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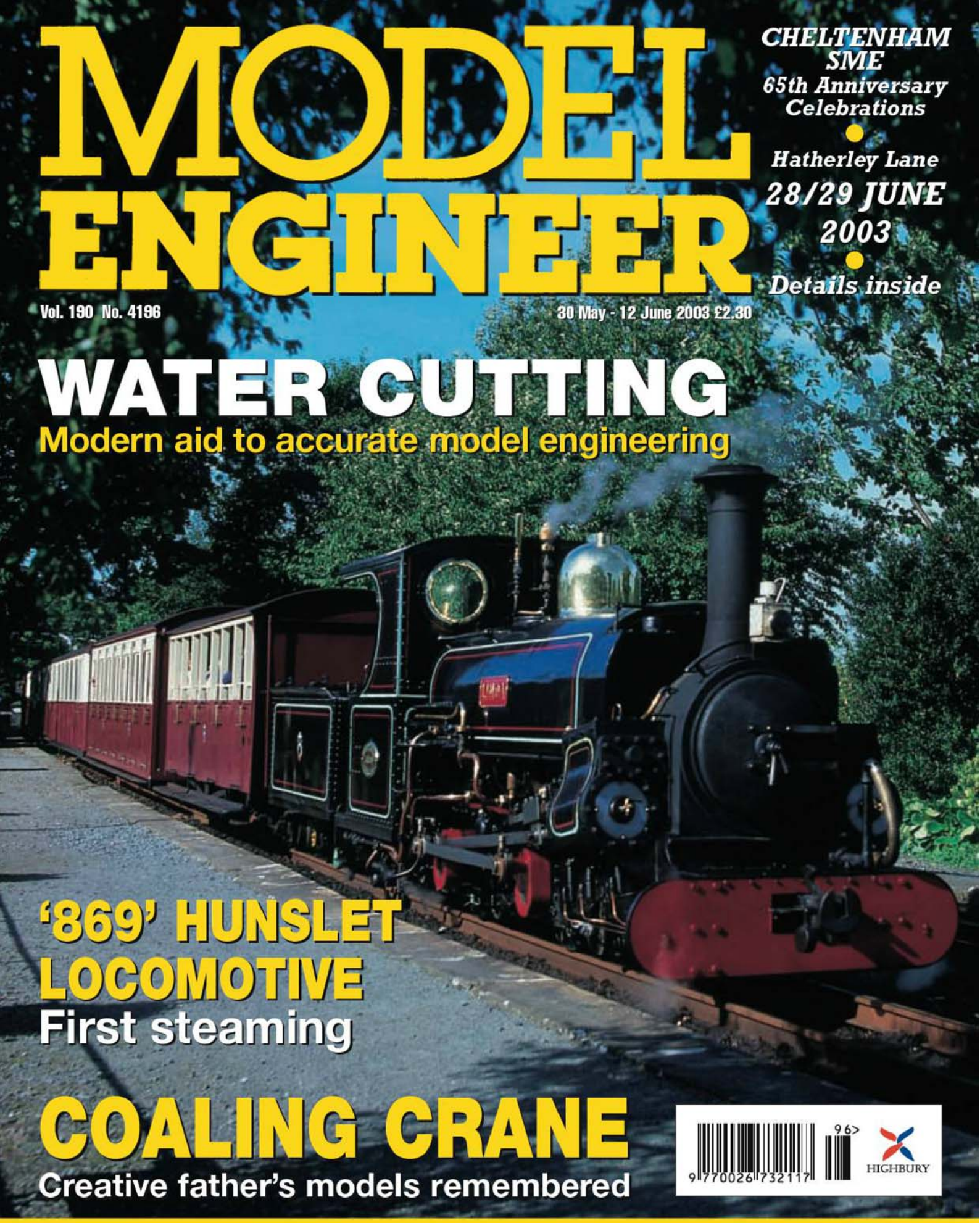

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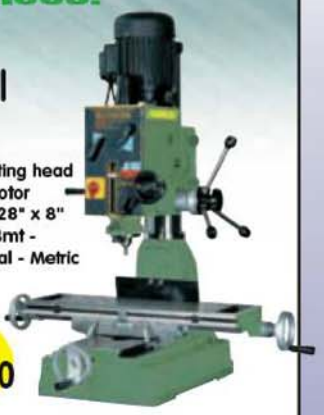

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IN THIS ISSUE

● Vol. 190 No. 4196 30 May 2003 ●

On the cover ...

Tank engine Linda *pauses at Minford Station, Gwynedd on the picturesque Ffestiniog Railway in North Wales. Purchased from the Penrhyn Railway shortly after the latter's demise,* Linda *was originally designed to burn coal but over the years has been converted to burn several different fuels including both oil and producer gas.*

(Photograph by Michael Boulton)

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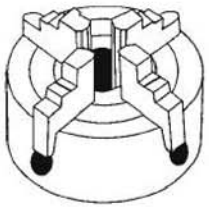

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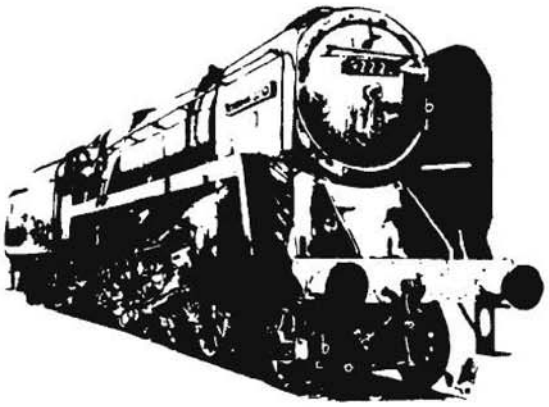

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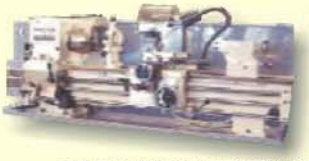

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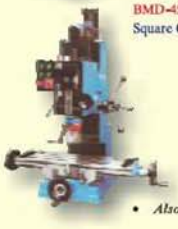

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SMOKE RINGS
With the Editors

The real world

A letter in *Postbag* from Mr. Rich in Monmouthshire may provoke some discussion. Neville Evans has taken space to respond to some of Mr. Rich's remarks and we feel it necessary to make space for editorial comment.

Mr. Rich is critical of this magazine and its contributors for failing to publish the information he considers necessary to enable expert builders to produce accurate scale model locomotives. He continues with the expressed opinion that *Model Engineer* has become a magazine for the 'Small Locomotive Builder' and among other views, suggests that if accurate and authentic designs are not published in these pages, the information will be lost.

First, *Model Engineer* is no more devoted to Great Western locomotives than to clocks, i.c. engines or workshop machinery. Considerable effort has been made to extend the breadth and variety of topics embraced in these pages, to encourage readers with different and widely ranging interests. Evidence and comment indicate that this has met with some success, but we can only publish material submitted for the purpose.

We are sure that the number of readers with the desire to produce 'super-scale' working model locomotive are few. Like Mr. Rich, those there are need no guidance from these pages to do so. We are also aware that many builders are a little less expert and are pleased to have access to designs which represent prototypes and yet are relatively straightforward to build. During the very long life of this magazine, a huge range and variety of prototypes have been described; any who wish to do so might choose to base their 'super-scale' model on one of these.

It is gratifying to note that Mr. Rich has respect for those who, by offering their designs for publication, are prepared to put their heads 'over the parapet', perhaps to be criticised by others whose opinions differ either in broad principles or minutiae.

Concerning the relationship between designs and commercial interests, model engineering is no more than a cottage industry well served by a number of individuals who are unlikely ever to make a fortune from their enterprise, but who are prepared to work for those involved in a hobby of which they are very fond. We are grateful to all of them for supporting our activities.

The publication of information which Mr. Rich believes will be lost when the present generation is gone depends on that generation being prepared to provide it. That said, a wealth of detail is already available in books and journals published by acknowledged experts on the subject. Mention of journals puts us in mind of the publications of learned bodies and institutions, some of which maintain a level of innovation and excellence far beyond anything achieved in these pages, by subjecting submissions to very rigorous scrutiny and conditions. In some cases, we understand that far from the contributor being paid by the publisher, the converse applies.

Those who for whatever reason would have *Model Engineer* publish only items in which they are specifically interested would do well to remember that this magazine is now one of a large portfolio of titles owned by a publishing house unlikely to look favourably on retaining a magazine which does not show an adequate return on investment. When our esteemed Founder launched this journal ten and a half decades ago, it was the only one of its kind, as indeed was the exhibition which in due course accompanied it. Times change and these monopolies have long gone, so a breadth of content, and hopefully a wide associated appeal, is an important factor for survival.

Whissendine 2003

Melton Mowbray DMES will be holding their eighteenth Miniature Steam Rally at Whissendine, Rutland on the weekend 7/8 June.

Saturday is for owners and enthusiasts to participate in two road runs through the village, enjoy general steaming and running in the extensive grounds, and to conclude with social events at the clubhouse, including a hog roast in the sound of at least two fair organs. Over 60 miniature steam road vehicles are expected to attend ranging in size from 1½in. to 6in. to the foot scales, and including member Phil Tansley's full size Wallis & Steevens 'Expansion' traction engine.

Catering for 2½, 3½, 5 and 7¼in. gauges, the society's miniature railway tracks will be busy throughout the weekend with both visiting and members' locomotives.

On Sunday 8 June the rally will be open to the public and engine owners will be putting their engines through their paces, including demonstrations of heavy haulage and participation events. There will be an exhibition of models under construction or not in steam, and light refreshments will be available throughout the day.

There will be no charge for admission and all are welcome. The event will be well signposted from the A606 Melton to Oakham road as well as routes from the A1.

Nevil Shute Norway Conference

The third International Conference, celebrating the writing, philosophy, and contributions to aviation of Nevil Shute (Norway), pioneer aviation engineer, inventor, pilot, author and adventurer will take place 21-25 June 2003 at The Queens Hotel, Southsea in Portsmouth, UK.

Starting with a buffet reception on Saturday 21 June, highlights will include a Gala Meal with after-dinner speaker. Delegates from all over the world will gather to enjoy films, exhibitions, seminars and discussions, and visit nearby locations associated with the author.

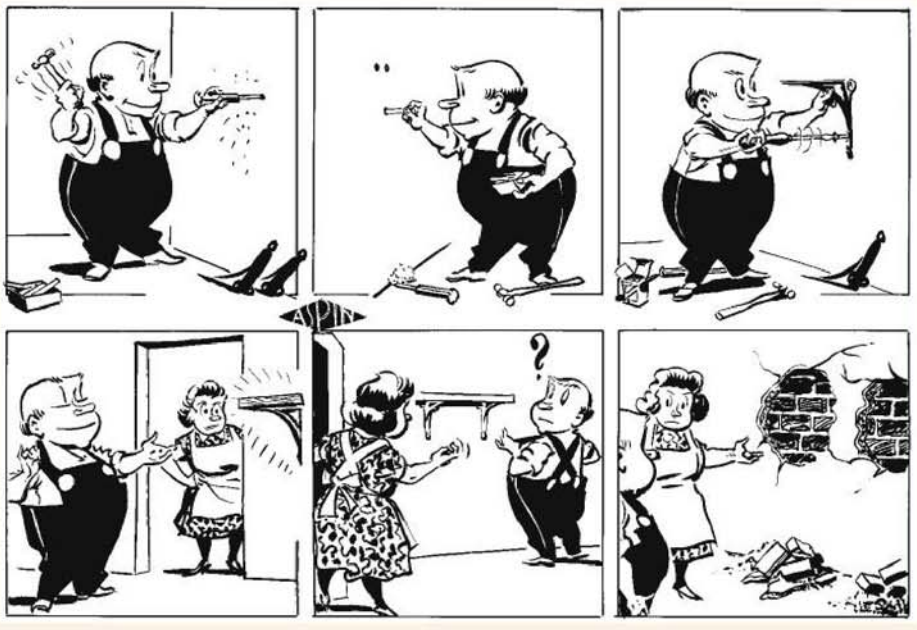
Between 1924 and 1960, Nevil Shute Norway (1899-1960) wrote 24 novels and an autobiography. Several of his novels, including *A Town Like Alice* and *On The Beach*, became successful films. Admirers believe his stories of ordinary people doing extraordinary things, told with an engineer's eye for detail and a realistic technical background, have a lasting appeal.

While pursuing a career in aviation, Shute was a keen model maker, and after relocating to Australia as a full-time author, he established a well equipped model making workshop at his home. Here he built several models incorporating his own modifications, including a Stuart Turner steam engine and *Seal Major* petrol engine.

One of his most successful works, *Trustee From The Toolroom* is a novel about model engineering. The hero, a writer on model engineering matters, faces a human problem which he resolves with honesty, integrity, good engineering, and the help of fellow model engineers.

The Nevil Shute Foundation is an non-profit making internet-based group for contact and exchange of news, opinions, and information among Nevil Shute readers. For further information about this unique event, contact **steph.gallagher@bigfoot.com** or visit **www.nevilshute.org** which publishes writings, reviews, comments, biographies, pictures and other information about Nevil Shute Norway.

CHUCK the MUDDLE ENGINEER **by B. TERRY ASPIN**



POST BAG

Trevor Walton

SIRS, - Members of Derby SMEE were devastated by the news of the death on 22 March last of the Society's Chairman Trevor Walton, at the early age of 58 years.

Trevor was born in County Durham and served a millwright's apprenticeship with ICI in the north east. He came south for work, which was found maintaining earth moving equipment at opencast sites.

Then came a move to Derby Locomotive Works as a toolroom fitter. On privatisation he moved to Toton Diesel Depot maintaining diesel locomotives for EWS, where part of his duties was the operation of the Depot's ground wheel lathe.

Trevor joined Derby SMEE in 1977. He built two models; a 2in. scale Fowler BB ploughing engine and a 3½in. gauge LNER 3-cylinder V2. A third model under construction is a 3½in. gauge New York Central 4-8-4 Niagara. His workmanship was superb. If it was a question of machining or hand tools, the preference would be for the latter. Although his work involved diesel locomotives, his first love was steam and he would have no truck with diesel or electric models.

The summer months were taken up on the traction engine rally circuit with his Fowler, accompanied by his daughter Hayley and his son-in-law Ian. He enjoyed driving his V2, particularly on the late night runs. Everything he tackled was approached with enthusiasm, whether it was model building, track laying or maintenance. He was never deterred by hard work.

Trevor will be sadly missed by all his many friends. Our condolences go to his wife Vivienne, daughter Hayley, son-in-law Ian and grandson Tommy, a budding model engineer.

Dennis Monk, Derby.

Railway history

SIRS, - As one interested in history, especially of the British Isles, I was most taken by the article on Horses, Romans and Railway Engineers published in *M.E.* 4192, 4 April 2003.

I'm astounded at the amount of research to which members of the fraternity go in their quest for the truth and and the enlightenment of their fellow enthusiasts.

I measured some grooves on a roadway a couple of thousand years old in Turkey; they were 4ft. 7½in. as near as dammit. I think this period was before Julius Caesar, so maybe they widened the wheels to give grater stability in those high speed pursuits and the like that have been revealed to us by Hollywood film makers.

It was most fortunate that the article appeared in a magazine published on the fourth of April, otherwise I would have been doubtful of the words printed in 'Our Bible'.

Barry Glover,
President: Australian Association of Live Steamers.

Thanks

SIRS, - I wish to beg a little space in which to express my sincere thanks for printing my letter regarding the identification of a stationary engine and to Marcus Rooks for taking the trouble to furnish me with a full account of the manufacturer of the engine and other details. My thanks also go to Mostyn Phelps for his assistance in the matter. I feel sure I am correct in saying that the manufacturer J. & L. Randall also produced the 'Merit' range of model railway accessories.

On page 383 of *M.E.* 4192, 4 April 2003, Martin Evans mentions that H. A. Taylor's Black Five is in the Bletchley Museum. I believe this model is now to be found on the veranda of the National Railway Museum, York, together with Roy Amsbury's Deltic engine which was in the annex holding the reserve collection at the NRM.

David Spooner, Sheffield.

Encouragement

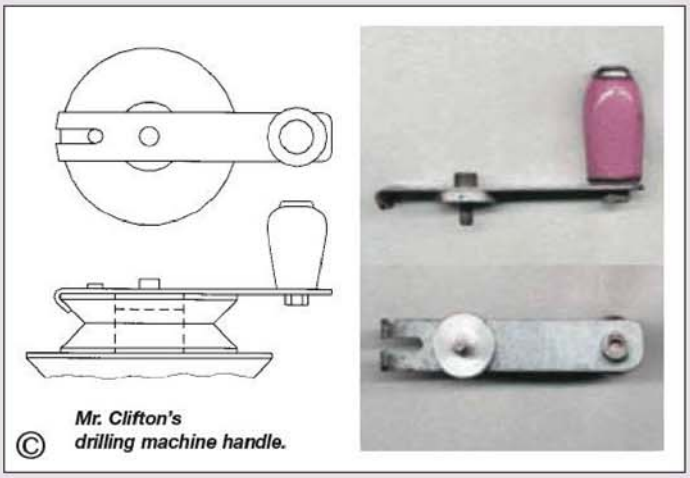
SIRS, - I write to enquire from you or your readers the best way forward for a ten year old boy who shows a strong interest in mechanical things and enjoys making models in Meccano and Lego, etc. It seems that the step from assembling kits to actually making things in wood or metal is enormous. The situation is not improved by the fact that many schools no longer teach woodwork or metalwork.

I feel he should visit a model engineering club meeting and see what model engineers make, and he needs to see a workshop and watch metal being machined. He would also benefit by visiting a Meccano club meeting to see the fantastic models which are being made today with Meccano.

He lives near Llangollen in north Wales. Are there any engineering works or factories in this region which would show him what a machine shop looks like?

I would be most interested to hear your readers' comments.

John Wilding, Sussex.



© *Mr. Clifton's drilling machine handle.*

Early days

SIRS, - In Part I of his series *Early Days (M.E.* 4184, 13 December 2002*)* Martin Evans does himself less than full justice when writing about his model shop in Pimlico. He has, or should have, an honoured place in the history of small scale model railways as the first manufacturer to introduce sheet metal kits for 4mm scale model locomotives: an LMS 3F 0-6-0T and a GWR 57xx 0-6-0PT.

Not until the 1980s, when photo-etching arrived, was anything similar available, although the gap had been partly filled by cast white-metal kits.

On another subject, in *M.E.* 4190, 7 March 2003, Keith Wilson mentions the problem of finding the correct font for GWR name and number plate figures. The Historical Model Railway Society Livery Register for the GWR contains a page showing the Great Western alphabet and numbers 1 to 0, dimensioned.

A similar page is published in Brian Haresnape's *Railway Liveries, Great Western* (Ian Allan 1987) which is shown to be a Swindon drawing dated December 1937, perhaps available from the National Railway Museum at York, but probably only for gluttons for punishment!

Ian Dawson, Sussex.

Holes

SIRS, - The problem of tapping 100 holes to which Peter Spenlove-Spenlove referred some time ago (*Pete's Page M.E.* 4182, 15 November 2002) prompts me to offer my method of tapping holes using the drilling machine. If you need frequent reversing, together with a feel for the stress on the tap, you cannot beat good old muscle power.

Having made a handle for my lathe mandrel and found the benefit when using a tap or die, or even in screw cutting a short thread up to a shoulder, I decided to make one for my DIY 5-speed drilling machine, for this method is so superior to pulling the belt round.

The only alteration to the machine is the fitting of a short 3/16in. dia. driving pin into the top of the spindle pulley. The handle simply hooks over the flange of the pulley, the slot engages with the pin, and the disc sits into the bore of the pulley. If you have no means of turning this disc to fit, a piece of flat bar filed to fit across the bore would do. It only has to locate the handle sideways.

When using, slip the belt off for safety and to give a better 'feel' for small taps. I have tapped up to ¼in. dia. in steel with this, and it should be possible at least get to a good start with larger threads.

If the job is clamped, drilled the correct size and not moved, the tap will enter the hole perfectly in line and avoid the most common cause of tap breakage.

The hinged belt guard on my machine makes it necessary for me to 'cross hands', turning the spindle with my right hand and feeding down with my left, but with use this seems to be no problem. When you have made the handle keep it handy hung near the machine. If you need to hunt for it you will not use it!

Incidentally, the pictures show that a scanner can be used to make close-up photos of small objects, taking care, of course to avoid scratching the glass plate!

R. Clifton, Isle of Wight.

Grasshopper engine

In 2001, *M.E.* published an interesting four-part series by Mr. Colin Pape of France about Oliver Evans' grasshopper engine which is in the Deutsches Museum. This led me to Munich last year to measure this fine engine and to prepare a detailed set of drawings.

Unfortunately, I failed to collect all of the data I need. If anyone is involved in a similar project, I would be pleased to exchange drawings. So far I have fifteen A-size drawings, and will soon have more.

I can be reached at **r-evans4@staff.uiuc.edu** or at 520-648-8365 in Arizona, USA.

Rupert N. Evans, Arizona, U.S.A.

Small locomotive or scale model? See letter from Mr. P. J. Rich.

Fabrication or casting?

SIRS, - Having recently moved into model engineering, and reading avidly to bring myself up to date, it has struck me very forcibly that in the UK we have a tradition of producing 'solid' castings and then machining them to shape.

I came across a reference in an old *M.E.* that continental practice is more commonly that of fabricating components. Specifically, this seems an attractive and more environmentally friendly method of working. In addition, I see that a Japanese modeller has written several books about fabrication methods for locomotive construction.

I have access to all back copies of *M.E.*, I am conversant with silver-smithing methods and techniques and have been involved in welding (ferrous and non-ferrous metals) for some time. I wondered therefore if you have published articles on fabricating components, as opposed to machining them from the solid?

A review of advantages and disadvantages would make for interesting correspondence as I feel sure the scale and the work in question is particularly relevant.

Trevor Faulkner, Sheffield.

Small locomotives or scale models?

SIRS, - I wish to offer some views concerning Clive Barton's letter (*M.E.* 4182, 15 November 2002) about Swindon locomotives, Neville Evans' reply in his article (*M.E.* 4186, 10 January 2003), and the letter by M. Breeze (*M.E.* 4188, 7 February 2003)

I have known Neville Evans for many years, and a more genuine man you could not wish to meet. However, this does not mean that I agree with what he is doing with his *Penrhos Grange*. Neville justifies his choice by noting the popularity of Martin Evans' excellent *Torquay Manor* at an exhibition near Bristol, in the heart of GW territory. What, I wonder would the situation have been had the exhibition been held in the North East?

Mr. Breeze displays an obvious LNER bias; there is nothing wrong with that, and he comments about several GW locomotives. What he fails to admit is that the LMS 'Princess Royal' and 'Coronation' Pacifics virtually copied the GW 'Star' class valve gear. GW locomotives didn't need large smokeboxes to enable them to steam, and with more careful study, Mr. Breeze may be surprised to find that the draughting arrangements on the BR Standards were all worked out at Swindon. I believe also that some ex-LNER locomotives benefited from work done at Swindon which in the 1950s was at the very forefront of boiler draughting design. Mr. Breeze may be further surprised to learn of the GW influence on Gresley's conjugated valve gear, both in its design and its later modification. I would also remind him that it was K. J. Cook, a GW man, who eventually fine tuned the A3s and A4s in the 1950s.

Keith Wilson's contributions over the past couple of decades give the impression that *M.E.* is GW biased. I agree with Mr. Barton that, with *Penrhos Grange*, we are 'lumbered' with another GW design although my reasons for using the contentious word relate to Neville's statement that he intends only to copy the external details of the full size locomotive. This, I feel is rather sad, with parts out of sight being simplified for 'ease of construction'. I appreciate the benefit of this for beginners in our hobby, but experienced and/or advanced model engineers are not being catered for. The result will be a range of small locomotives which are shadows of full size rather than models of what they are supposed to be.

I feel that our hobby is being done no favours by unnecessary simplification and by abandoning authenticity. I hope that Neville does not 'simplify' things to the extent that they become more difficult to make! At present I have three 5in. gauge 'Saints' under construction to my own design based very closely on the official Swindon Works drawings; I am finding no difficulty whatever in construction, and little need to alter the full size design.

In recent years model engineering and authenticity appear to be losing out in favour of making small locomotives just to run up and down a track. Simplification started with LBSC and has continued with all of our noted designers since, one result being that there are very few model designs on the market which cater for the advanced/experienced model engineer, and few which, if built to the design, would qualify for the *J. N. Maskelyne Trophy* award for authenticity at the Model Engineer Exhibition.

Some designs discard history, authenticity, and model engineering in one fell swoop. There are already many excellent designs for beginners including Martin Evans' brilliant *Simplex,* so why spoil excellent full size locomotives for the sake of ease of building? I have been a reader of *Model Engineer* magazine for 45 years and have to insist that it is *our* magazine, not the *Small Locomotive Builder's Magazine* which, as far as locomotive design is concerned it seems to be becoming.

Neville is to recommend Roy Amsbury's boiler fittings, a step backwards of at least twenty years to when they were originally published. I knew Roy very well and am sure he would would want us to advance and improve upon what he did. A brilliant model engineer, Roy built model locomotives and I do not believe he would have wanted his work incorporated into a design which does not follow his principles.

Adopting full size practice in most respects is often easier, achieves a more accurate scale effect, in certain respects can be cheaper and, more importantly, gives much more personal satisfaction when completed.

I assume that designers have to take commercial interests into account but I wonder whether alterations are made to suit these commercial interests and make their job easier rather than give the model engineer what he requires. Our designers should provide the full information to build an authentic scale model and leave it to the individual to include, omit or alter the design to suit his needs.

Most who commit themselves to such a project will spend some years doing so and will make what is shown on the drawing. If the drawing is wrong, the model will be wrong. The model might just as well be built right as wrong, so designers have a responsibility to get things right. If the correct information is not described then it remains unknown, let alone not manufactured. Most may not regard this as important, but it is the kind of information that judges and those who aim for a medal or award standard at exhibitions need to know, yet no one is setting it down.

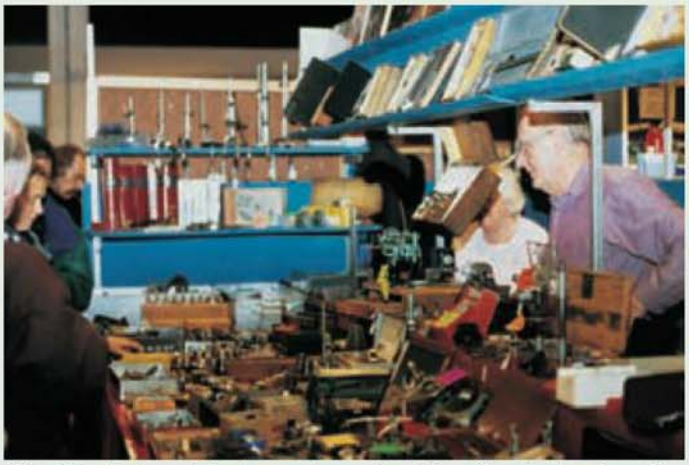
In twenty or thirty years time, those of my generation who remember steam locomotives and worked on them in service will not be around. I therefore feel it to be important to our hobby that our knowledge is correctly put on record both in words and in drawings. If we don't start doing this now, much knowledge and information will disappear because much of what I have been talking about is in my head, not in drawings or photographs. If we don't provide accurate and authentic designs, what will there be for future novices and beginners to move on to in order to develop and stretch their skills, to say nothing of improving and stretching the skills of the designer?

I have the greatest respect and admiration for such as Martin Evans, Don Young, Keith Wilson and now Neville Evans, who have the courage to make their designs publicly available, some of whom, over the years, have had some very unjustified criticism levelled against them, but the year is now 2003 and I really do think it is time to scrap unnecessary alteration and simplification and to move on.

P. J. Rich, Monmouthshire.

(Neville Evans' response can be found in his article on page 617 of this issue and editorial comment in Smoke Rings on page 595 — Ed.)

In the maroon sweater, Barry Miller of Compass House Tools, plans the next day as Larry Cheeseman (left) looks on.



Mike Bidwell gives advice to a customer about the wide selection of small tools and inspection equipment available.

TRADE STANDS

AT THE 72nd MODEL ENGINEER EXHIBITION

Gerry Collins
spent some of his time at MEX 2002 checking out what was available from the suppliers attending the event at Sandown Park.

Judging from the crowds surrounding the trade stands I should imagine that they all did good trade, some certainly relieved *me* of some hard earned cash. A number of stands dealt in second-hand tooling, probably from factory closures which seem all too frequent these days. Many model engineers now have industrial size machines in their workshops, and these traders are among the few sources available to model engineers, supplying at reasonable prices the larger tooling and accessories required for these machines. As the stock and availability change daily is it not much use me telling you what you have missed, you should have been there. Some of the shopping bags I saw leaving the exhibition seemed heavily loaded to me.

If you like to experiment then the show was the place to be. I noticed stands supplying solar panels, various small electric motors of different voltages, electronic odds and ends, wheels and other items, the function of which were beyond my ken, but judging by the money changing hands, others knew about them. Many of the traders present are regular advertisers in *Model Engineer* and they are always pleased to attend to queries and help if at all possible.

Compass House Tools are located in the little Sussex village of Rotherfield and proprietor Barry Miller, was in a happy mood by the end of the first day when he showed me the list of items he needed to bring to the show the following day in order to restock the stand. Part of Barry's business is supplying ready-to-run locomotives in 5in. and 7¼in. gauges, and I know that a number of enquiries were made.

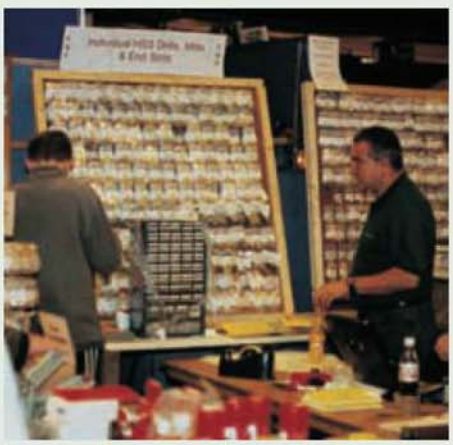
Bidwell Tools based in Maldon, Essex supplies a wide selection of small tools, inspection equipment and books aimed at the model engineer. Mike Bidwell has spent 49 years in the engineering industry. As a toolmaker he is well versed in all things engineering and is just the man to give advice.

Nearby was the stand of EKP the well-known manufacturer and supplier of all sorts of nuts, bolts, set-screws and washers. Based in the West Country, EKP supplies special round headed bolts without a screw driver slot to represent coach bolts for the model wagon builder. Having automatic machines the company has branched out into supplying steam fittings. Buying material in bulk for production work it seemed sensible to carry a range of steel and brass sections in 2ft. lengths and many model engineers walked away with bundles of material. Also available was a range of cutting oils, gasket material and other items of interest and use to the model engineer.

One of the first stands that visitors saw when they entered the main hall was that of our very good friends Myford Ltd. Presided over by a jovial Chris Moore, the stand was packed with Myford accessories and attachments. For most of the time it was difficult to get near. One of the advantages of being in attendance throughout the show is that you can wait until the last half hour of each day when most of the crowds of visitors have left and you can shop in comfort. Myford have expanded into supplying items such as Vee blocks, rotary tables, dividing heads, and the like, which the model engineer finds indispensable these days. I presume that these are of Far Eastern origin but pass the tough inspection limits set by Myford.

Another trader from the West Country is Tracy Tools from Dartmouth. The stand is a magnet for model engineers who know that they can find a large range of drills, taps, dies and reamers at reasonable prices. This year they had a range of ex-government carbide and cobalt cutting tools which were specially made for the aerospace industry; this stand certainly drew the crowds.

Another regular stand at Model Engineer Exhibitions is Warco Machine Tools from Chiddingfold in Surrey. Roger Warren, MD of



From the West Country, EKP's well stocked stand.

A new Super 7 on cabinet stand, Myford's latest.

The College Engineering Supply stand.

Warco had a very full range of machines on display. I particularly liked the range of guillotine and press brakes which are now on the market, it does make life easier when you are working in sheet metal. Another item I liked was a medium sized tilting table, with a table size of 10 x 7in. furnished with three tee slots, it would accommodate most model engineering jobs. It is not long ago that you would have to acquire the castings and undertake some tricky machining to have such an accessory; now they are available off the shelf at a very reasonable price.

A number of companies deal in second-hand machinery. With the availability of phase converters, the use of ex-industrial 3-phase machines on a single phase supply is simple. Home and Workshop Machinery is one such company and they had a small sample of their stock on show at Sandown Park. One machine that caught my eye was a Tom Senior Universal Mill in excellent condition. The label said that it had hardly been used and I could believe it. With an extra large swivel table (36 x 8in.) and electronic variable speed drive to the table it would have enhanced any model engineer's workshop. As I had spent my monthly allowance on a packet of drills, I had to walk past.

A regular advertiser in these pages is L.A. Services, otherwise known as The Engineers Emporium. It is difficult to describe the contents of this stall as it seemed to contain anything and everything that could be required by the engineer. Chucks, faceplates, tool grinders, you name it and it was there. I noticed a selection of fully machined driving car wheels at prices little more that the cost of a rough casting. At the back of the stand a number of second-hand books were on display and *A History of Tin Mining in Cornwall* was added to my library.

Model engineers who like to make their own tooling and accessories found all they required at College Engineering Supply's stand. Based in Wolverhampton, they are suppliers of standard machine tool castings, cast iron block and bars. In addition, they supply plastics, Tufnol, non-ferrous metals in many different sections, tube and sheet and a large range of bright mild steel. A lot of material is sold by weight which gives very competitive prices. The young ladies behind the counter made it a pleasure to spend money.

A stand which at first sight may be thought to have had little to do with model engineering was Grandad's Toys. Designed originally for the doll's house trade Peter Turvey has developed miniature clay bricks, paving and tiles which, when laid with the special mortar, gives a very realistic wall or roof. Those model engineers who build stationary engines and want to mount their pride and joy on a realistic plinth and tiled surround can find their answer here. All the bricks and tiles come in various colours and, if you want to lay a concrete foundation with cast-in holding down bolts etc, the company can supply a concrete mix with scale size aggregate. Peter exhibits at Dolls House Fairs throughout the South and will be at the Model Engineering Exhibition in Harrogate in May.

A Tom Senior Universal Mill on the Home and Workshop Machinery stand.

Once you have used a machine fitted with digital read out (DRO) you wonder how you coped before. Fitted to a milling machine, accurate spotting and drilling to an accuracy of 0.0005in. is a 'piece of cake'. Ortec Ltd. of Guernsey in the Channel Islands, are manufacturers of low cost, high quality DROs for the model engineer. They offer a complete range of readouts up to 3-axis and the encoders are available in a variety of lengths to suit the machine. I saw a number of interested model engineers examining the equipment on display and I am sure it will not be long before such equipment is in common use.

A familiar figure at all exhibitions is Bruce Davey of Bruce Engineering, ably supported by his wife Gerry, with Paul Gammon and Anthony Mount. The stand is full of the bits and pieces required by the model engineer. Bruce is the distributor for many designs including the prize-winning models of Anthony Mount, Stuart Models and Cheddar Models. They are not just steam models but include boat kits, gas engines and boiler plants. The world famous stainless steel superheaters by Paul Gammon were on display, ideal if you want to fit radiant superheaters which extend into the firebox. If you are searching for that unusual piece of material, fitting or model seek out the Bruce Engineering stand at the next exhibition, you could well find it there.

All model engineers need small tools and fixtures; one company which caters for that need with a wide range of tooling is Chronos Ltd., of St. Albans. The stand was packed with goodies and owner Mark Smith and his staff were happy to answer any questions. I was interested to see the Vertex tilting rotary table which could solve many problems in setting up a component for milling or drilling at an angle. There are many new lines in their latest catalogue and Mark will be happy to send you a free copy if you ring 01727-832793.

With the Editor hovering and space running out there were still many stands I could mention: Chester Machine Tools with their wide range of machines, J. P. Tools all the way from Sheffield with a large selection of cutting tools including some in solid carbide. Even I was persuaded to part with some cash. Finally, Folkstone Engineering Supplies who carry a large range of ferrous and non-ferrous metals in many different sections, together with a range of engineering fixings, including socket head screws.

Checking the free showguide I have just counted up 48 trade stands which means that there are a good many which I have left out. My apologies if there are any of particular model engineering interest which I have overlooked; there was so much to see and so many tools to examine. Unfortunately, some well-known suppliers were missing but, at the end of the day, the traders present seemed happy with the business that they did, and the smiling faces and heavy loads of the visitors showed that they were just as happy with their bargains. Being just after the festive season it was too late to revise my list to Father Christmas, perhaps if I leave this issue laying around with the page open I never know my luck for next year. See you there.

Miniature bricks and tiles from Grandad's Toys.

Inspecting the goods on the Chronos stand

A new lathe available from Warco Machine Tools.

Left: water cutting involves no heat and leaves clean edges.

Right: the water cut side rod (bottom) required little work to finish (top)

A CUT ABOVE THE REST

Tim Coles
discusses the advantages of water cutting for model engineers.

These days, time for working on my 5in. gauge version of the gas-turbine locomotive, GT3, seems to become ever more limited. I have to spend increasing periods away from home during the week and so any legitimate short-cut to completing the model needs to be considered. Now, it so happens that my good model engineering friends Ted Goode (Cambridge MES) and Peter Taylor (South Cheshire MES) have temporarily abandoned the pleasures of GL5 (The Ground Level 5in. Gauge Main Line Association) and started building a pair of 7¼in. gauge **0-4-4** tank engines.

Together with the various massive iron castings for these locomotives came pre-cut main frames and bogie frames complete with all the necessary holes. There was also a set of pre-cut connecting and coupling rods. Curiously, these parts showed no signs of burning, either from flame-cutting or laser profiling, just a grey crystalline finish to the cut edges. *"Ah, yes"* said Peter, *"They're water cut. No heat, just a fine jet of high-pressure water."* I enquired further and Peter was able to furnish me with the name and address of the people who carried out the water cutting, a company called Sciss (pronounced to rhyme with 'mice') based in Kent.

I called Sciss and talked to Ian Gorsuch, who suggested I should send him my drawings for a quotation. I promptly e-mailed .dxf files of my GT3 mainframes, bogie frames and coupling rods and a day or so later a quotation was e-mailed back. I thought the price was reasonable and told Ian to go ahead. Less than a week later, a long and heavy parcel arrived at the door.

Since GT3 has no heavy boiler and the makers of the turboshaft engine claim an output of over 7bhp, I reckon I need adhesive weight for the drivers and so I opted for frames 5mm thick. **Photograph 1** shows the finish on the frames just in front of the leading coupled axle. I gave the frames a rub with an emery block to remove the sharp edges but otherwise they needed no more treatment. All of the many holes for horncheek fixing screws, frame stretchers and brake hangers were already cut, and as far as I can tell, accurately placed to within a few thou.

Photograph 2 shows a before-and-after set of coupling rods, cut from 10mm thick mild steel plate. Some gentle work with a fine file followed up by an emery flap in the vertical drill sorted out the cut edges, which seem to have a draft angle of about 2 degrees. My drawing specified 0.500in. diameter for the main holes in the rods; Sciss correctly surmised that this was the finished size and cut them 20 thou undersize ready for reaming.

After this, I decided to go for some more water-cut parts. **Photograph 3** shows the wheel balance-weight plates, brake-gear equalising plates and brake pull rods cut in 1.5mm mild steel. The six brake hangers are cut in 3mm mild steel and the beautiful oval buffer heads are cut in 3mm stainless steel. It would have been hard work making all these parts by hand from sheet material. Again, I simply sent drawings by e-mail and the parts were posted back. The drawings do not need to be annotated with dimensions because these exist within the file, however I do include one dimension, for reference.

The actual cutting system uses a jet of water, pressurised to a hefty 40,000psi and fed with 80-mesh garnet abrasive particles; in effect it is an abrasive cutting process. The jet is just 25 thou in diameter and the nozzle, which lasts about 70 hours, is made from boron carbide. The blank material is fixed in place and the water jet is moved by an accurate computer-controlled X/Y motion system. The general tolerance of the work is about 0.005in. which is pretty good for sheet material work. Over short distances the tolerance can be even better.

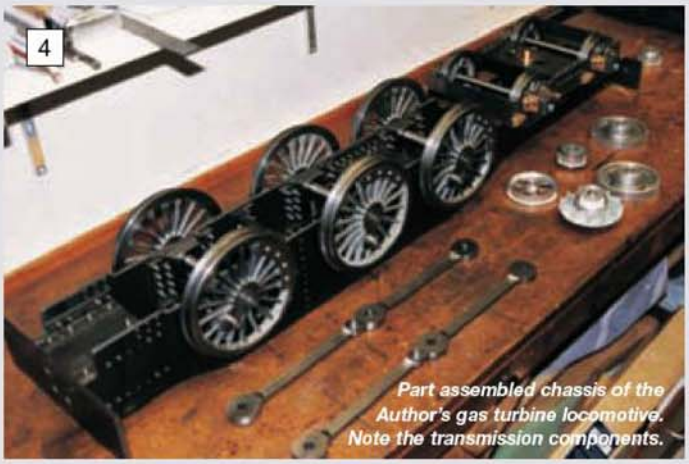
Water cutting can be used for anything up to 2½in. thick in mild steel and, unlike laser-cutting, it can deal with materials such as aluminium, copper and brass. Perhaps locomotive builders could try water-cut boiler tube plates or cleading sheets, while clock makers might experiment with ready crossed-out gear wheels. Since water cutting is a cold process, there is no heat distortion and no heat affected zone. All sorts of materials can be cut including hard steels, composites, ceramics, and even mixtures of different materials. About the only material which cannot be cut is toughened glass. I understand that this material tends to explode.

The length of items for water cutting can be anywhere between fractions of an inch up to about 8ft. long. The final quality of the cut is determined by the rate of feed, there being five speeds: model parts are generally cut at rate 3, which is a good compromise between quality and cost. And talking of cost, how much is likely to be charged for this process? Well, your best bet is to get a quote from the company, but as a rough guide, my loco frames, bogie frames and coupling rod blanks came to about £250.

Some may consider this to be a lot of money but bear in mind first that this included the material, and secondly that this included all of the holes ready drilled. Just think how much time I saved in marking out, cutting and drilling. My final illustration, **photo 4**, shows the part-assembled chassis of GT3 with some of the transmission components laid out on the bench. No, that is not a turbine wheel next to the coupling rods, that is just the cooling fan!

Contact Ian or Sam at Sciss Ltd. on 01580-890582 or for further information visit their website at **www.sciss.co.uk.** I would add that I have no connection with Sciss Ltd., other than as a private customer.

CAD files were e-mailed to Sciss Ltd. and the finished parts were delivered shortly afterwards.



Part assembled chassis of the Author's gas turbine locomotive. Note the transmission components.

REPLICA 18th CENTURY HOODED WALL CLOCK

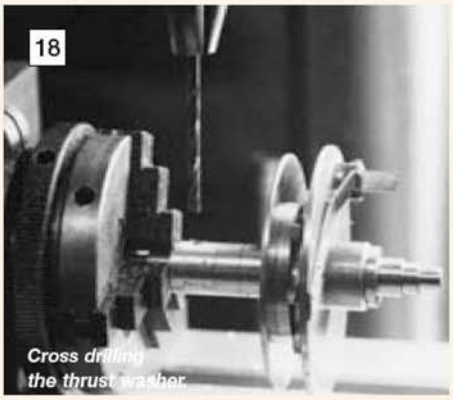
Iab Beilby

completes work on the great arbor components and deals with the wheel arbors and sun/moon disc.

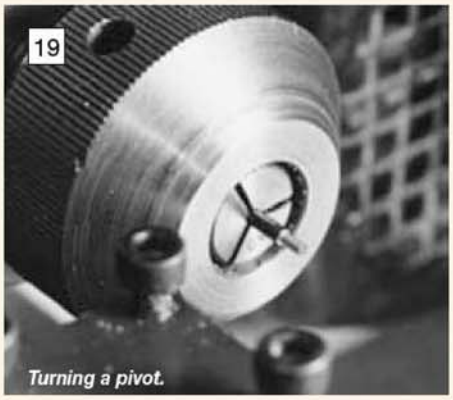
●*Part III continued from page 483 (M.E. 4194, 2 May 2003)*

Slip washer.

Slip washer and hour wheel.



Cross drilling the thrust washer.



Turning a pivot.

The slip washer is marked out as shown in **fig 7**. First drill the three holes 1.8mm (10BA clearance), then open out the centre hole to 3/8in. and the adjoining hole to 1/2 inch. To reduce the risk of the drill grabbing when it cuts into the previous hole when cutting overlapping or adjoining holes such as these, I always prefer to use counterbores. A hole to suit the diameter of the counterbore pin must be drilled first. When both holes have been drilled, the waste between them is removed with a small flat file. **Photograph 16** shows the finished washer and **photo 17** the washer in place with the hour wheel on the sun/moon bush.

Thrust washer

This simple component is detailed in **fig 8** and is used to locate and maintain the chain pulley in place on the main arbor. The usual method adopted was simply to cross drill the arbor and drive in a large steel pin. However, I intend to use a thrust washer held in place by cross-drilling the arbor, and tapping 6BA. A steel countersunk screw is then used, secured with a thread locking compound. All the components on the main arbor can then be dismantled and replaced without too much difficulty to facilitate cleaning and overhaul at a later date.

When the thrust washer has been machined and reamed 1/4in. diameter in the lathe, it should be mounted on the main arbor with the chain pulley as shown in **photo 18**, and then both the thrust washer and arbor cross-drilled 2.3mm (6BA tapping). The arbor is then tapped 6BA. The washer is drilled 6BA clearance and countersunk to house the head of the screw.

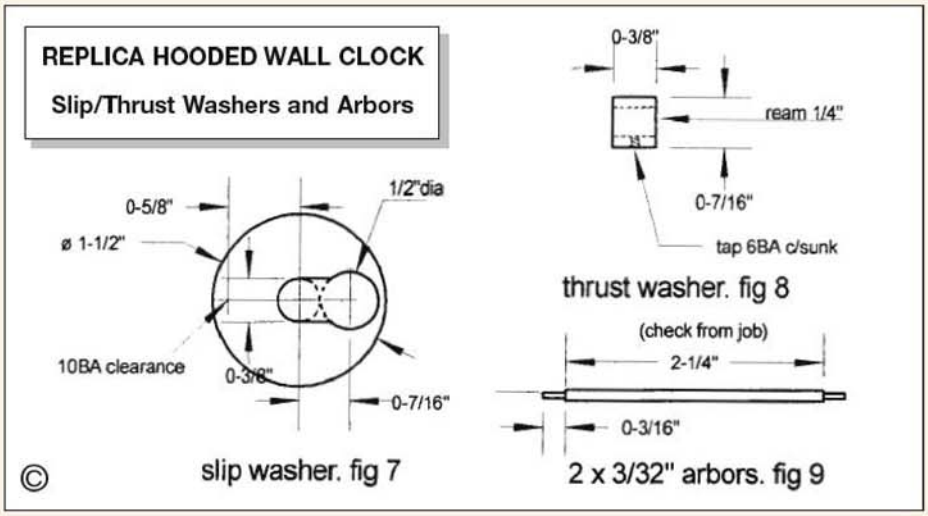
When the great wheel is fitted to the arbor, the click on the chain pulley should locate against the crossings of the wheel. In order to obtain a positive seating against the crossings, it may be necessary to adjust the face of the click by filing. A great deal depends on the angle and length of the click.

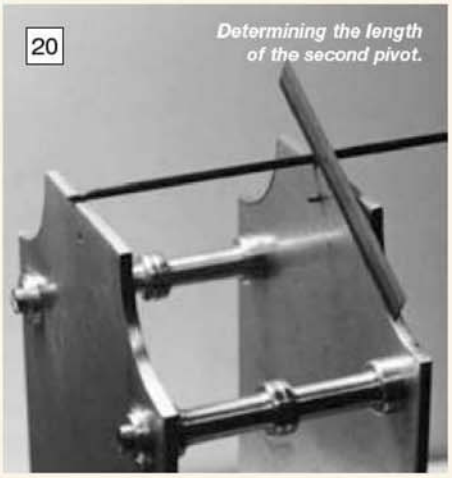
We have now reached the stage where all of the great arbor components have been made.

Wheel arbors

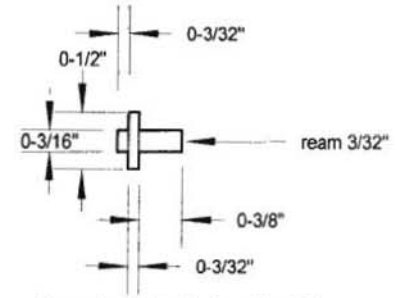
These are dimensioned in **fig 9** and are made from 3/32in. pivot steel, or silver-steel. If silver-steel is used, the pivots will require hardening and tempering. I made the pinions as separate heads and secured them in place using Loctite. The only work to be done to the arbors is turning the pivots, and as these must be concentric they are best held in a collet or 4-jaw chuck for turning. After turning the first pivot nearly to size, it should be finished with the pivot file, Arkansas stone, and finally the pivot burnisher. **Photograph 19** shows the turning in progress.

The arbor can then be laid across the plates of the movement as shown in **photo 20** in order to determine the position of the second pivot which can be marked on the arbor with a screw head slotting file. The arbor is then returned to the lathe to turn the second pivot. There should be a small amount of endshake between the shoulders of the arbor and the plates. **Photograph 21** shows the two finished arbors. ▶

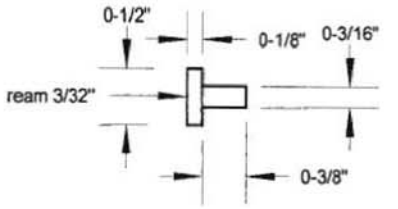




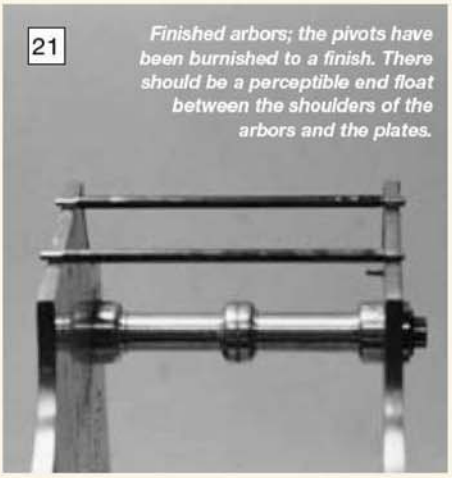
20 Determining the length of the second pivot.



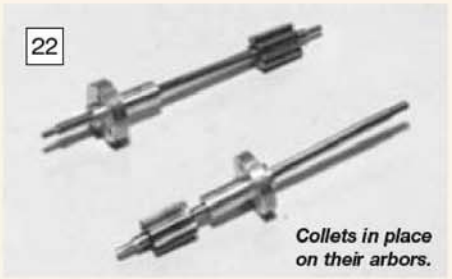
2 x wheel collets. fig 10



© pallet / crutch collets. fig 11



21 Finished arbors; the pivots have been burnished to a finish. There should be a perceptible end float between the shoulders of the arbors and the plates.



22 Collets in place on their arbors.

23 Finished wheel stud.

Collets

Both the wheel and pallet collets are dimensioned in **figs 10** and **11**. They are machined from 1/2in. brass. When making these collets, it is important that the machining of the wheel seating and the drilling of the centre holes are all done at the same setting in order to ensure concentricity. The 3/8in. dimension is machined first, the work parted off, reversed in the chuck and the wheel seating turned slightly over 3/16in. diameter. The shoulder should be undercut, to allow the wheel to fit right up against the collet seating. The collet should then be reamed 3/32in. diameter. As previously mentioned with reference to clockmaking, to ensure a good fit it is better to turn the wheel seating slightly oversize and to broach the wheel to fit.

The collets for the pallet arbor are machined in the same way, but there are no seatings for the pallets or crutch. The pallets and crutch are both reamed 3/32in. to a tight fit on the arbor and are fixed to the collets with 10BA screws. The wheels are fixed to the collets with three equi-spaced 10BA screws. The best way of doing this is to drill the three holes in the wheel, place the wheel on the collet seating, and use the wheel as a jig to drill into the collet shoulder.

The collets and pinion heads are secured to the arbors with Loctite when all the components have been made as shown in **photo 22**. However, if you propose to use the John Wilding depthing tool to depth the train in due course, the pinions must not be fixed to the arbors until depthing of the wheel train has been completed.

Reverse minute wheel stud

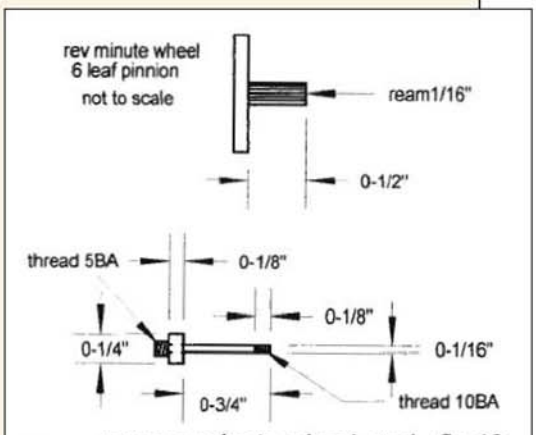
There are many ways of making this small component and although not traditional, I usually fabricate the component from hexagonal stock (**fig 12**). A length of 1/4in. hexagonal steel is held in the 3-jaw chuck and a 1/8in. length reduced to 1/8in. diameter. This is then threaded 5BA from the tailstock and the component drilled 1/16 in. without disturbing the setting. The work is then parted off 1/4 in. long. A 1 1/16in. length of 1/16in. silver-steel is then threaded 10BA x 1/8in. for the retaining nut and simply fixed into the drilled hole with Loctite.

Particular attention should be paid to ensure the wheel and pinion have a small amount of endshake between the 10BA nut and the stud seating. Any surplus steel protruding from the 5BA threaded part of the stud can then be carefully removed by grinding or filing. The finished stud is shown in **photo 23**.

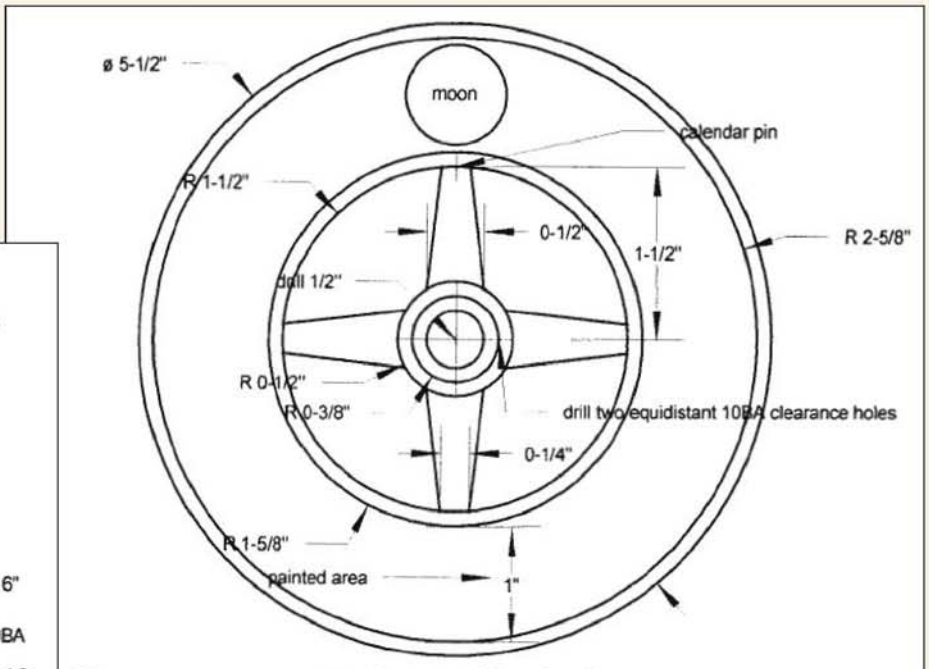
Sun/moon disc

Figure 13 gives the dimensions of this disc. The illustrations reveal that I have had my disc professionally painted, not as on the original clock, but this is a matter of personal taste. I would not advise having the disc painted until after the movement and main dial have been constructed and found to be working correctly. Should any adjustments to the sun/moon disc be necessary, these are better carried out before painting.

The 5 1/2in. disc is cut from a piece of 5 3/4 x 5 3/4 x 0.048in. brass sheet. First scribe a centre line and mark the location of the centre hole using a sharp



© reverse minute wheel stud. fig 12



© sun & moon disc. fig 13

Sun/moon disc after cutting out.

centre punch. Dividers are then convenient for marking the 1/2in. centre hole and the other dimensions of the dial. The pin which operates the calendar wheel is located at 1 1/2in. radius beneath the illustration of the moon, ensuring that the date changes at midnight; this should be marked at this stage. The dial is then cut out by hand using a piercing saw. One advantage of using 0.048in. gauge brass is that it makes this operation quite easy.

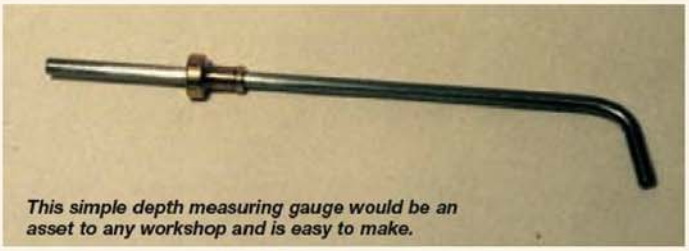
The disc is then taken to the drilling machine, and the centre hole is the first hole to be drilled, followed by the clearance holes for the 10BA fixing screws, and finally the hole for the calendar pin. A check should be made to ensure the drilling has not distorted the disc in any way, and any burrs thrown up on either side of the disc should be removed with fine emery paper.

The piercing saw is then used to cut out the segments between the crossings. It is surprising by how much the wheel is lightened by removing these relatively small pieces of brass. **Photograph 24** shows the disc after cutting out these segments.

The calendar pin is an ordinary tapered steel clock pin driven into the disc with the disc supported on a steel stake.

●*To be continued.*

A SIMPLE DEPTH GAUGE


This simple depth measuring gauge would be an asset to any workshop and is easy to make.

Len Walker
describes a simple but very useful addition to his workshop equipment.

This gadget is undoubtedly one of the most useful I have ever made. It is probably the simplest too, but then these two things so often go together.

I have used it in industry and in my own workshop for many years to measure the depth of holes in components, step dimensions, etc. The elegance of the tool is its extreme simplicity. For example, if the depth of a bore is to be checked, just press the brass ferrule against the job and then push the stem firmly against the bottom of the hole. Remove and measure the true depth with a rule. Because the brass ferrule is split and sprung into contact with the stem it will stay put.

Checking and measuring takes only seconds, a useful time saver when boring to depth in stages. Perhaps more important is the confidence it provides as the hidden depths of the hole can be brought out into full view and checked at your leisure and convenience. It will measure the depth of holes from 1/8in. dia. upwards and, if the tip is magnetised, can be used to remove swarf (often a nuisance) prior to checking.

Stem (Detail 1)

Construction is simple and starts with the stem, which is made from 3mm dia. silver-steel. Cut off a piece, say 5in. long. Mount it in the 3-jaw chuck on the lathe and face off and polish one end square. Do not chamfer, leave the edge sharp.

Fit two wooden jaws to your bench vice and file a 7/32in. radius on to one jaw. Bend the stem with the 3 3/4in. length gripped between these jaws in the bench vice. Leave the short end over-length and tap round using a hardwood punch. This method ensures that the main portion remains straight. Trim the short leg to size and chamfer as shown.

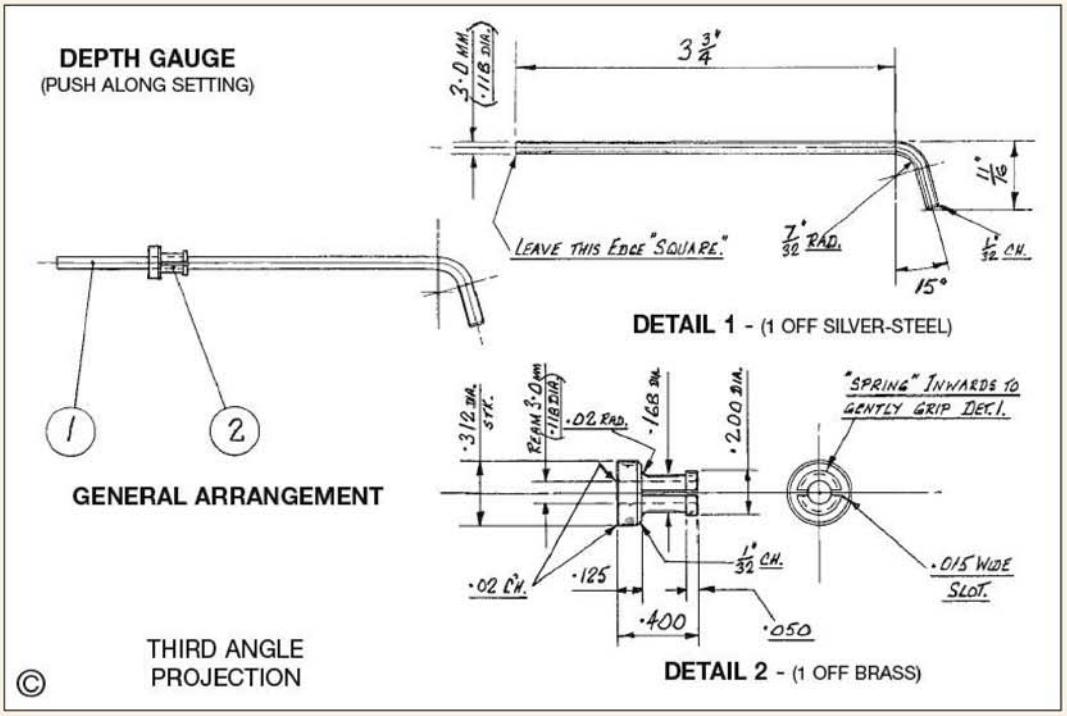
The measuring tip can be hardened and polished if so desired. Mine was left soft.

Ferrule (Detail 2)

Held in a 3-jaw chuck, face the end of a piece of 5/16in. dia. brass. Centre drill and then drill and ream 3mm dia. to the depth required plus 1/8 inch. Turn the 0.200in. dia. and then gently turn the 0.168in. dia. and 0.02in. radius. Cut the 1/32in. chamfer. Part off to length taking care to ensure a square part-off face. Reverse in the chuck and form the 0.02in. chamfers in the bore and on the outer diameter. Slit 0.015in. as shown. A junior hacksaw will do the trick if used carefully. Deburr the part.

Using soft jaws in the bench vice, gently squeeze the 0.2in. dia. so that it grips Detail 1 firmly. The ferrule should allow the stem to pass through when given a firm push but remain in position while a rule measurement is taken.

I have found this tool so adaptable that it has been used for all manner of other jobs. These include centring brackets on assembly, measuring all sorts of inaccessible places, measuring the depth of blind holes, recesses and so on. Keep it safely in an old needle file box or similar. It will repay your efforts many times over.



A 35 TON COALING CRANE

Beryl Harcourt

recalls her father's role as a hospital engineer and his prolific and varied output as a skilled model engineer. By this means she hopes to locate some of the models now dispersed around the world.

The dockside coaling crane went to Australia.

Humphrey John Wyatt, born 29 October 1893 and known as Jack, my father was the sort of man who could turn his hand to anything. I know that my view of him is prejudiced but those who knew him would agree that he had both intelligence and manual dexterity. He would happily mend my doll, as he would gladly mend a fuse or a burst pipe, or anything that needed fixing. Originally he had trained as an electrician but for the majority of his working life he was employed as a hospital engineer. This would have been from the 1930s until the 1960s, and in those days hospital engineers had to know a bit about just about everything! He was not only a hospital engineer, but he was also clerk of works and head of the fire brigade. He worked at a large mental hospital which generated its own electricity, pumped its own water, and had a laundry and two farms.

In the 1930s these large mental hospitals were largely self-supporting in that the long-stay patients provided a large contingent of labour which was used as gardeners, farm workers, cleaners, etc. To support this unskilled labour my father had a work force of maintenance engineers, fitters, carpenters, painters, etc. and they were kept busy looking after the machinery and equipment used by all parts of the hospital. Nearly all repairs were carried out on the premises which could put a strain on his ingenuity, but he adopted as his motto: *'The impossible can be attained, but miracles take a little longer.'*

We lived at that time in an interesting house which had a large garage at the bottom of the garden. We didn't own a car so Dad used the garage as his workshop. In his spare time, evenings and weekends, he could always be found in his workshop making models. He had equipped his workshop with a lathe, a 1930 Zyto which is now in the process of being refurbished by his grandson, a drilling machine, buffing machine, etc., and was filled to the brim with tools of every kind. If he couldn't buy the tool he wanted, he made it, and even if it was obtainable he usually made it to suit his particular needs.

Over the years he made many models, mostly of pumping engines, some of which were working at the hospital, and each year he would enter them in the annual Model Engineering Exhibition at the Drill Hall in Norwich where he won numerous awards. The Society's aim was to foster skills in the mechanical arts and to this end they had a large fully equipped workshop where young and old could go and learn to use their hands.

In the Official Catalogue of the Exhibition of Norwich & District Society of Model Engineers held in October 1936 are listed the models submitted by H. J. Wyatt:

- Grasshopper Engine, the original erected in 1865 at Thorpe Mental Hospital.
- Three-cylinder steam engine with flywheel and propeller, built on a penny.
- Three-throw crank shaft turned from a Ford back axle in four hours
- Horizontal single cylinder steam engine. Materials cost 4/-
- Set of patterns for Grasshopper Engine model.
- Set of patterns for side frames of a Wharf Crane Winding Gear.
- Part of a 1/2in. scale model of a 35 ton Electric Wharf Crane. Contains 5,500 rivets and 49 gear wheels cut in the lathe.

From this list it would seem clear that he was well on the way to completing the Crane. He had no interest in making locomotives but liked to make models which other people seemed to think were too difficult. His smallest model was a three cylinder engine on a penny — the smallest rotary engine ever made perhaps, which ran on compressed air, and his biggest was a 5ft. Dockside Coaling Crane which took five years to build and won him the London Championship Cup in 1937. In order to keep everything to scale he made his own taps and dies for the bolts on the Coaling Crane and he made all 5,500 scale rivets too.

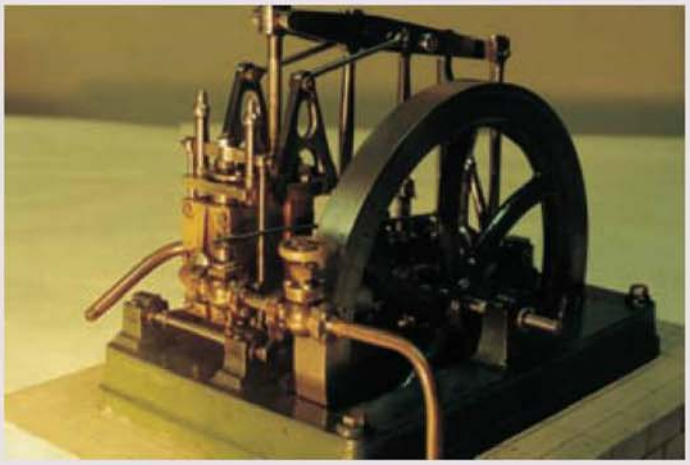
The trophy presented in 1937 for the crane.

The three-cylinder engine on a penny seems to have disappeared and I would love to find it. The Dockside Coaling Crane, on completion, was crated and loaned to the South Kensington Science Museum where it was kept until the early 1950s, having been stored safely during the war. It was eventually offered to them but they couldn't find the funds and it was purchased by a Mr. Harding-Kiff, shortly before he emigrated to Australia. Mr. Harding-Kiff told the Science Museum that he intended to give the Crane to a Museum in Australia. Dad also made an Electric Lift (at present in store at Christchurch Mansions in Ipswich) and a Lound pumping station grasshopper beam Engine. The Grasshopper Engine is in Canada with his son, together with the Championship Cup which he won in 1937 for the Crane.

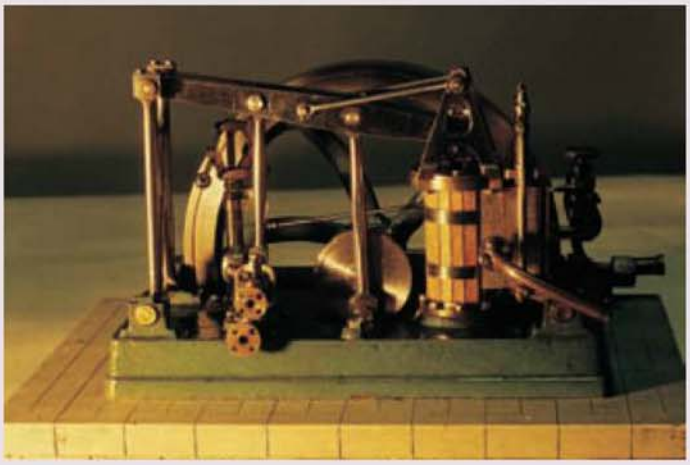
At about this time, the firm of Craftsmanship Models was created with my father making the scale models which were used by various engineering companies to demonstrate their equipment, such as boilers. He would make these with cut-outs to reveal the internal workings. He also made watchmaker's lathes which were unobtainable at the time. He contributed to the design of some of the first model aircraft engines and I can remember seeing a tiny engine with an even more miniature spark plug clamped in the vice with Dad swinging what seemed to be a huge propeller. Once started the engine would run at high revs for as long as the fuel lasted. I also remember him making a twin, horizontally-opposed engine which was to be housed in a replica of the *Bluebird* for which he knocked up an aluminium body. I think he raced it only once, being more interested in its creation than the performance. I have not been able to find out what happened to Craftsmanship Models after Dad left them.

Maybe my father lost his competitive spirit or maybe, having won the ultimate award, he decided to turn his hand to other items. One day he came home with a sack full of used pistons. This white metal was ideal for his next project which was to make ashtrays. Each ashtray had an individual stem which could consist of say, small metal disks set in rotating fashion one on top of the other but actually turned from a solid bar, or a column of strips of metal slightly curved from base to tray. Another variation would include bands of black plastic inserted and there were endless variations in the columns that supported the ashtrays which were turned on the lathe. The tray and base were made from the pistons and the columns from anything he could lay his hands on.

Dad retired in the 1960s and had to leave the hospital house and his beautiful workshop. The only workshop he had now was a tiny cellar, so



Model Lound pumping station Grasshopper beam engine.



The beam engine is now in the keeping of Mr. Wyatt's grandson in Canada.

he turned his attention to making jewellery and ornaments. He went to evening classes at the Technical College and made articles from beaten copper which he then had silver plated. We each have a tea service, individually styled to suit our tastes. He became expert at repairing pewter and was used extensively by a local jeweller to this end. His final show of talent was to take up oil painting, copying old masters and giving them to his relatives where they are on show as a permanent reminder of this talented man.

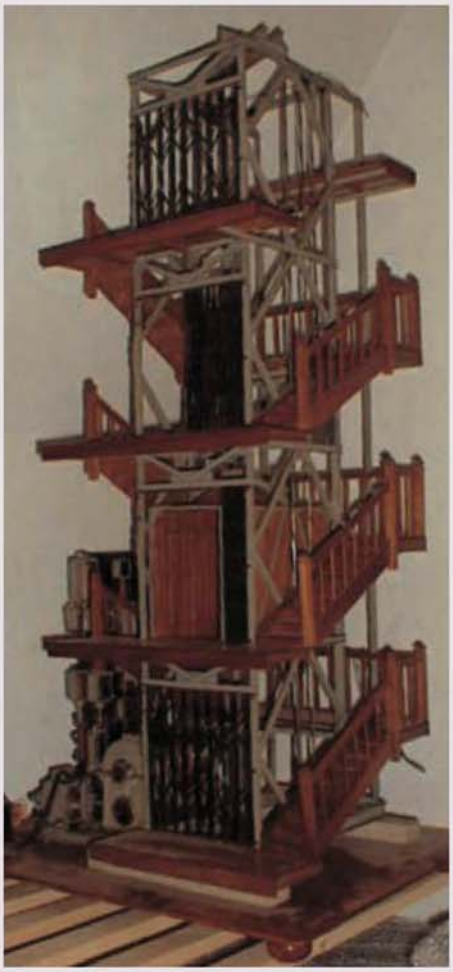
I am presently trying to establish the whereabouts of the rest of his models and would appreciate any news anyone may have. I would love to photograph them for the sake of his grandchildren who are interested in his achievements, one of whom, when the Zyto lathe has been refurbished, may well try to emulate his grandfather's successes.

The following notes describe the construction of my father's 35-ton Coaling Crane model and were penned by him in the 1930s.

Coaling crane scale model

I have noticed, for many years, that models requiring building up with sections, angle, tee, channel, and girder, have been very few and far between because, I understood, of the difficulty of obtaining suitable scale sections. The position constituted a challenge to the ingenuity of the model making fraternity, and I decided that something must be done about it. I always wanted to build a large crane and, after a lot of perusing of catalogues, and correspondence between manufacturers and myself, I found the suitable material was forthcoming. I chose a 35-ton Coaling Crane, electrically-driven, as made by Messrs. Stothert & Pitt of Bath, who very kindly supplied the drawings. About three months was spent in re-drawing the crane to the scale of half-inch to the foot, and then the job was started. The original drawings were followed very closely, and nothing was left undone to ensure a correct copy, which resulted in a most realistic appearance. The four motors are a little over scale size, in order to get the necessary power to work the crane, but I managed to fit them in with the necessary gears without altering external dimensions. They work at 30 volts, 2 amps, dc, and were entirely made in my workshop. I have to acknowledge many valuable hints from *M.E.* on the making of much of the model, particularly the commutators, and the two worm reduction gears. The armatures were wound four times before I got sufficient power for the job, each time raising the required voltage until 30V was found sufficient. The fields are former wound, first with 30swg DCC, and, finally, with 30swg enamelled copper wire, the latter giving enough turns for the field strength. The worm-gears referred to were steel and bronze, the steel worms cut square thread to double the length required, one half being gashed and hardened to make a cutter for milling the worm-wheel, afterwards softened and turned off to form a shaft, as required. This method, naturally, ensures that the worm perfectly fits the worm-wheel, and can be recommended as an excellent dodge. I am indebted to Mr. G. Gentry for this idea, in an article in the *M.E.* about 1926.

The other 52 gears, ranging from 12-tooth pinions to 72-tooth spur-wheels, are cut in the lathe to 24 DP, and include four pairs of mitre-wheels — two equal and two reducing. Cutting was done by a four-toothed fly-cutter rotating in the lathe centres, the blanks swung on a vertical slide, and divided by means of the lathe change-wheels. These gears are all in hard brass.



This model electric lift is in store in Ipswich.

One odd one, the steel pinion of 12 teeth which engages in the circular rack, is 1/4 circumferential pitch, and was filed up by hand. The rack consists of a 3/8 x 3/8in. brass channel, bent to a circle of 14 1/4in. dia., and 1/8in. round steel pins to 1/4 pitch are inserted through the upper web and half-way through the lower, 175 pins in all. Five pins were purposely omitted, to avoid twisting the 16 cables by continuous slewing in one direction, the pinion 'free-wheeling' at the point where the pins are missing.

The upper part of the crane turns on a roller ring of 48 steel rollers, 1/2in. dia., held and spaced in an inner ring of 5/16in. channel, and an outer band 1/4 x 1/16in. brass flat. The ring is fastened to a central hub, bored 11/16in., by twelve 5/16in. channels, radiating from the centre, and secured to the inner channel by 24 tiny gusset-plates and 1/32in. rivets. A hollow king-pin, bored 1/2in., secures the main girder of the crane, passes through the roller ring, thence through a cross-girder on the base or truck, as it is called, and is locked by a brass nut screwed 40 threads. The 16 cables pass through this king-pin, and thence to the various motors.

The most spectacular part of the model, and the most difficult, was the superstructure and the jib. Readers will appreciate that, to build an arrangement of girders, braces, stays, struts. etc., and to keep everything square, was no easy task. But, by screwing the main channels down on boards marked correctly, using innumerable tool-makers' cramps, putting in temporary rivets, taking them out drilling a few more holes, more holes, more rivets and so on, the job was at length accomplished. Figures are dry things, but it may be interesting to record that a check was kept on everything used in the model, and that, finally, these figures were arrived at:

Rivets, 1/16in., 3/64in. and 1/32in. 8,500; gear wheels, 52 and two sets worm gearing; total length of sections used throughout, 450ft., ignoring a few feet of scrap, drills used and broken, 43, mostly 1/32in.; hand-rail stanchions, 58, for which 116 3/16in. steel balls were bored and swung on steel pins and then drilled transversely No. 53 for handrail, of steel wire.

I wish to tender thanks to Messrs. E. Gray & Son Ltd., of Clerkenwell Road: 'Pa' Kennion: and McKechnie Bros., Manchester, for courtesy in the matter of supplies of sections to scale — or, at least very near.

The whole of the lathe-work on this model was done on a Myford.

The author running a test in his workshop using his faithful ZX Spectrum Plus computer.

The computer and display screen standing on the bench adjacent to the burnt air engine.

THE BURNT AIR ENGINE

Frank Taylor

continues the description of the instrumentation and computer interface devised for his engine.

●*Part XI continued from page 492 (M.E. 4194, M.E. 2 May 2003)*

In order to obtain the data handling, storage and display benefits that a computer can provide it is necessary to get the information from the engine sensors into storage in the computer memory. In addition, control signals from the computer must be received and translated such that they control the 1.3kW heater in the engine. This is done in the interface, which is a home-built box of electronics. The same system of communication is used to work the engine as is used for communication totally within the computer. As this is a little less complicated to explain we could look at this first.

Internal data transfer

Within the computer there are what might be called main 'highways' which go everywhere such that every working part has access to the highway. Every working part has an 'address', which is just a number like a number on a house. In the middle is the central processor, which obeys the program.

Referring to **fig 9** let us look at how a number located in memory address 1 is moved to memory address 4. The highways would normally have a minimum of sixteen lines but for simplicity, the drawing has just one. In response to a program instruction the processor sends out a number 1 on the address lines, together with a signal to say it wants to read. The address decodes all numbers on the address lines and responds only to its own number. In response, number 1 address connects itself to the data lines. The next program instruction causes the processor to connect to the data lines and read the contents of address 1 and store it temporarily.

In response to the next program instruction, memory 4 is accessed in a similar way to that already described, except that a write signal is sent. This means that the processor wants to send data to 4. When address 4 has connected to the data lines the processor transmits the data that it has in store to address 4. If we imagine address 4 to be where we want to put information from a sensor, and address 1 to be the address of that sensor information, then the transfer of the information occurs in a similar manner to that described.

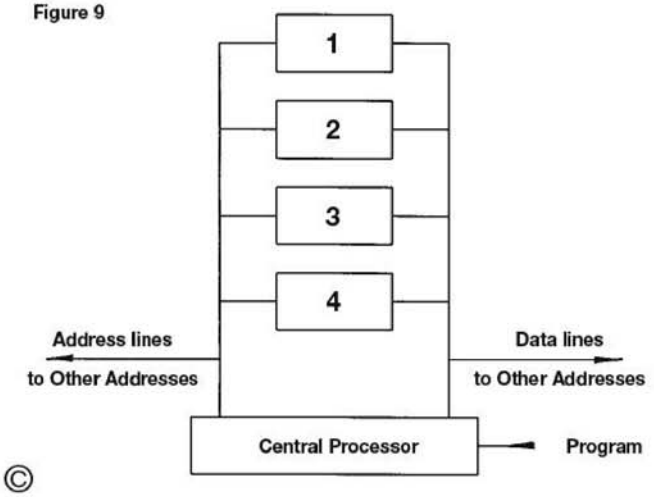
Practicalities

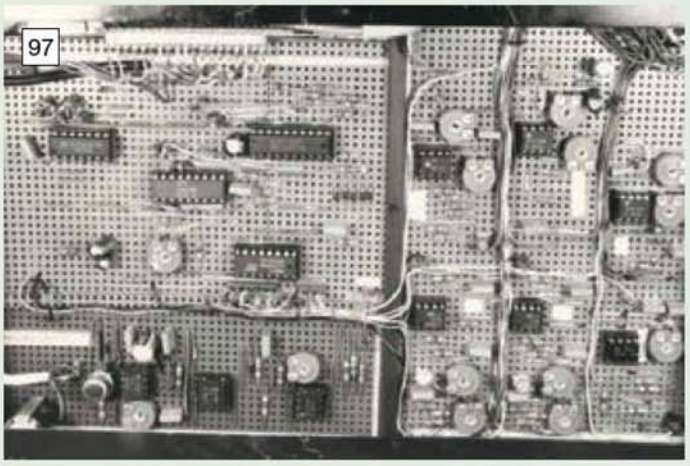
First one must get access to the address, data and control lines. These are generally available on an external socket at the back of the computer. A connection diagram for these is required. The other information needed is the type of addressing system, and what spare addresses there are that could be used. I will not go into this detail but just say that I needed two addresses and their numbers are 127 and 191

I do hope you have followed so far because we are now going to dive into the deep end and look at the interface and the piece of program that gets the information from the sensors into a set of stores in the computer.

At the bottom left of **fig 10** you see the sensor inputs. These are connected to six separate amplifiers and signal conditioners which, for the range required, bring the output to 0 to 2.5 volts. These voltages sit and wait at the input of the 8-way switch. In the top left hand corner is block D which stands for decoder. This is doing nothing except watching for either of my address numbers (127 or 191).We will deal with the other blocks later as we now need the program to get it all going. This tiny piece of the program is just six instructions and we will take them one at a time, exactly as the processor does, in numerical order.

Figure 9





The interface circuit board built by the author to monitor the inputs and outputs to and from his engine.

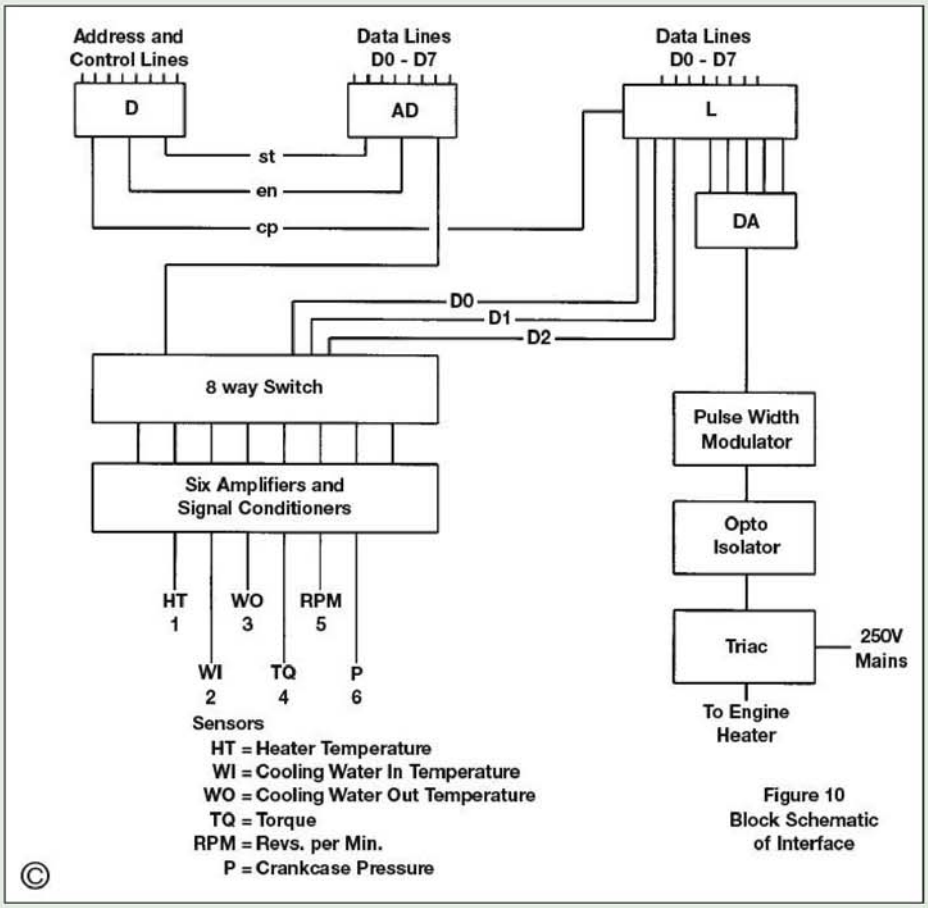


Figure 10 Block Schematic of Interface

142 FOR C = 1 TO 6
144 OUT 127, (C + Q)
(note Q is heater setting times 8)
147 OUT 191,0
148 LET V = IN 191
152 POKE (65268 + C), V
153 NEXT C

As you can see the instructions in Basic language are written as a statement in English and mean something even before explanation. We now need to switch our attention back and forth between the program and fig 10, and I shall take this as understood

The first line 142 means the value C will be made 1 then the following instructions will be acted upon. When line 153 is reached the processor goes back to line 142 makes C equal to 2 and does it all again and again until C = 6 is completed, when the processor goes about all the other things it has to do.

With C = 1 we move to line 144; OUT 127 means that we are going OUT to an external device with address 127 and the number we wish to send is C (which selects the sensor) plus Q (which will set the heater). The two pieces of information are combined in this single number. This is possible only in binary code. At the interface the decoder (D) 'sees' OUT 127 on the address lines and sends a signal on wire 'cp' to block L, (for latch). The latch connects itself to the data lines DO-D7, reads and holds the number C + Q. On the underside of the latch the binary lines are split such that the original two separate pieces of information are available.

The group of five has the heater setting and we will see what this does later. The group of three carries the value of C, which is 1 at present, to the 8-way switch. In response, the 8-way switch switches its number 1 input (heater temperature) through to its output, which is the single wire going to AD. This stands for analogue to digital converter which converts the analogue voltage of between 0 and 2.5 volts to a binary code number between 0 and 250. However it has not done this yet, the voltage is just waiting on its input and we go back to the next line in the program, 147 OUT 191,0. In this instruction the data lines are not used and the '0' goes nowhere but the decoder 'sees' the OUT 191 and sends a pulse on the 'st' wire. This starts the conversion of the analogue signal to binary code number, which waits in a store ready to be connected to the data lines.

The next line of the program, 148, means that the processor should read in the contents of address 191 and make V equal to it. The decoder 'sees' the IN 191 on the address and control lines and puts a pulse on the 'en' wire to make the converter connect to the data lines. The processor reads the number and our heater temperature is in the computer as variable V. All we have to do is put it in store, which is done by line 152. POKE is an instruction which enables you to put a number directly into any memory in the computer. With our value of C at 1 the heater temperature will reside in store 65269 until needed.

The sequence now repeats with increments of C which cater for the two water temperatures, torque, rpm and crankcase pressure. The stores in the computer are continuously updated each time the computer completes its program and at the same time the heater information is also updated to keep the heater on its target setting.

Heater control

You may remember my early effort to control the heater where the temperature swing was 40deg. Celsius. Somehow the hysteresis inherent in the large metal mass of the heater had to be off-set. It was decided that the total power of the heater would be divided into 20 equal increments and when the rising temperature reached a certain point in relation to the target the heat would reduce one increment for every degree rise.

Unfortunately this point varied with the required target. It was another case of a correction formula as we had with the pressure sensor. The formula straightened it out nicely. You will see later when I show some of the data collected that from a swing of 40deg. C there is now a deviation of around 3 degrees.

The computer works out the heat required, after looking at the heater and the ambient temperature, and gives a value to Q. In the earlier description we left a heater setting binary number on the five lines coming out of the latch going to DA (see fig 10) which means digital to analogue converter. The output of this converter is a voltage proportional to the number. This voltage, applied to the pulse width modulator varies the width of the 'on' pulse from nothing to full on in twenty incremental steps.

These pulses go to the opto-isolator which keeps the mains supply separate by the use of an infra-red beam of light to pass on the signal. An additional facility within the isolator is that it does not obey the on/off pulse immediately but waits until the current in the alternating cycle is zero before doing the switch. This prevents interference, which could be a major problem with this type of project. The signal passes to the Triac, a device capable of switching the 1.3kw heater on and off.

Main program

Once the computer and the engine, or device, are working together, the main program can provide any facility your heart desires. My program expanded bit by bit as I found the need and as time goes on, no doubt, it will expand further. At present the engine can be run with the heater at a fixed temperature or with a fixed heat. I can choose the temperature or the heat that I want. The computer displays the readings, which can be taken on a time basis manually or linked to water temperature change. There are facilities for an instant display, which is handy if you are adjusting something.

The program asks you to key in things like humidity, ambient temperature, purpose of the run, etc. These are used and retained. If desired all the data can be put on tape together with a couple of pages of notes for future reference.

The program will draw up to four simultaneous bar graphs of any selected parameters. This enables things to be spotted which might be missed when looking at a table of figures.

To give it all a little reality I include **photo 97**, a picture of the interface. You can see the circuit board is divided into three. On the right are the six amplifiers with means of screwdriver adjustment for calibration.

Top left section are four chips in the order you would normally read print. Decoder, latch, digital/analogue converter and the 8-way switch. The whole of the darker colour board bottom left is the pulse width modulator.

Perhaps I should say before closing this article that I am no computer expert. My knowledge is limited to what I have found out about my particular computer which is an old ZX Spectrum Plus. I am thus not able to answer questions on any other machine.

Next time I will present and discuss some of the data.

●*To be continued.*

STEAM TUG KERNE

Above and left: steam tug Kerne seen at its mooring at the Mersey Maritime Museum.

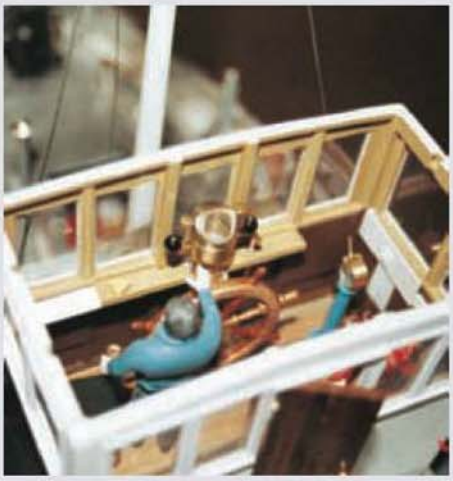
George Barrett
shows us the finished 1:24 scale model as well as some photos of the full size ship now, thankfully, once again in steam.

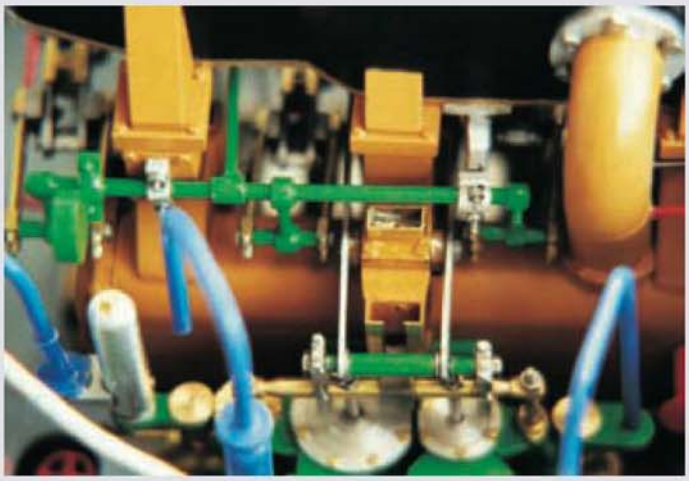
Following my initial article on the *Kerne* (*M.E.* 4173, 12 July 2002) I now have some further information on the full size ship plus an update on the model's progress. The ship had not sailed for 2½ years as work was required on the steam boiler in order to gain a new boiler certificate. A total of 14 new screwed stay tubes had to be fitted and this work was carried out by the crew as no boiler makers were prepared to take on the work. Some minor engine repairs were also needed and the ship has also been repainted (an on-going task!) As from August 2001 the ship has been in steam once again and has made several trips during the remainder of that year and also during 2002. On these runs the ship has sailed up the Weaver River to the Anderton Lift, Ellesmere Port, up the Ship Canal and also out to sea to the Liverpool Bar, etc. The ship is presently moored at Langton Lock, Liverpool and, at the time of writing, will soon be travelling up the Weaver to the Steam Rally at Acton Bridge.

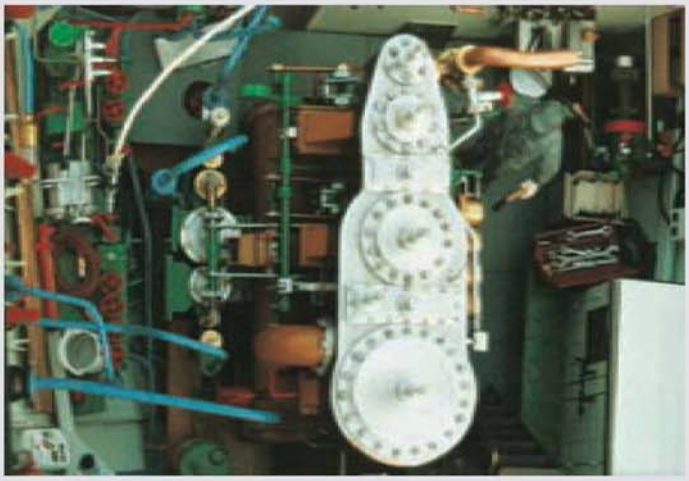
The model

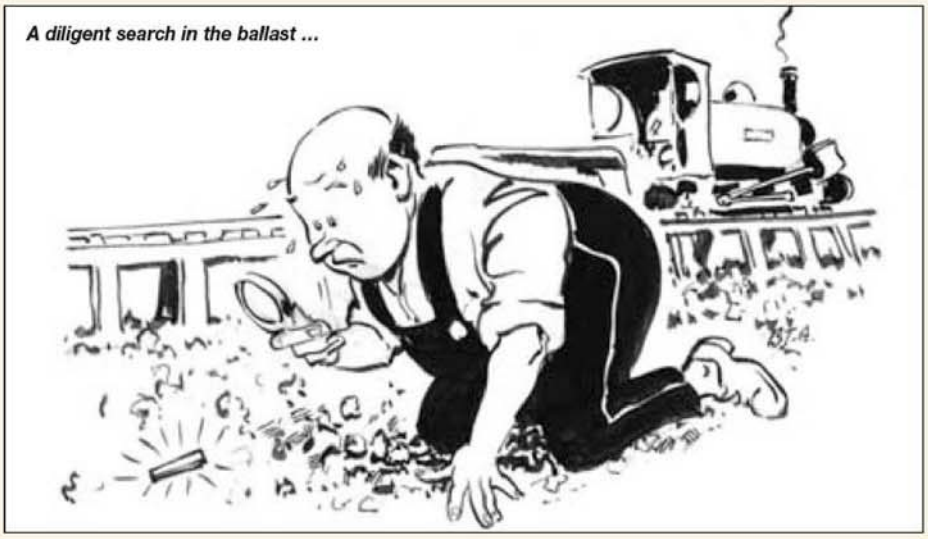
This was also completed in August 2001 to coincide with the first sailing of the full size ship. It has now been on display at several exhibitions and also travels with the ship for display when the vessel is moored up. As mentioned last time, the model is completely scratchbuilt from aluminium alloy, steel and brass. In fact, the only bought-in items on the whole model are the figures and even these were modified to represent the ship's crew! All dimensions for the model were taken from the full size vessel and many sketches were also made and photos taken. I was pleasantly surprised by the model's motor and unusual drive system which have performed far better than I had expected. Turning at 100rpm (full ahead on the ship) it performs in a most sprightly manner and I'm pleased to report that the Forward/Reverse also works. The accompanying photos, which I feel will be of interest to readers, show the now fully finished model.


KERNE









A diligent search in the ballast ...

'869': EPILOGUE TO A CHUCK VENTURE

B. Terry Aspin
provides an epilogue for his series on building *Charles*, a 5in. gauge Hunslet engine.

Descriptions and directions for constructing model locomotives have been 'Stock in Trade' with *Model Engineer* for more than a century and there is little doubt that, in the main, readers' efforts have been a success and many fine models have been created. Chuck believes, however, that the series of article on '869' have been a little out of the ordinary and, in life as it were, the model itself may be described as 'different' That it gave the builder (and others) a few surprises cannot be denied. By no means were all the surprises agreeable but, at least, they were in no way approaching a complete disaster. (Yet!)

Chuck thinks that readers of this magazine who have done him the honour of perusing his account may well be interested to know how the pudding is proven. *Charlie's* 2002 season commenced quite early in the year. She was introduced to the rails while the weather was not quite conducive and the fact that she is heavy to handle was not a surprise. Chuck had made sure that no lifting was involved. The 'roll-on roll-off' technique was and still is employed requiring, basically, two handlers and Chuck's 4-wheel Reliant van moves her to and from the club track at a distance of a mile. The model fits quite closely in the back of the van, the closing of the tailgate slightly compressing the central buffer. To prevent the locomotive toppling in transit a couple of wooden 'gates', made from 1 1/2 x 3/4in. battens, are swung in from the sides of the van and locked with a cross bar above the cab.

At her place of residence, the model lives on her own trolley built to a height to match the floor of the van where it is guided home on aluminium alloy rails of 1/4in. square section. At the steaming bay, conveyance to the track is via the club's hydraulic variable height trolley.

It soon became apparent that, with such a large boiler, steaming up was going to be a lengthy process and, in the first instance, occupied the better part of an hour. As already disclosed, attaining the water level with a direct connection to the main supply required 12 minutes and the steam raising blower, which last saw service with *Golly Gosh* and Co., although it had been promoted from 6 to 12 volts was clearly struggling.

With steam available at last, however, it was also clear that the model knew what to do with it. Most small locomotives with which Chuck has been acquainted have required a reasonably full head of steam before moving off. With something like five pounds on the clock *Charlie* was ready to go! By the time she reached the points to the 'main line' (just a few yards) a few puffs from the blast pipe had well established her fire and pressure was rising. Meanwhile helpers had been treated to a copious shower of condensate from the chimney!

A few laps of the circuit to 'prove' the engine and Chuck was prepared to call it day, all the indications being that driving was made more comfortable at lower steam pressure. The boiler had been designed and built for a pressure of six bar and had been hydraulically tested to 180lbs. In later use during the season it was found that the model could fulfil all that was expected of it at a pressure much lower, between 20 and 30 pounds! Readers may regard this as something of a paradox but it is, nevertheless, absolutely true. Perhaps the phenomenon may be attributed to the extra large cylinders on a 5in. gauge locomotive.

The weight of *Charlie* on only four wheels contributed a great deal to the adhesion and there was no tendency to slip. It was found that good results could be obtained with a relatively thin fire burning anthracite 'doubles'. There was also an advantage to be gained in leaving ajar the fire-hole door to eliminate the tendency towards 'organ piping' (a loud howling) in the tall chimney. Usually associated with 'a hole in the fire'.

The inadequacy of the blower came to a head when the rotor suddenly disintegrated one day while steam was being raised. The snail casing of the instrument had originally served as cooling for a redundant electrical device and, fitted with a low voltage electric motor, had performed its steam raising function admirably for more than 20 years. To restore it to working order, the original fan was copied in sheet aluminium alloy and, as this had angled blades, reassembly revealed that it had previously been running in the wrong direction! Rotation reversed, the result was astonishing, with the voltage reduced again to 6V and steam-up time to about 20 minutes! Chuck thinks there must be a lesson in this somewhere.

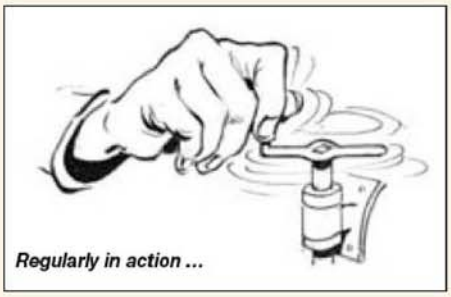
Charles *lives on a trolley which has been built to match the height of the author's Reliant van.*

A shower of condensate ...

It had been hoped that a large model on 5in. gauge would produce adequate power but Chuck admits he could not have fully appreciate the possible strain such power might inflict on the working parts. There is a reference in the first instalment of the series (*M.E.* 4175, 9 August 2002) to the fixing of the fly cranks and to the 'belt and braces' approach applied. Nevertheless, one fly crank did move — only slightly it is true — but enough to cause embarrassment. It moved by crushing the thread of the W-point socket-head screw into the steel of the axle. Now a third security feature has been added in the form of round keys. Square keys would have been better but would probably have called for a complete dismantlement. From Chuck's point of view this was not an option at this time.

One or two other annoying problems were caused, for example, by the shearing of a taper pin in the hand-brake system (this item is regularly in action on a model approaching 1:4 scale) and the loss of a split-pin in the pole end of the reach rod, which was less secure than it should have been. More recently a flat cotter came loose from the big end of a connecting rod occasioning a diligent search in the ballast. The remedy, sometimes applied to full size engines against the loss of a cotter, was to fit a split-pin to the bottom of each one so that if it came loose it could not drop out.

A more persistent problem at first, however, was Chuck's inability to persuade the cylinder lubrication system to work reliably. It was one of those classic occasions related to Mr. Sod where,



Regularly in action ...

still in the workshop, everything appeared in satisfactory working order only to fail to function when steam was raised. It is probably a fact of life that, when the oil pump decides to default, it is invariably full to the brim with oil. Removing this stuff, before any attempt can be made to rectify the matter, can produce an extremely sticky situation, and usually does. The system in use was described in the article. Oil from the pump is divided between the two miniature Roscoe-type

Always willing to learn ...

lubricators either side of the smokebox. These have needle valves to regulate the supply and the oil enters the valve chests through the covers as it did in the original. The old bloke believes that the problem may have originated with his rather over-size pump ram at 3/16in. diameter. It coped easily with SEA-40 on the bench but the heavier fluid caused it, on the down stroke, to skip teeth on the ratchet wheel. A brighter spark would have spotted this instantly but it took Chuck a dozen dismantlements for the penny to drop!

Still without a working injector, the boiler feed pump seems to cope extremely well with all load conditions so far encountered and requires the bypass open from time to time. Blowing off wastes water and so does lengthy standing time. In such an eventuality the hand-pump, (the panic pump) situated on the driving car, has to be brought into play.

Chuck's determination to spin the brass outer dome has brought him some self-criticism. Comparing photographs of the original engine and the model, the outline of the domes clearly does not match. In preparing the mould for spinning he had based it, allowing for scaling, on the dimensions indicated on his copy of the Hunslet general purpose drawing. Regrettably this does not conform to the profile of the actual dome as seen today on *Charles*. Spun from 16 gauge brass there may be sufficient material for adjustment. But that, perhaps, will have to be a project for the future when some sympathetic person has explained to him how to do it! Chuck is always willing to learn.

EUROPEAN CANALS, SHIPLIFTS AND LOCKS

John Olsen
visits the Niederfinow shiplift in Germany.

●*Part V continued from page 490 (M.E. 4194, 2 May 2003)*

The shiplift at Niederfinow is on an important canal route from Berlin to the Oder river. This canal was originally called the Hohenzollern canal but is now known as the Oder-Havel canal. The city of Berlin is well supplied with rivers and waterways. It is linked to the Elbe system in the west, and by the Oder-Havel canal to the Baltic Sea. Berlin is higher than the Oder valley and the lift takes the canal down the escarpment. The lift replaces an earlier series of water conserving locks. Built between the years 1927 and 1934 it accommodates vessels up to 94 metres long and 12 metres wide. The draught is 2.5 metres. The weight of the trough is 4300 tonnes. The barges are lifted through 36 metres. Although not the largest shiplift, this is an impressive machine, particularly since it has more of the ambience of the older shiplifts with its lattice work steel structure, rather than the plain look of the newer designs.

Looking up at the Niederfinow shiplift.

The lift operates on the counterweight principle like a modern lift in a building. This is also the method to which the original lift at Anderton was converted. Multiple counterweights are hung from pulleys either side of the trough; there are 192 counterweights altogether. The drive machinery is mounted on the trough itself above the vessel being lifted. There is a separate 75hp motor for each rack, located near the corners of the trough. Long shafts link all four to ensure even driving even if a motor fails.

The main structure is a steel framework standing in the valley. It is linked back to the upper canal by an aqueduct 157 metres long which itself would be an impressive structure even without the lift.

The shiplift can be seen well from the ground. It is also possible to visit the upper level for a fee. At the time of my visit in the early evening, the ticket office was not manned but we were able to follow the example of some other visitors and climb over the turnstile. Once at the upper level it is possible to walk around a wide footway right around the lift. This is an excellent vantage point from which to watch operations. From here we were able to watch a three section push barge make the ascent. First the push tug pushed in the

Looking down on the trough from the high walk way. Shafts linking the four motors can be seen at either side. The machinery rooms rise up and down with the trough.

first two sections which were then uncoupled and raised. At the top, lacking a push tug, the two dumb barges were towed out by means of an endless travelling rope provided for the purpose. The push barge then entered and was accompanied up the lift by a Berlin registered yacht complete with family dog.

Looking down into the lift from the walkway above the entrance gate can give a strange impression as the lift begins to move upwards. Between the counterweights going down and the trough going up, it is hard to tell if you are moving or standing still; not unlike when your train is stopped in a railway station and the adjacent train begins to move away.

As the trough moves upwards, the weight of cable on each side of the pulleys changes. This would cause a total change of weight of 90 tonnes between the top and bottom positions. To compensate for this, iron chains are hung from the counterweights to the trough. This keeps the weight to be lifted balanced at all times.

Getting there

Niederfinow is located about 60km north east of Berlin. This means that it is located in the former DDR. Ten years after re-unification we found that much progress has been made in improving the infrastructure, so there are many new roads and some still being improved.

From Berlin, proceed to the outer ring road. Leave the ring road at exit Schwanebeck and proceed north on the A11. Leave the A11 at exit 12 and proceed east towards Ebereswalde. Drive through most of the town and veer left onto the B2 road, shortly turning right onto a secondary road that goes to Liepe and Oderberg. The road follows a winding path through woods and after a time you will cross the canal and continue with it on your right. Soon there is a base for excursions which can provide a trip down the lift.

I arrived too late in the day for this and have no details. Near this point you can also visit the old water conserving locks. Although restoration of these was apparently being discussed in 1997, no sign of any activity was apparent when I visited. The locks use side reservoirs to reduce the total amount of water used for each operation. There are four locks, each with a lift of 9 metres. These locks only catered for vessels up to 600 tonnes, and apparently took two hours to pass.

The interior of the shiplift with the trough raised. Counterweights can be seen on the left.

Continue down the road to the bottom of the descent and make a turn to the right towards the village of Niederfinow. Cross the old canal, pass under the aqueduct and park in the car park by the shiplift on the left. A fee is charged for parking. Toilets are available near the lower gate of the shiplift

●*To be continued.*

A pair of push tows emerging at the top, pulled by a cable system.

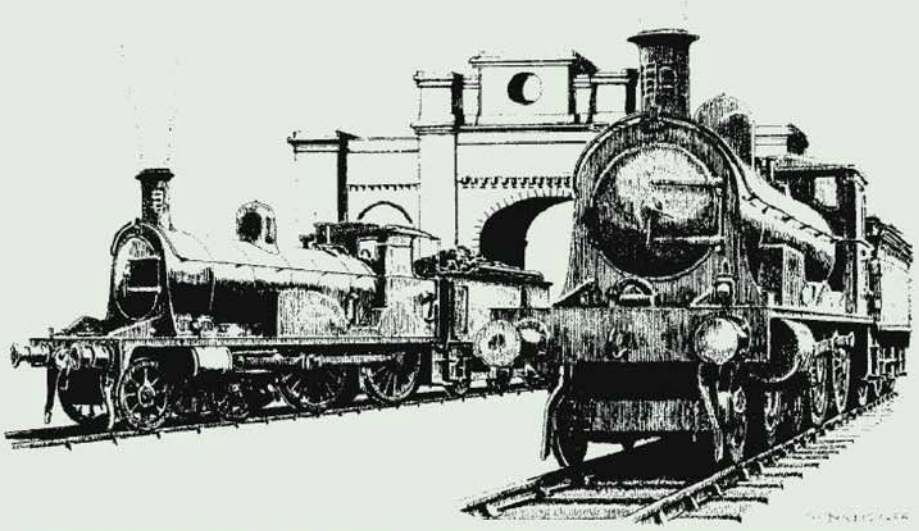
The yacht and the push tug have made the ascent and prepare to leave.

The push tug and a third barge wait at the bottom. In the distance a yacht hurries to make the last lift of the day.

Neville Evans

describes the backhead fittings and has a few words about glass case models and 'user-friendly' working scale models.

●*Part XXVI continued from page 496 (M.E. 4194, 2 May 2003)*



THE HIGHLAND RAILWAY JONES 'BIG GOODS' & LOCH 4-4-0

LOCOMOTIVES IN 5in. GAUGE

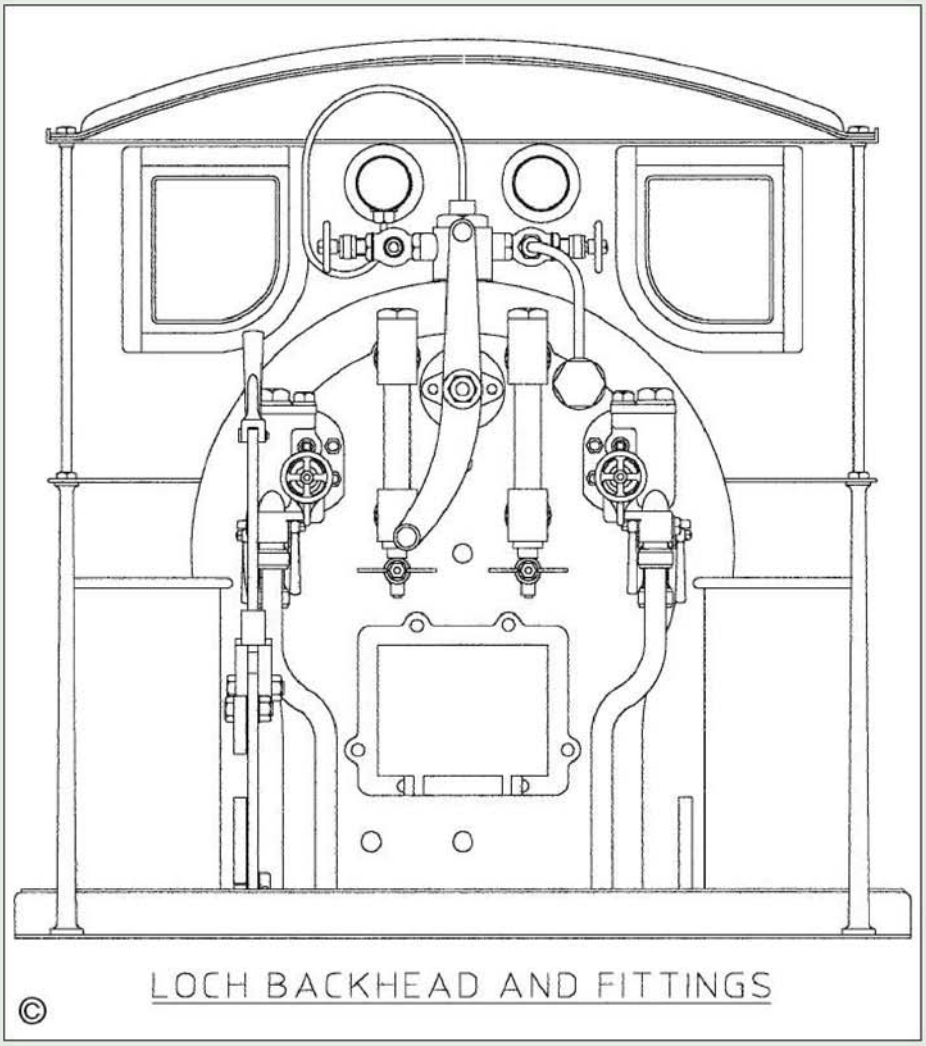
I have shown the backhead of the 'Loch' in my drawings. There is little point in printing the drawings of both locos as they are so similar. All the blobs and gadgets are there, albeit in slightly different places. Be it known, however, that at some stage in the life of the 'Big Goods', the vacuum brake control seems to have been moved from outside the left-hand injector control valve to the position that we see in the photographs. Because of the oversized water gauge, I must say that I feel a bit guilty, but totally unrepentant over this — we have had to forego the shelf on the 'Loch', but I believe that it will just go into the 'Big Goods'. The brake valve and the firehole door will have to wait for next month's gripping episode, as will the ash pans.

Water gauges

These are the product of Deryck Goodall's fertile mind. He and I have been using them for the last 25 years or more, so they can be said to have been well-proven. The advantages include longer spaces for glass and water as there are no gland nuts to worry about. They are easier to make than the 'normal' variety, in fact I wager I could have made a dozen in the time it took me to do the drawing, and they look better. The bleed valves are similar to the cylinder drain cocks, with the addition of the little scale type screw.

I was talking to my pal 'Ivor the Engine' this afternoon about water gauges. He described having once run the 'Manor' boiler dry, due to a small un-noticed bubble in the bottom fitting which gave a false reading. He thought he had half a glass, whereas in fact the boiler crown was uncovered. I have noticed this dangerous phenomenon many times with my gauge 1 engines, which from necessity have small gauge ▶

A general view in the cab of 'Big Goods' No. 103 of the Highland Railway on display at Glasgow Museum of Transport and Technology. Note the firehole surround and shelf.



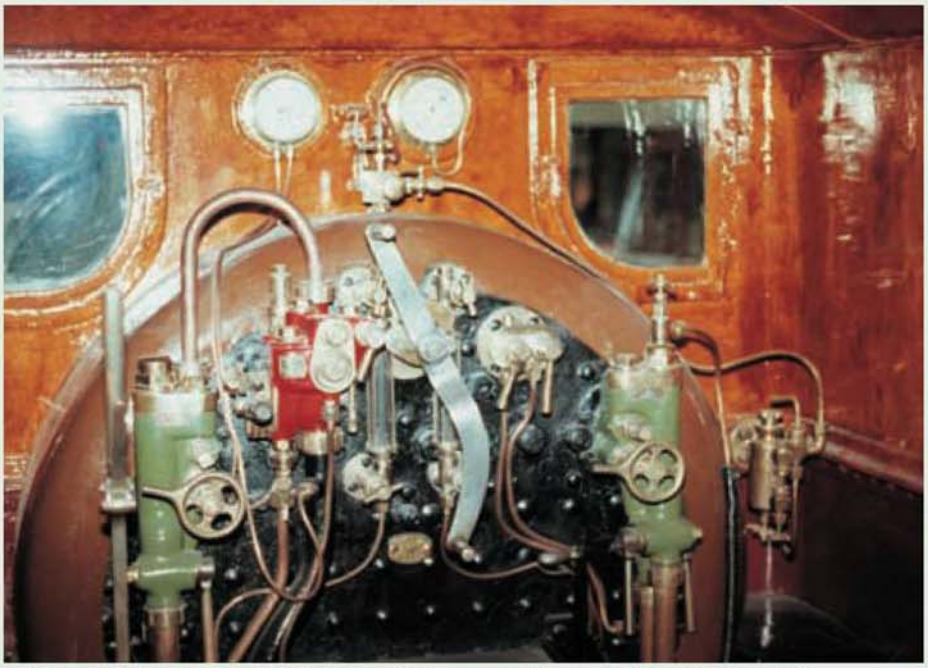
glasses and passages. I have therefore specified 1/8in. dia. passages throughout my water gauges. I feel sure that the safety factor that this builds in far outweighs any problems of scale. Of course, if you're making a glass case model, you can afford to stick to prototypical sizes.

Manifold

The purpose of the live steam manifold is to allow for steam feeds to various ancillaries, in our case the blower, the steam brake control valve and the pressure gauge which is fed through a separate pipe on top of the banjo nut. The fitting is easily made from two lengths of round brass rod. I always drill the large vertical cylinder first, push in the finished horizontal member, then silver-solder and drill and finish the vertical bit, which is the main body of the manifold, last. The body can be made of brass, but I would suggest that the banjo bolt be made of something stronger, such as gunmetal or phosphor bronze.

The little globe valves on each end are pinched from Roy Amsbury, who described something very similar in February 1973 (*M.E.* Volume 139). The design doesn't seem to have dated in the intervening 30 years; I don't suppose the properties of steam have changed much either. It is important that we use a tough alloy such as gunmetal for the body of the valve, so that the valve seat will remain undamaged with use.

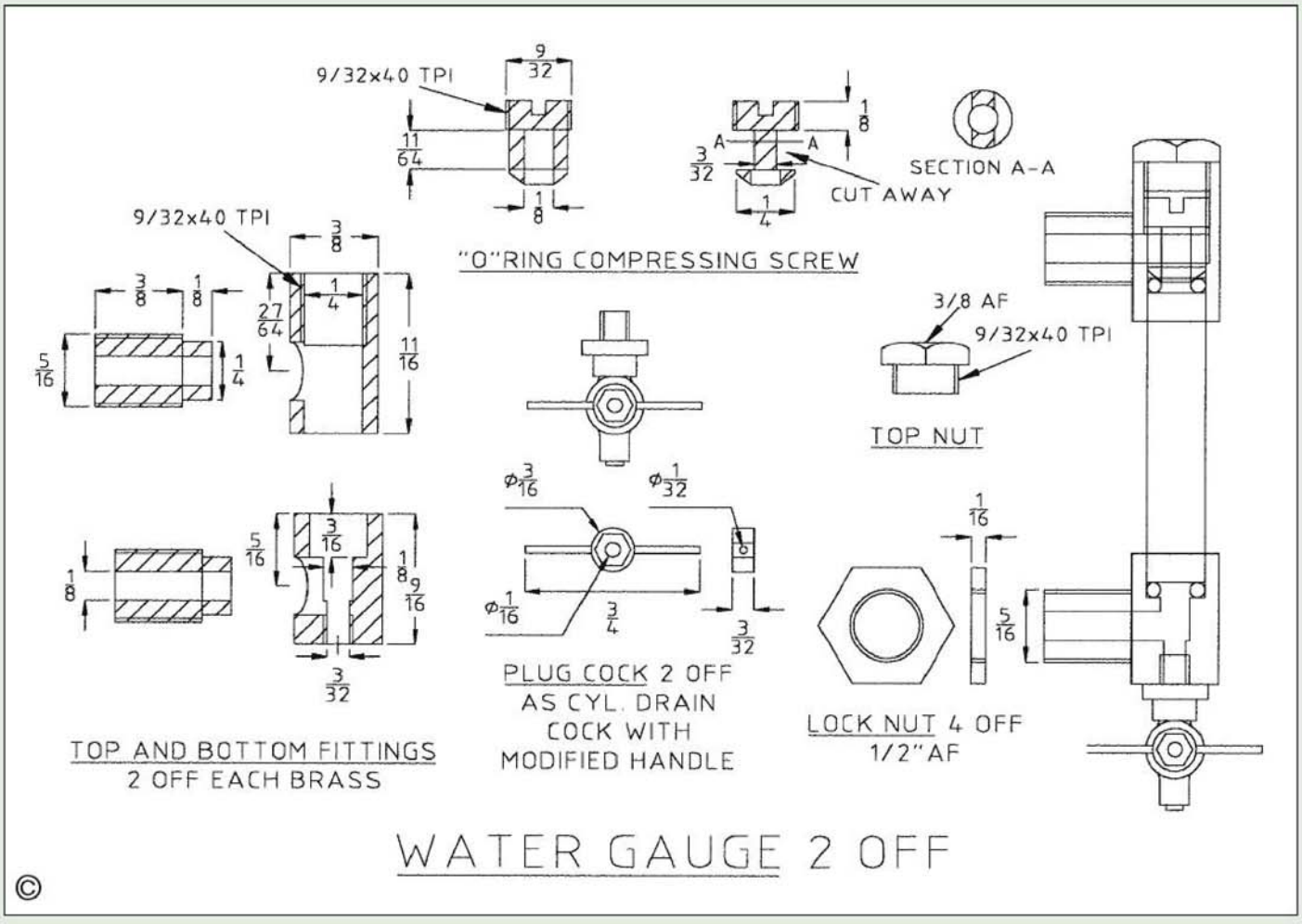
The inside of the globe valve can be hollowed out by means of a suitable little right angled tool; be sure to give it a slight radius on the ends, and make sure that it will pass through the larger hole in the valve. This cavity is quite important to allow free passage of steam through the valve. The valve seat should be finished off with a small reamer and then a D-bit.

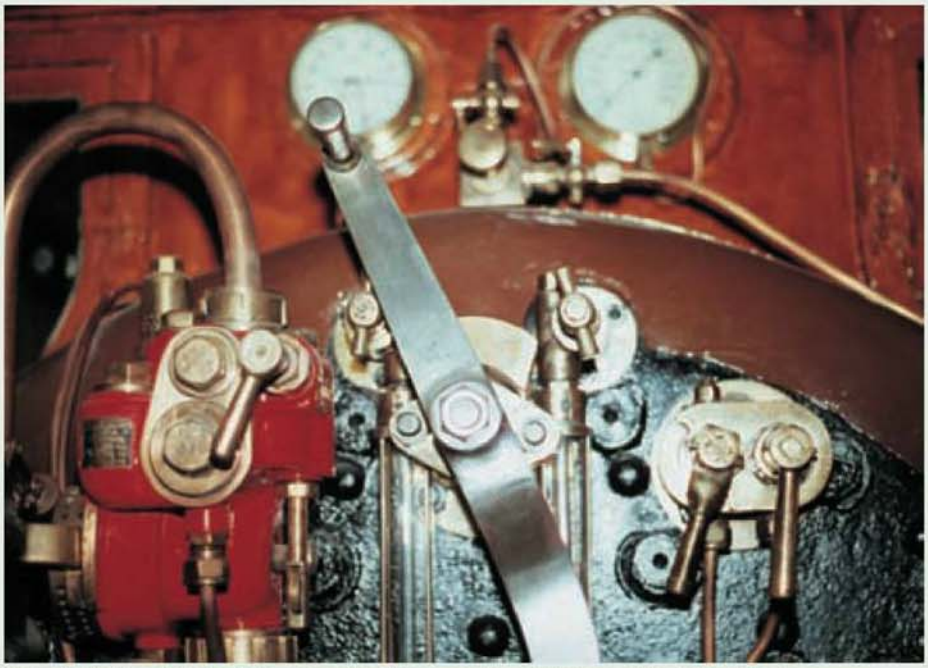


This view in the cab of No. 103 reveals the interior paint finish - as Scottish steam 'puffers'.

Regulator bush and handle

The regulator is squashed between the two top water gauge bushes, the double handle however fits quite neatly in front of the gauge. The lower curved part is a later addition, the original locomotives only had the straight vertical piece. My design of regulator means that the handle has to turn 180deg. for full opening, a slight disadvantage which is outweighed by the lovely smooth action of the regulator. The rear collar either bears directly against the





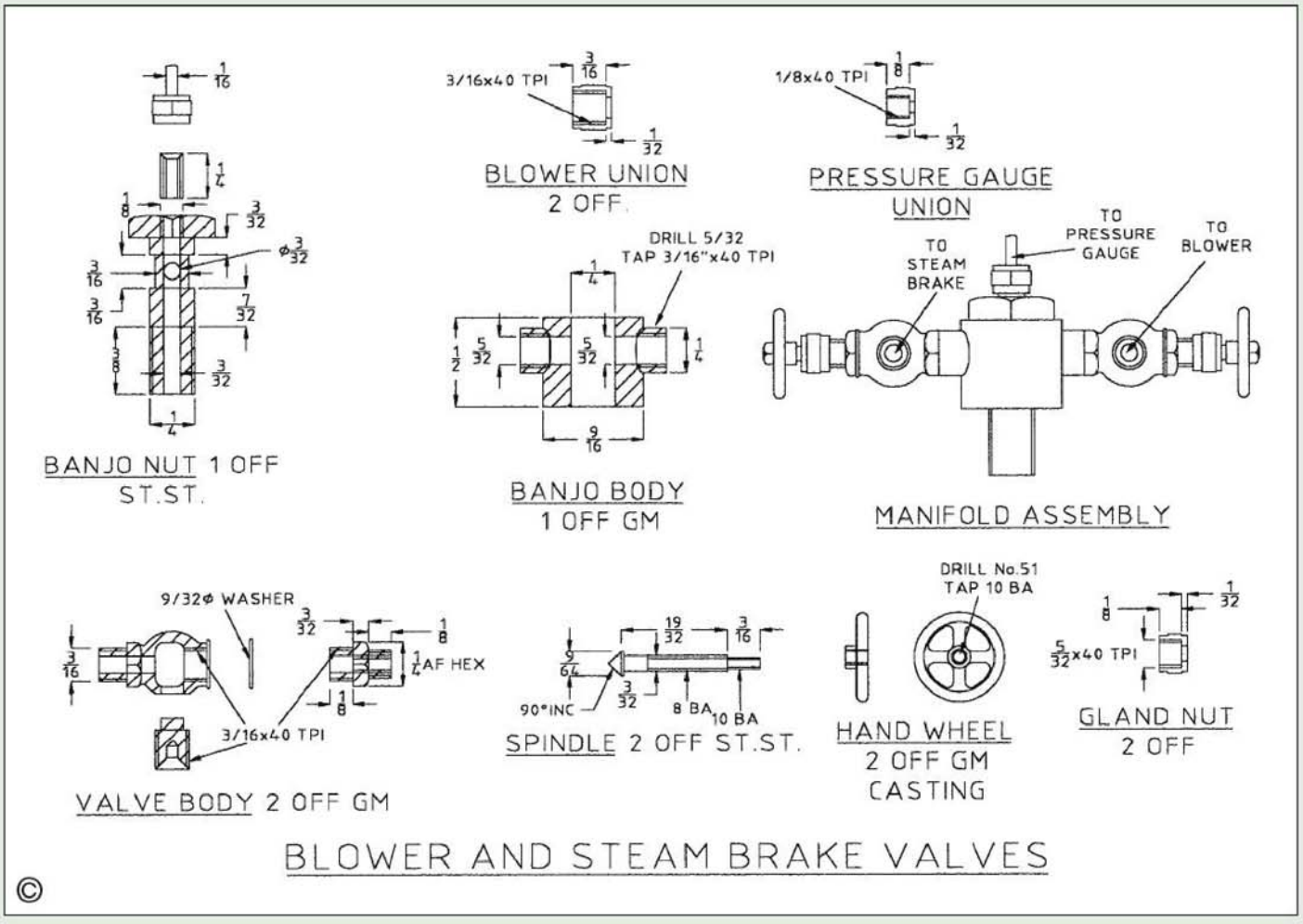
Note the brake valve situated between the injector valve and gauges of No. 103 at Glasgow.

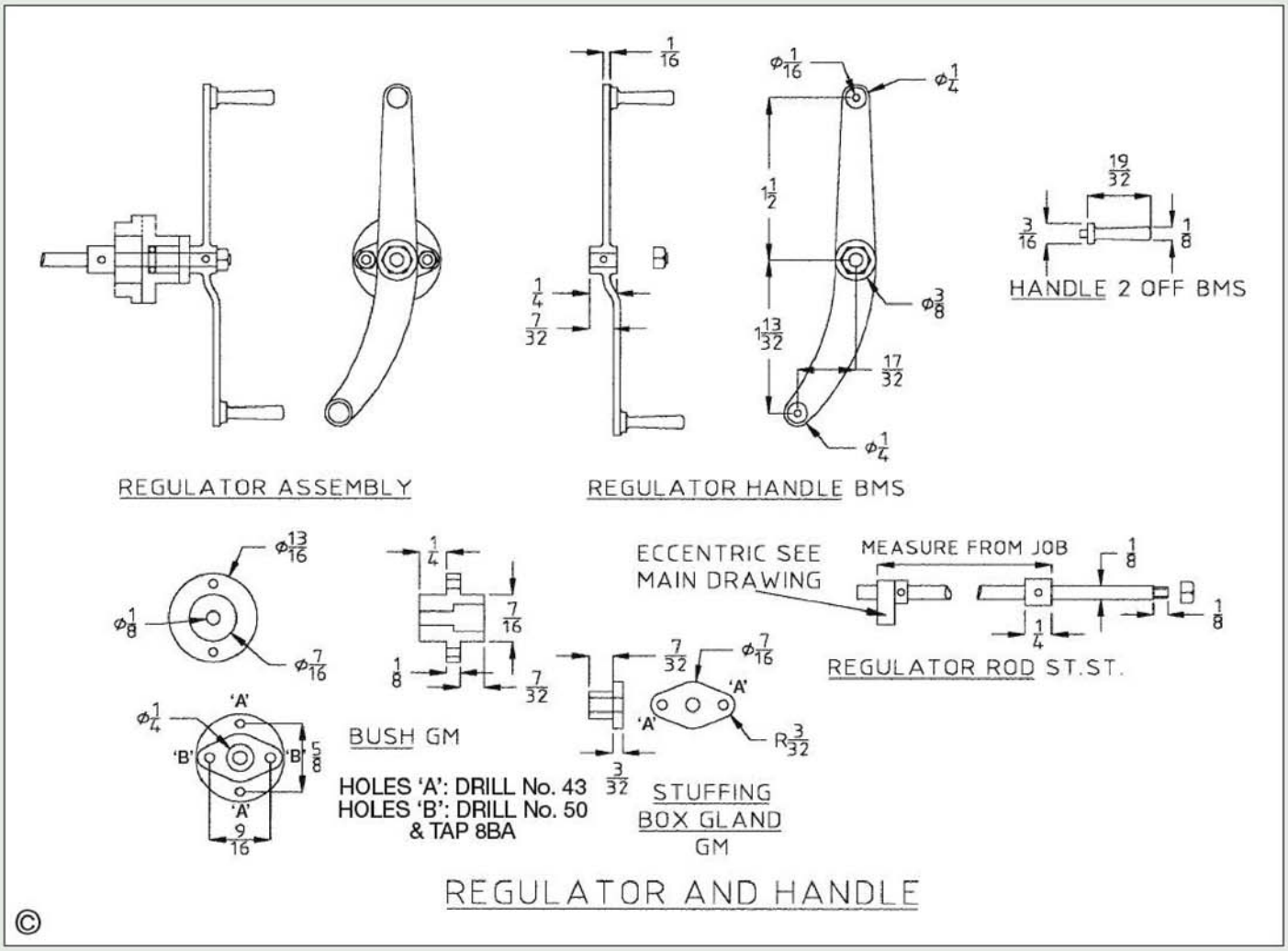
bush, or could even be tensioned by a phosphor bronze spring. I don't think that this is necessary however, and my own loco was fitted up by assembling the regulator rod with a little dab of Loctite where the bush goes. I then pushed the big bush in and pulled it back out again. I let the Loctite go off for a minute or so, pulled the rod assembly back out, and pinned the bush with a bit of 1/16in. diameter stainless steel wire. I have shown an 'O' ring gland which uses an ordinary silicone 1/4in. O/D 'O' ring. Traditionalists may prefer to use 3/16in. or so of soft packing which would do the job just as well.

Post Bag

A long and very interesting letter from my old pal Pete Rich came to hand the other day, (see *Post Bag*, this issue). Incidentally, I took John Hill round to meet him a few years ago and he commented that in his opinion Peter wasn't a very good modeller at all. His secret was that he was a magician who waved his magic wand and merely reduced full size articles to whatever scale he desired. There's probably a lot in that! In fact I can remember 25 or so years ago calling round to see Pete who had just finished a connecting-rod for a 'Saint', not the easiest of artefacts to fashion, just take a look at my recent drawing and you'll see why. I asked him how he made the rounded boss at the big-end. Pete was rather surprised at my having asked. *"You just put an end mill in the chuck, swing the big end round on a piece of round bar and it's done."* I went away with the feeling that it wasn't quite as easy as that.

As I said at great length, when I started the short series on *Penrhos Grange*, my object was to produce a locomotive that was larger than *Torquay Manor*, but used the same castings and drawings. These have been well proven over the last 30 years and the 'Manor' has become one of the great standards of the small steam world. Many people had drawn my attention to a gap in the range of engines, in that the large GWR 4-6-0s were not represented at all in 5in. gauge. I am well aware that Keith Wilson is covering the same ground in a larger scale, but there are lots of folk who, for one reason or another, would prefer to work to drawings that don't require to be adjusted for scale or size. I'm of the opinion that most modellers will be happy with a scale outline, and won't worry about the detail on the inside of the cylinders.





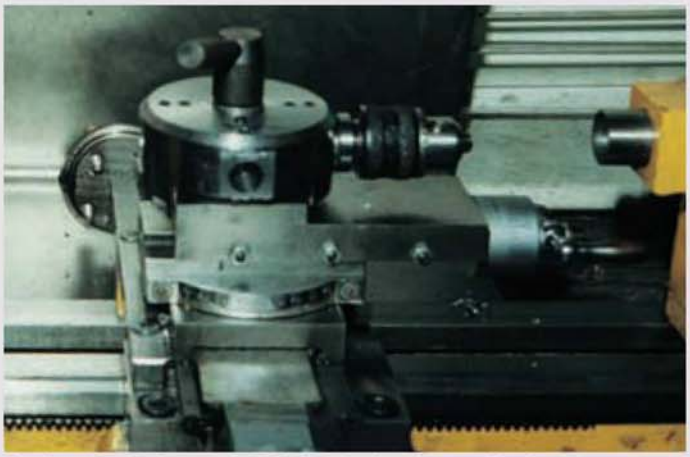
As to the matters of authenticity and simplification, we should bear in mind that in our smaller sizes we are not worried about weight, which, at least in Britain, was one of the major concerns that bedevilled full size engineers; in fact our small designs are not heavy enough and normally rerquire the addition of a little judicious weight. I feel justified therefore, in using such devices as one-piece hornblocks, instead of two piece horncheeks, because they are stronger, heavier and easier to machine. Actually, I did point out that Martin Evans had drawn scale axlebox assemblies, complete with horncheeks and leaf springs, which I can thoroughly recommend.

It is surely obvious that anyone with the necessary skill and experience to produce a totally authentic model needs no help from the likes of me. There are in fact many very close to scale model designs on the market, Doug Hewson's British Railways 4MT tank, Chris Rayward's LNWR and LSWR tanks, Roy Amsbury's Atlantic compound, not to mention my own *Didcot* and the two Highland locomotives as well as many others. I have also seen models of *Torquay Manor* and *Springbok* (Gold Medals in recent shows) where the builder has gone the final few yards to produce a stunning, true to scale replica that will really work.

I must say that I have a lot of respect for the professional modellers who turn out glass case models: even though they are not designed to do a day's work, they have their place in the larger picture. For my own part however, I shall continue to design locomotives that are as close to scale as possible, commensurate with their ability to do a useful job of work. The next one will be a 'Schools' class 4-4-0 exactly to scale on the outside, but modified internally so that it works. In the meantime my own 3-cylinder compound is fast taking shape; some photos next month with average luck.

●*To be continued.*

The turret and backstop assembly in use on the lathe. The turret can be indexed to bring various tools into operation, positioned by the backstop.



Another view of the turret which is locked to the top slide via part of a redundant tool rest which also provides the indexing facility.

TURRET & BACKSTOP

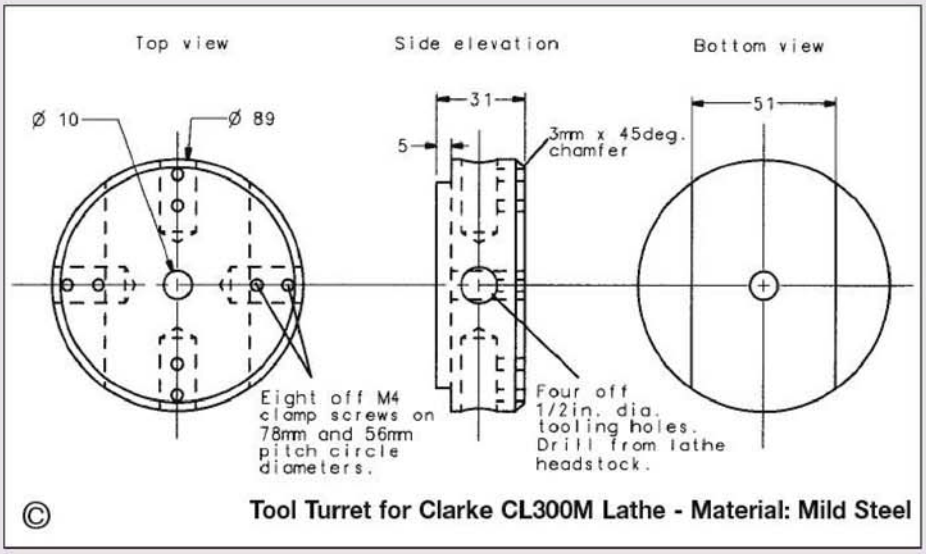
G. McLatchie

describes how he made this device for his Clarke CL300M lathe.

This simple turret and backstop assembly was designed to take advantage of a spare indexing tool rest I had available for my lathe. It was simple to make and is useful for repetition work.

Turret

This was machined from 89mm (or 3½in.) dia. bar. The material was sawn roughly to length, gripped in the 3-jaw chuck and faced and chamfered. The blank was then reversed, faced to length and drilled and reamed for the 10mm dia. stud on the top slide. A slot was then machined into the bottom surface of the turret to accept the old tool rest base. Mine was 51mm wide but check yours and make the slot to suit.



© Tool Turret for Clarke CL300M Lathe - Material: Mild Steel

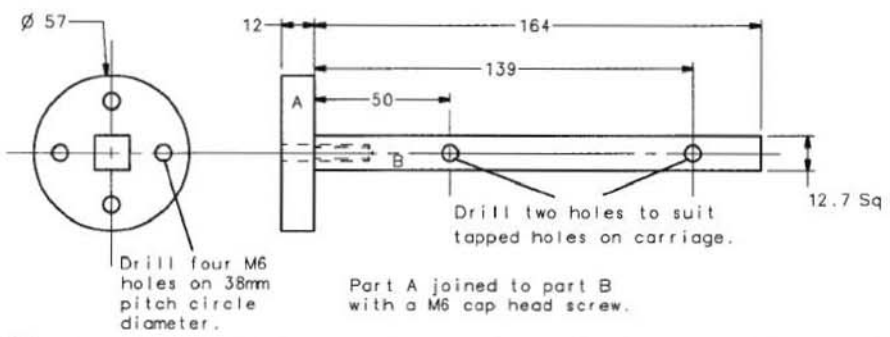
Modifying the tool rest

I first removed the base of the tool rest using a hacksaw. The required base piece was then chucked in the 4-jaw with the sawn surface outwards, and faced off. It was then removed from the chuck and placed in the slot machined in the turret. The 10mm dia. hole in the tool post base was then lined up with that in the turret and the two parts clamped together with an M10 bolt. It was then possible to mark out the base for four M5 screws to attach it permanently to the turret. These were placed in the corners away from the positions of the tooling holes. Countersunk screws were used.

Tooling holes

The turret was then assembled on the top-slide of the lathe. The centre point of the turret was found using a centre finder fitted in the 3-jaw chuck. The first tooling hole was then drilled and reamed. The diameter and depth of hole is your choice. I used ½in dia. holes to a depth of 13/16 inch. The turret was indexed and the procedure repeated for each of the other three holes.

The turret was then removed from the top-slide and marked out for the eight M4 clamp screw holes. These were then drilled and tapped. Do not forget to clean out the tooling holes with a reamer to remove any burrs after this operation.



© Four Position Backstop for Clarke CL300M Lathe - Material: Mild Steel

Backstop

The main disc for the backstop was made from a sawn blank of bright mild steel bar. It was first secured in the 3-jaw chuck and faced off. It was then reversed in the jaws and faced to length. The hole for the M6 screw was drilled and reamed and the disc removed from the chuck. The disc was then marked out, drilled and tapped for the M6 stop screws

The square shaft was made from 12.7mm (½in.) square material. This was gripped in the 4-jaw independent chuck and set to run true. The M6 hole was then drilled and tapped in its end approximately 20mm deep.

The bar was then removed from the chuck and the two 6mm holes used to attach it to the carriage were marked out. The device is attached to the carriage via the two holes used for the travelling steady, so check the position and spacing of yours before you drill your bar.

I made my stop screws from M6 studding secured with suitable nuts. When in use, the stop screws are indexed and aligned with the end face of the cross-slide.

Although these gadgets were designed for the Clarke CL300M lathe they may be adapted to fit other lathes of this size and type. Having made them, I have found them to be very useful accessories. If you decide to follow suit, I hope you find them useful too.

ROAD STEAM

SAVAGE'S *LITTLE SAMSON*
in 3in, 4in. (and other) Scales

Martin Wallis

enters the last stages of construction with the canopy and stanchions plus the ashpan and grate.

●*Part XXXVII continued from page 501 (M.E. 4194, 2 May 2003)*

This time we are going to consider the canopy, which is very much a fun thing to make and a quite a quickie in terms of time and effort. Working with wood will make a pleasant change. The model engineer's approach to woodwork is usually to pretend it is metal and proceed accordingly. Dimensions are checked with a micrometer, all the marking out is done with the utmost precision, and tolerances achieved are very much tighter than wood is generally accustomed to.

Extra long

Two *Little Samson* builders have expressed an interest in building a showman's version, i.e. with an extra long canopy running the full-length of the engine including a dynamo on an extended smokebox. No photos of such a *Little Samson* survive, but at least one engine was sold to a showland family; whether or not it ever had a dynamo fitted is unknown. However, even if not conclusive, there is evidence of 'showmanising' and it is to be found on the Savage canopy drawing.

Brass tube

Savage's drew the canopy stanchions as forgings top and bottom with the middle portion detailed as 1in. bore steel pipe. This may have been to save weight. The pipe was $1\frac{1}{2}$in. O/D over which is shown a brass tube, not twisted as is usual on a showman's engine, just ordinary brass pipe. The question arises if brass tube might ever have been fitted to the stanchions of ordinary engines of the period. I suggest not, but would wager that the engine did go into showland.

Stan Nipper's fine 3in. scale model fitted with the Savage canopy which Stan has painted white on both the top and underside. (Photo: S. Nipper)

Materials

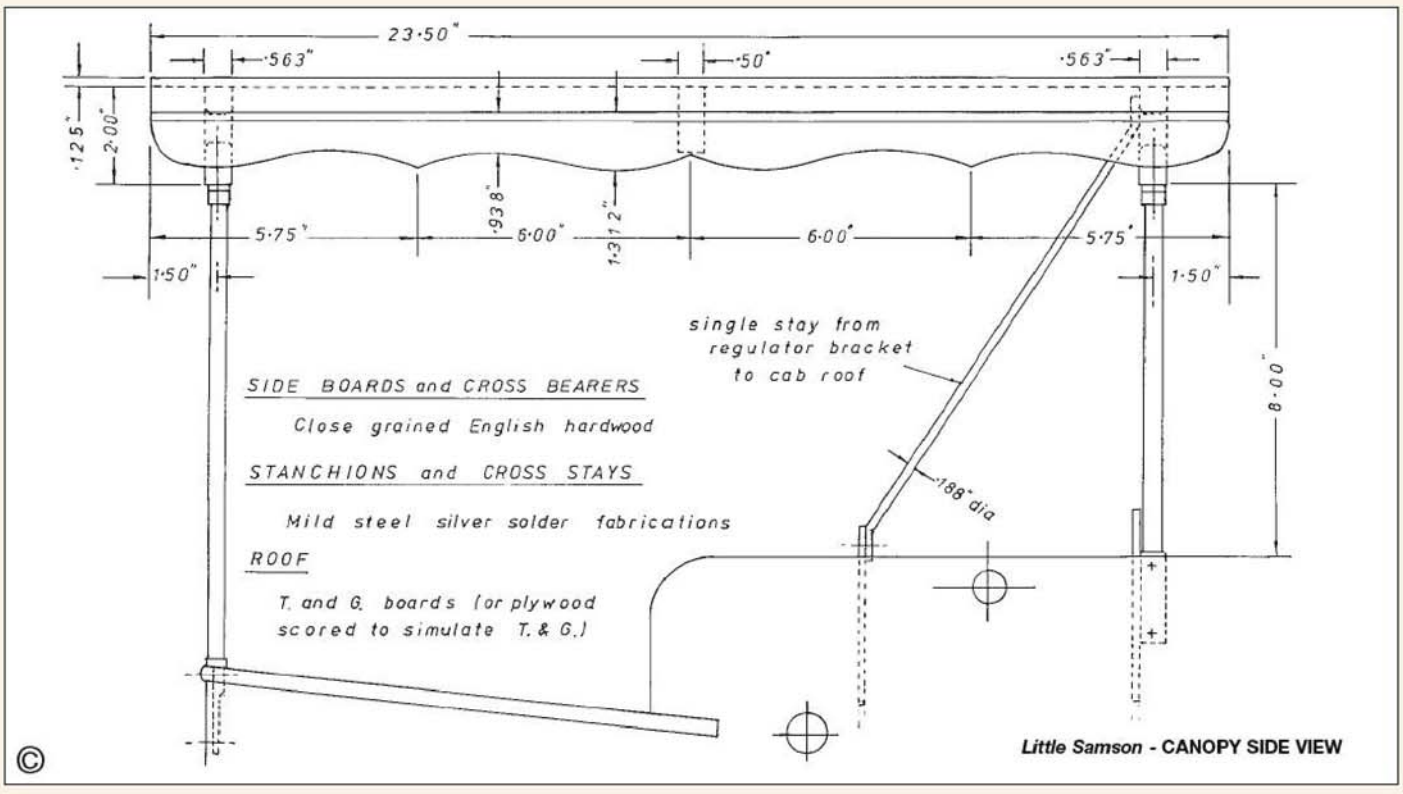
The Savage drawings give no indications of the materials used for the canopy. Indeed, in many respects there is so little detail that I wonder if this drawing is simply a modification drawing supplementary to the proper one, i.e. raised for the addition of the brass tubes only.

On the model drawing I have specified close-grained English hardwood, but any hardwood would probably do. In full size, canvas would have been applied to the top of *Little Samson's* roof to render it waterproof. It would have been painted with white lead. I understand from the full size engine folk that for health and safety reasons, white lead paint is no longer made and that apparently no substitute is available.

Removable or not

There is an advantage in making the canopy removable, both from the point of view of easy access and ease of firing. However, being a small engine in full size, there is proportionately a relatively large space under it, so the inconvenience would be minimal.

If our canopy is to lift off easily it can either do so with or without the stanchions. I would favour taking the stanchions with it, as if left in place the stanchions are an invitation for a poke in the eye — literally (**photo 7**).

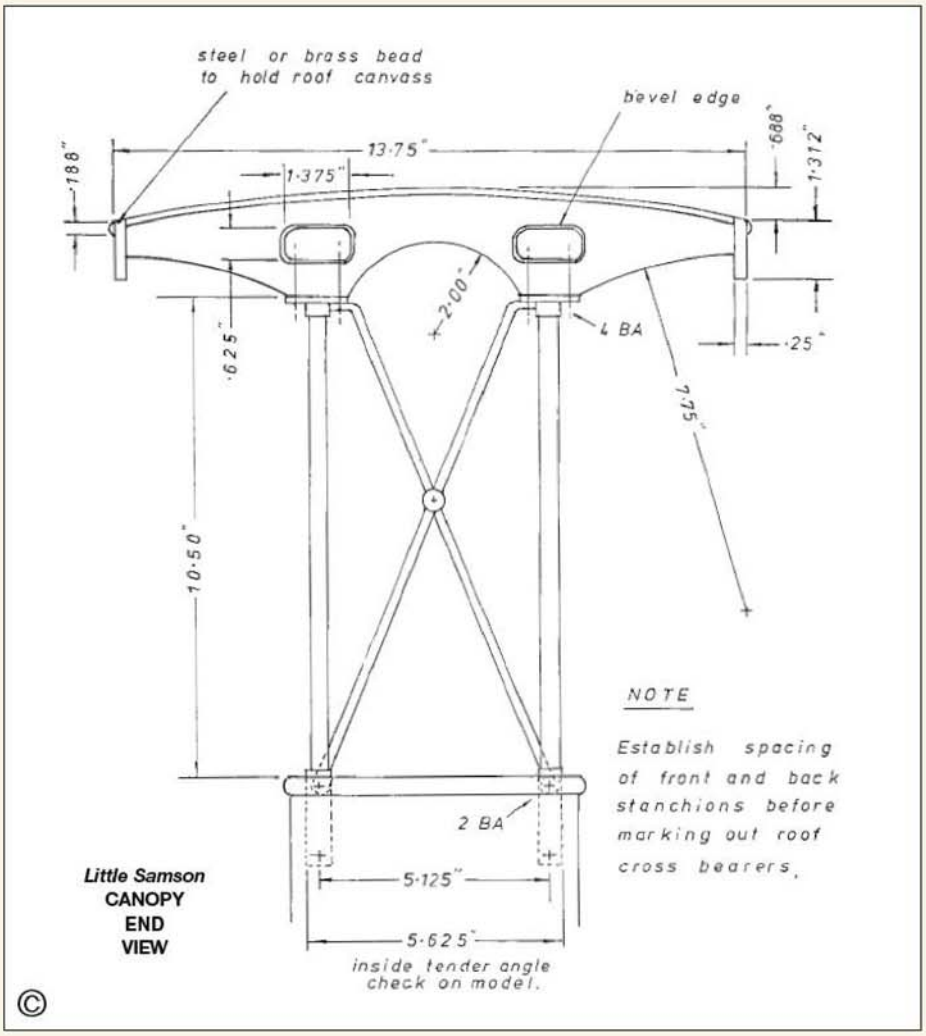


Little Samson - **CANOPY SIDE VIEW**

One of my favourite photographs: driver's view from John Freeborne's 4in. scale **Little Samson.** *I look forward to seeing a similar picture with the engine in steam. (Photo: P. Kybert)*

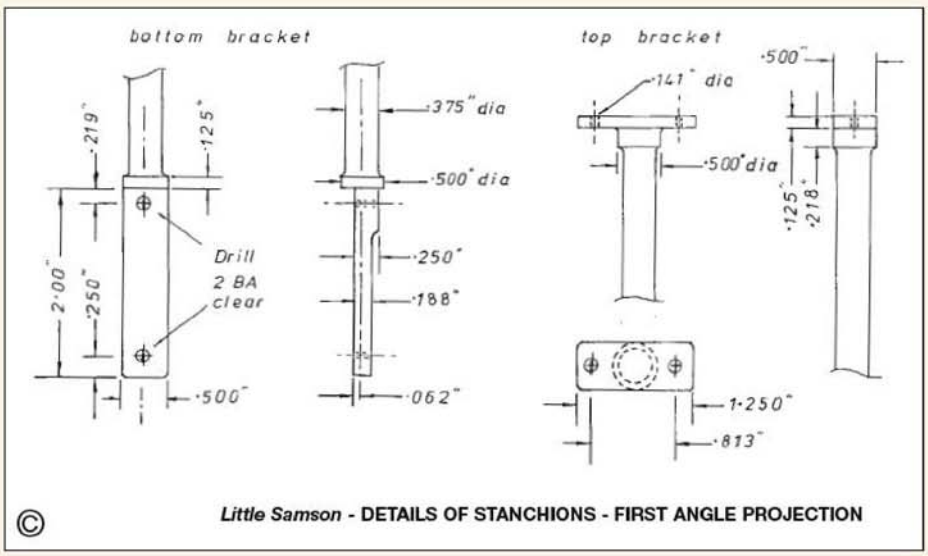
Stanchions

These should be made first and fixed to the engine before commencing any woodwork. The front two stanchions bolt to the inside of the hornplates ahead of the spectacle plate, and the back two fit to the back of the coal bunker. It is possible that the front pair will end up at slightly different centres to the back pair, a matter which must be established so that the dimensions of the cross bearers may be adjusted to suit.



John's canopy stanchions before silver-soldering. The pair on the outside have their collars and plates in place. (Photo: P. Kybert)

Stan's 3in. scale stanchions are silver-soldered and ready to be fitted. (Photo: S. Nipper)



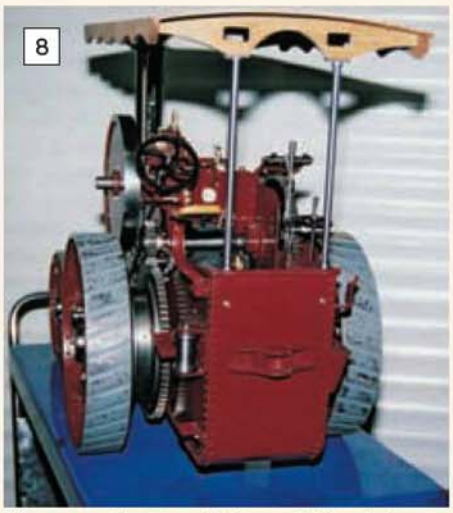
The stanchions are silver-soldered fabrications and are illustrated in **photos 3** and **4**. In 3in. scale their overall length should be 10in. and 12½in. but it is worth confirming their lengths *in situ* before silver-soldering. The top of the canopy should be parallel to the boiler barrel, that is to say a bit up by the front. It is not easy to get a spirit level onto the top of the boiler barrel when the cylinder is in place; the top edge of the hornplate will be more convenient. A few slivers of wood will be needed under the back wheels to pack the engine level. Then, laid on a straight edge set across the stanchions, the spirit level will quickly confirm what is going on.

Continuing with the metalwork, a pair of cross stays are required, one for the front and one for the back pair of stanchions. These are marked out using dimensions taken directly from the engine. A 3/8in. diameter boss needs to be silver-soldered half way along each of their lengths where they bolt together. Again, the exact position is taken from ▶

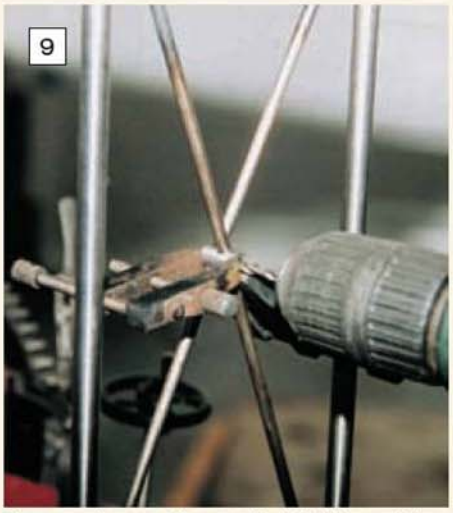
Stan uses his small CNC mill to cut out the cross bearers from chipboard.

Several bites were needed on the little CNC mill to cut out the canopy side boards.

The stanchions are in position and canopy assembly about to begin.



The canopy is now well advanced. The windows in the cross bearers are for the stanchion fixings.



The cross brace collars are jig drilled for position on the engine. (Photos 5-9: S. Nipper)

the model and may be drilled for some temporary fixings to hold them in place while silver-soldering. This is shown in **photo 9**. After silver-soldering, these fixings are drilled away leaving the finished and perfectly positioned bosses.

Cross bearers

In full size, the cross bearers are detailed as 2 1/4in. thick, which scales to 0.563 inch. I guess most builders will either go undersize to 1/2in. or oversize to 5/8in., and that is fine. Midway between them is a cross member which is slightly thinner, the purpose of which is to keep the tongued and grooved boards aligned and in good order. On his 4in. scale engine, John Freeborne used mahogany for his cross bearers, (**photo 2**), while Stan used veneered chipboard (**photo 5**).

Access to a bandsaw will be of great assistance and save a lot of time, but most builders will be marking out, cutting, and sanding these items by hand. Stan used his CNC milling machine to cut out his bearers. The edges must be sanded smooth and well sealed before painting. The works photographs indicate that the bearers were painted white, as was the underneath of the roof and the insides of the sideboards. Clear varnish is an alternative if the builder prefers.

Tongued and grooved boards

Full size engine canopies are invariably made from tongued and grooved boards, although some makes did use sheet steel on a few of their designs. Fowler drawings detail each board with a radius to match the curved top of their angle iron cross bearers. To achieve this I imagine they must have had special planer blades ground to the radius specified. As readers will have guessed, the Savage drawings gave no detail at all, not even the width and thickness of the T & G boards. I suggest the roof is either made from scale tongued and grooved boarding, or from plywood scored to simulate T & G boards.

The small section tongued and grooved boarding will probably need to be made. Special profile carbide cutters are available for routers, but the milling machine will do just as well in the absence of a router. Indeed, special cutters are not necessary, as the slot may be cut using a slitting saw or a thin side and face cutter, and the tongue made with two passes of an end mill or slot drill.

John made his roof from mahogany strips purchased from his local DIY shop, the inside of which may be seen in **photo 2**.

If plywood is chosen, either 3mm birch ply or 3mm marine ply is used with the wood grain running front to back. Apart from correct appearance, the plywood will bend much easier this way around. Deep score lines about 1in. apart for 3in. scale, are required on the inside face where it is seen. The ply will pull round quite easily and the sideboards will keep the edges from bowing.

Side boards

The side boards with their characteristic wavy bottom edge are made from the same material as the cross members. In 3in. scale the required section is 1 5/16in. by 1/4in. thick. Before starting, thought should be given to any signwriting, as there is very little room — even less so given the beading along the top edge to hold the canvas down. If signwriting is envisaged, it would be wise to make the side boards a little deeper, even an extra 1/4in. or so might make all the difference. Among my collection of contemporary *Little Samson* photographs, only two are signwritten on the canopy boards, and that is with rather small characters.

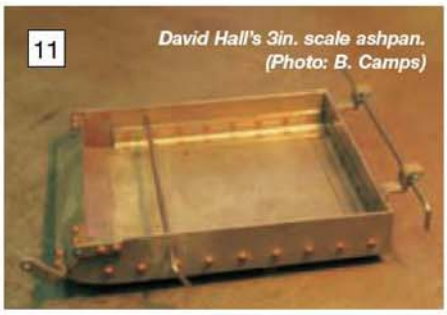
If scale canvas sheets are to be hung from the canopy, small hooks should be fastened at intervals along the inside. This is the sort of detail that wins Gold Medals and the builder must make his/her own decision.

A piece of the past

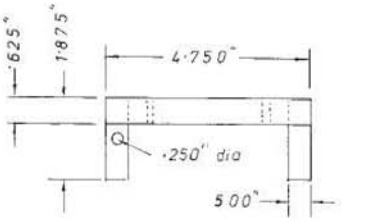
A piece of suitable material should be glued to the roof to simulate the canvas. I recall going around a great many fabric shops trying to find a coarse weave bed sheet to simulate the canvas on the canopy of my model Fowler engine. I soon gave up explaining to assistants that I had no intention of using the sheet on a bed, but planned to glue it to the roof of a steam engine I was then building. Such explanations did not seem to help; I kept being shown hessian type materials, which are rather too coarse and fluffy for the purpose.

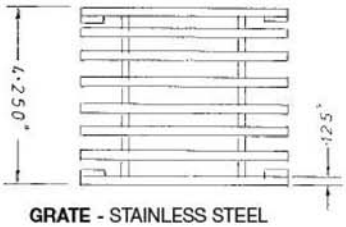
On his 4in. *Little Samson* John used an antique bed sheet to get the right weave. The sheet belonged to his grandmother and was very old — the late 1800s or so — and had seen much wear. It had been in his loft for ages. John remembered it and wrote that it was accordingly saved from the sad fate of becoming a dust sheet in the next

Granny's old bed sheet. (Photo: P. Kybert)

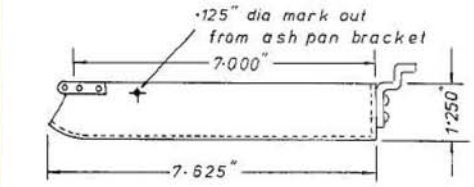


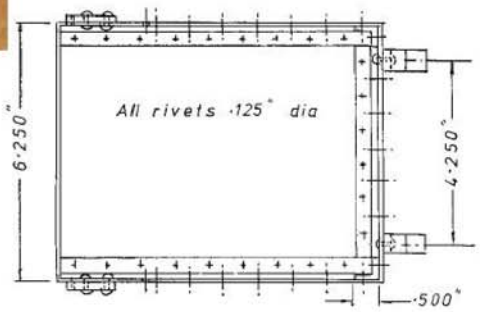
Little Samson - **GRATE AND ASHPAN**
FIRST ANGLE PROJECTION



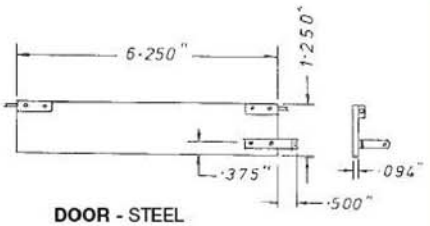


GRATE - STAINLESS STEEL

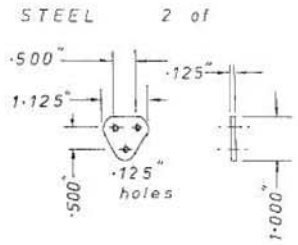




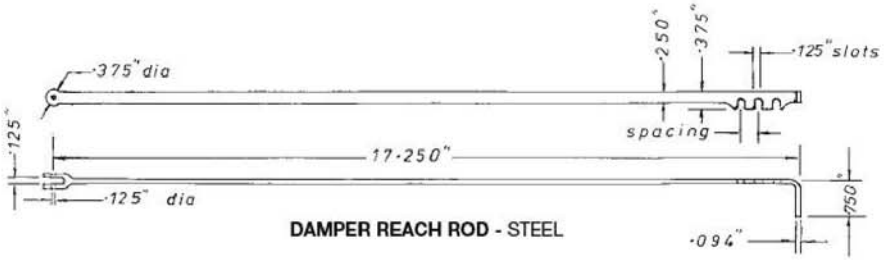
ASH PAN - 18SWG STEEL
ANGLE & RIVET CONSTRUCTION



DOOR - STEEL



ASH PAN BRACKETS - STEEL



DAMPER REACH ROD - STEEL

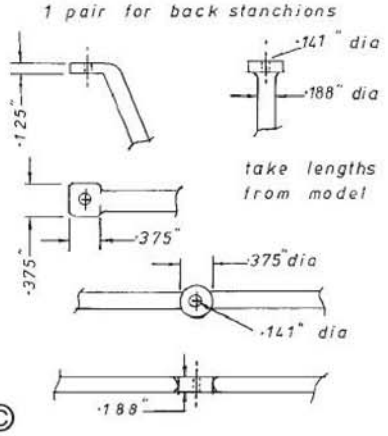
© David Hall

round of home improvements and put to a much better use. It had just the right weave and texture to simulate canvas.

The sheet is glued to the roof with PVA wood glue or similar. PVA glues are not particularly waterproof, but after the roof has received a few coats of emulsion paint, this hardly matters. I recommend a trial gluing first, if too much glue is used it will soak through the material and disguise the weave that has taken so much trouble to find.

I have detailed a piece of half round beading on the top edges of the sideboards to fix the edges of the canvas edges down. Standard road steam practice, this is one of the details which I took to be missing from the Savage drawing.

Little Samson - **CROSS STAY DETAILS**
FIRST ANGLE PROJECTION



© David Hall

Ashpan and grate

These are unglamorous but important parts of our engine. In fact, they seem so uninteresting that I have only a handful of pictures from our *Little Samson* builders to offer readers. This is in stark contrast with the connecting rod where I had quite literally enough photos to cover my entire dining room table.

My own second model, built many years ago now, was the late Bill Hughes' ever popular 1½in. scale Allchin, which had a drop down centre section in the ashpan floor, and a hinged grate which drops down with it to eject the ashes and any remains of the fire. Much time was spent making it and it worked wonderfully to begin with, but in due course became tight and difficult to operate, the ravages of the extreme heat had distorted the mechanism and the moving parts became full of ash. Since then my models have all had a simple arrangement where the ashpan and grate drop together on the removal of a single pin, *Little Samson* included.

In full size, *Little Samson* had two brackets, one each side, each secured under a pair of the foundation ring rivets. These brackets dropped down and appeared to support the ashpan. This was so similar to the system which I favoured that it was quickly adopted. One of these brackets may be seen in **photo 1**, the pin being pulled out from the other side.

Since the grate, which is on four legs, rests on the ashpan floor, the grate will drop with the ashpan. The fastening for the damper control has to be removed first but the whole process is the work of a few seconds. If by some misfortune the fire has to be dropped quickly, only one nut and bolt has to be removed (damper control rod) and one pin pulled out; the ashpan, grate and fire then all drop together and the engine may be pulled clear before the fire damages the paint.

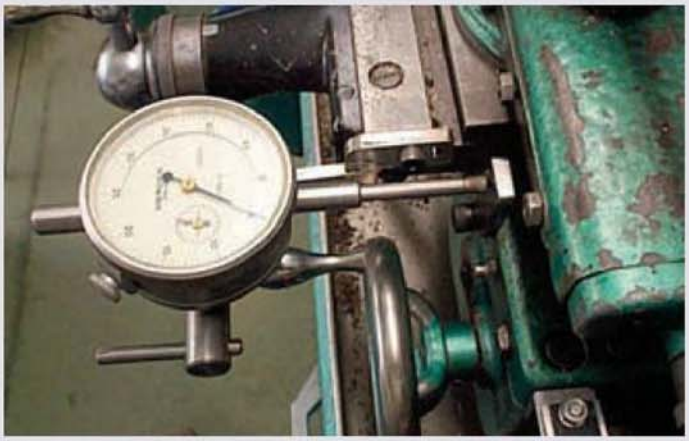
The ashpan, shown in **photo 11**, is a straightforward steel fabrication. It is worth using a fairly thick piece, as thinner gauges will distort more readily when hot. The ashpan should be painted with a heat resistant smokebox paint, readily available from the trade. I understand the paint suitable for car/motorbike exhausts works well and I can personally vouch for smooth black Hammerite, which has served me well. Due to space constraints, detail drawings of the various pins and brackets have not been included here.

The grate is made from 5/8 x 1/8in. stainless steel strip, a material which can be difficult to drill and work, the more so if guillotined from plate. The drilling speed should be slow, cutting oil used freely, and the drill kept cutting. If the drill rubs stainless can quickly work harden. Do not be tempted to use ordinary mild steel, it will certainly work fine to start with, buts its life will be a small fraction of that of a stainless grate.

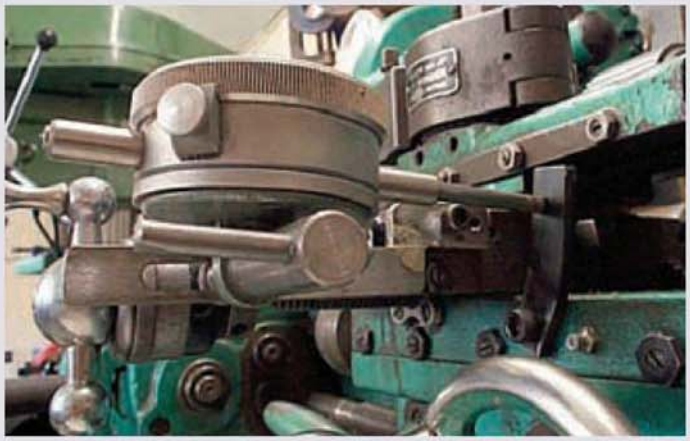
I guess most grates will be assembled by stainless welding, quite a specialised process. If unavailable, a riveted fabrication is an alternative. Each bar is drilled where the spacers are drawn, say 6mm or 1/4in. diameter, round or square spacers are made, each with a hole in it, and the grate is threaded together onto two stainless rods. The ends are then riveted over tightly, a job much aided with a bit of heat from oxy-acetylene equipment. Regular advertiser Norman Spink (call 01246-277010) sells stainless steel welded grates, which are recommended.

Photographs of John Freeborne's 4in. scale grate and ashpan will be included next time. He has made a few modifications to allow for the materials he had to hand, and a few from his own ideas.

●*To be continued.*



The arrangement used by the author to mount his dial test indicator to the cross slide of his Myford Super 7 lathe. The dti has 1in. of travel.



Another view of the dti and its associated bracket and datum bar. Note the slot used to set the dti for different parts of the slide's range of travel.

LOW COST LATHE TRANSFORMATION

M. J. Appleyard
explains how to speed up and improve the accuracy of batch production turning processes.

While visiting the 2002 Model Engineer Exhibition I noticed how relatively inexpensive the digital read out slide bars were becoming. This prompted me to ask myself the question: *"Can I fit one of these to my lathe and will it speed up my rate of production?"* I then asked myself another question: *"What slows down my current production rate?"* My answers concerned the need to measure and re-measure because I do not get consistent feed when applying a cut to the work. In addition, I have no means of longitudinal saddle travel measurement.

Investigation

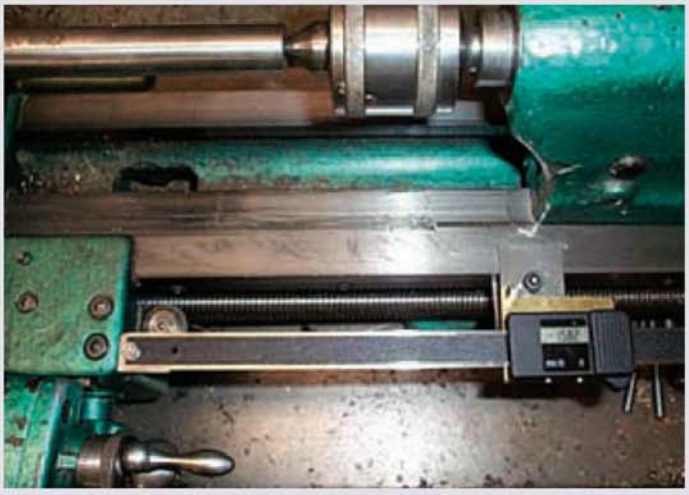
As a result of the above questions I decided to investigate the inconsistency that I have in applying a cut to the lathe cross-slide feed travel. As a quick test, I placed a dial test indicator (dti or 'clock' for short) on the compound-slide with the spindle of the instrument measuring the cross-slide travel. I then rotated the feed screw forward to zero and set the dti to zero. The feed screw was then rotated backwards and forwards ten times, bringing it back to zero on the feed screw index each time. The dti readings were recorded (of course, they should also have been zero). This exercise highlighted what I already knew: there was considerable inconsistency. In fact the dti only read zero when the feed screw was zero on three occasions out of the ten tests. With older lathes it is nearly impossible to get consistent readings.

Having confirmed the nature of the problem, I now needed a solution. It was staring me in the face: why not leave the dti permanently in place? It can be returned to zero every time. It measures slide position directly and independently of the lead screw or index. The other alternative is to use a digital slide bar. I looked at the cross-slide arrangement on my lathe, a Myford Super 7 with a long cross-slide fitted, to try to imagine how the slide bar would fit. To cover the full travel I would need a 6in. long bar. This would mean that when the slide was fully wound in, about 6in. of the slide bar would be protruding. In addition, the compound-slide locking bolt protrudes from the side of the slide, so access was needed for this.

As a result, I decided that fitting a dti was the best option for the cross-slide. The longitudinal axis of the saddle (along the bed) was the right place for fitting a digital read out bar; in my case, the only restriction was the overhang of the bar at the right hand end of the lathe when the saddle was at the tailstock end. I opted for the 8in. bar at a cost of £30 + p&p. It was ordered from Arc Euro Trade (0116-269-5693) and arrived the next morning. I could have used up to a 12in. bar but I did not want the overhang. The bar will measure in imperial or metric units at the press of a button. The readout shuts down after about five minutes and is re-activate at a press of the inch/mm button.

Cross-slide travel

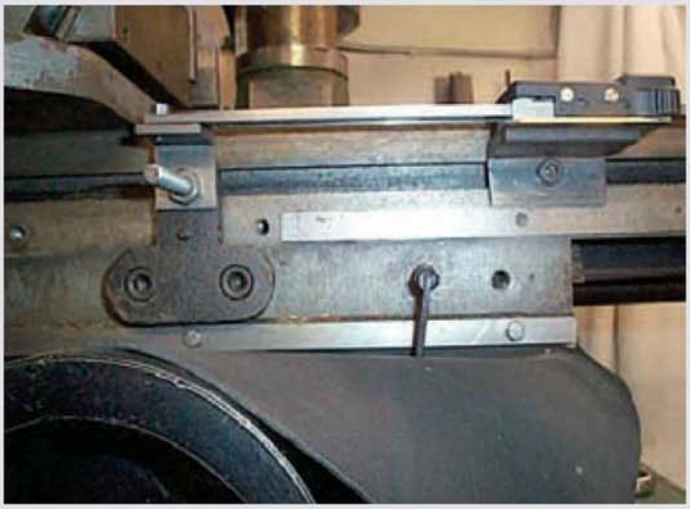
The dti I used has a 1in. travel and is calibrated in 0.0005in. increments. This I felt would be ideal provided that its position could be adjusted. Clocks of this type can be purchased for about £20. A small bracket with a slot was made and fitted to the cross-slide to carry the clock using a quick-release bolt and nut. A datum bar was made and fitted to the saddle. These brackets can be made from any suitable off cuts around the workshop, however one must ensure that when



The digital read out slide bar fitted to the longitudinal axis of the lathe. The 8in. long unit is attached to the lathe bed via an adjustable bridge clamp.

A further view of the slide bar assembly showing the method used to attach the unit to the saddle of the lathe with an angle bracket.

Set up used to mount the digital read out bar onto the longitudinal table axis of the milling machine. Some further simple brackets are used.



Another view of the brackets used on the milling machine. The method can be adapted to suit your own machine and the materials to hand.

assembled with the dti, the set up is quite rigid and that the clock sits square in relation to the datum bar.

Longitudinal saddle travel

Having completed the cross-slide installation, I now looked at the saddle longitudinal axis. My choice of the 8in. bar meant that the anchor point had to be adjustable. I had also made up my mind that the bar must be easily removable. This was so that I could take full advantage of my purchase and use it on my milling machine when required. I opted to have the measuring unit part anchored to an adjustable bridge clamp which would keep it as far away from the cutting swarf as possible and give it some support.

A small plate was made from a scrap piece of brass and screwed to the back of the measuring unit with two 6BA countersunk screws (the bar was already tapped). A bridge clamp was made from two pieces of 1 1/4 wide x 3/16in. thick flat bar 2 1/2in. long, with a packing piece the thickness of the lathe bed. This latter item was attached to the lower plate by means of a tack weld. A 1/4in. BSF quick-release bolt was made and fitted with a clearance hole in the top plate and a tapped hole in the lower one. For the saddle end a piece of 1 x 1in. steel angle was cut 5/8in. long and a 5BA stud fitted into the top face for clamping the pre-drilled slide bar.

The main point to consider was the alignment between the saddle fixing and the adjustable bridge clamp. I moved the bridge clamp up to within 1in. of the saddle and placed the measuring unit on the bridge clamp. Next, I adjusted the slide bar until it touched the saddle. I then selected the best place to bolt the little angle iron bracket onto the saddle and marked around it. Removing the angle iron, I drilled a 3/16in. clearance hole in it and drilled and tapped a corresponding hole in the saddle.

I then re-fitted the angle iron to the slide bar and bolted it to the saddle. It is important to check the alignment of the measuring unit, making sure you check its height and whether it is parallel with the lathe bed. When you are satisfied, clamp the measuring unit to the bridge clamp. Move the bridge clamp away from the saddle to its full extent and lock it up. Now run the saddle up to the clamp and ensure that no strain is put on the bar. Mark the position of the securing stud for the measuring unit and remove the bar. Drill the plate and drill and tap the clamp 5BA. Fit a stud, replace the bar on the lathe and bolt up.

Putting all this all to work

My first exercise was the manufacture of sixteen big end bolts from 5/16in. dia. stock. The bolt head diameter was 0.275in. and its length was 1/8 inch. The bolt shank diameter was 0.141in. (4BA) and its length 1 inch.

The lathe needs to be fitted with a quick-change type tool post. I needed to record some readings during the machining so I made up a chart with two headings 'Dial readings inner dial' and 'Dial readings large dial'. Under each heading I had four rows, one each for roughing cut, finishing cut 0.275in. dia., finishing cut 0.141in. dia. and number of turns on the thread.

First bolt

1: Using the roughing tool, face off stock and set slide bar to zero. Touch the tool onto the stock and set the dti to zero. Apply 0.075in. cut using the dti and machine for a length of 0.990 inch. Record dti readings under the roughing cut heading (both inner and outer dials).

2: Change to the finishing tool. Touch the tool onto the stock, apply a 0.010in. cut and, when the tool starts to cut, zero the slide bar. Machine the head diameter slightly longer than required. Measure the diameter and calculate the cut needed to get to finished size. Apply the cut using the cross-slide dti and machine. Re-measure to confirm the 0.275in. diameter. Record the dti readings (both inner and outer dials).

3: Touch the tool onto the stock (shank diameter). Apply a 0.005in. cut and, when the tool starts to cut, zero the slide bar. Machine the shank diameter for a length of 0.995 inch. Measure the diameter and calculate the cut needed to get to finished size. Apply the cut using the cross-slide dti, machine for a length of 1in. and face off. Re-measure to confirm the 0.141in. diameter. Record the dti readings (both inner and outer dials). Thread the shank to length, counting the number of turns of the die holder and record these. Align the parting off tool to the end of the bolt and zero the slide bar, move saddle along 1 1/8in. and part off.

This feature has been adapted from the Author's inexpensive book Build your Model with Foresight, *aimed at helping model engineers complete their projcts in the quickest time, at the lowest cost and without frustration. For more information contact M. J. Appleyard on 01634-669875.*

Second bolt

For the next bolt I used an adjustable square to set the amount by which the bar had to protrude from the chuck. This can then moved out of the way when the chuck has been tightened. Now for the machining of the second bolt.

4: Change to the roughing tool, face off the stock and set the slide bar to zero. Move the tool forward to the dti reading for the roughing cut as recorded under (1) above and machine for a length of 0.990 inch.

5: Change to the finishing tool, move the tool forward to the dti reading for the final finishing cut on the 0.275in. dia. as recorded under (2) above and apply the cut. When the tool starts to cut, zero the slide bar. Machine the head diameter slightly longer then the length required.

6: Move the tool forward to the dti reading for the final finishing cut on the 0.141in. dia. as recorded under (3) above and apply the cut. When the tool starts to cut, zero the slide bar. Machine the shank diameter for a length of 1in. and face off. Thread the shank to length counting the number of turns of the die holder. Align the parting off tool to the end of the bar and zero the slide bar. Move the saddle along 1 1/8in. and part off.

I produced five bolts without the need to measure and taking only three cuts each. At this point I lost my nerve and thought I had better check sizes. I should not have worried as all were within 0.001 inch. You will find that once the dti has been set you will get consistency every time eliminating the need for multiple cuts and measurements.

Added benefit

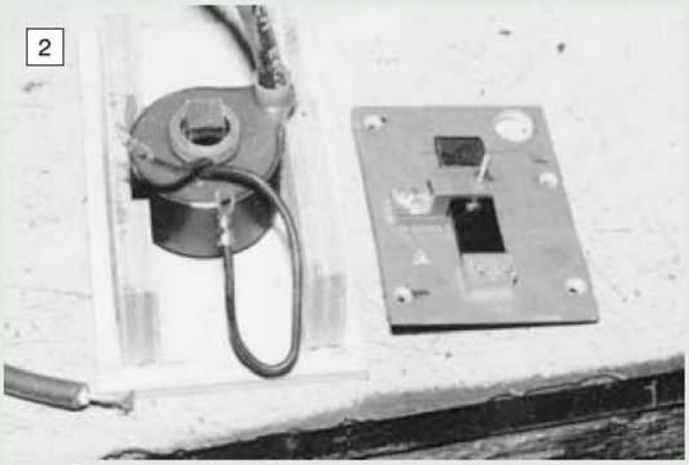
As previously noted, if you design the digital read out bar installation such that it can be easily removed, then it can also be used on the milling machine.

Conclusions

These two modifications to my lathe have transformed my production rates to the extent that I would estimate I save 30% of the time previously taken on such work. The only drawback is that the machine does look a little cluttered. I suppose I just need to get used to it.

I strongly recommend this modification to all serious model engineers. As well as improving the accuracy of the finished work, it really does make life a good deal easier.

The spark delivered by one of the commercially available buzz boxes supplied by Redwing of Minnesota, USA.



Some of the parts used in the homemade version of the buzz box. Visible are the coil, laminated iron core and the box top.

BUILDING A 'BS' BUZZ BOX

Jim Service

describes his ignition device for internal combustion engines.

Some builders of model internal combustion engines use car ignition coils and 12 volt batteries for ignition on their engines. This works quite well, but the ignition source often dwarfs the engine it supplies; I know it did in my case.

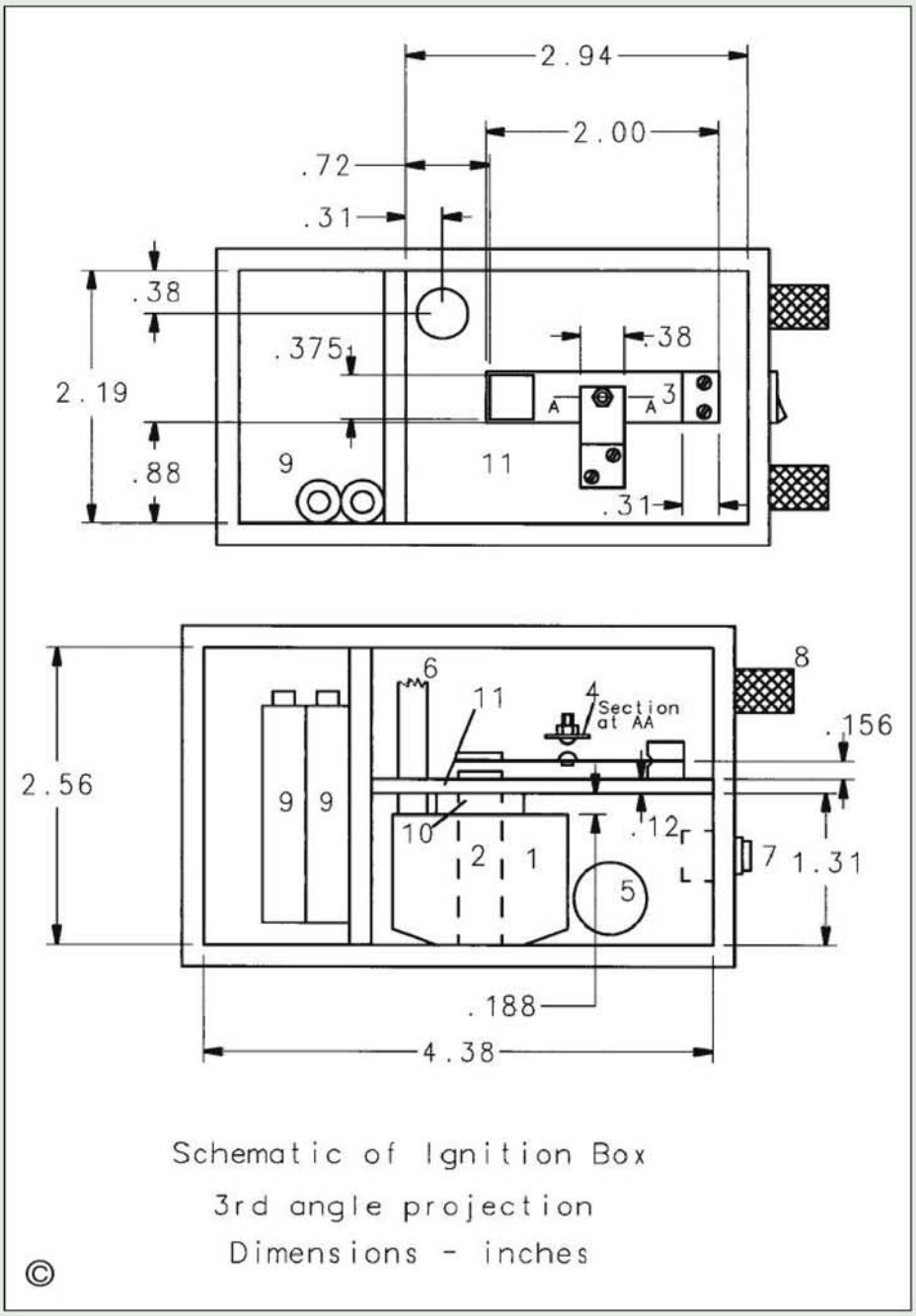
Jim Foster of Redwing, Minnesota, kindly gave me one of his 'buzz boxes' to try. This works on a well-established principle. I recall, as a boy, my father had a 'medicinal' shocking coil which worked on the same lines. Whereas nowadays we avoid electric shocks like the plague, our forebears went to considerable lengths to administer severe jolts to themselves and unfortunate acquaintances; it's surprising how many survived, or maybe we just don't know how many did not.

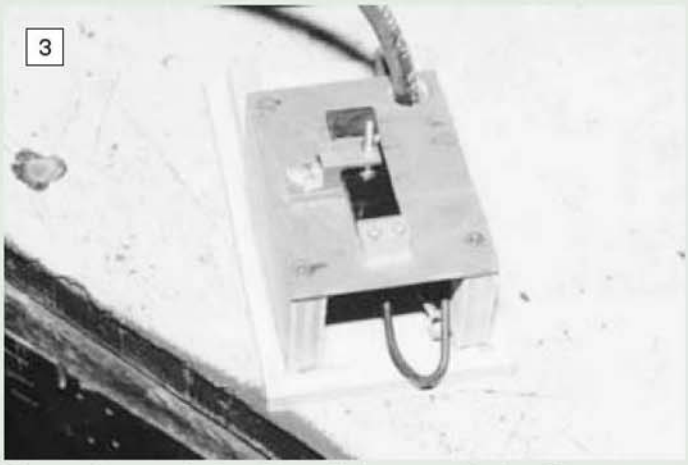
In co-operation with Ron Christensen, Jim developed his buzz box and markets made-up units, available in the UK from John Bruce, Freeman Road Industrial Estate, North Hykeham, Lincolnshire LN6 9AP (01522-880079).

The essential items are a Tecumseh coil as used in lawn mowers, a laminated core, armature and contacts, and an auto capacitor. I daresay any other make would do. I believe Tecumseh is

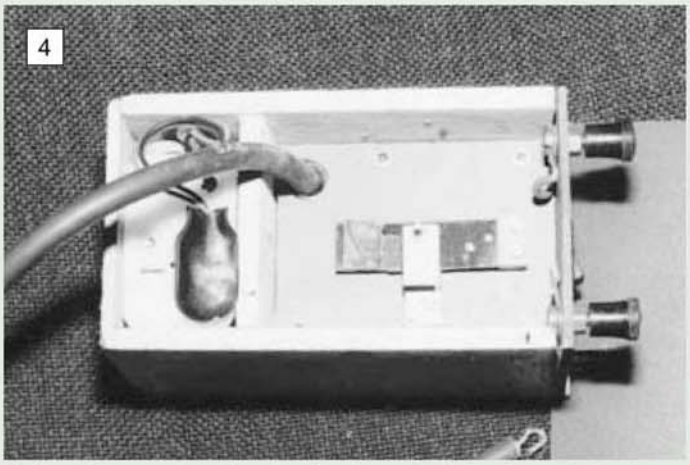
Key to components:

- **1:** Ignition coil - ex-lawn mower engine.
- **2:** Laminated core to fit item 1, approximately 1.5in. long.
- **3a:** Armature made from 0.005in. blued or spring steel.
- **3b:** With 3 or 4 laminations ($^1/_2$in. x $^7/_{16}$in.) glued to end.
- **3c:** Contact 'blob' riveted as shown.
- **4:** Bracket to hold contact silver-soldered to 8BA screw adjustment.
- **5:** Auto capacitor.
- **6:** HT lead brought out of top.
- **7:** On/off switch.
- **8:** Terminals for engine leads.
- **9:** Batteries - 6 x 1.2v: 1700mAh.
- **10:** Insulated distance ring $^3/_{16}$ x $^3/_{16}$in. x to fit laminations.
- **11:** Paxolin or other insulation.

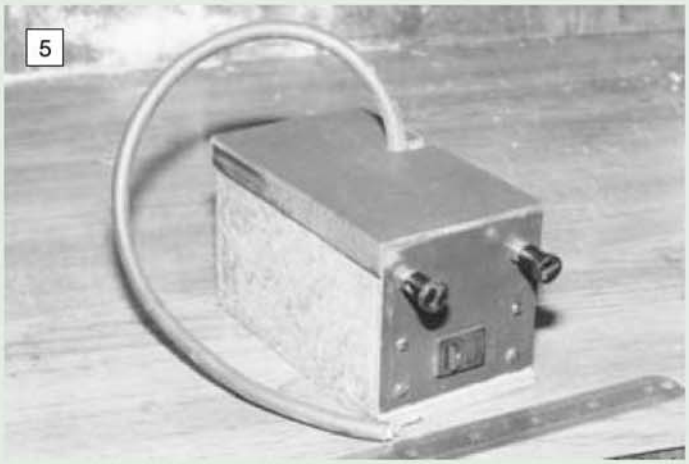




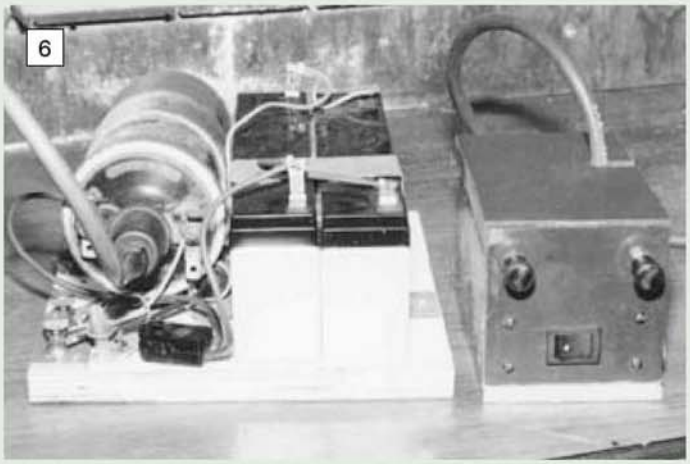
The same box seen in photo 2 but with the top now in place. The contact bracket and spring steel armature are clearly visible.



A view of the completed box showing the terminals for the engine leads and details of the internal dry battery connections.



The box with the armature and contact bracket decently housed under a lid. The output terminals and on/ off switch can be also seen.



The new buzz box photographed alongside the old, bulky ignition source. The device is neater and less vulnerable to accidental damage.

favoured in the US mainly because of its compact dimensions. I understand the last two items are replicas for a model T Ford. All these are mounted in a smart wooden box with terminals brought out for easy connection. It is of robust construction. A 6 volt DC supply is required. The unit generates a very lively spark (**photo 1**) and I find the starting of my engines greatly enhanced.

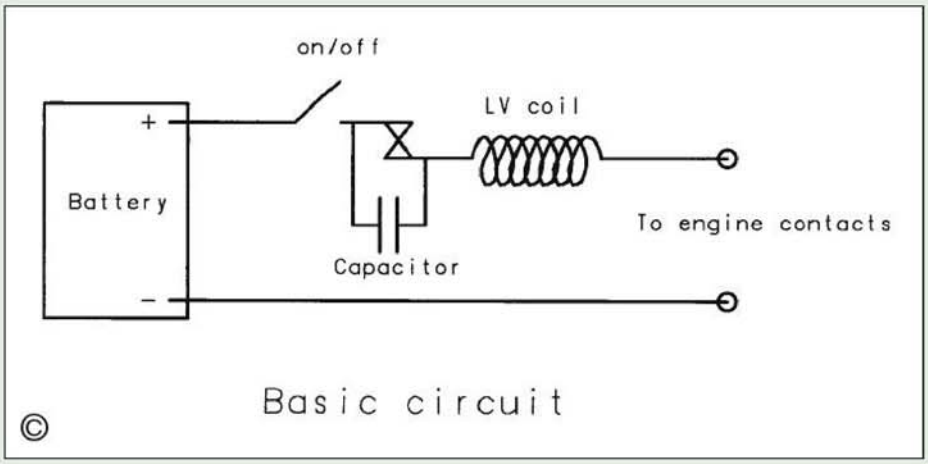
Then my Scottish thrift surfaced and with Jim's approval, I set about constructing a Caledonian or type 'BS' (Bawbee Saver) version; the following is a description of my efforts. The diagram and schedule show the general layout and components required. The dimensions are the ones I used, but apart from the lamination and armature locations, most other dimensions can be as the builder favours. If I were to do it again, I think I would make it a little larger as I found final assembly a bit fiddly for my poor old fingers which, alas, are nowadays more akin to bunches of small bananas than appendages of the human hand.

Along with the ignition coil, the next item has to be the laminated core. Practically any scrapped mains-transformer can be used for this. The older video recorders had massive transformers (which is partly why they were so heavy) with oodles of iron in the construction. While a hacksaw would do just as well, I found the best way was to slice up the core on a bandsaw. The iron is very soft and cuts cleanly. The resultant chunk of laminations was then cut to the required core size 'A' and laminations removed to core size 'B'. The laminations are usually stuck together, but are easily prised apart using a knife blade. Actually, dimensions 'A' and 'B' are the same, as the laminations fit into a round hole (**photo 2**). Note that the laminations should be a tight fit in the square hole of the cover.

The armature is made from 0.005in. blued or spring steel. It has 3 pieces of laminations glued to one end. The other end is anchored on a brass block made from the earth pin of a 13-amp plug, together with two fixing screws and a top plate. After going to a lot of trouble to soften the steel for drilling, I found that an ordinary drill went through easily without prior softening. The contact blob came from an electro-mechanical relay (J. A. Crew have lots of surplus relays) and was riveted to the armature as shown. By the way, an armature and contacts from a small old-fashioned electric bell would do, if you can find one! Another contact blob was silver-soldered to an 8BA screw which is carried on the bracket as shown in the photograph.

The circuit diagram shows the connections. In order for the device to work, the contacts have to be adjusted, with the battery connected, until they buzz. Steer well clear of the hot end of the high-tension lead, when you do this. Whereas on most engines, the spark is produced when the contacts open, the buzz box starts to spark immediately the contacts close so some adjustment to timing will probably be required.

The internal batteries are adequate if, as I do, you only run your engines briefly for invited visitors and 'nosy parkers'. If it is intended to run the engine for extended periods, say at rallies, then an external 6V source is essential.



KEITH'S COLUMN

SAINT CHRISTOPHER

A GWR LOCOMOTIVE for 7¼in. gauge

Keith Wilson

deals with the tender springing and considers the safe operation of full-size railways.

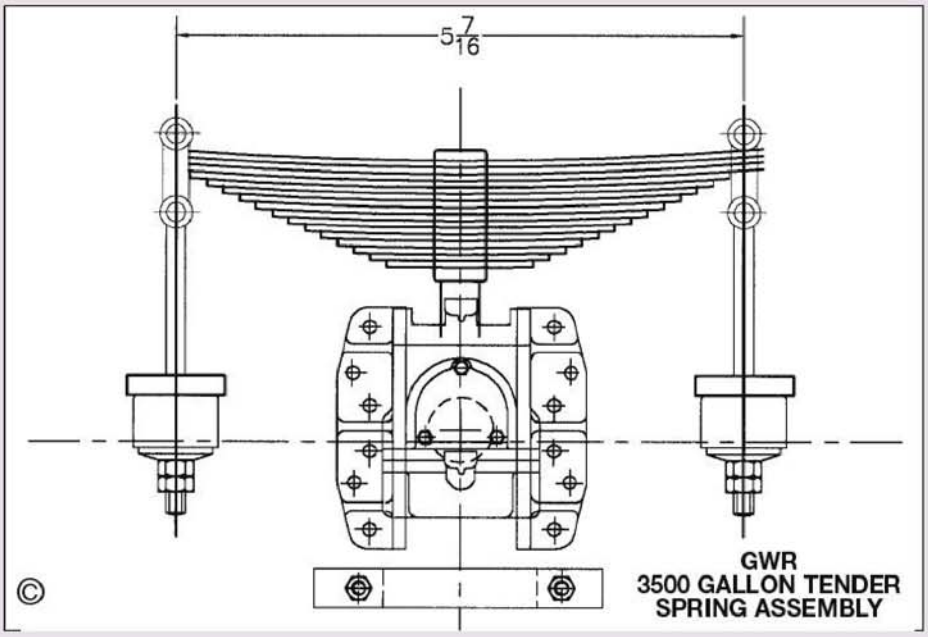
●*Part XXXIX continued from page 507 (M.E. 4194, 2 May 2003)*

The matter of tender springing is not one to be taken too lightly. Although the calculations are straightforward, one must not forget the very large weight discrepancy between full and empty. This is less important in full size for the change in weight is small compared to the tare weight of the tender (Tare = Empty). But in our smaller scales we must allow for the change being as much as 100%, for the weight of the driver can closely approach the tare weight of the tender.

It so happens, rather conveniently, that we can therefore use 'scale' springs, i.e. springs made from the same material, and substantially the same sizes. Since the springs on the tender are somewhat more visible than those on the engine, this makes things look better.

Now, I am fully aware that 'dummy' cast springs can be used, but then what about the working springs? True, it is possible to put a coil spring inside the buckle of the dummy, but it is very difficult to get one sufficiently strong within the size constraints of the buckle. With the old proverb *"spoiling the ship for a hap'orth of tar"* in mind, it does not seem to be so illogical to make the true leaf-springs. Certes, I have made them on tenders since about 1973 or so; while muttering sweet nothings under my breath during the making thereof, I do not regret it.

I first made the buckles out of strips of steel, silver-brazing them together, but it is easy to get some trouble on the engine springs where the buckles are in tension and shock-loading can cause the joints to break. It can then be merry hell to get them out and repaired; from solid is therefore the rule. On tenders, however, they are in compression.



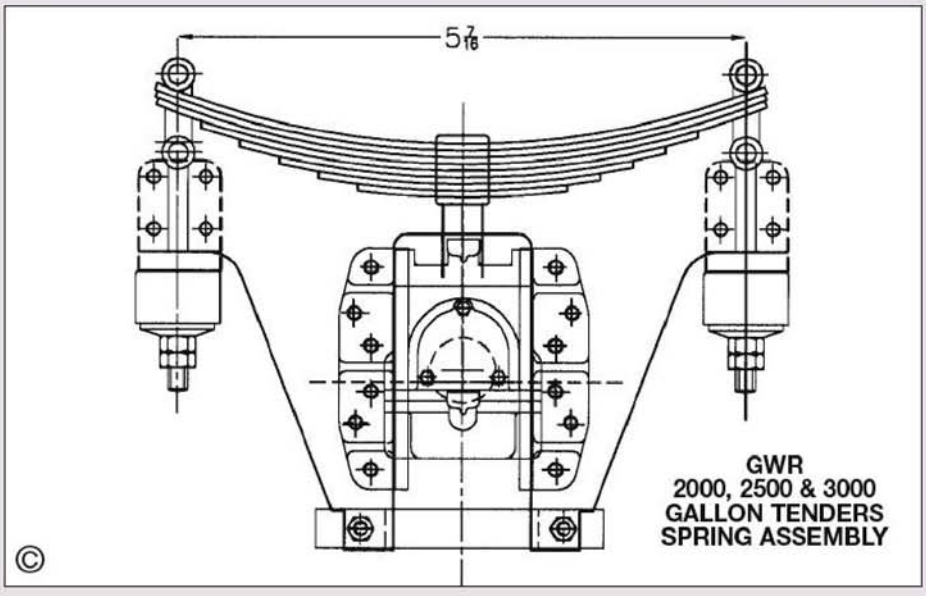
It is not so difficult as may at first be thought. The first task is to make a drilling jig, best made by jig-boring on the lathe vertical slide or on the milling machine table under the vertical head. It is so easy to put a small centre-drill in the chuck and use it to precisely locate each hole, later drilling them out to the required size.

For the buckles required for the 35 and 40 tenders, I suggest a 'top row' of five No. 44 holes at 0.1in. centres, followed by two 'vertical' rows of ten No. 44 holes at 0.1in. centres, bottom row as top row. Use a piece of 1/8in. mild steel for this jig. If the jig be firmly clamped to a suitably sized piece of mild steel (1/2 x 2in. recommended) long enough to make six buckles side-by-side (minimum length 4 1/2in.) then the holes can be drilled right through. Tip — use a high speed, gentle feed and some 'juice'. A quick shot of WD-40 works wonders in a case like this.

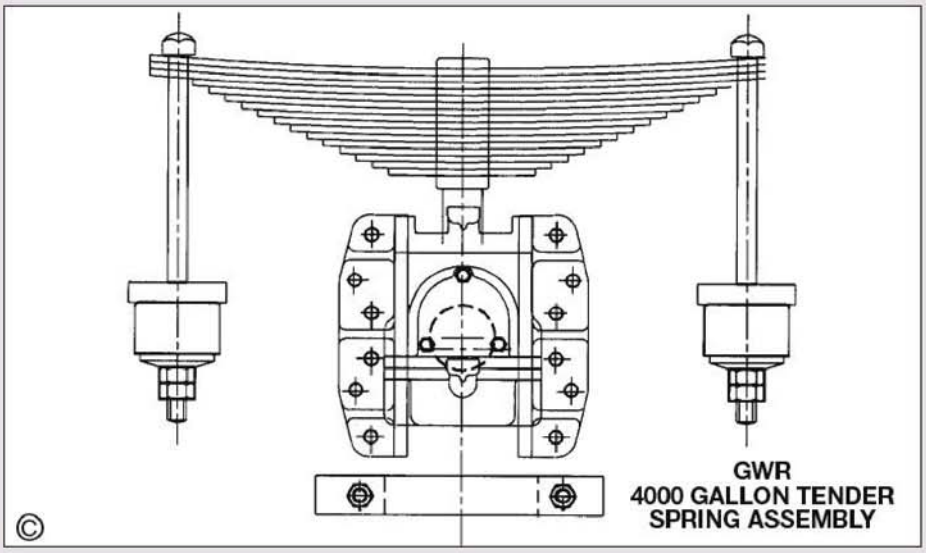
After the block is drilled, if you so desire and use a little care, the holes can be opened out a couple of drill-sizes. Your own experience will soon teach you what's what.

Lay the block in the appropriate position over the open jaws of your biggest vice (or under a bush-press if you've got one (or access thereto) and with a block of steel aimed at the centre of the blank, give it a hefty clout with a big hammer. Two or three blows should be enough to break out the inner portion, then it is a matter of a few minutes use of a square file to produce an embryo spring buckle. Although my drawings shew 1/16in. walls, they are best left nearer 3/32in. making them easier to machine. I have no good information to hand of the correct scale thickness, but then I believe very few people have anyway. As an example of time taken, a recent batch of a total of 64 similar buckles took about two days to complete.

Leaves are a bit of a pain, but I wot not of any easy way. You may purchase the raw material in hardened and tempered, or annealed condition. In the first case, the use of titanium nitride coated drills for the holes is recommended. These are often sold as 'TiN' coated indicating not the element tin, but the compound titanium nitride. Alternatively use a punch on a block of lead. If



Wilson's Words of Wisdom:
One may show the path
to knowledge.
A thousand
cannot make men think.



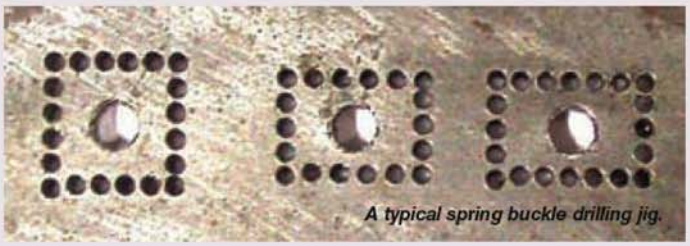
annealed, ordinary drills will suffice. Heat treatment is best left to the professionals unless you have a muffle furnace and know what you're doing. Just imagine trying to do all 96 leaves with a blowlamp. What we used to call a dose of the 'screaming ab-dabs' seems remarkably likely.

Hard or annealed, the rolling of the spring leaves is simple, but more 'oomph' is needed for the hardened version. However, it is quite straightforward, I have done it many times. For 'oomph' read a greater amount of curvature required in the rolling. It seems paradoxical, but sufficient extra distortion on the heat-treated spring steel will produce permanent curvature. I am not aware of ever having advocated any process that I have not used myself, unless I have said so.

To assemble the individual complete springs, a piece of 3/32in. rod, pointed at the top and gripped in the vice is a great comfort. Pushed through the top of the buckle, the leaves can be inserted through the buckle and threaded onto the rod. You may well find that the last leaf is a bit tight and might need slight relief at the back. When all are threaded, the rod may be pushed right through, cropped off and burred over to ensure its retention.

Being long and thin, the spring pins or bolts can be troublesome. However, if you start with about 1in. protruding from the chuck jaws, this can be turned down to size and threaded. Pull out another inch and turn it down. Three such operations should see the pins turned, and if there are too many 'grotty' marks on the pin then a final light cut with the threaded end on a tailstock steady will produce good results. Incidentally, I keep a range of centre-drills, each with its own taper-shank mount; the range is from 1/8 to 5/16in. for the Myford, with a 1/2in. one for the Colchester. It pays.

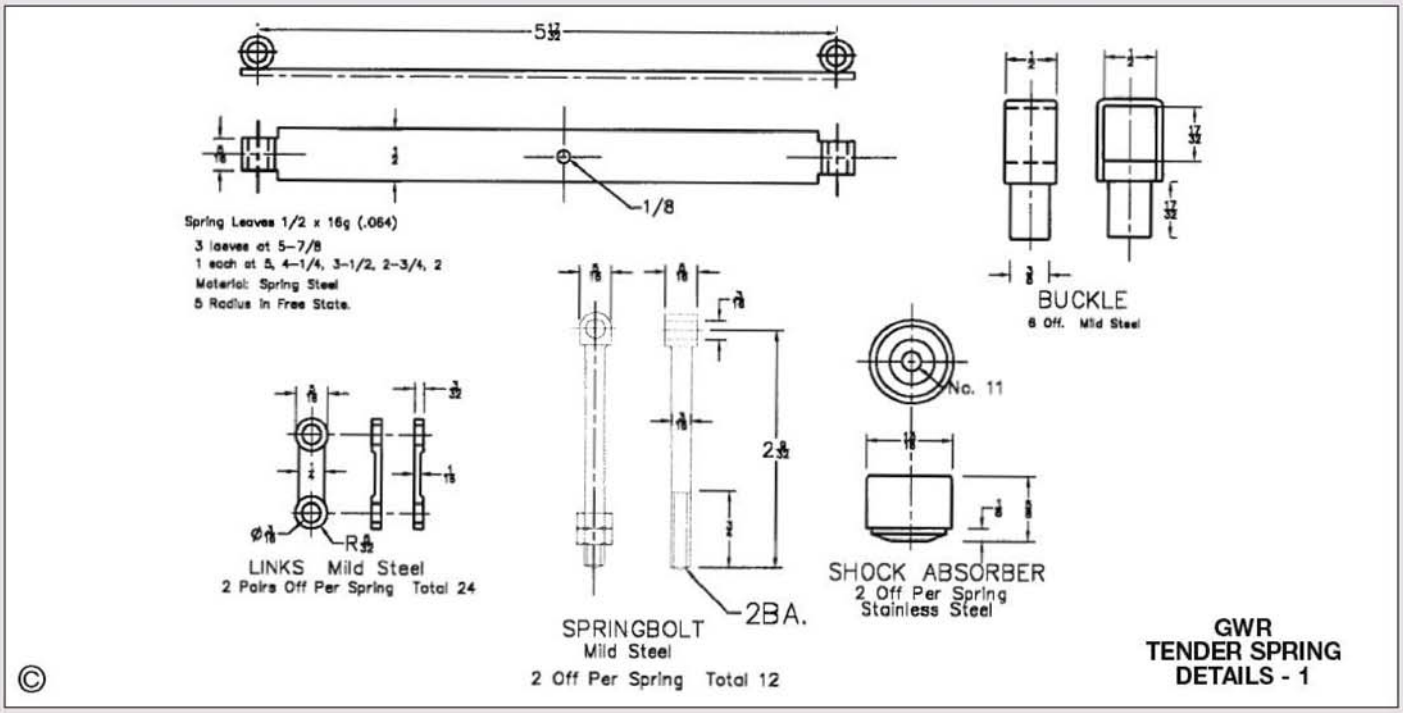
The dampers or shock absorbers are best made from stainless steel, it is not exactly the right colour but will save many hours on rust-removal. Full-size cups were 3/16in. thick containing rubber with the bottom filled in by a metal plug. The overall outline however is well-matched by the fitting as shewn.


A typical spring buckle drilling jig.

The two larger types of spring I shew are more or less interchangeable, at least I have not noticed any visible difference on the Swindon drawings. However, as far as I have seen, the two systems of coupling springs to suspension bolts are not. The actual system which is tucked up behind the hanging plates, is almost invisible for our sizes. However, 'tis up to you. The main problem is the little links, for not only are they many but also need to match pretty closely. I had to look closely at this problem with my current batch, for engine and tender both have this type, and on the engine they are confoundedly obvious, so no way of avoiding.

With a total of at least 84 links, the fun of making them, albeit in three different sizes, is apt to pall surprisingly quickly. So I prepared the drawing and sent it to the nearest laser-cutting firm. Lazy? Maybe. But when I got two complete sets of 'Bulldog' frames, bogie frames, the plates on the bogie for springs (butterfly plates), the bogie cross-braces, all the spring links, two sets of Dean Goods frames, four sets of tender frames, all buffer plates and numerous valve gear parts, for about £200 (as far as memory serves), I deemed it a good bargain. This was several years ago, prices now are somewhat higher.

As a matter of caution, the precise lengths of the suspension bolts will depend on the frames you choose; the long ones shewn are fit for the 67 1/2deg. frames (see *M.E.* 4192, 4 April 2003 when the frames were discussed but not shewn), ▶



Spring bolts.

Assembled spring (for GWR 'Bulldog').

but shorter ones are suitable for the later 45deg. frames. They were shewn in the aforementioned article and should be 2 5/16in. from under head to end of bolt.

The drawings for the lighter spring suited for 3000 gallon (or smaller) tenders are shewn here for the sake of completeness, and do not apply to the present types of tender.

Pass the buck

Not long ago I received a letter condemning my exposure of the swindles used in claiming the relative safeties of roads versus rail travel, and suggesting that I was a 'car worshipper'. I concluded that the writer was a newcomer to *Model Engineer* and has not actually read much, if any, of my humble (?) writings.

I would point out that my quarrel is certainly not with railways, (although many of the old safety measures have been dispensed with and the buck passed to others) but with the *very* unreliable propaganda put out, for their own benefit, by not exactly disinterested anti-road pressure groups. It was much the same in North America, anyone who tried to tell too much (or indeed any) of the truth about the indigenous natives was carefully branded an 'Indian Lover' in tones of bitter condemnation and ignorance.

As examples of the above mentioned passing of the buck, level-crossing accidents were very rare before the present half-gate system was introduced. Mark this well, I do not try to excuse the actions of some incredibly dangerous drivers in dodging the barriers; I believe that the penalties for doing so should be extremely high, for there can be no sane excuse. But it could not have happened with the old system.

Although I have not read the report on the recent Ladbroke Grove crash, I can't help thinking that it could not have happened had the old system of interlocking been used, for not only would the 'doubtful' signal have been at danger but the relevant points (plus possible catch points) locked into the Down Relief road. These points could not have been set for the Down Main until relevant signals on Down Main, and more importantly Up Main, had been locked at danger. But of course, the railways are no longer run by railwaymen/women.

Again, I know of a case where a driver was suspended for a SPAD. A railwayman in a semi-managerial position investigated and found that although the signal was visible from about 150 yards away, when any closer it could not be seen from the driving position unless the driver crossed over to the opposite side of the cab and pressed his head against the glass, or opened the cab front door and looked out.

The suspension was rescinded on the correct grounds of extenuating circumstances. But someone else in a senior managerial position who was obviously completely ignorant of railway matters, immediately overturned this logical decision. I do not know if the surroundings of the signal were investigated and modified, but if not the example speaks for itself. Incredible as it may beseem, other equipment had been erected near the signal that completely obscured it from view in certain train positions. Any questions?

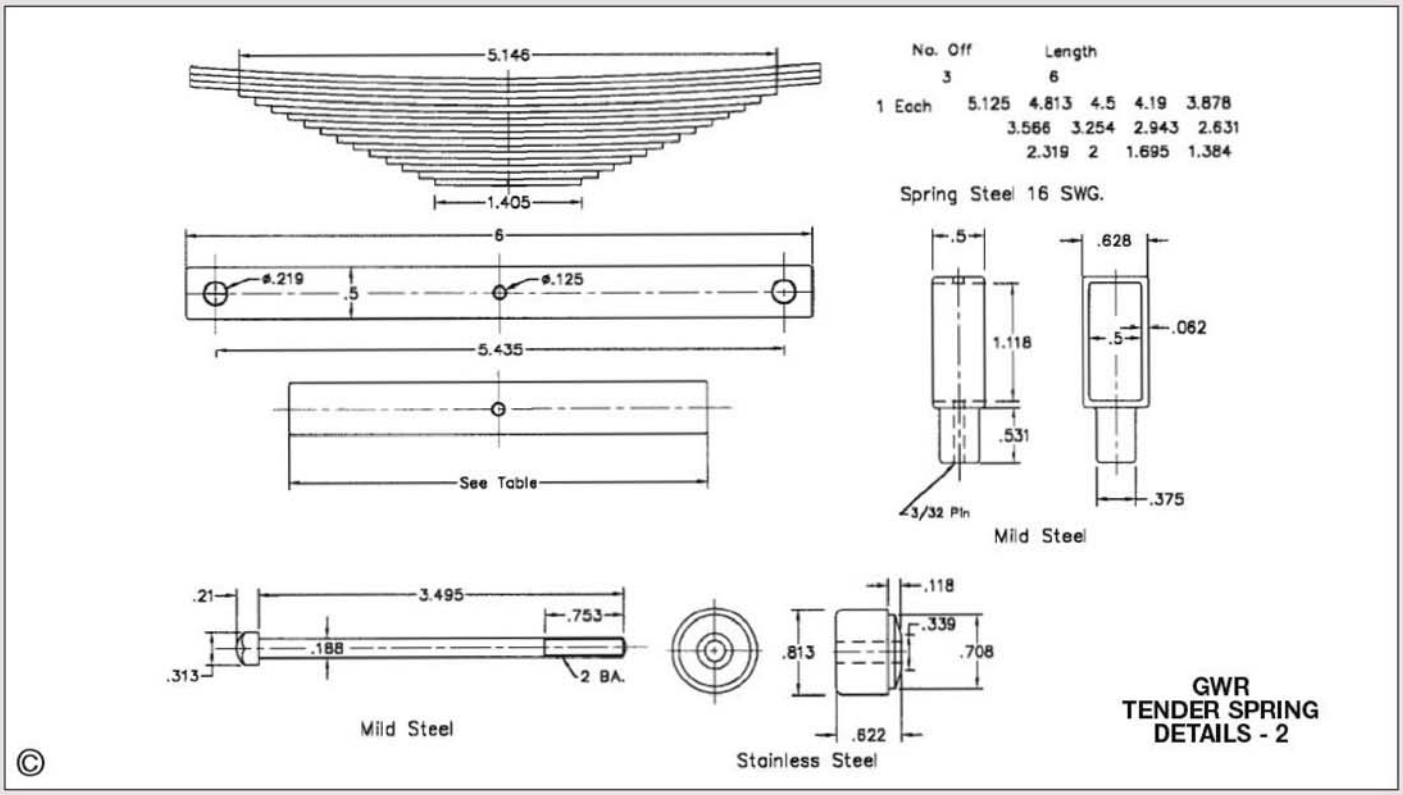
This was told personally to me by the semi-managerial railwayman concerned; wild horses etc. will not get any identification from me, beyond the fact that it was on London's Underground.

The also-used infamous *"Lies, damned Lies, and Statistics"* remark was made by a person ignorant of the proper use of statistics, about a knave who knew and employed the improper use of statistics.

Improper use: using carefully selected figures to 'prove' something convenient for the user.

Proper use: using complete, or all available figures to find out what will prove itself.

●*To be continued.*



PETE'S PAGE

TRAVELLING ON THE GREAT CENTRAL RAILWAY

No, it is not a giant double Fairlie but two Black 5 boilers under repair and back to back at the Great Central Railway shed.

British Railways standard taper thread plugs which were said to made from lead-bronze castings.

Peter Spenlove-Spenlove provides some information on the GCR preservation scene.

During the 1890s a proposal was made to build a fast railway link between the north midlands and Paris. It was to accommodate European as well as the British rolling stock. Easy grades and curves, as well as an absence of level crossings, would allow high speeds. Both the French and British ends of the tunnel under the English Channel were making good progress. The line was completed into Buckinghamshire but the government was persuaded to stop the tunnel works. It was feared that undesirables might pass through.

The line which ultimately ran to Marylebone was the Great Central Railway, previously the Manchester, Sheffield and Lincolnshire Railway which needed a south bound route. During the Beeching era and the days of railway politics the GCR 'London Extension' was closed and the tracks torn up. Soon after, preservationists rebuilt portions totalling 17 miles, so far 5 1/4 miles south from Loughborough is doubled tracked with steam and diesel locomotives using both tracks. When did you last look out of your steam train and see timetabled steam trains coming the other way on a mainline?

Close up photo of the front right hand side of one of the boilers near to the foundation ring.

Among our regular passengers (not customers as the national railways insist on calling us) are some model railway enthusiasts who bring catalogues and models (table top models, not the steam models familiar to *M.E.* readers). They discuss fine details. Some are rivet counters. You hear comments like: *"Your model is number XX and the tender was welded then and not riveted."* The reference books are consulted. At Loughborough Central Station I took the 200yd. trackside footpath to 'The Shed' outside which stood two Black 5 boilers back to back. One had just been hydraulic and steam tested and the other was still under repair. Nobody was available to confirm its number and status.

Most readers are conversant with *our* steam boilers and their stays but I defy anyone to be a stay counter on this silver painted boiler as it sits in the late winter sunshine, unless you are a volunteer who has to drill them out, re-tap the holes then make and fit new ones.

A boiler undergoing a hydraulic pressure test. Just like our model boilers but with everything on a bigger scale.

Boiler barrel detail. Note the cover plates inside and out and the crinolines for the lagging and outer casing.

Mr. B. (Albert) Mann, founder member and first Chairman of CSME, with his son Colin, test run a newly completed engine circa 1932.

Erecting the CSME sign circa 1960. Sam Fear is on the left, Les Dobbs on the right with Charlie Toomey hidden in the centre.

Les Dobbs poses for a picture with his 3in. scale Burrell traction engine at one of the Shaftesbury Hall exhibitions held in 1969 and 1971.

CHELTENHAM SME
65th ANNIVERSARY WEEKEND

Graham Gardner
welcomes readers to a very special celebration on 28/29 June at the CSME Hatherley Lane site.

This year sees the 65th Anniversary of the Cheltenham Society of Model Engineers Ltd. and members are busy planning a special weekend in conjunction with Cancer Research UK. But first a little history.

Twenty 'interested members' held a meeting at 9 Berkley Place, Cheltenham on Wednesday 12 January 1938. By the end of the evening the Cheltenham Society of Model Engineers was formed. With the onset of War soon after, the Society was put 'on hold' until 1946.

When the Society reformed it was decided that a permanent home was required and several possible sites in the area were considered. It was only after member Sam Fear managed to interest local businessman Sir George Dowty, that the Society moved to its present ground at Arle Court, just 5 minutes from junction 11 of the M5.

After a great deal of hard work and determination by the membership, a track was officially opened in 1961 along with an extended pond for the boating members. Throughout the 1960s, the Society grew and flourished and became known as the 'Society in the Trees', a tribute to the grounds in which it stands.

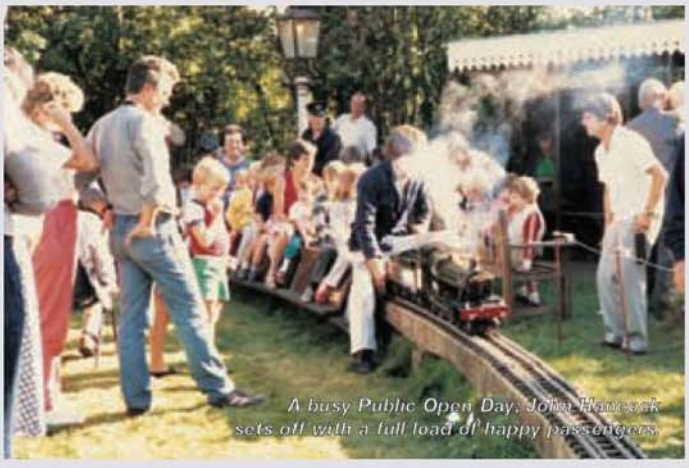
The signal box that once stood in the Lower High Street, Cheltenham.

To promote the Society further and to raise funds, two major exhibitions were held at Shaftesbury Hall in the centre of Cheltenham, one in 1969 and another in 1971. I recall attending the latter as a junior member, while still trying to get to grips with a lathe as an apprentice! During the 1970s the Society ran many portable track events at schools and steam rallies in Gloucestershire, many of which I helped run, learning a lot about models and full size engines from various drivers as I did so.

During the 1980s and 1990s more work took place on the ground in the form of a new station, steaming bays, bridges, workshop facilities and a canteen. A milestone for the Society was in February 1999 when the ground was purchased, thus securing the future. Today, the Society is a limited company and has approximately 150 members with interests in locomotives, traction engines and boats.

With 2003 being the 65th Anniversary, and with the recent loss of one of the members, it was decided to put on a special weekend 28/29 June and to support Cancer Research UK as well. The ground will be open to the public on both days from midday (admission free) with locomotives, traction engines and boats running throughout the weekend plus a large model tent and many other attractions including a special Members and Guests night on the Saturday evening, with night running.

Please come along and support this special event, fun for all the family guaranteed. For further details telephone 01242-580548 or visit the CSME website at **www.go.to/cheltsme** See you all there.



A busy Public Open Day; John Hancock sets off with a full load of happy passengers

Tony Richardson, John Parker and Peter Arnot prepare their boats for another run on Members' Day.

CLUB CHAT
With Stan Bray

UK News

The **Southern Federation of Model Engineering Societies** Autumn Rally will be held 20/21 September at Audley End, hosted by **Saffron Walden DSME**. Recognising the need to plan the event well in advance, every effort will be made to get everything ship-shape throughout the summer, and the club has hit on a novel way of trying to ensure that there are plenty of volunteers to assist on the two days of the rally. Any member helping out over both days will be given a free raffle ticket for the Sunday when a draw will take place for a bottle of whisky. In a recent issue we reported the rather unfortunate incident of a section of mixed gauge point work constructed to provide access to the turntable with the 5in. gauge rail on the wrong side. It appears that this error has now been rectified and the point dragged from the workshop and put in position. It has since been decided that another point will be needed for the other end of the turntable and work is about to start on that. If only this had been known beforehand — the 5in. rail will need to be on the same side as the one that was fitted wrongly! Never mind, doubtless it has all been good experience.

A planning application by **Sutton Coldfield MES** to extend their clubhouse was turned down by Lichfield District Council on the grounds that the building was for an indoor activity. During discussion with the planning authority the question was asked whether permission would have been granted had the club been a Rugby Club, and it seems that it would. How this can be explained or justified is beyond comprehension, particularly if the range of indoor and outdoor activities associated with a Rugby Club is considered. The model engineers have lodged an appeal and an inspector is due to pay them a visit. Members will be asked to meet a small increase in their annual subscription this year to cover the considerable increase in insurance premiums. We note that several societies are reporting this, due of course, to the prevalent attitude of some who set out to obtain compensation for even the most minor incident.

Docklands & East London MES is currently working on a track expansion programme and is to increase the number of public running sessions this year. This last is due to a demand from the general public with whom the railway has proved very popular. It is hoped that additional locomotives will also be available to cope with the extra loads. In an effort to reduce the burden on a few individuals with calls on them for additional driving duties, a driver training programme is being set up to augment the number of competent drivers available.

An interesting evening chaired by our Editor at **North London SME** was devoted to members discussing the various machines they have or had used in their workshops and how useful or useless these machines have or had been. Inevitably, such a discussion expanded into a session during which members explained how they had resolved various awkward machining problems, resulting in an interesting exchange of ideas. The club has a full programme of events and activities of interest across the many and varied sections. Arranged for the summer, and a new item this year, is a visit by **Gauge 1 Model Railway Association**, members of which will have the opportunity to try out the garden railway, as well no doubt as to see and possibly operate the larger gauge models.

These days, many societies struggle with the lease to the land on which they operate, with quite a few working on no more than a year by year basis. No such worries though for **City of Oxford SME**, which has just been promised a 50 year lease on their site at Cuttleslowe Park with a rent review at ten year intervals. They have also been granted planning permission for a new clubhouse to include a large room suitable both for meetings and use as a waiting room during public running sessions. The tracks themselves are constantly undergoing improvement, the latest being the fitting of a hydraulic lifting device, installation of a new siding and re-aligning and ballasting the ground level track.

The will be plenty of fun for members of **Chichester DSME** in late June when they combine their annual barbecue with (CLIC): the Chichester Locomotive INefficiency Competition which will involve simple tests both for drivers and passengers. They are pleased to report that the new track has been completed in time for the summer running period and was due to be officially opened on 27 April. The club is also in the happy position of having recently signed a new lease.

In view of the success of the Open Model Locomotive Efficiency Competition (OMLEC) hosted for the last two years by **Guildford MES**, the club has decided to make it an annual event. At the same time, since there has been a steady decline in interest in GMLEC, the society's own locomotive efficiency competition, the two events will now be combined and GMLEC replaced by another competition to test driving skills; details and format as yet to be finalised. We hasten to confirm that these competitions will not affect the club's popular annual rally, which this year will be held 19/20 July.

Members of **Hereford SME** will be holding their annual exhibition and open weekend 21/22 June 2003. The format will be similar to previous events, with an exhibition in the clubroom, trade and preservation stands on site, and full running facilities on the tracks. There is also plenty of space for traction engines and other road vehicles to operate. This event will see the first use of the new signalling system which has been installed during the winter months. Boiler certificates will be required for all steam models. A Barbecue will be available to all on Saturday evening, and camping and caravanning facilities are available on a first come first served basis. The adjacent Waterworks Museum will be open on both days with engines operating on steam. Further information is available from Phil Keating (01432-820369) or John Arrowsmith (01432-265151).

The very popular **Cambridge MES** open weekend takes place over the weekend 28/29 June; the track is situated at Fulbrooke Road, off Granchester Road and is easily accessible from the A14 or M11 motorway. As well as running on the triple-gauge ground level track ($3\frac{1}{2}$, 5 and $7\frac{1}{4}$in.) there will be an exhibition for which models are invited as well as for running purposes. Good facilities are also available for the operation of model road vehicles. Refreshments will be provided throughout the weekend, and owners of models will be provided with a free meal. Limited space is available for caravans and camping but readers should note that pre-booking is essential. Further information is available from Andrew Clarke (01223-880639) who should also be contacted to book a caravan or camping space. Cambridge is a popular town with plenty to interest any requiring a break from the rally. The town is within reasonable walking distance of the track and is well served with museums, good shops and excellent restaurants. There are also plenty of sports facilities for the energetic. Further information about the society can be obtained from their website: **www.cambridgemes.co.uk** and the city itself also hosts several interesting websites.

To give the society some much needed local publicity, and hoping in the meantime that new members might be attracted, some members of **Sutton MEC** staged a display which covered a total of four tables at the local library for a couple of days. This also acted as a preview for the annual exhibition day a couple of weeks later at which the society model competition was also held.

Work continues on the **Lincoln DMES** track in preparation for the official opening 20/21 September. This event will also be a celebration of the club's 70th anniversary this year. As well as extending the length of the track, there are also new raised steaming bays which include a hydraulic lift to raise the models to the required height. Although the whole circuit has not yet been completed, the track has been in use for public running for some while. The first run of this season was blessed not only with fine weather but also with a good attendance from the public. To mark the first day of running, a special cake with a single candle had been made for the event and was thoroughly enjoyed by all members present. At the AGM in April, Secretary Dave Tomlinson expressed his wish to stand down and Terry Peacock was duly elected in his place. Readers wishing to contact the society should contact Terry at 12 Jerusalem Road, Skellingthorpe, Lincoln LN6 5TW.

Crawley Model Engineers have participated in two local exhibitions this year. The first was the Crawley Model Rail Exhibition at which they had a small stand depicting steam locomotives through the ages. A model of a Trevithick locomotive formed the starting point and an LMS Jubilee was the final model with a variety of prototypes between. Also on show were two models of *Tich* displayed in such a way that visitors could view the backheads. The second exhibition was that of **Crawley MRS**, supported by members of Crawley ME as a means for members of the model engineering society to demonstrate their gratitude to the model railway society, which provides them with a meeting place ▶

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.

John Birkes	*City of Oxford SME*
Roger Burns	*Ottawa Valley LS & ME*
David Plant	*Chesterfield DMES*
Maurice Richins	*City of Oxford SME*
Tom Roydouse MBE	*Otago MES*
Bill Webster	*Heaton & District Model Boat Club*

during the winter months. Plans for the future include the acquisition of a container for storage, subject to approval being granted by the local authority. Not only will this provide valuable storage space, but it will also free up space in the present club building which can then be converted to a social area for members to use for relaxation.

A good number of entries have already been received for the annual **Peterborough SME** traction engine rally 18/20 July, at Sacrewell Country Park. Last year over 40 engines were present and it is anticipated that this number will easily be exceeded this time. The rally will be accompanied by an exhibition plus all the attractions of the farm and buildings of the country park. Further information can be obtained from the club website **www.peterboroughsme.co.uk** and anyone intending to visit for the first time should be aware that the country park is well signposted from the A1(M). Those travelling from an easterly direction will find the southern section of the ring road similarly signposted.

Judging by the number of entries which began to arrive as early as April for the **Melton Mowbray DMES** Whissendine 2003 weekend 6/7 June, it looks as though this will be another bumper event. Additional publicity has already been gained by a mention of the event in *Old Glory*, a magazine which usually reserves publicity for events involving full-sized engines rather than models. That said, at least two full-sized engines will attend the rally as well as numerous models. Saturday will be set aside purely for enthusiasts and will include two organised road runs for model road vehicles (and their crews) to the village pub. The tracks which cater for 2½, 3½, 5 and 7¼in. gauge models will all be available throughout the day. The clubhouse will be the centre for a social evening which will feature a hog roast. The public will be welcome on Sunday and will have access to rides on the railway and behind model road vehicles. Lunches will be available, and the bar will be open. Judging for the annual competition will also take place on Sunday and as well as these awards, every participant will receive a commemorative plaque. Some caravan and camping places are available on site for entrants, but early booking for one of these is necessary by prior application to Peter Robinson, 7 Windmill Way, Lyddington, Oakham, Rutland LE15 9LY; tel: 01572-821457; e-mail **daphneandpeter@lyddington100.freeserve.co.uk** Should anyone not be able to book for camping on site, an excellent four star campsite is situated nearby within a few minutes drive of the event, which is held at the Whissendine Sports Club, near Melton Mowbray.

Most clubs do their best to improve the environment of their track site and are usually only too pleased when unusual birds of the feathered variety pay a visit or they see the odd rabbit and perhaps even a fox. At least a couple of clubs have such animals that quite openly sit and watch the trains go by. Members of **Lancaster & Morecambe MES** however, may well have mixed feeling about such matters. One of the winter maintenance jobs has been to replace the track ballast with limestone because the local rabbit population had developed a liking for digging holes in the previous type. Nobody really begrudges a few rabbits digging some holes, but we are aware how the rabbit population has a habit of increasing so in no time at all a few holes can become a major excavation. Even so, and although they know the rabbits will be disappointed, members do not intend to discourage them in any other way. Then there are the mice; it seems that the local variety cannot tell rubber from cheese as they have eaten all the compressed air line, so something a little less tasty will have to be used to replace it. Despite all these problems the annual club dinner (rabbit pie was definitely *not* on the menu!) held in March was well attended and everyone apparently had a good time. The monthly meetings at Carnforth Working Mens' Club are also well attended. Members are now working hard to prepare to host the *Sweet Pea Rally* at their Cinderbarrow Picnic Site track 13-15 June, *Sweet Pea* owners, visitors, rabbits and mice all welcome!

The annual spring get together for members of the **National 2½in. Gauge Association** took place at the headquarters of **Surrey SME** at Leatherhead and, as usual, was well attended. Several members showed projects under construction, and there were examples of yet more new drawings and castings available, including a new SECR Class 'C' locomotive. Something different this year was a talk by Laurie Cooke about Inheritance Tax and inevitably the question of what happens to ones models after death was discussed. The shield awarded to the Association for being judged the best club stand at the recent Model Engineer Exhibition was on show for the members who had not seen it before. It was announced that the association has every intention of winning it this year as well!

World News

New Zealand

A meeting was held by **Southland SME** to discuss the questions of safety and the possible appointment of a safety officer. The need appears to have arisen due to an oversight resulting in the society operating both the portable and permanent tracks for a very brief period without the necessary certificate from the Inspector of Machinery in Wellington. Having sorted out the certificate, the club is now going ahead with planning the 2003 Great Little Train Show. With the general feeling that the 2002 event was the best ever, they really have something to live up to this year. Additional competition classes at the show this year will include separate categories for juniors and beginners.

A new club locomotive is being built for **Otago MES**. It will be based on the late Kennion Brothers' *Butch* design, but in 7¼in. gauge. A consortium of members is carrying out the work and some of the parts were on show during the club's annual exhibition. The decision to use the design is because a model of the type, but in 5in. gauge as originally designed, and built by Bill McGhee, a life member of the society, won IMLEC in 1977. The group building it will therefore be able to draw on his experience.

Canada

Members have been continuing with work on the new **Ottawa Valley LS & ME** raised track. When we last heard 233 posts had been put in position, leaving another 75 to be installed, which amounts to about 300 feet. Not all the rail and other materials have been obtained as yet, but no doubt this side of things will soon be sorted out. In tandem with work on the raised track, improvements have been made to the ground level railway and by fitting an additional switch (point to the Brits!), and altering the position of two others, it has been possible to provide a new siding for the turntable line and an extra siding for holding trains waiting to use the main line. The club has received considerable support for these projects by staff at the Heritage Museum in Cumberland where the tracks are situated. Unfortunately, even though the railways are within the precincts of the museum, vandals are still active, although their main target appears to be the toilet door rather than the actual tracks.

Australia

In March the **Steam LS of Victoria** organised a special running session for the Hampton Kindergarten, an event that seems to have been enjoyed as much by the old 'uns as by the youngsters. One of the problems with opening a club track for public running in the afternoon is that members who attend to run things can find it difficult, particularly if travelling any distance. They have to decide whether to take lunch in the middle of the morning or wait until the evening. An idea introduced by the society is to provide a barbecue lunch prior to public running sessions with the result that the turnout of members has increased considerably. With such a lunch provided at the club, the midday meal no longer presents a problem and offers an additional advantage in the social aspect of lunching with ones friends.

South Africa

A special meeting organised by **Centurion SME** for model road vehicles was attended by no fewer than 24 enthusiasts and their families, indicating a steady increase in interest in this aspect of the hobby in South Africa. Work on collating the contents of the club library continues which when finished will mean that a comprehensive computerised index will be available allowing members to locate the articles they are seeking, without difficulty. Also under consideration is a scheme to encourage younger members into the society, bearing in mind that few people these days understand the workings of old time machines. They probably do not know how to operate machinery either and some guidance is therefore useful and likely to encourage would-be newcomers to our hobby.

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.

MAY

30 **Vale of Aylesbury MES.** *Track Night.* Contact Clive Ellam: 01296-623433.
30 **Historical MRS (Essex Area).** *Dave Carson: Piers of the Realm, Compact Layout Design.* Contact Jem Harrison, 27 Colne Place, Basildon, Essex SS16 5UZ.
31/1 June **Vale of Aylesbury MES.** *Traction Engine Rally and Open Weekend.* Contact Clive Ellam: 01296-623433.
31/1 June **Dockland & E. London MES.** *Track Run.* Contact P. M. Jonas: 01708-228510.
31/1 June **Fylde SME.** *6th Annual Locomotive Efficiency Run.* Contact Alan Reid: 01253-882872.
31/1 June **Ottawa Valley Live Steamers.** *Heritage Weekend & Barbecue.* Contact John Bryant: 761-1109.
31/1 June **Rochdale SMEE.** *Northern Association Narrow Gauge Model Locomotive Efficiency Competition.* Contact Mike Foster: 01706-360849.
31/1 June **Guild of Model Wheelwrights** at Arley Hall, Knutsford. Contact Biddy Hepper: 01492-623274.

JUNE

1 **Andover DMES.** *Members' Running Day.* Contact R.W. Hanman: 01980-846815.
1 **Basingstoke DMES.** *Running.* Contact Ian Shanks: 01420-561741.
1 **Bristol SMEE.** *30th Anniversary Celebrations & Family Day.* Contact Trevor Chambers: 01454-415085.
1 **Forncett Industrial Steam Museum.** *Model Engineers' Day.* Contact R.F. Wilson: 01502-714905.
1 **Hornsby ME.** *Sailing Day.* Contact Ted Gray: 9484-7583.
1 **Leyland SME.** *Ground Level Running and Charity Day.* Contact Mark Entwistle: 01772-422411.
1 **Nottingham SMEE.** *Running.* Contact Gerry Chester: 0115-9259096.
1 **Oxford (City of) SME.** *Running.* Contact Chris Kelland: 01235-770836.
1 **Plymouth MSLS.** *Running.* Contact John Brooker: 01752-671722.
1 **Reading SME.** *Running.* Contact: Graham Bustin: 01189-615450.
1 **Rugby MES.** *Running.* Contact David Eadon: 01788-576956.
1 **South Durham SME.** *Running.* Contact B. Owens: 01325-721503.
1 **Surrey SME.** *25th Birthday Celebration Steam-Up.* Contact John Cook: 020-8397-3932.
1 **Taunton ME.** *Running.* Contact Don Martin: 01460-63162.
1 **Tonbridge MES.** *Visit by Colchester MES.* Contact D. C. Brunning: 01732-352153.
2 **Historical MRS (London Area).** *David Vestry: Railway Oddities.* Contact John Millbank: 0208-948-0556.
2 **Lancaster & Morecambe MES.** *Running Night.* Contact Harry Carr: 01524-411956.
3 **Romney Marsh MES.** *Track Meeting.* Contact John Wimble: 01797-362295.
3 **South Durham SME.** *Meeting.* Contact B. Owens: 01325-721503.
3 **Stamford MES.** *Informal Discussion.* Contact David Ash: 01780-751211.
3 **Surrey SME.** *Discussion Night.* Contact John Cook: 020-8397-3932.
3 **Taunton ME.** *Stationary Engine & Loco Running Night.* Contact Don Martin: 01460-63162.
4 **Bradford MES.** *Boating Evening.* Contact Gordon Eddison: 01943-864217.
4 **Bristol SMEE.** *Ashton Court Railway Meeting.* Contact Trevor Chambers: 01454-415085.
4 **Tyneside SMEE.** *AGM.* Contact Ian Spencer, 39 Briardene Crescent, Kenton, Newcastle upon Tyne NE3 4RX.
5 **Leyland SME.** *Visiting Guest Speaker.* Contact Mark Entwistle: 01772-422411.
5 **South Lakeland MES.** *Meeting.* Contact Adrian Dixon: 01229-869915.
5 **Sutton MEC.** *Bits & Pieces.* Contact Mike Dean: 0208-657-5401.
6 **Vale of Aylesbury MES.** *Track Night.* Contact Clive Ellam: 01296-623433.
6 **North Norfolk MEC.** *Dr. Robert Cooke: The Life of Charles Babbage.* Contact Gordon Ford: 01263-512350.
6 **Portsmouth MES.** *Bring & Buy.* Contact John Warren: 023-9259-5354.
6 **Rochdale SMEE.** *Bits & Pieces.* Contact Mike Foster: 01706-360849.
6 **Romford MEC.** *Competition Night.* Contact Colin Hunt: 01708-709302.
6 **Romney Marsh MES.** *Visit to Grove Ferry Railway.* Contact John Wimble: 01797-362295.
7 **Amnerfield Miniature Railway.** *Diesel & Electric Open Day.* Contact David Jerome: 0118-9700274.
7 **Gas Turbine Builders' Ass'n.** *Fly-in* at Brooklands. Contact: Tom Wilkinson: 01508-570977.
7 **Kew Bridge Steam Museum.** *Tower Open Day.* Information: 020-8568-4757.
7 **Reading SME.** *Club Running.* Contact Graham Bustin: 01189-615450.
7 **Romney Marsh MES.** *Visit to Garden Railway, Iden.* Contact John Wimble: 01797-362295.
7 **SM&EE.** *Competition Day & Working Model Display.* Contact David Boote: 01202-745862.
7 **Worthing DSME.** *Visit by 2½in. Gauge Association.* Contact Bob Phillips: 01903-700642.
7 **Wrexham DSME.** *Inaugural Run of Irish Mail in 5in. gauge.* Contact Paul Malin: 01691-650429.
7 **York City & DSME.** *Summer Informal Meeting.* Contact Ken Bateman: 01904-421445.
7/8 **Cardiff MES.** *13th Welsh National Locomotive Rally.* Contact Trevor Jenkins: 029-2075-5568.
7/8 **Melton Mowbray DMES.** *Whissendine 2003.* Contact Phil Tansley: 0116-2673646.
7/8 **Moors Valley Railway.** *Grand Summer Gala.* Contact Jim Haylock: 01425-471415.
7/8 **West Riding SLS.** *Annual Rally.* Contact David Batty: 01924-363908.
8 **Centurion SME.** *Visit by Johannesburg Live Steamers.* Contact Rudy Du Preez: 012-9986780.
8 **Guildford MES.** *Running Day.* Contact Dave Longhurst: 01428-605424.
8 **Harlington LS.** *Open Day.* Contact Peter Tarrant: 01895-851168.
8 **Hornsby ME.** *Running Day.* Contact Ted Gray: 9484-7583.
8 **Leeds SMEE.** *Running Day.* Contact Colin Abrey: 01132-649630.
8 **Lincoln DMES.** *Running.* Contact Paul Thompson: 01522-888228.
8 **National 2½in. Gauge Ass'n.** *Locomotive Rally* at Bromsgrove SME. Contact Clive Young: 01233-626455.
8 **Nottingham SMEE.** *Running.* Contact Gerry Chester: 0115-9259096.
8 **Plymouth MSLS.** *Members' Running.* Contact John Brooker: 01752-671722.
8 **Romney, Hythe & Dymchurch Rly.** *Family Fun Day.* Information: 01797-362353.
8 **Surrey SME.** *Running.* Contact John Cook: 020-8397-3932.
8 **Sutton MEC.** *Track Day.* Contact Mike Dean: 0208-657-5401.
8 **Guild of Model Wheelwrights** at Worcester County Museum, Kidderminster. Contact Biddy Hepper: 01492-623274.
8 **Worthing DSME.** *Running.* Contact Bob Phillips: 01903-700642.
9 **Bedford MES.** *Treasure Hunt.* Contact Ted Jolliffe: 01234-327791.
9 **Erewash Valley MES.** *Steaming Evening.* Contact Jim Matthews: 01332-705259.
9 **Saffron Walden DSME.** *Club Night.* Contact Jack Setterfield: 01843-596822.
10 **Basingstoke DMES.** *Meeting.* Contact Ian Shanks: 01420-561741.
10 **Dockland & E. London MES.** *Bits & Pieces.* Contact P. M. Jonas: 01708-228510.
10 **Romney Marsh MES.** *Electric Track Meeting.* Contact John Wimble: 01797-362295.
10 **Surrey SME.** *Members' Evening Steam-up.* Contact John Cook: 020-8397-3932.
10 **Sutton Coldfield MES.** *AGM.* Contact Roger Timings: 0121-308-5875.
11 **Hull DSME.** *Running + Two-Day Event Shakedown.* Contact Brian Rylance: 01482-647032.
11 **St. Albans DMES.** *Track Evening & Barbecue.* Contact Roy Verden: 01923-220590.
12 **High Wycombe MEC.** *Track Evening.* Contact David Savage: 01494-527402.
12 **Historical MRS (Sussex Area).** *Simon Wilson: The Southwold Railway – Prototype and Model.* Contact Terry Cole, 17 Coombe Drive, Steyning, West Sussex BN44 3PW.
12 **N. W. Leicester SME.** *DIY Barbecue & Night Run.* Contact John Elliott: 01455-847040.
12 **Sutton MEC.** *New Drivers' Run.* Contact Mike Dean: 0208-657-5401.
12 **Worthing DSME.** *Summer Steam-Up & Barbecue.* Contact Bob Phillips: 01903-700642.
14 **Erewash Valley MES.** *Steaming Day.* Contact Jim Matthews: 01332-705259.
14 **Portsmouth MES.** *Families Day.* Contact John Warren: 023-9259-5354.
14 **Reading SME.** *Workshop Lesson.* Contact: Graham Bustin: 01189-615450.
14 **Romney Marsh MES.** *Track Meeting.* Contact John Wimble: 01797-362295.
14/15 **Dockland & E. London MES.** *Belhus 'Mayhem' Track Run.* Contact P. M. Jonas: 01708-228510.
14/15 **Harrow & Wembley SME.** *Open Weekend.* Contact Dr. Roger Greenwood: 020-8427-2755.
14/15 **Hull DSME.** *Two Day Event.* Contact Brian Rylance: 01482-647032.
14/15 **Lancaster & Morecambe MES.** *Sweet Pea Rally.* Contact Malcolm Ford: 01539-444726.
14/15 **Nottingham SMEE.** *Thomas the Tank Engine Weekend.* Contact Gerry Chester: 0115-9259096.
14/15 **South Lakeland MES.** *Open Weekend.* Contact Adrian Dixon: 01229-869915.
14/15 **Guild of Model Wheelwrights** at Acton Scott Farm, Church Stretton, Shropshire. Contact Biddy Hepper: 01492-623274.
15 **Andover DMES.** *3½in. Day.* Contact R. W. Hanman: 01980-846815.
15 **Bedford MES.** *Running.* Contact Ted Jolliffe: 01234-327791.
15 **Bure Valley Rly. (Friends of).** *Fathers' Day Special.* Contact Paul Conibeare: 01263-733858.
15 **Guildford MES.** *Open Afternoon.* Contact Dave Longhurst: 01428-605424.
15 **Hornsby ME.** *Sailing Day.* Contact Ted Gray: 9484-7583.
15 **Leighton Buzzard NG Rly.** *Fathers Day Specials.* Enquiries: 01525-373888.
15 **N. W. Leicester SME.** *Running Sunday.* Contact John Elliott: 01455-847040.
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15 **Romney, Hythe & Dymchurch Railway.** *Fathers' Day Event.* Information: 01797-362353.
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18 **Bournemouth DSME.** *Bits & Pieces.* Contact Mike Baker: 01202-383653.
18 **Bristol SMEE.** *IMLEC Update.* Contact Trevor Chambers: 01454-415085.
18 **Historical MRS (North West Area).** *Mike Turner: Point Operation.* Contact David Goodwin: 01224-880018.
18 **Leeds SMEE.** *Midsummer Steam-Up.* Contact Colin Abrey: 01132-649630.
18 **MELSA.** *Meeting.* Contact Graham Chadbone: 07-4121-4341.
19 **Leyland SME.** *Project Night.* Contact Mark Entwistle: 01772-422411.
19 **Sutton MEC.** *Busy Night.* Contact Mike Dean: 0208-657-5401.
20 **Rochdale SMEE.** *Quiz Night.* Contact Mike Foster: 01706-360849.
21 **Chesterfield MES.** *Running Day.* Contact Mike Rhodes: 01623-648676.
21 **Chichester DSME.** *Barbecue & Loco Inefficiency Competition.* Contact Brian Bird: 01243-542266.
21 **Harlington LS.** *Visiting Clubs Day.* Contact Peter Tarrant: 01895-851168.
21 **Hornsby ME.** *Family Day.* Contact Ted Gray: 9484-7583.
21 **Leyland SME.** *Summer Solstice Steam-Up.* Contact Mark Entwistle: 01772-422411.
21 **Nottingham SMEE.** *Evening Steam-Up & Barbecue.* Contact Graham Davenport: 0115-8496703.
21 **Romford MEC.** *Track Afternoon.* Contact Colin Hunt: 01708-709302.
21 **SM&EE.** *Rummage Sale.* Contact David Boote: 01202-745862.
21/22 **Brighouse & Halifax ME.** *Sir William Stanier Special Weekend.* Contact Bob Durham: 0113-293-8524.
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21/22 **Surrey SME.** *Visiting Clubs Day.* Contact John Cook: 020-8397-3932.
21-25 **Nevil Shute Norway Foundation.** *International Conference 2003* at The Queens Hotel, Southsea. Contact Steph Gallagher: **steph.gallagher@bigfoot.com**
22 **Amnerfield Miniature Railway.** *Running.* Contact David Jerome: 0118-9700274.
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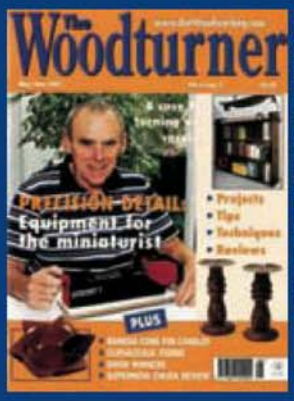

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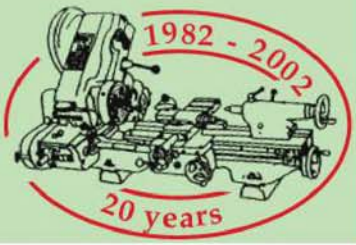

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MYFORD SUPER 7B 31/2" x 19", gearbox, 3 jaw chuck and tooling....£1,250
MYFORD SUPER 7B, 31/2" x 19", gearbox, Power Cross Feed, cabinet stand, tooling....£2,750
MYFORD SUPER 7B, 3½"x 19", gearbox, Power Cross Feed, Hardened bed, 3jaw chuck and tooling on stand excellent condition from new and NOT re-conditioned....£3400
RAGLAN CAPSTAN 10" x 24" 6 Station Turret, cut of slide, collet chuck (lever) & collets, bar feed, variable speed, coolant....£950
SMART AND BROWN 1024 Tool-room lathe, full screwcutting gearbox and power feeds complete with 3 & 4 jaw chucks, collet set, steadies and equipment in very good condition....£1500
VICEROY TDS 1 GBL 5" x 24", gearbox, power slides, 3 MT tailstock complete with fixed steady....£1,400

TOO MANY LATHES TO LIST!!

MILLING MACHINES ....V - VERTICAL, H - HORIZONTAL

ADCOCK AND SHIPLEY IES Horizontal/Vertical Head, 30" x 8" powered table and feed gears,coolant £1,625
ADCOCK AND SHIPLEY 2ES horizontal milling machines....Just in
BOXFORD VM30 vertical variable speed / 30 INT head, table 211/2" x 6" + Abwood vice and chuck....£1,500
BRIDGEPORT vertical belt head 2 speed (short motor) head, R8 powered head, gearbox table, 42" x 9" table ....Very nice £2,250
CENTEC 2B Horizontal, 1" arbor, table powered, 3 ph motor, single phase main motor....£725
CENTEC 2B Vertical/Horizontal, quill feed 2MT head, 25" x 5" table, pedestal model....£1,400
ELLIOT '00' OMNIMILL V/H 3 Morse taper quill universal head, 28" x 71/2" powered table....Just In £1,850
ELLIOT '00' OMNIMILL V/H 3 Morse taper quill universal head, 28" x 71/2" powered table probably the best one around on the second hand market....Just In £2,750
ELLIOT Turret mill R8-10 speed 70-3000 rpm, table 45" x 10" (powered)....£1,500
HARRISON horizontal, 31" x 8" powered table....still good value £625
HARRISON H/V 30 INT swivel head & clutch, 30" x 8" table/powered....£1,950
HARRISON Vertical 30 INT swivel head & clutch, 30" x 8" table/powered....£1,950
MARLOW VERTICAL TURRET TYPE MILL, 3 Morse Taper A favorite mill for its height under the head....£750
RAGLAN vertical mill 2 Morse taper, 2 speed motor, variable selector 175-2220 rpm, stand....give away £750
RISHTON vertical bench milling machine....Coming in
SIP RF30, vertical millingdrilling machine complete with accessories....Still only and New £799
TOM SENIOR MODEL E vertical mill complete with cabinet stand single phase and rare....£2650
TOM SENIOR MODEL E vertical mill complete with cabinet stand single phase and rare in excellent condition + Tom Senior swivel vice and geared conversion gear, one meticulous owner from new- must see good home....£3450
TOM SENIOR JUNIOR horizontal mill with a vertical head (sleeve to be made), table; 20" x 4½", powered....£1200
TOM SENIOR M1 horizontal, 25" x 6" powered table, 1" arbor....£575
TOM SENIOR M1 V/H, 25" x 6", 2 morse taper, 1" arbor. ....Selection £1,200 - £1,450
TOM SENIOR M1 V/H, 25" x 6", 2 morse taper, 1" arbor, very late 240 volt machine....£1,950
TOM SENIOR ELT MAJOR, 2 morse taper quill feed head, powered 37" x 81/2" table in £3,200
VICEROY AEW vertical mill, 30 INT swivel head, powered table 34"x 8", ...Very clean £1,625

DRILLS

ARBOGA ER 25 / 25" Radial Drill speeds (8) 100-2900 RPM ....clean table £1,425
ASQUITH 14-54 001 Mk2 (5mt) Radial Drill....£3,950
FOBCO 1/2" Bench, tilting table....£325
FOBCO 1/2" Pedestal drill tilting table....£345
MEDDINGS MB10 high speed drilling machine with 240 volts....£375
MEDDINGS 1/2" pedestal drill....£245
MEDDINGS 2 Morse taper pedestal drills (new type lighter drill)....Choice £275
MEDDINGS 2 Morse taper quality bench drills....Choice only (each) £325
POLLARD CORONA Pedestal 1/2"/1 morse....From £100
SIP HDP 600B 5/8" / 2MT Bench Drill, table operated by rack, speeds; (16) 162 – 3000 rpm....New £175
STARTRITE Mercury 1/2" 4 speed bench drill....£225
STARTRITE EF1 3 morse taper, power up / down, 12 speeds, 80 – 2800 rpm ....in excellent condition £950

GRINDING / BUFFING

BRIELEY drill point grinder complete with cabinet stand and parts....£375
CLARKSON MKI Tool and cutter grinder complete with universal head and centres....£550
MILFORD 12" Pedestal Grinder....£325
VICEROY Grinder, pedestal model....£145
VICEROY Buffers, pedestal models....Each £250

MISCELLANEOUS / FABRICATION MACHINERY

HOFFMAN dividing head complete with tailstock....£425
HARE MODEL 51t complete with hydaulic indexable table....just £425
EMI-MEC SPRINT spindles and collets, bsa no.48 direct spares, smart and brown lever compound slides + lever collets, hardinge finger feed collets....just in
SWEENEY AND BLOCKAGE NO.2 flypress complete with ball....very clean £225
MARLCO notch broaching fixture + notch broach....£425
HARCOS universal head for tool and cutter grinder....£245
MYFORD vertical slides just in ....£95 / £155
MYFORD VM-D milling attachment for ml7 and super 7 lathes ....as new £675
BCA 12" horizontal / vertical rotary table ....very nice £425
QUANTITY of slips, height gauges, squares, straight edges, micrometers, cubes, angle plates and miscellaeous measuring tools....just in
COPE AND DRAGS....wood £20 / metal £30
TONGS (a varied selection)....each £5
FLAMEFAST DS 130 ceramic chip forge....£345
FLAMEFAST DS 100 hearth....£140
MARLCO broaching press....£425
JONES AND SHIPMAN 4" x 24" bench centres....very nice example £245
TOM SENIOR slotting head....£450
STARTRITE 18-S-5 Woodworking / non ferrous bandsaw (5 speed bandsaw)....£950
DIAMOND fret saw, variable speed....£345
RJH BT 125 Fretsaw, variable speed....£345
SMART AND BROWN / CLARKSON H3-H5 toggle presses....Each £195 / £275
ARRAND 2MT long milling spindle....As new £75
VERDICT CLOCKS, Long/Short Metric and Imperial models....New £40
FLAMEFAST LD300 soldering Iron stove....£75
GRANITE 18" x 12" Surface Plate....£140
VIBROSHEAR Nibbler....Just in £425
TRIUMPH BURNERD 4 Jaw Chuck....£245
TRIUMPH FACE PLATE D14....£70
JONES AND SHIPMAN Broaching Press + Stand....£375
ABB Inverter & 1/2 hp motor, wired up....£250
SIP 7" bandsaw, horizontal & coolant....New £750
WELLSAW hacksaw....As Is £145
DUPLEX D29 toolpost grinder....£345
BOXFORD (imperial only) thread dial indicator....£65
ABWOOD 6" swivel/tilt machine vice....Each £345
VANCO, 1" linisher / vertical + extractor....£495
BURNERD, D14 lever collet chuck + collets....£400
BURNERD, LO lever collet chuck + collets....£400
VERTEX Dividing head....New £245
VERTEX 6" - 8" - 10" rotary tables good value equipment....New From £135
MYFORD ML7 / Super 7 rear tool post....£40
MYFORD 254S rear tool post....New £40
MYFORD Vertical slide / fixed type (copy)....£99
LOCKWOOD QUAD HEADED 2mt Die Holder quality equipment....New £40
LOCKWOOD QUAD HEADED 3mt Die Holder quality equipment....New £40
LOCKWOOD Test Bar / 2mt Boxed quality equipment....New £39
LOCKWOOD Test Bar / 3mt Boxed quality equipment....New £42
MAGNETIC chuck - 18" x 6" fine pole....Never used £325
TOM SENIOR Model E pedestal stand....£150
UNION tool and cutter grinder stand....£135
50 INT Tooling; Selection....Just in
STARTRITE 352 woodworking band saw....£975
STARTRITE 14-S-5 woodworking band saw....£775
ALCOSA GF 080/1 Rapid Melting Furnace....£300
MYFORD Burnerd Griptru 3 Jaw Chucks....Boxed £225
COLCHESTER D13 Burnerd 4 Jaw 8" light body independent chuck....one off £225
RJH 4" Linisher / Vertical complete with built in extraction....£625
MICROMETERS and associated measuring tools....Still packaged as new
POTTERY WHEELS, kilns and associated equipment....Just In Cheap
SPECAC Powder type press....£225
HARRISON L6 metric gearbox....As is £250
HARRISON L6 tailstock....£245
NEW FROM NEW ZEALAND:- Machine vice, 55mm. Jaws precision miniature type ideal forvertical slides and smaller milling machines such as BCA now with the swivel base....£134
Vice on own....£85
Swivel base on own....£49
SIP 1 TON MOBILE CRANE Manufactured 2000 (used just once)....As new £375
MITUTOYO grade A set of slips....£245
F.J. EDWARDS 24" hole cutter....£525
Large bench vice....£70
LINK1.5 ton vehicle crane + top hat....£625
MITUTOYO 103-913 metric set micrometers....£275
NORTON / EDWARDS arbor presses....£75 / £145
AJAX 6" hacksaw....£425
SURFACE plates from 12" x 12" to 36" x 36"....Very nice from £30
WEBER 11/2 ton mobile garage crane, late blue colour....£495
ELLIOTT 1250 STURDIMILL vertical head....One off (rare) £525
RJH linisher 4" wide belt, pedestal....£345
STEEL STOCK different stock rolling in almost daily....to callers only
ELLIOT U1 / U2 Slotting Head....£475
SWAGE BLOCKS....£125 / £145
J & S Universal grinding vice....Choice £275 / £325
BOX TABLES: Grade A and B, many sizes....£40 - £150
SLIPS / GAUGES Metric / Imperial, New Sets; 87 / 81 piece....£215 / £145
HORIZONTAL METAL BANDSAW 6" x 41/2" capacity....New £170
COLCHESTER STUDENT / MASTER Round head, face-plates, small / large ....£50 / £80
QUALTERS AND SMITH 6" Hacksaw....£345
BORING HEADS 2 / 3 Morse, R8 Taper, Max. Capacity 41/2" round bar....New, each £90
ODONI Machine Bed Clamps (pair)....Special £24.50
HEIGHT GAUGES by Chesterman, Shardlow, Moore and Wright....From £95
ELLIOTT 10M Shaper, 10" stroke....£325
DIE BOXES....From £45
TRANSWAVE 3HP Converter....New £295
TRANSWAVE 5.5HP Converter....New £385
TRANSWAVE MT & RT rotary converters....From £485
CROMPTON PARKINSON ¼ HP, resilient mount, Boxford / Myford Super 7 Type motor ....New £140

News: We have just had some Adcock and Shipley 2E horizontal mills in good condition at only £295 each + VAT

WE ARE CONSTANTLY CHANGING OUR STOCK FASTER THAN THE ADVERTS CAN KEEP UP WITH US!!!

PLEASE PHONE 020 8300 9070 TO CHECK AVAILABILITY OR TO OBTAIN OUR LIST

DISTANCE NO PROBLEM!! DEFINITELY WORTH A VISIT ALL PRICES EXCLUSIVE OF V.A.T.

SPRING CLEARANCE: LOTS OF MISCELLANEOUS MACHINES AND MACHINE TOOLS STARTING FROM JUST £20

newall
Newall Measurement Systems

- 2-Axis DRO from **£615** inc vat
- Made in the UK
- 5 year No-Fault Warranty
- 10 micron Accuracy

Conquest Lathe

NOW INCLUDES TEST CERTIFICATE

£395

VARIABLE SPEED

*Price Includes VAT & Delivery**

STANDARD ACCESSORIES

- 80mm 3-jaw chuck
- Q.C.T.P. With 3 Tool Holders

CHESTER U.K. LIMITED
MACHINE AND TOOLING SPECIALISTS

920 Lathe Deluxe

- Swing over bed: 229mm
- Swing over cross slide: 133mm
- Distance between centers: 500mm
- Spindle bore: 19mm
- Taper in spindle nose: MT3
- Motor: ³/₄HP
- 6 Speed: 100-1800rpm
- Net weight: 100kg

STANDARD EQUIPMENT:

- 4" 3-jaw chuck with 2 sets of jaws
- 7" 4-jaw chuck with reversible jaws
- Steady rest • Follow rest
- MT2 Dead centre
- MT3 Dead centre
- 4-way tool post
- Face plate
- Tool Box & Tool Kit
- Tray & Splash guard

£699

*Price Includes VAT & Delivery**

Model B-Super

- Swing over bed: 420mm
- Distance between centers: 500mm
- Mill drill spindle taper: 19mm
- Tailstock barrel travel: 80mm
- 7 speeds 160-1360rpm
- Swing over cross slide: 160mm
- Spindle taper: MT3
- Draw bar: M12
- Cross slide travel: 180mm
- Motor: ³/₄HP
- Net weight: 155kg

STANDARD EQUIPMENT

- 4" 3-jaw chuck
- 2 dead centres
- 1/2 drill chuck
- Change gears
- MT3 chuck arbor

£699

*Price Includes VAT & Delivery**

Centurion

- Swing over bed: 420mm
- Distance between centers: 520mm
- Mill drill spindle taper: MT3
- Tailstock barrel travel: 80mm
- 7 speeds 160-1360rpm
- Swing over saddle: 160mm
- Spindle taper: MT3
- Draw bar: M12
- Cross slide travel: 200mm
- Motor: 2 x ³/₄HP
- Net weight: 230kg

STANDARD EQUIPMENT

- 4" 3-Jaw chuck
- 2 dead centers
- 1/2 drill chuck
- Change gears
- MT3 chuck arbor

£1100

*Price Includes VAT & Delivery**

Champion Mill

- Drilling Capacity: 20mm • End Mill Capacity: 25mm
- Face Mill Capacity: 63mm • Table Size: 150x630mm
- Number of Speeds: 4 • Speed Range: 400-1640rpm
- Spindle Taper: MT3 • Tilting Head: 90° Left & Right
- Motor: ¹/₂HP

From

£585

*Price Includes VAT & Delivery**

STANDARD ACCESSORIES

- 1-13mm Drill Chuck & Arbor

Eagle 25 Mill/Drill

- Mill/Drill Capacity: 25mm
- Table Size 190 x 585mm
- Fine Feed
- Number of Speeds: 12
- Speed range: 100-2150rp
- Spindle Taper: MT3
- Spindle Travel: 100mm
- Motor: 1HP

Price

£699

*Price Includes VAT & Delivery**

STANDARD ACCESSORIES

- 1-13mm Drill Chuck & MT3 Drill Chuck Arbor • Eagle Face Mill Cutter • T3 Tilting Vice • M12 Drawbar • NVR Switch Gear • Interlocked Chuck Guard • Manual and Parts List

Eagle 30 Mill/Drill

- Mill/Drill Capacity: 32mm
- Table Size 210 x 740mm
- Fine Feed
- Number of Speeds: 10
- Speed range: 80-2300rpm
- Spindle Taper: MT3
- Spindle Travel: 130mm
- Tilting Head
- Motor: 1HP
- High/Low Gearbox

Price

£899

*Price Includes VAT & Delivery**

STANDARD ACCESSORIES

- 1-13mm Drill Chuck & MT3 Drill Chuck Arbor • Eagle Face Mill Cutter • V100 Machine Vice • M12 Drawbar • NVR Switch Gear • Interlocked Chuck Guard • Manual and Parts List

626 Turret Mill

- Milling Capacity: 25mm
- Drilling Capacity: 32mm
- Table Size 152 x 740mm
- Fine Feed
- Number of Speeds: 9
- Speed range: 190-2100rpm
- Spindle Taper: MT3 or R8
- Tilting Head
- Motor: 1¹/₂HP

Price

£1340

*Price Includes VAT & Delivery**

STANDARD ACCESSORIES

- One Shot Lubrication • Halogen Work Light • Machine Stand
- Drawbar • Manual and Parts List

Craftsman Gap Bed Lathe

- Swing over bed: 300mm • Swing over gap: 450mm
- Swing over saddle: 170mm • Distance between centres: 570mm
- Spindle bore: 36mm • Spindle nose taper: MT5
- Cross slide travel: 150mm • Compound travel: 89mm
- Tailstock barrel taper MT3 • Tailstock barrel travel: 92mm
- Range of speeds: 50-1250rpm
- Motor: 11/2 HP
- Netweight 398kg

£1550

*Price Includes VAT & Delivery**

STANDARD EQUIPMENT:

- 6" 3-jaw chuck with 2 sets of jaws
- 8" 4-jaw chuck
- Steady rest
- Follow rest
- Stand • Face plate
- Splash guard
- Threading dial
- 4-way turret tool post
- 3MT dead centers
- T-Slotted cross slide
- Halogen work light

Super LUX Mill

- Milling Capacity: 25mm
- Drilling Capacity: 32mm
- Table Size 240 x 800mm
- Fine Feed
- Number of Speeds: 6
- Speed range: 95-1600rpm
- Spindle Taper: MT3
- Tilting Head
- Motor: 1¹/₂HP

Price

£1500

*Price Includes VAT & Delivery**

STANDARD FEATURES

- Powered Head Elevation • Cast Iron Stand
- Angle Tilting Head • Manual and Parts List

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