BOOT LANE WORKS
www.bootlane.org.uk

DRAGONFLY

Thank you for buying this locomotive kit from Boot Lane Works, please read all the instructions carefully before assembly.

Tools & Adhesives

I recommend a few tools to help you assemble your kit –

- Small Bench Vice
- Modelling Knife *(I use a scalpel)*
- Tweezers, Pliers, etc…
- Needle Files, various shapes
- Wet & Dry abrasive paper *(the mixed selection from Halfords is very good)*
- Selection of small twist drills, including 1.5mm & 2mm diameter
- A 90-degree angle *(I use a set block, but a small set square will work well)*
- Personally, can't manage without my small, tapered reamer, look for them on eBay!
  TAKE CARE WITH THE REAMER - MAKE A SMALL CUT, TRY, AND CUT AGAIN

I also recommend the following adhesives –

- Super Glue
  I use Gorilla Super Glue
- Dichloromethane, A liquid solvent for the acrylic
  I use E.M.A. Model Supplies "Plastic Weld"

A little about the printing process.
The printer extrudes a filament of plastic, layer by layer, to create an object. As it does so, it can leave tiny ridges along the object.
The printer can also leave a bit of a "squish" from the build-plate and there is usually a tiny "ridge" around the flat surface of the object that was attached to the build-plate.
For best results, clean the ridge off with a file.

THE RESIN PARTS ARE BRITTLE AND MUST BE HANDLED WITH CARE
The resin is hardened by an ultraviolet light process but continues to adsorb the light after the process.
Please ensure the resin is thoroughly painted to stop the hardening process.

THE ACRYLIC IS ALSO BRITTLE, CARE SHOULD BE TAKEN DURING CONSTRUCTION
I have added spare acrylic parts as I did suffer some breakages during construction. There are three frames, and three motion brackets included in your kit!

CHASSIS

Please bear in mind that this kit, although intended for garden use, is still a small power unit, designed for hauling a handful of wagons or a couple of small carriages.
We DO NOT guarantee this chassis if used for "Heavy Haulage"!

OK, let's jump straight in!

This is a long description but bear with me. If we can get this right, everything else will fall into place and your model with run like a dream…

IF YOU HAVE PREVIOUSLY BUILT A CLARA OR LEO FROM BOOT LANE WORKS – NOTE THAT THERE ARE A FEW SUBTLE DESIGN ALTERATIONS WITH THIS KIT

Locate the two 2mm acrylic frames. Be careful with these frames, the strength comes from the frame stretchers. There is a spare frame included with your kit, in case of breakages during construction.
Locate two motion brackets (again there is a spare included with the kit), using liquid or super glue, attach the brackets to the frames.
Use a square to ensure the bracket is 90° to the frame.
ENSURE YOU HAVE ONE LEFT & ONE RIGHT FRAME WHEN COMPLETE.

Now locate the two cylinder-blocks, they are marked with a "L" & "R" as they are handed due to their shapes.
Ensure the 2mm brass rod will slide freely into the block - run a 2.5mm drill down the piston-rod hole to ensure there are no obstruction and the brass rod runs freely in the bore.
Attach the front cylinder covers to the cylinder blocks.

Attach left cylinder-blocks to the left acrylic frame using two 8mm M2 screws. I have designed most of the chassis to accept the 8mm M2 screws as self-taping, some of the holes may require opening slightly to get the screw started.
Repeat for the right-hand side.

You will also need the 2mm brass square sections.
The brass square section needs to be approximately 50mm in length, you can trim them once you know exactly how they fit, although there is plenty of excess space in the cylinder block to accept any spare brass rod.

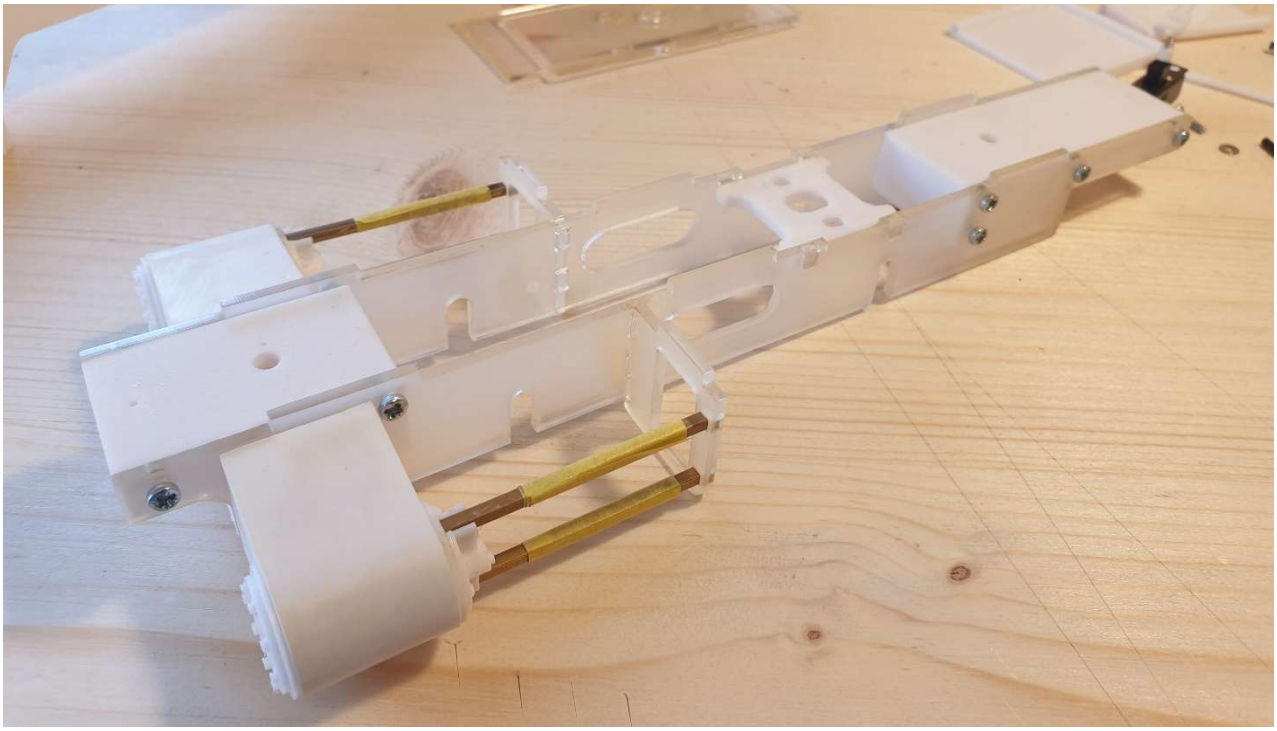
With the motion bracket attached to the frame, fit the slide-bars into the cylinder-block and motion bracket. Ensure the cylinder-block is parallel to the frame.

Locate the two frame stretchers and the motor-plate. The longer stretcher at the rear.

In a slight departure from CLARA & LEO, the motor-plate is now sandwiched between the frames and located using lugs & holes.

Attach one of the frame & cylinder-block assemblies, to the front stretcher, and then repeat with the rear. Once you are happy that everything is square, attach the other frame & cylinder-block assembly.

Don't forget to sandwich the motor-plate between the frames, the slot on the face is to clear the drive gear on the wheel axle and should face the axle.



DRAGONFLY'S chassis with frames, cylinders, slide-bars (2mm square rod), motion brackets, stretchers & motor-plate.

Looking good so far?
Let's do the wheels!

There are eight printed inserts for the Binnie wheels, two inserts for each wheel, one with a hole for the crankpin and the other, a counterbalance weight. The inserts push into the wheel from the front and are a good tight fit, but not so tight as to push the wheel out of shape! I found the best way to fit the inserts is to offer them both to the wheel (they have very slight tapers to help you get started). With the two inserts in position, place the wheel and inserts into a vice and squeeze the whole assembly together.
Do this for all four wheels. You may wish to tidy the wheels a little at this stage. Binnie wheels tend to have slight flash marks on the flanges, part of the injection process. I use a file to tidy up the wheels.
Next, add the crankpins. There are six conehead screws in total, 2x 16mm, 2x 12mm & 2x 10mm.
The 16mm screws for the rear wheels (for connecting & coupling rods).
The 12mm screws for the front wheels (coupling rods only).
The 10mm screws for the crossheads.

Do the rear wheelset first.
You will need two wheels, two 16mm conehead screws, the ⅛ inch axle with the gear and two brass top-hat bushes. NOTE – There are four axles with your DRAGONFLY kit, the shorter two are for the locomotive.
Screw the 16mm into each insert.
Slide a bush onto the axle, the lip of the top hat towards the outside, or wheel.
Next, start pushing a wheel onto the axle. *I use my taper reamer to open the hole in the wheel very slightly, to create an easier start.*
Repeat for the other side, then using your vice, squeeze the two wheels on the axle.
We are looking for a "back-to-back" measurement of 28-29mm. *This means the distance between the back of the two wheels.*
Now do the front wheelset. Remember, the 12mm conehead screws, and you should have the ⅛ inch axle with no gear. Don't forget the bushes.

Good.
Let's quarter the wheels.
This is easy, don't get worked up over it…

Locomotive driving wheels are quartered. That's to say, the cranks are at 90° to each other. Both wheelsets must be quartered identically to each other. Here's how we are going to do it.

Although the wheels are tight on the axles, they can be twisted. Try it.
Move the wheels around so they are approximately 90° to each other.
Now place one wheelset in the vice so that the jaws grip the edges of the inserts. The rest of the wheelset pointing upwards.
Ensure that whatever you do, repeat for both wheelsets…
I placed my wheelset in the vice, jaws griping the inserts and the lower crank towards my left, then I twisted the top wheel around so that it's crank was at the top of furthest away from me.
With the lower wheel firmly in the vice it is easy to look over the top and see if the top wheel is at 90° to the bottom!

That's it, repeat for both wheelsets. Check your back-to-backs, and then your quartering again.

The wheelsets should now drop into your chassis.
The lip of the bush should sit outside the frame and is kept place between the wheel & the frame.

Locate the printed retaining plate. This plate will may require cleaning to fit?
It sits in between the frames and screws to the bottom of the stretchers. The plate follows the shape of the frames, and its purpose is to keep the wheelsets in place, pushing up against the bushes.

Once you have ensured a comfortable fit and fixed it into place, try your chassis for free running.

We're on the home stretch now!
Let's fit the motion.

We have supplied a few extra parts in your kit, I found the crosshead can split, so you have spares and I've included a spare set of coupling rods and a spare connecting rod.
Mostly because the rods are (like the original) very fine…

You need two coupling rods (couples the wheelsets), two connecting rods (connects the wheel to the piston rod), & two crossheads.
You will need two M2 half nuts, 10mm conehead screws & steel washers.

Start by screwing the 10mm conehead screws into the connecting rod, there is a countersink printed into the rod. With the screw in place clean the printed area around the screw. This part fits into the crosshead and should be a nice loose fit.
Opening the hole in the crosshead accept the 2mm brass piston rod. The rod will need cutting into 25mm lengths. Make sure the end of the rod is nice and clean.

DO NOT DISCARD THE REMAINING BRASS 2MM ROD!

I opened the hole in the crosshead with a 2mm drill bit. Push the rod in as far as you can. But do not obstruct the bore for the connecting rod.
With the piston rod in place, push the connecting rod into the crosshead and using a washer and nut, tighten the whole assembly.
You should find that the rod and crosshead remain nice and loose, but firmly attached to each other?
Repeat for the other side.

Nearly there, one last fiddly bit!

Locate the four ABS crankpin sleeves. These have been cut to the correct length for your crankpins, there are two lengths, the short ones are for the short crankpins, the longer ones for the long crankpins!
The sleeve fits over the crankpin, and the rod fits over the sleeve.
An M2 washer fits on the end of the sleeve and the M2 nut captivates the rod while allowing it to move freely on the sleeve.
The bore holes on the rods are reasonably loose on the sleeves, to allow for inaccuracies in the quartering. But, still tight enough to give smooth operation.

The sleeve acts as a spacer on the crankpins, and in a moment, you will be able to tighten the nuts against the tubes but allow the rods to remain free.

The piston rod will need pushing into the cylinder and the assembly rotating until the crosshead lines up with the slide-bar.

With all the rods on, you should now have a free running chassis.

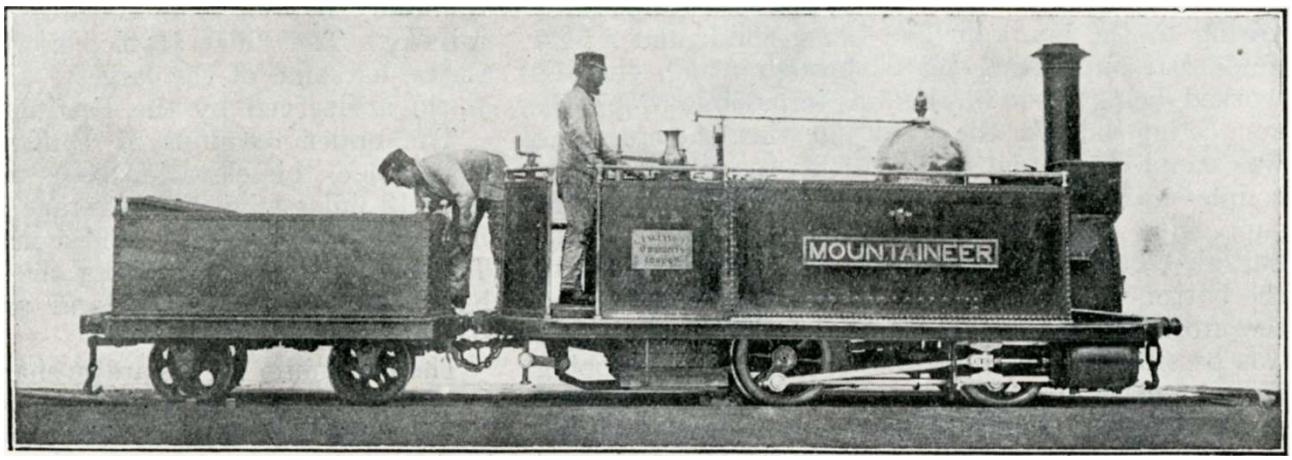
Once you are happy that all is free running, add a tiny amount of super-glue or Loctite to the ends of all four crankpins to ensure they cannot come loose in operation.

Next attach the motor. There are two 5mm M3 screws to fit the motor.
Try and allow a little play between the worm and gear. Do not push them to tightly together as this will wear the worm done. A little play here is a good thing.
Having said that, if the two are too far apart the gear will strip the worm…

BODY, TENDER & DETAIL

DRAGONFLY emulates the original Ffestiniog Railway's, George England 0-4-0 tank-engines.

We wish to thank MRFS for his support and advise during the design and development stage of production. You will notice that DRAGONFLY is not portrayed with an enclosed tank-top, this was deliberate as we do believe the engines were built as our model portrays.



FOOTPLATE

The footplate is built up from two 2mm acrylic pieces, they should be glued together to make one solid piece.
You will notice aspect of the footplate, there are slots for the frames & stretchers to locate. There are also slots for the wheels to clear the footplate.
Notice also, six holes at the rear to attach the cab-sheets, use 8mm M2 screws from underneath the loco to attach. The larger holes recess the screwhead.

One last aspect of the footplate is the switch holes.
I initially mounted the switch under the tank on the pre-production model, but quickly realised that access was extremely limited due to the motion.
I moved the switch to the cab-sides, but have opted for two sets of holes, dependant on which side you chose to mount the switch. If you want to use the switch that is...!

BOILER

The boiler is built up from three parts, the smokebox, barrel & firebox.
The underside of the barrel is clear for your electronic equipment (as are the tanks).

The smoke box & firebox are the main fixing points for the boiler. I have built slots into the rear stretcher and footplate to allow the firebox some backward/forwards movement when attaching. This was required when I added the tanks and cab front-sheet (cut from 1mm acrylic).

The hole in the top of the barrel is for alignment purposes only and serves no other function.

The smokebox door (1mm acrylic sheet) is detailed with two handles and a hinge (supplied) and sits 1mm off the base of the smokebox.

The firebox is detailed with a regulator, firehole door & gauge glass. While a small safety valve chute sits in the recess on top of the firebox.

The original machines had (indeed, continue to have) a distinctive design feature.
The boilers were slung very low in the locomotive in an assumed effort to lower the centre of gravity. The frames were attached to the cylinders at the front and the firebox at the rear.

In the model the frames run the length of the engine, but we have supplied a false lower firebox.
This is printed in such a way as to just sit over the frames.
Note – there is a very slight inclination to the rear of the firebox, that continues through to the lower firebox.

TANKS & CABSHEETS

The tanks have holes for mounting to the footplate with four 8mm M8 screws.
They also have holes to take the two water fillers and six handrail knobs.

The handrail knobs are resin printed, and we have supplied plenty of spares!

Open the holes in the top of the tanks to accept the fillers & knobs.

The handrails extend along the top of the front cab-sheets, and I slid the 1.5mm brass handrails into place once the tanks and cab-sheets were in place.

The rear cab-sheets also have handrails & knobs but are independent of each other and everything else.

DETAILS

Two sandboxes are supplied, these were mounted on the front of the tanks. Please look at the photos for placement.

We have provided our standard reversing lever, which is mounted alongside the firebox.

While we do not believe the originals had overall sheeting across the tanks, we do firmly believe that there would have been some form of bracing.
Two lengths of 1mm acrylic have been supplied to act as tank bracing.

We have included rivets, (Nail Art!)
I have found the best way to attach these are to mark a length of masking tape with 3-5mm pencil markings. Fix the tape along the line you wish to place your rivets and, using the point of your modelling knife stab a rivet, dab it in your chosen glue and place it alongside the tape next to the mark. Prime the surface prior to riveting, then prime again after riveting.
Repeat, repeat, repeat, repeat, repeat, repeat, have a cuppa (or treat yourself to a Single Malt)!!!

The tanks were riveted, although rivet patterns differ from photograph to photograph…
I also riveted the lower firebox, the smokebox and pairs of rivets placed on the tank bracing.

There are four couplings supplied!
Two simple buffer/couplings, one spare, and one drawbar. The couplings have 1.5mm holes to accept 1.5mm brass rod to create a drag-hook.
The front coupling attaches to the underside of the front stretcher with an 8mm M8 screw. There is a similar hole in the rear stretcher should you wish to run you model without a tender.
If using the tender, then there is a second hole, closer to the firebox for attaching the tender drawbar.

TENDER

The tender is built up mostly from 1 & 2mm acrylic.

The main body is built up from 2mm around the tender floor. The rear, sides and front pieces sit around the floor which has a lip at the front of the tender.
The 1mm acrylic detail is laid over the main 2mm body. Note – the front and end pieces of 1mm acrylic have narrower edges that are designed to butt to the side pieces and create a unique 4mm edging.

The final piece of 2mm acrylic is joined to the printed stretcher piece and has four slots to accept the axle box mounts and secures the body to the chassis with two 8mm M2 screws.

The final piece on 1mm acrylic locate from beneath the tender and represents the lip around the outside of the vehicle.

A short length of 2mm brass (remember I advised you to retain the brass earlier!!!) can be used at the front of the tender stretcher to act as a drawbar pin and allow the tender to be “close coupled” to the locomotive.

My own personal choice of paint is Halfords rattle cans, use a primer and a topcoat.
Be sure to prepare the surfaces, wet & dry is great when used with water on the filament printed areas. The chimney and dome can be easily mounted in a small lathe (if you have access to one) and lightly cleaned with wet & dry, prior to painting.

I have added images below, it seemed easier than trying to place them in the text?

A PDF copy of these instructions can be found at –
www.bootlane.org.uk/instructions

Andrew & Jacqui

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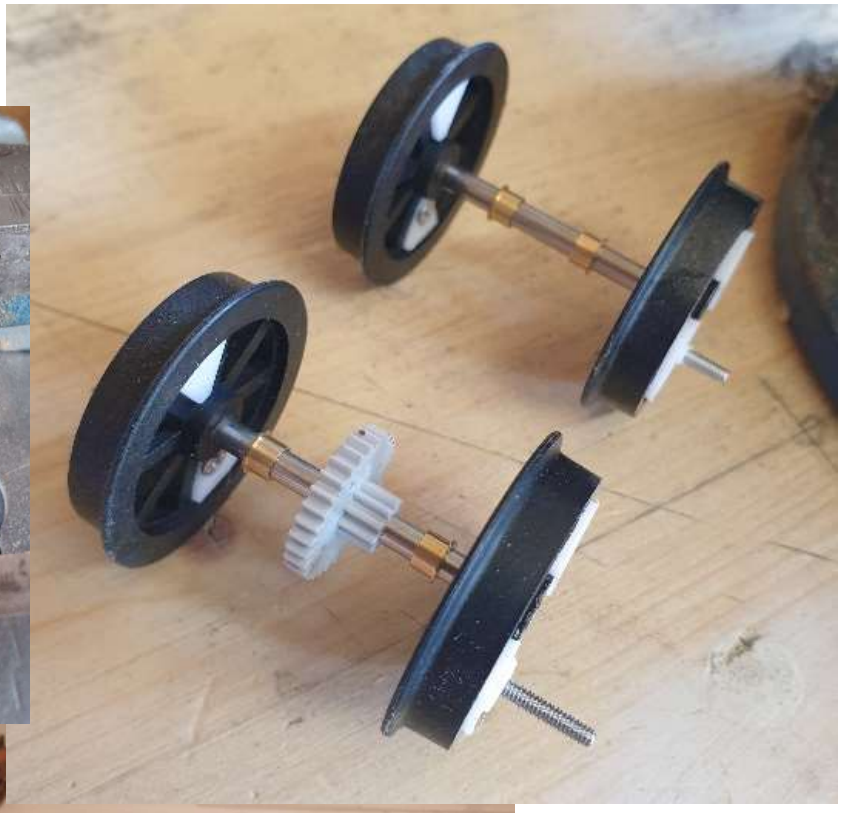
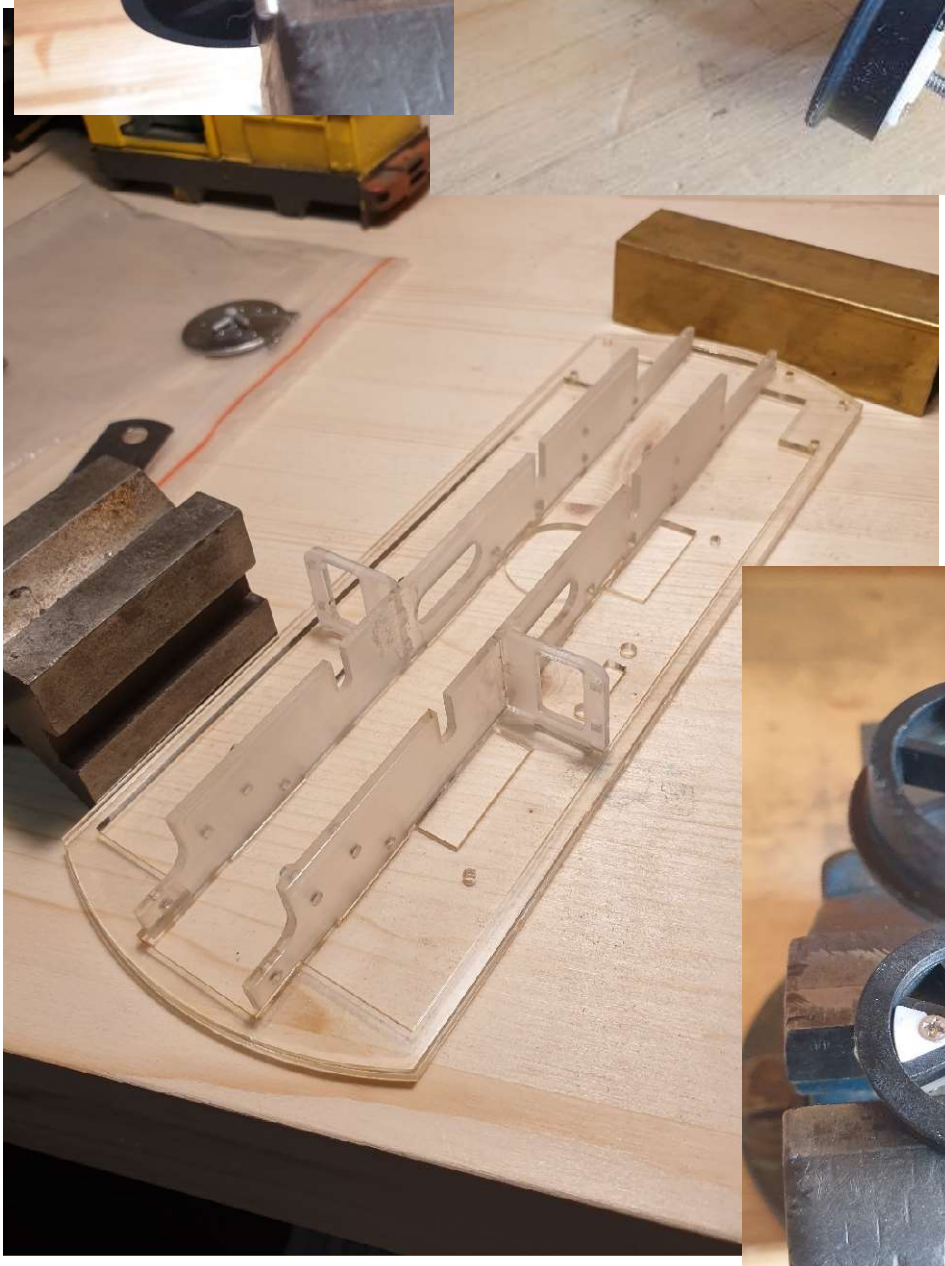
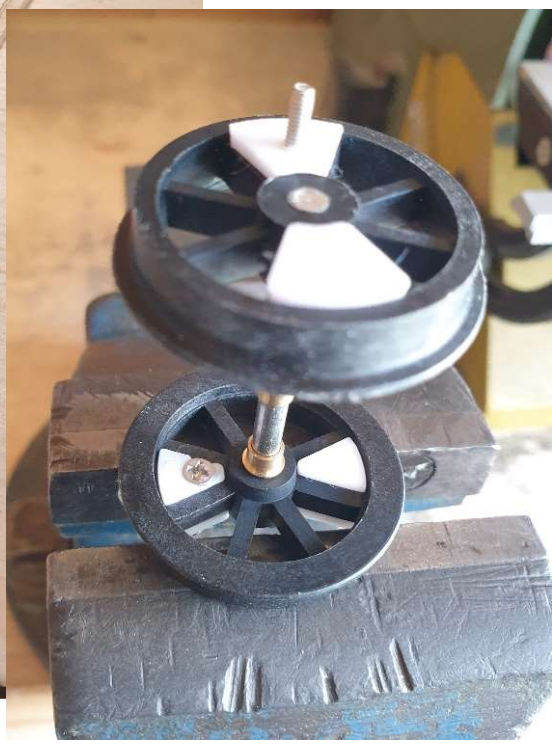
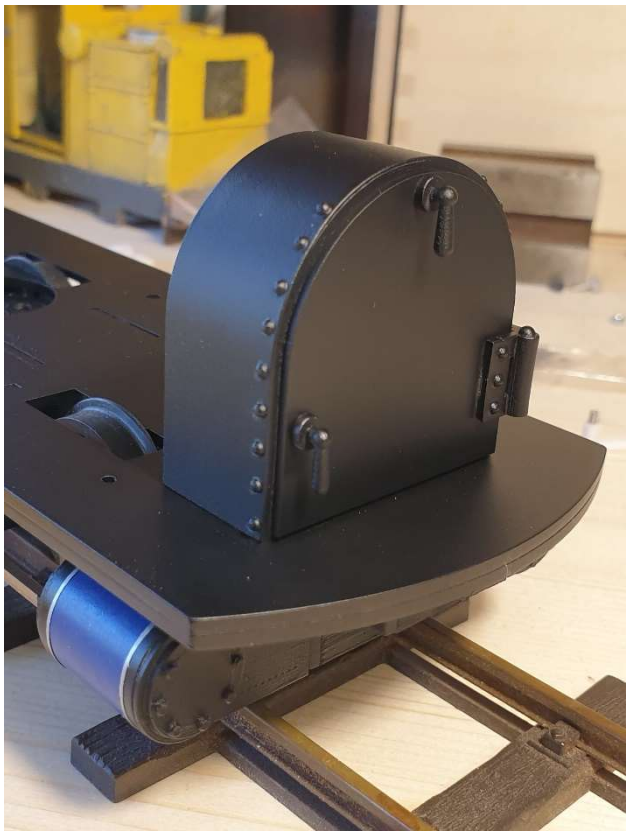
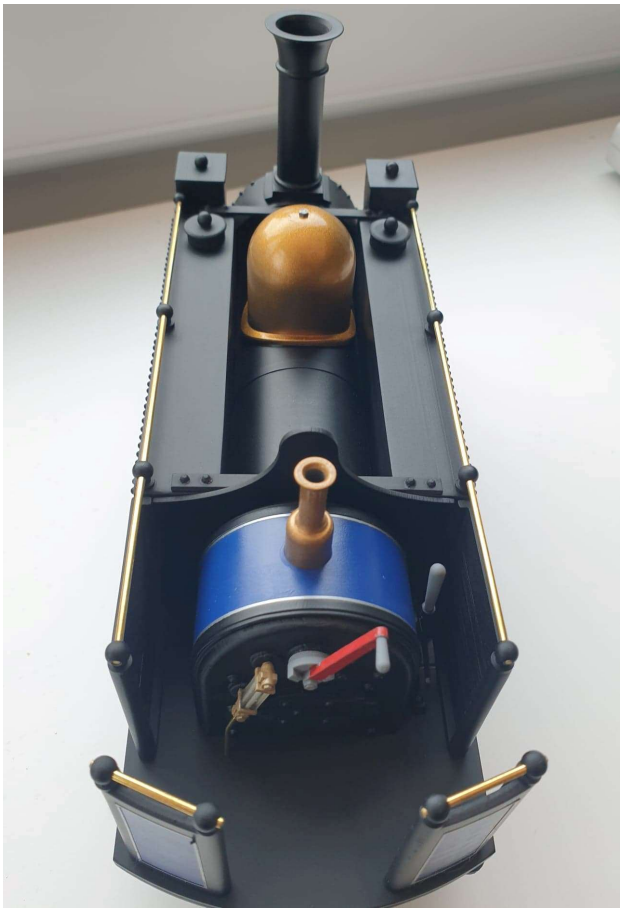
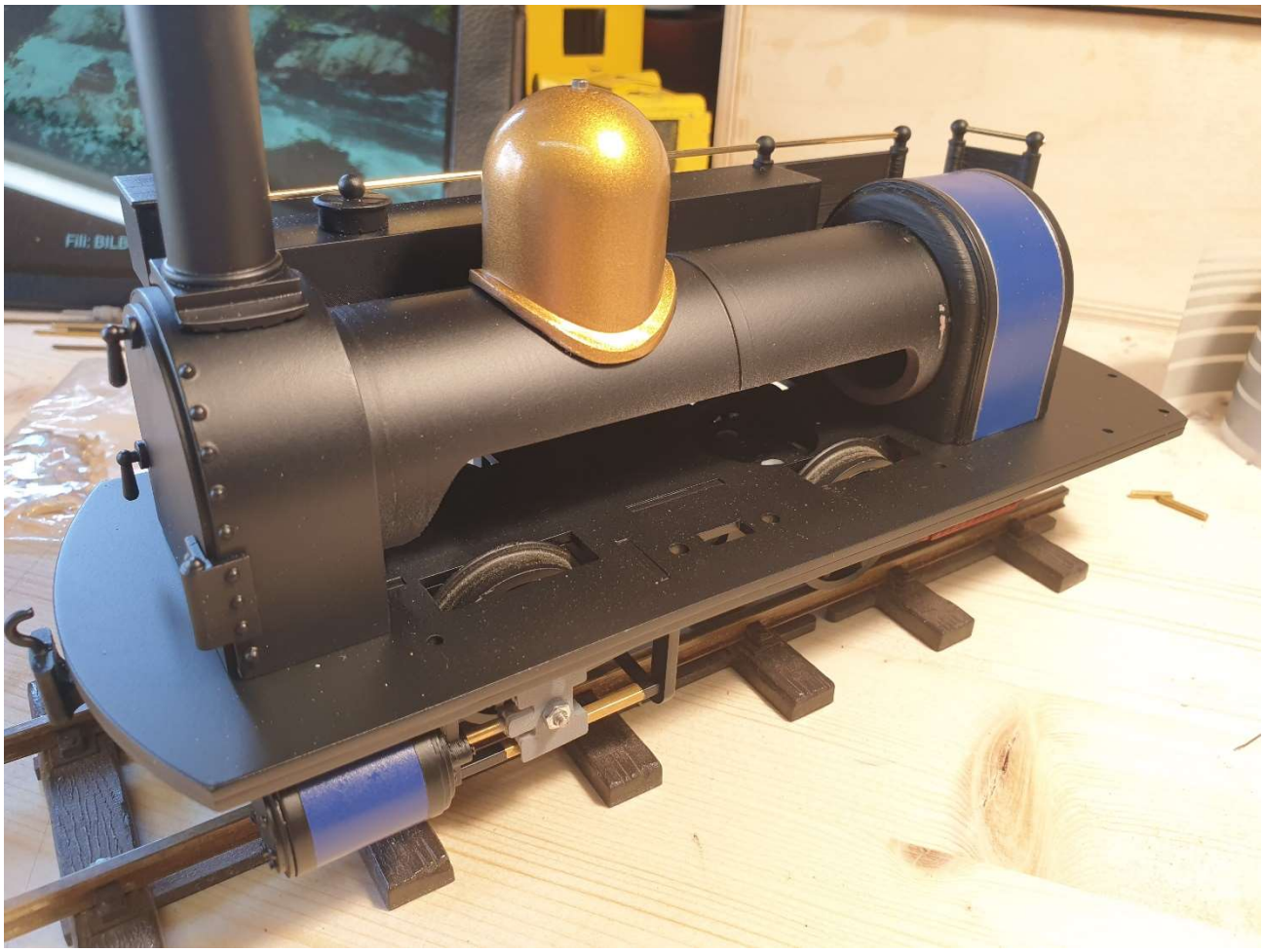




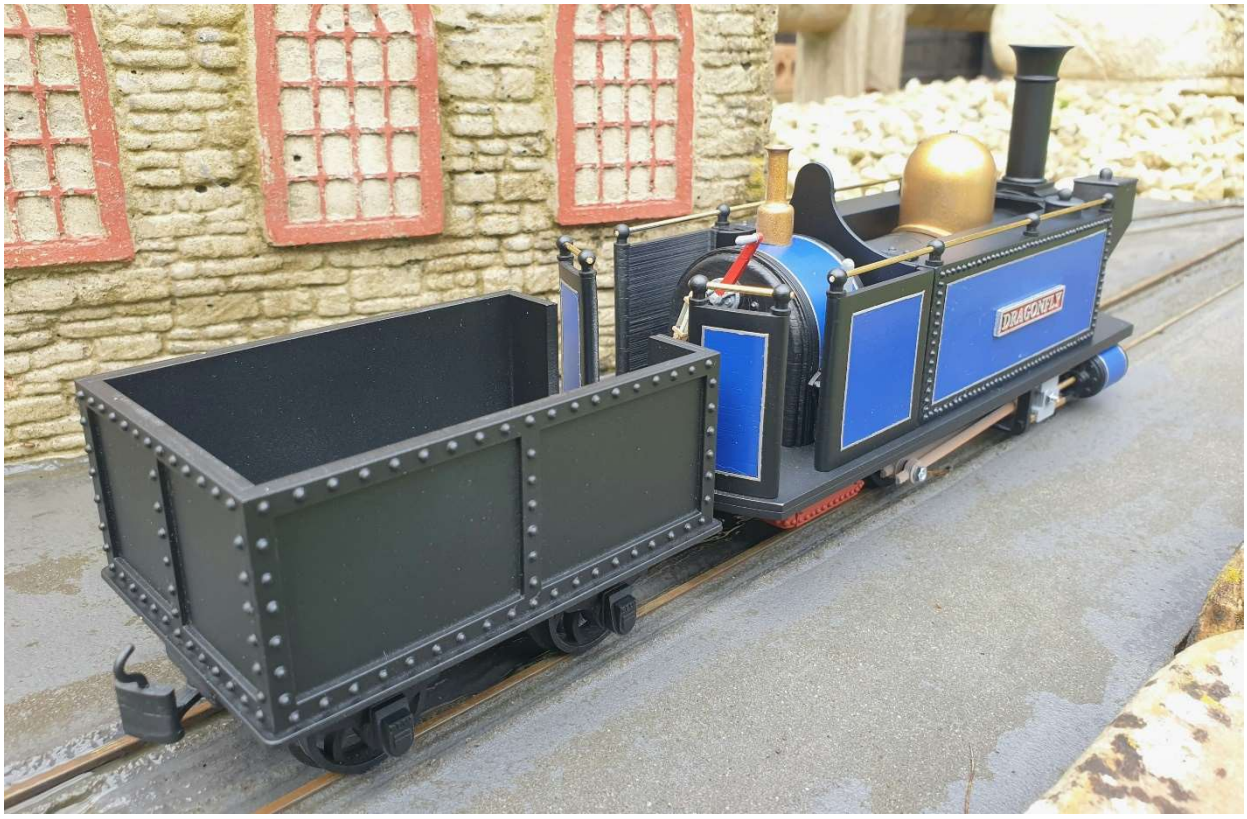









DRAGONFLY


DRAGONFLY