



IVY

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"

ABOUT THE PRINTED FILAMENT

THE FILAMENT WILL SOFTEN IF IT GETS HOT - DO NOT LEAVE IN DIRECT SUNLIGHT

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.

For best results use a file to clean the surfaces, then apply a primer or a primer/filler and rub back with a wet 'n' dry. A little effort with preparation will reward you with great a topcoat.

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 continuing.

IVY is our interpretation of the Kerr, Stuart & Company “WREN” Class.
The Wren evolved from the original “BUYA” Class of 1903 to the final (or “New Type”) design,
represented by IVY from the 1920s through to 1941.
There are several WREN locomotives in preservation, we were inspired by WREN at the Vale of Rheidol
Railway, especially the livery it currently carries.

There is an excellent online article here - https://www.irsociety.co.uk/Archives/5+6/KS_Wren.htm



Image credit – The Vale of Rheidol Railway

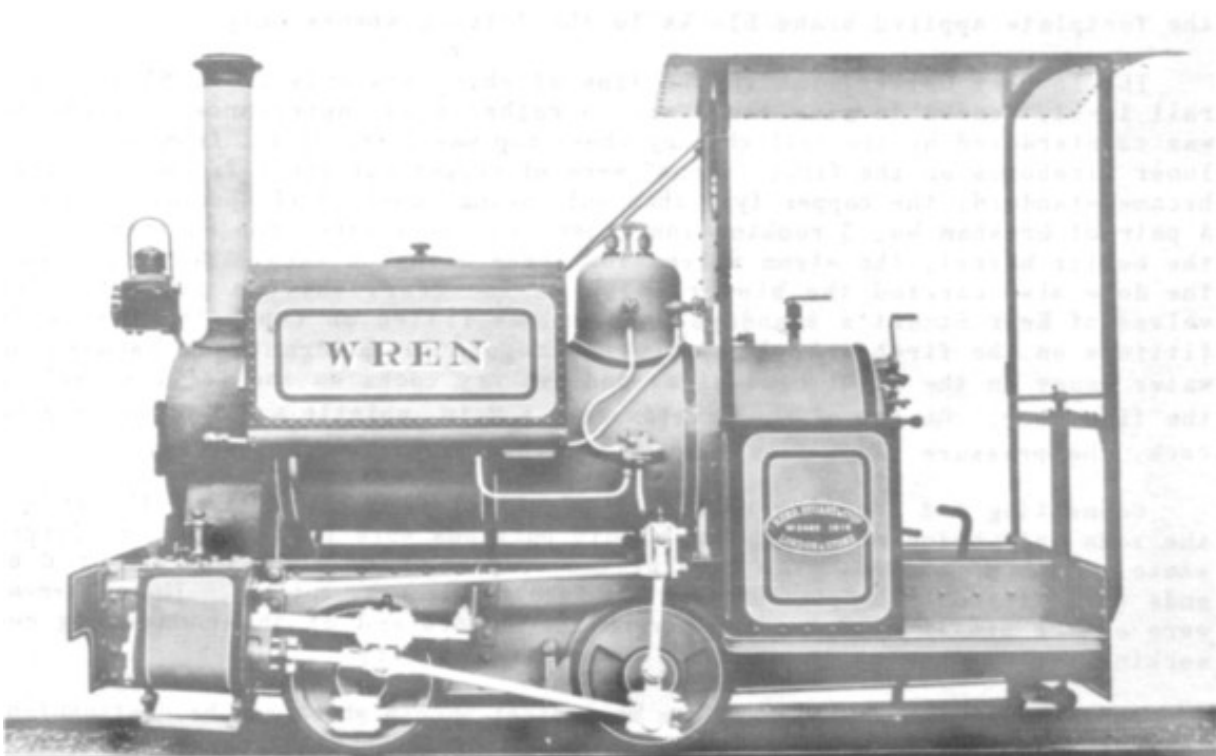


Image credit – The Industrial Railway Society

We have made some compromises to enable manufacture and build of the kit. Most noticeable, is the lack of outside “Hackworth” that Kerr, Stuart used extensively on many of their narrow-gauge designs. The Hackworth valve gear was experimented with, but too many issues were present to bring the gear into the final model.

Some allowances were also made with the roof to create a lightweight but buildable structure.

We have used the same motor and mount design from our Sweetie range, a small 3/6v motor, that is clamped into place in the rear stretcher between the frames.

There is a surprising amount of room under the saddletank and inside the boiler barrel to accommodate 4X AAA batteries and an RC unit. Our own preference of RC is from “RC Trains”, but there are plenty of others.

Room (and mount holes) have been provided on the underside of the saddletank, along with a small sliding micro switch.

An RC unit is not necessary, the micro switch can be easily set up to allow forward & reverse with a centre off position. If using this option, we would recommend the use of only one or two AA or AAA batteries for a realistic running speed.

LET’S BUILD THE KIT! STARTING WITH THE CHASSIS

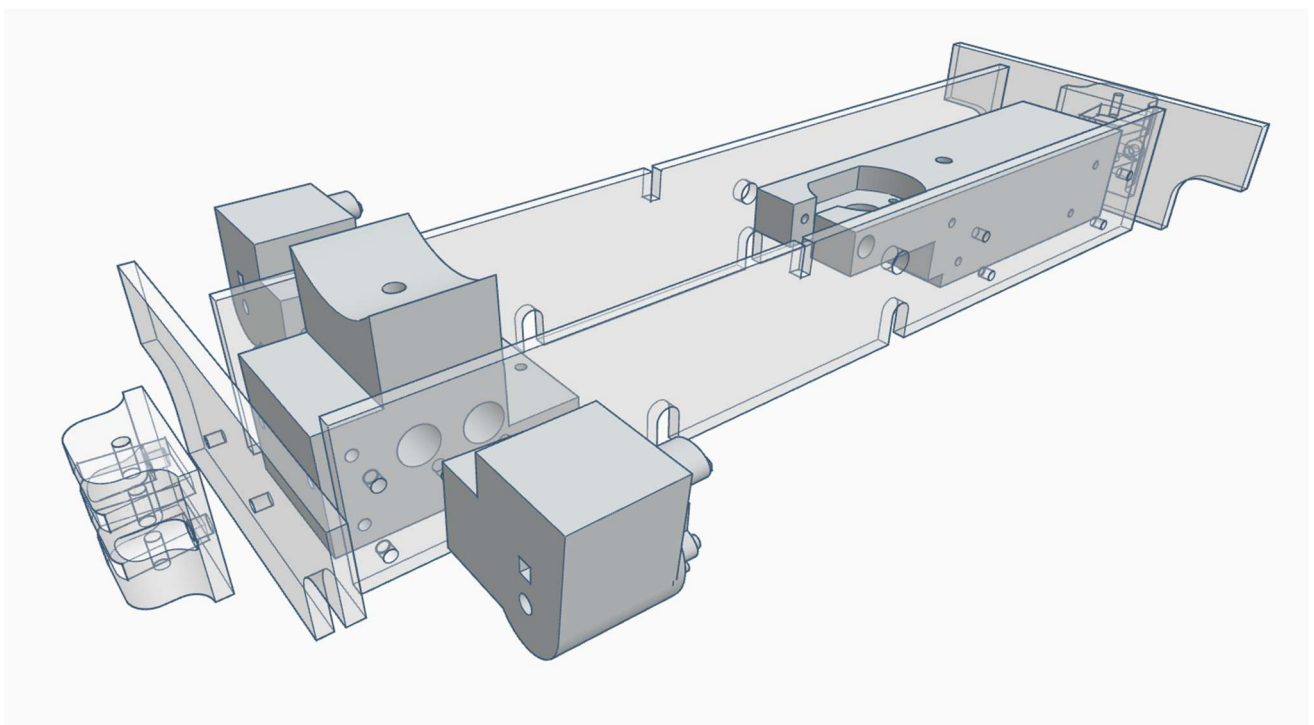
Locate the two cylinder blocks, they have been conveniently marked with a “L” & “R” by our design team!!!

Almost all the screws in the kit are M2, and all screws “self-tap” into their respective holes. However, we recommend the use of a small M2 tap prior to building the kit. It’s not necessary, but it does make the build easier.

Run a 2.2mm or even 2.5mm drill down the cylinder bore. What we are looking for is a nice “loose” fit to the 2mm brass rod (supplied) as piston rods. If there is plenty of clearance between the rod and the block it allows the whole chassis to run freely in use.

We are also ensuring that the printer has not left a filament “bump” down the bore.

Attach a cylinder block to one of the 2mm thick acrylic frames. Then do the same for the other side. You should now have left & right frame plates. The two frames are separated by two frame stretchers. The rear stretcher, which also carries the motor and the front stretcher which acts as a saddle for the boiler.



The above image shows the two plate frames (transparent), the cylinder blocks & stretchers (solid grey). Also shown are the buffers & buffer beams (2mm acrylic).

The cylinders mount onto the frames with four (two per cylinder) M2 8mm panhead screws. The frame plates mount onto the stretchers with ten (five each side) M2 8mm panhead screws. At this point, only use the lower two screw positions on the rear stretcher. The upper two will be used later, to attach the footplate.

Amongst your screws will be an M2 16mm conehead screw. This screw goes through the rear stretcher (accessible from outside the frames) and clamps the rear stretcher around the motor. However, I suggest you leave the motor out for the time being.

You can attach the buffers & buffer beams now if you wish, personally, we left them till the end of the build.

LET'S MAKE UP THE WHEEL SETS

**WE'VE USED IMAGES FROM THE SWEETIE RANGE
BUT THE TWO MODELS ARE ALMOST IDENTICAL**

You will need -

- X4 Binnie 24mm wheels
- X4 printed inserts
- X2 10mm M2 conehead screws
- X2 12mm M2 conehead screws
- X2 stainless steel axles (one with a drive gear, one without)
- X4 brass top-hat axle bushes



The two inserts lower right are in grey undercoat, while the other two are still white filament. These last two have been pressed into the Binnie wheels. *The IVY inserts are the almost the same, just a different shape.*

Note the two different lengths of M2 conehead screws 10mm & 12mm.



Using a vice, press the wheel inserts into the Binnie wheels.

Ensure that the spokes on the printed insert aligns with the cutouts on the wheel.

Fit the 10mm & 12mm M2 conehead screws into each of the four wheels from the back of the insert.

Keep tightening the screw until it is good & tight and will not go any further.

Squeeze the wheels onto the axles using a vice.

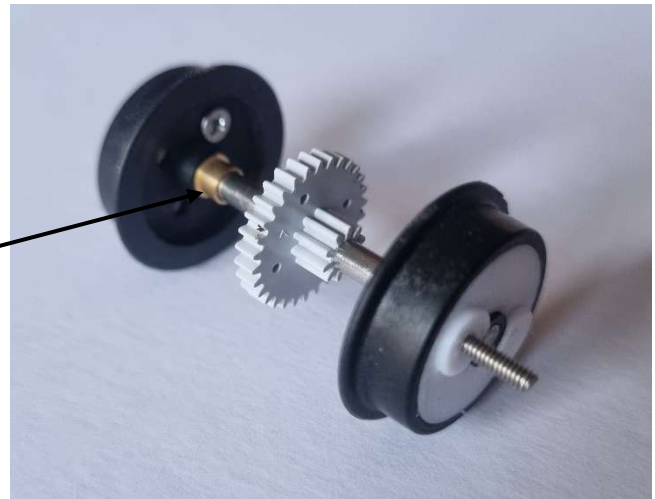
BE CAREFUL

You have two wheels with long crankpins (12mm M2 screws) and two with short crankpins (10mm M2 screws).

Ensure that the long crankpin wheels are pressed onto the axle with the drive-gear.

ALSO

Remember to push the brass top-hat bushes onto the axles prior to pushing on the wheels. The bushes go on with the lip towards the wheels.



WARNING

It is very important that you maintain a “Back-to-Back” measurement of 28mm (the Back-to-Back is the distance between the back of both wheels on the one axle).

If your Back-to-Back is greater or less than 28mm, you will find the chassis binds up, and an increased likelihood that the chassis will derail in operation.



QUARTERING

This is easy, don't get stressed over it.

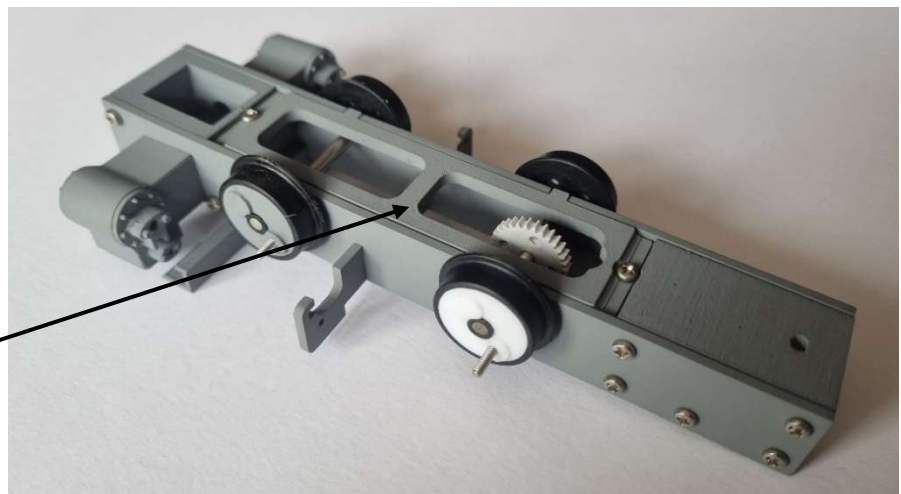
Place a wheelset in the vice, with the jaws just gripping the bosses on the inserts, as shown in the image.

Now, carefully grip the top wheel with your finger & thumb and twist the top wheel so it is 90° to the bottom wheel. *Hold the lower wheel in place also.*

You can get a very good idea of the 90° angle by looking down from the top. Repeat the process for the other wheelset, remember to get them both pointing the same way.

Finally, drop your wheelsets into the frame assembly. The brass top-hat bushes sit with their lip outside the frame-plates.

Lastly, place the retaining plate into the chassis assembly and screw it down with two 8mm M2 screws. The notch in the retaining plate is at the rear and will allow the worm gear to clear the plate.



**REMEMBER – THE IMAGES ABOVE ARE FROM A SWEETIE
YOUR IVY WILL LOOK A LITTLE DIFFERENT – BUT THE PRINCIPLE IS THE SAME**

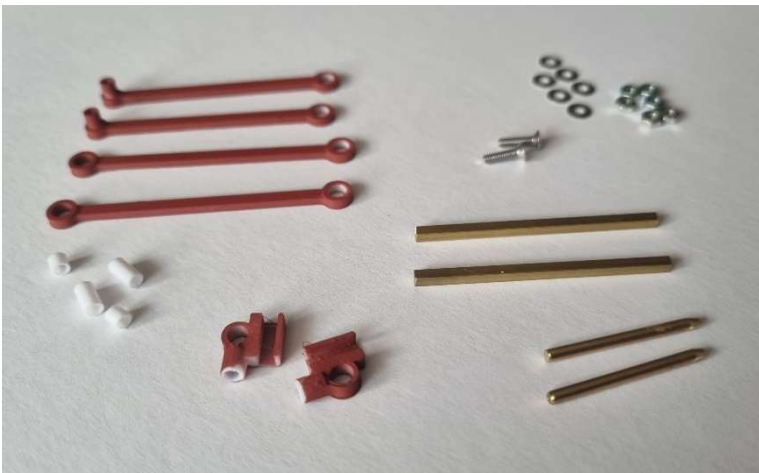
Also notice that the motion bracket has been added in the last image.

You will need to drop the 2mm acrylic motion into the slot in the top of the frames. The motion bracket primarily holds the end of the slidebar. The motion bracket is rather delicate, and a spare has been provided in your kit!

We find a dab of glue on ONE frame and the motion bracket holds everything in place, and should you need to take your chassis apart at a later stage, one side of the frames is free to be removed.

WE WILL DO THE MOTION (RODS) NEXT

**ONCE AGAIN, THE IMAGES THAT FOLLOW ARE FROM A SWEETIE KIT
BUT THE IVY IS ALMOST IDENTICAL (IF IT AIN'T BROKE...)**



You will need –
(There are spares of some items with your kit)

- X2 connecting rods
- X2 coupling rods
- X2 crossheads (a pair)
- X2 8mm M2 conehead screws
- X6 M2 nuts
- X2 short white ABS tubes
- X2 long white ABS tubes
- X2 washer (the photo shows six, our mistake)
- X2 2mm square brass rod
- X2 2mm round brass rod

The 2mm brass square rod needs to be cut into two lengths of 50mm.

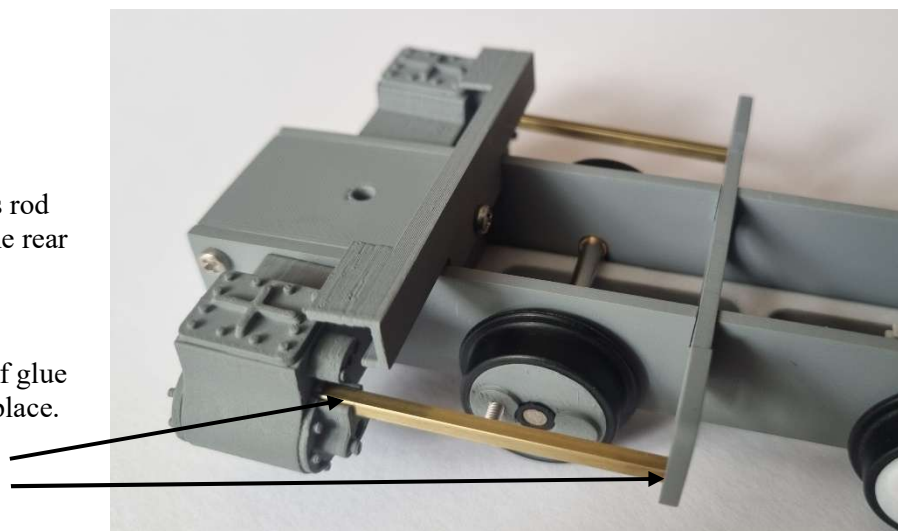
The 2mm brass round rod need to be cut into two lengths of 30mm.

Use a saw or cutters, but clean up the ends with a file, emery cloth or wet'n'dry to ensure the ends are not rough and jagged.

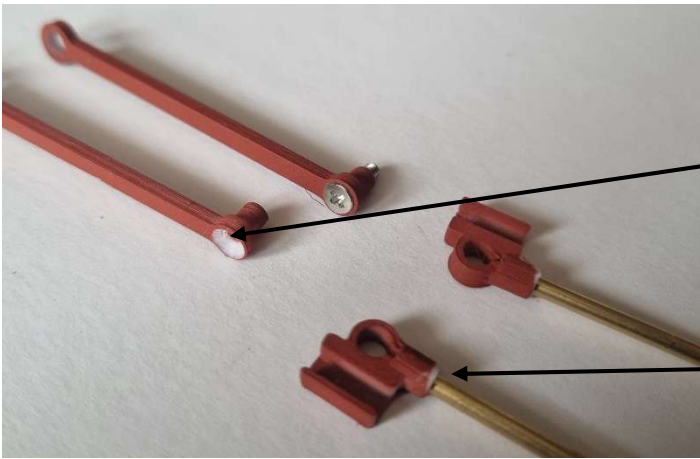
SLIDE-BARS

Push the 2mm square brass rod onto the cylinder block. The rear end is held in place by the motion bracket.

You may need a tiny dap of glue to hold the slide-bars into place.



MOTION



Using a countersink drill, open the back of the connecting rods to accept the 8mm M2 screws.

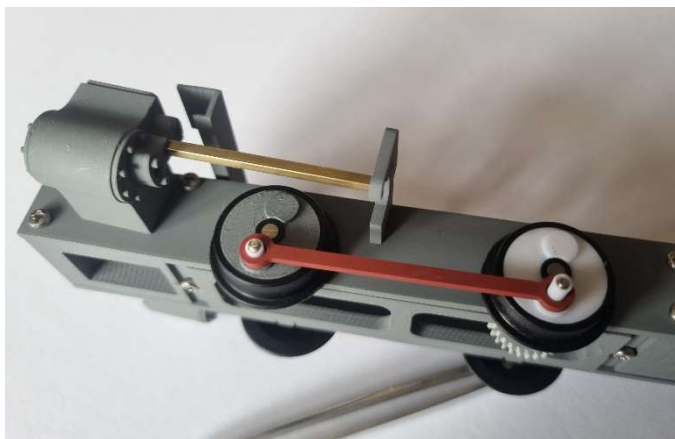
Push the 2mm brass round rods (cut to 30mm) into the crossheads.

Take care here, the crosshead can split. You have spares...

Add a dab of glue if needed.

Push the connecting rod into the crosshead, then add a washer and an M2 nut.

Tighten the nut, the assembly should remain loose once tight.



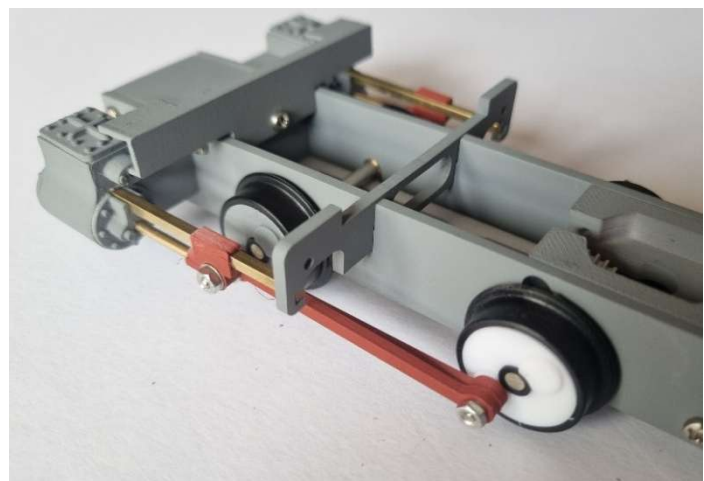
Place a short white ABS tube over the front (short) crankpin, and a long ABS tube over the rear (long) crankpin.

Place one coupling rod over both crankpins and using an M2 nut, captivate the rod in place on the front crankpin.

Slip the crosshead over the slide-bar, push the piston rod into the back of the cylinder and drop the end of the connecting rod onto the rear crankpin.

Use a M2 nut to captivate the rear assembly.

Repeat for the other side.



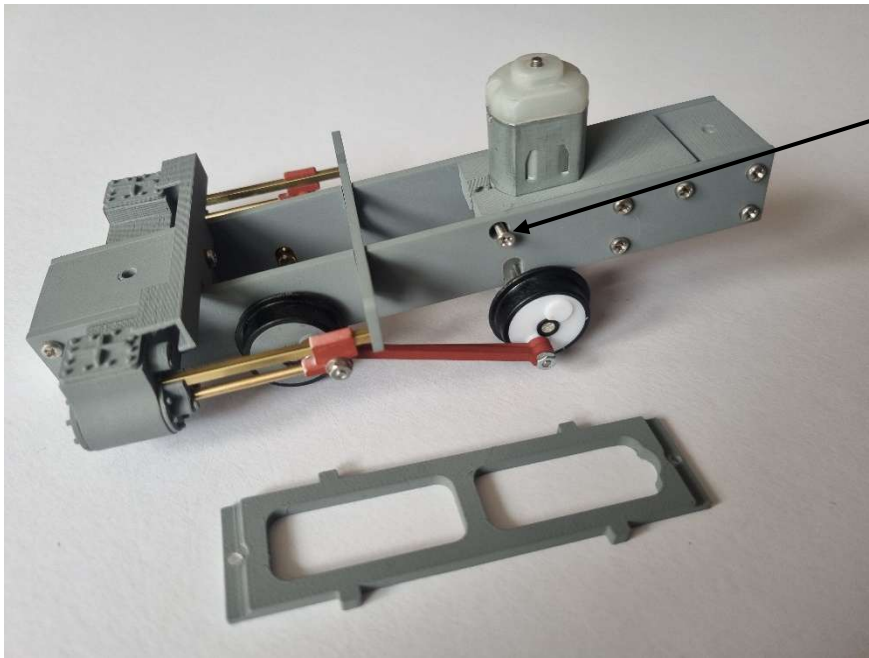
Hopefully your chassis should now run smoothly!

If it doesn't, the likelihood is your quartering is out, take the wheelsets out and check the quartering. A very quick way to check if it's your quartering, is remove the connecting rods and just try the chassis with only the coupling rods!

Check for other things too, such as rods touching each other, or the piston rod binding in the cylinder block, or the crosshead binding on the slide-bar.

All these issues can be cured by opening out the binding area, with a needle file, or wet'n'dry.

Once you are happy with the chassis, let's attach the motor...



Locate the 16mm M2 conehead screw.

This screw is driven into the motor mount from the **left-hand side** of the chassis.

You will need to either remove or drop the rear wheelset (as in the image) to access the hole.

The motor mount acts as a clamp; the screw needs to go right through both sides of the mount and clamp the two side up tight on the motor.

**ALWAYS KEEP THE WORM AND GEAR WELL LUBRICATED
WE USE A LIGHT MULTI PURPOSE OIL ON OUR MODELS**

THE FOOTPLATE

The Wren Class has a rather unusual footplate design, that we have tried to emulate.

Effectively, there are two platforms, one attached either side of the main frames.

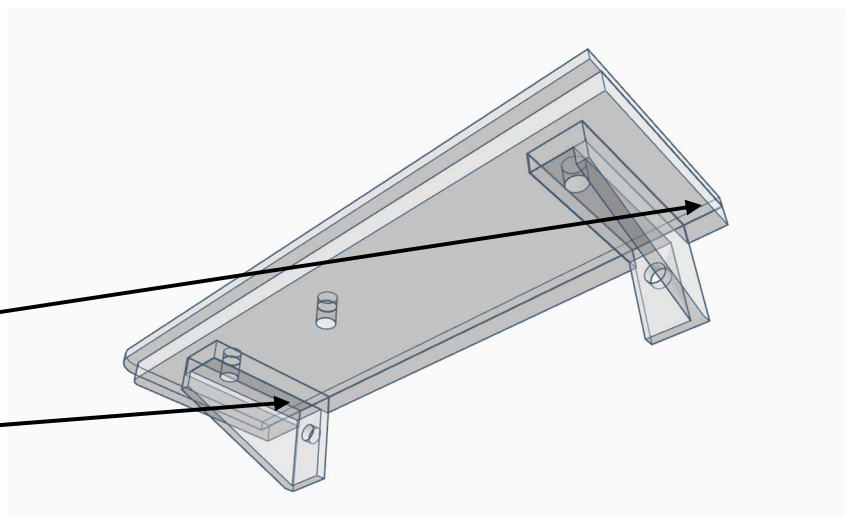
On some of the Wren's we looked at, there was a well between the frames at the rear, others had the well boarded in. We have left the well, it being easier for the modeller to board in than make a well!

Each footplate is made up from one piece of 2mm acrylic and one piece of 1mm acrylic.

Each side also has two filament printed brackets.

The 2mm & 1mm acrylic pieces should be glued together, with the straight edges flush and the curved corner stepped apart.

The two brackets were also glued into this assembly as shown in the image.

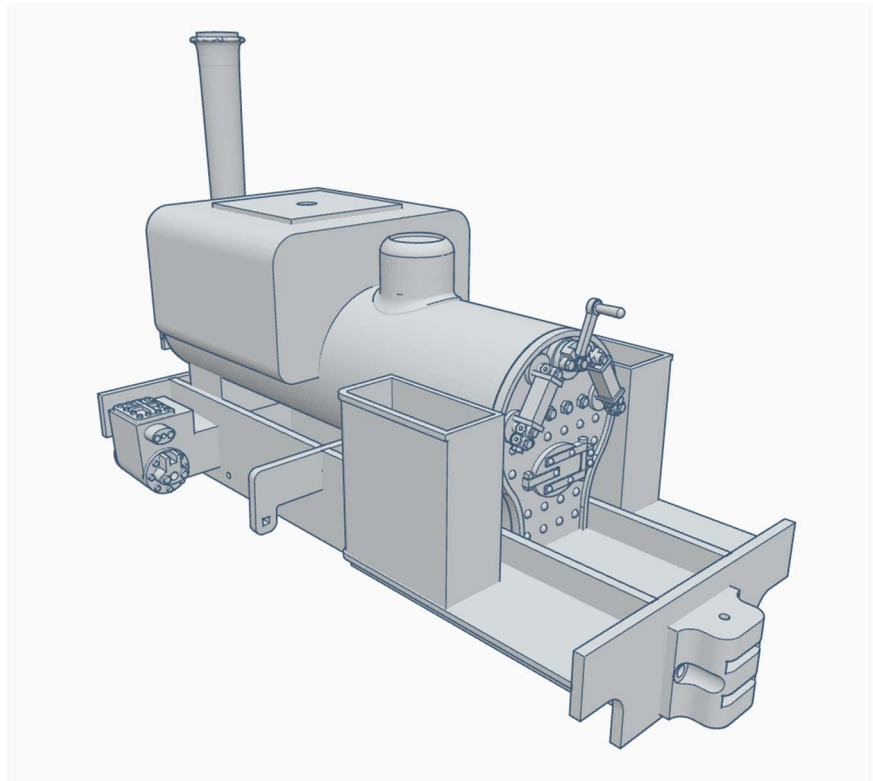


Both footplate sections attach to the outer side of the chassis block, using four (two each side) M2 8mm panhead screws. Two further M2 8mm screws attach the bunkers (these are handed, left & right) onto the footplate.

THE BOILER, SADDLETANK & CAB

The boiler mounts onto the front & rear stretchers, the two M3 screws drive up through the stretchers and into the smokebox & firebox. The boiler is made up from three component parts, the barrel/firebox, smokebox end and firebox end.

Onto each end there is resin printed detail supplied. Smokebox door & dart, firehole door, regulator and gauge glasses. The boiler becomes a major structural element of the finished kit, and where we recommend any extra weight needed, be added?



The saddletank drops onto the boiler barrel, there are logs and slots to ensure it doesn't move in use. We have added a small square of 1mm acrylic, some of the locomotives in preservation, seem to have an extra panel on top of the saddletank? A tank filler has also been provided.

The cab is made from three components, the front and rear sheets, and the roof.

In a departure from Boot Lane Works practice, we have printed the roof, and it will need a little rubbing down to achieve a good finish. However, the curve is printed into the shape and should help maintain the overall effect of the model.

We have deliberately printed a tighter curve on the roof, as we found that the process of painting & rubbing down, shallowed out the curve!

The cab sheets were attached with a little glue to the rear buffer beam and the top of the bunkers. Although not 100% ideal, we found this to be the strongest, yet most unobtrusive method of attachment to what is, a very delicate aspect of this model.

A PDF copy of this document can be downloaded from –
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