MODEL ENGINEER

VOL. 198 NO. 4298

27 APRIL - 10 MAY 2007

COVER STORY

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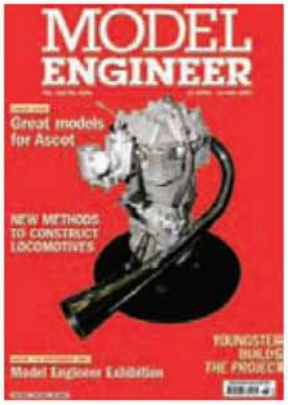

ON THE COVER...

Bill Connor's latest creation, his model of the 1938-39 works Velocette racing engine, made in half scale. Run for the first time this year, it will be a star attraction at this year's Model Engineer Exhibition at Ascot in September, along with his other outstanding models. See pages 497 and 511.

(Photograph by Neil Read)

TURN TO PAGE 511 FOR YOUR EXHIBITION ENTRY FORM

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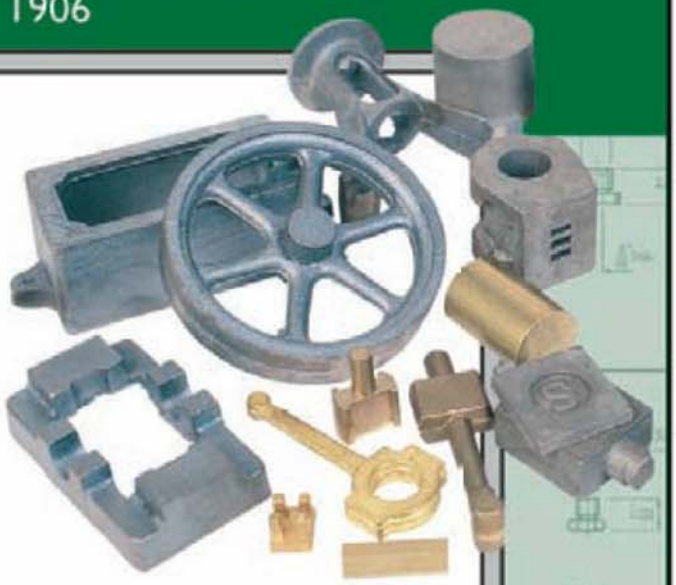
STUART MODELS

FOUNDED 1906



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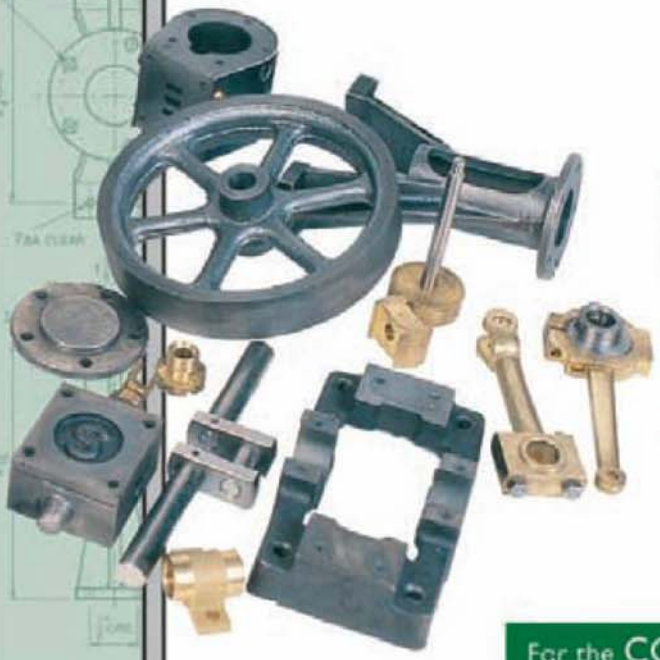

For the ENTHUSIAST

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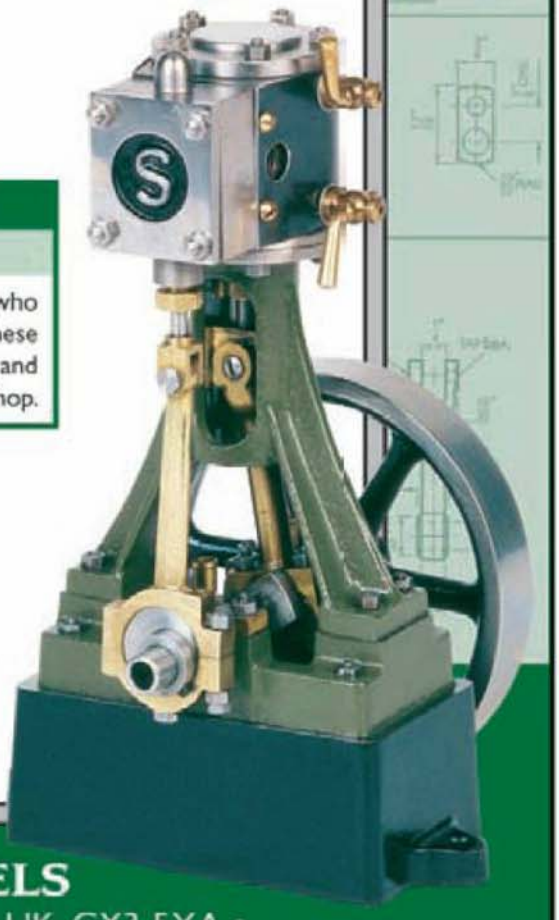

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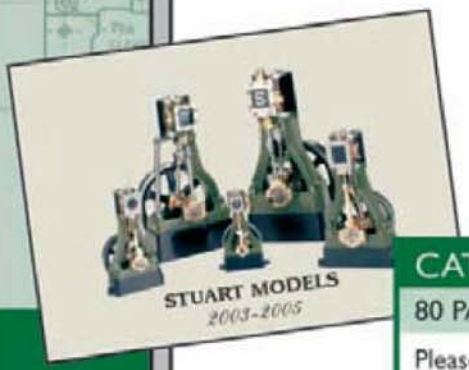

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- Digital rev. counter
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- Interlock chuck guard
- Self ejecting drawbar
- Infinitely variable speeds
- Back gear for maximum torque • Tilting head

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- Traverse: 16 3/4" x 8 5/8"
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CDP5SB	300/5	£79.98	£93.98
CDM10B	370/12	£89.98	£105.73
CDP202B	370/12	£99.98	£117.48
CDM13F	370/12	£109.98	£129.23
CDP30B	510/12	£134.99	£158.61
CDP55FB	510/12	£149.98	£176.23
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CWB1200P	Workbench; 8 dr	£219.98	£258.48
2.CWB1700P	Workbench; 5 dr, 1 door	£219.98	£258.48
3.CCB600P	Mobile cabinet; 4 dr	£79.98	£93.98
4.CCB1000P	Cabinet; 2 doors, 3 shelves	£109.98	£129.23

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MODEL	DESC.	DR. LOAD	EX VAT	INC VAT
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4 CBB206	6 Dr chest	304kg	£85.98	£101.01
CBB205	5 Dr chest	304kg	£89.98	£105.71
CBB209	9 Dr chest	304kg	£99.98	£117.48
CBB210	10 Dr chest	304kg	£129.98	£152.73
CBB212	3 Dr cab	434kg	£139.98	£164.48
CBB213	5 Dr cab	434kg	£159.98	£187.98
3 CBB215	5 Dr cab	434kg	£169.98	£199.73
5 CBB217	7 Dr cab	434kg	£199.98	£234.98

Clarke POLISHING KITS

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Newest member of the *Model Engineer* editorial team is Michael Jones, assistant editor.

Originally from the United States, he has made his home in Britain since 1992. A keen model engineer, his career spans positions in manufacturing, marine engineering and as an IT consultant. Industrial archaeology and the history of technology are passions, too, with some of his professional life dedicated to preserving historic ships. He holds master's and engineer's licenses.

Work as the manufacturing manager for a carbide tool company provided experience with early NC grinding machines, Swiss-made screw machines, and an assortment of customised grinders, lathes and milling equipment.

Later, after moving to the east coast of the US, Michael eagerly took up the chance to work on small ships and boats. Sea-time was gained with a wide variety of vessels, some quite unusual, such as the steamboat *Sabino* (the last passenger-carrying, coal-fired steamboat in the US). Almost six years were spent in charge of the restoration and operation of the historic lightship *Nantucket* (WLV-534) to fully operating condition to be used as a maritime museum and educational facility. Computers were extensively used in planning maritime repair work. Familiarity with computers, many types of software, and a desire to teach others, led to work as a full-time IT consultant, principally in publishing and manufacturing.

Michael is a member of the Society of Model and Experimental Engineers, Cardiff Model Engineering Society, The Steamboat Association and the Seven and a Quarter Inch Gauge Society. There are plenty of model engineering projects completed, more 'seasoning' under the workbench, and designs for models waiting in the computer. But will he find the time with his new post?

Special centenary price

There will be a special centenary entry fee of just £5 for those who book in advance for the Model Engineer Exhibition. Don't forget to put the date in your diary: September 7 to 9, Ascot Racecourse Grandstand.

More for MEX

Some more great model engineering collections are now confirmed for the centenary Model Engineer Exhibition at Ascot in September. Bill Connor is bringing his superb classic model motorcycle engines, and Anthony Mount is bringing his collection of steam engines. Anthony's models will be seen running on compressed air.

Eric Offen will be bringing some Edgar T. Westbury engines as part of a tribute to that great contributor to *Model Engineer* in so many fields. If you have a Westbury design, and could bring it to the exhibition, please let us know.

We should also like to pay tribute to all the other great *M.E.* designers, so we would like to hear from you if you have a model designed by one of the 'greats'.

We will bring you details of further important exhibits as they are confirmed.

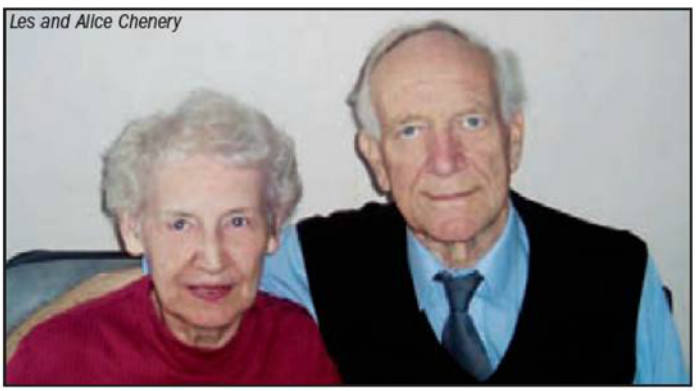
Les Chenery

We are sad to inform readers that Les Chenery has died after a short illness. Les was born in Holloway 76 years ago, left school aged 14 and completed an apprenticeship in general engineering before undergoing National Service as a mechanic in the Royal Electrical and Mechanical Engineers.

Upon leaving the army he returned to engineering and worked for Hilger and Watts, as a scientific instrument maker for 16 years before spending the rest of his working life at Hammersmith Hospital, in London, at the Royal Postgraduate Medical School's engineering workshop making prototype medical instruments.

His hobbies were always mechanically biased, and after starting with steam he went on to design and build a number of working scale models of various types of internal combustion engines including:

1. Gnome Rotary (9-cylinder, 1:5 scale)
2. 14-cylinder double row Gnome Rotary engine.
3. De Havilland Gypsy 1 (1:4 scale).
4. Anzani Y Type (1:4 scale).
5. Aeronca E113 (1:4 scale)
6. V-Twin 15cc ('Chenery Aero Twin').
7. Side Valve 6.75cc.
8. Bentley BR2 (1:5 scale).
9. Le Rhone 9-cylinder rotary.
10. Freelance 5-cylinder rotary.


Les and Alice Chenery

Countless hours of research and work in the workshop resulted in top awards at the Model Engineer Exhibition including:

1. The Bradbury-Winter Cup.
2. The General Engineering Championship.
3. The Duke of Edinburgh Trophy.
4. Gold Medal.
5. Silver Medal.
6. Two Bronze Medals.

Les also wrote construction articles, produced drawings and had castings made. This in turn led to him being able to make sets of drawings and castings available so that others could build their own examples. He was always available on the end of the phone to answer any queries, or to solve any problems, that people may have come across when building his designs.

A special mention must be made of his wife Alice, his constant companion who also looked after the administrative side of his hobby. Thanks to the sheer number of phone calls that she answered, Alice not only became very knowledgeable about the engines that Les made, but subsequently became good personal friends with numerous of his contacts' wives around the world.

We thank John Chenery for providing the information for this obituary and express our condolences to Alice, John and the family on their sad loss.

The mystery object Mr. Hunter would like to go to a good home.

Write to us

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In the interests of security, correspondents' details are not published unless specific instructions to do so are given.

Responses to published letters are forwarded as appropriate.

3-phase supplies

SIRS, - I've just been reading Mr. Wells' of Essex letter requesting comments on his proposal to use a portable generator and 220v 3-phase electricity.

Well that comment must be, 'Beware'. If you don't know anything about electricity, and I number Mr. Wells amongst those, then leave it to a qualified electrician.

The Area Board will supply the 3-phase to a panel in the workshop. Three phase supply voltage incidentally is nominally 415 not 220V. From that panel the electrician will connect in the 3-phase requirements for any motors and also single phase supplies for the lighting and 240V ring main(s).

All these circuits have to be tested and certificates issued. Don't scrimp on this; far too many fires are caused by amateur electricians, even if they are well meaning and cheap.

Secondly, do not try to mix portable and permanent supplies without the proper switching arrangement. One result for example, could be that during a power failure, electricity from the portable generator, linked into a ring main through a 13A plug back feeds into the system. This back feed would go through the local 'step down' transformer in reverse, i.e. being stepped up, with the inevitable consequences to the crew trying to restore the system.

Sorry to sound like a prophet of doom Mr. Wells, but electricity is no longer for amateurs despite what the DIY Superstores try to tell us. Bite the bullet, pay for expert advice and enjoy your retirement in safety.

Peter Gregory, Wiltshire.

Paignton Zoo Miniature Railway

SIRS, - I am researching the history of this $10^{1}/_{4}$in. gauge miniature railway, which runs around a large lake inside the zoo. It opened as a 12in. gauge line in the early years of the war, and after being re-gauged, did see steam motive power for a short time. I would welcome any information about the railway's history, its locomotives, or any photographs or postcards readers may have. I would also be interested to hear anything of a Mr. George A. Dingle from Callington, who ran a couple of steam railways in Devon immediately following the war. Anything is welcome, all costs fully refunded.

Peter Scott, Berkshire.

Mystery object

SIRS, - Enclosed is a picture of an item I found many years ago In a Leicester scrapyard. It is made of aluminium, is about $^{5}/_{16}$in. thick and the centre part revolves. If anyone can find a use for it I will gladly send it to them.

Roy Hunter, Leicester.

Nano engine drawings wanted

SIRS, - I wonder if anyone can help me locate a plan, or copy of, for the *NANO*, a 0.1cc compression ignition engine designed by Richard Gordon and included as a supplement in *Model Engineer* magazine sometime in the early 1990s. Also in similar vein, I am desperate for a carburettor assembly for a Taplin Twin, either 7cc or 8cc.

Jim Lake, Hampshire.

Sealing electronics

SIRS, - Re: *M.E.* 4291, 19 January 2007, *I/C Topics. - Sealing the Hall Effect Sensor on the NE15S*. I endorse the comments on the use of Silicone sealant and the production of acetic acid. This material is best left to gap filling around the bath.

The adhesion of this material to smooth surfaces is not very good and any moisture will soon find a way around the interfaces and terminals particularly with the thermal cycling and vibration of an engine.

The encapsulation of electronic devices such as Hall Effect sensors, transistors and diodes uses epoxy materials almost exclusively. They act as a primary package and provide environmental protection. These materials come in many forms and have high strength; low expansion coefficients and they adhere to most hard surfaces with little shrinkage around the terminations. This all helps to protect the device characteristics during manufacture and their working life. I hope this information helps with the selection of a suitable material.

It is just worth looking at the Internet for Hall Effect sensors. I found many positioning devices intended for direct attachment to I/C engines without the need for secondary sealing. I have enjoyed reading the series and am pleased that the drawings are in metric format. I might just have a go!

Jon Nixey, Suffolk.

Drawings are still available! – Nemett.

Lifting and shifting terminology

SIRS, - Reading *Lifting and Shifting - Long Ago* by John Ditchfield, (*M.E.* 4291, 19 January), I found myself struggling with the description *"notched pulley"* for the lifting pulley with provision for retaining the hoist chain shown in photo 11 of the article. This form of pulley is still common on any windlass for lifting the anchor cable (chain) of boats and ships. My experience is that the marine version of the pulley is historically termed a 'gipsy'.

The recess for retaining the chain can unusually be called a 'whelp' or my preferred term a 'snug'. These terms are typically combined into a 'six snug gipsy' description of the pulley.

I appreciate the impossibility of being dogmatic over the

terminology of historical items with origins in different regions. Typically, the marine term 'porthole' common in commercial shipping is replaced by 'scuttle' in the Royal Navy and 'sidelight' by any Scottish shipbuilders left!
Frank S. Morris, Gloucs.

Encouraging the young

SIRS, - The desirability of introducing young people into our hobby is highlighted by David Lewins (*M.E.* 4290, 5 January 2007). He mentions several ways in which the Worthing and District Society of Model Engineers encourages the participation of children in that Society's activities.

Here in Bradford, we have about ten junior members, three of whom receive home tuition. They, together with their mothers (and occasionally a father), attend our Wednesday working parties about twice a month, and give enthusiastic assistance for a few hours, especially if materials have to be pushed around the track on one of the trolleys! Our lunch breaks are an opportunity for the older members to offer advice and help with any project the juniors may have in hand.

In addition, our Society has annual competitions for pop-pop boats and rubber-powered locomotives; we encourage our younger members to make one or both of these, and give assistance when necessary. We have a Junior Section in our annual exhibition; last December there were seven entries in that Section. Two or three adult members help at an after-school technology club and this club has visited our railway to 'play trains'. Last August saw an afternoon set aside for a Junior Members' Driving Day, when we had about fifteen juniors driving both steam- and battery-powered locomotives under the supervision of the owners. Opportunities are also given for supervised sailing of radio-controlled boats, but unfortunately this is on a different site at present.

David Lewins mentions the litigious times in which we live. I would like to suggest that each Society has its own Child Protection or Safeguarding Policy, as much for the protection of its members as for that of children. However, unless your society has any activities which involve members and children in small groups, it is unlikely that anyone should need a C.R.B. ('police') check. Individual societies may want to take advice about this matter.

Next year sees the centenary of our society. We are trying to encourage the participation of younger members, to ensure that there is still a Society in 2108!
Jim Jennings (President, Bradford M.E.S.)

Bellis and Morcom

SIRS, - In response to Mr. Paul Campbell's letter (*M.E.* 4289, 20 December 2006) regarding the Bellis and Morcom twin-cylinder stationary engine. I have no technical details of this engine myself but there is a very similar looking one (I am not sure if it is the same model) at the Bressingham Gardens Steam Museum, near Diss in Norfolk.

I think that the engine had been used in a Norfolk hospital for generating electricity; I cannot remember which one.

I have been reading *Model Engineer* since the 1960s, long may it continue.
John Willett, Suffolk.

Bubbly bottle safety

SIRS, - Referring to Ted Jolliffe's response (*M.E.* 4289, 20 December 2006) to my letter (*M.E.* 4284, 13 October 2006) on the Bubbly Bottle Challenge, no amount of comprehensive study alters the reality that he is using a bottle designed to hold soft drink as an untested pressure vessel at 125psi. Might I suggest that an hydraulic test beforehand would be a sensible precaution.

The fact that no failure has so far caused any injury is pure good luck.

Commercial vehicle tyres, which are designed to contain compressed air, are (or should be) initially inflated within a substantial cage because of the proven lethal consequences of failure.

An air test to destruction (with appropriate precautions) of a soft drink bottle might prove enlightening.
K. F. Hillier, North Yorkshire.

We apologise to Mr. Hillier for the misspelling of his surname on his previous letter.

More on out of print books

SIRS, - I was interested in C. G. Williams *Out of print books* letter (*M.E.* 4290, 5 January 2007). He says that he was lucky to find the website of the bookseller Martin Bott and lucky also to find the book he was looking for.

If one is looking for out of print books and also for second-hand, therefore cheaper, copies of books still in print, one does much better to go to one of the websites that search through a multitude of bookseller's websites. My preferred choice is **www.abebooks.co.uk** who boast that they search through 13,500 bookseller's websites world-wide. There are a number of other such websites including **www.used.addall.com** and **www.allbris.com**

My main interest at the moment is early marine steam engines. I was therefore looking for a copy of *The Black Battlefleet* by G. A. Ballard. This book published in 1980 is all about the early steam battleships and is illustrated with hundreds of photographs, plans, draughts and diagrams. Entering this book into the 'abebooks' website produced 20 booksellers offering copies. If one has not visited such a website before, the variation in price asked by the different booksellers may come as a bit of a shock. In this case the asking price varied from £22 to £85. I do not need to tell you which copy I ordered!

Browsing through back numbers of the *Model Engineer* a while ago I came across a photograph of a very fine model of a side lever paddle engine. The caption said that the model was based on drawings contained in John Bourne's *The Steam Engine*. Entering this in abebooks website produced 60 results but it turned out that Bourne produced three books on Steam Engines; a Catechism, a Handbook and the Treatise. Looking through the descriptions it was apparent that it was the Treatise that I was after. Prices varied from £100 to £498. The £100 copy was cheap because one plate was missing. Several good copies were in the region £170-£190.

Quite by chance the £100 copy was at a bookseller not a mile from my house. I was able to visit him, find that the missing plate was an unimportant one and that the five plates containing detail drawings of the side lever engine were all there so I was happy to buy this copy.

Another find from browsing back numbers of the *M.E. was A Manual of Machine Drawing and Design* by D. A. Low and A. W. Bevis. First published in the late 1800s it went through a multitude of editions right up to the 1950s. Later editions contained more pages and plates than the early editions. My copy is the 1933 edition and contains 804 figures all relating to steam engines including a set of detail drawings of a triple expansion marine engine. At £9 it was a bargain.

If one is not looking for a specific book but rather books on a specific subject the abebooks website also enables one to input 'key words'. There is a certain skill in doing this. Enter 'Steam-Engines' and one gets 12,262 results! None of us would have the patience to wade through all of those. Even with the fastest possible broadband connection it would take months.

One needs to be more specific. Enter "Marine Steam-Engines". One must enter the " " (quotes) so that the search only gives results containing all three words. This cut the results to a manageable 69 results, but it excluded relevant books such as The Science Museum catalogue "Marine >>

Engineering" and Sennett and Gram's "The Marine Steam Engine".

Computers do not have brains. They can only look for the words one has actually entered although the 'abebooks' website is cleverer than some. If one gets the entry nearly right it may well come up with the message *"No match found. Did you mean..."* Say yes and one is home and dry.

One does not necessarily have to enter the complete title. The full title of Thomas Tredgold's work is. *"The Steam Engine: its invention and progressive improvement, an investigation of its principles and its application to Navigation, Manufactures and Railways"*. Fortunately entering *'Tredgold'* and *'The Steam Engine'* finds it. It is a magnificent book with 120 plates many of them large folding plates but it is very rare and a good copy with all the plates is likely to cost £1000.

Old technical books, particularly those with large plates, are a good investment. In the 1970s I thought that I was very rash paying nearly £300 for a copy of John Charnock's *History of Marine Architecture*. Today the only complete copy that the 'abebooks' website could find world-wide was priced at £3850.

All I can do is hope that readers do not get too frustrated by the idiosyncratic logic of computers and wish them good hunting.

P. M. Antrobus, Warwickshire.

Easy dividing

SIRS, - When I read Bill Farmer's project for making a division plate for a wheel cutting engine (*M.E.* 4290, January 2007), and the problem of dividing for prime numbers, it reminded me of my own efforts in cutting the change wheels for my lathe as described in my letter which was printed in *M.E.* 4275, 9 June 2006. Could I have cut a 59 tooth wheel?

Let's have a re-cap on my method. On the end of my lathe spindle is fastened a drum, in my case a gramophone turntable 20cm diameter. Round this is pasted a strip of paper on which the number of divisions have been marked off with holes pierced by my dividers. A cursor of clear plastic has a hairline scribed on it to match up to these holes. There is also provision for clamping the drum to prevent movement whilst cutting metal.

Obviously, this method is dependent on these divisions being accurately spaced, and there are two ways to achieve this. The strip could be fixed round the drum and the pin holes stepped round with the dividers, or the strip could be laid flat and the holes marked before fixing.

Either way, if they are stepped out with the dividers set to only one space, there is bound to be a progressive error by the time the end hole is reached.
But there is a better way, by using factors.

To make it clear, let's use an example for 20 divisions. You will not need a drum or even a lathe, just a sheet of paper, A4 will do, and two pairs of dividers, large and small, preferably with fine adjustment

Lay the paper on a suitable surface to accept the points of the dividers, not the dining room table! Draw a line along it, and prick this line at each end, about 25cm apart, leaving a couple of centimeters of paper at one end for a purpose which will become apparent later. These two marks represent the circumference of an imaginary drum. In reality the strip would have been carefully placed round the drum with the ends overlapping and a hole pierced through both to give the circumference of the drum.

Now set your large dividers to about one fifth of this length and step along the line. You will end up with an error. But with a few adjustments you will soon have six marks evenly spaced. Ring each with a pencil and number them, zero, 4, 8, 12, 16, 20. There are six, because when the strip is round the drum the two end holes will become one.

Now, with your small dividers, use the same method to divide the first space into four. With this setting you can now set off the rest of the 20 marks, and number them all. You will get a correction at each fifth mark, so there will be no accumulation of error and the 20 spaces will be all the same.

How accurate is this? I don't know, but the circumference of my drum is just over 63cm, a couple of feet, so we are talking about the lining up of a pin hole with a hairline at a distance of about three centimetres for each of 20 spaces, with a reduction of error due to the smaller diameter of the job being cut.

What about primes, which have no factors to make things easy? Can we do 19? Let's try.

At the end of our 20 line, mark off another space to make 21. Now you know why we left a bit of space. Open your large dividers slightly to divide this longer length into five and then readjust the small divider to divide this new space into four. Now when you step off again you will get only 19 steps before arriving at the original circumference end mark. Just what we want!

Inspector Meticulous, however, will have spotted that there is still a slight error. We added a twentieth on to the end. This should really have been a nineteenth, but in practice this slight error can be corrected when the strip is pasted to the drum. It will be cut just before the first hole and just before the last, leaving only 19 holes. When the two ends are brought together the 'give' in the paper will allow this last space to be measured by the small dividers to be exactly the same as between all the other holes. So it looks as though I could have cut a 59t wheel, since it is nearly 60, which has factors of six and 10.

If you are tempted to have a go at this Heath Robinson method of dividing you will have to find a suitable drum. A biscuit tin lid is attractive but I think rather flimsy. I suggest that you go to the cookery shop and get a 'sandwich tin'. Pie tins have sloping sides and are no good, but cake and sandwich tins are cylindrical and fairly sturdy. You will also need paper in a long strip. The small paper rolls used in cash registers are one possibility.

For a try out or a one off, a hole in the middle of the tin and a length of screwed rod through the lathe spindle for a draw bar would probably suffice. Make sure that this; the cursor and the clamping device are firmly fixed before cutting metal.

So if you have a change wheel with broken teeth, or you want a 63t (9 x 7) wheel to cut metric threads, have a go at cutting your own!

Dick Clifton, Isle of Wight.

Thanks

SIRS, - May I, through your magazine, thank all those people who responded to my letter regarding pacemakers, both in *Model Engineer* and privately. It is most gratifying to have such support. Mine was fitted with ease in the new unit at Salisbury Hospital in what must be record time for the NHS, and I can report that everything is well and I am spending many hours in the workshop on my present project. Nothing in the workshop seems to affect the pacemaker. In my case it does not have to work continuously, and during check-ups they can determine how often it 'kicks-in'. Amazing stuff!

I would concur with Thomas Harman regarding the lack of detailed information being given, not only by the manufacturers but also the medical profession.

Finally, may I support Mr. Federici's idea that Nemett could think about a parallel twin for his next engine on the lines of a Triumph. But not a bolt on flywheel as that was BSA. Triumph had a built up and bolted crankshaft with the flywheel in the centre.

Leonard Dowden, Hampshire.

We are delighted that Leonard is back in his workshop with no problems and suspect that the correspondence on this subject has helped many readers and will help others in the future.

DIGITAL PHOTOGRAPHY
For Model Engineers

PART 2

Continued from page 443 (M.E. 4297, 13 April 2007)

Malcolm Stride

continues his advice on how to photograph engineering models as an introduction to the *Model Engineer* photographic competition.

After the basic theory groundwork covered in part 1 we can now move on to discuss how best to take digital photographs.

Moving objects - It is normal to 'pan' the camera to keep the subject sharp whilst leaving any background blurred. Background blur is much less noticeable with the smaller sensors on digital cameras compared to 35mm film cameras. The example (**photo 9**) shows the background blur and used settings of F2.6, 1/100sec and equivalent focal length 105 millimetres.

Moving subjects require a higher shutter speed to freeze the motion. One technique is to pre-focus on a point in the path of the subject, use the focus lock to hold that focus setting, pan with the subject and fire the shutter as the reference point is reached.

Many cameras have a continuous auto-focus mode for use with moving objects. This may be set together with a higher range of shutter speeds by selecting the camera's 'moving object' mode. One of the more difficult situations is when the subject is moving directly towards the camera.


9

It is often better to set the camera to central spot focus to avoid focusing on the wrong part of the subject. The difficulty with automatic multi-zone focusing is that with moving objects, the camera may never focus because it cannot decide which zone to use and the shutter is locked until correct focus is obtained. This lock can often be switched off. A similar situation can apply to exposure metering, which is also best set to 'spot' metering.

With moving subjects the effect of shutter lag is accentuated. If this is a problem, try setting the camera to use spot exposure metering, manual focus (pre-focus) and manual white balance. This reduces the work of the camera electronics and can help to minimise the lag. The 'burst mode', found on some cameras takes several shots in quick succession when the shutter is held down, may help. It may be automatically set when the 'moving object' mode is selected.

Static models - These do not present the problems associated with fast movement but correct focus and exposure are essential. Also more attention is needed to avoid a distracting background, otherwise the eye will be drawn away from the subject.

Outdoor photography

When photographing outside events, it is not usually possible to arrange backgrounds and special lighting, so choice of viewpoint to minimise background clutter and use of daylight with or without flash for lighting are the only options.

Careful choice of viewpoint can make a big difference to a photograph. Ideally the background should be a fair distance from the subject and should not contain any significant objects unless wanted in the photograph. Out of focus foliage and walls can provide good backgrounds.

Traditionally photographs have been taken with the light coming over the photographer's shoulder but this is not always possible or necessary.

If photographing against the available light, use of fill-in flash will help to avoid loss of detail in shadows. As you can see from shadows on the ground, the fine Shay locomotive (**photo 10**) was taken with the sun >>

9. A typical panned shot, showing the blurred background with to the camera following the subject.

10. A fine Shay locomotive taken against the light and using fill-in flash to light the shadows on the dark side.


10

11. What happens when fill-in flash has reflected off a bright object! Also note the red-eye problem with the locomotive's driver – this can easily be rectified using a photo program, such as Adobe Photoshop (or the one that usually comes bundled for free with the camera).

12. The large depth of field range with small digital cameras is shown up well on this 7¼in. gauge Britannia.

13. A monopod is easy to carry and will steady the camera in many situations.

almost into the lens but the use of the on-camera flash has brought out the detail of the cylinder area. Most cameras will fire their flash in this situation when set on fully automatic mode. One odd effect that can occur in this safety conscious age is caused by bystanders wearing reflective jackets. At IMLEC (**photo 11**) a couple of years ago, the fill-in flash bounced off the reflective stripes confusing the exposure metering system.

The depth of field needed for model locomotives is often large and a wider angle lens setting and smaller aperture should be used. Because digital lenses have an actual focal length less than a standard film lens, the depth of field for a given aperture is greater.

For very long locomotives, it is best to focus at a point approximately 25% further away than the nearest point to the camera. With a prosumer camera set to a fairly wide zoom angle, this can give an amazing depth of field, as shown by the 7¼in. gauge *Britannia* (**photo 12**), taken on the Olympus C5050 at 1/60sec, F2.8 and equivalent focal length of 35 millimetres. The focus point was the top edge of the first driving wheel. This shot has fill-in flash to lighten the smoke box front.

The increased depth of field can be a problem when you do want to blur the background, so it is a double-edged sword.

In dull weather, a tripod is beneficial because slower shutter speeds may make camera shake a problem. For those who do not want to carry a large tripod, a monopod (**photo 13**) makes a good easy to handle alternative. Outdoor shots at home are easier because a tripod and reflectors can be used unencumbered.

At exhibitions

Photography at exhibitions can be problematic due to the generally crowded environment, variable lighting conditions and difficulty in getting the 'right' view. Usually, flash must be used to provide some control over the lighting and a zoom lens helps to frame the subject correctly.

When using flash, it is a good idea to use a diffuser to soften the light. Some units have a diffuser, but very thin tissue paper taped over the flash lens is an alternative. If you do this, do not use the flash continuously, pause after a few shots or you may overheat the flash tube.

If you have a flashgun with a tilting head, a piece of white card taped to the top can provide a form of bounce flash when there is no ceiling to bounce the light off.

A big problem at exhibitions is models in glass cases (**photo 14**), which are very tricky to photograph because of reflections from the case, particularly when using flash. Also, the glass may interfere with the auto-focus system. Having the camera at an angle to the glass and a polarising filter can help. The closer the camera to the glass the better.

When using flash to photograph large models in open halls, remember that no light will be reflected back from stands or walls, so the exposure may have to be increased slightly.

Take shots from slightly different viewpoints then check them before continuing.

Avoid bright lights in the picture; these can confuse the automatic exposure settings. Reflections of lights on models can do likewise and may also affect auto-focus operation.

The monopod can also be useful here and if the camera's ISO setting is turned up, careful use of a monopod may avoid the need to use flash.

At home

Photographs taken at home can be outdoors, in the workshop or 'posed'. The home environment allows full control of the background, lighting and viewpoint. I use a tripod and camera self-timer for all shots taken at home because it frees up the hands to hold reflectors and avoids camera shake.

Workshop photographs

Firstly, it is important to consider safety aspects. Do not be tempted to take

photographs with machines in operation. If the camera strap gets caught in the chuck, the last photograph you take may be of you getting dragged into the machine!

Beware of reflections off metal surfaces if using flash.

The available light can often be used with a longer exposure and a tripod, and allows more control over depth of field.

White card behind the subject can hide a distracting background and reflectors will help get light into dark areas.

The viewpoint can be a problem when taking close-up shots of machine set-ups. The zoom lens will help but most machinery cannot be moved around to improve visibility. In my case, the only possible viewpoint for the lathe is from about 45deg. either side of the front. Something to consider when setting up a new workshop?

Once taken, do check the photograph for exposure and focus, and any prominent distracting objects not noticed when composing the shot. If left until later, the workshop processes may have moved on, making it impossible to repeat the shot, believe me I know!

Posed indoor photographs

These fall into two categories, normal and close-up. The distinction is needed because the techniques can be very different.

Normal photographs - These include any photograph of a static model that can be taken with the standard zoom lens.

Most readers will not have ideal conditions for indoor photography (e.g. plain walls) but a simple home studio set-up will provide more control over the photographic environment.

The choice of background colour will depend on the subject but two widely used options are black or white. A plain white background is suited to many subjects making them stand out and helping to reflect light into corners.

For bright metal subjects, such as I/C engines or unpainted tooling, a black background will highlight the subject but more care will need to be taken with the lighting.

Because you have total control, the lighting set up can be simple or complex. If using normal house light, avoid mixing incandescent and fluorescent (including low energy bulbs) sources as this can affect the white balance.

The background colour will affect the exposure needed - a black background causing over-exposure, and a white background the opposite effect. The effects may be minimised by using the spot metering setting but some exposure compensation will be needed. Depending on the subject, the compensation can be up to two stops (exposure steps).

If using flash, check where the flash exposure compensation must be set - on the camera, or on the flash gun itself. The settings may interact.

Reflections can again cause problems, but are easier to control in this static situation. Clocks are particularly difficult, with their large areas of polished brass and glass cases. Beware of reflection of both the camera and tripod and also if using flash, problems with bright metal areas 'burning out'. Use of manual focus may be necessary if reflections prevent accurate auto-focus.

More control is possible with the focus and depth of field because use of the tripod allows a wider range of exposure settings. One disadvantage of flash in this situation is that it may restrict the aperture(s) that can be used. Check the camera or flash manuals for this.

Close-ups - A close-up photograph is one taken at or below the minimum focusing distance with a normal lens. A specialist type of close-up photograph is the macro photograph where small subjects are captured at original size or greater.

Depth of field will be small, although this may be less of a problem with some cameras. Also when focusing at these short distances, distortion may occur with wide-angle lenses.

This can be reduced by using a telephoto lens and taking the photograph from further away.

Depending on the subject, manual focus may be best as most auto-focus systems depend on having suitable 'edges' in the focus zone to operate correctly.

The camera may also cast shadows over the subject – (see under 'Lighting' which will be discussed in Part 3).

14. This 18-cylinder radial engine in a glass case shows reflections limited to the top corners by the camera angle.

15. A screw-on close-up lens (right) can be fitted to many prosumer and DSLR cameras and an extension tube (left) used for DSLR cameras.

Macro photography

Macro photographs are even more critical and will require special lenses or attachments on some cameras. Some prosumer cameras will focus down to about 25mm without extra lenses if the macro mode is set in the menu. DSLR cameras will require a special macro lens, a close-up lens attachment or an extension tube.

Macro lenses are designed to focus down to close distances without causing unwanted distortion or other problems.

Close-up lenses for DSLR and other cameras look like normal filters (**photo 15** - right) and screw onto the lens. They come in different strengths and the +2 strength gives good results with the two lenses on my DSLR but take advice on what is suitable for your own camera.

Extension tubes (photo 15 - left) for DSLR cameras fit between the normal lens and the camera, moving the lens further away from the sensor so that the image is larger. The magnification with extension tubes is generally much higher than with close up filters.

With all these options, check your camera manual for suitability of attachments.

To be continued.

3F TO 3F
An ambitious conversion

PART 4

Continued from page 408 (M.E. 4296, 30 March 2007)

Geoff Dowden moves on to the tender for this clever conversion of a Derby 3F into a Midland 3F but starts with notes on the chimney and dome.

The chimney casting, as purchased, was of the type specified for 'Jinty' and from photographs, appears to be the Stanier version which, later in their lives, adorned many of the class 3s. I wanted mine to be in keeping with the Midland style with capuchon as shown in the G/A drawing. By comparing the dimensions of each chimney it appeared that the Jinty style was too tall, but as ever, I was assured by those in the know, that this was of little consequence as matters could soon be rectified with the aid of a little subtle butchery. The first requirement was to abandon the purchased cast iron chimney and acquire a gunmetal version which could be sawn in half across its diameter, the necessary 5/16in. excess of metal then being removed from one half in the lathe, the other portion faced off when the two halves could be re-united with silver solder in readiness for machining to the correct diameter This proposal all sounded a little drastic to me, but in practice the technique worked perfectly. The capuchon was formed by machining the top of the chimney square, attaching a 1/8in. thick ring of gunmetal to the top by silver solder and then machining and filing to the correct profile as shown in **fig 12**.

The dome

As with the chimney, the gunmetal dome was cast for

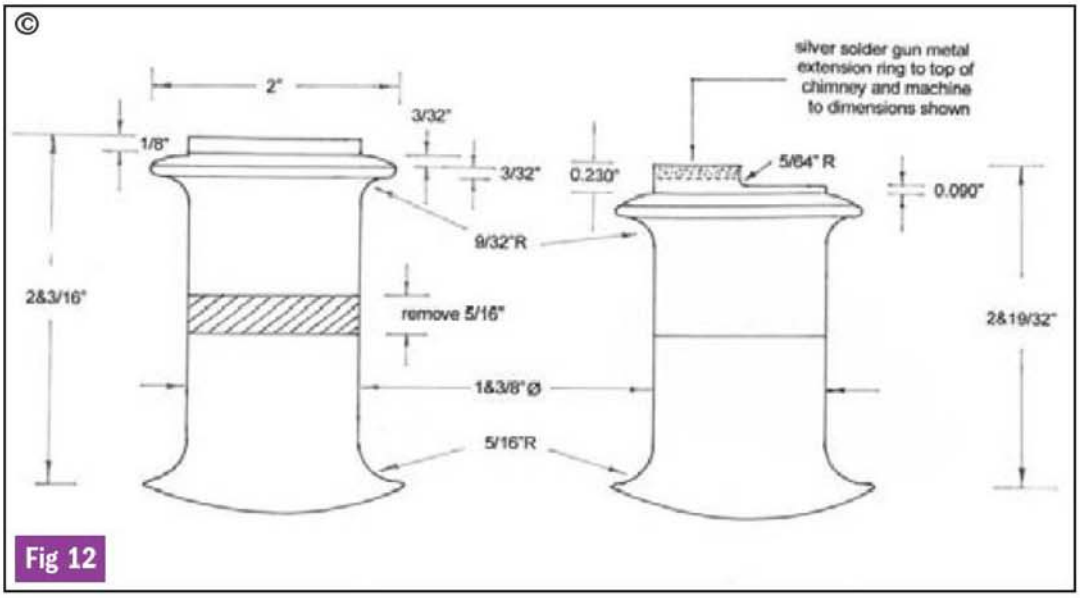
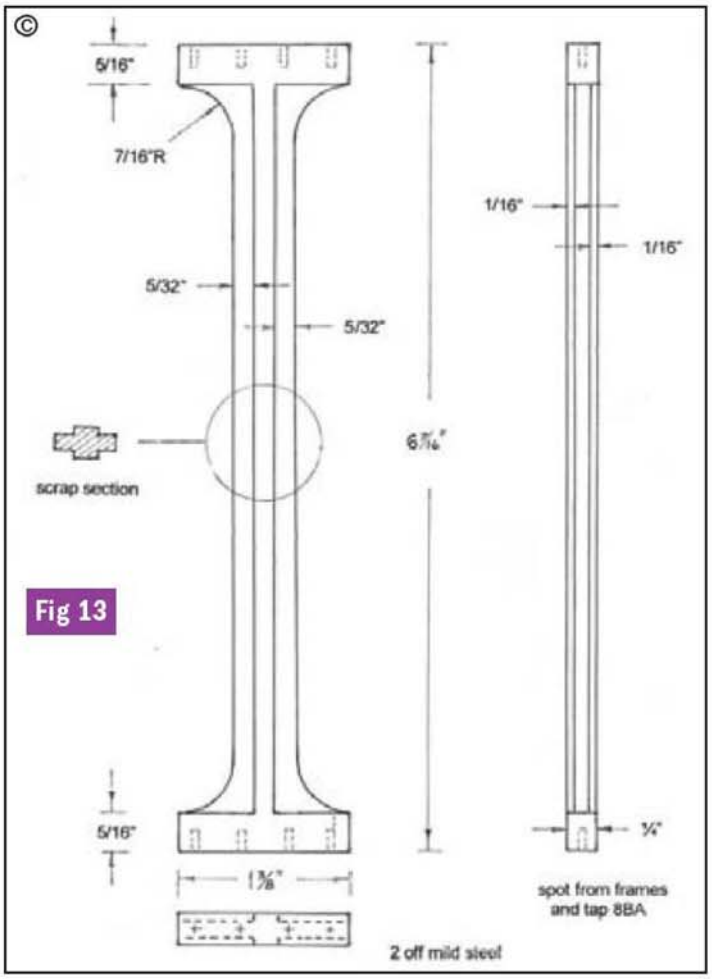


Fig 12. Chimney amendment details.



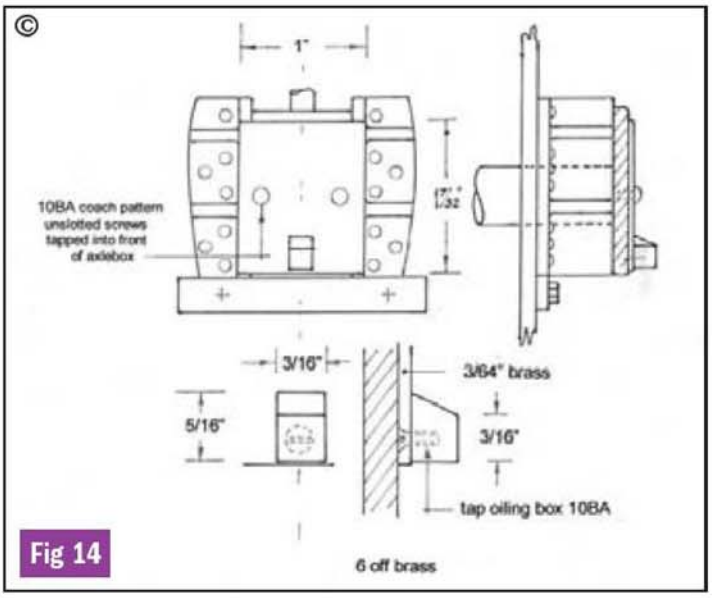


Fig 13. Tender frame stretchers.

Fig 14. Axlebox covers.

Jinty's superstructure and barrel, and once the cladding was on my class 3, it became obvious that if the dome was fly cut to the diameter required there would be no skirt left! More dismay, but again my colleague came to the rescue. *"Heat the thing up"* it was said, and then *"persuade the skirt metal to go somewhere else by the discreet use of a knocking stick"*. The pundits said it would work and, as before, they were right.

The tender

Sometime around this period in the construction of my locomotive, I was asked, *"Where is the tender?"* A little perplexed I replied that it had not yet been made and said, *"Why do you ask?" "Well"* came the reply from my informant, *"It is always a good idea to make the tender first because it is common knowledge that modellers are notoriously prone to finishing the locomotive and then never get round to completing the tender"*. This earth shattering statement was news to me, but I must confess that although I do not have widespread experience of other track/club operations; at those that I have visited, I cannot recall witnessing a plethora of locomotives steaming around dragging along an odd assortment of alien tenders. However, I do realise that my non-observance fails to prove that such a situation does not exist and not wanting to become a member of such a misguided bunch, I decided that I had better heed the warning.

Consequently, either as a result of my gullibility, or at the time I believed there to be some merit in the comment, further progress on the locomotive came to a halt and work on the tender began. I remembered the *M.E.* series on the Midland Single, the '*Princess of Wales*', so made it a priority to scan the back numbers for useful information. Almost at the end of the series, when it came to the tender instalments, Martin Evans described the construction of the 8-wheeled version in considerable detail, but by comparison covered the 6 wheel variety in only three pages, one of which was all about the livery, the other two fortunately giving me a start as they showed a General Arrangement drawing, together with details and dimensions for the frames, wheels, axles, axle boxes and horn block assembly.

Accordingly, following purchase of the appropriate castings, fairly rapid progress was made in the attachment of horns to the frames and the erection of drag and buffer beams, but then arose the question of the stretchers. *"What were they like"? "What shape were they"? "Where did they fit?"* These, and more, were all questions for which I required an answer.

Stretchers

I recalled that Martin had said that construction of the *Princess of Wales* tender closely followed that of *Nigel Gresley*, which immediately prompted more searching of back numbers. Subsequently, I decided to manufacture a pair of stretchers, shown as **fig 13**, from solid lumps of mild steel, similar to the Gresley drawing, which were fitted between the frames and secured with four 8BA hexagon-headed bolts each side.

Axleboxes

Production of the axleboxes followed established practice to Martin's drawings, but as I was unable to locate a supplier of suitable cover plate castings at the time, I fabricated a set of six as shown in **fig 14.**

Springing

There now followed another long delay while I evaluated how this could be undertaken in practice. I carried out a review of the arrangements utilised on other designs which have appeared in *M.E.*, and eventually concluded that the method must take the form of a suitable spring concealed in a dummy leaf spring assembly bearing onto a plunger let into the top face of the axlebox. The whole unit would then have to be supported on a yoke, the lower end of which pivots in a mounting attached to the frames. Unfortunately, despite exhaustive enquiries with the trade suppliers, I was only able to purchase a set of 3⁵/₁₆in. wide dummy leaf spring units from my shopping list, and which from memory, I think were intended for *Springbok*. No sign anywhere of yoke or bottom clamp castings. However, from Martin's GA drawing, I was able to prepare a couple of drawings of my own and then set about the task of producing a trial yoke as a 'one >>

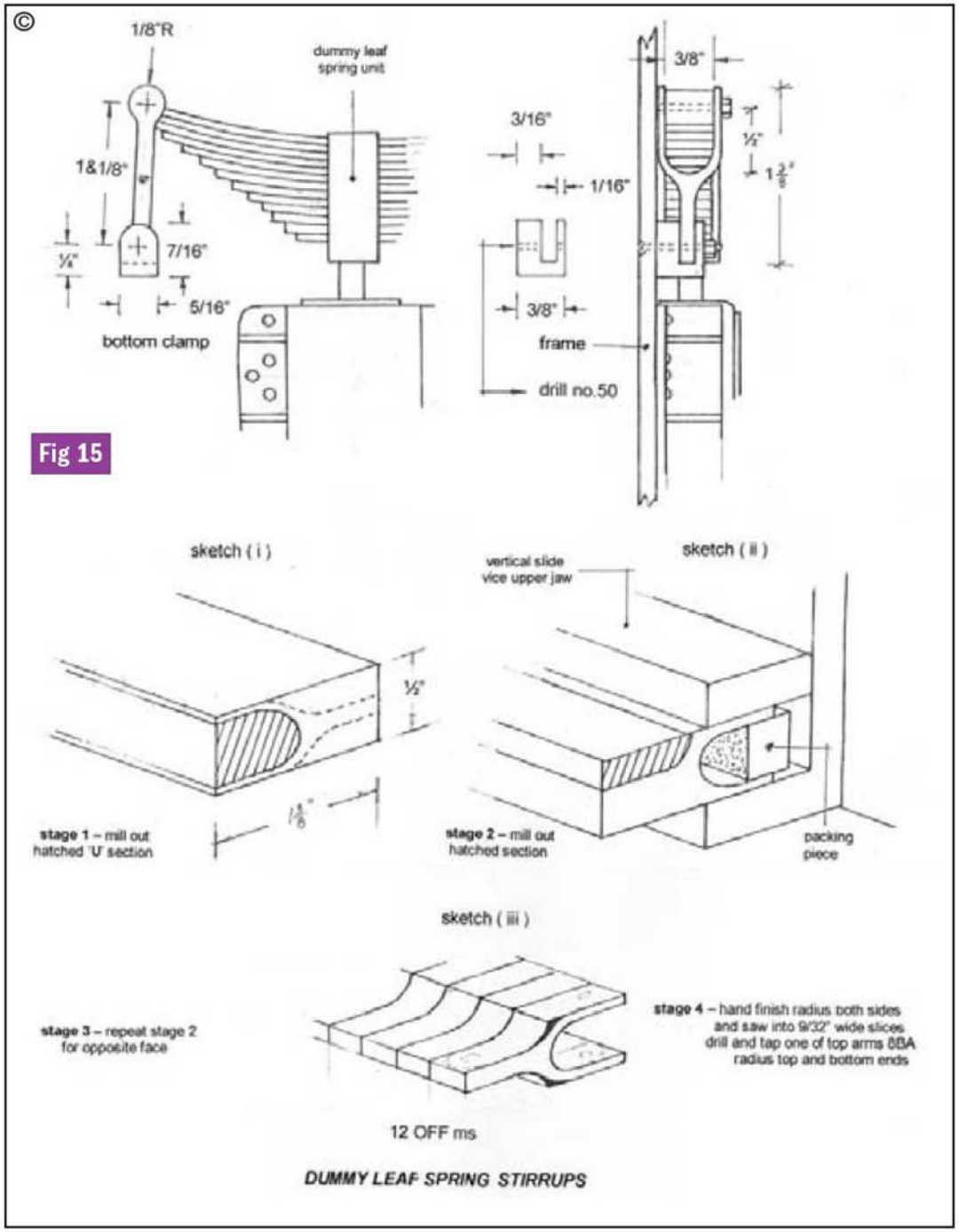


Fig 15

Fig 15. Tender spring arrangements.

Fig 16. Tender buffer details.

off'. I was quite pleased with the resultant overall shape, but when it was offered up to the job it proved to be a little too long. Appropriate adjustments were therefore made in order to prepare the final drawing dimensions, shown as **fig 15**, and it was time to think about the task of producing a set of 12 in the most economical timescale fashion.

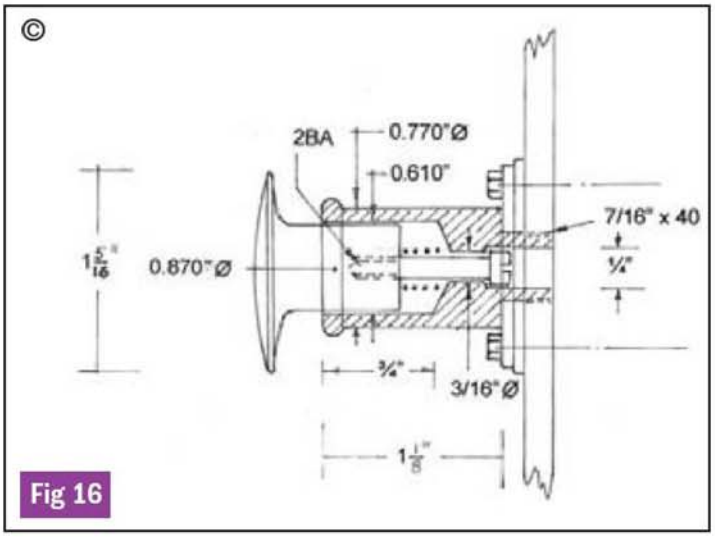


Fig 16

I resolved again to resort to the 'machine an ingot to the appropriate profile and slice off one at a time technique' and I am extremely pleased to say that, on this occasion, the method produced the required components without any undue stress or difficulty. As a bonus, for the first time in my model engineering career, the exercise allowed me to utilise a round nosed end mill, or is it slot drill, to crunch out the majority of the unwanted metal. Once the latter had become a mountain of swarf in the lathe tray, the block was removed from the vice in the vertical slide and hand finished to final shape by a little careful filing. Slices were then sawn off, the top ends appropriately drilled No. 50 and all three ends radiused with the use of filing buttons. **Figure 15**, sketches (i) - (iii), illustrate the sequence of events.

The dummy spring units were then cleaned up and fitted between the arms of the yoke, spotted through and each shackle end drilled No. 50. The inside arm of the yoke is now tapped 8BA and the shackle ends and the outer arms of the yoke opened out to No. 43 for 8BA clearance so that the spring unit can now be fitted between the pair of yokes and test positioned over the axle centre. Now it was time to produce the 12 clamps for securing the bottom end of the yokes, and for a change, this task was a simple sawing, filing and slotting operation. The clamp dimensions are shown in fig 15. After temporarily fixing the bottom of both yokes to the clamps with a 10BA nut and bolt, the whole assembly is offered up to the top of the axlebox with the spring and plunger inserted, but in an uncompressed state and not forgetting to allow for the slight inclination of each yoke towards the axle centre. The fixing point for the clamps can now be determined so that the frames can be drilled No. 55 for permanent securing of the yoke support clamps with the aid of 10BA countersunk screws inserted from the back of the frames.

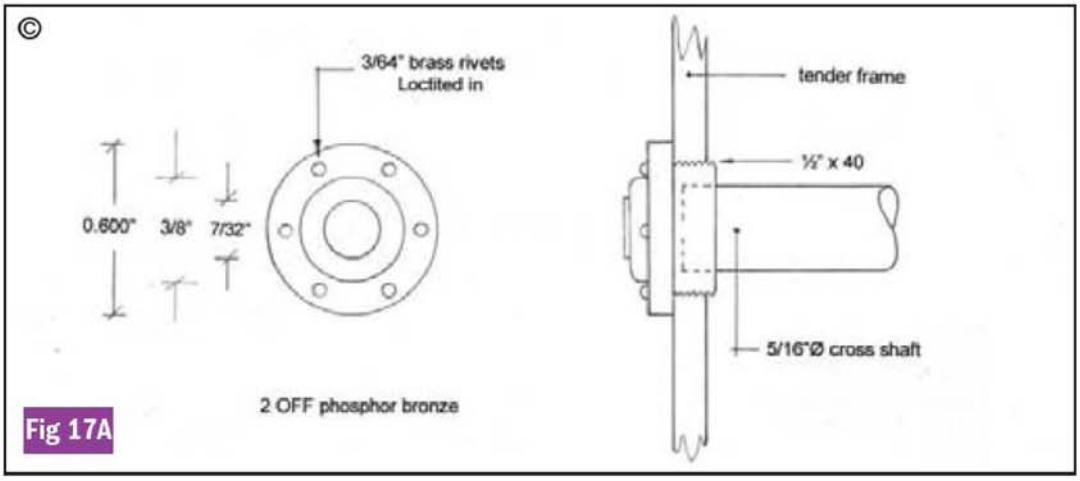


Fig 17A

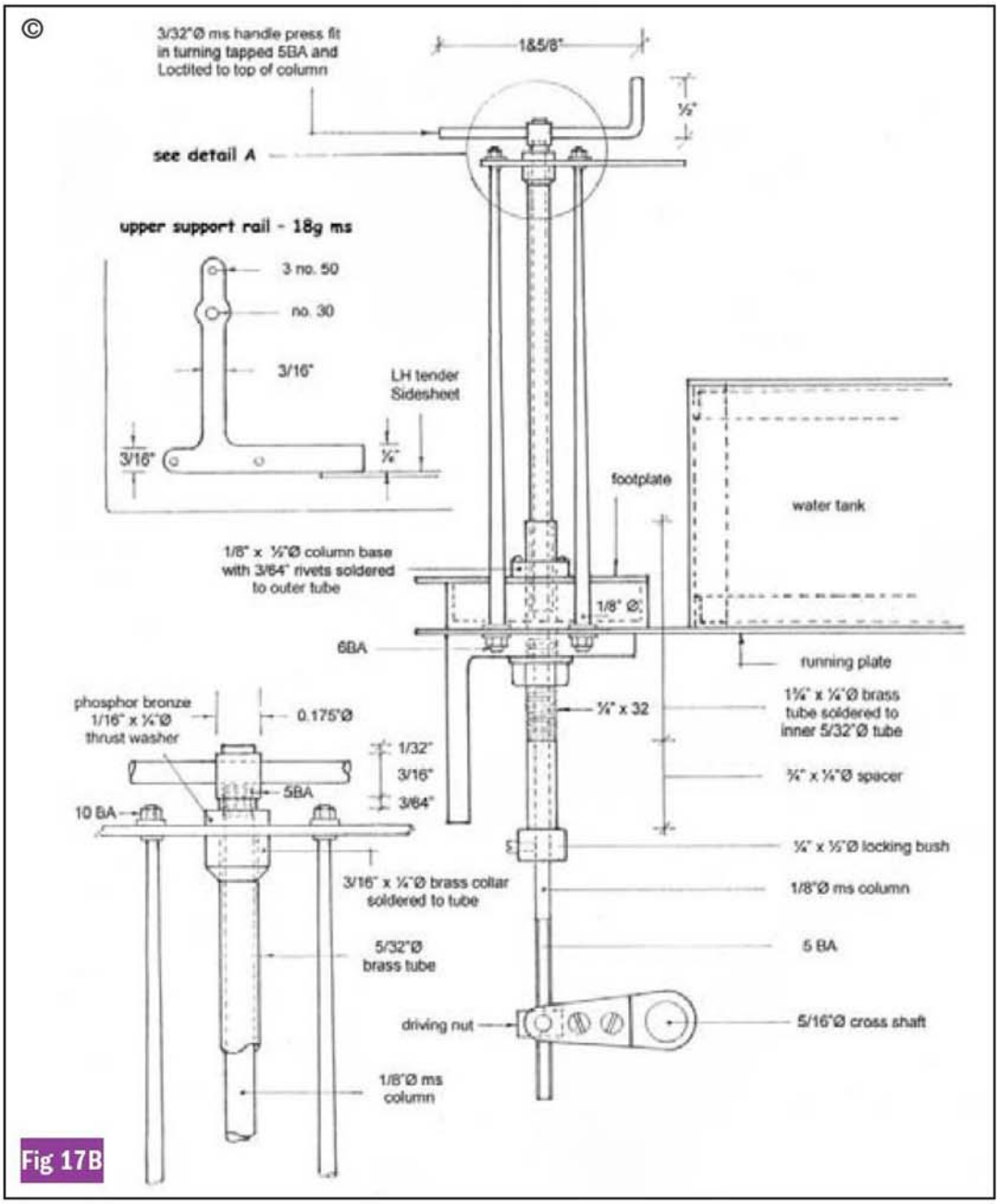


Fig 17B

Tender buffers

My solution to the familiar problem of the tender buffer stocks coinciding with the back end of the frames, was to modify the stocks and buffers, salvaged earlier form the locomotive and as illustrated in **fig 16**.

Brake gear

I used the *Princess of Wales* G/A drawing as a guide and, as before, produced a cardboard former to establish the brake hanger dimensions. As I was unable to trace a supplier of suitable brake blocks, I utilised the set on the cast ring originally purchased for the locomotive, not quite the detail shown on the drawing but they look okay to me.

At this stage in the proceedings I realised that yet another pair of holes needed to be drilled in the frames, this time just above and to the rear of centre of the lower tender footstep, in order to provide the location for the brake cross-shaft bush. Unfortunately, this detail was omitted from the *Princess of Wales* G/A drawing and by examination of a number of photographs, the position that I eventually determined will be shown in **fig 19** next time.

In order to simplify the practical aspect of this operation as much as possible, I thought it best to dismantle the chassis for marking and drilling the hole position on the frames. As it was not now possible to clamp the pair of frames together for drilling purposes, I made a simple little jig for the hole drilling operation that would guarantee accurate alignment of the shaft on re-assembly. The holes were drilled and tapped followed by fitting of the two phosphor bronze bushes as shown in **fig 17A**. Production of the brake beams, forks, associated pull rods, a pair of adjusters, cross shaft and the two brake levers followed enabling the complete set to be assembled on the re-built chassis.

Now was the time when I had to decide where to position the brake column on the tender footplate in order to dimension and locate the brake levers on the cross shaft. It seemed logical to construct the brake column first, so a design was produced, **fig 17B.**

Fig 17A. Tender handbrake cross shaft bushes.

Fig 17B. Tender handbrake arrangement.

●*To be continued.*

PETE'S PAGE

Depth stops and fences

Peter Spenlove-Spenlove
offers advice on drilling quantities of holes to a constant depth when using the lathe and describes an improvised work fence for the milling machine.

I had to drill a 3/16in. hole to a fixed depth in a number of brass pieces, some of which can be seen in **photo 1** on the T-slotted cross-slide. Each piece was first centre drilled with a 1/4in. dia. body centre drill. This was taken into the brass until the tapered end almost disappeared into the work. This ensured that a bevel edge remained on the work after the drilling of the 3/16in. dia. holes and thus saved a chamfering operation.

When drilling the 3/16in. dia. holes to a depth of 1 1/2in. I could have used the tailstock graduations to control depth but this would have been slow and liable to error. Far simpler and more accurate was the tubular stop method. I have a small tin which contains a selection of tubes and collars. One with a 1/4in. hole was selected. The 3/16in. dia. drill was sharpened and then gripped firmly in the tailstock chuck such that the tube acted as a stop with the projecting drill long enough to cut to the required depth.

This method avoids the need to watch the tailstock scale or even having to put the parts in the headstock chuck to any special depth. Of course, if the tailstock drill chuck is a poor one and the drill slips then the depth setting will be lost - hence the advice to tighten the chuck firmly. However, if this happens the drill will probably slip back into the chuck and the hole be drilled too short. Thus, on rechucking the drill, the job can be corrected.

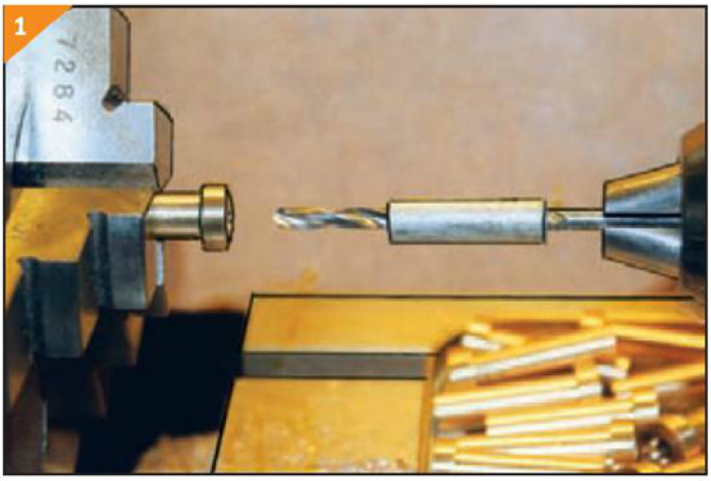
Work alignment

When a part machined component is clamped on to the milling machine table it is usual to align it to the table with a dial test indicator before fully tightening the 'hold down' clamps. For larger items, such as wood or plastic panels, there is a quicker simpler way. It is not so precise but is ideal for DIY woodwork. Select a nice straight length of mild steel, rectangular bar that is a snug fit in the T-slots of the milling machine table. Carefully deburr it so that it sits in the T-slot with about 1/8in. standing proud of the table's surface. The work can now be pushed up against this fence before clamping down. The job illustrated in **photos 2** and **3** is a rectangle of high-density polyethylene. It is 3/4in. thick but I needed to machine a tidy radius along all the corners. After doing all four corners on the top I turned the panel over but the radius was too large for the fence. Introducing a length of silver steel under the fence to raise it cured this. If the work is firmly clamped the fence can be removed before machining to allow access to the edges of the work.

If your milling machine is old, check to see if there are burrs at the bottom of the T-slot gaps. A previous owner may have over tightened a T-bolt causing the end to distort the slot. File or stone the burr away and use the fence to check for fit. If a long fence is not possible because material is in short supply or you have a machine with an odd slot width, make up a couple of short fences 1in. or so long. They can be just as effective and will be less likely to be used as a material source than the long fence. **ME**

1. The tubular stop in use on the lathe. Note the accumulation of workpieces on the cross-slide.

2 and 3. Two views of the fence made from a length of mild steel, rectangular bar.



Rhys Sully
aged 12, describes in his own words how his interest in model engineering began.

The Project

It was all because of my Dad really, getting me started with trains, and proof of this is that after a year of just watching them I started to have lessons on how to drive or at least start to be able to go near them. I started to drive a BR Class 78 5in. gauge engine and a 3½in. gauge Rob Roy (**photo 1**). And after 8 years of getting better I was allowed to drive a 7¼in. LNER A4 *Mallard*. And the good thing about the big gaping firebox door is that you can cook fried breakfasts in it, and lovely ones at that (**photo 2**). I've also driven at other railways; they are Swansea, Great Cockrow, Hereford and Stockholes Farm Railway. That's when I thought to myself that I'd really like an engine of my own.

When I asked my father to let me build a 5in. gauge steam locomotive he said (as usual) no because it was too big even though he himself had built a 7¼in. gauge A4. So while he was thinking 00 and I was saying 5in. we came to the conclusion that a Gauge 1 engine might be suitable. So after searching and searching we came across a Gauge 1 locomotive design called *The Project*, and then as promised one Christmas morning there in front of me was all the thousands of bits of metal to make it, in fact I think that was the first Christmas that me and my father were actually allowed in the workshop. Of course my father never misses a chance to go in the workshop, so we did.

Now that I have told you how it came about I can tell you a little bit more about the building and designing of it.

The Project is a single-cylinder 0-6-0 tendered engine (**photo 3**) commonly known as a Derby 4F. After I built the tender and painted it and the rolling chassis for the locomotive itself I came across a few problems in the boiler back plate as there was already a bush hole for the axle pump as well as a steam take off from the boiler going to the regulator and the blower. So as you can imagine it was cramped with all of those things on it, but me being used to driving and repairing the *Mallard* I wanted to have a gauge glass for it. So in the end with some help from my father we just managed to fit another two bushes in the back plate for the gauge glass. So that sorted that problem out.

Actually, after that there were not many major issues although there were a few minor problems such as the back coupling rods kept flying off whenever the engine was moving but that was easily sorted out by putting stronger screw threads in and then use Loctite. But then there was one that had us both fooled, the slide valve in the top of the cylinder must have been pushed up and it didn't go back down. It took a fair amount of time of steaming it up in hope that it would warm up and drop down but it didn't and we decided to take the boiler off and the top of the cylinder off. Although it had not been run that much the top of the cylinder was getting scratched so the valve was taken off and, using finer and finer grades of abrasive paper, was rubbed down, put back in place and firmly pushed down and everything put back in place. After that everything has been working perfectly except, after it was steamed up, meths. kept leaking out of the meths. pipe and ruining the paint underneath the tender. It has now been spray painted and it proudly runs at Cardiff Model Engineering Society. I've made a truck to go with it with another one on its way and a 0-4-0 remote control engine. With thanks to my father without whom this feature and a garden railway would not have been possible. ME

1. Rhys looking most competent at the controls of a 3½in. gauge Rob Roy engine.

2. Breakfast the Sully way! Cooking aboard a 7¼in. gauge LNER A4 Mallard.

3. With the tender complete 'The Project' Derby 4F engine awaits finishing and painting.

A DISGORGER

Derek Cooke in Australia, describes a useful gadget that's easy to make for fishing fans.

While this may not have much to do with model making, some readers may fish, or have angling friends whom this gadget would make 'compleat'. A couple of years or so ago our cleaning lady, who is an amusing conversationalist, was telling us over a cuppa about her fishing holiday and saying deservedly unkind things about those who failed to return undersized fish. I asked her what she used to remove hooks, and was told fine-nosed pliers. So I drew a hook with a gape of about 8mm, and she said that was the size of hook she used. The following Christmas our two Jack Russells presented her with the disgorger pictured. It was not just because she was generous in sharing her teatime biscuits that they loved her!

Owing to family problems it was some time before she was able to take another fishing holiday, and when she returned I asked her about the disgorger. She remarked that it was 'super' when used on the jetty, but no use on the rocks. Seeing my puzzlement, she said that she wasn't game to use it on the rocks in case it dropped into a crevice from which it could not be retrieved. I asked her to return it the next week in order that I could provide it with a lanyard. A suitable hole was drilled towards the back of the handle, deeply countersunk on both sides, and the hole rounded and smoothed with rat-tail files. I had cotton material in mind, but my local supplier had only synthetic of a suitable diameter in stock. There was no question of reducing the strands to make tapered splices, so I merely melted the ends of the strands using one of those Butane gas-lighters, spliced them, and then whipped the end of the splice with some waxed twine. The little 'bumps' on the ends of the strands serve well to stop the waxed twine whippings from sliding down. (Had the gadget been for myself, I'd have used a couple of anglers' knots!)

The construction of the disgorger requires a note. The handle was made from aluminium alloy 1/2in. or 12mm dia. with a short taper at the back, and a longer one at the front. The area between was knurled. The spiral was wound from 2.2mm dia. stainless wire (intended for TIG welding I think). A piece of 1/4in. dia. rod was gripped in the vice - sticking out to one side. The end of the wire, bent at right angles for 1/2in. or so was set in the gap between the jaws, the wire wrapped round the rod for about three turns, and then lined up with the rod. One of those mini cut-off discs for use with Dremel type motive power was the answer to cutting off the bent piece and rounding the end. The rear end is secured in the handle with a suitable Loctite adhesive. In use, the spiral is twined into the trace or cast, pushed up to the hook, and the two are held together while the hook is pushed out.

I claim no originality for the idea. Back in the 1930s I was dashed a disgorger from the famous firm of Hardy Bros. of Alnwick (the firm is still extant and has a branch in London). It was a rod of 7 or 8mm dia., with a radial spiral slot (about 0.5mm wide) running from the nose for a couple of turns, and was made from die-casting metal. Copying this in stainless steel had the air of impossibility! It was ideal for the small brown trout of the burns of my native Northumbria though it didn't make catching them any easier! **ME**

THE MODEL ENGINEER EXHIBITION
7th - 9th September 2007 Ascot

Please return completed form to:
Model Engineer Competition,
9 Tranmore Lane, Eggborough,
E. Yorkshire DN14 OPR

ENTRY NO.

OFFICE USE ONLY

CLASS	ENTRY NO.

ENTRY FORM - COMPETITION & LOAN MODELS

PERSONAL DETAILS (Please print)

Surname _____ Forename(s) _____ Age: _____

Address _____

_____

_____ Post Code: _____

Home Tel No _____ Daytime Tel No _____

Model Club or Association _____

Have you entered before? (Y/N) _____

Do you purchase or subscribe to a Magicalia Publishing Ltd magazine? (Y/N) _____

How many years have you been a modeller? _____

Mail Order Protection - please tick this box if you would prefer not to receive mail from other companies which may be of interest to you ☐

MODEL DETAILS – PLEASE TICK BOX IF MODEL IS FOR LOAN ☐

Entry Class (competition entries only) _____

Model Title (to be used for catalogue and display card) _____

Model Description _____

_____

_____

Model Scale _____ Length _____ Width _____ Height _____ Weight _____

Type of construction _____

_____

Parts not made by you and commercial items _____

_____

Have you supplied a photograph? (Y/N)

Are you supplying Judges Notes? (Y/N)

Value of Model (Magicalia Publishing Ltd will not insure the model unless a value is entered) £ _____

Name and address of your local newspaper _____

_____

N.B. Please make a copy of this form and any photographs enclosed for your own reference.
Please note that Magicalia Publishing Ltd will not accept liability for any loss of documents or photographs submitted with this form.

To help you get the best from The Model Engineer exhibition

These notes are written purely for guidance. Full information is contained in the Competitors' Information booklet which is sent to every entrant as part of the information package. If you have an item and are unsure as to the Class into which it should be entered, leave that section blank and we will take care of it. The Judges have the right to move any competition exhibit into another class if they feel that by doing so its chances of gaining higher marks or a more appropriate award are improved.

If the item is offered as a Loan exhibit please indicate this by writing Loan on the form in the box identifying the Class. Loan models are not judged but carry all other privileges associated with competition entries.

Part built models are particularly welcome in the Loan Section; visitors like to see work in progress, and entry does not preclude the item being entered in competition when completed.

The classes listed below are those associated with mainstream model engineering.

Club exhibits

Where a club is exhibiting, each model should be entered on a separate entry form and clearly identified as a club exhibit by entering Loan/Club in the class section box. This ensures that we have a full record of all models on display during the show and facilitates matters of administration and insurance.

Additional forms

If you do not wish to deface your copy of the magazine we are happy to receive photocopies of the entry form, one for each model. We will be pleased to send out extra forms if required, so if you know of a modeller who is not a reader of one of our magazines but who you think may wish to participate, please advise them to contact our Exhibitions Office, or simply photocopy the entry form for them.

The success of the show depends largely on the number of models on display. Your work could well be the stimulus which inspires someone else to start in the hobby. There can be no doubt that this event is our showcase on the world of modelling in all its aspects. Every modelling discipline needs more and more participants, and it is by displaying not only the crème-de-la-crème, but also examples of work of a more achieveable standard, that people are encouraged to join into the wonderful world of modelling, in whatever aspect.

We look forward to seeing a sample of your work at the show!

Engineering Section

A1 Hot air engines.
A2 General engineering models (including stationary and marine engines).
A3 Internal combustion engines.
A4 Mechanical propelled road vehicles (including tractors).
A5 Tools and workshop appliances.
A6 Horological, scientific and optical apparatus.
A7 General engineering exhibits – not covered by the above

Railway Section

B1 Working steam locomotives 1" scale and over.
B2 Working steam locomotives under 1" scale.
B3 Locomotives of any scale, experimental, freelance or based on any published design and not necessarily replicas of full size prototypes, intended for track duties.
B4 Scratchbuilt model locomotives of any scale, not covered by classes B1, B2, B3, including working models of non-steam, electrically or clockwork powered steam prototypes.
B5 Scratchbuilt model locomotives gauge 1 (10mm scale) and under.
B6 Kitbuilt model locomotives gauge 1 (10mm scale) and under.
B7 Scratchbuilt rolling stock, gauge 1 (10mm scale) and under.
B8 Kitbuilt rolling stock, gauge 1 (10mm scale) and under.
B9 Passenger or goods rolling stock, above 1" scale.
B10 Passenger or goods rolling stock, under 1" scale.
B11 Railway buildings and lineside accessories to any recognised model railway scale.
B12 Tramway vehicles.

Marine Models

C1 Working scale models of powered vessels (from any period). Scale 1:1 to 1:48
C2 Working scale models of powered vessels (from any period). Scale 1:49 to 1:384
C3 Non-working scale models (from any period). Scale 1:1 to 1:48
C4 Non-working scale models (from any period). Scale 1:49 to 1:384
C5 Sailing ships and oared vessels of any period – working.
C6 Sailing ships and oared vessels of any period – non-working.
C7 Non-scale powered functional models including hydroplanes.
C8 Miniatures. Length of hull not to exceed, 15in for 1:32 scale, 12in for 1:25 scale, 10in for 1:16 scale; 9in for 1:8 scale. No limit for smaller scales.
C9 For any model boat built from a commercial kit. Before acceptance in this class the kit must have been readily available for at least 3 months prior to the opening date of the exhibition and at least 20 kits must have been sold either by mail order or through the retail trade.

Scale Aircraft Section

D1 Scale radio control flying models
D2 Scale flying control-line and free flight
D3 Scale non-flying models, including kit and scratch-built
D4 Scale flying radio controlled helicopters

Model Horse Drawn Vehicle Section

G1 Carriages & other sprung vehicles. (Omnibuses, trade vans etc.) Wagons, carts and farm implements. Caravans.

Junior Section

J1 For any type of model, mechanical or engineering work, by an under 14 year old.
J2 For any type of model, mechanical or engineering work, by an under 16 year old.
J3 For any type of model, mechanical or engineering work, by an under 18 year old.

All entries will be judged for standard of craftsmanship, regardless of the modelling discipline, i.e. a boat will not be competing against a military figure. Providing a model attains sufficient marks it will be awarded a gold, silver or bronze medal.

Model Vehicle Section

K1 Non-working cars, including small commercial vehicles (e.g. Ford Transit) all scales down to 1/42.
K2 Non-working trucks, articulated tractor and trailer units, plus other large commercial vehicles based on truck-type chassis, all scales down to 1/42.
K3 Non-working motor bikes, including push bikes, all scales down to 1/42.
K4 Non-working emergency vehicles, fire, police and ambulance, all scales down to 1/42.
K5 Non-working vehicles including small commercial vehicles (e.g. Ford Transit,) scale from 1/43 or smaller.
K6 Any available body shells including Concours, in any scale or material, to be judged on appearance only.
K7 Functional model cars/vehicles which must be able to move under its own power of any type. Can be either free-running, tethered radio controlled or slot car, but must represent a reasonable full size replica.

DUKE OF EDINBURGH CHALLENGE TROPHY

Rules and Particulars

1. The Duke of Edinburgh Challenge Trophy is awarded to the winner of the Championship Award at the Model Engineer Exhibition.
2. The trophy remains at all times the property of MAGICALIA PUBLISHING LTD.
3. The name of the winner and the date of the year in which the award is made will be engraved on the trophy, which may remain, at the discretion of MAGICALIA PUBLISHING LTD., in his/her possession until required for renovation and display at the following Model Engineer Exhibition.
4. Any piece of model engineering work will be eligible for this Championship Award after it has been awarded, at The Model Engineer Exhibition, a Gold or Silver medal by MAGICALIA PUBLISHING LTD
5. No model may be entered more than once.
6. Entry shall be free. Competitors must state on the entry form:
   (a)That exhibits are their own bona-fide work.
   (b) Any parts or kits which were purchased or were not the outcome of their own work.
   (c) That the model has not been structurally altered since winning the qualifying award.
7. MAGICALIA PUBLISHING LTD. may at their sole discretion vary the conditions of entry without notice.

COMPETITION RULES

1. Each entry shall be made separately on the official form and every question must be answered.
2. Competition Application Forms must be received by the stated closing date. LATE ENTRIES WILL ONLY BE ACCEPTED AT THE DISCRETION OF THE ORGANISERS.
3. Competitors must state on their form the following:
   (a) Insured value of their model.
   (b) The exhibit is their own work and property.
   (c) Parts or kits purchased.
   (d) Parts not the outcome of their own work.
   (e) The origin of the design, in the case of a model that has been made by more than one person.

NOTE: Entry in the competition can only be made by one of the parties and only their work will be eligible for judging.

4. Models will be insured for the period during which they are in the custody of MAGICALIA PUBLISHING LTD.
5. A junior shall mean a person under 18 years of age on December 31st in the year of entry.
6. Past Gold and Silver medal award winners at any of the exhibitions promoted by MAGICALIA PUBLISHING LTD. are eligible to re-enter their model for the 'Duke of Edinburgh Challenge Trophy'.
   Past winners at any of the exhibitions promoted by MAGICALIA PUBLISHING LTD. will not be eligible for re-entry into the competition unless it has been substantially altered in any way.
7. MAGICALIA PUBLISHING LTD reserve the right to:
   (a) Transfer an entry to a more appropriate class.
   (b) Describe and photograph any models entered for competition or display and to make use of any such photographs and descriptions in any way they may think fit.
   (c) Refuse any entry or model on arrival at the exhibition and shall not be required to furnish a reason for doing so.
8. Entry into the competition sections is not permitted by:
   (a) Professional model makers.
   (b) Anyone who has a financial interest in the direct supply of materials and designs to the public.

NOTE: If unsure, please contact the Competition organisers prior to the show.

9. The judges' decision is final. All awards are at the discretion of the judges and no correspondence regarding the awards will be entered into.
10. Exhibitors must present their model receipt for all models collected at the end of the exhibition and sign as retrieved.
11. The signed release for each model must be presented to security staff when leaving the exhibition complex with display model(s) after the close of the exhibition.

IMPORTANT NOTE: PLEASE MAKE COPIES, INCLUDING PHOTOGRAPHS, OF ALL INFORMATION RELATING TO YOUR MODEL, AS MAGICALIA PUBLISHING LTD WILL NOT ACCEPT LIABILITY FOR ANY LOSS.

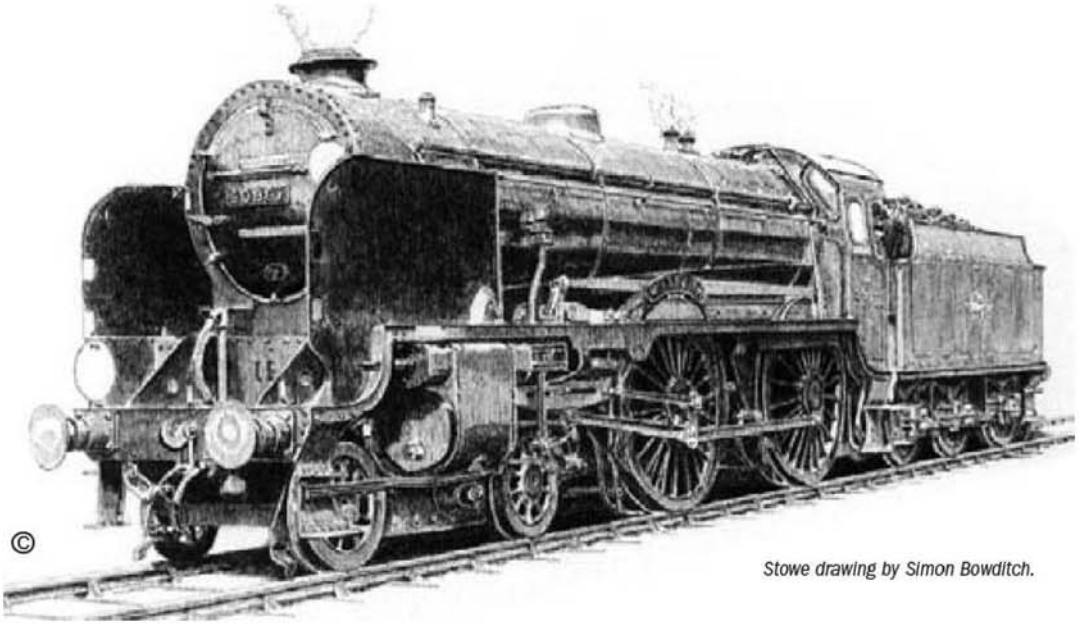
CLOSING DATE 24TH AUGUST 2007

STOWE - SOUTHERN RAILWAY 'Schools' class locomotive

PART 11

Continued from page 396 (M.E. 4296, 30 March 2007)

Neville Evans continues the description of the rear of this well detailed design.



Stowe drawing by Simon Bowditch.

As I mentioned in the last article, the rear end of the 'Schools' class is supported by means of what appears to be a small girder bridge, complete with flying buttresses and large quantities of angle iron, perhaps to balance off the rather extravagant front end with its plethora of cylinders and valve gears. The problem was in fact not new as the designers of the larger 4-6-0s had to cope with the facts of a large boiler and a short cab. This leads me to believe that there was a bit more to it than just a convenient place to stick the reversing wheel, though what it was I cannot think.

The actual construction should produce few problems. The main side plates are cut from 1/16in. bright mild steel plate and seem to be ideal subjects for a spot of 'lasering'. My local man in Bridgend, Roger Miles (find him on 01656-656735) uses water cutting from choice. This means the use of a high pressure water jet which contains a fine abrasive, and will cut much thicker material more accurately and with no distortion compared with a laser. It also does away with the annoying propensity of the laser to harden the metal locally due to the high temperatures involved at the point of impact. Much to be recommended. The side angles are built up from 1/4 x 1/16in. angle. The large (and small) radius curves can conveniently be turned from bar and the whole lot assembled on the main plate with rivets and solder. Note from the appended artwork, once again the work of Derek Tulley, that the rivet heads are not particularly large. I make them about 3/32in. scale dia. at the head, which means a shank thickness of only 3/64in. or even 1/32 inch. I have marked the holes at 1/32in., but I leave the final decision to you. It's your locomotive after all.

>>

1. Front of the underframe (photos in this article: Derek Tulley)

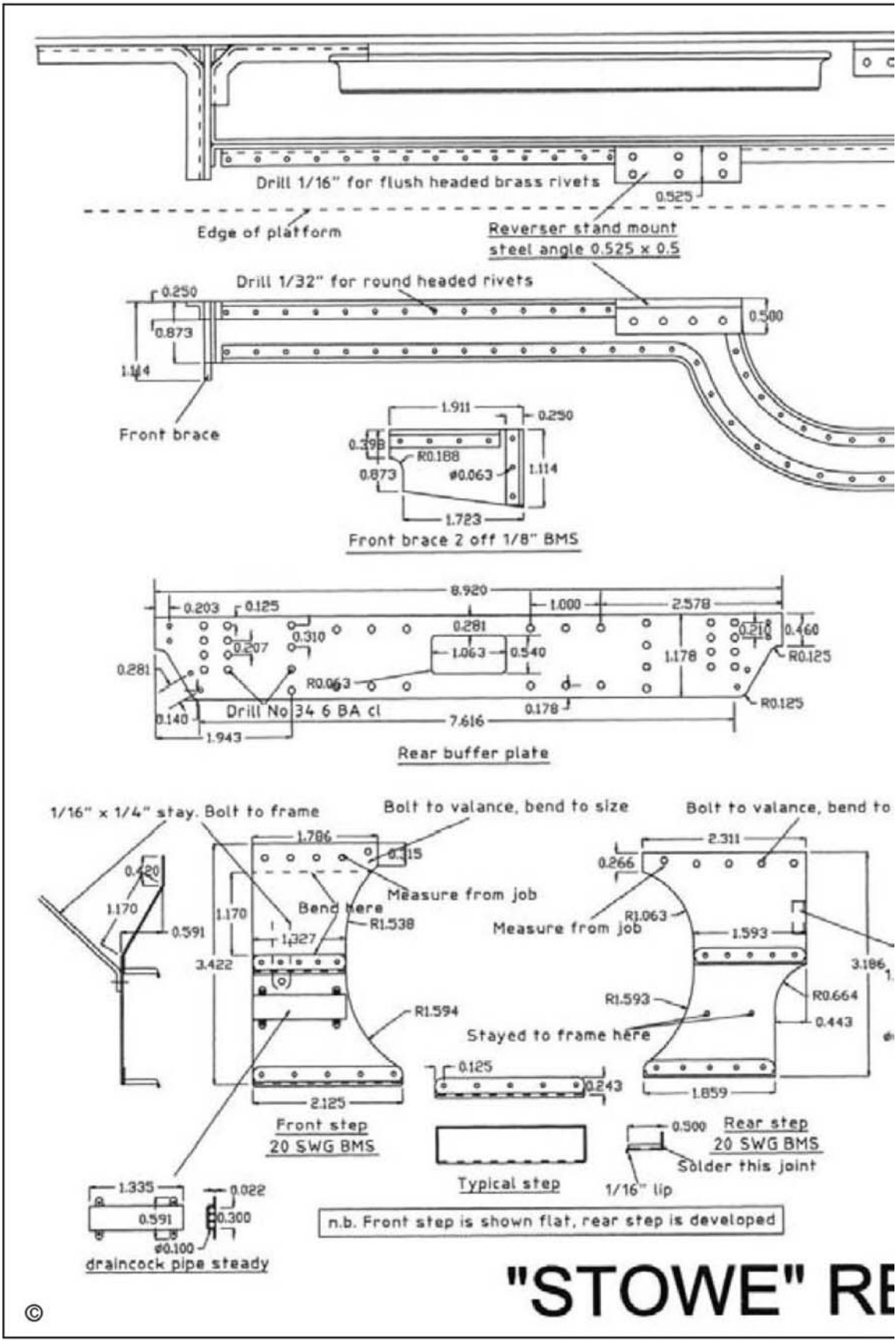
2. Rear footstep. Note the bracing strip rivetted to the step.

The whole device is fastened to the main frames at the front end, by a substantial brace made from 1/8in. plate. This plate is held on by a pair of 1/4in. angles at the side, and what I have called a front brace top angle. One of the problems of small locomotive design is finding a suitable name for everything. Once again it's a matter of cutting out a 45deg. chunk of metal, bending the thing round to the required angle and soft soldering it up. I find this to be most satisfying work. The top of these two artifacts serves as a support for the platforms, to which they are flush rivetted. Round headed are used underneath on the brace. The back end is simply attached to the rear buffer beam by means of small angles.

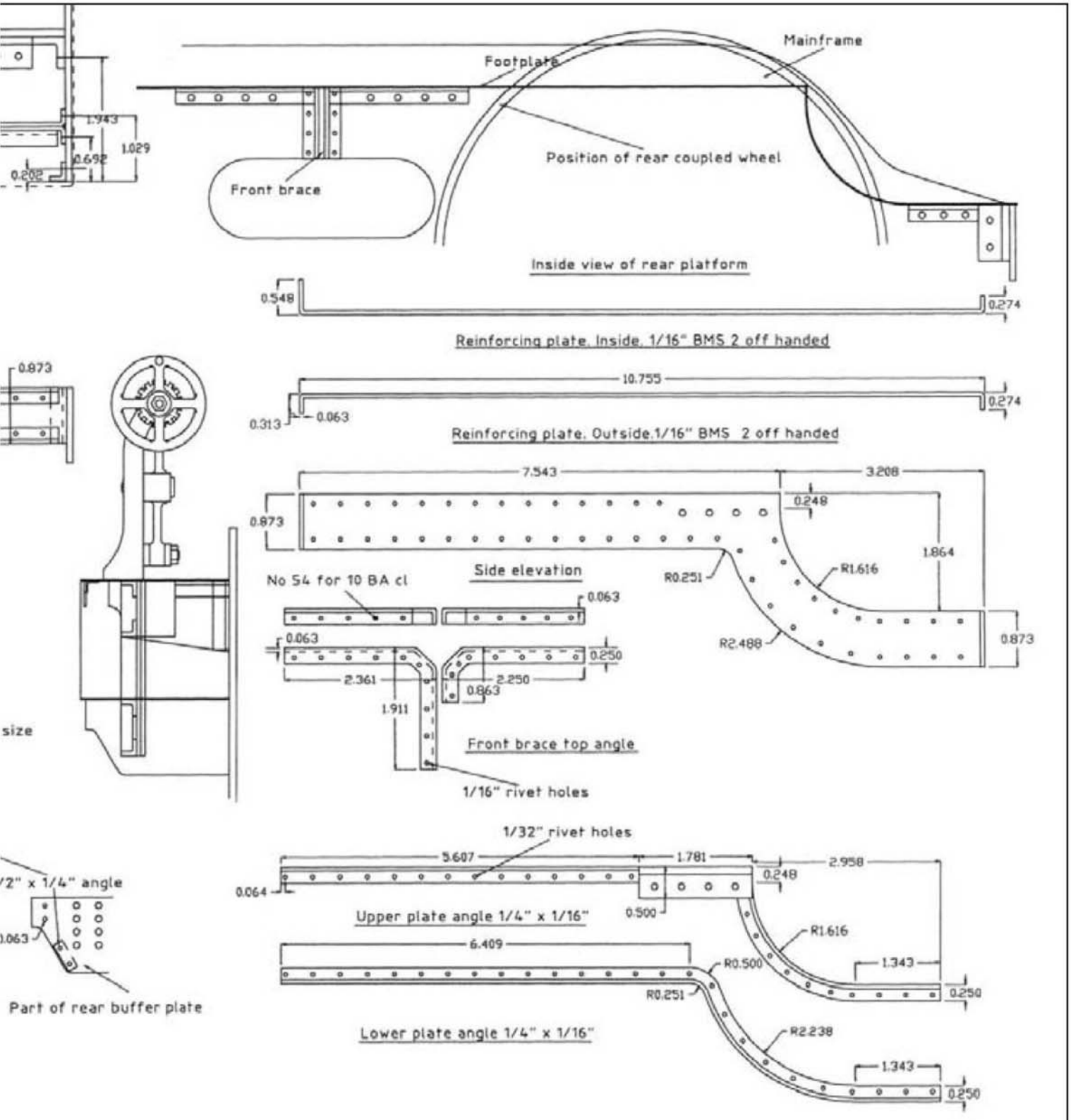
Footsteps

The front and rear footsteps have been drawn exactly to scale in side elevation according to the working drawings in my possession. In my experience however, the shape can change from batch to batch of any class of locomotive. The only answer is to check with the engine that you are modelling. If you aren't concerned with individual locomotives then life becomes much easier.

One problem when dealing with the sheet steel structures of any locomotive, is that of scale thickness. When you consider that 1/4in. thick plate on the original locomotive, if used for cab sides, platforms and superstructure generally, would be considered to be too heavy and expensive, as well as being expensive to work. Quarter plate however would work out at 0.022in. or 24SWG in the scale that we are working at. I would consider that anything less than 1mm, (0.039in.) or 20SWG, (0.035in.) is too thin. A good example would be the actual treads themselves, which have to be soldered in the corners as per the drawing, to avoid damage. Note that both steps are kinked quite sharply in to avoid tunnels and platforms. I have drawn the front step flat and the rear step as a developed shape. Both steps are braced on the inside as shown on the drawing.



To illustrate how metal thickness can affect weight, during the war it was discovered that the Hawker *Tempest*, which came into RAF service in early 1944 as our standard and latest ground attack and low level fighter, was coming out too heavy by a considerable amount. No one could discover why until an observant inspector actually 'miked up' a batch of aluminium sheets. It was found that the sheets, which were of course sold by weight, had been deliberately sent 1SWG too thick, thus



EAR SUPPORT & STEPS

gaining the manufacturer a large illicit profit. The fact that the *Tempest* was coming out many hundredweights over weight, which reduced performance didn't really concern him.

Shape of things to come

The design work of this very complex and interesting little locomotive is nearly finalised, (the Chinese had a curse- *"may you live in interesting times"*) together with the complicated and intricate pattern making which has turned poor old Pete Thomas' hair a lighter shade of grey. I have, therefore, decided that the next locomotive will be something simple, smallish and cheap (car boot size). I have resuscitated an engine that I started seven years ago before in an unguarded moment, I let slip to a then deputy editor of *Model Engineer*, that I had designed *Didcot*, a great Western 1400 >>

3. Top of rear footstep. Note the angle brace bolted to the buffer beam.

4. Detail of underframe.

5, 6 and 7. More details of the underframe.

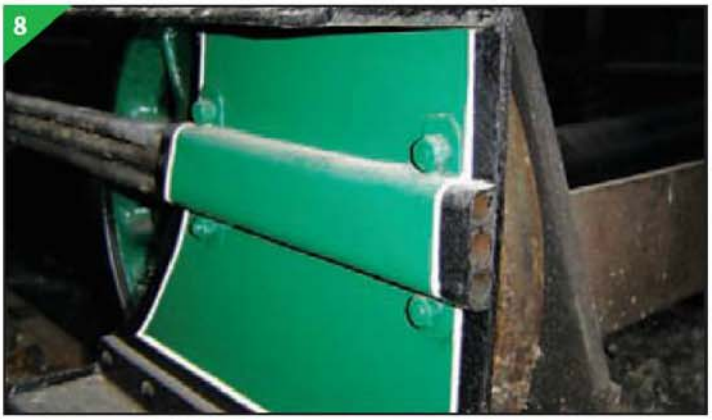
8. Front footstep with draincock pipe steady.

tank, marketed by Reeves. He said that he was building one and liked it very much, and would I consider doing a series of articles on building an engine for *Model Engineer.*

The locomotive that I was building was based on the LBSC 13, a sweet little Atlantic tank. This wheel arrangement meant that I could balance the locomotive, so that the c.of g. lay exactly between the coupled wheels, meaning optimum tractive effort. Roller bearings all round, and simple proprietory castings. I had decided to build it in six months and after nearly three months she sat on the bench as a rolling chassis with finished cylinders and boiler. The valve gear was a little concoction that Simon Bowdich and I plotted. It was a straight link Joy's gear with a kink at the top of the vertical link to compensate for the straight slider guide. To our astonishment, when tuned up on the 'confuser', it gave excellent valve events between 25% and 65% cut-off, with absolute perfection in the middle range, which is after all just what we want. Today, of course, I would simply place an order down the road and pick up a complete set of valve gear, coupling rods, connecting rods, frames buffer beams and anything else I could think of a week later, for about the same money that I would expect to pay for the steel alone.

Simon has lately been working on a Joy's gear for an L&Y Aspinall 0-6-0, and has discovered that by reducing the radius of the curved link he can give improved results from the original. We can therefore offer an engine that can be made as an inside cylinder Atlantic tank in half a dozen different guises- (the Great Northern for instance had a beauty designed by Ivatt) with any kind of inside valve gear, and cylinders that can be easily machined from castings, or a solid block or two of Meehanite or any other metal that takes your fancy. There are also the outside cylinder locomotives, notably the Tilbury tanks, in three very different variations, and a couple of others. These can also use standard cylinders and probably Stephenson's valve gear. I have already drawn the GWR 'County tanks' and all the castings are available for these. Watch this space.

To be continued.



SAVAGE'S
UNIVERSAL CARRIER

PART 31

Continued from page 402 (M.E. 4296, 30 March 2007)

The late Stan Nipper and Martin Wallis begin work on the boiler feed pump, but Martin finishes the article with an account of his experiences gained while running an evening class.

I have been following the correspondence regarding model engineering evening classes in *Postbag* with much interest. If space allows I should like to complete this month's notes with a brief account of the differing circumstances during the 25 year history of 'my' class. Evening classes are an important part of our hobby, particularly for beginners.

Anyway, to the job in hand - the *Universal Carrier's* boiler feed pump. The pump, see **photo 331**, is bolted to the side of the crankcase and driven from an eccentric sheave on the second shaft. The eccentric sheave and strap are kept clean and fully lubricated in a totally enclosed cast casing, complete with an elegant domed lid. The casing, or as Savage call it the *"pump eccentric housing"* has a drain hole in the bottom and an oil filling point in the top. The oil level inside should be sufficient to allow the eccentric strap to dip into the oil as it goes round.

Pump eccentric housing and works drawings

The Savage drawings detail a casting for the housing but, as is their usual routine, do not include the material or the wall thicknesses. Presumably the foundry had separate instructions, and the wall thicknesses were either given separately or left to the pattern makers' discretion. It does beg the question of how much information is given to the pattern maker; the drawings I have are perfect to machine a casting from but would not be sufficient for the pattern making.

Happily the quality of drafting is very good so the drawings may readily be scaled. Due processes arrived at a prototype wall thickness of either a bare 1/4in. or a generous 3/16 inch. Taking 1/4in. as the thickness for the prototype our *Universal Carrier* ought to have just 1/16 inch. This is far too thin a section for a normal sand casting so the model drawings were changed to 3/32 inch. The foundry still complained at 3/32in., so ribs running around the inside of the casting were added to speed the pouring. These ribs are intended to be sacrificial, to be filed or machined away during assembly.

Care and light cuts are required when machining this casting. Initially clamp it down on three points; remember if it is twisted by the clamping action when released it will spring back - and the machined surface will no longer be flat. An angle plate, see **photo 333**, will conveniently hold the casting to machine the pump bush casting. A little filing to complete the 0.125in. radius lugs for the fixings may be required, the outside set should be done in conjunction with the pump eccentric housing cover.

Pump eccentric housing cover

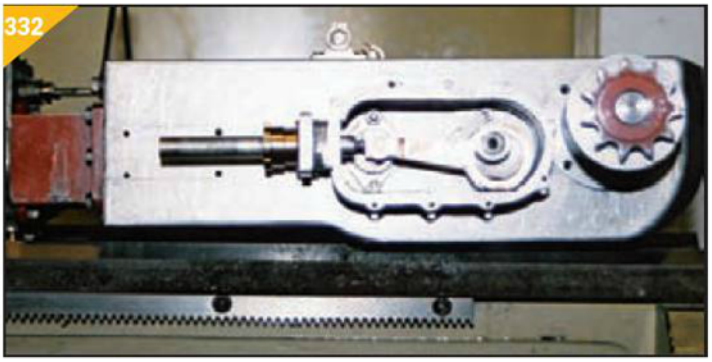
Again a casting is provided. The pattern was made with a pair of press tools to form a piece of 3mm acrylic sheet, very little force being required when the acrylic sheet is hot. A minimum machining allowance was added so if builders choose he/she could simply rub the casting on a piece of wet and dry paper on a sheet of glass or other flat surface. The 3mm wall thickness, which is just a little under 1/8in., cast without mishap.

The dimensions for the 5BA studs that secure the cover to the housing ought to match the lugs on the pattern, but may be adjusted a little if necessary to centralise the drilling to the casting. I am certain that is what the Savage machinists would have done all those years ago so there is no reason why the model engineer should not do the same.

Eccentric sheave and strap

The eccentric sheave has a throw of 1/4in. so the pump ram will have a stroke of 1/2in., plenty to keep well ahead of the boiler's requirements. Little needs to be said about machining the eccentric, or eccentric strap, as the routine >>


331


332

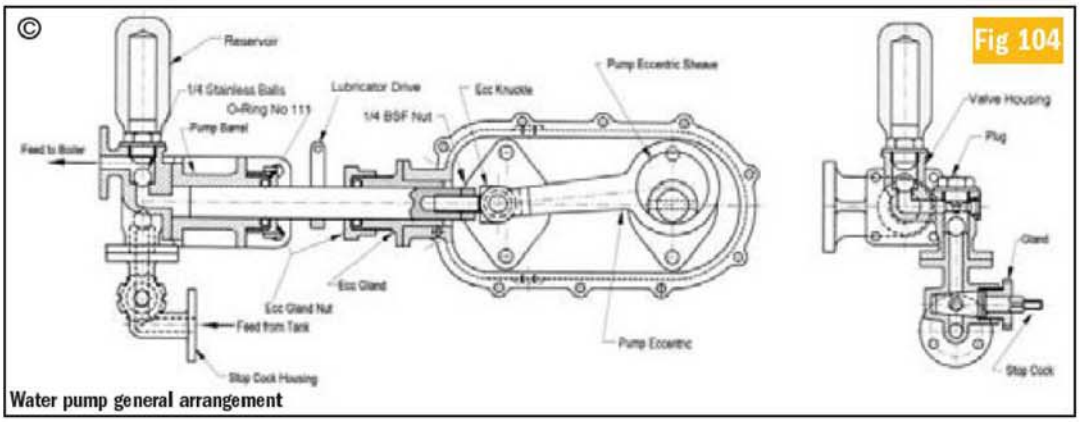
331. The completed feed pump assembly. To enable the eccentric and strap to be viewed the housing cover has been removed (photo: Roger Barnwell).

332. The pump eccentric housing, eccentric, eccentric strap and pump bush and cap are the parts we are concerned with in this article (photo: Stan Nipper).

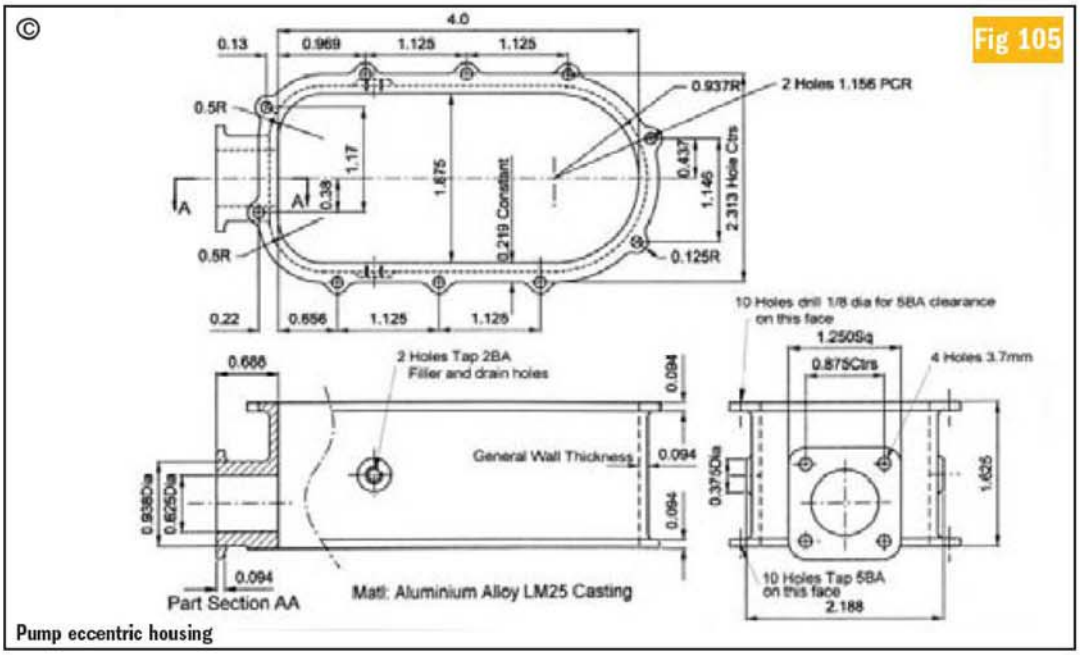
is essentially a repeat of what was undertaken earlier for the valve gear sheave and strap.

Sharp eyed readers may have already spotted from the illustration how close the eccentric bore is to the edge (**photo 335**), which might raise a few eyebrows, indeed if the 0.438in. bore is increased to 1/2in. it would break through. Stan's drawings, just like the Savage works drawings, show the diameter of the eccentric virtually clipping the bore. Stan and I spent some time wondering if we should make a 'correction' to the drawing but to do so, given how limited all the clearances were, would mean enlarging the eccentric housing and as may be seen it already butts against the extension tubes that takes the drive to the back wheels. We wondered if originally the pump was found lacking so to increase its performance the throw was increased, by as much as could be done in the confines of the housing.

With the limited clearances in mind the outside of the eccentric strap will need to be machined, see **photo 336**, and even with the outside of the eccentric machined close inspection of **photo 331** reveals that Roger ran a boring bar through the right hand end to lightly skim through it and remove the ribs. A few minutes with a slot drill will complete the fork and the eccentric and rod will be ready to fit. Both the eccentric and the little end pin are held in place with a roll pin.



Water pump general arrangement



Pump eccentric housing

Pump bush and gland cap

A gunmetal casting is provided for the pump bush. First of all rough machine it all over so you are holding proper machined surfaces when finishing to size. Aim to drill, bore, and ream the main bore; add the 0.75in. x 24tpi thread and the recess for the O-ring all at the same time so concentricity is guaranteed.

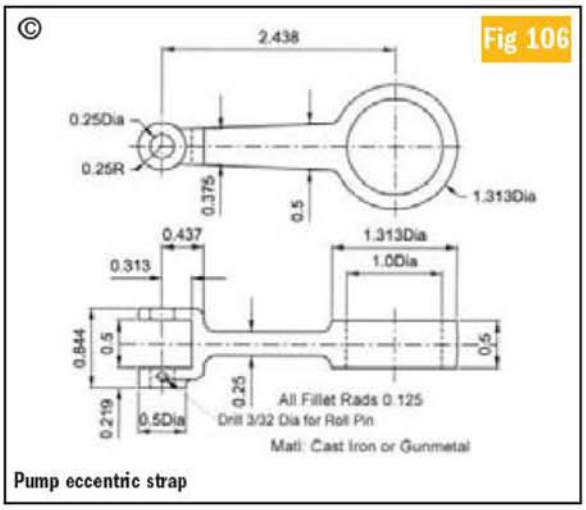
The 0.75in. x 24tpi thread was chosen for convenience as 24 is a multiple of 8 - which is the leadscrew pitch for both Myford and Boxford lathes. This makes the screw cutting about as easy as it gets. When forming fine threads, particularly on boiler fittings and pumps, I prefer to screw cut first and then lightly chase down the thread with a die to complete the tooth form. I find BSB (British Standard Brass) a very handy thread in these circumstances. As far as I know BSB is always at 26 threads per inch. I have BSB taps and

333. Machining the bush flange (photos on this page: Stan Nipper).

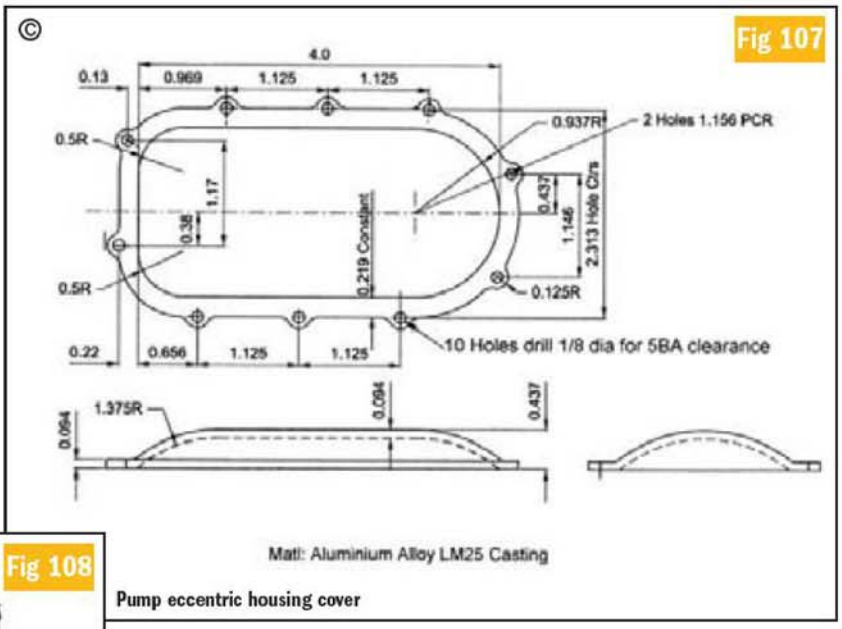
334. The 1in. dia. clips the eccentric boss, exactly as in full size.

335. The completed eccentric.

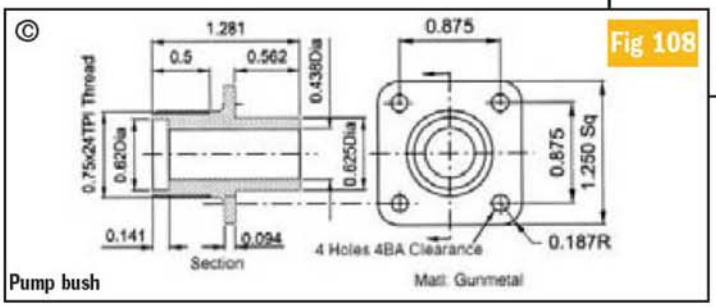
336. The outside of the eccentric strap will need to be machined to attain the necessary clearances.



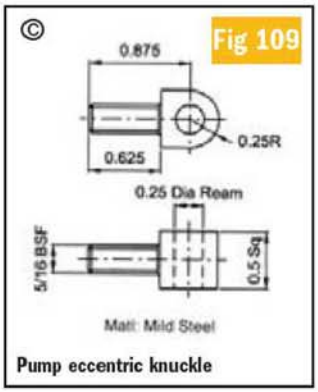
Pump eccentric strap



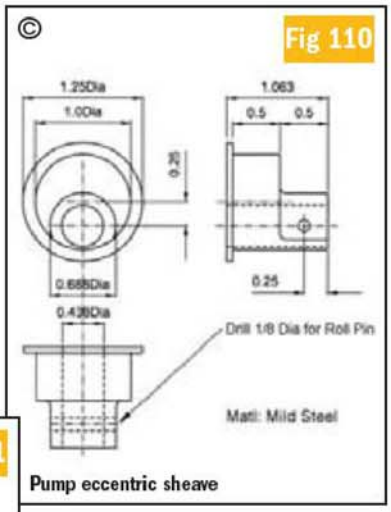
Pump eccentric housing cover



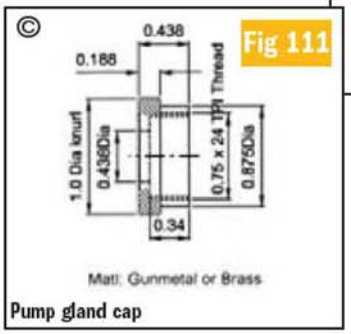
Pump bush



Pump eccentric knuckle



Pump eccentric sheave



Pump gland cap

dies up to 5/8in. but not 3/4 inch. If you happen to have a set then 3/4in. x 26tpi is, of course, fine for the thread. The same applies to the cap, screw cut away the bulk of the thread and complete with a tap.

Pump rod and eccentric knuckle

The pump rod is a length of 7/16in. stainless rod some 4in. long, the length to be confirmed on the model. The eccentric knuckle is threaded into the end of it, once adjusted a lock nut being provided to prevent subsequent movement. Two gland nuts are provided, one on the eccentric housing side to keep the oil in and the water out and the gland nut on the pump barrel to do exactly the reverse - keep the water in and the oil out. It is important not to allow oil into the boiler as priming is bound to ensue.

An evening class

It is with some pride that I realise that 'my' evening class is in its 27th year.

In 1980 I left university and started my first job teaching. I instructed O-levels students, as they then were, in woodwork, metalwork, and technical drawing; although I did not take to the technical drawings - so much more fun to make. By default I was responsible for the metalwork shop as no one else was interested. Equipment included a Colchester lathe, two Harrisons, two Raglan training lathes, a Harrison horizontal milling machine, a power

337. Machining the eccentric strap fork (photos on this page: Stan Nipper).

338. Screw cutting the 0.75in. x 24 tpi thread on the pump bush.

339. Machining the radius on the eccentric knuckle.

340. Finished - one eccentric knuckle.

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hacksaw, aluminium casting facilities and (frighteningly) next to no hand tools. The files supplied were blunt to the point of being near useless.

The machinery maintenance had been non-existent for years so each evening after school I stayed an hour or two and headstocks were topped up with oil, slides were adjusted, files replaced, and hacksaw blades renewed and but back in their frames the right way around. Since I was staying on late it seemed only fair to allow the keener students to stay on with me, partly to help and partly to work on their projects for their examinations. The numbers grew steadily and more and more time was taken keeping an eye on the youngsters, and inevitably the maintenance program slowed. The solution was an evening class. The school was very supportive; a fee was set and a register supplied. I was doing just the same but now I was being paid, naturally a bonus.

Full time co-ordinator

In 1980 each school, certainly in my county, of any size had a full time (or near full time) member of staff appointed to co-ordinate evening classes, further education, and after school activities. All I had to do was walk up the corridor and ask if a class could be started. If a class was poorly attended it certainly shut but the co-ordinators discretion allowed popular classes to subsidise those that might fall a few pennies short of the full pound. In my opinion a happy, informal, arrangement of considerable mutual benefit to all concerned. My class was always very well attended in the winter but slightly less so in the summer.

In due course the class expanded and covered two evenings, one for beginners and the other for those with more experience which evolved into the adult class. Three years later promotion in the 'day job' took me to another school, but not feeling able to disappoint the class, the evening class continued uninterrupted and I commuted from school to school. Unfortunately, after I left the workshop maintenance ceased and the condition of the equipment steadily deteriorated, eventually to the point where the class could not effectively function.

After some persuasion my present school (non LEA - Local Education Authority) agreed to host the class and the Colchester and Harrison lathes were superseded by Myford 254s and VMC milling machines. The smaller work capacity was certainly keenly felt but all the Myford lathes worked, were well cared for, and all the tooling was sharp and to hand. Happily the school did have oxy-acetylene, an air/gas hearth, aluminium casting facilities, sheet metal folding equipment and other such specialist equipment not available to most model engineers. The finances continued to be run by the LEA, cheques being made payable to them and my salary LEA authorised.

Numbers attending, particularly children, were in excess of capacity and a waiting list was normal. Students came from several schools, not all local. From time to time A-level and university students joined, and several pupils did their GCSE course work at the class.

Financial arrangements

Unfortunately while the facilities were good the financial arrangements behind the facade became increasingly doubtful. Registers were seldom sent, receipts not forthcoming and worse still - the staff were not getting paid.

The 'education cuts', or perhaps in preferred terminology the 'search for efficiency' via 'accountability' etc. envisaged savings by rolling several schools' evening class activities under one organisational umbrella: appointing what I recall were called 'patch co-ordinators'. The result was I no longer knew who my immediate boss was, finding out the term dates was far from straightforward, and teaching contracts were sometimes over half a term late. The 'patch offices' seemed to employ almost exclusively temporary staff, usually gap-year students. who were always cheerful and polite but inevitably had no clue as to what model engineering might be about, and were without any access to the useful information. Far from being simpler the amount of paperwork increased. I was asked to return numerous questionnaires on gender, ethnic origin, country of birth, and all sorts of information that I considered was rather personal information and had no bearing on model engineering whatsoever. I was asked for schemes of work, i.e. for the syllabus. At one stage I was told that if the class was not 'working towards a recognised qualification' it could not continue. I ignored it all.

It seems funny now, but was not at the time, when the 'search for efficiency' dictated that I would now require two quite separate contracts, and thus two pay checks, one in respect of the students in the class (i.e. children) and one relating to the adult members, the two hypothetical classes taking place concurrently. Simultaneously 'they' could not decide on the correct rate of pay for my assistant (there were too many juniors for me on my own) and she ended up twelve months in arrears with her pay.

By chance, and ironically for those who know me, I discovered that if my class could be re-categorised as a 'sport' it could be run by the sports' hall (cheques still payable to LEA), thus model engineering joined ladies badminton, yoga and karate and for a while I was a fully paid up 'sports teacher'.

Obvious casualty

When the class moved school I had already changed from two nights to one, but in addition to the evening class the day job required a further evening duty of me each week for the school pupils. The school has a substantial number of boarders so an evening workshop activity is offered for them. Add in a parent's evening and I was regularly at work three evenings a week.

Since there was nothing to be done about the school's evening duty expectations, the obvious casualty was the evening class. However, as part of the school's charitable status there is an expectation that it shares the school's facilities, at least in part, with the wider community. Already the evening class took place on the school premises, the county council paying £5 a week for the privilege. Could the school be persuaded to allow the evening class members to join the school's own late night workshop session?

Great success

The answer was: *"Yes!"*, and it has proved to be a great success. In setting the fees the school bursar enquired what the usual evening class fees were and, to my astonishment, then set the fees to a little under half that figure.

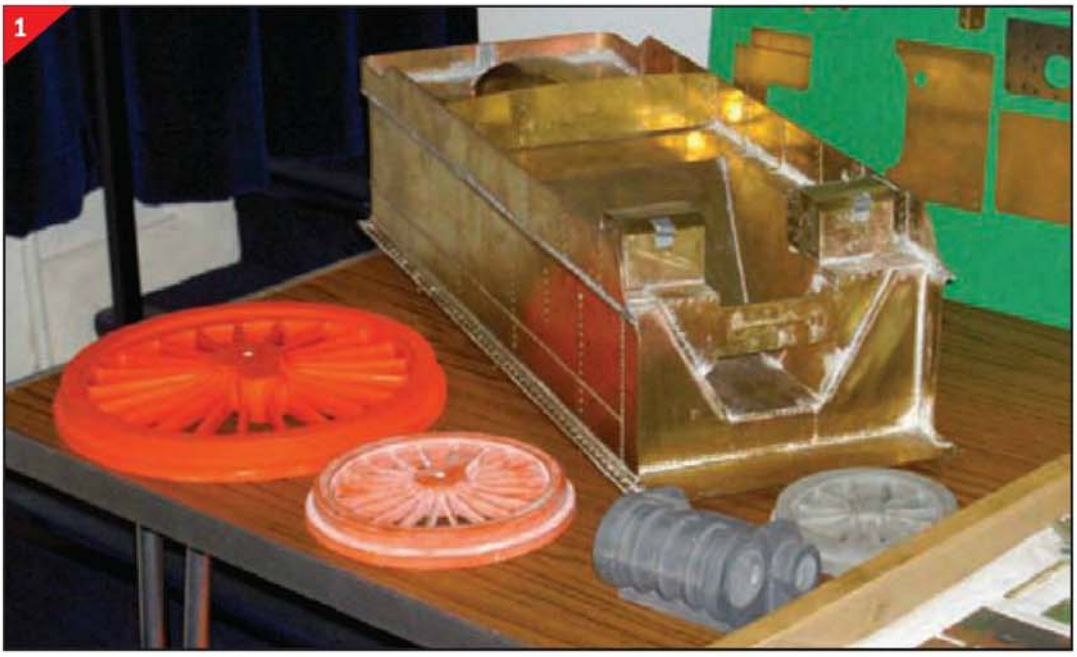
My primary duty remains to the school pupils, but at just £2 an hour the evening class 'senior group' are very happy to help each other and, if necessary, be patient. A considerable bonus is the enormous pool of knowledge from a dozen or more adults that is available to the pupils, combined of course with endless quantities of encouragement for all things 'engineering'.

A consequence of the combined nature of the class means that 'child protection' issues prohibit any advertising. I understand, if advertised, there would be a requirement to 'police check' the class members as they are sharing facilities with juniors. However, if it can be demonstrated that members are there for the right reasons, and I am present all of the time, the school is satisfied. We accept new members by personal recommendation only.

What happens to the monies raised from the course fees? Last term we bought a large plastic Christmas tree complete with lights for the foyer, and plans are in place to award end of year prizes for promising engineering students.

To be continued.

LOCOMOTIVE BUILDING
Using modern methods



Michael Jones
M.E.'s new assistant editor and SMEE member, reports on a recent presentation by Professor Peter Thomas.

1. Many parts were displayed at the talk, including the completed tender body, patterns and castings.

2. An example of a cab produced using some of the methods discussed in the text.

Earlier in the year, in a moment of super-organisation, I wrote a wish list in my diary of all the talks and model engineering events I hoped to attend during the year. The title of one talk, *Building a Model Locomotive Using Modern Methods* to be given by Professor Peter Thomas seemed particularly intriguing. So, it was good fortune that I happened to be near London on 3 February 2007 and was able to attend.

Before the talk, the SMEE meeting room was abuzz with members discussing the many interesting 'bits and pieces' spread across the tables in the front (**photos 1** and **2**). These caused a lot of admiration and speculation by members. There were many questions, the answers to which were revealed during the talk.

Professor Thomas started by explaining that one reason for producing locomotive parts in varying stages of completion was to give encouragement and help to model builders so that more locomotive models could be completed. He felt that many models failed to be completed because constructors came up against obstacles that seemed insurmountable. Some of these might be overcome by producing affordable parts using modern methods which would give that extra boost for builders needed to see these projects through to completion.

The modern manufacturing technologies employed all start by using CAD (computer aided design) and CAM (computer aided manufacturing) software to design the parts and plan the best ways to make them. Along with his knowledge of manufacturing methods, this has allowed Professor Thomas to develop and introduce better ways to produce castings and numerous other parts for the range of products offered by Practical Scale in collaboration with Polly Models. **http://www.pollymodelengineering.co.uk**

The objective of their locomotive designs is to produce models which are as close to scale for the prototype as possible, without sacrificing detail. Yet, the designs are easy to build, thereby satisfying both the discriminating model engineer and less advanced builders alike. They should perform well on the track.

Professor Thomas was of the opinion that fully-machined kits may be a good way for model engineers seeking to build a locomotive to start in the hobby, for example, the '*Polly*' locomotive models. However, in contrast to kit locomotives, where every part is fully machined, the components from Practical Scale are not complete locomotive or tender kits, rather they are a means to hasten the building of certain models. There are still plenty of parts that constructors must make themselves. Several reasons were offered as to why this approach might help locomotive builders.

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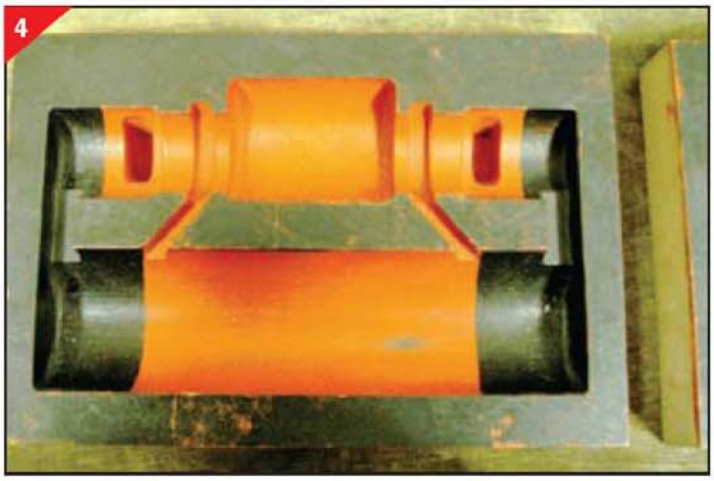


3. Penrhos Grange cylinder pattern showing fine details in reinforcing ribs around the cylinder.

4. Core box for the cylinder pattern.

5. 7¼in gauge wheel pattern.

As fewer people come from industrial backgrounds to become model engineers, the pool of talented practical engineers and toolmakers to whom other aspiring model engineers can turn to for information diminishes. Therefore, those interested in pursuing the hobby of model engineering when faced with common challenges to their abilities or available machinery might find cut-to-size or fully machined parts to be the answer.

Other reasons include modern life's frenetic pace which may mean builders face a shortage of time to complete projects. Additionally, some may lack the facilities, equipment, materials, or ability to finish their locomotives and they become disheartened at their progress (or lack thereof). Professor Thomas expressed the hope that more models could be finished and out running on a local track as a result of this approach to locomotive building.

Finally, in a society where disposable income has generally increased, model engineers are more likely to be able to afford to buy components that can be an aid to completing a model. The components, available in varying stages of completion-from castings to fully machined parts, may help those who face some of the challenges outlined in completing their locomotives.

Penrhos Grange

Neville Evans began his *Penrhos Grange* design as an adaptation of the castings and other parts used in *Torquay Manor*, a locomotive design developed by the late Martin Evans (no relation). In full-size practice, Great Western Railway locomotives shared many parts, so this was a very prototypical approach to designing a locomotive. Articles on construction of the new model, using existing castings began appearing in *Model Engineer* before Peter Thomas entered the scene and offered to design a cylinder for the 'Grange' based upon principles he used when making parts for his own model GWR 51XX class locomotive.

The design of this new, more prototypical, cylinder caused some confusion to builders of the locomotive as construction articles had already begun to appear in *Model Engineer*. There were, however, several significant benefits to the new cylinder casting design. The functionality was increased and thermal efficiency improved. The weight was reduced; a completely machined cylinder only weighs just under two pounds (900 grams) and it has been made easier to machine.

Finally, reducing the size of the casting allowed Neville Evans to change the *Grange* design to incorporate a scale-sized bogie, something which was not possible previously. The result radically changed the *Manor* to *Grange* conversion into a new, more prototypical model while making the construction process easier.

Manufacturing versus model engineering

Polly Engineering, along with a few sub-contractors, provide machining and other services for the components for Practical Scale. Professor Thomas pointed out some key areas where model engineering and manufacturing differ. Model engineering techniques are not applied to manufacturing because the time versus cost balance and the machines used are different. He contrasted a CNC machining centre where multiple parts can be machined in one setup, and left unattended by an operator versus the model engineer's approach to using a lathe or milling machine where one part at a time is machined. Whilst in manufacturing more time may be spent on setting up for CNC production, the actual production times can be very short.

Additionally, the consistency and accuracy needed for inter-changeability of parts is built into methods of commercial production of parts. They need to make sure that a wheel ordered today will fit an axle made earlier, for example. In short, manufacturing these parts means the accuracy of the machined parts may be higher, but the tolerance is greater.

Because of the greater accuracy of the castings produced by the modern methods described in the talk, it is possible to take these directly to a CNC machine without additional preparation work.

Pattern making

The two main cast iron products produced for *Penrhos Grange* are the cylinders and wheels for both the locomotive and tender. The patterns for these were first designed and drawn in a solid modelling CAD programme. Next, the pattern file is opened in a CAM programme and here the various features of the pattern were assigned specific machining procedures. For example, roughing out the shape with larger cutters is one operation. Selecting machining cycles using progressively smaller cutters, some with ball noses, allows the finer details like the radii between the spokes to be produced. All these machining operations are processed by the CAM programme to create a computer readable file containing the specific instructions that a CNC machine needs to operate.

On a CNC-controlled milling machine or router, patterns and core boxes are machined from hard polyurethane board (a plastic) that holds detail well and is durable enough to be used in the foundry.

Urethane patterns are tan, but after machining they are painted orange, for the actual shape of the casting, and black, for core locations, **photos 3, 4** and **5**. By machining directly into a high-density pattern material one can produce a strong, single piece pattern such as the wheel shown in photo 5 without the need to glue many small parts together. A lot of detail can be achieved as illustrated in the close-up of the re-enforcing bands on the cylinder casting (see photo 3).

Machining castings

Wheels and cylinders can be supplied as either raw castings or fully machined. Prof. Thomas displayed examples of both. An excellent example of the differences in manufacturing processes from those used by model engineers was provided in the way a cylinder casting is mounted for machining. **Photographs 6** and **7** show how the cylinder is mounted on a fixture which rotates for all the machining operations needed: boring the cylinder and valve bores, facing both ends and drilling the holes for the cylinder and valve cover studs, etc.

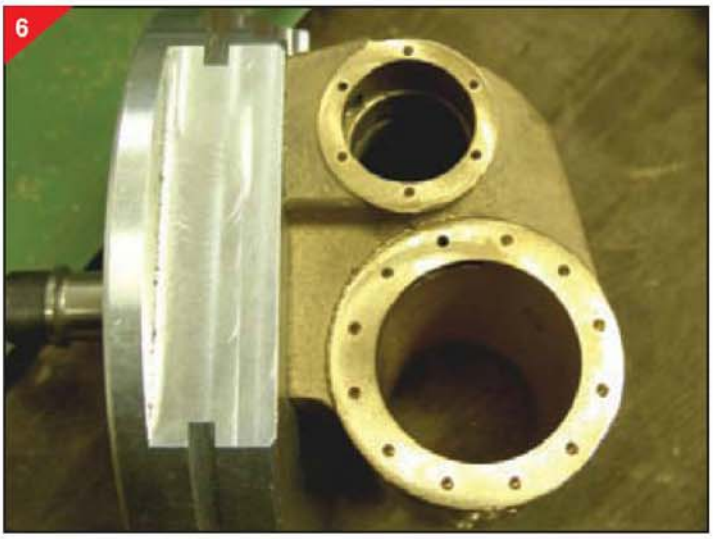
Annealed castings

If iron cools too quickly it can develop hard spots which can make machining very difficult. The solution is to heat treat iron castings before they are machined or shipped to customers. A heat-treating specialist provides this service for Polly Models/Practical Scale. Several other sub-contractors provide specialist services, too.

Laser cutting

Some people like producing frames by drilling and hack sawing and filing, but laser-cut frames were offered as an example of how modern methods take the 'donkey work' out of producing these time-consuming parts. A common feature of many commercially produced laser frames for locomotives is centre-marking of hole locations with the laser. Professor Thomas was emphatic about his aversion to spotting the centres this way. Firstly, the cost rises due to the increased machining time on the laser; he felt this made them economically unviable. Secondly, the resultant marks have a hardened centre which can cause problems such as drills wandering and breaking.

His preferred method of drilling holes in production is to have them all started with a spot drill using a CNC machine. This way, not only are the centre marks in the right place, but they won't be hardened and the model engineer can simply get on with drilling. He reiterated that the purpose of the parts was to be an aid: to make it possible for constructors to complete models more rapidly. If they started breaking drills putting holes in frames, this defeated the purpose.



6. Bronze cylinder mounted on machining fixture.

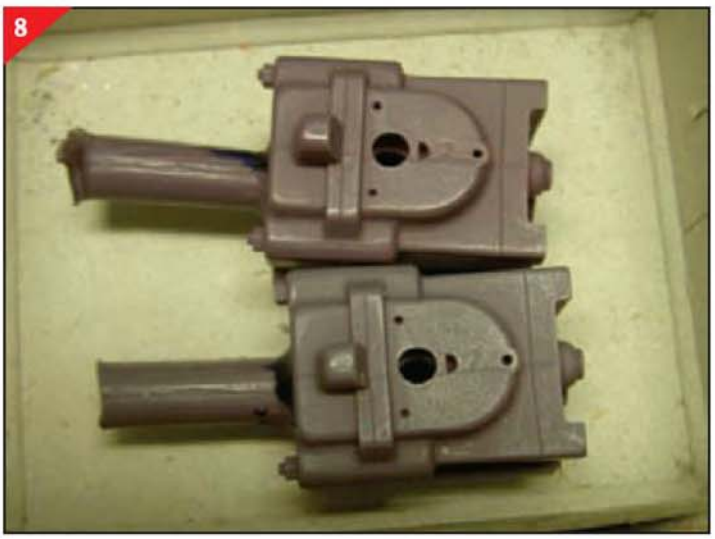
7. By using an indexing fixture all surfaces on the cylinder can be machined in one setup.

8. A pair of tender axle box lost-wax patterns with sprues.

Lost wax casting

Lost wax casting was discussed as a way to ease the difficulty of producing the 'fiddly bits' of a locomotive. An example shown and discussed in detail was that of the uniquely shaped GWR brake hangers.

A master pattern in brass >>



9. The highly-recognisable GWR safety valve cover as a lost-wax casting.

10. Real opening cab windows which may suit other GWR locomotive classes.

was constructed in three pieces. The two outer parts were machined to the correct profile with bosses at either end. Between these was sandwiched a triangular spacer. The pattern came apart quite easily, to aid its removal from the mould. This quick construction method was seen as the good way to 'knock up' a master pattern whose singular purpose was to be the basis for casting wax patterns in a soft silicone rubber mould.

This mould is created by imbedding the master part in unhardened silicone moulding material and applying a vacuum. When cured, the silicone is ready to have the pattern removed. This is achieved by a highly skilled person who frees the pattern by making herringbone cuts in the cured rubber. These cuts will rebound, be self-supporting once the master has been extracted, and will not show on the wax patterns when they are cast. The silicone mould is strengthened in a hard backing to improve its durability and shape when hot wax is poured in.

When cool, the wax patterns (**photo 8**) are attached to a central sprue. The resulting 'tree' of patterns is placed in a casting flask and a ceramic refractory slurry poured in. When set, the ceramic flask is heated in a furnace to further dry the ceramic refractory and melt the wax. Then, molten metal (brass, stainless steel, etc.) is poured in the flask and when cool, the 'tree' of parts, now all metal, is removed from the ceramic casting.

To prevent distortion in the finished investment castings, it is sometimes helpful to cast some holes as solid features in the parts. Centre marks can be used at these locations which means the constructor only needs to drill the part to complete it.

In addition to brake hangers, other lost wax parts available for the Great Western Railway or Collett-designed locomotives include, crossheads (in stainless steel), axleboxes and covers, tender hornblocks, spring hangers, motion brackets and the distinctive GWR safety valve bonnet shown in **photo 9**. Crossheads, because of their complexity, and safety valve covers and chimney caps, because of their prominent position on a locomotive, really benefit from the fine quality of the lost-wax casting.

Wire EDM

Wire Electric Discharge Machining (EDM) is a capability not found in most model engineers' shops. This spark erosion technique can very precisely cut very hard materials and the thinness of the wire means details can be incorporated in the parts which are unachievable otherwise.

Expansion links and die blocks were displayed for *Penrhos Grange* which had been cut from gauge plate. The links had immaculate detail and their inner curved edges (where the die block runs) were relieved, both sides, to allow the block to have a slight overrun at the ends of its bearing surface as in full-size practice. The die blocks were shown to fit perfectly in either link.

Platework

The power of CAD was well illustrated by the methods used to produce brass sheet parts for the GWR tenders, cabs and cab window frames.

The cab is available as a complete kit of parts with all holes drilled, including the roof see photo 2. Such is the accuracy of the CAD design and subsequent CNC machining, when the roof is bent into place, all the rivet holes, angles and mating parts will line up properly.

Opening window frames (**photo 10**) with operating closing latches to fit in the spectacle plate of the cab are available. According to the design selected, these can be fitted with either plastic or glass window panes and these are suitable for several GWR locomotive models.

Tender parts start as a large flat sheet of 1mm brass secured on a CNC router by a the suction from a vacuum table which has a renewable porous subsurface (so the cutter can cut into it safely). A small, two-flute slot drill is used at a spindle speed of 24,000rpm to cut the parts in three passes. Holes are drilled (actually milled as round circles), using the same cutter, at the same time as the shape of the parts is cut.

The 3500 and 4000 gallon tenders are supplied as flat stacks of parts. These are not the tenders which feature that distinctive flare at the corners (see *M.E.* 4292, 2 Feb 2007) seen in earlier GWR tenders, rather they are the straight-sided tenders appropriate to the locomotive designs of the Chief Mechanical Engineer of the Great Western Railway, C.B. Collett.

Some sheet metal parts, are machined with a ball nose cutter to make a score line for bending. This allows the bends to be the correct shape and accurately placed, improving their mating with other parts. Producing these tender parts for the model engineer removes a lot of the hard work needed to make some of these parts using conventional methods.

Future plans

The next locomotive designs intended for 'the modern methods treatment' using the techniques discussed in the Professor Thomas's talk are Neville Evans' 5in. gauge design for a Southern Railways 4-4-0 'Schools' class and a GWR 4-6-0 *Hatherton Hall*. Additionally Practical Scale is working on the Collett Goods 0-6-0 tender locomotive designed by David Aitkin. Beyond that, efforts will go into developing models for which sufficient interest has been expressed. Let your wishes be known. **ME**

MACHINE TOOLS

Deckel FP1 milling machines

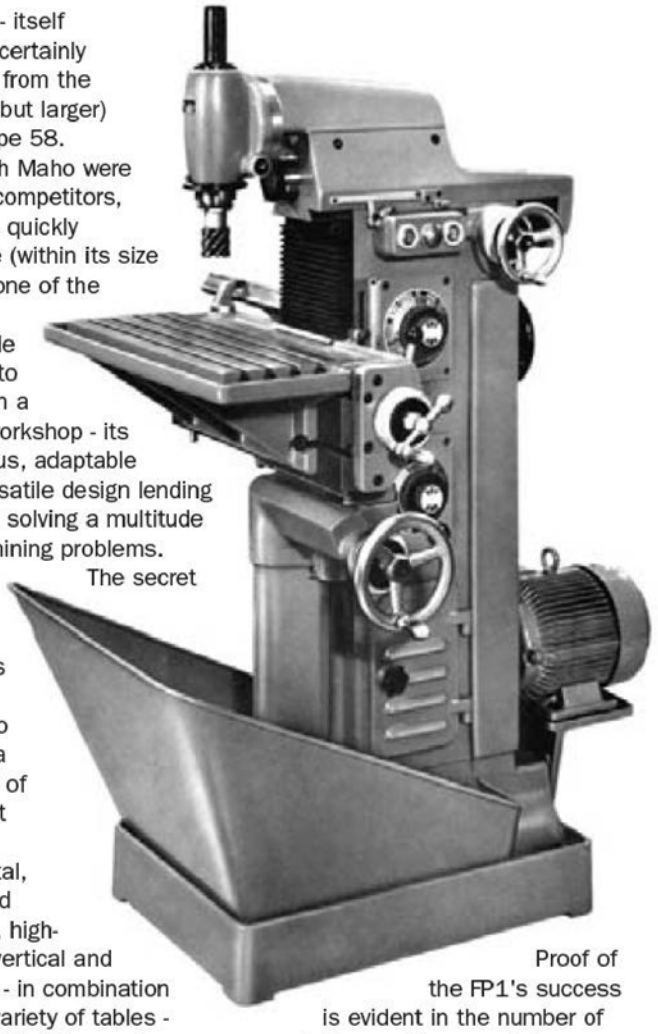
Tony Griffiths looks at the development of these highly desirable German universal milling machines and the dozens of clones.

Founded in Germany during the early years of the 20th century, the Deckel Company's machine tool business grew out of its involvement with the camera industry. Its specialisation was leaf shutters, using the brand name Compur, a type widely used by leading manufactures including Hasselblad on their 'Type C' lenses. Deckel also developed the well-known and very successful bayonet lens mount for the Retina Reflex, Voigtlander Bessamatic and Ultramatic cameras - a design that held back, for a while, the invasion of the much cheaper, yet just-as-well-made, Japanese single-lens reflex.

By 1984, and with demand for leaf shutters confined to a shrinking market, Zeiss, which owned both Deckel and Alfred Gauthier, (makers of Prontor shutters) merged the two firms. Production continued until around 2002 when, due to a catastrophic fall in demand, a final halt was called.

Although in 1953 the majority of Deckel's 50th anniversary brochure was devoted to camera-associated products, they had, by then, gained sufficient experience to manufacture specialised machine tools for use in their own factories. As a result, Deckel were able to launch into the rapidly expanding market of the 1950s a range of high quality milling machines and milling accessories using their own name but employing a company set up separately from the shutter business.

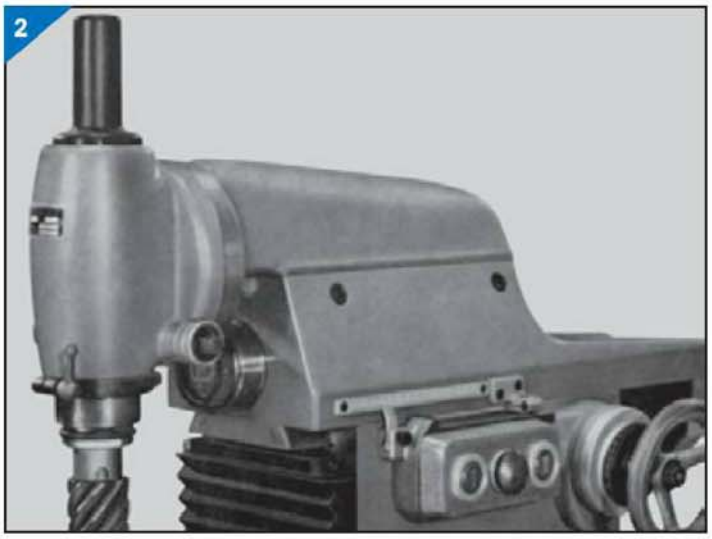
If the widely believed chronology is correct, the FP1 was a smaller, more handy interpretation of an already established design, the Maho SK250 - itself almost certainly derived from the earlier (but larger) Thiel Type 58. Although Maho were strong competitors, the FP1 quickly became (within its size range) one of the most desirable millers to install in a small workshop - its ingenious, adaptable and versatile design lending itself to solving a multitude of machining problems.



1. The Deckel FP1.

The secret of the type's success was its ability to mount a number of different heads - horizontal, standard vertical, high-speed vertical and slotting - in combination with a variety of tables - plain, plain-tilting and compound swivelling. All the heads could be driven backwards and forwards across the top of the main column, by a handwheel and gearing to provide an in-out feed, while the tables all bolted to a flat, vertical T-slotted knee equipped with power longitudinal and vertical feeds. By juggling the choice of heads and tables, and utilising other accessories, a skilled technician was seldom defeated in his attempts to produce the most complex of milled and drilled components - and all to a very high standard of accuracy.

Proof of the FP1's success is evident in the number of similar machines made in various European countries with examples including: Switzerland by Aciera (F1, F2, F3, F4 and F5), Schaublin (Model 13), Mikron (Models WF2/3S, WF3S, WF-3-DCM and WF-2/3-DCM), Christen (Type U-O) and Hispano-Suiza S.A. (Model HSS-143); in England by Alexander (Master Toolmaker); Czechoslovakia by TOS (Modesl FN32 & FN40 Optic); the former Yugoslavia (in Zagreb) by Prvomajska (Models ALG-100 and ALG200); Italy by C.B.Ferrari (Models M1R & M2R) and Bandini (Model FA-1/CB); Denmark by Metba >>



2. Vertical spindle head.

(Models MB-0, MB-1, MB-2, MB-3 and MB-4); Germany by several companies including: Maho (many models over many years), Macmon (Models M-100 and M-200), Thiel (Models 58, 158 and 159), Hermle (Model UWF-700 and UWF-700-PH); Rumag (Models RW-416 and RW-416-VG) and Emco (Model F3); Belgium by S.A.B.C.A. (Model JRC-2); Poland (as the Polamco FND-25 and FND-32) - and also by three manufacturers with uncertain origins: Sinn (Models MS2D & MS4D), Ruhla and Comet (Model X8130, imported to the UK in the 1970s by TI Comet). At least five Chinese versions have also been made, including one from the Beijing Instrument Machine Tool Works.

A number of the 'clones' were indigenous designs that merely followed the general Thiel/Maho/Deckel concept while others, like Bandini and Christen, borrowed heavily from Deckel and even had parts that were interchangeable. Should you come across any of those makes and models all will provide 'The Deckel Experience', though you must bear in mind that, being complex mechanisms, they can be difficult to repair.

The FP1 was eventually to be built in three versions, each easily distinguished from the others: the Mk. 1 of the early 1950s had lever engagement of spindle speeds (by the juxtaposition of two levers on the right-hand face of the column) but changewheels (inside a case on the right-hand side of the column) to vary the rate of table power feed; the Mk. 2 of the late 1950s used levers to alter both speeds and feeds while the Mk. 3, introduced during the early 1960s, was fitted with more convenient and modern-looking dial controls.

General layout

Constructed in an ingenious way, the layout of the spindle-drive system was both compact and effective. The top of the main column was machined as a slideway to carry a separate housing that doubled to carry a horizontal milling arbor and also act as mounting for the various heads or a horizontal milling overarm. The chrome-nickel alloy spindle was case hardened and ran in bearings that provided both excellent support and an easy means of adjustment. To solve the problem of how to drive the spindle when its housing was moved forwards and backwards (to provide lateral travel to the cutter), a long fixed gear was mounted parallel to and beneath it on the final-drive shaft and the upper gear allowed to slide along it.

A word of warning for users of the English-made Alexander Master Toolmaker who might want to fit a Deckel head - the Alexander drive gear has a 21deg. pressure angle while that of the Deckel is 14.5.

Besides normal horizontal and vertical milling operations, all models were available with a range of suitable accessories to cover slotting, jig boring, spiral and punch milling. In respect of these operations, an important part of the machine's versatility was dictated by the multi-angle, swivelling and tilting table. With just the plain table in place the miller remained very desirable, but it was not possible to enjoy to the full all the FP1's ingenious capabilities.

Drive system for head and table

Cleverly arranged so that the table-feed rates were completely independent of spindle speeds, the drive system on the Deckel began with a two-speed 3-phase motor mounted at the back of the machine on an easily reached, completely open and height-adjustable cast-iron platform. The table-feed gearbox was mounted inside the column, below the spindle-drive gears, and had eight speeds. Used in conjunction with the two-speed motor this arrangement gave 16 feeds, the fastest of which, the makers suggest, was quick enough to be used in place of a power 'rapid-traverse'.

While the rate of table feed was set by either pick-off gears or (later) two levers or a dial, on all versions the direction of movement was controlled by an unusual (for a machine tool) ball-handled rod, rather like a car gear-change lever. The lever controlled the movement of the main 'vertical table' through eight different directions - left, right, up, down and a further four combinations where, with both horizontal and vertical feeds engaged at once, the table would move diagonally at an angle of 45 degrees. The table feed screws were all precision ground, ran though large bronze nuts and were fitted with exceptionally clear, finely engraved satin-chrome finish micrometer dials.

Built-in steel rulers were provided for each axis of movement which, in combination with holders to accept dial-test indicators and gauge blocks, allowed high-precision measurements by co-ordinates to be made, independent of the feed screw readings. All table movements were fitted with automatic tripping stops with the upper one, to limit the table's vertical rise, fitted with micrometer adjustment. On the earliest model, to protect the table-drive mechanism against overloads, a shear pin was fitted hidden under a slip spring above the coolant pump. All gears, and their shafts, both spindle and table drive, were hardened and ground-finished.

Heads

Several types of vertical head and cutter supports were available: a standard overarm and drop bracket to hold a horizontal milling arbor; a standard vertical spindle head, powered by the machine's own drive system; a high-speed vertical spindle head with its own motor; an angular spindle head driven from the main motor and designed to assist with the milling of hard-to-get-at sections; a corner milling spindle with its own motor and a swivelling, belt-driven end tip intended for machining internal corners and edges - and a rare precision boring head from the LKB optical coordinate jig boring machine. A simple slotting head was also listed.

Vertical heads

Usually ordered with every machine as a standard accessory, the ordinary vertical head could be swivelled through 360deg. and was equipped with a (rather short) 2.375in. (60mm) travel quill carrying a No. 4 Morse or 40 INT nose. The maximum clearance between spindle axis and inner face of the main column was 11in. (280mm). Unfortunately, the head had exactly the same range of 16 speeds from 40 to 2000rpm (or 95 to 1900rpm) as the horizontal spindle; a range that (compounded by a very short lever and small knurled-edged handwheel to move the quill) limited its ability to use very small cutters.

To get round the problem Deckel offered an alternative

head, the 'High-speed', powered by a 0.75hp 3-phase motor that gave six belt-driven speeds from a low of 1900 to a maximum of 6000rpm. Fitted with a 40 INT nose the head could be swivelled 45deg. either side of central and, because the unit was self-motorised and did not require the usual gear drive, the base was able to be made extra long to provide a useful 7.875in. of extra travel and an additional 4in. of clearance from cutter centre to the column face. Unfortunately, instead of equipping the high-speed head with a long-travel quill with fine-feed control, Deckel used the same annoyingly restricted unit from the standard head. a design decision that any operator charged with the delicate handling of small cutters would have found very frustrating.

Angular spindle head

An interesting accessory, designed to machine into places that would otherwise have been impossible or very difficult to get into with conventional tooling, the Angular Head was fitted as standard with a No. 1 Morse taper socket, into which a variety of special or standard cutters could be mounted. The head could be swivelled 360deg. about both its longitudinal and vertical axis, so allowing the tool to be set at any desired angle 'in space' - not quite up to the ingenious flexibility of the system used on the (very much heavier) French-built multi-swivel Hure miller, but not far off.

Corner milling spindle head

Another unit intended for use in workshops producing mould and die tooling where access to internal corners and edges was difficult. The spindle carrier assembly could be rotated through 360deg. about its vertical axis, while the cutter-spindle proper could be twisted through an angle of 90 degrees. A single-lip cutter was usually used, ground specially to shape for the job required. Driven from its own 0.55kW motor, a round drive belt, with a pair of jockey pulleys to keep it in proper contact with its pulleys, passed down the length of the column and drove the spindle head directly. Because only very small cutters, required to run at very high speeds, were employed, just two speeds of 4000 and 6000rpm were provided.

Precision boring head

Lifted from an accessory range intended for the Deckel LKB Optical Jig Borer, and offered on all sizes of FP millers, the unit for the FP1 required the use of an intermediate gearbox. The head, as might be expected, was intended for very close tolerance boring work, especially on proper jig-boring operations in conjunction with Deckel's own optical or standard measuring systems. The spindle ran in specially made, high-precision ball bearings and had 21 speeds and 6 rates of feed. Coarse setting of the head was made by hand against a graduated scale, while fine adjustment was through worm gearing against gauge blocks and dial-indicator readings. The head could be tilted through 90deg. in both directions.

Slotting head

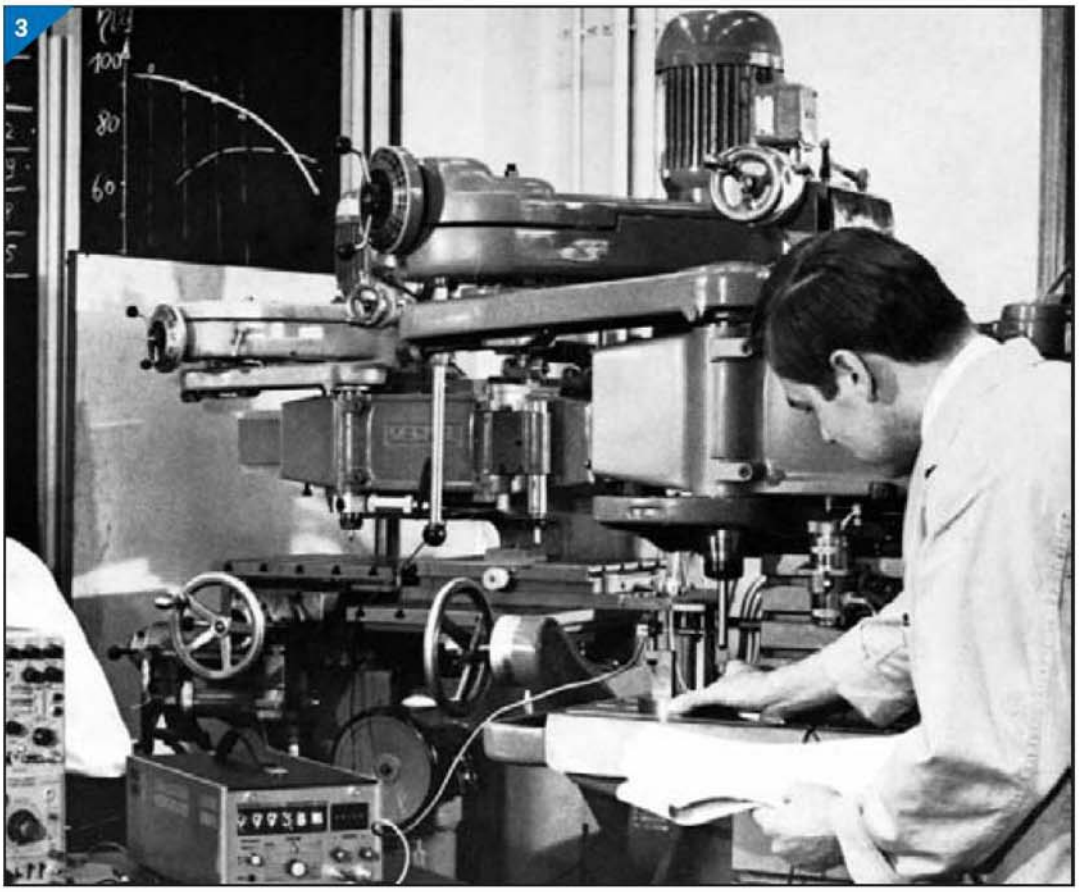
The swivelling slotting head is one of those accessories that can sit unused on the shelf for months, but, when needed, is an invaluable tool. Eleven ram speeds were provided ranging from 16 to 200 strokes per minute. The ram stroke, the setting of which was read from a graduated scale, could be adjusted between a travel of 0 to 80mm (3^{1}/$_{8}$in.).

Buying an FP1

There are a few general points worth considering when looking for an FP1 or similar miller. Used examples are now available very reasonably, and it is now possible to invest in an example with basic equipment, in sound working order, for little more than the price of a new, but larger Far Eastern machine of indifferent quality. Unfortunately the various accessories (especially the high-speed and slotting heads and various dividing attachments) are very sought after, and command high prices; however, once acquired they are a solid investment and easily sold on when no longer required.

Being relatively complex machines, with finely made parts, dismantling requires a certain mechanical sympathy. Be suspicious of any example that shows evidence of rounded nuts, hammer blows to any of the casings or other signs of brute-force intervention - it may have been through the hands of a mechanical incompetent and suffered hidden, serious and expensive-to-put-right damage. The joy-stick lever should slide without undue force through its gate - if it has to be wrenched, something is amiss.

The FP1 was developed into the larger and mechanically very similar FP2 and FP3 Series machines with the former, in many respects, identical to the FP1 and with most of the foregoing notes also applicable to the model. However, the FP3 Series, made until the late years of the 20th Century, included some rather different, specialised versions with none of the FP1 and FP2 accessories able to fit. **ME**



3. Pre-delivery testing at Deckel.

PART 6

Continued from page 405 (M.E. 4296, 30 March 2007)

Bill Steer continues the construction of this simple tool commencing with details of the ratchet wheel.

A compact RATCHET BRACE

Details of the ratchet wheel are given in **fig 16**. It is made from mild steel. Commercially, such items are often case hardened to improve abrasion resistance, but unless you have access to the cyanide process, together with the controlled conditions found in a metallurgical laboratory, I wouldn't recommend trying it. This is said from experience, having attempted to case-harden one of my prototypes in our more usual way, with *Kasenit* compound. Although I took a number of precautions, the result was disappointing; uneven hardness, on this small scale, had left some of the tips of the teeth quite brittle in places. Subsequently I replaced this wheel with one that had been left unhardened; this has now been used to produce dozens of trial holes and continues to show no signs of wear. Should wear become a problem in the future, I would probably remake the wheel, using silver steel, but leave it unhardened.

Begin by taking a length of 5/8in. dia. mild steel rod and grip it in the 3-jaw chuck with about 1/2in. projecting. Face the end, centre and drill 1/4in. for a depth of about 3/8 inch. Turn down the outside a shade under 9/16in. dia. (5 thou-or-so will be sufficient to provide adequate clearance with the ratchet housing — yet to be described), this should be over a length of 3/8in. Begin to part off, just over 9/32in. from the end, but stop when the resulting groove has a depth of about 1/16in.

We now have a blank on which to cut the teeth. These could either be milled or shaped. I chose the latter method, since, on this scale, it is quite easy to accomplish in the lathe; racking a suitable tool along the workpiece, which, in turn, is indexed by means of a gear linked to the mandrel (**photo 37**). The groove left by the parting operation will provide relief at the end of each stroke. The tool should be ground and set up to produce a tooth angle of 60deg. For indexing, I used the alternate teeth of a 60 tooth gear, locating these with a simple detent — slight hand pressure to the chuck again overcoming the effects of backlash. To avoid straining the lathe, cuts should be quite shallow; 5 thou-or-so to start, reducing to a couple of thou-or-less when approaching the full tooth depth. Once all the teeth have been cut, skim off any raised burrs and complete the parting operation. Don't face to length yet however, as this is best left till after the square hole has been made (an operation that may result in a certain amount of bruising).

Making the square hole

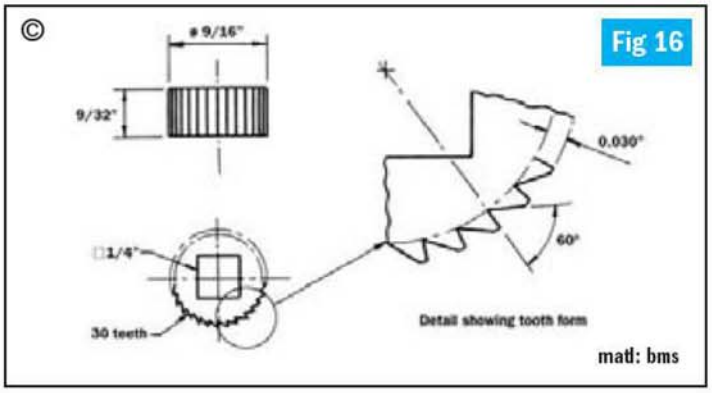
Probably the best way of producing the square hole is by broaching; this is a specialised technique though, and the equipment necessary is not often found in home workshops. A alternative method is the use of files and a drift punch (**photo 38**). This is a fairly slow process that does requires some patience, but it can give good, reproducible results; it was the method I used. Details of the punch are given in **fig 17**. As we shall also be needing the same size square holes in the end cheeks, when we come to them, a little time spent in making this item will be well rewarded.

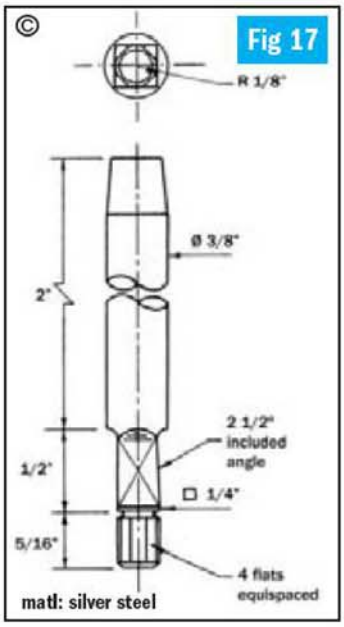
The punch is made from a length of 3/8in. dia. silver steel rod. One end is turned down to 1/4in. in diameter and acts as a pilot. Four small flats on this (coinciding with the corners of the punch itself), together with

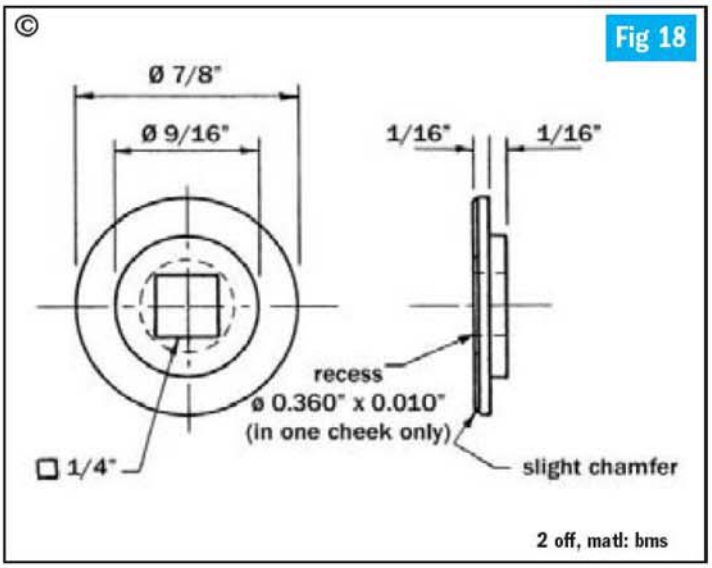
37. Using the lathe as a shaping machine to cut the teeth in the ratchet. Indexing is achieved by means of a gear linked to the mandrel.

38. A drift punch for producing square holes.

Fig 16. Ratchet wheel.







39. The finished ratchet wheel.

40. The finished end cheeks. Note the shallow recess in the one on the left.

Fig 17. Drift punch for making square holes. Harden and temper - dark straw/purple.

Fig 18. End cheek.

Fig 19. Ratchet retaining nut.

a round-bottomed groove at the shoulder, provide some limited clearance for the fine shavings produced when in use. Following beyond the groove the section becomes square. This is the cutting edge and after a very short parallel run the square section tapers away to provide further clearance. The square section can be formed either by milling, or with the aid of a file and rest, in the lathe. Note that all internal corners are rounded with a smooth transition to reduce stress build up and hence lower the subsequent risk of fracture during use. When completed the punch should be hardened and then tempered to a dark straw/purple colour.

In use, the pilot is inserted into the hole in the centre of the ratchet wheel (entering the faced side). The wheel should then be stood on a small anvil (containing a suitable clearance hole for the emerging pilot) and the top of the punch struck smartly with a moderate size hammer. If you are at all nervous about using a hammer (a glancing blow can cause the punch to break), squeeze the assembly between the jaws of a vice, or even better, use a proper lever press. This action should produce an impression of the square, on the surface of the wheel (don't try and force the punch all the way through — it's not designed for that and it will almost certainly break).

Next, take a small triangular file and carefully remove the corners from the hole, using the impression as a guide. Return the punch to the hole and after lining up, strike again. On extracting the punch (use a hammer in conjunction with a brass drift if necessary), burrs, in the corners of the hole, will reveal where further filing is needed. Continue this process until the punch can be driven all the way through. Finally, take the completed mainshaft and try fitting the wheel to it; a few more strokes with a small Swiss file may be needed. When all is well, return the wheel to the lathe (use some soft packing in the form of a split brass ring, to prevent the chuck jaws from spoiling the work), face to length and lightly chamfer the corners. **Photograph 39** shows the finished ratchet wheel.

End cheeks

When positioned on the mainshaft, the ratchet wheel is held between a pair of end cheeks. These cheeks are shown in **fig 18**. Note that although only one has been drawn, there is a slight difference between them, in that one has a small recess on its larger face. This is concentric with its axis and is to accommodate the witness left on the mainshaft at the interface of the square section and flange.

Grip a short length of 1in. dia. mild steel rod in the 3-jaw chuck, with about 1/2in. protruding. Reduce the outside diameter to 7/8in. over a length of 7/16in. Face, centre and drill 1/4in. dia. for a depth of 7/16 inch. Turn down a shoulder, on the end, making it 1/16in. long by 9/16in. dia. (try and get this latter dimension as near as possible between 0.562 and 0.563in.). Break the sharp corners and part off to just over 1/8in. long.

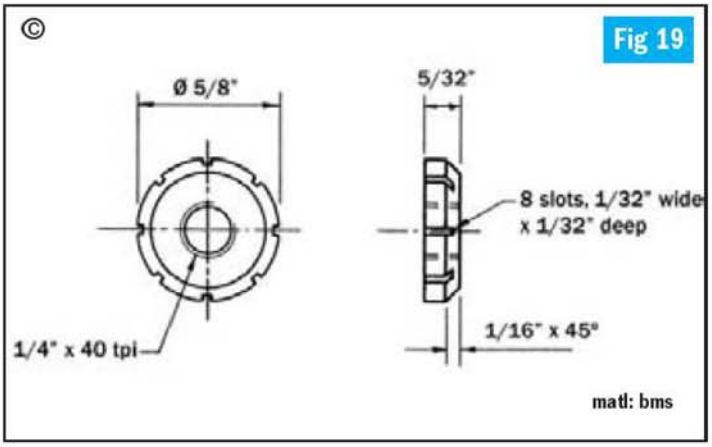
Without removing the parent material, repeat the operations to produce the second blank.

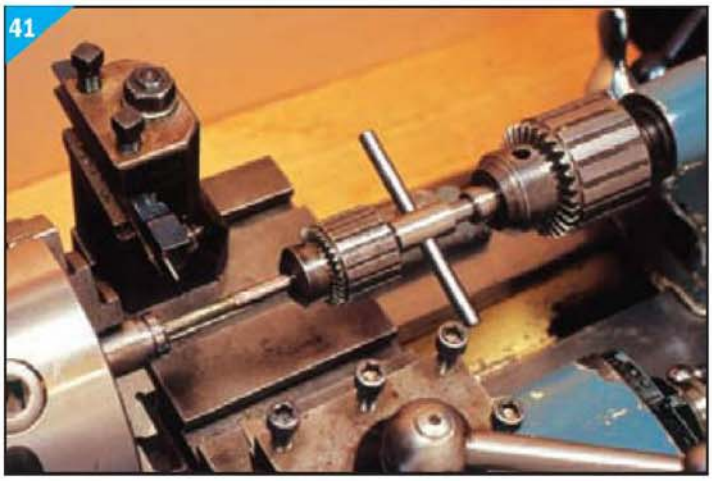
Now, as for the ratchet wheel, use your drift punch, in conjunction with a small file, to produce a square hole in each (enabling them to be fitted to the mainshaft). Having done this, the cheeks can be lightly gripped by the reduced portion of the shoulder, in the 3-jaw chuck, faced to size and the edge finished with a slight chamfer. A small boring tool can be used to put in the shallow, aforementioned, recess in one of the cheeks.

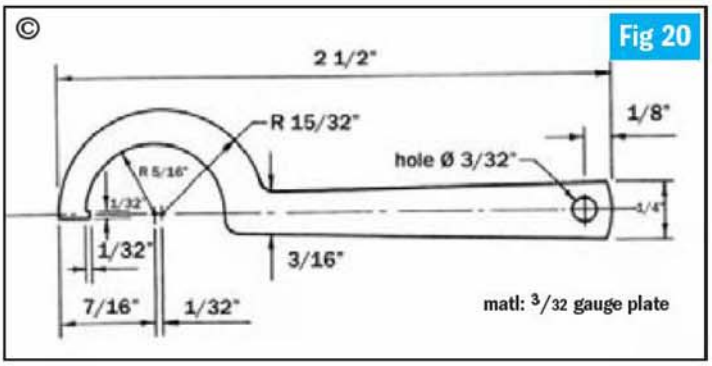
Photograph 40 shows a pair of finished cheeks.

Ratchet retaining nut

The ratchet wheel and its two end cheeks are held in place with a retaining nut (**fig 19**). To make this, start with a short length of 3/4in. dia. mild steel rod, face, centre and drill No. 1 (tapping for 1/4in. x 40tpi) to a depth of 1/2 inch. Turn down the outside to 5/8in. dia. for a length of 3/8 inch. Begin to part off just over 5/32in. from the end, but stop when the groove is 1/16in. deep. Using the lathe >>







41. Using a guided tap to make the thread in the ratchet retaining nut

42. Tempering the 'C' spanner over a shallow bath of sand.

43. The finished ratchet retaining nut and 'C' spanner.

44. The ratchet wheel, end cheeks and nut assembled on the mainshaft.

45. A pair of pin drills made to counterbore the two holes in the side of the ratchet housing.

Fig 20. 'C' spanner. Harden and temper - blue.

as an indexed shaping machine, in conjunction with a suitable tool (something ground rather like a 1/32in. wide parting blade and held on its side), proceed to cut the eight slots — these should each be 1/32in. deep. Chamfer the edge of the nut and, using a guided tap, put in the thread (**photo 41**). Complete the parting operation, mount on a stub mandrel and, as usual, face to length.

'C' spanner

The 'C' spanner used to tighten the retaining nut is shown in **fig 20**. It is made from 3/32in. thick gauge plate and is a simple exercise in marking out and cutting to line. I always derive a certain amount of pleasure from making such parts. Not only do they provide a refreshing change from operating machinery, but they give an opportunity for real hand/eye co-ordination — something that can be deeply satisfying and yet so often forgotten about nowadays!

Having cut out your spanner, it should be carefully polished and then hardened (heat to cherry-red, and then plunge vertically into a container of cold cooking oil; stirring until cold). Clean up, repolish and then temper to a deep blue colour by heating on a shallow bath of sand (**photo 42**). Quench in water, dry and coat with oil.

Photograph 43 shows the completed retaining nut together with its 'C' spanner while **photo 44** shows the ratchet wheel, end cheeks and nut assembled on the mainshaft.

Pin drills

The next main item to make is the ratchet housing but as we shall need a couple of spot facing tools (pin drills), to counterbore two radial, tapped holes, it is worth making these first (assuming that you haven't already got something suitable to hand). One needs to be 5/16in. dia. with a 0.157in. dia. pin and the other, 11/64in. dia. with a 0.104in. dia. pin. As we shall only be removing a small amount of material, these don't have to be very fancy and consequently can be made up quite quickly. I think that **photo 45** is self-explanatory and hence I have not prepared any detailed drawings. The main limitation of these simple tools is that owing to the restricted space between the teeth they do need to be frequently withdrawn from the work and cleared of swarf.

For the larger of the two take a short length of 5/16in. dia. silver steel rod, face the end in the lathe, centre and drill No. 22 for a depth of about 5/16 inch. Transfer to the bench vice, gripping it vertically, and using a piercing saw make a diametric cut across the end containing the hole. This should be about 1/16in. deep. Make a second, similar cut, at right angles to the first. (There is no need to use a protractor, the eye is plenty good enough!) Now, using a small file, remove some of the material between the saw cuts to produce something resembling a hole saw with four teeth. This is easily done by running the safe edge of the file along one of the saw cuts whilst stroking, slightly upwards, towards the next cut. Take care to get the tooth formation in the right direction (if in doubt, take a look at an end mill). Once the teeth have been cut, harden the tool and temper to a dark straw colour. Restore the edge of the teeth with a small slip stone. Finally, make a pin, to fit the hole, leaving about 3/16in. standing proud.

The smaller tool can be made in exactly the same way, using a No.37 drill for the hole. Both tools should be used at a fairly slow speed, with the pin guided by the appropriate sized tapping hole in the workpiece.

To be continued.

NEWS

Before starting the real business this time can I remind those sending items for inclusion in this or any other part of the magazine, that unless specifically requested otherwise, all material should be sent to the Editor, David Carpenter at the postal address on the contents page or by e-mail at: **david.carpenter@magicalia.com**

Notices

Canvey Railway & MEC is holding an open weekend over the weekend of July 27-29. More information can be obtained from B. Baker, tel: 01702-512752.

A change of Secretary has occurred at **Ryedale SME** with the reins now firmly held by David Myers who can be contacted via the society website at **http://www.rsme.org.uk**

Brian Butler is organising a **National 2½in. Gauge Association Midlands** get-together at Cadbury World Church Hall on Saturday 20 October between 11am and 3pm. Those wishing to attend are asked to let Brian know on 0121-459-7192 in order that the hall hire can be confirmed.

Warrington DMES is holding an open weekend on 2/3 June 2007 for members of model engineering societies and friends only. The society has a 3½ and 5in. gauge raised track approx ⅓ of a mile long and a pond available for the model boating fraternity. Boiler certificates and club membership cards are required. There is accommodation for camping/caravans on site. There will be a Saturday evening barbeque (bring your own grub) and the site is within walking distance of a pub.

Please e-mail **secretary@wdmes.org.uk** to tell the society you are going, and to book camping facilities.

Duncan Webster is the new secretary at Warrington and can be contacted at 8 Warren Road, Appleton, Warrington WA4 5AG, tel: 01925-262525.

UK Club News

The Beamish Model Engineering Group now has a fully functional kitchen extension which includes a selection of armchairs donated by a local educational establishment. The downside is that the chairs are so comfy they make it more difficult to face the wind and rain after lunch!

The social calendar at **Birmingham SME** has a host of events to suit all tastes including the annual dinner dance which took place in March. This caught my eye because of the dress code which stated that *"dress is entirely optional"*. Must have been an interesting evening! The relaying of the ground level track has now been completed due to the *"favourable weather"* and *"sterling work by the work crew"*. The replacement of the bridge by the clubhouse is also making progress with the components being fabricated off site and then brought in when ready. The newsletter quotes a comment from the Santa Specials attributed to *"a small Williams"* who remarked that *"When Santa was leaving, I saw that under his trousers he had human trousers, so I think it was a fake Santa"*. The phrase "human trousers" has now entered the family vocabulary.

Another society affected by the high winds earlier in the year is **Bradford MES** which had a substantial tree brought down onto the bridge over the raised track. It appears that only the railings are damaged and that the newly constructed wall (finished the day before) escaped unscathed. Good news from the club is that three junior members attended the January *"Bits & Pieces"* meeting. One of the trio, Nicholas Wright, gave a talk on how he converted a stationary steam engine to run on the track. As the President, Jim Jennings, commented in his note *"It must have been quite daunting for him to stand up in front of all those knowledgeable people"*. Apparently Nicholas impressed all present with his ingenuity and especially how he experimented with different gear ratios. I hope to put some more details in a future column about Nicholas' efforts and he is to be congratulated. At the same meeting, Godfrey Wormald produced some photographs, patterns and components of the full-size replica of a 1901 Oldsmobile Curved Dash automobile that he is building. The car is powered by a Citroën 2CV engine and Godfrey had carried out a trial run earlier the same day.

Work on the raised track replacement at **Bristol SMEE** is progressing with a temporary join laid between the old and new tracks for the Santa Specials. Phase one of the renewal has been completed on schedule.

Work in progress at **Chesterfield DMES** includes a new base for the viaduct, new metal fencing for the cutting, fencing over the tunnel entrance, and a new roof on the toilet. The working parties have obviously been busy.

Activities at **Crawley Model Engineers** earlier in the year seem to have revolved round a lot of tea drinking and throwing the ball for the dog. I think the excuse was the inclement weather for some of the time. In spite of this several locomotives have been tested following winter work and the dog did prove useful in finding the lubricator lid for the red Simplex which blew off after water collected in the system.

Close season work on the track at **Frimley Lodge Miniature Railway** has included raising part of the track bed to try to improve the drainage. The heavy winter rain has resulted in mud and silt being washed into the lower parts of the track. This included the turntable which has had to be dug out on a couple of occasions. The society is planning to train members to use the signalling facilities including the shunter's console.

Thanks to a grant from the Lottery 'Awards for All' fund, work on the new station canopy at **Hereford SME** is progressing well with the structural

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steelwork and roof in place. The locomotive *King Offa* is now in good condition after significant work last year. Work is needed on the portable track, carriages and trailer to bring them back to an acceptable standard.

Leyland SME has sent news of the passing of its Vice President Alf Chadwell. Alf took up the model engineering hobby when he retired in 1978 at the age of 65, rather a surprise for many who had assumed he had been making models for much longer. He had been in the habit of giving a lift to a Mr. Burns to the miniature railway track near the allotments at Witton, and there he met one Bert Hayhurst. Bert and Alf joined the model engineering night school class at Witton School and there Alf built his first model, to the *Juliet* design by Curly Lawrence. He went on to build four more models, a *Jersey Lily*, a *Lion*, a *Maid of Kent*, and a *Gemma*, and he completed a *Princess Marina* and a *Simplex* that had been started by others. We extend our sympathy to the club and Alf's family at this sad time.

Cliff Allen has taken on the mantle of Chairman at **Model Engineers Society (NI)**. Work is continuing on all the winter maintenance tasks at the Cultra Site with members on Saturday afternoons *"enjoying each others company, sorting out the world's problems and doing a bit of model engineering too"*.

The **National 2½" Gauge Association** is attending the Model Engineer Exhibition at Ascot racecourse and report a large influx of new members. No doubt those within reach will be able to help out at the exhibition. The National Rally will be held at the Rugby Society track on 10 June this year.

Work on the ground level track extension is progressing well at **North London SME**. On the raised track, renovation of the passenger carriages is being carried out along with some replacement of the sleepers, track and anti-tip rail. The society stand at the Alexandra Palace Exhibition attracted many visitors who no doubt included some of you reading this issue.

I reported recently (*M.E.* 4295, 16 March 2007) that **Plymouth Miniature Steam** had found alternative workshop facilities at the local College of Further Education. I am pleased to report that the numbers attending the new venue are distinctly higher than the previous venue. Work is carrying on at Goodwin Park to bring the facilities up to scratch and the two club locomotives *Fred* and *Hernia* should have had their boiler inspections by the time you read this, thus providing two steam locomotives for the coming season. John Brooker was given the position of Life President in recognition of services to the club over many years. Tony Lloyd has been given life membership in recognition of his work on the aforementioned *Fred*. An article in the newsletter by Dave Everrett describes a visit to an interesting museum in Wales. **The Museum of Internal Fire** is a small privately-run museum housing a collection of internal combustion engines ranging in size from single cylinder industrial engines to a twin-cylinder open crank Tangye engine dating from 1929. The museum has three halls at present and is located at Tan-Y-Groes, just off the A487 Cardigan to Aberystwyth road, eight miles from Cardigan. It is run by Paul and Hazel Evans plus some volunteers and sounds like a very interesting place to visit. I found that the museum has a website at www.internalfire.com which contains lots of information and photographs including some history of the main engine manufacturers. The contact telephone number is 01239-811212.

The membership at **Reading SME** is reported to be at the highest ever level at 120. This all helps to keep the society on a sound footing and provide more help with society activities. Some additional safety measures are to be installed at the level crossing on the entrance road. Editor John Billard reported on his trip to the steam railways in Germany in February which included trips on the metre gauge Brocken mountain railway.

Members of **St. Albans DMES** had some tree cutting to do after the gales when some trees were brought down across the boundary. Members removed most of the debris but will be calling in professional help with the larger trunks. The wood turners benefited because some of the trees were cherry trees and two of these were cut up for turning. The saying *"It's an ill wind that blows no good"* comes to mind. Roger Stephen has had a vintage stationary engine identified recently. The engine is a Doll model 362 and this fact was provided by John O'Rear (http://johno.myiglou.com). The unusual thing is that it has taken Roger 40 years to have the engine identified by someone 4,000 miles away.

Members of **Stamford MES** had a very interesting visit to the Triumph Motorcycle factory and were very pleased to see a real British success story. Approximately 40% of the components are made in house and the factory currently produces around 40,000 motorcycles per year, most of which are exported. If Triumph can do it, why can't others?

We have received details of a society new to us. **The Valley Road MES** is based in Lambly to the north-east of Nottingham and I can do no better than quote from the letter sent in by Secretary David Mitchell: *"We have about 40 members with varied expertise; the emphasis is on friendship and to provide a friendly and sociable atmosphere for members to meet and discuss their problems. We do not run for the public, so members have the freedom to experiment and there is no pressure on members to commit themselves to the society beyond what they are prepared to give voluntarily.*

We meet at the track every Sunday morning; the third Sunday is our running day. Most of our maintenance is done on Wednesday mornings weather permitting otherwise it's another social gathering.

We now have about 950 feet of raised 3½in. and 5in. gauge track with both left and right-hand curves. Our gradients are friendly, especially for the smaller locomotives. Anyone prepared to construct a 7¼in. gauge track on the site would be welcome." Anyone interested can contact David at 32 Horsendale Ave. Nuthall, Notts NG16 1AN, tel: 0115-927-8870. We extend a warm welcome to the society and hope to have regular reports in the future.

The Vale of Aylesbury MES has a new Chairman, Clive Ellam, who has taken over from Andy Rapley, the holder of the post for the last five years. Clive has actually held the post in the past and so knew exactly what he was letting himself in for when he agreed to take on the job. The annual miniature traction engine rally was attended by 23 engines last year, was blessed with good weather and the enjoyment was increased by the Saturday evening barbecue and the pub runs held at lunch times on both days.

York City DME have reported a successful year in 2006. The Chairman's definition of doing well is *"going forward in a controlled, managed fashion in a chosen direction and with, at the end of the year, achieved outcomes"*.

World Club News

New Zealand

Maidstone MES (NZ) provided some of the entertainment for the Upper Hutt Police Social Club Children's Christmas party last year and report that the activity went very well. Peter Carr provided the motive power with his locomotive *Owain Glyndwr*.

South Africa

At the recent AGM, a *"rather reluctant"* Carl Rosenstrauch was persuaded to become Chairman. Outgoing Chairman Rudi du Preez is to assist Carl from the position of Vice Chairman.

One of the miniature magnetos produced from the Minimag Co. kit. The same coil can be used in a battery ignition system.

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.

Bob Burns	*Bristol SMEE*
Alf Chadwell	*Leyland SME*
David Gascoigne	*Chesterfield DMES*
Graeme Harris	*Hutt Valley MES (NZ)*
John James	*Hereford SME*
Les Chenery	

Trade News

We have received news of a small company that will be known to those with an interest in I/C engines. **The Minimag Co.** supplies miniature magneto kits and coils (the Spark Demon) for 4-stroke engines. The owner, Jim Shelley wishes to dispose of the business and is offering it for sale. Jim will be known to many readers as the designer and builder of the Maltese Falcon 260cc flat four aero engine. The sale includes the lamination stamping tools, coil winder, coil vacuum potting equipment, rotor magnetiser, some Alcomax rotors plus other related items including some Maltese Falcon crankshaft castings. It may be possible to arrange some training in coil winding for anyone taking over. Jim can be contacted at Minimag Co. 358 Birmingham Road, Walsall, West Midlands WS5 3NX, tel: 01922-628553 by those with an interest in the business.

Humour time

From **Birmingham SME** come some examples of "Brum Slang" which seems to be an aid to translation for visitors. The examples that caught my eye included *"Kinnoy av a cartin o' mushy pays ploise?"* and *"stoik 'n kidnoy poise"*, both of which are useful in the chip shop.

More *"Words of wisdom"* from the **Steam Locomotive Society of Victoria**:

1. Do not be irreplaceable. If you cannot be replaced, you cannot be promoted.
2. Before you criticise someone, you should walk a mile in his shoes. That way, when you criticise him you are a mile away and you have his shoes.

An interesting comment on life!

And finally from **Chesterfield DMES** the following were under the heading *"Only in Britain..."*

> Only in Britain...do supermarkets make sick people walk to the back of the shop to get their prescriptions while healthy people buy cigarettes at the front.

And:

> Only in Britain...do people order double cheeseburgers, large fries and a *diet* coke.

DIARY

APRIL

27 **North London SME.** *Workshop Evening.* Contact David Harris: 01707-326518.

28/29 **Bournemouth DSME.** *B&DSME Model Engineering Exhibition.* Contact Dave Fynn: 01202-474599.

28 **Frimley & Ascot LC.** *Annual Dinner.* Contact Bob Dowman: 01252-835042.

28 **Leyland SME.** *Learner Drivers Afternoon.* Contact A. P. Bibby: 01254-812049.

28 **Romney Marsh MES.** *Boiler Testing.* Contact John Wimble: 01797-362295.

28 **SM&EE.** *Spring Clean Day.* Contact Maurice Fagg: 020-8669-1480.

28 **York City & DSME.** *Garry Hall: Building a loco from a kit.* Contact Pat Martindale: 01262-676291.

29 **Edinburgh SME.** *Start of Track Running season.* Contact Robert McLucke: 01506-655270

29 **Guildford MES.** *First Public Running.* Contact Dave Longhurst: 01428-605424.

29 **Isle of Wight MES.** *Rally at Broadfields.* Contact Malcolm Hollyman: 01983-564568.

29 **MELSA.** *Sunday in the Park.* Contact Graham Chadbone: 07-4121-4341.

29 **New Jersey Live Steamers, Inc. Steam-Up.** Contact Karl Pickles: 718-494-7263.

29 **Nottingham SMEE.** *Public Running.* Pete Towle: 0115-987-9865.

29 **Saffron Walden DSME.** *Public Running.* Contact Jack Setterfield: 01843-596822.

29 **Staines SME.** *Public Running.* Contact Stan Bishop: 01784-241891.

30 **Canterbury DMES (UK).** *Chris MacDonald: The Life & Times of LBSC.* Contact Mrs P. Barker: 01227-273357.

30 **Chelmsford SME.** *Adrian Wright: The Midland Railway and the Settle to Carlisle Line.* Contact D. Blake: 01376-324205.

MAY

1 **North Cornwall MES.** *Meeting & Maintenance Evening.* Contact Geoff Wright: 01566-86032.

1 **Romney Marsh MES.** *Track Meeting.* Contact John Wimble: 01797-362295.

1 **South Durham SME.** *Meeting.* Contact B. Owens: 01325-721503.

1 **Taunton ME. Noel Shelley: Small Foundry Work.** Contact Don Martin: 01460-63162.

2 **Birmingham SME.** *Running Evening.* Contact John Walker: 01789-266-065.

2 **Bradford MES.** *Meeting.* Contact John Mills: 01943-467844.

2 **Bristol SMEE.** *Derek Todman: ENVISAT.* Contact Trevor Chambers: 0145-441-5085.

2 **Chingford DMEC.** *AGM.* Contact Ron Manning: 020-8360-6144.

2 **Hull DSME.** *Auction.* Contact Tony Finn: 01482-898434.

2 **Leeds SMEE.** *Meeting.* Contact Colin Abrey: 01132-649630.

2 **West Wiltshire SME.** *Boiler Testing.* Contact R. Nev. Boulton: 01380-828101.

3 **Westland & Yeovil DMES.** *Meeting.* Contact Gerald Martyn: 01935-434126.

4 **Canterbury DMES (UK).** *Seen on the Table 3.* Contact Mrs P. Barker: 01227-273357.

4 **Northern Ireland (MES of).** *Visit to Downpatrick Railway.* Contact Stephen Atkinson: 9044-8555.

4 **North Norfolk MEC.** *Bits & Pieces.* Contact Gordon Ford: 01263-512350.

5 **Bedford MES.** *Members' Fun Day.* Contact Ted Jolliffe: 01234-327791.

4 **Portsmouth MES.** *Meeting.* Contact John Warren: 023-9259-5354.

4 **Rochdale SMEE.** *Meeting.* Contact Bob Denyer: 0161-959-1818.

4 **Romford MEC.** *Competition Night.* Contact Colin Hunt: 01708-709302.

5-6 **Dockland & E. London MES.** *Public Running.* Contact P. M. Jonas: 01708-228510.

5 **Ickenham DSME.** *Public Running.* Contact David Sexton: 01895-630125.

5 **Isle of Wight MES.** *Track & Pond.* Contact Malcolm Hollyman: 01983-564568.

5-7 **MELSA.** *Labour Day Weekend - Mackay.* Contact Graham Chadbone: 07-4121-4341.

5 **National 2½in. Gauge Ass'n.** *South East Area Spring Rally.* Contact Clive Young: 01233-626455.

5 **Romney Marsh MES.** *2½" Gauge Association Rally.* Contact John Wimble: 01797-362295.

5 **SM&EE.** *'Do it Ourselves' Afternoon.* Contact Maurice Fagg: 020-8669-1480.

6-7 **Aylesbury (Vale of) MES.** *Miniature Railway Gala.* Contact Andy Rapley: 01296-420750.

6-7 **Bedford MES.** *Public Running 11am - 4-30pm each day.* Contact Ted Jolliffe: 01234-327791.

6-7 **Bristol SMEE.** *Public Running.* Contact Trevor Chambers: 0145-441-5085.

6-7 **Malden DSME.** *Public Running.* Contact John Mottram: 01483-473786.

6-7 **Nottingham SMEE.** *Public Running.* Pete Towle: 0115-987-9865.

6 **Basingstoke DMES.** *Public Running.* Contact Guy Harding: 01256-844861.

6 **Cardiff MES.** *Open Day.* Contact Don Norman: 01656-784530.

6 **Edinburgh SME.** *Open Day & Track Running.* Contact Robert McLucke: 01506-655270.

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SWING OVER BED	180MM
SPINDLE BORE	21MM
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DIMENSIONS (LxWxH)	780x480x420MM

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DISTANCE BETWEEN CENTRES	400MM
SWING OVER BED	210MM
SPINDLE BORE	21MM
RANGE OF SPEEDS	50~2000RPM
MOTOR	3/4HP
DIMENSIONS (LxWxH)	1050x560x570MM

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DISTANCE BETWEEN CENTRES	550MM
SWING OVER BED	250MM
SPINDLE BORE	26MM
RANGE OF SPEEDS	50~2500RPM
MOTOR	1HP
DIMENSIONS (LxWxH)	1150x700x570MM

DB11VS LATHE
£1195.00

DISTANCE BETWEEN CENTRES	700MM
SWING OVER BED	260MM
SPINDLE BORE	26MM
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DIMENSIONS (LxWxH)	1360x700x630MM

MODEL B 3-IN-1
£759.00

DISTANCE BETWEEN CENTRES	520MM
SWING OVER BED	130MM
SPINDLE BORE	26MM
RANGE OF SPEEDS	117~1360RPM
MOTOR	3/4HP
DIMENSIONS (LxWxH)	920x690x1050MM

CRAFTSMAN LATHE
£1525.00

Complete with stand

DISTANCE BETWEEN CENTRES	570MM
SWING OVER BED	200MM
SPINDLE BORE	36MM
RANGE OF SPEEDS	50~1200RPM
MOTOR	1.5HP
DIMENSIONS (LxWxH)	1370x740x680MM

CRUSADER LATHE
£2095.00

Complete with stand

DISTANCE BETWEEN CENTRES	810MM
SWING OVER BED	178MM
SPINDLE BORE	38MM
RANGE OF SPEEDS	65~1810RPM
MOTOR	1.5HP
DIMENSIONS (LxWxH)	1780x850x1660MM

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