge part in him gaining this scholarship.

Another FMES-Polly Award winner, Noah Eggar, was able to start college at entry level 2 because of his work at HSME and now, two years later, he

has obtained his Engineering Level 3 certificate (with distinction!) far earlier than a typical school-leaver would have done. He is currently at the interview stage for an apprenticeship with further study either at Technical College or University.

Dan Bell, a more recent winner, has embarked on a four year apprenticeship with a company in Cheltenham, James Newby, another past winner, now has his own business and Lewis Mason, yet another past winner, is working in the toolroom at a major company in Hereford. All of these young people have benefitted enormously from the training they have received from model engineers, with the FMES-Polly Award adding a sense of competition and valuable external validation for their efforts.

Hereford doesn't have a monopoly on FMES-Polly Award winners (and quite rightly too!). Edward Crabb (**photo 4**) a member of SMEE, the Society of Model and Experimental Engineers, was the recipient of the 2015 Federation Trophy and Polly ME Ltd. Prize. With a family background working with full size steam and model engineering, Ed spent time with his grandfather building a small steam plant. Subsequently, Ed successfully completed a BTEC L3 Extended Diploma in Mechanical Engineering, and attained an apprenticeship in the boiler shop at the Mid Hants. Railway, which included further studies at Farnborough College. He is now a full time boilersmith, continuing to expand his knowledge and experience at the railway. In his spare time, he volunteers on the steam locomotives at the Talyllyn Railway.

Application forms for the 'FMES-Polly Award' (as it is usually, and more manageably, titled) can be downloaded from the FMES website (www.SFMES.co.uk); look for FMES-Polly Award in the menu on the left-hand side of the homepage. The form is very simple and needs to be accompanied by details and photographs of the project, providing evidence that the young engineer undertook the work needed for its construction. The project does not need to be a model (past winners have constructed machinery, for example) or even made from metal (other past entrants have used wood) – it just needs to be a piece of engineering (in the widest sense). The closing date for this year's entries is 31st January, 2022.

The winner and runners-up are invited to the FMES AGM, along with their families, to be presented with their prizes. The AGM's usually take place in 'interesting' venues, for example 'STEAM' at Swindon and RAF Cosford, which can be visited (free!) before or after the main event.

If you've got this far, hopefully you have at least some interest in encouraging the next generation of engineers (or perhaps you are one of this 'next generation'). If you are a young engineer (aged 24 or under) who has completed a project or are well on the way to doing so, then why not enter? Alternatively, if you know of a young engineer at your club who has done so, why not encourage them to enter? If you have not yet embarked upon a project or set up a YE section, please consider it (and enter next year!).

FMES has launched an initiative to try and encourage greater participation from young engineers, which will be outlined in more detail once it is at an appropriate stage. I can only say that being involved in an model engineering club and learning the skills needed to make (and even design) engineering models has been of enormous benefit to Matthew and the other YEs at Hereford. In particular, local firms actively seek out HSME YEs and readily offer them apprenticeships! Equally, the presence of YEs and (importantly) their parents, has benefitted Hereford SME tremendously. It is hugely rewarding passing on your skills and expertise and very beneficial to your club – "What's not to like?" (as a young engineer will no doubt say to you at some point…).

ME


4

Edward learning to use a Myford lathe under dad's watchful eye – at a very young age. Note the box he needs to stand on!

Write to us

Views and opinions expressed in letters published in *Postbag* should not be assumed to be in accordance with those of the Editor, other contributors, or MyTimeMedia Ltd. Correspondence for *Postbag* should be sent to:

Martin Evans, The Editor, Model Engineer, MyTimeMedia Ltd, Suite 6G, Eden House, Enterprise Way, Edenbridge, Kent, TN8 6HF
F. 01689 869 874
E. mrevans@cantab.net

Publication is at the discretion of the Editor. The content of letters may be edited to suit the magazine style and space available.Correspondents should note that production schedules normally involve a minimum lead time of six weeks for material submitted for publication.
In the interests of security, correspondents' details are not published unless specific instructions to do so are given.
Responses to published letters are forwarded as appropriate.

Favourite Tools

Dear Martin,
Coming to *Model Engineer* rather late in life, I am something of an armchair engineer but have been actively involved in genealogy for many years. Mike Joseph's article on his *Favourite Tools* leaped at me, with its names and possible ages of their former owners. Ignore this if he is already aware, but his picture of gauges stamped with S. G. Herrington got me delving into various family history sources and revealed the maker to be almost certainly a Sydney George Herrington.

This S.G.H. was born in May 1912 in Portsmouth. In 1928 he joined the GWR as an apprentice in the 'Fitting, Turning & Erecting Workshop' at Swindon and spent a period in the Stafford Road Drawing Offices from May 1933. He appears to have completed his apprenticeship in December 1933. The war time 1939 Register shows S.G.H. at the family home in Okus Road, Swindon and listed as a 'Toolroom Fitter GWR'. He appears to have died in 1996 in Swindon. (Ancestry, UK Railway Employment Records: The 1939 Register.)

Regarding the boxed combination square, there is a record of a Herbert John Fox (1885-1976) who lived at Banbury and was a Carriage & Wagon Examiner with the GWR but are these the tools for such an occupation?

Initials on the remainder are unfortunately too vague to explore further.

Regards, David Reay (Lancaster)

Dear Martin.
Having read the two articles by Mike Joseph about his *Favoured and Favourite Tools* in issues 4764 and 4675, I dare say that we can all pick out our favourite and possibly most used items that we have gathered over the years. I know that I have collected things, and still do, and when I have a job to do it makes things easier having them, although sometimes it does take a bit of a hunt to find the right tool for the job in hand. The good thing about buying good quality tools, whether new or used as some of Mikes examples as shown, they are always handy. Take for example the humble screwdriver, probably the most abused tool in a toolkit, used for opening things etc. Even a hammer, for instance - a good well made one will always feel right when using it, it feels as though it is an extension of your hand. The one thing I do abide by is the old saying that the only person who looks after your tools is yourself; I don't doubt that we can all remember lending out something and when it comes back it is in a state.

Looking at the clamping tool that Mike is not sure about, I would hazard a guess and suggest that it may be used for holding some if not all of the gauges that it is shown with when they are being used. It is amazing what we have stashed away in the way of tools that we have collected over the years. Unless a tool is beyond repair I like to keep hold of as it is the day you get rid of it Is the day you need it for a particular job. I don't doubt that we have all searched high and low for that particular screwdriver/spanner/socket etc. that we know is somewhere but can we find the damn thing when we want it? One thing I do find interesting is that when somebody is doing a series on making a particular model they often end up making simple jigs and fixtures. When making multiple parts that need to be exactly the same it makes life a lot easier. I am sure that during your career both in industry and also when making your garden railway you have found the same thing i.e. making jigs for repeat items helps a lot.

Yours sincerely,
J. E. Kirby (London)

Blackening

Dear Martin,
I would just like to add my two penn'orth to the discussion on blackening nuts and bolts. I was reading Peter Seymour-Howell's (must read) article, where in the last but one *Model Engineer* he mentioned blackening nuts and bolts. The first thing I do when I take delivery of nuts and bolts is empty the packets out into a plastic tea strainer and dip them into my blackening kit. It doesn't take very long and once done they are done; even if they do not need blackening they can soon be painted over. The thing is that when I have built a bit of my engines I am bound to want to take them apart again and with one of my steam locomotives, even if it is 1,000 hours later for an overhaul, when the cab comes off, the sets can be put in a tray and be put back in again, hey presto! They seem to be getting quite valuable now, especially the 12BA set screws with the 2mm A/F heads which are the perfect size for 5 inch gauge side platforms and cab roofs. So - what has happened to those for heaven's sake! I do not use anything larger than 8BA for a 5 inch gauge engine where it is visible other than for fixing cylinders to frame plates so everything up to that size just has to be blackened.

Kind regards, Doug Hewson

Diamond Lap

Dear Martin,
Stewart Hart's article *Cheap and Cheerful Diamond Lap* (issue 4671) could not have come at a more opportune time for me as I was looking for a small 'fill in' project whilst waiting for a material delivery. Although I only have two brazed carbide lathe tools that I rarely use I reasoned the diamond lap could be used for honing HSS tools and was therefore worth making.

Having consulted my local pigeon population only to find their welder codes had all lapsed I decided on a completely bolted construction centred around a piece of 2 x 1 x 3⁄16 inch aluminium RHS from my scrap box. In the end it was an all-aluminium construction and the motor, controller and diamond cutting wheel were all sourced on the internet as Stewart advised. The table support leg is slotted vertically and the mounting bracket is slotted horizontally so that the table is fully adjustable.

It works a treat on HSS tools and gives an excellent honed cutting edge - well done Stewart, a cheerful result.
Kind regards, Hugh Williams (Cwmbran)

Lithium Cells

Dear Martin,
Can I just echo Malcolm High's comment about lithium cells (issue 4672) that they need to be treated with the greatest respect?

I had a serious issue with a 10W portable L-Ion powered work lamp. In preparation for a forthcoming job, I was charging it in the kitchen, ready for use the following day, when the thing caught fire.

I was out in my workshop at the time but, by sheer random chance, my wife came home early, found the place full of smoke and a fire gaining ground in the kitchen. She threw a fire blanket over the fire and put it out then called the fire brigade.

We had three fire appliances attend with an impressive number of firemen. Having confirmed that everyone was safe and sound and that the fire was out they even fitted two smoke detectors to the house.

I can't recall where I got the lamp from but they are generally available from Lidl, Aldi, Screwfix, etc. It appears that the cause of the fire was that the batteries overheated during charging. As far as I can tell, I must have grabbed the wrong charger from the plethora of chargers I have in the house and workshop and thus caused the overheating and subsequent fire.

In retrospect I feel that I had a very narrow escape from a major disaster. Should I ever replace the lamp, I will seriously consider charging it in a fire proof container...
Regards, Dave Pack (Edinburgh)

Magnetic Drive Clock

Dear Martin
I followed an article in *Model Engineer* which started in the 2nd-15th February 2007 edition. I made the model and it has kept good time to this day. A friend has asked me to make him one and although I have all the original paperwork, the DXF files which I obtained via the then editor were lost years ago following a windows blue screen event. Does anyone still have these files?
Kind regards,
Robin Kenward

(If you can help, please respond to me in the first instance – Ed.)

Far Eastern Tools

Dear Martin,
I was heartened to read Mr Nick Feast's article (issue 4676) and look forward to the continuation. I also was a little surprised at Terence Holland's commentary on his experiences with an Oriental mini milling machine.

My own experiences with Chinese machinery have been very mixed. But overall giving them a little TLC and considerate usage mostly will turn them into very tractable machines at very low cost. Due to the inescapable ravages of age, which come to us all, a house move and retirement as such (do we ever retire?) I had to get rid of my larger industrial machines and go solely bench top. I already owned one of those little yellow mini-lathes, which over a longish period had been modified with all the better known modifications and Dave Fenner's books along with a rapidly changed set of parts to convert the tailstock to lever operation and cam locking.

However, a mill was needed. What to buy? Who from? Would it cope? I settled on a very small mill, originating from the Weiss factory and supplied by one of our better known and more reputable model engineering suppliers. It was a dream to use (with care and respect for its size) pretty much straight from the box as they say and much to my surprise. The real choice lay with a rigid column fixed to the base and with only the head rotating. It has done so far, after 4 years, everything I have asked of it. Cleaning and lubricating, one adjustment of the fitted taper roller bearings and a watchful eye on gib adjustment is all it's had. This makes it, for the money I paid, excellent value for money.

The little yellow lathe failed after some very significant use including a few years bashing out small parts when we were in business. The parts to rebuild were more expensive than buying a new machine. These of course are of SIEG origin - just look at the castings and their shapes. Hence a new mini lathe was purchased from another of our alleged reputable suppliers because I could go fetch it in the car in a day's drive. This was of REAL BULL origin. Perhaps REAL DOG would be more appropriate and my fights with this machine and the supplier are documented elsewhere. This was the fabled Friday afternoon car. Unfortunately, due to circumstances outside our control I was unable to use the machine until it was out of warranty. Suffice to say that it took three full weeks of workshop time just to correct the bed and saddle casting with scrapers, engineers blue and diamond laps just for starters. However, the saga went on to every part. But now I have a very tractable machine in the stable put to use with some of the bits made for the earlier machine. Again, despite my frustrations with the machine and the failed supplier, whom I will not use again, I do consider the basic machines of this type to be intrinsically good and good value. Yes, I will never recover the effort that went into this machine in my hours but I have the satisfaction and I have improved my woefully inadequate 'millwrighting' skills no end.

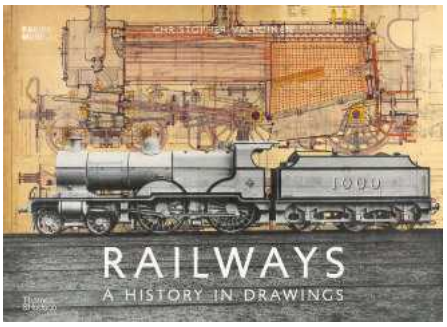
Such was the frustration that I almost gave up but I did put aside the beast into the garden tool shed and bought another lathe from the Weiss origins normally marketed in Europe under the Optimum label but from the UK supplier of the mill. Again, not a problem. A good clean, thorough lubrication, a check of the adjustments and it worked well from the box from three years ago now. I have only one beef and that is the annoying boss on the topslide that means an adaptor plate has to be made for the QC tool posts of my personal choice.

The economical nature of these machines has enabled me to have a better equipped workshop, with a wider variety of processes available to me at far lower cost than rigidly sticking to allegedly far better, bigger, quality 'British' equipment, much as I hate saying that. Yet for me, as the worst self critic, my work is just as good.

One thing however - does anyone know of a translation source for this obscure language 'Chinglish' found in so many handbooks and manuals please?
Kind Regards,
Ian Bayliss

Book Review

Railways: A History in Drawings



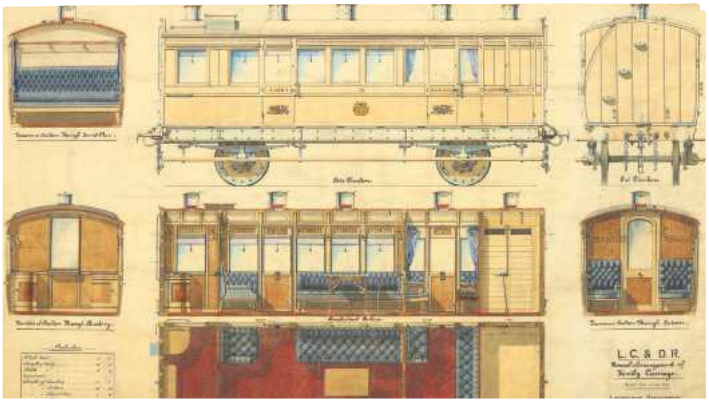
Christopher Valkoinen

Published by Thames and Hudson, 2021
ISBN 978-0-50002-167-5
£50, 306pp, hardback, size 23.7 x 32.9cm

The advent and development of railways had a huge impact on life in Britain and around the world; this is understood. Thousands of books have been written on the subject and there's at least something to be gleaned from most of them. If we try to think, for a moment, about the number of 'things' that were made to enable the railway to operate we are quickly at saturation point. In order to convey concepts and ideas to manufacturers and speculators, almost every item was drawn by somebody at some time – from express passenger locomotives to station masters' buttons; from the windows of the LNWR's Churches in Crewe to Stephenson's bridge over the Nile.

An unexpectedly large number of these historic drawings survive, including some very early engineering drawings that have UNESCO listing status. The NRM holds an archive of over one million drawings and the author has selected about 130 of the most beautiful pieces of functional and meaningful artwork to illustrate this remarkable book. The subjects chosen are wide and varied but the common thread is simply the beauty of the drawings and their annotations.

At Horwich Works drawing office in 1917 almost half of the employees are women. (National Railway Museum/Science & Society Picture Library)



LC&DR family carriage. (National Railway Museum/Science & Society Picture Library)

Christopher Valkoinen works within Search Engine, the NRM's own research facility, so has first-hand knowledge of the collection. His selection provides an insight into not only engineering advancement but also the social history of the railways - and it is a real feast for the eyes!

The format of this tome is very pleasing; the body of the book has a left-hand page of informative, descriptive text, which invariably includes a fascinating history with many hitherto unknown facts, and on the facing page a full-page facsimile of the chosen drawing accompanied, where available, by contemporary photographs. There are many locomotive and other vehicle General Arrangements, mostly coloured, and scores of maps and other contemporary documents. Captions are clear and the page layout is beautifully crisp and clean.

Anyone who has a passion (as, I admit, I have) for the beauty of art in engineering will appreciate this book. It also serves as a tribute to the thousands of unknown draughtsmen and women whose skills brought ideas to life.

The book is available in the UK on the Thames & Hudson website: www.thamesandhudson.com/railways-a-history-in-drawings-9780500021675. In the US: www.thamesandhudsonusa.com/books/railways-hardcover

Diane Carney

A K.N. Harris Oscillating Engine PART 1

Geoff Walker builds a simple oscillating engine designed and described by K.N. Harris 75 years ago.

Introduction

This miniature engine is based on a design by the model engineering writer K.N. Harris. KNH wrote numerous articles for this magazine over a period of some 50 years and is, to the best of my knowledge, the author of two books, *Model Stationary and Marine Steam Engines* and *Model Steam Boilers*.

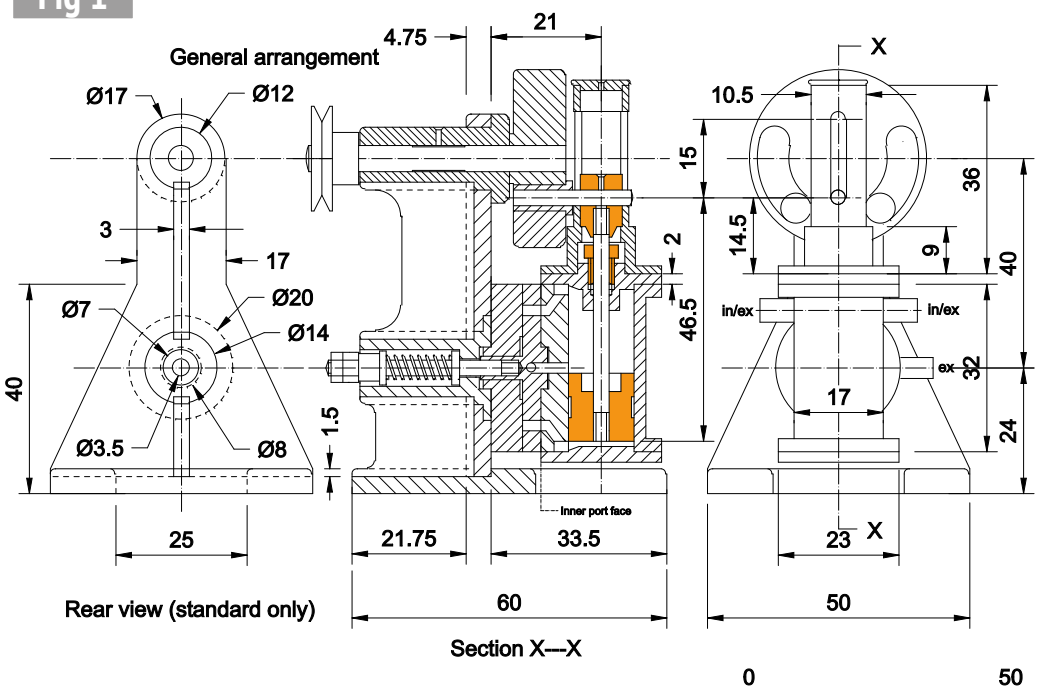
The engine, which can be seen in **photo 1** and **fig 1**, has a 12.7 mm bore (½ inch) and a 15 mm stroke and has much the same characteristics as the KNH design which can be seen in **photo 2**. His design was first published in *Model Engineer* in December 1946, issue number 2381, and is a short but detailed article with various diagrams and enough written information for a prospective builder. The article is described as an 'air motor' but, as KNH indicates, the engine would run just as well on steam. The diagrams are also in his steam engine book but here there is scant information to accompany them. The post war *Model Engineer* issue is worth acquiring for a more detailed appreciation of his engine and my engine.

My aims for this article are that hopefully my interpretation will be of interest to all and, as KNH did, provide enough information for any prospective builder. This is a short article therefore any diagrams and associated text will be kept to a minimum. A scale is provided in fig 1 for less important sizes and **figs** ≫

1

Front view of the complete engine.

Fig 1



A Single Cylinder Double Acting Oscillating Engine
(Based on a design by K. N. Harris) See text, figs 2 and 3 and photos for more details.

2 and **3** give more details for the port block, the cylinder port face and the flywheel/crank.

The engine is a step up from a basic oscillating cylinder engine and may well be a good choice for a beginner who is moving on from that type of engine to a more detailed challenge. Equipment needed will be a lathe, a milling/drilling machine with a rotary table plus the usual selection of hand tools. All working methods described are just my beginner's way of working; there are of course always alternative and often better methods.

The basics

Here are some basic details for the engine:

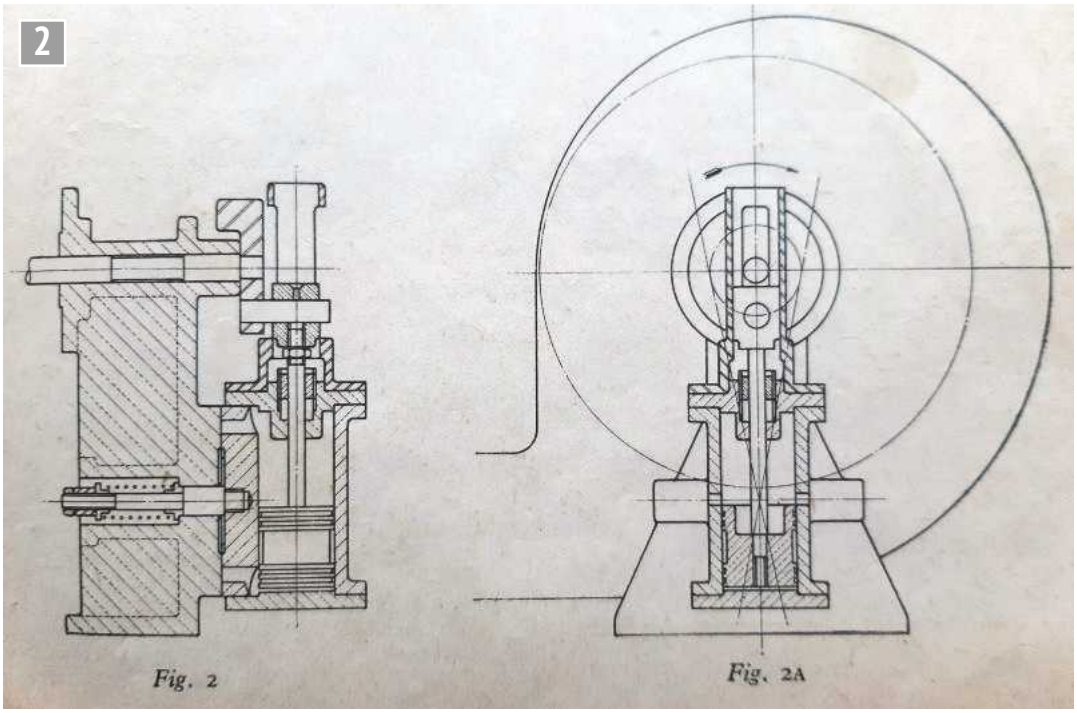
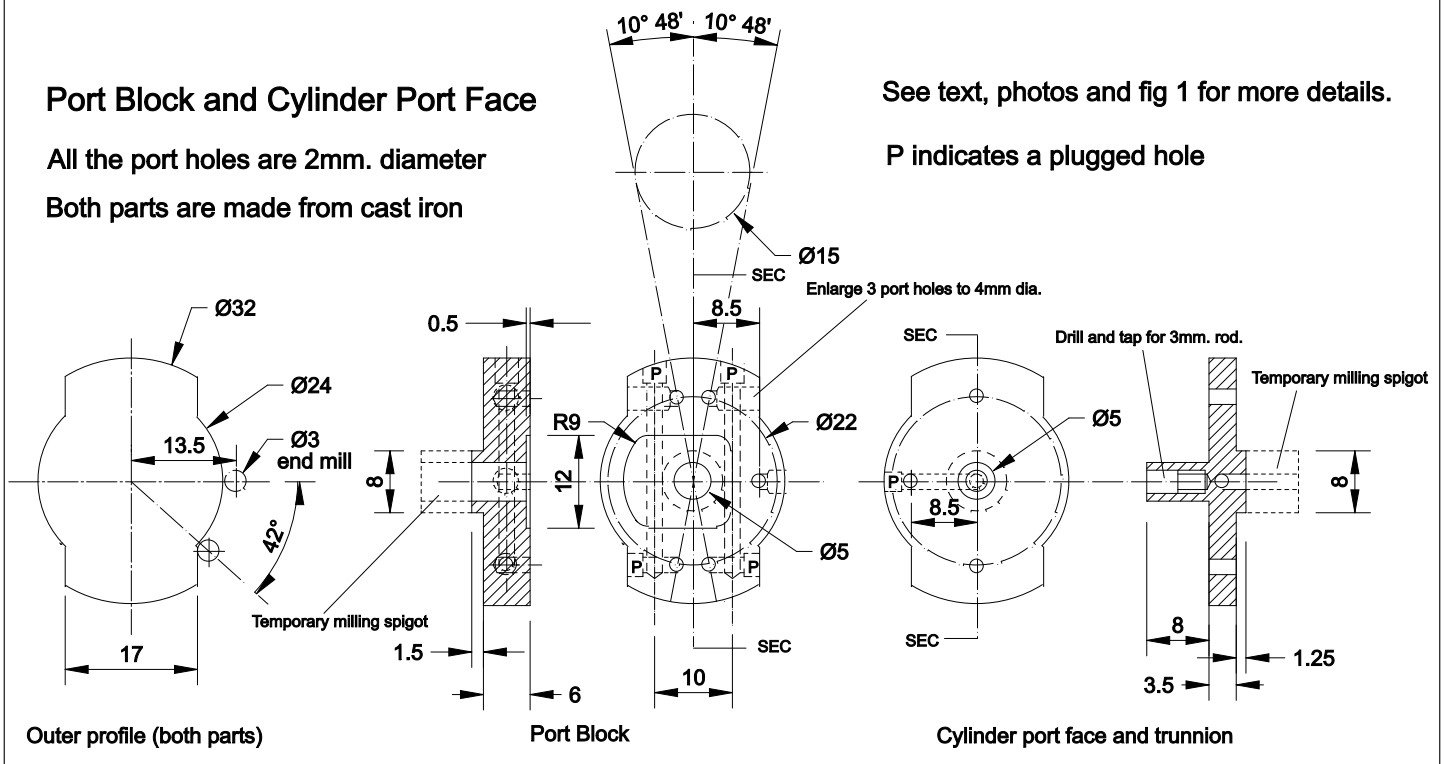


Photo of KNH drawings.

* This is a double acting engine having a cylinder in which the air/steam acts alternately on both ends of the piston.
* The engine is an inverted design with the cylinder and piston below an overhead crankshaft.
* The engine can be run clockwise or anticlockwise simply by switching the input from one side to the other.
* The flywheel and crank have been combined and a single accessory drive pulley is also used as a retaining collar.
* A big end guide is included to help take the side strain off the piston rod and gland.
* The standard is made from mild steel and cast iron and is fabricated from nine different parts, using JB Weld original adhesive (JBW) to bond the parts together.
* The cylinder assembly is also fabricated, this time from two parts and again bonded together with JBW.

The engine also features a secondary auxiliary exhaust which functions independently of the primary exhaust. With

Fig 2



reference to fig 1 the exhaust is positioned at a mid-point in the cylinder and is only fully open when the piston is at TDC or BDC. For the majority of the engine cycle it is closed by the piston. The length of the piston is equal to the stroke length minus the port diameter, i.e. 15 – 2 = 13 mm.

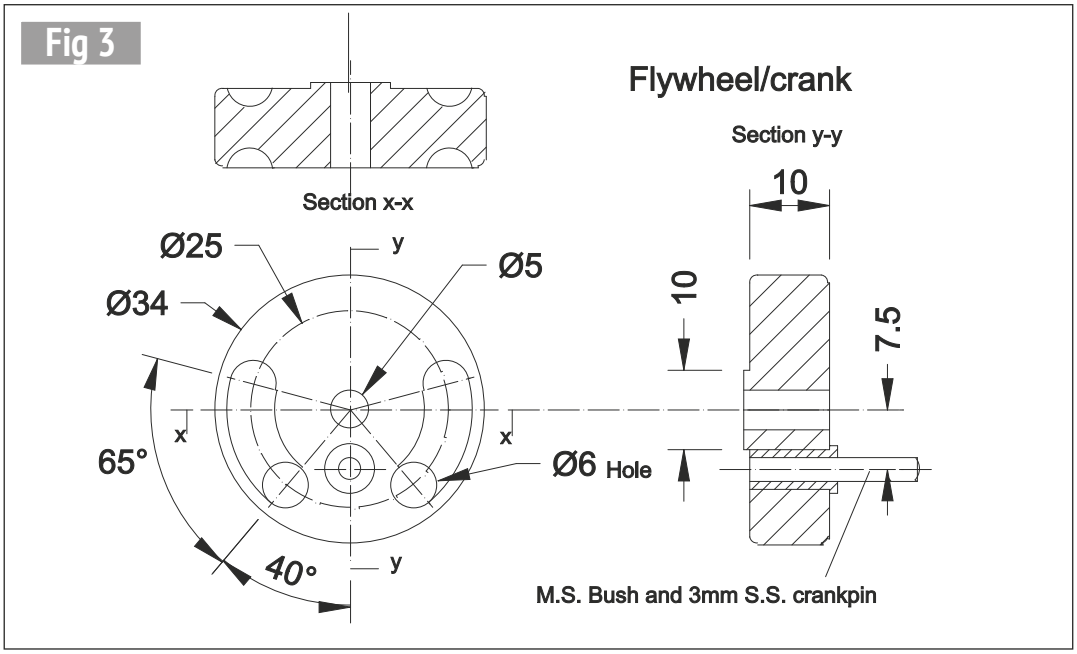
The standard

I would imagine the standard on the KNH engine was cast, which would have been my preferred choice. It is unfortunate that with the country in lockdown and travel restricted, a trip to the foundry was not an option for this engine. Having experimented with JB Weld original adhesive and been impressed with its bonding strength I was happy to fabricate.

Fig 1 gives all the key sizes for the standard and the less important ones can be scaled. **Photographs 3** and **4** show the construction method and the main parts of the standard before and after assembly. I used 3⁄16 inch (4.75 mm) and 3mm mild steel plate as I had that in stock; the slots in the plates and bosses are machined to suit. The port block and the crankshaft boss are made from cast iron and the trunnion boss from mild steel. The tapered central upright was held on a lathe faceplate and two settings were used to drill and bore the boss holes to the correct sizes.

On assembly, first attach the tapered upright to the base using JBW and two small countersunk head screws from the underside of the base. The two screws are optional but if not used some method will need to be devised to hold the upright while the JBW sets. Next, attach the two bosses with JBW, using small toolmakers' clamps to secure them in place while the JBW sets. The ribs can then be slid into place, bonding with JBW, and finally the port block can be attached, again using toolmakers' clamps to hold it in place while the JBW sets. If desired the external corners can be rounded and the internal corners can be filleted to help give the appearance of a casting.

Fig 3



The standard and parts prior to assembly.

The port block is detailed in fig 2. This should be prepared on a lathe, turning the outer diameter to 32 mm, the face width to 6 mm and the register to 8 mm diameter. Leave the register length longer so it can be held in the rotary table chuck as shown in **photo 5**. With this arrangement the outer profile plus the relief area can be machined and the port holes drilled 2 mm diameter. Drill the vertical and horizontal holes which link the port holes on each side of the block. Plug the holes as shown on the drawing with 3 mm mild steel plugs using Loctite to secure them in place. The two inlet and outlet bosses can be turned from 6 mm stock, shouldered to 4 mm diameter and again attached using Loctite to secure in place. The outer ends of the bosses are drilled for ⅛ inch copper steam pipe. The auxiliary exhaust port is made from 5⁄32 inch (4 mm) pipe.

Note - the reader will probably have noticed the four countersunk fixing holes in photos 3 and 4 have been plugged and then replaced with two smaller discreet fixing holes at the rear of the tapered upright.

●To be continued.

Milling the port block.

Robert Hobbs ventures into unfamiliar territory.

Continued from p.700
M.E. 4678, 19 November 2021

PART 4

Recycling a 3½ Inch LNER Prairie

The cab sides were fitted to the running boards and the shape of the spectacle plates was determined by cutting out a card template to fit the firebox profile; with the cab side held vertically the outer edge of the card was trimmed to suit. The two plates were cut out from galvanised steel sheet and filed to shape. The position for the reach rod hole in the left-hand plate was aligned from the running board, marked, drilled and filed to provide a neat fit. An early set-up of the cab sides and plate is shown in **photo 44.** It was a straightforward operation to cut the roof to shape from galvanised plate and roll to the required contour. Rails were fitted together with a false sliding roof (**photo 45**).

The saddle casting - which was purchased, along with the chimney and steam dome, from G.L.R. Kennions - was cleaned up and fitted to line up with the centre section of the front apron, thus setting its position longitudinally on the frames and determining the height of the smokebox to match the boiler. **Photograph 46** shows the partially cleaned up saddle.

Trial fit of the spectacle plate.

The smokebox, which was rolled earlier in the project, was next on the list and with the front ring set in place the rivet hole positions were marked out and drilled, first with a centre drill to set the position, then with a drill to match the rivet size. The rivet holes for the boiler end of the box were tackled in a similar manner. The superheater covers were drilled and spotted through onto the smokebox for riveting later. **Photograph 47** shows the smokebox supported on a vee-block whilst using the bench drill to make the holes.

Cab roof with false sliding hatch.

Smokebox saddle.

The running boards were rubbed down and marked out for the rivet holes, which were drilled in the bench drill using a fence to guide the line of holes. **Photograph 48** shows the running boards after the curved sections had been rubbed down and refilled, allowing the boards to be sprayed with etch primer. The almost complete front end is shown in **photo 49**; the rivets are now in place on the smokebox, apron and running boards. The empty holes are for the mounting bolts which will also secure the front apron lamp irons etc.

The lamp irons were cut from steel sheet finished to shape with the small belt linisher. Mounting holes were drilled and the front and rear lamp irons bent to suit. Although these details are simple but fiddley little fittings, they are well worth the effort. **Photograph 50** shows the rear of the tender with the lamp irons, steps and the draw hook in position.

The cab sides and the spectacle plate were positioned on the running boards and the final shape around the boiler carefully filed to fit.

The window frames for the spectacle plate were formed from OO gauge rail which was bonded in position. The plates were then riveted to the cab sides and spray etch primed (**photo 51**). The inside frame for the windows was cut from mahogany strip and glued together, with the plastic panes being made from an old tape cassette box (even more recycling) and is shown in **photo 52.**

The reverser stand casting and hand wheel were cleaned up, primed and spray painted British Railways Green (**photo 53**). The tender brake stanchion was a simple turning job in the Myford and is shown in **photo 54.**

The pump eccentric strap and the lubricator strap with its extension rod are shown in **photo 55.** The steam feed and the exhaust pipework were straightforward turning and threading operations (**photos 56** and **57**).

Drilling rivet holes in the smokebox.

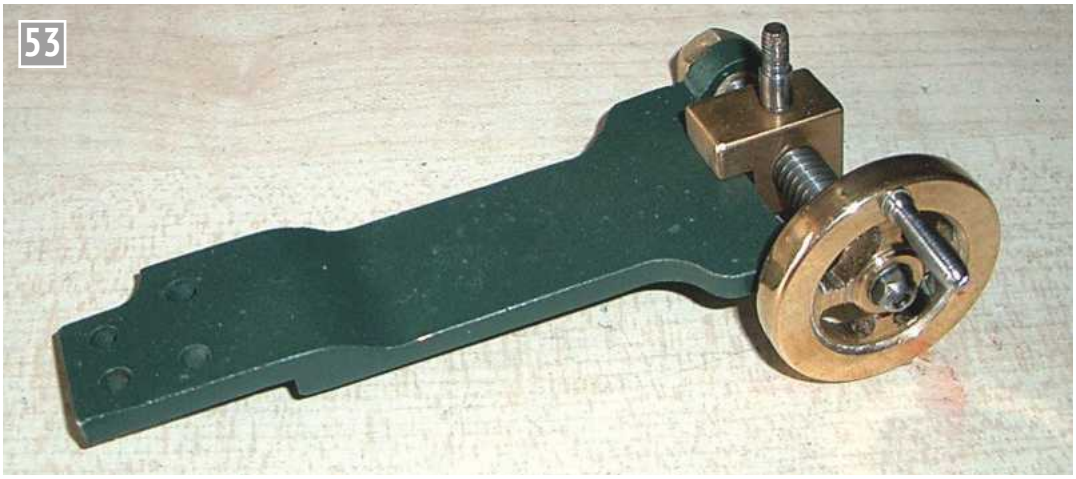
Running boards in primer.

Completed front end.

Details added to the rear of the tender.

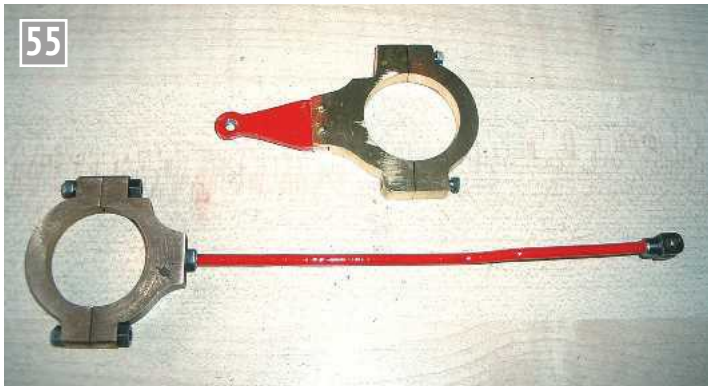
Cab sides with spectacle plates added.

Window frames.

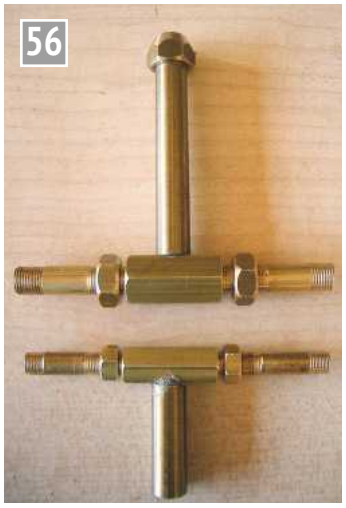


Reverser stand.

Tender brake column.

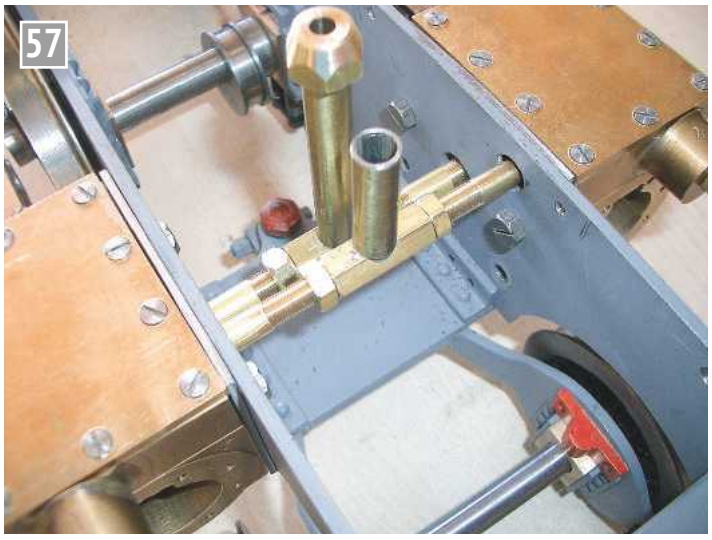


Straps for pump and lubricator eccentrics.



Steam feed and exhaust pipework.

For my part, this locomotive was never intended to run, it was only for static display, but it would have been unacceptable to leave it in this condition!

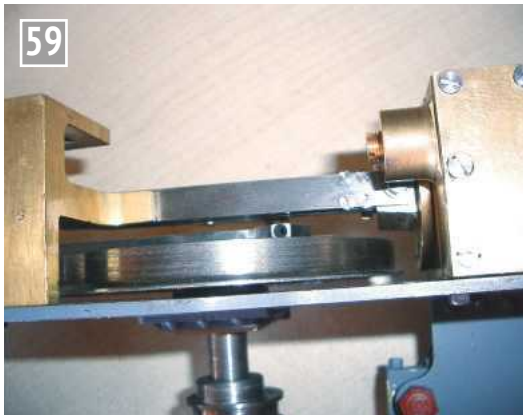


Pipework in place.

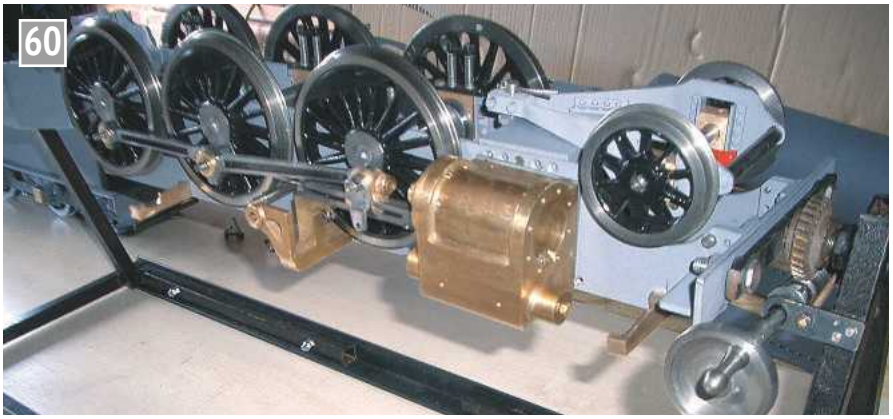
The loosely assembled locomotive was starting to look the part (**photo 58**) and a feeling of 'getting there' was on the horizon. Pride cometh before the fall, however … and what a fall!

Whilst trying to fit the slide bars and the crosshead to the cylinder/ valve chest assembly there was no room for the crank pin and the connecting rod to pass freely behind the slide bars (**photo 59**). The photo highlights the lack of clearance. On investigation, the cylinder blocks, valve chests and motion plates had been machined smaller than required on the width dimension, by about sixty-five thou. Yet another lesson learnt! In future, all components will be fully checked for the correct size to the drawing before proceeding with a recycling project. Perhaps this is another reason why the locomotive was part finished and up for sale. For my part, this locomotive was never intended to run, it was only for static display, but it would have been unacceptable to leave it in this condition! The problem was corrected by fitting packing pieces cut to shape and fitted between the main frames and the cylinder assembly as well as the motion plate. These additions would not distract from the finished locomotive

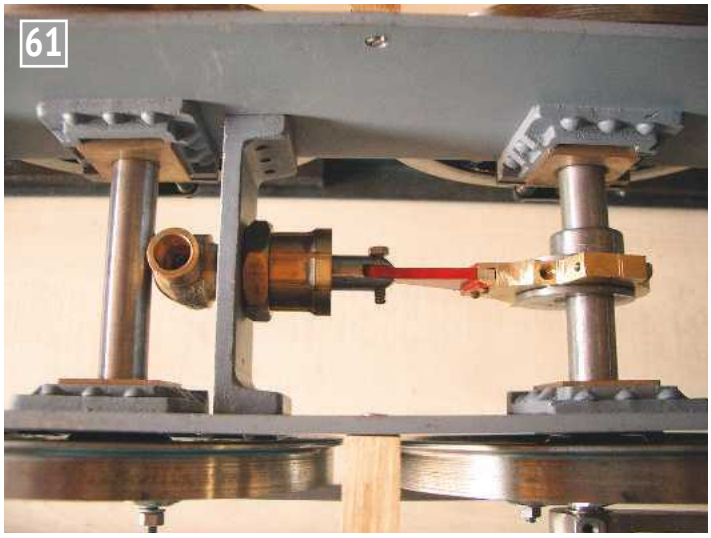
The locomotive takes shape.



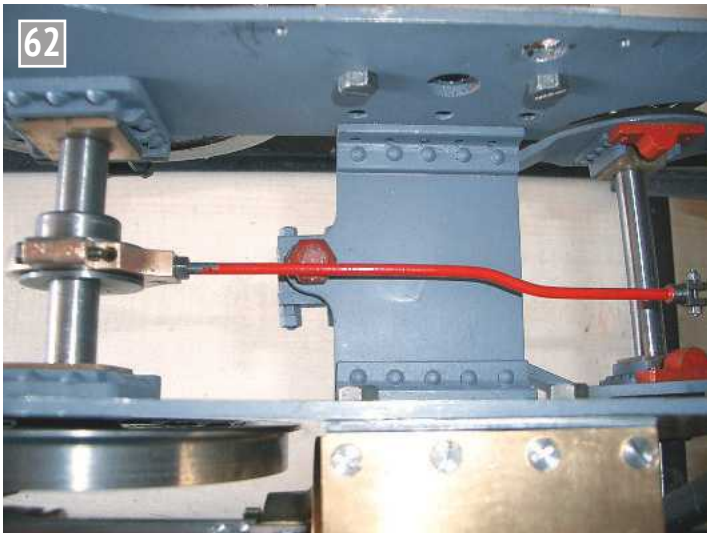
Clearance problem on the crosshead.



Building stand in action.

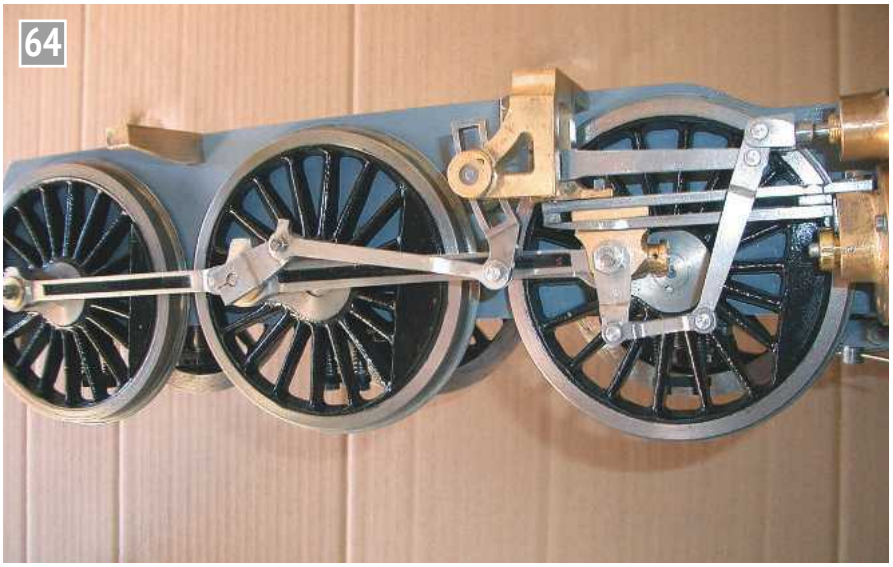


Feed pump.



Lubricator eccentric.

Making clevis pins.



Most of the valve gear is now in place.

because they were hidden by the fittings themselves and the running boards. Having sorted out the clearances, the loose assembly of the locomotive was set up in the turn-over frame to allow easy access for the detail fitting and adjustments to the motion, valve assembly, springs and eccentrics. **Photograph 60** shows the turn-over stand with the main frames in position. The feed pump and the lubricator eccentric/ linkage are shown in **photos 61** and **62** respectively. Clevis pins were turned in the Myford to suit the pivot points in the valve gear; these pins were of differing length and to drill the retaining split pin holes a simple drill jig was employed. The split pins and the drill jig are shown in **photo 63.** A close-up of the valve gear *in situ* is shown in **photo 64** and thankfully, after a few minor adjustments, they all operated smoothly. This is a suitable point to leave this part of the project with the next instalment dealing with the painting and final assembly.

●To be continued.

Bolton Corporation No. 140 in 1:16 Scale

PART 4

Ashley Best builds a model of the first of the fully enclosed Bolton trams.

Continued from p.697

M.E. 4678, 19 November 2021

*In 1927, Bolton Corporation Tramways took delivery of twelve new large bogie tramcars. These were built by the English Electric Company and were of interest in more ways than one. They were Bolton's first totally enclosed tramcars and the last trams in England to use the Brill designed 22E trucks and were almost the very last traditional style tramcars to be built by English Electric. One of these trams, number 140, forms the subject of this article (**photo 1**).*

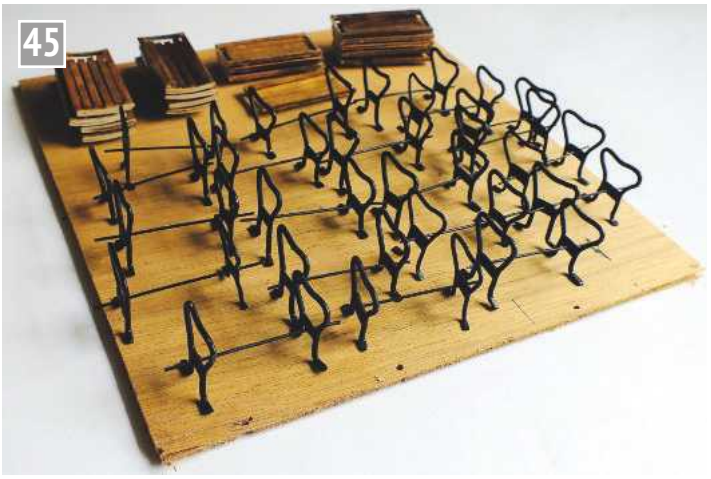
Bolton Corporation No. 140.

Bending jig.

Seating

On this tram, the lower saloon 'two and one' transverse seats were made with equal length side frames as the floor is flat. The upper saloon has a floor camber so the seats needed unequal legs. All the seats were made in advance as were the controllers and other parts including the lights. The seat frames were made from copper wire drawn from surplus electric cable and formed in special jigs (**photos 43** and **44**). The frames are shown in **photo 45**. The lower saloon seats were made by reference to an interior view photo of the lower saloon. These two and

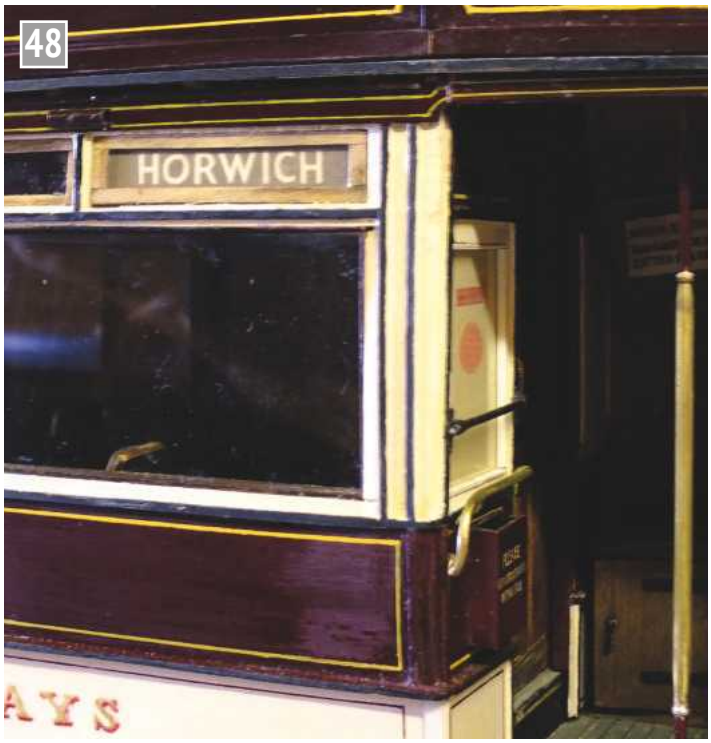
Frame feet.



Sets of frames.

Lower saloon seat.

Upper saloon seats.



Side indicator.

End indicator.

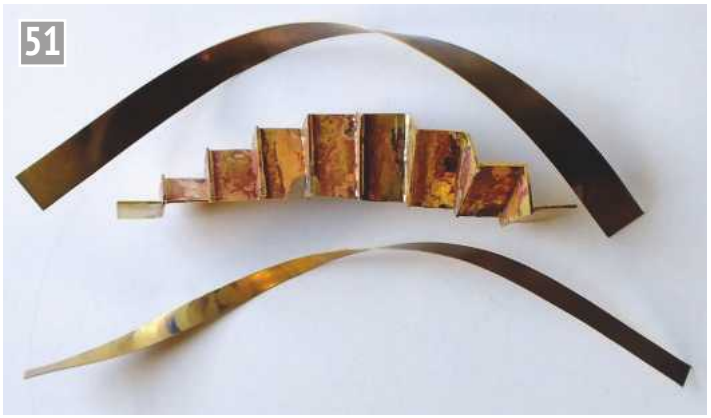
one seats had the usual slatted base parts but the flip-over backs were solid – supposedly to prevent pick-pockets reaching through (**photo 46**). Unfortunately, there does not appear to be any photographic reference of the upper saloon, so these had to be based on the standard seat on other Bolton trams (**photo 47**). The seats were wooden as were all the seats on Bolton trams. Not for Bolton was it thought necessary to move forward to upholstered cushions in its tramcars, as was increasingly occurring in other systems, responding to competition from bus manufacturers. In 1927 there were tramway undertakings in and around Greater Manchester and in almost all the industrial towns and all used wooden seats. A few were starting to equip at least some cars with sprung, upholstered seats. Bolton's citizens were obviously considered to be in no need of such a refinement. It is a fact that, at least on well-maintained track, a tramcar provides a smoother ride than a bus. Therefore, although unyielding, wooden seats were not as uncomfortable as might be thought. Cleaning the tram interiors was much simpler with wooden seats and maintenance costs were considerably lower. As an aside, I remember the introduction of what were described as 'Utility Buses' towards the end of World War Two, having wooden seats and basic bodywork. Eventually upholstered seats as replacements were installed and later, after relatively short lives, most of the buses were re-bodied.

Destination indicators

The lower saloon has an indicator at each end next to the platform (**photo 48**) with another above the windscreen (**photo 49**) on each platform. Lighting for these, unlike the head and tail lights, is not directional. Diodes are employed for directional lights. Bolton's use of large capital letters as route indicators was distinctive. The letters were not of a particular font, but clearly designed locally (**photo 50**). This use of the route letter with its position in the front of the upper saloon end was the feature that made the trams distinctive and at once recognisable as from Bolton. These days with almost universal use of standard lower case fonts throughout the transport world, it is refreshing to look back to the time when transport undertakings could design their own clear easily seen capital letters which were universally applied.

Trams carried informative destination indicators on the front, rear and sides of vehicles unlike now when the front destination is all there is on many buses. Lighting on the model is drawn from a switch in the cabinet on the platform. This is fed from a connection to the overhead

Route letter.



Stair parts.

supply. The same cabinet has another switch for the motors. It is thus possible for the tram to operate with lights on or lights off or for the car to remain standing with the lights on. The wiring diagram is shown in **fig 4**. No doubt it would be possible for an electronics whiz to devise something much more sophisticated but I am content with this simple system which works well enough.

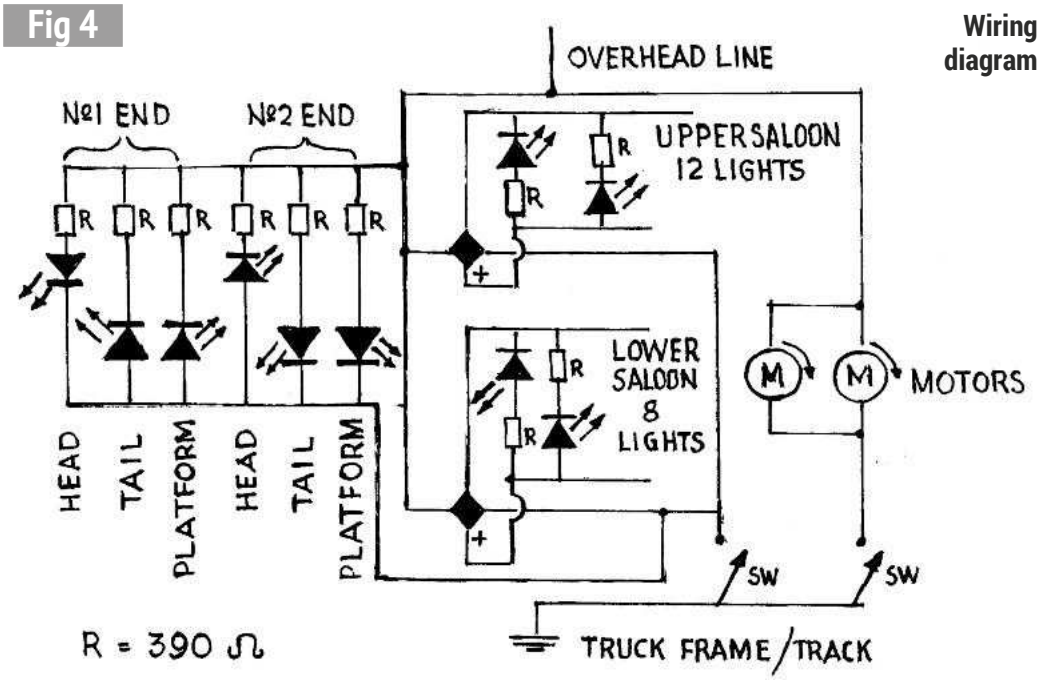
Stairs

The stairs are perhaps the most difficult thing to make with different ways to achieve a satisfactory result. I have ended up with using metal and have found this the most satisfactory. I use brass and silver solder throughout. My

Completed stairs.

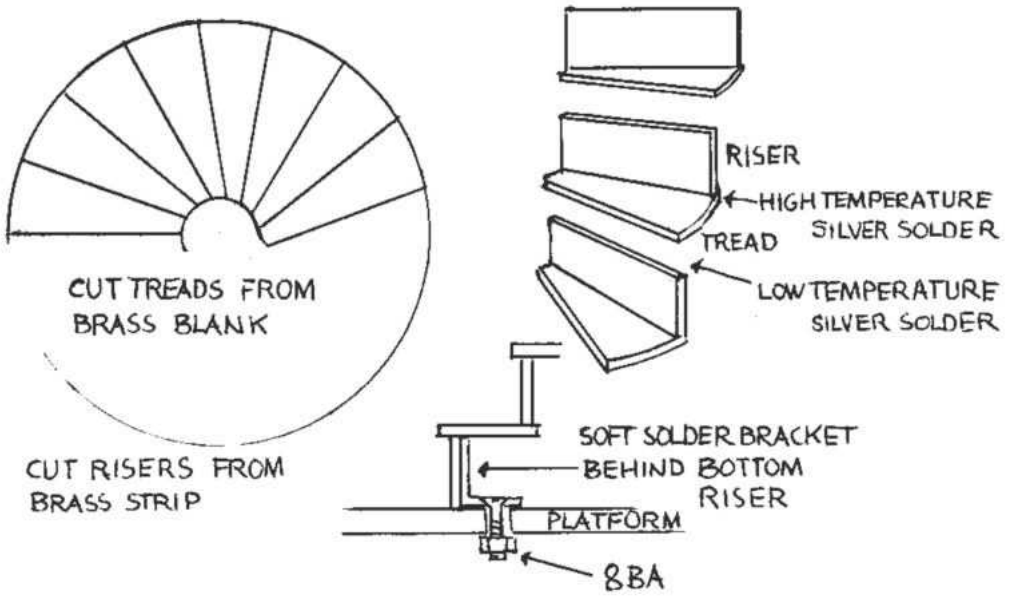
first experiment used tinplate and soft solder but this was almost impossible as it kept falling to bits. I tried plywood and this worked really well and was quick and easy to assemble, but became awkward when fitting stair rails and beading. Card is also possible, but suffers from the same disadvantage as wood. Silver-soldered brass is very robust, can be used as an electrical feed from the top deck to platform and provides

Fig 4 **Wiring diagram**



Bolton's citizens were obviously considered to be in no need of such a refinement...

Fig 5



Stair plan

a reliable strong support for the top deck canopy bend – especially useful on cars with open platforms. The essentials are shown in **photos 51** and **52**. Treads and risers are made as units and then united to form the stairway (**fig 5**). Stringers are formed from annealed strips and soldered carefully. Careful use of the gas torch and directing the flame accurately makes it possible to avoid joints becoming unsoldered. The final application of beading is accomplished with soft solder with no chance of the main item collapsing. The most important requirement is extremely careful measurement, planning and cutting. Kicking plates and wearing strips can be added finally, being glued in place with epoxy glue.

Lights

On this model I used LED lights in the lower saloon when resistors could be hidden in the false ceiling and bridge rectifiers concealed in the bulkheads (**photo 53**). Upstairs there was no room and grain-of-wheat bulbs are used. Brass fixtures are used for the lamps with moulded plastic clear shades (**photo 54**). These fixtures had a small brass holder and the shades were made from clear plastic sheeting heated to soften it and then quickly pressed into a suitable hole with a metal former to the correct profile. Heating the plastic sheet was a bit tricky if done with the gas torch but could be achieved under a cooker grill. It all had to be done at speed as the plastic hardened quite quickly. Assembling each lamp has to be done with care to ensure wires are not shorted as they pass through the brass. One wire was insulated to prevent this. Epoxy resin ensured rigidity.

●To be continued.

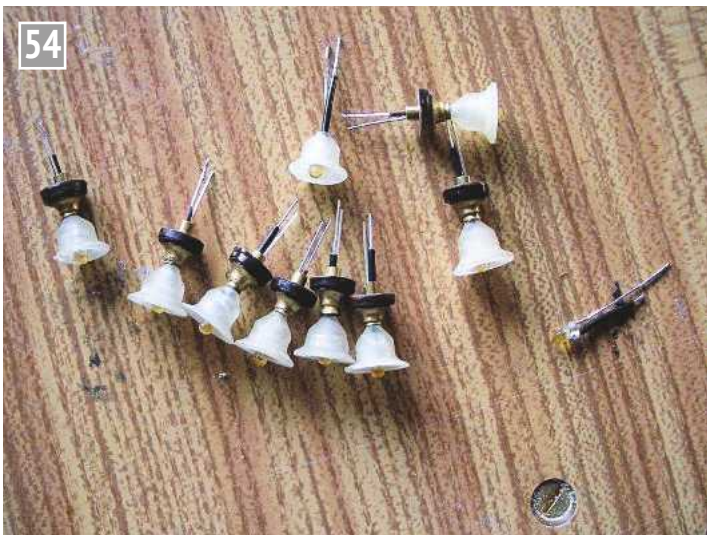
NEXT TIME

We add the paint.

REFERENCES

English Electric Tramway Album, Geoff Lumb.
Bolton Corporation, Harry Postlethwaite.
Tramways in Bolton, Tony Young and Derek Shepherd.

Lighting wiring.



Set of lamps.

CLUB NEWS

Geoff Theasby reports on the latest news from the Clubs.

Debs and I visited Chatsworth House in Derbyshire recently and viewed the Chatsworth Tapestries, which date from 1450. In one of them a water wheel is clearly visible (**photo 1**). We spent a weekend in Manchester which coincided with the Conservative Party Conference (no relation) and saw the protest march down Deansgate, from the respectful distance of the Cloud 23 bar in Beetham Tower. We visited Jodrell Bank radio telescope and found it very good, although less technical than I remembered from a previous visit. The presenter of the explanatory, (ex-'planet'-ery?) talk was most impressed by my description of a home-made radio telescope, which used a redundant satellite dish. This is described in my article in *Practical Wireless*, January 2018.

I attended the Sheffield Computer Fair and skipped joyously homeward clutching to my bosom a new keyboard. The number of computers labelled 'Bargain of the Day' was notable. (This does not compute…)

Another recent picture from the archives - Portsmouth's Spinnaker, from our cruise ship. Served internally by

The Spinnaker, Portsmouth, from seaward.

Chatsworth tapestries, dating from 1450.

an interesting triangular staircase and lift - an external lift was removed after senior staff from the construction contractors were trapped within it after one too many malfunctions (**photo 2**).

In this issue, 'that' blue engine, an old society, cheap models, a Lone Ranger joke, a cellist, an anniversary, drones, railings and a good idea.

Kingpin, summer, from **Nottingham Society of Model & Experimental Engineers,** opens with a picture of 'that' blue railway engine, to which we are so grateful for bringing children up to appreciate the glory of steam power. Members visited the Cromer Light Railway in May, and their brief report is followed by an announcement by the Great Central main line project bringing us up to date. John Ollerenshaw introduces the Wortley Top Forge, a historic, water-powered heavy iron forge dating from monastic times. (www.topforge.co.uk) Some poor member was pictured in an undignified pose 'looking for a dropped 50p…' Mike Firth concludes his series on the Society's history. Tom Ingall has his own contribution concerning the GCR project and Joe Hoy describes the final days of the High Speed Train.

W. www.nsmee.org.uk

Criterion, September, from **High Wycombe Model Engineering Club**, tells of three successful running days in the summer. Junior member Ed Field has gone to study renewable energy at Exeter Uni, before which he spent the summer on work experience with a special effects company. This was hard work with long hours but he enjoyed it immensely. A regular income meant that he could indulge his desire of owning an old Land Rover, albeit 'financially crippling', and Martin Page adds notes on the Welsh Highland Railway. A forthcoming event concerning locomotive husbandry reminds me of Tom Lehrer. A local

primary school gave the Society a cheque, funds raised from the children and parents, for 13 years of running these always enjoyable end-of-term events. A video of Chris Gooch's steam driven baler has appeared on Instagram and viewed 5.8 million times! The second public running day brought forth two sets of twins and a three-month-old. One budding enthusiast had 12 rides that day… The third public running produced triplets and a babe in arms. Chris Gooch was asked to provide a showman's engine for a local event. This faced a slight problem-ette, in that the proposed engine was in bits for its ten year hydraulic and steam tests. After several weekends and late nights, it passed these with two days to go and the vehicle duly appeared as requested.
W. www.hwmec.co.uk

Steam Whistle, September, from **Sheffield & District Society of Model & Experimental Engineers,** opens with a drawing of a James Nasmyth nut-cutting machine, which is among a collection of models by member, Maurice Turnbull, who regularly exhibits at our events. His interest began when he rescued some old books from a bonfire, including two by the celebrated Mr. Nasmyth. This leads in to the next item about the latest public running day, which brought record queues for rides. This is despite competing events nearby, so 'we' must be doing something right. (Who's this 'we', Paleface? - Geoff) Editor, Mick Savage writes that on 10th December 1900 there was held the first recorded meeting of our Society. A branch of the Society of Model Engineers met in the YMCA, and met regularly until 1903, according to the *Model Engineer*, but nothing is then noted until 1937 and it became a founder member of the Northern Association of Model Engineers in 1945. Alan Cooper, spending time in the ticket office of late, thought there must be a more convenient way of dispensing tickets and designed and made one! Murray's 'Thought' concerns nitrous oxide and its many uses such as anaesthesia (Entonox) 'laughing gas' parties, pressurised aerosols, esp. for whipped cream, which the normally-used CO2 makes taste acidic. It is also useful for increasing the power output of i/c engines and rockets.
W. www.sheffieldmodelengineers.com

The always reliable *Newsletter & Journal,* autumn, from the **Gauge 1 Model Railway Association** has a superb picture on the front cover of a NORD 'Outrance' 4-4-0, built on an Aster Jumbo chassis. This is not as much 'bastardisation' as might be thought. The originals were based on the Sturrock GNR 2-4-0 (**photo 3**). Editor, Rod Clarke, asks for more items from those who keep their light under a bushel, using pseudonyms or claiming anonymity as desired. We editors know that not every skilled engineer is good at setting their ideas down in paper or screen so we can rewrite your proposals if required. Alongside (behind?) the above Nord locomotives could be found coaches such as those built by Fabrice Pinot and friends, described in a three page article on these rarities of the French model scene. Tony Armstrong made a train of contemporary carriages for his LBSCR 0-4-2 *Gladstone*. Duncan Bell made a couple of cheap shunting locomotives. He found that the £130 kit was easiest to build but the £55 kit was more enjoyable. Barry Curson built a model 'Fell' Diesel, the prototype of which worked around the UK for several years but was not proceeded with and the sole example was scrapped after a fire in 1958. An ingenious use for a metal dustbin lid was conceived by Jim Smith, who used it to form the basis of a turntable pit, the driving mechanism being from an old hand drill. (Dustbin lids? Radio amateurs found that their dimensions and shape made very good dish aerials for microwave work – Geoff) After last issue's reference to Pat Honey's DMU-based special trains, I was pleased to see them featured in this *N&J*, and I enjoyed Fred Roberts' item on his garden railway 'Adlestrop', including being photographed from a drone. John Mileson's collection of scratch-built models is featured. John would like to claim that he is a skilled modeller but he isn't (he says). However, I fear he is too modest. Australian, Peter Watson reminds us to keep

G1 Nord 'Outrance' 4-4-0 (photo courtesy of Chris Ludlow).

our eyes on the gutter. There he has often found material useful to modellers including his favourite, broken spring steel needles from mobile street cleaner brushes.
W. www.g1mra.com

Norwich & District Model Engineering Society's autumn *e-Bulletin* opens with a picture of a chair made from chains, by member Robert Bailey, who has designed and made a series of fully functional chairs from unlikely materials. (J.J. Rousseau comes to mind - Geoff) Member, Mike Fordham often visits Quainton Road heritage railway and shows a picture of the 1 km on-site Golding Spring miniature railway, run by the Vale of Aylesbury Model Engineering Society.
W. www.ndmes.org

Spotted on youTube, a rather different clip, of Beatrice Harrison playing her 'cello in her Surrey garden. The world's first live (1924) outside broadcast came about because the cellist noticed the birds joining in to make a rather wonderful sound and other such recordings followed. In a similar 1943 broadcast, you gradually become aware of another sound - British bombers heading south. As the editor says, 'Haunting!'

The September *Blast Pipe*, from **Hutt Valley and Maidstone Model Engineers Societies**, carries a piece about Basil Jones, who produces spun items, and gave a talk on the practice together with a few dodges to make it easier. Caleb Scott made a video of Basil spinning a steam dome to illustrate the evening. Lest readers think that spinning is only used on sheet metal, Basil also makes wheels for Formula 5000 racing cars. Just as I was expecting to close up this paragraph, on the last page is a stunningly realistic, 1 metre long cardboard model of an unidentified locomotive by John Regan, who accompanied Basil on his visit.
W. www.hvmes.com

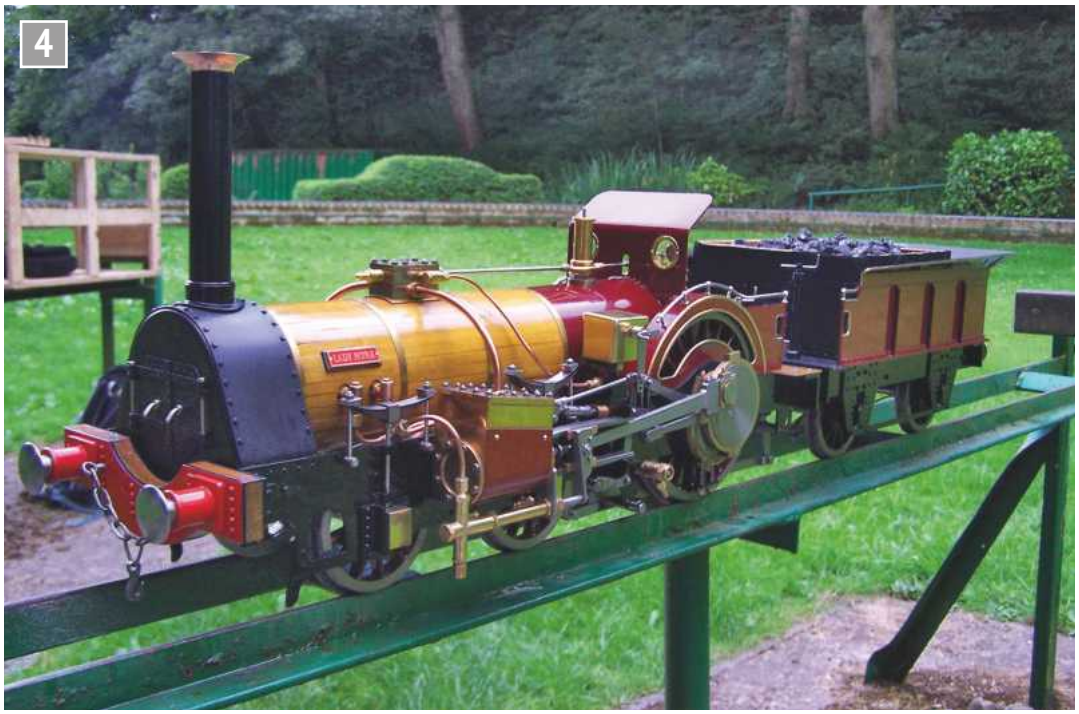
Inside Motion, September, from **Tyneside Society of Model & Experimental Engineers,** bears the sad news that their ride-on mower has auto-destructed and they cannot afford another. Thus, this edition is emblazoned (in green) 'Your Grass Needs You'. Any suggestions, helpful or facetious, to secretary, Linda, (telephone, and press the HASH key…) Dave Henderson often visits the *La'al Ratty* (Ravenglass & Eskdale Railway) in Cumbria and, to celebrate the 60th anniversary of the line's purchase by the preservation society, he was asked to help provide a display of 7¼ inch gauge locomotives. He didn't expect to get much attention as a sideshow but business was brisk, and at 5pm on the Saturday a passing Steam Special, hauled by rebuilt SR West Country *Braunton* was greeted with a deafening chorus of whistles. We are asked to visit the R &E Facebook page to hear it but I couldn't find the recording. I subsequently looked at lots of R & E videos on youTube. An onerous task but all done in the name of a service to my lovely readers. Try www.youtube.com/watch?v=C71nRRCBcVc It starts silently and the sound effects begin at 1m 16s and last until 2m 33s, with video from a drone.
W. www.tsmee.co.uk

Bradford Model Engineering Society *Bulletin,* September, reports that the August meeting was notable for the mass testing of the clubhouse railings. This proved very popular, with lots of volunteers helping. Perhaps, says secretary, Laurence Bentley, they should be periodically tested, like boilers. We would not wish to be thought culpable if several old boilers participants tested them to destruction… President, Jim Jennings has recently completed a Crampton but it was becoming quite dark by the time editor, Graham Astbury took this picture - 1/10 second at f2.8 (**photo 4**).

It is said that only seven words in any local language will get you most things - Hello, Goodbye, Please, Thank you, Yes, No, and My friend will pay…
W. www.bradfordmes.uk

Northern Districts Model Engineering Society (Perth) in their Sept-Oct issue, has an intro by Tom Winterbourn who considered that WA was lucky to be Covid-free at the moment of writing and the Society was able to hold their May running day such that the rest of Oz could only goggle at. It didn't last - the June running day was scuppered. Andrew Manning writes of his experiences in making etched nameplates for his models. Briefly (the article is a full two pages) he made them with Press & Peel on an inverted domestic iron, protected by ceramic felt boiler insulation and some weights. Ron Collins had a good idea to protect the mill table and stop the T-slots filling with swarf. Take two sheets of melamine MDF etc. and cut to fit round your milling vice. On the underside, bolt a strip of wood to fit in a slot (or studs and T-nuts to suit) and lift off or slide and lift as required. Great! Editor, Tom thought it was such a good idea that he made some for himself (me too – Geoff) Tom also wrote about the Ludlow and Clee Hill Railway, near which he lived when growing up but never really noticed, even as a young trainspotter.
W. www.ndmes.org.au

And finally, I don't understand people who can't work fractions. After all, there's only a fine line between numerator and denominator.



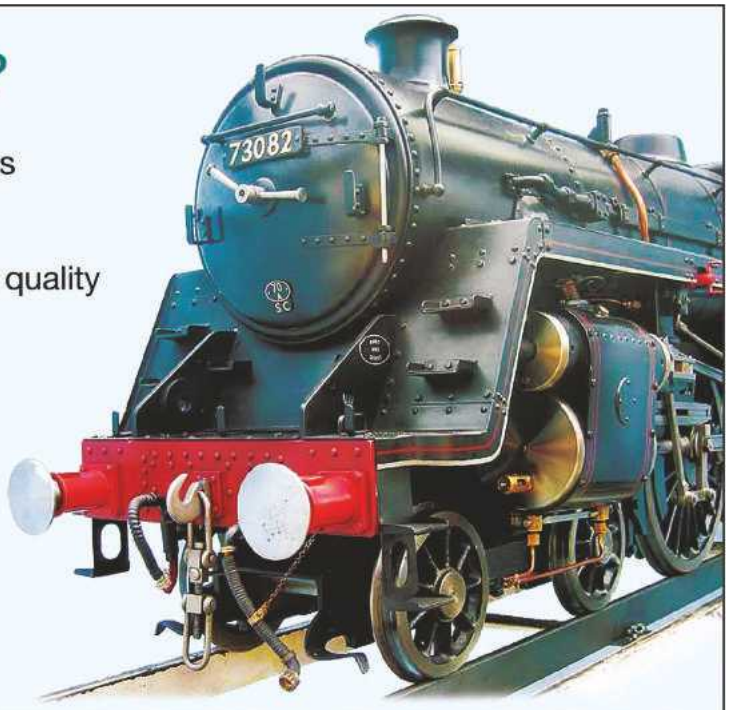
Jim Jennings' Crampton (photo courtesy of Graham Astbury).

CONTACT

geofftheasby@gmail.com

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

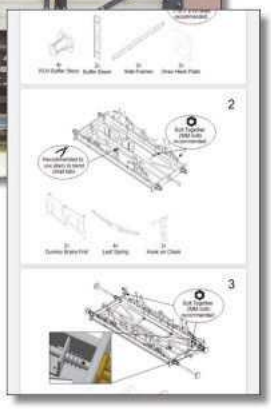
Call Mike or Jayne Palmer on **01526 328772**

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

NEW! 5" gauge Wagon Kits

Contact 17D :
Email: sales@17d.uk
Tel: 01629 825070 or 07780 956423



Screw & rivet together kits - only minimal tools needed.

Chassis options available:

9ft or 10ft wheelbase versions

9ft WB: Price £359.40

10ft WB: Price £366.00

Detailed, illustrated instructions available to download.

(screws & rivets not supplied)

Body options available:

"Banana Van" type box wagon: £199.99
(to fit 10ft WB chassis)

5 Plank Wagon:
9ft or 10ft Wheelbase version £94.99

7 Plank Wagon:
9ft or 10ft Wheelbase version £99.99

Prices shown are inclusive of VAT

17D

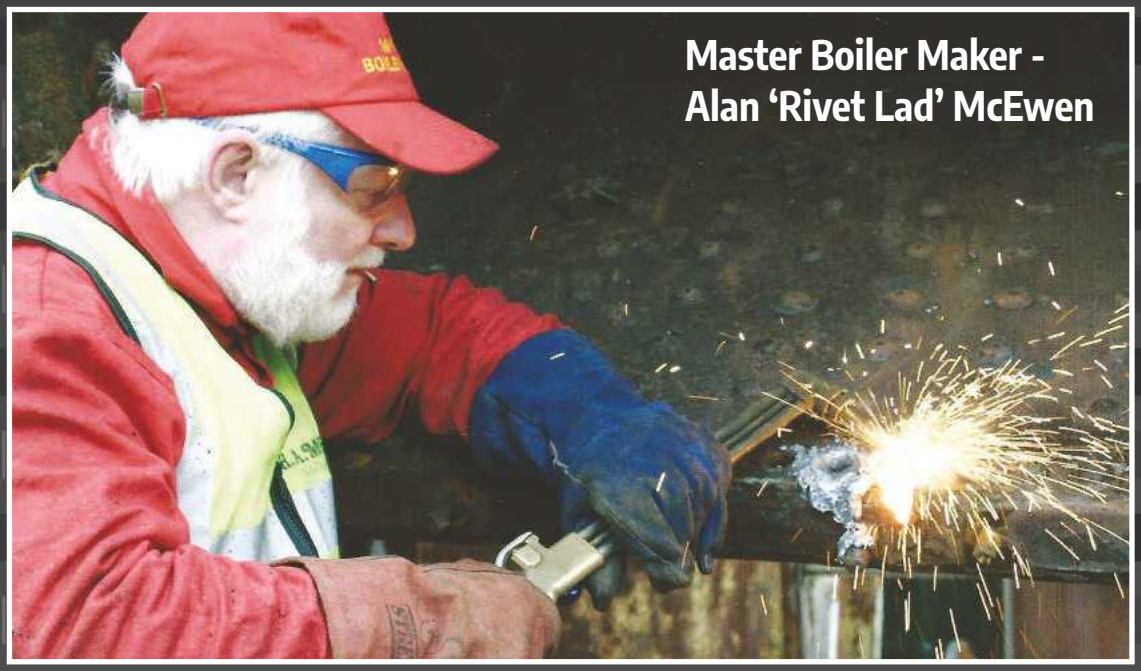
MINIATURE RAILWAY SPECIALISTS

LOCOMOTIVES, ROLLING STOCK, COMPONENTS
CNC MACHINING SERVICES

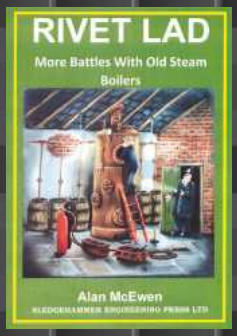
www.17d-ltd.co.uk

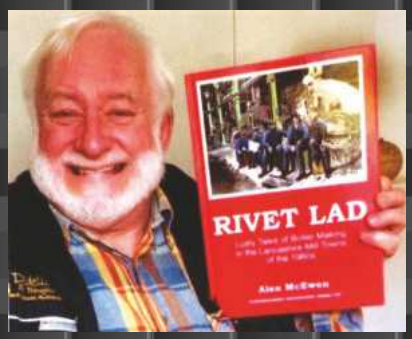
17D Limited, Units 12 & 13 Via Gellia Mill, Bonsall, Matlock, Derbyshire, DE4 2AJ

Bringing British industrial history to life



Master Boiler Maker -
Alan 'Rivet Lad' McEwen





When Master Boiler Maker and author, Alan McEwen was a young sprog, he loved banging and hammering on rusty old boilers; now that he is an old hog, he just prefers others to bang and hammer!
Alan McEwen's Boiler Making adventures and also 'potted histories' of several Lancashire and Yorkshire Boiler Making firms, can be read in RIVET LAD - *Lusty Tales of Boiler Making in the Lancashire Mill Towns of the 1960s.* The book is crammed with 'hands on' technical information of how Lancashire, Locomotive, Economic, and Cochran Vertical boilers were repaired over 50 years ago. The book's larger-than-life characters, the hard as nails, ale-supping, chain-smoking Boiler Makers: Carrot Crampthorn, Reuben 'Iron Man' Ramsbottom, Teddy Tulip, genial Irishman Paddy O'Boyle, and not least Alan himself, are, to a man, throw-backs to times gone by when British industry was the envy of the world.

Alan McEwen's first RIVET LAD book: *RIVET LAD – Lusty Tales of Boiler Making in the Lancashire Mill Towns of the Sixties* published September 2017 is now priced at £25 plus £3.00 postage and packing to UK addresses.

Alan's second RIVET LAD book: *RIVET LAD – More Battles With Old Steam Boilers* was published in September 2018. **Now priced** at £25 including postage and packing to UK addresses.

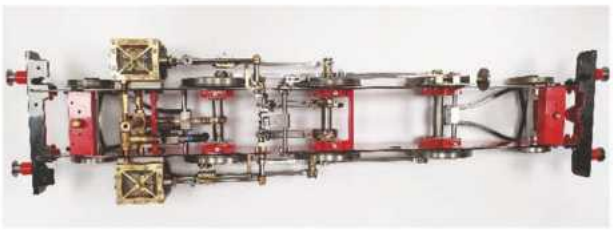
BOOK BUNDLE SPECIAL OFFER

Both RIVET LAD books can be purchased together for £40 plus £5 postage and packing to UK addresses.
To place an order please telephone 01535 637153 / 07971 906105. All our books can be ordered on our website www.sledgehammerengineeringpress.co.uk or email: lankyboilermaker@btconnect.com.
Overseas customers contact Sledgehammer by email for postage costs.
We accept payment by debit/credit card, cheques, cash and postal orders made out to SLEDGEHAMMER ENGINEERING PRESS LTD.
World From Rough Stones House, Farling Top, Cowling, North Yorkshire, BD22 0NW.

Model Engineer *Classified*

POLLY MODEL ENGINEERING LIMITED

Find us on



Build your own 5" gauge coal fired 'POLLY Loco'

Buy with confidence from an

Established British Manufacturer

Supplied fully machined, assembly requires hand tools only – no riveting, soldering or other complex processes. Kit includes **British** made boiler UKCA & CE stamped and accepted under Australian AMBSC regulations.

Model is supplied as a succession of kit modules. Spare parts easily available.

12 models to choose from, tank engines, tender engines, standard gauge/narrow gauge – something for everyone! Prices from £5999 including VAT and UK carriage. Build & cost is spread over 12 months.

Catalogue £3.00 UK £8 international posted (or download for 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

Suppliers Of Quality · Machine Tools ·

· Engineers And Founders · Purveyors Of Quality Steam Models

Repairs To Models · And Machinery ·

THE ENGINEERS EMPORIUM

L.A. Services Ltd

Est. 1983

01455 220340

The Economy

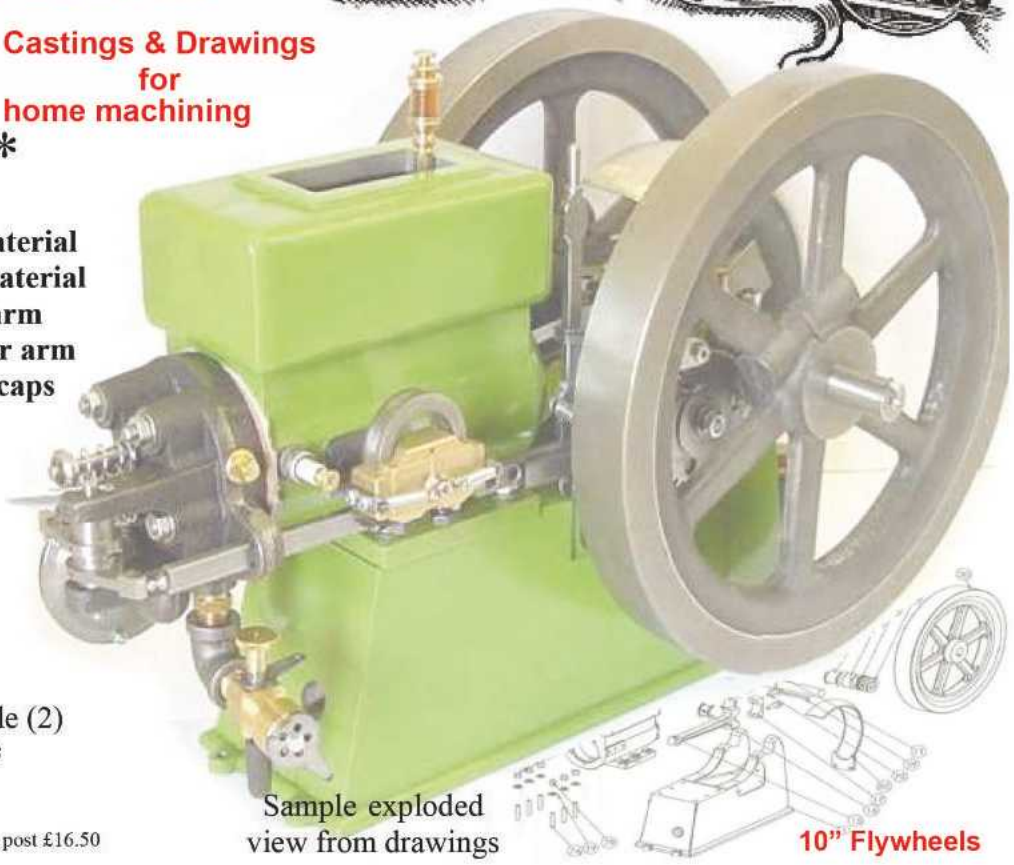
Castings & Drawings for home machining

Dec/January offer*

Cast iron flywheels	**Liner material**
Cylinder head	**Piston material**
Base casting	**Rocker arm**
Hopper casting	**Governor arm**
Drawings in book form	**Bearing caps**

In addition to the above parts included in the offer are :-

Cam follower Brg	Cut gears (3)
Crank guard casting	Cam profile
Head gasket (2)	Oil cups (2)
Spark plug	Piston rings (3)
Transfers (2)	Springs (6)
Timing plate profile	Crank web profile (2)
Con rod profile	Mag bow profile



Sample exploded view from drawings

10" Flywheels

£495 ex works

uk post £16.50

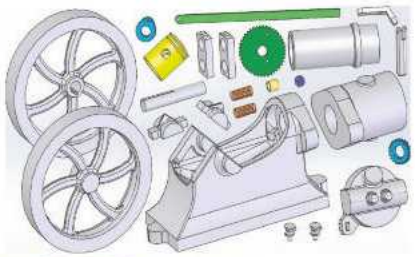
The Senior

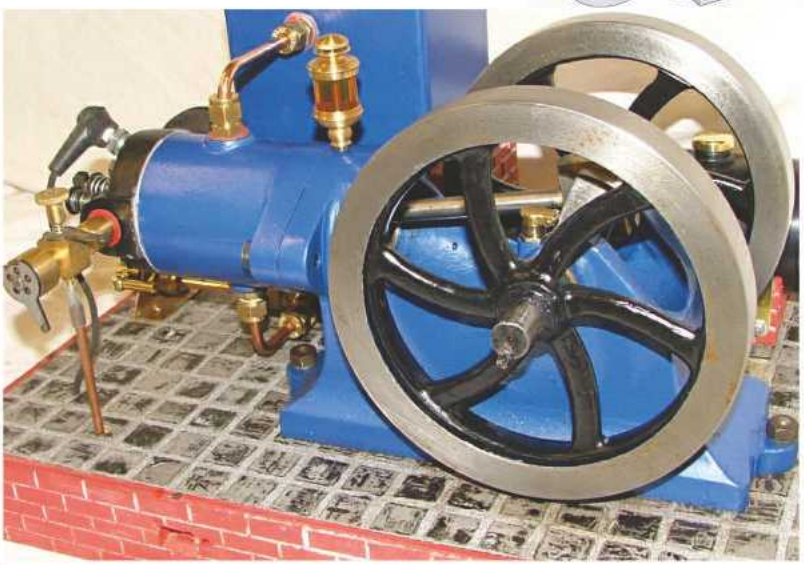
A full size model open crank engine

Twin cast iron flywheels
Tank cooled cylinder
Automatic inlet valve
Spark ignition
Drawings in book form
7 castings
Piston material
Liner material
Cam bearing
Cam profile
Cut gears (2)
Piston rings (2)
Valve springs (2)
Spark plug
Oil cups (2)
Crank material
Rocker arm
Valve rod material

An ideal model for those with Myford 7 type lathe.

Twin 7" Flywheels





£395 ex works

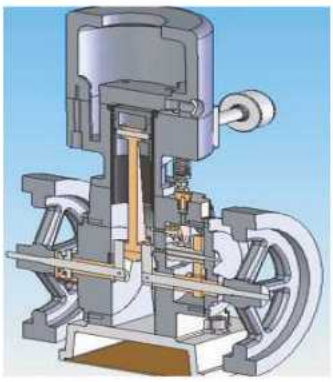
WWW.THEENGINEERSEMPORIUM.COM INFO@THEENGINEERSEMPORIUM.CO.UK

ME 12 21 2P JDO

The Junior

Our Junior model takes its inspiration from the well known Lister Model A. The model runs on the 4 stoke Otto cycle using a glow plug for ignition but can be converted to spark ignition if desired.

8 Castings, brass & steel material pack inc. 3 profiles



The drawings are supplied in a book format, each component is printed on one A4 page, there are exploded diagrams, section views and parts lists to help make construction easier to understand.

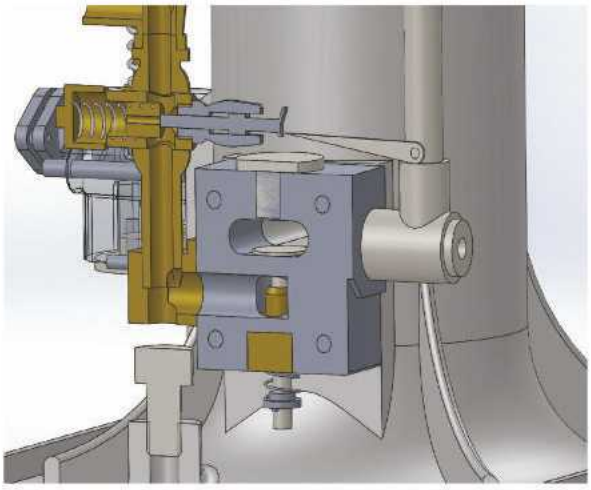
Dec/January offer

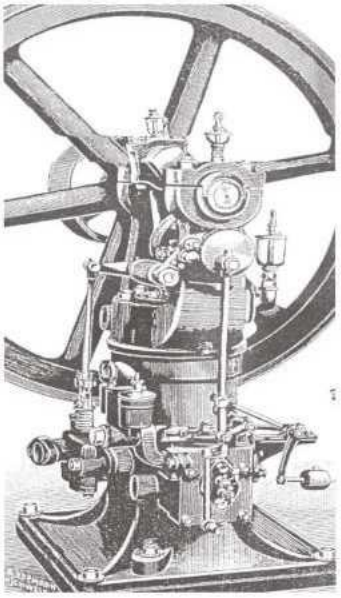
A copy of an original Lister hand book published by Internal Fire Museum included FOC

£279 Ex works

The Otto

Supplied as 8 raw iron castings, 2 pre cut gears, some raw material, a glow plug and 3 profiles. The Otto inverted D6 engine will build into an impressive model approximately 266 mm tall with a 199 mm diameter cast iron flywheel. The drawings are in book format with a single page per part, parts lists and exploded diagrams with some guidance notes.





Dec/January offer

Castings, drawings and 2 brass name plates (usually £49.50)

Offer price £355 ex works

Hubbard

An interesting 2 stroke marine engine these castings will build into a model of a two stroke marine boat engine based on the 1912 Hubbard engine. The model is run on glow fuel with ignition by glow plug. It has a capacity of approximately 12cc. The flywheel is iron, the remaining castings are in aluminium.

The drawings are traditional format with various views on the same sheet. There are 8 sheets of drawings. Approximately 150 mm tall. 86 mm diameter flywheel. This is an ideal model for those with smaller machinery.

Limited Offer

Slight foundry seconds
£195 inc UK post
(until sold out)

Catalogue available (free) for over 20 designs.
Please ring or to order

*Contents may vary

THE ENGINEERS EMPORIUM
L.A. Services Ltd.

01455 220340

ME 12 21 2P JDO WWW.THEENGINEERSEMPORIUM.COM INFO@THEENGINEERSEMPORIUM.CO.UK

HOME AND WORKSHOP MACHINERY

144 Maidstone Road, Foots Cray, Sidcup, Kent, DA14 5HS
tel: 0208 300 9070 - evenings 01959 532199
website: www.homeandworkshop.co.uk
email: sales@homeandworkshop.co.uk
visit our eBay store! Over 4000 items available; link on website;
homeandworkshopmachinery


Check out our eBay store to view our large amount of stock!


Myford gearbox unused £1000


Colchester Bantam 2000 lathe (long bed) metric leadscrew, Dickson post £4950


Stanier precision vice 55mm jaw New / New Zealand £195


Startrite Robland K210 £2450


3 1/2" Britannia 4-6-2 rolling chassis and castings; see Website for more pictures £1150


Lista
(German quality manufacturing)
7 drawer cabinet used by the MOD
£750 / more available

Merry Christmas From Home and Workshop Machinery


X-Y 12" x 6" table £525


Bridgeport 42" x 9" turret milling machine / R8
Preferred belt change heat type! £3250


Harrison / Colchester change wheels


Pacific poss. 5" locomotive 4-6-2 Boiler kit, casting set and frames see Website for more pictures £1800


Toggle press £145


Vertex 150mm swivel / tilt table £450


Bridgeport / Versatool cabinet £400


Kastro as new 10" hacksaw £1500


Q & S Terrier 6" hacksaw £625


Denford Viceroy 8" vertical linishers from £1250


DP / MOD gear cutters £20 each, please enquire for availability


Harrison Graduate wood lathe 240V & 440V models available £1375


Springbok B1 4-6-0 rolling chassis & tender etc. £1500
More pics. On Website!


Myford ER25 solid collet chuck made by Myford (Notts) New £70 More in our eBay shop!


Transwave 5HP static & Rotary converters from £375


SIP K225 cut off saw, 52rpm + coolant 240 Volts, as new! £750


Ajax UP Universal Mill £1750


Trend CNC Smart Plus + Goya 100 control + Trend Vacuum table and Trend vacuum extraction £5000


MYFORD SUPER 7 3 1/2" x 31", gearbox, clutch, power cross feed, stand, tray and blocks £3250


Tripus 240v switch £90


Myford bridge & rifle felts £7.50 each


Flott (Germany) quality pedestal grinder £525


Excel swing die grinder 10" x 5" magnetic chuck rare £1250
Fly press tooling in our eBay shop!


Myford dividing head Nice £450


Harrison M250 lathe 5" x 20" 240 VOLTS FROM NEW £5450


Harrison M300 lathe £3950


Keetona Box-Form 1 100" x 14g , 2.5 metre x 2mm box and pan folder £2950


Neat cut and soluble cutting oils £10 each


Keyway broaches by Marlco & DuMont each £40


Myford ML7 lathe £1250


Hofmann 200mm table £425

Please phone 0208 300 9070 to check availability.
Distance no problem – Definitely worth a visit – prices exclusive of VAT
Just a small selection of our current stock photographed!

Worldwide Shipping

POWERED BY barclaycard
VISA