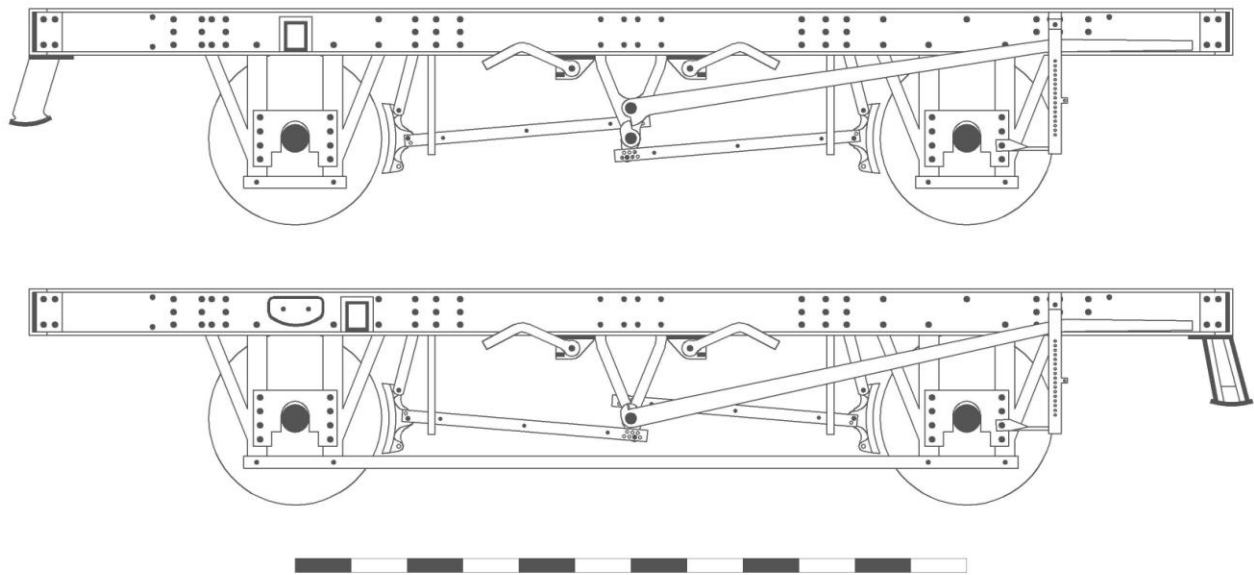


Rumney Models – RCH Morton 21T Hopper Wagon Chassis Instructions

Notes

These instructions cover the Rumney Models chassis kit B.29. Note that this chassis is suitable for EM/P4 only and will require a small degree of modification if building in EM.

This kit is designed for 21T hoppers which were fitted with RCH axleguards and Morton brakegear. These cover a range of Private Owner hoppers. The kit will provide a complete sprung chassis with a prototypically open underframe. The chassis should prove ideal for Dave Bradwell's 21T NCB hopper body.



The steel bodied 21T coal hopper wagon had its origins in the North East of England as an updated version of the NER wooden hopper. The LNER built versions had the NER clasp brake with a distinctive tall lever guard which went up above the chassis. After Nationalisation BR continued to build examples, initially with the NER brake, but then with the standard RCH lifting link brakegear. Some later wagons were vacuum braked and a small number were through vacuum piped. The 21T hopper family also included a large number of wagons built for private owners including the NCB. The majority of these were fitted with Morton brakegear instead of the RCH lifting link type. A trawl through Paul Bartlett's website would suggest that there may have been some BR riveted hoppers built with the underframe depicted in this kit; there were certainly some in NCB use with the BR style of riveted body. The Parkside riveted body 21T hopper (kit PC80) would be a good starting point for these. Also some were later rebodied and Parkside's rebodied 21T hopper (kit PC78) would provide a good basis for these.

Construction Notes

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 all the photos are of chassis covered by this particular set of instructions but they will suitably illustrate the point in question.

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

Everyone has their own soldering methods. I use a temperature controlled soldering iron with predominantly 145° solder and predominantly La-Co paste flux.

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.

Technical

The suspension is individual springs made from 0.008" steel guitar wire soldered to the etched spring/bearing carriers. For this you will need a suitable flux. I use Carr's Black label. 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 W-Irons. Think of the 50g total as an ideal weight but also a maximum. There are notes on weighting the wagon at the end of the instructions.

The chassis is designed to produce a buffer centre height, when the kit is completed and weighted to 50g of 13.8mm when using Exactoscale wheels. The Exactoscale wheels are 13.4mm (3'1½") in diameter. Different makes of wheel may affect the ride height depending on their diameter.

Materials list

A few different sizes of wire are needed to build the chassis. Eileen's Emporium are good source for these and they do a mixed sizes pack if you don't want to buy large quantities.

0.31mm - Brakegear, tiebars, lever guards, hopper door mechanism
0.4mm - Brakegear
0.8mm - Main brake cross shaft
1.0mm - Alignment pins

You will also require items such as wheels, bearings, buffers, axleboxes and springs as well as couplings to complete.

For buffers I would recommend those produced by Lanarkshire Model Supplies. They are by far the best around and a lot of types are available pre-drilled for fitting sprung buffer heads. This service is particularly useful for heavy duty buffers with their large 2.5mm shanks. The quality is excellent. The majority of wagons that are covered by these chassis will have had 1'6" buffers. Lanarkshire Model Supplies do various suitable 2 rib and 4 rib examples. As always check your prototype. If you intend to make your buffers sprung then both MJT and Wizard models do turned heads.

These 21T hoppers had 7 leaf springs and could be seen with a variety of RCH and BR heavy duty oil axleboxes as well as roller bearings later in life. Rumney Models produces suitable 7 leaf spring castings with Roller Bearings (FE.07), BR 2 part (FN.07), BR 2 part square (FO.07), BR welded with horizontal lugs (FP.07), BR welded with vertical lugs (FQ.07) and RCH (RS.07) axleboxes.

Rumney models produces coupling hooks suitable for these (B.94) and also BR Instantan links (B.95A). These can be found in the 4mm section of the Rumney models website under Wagon Detailing.

Contact details for the above suppliers can be found at the end of these instructions.

Component List

- 1 - Chassis top plate
- 2 - Axleguard/Solebar assembly
- 3 - Riveted axlebox guide overlay

- 4 - Solebars overlays
- 5 - Solebar detailing

- 6 - Longitudinal bracing
- 7 - Short cross bracing
- 8 - Long end cross bracing
- 9 - Long centre cross bracing

- 10 - Main brakegear
- 11 - Brake shoe infill
- 12 - Push rod cranks
- 13 - Push rod safety loops

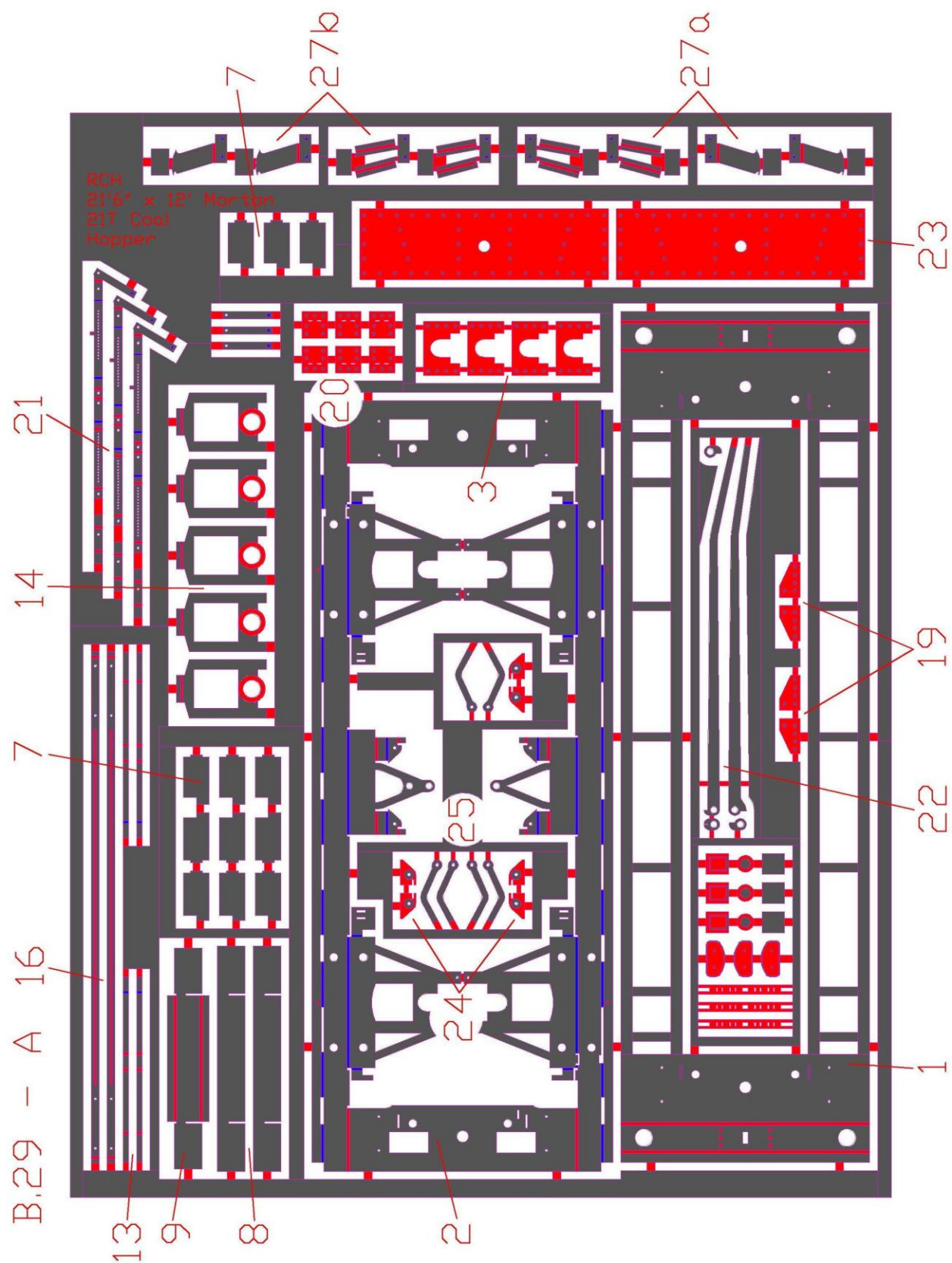
- 14 - Spring Carriers
- 15 - Bearing washers
- 16 - Tiebars
- 17 - Axle keeps

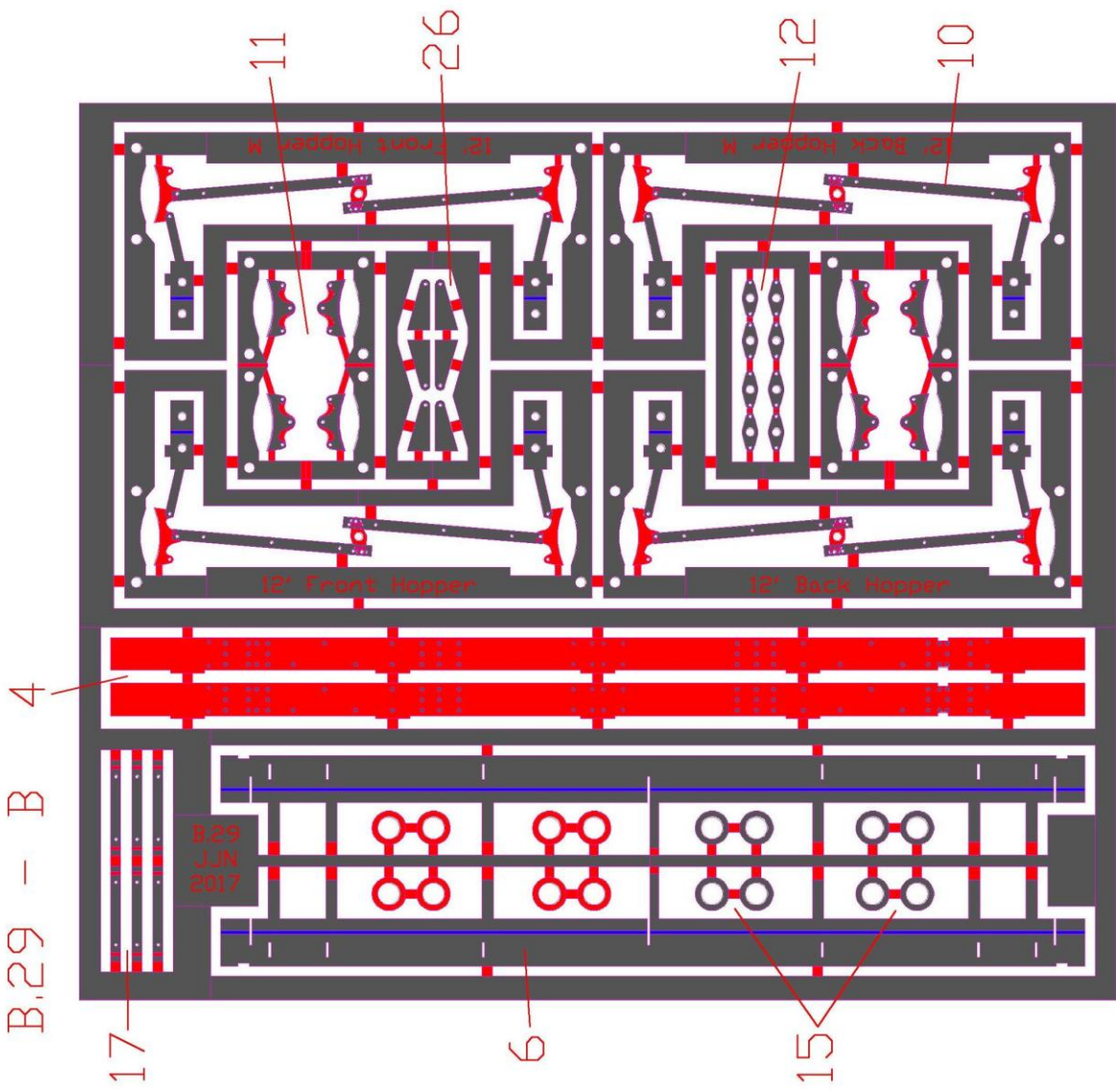
- 18 - Coupling pocket detail - Spares etch
- 19 - Solebar/Headstock corner plates
- 20 - Solebar/Headstock bracing

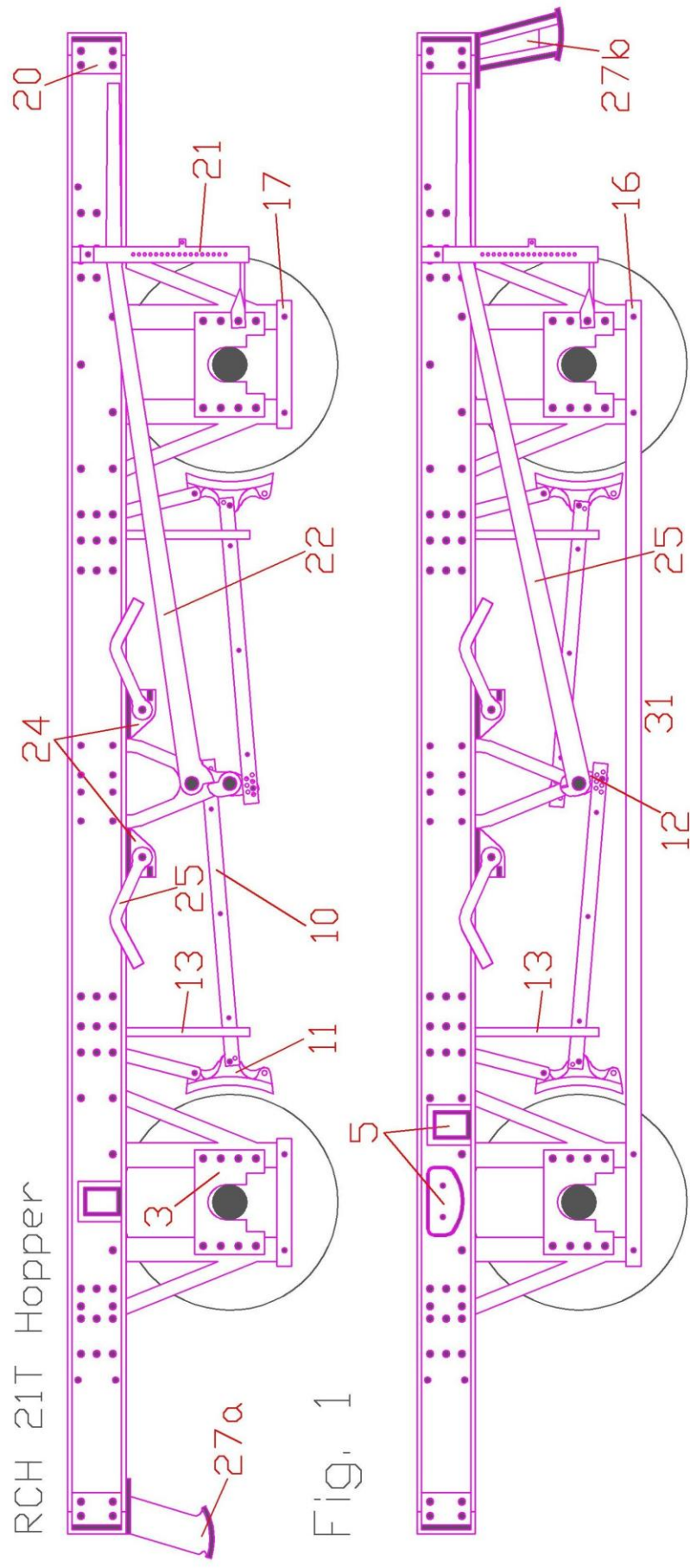
- 21 - Brake lever guard/bracket/stay
- 22 - Brake levers

- 23 - Chassis end overlays
- 24 - Hopper door handle bracket overlay
- 25 - Hopper door handles
- 26 - Handrail brackets

- 27a - Chassis steps (left handed)
- 27b - Chassis steps (right handed)







Construction

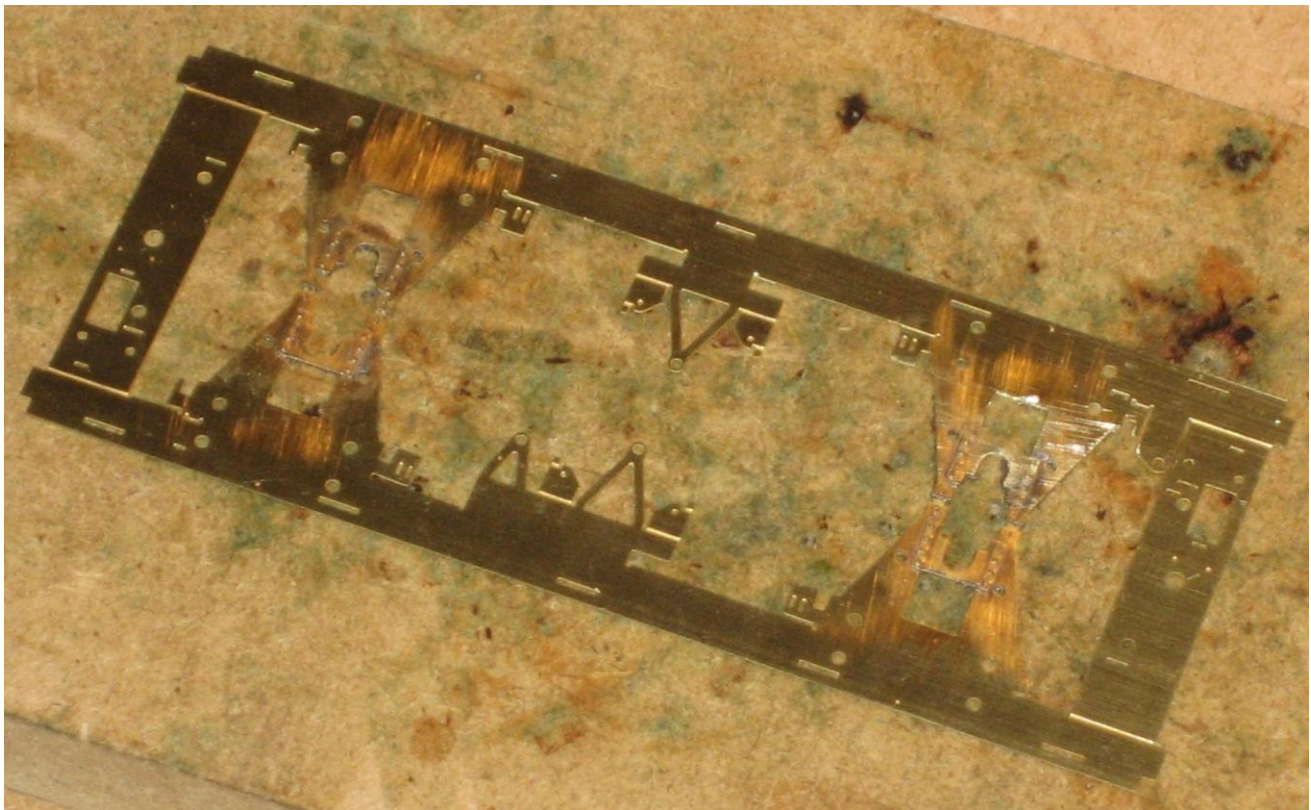
Main Chassis

Start with the chassis top plate (1). Firstly check the fit of your buffers in their holes in the headstocks. It may sound a bit odd starting with something that usually goes on at the end but it will be much easier to open out the holes now rather than later. Push out the half etched rivets on the headstocks. I find the easiest way to do this is with a drop head rivet press with the fret placed over one of those ubiquitous green cutting mats. Remove from the fret.

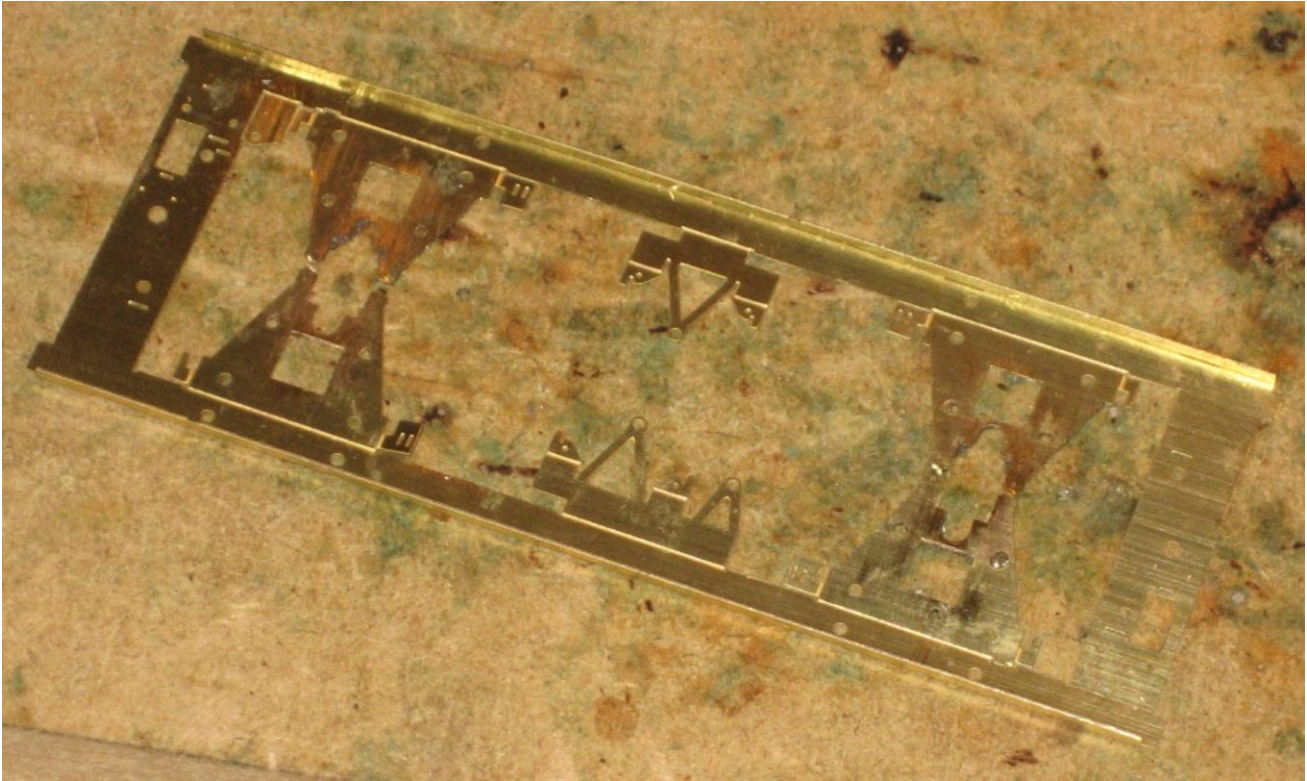
The headstocks need to be folded up. This is best done with the chassis top plate clamped to something or held in a vice to avoid distortion. There are two sets of fold lines as the headstocks need to be folded into a channel. Starting with the outermost end part of the chassis top plate fold through 90°. You can reinforce this fold line if you wish but I haven't found need to do this. Next fold the headstocks through 90° to form a channel. Do not reinforce with solder yet.

Check that all the holes in the in the vees on the axleguard/solebar assembly (2) will accept 0.8mm wire. Check that the small holes in the hopper door handle brackets will accept 0.31mm. Remove the detailing from the middle of the axleguard/solebar assembly and clean up connecting tags.

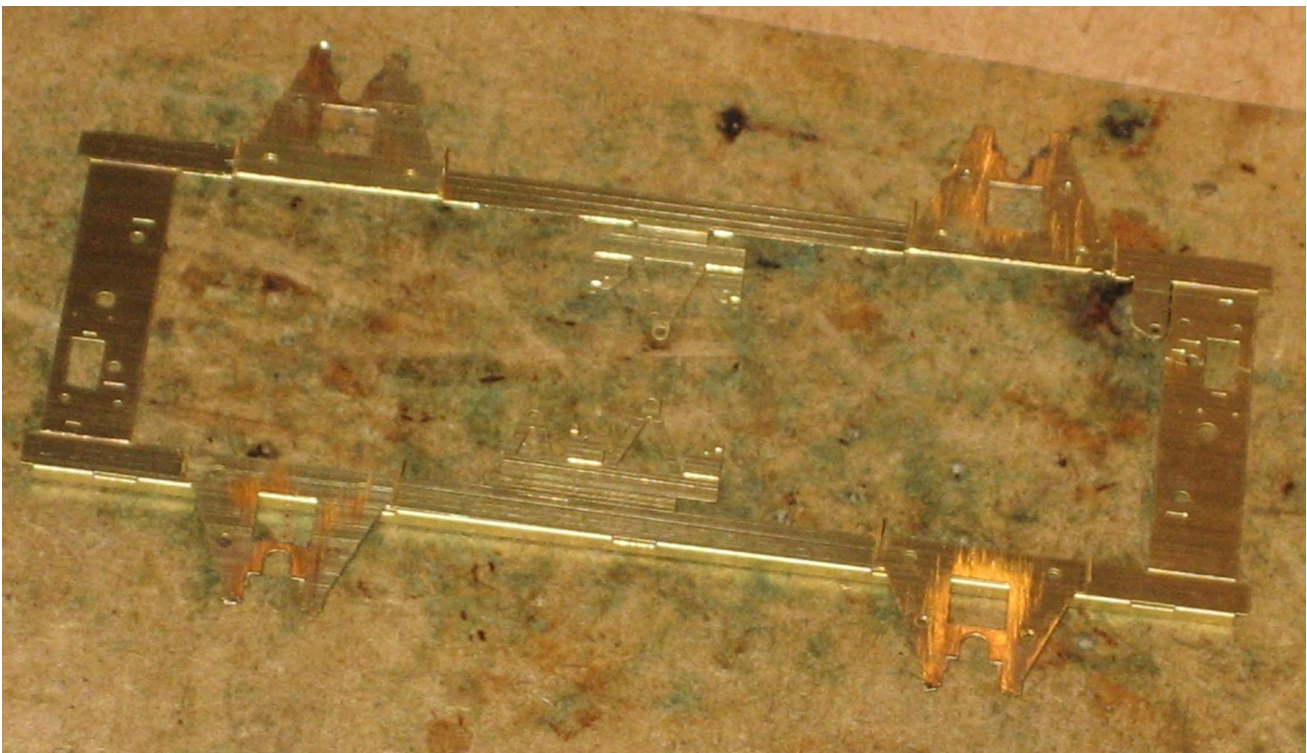
Etched riveted axlebox guide overlays (3) are included on the fret. Use the slots for the axles as a guide and solder in place. Make sure they will end up on the outside of the axleguard. See the photo below.



Fold up the outside edges of the axleguard/solebar assembly. These will form the bottom of the solebars. Also fold out the little suspension spring/brakegear supports.



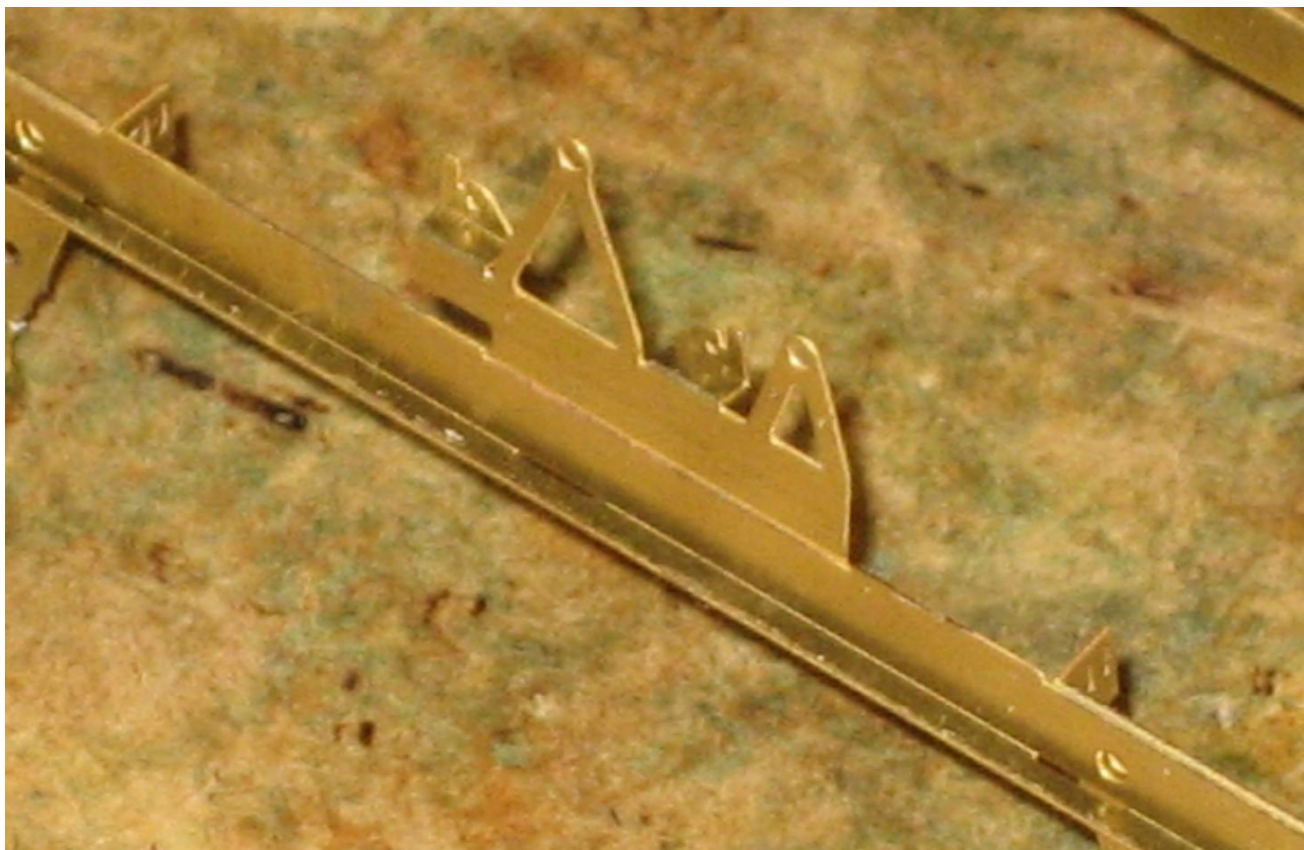
The axleguards need to be folded so that the fold line is through 180° with the fold line on the outside.



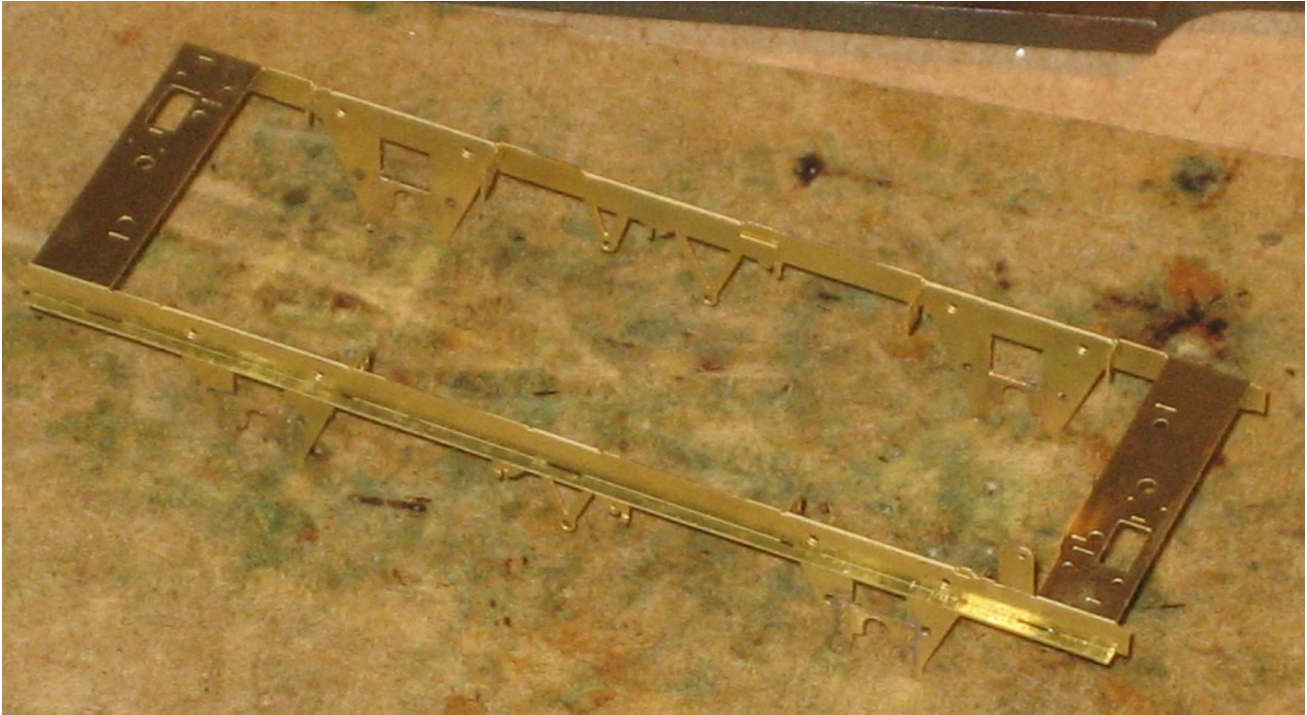
Fold the solebars at the points where they meet the spacers at the ends. It is critical that these folds are all at 90°. If you have a chassis that isn't square it is more than likely due to these folds being unequal.



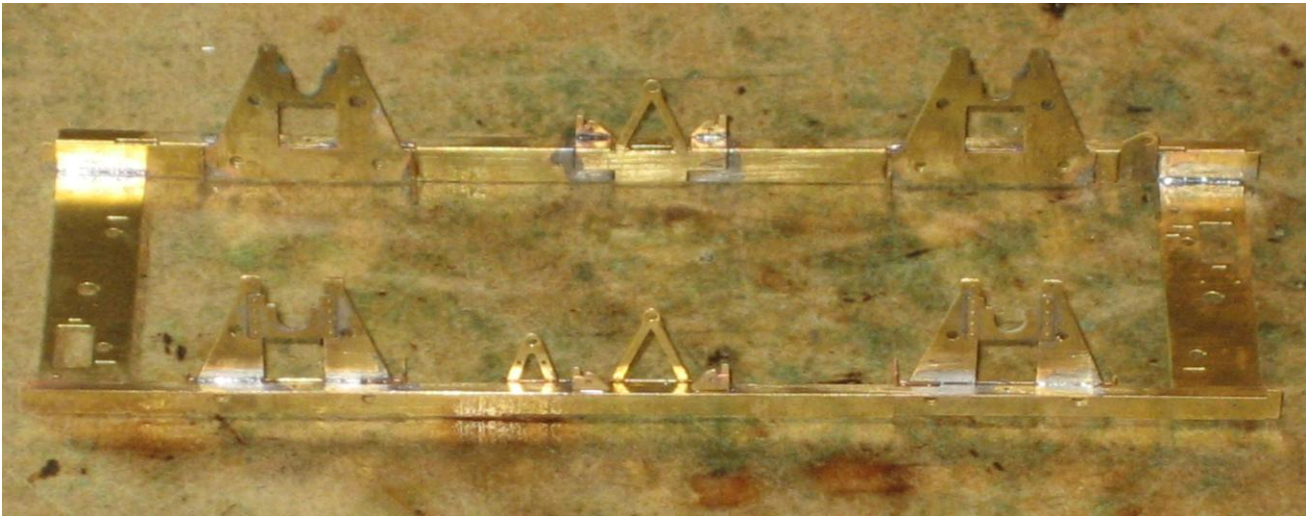
Fold up the hopper door handle brackets which can be found along with the vees on the centre of the solebar.



Fold over the vees/hopper door handle brackets in the same way as the axleguards.



Reinforce all the fold lines with solder and solder the axleguards and vees to the back of the solebar making sure there is no gap between them.



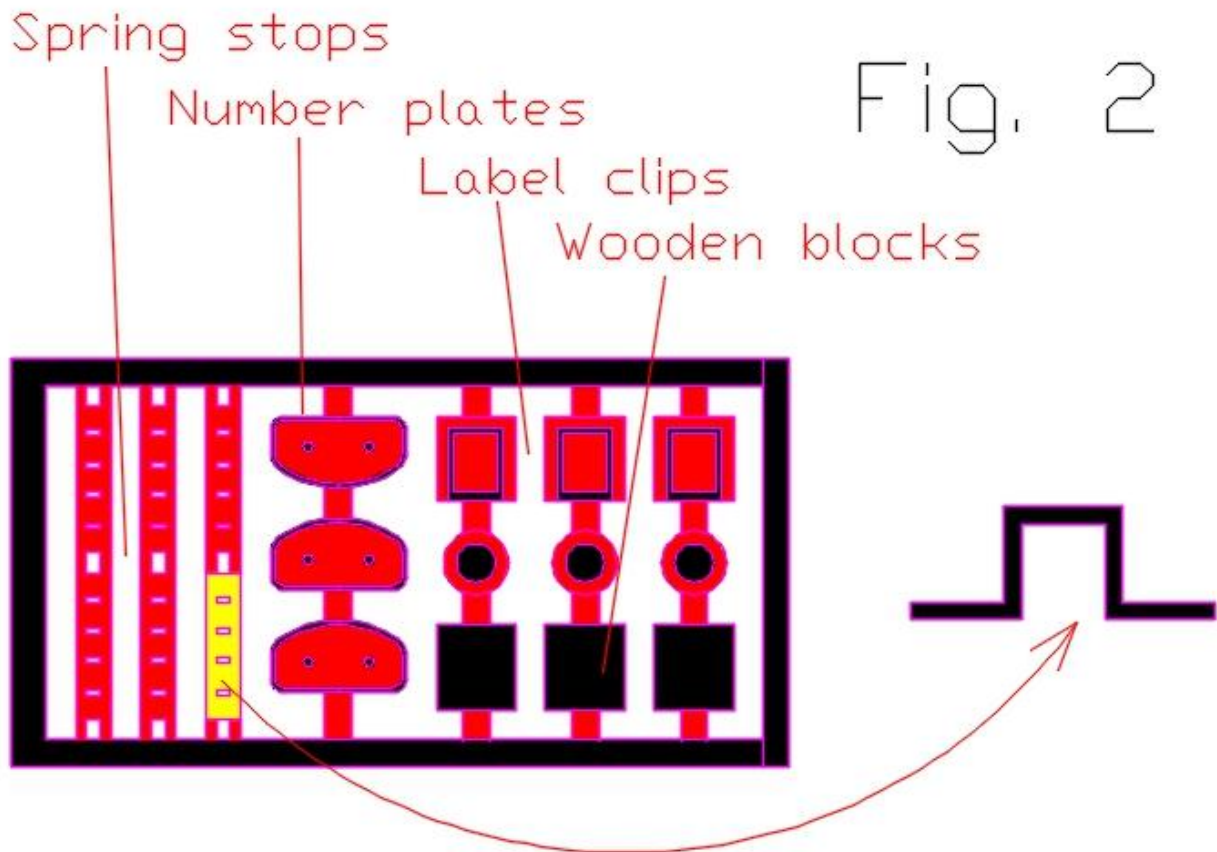
Remove the solebar overlays (4). As a result of the etching process there should be a curve through them with the ends closer to you if looking at the rivet detail side. Carefully bend them so that the curve is reversed slightly and that the ends are further away when looking at the rivet detail. This can easily be done between thumb and forefinger but take care not to put any folds into it.

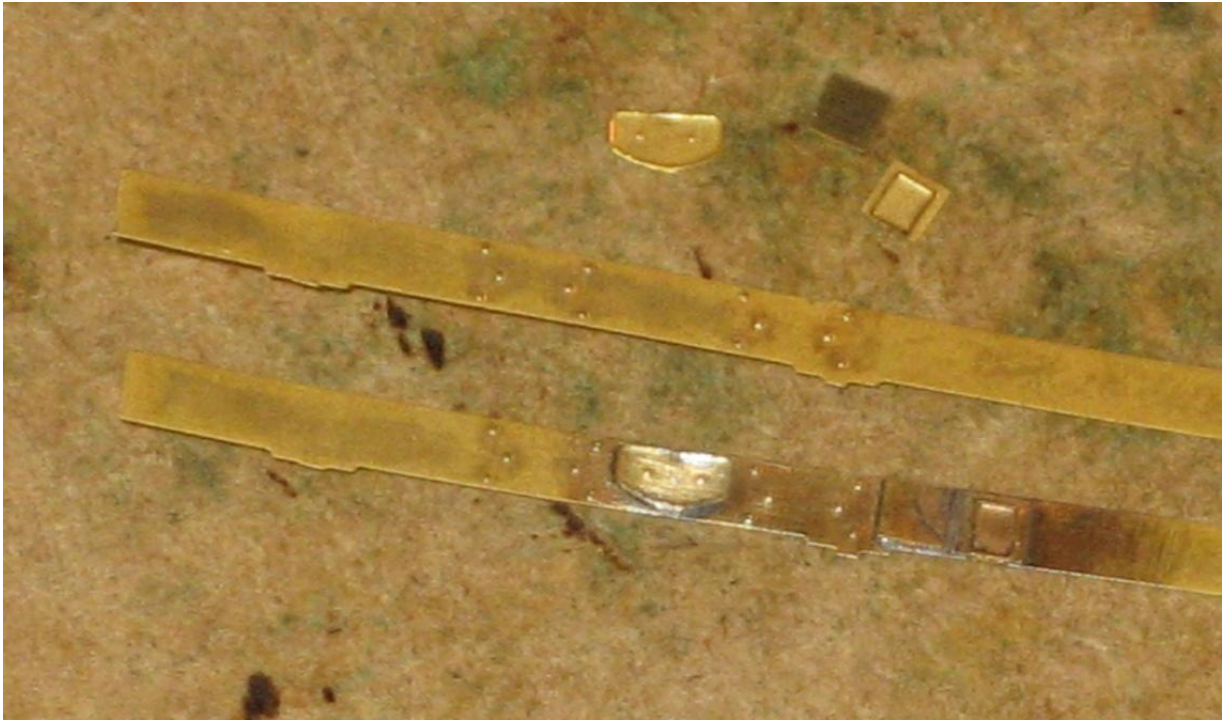
Now is probably the easiest time to attach the solebar detailing to the solebars so I shall cover this now before returning to the business of assembling the chassis.

Solebar detailing

The solebar detailing (5) comes contained in its own little fret. See Fig. 2 below. On it you will find fabricated axle spring stops, two sorts of number plates, label clips and a rectangle that is actually a block of wood on the real thing. I have no idea what the purpose of the last item is but it was quite common. The positions of all this stuff varied so check your prototype. Solder the number plates, label clips and block of wood (if required) in place on the solebar overlay.

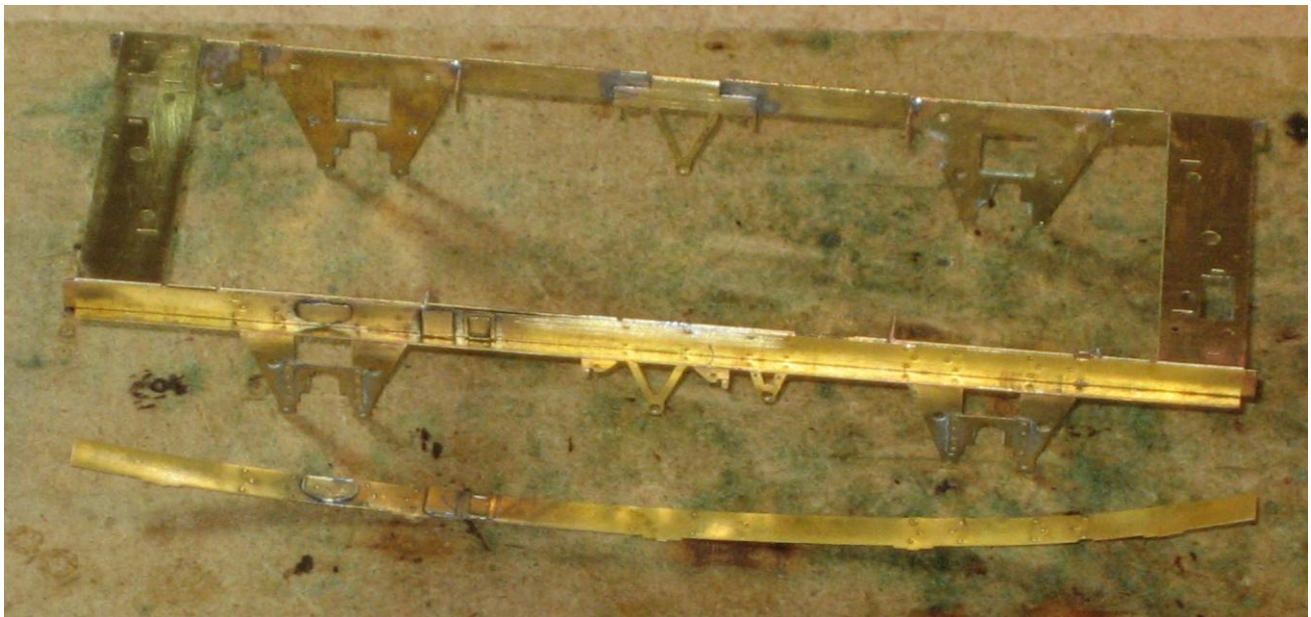
Note that there are tabs for locating the solebar overlay into the axleguard/solebar assembly and these are on the bottom.





Main Chassis Continued...

Locate the solebar detailing overlay on the axleguard/solebar assembly and tack solder in place. Note that there is a right a correct side for the solebar detailing on the chassis, i.e. the rivets in the centre of the detailing should line up with the vees. See Fig. 1 if you are unsure. Do one solebar at a time and lightly solder in place once happy with the fit.



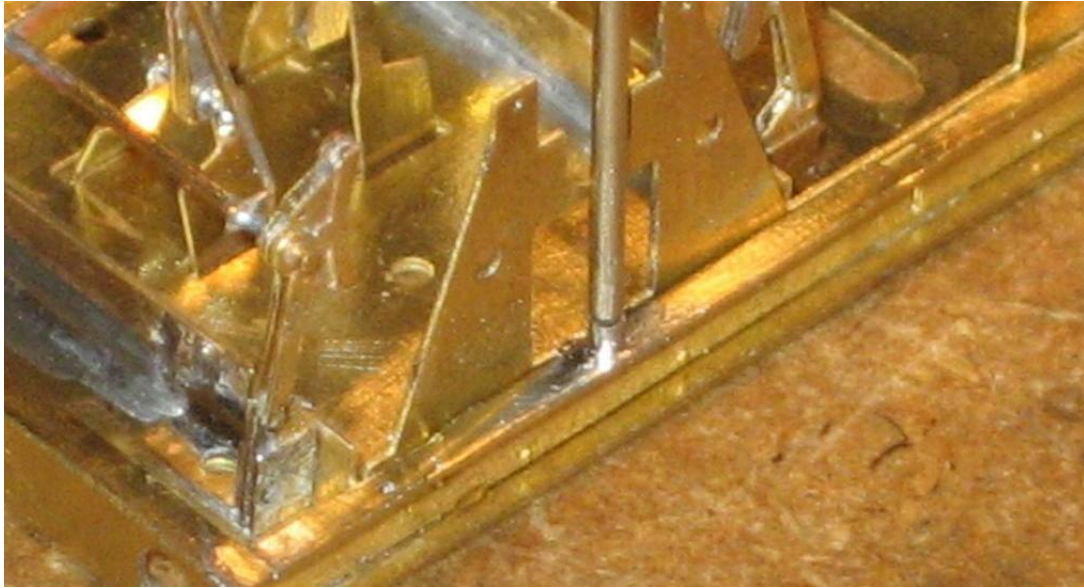
The chassis top plate and the axleguard assembly then need to be soldered together. There are 1mm diameter holes on both the top plate and axleguard assembly to aid location. Use the locating holes on the chassis top plate to drill four holes into a scrap piece of wood. This will aid construction of the chassis from this point. Slide the axleguard/solebar assembly into place on the chassis top plate. Using short lengths of 1mm wire, with the ends tapered slightly, pin the two parts together and onto the piece of wood. You may need to open out the holes in the chassis parts slightly but make sure the wire is a tight fit. Leave in place on the piece of wood for the moment. See the photo at the top of the next page.

The corner plates (19) can also be added now. They are simply a triangle to reinforce the solebar/headstock joint. The angled part should face towards the inside of the wagon. Again see the photo below. Note that you will need to remove the rivets if fitting the steps on top of them. This can be done later.



Spring Stops

There are 6 fabricated spring stops on the solebar detailing fret (see Fig.2) which can be folded up and then soldered in place. I find a small pair of self closing tweezers good for this. Some wagons had round pattern spring stops. 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 and the top gently filed flat.



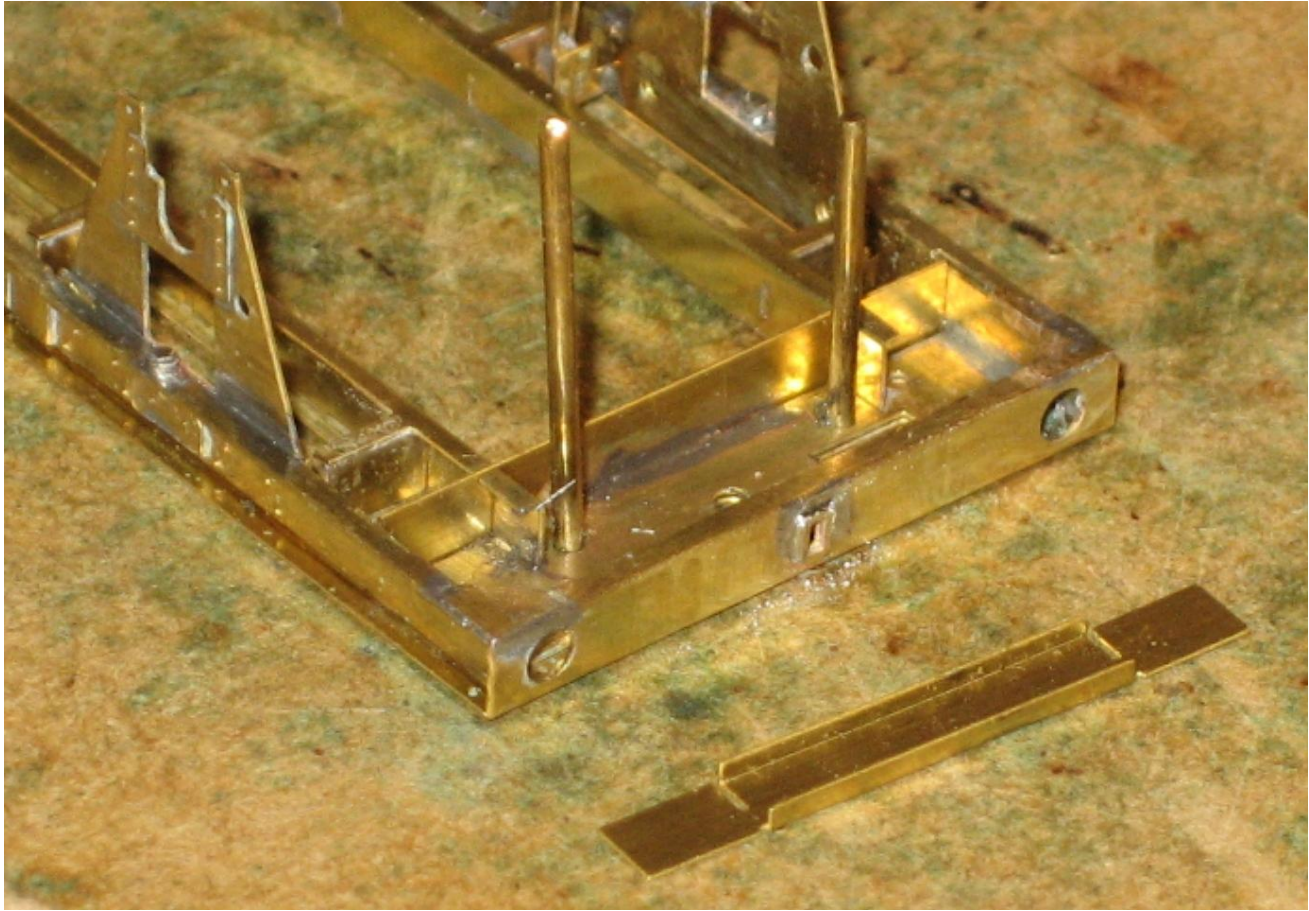
Chassis Framing

Remove the longitudinal bracing (6) from the fret and fold into an L shape. Remove the short cross bracing pieces (7) from the fret and solder in place on the inside of the now L shaped longitudinal bracing. Note that there are slots and tabs to aid this procedure. I found it useful to hold everything against a piece of wood that was securely fixed in place and to use a file to ensure the cross bracing stayed where it should be. Note that there are 6 short cross pieces on each side.



Once they have been assembled these longitudinal framing parts can be located in place on the chassis. There are tabs and slots to assist with this. Tack solder in place at the ends. Note that there is a correct side for these and that the centre cross pieces on the longitudinal framing and the chassis top plate should match.

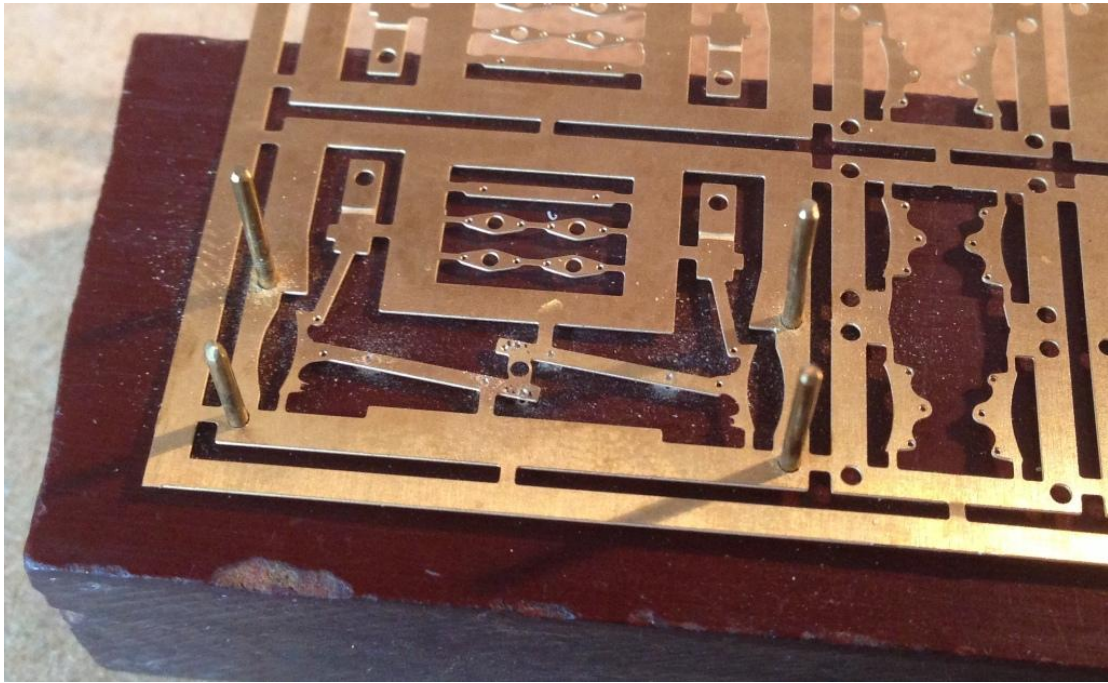
Remove the long end cross bracing (8) and the long centre cross bracing (9) from the fret. Fold the long centre cross bracing into a channel. Using the slots provided locate in place on the chassis.



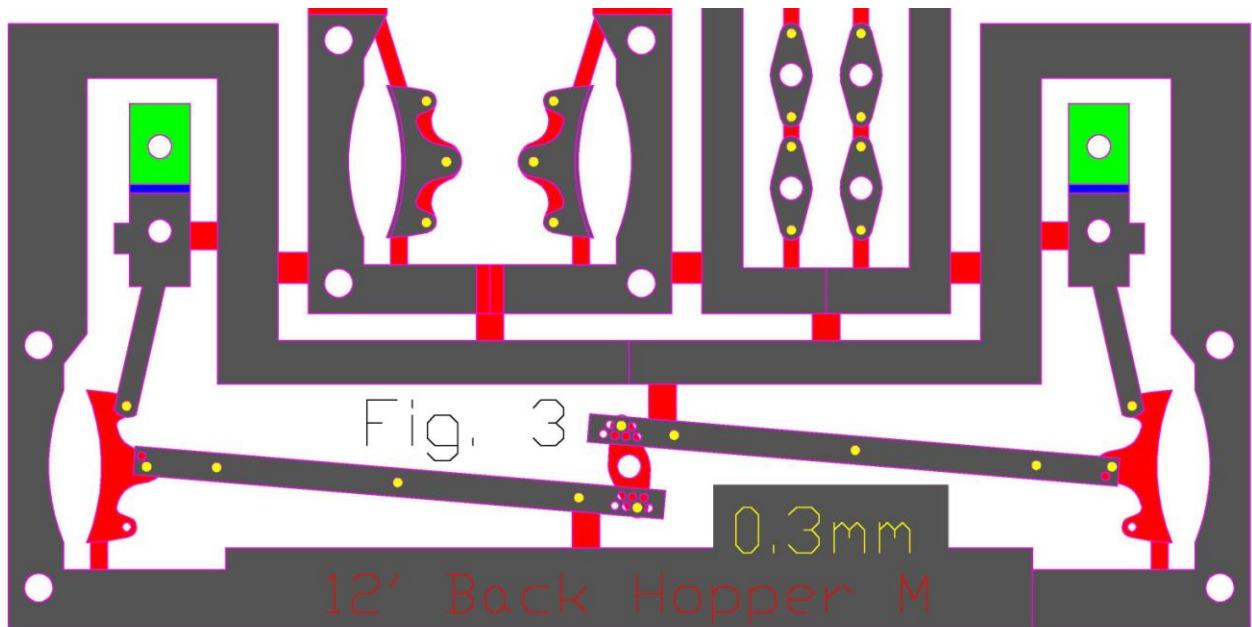
Solder everything in place making sure that the axleguard/solebar assembly and the longitudinal framing are accurately and securely fixed to the chassis top plate.

Brakegear

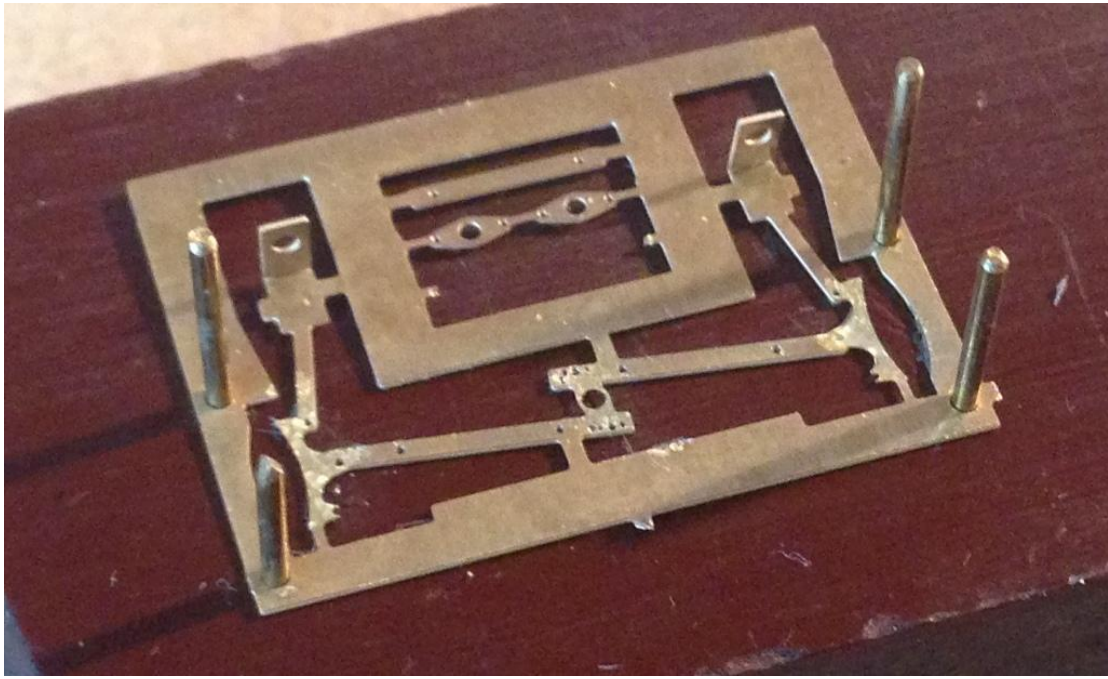
The first step is to create a jig to aid assembling everything. Use a suitable piece of wood or mdf. Use the etch as a guide. Drill through the main brakegear (10) parts labelled **front** with the writing **facing** towards the wood. The larger holes are 1mm diameter and the smaller ones 0.3mm. If you are unsure which holes you should be drilling through see Fig. 3 below. As you are making a 4 shoe Morton chassis you will need two jigs, one for each side.



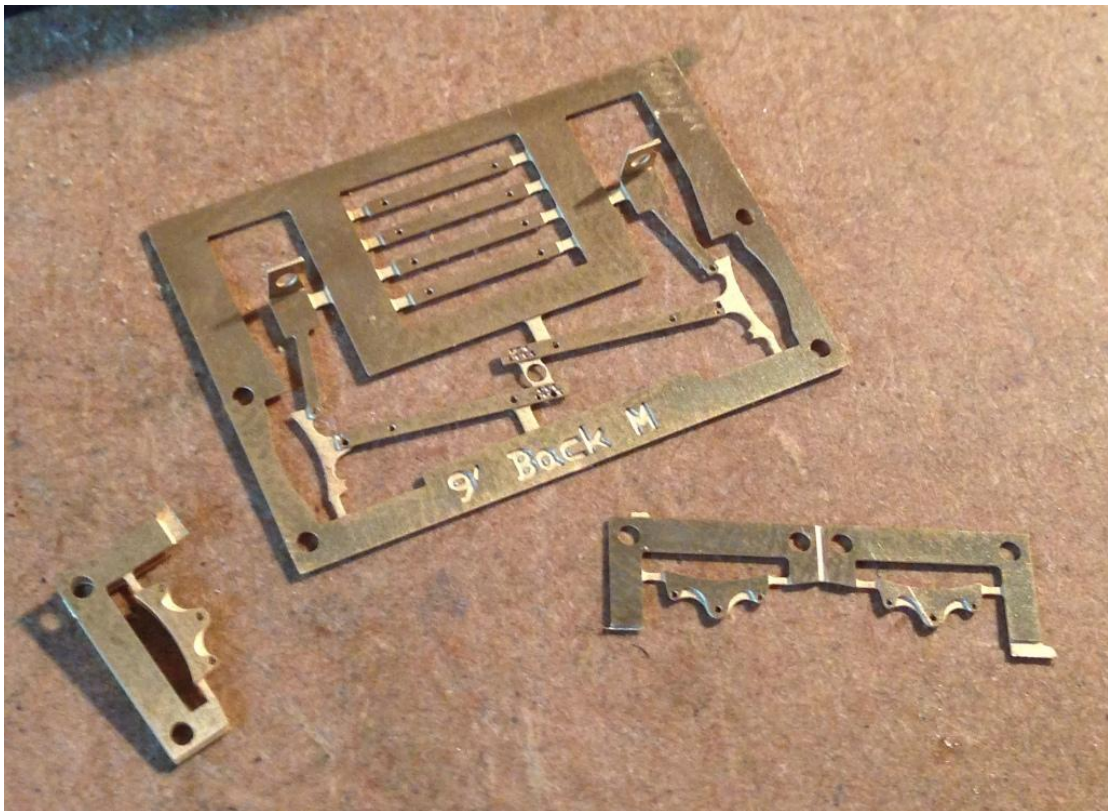
Check that the small holes in the fret can accept 0.31mm wire. These are marked in yellow on Fig. 3 below. I find it easier to locate the hole from the side with no writing.



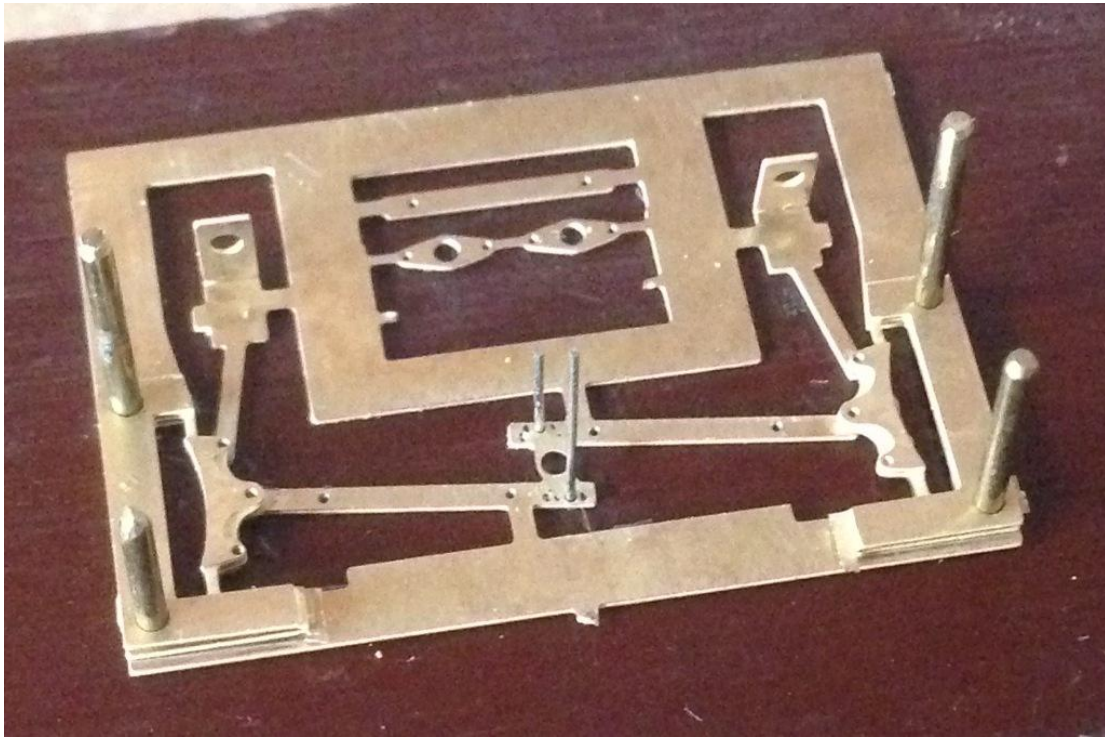
Remove the push rod cranks (12). Carefully fold up the feet (shaded green on Fig.3) on the part labelled **front** through 180° with the fold line on the inside and pin to the jig using short lengths of 1mm wire, writing side facing down.



Take the brake shoe infills (11) and fold double with the fold line on the outside.



Place the brake shoe infill over the front using the 1mm wire rods to align everything. Insert two short lengths of 0.31mm wire onto the holes where the push rods join the brake shaft cranks.

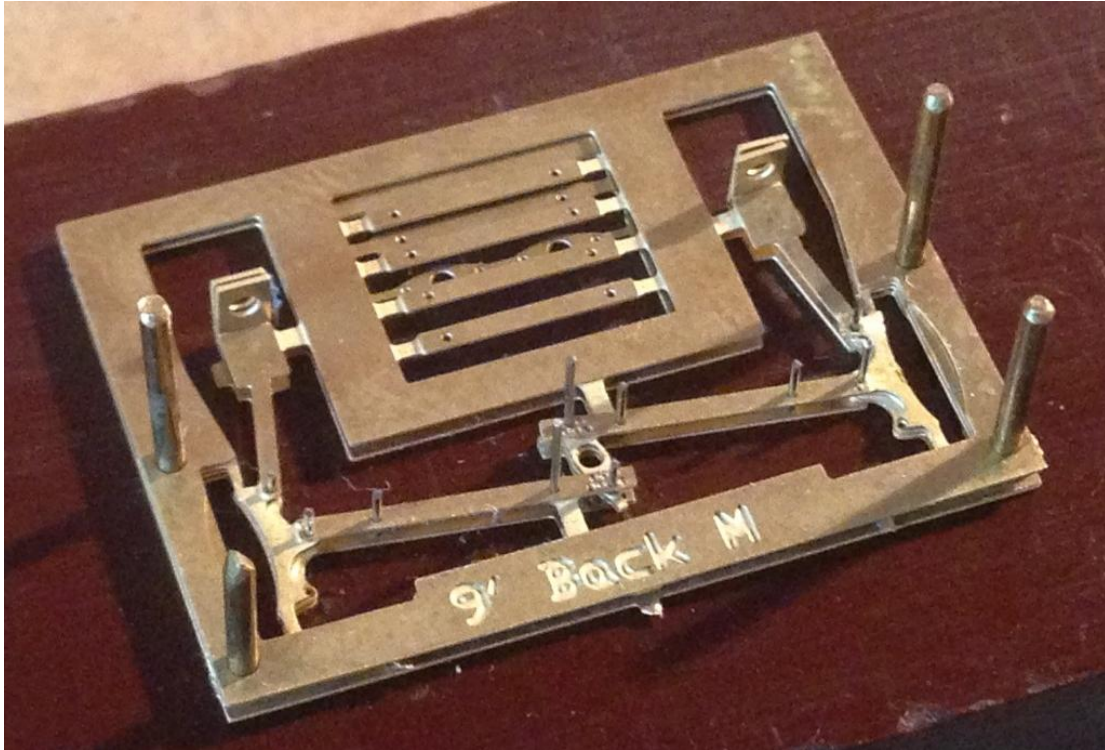


Fold up one set of push rod cranks and place onto the two lengths of 0.31mm wire.

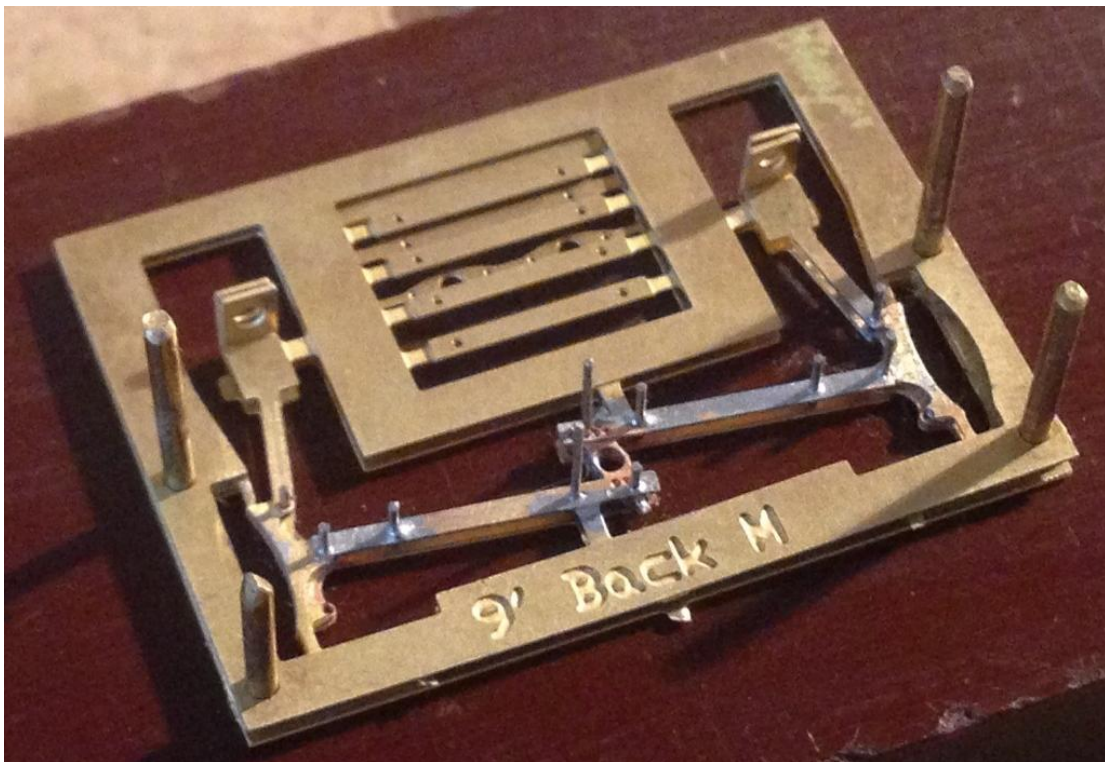


If you wish to use the push rod infill pieces provided then repeat the process for the cranks with these parts.

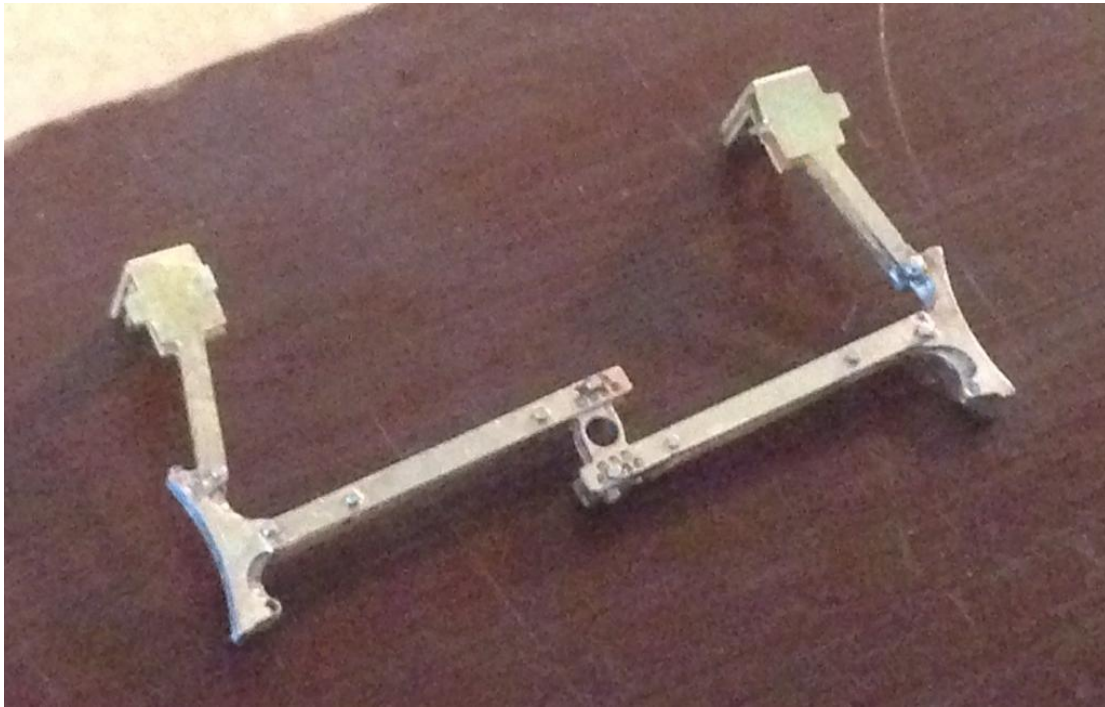
Carefully fold up the feet on the **back** part of the brakegear through 180° with the fold line on the inside and pin onto the assembled layers with the writing visible and facing away from everything else. Make sure all the bits of wire go where they should. Fill the remaining holes with 0.31mm wire making sure it goes all the way through.



Solder the layers together paying particular attention to the brake shoes (I found it best to apply solder to the long curved edge) and the joints where the wire meets the etch.



Carefully remove the brakegear from the fret; I used a piercing saw. Clean up any tags that are left and also the wire to represent bolt heads.



There are two tabs on each of the brake shoes that locate into slots in the axleguard/solebar assembly (2). You will need to angle the locating wings on the axleguard/solebar assembly in order to fit them. You may also need to remove the locating tab that goes towards the outside of the wagon. Locate the brake gear in place and then return the wing to its original position at 90° to the solebar. Solder in place against the wing and the longitudinal framing. Make sure that the brake shoes go on the correct side. Refer to prototype pictures, Fig.1 to be sure.



Safety Loops

The safety loops (13) can now be folded up and fixed in place. All the fold lines are through 90°. You will need to open one of the folds out slightly in order to get them around the push rods. They should go on top of the cross section just to the inside of where the brake shoes locate. Solder in place. Don't worry if they're a bit wonky most of those fitted to the real thing were!



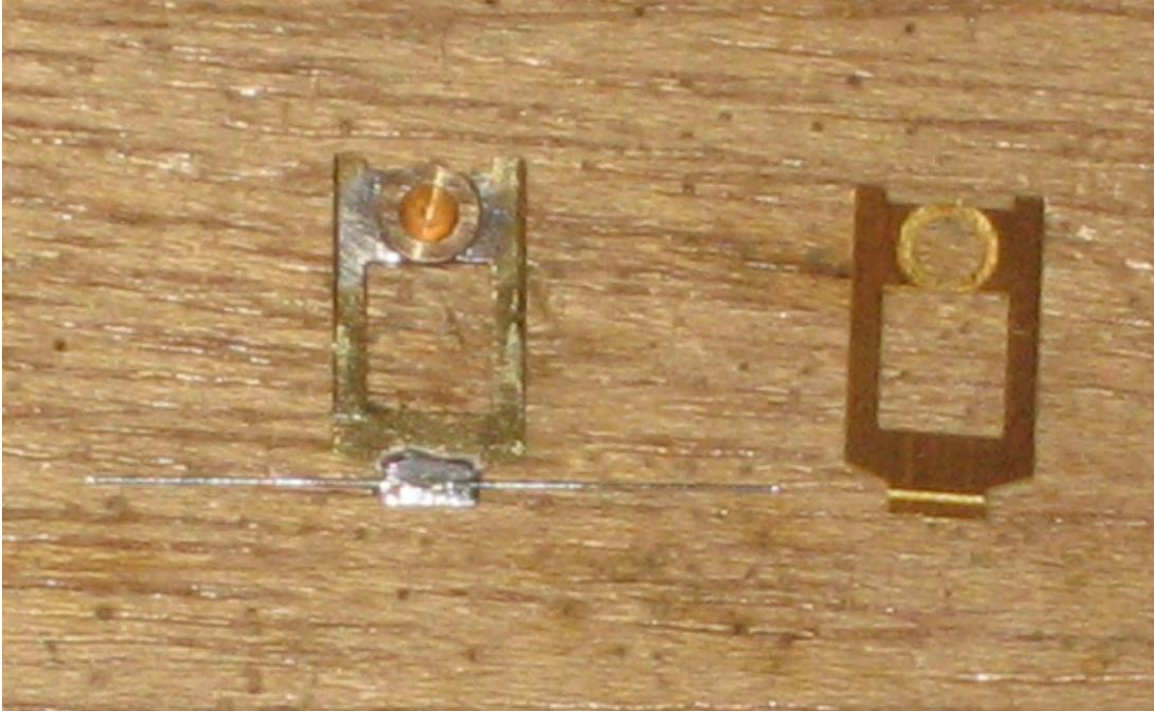
Spring Carriers

The spring carriers (14) can now be assembled. They are designed so that the springing wire is soldered to the carrier using the half etched slot as a guide. As mentioned in the preamble a suitable flux will be necessary. I use Carr's Black Label.

The distance between the backs of the axleguards is a tad larger when compared with other systems and works out at 24.5mm. This is deliberate and I make no apologies for it. The advantage of this measurement is that if using pinpoint axles you don't have to hunt around for bearings that are deep enough but you may find that the carriers need packing out a little to take up any slop. Bearing washers (15) are included for this purpose. There should be a good fit between the axles and the bearings with ideally no sideways movement at all. If using pinpoint axles use a waisted type of bearing to avoid having to remove any more material from the cast axleboxes than is necessary. I have used Exactoscale waisted pin point bearings which are just about perfect for the job with only occasional ones that require packing out.

Due to the removable nature of the tiebars 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 axle. Use the bearing washers provided. I have built chassis with Exactoscale parallel axles and used one half etched washer and one full width washer to pack the bearing out. This leaves the outer edge of the bearing 0.25mm beyond the axleguard and provides 1mm of bearing surface for the axle.

I find the easiest way to assemble the spring carriers is to make a small jig consisting of an off cut of wood with a 2mm hole drilled into it. The spring carrier can then be placed so the half etched guide slot for the spring is facing towards you and the bearing locates through the hole in the carrier and the wood. The bearing can then be soldered in place. The spring wire can then be located in its half etched guide slot and soldered in place using a suitable flux. I use Carr's black label. The spring wire needs to extend at least 7mm either side of the point where it is attached to the carrier.



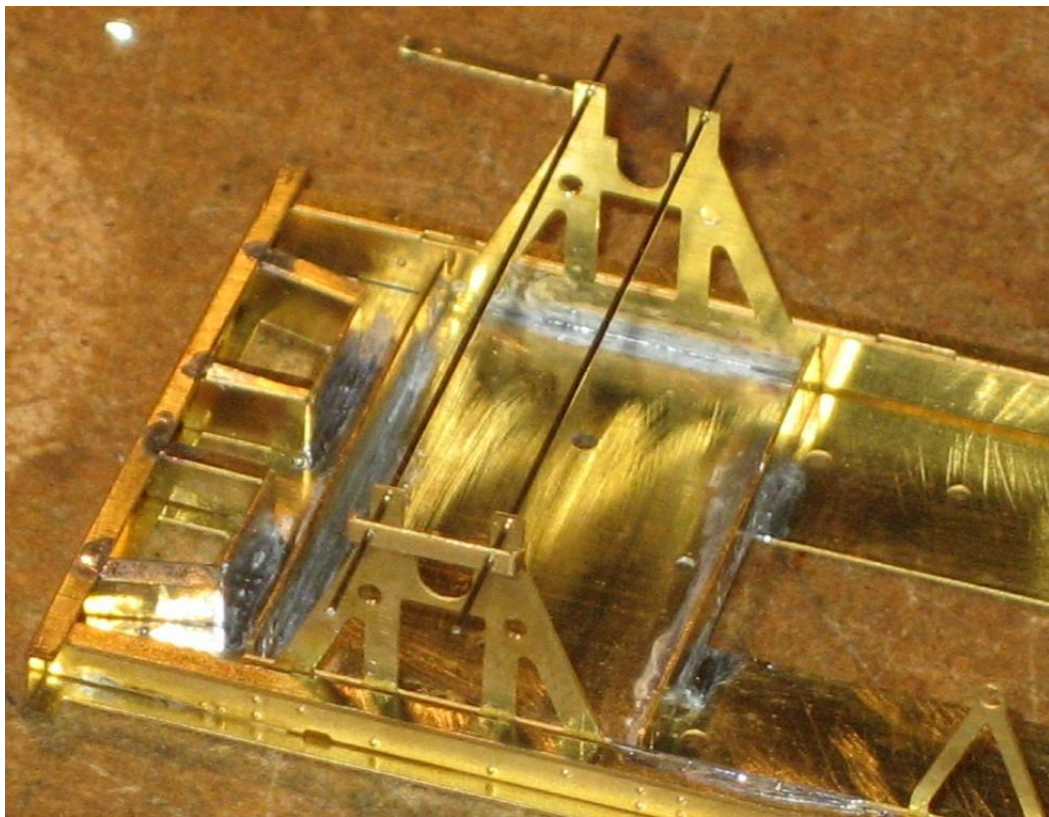
A note on roller bearings: These were retrofitted to some wagons fitted with this chassis. My preferred method of doing this that is to extend a parallel bearing using a length of 1.5mm x 1mm brass tube approximately 2mm long and then gluing the axlebox casting to this. The axlebox will then move up and down with the spring carrier. If you use this method you will need to make sure there is sufficient clearance between the axlebox and spring castings and will have to make the tiebars removable if you ever want to get the wheels out again.



Tiebars/Axle Keeps

There are tiebars (16) and axle keeps (17) are included. I would expect wagons of this capacity to have tiebars but I have seen photographs of hoppers with this chassis that have individual keeps on each axleguard. In either case these are designed to be removable if you wish in order to allow the wheel sets to be easily dropped out. They can be soldered permanently in place but either way you will need to make sure the holes will accept 0.31mm wire before removing them from the fret.

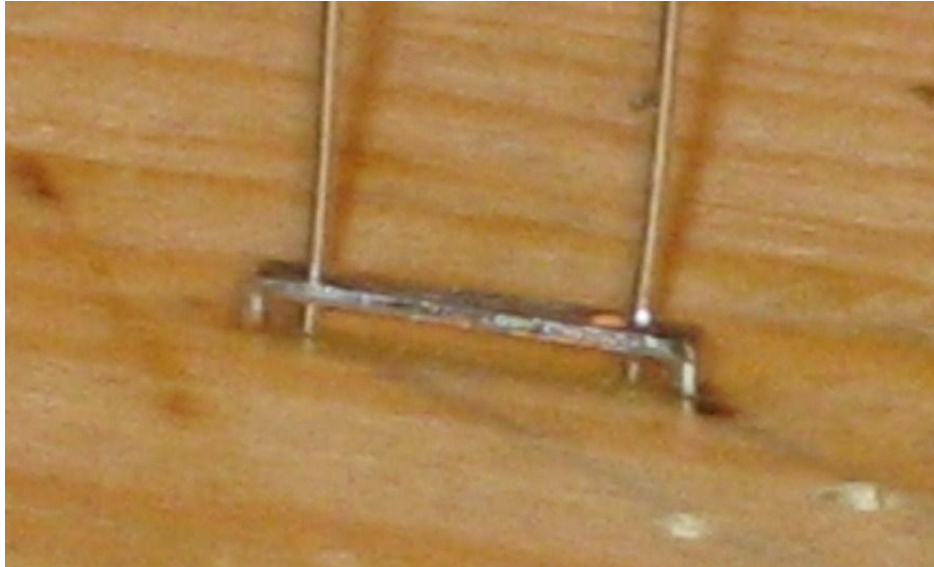
If you are not planning on making them removable then they can be pinned and soldered to the axleguards. Remove from the fret and fold the ends up. Thread lengths of 0.31mm wire through the tiebar and holes in the axleguard and the corresponding holes on the opposite axleguard. Solder in place. Fit the other axle guard and solder in place. Trim the wire so that it represents bolt heads on the tiebars but extends approximately 0.5mm from the back of the axleguard. These pins will prevent the springs from becoming disengaged from their slots.



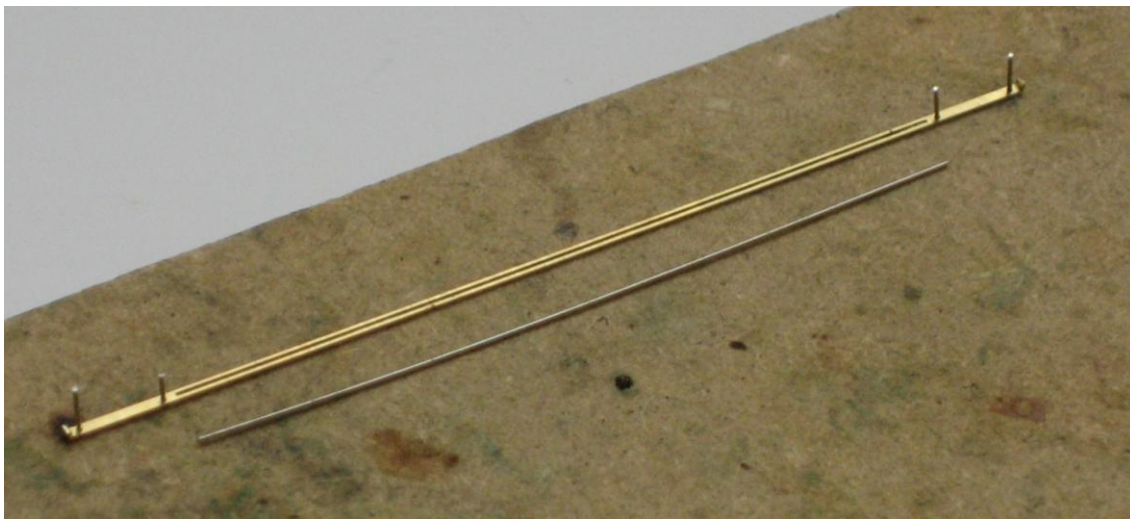
If you want to make them removable to allow the axles to be dropped out then you will need to solder 0.31mm pins through the holes in the tiebars. I find the easiest way of doing this is to use one pair of holes as a jig and drill a pair of 0.3mm holes into a piece of scrap wood. Short lengths of 0.31mm wire can then be threaded through the axle guards locating into the holes in the wood. These can then be soldered in place and filled back to represent bolt heads before folding up the ends.

Fold the ends and locate two short lengths of 0.31mm wire through the holes and into the holes drilled into the wood. Solder the wire in place and whilst still pinned to the wood file the wire back to represent bolt heads. Remove and trim the other end of the wire. You will need to make sure there is at least 0.75mm of wire projecting from the back of the tiebars otherwise the spring carriers will be able to fall out of place when everything is assembled.

It is also a good idea to leave at least one of the pins in the axle guard as long as possible to give you somewhere to hold them when painting. Once the tiebars and the chassis are painted they can be tack glued together on final assembly. The glued joint can be broken and the tie bars removed if you find it necessary to remove the wheels at any point.



I find long tiebars are quite fragile on their own and so reinforce the back of mine with 0.31mm wire. There are slots etch on the back of the tiebars to help with this. This makes for a much stronger part.

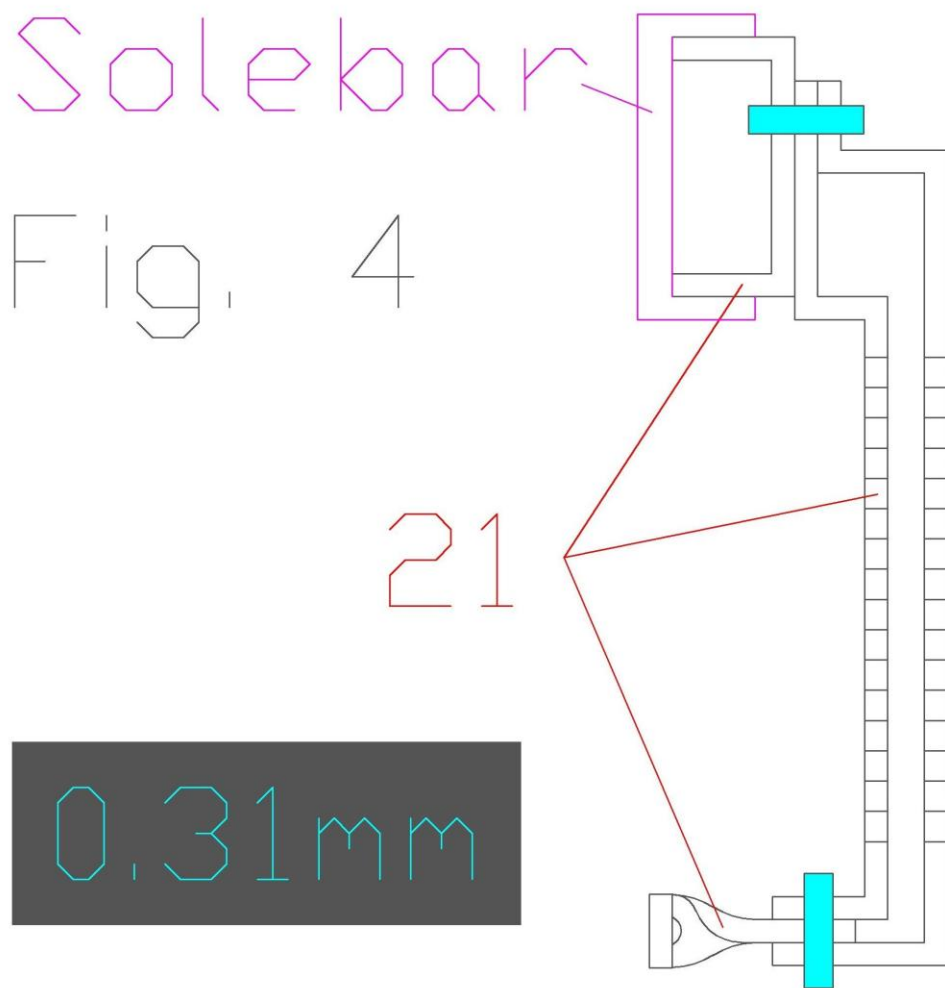


Headstock detailing

Now is as good a time as any to fit the coupling pocket detail (18). Solder in place using the hole for the coupling as a guide. I find the easiest way of doing this is to shape the end of a cocktail stick to fit in the slot. This can be used to align the detail on the headstock and hold it in place while you solder them together

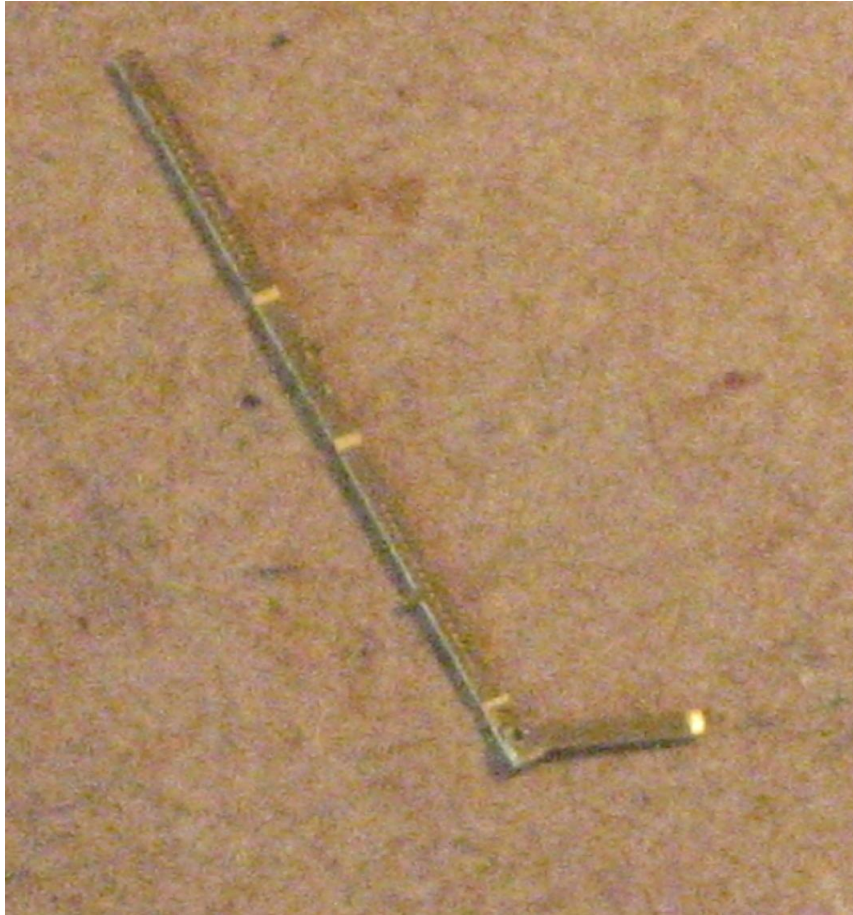


Brake Lever Guards



Make sure that the holes in the brake lever guard/bracket/stay (21) can accept 0.31mm wire and remove from the fret.

Separate the lever guard/stay from the lever guard bracket. Firstly fold the stay through 180° with the fold line on the outside whilst you're going along (you will also need to push out the rivet and twist the end of the stay to fit against the axleguard. Solder a length of wire through the holes where the lever guard and stay meet to represent a bolt).



Fold the lever guard along with the lever guard bracket referring to Fig. 4 above.



Solder the lever guard and bracket together using 0.31mm wire to align them. Trim the wire on both the front and back to represent a bolt. The whole assembly can then be located in the solebar and soldered in place. There are slots in the solebar to receive the lever guard brackets.



Axleboxes and springs

Now is a good time to fit the cast axle boxes and springs. It will make life easier when bending up the brake levers as they should be bent, like the prototype, to clear the axleboxes and springs. The back of the axleboxes will of course need slotting to allow the wheel bearings to drop out if making them removable.

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 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. 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 axleboxes and then cranked for the handle. Check on the model and adjust until you are happy with the shape. Once you are happy with the shape the brake levers can be soldered in place. Solder the Morton cam into place in the lower hole on the appropriate vee.

Hopper door handles

Fit two lengths of 0.31mm wire on the chassis so that they pass through the hopper door handle brackets on the axleguard/solebar assembly and project approximately 3mm past the each side of the chassis. Carefully solder in place. Remove the hopper door handle bracket overlays (24) from the fret and fix in place using the 0.31mm wire as a locating aid. Make sure the hopper door handles (25) can accept 0.31mm wire and remove from the fret. The handles need to be bent so that they clear the solebars. Locate on the wire and solder in place. An excess in the wire can now be trimmed back.



End Sheeting

The ends of the underframe were covered in metal plate. Chassis end overlays (23) are included to replicate this. Locate onto the ends of the chassis and solder in place. Note that the holes should align and the angled rows of rivets should taper towards the centre of the wagon.

Steps

Two types of end steps are included in both left hand (27a) and right hand (27b) versions. There didn't seem to be much of a pattern to which type was fitted and to which end of the solebar so check your prototype.



Fabricated



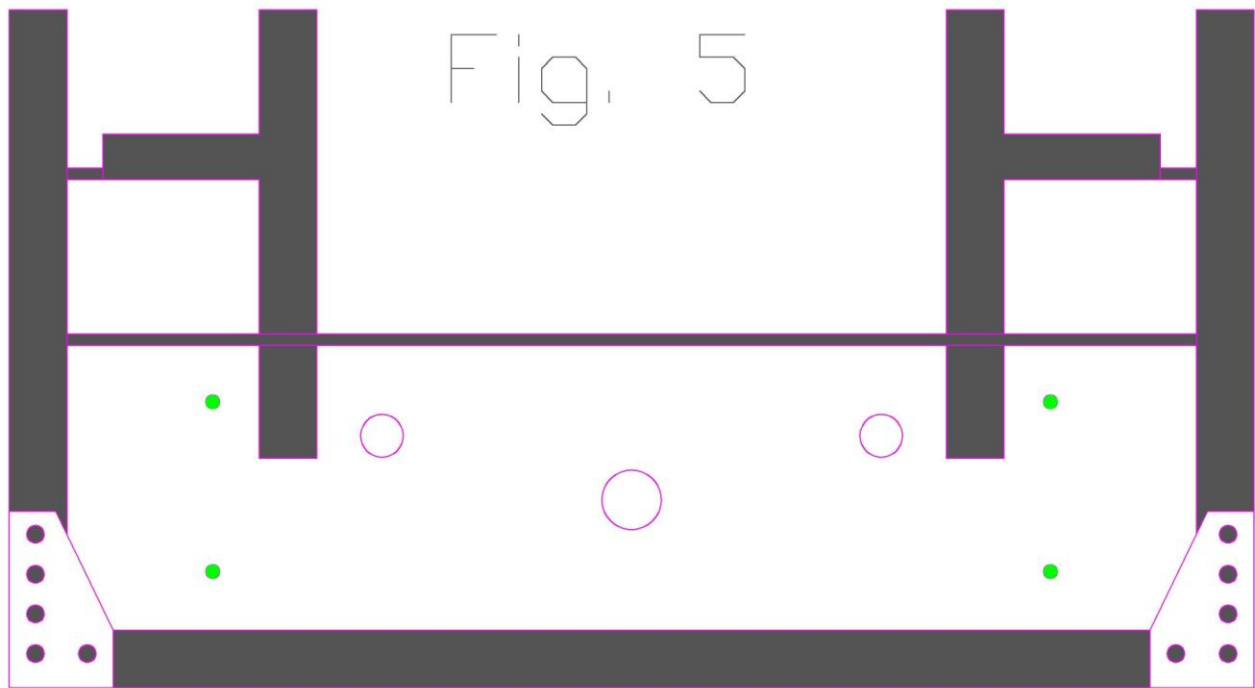
Plain

In both cases press out the half etched rivets that represent the bolts used to attach the steps to the solebar. The plain type basically folds into a channel shape. The fabricated type is a bit more delicate. You need to fold the sides up whilst firmly holding the centre of the part. The top and the step can then be folded up. Reinforce the fold lines with solder. I couldn't manage to find a way of capturing the prototypical bend in the step so left mine flat.

Locate on the left hand end of the chassis and solder in place.

Handrails

These varied so check your prototype. You will need to use the locating holes provided in the axleguard/solebar assembly to drill through the chassis end overlays, form the wire to fit into these holes and then solder them in place. The locating holes are marked in green on Fig. 5 and the picture below that shows what they look like. The horizontal part of the handrail should be around 1mm above the end of the chassis.





The arrangement of the handrails on the ends of 21T hoppers varied considerably. I have included some handrail brackets (26) to replicate the type seen below on BR bodies. Use 0.31mm wire for the handrail and glue the brackets in place on the hopper ends.



Painting

One of the advantages of having the chassis as a complete unit with solebars and headstocks is that you can paint it separately from the body and then glue the two together afterwards. If using an airbrush or aerosol this means you can prime it and then paint it black with no masking at all which makes life a little easier.

I use Halfords grey primer in a tin through an airbrush with cellulose thinners to prime just about everything, including plastic bodies. The primer is synthetic and has no adverse effects on the types of plastics used on RTR railway models and kits. The cellulose thinners used evaporate so quickly that they don't have time to attack the plastic. You can then put your choice of paint over the top including cellulose. Don't use the red oxide in a tin on plastic though as it won't adhere and the paint will just come off.

Notes on wagon bodies and weighting

The suspension on the underframe is designed to work optimally under a 50g load. There is simply not enough room to fit sufficient ballast in the underframe so the only place for it to go is in the bottom of the hopper. Liquid lead isn't a bad idea. It can be painted to match the body colour and shouldn't be too noticeable. Full hoppers are no problem as this can be disguised below the load.

Finally

If you haven't come across the wonderful resource for BR wagon photos that is Paul Bartlett's website then I would thoroughly recommend a visit to:

<http://paulbartlett.zenfolio.com/>

Justin Newitt - September 2017

Suppliers List

Eileen's Emporium (wire and sundries)
Unit 19.12 Highnam Business Centre
Newent Road
Gloucester
GL2 8DN
UK
www.eileensemposium.com

Lanarkshire Models and Supplies (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 (buffer heads)
PO Box 70
Barton upon Humber
DN18 5XY
www.wizardmodels.co.uk