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Vol.199 No. 4306

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MODEL ENGINEER

Published by
MAGICALIA PUBLISHING LTD.
Berwick House, 8-10 Knoll Rise,
Orpington, Kent BR6 0EL

Tel: +44 (0) 1689 899200
Fax: +44 (0) 1689 899266

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ISSN 0026-7325

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ON THE COVER...

An impressive and purposeful triple expansion engine by
G. Aisthorpe on display at the recent Harrogate Exhibition.
One of many fine and interesting models on display at the
Great Yorkshire Showground. Ascot is next in the exhibition
calendar.

Be sure to get your entry form in the post very soon.

(Photograph by Michael Jones)

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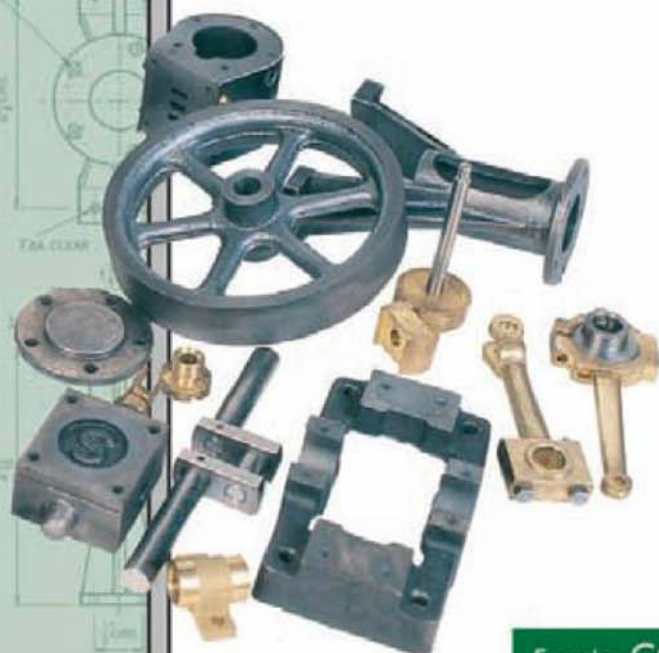
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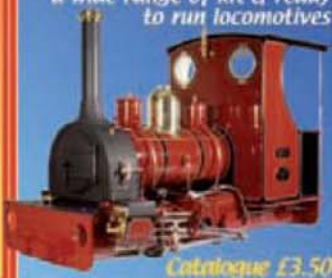
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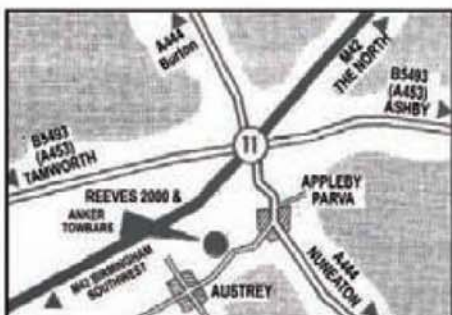
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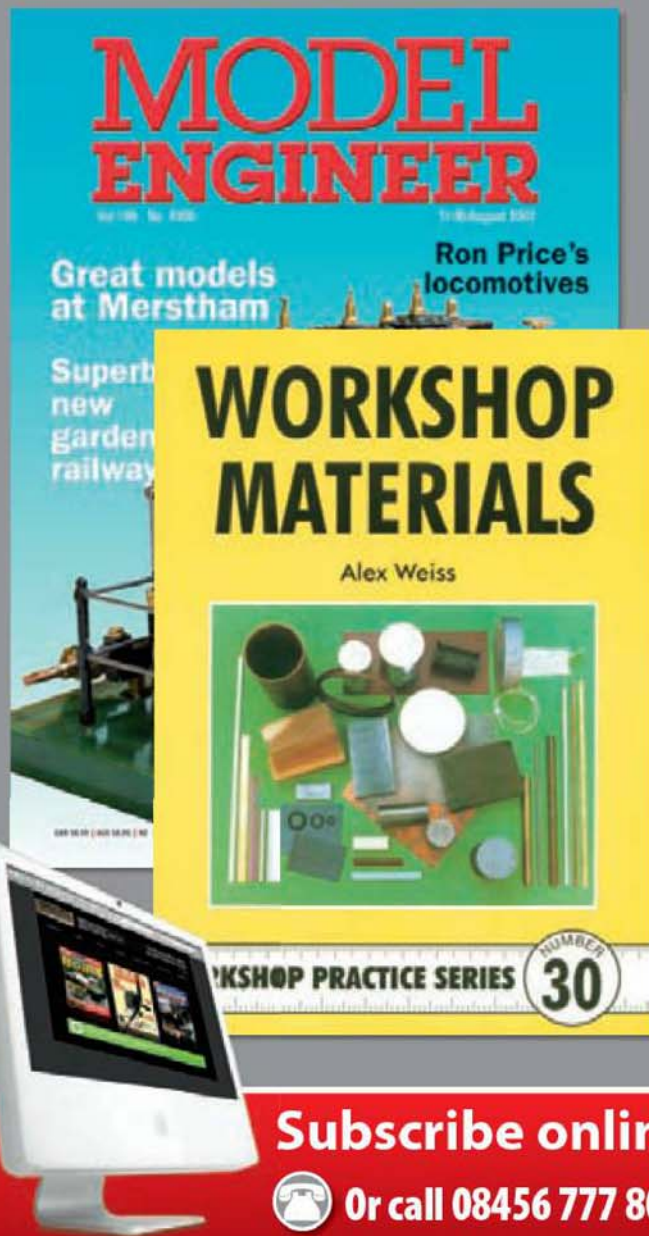
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Back on the web

Readers will be interested to know that our website is being revived. We have already had www.model-engineer.co.uk up and running to give information about the Centenary Model Engineer Exhibition at Ascot next month.

Next on the web will be a model engineering website that will reflect the interest of readers of both *Model Engineer* and *Model Engineers' Workshop*. We will bring you more details shortly.

One of the objectives of the website will be to encourage newcomers to the hobby, with plenty of information available on line to help them, as well as the rest of us.

SMEE success

While on the subject of beginners, in this issue we highlight the excellent course organised by the SMEE for newcomers to model engineering. On the last course some 15 tyros completed a *Polly* steam unit to the design of Tubal Cain, and very good jobs they made of them, too.

While most of the students travelled from the Home Counties to Marshall House in South London for the training sessions, one true enthusiast travelled up from Devon.

Polly is an ideal first project. It contains all the elements, such as a boiler and cylinder which are at the heart of practically all steam designs, and there's no reason why a student should not go on to greater things with a little help, which is always available within the model engineering fraternity, not to mention in 'ours'.

What's more our friend Nemett will also tell you that if you can build a steam engine, you can build a simple I/C engine.

If you are a complete beginner, or have tried to get started but faltered, the SMEE course is for you. It is well worth making the journey once a month for. Attending the sessions plus some homework in between will see you the proud builder of a delightful

working steam engine plant, and have you wondering what to tackle next.

Ray's railway

Ray McMahon, like many a model engineer, knew exactly what he wanted to tackle next. Of course, we all have that list of projects to complete that will keep us going until we are 184. Ray, needing a break from locomotive building, went back to an old ambition, to have a small gauge garden railway.

For most of us a bit of line through the shrubbery would be fine. Not so Ray. His layout, described in this issue has just about everything, including a canal and a 20ft. span model of the Forth Rail Bridge.

Now let's think, it would be possible to build one. Just need to extend the project list to see us through to 186. Problem solved.

Reminders

Thinking about the prospect of time running out, here are a couple of reminders. This is the last issue in which we will be printing the entry form for Ascot. You have about a week to get your entry form in.

We love to see as many competition entries as possible. We are also happy to see your models entered as 'loan' entries if they are not finished or if you do not want them to come under the scrutiny of our judges, for any reason.

It is your chance to be part of model engineering history at this once in a lifetime exhibition. It's also a chance to add your contribution to the well-being of the hobby. We are all inspired by other people's models. They give us ideas and encouragement.

It's a wonderful opportunity, too, for clubs and traders to contribute to the common good via the exhibition. We'd like to think we've done what we can to put on a great display of models, and keep prices down to a minimum. But it is the support of all in model engineering that makes it a success for the benefit of everybody.

One or two people have accused us of 'hyping' it up. Well, perhaps we have a bit, but

we think people will allow us that once every 100 years. And we've had plenty to get excited about.

This year is a true celebration of models and modelling.

So be sure to get your entry forms in before the deadline. That is important to ensure that your models will be insured at Ascot. This applies to clubs also.

Our next issue is the last before Ascot, and we will bring you a preview of what to expect, travel details, and everything else you need to know.

Ascot 2008

We wanted somewhere really special to celebrate the 100 years of the Model Engineer Exhibition this year. For once, the editor's fascination with the sport of kings paid a good return after visiting the new Ascot Grandstand, just redeveloped at a cost of £185 million.

"Just the place for us" we thought, not really believing that it would be possible. Having just paid a small fortune for our seats for the Diamond Day meeting, how might we put on a top exhibition in the same place for a fraction of the price? Somehow we managed.

Back again next year? We hope so. It is certainly our first choice.

"How are you going to follow up, after all you have done this year?" The question from a national secretary came as no surprise. We'd been pondering that too.

A couple of us are already working on it, and we expect to start implementing our plans as soon as this year's event is over. We already have some interesting ideas, and will keep you informed of developments.

One idea we are keen on is to revive interest in the 'experimental' in the names of many of our societies and clubs. With the challenges presented to us these days by global warming and the need for responses on a domestic scale, we reckon that you engineers out there might have a significant contribution to make. We hope to encourage that through the 2008 Model Engineer Exhibition.



Source for rotary engine details

SIRS, In M.E. 4299, 11 May 2007, Mr. Roger Castle-Smith sought information on Radial Engines.

Camden Miniature Steam Services, Barrow Farm, Rode, Frome, Somerset BA11 6PS still has listed *Clerget Patent Aero Engines*. It contains a great deal of useful detail.

Colin Owen, by email.

Phillips or Pozidriv?

SIRS, - Peter Spenlove Spenlove's welcome article, *Phillips or Pozidriv* (M.E. 4300, 25 May 2007) brings to mind days at the BSI Hand Tools Committee in 1970-71, drafting BS 2559 Pt. 2, *Screwdrivers and Screwdriver Bits for Recessed Head Screws*.

There was a Phillips representative on the Committee, who explained that an American invented the Phillips system in the early 1930s. It was bought by another American, Henry Phillips, who marketed the system about 1936 in time for WW2. Its use with power screwdrivers, for which it was intended, considerably increased production rates during WW2.

The Pozidriv system was introduced by Phillips about the late 1960s, when the original patent ran out. The new system uses a steeper angle in the screwdriver bit. I recall that the Committee had difficulty

describing the two systems, without using the copyright trade names, which would not have been acceptable in a specification.

I have Phillips screwdriver bits marked Ph 0 to 3 and Pozidriv marked Pz 1 to 3. I understand that they are available up to Size 4 and there may also be a Pozidriv Size 0.

We are told that a Phillips screwdriver must only be used on a Phillips screw and a Pozidriv on a Pozidriv screw. This is no doubt correct if a power driver is used to insert or remove a screw. However, in an emergency, it is worth trying a hand screwdriver of suitable size of either type, or even a flat blade screwdriver, to see if a screw can be removed.

I suppose the model engineer is more likely to use cross drive screws in workshop and experimental equipment rather than in serious modelling. I have used two, slotted, $\frac{3}{4}$ in. No. 8 wood screws to secure $\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$ in. angle 'chairs' to crossing timbers in $3\frac{1}{2}$ and 5in. gauge points, as I find a better purchase can be obtained with a traditional screwdriver, particularly in awkward situations. However, recently I have not been able to obtain slotted steel screws of this size. They all seem to be Pozidriv.

Dennis Monk, Derbyshire.

Phillips or Pozidriv? (2)

SIRS, - Peter Spenlove Spenlove's article (M.E. 4300, 25 May 2007) was one I wish I'd

read at least 30 years ago; had I done so it would have saved many a mangled screw-head!

One thing the article did not make clear is that both Phillips and Pozidriv come in a variety of sizes. In my experience using the wrong size easily causes as much damage as using the wrong type of screwdriver.

I have in my collection Phillips sizes 00, 0, 1, 2, 3 and 4 and Pozidriv sizes 0 to 4. There may be more sizes, particularly at the smaller end. The combination crosshead/flat screw-heads found on electrical equipment also come in both types although Pozidriv seems to be the more common.

There are in fact special combination (i.e. crosshead/flat) screwdrivers available; the great advantage of using these is that considerably greater torque may be exerted. I have only seen these made by Facom, but possibly other specialist screwdriver manufacturers make them.

In closing there is at least one other crosshead form, the "Reed & Prince". This is of North American origin and is I believe used on some aircraft although may of course appear on other items from that part of the world.

Tony Chapman, by email.

Optical centre punches

SIRS, - In discussion with a friend, we agreed that one of the tricky things in metal-work is getting the centre-pop mark spot on the marked out cross lines. There are optical centre punches available these days and we wondered whether anybody who had tried one could advise on their usefulness?

Neil G. Heppenstall, Cheshire.

I have used one of these for some years and they are fine on flat areas where the punch unit is wholly on flat metal. They are not good on smaller areas or across recesses (because parallax errors can be introduced). I also find it useful to remove spectacles when using them. - MLS.

Schools big ends

SIRS, - Just a few words to add to Antony Cook's letter on

Ultrasonic cleaning

SIRS, - Following Roy Griffin's article on ultrasonic cleaning, I thought "this is for me", for cleaning small bits after silver-soldering. On the internet I was offered the choice of 50 or 75 watt units; the smaller seemed big enough to take my bits, so I bought one.

I feel that fellow readers should be alerted to the fact that the smaller model does not perform as the article suggests.



The results obtained by John Day's ultrasonic cleaner.

I've tried it on black rusty steel and dirty brass for several sessions of three minutes - the majority of people to whom I showed the results could see no difference. None of my local super-markets' calcium removing cleaners mention sulphamic acid, so I used an ammonia cleaner. Quenching in water removed most of the flux and the result of 12 ultrasonic minutes in the ammonia solution was not what I was led to expect. Maybe the extra 25 watts and sulphamic acid would produce better results?

John Day, Capel, Dorking

Schools big ends (M.E. 4297, 13 April 2007).

Until about the mid 1940s it was standard GWR practice to secure coupling and connecting rod bushes with a 'set bolt' screwed into the body of each 'rod' as per Antony's drawing but without the lock nuts. In the GWR instance the bush was also tapped to accept the 'set bolt'. I speak from experience here, having dismantled these parts on a number of occasions.

From about that time the design was altered to a key to prevent the bush from turning, exactly as described by Antony. I am unable to give a precise date for this alteration but I suspect that it took place at the same time that the connecting rod big-end was re-designed with the squared off shoulders rather than the blended type.

The 'set bolt' remained in use on ex-GWR locomotives right up to the very end of steam on the 'Western' on a number of engines, a fact which became apparent to me when working to preserve some of the locomotives from the famous Barry scrapyards in the late 1960s. It is a matter of interest that one of the 28xx Class locomotives in the scrapyard (I believe No. 2807) was fitted with connecting rods which had originally been fitted to one of the original 'Saints'.

As far as the 'set bolt' is concerned I have always understood that it was present simply to prevent the bush from turning rather than to secure it in its housing.

Pete Rich, Monmouthshire.

Vertical boilered locomotives

SIRS, - Re. Tony Simons' (M.E. 4301, 8 June 2007) requesting information about vertical boiler slate quarry locomotives.

I am not sure what Tony wants, but I would suggest he obtains a copy of the following book: *Vertical boiler locomotives and rail motors built in Great Britain*; author: Abott, Rowland A.S, ISBN: 0 85361 385 0, published by: Oakwood Press 1989.

The information is not extensive but it has a section

Pop-Pop boats

SIRS, - I was interested to see the article An Electric Pop-Pop Boat (M.E. 4300, 25 May 2007), as I still have a conventional (heat-driven) pop-pop boat dating from my post-war childhood. The boat hull is made of two simple aluminium pressings, together with a smaller aluminium strip bearing a steel fuel cup. It was originally powered by tablets/chunks of 'meta' (metaldelhyde) - an easily lit if slightly smelly solid fuel - obtained largely in our case by the purchase of HMG-surplus solid-fuel tablet cooking sets, as used by our troops at war.

The boat can also be powered by cotton wool soaked in meths, or even stubs of candle.

The propulsion unit comprises a single brass tube, around 1/4in. bore, which appears to be deliberately in good thermal contact with the bottom of the boat. It emerges via a simple rubber tubing seal just forward of the rudder. At the top end, the tube connects to a shallow flat 'engine', under which the fuel cup is positioned. This oval brass 'engine' has a relatively thick base but a thin top, which has a large annular 'dent' pressed into it. The combination of heat and water causes the brass sheet to change shape (abruptly, like a child's 'clicker') from roughly convex to concave and back, as the water boils/cool. (I am not sure if the presence of the dent, and/or some trapped air, is/are necessary to its operation).

This pulsing causes alternate ingestion and expulsion of water at the stern. The propulsion comes about since the water sucked in is drawn from that all around the pipe end, whereas that expelled is clearly pushed rearwards. This generates a net thrust, much as a centrifugal pump (or a conventional propeller) would.

If any reader seeks more details, I can be contacted via the Editor.

Chris Finn, East Yorks.



Chris Finn's pop-pop boat showing the motor unit with its single pipe outlet.

on the locomotive builder, De Winton & Co., Union Works, The Slate Quay Caernarfon. Furthermore the author lists the preserved De Winton locomotives in the UK; most of these are in Wales. Any good book shop should be able to supply the book.

Peter A. Penning, Netherlands.

Black rocks?

SIRS, - The snippet from the Saffron Walden club's newsletter concerning the sack of "black rocks" prompts me to write of an experience at The Mid-Devon Agricultural Show a couple of years ago.

I was preparing a locomotive for use on a portable track when I became aware that I was being watched. I turned round to be confronted by my worse nightmare; a 60 something year-old, grossly overweight man dressed in plus fours, wearing a deer stalker hat and perched precariously on an inadequate shooting stick. He fixed me with a belligerent stare, I returned to my task. He spoke in what was once a respected accent, "Aiy sai" I ignored him, he tried again "Aiy sai - yew" I thought "Not me he is talking to a tree". He tried a third time "Aiy say -

yew, yew with the train" I turned and faced him. By this time he was on his feet and pointing at me with the shooting stick "Hyow dus the smoke generator work"

Astounded I replied "Well actually you get some stuff called coal and set fire to it" He snorted and stamped off.

Since then I've managed to avoid agricultural shows!
Peter Parks, by email.

Pop-Pop boats (2)

SIRS, - There is surely no mystery as to how these boats are propelled, and it has precious little to do with bricks and pieces of string. The exhaust is projected directly backwards from the unit, but the intake comes from a radius of the nearest water. So there is nothing equal and opposite in the cycle and the boat moves forward.

In 'brick' terms, if it were possible, you would fling your brick directly backwards and then haul in an infinite number of bricks totalling the same weight, but spread in a 180deg. arc at the stern. In practice of course the bricks would all sink, possibly taking the boat to a watery grave in the process!

Denys Harley, by email.

Gunpowder beam engine

SIRS, - I refer to the good-looking model engine by John Wilson (M.E. 4300, 25 May 2007). Unless there is something subtle that I have not appreciated, the correction for parallel motion is not correct as illustrated. I am not saying that it would not work in practice, both in the model and in the original. The original power of only 30hp, the piston rod length of over 10 times the stroke, the slow speed and the general loose (by today's standards) fits would allow the necessary flexing of the whole system in operation.

Leaving out the air-pump rod nearest the beam pivot, the two piston rods need separate correction dependant on their distance from the pivot point. This cannot be supplied by only one correcting rod pivoted in the low pressure piston rod plane (approximating from illustration). In fact that system cannot be correct for any of the rods and with modern fits is inoperable over any significant range.

The error to be corrected is simply that produced by the radius of the beam to the correcting point over half the stroke. The correction has to

be equal to the error radius at all points of the travel. This can be produced by one correcting arm provided that it is pivoted as far the other side of the piston rod pivot as the beam pivot is on the one side. I have seen a low power engine where this was done (in a museum at Stellarton, Nova Scotia). It takes a lot of room but it is simply perfect. Each rod requires its own correcting arm pivoted to satisfy this requirement.

Most engines were not made to take up so much space therefore compound correction arms were and are needed where the correction errors produced by shorter arms and pivots were 'nearly' removed over the operating range. There are many such Watts Correction Arm systems and they work quite satisfactorily. They were surely needed when the power handled became large.

In case anyone thinks I am being 'picky' and critical let me say clearly that this was obviously a good design. It worked which is the only practical requirement of any working design. The design engineer produced something that was simple and practical in its environment. He balanced perfection against practical operation and in so doing, he did what all engineers should do, he made an economical product for the particular need.

Ted Wale, by email.

Four start internal threads

SIRS, - As a favour I have been asked to make a knurled wheel to fit an antique scientific device. It has a 0.207in. O/D four-start threaded brass stud which seems to be close to 24tpi Whitworth. I suggested replacing the stud with a single start thread but that is not acceptable. I know how to cut a multi-start thread but not internal and not that small. I guess that a 0.5in. long thread would be plenty. All ideas and comments are eagerly awaited.

Chris Smith, Somerset.

Trichlorethylene

SIRS, - I do not think Ray

A parcel of water jet cut parts for Tim Coles GT3 locomotive.



Jerry Burchell's gas turbine locomotive bogie assembly brazed up from water jet cut parts.

New technology

SIRS, - Following on from Michael Jones' article describing new locomotive construction methods (M.E. 4298, 27 April 2007), may I put forward two further new technologies?

Water-jet cutting

I have made extensive use of water-jet cutting in the construction of my gas turbine locomotive GT3. Main frames, bogie frames, tender frames, coupling rods, buffer heads, cab structure, window frames, head-code ovals and brake parts are all water cut in materials from 1mm stainless to 12mm mild steel. The process is similar to laser cutting but being a cold operation, gives no problems with local burning or hardening. Holes down to 1.5mm dia. can be produced and most materials can be used, including brass, aluminium and hard steel.

In practice, I email an AutoCAD drawing (in .dxf format) to the water-jet cutting company and they send back a heavy parcel with the parts, a few days

later. Little finishing is generally required, apart from de-burring, because the water-jet cut leaves a pretty smooth surface, but very sharp edges. The cut does have a slight draft angle but this can mostly be ignored.

Vacuum brazing

In this process, a paste of silver solder is applied to the joints of a copper or steel fabrication. The assembly is then put into a vacuum chamber and the temperature is first raised and then lowered in a carefully-controlled cycle. With the correct application of paste, nicely filleted joints result and the job comes out cleaner than when it went into the chamber. The work does need to be self-jigging or held together by a suitable frame.

My good friend and fellow GTBA member Jerry Burchell is using vacuum brazing in the construction of his Metropolitan-Vickers gas turbine electric locomotive, 18,100. The photo shows one of his bogie assemblies, vacuum brazed together from, as it happens, water-jet cut parts. The result is a structure which closely follows the full-size design, is immensely strong, and yet was very easily produced. The vacuum brazing company seemed to think there should be no problem vacuum brazing a complete locomotive boiler, with successive heatings. I think this might take a bit of development, but it holds out some interesting prospects.

Finally, may I offer a comment on lost-wax castings? I made up patterns for the spring-hangers and bogie horn blocks for my locomotive and sent them for lost-wax casting. The results were quite good but no one told me that brass shrinks on casting and the parts all turned out 10% smaller than intended. Please don't tell the competition judges about this!

Tim Coles, Cambridgeshire.

Griffin is correct to write that "fortunately, the local supermarkets and DIY shops in France sell trichlorethylene" (M.E. 4299, 11 May 2007).

They certainly used to until it was made illegal to sell to individuals by law some four years ago.

I gained a litre or two before this law came into force and even so it was kept under lock and key.

I have included a relevant link from the web: <http://fr.prevent.be/net/net01.nsf/p/FC3C8047A34D831BC1256CEE003EC02C>

This site also tells you why the law was introduced.

It is a remarkable inclusion to suggest that illegal

dangerous substances are on sale especially as it so easily checked on the internet and was made illegal four years ago.

Ron Wallman, France.

Camera tripod threads

SIRS, - I am afraid that the assertion by Mr. Weighell (M.E. 4302, 22 June 2007) that all cameras use $\frac{1}{4}$ in. Whitworth thread for the tripod bush is not correct. I have German camera (an Exakta) that I believe was originally bought in Germany. The tripod bush thread is larger than $\frac{1}{4}$ in.

When I acquired the camera I went into a local camera shop and asked for a Continental to British adapter. One was immediately produced, which

implies that it was a common request.

As a result of Mr. Weighell's letter I decided to find out what the thread was. I assumed it was metric, but it measured as 9.4mm dia. and 1.5mm pitch, although the fit of the thread gauge was not perfect. I could not find any metric threads which fitted, and thought "is it imperial?" A quick check on imperial gave $\frac{3}{8}$ in. (9.525mm), and 16tpi gives 1.587mm pitch i.e. $\frac{3}{8}$ Whitworth. A $\frac{3}{8}$ whit bolt fitted perfectly.

This leaves the interesting question "why has a German camera made for the German market got a Whitworth thread?"

E. Boardman, Glocs.

PRICE'S PLACE:

A workshop visit



Roger Backhouse profiles the models, craftsmanship and workshop of Ron Price, member of the North London Society of Model Engineers.

In the North London Society of Model Engineers, Ron Price's friends joke that his workshop is so small he makes locomotives by standing them on end! Indeed, in a shed measuring only 8ft. by 5ft., Ron (photo 1) has constructed 14 locomotives of different sizes ranging from 3½in. gauge Gresley Pacifics to a gauge 1 gas-fired Tich look-alike (photo 2).

Model engineering sometimes runs in families and Ron's is no exception. His father specialised in O-gauge models and was also a founding member of the Hatfield Model Engineering Society (now at Welwyn). Ron's son, Graham, is also a model engineer and his grandson can sometimes be seen at the North London track driving Ron's locomotives.

Career

Ron started work at the age of 14 in production engineering working a capstan lathe. This experience gave him a sound

background in machining operations. He served his apprentice time as a sheet metal worker for the De Havilland aircraft company, eventually becoming an assistant production engineer. During his working life he helped build the full range of De Havilland aircraft including the Mosquito, Comet, Venom and Trident.

Inspiration

LBSC's works were an early inspiration along with articles in *Model Engineer*. Much was learned from his father and Ron's own experience at adapting ideas and techniques fostered his own approach. Ron is well-known for sound advice to members of the North London Society but he admits to having learned a great deal from other members there.

The nearby East Coast main line has been an inspiration. Ron has modelled several ex-LNER Pacific locomotives. Guidance on these has come

from experts such as Peter Townend, former shed master at Kings Cross, who now advises the Tornado locomotive project in Darlington.

Ron's locomotives

The first engine Ron completed was a Martin Evans-designed Jubilee 2-6-4 tank. Then, working with his father, he built LBSC's Hielan Lassie. This won a Highly Commended award at the 1955 Model Engineer Exhibition.

However, most of his engines have been built using his own plans derived from works drawings obtained from the National Railway Museum. No one should underestimate the amount of time involved in making your own model locomotive plans, which often have to be reconstructed from limited data.

An example of Ron's attention to detail is exhibited in his model of the A4 Mallard. Presented in British Railways' green livery, it took 14 years



1. Ron Price with one of his 4-6-2 LNER locomotive models, *Amadis*.
2. Ron's gas-fired Tich look-alike in Gauge 1.





to build using works drawings. This model even has a working 'cod's mouth' front opening operated by crank handles inserted from either side (photo 3).

His latest project is a Peppercorn A1 Pacific locomotive (photo 4) which he hopes to steam test shortly. At the time of my visit, he was working to complete the tender (photo 5).

The LNER 10000 locomotive

The original Gresley-designed 10000 was an experimental

locomotive with a Yarrow water-tube boiler built in 1929. The boiler was larger than usual so the safety valves were set to one side. The boiler casing itself was a difficult shape to model, but managed most successfully on Ron's model. Unsurprisingly, Ron decided not to make a Yarrow boiler, per the prototype, as it would have required over 1,000 silver-soldered joints.

The model carries the name *British Enterprise* (photo 6). Though nameplates were cast for the prototype, for some reason they were never

carried. In real life the engine was not a success and was rebuilt in 1937 as a 4-6-4 with conventional boiler.

This model is without doubt one of the finest I have seen and almost certainly unique in 3½in. gauge. Visitors to model engineering exhibitions will have seen it on display at the North London Society stand, but it has never been entered in competition.

The workshop

Ron produces models in an incredibly small space. His wooden workshop contains a Hobson lathe, drilling machine, a small Chester mill, linisher, compressor and grinder together with a wide range of hand tools neatly stored. For most projects Ron does not build large jigs though he uses small disposable jigs for some drilling operations.

He finds the most difficult parts to make are those with lots of components. For example, the tender of the A1 alone needs over 80 leaf springs.

Painting is, says Ron, not his favourite job, but the results using a Humbrol grey paint on 10000 are excellent. Most painting is done out of doors on a dry, windless day using

3. An A4 Pacific Ron built. Its detailing even includes a crank-operated 'cod mouth' front opening.

4. The latest project, a Peppercorn A1 Pacific locomotive, nearly ready for steaming.

5. A side view of the Peppercorn's tender chassis.

6. 'British Enterprise', a model of Sir Nigel Gresley's experimental locomotive '10000'.

7. 'Flippers' used to remove hammer marks from sheet metal.

a spray gun powered by a compressor. Occasionally some painting is done in the garage.

Boiler making

He makes his own boilers working with a friend from the North London Society. The approach is to use propane for general heating but using oxy-acetylene for specific soldering operations.

Some of his favourite tools come from his work background in sheet metal. He uses a panel-beater's tool called a 'flipper' (photo 7) made of a file polished on one side and bent to shape. This is used for finishing sheet metal avoiding the familiar 'half moon' hammer marks. The results are well-demonstrated in the superb finish of Ron's Gresley 4-6-4 10000 made in five years after his retirement (photo 6).

Ron's work is an inspiration. I came away from my visit amazed at the quality and the remarkable number of engines he has produced. Future engines will be well worth looking out for.



Merstham Model Steam Show



Brian Davies visited this annual event, which has something to suit all model engineering tastes, and took along his camera to record the highlights.

1. The SMEE stand.

Now in its 22nd year, the Merstham Model Steam Show took place over the weekend of 19/20 May at St. Nicholas School, a residential school for boys aged 11-16 with learning and behavioural difficulties. Located in Merstham, Surrey, the event is organised by the Merstham Model Steam Society in association with the Friends of St. Nicholas School. All proceeds are used to provide recreational facilities and activities for the pupils.

Spread over the indoor exhibition spaces, in a large hall and the gym, are several indoor garden railway layouts, trade and club stands.

Outside there is a permanent 7½in. gauge track some half a mile in length that runs around the grounds of the school. This track, operated mainly during the summer months by the narrow-gauge Merstham Valley Railway, enables the

pupils to experience the thrill of operating live steam models. The Croydon Society of Model Engineers supports the event with their portable 5in. gauge passenger railway. Complementing the railways was the school's large swimming pool used to operate model boats of all kinds. This really is a show for all tastes.

I arrived on site early to find the area buzzing with many folk busy setting up their stands and with a number of indoor garden gauge railways getting steam up ready for a day of playing with trains.

Indoor exhibitions

Always present at this show is the Society of Model and Experimental Engineers (SMEE) (**photo 1**). Their stand featured a display cabinet with several examples of Tubal Cain's model *Polly*. This steam engine and boiler building project is the subject of their training

sessions. The model has a vertical boiler and oscillating cylinder steam engine. On display were models in various stages of completion and the formers for the boiler end plates. These courses are regularly held at Marshall House, South East London. Full details are on their website.

Trade stands

A large number of traders attend this show. The event began as a weekend for garden railway modellers and the trade stands reflects this heritage. However, more and more traders do combine all sizes within their business.

The stands I took photos of are only a small sample. It would have been impossible to include all of them in this report. Details of all the traders can be found in the links at the end of this report.

Martin's Models (Martin Howard, proprietor) had many products for garden railways, including buildings and an impressive line-up of ready to steam locomotives for the garden gauges.

Chalk Garden Rail (Peter Skinner, proprietor) cater for a broad range of modelling tastes. Their accessories for garden railways included buildings, figurines of animals and people, and rolling stock for new or historic-look railway layouts.

You may need water slide transfers to complete your garden railway model. Locolines supply water slide transfers for many liveries, including custom ones you design. There are literally hundreds of different transfers available. Also displayed was their *Viscount* double-decker tram model, an ➤



2. Rolling stock on the Gauge 1 Model Railway Association stand.

3. Livery options on display at Lightline's stand.

4. Adrian Little's freelance gauge 'O' model.

5. Peter Cook driving Netta.

6. Berwyn under full power driven by Antony Morse.

7. Bruce Morgan with Rhian.

amalgamation of various British designs, for use on garden railways.

Another well-stocked stand was IMP Models which featured plenty of accessories for the smaller gauges. They displayed a large number of locomotives, ready to run, awaiting new owners.

Mainly stockists of buildings and figures, Modeltown had an



interesting and attractive stand showing their cast resin kits including engine sheds, line side buildings, stations and terraced houses. These are reported to be easy to build and paint. Further information on their website.

The Gauge 1 Model Railway Association stand had a display of rolling stock and locomotives together with a large number of

photos and a monitor running various recordings (**photo 2**). Further details of this specialist association can be found on their website.

If you don't have the confidence to line-out your model yourself, Lightline will do this for you. You can choose from a range of liveries and their website has more than 300 photos to give you further





inspiration (**photo 3**).

The G-Scale Society had a large stand, with lots of detail. A small section had a street scene with a working tramway, and in the foreground several boats along the quay. More information on their website.

On the indoor track many trains were running, including this freelance coal-fired, 0-gauge model made by Adrian Little. As you can see it is very realistic under steam pulling four wagons (**photo 4**).

Outdoors activities

In addition to the stands in both the main hall and the gym, a number of traders and clubs were located in either of two marquees or smaller tents.

At the Chantry Model Club of Gravesend stand, a model that caught my eye was the steam launch *Victoria*, a fully working model. The prototype was built in 1912 at the Simson and Strickland shipyard.



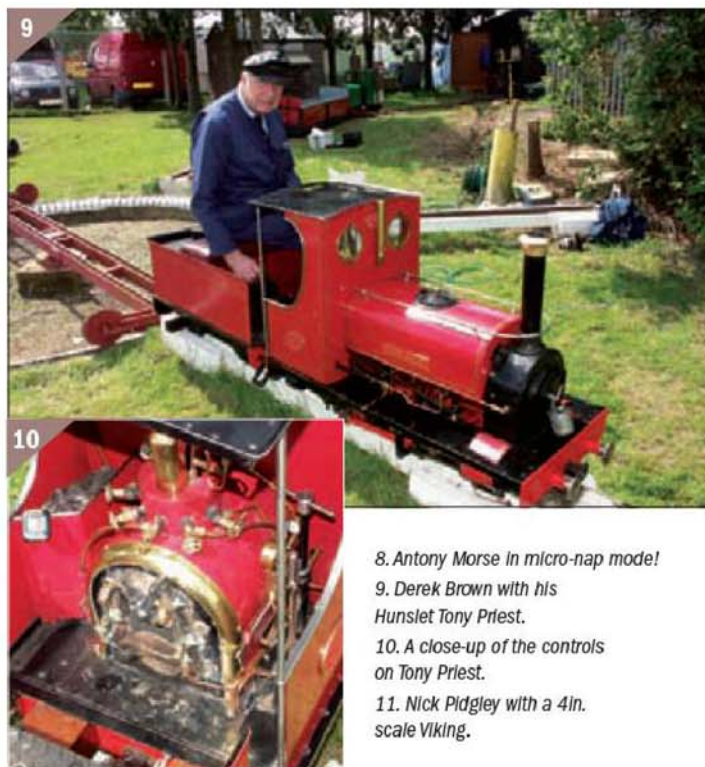
St. Nicholas School features a large outdoor swimming pool and this was given over all day for owners to sail their radio-controlled models. The size of the pool dwarfed the models that operated on it.

Railways

On the 7 $\frac{1}{4}$ in. track, operated by the Merstham Valley Railway, there was much activity with several narrow gauge locomotives in full steam ready to take passengers around the more than half-mile track. This has been extended so that the out and back journey is more than a mile long.

Antony Morse was driving *Berwyn* (**photos 6 and 8**). While Bruce Morgan had command of the Hunslet engine, *Rhian* (**photo 7**).

Well-known *Model Engineer* contributor, Derek Brown, poses with his Hunslet *Tony Priest* on the steaming bay prior to going out for a run (**photo 9**). A detail



of the backhead is in **photo 10**. Later, he realised he had a problem with the locomotive because the power was very low and was unable to pull passengers on his own. This resulted in double-heading with Chris Manning driving *Robert*.

Diesels were represented, too, with Stephan Morse at the controls of diesel-hauled trains and *Dippy* was driven by Marie Cogan.

The 5in. gauge portable track operated by the Croydon Society of Model Engineers was in operation, too, with Peter Cook driving an 0-8-0 LNER *Netta* (**photo 5**).

Traction engine

The only traction engine I saw was a William Foster 1:3 scale *Viking*, driven by Nick Pidgley (**photo 11**). A problem arose when a screw fell out of the reversing handle, but he was able to improvise a repair and kept running.

All in all this was an excellent show and I was impressed by everybody's enthusiasm. The weather was kind and that always helps. There was plenty of parking and food was available for those that needed it.

The Merstham Steam Model Show is a day out which is to be fully recommended. Staged

8. Antony Morse in *micro-nap* mode!

9. Derek Brown with his Hunslet *Tony Priest*.

10. A close-up of the controls on *Tony Priest*.

11. Nick Pidgley with a 4in. scale *Viking*.

on the third weekend in May every year, full details of future events can be found on the Merstham Model Steam Show website.

ME

Web Links

Merstham Model Steam Show www.mmss.co.uk
All traders' websites are here: <http://www.mmss.co.uk/traders/>
The SMEE www.sm-ee.co.uk
Martin's Models www.gardenrailways.co.uk
Chalk Garden Rail www.chalkgardenrail.co.uk
Locolines www.locolines.net
IMP Models www.impmodels.com
Modeltown www.modeltown.co.uk
Gauge 1 Model Railway Assoc. www.gaugeone.org
Lightline www.lightline16mm.com
G-Scale Society www.g-scale-society.co.uk

PART 10

Continued from page 86
(M.E. 4304, 20 July 2007)

Bill Steer
concludes the
series by making an
alignment aid.

A compact RATCHET BRACE

67. A further view of the ratchet brace, set up to drill holes for brake hangers in a nearly completed Juliet chassis. Because of the limited space in this particular position, a rigid, extended, stub-drill is being used.

68. Adding detail to a Rob Roy — the brace with its universal support structure set up to drill holes for the attachment of guard irons. Note the use here, of a standard length drill, supported by means of an additional steady.

One final accessory worth making is the alignment aid. This is a simple tool used to help with the lining-up of the support structure with respect to the position of the hole to be drilled. A drawing for this is given in **fig 32**, and I think it is self-explanatory. The pointer arm is made of $\frac{5}{32}$ in. dia. silver steel and this needs to be a nice fit within the reamed hole in the collar. The collar, itself, should be a good location fit in the reaction bar. The use of this aid will be described in the next section.

Setting up and applications

Assuming that the particular mounting problem for the ratchet brace can be solved through the use of the universal support structure (most can, but sometimes it takes added ingenuity coupled with extra packing and/or jacking), look carefully at the work to be drilled and decide on the best configuration for the structure. This will obviously depend on the size and nature of the work piece as well as the position of the hole to be drilled in relation to other obscuring components.

As an example of a frequently encountered problem, let's look at the drilling of holes for brake hangers in a nearly completed locomotive chassis. At this stage the chassis is usually too big or cumbersome to mount easily under a normal drilling machine. We will assume, in the first instance, that it has been possible to remove the running boards, as this will simplify the description.

To begin with, if possible, the position of the hole should be marked out and centre punched. Lack of access can sometimes make this difficult, in which case a small drilling jig may come to the rescue. This need be no more than a piece of $\frac{1}{8}$ in. thick steel plate with an appropriately sized hole drilled through it. After being slipped into position, it can be held in place with a toolmaker's clamp or even double-sided sticky tape.

Tie rods should next be inserted into the support bar in such a way that it can straddle the chassis plate and be held in position with the aid of the two clamps. For extra stability, it

is worth lock nutting the ties on the under side of the support bar.

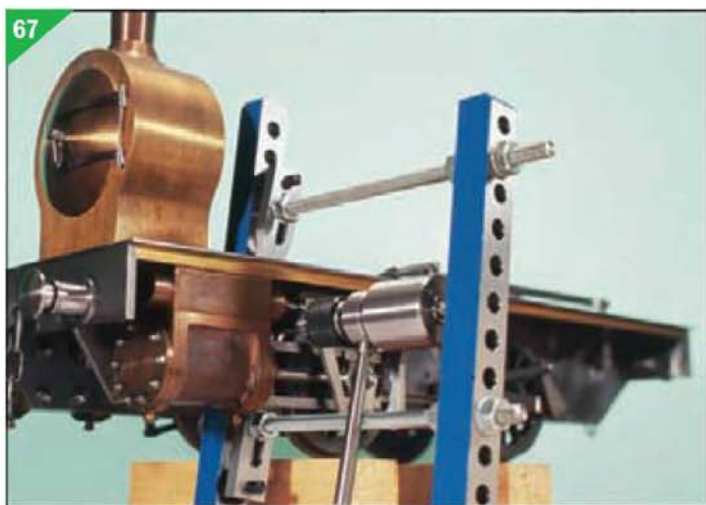
The support bar should initially be positioned with the centre of one of its holes roughly lined up with the position of the hole to be drilled. With the support bar firmly clamped we can now add the reaction bar, using nuts and washers, to set it in approximately the right position for use with the ratchet brace. Don't fit the brace just yet, however.

To ensure that the longitudinal axis of the brace will be held perpendicular to the surface being drilled, plug the alignment aid into the appropriate hole in the reaction bar. After slackening the clamps just a little, slide the support bar around until the tip of the pointer coincides with the marked position of the hole. Tighten the clamps and now fit the ratchet brace, equipped with its drill bit.

In many cases it will be found sufficient to hold the reaction bar, which works against the brace, with just two nuts and washers. Use one on the end of each tie bar. Where a more rigid structure is required (e.g. to give greater precision), it is worth nutting up on both faces of the reaction bar.

With everything now in place, drilling can commence.

Photograph 67 shows the ratchet brace set up ready to drill a hole for a leading brake hanger on a Juliet chassis. Such a hole is particularly difficult to get at due to the vicinity of the motion work, but the ratchet brace takes it in its stride — the only concession being the use of a stub drill with a large diameter extension,





to assist with maintaining stability.

Had it not been possible, or desirable, to remove the running board described in our example, we may have found that one of the clamps was obstructed by it. This could have been overcome by allowing the clamp to straddle the running board through the addition of extra packing pieces, or small jacks — a little more tricky, but by no means impossible!

Another application is shown in **photo 68**. Here, it had been decided to add some extra detail, in the form of guard irons, to a nearly completed Rob Roy.

The problem was how to drill the required small fixing holes. Again, the ratchet brace comes to the rescue. Space was very limited due to the proximity of the cylinder cover at the front end of the locomotive.

Consequently, a fairly complex arrangement of the support structure had to be employed which entailed clamping the structure to one frame member, so that the support bar could still provide a backing for the other frame being worked upon).

A small jig was used to guide the drill, which, because of the limited clearances, had to be of standard diameter throughout and of full length. To prevent this from whipping an additional steady was fitted to the adjacent tie rod; this can be seen in the photo. The weight of the support structure is being carried by the workbench.

Other possible applications that come to mind are the drilling out of broken studs from dome flanges, cylinder covers, or valve chests; fitting of damper control and drain cock mechanisms; addition of lubrication systems and



many others.

Finally, just to prove that at least one of the original design criteria has been met, **photo 69** shows the brace set up, between the frames of a 5 1/2 inch gauge locomotive. It is about to be used to drill a hole (for the attachment of a drain cock linkage) that is obscured from outside the chassis by the lubricator mechanism!

Closing thoughts

Although the ratchet brace is a tool from a past era, I have tried to show that it still has much to offer in our own field — especially when designed with model engineering applications in mind. Hopefully, the tool I have described, will help to solve many problems, but I acknowledge that the solutions it offers may not necessarily be unique. Of course, it can, and often will, take quite a long time to set up

69. The brace set up between the frames of a 5 1/2 in. gauge locomotive. The position of the hole, about to be drilled, is obscured from the outside by the lubricator mechanism.

70. The author's ratchet brace and support components in a small wooden storage case awaiting its next assignment.
Fig 32. Alignment aid.

the tool for use (drilling the hole is always the quickest part), but when the only alternative involves major dismantling and then subsequent re assembly of components, this time is well spent!

In fear of being accused of over extolling the virtues of the ratchet brace, I hasten to add that it forms no substitute for forethought in the design stages and construction of a system!

If you have made the brace and its fittings as described, you should have by you a nice looking tool that is both functional and a pleasure to use. It may only be called upon occasionally, but when it does, you will find that it really comes into its own. In order that it is always ready for action, I suggest making a small box, with divisions, to keep all the parts together. Varnished MDF or ply would be fine for this, but don't use oak, as the tannin in it will stain the bright steel parts.

I end with **photo 70**, which shows my own kit of parts in a small wooden case with a hinged lid, awaiting its next assignment!

ME

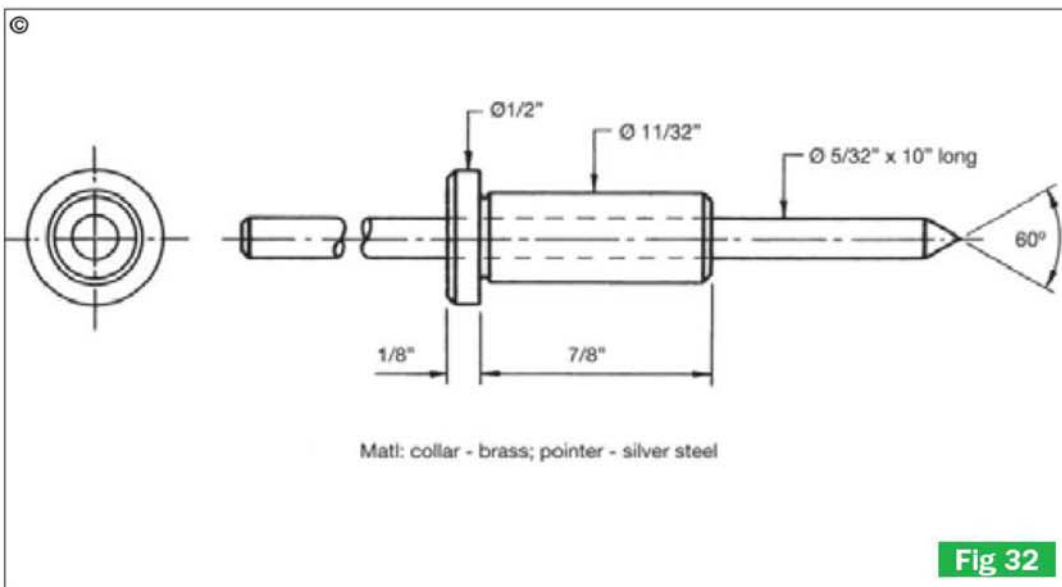
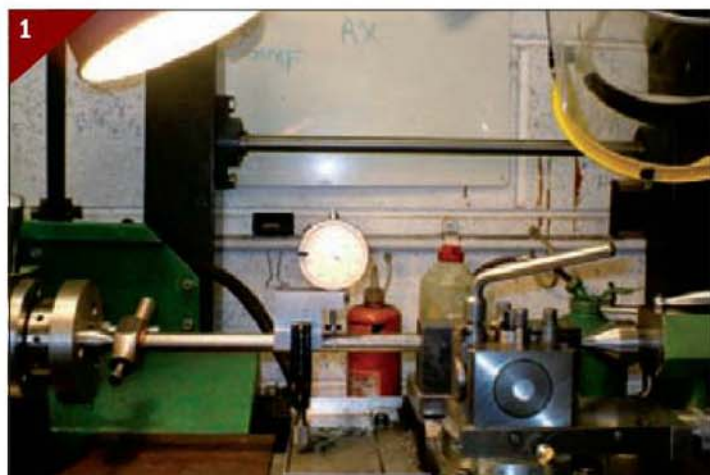


Fig 32

Boring Bar Setting Jig



Roger Mountain describes a tool designed to take the drudgery out of setting a between centres boring bar.

One of my least favourite methods of boring on the lathe is using a between centres boring bar. This is because of the difficulty of setting the cutter to accurately take out the last 0.001in. or so. Recently a job came along in which I had no alternative but to use this method. The first roughing out cuts presented no



problem as the cutter securing screw could be slackened and the cutter gently tapped to adjust it, but to accurately bore the hole to a sliding fit on a shaft it was obvious that another method of setting the cutter would be required.

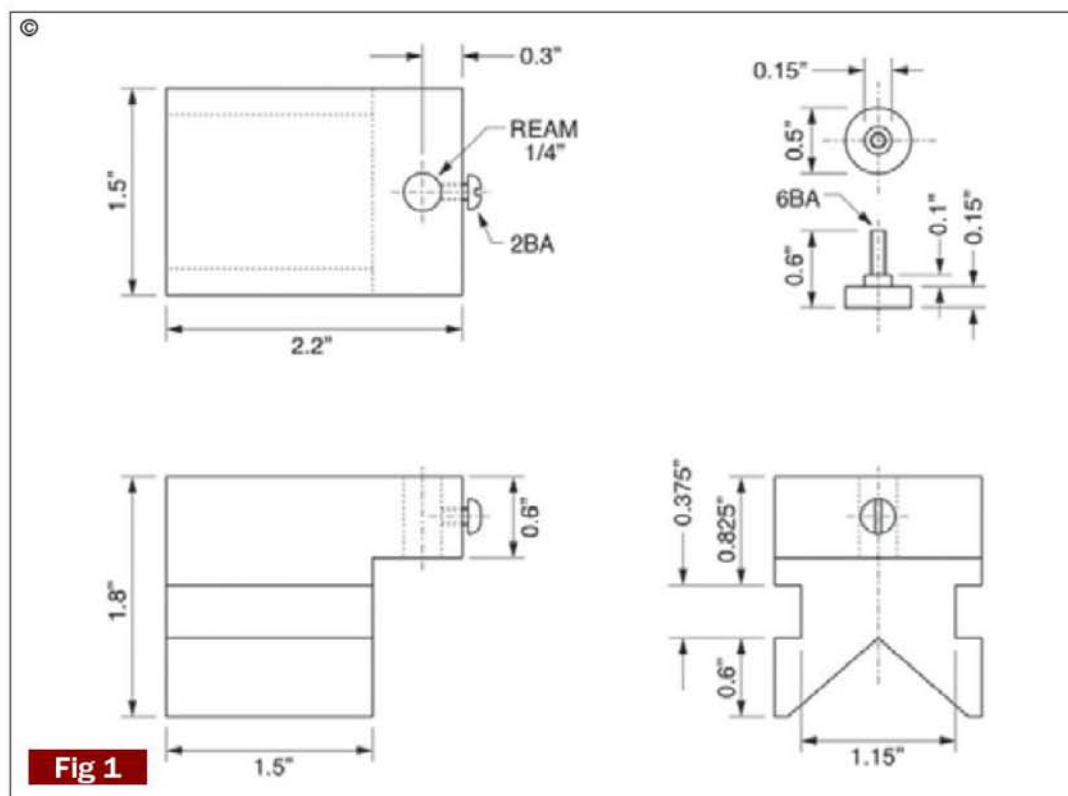
Casting around for an idea I decided to try and use a V-block and DTI. I measured up a V-block from my Moore & Wright

set and decided to machine another from mild steel to the same dimensions so that I could 'borrow' the clamp from the set.

I have sketched out the V-block to these dimensions in **fig 1**, obviously anybody wishing to make this jig would have to alter the dimensions to suit their own V-blocks and DTI. The standard DTI ball anvil is not suitable for use in this application so I turned up a flat anvil in silver steel also shown in **fig 1** to fit my DTI.

Photograph 1 shows the jig mounted on the lathe. To use the jig the lathe is stopped and the lathe saddle is wound back to expose the boring bar cutter. The lathe spindle is then rotated until the cutter is facing upwards. Assemble the jig and DTI and place the block on the boring bar as illustrated in **photo 1** with the clamp fitted but not tightened, rotate the block around the boring bar until a maximum reading is obtained the clamp is then tightened and the cutter may then be adjusted remembering that 0.001in. indicated on the DTI will equate to the hole being 0.002in. bigger.

Photograph 2 shows the assembled jig with the 'borrowed' V block clamp. **ME**



RACHEL

A wall steam engine

PART 3

Continued from page 83
(M.E. 4304, 20 July 2007)

Stan Bray
now turns his
attention to the
frame for this
attractive
wall engine.

The construction of this wall engine differs considerably from that of an ordinary horizontal engine. The cylinder rests on a casting, which has been dubbed the frame (item 5). That casting in turn fits on brass bar material and the brass is mounted on two castings that, for the purpose of clarity, must be referred to as the base. The word base is of course generally used to refer to the lowest section of an artefact and, more often than not, supports everything. In the case of Rachel the base is secured vertically to a wall and therefore takes an entirely different form.

The cast frame on which the cylinder is bolted is of V-shaped section and fortunately requires very little in the way of cleaning up. It is made of nice soft grey iron and a minimum amount of machining is required. A start was made by bolting the casting to the milling machine table and machining the surface to which the cylinder will be bolted. It can then be turned the other way up and the two feet machined. By using an identical down feed position it is then possible to be sure that the two sides are of an even length. Securing it to the table for this operation will no doubt require

some improvisation as far as the clamps are concerned but to ensure rigidity the clamps should cover as much of the base as possible.

It will be seen from the drawing that there is one section lower than the rest, thus providing a platform for the cylinder block and piston rod guide. Cutting this out is probably best left until later, after the exact location of these parts has been sorted out.

Piston rod guide (item 6)

The guide was fabricated from a small piece of bronze and is very easy to make. It can either be done as a single item or fabricated with the section through which the rod runs silver-soldered to the body. The latter will probably look better, the former will be easier to construct. Although the guide is easy to make getting it lined up with the centre of the cylinder bore is rather more difficult. The best suggestion that can be made is to make it slightly over height and, little by little, lower it until the correct fit is achieved. This can only really be done by bolting the cylinder block in place, with the rear cover on and the piston fitted, the latter complete with a rod of the correct diameter. It will then be possible to measure

the difference in height and make any adjustments that are necessary. The piston rod must move smoothly through the guide without binding, when both components have been bolted down.

There are three holes for bolts with which to hold the guide in position. The use of studs and nuts is advisable for this purpose and the holes have to be marked off very carefully in order to get them to line up properly. An experiment was tried which involved sticking the guide to the frame and passing the drill through the holes already drilled in the latter. It is a little difficult as the unit is difficult to stabilise while the drilling machine is used.

No doubt the answer would be to use a flexible drive to power the drill, which would make it a great deal easier. The actual joining of the parts can be done quite successfully with double-sided adhesive tape. To use it it is absolutely essential that any burrs on the holes drilled in the frame are completely removed. It is also essential to ensure that both surfaces are absolutely clean. In particular this applies to the frame. Being of cast iron it contains a certain amount of graphite that is likely to remain as a fine powder and this will prevent a good bond. ➤

16. The frame of the engine is a robust casting and requires careful clamping during machining.

17. Four clamps were used to fix the frame casting to the milling machine table to enable the top surface to be machined.





18. With the rough surfaces cleaned up a fly cutter was used to obtain the required finish on the top frame.

19. With a datum established the casting was turned upside down so that the underside of the feet could be machined. Note that special clamps were made to fit in the recess and secure the ends.



The surface should therefore be wiped thoroughly with a rag soaked in white spirit or something similar. The guide should be secured with studs and nuts, not bolts.

Two points to note are firstly that there is insufficient room for a normal hexagon nut to be fitted at the rear to hold the

guide in place, there is just about room for a bolt with one size smaller head, but even then it was found to be virtually impossible to fit a box spanner in order to tighten it up fully. It was necessary therefore to just remove a little of the metal from the sides of the frame with a file in order to gain sufficient space.

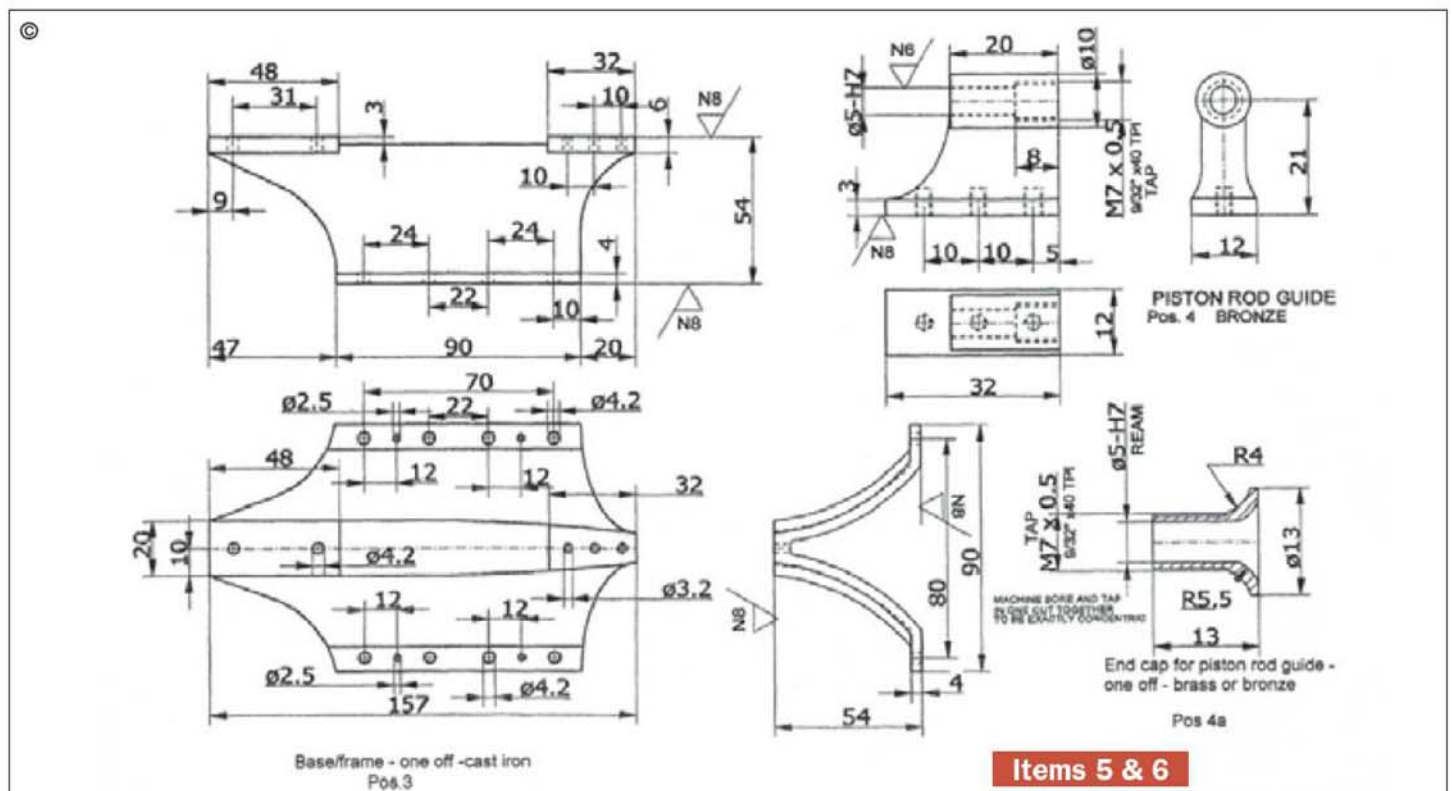
The second point is the fact that the construction of the guide calls for it to be curved at the front and one of the holes lines up at the place where the metal is at it thinnest. The result is that it is not possible to drill and tap a blind hole. It is therefore necessary to pass both drill and tap right through and screw in a bronze stud, leaving it proud. Carefully run in

a drop of soft solder to secure it and then dress the assembly with a small file. Unless it is pointed out nobody will ever know what has happened.

Frame supports

The frame is bolted through the base and the distance bars, manufacture of which has already been described. Ensuring the various holes line up with each other, through all three components, will be a matter of individual choice. The more experienced model engineer may well be content to mark off the holes in each part and drill them. Providing the marking out is right and the drill does not wander during operations this will be fine and it is certainly

the correct way of doing the job. However, trying to get so many holes perfectly placed by marking out their positions with rule and centre punch is rather like trying to jump up and reach the moon. If a mill/drill is available there should be no difficulty in getting them all in the right place as you can work to the graduations on the hand dials. If not then there are two ways open to you. One is to drill the holes in the cast iron base, put the brass section on top and secure it with clamps and pass the necessary drills through, a similar method being employed to transfer them to the frame, although holding this in position is rather more difficult and it





would probably be better to stick it in place with double-sided tape rather than attempting to use clamps.

The second method is to mark the position of the holes on the underside of the frame and drill them. Make absolutely certain that they are in such a position that they will not break out into the upright section, but that they will come through with sufficient space left to clear the nuts used to bolt the parts together. Once the holes have been drilled they can be transferred to the brass section in the same way as suggested above, then the brass section can be used to mark off the holes in the cast iron pieces. Most people will find it far

easier to adopt some method of transferring the holes.

This will still not solve the problem of accurately placing the holes to bolt the bearing support in position and those were first put in the base and distance pieces and from there transferred to the supports.

The shape of the supports virtually ruled out clamping the parts together and so the support was stuck in position using cyanoacrylic adhesive while the holes were drilled. A smart tap with a plastic mallet separated the parts and it was then possible to tap the holes in the bearing support and open those through the base and distance pieces to clearance size.



Cylinder block (item 7)

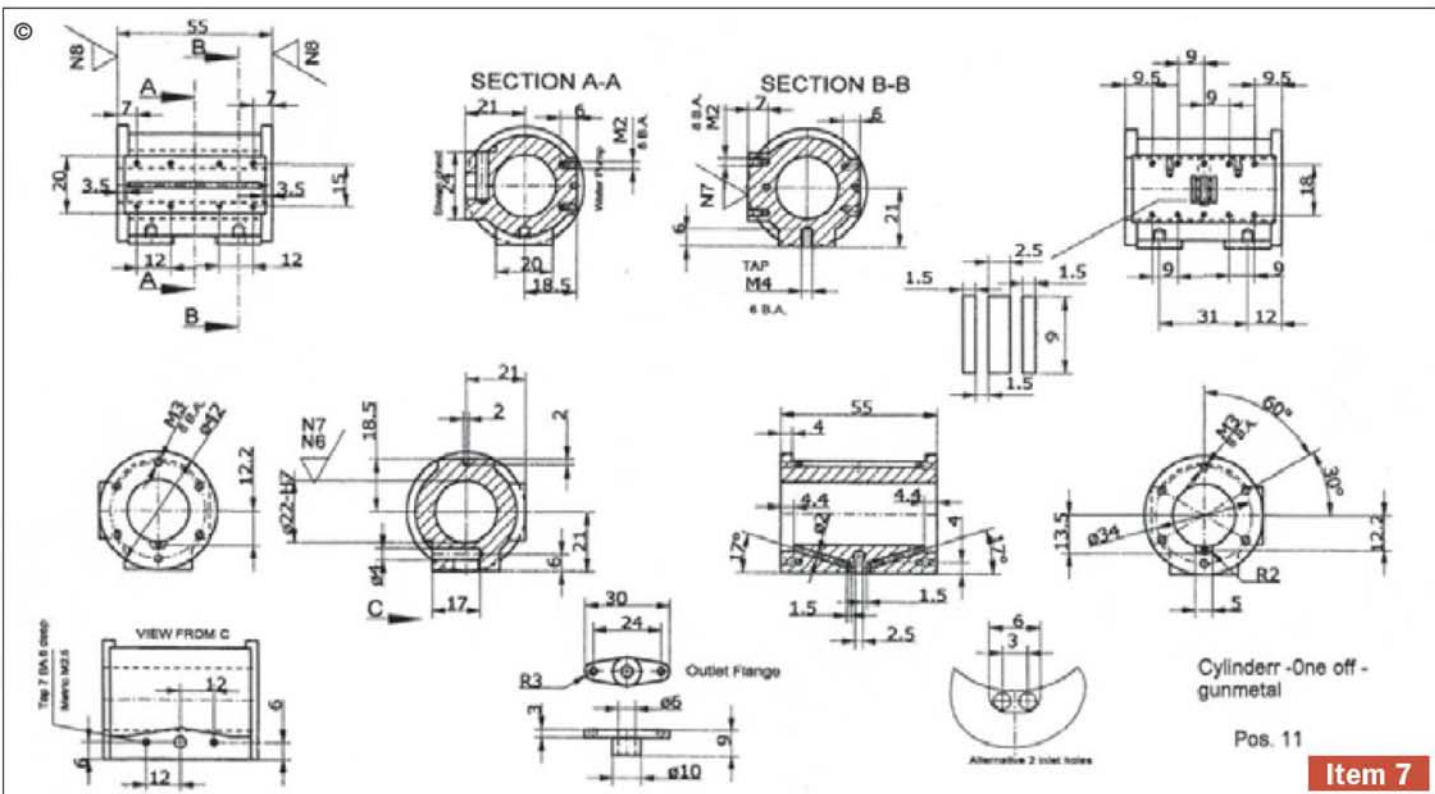
A start was made by milling the three flat surfaces, so that each could, if required, be used as a datum. Note later operations will cause these surfaces to be marked or damaged and so only sufficient metal should be removed for the immediate purpose. One end was also milled flat and the end that had not been machined was marked out with odd leg callipers and centre punched. The intention was to set the job in the 4-jaw chuck to machine the bore. However, on my particular machine this proved to be a little tricky as the centre hole of the chuck was too small to set the cylinder into it and too large to allow the machined

20. The cylinder is a bronze casting with three flat sides. That which forms the base is split into two parts, the others form the valve face and pump base.

21. Each of the three faces on the cylinder casting were machined with a fly cutter.

face of the cylinder to butt up against the face of the chuck. One edge was always trying to dip into the hole, thus setting the cylinder at an angle. Finally it was set up by using a small square off the face of the chuck to get it lined up. More on this component next time

●To be continued.



The fly press

Peter Spenlove-Spenlove

introduces readers to the fly press, a useful machine for a variety of work that requires only muscle power to operate it.

1. A Norton fly press minus its heavy cast iron balls.
2. An earlier fly press together with some of its standard tooling.



Press work is often thought to be very much in the province of large professional organisations where mass production is part of every day life. However, simple press work operations can be useful to the amateur. You are unlikely to have the use of a large industrial press but you may own or have access to a fly press. A fly press can be used rivetting, bending and flanging in addition to its main role of pressing sheet metal articles to shape.

Photograph 1 shows a typical fly press, made by Norton who built them in ten different sizes ranging from 1cwt to half a ton. Also supplied with the machine but not shown on the photo would have been at least one pair of large cast iron balls for mounting on the upright horns. **Photograph 2** shows how the ball was fitted to a slightly older type of machine.

The fly press consists of a cast iron frame carrying a vertical ram. This is brought towards the base of the machine by means of a shaft

upon which is cut a multi-start thread. Thus the ram moves a considerable distance for a relatively small turn of the threaded shaft.

The threaded shaft is turned by means of a hand operated crank handle or fly and the amount of power available is enhanced by the large cast balls mentioned above.

If buying, or even just using a fly press check that the fly is in good order with no cracks or botched repairs. If a 7in. dia. ball comes off the peg it lands with a considerable thump and you would not wish to be under it. Keep people clear of the flying handle too as it can catch you in the chest and injure you like the horns of a Spanish bull.

Past times

In times past fly presses were much used in industry - often by relatively unskilled labour. They found much favour during the two world wars when you could go on working even if there was a power cut. You may have

seen photographs in period literature showing multiple rows of fly presses all helping the war effort and often operated by female labour.

The fly can be adjusted on the ram to suit the size of the job and the stature of the operator. The balls can also be swapped - lighter ones for delicate work or heavier ones to give a hefty thump. Photograph 2 shows the press with four dogs on the base to locate and hold the bottom half of the press tool. Note the downward inclination of the dog screws. The inset shows clamps and bolts or studs and nuts. Also available was a nut assembly to go on the ram screw. It can be set to stop the ram part way through its stroke so that, for example, a bush can be pushed part way into a bore to a specified depth.

There is no space to go into press tool design here but there are a number of text books on the subject. Check with your local library.

ME



STOWE - SOUTHERN RAILWAY

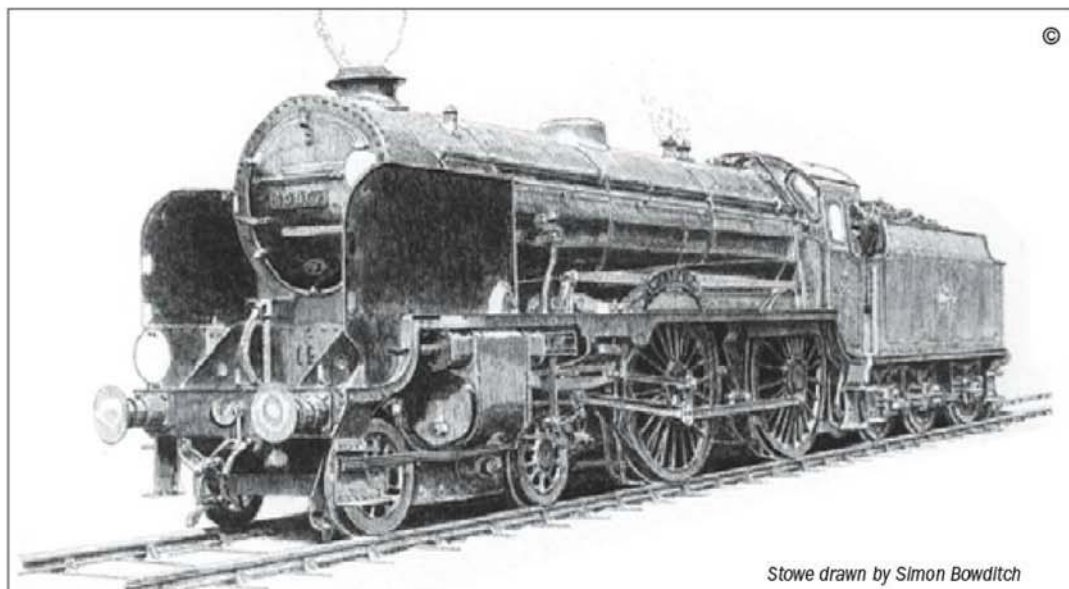
Schools class locomotive

PART 13

Continued from page 636
(M.E. 4300, 25 May 2007)

Neville Evans

returns to the series on this attractive Schools class locomotive, and describes the draincocks and pressure relief valves.



Stowe drawn by Simon Bowditch

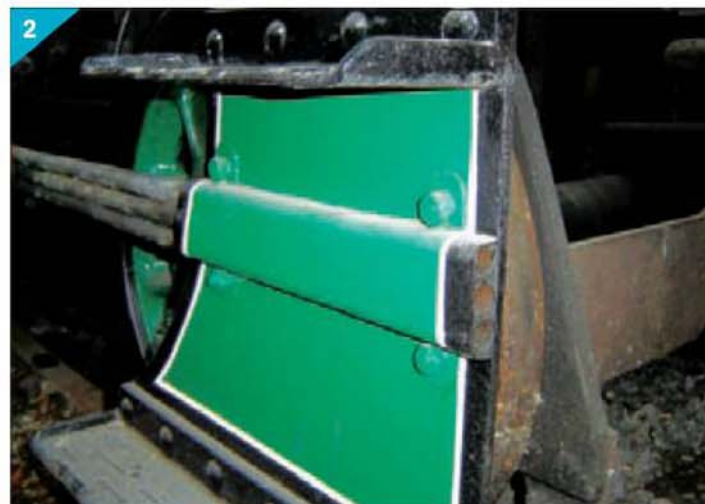
The spring loaded plunger type of draincock fitted to the Schools class, as well as the earlier Lord Nelson class, was introduced after much experimentation, at or about the time of the 'grouping'. It replaced a variety of plug cocks and vertical spring loaded valves and remained as standard until the end of steam. On the GWR and the Western section of British Railways a slightly different arrangement was used, but

the basic principles remained the same. A point that I should like to make at this time is that it is sometimes said that draincocks are not strictly necessary when slide valves are used, due to the ability of these valves to lift slightly when under pressure from excess condensate from below. However, I would certainly not omit them from any small locomotive that I built, whether they had slide or piston valves, thus avoiding the possibility of bent valve spindles.

The Great Western type of draincock as used on the Granges, as well as most of the other two outside cylinder classes, presented a number of problems in the smaller sizes and were a very interesting piece of design work. The presence of bent up supports behind the rather complex levers and structures that actuate the plungers meant that the valves had to be dismantled to reduce their width before they could be screwed into the cylinders.

1. The front right-hand cylinder showing the piping arrangement.

2. The front right-hand footstep.





3. The underside of the rear draincock.
4. The underside of the front draincock.

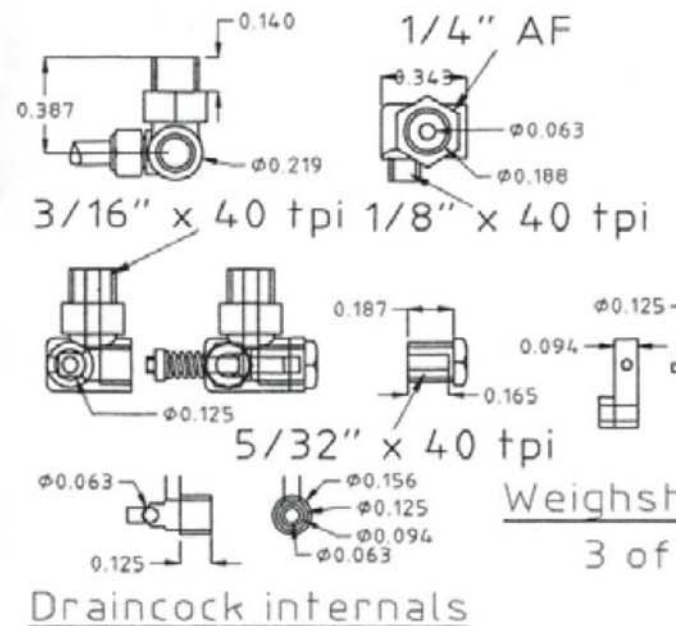
The Southern type are easier to assemble and will screw directly into the cylinders. The central draincocks, in full size, are attached to the valve chest drain. However,

in the case of the Schools class I think that, as with the pressure relief valves, they are best represented as dummies. These central instruments sit underneath a small sheet metal fairing, which I shall detail in a later episode. The spring loaded plungers are operated by small levers attached to the pull rods by means of 12BA bolts set in slotted holes,

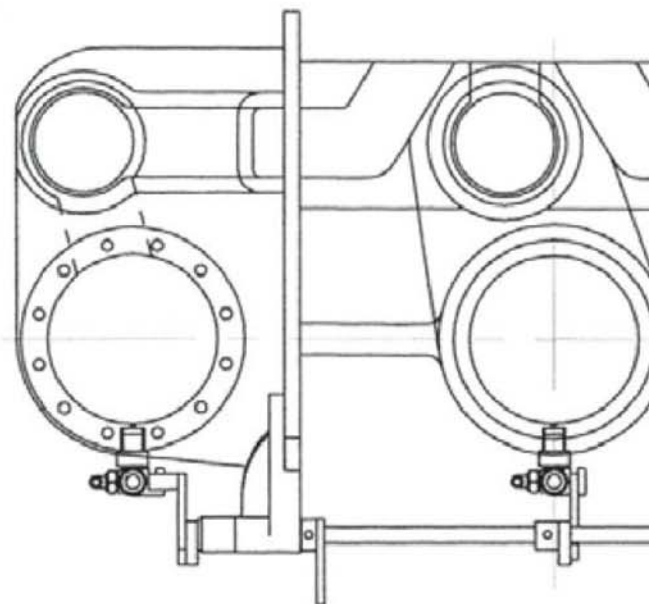
so that they can be adjusted slightly fore and aft to give a small amount of leeway in the original set up.

This rather flimsy arrangement could be augmented by soldering or Loctiting the levers onto the pull rods after the final adjustments have been made. Note that a small amount of adjustment can be also be effected by screwing the end

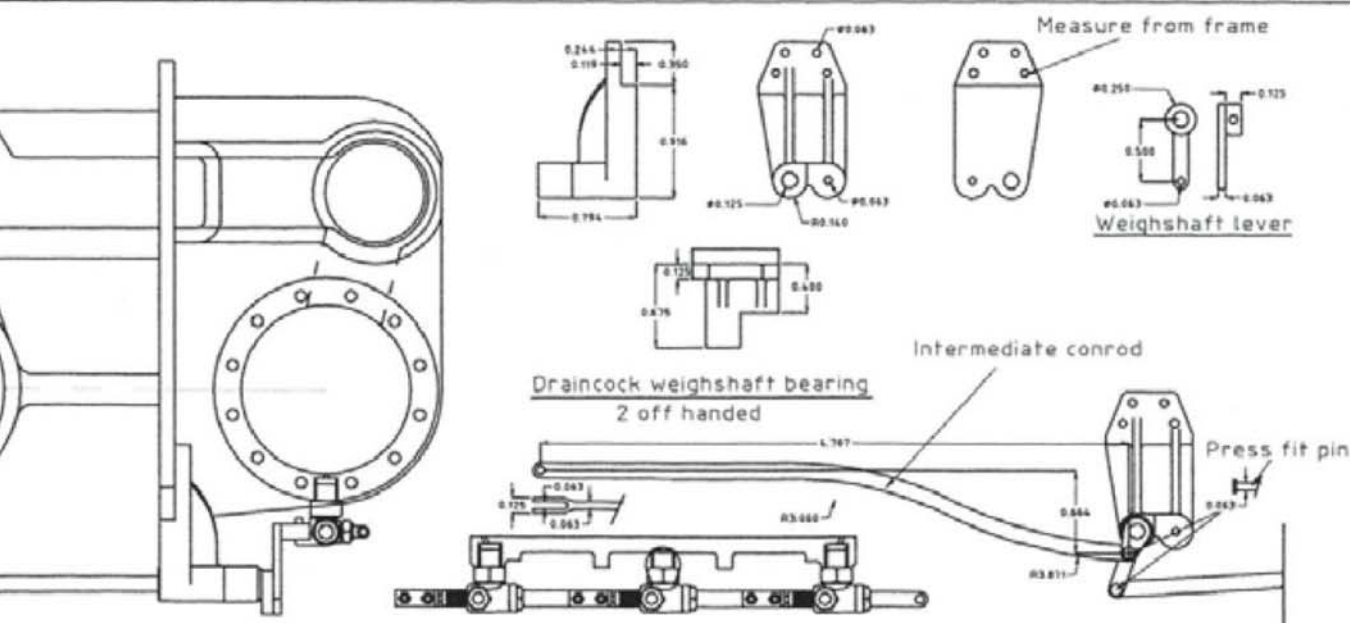
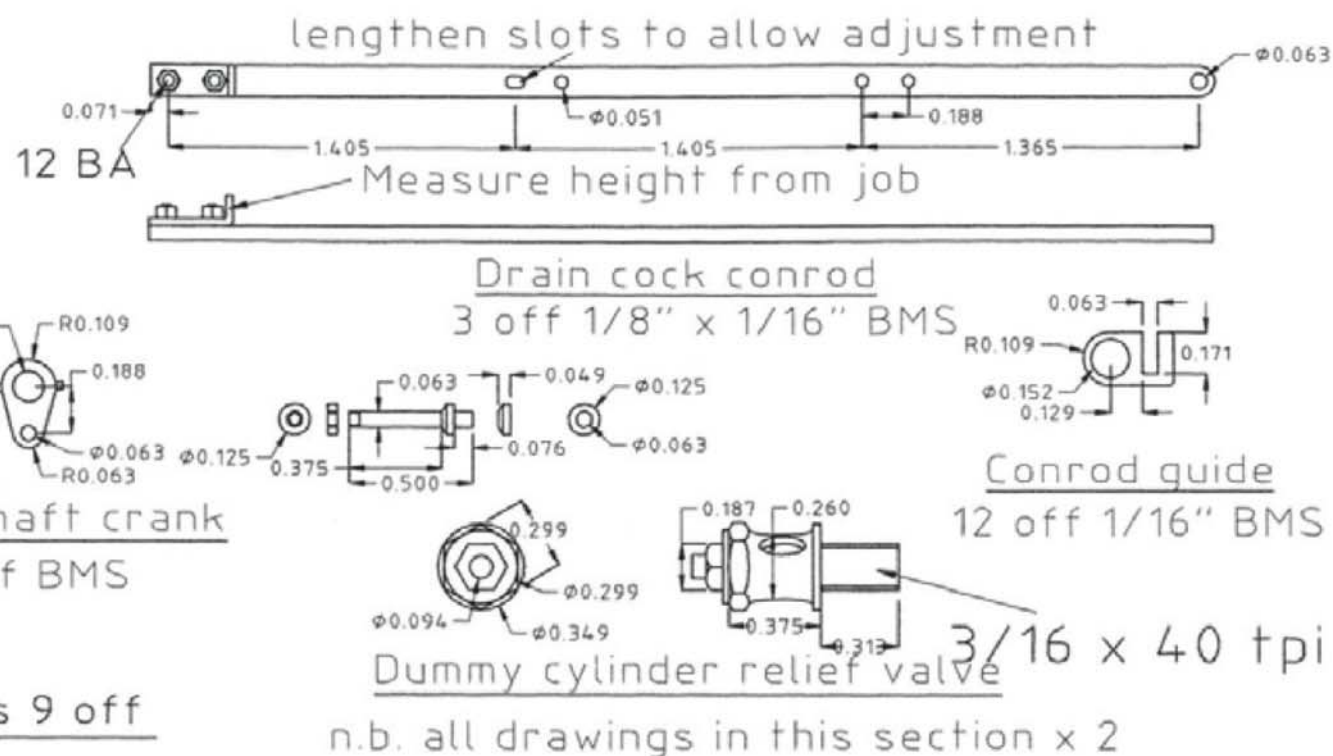
collars in or out. What must be borne in mind however is that as the valves are spring loaded, they have to be positively held open by the lever in the cab while they operate. The valves can simply be held in the open position manually while it is deemed necessary, to clear water from the bores. The rearmost two pieces of pull rod, will be detailed later when the



"STOWE" DRAINCOCK Assy's



©



boiler erection drawing has been finalised, as the position of the rear bell crank is probably rather critical.

The construction of these valves should present few problems. They can be fabricated from brass or gunmetal and in fact Bruce Engineering should, by the time that you read this, have bodies partially or completely

machined in stock. The plunger is made from two pieces of stainless steel, the valve head being soldered onto a 1/16 in. dia. stainless rod. It should be possible to scrounge the springs from discarded disposable lighters. Failing that they will be obtainable from trade sources. The 30deg. bevel on the valve head can be ground

into its seat by holding the protruding end of the plunger with a small hand vice.

The very obvious bracket bearing supports are handed, for obvious reasons, and should be quite rigid provided that a good fit is maintained on the step where it abuts against the frame. As all the various rods are in tension while working, they can be made of scale

proportions and will be of ample strength.

Pressure relief valves

I have drawn these little items as dummies, although Doug Hewson has designed a very practical working arrangement for his series of BR locomotives. I really don't think however that they would be very effective as working

models because of the scale effect. They would have to be set at about 5-10psi above boiler pressure, in other words somewhere around the 100psi mark, and I fail to see how a tiny spring such as can be accommodated in the body of the valve could be adjusted so as to hold this pressure, even though the inlet passage is only $\frac{1}{16}$ in. diameter. Also I'm absolutely certain that they are not necessary in our small scales, as condensation and priming can be easily cleared through the cylinder drain cocks.

● To be continued.



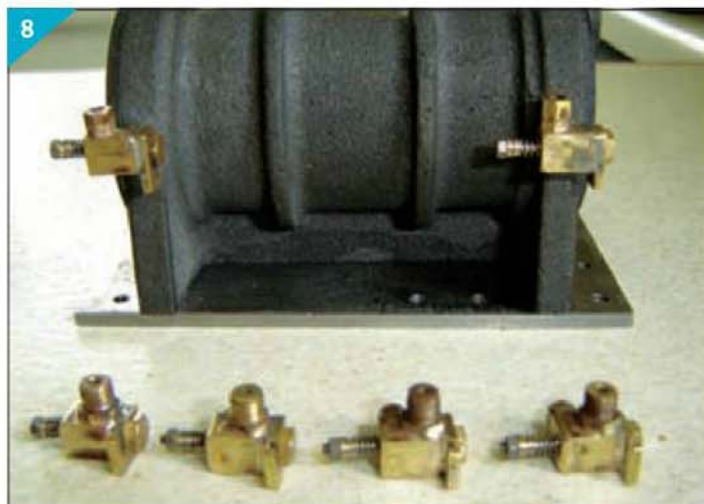
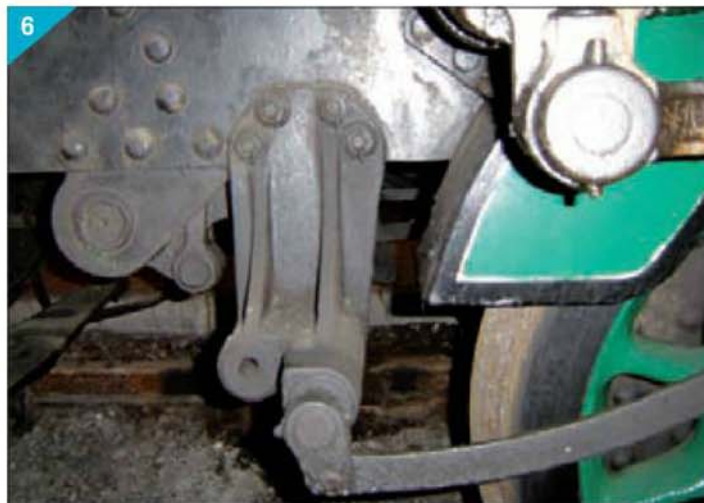
The weekend of 7 and 8 July 2007 saw IMLEC 2007 take place at Pembrey Country Park, hosted by Llanelli and District Model Engineers. A full report will appear in the next issue of *Model Engineer* due out on 31 August 2007. Our photo shows a cheerful John Hurley from the Kinver Society just prior to trying his luck on the Pembrey track. He is greeting the photographer while his passengers settle down and his observer makes the final adjustments to the dynamometer car's instruments. Although John did not win, he and his 5in. gauge 4-6-0 *Royal Scot* gave a good account of themselves and completed their allotted run time with ease. To find out more about John's experiences and those of the other competitors taking part see your next issue of *M.E.*

5. The centre draincock.
Note the fairing.

6. The lower weigh bar bearing.

7. The rear right-hand draincock

8. Prototype draincocks for the model.



PART 35

Continued from page 94
(M.E. 4304, 20 July 2007)

The late Stan Nipper and Martin Wallis bring this popular series to a conclusion with information on the cab and plate work.

380. The cover over the load platform is canvas, as presumably is the awning over the driver. F. & A. Bird were flour millers from King's Lynn. One of the smarter cabs.

381. A large cut out is needed in the apron to fit the locomotive boiler (photo: Stan Nipper).

382. An example of an apron complete with some very fine sign writing.



SAVAGE'S UNIVERSAL CARRIER

The cab sides, bunker, roof and load platform are the last parts to be made and the *Universal Carrier* series will be complete. Do I hear a hurrah or two from the stalls?

While the dimensions given for the plate work are to three decimal places the level of accuracy required is not as exacting. As long as one plate fits neatly to the next and the lines of rivets are straight and equally spaced little more is expected.

I am not suggesting for one moment that sheet metal work is without challenge; it is a highly skilled trade in its own right. It is however, with reasonable care, as pleasant a pass time as any other part of the construction.

Apron

A single piece of steel sheet starting on one side, then wrapping around the front of the wagon, and returning down the other side, makes the front apron. 'Apron' is, as far as I know, the usual terminology in Sentinel and other undertype steam lorry parlance, so I assume it is correct for our Savage. The 4in. radius for the cab corners is scaled off the two 'C' type general arrangement drawings I have, but a glance at **photo 393** shows that the class OA had the tighter radius used on earlier models. Both the Savage works G/A drawings used are arranged for a water tube boiler, but 4in. radius ought equally to

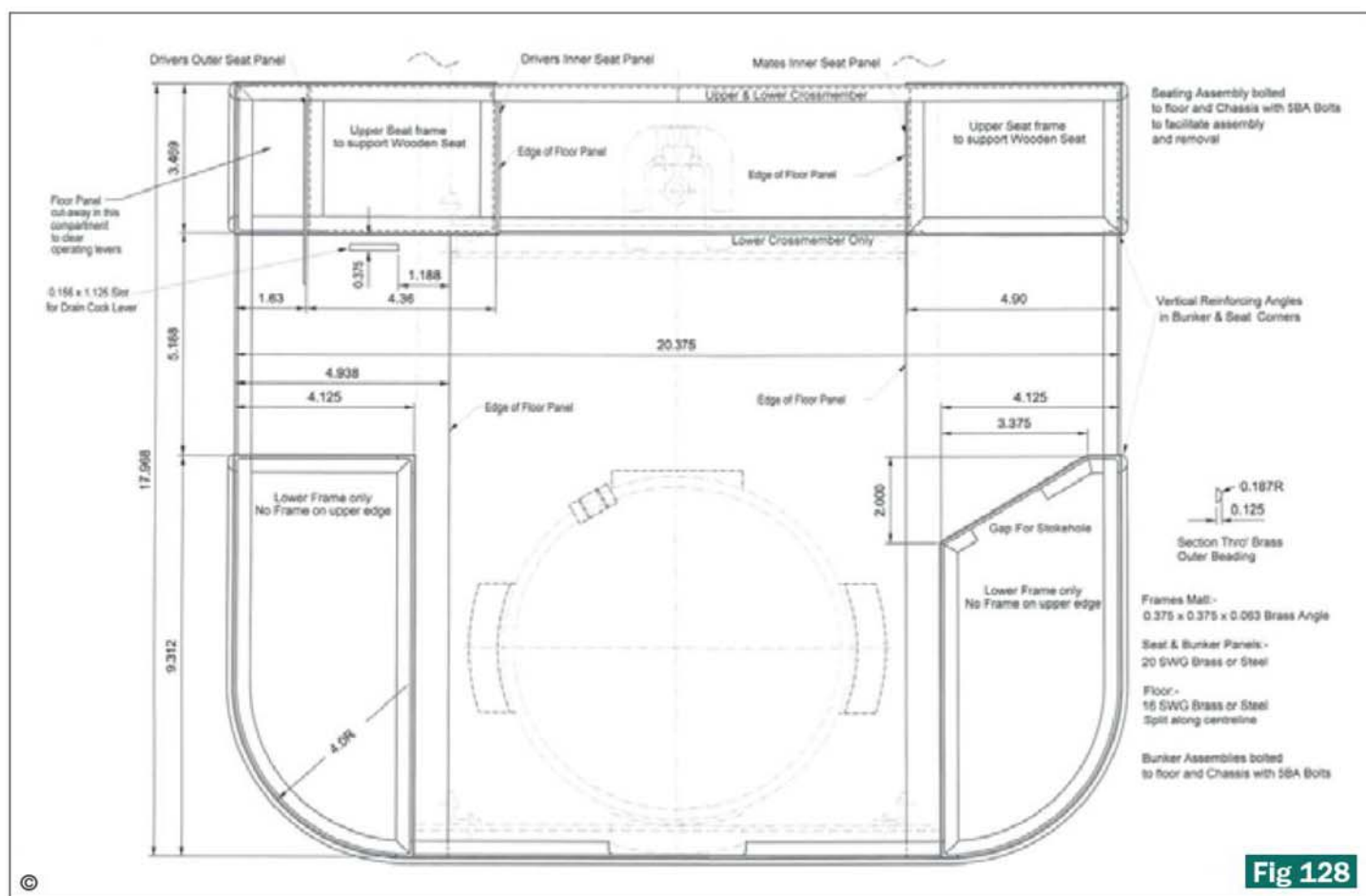
fit the other boiler variants.

Using relatively thin 20SWG gauge steel allows the radius to be easily enough pulled around a piece of bar or tube. Make sure no dents or blemishes are put into the steel as they will inevitably become all too apparent when the gloss paint is applied later. Once the sides have been bent they may be used as a template for the left and right-hand sections of the cab floor.

Floor panels

The two floor panels that make up the bases of the coal bunkers, cab floor and run back under the seats are fixed to the top of the chassis channels. The central floor panel on the wagons with vertical and water tube boilers is lower by the height of the chassis channel. This 'well' is to allow the fire hole door to swing open. The central floor panel has a circle cut in it to clear the vertical boiler, or likewise a rectangular hole to suit the water tube boiler. This allows





383. The floor plates, note the voids for the controls next to where the driver's seat fits and the hole for the steering shaft (photo: Stan Nipper).

384. Angle Iron cut prior to bending (photo: Stan Nipper).

385. The bend complete. (photo: Stan Nipper).

Fig 128. Cab assembly, vertical boiler, plan view.

presumably to aid assembly.

At 16SWG the cab floor is thicker than the apron to afford a little extra rigidity. The material specified for all the plate work is brass or steel; but since there is not an issue of prolonged contact with water, steel is probably better. If brass is the chosen material remember to use a good quality etching primer when painting.

Bending the angle

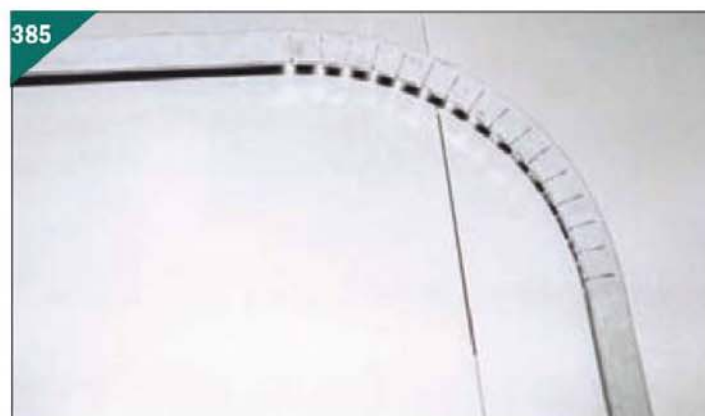
The cab apron is fixed to the floor with 0.375 x 1/16in. thick steel or brass angle, which is bent to follow the apron profile.

If oxy-acetylene welding gear is available - for example at an evening class - I would pull the angle around a former red hot as it is a lot easier. The flame may be progressively moved along the metal pulling it around as you go. As an alternative to

heat Stan cut slots in his angle, **photo 384**, and pulled it around a former cold, **photo 385**.

Usually I would prefer the angle to be 'slot free' so would be inclined to fill the slots in with silver solder afterwards; which would obviously require heat,

the respective boilers to be dropped into place. I notice that Stan has called for the floor to be split along the centre line,



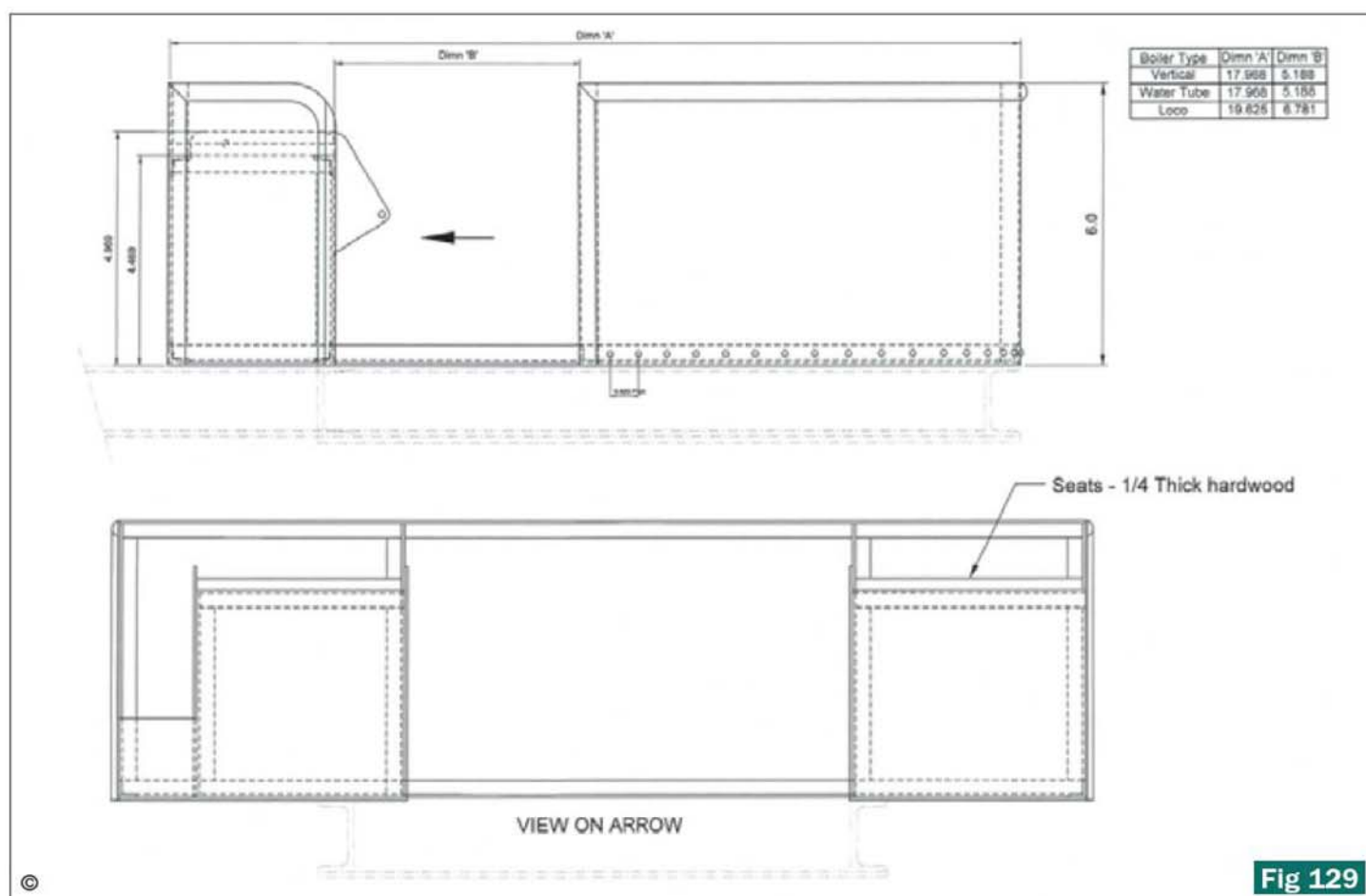


Fig 129

rather begging the question that if heat was available that it might have been better to bend it hot in the first place. Stan, no doubt, would have pointed out that the 'slots' are in the bottom of the coal bunker and might wonder what I was fussing about. He could well be correct.

The angle is rivetted around the bottom of the apron, see the smart line of rivets in **photo 382**, and the assembly then held to the floor with 5BA bolts to allow for possible dismantling at some later date.

Half round beading

At the time of building Stan was unable to source the correct size of half round beading, so he made his own. A piece of square steel stock is drilled lengthways and split so when gripped in the machine vice it would close firmly around the brass bar. A slitting saw then does the business. The thickness of the slitting saw means the two sections manufactured are rather less than a true half circle but happily that is exactly the section that is required. The process is

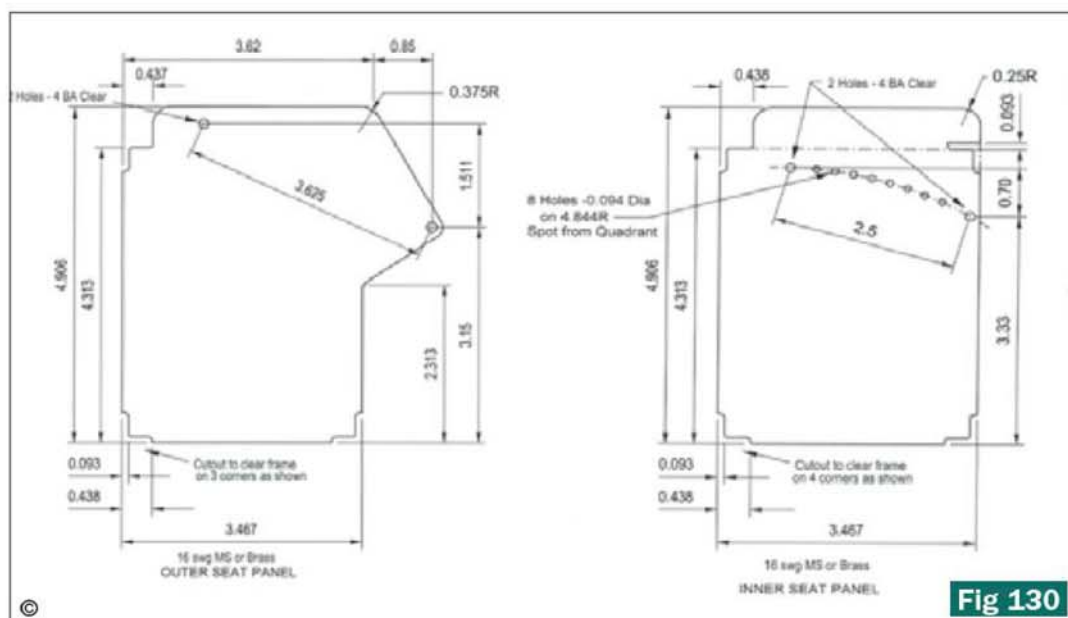


Fig 130

illustrated in **photo 387**.

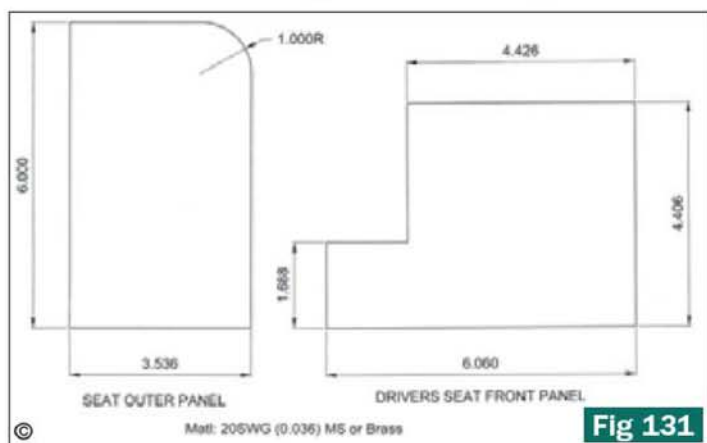
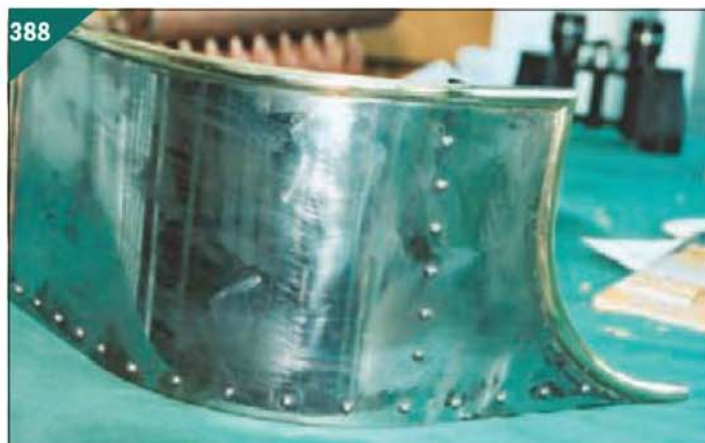
The best way to fix the beading to the steel/brass apron and associated panels is with soft solder. I am not keen on rivetting as the rivets are probably made from a soft brass whereas the beading will probably be a hard brass. I am not sure if the two types of brass have a different mix

of copper and zinc but do know that it does mean there is a risk that the rivets are likely to tarnish to a slightly different colour appearing as a series of dots after a week or two. When soft-soldering first clean the mating surfaces and then hold them together with three or four small toolmaker's clamps. Warm the work with a gentle

Fig 129. Cab assembly - side view.

Fig 130. Driver's seat side panels.

flame (local heat) and as the soldering progresses move the toolmaker's clamps steadily along. Take care to remove all the flux afterwards as if any is ➤



386. The left-hand bunker side plate complete with stoke hole (photo: Stan Nipper).

387 Making the half round beading (photo: Stan Nipper).

388. The half round beading was soft-soldered to the front apron side (photo: Stan Nipper).

389. John's cab nearing completion. (photo: John Thompson).

390. The cab on the locomotive boiler is noticeably longer (photo: Martin Wallis).

391. Adding the boiler cladding (photo: Stan Nipper).

Fig 131. Cab panel details.

so a fine-toothed hacksaw could be pushed in. The ferrule (again slotted) was tapped back on making an ideal pad saw for sawing metal sheet. An Abrafile is essentially a very long 3mm dia. file stretched inside a hacksaw frame. A wonderful tool for this sort of job; with light cuts and a steady hand they last for ages.

Small cut outs are required to clear the floor and corner angle irons will need to be filed in as necessary, the exact sizes being taken from the model. The assorted holes for the reversing lever and feed water controls should be jig drilled from their respective levers and quadrants.

Two seat outer panels are needed, one for each side of the engine, the drivers panels are shown unpainted in **photo 389**. These will need to be edged with the same brass beading on the front/back and top edges.

The two wooden seats rest on boxes used for stowage of tools, oil cans, spare packing and the other sundries needed on a working wagon. As already



mentioned the left-hand seat box is ideally situated to hide the mechanical lubricator. Both seat boxes should have thin angle run around the top to strengthen them and for the seat tops to rest on. On the model $\frac{1}{4}$ in. thick hardwood is specified; choose a grain for the best scale effect. The *Little Samson* drawings annotated the seat rather vaguely 'best quality wood here' - but on the wagon not even that information was offered.

Bunker side plates

Two internal bunker side plates

are needed, a stoke hole being drawn on the works drawing for the left-hand plate but not the right. Presumably both would be used for coal stowage so why the access was omitted on the right-hand side is unknown, doubly odd as the wagon is driven from the right so with one man operation the right-hand bunker would surely be the first choice for the coal. Perhaps the draughtsman just forgot. The left-hand plate complete with stoke hole is shown in **photo 386**.

The last piece of sheet metalwork is the boiler

left it will, in due course, lift the paint.

Cab and seat side panels

The seat side panels, inner and outer, may be cut out with a saw and an Abrafile. The extra effort of sawing rather than using a hand guillotine is worthwhile as it will ensure the plates remain flat. I adapted a file handle by removing the ferrule and slotting it about half its length

cladding. Brass or steel of 20SWG is just fine. The cladding will transform the boiler hiding all those unsightly welds and with a lick of paint and a few brass bands will transform the engine.

Load platform

Few details of the load platform are available other than that wooden cross members are fitted across the chassis to which what Stan and I assumed was tongue and groove boarding running lengthways on top. A good solution is to use a decent piece of plywood (with the grain obviously running lengthways) and to deeply score it to simulate the tongued and grooved boards. The platform should either lift off or hinge in order to access the water filler cap on the tank, to inspect the engine and oil the chains.

Side panels may or may not be added as preferred, **photos 380, 392 and 393** cover a few of the options. Looking back through these articles will add several more - road sweepers, raw wool/wool bail stowage (we think), the generating engine, tipping wagons, in fact virtually everything except an articulated wagon. Should the platform prove a bit too wide for comfort two cut outs may be made in the platform for your legs.

Roof

The majority of Savage's wagons were turned out without a roof, which is ideal for the model engineer as it makes it much easier to drive. Several styles of roof were fitted, usually for export, and were rather more functional than elegant. The most common arrangement is illustrated in photo 392, and enhanced version with a cab back and front valance in photo 393.

I am not aware of a model wagon with a roof, so there are no pictures, but I guess it is just a matter of time.

Lost wax name plates

Two lost wax name plates are available for the *Universal Carrier*, the large rectangular plate as seen on the apron side in photo 392 and the round

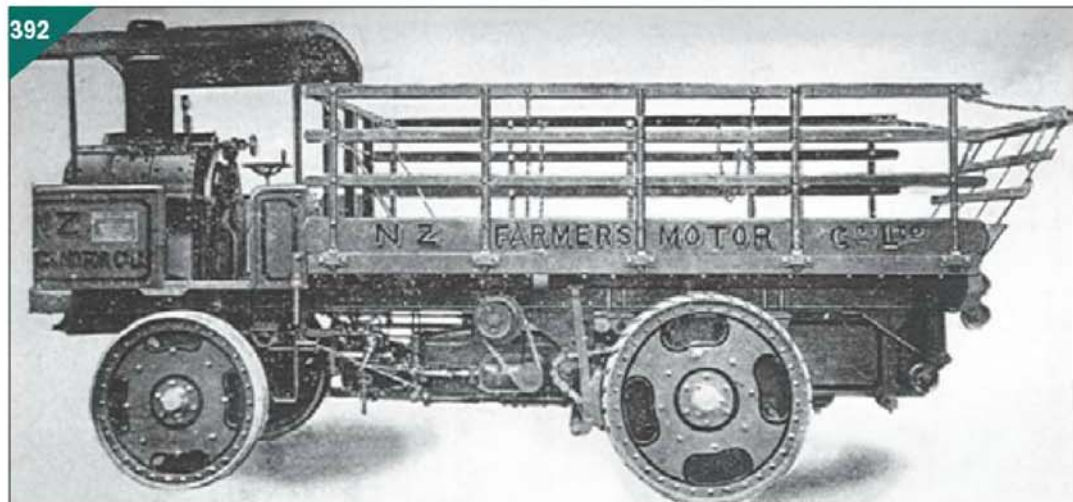


plate on the drivers cab side in **photo 380**. The positioning of the plates varies from prototype to prototype. Both plates are common to the *Little Samson* tractor, the *Little Samson* valve chest name plate could also be fitted if desired but I have not seen that particular plate on any of the old photos.

Painting

I do not plan to say anything on painting and lining as no information on the Savage colour scheme for their wagons has yet to be established.

All I have are the black and white photos, the majority of which have been printed in these pages during the course of these notes. For a full treatise on painting and lining I recommend Christopher Vine's excellent book on the subject (*How (not) to paint a locomotive*) which has been reviewed and advertised in these pages.

Keep a dog and bark

That completes the *Universal Carrier* series.

It is now a little over ten years since I started writing in *Model Engineer*. When I started a friend observed that you cannot "keep a dog and bark"; advice I have not forgotten - and have found to be only too true. The plan is to drop my regular monthly involvement with the *Road Steam* column in favour of rather more freelance and occasional reporting of rallies and interesting models; keeping the annual Christmas *Out and About* of course. I am looking forward to a bit more time in my workshop.



I would very much like *Road Steam* to remain monthly but to do so a steady supply of articles will be needed by our editors. Perhaps an explanation of how I was 'caught' for *Model Engineer* by Mike Chrisp might be encouraging.

Written English was never a great strength of mine; indeed spelling was always a problem and my general literacy was unimpressive. However, I could build models and that Mike patiently kept explaining to me what was really important in sourcing articles for 'ours'. Since I was standing next to my 6in. Fowler at a Model Engineer Exhibition it was difficult to plead complete engineering incompetence.

Mike persisted, promised to correct my verbiage, and in consequence I wrote my first article. I will never forget the thrill of seeing the text on the shelves in the newsagents. That buzz has inevitably passed, but what has endured is the

392. The export canopy is very plain, presumably to protect the driver from the sun. Note the engine powered capstan under the lorry bed and the guide pulleys at the rear of the wagon; this is presumably to drive a dismountable derrick for loading/unloading wool bales. 393. This cab is one of very few fitted for the home market, note the very recognisable 'Little Samson' flourish in the shaping of the front canopy valance.

knowledge that my text makes a difference. A few lucky folk have model engineers in the family but for most it is magazines such as *Model Engineer* that have introduced them to our hobby, and a whole new world. I would therefore urge those who 'do' to occasionally put pen to paper (or finger to keyboard) and pass on some of their wisdom and experiences. You can certainly trust our editors to unscramble the niceties of language and tidy any diagrams for publication. **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 0PR

ENTRY NO.

OFFICE USE ONLY

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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 _____

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 achievable 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



3F to 3F

An ambitious conversion

PART 8

Continued from Page 100
(M.E. 4304, 20 July 2007)

Geoff Dowden
returns to the
platework of this
attractive locomotive.

I now felt that I could justifiably refocus my attention on the locomotive and carry on where I had left off, i.e. about to produce the spectacle plate to enable the rear splashers to be completed. A $\frac{1}{16}$ in. thick brass sheet was marked out. The centre section was chain drilled and sawn out so that it could be filed to shape to form a fairly close fit around the rear end of the firebox and transversely in line with the centre of the rear axle.

The beading to the rear splasher could now be completed and attention turned to cutting out the holes for the window openings. From photographs it appeared that the pair above the top of the firebox had a frame surround at the front and were pivoted centrally to allow the windows to tilt backwards into the cab. I would have preferred mine to do the same, but being unable to work out the methodology, I decided to make the windows a permanent fixture.

9. Firebox cladding.

Now having had the opportunity to study the works drawings in the Class 3 publication, I understand the construction and operation but at this late stage I have no wish to change things. On examination of the photographs I was unable to detect the presence of any external framing on the front of the spectacle plate for the rectangular outer pair of windows. Details of both types are shown as fig 27.

Firebox wrapper

Jinty's design for the firebox cladding is obviously unsuitable and a new concept had to be devised. I eventually concluded that a 'cage' or tunnel like arrangement might be appropriate. Consequently, with the boiler in the frames, I calculated the firebox wrapper dimensions and put together a framework of $\frac{1}{8}$ in. x $\frac{1}{4}$ in. brass bar for the horizontals and front and rear ends. A timber former was prepared with the $\frac{15}{16}$ in. radius between the top and sides, each of the end pieces of bar then being annealed and bent around the former to ensure that the two end frames would be identical.

Before proceeding with the attachment of the horizontal struts, I positioned the rear former against the spectacle plate on the chassis and matched the strut fixing holes to the spectacle plate, so that later on, the 10BA fixing screws inserted from inside the cab would hold the two assemblies together.

Both formers were then connected with six horizontal lengths of bar, secured in

position between the two ends with 10BA countersunk screws tapped into the ends of the struts as shown in fig 28A.

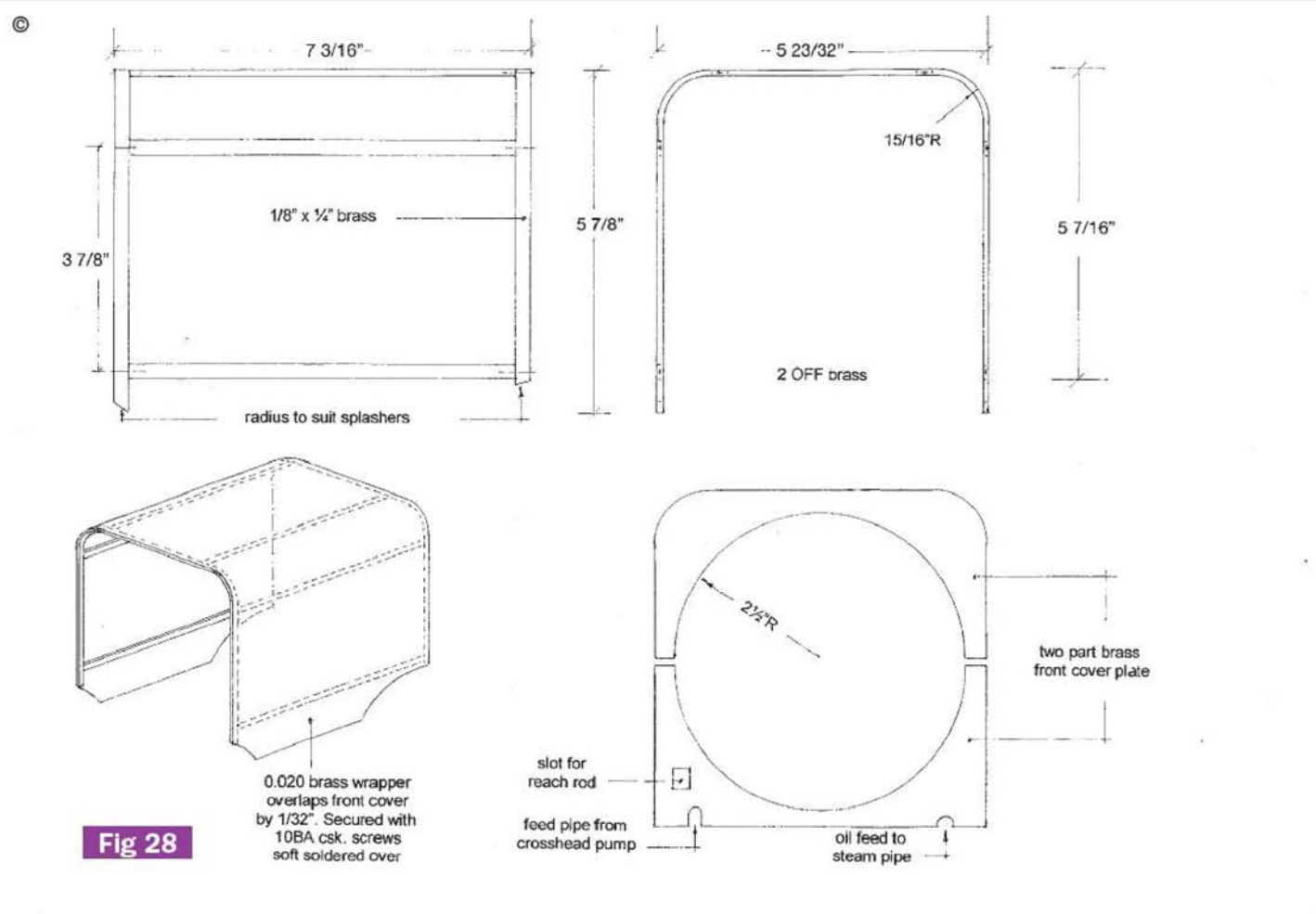
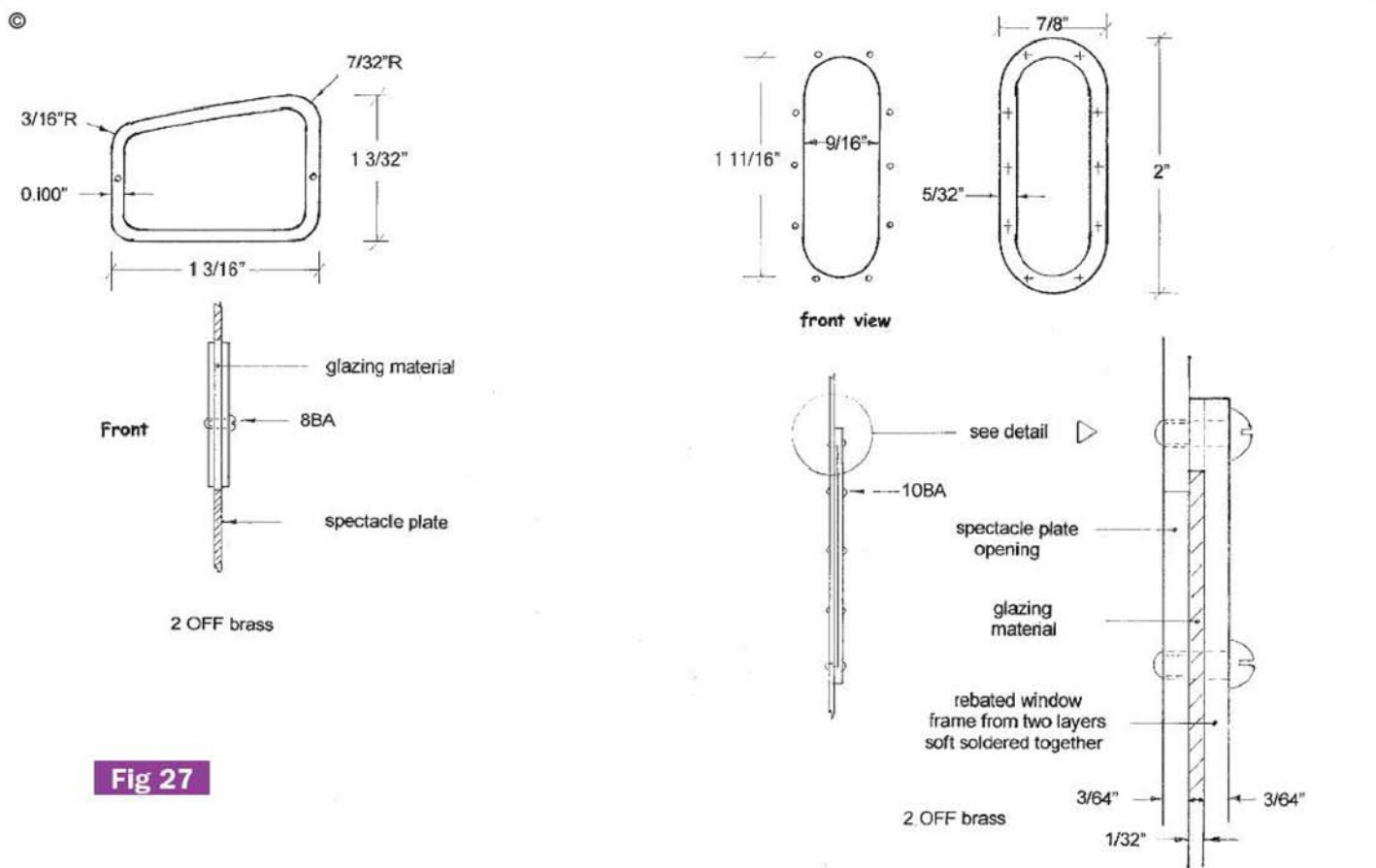
A $\frac{3}{64}$ in. thick brass plate for the top half of the front end of the 'tunnel' was prepared, its lower edge being filed to match the boiler diameter plus $\frac{1}{32}$ in. or so for clearance. It was then secured to the end bearer with 10BA countersunk screws and its top edge filed flush to match the profile of the end bearer. Similarly, the lower half of the front end plate was prepared with a suitably sized hole to give clearance for the reach rod travel. This lower plate was secured with four roundhead screws to facilitate tightening on final assembly.

The wrapper sheet of 26g brass was marked out with a small amount of overlap to the edge of the front plates, cut and filed to shape and then secured with 10BA countersunk brass screws tapped into the front and rear bearers. This mechanical method of fixing the wrapper was quite deliberate as I was advised against the soldering technique, which it was suggested, was likely to cause twisting and distortion due to the application of the necessary heat.

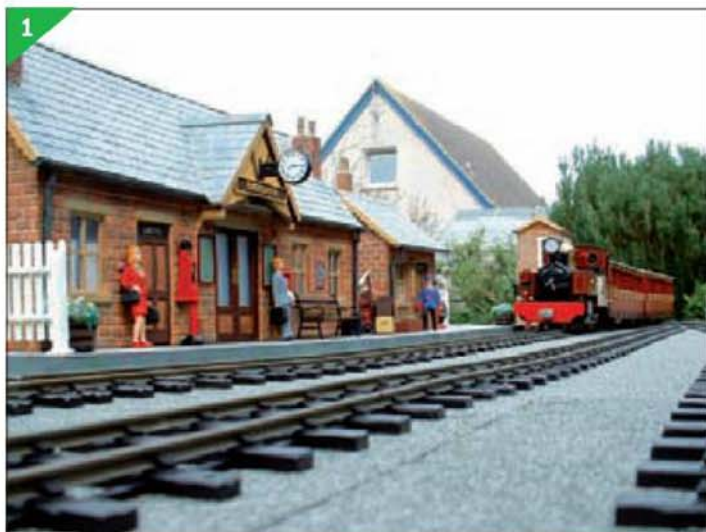
I found that the most difficult task of the whole operation was matching the bottom edges of the wrapper sheet to the running plate and the curved sections of the splasher tops. However, a good deal of patience and the familiar method of trial and error eventually produced the desired result.

● To be continued.





STEAM IN MY GARDEN



Raymond McMahon describes how he was lured from the workshop to construct his garden railway complete with canal, harbour and a look-alike Forth Rail Bridge!

Over the years I have completed many model engineering projects in my workshop. Most of them have been live steam such as locomotives from 3½ to 7¼ in. gauge and a 1:3 scale traction engine. However, my building schedule never permitted me time to pursue another interest - that of a small-scale live steam garden railway. My summers seemed to disappear unseen as I spent most of them stooped over the lathe and the milling machine.

In the West of Scotland, I became involved with a group of 16mm narrow gauge modellers all of whom had their own garden railways. This association re-kindled my interest in garden steam. So, when a 5 in. gauge Pannier was finished and a 3½ in. gauge Darjeeling locomotive was just started, I felt the need for a change from the workshop. I planned to work outside during the summer building the track and in the winter, my normal model engineering projects would continue.

1. The 08-15 arrives bang on time at Evergreen station. The neutral colouring of the weathered tar paper base can be seen under the tracks.
2. The narrowboat 'Pat' has arrived quayside with its cargo.

The garden plan

We are very fortunate to have a reasonably sized back garden, split in to two sections because of apple trees and bushes. The smaller part, partly paved, was surveyed for the first phase of track building. There was a natural slope in the ground here and this gave me a raised level track area on which engines could be prepared and steamed. The advantage was that one did not have to get down on one's knees to work at the engines and rolling stock, etc. It looked very promising and the construction was started in the paved part of the garden.

Trackwork

I view the track itself as a means to an end. Primarily I was interested in the visual aspect of the railway and the available accessories that could create scenic detail. With the right approach one could make the garden railway visually very interesting.

The track base work was

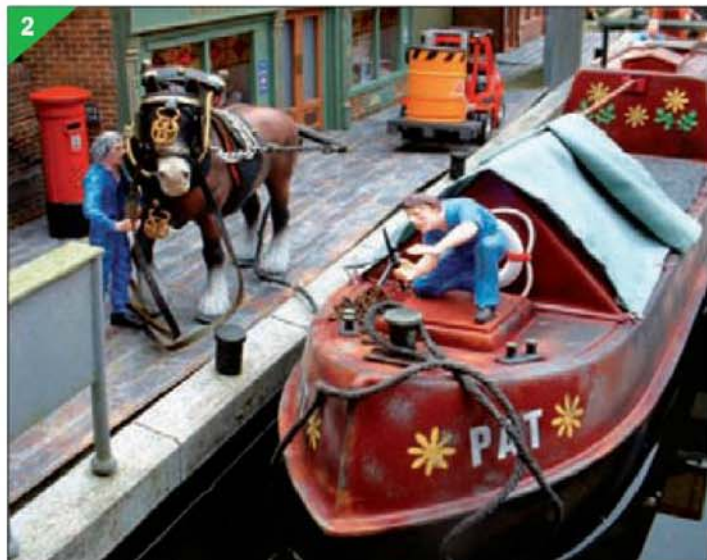
very simple. Large, rot-resistant fencing planks were screwed together and mounted on timber legs of whatever length was required for the gradient. The top surface was covered with roofing felt stuck down with adhesive. The surface weathers over time and eventually blends in quite well (Photo 1). Fallen leaves from the surrounding bushes and trees, which naturally accumulate on the track, can be easily be brushed away. I decided not to use loose ballast as it can be dislodged in heavy rain and causes problems with the operation of the points.

Water features

I rather liked the idea of having a small harbour basin leading to a short section of canal (photo 2). To build a harbour, I used an old central heating plastic expansion tank which was trimmed to the correct depth and mounted in place. This proved to be ideal. The canal was made up from timber - tarred inside to make it waterproof.

Construction

In the first phase of building, the railway, canal and harbour, were built in the summer of 2005. The oval extension was completed in 2006 and its main feature was construction of a look-alike Forth Rail Bridge (photo 3). We were very fortunate to have a very large overgrown flower bed in the area of the proposed track





and, with 'upper management' approval, this was dug out. Approximately 11 tons of good quality soil was removed and three concrete foundations were then cast in place. A butyl rubber liner was used to retain the water. The view of the bridge from the kitchen window is superb; I know, as I wash the dishes for Brownie points!

Forth Bridge

The bridge took nine weeks to build. I used an outline drawing from a book to obtain the basic dimensions. To accommodate the over-scale narrow gauge track the bridge was widened, lengthened and made slightly taller all while trying to keep the proportions of the prototype. It is 24ft. long. The two short connecting bridge pieces are fitted with four round sliding brass dowels in order to accommodate any expansion and contraction that may take place within the bridge.

The bridge foundations have tubular supports (plastic drain pipe) fixed in place. On the base of each main span are four circular plugs, fitted into wooden spacers, which fit into these pipes, making it easy to remove the spans for maintenance, etc. There are butyl rubber sections sandwiched between them and the cast bases.

Construction of the truss-work and track deck is from wooden dowels, mahogany strips, and a plastic track bed (photo 4). Approximately 450ft. of timber was used in its construction.

Fortunately, once the bridge was painted I did not have to start painting it all over again as per full-size!

Locomotives

Spare time was somewhat restricted with all the track building, so I decided to purchase my first steam locomotive - dare I say it foreign-made (photo 5)! This engine was recommended to me as it has a good reputation for steaming straight out of the box and was very good value for the money.

All the steam locomotives are radio controlled, gas-fired and can give up to half an hour running time depending on conditions. Needless to say, because of their size they are very easy to handle, a big consideration when one gets older.

Scenery

Most of the scenic buildings and accessories, purchased in kit form, come moulded in grey resin. They need to be assembled and dressed-up. They are superbly detailed, but the secret in creating the illusion is in the painting. Like full-size they have to look weathered and tinted. Brickwork alone can involve using up to six colours (photo 6). Humbrol matt finish enamels have proved to be ideal for the purpose.

I had great pleasure in building the garden railway and solving the different challenges involved. The 14 months were



well spent and it gives myself and others a great amount of pleasure. Hopefully, the photographs convey some of the splendid atmosphere of a garden railway. Now, I really must get back to my Darjeeling engine!

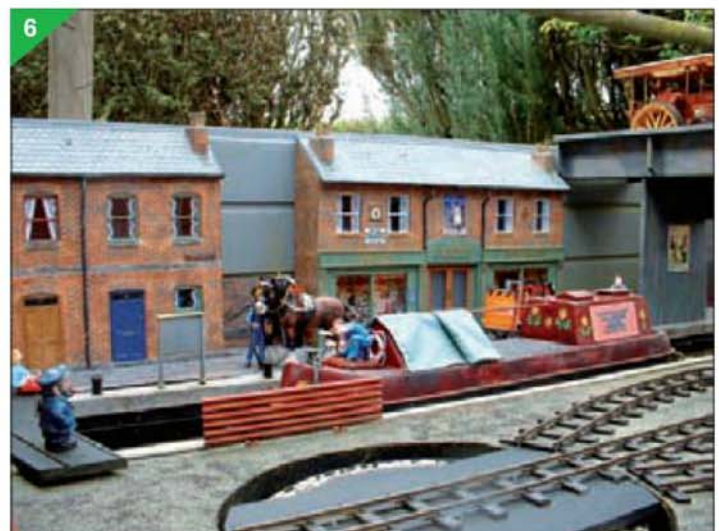
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3. This cantilever bridge, modelled on the Forth Rail Bridge, is 24ft. long.

4. While a goods train is stopped on the bridge, one can appreciate its construction details.

5. A steam locomotive waits in the yard with a goods train.

6. The buildings in the background illustrate the realism of the brickwork which can be achieved by using up to six colours of matt enamel.





Training with THE SMEE

D. G. Clayton Jones a participant in the Society of Model and Experimental Engineers' second basic training course describes his experiences.

Trainees proudly pose with their models at the SMEE headquarters. Seated second from right is SMEE Chairman, Peter Haycock, with former M.E. editor, Mike Chrisp on his right.

October 2006 saw the new 'recruits' assembled at Marshall House for the second SMEE course to build a Polly vertical oscillating engine, originally designed by Tubal Cain. Fifteen attendees started the course, all of whom keenly persevered until the final meeting in May 2007. We varied in age, some older and retired while others were younger and still working and we varied in experience in modelling and 'real life' engineering. Some, but not all, had attended a previous Basic Course Part 1 at SMEE on setting-up a workshop and not everyone had yet even purchased or set up equipment. Although the majority lived within the London, Essex, Kent, Surrey region, one participant

journeyed from Devon for the monthly instruction day.

We were educated by a faculty of eight enthusiastic lecturers, who were assisted by a number of other equally keen members, as well as a most important tireless team who produced excellent coffee, tea or lunch as required through the day. All were volunteers and as regular in attendance as the participants. Sometimes there were almost as many non-delegates as delegates in the room, which provided an excellent opportunity to discuss and converse with many people at once on so many directly or indirectly related engineering matters.

The Course was divided into seven sessions at monthly intervals commencing at 9.30am. The first day dealt with the theory of simple oscillating

engines and then progressed to the construction of the boiler, including a number of modifications to the various fittings which were suggested both for ease of use and better safety, to suit the world of 2007, than Tubal Cain's original design. An excellent large folder of notes, drawings and various lists supplemented the lecture format while the techniques were actually demonstrated practically by the lecturer in the lecture room. Although the engine is small a CCTV system allowed us all to see and if there were any queries it was easy to 'approach the bench'. The only problem was the sensitive fire alarm which was well tested on each use of the blowlamp!

Suitable materials were provided for those who wished, at a small extra cost and 'homework' was to make the items of that day by the next meeting. Subsequent meetings followed the same format, with the exception that the first part of each meeting was devoted to inspection of the homework with comments from the lecturers and a question and answer session for any problems or solutions we had found. The sessions covered a very wide variety of topics including advice on purchase and use of equipment, materials and tools. Over the course we learned how to make the firebox and base, burner, boiler fittings and safety valve, the stand and cylinder, piston and crankshaft assembly. One meeting had to be cancelled because of inclement weather, for which many of us were grateful, as extra homework time was one of the benefits - particularly valuable where 'domestic credit' had been limited!

Boiler testing was conducted at one of the sessions and the penultimate day dealt with painting and finishing, including some of the chemistry and physics of paintwork, as well as final assembly and troubleshooting. Each day seemed to pass so quickly that questions and discussion continued even on the train home!

On the last day a variety

of boxes and containers appeared with various finished or almost completed models (one including three versions – for grandchildren, from one participant!). In spite of this being a 'standard' design, many Pollys had gained further small modifications and all had glowing metalwork, shiny paint and polished wood. After a description of the judging method and a talk and slide show of prize-winning entries in other exhibitions, the participants judged the display of models. It was the universal view that this was very difficult process as every model had its merits. However, after a suitable break for lunch (this time at the local pub, in spite of the Cup Final audience!) we returned for the well-deserved prize of an engraved

glass tankard for the highest marks to be presented to John Keats (not the poet!) for his immaculate engine.

We ended the day with a short lecture from Model Engineer Exhibition Chief Judge Ivan Law about how factors involved in constructing and exhibiting models affect their judging, as well as what makes medal-winning entries.

With the course completed we all felt much better equipped and encouraged to go on to further model making endeavours, and had the course been longer, I think that many would happily return for more instruction. At no time were any questions thought to be too simple and nothing seemed to be too much trouble to explain. Unlike schooldays, every piece

of homework was praised and where alterations were needed they were suggested in a friendly and enthusiastic manner. We all agreed that we had made new friends and had a unique opportunity to learn much from such

experts. This course amply demonstrated that SMEE is not an elitist organisation and that anyone who wishes to take up model engineering will find friendly help, encouragement and advice, even if they are complete beginners. **ME**

The next courses will run on the following schedule:

Basic training for Model Engineers Part 1

Day 1: 15 September 2007
Day 2: 13 October 2007
Day 3: 10 November 2007

Basic Training for Model Engineers Part 2: Building an Engine and Boiler

Day 1: 8 December 2007
Day 2: 19 January 2008
Day 3: 9 February 2008
Day 4: 8 March 2008
Day 5: 5 April 2008
Day 6: 10 May 2008

Contact details

For further details contact:
The Training Secretary,
Marshall House, 28 Wanless Road, London SE24 0HW.
T: 01442 266050. Or visit
www.sm-ee.co.uk

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PREVIEW OF ASCOT CENTENARY 1907-2007



From Malcolm Stride

Notices

Can I remind readers that all items for inclusion in this column should be sent to the Editor whose contact details can be found on the *Post Bag* pages.

Avonvale MES has a new secretary; Mrs. S. Black, 48 Delabere Road, Bishop's Cleeve, Cheltenham, Gloucestershire GL52 8AJ. T: 01242 675219.

Strathaven Model Society also has a new secretary. Mr. R. S. Watt, (79 Stewarton Drive, Cambuslang, Glasgow G72 8DQ, T: 0141 6415478) has taken over following the retirement of the previous incumbant.

Ickenham DSME has sent in details of running days for the season. They are on the first Saturday of every month and running is from midday until 5.30pm. Further details can be obtained from Secretary David Sexton, T: 01895 630125. The track site entrance is behind The Pump in Ickenham High Road.

On Sunday 9 September **South Durham Society of Model Engineers** will host the **Stephenson Memorial Miniature Locomotive Association** locomotive efficiency trials at the Hurwoth Grange track site near Darlington. Proceedings will start at 10.00am. For further information contact E. Gibbons T: 0191 4107564.

Running will take place at the **Stockholes Farm Miniature Railway** on August Bank Holiday Monday (27th) between 11.00am and 5.00pm. The Guy Fawkes bonfire night will be on Saturday 3 November with running between 3.00pm and 8.00pm. Further details can be obtained from Ivan Smith on T: 01427 872723.

The **City of Sunderland MES** is holding an open day on Sunday 2 September 2007 at the Roker Park track site. Activities will commence at 10.00am and there will be a buffet provided as will tea and coffee at the trackside. All visitors are welcome with their models and facilities are

available for operating model locomotives, road vehicles and boats. Further information can be obtained from secretary Albert Stephenson (T: 01429 299649). Notice the date change for this event.

Stolen Locomotive

Some weeks ago a 5in. gauge locomotive was stolen from a house in Flitwick, Bedfordshire. The owner is seriously ill and he is a former member of **Bedford MES**. The locomotive stolen is a very good example of LBSC's *Maid of Kent*, painted green and lined as a Southern Railway 4-4-0. If any of our readers is offered, or hears of such a locomotive being offered for sale from an unreliable source or in unusual circumstances, please contact PC 796, Tony Thompson at Dunstable Police Station, T: 01582 473229. Please quote the crime number D/15417/2007.

UK Club News

On Sunday 8 July, 2007, members of the **National 2½in. Gauge Association** and their families and friends visited Fawley Hill, home of Sir William and Lady McAlpine.

The visitors were all made very welcome, both Sir William and Lady McAlpine mixing with everyone together with staff and friends. The station on the railway at Fawley Hill came originally from Somersham in Cambridgeshire dating back to 1848 on the Eastern Counties Railway. The last train passing through this station in British Railways time was on 28 December 1964. Some of the buildings including the signal box were soon demolished, but the waiting room was dismantled in 1977, and rebuilt at Fawley Hill. The Signal Box came from Shobnall Maltings in Staffordshire.

A more local item is the Waiting Room from Bourne End in Buckinghamshire, and has been formed into the end of the line terminus and called "Bourne Again Junction".

The station called *Inverernie* was originally the waiting shelter at Thrapston in Northamptonshire. There are

many other line side features.

The railway is standard gauge, and the principal prime mover is a Hudswell Clark saddle tank locomotive, which, was completed in 1913 and rebuilt by the manufacturers in 1938. Apart from a couple of excursions to Carnforth for repair work, it has remained at Fawley since 1965. A note in the **Bedford MES** newsletter informs us that if you favour travelling by Supermarine *Spitfire* or an Avro *Lancaster*, your maintenance task is about to become easier. Haynes Publishing is to produce versions of its workshop manuals for these aircraft. The *Spitfire* will be later this year with the *Lancaster* following in the spring of 2008. As the note says, these will contain a wealth of information to help modellers.

Work on the steaming bay turntable at **Bournemouth DSME** continues with the completion of the concrete pouring. This will now be left to cure for a couple of months before the various parts of the turntable are bolted down. Once complete, the turntable will enable running to be carried out in both directions which will, as the report states, "give us a completely different experience as well as equalising wear on the trolley wheels."

Bradford MES is celebrating the award of the NAMES Shield for the best Club Stand at the Harrogate exhibition this year. Congratulations to all concerned. On a more mundane note, the workshop has been tidied and the 'accumulated junk' cleared out. Re-ballasting and levelling of the ground level track is continuing. The *Flora and Fauna* theme day on 20 May is reported as a big success with a good collection of locomotives and visitors arriving to enjoy running on the track. At least one locomotive was decorated with flowers in honour of the day's theme.

On Sunday 1 July, **Colchester SMEE** opened its club grounds and railway track to families and friends. Train rides were given to children, young and old, throughout the day. Both

the elevated and ground level layout (for the first time) were used for train rides. Trains were pulled by steam, electric, and petrol powered locomotives from various builders. The Colchester Society have also given support to the **Brightlingsea Model Boat Club**. At its recent exhibition held in the town, Colchester displayed locomotives built by their members.

Work carried out at **Ickenham DSME** has included clubhouse wiring, lamp-top painting and discussion of proposed improvements to the projection end of the club house. In the workshop, work has continued on the restoration of *Speedy*.

The **Lindsey Model Society** is 25 years old this year and Doug Hewson's report states "we should be doing something spectacular." In the mean time, work continues on building some tank wagons which eventually will be used to transport water from Belle Isle to Peak Forest Yard which has no water supply. Either a pick up goods train or a block train will transport the water depending on how many wagons are built.

The idea is to build a 'fuel loading depot' at Belle Isle with a pipeline along the back locomotive road or the boundary siding with high level loading points at wagon lengths so that the wagons can be filled from a small header tank pumped from the underground storage tanks.

At Peak Forest Yard there will be a 'fuel discharge terminal' where the tanks can be connected to a low level pipe along the siding which will drain into the underground tanks there.

The **Model Engineers Society (NI)** has obtained permission to operate model boats on the ponds in the grounds of Antrim Castle Gardens. There are two ponds, the *Round Pond* and the *Long Canal*. Philip Magennis of the Antrim Borough Council sees the activities "as enhancing the Castle Gardens" and is looking forward to "a long and fruitful partnership" with the society. This sounds like a very enlightened borough



council keen to offer support to model engineering activities. I would welcome news of other such councils.

The new permanent signals on the tracks at **Reading SME** are being installed by Peter Ballard and the good news is that they are still there and have not succumbed to the vandals. They do save a lot of time setting up and taking down on running days.

The track gang have spent some time levelling the ground level track and in the finished areas, the ride is reported as being improved.

The recent MJ Engineering open day was a success with several visiting traction engines, some from a good distance from Reading.

Member Gordon Hands recommends that any members visiting Buckfastleigh in Devon should visit the museum where they will find a 5in. gauge Stirling single locomotive built by Sir Walter Alcock. Sir Walter was the most famous cathedral organist of the 20th century and was also a model engineer. This prompted Gordon to ask how many readers can think of names of model engineers who were famous for other reasons. Answers on a postcard, please...

The May meeting at **Stamford MES** included a talk by Catherine Gough on the Papplewick Pumping Station and its history. The pumping station was built to lift water

from the sandstone rocks which cover a large part of the local area. The water was required to meet the ever increasing needs of Nottingham. The pumping station has six hand fired Lancashire boilers and construction of the pumping station was managed by Marriot Ogle Tarbotton who took over from Thomas Hawksley in the early design stages. Because the project was built within budget, Tarbotton was able to add some of the decorative details which are a feature of the pumping station.

Work at the **Stockholes Farm Miniature Railway** has centred on the preparations to accommodate the new goods circuit. The second retaining wall between the fish pond and quarry corner is nearing completion and the track work at Billmore Junction has been realigned to accommodate the goods circuit which has now been extended from the main depot to Millstone Colliery corner. A run-round loop has been incorporated.

Members of **Wigan DMES** were entertained by a talk on early sound recording devices by Dave Dick. Dave has some early disc machines but his real passion is cylinder machines. Dave demonstrated several of his players, showing how the sound quality had improved as manufacturers developed their machines.

Charles Weatherley from **Worthing DSME** had an

Charles Weatherley from Worthing DSME enjoying his duties at Sompting Community Festival.

unexpected bonus when he took the club portable track to the Sompting Community Festival in June. Also in attendance was the local belly dancing group *Sahari-Zari-Super-Zars* who seemed to be enjoying the ride (photo 1), as did Charles. I expect there will be a queue of volunteers to cover the event next year!

The society now has a stable of three steam and one electric club locomotives all fully operational and is looking for more members to become qualified to drive at public running or portable track outings.

They are also looking for a private or commercial sponsor to provide a trophy to be awarded at the AGM for the best progress by members on projects presented at the Bits & Pieces evenings and voted for by the members.

World Club News

New Zealand

Ron Blackwood of the **Hutt Valley MES** swapped his public running duty day and set a new high record with 284.9 passengers carried. My question is the obvious one, what is 0.9 of a passenger? Did one fall off part the way round or did he or ➤

she have some bits missing?

A council inspection of the site resulted in a very complimentary report on the excellent state of the site and buildings. The final comment is worth quoting "Thank you for making such a positive contribution to the city. We look forward to continuing our relationship with you and hope that your organisation is prospering". Is this a sign that those in power are beginning to realise that model engineering as an activity is something to be encouraged?

Maidstone MES reports a 'frustrating May' with cancellation of the AGM due to lack of a quorum (caused by various members' illness)

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.

Jack Taylor

Auckland SME (NZ)

and cancellation of the running session on 20 May due to the poor weather. I have sympathy with the latter because as I am writing this it has been raining hard all morning with the occasional clap of thunder thrown in to keep me awake! Hopefully the various members recovered and the AGM took place as planned in June. Bob Begbe attended a planning workshop organised by the local council to put the society's point of view.

Humour Time

The following was in the **Stamford MES** newsletter:

A mechanic was removing a cylinder-head from the engine of a Triumph motorcycle when he spotted a well-known cardiologist in his shop. The cardiologist was there waiting for the service manager to come take a look at his bike - when the mechanic shouted across the garage, "Hey Doc, want to take a look at this?"

The cardiologist, a bit surprised, walked over to where the mechanic was working on the motorcycle. The mechanic straightened up, wiped his hands on a rag and asked, "So Doc, look at this engine. I open its heart, take the valves out, repair any damage, and then put them back in, and when I finish, it works just like new. So how come I make about £20,000 a year and you probably make 20 times that - when you and I are doing basically the same work?" The cardiologist paused, smiled and leaned over, then whispered to the mechanic, "Try doing it with the engine running..."

DIARY

AUGUST

- 17-19 Bristol SMEE.** Bristol Model Engineering and Hobbies Exhibition at Thornbury Leisure Centre, Nr. Bristol, South Glos. 10am-6pm (Fri) 10am-6pm (Sat) 10am-5pm (Sun). Adult: £6, Child: £2.50, OAP: £5.50, Family (2+3): £14. Contact 0117 967 5878.
- 17 Canvey R&MEC.** Meeting. Contact Brian Baker: 01702 512752.
- 17 MELSA.** AGM. Contact Graham Chadbone: 07 4121 4341.
- 17 Rochdale SMEE.** Richard Guthrie: US Steam Power, Great & Small. Contact Bob Denyer: 0161 959 1818.
- 17 Romford MEC.** Track Maintenance. Contact Colin Hunt: 01708 709302.
- 18 Adelaide Miniature SRS.** Members' Day. Contact Peter Cooper: 8264 3471.
- 18 Brandon DSME.** Running Day. Contact John Martin: 01842 75 2493.
- 18 Canvey R&MEC.** Members' Only Running Day. Contact Brian Baker: 01702 512752.
- 18 Canterbury DMES (UK).** Pimms & Steam. Contact Mrs P. Barker: 01227 273357.
- 18-19 Isle of Wight MES.** Garlic Festival. Contact Malcolm Hollyman: 01983 564568.
- 18 National 2½in. Gauge Ass'n.** Northern Area Summer Rally at Fylde. Contact Clive Young: 01233 626455.
- 18-19 Nottingham SMEE.** Miniature & Model Railway Exhibition &

- Public Running. Contact Pete Towle: 0115 987 9865.
- 18-19 Reading SME.** Club Open Days/Public Running. Contact Brian Joslyn: 01491 873393.
- 18 Romford MEC.** Trackside Afternoon. Contact Colin Hunt: 01708 709302.
- 18 SM&EE.** Gauge 1 Informal Run Afternoon. Contact Maurice Fagg: 020 8669 1480.
- 19 Basingstoke DMES.** Members' Running Day. Contact Guy Harding: 01256 844861.
- 19 Bradford MES.** Heath Support Group Unit. Contact John Mills: 01943 467844.
- 19 Guildford MES.** Public Running. Contact Dave Longhurst: 01428 605424.
- 19 Maidstone MES (UK).** Public Running. Contact Martin Parham: 01622 630298.
- 19 Norwich DSME.** Public Running. Contact Shirley Berry: 01379 740578.
- 19 Oxford (City of) SME.** Public Running. Contact Chris Kelland: 01235 770836.
- 19 Pinewood MRS.** Public Running. Contact Ivan Hurst: 01252 510340.
- 19 Plymouth MSLS.** Public Running. Contact Malcom Preen: 01752 778083.
- 19 Saffron Walden DSME.** Public Running. Contact Jack Setterfield: 01843 596822.
- 20 Model Steam Road Vehicle Soc.** Meeting. Contact Geoff Miles: 01869 247602.
- 20 New Jersey Live Steamers, Inc.** Antique Cars. Contact Karl

- Pickles: 718 494 7263.
- 20 Peterborough SME.** Barbecue & Drive-a-loco evening. Contact Ted Smith: 01775 640719.
- 21 Chesterfield MES.** Meeting/Talk. Contact Mike Rhodes: 01623 648676.
- 21 North Cornwall MES.** Meeting & Maintenance Evening. Contact Geoff Wright: 01566 86032.
- 21 South Durham SME.** Afternoon Steam-Up. Contact B. Owens: 01325 721503.
- 21 Taunton ME.** Creech Evening. Contact Don Martin: 01460 63162.
- 22 Bradford MES.** Junior Driver Training Day. Contact John Mills: 01943 467844.
- 22 Frimley & Ascot LC.** Public Running. Contact Bob Dowman: 01252 835042.
- 22 Hull DSME.** Brian Rylance: Norway. Contact Tony Finn: 01482 898434.
- 22 Oxford (City of) SME.** Wednesday Running. Contact Chris Kelland: 01235 770836.
- 22 Stockholes Farm MR.** Members' Running Evening. Contact Ivan Smith: 01427 872723.
- 23 Cardiff MES.** Forum. Contact Don Norman: 01656 784530.
- 23 Sutton MEC.** Evening Steam-Up. Contact Bob Wood: 0208 641 6258.
- 23 Worthing DSME.** John Bibby: Building a Gnome Engine. Contact Bob Phillips: 01903 243018.
- 24-27 Isle of Wight MES.** IWSR Steam Show. Contact Malcolm

- Hollyman: 01983 564568.
- 25 Bedford MES.** Members' Running Day. Contact Ted Jolliffe: 01234 327791.
- 25-26 British Columbia SME.** Railway Show. Contact Sean Laurence: (604) 931 1547.
- 25 Chesterfield MES.** Public Running. Contact Mike Rhodes: 01623 648676.
- 25-27 Harrow & Wembley SME.** Open Weekend. Contact Roy Goddard: RSGwatford@aol.com
- 25-26 Kinver & West Midlands SME.** Kinver Diesel Weekend. Contact John Campbell: 01384 891244.
- 26 Adelaide Miniature SRS.** Public Running. Contact Peter Cooper: 8264 3471.
- 26 Cambridge MES.** Members' Steam-Up. Contact Tim Coles: 01954 267359.
- 26-27 Bedford MES.** Bank Holiday Public Running 11am - 4-30pm each day. Contact Ted Jolliffe: 01234 327791.
- 26-27 Bristol SMEE.** Public Running. Contact Trevor Chambers: 0145 441 5085.
- 26-27 Cardiff MES.** Public Running. Contact Don Norman: 01656 784530.
- 26 Chelmsford SME.** Open Day. Contact Tom Sharich: 01277 222611.
- 26 Chichester DSME.** Steam on Sunday. Contact Brian Bird: 01243 536468.
- 26 Edinburgh SME.** Club Track Running and GL5 Day with Shunting Competition. Contact Robert McLucke: 01506 655270.



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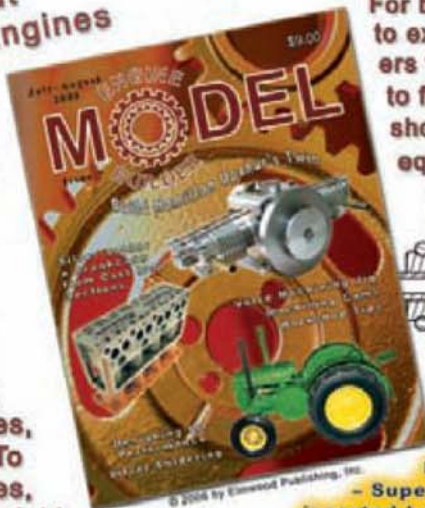
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12. UNF OR UNC TAP SET (2 Taps each size) & DIE SET: $\frac{1}{16}$ x 32, $\frac{1}{8}$ x 40, $\frac{1}{4}$ x 40, $\frac{1}{2}$ x 40, $\frac{3}{4}$ x 40
13. UNF OR UNC TAP SET (2 Taps each size) & DIE SET: $\frac{1}{16}$ x 32, $\frac{1}{8}$ x 40, $\frac{1}{4}$ x 40, $\frac{1}{2}$ x 40, $\frac{3}{4}$ x 40
14. GAS (BSF) PIPE SET: $\frac{1}{16}$ x 32, $\frac{1}{8}$ x 40, $\frac{1}{4}$ x 40, $\frac{1}{2}$ x 40, $\frac{3}{4}$ x 40 (2 Taps each size)
15. METRIC FINE PITCH SETS (10 sizes from 3 - 12 mm) TAPS & DIES
16. METRIC FINE PITCH SETS (6 sizes from 14 - 24 mm) TAPS & DIES
17. ENDMILL SET (THREADED SHANK) $\frac{1}{16}$ x 32, $\frac{1}{8}$ x 40, $\frac{1}{4}$ x 40, $\frac{1}{2}$ x 40, $\frac{3}{4}$ x 40 or (mm) 3, 4, 5, 6, 7, 8, 10, 12 mm
18. SLOT DRILL SET (THREADED SHANK) $\frac{1}{16}$ x 32, $\frac{1}{8}$ x 40, $\frac{1}{4}$ x 40, $\frac{1}{2}$ x 40, $\frac{3}{4}$ x 40 or (mm) 3, 4, 5, 6, 7, 8, 10, 12 mm
19. ENDMILL SET, $\frac{1}{16}$ x 32, 1" DIA. WITH $\frac{1}{16}$ THREADED SHANK TO FIT COLLET CHUCK
20. COUNTERBORE SET (FOR SPOTFACING) $\frac{1}{16}$ x 32, $\frac{1}{8}$ x 40, $\frac{1}{4}$ x 40, $\frac{1}{2}$ x 40, $\frac{3}{4}$ x 40 OR (mm) 3, 4, 5, 6, 8 mm
21. REAMER SET (STRAIGHT SHANK) $\frac{1}{16}$ x 32, $\frac{1}{8}$ x 40, $\frac{1}{4}$ x 40, $\frac{1}{2}$ x 40, $\frac{3}{4}$ x 40 OR (mm) 2, 3, 4, 5, 6, 7, 8, 10, 12 mm
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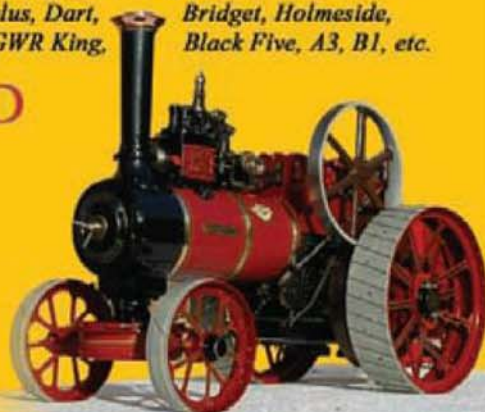
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ALL PRICES EXCLUSIVE OF VAT

Just A Small Selection Of Our Current Stock Photographed!

MICRO MILL
£109.00



DRILLING CAPACITY 6MM
TABLE SIZE 275x165MM
SPINDLE TAPER B10 or JT1
RANGE OF SPEEDS 0-5000RPM
MOTOR 150W
WEIGHT 14KGS

COBRA MILL
£275.00



FACE MILLING CAPACITY 20MM
TABLE SIZE 145x240MM
SPINDLE TAPER MT2
RANGE OF SPEEDS 100-2000RPM
MOTOR 150W
DIMENSIONS (LxWxH) 480x380x680MM

CONQUEST MILL
£450.00



FACE MILLING CAPACITY 16MM
TABLE SIZE 90x404MM
SPINDLE TAPER MT3
RANGE OF SPEEDS 0-2500RPM
MOTOR 350W
DIMENSIONS (LxWxH) 490x445x860MM

CHAMPION 20V MILL
£775.00



FACE MILLING CAPACITY 63MM
TABLE SIZE 700x180MM
SPINDLE TAPER MT2
RANGE OF SPEEDS 50-2200RPM
MOTOR 1HP
DIMENSIONS (LxWxH) 670x550x860MM

EAGLE 25 MILL / DRILL
£675.00



FACE MILLING CAPACITY 65MM
TABLE SIZE 190x585MM
SPINDLE TAPER MT3 or R8
RANGE OF SPEEDS 100-2150RPM
MOTOR 1HP
DIMENSIONS (LxWxH) 900x940x1040MM

LUX MILL
£1195.00



FACE MILLING CAPACITY 75MM
TABLE SIZE 240x820MM
SPINDLE TAPER MT3 or R8
RANGE OF SPEEDS 95-1600RPM
MOTOR 1HP
DIMENSIONS (LxWxH) 880x780x1150MM

SUPER LUX MILL
£1545.00



Complete with stand
FACE MILLING CAPACITY 80MM
TABLE SIZE 240x820MM
SPINDLE TAPER MT4
RANGE OF SPEEDS 95-1600RPM
MOTOR 1.5HP
DIMENSIONS (LxWxH) 1120x1040x2100MM

626 TURRET MILL
£1395.00



Complete with stand
Shown with optional powerfeed
FACE MILLING CAPACITY 75MM
TABLE SIZE 156x745MM
SPINDLE TAPER MT3 or R8
RANGE OF SPEEDS 190-2100RPM
MOTOR 1.5HP
DIMENSIONS (LxWxH) 1085x990x1710MM

836 TURRET MILL
£3871.63 (Delivery by quotation)



DIAMETER OF QUILL 86MM
TABLE SIZE 200x660MM
SPINDLE TAPER R8
RANGE OF SPEEDS 100-1300RPM
MOTOR 1.5HP
DIMENSIONS (LxWxH) 1400x1300x1955MM

Call For Our New Catalogue

All Prices Include Vat & Delivery*

***UK Mainland only**

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