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Vol. 202 No. 4348

27 March – 7 April 2009

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Tel: +44 (0)844 848 8822
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EDITORIAL

Editor: David Clark
Tel: +44 (0)1847 821136
Email: david.clark@myhobbystore.com
Production Editor: Kelvin Barber
Assistant Editor: Michael Jones
Technical Editor: Roger Bunce

PRODUCTION

Designer: Yvette Masson
Illustrator: Graeme Chambers
Pre-Press: Brian Vickers
Production Manager: Richard Baldwin
Ad Production: Robin Gray

ADVERTISING

Senior Sales Executive: Duncan Armstrong
Email: duncan.armstrong@myhobbystore.com
Tel: 0844 848 5238

MARKETING & SUBSCRIPTIONS

Marketing Executive: Heather Morrison

MANAGEMENT

Head of Design and Production: Nikki Coffey
Special Projects Publisher: Nikki Parker
Subscriptions Director: Rebecca Blight
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This 1938 Bolton Corporation tram was made by Ashley Best who starts a new series on trams in this issue. (Photograph by Ashley Best)

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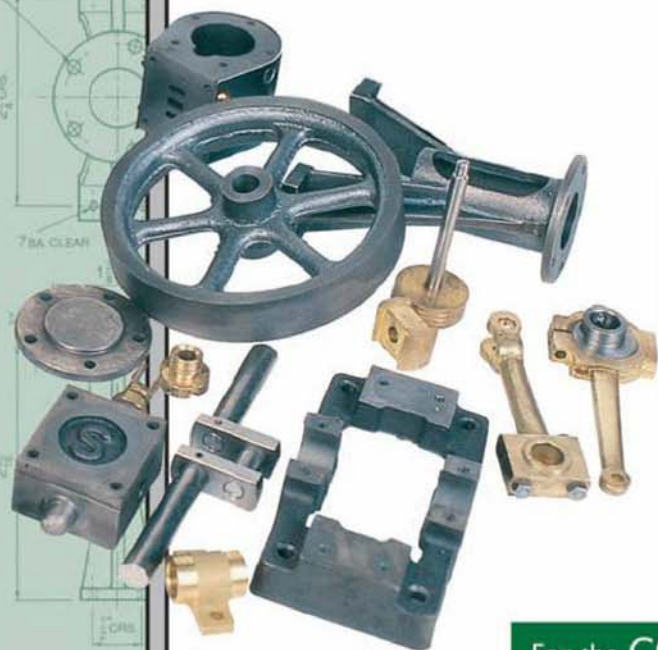
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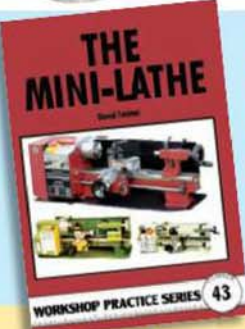
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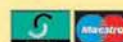
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This book is intended for modellers in the smaller scales and, for larger models the basic painting section is no better than in other books. However, the larger section of the book covers lining methods and is absolutely brilliant on the subject; it also contains a great deal of incidental detail on the various British railway liveries. Recommended very highly! 154 beautifully produced pages. Around 250 photos, virtually all in colour. Diagrams and drawings. Paperback.



Forming Methods Vol. 2

• 1943 • £ 9.70

More forbidden fruit from the Navy Department, Bureau of Aeronautics! This volume comprises two booklets, the first being *Forming by Draw Bench, Power Rolls and Spinning*. The first two of these processes, involving the use of dies, or special contouring rolls, are very much industrial, but spinning is a hand process, and is well dealt with here, albeit in only nine pages. The second booklet is *Heat Treatment of Aluminium Alloys*, a subject we haven't seen covered before, and whilst it is described here as an industrial process, we think the home engineer might be able to do this on a small scale, if he feels so inclined, as it would certainly be useful. 84 well illustrated pages. Softcover.



NSWGR 422 Class Diesel Electric Locomotive - A Construction Project for 5" Gauge • AME • £51.35

From 1991 to 1996 Australian Model Engineering carried a series describing, in very considerable detail, how to build an electrically powered model of a New South Wales Government Railway 422 Class Co-Co diesel-electric locomotive, and here it is in book form, slightly updated to take into account advances in electronics, mainly in the sound-system. As far as we know this is the first detail series on building a large electric powered model, and it is difficult to believe anyone could improve on it. The 422 class locomotives are handsome in their own right, with a European look; the bogies and underframe are similar to the American built 66 class found all over the U.K., and the design could be stretched and adapted into a model of this class. Either way, this book gives you full drawings and copious photos and instructions for a exciting and different project! 218 spiral bound, digitally printed, pages. Softcover.



Lathe Notes Vol. 6

• 1915-1924 • MACHINERY MAGAZINE • £ 8.15

This volume contains four more articles from MACHINERY MAGAZINE, the two main ones comprising *A Study of Lathe Holders Used For Turning, Cutting-off and Screw Cutting*; these may date from 1915, but there is a huge variety of ways of holding tools described or illustrated here, many of which will be useful to model engineers. A third article describes *Building Heavy Lathes Without Machine Work on the Bed Casting*, which is interesting, the fourth article - *The Production of Square Threads on the Lathe Tools, Methods, and Principles Involved* being of much more practical use. Great information and great value! 48 pages. 100 drawings and illustrations. Softcover.



The Traction Engine Archive Vol. 3 - The Transitional Years

• Meredith • £25.30

This third volume in this excellent series from The Road Locomotive Society differs somewhat from its predecessors in that most of the photographs were taken by the author, the majority from the early 1950s up to the 1970s, with a number later. The chapters are: *Steam Rolling, The Fairground Scene, Wagons, a Miscellany, The Rural Scene, Preservation - the beginning, The Rally Scene, Engine Gallery and Preservation Comes of Age*. What is particularly nice is that many of the scenes are within living memory, so there is a lot of nostalgic pleasure here. 176 pages. Around 180 B&W photos, most full page. Hardbound.



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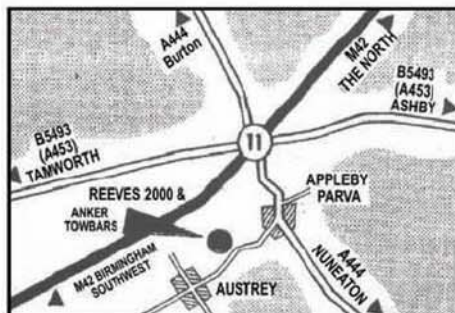
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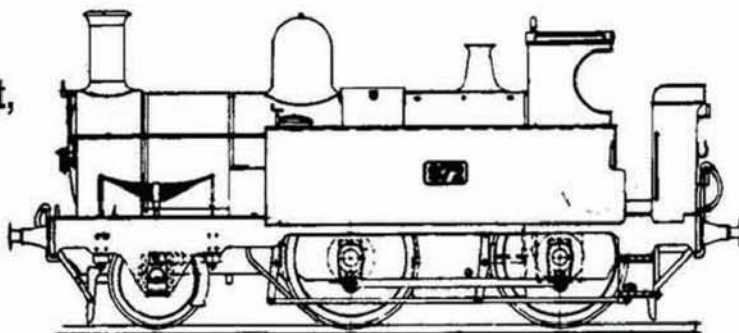
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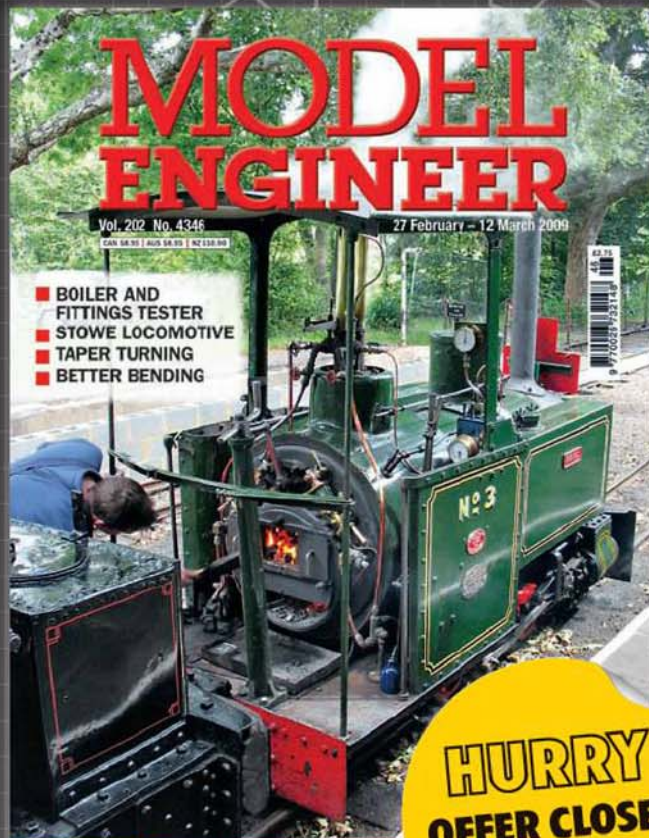
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The 2009 Model Engineer Exhibition

This year's exhibition will be on 11-13 December at the Sandown Park Racecourse, Esher, Surrey. Plans are coming along fine and many traders have already booked stands. Any clubs that wish to attend are welcome to contact me at the editorial email address or by phone.

Tramcars

In this issue, Ashley Best starts a new series of articles about 12 trams, from the Manchester area, that he has modelled in 1:16 scale. In subsequent articles, Ashley will describe how to model trams in detail: exemplified by his Oldham Corporation Tramcar No. 128, which was awarded a Gold Medal at the 2008 Model Engineer Exhibition. Ashley started modelling the larger scale trams after reading the articles by E. Jackson-Stevens in *Model Engineer* in the early 1970s. Hopefully some other modellers will be interested enough in Ashley's models so that the cycle starts again.

Delivery of subscription copies

Four weeks ago, *Model Engineer* hit doorsteps on the Thursday. This was one day before going on sale in newsagents. We put it down to delays caused by snow. Two weeks ago, they started arriving on the Thursday, no snow this time. On Wednesday 11 March my copy of 4347 arrived. I am not sure why there is a delay on delivery. Previous to this, I would receive *Model Engineer* on the Saturday when living in Dorset and the Monday when I moved to the top end of Scotland.

I have talked to subscriptions and there is not an internal MyHobbyStore delay as the posting information for the bags is supplied on the Friday as normal. Also, there are no editorial delays; *Model Engineer* is going to the printers on time. I have just heard that 4346 was posted late and I still don't know why. We will certainly get to the root of this and sort it out. Meanwhile, this issue will hopefully arrive on time.

Overseas subscriptions

For some time we have been aware of increasing delays in some overseas subscriptions. We have looked at this and are changing the method of supply. This means that there is a possibility that this issue, 4348 might arrive before 4347 for one or two readers'. If this happens,

please wait a couple of weeks before contacting customer services for a replacement for 4347. It might just turn up late.

Subscriptions in general

Normally we don't have problems with subscriptions and a subscription is the cheapest method to get your favourite magazine. By far the best (and cheapest) way to pay is by Direct Debit. Then you won't get all those "Your subscription is due to end" letters. So, help to save a tree, subscribe by Direct Debit today.

Free adverts

The Free Private Adverts are still alive and kicking. I get sufficient free adverts for most issues and hopefully, this is a useful reader service. This issue sees a slight change in the advert submission form to comply with the Data registration requirements. Please use the new form rather than an old one from a back issue. Photocopies are acceptable so there is no need to destroy your copy of *Model Engineer*. Although adverts are normally inserted into either *Model Engineer* or *Model Engineers' Workshop* depending on the box ticked, I often put wanted adverts in both magazines to reach as large a readership as possible. I prefer not to put email addresses or mobile phone numbers into an advert, although I will consider mobile phone numbers if you don't have a land line.

URL for the new Model Engineer website

This is www.model-engineer.co.uk and is the same URL as used for the Model Engineer Exhibition last year. It will show an advert and information for the 2009 exhibition until the new site is up and running. I am working with the web designer to put different categories on the website. It should be active very soon.

Myford Open Day

Myford are holding an open day on Thursday 16 April to Saturday 18 April. Times are 9-5 Thursday and Friday and

9 till 3 on Saturday. To find out more, contact Malcolm at Myford on 0115 925 4222 or email sales@myford.com

I shall be there on the Thursday so feel free to come and have a chat. Constructive criticism, suggestions and ideas are welcome. I look forward to seeing you there.

Nemett and I/C Topics

Malcolm Stride has said that, due to personal reasons, he can no longer commit to doing a regular column. He will, however, still provide articles on his new engine when it is finished. If any reader has suitable articles that could be used in the *I/C Topics* section, or indeed would be interested in writing the column on a regular basis, please contact me. I have learnt quite a bit from Nemett over the years and would like to continue the column, even if we have different contributors for each column. There is a Nemett Trophy on offer at the 2009 Model Engineer Exhibition for the best example of the Nemett NE15-S Lynx engine on display. You still have plenty of time to build an example of this superb engine. Plans are available from M. L. Stride, Box 001 at the *Model Engineer* editorial address or from the website, <http://sites.google.com/site/nemettengines/>

The 2-cylinder version looks very advanced in construction judging by the photos on the website.

MSC/J&L catalogue

When I arranged the catalogue offer, postage was not mentioned. The catalogue was free. After about three weeks MSC/J&L were in danger of running out of catalogues so they decided to charge £5.69 postage. When I found out about this, I rang them up but they refused to waive the postage charge to readers. I am sorry about this, it was originally a genuine free offer that MSC/J&L unfortunately changed. I am sorry for any reader who was expecting a free catalogue but what they did was out of my control.

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David Clark,
The Editor,
Model Engineer,
MyHobbyStore Ltd.
Berwick House,
8-10 Knoll Rise,
Orpington, Kent BR6 0EL.
F. 01689-899266.
E. david.clark@myhobbystore.com
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Responses to published letters are forwarded as appropriate.

Sundial

SIRS, - Roger Bunce states in his article on the *Equatorial Sundial* (M.E. 4347, 13 March 2009) that if he were to make another dial, particularly one in stainless steel, he would consider using laser or water jet methods to cut and engrave the dial.

I have been trying for nearly a year now to find someone who can engrave from a DXF file a 720 x 68 x 2mm stainless steel plate with the lines and motto for a south-facing wall-mounted sundial, without success. I have made a number of enquiries to laser cutting companies, all of whom have said they can't do it because the laser cutting machines now in use are not suitable for engraving lines, because of the way the electronics controls the laser. No problem cutting the plate, the mounting holes and the holes for fixing the gnomon, but engraving, no! I am told that even using the older machines, they could not have burned grooved lines deep enough to invest with colour.

The water jet cutting people also told me that you just can't engrave with water cutting: you can only actually cut through plate.

I am currently looking at the possibility at engraving the dial on white faced plastic sheet using a computer controlled woodworking 'mill' in a friend's joinery shop. The disadvantage of this is that I don't think I will be able to get lettering with sharp corners for the motto, since the smallest tool the machine can use is 1.5mm dia., but I am waiting to see the results of a trial run on the text. The lines are no problem, but I would still have preferred it made of stainless steel rather than plastic. If anyone can tell me how to get it engraved onto 2mm stainless steel, I would be very grateful.

Incidentally, this design was produced by a very useful computer program and if anyone would like to investigate some sundial designs, you can download it free from <http://tinyurl.com/5vadpu>

Investment soldering

SIRS, - In response to Mr. Miller's letter concerning investment soldering (M.E. 4344, 30 January 2009), may I offer the following recollections. At the beginning of my career I undertook a course in dental technology and this technique was used extensively. Even then commercial investments were available but why should life be made easy for the students? We had to make our own. The refractory was silica (approx 75% available as silver sand from a builder's merchant and used for rendering). The binder was plaster of Paris (approx 25% available as 'one coat plaster' from DIY stores). Silver sand from a builder's yard is often contaminated and should be heated up to dry it out and burn off any organic matter and it should then be passed through a gauze tea strainer to remove lumps. We used surgical plaster which was very fine but the rather gritty plaster from the DIY store may benefit from the tea strainer treatment.

The parts to be soldered would be set up and secured with wax (beeswax was more secure than paraffin wax) with or without strengthening/ supporting wires. They would then be carefully removed and invested leaving all joints exposed. The wax, plus and minus the wires were removed with boiling water and the area was cleaned up with detergent and a soft toothbrush taking care not to remove any investment. Whilst in this saturated state the porosity of the investment would allow drying out with a gentle flame without explosion (still use eye protection) before taking up to soldering temperature. This method allowed a rapid turnaround time as many fabrications were required during or immediately after surgery.

This method was ideal for the quick turnaround required and for positioning difficult to hold components in seemingly impossible relationships to one another. Incidentally the same investment can be used for lost wax casting but that is another story.

A. E. Green, Lancashire.

This will produce a full and printable design for a horizontal or vertical dial sundial. However, if you want to produce the design as a DXF file you will have to pay for the full program, which has a lot more features and design possibilities.

Tony Finn, East Riding of Yorkshire.

Suitable subjects

SIRS, - A group of us were having a discussion about what constituted a suitable subject, or range of subjects for the enlightenment or entertainment of club members.

As a hard pressed programme secretary my view is, and has been for many years that any engineering related subject is suitable; there are gems to be gleaned from any engineering based discussion.

A personal preference is for historical talks, railway reminiscences, history of firms connected with the area,

aviation, and model engineering techniques and methods.

I draw the line at home movies unless they are model oriented. Or as on one never to be forgotten evening cartoons, unless accompanied by a detailed description of how they were animated.

As usual in club discussions there were plenty of criticism of the current programme, but as is so often the case, when the critics were given the opportunity of nominating speakers or subjects there were no concrete suggestions.

I freely confess, as I am sure would other programme organisers, that I shamelessly peruse the columns of the *Diary* section in search of inspiration. After several years I confess that I have called in all the favours I am able, and find that when arranging the forthcoming programme that a start as early as March in readiness for the next year is essential, both

to get suitable speakers and subjects for internal discussion.

Having set out my stall in this fashion I wonder what steps others take to get speakers and suitable subjects? Any or all ideas welcomed.

Ted Jolliffe, Bedfordshire.

Wireless signalling

SIRS, - I was grateful for the very full reply given by Jed Weare (M.E. 4345, 13 February 2009) to my enquiry regarding possible wireless communication of signalling information on miniature railways. It was good of him to go into such detail.

The process of installing suitable communication systems to allow the free and safe passage of our trains as and when required is one that has occupied our grey cells for a good long time and we have considered a great number of alternatives for each component that might be required.

The core of my letter and Jed's response was the consideration of methods of communicating information over a distance and Jed strongly advocates using the rails themselves. We had already considered this at some length and rejected it as, although theoretically using an existing strip of metal (i.e. the rails) between two points for communication is a simple and cheap answer, we understand that it seems to have met with a number of practical problems on other existing similar railways.

Jed may yet encounter difficulties when moving from his existing elevated railway to ground level track. Our rail, for example, is steel and to retro-bond each joint absolutely effectively in situ would not be too easy. We were lead to believe that other ground tracks suffered also from current loss to earth especially in relatively damp situations and that therefore 'isolating the rails from each other' is not easy to achieve. The sleepers of elevated railways do not sit in/on damp earth and ballast.

We are unable to follow Jed's suggestion of using mains power at each location or even low voltage supplied through the rails

from a central mains source as nowhere on the line is nearer than about ¼ mile to a 240V source. Battery power at each location with relatively low power communication between the ends of each section is therefore forced upon us and over the relatively long distances involved we were not convinced that a rail link would be electrically robust enough. The cost of half a mile of low voltage AC power cable buried in PVC conduit was one that we were trying to avoid by the consideration of wireless communication.

Our railway is operated by only a small number of helpers, virtually all of whom are working on the trains as drivers or guards on running days or we could consider 'signalmen' at each passing loop with suitable mobile radios. With three sections on the line, possibly three or four trains, and passing loops out of sight of each other, even this would need a very rigid protocol and central control point to ensure safety.

For all these reasons this is why we settled on a default to a danger detection system but still need to resolve how to communicate what has been detected to adjacent section ends of the system.

John L. Townsend, by email.

Regrounding chuck jaws

SIRS, - It seems to me important that the three jaws should be gripping on something while they are being ground, just as they would be in everyday use. To do this I turned up a strong steel washer, a bit larger than the grinding wheel and designed to fit right at the back of the jaws and compressed by their innermost scrolling teeth, thus leaving the whole of the normal contact surfaces clear for grinding. Note that the washer will run off-centre and therefore it should be bored similarly off-centre so that when installed correctly the bore will run true and avoid touching the end of the grinder shaft.

Trim the tool-post grinding wheel with a diamond, advance it right in so that it almost touches the washer, start the chuck rotating at its slowest speed, set for a cut of not more than

one thou and engage right-going fine feed. Make sure the chuck and the grinder are rotating in opposite directions in order to get a forward cut. Remove only the minimum of metal otherwise your chuck will not accommodate very small objects. The result will give a very accurate chuck, but possibly only at this particular diameter. At other diameters, the accuracy will depend upon the condition of the chuck's scrolling mechanism. For grinding the external surfaces, the jaws should be expanded into a large ring. I used three jubilee clips in series, around the outsides of the jaws. The same principles can be used for four-jaw chucks except of course that, as Martin Leigh says, the jaws must be ground one at a time.

Bill Foreman, Suffolk.

Young modellers

SIRS, - The letter from Paul J. Weighell (M.E. 4345, 13 February 2009) made some interesting suggestions as to what positive steps could be made to encourage young people to take an interest in model engineering. However, as a 17 year-old model engineer myself, I feel that he may be perhaps overestimating the significance

of the types of projects featured in magazines such as M.E. I find it hard to believe that even the youngest children would have no idea what a steam engine was since transport from the past, particularly trains, feature so heavily in children's books and television programmes. Many children are drawn to the magic of the past and in particular the sight and sound of steam engines and I suspect this is in part because they don't experience things from the past, day to day. I hardly need to point out that there are always plenty of young children at the larger, better publicised preserved railways. As such I suspect that most young people are very much aware of old technologies and their lack of enthusiasm for our hobby is probably due to more complex factors than the lack of magazine articles describing the construction of model skateboards!

It is true that 'Thomas the Tank Engine' and the like have had a negative effect on interest in steam and trains in general because they have given rise to the notion that such things are only for 'babies'. However, I feel that amongst people who are old enough to take

More on Wolf power tools

SIRS, - Johan Berserik's letter regarding Wolf Power Tools of London brought back some memories (M.E. 4346, 27 February 2009). In 1969 at our engagement, my wife to be was presented with an engagement ring. In return, she had delivered (at my request) from the local builders merchants to my address the latest model Wolf Saphire74 Power Drill. Possibly one of the first double insulated all high impact plastic bodied power tools on the market. It came in a red moulded carrying case. I still have the drill and after all these years it still works as good as new. It has been in use for many years, both as a drill and used with the bolt on circular saw and sanding attachment.

One example of its strength came some years ago when repairing guttering on the roof of the house. I managed to drop the drill on to the concrete pathway below and on climbing down the ladder thinking that would be the end of that. I discovered the only damage was the riveted label on the top had been bent; the drill still worked perfectly. What put me onto the Wolf make in the first place was that they were used by lots of trade people. I saw them in use by the work groups of the Ministry of Public Works and Buildings, more commonly referred to as the boys from the Ministry of Bricks and Sticks.

I do not know when the company stopped trading, but I suspect they went the same way as a lot of other British quality tool manufacturers in the past 40 years.

Ken Stoot, by email.

part in model engineering, the more worrying issue is the belief that an interest in steam trains indicates that a person is a social outcast who needs to 'get a life'. Unfortunately, the list of interests which are similarly afflicted is enormous and includes almost any hobby which requires spending a lot of time in a workshop! I believe the real challenge we face is that of making a greater number of young people understand the fundamental reasons why making engineering models is so worthwhile. I can suggest a few examples of this myself.

Nowadays schools do not really teach practical skills - metalwork and woodwork no longer exist as routine school subjects. My school still included projects in metal and wood in its technology lessons but there was not enough time to teach the finer points of using tools and equipment - it was often considered adequate for everyone to have 'had a go'. I owe my ability to solve problems with my hands in everyday life almost entirely to my own interest in making things at home. It is also surprising how often my specific engineering skills have been useful elsewhere as well!

I am a creative person but I am also someone who feels most confident with maths and science. These two qualities tend not to go together very well, but model engineering combines both perfectly, especially for those who design their own models. Model engineering projects constantly provide practical problems which need to be solved by a mixture of technical understanding and creative thinking, and of course common sense. This is one of the most satisfying aspects of model engineering for me - it is definitely a hobby for people who enjoy a challenge.

Most importantly of all, model engineering genuinely is fun! I am the first to admit that I find some jobs tedious, especially the production of large numbers of simple components, but I do really enjoy using hand tools, machine tools and gas torches (and of course big hammers!)

Petrol Vapour Carburettor

SIRS, - To all users of the 'Petrol Vapour Carburettor'. Normal (industrial) 2-stroke engines need oil adding to the fuel for lubricating the moving engine parts. Until now I was more or less convinced that such an oil addition in my 'Petrol Vapour Carburettor' did not have a significant effect because I thought the vapour pressure of the oil was too low to be transported with the molecular gas mix to the engine cylinder.

With classic carburettors the oil is dissolved in the tiny oil drops that are transported with the air stream through the carburettor.

Some days ago I added oil drops into the air intake of the vapour carburettor of my 'Disk Valve 4-stroke Engine' while it was running. In fact I did this experiment to investigate if this could help in preventing the corrosion of the cast iron disks. I was astonished seeing the engine running faster at the moment of oil dosing. The corrosion of the disks seems to be much less and may even be absent because the engine keeps running now while before the engine stopped running after some 10 run times or less without oil addition to the fuel due to corrosion of the contact surfaces of the cast iron disks.

Another surprise for me was the regulation of the engine speed with the throttle valve on the carburettor was much less sensitive with oil addition than with pure (and fresh) petrol. I tested a 5% oil addition for my other 2- and 4-stroke engines with the same positive results. On the video below you can see the improved speed regulation for my 'Pressure Controlled 2-stroke' engine.

http://www.youtube.com/watch?v=vcGGd0ib3Yk&feature=channel_page

Not being a chemical expert I have no theoretical foundation for these effects; I only can mention my results. At least I have to withdraw my former statement that oil addition into the vapour carburettor should have no significant effect. Maybe someone with more chemical knowledge can confirm my experiments on a more theoretical base.

Jan Ridders, Holland.

and I know that a lot of other people of all ages do too. However, many young people are not really aware of how things are made, particularly things which are made by engineers. Obviously anyone who is ever actually given a model engineering magazine to read will quickly gain an insight into what goes into making a model, but magazine articles are understandably written to explain to those who have already decided they would like to build something how to do it. Consequently they don't tend to impart to the reader exactly why they would enjoy the project!

I believe that the real key to attracting younger people into model engineering is to make them realise that it is not just an interest for people on the fringes of society who have nothing better to do. We need more young people who realise that, for the reasons above and many

others, it is a hobby which need only be a small part of a normal life, but in turn will enhance one's life in all sorts of ways and provide the simple pleasures of making things and solving practical problems which people of my age so rarely experience.

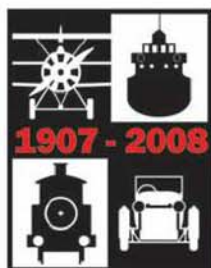
I am certainly not suggesting that it would not be interesting to see some more up-to-date projects appearing in these pages, especially some more designs for simple internal combustion engines and models powered by them. I/C engines are usually considered by young people to be much more interesting than electric motors and they are completely relevant to the modern world - they are found under the bonnet of virtually every car on the road amongst many other things. Does anyone have any ideas for models built around commercially made I/C engines?

However, if more young people were made aware of the true reasons why model engineering is so enjoyable, I suspect many of them would see the appeal of the traditional steam projects. I used to build slot cars by installing Scalextric motors, gears, wheels and axles in Airfix car kits. The satisfaction of getting one of these devices to run on the track was nothing compared to the sense of achievement I felt when I connected a newly constructed oscillating engine to an electric tyre pump and away it went! I am currently building a simple O gauge live steam locomotive to my own design and I am constantly spurred on by the knowledge that one day I will get it running. When I do I will know that it is all my own work and that I understand exactly how and why it works, and that for me is a major attraction of the hobby. It has been said many times before that the simplicity of the steam engine is one of its greatest attractions. Children may be fascinated by robots but I doubt many would enjoy fiddling about with electronic circuits and tiny, commercially made electric motors as much as they would enjoy getting their hands dirty and making a real, working steam engine out of raw materials.

It may seem that I am being rather pessimistic about the prospects for the future but I think I have a reasonable understanding of what the real problems are and I hope that I will be able to do something positive about it soon. There may yet be hope for model engineering as we know it!
Michael Prestage, by email.

Tender axle bearings

SIRS, - Re. Neville Evans comments on bearings for the tender axleboxes on Stowe (M.E. 4345, 13 February 2009). He may be interested that Arc Euro Trade advertise type JTT810 bearings - these are ½in. bore x 1¼in. O/D x ¾in. caged rollers with two rubber seals. They may be suitable assuming the tender axle journals are long enough.
Mike Johns, Somerset.



MODEL ENGINEER EXHIBITION

The awards



Tom Pasco was awarded a Gold Medal for this remarkable 7-cylinder radial engine entered in class A3.



This Thames conceptual hot-air pumping engine built by Brian Marshall was awarded a Silver Medal in class A1.

On display at the Model Engineer Exhibition held last September at Ascot was a superb collection of models entered into the competition. Some of the results of the competition have been described in earlier issues of *Model Engineer*. Here we are pleased to present a complete listing of all the medals and trophies awarded at the exhibition.

The awarding of any medal or certificate is solely at the discretion of the judges and models are not judged against each other but on their individual merits. If a model is incorrectly

entered into the wrong section, it will be placed into the correct category by the judges before they commence their work so that the criteria used for judging are appropriate for the model.

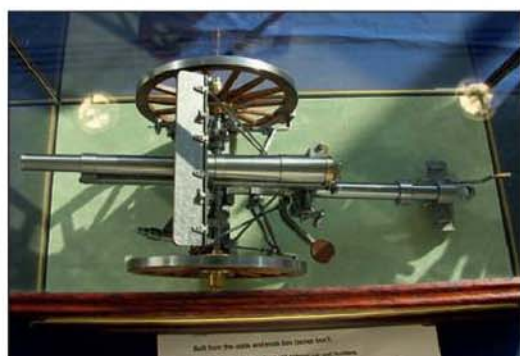
At the exhibition, 19 Gold, 14 Silver and 19 Bronze Medals were awarded. In addition, one Very Highly Commended, four Highly Commended and six Commended Certificates were awarded.

Model Engineer wishes to thank everyone who brought models to the exhibition for the competition and congratulate those who were recognised for their outstanding work. **ME**

Class	Exhibitor	Description	Award
Duke of Edinburgh Trophy	Roddy Turner	Ruston Bucyrus 1260-W Walking Dragline (scale 1:76)	Duke of Edinburgh Trophy
A1	Brian Marshall	Conceptual Thames pumping engine (Hot air)	Silver Medal
A2	Paul Boscott	5-cylinder steam/air engine	Gold Medal, Bill Hughes Trophy
A2	Lothar Matrian	'Reichenbach' stationary engine	Gold Medal, Tom Nevins Trophy
A2	Lothar Matrian	'Novelty' stationary beam engine	Gold Medal
A2	Lothar Matrian	'Lachapelle' vertical engine	Gold Medal
A2	Michael Dean	Easton and Anderson grasshopper engine	Silver Medal
A2	Nicholas Hooper	Lady Stephanie beam engine	Silver Medal
A2	John Weight	Scotch crank engine	Bronze Medal
A3	Mike Sayer	1:3 scale 3-litre 4-cylinder Bentley engine	Gold Medal
A3	Barry Hares	1:5 scale Rolls-Royce 'Eagle 22' aero engine	Gold Medal, Bradbury Winter Trophy
A3	Tom Pasco	74cc 7-cylinder radial engine	Gold Medal
A3	Bill Connor	Half-size 1956 Manx Norton short stroke engine	Gold Medal, Edgar Westbury Trophy
A3	Tom Pasco	25cc opposed piston 4-stroke engine	Silver Medal
A3	Tom Pasco	40cc V-twin I/C engine	Silver Medal
A3	Brian Finch	Otto and Langen atmospheric gas engine	Silver Medal
A3	John Heeley	1:4 scale DeHavilland 'Goblin' turbo jet engine	Silver Medal



A remarkably versatile 'Stepper Head' multi-purpose CNC machine was entered in class A5 by Alan Jackson and was awarded a Gold Medal and the Bowyer-Lowe Trophy.

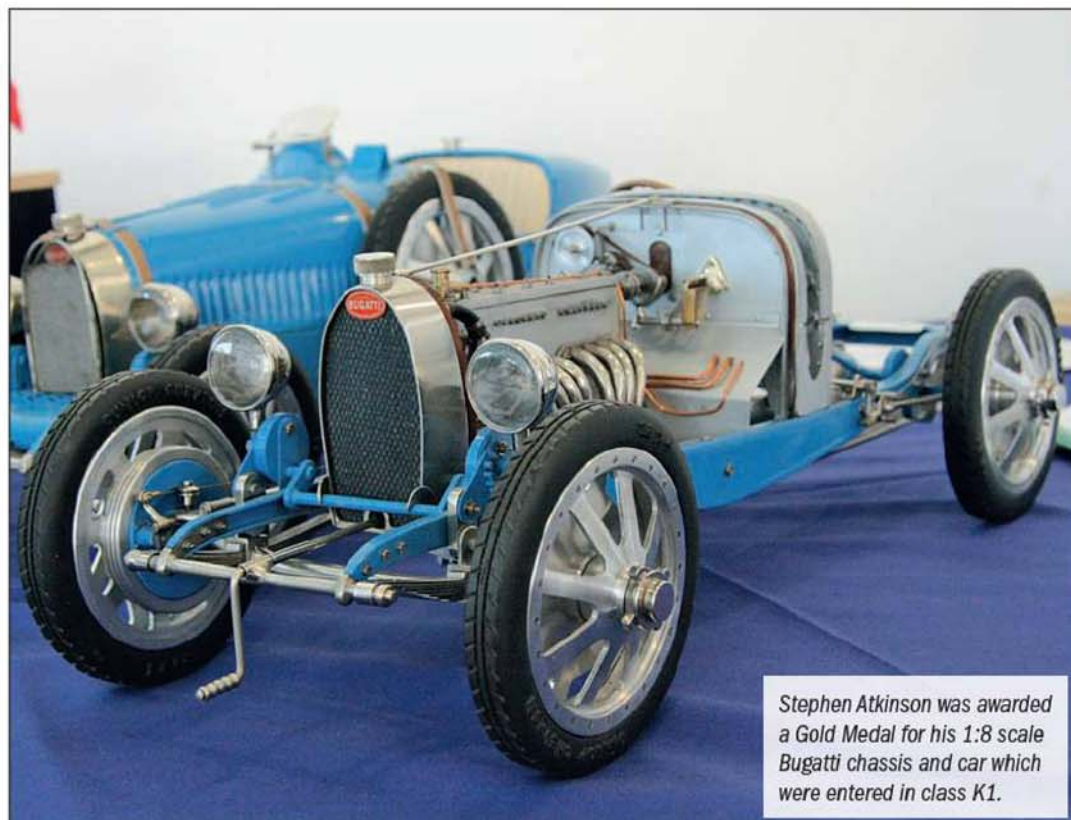


An unusual entry in class A7 was Ken Stoa's 15pdr Mk.1 'Star' field gun built to drawings published in M.E. It was awarded a Silver Medal.



Late afternoon sunshine appears to be streaming into the Cooper's Workshop, a display complete with miniature tools which was entered by Alan Parsons in class A7 and earned him a Gold Medal.

Class	Exhibitor	Description	Award
A3	John Heeley	1:4 scale Bentley BR2 rotary aero engine	Bronze Medal
A3	John Carter	'Robin' 1.5cc 4-stroke glow plug engine	Very Highly Commended
A4	Nicholas Hooper	2in. scale Burrell showman's engine	Bronze Medal, Aveling and Barford Trophy
A5	Alan Jackson	'Stepper Head' multi-purpose CNC machine	Gold Medal, Bowyer-Lowe Trophy
A5	Charles Woodward	Clockwheel and pinion cutting machine	Silver Medal
A5	Charles Woodward	Stent tool and cutter grinder	Bronze Medal
A5	Ken Willson	Top slide for Myford S7 with digital scale	Bronze Medal
A5	Peter Clark	Schaublin 70 lathe accessories	Highly Commended
A5	John Carter	Co-axial centring gauge	Commended
A6	Nicholas Hooper	Skeleton clock	Bronze Medal
A6	Nicholas Hooper	Crystal wheel skeleton clock	Bronze Medal
A6	Alan Thatcher	Crystal wheel skeleton clock	Bronze Medal
A7	Alan Parsons	Cooper's Workshop of 1930-40,	1:12 scale
A7	Alan Parsons	Blacksmith's Workshop of 1940, 1:12 scale	Gold Medal
A7	Ken Stoa	15pdr Mk. 1 star field gun	Silver Medal
B1	Alan Crossfield	5in. gauge GWR Bulldog locomotive <i>Empire of India</i>	Gold Medal, Maskelyne Trophy
B1	Thomas Tegg	5in. gauge LMS mixed traffic 2-6-0 locomotive	Silver Medal
B1	Rene Etter	5in. gauge New York Central and Hudson River 4-4-0 locomotive	Bronze Medal
B1	David Murray	5in. gauge GWR 56xx 0-6-2 tank locomotive	Bronze Medal
B1	John Gizzy	5in. gauge GWR King class locomotive, <i>King John</i>	Bronze Medal
B1	Richard Castle	5in. gauge BR Class 2, 2-6-2T locomotive	Bronze Medal, Charles Kennion Memorial Trophy
B1	John Swindlehurst	5in. gauge Stephenson's <i>Rocket</i> locomotive	Bronze Medal
B3	John Lewis	3 1/2 in. gauge GNR large-boilered Ivatt Atlantic locomotive	Highly Commended, New Zealand Trophy



Stephen Atkinson was awarded a Gold Medal for his 1:8 scale Bugatti chassis and car which were entered in class K1.

Class	Exhibitor	Description	Award
B3	Nicholas Hooper	3.5in. gauge LBSC-designed 'Mona' 0-6-2T locomotive	Commended
B9	Geoffrey Dowden	5in. gauge 7-plank mineral wagon	Highly Commended
B9	Geoffrey Dowden	5in. gauge 12-ton covered wagon	Highly Commended
B12	Ashley Best	1:16 Oldham Corporation Tramcar No. 128	Gold Medal
C1	Ronald Paddison	1:8 scale <i>George and Mary Webb</i> lifeboat (Whitby)	Gold Medal, RNLI Lifeboat Trophy
C1	Steve Betney	<i>African Queen</i>	Commended
C3	Graham Castle	1:32 Carron Company steam lighter No. 10	Gold Medal, HV Evans Cup
C3	Peter Fitch	1:28 RAF General Service Pinnace No. 1374	Bronze Medal
C4	David Brown	HMS <i>Upholder</i>	Silver Medal, Mountbatten Trophy
C4	David Brown	HMS <i>Storm</i>	Bronze Medal
C4	David Brown	HMS <i>Graph</i>	Bronze Medal
C5	Charles Freeman	HMS <i>Beagle</i> barque rig survey ship	Silver Medal
C5	Peter Fisher	<i>Ocean Breeze</i>	Bronze Medal, Maze Trophy
C5	Charles Freeman	HMS <i>Grasshopper</i>	Bronze Medal
C5	Robin Burnham	30ft. Open sailing rowing gig	Bronze Medal
C5	William Lee	<i>Marguerite</i> Bristol Channel sailing pilot cutter	Commended
C7	Brian Finch	1:12 Freelance steam turbine launch	Silver Medal, Willis Trophy
C8	Bernard Baldwin	SS <i>Ben Loyd</i>	Gold Medal, John Prothero-Thomas Cup
C8	Roy Chapman	Cunard SS <i>Carmania</i>	Highly Commended
C8	Roy Chapman	Orient Lines <i>Orcades</i>	Commended
D3	James Morley	1:12 1908 Cody 1A Flyer biplane	Silver Medal
G1	Herbert Stumm	LeFrance fire engine	Gold Medal, Crebbin Memorial Cup
G1	Brian Young	GWR Delivery Van	Gold Medal, John Thompson Trophy
J3	Eric Henry	1:72 HMS <i>Caroline</i>	Bronze Medal, Under 18 Trophy
K1	Stephen Atkinson	1:8 Bugatti chassis and car	Gold Medal



Lamp parts.

Traction Engine Lamps

TONY
MEEK

Tony Meek describes how to make the vents and doors.

PART 2

Continued from page 319
(M.E. 4347, 13 March 2009)

The lamps were now beginning to take shape; **photo 19** shows the parts made so far, and **photo 20** the parts assembled. The next parts which I had been looking forward to making were the vent caps (**fig 6**). Bill Hughes, in his tips for making the 1½in. lamps, had recommended pressing an annealed copper disc between a shaped conical punch and a lead pad. I could not imagine how this would produce a component with much definition in the individual conical flutes so, with the benefit of a larger scale, I decided to make a rudimentary punch and die.

The first task was to make a batch of plain cones into which well-defined conical flutes would be added later. The tools for these cones were a male conical punch and a female conical die (**photo 21**). The punch included a 5mm central pin and the die had a matching hole in its centre. These features ensured the workpiece was held concentrically before the punch was pressed into the die. To further aid concentricity, a shallow recess was added in the top face of the die to receive the blanks.

Several blanks were made for the upper vents, cut from

0.018in. brass sheet and popped on a 5mm mandrel and turned to size in the lathe (**photo 22**). Copper is equally as good, but what is more important for these parts is the thickness. The thicker the material, the harder it would be to get good definition in the flutes.

The blanks were all annealed and pressed to shape (**photos 23 to 25**). The 5mm hole in the middle of the blanks stretched to just the right diameter when the cones were formed. This was determined in earlier trials.

The punch and die were then modified to include features that would ensure good



Partly assembled lamps.



Conical punch and die.



Turning vent cap blanks.



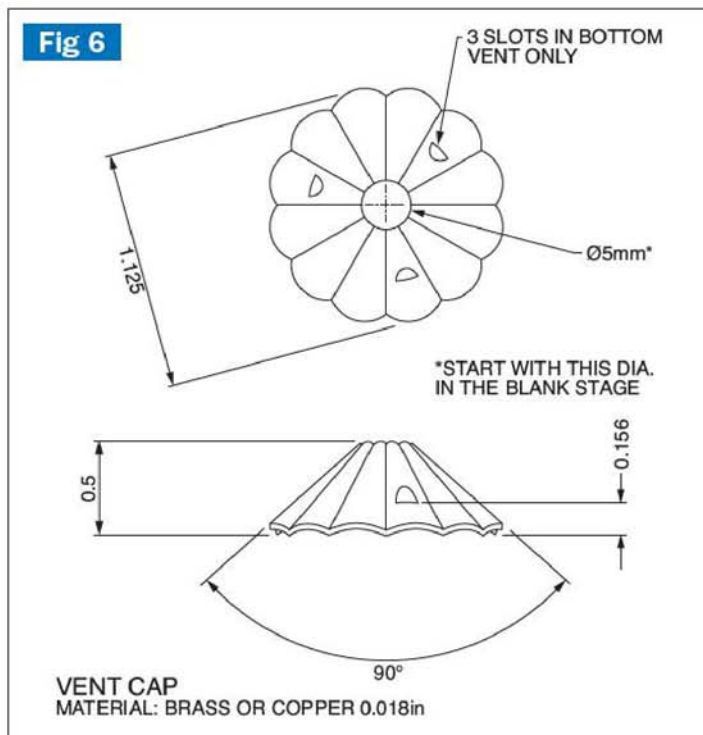
Brass blank fitted to punch.



Pressing the vent cap blank in vice.



Radial slots cut in punch and die.



definition in the conical flutes. With the 5mm pin removed, the punch was set up in the milling machine and, using a 1mm slitting saw, 12 equal spaced slots were cut in the cone

(photo 26). The cone of the die was slit in a similar way.

Each segment in the punch was then filed to shape - looking up along the segment to get an even curve (photo 27). There are other ways of doing this, but I thought that by the time I decided which to use, I would have done the job quicker by hand.

The die was a bit more awkward as blades were to be fixed in the grooves to line-up with the grooves in the punch. These blades were cut roughly to size from 1mm thick mild steel sheet and 'Loctited' into the grooves (photo 28). Also, the blades were cut so that they extended about 1/4in. above the top of the die. This was to ensure that the whole of the conical blanks fitted



Conical blank on punch.



Flutes in punch and die filed to shape.

28



Radial blades 'Loctited' into die.

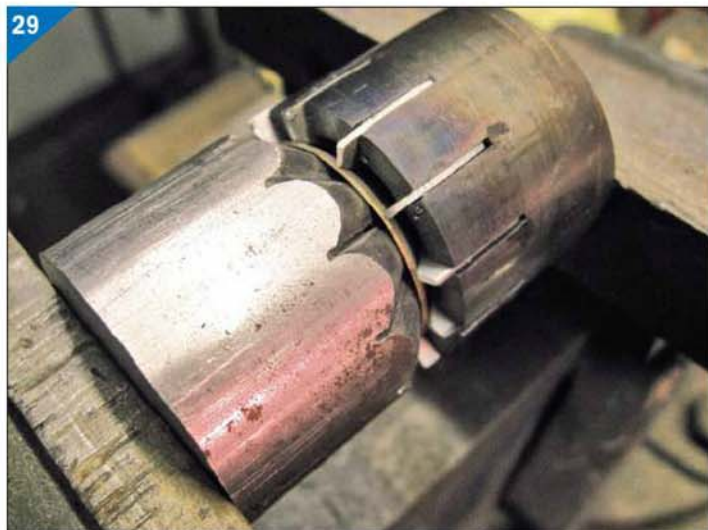
well within the blades. Also, the diameter at the tips of the blades needs to be greater than the diameter of the blanks so that they do not dig in and spoil the pressing.

When the Loctite was set (a little heat speeds things up), the die was put in the lathe and excess blade material removed. Turning the ends of the blades was straightforward but taper-turning the inside needed more

care. I found a 2-3deg. set-over from the conical surface was enough to give the change in depth needed along the length of the flutes. The material I used for the blades was not very stiff so very light cuts were taken to prevent them from bending.

To make the bends between the flutes smooth, each blade was filed along its edge to make a 'rounded knife-edge' (photo 27). The conical blanks were annealed again; the 5mm pin was replaced in the punch, and the first pressing made (photo 29). The first impression was quite good, but I felt that more definition could be achieved. The blank was annealed and repressed two more times to get acceptable definition - particularly at the smaller ends of the conical flutes (photo 30). Having established the technique, all the other conical blanks, plus a few spares, were pressed in just a few minutes

29



Pressing in the vice to form the conical flutes.

31



Vent bases and caps prior to assembly.

Mounting the vent caps

Bill Hughes' details are a bit vague regarding mounting the vent caps onto the vent base, so I devised an arrangement that seems to do the job well. I used crown shaped components having three long legs and three short legs, which were soldered into the tops of the vent bases (photo 31).

Had I thought about it earlier, I would have incorporated the mounting features in the vent base itself; if I make any more, I shall certainly do that. Figure 3 (M.E. 4347, 13 March 2009), and fig 7 show the proposed version.

The short legs were to position the lower caps and the long legs for the upper caps. Holes were milled in the lower vent caps to allow the longer legs to pass through (photo 32). The tips of the legs were tinned, and the inside of the caps tinned in the areas that contact the legs.

The lower caps were soldered in place first. It was easy to see what was happening so that a good joint could easily be made. However, regarding the upper caps: the joint area could not be seen and so one had to rely on good contact between the ends of the long legs and tinned regions of the underside of the upper caps. Heat was applied carefully to the outside using a small blowlamp.

These sub-assemblies, together with the lamp hoods, were fitted to the bodies later using Loctite; photo 33 shows them temporarily in place. The next parts to be made were the doors and associated parts.

Doors

The doors were made from 0.036in. brass sheet (the same as the bodies), and were simple rectangles cut to fit with about 0.010in. clearance top and bottom to allow for the thickness of paint (fig 8).

30



Fluted vent cap.

32



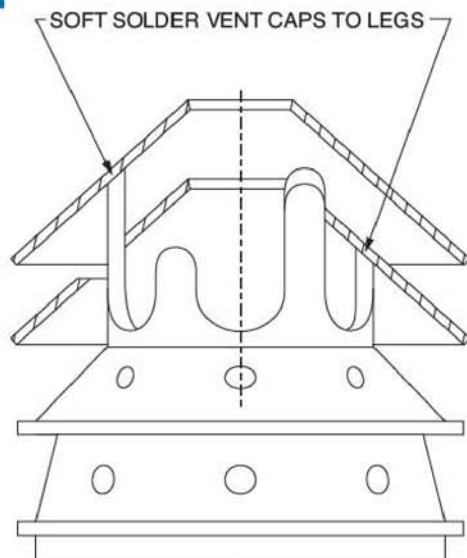
Vent bases and lower caps prior to soft-soldering.

The bezels for the sidelight windows were made from 0.018in. brass (fig 9), and were shaped around a steel former. Although the material was quite thin, it was still necessary to anneal them regularly to get the required shape. The depth of the bezel was made to match the material used for the window, 5mm in my case, but up to

$\frac{1}{4}$ in. would do just as well. The bezels were annealed again before being soldered onto the doors. I removed the middle of the first bezel before soft soldering it to the door, but found it better to solder the others to the doors and then remove the middles of both parts in the milling machine (photo 34).

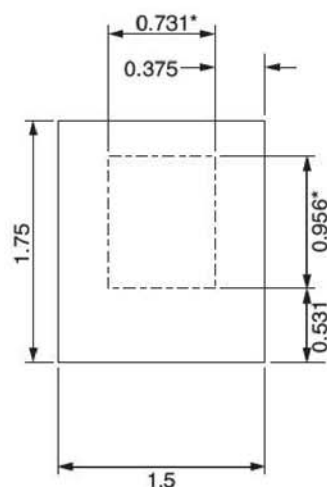
● To be continued.

Fig 7



PART SECTION OF VENT ASSEMBLY

Fig 8



*REMOVE AFTER BEZEL HAS BEEN FITTED
DOOR
MATERIAL: 0.036in BRASS

33



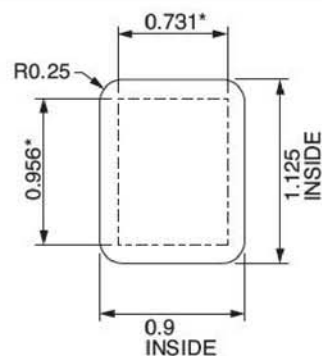
Lamp bodies, vents and lamp hoods temporarily assembled.

34



Door components.

Fig 9



*REMOVE MIDDLE AFTER FITTING TO DOOR



SIDELIGHT WINDOW BEZEL
MATERIAL: BRASS OR COPPER 0.018in
(SOLDER TO DOOR, PEEN EDGES ONTO WINDOW)

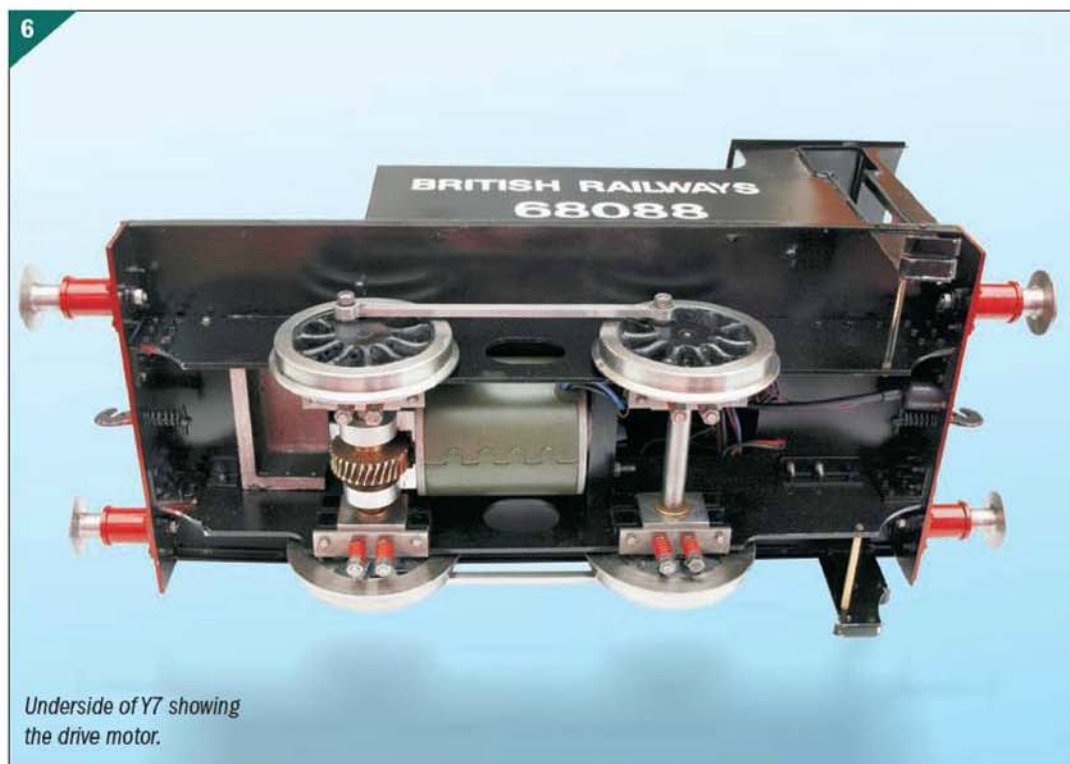


ROGER
BUNCE
Technical
Editor

Roger Bunce considers the Dock Shunter and Prairie Tank engines in more detail.

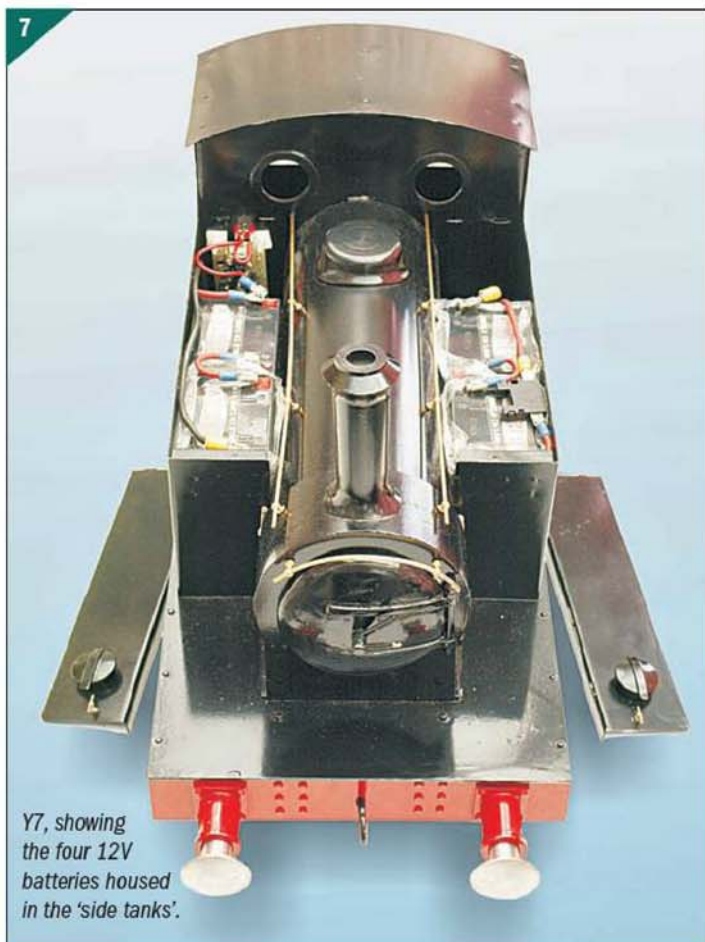
PART 2

Continued from page 327
(M.E. 4347, 13 March 2009)



Underside of Y7 showing the drive motor.

Pseudo Steam



Y7, showing the four 12V batteries housed in the 'side tanks'.

The Dock Shunter, Class Y7, is the smallest locomotive in the Pseudo Steam range and, like all the other locomotives, is in 5in. gauge. Dan's objective was to produce a real passenger-carrying, entry level, locomotive costing less than £1,000 for father and son, or grandad and grandson. In fact a kit of machined parts costs £894 including electrics and flying lead, but excluding batteries. To complete the locomotive involves painting the parts and assembling using hand tools. The locomotive is also available assembled and professionally painted for £1,285.

Brief history of Y7

The little Y7 was intended mainly as a dock shunter. It was designed by Thomas Worsdell and first appeared in 1888 when it was known as the Class H. The locomotive was re-classified Y7 under the LNER and the last batch, on which this model is based, was made in Darlington in 1923.

The simplicity of design and the short wheelbase makes it an ideal entry level model to run on both club and garden tracks.

Y7 model construction

The cab, chassis and side tanks are a steel fabrication, which is spot welded together and comes fully assembled. The dummy boiler is made from aluminium tube and the smokebox is an aluminium sand casting. Dan's aluminium castings are made using Petrobond sand. This is more expensive than 'ordinary' casting sand but gives much better surface finish and definition of fine detail.

The locomotive is driven by a single 285W DC motor located between the two axles (**photo 6**). This is powered by four 12V sealed lead acid batteries housed in the side tanks (**photo 7**). These are connected to give 24V at a maximum current of about 12A to the motor.

The power from the motor is transmitted to the drive wheels by a custom-made gearbox

comprising a four-start steel worm and bronze wheel. The ratio is 7.5:1. The choice of ratio is very important - too low a ratio and there is insufficient wheel torque - too high a ratio and the wheels lock when power is removed from the motor. Hence, if the locomotive were moving along the track and the motor switched off the wheels would lock - most undesirable!

The four wheels are independently sprung using coil springs and the axles run in Oilite bearings (photo 6).

The electronic circuitry is housed in the 'boiler' with control provided via a hand-held flying lead which has forward, reverse and speed control - as with all the locomotives in the Pseudo Steam range. Dan uses 4QD electronic motor controls for all his electric locomotives. All of his locomotives incorporate regenerative and dynamic braking. However, Dan is careful to point out that no matter what the braking system on the locomotive, there is simply not enough traction between the wheels and track of any miniature locomotive to resist the inertia of a loaded train. Careful driving is the best 'braking system', along with braked passenger trolleys.

The basic kit comes complete with electronics and, once assembled and batteries added, is ready to run. However, the following items are available at extra cost to enhance the appearance: brake block and levers kit, step kit, rail iron kit and 'chuffer' sound unit. The all-important batteries are also available at extra cost.

An additional item to accompany the Y7 is a 4-wheel period coach, which can be used as a driving trolley for ground level riding or simply to run behind the locomotive to carry additional batteries. Also included in the design is the option of adding motors to create a power car on raised level track. The body of this coach is made from resin and is supplied by Dave Noble.

Prairie Tank Class 51

This is the next size up in the range. The Prairie Tank has always been a favourite amongst

the modelling fraternity but, up till now, only live steam versions have been available in the larger gauges. The model is considerably more powerful than the little Dock Shunter - but more of that later. Consequently, it is somewhat heavier weighing in at about 150lbs (including batteries), as against 37lbs for the Dock Shunter; it is also more than twice the length. The cost of the kit is £5,160 and the finished model is £5,823.

Brief history of the Prairie Tank

The Prairie Tank was developed from the Class 31 locomotive and designed by Churchward. They first appeared in 1932 and remained in service until the end of steam in 1968. Because of their good acceleration, they were used mainly on suburban and branch lines because of the short distances between stops.

Prairie Tank model construction

The main difference in construction between the Y7 and the Prairie Tank is that the whole of the superstructure of the Prairie is a one-piece aluminium casting. In fact, one ardent club member has heard to say "You've got a Hornby that big!" - except he didn't put it quite like that!

Again, Petrobond sand was used to give a good finish and reproduce fine detail. Particular attention was needed to ensure accurate alignment of the mould halves - the split line is



Underside of Prairie showing the drive motor.

along the centre of the boiler. In fact, special precision casting boxes had to be made.

Like the Y7, the Prairie is driven by a single DC motor which drives the two centre wheels (photo 8). There is a choice of two motors, both are made in England by Parvalux: The standard motor is 580W while a special rewind version gives a massive 1,160W. The more powerful motor costs more money but is the one recommended by Dan.

The power from the motor is transmitted to the two centre drive wheels by a gearbox comprising a steel worm and bronze wheel. The gear ratio is 10:1. Again, the gear ratio was carefully chosen to maximise wheel torque and yet ensure that, while the locomotive is 'coasting', the motor can be overdriven by the driving wheels. The centre wheels transmit power to the other 'driving' wheels via the coupling rods.

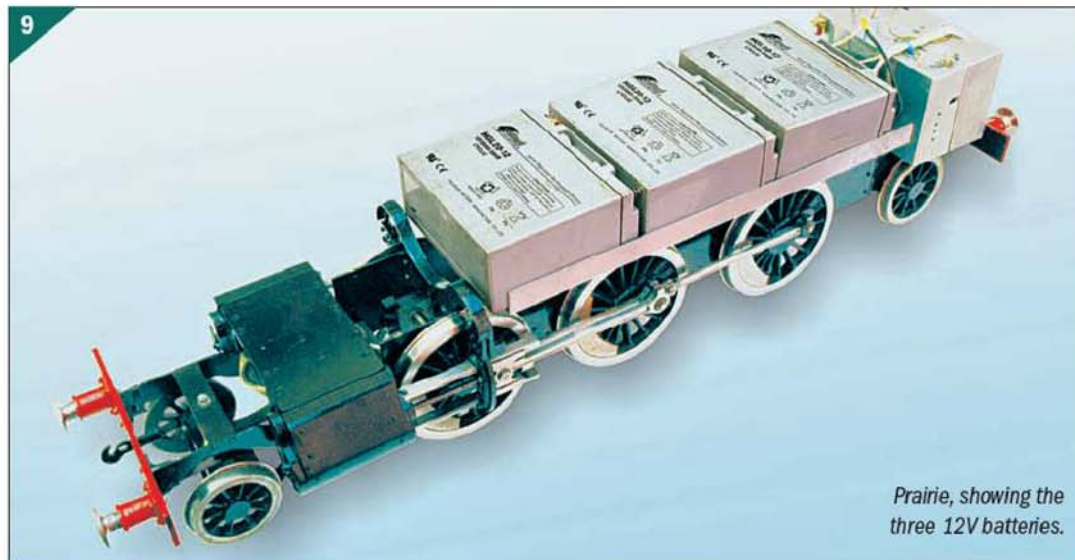
Power is provided by three 12V batteries fitted inside the aluminium superstructure of the locomotive (photo 9). These are connected to provide 36V at a maximum of about 20A to the motor.

The six wheels are independently sprung using coil springs and the axles run in Oilite bearings (photo 8).

The electronic circuitry is housed in the cab and the control box is similar to that of the Y7. The basic kit comes complete with all machined parts - the cast aluminium body will require fettling. Again, the following are available at extra cost: 'chuffer' sound unit, whistle sound unit, lamps and brackets, and batteries.

In the last part of this series, I will describe Dan's Pseudo Steam versions of the *City of Truro* and *Mallard* - both these models incorporate novel and groundbreaking features.

●To be continued.



Prairie, showing the three 12V batteries.

Equatorial Sundial



Checking equations

Before proceeding, it is a good idea to confirm that the basic equations are correct by plotting the EoT graph. However, to give reasonable resolution can involve several thousand calculations. As I mentioned earlier, I would not do that 'manually'. I have used a software package called Mathcad for many years and find it excellent (ref 10). The name is slightly ambiguous - it is a mathematics package and not a drawing package like, for example, AutoCad. The equations are entered in much the same way as one would write them on paper - so no clever programming is needed and Mathcad documents are very easy to understand. **Figure 3** shows the Mathcad plot of the EoT graph plotted at one-day intervals. It is exactly as expected. The curves above zero are the minutes an ordinary sundial is fast and, below zero, the minutes it is slow, throughout the days of the year. Incidentally, the computation time for the whole design of the sundial using Mathcad takes less than a second - I dread to think how long this would take manually.

The huge advantage of using Mathcad is that the affects of making design changes can be seen in seconds.

Comparing the results from the above equation with a 'more accurate' EoT table (ref 11), the error appears to be no more than about 15sec. at any time during the year. This is good enough for this sundial, which can only be read, at best, to an accuracy of 2 minutes.

Practical design

When designing this type of sundial the cam radius needs to be as large as possible to ensure timing accuracy. In the case of my dial it is 50mm radius at the base circle (the radius at zero time correction or UTC).



ROGER
BUNCE
Technical
Editor

Roger Bunce describes how to design and make the equation of time cam.

PART 2

Continued from page 324
(M.E. 4347, 13 March 2009)

The equation of time cam is not difficult to design providing you use a computer to handle the sums and a CAD package to draw the artwork. It is certainly possible to design it without a computer - as we saw in Part 1, with the Pilkington & Gibbs Heliochronometer, 1906. However, I don't have the time or patience to do it without using a computer:

The EoT cam is designed using the following equations (ref 8):

$$E = 9.87 \sin(2B) - 7.53 \cos(B) - 1.5 \sin(B)$$

$$B = \frac{360(N - 81)}{365}$$

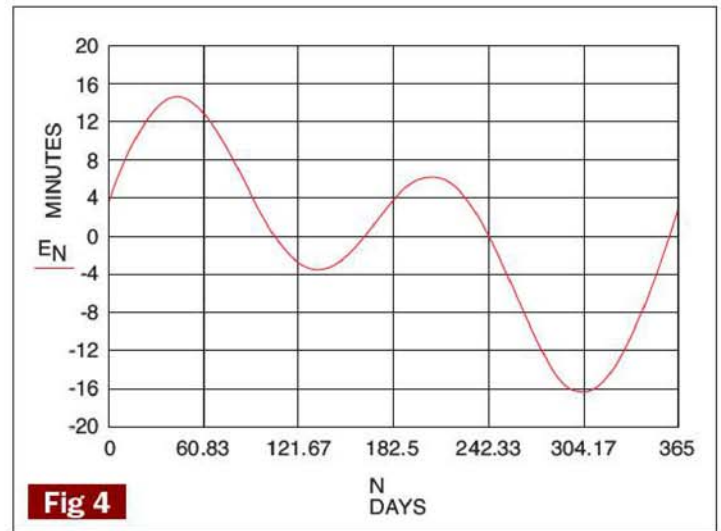
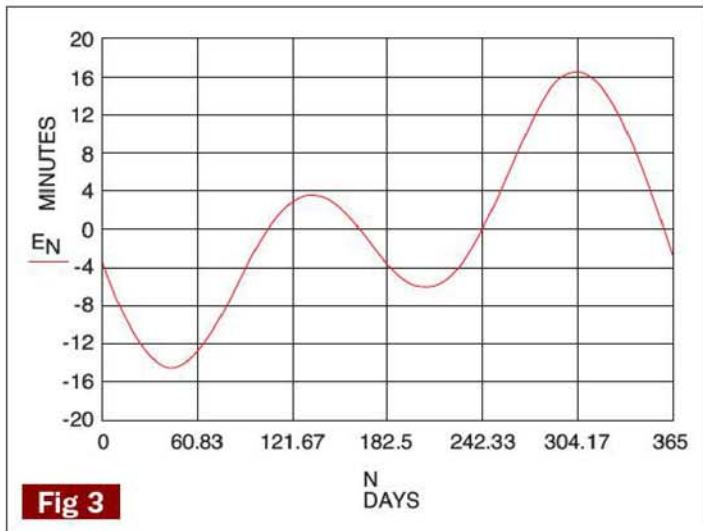
where:

E is the number of minutes an ordinary sundial is either fast or slow.

N is the number of days from the beginning of the year.

B is a function within the main equation to give sin and cos in degrees.

There are other EoT equations including at least one based on a Fourier transform approximation (ref 9). The one I have shown here is perhaps a little simpler but both are approximations.



Next, the maximum 'dip' in the cam needs to be found. From a graph of the EoT or an EoT table, the maximum time correction needed occurs on about 3 November (308 days into the year), when an ordinary sundial is about 16min. 23sec. fast relative to UTC. At this date, the EoT cam will need to have turned the hour dial clockwise, relative to zero correction, so the shadow of the gnomon indicates 16min. 23sec. earlier than LAT. This establishes the maximum dip of the cam from base circle (50mm radius), and is found from the general arrangement drawing. To do this: imagine the cam follower is touching the 50mm base radius of the cam. Then the hour dial is turned 16min. 23sec clockwise and the distance the cam follower overlaps the 50mm radius of the cam is measured, or calculated, from the drawing. In the case of my sundial it is 4.6 millimeters.

Knowing that a maximum dip of 4.6mm corresponds to a maximum correction of 16min. 23sec., and knowing all the time corrections needed throughout the year from the EoT, the profile of the cam can be computed. In order to do this a scaling factor between cam lift and time correction needs to be found:

This is simply:

$$S = \frac{CR}{E} = 0.282$$

where: S = Scaling factor, CR = 4.6mm dip in the cam, E = 16min. 23sec. fast

Mirror image

Returning to the EoT graph fig 3: The maximum number of minutes the ordinary sundial is fast occurs at about day 308 and is shown as a rise on the graph. However, looking at fig 2, View on F (M.E. 4347, 13 March 2009), a rise on the cam surface would turn the hour

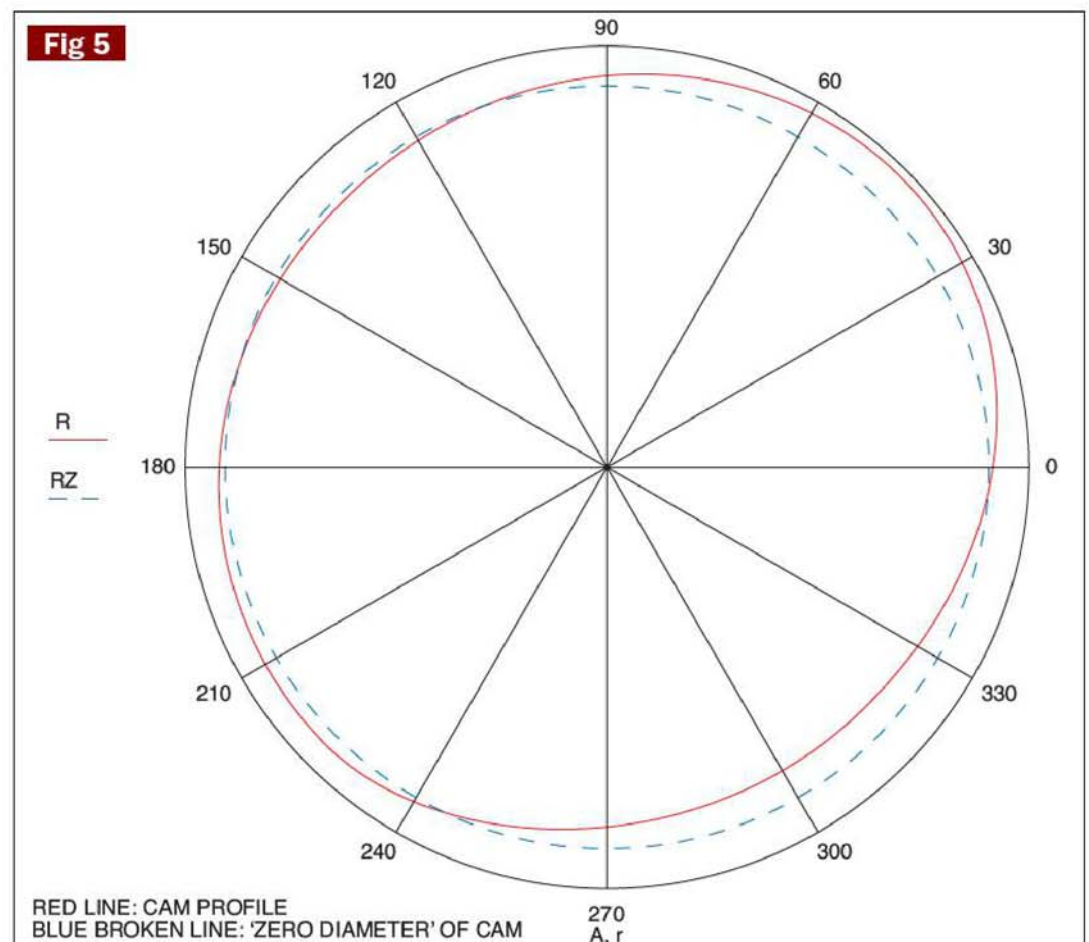
dial anticlockwise, whereas we have already seen that it needs to be turned clockwise so at that point, the cam needs to dip. In other words, the graph, on which the cam needs to be based, has to be the mirror image of the normal EoT graph. This is very simple to do: the RHS of the main EoT expression is multiplied throughout by minus one:

$$E = -9.87 \sin(23) + 7.53 \cos(B) + 1.5 \sin(B)$$

Figure 4 shows a Mathcad plot of this equation, which is the mirror image of fig 3.

Polar plot

It is now simply a matter of using this equation to plot a polar graph to form the EoT cam. One turn of the EoT cam (360deg.), represents the 365 days of the year. However,



Mathcad needs the angular coordinate A in radians:

$$A = 2 \frac{\pi}{365} N$$

The radial coordinate R at any place on the cam surface corresponding to A is:

$$R = RZ + (E \times S)$$

where: RZ = Radius of the cam at zero time correction (50mm in this case).

Figure 5 shows the polar plot of the EoT of time cam as a continuous red line and the radius of the cam at zero time correction as a blue broken line.

Completing the design

There are two more things needed to finish the design of the cam: make a phase shift and add the months of the year dial. This cannot be done in Mathcad and a CAD program is needed; I used AutoSketch. The polar graph was 'copied' from Mathcad and 'pasted' into AutoSketch. However, the file format (probably a 'bit map'), cannot be scaled directly in AutoSketch and so the graph was traced onto another drawing layer using a 'fitted' Bezier curve. The Bezier curve can then be scaled to match the dimensions specified in Mathcad.

The artwork for the month dial was drawn in AutoSketch. Regarding the phase change: fig 2, view on F, shows that the position of the month pointer, fitted to the middle plate, does not correspond to the position of the cam follower; in fact, there is a difference of 123.25deg. between them. To give this phase shift, the artwork was simply superimposed onto the cam profile and rotated 123.25 degrees. Figure 6 shows the artwork for making the cam. The continuous solid line is the cam; the broken line is the 'blank' diameter.

Making the cam

I would imagine that those of you with a CNC miller would make light work of machining the cam. I do not have CNC

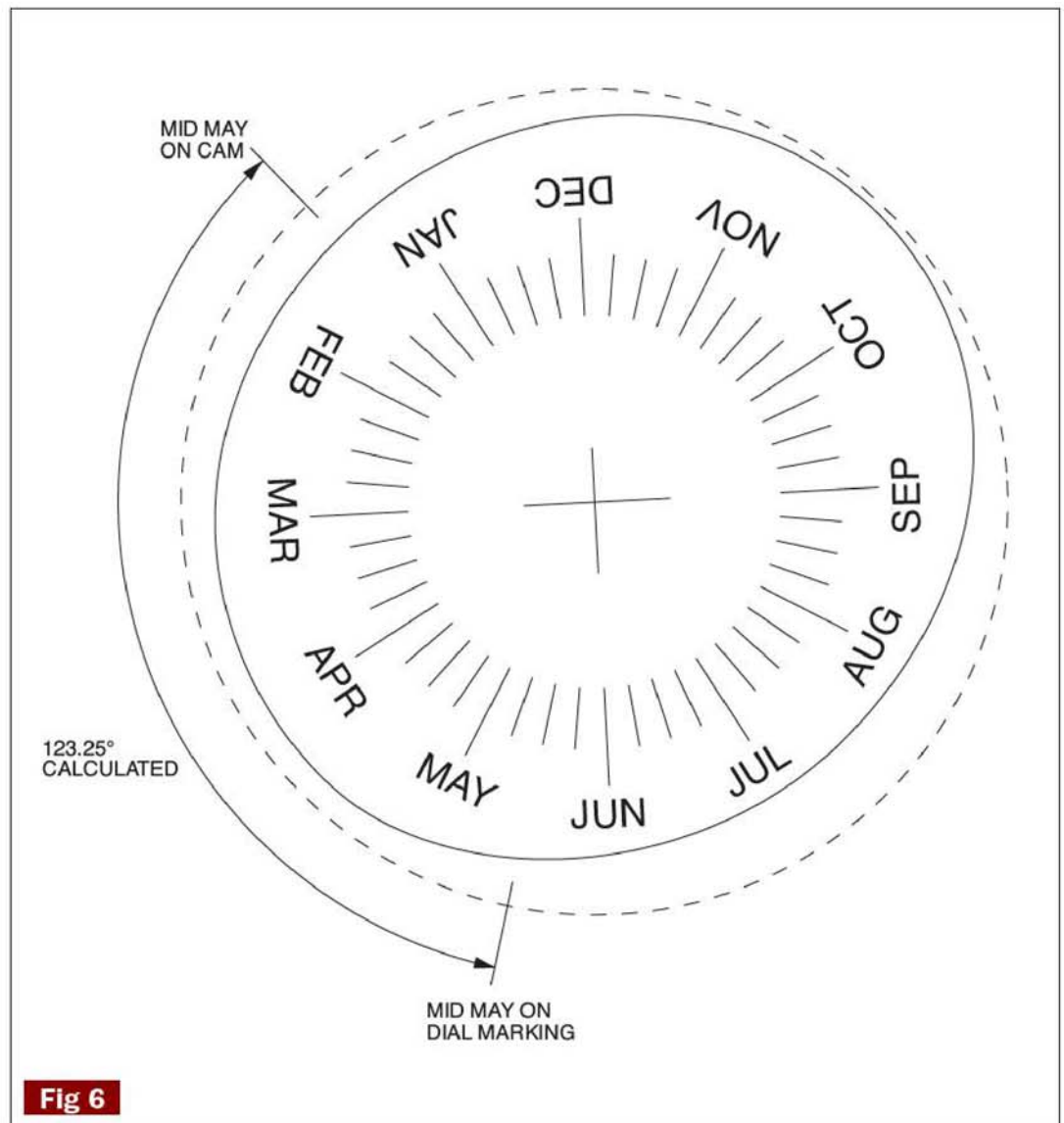


Fig 6

equipment so had to do it the 'old fashioned way'. I simply stuck the artwork on to a sheet of 16swg brass, covered it with clear 'sticky backed plastic' and finished it to shape - looking through my binocular magnifier to 'split the line'. Then I draw-filed the edge and finished with fine wet or dry paper.

Testing the cam

All that is needed to test the cam is set the month dial to the middle of April (16th to be precise - which is one of the zero correction times); set a scribing block to point to say 12.00 o'clock on the hour dial and turn the month dial. The hour dial should turn backwards and forwards corresponding the EoT correction minutes for the month set on the month dial. If

you want to be 'Mr. Meticulous' you could make any small corrections to the cam by 'filing a bit off'. I didn't do that, after all, it's just a sundial that 'thinks' it's a clock! **ME**

References

8. Equation of time formulae: http://en.wikipedia.org/wiki/Equation_of_time
Wikipedia ref: Meeus, J., (1997), *Mathematical Astronomy Morsels*. Pub. Willmann-Bell, pp. 337-346.
9. Equation of time based on Fourier transform: www.sundialsoc.org.uk/glossary/equations/equations.htm#8
10. Mathcad software supplied by: Adept Scientific, <http://www.adeptscience.co.uk/>
11. Waugh, A. E., (1973), *Sundials: Their Theory and Construction*, Pub. Dover Publications Inc., p. 205.

The British Sundial Society

The Society is a registered charity and was formed in 1989. It is a thriving and friendly society of some 500 members. Their objectives are to disseminate the art and science of all types of sundial and to catalogue and advise on the restoration of sundials that still exist in the British Isles and also to research their history. They publish four, 48-page, journals each year, and are affiliated to the Royal Astronomical Society. For more information, or if you have a general query about sundials, write to the Secretary at: 4, New Wokingham Road, Crowthorne, Berks, RG45 7NR
www.sundialsoc.org.uk

A tale of two traction engines



PETER
SOUTHWORTH

Peter Southworth relates the tale of W. J. Hughes and the lawsuit over his Allchin traction engine design.



A Lesney diecast model of a showman's engine based on W. J. Hughes' design.

Most, if not all, model engineers know of the 1½in. scale Allchin traction engine which was designed, or rather drawn up from the prototype, by W. J. Hughes. However, there is another story connected with the engine which is not so well known. Bill, as he was always known, was a school teacher in Sheffield. The full-size engine was close to his house so he could go and measure it up and during 1947-48 the drawings were produced. During this period he had the chance of buying it for £25, but could not afford it, having ill health and a family. The full-size engine was named *Royal Chester* as it initially was exhibited during the Royal show at Chester.

In the 1950s, the firm of Lesney's produced two diecast models, one of a showman's engine 3in. long painted red with a bit of lining

out. It had yellow wheels and on each side of the white canopy was "Lesney's Modern Amusements" (photo 1). Cast on the underside of the belly tank it said 'made in England by Lesney'.

The other model was an agricultural traction engine, 2½in. long painted green. Cast on the underside of the spud pan is 'Lesney No 1'. If anybody has one of Lesney's agricultural models, it's worth having a close look at it, as there are one or two things not quite right about it, in particular, the chimney top. Also, the spud pan is upside down.

Subtle alterations prove a case

As we have established, Bill's drawings came out in 1948 and the diecast toy in 1960. Where did Lesney's get their information from to make the model? What the firm did not know was that Bill had made one or two alterations to the

drawings during the scaling down process, but they were done so that the model was still as close to the real thing as possible and Lesney's had reproduced these alterations.

Bill accused the firm of using his drawings to produce their model which, of course, they denied, but they had not bargained on Bill's tenacity. When it was quite obvious that he was not going to get any money out of them for the use of his drawings, he took them to court. That was quite a bold thing to do with all the hassle along with the possible danger of losing. In those days, folk did not go to law, certainly not a working man with the responsibilities of a mortgage and a young family. However, to court Bill went. Because of the alterations he had made, and the firm reproducing them on their diecast models, he could prove that Lesney's had used his drawings. The court found in favour of Bill to the tune of £1,800, and that was in 1963. With the money he paid off the mortgage on the house and bought a new car. Average wages in those days was something between £500 and £600 a year which puts the award into perspective.

I have known of the story for a long time, but I am indebted to Bill's daughter for giving me the finer details.

ME

Recommended books by W. J. Hughes

Traction Engines Worth Modelling, 1949.

A Century of Traction Engines, 1959.

Fowler Steam Road Vehicles, 1970 Edited and introduced by W. J. Hughes.

The Sentinel, 1973 by W. J. Hughes and L. Thomas Vol. 1.

STOWE - Southern Railway Schools class locomotive

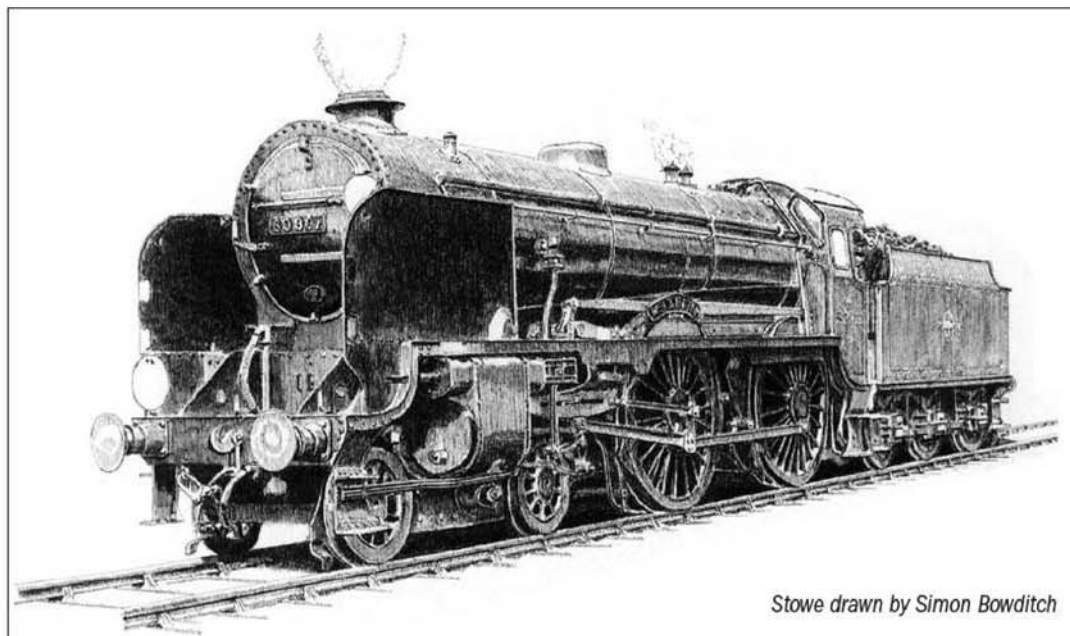


NEVILLE
EVANS

Neville Evans
describes the tender
axle pump.

PART 29

Continued from page 271
(M.E. 4346, 27 February 2009)



Stowe drawn by Simon Bowditch

I have in the past fought shy of describing an axle-driven pump because so far all my locomotives have been to the approximate scale of 1in. to the foot, which means that an injector is more appropriate as a boiler feed than a pump. For a start, pumps are unprototypical. In full-size practice, engines haven't used them for a hundred years or so. Furthermore, I have always found axle-driven pumps to be a source of annoyance in that

they can spray water all over the valve gear, are usually very inaccessible, and don't feed when the locomotive is at rest. On the plus side, however, we can set them to give a constant steady feed to the boiler, whenever the locomotive is running, by means of a simple by-pass valve. When you are talking about Gauge 1 and smaller of course you are committed to using a pump for boiler feed because it simply isn't practical to miniaturise an injector to that extent.

In part 27 (M.E. 4345, 13 February 2009) I mentioned that I intended to detail a pump which is driven by the tender rear axle. I was prompted to do so after having noticed that the lovely little Southern Railway Q1 at the Midlands Model Engineering Exhibition possessed such a fitment. I had in the past tried a tender axle pump on a Gauge 1 4-6-0 with no success, due to the fact that the tender wheels merely skidded along as there wasn't sufficient adhesive weight in the little

tender. I decided to have a go at eliminating as much internal friction as possible by incorporating a sealed ball race in the eccentric, which seems to be very satisfactory.

I was discussing the idea with some friends a short time ago, and one of them said that he had used such a pump on a Springbok tender with every success, quoting as his reasons the very ones that I had decided were well worth seeking, that is ease of accessibility and fitment, even as a retrofit. These aims seemed to outweigh the possible drawbacks, one of which is that an engine mounted pump doesn't detract from the power available at the driving wheels, as your little engine will always be able to produce far more power than it can use. A tender pump however has to be dragged along by the locomotive, using adhesive traction that could be better used for hauling passengers. I have chosen to mount the pump on the rear axle because it is easier to load



The components for the axle-driven pump.



The assembled axle-driven feed pump.

the two outside axles more heavily than the middle one, thus giving greater adhesion without instability.

I have drawn a $\frac{3}{16}$ in. dia. ram with a $\frac{1}{2}$ in. stroke as I'm sure that this will be sufficient to ensure a stable water supply in this engine. I can't see the point of detailing a pump that will supply four times the amount required, bearing in mind that all the water that goes through the return valve is pumped at boiler pressure and therefore represents a huge drag on the system. Even as we speak Deryck Goodall is re-proportioning Martin Evans' differential pump that he designed for Simplex. I'm sure that there is a lot of mileage in this concept combining as it does two pumps in one, thus evening out the thrust on the axle.

Mike Williams co-operated in the design and in fact made the first pump himself. He liked the basic set-up wherein the valve chamber and the pump body are made as separate items and soldered together, but suggested a modification whereby the pump body is reduced in diameter by 0.002in. at the place where it slides into the valve chamber. This simple modification has two functions. The slight ridge formed takes all the thrust generated by the action of the ram, which means that we can soft solder the joint. The solder flows into the joint more readily, and acts more as a seal instead of having to take all the pumping forces. The real point behind all this is that the valve chamber can now be finished in the lathe without the possibility of distortion caused by the higher temperatures used in silver-soldering. Nice one Michael.

Alternative valves

There must be literally hundreds of published designs for pumps, large and small, of every conceivable design. All that has to be done therefore is to incorporate those features that I know from personal experience have worked well in the past. On the side of Deryck's test boiler there sits a most elegant little pump that has worked well, to my knowledge, for the last 35 odd years. Imitation is, as they say, the sincerest form of flattery, so this is a slightly modified version of it. The valves are standard O-ring based shuttles. It should be borne in mind, however, that a simple ball valve, if properly made, can be as good as something more elaborate. I was reminded just now by my friend Gordon Smith over the Edison Bell apparatus, that when proportioning the dimensions of these valves, we should make sure that the cross sectional areas through the various holes and past the balls should remain as constant as possible. For instance, to maintain even flow past the ball, said ball need only lift a bare quarter of its diameter, which for a $\frac{1}{4}$ in. diameter ball is only $\frac{1}{16}$ inch. Remember that with a metal ball one should use a square shouldered seating, the hole being carefully reamed and finished with a simple burnishing tool as described in the art work. If we decide on a Silicone rubber compound ball then the seat to use is angled at 45 degrees. The finish on both seats is of great importance. To form the angled seat, nothing beats a purpose made cutter, ground up from a piece of round silver steel of appropriate diameter with the cutting



A LBSC type oil pump feed banjo fitting showing the Goodall valve.

face proportioned as shown. Run it slowly so as to avoid chatter which is the enemy of a perfectly smooth seat.

I was reminded by Deryck yesterday, that while I was in hospital with a broken ankle three years ago, he had made me a little LBSC type oscillating oil pump with what we called a Goodall valve many years ago when we had a little firm making goodies for Mamod type O gauge locomotives. His idea was to take my mind off my self inflicted infirmity. He brought it along while I was in bed on the day that I returned home, and I blush to admit that it completely escaped my attention at the time.

The valve is similar to the old 'pushbike' tyre valve which comprised of a rubber sleeve slipped over a small hole. Deryck replaced the rubber with soft Neoprene and we used the valves to inject water into Mamod boilers by means of a syringe. The system has also been used as a clock valve in a 5in. gauge locomotive with total success. We in fact used

a high boiler pressure (and therefore temperature) in our silver-soldered boilers with no ill effects on the sleeves. I have therefore included a photograph of its application to a mechanical oil pump that I shall be using in my *Loch*, a drawing will follow in the next gripping instalment.

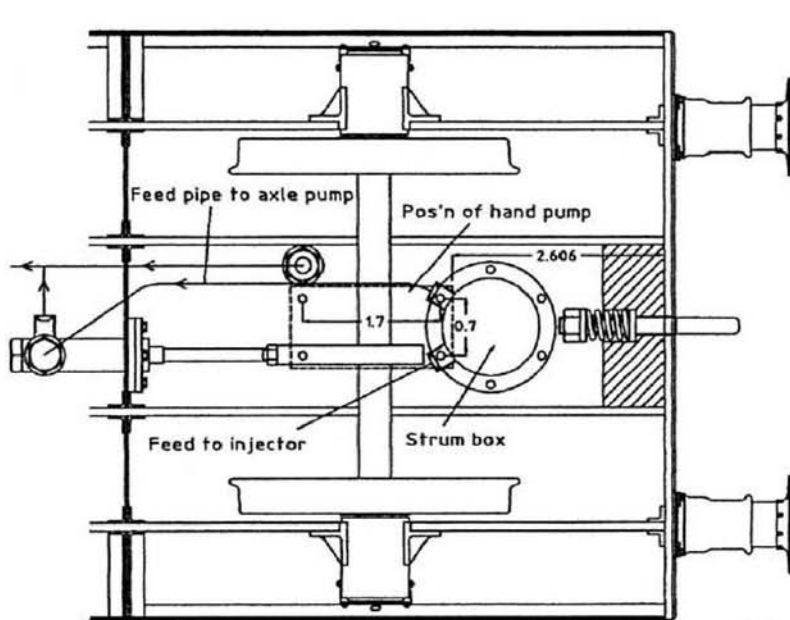
Sealed roller bearings

A most welcome email has just arrived from Mr. Tony Mountain saying that Imperial needle roller bearings with a seal one side are made by Schaeffler (UK) Ltd under the name of INA. The firm is at Sutton Coldfield, T. 0121 351 3833. Bearing No. SCE89-P appears suitable with the advantage that the O/D is only $\frac{1}{16}$ in. dia. I am most obliged for this information Tony, I only wonder why my own, normally very reliable, local stockists didn't pick it up. Simply fit the bearing with a light press fit, with the seal on the right side (work it out), and lubricate sparingly, (I would use Molybdenum grease), then forget it.

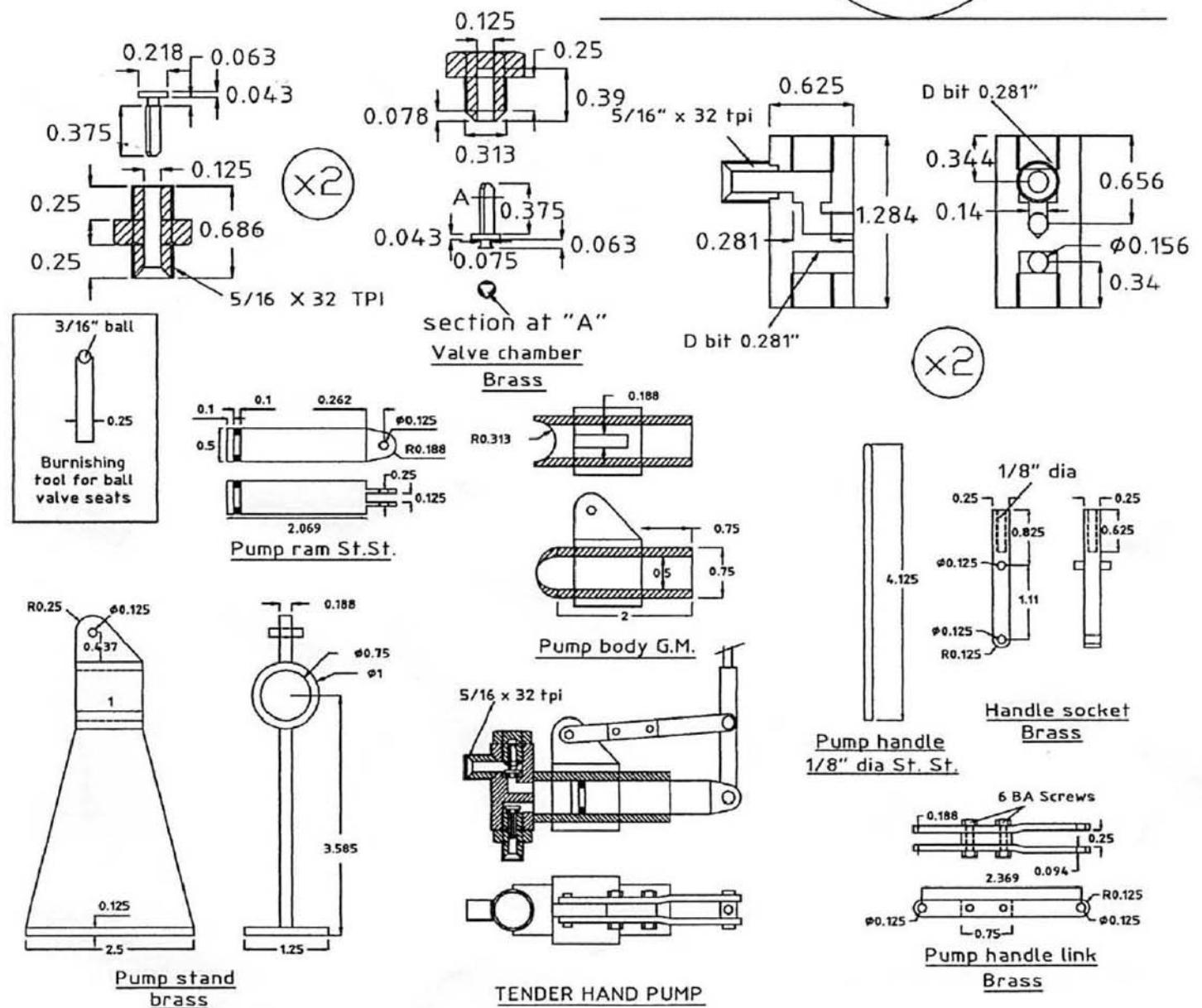
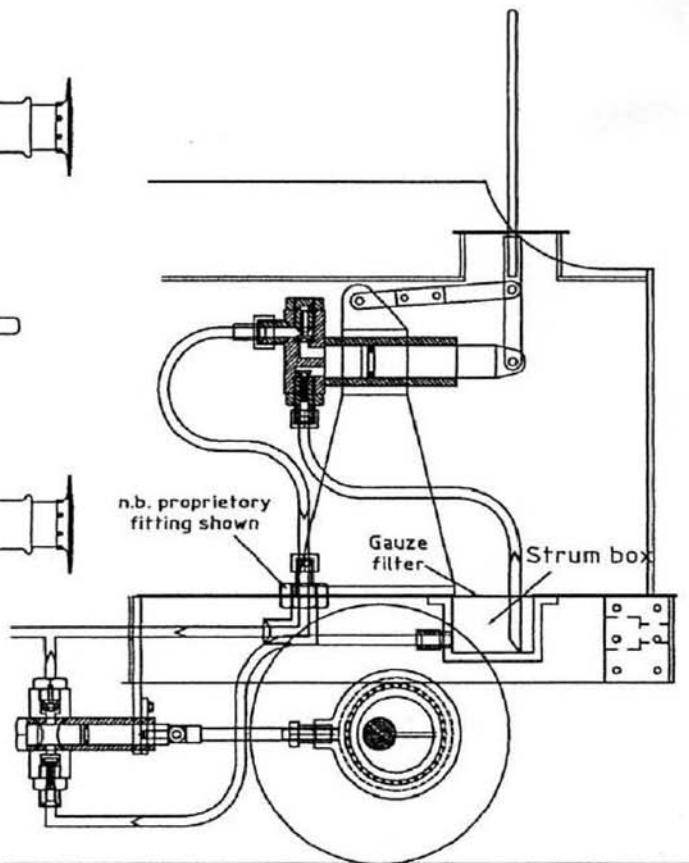
● To be continued. ➤

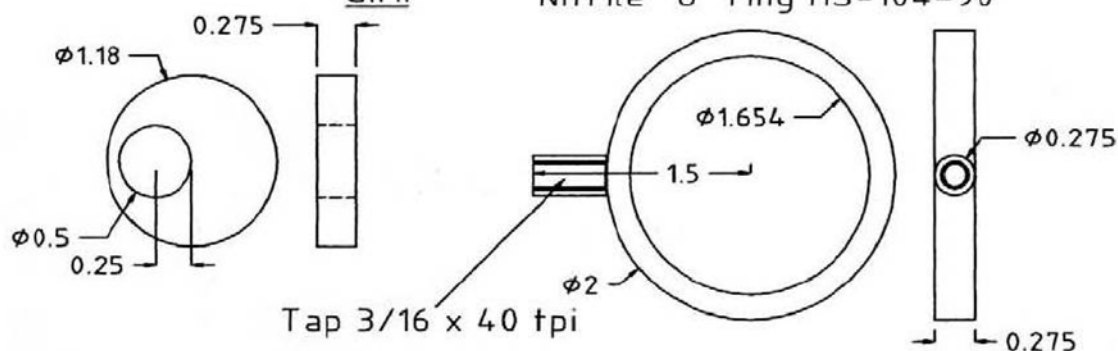
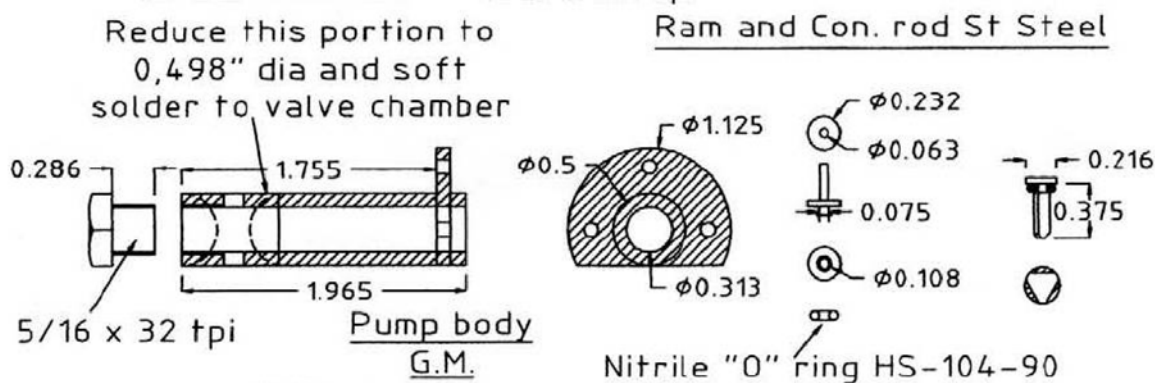
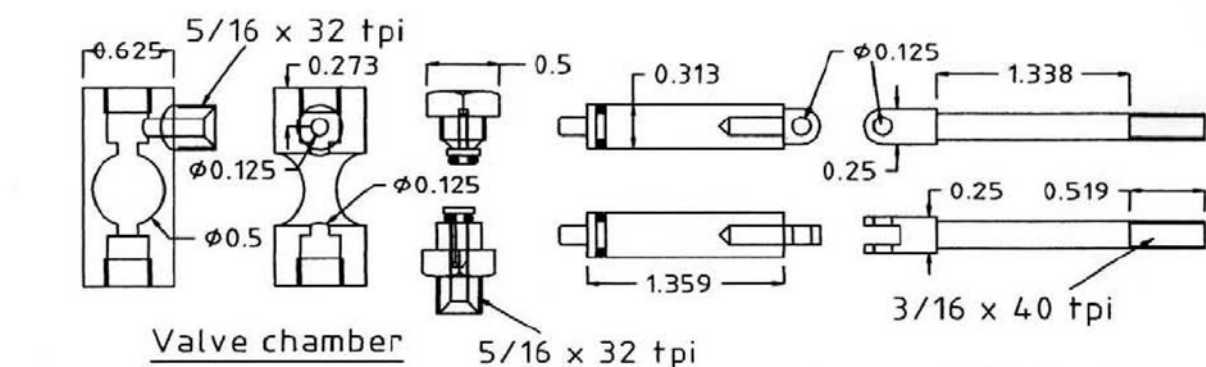


Another view of the LBSC type feed pump.



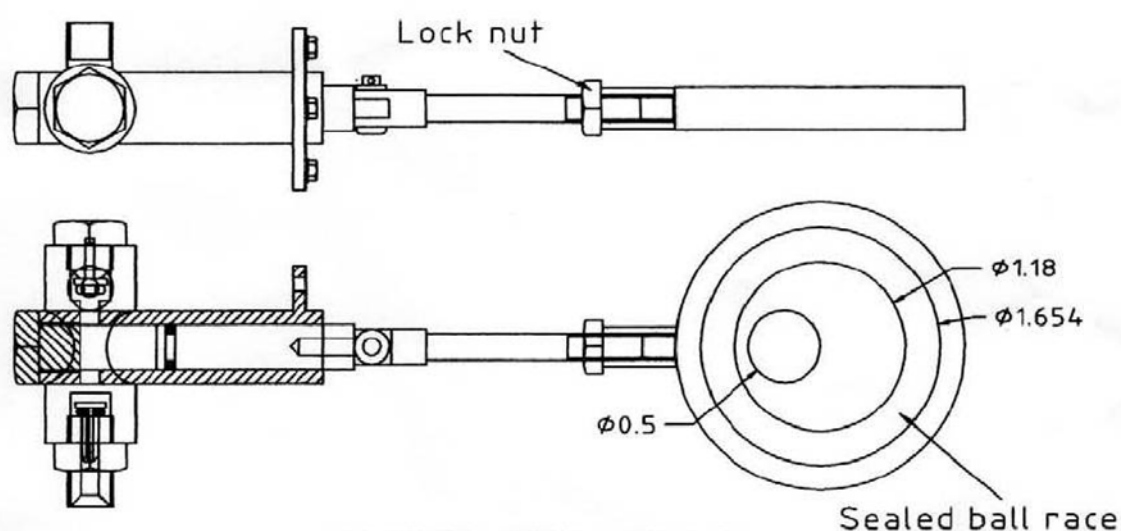
Underside view of tender chassis





Ball race eccentric

Use 6806Z 42mm x 30mm x 7mm sealed ball race



TENDER AXLE PUMP

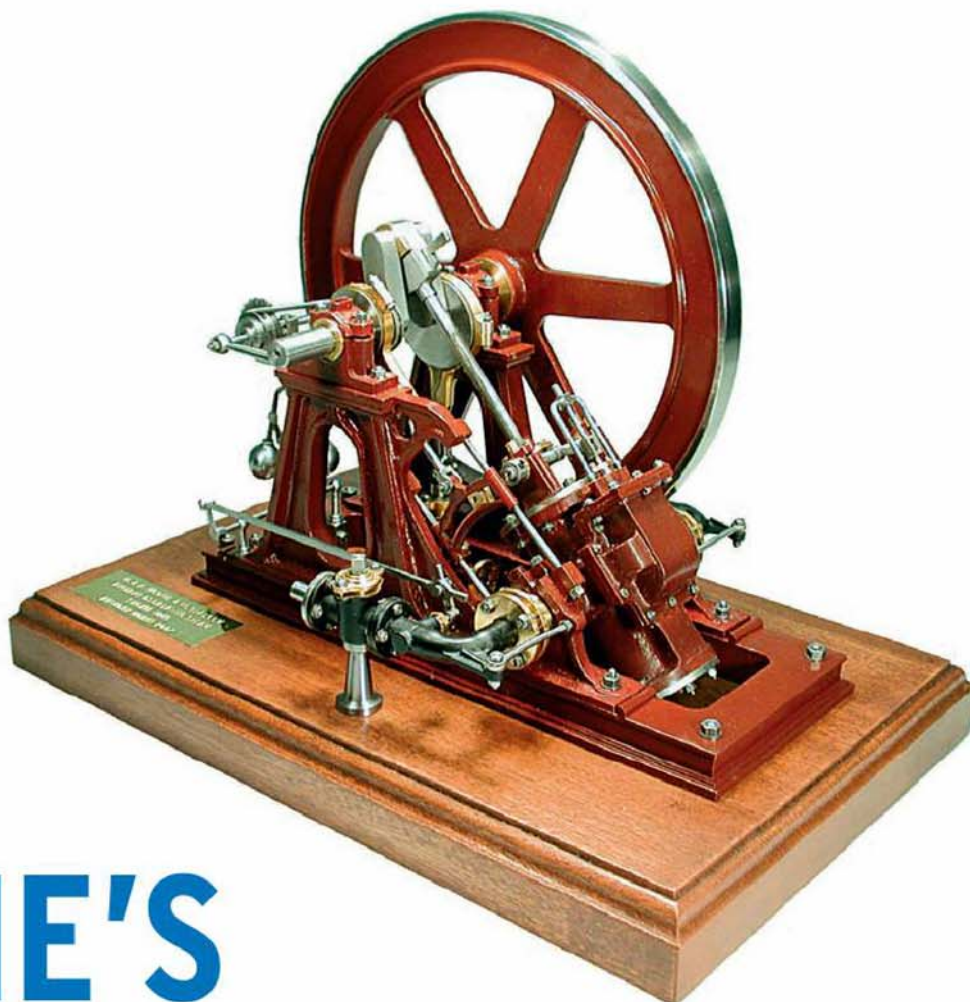


ANTHONY
MOUNT

Anthony Mount concludes this series of articles by describing the last few parts, and how to paint, assemble and test the finished engine.

PART 16

Continued from page 335
(M.E. 4347, 13 March 2009)



McONIE'S OSCILLATING ENGINE

The governor rocker shaft (part 78), is simply a straight length of 2mm dia. mild steel squared off at the ends.

To join the eccentric rod to the crosshead it was usual to have a shouldered pin with a split pin to stop it from coming out. However, for our size of engine a split pin, though not

impossible, will probably not be welcomed by most builders of this engine, so I have shown a threaded end to the pin for a 10BA nut (part 79).

Pump eccentric rod screw (Part 80)

This is similar to part 79, only a slightly different size.

Slide bar lugs (Part 81)

The way the builders of the full-sized engine fixed the slide bars at the top of the frames is a mystery to me; the engraving does not show it. There are a number of ways it could be done full-size but, in model form, we are very restricted for space.

The bottoms of the slide bars are screwed into the bearing, as full-size. At the top I was concerned at maintaining the centres of the slide bars for the crosshead to slide freely. In the end I machined a slot through the web and used a piece of 6mm square mild steel, with

the holes for the slide bars drilled using coordinates. This bar is shown as part 81 and the additional machining to this, and to the side frame, is shown on fig 6.

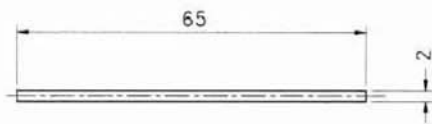
The bar was fixed to the frame with small countersunk screws and Araldite (photo 120). After the Araldite had set, I machined away the end of the bar, by the web, using a ball nose cutter. A 3mm slot drill was used to remove the section of bar in the middle to leave the two blocks. The edges were rounded and the whole merged into the casting, which, once painted, appeared as solid.

The drawback with this method is that you have to assemble the slide bars and crosshead, which are then trapped. Shortly after I had written the above I was looking at the completed side frame and saw a way of making the crosshead removable (fig 6). The construction is the same



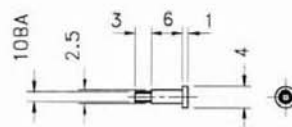
Slide bar support fixed to the side frame ready for machining to form two separate lugs.

Part 78



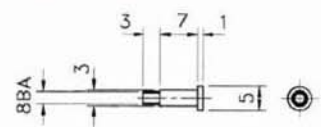
GOVERNOR ROCKER SHAFT
1 OFF MILD STEEL

Part 79



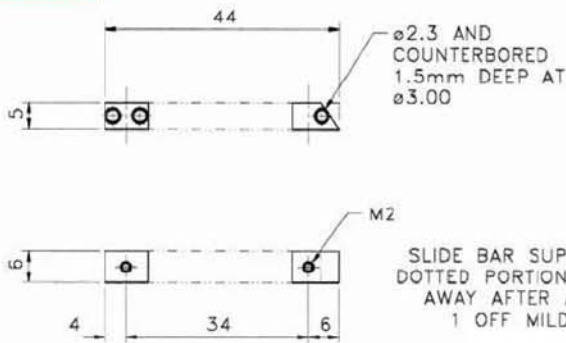
VALVE GEAR
ECCENTRIC ROD SCREW
1 OFF MILD STEEL

Part 80



PUMP
ECCENTRIC ROD SCREW
1 OFF MILD STEEL

Part 81



SLIDE BAR SUPPORT LUGS
DOTTED PORTIONS MACHINED
AWAY AFTER ASSEMBLY
1 OFF MILD STEEL

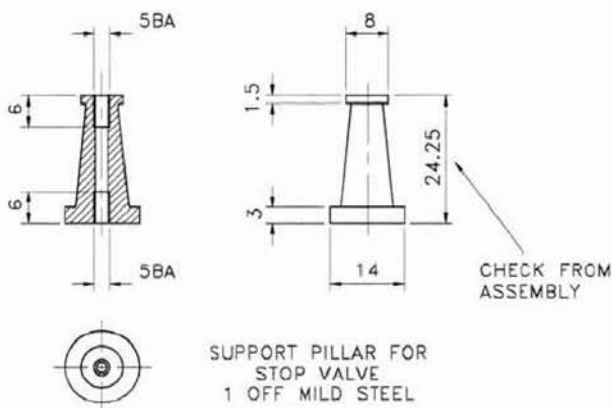
Part 82



SLIDE VALVE NUT
1 OFF BRASS

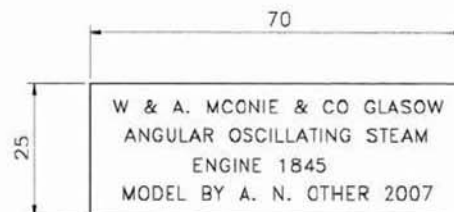
1st ANGLE PROJECTION

Part 83



SUPPORT PILLAR FOR
STOP VALVE
1 OFF MILD STEEL

Part 84



NAMEPLATE
1 OFF ENGRAVING BRASS

1st ANGLE PROJECTION

except that the slide bars are threaded both ends. The bar at the top has both holes tapped to receive the slide bars. The two holes in the bearing block, instead of being tapped, are drilled clearance size for the slide bars.

The top slide bar can be pushed into position from below and screwed into the top bar and a nut put on at the bearing end. The lower slide bar can also go in from below but a hole drilled at an

angle or a slot will need to be milled in the bottom flange of the side frame to allow the slide bar to reach the bearing block (fig 6).

Additional work on the frames

The frames are next clamped to the milling machine and a 6mm end mill used to spot face a seating for the nut that secures the elbow tie rod to the frames.

The bead on the inside edge of the frame, where the

crosshead slides, needs to be machined away to clear the round section of the crosshead.

Another hole and spot face is required, adjacent to the stud hole at the rear of the side frame, to take the little pedestal for the governor rocker arm. The hole can be spotted through into the base and the hole in the base tapped 8BA.

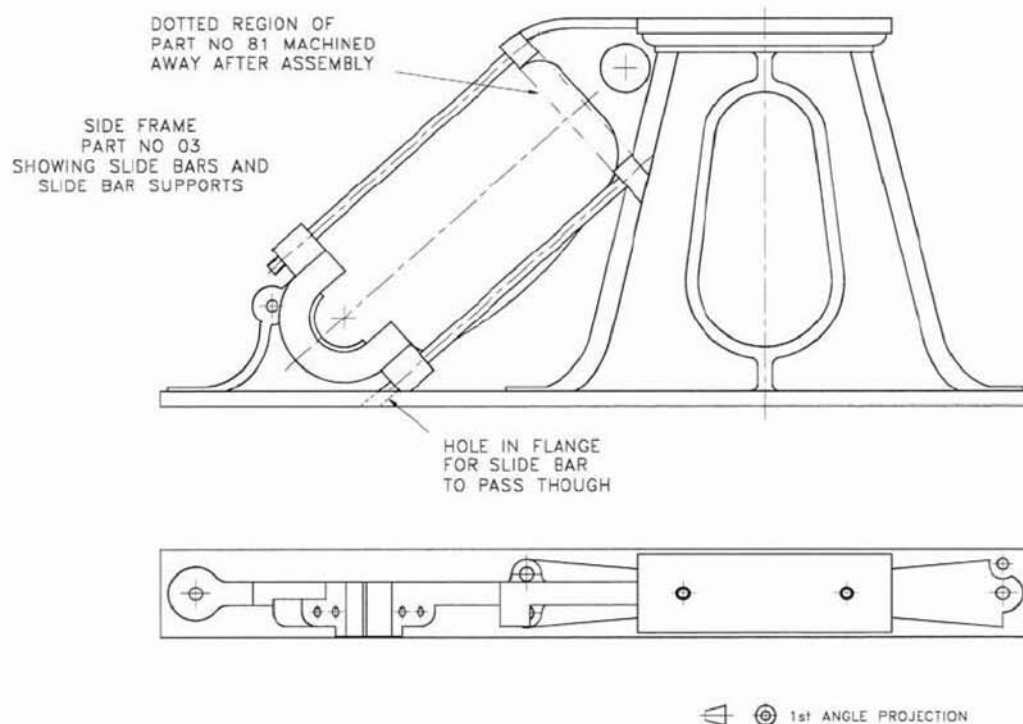
Yet another couple of tapped holes are required on the top of the frames to take the brackets that support the governor.

Slide valve nut (Part 82)

A tiny block of brass is needed for the slide valve nut. Make it a sliding fit in the valve and cross drill and tap for the valve rod. On assembly, check that there is space under the nut for the valve to rise, in case there is a carry over of water.

Support pillar (Part 83)

I have shown a support pillar to go under the stop valve. This is screwed into the base of the valve and secured from

Fig 6

the underside to the wooden base. This is not shown on the engraving of the prototype, as the other end of the steam pipe would have been securely fixed. However, on our model, there needs to be a means to hold the pipework firmly.

It can be machined from a short length of bar. Check the length on assembly to ensure that the cylinder can oscillate about the pipe without binding.

Nameplate (Part 84)

You can make up any type of nameplate you like, but do fit one that tells folks in the future a little about the history of your model.

Cylinder (fig 7)

Although we have already made the cylinder, I have included fig 7 to show the whole of the cylinder assembly, which I hope shows clearly the relationship of the various parts and the route taken by the steam from entry to exhaust.

Painting

As with most early stationary engines, there is no clue regarding the colour it was

painted. As a change from green, I painted mine maroon with black pipework. You often see stationary engine models with the flywheel painted bright red - this was never done in full-size practice - the flywheel was the same colour as the rest of the engine.

The painting of a model can make or mar it and good preparation is essential. Check over all the pieces to be painted to remove all sharp edges; paint cannot adhere to a sharp edge, a slight rounding of the edge is better than a chamfer, which is, in effect, two sharp edges.

Any castings need filling and rubbing down - a laborious but important job if you want the best results.

I have mentioned many times before that I have never had any success with a brush, but there are some people who can achieve a superlative finish with a brush.

Many people favour airbrushing, but I personally resent having to clean all the equipment afterwards, so I usually use an aerosol as used on automotive work.

Spray painting creates a fine mist that can waft over a surprisingly large area of the workshop. Any over-spray dries into a dust and I have found traces a couple of metres away, so consider using a spray booth. This can be as simple as a large cardboard box. Some form of suction, such as a vacuum cleaner can greatly reduce the dust. However, it is important that your vacuum cleaner is designed to cope with inflammable vapour!

Masking of unpainted areas is required. Each piece can be mounted on a stick of some sort; this is useful for turning the part around to get at each side and for holding the part while it dries. Cocktail sticks are ideal for small parts and bamboo barbecue sticks are useful for larger pieces. Metal rods are needed for heavy items.

Most aerosols use acrylic paint, which is touch dry in minutes. However, before handling it to assemble the engine, leave it overnight to harden thoroughly. At the time of writing, aerosol primers were still cellulose based, but

this may change with recent EU legislation. I usually apply the primers using alternating colours. Then, when rubbed down, you can see how much paint has been removed.

The normal advice of building up the colour in a series of thin layers is sound. You can always apply another coat - rubbing down a run after applying too much paint is a waste of precious time.

When removing masking tape take care to pull it off without pulling up the paint layer. In some areas it may be useful to run down the joint with a sharp knife, to reduce the risk of lifting the paint.

Assembly

With the painting finished it is time to start assembling the engine. With this engine, lining up the parts is important. Begin with the base and fix the two side frames to it. Leave the nuts finger tight and push the cylinder down onto the lower bearings. Nip up the nuts and check that the cylinder is in proper alignment with the base. Remove the cylinder and bolt on the bearing caps; then pass a reamer through the bore to ensure the holes are smooth and round.

Now try the crankshaft bearings in place and fix them down, with the crankshaft in position for alignment.

The cylinder can now be assembled as a complete unit except for the steam chest cover. Fit the piston and gland packing. Make sure that the piston, piston rod and valve rod move up and down easily and smoothly.

Fit the big end to the crankshaft and screw on the piston rod. Place the cylinder in the frames and, with the eccentrics fitted, turn over the engine to check clearances and ensure there are no tight spots.

If all is well, screw down the cylinder and crankshaft bearing caps and again check that it all moves smoothly.

Now the slide valve eccentric strap can be fitted and connected to the crosshead. Fit the die block and push in the rocker arm pin. I found it easier

to assemble the engine with the pin loose; it can be fixed with a spot of Loctite once the engine is fully assembled.

Carefully turn the engine over and watch what is happening to the slide valve. Adjust its position on the valve rod so that it opens the ports equally each end.

It pays to have the yoke that guides the end of the valve rod only partly pushed home so that it can be easily removed for adjusting the valve rod. Also, though not strictly to scale, I tapped a hole in the rocker arm boss so that it could be repositioned slightly on the end of the rocker shaft should this be required. It was interesting to see how great the position of the valve could be changed by adjusting the rocker arm on its shaft.

Now attention can be turned to the eccentric: its position on the crankshaft is adjusted so that the slide valve cracks open at top and bottom dead centres. To facilitate adjustment, I drilled a small hole through the strap so that the Allen key can pass through

to lock and unlock the screw, without having to remove the strap. The hole can also be used for oiling.

The steamchest cover can now be bolted on - do not forget to use a gasket of some sort. Brown paper soaked in oil was used in the past but modern liquid gasket material can be used, available from automotive stores. Check that it will withstand steam temperatures, should you wish to run the engine on steam.

These gasket materials are quickly removed, should you need to break the joint in the future, and are easily wiped off the paintwork without damaging it.

The pump eccentric strap can now be fitted - check that the pump ram does not bottom in the pump body.

You have probably already assembled the governor so this can be fixed in position and connected to the throttle valve. As mentioned previously, it is now time to measure the length and make the throttle push rod (part 51, *M.E* 4345, 13 February 2009).

The drive to the governor would have been by rope on the prototype, but in a model this size it is difficult to splice without making a bulge, and to have enough grip to drive the governor. Though not prototypical, I used a spring band which is ideal.

Testing the engine

So now comes the big moment - all is ready for the first test! Oil all bearings and rubbing points and turn over by hand a few times to distribute the oil.

Compressed air is ideal for testing; in fact, I only use compressed air to run my engines. This saves the bright parts rusting from condensing steam and, being a small engine, it is not really suitable for rubbing over with an oily rag, after you have finished running it.

High pressure is not required - 1bar (14.5psi) is plenty. I connected the air supply to the engine using a three-way valve - on, off and bypass to atmosphere. Begin with the valve set to bypass so that all the air goes to waste and

with the main stop valve on the engine fully open. Slowly turn the three-way valve from bypass to on, turning over the engine manually until it starts to run. I was very pleased that my engine started first time without the need for adjustment.

Conclusion

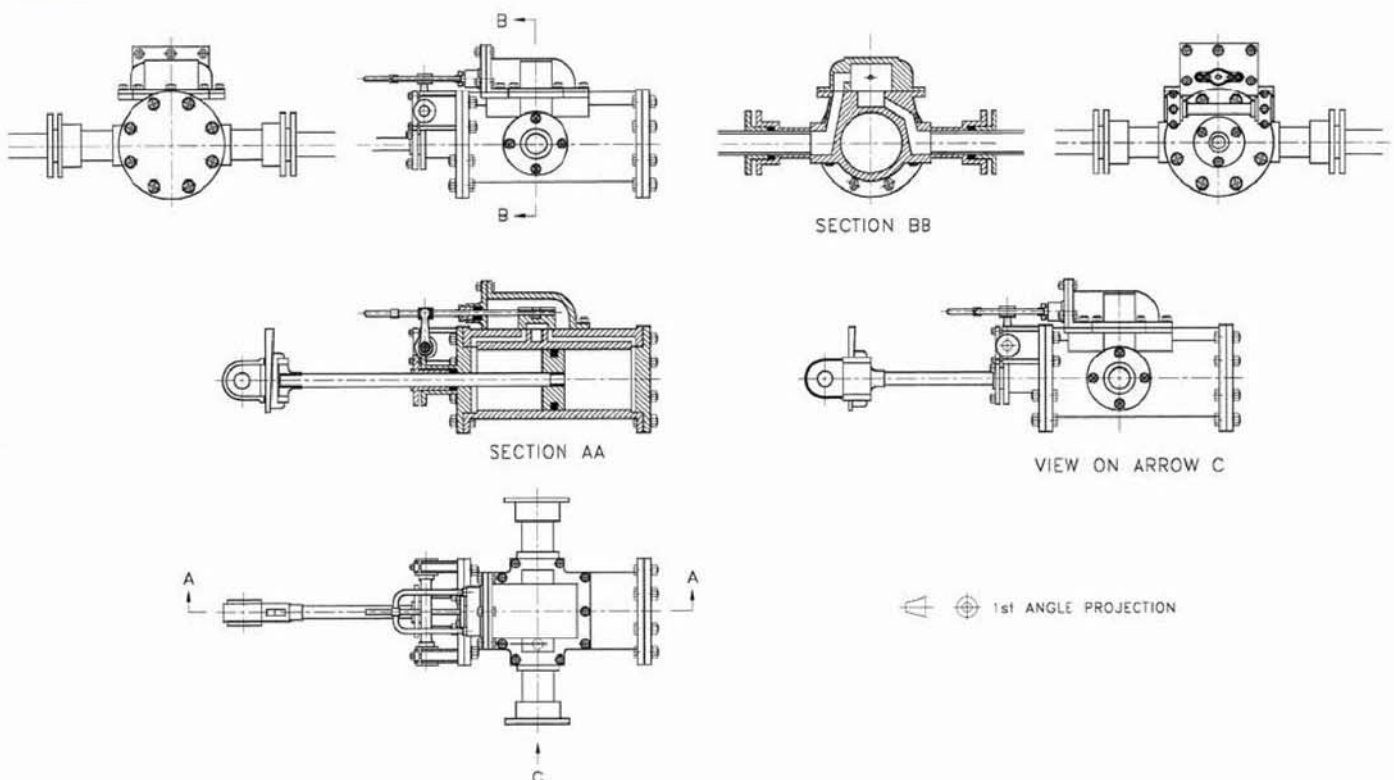
So there we are, with the engine running you can savour the joy of a job well done. I wonder if the Scotsmen who built the full-size engines had the same sense of excitement when their engines started to run for the first time.

It would be interesting to know how many were made; it was not a big engine so they could have been sent all over the country - the railway system was in the first phase of expansion when these engines were being built.

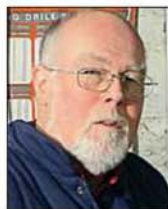
Did the workforce at the time realize what a change the industrial revolution was going to make to their lives and to the rest of mankind? - A revolution that continues to this day.

ME

Fig 7



The Re-Cycle Engine



DAVE FENNER

Dave Fenner makes the crankpin, covers the slave crank, the gearshaft and the crankshaft bush.

PART 4

Continued from page 339
(M.E. 4347, 13 March 2009)

The crank pin (fig 10) is simply turned from 16mm silver steel as, in the as supplied condition, this would have an accurately and smoothly finished outside diameter which would mate with the 16mm needle roller race chosen for the big end bearing. I have chosen not to apply any heat treatment, although to do so might be an improvement leading to longer life. It would, however, affect the method used to secure the pin to the web.

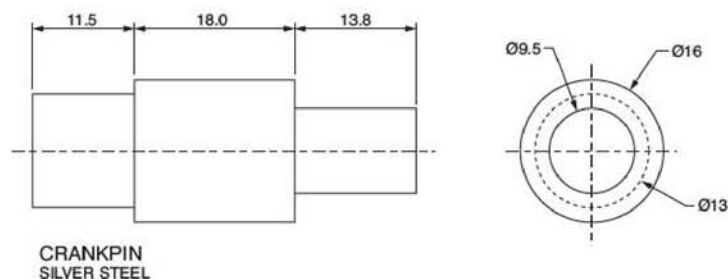
To assemble the four parts, I settled on three variations of keying. The web to main shaft joint is a close fit retained initially with Loctite. Braces are then added to the belt by means of a set screw driven into hole drilled and tapped along the cylindrical joint. **Photograph 32** shows this feature on the main shaft, and



Web is keyed to main shaft by screw driven along the interface.

also illustrates the build up of the slave shaft. The crank pin is also initially held by Loctite, which this time is augmented by a 3mm roll pin or spring dowel driven in radially from the outside diameter of the web,

the hole being drilled after the Loctite has cured. As it was more likely that the flywheel would be removed, it is located on a close fitting section of the shaft, held on by an M6 bolt, with the torsional loads being fed through



CRANKPIN
SILVER STEEL

Fig 10



Milling key in shaft for flywheel.



Mill spindle lock arrangement for cutting internal keyway.



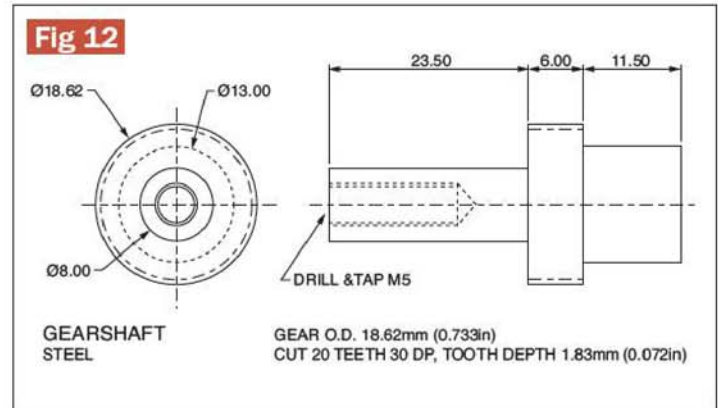
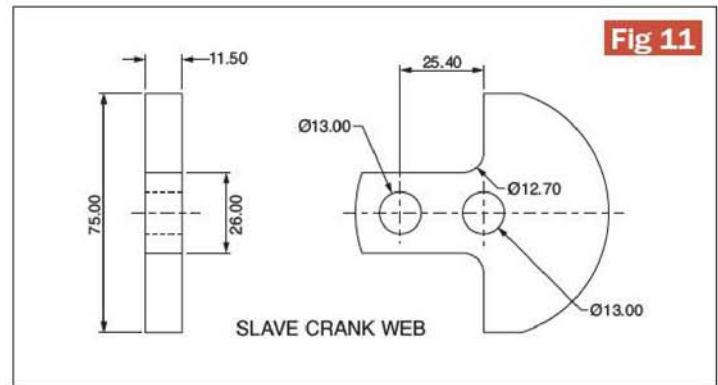
Cutting keyway in flywheel.

a 3mm key, located in keyways in shaft and flywheel. **Photograph 33** shows the keyway cutting operation on the shaft. To cut the internal keyway in the wheel, I unearthed the kit made up to do this on the VMC mill. A spindle lock is fitted, (**photo 34**) then the cutting tool held in the normal ½ in. Jacobs chuck. The cutter is drawn down by means of the lever feed, the table being moved in the X direction by a thou. or two between cuts. You can very quickly achieve the 1.5mm depth, and then move in the Y direction and take a second series of bites to arrive at the desired width. **Photo 35** illustrates this. The cutting tool is shown in **photo 36**.

Slave crank

Production of this sub-assembly follows closely the procedure given for the main crank. The web (**fig 11**) dimensions were adjusted to give extra

counterbalance, although no calculations have been made to determine whether this was necessary. The added complexity comes from the inclusion of the primary gear for the cam shaft drive. Start by preparing the shaft blank, with centres at both ends. Cutting the 20-tooth gear will require some form of dividing apparatus; my set up is given in **photo 37**, in which it may be seen that an ER 32 collet chuck has been employed to ensure concentricity of the gear teeth, and the shaft has been made relatively thick to give rigidity. **Photographs 38** and **39** show the shaft after gear cutting, then mounted between centres for turning the bearing location diameter. **Figure 12** gives the dimensions for this. For those new to gear cutting, this is most easily handled using a 30 DP involute cutter. The blank diameter in Imperial measure, is calculated by adding



Cutter used for internal keyway.



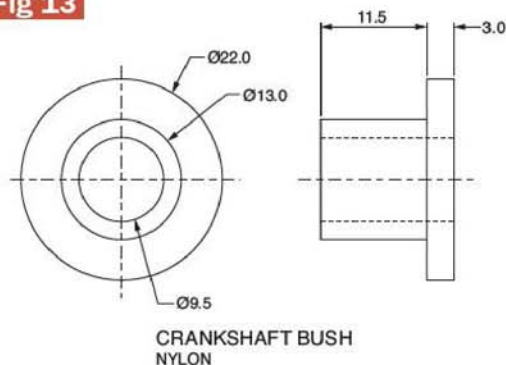
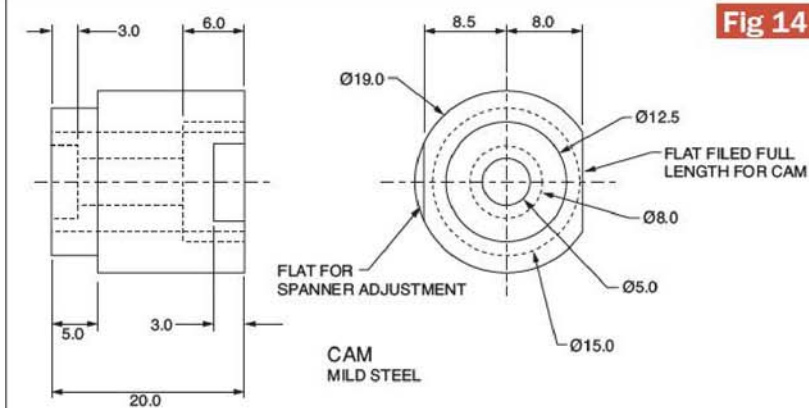
Set up for cutting gear teeth.



Slave shaft after cutting gear teeth.



Slave shaft mounted between centres to turn bearing location diameter.

Fig 13**Fig 14****40**

Shaft spacers with flywheel bolt and washer.

two to the number of teeth, then dividing by the DP. Hence we have $(20+2)/30 = 0.733\text{in.}$ or 18.63 millimetres. The depth of cut is given by 2.157 divided by the DP or in our case $2.157/30 = 0.0719\text{in.}$ or 1.83 millimetres. For those interested, more detail on gearing and gear cutting may be found in various books. In particular, *Machinery's Handbook* includes a detailed section on the topic, and *Gears and Gear Cutting* by Ivan Law, covers the subject in a detailed but concise manner, aimed at the amateur workshop enthusiast. It's number 17 in the *Workshop Practice Series* from www.myhobbystore.com

A nylon bush (fig 13) is fitted to the slave web and connects with the crank pin. Its purpose is to introduce a small degree of compliance into the joint, to allow for alignment inaccuracy.

Spacers

Two hollow cylindrical spacers are needed, one between the main bearings, and a second

between the outer bearing and flywheel. The intention is that when the flywheel is fitted, pulling up its retaining bolt will clamp up the stack of flywheel - spacer - bearing - spacer - bearing, against the shoulder on the crankshaft. Accordingly, the first spacer should be perhaps a couple of thous. or 0.05mm longer than the dimension over the shoulders within the bearing housings, and the second sized to take the flywheel jut beyond the end of the shaft. From the drawings, a size of 38.3mm would be correct for the first, but as there are several dimensions where small errors will be additive, it may be best to measure on the job. Each spacer is bored to slide easily over the 20mm shaft, with care being taken to ensure that the ends are faced square. An outside diameter of about 28mm will be found satisfactory. These parts have not been drawn.

I used steel here, as suitable material was to hand. Aluminium or brass would be

viable alternatives, and could be used to add polish or colour. **Photograph 40** shows the two spacers with the flywheel washer and bolt.

Contact breaker cam

Detailed in fig 14, this is initially a basic turning exercise, followed by a bit of old-fashioned filing. A flat is created over the whole length then radiused off a little. This is the feature which will operate the contact breaker. A second short flat is then added diametrically opposite, the purpose of this being to give purchase for a spanner so that the cam may be adjusted for ignition timing. **Photograph 41** shows the cam along with the driver details noted next. Of course if you don't fancy the physical exercise, you can always cut the flats on the mill then round off with a file.

Driver parts

These were an afterthought to enable the engine to be spun over at a reasonable speed for initial starting. The theory follows that of the old fashioned starting handle. The driver part features a cross pin through a bar turned from hex steel which can be gripped in the chuck of a cordless drill. The driven section is a hollow cylinder fitted over (Loctited to) the M5 Allen screw used to retain the CB cam. It has two angled slots formed by cross drilling then sawing / filing to give angled slots which will keep the drive engaged while spinning over, but, as with a starting handle, will disengage as soon as the motor fires up. Others may have their own solutions

to starting, such as an electric starter for model aero engine, or even a rope type starter such as used to be used on small JAP engined motor mowers and other garden implements.

Washer

The substantial washer depicted was a 'find' in one of the fastener boxes. Probably kept for the proverbial seven years it has now found a use.

Contact breaker

The particular breaker used was a Wipac CT 140. Also stated on the box was the information "Replaces C1: CS125: INT: 22270". This may help others identify suitable equivalent parts, although it is most likely that with a little ingenuity, many breaker assemblies could be used. After assembly of the cranks in the bearing housings, and fitting the CB cam, the breaker may be fitted with its pivot pin inserted in the hole in the slave bearing housing. The positions can then be marked to enable the holes to be drilled and tapped for the two M5 clamp screws.

● To be continued.



Crank driver dog and ignition cam.

Diamond hone fitted to an oscillating electric sander.

Repairing a slide valve

1



PETER ALLEN

Peter Allen describes how he repaired a slide valve without having to dismantle the locomotive.

After over 20 years of fund-raising at village fetes, one of **Royston & District Model Engineering Society's** Simplex locomotives was struggling to pull a full load on the portable track. The valve linkage was badly worn and was not providing full valve travel when compared with the society's other engine. Despite being an inexperienced machinist and never having made an engine, I was volunteered to fix it. I was told: "You will learn!"

Another problem revealed

Over the winter, oversize die blocks were fitted to the expansion links, and pins and bushes were renewed, resulting in full valve travel being restored. Steam was raised on the first club running day of the season. Performance was much worse; embarrassed in front of the club's 'great and good', my repair had failed! Now, on opening the regulator in mid gear, steam pressure was lost through the blast pipe. The consensus of opinion was that the slide valve was not seating properly. Back in my workshop, I removed the slide valve to reveal a 20 thou. groove worn into the cylinder port face. My restored linkage was pushing the valve beyond the worn area and damaging the edges of the valve. The valve was easily skimmed in the lathe, but

removing the cylinders for skimming was a major 'boiler-off' job.

Furthermore, the engine was needed for fetes in a few weeks' time. How

to restore flatness without removing the cylinders? Would lapping

do the job and would it last the season? - It was worth a try!

Lapping

The steam passages were carefully plugged with melted candle wax, to keep abrasive away from the piston. A soft alloy lap was made and fixed to an oscillating electric sander with a Velcro pad. After an hour, using the coarsest valve grinding paste, lapping made little impression on the cylinder and the lap was wearing much more than the work. Something harder and more abrasive was needed.

Honing

A diamond hone had been acquired for woodworking and was shaped with a hacksaw and files. Provided that the cut was taken from the uncoated back surface, the diamond particles pinged off the surface without causing excessive tool wear. A diamond-coated hone was made and screwed to the sander plate (**photo 1**). With the sander switched on, and light pressure applied, the hone was continuously moved within the confines of the valve chest to cover the whole of the

port face. Kerosene was used to wash abraded particles off the hone. After four hours of honing, the groove was removed and an even, flat surface achieved. This was repeated on the other cylinder - a total of eight hours honing (**photo 2**). Although I was fairly confident that all particles had been removed, I decided to remove the pistons to check.

New piston rings

The piston rings were badly worn - another reason for the poor performance! New PTFE rings were made by the club chairman, and fitted to the worn cylinders (the material was too expensive to risk my scrap rate). **Photograph 3** shows the author testing the locomotive after the repairs. The performance was markedly improved and remains so, even after two seasons of heavy club use, including a trip to Sinsheim. This method of repairing in situ appears to be a viable alternative to dismantling the locomotive. **ME**

2



The diamond hone after eight hour's use.

3



The author testing the locomotive after repairs.



ASHLEY
BEST

Ashley Best provides a brief history of trams in Britain before listing 12 trams, from the Manchester area, that he has modelled to 1:16 scale.

PART 1

Manchester
Corporation
tram, 1922.



Tramcars



Manchester Corporation tram, 1906.

Electric street tramways in Britain have an interesting history. The newer systems are re-introductions and are very different from what are loosely described as first generation tramways. The original systems had a comparatively short existence and by the end of 1962 all had gone except Blackpool, which continues to this day with its one surviving route.

Although a few undertakings started using electric traction towards the end of the 19th century (Blackpool being one), most were developed during the early 20th century. By the late 1920s, growth was almost complete and thereafter a steady decline set in. Some attempts at modernisation took place in the larger systems but many undertakings did little to improve the basic Edwardian technology and, indeed, some of the smaller tramways opened and closed with the same vehicles after relatively brief lives.

The Second World War delayed the demise of many street tramways, but in the end all succumbed. A link with the past was provided for a short time by the trolley bus, which enabled the power generation

equipment to continue in use but, by 1972, the trolley bus was also extinct in Britain. This sad history was not repeated in much of the rest of the world where the development of modern trams has been part of an evolutionary process and systems frequently have unbroken links with the past. All the new British tramways are in places that once operated trams, but the re-introduction was after a substantial gap - sometimes longer even than the initial period of running.

In spite of a relatively short existence, the era of electric tramways was full of interest and variety. While municipal operation was most likely in the cities and larger towns, this was not always so and there were many miles of company-owned tramways; in places the two would operate alongside each other. Gradually the companies abandoned, or sold, their tramway interests and the last years of tramway operation were by the municipalities.

There were several gauges employed right from the start, but three mainly: 3ft. 6in., 4ft. and standard gauge (4ft. 8½in.). This was by no means the total and the curious 4ft. 7¾in. was employed on some systems to facilitate the passage of railway

wagons along the grooved rail. Indeed, Glasgow, the final city system to close in 1962, was of this gauge. The narrow 3ft. 6in. gauge was used by many smaller systems, but Birmingham and some adjoining tramways were thus equipped.

Four-foot gauge tramways were to be found in several places, including the Potteries, North Lancashire and, of particular interest, in Bradford, which even tried trams with variable gauges on its connecting route to standard gauge Leeds.

In their heyday, tramways were introduced and developed by most large towns and cities; growth was rapid and in some parts of the country, where the towns were close to each other, it was sensible for connections to be made and through-running to occur. Thus, at one time, it was possible to travel from Liverpool to Stockport by tram - not without changing though!

The various tramways of the South Lancashire area were in many ways perfect examples of tramway history. There were municipal operators and there were company operators - some of which were later absorbed by municipalities. Through-running was a feature and at the centre of this web was Manchester, which had some of the most attractive and distinctive tramcars to be seen anywhere in the country. The entire group of tramways was of standard gauge and all used the overhead trolley system with either fixed or swivel head collectors. All the main types of tramcar were used, but gradually the more unusual types vanished so that, in the end, all that remained were examples of typical double deck cars of either 4-wheel or 8-wheel configuration.

Manchester's tramway neighbours included Salford, Stockport, Ashton-under-Lyne, Hyde, Oldham, Rochdale, Bury and Bolton. Of these only Bolton did not have joint operation with Manchester but was connected nevertheless. In addition, the South Lancashire Tramways Company operated into the city.

Early on, there were other company tramways that eventually became absorbed into the municipal systems. So, as far as tramways were concerned, South Lancashire had everything. What it didn't have was much in the way of modernisation. While other large cities made some attempt to modernise, Manchester did almost nothing and the surrounding systems did absolutely nothing and so vehicles of traditional design saw out the last days in various states of decrepitude - but therein lies much of their fascination for the enthusiast.

It is in this area of the country and its first generation tramways that my own model engineering interests have developed. I recall stepping out of Trinity Street Station in Bolton in 1945 and seeing the grimy trams lined up opposite. I was at an age when impressions make a deep impact and I was at once captivated. I wanted to know all about trams and embarked on a lifelong interest. I started making small models and drawing and painting trams and visiting places still using them. I rapidly discovered that, apart from Bolton, quite a lot of the once great South East Lancashire network remained and I managed to see some of each system. Then, after reading Ian Yearsley's *The Manchester Tram* in 1962, an idea for a project began to take shape. I made a small-scale table-top tramway to a scale of 3mm/ft. However, it was only in the early 1970s, when a series of articles by the late E. Jackson-Stevens appeared in *Model Engineer*, that the idea germinated and I started on a project that has, on and off, occupied the last 35 years. I decided to attempt a series of scale model trams to represent the systems based on Manchester and its satellite towns and, as I had never tried anything quite like it before, I picked on a Bolton tram as an example from my favourite system and the one I know most about.



Bolton Corporation tram, 1938.

The full project

After the Bolton car the others were selected to provide examples of trams from each main operator. However, the course of history provided a problem of the sort that afflicts most model-makers who wish to construct models set in a particular context. The systems that make up the network based on Manchester were impossible to represent at one moment in time if examples of the various types and stages were to be represented. Having made a model of a typical Bolton 8-wheel car of the late 1930s, it was impossible for all the others to be of the same period because some had gone. For example, the Rochdale system had already closed in 1932. So, the models are spread over the whole period of operation, but most represent trams in their heyday.

The final choice of tramcars to make included those of all the municipalities and those company operators that played a significant role in tramway development throughout the area. The chosen trams and systems include:

Manchester Corporation: (i) a large typical enclosed double deck bogie car - the archetypal Manchester tram, 1922; and (ii) a model of fleet No. 502, the first top covered 4-wheel corporation tram of 1906 (photos 1 and 2).

Bolton Corporation: a double deck bogie car - a typical Bolton tram with an open lower deck platform and enclosed upper deck of 1938 (photo 3).



Salford tram, 1935.



Stalybridge, Hyde, Mossley & Dukinfield Joint Board (SHMD) tram, 1945.



Oldham, Ashton & Hyde Tramways (OA&H) tram, 1899.

Salford: a double deck 4-wheel tram rebuilt from an open top car and with enclosed platform and open balcony, 1935 (**photo 4**).

Ashton-Under-Lyne: a 4-wheel double deck balcony car - a typical British 4-wheel tram, 1937 (**photo 5**).

Stalybridge, Hyde, Mossley & Dukinfield Joint Board (SHMD): a double deck

balcony car with track brakes, built by short-lived local tram builders British Electric Car Co. of Trafford Park as an open top car in 1902 and SHMD added the top deck later. The model (**photo 6**) is shown thus and in pre-war livery - this tram was the very last operated by SHMD in 1945 and its last journey was recorded by the BBC for posterity.



Ashton-Under-Lyne tram, 1937.



Model of the large portable oil lamp fitted to the OA&H tram.

Oldham, Ashton & Hyde Tramways (OA&H): a single-decker, 1899 tram (**photo 7**). The OA&H was a company tramway that operated the first electric trams in the Manchester area in 1899. The car chosen demonstrates the transition from horse to electric and was very much a pioneering design. It had a Peckham girder truck and at first was not equipped with electric headlamps, using

instead a very large portable oil lamp! (**photo 8**).

Middleton Electric Traction Co.: a California style single deck bogie car, 1904 (**photo 9**). This was another company system and, like OA&H, it belonged to the British Electric Traction group, which owned tramways all round the country. The California style was, as its name



Middleton Electric Traction Co. tram, 1904.

implies, suitable to a more equable climate than South Lancashire. It had a central saloon and open ends for smokers!

Oldham Corporation: an enclosed double deck 4-wheel tram with track brakes and a unique style of roof drainage, 1938 (photo 10).

Rochdale Corporation: a single deck bogie car with unique type of maximum traction trucks and a special trolley base - a most unusual vehicle, 1927 (photo 11).

South Lancashire Tramways Company: a double deck bogie car with open platforms and balconies, 1930 (photo 12). This was a company tramway with austere vehicles built to out-dated designs even in the late 1920s.

Bury Corporation: an enclosed double deck bogie car in post-war

livery and with advertisements, 1948 (photo 13).

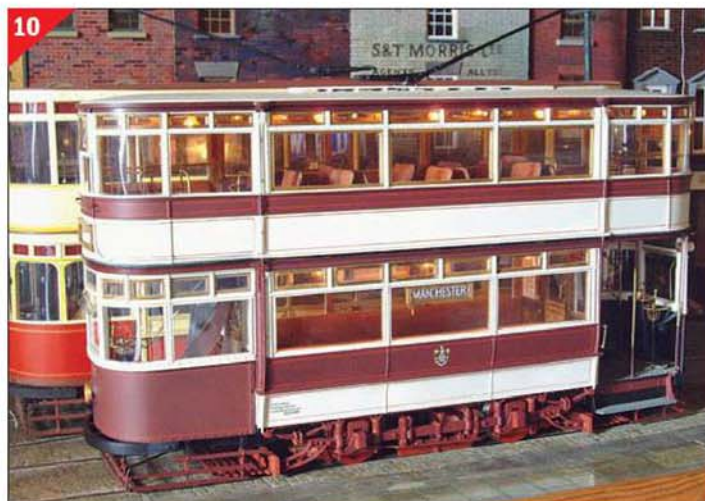
Lastly: a 4-wheel Stockport tram - yet to be decided.

The fleet is now almost complete at 12 trams. It has taken 35 years so far with one more tram to make.

Oldham No. 128

I have tried to select examples that have interesting or unique features because each system had its own individuality. A typical example is the Oldham Corporation Tramcar No. 128 shown at the Model Engineer Exhibition at Ascot in 2008. This model incorporates most of the methods and materials that have been shown to work well over many years. In addition, its construction involved a number of jigs and tools that are, in themselves, quite interesting and may have wider application.

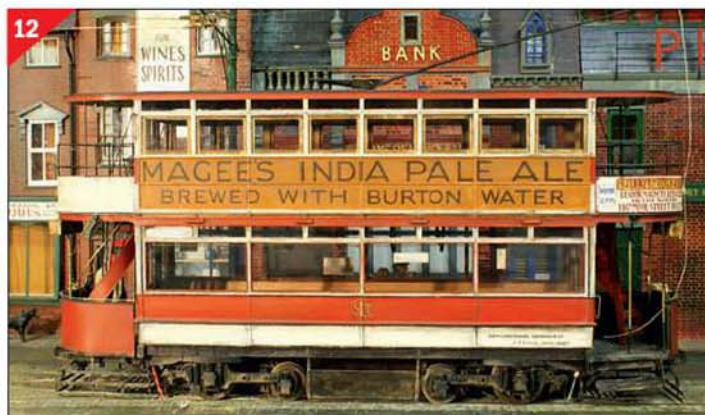
●To be continued.



Oldham Corporation tram, 1938.



Rochdale Corporation tram, 1927.



Lancashire Tramways Company tram, 1930.



Bury Corporation tram, 1948.

The Invention of the Pressure Gauge



PETER SOUTHWORTH

Peter Southworth explains how the pressure gauge was actually patented in Britain two years earlier than is commonly believed.

It is generally thought that the first person to invent the pressure gauge was Bourdon in France in 1849, but the truth is a little closer to home. On the 22 May 1847 Sydney Smith of Nottingham took out patent No. 11711 for an apparatus for determining the pressure of steam in boilers and regulating the dampers of a furnace. He sent the first one to George Stephenson who in his later years lived in Chesterfield. Stephenson is buried under the altar in Trinity Church Chesterfield. Stephenson wrote back:

Tapton House, Chesterfield.
October 15th 1847

"A most important invention has been submitted to me for my approval, patented by a Mr. Smith of Nottingham, and intended to indicate the strength of steam in steam engine boilers. It is particularly adapted for steamboats, and can be placed in the cabin, on deck, or any part of the vessel, where it may be seen by every passenger on board. It may also be fixed in the office of every manufactory where a steam engine is used at a considerable distance from the boiler. I am so much pleased with it that I have put one up at one of my own collieries. It is some distance from the boiler - in another house - and works most beautifully, showing the rise and fall of the steam in the most delicate manner. The indicator is like the face of a clock, with a pointer, making one revolution in measuring from 1lb to 100lbs upon the square inch of the pressure of steam. It is quite from under the control of the engineer, or any other person, so that its indications may be

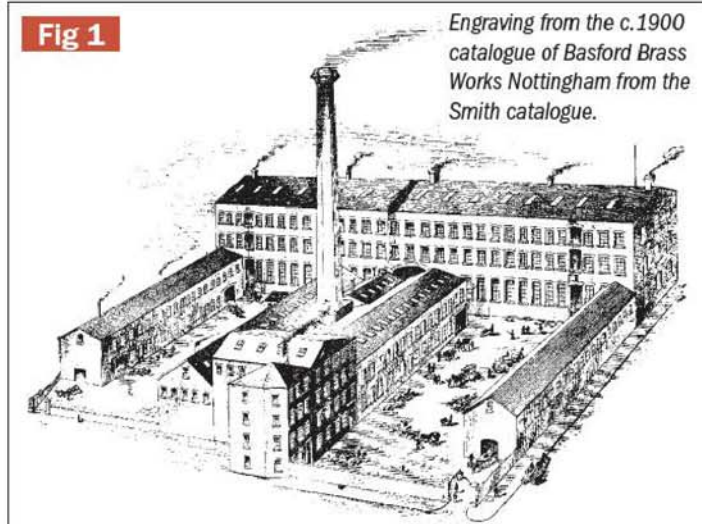


Fig 1

Engraving from the c.1900 catalogue of Basford Brass Works Nottingham from the Smith catalogue.

relied upon, and the construction is so simple that it is scarcely possible for it to get out of order. I might give a full explanation of the machine, but I think it best to leave that to the inventor himself. The numerous and appalling accidents which have occurred from the bursting of steamboat boilers have induced me to give you these observations, which I think desirable to be laid before the public. I may state that I have no pecuniary interest in the scheme, but being the first person to whom it has been shown, and the first person to make use of it, I feel it a duty I owe to the inventor, as well as the public, to make it as universally known as possible. The indicator is put up at Tapton Colliery, Nr Chesterfield, and may be seen any day by any respectable person".
(signed) George Stephenson.

Figures 1 to 3 are copied from a catalogue of Sidney Smith (Nottingham) Ltd., c.1900, whose claim was that they were the oldest pressure gauge makers in the world.

It seems very odd that Stephenson who, as we all

Fig 2



Frontispiece from the Sydney Smith & Sons (Nottingham) Ltd., catalogue c.1900.

know was a railway man and industrialist, seemed to be more interested in fitting the pressure gauge to ships rather than one of his locomotives. Also, why should the gauge be installed in the office when the person who should really know what pressure he is producing is the stoker? One wonders what the passengers on board ship were supposed to do when they saw the needle passing the red mark - man the lifeboats?

ME

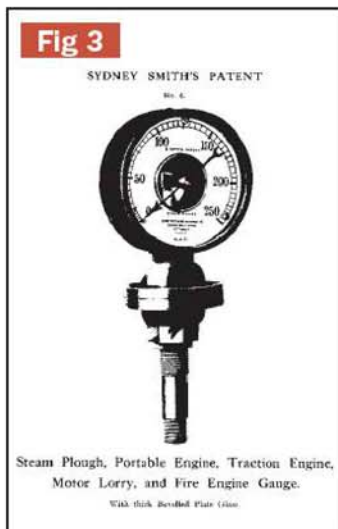


Fig 3

SYDNEY SMITH'S PATENT

Steam Plough, Portable Engine, Traction Engine, Motor Lorry, and Fire Engine Gauge.
With thick Resilient Plate Glass.

A gauge from the Basford catalogue.

DIARY DIARY DIARY DIARY DIARY DIARY DIARY DIARY DIARY DIARY

MARCH

- 27 **Colchester SMEE.** Working the Main Line. Contact Jon Mottershaw: 01206 383456.
- 27 **Hereford SME.** Nigel Jeffries: The Brunels, Father & Son. Contact Nigel Linwood: 01432 880649.
- 27 **Newton Abbot & District MES.** Meeting. Contact Graham Day: 01626 772739.
- 28 **Brighton & Hove SMLE.** Public Running. Contact Mick Funnell: 01323 892042.
- 28 **Leyland SME.** Boiler Testing Day. Contact A. P. Bibby: 01254 812049.
- 28 **Romney Marsh MES.** Boiler Testing. Contact John Wimble: 01797 362295.
- 28 **SM&EE.** Gauge 1 informal meeting. Contact Maurice Fagg: 020 8669 1480.
- 29 **Bedford MES.** Boiler Testing Locomotives. Contact Ted Jolliffe: 01234 327791.
- 29 **Bristol SMEE.** Steam-Up & Boiler Test Day. Contact Trevor Chambers: 0145 441 5085.
- 29 **Harrow & Wembley SME.** Sunday Running. Contact Roy Goddard: E. RSGwatford@aol.com
- 29 **MELSA.** Sunday in the Park. Contact Graham Chadbone: 07 4121 4341.

- 29 **Otago MES.** Club Running Day. Contact James Woods: 476 1369.
- 30 **Canterbury & District MES (UK).** AGM. Contact Gina Pearson: 01227 830081.
- 31 **Romney Marsh MES.** Track Meeting. Contact John Wimble: 01797 362295.
- 31 **Stafford DMES.** AGM. Contact Chris Dobbs: 01889 270533.

APRIL

- 1 **Bradford MES.** Spring Auction. Contact John Mills: 01943 467844.
- 1 **Harrow & Wembley SME.** OO Model Railway Night. Contact Roy Goddard: E. RSGwatford@aol.com
- 1 **Leeds SMEE.** Keith Hale: Silver Soldering. Contact Geoff Shackleton: 01977 798138.
- 2 **Cardiff MES.** Quiz Night. Contact Don Norman: 01656 784530.
- 2 **Leyland SME.** Frank Watson: East Lancs Railway 1846-59. Contact A. P. Bibby: 01254 812049.
- 2 **South Lakeland MES.** Meeting. Contact Adrian Dixon: 01229 869915.
- 2 **Sutton MEC.** Bits & Pieces. Contact Bob Wood: 020 8641 6258.
- 3 **Brighton & Hove SMLE.** Malcolm Stroud: Early Train Heating & Lighting. Contact Mick Funnell: 01323 892042.
- 3 **Colchester SMEE.** Keith Catchpole: WW2 Rail-borne Artillery. Contact Jon Mottershaw: 01206 383456.
- 4 **Hereford SME.** Club Running Day. Contact Nigel Linwood: 01432 880649.
- 4 **Midland Railway Society.** AGM. Contact Andrew Surry: 01462 451090.
- 4 **SM&EE.** Mark Miller: DH Dragon Rapide Restoration. Contact Maurice Fagg: 020 8669 1480.
- 4/5 **Taunton ME.** Exhibition 2009 at Heathfield Community School, Monkton Heathfield, Taunton, Somerset TA2 8PD. Sat 10am-5pm, Sun 10am-4pm. £5 Adult, £4 Senior Citizens, £1 Children. Information: 01823 698765.
- 4 **York City & DSME.** Geoff Shackleton: The Stationary Steam Engine. Contact Pat Martindale: 01262 676291.
- 5 **Birmingham SME.** Locomotive Efficiency Trials. Contact Mike Page: 01564 784006.

- 5 **Bristol SMEE.** Running Days. Contact Trevor Chambers: 0145 441 5085.
- 5 **Frimley & Ascot LC.** Public Running. Contact Bob Dowman: 01252 835042.
- 5 **Lancaster & Morecambe MES.** Running Day. Contact Mike Glegg: 01995 606767.
- 5 **Leicester SME.** Public Running. Contact John Lowe: 01455 272047.
- 5 **Leyland SME.** Reverse Running Day. Contact A. P. Bibby: 01254 812049.
- 5 **Reading SME.** Public Running. Contact Ian Fothergill: 0118 9421679.
- 6 **Lancaster & Morecambe MES.** Informal. Contact Mike Glegg: 01995 606767.
- 6 **Peterborough SME.** Bits & Pieces. Contact R A Meek: 01778 345142.
- 6 **Stamford MES.** Colin Richards: Building a Tiger tank. Contact Derek Brown: 01780 753162.
- 7 **North Cornwall MES.** Bits & Pieces. Contact Geoff Wright: 01566 86032.
- 7 **Romney Marsh MES.** Track Meeting. Contact John Wimble: 01797 362295.
- 8 **Brighton & Hove SMLE.** Wrinklies Day. Contact Mick Funnell: 01323 892042.

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- Traction Engine Lamps
- Stories from a locomotive driver
- Edwardian Elegance
- The Re-Cycle Engine
- Making BR Mk. 2F coaches in gauge 1
- Keith's Column
- Gold Medal Tractor cylinder patterns

PLUS all your regular favourites



Empire Building. The full-size Empire of India was built at Swindon in 1904 and was a member of the 33xx class; they were better known as Bulldogs. Alan Crossfield describes the chassis of his award-winning model that won the Maskelyne Trophy and a Gold Medal at the 2008 Model Engineer Exhibition.

ON SALE 8 APRIL 2009

Contents subject to alteration

Notices

The **West Wilts Society of Model Engineers** who are based at Westbury in Wiltshire are opening their new 3½in. and 5in. gauge raised track on Saturday 6 June 2009. Club Secretary Neville Boulton will handle any enquiries regarding meetings and the opening of the new track which is located adjacent to the Lefarge Cement Works at Westbury Country Park, Heywood, Westbury, Wilts. Neville Boulton can be contacted as follows: 'Millcroft', Mill Lane, Bulkington, Devizes, Wilts. SN10 1SW. T. 01380 828101. E. nev.gbrly@talktalk.net

Whissendine Steam Rally Melton Mowbray & District MES are holding a miniature steam rally on 6-7 June at the Whissendine sports club near Melton Mowbray. Members of the public are invited to attend on both days. There will be road runs to the pub and back, demonstrations of engines working and an exhibition of model engineering in a marquee. There is a raised track for 2½, 3½ and 5in. gauge and a ground level track for 7½in. gauge.

Sunday will see rides on the track and road vehicles will be encouraged to run round the rally field giving rides and demonstrating their capabilities. Several trophies will be awarded after the judging which is on the Sunday. Pets are allowed but no fouling of the field will be tolerated.

Caravan and camping (for exhibitors only) will be available on site but space is limited

so book early. Contact John Clawson, 88 Main Street, Fleckney, Leicester LE8 8AN. T. 0116 240 4272.

The Model Steam Road Vehicle Society

On 20 April, Mr. David Bickerton from the Black Country Steamers will give a talk on pattern making and the melting of metals in the garden foundry. It will be at the Gloucestershire Club, Sandhurst Road, Gloucester GL2 9RG. Contact John Bagwell on 01452 304876.

Narrow Gauge IMLEC

The 12th annual Narrow Gauge IMLEC is being held by **Erewash Valley Model Engineering Society** at their track at Borrowash near Derby. It will be held on 30/31 May. Entries are invited. Contact Mr. N. Thompson, 109 Ruskin Avenue, Long Eaton, Nottingham NG10 3HX.

Entry is on a first come, first served basis and is for narrow gauge outline locomotives in 3½in. and 5in. gauge. It is a fun event with cash prizes and trophies.

Colchester Model Engineering Society

Mr. Hugh Mothersole gave an illustrated talk to the society members. His subject was the history of the steam car from the 1880s to the present day. His talk covered most of the makers of steam cars over the years and included the

examples that have survived into the present day. Also described were the problems encountered to keep them working, especially the safety of the boilers. He finished with describing the London to Brighton Veterans run in a steam-driven car.

For further details of future talks and events see www.csmee.co.uk or phone Geoff King on 01206 822735.

Rochdale SMEE

At the first of the February meetings, members were entertained by John Hayes, long time champion and volunteer of the narrow gauge Ffestiniog Railway, whose illustrated presentation on the birth and re-birth of the popular tourist attraction proved to be both extremely interesting and informative.

In response to a request from a teacher at the Limeside Primary School, Oldham, whose class was studying 'Transport', Geoff Dowden, the society Publicity Officer, demonstrated the finer points of locomotive operation on the 12 February when he statically steamed his example of Martin Evans' 'William' to an audience of excited pupils. As Vice Chairman of school Governors it was an invitation that he could not refuse and was delighted to accept, his display being more than amply rewarded by the reaction of the children to the result of opening of the regulator, the



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.

Maj Hext

(John Wilfred Barratt Hext) *South Lakeland MES*

Alf Warren *Canvey Railway & Model Engineering Club*

Richard (Dick) Woodruff *Pinewood Miniature Railway Society*

spectacular effect of lifting safety valves and sight of the blaze through the open fire hole door.

Auction Night on the 21 February was eagerly awaited and lived up to its reputation as one of the highlights of the annual programme. In spite of the 'Credit Crunch' and without doubt attributable to the determined and sometimes comical theatre performed by member Len Uff, who in his capacity as auctioneer, managed to intimidate a total of £98 from a number of those present, the proceeds making a welcome contribution towards club funds. "Exciting and much better than *Flog It*" was a comment heard from the floor!

The Festival of Model Tramways

Ashley Best will be exhibiting some of his models and paintings at the Festival of Model Tramways, Europe's premier event for the model tram enthusiast. This will be held on Saturday 18 and Sunday 19 July 2009 at the Kew Bridge Steam Museum, Green Dragon Lane, Brentford, Greater London TW8 0EN. Opening times are 11am to 5pm.

Now in its 21st year the festival features the highest quality model tramway layouts and displays. There are sales stands to supply the modeller with all the necessary materials, kits, drawings, photographs, books etc., for model tram building.

Full details are available at www.tramwayinfo.com/festival

The Bristol Society of Model & Experimental Engineers

The society is celebrating its Centenary and a Gala weekend is being held on 6/7 June at the Ashton Court Railway site. Saturday is the centenary birthday and will be a free event for members and their extended families. There are all sorts of activities for people of all ages. Sunday is the centenary public running day for fare paying public passengers who can also take part in the other activities for a small charge. If you miss this



centenary, you will have to wait for another 100 years!

As part of the centenary year celebrations it is intended to show significant events from 1909 to the present day on the club stand. If anyone has anything that might be of interest to the society, such as old photos, old exhibition certificates or even a mention of the Bristol Society in old modelling magazines, please contact Paul Wiese, the chairman of the exhibition committee on 0117 982104. Geoff Shepherd is writing a history of the society and might be interested if you have knowledge of the Bristol Society from the distant past.

There will also be a bring and buy sale of model engineering and associated items.

As you read this, the society should have finished relaying their entire track circuit. Despite some bad weather, the team have been hard at work and are on the last leg. This means those of you who have entered IMLEC will have a nice track to run on.

South Lakeland MES

The society are holding an open day on the 16 May. Contact Adrian Dixon on 01229 869915 or E. adriandixon1@yahoo.co.uk

Scarborough & District Model Engineering Group

There will be an open evening on Tuesday 21 April 19.00 onwards. All are welcome.

The College is on Scalby Road (Whitby direction) next to the hospital. When arriving at the College entrance, turn right, and then go to the end of the short road and then turn left and left again, where you will find the workshops. A display of this and previous years work will be on view. For further details phone 01723 362537.

Urmston & District MES

The society are holding a May Day Rally in conjunction with the Lancashire Traction Engine Club. It is on the 2-4 May at Abbotsfield Park, Chassen Road, Flixton, Manchester M41 5DH. It will have miniature railway rides, traction engines in steam, vintage transport and machinery, fairground organs, crafts, model and Meccano exhibition, trade and charity stalls, children's amusements, arena displays, and refreshments. Entry is a very reasonable £5 with concessions for OAPs, children and families. Judging by the flyer from last year's event, a good time will be had by all.

The Vale of Aylesbury MES

The society is holding their annual miniature traction engine rally on the 30/31 May at the Buckinghamshire Railway Centre, Quainton Road Station, Quainton, Aylesbury, Bucks. Miniature road vehicles and associated equipment like threshers and balers will all be welcome whether complete or not. Enquiries to Bob Jones on

Stockholes Farm Miniature Railway Society

The society has changed the front cover of their newsletter from a line drawing to a photograph. Although this appears to be an LMS *Duchess*, closer examination will reveal that it is actually a 4-6-4 *Super Duchess*. As part of a review of future motive power, in 1938 the LMS found that there was a need for a larger version of the Princess Coronation class (now more commonly known as the *Duchess* class). The war put this on hold and at the end of hostilities attention turned to firstly diesel electric traction and later electrification.

Fortunately in 7½in. gauge we can ignore all this and build some of the 'might have been' steam locomotives. The photo shows Ivan Smith with the locomotive.

01296 29468, Ian Meikle on 01844 291590 or Clive Ellam on 01296 623433. E. cellam@madasafish.com

Worthing are hosting LittleLEC 2009

Station Road steam are sponsoring a 'LittleLEC' Efficiency Competition for 2½, 3½ and 5in. gauge model locomotives under 50lbs dry weight on 20/21 June 2009 at the **Worthing & District Society of Model Engineers (W&DSME)** Field Place, The Boulevard, Worthing BN13 1NP For further information, or to take part, please phone Station Road Steam on 01526 320012 or E. Mike@StationRoadSteam.com ➤

Pannier's only please
Kinver & West Midlands
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Ltd. are holding a Kinver Pannier Day on the 14 June. If you have a pannier, come and run it. Limited caravan/camping space is available. Contact Allen Bellamy on 01746 761008, Pete Dawson on 01384 873263 or Mike Dawson on 0121 6022019.

News pages - a request

Most articles, columns and features in *Model Engineer* are sorted and are working well. The only column that has not had real attention is the News pages. I have had a quick look through a six-month volume of *Model Engineer*, January to June last year. While it could be called news (one particular item was such and such a club sat around drinking tea because of the bad weather) on occasions it left a bit to be desired. Also the maximum page length appeared to be no more than two pages after the trade news was discounted.

I had intended to do 2½ pages of news in this issue but, after spending a day going through a pile of club newsletters then typing in the entries, I ended up with barely two pages. (I did enjoy looking at the newsletters; I got some useful ideas from some of them.) So I decided to ask you, the readers for help. I would like any club publicity officers or members to email me with information and news about what is going on in their local club. (I will of course accept photos and text by mail, but please type the text unless very short so I can scan it in.) Are you holding a rally or open day, have you built a new station building? Is your club holding a talk, an auction or bring and buy sale? Anything you think other readers' would be interested in is welcome. Photographs are also requested but if children are included in the photos, please try to get parental permission in writing. If the child's image is not important to the photo,

the children's faces can always be pixelated.

If someone has built an interesting model, a photo or two might be of interest. Be warned though; the builder may be asked to write an article for the benefit of other readers!

Regarding talks, perhaps anyone who would be willing to give a talk to a local club might like to offer their services via the News pages? They could give the topics they would be willing to talk about and the maximum distance they would be prepared to travel from their home area. This could also apply to traders who are prepared to talk about their products.

I have agreed a deal with *Steam Railway* magazine to include a sort of club information page in their magazine. This will be a focus on a different club each month. The idea is twofold; firstly we will help clubs to gain new members, secondly the new members and possibly some *Model Engineer* readers' might

start to get involved in the mechanical side of full-size railway preservation. A similar article about the club could also be included in these News pages. I know some clubs have proper workshops for the use of members; why not send me a few lines and a photograph or two of the workshop facilities?

I receive very little news from across the pond or down under. Perhaps some of you can let us know what is going on in foreign parts? Also, humour has been missing recently. I really enjoyed reading the reason behind old sayings like threshold and graveyard shift printed last year. If you have any funny stories (clean please) that you think other readers' might enjoy, let me have them to publish here.

I will assume any news received by email gives me permission to use it in either *Model Engineer* or *Steam Railway* magazine.

Finally, tell me what you want to see in the News pages? They are your pages and your input is welcome.

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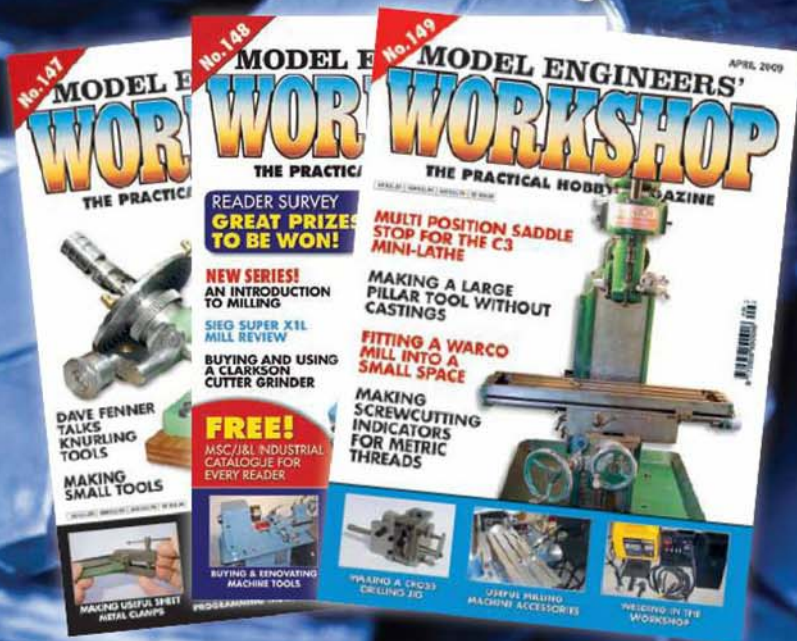
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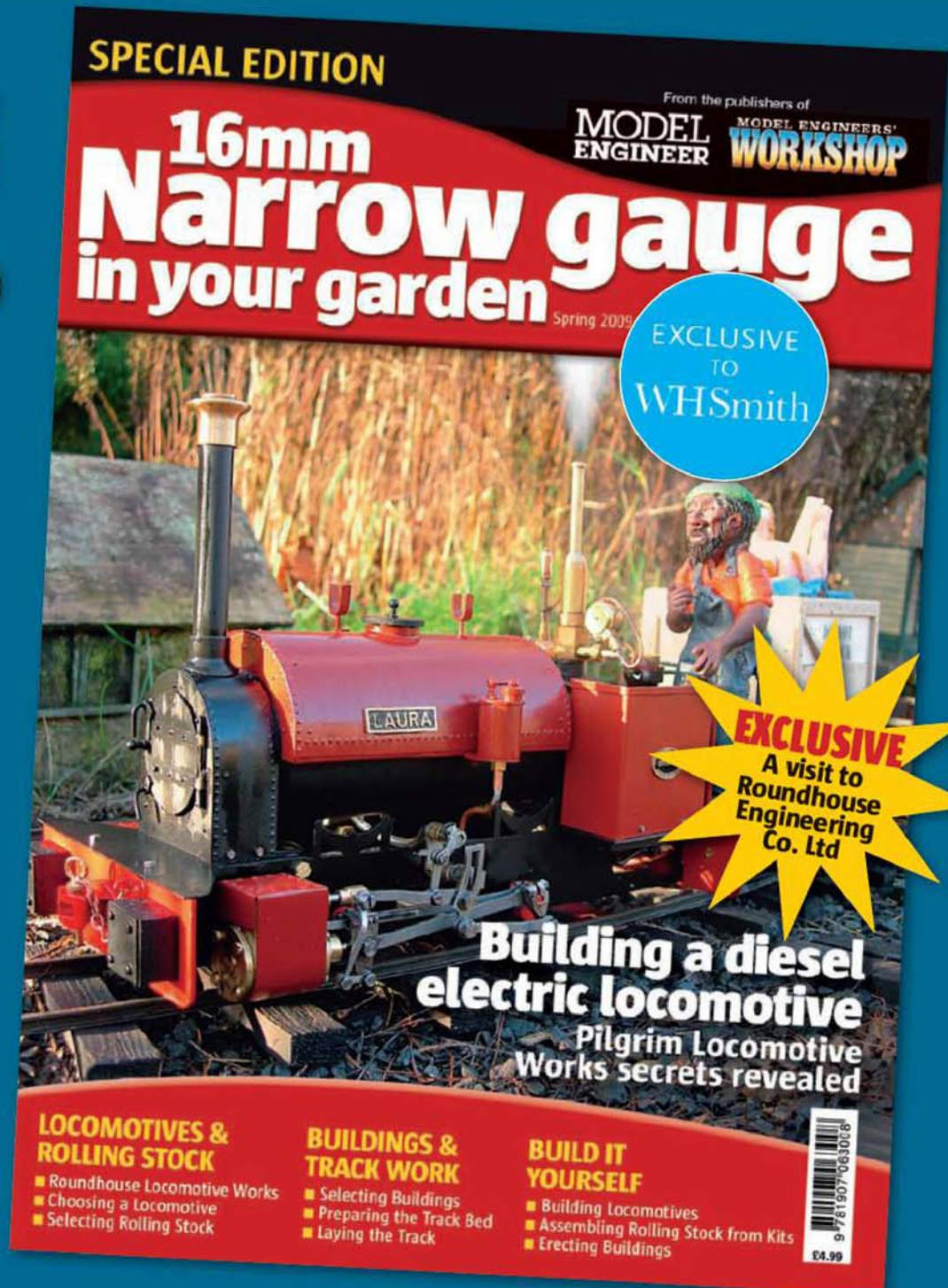
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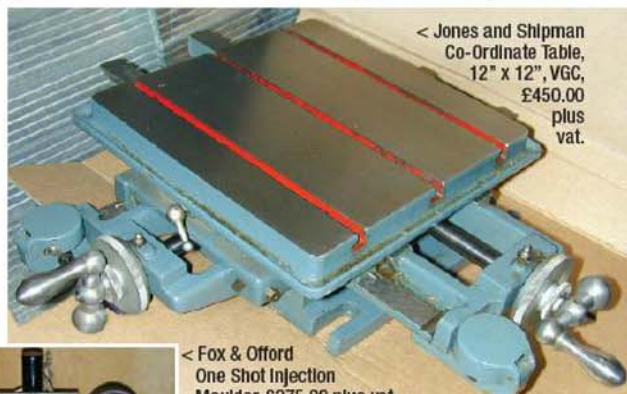
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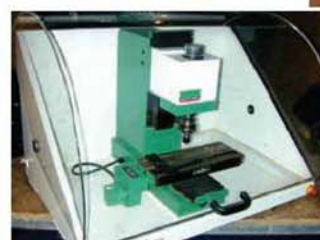
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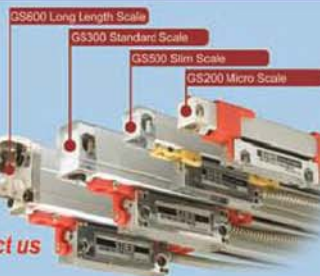
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E1	1/8 - 3/16 - 1/4 - 5/16 - 3/8 - 1/2	18.30
E2	1/16 - 3/32 - 5/32 - 7/32 - 9/32 - 7/16 - 9/16 - 5/8	29.15

BRASS SQUARES

F1	1/8 - 3/16 - 1/4 - 5/16 - 3/8	18.30
F2	1/4 - 5/16 - 3/8 - 7/16 - 1/2	32.10

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G1	5/32 - 3/16 - 7/32 - 1/4 - 9/31 - 5/16	12.05
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BRASS ANGLE

H1	1/4 x 1/4 x 1/16	5/16 x 5/16 x 1/16	12.50
	3/8 x 3/8 x 1/16	1/2 x 1/2 x 1/16	
H2	5/16 x 5/16 x 1/16	3/8 x 3/8 x 1/16	22.15
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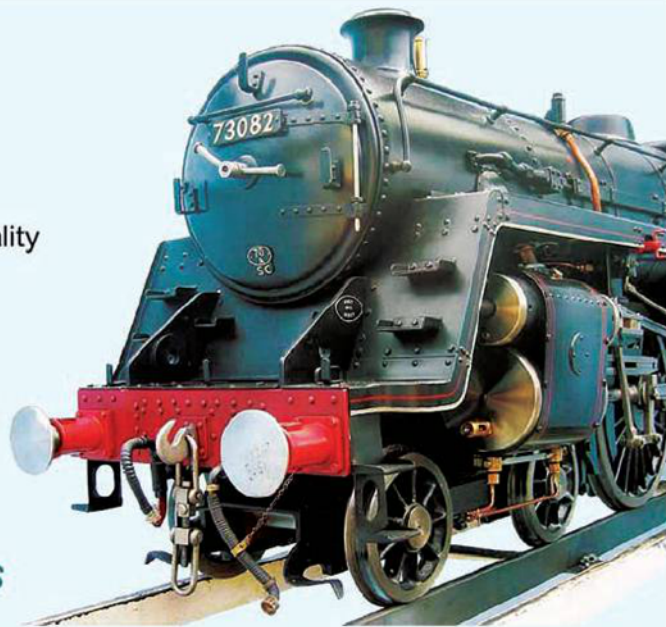
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T: + 44 (0) 1244 531631 F: + 44 (0) 1244 531331 www.chestermachinetools.com email: sales@chestermachinetools.com
Midlands Showroom: Unit 4 Plant Lane Business Park, Plant Lane, Burntwood, Staffs, WS7 3JQ Tel 01543 448940
Southern Showroom: TPH Machine Tools, Fairview Industrial Park, Rainham, Essex, RM13 8UA
T: + 44 (0) 1708 523916 email: machines@tphmachines.co.uk

