

MODEL ENGINEER

Vol. 193 No. 4236

10 - 23 December 2004

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ENGINEER
EXHIBITION

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EDITORIAL

Editor

Mike Chrisp (01442-269366)

Technical Editor

Nell Read (01604-833670)

Assistant Editor

Kelvin Barber (01525-850938)

Club News Editor

Malcolm Stride

Technical Consultants

John Haining, Stan Bray,

J. Malcolm Wild FBHI,

D. A. G. Brown

Editorial Administrator

Sarah Mead (01689-886677)

PRODUCTION

Design

Elizabeth Marfell

Production Manager

Colin Blake

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Polestar (Colchester)

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Atelier Data Services

SALES & MARKETING

Group Sales Manager

Colin Taylor (01689-886649)

Sales Manager

Tony Robertson (01689-886650)

Subscription Marketing Executive

Voula Browne (01689-887209)

CIRCULATION

Circulation Director

Andy Bone (01689-887244)

Non-newstrade Distribution

Mike Reynolds-Jones

(0121-788-3112)

MANAGEMENT

Publisher

Jez Walters

Divisional Publisher

Dawn Frostdick-Hopley

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On the cover ...

Foden C type tractor Pride of Fulham,
registration number GC 5832, was built
in 1928 and first owned by the
Atlas Transport & Shipping Company
of London. It was then purchased by
Camroux Coal of Fulham and used
for the transportation of coal.

Acquired for preservation in 1956 by the
present owner's father, it has since been
a regular exhibit at events and is now
owned by Peter and Pia Van Houton of
Leicestershire. Our photograph was taken
in 2004 at the Heart Link Steam Festival,
Wymeswold in Leicestershire.

Road Steam enthusiasts may care
to turn to page 690 of this issue
for our annual Out and About feature
describing some of the highlights
of this year's rally season.

(Photograph by Michael Boulton)

NORTH AMERICAN STEAM LOCOMOTIVE BUILDER'S PLATES

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Model Engineering - A Guide to Model Workshop Practice

• {1915} • Greenly • £17.35

Henry Greenly is now largely ignored in the model engineering sphere, being remembered almost exclusively for larger scale miniature railway locomotives. Perhaps this was because he was seen to have lost the "Battle of the Boilers" with 'LBSC' but, whatever the reason, the truth is that Greenly was perhaps the first writer of what one could call 'modern' model engineering articles, a few of which have been assembled in this book, first published in 1915; in fact this is perhaps the precursor of many of the compendium types books now seen - it is a salutary reminder of what a good writer he was, and how he wrote on many more subjects than 'LBSC'.

Here you get 26 pages on *The Equipment of a Model Engineer's Workshop*, 16 pages on *The Lathe and its Fittings*, 25 pages of *Notes on Lathe Work*, 33 pages of *The Various Processes Employed*, 21 pages on *Model Steam-Engine Cylinders*, 20 pages on *Types of Model Steam-Engine Cylinders*, 18 pages on *Engine Cranks, Connecting Rods, Bearings and Eccentrics*, 14 pages on *Steam-Engine Valve and Reversing Gears*, 25 pages on *Model Boiler Design and Construction*, 2 pages on *Model Boiler and Engine Valves and Fittings*, 11 pages on *Force Pumps, Injectors and Gauges*, 12 pages on *Firing Model Boilers*, 9 pages of *Historical and Other Scale "Glass-case" Models*, 14 pages on *Making a Model 1" x 1" Vertical Steam Engine*, 12 pages on *A High-speed Compound Condensing Engine and Coil Boiler*, 17 pages on *A 1/2" scale Model Midland Railway Express Locomotive*, 32 pages covering *A Working Model Metropolitan Railway Electric Locomotive (Gauge 1)*, 26 pages on *Internal Combustion Engines*, 19 pages of *Model Railway Engineering*, 22 pages of *Miscellaneous Working Models* (2 cannons, 2 guns, a crane, a portable engine and various boats), and 4 pages about a *Model G.C.R. Express Locomotive (Gauge 1 4-6-0 "Sir Sam Fay")*; 407 pages in all, including the Index.

If that listing doesn't give you an idea of the spread of this book, take our word for it, it is considerable! And whilst it may be nearly ninety years old, the vast majority of it is useful today, even the chapter on *Model Boilers*, which is extremely broad, covering model stationary and marine boilers as much as locomotives. As well as an excellent text, there are 85 photographs and no less than 724 line drawings - this really is a book you will enjoy and refer to time and time again. Paperback.

Watt's Perfect Engine • Marsden • £8.34



Watt's Perfect Engine • Marsden •

£8.34

This is a slightly 'popularist' history of James Watt and the development of his engine. Don't take 'popularist' in a derogatory sense either, as it isn't the simplest of tales, and to tell it coherently without blinding the reader with too much science, which Ben Marsden has achieved, takes some doing. So if you want to learn about James Watt, or to help someone to learn about him (the wife? those computer fixated kids?) then this is an excellent (and cheap) way of doing it. 213 page paperback. 13 illustrations.



Frank Whittle Invention of the Jet

• Nahum •

£11.34

The same remarks apply to this as to *Watt's Perfect Engine* above, from the same series, in that this is an eminently approachable history of how Frank Whittle developed the jet engine. The author is Senior Curator of Aeronautics at the Science Museum so this book is authoritative as well. 170 pages, 11 illustrations. Hardback.

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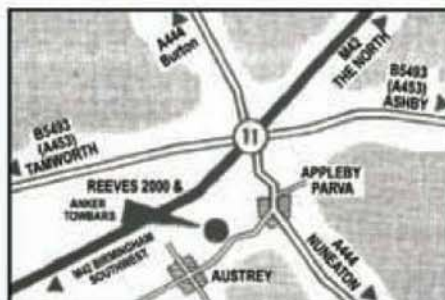


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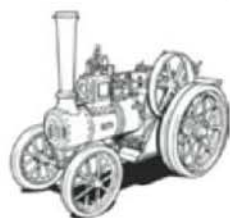
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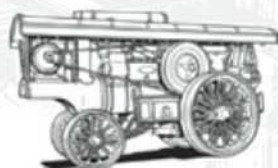


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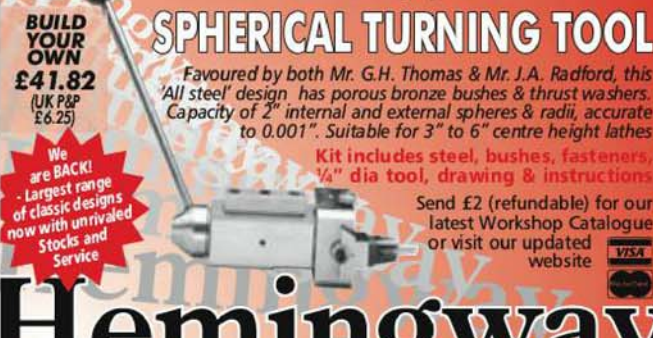
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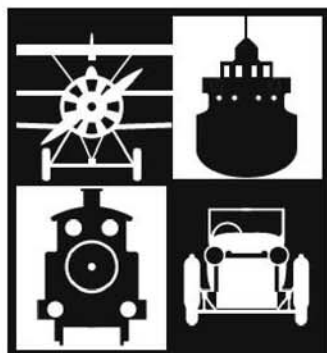
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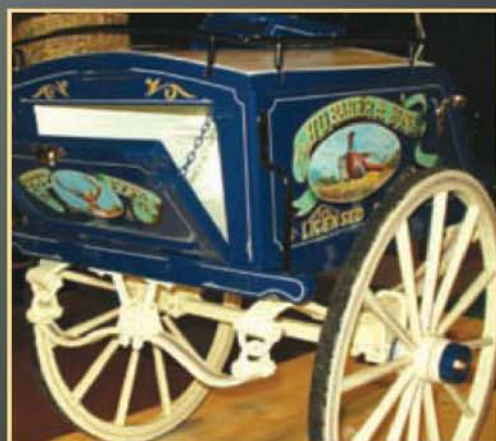
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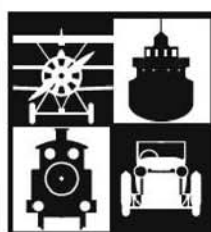
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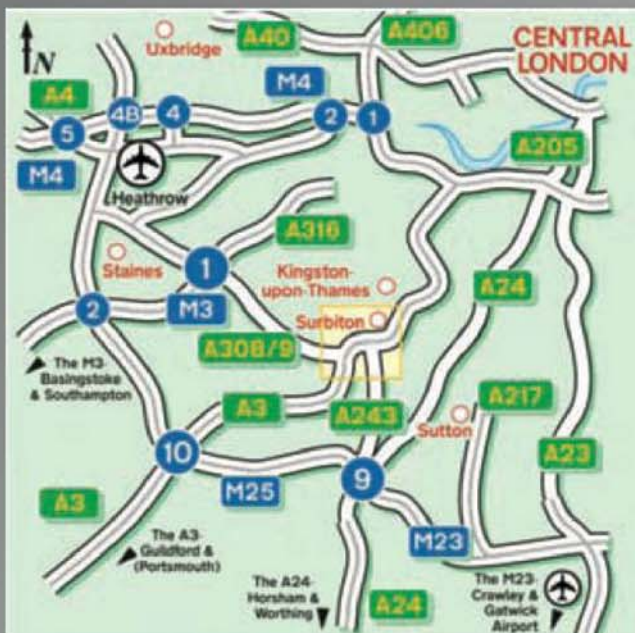
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From M25 North and West: Exit at Junction 10 onto A3 towards London. Exit onto A244 at Esher Common roundabout, signposted to Sandown Park. Turn right onto A307, Esher High Street at T-junction/traffic lights. Sandown Park can be found 1/4 mile along on left-hand side.

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SMOKE RINGS

With the Editors

TSR-2, Trinity School Greenpower car at speed. See this vehicle at MEX 2004 at Sandown Park. Photograph by Joshua Evans (age 14)



74th Model Engineer Exhibition

With only some three weeks before the 74th Model Engineer Exhibition opens at Sandown Park Exhibition Centre in Esher, Surrey, 29-31 December, we are very pleased to be able to announce that at the time of writing more entries for the Competition and Loan Model sections have been received than at this time since the move some years ago to this most comfortable and well appointed venue. We are also happy to report that the available accommodation for both Trade and Club Exhibitors has been fully booked.

While some maintain that the Model Engineer Exhibition is held at the 'wrong time of year', the results of recent visitor surveys indicates without any doubt that the immediate post-Christmas timing is favoured by virtually all who responded. So, as the well-known saying has it: "Why set out to fix it if it isn't broken?"

For the information of prospective visitors to the 74th Model Engineer Exhibition, the following Traders have booked stand space: AB Tools; R. A. Atkins; BB Engineering Services; Beugler Pinstriping Tools; Boost Energy Systems; Chalk Garden Rail; Chester UK; Chronos; College Engineering Supply; Compass House Tools; EKP Supplies; Engineers Tool Room; First Choice Products; Folkestone Engineering Supplies; Grandad's Toys; Green Man Dancing; HD Tools; HJH Tooling; Home & Workshop Machinery; JAG International; JB Cutting Tools; Kent Scale Engineering; LA Services; Langdon (London); Liverpool Model Centre; Model Engineering Supplies; Model Power Boat UK; Myford Ltd.; Noggin End Metals; Paddock Pavilions; Peatol Machine Tools; Phoenix Promotional Marketing; Polly Model Engineering; Proops Bros.; Ryan Tooling; S&M Tools; Shesto; Somoso Products; Spitfire Multi-Spark; Stoffels Special Tools; Tools 2000; Tools UK; Toolstop (Bracknell); Tracy Tools; Videolines; Warco; WCN Supplies.

Our advice, as always, is to make the most of your visit to Sandown by collecting the items which you require from traders in attendance, thereby saving delivery costs. Be sure to place your order in good time and say that you will collect the goods at the Exhibition.

Clubs and Societies which, at the time of writing, have booked stand space at the Exhibition are: Ass'n of Model Barge Owners; Buckinghamshire Railway; Gas Turbine Builders Ass'n; Guildford MES; GWR Preservation Group; Ickenham DSME; Kew Bridge Museum; Malden DSME; Meccano Modellers Ass'n; Model I/C Engine Builders Ass'n; MPBA; Napier Power Heritage Trust; National 2 1/2"

Gauge Ass'n; North London SME; Reading SME; Ruislip Lido Railway; Society of Model & Experimental Engineers; Society of Ornamental Turners; Southern Federation MES; Staines SME; Stirling Engine Society; UK Tank Club. The successful and enjoyable 'Club Room' will feature at this year's Exhibition where it will be possible to meet with other practising model engineers to discuss matters of mutual interest.

Following the recent successful reinstatement of the Programme of Lectures, these too will be included at MEX 2004. There is no charge for admission to these informative and interesting presentations which are scheduled for mid-morning, lunch time and mid-afternoon. They will be repeated each day of the Exhibition except on the final afternoon when there will be the usual presentation of Medals and Trophies. At the time of writing, the Programme of Lectures includes D. A. G. Brown: Co-Ordinate Drilling; Peter Haycock: Bolt Manufacture in Industry; Harry Paviour: Judging Models in Competition. Details of the Programme of Lectures will be published at the Exhibition and information announcements will be made during the event.

At last year's Exhibition we were pleased to have the opportunity to present in the entrance foyer two 'Greenpower' cars. We are delighted to be able to bring visitors to the Exhibition up to date with developments in Trinity School Racing and Greenpower.

Trinity School's Gareth Evans writes:

The late Norman Spink

We have just learned the sad news concerning the death of Norman Spink and have been asked to publish the following statement:

"With regret we have to announce the sudden death of Norman Spink, Chesterfield on 4 November.

"We will be unable to fulfil outstanding castings orders for some weeks, however all these will be completed in due course. We apologise for any inconvenience this will cause.

"Any queries please write to the usual address.

"Dorothy, Chris and Julia Spink"

We extend our most sincere condolences to Norman's family and many friends in their loss.

"Greenpower is an exciting opportunity for school pupils aged between 11 and 16 years to compete in a form of car racing while learning engineering skills. The full story can be found at <http://www.greenpower.co.uk/history.htm>. To keep costs manageable and the playing field (well, race track) fairly level, teams can only use one type of motor, supplied by the organisers (24 volt, 2000 rpm 240 watt wheelchair motor) and two pairs of 12 volt lead acid batteries to a given specification (75Ah). Apart from safety considerations like roll over bars, brakes and seat belts, the rest is up to each team ...

"TSR-2 is our second car and during 2004 it gained a second place, won two races (one by 12 miles), and broke its own fastest lap record from the previous year!

"The races are of 6 hours duration and full of pit-stop action as drivers and batteries need changing during the race. Being fast and reliable for a whole 6 hours takes some doing! Despite the tiny power source, our car has achieved 38mph and completes a 6 hour race around the full Goodwood historic circuit at an average speed of 26.4 mph. That may not sound much but when your bottom is only 2in. off the ground and you helped build it, it's quite a thrill!

"There is a lot of precision engineering in our car, aerospace grade materials and plenty of good solid engineering, which is basically what the race series is all about — getting the next generation interested in engineering!"

Visit tsr@trinity.croydon.sch.uk for more information concerning the project.

CHUCK, the MUDDLE ENGINEER

by B. TERRY ASPIN



POST BAG

Annabel

SIRS, - It was at the age of 16 in 1935, soon after I had received a VHC award for my 2 1/2in. gauge *Dyak* at the Model Engineer Exhibition, when I first wrote to LBSC. My first locomotive, I had built to his instructions as published in *M.E.*, a simple locomotive for the Sarawak Trophy competition. He sent an encouraging and helpful reply and an invitation to write again if ever I wished.

Later, when about 18 years old, I wrote to him again with a query concerning the design for my 2 1/2in. gauge 3-cylinder Pacific which I wanted to fit with Baker valve gear and Gresley 2:1 gear. He again replied helpfully and we continued to correspond occasionally. In one of his replies he mentioned that a friend of his, who had three or four 2 1/2in. gauge Carson locomotives, was coming to live in Cambridge and he would put us in touch. He did so and after we had met, the friend, Harry Landers, used to get a Carson out and allow me to drive it on the up-and-downer he had in his garden, seeming to prefer to watch rather than to drive.

He was a representative of *Evening in Paris* perfumes but I can't recall the quaint name LBSC gave him. LBSC had given all Harry's locomotives the 'monkey gland' treatment so they all ran well. I remember that one was coal fired, another used methylated spirit and another was fitted with a paraffin burner. Harry was not a particularly practical man, only making rolling stock in gauge 0 and gauge 1 — and not very well I'm afraid!

Then one day he said that he was going to visit Curly and asked if I would like to go with him. Needless to say my answer was "Yes please!" I was made most welcome by Curly and his wife and was allowed to drive *Ayesha* on the Polar track. What an experience it was; that engine went like a scalded cat! When we left Curly gave me an invitation to go again. We went several times and after Harry moved from Cambridge to Chelmsford I used to go on my own, meeting Harry there or taking some friends and on one occasion he said we would "give Annabel and her bell an outing."

Curly was very strong and just picked up the locomotive in his two arms and took it from the house, down the garden, up the steps and placed it onto the track! As well as us, there were usually some other visitors as well to make a bit of a

load. It was an honour to be allowed to drive it and yet another unforgettable experience for me.

Memories are somewhat hazy, but I think this must have been just before or just after the war; for some reason visits to Purley Oaks dried up soon after that. Seeing the picture of C. J. Grose driving reminded me that on visits there I met several people who were 'important' to me and I remember C. J. Grose was one of them. I wonder if that photograph was taken on one of my visits.

Sadly, I've only two photographs taken at Purley Oaks, one of a very young me using Curly's little air compressor to steam up Harry's Carson LNWR 4-4-0, and another of me driving it on the Polar track. As well as 'monkey glanding' Harry's Carson's engines Curly made him a gauge 0 passenger hauling coal fired 4-6-2 LMS Princess which he named *Princess Eva*, Eva being Harry's wife.

I must thank Jim Robson for providing the trigger for so many pleasant memories.

Don Unwin, Cambridgeshire.

Vertical engine

SIRS, - I believe the vertical engine belonging to Mr. R. E. Smith and shown on page 431 of *M.E.* 4232, 15 October 2004, is one of those made by Radiguet of Paris and sold in London by Stevens Model Dockyard at the turn of the nineteenth/twentieth century.

I have a similar engine but mine lacks the feed water pump; is this a later addition?

Some information on Radiguet and Stevens Model Dockyard can be found on the internet.

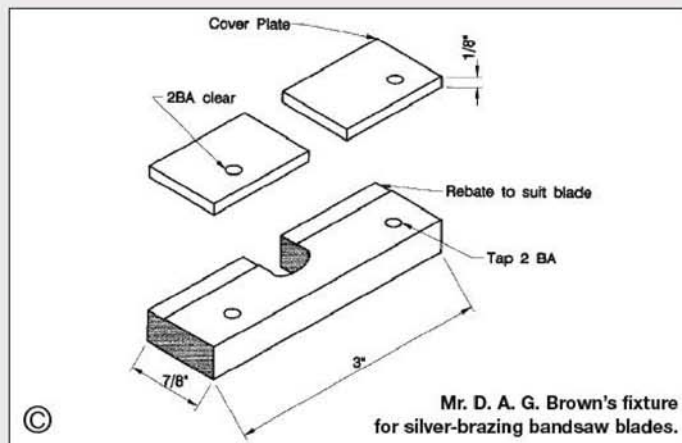
Frank Gutteridge,
Corsier, Switzerland.

Model engineering courses at Bromsgrove

SIRS, - As a mature student, I attend the 'Model Makers' Course OCN Level 2' Evening Classes at North East Worcester College, Bromsgrove.

During the summer, the college engineering workshop has been re-organised. My colleagues and I wish to continue our attendance at evening classes at N. E. Worcester College, Bromsgrove, but feel that more students are needed. It would therefore be helpful if the facilities now available could be publicised in these pages. Details of the new workshop and the proposed evening class are as follows:

North East Worcester College, Bromsgrove Campus, Blackwood Road, Bromsgrove, Worcestershire



Mr. D. A. G. Brown's fixture for silver-brazing bandsaw blades.

B60 1PQ has moved its engineering workshop to new premises and has taken the opportunity to replace its lathes and milling machines with brand new equipment.

The new machines in the workshops are nine conventional milling machines (seven XYZ 1500 and two XYZ 3000), ten lathes (XYZ Trainer 1330) and three new drilling machines together with two CNC milling machines and two CNC lathes with CAD packages. All the new manual lathes and milling machines are fitted with 2-axis digital readout. The workshop also includes some of the machine tools from the old workshop, namely surface grinders, tool and cutter grinders, and a Pinnacle milling machine. Fitting facilities are also available. N. E. Worcester College wishes to offer its facilities to engineers in the evenings, provided of course that there is sufficient interest from students.

It is proposed to run the course on Tuesday evenings 6.30pm to 9.00pm commencing 11 January 2005. The cost per 10 week term will be in the region of £65. Those interested should telephone the college at Bromsgrove (01527-570020), and ask for John Vardy, Programme Manager for Mechanical and Electrical Engineering. If successful, a further 10-week course will start Tuesday 22 March 2005.

R. L. Joseph, Worcestershire.

Bandsaw blades

SIRS, - In reply to Mr. G. McLatchie on the subject of bandsaw blades (*M.E.* 4232, 15 October 2004), I can assure him that there is absolutely no need to pay the exorbitant prices charged in the shops for replacement blades, and that it is simple to join new blade lengths and to repair broken ones. I have done it for years for both my small bench machine (1/4in. wide material) and the cut-off saw (1/2in. wide material).

Rolls of 100ft. of blade to a better quality than that sold by people who make the saws are available to order through good mainstream tool merchants (try Cromwell Tools or look up Bandsaw Suppliers in your

local library or *Yellow Pages*). A guide price is £60 a roll, which thus makes, say 22 blades. Cut off to length and scarf both ends at about 30deg. on the bench grinder, ensuring that while you are doing so, the teeth always point in the same direction.

Then silver-solder together in the accompanying sketch, preferably using Easiflo paste and bringing the two ends precisely together before joining. Practising on some blade scraps should show you the way if you are unsure about the operation.

Finish off the joint by filing or grinding away surplus silver-solder.

I normally use oxy-acetylene for the heating process, since it destroys the temper on only about three teeth, but you can use a small propane torch, at the expense of about seven teeth. My success rate on this operation is of the order of 90%.

D. A. G. Brown, Rutland.

Eagle

SIRS, — It was with great interest that I read your review of the book *Dan Dare Pilot of The Future* in *M.E.* 4234, 12 November 2004. It hardly seems that 54 years has passed since I purchased the first issue of the *Eagle* comic.

I very clearly remember going into the local newsagent as a boy of ten years to obtain it. At that time my main interest was the centre page of the comic — I wonder how many readers remember the superb cut-away sectional illustrations of steam locomotives, aircraft, ships and various aspects of industrial engineering which appeared in every issue. I collected them avidly, well into my teens, and still have some to this day, mostly those to do with ships and shipping.

One particular illustration was of great interest to me; it appeared in 1956 and was of *HMS Torquay*, an anti-submarine Frigate built by Harland and Wolff. In those days I was making simple ship models using any materials I could find. The local grocer was a great source of materials in the form of tea chests and orange boxes. There were no such things as kits and

radio control in those days; if there were, for many of us of that age and generation, their cost was way beyond our reach.

Unbounded enthusiasm decided me that with the aid of one of these illustrations I could make a model based on *HMS Torquay*. Suitable artist's card was purchased on which to draw; I joined it together with adhesive tape, made a start on the design and built the model. It was 50in. long and in those days was powered by two Taycol *Meteor* electric motors but no radio control. Construction was mainly of plywood but, because of its complicated shape, the funnel was made from thin card. At that early age it was to me then a huge undertaking.

Now 45 years old, the model has given me a great deal of pleasure over the years. It was updated in 2003 with a helicopter platform plus a few other details; after this refit it was named *Eagle* in celebration of the comic which inspired its construction all those years ago.

Raymond McMahon,
Wigtownshire.

King Cotton

SIRS, - As an ex-ring spinner and having lived in Bolton all my life, I feel obliged to set matters to rights after reading Dave Roberts' feature *When Cotton was King* (*M.E.* 4234, 12 November 2004). The captions to the two photographs have been reversed, Swan Lane being the mill shown on the left.

The Swan Lane mill is now taken over by other industries. I have worked in the cotton industry since 1958, and it was going into decline even then. The biggest mill complex was the Musgrave Spinning Company, Atlas Mills, which had seven mills in total. I worked here as a ring spinner in mills Nos. 1 and 5, looking after six frames; that in turn means twelve sides of spindles and twice as many rovings (two rovings to one spindle). I do not take kindly to being referred to as being "less skilled."

At its height in 1889, the firm's weaving shed was erected with 600 looms. The spinning side of the mills had 450,000 spindles and, along with its own foundry, employed 3,000 workers. The first mill was opened in March 1864. Mills Nos. 6 and 7 were powered by an 1888 2,500hp Musgrave twin-tandem compound engine, the Musgrave family having more than the cotton mills in Bolton, they also had an engineering works.

Musgraves provided countries including Russia with chains for the suspension bridge over the River

Dneiper in southern Russia, extending 2,400ft. in length. Bolton was a hive of industry with manufacturers of all kinds.

Morrisons' Supermarket is now where mills Nos. 1 to 4 were, and a building supply business occupies the site of Mill No. 6. Other sites have been redeveloped. The lodges (reservoirs as others may call them) have all been filled in for use as car parks.

I hope these notes are of some interest.

Sandra Southern (Mrs.),
Lancashire.

AEC Matador tyres

SIRS, - After many years of aeromodelling and flying radio controlled helicopters, I have decided to give model engineering a go. So far I have built a small Stuart steam engine. However, what I would really like to build is true-to-scale vintage trucks with all details, but the problem I'm having is finding any information on making tyres.

Could anyone tell me if there is a moulding process for the fabrication of the tyres? I am planning building an AEC *Matador* but how would I go about creating the military tyre pattern and the side markings on the tyre wall?

I would be very grateful for any help in this matter as all I can find are 8in. trailer tyres which are completely wrong.

Mike Forsyth by e-mail.

Electric traction

SIRS, - Garth Porter's letter (*M.E.* 4230, 17 September 2004) has been brought to my attention, and I would appreciate the opportunity to respond.

Mr. Porter wants to 'eliminate' (rather than 'minimise') the effects of a controller failure on a battery powered electric locomotive. It is useful to contrast this with steam locomotive experience. For locomotives of similar size, the energy stored in a steam locomotive boiler is approximately the same as the energy stored in an electric locomotive battery.

Steam locomotives can (and do) fail, but by design, maintenance and training, the risk has been brought to an acceptable level. I suggest that miniature electric locomotive design is now sufficiently mature for the same standards to be applied; the risk of failure of a properly designed and maintained locomotive operated by a person with suitable training is acceptable.

It is very definitely good practice to fit a battery isolation switch to

any electric vehicle. Mr. Porter seems to suggest a 'desperate swipe' to turn off a locomotive in the event of a failure. A properly designed locomotive with an experienced operator should not require any 'desperate' action.

The chance of an electric locomotive 'breaking away' is the same as for a steam engine; it depends on the design of the couplers. However electric locomotives with permanent magnet motors do not 'race away', their top speed is limited by design (motor gear ratio and wheel diameter), and is usually less than that of an equivalent steam engine.

I should perhaps provide some background to my comments. I am a member of the British Columbia SME, and a member of our Safety Committee. I have been involved in commercial electric vehicle manufacture (before moving to Canada), and in miniature electric locomotive construction.

British Columbia SME has operated half-ton 7¹/₂in. gauge battery electric locomotives for over 25 years. Our public ridership is approximately 30,000 over 60 operating days each year. Our trains are fully braked (non-automatic vacuum brakes). And we are still a 100% volunteer, hobby society.

In North America, liability insurance premiums have increased about eight-fold over the past five years, and so we are very aware of the risks involved in operating our miniature railway.

Bruce Wilson,
Treasurer BCSME.

Wobbler

SIRS, - We are often advised to set work mounted on a faceplate or gripped in a 4-jaw independent chuck by the use of a centre finder or 'wobbler' with its point located in the centre popped dimple which is to run true. I hope fellow readers will find the following of interest.

I lashed up a device (I hesitate to call it a tool) in a few minutes to meet an urgent weekend need. Its fundamental precept was to provide a 10+:1 magnification that allowed

centering to better than a 'thou' in the lathe chuck.

It consists of a 12in. (300mm) length of ³/₁₆in. (or what-have-you) silver-steel with a sharp point ground on each end; a piece of steel tube about ³/₄in. (20mm) dia., square or round — it doesn't matter, about 1in. (25mm) long; a short end of rectangular section bar about ¹/₂ x ¹/₄in. (12 x 6mm) of convenient length and a tube of silicone rubber sealant (gorilla s**t).

Weld/braze/hard solder the piece of bar at right angles to the axis of the tube and drill a small (¹/₄in.?) hole in the tube. Mount this assembly in a tool holder with the central axis of the tube on the axis of the lathe (no great accuracy is required) and slip the piece of silver-steel through.

One end of the silver-steel is held in the lathe chuck and the other end in a tailstock chuck. Roughen the bit to go inside the tube with a coarse file. Adjust the longitudinal position of the tube so that about 1 to 1¹/₂in. (25 to 36mm) of the silver-steel sticks out at the headstock end.

Wind a load of masking tape over the ends of the tube and squirt the gorilla s**t into the hole until it begins to ooze out of the masking tape. Leave the whole mess while you go for lunch/dinner or better still overnight if the weather is cold. Strip off the tape and trim with a sharp blade moistened with water.

To use, put your workpiece in the independent chuck and put the short end point into the centre punch mark. Roughly align the other end to a lathe centre in the tailstock and rotate the chuck, shuffling the work around with the independent jaws until the long end stops moving relative to the centre.

Remember to adjust the chuck jaws in the opposite direction to the movement at the long end. With reasonable eyesight and a following wind, a wobble at the long end of perhaps 0.002in. (0.05mm) means the other end is true to about 0.0002in. (0.005mm) or better. This device may not be pretty and won't win any prizes, but it does the job.

Peter King,
Christchurch, New Zealand.

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Correspondence for *Post Bag* should be sent to

The Editor (*Model Engineer*)

PO Box 310, Hemel Hempstead, Hertfordshire, HP3 8XL

fax: 01442-269366; email: mchrisp@highburyleisure.co.uk

or to aread@highburyleisure.co.uk or to kbarber@highburyleisure.co.uk

Letters sent to Berwick House, 8-10 Knoll Rise, Orpington, Kent, BR6 0PS

fax: 01689-886666 may be subject to forwarding delays.

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Steve Harris opened the contest with a fine run on his Bagnall inverted saddle tank locomotive.



Lee Nicholls drove David Holland's Sir George with great skill. Here he is crossing the bridge on the top loop of the track.

SEQLEC 2004

Neil Read and Mike Chrisp report a superbly organised, well attended, very enjoyable and highly successful event.

It is strange that events like the 7¹/₄in. Gauge Efficiency Competition (SEQLEC) are so simple in concept and yet have the capacity to stimulate fierce competitive effort and erudite technical discussion while providing a spectator sport as exciting to the model engineer as the international sporting events which occupy so much of our television time. All these facets of the competition were evident at the most recent SEQLEC held on Saturday 9 October at the Ruddington track of Nottingham Society of Model and Experimental Engineers.

We should not forget that organising these events takes considerable effort by the host society and calls for a good deal of teamwork. Getting competitors to steam up and bring their locomotives to the starting line at the appropriate time and then safely back to the steaming bays after their run is no small task. Here Nottingham SME members were well up to the mark and more than one visitor was heard to describe the operation of the event as "very slick." We could not have put it better ourselves! Even the weather smiled on us and the day remained dry, although at times the wind was keen.

The 7¹/₄in. gauge track at Ruddington Heritage Transport Centre is in the form of an elongated 'dog bone' some half a mile in length. Leaving the station in a clockwise direction the driver is first confronted by a 1:145 gradient before passing through a tunnel. The gradient then eases before the long back straight. However, approximately one third the way up the straight the gradient again increases reaching 1:90 before easing to 1:150 around the top loop. Drivers then have a gentle run down a 1:174 gradient back to the station area.

Eleven entries were received, resulting in some concern that insufficient time would be available for them all to run. In the event one competitor had to withdraw which left a field of ten.

Steve Harris

First man away was Steve Harris of the host society driving his inverted Bagnall saddle tank industrial locomotive. Although it has been running for three years, Steve is still working on the engine to refine its specification. The wheels of the locomotive have a history as they were turned from those from a 2ft. gauge locomotive. "They were pretty hard going to turn" recalled Steve with a grin. Steve set off with eight cars and, excluding himself, an inclusive passenger load of 20. This was reduced to 15 and the run was completed without incident to give an overall efficiency of 1.03%. Steve described the run as

"tense" and noted that the locomotive ran better as the run proceeded. This he put down to the track drying out, as it had been very damp first thing in the morning.

Lee Nicholls

Next competitor to the start line was Lee Nicholls of Peterborough SME driving David Holland's *Sir George* to the *Sweet William* design. Regular readers will recall that at last year's SEQLEC, this locomotive suffered a derailment which caused a certain amount of damage to its immaculate superstructure and paintwork. David has done a first class restoration job and the locomotive looks as splendid as ever. To improve stability, David has added a pony truck to the locomotive which he feels has made a significant improvement.

Lee, who says he has been driving steam since his umbilical cord was cut, took an inclusive passenger load of 12 on six carriages and got away to a good start. His run proved to be trouble free, however the lubricator on the locomotive worked almost too well and Lee finished the run in a condition that my old Grandma would have probably described as 'frowzy' (look it up!). Lee reckoned he had judged the load about right and that the locomotive had no more to give on the steepest parts of the track. Lee's and *Sir George's* overall efficiency was 0.88%.



Every puff counts! John Painter smiles contentedly as his 14xx breasts the top of the 1 in 90 bank.



Derek Brown shows grim determination on his opening lap as his Hunslet Tony Priest approaches the tunnel.



David Holland's run was marred in the early stages by a stuck boiler feed clack, but he still managed to complete his allotted time.



Barrie Cook seems relaxed as he brings his Hunslet Red Rum through the station area.

John Painter

We think it true to say that John, our next competitor, has competed in every SEQLEC and has been a worthy winner in the past. This year he was once more campaigning his GWR 14xx, built by Don Ketley, which he admitted had not been steamed since last year's event. A seasoned competitor, John likes to plan his run meticulously and always takes great pains to study the hosting track and rolling stock before deciding on his passenger load. Having a limited water capacity, care is also taken to select fleet footed water carriers and position them around the track to ensure the water carried optimises the adhesive weight of the engine. John, who is a member of the Swindon Society, chose to run with an inclusive load of 15 passengers on eight cars. As the run progressed it was clear that the locomotive was working on the limit and several stops for blow-ups were needed. However, other than that, the run was trouble free and an overall efficiency of 1.91% was achieved.

Derek Brown

The fourth run was by Derek Brown, of Stamford MES, with his Hunslet *Tony Priest*. Derek will need no introduction to regular readers as he is one of our esteemed Technical Consultants and is also co-author of the series on *Anna*, the Manning Wardle locomotive, currently running in these pages. Derek had with him the distinctive laser-cut canopy for *Anna*, and a fine piece of work it is too.

We gather from Derek that he almost did not make the event as he had convinced himself it was

to take place on Sunday, not Saturday. However, a fast drive and a rescheduled dinner engagement saved the day, although it seems likely he may have greeted his Saturday evening guests in overalls and with steam oil on his hands.

Derek chose to run with 15 adults plus one child on eight carriages. He made a fast and fuss free run, covering the greatest distance of all the competitors, and both he and the locomotive finished in clean and tidy shape. The overall efficiency recorded was 1.87%.

David Holland

David Holland, a member of both Northampton SME and Peterborough SME, had two locomotives at the event. As has already been reported *Sir George* was entrusted to Lee Nicholls while David reserved *Lady May*, his Bagnall type 0-4-2, also to the *Sweet William* design, for his own run in the competition.

David, who described himself on the entry form as a "suave, debonair, middle aged liar", got off to a good start having selected his passenger load to run with 11 adults and one child. However, during the early laps it was clear that all was not well on the 1:90 bank. Matters seemed to improve as the run continued and David completed the allotted time without further incident. After his run David reported that early in the run the boiler feed clack had stuck and was blowing water out of the saddle tank. Once this seated itself the locomotive ran well and the rest of the run was completed without incident. David and *Lady May* achieved an overall efficiency of 0.70%.

Barrie Cook

Barrie Cook of the Red Rose and Leyland Societies was the sixth contestant with his Hunslet *Red Rum*. Built by Peter Davies in 1991, this locomotive has contested SEQLEC four times having won twice and come second twice.

Barrie, whose day job is that of a land and mining engineer, took 15 passengers on 6 carriages and got off to an unhappy start. He came to a halt on the rise out of the station and had to back up to get away again. There seemed to be some doubt as to whether the pressurised braking system on the carriages was releasing correctly. However, a fresh start was made and the locomotive ran well until the final lap when he came to a halt on the 1:90 bank. Having restarted, a derailment occurred on the top loop of the track. This was speedily resolved and the train completed the final lap without further incident. Barrie and *Red Rum* achieved an overall efficiency of 1.60%.

George Finnemore

George Finnemore of Leicester SME describes himself as an elderly person who plays with trains. Well, his plaything for this event was his fine *Romulus* 0-4-0 industrial locomotive, which he built himself. Despite its immaculate appearance this locomotive was built in 1989 and has more than 1,800 miles to its credit.

George elected to take 10 passengers plus 2 children on six coaches and the *Romulus* appeared to be making plenty of steam. Unfortunately, with echoes of the previous run, problems were experienced with the brakes on



George Finnemore's *Romulus* was built in 1989 but looked very smart in the autumn sunshine.



Larry Barker had to overcome problems with an elusive self-propelled injector handle but managed to stay the course.



Melvyn Bright had a largely trouble-free run on his magnificent 9F and went on to win the event for the second year running.



Steve Weaver prepares to leave the station in lengthening afternoon shadows at the controls of George Bernard Squire.

the carriages and the first in the train derailed. The clock was stopped and a replacement battery fitted after which George was able to run without further incident. The problem seemed to do nothing to undermine the driver's resolve and the overall efficiency achieved was 1.21%.

Larry Barker

Larry Barker of Wolverhampton DMES was the next contestant, coming to the line with a characteristic beaming smile. His locomotive was his GWR 15xx 0-6-0, which he built himself and, let it not be forgotten, was the winner of SEQLEC 2002 at Weston Park. As with so many model engineers, Larry says he has Curly Lawrence (LBSC) to thank for starting him on the satisfying and rewarding road of model engineering and, as a carpenter/joiner by profession, he takes as much pleasure in cutting up metal as he does working in wood!

Larry took a total of 19 passengers on six carriages and his run appeared to be progressing well. However, there was a delay towards the end of the run and it was only at its conclusion that the reason became clear. Of all things, the operating handle on the injector steam valve had fallen off and Larry had to transfer a handle from a less critical valve in order to supply the boiler and proceed. This stout effort resulted in an overall efficiency of 1.12%.

Melvyn Bright

Melvyn Bright of Chelmsford SME was once again campaigning his superb BR 9F 2-10-0 *Evening Star*, which won in fine style at SEQLEC 2003 at Reading. Readers may recall that this locomotive was built to the design of Jim Vass and it was a collaborative project undertaken by Melvyn, Ron Martin and a group of friends in the 7¹/₄in. Gauge Society. It took seven years to build and, since completion, has



Melvyn Bright receives the Bristol Cup from our Editor, Mike Chrisp.

been used for passenger hauling on many tracks including the Great Cockcrow and Hemsby. Among its many features are manually operated cylinder drain cocks (for reliability) and vacuum brakes on the tender.

Melvyn chose to take 25 passengers plus a child on ten carriages. He started without problems but came to a halt on the bank leading to the tunnel. Reducing the passenger load to 19 adults and one child got the train away again and the run was completed without further incident. Melvyn's overall efficiency was 2.67%.

Steve Weaver

The final run of the day was by Steve Weaver of the host society. Steve had entered his 0-4-2 Tinkerbelle *George Bernard Squires*, which was built by Steve to the design by Roger Marsh. The locomotive was named after a former chairman of the Nottingham Society, who is now sadly

deceased, and was only completed in July of this year. It is used regularly for passenger hauling duties on the Ruddington track. Steve, who combines an interest in railways as a hobby with a day job as signalman with Network Rail, has been a member of Nottingham SMEE for twenty years.

Steve chose to take 18 passengers on eight carriages and made a clean start. However, it was soon clear that all was not well and the train came to a stop on several occasions. Eventually the load was reduced to 7 passengers and the locomotive made it back to the station area. Although it was difficult to be sure, Steve reckoned that there was 'blow-by' past the regulator which drastically reduced the available power. The overall efficiency achieved by Steve was 0.31%.

So another SEQLEC came to an end and it was time to make the final calculations. It was clear that the outright winner was Melvyn Bright with second place going to John Painter; Derek Brown followed up in third position. The official results accompany this report for those who wish to analyse them in more detail.

Our thanks go to Graham Davenport, President of Nottingham SMEE, and his indefatigable team for organising such a successful event. Thanks must also go to Neal Harrison and Sutton Coldfield MES for the all-important loan of the dynamometer car without which events such as this would not be possible. Neal, who delivered the dynamometer car to the event, was also on hand throughout the day to help with technical expertise and with judging. Finally, we must not forget the courageous competitors who allowed themselves and their locomotives to come under such public scrutiny. We hope to see you all at SEQLEC next year, date and venue to be confirmed. Watch this space!



SEQLEC 2004 HOSTED BY NOTTINGHAM SOCIETY OF MODEL & EXPERIMENTAL ENGINEERS

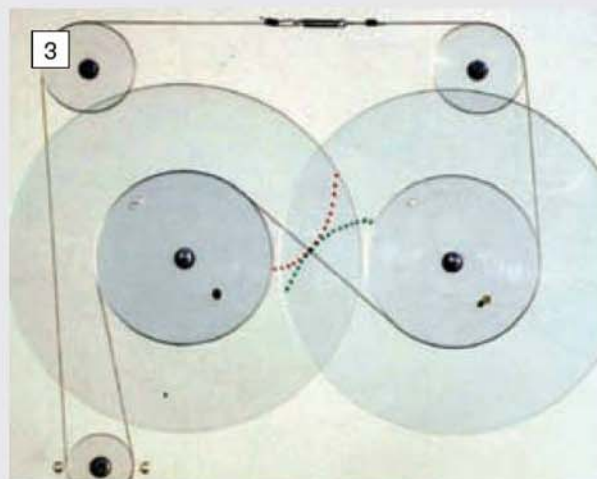
Run Number	Locomotive	Entrant	Society	Passengers	Distance Run (ft.)	Total Work Done (ft.lb.)	Run Time (min.)	Coal Used (lb.)	Average Drawbar Horsepower (HP)	Coal Consumption Rate (lb./hr.)	Specific Fuel Consumption Rate (lb./DBHP-hr.)	Thermal Efficiency (%)	Position
9	9F <i>Evening Star</i>	M. Bright	Chelmsford	20	17308	915703	31.18	3.113	0.8899	5.9897	6.7312	2.6688	1
3	GWR 14xx	J. Painter	Swindon	15	17158	562949	33.35	2.681	0.5115	4.8234	9.4296	1.9051	2
4	Hunslet	D. Brown	Stamford	16	19611	762560	28.90	3.709	0.7996	7.7003	9.6305	1.8654	3
6	Hunslet	B. Cook	Layland	15	17248	659250	32.72	3.728	0.6106	6.8369	11.1967	1.6044	4
7	<i>Romulus</i>	G. Finemore	Leicester	12	19523	615726	36.57	4.620	0.5103	7.5807	14.8566	1.2092	5
8	GWR 0-6-0	L. Barker	Wolverhampton	19	17208	666542	29.57	5.421	0.6831	11.0009	16.1034	1.1156	6
1	Bagnall	S. Harris	Nottingham	15	12252	842006	26.80	7.408	0.9521	16.5851	17.4201	1.0312	7
2	<i>Sweet William</i>	L. Nicholls	Peterborough	12	12262	713845	29.68	7.327	0.7287	14.8103	20.3230	0.8839	8
5	<i>Sweet William</i>	D. Holland	Northampton	12	17212	436995	30.83	5.668	0.4295	11.0296	25.6814	0.6995	9
10	Tinkerbelle	S. Weaver	Nottingham	18	7372	301445	33.37	8.854	0.2737	15.9197	58.1563	0.3126	10

Jacques Maurel,
in France, resolves the question
presented in the last issue.

Part I

I hope my question posed in the last issue got everyone's 'grey matter' working nicely. The answer is that the mechanism is movable! It would be locked if the gears were of the standard variety, but while the meshing between the upper and the two lower gears is standard (wheels turning in opposite directions), the meshing between the two lower gears is of the paradoxical type (wheels turning in the same direction).

How is this possible? We must return to involute theory. **Photograph 3** shows an acrylic model I have made to use with an overhead projector when working with my students. This model has two pulleys with a crossed belt (fishing line) carrying a knot identifying a fixed point on the belt. Using a felt pen, it is possible to mark out the locus of this point on a disc locked to the left pulley (red dots) and afterwards, on a disc locked to the right pulley (green dots). These dotted lines are the involute curves which will give the profile of the teeth. The pulleys are turning in opposite directions.



Left: the acrylic model is arranged to plot the involute curves on the 'gear' teeth for normal meshing. The gears turn in opposite directions.

Right: by rearranging the belt, the involute curves for the 'gears' when running in paradoxical mode can be plotted. They now turn in the same direction.



The three gears shown in this photograph mesh as follows: the centre and right hand gears mesh conventionally but the centre and left hand gears mesh paradoxically. Can you explain why?

PARADOXICAL GEARS

Now study **photo 4** which shows a simpler pulley and belt (not crossed) mechanism. The same two involute curves are still meshing together but the pulleys are now turning in the same direction! This demonstrates how a paradoxical pair of gears works.

Now, two new questions:

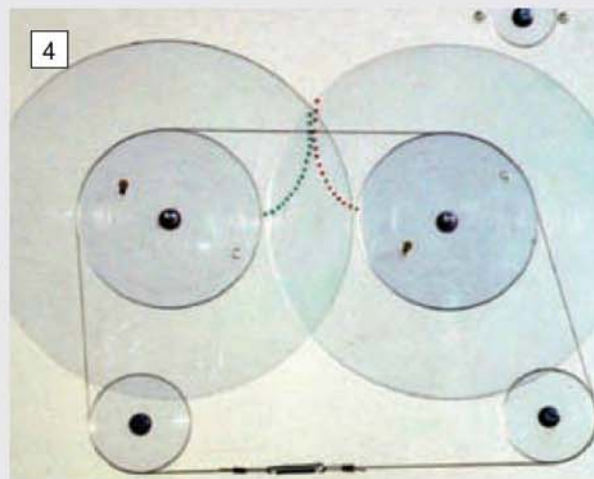
1: Why are the two gears on the left hand side of

photo 2 in paradoxical mesh and the two on the right hand side in standard mesh, while all thirty wheels are identical?

2: Who invented this paradoxical gear arrangement, when, and for what application?

Once again, there is no need to write to us as the answers will be forthcoming in the next issue.

To be continued.



MODEL ENGINEERS A NOVICES' GUIDE

Peter King
in New Zealand, risks all by making
the introductions ...

You may have already encountered some of our hobby's types, indeed you may even see yourself here; we're a motley collection but we're in character. Some are typical of the denizens of most clubs, for whatever reason the club was founded. For the benefit of newer readers I shall roll the stone off a typical model engineering club and observe what runs out. I suggest a glass of something fortifying before reading on!

Grumpy old Gits, some of which are also known as 'Rivet Counters' (see below), are some of the guys who started the club about seventy years ago, plus others who joined in 1945/6 when they were de-mobbed. They all still think in terms of treadle powered lathes of great antiquity, hand operated pillar drills, shapers and the like. They may still be building a 'Ford-Pacific' started before your father was born (or maybe even your grandfather). They only use scrap and other scrounged or free materials of unknown specification and are in for a nasty surprise when the boiler comes up for testing. They don't hold with computers, CAD, CNC, Cell-phones, Lasers, and all that other stuff.

A sub-group of these members have belonged to every club in the district and have fallen out with all at one time or another. All are firmly of the opinion that *Model Engineer* was only any good when *LBSC* was writing articles for it between about 70 and 40 years ago.

Rivet Counters know about rivets — how many, their size and spacing as used in every place inside or out on every road or rail locomotive manufactured anywhere in the world during the last 180 years. They brook no argument with their dictum, their word is law! They have often only ever built one model (which is never exhibited).

Miniature Steam Locomotive Building Fanatics cannot abide any articles in any model engineering magazines that deal with any other topic and write vitriolic letters to the editor of whichever magazine has earned their ire for the time being, and usually follow their rude communication with another cancelling their subscription. Not noticeable among the leaders and prizewinners in their field, they usually regard one very obscure locomotive of an even more obscure railway as the finest ever produced. They are likely to have an apoplectic fit if it is suggested that they make any tooling.

Miniature Steam Locomotive Rally Enthusiasts can be male or female and are usually to be found seated on driving trolleys trundling around a railway track with a happy grin on a face covered in spots of dirty cylinder oil. Their hands are usually filthy and clothes (plumage?) covered in small burn holes (sometimes still smouldering); they reek of coal smoke and cylinder oil and often wear a filthy grease-top hat. At other times, when not on the track, they tend to inhabit the 'Average Club Man/Woman' group (see below). The female of the type has been known to carry a very small locomotive in her handbag. There are Road/Traction Engine sub groups (see below).

Traction Engine Rally Enthusiasts inhabit one of four 'sub-sub' groups: Traction Engine, Showman's Engine, Ploughing Engine and Steam Lorry. Colourful and sporting dazzling polished brass and curlicues, the Showman's Engine type is easily recognised; other models are less shiny. Drivers spend untold years building the model and then five minutes building the driving trolley from an old pram chassis with only two wheels, an orange box and assorted steel scrap. Retrieved from the local dump, the essential extra two wheels are any which nearly match; why this should be so is one the unplumbed mysteries of model engineering.

Average Club Men/Women are gentle souls who happily build models of anything that takes their fancy. With model boats and clocks in glass cases on the sideboard, model aircraft, traction engines and a working locomotive or two in the workshop, they are currently making a tool and cutter grinder and have made several accessories for their lathes which are in constant use. Their workshops are fine examples of heterogeneous machinery acquired over many years from some surprising places. They are on the club lawn mowing roster, make tea when exhibitions are being run, and help out with both track and pond maintenance. They will usually help any 'new chum' seeking advice. This type is not known for dogmatic assertions of superior knowledge.

Unattached Modellers bear a resemblance to the 'Average Club Men/Women' (see above), but with a greater sense of independence (bloody-mindedness). Having probably fallen out with their local club, they often travel great distances to their chosen club. Some truly wonderful models have been made by members of this group; maybe isolation concentrates the mind.

Hangers-On are a peculiar breed with a dreadful fascination for belonging to clubs, any club, from Archery to Canary/Bird/Poultry Fancying and on

through Motoring to Zen Philosophy. They never actually *do* anything, they are just *there*; however, the fees they pay are a considerable help to the clubs to which they belong. Ski Clubs and Aero Clubs hold a particular fascination for this breed; they never ski or own skis, but have all the clothes and talk the talk; they never fly but are seen propping up the bar in the clubhouse. The model engineering variety don't own a workshop, have never made anything, never will and it is doubtful if they could drive nail straight.

Small Machine Fanatics never stop building small complicated pieces of machinery each of which is stored in a fitted custom built, lined, varnished and beautifully hand lettered wooden box. The machine is finished to the highest degree possible and is boxed together with every conceivable accessory which was also made by him. None of it has ever been used; any suggestions to do so is met with a blank stare of incredulity. A couple of variants of this type are the 'Small Hand Tool Fanatic' and the 'Small Accessory Fanatic' who only make the tools their categories imply; all other parameters apply.

GWR Fanatics are beyond rescue or cure; no reasoning will ever correct this affliction; no argument will ever restore them to the real world. They worship a god called Brunel and disciples such as Gooch and Churchward at the altar of Standardisation in Swindon. This worship is accompanied by the wearing of the largest blinkers ever seen, dating from when the company of their affection ceased all development of its locomotives and procedures, becoming time-locked into the Edwardian/WWI Era. Nothing which happened on other much more advanced railways, such as the Southern had any subsequent effect. They should be treated with the kindness afforded any other poor deluded individuals; it not fair to mock the afflicted.

Aero Modellers tends to congregate in hordes on any areas of flat land; time taken to observe the activity is rewarded by the emergence of several sub-types which tend to wax and wane as a proportion of the whole with changes in fashion. At present, most are hung about with several radio control units and reek of two- or four-stroke engine fuel. A small but growing number stink of kerosene (or paraffin) and have an affinity for howling jet units; don't smoke near either as you will probably incinerate them. A quieter group is only interested in gliders, mostly of peculiar shape and vast size. All these groups spend an inordinate amount of time with a sack in one hand while picking up fragments of a mangled model with the other and stuffing them into the sack while repeating the Aero Modeller's Mantra: "*Oh S***! Oh S***! Oh S***!*"

Boaties spend vast amounts of time producing beautiful models which are motored or sailed around a pond for a while before being put into glass cases while work starts on another. A small sub-group builds hydroplanes and vary the above practice by encouraging the model to scream around the pond, take off and dive into the water at about 200kph to leave a few floating fragments — sometimes. Both these groups spend much of their time retrieving lost gumboots from mud while sinking deeper with the other boot. Another

common activity is groping about for sunken boats in the duck sludge at the bottom of the pond.

Gods are sometimes also 'Unattached Modellers' (see above). These rare beings are so far beyond the average modeller as to defy any proper classification. Suffice it to say that they may be found in the area reserved for Duke of Edinburgh Award models at major exhibitions. A distant crowd of awestruck mere mortal model engineers may also be observed on their knees worshipping from afar.

Exhibition Judges are to be found in their natural habitat in/around major exhibitions. Often their physiognomies are recognisable as being those of leading modellers so, possibly contrary to popular conception these people are not related to Judge Jefferies. However, from time to time in the past, some have been from the 'Rivet Counter' genus (see above) or had other strange hobbyhorses. Known for esoteric preferences, they will be observed to shudder at the sight of a cross-slotted dome-headed screw fitted instead of a rivet while countersunk screws will make them gibber and sometimes foam at the mouth. They are often to be found huddled together muttering "... *not true to prototypical finish ...*", "... *colour not right shade ...*", "... *lettering not right size/style/colour ...*" and other such incantations.

SMEER Members are sometimes seen at ordinary club meetings but are most often found wearing their ceremonial blue robes at major Model Engineering Exhibitions. Suspected of being a sinister cabal with weird and terrible powers, admission to this 'master group' is rumoured to involve strange and dreadful oaths administered with the candidate lashed to a lathe. There is evidence that past and present Editors may be the terrible SMEER Grand Inquisitors feared by modellers, whom recalcitrant users of dome or countersunk head screws (see above) ultimately face. In certain lights, or when wearing polarizing glasses you may, at the side limit of vision, fleetingly see them as they really are: Darth Vader-like in appearance.

Hot Air Engine Fanatics breathe methylated spirit fumes to the extent that their eyes frequently rotate in opposite directions and their brains become so detached as to be in the next county. It is wise to keep a good distance between yourself and these addicts and never strike a match anywhere near them as it will cause a serious conflagration, that is if they aren't already alight along with everything around them. They are often to be found cossetting a night-light under some minute and complicated mechanical device which is thrashing itself to death while keeping an attached quarter watt bulb glowing dull red. Their strange dialect is quite impenetrable but they provide a useful service for the club in that they will collect all the unidentified junk, including tin cans, left on the club sales table to make their engines.

Gas Turbine Enthusiasts belong to a small but growing minority which also converse in an incomprehensible language and who compete with 'Hot Air Engine Fanatics' (see above) for old tin cans and used camping gas containers on the club sales table. These enthusiasts should be

given a wide berth as they are likely to have created small screaming devices spinning at around 200,000rpm while producing enough thrust to sling a model aircraft off the ground with startling alacrity. One good thing about this lot is that they are mostly away with the 'Aero Modellers' (see above).

Steam Turbine Enthusiasts are part of a tiny minority whose use of jargon just as incomprehensible as the 'Gas Turbine Enthusiast' (see above), but may be behind you on the club track! This may do little for your peace of mind, for while quietly drifting around the track with your mind out of gear, you may become aware of the approach behind you of a whine. At present these devices spin somewhat more slowly than gas turbines, possibly at only about 60,000rpm. However, we have reports that 'Gas Turbine Enthusiasts' are penetrating this group, and if the whine is high pitched ...

Clock Makers are members of a time-honoured group (Ho! Ho!) and, after several years are likely to have housees in which you can't think for the ticking of clocks, clicking of Congreve balls, and twirling of other bits. The cacophony of cuckoos, bells, chimes, hooters and assorted dingers on every hour deafens anyone within 50 yards. The unsympathetic allege that 'Clock Makers' minds tick like their clocks for years until one day they go 'cuckoo'!

Metrological Perfectionists are individuals who, for every part of whatever steam or other device they actually keep, throw away twenty with dimensional errors in the order of 0.0001 inch. There is no cure. Pointing out the inherent inaccuracy of the original prototype is a waste of time, as is reference to standards of fit. The final cure comes when an attempt is made to assemble all the perfect parts at which time the club will see them no more for they will move on to something else in the way of a hobby where the search for perfection, alas, will continue.

Australopithecus Robustus Intestinus, (old 'rough as guts' — some clubs have two of these), drags the most awful, rough hewn models along to the club exhibition, drives a locomotive which looks like it was chiseled and sawn from the solid, 'finished' with a half round dreadnought and apparently painted with distemper brush. Refined club members with beautiful locomotives are put out of temper because it *never breaks down!* Including the owner, this horrible thing's boiler passes all tests, never leaks, and runs all day. It clatters and clanks, hurls sparks and embers everywhere, drips oil on the track to give everyone else problems, but never 'Old Pithecus'.

Stainless Steel Kid builds everything from stainless steel, whether or not appropriate. The wise and those with a well developed sense of self-preservation will maintain at least 100 metres between themselves and his boiler — even when it's being hydraulically tested! This one has never heard of, or vigorously denies the existence of galling, stress corrosion cracking, tunnel cracking, and the like.

Round The Pole Car Racers are club members addicted to small but very noisy model motor cars

which scream around a pole on a tether at appalling speeds. This type fuels the overstressed engines they use with a mixture which, despite great secrecy on their part, usually contains a selection of nitro-methane, tri-nitro-toluene, castor oil, ether, methanol and nitro-glycerine for starters; they then get bold. Such mixes may remain stable for about twenty minutes. Like their 'Hot Air' mates (see above) these modellers also have a detached air. The uncharitable reckon they are *up* the pole not *round* it!

Pack Rats (USA), Sh**hawks (UK), or Vultures (?)**, are members of a group allied to 'Old Pithecus'. 'Hot Air Enthusiasts', 'Turbine Nutters', sometimes even ordinary 'Average Enthusiasts' (all see above), are briefly tempted to join this dreaded sub-culture. This group and their garages provide the ultimate fate of the unwanted, unidentified and unsightly junk which appears on club tables, in auctions or rubbish skips. These are the folk who store and sometimes recycle to use, everything from a guzunder or common thumbwetter to a bent bicycle frame.

Machinery Restorers are harmless fellows whose addiction is to restore and use aged machinery discarded by more rational mortals. The machinery in their garden shed aggregates to a load of about 8 tonnes, the wooden floor then gives way, the treasures are retrieved and a concrete floor poured. Further acquisitions will jam the shed until it is absolutely full, whereupon an extension will be built with a wooden floor — and the process repeats.

White Stick Charlie has spent the last twenty years building live steam models of American Big Boy locomotives in H0-gauge, inside cylinder British 0-6-0s in 00-gauge and, until recently, a 4-cylinder Pacific in 000-gauge.

Screwball/Ballscrew Specialists are part of a small but growing minority in the model engineering arena who will convert any machine to CNC operation. They are very easy to spot; a cursory inspection of their workshops will reveal a PC, monitor, keyboard and mouse with skeins of wires connecting everything in sight. There's even a stepper motor on the suds pump! An unexpected means of identification is to inspect any model with chequer plate; if it is real, with a 2mm chequer pattern, it's a cinch, guaranteed, CNC! This condition may be contagious so it could be better not to visit.

DRO Enthusiasts are members of a very minor movement and is at serious risk of becoming a 'Screwball/Ballscrew Specialist' (see above). The DRO Enthusiast may be infected with a chronic form of virus (no one is yet sure) and is in grave jeopardy of the condition becoming acute; each additional machine conversion increases the risk. The warning signs include the individual clinging to their display and the issue of threats to kill if it is taken away. There is no cure; inoculation with a little DRO vernier caliper has been tried when initial interest was shown, but in every case the individual developed the early chronic form.

Single to Three-Phase Practitioners may be suffering a milder mutation of the electronic virus

which seems to be developing into an epidemic at a greater rate. Time alone will gauge the veracity of this assessment.

Steam Locomotive Efficiency Fanatics are a rare oddity, but very easily spotted. Cast an eye over the steam locomotives at any club track; what you are seeking is a mobile heap of pressure/vacuum gauges. The search may take some time and cover many tracks, but it is instantly recognisable when one of these passes; it will not be very fast because of the immense load it is hauling. Closer examination will reveal further instrumentation including gas and optical pyrometers, rev. counters, air speed indicators, in-line batch coal weighing plant, two or more engine indicators, water flow-meters and temperature gauges on the tender/tank, injectors and check valves, about thirty bi-metal temperature sensors buried deep in the works, each connected to a gauge. I will not list the controls as this will only baffle the novice. Delicate enquiries out of the hearing and reach of the conductor's baton (one can hardly call them a mere 'driver') will elicit the information that on a good day its efficiency is about 0.5379% while 'Old Pithecus' (see above) regularly gets around 3.8%. These fanatics are not to be confused with enthusiasts who achieve much at the altar of efficiency on an annual pilgrimage called IMLEC.

Valve Gear Specialists are very easily recognized once the connoisseur of types is practiced in the art of identification. You are seeking a locomotive with Walschaerts gear on one side and Baker gear on the other. This came about when management diverted the attention of the 'Valve Gear Specialist' to mowing the lawn in the middle of yet another conversion which he forgot to complete. He has yet to notice the discrepancy and no-one is game to point it out for he would probably fall on his shovel in mortification if it was drawn to his attention. He spends days recalculating valve gear and adjusting valves by microns in efforts to achieve the ultimate but elusive perfect beat, forward and reverse. He has never achieved it and never will.

Tool Sharpening Perfectionists have built a tool and cutter grinder and have got into a Karmic Loop, doing nothing else but sharpen tools. Every drill has a split four facet point, every slot drill and end mill has absolutely perfect angles, likewise every side and face cutter and slitting saw is absolutely as per the book. Unfortunately, due to the gradient of his learning curve, no drill, end mill or slot drill now has more than half a spiral left and most of the arbor mounted cutters will only cut to a depth of 1.6mm. He has also tried lathe tools and now has a separate set of HSS tools with perfect angles for every material from Aluminium to Zirconium.

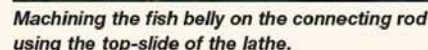
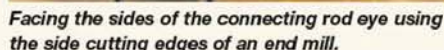
Lash-up Fiends are easily spotted at home; a brief examination of their work-shacks will reveal broken windows and patches on the sides, roof and door. Further examination will be rewarded by a sharp crack as something passes through the battered skin of the shack in a cloud of splinters and disappears into the blue. They may not always be easily identified when all the bandages have been removed, but a check with the local accident and emergency department will demonstrate a first name relationship with the staff.



describes wedges for the rocker arm, two types of connecting rod, and the cylinder.

The wedges (part 10) which hold the strap to the rocker arm are made from 1.6mm (0.062in.) thick mild steel strip. You could mill them but it is quicker just to file them up. Use sharp edged files to get square corners and check each piece individually so that it fits its companion and slides easily in its slot. Turn up the little brass bearing and assemble the whole bearing assembly. You can see from the photographs that the front of the wedge is just level with the cotter.

I have shown these as they appear on the prototype, but to be honest it is almost a case of self-inflicted 'GBH' to make these little wedges as sets of three. I just made them as two pieces, as for the rocker arm.



FAIRBAIN'S COLUMN ENGINE

The connecting rod for use with the overhung crank is a little unusual with the big end having

The first thing to do is to make a form tool the shape of the eye including the top bead. Harden and temper as usual. Finish the cutting edge to as fine a finish as possible, as the better the finish the better the turned eye.

Chuck a length of 10mm dia. mild steel rod and face off the end. Transfer to the milling machine and, after using an edge finder to locate end and edge, use co-ordinates to cross drill a 6mm dia. hole for the bearing bush. Finish the hole to size with a reamer.

Back in the lathe, centre the end and drill down and tap 8BA through into the cross-drilled hole. Give tailstock support and turn the eye using the form tool. Check that the cross-hole is properly positioned in the centre of the eye. Even though the cut is intermittent, the hole is small enough for a chatter-free eye to be formed.

Now back to the machine vice on the milling machine, set the connecting rod horizontal. Pass a rod through the eye and use this to orientate the connecting rod. The rod needs to be parallel to the table. Using the side of an end mill machine the flats either side of the eye; this can be seen in **photo 15**.

Yet again, chuck the connecting rod in the lathe, give tailstock support and turn the rod to 6mm diameter below the eye. Form the bead below the eye. At the other end turn a 2.5mm diameter spigot to fit into the fork. Set over the top slide to $2\frac{1}{2}$ deg. and turn the first part of the taper for the fish belly. Set over the other way to $2\frac{1}{2}$ deg. and machine the second taper. Join the junction into a smooth curve with the use of a fine file. The connecting rod at this stage can be seen in **photo 16**. Part off.

For the fork, a piece of rectangular mild steel bar 15 x 5mm is needed. From the various photographs you will see that I often make parts as pairs, as this usually makes it easier to hold and machine. Also, with some parts which are quite complicated and require careful setting up, even though only one is needed, it can save heartache to make two. Then if you foul up one.





Although only one forked end is required for the connecting rod a pair were machined to simplify work holding.



A finished connecting rod fitted with its bushes, straps and brasses for the overhung crank engine.

the other is there to take its place and you do not have to go over the whole process again.

So, cut off enough for two with a little to spare. Square off the ends, grip in the 4-jaw independent chuck and turn a 4mm diameter spigot each end. At the same set up, centre and drill 2.5mm dia. for a depth of 12mm to receive the spigot on the end of the rod.

Transfer to the vertical milling machine, clamp the bar horizontally and drill an 8mm hole at each end to form the roots of the forks. Fit a slot drill and remove the material between the two holes. Exchange the slot drill for a drill chuck and, using an edge finder, locate the end of the spigot. If you have already zeroed the dials to the edge and end of the machine vice jaws, by using a stop across the end of the vice, you can just push the spigot against the stop and you are ready to find the position of the wedge slots by means of co-ordinates.

Spot the ends of the slots with a small centre drill and drill through. To avoid repetitive repositioning of the slides, simply turn the bar over to drill the next set of holes. Then turn the bar end for end and repeat the process.

The holes now need to be turned into slots; 1.6mm slot drills are available, but they are fragile and expensive. There is much wailing and gnashing of teeth when they break. Unless they are run at high speed (rpm) taking shallow cuts using very careful, slow and constant rate side feed, they will break in a trice. I do not use side feed with them at all, but use them as a drill moving the job along a few thou' at a time. I recently machined thirty 1.6mm wide slots 5mm long and 5mm deep, and thirty slots the same size but 2mm deep, with the same slot drill, and it is still okay.

Having machined the slots, their rounded ends need to be squared out. For this I ground down one edge of a flat needle file until it fitted into the slot, and used this to finish the ends. The next job is to round off the external corners of the forks. This can be done by filing or by using a small Linisher. Finish off with fine files to blend the junctions together. Photograph 17 shows the pair of forks at this stage.

The final job is to form the concave ends to fit around the bearings. I set the bar up edgewise in the machine vice and, using co-ordinates, located the positions of the holes. Two points are relevant: I find drills often cut oversize and we do not want to damage the vice jaws. I

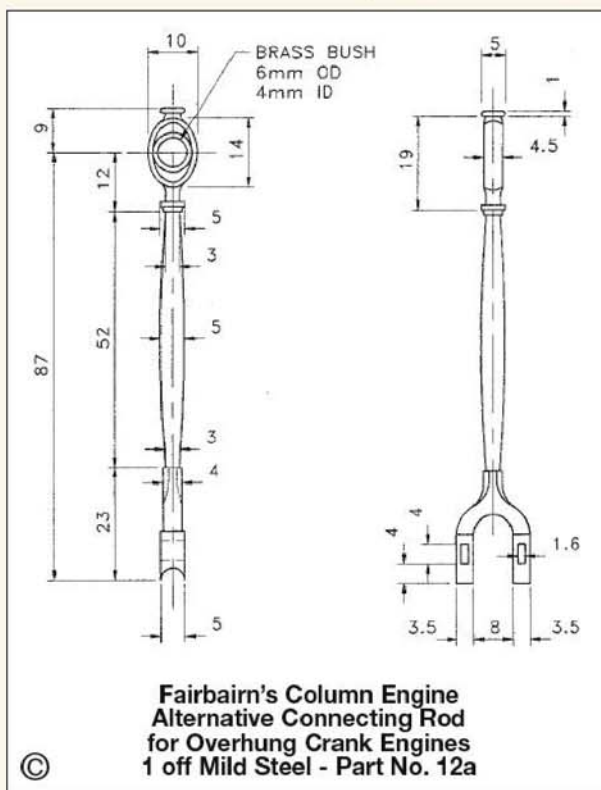


The alternative style of connecting rod for the two-web crankshaft shown here without its big end bearing cap.

centred the hole, drilled through 3mm and opened out to 4mm, then passed through a 4.8mm drill. On removal, the bar was so weakened that it just pulled apart. The ragged ends were tidied up with a file and the job was finished. A completed connecting rod appears in photo 18.

Connecting rod for the two-web crankshaft - Part 12a

For those making a freestanding engine with a two-web crankshaft, the connecting rod is a little different. It could be made with a top bearing in the form of strap and cotters as for the little end, but as a change and as it is somewhat easier to make, I have shown a marine type big end.



The fork is the same as before and the fish bellied rod is the same but with a spigot at each end. The main bearing is formed from two pieces of brass. Machine up some rectangles of brass a little bigger than the required size and soft-solder them together. Mill them to the finished overall dimensions and mount them in the 4-jaw independent chuck to drill through and ream for the bearing hole.

Reposition and turn the boss on the end. You will need to use packing under two of the jaws to reach over the bearing hole to give support to the front of the bearing. Use a 6mm diameter round nose tool to form the boss and feed in carefully as the cut will be intermittent due to the shape. Centre the end and drill to receive the spigot on the end of the rod.

Remove from the lathe and drill the two stud holes, 8BA clearance size for the upper section and tapping size for the lower section.

Melt apart, clean up and assemble the rod with Loctite. Photograph 19 shows the completed connecting rod with a marine type big end.

Connecting rod straps - Part 13

Apart from the different sizes follow the same procedure as with part 07.

Connecting rod lower bearings - Part 14

The connecting rod lower bearings are just simple brass bushes.

Connecting rod assembly

With all the parts of the connecting rod now made, they can be assembled. The main rod is fitted to the fork with Loctite. Rest the flat of the eye on a parallel and the edge of the fork on another one, all on a flat surface to get the two parts square to each other.

Press in the top bearing bush, then assemble the lower straps, bearings and forks. As the crosshead pin can be put in from the side, the assembly can be strengthened by using Loctite to hold the parts in place rather than relying on the little wedges alone.

Cylinder - Part 15

The cylinder is supplied as a lost wax gunmetal casting so needs little cleaning up. Start the machining with the casting gripped in the 4-jaw independent chuck. Put the valve face end in the chuck with one jaw bearing on the valve face. To clear the bottom flange, packing blocks will be required under the other jaws so that the



jaws bear on the body of the cylinder casting.

The piston should be a sliding fit with about 0.025mm clearance. By using a fine feed with a sharp tool on gunmetal, there should be no need to lap or hone a steam cylinder bore.

We now move from the lathe to the vertical milling machine. Clamp across the ends of the cylinder in the machine vice. Face off the valve face using an end mill. Take care at the bottom as the flange stands above the level of the valve face. Drop down the side and take a skim off the exhaust inlet.

Reposition for the top steam port and drill a 2mm dia. hole at each end of the slot — all these holes can be accurately positioned using co-ordinates. Exchange the drill for a 2mm slot drill and join the two holes together to form the slot. If you are not happy using small slot drills just leave the two holes as they are; they will still pass sufficient steam for a model stationary engine.

Now up-end the cylinder and clamp it to the milling machine table with two clamps to the bottom flange. We need again to align the centre of the cylinder with the spindle which can be done accurately enough for the next operation by fitting a piston on its rod into the chuck and adjusting the table slides until it goes easily up and down the cylinder bore. Zero the dials and, using co-ordinates, the spindle can be positioned to drill the steam passages to meet the ports. First,

Castings and drawings for this and other engines,
fittings and tools are available from
Cotswold Heritage, Bird Industrial Park
Long Marston, Stratford upon Avon
Warwickshire CV37 8RP.
'phone: 01789-721444; fax: 01789-721188
e-mail nicholls_eng_systems@compuserve.com

The way is now clear to centre and to drill the holes down with a 2mm drill. As the steam chest is at the bottom of the cylinder it is a long way down to the ports from the top so you will need to use a long series drill to reach. In fact I only drilled down 10mm in the milling machine, then moved to the drilling machine. This allowed me to drill part way and then invert the casting to shake out any chips in the hole which all helps to forestall a jam.

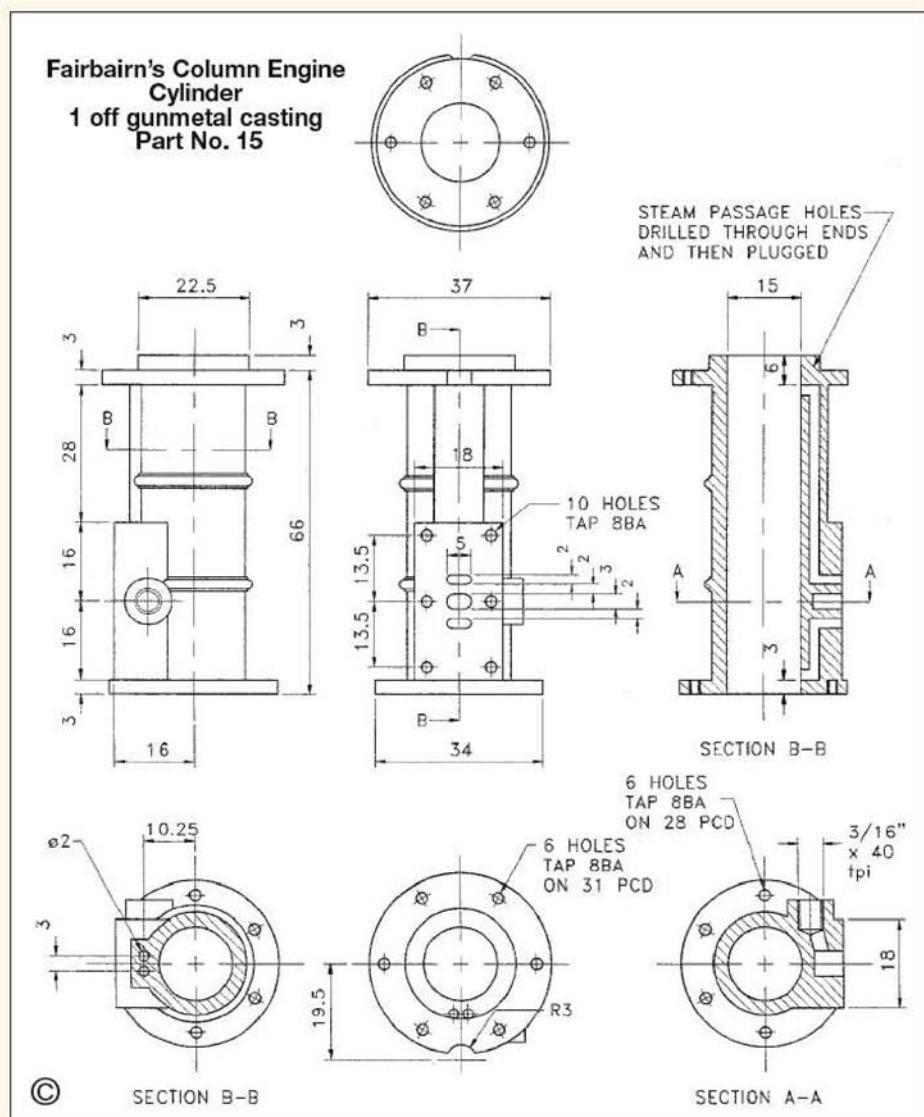
As the hole is deep, of small diameter and in a material which produces short chips, the drill will need to be cleared frequently to avoid a snatch and breakage. It helps if the drill is nicely sharpened; not only will it cut better but it is more likely to stay on course and not wander. I presume you have a depth stop or indicator on your drilling machine — when approaching breakthrough, even greater care is necessary as a snatch is very likely.

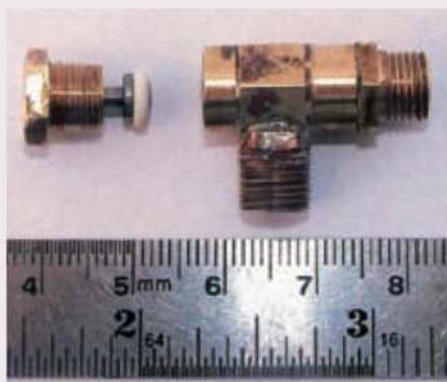


Turn the casting over to drill the other passages, but these are much shorter.

Clamp the casting in the machine vice, again by the ends, and align the drill on the exhaust port. Drill a 4mm dia. hole 6mm deep and square out the bottom with a D-bit or slot drill. It can be tapped $\frac{3}{16}$ in. x 40tpi later. Now turn the casting through an angle to allow a drill to go from the hole down into the exhaust port. Start the hole with a centre drill and open out to 3mm diameter.

●*To be continued.*





A non-return or clack valve utilising an O-ring seal as described in the accompanying text.

Ron Bignell

describes a neat variation on the usual ball type clack valve.

Recently, I have made some non-return valves using O-rings as the clack seal instead of the usual ball bearings. All the main parts for the body have been machined from 3/8in. A/F hexagon brass which is easier to grip for turning and threading in a 3-jaw chuck. Round bar may be cheaper but it can slip while threading with dies.

Main body - Item 1

Machine to drawing, drilling and tapping 5/16in. x 40tpi right through. Skim off the hexagon at each end leaving 5/16in. of hexagon on the body as shown. Part off 5/8in. long. Drill a 1/8in. dia. hole in the centre of the hexagon flat (any one) breaking through into the central hole.

Side feed - Item 2

Turn as drawing but, as shown, do not drill the 5/32in. dia. hole right through; 3/16in. is deep enough initially. Part off 7/16in. long and then make a chucking sleeve with a 5/16in. x 32tpi thread. Mount the workpiece in the sleeve while in the chuck and turn it down to 1/8in. dia. leaving 1/16in. of the hexagon. Face off the 1/8in. dia. spigot to finish 1/8in. long.

Locate this 1/8in. dia. x 1/8in. long pip into the 1/8in. dia. hole drilled in the body (item 1) and silver-solder in place. Now drill the 5/32in. dia. hole through into the main body but be careful not to go right through and out of the other side! Clean up and run your taps and dies into or over the threads as appropriate.

Valve seat - Item 3

Turn down to 5/16in. dia. and thread this end 40tpi. Centre and drill through 5/32in. diameter. Face off then part off to a length of 19/32 inch. Make a 5/16in. x 40tpi threaded chucking sleeve to hold this item to cut the thread and turn the other end. Fit the workpiece, turn it to 5/16in. dia. and thread it 5/16in. x 32tpi leaving the hexagon 1/16in. wide in the middle. Centre deeply to form a 60deg. facing in the hole.

End cap - Item 4

Machine the cap as shown. Do not drill the 3/32in. hole right through. Part off and chamfer the hexagon.

Valve bobbin - Item 5

The valve bobbin is made from 1/4in. diameter stainless steel. Set up in the 3-jaw chuck and turn

O-RING NON-RETURN VALVES

to 7/32in. dia. for 7/16in. length. Then turn down to 5/32in. dia. for 5/16in. length.

Using a 1/16in. wide parting tool ground with a square front edge and set square to the workpiece, bring it to just touch the 5/32in. dia. against the shoulder created by the two diameters.

Check the cross-feed index dial on the lathe and carefully feed in 0.015 inch. This will create a 1/16in. groove for the O-ring with a 1/8in. core diameter. Leave the extra 5/32in. length to provide a chucking piece. Part off at 17/32in. total length.

Now reverse in the chuck, gripping by the extra length on the 5/32in. diameter. Machine down to 3/32in. dia. as shown, taking light cuts. Before release from the chuck, use a fine flat file to make a small flat on the 3/32in. diameter to prevent hydraulic lock when in use. I have found it best to cut off most of the extra length with a junior hacksaw in a vice.

Return to the 3-jaw chuck, holding on the 3/32in. dia. and machine to length as drawn, taking only 0.005in. cuts — you do not want to bend or break this little part at this stage. Also take a 0.007in. cut off the 5/32in. dia. and deburr with a fine file. Mind you do not drop this part, as it is most likely you will never see it again!

Assembly

Check that the valve bobbin slides freely in the

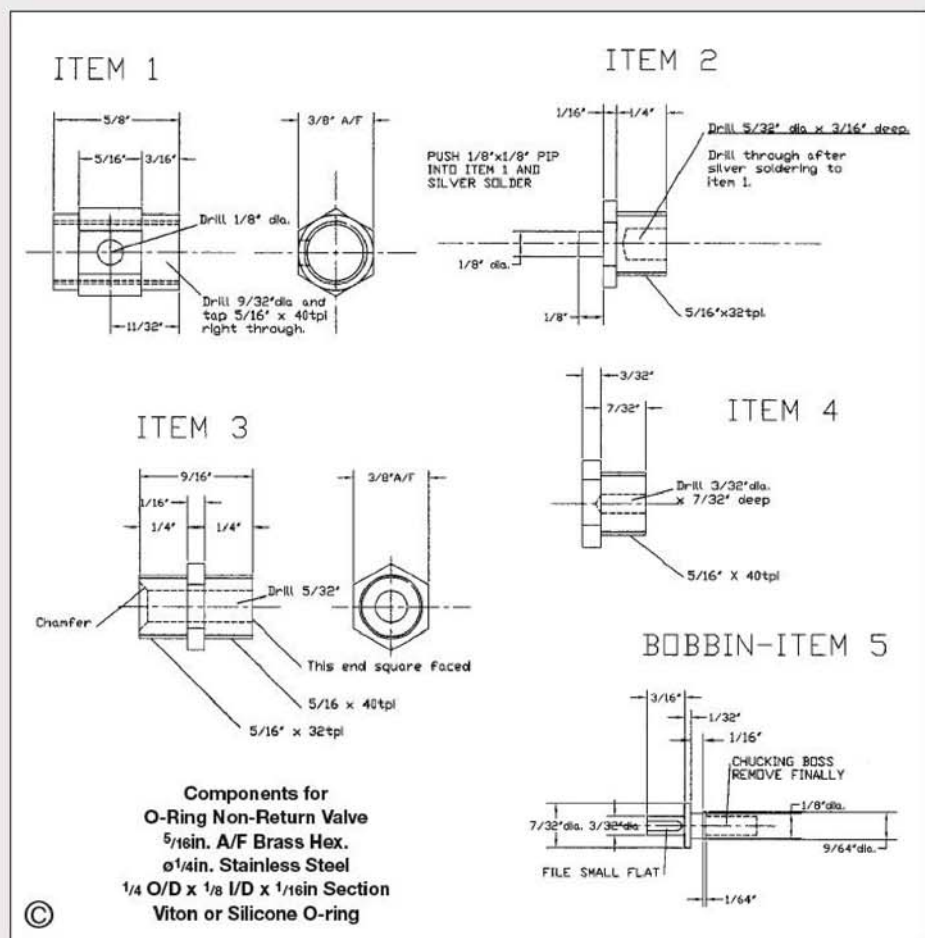
hole in the cap. The valve lift is not critical as there is no fear of the valve blocking the outlet to the boiler as can happen if a small ball bearing is used in a clack.

Screw the bottom or valve seat (item 3) into the main body (item 1). Use PTFE tape on the threads at final assembly. Fit the O-ring to the bobbin and place this sub-assembly in the cap (item 4). Screw the cap into the body.

Now try blowing into the inlet and outlet. If it does not seat right away look for grit or very small particles of swarf on the O-ring. Do not forget that the parts should be thoroughly cleaned before putting them together.

I hope you will bear with me over the long-winded description of this small item. I should like to think that anyone with the necessary tools would be able to make them. Viton or silicone 1/4in. O/D x 1/8in. I/D x 1/16in. section O-rings are available from various suppliers. I am at present running a much-used locomotive with ordinary black O-rings fitted to the non-return valves. So far, no distortion or hardening has taken place.

The chucking sleeves mentioned are best made from the same brass hexagon used for the valve. Mark them with a centre pop on the flat nearest number 1 chuck jaw to ensure that they will run fairly true when re-used. I hope you have fun making these non-return valves; I find it best to make them four or six at a time.





1
A selection of French clock movements, most of which have been abandoned or purchased cheaply.



2
A view of the rear of the movement selected for this project in the condition it was when acquired.

RE-CASING A FRENCH CLOCK MOVEMENT

Ian Beilby

begins by discussing 'orphaned' movements and shows how to put new life into an old clock with both sympathy and style!

Part I

Regular readers of *Model Engineer* may recall seeing previous articles of mine describing the construction of a hooded wall clock and a world time dial clock. The feedback that I have received from readers of the magazine has been most welcome. It has been encouraging and, most importantly to me, very informative.

Both of the clocks about which I wrote displayed the time in a novel and highly pictorial fashion and, from what readers have said to me, this is what primarily led to their initial interest in the features. The movements were not outstanding in that no elaborate escapements were fitted, and

no novel technical design features were incorporated. Deliberately designed with simple construction in mind it was the clocks' unconventional dials which were the incentive and selling point!

The dial is of course the focal point of any clock and the layman (or wife!) with little or no interest in what goes on behind the dial is mainly concerned with what the dial shows them and the clock's ability to indicate the time accurately. The amateur clock maker or model engineer looks at a clockmaking project from a somewhat different angle, spending months, or even years, producing a clock to a high standard and to the best of his ability. He is naturally proud of his achievement and quite rightly wishes to exhibit his skills and ability.

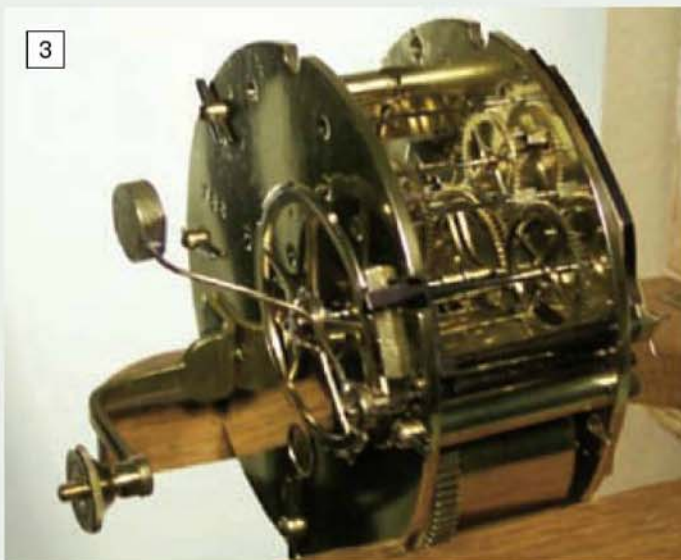
I believe this to be one of the reasons that skeleton clocks are so popular with amateur clock makers and appear prolific in exhibitions of model engineering artefacts. Their design is such that every aspect of the movement is visible, satisfying both the mechanically inquisitive, who

like to see the wheels go round, and the admirers of quality workmanship. The finish exhibited on these skeleton clocks is usually outstanding, and as much as a third of the time allotted to the construction of the clock is likely to be spent in achieving the high finish that we come to expect with a display clock of this type.

Model engineers are used to working to high standards, and it may come as a bit of a surprise to some to discover that the vast majority of domestic clocks are, by comparison, very poorly finished. Robust and well made they may be, but they are certainly not finished to the exhibition standard of a hand-made clock.

Much of this is down to the commercial pressures to which the clock making industry is subjected. Time, as they say, is money, and what point is there in spending time and money bringing a clock movement to a highly polished finish especially if it is to be housed in a case and never seen by its owner?

There is, however, an exception to this generalisation. The French clock makers of the



3
The movement after renovation. A high finish has been given to all the parts in keeping with the quality achieved by the original makers.



4
The elaborate dial fitted to the movement. This is highly decorative even by the standards of French clock makers.

19th century produced some outstanding and reliable movements and, although mass-produced by the thousand, the quality, finish and workmanship is equal to that of a handmade clock. Unfortunately, most people are unaware of this fact which has led to many French movements, which were sometimes housed in unfashionable black slate or marble cases, being forsaken and in some cases, quite literally thrown into the dustbin.

It is quite often possible to pick up orphaned movements from discarded cases at clock fairs and even at car boot sales. To my mind the quality of these movements is such that they are too good to be simply broken up for spares or re-housed in a wooden case. These abandoned movements present us with the opportunity to re-case them and at the same time display the fine quality of the movement. John Wilding addressed this same issue some years ago in an article in *Clocks* magazine entitled *Old Wine in New Bottles*, and several clock material suppliers retail kits for just this purpose.

In this series I would like to show readers how I re-cased a derelict movement which I bought some months ago, and to describe the construction of a glass case in which the clock is now housed and viewed.

Photograph 1 shows a selection of French movements typical of the type and condition in which many of these movements can be found. Many of the dials exhibit the Brocot escapement which in itself is interesting and worthy of display. **Photograph 2** shows the movement which I bought with this project in mind; the badly tarnished plates and wheel-work are clearly evident. **Photograph 3** shows the movement after cleaning and polishing. I am sure readers will appreciate the quality and workmanship and agree that the movement is well worth re-casing and displaying.

The dial of the clock is shown in **photo 4** and is highly decorative even by the standards of the French clock makers. The movement had lost its hands, bell and pendulum, and the original bezel straps which attached the movement to the case were very badly mutilated. However, all these items were dealt with while restoring and



Having been fitted with a 'sunburst' pendulum, the movement undergoes test.

cleaning the movement. As the clock was to be fully displayed, a decorative replacement 'sunburst' pendulum was fitted. The movement on test is shown in **photo 5**.

When working with antique movements such as this, and particularly when re-casing a movement, great care should be taken not to alter or adapt the movement in any way. If then, at a later date, it is decided to fit the movement into a more appropriate contemporary case, this can be easily achieved.

Great importance is placed on originality when assessing both the commercial and aesthetic value of antiques. We have an obligation to be careful and to stay within the bounds of what is considered acceptable restoration and repair. These considerations were uppermost in my mind when designing the main plate and the means of attaching the movement to the case.

Photographs 6, 7 and 8 show the finished clock and, although I appreciate we are a long way off at this stage, I hope the illustrations will help readers to grasp the basic idea.

The main plate into which the movement is inserted is cut and filed to shape from a suitable sheet of $\frac{1}{8}$ in. engraving brass. The edges of the plate are embellished with semicircular fluted pillars and half capitals at the base. Both pillars are topped off with decorative pineapple finials. The finials are tapped and provided with a length of 4BA steel studding. A central finial is placed above the dial and two decorative rosettes fill the space between the decorative pendulum aperture and the pillars. These two rosettes also serve to hide the heads of two 4BA cheese head screws which secure two small brackets attached to the back of the plate. The main plate is secured to its wooden base with countersunk brass wood screws via two $1 \times \frac{3}{4} \times \frac{1}{8}$ in. angle brackets tapped and screwed to the bottom of the main plate with countersunk 4BA screws. The side finials are secured to the plate in the same way with two slightly smaller brackets attached to the rear of the plate at the top.

The two semi-circular fluted pillars are cut from $\frac{3}{4}$ in. diameter fluted brass tubing. In order to attach the pillars to the front of the main plate a $\frac{5}{8}$ in. diameter wooden dowel rod is cut in half and glued into the rear of the pillars with epoxy resin. The pillars are then attached to the front of the movement plate with countersunk brass wood screws from behind. The central finial is tapped to take a length of 8BA steel studding and the finial and base are screwed directly into the top of the plate.

In order for the movement to be held securely in the main plate, two free standing rear columns are provided. The columns are fabricated from $\frac{1}{2} \times \frac{1}{8}$ in. brass angle and are provided with similar decorative finials and bases. These two rear columns are screwed to the wooden base and braced from the main plate with a $\frac{1}{2} \times \frac{1}{8}$ in. length of brass strip. The movement is secured to the main plate and columns by the movement straps in the conventional way.

In part two, a list of materials is provided, the method of construction discussed, and work will begin with the main plate and the fluted pillars.

● *To be continued.*



A front view of the finished clock with its transparent dust cover removed.



The finished clock incorporates fluted columns, rosettes and pineapple finials.



The rear view of the clock which is designed to be viewed all round through its transparent cover.

SOFT JAWS FOR A MACHINE VICE

Peter Spenlove-Spenlove

describes a simple aid to accurate repetitive machining.

I expect most model engineers who have a lathe with a 4in. dia. or larger 3-jaw chuck have heard about, or actually use a set of 'soft' jaws for some tricky jobs. But how many have used the same idea, i.e. 'soft' replacement jaws, in their milling machine vice?

I was asked to machine an axial slot in the end of some 1in. long pieces of $\frac{7}{16}$ in. dia. stainless steel rod. The slot was to be $\frac{1}{8}$ in. wide and $\frac{1}{2}$ in. deep i.e. like a very deep screwdriver slot. My vertical milling machine holds end mills in No. 3 Morse taper collets, but if I had used an end mill it would have taken me ages to mill the slot tidily. The slot had to be reasonably accurate — not easy in stainless steel, even the free cutting sort.

I had a 4in. dia. slitting saw with a standard 1in. dia. hole so first I made a 1in. dia. stub arbor with a No. 3 Morse shank tapped for a drawbar. I could now hold the saw with its axis vertical. Next, I needed to hold the 1in. x $\frac{7}{16}$ in. dia. parts with their axis horizontal. How? It had to be a firm solid hold and, if possible, easy to load to a set position for 'mass production'. This is where the soft jaws came in. The vice was opened wide and the original hard jaws removed. Exact copies were made in bright mild steel bar with the exception that it was not necessary to machine the bar surface on the 'flat' sides. You may need to machine (or file) the top edges level, an operation best done after screwing the soft jaws in place. My vice uses $1\frac{1}{2}$ x $\frac{1}{2}$ x 4in. bar for the jaws, held in place by two $\frac{1}{4}$ in. countersunk Allen screws.

Next, I put the hard jaws back and found a strip of scrap metal about $\frac{1}{16}$ in. thick by the same size as the jaw face — in my case 4 x $1\frac{1}{2}$ inch. This was placed between the soft jaws and the assembly put, end upwards, in the vice on the milling machine. Having satisfied myself that the two jaws were truly opposite each other, the vice was tightened and a G-cramp applied to clamp the upper ends together with the $\frac{1}{16}$ in. packing sandwiched between. Next, using drills and the boring head I made a hole centred on the $\frac{1}{16}$ in. packing (fig 1). In this case, I made a $\frac{7}{16}$ in. dia. hole by $\frac{7}{16}$ in. deep (flat bottomed) to grip my 1in. long stainless steel rods. If you are slotting a number of screws you may choose to tap the hole with the appropriate thread. This is only necessary if the screw is short, say less than two diameters long, to avoid trouble from the 'tipping over' forces which the milling cutter will impose.

When the hole was finished, the packing was removed, the burrs cleaned up and the new jaws fitted to the vice. It was now possible to grip the

part with a $\frac{1}{16}$ in. gap between the jaws. Actually, this gap closed up a bit, but obviously the faces of the jaws must not touch. Unless excessive, any swarf falling between should not prevent the jaws from gripping the workpiece.

This type of set up is very rigid, rigidity being limited only by the strength of the milling cutter or saw arbor. I could have used a 3-jaw chuck on an angle plate but this would not have been so rigid. There would have been too much overhang. The same is true if the vice is fixed to an angle plate. I find the soft vice jaw the best for simplicity and rigidity. Also, it is suitable for production runs of work, in that each piece goes in its 'pocket' to a definite stop (fig 2).

minute not revolutions per minute, so obviously a 3in. or 4in. dia. cutter has to run much slower than, say a $\frac{1}{2}$ in. end mill. Do try not to let the cutter chatter. Chatter is the ruination of slitting saws. Generally, chatter is less at low revs unless the set up, or part of it, is too flimsy.

My figs 1 and 2 are sketches showing a simple vice on a milling machine table. The vertical head is of course above. I do not use a key to transmit the drive torque to slotting cutters when mounted on the 1in. dia. section of my stub arbor. I rely only on the nut and flanges just in case the cutter jams, which can happen easily on a light machine in back gear. The cutter simply slips avoiding damage — usually. Many slotting/slitting cutters and saws have no keyway anyway.

If you make an arbor, I suggest that while you are at it, you make two. One can be short with the parallel bit on which the cutter fits about 1in. long. The other should be 4in. or even 6in. long so that you can reach the lower part of a job. Make a set of 1in. dia. bore collars or spacers from $1\frac{1}{2}$ in. bright mild steel and face the ends absolutely parallel.

The most important point, however, is that the 1in. parallel section of the arbor must be absolutely concentric with the drive taper and the shoulder at the top of the 1in. area must be square and clean. I suggest if you use mild steel, which is soft and easily deformed, keep the shoulders diameter almost $1\frac{1}{2}$ in. i.e. use no more than a 0.025in. chamfer on the outer corner. The inner corner should have a radius of about 0.03 inch. Do not under-cut this corner as it weakens the arbor. All milling cutters are chamfered, usually quite heavily.

Slitting saws are not usually chamfered. As they are thin and flexible in use, they should be clamped between special larger flanges — mine are 2in. dia. and are chamfered in the bore to miss the arbor radius. The arbor thread is usually about 1in. BSW, but I made mine 0.995in. O/D diameter x 16tpi which is quick to cut

and, because it is a 'fine' thread, the nut does not require a lot of spanner torque to tighten it, nor does it vibrate loose. In a factory I have seen chaps using a copper mallet on a spanner to tighten a 1in. BSW nut. I hope we are not so cruel to our machines!

With a fine thread, the outside diameter of the nut need only be about $1\frac{3}{8}$ in. dia., but in place of spanner flats, drill a hole (or mill a groove) for a C-spanner. This method is very simple and reliable. I use $\frac{1}{4}$ in. flat bright mild steel for making C-spanners. Some bicycle spanners have a 'C' bit incorporated. Try them for size and if one works, copy its proportions.

Aim for a 'wrap around' i.e. from peg to heel, of at least 160deg. up to 180 degrees. If much less a C-spanner can slip off. This is not much fun with a sharp milling cutter nearby!

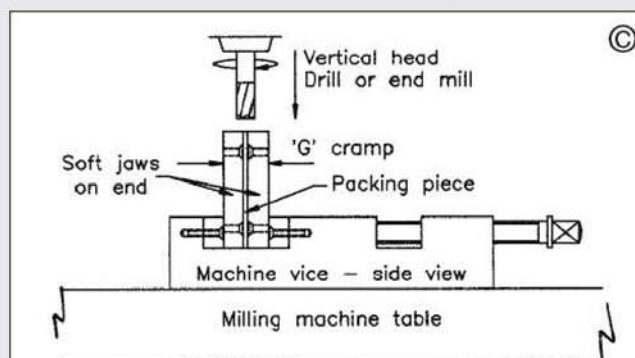


Figure 1 — Cutting the pocket in the end of soft jaws

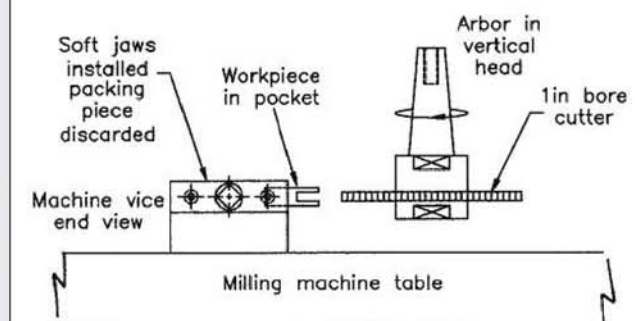


Figure 2 — Cutting a slot using the prepared soft jaws

The pair of jaws just described now has five special pockets. Four are for round pieces and one is shaped for a rectangular part. The round places often get used for other jobs. Some pockets are machined in the top edge. This is useful to hold, say a bolt while a square head is milled from the round. If you use a 60deg. protractor it is simple to mill hexagon heads too.

Along with other milling cutters, slitting saws are often available from surplus tool stands at model engineering exhibition and traction engine rally fields. Always take your micrometer with you to check sizes and to avoid non-standard shanks and other such problems.

Perhaps it is worth noting that if you wish to use large 1in. bore dia. milling cutters and saws, your milling machine must have a low speed spindle. Cutting speeds are quoted in feet per

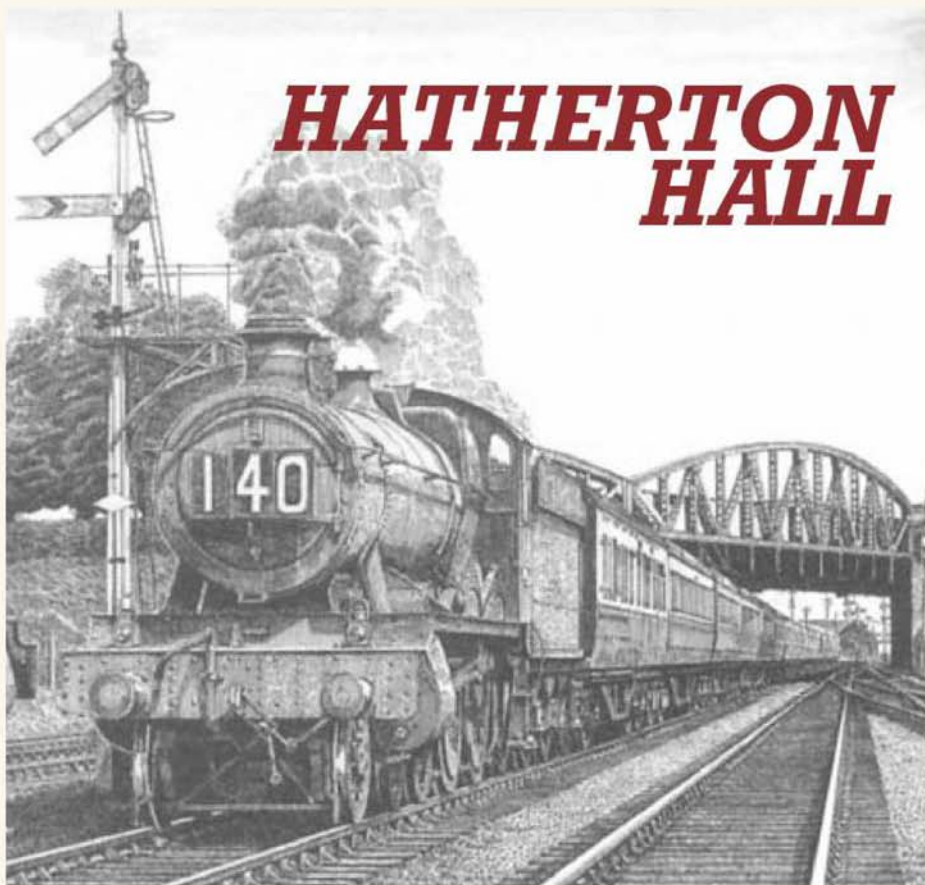
Neville Evans

introduces what he describes as a 'go-anywhere, do-anything' locomotive from the GWR stable.

●Part I

The mixed traffic or general utility locomotive concept was beloved of the operating departments of most companies.

The idea is that you can have a go-anywhere, do-anything locomotive, so that there is no need for a search for motive power — the first one to hand will do. Nowadays with Diesel traction there is no real problem. Sadly, when steam was the general rule it wouldn't really do. In any adhesion based system, more power requires more adhesive weight and therefore less availability. The LMS, for instance was badly handicapped by having built hundreds of the ubiquitous class 5 4-6-0s which, with 53 tons or so of adhesive weight, were able to travel over about 70% of the company's mileage. Unfortunately, as Brian Reed pointed out in his book *Modern Railway Motive Power* in 1950, their widespread use on mainline trains over the Western, Midland and Southern Scottish divisions was probably the principal locomotive reason for the chronic main line un-punctuality of that system in the early post war years. The LNER built large numbers of V2 Green Arrow 2-6-2s which could run over only 45% of that company's mileage. Their greater adhesive weight of 66 tons, together with their much larger fireboxes, gave these magnificent

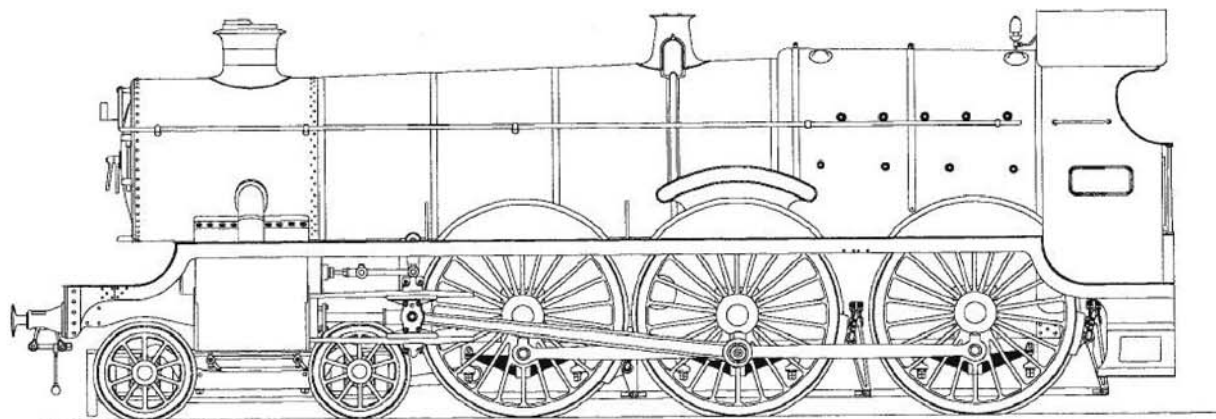


HATHERTON HALL

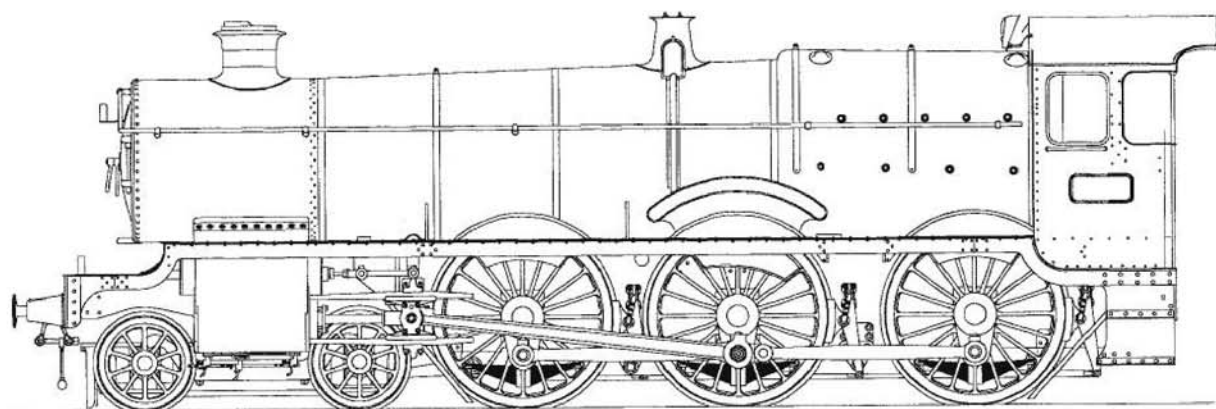
engines far more power, which enabled them to take regular turns on the most exacting duties without loss of time. To put it another way, don't send a boy to do a man's job.

The concept of the small-wheeled mixed traffic

4-6-0 was not new. Indeed the Jones Goods 4-6-0s of the Highland Railway could be described as being of that type. In this country, on the Continent, and in America, such locomotives had also been built since before the turn of the century.



Saint Martin before rebuilding as prototype HALL



Prototype HALL as rebuilt from Saint Martin

©

Many British railways built versions of their early 4-6-0s with smaller wheels to handle perishable goods which were carried in insulated closed vans, fitted with continuous brakes. As the perishables were mostly fish, milk and vegetables, these locos were often called 'Fish engines' due to their primary duties. The North Eastern, the Caledonian and the Great Central to name but a few, had them and they served with great distinction, provided they weren't overloaded.

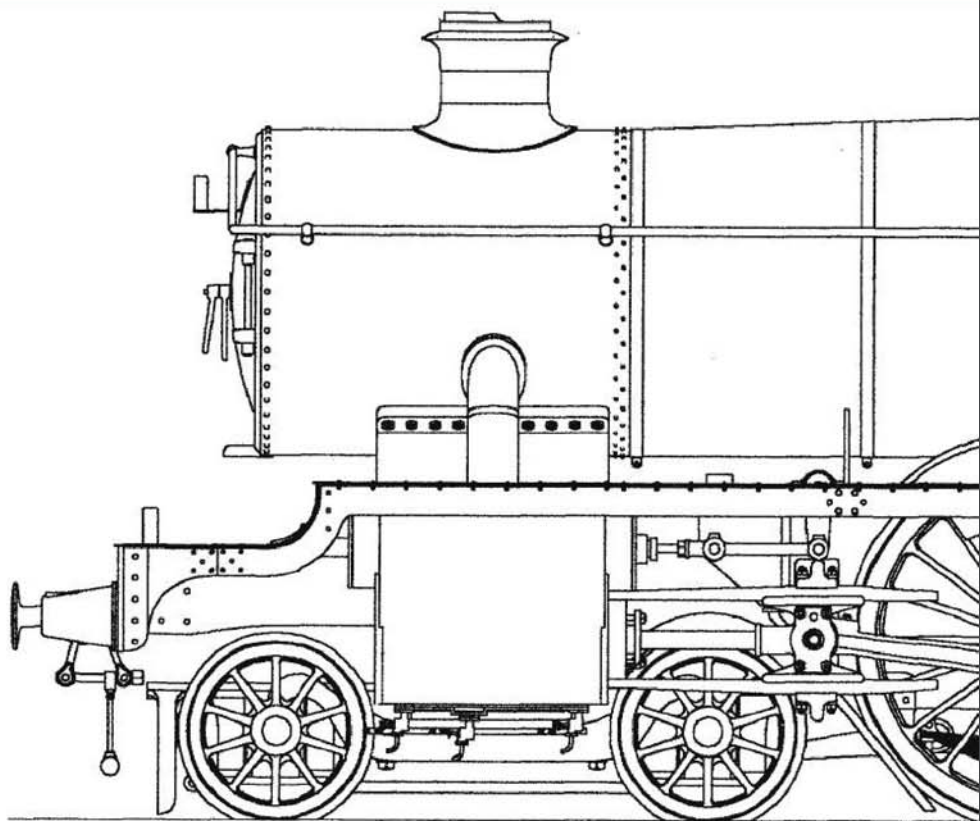
In Germany, the Prussian 08 class was built in huge numbers and almost until the end of steam. In 1908 also, there appeared in France what was probably the ultimate mixed traffic engine. The Nord railway had been operating its splendid de Glehn/du Bousquet Atlantics for some time (these were the locomotives that Churchward brought over to the GWR from France and which formed the basis of West Coast British express locomotive design from that time until the end of steam). Du Bousquet however decided to go one better and modified the basic Atlantic into a 4-6-0. The wheel size was fixed at 5ft. 9in. and he gave orders that the steam passages were to be enlarged by up to 30% so as to enable these engines to run as freely as did the Atlantics. The final development of these engines, with Lemaitre blastpipes were capable of a continuous power output of the order of 1900ihp.

In Britain, the first truly modern mixed traffic 4-6-0s were the Urie H15 class of the LSWR. These were probably designed by Finlayson, who had been smuggled into Eastleigh by Robert Urie from the North British Locomotive Company. After Dugald Drummond's death, Finlayson became Urie's chief draughtsman. The H15s with 6ft. diameter wheels were a success from the start, as they were standard 'shop engines' sold around the world by the northern British locomotive builders for many years. The Highland Railway 'River' class was similar to the H15s and designed for the same sort of work, which called for slogging power, rather than speed.

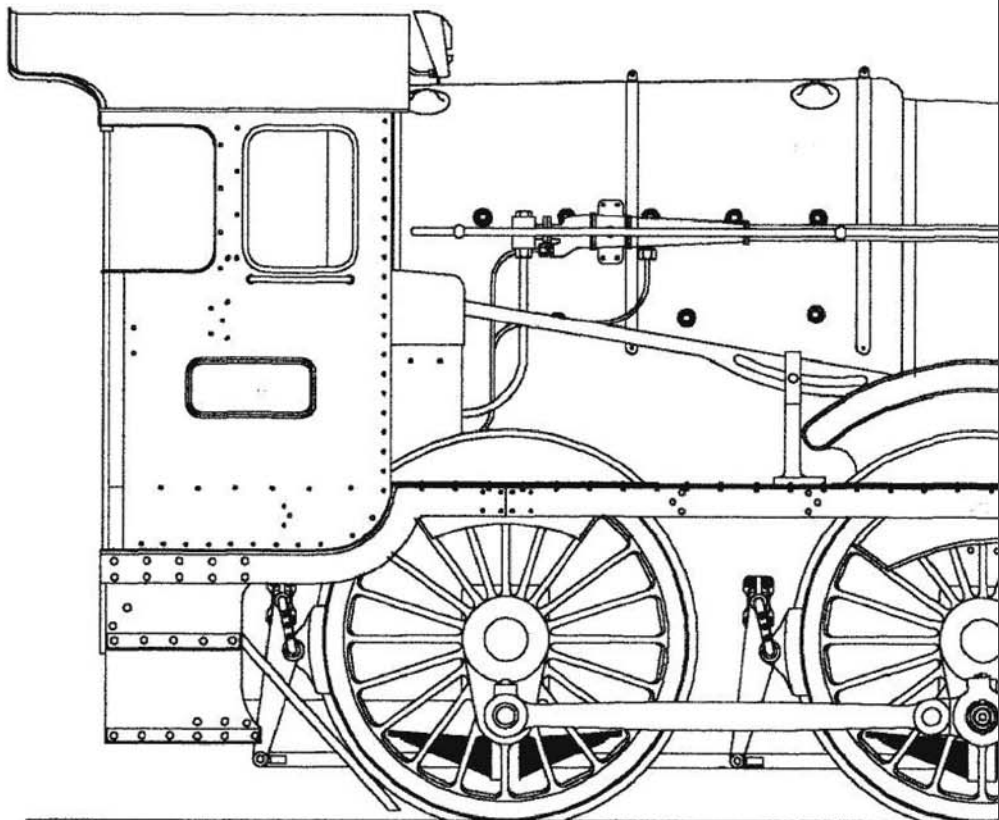
The fly in the mixed traffic ointment, and in fact in the British railway system in general, was tens of thousands of loose coupled, unbraked, grease axlebox wagons which had to be hauled at low speed from siding to siding throughout the country. A high percentage of these devices belonged to private owners and look great on a pre-war 00-gauge layout. On any other kind of system however they represented an unmitigated disaster which has only comparatively recently been resolved.

The Collett Hall Class

On Boxing day 1924, a new(ish) loco emerged from Swindon works. This was *Saint Martin*, rebuilt with 6ft. diameter wheels and a Collett Castle type cab. The object of the exercise was to refigure the 'Saint' class, probably the best engine of any kind on Britain's railways, to develop a little more power, at a lower speed. The operating department had been asking for an improvement on the 4300 Moguls, which were a bit feeble for the West country banks, and were inclined to nose about a bit too much with only a pony truck instead of a bogie. The choice of 6ft. diameter for the coupled wheels was probably a case of the smallest wheels that could be fitted in without having to redesign the locomotive to any

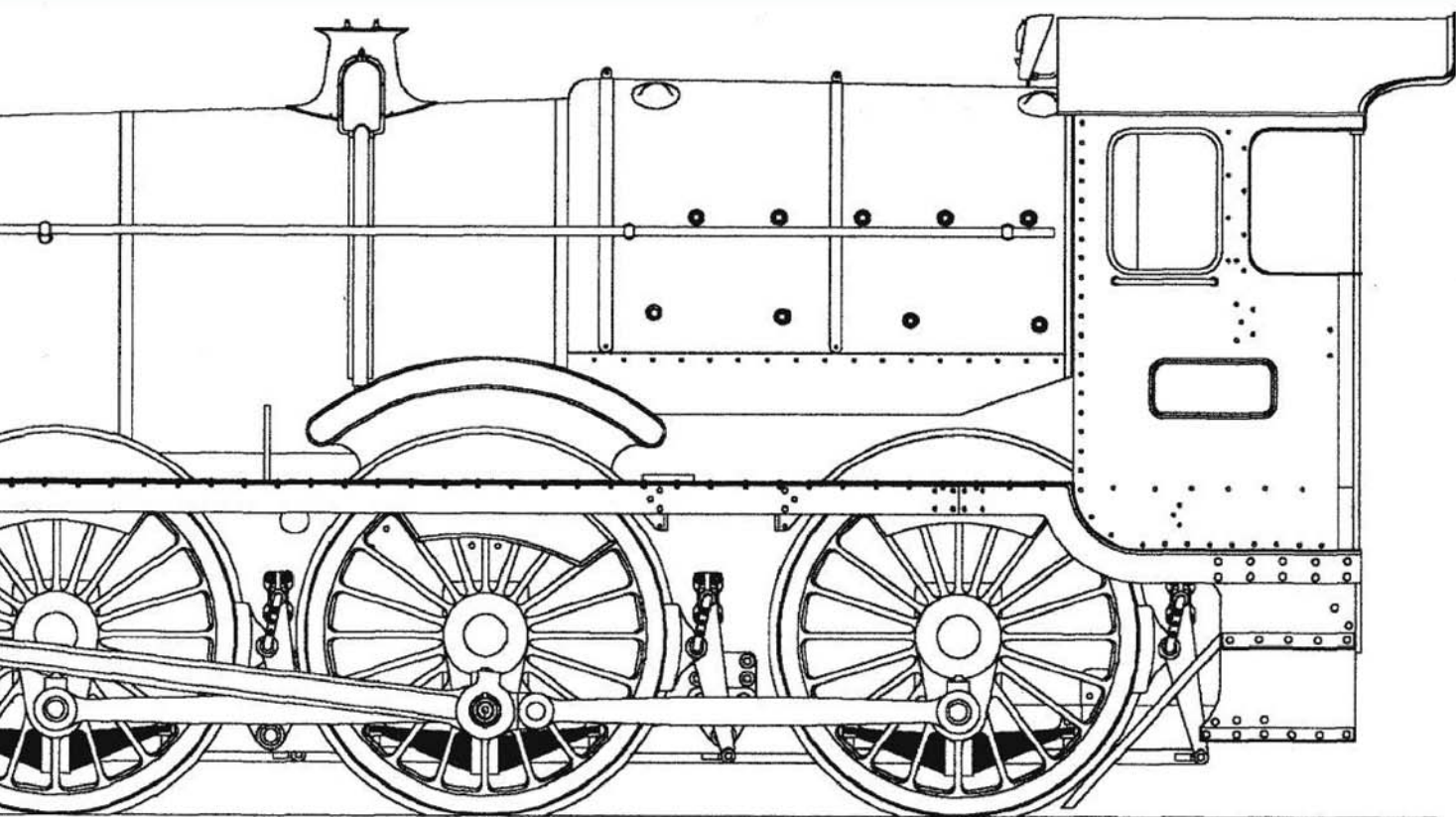


Production

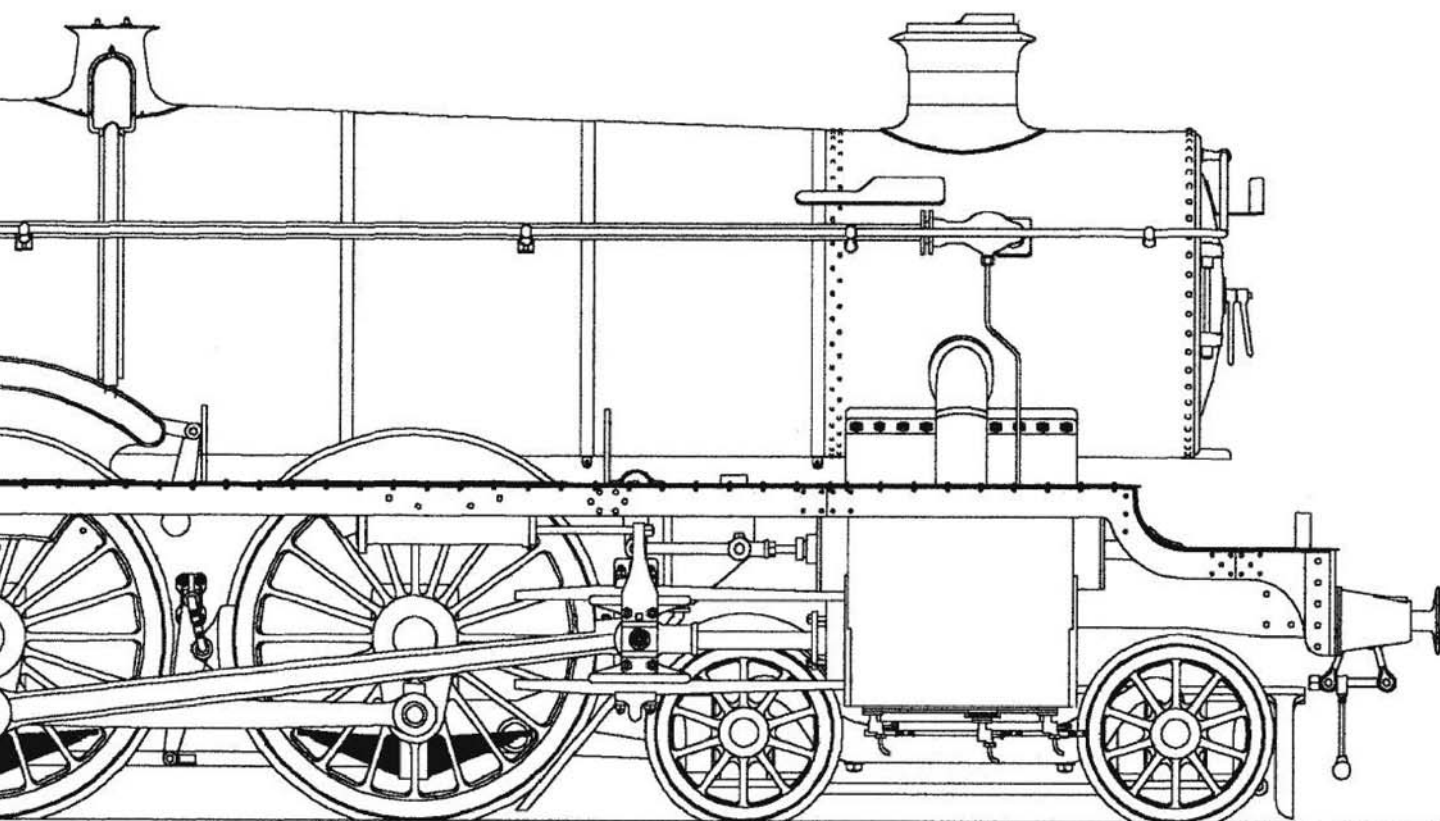


Later version of HALL

©



HALL with compensated suspension



with compensated suspension removed



Saint Martin rebuilt as the prototype Hall.



The first production locomotive: Adderley Hall.

great extent. There was, for instance, much more involved in the building of the 'Granges', which were, after all, the result of a cross between a 'Hall' and a 4300 2-6-0.

Saint Martin was given a lengthy trial period of four years or so before the first of many production batches was built to Lot 254, which was of no less than 80 engines, in 1928. There were several changes made to the production locomotives. The boiler pitch was restored to the same level as that of the Saint's at 8ft. 6in. They

were also fitted with straight outside steam pipes and curved front ends. The bogie wheel diameter was reduced by 2in. to 3 feet. The valve travel increased to 7¹/₄in. and a new type of rocking shaft was fitted. These alterations raised the engine weight to exactly 75 tons, which was 2¹/₂ tons heavier than *Saint Martin*. The tractive effort was increased by about 3,000lbf. due to the smaller wheels. Further batches of these most useful engines were built to a grand total of 259. A further 70 modified Halls were built by

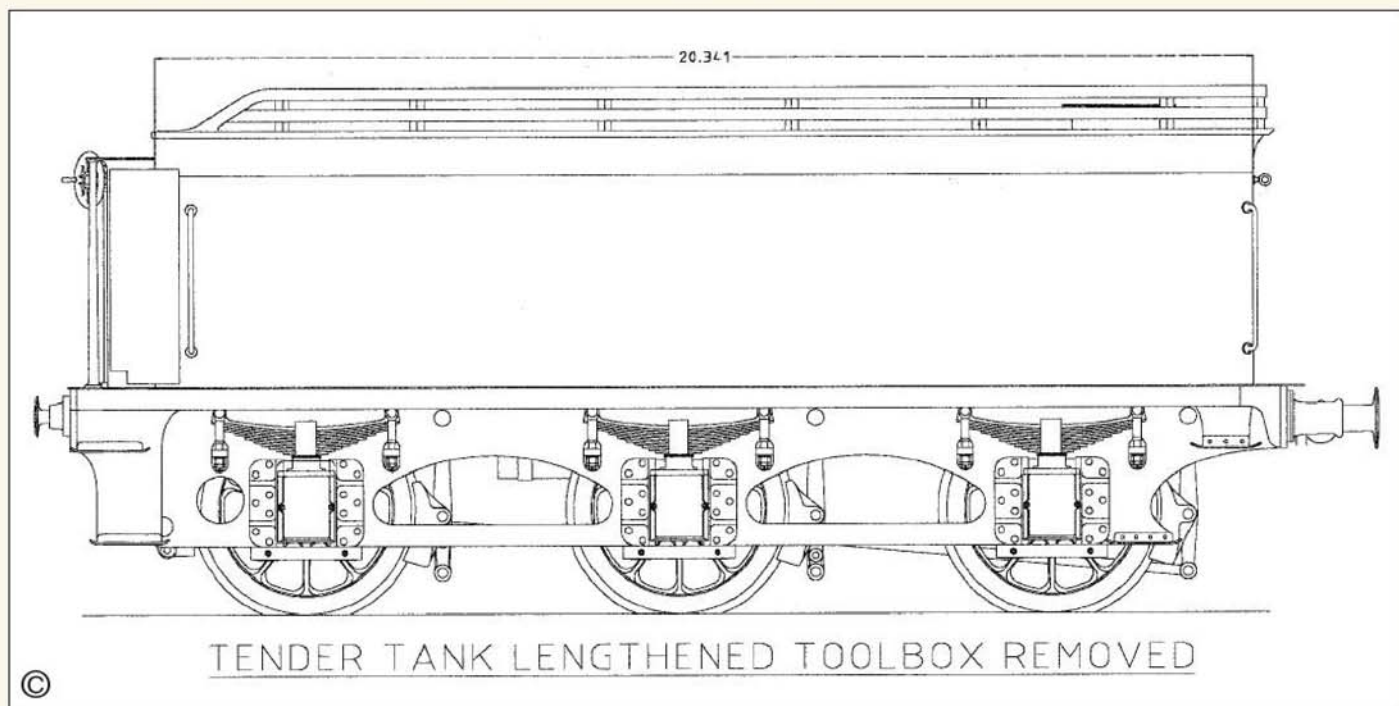
Hawthorn from 1944. These engines, which will be detailed, together with the 'Counties', in a few months, differed from the Collett 'Halls' in that they had continuous frames, and separate cylinders and smokebox saddles. The 'Counties' were given larger, high pressure LMS type boilers on the basic modified Hall frames, with the addition of 6ft. 3in. coupled wheels.

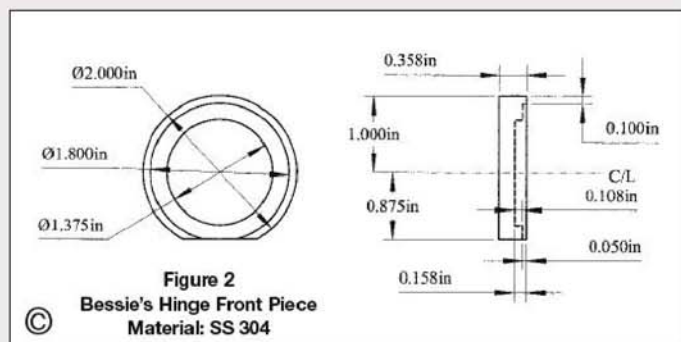
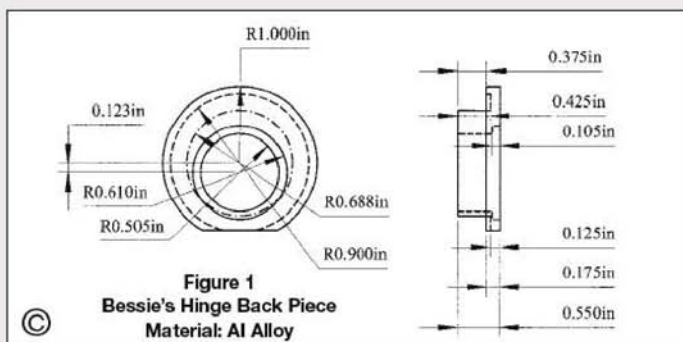
This then was the Hall class. To many people it represented all that the Great Western was about. The Halls were to be found wherever the main line ran and proved to be wonderful value for the money. To my mind they didn't achieve the high stepping elegance of the Saints, but then only the Stars and possibly the Stanier Jubilees did.

Loch tender

I had an interesting and extremely informative chat with my Caledonian ally, Graham King, the other day. It seems that I was wrong in my surmise (for such it was) that the frames of many of the Loch tenders had been shortened to delete the toolboxes. What I was seeing was of course a slight optical illusion caused by the angle at which the photograph was taken. The truth of the matter is that in accordance with a Board of Trade order of 1915 or so, outside toolboxes of all railways were forbidden due to the danger of trying to access them while the locomotive was moving. Instead of shortening the frames, which at the time I thought was a rather drastic step, the tanks of many of the Loch tenders were lengthened by about 8in. to fill in the gap as and when renewal of the tanks was necessary. The order could not have been taken very seriously however, because I haven't yet noticed a 'Big Goods' with a lengthened tank. No 103 at Glasgow Museum of transport has, of course, a toolbox tender as built. I have included a revised drawing of the long tank tender. Graham thinks that the water capacity of the tender as modified, would have increased by about 100 gallons.

●To be continued.





BESSIE'S HINGE

OR WHAT MODEL ENGINEERS DO WHEN NOT MODELLING!

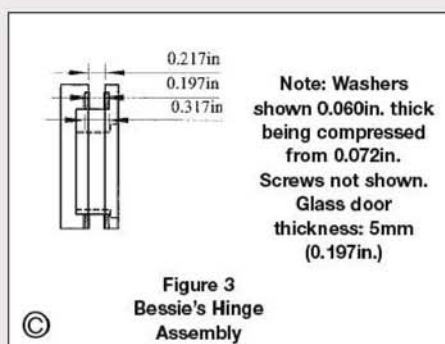
Ted Wale

explains how to win favour with your relatives.

I am sure many readers have been 'volunteered' for a job because "Dad can fix anything" or "Ted will do it for you, he can make anything in his shop." Worse is when, inadvertently, you volunteer yourself. I did that last year and I did not see it coming. However it may come in useful for other readers with kitchen cabinets, so here it is.

I live in Nova Scotia and was visiting my sister in Southampton, UK. I happened to notice that a door was missing from her kitchen cabinets. Enquiry yielded that the hinge had broken and could not be replaced. One look at the remaining hinge of the pair showed it to be a standard item (photo 1) at which I opened my big mouth and said: "Who said it couldn't be replaced? It's a standard item." Further insistence by me, and a trip to the local hardware store, produced the same statement. So I said "Let me have it, as I know they are available in Canada."

Back home with the remaining hinge all became clear. The style of hinge was certainly available but the type with those particular dimensions had



been discontinued and replaced by a different one! Why I was not told this in the UK I do not know. This style of hinge is usually fixed to a wooden door with screws, but my problem was different in that the unit has an unchangeable glass door with two holes for the special hinges to fit and clamp onto it.

Now the door was 4,000 miles away! It so happened that I had to make another rush visit a couple of months later and seized the opportunity to note all the necessary dimensions. The change of hinge style meant that at 35mm, the hole in the glass door was too big for the available new hinge

with its 28mm boss. The throw of the new hinge was also less by 3.12mm, so an adaptor piece was required to take up the gap between the hole and the boss and to offset the hinge boss towards the inner door edge. The final version of this adaptor is shown in fig 1 and photo 2. Two new stainless steel front pieces (fig 2) were required to complete the clamping to the door (photo 4).

The resulting assembly is shown in fig 3 where the 5mm (0.197in.) glass door is clamped between two rubber washers (shown dark hatched) as the adaptor, in the rear, nests into the front piece.

The screws, and the blind screw holes in the front piece, are not drawn as these were drilled through using the hinge boss as the jig. Having finally settled all this, the parts were a simple turning job. Fortunately my sister has an adept local handyman in one Jim Morris who had no trouble fixing it all together with a few simple written instructions from me.

The finished result is shown in photos 1 and 3. A happy ending derived out of the afflictions I had brought upon myself; my sister is happy about it too. I hope that any reader who has to undertake a similar restoration exercise will find this information helpful in enhancing the staff side of the family's workshop.



The open cupboard door reveals the unobtrusive fit of the new hinges and adaptors.



The cupboard hinge fitted into the neat adaptor devised to suit the existing glass door.



The neat appearance of the adaptor front pieces which are machined in stainless steel.



With the door closed, all is neat and tidy and the household crockery is protected from dust.

ROAD STEAM

Martin Wallis

reviews highlights of a year of active steaming at rallies and other events up and down the country.

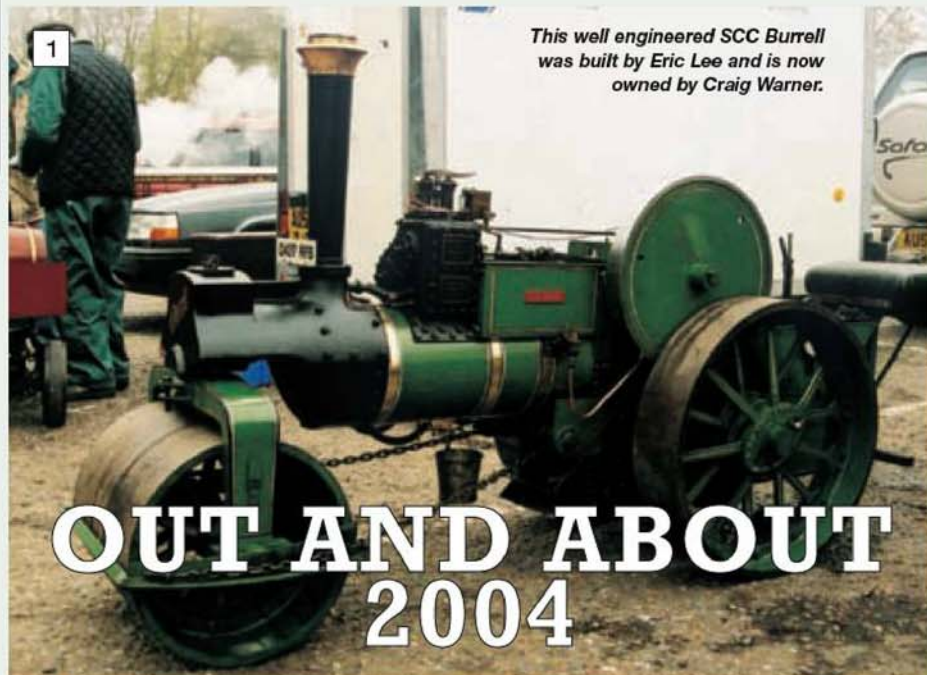
It has been a busy year. As ever there was no shortage of fine models, some making their debut and a few returning to the rally scene for the first time in many years. I suspect however that 2004 will be remembered by many for some spells of exceptionally wet weather and the '50 rarely seen engines' staged by the National Traction Engine Club at the Great Dorset Steam Fair (GDSF) to mark their fiftieth anniversary.

Selecting the photos has been a nightmare and less than one tenth of those taken have been selected. Several spectacular pictures of mud have been omitted; our worthy Technical Editor will remember the Rushden Cavalcade Rally (*Vividly!* - Ed.) my favourite mud picture being a single green Wellington boot abandoned by its owner and left sticking out of a sea of liquid mud. Also set to one side are the prints from two rolls of film devoted to the '50 rarely seen engines' which have been archived for possible future use.

Burrell Museum

The year began with the very popular Burrell Museum Rally and Road Run in Thetford on Easter Sunday. I understand there may now be a waiting list to exhibit at this popular event, which is no surprise as some engines had travelled from as far away as Pickering, Canterbury, and Malmesbury. There were just under fifty models present. Due to an unfortunate fire at the superstore adjacent to the museum their usual car park venue was unavailable but happily an alternative location was found which proved very successful, the road run this year being from the replacement car park to the museum.

A model making its first appearance at Thetford was a very fine 4in. to the foot single crank compound (SCC) Burrell based on a 12 ton roller (photo 1). Craig Warner, who purchased it from Eric Lee, a gentleman who worked for



This well engineered SCC Burrell was built by Eric Lee and is now owned by Craig Warner.

Rolls Royce and has built a number of very fine models, now owns the engine.

Eric made his own patterns for the roller swan neck and front fork, but since a casting for a cylinder in 1:3 scale was commercially available he bought this ready cast. I understand the model had been laid up for a number of years; it was good to see it out again. I thought the classic 'Burrell feel' was slightly dented by the chimney top being in brass rather than copper, but the model was so well put together in all other respects that I feel a little embarrassed to mention it.

Another model, now also a few years old, and making its first appearance at Thetford was the 1:2 scale compound Allchin (photo 2). The model was built by the late Gordon Hudson and made extensive use of W. J. Hughes' well known 1 1/2in. to the foot (1:8 scale) drawings — with the exception of the cylinder and crankshaft. A notable feature on the single cylinder engine is the ample overhang of the crankshaft on the gearing side. This had been retained on the compound model and later adapted to take a third speed gear as may be seen in the illustration. This makes the engine potentially very nippy indeed, so much so that it is possible to travel at a greater speed than the steering can cope with. The engine recently changed hands at the Cheffin's Sutton sale in October 2003 as a consequence of

the previous owner emigrating. Happily the new owner has no great ambition to make full use of the third speed, although since the photograph was taken, a set of vulcanised rubber tyres have been fitted. The Allchin ran very sweetly indeed and is certainly a very fine model.

Also at Thetford was a spotlessly clean and beautifully engineered 1:3 scale Dodman single crank compound traction engine built by Dennis Bussey to the Bob Whitehead design (photo 3). Unlike the Burrell SCC cylinder, the high pressure cylinder is directly above the low pressure cylinder, the result of which is that the valve face and cover are at an angle as may be seen in the photograph. Dennis built the model over four years, including such diversions as moving house and having to re-establish his workshop.

Harrogate

A 'must' for Road Steam enthusiasts is the Harrogate Exhibition, a very popular and highly regarded show. Show organiser Lou Rex does a grand job, and he certainly has a gift for always being cheerful however busy he is. The show this year was wonderful and worth every mile of my near four-hour journey to get there. Lou said he was "exceptionally pleased with the quality and quantity, but most especially with the diversity of the models this year" — as well he should be. He



A half size double crank compound Allchin built by the late Gordon Hudson and seen at the Burrell Museum Rally.



The 1:3 scale Dodman makes a handsome and unusual model. Note the sloping valve cover referred to in the text.



This Ruston Hornsby tractor seen at Harrogate was not a scale model but was great fun and appreciated by visitors.



Chris D'Alquen's half size Garrett 4CD has all the classic lines of its full size prototype. Casting for this engine are now available from Bob Whitehead.

was typically keen to pass much of the obvious success of the event to the "friendly staff and helpful stewards" and the "first class support from clubs and individuals."

Outside the Harrogate exhibition halls was a grand selection of models in steam. It was good to see some non-steam vehicles among them, including a Ruston Hornsby tractor which was in fact a Ruston Hornsby PB stationary engine in disguise (photo 4). The free-lance model was built by Robert Laycock and completed in 2001. It proved very popular and provoked a great deal of interest, certainly an inspiration for those with a stationary engine and the necessary ingenuity. The exhaust sounded just as it should.

Several pictures of Chris D'Alquen's half size Garrett 4CD tractor (photo 5) have appeared in the *Road Steam* column over the years, do you remember his home made foundry and the cast iron hubs he poured with spoke stubs integrally cast in them? Chris then cleverly welded the spokes to these stubs. The engine was steamed for the first time last summer but 2004 saw its first visit to Harrogate. The engine is one of a pair, the other was built in showman's form and was sold to an enthusiast in Newquay.

David Ragsdale's full size Foster 'Wellington' 4 ton tractor *Abigail* caused more than a few gasps amongst the visitors. This was as much due to its beautiful paint finish as its fine mechanical condition. Built in 1904, it has taken ten years to rebuild this engine from the remaining original parts. If you fancy one like it, David can supply you with the castings — details on his website www.ragsdale.uk.com



David Ragsdale's lovely Foster 'Wellington' tractor photographed at Harrogate.

Lastly at Harrogate "You either like it or hate it" was a comment from a fellow spectator regarding Eddy Chapman's recent project (photo 7). Eddy is a prolific engine builder and was exhibiting his latest engine, a 5in to the foot (1:2.4 scale) free-lance engine in bright red livery with yellow wheels. The model was designed for ease of construction, practicality and fun. A chain takes the drive from the second shaft to a 5-speed VW gear box situated under the driver's seat. Since a reverse gear is included in the gearbox the duplex engine has no need of valve gear for backwards running, so none

is fitted. The duplex, i.e. twin-cylinder engine, having the cranks at 90deg., makes the motion self-starting, so it is very easy to drive. What may at first glance be taken to be the reversing lever is in fact the brake, a hydraulic system employing motorcycle disc brakes. The front wheel hubs and tyres are of the 'space saving' variety as used in modern cars and the back hubs and tyres are from farm hay turning equipment.

Whissendine

Whissendine always provides an excellent display of models and has already had a mention in these pages this year, but I should like to add the 3in. to the foot (1:4 scale) Suffolk dredging tractor built by Peter Nixon of Chesterfield DMES to the pictures already published (photo 8). Work on the model began in 1985 using John Haining's drawings and very nearly all of it is fabricated. Peter rallied the model for the first time in late 2003 and it was making its first appearance in steam at Whissendine.

Wood Green

I had heard a lot about Mick Cox's 1:2 scale Foden 3-way tipping Foden wagon and finally caught up with it at Wood Green (photo 9). It proved to be as impressive as expected, the 3-way hydraulic tipping mechanism working exactly as the full size using the feed pump as the motive power. In all respects it was just like the prototype with the exception of the boiler working pressure which was 200psi, compared to the full size 225psi, an understandable and entirely appropriate concession for a model. The weight in working



Eddy Chapman's idiosyncratic engine was designed for ease of construction, and makes good use of modern materials and components.



Peter Nixon's neat little 1:4 scale Suffolk Dredging Tractor was photographed at the Whissendine Rally.



9
Mick Cox is the builder of this fine half size Foden 3-way tipping wagon. Behind can be glimpsed the full size 3-way tipping wagon of Ken Flemmons.



10
The delightful 1:4 scale Atkinson wagon photographed at the Pickering Rally was built by George Buckingham and is now owned by David Smith.



11
Roller models are rare but Brian Harris has converted his agricultural engine to roller specification for this season.



12
Elaine Wood driving her husband's 1:3 scale Burrell. Her husband Kevin was given the model to encourage an interest in steam.

order is 1.25 tons and the wagon is 11 ft. long with 3 speeds provided. The wheels are 'Y'-spoked and fabricated from plasma cut blanks, which were TIG welded together.

Pickering

A high point of the year was my first visit to the Pickering traction engine rally, and what a splendid occasion it was. This year the show had a rather indifferent write up in *Old Glory* (a periodical principally concerned with full size road steam and traction engine rallies) which left me a little perplexed, it is hard to imagine a friendlier bunch of folk than those I met.

Saturday evening of the Pickering rally featured a road run from the rally field into Pickering itself. This proved to be a splendid occasion, the police simply closed the road and a multitude of models from the smallest 1:4 scale wagon to the largest half-size showman's engine took to the Tarmac and off they all went. The whole of Pickering seemed to have turned out to see the spectacle, lining the pavements, both standing and sitting. Those sitting were on the kerb stones with their feet out in road, a very informal and welcoming sight, indeed the centre island of the roundabout on the way into Pickering was quite a sight, completely smothered by onlookers with happy faces. My clearest recollection is of a very smart police lady standing in the middle of the road directing the traffic — which consisted of models of every conceivable size and type, plus one steam motor cycle, at least four vintage pedal bicycles, and an invalid carriage complete with an elderly lady. I think the latter was a resident of Pickering

who was as surprised to be surrounded by steam miniatures as the miniatures were to have gained an invalid carriage!

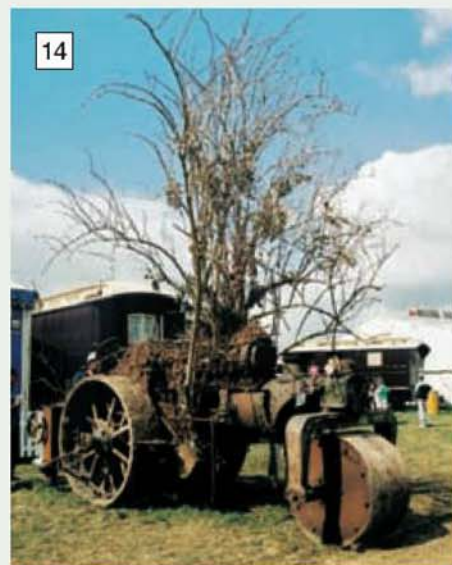
Perhaps the model on the road run that impressed the crowds most was the beautiful 1:4 scale Atkinson wagon (photo 10) built by George Buckingham and now owned by David Smith. The model had previously won awards at Donington in 2002 and Harrogate in 2003. It ran every bit as well as it looked.

There has been rather more discussion on the rally fields than usual this year regarding the conversion of full size steam engines. The reason was the Road Locomotive Society's publication in *Old Glory* of a complete list of engines that have been converted away from the use for which the engine was originally designed and built. A quick glance at the list confirms the move is almost exclusively one way, the end result being more showmen's engines.

The most contentious, and the most common, conversion is from a steam road roller to a showman's engine. There are strong views that the surviving engines which we are so fortunate to have had passed down to our generation, that have already outlived their makers and probably numerous owners, should be preserved in as near 'as built' condition as possible. Many fine rollers have already been lost, surely cutting the hub out of a steam roller wheel and re-manufacturing it to road locomotive proportions shows no respect for history at all.

Readers are quite correct in surmising that the subject of 'conversions' touches a nerve, the loss of so many rollers is indeed very sad. So far 114

steam rollers have been converted, which by any standards is no small number. It is therefore cheering to include photo 11 which is a 1:3 scale Foster agricultural engine which has been converted to a roller. The engine was built by Brian Harris some five years ago, and he has converted it to a roller for this year's season. A new set of wheels were made in the usual way, the front fork was assembled from box section, and the swan neck was rolled from 8mm plate.



14
A roller of indeterminate make in the as-found condition complete with 'camouflage'.



David Everson's fine Burrell crane engine photographed at rest at the Lincoln Rally.



The City of Gloucester Folk Museum's roller 1 Ton was built in 1933 for rolling private gravel paths.



A bare boiler for an Aveling and Porter steam roller, which has been the subject of extensive restoration.



Our contributor Tony Webster gives his Fowler wagon an airing at the Old Warden Country Fayre.

The original set of wheels has been retained making it a true convertible. Brian speculated that he would keep it as a roller for a while since roller models are unusual, but in due course intends to put the original wheels back on and re-rally it as an agricultural engine.

What does your partner buy you for Christmas? I usually get a tie, perhaps a few pairs of socks, or a shirt or two. Have you ever been bought a 1:3 scale Burrell, brand new, with

all the boiler certificates, straight from the makers (photo 12)? Well it does happen, the lucky chap was Kevin Wood and the model was purchased from John Rex by Kevin's wife Elaine in 1999. Elaine has a long standing interest in steam, her father being a well thought of coal merchant, through whom Elaine had the opportunity to regularly steer the full size scenic showman's engine *Quo Vadis*. It would not be too far amiss to say that Elaine became the 'coal consultant' for *Quo Vadis*, her dad providing a rather better product than that to which the engine was usually accustomed.

Lincoln Rally

After Harrogate came the Lincoln rally which is always excellent for models, the metalled roads being ideal for driving around. An unusual and well turned out model was the Burrell SCC crane engine (photo 13) built by David Everson, a machine tool merchant. The model took three years to build and the work included all the pattern making. The working pressure is 180psi. and the model weighs between 13 and 14 hundredweight.

Great Dorset Steam Fair

Reducing a show like the GDSF to half a page is of course daft but space dictates thus. One of the pictures has to be from the 'fifty rarely seen engines' and the single-cylinder roller owned by the show organiser Michael Oliver, complete with tree, is the one (photo 14). Removed from his back garden and exhibited in 'as found' condition it was quite a spectacle.

The other GDSF illustration is something

completely different, a unique steam roller built in 1933 by Arthur Trotter of Coleford to roll the gravel paths around his house (photo 15). The engine unit is thought to have come from a Clarkson steam bus made in Chelmsford in the very early 1900s. The boiler is of a simple design with just one cross tube and was made by Tom Goodhand of Gillingham in Kent. The vehicle appears to be called *1 Ton*, which is its presumed weight, and was bequeathed to the City of Gloucester Folk Museum on Mr. Trotter's death.

Other memories

It is not often that you have the opportunity to see a full size boiler removed from an engine but one was photographed during my travels (photo 16). Nice to see the special Aveling and Porter mounting designed for a flat bottomed cylinder casting.

I have met Tony Webster, who is presently so ably writing up the Fowler wagon within these pages, several times but only fleetingly at exhibitions. Happily our paths crossed at the Bedford Traction Engine Club Rally at Old Warden and we were able to chat at length. I have admired the wagon numerous times but have never seen it in steam. I am pleased to report that it runs beautifully, and Tony's colour co-ordinated boiler suit and removals container certainly looked the part (photo 17).

My last photo is of a 5 ton Foster wagon, works number 14470, type W completed in March 1921 (photo 18). This is just to prove that not all wagon prototypes out there are Fodens. Wouldn't this make a fine model engineering project?



Not all wagons were Fodens. This Foster would make a good prototype for a model.



A straight tool holder in use on the South Bend lathe. The main pillar is attached to the top slide via the T-slot machined by the manufacturers.



A 30deg. tool holder in use on the Author's Myford Series 7 lathe. This type of tool holder gives improved access on certain classes of work.

A VERSATILE PILLAR TOOL POST

A. N. Eastwood

suggests an adaptation of an old design particularly suited to the amateur's lathe.

●Part I

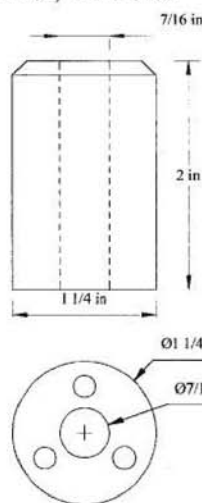
Almost all jobs in the lathe require at least one change of tool, and when I bought my (second-hand) Myford Super 7 it came with a four-tool turret. This, I thought, would be the answer to the problem of frequent tool changes. My excuse for this naiveté is that it was more than twenty-five years ago and I was new to model engineering. Experience soon taught me that whichever tools were used for any particular job, the next job needed different tooling. I made a second four-tool turret, interchangeable with the Myford original, but have always found that such turrets have major disadvantages.

Individual tools are limited to $\frac{5}{16}$ in. square, sharp points stick out in all directions, tools sometimes get in the way and have to be removed, and shim packing is required. The ideal solution is a quick-change tool post system, but a set with only four tool holders leaves little or no change from £100, and four are nowhere near enough. I now have a 9 in. South Bend lathe in addition to the Myford and made a system for it with a total of 20 holders based on a commercial design. Such a system requires very accurate machining and would be difficult for a beginner.

Many years ago small Drummond lathes were fitted with a pillar tool post which I believe was a patented design, although any patent will have expired long ago. In essence, the design consisted of a $1\frac{1}{4}$ in. dia. pillar cast integral with the top-slide. Tool holders about 2 in. wide by $1\frac{1}{4}$ in. thick were bored to a good sliding fit on the pillar and slit vertically so that they could be clamped firmly to the pillar by means of a $\frac{3}{8}$ in. dia. bolt. As supplied, the tool holders had no method of repeating the correct height adjustment if removed and replaced. I drilled mine and tapped them for a $\frac{1}{4}$ in. dia. adjusting screw. One of these original Drummond tool holders can be seen in the photograph showing the set of parts.

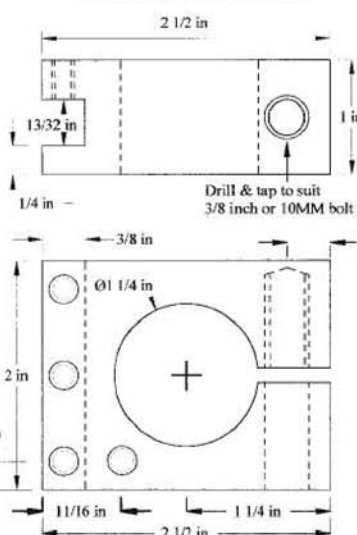
PILLAR TYPE QUICK CHANGE TOOLPOST SYSTEM

Pillar, Mild Steel



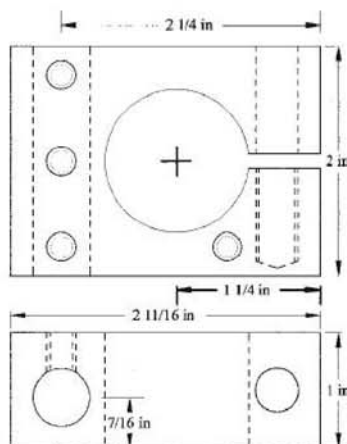
See text for spacing of three $\frac{3}{16}$ in. holes in base of pillar.

Standard Tool Holder



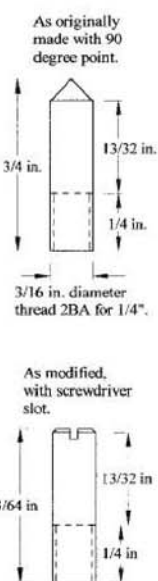
Boring Tool Holder

Shown to suit $\frac{1}{2}$ in. diameter boring bar



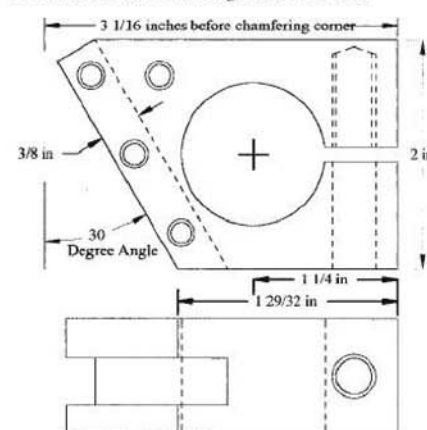
Topslide Dowels Three required.

(Shown twice full size)



30 Degree Tool Holder

Two can be cut from a 5 inch length of 2 x 1 inch steel

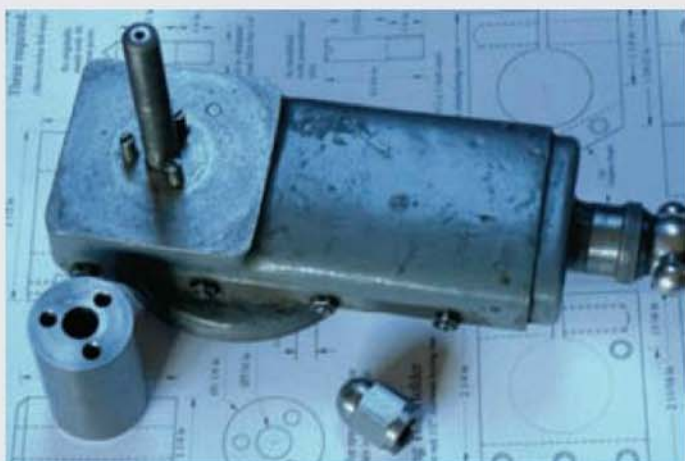




Some of the parts in the outfit. Shown is the Myford top slide, parts for the South Bend lathe, some tool holders and a modified knurling tool.



The main pillar fitted to the Myford Series 7 top slide showing the acorn nut which cleans up the appearance and helps prevent cut hands.



Another view of the Myford top-slide, this time with the pillar removed and showing the three dowels that prevent the pillar rotating.



Cutting the screw driver slot in one of the dowels using the horizontal milling machine. Carefully used, a hacksaw would do nearly as well!

In adapting this design to the Myford lathe it is vital that the post is prevented from rotating relative to the top slide; simply clamping it down with the Myford tool post stud and nut will not do. It can be argued that if the pillar can rotate it can save the tool in the event of a 'dig in'. My view is that since the forces acting on the tool point in most turning situations may tend towards unscrewing the securing nut it is best to prevent rotation. In any event you do not want the pillar to move when you are using a parting tool, or when you are screw cutting. Fortunately Myford provide three 2BA tapped holes in the top slide to fix the ratchet used when a four-tool turret is fitted; these can be used to secure the pillar against unwanted movement.

Provided that you bore the tool holders to a good sliding fit on the pillar they will clamp to it very tightly and will not move in relation to it. The good fit is essential, as any slackness will result in excessive force being required to close the tool holder onto the pillar. I originally used 8mm socket head cap screws for clamping, and some photographs show the tool holders in this state. The short length of a standard Allen Key means that little leverage is available, relative to the use of a bolt and ring spanner. I have now converted the holders to use M10 x 40mm bolts for clamping, and consider them superior in use, especially as the appropriate ring spanner hangs on a hook by the lathe and does not tend to get hidden by the workshop gremlin.

The system described below can be made, with sufficient tool holders, for about the same cost as a single four-tool turret, or a couple of



One of the straight tool holders in use on the Author's Myford lathe. The height adjustment screw and M10 locking screw can be clearly seen.

spare tool holders for a commercial system. It is important to appreciate that this system will give accurate and repeatable tool height adjustment, but it will not provide repeatable tool point positioning in respect of tool angle and workpiece diameter. This would be a disadvantage if much repetition work was to be undertaken, but for most amateurs the simplicity of construction of this system will outweigh any disadvantage. Even this disadvantage can be overcome if the system is made for a larger lathe, such as a Boxford or South Bend.

Construction

Use a length of $\frac{3}{16}$ in. mild steel to make three dowels as shown in the drawing. The points should have an included angle of about 90 degrees. The 2BA threads must be put on with a die held in an accurate tailstock die holder, as the dowels must stand perfectly upright when screwed into the top slide. If any dowel has a 'drunken' thread, discard it and make a new one. Set the dowels to one side and cut a piece of $\frac{1}{4}$ in. dia. steel long enough to clean up to a finished length of 2 inches. A shorter pillar would suffice but as the Myford tool post stud is about 2.675in. long and should not be removed or shortened, a two-inch pillar can be secured with a neat domed nut as shown in the photographs.

Face the top end of the pillar and machine the 45deg. chamfer, reverse it in the lathe and face the bottom end to length. Centre drill, and drill through, finishing with a $\frac{7}{16}$ in. reamer for a close fit on the stud. Now remove the Myford toolpost and screw the three dowels into the 2BA tapped holes in the top slide. Adjust them so that they all stand to the same height, and all touch the pillar when it is placed over the stud. Put a tubular spacer on top of the pillar and give it a sharp tap with a hammer. This will mark the underside of the pillar in three places. Centre punch each mark as accurately as you can. Pick up the centre punch marks with a small centre drill in the drilling machine, then drill each hole $\frac{3}{16}$ in. dia., about $\frac{1}{2}$ in. deep. Do not be tempted to fit the pillar into place at this stage; you might not be able to get it off again!

●To be continued.



The diamond-shaped Lima-Hamilton plate fitted to steam engines built after the amalgamation of 1947.



Some of the patterns used to cast Baldwin builder's plates after 1944. Not all are for steam engines.

NORTH AMERICAN STEAM LOCOMOTIVE BUILDER'S PLATES

Eric Ellis

closes the series with an addendum of snippets of further information.

●Part VIII continued from page 580 (M.E. 4234, 12 November 2004)

One of the things I have learnt about railways over the years is that, if you publicly claim to know some fact or other about the subject, there is always someone who knows different to you. Furthermore, they are often right, and may well have been waiting for that very moment to pounce.

To my surprise, no one has yet upbraided me over parts I to VII of these articles, but additional information and photographs have come to light; at times just too late to go into print. I suspect that this too is not uncommon when writing about railways. Hence, I offer this addendum to bring the series up to date.

Lima

(Refer to part II, M.E. 4224, 25 June 2004). First, rod (conventional) locomotives did not all have rectangular plates fitted up to 1916. Prior to about 1907 round plates were used for some years. It is possible that both rectangular and round plates were used before that year, but whether this was the case is not known.

Secondly, photo 1 shows the Lima - Hamilton diamond fixed to late steam builds, after the amalgamation of 1947. A Louisville and Nashville



Norfolk & Western Railway's Roanoke Shop was once known as the Roanoke Machine Works.

M1 2-8-4, an example of the Super Power concept of 1925, carried this plate. Lima - Hamilton built only 27 more steam locomotives before leaving the market in May of the same year. Curiously they were all 2-8-4s. Many had working lives of less than ten years.

Baldwin

(Refer to part III, M.E. 4226, 23 July 2004). Photograph 2 here illustrates patterns used in the casting of various Baldwin builder's plates after 1944. At top left may be a steam order — the date is difficult to make out; at top right an extra order used in steam days for spare boilers; at

bottom left a diesel-electric — note the addition of Westinghouse; at bottom right a part view of a BLH plate of 1954. The instruction written on to "insert construction number plate here" shows that savings were made in pattern charges by using the same backing but different numbers. The blanks in the two left hand plates tell the same story. Whether the 'steam' plates were cast flat and rolled is difficult to tell. They may have gone onto smoke deflectors.

Canada

(Refer to part IV, M.E. 4228, 20 August 2004). Canadian Pacific Railway (CPR) had three shapes of home build plates:

- 1: Oval, locomotives built at De Lorimier 1883-1884, and fixed to dome or smokebox.
- 2: Rectangular, with scalloped corners, the same as the Canadian Foundry, built at De Lorimier 1886-1904 and fixed to valve chests.
- 3: Rectangular, built at Angus 1904-1944 (see part IV, photo 1) or rebuilt there, that word being cast in. Photographs exist of locomotives with (2) and (3) fitted. Also, not only did Montreal Locomotive Works use the standard CPR layout as per type (3), but other contract builders followed suit e.g. Canadian Locomotive Company, and North British Loco, Glasgow.

Home builds

(Refer to part VI, M.E. 4232, 15 October 2004). Norfolk & Western Railway's Roanoke Shop had



The plate from a Great Northern Railway Class R2, 2-8-8-2 constructed in the company shops in Washington State.



The plate from a Rogers 4-6-0 locomotive built in 1897 for the Mobile & Ohio Railway.



The reverse of the plate shown in photo 5. The unusual details mentioned in the text and included to facilitate mounting can be seen.



The plate from a New York Locomotive and Machine Works loco. They were later called the Rome Locomotive and Machine Works.

previously been Roanoke Machine Works, and a plate from there in photo 3 exhibits the similarity between the two styles. Note, however, the difference in the position of fixing holes, and the lack of a class cast in the RMW plate from a 'G' 2-8-0.

Most powerful

It may come as a complete surprise to many to know that the most powerful simple articulated steam locomotive on a purely tractive effort basis was not a Big Boy, nor an Allegheny (nor are we talking compounds worked in simple mode). That accolade goes to the Great Northern Railway Class R2 2-8-8-2s, at 153,000 pounds force. Photograph 4 is of a plate from one of them, constructed at the company shops in Washington State in 1930. GNR rebuilt many locomotives, including changing wheel arrangements, and also built some new. Created by James J. Hill, their track ran from Duluth and St. Paul westward to the Pacific at Seattle, was the most northerly of American 'trans-continental', and had branches into Canada.

Contractors

Returning now to contractors, two plates, photos 5, 6, and 7 from Rogers and Rome, are from companies with histories as different as could be. The first was founded in 1831 by Thomas Rogers, started on locomotives in 1837, survived slumps and financial panics in the 1850s, 1870s and 1890, and built 6,300 engines. They were second only to Baldwin at times. They had a good reputation, joined Alco in 1905, and yet were the first of the ten Alco plants (including MLW) to close (in 1913).

There never was main line rail access to the plant in Paterson, New Jersey, which obviously limited the size of its products. Rogers' plates were originally round, then rectangular with rounded, scalloped or square corners and finally took the standard Alco form. The particular one shown (from a Mobile & Ohio 4-6-0 of 1897) in



The plate cast for a rebuilt Lake Superior & Ishpeming 2-8-0 locomotive.

the two photos is interesting because the top 'flange' of its hollow back is deeper than the bottom. This meant that the plate would have been fixed with the bottom on the horizontal centre line of the smokebox to make sure the front face was vertical, and that was done presumably to facilitate whatever it was that necessitated the semicircular cut-out. Possibilities include a hand rail bracket, a small bore pipe entering the smokebox, or even a brace for the pilot (buffer) beam, but whether both sides were the same is not known.

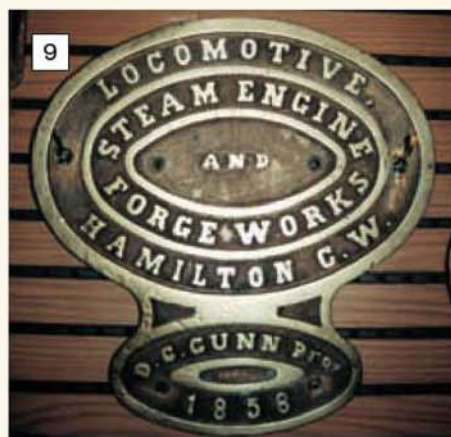
The second, founded as New York Locomotive Company in 1881, changed its name to Rome Locomotive and Machine Works in 1893, and built around 700 locomotives, most in the first ten years. At times rather wobbly financially, they flared like a struck match in the beginning, burnt slowly, and finally fizzled out quite quickly as far as new engines were concerned. Rome is not that far from Schenectady (about 80 miles), which may have had something to do with this situation.

Schenectady Locomotive Works was under the control of a powerful family from 1851 to the formation of Alco in 1901. Father and four sons ran the company; they were very forward looking and managed the firm well to boot. Like Rogers, it survived financial panics, and eventually became the dominant plant in the Alco family. Both Rogers and Rome illustrate the contrasting fortunes and the 'feast or famine' nature of the business of engine constructors at that time.

Finally

Just to prove that the building of steam locomotives, or more accurately rebuilding, is not all over quite yet, take a look at photo 8. This is an attractive design and the sole example made of aluminium alloy for the rebuild, completed in September 2004, of an ex-Lake Superior and Ishpeming 2-8-0. Several of these were sold out of LS & I service when they finished with them in 1962/3, very late for North American steam traction. The short line, in the upper peninsular of Michigan, bordered on the southern shore of Lake Superior.

I have left the last builders plate of all in the series almost to the end, and it really is a gem. Daniel C. Gunn was the owner of an early works in Hamilton, at the west end of Lake Ontario, Canada.



A rare plate from the company of Daniel C. Gunn based in Hamilton, Canada.

The plate was positioned between and above the driving wheels of its engine, as described briefly in the introduction to part I (M.E. 4222, 28 May 2004). C.W. stands for Canada West. This was the name of the area used before various parts of the country came together for confederation in 1867, to form the Dominion of Canada, which in itself became the later trigger for the building of the Canadian Pacific Railway. Photograph 9 illustrates what is an unusual survivor.

Finally, I simply could not resist including (photo 10) what is not a builders plate at all, but the front number from an example of the class that surely was the 'omega' of successful steam locomotive designs in looks and in operation, in North America. Introduced in 1945 and like so many other modern engines the world over, having a ridiculously short life, it is of course, a New York Central Class S1b 4-8-4 Niagara. Shed a tear, people, shed a tear.

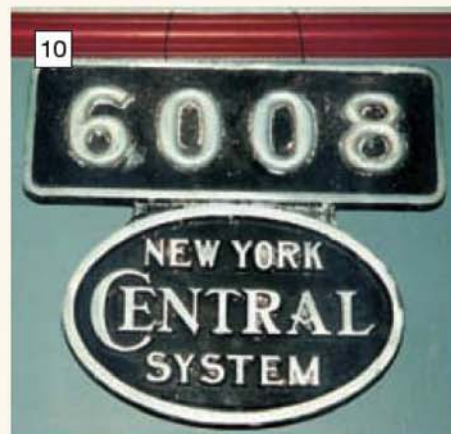
Acknowledgements

My special thanks for the photographs in this article go to Alan Miller, and also for putting up with my requests for information, which he answered with commendable alacrity and patience. Sources were many including:

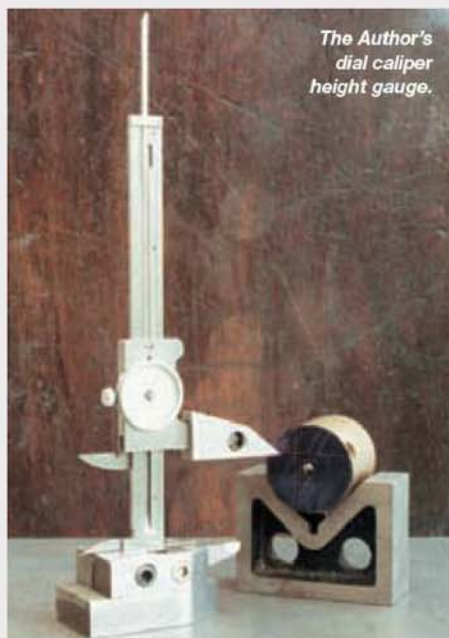
- 1: *A Short History of American Locomotive Builders in the Steam Era* by John H. White, Jr.
- 2: *Guide to North American Steam Locomotives* compiled by George H. Drury, published by Kalmbach.
- 3: *Canadian Pacific Steam Locomotives* by Omer Lavallee.
- 4: *Lima The History* by Eric Hirsimaki.

All four books are first class and can be recommended to anyone with an interest in North American steam locomotives.

Undoubtedly there are gaps and errors in these articles. I would be pleased to hear from anyone who could expand or correct my knowledge.



The front number plate from a New York Central Class S1b, 4-8-4, Niagara locomotive.



The Author's
dial caliper
height gauge.

A HEIGHT GAUGE FROM DIAL CALIPERS

For the blade I used a silver-soldered sandwich of $\frac{1}{8}$ in. thick gauge plate. The outside profile was left approximately $\frac{1}{64}$ in. oversize for cleaning up after soldering. The important surfaces are those marked parallel on the drawing. The inner surface clamps against the sliding arm of the dial caliper and the underside of the plates should be parallel to the base. The internal profile of the blade assembly is a close fit to the profile of the dial caliper sliding arm — the better the fit the more rigid the scribing blade is in use.

The edges of the sandwiched piece were chamfered $\frac{1}{32}$ in. at 45° , cleaned and coated with flux, then clamped up with 8BA nuts and bolts. The joints were silver-soldered and allowed to cool slowly. The outside was then milled to size after filing away the nuts and bolt heads. It is important to ensure that the inner surface of the blade is parallel to the lower surface when doing the final machining.

The $\frac{5}{16}$ in. dia. through hole is to clear the nose profile of the moving arm of the dial caliper. The dimension for positioning this clearance hole must be determined on assembly to suit the instrument concerned. When I silver-soldered the three-piece sandwich, an accumulation of solder within the inner profile resulted which was too difficult to remove by filing. The easier solution

was to drill through $\frac{5}{16}$ in. dia. and give clearance around for the nose profile. The blade now fits snugly on the sliding jaw of the dial caliper.

To finish, I hardened the tip of the blade by heating it to red heat and plunging it in oil. All the surfaces of the blade were then finished by lapping on an oilstone. A refinement would be to attach a hardened blade to the underside of the existing design with screws and leave the silver-soldered assembly soft.

My blade is clamped to the dial caliper with a 2BA grub screw, but I have shown a 4BA screw on the drawing. In my case, the dial caliper was clamped to the base using $\frac{1}{4}$ in. cap head screws to be replaced when $\frac{1}{4}$ in. grub screws are to hand. Soft pads under the clamp screws prevent marking the dial caliper.

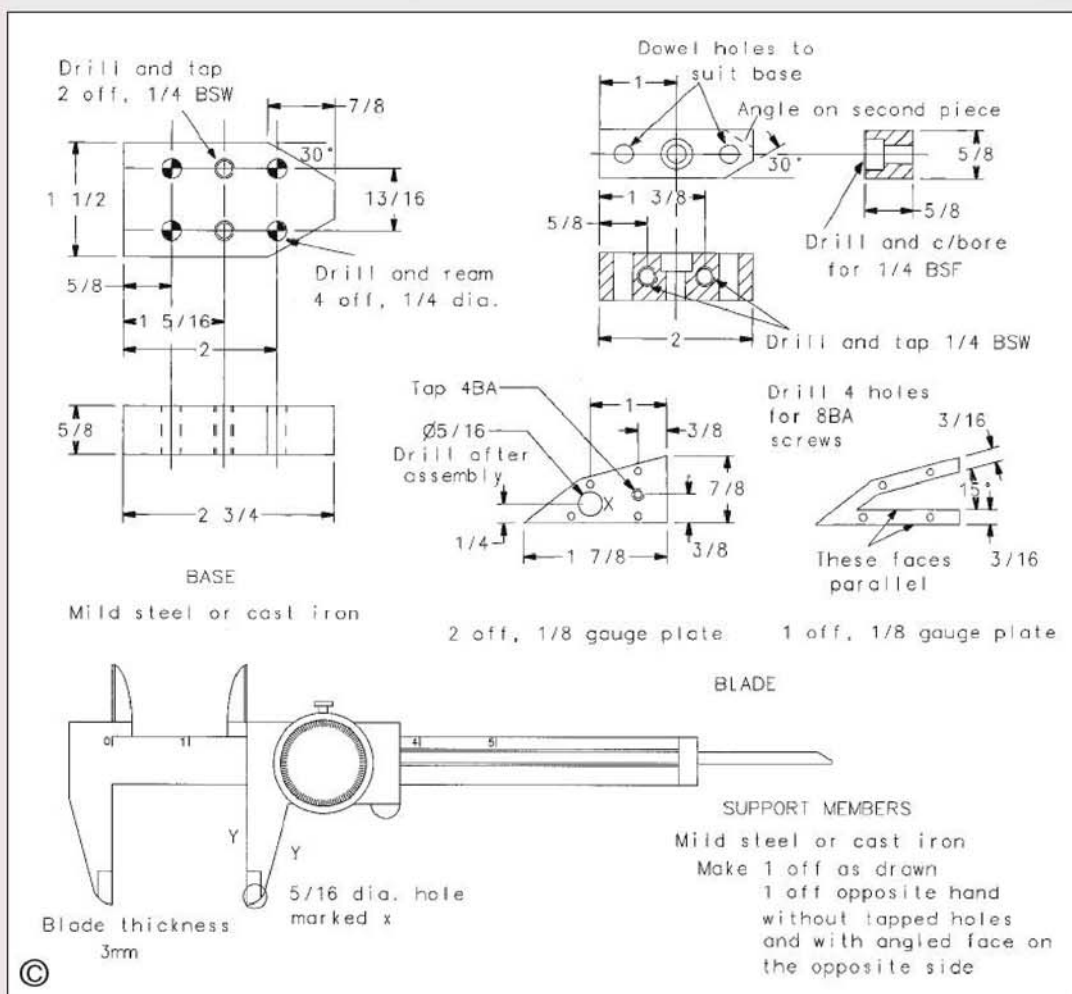
While it may appear an 'ugly duckling' of a tool, it functions well and has proved to be a good substitute for the real thing. Of course the blade cannot be brought to a zero position touching the marking out table. However, this is not a major problem as most marking out is done from a datum on the workpiece anyway. I find it best to touch on the datum and note the setting of the caliper. Successive dimensions can then be tabulated using a calculator to help with the arithmetic.

George L. Crook
describes an inexpensive tool
designed to add luxury to
marking out operations.

It is often said that "necessity is the mother of invention"; well, I was recently forced to consider the purchase of a height gauge. As I grow older I have lost my marking out skills on castings using a scribing block and rule. Holes that should have been within 0.005in. were appearing 0.015in. out of position. This is okay perhaps for a $\frac{3}{8}$ in. dia. hole but for 10BA tapped holes the errors were just unacceptable.

Years ago, when apprenticed in the Experimental Department at Bristol Engines, one of the standard tools in use on the marking out tables were the beautiful Chesterman height gauges, now financially well out of reach for me today. I scratched around and eventually decided that it would worth adapting my dial caliper gauge. A rummage in my scrap box and seven hours work produced my 'poor man's height gauge'.

Since it was available, the base and two side members were machined from a piece of cast iron but mild steel would have been equally suitable. The first assembly operation was to fit one of the side support members to the base, aligning the 30° angled cutaways. The $\frac{1}{4}$ BSW cap screw hole was then drilled and tapped followed by the $\frac{1}{4}$ in. dia. dowels. To help position the second support block, the arm of the dial caliper was clamped between the two blocks, then the second $\frac{1}{4}$ BSW and pair of $\frac{1}{4}$ in. dia. dowel holes were made.



FOR YOUR BOOKSHELF

CLOCKMAKING FOR THE MODEL ENGINEER

by Colin Thorne

Published by

Camden Miniature Steam Services

ISBN 0-9547131-1-7

Price £13.95 (UK p&p included)

I think it was the late George Thomas who mentioned in one of his articles in *Model Engineer* that he had taken a tour around the UK in order to visit like-minded friends in the model-engineering world. He found a large proportion, which had previously been recognised for their expertise in making models of one sort or another, were busy making clocks. There can be few model engineers who have not been drawn to the possibility of building a clock at some point in their lives. If nothing else, the methods employed by clock makers can often be used to advantage in model engineering.

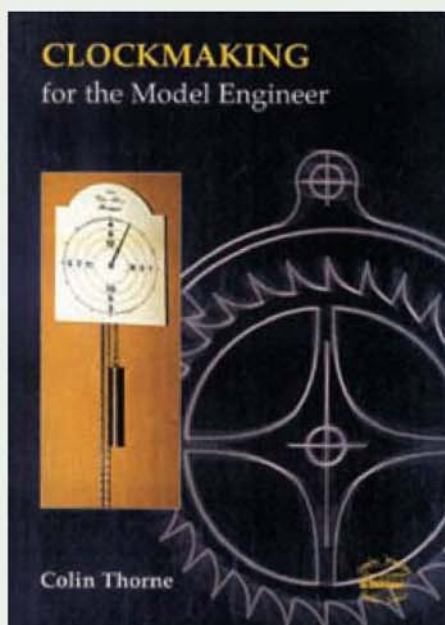
This book is aimed at the model engineer who wants to make a clock but is apprehensive about how to go about it and unsure about the special tools he might need. It is intended as an adjunct to the author's *Plans for Clockmakers* series of clock and horological tool workshop drawings. It is designed to assist the skilled model engineer, who needs no introduction to workshop processes, to make the transition into the world of horology.

The book is a relatively slim, soft-backed volume of A4 size with some 88 pages. However, its coverage is remarkably comprehensive and the reader is gently led through the various component parts of basic timepiece movements and the means employed to make them.

Following a preface and introduction, the author explains how to make the clock plates and the various types of pillar used in popular patterns of clock. Then come barrels and clickwork, springs and weights and maintaining power. We are then introduced to the fusee, stopwork arbors and pivots. This leads to the use of the clock maker's throw, pivot polishing and the Jacot tool. Wheels and pinions are described with just enough theory for understanding, and a practical method of producing an accurate division plate is explained. The making and fitting of wheel collets is then covered followed by pinions, including a dividing head for pinion cutting, and escapements. There are then instructions on constructing a pendulum, including some timely remarks on safe working practice, the motion work, hands and dials. The method of obtaining a professional looking silvered dial is given together with notes on casework and finishing the clock. Finally the tyro is given advice on assembling the clock, oiling the mechanism and putting it 'in beat'.

Well illustrated throughout with diagrams and black and white photographs, this book is provided with useful appendices giving further theory on clockwork mechanisms, a bibliography, material suppliers, and drawings for a Benjamin Franklin clock — an ideal project for the beginner.

As someone who has studied clock making for



some time, mainly with a view to using its methods to do other things, I found this a useful addition to the available literature and more easily read than some of the existing text books on the subject. I am sure it will serve its intended purpose admirably and many would-be clock makers who read this work will be persuaded to take their first steps into this fascinating hobby.

Clockmaking for the Model Engineer (ISBN 0-9547131-1-7) by Colin Thorne is published by Camden Miniature Steam Services, Barrow Farm, Rode, Frome, Somerset, BA11 6PS; website: www.camdenmin.co.uk at £13.95 inclusive of UK post & packing. *Neil Read.*

MILLING A COMPLETE COURSE

by Harold Hall

Published by Special Interest

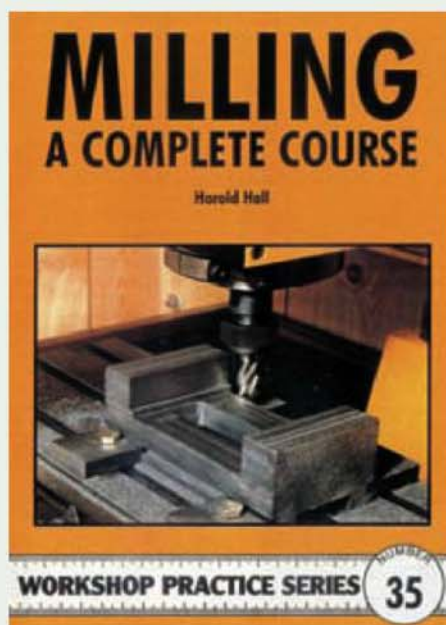
Model Books Ltd.

ISBN 1-85486-232-4

Price £7.95 (UK p&p included)

This book is written by Harold Hall and is a companion volume to his *Lathework - A Complete Course* (Workshop Practice Series No. 34). No. 35 in the *Workshop Practice Series*, the aim of this book, as set down in the preface, is to turn the newcomer to the milling machine into an experienced beginner. As with the book on lathework, this is accomplished by guiding the reader through several projects which not only provide an introduction to the milling process, but also furnish the diligent reader with a number of useful tools that can be used to expand the scope of his machine even further.

The book's 144 pages are divided into twelve chapters. Chapter one gets the reader started by describing some of the equipment needed and introducing him/her to the differences between some of the cutters used. Chapter two covers the making of some T-nuts, which are vital if work pieces are to be securely fastened to the machine table. Chapter three follows up with a description of a handy angle plate. Chapter four shows how to make some simple but effective clamps. These items are then used together in chapter five to machine a set of parallels. These simple projects provide the reader with the basic tool kit needed to undertake more advanced work.



Chapter six explains how to make an offset boring head. This is of simple and strong design and is used to good effect in chapter seven where it is utilised in the machining of a simple dividing head. Chapter eight describes a grinding rest for the off-hand grinder. This may seem to have little to do with milling, apart from being an interesting exercise, however all is revealed in the ensuing chapters. Here we are introduced to a number of accessories for this rest culminating in the description of making and using a milling cutter grinding fixture. All the drawings are clear and the methods used to make the parts well illustrated with good black and white photographs.

The process of milling has been neglected to some extent in literature aimed at the amateur worker. There are, of course, companion books on vertical milling and milling in the lathe in the *Workshop Practice Series*, but this latest work goes a long way towards filling some of the gaps. It also tackles head on the issue of how the amateur can sharpen his own cutters and describes equipment for doing it. I realise that other solutions are available, including the Quorn tool and cutter grinder, but further debate on the techniques to use is never amiss. A number of the set-ups used by the author are novel and worthy of note.

Some readers may be concerned about using their workshop to 'make tools' but there can be little doubt that it is a good way of improving both your technique and your tool kit. If you wish to take a short cut by buying an angle plate or boring head then that is up to you. The techniques described in the book are still worth reading about.

If I have a criticism of the book it concerns its title. To claim a work is 'complete' is rather bold. The Cincinnati Milling Machine of the USA published a treatise on milling and milling machines many years ago. My own copy dates from the 1960s and runs to 900 pages. I do not suppose for one minute it covered everything about milling then and certainly does not do so now. Perhaps the title *Milling - an Introduction*, would be more appropriate. However, before I am accused of nit picking I will add that this book is a good read and excellent value for money.

Milling - A Complete Course by Harold Hall ISBN 1-85486-232-4 is published in A5 paperback format by Special Interest Model Books Ltd., Stanley House, 3 Fleets Lane, Poole, Dorset, BH15 3AJ; tel: 01202-649930; fax: 01202-649950; email: chrloidd@globalnet.co.uk *Neil Read.*

David Lloyd-Jones

offers some advice on using this relatively new technology.

Most, if not all magazines now accept digital images as so many contributors are using this modern method of photography. New skills have to be learnt, one of which is how to correctly submit digital images to a magazine for possible publication.

Introduction

As digital cameras have become more and more popular, many railway enthusiasts and photographers are now submitting their images in digital format for possible publication in specialist magazines. It is only relatively recently that many magazines have actually started to accept digital images. One of the main reasons for this is not for the lack of well-composed and newsworthy images, but for the fact that the earlier digital cameras did not have sufficient resolution and level of detail to reproduce well in a magazine. In fact, many excellent digital pictures have been rejected due to this simple reason. How the contributor sent digital pictures to the magazine was another reason their pictures did not appear in print. Poorly printed digital images, being supplied in the wrong format, and those sent by e-mail were the main culprits.

However, improvements in the technology and rapidly increasing digital camera ownership has led to nearly as many digital images landing on editor's electronic desktops as traditional photographic slides and prints.

Many photographers have been seduced by digital technology and many more will be as improvements in cameras are accompanied by falling prices. Of course, there will always be the die-hard silver halide film users who will never ever be converted to digital despite being slightly curious of this new medium — although they are never likely to admit it.

In reality, the actual picture taking process is still exactly the same regardless of the type of camera you use. This usually involves trekking for hours in the rain to an ideal location, jostling for position with a hundred other keen photographers to get an ultimate shot, followed by a long trek back to the car afterwards. It is how you deal with the pictures afterwards, once you have returned home, which counts.

Traditional film users develop their slide or print films either in their own darkrooms or use a commercial film processor. Digital photographers download their images into a computer. Traditional film users burn, dodge and use cropping techniques to improve their images, digital photographers use image software such as *PhotoShop* to produce the same results. Of course, traditional film users frequently accuse digital photographers of manipulating their images, but that is what traditional film users have been doing in the darkroom since the dawn of photography, with the use of airbrushes, selective cropping, etc. *PhotoShop* is a digital darkroom with all the tools that a traditional film user would have at his disposal.

The only difference is that picture manipulation is a lot easier with digital technology and, in the past, the misuse of this has given digital

How best to please the Editor! Taken with a 5 megapixel single lens reflex camera with a touch of fill-in flash, the rods are set right, the folk look cheerful, the image is not only sharp and full of detail, but also meets his designer's 300dpi requirement. Supplied with minimal compression, the jpeg file size is a manageable 1.4Mb.



DIGITAL IMAGES

photography a bit of a bad name. A well-composed and properly exposed photograph in any medium needs no manipulation.

Up the resolution!

The key to digital photography and getting your pictures into print is supplying an image to the correct pixel size and resolution in a format that can be easily opened on another computer. For success you need to understand the customers (specialist magazine editor's) needs and requirements for submitting digital images. Many magazines now include brief information on submitting digital photographs in the contents section. If in doubt, call or e-mail the editor and ask if digital images are acceptable and in what size and format they are required.

A big turn-off is to just send a massive 5 megapixel image to a magazine 'on spec.' by e-mail. Not only does it take ages to send from your end, especially if you're using a standard 56k modem, it also clogs up the publisher's e-mail and frequently many companies now have electronic security systems in place to halt and delete unsolicited e-mails over 1 mega-pixels. Always check first before sending large images as attachments to e-mails.

Digital rule of thumbnail

If you want to send images by e-mail for a magazine editor to view, send small thumbnails of the images first. These should ideally have a pixel size of about 120 x 90 (approximate file size of 32k), which will give the Editor a rough idea of what images you have. You will then be contacted if high-resolution image(s) are required, and you will be advised how to submit them to the magazine. Preference is likely to be to have them on a CD-ROM disc, but an e-mail may be required if the subject matter is urgent. A problem with e-mail is that a small proportion of the image's resolution and detail level can be lost during electronic data transfer.

'Burning' your images

The key to submitting digital images to magazines is to invest in a CD writer to 'burn' images on to a CD-ROM disc. Many new computers are now supplied with them as standard. An advantage of burning images onto a CD-ROM disc is that a number of images can be sent at their maximum resolution and level of detail. Blank CD-ROM discs can accept about 600Mb of images which is sufficient for 120 5 mega-pixel images.

You might wonder why CD-ROM discs which have a capacity of some 700Mb only use about 600Mb for images; what has happened to the other 100Mb of disc space? Why can't I fill the disc right up? Simple; when files are 'burned', regardless of whether or not they are images, space is automatically allocated by the system for disc and file management. These extra 'hidden' files are vital as they allow other computers to read and access the contents of the disc.

As with most things, it is better to buy good quality blank CD-ROM discs; another good tip is to buy discs in slimline cases, simply because they take up less space, weigh less and save on postage costs. A CD-ROM disc in one of these slimline cases, popped into a padded envelope, is more than adequately protected for transit by post.

Great for Granny!

In addition to images supplied on CD-ROMs, others send their digital photographs printed on photo-quality paper. Unless you have a top of the range dedicated photographic quality printer fitted with the manufacturer's ink cartridges and the proper photographic quality paper, you are wasting your time and money. The average ink jet printer is great for printing out snaps for Granny and homework, but here too some of the resolution and detail is lost in the printing process. Even more detail is lost when your printed picture is scanned by the publisher, which further reduces the image quality.

Apart from the reduced detail level, the cost of printing off pictures with an ink jet printer is high. Hands up who has paid as much as (or more than) the cost of the printer on replacement ink jet cartridges? The cheaper option is to go for unbranded cartridges, but of course, these are rarely as good as the original manufacturer's ones.

The best option in terms of both cost and guaranteed quality is to send the images on CD-ROM. You can fit a lot of large images onto a disc and it cuts out the 'middle man' by supplying the images as computer files and not as printed images. In this format, the graphics department at a magazine can do more with your image than they can with the printed form.

Learning the new 'key' words

Those switching to digital photography from traditional photography have to learn new words, words like mega-pixels (Mp), dots per inch (dpi), resolution, and JPEG. These are important words and the key to submitting your pictures to a magazine.

Pixel Dimensions (approx.)

Thumbnails for web pages: 120 x 90
Images for web Pages/e-mails 640 x 480
Publication (quarter page) 1,600 x 1,200
Publication (half page) 2,400 x 1,800
Publication (full page) 3,200 x 2,400

Size does matter!

The image's pixel dimensions are the best guide to working out the correct level of detail and resolution. The important factor is not the resolution of a digital image, but the level of detail it contains. A simple guide is given above to help you calculate the optimum image size for the appropriate job in question:

Most of the small point-and-shoot 2 megapixel compact digital cameras currently on the market can only produce 1,600 x 1,200 maximum image size, which is the standard 6 x 4in. photo (although this figure does vary slightly between different makes of camera). These cameras are aimed at happy snappers who just want to put pictures of the family on the net or print off small pictures. To really get images good enough for full-page reproduction in a magazine, a 4 or 5Mp camera is required. These produce an 8 x 10in. photo size image, but these digital cameras can be costly. As you can see only the high-end digital cameras can really reach the level of detail required for a full-page picture.

However, all is not lost for those with smaller sized digital cameras. As you have probably noticed already, most of the images in this magazine are not full page, in fact most are less than a quarter of a page. Images of 1,600 x 1,200 size are well within the range of the average digital camera.

Why JPEG?

Another problem magazine editors encounter is images supplied in an unusual format. To save problems later *always* save images in JPEG format. JPEG or Joint Photographic Experts Group is the name of the committee that designed the photographic image-compression standard.

JPEG format is optimised for compressing full-colour or grey-scale photographic type digital images. The reason for using this format is that any computer system can open JPEG images. Remember, not everybody uses Microsoft's *Windows* software. Many magazine publishers use Apple Macs and some people use Linux systems. Regardless of the system used, all will read JPEG files.

Do make sure your images are to a suitable pixel size.

Do save in JPEG format.

Do e-mail small 'thumbnail' images first with an inquiry letter.

Do clearly name image files on CD-ROM.

Do use high quality ink and photo paper.

Do turn off time/date function which are difficult to remove from the image.

Don't e-mail huge unsolicited images

Don't over-sharpen images

Don't send hundreds of images; you choose the best.

Don't use cheap materials, i.e. blank CD-ROMs, paper or ink.

Don't send the camera's expensive storage media.

Conclusion

With ongoing improvements in picture quality and the ready availability of affordable digital cameras, many photographers are seriously tempted to switch to digital. By learning new skills on how to correctly submit the images to a magazine, you will considerably increase your chances of seeing your pictures in print.

Some do's and don'ts of submitting digital pictures are included above.



With Christmas approaching rapidly, it is time for me to wish all readers a very happy Christmas and a very happy and prosperous new year with success in all your many and varied activities. Perhaps like me you will be making new year's resolutions to complete all those unfinished projects that lie in the workshop. I also suspect that like mine, many of them will still be there this time next year!

I hope to see a good many of you at the Model Engineer Exhibition at Sandown 29-31 December, and with that in mind have you considered entering a model? There's still time before the closing date for entries arrives and we would be very pleased to see your work. If you do not wish to enter any of the competition classes you can exhibit finished or unfinished models in the loan section. How about putting one of your unfinished projects into the exhibition so that visitors can appreciate the work involved?

UK News

The *National* 21^{1/2}" Gauge Association reports that they are in the process of setting up the



Brian Butler with his LMS Black Five at Rugby in May 2004. (Photo by Peter de Salis Johnston)

organisational aspects and facilities for testing boilers. This will doubtless be good news to many members who in the past have had to get boilers tested outside the Association. In the newsletter Peter Gardner describes his backhead regulator which combines with the snifting valve. The regulator connects directly to the end of the superheater which passes through the backhead and by way of the firebox and flue to the cylinders. The advantages are much simplified pipe work involved in getting steam into the cylinders.

Ascot Locomotive Society now has permission to enter their new site and do preliminary work. This must be great news after all the recent trials and tribulations. Members are tidying up, surveying levels in new areas and re-aligning part of the Great Crested Newt Fence. The ecologist who obtained the DEFRA

Licence managed to give the permission just in time because any movement of the fence had to be completed before the Great Crested Newts settled into hibernation. This is typical of those 'model engineering activities' in which none of us expect to be involved when we took up the hobby. Derek Alford reports that a "small band of stalwarts duly completed the recovery of items from the previous buildings and held a 'Wake' on the last day of Horse Racing on the Straight Mile, flying the Union flag inverted." He also reports that following the last day of racing, a well known mobile phone operator left a temporary mast on the club site. When informed about this they said they had forgotten about it. So if a similar thing happens to your club, I suggest a careful examination followed by removal of the 'useful



David Markwick with his SR Schools and NZR Kb at New Romney. (Photo by Peter de Salis Johnston)

bits' could well be in order!

For those interested in aircraft, the Brighton Toy & Model Museum is currently presenting an exhibition of model aircraft showing the history of flight from "Bleriot to Concorde". This exhibition runs until 15 January 2005 and details can be found on the museum website at www.brightontoymuseum.co.uk

Crawley Model Engineers report some very warm operating days later in the summer. It was so hot on 1 August that "the heat made the track a bit shaky" and those present "had to go out and give it 'what for' a couple of times". Can I take a guess that "what for" involved the use of a big hammer? Crawley is another club which entertains children from Chernobyl and the recent visit involved about a dozen youngsters who enjoyed themselves and even got to drive the electric locomotives. ►

Mel Fuller of Ickenham DSME describes the experiments carried out when designing and testing the oil firing system for Peter Reynolds' steam tug *Cariad*. To judge by the photographs and accompanying comments, the experiments seemed fearsome! I illustrate this with a couple of quotes: "Air on. Fuel on. Ignition. Roaring flames, choking smoke and a red hot burner in seconds"; "What's happening now ... sparks are being flung from the blower ... a puff of smoke and a small blast of flame ... and then woosh, an impressive blow-back sends flames roaring out of our end, then silence." I can report that both Peter and Mel survived and eventually developed a successful burner! The newsletter also records the 100th Anniversary, on 4 July this year, of the opening to passengers of the Harrow and Uxbridge Railway.

The driver training weekends organised by the Ground Level 5" Gauge Mainline Association (GL5) proved very enjoyable for the recruits with five attending the April event and eight in October. It is good to learn that the Association received some appreciative e-mails from the participants.



Shunting on the Lyndsey Model Society track at Ulceby.

Leeds SMEE reports five new members so far this year, including two juniors, which shows that there are still some youngsters who are interested in engineering. The club had a stand at the Harrogate exhibition and several members have "had a few runs out at the Federation Spring Rally at the North West Leicestershire SME and IMLEC at Kinver & West Midlands SME". Arthur Bellamy reports on a trip to a miniature steam rally at Nienoord in Holland during which he met up with several other model engineers from England.

Some members of the Lyndsey Model Society attended the GL5 weekend and Doug Hewson reports that he "actually got to work in the signal box for a while". Members

have been carrying out work on their track at Ulceby and have made improvements to the signalling; the headshunt at 'Stowmarket' has also been lengthened to allow locos to take on water "without the driver having to ask the signalman to go out onto the down main every time he needs water." Members also visited the Lincoln Traction Engine Rally and report that the portable track is now much improved since the curves were rebuilt.

Stewart Jackson, Melton Mowbray DMES Editor has gone all philosophical with the following: "Brunel (I), Brunel (M), Darby, Dibner, Dyson, Harrison, Mucker, Isgonis, Paxton, Stevenson (G), Stevenson (R), Stroudley, Trethivick, Thornycroft and Watt. Some of the

men who are engineers by my measure. Some you may know, others you may not. Men who could turn their hand to lots of things, pioneering men. As model engineers, us lesser mortals have the same spirit but perhaps in smaller measure, but we should at all times still strive to do justice to our title — ENGINEER." A good philosophy indeed! The club loco *Lilla* is now back in steam but a valve timing problem needs to be sorted out.

The Model Steam Road Vehicle Society had a successful rally this year despite the weather. It is reported that they "even had the Ladies Morris Group dancing in the rain." Roger and Angela Harvey were awarded the MJ Engineering trophy "for their contributions to the society over many years." We extend our congratulations to them both. The rally rules specified that spark arrestors shall be fitted and safety officer John Benfield "was impressed by the number of different types of spark arrestors on show." Next year's rally will be held on Saturday and Sunday 25/26 June at Tewkesbury. The newsletter also carries two uses for old toothbrushes. First as a T-slot cleaner in the workshop and secondly if a length of some 2 or 3in. is cut

CLUB DIARY

A minimum of 6 weeks notice is required for diary entries. Clubs and Societies are asked to include a telephone number for the assistance of would-be visitors.

DECEMBER

- 10-12 **Great Western Soc.** (Didcot Railway Centre). *Thomas Santa Special*. Contact Jeanette Howse: 01235-817200.
- 10 **Hereford SME.** *Christmas Social*. Contact Richard Donovan: 01432-760881.
- 10 **Historical MRS (Essex Area).** *Christmas DIY Evening - Members' Latest Endeavours*. Contact Jem Harrison, 27 Colne Place, Basildon, Essex SS16 5UZ. Contact John Campbell: 01384-891244.
- 10 **Kinver & West Midlands SME.** *Ray Humphries: Workshop Hints & Tips*. Contact John Campbell: 01384-891244.
- 10 **Malden DSME.** *Video Show*. Contact John Mottram: 01483-473786.
- 11 **Erewash Valley MES.** *Santa Special*. Contact Jim Matthews: 01332-705259.
- 11 **Fylde SME.** *G-Whizz Christmas Exhibition*. Contact Alan Reid: 01253-882872.
- 11 **Glasgow & S.W. Rly Ass'n.** *Gordon Thomson: Railways of Eastern Europe*. Contact Bruce Steven: 0141-810-3871.
- 11 **Guildford MES.** *Christmas American Supper*. Contact Dave Longhurst: 01428-605424.
- 11-12 **Reading SME.** *Santa Specials*. Contact Graham Bustin: 0118-9615450.
- 11 **Woking MRS.** *Beaver/Cub Santa Special*. Contact Ronald Dewar: 01932-343331.
- 12 **Birmingham SME.** *Children's Christmas Party*. Contact John Walker: 01789-266065.
- 12 **Canvey R&MEC.** *Santa Specials*. Contact Brian Baker: 01702-512752.
- 12 **Chichester DSME.** *Santa's Steam Specials*. Contact Brian Bird: 01243-536468.
- 12 **Frimley & Ascot LC.** *Santa Run*. Contact Bob Dowman: 01252-835042.
- 12 **Harrow & Wembley SME.** *Christmas Run*. Contact Dr. Roger Greenwood: 020-8427-2755.
- 12 **Hornsby ME.** *Running Day*. Contact Ted Gray: 9484-7583.
- 12 **Malden DSME.** *Santa Special (Ticket Only)*. Contact John Mottram: 01483-473786.
- 12 **Pinewood MRS.** *Santa Run*. Contact Ivan Hurst: 01276-28803.
- 12 **St. Albans DMES.** *Club Running*. Contact Roy Verden: 01923-220590.
- 12 **Sutton Coldfield MES.** *Santa Special*. Contact Neal Harrison: 0121-378-3992.
- 12 **Woking MRS.** *Santa Specials*. Contact Ronald Dewar: 01932-343331.
- 13 **Bedford MES.** *Our Festive Quiz*. Contact Ted Jolliffe: 01234-327791.
- 13 **Hornsby ME.** *Meeting & Christmas Social*. Contact Ted Gray: 9484-7583.
- 13 **Melton Mowbray DMES.** *Video Show*. Contact Phil Tansley: 0116-2673646.
- 13 **Saffron Walden DSME.** *Club Christmas Dinner*. Contact Jack Setterfield: 01843-596822.
- 14 **Historical MRS (North West Area).** *Pre-Christmas Social*. Contact David Goodwin: 01224-880018.
- 14 **King's Lynn DSME.** *Christmas Meeting*. Contact Mike Coote: 01533-673728.
- 14 **Sutton Coldfield MES.** *Bits & Pieces*. Contact Neal Harrison: 0121-378-3992.
- 15 **Birmingham SME.** *Festive Nosh*. Contact John Walker: 01789-266065.

- 15 **Bournemouth DSME.** *Christmas Party*. Contact Dave Fynn: 01202-474599.
- 15 **Bristol SMEE.** *Jack Shettle: Hints and Tips*. Contact Trevor Chambers: 0145-441-5085.
- 15 **Chingford DMEC.** *Cheese & Wine*. Contact Martin Masterson: 0208-989-5552.
- 15 **Leeds SMEE.** *Quiz Night*. Contact Colin Abrey: 01132-649630.
- 15 **MELSA.** *Meeting*. Contact Graham Chadbone: 07-4121-4341.
- 16 **Cardiff MES.** *Chris Tuthill: Quiz Night*. Contact Trevor Jenkins: 029-2075-5568.
- 16 **Colchester SMEE.** *Festive Evening Meal at The Swan, Stanway*. Contact L. G. Hammond: 01376-511686.
- 16 **East Somerset SMEE.** *Terry Gorman: Metrology plus Bring & Buy and Seasonal Fare*. Contact Roger Davis: 01749-677195.
- 16 **Isle of Wight MES.** *The 29th Nostalgia Night with Christmas Fare*. Contact Ken Stratton: 01983-531384.
- 16 **Leyland SME.** *Christmas Dinner & Dance*. Contact Mark Entwistle: 01772-422411.
- 16 **Rugby MES.** *Christmas Party*. Contact David Eadon: 01788-576956.
- 16 **Sutton MEC.** *Quiz Night*. Contact Mike Dean: 0208-657-5401.
- 17 **Brighton & Hove SMLE.** *Christmas Social*. Contact Mick Funnell: 01323-892042.
- 17 **Canvey R&MEC.** *Christmas Party*. Contact Brian Baker: 01702-512752.
- 17 **Colchester SMEE.** *Quiz and Fizz Evening*. Contact L. G. Hammond: 01376-511686.
- 17-19 **Great Western Soc.** (Didcot Railway Centre). *Thomas Santa Special*. Contact Jeanette Howse: 01235-817200.
- 17 **Kinver & West Midlands SME.** *Bring & Buy Sale*. Contact John Campbell: 01384-891244.
- 17 **North London SME.** *Work in Progress*. Contact David Harris: 01707-326518.
- 17 **Rochdale SMEE.** *Members' Bits & Pieces*. Contact Mike Foster: 01706-360849.
- 17 **Romford MEC.** *Bring & Buy Sale*. Contact Colin Hunt: 01708-709302.
- 17 **Romney Marsh MES.** *DVD Evening*. Contact John Wimble: 01797-362295.
- 18 **Historical MRS (Bristol Area).** *Derek Chaplin: Train Journey Through Wales*. Contact Gerry Nichols: 0117-973-1862.
- 18 **Talylyn Railway.** *Carol Train/Santa Specials*. Enquiries: 01654-710472.
- 18 **Historical MRS (Scottish Area).** *Pre-Christmas Social*. Contact Richard Crockett: 01896-750730.
- 18 **York City & DSME.** *AGM*. Contact Pat Martindale: 01262-676291.
- 19 **Ascot LS (2003).** *Pre-Christmas Get-Together*. Contact Derek Alford: 01344-482485.
- 19 **Bournemouth DSME.** *Santa Specials*. Contact Dave Fynn: 01202-474599.
- 19 **Chichester DSME.** *Santa's Steam Specials*. Contact Brian Bird: 01243-536468.
- 19 **Harlington LS.** *Mince Pie Run*. Contact Peter Tarrant: 01895-851168.

- 1: Save your money here.
- 2: An angry dock and an entertainment venue.
- 3: Cindy's rival in a tin.
- 4: Ursus in a duffle coat.
- 5: Brightly coloured card game.
- 6: A road for a gun.
- 7: A travelling show at an old university.
- 8: An English motor car?
- 9: HUGE!
- 10: Route to a rabbit's home.
- 11: Royal grave.
- 12: Gunners.
- 13: Mature thoroughfare.
- 14: Shakespeare's birthplace.
- 15: Tea clipper.
- 16: Leave your car on the fairway.

A Christmas Quiz from North London SME

The following list gives clues to London Underground Stations. A few Docklands stations and one national rail station, also in London, have been included for fun. All you have to do is decipher which is which.
Answers next time. Have fun!

- 17: A channel at the edge of the sea.
- 18: A glass ball made into a curved structure.
- 19: Miners' friend on the quayside.
- 20: Geographical feature of the Sussex Coastline.
- 21: Six consonants in a row.
- 22: 007's highway.
- 23: Roger Bannister reached this in under four minutes.

- 24: A dirty slide.
- 25: Deborah's lair.
- 26: Winged messenger.
- 27: An Abba song.
- 28: Capital's crossing.
- 29: Posh (without Becks).
- 30: Everyone has a ring of gold.
- 31: I'm sorry, I haven't a clue!
- 32: London's burning.
- 33: Sherlock homes
- 34: Squashed ring.
- 35: Citrus abode.

- 36: Moses' encounter in the desert.
- 37: The Vicar's unwell.
- 38: Dark habits.
- 39: The departure place for Hugh Grant's bookshop.
- 40: Tree spreading Good News.
- 41: Half Niagara Falls?
- 42: Pay your duty here.
- 43: A countess' husband captured.
- 44: Nellie and her chess piece.
- 45: A Mediterranean island divided.
- 46: Not Eton, nor a mountain.
- 47: Chalet.
- 48: Created a valley
- 49: Blond haircut.
- 50: Cue for Mother Brown.

from the handle and the cut end drilled, the result is a good handle for a needle file. There is also mention of rechargeable propane gas cylinders which can be re-filled at garages via a special valve on the top. Information from www.gaslow.co.uk ('phone: 01509-843331). We understand this to be new legislation so some garages may not be aware that they are permitted to fill such cylinders. The gas obtained by this route is reported to be "one third of the normal price."

North London SME members have been asked to consider what they would like to achieve during this winter's working parties at the Colney Heath track site to improve the boating facilities. Much activity at the August general meeting saw Pam Corcoran's Wallis & Stevens Roller and Ron Todd's 4in. to the foot (1:3 scale) Burrell in steam. Many of the members present at the meeting took the opportunity to drive the roller, and it is reported that "you could tell those who had

already had a turn by the oil stains on their clothing." This is familiar situation for all of us steam buffs, I think, as are the comments when we arrive home! While all this was going on, three model tugs were practising towing and docking *Polyanna*, the large model tanker, on the pond. This was reported as "all done with consummate skill." Having tried this myself in the past, I can definitely say that it is not as easy as it looks! This year saw North London hosting its first visit by children from Chernobyl and judging by the letter of appreciation in the newsletter the July visit was enjoyed by all who participated. Member Jim Robson (of *Annabel* fame, see *M.E.* 4232, 15 October 2004) makes some observations on the behaviour of young passengers on the track. The conclusion seems to be that they all start off well but at some point become troublesome. Jim is not sure at what age this takes place but comments that "the most enjoyable and relaxing afternoons

are those when we entertain children of about five years of age." Others may care to comment.

With their track in a somewhat vulnerable location, members of **Plymouth Miniature Steam** have suffered the attentions of vandals recently and the newsletter reports "Yet again we have had visits from the vandals and the fire brigade." Yes, they both cause problems and a visit from one occasionally leads to a visit from the other. A recent incident involved an old motor scooter which was placed in the tunnel and fired resulting in damage to the concrete and the track. An additional loss was of another gate padlock, which had to be cut off by the fire brigade!" The club also has a resident buzzard in the park and the Editor's photograph confirms his comment that he "would not wish to tangle with this bird." The annual exhibition was held in July and the Editor reports that it revealed not only progress on existing projects but also some new items on show. The

Beginners' Pages describe the machining of a set of driving wheels for the club locomotive.

Dave Holliday, Editor of the **Portsmouth MES** newsletter, reports that he visited the Dordt in Stoom steam fair in Dordrecht, Holland in May. This is claimed to be the largest steam fair in Europe and expected to host 250,000 visitors. There was plenty of variety with old buses (including a 1947 Crossley), steam boats, standard gauge and miniature locomotives, full size and miniature traction engines and steam fire engines. Among the talks held during the year, there was one entitled *Strong Rubber Bands* by George Day which caught my eye. In fact it was about the development of steam catapults for aircraft carriers with which George was involved at Farnborough. A group of members enjoyed a very interesting visit to the new Rolls Royce car factory near Chichester. Mark Hill-Tout describes his first experience of being Officer of the

- 19 Tallylyn Railway, Santa Specials. Enquiries: 01654-710472.
- 19 Tyneside SMEE, Christmas Party. Contact Ian Spencer, 0191-2843438.
- 19 Woking MRS. Santa Specials. Contact Ronald Dewar: 01932-343331.
- 19 York City & DSME, Running Day. Contact Pat Martindale: 01262-676291.
- 20 Peterborough SME, Party Night. Contact Tony Meek: 01778-345142.
- 20 Salisbury DMES, Film Night plus Christmas Meeting. Contact Pete Parrish: 01980-610346.
- 21 Basingstoke DMES, Meeting Night. Contact Guy Harding: 01256-844861.
- 21 Chesterfield MES, Members' Slide Night. Contact Mike Rhodes: 01623-648676.
- 21 Northampton SME, Christmas Drinks. Contact Pete Jarman: 01234-708501 (eve).
- 21 Taunton ME, Mince Pies & Natter. Contact Don Martin: 01460-63162.
- 22 Isle of Wight MES, Christmas Special Track & Pond. Contact Ken Stratton: 01983-531384.
- 23 Sutton MEC, Natter Night. Contact Mike Dean: 0208-657-5401.
- 23/24 Tallylyn Railway, Santa Specials. Enquiries: 01654-710472.
- 24 Great Western Soc. (Didcot Railway Centre). Thomas Santa Special. Contact Jeanette Howse: 01235-817200.
- 24 Kinver & West Midlands SME, Christmas Eve Party. Contact John Campbell: 01384-891244.
- 26 Canvey R&MEC, Boxing Day Steam-Up from 10am. Contact Brian Baker: 01702-512752.
- 26 Cardiff MES, Boxing Day Steam-Up. Contact Trevor Jenkins: 029-2075-5568.
- 26 Colchester SMEE, Boxing Day Steam-Up from 10am. Contact L. G. Hammond: 01376-511866.
- 26 Guildford MES, Boxing Day Run. Contact Dave Longhurst: 01428-605424.
- 26 Leyland SME, Mince Pie & Steam-Up. Contact Mark Entwistle: 01772-422411.
- 26 High Wycombe MEC, Boxing Day Steam-Up. Contact Eric Stevens: 01494-438761.
- 26 Kinver & West Midlands SME, Boxing Day Steam-Up. Contact John Campbell: 01384-891244.
- 26 Maidstone MES (UK), Boxing Day Run. Contact Martin Parham: 01622-630298.
- 26 Malden DSME, Members and Friends Private Run. Contact John Mottram: 01483-473786.
- 26 MELSA, Sunday in the Park. Contact Graham Chadbone: 07-4121-4341.
- 26 Reading SME, Boxing Day Steam-Up. Contact Graham Bustin: 0118-9615450.
- 26 Stockholes Farm MR, Members and Family Day. Contact Ivan Smith: 01427-872723.
- 26 Sutton MEC, Boxing Day Run. Contact Mike Dean: 0208-657-5401.
- 26 Sutton Coldfield MES, Boxing Day Steam-Up. Contact Neal Harrison: 0121-378-3992.

- 27 Basingstoke DMES, Christmas Run. Contact Guy Harding: 01256-844861.
- 27 Bradford MES, Mince Pie Steam-Up. Contact John Mills: 01943-467844.
- 29 Birmingham SME, Chit Chat. Contact John Walker: 01789-266065.
- 29-31 Highbury Leisure Publishing Ltd, 74th Model Engineer Exhibition at Sandown Park Exhibition Centre, Surrey. Admission: Adult £7.50, Senior Citizen £6.50, Child £3.50. Discounts for advance bookings. Wed/Thu 10.00-17.00, Fri 10.00-15.00. Information: 01353-654429.
- 30 Sutton MEC, Boats & Planes. Contact Mike Dean: 0208-657-5401.
- 31 Kinver & West Midlands SME, New Year's Eve Party. Contact John Campbell: 01384-891244.
- 31 New Jersey Live Steamers, Inc. New Year's Eve Midnight Run. Contact Karl Pickles: 718-494-7263.

JANUARY

- 1 Birmingham SME, New Year Steam-Up. Contact John Walker: 01789-266065.
- 1 Brighton & Hove SMLE, First Steam-Up of the Year. Contact Mick Funnell: 01323-892042.
- 1 Chesterfield MES, Arctic Running. Contact Mike Rhodes: 01623-648676.
- 1-2 Claymills Pumping Engines, Steaming. Contact B. Eastough: 01283-812501.
- 1 Frimley & Ascot LC, New Year's Day Run. Contact Bob Downman: 01252-835042.
- 1-2 Great Western Soc. (Didcot Railway Centre), New Year Steamday. Contact Jeanette Howse: 01235-817200.
- 1 Isle of Wight MES, Track & Pond. Contact Ken Stratton: 01983-531384.
- 1 Leyland SME, Chairman's Run. Contact Mark Entwistle: 01772-422411.
- 1 New Jersey Live Steamers, Inc. New Year's Day Run. Contact Karl Pickles: 718-494-7263.
- 1 Northampton SME, New Year Running Day. Contact Pete Jarman: 01234-708501 (eve).
- 1 Portsmouth MES, Frostbite Run from 10am. Contact John Warren: 023-9259-5354.
- 1 Romney Marsh MES, New Year's Day Track Meeting. Contact John Wimble: 01797-362295.
- 1 Saffron Walden DSME, New Year Steam-Up. Contact Jack Setterfield: 01843-596822.
- 1 Tyneside SMEE, New Year's Day Run. Contact Ian Spencer, 0191-2843438.
- 2 British Columbia SME, Frostbite Meet. Contact Sean Laurence: (604) 931-1547.
- 2 Hereford SME, New Year Steaming & Party. Contact Richard Donovan: 01432-760881.
- 2 South Durham SME, Running Day. Contact B. Owens: 01325-721503.

In Memoriam

It is with the deepest regret that we record the passing of the following members of model engineering societies. The sympathy of staff at *Model Engineer* is extended to the family and friends they leave behind.

David Ash
Bernard Gill
Les Hollingsworth
Bob Morrow
Margaret Tidmarsh

Stamford MES
Wigan DMES
Pinewood MRS
Toronto SME
Model Steam Road Vehicle Society

Day at a recent running session and described it as a "steep learning curve." He seemed disappointed when an anticipated visit "from one of the lovely ladies bearing a double portion of cream sponge cake brought on a nice tray with perhaps a linen cloth and a few kind words about how well the OOD was doing this week" did not materialise. Perhaps his expectations had been raised by those who persuaded him to volunteer for the job?

The Saffron Walden DSME club locomotive has had "successful trials around the track under its own power and control unit, towing a trolley load of technicians with fixed grins." The water storage tank is to be replaced with a stainless steel unit following unsuccessful attempts to stop up the leaks on the old one.

Members of St. Albans DMES have enjoyed a successful season both on the track and at the boating lake. The boating meeting on 18 August had several boats operating including Jeff Carter's fishing boat, Malcolm Finlayson's canal narrow boat, John Cooke's French lugger, and Mike Dyer's Cornish Shrimper all on the lake. Member Alan

Ashberry, one time contributor to these pages, describes how he constructed some model LNWR rotating disc ground signals.

Stamford MES reports that the effort expended in "replacing sleepers and adjusting the alignment of the track enabled those running to do so with reasonable confidence."

John Cook of Surrey SME reports that the 8 August running day was hot but that did not deter the crowd of visitors who attended from as far afield as Banbury, Oxford and Reading as well as Portsmouth and Brighton. Three locomotives dealt with the passenger hauling, a Hunslet, an American K36 2-8-2 and the club 0-6-0 tender locomotive. A party of children from Chenobyl was also made welcome on the day.

Another club making improvements to the track is Tyneside SMEE who "have progressed track layout and improvement at a measured pace." The July meeting was a video

evening featuring a variety of items including the Darjeeling Railway, the Chengde line in China and Welsh narrow gauge among others.

At the West Riding Small Locomotive Society Rally, President Colin Bradley presented the awards. The *Best Finished Locomotive* was Mr. S. Merton's LMS 4F, the *Best Unfinished Locomotive* was Mr. D. Batty's SAR Natal 4-6-2 and the *Best non-Locomotive* was Mr. B. Walker's display of stationary engines. We congratulate all the winners on their achievement — now, how about entering in the Model Engineer Exhibition? Stuart Merton provides some information on tool grinding; I must admit that one of the benefits of writing this column is that I get to see a great many useful tips and informative snippets from club newsletters. I am not sure why my model engineering skills are not improving as a result!

The open day at the Wigan DMES was not blessed with the usual fine weather this year. The

newsletter front cover picture shows a group of not so happy looking folk sheltering from the rain. Despite this, several visitors braved the elements and ran their locomotives on the track. Six locomotives visited this year in contrast to 28 last year. The July meeting was addressed by Frank Walker who talked about the restoration and operation of vintage cars illustrated with slides from various steam fairs and the London to Brighton run.

In contrast to the poor weather experienced by Wigan members on their open day, that for the Worthing DSME exhibition was good on the Saturday; the conditions on the Sunday are described as "not kind." The society also hosted the Southern Locomotive Rally this year and with some forty locos attending there was continuous running from 10am until late afternoon. John Fuller has been amusing himself with the Microsoft Train Simulator program which he purchased at the Brighton show. John describes the program as "a winner" so I suspect that the output from his workshop will be curtailed for a while!

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3. BA TAP SET (2 Taps each size) & BA DIE SET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 BA
4. 26 TPI TAP SET (2 Taps each size) & 26 TPI DIE SET (CYCLE OR BRASS THREAD) 1/4 x 26, 3/8 x 26, 1/2 x 26, 5/8 x 26, 3/4 x 26
5. BSF TAP SET (2 Taps each size) & BSF DIE SET: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1"
6. BSF TAP SET (2 Taps each size) & BSF DIE SET: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1"
7. BSW TAP SET (2 Taps each size) & BSW DIES: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1"
8. BSW TAP SET (2 Taps each size) & BSW DIES: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1"
9. METRIC COARSE TAP SET (2 Taps each size) & METRIC DIE SET: 2, 3, 4, 5, 6, 7, 8, 9, 10, 12 mm
10. METRIC COARSE TAP SET (2 Taps each size) & METRIC DIE SET: 14, 16, 18, 20, 22, 24 mm
11. UNF OR UNC TAP SET (2 Taps each size) & DIE SET: 0 to 12 UNF or 1-12 UNC
12. UNF OR UNC TAP SET (2 Taps each size) & DIE SET: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1"
13. UNF OR UNC TAP SET (2 Taps each size) & DIE SET: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1"
14. GAS (BSF) PIPE SET: 1/4, 3/8, 1/2, 5/8, 3/4 (2 Taps each size)
15. METRIC FINE PITCH SETS (10 sizes from 3 - 12 mm) TAPS & DIES
16. METRIC FINE PITCH SETS (6 sizes from 14 - 24 mm) TAPS & DIES
17. ENDMILL SET (THREADED SHANK) 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1" (or (m/m) 3, 4, 5, 6, 7, 8, 10, 12 mm)
18. SLOT DRILL SET (THREADED SHANK) 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1" (or (m/m) 3, 4, 5, 6, 7, 8, 10, 12 mm)
19. ENDMILL SET, 1/8, 1/4, 3/8, 1" DIA, WITH 1/4 THREADED SHANK TO FIT COLLET CHUCK
20. COUNTERBORE SET (FOR SPOTFACING) 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1" OR (m/m) 3, 4, 5, 6, 8 mm
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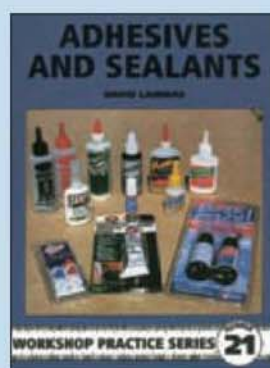
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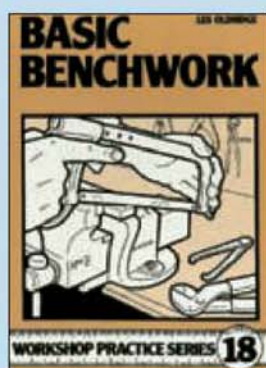
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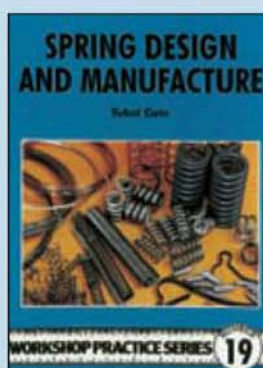
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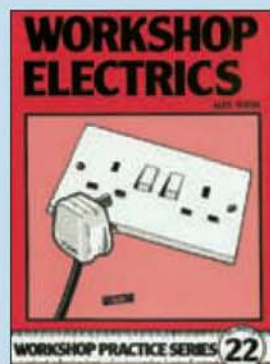
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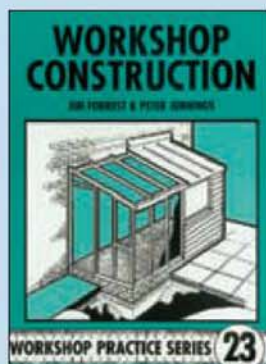
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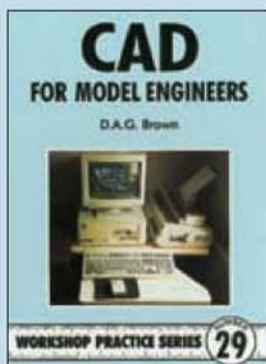
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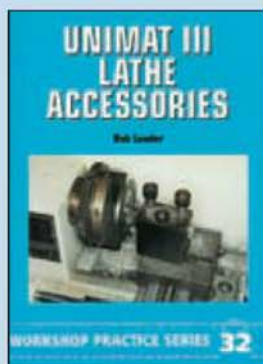
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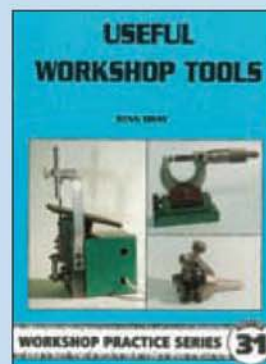
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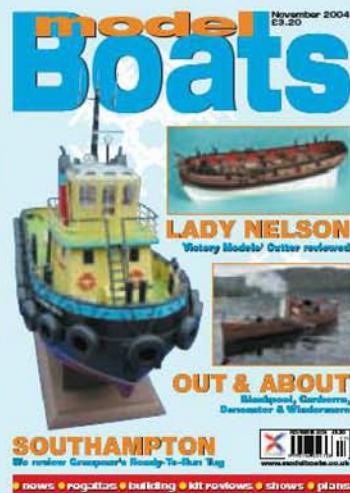
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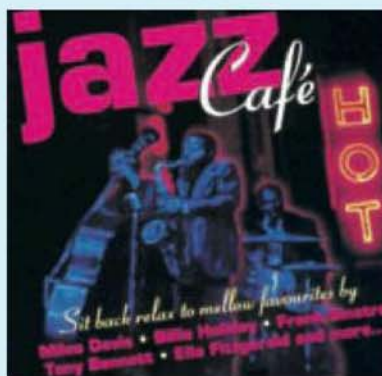
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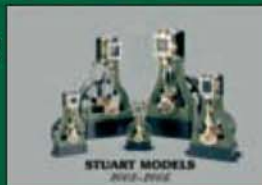
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