Rumney Models BR 1/221 Izal Palvan Wagon Kit

Introduction

This set of instructions covers the Rumney Model kit for the BR Izal Palvan kit PC.56. This kit is designed to build into a fully detailed and accurate 4mm wagon model of the BR diagram 1/221 Izal Palvans.

General Notes

This is very much a composite kit with both etched and 3D printed parts. The kits have been designed so that as much of the etched component construction can be done before fitting the printed parts. It is possible to solder small parts close to printed ones, but you need to be very quick, or you may risk damaging them.

Read through the instructions first and familiarise yourself with the components. Drawings and photographs taken during the construction of the test etches are included to attempt to make my waffle clearer. Note that not every single photo may be of your particular kit but will suitably illustrate the item in question. Parts are numbered on the fret, and I've tried to do this in build order.

Prototype Notes

In the early 1960s BR began to build a variety of specialist Palvan designs to suit the needs of its customers. They varied in size and layout, some had sliding doors and others cupboard, but all were longer than the standard BR Palvan which was not proving a complete success due to its riding characteristics. As part of this program, BR built 250 Palvans to diagram 1/221 for specifically for carrying Izal products from their factory at Chapeltown in Sheffield. They were constructed at Derby under lot 3310, were 18'9" over headstocks with an 11' wheelbase.

Numbers were B782274-B782523.

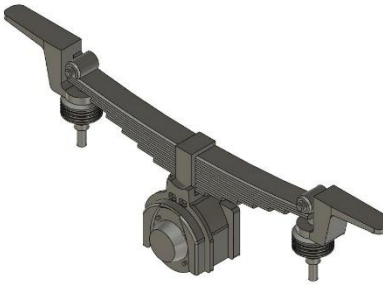
They featured what I have termed the ‘Derby clasp brake’ which was a variation on the standard LMS clasp brake system and which was only found on other BR builds under a couple of batches of Shocopens, a batch of Pipe wagons and the production Vanwides.

3D Printed Solebars

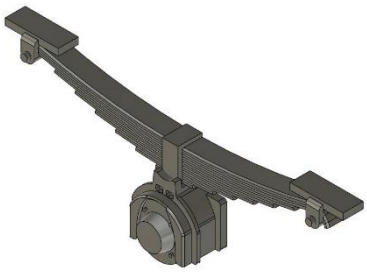
My build featured in these instructions features 3D printed solebars complete with the springs and axleboxes. I have not included these in the kit as standard as they are more expensive for me to produce. The 3D printed solebars are great for reproducing things like the brackets that attach various things to the solebars, in this case the bottom door runners but, given that most of this ends up hidden, I’m not sure this extra cost is worth it. I have therefore included separate springs and axleboxes for use with the etched solebars. If you want to use the 3D printed solebars, they are available to order at cost.

Springs and Axleboxes

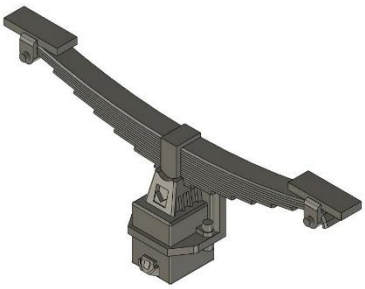
The Izal Palvans had non-standard springs. When built they had a shorter, 8 leaf version of the LMS J hanger type with roller bearings. Later on in their lives some had the J hangers replaced by simple 8 leaf springs, though these were longer than standard, still retaining roller bearings. BR 2 Part square oil axleboxes could be found fitted to the simple 8 leaf springs when some were used as internal user wagons late in life. The kit is supplied with the springs and axleboxes as built. The non-standard 8 leaf simple springs, either with roller bearings or oil axleboxes, are available as alternatives from Rumney Models when ordering the kit.



J-Hanger Springs
Roller Bearings



Standard Springs
Roller Bearings



Standard Springs
BR 2 Part Oil Axlebox

Livery

When built the Izal Palvans were painted in Izal’s house colour. This mean that the sides and ends were painted a mid-green. The roof was grey and the underframe black as per BRs practise at the time. Good colour images of the Izal Palvan are available online to give you something to match the paint to. I intend to try Vallejo Air Olive Green (their code 71.007) as a starting point on mine. I’ve found this comes out lighter than how it appears on the computer screen.

3D Printed Parts

This kit includes high quality 3D printed parts. They are produced using the latest stereolithography technology to cure photosensitive resin. They have been thoroughly cleaned and then cured to produce the parts you have. As they are cured by a certain wavelength of light there is the possibility that if left exposed to sun light for a prolonged period of time the parts may go brittle. This is not unlike some plastics. To avoid this please consider the following:

- Do not leave unpainted resin parts exposed to direct sunlight for any length of time. Store in a dark place.
- Make sure all 3d printed parts are properly primed and painted.
- If the kit is not intended to be built for a while, consider priming the printed parts before storing.

If these points are followed, then the printed parts will be fine. However, if you leave them for several years on a south facing windowsill then you might have end up having problems with them…

The printed parts are pushing the boundaries of what is currently possible with the printing technology. Whilst they have been road tested and tweaked for strength where necessary some still feature very thin walls and should therefore be handled with care.

Some parts may have been left on the supports they were printed with to help prevent damage to them before use. They will need removing from the supports and all parts will need cleaning up. When removing them from the supports and cleaning them up please note the following:

- Parts should be removed from the supports using a pair of flush cutters or a piercing saw with a fine blade (size 6/0 is recommended). Only use flush cutters, one side of the blade needs to be straight, so it makes a |/ shape. Cutters where each blade forms a \/ rather than being completely flat on one side should be avoided as they may cause damage. I tend to mostly use a piercing saw.
- If using cutters, the place to cut them is where the support meets the part. Often this is right against the printed part. This is the designed in weak point. Avoid the temptation to cut the supports away from the printed parts as this may damage the parts. If using a piercing saw, then the closer you cut to the part the less you will need to clean up. Be aware of the following point though:
- The material files/sands and cuts with a saw blade very easily, almost too easily. Go slowly and take care. When cleaning up, wet and dry paper is recommended, preferably with a little water to contain any dust. You can also use fine files.
- The material does not cut that well with a knife blade. Whilst not so brittle that it will crack as soon as look at it, it may fracture if you try and cut it with a blade. I can't imagine why anyone would want to try and cut the prints, but I thought I'd say it anyway. You can however use a sharp scalpel blade to pare away material if needed.
- Due to the process used to produce these parts they may need fettling to fit, i.e. parts may come out slightly oversize.
- Holes will almost certainly need opening out. Use a sharp drill or a cutting broach. Smaller holes such as those for the door handles will almost certainly appear as an indentation rather than a hole.
- Dispose of the waste support material responsibly. At this time, it cannot be recycled.

Fixing the printed parts in place can be done using either cyanoacrylate (superglue) or epoxy glue. I have used both successfully. In both cases makes sure the printed parts and what they are being attached to are free from any grease. I have found that in both cases the glues can provide a good bond with the brass parts, so much so that the parts can break rather than the joint if you try to remove them. I put this down to the surface of the parts being not entirely smooth so there is something for the glue to key to.

The printed parts need no special cleaning before painting. A wash with a cream cleaner to remove any grease will be sufficient. Like plastics avoid using prolonged contact with cellulose thinners as this may damage them. IPA will be fine as this is what is used to clean them after printing.

Etches

Check all holes before removing parts from the fret. The drawing process for etching, if you use a CAD program as I do, is extremely accurate but the actual etching process itself not an exact science. If the fret is slightly over etched, then there is no problem but if they are under etched the holes will need enlarging. I find that this is easiest to do before removing parts from the fret. The hole sizes will be noted at the appropriate points. Use an appropriate drill or a tapered reamer.

Remove one part at a time from the fret.

The instructions will assume that tags connecting parts to the fret will be cleaned up on removal of a part unless it is specified specifically in the instructions not to.

Very important:

All fold lines are through 90° with the fold line on the inside unless stated otherwise.

This means that when I say fold something up the folds should be made through 90° with the fold line on the inside. If the fold is to be done in any other way I will say so.

Everyone has their own soldering methods. I now use an Antex 50W temperature controlled soldering iron with predominantly 145° solder and La-Co paste flux.

Tools

The following tools may be useful when constructing the wagon:

- A selection of drill bits including 0.3mm, 0.5mm, 0.6mm, 0.8mm & 1mm
- A selection of tapered reamers in the range 0.3mm-1mm and 2mm
- A smooth jawed vice
- A selection of needle files including a small square one
- A piercing saw with fine blade (size 6/0 recommended) or a pair of flush cutters
- Wet and dry paper (800 or 1200 grade)

Technical

The suspension is individual springs made from 0.008” steel guitar wire soldered to the etched spring/bearing carriers. The wire is nickel plated so should solder with your regular flux. If you have any issues the use Carr’s Black label flux for steel. If the finished vehicle is weighted to 50g with the weight evenly distributed then this will produce a spring deflection of 0.5mm. Don’t be tempted to up the gauge of spring wire. Even moving up to 0.009” springs will have a significant effect on the spring deflection. Also don’t over weight the wagon or the springs will not have enough upwards movement before they hit the axleguards. Think of the 50g total as an ideal weight but also a maximum. There are notes on weighting the wagon in the part of the instructions that deals with assembling the body.

Materials List

In addition to the etches and 3D printed body parts, the following are included with the kit:

0.008” Spring wire
18” cast whitemetal vacuum cylinder

You will need to source some parts to complete the kit.

Wire and Tube

You will need several sizes of wire are needed to build the underframe. Eileen's Emporium are good source for these, and they do a mixed sizes pack if you don't want to buy large quantities. You may also want some small nuts and bolts to join the ends to the underframe.

0.31mm - Most of the brakegear, axle keeps, brake lever guards
0.5mm - Drawbar hook retention
0.6mm - Vacuum cylinder piston shaft
0.8mm - Main brake cross shaft, vacuum pipes
1.0mm - Alignment pins

14BA or M1 bolts & nuts - Fixing the ends to the chassis

Buffers

Buffers on these wagons were 1' 8½" Oleos. Hollow, 3D printed buffer housings have been included for use with metal heads, but you will need to source these to complete. Wizard Models list 13" buffer heads with 1.45mm shanks suitable for Oleos.

If you wish to use rigid buffer castings those produced by Lanarkshire Models & Supplies are recommended (their code LMS BP01).

Vacuum Pipes

Lanarkshire Models also supply cast vacuum pipes (their code VP03) and again the quality is very good. I personally prefer to make mine from brass wire as they are a little vulnerable but if you want cast ones, they are the best available.

Couplings

The prototype was fitted with screw couplings. These are available from Rumney Models (B.96).

Wheels

You will need 3'1½" 3 hole disc wheels from your favourite manufacturer to your chosen 4mm gauge along with bearings. If you are using pinpoint bearings a waisted type such as that marketed by Alan Gibson (their code 4M63W) would be ideal. If you are using Exactoscale products, then you can also use parallel axles and either 2mm or 1.5mm parallel bearings. If you are using the later, you will need some 2mm x 1.5mm tube to act as a sleeve over the bearings.

Transfers

Suitable transfers for these wagons are available from Cambridge Custom Transfers. They come with sufficient for 12 vans. As I have spares I will include a set whilst I have stocks.

If you want alternative numbers, Railtec will produce a small custom sheet of 12 wagon number transfers of your choice complete with prefix (their code 4mm-9965). Font is Gill Sans, the numbers should be a scale 3" high and the prefix letter B 3½" high.

Parts List

Underframe

1 - Chassis top plate
2 - Axleguards
3 - Vees
4 - Buffer spring and drawbar brackets

5 - Solebars
6 - Solebar overlays
7 - Solebar detailing
8 - Solebar and headstock gusset plate
9 - Drawbar plate

10 - Spring carriers
11 - Bearing washers
12 - Axleguard keeps

13 - Clasp brakes
14 - Brakegear linkage
15 - Brake shaft crank overlays
16 - Clasp brake hanger overlays
17 - Brake yokes (EM/P4)
18a - Brake yoke safety loop jig
18b - Brakegear linkage safety loop

19 - Brake lever guard brackets
20 - Brake lever guards
21 - Brake lever guard stays
22 - Brake levers

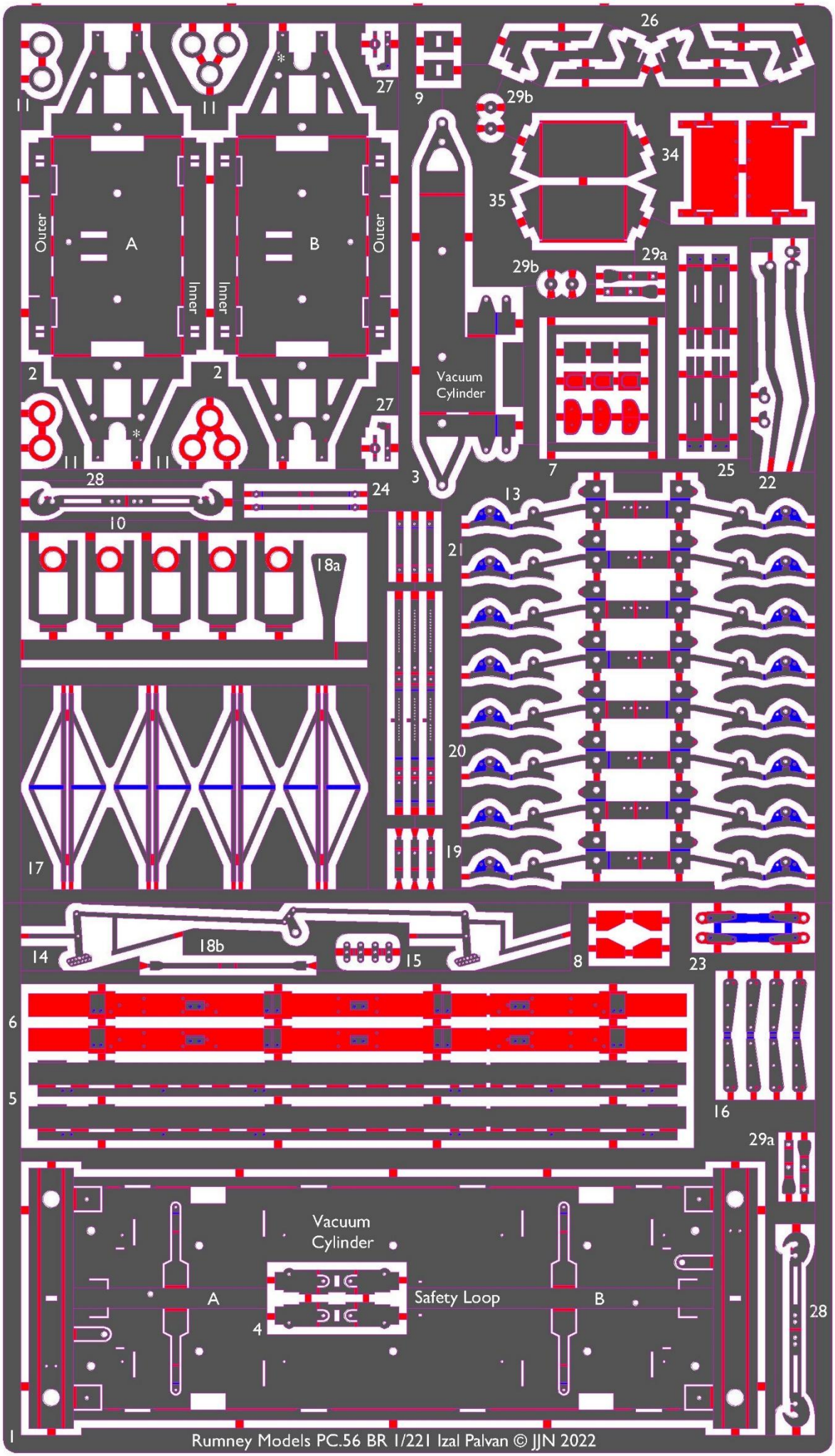
23 - Vacuum cylinder actuators
24 - Vacuum cylinder safety loops

25 - End stanchion bracket top
26 - End stanchion bracket angle

27 - Dummy vacuum pipe couplings
28 - Coupling hooks
29a - Buffer springing retainers
29b - Buffer springing washers

Body

30 - Body ends
31 - Body end overlays
32 - End stanchions
33 - Body end fixing bracket
34 - Ventilator backing
35 - Ventilator hood
36 - Lamp irons
37 - Corner overlays
38 - Door runner covers
39 - Door runner angle jig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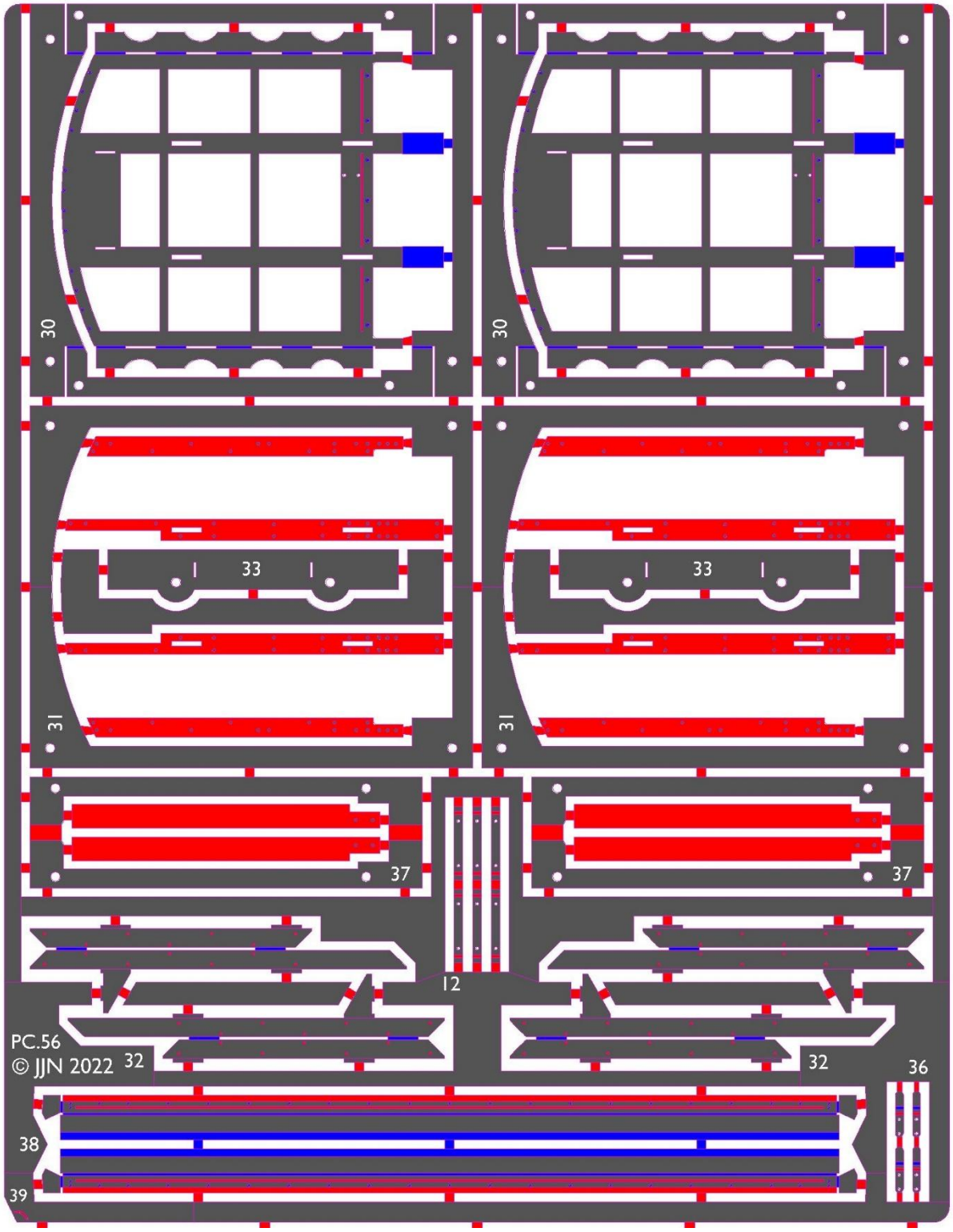
Rumney Models PC.56 BR 1/221 Izal Palvan © JJN 2022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Construction

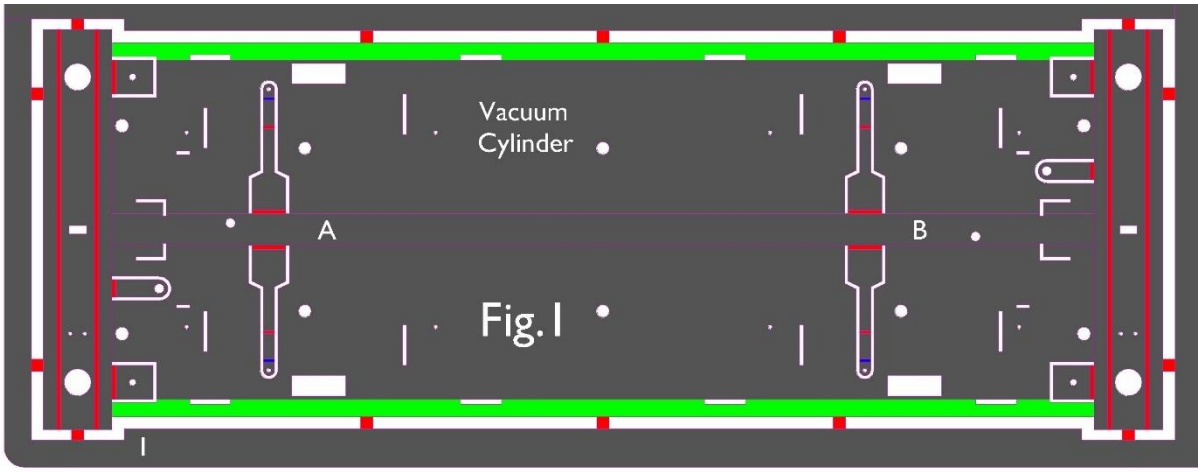
This kit is very much a mixed media affair, but I have tried to arrange construction so that as much of the soldering work is done before fitting any 3D printed items. There are a few items that need to go on during the process rather than at the end so keep in mind that they are there and away from the hot end of a soldering iron. It is possible to solder close to the prints, but you will need to be quick and use a hot iron.

I used 3D printed solebars on my build that illustrates these instruction as they were supplied with the commission that started this kit. These are not included as standard with the kit as I'm not convinced they are worth the additional cost for this kit. I have written then instructions with the option of using them in mind. Bear this in mind as you go along and pay attention to what work is necessary when using them, or using the etched solebars included.

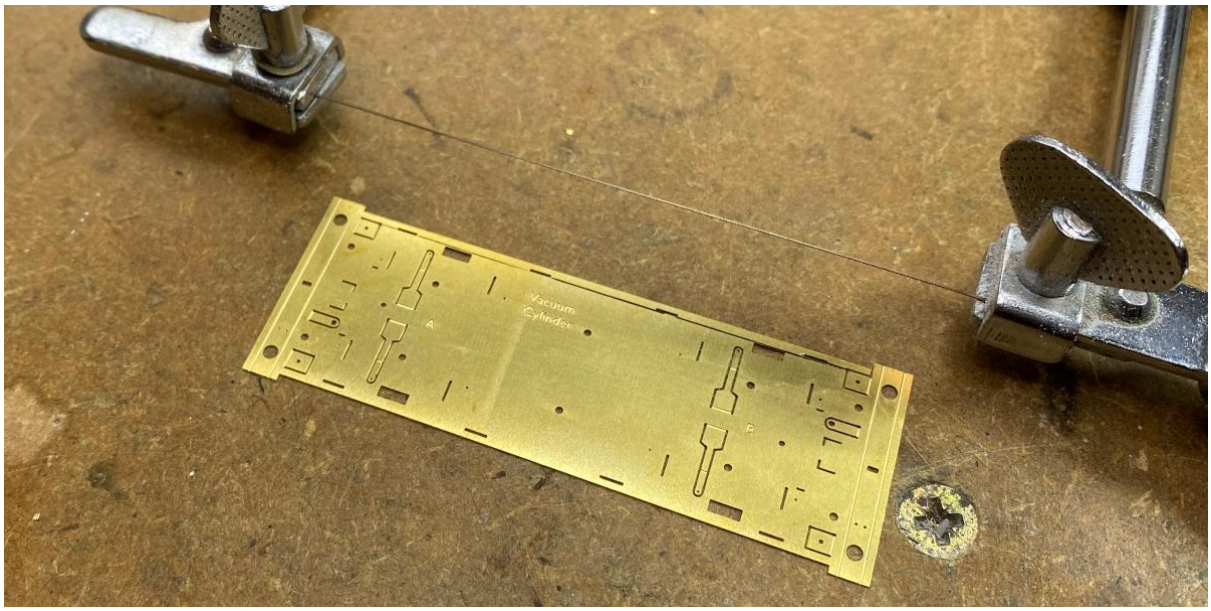
Main Underframe

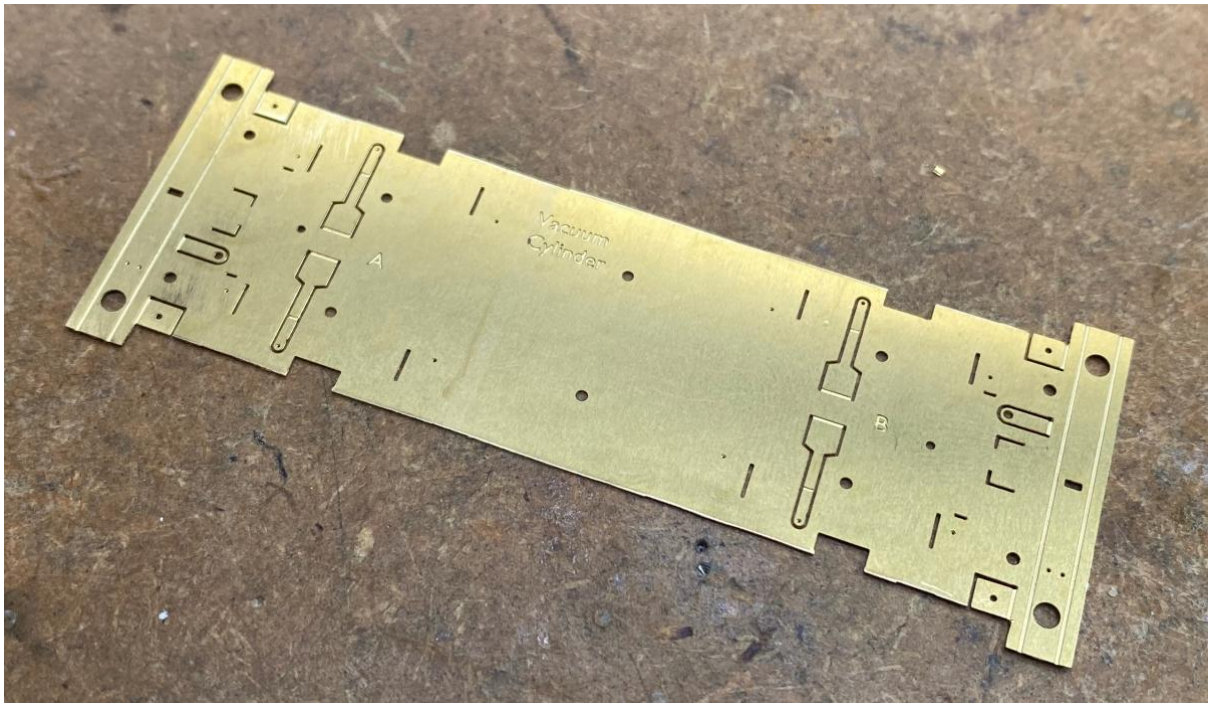
Start with the chassis top plate (1).

If you want to use the one-piece 3D printed solebars that are available to order, you will need to modify the top plate to accept them. This is not necessary when using the etched solebars. You will need to remove the top of the solebar which is shaded green in Fig.1 below.



Use a piercing saw to remove the material.

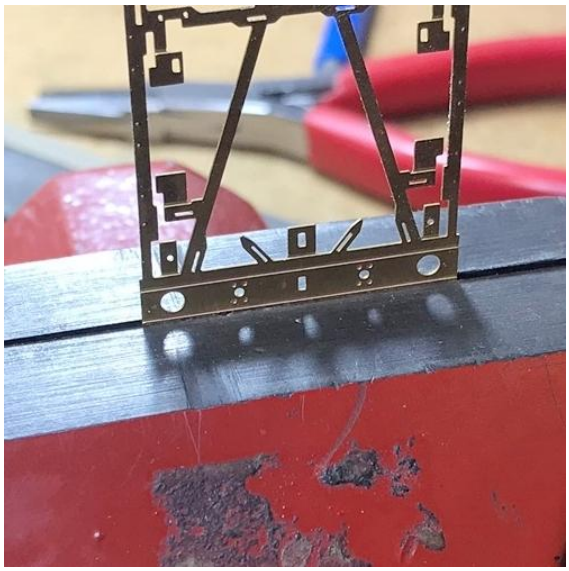




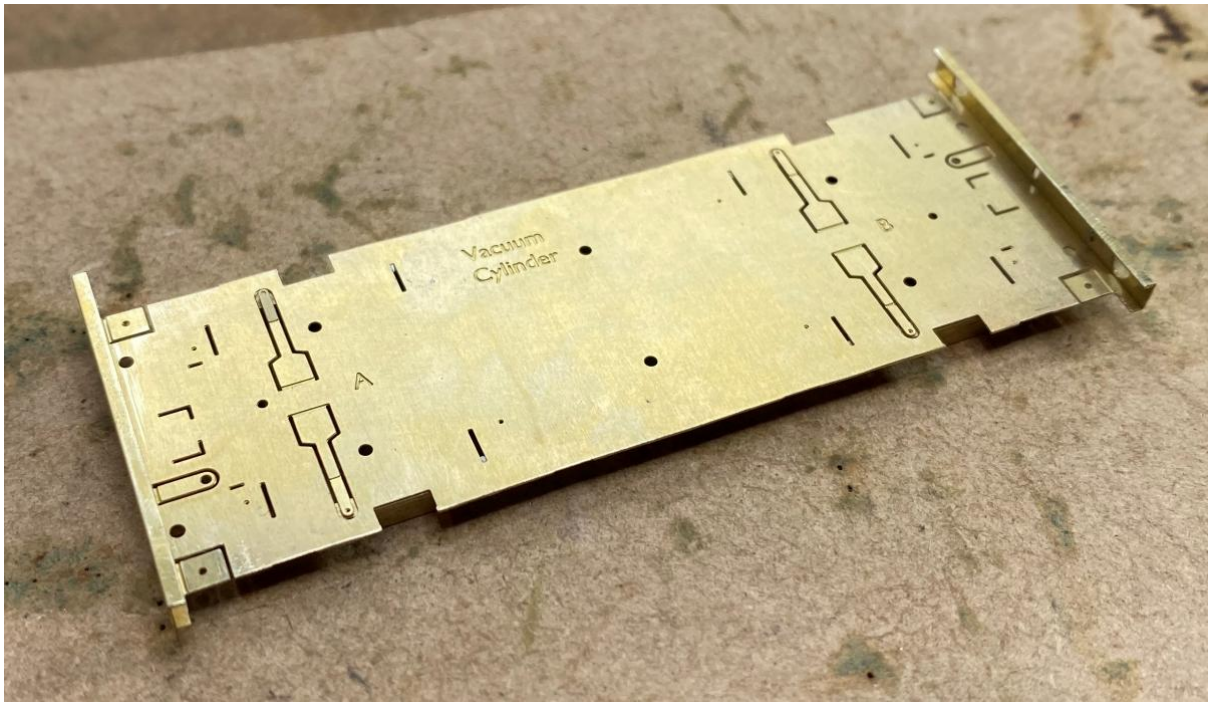
Without the etched solebars the underframe will lack some rigidity. To counter this I soldered a couple of pieces of brass angle to the top of the top plate. See image below. This is not necessary when using the etched solebars included. The angle I used was 1.5mm x 2mm as I happened to have some of this size lying around. Something similar or maybe slightly larger will be idea. Whatever is cheap as some sizes of brass angle are expensive. See below. You may find it easier to fold up the headstocks before soldering on the angle.

Whatever type of solebar you are using you will need to check the fit of the buffers in their holes in the headstocks. It may sound a bit odd starting with something that will go on much later in the build process, but it will be much easier to open out the holes now rather than later. Use a tapered reamer if they are tight. If using the 3D printed buffer housings make sure all remnants of the supports are removed before altering the etches.

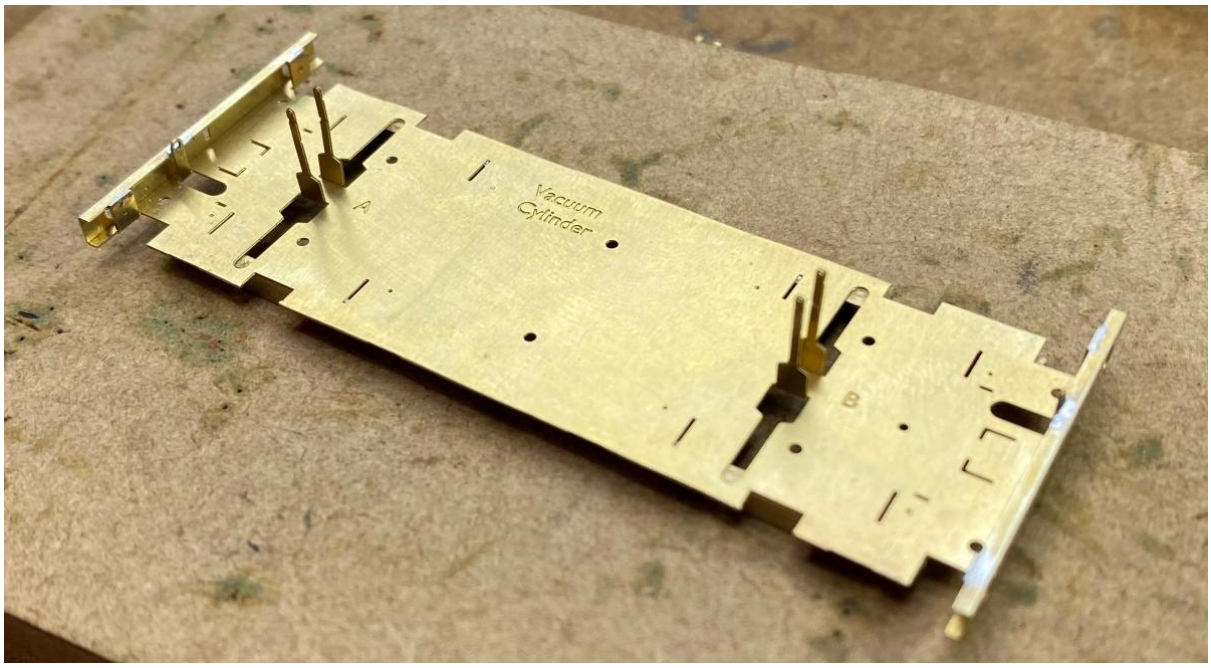
Next the headstocks need to be folded up. This is best done with the chassis top plate clamped to something or held in a vice to avoid distortion. There are two sets of fold lines as the headstocks need to be folded into a channel. Starting with the outermost part of the chassis top plate fold through 90°. Fold the headstocks through 90° to form a channel. Take care to make sure everything is square. I don't worry about reinforcing the fold lines with solder.



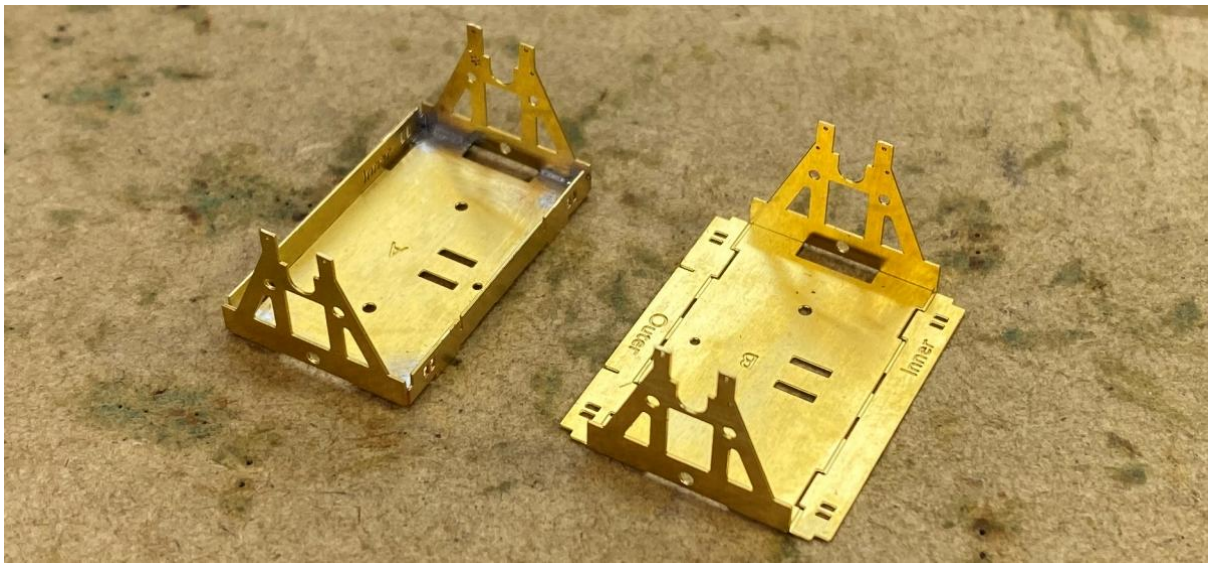
Repeat for the other end.



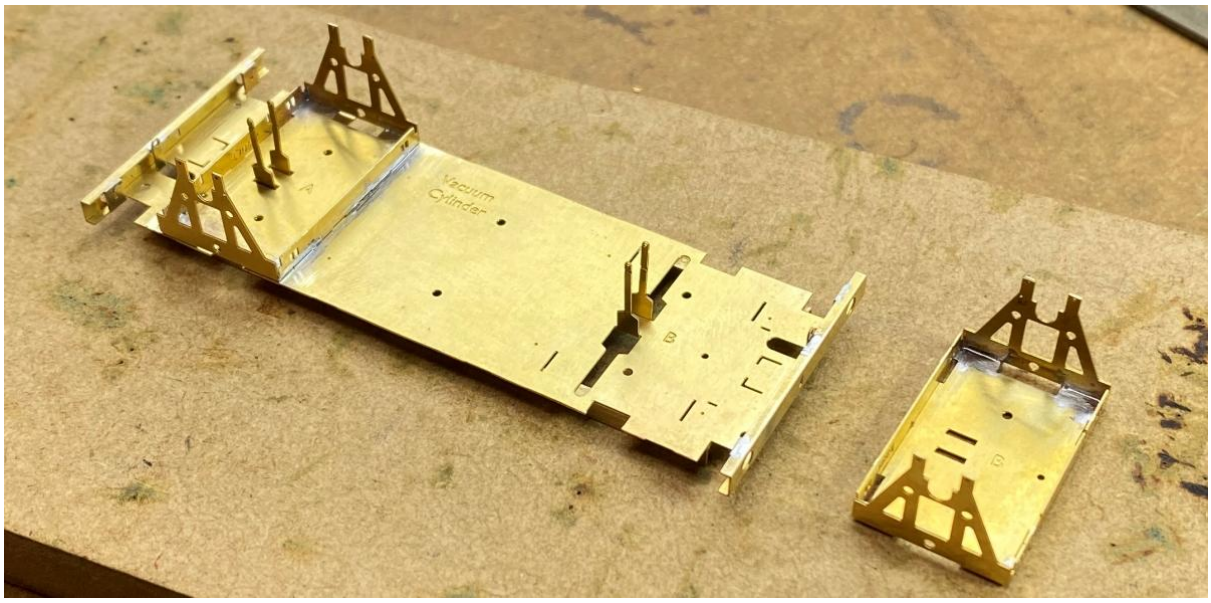
Fold out the buffer head guides, vacuum pipe brackets and clasp brakegear hanger brackets, all through 90°. The later items will be adjusted later but need to be at this angle for the moment. Solder the buffer head guides to the bottom of the headstock.



Check that the small holes in the axleguards (2) marked with a * can accept 0.31mm wire, remove from the fret and clean up any connecting tags. Carefully fold up the four sides, starting with the axleguards and making sure that everything is at 90°. Adjust if necessary. Reinforce the corners with a little solder.

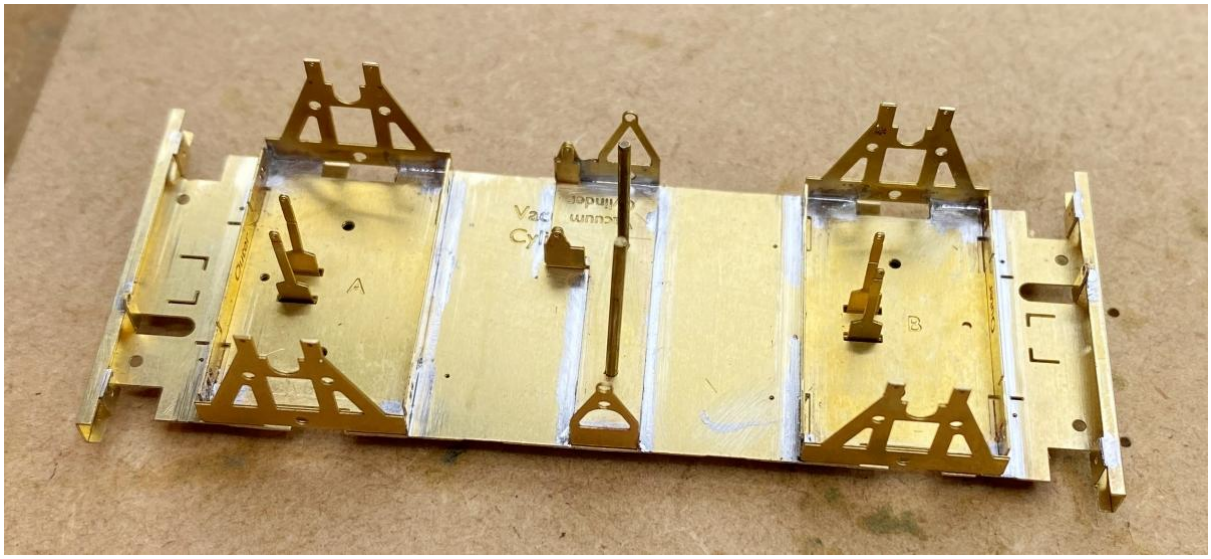


Solder the axleguards in place on the top plate. There are slots and tabs to aid alignment and ensure they go on the correct way around. Make sure the axleguards are flush against the top plate before soldering.



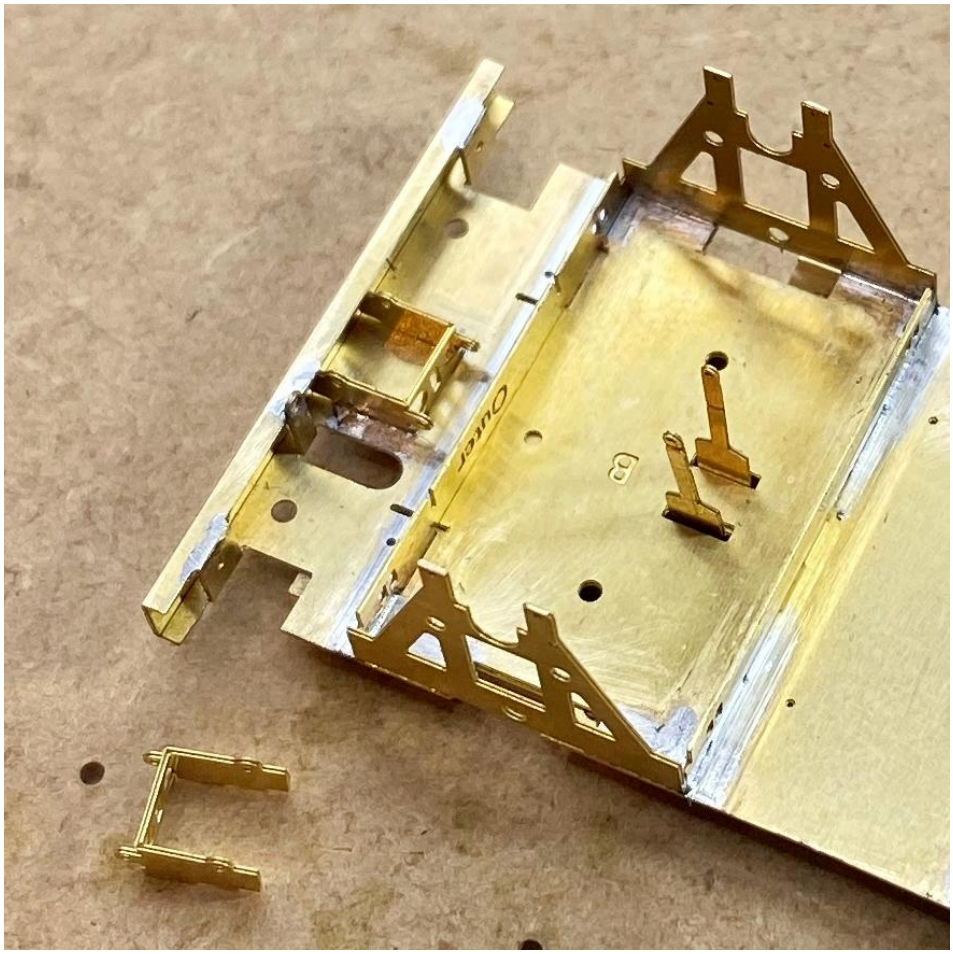
Check that the brake shaft holes in the in the vees (3) will accept 0.8mm wire and the small ones for the vacuum cylinder can accept 0.5mm wire. Remove from the fret and fold up the sides and the vacuum cylinder bracket. Not that the two fold lines on the back of the part (the side with no writing on) are through 180° with the fold lines on the inside.

Use short lengths of 1mm wire with the ends tapered slightly pin the vee and the top plate together. You may need to open out the holes slightly but make sure the wire is a tight fit. This is best done on a piece of wood with a pair of holes drilled in to accept the wire pins. Use the top plate as a drilling jig. Note that there is a correct way around for the vees, denoted by where the vacuum cylinder is.



Solder the parts and then remove the locating pins for the vees.

Fit the buffer spring brackets (4). These fold into a C shape and locate at the centre of the ends of the top plate. There are tabs on the brackets and L shaped slots in the chassis top plate. Solder together. These parts will act as fulcrum points for my style of buffer springing (if required) but also act as a bracket to retain the drawbar hooks.



If using the etched solebars (5), remove from the fret and fold into an L shape. I find the best way to do this is in a vice.

Remove the solebar detailing overlays (6) from the fret. As a result of the etching process there should be a curve through them with the ends closer to you if looking at the rivet detail side. Carefully bend them so that the curve is reversed slightly and that the ends are further away when looking at the rivet detail. This can easily be done between thumb and forefinger but take care not to put any folds into it. Press out the half etched rivets on the back of the detailing overlay for the bodyside brackets.

The solebar overlays are designed to fit into the slots in the solebars. The completed solebar then locates into the slots in the chassis top plate. Locate the solebar detailing overlay in the solebar and tack solder in pace. Note that there is a right way up for all the overlays (if in doubt note that the notches for the brake lever guard should match those in the solebar).

Now is probably the easiest time to attach the solebar detailing to the solebars so I shall cover this now before returning to the business of assembling the chassis.

Solebar Detailing

The solebar detailing (7) comes contained in its own little fret. See Fig. 2 to the right. On it you will find number plates, label clips, and a rectangle that is actually a block of wood on the real thing. The usual arrangement on the Izal Palvans was for a number plate in the middle of the rivets for the left hand axleguard and then a label clip between the rivets directly to the left. See image below.

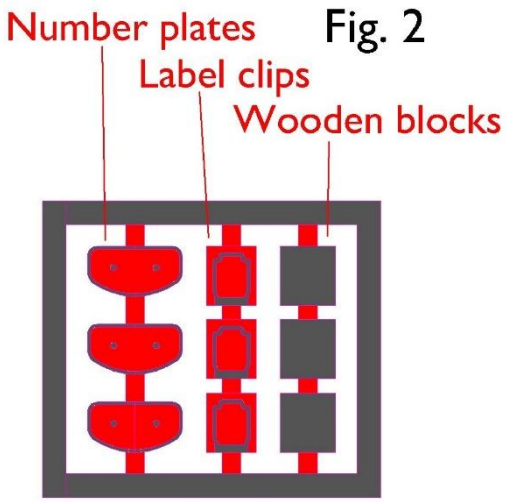


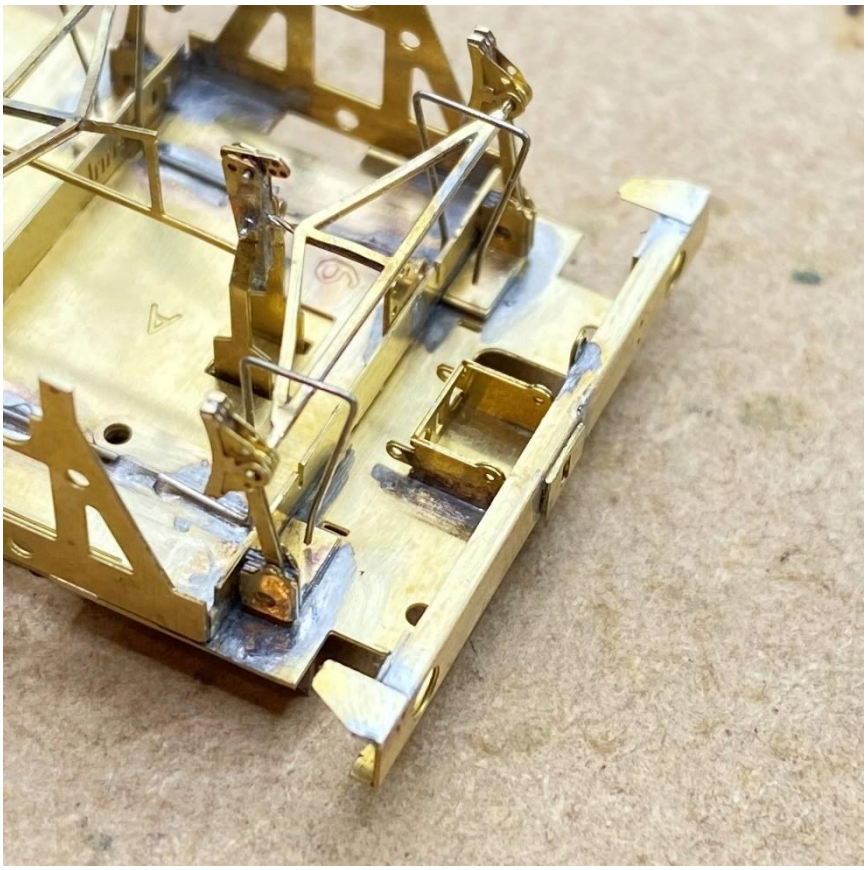
Fig. 2

The details can be soldered on or glued. If you wish to glue the detail on its best left until the chassis is assembled.

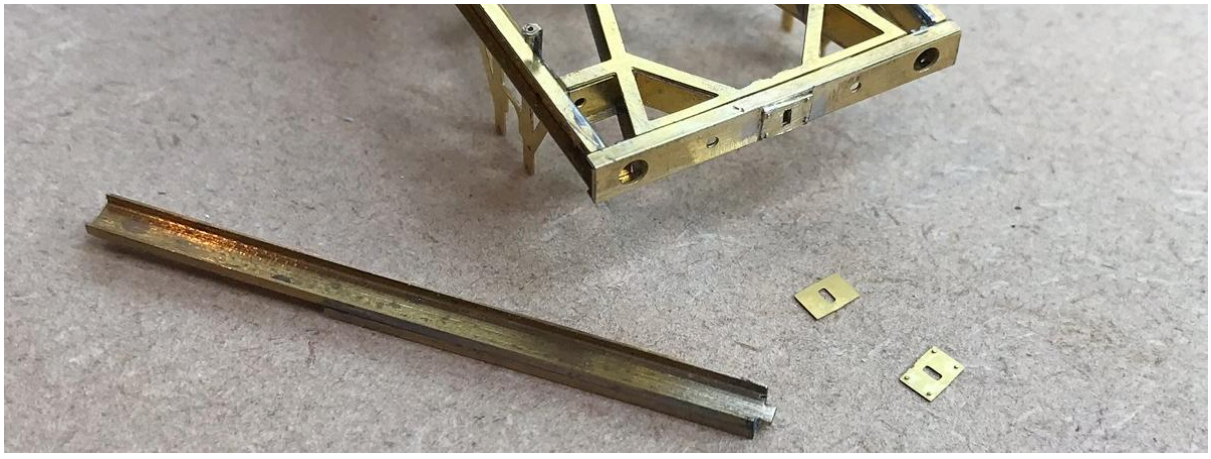
Main Chassis Continued…

The solebars can now be fitted to the chassis. Note there is a correct side for the solebars. There is extra rivet detail in the middle on one side and this should be on the side the vacuum cylinder bracket is. There are slots and tabs to aid location and the ends go into the channel that is the headstock. Fit the solebars at an angle and then straighten, locating the slots and tabs at the same time.

Add the solebar and headstock gusset plates (8). These should be arranged so that the angled edge goes between the inner corner of the headstock and the outer edge of the solebar. The shorter straight edge goes along the edge of the headstock. If you are using the 3D printed solebars it's a good idea to solder the gusset plates on now as they will form a good gluing point for the 3D prints.

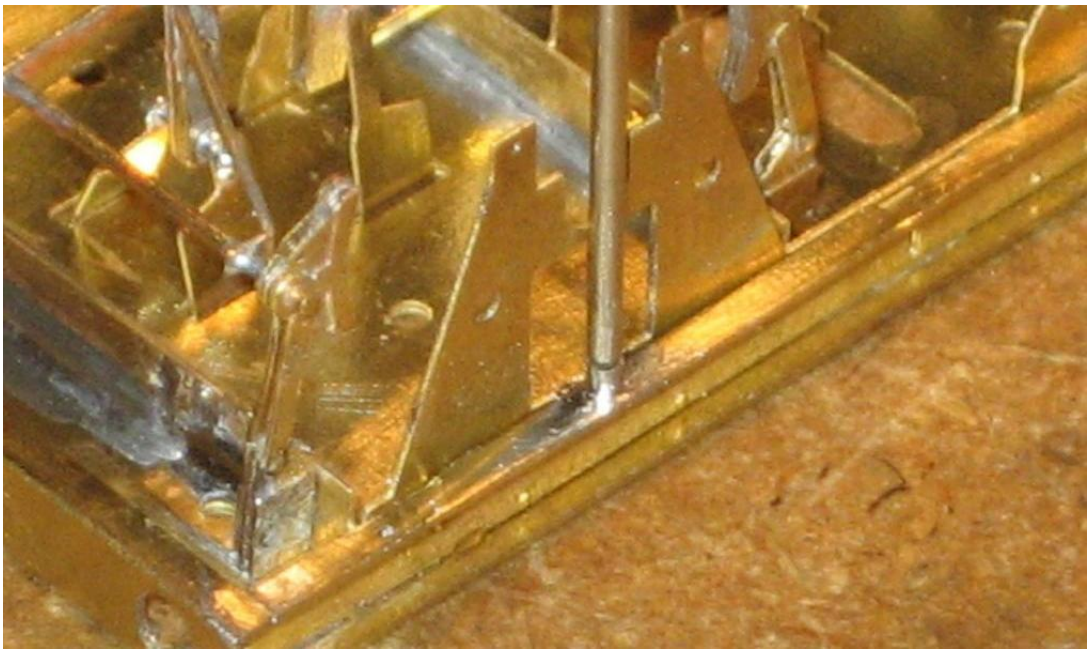


Fit the drawbar plate (9). Solder in place using the hole for the coupling as a guide. I've made up several implements to help fitting these including a cocktail stick filed to shape and a couple of pieces of brass C section soldered together and filed to shape. It's useful to have something to hold the plates on whilst fitting.



Spring Stops

The Izal Palvans had round pattern welded spring stops. If using the etched solebars provided they will need adding. I use 1mm wire for these. I cut almost all the way through the wire with a piercing saw and then solder in place. The cut can then be completed without the soldered joint breaking.



Spring Carriers and Axle Keeps

The spring carriers and axle keeps have been designed so that everything can be fitted after painting. This is my preferred method of arranging things. You can of course fit them permanently in place at this stage if you wish. Note that the keeps are fitted to the axleguards using wire to locate them and it is this wire protruding from the back of the axleguard that stops the spring carriers from dropping far enough that the spring wire becomes disengaged from its slots.

Assemble the spring carriers (10). The bearing sits in the round, half etched recess and the springing wire is soldered to the carrier using the half etched slot as a guide.

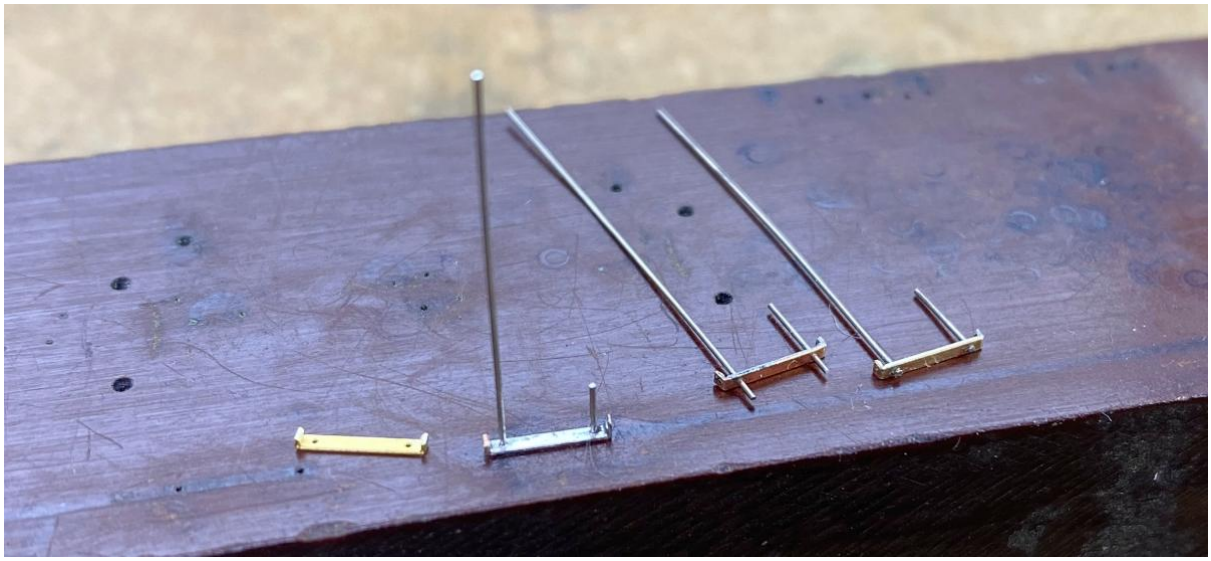
Remove from the fret and clean up. If you are using pinpoint bearings solder the bearing to the carrier so that it sits in the round, half etched recess. I find the easiest way of doing this is to drill a 2mm hole into a piece of scrap wood or mdf. The spring carrier can then be placed so that the bearing locates through the hole in the carrier and into the wood.

You should make sure that there is as little sideways movement as possible in the axle, but it shouldn't be so tight that it doesn't rotate properly. Bearing washers (11) are included to pack out the spring carriers and reduce the distance from the axle end to the tip of the bearing cone. Check the spring carriers with an axle on the underframe and add an appropriate number of washers to achieve this. There are full thickness and half etched washers on the fret. I fit the washers over the bearing so that they are between the spring carrier and the axleguard as this reduces the bearing surface of the spring carrier on the back of the axleguard and so will reduce possible friction in the setup. Use a waisted type of bearing, the ones produced by Alan Gibson are recommended. See image above.

Locate the spring wire in the half etched slot and soldered in place. The spring wire is nickel plated steel so it should be possible to solder it with regular flux rather than something like Carr's black label flux for steel. The spring wire should extend 7mm each side of the spring carrier. The safest way to get there is to make them overly long and trim them back checking on the model. I chemically blacken the spring carriers before final fitting.

Due to the removable nature of the axle keeps you can easily use Exactoscale parallel axles and bearings. If doing so, then you will need to pack the bearings out on the back of the spring carriers before soldering them in place due to the length of the axles. Use the bearing washers (D) provided. I have built my chassis with Exactoscale parallel axles, and when doing so used one half etched washer and one full width washer to pack the bearing out. This leaves the outer edge of the bearing about 0.25mm beyond the axleguard and provides 1mm of bearing surface for the axle. Assemble the spring carriers as per the instructions for pinpoint bearings above putting the washers on the opposite side of the spring carrier to the flange on the bearing.

The following method is how I make up the keeps so that I can paint them separately and fit them at the end. Whilst still attached to the sheet, use one of the axle keeps (12) to drill a pair of holes into a piece of scrap wood or mdf. Remove from the sheet and fold up the ends. Use two lengths of 0.31mm wire to pint the keep to the wood. One of the lengths can be quite short but leave the other longer, say 20-30mm, as this will give you something to hold or something to stick into a piece of wood when painting them. See image below.



Remove the keep from the wood and cut/file the wire on the front so that it resembles bolt heads. I don't worry about the wire on the back at this stage and simply trim it when everything goes together.

If you want to assemble everything permanently in place at this point, then fit the springs carriers and wheels in place then use lengths of 0.31mm wire strung between the holes in opposite axleguards to locate the keeps in place after you've folded them up. Solder in place and cut/file the wire on the front so that it resembles bolt heads. Trim the wire between the backs of the axleguards remembering that it is this wire that will stop the spring carrier dropping so far that the spring wire can become disengaged.

Brake Shoes

The clasp brakes (13) are designed to be folded up as one piece, soldered together and then tidied up afterwards.

If you wish, press out the half etched rivets at the top of the hanger bracket. I use a drop head rivet press for this with the parts held on one of those ubiquitous green cutting mats. Remove from the fret and fold up. All the fold lines are through 180° with the fold line on the outside except for the two between the two plates connecting the halves together and the brake hangers. There are four parts to the brake shoes: Two outer detail parts and two inner shoes. The inner shoe parts need to be folded through 180° with the fold line on the outside. The four parts of the brake shoes need to be aligned and soldered in place. I do this by putting a 0.5mm drill bit or a suitably sized tapered reamer through the holes for the yolks and clamp the four etched layers together using a pair of self closing tweezers. If you hold the drill in one hand you can rest the base of the tweezers on the workbench leaving one hand free for the soldering iron. It's easier than it sounds, see attached photo. Solder together and clean up the clasp brake assembly and the shoes in particular.

Put to one side and continue with the rest of the brakegear for the moment.

Brakegear

Next attention can turn to the brakegear. Check and open out where necessary the holes in the brakegear linkage (14), brake shaft crank overlays (15) and clasp brake hanger overlays (16) and then carefully remove from the fret. Refer to Fig.3a below for hole size details.

Start with the clasp brake hanger overlays (16). These fold over the brakegear linkage to form the detail on both sides. You will note that they are triangular in shape with a long straight edge. The three holes along this long straight edge line up with the three holes at either end in the brakegear linkage (14). Use short lengths of 0.31mm wire to pin everything together. Note that the long angled face of the triangle faces towards middle of the assembly. Solder in place. Trim the wire so that the top and bottom resemble bolts and the middle length extends approximately 2mm either side of the assembly. This last pin will be used to attach the brakegear to the brackets on the chassis. Refer to the photos below and Fig.3b on page 22 if in doubt.

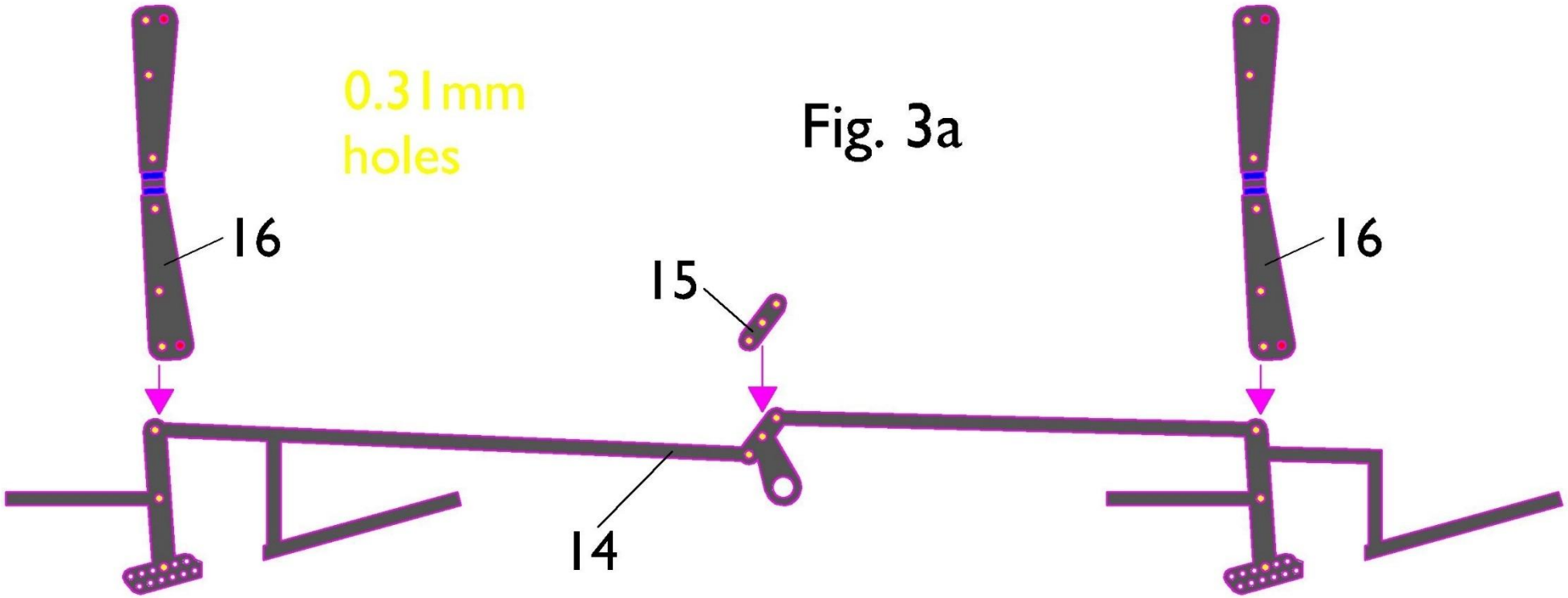
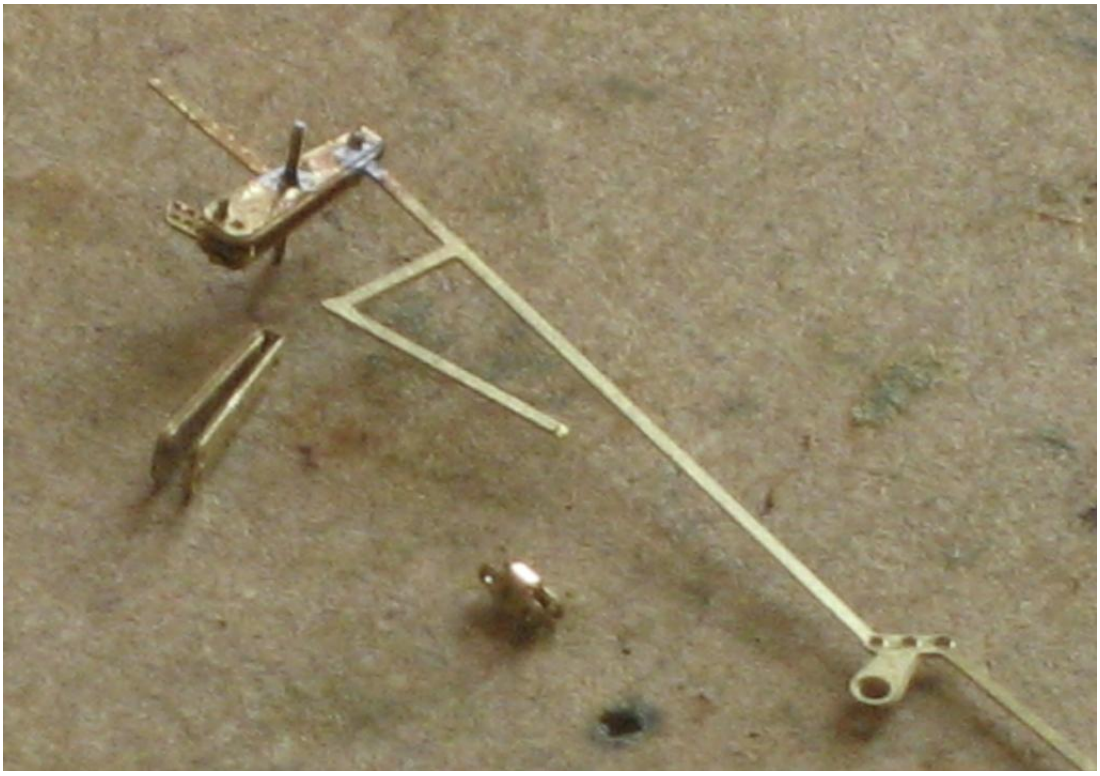
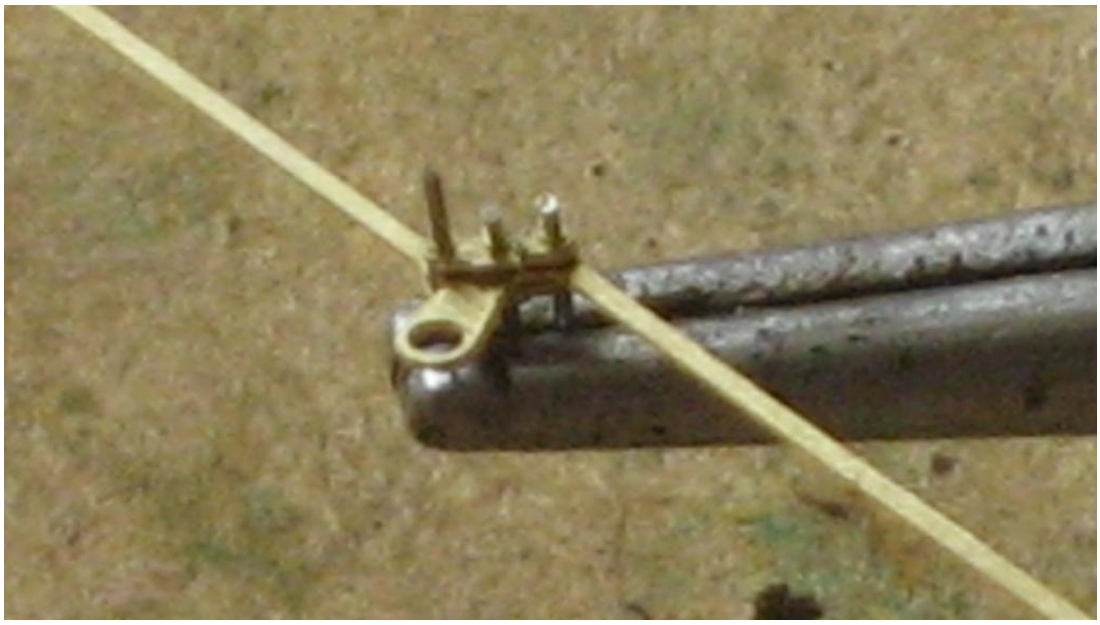


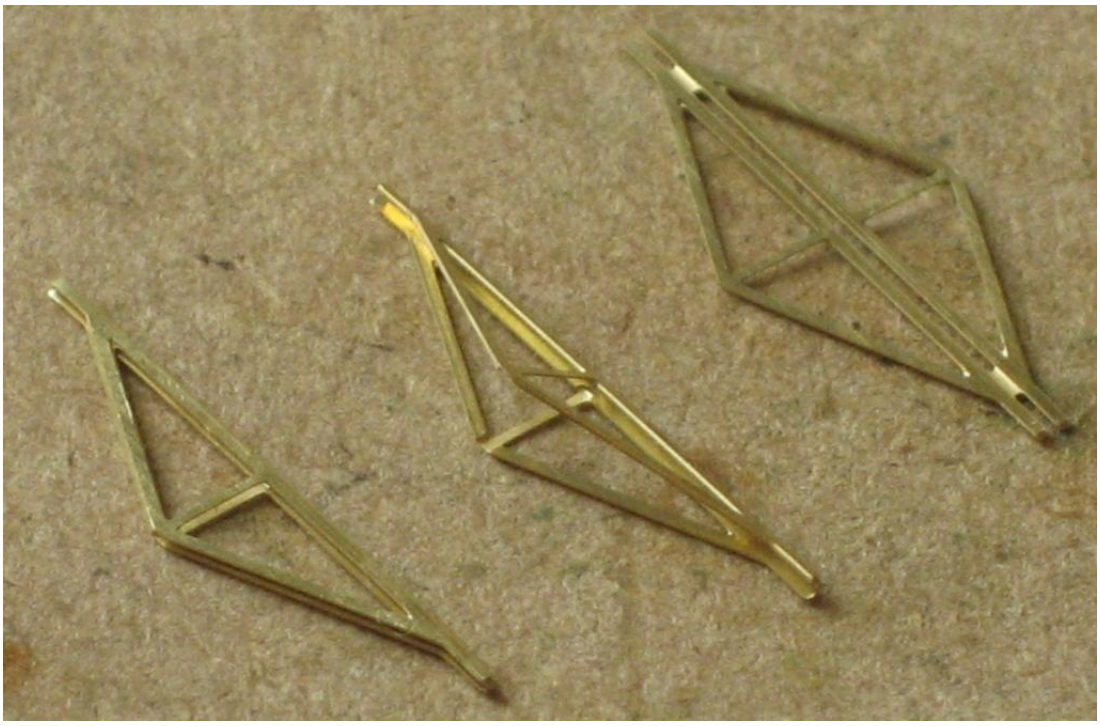
Fig. 3a



In a similar manner attach the brake shaft crank overlays (15) to the centre of the brakegear linkage. Again use 0.31mm wire to attach the overlays and solder in place. Open out the large hole in the centre for the main brake shaft to accept 0.8mm wire.

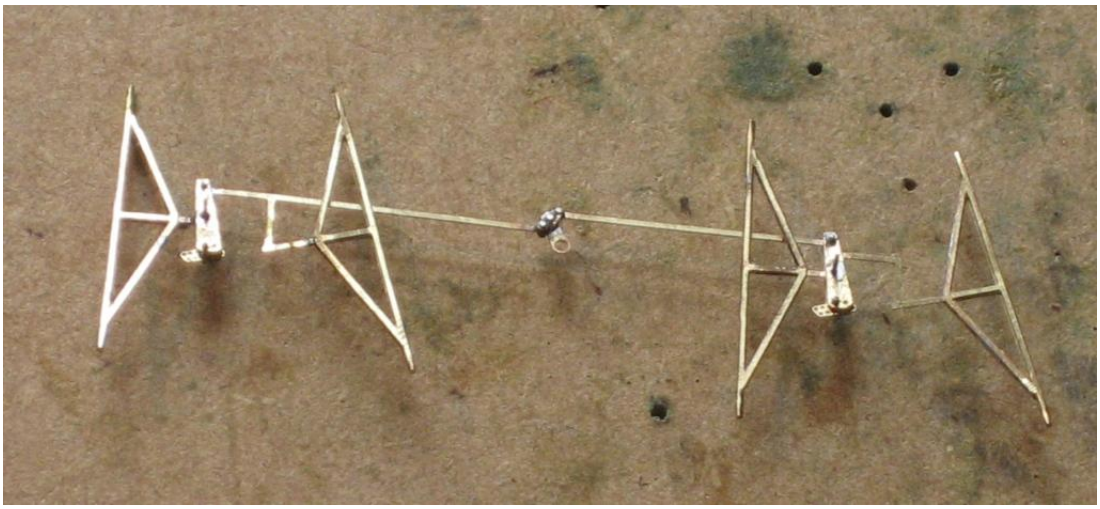


The brake yokes (17) can be folded up next. Remove from the fret and fold them over on themselves. Note that there is a half etched recess on the centre of both sides of the yolks. They should be folded so that these form a slot into which the brakegear linkage will fit. Once folded up solder together and file off the tabs that connected the two sides. Be very careful not to get any solder into the slot in the centre.

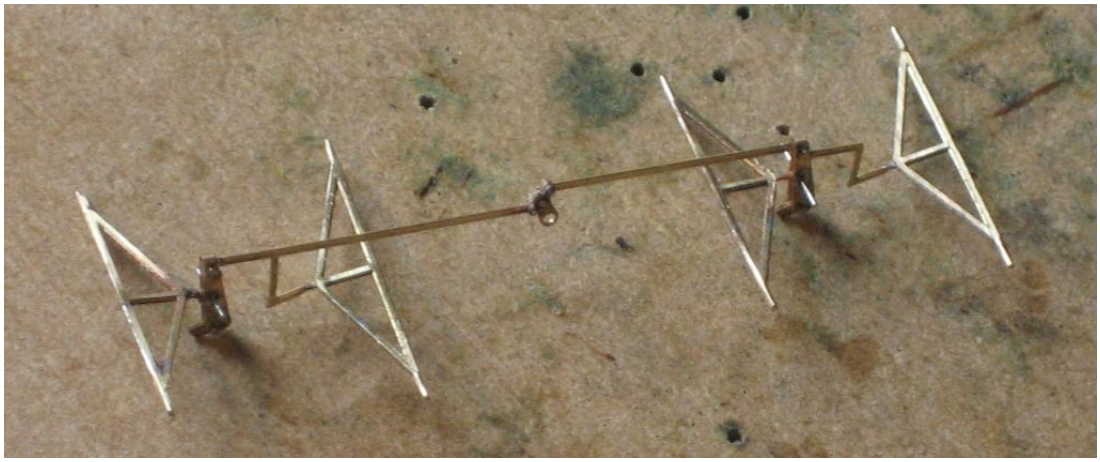


You will need to fettle the ends of the yolks to fit the holes in the brake shoes. A little work with a file should suffice and the holes can always be opened out a little if necessary. It is much easier to make sure all is well now rather than when the clasp brakes are attached to the chassis.

Make sure that there are no half etched connecting tags left on the brakegear linkage (this is important or the yolks won't be in the right place). Fit the yolks to the brakegear linkage using the slots on the yolks and tongues on the linkage. Make sure that they are hard up against each other and solder in place.



Carefully twist the yolks through 90°s as shown in the photo below.



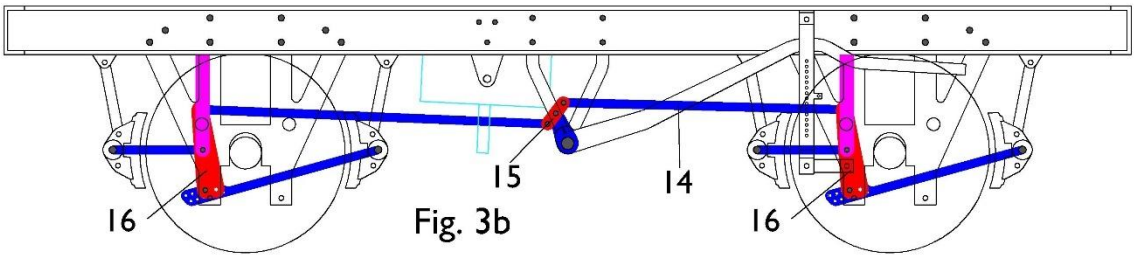


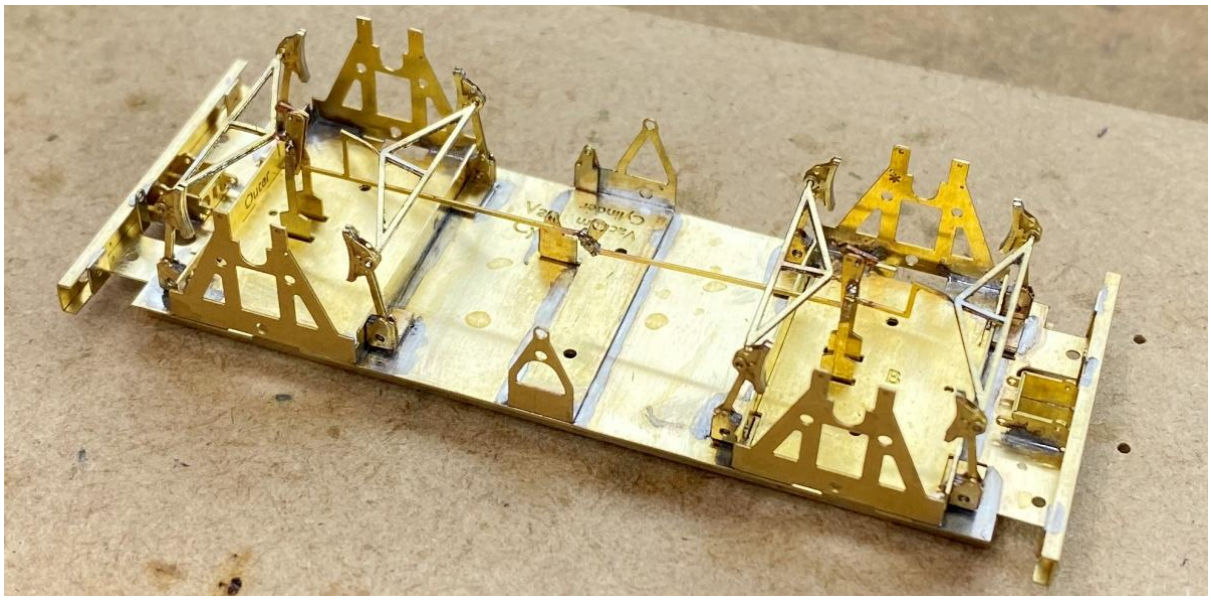
Fig. 3b

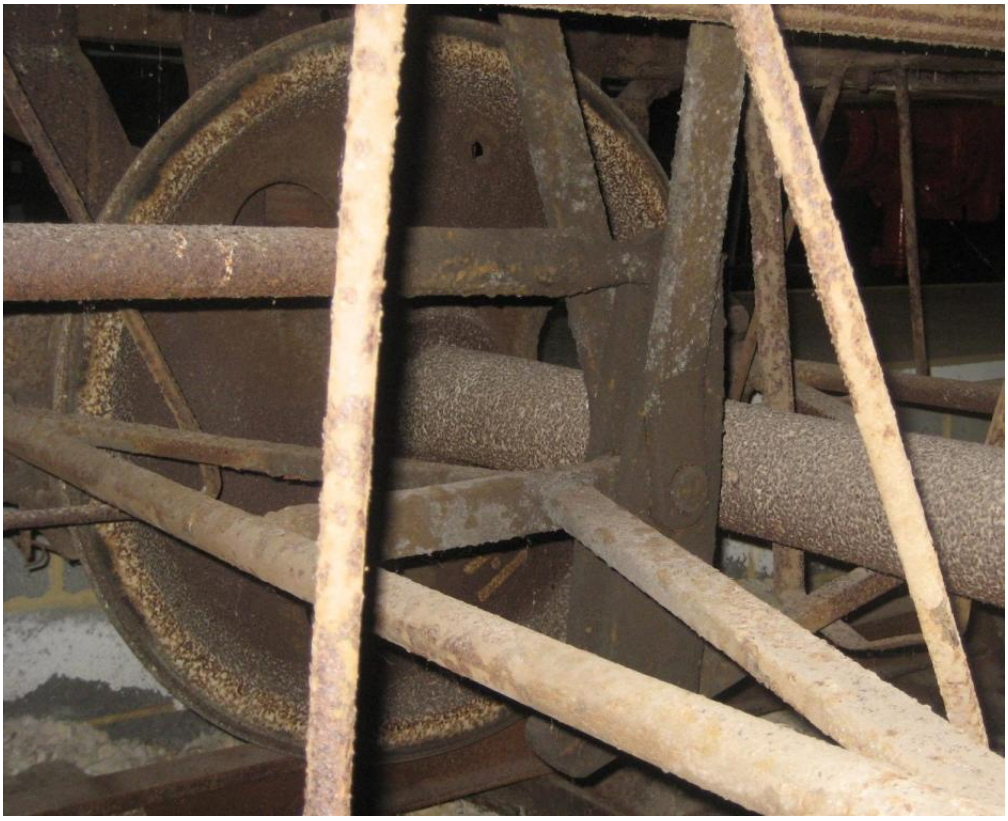
Brakegear Assembly

Firstly, attach the clasp brakes to one side of the chassis. There are tabs on the clasp brakes that locate into slots in the axleguards (3). There are two different sets of slots depending on which gauge you are building to. The outer ones are for EM/P4 and the inner ones for OO. The clasp brakes can now be soldered in place on the chassis but only do one side of the wagon at the moment. Make sure that the clasp brakes are hard up against the axleguard assembly. The holes can also be used to help pin the clasp brakes to the chassis top plate when soldering.

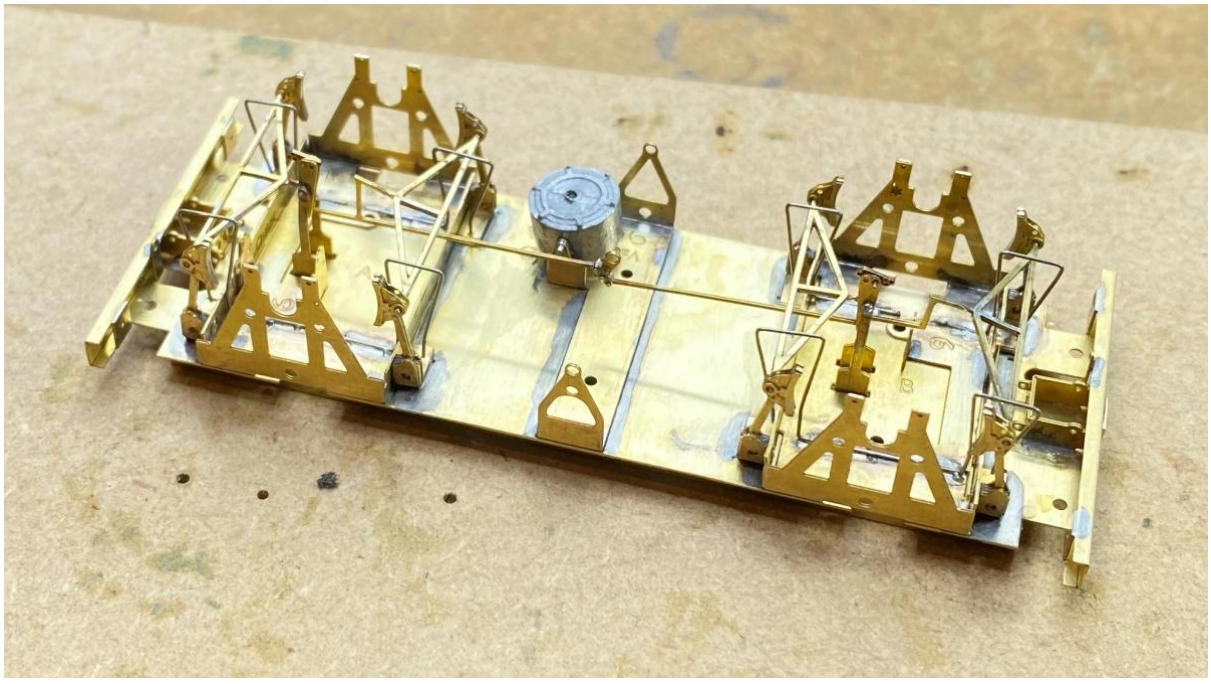
Next take the brakegear assembly and attach it to the chassis so that the yolks go through the holes in the brake shoes and the protruding pins in the brakegear linkage engage with the holes in the clasp brake hangers attached to the chassis top plate. See photos below. Solder in place.

Add the remaining clasp brakes and solder in place.





Once the brakegear is in place you can make and fit the brake yoke safety loops. There is a brake yoke safety loop jig (18) on the fret to aid making these. Use the two half etched lines on the fret to remove the part and file back any remnants of this line. Use 0.31mm wire to form the safety loops. There are eight small holes etched in the top plate into which one end of the safety loop can be located with the other end being soldered to the spacer on the axleguard.



Vacuum Cylinder

Now is the time to prepare and fit the vacuum cylinder. Drill a 0.6mm hole in the centre of the vacuum cylinder top (the end with the detail) for the piston shaft and then remove the mould feed from the other end. Fit the vacuum cylinder in place between the brackets on the vees (3). See image above.

Brake Shaft

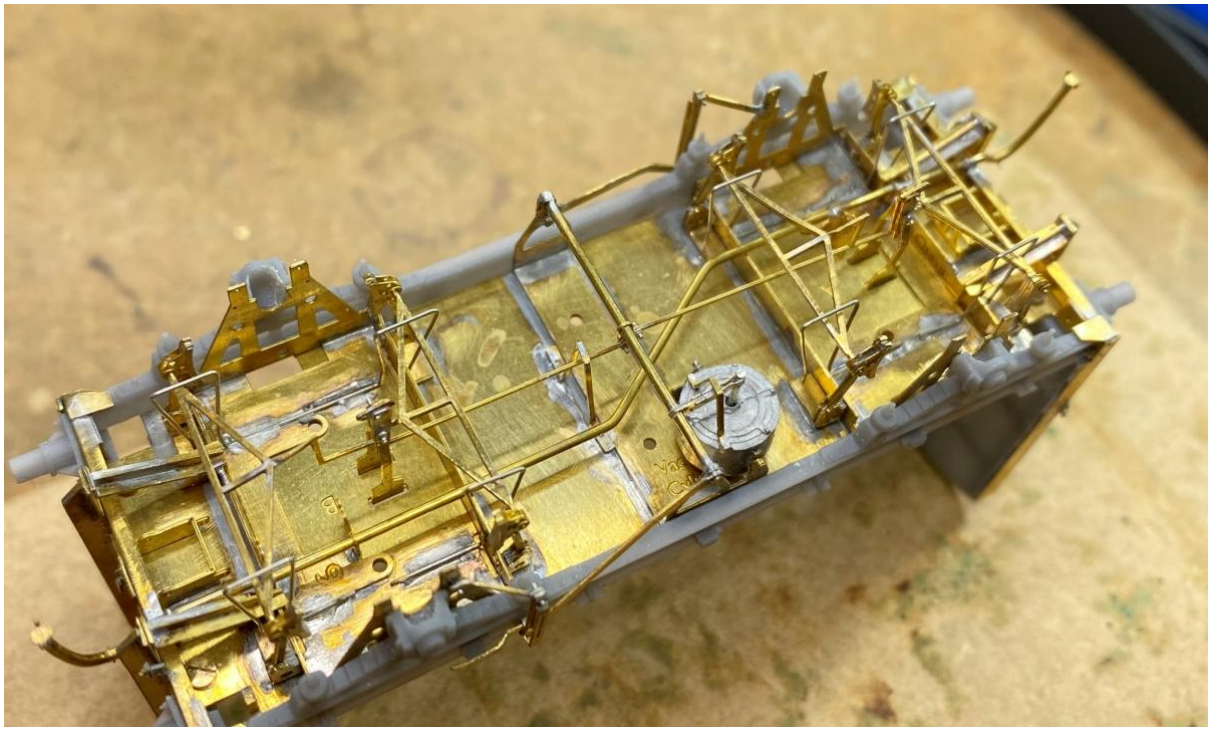
Cut a length of 0.8mm wire to form the main brake shaft.

Check that the vacuum cylinder actuators (23) can accept 0.8mm wire. The actuators need to have their half etched rivets pressed out and then folded over. They are designed for the ends to wrap around the 0.6mm piece of wire extending from the vacuum cylinder. These can be fitted along with the brake shaft (0.8mm wire) through the vees. Leave soldering of the actuator until the vacuum cylinder piston shaft is in place.

Solder the brake shaft in place and trim the ends if necessary.

The vacuum cylinder piston shaft (0.6mm wire) can be added now and then the two halves of the vacuum cylinder actuator soldered together and to the brake shaft.

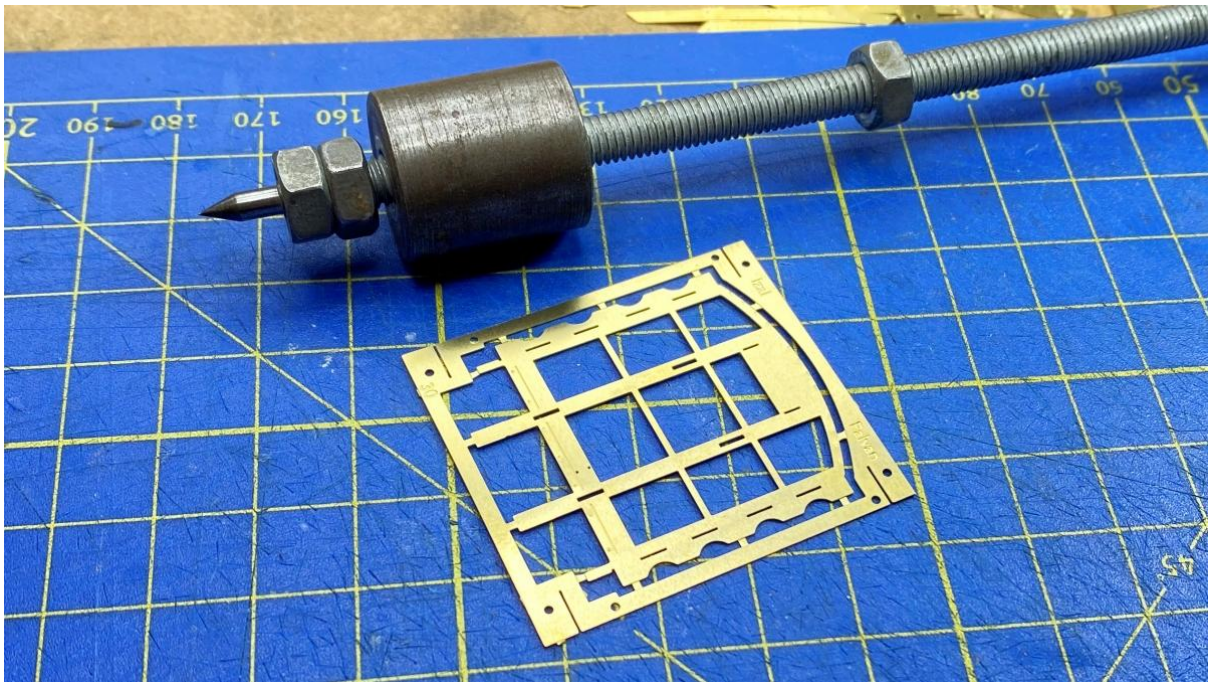
If you're feeling particularly brave the vacuum cylinder safety loops (24) can be added. Carefully make sure the small holes can accept 0.4mm wire and remove from the fret. Fold into a _/ _ shape, locate over the two outer bolts on the top of the vacuum cylinder on the brake shaft side and solder in place. If you're using low melt solder, it's best to tin the safety loops before checking the hole size and removing them from the fret.



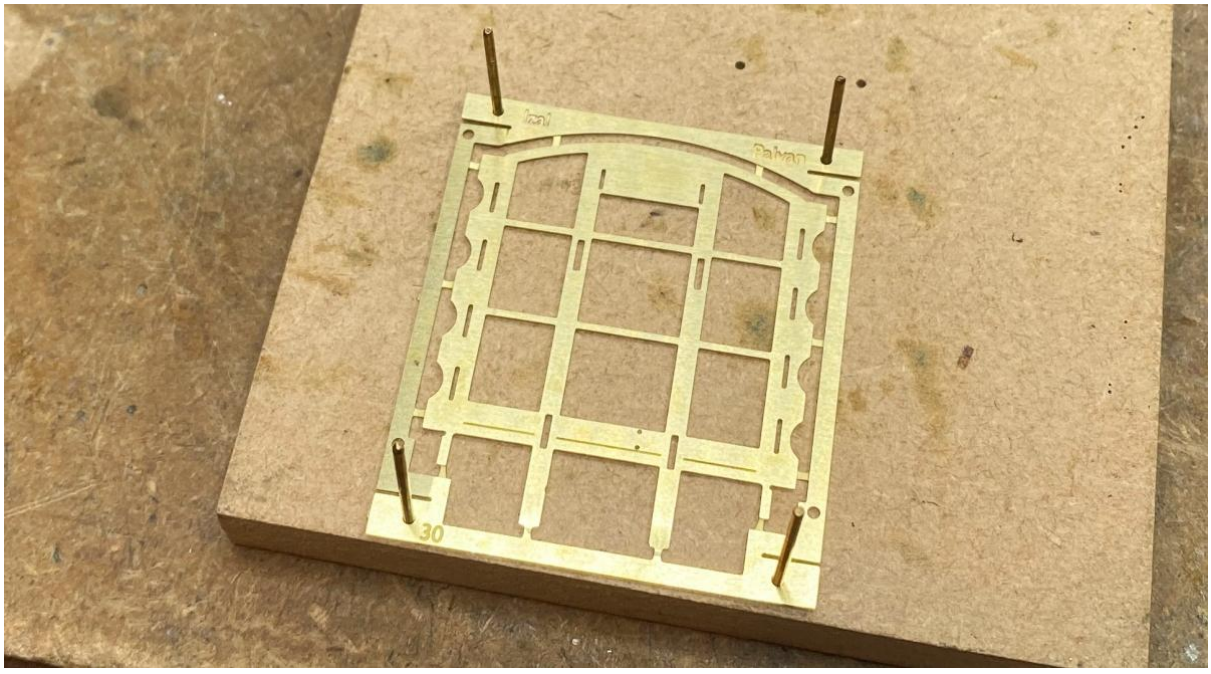
Etched Body Ends

At this point we will jump ahead a bit and make up the etched part of the ends before going back to finish the underframe.

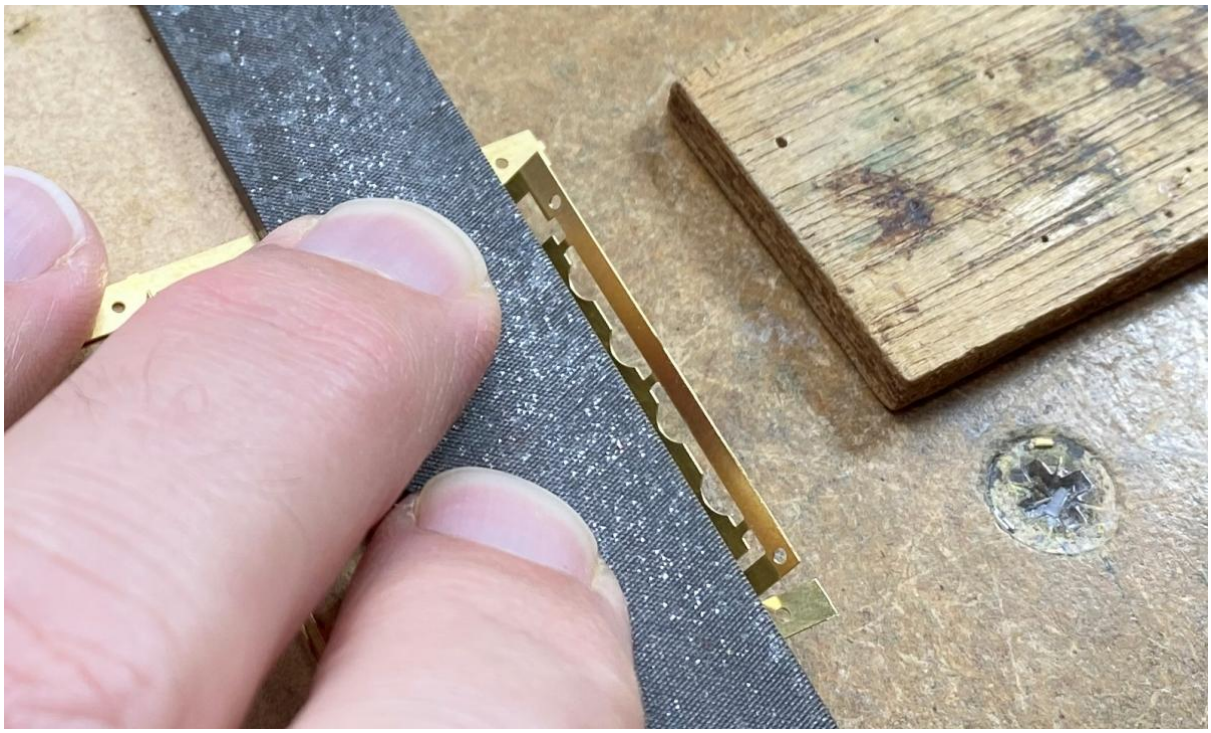
Find the small fret containing the body ends (30). Whatever you do not remove the end from the surrounding fret. It is designed to be built whilst still attached to the fret. Press out the half etched rivets on the back. There are 7 along the bottom edge of the body and 12 along the arc of the roof at the top.



Use the fret to drill four 1mm holes through the holes at the top and bottom into a piece of scrap wood or mdf as per the image below. These will be used to locate 1mm wire ‘pins’ which will ensure the layers of the ends are accurately aligned. The ‘pins’ can be made from ordinary 1mm brass wire cut to about 20mm long. Put a chamfer in the ends to remove any burr from cutting and make them easier to fit.

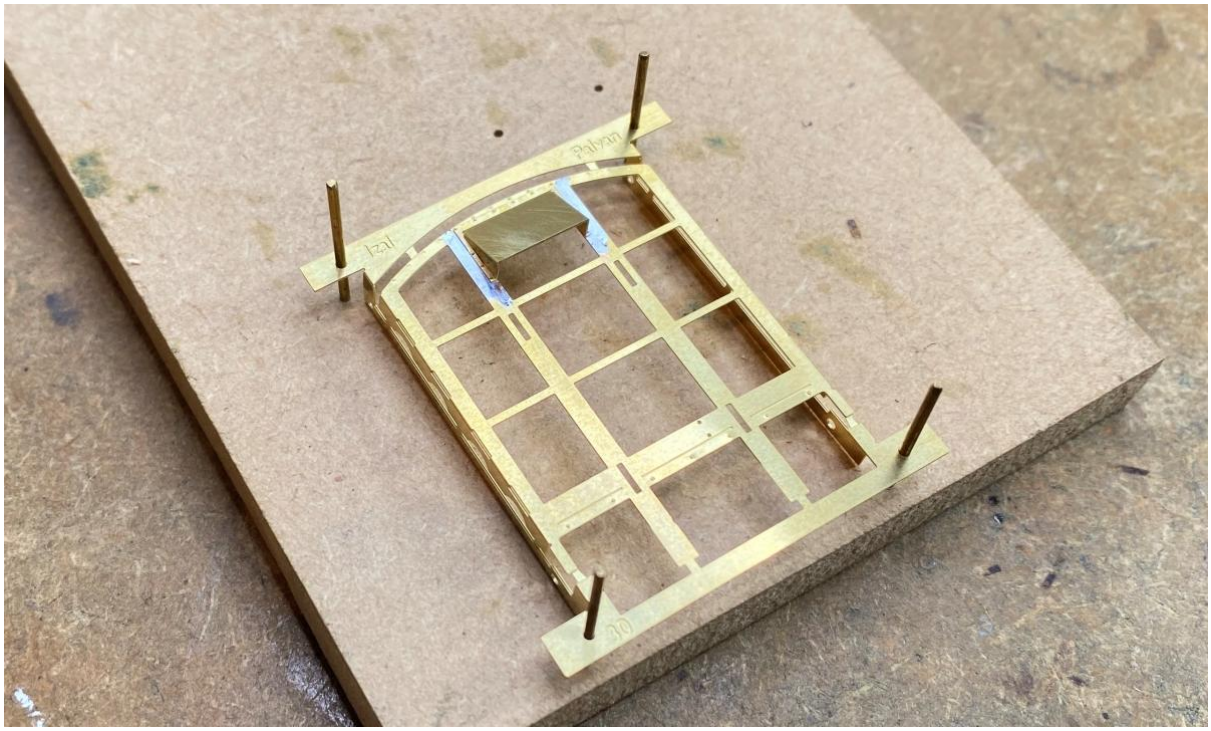


Whilst properly supporting the end fold up the sides (the part with the scalloped section).

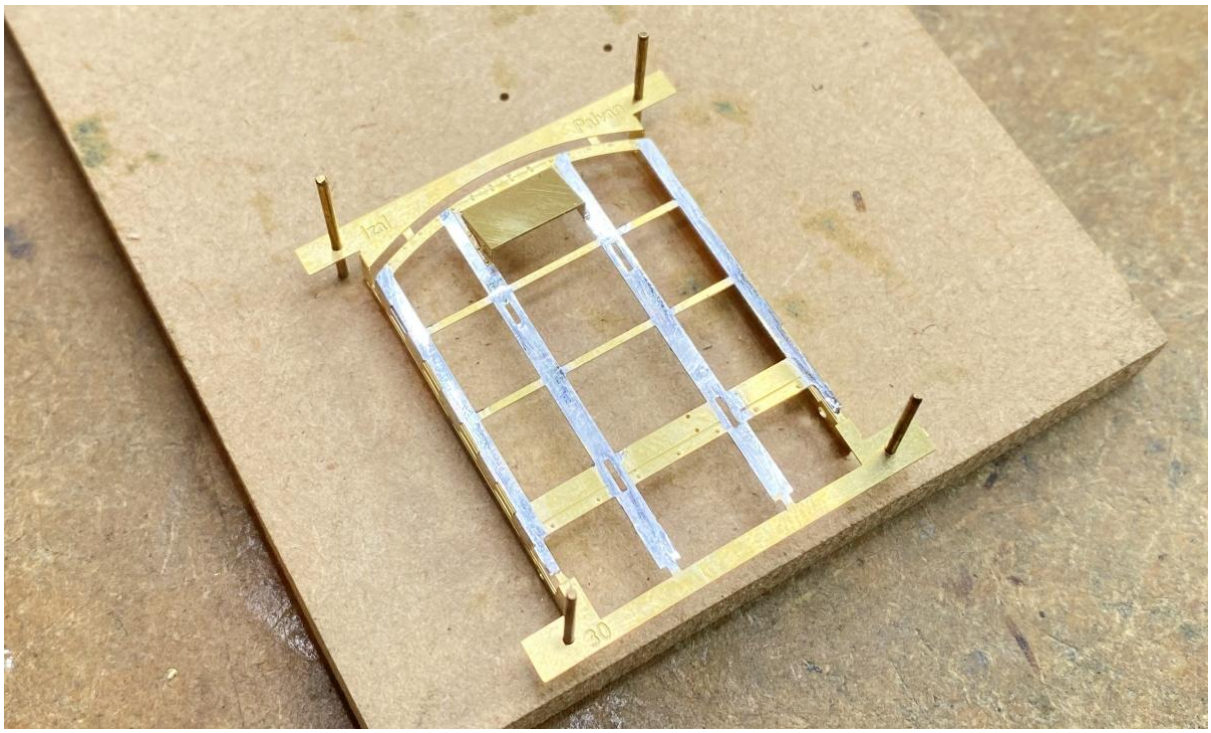


With the sides folded up fit onto the jig so that the writing on the fret is visible. See image below.

Remove the ventilator backing (34) and ventilator hood (35) from the fret. Fold the two sides of the ventilator hood through 90°. Use the hood to pin the backing to the end and solder in place. See image below.



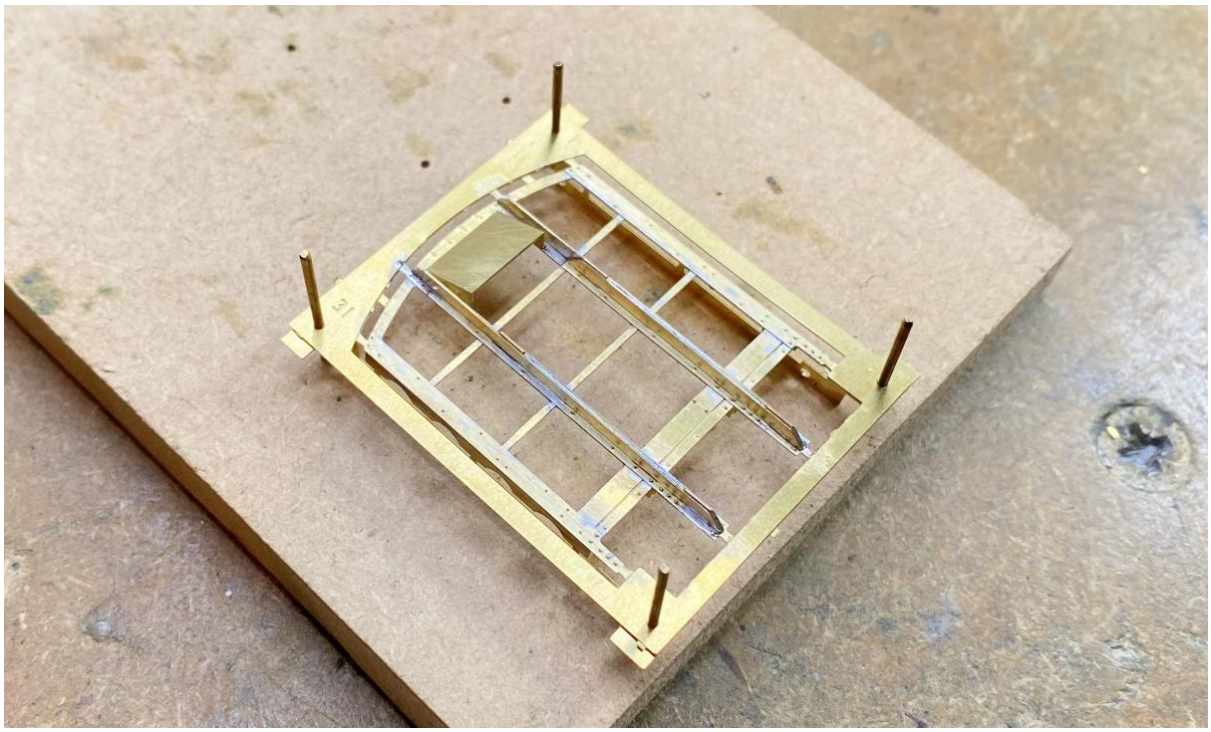
Carefully tin the four vertical parts of the end.



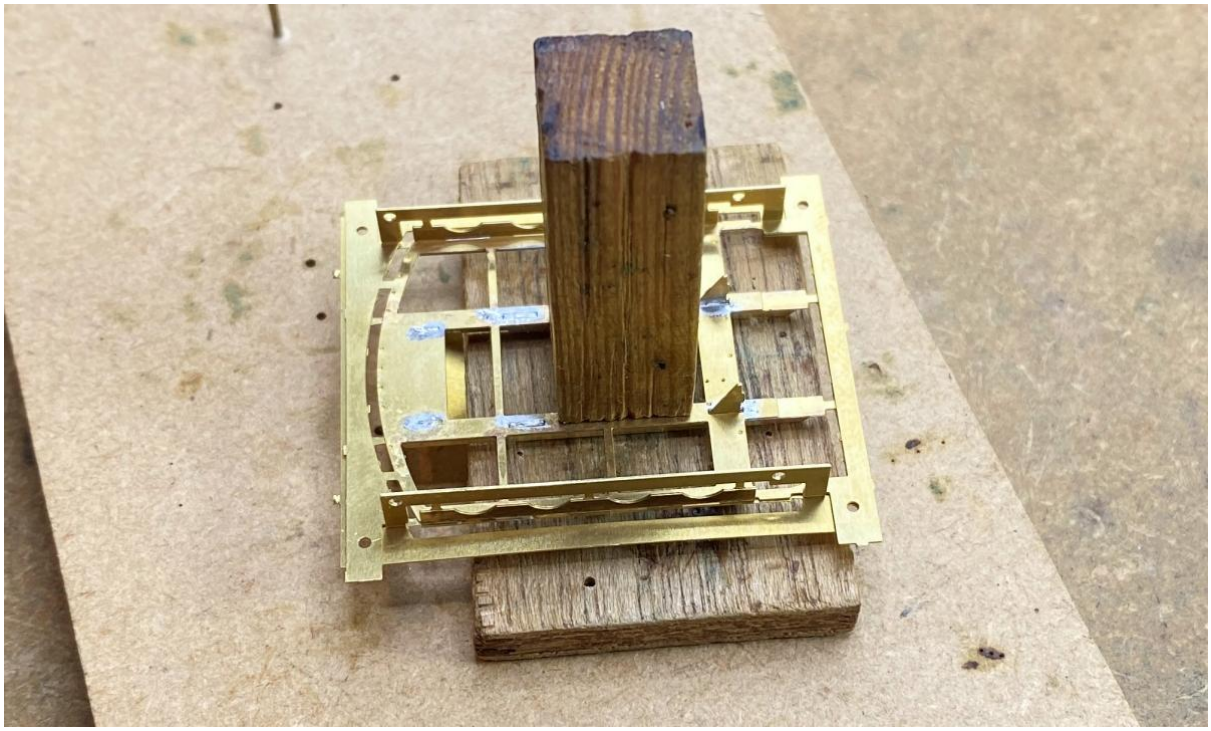
Remove the body end overlays (31) and using the 1mm wire ‘pins’ to align things fit over the top of the end. Carefully solder the two layers together making sure they are properly joined.

Remove the end stanchions from the fret noting that there are two parts to each stanchion joined by two fold lines. The two halves of each stanchion should remain attached to each other. Press out the half etched rivets on the back. Fold the two halves of each stanchion double so the fold is through 180° with the fold line on the outside. Solder together.

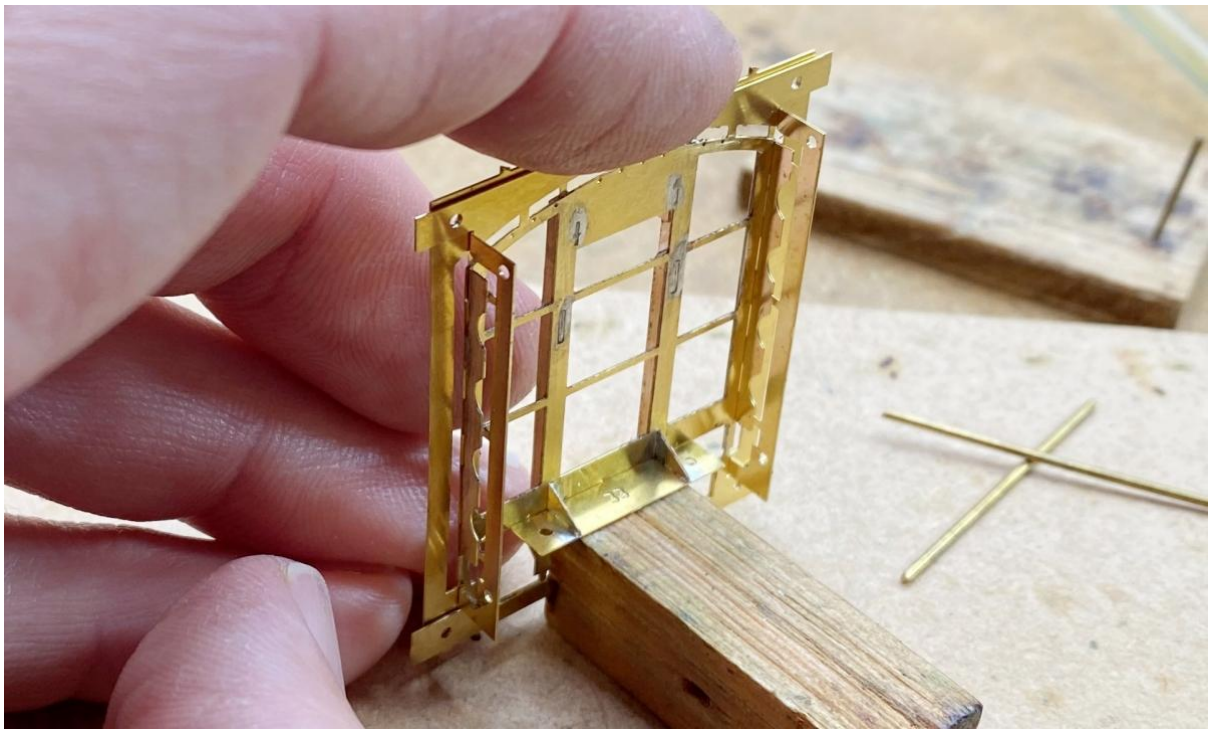
Fit the end stanchions to the end assembly noting that the side of the end stanchion with the shorter layer goes towards the middle. Tack solder in place at the top and bottom.



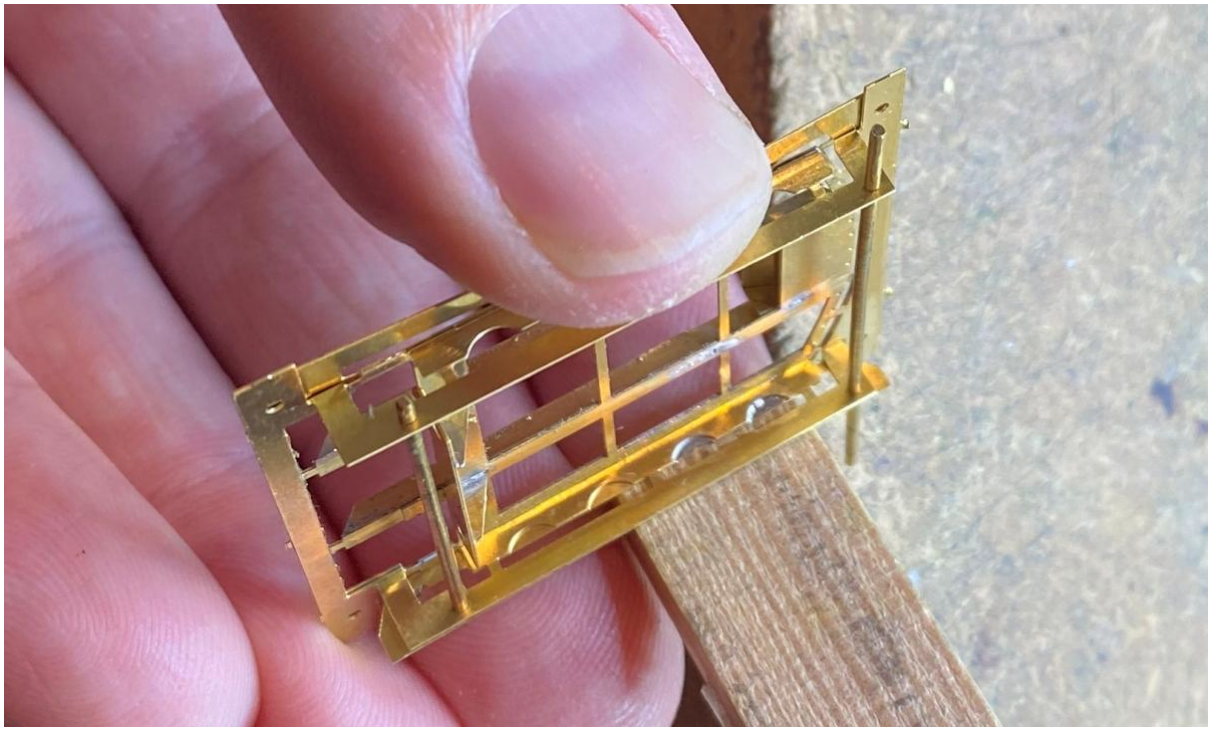
Remove the end from the jig and turn over. Use a small block of wood or similar to make sure the end stanchions are hard up against the end and solder the tabs in place from the back.



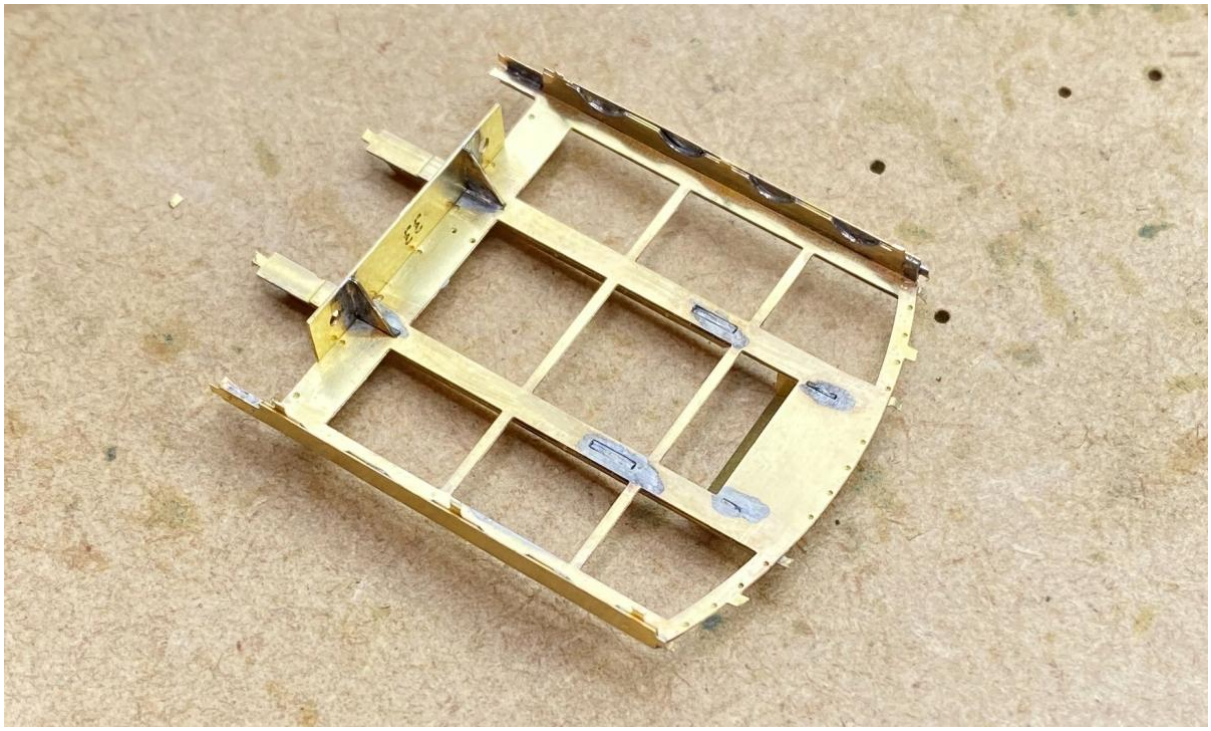
Remove the body end fixing bracket (33) and attach to the end stanchions on the inside of the end. There are tabs on the end stanchions and slots on the fixing bracket to aid alignment. Solder together making sure the fixing bracket is fully home on the tabs. The fixing bracket on this version of the etches is full length and will only fit one way around.



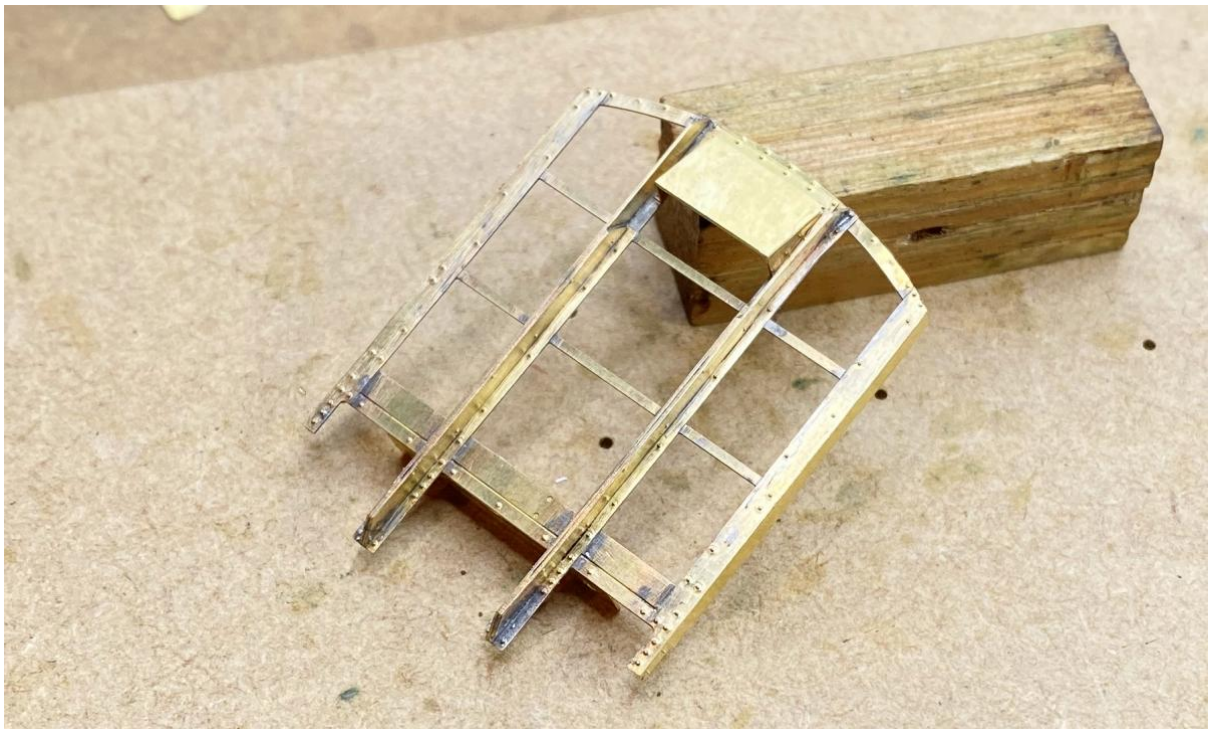
Fit two lengths of 1mm wire through the holes in each of the sides on the end. These will be used to locate the corner overlays (37) in place for soldering. The corner overlays are fitted on the outside of the sides with the rivet detail facing outwards whilst still attached to the fret that surrounds them. There's only really one way round for these parts. You can solder the overlay in place using the scalloped cuts in the end frame to locate the solder. Make sure the part is soldered on properly and is hard up against the end frame.



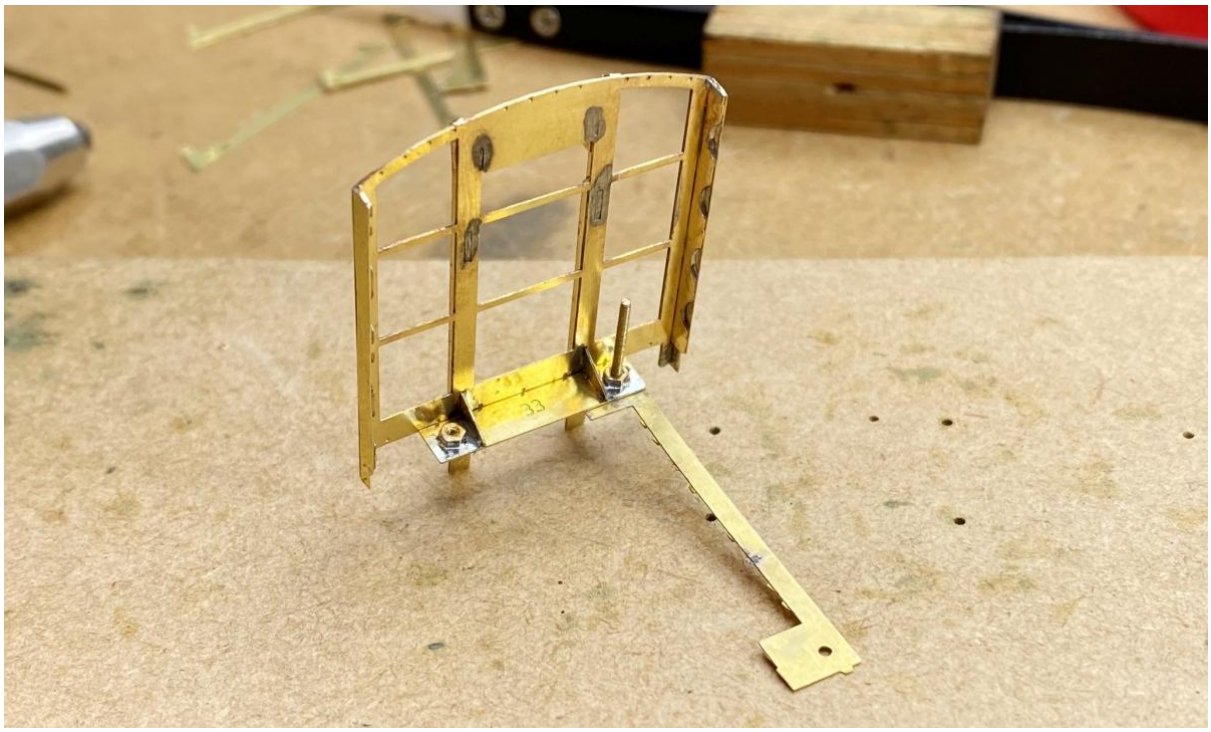
Ones the corner overlays are in place carefully remove the end from the surrounding fret using a piercing saw. It's a bit of a fiddle getting it off so go carefully.



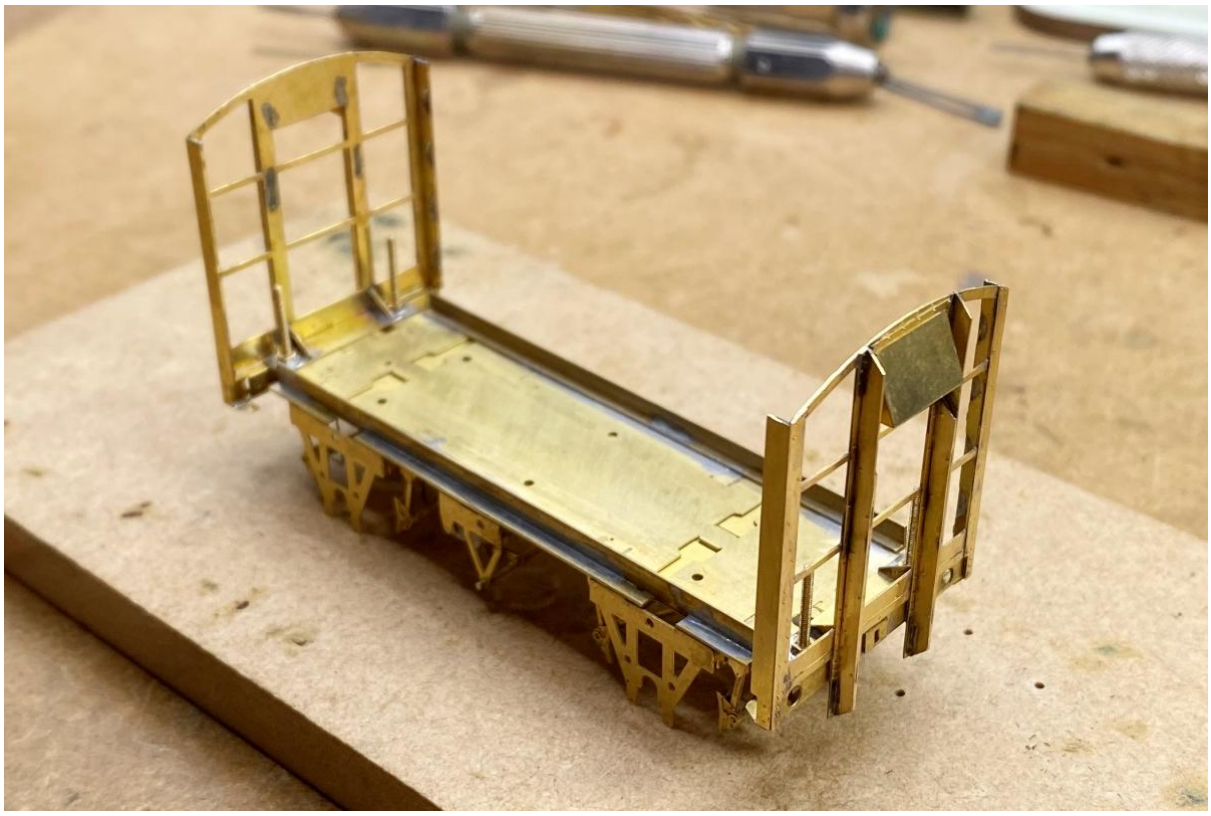
Clean up any remnants of the connecting tags.



Solder two 14ba or M1 nuts to the top of the end stanchion fixing bracket. My bolts were not threaded right to the end, so I used some of the scrap fret that surrounded the end to space the bolt head away from the bracket whilst soldering. Take care not to solder the bolt in place at the same time.

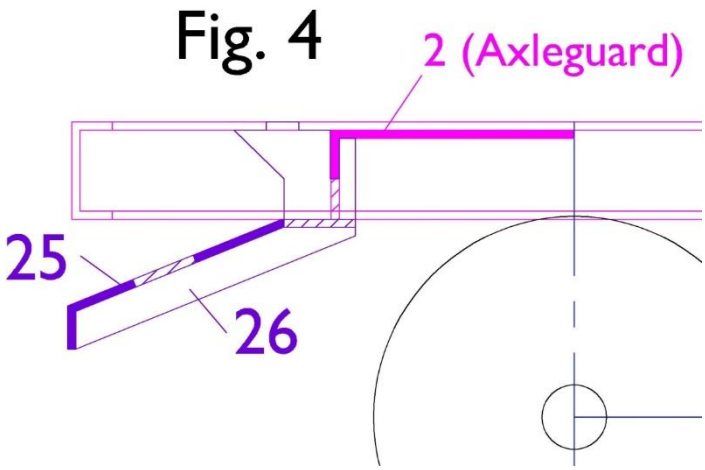


Once you have completed both ends, fit them to the underframe using bolts.



End Stanchion Supports

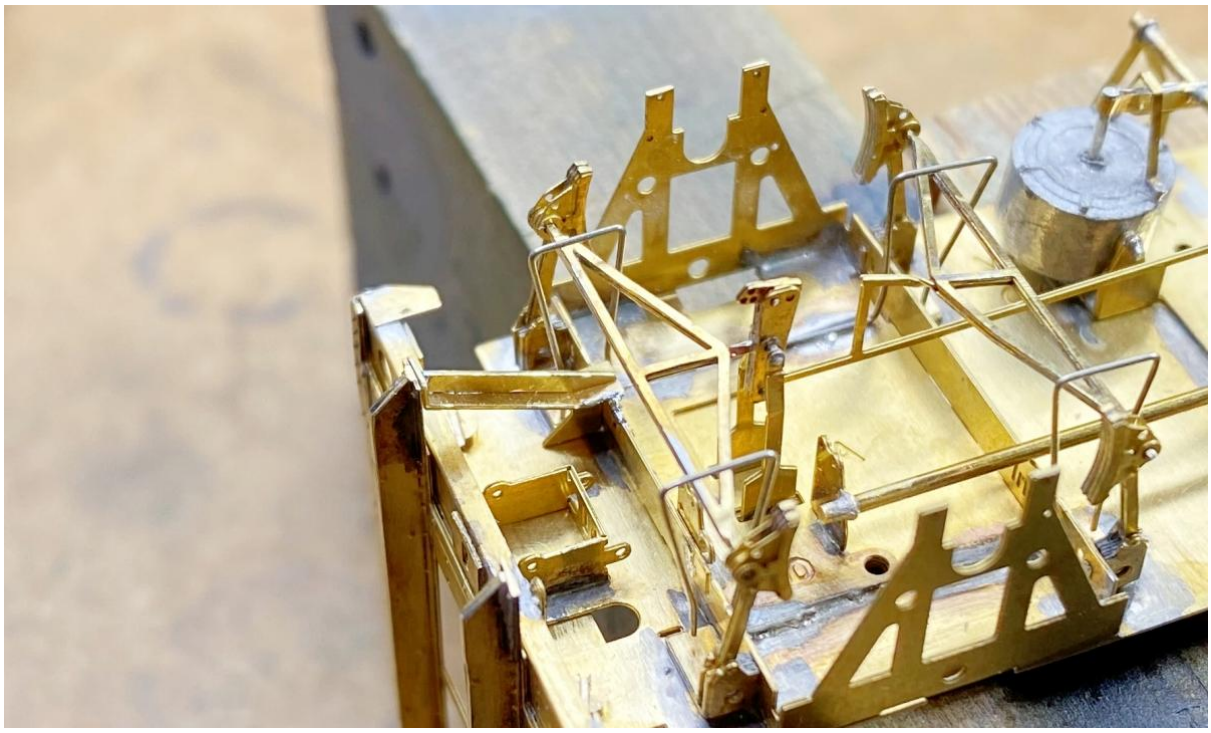
The Izal Palvans were curious in having long end stanchions that went down below the headstock. The bottom of the stanchions were supported by brackets that angled back up into the underframe. They were T section, like the end stanchions, and have been replicated in two parts, an end stanchion bracket top (25) and an end stanchion bracket angle (26).



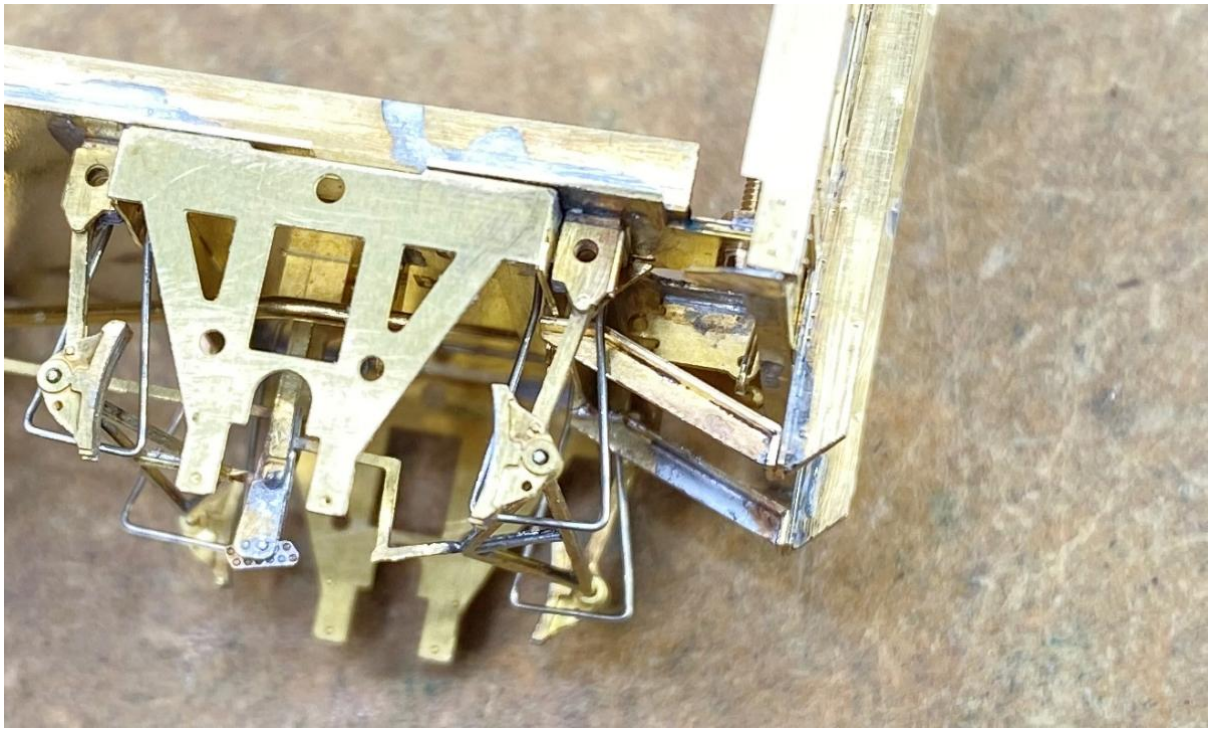
Press out the rivets in the end of the bracket top. These will sit behind the end stanchions. Place the bracket top on the edge of a piece of wood with the rivets showing. Locate the bracket angle in place using the tab and slot provided and solder together as per the image below.

Fold the end of the bracket top with the rivets in up against the end of the angle. Fold the other end so that it is perpendicular to the other end of the angle. See image below.

The bracket slots onto the axleguard and up through the chassis top plate. The tab that locates into the top plate should protrude through it. Solder to the top plate. I found this easiest to do by soldering from the top of the top plate rather than the underneath which is quite busy with stuff.

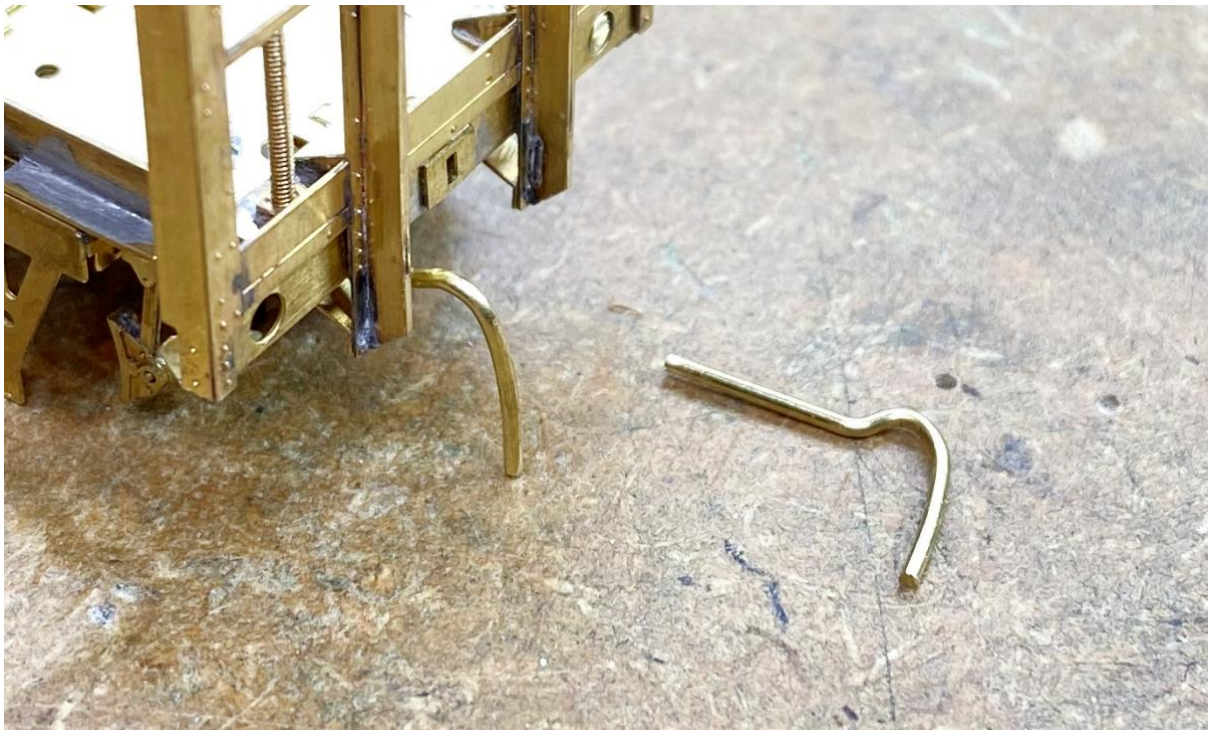


Repeat for the other three. Don’t solder the brackets to the end stanchions.



Vacuum Pipes and Dummy Vacuum Pipe Couplings

You can buy cast vacuum pipes from the likes of Lanarkshire Models, but I find them a bit fragile and didn't have a great survival rate. I now use 0.8mm brass wire for my vacuum pipe. There isn't any texture to the pipes but after trying to make properly scale vacuum pipes by winding 0.1mm wire around a length of 0.7mm wire I came to the conclusion that it wasn't really worth it and that the cast ones were also vastly over scale. The bracket on the inside of the headstock can be used to locate a piece of wire for the pipe. This may need moving over a little as it's a bit tight against the end stanchion.



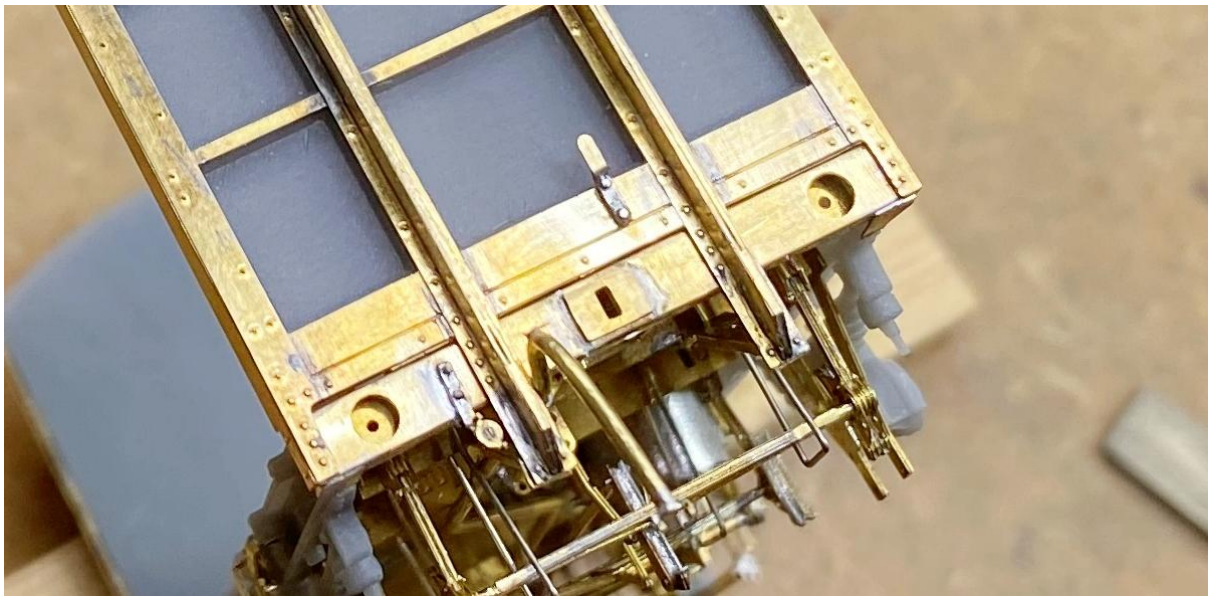
There are two dummy vacuum pipe brackets (27) included. These are quite distinctive and come in two parts. There is a bracket with a pair of holes in which attaches to the solebar and a round head that has 'tails' that fold up. I find it easiest to assemble the two with the tail still attached to the fret.

Before assembling the bracket use one of them to drill the missing pair of holes in one headstock. The holes should be just outside the end stanchion on the left hand side of the headstock as you look at it.

Also use the bracket to drill a couple of 0.3mm holes in a scrap piece of wood or mdf. Use this jig to solder a couple of pieces of 0.31mm wire to the holes in the bracket. The wire that protrudes can be filed back to represent bolt heads, leaving the other side long enough to locate on the headstock. Press out the rivet on the bracket and twist the base of the bracket through 90° so that the interface with the head faces away from the 'bolt heads'.

This bracket can then be soldered to the back of the head (the side with no half etched areas). It is easiest to do this while the head is still attached to the fret and there is a small slot to help provide a positive location. Drill couple of holes into a scrap piece of wood so you can fold out the tails on the head and fit these tails into the holes. This saves you having to fold them up afterwards and if you use enough solder will reinforce the fold lines for the tails.

These can then be soldered in place on the headstock using 0.31mm wire soldered to the bracket part to align them.



Brake Lever Guards

Next make up the brake lever guards and brackets. If you are using the 3D printed solebars you will not need the bracket part (19) as this is on the printed solebar but you will need to solder in place the wire that connects the top of the guard to the bracket.

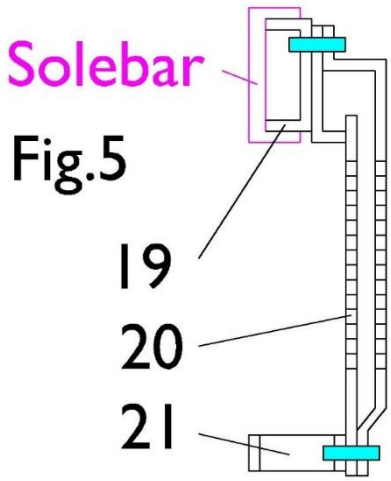
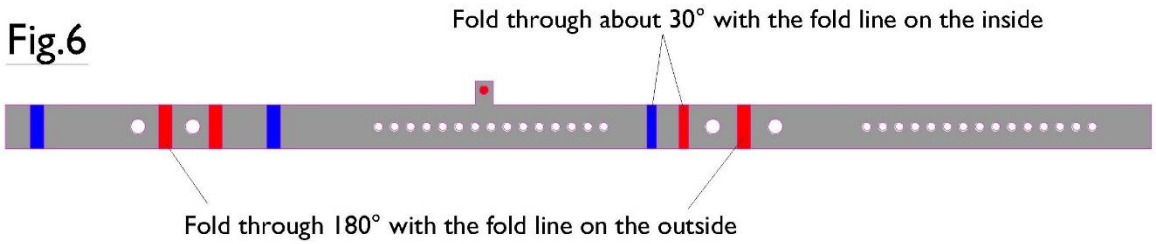


Fig.5

Make sure that the holes in the brake lever guard brackets (19), brake lever guards (20) and the lever guard stays (21) can accept 0.31mm wire and remove from the fret. Fold the lever guard along with the lever guard bracket referring to Fig.5 and Fig.6 below. On the guard there are a couple of folds through 180° with the fold line on the outside and a couple through about 30° with the fold line on the inside.

Fig.6 below gives the location of these folds. Everything else is through 90° with the fold line on the inside. I generally start with the 30° folds and then leave the 180° ones until last.



Leave the stay flat for the moment.

Use a piece of 0.31mm wire through the top hole in the guard to pin the bracket and guard together. The hole in the bracket is not central. The bracket should be arranged so the hole is towards the top. The bracket will then roughly line up with the top of the guard. See image below. When happy solder together and trim the wire to represent a bolt. If using the 3D printed solebars just solder a piece of wire through the top holes and makes sure the guard is soldered together so it doesn't come apart.

Use the stay to drill a pair of holes near the edge of a piece of scrap wood or mdf. See image below. Use a couple of lengths of 0.31mm wire to pin the stay to the piece of wood. It should be arranged the opposite to the picture below, with the visible fold line on the stay to the left. This is important.

Place the lever guard over the wire on the right hand side. This should be done so the bracket is facing downwards. This will be a mirror of the image below. Get the guard as perpendicular to the stay as possible and solder the guard to the stay and wire and solder the other wire to the stay as well.

Trim the visible wires to represent bolts and carefully remove from the jig. Repeat for the other lever guard.

Fold the stay so the middle is at about a 45° angle to the ends.

If using the etched solebars fit the brake lever guards onto the underframe. The bracket locates into slots in the solebar and the stay locates into the holes marked with a * on the inside of the axleguard. Tweak the angle of the stay if necessary so that the guard is vertical when the wagon is placed on its axleguards. Solder the stay to the axleguard and the bracket to the top of the solebar. Trim the wire flush on the back of the axleguard and trim to resemble a bolt on the back of the joint between guard and stay. Repeat for the other side.

If using the 3D printed solebars they will need fitting first.

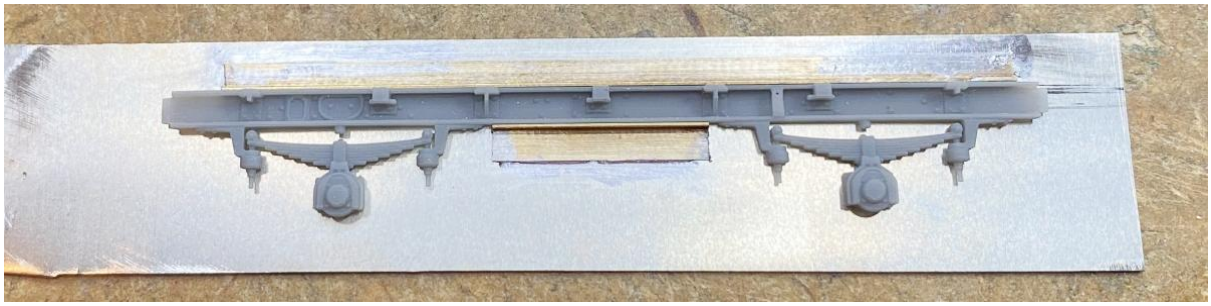
3D Printed Springs and Solebars

If you are using the 3D printed solebars now is the time the time to fit them. If using the etched solebars you can now fit the 3D printed springs and axleboxes. In both cases you will need to make sure the remnants of the supports are cleaned up using fine files or wet and dry paper.

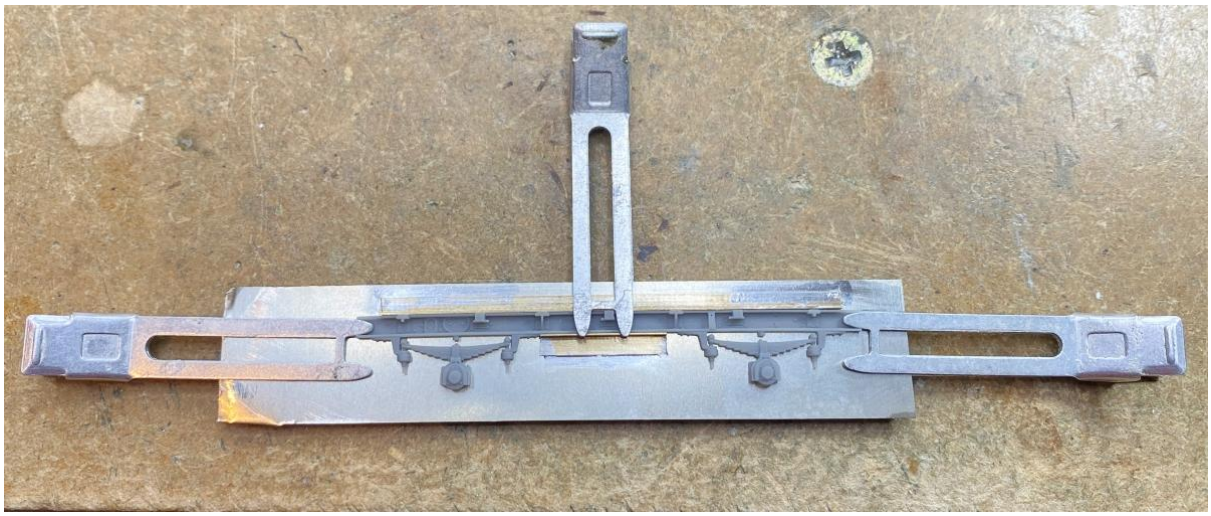
If using the individual springs and axleboxes I found it helpful to make up something to help locate them in place. I cut a length of 2mm OD tube so that it projected 0.5mm beyond each axleguard 26mm total length). I then soldered a couple of full thickness axle washers (11) to the tube so that they sat tightly up against the inside of the axleguards. See image below.

You can then use this to help locate the slot on the back of the axleboxes in place meaning you're not having to check. I've used both 5 minute epoxy and superglue for this job but superglue requires getting it right first time. You shouldn't need to adjust the slot in the back of the axleboxes but if you find it's a bit tight when you fit the spring carriers and axles the material can be pared away with a sharp scalpel blade.

If you are using the 3D printed solebars clean up the remnants of the printing supports using wet and dry paper and check the fit on the underframe. You may find the ends need a little adjustment. You may also find that they have a bow along their length. This is a result of the printing process but the parts can be rest in water that is close to boiling point. In order to hold the parst whilst doing this I made up a jig from a piece of spare nickel silver and some 3mm x 1mm brass angle as per the image below.



The solebar can be clamped to the jig using aluminium soldering clamps and the part submerged in water that has been boiled in a kettle. Give the water a minute to cool slightly in the kettle after boiling. If it is too hot it may distort the parts.



Fit the solebars to the underframe using 5 minute epoxy or superglue making sure they go on the correct side. There are rivets for the vacuum cylinder bracket on one of them.

Buffers

Clean up and fit the buffer housings. If using the printed housings, they will need a 1.45mm drill running through them for metal buffer heads and springs. Make sure they sit nice and flat against the headstock. Glue in place. I've used both 5 minute epoxy and superglue for this job. Superglue works fine, especially with the spigot locating into the headstock, but you'll need to get it right first time.

Remember when painting that the shanks of Oleo buffers should be shiny metal.

Brake Levers

Make sure the holes in the brake levers (22) and the cams can accept 0.8mm wire. The levers and cams can then be removed from the fret but note that the connecting tab between the non-Morton lever and backing cam should be left intact. Once removed from the fret the connecting tab between the cam and the non-Morton brake lever can be folded through 180° with the fold line on the outside. Solder a short length of 0.8mm wire through the hole in the Morton cam brake lever. This will locate into the top hole on the vee with a pair of holes in. I use a hole drilled into a piece of scrap wood to aid doing this. Once soldered in place trim the wire and file so the end is flat.

The brake levers then need to be bent up as per the prototype clearing the spring hangers and then cranked for the handle. I occasionally get asked for jigs to help with this but, despite being a big fan of jigs, in this instance I believe that it would actually take longer with a jig. This is because you'd spend an age trying to get the brake lever to exactly match the jig instead of just getting on with the

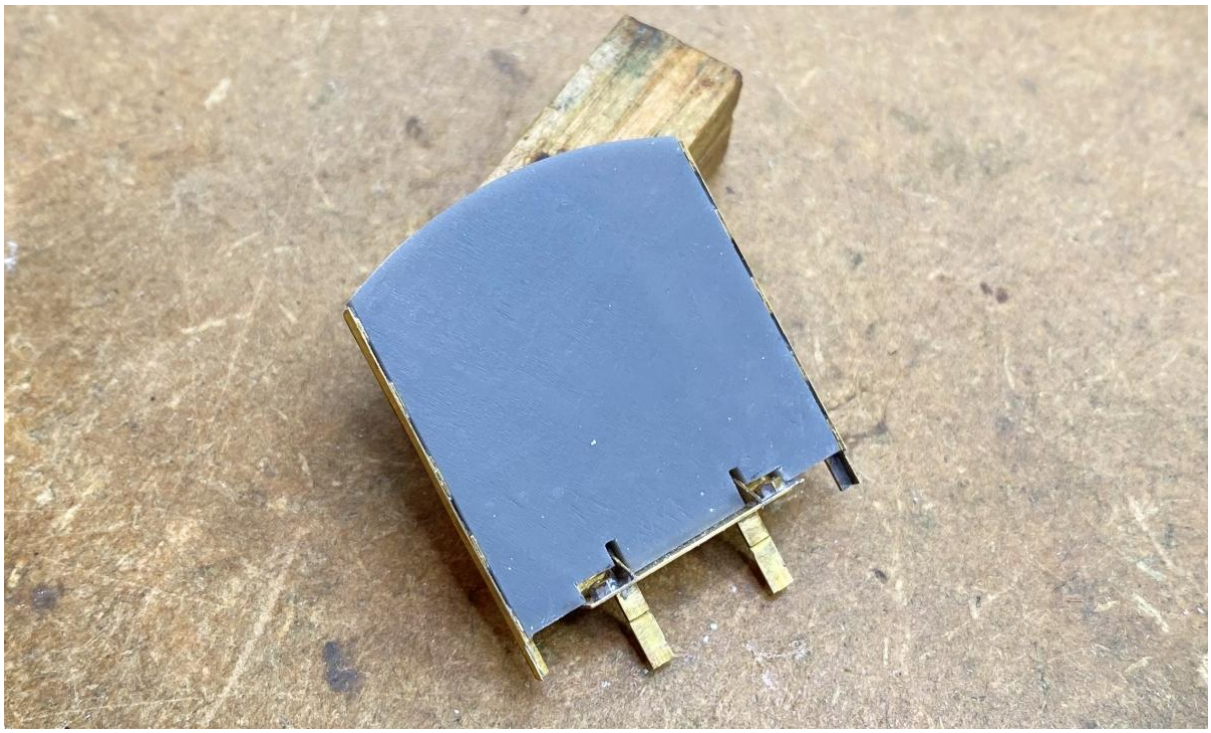
business of folding it up. There should be a bend about 1.5mm in from the point where it meets the vee and enough space to clear the spring hanger.

Place the unbent brake lever on the model and mark where it will clear the spring hanger. Bend at this point and near the vee. Check on the model and adjust until you are happy with the shape then do the handle. Once you are happy the brake levers can be soldered in place. If using the Morton brake set, solder the Morton cam into place in the lower hole on the appropriate vee. The images below should give you a good idea of how they work.

3D Printed Inner Ends

The ends on the Izal Palvan were quite distinctive with the plywood sheeting set back by a wooden frame that had tapered horizontal pieces so water wouldn't collect. A 3D printed inner end has been done that captures this characteristic which just wouldn't be right done with etched brass.

Use a file to clean up the remnants of the printing supports and dress the ends until they sit properly in the etched end framing. I don't mess around and use a quite a heavy metal file for this work (see above image). You may need to take some material off the top and the sides. The inner ends in the images feature a couple of notches to clear where the fixing nuts were been soldered in place. This isn't necessary on your version of the kit as the fixing holes have been moved out the way.



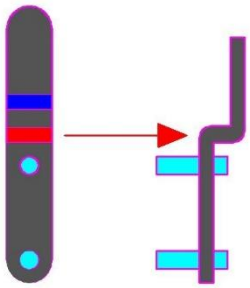
Once you are happy with the fit at the sides and bottom, the printed inner end can be glued in place using either superglue or 5 minute epoxy. Once the glue has gone off go back with the file and make sure the profile at the top matches the etched end.

Lamp Irons

Lamp irons (36) were fitted to the ends of the wagons. There are a pair of holes etched in the metal end framing at each end. Use these holes to drill 0.3mm holes through the 3D printed resin inner ends.

There are two types of etched lamp irons included, one with holes for pinning in place using 0.31mm wire or the other with half etched holes that can be pressed out to form bolt heads and glued in place. I dislike the latter as the join is weak and can easily be broken but others do so they are included.

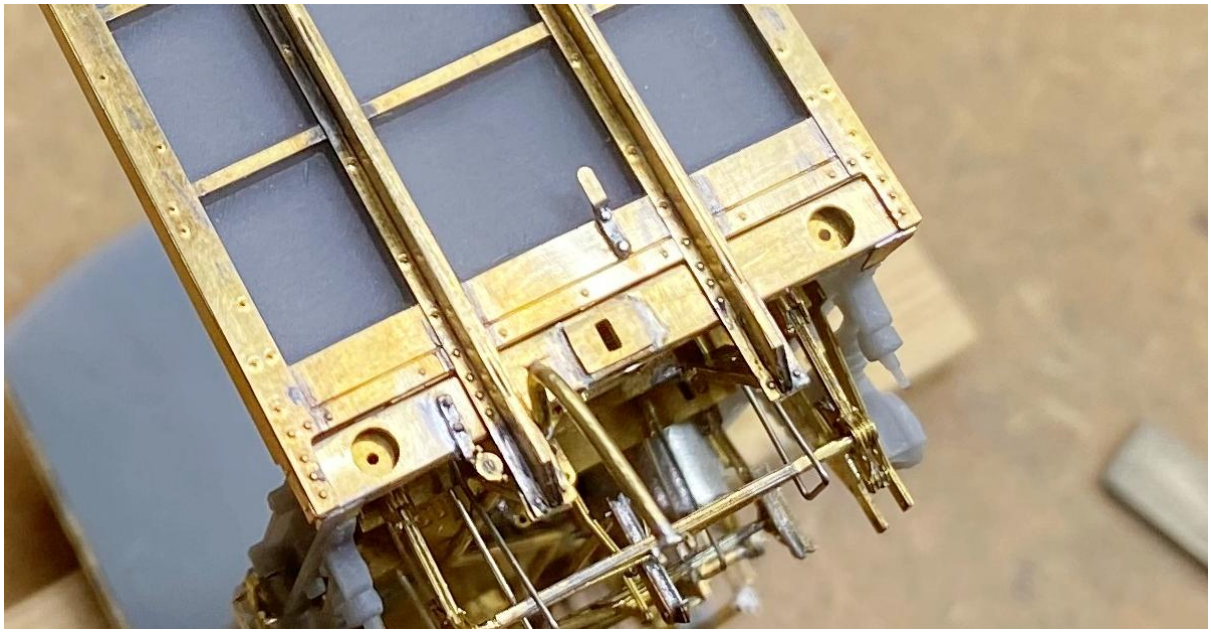
Fig. 7



36

If pinning them in place, use one of the lamp irons whilst still attached to the fret to drill a pair of holes into a piece of scrap wood or mdf. Insert two short lengths of 0.31mm wire into the two holes. Check that the holes on the other lamp irons you are using will accept 0.31mm wire then remove from the fret and fold up as per Fig. 7. Place the lamp irons onto the two pieces of wire and then solder to the wire and reinforce the fold lines at the same time. File the visible bits of the wire back to resemble bolt head. The lamp irons can then be glued in place on the ends with the wire fitting into the holes.

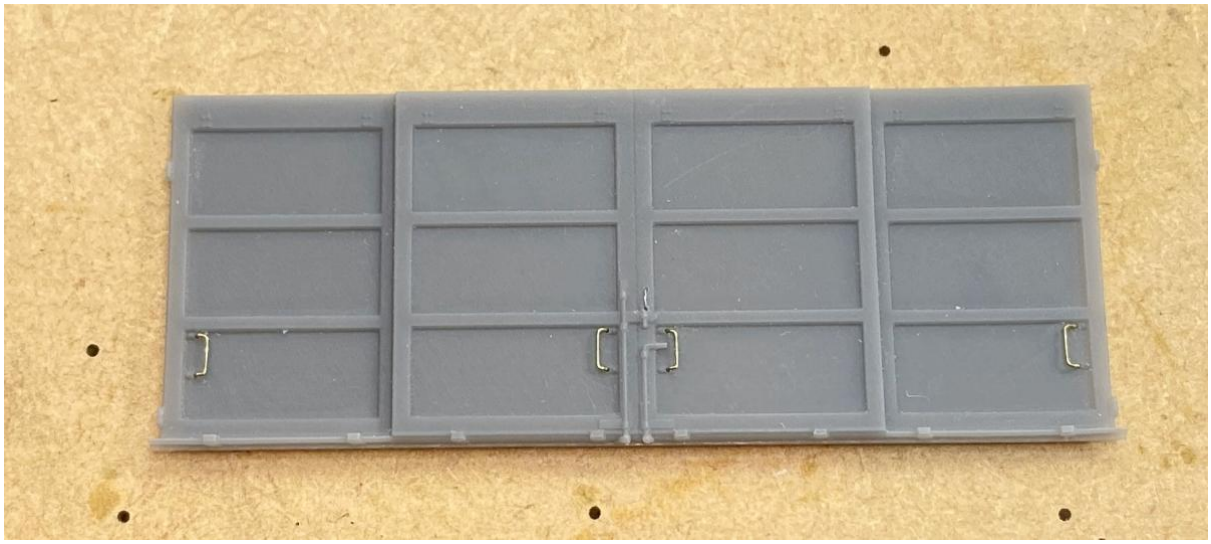
If using the other type, press out the half etched holes then do that and fold up as per Fig.7 and fix in place.



3D Printed Sides

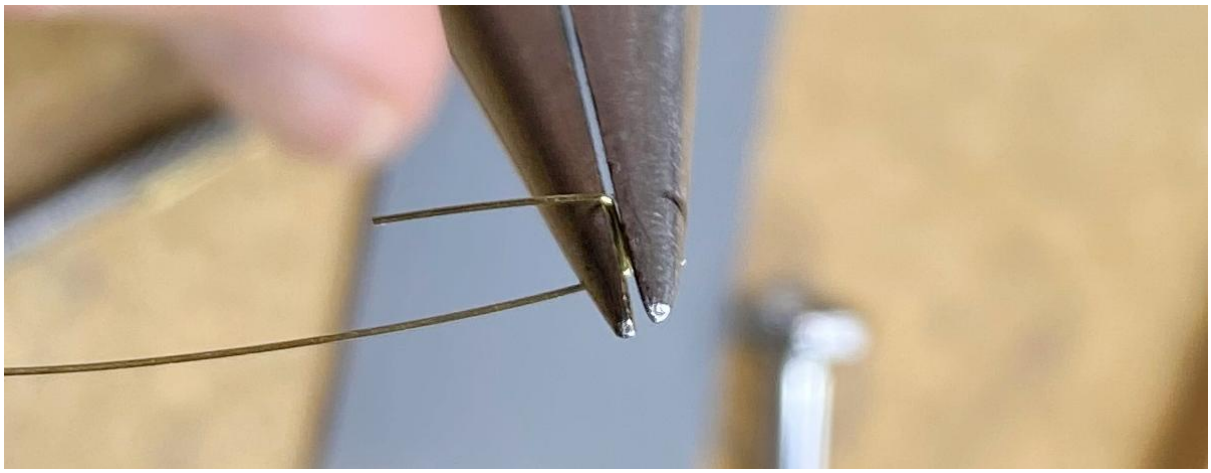
Firstly, make sure that the ends are fitted to the body. Use a file to clean up the remnants of the printing supports and dress the sides until they sit properly between the etched end framing. There are steps on the inside of the sides at the end and bottom. You will need to clear these out with a file. As a rough guide to positioning, the top of the door runner at the bottom should be level with the top of the headstock. You may need to file flush the wire that pins the brake lever guard to the bracket on the solebar to get it to sit properly.

There are four handles on each side that will need forming from 0.31mm wire and fitting. The part of the handle that attaches to the side has been printed and there are holes in the artwork for the wire. These are too small to print cleanly and will appear as dimples. They will need drilling out 0.3mm to take the wire handles. You may find it easier to find the dimples on the back. The position of the handles can be seen in the image below. Scroll down for how to form them.

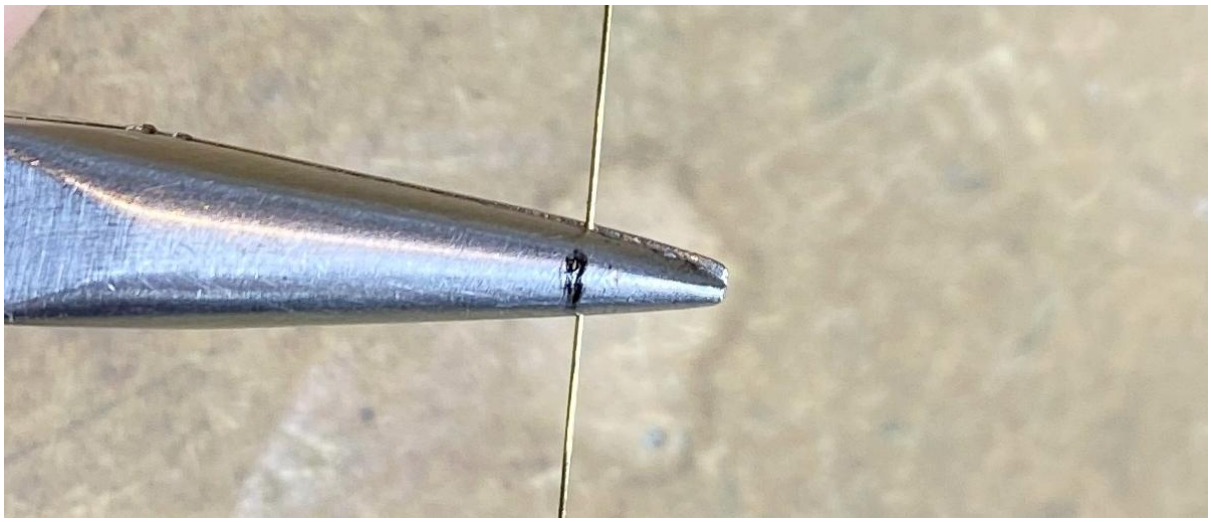


Also note in the image above a short chain above the locking clasp in the middle that fixes the door pin to the side. This is optional. I made mine from a short piece of 41swg soft brass wire folded double, the loose ends soldered together and then twisted in a pin vice to resemble chain. Use a little solder along the whole chain to keep everything together. I fitted this length of chain into two 0.3mm holes drilled in the sides.

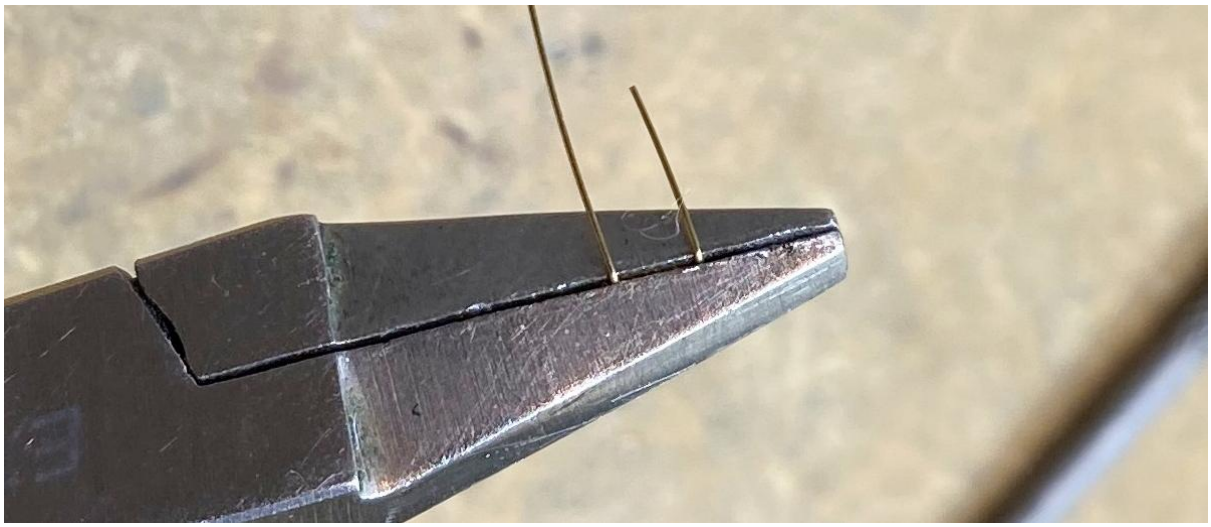
To form the handles, bend a piece of 0.31mm wire into a U shape using a pair of tapered pliers. The inside of the U should be a little less than 3mm. Check on the model and tweak as necessary to get a good fit into the holes.



Once you are happy, mark the pliers so you can easily repeat the process for the other 7.



Once bent, clamp the U shaped wire in a pair of pliers and form another pair of bends. There should be about 1.5mm of wire before theses second bends. The handle can then be glued in place on the sides. I used a scrap piece of 1mm plasticard to space the handle from the sides and glued them in place with superglue at the point where the tails on the handle protrude through the back of the sides.

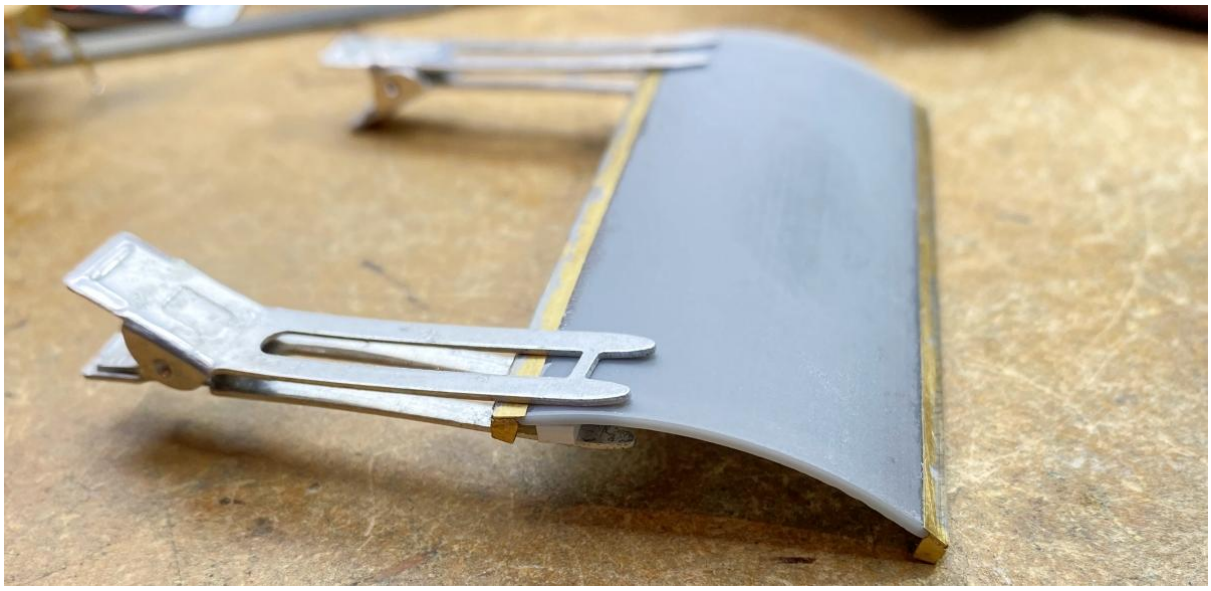


Roof

Use a file or wet and dry paper to clean up the remnants of the printing supports on the roof. Pay particular attention to the indie of the curve at the ends. Check the fit between the ends. You might find that the recess on the roof at the ends isn't quite long enough and need to fettle things to fit. I found this easiest to do by chamfering the step on the underside of the ends with a scalpel and then chamfering the inside of the printed inner ends.

Once happy with the fit of the roof the door runner covers (38) need to be constructed. There are various half etched rivets that need pushing out on the back and a length of 0.31mm wire needs soldering in the slot. I did this before folding it up but with hindsight, it might be easier to make the long fold on the back first before pressing out the rivets and soldering in the wire. The angle of the bend needs to match the fold out ends. I have done a door runner angle jig (39) to help get this angle right when folding. Once happy with the bend and the rivets have been pressed out fold out the ends and solder to the cover.

I fitted the door runner covers using 5 minute epoxy, doing one at a time and using aluminium soldering claps to help keep it in position. There is a representation of the top of the angle at the ends on the roof and the door runner covers should go up against this. Check the angle the door runner cover makes with the roof before the glue goes off completely. It should be a continuation of the roof at the ends. And the sides of the door runner cover should be vertical when the roof is fitted on the wagon. I used a couple of elastic bands to hold the sides in position so I could check everything as I glued the door runner covers on.



There is no representation of the rain strip on the roof included. I ran out of space. Use lengths of 0.25mm x 1mm rectangular plastic rod to represent them. Glue them in place along the inner edge of the door runner covers.

Finishing Touches

Coupling Hooks

Fold up and fit the drawbar hooks (28). These should be folded double with the fold line on the outside and soldered together. Use a file to dress the edges around the hook and get it to look a bit more like a casting. Make sure the hole at the opposite end to the hook can accept 0.5mm wire and fit to the underframe along with screw couplings.

The coupling hooks can be retained by using short lengths of 0.5mm wire through the holes in the buffer spring and drawbar brackets at the ends of the underframe.

Buffer Springing Retainers

Provision has been made for using steel wire to spring the buffers. I find the majority of coil springs supplied with buffer heads to be too strong to be of practical much use, so my preferred method of springing buffers is to use guitar wire leaf springs behind the headstock rather than coil springs in the buffer housing. This chassis includes the set up as part of it. Buffer springing retainers (29a) are fitted to the buffer shanks and then a 25mm length of guitar wire spring is fed through the holes and slots next to the headstock. The wire bears on the buffer retainers. Fit a buffer springing washer (29b) between the retainer and the headstock to preload the spring. See Fig. 7 below.

To fit the buffer retainers, remove from the fret and check the fit of the buffer head shanks in the holes; adjust if necessary. Fold the buffer retainer into a C shape leaving the top unfolded for the moment. Place the buffer head shank through the buffer housing on the wagon and then slide the retainer onto the shank though the holes. Hold the retainer bottom with a pair of self closing tweezers and solder in place so that the head of the buffer should be 6mm from the face of the headstock. Use very little flux or you may encounter problems with the shank rusting. Obviously, you will need to arrange things so that the buffer head is the correct distance from the headstock, in this case a scale 1' 8½" or 6.85mm. Once the retainer is firmly soldered in place you can fold the top over. Note that there is a correct side to fit the buffer retainers. The retainer bottom comes with a wedge on one side which should face towards the solebars. This will prevent the buffer retainer from rotating sufficiently for the wire to become disengaged.

The gauge of the spring wire necessary may vary depending on your train lengths but 0.011" is a good place to start. It maybe that you personally want a harder or softer wire in which case simply replace with a heavier or lighter gauge of guitar wire. Be aware though that the spring rate will change rapidly with the change in gauge. If you fit something like 0.008" wire then there maybe virtually no springing effect, conversely if you fitted 0.015" you may find that you might as well have made the buffers rigid. Guitar wire of suitable gauges can be had in single strings from good music shops.

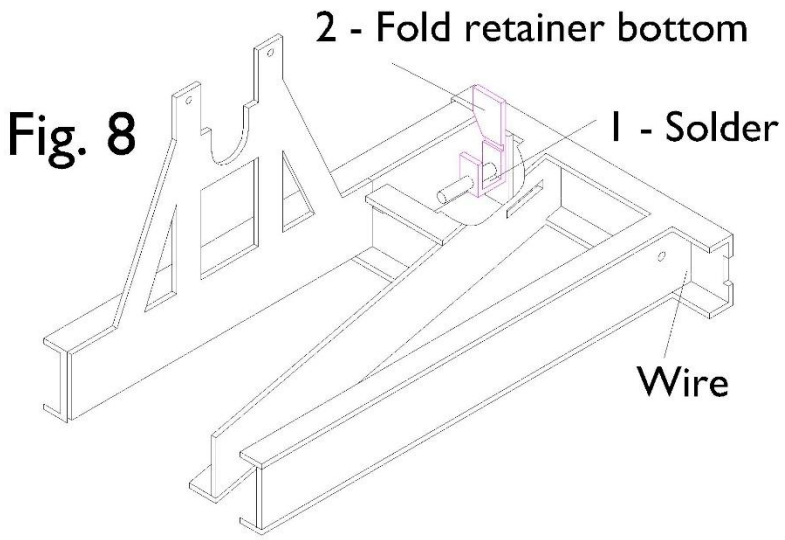


Fig. 8

Ballast

I aim for 45g unsprung weight for my wagons. That means the weight of everything apart from spring carriers and wheels which get fitted after painting. Lead flashing can be used for ballast. The obvious place for this to go is inside the body. I have had issues with lead sheet oxidising and expanding before (even without, or at least without the knowledge of, the presence of PVA glue) so now prime my ballast before fitting.

Thoughts on Painting

If you have followed the instructions, you will now have 6 separate parts that make up the wagon. You could just glue everything together, but you may find it tricky neatly painting the three colours required. I'm a bit of a fan of breaking things down where possible (and it isn't always possible or practical) to make painting easier. You could glue the body together and keep the underframe separate using the bolts to secure the two. Be warned though that if you have contrived a nice close fit between parts once you have added paint, however thinly, the parts won't fit anymore, and paint will get scraped off when trying to reassemble things. As faffy as it sounds, I will try painting the parts separately and then assemble afterwards, perhaps opening out the holes for the bolts enough to avoid paint being scraped off the headstock.

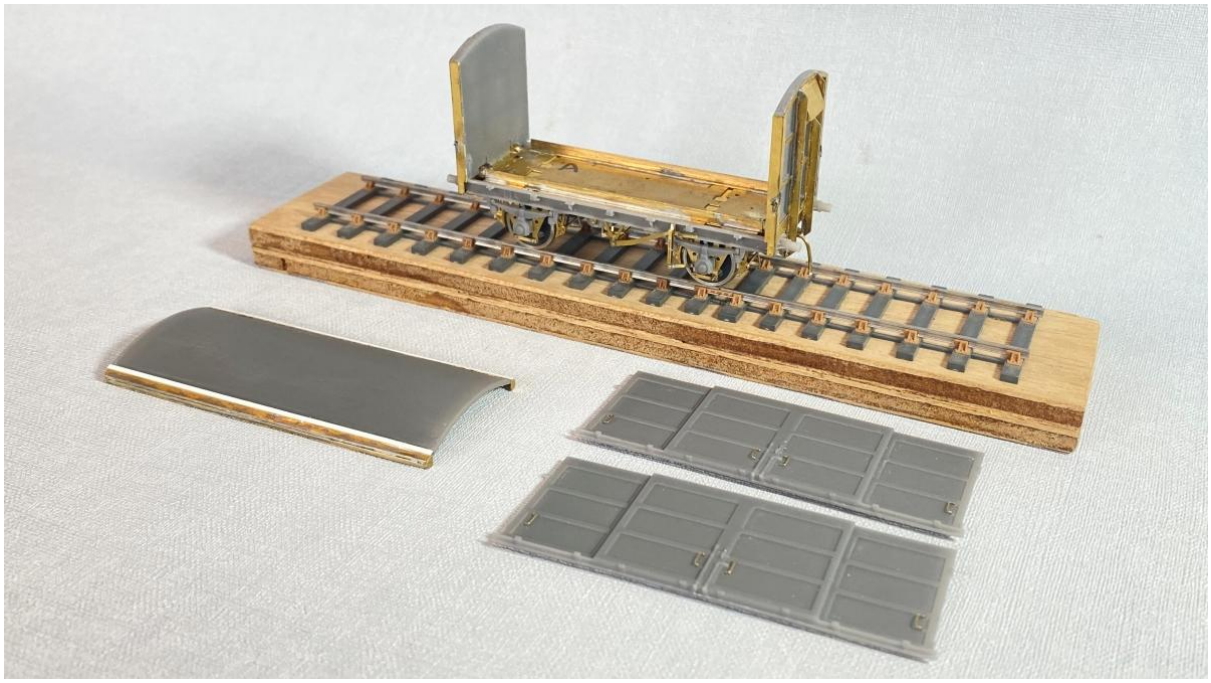
With the mixed media nature of the kit, you won't be able to use an etched primer as the prints won't like it. I would recommend using Halfords grey primer in a tin (not the rattle cans) to prime the model using an airbrush. This goes on with cellulose thinners and I usually mix the primer 1:3 with thinners. This primer doesn't affect the prints (it's acrylic and the cellulose thinners evaporate before they do any damage) and gives a lovely thin coat.

Colours, as far as I can make out, should be as follows:

- Black: Underframe, solebars and headstocks. End stanchions and corner framing from the top of the headstock downwards.
- Green: Sides, ends, end stanchions and corner ironwork from the top of the headstock upwards. The vertical parts of the door runner covers and roof ends.
- Grey: The top of the roof, basically everything on the roof and door runner covers that isn't vertical.

Having the underframe separate makes some sense as it's all black. The sides are all green and the bottom of the ends stanchions and corner ironwork will be easier to paint black with them being away from the headstocks and annoying things like buffers which get in the way.

Of course, all this advice may get changed once I've actually painted mine!



The Cambridge Custom Transfers waterslide transfers will need a really glossy surface to go on properly. This can be knocked back with matt afterwards. I've used Vallejo polyurethane varnishes successfully in the past for this. I generally apply the gloss (26.650) for transfers using a good quality flat soft brush with the varnish mixed 3:2 with Airbrush Thinners (71.261). I airbrush the matt (26.651) finishing coat mixing it 1:1 with Airbrush Thinners (71.261).

Like all vans these don't seem to have been that well cared for and so will need some weathering to knock back a very clean model. There are lots of different ways to do weathering. I would like to put in a big plug for a gentleman called Mike Confalone who does some of the most realistic weathering I have ever seen. He has a large proto-freelance HO layout called the Allagash set in Maine in the mid-1980s and uses artists oil paint and a product called Pan Pastels for weathering. I have tried his techniques and have been really happy with the results when using them. Pan Pastels are finely ground artists pastels and have a bit more to them than powders, not being a completely dry medium. They are applied using a good quality flat soft brush and are available in proper artists colours. Raw Umber (780.5) is a good general grime colour and Raw Umber Tint (780.8) is also useful for highlights. Burnt Sienna Shade (740.3) is good for representing rusting around bits of the underframe.

If you are interested, then do an internet search for Mike Confalone Weathering. He has done a couple of weathering DVD downloads for Trainmasters TV including one on weathering freight cars. They are all big American bogie wagons, but the techniques are still applicable to our British steam era wagon.

Justin Newitt - November 2022

Suppliers List

Rumney Models (screw couplings)
www.rumneymodels.co.uk

Eileen's Emporium (brass wire, tube, nuts and bolts)
Unit 19.12 Highnam Business Centre
Newent Road
Gloucester
GL2 8DN
www.eileensemporium.com

Lanarkshire Models and Supplies (cast buffers)
9 Nairn Avenue
Blantyre
G72 9NF
www.lanarkshiremodels.com

MJT (buffer heads)
Dart Castings
17 Hurst Close
Staplehurst
Tonbridge
Kent
TN12 0BX
www.dartcastings.co.uk

Wizard Models (Oleo buffer heads)
PO Box 70
Barton upon Humber
DN18 5XY
www.wizardmodels.ltd

Alan Gibson Workshop (wheels and bearings)
PO Box 597
Oldham
OL1 9FQ
www.alangibsonworkshop.com

Scalefour Society and EM Gauge Society Stores (Exactoscale wheels and bearings)
www.scalefour.org
www.emgs.org

Cambridge Custom Transfers (transfers)
6 Roseland Gardens
Bodmin
PL31 2EY
www.cctrans.org.uk