

THE ORIGINAL MAGAZINE FOR MODEL ENGINEERS

Vol. 219 No. 4575 • 8 - 21 December 2017

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ON THE COVER...

Rola is pictured on the track of the Romney Marsh Model Engineering Society with her current custodian, Bobby Jones, the president of the society. Rola was built by Curly Lawrence in 1960. (Photo: Jackie Jones)





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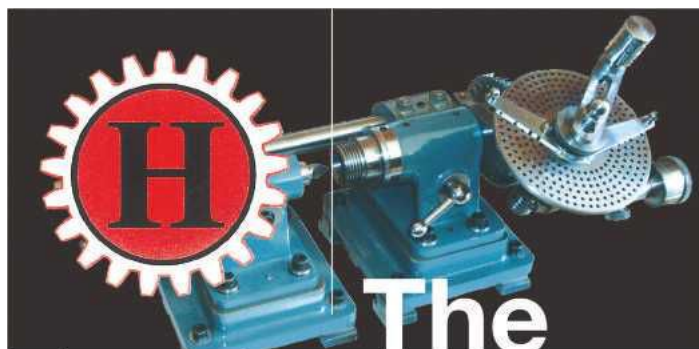
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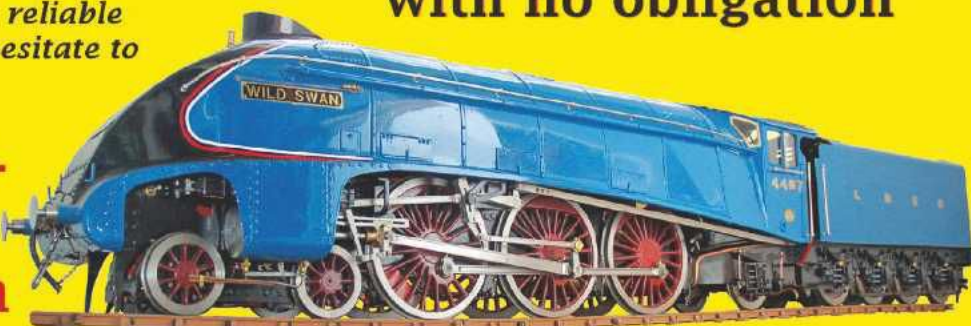
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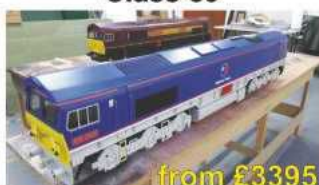
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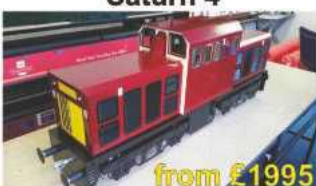
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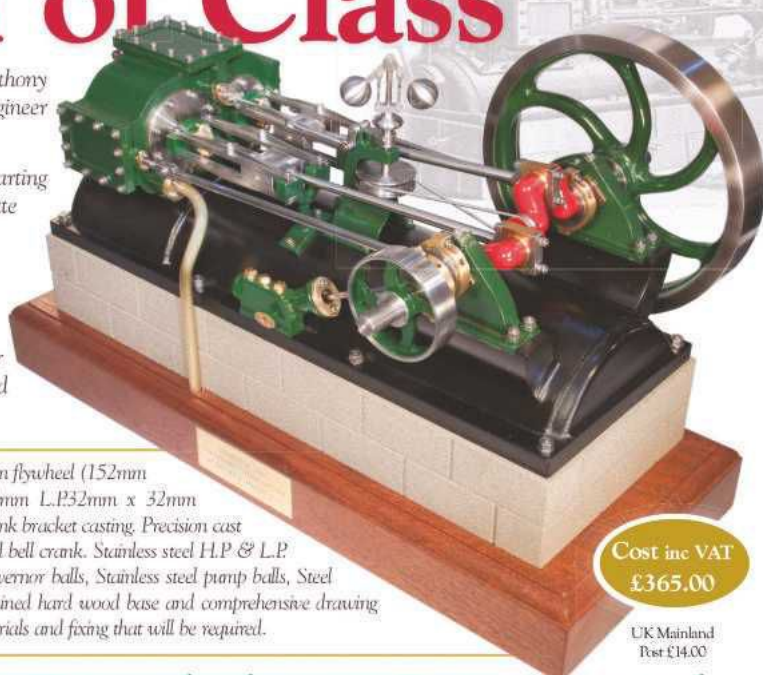


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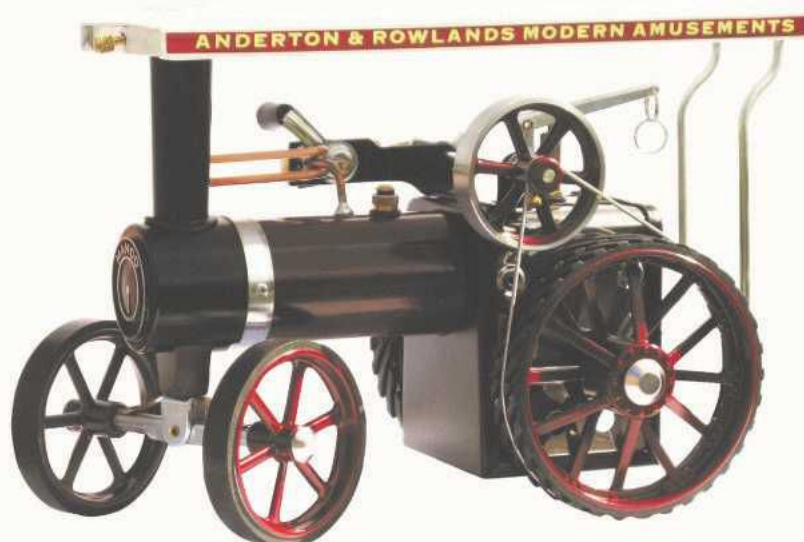
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London Exhibition

It is December already; Christmas is just around the corner and the New Year will be upon us before we know it. Now is the time to reach for the diary, open the page for late January, and reserve the date for the London Model Engineering Exhibition at Alexandra Palace. This is the South's largest Model Engineering Exhibition and runs from the 19th to the 21st of January. It is widely regarded as one of the leading model shows in the UK and attracts over 14,000 visitors. Full details may be found in the full-page advertisement elsewhere in this issue – indeed, you should already have tripped over it on your way to this page.

New for 2018 is David Fortey's 1:72 scale model of HMS *Ark Royal*, as she was around 1976. David started the project in 1992 and, after 25 years of painstaking research and building, his model is finally complete. The model is radio controlled, weighs a staggering 90kg and is powered by four 12V Ford Fiesta blower motors, which run off a single car battery. The motors are independent and behave exactly the same as in the full-scale version, the only addition being the incorporation of a bow thruster to overcome the scaled-up effect of the wind.

Come along and see the full spectrum of model engineering at the show from traditional models, steam locomotives and traction engines through to the more modern gadgets and boys' toys, including remote control trucks, boats, aeroplanes, helicopters and robots.

Visitors can travel between the show's different zones, trying the various activities and watching fascinating technical demonstrations. Over fifty clubs and societies will be present, displaying their members' work and competing to win the prestigious Society Shield. In total, nearly 2,000 models will be on display.

Organisers expect to welcome the return of the British Model Flying Association, Tamiya Trucking Group, Brickish, The Imagineering Foundation and the Polly Owners Group, who provide passenger rides behind 5 inch gauge steam locomotives within the Great Hall.

All of the leading suppliers will also be present, showcasing new products and special promotions and giving hobbyists an excellent opportunity to see and compare products under one roof. You will be able to purchase virtually anything you need for your next model or project or to get you started in the hobby.

Starting Out

In this issue, Graham Sadler continues his series aimed at beginners by explaining how to set up the newly acquired lathe. For newcomers to the hobby who would prefer a more 'face-to-face' introduction, perhaps in addition to Graham's articles, I would recommend the training courses run by the Society of Model and Experimental Engineers (SMEE). These courses take place in London, at the society's Marshall House headquarters. The 'basic', or Part 1 course, starting in February, runs over three Saturdays and introduces the basics of setting up a workshop, covers the safe use of tools and suggests possible projects.

It's followed in May by the Part 2 or 'Polly' course in which students go on to make the ever popular small oscillating engine *Polly* designed by T.D. Walshaw.

This course runs to six sessions and each session discusses parts of the engine which delegates then go home to make in their own workshops in time for the next session. There's a good *esprit de corps* which is encouraging both for beginners and more experienced hands.

The courses are presented by society members who come from a wide range of backgrounds. Some have many years' experience in engineering while others have started much more recently. Most of the lecturers attend sessions that they are not themselves presenting. That means there is always a wide pool of experience to draw on during the many discussion sessions. Experience has shown that delegates derive as much from the wide-ranging discussion between themselves and the SMEE members present as they do from the formal presentations.

Details are available from the SMEE website www.sm-ee.co.uk or you can email courses@sm-ee.co.uk. Alternatively, visit the SMEE stand at the London Model Engineering Exhibition in January which, of course, is already in your diary, isn't it?

Martin R Evans
Acting Editor



SMEE course attendees test their newly built engines. (Photo: Mike Chrisp)

Martin Evans can be contacted on the email below and would be delighted to receive your contributions, in the form of items of correspondence, comment or articles.
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Out and About 2017

Martin Wallis reports on the road steam scene.



Easter Sunday at the Charles Burrell Museum.

'Out and About' is intended to be a record of the more interesting and unusual 'road steam'. Full size engines are included not only as hopefully of interest but also with a view to encouraging model engineers to consider modelling the more obscure prototypes.

My first sniff of steam this year was the Easter Sunday beginning of season steam up at the Burrell Museum (**photo 1**). An interesting engine was Burrell roller No. 3993, built in 1924 (**photo 2**). She is fitted with a Ratty scarifier, which has a heavy cast iron frame equipped with six tines, or

teeth, arranged as two sets of three, with one set to be used at a time according to the direction of travel (**photo 3**). A worm and worm wheel moves the frame and this is operated by a hand wheel at the back of the engine. The roller could thus scarify moving backwards as well as forwards, surely a benefit, but the number of

turns of the hand wheel on each change of direction must have been quite daunting.

A rally certainly in an ascendancy is the Saffron Walden 'Crank Up'. Some readers may well remember the Saffron Walden 'Crank Ups' organised by Paul Engelmann at Shire Hill in Saffron Walden for many years from the 1970s



Burrell 10 ton roller No. 3993, a Class 'A' built in 1924.



Detail of the Ratty scarifier - the tines are not fitted.



The proud builder of this 3 inch Burrell is tending the fire. The level of detail is extremely impressive.



Note the model, like the full size, has split horn plates and a four-spline crankshaft.



Driver's view of the 3 inch Burrell.



Half size Burrell wagon, making a very welcome return to the rally field.



Half size Charles Waterous Engine Company Fireproof Champion.

until the early 2000s. The East Anglian Traction Engine Society revived the 'Crank Up' in 2015. The star of the show was a quite stunning 3 inch scale Burrell based on engine number 1606 called *Spanker*, built in 1892. This was its first steaming at a public rally (photos 4, 5 and 6).

The prototype was a large engine for a single and was rated at 8NHP. Obviously, this is evident in the model as well; most 3 inch Burrells (for example those of the Plaistow design) have a 6 inch diameter boiler barrel but this engine has an 8 inch diameter barrel. The model is fully sprung front and rear on volute springs as on the prototype.

The model, one of a pair built collaboratively by two builders, was constructed from drawings taken directly from the full-size engine. The model on view took 38 years to build, including making all the patterns, gears and boiler; the second engine, while nearing completion, is not yet



The prototype had a coal/wood box on the back but for practical reasons in model form a driver's seat has been substituted.

ready to steam. The cylinder was machined from their own pattern, the only core being the cylinder bore. The prototype is now in the Mike Dreelan Collection in Aberdeen.

The Strumpshaw Steam Engine Rally, hosted by the Strumpshaw Steam Museum, takes place on the second May bank holiday and is always worth a visit. Amongst the models making a welcome



Detail of the crosshead assembly.

return to the rally scene was the half size Burrell wagon completed in 2007, and now with a new owner (photo 7). The model is based on a prototype recorded on Burrell drawings dated 3rd July 1901. There is no proof it was ever built, no works number recorded and no surviving photographs; however, it was thought to have been constructed and there are

reports of a works wagon of this design being used on the run between St. Nicholas Works and the railway station. The vertical cross tube boiler was similar to designs built by Burrells for small marine craft in the 1880s. The differential was mounted on the second shaft with double drive to the back wheels.

Visiting Strumpshaw for the first time was a half size



11
The drive train on the Fireproof Champion. The crank shaft, top left, drives by chain a two speed gearbox and thence by another chain the back wheels.

Charles Waterous Engine Company *Fireproof Champion* (photos 8, 9 and 10). The Waterous Engine Works was a famous Canadian farm and road engine builder. It made farm, road rollers and steam pumper fire equipment. It also made factory steam engines and marine engines. The company's founder, C.H. Waterous, was a talented machinist and set up C. H. Waterous and Co in 1864, the factory being in Brantford, Ontario. He essentially used the designs of Ohioan engine maker D. June, developing from them the Waterous *Fireproof Champion* steam portable engines. Waterous made 2,500 *Fireproof Champion* engines between 1876 and 1894, exporting them all over the world with the exception of Europe. The engines were designed to drive saw benches and threshing machinery, originally either static or horse drawn, but later models were adapted to be self-moving. The model is based on their smallest engine, rated at 8NHP, but Waterous also built them in 10, 14, and 22 NHP.

Later, the twin sons of the founder moved west to Winnipeg and set up a factory there. They later moved to St. Paul, Minnesota, and established a branch of the Waterous name there in 1884. It made fire hydrants and fire equipment. This branch of the company is still in business.

The model was built by D. Carder over a 5 year period and was completed in 2005. All the details and measurements were taken from surviving photographs, no drawings being available. The model was sold to the Isle of Wight and thence to the present owner. The boiler runs at 185psi and is fitted with a two-speed gearbox. In full size the steersman sat on the gearbox half way along the engine (photo 11) but on the model this has been changed to 'rear steering'.

Tucked away amongst the full-size engines at Strumpshaw was a rare engine that had not been out for the last 50 years – the Marshal



13
The wheel spokes are riveted to the both the hubs and rims, avoiding any risk of cast in spokes working loose.



12
Marshal 'S' type traction engine No. 77973.

'S' type traction engine No. 77973 which was a late engine built in 1925 (photos 12, 13 and 14). She is thought to be the only three-speed fully sprung 'S' type Marshall remaining. The engine spent all of its (short) working life in Scotland and has been the subject of a recent restoration. The Marshall 'S' type was a class of engine including road rollers on which Marshalls pinned high hopes in the, by then, dwindling market. Particular attention was given to standardisation, and dimensional tolerances, so as many parts as possible were

interchangeable across the range of engines. In photo 12 the ring of bolts just behind the smoke box allows either a conventional or a roller front end to be fitted. The boilers were all the same and were all fitted with the Marshall patent pressed corrugated firebox crown, obviating the need for crown stays. The 'S' type had ring oiling on the crankshaft bearings and the valve gear was the Marshall patent single eccentric radial gear, making more room on the crankshaft for the road gears.

●To be continued.



14
A three speed engine - the three speeds are accessed via the round hand wheel. Two of the three speeds may be seen in the left of the picture and the third is in shadow inside the flywheel rim.

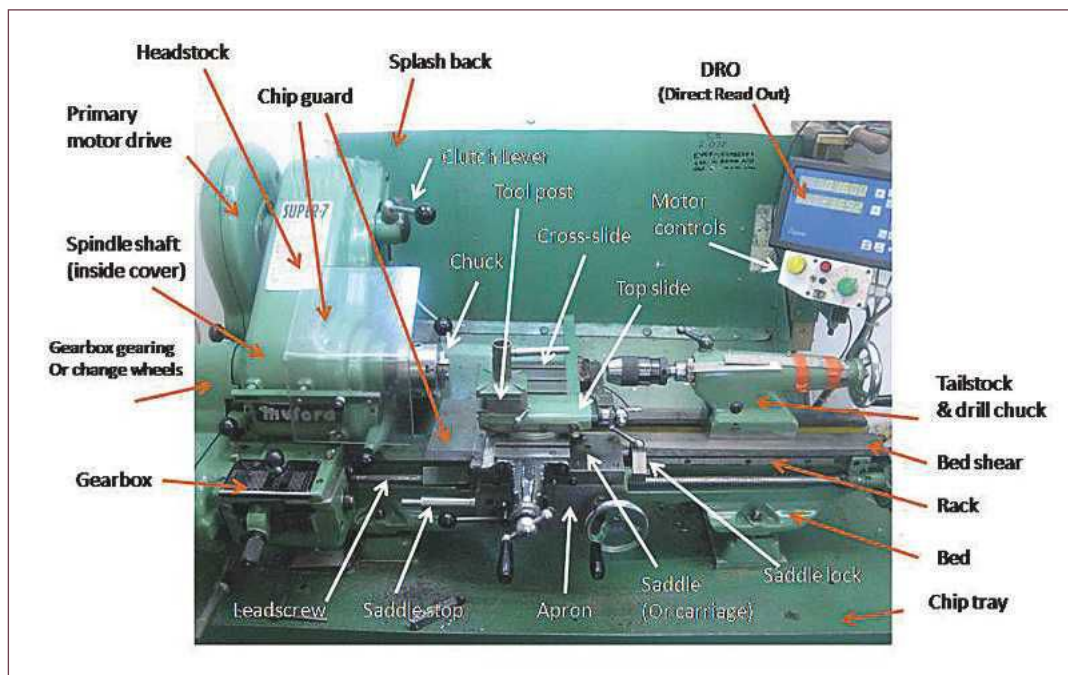
Lathes and more for Beginners

PART 2

Graham Sadler explains how to set up your newly acquired lathe.



Continued from p.803
M.E. 4574, 24 November 2017



So now you have the lathe and all you have to do is set it up to work. This is easy if the machine comes with a cabinet stand but if it's a bench lathe then you will need a bench to put it on. The important quality here is rigidity so don't be tempted to sit it on a few ex-kitchen

units unless it's a mini-lathe. The legs for the bench should ideally be 75mm square and rails are best at a minimum of 100 x 50mm. Simple lap joints can be employed to hold it together along with glue and perhaps 100mm screws. It would be a good idea to have the lower shelf at least 200mm above the floor to enable roll out bench boxes to be used one day for storage of 'useful junk' (photo 1).

Rails should be placed in a position under the lathe feet so that long bolts or studding can be passed all the way through the top and the rails to secure the lathe to the worktop. Be sure to seal the bolt holes to stop any oils passing through. The lathe should be mounted close to the front edge of the bench so that you don't have to lean over it, so avoiding back strain. At the same time,

be sure to position the bench and machine so that all covers can be fully opened and, on the left of the headstock, have at least 600mm clearance to any wall as that's the normal length which material is supplied in and you will want to get it in and out of the spindle. An alternative to this, if your workshop will be in a shed, is to put a hole in the wall in line with the spindle and arrange a suitable cover. It will also help to stop thinner stock from whipping about when you use the higher speeds.

A good place to locate your bench drill when you get it is to the right of the lathe, then drills are handy for both machines (photo 2). This also shows the dedicated storage for accessories but my collection is complete so this sort of storage is not worth considering for a number of



Under bench boxes.

years! I used to be very jealous of old hacks who had all the kit under the sun when I had almost nothing... Note the drawer runners - they extend fully - and the position of the drills is very handy for both lathe and drill.

While on the topic of basic workshop layout, put your bench under a window for good light and try to mount the vice close to one end so that it is possible to stand at the end and work in line with the jaws. If you mount it in the centre of the bench you will have to lean over for this task, leading to fatigue and, in addition, it's far harder to judge the angles of work pieces. I have a thrust bench which sticks out into the centre of the workshop; it's where I do most work and being able to get all round it assists smooth operation.

I have been responsible for the layout of several school workshops, while at home I have had 5½ workshops ranging from an upstairs bedroom to my current recently extended palace (10 x 3m - this is the ½ workshop!) so I've had plenty of experience setting them up – but more on layout at a later date.

Make sure there's enough room for your feet to go under the bench so have a generous kick plinth - this will save back strain. In any case, leave plenty of space for the under bench boxes. Be careful when moving and mounting a Myford lathe. Because of the

way the drive is arranged, with the motor behind the bed, it is easily unbalanced as its centre of rotation is only just inside the rear foot, so the slightest angle of tilt will cause it to fall over. Removal of the motor will help but it can be a pig to refit when the lathe is bolted down. One simple precaution is to bolt a 600mm-ish piece of wood to the underside of the bed (through the bed with suitable protection for the shears) to limit any tipping.

It would be nice at this stage to arrange some form of swarf tray to go fully under the machine - for a long time I used suitable sized tea trays. My current *splash back* is made from a large aluminium tray that I rescued from the skip at school. It was part of a dinner trolley that was thrown out when the kitchens were being re-equipped. I still have one left that has been in store for perhaps twenty years - it will get used one day (**photos 3 and 4** - taken while moving the lathe into the workshop extension). The four holes on the front are for the DRO (Digital Read Out, an electronic box of tricks which tells you exactly how much you are moving the slides - a great bonus but something you can do without for a long while) and motor control gear, shown clearly in photo 3 along with the IKEA bedside 12V lamp. The socket at the back has the lamp's transformer and the mains supply to the DRO.



Splashback, lamp and electrical controls.



My Myford lathe, drill and storage set up.

The lathe should be packed up with thin pieces of metal to get it as level as possible. This is particularly important with lighter weight machines as the bed can twist slightly when being bolted down. This won't damage it but will result in a reduction of accuracy - however it will be good enough for now. I'll cover the full setting up and levelling at a later date.



Front of splashback.

If you are in a shed which has any flexibility in the floor put full rails across the bottom of the bench legs a minimum of 50mm thick for the whole bench to sit on in order to help stop the floor flexing under the load. Even better is to provide supports for these under the floor directly onto the ground. Ensure they go across the floor support rails. Incidentally, if you are thinking of buying a 'shed' as a workshop, have a good look at loose boxes/stables for horses – these are much better than a garden centre shed and seriously more rigid.

As for the height of the lathe, originally mine was mounted on a stout wooden bench, again rescued when a school workshop was revamped. It was 820mm high but it was a strain on the back so I added 57mm square rails on the bottom to lift it up (a monumental retro-fit – see photo 1) and things became much more comfortable (I am 1.7m tall).

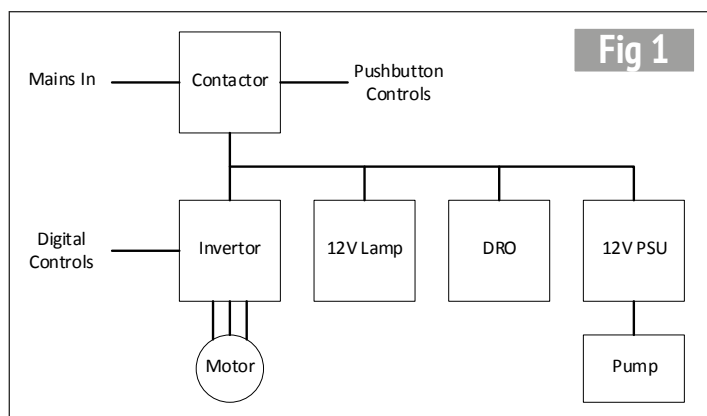


Fig 1

Using kitchen units

These do provide great storage under the lathe but on their own are useless for anything bigger than a mini-lathe. Kitchen units are designed to be solid only when multiple units are joined together and fixed to the solid walls behind them. The bench top can be a worktop but a 32mm one will be too thin. Do a tour of the local kitchen fitters or DIY stores and look for their damaged or reduced sections (we are not fussy about the colour). We don't mind the odd broken bit or deep gouge in the top and this option will be a lot cheaper. You will still need to add the 100 x 50mm rails and, in addition, double up some of the verticals to give stability. Then, at the back, cannibalise more units to screw to the sides in order to make it all more rigid and stop the whole bench rocking from side to side, using 25 x 32mm or 50mm wood strips in the corners. Screw through this new back and the sides into the rails to secure them and screw the front rail to the cross rails with the long screws. The important thing is to ensure rigidity or, when you're moving from foot to foot in a shed, the lathe can flex and it will affect accuracy.

Electrical connections

For the on-off control do not under any circumstances use a single pole switch such as a light switch. This is extremely dangerous. Most new lathes will have built in controllers in order to get their CE marking and most pre-owned will be the same. For years I used a Dewhurst type drum reversing

switch. I later discovered that this type of switch should not be used to switch on and off as the contacts can get eroded from the sparks caused when it's operated. I can state I had to take mine to pieces several times to sort this problem out. Don't use a toggle switch either – it's too easy to flip over when leaning on the machine or reaching over it. A *no-volt trip* is really required. This will not allow the machine to start after (say) a power cut, something an ordinary switch will allow. A cheaper alternative if you feel competent enough is to get a *contactor* (a special relay) and connect it to a start-stop pair of push buttons. These can be purchased on eBay quite cheaply for about £12 or £25 for a full switch unit. Check with the seller that it has a relay in it, that it can handle the power you need and that it's rated at 240 volts, not 440, and at least 13 amps. If you follow this route, be certain to put the buttons in a robust (non wooden) box and pay due regard to providing decent earthing.

I stress again the safety aspects of this - mains power is lethal. Only take the home built route if you are certain of your abilities. I provide a diagram here to show the electrical connections for such an arrangement (figs 1 and 2). On my Myford, I now have a three-phase motor powered by an inverter and this gives a full variable speed drive which is a godsend. We will discuss machining speeds at a later date but, even when things are calculated to be correct, your ears and eyes will tell you if

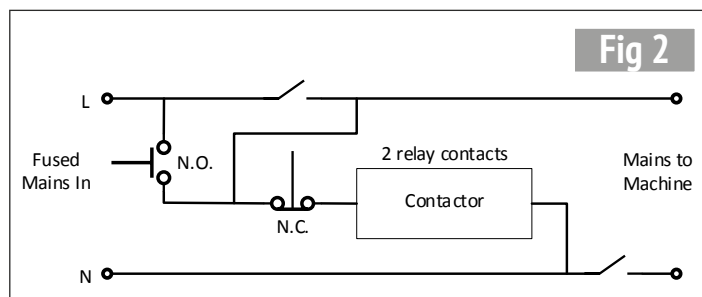


Fig 2

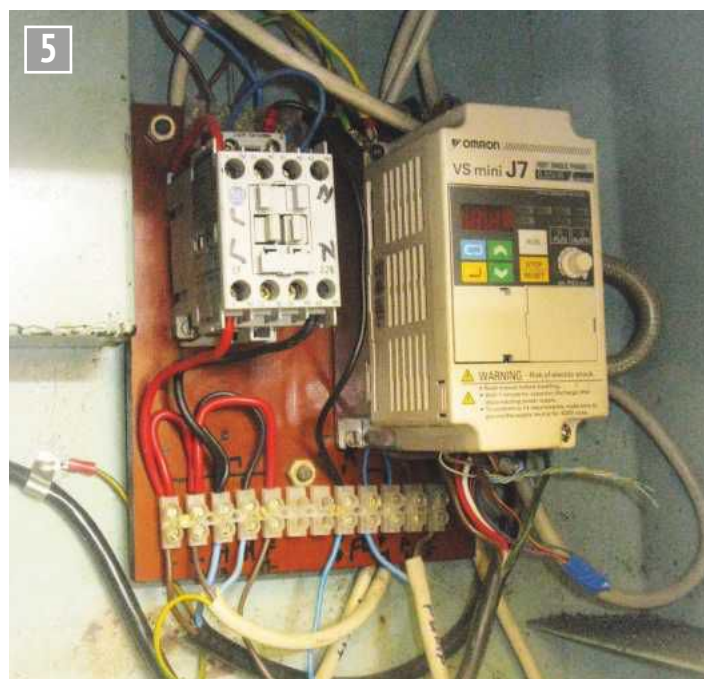
you are turning too fast and the ability to instantly change speed without stopping the machine is, to say the least, highly satisfying.

On my machine I have a main contactor on the left (**photo 5** *Hmmm... - Acting Ed.*), which supplies power to the inverter (on the right), machine lamp and DRO. It is all fitted into the cabinet compartment which also houses the coolant pump. The wiring seems complex but it isn't as there are a number of individual circuits. My cabinet base originally belonged to a *Viceroy* lathe, purchased from a dealer for a reasonable fee when I got my Bridgeport Milling machine from him, but needed modification. By the door of the workshop I have a main power switch - actually it's a 24 amp earth leakage trip switch. This turns off the power to the whole workshop and is always flicked when leaving and entering. It even controls the sound system!

If your workshop is in a shed a single 2.5mm² standard electrical cable is not really adequate. If the machines, lights and perhaps a fan heater are all on at the same time the load could be excessive for this cable. While on the subject of machine lights, don't even consider using a mains lamp, for the same reasons as using a 'light' switch for the lathe. Your hands will be wet with cutting oils, and swarf chips do get absolutely everywhere, so the possibility of a short circuit with you as the conductor is a shocking possibility! There are numerous good quality LED household lamps available at low cost - one came from IKEA, and has a clip on it for mounting. Another was picked up in a supermarket in France and another in Aldi.

WARNING. Be certain about your abilities with electrical work or get it checked.

●To be continued.



Electrical gubbins.

The Middleton Inverted Vee Engine

PART 5

Rodney Oldfield completes another small stationary steam engine by designer, Bob Middleton.



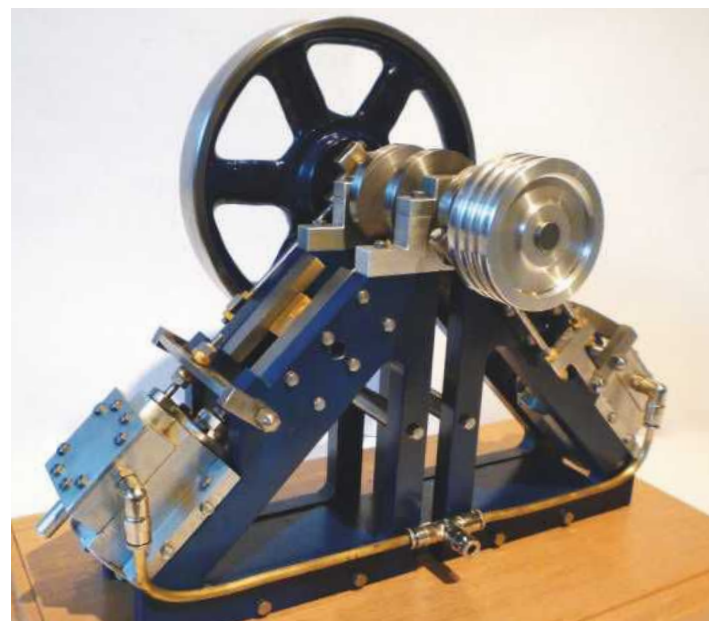
Once again, Bob Middleton has come up with a new concept for a small stationary engine and it has been my privilege to be one of the first to build this Inverted Vee Engine. This article describes its construction which, as with all Bob's engines, is invariably from stock size material.

Continued from p.733
M.E. 4573, 10 November 2017

Valve activator bar (fig 15)

Once again, I cut mine from $\frac{1}{8}$ inch stainless steel plate and the levers from $\frac{1}{4} \times \frac{1}{4}$ inch square bar. Doing it this way I had to put brass bushes into all the moving hole parts. If you have enough brass to do this from solid it might be easier (but would not stay as shiny over time). For the profile cut a piece $\frac{1}{2}$ inch deep and just over $3\frac{1}{2}$ inches long (to be filed off square with the levers afterwards). Next machine, or file, a $\frac{1}{8}$ inch deep cut-out from each end leaving a $2\frac{5}{8}$ inch centre lip stuck down - this is to help square the levers and give more rigidity whilst you fit and rivet them on.

Next, cut your $1\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4}$ inch levers to length, clamp together in pairs, drill and ream



two $\frac{1}{8}$ inch diameter holes at $\frac{1}{2}$ inch centres, making sure all the hole centres are the same, and then with your two $\frac{3}{4} \times \frac{1}{4} \times \frac{1}{4}$ inch levers drill and ream your $\frac{1}{8}$ inch diameter hole. Cut out a $\frac{1}{8}$ inch slot $\frac{1}{4}$ inch deep. Next, place on your activator bar and drill through the rivet hole sizes, countersink both sides then rivet over the levers using the same material, making sure that you have a good, firm fit. File the outer profile and form a slot $5/32$ inch wide, $1\frac{1}{2}$ inch and $1\frac{5}{8}$

inch in from the edges, as shown in the drawing. Take off all sharp edges, file and polish (photo 41).

Valve activator support bar

Using $\frac{1}{8}$ inch diameter bar, stainless steel or silver steel, $3\frac{1}{2}$ inches long, thread each end 5BA just over $\frac{1}{8}$ inch long then, using some $\frac{1}{4}$ inch hexagon bar, turn down some 5BA domed nuts. Thread the support bar through the activator bar and tighten the nuts until they bottom out and become a snug running fit on the support bar with little play (photo 42). When my machine was all built up I measured for my thin and thick washers then I made them to fit.

Valve bobbins

These are made from $\frac{5}{16}$ inch diameter aluminium bronze bar (use something hard wearing). Drill and tap 5BA through then form a dome on the end. Part off $\frac{3}{16}$ inch long then use 5BA lock nuts as in photo 43.

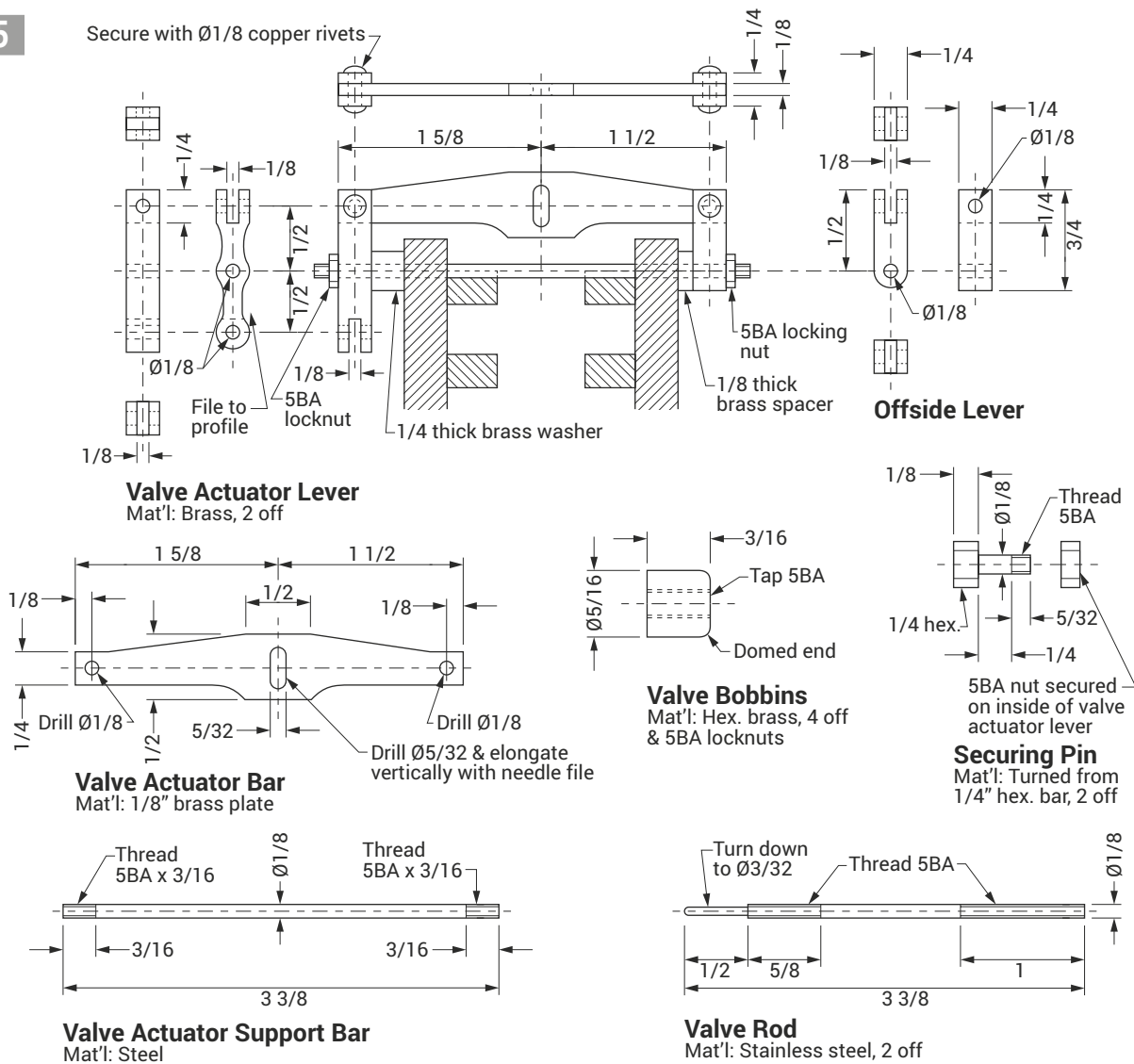


The valve actuator bar with levers attached.



The support bar is now added to the actuator lever.

Fig 15



The valve bobbins mounted on the valve rod.



The finished flywheel and what it's made of.

Flywheel

Having no material to make the fly wheel, I remembered I had five old cast iron gear wheels, so I turned one down to the size and width that looked right (sizes don't particularly matter - only the bore size). I had to bush down the bore size to get a good fit on the crankshaft (**photo 44**).



Marking the end of the bar for the alternative crankshaft.



Offsetting the bar for the crankshaft.

The alternative crankshaft (fig 16)

A built-up crankshaft has already been described but I'll now describe an alternative crankshaft which is machined out of the solid.

Take an 8½ inch length of free cutting steel 1½ inch or 30mm diameter. Mount it in a three-jaw chuck, face off and then with the cutting tool mark a line across the face (**photo 45**). Next, re-mount it in

a four-jaw chuck, sticking out at least seven inches with the marked line running vertical, in line with jaws no. 1 and no. 3. Under no.1 jaw place a packing piece of thickness 0.218 inch (**photo 46**). (If using 30mm bar the packing piece should be 0.275 inch.) Get the bar running true, slacken jaws 2, 3 and 4, take out the packing piece, then re-tighten jaws 2, 3 and 4, keeping the scribed line vertical with jaws 1 and 3. Machine a centre into the end of the bar (**photo 47**).

With the tailstock centre tightly in place leave an approximately $\frac{1}{4}$ inch wide collar. Start turning the bar down to $\frac{3}{8}$ inch diameter by $2\frac{3}{4}$ inches long. You will have to keep changing your knife edged tools from right hand to left hand (and vice versa) to get down to size and to leave a square edge (**photos 48 and 49**).

Leaving the centre collar exactly $1\frac{1}{4}$ inch long, repeat the above, turning the shaft nearer to the chuck.

Once again leave jaws nos. 1, 2 and 4 tight and place a $\frac{5}{8}$ inch packing piece under jaw no. 3 and tighten it up. Slacken jaws 1, 2 and 4, take out packing piece and re-tighten jaws 1, 2 and 4, making sure the bar is level and the line is vertically aligned with jaws 1 and 3.

Machine another centre in the end then bring the tailstock centre up. Using small cuts and a great deal of care, keep changing your right and left tools, turning it down to $\frac{1}{4}$ inch



The centre for the main axis of the crankshaft.



Turning the second half of the main axis.v



Further progress on the main axis.



Turning the journal on the crankshaft.

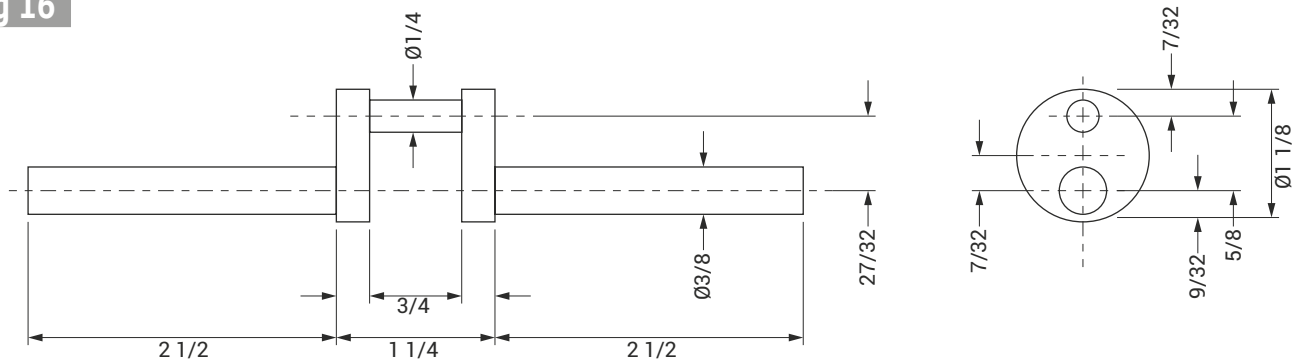
diameter and the flanges to $\frac{1}{4}$ inch wide (**photo 50**). Running slowly, take all the sharp edges off and polish.

Once you have parted the crankshaft off (I sawed mine off by hand – **photo 51**), because you have removed so much metal at different diameters you may have released some stresses and tensions, so place the crankshaft into a three-jaw chuck up to the flange and place a digital clock on the outer end. If it needs it, tap it true with a soft hammer



Parting the crankshaft from the unwanted stock.

Fig 16



Alternative Crankshaft

(mine was point .010 inch out of true). This may seem a complex way of producing a crankshaft but I made one as the drawings and I machined one out of a two inch diameter bar (not to be recommended, but it is the one in my engine now). I also made one as described above and this one was by far the easiest for me (photo 52). Do your own thing.



The original and alternative crankshafts compared.



Cutting gaskets.

Gaskets

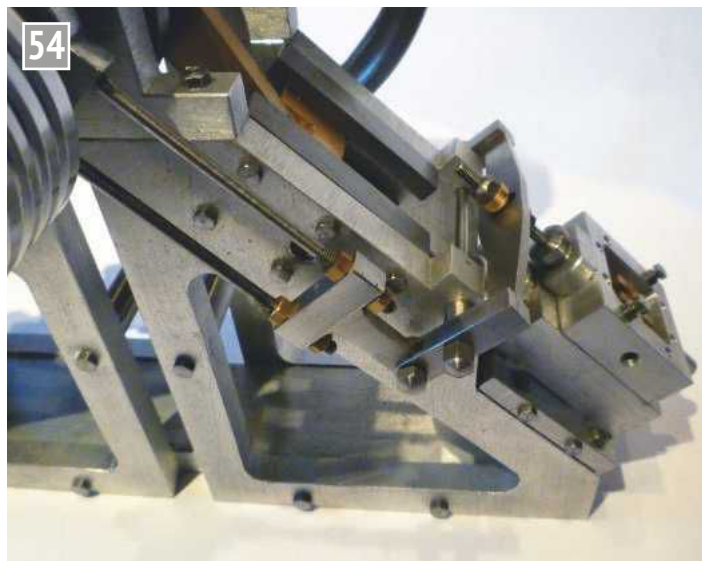
Because I run my models on air at fairly low pressure, I use ordinary brown paper (usually the backs on big old envelopes). To make them, use a piece of scrap metal with the bore diameter machined out $\frac{3}{4}$ inch with a sharp edge on it and, with the ball peen hammer, gently tap around the edge of the diameter. When you have cut the hole out place it onto the end cap and gently tap around the outer edge. Once you have the gasket cut out, using the end cap as a jig, drill one hole in the gasket, slip a screw in and drill out the remaining holes (photo 53). Do a similar thing with the steam chest and cover and, when fitting, smear both surfaces slightly with grease.

Setting the slide valves

Take off the top cover and disconnect the long side lever attached to the eccentric rod end. Now, by hand, move the lever to make sure that the

slide valve moves freely from top to bottom. Reconnect the eccentric rod and turn the flywheel the way you want it to run. Adjust the valve bobbins along the valve rod so that you have full movement of the slide valve (photo 54). You will also have to adjust the position of the eccentric rod end unit at the same time. Next turn the flywheel so that the piston is at the bottom and slacken the grub screw on the eccentric sheave, keeping everything stationary. Turn the eccentric sheave by hand (it is easier to leave the Allen key in the grub screw to do this) until a tiny crack appears between the slide valve and the bottom porting slot. Tighten the grub screw then turn the flywheel until the piston is at the top and hopefully you should just start to see a crack opening on the top port (photo 55).

This makes it sound simpler than it is, but think about it -



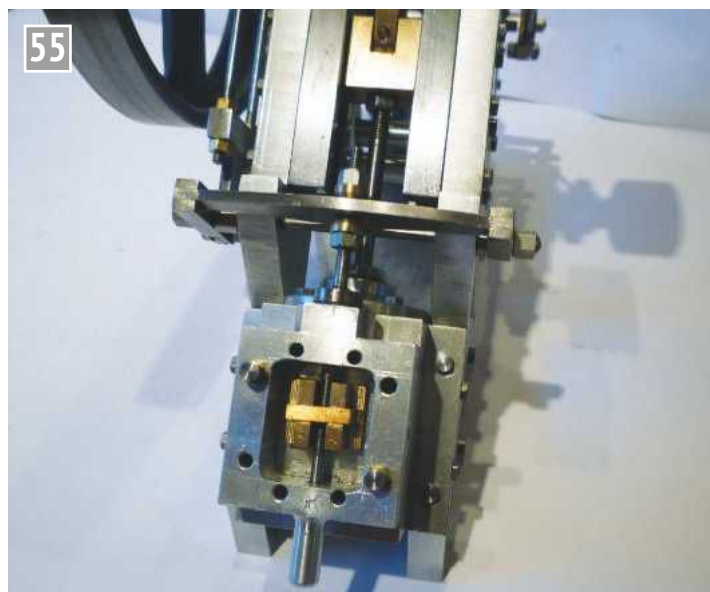
The valve actuating lever in place.

the steam or air must enter the piston chamber to push the piston up and just before the top it must shut down and then start to crack open to let the steam or air in to push the piston down. Then length of movement is governed by the

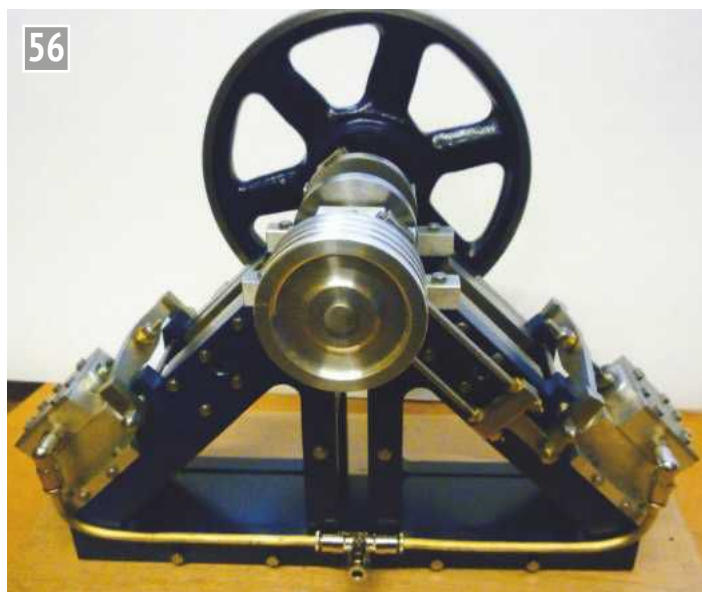
throw on the eccentric sheave, which is $\frac{1}{4}$ inch travel.

That's it! Now is the time to add the pipework (photo 56), connect it up to an air supply and give it a test run.

ME



Setting the slide valve.



The engine is now ready for its air test.



Tugboat Annie with George Barlow.

Richard Linkins reports from the LBSC 50th anniversary rally held at the Romney Marsh MES.



LBSC Rally at Romney Marsh

On the 16th September a rally was held to commemorate the late Lilian Lawrence, usually known as LBSC or Curly, at the Romney Marsh MES track at Rolfe Lane, New Romney. This was very well supported both by visitors from other societies and by RMMES members. The event had been advertised by distributing leaflets to other societies in the South East and at exhibitions. A number of owners of LBSC designed locomotives had also been approached directly. The response was almost overwhelming and the offer of a number of locomotives had to be politely declined due to limitations on space.

A total of 45 locomotives of 2½, 3½ and 5 inch gauges were on display or running. The majority of them had been designed by LBSC and described in one of his construction series. There was also one that had been rebuilt by him and two designed by other people but described by him in his column in *Model Engineer*.

We were particularly pleased to have *Tugboat Annie* and *Rola* on display. These locomotives were both built by LBSC. *Tugboat* is a 2½ inch gauge 4-6-2 built as his response to the Bulleid *Merchant Navy* Pacifics. It has four cylinders with the cranks set at 135° to give eight beats per

revolution, as was used on the Southern *Lord Nelson* class. However, it only has two sets of valve gear and a special conjugated arrangement to drive the inside valves. This gear was designed by Harold Holcroft, who was technical assistant to both Maunsell and Bulleid. Her name reflects LBSC's sense of humour; Oliver Bulleid had named his locomotives after great ocean shipping lines but LBSC did not have much respect for the Bulleid Pacifics so he named his own after a humble tugboat. For several years *Tugboat Annie* was in the care of George Barlow and ran regularly on the track at Rolfe Lane (photo 1).

Rola was LBSC's idea of what a rebuilt broad gauge Great Western Railway *Ajax* locomotive would have looked like if converted to standard gauge (**photo 2**). She is 3½ inch gauge with driving wheels that scale to ten feet. Apparently the large driving wheels give her a good turn of speed.

Apart from *Tugboat Annie*, ten other 2½ inch gauge engines were on display. LBSC rebuilt many locomotives mostly for other people but sometimes for himself. These were represented by a lovely North Eastern *R1*, rebuilt by LBSC in 1932 for a 'brother' who worked on the Southern Railway at Ashford. It is a commercially built model but was a poor performer before LBSC took it in hand. Afterwards it could pull a twelve stone man, even though it is oil fired. LBSC called this rebuilding process 'the monkey glands treatment' after a quack medical rejuvenation process of the 1930s.

Other designs on show were *Austere Ada* (**photo 3**), *Caterpillar* (**photo 4**), *Eva May*, *Fayette*, *Olympiade* and *S15*. The locomotives described by LBSC but not designed by him were a freelance 2-6-2 which incorporated components from several of his designs and a *Sentinel* geared locomotive (**photo 5**). The latter was found in a dismantled state during a workshop clearance; it had a flash steam boiler coal fired through a chute as in the full-size locomotives.



LBSC's imaginary broad gauge conversion *Rola*.

There were no fewer than twenty four 3½ inch gauge locomotives to be seen. Four of these ran on the track: *Jack* (**photo 6**) to the *Juliet* design, *Netta* (**photo 7**), *Hielan Lassie* and *Betty*. *Jack* was on to the track early and ran impeccably as usual. *Juliet* was one of LBSC's smallest designs for 3½ inch gauge but these locomotives always perform well.

On display were *Canterbury Lamb*, *Rainhill*, *Jenny Lind*, *Rola*, *Sister Dora* (**photo 8**), *Adriatic* (**photo 9**) to the *Jeanie Deans* design, no fewer than three *Virginias*, *Mona*, *Exe*, *Tich*, *Peatling Hall* to the *Lifford Hall* design, *Roedean*, *Hielan Lassie*, *Britannia* and a BR 75000. It

was interesting to compare the London and North Western Railway designs *Sister Dora* and *Jeanie Deans*. The former was LBSC's first design for 3½ inch gauge and a relatively simple machine whereas *Jeanie Deans* was his only compound locomotive, not suitable for novice builders.

Mona and *Exe* are sisters, the latter built by the late Bob Hobbs as a tender version of *Mona*. We were very fortunate to have *Pocohontas*, a *Virginia* built by the late Geoff Wigzell; Geoff won the LBSC trophy at Rolfe Lane in September 1988 with this locomotive. I can still remember the expression of pride on his face when he was presented with the trophy.

Ten five inch gauge locomotives were present. Four engines to the *Maid of Kent* design ran during the day. Two were lovely examples in the Southern Railway Maunsell green livery (**photo 10**), one had outside cylinders, which was an alternative offered by LBSC, and the fourth had been modified into an ex South Eastern and Chatham Railway D Class. Two *Speedy* locomotives were in operation, together with a *Netta* in full North Eastern Railway green livery and a *Minx*. On display was *Titfield Thunderbolt*, LBSC's version of *Lion* built for the Liverpool and Manchester Railway and an unfinished Great Western Railway pannier tank to the *Pansy* design.



Austere Ada.



Caterpillar.



Sentinel geared locomotive.



Jack.



Netta.



Sister Dora.



Adriatic.



Maid of Kent.

We were blessed with good weather in the morning and early afternoon. Some heavy rain fell later on but fortunately most of the locomotives had come off the track by then. The covered display area proved especially useful as several people took

advantage of it to keep dry and enjoy another look at the display locomotives. A number of photographs from LBSC's own collection were on view, together with his original general arrangement drawing for *Rainhill*; this showed how he could capture the character

of a locomotive in a relatively simple design.

The ladies provided a wonderful assortment of food. They certainly made sure we would not run out of refreshments. Many of the visitors and members told me how much they had enjoyed

the day. We had visitors from as far away as High Wycombe, Cambridgeshire and France. A lot of people contributed to the preparation and running of the event preparation and it was only a success because of their efforts.

ME

Bottom Entry Displacement Lubricator in 3 inch Scale

Nigel Walton describes a displacement lubricator designed for his three inch scale Allchin traction engine.

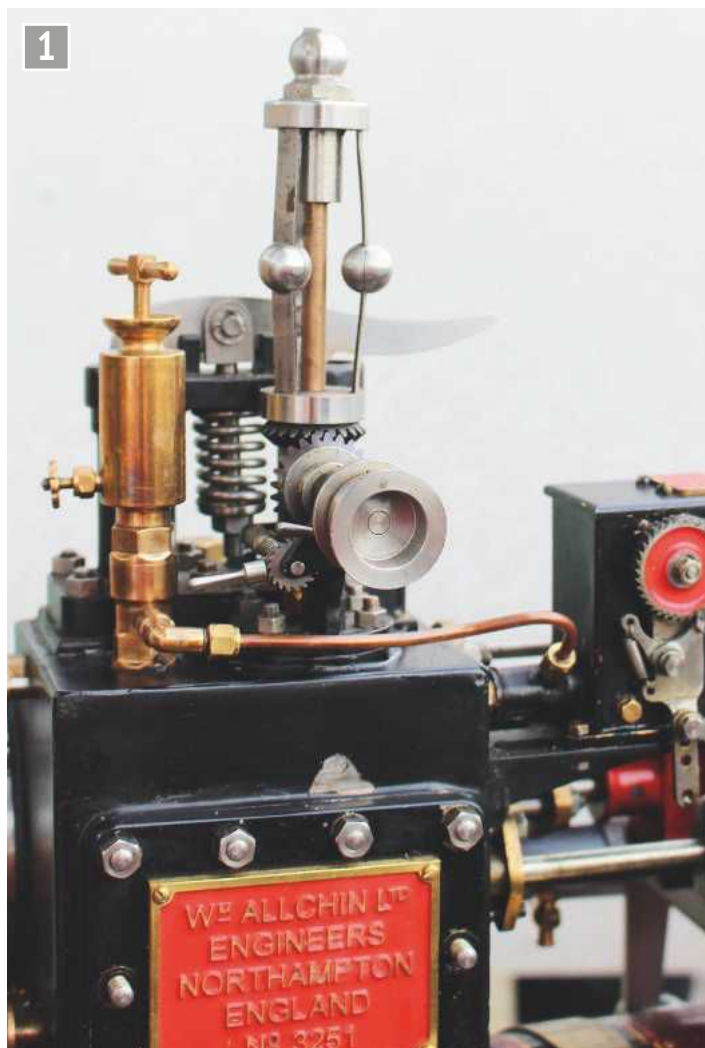


Parts 1 to 8 designed by Nigel Walton - 2015. Dimensions in mm unless stated otherwise.

The Allchin traction engine in 1½ inch scale (1½ inches to the foot) by W. J. Hughes (**ref 1**) is a very popular working steam model, many examples having been built over the years since its first appearance in the *Model Engineer* magazine December 1957. With larger scale models arguably becoming more popular some builders have opted for three inch scale referring to the original W. J. Hughes Allchin drawings and multiplying all dimensions by two.

It was in three inch scale that I decided to build (**photo 1**), taking more than twelve years to complete the engine. I must emphasize though that this was very much an off-and-on process, with two house moves and several years working overseas; completion finally materialized in June 2015.

The original 1½ inch scale drawing includes a displacement lubricator mounted on the cylinder above the steam chest; this however is only a dummy model which at three inch scale I did not think at all desirable.



The completed and installed displacement lubricator.

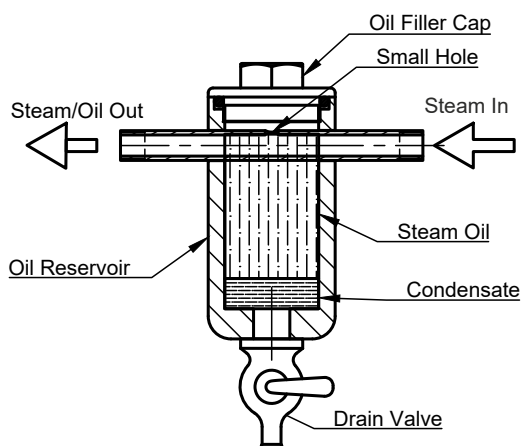
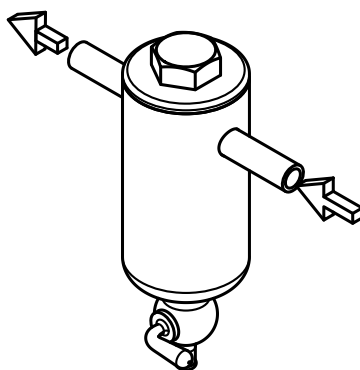


Fig 1 Typical Side Entry Displacement Lubricator



So, the quest began to design and build a working displacement lubricator for my engine.

Searches on the internet did not provide anything particularly suitable, being mostly side entry displacement lubricators used on small stationary engines as depicted in **fig 1**. Several varying arrangements exist including some with metering valves that control oil flow.

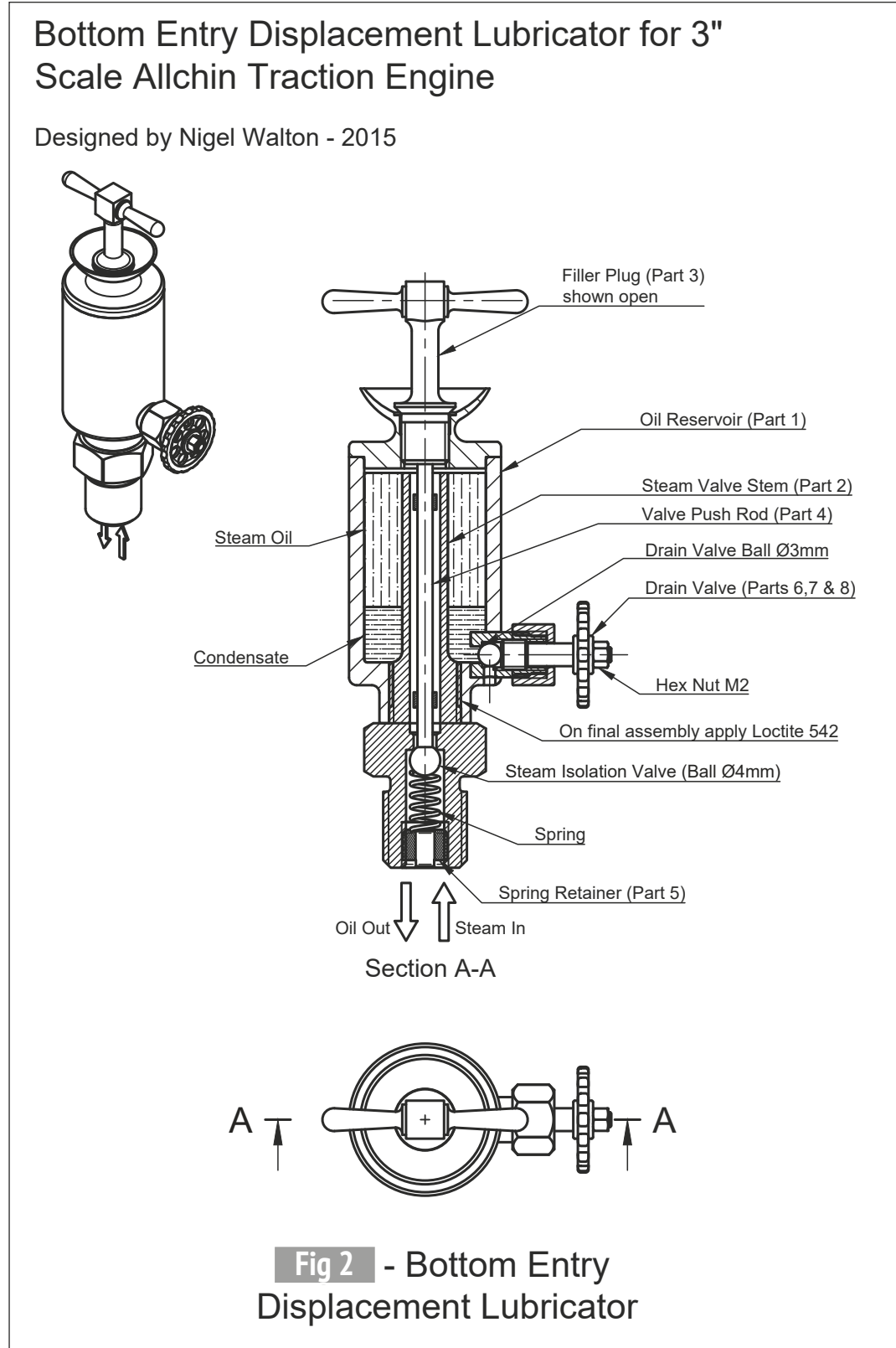
What I needed was a bottom entry model; a quick browse through one of my traction engine books (**ref 2**) provided the perfect solution and included

an integral isolation valve; it was not long before I decided to follow this example and my interpretation is shown in **fig 2**.

How a displacement lubricator works

The key is in the description; condensing steam displaces steam oil from an oil reservoir into the steam chest thus providing lubrication of the steam valve and cylinder/piston. The oil reservoir (**part 1**) is filled with steam oil and this reservoir, when the filler plug (**part 3**) is screwed down shut, is open to steam from the steam chest via the steam valve stem (**part 2**). Steam entering the void above the oil in the reservoir cools and condenses into the water and, because water has a higher density than oil (oil floats on water), the water sinks to the bottom of the reservoir. This displaces some oil which spills over and down the inside of the steam valve stem and hence into the steam chest (making the steam valve stem dual purpose).

This particular representation has a couple of nice features in the form of a drain valve (comprising **parts 6, 7** and **8**) and an integral isolation valve (refer to **fig 2**). The filler plug also acts as a valve; in the operating condition this filler plug is screwed down and closed steam tight, displacing the valve push rod (**part 4**), opening the isolation valve and thus allowing steam access from the steam chest. Imagine the scenario where, steaming along with a good head of steam, the driver pulls over for a rest at an appropriate watering hole with adequate human lubricating facilities. After refreshment and before continuing his meandering journey he opens the displacement lubricator drain valve to find water coming out. It's time to add some steam oil. He allows all the water to drain away, evidenced by the exhausting of residual oil or steam once the water has cleared. After closing the drain valve the driver opens and removes the filler plug; the isolation valve spring closes the isolation valve, shut-



ting off and isolating steam from the steam chest. After filling with good quality steam oil, assisted by the funnel shape at the top of the displacement lubricator, he replaces the filler plug and turns it down tight, the valve push rod opens the isolation valve and we're back in business.

The engine does have a mechanical lubricator which can be considered the main stay of the lubricating system and to a certain degree can be metered, the displacement lubricator then being a standby facility. In this mode, with the reservoir full and the filler plug screwed back a couple of turns, the

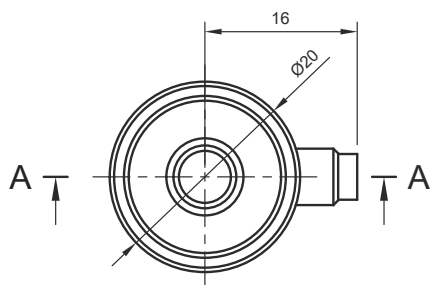
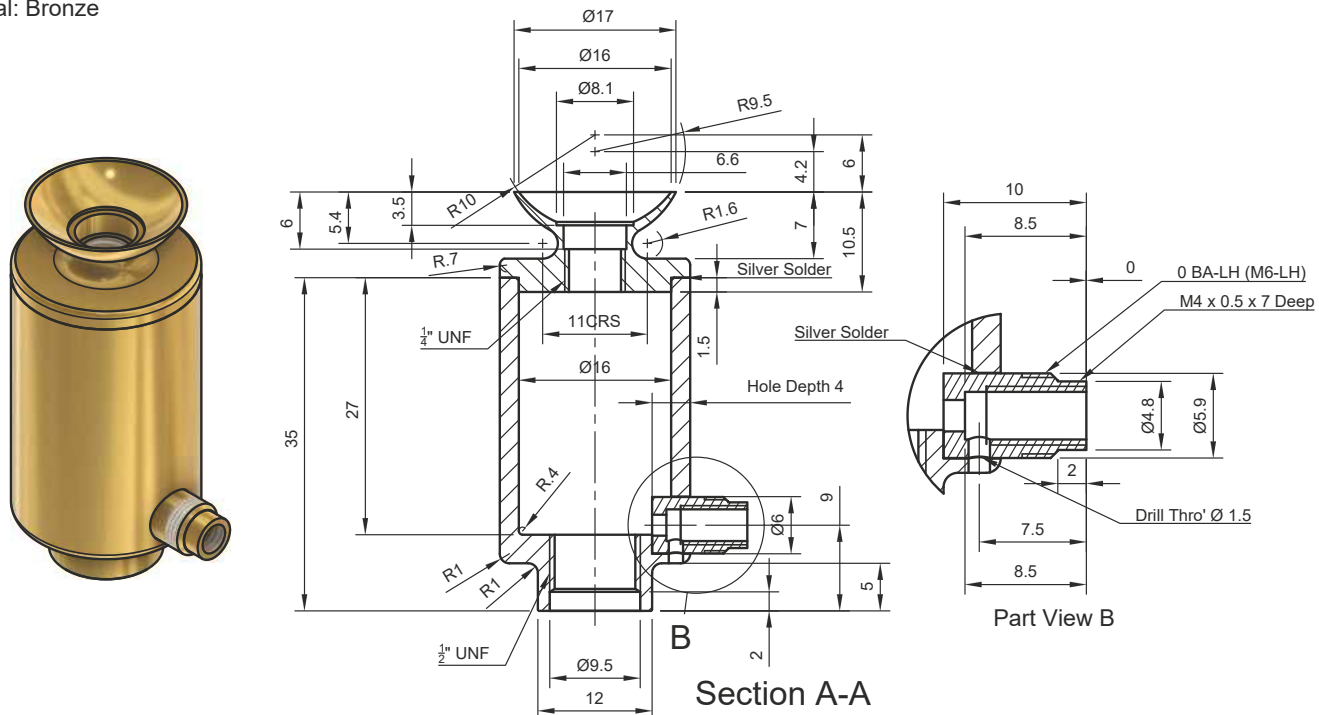
displacement lubricator is isolated from the steam supply and is on standby. Activating displacement lubrication is simply a case of screwing down tight the filler plug.

Does it work?

In preparation for official boiler testing and certification ➤

Part 1 - Displacement Lubricator Oil Reservoir

Material: Bronze



I anxiously filled the fire box with kindle and coal, lit a fire and raised steam for the first time (well it wasn't quite that simple - nothing more to be said). The aim was to identify any issues that needed resolution, of which there were a few. Nevertheless, a happy grin ensued for most of the rest of the day. After an hour or so of steaming the boiler was blown down and the contents of the displacement lubricator examined; to my delight it was full of water with not a drop of oil in sight.

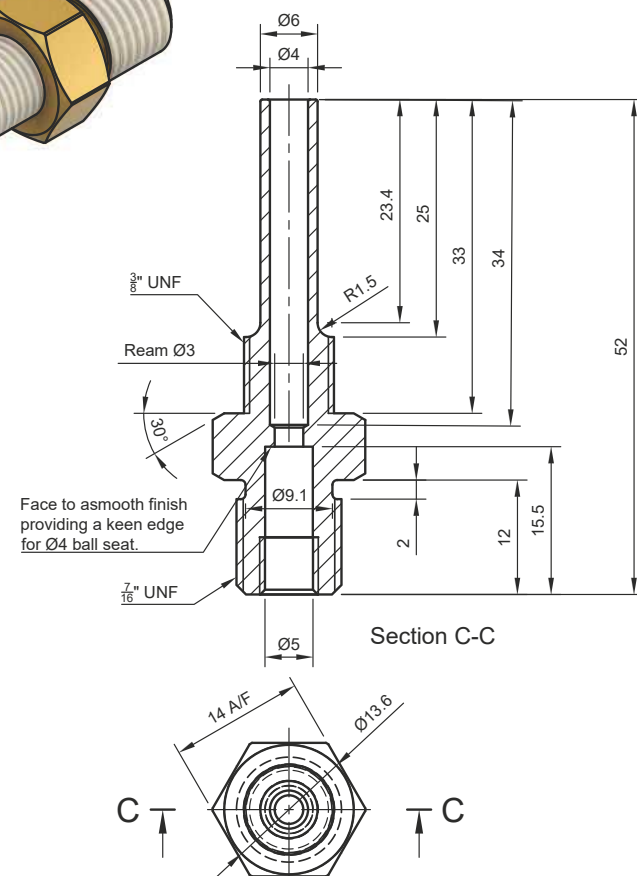
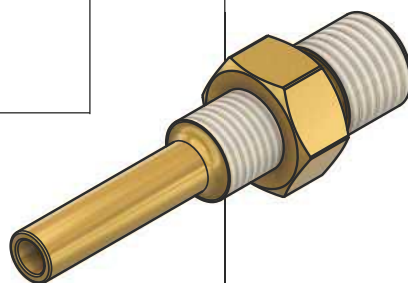
This meant that 4.3ml of oil had been displaced into the steam chest over a very short period. Over what period exactly is not certain though I am satisfied it's an effective form of lubrication that clearly works. It's very much an on-or-off situation - it may be possible to regulate the supply of oil to the steam chest by con-

trolling the gap between the ball and seat of the isolation valve when the filler plug is fully closed but obviously this would have to be a predetermined gap and not adjustable. For my own purpose I have adjusted the length of the valve push rod such that the last 1/8 of a turn of the filler plug acts on the valve push rod to open the isolation valve. For now, I'm happy with it as it is and doubt I will make any further improvements.

Building the displacement lubricator

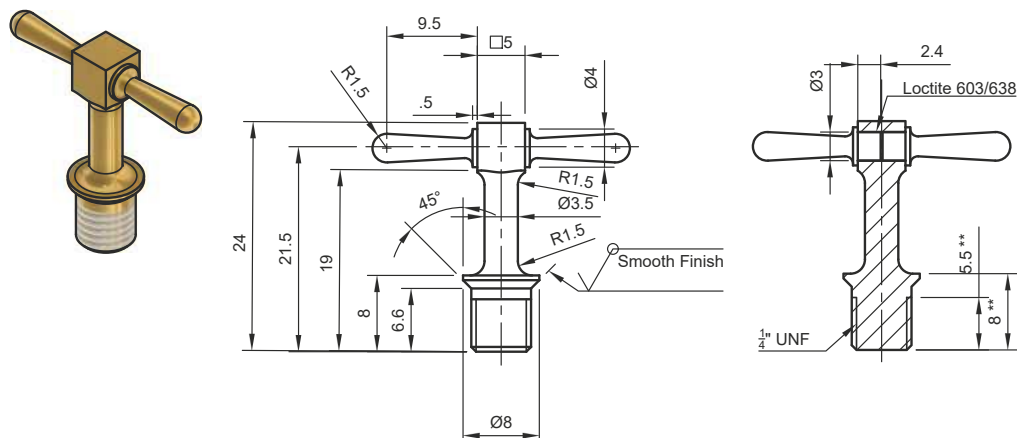
Proportionally my design does not follow the reference drawing (ref 2) exactly, in particular with respect to the ratio of body

Part 2 - Displacement Lubricator Steam Valve Stem



Part 3 - Displacement Lubricator Filler Plug

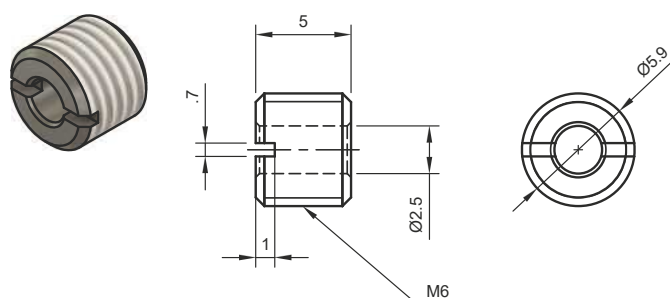
Material: Bronze



diameter and height. I made my design proportionally taller to provide a larger reservoir. Consequently, this is not a replica of any particular model but more a working representation. I have included dimensional drawings of my prototype which subsequent builders may like to follow or amend at their desire. This will be a very easy build for anyone competent at building a complete engine so a detailed description of the machining and fabrication process seems unnecessary.

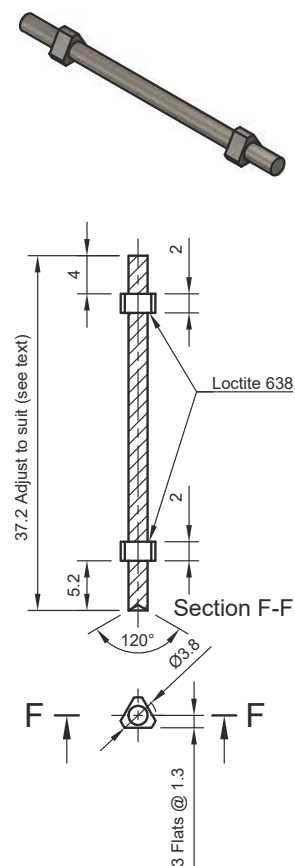
Part 5 - Displacement Lubricator Spring Retainer

Material: Bronze / 303 St St.



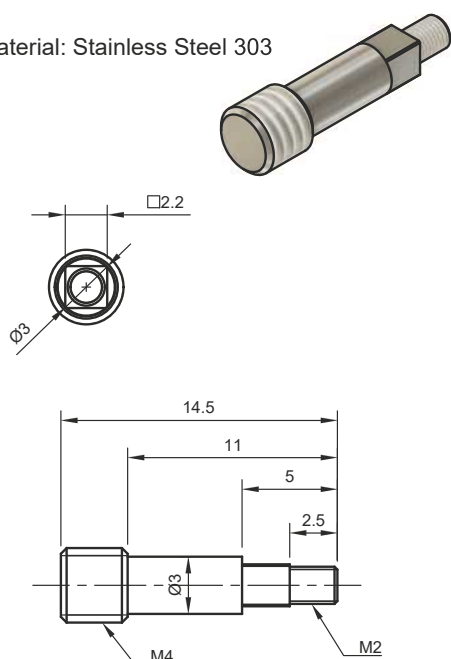
Part 4 - Displacement Lubricator Valve Rod

Material: Stainless Steel 303



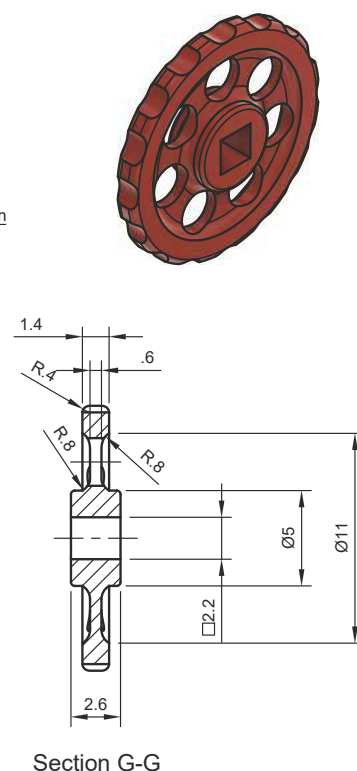
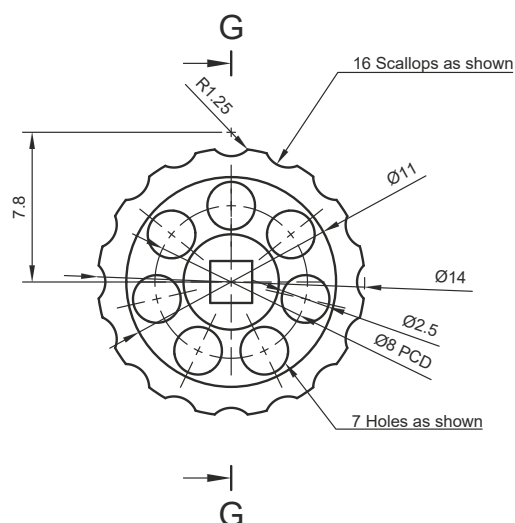
Part 6 - Displacement Lubricator Drain Valve Spindle

Material: Stainless Steel 303



Part 7 - Displacement Lubricator Drain Valve Hand Wheel.

Material: Stainless Steel 303, or
Brass or Mild Steel painted.



It may be noted that on the drain valve gland nut (part 8) I show a left-hand thread for assembly with the corresponding feature on the oil reservoir. This is a safety feature that prevents the drain valve spindle being fully unscrewed when opening the drain valve. Draining the reservoir of water only requires half a turn of the drain valve spindle making accidental full unscrewing of said spindle very unlikely. In this respect constructors can make their own choice or exercise their own opinion as to what safety feature they include.

My material of choice is bronze but experienced builders will have sufficient knowledge to make their own choice.

Conclusion

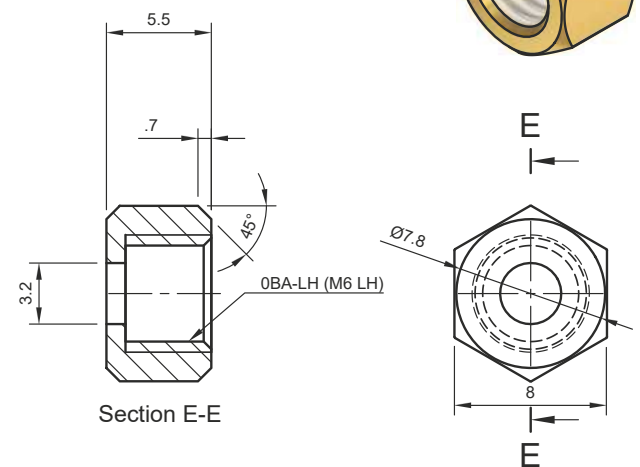
The design offered is functional; reference to the drawings provides details that are easily modified to suit larger scales and vary proportions to satisfy the builder. I hope this article provides some inspiration to design and build a displacement lubricator rather than 'make do' with a dummy representation or purchase a commercial product. ME

REFERENCES

1. 'Building the Allchin' by W.J. Hughes, 1990 edition, ISBN 0-85242-635-6
2. 'Traction Engine Design and Construction 1900-1930' by G. F. A. Gilbert, published by the author.

Part 8 -Displacement Lubricator Drain Valve Gland Nut

Material: Bronze



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- **Wide-A-Wake**
Ramon Wilson completes the reconstruction of the boiler
- **Ferrabee**
Anthony Mount makes a start on the valve gear for his stationary steam engine
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Ashley Best makes window frames, balconies and seats for the Bolton tram
- **Wally**
Bob Reeve assembles the gearbox and rings Wally's bells
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Terence Holland continues his journey to the battlefields of Ypres, Arras and the Somme
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Chris Gunn makes and fits the decorative ring to the flywheel
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Martin Gearing begins the description of his vertical boiler by describing the handpump that will be needed for testing it
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The Halesworth club celebrates its Ruby Anniversary at the Lowestoft Model Engineering Exhibition



Content may be subject to change.

ON SALE 22 DECEMBER 2017

Improvements to a GWR 14XX PART 3

John Whale
tackles
the blast
pipe and
petticoat pipe.



Continued from p.703
M.E. 4573, 10 November 2017

The following articles are intended to enable owners of the Winson 14XX to make their engines run more successfully. I assume your locomotive is complete and offer some suggestions for improvements.



The draughting arrangement on the engine was very poor and the only way to keep the fire going was to use the blower, which worked well - but turn the blower off and the fire went out.

I needed a new blast pipe and used as much as I could from the original. First make the blast pipe bridge from a piece of brass 0.89 inch wide by 0.50 inch thick (see **fig 4** and **photo 6**). Machine it to length and drill 0.22 inch diameter to the depth shown and tap the hole $\frac{1}{4}$ inch x 40TPI. Next drill the four holes 0.12 inch diameter. Unscrew the existing blast pipe from just below the nozzle and cut it off at 7 degrees then silver solder in the position shown. After cleaning up drill 0.315 inch diameter through into the cross hole.



The new blastpipe.

To make the two blast pipe uprights take the existing ones and, referring to **fig 4** and **photo 7**, cut off at 1.22 inch and then turn the flange to the dimensions shown with a hole

to suit the cut off upright and silver solder in position. If you prefer these parts could be turned from a solid brass bar.

Next make the nozzle reducer (**fig 4**) from a piece of 0.33 inch



Fig 4

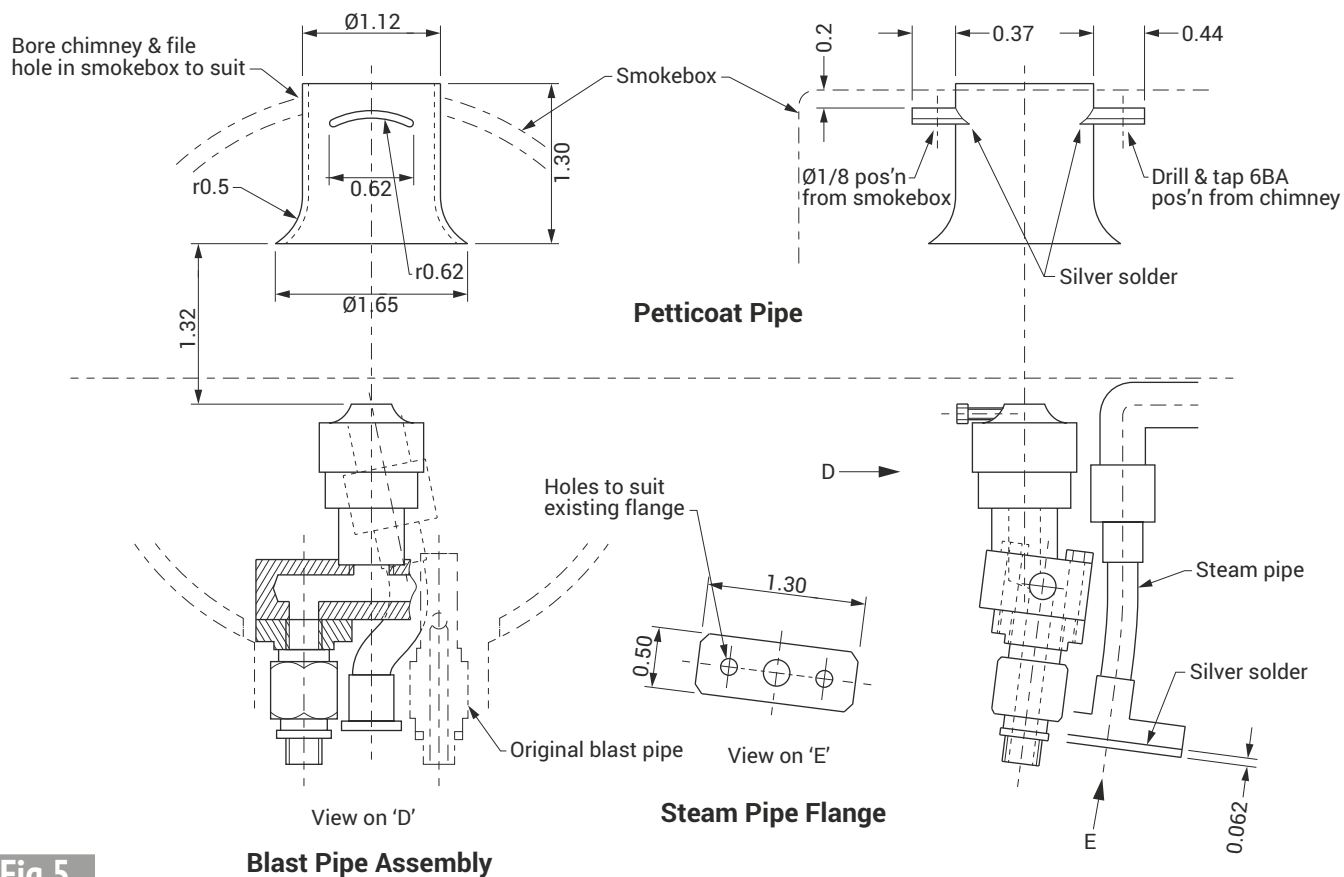
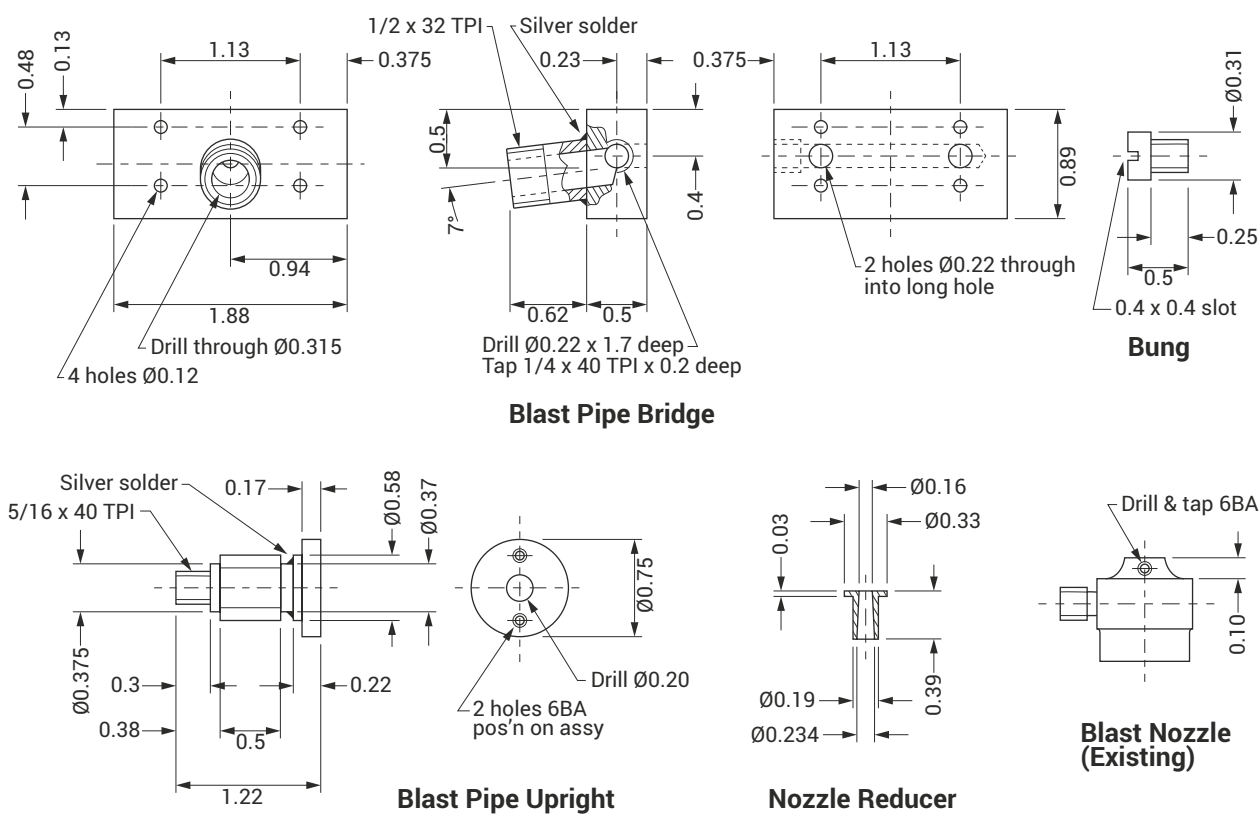


Fig 5



The two new blastpipe uprights shown in place.

brass bar. Turn the 0.234 inch diameter then drill the 0.125 inch diameter. Set the top slide to a shallow angle and, using a small boring bar, make a tapered hole then check the 0.16 inch dimension using a 0.16 inch drill pushed in 0.39 inch. When this is achieved check the 0.18 inch diameter; if this is close it will be fine. Finally, part off to length.

Turn the bung (see fig 4) from 0.31 inch diameter brass bar, turn down to 0.25 inch diameter and, using a $\frac{1}{4}$ inch x 40TPI die in a diestock, place the die against the job and bring the tailstock up to the diestock to hold it square. Turn the chuck slowly by hand to start cutting the thread and gently move the tailstock to keep the thread square until the thread is complete. Part off the bung to length and put a screwdriver slot in the end with a hacksaw. Then screw the bung in using a thread sealer such as PTFE tape.

The steam pipe flange on my engine was so narrow that steam escaped before reaching the cylinders. To cure this I made a complete new flange but an easier way is to silver solder on a new flange face made from $\frac{1}{16}$ inch thick brass as shown in fig 5. Note, if the flange on your engine is 0.375 inch wide or more this will not be required.

The petticoat pipe can either be turned from the

solid, preferably from brass, or it can be made from copper tube and the end flared as shown in fig 5 and **photo 8**. To make it from copper tube bore the chimney to suit then turn a wooden former and bore a hole in it 1.12 inch diameter. Using a file make a flare at the end of the hole. With the former in the vice heat the copper tube to red hot and anneal it by putting it in cold water. The tube will now be soft enough to place in the former and, using a ball pein hammer, tap the tube into the flared end of the former until the flare is to the drawing shown in fig 5. If the copper starts to get hard to work anneal it again and continue. To make the petticoat pipe from the solid hold a piece of round bar 1.65 inch diameter, preferably brass, in the 3-jaw chuck and bore it out to 0.95 inch diameter and turn the



The petticoat pipe.

outside to 1.12 inch diameter and 0.8 inch long. Reverse in the chuck and bore the flare as shown in fig 5 with the top slide set at approximately 45 degrees. Finish using a file. Make the fixing brackets from 0.16 inch thick brass or copper as shown and silver solder them in position. Note these can be made from brass angle and bolted in place using countersunk screws with the head on the inside. To fix the petticoat pipe in position carefully file the hole in the smokebox to suit. Drill a $\frac{1}{8}$ inch hole in the front bracket, positioned from the smokebox, and secure in position with a 6BA hex head screw, then fit the chimney and drill through .086 inch into the bracket from the back of the chimney flange. Remove the chimney and tap the bracket 6BA then open out the hole in the chimney to $\frac{1}{8}$

inch and fix the petticoat pipe and chimney in position.

Make gaskets for the steam pipe and blast pipe upright flanges then place the smokebox saddle in position and fix the steam pipe in place, not forgetting the gasket. Now screw in the blast pipe uprights and position the blast pipe bridge as shown in fig 5. Mark through the four 0.12 inch holes into the uprights. An easy way of locating the bridge is to place round pegs in the uprights and locate them using the 0.22 inch holes. Remove the bridge and uprights, drill .086 inch and tap 6BA as shown then screw the uprights back in using thread sealant and fix the bridge in place with 6BA hex head screws, making sure the gasket is in place. All that remains is to fit the blast nozzle and reducer as shown in fig 5.

●To be continued.

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A Bulleid Display at the Bristol Model Engineering Exhibition

Bernard North takes us on a tour of the display of Bulleid's locomotives at Bristol.



Remembering 50 years since the end of Steam on the Southern Region of British Railways.

The Southern Region of British Railways, formed at the nationalisation of the Britain's railways in 1948, inherited a large and varied stock of steam locomotives. Some of these, like the Bulleid Pacifics, were relatively modern whilst others such as the *King Arthurs* and the LBSCR *Terriers* went back to an earlier era when steam was king on the railways. Steam was used throughout the system, particularly in areas where large scale electrification had not yet taken place. In fact, part of Bulleid's responsibility was the implementation of electrification across the Southern but it had not yet reached the lines to the South West. This meant that most of the crack expresses of the region were steam hauled almost to the end of steam on British Railways. These included such trains as the *Atlantic Coast Express*, *Bournemouth Belle* and the *Golden Arrow*, to name but a few. The boat trains to Southampton out of Waterloo



were also an example of steam traction right to the end of steam.

The end for Southern Region steam came in July 1967 when the electrification of the main line from Waterloo to Southampton and Bournemouth was completed. The mainstay of steam traction on these lines was the Bulleid Pacifics, in their many different forms, *Merchant Navy* and *West Country* in both their original air smoothed design and the rebuilt versions. It was therefore a fitting tribute to the end of Southern Region steam, 50 years almost to the day, that a display of Bulleid designed locomotives in model form should be assembled for this year's

Bristol Model Engineering Exhibition (**photo 1**).

The idea for this display came from numerous discussions between Rob Speare and me, over a number of years, about putting together a Bulleid display in the heart of Great Western country at the Bristol Exhibition. Rob has been the driving force behind a superb website (www.bulleidlocos.org.uk) that brings together information on many examples of Bulleid designed locomotives in model form. It's well worth a look, whether or not you are a Bulleid fan.

The display brought together examples of Bulleid designed locomotives in model form from all directions including



Part of the Bulleid display at the Bristol Model Engineering exhibition.



Display board describing Bulleid's life and work.

the Isle of Man. As well as several *Merchant Navys* and *West Countrys*, the display also included the unusual Q1 class 0-6-0 goods engine and a lesser known 0-6-0 Diesel shunter making use of 3D printing. Both completed models and those under construction were on display together with one or two 'full-size' items.

The centre piece of the stand was a large display screen packed with information about O.V.S. Bulleid's life and his locomotives, a potted history of one of the last Chief Mechanical Engineers of the steam era (photo 2).

Merchant Navy class

Bulleid's *Merchant Navy* Class was well represented in both its original and rebuilt forms. Named after shipping lines that used the port of Southampton, John Lloyd's 21C2 *Union Castle Line* (photo 3) and John Cottam's 21C6 *Peninsular and Oriental Steam Navigation Company* bearing the *Golden Arrow* headboard (photo 4) were fine examples of the original air-smoothed design. The extensive rebuilding of the class, masterminded by Ron Jarvis for British Railways, produced a rather more conventional appearance and was represented by Mike Casey's 35031 *Isle of Man Steam Packet Company* (photo 5), a new member of the class.

Keith Wilson's *Ariel* design for a 5 inch gauge rebuilt *Merchant Navy* was also well represented with several examples under construction (photos 6, 7 and 8).



John Cottam's 21C6 *Peninsular and Oriental Steam Navigation Company*.



Kevin Neate's *Ariel*, so far un-named.



Bob Gates *Ariel* on a building stand, so far un-named.

The West Country class – original form

The light Pacifics, better known as the *West Country* and *Battle of Britain* classes, were



John Lloyd's 21C2 *Union Castle Line*.



Mike Casey's 35031 *Isle of Man Steam Packet Company*.



Anthony Caudrey's 35008 *Orient Line*.



The late Alec Hadfield's 3 1/2 inch gauge model of 21C145 *Ottery St Mary*.

a slightly smaller and hence lighter version of the *Merchant Navy* class, enabling wider route availability. They were named predominantly after

west country towns served by the Southern Railway and also later after RAF Squadrons and related names that were part of the Battle of Britain. The

late Alec Hadfield's 3½ inch gauge model of 21C145 *Ottery St Mary* (photo 9), based on LBSC's *Pamela* design, showed the class in its original form. Under construction were Les Huggins's 34007 *Wadebridge* and Stefan Owen's 34092 *City of Wells* (photos 10 and 11).

Now to the smaller end of the scale - this 2½ inch gauge model of an original *West Country* Class locomotive by Doug Rundle makes an interesting display of component parts (photo 12).

The rebuilt *West Country* class

The *West Country* Class in its rebuilt form was represented by my own 5 inch gauge model of 34008 *Padstow* (photo 13). Alongside the locomotive was the original coffee table made by the Eastleigh apprentices back in 1945 (photo 14).

Bearing the Cornwall Coat of Arms, it was presented to the Chairman of Padstow Urban District Council at Padstow's official naming ceremony on 31st October 1945. So there's a bit of history alongside a model of the locomotive that bears its name. The cup alongside the coffee table was the CuP Alloys trophy for 'Best in Show', awarded this time to Rob Speare, who masterminded this special themed display.

The Q1 class goods locomotive

Bulleid's unusual 0-6-0 Q1 class goods engine, built during war time under austerity conditions, was a rather utilitarian design. Devoid of frills and gadgets, the locomotive has a certain charm and it became Britain's most powerful 0-6-0 on the system. It provided much needed motive power to a rundown locomotive stock on the Southern Railway towards the end of the Second World War. A full-size version is preserved as part of the National Collection at York.

Nick Feast's 3½ inch gauge design (photo 16) featured in *Model Engineer* pages as a construction series and Nick's model was on display

on the stand (photo 15). This, together with Rob Speare's almost complete 5 inch gauge version (photo 16) and William Powell's partly built model (photo 17), were fine examples of the class.

Diesel locomotives

Now for something completely different. Bulleid had already produced 26 Class 12 Diesel electric shunters for the Southern Railway to an earlier Maunsell design. Following on from this, a new Bulleid design for Diesel mechanical locomotive No. 11001 was produced and came into

service in 1950 after Bulleid had departed to Southern Ireland. Only one was built as a prototype and it has the dubious claim that it was the first Diesel locomotive put into service by British Railways. This 5 inch gauge version, under construction by Quentin Reed (photo 18), will use electric motors with modern electronic controls and is making extensive use of 3D printing technology to produce the various body panel components. The wheel patterns have also been manufactured using 3D printing.

The *Leader* class

The one locomotive that was missing from the display was Bulleid's infamous *Leader* Class. There are not too many models of *Leader* around and, whilst not being part of the end of Southern Region steam, it is part of the Bulleid story. It was however represented on the display by a video showing Kevin Ayling's 5 inch gauge version running at IMLEC 2017 at Southport.

I did suggest to Rob that we might try to obtain the full size front end mock up produced by Southern Locomotives Ltd. for the Bulleid event held on



Les Huggins 34007 Wadebridge.



Stefan Owen's 34092 City of Wells.



Doug Rundle's 2½ inch gauge West Country Mary Tavy, another new member of the class.



Bernard North's 34008 Padstow.



Coffee table from the original October 1945 naming ceremony for 21C108 Padstow.



Mike Gipson's 34004 Yeovil.

the Swanage Railway earlier this year. I also suggested, somewhat tongue in cheek, that we should start a rumour that the next full size 'new build' project should be a *Leader*. Anyone want to take up the challenge? - I am sure all the drawings are in York Museum!! It is a shame that the only working version was consigned to the scrap heap and not preserved for posterity, even with all its sleeve valve problems. Perhaps with modern materials and technology it could be made to work.

Full size bits and pieces

The display also included a few full-size items on display, including a replica nameplate for *Sidmouth* (photo 19), some cut outs from a boiler foundation ring (photo 20) and one of the electric lamps used at the front and rear of the Pacifics (photo 21).

Finale

Finally, at the end of show, here is a group photograph (photo 22) of most of the Bulleid owners who entered exhibits for the display. One or two escaped but most are present. There are some well known faces amongst this group and our special thanks go to all of them for loaning their models, some having travelled quite considerable distances to be with us. Finally, a big special 'thank you' to Rob Speare (in the centre with the cup), who put in a lot of effort to bring this all together. His careful layout and display skills, together with some gentle persuasion, made this all happen. This was a memorable weekend and a display that would be difficult to repeat. Does anyone know of a collective noun for a group of Bulleid model owners?

ME

Photographs by
Bernard North and Rob Speare.



16 Nick Feast's 3 1/2 inch gauge Q1 class 0-6-0 goods locomotive.



17 A part built 5 inch gauge Q1 class 0-6-0 goods locomotive built by the late Gerald Chandler and now owned by William Powell, who has set about completing the model.



18 Quentin Reed's Diesel shunter No. 11001.



19 Replica Nameplate for Sidmouth.



20 Boiler foundation ring cut outs.



21 Electric lamp housing.



22 A round-up of most of the Bulleid owners.



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Help – Tri-Wing Screwdrivers

Dear Diane, I have three electrical items which I wish to take apart for cleaning.

There are six screws which retain the back. Five of these have Philips heads whilst the sixth annoyingly has a tri-wing head. For those unacquainted with such a head it is almost identical to a Philips head except that it has three radial slots rather than four. I have a set of tri-wing bits, which includes a holder, but the screws are at the end of a deep hole with a diameter that is only slightly larger than the screw head. Even the drive hexagon on the tail end of a bit is too large for it.

I have failed to find a source of tri-wing screwdrivers with the bit integral with its shaft – no luck from RS components etc. These are readily available for Philips and Pozi-drive. I could machine a bit on the end of a piece of silver steel and harden. But this is not quite as straightforward as it might at first appear. Another possibility is to buy a tri-wing bit which is available from RS components and others, then machine off the hexagon end, drill and tap the end then add a silver steel shaft. But, and a big but, I don't know if it possible to soften such bits to allow machining then re-hardening.

So I seek answers to two queries. First, is it possible to

buy individual tri-wing drivers with a shaft which is only marginally bigger than the bit and is at least 5cm long? Secondly, could a tri-wing bit be softened so that I could add a shaft? My knowledge of working chrome steels and similar is somewhere between non-existent and nil!

Regards
Roger Castle-Smith
(Milton Keynes)

Pinhole Grates

Dear Diane, Having spent most of my working life in the Boiler Industry, starting with Ruston and then onto Robey as Chief Engineer until its closure in 1987 and finally BIB, all in Lincoln, in all that time I have never heard of a Rosebud Grate (as featured in recent issues of *Model Engineer*).

However, I am familiar with this type of grate, with its universally known title of the simple 'Pinhole Grate'.

This type of grate is fitted to solid fuel fired boilers where the fuel to be burnt is physically small in size, most of which would fall through the air gaps in conventional firebars.

The purpose of any type of grate is to support the fuel being burnt, whilst allowing the combustion air to pass through. The air passing through the grate is known as Primary Air, as distinct from Secondary Air which is required to burn off the volatiles liberated from the fuel above the firebed. For typical fuels, the ratio of Primary to Secondary Air is approximately 70:30.

For the amount of steam to be generated, it is possible to calculate the amount of fuel required, and also the amount of combustion air.

For any type of grate, there will be a Maximum Burning Rate (fuel burnt per unit area), and this is established from experience. To burn more fuel, more air is required, and thus the velocity of the air passing through the grate will increase. If this is increased

to the extent that the fuel is literally 'blown off' the grate, then the Maximum Burning Rate will be established.

So knowing the size of grate, and based on its Maximum Burning Rate, the max fuel consumption can be established and consequently, the amount of steam generation.

There will be a pressure drop for the air passing through the grate, and also the combustion gases passing through the boiler tubes, and thus some form of draught is required to overcome this resistance. In the case of a steam locomotive, the 'Induced Draught' required is produced from the effect of the exhaust steam, and its arrangement, in the smokebox of the boiler.

So we need a grate that is big enough, with minimal resistance to air flow, and thus the use of tapered holes will have less pressure drop than parallel holes. As for the heat that is transferred in the tubes, well that's down to the complexity of convective heat transfer - suffice to say that we need the maximum heating surface possible, within the physical constraints of the overall boiler size.

Back in 1951, I went with my parents down to London for the Festival of Britain, and we stayed with my Uncle and Aunt in Leyton. Uncle Bert worked on the railways, and one night he said we should go to Stratford to see the Boat Train coming through. So off we went and stood on the platform waiting. Uncle Bert looked at his watch and muttered that it was late, but eventually the sound of an approaching train could be heard. "Here it comes" said Uncle Bert, and then "God, he's making up time, and he's got everything coming out the chimney, bar the firebars".

I still remember that moment - it was 70000 Britannia but I didn't know what Uncle Bert was talking about, but I now do. It's all down to burning rate, and its limitations.

M J Willerton

Steam Hammer

Dear Diane Carney, I wonder if your readers who might make this model would be interested in the following information and photograph.

The Stuart Models website mentions that their Steam Hammer is based on Rigby's patent design.

The real thing can be seen in the Glasgow Maritime Museum in Irvine, Ayrshire, and another very similar is in the Chatham Naval Dockyard Museum in Kent.

My photograph shows that the model is a very good likeness and gives an idea of the scale of the real thing. It is a massive beast.

John Chapman (Plymouth)



Making the Tool Chests

for an LNWR Webb tender

PART 1

Chris Rayward demonstrates how to make the rather beautiful tool chests found on Webb tenders.

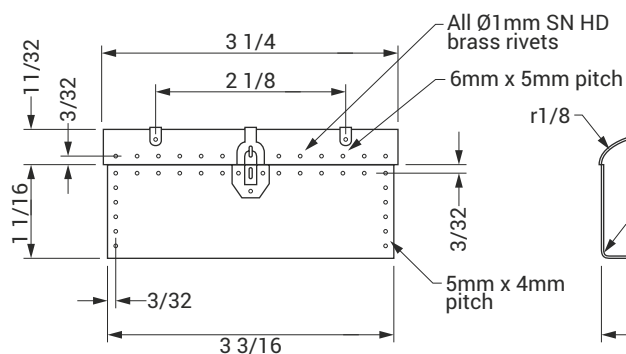


Some time ago I began making an L&NWR 2-2-2 Problem class passenger engine in 5 inch gauge. It started when I was given some parts which had been started by the late Geoff Cashmore and, as was only to be expected, he had done much good work. He and I had corresponded in the early 1980's and I was well aware of his enthusiasm for the L&NWR locomotives. At the time I was mentally in the doldrums and it was just what I needed to lift me back into model engineering.

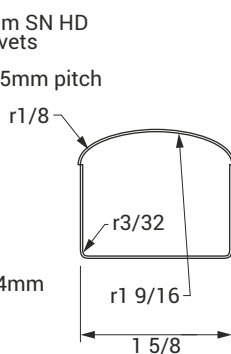
Those of you who have seen the locomotive at exhibitions will know how good it looks, and I am still working slowly



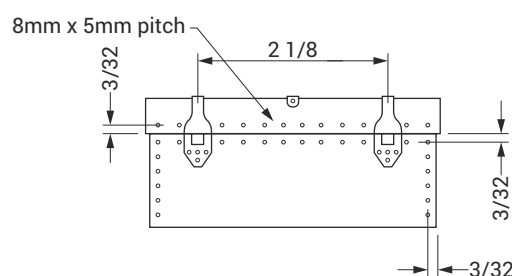
This picture was taken by me on the footplate of the prototype Precedent Hardwick and shows the right-hand chest in a poor state. It has clearly been patched and the original hasp and latch plate have been replaced. The chests are over 3ft long and I am told they were used for the crew's coats and food supplies in one and the required tools in the other. Note how the lid has hooks on it which were used to secure the tarpaulin above the footplate when the weather was bad. The chests were secured to the tank top using screw-eyed hooks through the handles at each end and there are blocks of wood underneath inside the constraining brackets to prevent chafing between the metal surfaces.



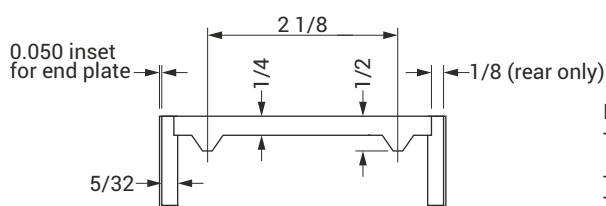
Tool Chest Front (Inside) Main Casing
Mat'l: 20SWG brass



Tool Chest End Plates
Mat'l: 0.048 brass, soft solder inside casing

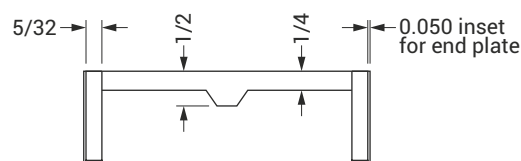


Tool Chest Rear (Outside)



Inside Section
Showing end strips & rear support for hinges

Notes:
- Form, tin & position end strips & soft solder in place
- Add rivets as shown
- Similarly, add front & rear support plates for hardware & add rivets after soldering



Inside Section
Showing end strips & front support for latch



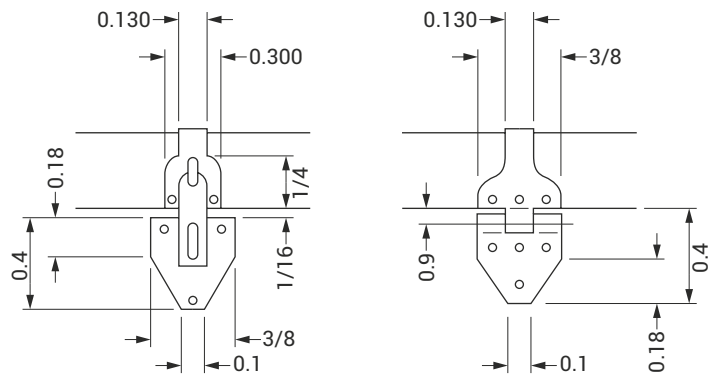
The tank bodies are started by cutting to length two pieces of half hard 20swg brass plate to the required sizes. Centre lines are added to each plate and the positions of the bends are also scribed on either side. A forming block of the correct inside dimensions and with radii on the lower corners is then needed to put the two bends in each plate. I used a piece of wood with a hide mallet to form the bends with the forming block being proud of the chest so the material could be held securely in an ordinary bench vice. It is imperative to keep the work area clean as the slightest quantity of swarf from any previous operation will find its way under the surface being worked and cause blemishes that will show later on.

towards its completion. Doing the drawings, providing castings and the other specialized materials has encouraged others to build it too and many fine models are taking shape. Those who have reached the stage of running the chassis on air have been delighted. By popular request I went on ahead to build the tender, which is very nearly complete, and two of the items needing care have been the tool chests that are so prominent on each side of the tender.

The construction of this model has not been serialised but I mentioned to our Acting Editor that I had prepared a series of photographs showing the construction and he felt others would like to know the techniques involved; so here they are. Anyone wanting a full-size copy of the original drawing may have one from me for a small sum and I can be contacted on 01600 713913 or via my email at hotspurmodels@outlook.com

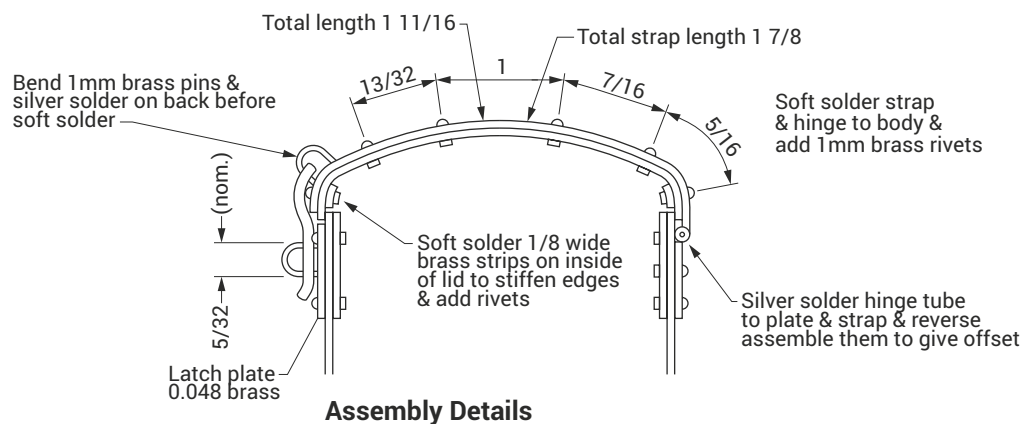
This short series is done with photographs and extended captions which I hope will be self-explanatory.

●To be continued.

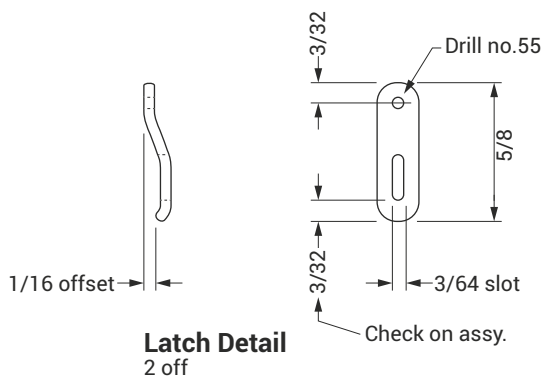


Latch Plate Detail
2 off

Hinge Plate Detail
2 off



Assembly Details



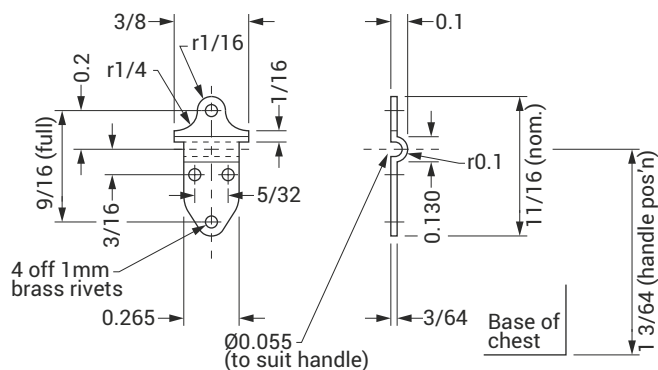
Latch Detail
2 off



The upstands from the new channel sections should be checked for height and squareness and corrected if necessary. The next task is to add the two pairs of support strips inside each end by bending the brass to be a close fit and tinning them with soft solder. They are to act as recesses for the end plates made from 18swg brass and need to be held just 0.050 inch in from the end edges and heated to retain them in place. Note that for the correct rivet spacing the back row of rivets is slightly different to the front and there is a notch in these strips to allow the rear stiffening for the hinges to be longer than the front one.



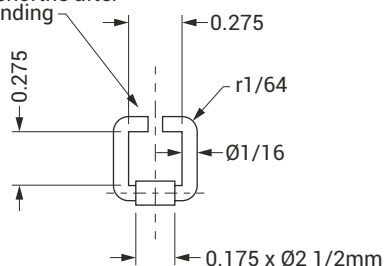
Clearly the end plates cannot be added until these recess strips are secure so the rivet holes holding the strips at each side back and front need to be added and the rivets put in. Here I use some 1mm snap head brass rivets and after drilling and de-burring the holes each rivet is cut and squared off before being fitted. Thankfully this is quite a simple task as a small hammer or punch can quite easily gain access to the end of the rivet and the chest body is easily held with the rivet head onto a small rivet snap.



Handle Mounting Plate

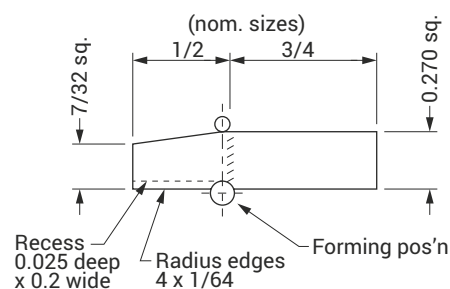
Mat'l: 2 1/2mm brass bar, 2 off

Turn both ends of a 1 1/2" free length & shorten after bending



Handle

Mat'l: Stainless steel, 2 off



Handle Forming Mandrel

2 off

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Technologie sans Frontières

PART9

Dr. Ron Fitzgerald looks at English and French locomotive design in the second half of the nineteenth century.

Continued from p.712
M.E. 4573, 10 November 2017

'All steam locomotives in France are scheduled to be withdrawn by 1971. Thus will end the story of the finest locomotive work the world has ever seen; a story of highly efficient but often highly complicated machines, worked by the best trained and most competent locomotive men there have ever been.

A lot of superlatives perhaps but nobody who has studied steam locomotive work in many countries will deny their truth.' *Dr. P. Ransome-Wallis.*

Nord 2101 and du Bousquet's first essay in locomotive design

The risk of confusing sequence with consequence is ever present where firm evidence is lacking but it seems reasonable to assume that the engineers of the Nord Railway at La Chapelle were influenced by their Ouest neighbours' work at Batignolles. Towards the end of the second half of 1888 the La Chapelle workshops built a four-coupled bogie locomotive which is likely to have been a reaction to current events in the 17th *arrondissement*. Ouest 951/2 was crossed into the *Outrance* pedigree to produce a gaunt, inside framed 4-4-0 that entered service in April 1889 carrying Nord no. 2101 (**photo 55**).

The Nord machine had a tidier version of the Delabeque's *Outrance* Belpaire boiler with the trailing axle located behind

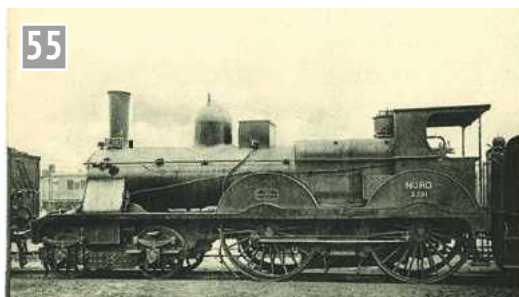
the backhead and under the footplate, leaving the ashpan unencumbered. The firebox did not have a brick arch but was fitted with a Tenbrinck water table. The water table occupied the same position as a conventional brick arch but was a hollow, pillow shaped, water-filled copper chamber connected by tubes to the firebox water spaces. The inventor was a P. & O. engineer of that name. The boiler pressure of 2101 was 156psi. The Crampton style regulator and steam pipes were abandoned and replaced with a dome regulator with internal steam pipes on the English model.

Inside cylinders, 19 x 23½ inches, were used with the valve chest covers outside, penetrating the frames. This was an idea common in Belgium where it was favoured as giving free access to the valve chest. It also had the advantage of allowing the eccentrics and motion of the Stephenson valve gear to be located between the cranks and the inside face of the frame plates rather than at the midspan of the crank axle. The driving wheels had a diameter of 6 feet 10¾ inches. An Alsace type, fixed pivot bogie (**ref 1**) was placed symmetrically under the inside cylinders. The centre

portion of the bogie's outside frame plates was dropped to give more clearance for the cylinders and valve chests.

Nord 2101 was displayed alongside Ouest 951 at *l'Exposition de Paris* in 1889. A series of trials followed including a period on the P.L.M. With a slightly larger grate area, a higher boiler pressure and bigger cylinders, the machine proved more powerful than the *Outrances*, hauling 190 tons at 45mph, and showed slightly better fuel consumption. In 1890 she handled a 240 ton train, developing 690hp at just over 65mph and 670hp at 76½mph. More prolonged service proved less satisfactory. A passing reference in an article published by *The Engineer* in 1892 (**ref 2**) indicates that 2101 had suffered a re-occurrence of the problems encountered with the *Outrance* class. The frame plates had fractured after running 40,000 miles and after 46,000 miles the crank axle had had to be replaced. It was withdrawn from service in 1893 and scrapped in 1897.

Nord Railway 2101 was built during Ferdinand Mathias's period as *Ingenieur en Chef du Materiel et de la Traction*. His chief assistant engineer was David Banderli whose possible connection with the fixed pivot



Nord 2101 (source: Roelof Brettschneider collection).

bogie has been noted above. Both died in 1890. Matthias was 69 at the time of his death but Banderalli's career on the Nord was clearly cut short by his death at the age of 54. Whether he was considered heir presumptive to Delebecque is an open question. In 1890 Gaston du Bousquet replaced Matthias as Chief Mechanical Engineer of the *Chemin de Fer du Nord*.

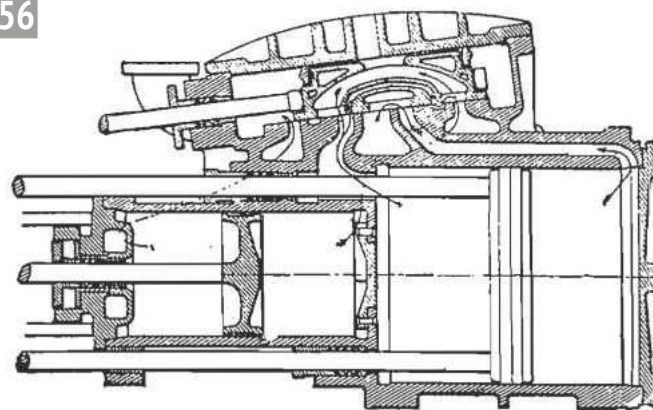
The first locomotive design to be directly credited to du Bousquet is the heavy goods, Woolf compound described in *Le Genie Civil's necrologie* (obituary). Van Riemsdijk refers to this machine in his book *Compound Locomotives* (ref 3) stating that the date of construction was 1886 but the failure to provide any supporting source makes verification difficult. This is unfortunate, as van Riemsdijk's date is at variance with that given by Vilain (ref 4). The latter says that the locomotive was experimental and that the experiment took place in 1889 involving three locomotives: 4728, 4731 and 4733. They were members of a class that was well established on the Nord; two cylinder, simple expansion, eight-coupled machines with no carrying wheels, two cylinders outside the frames and outside Stephenson valve gear. Latterly some had been fitted with Delabeque's Belpaire firebox boiler but the Crampton

type steam pipes and regulator persisted.

Du Bousquet modified the design by replacing the outside cylinders with outside, close coupled, tandem compound units. A single casting combined the low- and high-pressure cylinders with the valve chest. The low-pressure cylinder was placed at the front end of the locomotive and high-pressure cylinders behind it, adjacent to the leading coupled wheels. The layout of the piston rods was similar to a current British stationary and marine practice known as the 'three rod' configuration. Two rods attached within the circumference of the low-pressure piston exited from the cylinder through glands and flanked the exterior of the high-pressure cylinder to join a crosshead which also carried the single high-pressure piston rod. The tandem cylinders worked on the Woolf compound system which dispensed with the intermediate receiver between the high- and low-pressure cylinders, the former exhausting directly to the latter. The single, Trick-ported, slide valve was heavily sloped on its seating and the steam passages were very asymmetrical (photo 56).

In service the experimental locomotives showed a 13% economy in coal consumption with a similar percentage gain in haul capacity but, beyond this, there is no

56



Du Bousquet's Woolf compound cylinders fitted with Trick valves
(source: *Les Locomotives Nouvelles*, Pierre Guedon, 1898, p. 324).

reliable information available concerning the full-life performance of the machines. Twenty more examples were built but it did not become a general type. The boiler pressure remained the same as the equivalent simple expansion engines, 150psi, which was low for compound cylinders in railway work. It was also the case that, when used in locomotives, the absence of a receiver in the Woolf system is suspect and the tandem cylinders tended to overload the crankpins. Notably, du Bousquet retreated from Woolf compounding thereafter and his later tandem-cylindered tank locomotives for the *Ceinture* used a receiver and a single rod passing through both cylinders. The sustained line of locomotive development

on the Nord Railway was not deflected by du Bousquet's first effort in locomotive design and it continued to be by way of the *Outrance* class and de Glehn's Nord 701.

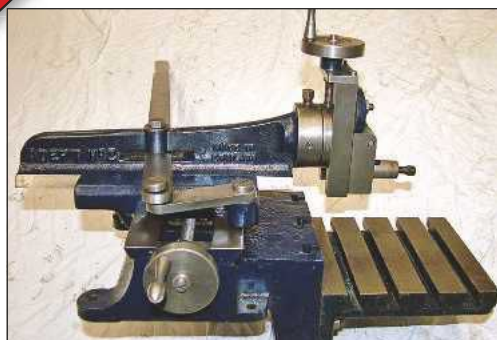
● To be continued.

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1. *The World of Steam Locomotives*, Gustav Reder, Blandford Press Ed. 1975, p. 194.
2. *The Engineer*, September 2nd 1892, p. 205.
3. *Compound Locomotives*, J. T. van Riemsdijk, Pub. Atlantic Transport Publishers 1994, p. 16.
4. *Dix Decennies de Locomotives sur le Réseau du Nord (1845-1948)*, Lucien-Maurice Vilain, Editions Picador, 1977, p. 163.

No.262

LOOK OUT FOR THE DECEMBER ISSUE, 262,
OF MODEL ENGINEERS' WORKSHOP, FOR EVEN
MORE FASCINATING TALES FROM THE WORKSHOP:

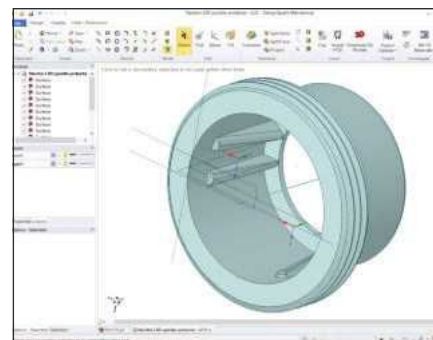


Using a shaper with Bill Morris.



An update on Peter Shaw's filing rest.

MODEL ENGINEERS'
WORKSHOP



Darren Conway prints a spindle nose protector.



Triang metal Truck.



Märklin W196 Mercedes "Silver Arrow" model from 1994.

Old Toys Never Die

They just need taking care of!

Henk-Jan de Ruiter looks back to a bygone age when toys were toys.



This article is a short introduction to European classic metal toys, worth restoring or collecting.

There was a time when men were men and toys were toys. Often these toys, made of thin sheet metal, had a sort of straightforward simplicity and that is exactly part of their charm.

I like particularly the size and scale of these models, generally about 25-50 cm long and therefore not too large to create storage problems. Moreover, you have a great conversation piece in your 'man cave'.

These toys were made in factories over a period of several decades using extensive manual labour in



Märklin Mercedes SSK model from 1995 with flexible exhausts.

order to design, paint, bend, bolt or rivet all these models together.

Nobody had heard of CAD-CAM, CNC, waterjet or laserjet cutting; manual manufacturing was the way things were done and marketing budgets were low.

Each employee could be proud to have accomplished the production of such a fine tinsplate model, made solely by their talent and skill, an art that seems almost lost in this modern age.

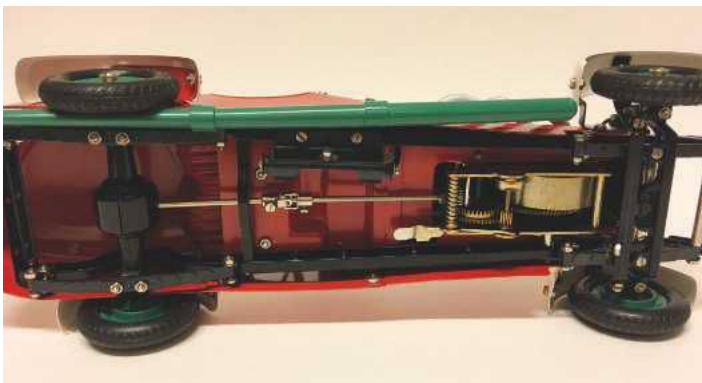
Of course, toys made during the 1920's and 1930's are more expensive and more difficult to come by than modern toys.

For example, the Alfa P2 model motorcar, made by the French CIJ (*Compagnie Industrielle du Jouet*) is regarded as the 'Holy grail' and can easily fetch a couple of thousand UK pounds.

These kinds of cars grab your attention right away; they ooze glamour and inspire the same feelings that those first racing cars - Maseratis or Ferraris - had in real life.

Other interesting model car toys were made by PAYA of Spain and INGAP from Italy.

Meccano made some beautiful model motorcars during the pre-war period and these are very sought



Underside of the Mercedes SSK with clockwork motor.



Schuco metal toy representing a BMW 327.



Tinsplate Scalextric slot car model from their 50 Year Anniversary Set.

after. The Märklin company in Germany is also a famous name in the world of toys and their history goes way back; they are one of the few companies able to manufacture these tinsplate products up to this day. Their extensive line of products is sold under the name of Märklin Metall.

Another German brand still producing a collector series in this field is Schuco.

Sometimes classic toys need restoration, which can be a (partial) repaint job or a complete overhaul.

Purists will probably argue not to touch these older toys too much in order not to disturb the patina or heritage of the object.

Most companies ceased production of tinsplate toys around the 1960's as production became too costly, and therefore no longer economically viable, and changed production to plastic products. A second reason was that they could more easily bring on extra detailing with plastic flow patterns in the moulds.

Although a lot of these toys are from a bygone era, a few companies revived these kinds of toys and it is good to see that people start to recognize these excellent toys and keep them in high esteem - not only showing them off at exhibitions but also preserving these toys for the next generation.

I hope this article will inspire readers to explore this wonderful world of metal toys and to meet great people and make new friends.

ME



Triang crane.



Triang KL44 Jones crane.



Brake levers for up and down movement and hook.



Levers for crane control.



Meccano No. 1 Motorcar with clockwork mechanism, first introduced around 1933.



Another Meccano clockwork motorcar.

An Engineer's Day Out PART 3

Roger Backhouse pays a visit to Hull's **Streetlife** Museum of Transport.



Continued from p.769
M.E. 4575, 10 November 2017

© All photographs taken inside *Streetlife* are taken with the permission of *Streetlife* Museum: Hull Museums

Streetlife – Hull Transport Museum

Open free of charge Monday to Saturday 10-5 and Sunday 11-4.30. Last admission 30 minutes before closing. Website www.hullcc.gov.uk Tel 01482 300300

Other engineering

William Dent Priestman of Hull designed the first successful internal combustion engine to use heavy oil (paraffin/kerosene), before Rudolf Diesel, but which is far less celebrated. Priestman used a fuel vaporiser and electric ignition. *Streetlife* has a unique example from 1894 of one of their heaviest engines, at 7.5 tons (**photo 40**). A model is nearby.

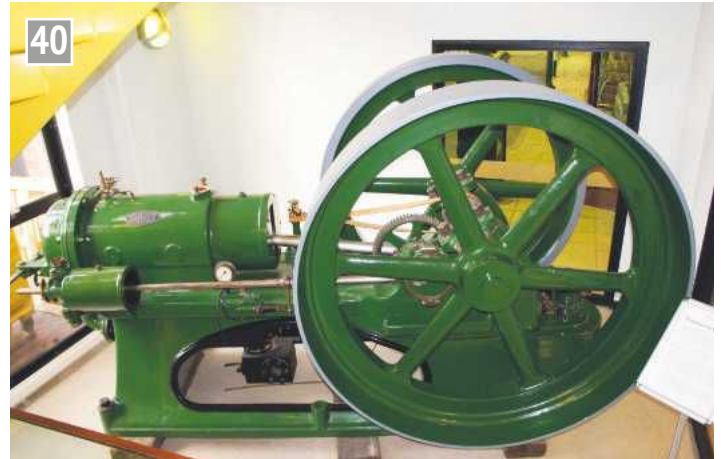
Priestmans also built a ditch digger, seen outside (**photo 41**). Improving land drainage was crucial to agricultural productivity. This would have been towed by a tractor.

Whether you consider automata to be real engineering or not the collection of early arcade attractions is delightful, encouraging visitors to waste their money (**photo 42**)!

Nearby attractions

Arctic Corsair is the last Hull side trawler, built at Beverley in 1960. It was rammed by the *Odin* Icelandic gunboat in the 'Cod Wars'. Later trawlers used nets lowered over the stern.

Steam and then diesel power enabled trawlers to go further to fish so marine engineering made Britain into a nation of fish and chip shops. The *Corsair* is open for tours from April to September on Wednesdays and



Priestman oil engine.

Sundays only. Volunteers are raising funds and working to restore the vessel (**photo 43**).

The Deep

The Deep aquarium is large, interesting and offers good views of the Humber from the cafe. Besides engineering to maintain suitable aquarium environments a research facility models river and seacoast conditions. Though not normally open, group visits are possible.

Hull's other museums

Other local collections include Wilberforce House, Ferens Art Gallery, Hands on History Museum with unique Tutankhamun replicas, and the Hull and East Riding Museum.

The Maritime Museum has excellent ship models in a fine Victorian building. Spurn Lightship (**photo 44**) is sometimes open at Hull Marina and there's a slipway steam engine nearby (**photo 45**).

Moving bridges

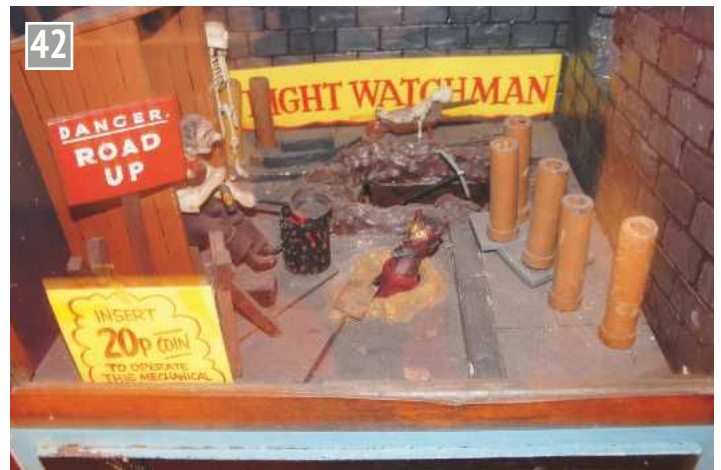
Twelve moveable bridges cross the River Hull. Nearest are the 1961 Drypool Bridge (**photo 46**), a Scherzer type rolling bascule, and a modern footbridge which rotates 'like a pinball flipper' and carries passengers when it moves (**photo 47**)!

Springhead pumping station, Willerby

Yorkshire Water is restoring a Victorian pumping station



Priestman ditch digger for farm work.



Automata arcade.

in a £2.5m scheme. A local landmark, it was constructed in 1862 to supply most of Hull's drinking water. The original pumping engine was mothballed in the early 1950s but remains on site. At the time of writing it is not known when it will reopen to the public.

Humber bridge and bus ride to Barton-on Humber

The greatest local engineering work is arguably the Humber Bridge, the longest single span in the world when opened in 1981 and a classic elegant suspension design.

There's a viewing point on the north side but the 350 bus from Paragon Interchange Station to Barton on Humber is a great way to see the bridge. (Free to holders of the English Freedom Pass.) *En*

route see if West Hull Weight Watchers still meet at the Three Tuns Pub. (I couldn't make it up.)

Other Humberside attractions include the Fishing Heritage Centre at Grimsby with the *Ross Tiger* trawler open to visitors. The dock's hydraulic tower is a fine Victorian structure. Goole has the Yorkshire Waterways Museum, also fascinating.

Don't forget Hull & District Society of Model and Experimental Engineers welcomes visitors to meetings at New Walton Club and their track in West Park.

Few towns of this size manage so much well-kept heritage. Though not on the usual tourist route Hull and Humberside richly deserve a visit even after the Year of Culture.

ME



Arctic Corsair trawl winch.



Spurn lightship.



Slipway winding engine.



Drypool Scherzer rolling bascule bridge.



The footbridge rotates like a pinball flipper and carries passengers as it does so.

Stuart Steam Hammer

PART 3

Ray Griffin makes the piston rod, piston and hammer.



Continued from p.695
M.E. 4573, 10 November 2017

Piston rod, piston and hammer

The piston rod and hammer are crucial to both the appearance and functionality of this model. The piston rod is a $\frac{1}{2}$ inch diameter rod with flats on opposite sides bringing the width across the flats to $\frac{7}{16}$ inch and the rod is $3\frac{27}{32}$ inches long. The hammer is a $1 \times \frac{3}{4}$ inch block reduced to an $1\frac{1}{16}$ inch square for the face that contacts the anvil.

Photograph 17 shows the completed hammer and piston rod with the brass piston in place. It was a feature of the working machines that the rod and hammer were in one piece for strength and simplicity. A piece of mild steel $1 \times \frac{3}{4} \times 5\frac{1}{2}$ inches is supplied with the kit, allowing for solid construction.

I decided against this approach and opted for a two-piece version. I guess that this loses me points for authenticity of construction but this is not a full-sized machine and it appeared to me that I had valid reasons for following my method. Primarily, I was uneasy about the amount of metal to be removed from the $1 \times \frac{3}{4}$ inch piece to reduce it to $\frac{1}{2}$ inch diameter rod. There



Hammer, rod and piston assembly. Note that the flat on the rod is parallel with the side of the hammer.

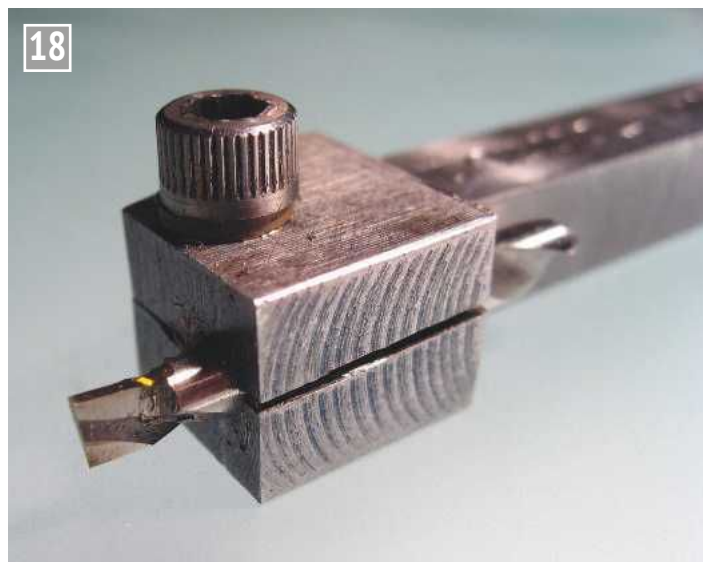
were the usual doubts about banging square edges on the cutting tool and the volume of metal wasted as swarf. It also seemed to me that there was potential for mistakes in alignment that could require the work to be scrapped and restarted.

To make the rod, I took a $4\frac{1}{2}$ inch length of $\frac{1}{2}$ inch diameter mild steel with a good surface finish. I assured myself that it was straight by rolling it on the surface plate. The piston end was reduced to $\frac{3}{8}$ inch diameter $\times \frac{1}{32}$ inch long and tapped $\frac{1}{4}$ inch $\times$ 32TPI $\times \frac{9}{16}$ inch deep as indicated on the plan. To avoid marking the surface with the jaws of a chuck, I used a collet chuck to hold the work. I find the ER collet chucks that screw onto the nosepiece of my Myford invaluable for work such as this. The rod was removed and

$3\frac{27}{32}$ inches marked from the new shoulder. On return to the collet, a thread $\frac{1}{16}$ inch long by $\frac{5}{16}$ inch $\times$ 26TPI was made, starting at my $3\frac{27}{32}$ inch mark.

I always undercut threads adjacent to a shoulder to the depth of the core for the thread in order to ensure that the mating part screws right up to the end. My copy of the small parting-off tool described by George Thomas in *The Model Engineer's Workshop Manual* (**photo 18**) is a great tool for doing this. The tool holds HSS tool bits ground to the users' profile. I make tool bits from broken or blunt centre drills, with the cutting edge of the tool shown in photo 18 measuring 0.040 inch in width. At this stage, before the flat sides of the rod were formed, the piston was made, fitted to the rod, and turned to be a good fit in the cylinder.

The piston is a straightforward turning operation using brass rod supplied in the kit. The rod was held in the three-jaw chuck and the piston first turned to a diameter slightly larger than the required size of 1 inch. It was made longer than the $\frac{1}{2}$ inch called for to allow for facing the end and the thickness of the parting blade when parted from the material in the chuck. The groove for the graphited cotton seal was made to the plan dimensions of $\frac{1}{8}$ inch wide $\times \frac{7}{64}$ inch deep using a parting blade. I used the FoR (Front or Rear) inverted parting tool sold by Eccentric



My small parting tool.

Engineering, with a $\frac{1}{8}$ inch wide blade, which was also used for final parting. The FoR tool can be used with either front or rear tool posts. I always use mine in the front position and find that it cuts well, provided that the cutting edge is sharp. I do have a rear tool post and am aware of the theoretical advantage of rigidity for parting operations but rarely use it. The cutter is hidden behind the work and I find lining up the edge of the blade with scribed lines on the work difficult. I like to check that I am cutting up to my marks with a magnifying lens as the blade meets the rotating work. Leaning over the revolving work, holding a lens seems a recipe for disaster.

It remained to drill and ream a $\frac{3}{8}$ inch hole through the centre using a drill held in the tailstock. The $\frac{3}{8}$ inch hole needs to be a close fit on the $\frac{3}{8}$ inch diameter portion of the piston rod. In situations such as this I prefer to use a drill 0.1mm smaller than the final dimension and then follow with the first part of a hand reamer held in the tailstock chuck. Hand reamers have a very slight taper at the start so it is helpful to introduce the first portion, withdraw the reamer and test for fit on the piston rod. Probably, if the rod was made to size, it will be too large to enter the hole. The reamer can then be reintroduced for a further cut and the rod tried again. In this manner, it is possible to get a perfect fit between the hole and rod. I always use this approach when fitting shafts into holes. Experience with poor fits has taught me never to pass the reamer all the way through in one pass.

A recess with a flat bottom $\frac{1}{2}$ inch in diameter and $\frac{1}{8}$ inch deep is required in the outer face to accommodate the head of the screw fixing the piston to its rod. I did this with a small boring bar held at centre height. The piston was then parted from the stock material. The piston was fitted to the rod and held in place with a

small steel screw made from material supplied in the kit. The rod and piston assembly were returned to the collet chuck to enable the piston to be turned to be a good fit in the cylinder. I checked, using a DTI located against the rod, that it was turning truly before finishing the piston. It is always possible for a small speck of swarf to intrude between the rod and collet to destroy concentricity. Final sizing of the piston was achieved using a sharp tool taking very fine cuts until the piston would just enter the cylinder.

The piston was removed from the rod, and the flat sides of the piston rod machined on the mill/drill. The rod was gripped in the machine vice and placed on a length of precision ground steel as a spacer, so that approximately $\frac{1}{8}$ inch was standing above the jaws. I had to decide on the amount of material to remove from each side. The plan provided shows the rod to be $\frac{7}{16}$ inch across the flats, calling for $\frac{1}{32}$ inch to be removed from each side. Later, I would need to produce a corresponding slot $\frac{7}{16}$ inch wide in the mouthpiece to fit the rod. However, my machine has metric divisions and I do not possess a $\frac{7}{16}$ inch milling cutter or slot drill but do have one for 11mm so I decided to make the rod 11mm across the flats. The calculation revealed that I needed to take 0.79mm from each side. I used a large end mill to cut one side, turned the work over with the flat side resting on the ground steel spacer and did the same again to complete work on the rod. When I undertake a job such as this, I first of all check that the inside surface of the fixed jaw of the vice is parallel with the long axis of the table using a DTI in the chuck. I also use the DTI to check that the floor of the vice used to support the ground steel is parallel with the surface of the table. A small shard of metal lodged on one side between the vice and table can give



Cutting the head of the hammer using the milling machine.

the vice a tilt which will be reflected in the work. Finally, I firmly tap the surface of the work with a wooden mallet when the work is nipped up, but before fully gripped, to ensure that it is firmly seated on the base. With the flats machined and the piston held in place with its screw, the finished rod was put aside ready for the hammer to be made.

As stated earlier, the hammer is a 1 x $\frac{3}{4}$ inch block reduced to an $1\frac{1}{16}$ inch square for the face that contacts the anvil, with a height calculated from the drawing of $3\frac{1}{32}$ inch. I cut a 1 inch length from the 1 x $\frac{3}{4}$ x $5\frac{1}{2}$ inch piece of mild steel supplied with the kit. The block was secured in the vice on the milling machine with one of the cut ends uppermost and approximately $\frac{1}{8}$ inch protruding above the jaws of the vice. It was then checked to vertical before the jaws were fully tightened. To do this I used a set square raised on a parallel block placed on the table of the machine against the free side of the block. A flat surface was then created using my Arrand face mill. The block was removed, turned through 180 degrees, placed on the surface plate and a line scribed all round at $3\frac{1}{32}$ inch with my height gauge. During this spell on the surface plate, the centre of the new flat end was scribed with a height gauge.

The block was then secured in the four-jaw independent

chuck of the lathe with the centred end outermost. The block was made central with the axis of the lathe for the hole to be drilled and tapped to fit the piston rod. As usual, I used a laser centre finder held in an ER collet chuck retained in the tailstock. This makes it so easy to manipulate the jaws of the chuck to bring the centre cross in line with the laser. A thread $\frac{1}{2}$ inch deep by $\frac{5}{16}$ inch x 26TPI was made, following my usual practice of a centre drill, followed by tapping sized drill followed by an appropriate tap. I used a second cut, followed by a bottoming tap, as I was working with a blind ended hole. It was then necessary to test the piston rod in the hammer, with the hammer retained in the chuck. My method of fabrication meant that the flats on the rod may not have been parallel with the sides of the hammer, due to the addition of the screw thread. It proved easy to bring them into alignment by noting any misalignment with the rod screwed in tightly. The rod was removed from the hammer and fine cuts taken across the surface of the hammer until satisfactory alignment was achieved. The hammer was removed from the chuck and returned to the milling vice to cut the $1\frac{1}{16}$ inch square end on the block (photo 19), and assembled with the rod and piston.

●To be continued.

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The Barclay Well Tanks of the Great War PART 30

Terence Holland describes and constructs two appealing, century old locomotives.



Continued from p.701
M.E. 4573, 10 November 2017

This constructional series addresses Andrew Barclay 0-4-0 and 0-6-0 narrow gauge locomotives supplied for use in the First World War. Built without the use of castings, the 0-4-0 design is described as two versions; as-built for the British Admiralty in 1918 and as rebuilt and currently running on the Talylyn Railway as their locomotive No.6, *Douglas*. The 0-6-0 engines described were built in 1917 and operated on 60 centimetre gauge track at the Western Front in France. These were small, spartan machines of which only 25 were supplied and none have survived into preservation.



The author's painting of Douglas at Pendre in the 1980s.

Combination lever and union link

See **figure 89**. Note that the drop link was dealt with earlier as part of the crosshead design (figure 63). The union link and combination lever are straightforward and machined

from mild steel. Ream all holes $\frac{1}{8}$ inch diameter to take custom-made 5BA bolts.

Lifting arm bearing, lifting arm and lifting lever

See **figure 90**. My lifting arm bearing is shaped up from

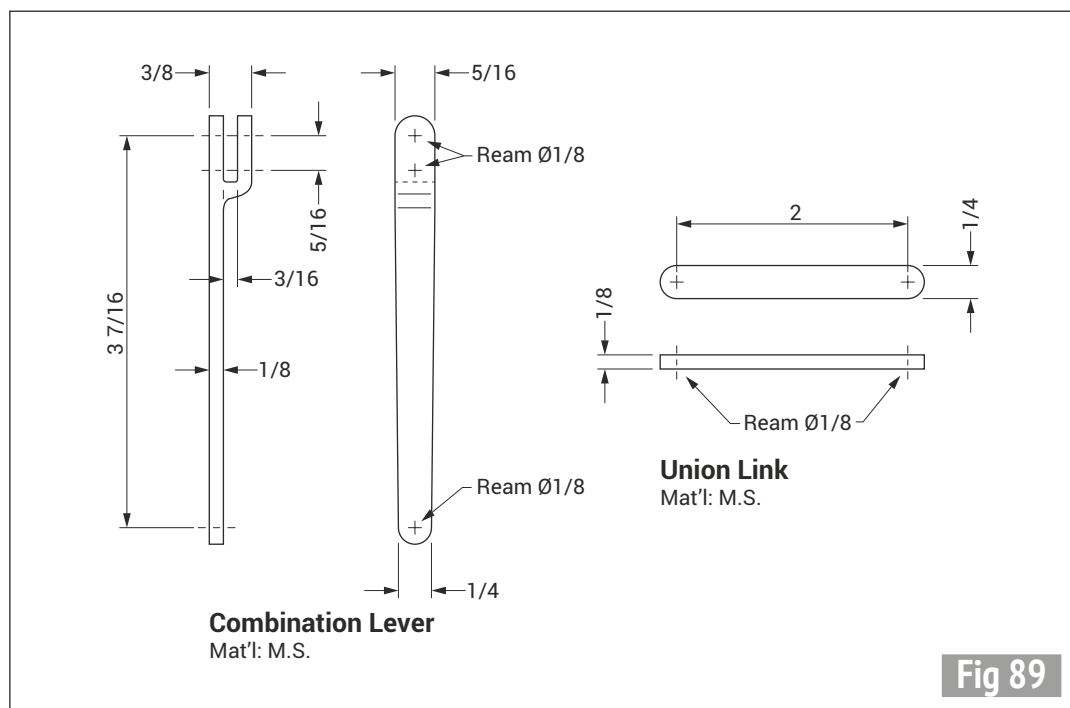


Fig 89



Valve rod connection on Douglas.

a piece of phosphor bronze with a lug on the top which is silver soldered for connection to the lifting link. The bearing surfaces are so big, however, that a piece of brass would probably suffice and be a lot easier to machine. A third option, more akin to the prototype, would be to make it from mild steel with a non-ferrous metal liner pressed in. The lifting arms and lever are simple mild steel fabrications; pinned to the reversing shaft with roll pins or taper pins. Fit the finished assembly with suitable roll or taper pins. Drill and tap 4BA for temporary fixing with cap head bolts whilst setting up.

The valve rod fork

The Barclay design of this component (see **photo 137**) is a



Cab view of reversing lever and quadrant.

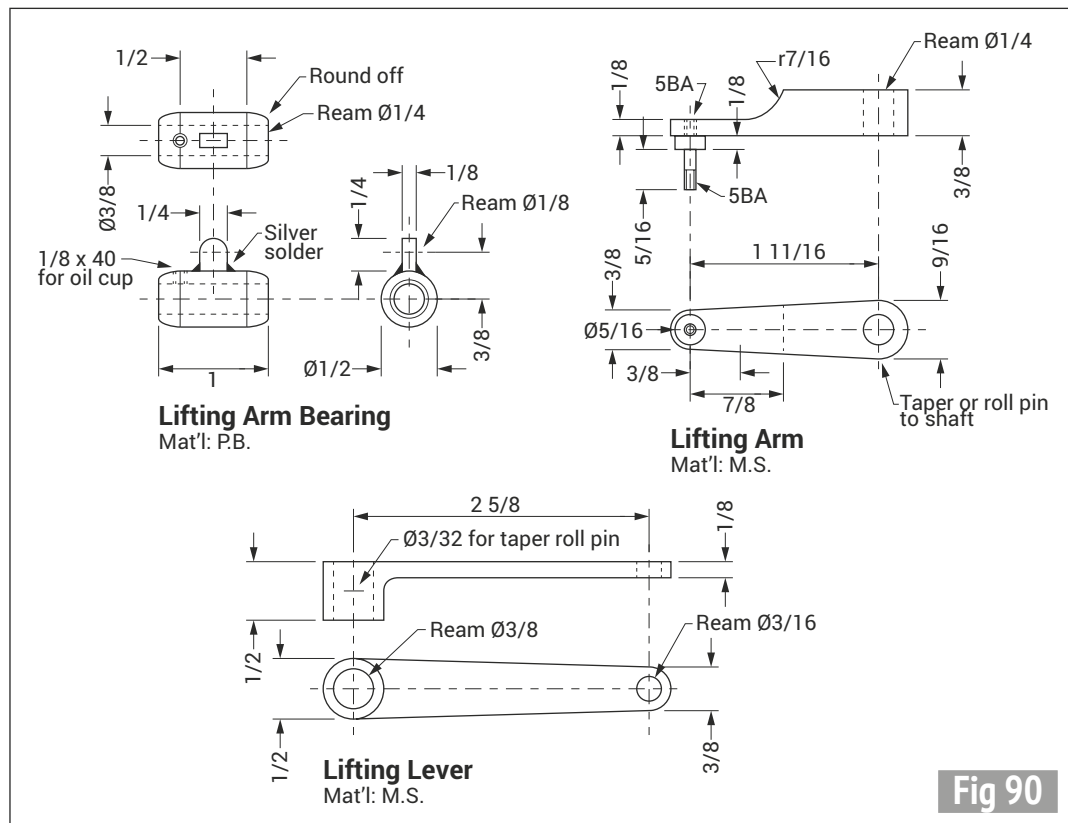


Fig 90

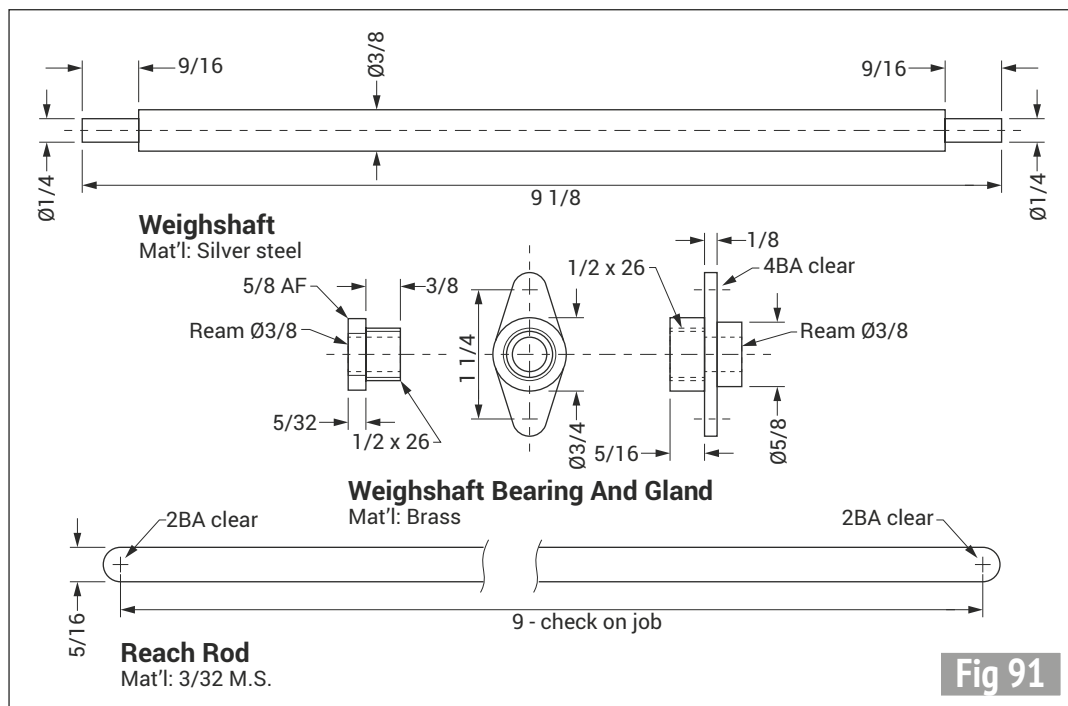


Fig 91

bit simpler than a conventional Walschaerts fork but I have specified a more substantial, conventional forked end (shown previously in figure 82) as this component is hidden behind the running irons.

Weighshaft and reach rod

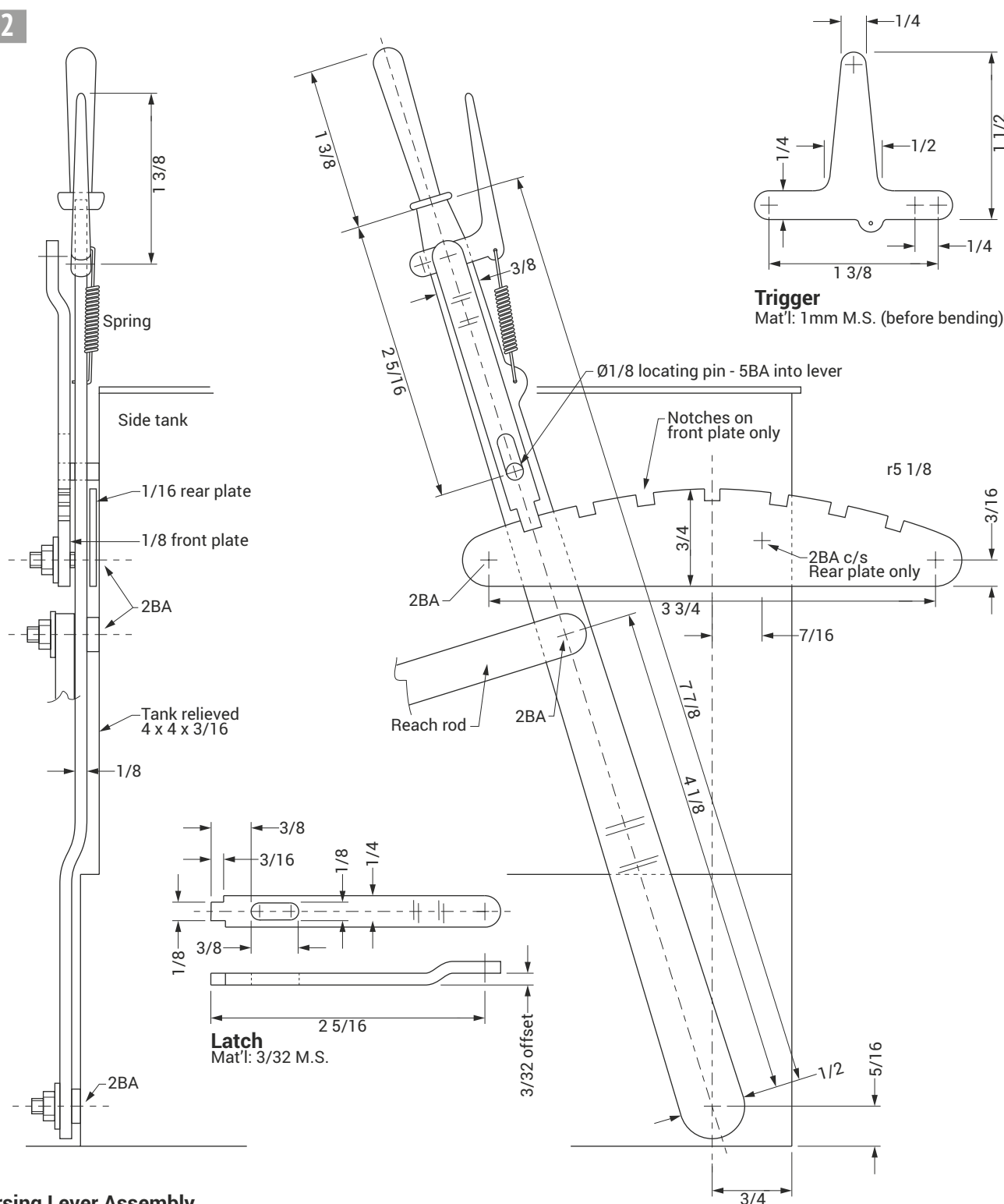
Figure 91 shows the weighshaft, its bearings and the reach rod. The gland

prevents water leakage from the well tank and also stops the ingress of lubricating oil from the weighshaft into the feed water. The reach rod is a simple length of $\frac{3}{32}$ inch thick steel. The distance between centres should be checked on the job with the reversing lever in the centre notch and the lifting arms in the mid position.

Reversing lever and quadrant

See **figure 92** and **photo 138**. These components are fabricated from mild steel. The quadrant plates are bolted to the inside of the driver's bunker, which has a cut away section to provide clearance between the bunker and the boiler lagging (photo 138). To cut the notches, set the die blocks on

Fig 92



Reversing Lever Assembly

both sides in mid position, set the reversing lever vertical and mark for the centre notch. Set the lever forwards and turn the wheels by hand in a forward direction. Full forward gear is the position where, when moving the wheels forward, the lever doesn't move. Mark this position and repeat for reverse gear. File the three notches

then two more between forward and mid gear and reverse and mid gear. Note that notches are cut on the 1/8 inch thick outer quadrant plate only.

Connecting the parts

All connecting points on the valve gear should be reamed 1/8 inch and fitted with custom-made bolts with 5BA threads.

Take care with the thread length so that when the nuts are tightened there is approximately 1/32 inch clearance. Use 7/32 inch AF steel rod and make them a good running fit. Too much clearance on the pin diameter will result in lost motion at the valves. Fit them with standard 5BA nuts, which also happen to be 7/32 inch AF.

Setting the valves

With the valve chest cover removed, the valves should be set on the valve rod so that, in mid gear, the ports just 'crack' at each dead centre when the wheels are turned by hand.

●To be continued.

CLUB NEWS

Geoff Theasby reports on the latest news from the Clubs.



Just returned home after a visit to the Scottish island of Bute to visit an old friend. We managed a visit to Mountstuart, spotting a Tompion long-case clock, and a short tour of the island. Our host was embarrassed when I lost a tooth crown in her home-made soup! It really wasn't her fault; the soup was lovely and smooth and my crown was already loose. I got my revenge that night when, upon retiring, I tried to close the curtains and brought down the entire fitting, pole as well. I might have concealed this from our host were it not for the fact that the complete assembly fell upon a strategically-placed and sizeable drum kit, belonging to her adult son, who was working away. In the event she was not disturbed as it has collapsed before. I managed to track down the Bute Tramway details; it closed in 1936 but the tram sheds still exist. Also, in August 2017 a miniature railway was set up on the Rothesay promenade for a short while but I missed it. I have been unable to trace who provided this. Wemyss Bay (pronounced *Weems*) station, from where the ferry departs, is a spectacular, fully-glazed, curved station, Grade 1 listed (**photo 1**). It also has a fascinating bookshop, from where I bought a book on the design of modern combat



Wemyss Bay station.

jets for £3. There was less shipping using the Clyde than I expected - yachts, surface warships and submarines. One such had the 'sail' near its bows and a very long afterdeck - possibly a missile-carrying vessel. Several cormorants were present on the nearby rocks, flying very low over the water or floating aimlessly before suddenly diving from sight. I suspect they have a form of ASDUC (Ability to Seek Dining Under Cormorant) which detects the presence of nearby fish. It was also SO QUIET! Inside the house the ambient noise level was 30dB; outside it was 40dB. We could hear the wavelets, in a flat calm, gently plashing on the beach from fifty yards away. At home in the leafy suburbs the indoor level was 40dB and outside, 50-60dB. Returning home, our train was held in a queue at Carlisle due to flooding in the Lake District so, rather than head home via Warrington and the Hope Valley line, and with thanks to my resourceful helpmeet, Deborah, we did a 'pierhead jump' onto a Settle-Carlisle train to Leeds and then caught a service train to Sheffield.

Now, that's enough about me - on with the motley!

In this issue: a turbine, smalls, the origins of standard gauge, Saxon railways, pre-wedding, a steam car trip, solid fuel comparison, a youthful driver and catching a 'gotaway'.

The *Newsletter & Journal* of the **Gauge 1 Model Railway Association**, autumn issue, has arrived at Firth Park Sidings and what a fine publication it is! I am quite spoiled for choice. I will begin with a not-so-obvious example of simple construction, this Southern 'Spam Can', built by John Perkin on a bought wheels and chassis model, *sans* cylinders and conrods. What locomotive doesn't have these items? A turbine! So here is John's idea of a MN turbomotive. It is built in styrene sheet and powered by a Meccano motor and followed by a battery wagon (**photo 2**). Whilst not a prize-winner - and the lettering could be improved - it is a good use of what would otherwise be a box of spare bits. This edition covers the summer season, so lots of GTGs ('Get ToGethers') on the garden railways feature. Michael Fueg, inspired by pipe-smokers' 'companions', has designed a compact multitool (coupling tool, mirror, pump lever, torch and hook) which helps him cope with small running problems. The Yorkshire Group's *Ridings* layout is explained in some detail. There are several excellent models I could pick but this GWR Railmotor by Bruce Fleet is very appealing (**photo 3**).

W. www.g1mra.com

The Link, October, from **Model Engineers Society (NI)** covers the 'Smalls Day' in September, which was poorly attended due to the bad weather. Chairman



John Perkin's Bulleid 'Turbine' MN locomotive G1MRA N&J
(Photo courtesy of John Perkin).

Cliff Allen brought his Hornby live steamer system and Tommy's turbine-powered generator had an outing, running on compressed air. Editor Terence Aston relates his visit to Sheffield's Kelham Island industrial museum and its massive River Don engine.

W. www.mesni.co.uk

The News Sheet, October, from **North London Society of Model Engineers**, saw Chairman Ian Johnston visiting the Discovery Centre in Luton and, specifically, the horse-drawn vehicle collection by George Mossman. It is VAST! Whilst there he carried out a little test, based on the well-known story of the origin of the 4 foot 8½ inch rail spacing of standard gauge being the width necessary to accommodate two horses running side-by-side. Yes, the carriages he checked were indeed roughly of this measurement. However, on finding a Roman chariot he discovered that its wheels were spaced at 5 foot 3 inches! So much for that theory! However, his faith in the story was restored when he found that it was a film 'prop' made wider for safety on the director's instructions...

W. www.nlsme.co.uk

Ryedale Society of Model Engineers' Monthly Newsheet, August, shows the pretty patterns obtainable with the newly repaired mower. Brian Bennett has fitted his *Park Royal* railbus with a miniature camera in the driving cab, feeding a picture back to his controller. A well-attended pre-wedding party, for a young man getting married in York Minster the following day, was accompanied by a large Irish contingent, reminding one of the Cheltenham Festival. A few days later the track entertained three families of Orthodox Jews from Manchester, who made the track their base for the whole day. They returned a week later to continue the fun. August 26th brought more locomotives than ever before in the Editor's 16 years of membership. They ran the water tanks dry! Over the weekend, Pauline made 110



Bruce Fleet's GWR Railmotor (Photo courtesy of David Pinniger).

bacon butties as well as other tasty comestibles.

W. www.rsme.org.uk

Goodwin Park News, Autumn, from **Plymouth Miniature Steam**, shows the largest tree on site, having fallen across the track in a leafy dell, being reduced to matchwood by the assembled company. Mike Malleson tells the story of his 48-year experience in building *Gipsy Hill*, a Stroudley Terrier, from M.E. of 1963, and in trying and failing to paint it. Finally, he had it painted professionally and, resplendent in its coat of many (Stroudley) colours, it awaits its first steam test. Dave Biss writes on changing his 25-year-old Maxitrak *Simplicity* and another similar locomotive from 27MHz radio control to 2.4GHz using two 4QD controllers, supposedly identical but about 13 iterations apart! Start again... Having worked with 16mm models lately, he tried an Electronic Speed Control (ESC), which is very popular in that market, and it works perfectly with both engines.

W. www.plymouthminiaturesteam.co.uk

The Prospectus, September, from **Reading Society of Model Engineers**, sees David Scott making use of scrap MDF - shallow cabinets for tools, instant shelving or equipped with castors for a trolley and so on. Mike Manners had a 100 mile trip in a Stanley steam car - great fun - and with few minor interruptions, even

if they had to steal some of the Grand Union canal water to do it. *Wolverton Pug* spent the summer travelling more than 1,000 miles on Polish Railways, was entertained in various off-the-beaten-track brewpubs and brought back some nice pictures.

W. www.rsme.co.uk

Northern Districts Model Engineering Society's Steam Lines, July-August edition, has Paul Costall comparing imported Welsh steam coal with the local 'char', tried in his *Blowfly* and TE. Les Harris, at another club, was told he 'wasn't a proper model engineer' since he bought his locomotive. Les was, maybe still is, one of the only two fully qualified machine tool fitters in Western Australia, with a lifetime's experience.

W. www.ndmes.net

The *Gauge 3 Newsletter*, autumn, finds Ian Turner buying Doug Hewson's book on railway wagons, which is a collection of EIM articles, explanatory design information plus 16 A2-sized plans covering 23 different wagon designs. Furthermore, they are drawn at 17/32 scale, so just right for Gauge 3. Torsten Schoening built a metal underframe for his polystyrene 1907 Saxon State Railways van - type Pwg Sa 07 for the cognoscenti (or in German, *cognoscenti*) - an unusual model (photo 4). Barry Lane has completed a 6-wheel, L&Y picnic saloon of 1908. Scratch built, it is complete inside and out and has a Cleminson wheelbase (photo 5). Ashley Wattam creates G3 wagons from Bachman Thomas G Scale originals



Torsten Schoening's Saxon State Railways van from the Gauge 3 newsletter (Photo courtesy of Torsten Schoening).



Barry Lane's L&Y picnic saloon, as above (Photo courtesy of Barry Lane).

costing about £35 each, net. (It keeps the kids away from the real things.) An Ampthill GTG on 2nd September revealed a prototype of the long-awaited *Sentinel* shunter - watch this space.

W. www.gauge3.org.uk

Conrod, September, from **Otago Model Engineering Society**, reveals that the only entry to the Editor's Challenge (a fidget spinner) was... The Editor and his Dad. Still, it got him into the workshop and he learned a few things in the process. His new challenge is to produce an item with no dimension exceeding three inches. I take this to mean 'contained within an imaginary three inch cube or sphere.' He describes making the spinner and thinks there are further improvements possible. The bearing chosen was sealed and the internal grease could not be removed, slowing it down quickly. (Wash it in petrol? - Geoff) He also made the spinner from aluminium, which is really too light.

W. www.omes.org.nz

Paul Ohannesian of **British Columbia Society of Model Engineers** sent me a 12 page item about the 4-8-4+4-8-4 Beyer Garratt 6029, *City of Canberra*, that has been rebuilt in Canberra. It is as long and as heavy as Captain Cook's *Endeavour*... It ended its career hauling coals to Newcastle (!), was bought for \$1 and

restored over 10,000 hours by volunteers. Developing 3,000hp, it could haul 1,500 tons and has been donated to the National Museum of Australia. The firebox is the size of several grand pianos, the tender takes A\$7,000 worth of coal to fill and lighting up the locomotive takes 24 hours.

W. www.bcsme.org

Bristol Society of Model & Experimental Engineers, *The Bristol Model Engineer*, Autumn, spends much time covering the Thornbury exhibition and the forthcoming 50th anniversary of LBSC's death. The two occasions were noted by several clubs exhibiting versions of 'Curly' Lawrence's designs, 38 in all, including the one that started all this, *Ayesha*, built by the man himself and now in the custody of the National 2½ inch Gauge Association. 10 *Tichs* and 8 *Juliets*, but no *Virginia* or *Evening Star*. Editor Richard Lunn should have exhibited his half-scale Burrell but, as he says, "It is 80% finished, with about 80% left to do". A display of Oliver Bulleid's designs won the CuP Alloys award for the best themed exhibit. The editor's campanology eye was taken by an item on the Guild of Model Wheelwrights stand, a peal of six bells on a frame, hung for change ringing. John Whale took his grandchildren and Maxitrac *Planet* to the track one day and Finn (aged 5)

asked if he could drive. He was shown the 'shining taps and levers' and took to it straight off - eight laps continuous, including two with mum on board! He was very proud of that...

W. www.bristolmodelengineers.co.uk

In M.E. 4569 I posed a teaser, which was correctly identified by John Gledhill. It is Chesterfield; the twisted church spire is to the left and also the SB Rail *Plasser & Theurer* 09 3X RT tamper. It is parked in what is left of Chesterfield Down Yard. John asks if he gets £5 or an M.E. pencil but I had to inform him that, though there were no prizes, in my opinion his perspicacity was only exceeded by his personal

beauty, whereupon he said "Why thank you, sir! That's worth more than a fiver any day!"

In M.E. 4568 I reported on the Sheffield & District Society of Model & Experimental Engineers Open Weekend but was unable to catch the Deutz narrow gauge WWII German military locomotive model. Thanks to George and Doreen Coles, I am able to print it here. The picture was lifted by them from the 7¼ inch gauge site and no attribution was found so, if you took it, please shout (photo 6). It is a Deutz Benzollok, C XIV F C32 with a 16hp petrol engine, and it is thought to be the only such 7¼ inch gauge model in the world. George is a specialist on Great War front line railways.

W. www.sheffieldmodelengineers.com

Stop Press - I just discovered on YouTube a video of a trip in a *Sentinel* 8DG, viewing the cab activity. I swear that the same piece of film is used three times, showing the stoking of the boiler, but it is well worth watching. There are several others featuring *Sentinel* wagons.

And finally, a Russian joke: Hospital patient to porter - "Where are you taking me?" - "To the morgue" - "I'm not dead yet" - "We are not there yet".

Contact:
geofftheasby@gmail.com



Deutz Benzollok WWI trench locomotive (Photo courtesy of an unidentified contributor to the 7¼ inch gauge website).

DECEMBER

- 6 Chesterfield & District MES.** Club running day. Contact Ian Blackburn: 01909 562458.
- 7 Cardiff MES.** Tony Bird: Topic to be decided. Contact Rob Matthews: 02920 255000.
- 7 Sutton MEC.** Bits & Pieces night. Contact Jo Milan: 01737 352686.
- 10 Chesterfield & District MES.** Santa Specials, 11am - 1pm. Contact Ian Blackburn: 01909 562458.
- 10 Frimley & Ascot LC.** Public running, Santa Specials, 11.30am - 2.30pm. Contact John Evans: 01276 34970.
- 10 NW Leicestershire SME.** Santa Special, 11am - 3pm. Contact Den Swain: 01530 412048.
- 10 Rochdale SMEE.** Santa Specials at Springfield Park from noon. Contact Len Uff: 0161 928 5012.
- 10 Sutton MEC.** Afternoon running from noon. Christmas Dinner. Contact Jo Milan: 01737 352686.
- 14 Sutton MEC.** Workers' Christmas Lunch and Quiz night. Contact Jo Milan: 01737 352686.
- 15 Rochdale SMEE.** General Meeting, Castleton Community Centre, Rochdale, 7pm. Contact Len Uff: 0161 928 5012.
- 15 Stockport DSME.** Quiz night. Contact Dave Waggett: 0161 430 8963.
- 16/17 Vale of Rheidol Railway.** Santa Trains. Contact: 01970 625819.
- 17 Rochdale SMEE.** Santa Specials at Springfield Park from noon.
- Contact Len Uff: 0161 928 5012.
- 17 Rugby MES.** Public running at Rainsbrook Valley Rly., 2pm - 5pm. Contact Ken Eyre: 01788 842709.
- 17 Westland & Yeovil DMES.** Track running day, 11am - 4.30pm. Contact Bob Perkins: 07984 931 993.
- 19 Chesterfield & District MES.** Photographic and WIP Competition. Contact Ian Blackburn: 01909 562458.
- 19 Grimsby & Cleethorpes MES.** Christmas meeting and photographic competition, 7.30 at Hartley Lodge. Contact Dave Smith: 01507 605901.
- 19 Nottingham SMEE.** Christmas get-together. Contact Pete Towle: 0115 987 9865.
- 19 Wigan DMES.** Bring & Buy (with mince pies). Contact Kevin Grundy: 01942 522303.
- 20 Bristol SMEE.** Members' night. Contact Dave Gray: 01275 857746.
- 20 Leeds SMEE.** Quiz Night. Contact Geoff Shackleton: 01977 798138.
- 20 Salisbury DMES.** Christmas Social. Contact Jonathan Maxwell: 01722 320848.
- 20/21 Vale of Rheidol Railway.** Santa Trains. Contact: 01970 625819.
- 21 Sutton MEC.** Chat night. Contact Jo Milan: 01737 352686.
- 22/23 Vale of Rheidol Railway.** Santa Trains. Contact: 01970 625819.
- 23 Chesterfield & District MES.** Club running day.

Contact Ian Blackburn: 01909 562458.

- 26 Grimsby & Cleethorpes MES.** Public Charity Trains, 11am - 3pm, Waltham Windmill site, weather permitting. Contact Dave Smith: 01507 605901.

- 26 Leeds SMEE.** Boxing Day Steam-up, Eggborough track from 10am. Contact Geoff Shackleton: 01977 798138.

- 26 Sutton MEC.** Boxing Day Running 10am - 2pm. Contact Jo Milan: 01737 352686.

- 27 Bradford MES.** Members' Running Day and Social from

12.30pm. Contact: Russ Coppin, 07815 048999.

- 28 South Cheshire MES.** Christmas Steam-up. Contact Stuart Daw: 01782 767587.
- 28 Sutton MEC.** Chat night. Contact Jo Milan: 01737 352686.

JANUARY

- 1 Chesterfield & District MES.** Arctic running. Contact Ian Blackburn: 01909 562458.
- 1 Grimsby & Cleethorpes MES.** Public running, noon - 4pm, Waltham Windmill site. Contact Dave Smith: 01507 605901.

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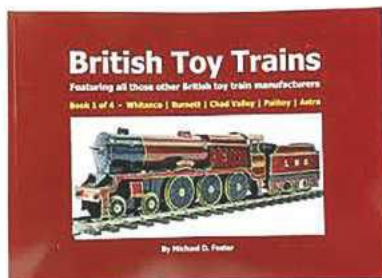


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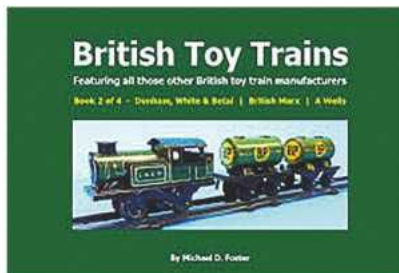
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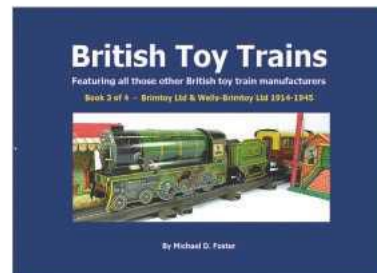
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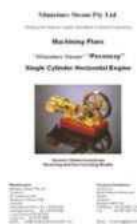
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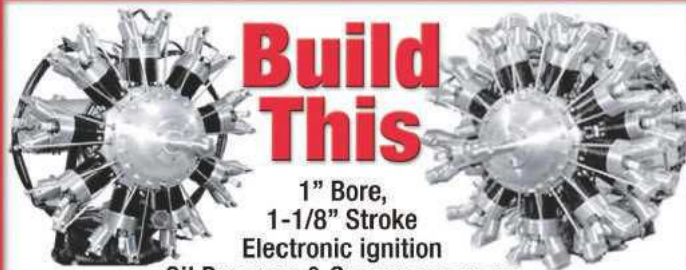
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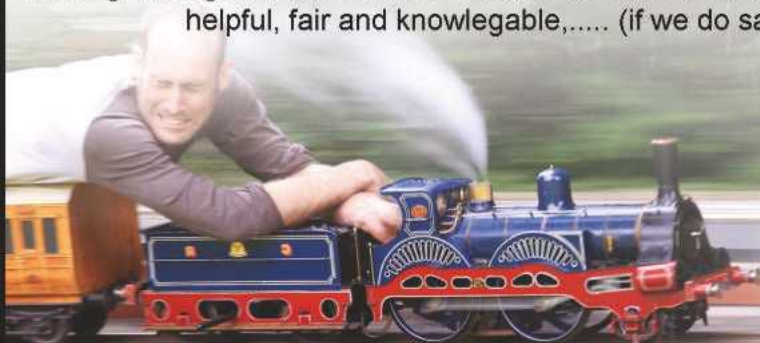
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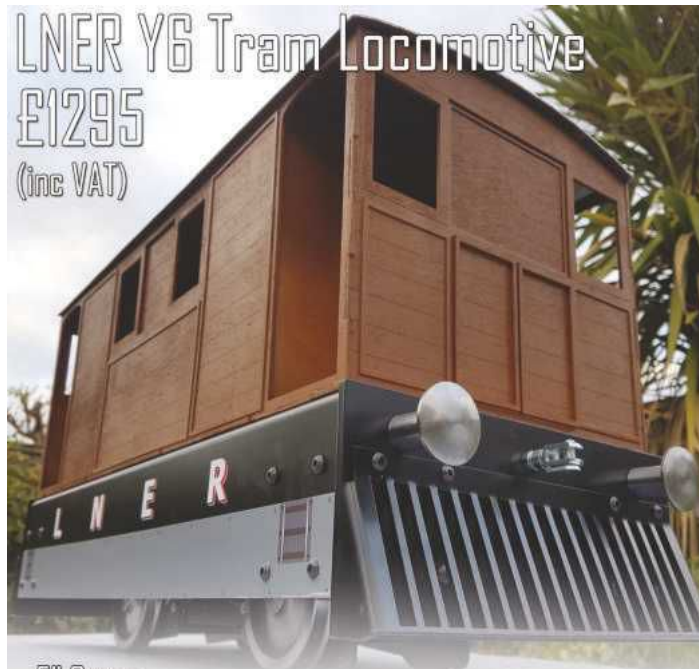
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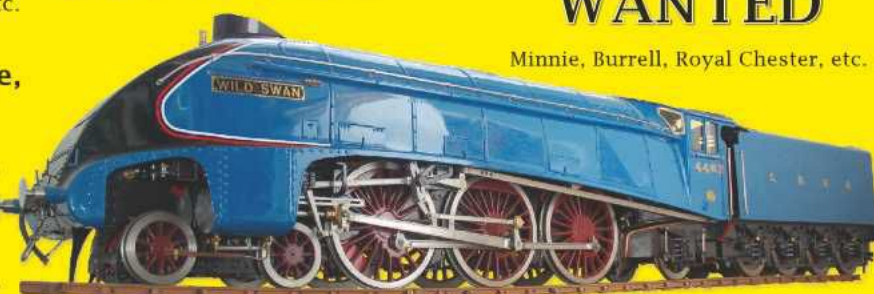


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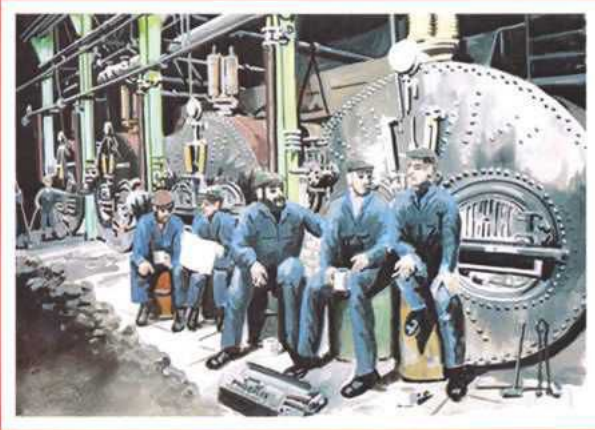
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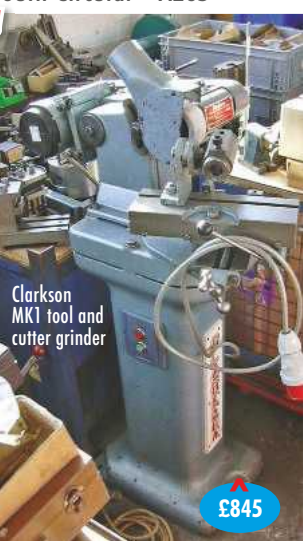


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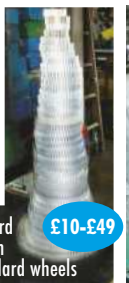


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