

MODEL ENGINEER

Vol. 195 No. 4256

16-29 September 2005

**LBSC
MEMORIAL BOWL
WEEKEND**

24-25 September

**BEDFORD
MODEL
ENGINEERING
SOCIETY**

AYESHA ARISES

RED WING ENGINE



NEW GAUGE 1 LOCOMOTIVE



SET OF 7 INDEXABLE LATHE TOOLS 12MM SQ



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TOOL

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PLAIN
SHANK



HSS

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CODE SCT071B - £65.00

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CODE	ITEM	PRICE
GCSET	SET OF 0.5 MOD CUTTERS	£48.00
M16ST2	2MT ARBOR	£48.00
M16ST3	3MT ARBOR	£48.00

POLICRAFT POLISHING KITS INC. MOPS, COM- POUND + ARBOR



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PC1001	BRASS	£18.80
PC1002	STEEL	£24.70
PC1003	WOOD	£20.70
PC1004	PLASTIC	£18.70
PC1005	CHROME	£16.70

NEW SMALL 3 JAW LATHE CHUCKS ON TAPERS



Code	DIA/THREAD	ARBOR	PRICE
MX20	50MM / M12	1MT	£55.00
MX21	50MM / M12	2MT	£55.00
MX22	65MM / M14	1MT	£65.00

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300MM BTN CENTRES
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THROAT 140MM
SPEEDS 100-2000
TABLE 240X145
SPINDLE MT2

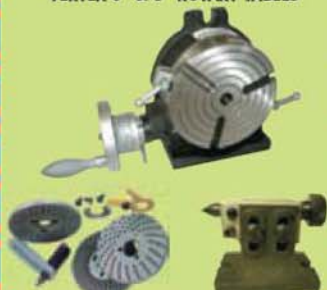


VERTEX B50 DIVIDING HEAD!!



Code XP17
PRICE £255.00
£194.00

VERTEX 6" & 8" ROTARY TABLES



Code	ITEM	PRICE
XP8	HV6 TABLE	£155.00
XP9	TS1 TAILSTOCK	£47.95
XP10	DPI DIV SET	£37.95
XP11	HV8 TABLE	£192.00
XP12	TS2 TAILSTOCK	£58.00
XP13	DP2 DIV SET	£52.00

NEW - MICRO MACHINING DVD S BY J F RODRIGUEZ EXCLUSIVE TO CHRONOS - SOLE UK DISTRIBUTOR

THE MILLING MACHINE & ITS USES
4 HOURS LONG. COVERS ALL ASPECTS OF MILLING
CODE DVD1 - £34.95 INC

GRINDING LATHE TOOL BITS AND OTHER THINGS
90 MINS. CODE DVD2 - £26.95

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2 HOURS, INCLUDES FACING, TURNING, GROOVING, PARTING,
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SMALL MACHINE. EXERCISES ARE APPLICABLE TO ALL SMALL LATHES
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THOUGHT WERE IMPOSSIBLE
CODE DVD4 - £26.95

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2 HOURS. FINALLY THE MYSTERY OF THREAD CUTTING HAS
BEEN MADE SIMPLE ENOUGH FOR THE BEGINNER
CODE DVD5 - £26.95

MACHINING OPS ON THE 7X10 VARIABLE SPEED MINI LATHE
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2 HOURS. LEARN HOW TO DO SUCCESSFUL MILLING WITHOUT
A MILL - USING YOUR LATHE AND EVEN A DRILL PRESS.
CODE DVD7 - £26.95

MAKING GEARS THE EASY WAY
4 HOURS. THE SECRETS OF THE HOB REVEALED. HOW TO USE ONE AND EVEN HOW TO BUILD
ONE FROM SCRATCH ON A SMALL - MEDIUM SIZED LATHE AND SMALL MILLING MACHINE
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XP73	100MM	£49.95
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+ fixing screw

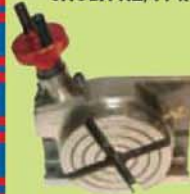
Code BSCH - £60.00

NEW 80MM 4 JAW CHUCK + MOUNT- ING PLATE FOR SHOBA 4" ROTARY TABLES



Code VO
£49.95

SHOBA HZ/VT ROTARY TABLES



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VP4 4"	£99.00

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IN THIS ISSUE

● Vol. 195 No. 4256 16 SEPTEMBER 2005 ●

SMOKE RINGS

Editorial news, views, and comment.
PAGE 309

POST BAG

Letters to the editor
PAGE 310

AYESHA ARISES

Tony Weale outlines the project to revive
the most famous model locomotive of all
time, LBSC's Ayesha. It is simple, attractive,
low-cost, and available in 3 versions.
PAGE 312

SOUTHERN LOCOMOTIVE RALLY

Report from Malcolm Stride on the
gathering of model locomotives whose
prototypes ran on Southern rails.
PAGE 316

ORNAMENTAL TURNING

John Edwards explains the uses of a
variety of cutting frames -- internal,
eccentric and ellipse.
PAGE 318

CLAUDE REEVE CLOCK REVISITED

John Wilding continues with the
construction of the exquisite Claude B.
Reeve regulator.
PAGE 320

PETE'S PAGE MILLING MULTIPLE BLANKS

Peter Spenlove-Spenlove comes up with
yet another ingenious workshop method,
this time end milling a group of blanks - in
one go.
PAGE 324

PENRHOS GRANGE

Neville Evans describes some tender
fittings for GWR locos and replies to some
letters published in *Post Bag*.
PAGE 325

SAVAGE'S UNIVERSAL CARRIER

The authors describe construction of a
large copper locomotive-type boiler, and
take a look at the business of assessing
risk.
PAGE 329

NEW SERIES RED WING AIR-COOLED ENGINE

Jim Service starts describing how to build
the Red Wing air-cooled farm engine with
clear step-by-step guidance.
PAGE 333



On the cover ...

Des Addeley clearly enjoying one of the
first drives of the 'new' Ayesha. In this
issue Tony Weale describes how he
managed to borrow the historic original
made by LBSC for the 'Battle of the
Boilers' in the 1920s, to prepare new
drawings for the 2 1/2in. Gauge
Association. In its early outings this
locomotive has proven to be an excellent
performer on the track, and can be built
in original Curly, Marsh or Ivatt forms.
Like her Rider Haggard namesake this
lady of the track will thrive on fire for
many years to come.
(Photograph by Gerald Chapman)

LOCOMOTIVE BAR FRAMES

Peter Rich begins a short series on
locomotive bar frame extensions, and
front end assemblies of GWR two-
cylinder locomotives.
PAGE 336

SETTING HIDDEN VALVES

Short description of a simple method to
find out what is going on inside a steam
cylinder valve chest.
PAGE 339

NEW SERIES GAUGE 1 GWR LOCOMOTIVE

Introduction to a new construction series
for a gauge 1 version of the GWR 1400
class by G.R.Thornber. A relatively
simple design suitable for beginners as
well as experienced modellers.
PAGE 340

CLUB CHAT AND DIARY

Recent action and forthcoming events
around the world.
PAGE 342

TURN TO PAGE 345 FOR GREAT OFFERS ON SUBSCRIPTIONS

INDEX to ADVERTISERS

Chester	357	Maxitrak	305
Chronos	298	ME Subs Ad	345
Classified	349 - 354	Meridienne	307
Compass House Tools	300	Model Eng. Services	300
Cotswold Heritage	302	Model Engine Builder	301
Doug Hewson	303	Myford	307
Engineers Tool Room	304	Parkside Railways	305
Folkestone Engineering	303	Phoenix Locos	305
G & M Tools	347	Polly Models	301
Greenwood Tools	303	Red Wing Motor Co.	300
Hemingway Kits	300	REEVES 2000	348
Home & Workshop	356	Steam & Diesel Castings	300
Jones & Bradburn	356	The Miniature Railway Supp Co	305
Kew Bridge	301	The Old Model Company	304
Leofric	300	Tracy Tools Ltd	302
Live Steam Models	307	Triple H Machinery	300
Machine Mart	306	WARCO	308

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- Class 57 (Deltic)
- Class 58 (Deltic)
- Class 59 (Deltic)
- Class 60 (Deltic)
- Class 61 (Deltic)
- Class 62 (Deltic)
- Class 63 (Deltic)
- Class 64 (Deltic)
- Class 65 (Deltic)
- Class 66 (Deltic)
- Class 67 (Deltic)
- Class 68 (Deltic)
- Class 69 (Deltic)
- Class 70 (Deltic)
- Class 71 (Deltic)
- Class 72 (Deltic)
- Class 73 (Deltic)
- Class 74 (Deltic)
- Class 75 (Deltic)
- Class 76 (Deltic)
- Class 77 (Deltic)
- Class 78 (Deltic)
- Class 79 (Deltic)
- Class 80 (Deltic)
- Class 81 (Deltic)
- Class 82 (Deltic)
- Class 83 (Deltic)
- Class 84 (Deltic)
- Class 85 (Deltic)
- Class 86 (Deltic)
- Class 87 (Deltic)
- Class 88 (Deltic)
- Class 89 (Deltic)
- Class 90 (Deltic)
- Class 91 (Deltic)
- Class 92 (Deltic)
- Class 93 (Deltic)
- Class 94 (Deltic)
- Class 95 (Deltic)
- Class 96 (Deltic)
- Class 97 (Deltic)
- Class 98 (Deltic)
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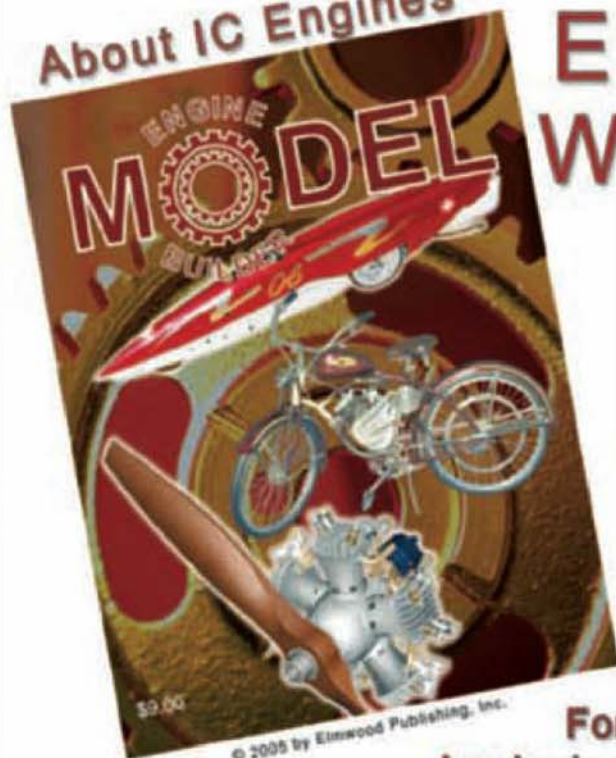
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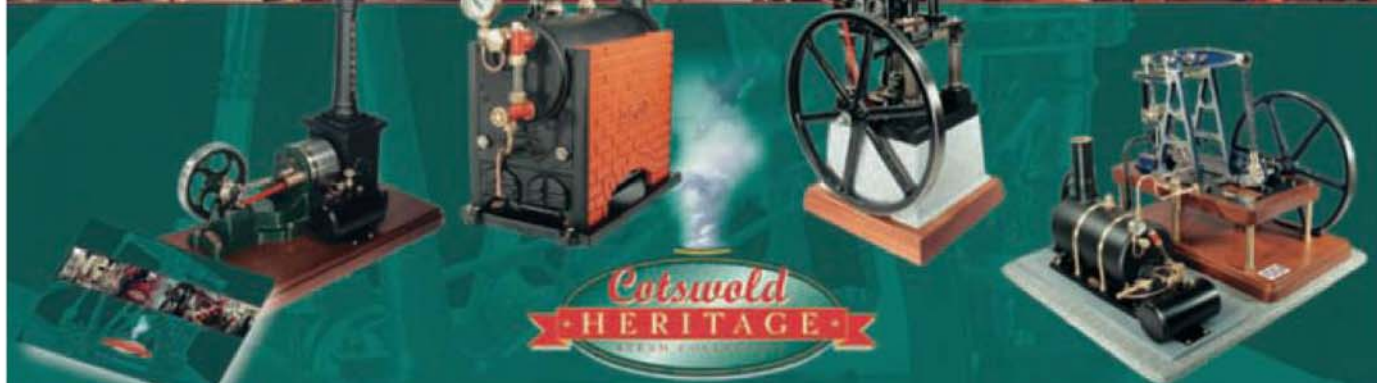
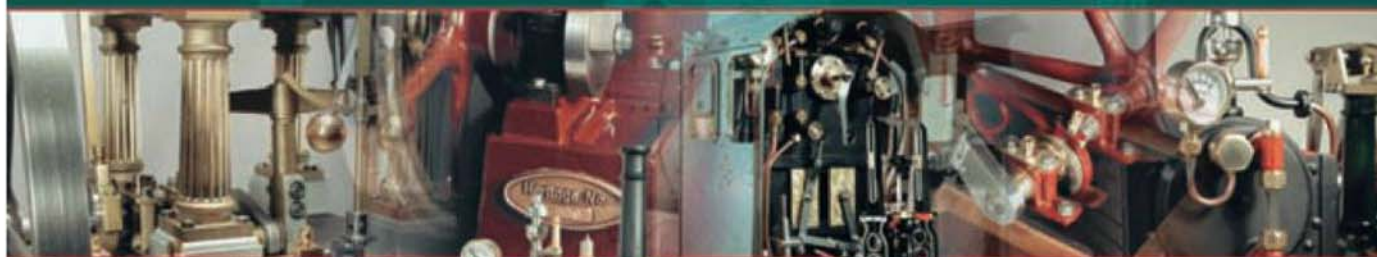
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32. INVOLUTE GEAR CUTTERS - ALL SIZES FROM 2 DP - 120 DP, INCL. MODULE & CP. [ALSO STUB, BEVEL & SPROCKET CHAIN]
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34. COLLET CHUCK, TO TAKE THREADED ENDMILLS, UP TO 1" DIA (2m/t, 3 m/t, R8 SHANK) IN STRONG WOODEN BOX
35. LATHE TOOLS (SET OF 8) $\frac{1}{4}$, SQUARE VARIOUS SHAPES
36. REVOLVING LATHE CENTRES, 1 M/T @ £18; 2 M/T @ £20
37. DRILLS WITH $\frac{1}{2}$ SHANK $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ DIA @ £18 SET
38. 3-WAY PRECISION ANGLE VICE, 50 m/m JAWS, 180 DEGREE COMPLETE CIRCLE
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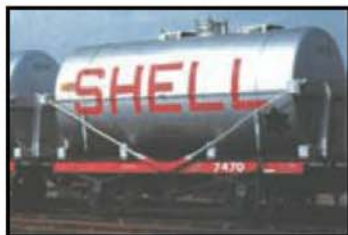
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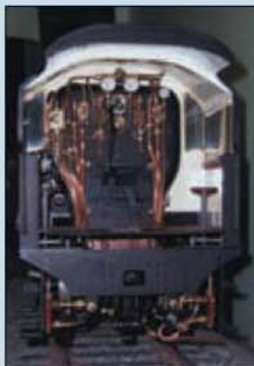
With the Editors



Super Crab

One model we would very much like to see at the Model Engineer Exhibition is the LMS Crab recently completed by Ted Legg. Ted sent us these photos showing his fine model. This model has appeared in *M.E.* before.

Back in 1994 Ted had the combined driver's brake valve in his pocket during a visit to the Reading club, and showed it to former editor, Mike Chrisp. Mike was suitably impressed and published a photo of it in the 16 September 1994 issue. Eleven years on we are happy to show it again, this time on the superb backhead.



Confusion

It was clear from the last readership survey that many people are confused over model engineering exhibitions that have proliferated in recent times. A centre-fold pullout in this issue is an advert for the Midlands Model Engineering Exhibition. To avoid any confusion, we should point out that this is not our own Model Engineer Exhibition.

That takes place at Sandown Park, Esher, Surrey, from December 29 to 31. Ours is the one that has been held on 74 occasions over a period of going on for 100 years. To date it is the only one we organise each year. It is the one where models are not in direct competition, but are judged to demanding standards to be awarded gold, silver or bronze medals, and other commendations.

A large number of other awards are made each year, not least the coveted Duke of Edinburgh Trophy for previous gold medal winners. It is fair to say that over the years the Model Engineer Exhibition has seen the cream of model engineering from the UK and overseas. This year promises to be no different.

Not every model can win a gold medal, but all entries are valuable in that they show visitors what can be achieved.

It is also the place where clubs and special interest groups can display their own models, meet new members and compare notes with model engineers from other clubs. Unfortunately we have limited space, so clubs are advised to book their space early.

Learn in Leicester

Norman Smedley tells us that he is running a course for model engineers at Leicester College. Newcomers and experienced model engineers are welcome.

Entitled 'Mechanical Engineering/Model Making' it will be held in the main workshops at the college, at Abbey Park Campus, Painter Street, on Wednesday mornings from 9.30 to 12.30.

It runs for three blocks of ten weeks. The workshop is well equipped with a full range of machine tools and equipment. Call Norman on 01664 434349

Be guided in Guildford

Guildford College of Further and Higher Education is also offering a 'Machine Shop Appreciation/Projects in Engineering' course starting this month. Also on Wednesdays, this runs from 1.30 to 4.30 pm or from 6.00 to 9.00 pm, and runs for 36 weeks.

The course offers practical skills in using hand tools, turning, milling and other machining. Health and Safety, metal joining and heat treatment are also covered. Students can choose from a range of projects, or bring their own work.

Contact Steve Scanlon on 01483 448500 ext 8358

Nice ones at Newbury

A 'Practical Model Engineering' course at Newbury College starts September 19 and runs from 6-9pm. The course code is 99250A and Newbury college can be contacted on 01635 845200 or 861823

Course tutor is A. Chamberlaine who has built several steam traction engines and steam lorries and is a genuine enthusiast.

We are told that there are "big machines available for model makers".

Powerful days out

The Museum of Science and Industry in Manchester is celebrating the 175th anniversary of the Liverpool-Manchester Railway from September 15 to 19 with several steam locomotives offering rides, Stephenson's Rocket replicas, other famous locomotives, a daily steam cavalcade, a Railfair featuring working models, memorabilia, and much more.

It is part of the 'Industrial Powerhouse' series of events planned for the North-west. Starting on September 24 is a new exhibition charting the story of the cotton trade in Liverpool and the North-west.

Details of these events at: www.industrialpowerhouse.co.uk

Curly Bowl

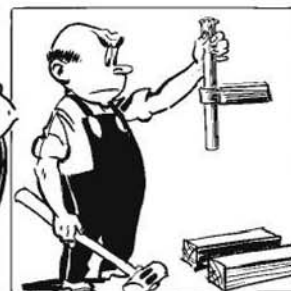
Don't forget that the LBSC Memorial Rose Bowl (the Curly Bowl) is being competed for during the LBSC Weekend being organized by the Bedford Model Engineering Society on September 24 and 25. It is more than 30 years since the great man died, and a collection was made among *Model Engineer* readers to purchase the Curly Bowl and a competition organized for locomotives of his design.

It is now a fixture in the calendar, so if you have a Curly locomotive, or some other item he designed, you will be made very welcome at Bedford, an excellent venue that can offer caravan space.

The organizers hope that plenty of locomotives will be running, but are keen to see plenty of static displays, too. Contact Ted Jolliffe 01234 327791.

CHUCK, the MUDDLE ENGINEER

by B. TERRY ASPIN



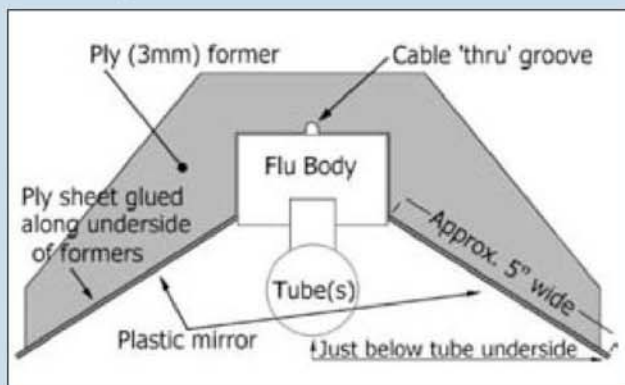
POST BAG

Improving fluorescent lighting

SIRS, - Re. Mr. Andrew Howard's lighting problems (*M.E.* 4243, 18 March 05) - From the description of his existing fittings, they sound like floodlights - I have tried the same sort of thing, and have found that a background level of fluorescent tubes (80w, 'Warm', 3 x 5ft. over each bench) at a height of about 2ft. 6in. augmented with 50w or 75w low voltage 'Anglepoise' type spotlights where necessary just about does the trick, especially when the light fittings have reflectors added each side. (see attached sketch). Twin tube fittings will also help, the ply formers (mine were set at approximately 1ft. spacing, i.e. five per fitting) can obviously be altered to suit the fittings used. The cable groove is only really for neatness in my own setup, where the cables run along from fitting to fitting. The sheet plastic mirror is obtainable from local DIY stores. I needed a circular saw to cut it satisfactorily into long thin strips. The mirrored ply sheets are offered up to the fittings before fixing to the formers, the angle arrived at experimentally (look at the bench top whilst tilting the mirrors - you may need a second person here) and marked on a former; they can then be cut to shape, and the whole thing glued together - I used a 'hot melt' glue gun for speed. When set, take the fittings down, drop the ply assemblies over the fluorescent fittings, and hang them back in place.

Looking at my workshop on a misty evening rather gives the impression that there's a 'Close Encounter' about to happen, with the light streaming out onto the ground.

Graham May, Kent.



I/C engines

SIRS, - Re. I/C Engine Topics, I look forward to the forthcoming articles on the subject. Whilst the fabulous multi cylinder radials and rotaries are of great interest, can we please have some design notes and constructional articles on single cylinder engines? What we need is a latter day Edgar T. Westbury.

Unlike the 'multies', a single cylinder I/C engine of between 3cc and 10cc is a practical machine that can be put to work in a model aircraft or boat. It is also within the scope of the less gifted among us!

Such an engine would admittedly have limited appeal as one can purchase an excellent glow motor from the Far East from as little as £30. Many model aircraft operators are not now capable of constructing an airframe, yet alone an engine. However, there are a few enthusiasts who take pleasure in

powering a model with an engine of their own manufacture.

Is it possible to publish articles on the construction of replicas of some now defunct spark engines of the forties and fifties? There is a small but enthusiastic band of modellers who enjoy building and flying old 'gas' models, but it does not seem appropriate to power them with a modern high performance glow motor.

I hope that sufficient other readers write to you in a similar vein to make my suggestions a viable proposition. Either way I shall continue to be a regular subscriber. P. G. Gain, Surrey.

Nemett replies:

I agree with Mr. Gain's comments and as I have mentioned in the column I am in the process of producing the drawings for a single cylinder 'beginners' four stroke engine. This will be slightly larger

than Mr. Gain mentions but could certainly be used to power a model boat or a fairly large aircraft. I have had several letters making suggestions for the column and will be looking at all of these with a view to including many of the requests in the column. I am very pleased with the interest created in this topic, it shows that there is obviously a demand for articles about I/C engines I do not claim to be an Edgar Westbury but hopefully I can provide articles on a wide range of topics related to I/C engines.

Rotary aero engines

SIRS, - In *M.E.* 4250, 24 June 2005, Mr. Murray Lane enquires about 'Double Gnome and Siemens-Halske Sh111 Aero engines. The following references may be helpful to Mr. Lane:

The Rotary Aero Engine by Andrew Nehum published by the Science Museum, London in 1999. ISBN 1-900747.

The Bibliography in this publication refers to a technical report by the Air Ministry, published in 1920 on the Siemens-Halske Sh111 engine.

Janes all the Worlds Aircraft of 1921 contains of a general arrangement drawing of the Sh111.

I hope this may be of use to Mr. Lane.

Roy Hungerford, Surrey.

Scissors valve gear

SIRS, - May I offer my congratulations to you on the excellent contents of *M.E.* 4250, 24 June 2005. There are articles on a fascinating variety of subjects, and to be honest I haven't quite read them all yet, so there will be even more pleasure to look forward to.

That article by Peter Rich set the old brain working. In his description of GWR number 40, *North Star*, Mr. Rich discusses the so-called 'scissors' valve gear fitted originally to this engine, and mentions that there was friction between Churchward and R. M. Deeley of the Midland Railway. Deeley was responsible for a similar valve gear being fitted to his 999 class 4-4-0 locomotives during the same period, and complained to Churchward of patent infringement. The outcome was that neither party continued to use this gear; although no further public explanation was given.

Now this caused me to look in *Model Locomotive Valve Gears* by the much missed Martin Evans, and on page 72 he too describes these eccentricless gears. However, he

Corliss valve gear

SIRS, - I refer to the letter from Mr. David Lloyd, Queensland, (*M.E.* 4249, 10 June 2005) about Corliss valve gear.

I recently completed a Cross-compound Mill engine with HP Corliss valves. I enclose a photograph of the finished model which was recently exhibited at the open day of the Forncett Industrial Steam Museum in Norfolk.

I do not recall any specific problem with the Corliss valve gear although, oddly enough, I found three errors with the slide-valve gear on the LP cylinder.

I found that the expert on these matters was Mr. Southworth, of Southworth Engines (who advertises in your magazine). Not only does he supply castings and drawings but is a model engineer par excellence in his own right and he gave me invaluable advice on methods of manufacture. I therefore recommend Mr. Lloyd to contact Mr. Southworth for advice.

Additionally, if Mr. Lloyd cares to contact me, I can advise him on the errors associated with the LP valve gear. I can only assume that Arnold Throp was so much more interested in Corliss gear than mundane slide valves that he overlooked three essential things! It would take up too much space to detail these here but am willing to advise anyone directly of these errors which Mr. Southworth has confirmed.

S. W. Dickenson, Suffolk.



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added that neither Churchward nor Deeley were "first in the field" with this design, earlier patents having been granted to Stevart in Belgium, and Lewis and Young in the USA. Evidently this was discovered by the disputing parties, hence no further use of the gear by them.

Robert Mills, Birmingham.

Steam flight

SIRS, - I very much enjoyed the article (*M.E.* 4248, 27 May 2005) written by Edward Perera about his radio controlled steam powered model airplane. His work is to be much admired, especially under the condition that he has to work, with little or no proper material and tooling. His work shows us all what can be done with perseverance and determination.

I would like to make one addition to his story if I may. It was stated in the article that no steam powered airplane ever flew, when, in fact, at least one did. In 1933 one Bill Bessler demonstrated a Travel Air biplane that he had converted to steam power. On April 12th of that year Bessler took his airplane off and flew over San Francisco Bay, California. Bessler returned and flew silently over the crowd at the airport at an altitude of 200 feet. The general feeling was that his engine had failed. Bessler leaned out and called "Well, how does she look?" As cameras clicked away, Bessler landed, reversed the engine, and stopped in 60 feet!

Bessler's engine was a V-twin weighing 180 pounds but boiler, condenser, pumps, and associated equipment brought the total power plant weight up to 480 pounds. He ran his engine for 30 hours on a dynamometer establishing its 150 horsepower output. Bessler is reported to have actually reversed the engine in flight to slow the aircraft and to increase descent rates.

This information was gathered from an article in *Flying Magazine*, December 1962, at which time Bill Bessler was still active building experimental airplanes. Additional information was found at www.flyingkettle.com/bessler6.htm

If Mr. Perera would like copies of these articles, I would be happy to provide them to him or discuss any topics related to steam flight. Perhaps I could chase down a special tool or some such that he can not get in his country.

Thanks very much for your interesting articles in *Model Engineer* which do seem to cover

every topic imaginable and give details on some of the most interesting and resourceful people world-wide - those of us who call ourselves model engineers!

James S. Conery, New Hampshire, USA.

Recycle for Cancer Care

SIRS, - Every year cancer claims the lives of more than 150,000 people in the UK, with a further one million living with the disease at any given time. Marie Curie Cancer Care provides high quality nursing, totally free, to give terminally ill people the choice of dying at home supported by their families.

You can help to raise vital funds needed to provide this care by donating your old mobile phones and printer cartridges to the Recycling Appeal run on behalf of Marie Curie Cancer Care. Simply post phones and cartridges to: Marie Curie Recycling Appeal (EL), 31-37 Etna Road, Falkirk FK2 9EG. For more information on how to obtain freepost envelopes or arrange free pickups call 08712-505050 or visit our website at www.recyclingappeal.com/marielcurie

It is estimated that there are 75 million mobile phones languishing in cupboards and drawers around the UK and more than 30 million inkjet cartridges are thrown in the bin each year.

Thank you in advance for your support.

Emily Goulborn, Marie Curie Cancer Care.

Sleeve valve aero engines

SIRS, - I have just finished reading that superb book by Bill Gunston, "Fedden" - the life of Sir Roy Fedden, published by the Rolls-Royce Heritage Trust. A large portion of this book is devoted to the design and production of sleeve valve aero engines during Fedden's period as Chief Engineer for The Bristol Aeroplane Company.

Fedden had selected the sleeve valve engine as the most likely candidate to provide the power levels required for future aircraft designs and pursued its development and eventual success against almost insurmountable

odds. Most engineers would have given up, but his success made Bristol one of, if not the, world's major manufacture of aero engines up to the advent of the gas turbine.

The sleeve valve engine is inherently simple, being uncluttered by the more usual poppet valve gear. It does however have an Achilles heel; the sleeves.

A major problem, if not the major problem, was the mass production of the sleeves which not only had to be perfectly circular, but machined to very fine tolerances. (+/- 0.0002in.) Initially all sleeves were hand lapped, but with Hiltner in power and WW2 looming, production volumes were rising rapidly, and this more or less hand built method was clearly unsatisfactory.

Not only had these sleeves to be round, they needed to have very similar coefficients of thermal expansion to the actual cylinder,

and to be distortion free as well. This was quite a tall order in the 1930s. It did in fact cost the Bristol Company well over £2,000,000, a staggering sum in 1938, to finally solve the problem.

The manufacturing problems were finally solved by a combination of new alloys (Firth Vickers) and I quote "Grinding each sleeve with a worn-out, undressed wheel, incapable of cutting" Can any reader throw more light on this process and would the production of similar sleeves, with our vastly improved metallurgy, heat treatment and CNC machines prove to be a far simpler problem.

For those readers unfamiliar with the sleeve valve engine; it dispenses with the almost universal poppet valve, and uses a rotating and reciprocating sleeve to control the exhaust and inlet valve events. Sleeve valve engines are almost perfectly balanced, silent and have higher specific power outputs. Oil consumption is virtually zero and TBO considerable. Why they have not been more widely adopted is something of a mystery.

Colin Usher, Cheshire.



Hilger & Watts centre locator

SIRS, - At a recent industrial auction I purchased a boxed 'Hilger and Watts Centre Locator,' in very good condition. Hilger & Watts (48 Addington Square, London) are not in the current phone book, and presumably have gone out of business.

The Centre Finder (focus 2.5in.) has a 1/2in. diameter ground steel spigot for positioning in the tailstock (lathe) or vertical head (milling M/C) and this spigot appears to be retained by a large knurled nut; however, when this nut is removed, the spigot stays in place. I do not want to use force on the spigot as I fear I may disturb the prism.

There are three aluminium alloy studs, two of which contain Allen headed screws. There is also a hexagon key in the fitted box, so I assume this is for adjusting the cross hairs or graticule, but here again, I do not know the procedure.

Does anyone out there have a handbook or advice on how to remove the spigot or adjust the cross hairs?

G. D. Hall, Warwickshire.

AYESHA ARISES



Tony

Weale

adds 'words and music' to a project by the National 2 1/2 in Gauge Association to revive the locomotive that inspired the model engineering movement.

When I first saw LBSC's 2 1/2 in gauge *Ayesha* on display at the 1968 Model Engineer Exhibition, I could not have imagined that one day in the future she would stand on my mantelpiece while I prepared drawings for a replica. But such is life, and that is exactly what happened. Should anyone be wondering what all the fuss is about, it was *Ayesha*'s public performance in "The Battle of the Boilers" in 1924 which demonstrated that a 2 1/2 in gauge, coal-fired passenger hauling locomotive was a practical machine, and that an average man with a home workshop could build one. Had it not been for *Ayesha*, there would have been no "LBSC" to enrich the pages of the *Model Engineer* for so many years, and live steam might have remained a rich man's pastime, without developing into the movement which we all now enjoy.

Within the 2 1/2 in Gauge Association there have been regular thoughts and enquiries about the *Ayesha* design, since, apart from the historical aspect, it was a most attractive locomotive with a proven performance, and it looked reasonably easy to build. But castings have long been unobtainable, and although LBSC had written a constructional series for *English Mechanics* in 1930, it was not his most detailed or inspiring work. Complete *Ayeshas* from the vintage period are almost unknown, though saying so will probably encourage some to emerge from the woodwork!

This was the situation in 2003, when, with the 80th anniversary of "The Battle of the Boilers" approaching, the Association displayed both Greenly's *Challenger* and LBSC's *Ayesha* at the Model Engineer Exhibition at Sandown Park. Following the show, we were lucky enough to have *Ayesha* on extended loan, and we had the

opportunity to study the locomotive in detail. The first discovery was that LBSC had incorporated many commercial castings and parts, of Bond's or Bassett-Lowke origin (and probably of Greenly design), and the second was that the locomotive bore little resemblance to the published design of 1930. This, though enlarged and improved in typical Curly fashion, was not such an attractive machine. It was certainly not the "real" *Ayesha*, and few of the Association's existing castings were suitable. Since we could not reproduce either version of the locomotive from our standard parts, a "clean sheet of paper" approach was indicated, and we sought members' views on how we should proceed.

The question was, should we replicate LBSC's original *Ayesha*, or try to sort out the shortcomings in the 1930 *English Mechanics* version, or alternatively produce a new, true-to-scale design for a Marsh/Ivatt Atlantic? There was an enthusiastic response, which basically proved that our members were all individuals with their own ideas on the subject! The consensus was that we should revive the original 1922 design as a tribute to LBSC, but include recent developments to produce an up-to-date locomotive. We also saw the need to maintain *Ayesha*'s essential simplicity, which made it an ideal project for a beginner with limited facilities.

The Association does not go in for formality or committees, nor does it have its own headquarters. However, judging by various technical features requested for the revived *Ayesha*, our members believed that we had a design office somewhere, with a skilled team of locomotive engineers on hand! In reality "we" consisted of the Association's patterns and castings officer, Des Adeley, who is now our National Secretary: our drawings and reprints specialist, Peter Shaw: plus experienced boiler maker Peter Gardner: and myself, who just happened to live within easy reach of all the others.

The

first step was to build a prototype chassis, so that we could look at the problems in three dimensions, and we had several pleasant meetings while this took shape. We all had a good look in our vintage collections and unearthed a suitable smokebox and a bogie. The latter was identical to that used by LBSC, and even bore the same maker's marks. Peter Gardner designed an up-to-date boiler, and when provided with some copper tube, produced the finished article remarkably quickly. Des, and several other members of the Association who had offered to help, made patterns and individual components from my provisional drawings. Most encouragingly, it all fitted together without much difficulty, and the prototype chassis ran on compressed air in Des's workshop in October 2004, almost exactly 40 years since the last recorded steaming of the original locomotive.

Ayesha is not a scale replica of a Brighton or Ivatt Atlantic, but having studied the dimensions it proved possible to incorporate variations, so that the new design could be built either as a close replica of LBSC's own locomotive, or to a more prototypical GNR or Brighton outline. It is fair to say that Curly was still on the learning curve in the 1920s, and he built his *Ayesha* with 1/16 in main frames, with the axleboxes running directly in them, as was then common practice. Otherwise the chassis was somewhat complicated, with several round-section cross stays, a cast stretcher carrying intermediate valve spindles, and a common sleeve to drive both slip-eccentrics, this being a definite Greenly feature. There seemed little point in copying this chassis exactly, so the new version is based on the simpler 1930 design, with thicker frames and plate horns. These will be offered as water-jet cut components, enabling a strong and accurate chassis to be assembled with minimal machining.

LBSC's locomotive utilised "Averill"

cylinders. It is not clear whether this clever design is due to Tom Averill or to Henry Greenly, but it originated in an age when few amateurs would have had access to a milling machine, and even vertical lathe slides were rare. The cylinders and their common steam chest are designed to be machined entirely by turning, and the steam chest also forms a frame stretcher and eliminates most of the usual steam and exhaust plumbing. It took us some time to comprehend the finer points, but machining and assembly of our new castings has proved to be simpler and quicker than for equivalent conventional cylinders. Continuing the vintage theme, we have reproduced the cast buffer beams, bogie centre and equalisers, and trailing frames used by LBSC, all of which will be useful components for the future. Indeed our research in early volumes of *Model Engineer* has revealed several other locomotive designs worthy of revival.

Curly's first *Ayesha* boiler was partly soft-soldered and, as he described in his notes, was replaced by the current one in 1936. Interestingly it was not the same as the 1930 version. Although his design could probably be modified to conform to current standards we took the opportunity to produce a completely new boiler, with improved staying, a larger heating surface, a simple radiant superheater, and provision for lagging, all of which was possible within the original overall dimensions. It is recorded that in the 1920's *Ayesha* and similar locomotives were often worked at well over 100 psi. We have specified a maximum of 90 psi for the new boiler, higher than usual for 2 1/2 in gauge, and we have also increased the cylinder dimensions slightly, so there should be no shortage of power.

A further departure from the original is in the grate and ashpan. LBSC's locomotive had a fixed grate, with a shallow ashpan above the trailing axle. A dropping grate was suggested for the 1930 version, but would be fiddly in this size, and the ashpan would still present problems. For easy fire-dropping we have deleted the conventional ashpan, provided ash shields around the trailing wheels, and arranged a removable grate which dumps forwards.



Simple and practical - pure Curly

Ayesha's original tender utilised cast iron side frames, of unknown origin, and was not true to type for either a Marsh or an Ivatt locomotive. For the new *Ayesha*, alternative tenders have been drawn in the appropriate styles to match the chosen locomotive.

Should anyone want to build a completely authentic Curly tender, the Association has suitable cast brass frames, intended for the Carson/Bassett-Lowke "Experiment."

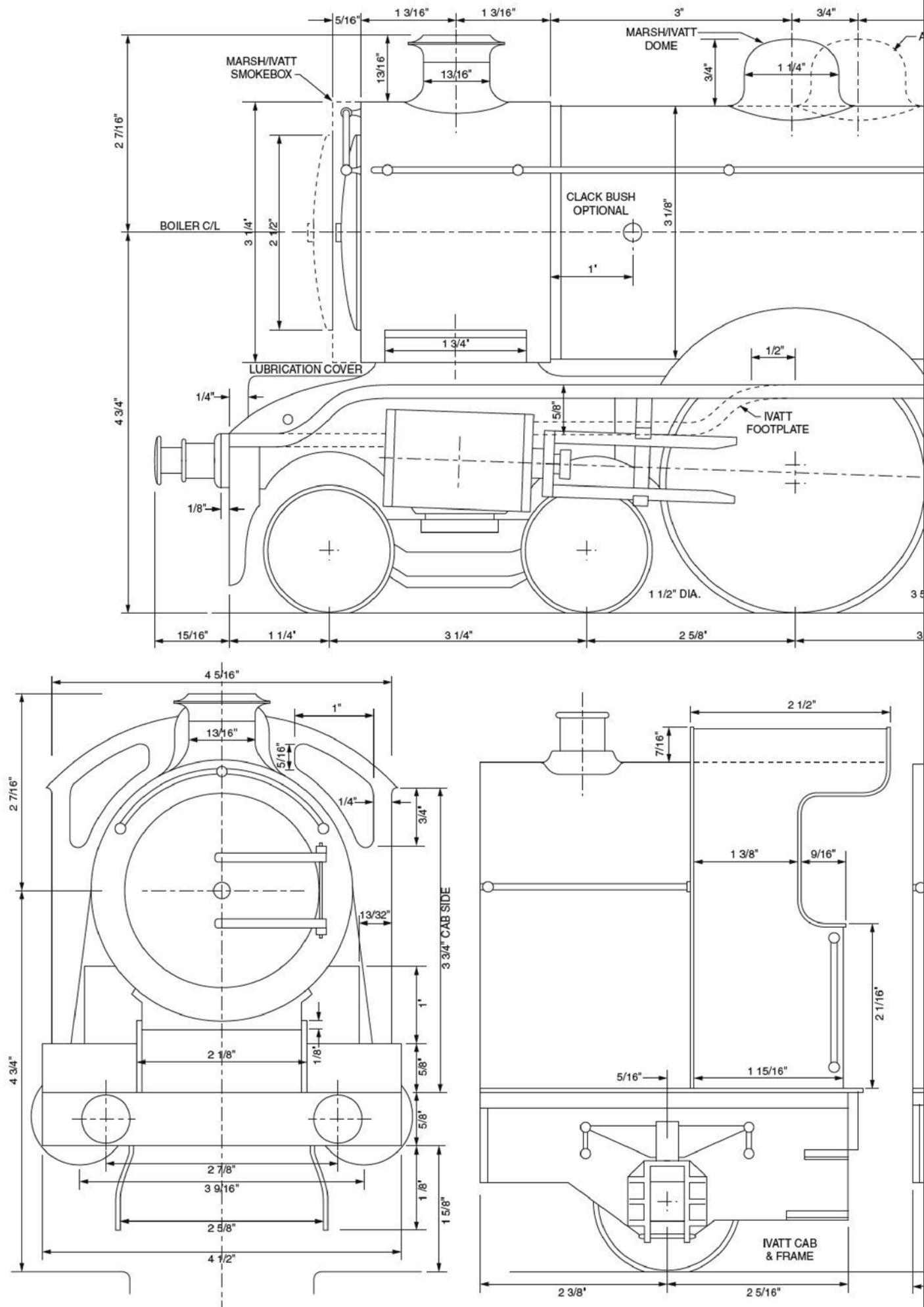
We are aiming to present a completely proven design which can be built easily, and with this in mind a second prototype is under construction,

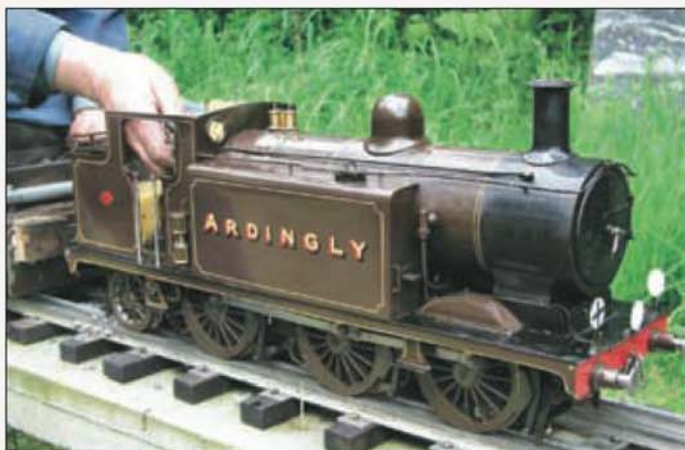
strictly to the drawings, and using the waterjet cut frames. Patterns and castings have reached an advanced stage, and the first prototype has been steamed by Peter Gardner and at the time of writing is almost fit to be seen in public.

The *Ayesha* revival project has followed the classical route from the drawing office, "through the shops" to assembly and trials on the line, and has employed a wide range of skills from the Association's enthusiastic membership. We hope that Curly would approve of our efforts, and we all look forward to seeing a new generation of *Ayeshas* taking shape.



New Ayesha (above) in Curly form can be compared with the Maestro's original on the opposite page





The neat LBSC D1 class, 0-6-2T, Ardingly being fed by Les Dawson from Reading SME.



Superbly finished Southern Railway O2 class, 0-4-4T by John Gates from Sutton MEC.

SOUTHERN LOCOMOTIVE RALLY 2005

Malcolm Stride
visits the annual gathering of
models of the Southern Railway.

This was the fourth weekend rally for scale models of Southern Railway (or its offshoots) locomotives and stock. Those enthusiasts brought up in other regimes are sometimes surprised by the variety and innovation shown on the Southern Railway over

the years. After all, where else would you find locomotives with chain driven valve gear and locomotives cut down to basics like the 'Q1'?

The rally was hosted by the Surrey SME this year at their track site in Leatherhead. The site is situated in the shadow of an embankment which carries a part of what used to be the Southern Railway and so is a fitting place for such a gathering.

Having looked forward to this rally, I was slightly disappointed to see the rain falling

steadily as I prepared to set off for my visit on the Saturday. After a wet journey I arrived at the very pleasantly situated site to be greeted and made welcome by organiser John Cook and his team.

The society facilities include a raised track for 2½, 3½ and 5in. gauges and a ground level 5 and 7¼in. gauge track, both of which were in use for the weekend. There is a facility to transfer 5in. gauge locomotives and rolling stock from one track to the other so those who wished to try a run on both tracks could do so easily.



Arundel, a nice LBSC railway 'Gladstone' class 0-4-2 by Andrew Breese from Worthing SME.



The SSUB suburban electric set built using measurements of the National Railway Museum example by Mike Ennis from Guildford MES.



Superb LBSC Atlantic 4-4-2 by Ron Warren from Surrey SME on the ground level track.



Southern, but which country? Local man Paul Edmonds' Queen of Carolina waiting in the station before a running session.



Left:
John Wilks
(Crawley Model
Engineers) and
Crampton
locomotive on
the ground level
track.



Right:
The unusual Q1
class locomotive
with Peter
Kingsford and
Trevor Harley
from Maidstone
MES aboard.

The site was once a watercress growing area and so is quite lush with a stream running through parts of it and also some of the railway used to transport the cress still visible alongside the entrance road. The club tracks cross the stream at a bridge close to the station area and the wooded site has plenty of parking and an excellent club house which housed a small exhibition during the weekend.

When I arrived, the steaming bay area was already a (slightly damp) hive of activity with several locomotives raising steam and lots of chat and banter going on.

The track was very busy for most of the day with several pauses caused by what was forecast as 'the occasional sharp shower'. The result of

these was that those drivers who had never experienced wet aluminium track found the going somewhat slippery but all adjusted as time went on.

As the day progressed a wide variety of locomotives were to be seen on the tracks with visitors from many clubs around the south east. The locomotives ranged from the early days of railways with the Crampton right up to modern diesel types and that epitome of the Southern Region, the electric multiple unit with a wide variety of types in between. I have not included a detailed description of every locomotive and driver in this report but have included a selection of photographs of those locomotives which caught my eye together with a detailed caption.

Particular mention must be made of the 2 1/2in. gauge *Ayesha* which was on display in the club house. This revamp of a famous design by the National 2 1/2in. Gauge Association generated a lot of interest from those attending the rally.

In addition to the models in the club house there were three 'society' stands in attendance, The Lynton and Barnstaple Trust, The Mid Hants Railway and the Railway Correspondence and Travel Society. All three seemed to be attracting lots of attention during the day.

The inner man (or woman) was well provided for with refreshments available in the club house and lunch provided for all entrants by a busy team of ladies from the host society to whom

many thanks are due for their unstinting efforts during the day.

I had to leave at the end of the afternoon but have it on good authority (from a driver who sampled it) that an excellent barbecue was provided in the evening so no one had any excuse for going home hungry!

I should like to express my particular thanks to all those entrants who braved the damp conditions and put up with me demanding photographs and smiles at awkward moments, for without you, there would be no rally. Great thanks are also due to all those in the organising club for their hard work in staging the event, particularly John Cook and his team who ensured things ran smoothly during the day.



The back head of Ayesha.



Lots of discussion in the steaming bay!



Somewhat larger than the rest on the raised track, the Lynton and Barnstaple Railway Lew being run by Paul Collins from Harlington LS.



The Merchant Navy class New Zealand Line built by Russell Coffin and driven by local man Peter Moles.

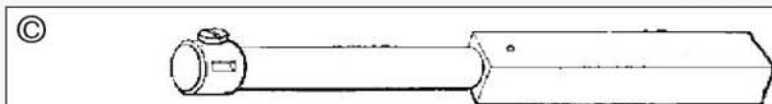
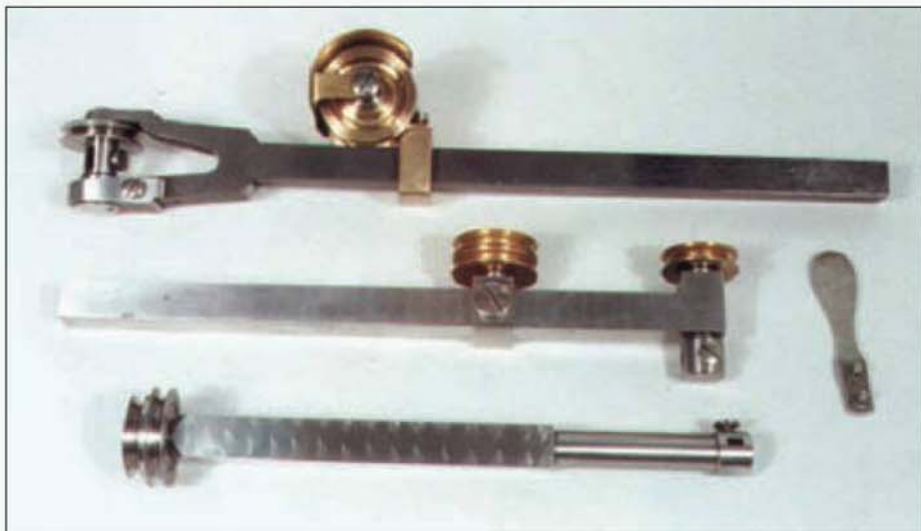
PLAIN MAN'S GUIDE TO ORNAMENTAL TURNING

John Edwards

examines more ornamental cutting frames and their uses.

●Part III continued from page 85
(M.E. 4254, 19 August 2005)

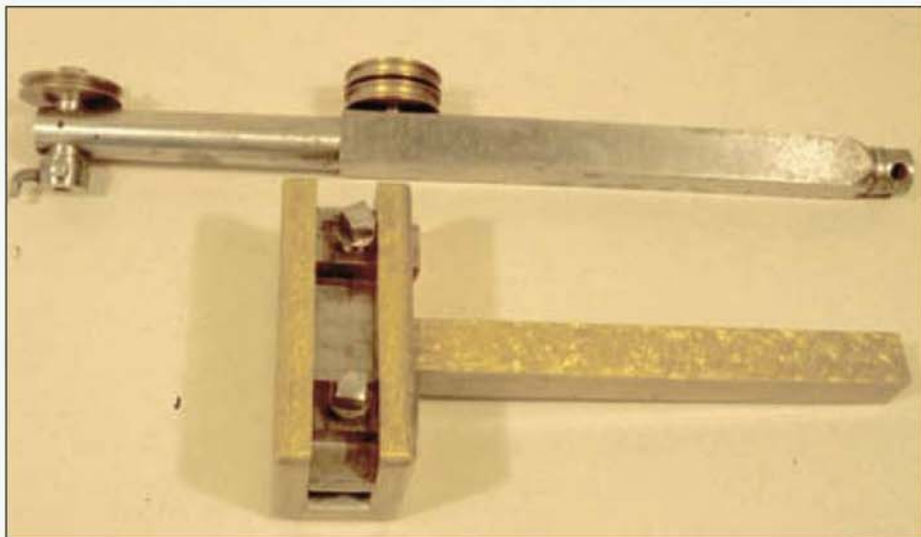
In the last issue we examined some of the simpler cutting frames. We now move on to frames used to cut internally, also to cut eccentrics and ellipses.



The **Internal Cutting Frame** has the cutter head on an extended shaft so that it may enter deep into the work.

These have various purposes: for cleaning into internal corners, under-cutting or piercing through from the inside; some are used for

cutting the internal sides of polygons. They are sometimes used in conjunction with cranked cutters. The right-angle tool-holder is useful for deep cutting and boring as it may be advanced by the long leadscrew of the slide-rest instead of the short guide screw of the tool-slide.

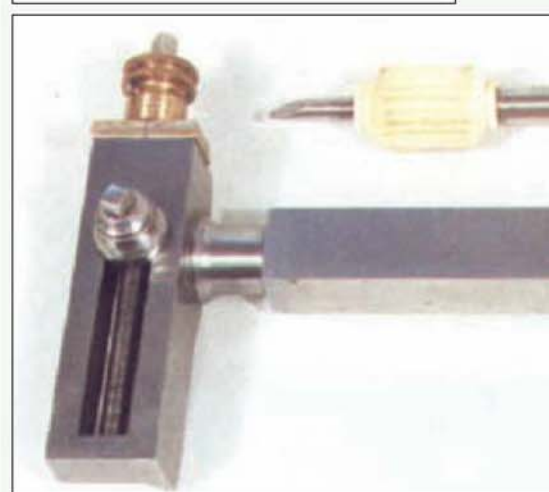
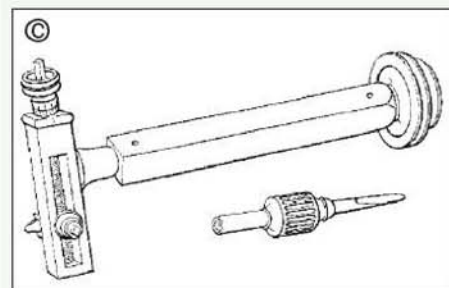


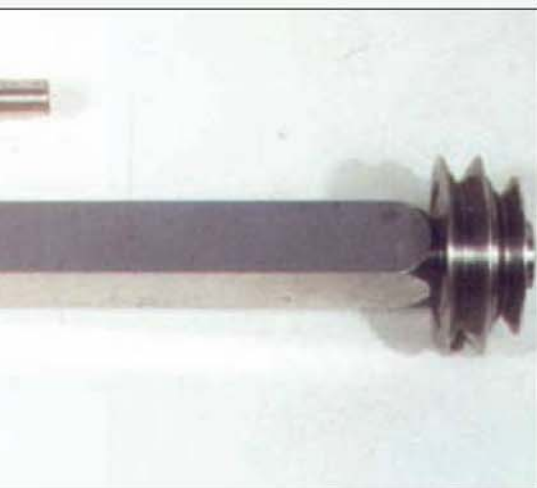
The **Eccentric Cutting Frame** is similar to a boring head, having a cutter box that can be set to drill a hole on centre or set eccentrically cut a circular groove of any radius within its range. It is used with a single point cutter for individual plunge cuts or continuous swathe cuts. A plunge cut gives a circular indentation with a radius equal to the eccentricity of the instrument, which is adjustable.

Using a point tool; a series of cuts may be taken at regular intervals around the work to form a variety of patterns such as the barleycorn, the turk's head and others; or, by adjusting the radius of the cutter by regular intervals, shell patterns may be formed. Using a round-nosed cutter the tool may be used to take planing cuts to form facets or hemispheres.

The lid of this African Blackwood box was cut with the Eccentric Cutting Frame; the background pattern comprises series of 5 shallow cuts made with one space intervening. The centre pattern was cut deeper by double counting with the Eccentric Chuck.

The top of this pepper mill was cut with the Eccentric Cutting Frame at an angle of about 45deg. to the lathe axis.





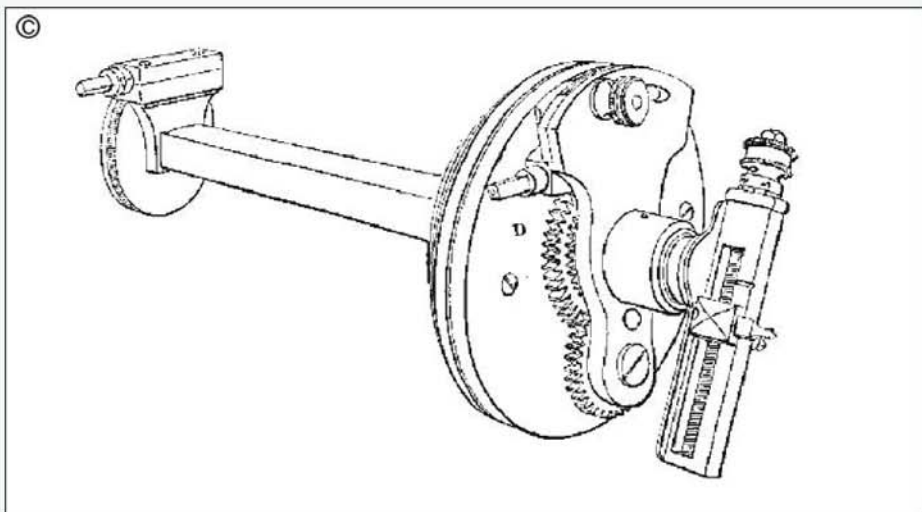
The Ellipse Cutting Frame is like an Eccentric C/F but with two eccentricities and a 2:1 gear ratio between them so that when rotated, the cutter follows an elliptical instead of a circular path. The radius of the cutting head is adjusted to half the required minor axis of the ellipse to be cut. The spindle of the cutting head rotates within a socket on a flange; fixed to the back of this short spindle is a 36-tooth gear meshed with another 36-tooth gear combined with a 24-tooth gear meshed with a 48-tooth gear. The 36/24-tooth combination is on the pivot point of the flange and the 48-tooth gear is fixed to the main spindle which passes through the large pulley. When the large pulley is rotated the whole of the apparatus rotates around the 48-tooth gear but as the ratio of the gearing is 2:1 the cutting head rotates at twice the speed of the pulley and in the opposite direction. The flange plate may be released and moved in an arc around the pivot point so that the socket becomes eccentric to the axis of the main spindle; this eccentricity equals half the difference between the minor and major axes of the ellipse to be cut. Alterations to the eccentricity of the flange plate, being in an arc, not a straight line, change the plane of the subsequent ellipses so, to keep a series of ellipses on a common plane, it is necessary to compensate for the flange angle; this is done by rotating the main spindle by an equal change of angle using the worm and wheel adjustment at the back end of the main spindle.

The pattern on this dome-top box was cut with the Ellipse Cutting Frame and comprises a series of ellipses in a 3-looped rolling circle achieved by double counting with the Eccentric Chuck.

The four-leaf clover pattern cut in this flat-top box was made with the Ellipse Cutting Frame with substitute gears so that the motion produced a four-lobed cut instead of an ellipse.

The description of ornamental cutting frames and their uses will be continued in the next article which will deal with the Epicycloidal, Segment and Rose Cutting Frames.

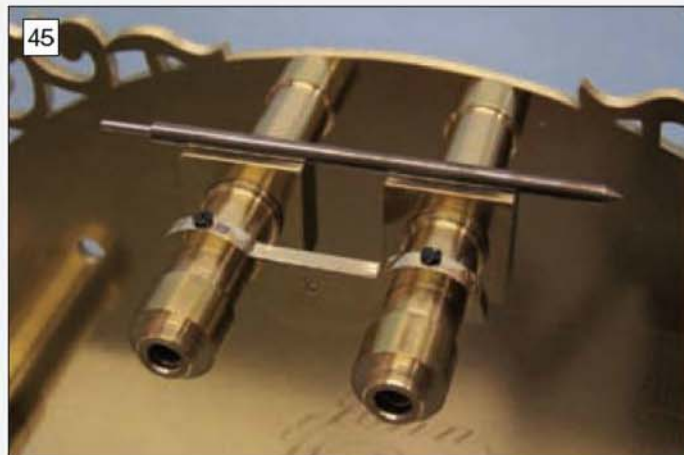
● To be continued.



If any reader wishes to know about the Society of Ornamental Turners or, indeed, anything about O T equipment and techniques not covered in this series, I can be contacted by telephone on 01732 355 479 or by email at johnf.edwards@virgin.net



The two square pendulum supports. Note the V-grooves in the top surfaces, which were formed with files.



The pendulum supports in position on their pillars. A piece of $\frac{1}{8}$ in. dia. rod has been used to line them up correctly.

AN UPDATED CLAUDE REEVE EIGHT-DAY REGULATOR CLOCK

John Wilding FBHI

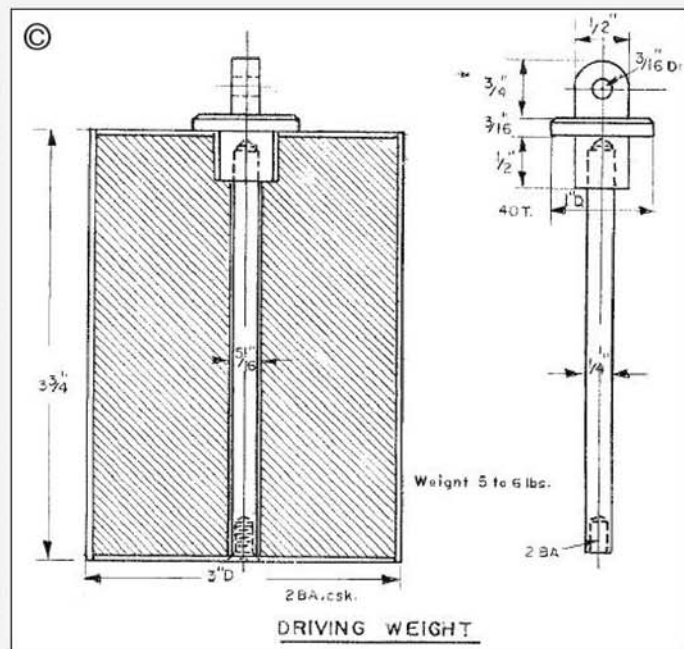
now describes the pendulum and weight before leading on to the escapement and pallet assembly.

●Part V continued from page 194 (M.E. 4254, 19 August 2005)

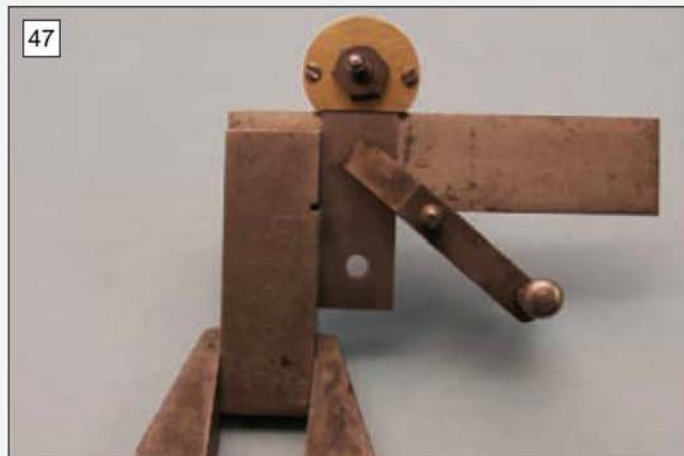
I have coupled these two components together because much of the work in casting the lead is common to both. The pendulum is suspended from the upper two pillars which carry the back movement plate. In order to provide a proper seating for the cross pin in the upper part of the pendulum suspension, two $\frac{3}{4}$ in. square brass blocks are bored to be a close fit on these pillars. The blocks are illustrated in photo 44. The upper surfaces are provided with a V-groove. I filed these by marking out the lines and initially using a triangular file followed by a square one. The bottom surfaces are drilled and tapped 8BA for pinching screws which will hold the blocks in place. Photograph 45 shows these

two blocks in position on the pillars. A short length of $\frac{1}{8}$ in. diameter rod is placed in the V-groove to obtain correct alignment while the 8BA screws are tightened up.

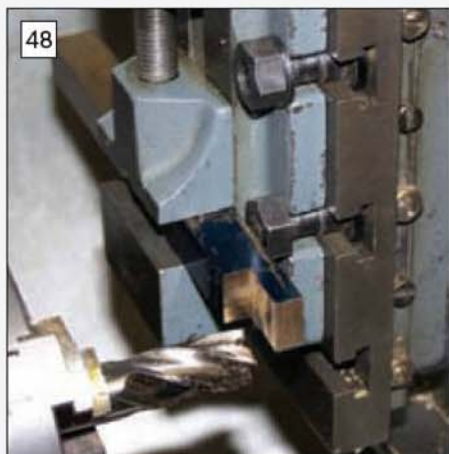
I did not quite follow Claude Reeve's design for the upper fixing of the pendulum but mine is very close. In photo 46 you can see the suspension dismantled. The suspension spring on the left is sandwiched between the two brass cheeks shown on the right, a threaded rod passes through this assembly and the whole is clamped by two thin 2BA nuts.



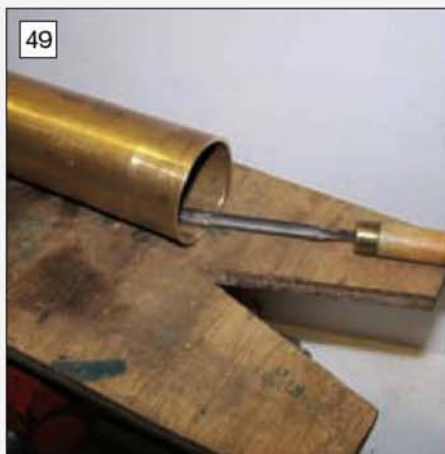
The pendulum suspension parts dismantled. The suspension spring is the object on the left.



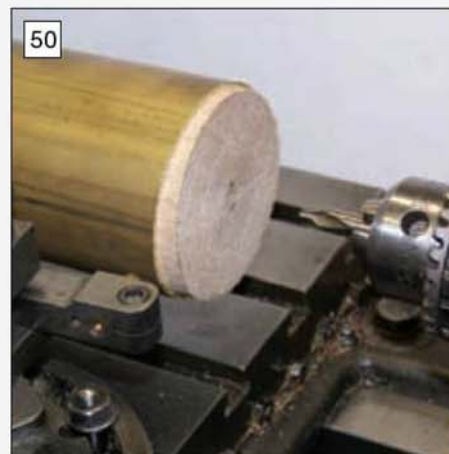
Using a small engineer's square to correctly align the pendulum suspension during assembly.



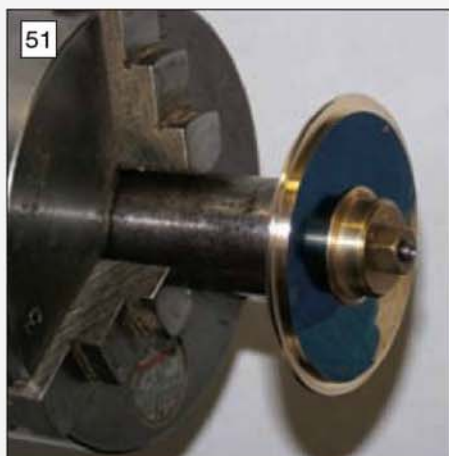
48
Set-up for milling the lower brass clamping piece of the suspension.



49
Removing the burrs from inside the tube after machining the ends.



50
Setting the tube to run true prior to centring the wooden plug.



51
Turning the flanges of one of the end plates for the driving weight.



52
The set-up used for pouring the lead. A piece of hardboard with a window cut in it was used.



53
The parts of the driving weight assembly shown dismantled.

In photo 47 you can observe that the use of a small square ensures the assembly is put together in proper alignment. The lower end of the suspension spring is clamped in a brass piece which is threaded to screw onto the top of the pendulum rod. **Photograph 48** shows how this component is milled in the lathe. The lower end of the rod is threaded for a large brass knurled rating nut.

Bob

This is a brass tube lead filled. The tube is sawn to length, one end is held in the 3-jaw chuck and the other is supported in the fixed

steady. In this way both ends can be machined true in turn. The internal burr should be removed with a file or scraper as demonstrated in **photo 49**. Because the weight tube is too large to be accommodated in the Myford fixed steady it is fitted with a wooden plug. One end of the tube is held loosely in the 3-jaw chuck while a round end piece of stock is brought up to touch the rotating work, this will make it run true (**photo 50**). The chuck jaws are tightened and a centre drill is then fed into the wooden plug. The drill is replaced with a rotating tailstock centre; the ends of the tube can then be machined true.

Both components are fitted with flanges, one of which is made a permanent fit. These flanges can be turned in the set-up illustrated here in **photo 51**. They are fixed by drilling equidistant holes through the wall of the tube, tapping these 10BA and screwing in brass studding or simply by driving in brass clock pins.

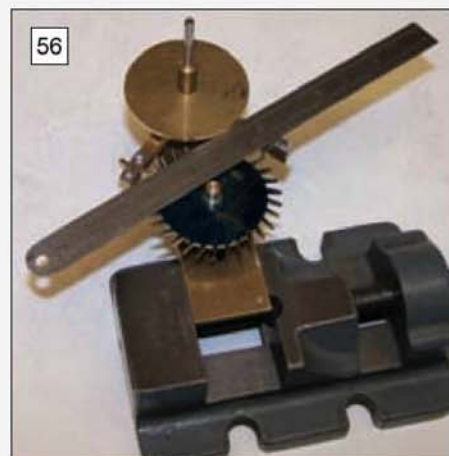
The lead is cast in the tube itself and I show the arrangement in **photo 52**. A piece of hardboard with a window cut out of it is fitted in the tube. At least three turns of paper are used to line the tube and the same applies to the 1/4in. dia. rod in the centre.



54
The holes for the weight hook should be well chamfered both sides.



55
A pair of trial pallets should be made from soft material in order to test the action.



56
Using the impulse circle in order to check the impulse planes.



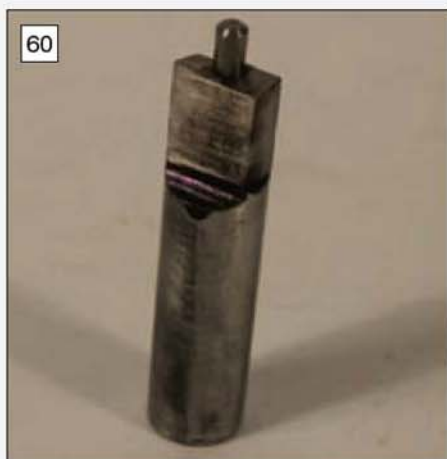
57
The ingenious beat setting arrangement uses a leadscrew with both 10 and 14BA threads.



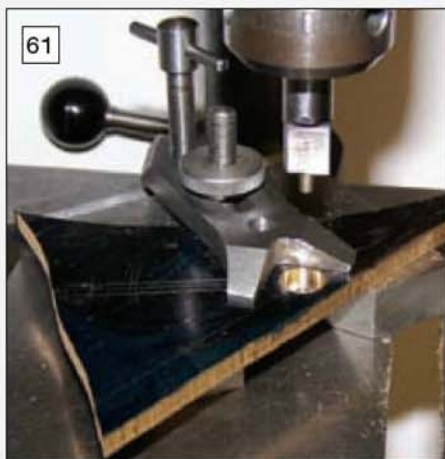
58
The set-up for soldering the extensions to the yoke piece.



59
Set-up for drilling the pin hole through the knurled screw and threaded rod.



60
The home made spot facing cutter used to form the recesses in the pallet arms.



61
Drilling the recesses in the pallet arms. The part is clamped using a finger plate.



62
Method of clamping the pallet arms to a wooden faceplate.

The paper will char but will still provide the necessary clearance to enable the assembly to come apart easily when the lead has cooled. For the pouring, the assembly can be placed in a flower pot partly filled with sand so that the tube is well supported.

I show the weight assembly in **photo 53**. The central rod is threaded 4BA at its lower end and is secured to the lower flange with a countersunk head steel screw. The top of the weight can also be seen here.

It is drilled for the hook on the weight pulley and a suitable set-up for this drilling operation is given in **photo 54**.

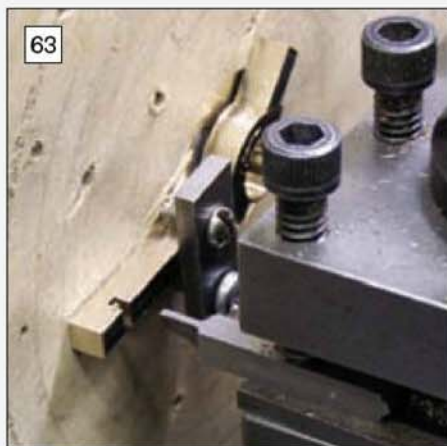
Escapement

The method of laying this out suggested by Claude Reeve does not give equal angles for the two impulse planes. This is quite clear if you look at the large drawing of his escapement. If a ruler is laid against the entry impulse face on the left of the drawing and the line extended upwards and the same action carried out on the exit pallet the two lines should be tangential to a common impulse circle drawn at the pallet centre. It will be seen that the two impulse planes do not conform to this requirement.

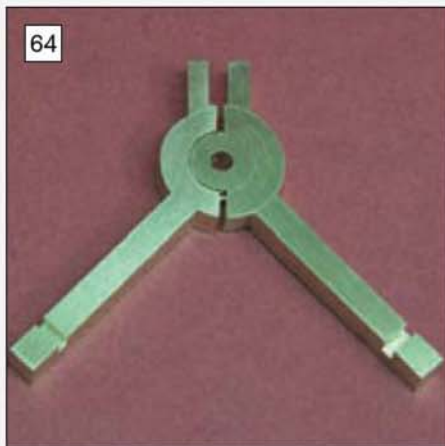
I consulted a colleague on this matter and he suggested that I make the escapement to span a

fewer number of teeth, $9\frac{1}{2}$ instead of Claude's $11\frac{1}{2}$ and this is what I have done. However Claude's design is perfectly usable if the impulse faces are made equal. The radius of the impulse circle in Claude's layout should be 0.92 inch. I strongly recommend that initially the pallets are cut out from brass or light alloy as shown in **photo 55**.

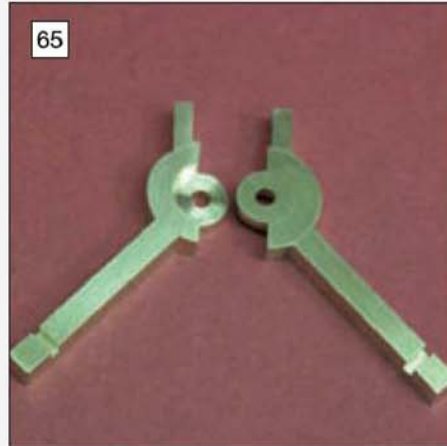
The arms are easily bent and the actual pallet nibs can be filed until they work properly. The escape wheel teeth *must* land on the circular dead faces of the pallets. A disc having a radius equal to the impulse circle can be machined and placed on an extension of the



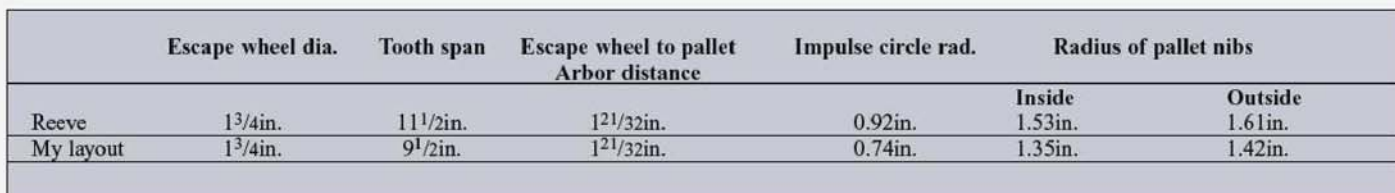
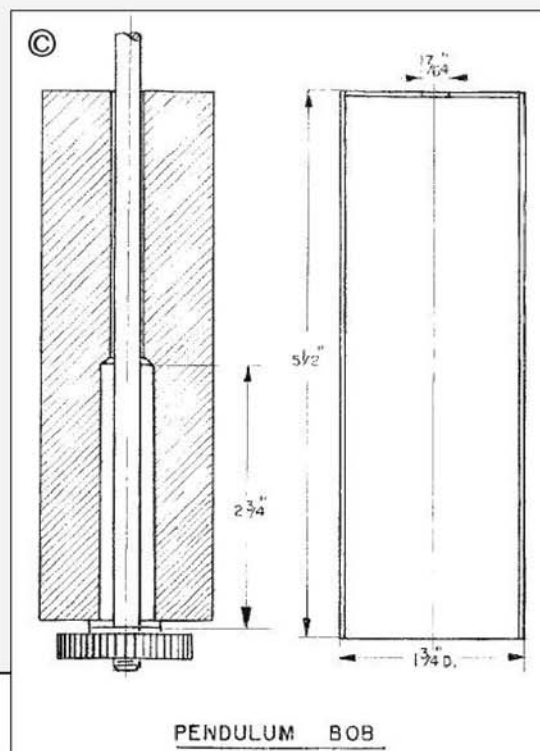
63
Machining the groove on the lathe with a narrow parting tool.



64
The pallet arms shown placed together as they would appear in the assembly.



65
The pallet arms shown separated. Some further drilling work has yet to be done on these parts.



● *To be continued.*

Peter Spenlove-Spenlove explains how to speed up the production of multiple parts and finishes with some notes on milling.

From time to time model engineers are faced with the task of machining multiple parts. A typical example is the machining of the profiles of spokes for a traction engine wheel. I was often faced with this problem during my working life. It was frequently necessary for me to produce a trial batch of prototype pressed parts. If the design was successful these would be made from coiled steel strip on a press in vast quantities. However, the first few had to be hand made. When faced with this problem I used the following technique with some success: -

1: Cut off sufficient pieces of material for the work in hand plus some spares. Make sure the blanks are slightly larger than the required work pieces.

2: If buckled, carefully flattened the blanks as much as possible. This can be done in a smooth jawed vice or between two stout plates under a fly press.

3: Paint each piece with solder paint and warm up until they are all tinned evenly. Carefully wipe off any surplus blobs whilst still molten with an old cloth.

4: Build up a stack of parts and clamp them together. Do not use your best clamps for this work but rather springy, home made ones.

5: Warm up the stack until the solder runs. Add more solder to fill any small gaps.

This procedure produces virtually a solid block that is much easier to hold than the individual thin pieces. It was found during soldering that the stack tended to come loose in the clamps. This occurred when the solder ran and the finite thickness of the solder layers reduced. It helped to use G-clamps bent up from 1/4in. x 1in. bright mild steel strip and fitted with 1/4in. clamp screws. These rather springy clamps had enough give to compensate for the slight reduction in the width of the block as the solder melted. It also avoided damaging my expensive bought ones.

Once I had my soldered up the block the required shape was marked on one end face and the profile centre punched for clarity. The whole was then clamped in the machine vice for milling. Care was taken to ensure that the block was held in such a way that if a soldered joint failed the block would remain clamped. If the job is critical, and the shape allows it, it is worth considering adding pins or rivets to make sure nothing can come adrift. I sometimes made the parts over long so that rivets could be added to a part that was subsequently cut off. However you need to be careful that the vice jaws locate on the block itself and not the rivet heads.

When milling keep the marked line you are cutting to as close to the vice jaw as possible so that the cutting forces do not attempt to break the soldered joints. Some jobs may be longer than the vice jaws. If this crops up use some bright mild steel strip either side of the work stack in the vice

jaws as shown marked in black in the diagram. The lengths of mild steel should be an inch or two longer than the work and should be as stout as your vice allows. Very narrow work may tend to climb out of the jaws during milling, particularly if your vice is of a light type where the sliding jaw can lift. Under these circumstances the only way may be to mill the parts piecemeal, moving the block in the jaws as you proceed to maximise the grip from the jaws.

When milling take light cuts with a sharp cutter. Heavy cuts may tend to bend the extremities of the stack and throw up large burrs. Once you are satisfied with the shape on the block, carefully deburr it and then warm it up again to separate the individual components. Complete the deburring, clean off the solder and there you are!

Milling

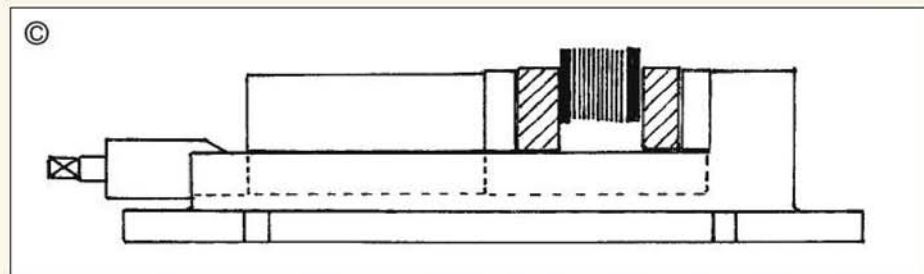
I am sometimes asked to advise on milling feeds and speeds. That is difficult to answer because milling machines vary enormously. The type of work handled by a typical model engineer also varies. The figures stated in catalogues and tables for cutter speeds and feeds assume that a heavy, stiff machine is available together with an adequate coolant supply. Anyone who has visited a production plant will know that industrial milling machines remove material at a colossal rate, so much so that special guards are needed to stop the operators being showered with coolant and hot swarf. Our machines cannot hope to work like that even if we wanted them to. The best advice is to mount your work as close to the table as possible and use a cutter, assuming the machine is of the light vertical type, that is as short as possible. It also helps to use a cutter of a relatively large diameter provided the work piece the speed range of the machine can accommodate it. If a coolant pump is available use it but, if not, you will have to make do with a brush or washing up liquid bottle as countless model engineers have done before you.

Use the recommended cutting speed for the cutter and apply a depth of cut of approximately 1/32 inch. Feed the cutter into the work gently using hand feed. If the depth of cut is too much

the machine will protest – perhaps violently. Reduce the depth of cut and try again. If all is well try increasing the depth of cut until the machine declares its distress. If the cutter speed is too high the chips will come off the work very hot (smoking) despite the applied coolant. Try reducing the speed to see if cutting becomes more comfortable. Working the machine too fast will often give a poor surface finish, wear the cutter and may cause the motor to stall. Try to feel what the machine is doing through the hand wheel you are using to feed the work. If you feel much resistance then ease off on the rate of feed. To be able to read the process correctly the machine must be in correct adjustment. If the slides are too slack chatter will almost certainly occur and the cutter may be damaged. Slides that are too tight make the controls insensitive and make it difficult to feel what is going on.

On light milling machines it is important that the cutter is used in up-cut mode i.e. the cutter is trying to push the work away from it. If used in climb milling mode the cutter will most likely 'grab' the work and a broken cutter and damaged work piece will result. Climb milling is used in industry but only on special machines that have slides with no backlash in the various axes. It is reckoned that climb milling uses less power and gives a better finish on the work but only if you have a machine that can cope with it. Definitely something you should not try at home!

Take particular care when using small diameter cutters. High speed steel is rather brittle and feed rates should be reduced to preserve what can be an expensive item. In my experience such cutters rarely fail and throw the debris across the workshop. Usually the broken piece sits in a puddle of cutting fluid mocking you. When I was a youngster broken cutters were reclaimed by drilling out a piece of mild steel and placing the parts of the cutter in the hole with some Easyflo flux. Believe it or not the parts were then silver-soldered back together. It worked provided you kept the flame away from the tip. The cutter could then go on to do further work on soft materials. Our excuse was that high speed steel cutters were expensive in those days and not easy to buy over the counter. 



The set up for milling a stack of blanks in the machine vice. The members shaded black represent mild steel clamp plates placed between the jaws and the stack to support work which is longer than the vice jaws.

Neville Evans

now describes the tender buffers.

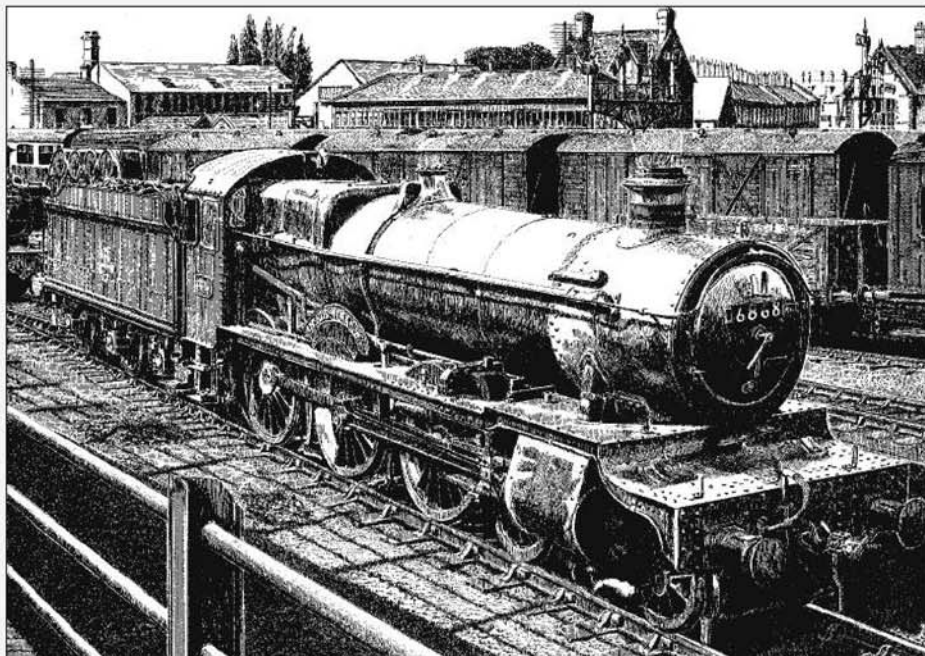
●Part XXII continued from page 208
(M.E. 4243, 19 August 2005)

As can be seen from the accompanying drawings, there were buffers on both ends of the GWR tenders. The rear tender buffers were of the same pattern as those on the front of the locomotives, which is why I decided to hold the engine buffers over until I described both sorts for the tender. The traditional GWR tapered buffer never disappeared despite the introduction of the parallel-sided type by our Mr. Collett. The innards of both our small versions are similar in that they are both self contained, the only difference lies in the smaller diameter of the tapered version.

In the past I don't honestly think that it mattered a great deal whether you fitted strong or weak springs inside the stocks, as these items, in normal club passenger hauling, using a rigid bar from tender to front truck, were purely decorative. If however you pull passengers on the Nottingham track or elsewhere where they use a chain coupling, or on a ground level track hauling a load of scale wagons or coaches the situation may be totally different.

I recently spoke to Geoff Moore of the Guildford club on the subject and he was quite adamant in his belief that buffer springs should be powerful enough to withstand shock loads without collapsing completely. I have the utmost regard for Geoff and his views and therefore am specifying a spring for the parallel-sided type that has a compressive load of about 70lb per inch. Unfortunately that just isn't possible in the much smaller tapered buffer, so you'll have to content yourselves with using the strongest spring that you can get in.

The front buffers are perfectly simple turning jobs, which perform the function of absorbing shocks and also spacing the tender at the correct distance from the locomotive. They are set in rectangular plates that are rivetted to the buffer plates. The $\frac{7}{16} \times \frac{1}{32}$ in. washer can be soft soldered to the front as shown. The shank that carries the buffer head, simply runs in holes drilled in the front buffer plate and the front inner



PENRHOS GRANGE

stay. I have a slight phobia about over thick buffer plates. Both plates are therefore made from $\frac{1}{16}$ in. sheet as per the drawing. They will however be amply strong as they are well braced from the inside.

Tender frames continued

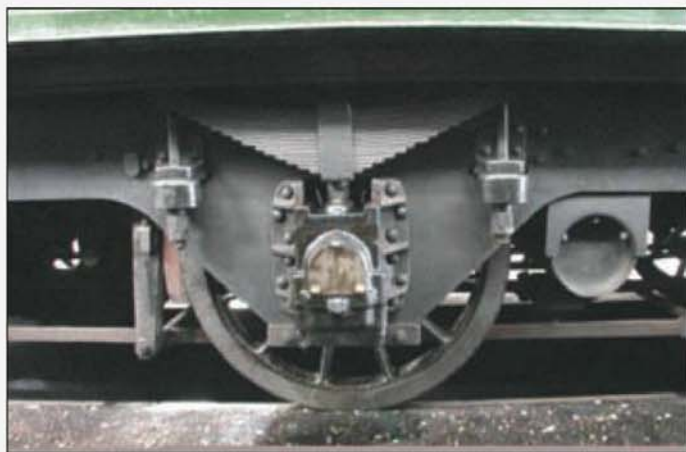
As I mentioned last time, nearly all the hauling loads are transmitted through the inner frames. It therefore behoves us to firmly attach the two blocks of whatever metal you decide to use to the inner frames. Incidentally, I would consider that aluminium alloy would be the ideal material in this application, it would add a great deal of desirable lightness to the tender and be amply strong enough. Henry Ford was once asked to explain his motor car design philosophy and replied, no doubt tongue in cheek, "*simplicate and add more lightness*". My sentiments exactly. The aforementioned firmness of attachment will be dealt with by using twelve 5BA hexagon headed bolts on each of the spacer blocks. If, instead of screwdriver slotted heads, we use hexagon headed bolts, or even Allen screws which are generally made of steel of higher

tensile strength than most 'bought in' fixtures, we have the ability to dismantle the blocks without having to take off the outer frames.

An important feature is that of the many small angles that hold the main and side members together. These may be fastened to the frames with $\frac{1}{16}$ in. round headed rivets. I have not shown all the necessary holes, but it is pretty obvious where the rest of them go. The angles have to be left out of the front and rear stays, as they would get in the way of the stay fixing bolts.

Tender drawbars

The problem with these artefacts lies not with their difficulty of construction, which obviously is not very great, but with the fact that if you have to separate the locomotive from the tender after every run, you will have to undo three links. A removable tender floor seems to be the obvious solution, though we are going to have to wait until Pete Thomas has got a bit further with the first engine to really see how it all goes together. Let us say that I do not anticipate a lot of snags (which can be a fatal sort of thing to say). An alternative is simply to use the central bar and



The centre axle of a 4,000gal. tender with late type frames and brake hangers.



A close up view of the Collett buffers and rear steps fitted on a 3,500gal. tender.

keep the other two for show.

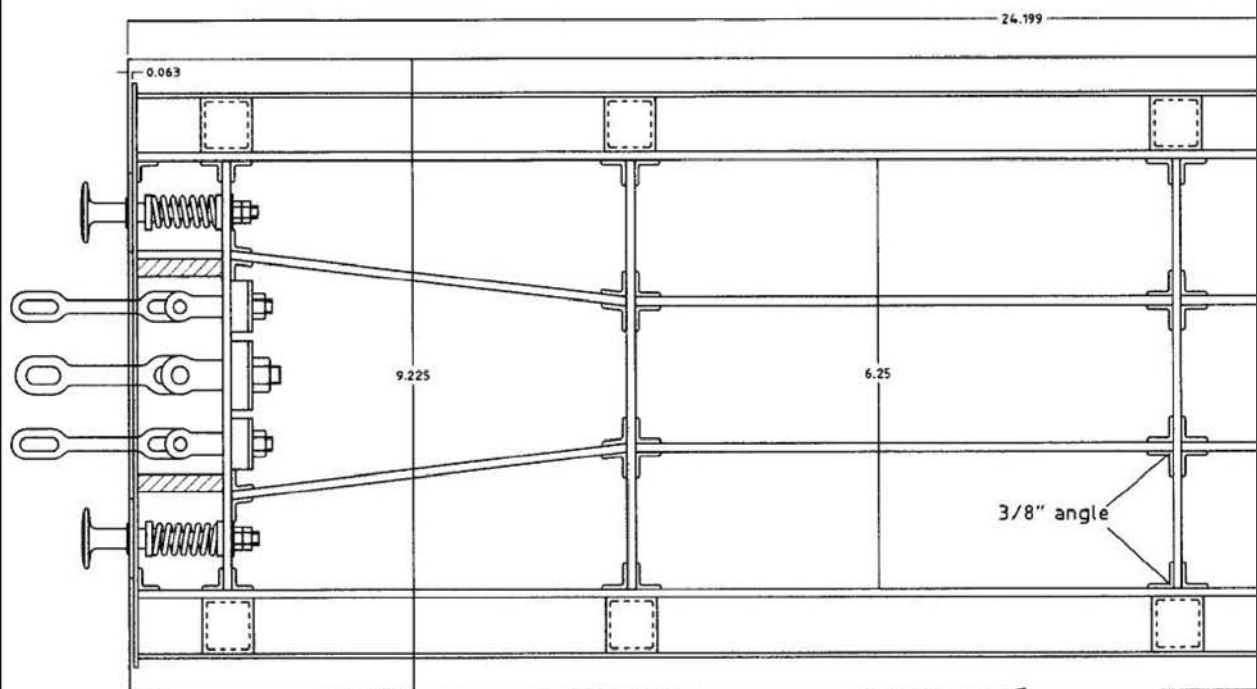
Tender wheels

The only remarkable feature of these wheels is that the strengthening boss is at the back of the wheel so that the axle box can be as close as possible to the front. These are Collett wheels, we shall also be making a pattern for the Churchward wheel in the nearest future. Note that there is no step turned into the axle to reduce the diameter where it enters the bearing, which is my standard fitment of $\frac{1}{2}$ in. inner diameter needle rollers. The axle is however reduced in diameter between the wheels.

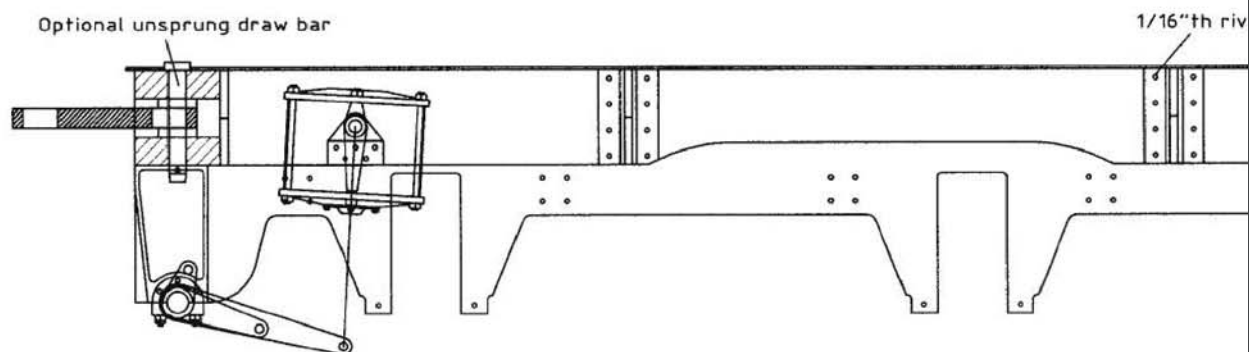
This prototypical feature means that Loctite can be applied more effectively where it is needed which is between wheel and axle, by the simple expedient of pushing the wheel onto the reduced bit, applying glue to the axle and to the wheel by means of a bit of bent wire or some such (I use a small Allen key). This is a bit of a fiddle but it means that you do not spread Loctite all over the bearing surfaces.

Readers letters

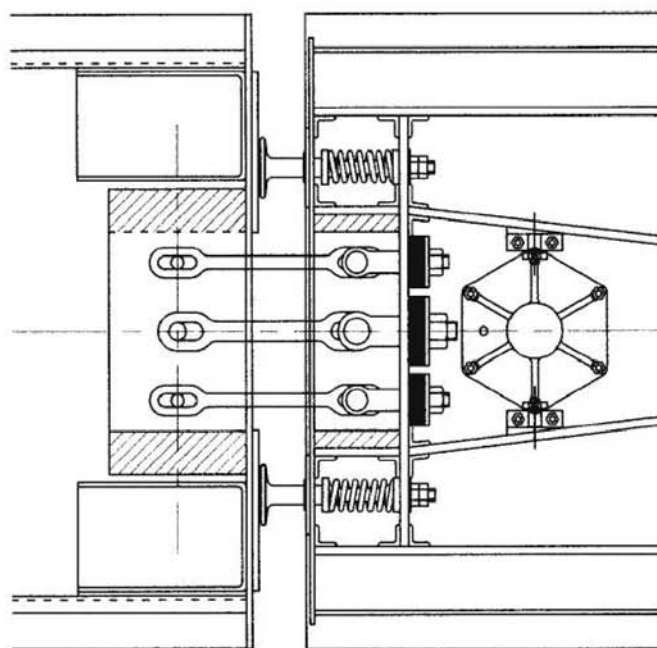
There were some very interesting letters in the last few editions of *Post Bag* notably that from Ketan Swali of Arc Euro Trade Ltd., who also advertise in the same issue (*M.E.* 4249, 10 June 2005). Mr. Swali can supply bearings for all of the applications that we need, and I must congratulate him on his enterprise and expertise in giving us all the information and products that we are looking for. While on the subject, please note that all the different manufacturers use different reference



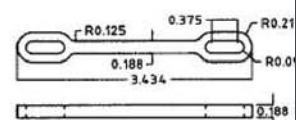
Outline of tender sole plate



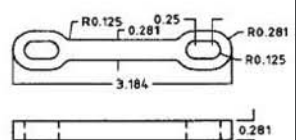
G.A. TENDER FRAMES & EQUIPMENT



G/A of draw bar arrangement

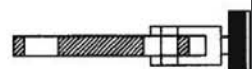


Safety bar 2 off BMS

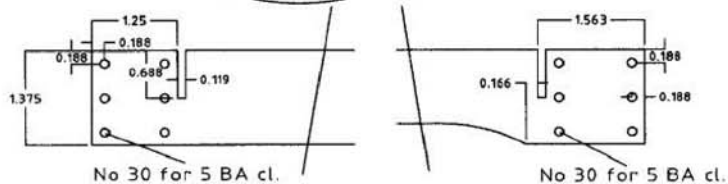
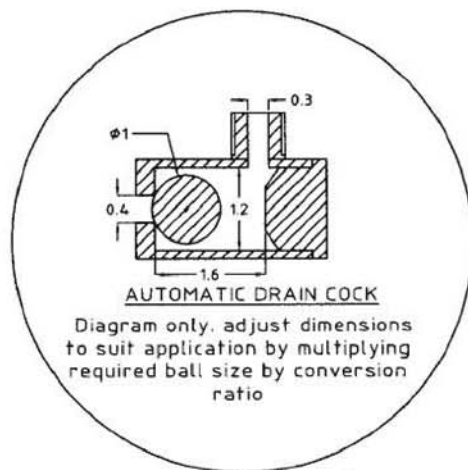
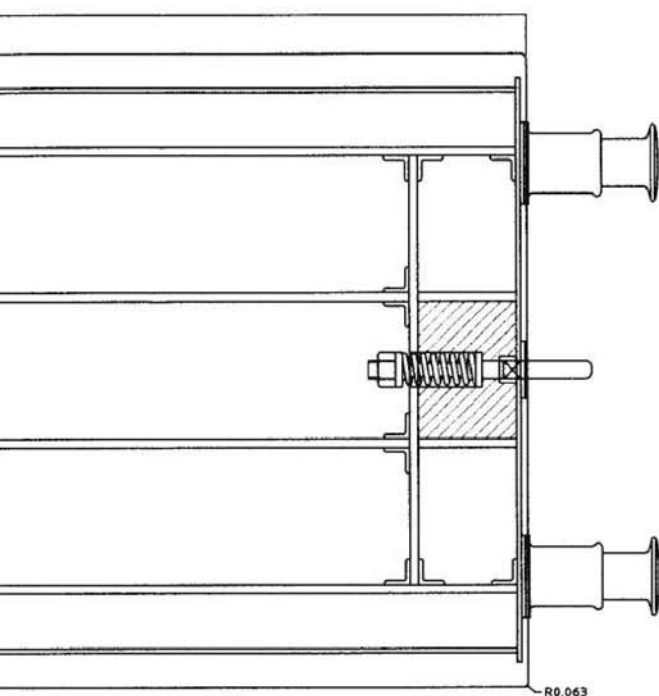


Draw bar 1 off BMS

TENDER

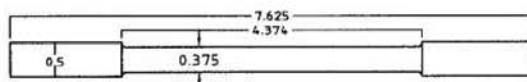
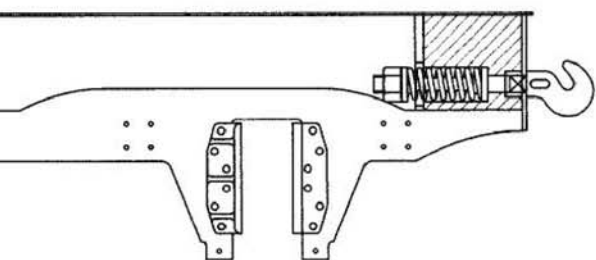


Sprung draw bar & clevis

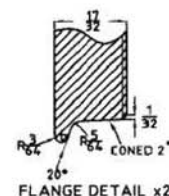
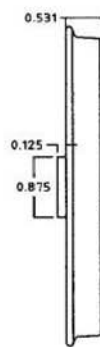
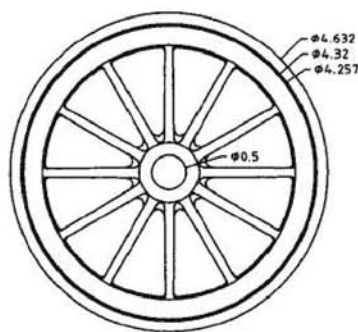


Shows fixing bolt holes in tender inner frame & stays

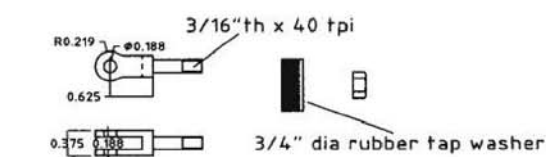
ets



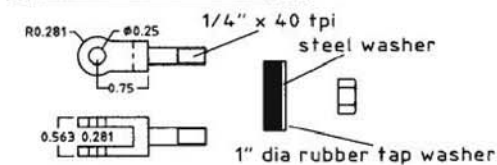
TENDER AXLE 3 off silver steel
Set wheels 4.685" back to back



TENDER WHEEL 6 off Iron casting

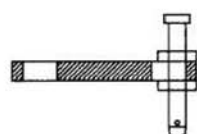


Clevis Safety bar 2 off BMS

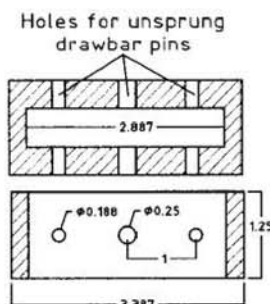


Clevis Draw bar 1 off BMS

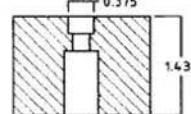
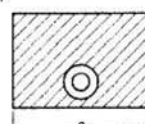
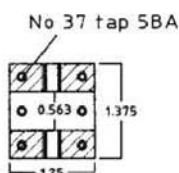
DRAW BAR & SAFETY BARS



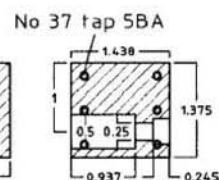
Alternative draw bar & pin



FORWARD FRAME STAY



REAR FRAME STAY





Jim Ewins' famous 0-6-0T based on LBSC's Minx running as well as ever at Cardiff this year.



Ron Bignell's new Rhymney Railway 0-6-0T on its first outing. A lovely engine that goes as well as it looks.

numbers for the same product. I suggest that you obtain a catalogue from your chosen supplier and order from that. If you will take my advice do not go for lubricating holes in needle rollers of this type. Too much lubricant is worse than too little. Use an appropriate grease on assembly, fit and forget until the next general overhaul.

On the subject of catalogues, Mr. Rea is quite correct in his preferring gauge plate for the manufacture of slide bars, which is why I invariably specify it for this purpose. This lovely material can be supplied in a large variety of sizes. If you ask your friendly, local, metal stockist nicely he will no doubt give you a hand-out describing exactly what is available, together with the prices thereof. Do not harden it as it is quite hard enough, and also tough enough, which is probably more important.

May I commend to all our readers, the letter from Alan Aldridge, in *M.E.* 4251, 8 July 2005. It has always seemed to me that British Railways with their innate conservatism and dare I say, lack of design expertise, were simply unable to design a Pacific with cast steel frames or to do what was done on the Continent, and certainly in Germany for many years, which was to use the superior bar frames. BR merely did the obvious thing and modified the Bullied Merchant Navy to use two cylinders instead of three. All the best ideas such as mounting the hornblocks in the centre of the frames, suspending the guide bars in the centre instead of both ends, the ash pan arrangements and many more, were retained and were either straight Bullied or they came down from the great William Stroudley via Dugald Drummond from the LSWR. As to even mention the name of Oliver Bullied, who was the best locomotive designer in Britain at the time, was an absolute anathema, his many achievements were played down and every opportunity taken to rubbish the design of his *Leader*, which with development and an oil fired boiler could have been a winner. The concept of this engine was in fact quite brilliant, although it must be said that the writing was on the wall by the 1940s and BR were really marking time waiting for the introduction of the Diesel.

An informative letter from Duncan Webster, another telephone acquaintance of mine whose words always merit close attention. Further to his remarks concerning axles, I am reminded that



A 'Castle' nameplate splasher, not a thing normally photographed off the locomotive.

when I was making replica 'cammy' Norton motors, I hit upon the idea of using what the Americans call 'dowel pins' as pivots for my rockers. I ran reciprocating, crowded needle rollers contained in drawn cups and pressed into the rockers. In other words exactly what we are talking about now, except that we now use caged



Another view of the 'Castle' splasher. Note the reach rod steady and indentation.

needle rollers. If you are wondering what I mean by 'crowded' the advert from Arc Euro Trade on the second advertisement page (*M.E.* 4249, 10 June 2005) carries a good picture of both types in the middle group of bearings. The two, top bearings are caged, the bottom one is crowded. The basic difference is that the crowded bearing will carry greater shock loadings and weight, whereas the caged bearing has less friction. For our purposes the caged variety will do all that we require. I must add that these dowel pins gave every satisfaction, working as they did in an extremely fraught environment. To my knowledge none has given the slightest trouble over 20 or so years of hard use.

Dowel pins are manufactured by INA bearings in Llanelli, among others and may be obtained from your friendly neighbourhood bearing stockist. They are supplied in a suitably hardened state, in many sizes including $\frac{1}{2}$ and $\frac{3}{4}$ in. and can be ordered in appropriate lengths for our needs. From my experience of this product, it should prove to be the ultimate axle material for our needs. Expect to pay about £5 a length, when your axle worries will disappear. If you have any problems, then talk to Martin at 'Antifriction' on (01792) 771171, who will sort them out for you.

Automatic drain cocks

Mr. Colin Roberts enquires in *M.E.* 4252, 22 July 2005 about automatic drain cocks. As it happens I am just making a set for the GWR 1400, following the precepts that I set out in May 31 2002. These desirable features also do away with the necessity for snifting valves or pressure relief valves on the end of cylinders. The principle is that under pressure, the ball valves seat normally over the exit holes, unless water is present. In this case the balls are lifted off their seats presumably by the turbulence of the water and do not reseal until all the water has been expelled. I have tried it and it works a treat. I have given ratios instead of dimensions, based on a unit diameter of the ball. Obviously size will vary according to the size of your engine. Please do not take these ratios as being finite, slightly different ratios may suit different applications. In the 1400, with 1.25in. dia. cylinders, I shall be using $\frac{1}{8}$ in. dia. balls and anticipate no problems.

●To be continued.

Stan Nipper and Martin Wallis clear up some unfinished business from last time before discussing the alternative copper locomotive boiler.

●Part XIII continued from page 217
(M.E. 4254, 19 August 2005)

Here we start with the drawing of the front boiler support plate and the boiler support plate carried over from last time.

Copper boiler

My general rule of thumb is that copper boilers are fine up to about a 6in. diameter barrel but over that the plate thickness required and amount of material needed makes them uneconomic. Our locomotive boiler with a 7in. barrel ought to be a 'no' but since the barrel is shorter than usual, and a potential builder was keen to have a copper boiler it was decided to prepare a design.

I have been informed, and I have no reason to doubt it, that at least one supplier of copper boilers will not certify any copper boiler at a pressure exceeding 100 pounds per square inch. However, I am well aware that a road steam design of many years standing, of which numerous examples have been made with every satisfaction, has a 6in. dia. barrel, all the plates are $\frac{1}{8}$ in. thick, and it works at 110psi - so perhaps this particular supplier is being over cautious.

My instinct is always to 'play it safe' and the net result was a boiler in 0.177in. (or 4.5mm) copper with $\frac{1}{4}$ in. (or 6mm) copper stays at a maximum of 1.125in. centres. Since 100psi is not

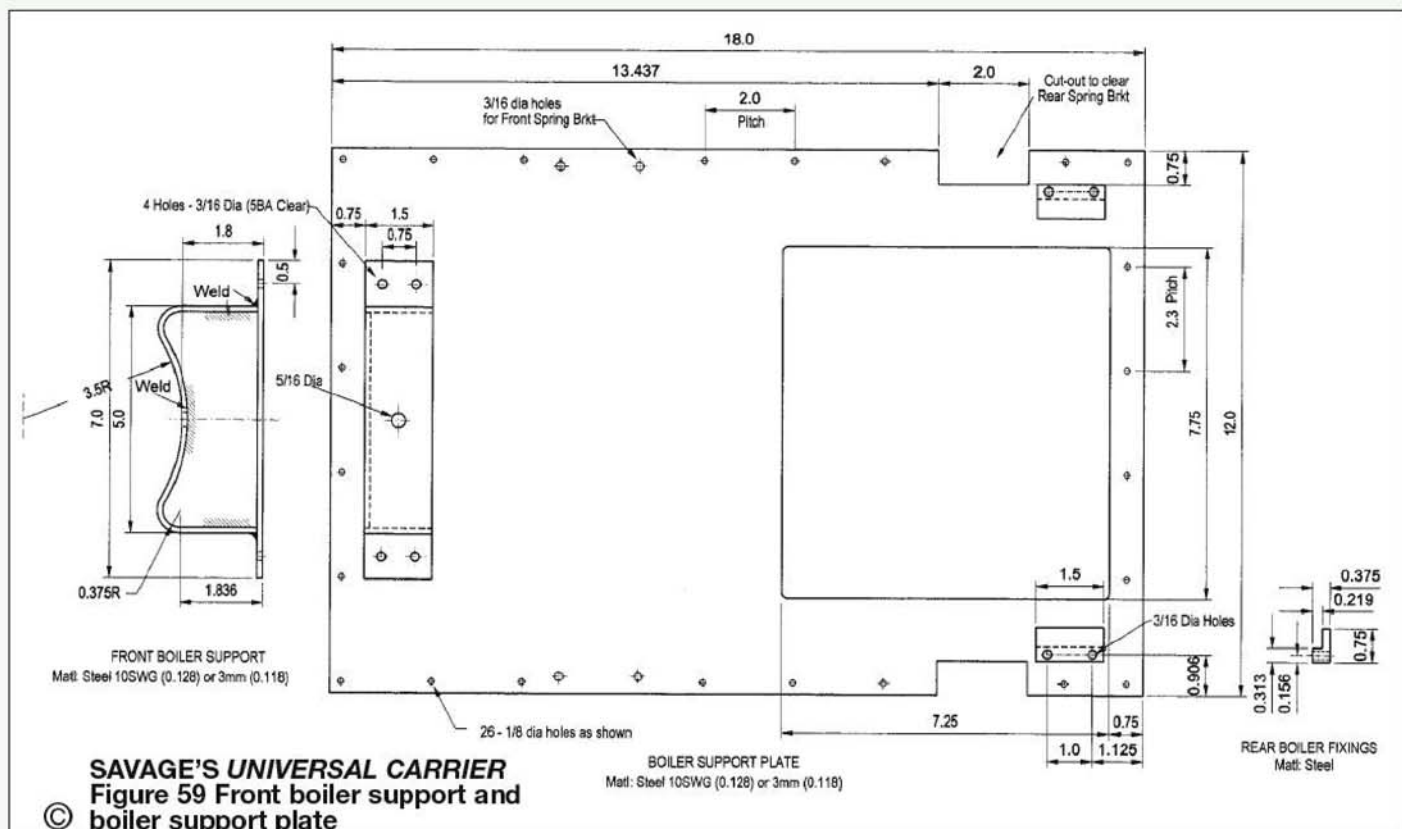


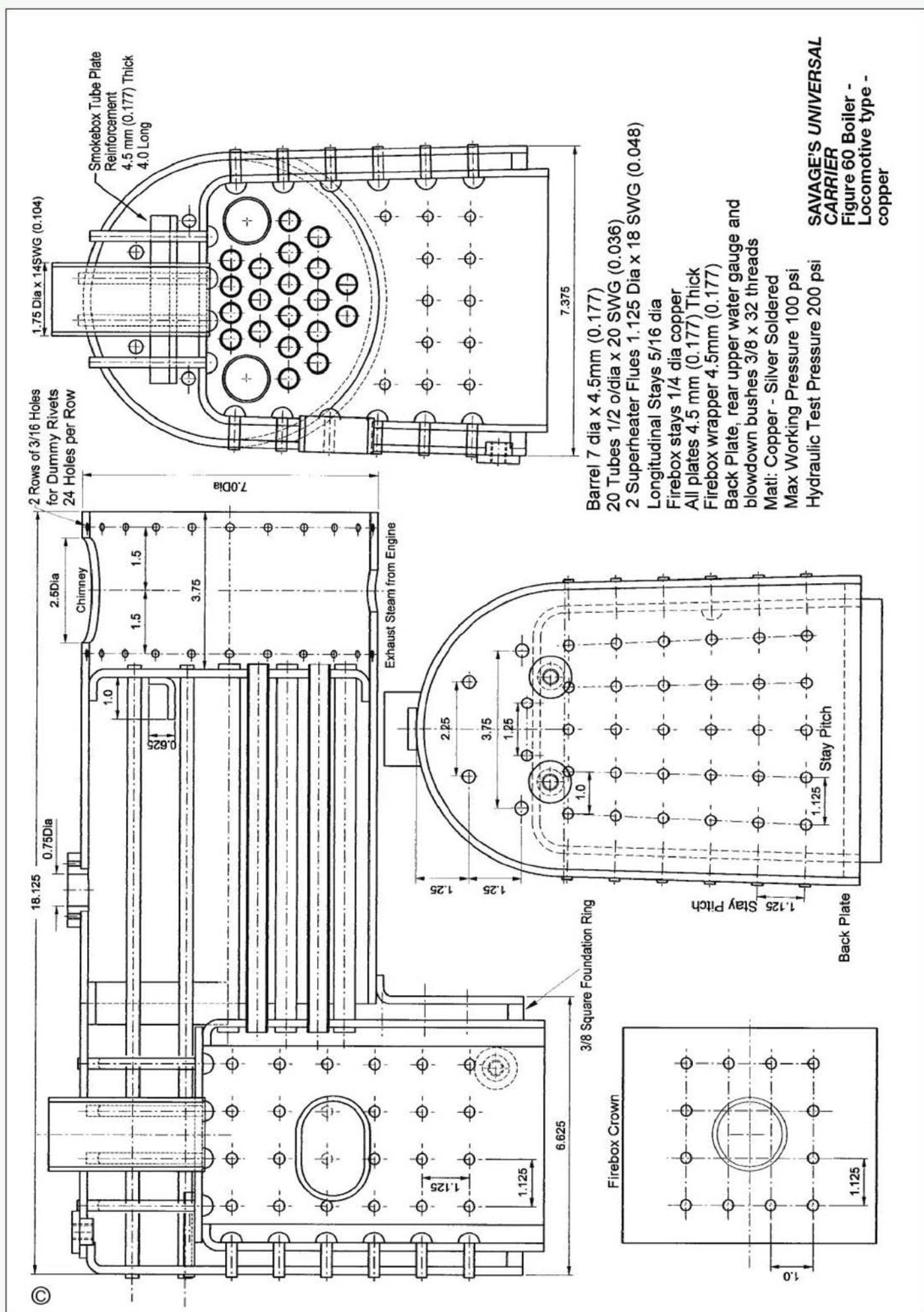
An early OA, A or A1 class Savage wagon fitted with a locomotive boiler and complete with a generator set for showman's use. It has been suggested elsewhere that the engine for the 110V generator is a duplicate of the one already fitted. We suspect this is true for the most part, but doubt if there is any need for it to be reversible. Note the Little Samson chimney cap and curved spoke steering wheel.

SAVAGE'S UNIVERSAL CARRIER

really enough to compound satisfactorily, particularly since the engine is remote from the boiler, superheater flues have been added to dry the steam.

I am keen to add that your authors, while they do have plenty of experience, do not consider themselves boiler 'experts'. The drawings were prepared and forwarded to a professional boiler







A 1¹/₂in. to the foot model of a Savage generating wagon which was made by G. D. McLeman and resides in Sir William McAlpine's private collection.



The other side of the model which is based on a 1904 prototype so the engine and change speed gearing are two separate units.

builder for his blessing, which happily the drawings got. If a wagon builder is purchasing his/her boiler from a manufacturer who is prepared to issue a ticket for a higher pressure, on the grounds the boiler is over engineered and perfectly safe to be pressed further, that is a decision for the customer.

The silver soldering of copper boilers have been cover twice before in *Road Steam*. M.E. 4051, 26 September 1997 and M.E. 4053, 24 October 1997 detail copper boiler construction and much of it was repeated in the *Little Samson* series so perhaps too much detail is unnecessary.

Key points

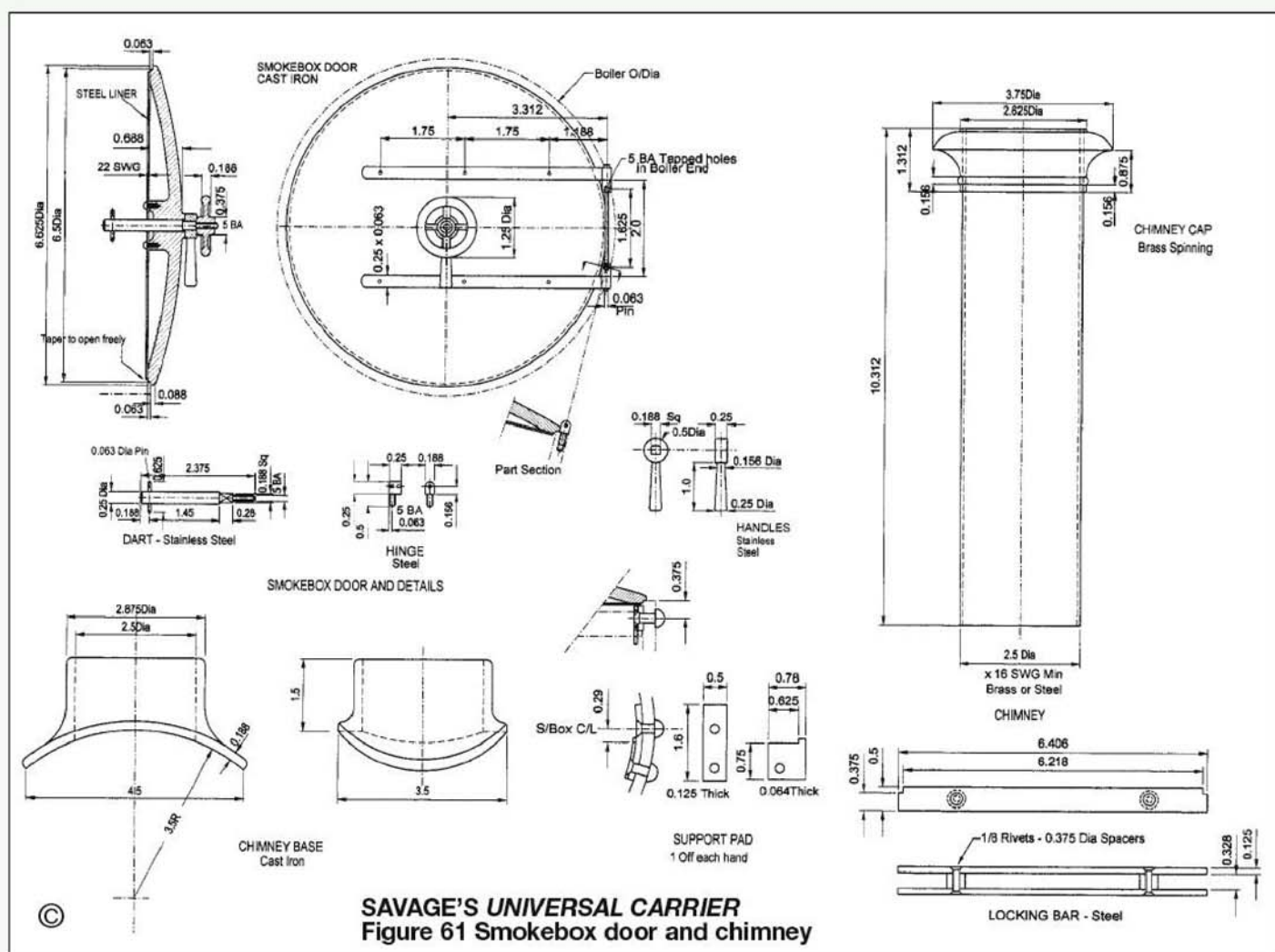
The key points for success are to make sure that the boiler plates fit together snugly, that they are clinically clean before any flux is added, and that the joints are nice and hot when soldering. It is very satisfying watching silver solder flash into a joint. The 'good fitting' aspect should not be underestimated as an imperfect joint will soak up a fortune in silver solder before it is filled, I know of one boiler that cost more in silver solder than copper.

The amount of heat required to silver solder a boiler of this size should also not be underestimated. Two substantial air/gas or

propane torches will be needed to get the boiler hot. Oxy-acetylene would be a great advantage as the joints may be warmed that last little bit individually and the silver solder flashed in. An evening class would be an ideal venue as school/college workshops are spacious and with any luck there may be two adjacent hearths so both air/gas torches may be utilised.

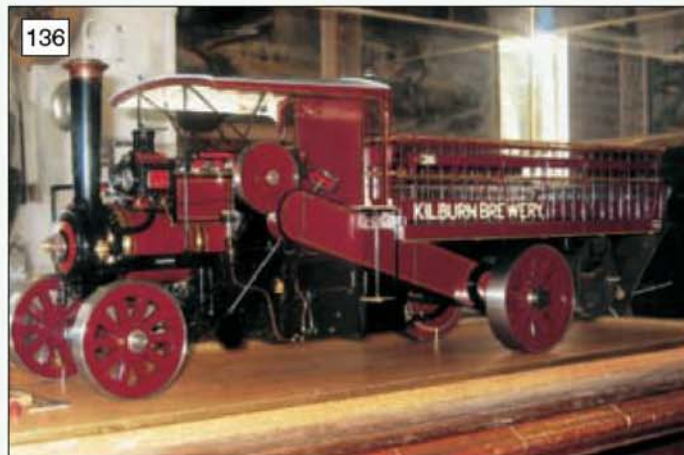
Sequence of events

A bit of forward planning is likely to pay dividends. Each silver soldering operation should be planned in some detail beforehand, for example the boiler may well need to be turned over part way through so two





The attention to detail on the model, which was built in 1981, is stunning. The photos in this article were taken by Rod James.



Also in the Sir William McAlpine collection is this charming Burrell, presumably by the same builder.

sets of tongs should be laid out ready. Likewise when it is time to silver solder the back head in place the boiler will need to be stood on its front tube plate, will it balance there safely?

Smokebox door and chimney

The smoke box door and chimney are recognisably *Little Samson* varying only in dimension. Unfortunately, since in size they fit almost exactly between the 3in. and 4in. to the foot *Little Samson*, new patterns have been made. However, since there is happily no taper on the chimney the 3in. to the foot *Little Samson* chimney cap is a perfect fit.

Risk assessments

Last time the suggestion that 'risk assessments' were part of a new boiler's paperwork was picked up by a few readers. My understanding was, and is, that commercial boilers should arrive with a variety of such assessments as part of the routine paper work, relating to the boiler's installation and subsequent operation. However it seems that, according to some, the notion of a 'risk assessment' on a boiler is another 'health and safety' intrusion imposed on our hobby.

It is certainly true that an increasing number of traction engine rallies ask for appropriate 'risk assessments' when running model engines, for example the Great Dorset Steam Fair require a risk assessment for all models in steam.

I only have experience of courses/qualifications appertaining to school teaching, i.e. the use of a bandsaw, metal lathe, aluminium casting and so on. However, in the hope of not upsetting the professionals, a brief explanation of risk assessments might be useful.

Quantifying risks

Essentially a risk assessment is a way of quantifying (putting a value or number on it) of a potential danger or hazard. To arrive at a risk assessment for any activity or situation there are two numbers that are multiplied together. Firstly the severity of an injury and secondly the probability of such an injury occurring.

If the severity is marked out of 5, where one is a minor inconvenience (small cut/bruise/burn) and 5 is very severe (casualty/ambulance/hospital); and the probability of such an injury is likewise marked out of 5 - where 1 is very unlikely and 5 is highly likely. Some examples might run like this:

1: Children using a hot-melt glue gun in school. Severity 1 (small burn, run finger tip under cold tap, offer sympathy).

Probability 5 (highly likely - they are children)
Assessment is $1 \times 5 = 5$, which may be considered an acceptable risk

2: Crossing the road.

Severity 5 (fatality)

Probability 1 (very unlikely - we all take care, look and listen)

Assessment is $5 \times 1 = 5$, which is acceptable - we all cross the road

3: Turning brass in lathe without goggles.

Severity 4 (possibility of serious eye damage).

Probability 4 (likely, brass swarf flies everywhere).

Assessment is $4 \times 4 = 16$ which is an unacceptable risk.

4: Leaving a model in steam unattended.

Severity 3 (finger trapped in motion, hand burnt on pipe/chimney/smokebox)

Probability 3 (pretty likely - children are fascinated by steam models)

Assessment is $3 \times 3 = 9$, which is an unacceptable risk.

The above may be seen as common sense, which of course it is. To some extent therefore these risk assessments therefore do no more than attempt to deal with our brethren who are lacking in the common sense department, and we all know a few of them!

Recording such 'risk assessments' is part of every day life for many professions these days. My understanding is that clubs and societies are also increasingly expected to provide these assessments for open days, public running, use of the club workshop, and so on.

Control measures

These are measures taken to reduce the risk, a good example being the turning of brass mentioned above. If in a club workshop a large sign was put up saying 'Goggles must be worn' adjacent or behind each machine, given that all the members can read (a fair assumption), the risk involved may be re-categorised as acceptable.

The old adage 'prevention is much better than cure' is what risk assessments are all about. The identification of risks and, through control measures, taking constructive action to minimise them.

Children on site

One of the pleasures of public running days at clubs up and down the country are the children who, with their parents, are always made welcome. Running days both boost club funds and offer a pleasurable and educational experience for so many young

people. At a recent club AGM a member reported on the prospect of clubs requiring a 'designated child protection officer' and the suggestion that all the members actively mixing with young people should be 'police checked'.

What does this mean? It is certainly the case that many sports clubs have a 'designated child protection officer' and referees/trainers/coaches are 'police checked'. The notion of a 'designated child protection officer' is not complex, it is simply a club member taking responsibility for 'child protection' and having his/her name and contact details on the club notice board and news letters so he/she can be easily contacted.

Should any club member, or anybody else on site, feel 'uncomfortable' with the conduct of any individual there is a 'designated person' to speak to. My understanding is that if any club member was aware, or had good reason to suspect, that any 'inappropriate behaviour' was taking place it is a legal requirement to inform the 'designated child protection officer'.

If there is felt to be any substance in any such information received the 'designated child protection officer' then has a duty to inform Social Services or perhaps the police.

Police checked

All teachers, social workers, and professions with regular contact with young people are required to be police checked. This is a simple service, costing I believe either £28 or £33, where police records are accessed for any criminal convictions. I am confident that there would be no need to police check every club member, but, to show willing, perhaps the designated 'designated child protection officer' and the club chairman might not object too strongly to this minor personal intrusion? It is a one off payment and not a rolling cost.

I am not sure if these notes will raise comment or not. I trust they are helpful and if by omission or error are incorrect I trust a reader or two will write to *Post Bag* to put the record straight.

●To be continued.

Drawings and castings

Drawings and castings for the Savage Universal Carrier are available from:

Little Samson Models, 38 Wheatsheaf Way,
Linton, Cambridge CB1 6XD
website: www.littlesamson.co.uk
e-mail: edward@littlesamson.co.uk
Bell Boilers may be contacted on 01452 722211



1
Comprehensive set of iron and brass castings as received from the suppliers in the USA.



2
Using a slitting saw to remove the risers from the underside of the main engine base.

BUILDING THE RED WING MOTOR CO. AIR-COOLED ENGINE

Jim Service

describes how he built this delightful farm engine using castings supplied from the USA.

●Part I

In 1912, the Red Wing Boat Manufacturing Company of Minnesota became the Red Wing Motor Company and introduced a 2½hp air-cooled, farm engine. Only this model was air-cooled. All subsequent were water-cooled, hopper engines. The frame and cylinder were remarkably similar to engines concurrently being manufactured by Gade Brothers, Iowa. So badge engineering or, more likely, copycat engineering flourished in those days.

To my mind, the concept of air-cooled engines on farms makes a deal of sense. These engines had to operate in the open air or at best in unheated out-buildings. The prospect of frost damage in North America must have been very real. For this reason, I am surprised that there were not more air-cooled units. However, although they did not have anti-freeze as we know it, they did have moon-shine and what a marvellous excuse when Mrs. Farmer started poking around in the barn: "need that for the engine, Honey!"

As far as is known, no examples of this engine exist today. The model Red Wing hopper engine, also by Jim Foster of Minnesota, is very elegant and a hard act to follow. I cannot say the air-cooled version is quite as attractive, but it does represent an unusual engine and is fairly easy to construct.

My kit came from the US. **Photo 1**, shows the castings as received. The main parts are good quality cast iron, and auxiliary items are brass castings. The kit also includes all the springs, spark-plug and even finished piston rings.

The manual with the kit shows some stages in assembly, so I do not intend to bother with too many others. It has to be admitted, that some of my set-ups look a bit flimsy, but we are trying to build a fairly hefty model on light machinery. For

this reason, I recommend very light cuts, slow feed and sharp tools. Owners of Bridgeport milling machines, Dean Smith and Grace lathes, etc. can adopt a much more robust approach to the build. I do place a lot of emphasis on using the index dials on the milling machine to locate milling and drilling operations, always of course, using a centre drill to start things. Do this and you cannot go wrong. Mark out by all means, but only regard your marking as a guide.

Main engine base

I did not intend to fit an integral fuel tank as I prefer my engines to run on butane. However, I did need a means of clamping that side of the base, so a ¾in. BSW hole was drilled and tapped at the take-off point of the fuel tank; this will be plugged later. After rough grinding, the base was then clamped on the mill as shown on photographs. Packing was inserted here and there as required in order to get the base reasonably flat for machining.

Photo 2 shows the excess cast iron risers being removed by a slitting saw. Most people would say this can be done with an ordinary hacksaw. True,

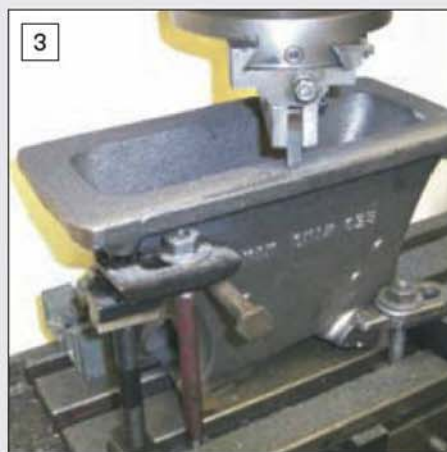
but when you get to my age, any physical exertion that can be done by mechanical means gets done by the machine.

The M.E. facing tool was used as in **photo 3**. Alternatively, a small fly cutter would do the job quite well (maybe a bit slower). On my set-up, the tool was rotated at about 100rpm, with depth of cut limited to 0.01 to 0.015in. per pass. The table feed has to be fairly slow. After machining the base perfectly flat, the front and rear end were machined straight, using an end mill as in **photo 4**. This provides a register for other machining operations.

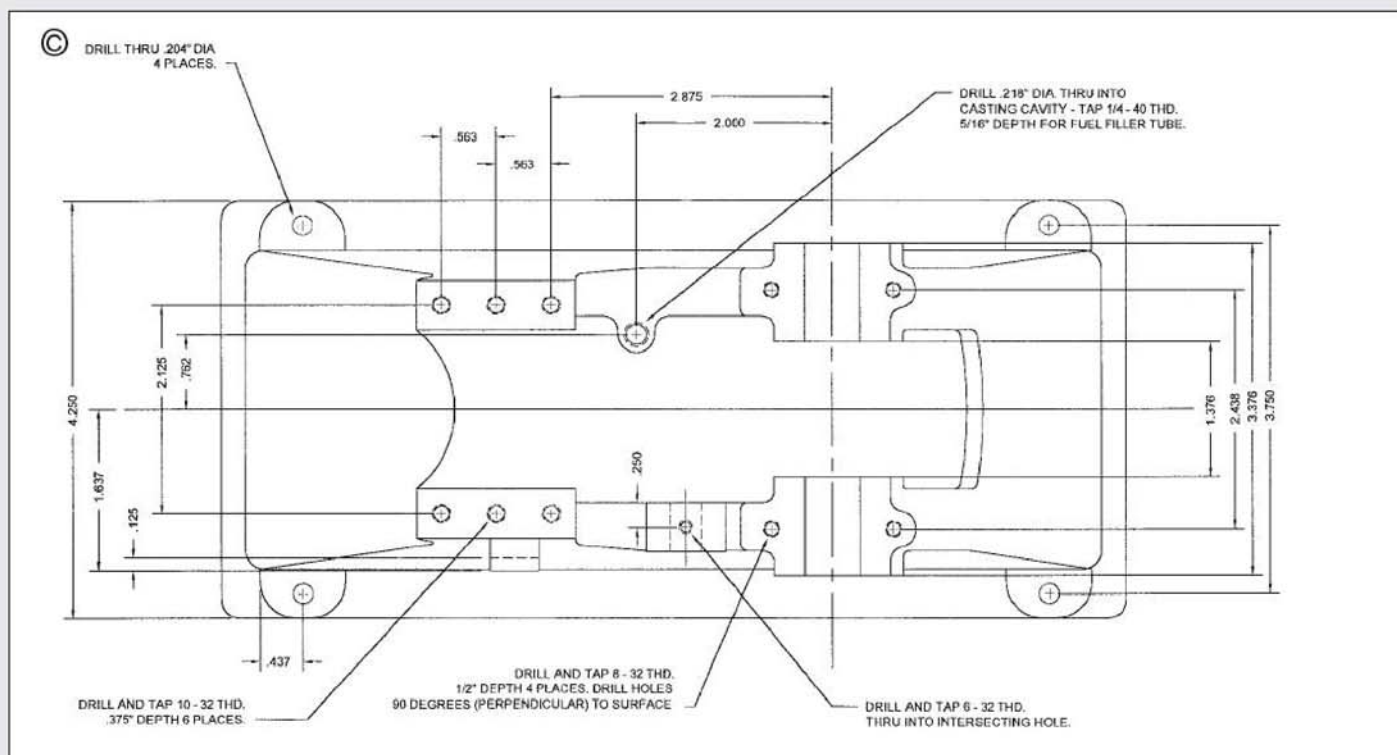
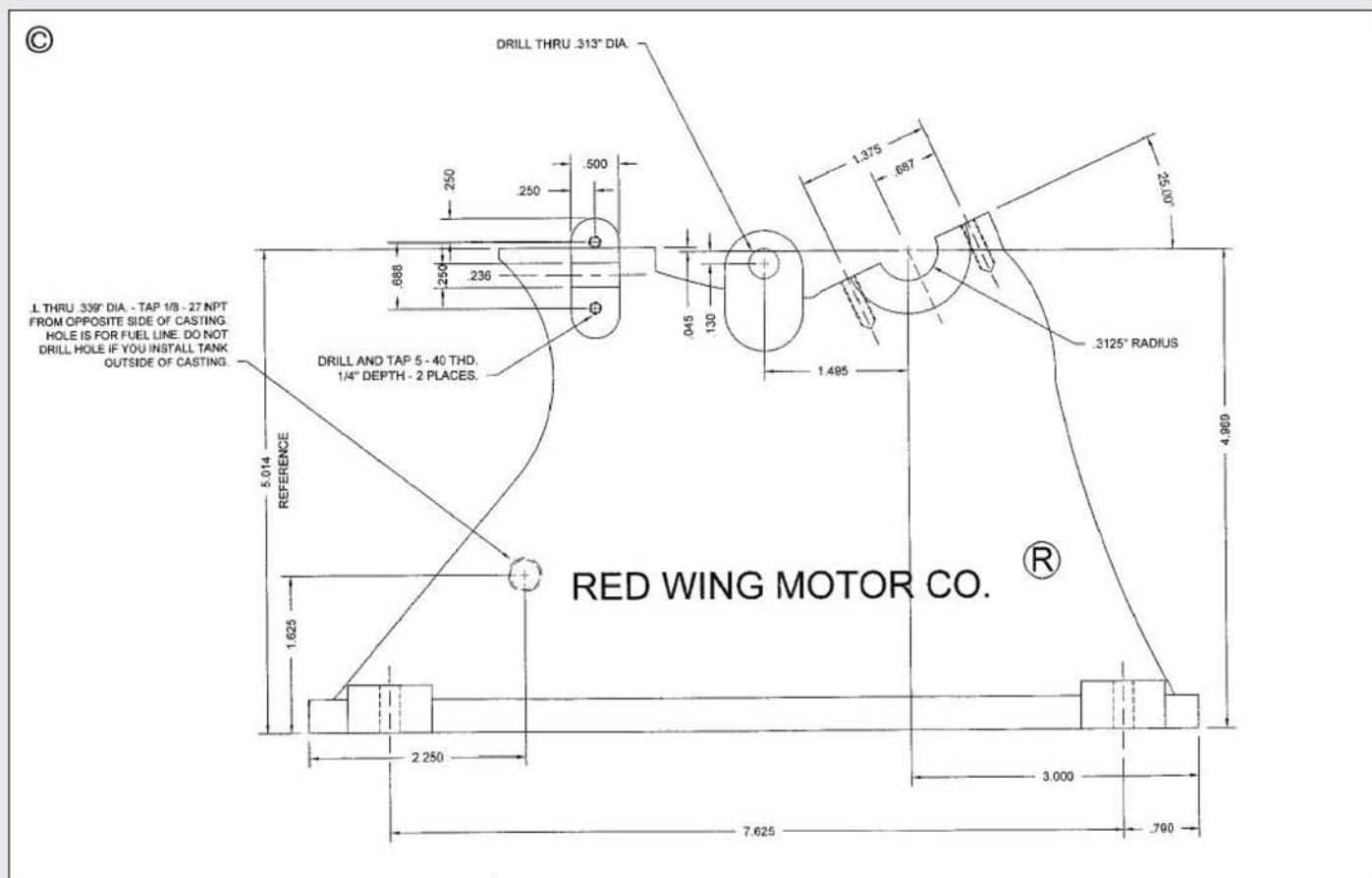
The holes for the holding down bolts were drilled and spot-faced using the cutter shown in **photo 5** (spot-facing is not necessary but it looks better).

Two 3/16in. dia. dowel-holes were drilled in the centre of the bottom of the casting exactly 8¼in. apart (best achieved by using index dials). These holes are important as they provide a means of centring the casting for later operations.

The crankshaft height was then marked off using a scribing block on a surface plate. Note the distance 3in. shown in the drawing between the crankshaft centre and the front end of the casting is nominal only. The aim is to get the bearing holes as near as possible to the centre of the bosses, and take all other measurements from there. Two straight edges were bolted at right angles on the milling machine table, approximately 7in. apart. The casting was tilted on a 2in. high, 3in. wide, by 2½in. long box angle-plate (Eclipse no 321- anything similar will do). The casting was then adjusted to 25deg. by moving the front straight edge onto the previously machined front-edge of the casting. It was then clamped with one clamp on the crankshaft well and the two others at the rear as in **photo 6**. Both bearing pedestals were machined using a fly-cutter. A shell mill would be better, but I do not have one. As it was, the fly-cutter had to be very sharp with a speed about 120rpm, slow table travel and down feed on each cut, limited to 0.01 to 0.015 inches. The surfaces were then taken down to the previously marked height.



3
Machining the base with the M.E. facing tool. A fly cutter could also be used.



The bearing caps having previously been taken down to correct height (this can be done on the milling machine or in the 4-jaw chuck on the lathe) were glued in place, using Araldite as in photo 7. The bearing fixing holes and oiler holes were drilled and spot-faced as in the photograph. The bearing caps were then knocked off and the base holes tapped 3BA, using the milling chuck as a tap-wrench to start them off perpendicular. The casting was then removed from the mill and both bearing-caps were secured with studs and nuts.

Next, two $\frac{3}{16}$ in. dia. dowel holes were drilled on the face of a 10in. long piece of machined angle iron at exactly $2\frac{1}{4}$ in. height and $8\frac{1}{4}$ in. centres (this was done using the index dials on the milling machine table). The casting was dowelled to this, using the previously drilled dowel holes. This I feel is the best method of ensuring the casting is held centrally on the milling machine table. I realise some builders for various reasons, may dislike this arrangement; for instance, the need for a suitable

length of angle iron, and reluctance to drill holes even if one is available. The alternative is to accurately machine the long side of the main casting to a known dimension from the centre. This should be done when the bottom of the casting is machined. I do not think this is as good as the dowels, but is the next best thing.

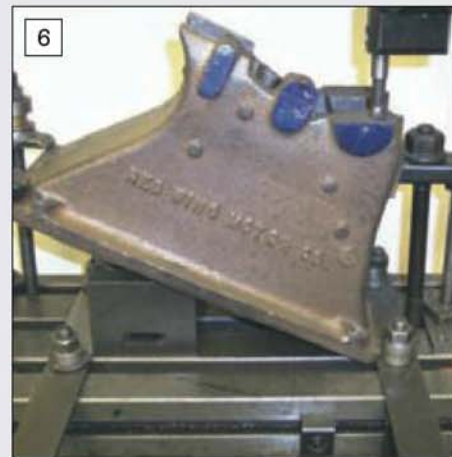
It was clamped as in photo 8 which shows the faces of the bearing block, the gear-pillar and the valve guide being machined to drawing dimensions. The 1-2-3 block on two $\frac{1}{4}$ in. tool



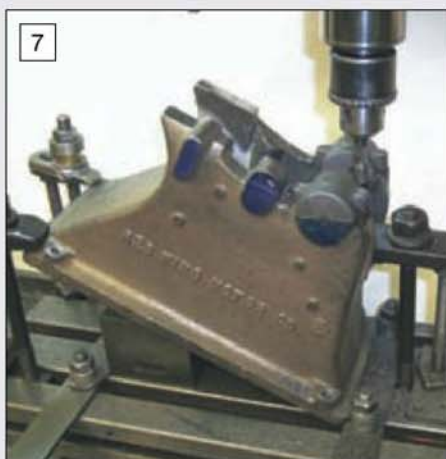
Using an end mill to clean up the edges of the flange on the main engine base.



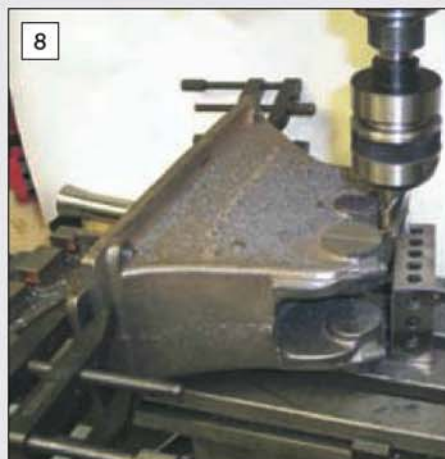
Spot-facing the holes for bolting the engine down on its mounting surface.



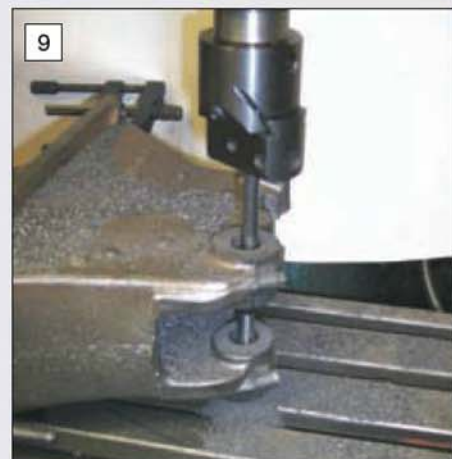
Fly cutting the crankshaft bearing cap mounting surfaces.



Drilling the crankshaft bearing cap fixing holes with the base casting suitably angled.



Milling one of the outside surfaces of the crankshaft bearings.



Boring the holes for the crankshaft bearings using an offset boring head.

bits is the centre reference for measuring the height of these items during machining. All heights were checked, using a depth micrometer.

Next job was the holes for the crankshaft bearings. Using the milling machine index dials, the casting was backed-off 4.969in. from the bottom. A scribe point held in the milling chuck was then used to locate the centre between main casting and bearing cap. As I have mentioned, the drawing dimension given is nominal only, the main point is to locate the drill on the line between the main casting and bearing cup.

The top hole was centre-drilled and taken out in stages to $\frac{3}{8}$ inch. Using a centre-drill fitted in

a short length of $\frac{3}{8}$ in. dia. mild steel rod; the bottom hole was centre drilled and taken out to $\frac{3}{8}$ in. by stages. Then, both holes were bored out to $\frac{5}{8}$ in., using a boring head as in photo 9. I was lucky enough to get $\frac{5}{8}$ in. exactly, but there is no need to worry, if the hole is a bit over-sized as the bearings have to be made to fit anyway.

The milling machine table was moved forward by 1.495in. and sideways by exactly 0.130in. as in drawing (index dials). These dimensions are very important and have to be correct to get the gears to mesh correctly. The gear pillar was then centre drilled, drilled and reamed $\frac{5}{16}$ inch. The table was again moved sideways and the $\frac{1}{8} \times \frac{1}{4}$ in. slot milled in the valve rod bracket as per drawing.

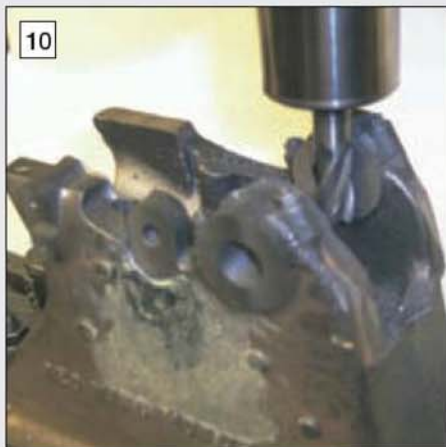
Three $\frac{1}{8} \times 1$ in. mild steel flats were laid longitudinally on the milling machine table; the centre one on top of the centre slot. This length was then securely bolted down at both ends. Again using the milling machine index dials, this was drilled for dowels exactly $\frac{8}{16}$ in. apart. The casting was then located on this, using its dowels and securely bolted at each corner. Using a $\frac{1}{2}$ in. end mill, the table was moved forward 0.438 inches and the inside face of the drive side bearing machined as in photo 10. The table was moved back 0.876 inch and the gear side bearing was also machined.

The rear pedestals were then machined to height and width, again using a $\frac{1}{2}$ in. dia. end mill. One pedestal was machined to within 0.015in. of the finished height; the other pedestal likewise. Both were then taken down to finished height at one setting of the down feed. Measuring the height is not easy, but can be done as in photo

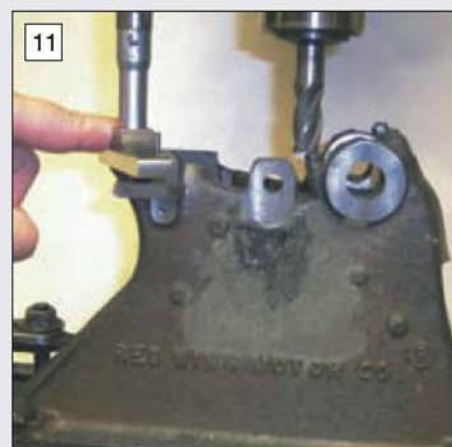
11. A $\frac{1}{4}$ in. tool bit is fitted into the previously machined slot. This slot centre is 0.281 inch below the cylinder centre height. With the $\frac{1}{4}$ in. tool bit in place, the distance between it and the top of the pedestal is 0.156 inch.

The cylinder fixing holes were then drilled and tapped to 2BA (if I did it again I would use $\frac{3}{16}$ in. BSF) on the co-ordinates indicated in drawing. The 4BA hole was drilled and tapped in the gear support pillar and the rear of same, lightly machined, to provide a flat surface. In the view of the fairly complex setting up, it is best to get all the machining possible done on this component at one go.

●To be continued.



Cleaning up the inside surfaces of the main bearing housings with an end mill.



Measuring the height of the cylinder support pedestals.

GWR LOCOMOTIVE BAR FRAME EXTENSIONS AND CYLINDER ARRANGEMENTS

Peter Rich

relates the results of his research into this hotly debated topic.

The view from the top of Machen Mountain on a warm summer evening is wonderful and it was while I was up there practicing a couple of hornpipes and jigs on the pipes the other day that my mind drifted off to other matters. It occurred to me that over the years, more often than not, most authors in our model engineering world who write about the Great Western 'Churchward' designs of 2-cylinder locomotives usually mention, rather unfairly in my view, the 'weakness' of his design of bar frames for the front end of the main frame of these locomotives.

Many model designers have shied off describing this aspect of the design of these locomotives in the belief that it repeats this weakness in their design. I was well into the hornpipe named Jim Tweedies Sea Leg (by J. Allan Macgee), which I am sure all readers are familiar with. It occurred to me that although the issue has been mentioned on a number of occasions it has not really been discussed in M.E. during the past forty years. Certainly I cannot recall anyone pointing out the advantages of bar frames in our model sizes so I thought I would throw my views into the arena and see if we can get some discussion going.

For those of us who are not too familiar with these locomotives the main frames for these

engines basically consist of normal steel plate frames from the rear buffing plate through to a point just to the rear of the cylinders.

However, in the case of locomotives fitted with leading bogies the plate frame was finished at a point to the rear of the rearmost bogie wheel. From here the frame continues forward with an 11in. deep x 2in. thick bar frame, attached with fitted bolts to the front of the plate frame, which ducks below the smokebox saddle, which was integral with the cylinders (see later notes), then rises to be attached to the front buffer beam as will be seen from included drawings.

Until the introduction of the 'Grange' and 'Manor' classes in the 1930s, in all engines the horizontal centre line of the bar frame was set at 2½in. above the horizontal centre line of the driving wheels however there was the inevitable exception to the rule.

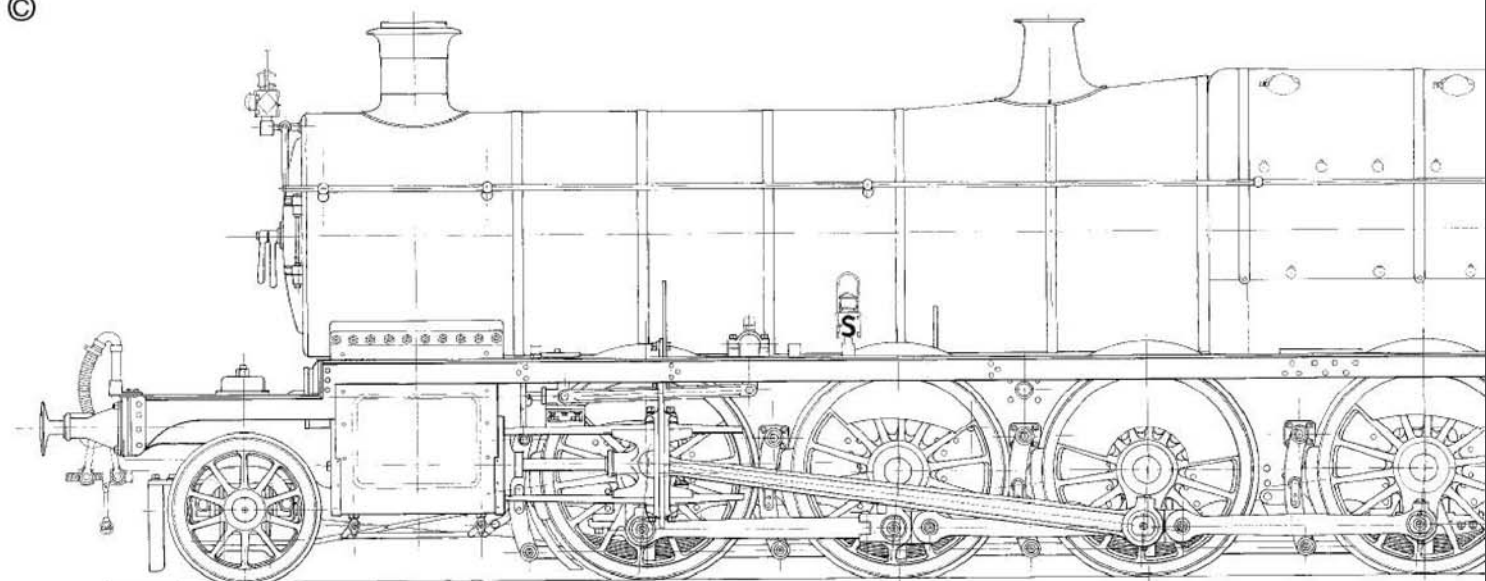
The smaller tank locomotives of the 44xx and 45xx classes were also fitted with bar frames but their centre line was about 3½in. above the driving wheel centre line but their cylinders remained at 2½in. above the driving wheels. With the 'Grange' and 'Manor' classes, because of their smaller driving wheels, the centre line of the bar frame was raised to 4½in. above the driving wheels in order to maintain adequate clearance over the bogie frame. This also caused alterations to be made necessary to the cylinders and valve gear on these two classes but I will not go into that now.

Purely for interest and to encourage discussion, I thought I would include my **drawing 1** of Churchward's prototype loco No. 97 in its original condition together with its 4,000 gallon tender. This is from my 5in. gauge designs and is included because it was the design of this particular loco that caused the horizontal centre line of the bar frames to be set 2½in. above the driving wheel centre line. This dimensional feature became standard on every class of 30in. piston stroke locomotive until the 'Granges' and 'Manors' were built in the 1930s.

Contrary to what has been written elsewhere, the raised cylinders and bar frame was nothing whatsoever to do with the clearance of station platforms, etc. After all, the Great Western had been mainly built to Broad Gauge dimensions so there was no trouble providing adequate clearances alongside station platforms. Besides the cylinders would have had to be placed considerably higher than the 2ft. 6¼in. cylinder height of the smaller wheeled classes if there was a problem clearing station platforms.

They were raised in order to provide adequate clearance within the loading gauge underneath the cylinders when this loco had worn wheel tyres and axlebox crowns (See *An Outline of G.W. Locomotive Practice, 1837-1947*, by H. Holcroft). I do not know how this was justified on later locomotives with similar sized driving wheels which carried the modern, up to date spring loaded plunger type

©



Drawing 1

cylinder drain cocks. The drawings for these show that the exhaust pipe from them touches the loading gauge even with new tyres and axleboxes. In this connection it is not generally known that 'Dean Single' No. 3021 *Wigmore Castle* was fitted up with wooden, dummy, outside cylinders, as per No. 97, and driven all over the system to prove the clearances involved (*Outline of G.W. Locomotive practice, 1837-1947*).

No.97 came into service in June 1903 and, unlike other G.W. locomotives of the time, was painted all over black, except for its red buffer beams, and was lined out in red lining in the style shown. As far as I am aware this was the only G.W. tender locomotive which was ever fitted with cab-side doors.

Further locomotives of this type were built from 1905 but these had their boilers raised by 8½in. and, on its overhaul in 1906, No. 97 was brought into line with these. In the 1912 reorganisation of numbers it was renumbered to No.2800 to become the leader of this famous class of freight engines.

The first production series of the 28s, Nos.2801 to 2820 were built in 1905 and now carried the familiar Middle Chrome Green livery together with Indian Red frames, cylinders and crossheads of the time. The 28s were regarded as one of the best, if not the best, freight locomotives ever built in our country and lasted right up until the very end of steam locomotives on the Western Region of British Railways in 1965.

I recall climbing on the footplate of No.2800 (old No.97) at Ebbw Junction Depot when I was a cleaner there in the mid 1950s, and can clearly remember that its drivers brake application valve was different to that on any other locos around at the time. In fact I have never seen another one quite like it so perhaps in this respect 97/2800 still remained an individual locomotive within its class.

Regarding the tender, this is one of twenty to the 1899 design by William Dean (works drawing 15680 refers) and it is not generally known that these tenders had their water scoop gear operated by a vacuum cylinder set up into the tender well tank. This was later replaced by the normal screw handle type but I am unable to say when this occurred. However Churchward's water tank alteration drawing No.15860, of 1914, for these tenders shows that it was no longer present.

In the full size preservation world, over the past ten years, it has fallen to me to produce most of the new working drawings for the conversion of the full size 'Hall' class locomotive, No.4942 *Maindy Hall* to the replica 'Saint' class locomotive, No.2999 *Lady of Legend*.

That is part of a project now being carried out by the Great Western Society at Didcot. I have done similar work for the full size *Betton Grange* project recently getting under way at Llangollen. Included in this has been the design of the new cylinders and bar frames for these two projects, together with the necessary plate frame alteration drawings necessary to convert No.2999 to a 4-4-2 in order to represent the locomotives of the 'Scott' class of a century ago. I am also currently involved in making the necessary frame, bogie and boiler alteration drawings to convert a 'Modified Hall' class to a 'County' class 4-6-0 which is intended to take place over the next decade or so.

Readers will probably know that both of these classes of locomotives had full length plate frames so I am sure, from this, it will be appreciated that I have had an insight into both types of mainframe from 'hands on' experience. This has involved me in a great deal of research into both bar frame and plate frame types of main frame also generally into all of the G.W. Churchward type two cylinder locomotives. This has been done to enable me to produce authentic

and historically correct drawings for replacement components for which the official Swindon drawings no longer exist.

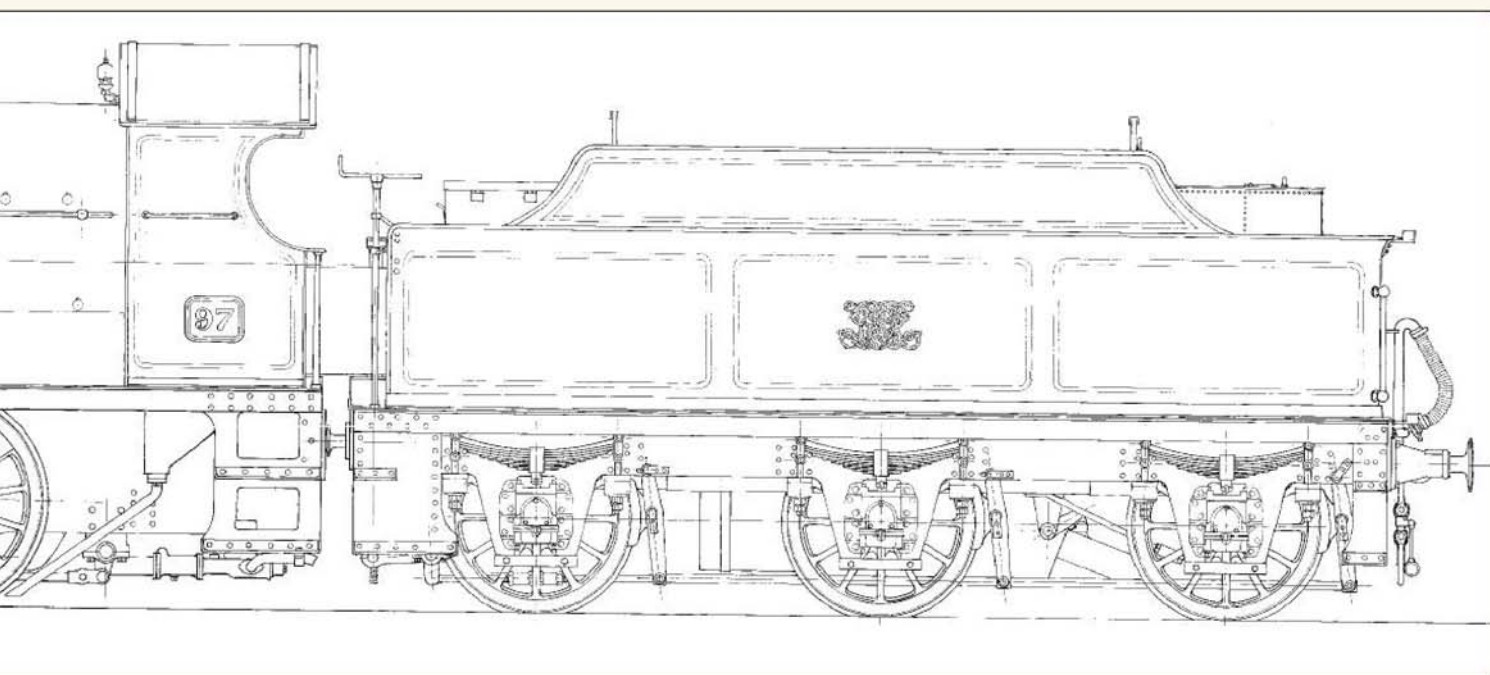
As far as I can see the G.W. never officially admitted to any weakness in the front end bar framing of its locomotives. In fact, having produced seven prototype locomotives with this type of mainframe in the period 1902/06 the Western went on to produce well over 1,700 locomotives of similar design which I think speaks for itself.

It is true that from 1908 on those engines with a leading pony truck, where the bar frame required a downward set to pass under the cylinders, strengthening struts from the top of the front buffer beam sloping up to the underside of the smokebox were fitted.

However, I believe this was more than likely an inexpensive 'belt and braces' job over most of the classes involved rather than any real need for greater strength. I am sure that if it was really necessary an easier and better method of providing strength was possible. Besides Churchward was a very competent engineer and wanted things right and I am sure that if he had any worries at all about this kind of framing he would have had it redesigned very quickly.

Where I think most commentators are making a mistake is that they only consider the bar frame itself and do not look at the complete front-end assembly. With the complete assembly of the bar frame, cylinders, buffer beam bracing and racking plate in place, in my opinion, it would be difficult to find a much more strongly constructed structure than the G.W. two cylinder front end.

Any 'weakness' is confined to the short part of the bar frame ahead of the cylinders which tends to be confirmed by photographs of damaged engines. The cylinders with their numerous internal bracings, both fore and aft and athwart, provided tremendous strengthening to the bar frames.



With one exception no locomotive with a leading bogie had these struts, the exception being loco No.4600 which was a one-off 4-4-2 tank loco. According to Harry Holcroft, who was at the Swindon drawing office from 1906, it was only the smaller 44xx and 45xx classes of 2-6-2 tank locomotives with their small wheels which suffered habitually from 'weak' front ends.

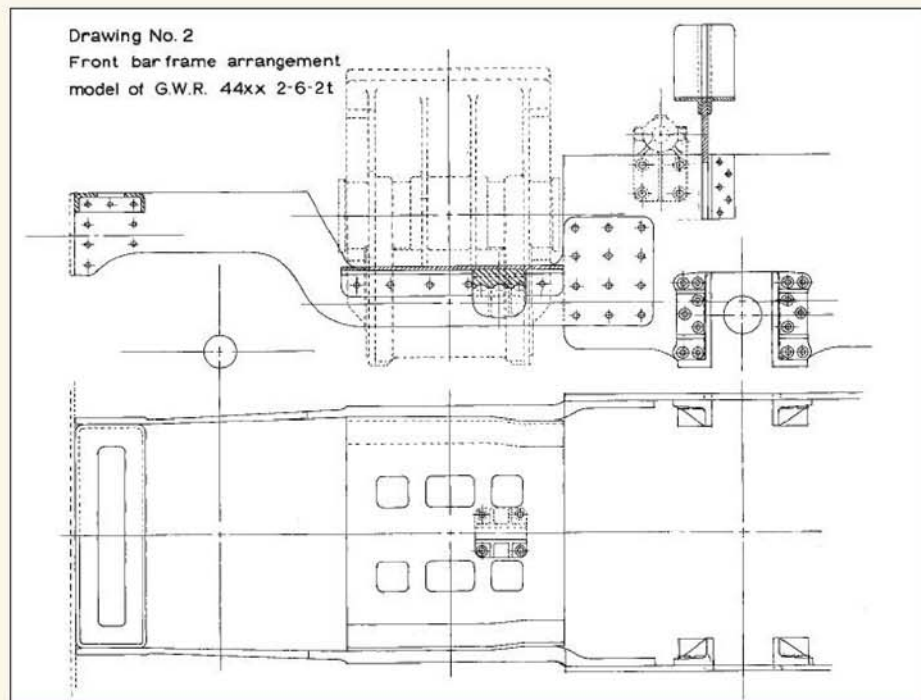
My drawing 2 shows a side view and plan of the bar frame as applied to the 44xx class and depicts the most severe downward set of the bar frame, which is probably the worst case scenario over the range of Churchward's locomotives.

If the bar frame was going to collapse then I am sure readers will see that the collapse would have been confined to that section of bar frame ahead of the cylinders (see later drawings and comments for illustration of how the bar frame was applied to large wheeled locomotives).

The locomotives of the 44xx class were built in 1905 without struts yet on some of these engines the support struts (see drawing of 4406 in a later article) still had not been fitted as late as 1924.

Locomotives No.4403 and No.4409 were cases in point. So, even with these small wheeled classes with their reputed 'weak front ends', the Great Western appears not to have had many worries about weakness in its bar frames.

Apart from accidental damage the only other way any bending weakness fault would have shown up would probably have been when locomotives were regularly used to push trains on heavy banking duties. A fault which could and



did occur on the smaller wheeled classes, where the locomotives did probably equal amounts of pushing and pulling, was that the fitted bolts securing the bar frame to the main plate frame could work loose. This required renewal, which was probably done by reaming the holes larger and fitting larger bodied, fitted bolts

For many years in the Welsh valleys, and elsewhere on the system, locomotives of this design were used in a pushing capacity on banking duties. Eventually, in B.R. days, it can

be claimed that a GW bar framed loco was tried at pushing trains up the famous old L.M.S. Lickey incline. This was a duty for which the L.M.S. built a large 4-cylinder 0-10-0 (nicknamed *Big Bertha* or *Big Emma*).

British Railways had no qualms about employing an ex-GWR bar framed 52xx class loco on this duty as a trial. That it was not greatly successful was nothing whatsoever to do with weak bar frames.

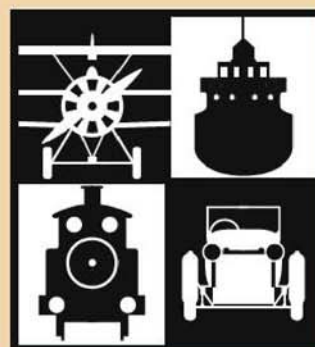
●To be continued.

IN THE NEXT ISSUE



- Rhombic hot air engine
- Skeleton Clock
- I/C engines
- Myford slotting head
- North London Rally
- Anna
- MG TC
- Letters to a grandson
- Lead free solder
- Lillian

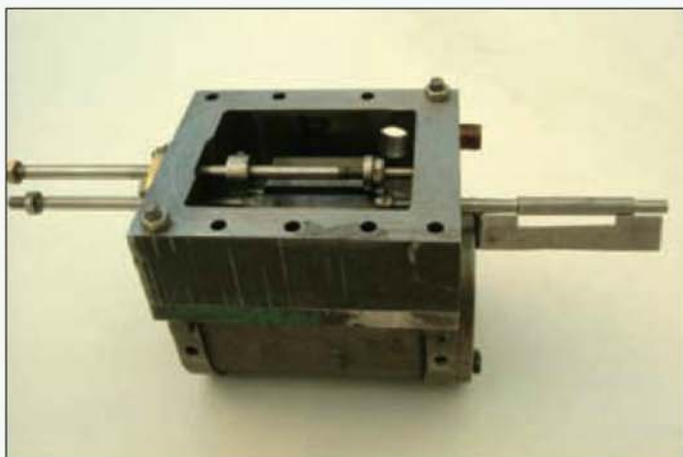
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(Contents may be subject to change)



The cylinder and steam chest of the author's locomotive with the dummy parts attached. The valve is about to open (or close) the rear port on the left.



The two components needed. Although of simple construction they served the purpose admirably.

SETTING HIDDEN VALVES

Dave Roberts

describes a simple method of checking what is going on in your locomotive's valve chest

The subject of this short article is a device to allow the adjustment of steam engine slide valves where the valves are hidden from view inside the steam chest. The gadget is very simple and something like it must have been used many times, but I do not recall seeing it described before in these pages.

The writer's current project is the old-time locomotive *Jenny Lind*, a 2-2-2 built by the Leeds firm E.B. Wilson in 1847. The cylinders are inside the frames, with a common steam chest between the cylinders, a similar arrangement to Martin Evans' *Boxhill* design. The valves are driven by Stephenson link motion with locomotive links.

With the cylinders and steam chest assembled it is quite impossible to see where the valves are in relation to the cylinder's steam ports. After some thought I eventually hit on the idea of a 'dummy' valve and port face fitted to the front of the cylinder assembly, thus duplicating events inside the steam chest externally.

The valve dummy is a piece of (say) 1/8in. rod, which screws into the tail end of the 'real' valve rod. It is turned down at each end leaving a length equal to the overall length of the slide valve.

The port face dummy consists of a strip of thin brass or steel with a right-angle bend to allow clamping under one of the cylinder cover bolts. It will have a notch cut into one edge equal in length to the distance across the outer edges of the ports. The position of this notch is found at the set-up stage.

It should be mentioned that with this system there must be means of adjusting the valve external to the steam chest. In my engine the valve rod screws into a square guide forward of the expansion links. Also the valve rod must have a front tail guide.

The drawings and photographs give an idea of what the parts look like. I used an

8BA thread to fit the valve dummy to the spindle, which must screw positively up to a shoulder.

Setting up the dummies

Before fitting the cylinders to the engine, attach the steam chest to one cylinder with a few screws. Fit the valve with its rod, and screw the dummy into a tapped hole in the front end of the valve rod. The bent strip is clamped under a convenient cover bolt such that the edge of the strip just clears the rod. Adjust the valve so that its back edge is level with the outer edge of the steam port, in other words, 'edge to edge'. With the valve held in place, make a mark on the strip level with the back shoulder on the dummy. Some marking fluid applied to the strip might help. Repeat the operation with the front port.

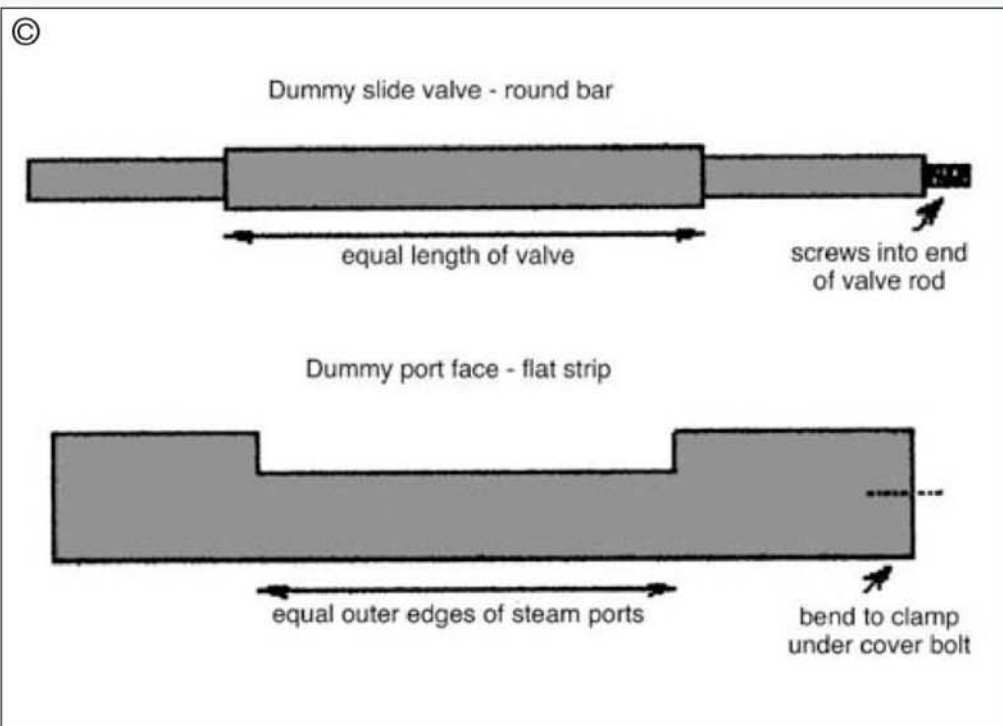
I cut away the part of the strip between the marks for clarity, but this is not strictly necessary. Owing to slight differences in the cylinders and valve rods on my engine, two sets of dummies were needed.

All this seems a long-winded description for an operation that is simple and straightforward, but needs to be done with care if it is to be relied upon. As a double check, the two marks on the strip should equal the distance between the outer edges of the ports.

Mark the dummy sets *left* and *right*, and keep them safe for final assembly, when they will be re-fitted as for the set-up. The dummies duplicate the position of the valve in relation to the ports and so allow the valve to be set in the required position.

On my locomotive, it was only necessary to centralise the valve movement on the ports as I had previously pinned the eccentric pairs together at their designed angles and the eccentric pairs are fitted to the axle correctly relative to the crank pins, as recommended by Don Ashton.

A number of variations on the principle are possible and ingenious builders may adapt the system to suit a particular engine.



A GWR 1400 CLASS LOCOMOTIVE IN GAUGE 1

G. R. Thornber

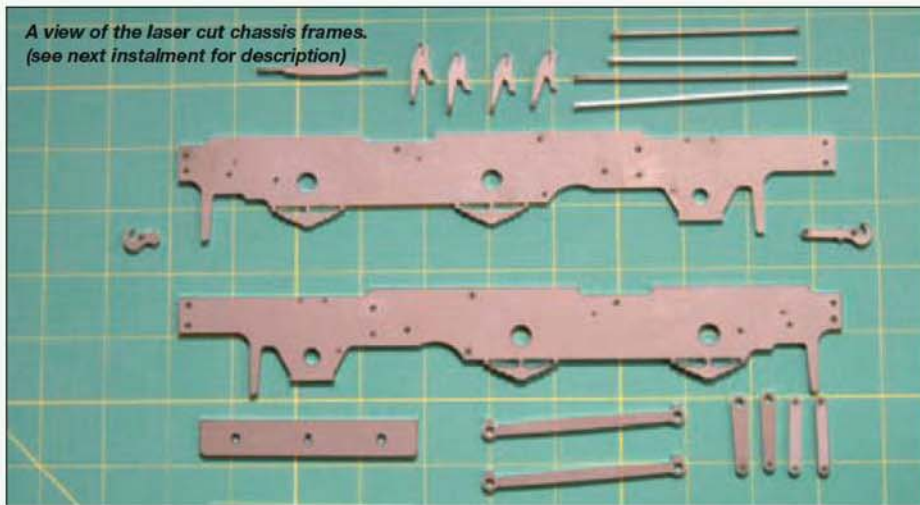
describes his gauge 1 version of the popular and attractive GWR workhorse.

● *Part 1*

Back in the early 1980s *Model Engineer* published 'Dart', a GWR 1400, in 7 $\frac{1}{4}$ in. gauge. I have always liked this particular locomotive, which I find very attractive. Although it is a small locomotive, I felt that it was too big for me in 7 $\frac{1}{4}$ in. gauge so I decided to scale it down to 5in. gauge - this was before Reeves produced their version. The cylinders, motion and boiler of 'Metro' were a very near match, so the design was not exactly groundbreaking. Although the chassis was finished a long time ago it is only recently that I fitted the boiler. It has been steamed using a gas burner and performed quite well. I now have to pluck up the courage to take it to the club track!

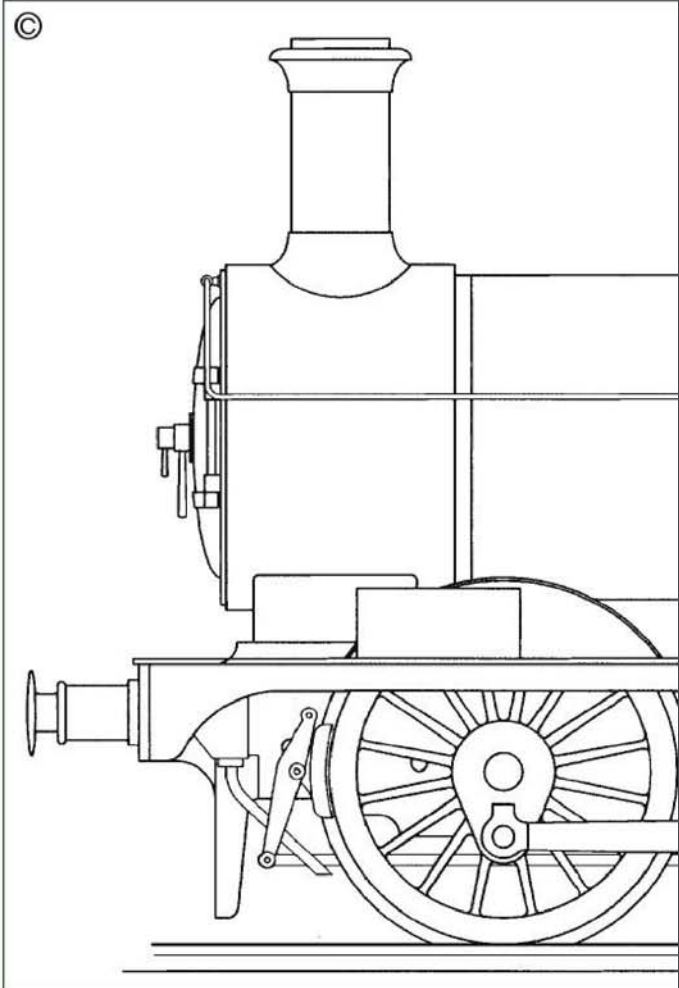
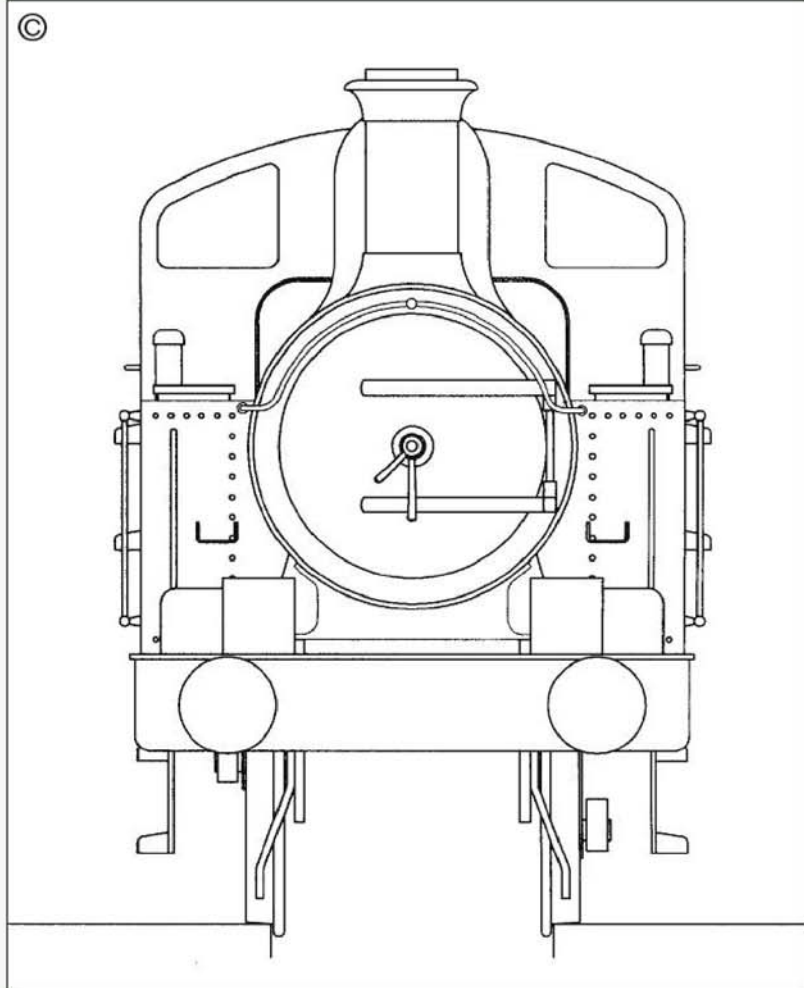
It was not surprising, therefore, that the first locomotive I drew in gauge 1 (10mm = 1ft.) was this 1400 class. I suppose that I was somewhat

A view of the laser cut chassis frames.
(see next instalment for description)



naive with rather limited experience, but surprisingly it did not work too badly. This was about seven or eight years ago and over the period from then until now, a fair bit of experience has been gained and this has been put into this revamp.

The original locomotive had an axle driven feed pump between the two cylinders, but I have now dispensed with this. I also made the side tanks to carry water and an emergency hand pump. Again these have been done away with as the amount of water carried did not



make the effort worthwhile. Filling is now carried out using a hand-held weedkiller spray. More about this later.

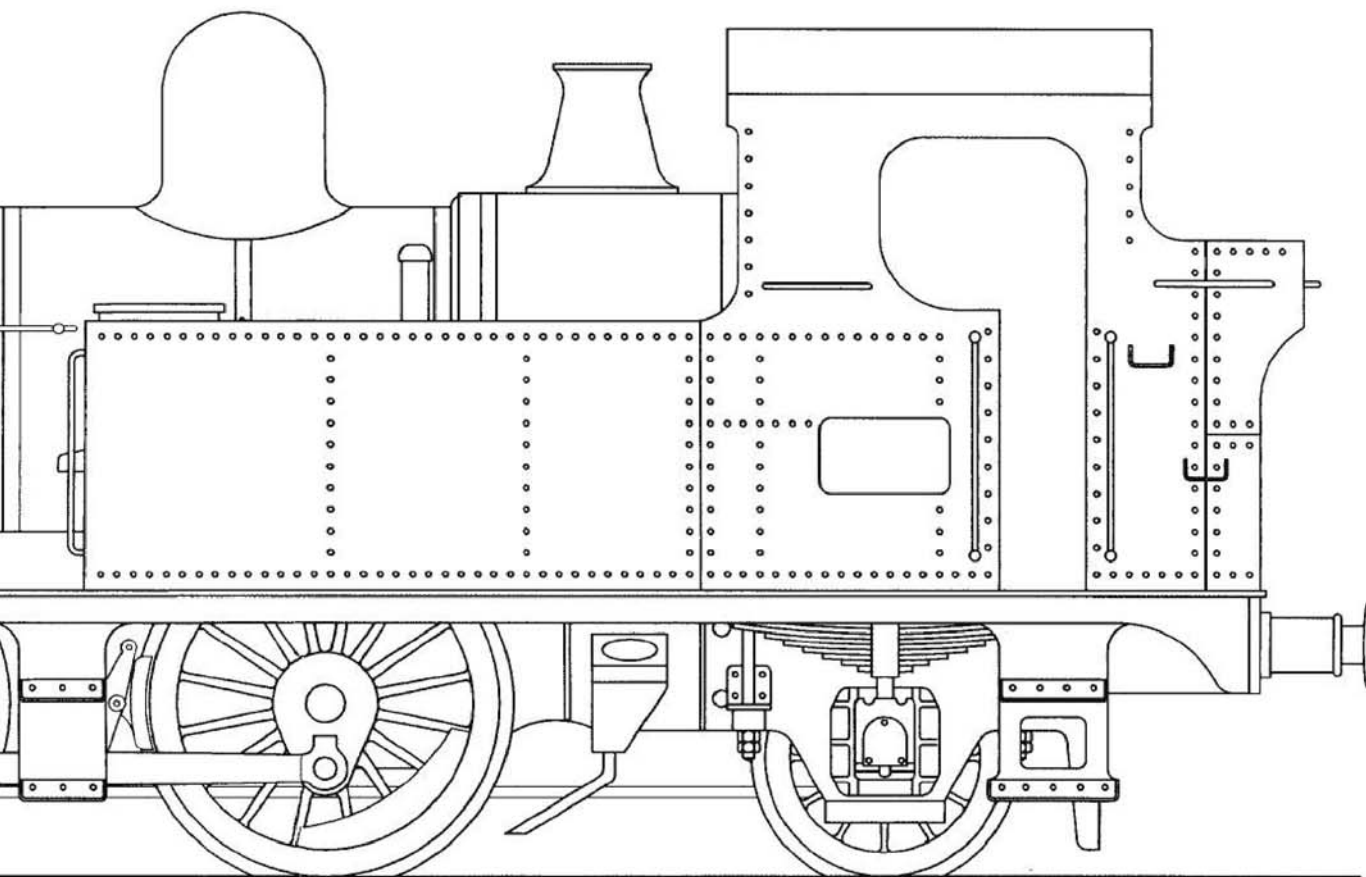
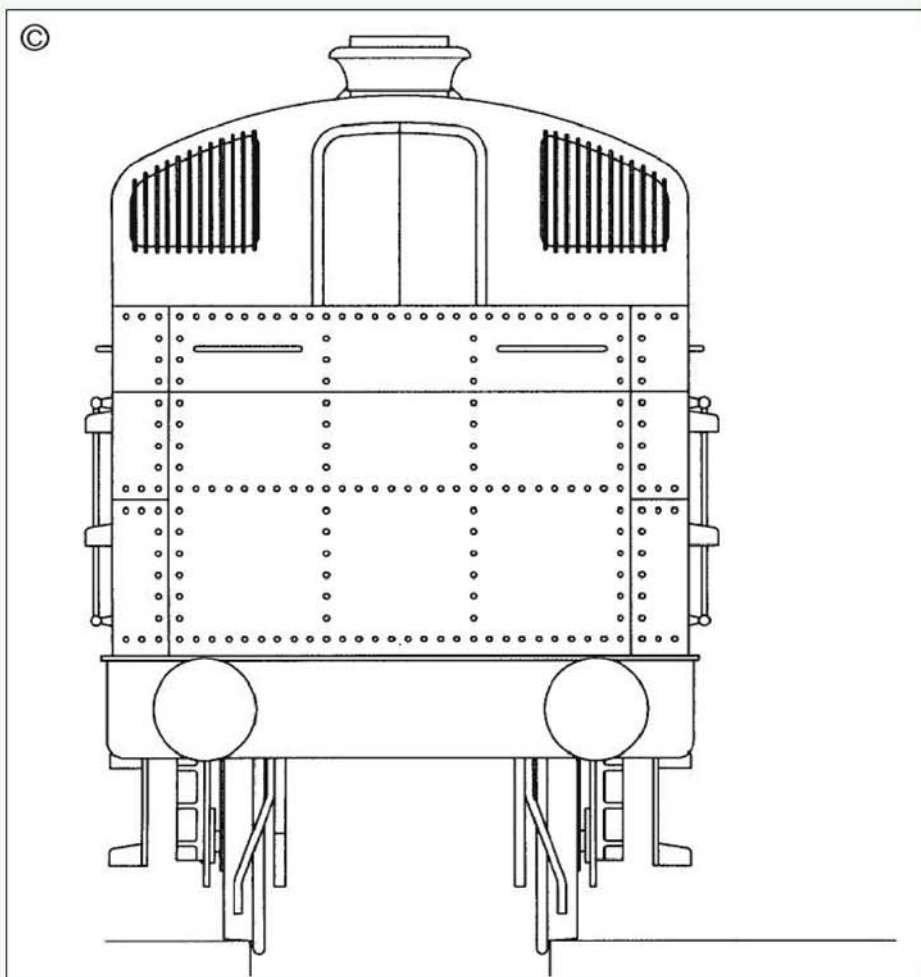
The boiler has gone through a series of changes - gas fired as people will have come to expect with my designs. This now has two $\frac{1}{2}$ in. flues and two cross tubes in the fire-box. Once again I will be using a closed gas system. The reason for this will be detailed later.

When compared with my previous articles this locomotive is relatively simple with no particularly difficult parts. The main axle can be a bit tricky but the way I've done it makes it easier. Only three castings are used - the main wheels, the trailing wheels and the trailing wheel springs and axle boxes. These can be obtained from the usual gauge 1 suppliers. As before I will be illustrating with three-dimensional drawings. Not many photos will be included as my original locomotive is not really representative.

One feature of the real locomotive is that there are a large number of rivets on the side tanks. On the original model these were all drilled by hand and dummy rivets put in. I hope to be able to provide brass laser cut sheet that will have the holes spotted through.

I have been amazed at the feedback that I received from my previous series and would welcome feedback on this project - e-mail: grandsft@chiltern8.freemove.co.uk tel: 01253-795766.

●To be continued.





UK News

Members of the **Ashcombe Miniature Railway** had a trip to the Isle of Wight Steam Railway recently with a notable feature of the outing being the variety of transport used during the day. This consisted of modern diesel and electric trains, ex-London Transport 1938 tube stock, early four-wheeled coaches hauled by steam (an 0-6-0ST *Royal Engineer*) and a modern twin-hulled ferry. Track and signal maintenance was carried out in the early part of the year. Some of the younger members are being trained in such things so that there are members with the necessary skills when some of the older ones leave the school. It is hoped that those leaving will continue their model engineering efforts in one of the local societies.

Brighton & Hove SMLE has carried out extensive work on the track which is now running very well. Like many societies it is suffering from increased costs, most notably insurance premiums and has had to raise fares for public running days to cover the extra costs. A vandalised signal post has been replaced and following replacement of some parts the signal/telephone system is now fully operational. James Mander continues the description of his

very interesting petrol/hydraulic locomotive. James is building the hydraulic drive system from separate components rather than buying a ready-made unit. Perhaps he might like to send his articles in to *Model Engineer* when the project is finished?

Following the great success and popularity of the 3 1/2in. gauge rally held at **Bristol SMEE** in May, another has been organised for Sunday 25 September. Anyone who would like to attend should contact organiser Alan Church at alan.church3@btinternet.com for more information.

Chairman, Roger Smith reports a very good start to the season at **Chesterfield DMES** with more and more visitors appearing at the running weekends. The 15th Annual Miniature Steam Rally in May was held in good weather with 15 vehicles of various types driving round the grounds. Mick Charlton was judged to have the 'Best Engine in Show' for his 1:4 scale Marshall 6NHP Agricultural Engine. The event was visited by more than 3,000 people over the two days and in addition to the vehicles the visitors admired the display of members work and enjoyed rides on the railway. The canopy over the raised track station has been provided with a new roof and during the process was lengthened by two bays. The newsletter carries

details of a new e-mail news service provided by the Great Central Railway at Loughborough. To subscribe send a blank e-mail to **G C R - A n n o u n c e - s u b s c r i b e @ y a h o o g r o u p s . c o m** This year is the 40th Anniversary of the Hady track site and the club have produced a souvenir booklet giving some of the history which goes back to 1932 although not much is known of the period between then and the 1940s. If any readers have knowledge of the early days then I am sure the society would be delighted to hear from you. The society also operates the 7 1/4in. gauge track at the **Papplewick Pumping Station** near Nottingham; website www.papplewickpumpingstation.co.uk

Another society with a new Chairman this year is **Leicester SME** where Alan Berry has taken over the reins from Paul Masters. Some damage was done to the station building and signalbox by vandals but has now been repaired. This prompts me make a point to all clubs; if you experience acts of vandalism or any other anti-social activity at your sites, can I urge that all incidents, however trivial, are reported to the police? It is only by doing this that we will get action taken.

Doug Hewson reports that at the recent **Lindsey Model Society** running weekend the weather at the start was "dull but pleasant" and all

those present enjoyed some good train operations with the new signals being operational. The new signals were the cause of some "SPADS" due to members not expecting signals to be in the new places. The rain started at about 3pm and the assembled group "sat around under the awning putting the world to rights like ten grumpy old men". (Doug's words not mine!)

The public running season at **Malden DSME** got off to a good start with the May Bank Holiday session being described by the Treasurer as "the best we have ever had". A group of members had a trip to Chatham Dockyard in May (described as "the old codger's day out") and had a very interesting time touring the exhibits and watching the demonstrations.

Following brake tests on the riding cars at the **Model Engineers Society (NI)** work has been carried out to renew some parts and to incorporate a measure of interchangeability to enable more driving trucks to be coupled. At the May meeting, Loudon Blair gave a presentation on the production of his jet (gas turbine) engines and the associated aircraft. Those present were treated to a demonstration when Loudon ran the turbine outside after the main talk. In the *Heard at the Track* section it is reported that the Saturday Club has introduced computer classes for the uninitiated with the unkind comment "something about old dogs and new tricks springs to mind".



SEPTEMBER

- 16 **Canvey R&MEC. Meeting.** Contact Brian Baker: 01702-512752.
- 16 **North London SME. Loco Section Meeting.**
Contact David Harris: 01707-326518.
- 16 **Rochdale SMEE. Auction Night.** Contact Mike Foster: 01706-360849.
- 16 **Romford MEC. Peter Lawrence: Below London Streets.**
Contact Colin Hunt: 01708-709302.
- 16-18 **Guild of Model Wheelwrights. Sacrewell Farm Show of Skills, Nr. Wansford.**
Contact Biddy Hepper: 01492-623274.
- 17 **Adelaide Miniature SRS. Major Projects.** Contact Bob Yule: 8387-5032.
- 17/18 **Birmingham SME. National Locomotive Rally.**
Contact John Walker: 01789-266065.
- 17/18 **Claymills Pumping Engines. Burton Festival combined with Severn Trent.**
Contact B. Eastough: 01283-812501.
- 17/18 **Furness MRC. Glossop Exhibition.** Contact Fred Firth: 01229-821192 or Colin Burns 01229 837079.
- 17/18 **Furness MRC. North Fylde (Fleetwood) Exhibition.**
Contact Fred Firth: 01229-821192 or Colin Burns 01229 837079.
- 17/18 **Kew Bridge Steam Museum. London Open House Weekend.**
Information: 020-8568-4757.
- 17/18 **MELSA. MELSA Annual Competition, Display & Awards.**
Contact Graham Chadbone: 07-4121-4341.
- 17/18 **North Norfolk MEC. 1940s Weekend.** Contact Gordon Ford: 01263-512350.
- 17/18 **Nottingham SMEE. Thomas the Tank Engine Weekend.**
Gerry Chester: 0115-9259096.
- 17/18 **Reading SME. Southern Federation Rally.**
Contact Brian Joslyn: 01491-873393.
- 17 **Stafford DMES. NAME Rally.** Contact Chris Dobbs: 01889-270533.
- 17 **York City & DSME. Informal discussion - club issues.**

- 18 **Contact Pat Martindale: 01262-676291.**
- 18 **Bedford MES. Teddy Bears Day with Public Running.**
Contact Ted Jolliffe: 01234-327791.
- 18 **Bristol SMEE. Public Running.** Contact Trevor Chambers: 0145-441-5085.
- 18 **Frimley & Ascot LC. Club Running.** Contact Bob Dowman: 01252-835042.
- 18 **Guildford MES. Charity Day, Public Running.**
Contact Dave Longhurst: 01428-605424.
- 18 **Northampton SME. Sunday Steam-Up.**
Contact Pete Jarman: 01234-708501 (eve).
- 18 **Oxford (City of) SME. Public Running.** Contact Chris Kelland: 01235-770836.
- 18 **Plymouth MSLs. Public Running.** Contact John Brooker: 01752-671722.
- 18 **Rugby MES. Public Running.** Contact David Eadon: 01788-576956.
- 18 **Saffron Walden DSME. Running Day (public running after 2pm).**
Contact Jack Setterfield: 01843-596822.
- 18 **Saffron Walden DSME. One Day Rally (open to all clubs).**
Contact Jack Setterfield: 01843-596822.
- 18 **St. Albans DMES. Club Running.** Contact Roy Verden: 01923-220590.
- 18 **Taunton ME. Public Running.** Contact Don Martin: 01460-63162.
- 18 **Wimborne DSME. Public Running.** Contact Eric Basire: 01202-897158.
- 19 **Model Steam Road Vehicle Soc. Hamish Dawson: Clyde Puffers.**
Contact Geoff Miles: 01869-247602.
- 19 **Peterborough SME. Fire Fighting.** Contact Tony Meek: 01778-345142.
- 20 **Chesterfield MES. K. Grainger: GWR Broad Gauge.**
Contact Mike Rhodes: 01623-648676.
- 20 **Nottingham SMEE. Stan Nipper: Savage's Universal Carrier.**
Contact Graham Davenport: 0115-8496703.
- 20 **South Durham SME. Afternoon Steam-Up.** Contact B. Owens: 01325-721503.
- 20 **Taunton ME. Alan Fradgely: Post-war Far East Railways.**
Contact Don Martin: 01460-63162.

North London SME is celebrating the formal acquisition of additional land from the local water company which will enable them to extend the Colney Heath site. The society expressed its gratitude to the board of the Three Valleys Water Board for their positive support for this project. The June meeting featured our regular contributor, Derek Brown, who gave a talk on the progress with *Anna* and had brought the (large) chassis and other items down from Rutland for the occasion. David Harris and Mike Crisp hosted a visit by members of the **Chingford** and **Chelmsford** societies in June. The event was off to an early start with the first visitors arriving at around 9:30am and taking a walk round the site. This was much to the consternation of the wildlife who are apparently not used to being disturbed until the sun is much higher in the sky! Adrian Newson poses a question in the newsletter which will be familiar to our readers. He comments "My micrometer measures in decimal, my vernier measures in decimal, my lathe and mill micrometers are also in decimal, slip gauges are in decimal, etc., etc. All these have been round a number of years, so why is it that the majority of imperial drawings are annotated in fractions?". As is usual, answers on a postcard please...

We have received a reminder from Reading SME that it is



Derek Bray with the Pom Pom at Chinley Junction on the Lindsey Model Society track.

hosting the Southern Federation Rally over the weekend of 17/18 September at the Prospect Park track site. The rally will be on the Saturday with an open day on the Sunday when visitors will be invited to haul passengers. Their will be trade stands and a model exhibition whilst the inner man will be catered for with a barbecue on the Saturday evening. For further information contact Chairman, Gary Williams on 01189-401405 or mobile 07944-272106.

The June track meeting of the St. Albans DMES was held in good weather which made the evening barbecue even more enjoyable for the 50 members and friends who attended. As Chairman, Michael

Dyer comments "what better way to enjoy a barbecue on a warm summers evening than to watch the trains rumble by". We can all agree with that view. David Brown even had his astronomical telescope set up so that the members could observe current sun spot activity. Following all this as the light faded the members drifted home or to a local pub to finish the evening. Tony Mason visited the London Transport Museum open day in June and as a result suggests that for those modelling a London Transport subject, a visit is an absolute must. Details can be found on the website at www.ltmuseum.co.uk

Richard Priestley introduced his new locomotive (LNER 0-4-0 Y6)

to the Stockholes Farm Miniature Railway at the Easter running session. The locomotive put in an excellent performance on its first outing, covering about eight miles during the day. The new track extension, comprising two points and a short length of track has increased the new circuit by about 350ft. and made it even more interesting. The annual locomotive trials took place in April and had 13 entrants. Drivers had to carry out a variety of manoeuvres, being penalised for any errors in operating procedure. The 'Broken Spoke Award' was presented to Jean Hague for her great help on the refreshment/housekeeping side of the railway.

The 70th Annual Exhibition at Sutton MEC was held in April on the 60th anniversary of VE Day and Dennis Westlake reports that there seemed to be even more visitors this year. Many fine models were on show including, dare I say it, a Gatling gun by Peter Wickenden-Taylor which gained the Sir Malcolm Campbell Challenge Trophy which is awarded to the "Craftsman of the Year". The Judge for the occasion was Ted Jolliffe. Following the retirement of Geoff Burlington from the post of President, Derek Tidbury has been elected to the post. Bob Wood has taken on the role of Secretary. Work is progressing on the various projects around the site including the porch extension. The next

- 20 West Wiltshire SME. First Winter indoor Meeting. Contact R. Nev. Boulton: 01380-828101.
- 21 Leeds SMEE. Don Smith: Ships & Train slides. Contact Colin Abrey: 01132-649630.
- 22-24 North Norfolk MEC. Thomas Weekend. Contact Gordon Ford: 01263-512350.
- 22 Sutton MEC. Video Night. Contact Bob Wood: 0208-641-6258.
- 22 Worthing DSME. Bob Symes: Modelling Techniques. Contact Bob Phillips: 01903-243018.
- 23 Brighton & Hove SMLE. Keith Carter: Travelogue Films. Contact Mick Funnell: 01323-892042.
- 24/25 Bedford MES. LBSC Memorial Bowl Rally. Contact Ted Jolliffe: 01234-327791.
- 24 Brighton & Hove SMLE. Trackday. Contact Mick Funnell: 01323-892042.
- 24 Chesterfield MES. Running Day. Contact Mike Rhodes: 01623-648676.
- 24/25 Furness MRC. Southport Exhibition. Contact Fred Firth: 01229-821192 or Colin Burns 01229 837079.
- 24/25 Furness MRC. Leigh Exhibition. Contact Fred Firth: 01229-821192 or Colin Burns 01229 837079.
- 24 Hollycombe Steam & Woodland Garden Society. Fairground at Night. Enquiries: 01428-724900.
- 24 Hornsby ME. Family Day - Boiler Inspection. Contact Ted Gray: 9484-7583.
- 24 National 2 1/2in. Gauge Ass'n. LBSC 'Curly' Bowl at Bedford MES. Contact Clive Young: 01233-626455.
- 24 North London SME. G1MRA visit. Contact David Harris: 01707-326518.
- 24/25 Nottingham SMEE. Thomas the Tank Engine Weekend. Contact Gerry Chester: 0115-9259096.
- 24/25 St. Albans DMES. Club Exhibition at Francis Bacon School. Contact Roy Verden: 01923-220590.
- 25 Adelaide Miniature SRS. Public Field Day. Contact Bob Yule: 8387-5032.
- 25 Annerfield Miniature Railway. Public Running. Contact David Jerome: 0118-9700274.
- 25 Birmingham SME. Cycle for Charity Day. Contact John Walker: 01789-266065.
- 25 Bournemouth DSME. Funlec. Contact Dave Fynn: 01202-474599.
- 25 Bristol SMEE. 3 1/2in. Gauge Rally. Contact Trevor Chambers: 0145-441-5085.
- 25 Cardiff MES. Open Day. Contact Trevor Jenkins: 029-2075-5568.
- 25 Guildford MES. SMEE Day. Contact Dave Longhurst: 01428-605424.
- 25 Harlington LS. Public Running. Contact Peter Tarrant: 01895-851168.
- 25 Leicester SME. Open Day. Contact Raymond Wallis: 0116-285-8824.
- 25 SM&EE. Visit to Guildford MES. Contact David Boote: 01202-745862.

- 25 York City & DSME. Running Day. Contact Pat Martindale: 01262-676291.
- 26 Bedford MES. Power Transmission - discussion evening. Contact Ted Jolliffe: 01234-327791.
- 26 Hornsby ME. Meeting. Contact Ted Gray: 9484-7583.
- 27 Romney Marsh MES. Track Meeting. Contact John Wimble: 01797-362295.
- 28 British Horological Institute, Midlands Branch. Don Unwin: Replicas, and More Replicas. Contact Richard Thomas: 01789-414805.
- 28 Hull DSME. Paul Valey & Malcolm Foster: Sheet Metalwork Basics. Contact Tony Finn: 01482-898434.
- 29 Brighton & Hove SMLE. Workshop Evening. Contact Mick Funnell: 01323-892042.
- 29 Cardiff MES. Bits & Pieces. Contact Trevor Jenkins: 029-2075-5568.
- 29 Leyland SME. Bring & Buy. Contact A. P. Bibby: 01254-812049.
- 29 Wimborne DSME. T. McConnell: The Third Reich. Contact Eric Basire: 01202-897158.
- 30 Furness MRC. Manchester Exhibition. Contact Fred Firth: 01229-821192 or Colin Burns 01229 837079.

OCTOBER

- 1/2 Furness MRC. Manchester Exhibition. Contact Fred Firth: 01229-821192 or Colin Burns 01229 837079.
- 1 Guernsey Model Engineering Society. Track Day. Contact Dave Simon: 01481-251017.
- 1 Ickenham DSME. Public Running. Contact David Sexton: 01895-630125.
- 1 Leighton Buzzard NG Rly. Enthusiasts Day. Enquiries: 01525-373888.
- 1 York City & DSME. David Bedding: Talk & Presentation. Contact Pat Martindale: 01262-676291.
- 2 Birmingham SME. BSME Members' & Families Day. Contact John Walker: 01789-266065.
- 2 Bristol SMEE. Public Running. Contact Trevor Chambers: 0145-441-5085.
- 2 Frimley & Ascot LC. Public Running. Contact Bob Dowman: 01252-835042.
- 2 Guildford MES. Members' Running Day. Contact D. Longhurst: 01428-605424.
- 2/3 Kew Bridge Steam Museum. Steam Models Show. Information: 020-8568-4757.
- 2 Malden DSME. Public Running. Contact John Mottram: 01483-473786.
- 2 National 2 1/2in. Gauge Ass'n. Locomotive Rally at Chesterfield & District MES. Contact Clive Young: 01233-626455.
- 2 Northampton SME. Public Running Day. Contact Pete Jarman: 01234-708501 (eve).

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.

Tom Grant	Model Engineers Society (NI)
John Montgomery	Model Engineers Society (NI)
Peter Shewry	North London SME

"impending task" is the complete replacement of all 1,600 sleepers on the raised track.

The May open weekend at Tyneside SMEE was another event held in fine weather. The only problem this time was the wind which necessitated tying the tent down with concrete track pedestals. The tent in question was used for the jumble sale. A good collection of visitors took to the track over the two days with many locomotives being driven by a variety of drivers. Because I don't see why I should suffer alone, I will inflict the following joke from the newsletter (attributed to Norman Hay) on you all. "A recent breakthrough in animal to human transplants has enabled a surgical team to replace a man's ear with a pig's ear. A while after the operation, a news team was sent to interview the man, who said that the ear worked great but the only problem was the crackling". You need to know about roast pork to appreciate that! At the video evening in May, two films were shown; one on 'The Industrial Railways of the North East' and the other on 'Main Line Steam in China'.

John Hott from Wimbourn DSME recounts his efforts to steam some wood for bending during the restoration of his full size GMC 6x6 military truck. John used a plastic drain pipe for the steaming chamber but had to support it in a wooden trough because it sagged before the wood! Once this was done the process was successful and John recommends "one hour of steaming per inch of thickness". The bending was easy though had to be completed within 8-10 seconds of the wood coming out of the steamer. Consideration is being given to a new club hut at the track site.

The improvements to the car parking area at Wigan DSME have now been completed meaning that the society "can now welcome visitors without fear of their vehicles sinking in the soft ground". As part of this work "six hand picked volunteers spread and levelled 30 tonnes of crushed aggregate in six hours". The workers were sustained by numerous cups of tea and an individual hotpot each. It always amazes me what model engineers will do for food! The society has changed the format of its open days this year and will now hold one day open to all types of locomotives rather than separate diesel/electric and narrow gauge days. This reduces the effort in manning car parks and catering and as the Editor points out "only having to tidy up the grub once when the visitors don't turn up". This raises a good point, can I suggest that if clubs intend to visit other society's events they make every effort to notify the host club of their intention. After all we all complain when food goes to waste and if people don't turn up then lots of time and effort is expended for just a few people. The May talk was by Ian Stallard and described his engineering work assisting with the rehabilitation of those with spinal injuries. In particular Ian described the trip he made on a tricycle from Land's End to John o' Groats raising funds for his unit. The trip took 18 cycling days with Ian covering the 1,035 miles at an average speed of 10.4mph. I think Ian deserves all our congratulations for his efforts. Member Bob Connor has been

investigating DROs for his lathe and has found a website which carries details of a low cost system supplied as a kit of parts. The site can be found at www.shumatech.com/products/dro-350/index.htm

Engineering work carried out at Worthing DSME includes new wheel sets for the passenger cars and welding work on some of the aluminium frames which are now in stock for future use. Some realignment of the concrete 'A' frames on the track has also been done and work to replace rotten sleepers continues. Work has started on the refurbishment of the club Speedy Adrian Vickers.

World News

Australia

The Editor of the *Model Engineers & Live Steamers Association* Maryborough newsletter reports that the publication has now become part of the 21st century and is produced using entirely electronic means. This has meant upgrades to the computer to handle all this and was made possible by the time and equipment donated by several members. A number of members travelled to the Queensland SMEE for the annual AALS convention and took the opportunity to meet old friends and to view some of the fine workmanship on show. Monty Pittard has taken over the Club Presidency from George Bishop who has stood down from the committee. At the track recently a surprise cake was provided to mark the 80th birthday of Bill Olds. May we add our congratulations to Bill

on achieving this milestone? The newsletter carries the following method for calculating the weight of coal in a stack; "multiply the length by the width by the height (all in feet) and divide the result by 40 to get the weight in tons". Does anyone fancy checking this out?

Good progress has been made with the new storage shed for electric locomotives at the Steam Locomotive Society of Victoria with the painting and installation of the roof to be completed before the battery chargers and locomotives can be installed. Progress has also been made on the assessment of the work involved in the elevated track restoration project. This is described as "the most significant project undertaken since the initial club tracks were first laid". We wish them luck with the project and look forward to reporting progress in the future.

United States

At the election of officers at the April meeting of the New Jersey Live Steamers Tom Piccirillo was elected as President taking over from George Parsons who has stepped down from the role. The summer season got off to a good start with the weather co-operating resulting in a lot of activity on all the gauges. The society reports that more young people seem to be starting out with the smaller scales in the live steam arena. The society has purchased and set up a "new state of the art soda machine". This machine is much more energy efficient than its predecessor and even gives change and keeps a log of sales. It was tested fully at the spring meeting recording 199 sodas sold at 75 cents each.

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| <p>2 Oxford (City of) SME. Public Running. Contact Chris Kelland: 01235-770836.</p> <p>2 Plymouth MSLS. Public Running. Contact John Brooker: 01752-671722.</p> <p>2 Reading SME. Public Running. Contact Brian Joslyn: 01491-873393.</p> <p>2 Romney Marsh MES. Visit to Ted Craker's 5in. Gauge Garden Railway. Contact John Wimble: 01797-362295.</p> <p>2 South Durham SME. Running Day. Contact B. Owens: 01325-721503.</p> <p>2 Taunton ME. Public Running. Contact Don Martin: 01460-63162.</p> <p>2 Guild of Model Wheelwrights. Apple Day, Mary Arden's House, Wilmslow, Nr. Stratford-upon-Avon. Contact Biddy Hepper: 01492-623274.</p> <p>2 Wimbourn DSME. Public Running. Contact Eric Basire: 01202-897158.</p> <p>3 Peterborough SME. Bits & Pieces. Contact Tony Meek: 01778-345142.</p> <p>4 Romney Marsh MES. Bits & Pieces. Contact John Wimble: 01797-362295.</p> <p>4 South Durham SME. Meeting. Contact B. Owens: 01325-721503.</p> <p>4 Taunton ME. David Hartland: Presents. Contact Don Martin: 01460-63162.</p> <p>5 Bradford MES. Meeting. Contact John Mills: 01943-467844.</p> <p>5 Leeds SMEE. Meeting Night. Contact Colin Abrey: 01132-649630.</p> <p>6 Cardiff MES. Bring & Buy. Contact Trevor Jenkins: 029-2075-5568.</p> <p>6 Guernsey Model Engineering Society. Nickel Plating. Contact Dave Simon: 01481-251017.</p> <p>6 Rugby MES. Bring & Buy Sale. Contact David Eadon: 01788-576956.</p> <p>6 South Lakeland MES. Meeting. Contact Adrian Dixon: 01229-869915.</p> <p>6 Sutton MEC. Bits & Pieces. Contact Bob Wood: 0208-641-6258.</p> <p>7 Brighton & Hove SMLE. Ian Gledhill: The Manx Electric Railway. Contact Mick Funnell: 01323-892042.</p> <p>7 Canvey R&MEC. Meeting. Contact Brian Baker: 01702-512752.</p> <p>7 Maidstone MES (UK). Guest Speaker. Contact Martin Parham: 01622-630298.</p> <p>7 North London SME. Keith Catchpole: Edison Cylinder Phonographs. Contact David Harris: 01707-326518.</p> <p>7 North Norfolk MEC. AGM. Contact Gordon Ford: 01263-512350.</p> | <p>7 Portsmouth MES. John Warren: Walshearts Gear. Contact John Warren: 023-9259-5354.</p> <p>7 Rochdale SMEE. George Howard: Making Holes. Contact Mike Foster: 01706-360849.</p> <p>7 Romford MEC. Competition Night. Contact Colin Hunt: 01706-709302.</p> <p>8 Nottingham SMEE. NSMEE Efficiency Competition & Night Run. Contact Gerry Chester: 0115-9259096.</p> <p>8 Stafford DMES. LNER Society Running. Contact Chris Dobbs: 01889-270533.</p> <p>8 Welling DMES. Open Day for 5in. & 3 1/2in. gauge locos & traction engines. Contact Reg Hawes: 0208-859-1952.</p> <p>9 Bristol SMEE. Public Running. Contact Trevor Chambers: 0145-441-5085.</p> <p>9 Cambridge MES. Public Running. Fulbrook Road. Contact Rex Mountfield: 01284-386128.</p> <p>9 Canvey R&MEC. Last Public Running Day. Contact Brian Baker: 01702-512752.</p> <p>9 Elmdon MES. October Hibernation Day. Contact Chris Giles: 0121-458-1291.</p> <p>9 Guildford MES. Driver Training Day. Contact Dave Longhurst: 01428-605424.</p> <p>9 Harlington LS. Public Running. Contact Peter Tarrant: 01895-851168.</p> <p>9 Hollycombe Steam & Woodland Garden Society. Allcomers Day. Enquiries: 01428-724900.</p> <p>9 Leeds SMEE. Running Day. Contact Colin Abrey: 01132-649630.</p> <p>9 Leyland SME. Diesel Day. Contact A. P. Bibby: 01254-812049.</p> <p>9 Malden DSME. Visiting Clubs Day. Contact John Mottram: 01483-473786.</p> <p>9 Stafford DMES. 2 1/2" Gauge Association Rally. Contact Chris Dobbs: 01889-270533.</p> <p>10 Bedford MES. Alan Gildersleve: Our Winter Projects. Contact Ted Jolliffe: 01234-327791.</p> <p>10 Saffron Walden DSME. Club Night. Contact Jack Setterfield: 01843-596822.</p> |
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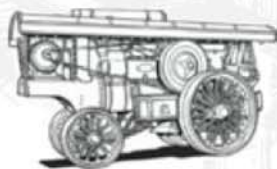


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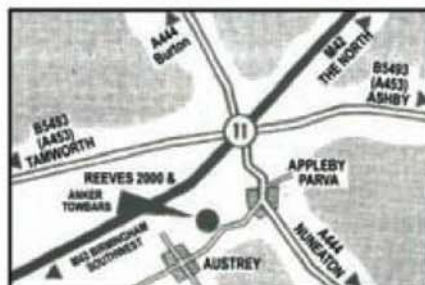


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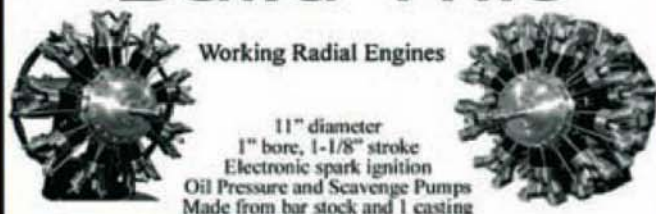
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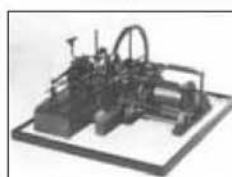
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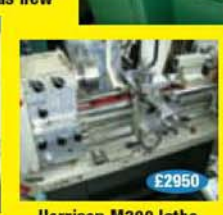
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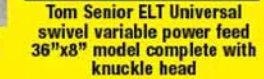
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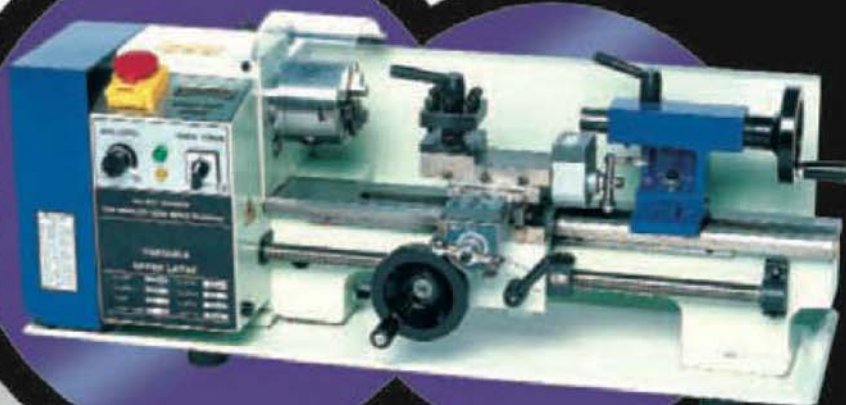


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