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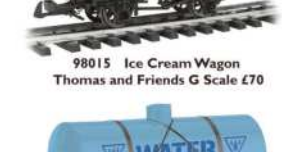
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VIEW FROM THE END OF THE PLATFORM

Incorporating GARDEN RAILWAY
WORLD Issue 338 October 2022

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BACK WHERE IT ALL STARTED

Happy fifth birthday to me! My first issue in the Editors chair was in October 2017, and the time has really flown past. So many wonderful models brought to you on these pages, by some incredible modellers.

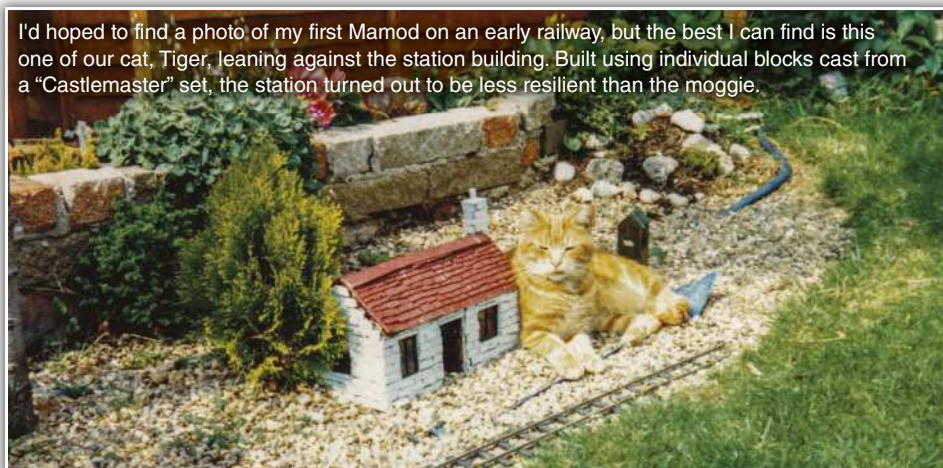
This month sees me going back to my very first garden scale modelling. Back in the 1980s, my Mum bought my Dad and I, a Mamod steam locomotive kit. Her hope was that we'd build it, and then take over some of the gardening duties to set up a layout.

What she hadn't banked on was the limited control we had over this steam-powered rocket. In an effort to make it work properly, the first line had to be flat. Since our garden isn't, for several years, there was a wooden track on stilts blocking the view of a flowerbed, not what she'd hoped for! It's a good job I discovered battery-electric modelling so the

track could go around the pond instead.

All this comes to mind as I start work on an Accucraft Peckett kit. Another bolt-together model, this one is a quantum leap in terms of fidelity and hopefully controllability. But it was still that Mamod that got me, and many others, started. If you have any Mamod memories, we'd all like to hear them...

Unfortunately, you'll have noticed that the price of Garden Rail has had to be increased. We've been holding off on this as long as possible, but with paper and power prices moving upward faster than a Mamod with a fresh fire, we can't avoid it. We'll do our best to justify your continued support – and don't forget that if you can manage with a digital rather than paper copy of the mag, our website www.world-of-railways.co.uk has many budget-friendly offers.



CONTENTS

P6 GAUGE 1 IN THE GARDEN
by Stuart Hithersay

P14 BUILDING A LIVE STEAM
LOCOMOTIVE – PART 1

P18 A FOUR-WHEEL DRIVE SIMPLEX
by Dan Foard

P20 A COLLIERY FOR THE AMBER VALLEY
LIGHT RAILWAY by Richard Barwick

P22 MAILBOX

P24 TOP 10 PRO TOOL TIPS
by Mark Thatcher

P27 BR CONCRETE LINESIDE HUTS
by Julian James

P30 A YORKSHIRE SUMMER
by Alan Poxon

P32 PRODUCT NEWS

P34 COACH & WAGON WORKS RAILWAY
COLOURS by Mark Thatcher

P40 THE WORM THAT TURNED
by Dave Skertchly

P50 READERS' MODELS



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Gauge 1 in the garden

Stuart Hithersay visits the G1MRA President's line.

When the Gauge 1 Model Railway Association was formed in 1947 by a group of enthusiasts, mainly in the South East of England, the scale of Gauge 1 was nearly extinct.

Initially, the focus was on electrically driven models, but, over the years, the popularity of live steam grew to a point that it was unusual to see an electric model at a meeting. This imbalance has now levelled itself out with the advent of affordable and high-quality radio control battery-electric models, and now even DCC in two rail is gaining popularity.

Gauge 1 is often referred to as the beachhead between railway modelling and model engineering, and that has never been truer than today, with the fast-paced development of technologies like 3D printing and laser cutting allowing the creation of quality scale models at far more affordable prices.

This year, G1MRA celebrates its 75th

Anniversary, and to mark this, we are staging our largest ever show at Bicester Heritage on October 1st and 2nd. Like all good birthday parties, we have invited all our friends and therefore have layouts in all scales from 5inch down to Z, as well as plenty of societies, demonstrations, classic cars and bikes, and a world exclusive of live steam Gauge 2 personally built by Henry Greenly. We promise you a fantastic weekend, so please come along and help us celebrate our milestone anniversary.

Our President, Dick Moger, has been responsible for some of the locomotive designs published by G1MRA over the years, helping bring the ability to build a live steam model to a generation not taught machining at school.

His ARM1G, a locomotive designed to be put together by the amateur engineer, has been hugely popular both inside the association and in the wider Gauge 1 world, with several variants being produced on

the same mechanicals. In fact, a visit to his line has you wondering if you have got double vision, the SECR 0-4-4 Tanks seem to be everywhere.

When Garden Rail asked me for an article on a Gauge 1 Track that was integrated into the garden, I thought of Dicks' latest creation. It fits that bridgehead comparison, being partly constructed to the traditional Gauge 1 test track on legs design, although well disguised with box hedging, but also well integrated into the garden itself.

Forming a kind of dog bone shape, the line gives the impression of a four track main line with fast and slow lines. Dick has worked hard to create a fully signalled station on a curved platform, staggered to the SECR pattern of the local area.

In a recent interview, I was asked why Gauge 1? After my initial hesitation, it occurred to me that the social aspect of the association is one of the main things that

Like most Gauge 1 lines, this one is tracks on stilts to make access to the manually-controlled locomotives easy. Neatly clipped Box hedges help blend it into the surroundings.



sets us apart from some of the other scales.

A G1MRA get-together in a member's garden is something that has been sorely missed over the last couple of years, and one major consideration in the design of Dick's line was being able to welcome several visitors to run together and enjoy each other's company.

The track base is constructed from 300mm medium-duty galvanised cable tray, mounted on adjustable scaffold jacks. On top of this is a plywood deck covered in torch on roofing felt to give a weather-proof finish. This method of construction proved not only rapid, but also durable and allows levelling of the track bed if any movement of the ground causes dips. Currently under construction is a covered area above the station and steaming bay to keep out the worst of the weather and dreaded leaves on the line. If only South Eastern Trains could manage something similar!

Trackwork is mostly from the Tenmille track system, which consists of ready-built track panels, coming in either 36" or 58" lengths. Dick's track differs, however, from



Dick's line is home to many 0-4-4 locomotives, built to his own designs.



Signals are from the Model Signal Engineering range.

many Gauge 1 layouts in that both inner and outer tracks run in the same direction. This, he says, has more benefits than just not getting lost and simplifies the point work, so there are facing points on the running lines, hopefully eliminating collisions. The bonus result is the track gives the impression of a four track mainline, with up and down fast and slow lines.

As someone who is used to a standard two track opposite directions railway, it is a touch disconcerting to see what, at first glance, appears to be a head-on collision about to happen!

Once you've managed to stop your eyes playing tricks on you, the result is very pleasing as trains happily overtake each other at prototypically differing speeds on the main straight, featuring fully working semaphore signal gantries, which are Dick's piece de resistance.

The signals, supplied from Model Signal Engineering, via Wizard Models, are controlled through a combination of MERG kits, Dick's own laser sensors and Arduino programming. The effect of watching a four track mainline with all the signals working correctly is quite mesmerizing and really adds to that immersive feel.

The steaming bay and stock sidings are



We're not sure what those on the platform are looking at, but it's distracted them from the arrival of an SECR livery C Class.



Signs of the future? The Leader passes under the signal gantry.

reached via a fairly steep gradient, which, with electric locos or radio control, is no problem, but a manual steamer is best handled as a two-man job, or by being absolutely sure the points are all set correctly before you begin. To this end, Dick has fitted an automated bell to tell you when the crossover is set against the main line.

Dick explained that building a track in the garden has been a labour he loves. It's not his first track by any means, but like all modelling, it extends your skillset to areas you might never have been to, since it's outside you start to understand about ground works, gardening or at least populating the track base with plants and hedging of a correct scale for the rolling stock i.e. small leaf shrubs plants.

The social aspect of a garden-based track in Gauge 1 is almost as important as the building of locos, stock and layout because there is nothing nicer than a full day of watching your mates running their steam or electric locos and stock, laughing and worrying about all aspect of a temperamental loco, drinking tea and having a good lunch surrounded by like-minded people.

The afternoon my young Nephew Thomas and I spent running on the line was fantastic, a mix of electric propulsion for young Thomas in the form of a Peter Rogers Models 2 BiL, complete with correct interior lighting and sound, as well as a battery electric scratch-built SECR H class for stock shunting.

I enjoyed a good half-hour run with one of Accucraft UK's beautiful Adams Radial Tanks and a matching pair of Lyme Regis branch Maunsells coaches also from Peter Rogers Models.



Some stunning paintwork on these dapper chaps waiting for a train.



An Adams Radial waits to pull away in the sunshine.

A testament to Dick's trackwork is that I barely had to touch the regulator for the full run. Dick treated us to a show of several of his large collection of SECR models, including an H class built to his own design, the build book of which is available from G1MRA and most parts can be bought from suppliers Just the Ticket or Model Engineers Laser. These little gas-fired locos have proved very popular, and a number of variants can now be purchased. I believe the cylinder block has gone on to form Q1 and M7 models, as well as others.

If modelling in the Gauge 1 scale interests you, then all of the traders will be present at our 75th Anniversary show at Bicester Heritage, on October 1st and 2nd. Dick will be there (Doctor Dick's Performance Clinic), offering locomotive advice, and we have amassed one of the largest collections of top-quality exhibits of any show this year.

Advanced tickets and merchandise are available on our website www.g1mra75.co.uk along with information on confirmed traders and exhibits. ■



The 2BIL unit rounds a curve past the lavender bush.

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Dick Moger attends to his locomotive during a running session.

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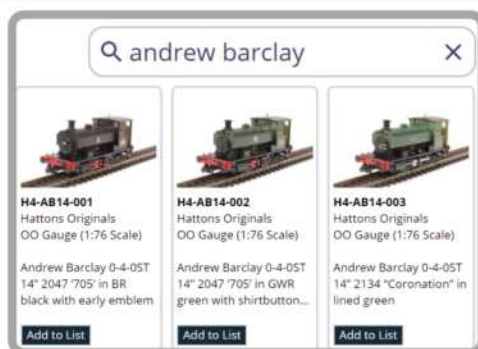
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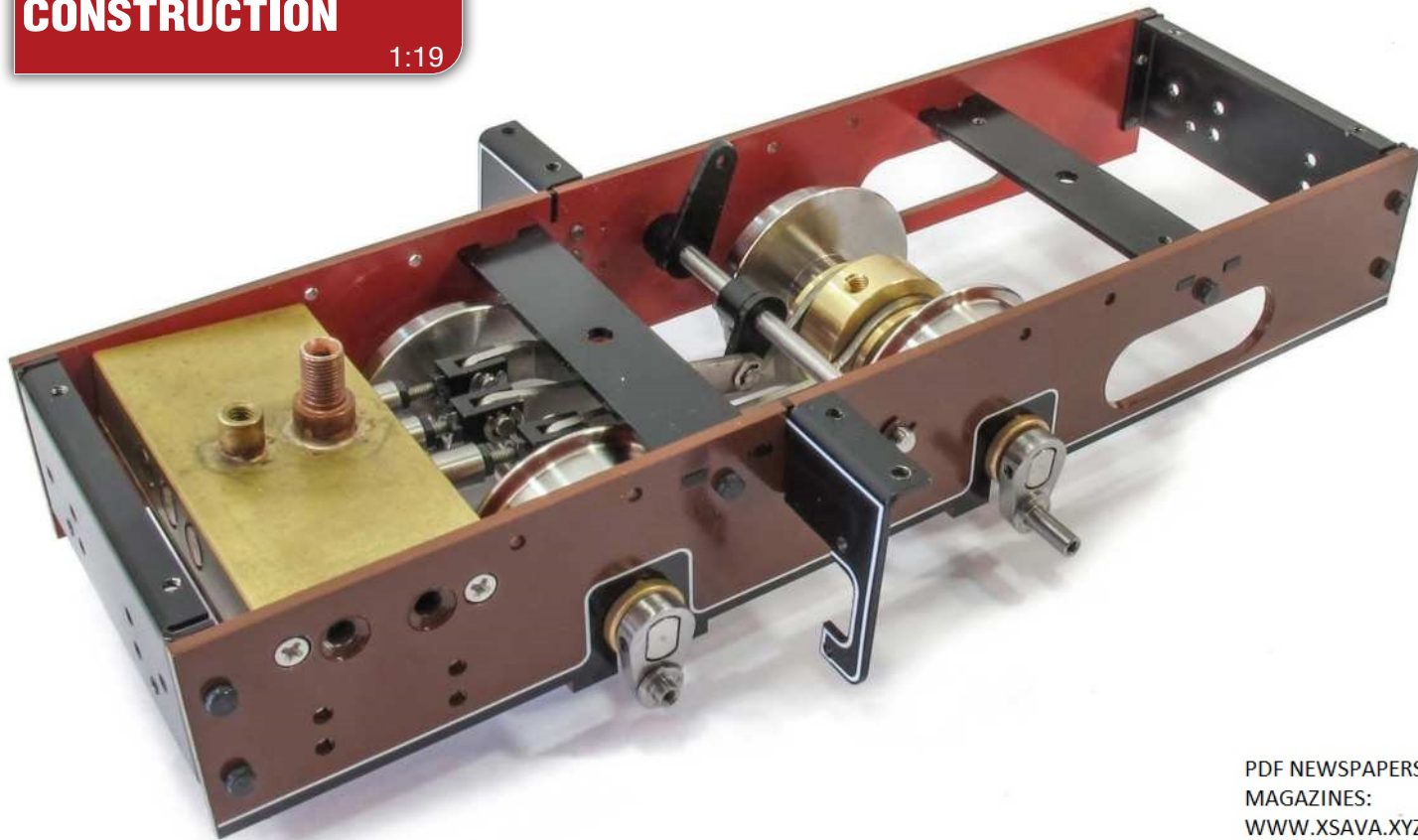
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Building a live steam locomotive – Part 1

We all love a steam engine, but what goes into making one? The Editor gets his hands on an Accucraft kit to find out.

I am not an engineer. Watching a scratch-built steam loco passing me by on a garden railway, I'm in awe of the skills required to fashion lumps of metal into a living, chuffing machine.

This isn't to say I'm no good with my hands. Give me some small scale stuff powered by an electric motor, and I'm perfectly happy. Dozens of etched brass locomotives have emerged from my workbench. Plastikard or wood, I'm comfortable with these, too. But, actual live steam, well that's a whole different ballgame.

Apparently, this qualifies me perfectly to try out one of Accucraft's new kits to build its well-regarded Peckett. Graham Langer was quite honest with me when asking if I fancied trying one out – he wants to be sure that anyone who knows which end of a nut-runner to hold can assemble the parts. What he didn't need was someone who knew what they were doing. That's not the point.

Landing on my doorstep a few weeks later, was a box of bits. The big question is, can I turn these into a locomotive that runs as well as the ready-to-run versions? There's only one way to find out... ■



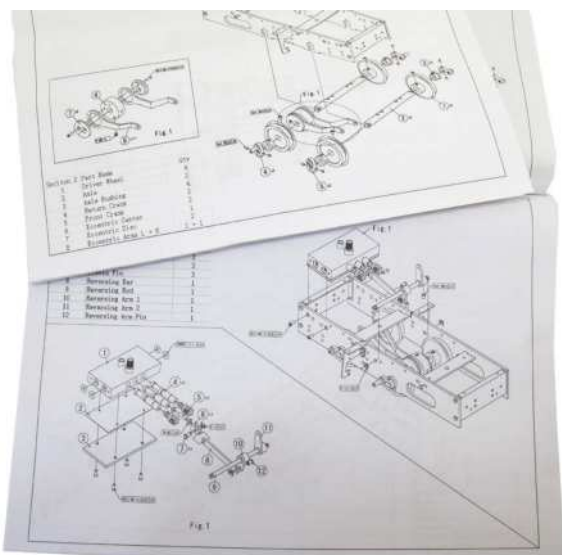
Inside the big box, are three smaller ones labelled with the construction stages in the instructions they relate to. In theory, if I work through them one step at a time, in the end, I'll have a steam loco to be proud of. To say I was nervous at this point would be an understatement.



Each stage is bagged up separately and numbered. There's obviously a lot of effort gone into packing things to make everything as easy as possible.



Alongside the main parts are many, many little bags of screws and bolts. Each is identified on the packing slip, but they can contain components for several different stages. There are a lot of tiny bits in here, so care when opening them is advised. Unless you like crawling around the floor looking for a tiny, black, grub screw that is.



The instructions break the build down into 15 stages. Each is presented as an exploded diagram labelled with the components and fixings required. However, after this, the builder is on their own. Working out the order components should be fitted requires some thought if you aren't going to be putting things on and taking them off again.



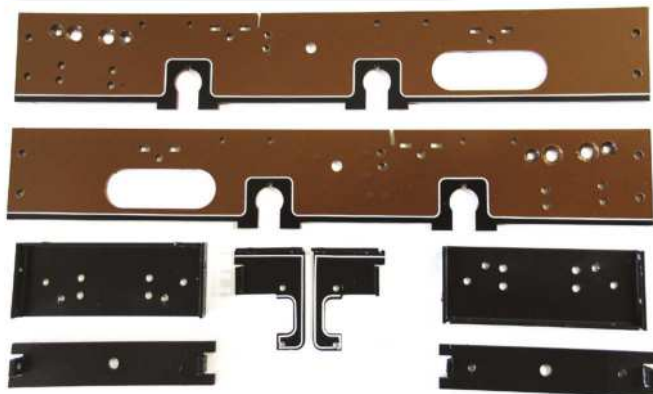
An organised approach to the project will hopefully pay dividends. Open one packet at a time and complete that stage before moving on. A cardboard tray holds the bits and stops them disappearing. Fixings are decanted into a ramekin, carefully counting out only what is needed, and leaving the rest in the bag.



My toolkit is pretty limited for this project. Some nut spinners in small sizes (Mark Thatcher talks about these on P24), small spanners from a Model Engineers Laser set, tweezers and a couple of Allen keys, which are supplied in the pack by Accucraft. Small pliers are also useful to have handy, the sort of things most modellers will have to hand. No lathes, power tools or proper engineering equipment at all, though!



Thoughtfully, a bag of spare parts is also included for those of us whose modelling supplies don't include stocks of the sort of fixings magically attracted to the carpet.



Stage one is the chassis. All the components are supplied ready to use, even the painting is done for us – and a really nice job it is, too. I'm sure I couldn't paint and line a model this well. Care will be taken to avoid scratching anything.



Remembering my work in OO, I know that a flat and square chassis is vital for good running and road holding. An old mirror is used to check this, although I needn't have worried, as everything turned out perfectly – a boost for my confidence.



Fitting the axle bearings into the frames proved a little tricky as the paint made them a tight fit in the holes. Supporting the frames on a vice, and gently tapping the brass bearing worked fine. A nice touch is the lug that fits into a slot above the axle hole to stop the bearing rotating. Do scratch-builders do this, or rely on Loctite? There's certainly no need for anything like that here.



Construction is simply a case of looking at the diagram and screwing/bolting parts together. The hex-head bolts go in well, although they are tight and a very tiny drop of oil makes things easier. Nut spinners are much better than spanners for this sort of work, as they offer the nut to the job and can be twiddled between your fingers.



Stage two, and we fit the wheels. First, the eccentrics are made up. These will slide onto the rear axle, and operate the valves to direct steam to the cylinders. The brass parts have off-centre holes to move the arms fore and aft as the loco steams. All this is beautifully made, anyone who can do this from scratch has my admiration.



Accucraft outside-framed locos can generally be set to either 32 or 45mm gauge. Depressions in the axle accept grub screws in the wheels for easy changeover, and the same applies on the Peckett. The wheels are a tight fit over the axle ends, but seem to slide well enough once in place. A drop of oil aids assembly.



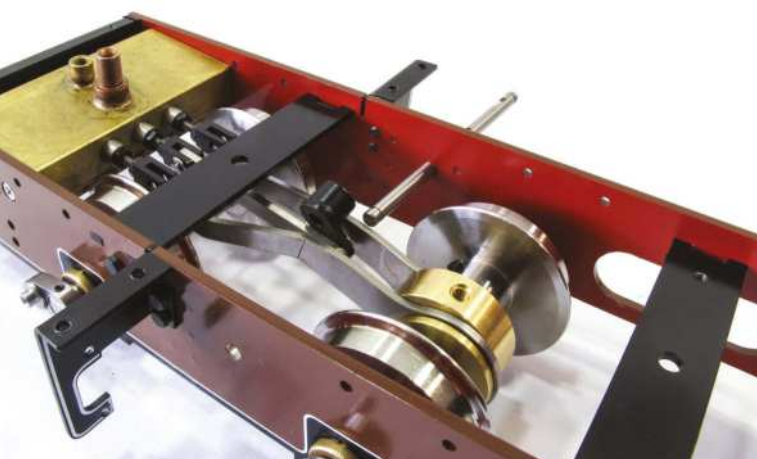
Time for the Valve Block – the brains of the loco. In the front, you can see the three steel piston valves. The outermost control the steam, and the centre is for the reverser. Most of the rest of the parts shown are for the reversing linkage and connections to the eccentrics.



Each valve guide has its linkage attached by a threaded rod. On the rod are placed a couple of lock nuts, which will be spun to the outer ends once the timing is set. Friction between these, and the component they butt up against stop anything moving.



To keep everything steam tight, O-rings are inserted into the sides of the valve block. Take care with these, any damage to them will affect performance. Rounded end tweezers are a good idea, although they seat easily enough. This is where a slow and steady build pays off. It's easy to leave something like this out, trying to refit them late would require an awful lot of disassembly.



...because when I come to fit the reversing gear to the Valve Block, I find the eccentrics are upside down. Out comes the rear axle, it's flipped over and put back in place. A few minutes work, but annoying.



A test fit of the eccentrics onto the rear axle. With the bearings already firmly fitted in the chassis, I'll need to take this apart and thread the axle through, putting both the wheels and eccentrics on as I go. Is this the best way to do it? I don't know, but it works for me.



Wheels and axles in. The ends of the axles will stick out the side, so I can fit the cranks later. Until they are on, there is quite a bit of sideplay with the model set to 32mm gauge. The sharp-eyed will be laughing at me right now...



The clevis (forked black parts) are attached to the eccentrics with steel clevis pins, retained with a circlip. If you've never used circlips before, look them up as they are the fiddliest parts so far. I pushed to locate the steel clip in the groove on the end of the pin, and give it a good shove from the side with a pair of pliers, so it snaps into place. Proper circlip pliers are available, but I don't own a set and suspect that there's not enough space to get them in here anyway.

Conclusion

So far so good. Everything fits well, meaning it's a bolt together job. The components feel well-made and I'm very impressed with the paintwork. Allowing for photography, this has taken just under eight hours so far. Maybe I could have done it faster, but I'm trying to be methodical. Most of the time this is working.

Is it fun? Yes. I'm enjoying myself tremendously. You can't shake the box and have the kit fall together, each stage demands that the builder look at the work to be done and think about how to do it. I'm really enjoying this and the sense of satisfaction is terrific. It's educational too. Not being a serious steam man, being forced to assemble each part means I'm more familiar with them, and what they do.

Next month, I move on to building and fitting the cylinders. Then there is the gas tank, boiler and controls. I might even get to test the model. I hope so, as once I have working loco, I'll be much more relaxed.

Garden Rail Resource

Accucraft UK Ltd
PO Box 394, Hereford, Herefordshire,
HR1 9QN
www.accucraft.uk.com

Model Engineers Laser
www.modelengineerslaser.co.uk

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A four-wheel drive Simplex

Dan Foard builds a model of an old friend.

I suppose it all started when I left school in mid-1992, and started work as a Christmas temp at Beatties of London Model and hobby shops, at their Lewisham Branch. One of my fellow staff members was the late Dave Brewer of Meridian Models. One fateful day, we were talking at the back of the shop about our hobbies and I said, "I model narrow gauge railways in 4mm".

Two years later, having joined the Greenwich and District Narrow Gauge Railway Society, I found myself driving full-scale narrow gauge locos at Leighton Buzzard in the industry trains demonstrations at Stonehenge Works. I had a couple of particular favourite locos, one of which was an ex-Garsides loco from the Leighton Buzzard museum fleet of internal combustion locos, this loco happened to be Arkle.

Jump forward to the lockdown of 2020. After being put on furlough, I was kicking around, looking for something to do with my time as my ground level 45mm garden line kept getting damaged by other people using garden equipment. This left me thinking of changing scales to 16mm. I started



The Micromotor mounted underneath the chassis, and connected to both axles using Delrin chains.



The engine cover was scratch-built with brass sheet. After this photo was taken, a 3D-printed radiator replaced the whitmetal one shown.

looking for a simple diesel kit and found the IP Engineering range of kits. In there was listed, Arkle 20/28 Simplex Loco. It was like finding an old friend again without having to drive 70 odd miles to have a play.

Kit duly purchased and delivered, I set about building it the way I wanted it. On first look, I wasn't happy about filling the area under the bonnet with just the motor and a switch. In addition, the kit was only two-wheel drive. Simplex locos are four-wheel drive, driven by a pair of chains from a centre sprocket on the gearbox in reality. This made me stop and think about making Arkle 4wd, by joining the axles with Delrin chain.

I then decided that, if I was going to go that far, why not go the whole hog and try to make the loco powered like the prototype? I had recently been looking at N20 DC gearhead micro motors, and wondered if I could get one fitted in the chassis somewhere, driving the chains to operate the wheels.

Having obtained a motor, I set about working out how to fit it into the chassis and whether or not my idea was even feasible. With a small amount of judgement and a lot of luck, I ended up cutting a slot in the side of the provided chassis that was tight enough to hold the motor in place, and was just about in the middle between the axles - lucky guess or what? Having also ordered sprockets and Delrin chain, I was fortunate enough to find that once part of the collar of one drive sprocket was removed, this gave the right gap and size to get both sprockets on the motor output shaft and also line up roughly middle on both axles.

The chassis now sorted, I decided to fit radio control as well. The motor being 12v meant that I needed a decent battery supply

and I ended up using 3s 11.1v lipo batteries from a small-scale model aircraft that a friend of mine located. Unfortunately, these were just too large to fit in the whitmetal cast bonnet that came with the loco, so I constructed new bonnets out of thin sheet brass, replacing the engine support beams with a brass section as well, which gave a much better look than the original ones.

It was about this time that Mark Sayer approached with some images of a 3D-printed Simplex radiator for 16mm, that could have been mistaken for a real one because of the amount of detail on it. Once this part was delivered, it really set the tone for the rest of build, making me want to get the detailing just right.

The cab was the last area to get any attention, as the rest of the build had taken long enough, and again, I wanted to include as much details as possible. I ended up building a box-style seat from leftover bits from the kit, a clutch pedal and the direction and gear levers as well.

The last bits to be done before painting was adding the front handrail, the coupling blocks and bumper bars and the sandboxes onto the chassis.

The whole loco was coated first with etch primer and left to harden, then a layer of normal Halfords grey primer and was left to dry overnight. Next day, the loco cab was masked up to cover the windows area as this on the Leighton Buzzard locos was painted white. The rest of the loco was then painted in Halfords Brooklands Green, which is about the nearest colour available readily to the original Simplex paint shade. Again, this was left overnight to dry thoroughly, the cab was then unmasked carefully and the white brushed on using a white from the Games Workshop range of acrylic paints. These are my go-to range of paints for modelling and especially weathering.

I hand-lettered the loco name on the bonnet sides and then started the weathering process with washes of various colours and dry brushed areas, in again various shades of muddy colours on the footplate area. The final bit of construction work was done the night before Peterborough this year, with me making a plastic tray to hold the LocoRemote Maxi unit away from the motor so there would be no short circuits.

I'm happy to report that Arkle ran faultlessly throughout the day on one battery at Peterborough, and has since paid a visit to The Isle of Westland Railway owned by my friend Andrew Coward.

It has been an enjoyable build overall,

sometimes frustrating, and occasionally downright infuriating, but I'm extremely pleased with the overall result and the haulage capacity has yet to be fully tested, which considering its such a small motor, is still pretty impressive anyway.

Thanks to Kevin Edwins for the assistance and detail pictures of the real Arkle and other Simplex locos. Thanks also to Nicki Robinson at SLR Models for her help with some of the detail bits, and finally, thanks to my friends that have been on this near 30-year journey now in the wonderful world of narrow gauge modelling. I wish I had discovered 16mm a lot sooner. ■



A LocoRemote control unit and the battery pack fit under the engine cover.

Garden Rail Resource

IP Engineering
Carousell, Spilsby Road, New Leake,
Lincolnshire, PE22 8JT
www.ipenginnering.com

LocoRemote
www.locoremote.co.uk

SLR Models
www.slrmmodels.co.uk

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A colliery for the Amber Valley Light Railway

Richard Barwick goes underground to provide traffic for his line, seen in our July 2022 edition.



My annual visit to the National Garden Railway Show generally sees me return with one or two rolling stock or small locomotive kits. I can't resist the ubiquitous Binnie skips; they are cheap and easy to construct, so I have amassed a small collection, along with an IP Engineering Simplex to haul them.

The Colliery

Having a train of skips with a locomotive, I felt it needed a reason for existence, as the line, though entirely fictional, uses place names and buildings typical of this former coal mining area. I decided to build a colliery, to be placed adjacent to Crich Town station - although Crich never actually had one.

Construction

The site for the mine was tight, only about 1m², hemmed in by Crich Town station on one side and rhododendrons on the other. Much digging was required to level the site and remove the roots of a long-felled tree. Last autumn, a concrete base was laid to



Winding drum and motor/gearbox.

take the colliery buildings and yard, after which I retreated indoors for the winter.

I opted for a shaft mine with a winding house, pit head gear and winding wheel, but no actual shaft. A look at the Modeltown website revealed a stone pumping engine house of Cornish appearance that I thought could be modified as a winding house to meet my needs. One was ordered and duly delivered by Father Christmas!

Assembling the resin winding house and its chimney was straightforward. The kit includes the reciprocating mechanism and other components required to give the appearance of an operating pump. These were not used but the motor/gearbox retained. The reciprocating mechanism was replaced by a wooden drum. The supplied battery box and switch were mounted inside the building and can be operated by removing the roof.

The building and chimney were sprayed with matt grey acrylic primer, followed by stippling on a darker grey over the stone-work. Moss, lichen, etc, is represented by various greens and later, real coal dust was used to create the inevitably grubby appearance of a colliery building. The resin base plate was painted in a similar way. The windows and doors were painted red and glazed with the acrylic sheet provided.

The pit headgear was constructed from scratch from no particular prototype, but a search of photographs on the internet was used to determine typical forms and dimensions. A full-size drawing was produced and used as a template for construction.

The headgear consists of three parts:

- The tower, supporting the winding wheels
- The cage tower surrounding the cage
- The cage itself

These structures were constructed from 10mm X 10mm aluminium angle of 1mm thickness, secured by 4mm diameter pop rivets and secured to a 2mm thick aluminium baseplate.

The cage is an open-sided rectangular box about 120mm x 120mm x 220mm. It has two levels, the platforms are aluminium, inset with 45mm spaced rails. The cage roof fits inside the framework but is not secured to it. It can therefore drop slightly as the winding cable inevitably stretches, thus maintaining the cable tension. A 25mm Meccano pulley is mounted onto the roof.

The cage tower is the same shape as the cage but slightly larger so that it surrounds it. The top has a catwalk. There is an expanded metal fence along the sides and a pair of polystyrene gates across the track.

The tower supporting the winding wheels is basically a trestle. The wheels are two 75mm diameter Meccano pulleys, free to

rotate on a common axle. This structure is mounted surrounding the cage tower, such that the cable descends vertically to the pulley on the cage roof. The tower also has a catwalk and railings.

The cable is currently household string, but will be replaced by something more durable. It runs from the winding drum, through an aperture in the gable end of the winding house, over one winding wheel down to the cage, over the pulley and back up round the other winding wheel to the drum. The winding wheels thus contra-rotate, although the cage does not actually move.

The headgear was painted matt reddish brown and dirtied with coal dust. The baseplate, platforms and catwalks are matt black.

Setting Out

The winding house and headgear are secured to the concrete base. A track runs through the cage tower and cage and converges with a couple of sidings before joining the "main line". A fence (polystyrene posts and galvanised wire) separates the colliery from the rest of the railway.

The base is covered with fine gravel and crushed coal just covering the tops of the sleepers. Coal dust is used to dirty the buildings and structures and there is a sizable heap of coal adjacent to and spilling over one of the sidings.

What Next?

The colliery needs a few more buildings: a tin shed, perhaps for coal grading or facilities for the miners, with another as a shed for the Simplex. A garden railway is never finished! ■



Headgear under construction.

Garden Rail Resource

ModelTown
The Odd House, 188 Todmorden Rd,
Bacup OL13 9UD
www.modeltown.co.uk

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contacting suppliers.



In July, we visited the Amber Valley, and here's a view there wasn't space for back then with 'Lynne' hauling a passenger train.



Letters are welcomed on any aspect of large scale railway modelling. Please e-mail the Editor:
phil.parker@warnersgroup.co.uk
or post to The Editor, **Garden Rail Magazine**,
Warners Group Publications, West Street,
Bourne, Lincolnshire, PE10 9PH

TREEMENDOUS SUGGESTION

With regards to Dave Skertchly's excellent Arboriculture article in the September Edition of Garden Rail. May I humbly suggest the use of *ilex crenata* (Japanese holly) instead of *Buxus sempervirens*? The leaves and structure of *ilex crenata* are very similar to *buxus sempervirens* but are not affected by box blight or box moth caterpillar.

Simon Taylor

BENDING TRACK

Because I'm a glutton for model-making competitions, I'm entering a 4 sq. Ft competition in the Micro Model Railway Despatch, run as the 20th Anniversary for Carl Ardens trackplan (three tracks, no points, a single traverser). I'm doing it in the larger scales to try and re-use figures and things, but because I just couldn't fit G track in, I'm using it as an opportunity to use up some of the very limited bits of 32mm stock I've got.

I invested in my only purchase for the project, some 32mm Peco Flexitrack, but it's not quite flexible enough, and I need some rather tight curves for this. I don't want to invest in a dedicated rail-bender just for two bits of 32mm scale track, is there a technique a reader can recommend?

Ben Bucki

OOPS

Last month, a slight error appeared in our piece on Pavel Ponížil's layout, where we called it "a focus on the Rhb narrow gauge railway". As soon as the issue appeared, Swiss railway aficionados pointed out that it should be "RhB narrow gauge railway." Apologies for that, but to make up for this, here are a couple of images of Pavel's magnificent model we didn't have space for.



DIARY DATES

Date: 1/2 October, 2022

Event: 75 Years Gauge 1 Model Railway Association

Venue: Bicester Heritage Centre

Web: www.g1mra.com

Date: 13-16 October, 2022

Event: Midlands Model Engineering Exhibition

Venue: Warwickshire Event Centre, The Fosse, Leamington Spa, CV31 1FE

Times: Thursday - Saturday 10.00am - 4.30pm, Sunday 10.00am - 4.00pm

Web: www.warwickshireeventcentre.co.uk

Date: 29 October, 2022

Event: Exeter Garden Railway Show

Venue: The Matford Centre, Matford Park Road, Marsh Barton Ind Estate, Exeter, EX2 8FD

Times: 10.30am to 4.30pm

Web: www.exetergardenrailwayshow.com

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Date: 9/10 December, 2022

Event: Steam at Rowington

Venue: Rowington Village Hall, Rowington Green, Warwick, CV35 7BU

Times: Friday 2pm - 7pm, Saturday 10am - 4pm

Web: www.johnsuttonmodels.co.uk

Date: 11/12 March, 2023

Event: Midlands Garden Rail Show

Venue: Warwickshire Event Centre, The Fosse, Leamington Spa, CV31 1FE

Times: 10am to 4pm

Web: www.warwickshireeventcentre.co.uk

ARTICLE SUBMISSION NOTES

Garden Rail welcomes articles submitted via posted disc, email, Dropbox (or other large file sending systems online). Please ensure that your name, e-mail address, telephone number and postal address for payment on publication are included. Send to: phil.parker@warnersgroup.co.uk or to the contact address on the Contents page.

Articles should be submitted in MS Word or other word processing format. Please do not use fancy formatting or embed photos in the piece, these should be sent separately at the highest resolution possible and in JPEG format. Printed photos of a historic nature will be accepted. Captions for all photos should be included as part of the submission. You must own copyright to any material submitted and not have submitted it to other publications.



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Top 10 Pro Tool Tips

Mark Thatcher lists his own top 10 of 'must-have' tools and components.

I have lost count of the quantity of tools, components and accessories I have amassed when building stuff for my garden railway over the years. Some tools fall into the category of leaving them in the bottom drawer, and whilst maybe these purchases were well-intentioned at the time, some did not work for me.

Others fall into the category of being fine tools, I just can't get the knack of them due to my own ineptitude. Lining pens fall into this category, I am afraid.

However, over the years, and with great strides and improvements made in the tools and components department, I have compiled a list of the top 10 tools and

accessories that I simply could not live without. I think the price of only one of these tools would fall into the "considered purchase" department, but the rest are relatively inexpensive and should fall within most people's budgets. So, let the countdown begin! ■

10 THICK SUPERGLUE AND ACCELERATOR COMBO-PACK FROM SCREWFIX DIRECT

Now, I will be the first to say that if you choose to use a great superglue with a precision applicator, then this glue is not for you. I would prefer, and still use, Roket superglue from Deluxe Materials as it is the best glue on the market that I can find, and very easy to precisely apply too. However, for more general use the Screwfix offering is OK. But why this makes the top ten, is that the glue itself is bundled with a spray can of glue accelerator for only £6.49 for the pair! So, even if you use the superglue purely for DIY jobs around the home, you have a good aerosol can of accelerator included too.



9 TAMIYA LOW-TACK MASKING TAPE

I swear by this tape to get a clean and crisp line between masked painted surfaces. Three widths are available, 6mm, 10mm and 18mm. Initially, the tape is supplied on a tape dispenser, which is very important as you do not want to use loose rolls of masking tape attracting dust and debris on the exposed sides of the tape, which will easily be transferred to the model. However, once you have used one roll of tape, you may purchase replacement rolls of tape more cheaply, saving the expense of buying a new dispenser every time. Also, being low-tack, there is less risk of you damaging any previously painted surface. The cheapest price I have found for one roll of the 6mm thick tape on a dispenser, plus two rolls of loose bagged 6mm tape is £4.35 from Hobbies.co.uk. I use the 6mm width more than any other.



8 A CHEAP AIRBRUSH

I must admit that, in the past, I have never gotten on well with airbrushes. I could never quite get the paint mix right, and the nozzle was always blocking up. At least two airbrushes ended up in the bin. However, I tried a cheap airbrush/compressor combo, and straight out of the box, I was getting consistently good and even results. It is much less wasteful than using rattle cans, too. My model was by GoHelper, from Amazon, and came with 0.1mm, 0.5mm and 0.3mm needles. The latter was already attached to the airbrush, and I have not seen the need to change it yet. The airbrush comes with a small table-top compressor, which seems to be powerful enough for small jobs, yet is very quiet. For under £60, this has proven to be a good buy.

Of course, cleaning airbrushes is still a bit of a fiddle, but using Vallejo thinner/cleaning solutions makes that easier. I also added a spray container from SAGUD. Basically, squirt some cleaner into the reservoir of the airbrush, then insert the nozzle into the container and just run the cleaner through into the container. You may have to repeat this process a couple of times, but I have not had a blocked nozzle yet using this device.

I think the game-changer that allowed me instant success after two previously failed attempts was that Vallejo also sells airbrush-ready pre-diluted paints. Shake the bottle well and just drop the paint directly into the airbrush's reservoir. No thinning is required, so you are ready to paint straight away. A box of 16 Vallejo starter paints are £16.99, and all the above is available from Amazon.co.uk.



7 MAGNIFYING GLASSES

My eyesight is still pretty good thankfully, although I have started to wear 1.5 reading glasses for close work. But, sometimes you need a little more light on the scene, so these LED glasses are just the ticket. You have a choice of five lenses of differing magnification and the LED light has two brightness settings. But best of all, there are no batteries to replace as they are recharged from the USB of your digital device. And being LED lit, they consume very little power and seem to last an age! Mine cost around £17 from Amazon, but there are loads of choices available.



6 SMALL PARTS HOLDER/SOLDERING AID

This was a game-changing purchase for me, particularly when used in conjunction with the airbrush mentioned above, as you can mount up to 10 small parts at one time ready for painting and this is the quickest and easiest method I have found to paint small components as it gets the parts off your table/cardboard/BluTack, so nothing sticks. In fact, I have two of these. I also use these to clamp wires for soldering. I used to use a traditional wire clamping station (the one with the magnifying glass attached), which will only allow you to solder one set of wires at a time, but with this, I can set up five wire joints to solder at a time per holder, making the whole process far more efficient. And the price? Just £6.99.



5 A PORTABLE DREMEL!

Yes, I bet most of us have owned a Dremel or similar mains-powered mini-drill at some point. But there are times when either the mains cable is not long enough, the power supply gets in the way, or you simply don't have the flexibility to get into tight spaces. Well, this little device does just that. Like the glasses mentioned above, it is also USB chargeable and has three speed settings. Mine cost £17.99 and even arrived with some drill bits and sanding pads – not shown in the attached photograph. What a bargain!



4 RANGE OF BUILDER'S PARTS FROM CAMBRIAN MODEL RAILWAYS

Cambrian must make it into my top 10. OK – they sell components, not tools, but with such a vast range, its products are of a great aid to either the scratch-builder or modeller who wants to augment or super-detail an existing model. I get through a ton of rivets and have used its ladders, radiator grilles, loco lamp kits and even station valances and brackets in the past. The range is very well priced and the website is on my favourites list as normally, if I need a detailing part, the chances are it'll be available.

www.cambrianmodelrail.co.uk



3 SANDING BLOCKS FROM COACH & WAGON WORKS

Another supplier making it into the top 10 is Coach & Wagon Works. I use its miniature sanding block sets on a regular basis. This set comprises one small sanding block, which has a 'grippy' surface that the sanding sheets grip on to, pretty much like Velcro. The great thing about these is that the sheets just peel off when they get worn and a new sheet is added in an instant. There are four grades of sanding sheets included: 120, 180, 240 and 320 grit, and you get six sheets of each grit in the pack. The price is only £3.00, and these have got me out of loads of tight scrapes in the past and allow me to get into hitherto inaccessible tight corners.

www.coachandwagonworks.uk



2 NUT RUNNERS, VARIOUS METRIC AND IMPERIAL SIZES

I can't tell you where I got these nut runners from, but I use these so much. Often there is a nut that needs tightening in a really inaccessible place, and it takes an age to achieve this with a regular miniature spanner. Whereas with these nut runners, I can simply spin the nut into place on the bolt, then, if necessary, nip it up with a more traditional spanner.



1 WOWSTICK PORTABLE SCREWDRIVER

If there is one item that I reckon you should buy off my top 10 list, it is the WowStick portable powered screwdriver. It is the size of a large pen and is a real quality build. The rocker action switch for forward and reverse is particularly tactile and just in the right place I find. It comes in a nice pouch, and has a tube of 20 various interchangeable screwdriver heads, Allen keys and various other useful tools. It takes 2 x AAA batteries, which seems to last an age, yet is not too powerful in its operation to risk over-tightening screws and stripping threads. I have the old model, a new rechargeable version is now available for around £30-35, so if you want one, I suggest you go for that option.





BR Concrete lineside huts

Julian James models a Southern Railway speciality.

Lineside huts have existed throughout large parts of the British mainline rail network for over 50 years, providing shelter for track and signal engineering staff. This design was a speciality of the Southern region, and their love of pre-cast concrete. By removing the chimney, the hut could be delivered to site by train, hence the unusually shaped roof.

My model from 3D Wayne, the first I have seen for larger scale railways, and suitable for garden use, is perfect for my 1:19 back garden line. Assembled, the model measures 209mm long, 145mm wide and 112mm high, all three dimensions being measured over the slightly overhanging roof. The height over the chimney is 140mm. The material is 3D-printed white plastic 3mm thick. This thickness provides ample strength and rigidity. Components require negligible trimming.

The manufacturer suggests assembly using a good quality superglue, or a thicker adhesive such as UHU. As the components fit easily together, requiring no force, the small gaps benefit from a gap-filling cyanoacrylate.

I bought two kits and assembled the walls first, one with superglue and one with

epoxy resin. To ensure a square assembly of the walls, it is only necessary to draw a rectangle to the inside dimensions on a piece of card and stand the walls on top aligned with the drawn lines while the glue sets. As the long walls fit within the ends, the four walls can be glued in one go with a heavy object such as a paint tin placed against the ends to stop movement outwards during setting.

As superglue and epoxy resin set rigid, they are prone to cracking if subject to shock loads. I always add a flexible bead of white silicon to the invisible inside corners. although, it can be used as the sole means of securing the three roof components.

I also strengthen the inside corners at base level with corner pieces folded from aluminium, held in place with epoxy resin. Each aluminium corner piece has a hole to take an upstanding locating peg from rustless material fixed in the ground. Remember to mark the hole locations on the card template used for assembly of the sides before gluing the roof on the building!

Concrete is a very difficult colour to represent in paint. I must have looked at thousands of lineside huts on my travels. The vast majority are cream in colour, possibly a very light grey. I keep trying to kid

myself they are grey, but really, they are not. Nevertheless, I have painted the model grey because it looks right. This is then overlaid with random patches of other colours, dabbing with a sponge. When the paint has ample time to dry, spray with three coats of matt varnish. ■



Small, aluminium brackets are fitted inside the model.

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Graham Pearce's 32mm gauge Parkwood Railway shares the garden with a dual gauge track and an elevated Gauge 3 circuit. Here, a Roundhouse Double Fairlie takes on water while a Roundhouse Lady Anne hauls a rake of ganister wagons on the inner route. The wagons have scratch-built bodies on Lineside Hut flat wagons.

A Yorkshire Summer

Alan Poxon takes us on a tour in God's own country.

The Yorkshire Group of the 16mm Narrow Gauge Modellers has a packed summer programme of garden railway open days spread over a large geographical area. The events are usually very well attended and are social affairs with food and hot drinks aplenty. However, considering circumstances in 2021, and the demographic of the enthusiasts involved, it was no surprise that visitor numbers were greatly reduced, and many events were postponed.

Those, like myself, who still needed a regular fix of trains in the garden, were lucky in that the Yorkshire Group had a number of small local gatherings that still met informally on a weekly basis. These groups, known as 'sheds' in the adopted railway parlance, are based around Sheffield, Huddersfield, Leeds and Bradford. In

2021, the Huddersfield Shed met regularly in one of five garden railways, which itself was a reduction over previous years.

The Huddersfield Shed garden railways provide an interesting variety of running. There is a mix of 32mm, 45mm and dual gauge railways, all amply provided with steaming-up areas and passing places. Some of the garden railways have gradients that favour radio-controlled or geared locos, while others have circuits very suitable for manual-controlled locos. Because of this variety, I have locos permanently set to each gauge so as to avoid regauging during the summer.

The gardens themselves are worthy of note. Some have railways with a background of mature plants and hedges. Other gardens are filled with railways, with the plants finding space to grow wherever they

can. All five venues have areas set aside for watching trains go by, consuming hot drinks and putting the world to rights. I remember most of the summer running being in the sunshine but, being in Yorkshire, I am sure that it rained once or twice.

At the end of a successful summer programme of outdoor running, the Huddersfield Shed moved indoors for the winter season. We are lucky to have use of a large 32mm indoor layout in a heated building that allows the Monday get-togethers to continue the whole year round. However, 2021 ended with indoor running being replaced again by Zoom meetings, but we are all looking forward to another great summer season in 2022.

Cheers! ■



A Roundhouse Katie poses at Martin Trowell's Monk Ings Bottom Railway. The garden railway has both 32mm gauge and 45mm gauge elevated track that complete a circuit on a large lawn. The Hudson munitions wagons are Resurgam kits, the small truck is based on those supplied to RAF Fauld and the larger MOD NGF is from RAF Chilmark. Both wagons are carrying 3D-printed RAF bombs.



ABOVE: An elderly Roundhouse Lady Anne drifts light-engined around Dave Webb's Almondbury Light Railway. The 32mm track climbs to the far corner of the garden before descending a spiral to regain the lower level. The railway is a regular venue for both Huddersfield Shed and Yorkshire Group meetings.



ABOVE RIGHT: Resting in sidings between turns are an Accucraft Leader and a Roundhouse kit-built hybrid 0-6-2 loco based on a Lady Anne body with a Fowler boiler. A scratch-built freelance box-cab loco passes by on the running line at Roy Plum's Nook End Railway. The radio-controlled battery-powered box-cab is built on a Essel chassis with an Acme sound card. The railway is a dog bone arrangement on two sides of the garden with a branch line rising steeply to a steaming up area.

RIGHT: Geoff Calderbank's 45mm West Calderbank Railway has a single circuit that follows the outer edge of the entire garden, along with a long branch line descending to a lower level. Here, an Accucraft 'Viking' hauls a rake of three Accucraft Isle of Man four-wheel coaches on the main line bridge that leads to the large steaming-up area.



From the works

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Locomotive specification:

- Powered by two Bühler motors with ball bearings
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SDG Observation Car: 269 €

SDG Passenger Car: 249 €

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G scale DR IV BR 132 Diesel

The 130 class of heavy freight locomotives were built in Luhansk, Ukraine, from the 1970s onwards. German reunification saw Deutsche Bahn (DBAG) inherit over 700 examples, which gained the nickname "Ludmilla". DR Class 132 was created by the Voroshilovgrad Locomotive Works, supplying electric train heating, something the Soviet-era builders had been unable to do. Many of the locomotives can still be found operating in Germany, Poland, Romania and Hungary. Piko's model carries the 1948 – 1956 DB livery suitable for the steam/diesel transition.

Specification:

- Two powerful 5-pole precision can-type ball-bearing motors
- Numerous separately-applied details, including lights, windscreen wipers, handrails, horn, bumpers, and exhaust vents
- Operating red and white directional lighting with functional high beam using DCC
- Detailed engine room interior and engineer figure
- Digital DCC decoder and sound installed with a PIKO SmartSound Decoder XP 5.1. The locomotive will run on Analogue/DC but may not have all sound functions
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Stretton station kit

Stretton station, on the Ashover Light Railway, was supplied by the Clay Cross Company. Opened in 1925, it was the line's main passenger interchange with the MR consisting of a covered waiting area and a good office.

This laser-cut kit is in 1/20 scale making it suitable for both the 16mm and G scale modeller. Walls are double thickness 3mm thick, laser-cut poplar plywood with engraved planking. The roof is corrugated styrene sheet. Being wood, the kit will need thorough painting or varnishing if it lives outside in the rain. Use of waterproof woodworking glue or epoxy adhesive is also recommended.

Dimensions:

Length: 40cm

Width: 17cm

Height: 16cm (to the top of the front barge board)

Price: £50 + £4 UK post and packaging



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16mm scale Penrhyn quarry slate wagon

Newly released from HGLLW is a kit of a Penrhyn quarry slate wagon made from a high-resolution 3D print, which we are assured, will require very little preparation and cleaning up. Hidden tabs simplify accurate assembly.

The wagons are available in 16mm/ft scale with either the correct 32mm gauge or a widened version for 45mm gauge. They are supplied complete with Binnie glass-filled nylon wheels.

Price: £23.00 each or a pack of 5 for £100.00



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CLAVEY MODELS

3D-printed figures in various scales

A new range of 3D-printed figures, available in G, 16mm and 7/8ths scales, plus others. All are produced in the UK by David Clavey.

The pictures show:

- Alf the Victorian driver, in charge of a Millie Roundhouse loco.
- Ted taking a cuppa while the Ellie locomotive steams up.
- Viv driving a Brush 16303 loco. She can turn her head to look out of the front or rear windows.

Many figures can also turn their heads, or even swap heads, allowing for more variation.

Prices:

Typically £15.80 for painted figures including U.K. p&p
£6.30 for grey primed figures ready to paint plus p&p
£3 extra on both prices those for 7/8ths and 1/12 scale



Clavey Models
www.ebay.co.uk/usr/clavey.models



Coach & Wagon Works Railway Colours

Mark Thatcher tries out a new range of paints.

Following on from the launch of their successful brick, stone and slate paint sets for buildings and structures, Coach & Wagon Works has added to its line-up three new sets for railway companies' locomotives and rolling stock.

The three new paint sets are for the Ffestiniog, Talyllyn and Darjeeling Himalayan Railways. Each set comprises five 40mm tins of various colours to give you enough flexibility to cover off most bases, with (mainly) what I would call two primary colours and three supporting colours in each paint set.

The primary colours in the DHR set are the Darjeeling Blue and Rapeseed Yellow. In fact, I used this set to paint the covered wagon for a recent review on Timeless Models. As the blue colour of the locos and stock varied over the years, it would be very difficult to find an exact match, as it does not really exist, but this looks to be a faithful representation. The Rapeseed Yellow is quite a challenge too, as it is not just a bright yellow but has a little hint of orange

in it; this works well, though. The other colours included in this set are dirty white, dark grey and black.

The two primary colours in the Talyllyn paint set are Talyllyn Brown and Red. I have no reference rolling stock to compare these with, but judging by the colour swatches provided, they look to be a very close match. The supporting colours in this set are the same as in the DHR set.

There are three primary colours in the Ffestiniog paint set; Ffestiniog Dark Green, Mid Green and Red. These are supported by a light grey and black. Referencing these against my GRS brass model of a Double-Fairlie (which I bought painted), I can see these colours are a very close match too, with two similar shades of green included. The darker green better matched the model I had to hand.

Each set comes nicely presented in a cardboard box with an acetate top, so you can see the colours that are included. Also included are five stirring sticks, which is a nice touch. In my experience, these paints

are a joy to use, and apart from the yellow, will usually cover in one coat. However, it helps greatly with a yellow or red if you use a white undercoat.

Price: £23 per set. ■



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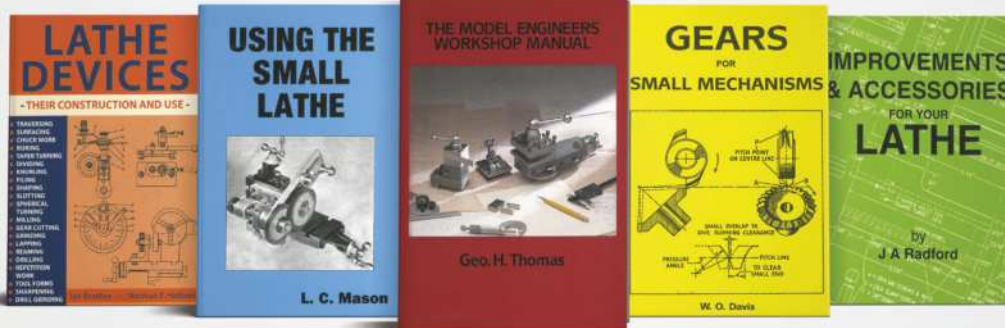
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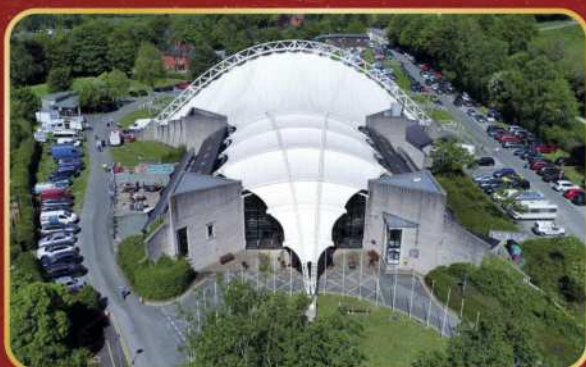
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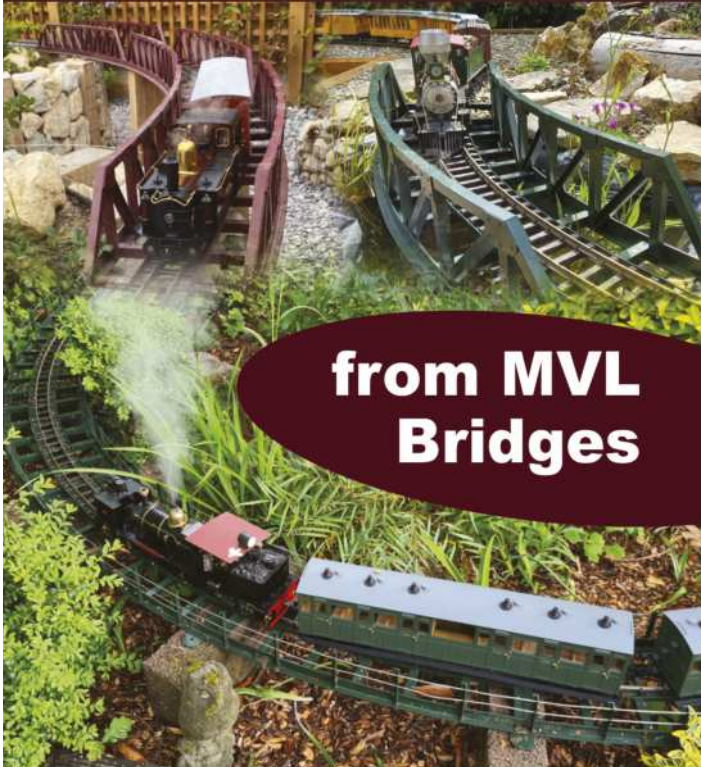
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The Worm that Turned

Mad Professor Dave Skertchly discovers that the worm and wheel drive we use on our scratch-built electric locomotives has an ancient heritage and is subject to rather surprising sums, which explain so many problems.

In the Formula One team I worked for, the very first part of the car to be designed each year was the gearbox. Its position in the car next to the driving wheels and in front of the diffuser (the aerodynamic part which effectively sucks a Formula One car onto the track), determined the shape of everything else. Of course, top designers such as Adrian Newey, demanded compact, reliable gearboxes, and that was an ongoing challenge. And so it is with our model locomotives, just like a Formula One car, the gearbox is at the heart of every electric locomotive.

The most common gearbox used to drive our locomotives is the worm gear, which is more correctly known as the worm and wheel. This type of gear is ancient; it was

developed by no less an engineer than Archimedes, so yes, it uses an Archimedes screw. Unlike a gearbox with spur gears, the 'worm' is in effect a screw that engages with a one-sided thread on the 'wheel'. The worm moves the wheel just one tooth for each rotation. The worm and wheel set-up has two significant benefits for us modellers. First, in comparison to conventional spur gears, the worm and wheel has a very high ratio in a very small space, and second, the output is at right angles to the input without an intermediate gear or differential. It allows motors to fit in a locomotive-shaped space, but that is about it, the rest, unfortunately, is really bad news.

Unlike spur gears, the teeth on the worm slide over the teeth on the gear

wheel, which creates high friction and low efficiency. Lubrication is critical, industrial worm and wheels run in an oil bath, so we too need to be handy with the oil can. Most importantly, the worm and wheel has a high 'mechanical advantage', this is engineers speak for the effect of a lever, screw, or wedge.

Let me explain; a lever has a long arm operating against a short arm with a pivot in between, a large movement of the long arm with a small force creates a small movement of the short arm with a large force; a kind of force amplification. The load lifted, divided by the load applied, is the mechanical advantage. Should you happen to get your finger trapped in the locomotive motion, you will notice that the worm and wheel

drives seem very 'powerful' even with only a modest motor driving it. To engineers, who specialise in being obscure, it is actually no more 'powerful' than any other gear but what it does have is a very high 'mechanical advantage'. In effect, a locomotive being driven by a worm and wheel is being driven along by a screw, or even a series of wedges applied in quick succession. This is the reason a worm gear cannot be overdriven, not friction. In effect, the materials of the gear would fail before you could apply enough force to drive it backwards. As in all things engineering, there are exceptions, such as multi-start worms, but for now, we won't go there.

The downside of all this is that in a crash, where the wheels and motion may become jammed, the lever effect works in reverse jamming the motor and damaging the mechanism, often putting it out of adjustment, or worse, stripping the gears or smashing the gearbox frame. It is obvious that our worm and wheel gearbox mechanisms need to be incredibly strong and stiff if they are to withstand the rough treatment of a garden railway.

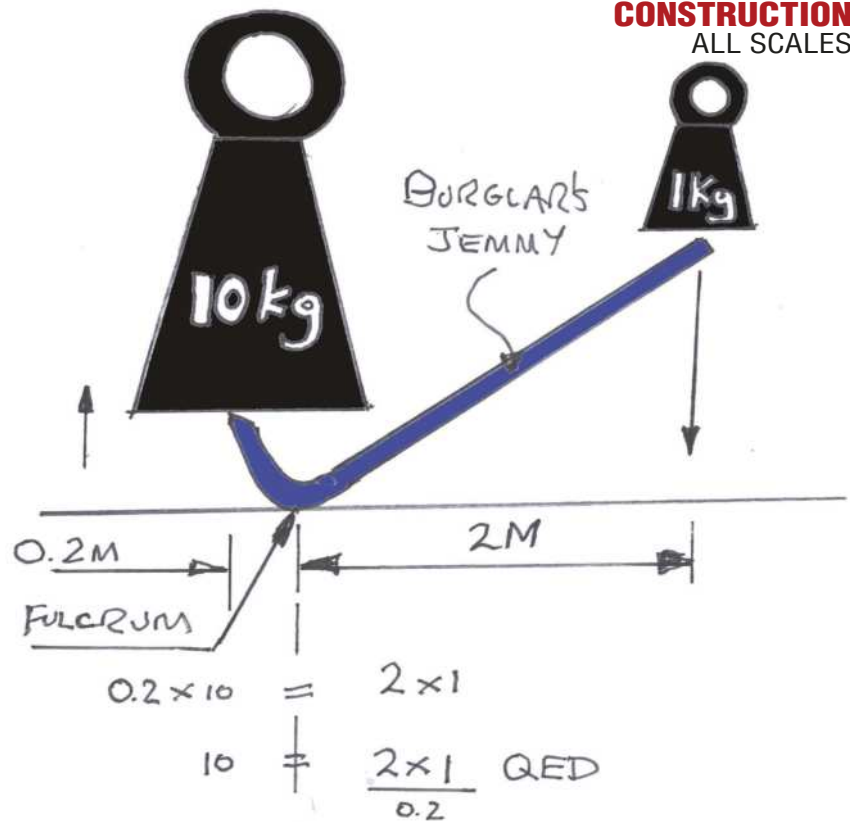
When we look at a worn worm, we can see that the teeth in contact with the wheel have worn to a point and can be easily pushed out of mesh, especially if the motor mount is slightly flexible. It is tempting to believe that the high wear of the worm is due entirely due to high friction, but this is not the case. The wheel progresses just 1 tooth for each rotation of the motor, so the worm, if we are using a 40:1 gear ratio, will wear at 40 times the rate of the wheel.

I quite like gears made from polyacetal, a worm gear can be expected to last a season or two on my line. Polyacetal was specially designed for gears and bearings in space, I believe, and polyacetal worms are cheap and easily replaced, so it is not such a problem, I bought a box full for just a few pounds.

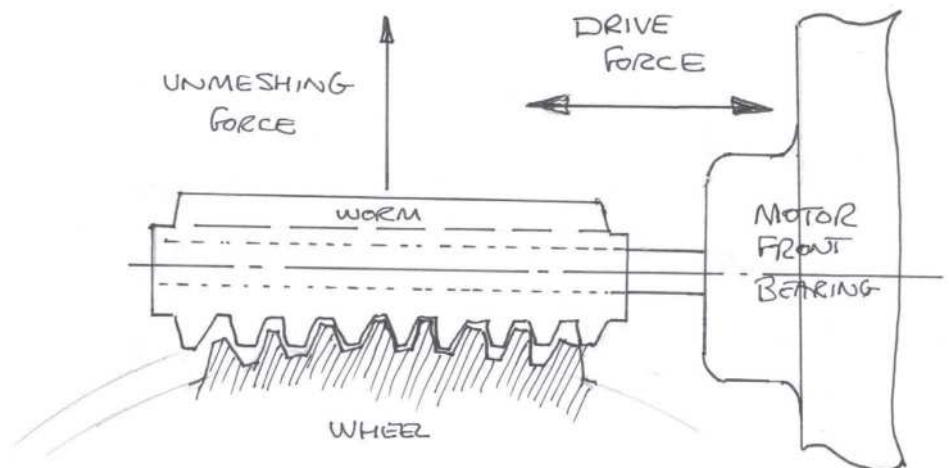
Dean Goods, IP Engineering, PDF models and others supply gears, and if all else fails, they supply complete gearbox kits. I find that MFA is great for motors and its website has superb tables of motor performance data. Motors are cheap and it is worth experimenting.

Finally, when all is done, build a lovely locomotive to match the gearbox and send an article to the Editor.

As I sit on my rustic park bench outside the Sheep Shearers Arms, I can hear the gentle whirring of my electric worm and wheel-driven locomotives as they pass by. As I pick up my pint of Fine Auld Phagbutt, I flinch from a nasty cut on my forefinger, and I am reminded not to get it trapped in the motion again! ■



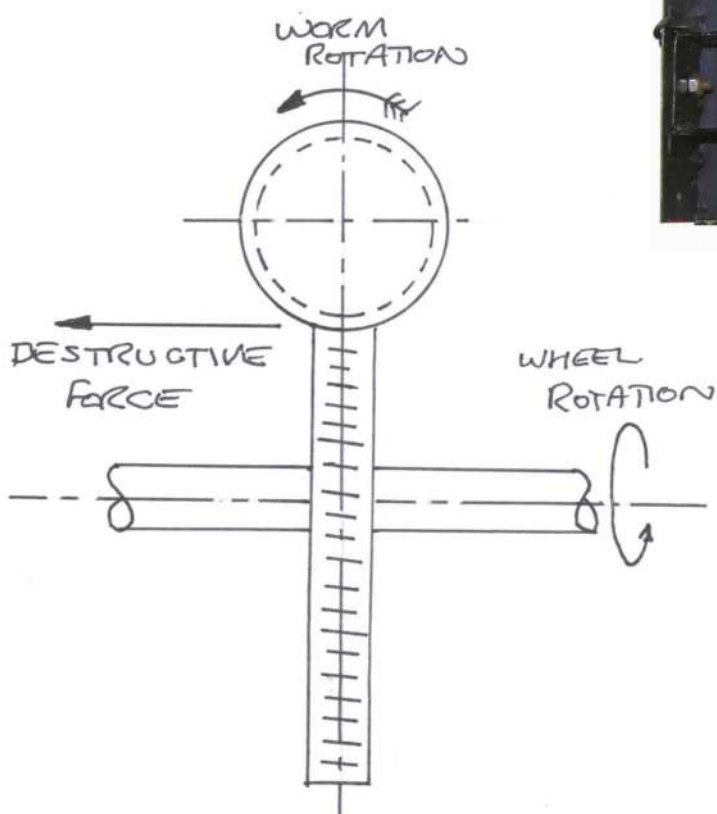
To understand mechanical advantage, we can see that by leaning on the long side of the crow bar with a small force, we can lift a very heavy weight a small distance.



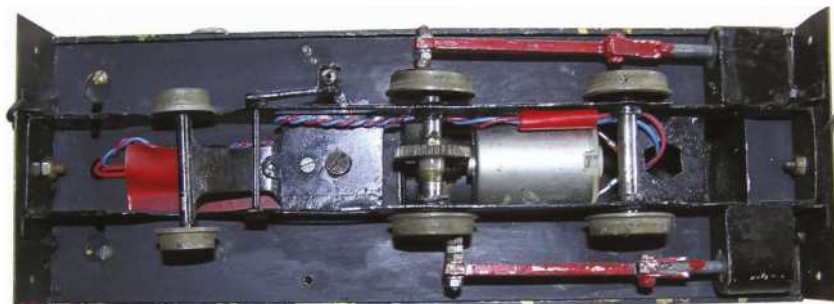
The worm is in effect a wedge, similar to a lever, which is being driven into the slots created by the teeth of the wheel. We can see this creates some problems; first, the worm is trying to screw the motor bearings out of the body of the motor, and indeed, screw the motor off its mount. A well-fitting spacer between the worm and the front bearing of the motor might be a good idea. Beware, the bearings are less substantial when the screw is trying to pull the innards out of the motor, so best set the orientation so that the locomotive, when moving forwards, pushes the worm against the front bearing of the motor. We can also see that the wedges on the worm are being forced out of mesh by the internal angle of the teeth on the wheel gear, which causes wear on both the motor bearing and worm and will eventually force the worm out of mesh with the wheel gear.



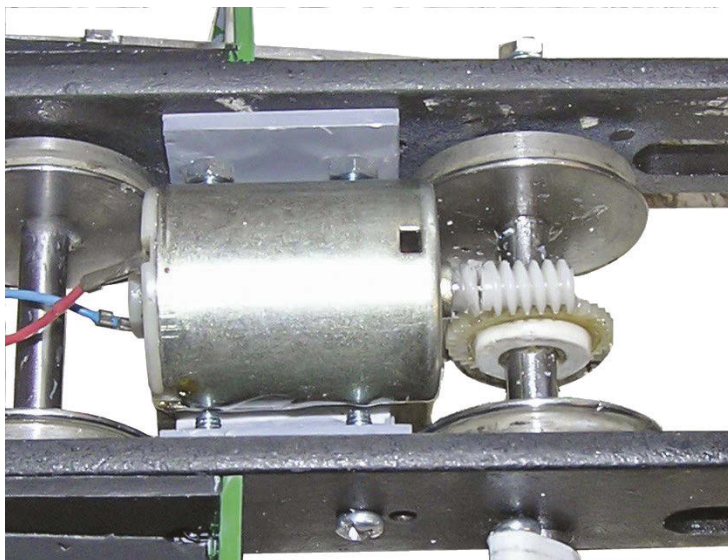
In this case, we can see how the high mechanical advantage or crow bar effect of the worm and wheel has split a 3D-printed commercial gearbox after a crash in which the locomotive motion became jammed. This is not helped by the way that 3D-printed plastics are directional and not homogenous.



We can see that the friction between the worm and wheel will force the motor and gear sideways with respect to one another. The motor and gears need to be fixed so they cannot move sideways.



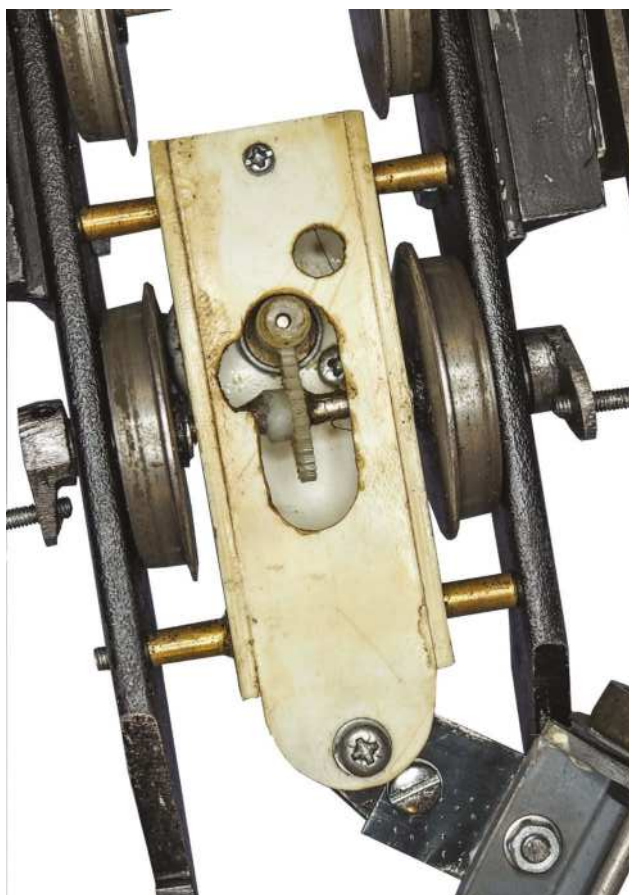
This 40-year-old scratch-built locomotive has the best gearing, which seems indestructible. The Motor is glued to the frames so it is rigidly mounted and the gear wheel is Araldited to the axle.



This later locomotive is not quite as good, the distance between the outside frames meant that the motor had to be glued to a platform. This platform was sufficiently flexible to allow a worn wheel to jump out of mesh to the accompaniment of that annoying buzzing sound.



Mounting the motor vertically to the footplate works well, although the footplate can act as a sound board, making the locomotive quite noisy.

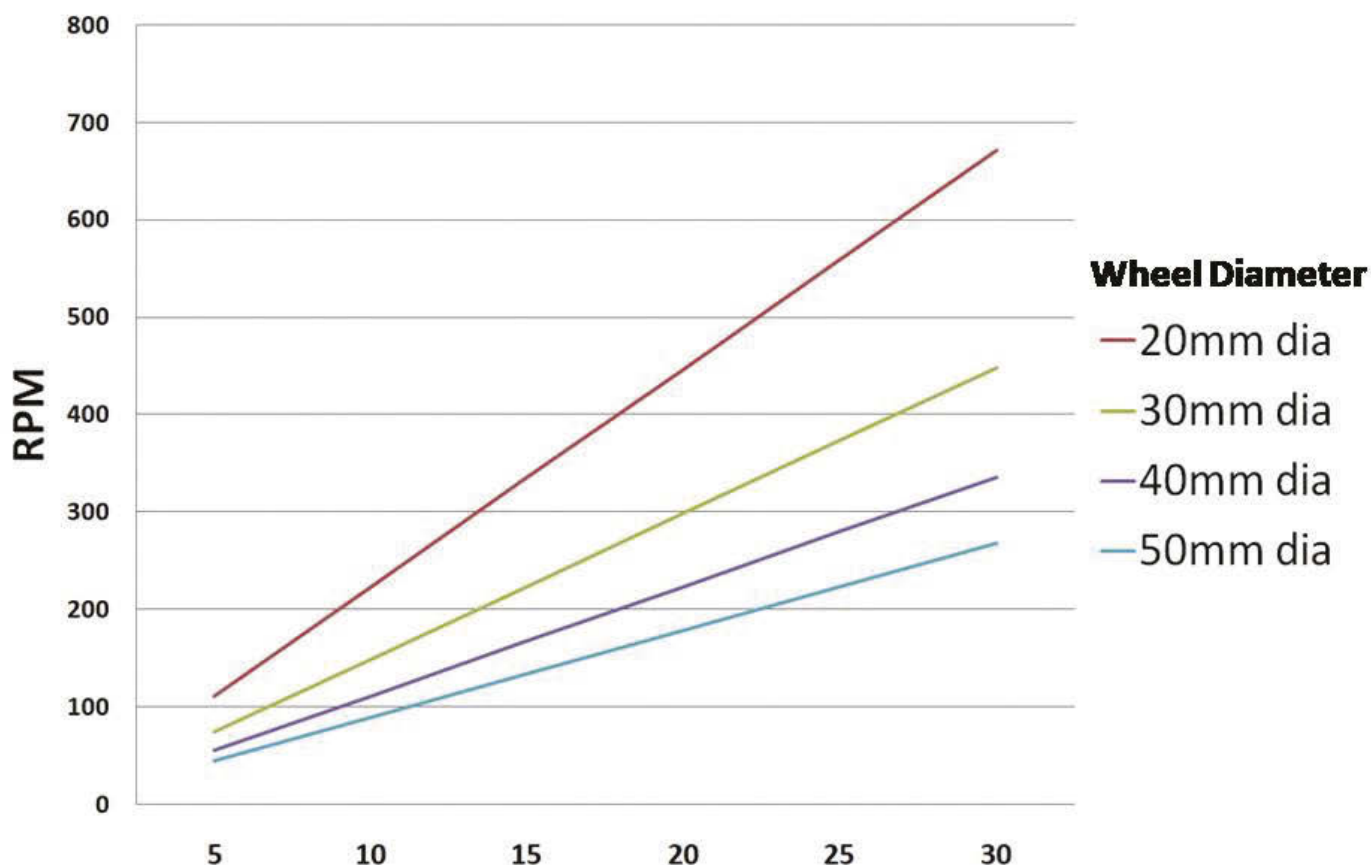


This Plastikard gearbox worked well for many years once reinforced with M2 bolts to stop it from being split apart.

Making a gearbox

The first step to making your own gearbox is to decide on the ratio. This will depend on the speed the locomotive is to travel, the wheel diameter, the motor RPM and voltage chosen.

Wheel RPM Calculator



FULL SIZE MILES PER HOUR

The graph shows the wheel RPM for a particular locomotive speed and wheel diameter. The motor RPM at various voltages can be found on the suppliers' websites. Divide the motor RPM by the wheel RPM, and this gives you the required gear ratio.

For example, for a locomotive with 30mm dia wheels designed to run at a full-size speed of 20mph, we can see that the wheels rotate at 300rpm. For this model, we might pick an MFA Como Gears RE-280 (3 to 6V) running at 6636rpm, which would need a 22:1 gear (6636 / 300). A Dean Goods 20:1 gear might do the job.

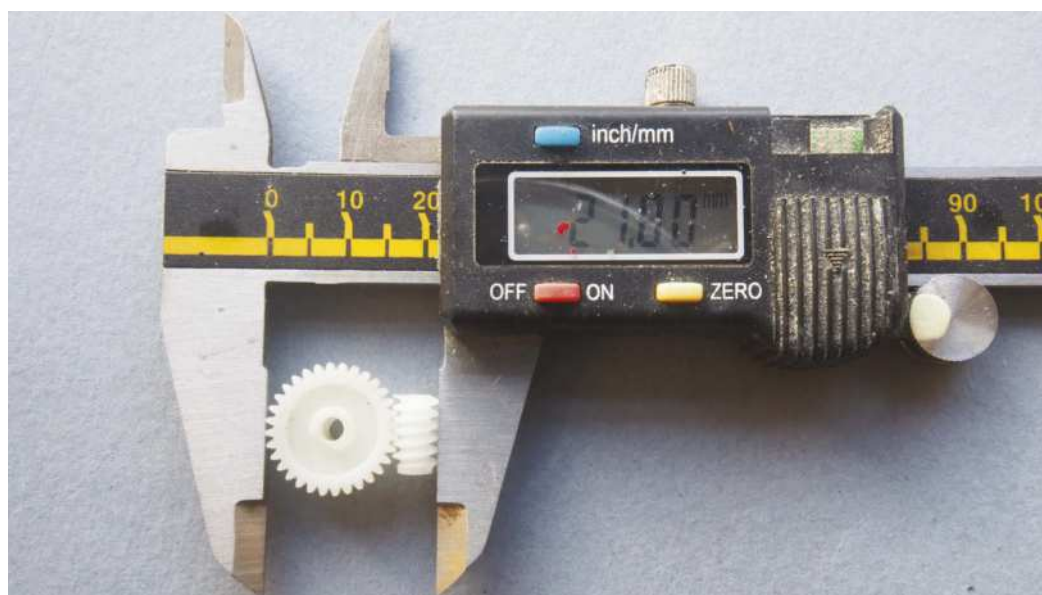
A lower ratio that will make the locomotive slightly too fast can be controlled with an inexpensive speed controller or, if you are feeling flush, an RC speed controller or LocoRemote.



To calculate the distance between the centres of the worm and wheel, first, measure the diameter of the worm.



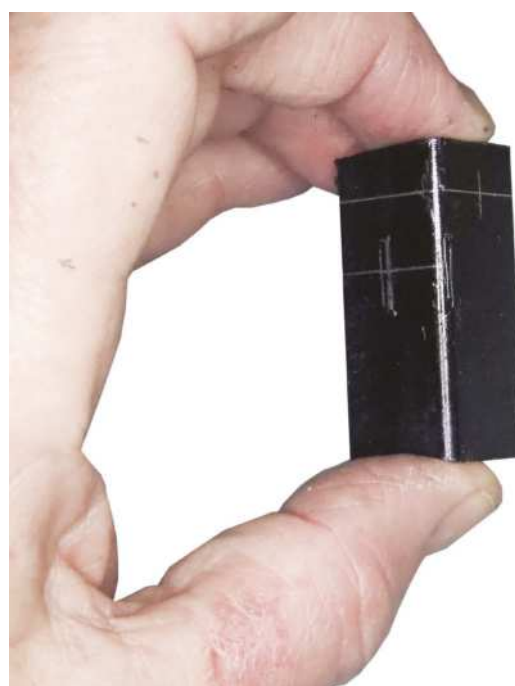
Measure the diameter of the wheel then Divide the sum of the worm and wheel diameters by two.



Measure the worm and wheel combination size with worm and wheel in mesh. Subtract the worm and wheel radii when out of mesh calculated above and that gives the centres of the bearings. This may be a bit tight for all sorts of complex reasons, but this ultimately works to our advantage.



Measure the diameter of the bearing casing on the front of the motor.



Start with a piece of steel tube. This tube started life as a greenhouse frame. Mark the position of the axle and motor shaft. The blue colour is a kind of ink that highlights the scribe lines. Permanent marker also works well.



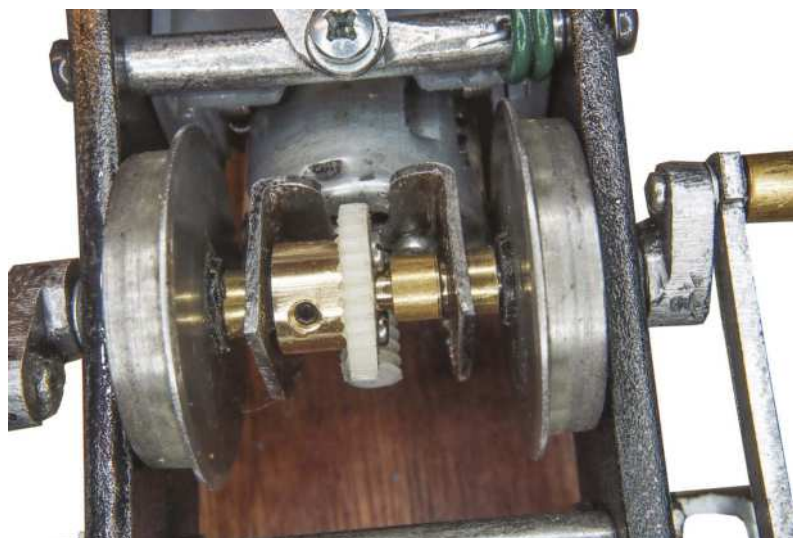
Drill the 3mm diameter axle hole, however, it is worth remembering that 1/8" axles are actually 3.125mm.



Drill the motor shaft position and open up to the motor bearing housing size. Temporarily fit the motor worm, wheel and axle. With any luck, you will find that the motor is tilted as shown.



Cut off the surplus material and file to a nice shape and finish. Now slot the hole for the motor bearing until the fit of the worm and wheel is 'just right'. You may also find that you need to add slots to clear the gear. Drill the screw holes, these can be oversize, but make sure you can get a screwdriver to them during assembly.



Make and fit bushes from plastic or brass tube. Anything will do if you don't have a lathe. This will ensure that the wheel cannot move sideways out of mesh. This wheel was screwed to a brass bush, which was secured to the axle with a grub screw.



Using gears from a kitchen gadget may not be as straightforward as expected

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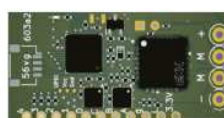
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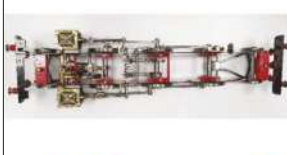
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ACCUCRAFT	51	MICRON RADIO CONTROL	46
AMAZING LITTLE TRAINS	48	MERIDIENNE EXHIBITIONS	46
ANYTHING NARROW GAUGE	11	MODEL TOWN	35
BARRETT STEAM MODELS	39	MVL BRIDGES	39
BOLE LASER CRAFT	49	MY LOCO SOUND	49
BRANDBRIGHT	47	NORTH PILTON WORKS	39
CAMBRIAN MODELS	39	OLD MILL FARMHOUSE	48
DREAM STEAM	2	P & S HOBBIES & MODELS	47
ELLIS CLARK TRAINS	4	PDF-MODELS	48
GARDEN RAILWAY SPECIALISTS	52	PLATEWAY MODELS	48
GARDEN RAILWAYS LIMITED	49	POLLY MODEL ENGINEERING	46
GAUGE 1 MODEL RAILWAY ASSOCIATION	39	RAILS OF SHEFFIELD	37
GAUGEMASTER	29	RESURGAM ROLLING STOCK	48
HATTON'S MODEL RAILWAYS	12, 13	ROUNDHOUSE ENGINEERING	11
I P ENGINEERING	47	SMALLBROOK STUDIO	35
JACKSONS MINIATURES	36	STRIKALITE	49
JOHN SUTTON BOOKS	36	TEE PUBLISHING	36
KENT GARDEN RAILWAYS	5	THE ASS. OF 16MM NG MODELLERS	47
LLANGOLLEN GARDEN RAIL FESTIVAL	38	THE G SCALE SOCIETY	49
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Readers' Models

We are always proud to show off Garden Rail readers' modelling. If you'd like to see your models here, send photos and a short description to the Editor.



GN15 is G Scale, but running on H0 track. There are quite a few locos and wagons for sale now in the scale, but I have wanted a large steam engine for a long time, however, the only steam engines commercially made in GN15 are little 0-4-0 engines.

I contacted my friend Rich Perrelli in San Diego, who is a gifted modeller, and asked him whether he could do a conversion for me. He agreed, and I purchased a used Bachmann Spectrum On30 Shay locomotive, plus three G Scale engineers, which I sent him. I gave Rich carte blanche to do whatever he thought would look good. After a few emails and phone calls, he had an idea of what he was going to do, and I readily agreed. Needless to say, I am very very happy.

Thomas Preisner

Banana!!!

He's called Stuart and he is a Hythe Pier 16307 Gerald Yorke locomotive, printed in yellow with blue dungarees! The loco was originally built for the Ministry of Munitions in 1917 and worked at the Avonmouth mustard gas factory. It came to Hythe in July 1922, and as far as I know, has never appeared in these colours.

Control is by a LocoRemote Mini B controller of course.

Chris Rennie



Huddy is a small 16mm scale freelance petrol loco on a 32mm or 45mm gauge Hudson tipper type chassis in a variety of body styles and colours. It can haul a few loaded tippers as well as negotiate tight 2.9-inch radius curves.

This version has been printed in 'Marmalade sandwich orange' at the request of its driver.

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