Bachmann Grain Hopper Underframe Instructions

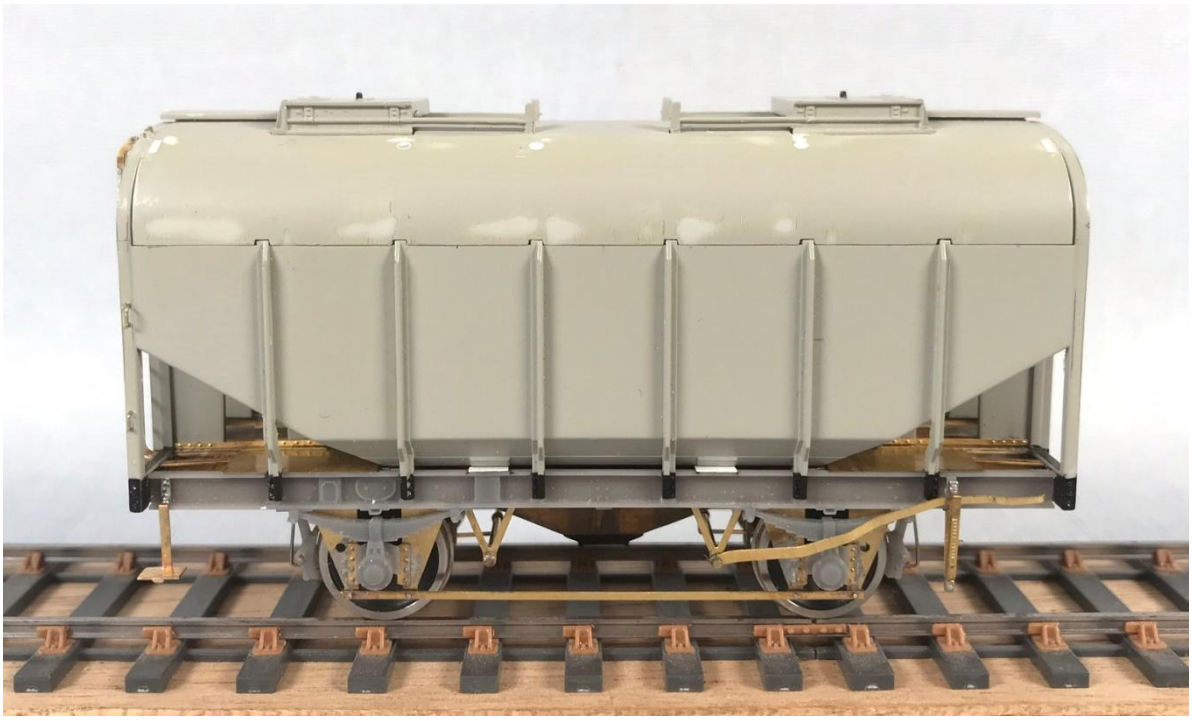
Introduction

This set of instructions covers the Rumney Models wagon underframe kits PB.36A, PB.36B and PB.36C. These kits are designed to build into an accurate underframe and body detailing for the Bachmann welded grain hopper body. They are mixed media kits and include a comprehensive set of etches as well as 3D printed parts for the solebars, brake shoes, springs/axleboxes, cosmetic buffer springs and buffer housings for use with metal heads and springs (not included). These underframe kits can be constructed in P4, EM but not in OO.

The kits cover the following variations on the BR diagram 1/271 hoppers:

- PB.36A - Unfitted wagons with early type hopper release mechanism (lot 2183 wagons)
- PB.36B - Unfitted wagons with later type hopper release mechanism
- PB.36C - Through piped wagons

Kits PB.36A and PB.36B have different sets of etches, kit PB.36C is basically the PB.36B underframe with an additional etch for the different pattern ladders that were fitted to the through piped wagons.



Notes

This is very much a composite kit with both etched and 3D printed parts. The kits have been designed to that as much of the construction for the etched parts 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 suitably illustrate the item in question. Parts are numbered on the fret and I've tried to do this in build order.

Prototype Information

All vehicles built to diagram 1/271.

Unfitted - Early hopper release mechanism (small vees on the centre of each solebar) - 50 wagons

- B885040-B885089 Lot 2183 Derby 1951-2

Unfitted - Later hopper release mechanism (pillar on inspection door side only) - 520 wagons

- B885090-B885114 Lot 2447 Derby 1953
- B885115-B885139 Lot 2448 Pressed Steel 1955
- B885140-B885189 Lot 2656 Pressed Steel 1955
- B885190-B885309 Lot 2709 Pressed Steel 1955-6
- B885310-B885409 Lot 2925 Pressed Steel 1956
- B885410-B885509 Lot 2994 Pressed Steel 1956

All unfitted vehicles were fitted with 1'6" spindle buffers, oil axleboxes and Instanter couplings from new. 1'6" fabricated buffers seem to have been most common on early builds with later ones having 1'6" 4 rib with step. 1'6" 4 rib could also be found but these could be replacements rather than being fitted from new. As with all wagons the oil axleboxes could be changed to a different pattern over time and many, though not all, were fitted with roller bearings or Hybox axleboxes from the early sixties.

Through piped - Later hopper release mechanism (pillar on inspection door side only) - 100 wagons

- B885610-B885659 Lot 3233 Derby 1959
- B885660-B885709 Lot 3234 Derby 1959-60

Through piped wagon underframes were as per the unfitted version with the later hopper release mechanism except for different pattern ladders at the ends. Through piped vehicles were fitted with 1'8½" Oleo or Dowty buffers, roller bearings and screw couplings from new.

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 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. Parts 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 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. 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 use a piercing saw.
- If using cutters, the place to cut them 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 them. 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.
- The material does not cut well with a knife blade. Whilst not so brittle that it will crack as soon as look at it, it is likely fracture if you try and cut it with a blade. I can't imagine why anyone would want to try and slice 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 for things such as brake lever guards and door springs will almost certainly appear as an indentation rather than a hole.
- Dispose of the waste support material responsibly.

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 things such as cellulose thinners as this may damage them.

It is recommended that etched parts that attach to printed ones, such as steps and brake lever guards are pinned in place using 0.31mm wire to produce a strong join. The etches are designed to easily facilitate this

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.

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, 0.85mm, 1mm, 1.45mm and 2mm
- A selection of tapered reamers in the range 0.3mm-1mm
- A smooth jawed vice
- A selection of needle files
- A piercing saw with fine blade 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. 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 axleguards. 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 but it should be obvious from the nature of the kit where it will need to go, i.e. in the bottom of the hopper.

Materials list

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.

0.31mm - Brakegear, tie bars, brake lever guards, hopper handles, ladders, steps
0.5mm - Coupling hook retention pins
0.8mm - Brake cross shafts, through vacuum pipe

You may find thin walled microtube useful for a through vacuum pipe (0.8mm x 0.4mm - you can then pin sections of it together using 0.4mm wire) if required and to retain spring metal buffer heads (0.7mm x 0.5mm) both of these are produced by Albion Alloys under their Precision Metals range. These should be available form Eileen's and can also be found in good model shops.

3D printed buffer housings are included but you will need metal heads and springs to complete. For spindle buffers both MJT and Wizard Models do 13" buffer heads with 1mm shanks and springs and for Oleo buffers Wizard do 13" buffer heads with 1.45mm shanks and springs.

If you wish to rigid buffer castings the those produced by Lanarkshire Models & Supplies are recommended. Early unfitted wagons were built with 1'6" fabricated buffers (B009) with later unfitted examples having 1'6" 4 rib with step (B.024) from new. Through piped wagons had either 1'8½" Oleo (BP01) or Dowty (BH02) buffers.

Unfitted wagons were built with 3 link couplings. BR had a policy of replacing 3 links with Instanters in the 60s as the Instanter links became available from withdrawn wagons so and the Grain hoppers were included in this. Coupling hooks and Instanter links are included in the kit but plain links will be needed complete. Brassmasters now supply links for those not wishing to make their own.

Through piped wagons were fitted with screw couplings. These are available from Rumney Models, code B.96.

You will also need 3'1½" 3 hole disc wheels from you 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.

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

Transfers

If you decide to completely repaint the Bachmann body, then you will need transfers.

Cambridge Custom Transfers do a numbering sheet for the wagons in the BR era with pre-1964 lettering. This is CCT code BL133 which covers BR built wagons. Contact details can be found at the end of the instructions.

Fox transfers do various sheets that contain lettering suitable for the Grain hoppers including their freight vehicle names and instructions sheet, along with the ones for tare and tonnage markings, wheelbases, and various numbering sheets. Again, all this is suitable for pre-1964 lettering.

Parts List

1 - Bottom Plate
2 - Outer transverse spacers
3 - End longitudinal spacers
4 - End angled spacers
5 - Inner transverse spacers
6 - Coupling guide
7 - Top plate
8 - Reinforced axlebox guides

9 - Hopper bottom
10a - Hopper side plate (handwheel side)
10b - Hopper side plate (non-handwheel side)
11a - Hopper side angle (handwheel side
11b - Hopper side angle (non-handwheel side)

12 - Hopper opening mechanism
13 - Handwheel

14 - Chassis top plating

15 - Spring carriers
16 - Washers
17 - Tie bars

18 - Brake links
19 - Brake hanger overlays
20 - Brake link overlays

3D printed Parts (Solebars, brake shoes and springs/axleboxes)

21 - Brake lever guard
22 - Brake Lever

23 - Footsteps

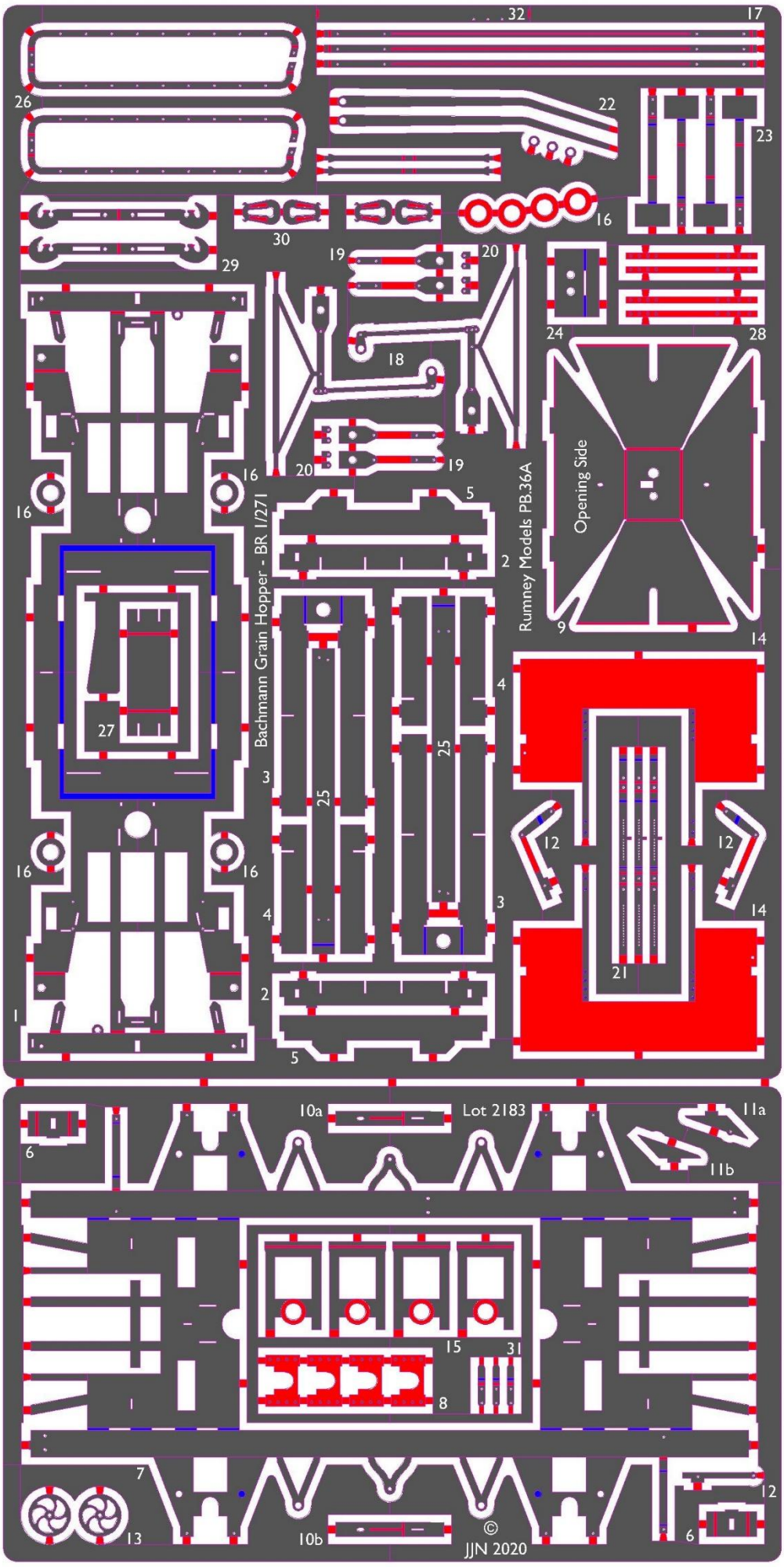
24 - Buffer drilling jig

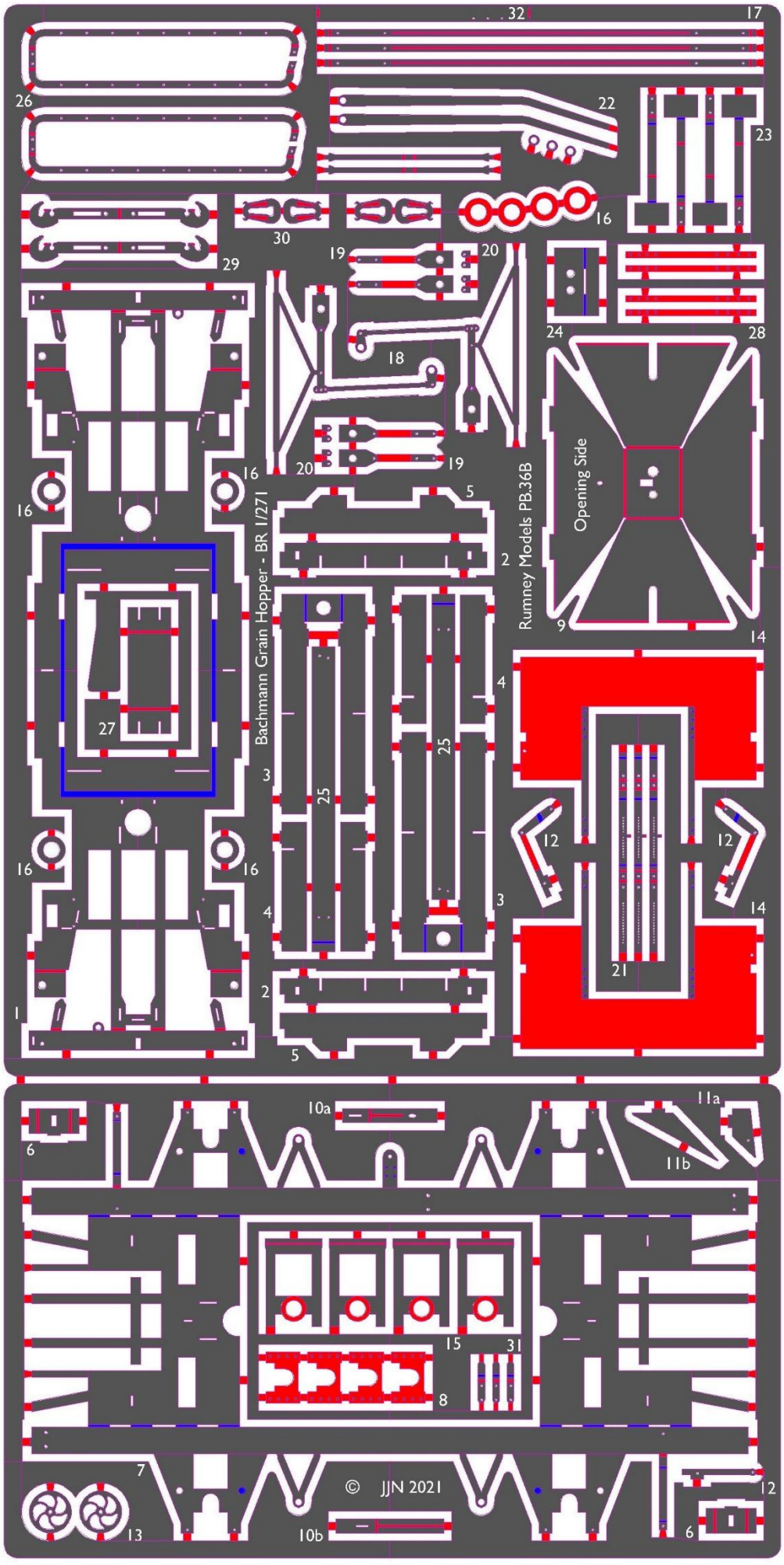
3D printed Parts (Buffer housings or Whitemetal buffers)

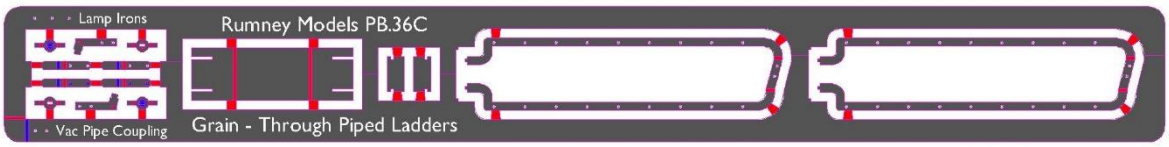
25 - Ladder drilling jig
26 - Ladder
27 - Ladder assembly jig

28 - Hopper end support angle

29 - Coupling hooks
30 - Instanter links


Bachmann Grain Hopper - BR 1/271
Rumney Models PB.36A
Opening Side
Lot 2183
© JJN 2020


Bachmann Grain Hopper - BR 1/271
Rumney Models PB.36B
Opening Side
© JJN 2021

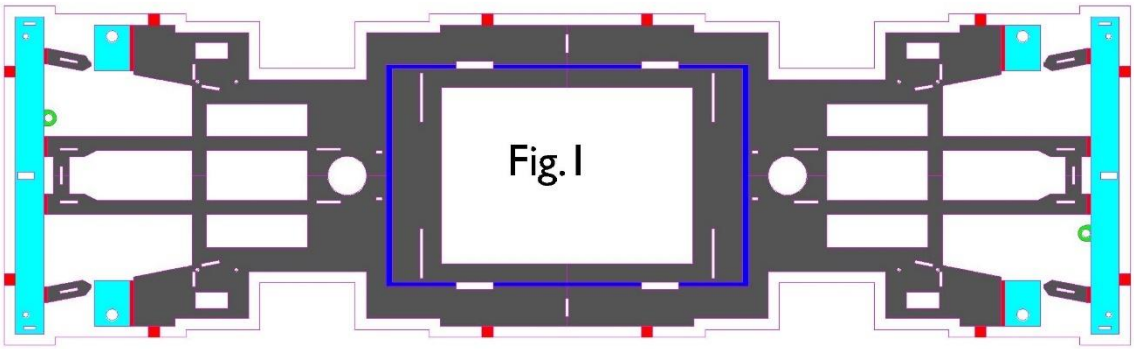


Construction

The general arrangement of the underframe is that of a sandwich with spacers plates for the bottom and the top and spacers, located using tabs and slots, in between. Everything else will then be fitted to this structure.

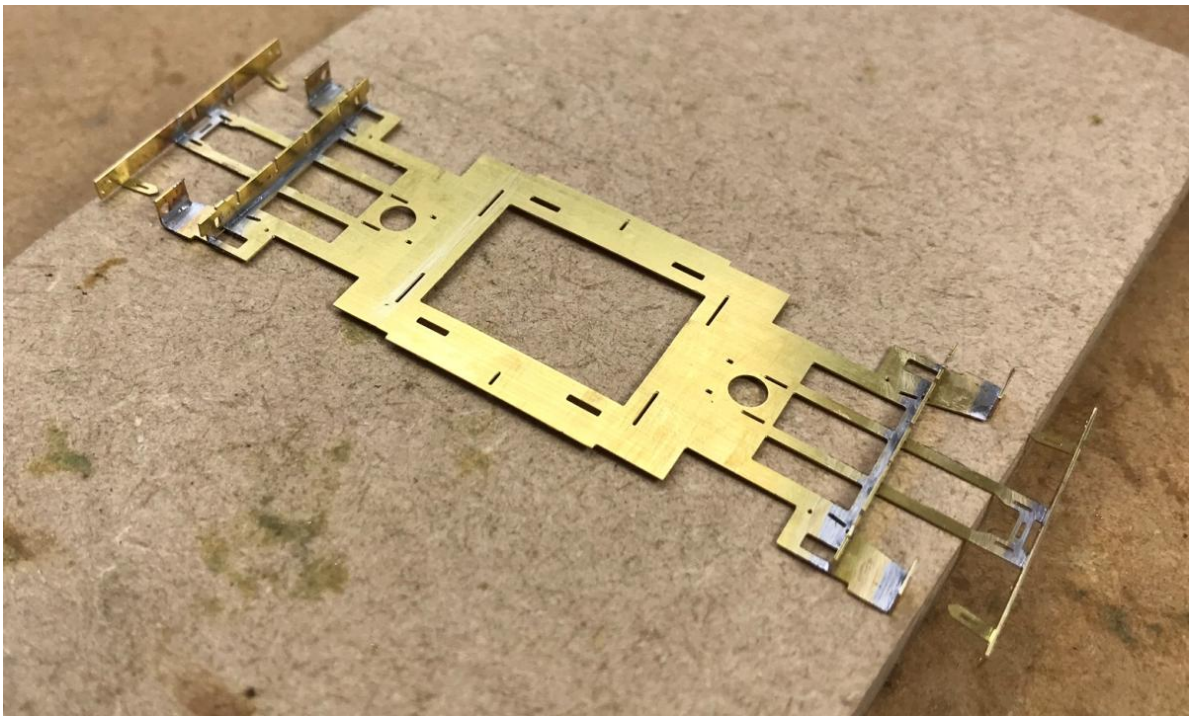
Main Underframe

Start with the bottom plate (1). Remove the small fret in the middle marked 27 and put in a safe place. If you are constructing kit PB.36B (unfitted wagons with the later type hopper opening mechanism) the remove the small areas shaded green in on the headstocks. These are supports for vacuum pipes and are only needed if building a through piped wagon.

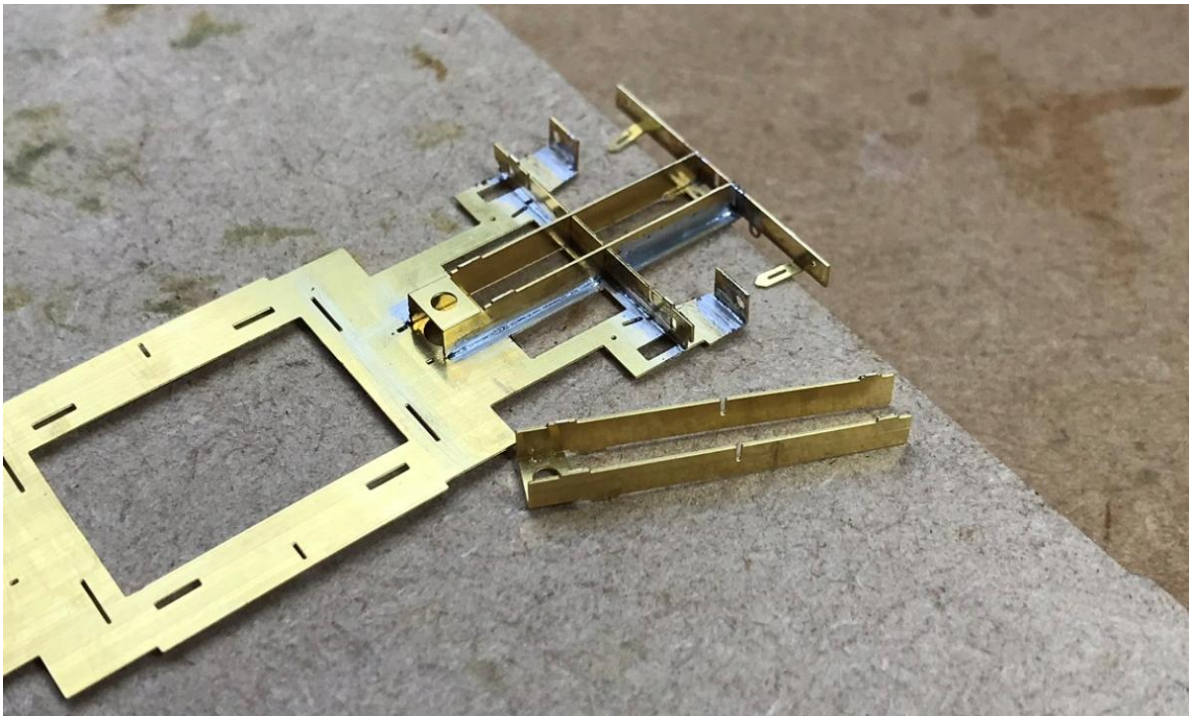


Fold up the areas shaded light blue in Fig.1. Note that the areas in grey should all be flat.

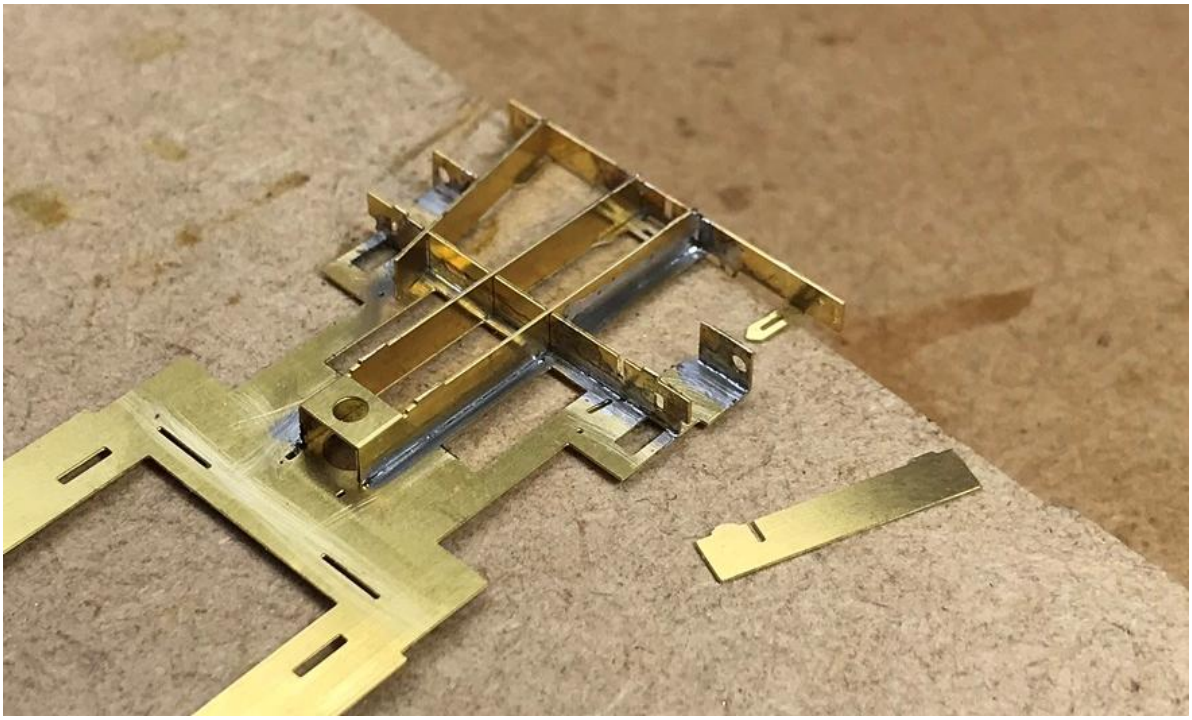
Fit the outer transverse spacers (2) using the tabs and slots provided according to the image below.



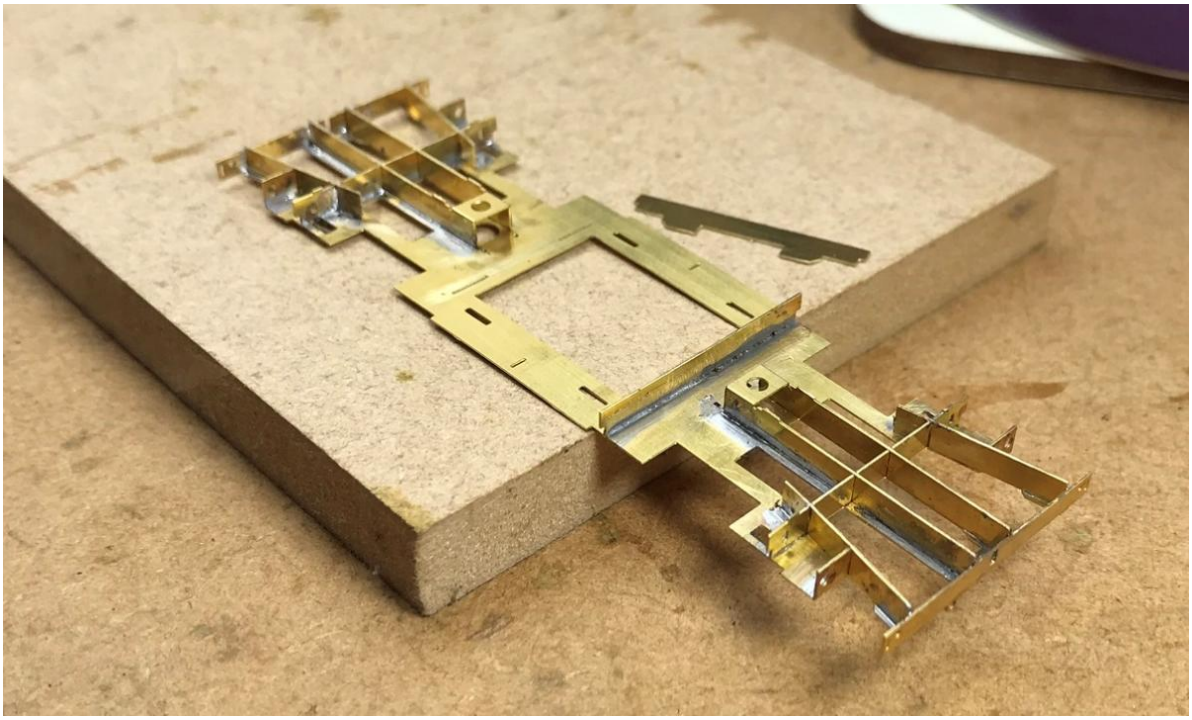
Fold up the end longitudinal spacers (3) and, referring to the image below, fit in place using the tabs and slots that are provided in the bottom plate and outer transverse spacers.



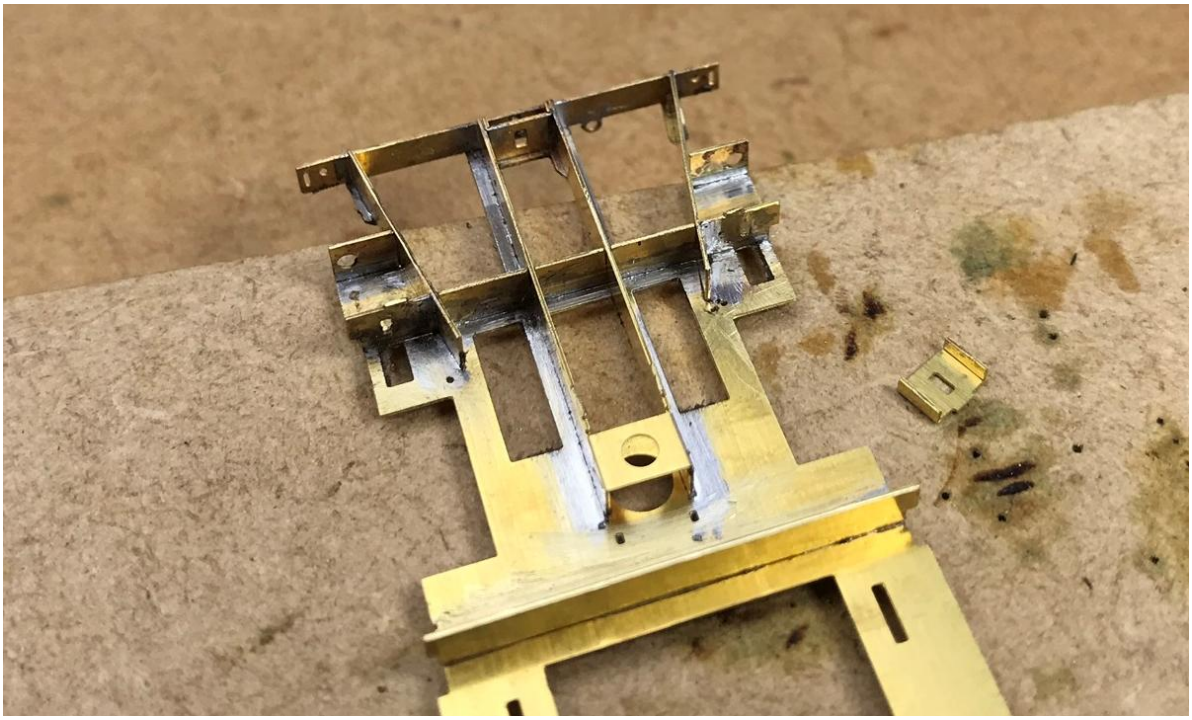
Fit the end angled spacers (4) using the tabs and slots provided. See image below. Note that the location points provided at the headstocks should be at right angles to the headstock.



Fit the inner transverse spacers (5). Note that these will protrude beyond the flat base of the bottom plate so you may want to use a small piece of wood to support the assembly whilst fitting them.



The coupling guide (6) needs to be folded into a C shape and then fitted to the underframe directly behind the headstock and between the longitudinal spacers. There is a slot in the bottom plate to aid this.



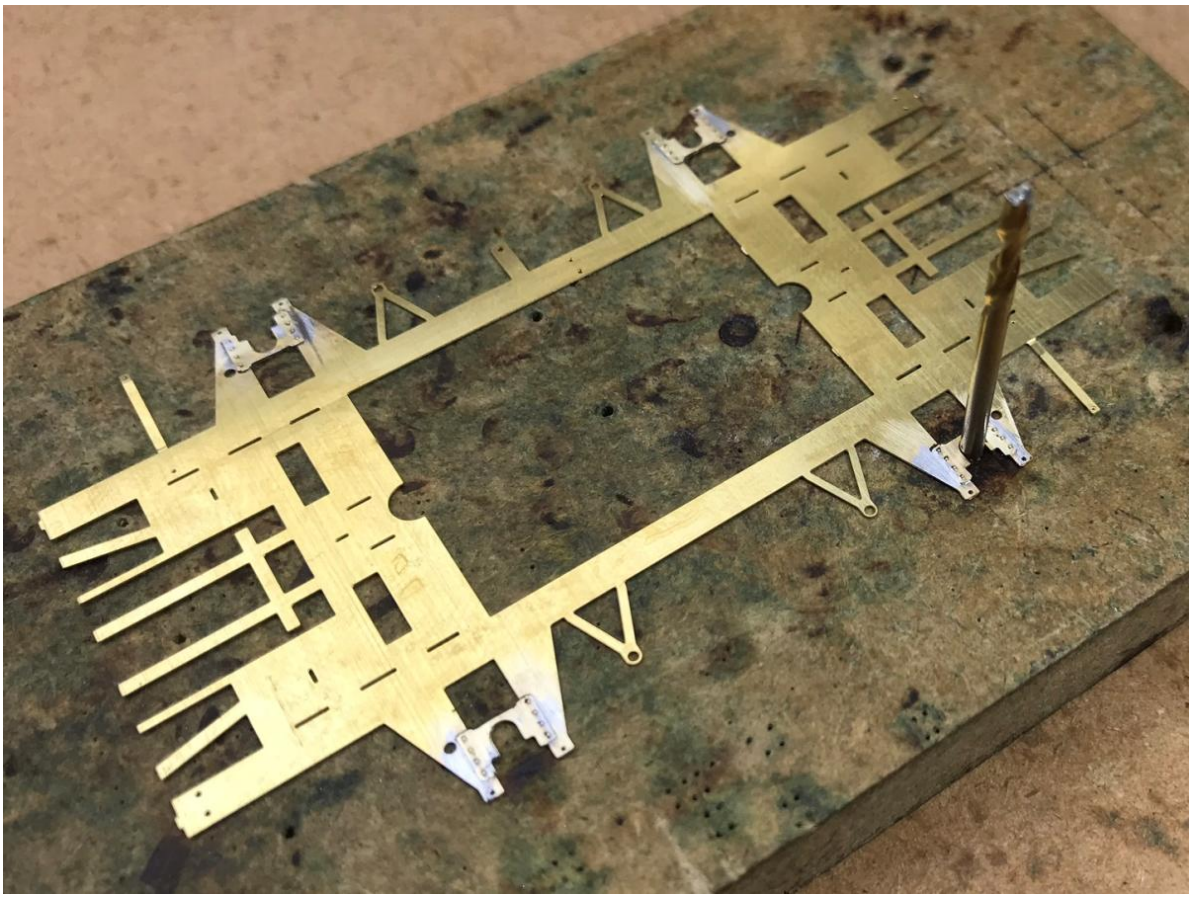
Next is the top plate (7). Before doing any assembling there are some holes that need to be checked.

There are four small holes etched on the outer sides of the axleguards. As far as I can make out all the relevant grain hoppers had these. Some had corresponding holes on the inside of the axleguards. There are half etched holes which can be drilled using a 0.85mm drill if required.

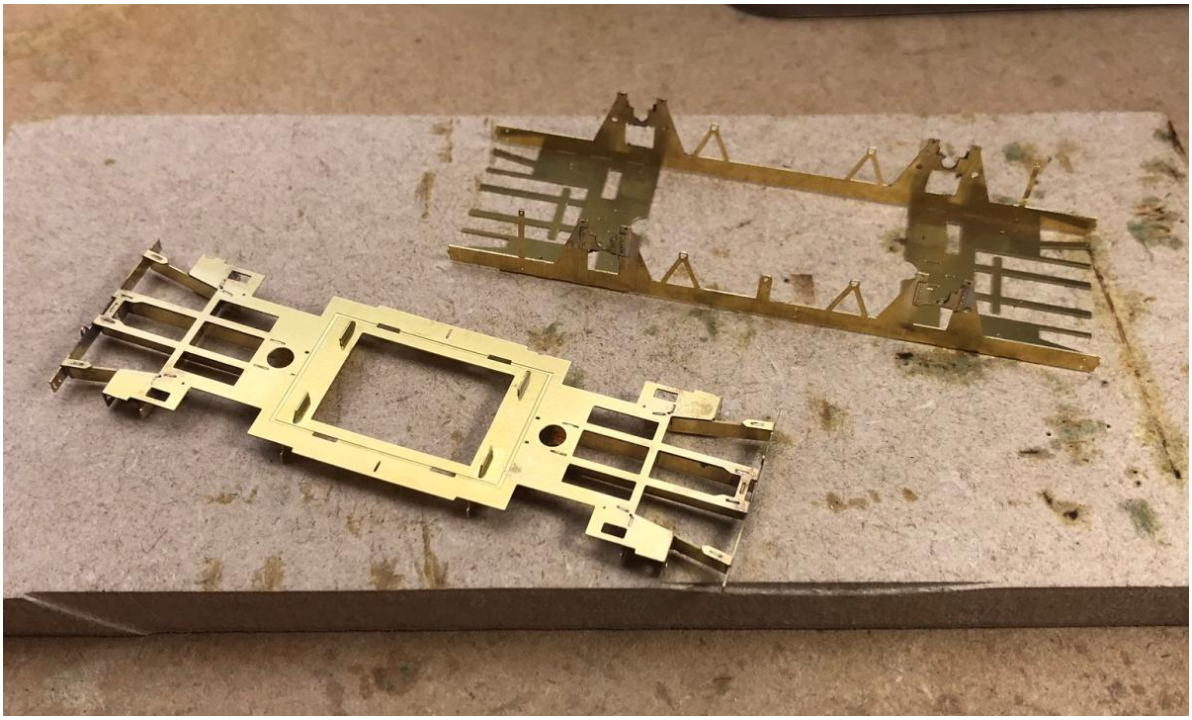
At the very bottom of the axleguards and the brake lever guard stays there are small holes that need to be able to accept 0.31mm wire. Check and adjust if necessary.

In a similar vein the holes in the vees for the brakegear should be able to accept 0.8mm wire and the holes in the central vees (PB.36A) or hopper opening shaft pedestal (PB.36B) should be able to accept 0.5mm wire.

Before folding the top plate up the reinforced axlebox guides (8) need to be fitted. They go on the side of the top plate that doesn't have any fold lines. I find the easiest way to fit them is to hold them and the top plate up against a piece of 2mm rod or a drill bit inserted into a piece of wood. See the image below. Solder in place.

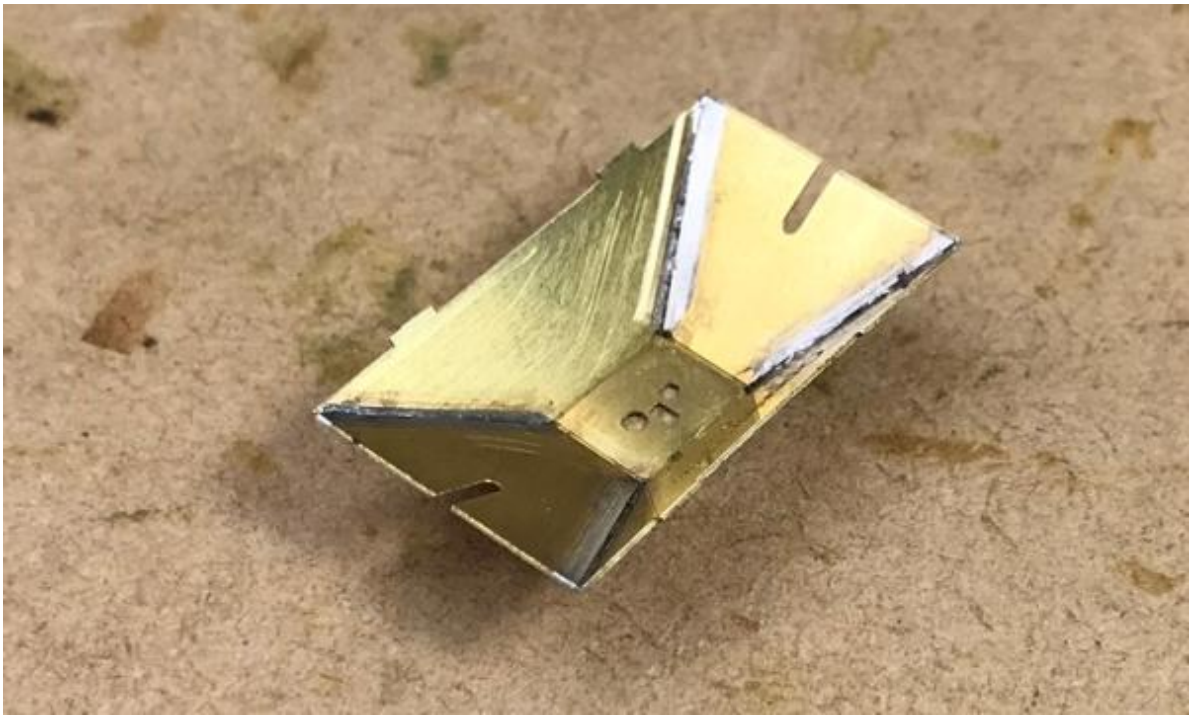


Fold the sides of the top plate up taking care to make sure they are at 90° to the spacers. It's easy to this part to get a twist through it if the four corners are not at 90°. See image below.



Fit the top plate to the underframe assembly and solder in place. There are tabs and slots to help align things.

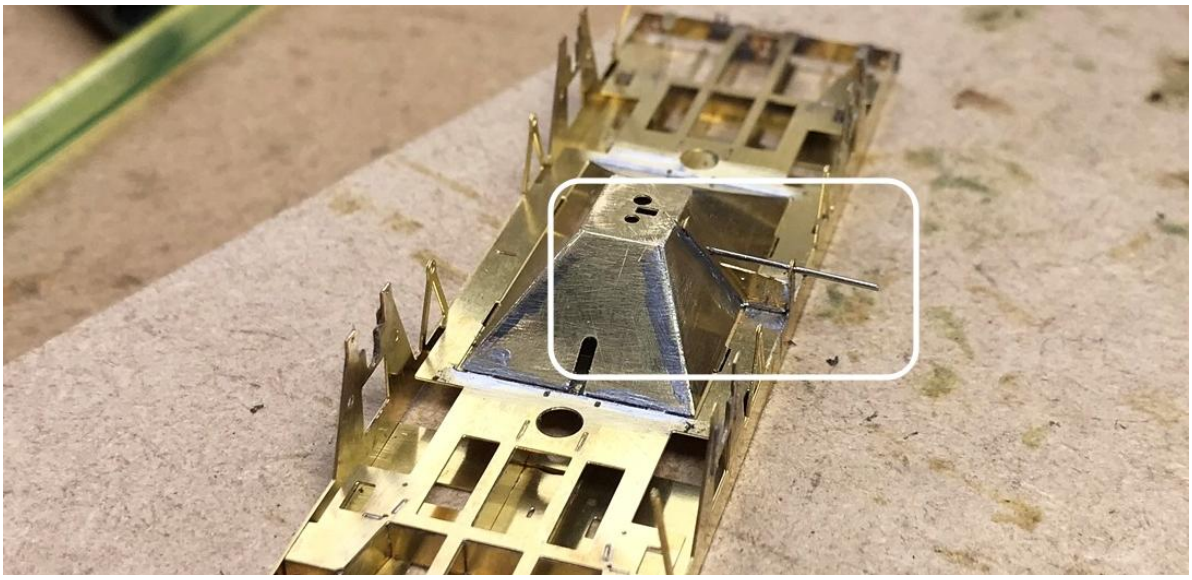
Next fold up the hopper bottom (9) and solder at the joins.



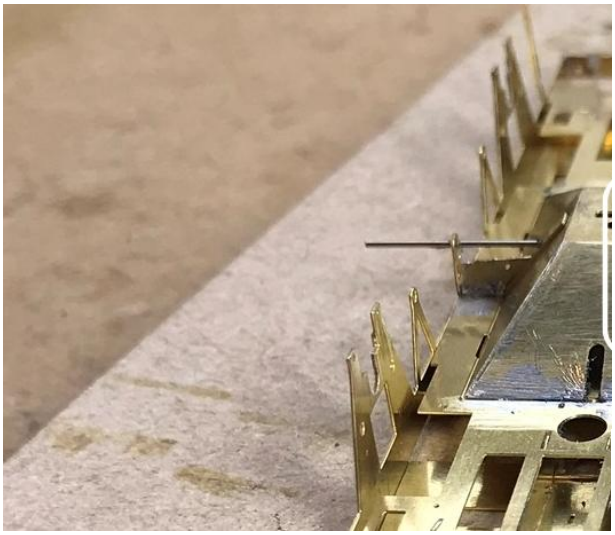
Fit the hopper bottom to the underside of the bottom plate. Note that for kit B.36B there is a correct way around. One side is labelled 'opening side', and this goes the same side as the hopper opening shaft pedestal. For kit B.36A it doesn't matter.

Next the hopper side supports need to be fitted. They consist of two parts, a flat plate that folds and fits up against the side of the hopper bottom and the underside of the bottom plate and then a triangular a trapezoidal shaped parts that forms the web of what is in effect a T section.

Start with the handwheel side. For kit PB.36B this is defined by the hopper opening shaft pedestal, for kit PB.36A it doesn't matter which side it is, but these support angles will then define which side the handwheel goes. Fold up the hopper side plate (handwheel side) (10a) so that it sits against the side of the hopper bottom and the underside of the bottom plate. Note that there are slots in both the hopper side plate and bottom plate which should coincide. Before soldering in place, fit the hopper side angle (handwheel side) (11a) using these slots to locate it. Hold it all in place by way of the angle and solder together.



Repeat for the non-handwheel side using parts 10b and 11b.



Next the hopper opening mechanism (12) needs to be assembled and fitted. Refer to the following three images and Fig.2.

The opening mechanism basically consists of a crank that attaches to the handwheel shaft and a rod that attaches to the door at the bottom of the hopper. This is all represented by a sandwich

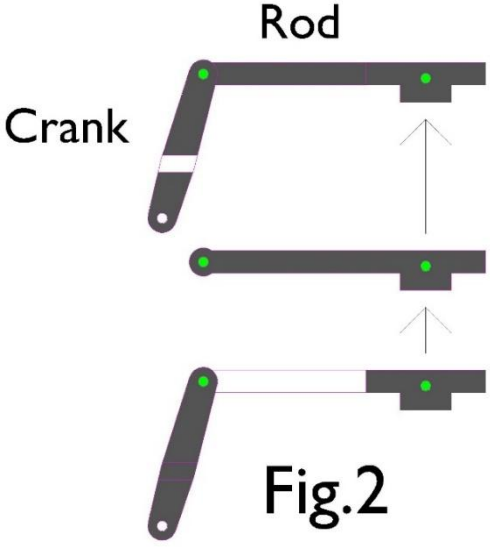


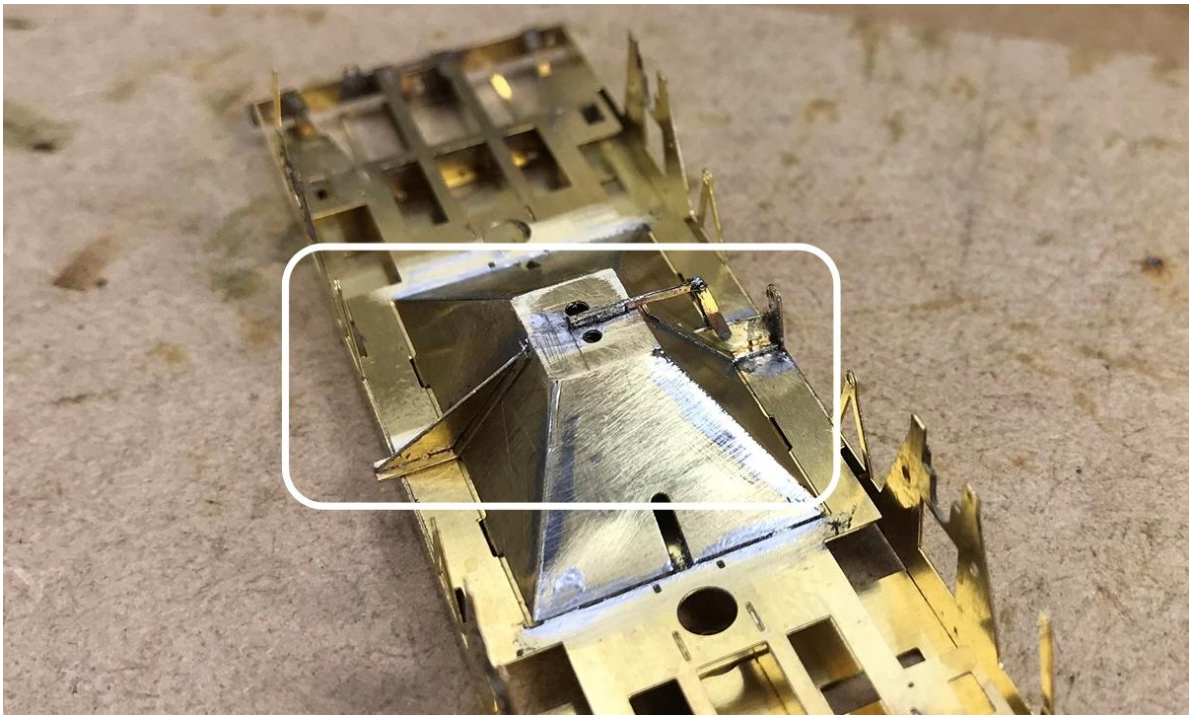
Fig.2

of three parts. The part that goes in the middle of the sandwich is just a representation of the rod part whereas the two that fit on the outside have both the rod and the crank. See Fig.2.

Use three small lengths of 0.31mm wire to pin the parts together whilst assembling. These bits of wire should go through the holes shaded green in Fig.2 not through all as per the images. One of the parts can be used as a jig to drill two holes into a block of wood which can hold the wire whilst assembling. The wire can be cut and filed back to represent bolts when the part is assembled.

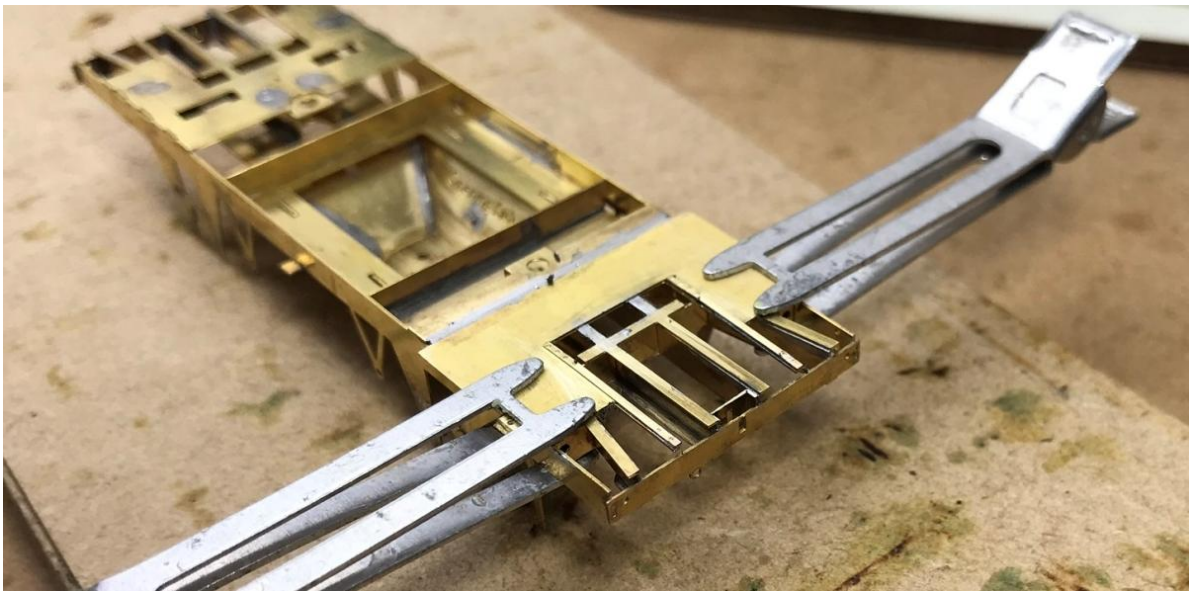
Take care to get the outer parts the right way around. On the outer parts there are two half etched areas, a long rectangular one on the rod parts and a small rectangular one on the other side of the crank parts. The parts need to be arranged so that the large rectangular half etched areas on the rod part are showing.

Fit to the hopper bottom using the tabs on the opening mechanism and the slot in the bottom of the hopper. Note that the two ‘crank’ parts of the opening mechanism go either side of the hopper support angle. The holes in the end of the crank parts and the support angle should coincide. Use a small length of 0.31mm wire to pin the parts together if required, solder in place and trim to represent a bolt. See image below.



A length of 0.5mm wire can now be fitted for the handwheel shaft. On kit PB.36A this goes all the way through the hopper bottom, between the two vees. On kit PB.36B the shaft goes in to one side of the hopper only. Solder in place and trim the wire. Remember to leave the wire 0.5mm or so proud of the vee or pedestal for the handwheel. The handwheel (13) is numbered next but I left fitting it until later to avoid possible damage.

I am a big fan of as many parts as possible being positively located, either using pins or slots and tabs. It makes life so much easier. The chassis top plating (14) is one time where I failed to find a discrete method of arranging for this sort of positive location, apologies. There are eight half etched holes on each top plating that can be pressed out to form rivets. Some aluminium clips are useful for aligning things until you're happy and then solder in place. The full thickness part of the top plating line up with some of the representation of the underframe. See image below.



With the basic underframe assembled you can check the fit on the body. There are cut outs in the top platting that sit behind the outer side stanchions. These may need adjusting to get a good fit.

Spring Carriers, Tiebars and Wheelsets

Some people like to assemble and fit the wheels before the brakegear goes in and are happy to leave the wheels permanently in place. I like to arrange for the wheels to be removable and only really fit them in place after painting. In order to do this any brakegear links that go directly under the wheels will need cutting to allow the axle to pass through. Either way now is as good a time as any to make up the spring carriers and check the fit.

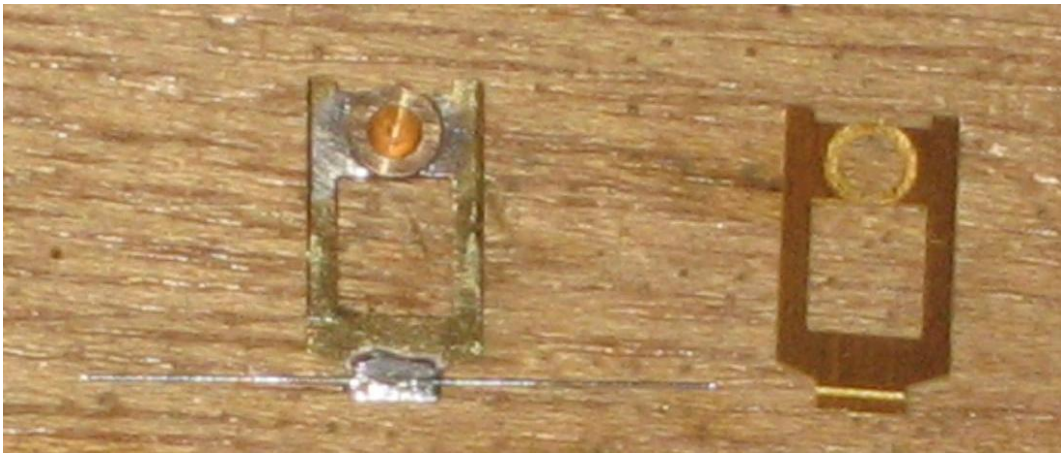
Spring Carriers

The spring carriers (15) 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. They have 2mm holes in them which should be used for pinpoint axles and 2mm OD parallel bearings.

If using pin point axles you may find that the carriers need packing out a little to take up any slop. Bearing washers (16), both half etched and full thickness are included for this purpose. Fit them over the bearing between the spring carrier and the back of the axleguard. There should be a good fit between the axles and the bearings with as little sideways movement as possible. Use a waisted type of bearing. The printed axleboxes are designed for waited bearings and you'll find a standard top hat bearing won't fit. I use Alan Gibson waisted pin point bearings which are nice and deep so you don't have to worry about the bearings being too tight.

Due to the removable nature of the axle guards you can easily use Exactoscale parallel axles and either 2mm OD or 1.5mm OD bearings. If doing so, then you will need to pack the bearings out before soldering them in place due to the length of the axle. Use the bearing washers provided on the opposite side of the spring carriers to the bearing flange. 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. 1.5mm bearings with carriers 38B will need a short length of 2mm x 1.5mm tube soldering in place over the bearings to fit the axleguards properly.

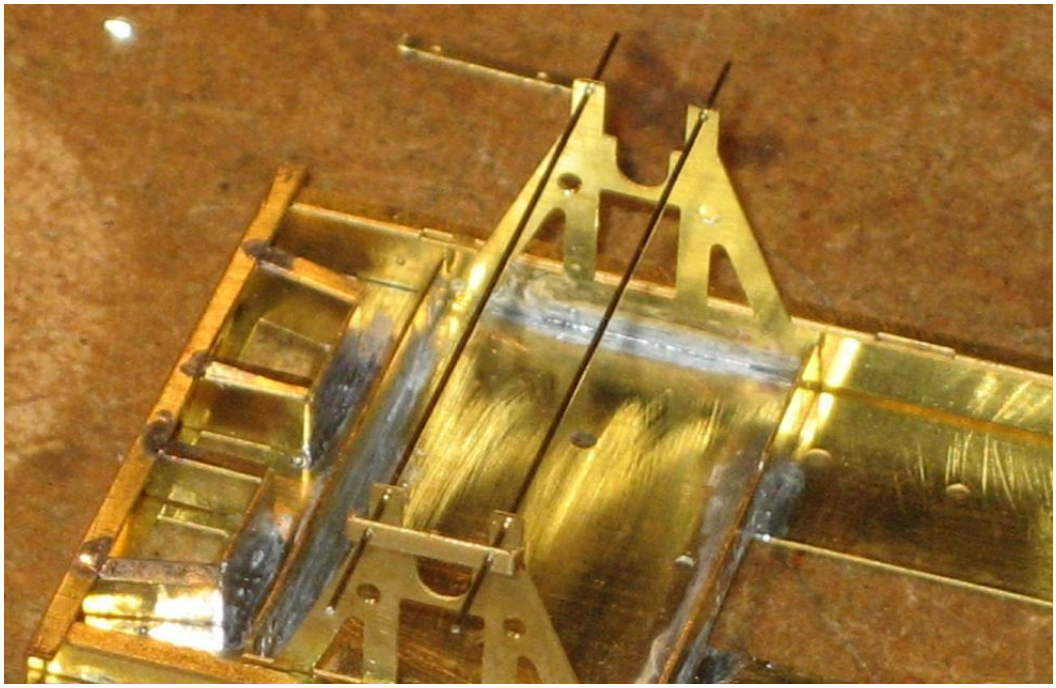
I find the easiest way to assemble the spring carriers is to make a small jig consisting of an off cut of wood with a 2mm hole drilled into it. The spring carrier can then be placed so that the bearing locates through the hole in the carrier and into the wood. The bearing can then be soldered in place. The spring wire can be located in its half etched guide slot and soldered in place using a suitable flux. I use Carr's black label. You are aiming for a spring wire that is 21mm long, located centrally on the spring carrier.



Tiebars

The tiebars (17) are designed to be removable if you wish, to allow the wheel sets to be easily dropped out. They can of course 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. Tiebars are fairly vulnerable, so in order to strengthen them I have included a slot on the back into which you can solder a length of 0.31mm wire. This will make them a lot more robust.

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 a tiebar and holes in an axleguard and then the corresponding holes on the opposite axleguard. Solder in place. Fit the other tiebar and solder in place. Trim the wire so that it represents bolt heads on the tie bars but extends approximately 0.75mm 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 tiebar 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.

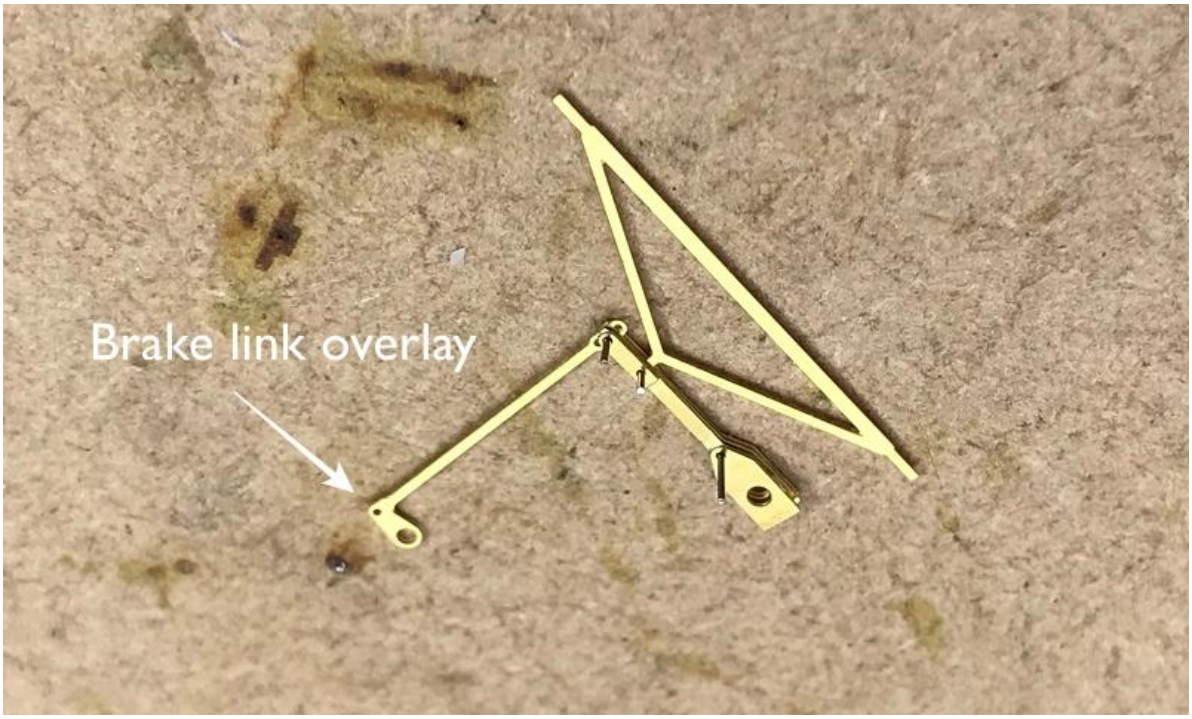
Fold the ends of the tiebars and locate four short lengths of 0.31mm wire through the holes in the tiebar and into the holes drilled into the wood. Solder the wire in place and solder a length of 0.31mm wire into the slot in the back to strengthen the tiebar. Trim three of the wires back so that there is at least 0.75mm of wire projecting from the back of the axleguards otherwise the spring carriers will be able to fall out of place when everything is assembled. It is a good idea to leave one of the pins in the tiebar as long as possible to give you somewhere to hold them when painting. Remove from the jig and trim the other ends of the wires to represent bolt heads.

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.

Brakegear

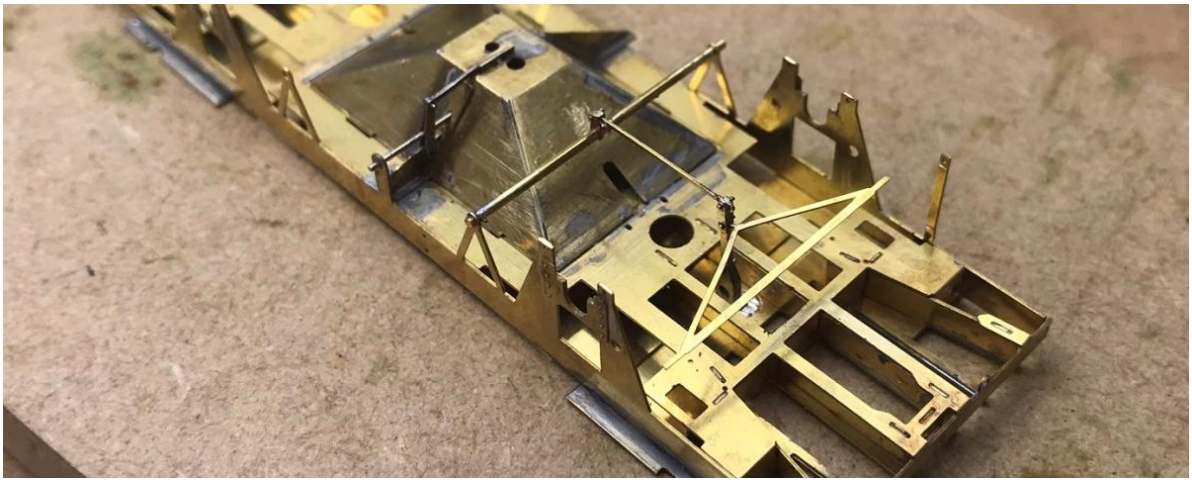
As mentioned earlier I tend to assemble the brakegear without the wheels in place and then split any links for the axles as necessary. You can of course fit the brakegear with the wheels in place if you wish.

The brake links need assembling and fitting along with their safety loops. The brake links consist of three parts: brake links (18), brake hanger overlays (19) and brake link overlays (20). Make sure the small holes can accept 0.31mm wire and the larger hole on the crank opposite to the yokes can accept 0.8mm wire. Fit the two hanger overlays to the links using three lengths of 0.31mm wire to align them. Again, a jig can be made by using the links to drill three 0.3mm holes into a piece of wood to hold the wire whilst soldering together. See image below.



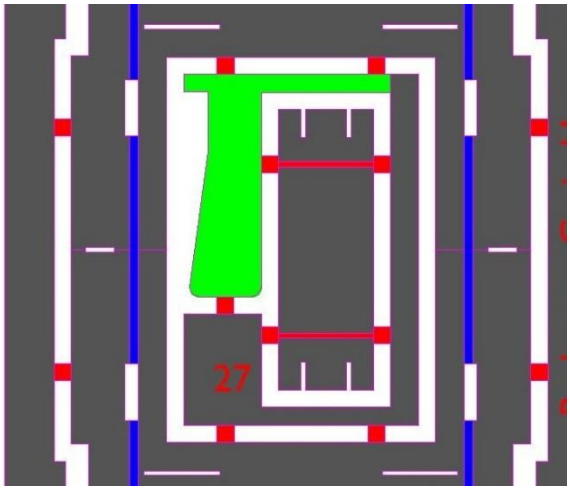
Next fold up and fit the brake link overlays. These are designed to wrap around the brake links with the half etched area on the outside and then they can be pinned in place using the holes with 0.31mm wire. See above image for position. They are fiendish and there are no points deducted for not worrying about them. I find a small, tapered broach useful when trying to line them up.

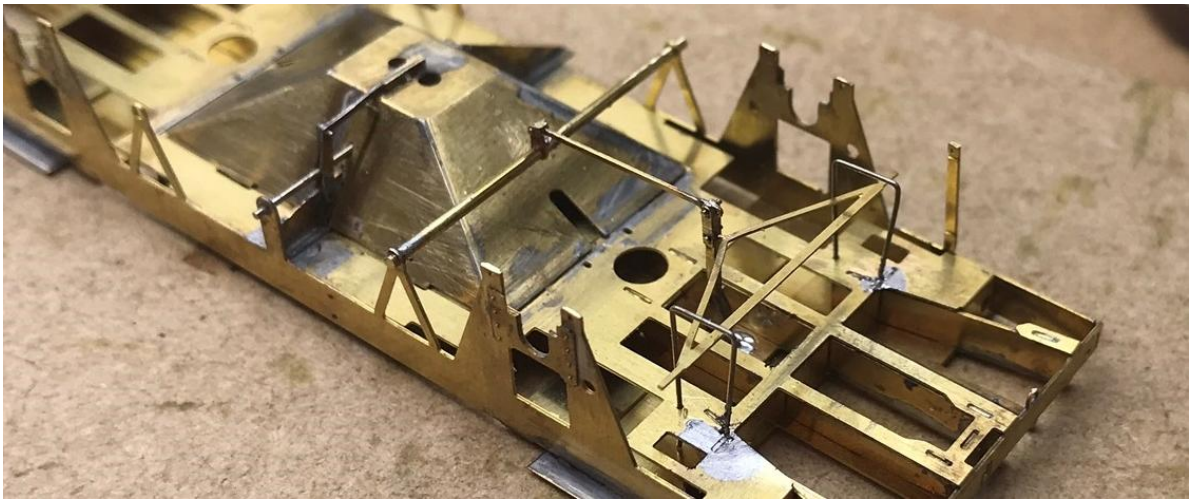
Fit the assembled brake links in place with a length of 0.8mm wire for the brake shaft. Remember to leave the brake shaft long were the brake lever goes. There is a tab on the bottom of the brake links and a slot on the underframe op plate to help alignment. Solder in place.



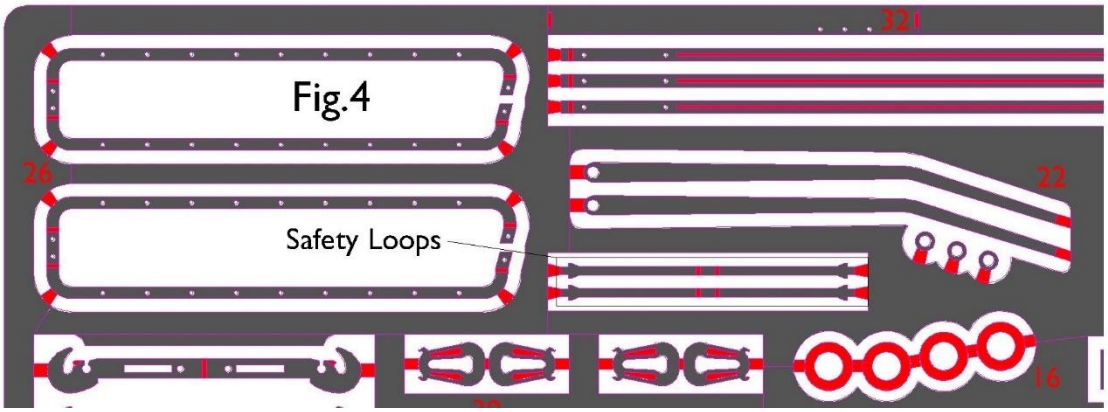
The brakegear safety loops can be fitted next. There are two for each of the brake yokes that can be fashioned out of 0.31mm wire. A jig is included to get the right shape. This is the area shaded green in Fig.3 and is on the small fret that was removed from the middle of the underframe bottom plate at the beginning. There are holes in the bottom plate beneath the brake yokes to aid location. Solder in place. See image below.

Fig.3

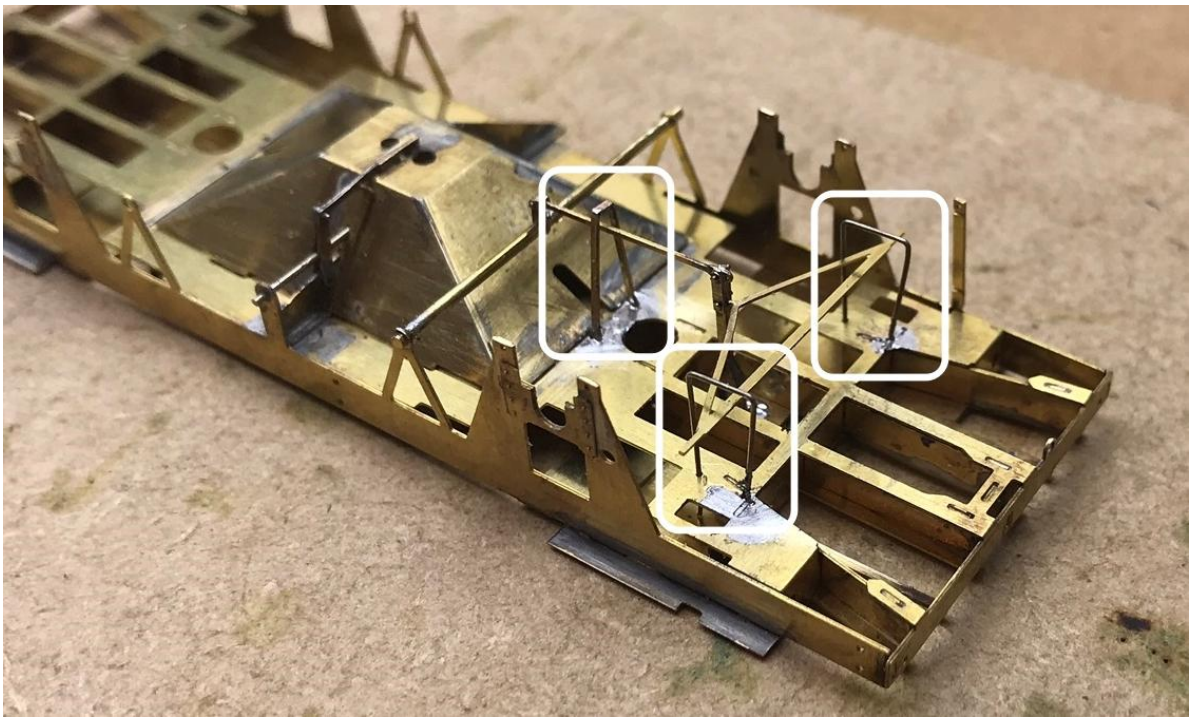




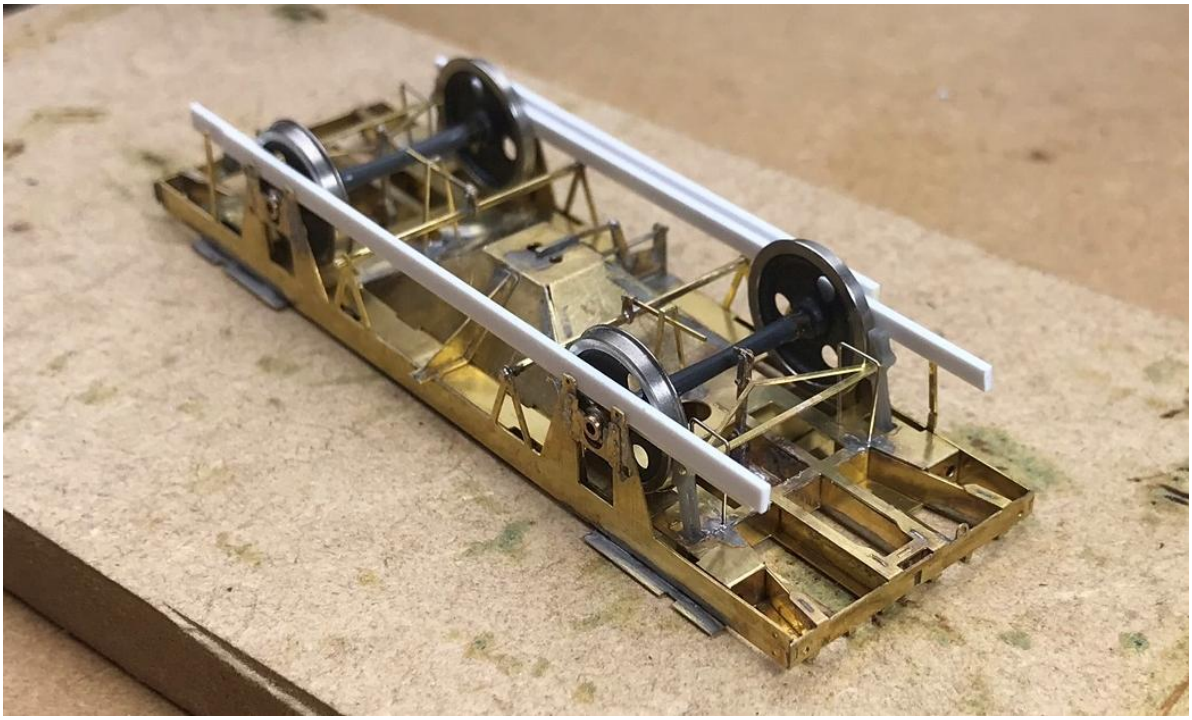
There are also safety loops for the rod that links the brake shaft crank with the brake hangers. For some reason they didn't get a number on the fret. For their location see Fig. 4.



The safety loops fold up into a _/ shape and fit as per the image below. There are tabs and slots to aid location. See image below.



The next job is to fit the printed brake shoes. Remove from the supports and clean up their remnants with some wet and dry paper or a fine file. There are holes in the brake shoes for the ends of the brake yokes to pass through. Make sure these are 0.5mm in diameter. Use a drill or tapered broach to make sure. There are tabs on the brake shoes and slots in the outer transverse spacers to locate them. The shoes can be epoxied or superglued in place. I used epoxy and arranged for some plasticard beams to fit between the wheels and axleguards to stop the brake shoes from falling over. This was probably overkill on my part but you need to make sure they are in the correct position in relation to the edges and treads of the wheels as you won't be able to adjust them once the glue has set.

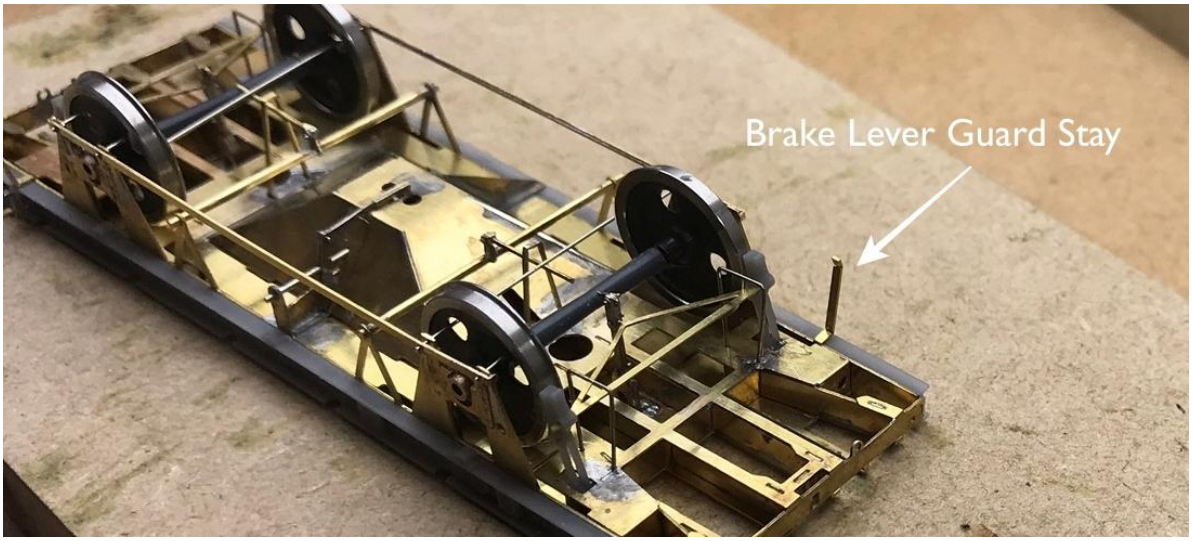


The printed solebars need to be fitted next. They need to be removed from their supports and the backs of them cleaned up with wet and dry paper. Use water to contain any dust. I do this by laying a piece of wet and dry paper on the workbench and the holding the solebar flat against it, moving it gently along its length. The printed resin sands very easily so go easy. The solebar should be such that the thickness of the back should be 0.5mm.

Note that the two solebars are different. There are indentations in them which will turn into holes for locating the steps. There are two steps on the hopper inspection cover side and one on the other. The holes for these are etched into the sides of the underframe. Make a note of where they are. Make sure the solebars go on the right side as they will need to be drilled out to pin the steps in place. You may also find the solebars are a little long. File or sand them equally at each end so they fit nicely between the etched headstock backs.

When happy glue them in place. I used superglue to fit mine.

Drill out the indentations for the steps 0.3mm. The drill should pass through the holes etched into the side of the underframe. The holes are arranged in vertical pairs. Also drill out the indentation in the brake lever guard bracket, this will be used to located the lever guard.



The stays for the lever guards need to be folded up. They should sit against the bottom of the solebar and then be angled out slightly. They can be adjusted when the lever guard is actually fitted. See image above.

Brake Lever Guards, Springs/axleboxes & Brake Levers

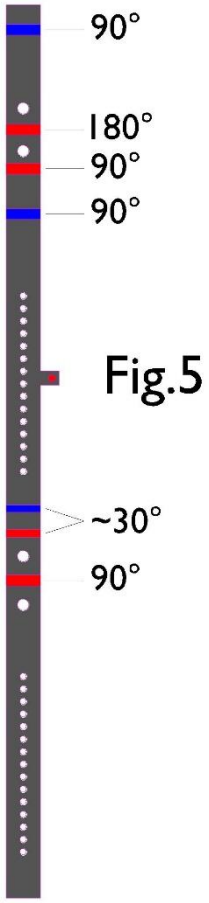
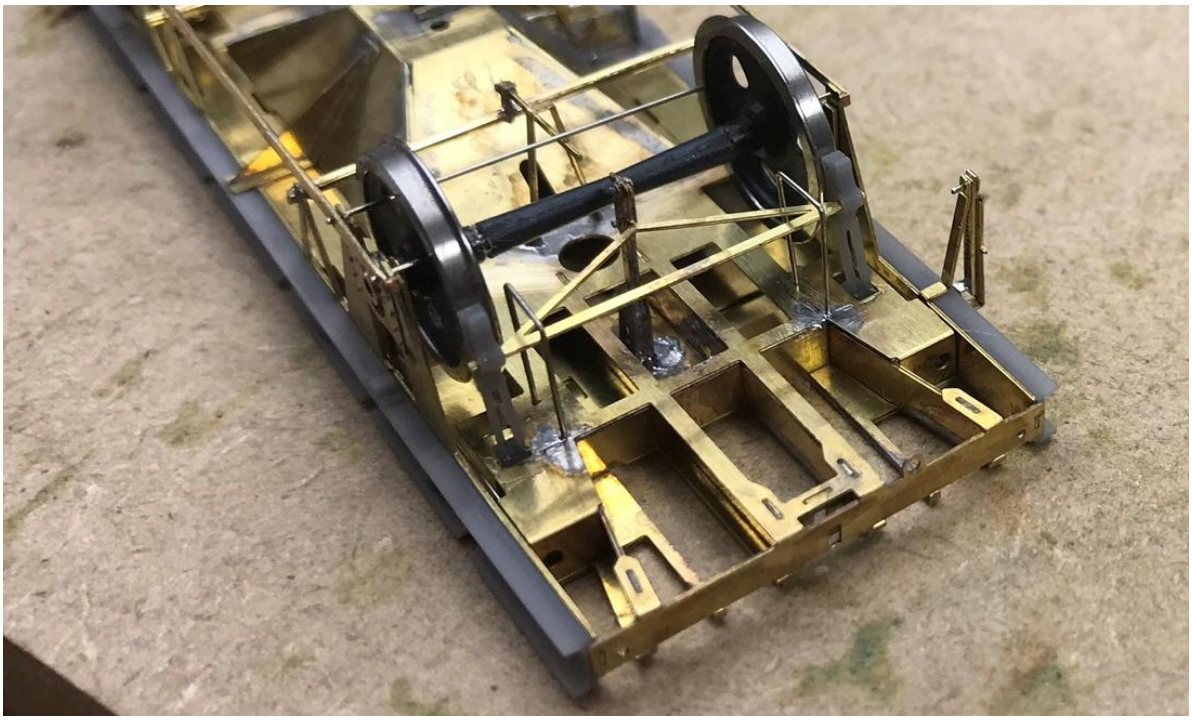


Fig.5

The brake lever guards (21) need folding up and wire soldering to them so that they can be pinned in place against the printed lever guard bracket and stay. Make sure the four larger holes can accept 0.31mm wire and then fold up using Fig.5 as a guide. I find it easiest to start in the middle and then work towards the bottom. When the lower half is done repeat for the top. Note that all of the folds are with the fold lines on the inside except for the 180° fold where the line should be on the outside. Once folded up solder together at the place where the two halves meets. Solder a length of 0.31mm wire into the top hole and another into the bottom holes. The wire should extend 0.75mm form the back of the lever guard and be filled back to represent a bolt head at the front.

Once assembled the lever guards can be fitted in place using the holes in the printed lever guard brackets and the stays to locate them. I quickly soldered the lever guard to the stay and used a small amount of superglue to fix the top against the bracket. You can glue both ends if you like though.



Next fit the printed springs and axleboxes. Remove from the supports and clean up. The axleboxes have been slotted to clear any bearings and this shouldn't need adjusting at all. I superglued mine in place using a piece of 2mm rod placed in the slots in the axleguards to help locate them. Make sure the spring brackets are hard up against the bottom of the solebar. If you find the slot needs a little adjusting it can be pared back with a sharp scalpel.

With the springs and axleboxes fitted the brake levers can be bent up and fitted in place. They should be bent as per the image above to clear the axlebox and ten cranked for the handle. The part that is directly in front of the axlebox should be approximately 3mm from the front face of the axleguard.

Ignore the four pieces of white plasticard in the above image. I added these to represent the brackets that bolt the hopper sides to the underframe as these weren't on the test prints. They are on the production solebar prints.

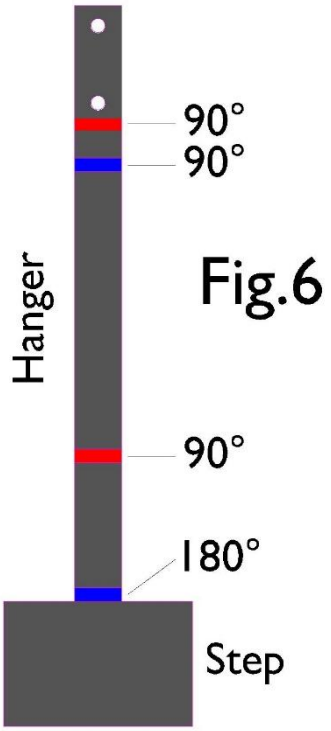
Steps

The footsteps (23) are a one piece fold up affair that are designed to be pinned to the 3D printed solebar using 0.31mm wire. As mentioned earlier you will need 3. One at the left hand end of each solebar and one under the inspection cover. Note Fig.6 for the various folds but not all are made at once.

Make sure the two holes can accept 0.31mm wire. Start at the end with the step. Fold the step through 180° with the fold line on the outside. Then fold the next line though 90° so the hanger is against back of the step. Solder the step to the hanger underneath and at the back.

Use one of the footsteps to drill a pair of 0.3mm holes into a piece of wood. This will act as a jig to hold the 0.31mm wire pins.

Lay the footstep against the jig and insert two short lengths of 0.31mm wire through the two holes an into the wood. See image below. Solder the wire in place, trim and file back to represent bolt heads.



Next fold the line in the hanger closest to the pins through 90°. Reinforce this line with solder.

Finally make the last fold through 90° and reinforce with solder.

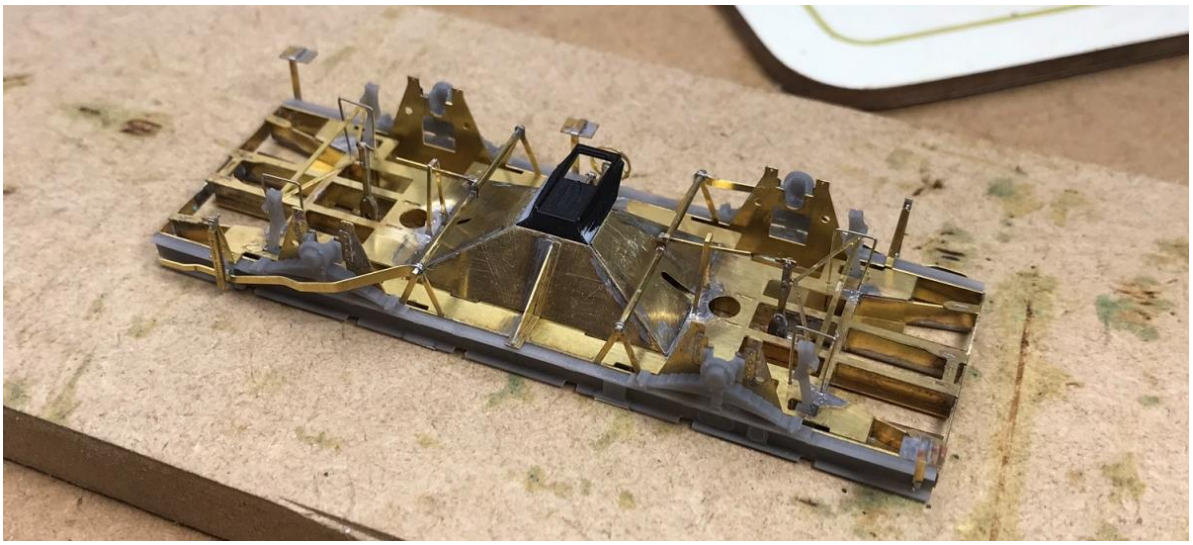
The steps can then be fitted in place using the holes in the solebars as a location point. If things are a bit tight when fitting them open the holes out a bit. Use superglue to fix them in place.

Hopper Handwheel

Now is a good time to fit the hopper handwheel (13) mentioned earlier. The real things were dished and an easy way to represent this is to insert a short length of 0.5mm wire into a pin vice, place the handwheel on the wire and then press against the end of the pin vice. This should dish it.

The handwheel can then be fitted to the hopper opening mechanism shaft and glued in place.

You will also need to rescue the hopper door cover form the Bachmann underframe and fit in place on the hopper bottom.



Bodywork

There are some general improvements that can be made to the Bachmann body which might be worth considering before dealing with the specific items included in the kit.

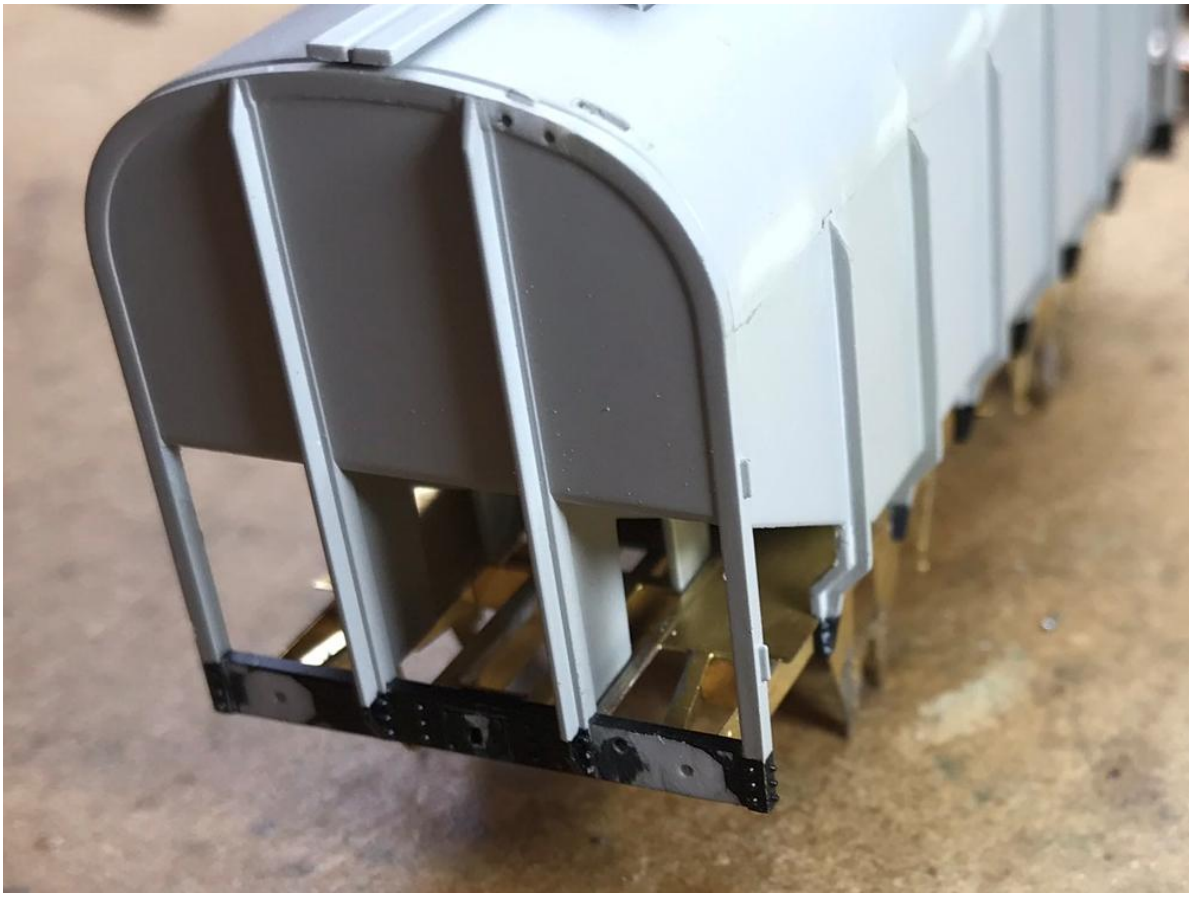
The moulded handrails can be replaced with some made from 0.31mm and the outer angled stanchions on the sides can be improved by removing material from behind them just below the hopper. They should be as per the image below and it makes a big difference to the appearance of the model. Others have poured scorn on Bachmann for the way they did this but I'm not sure how they would have got the body from the mould otherwise, the alternative would have been to mould the stanchions separately which creates different problems. A few minutes work with a file will remedy the situation.

Buffer Jig & Ladders

If you are going to replace the buffers with something that's either sprung or more realistic/suitable then, once you have carved the moulded ones off you will need to create holes to receive the new buffers. A buffer drilling jig (24) is included to achieve this.

Fold the drilling jig up and place it against the headstock, between the middle and outer end stanchions with the holes on the face of the headstock and the other part of the jig on the underside. Drill through the outermost hole in the jig using a 1mm drill. The holes can then be enlarged to suit the buffers you are using. Note that if you are using cast buffers or my Oleo housings this will be 2mm. If you are using my spindle buffer housings then this may be less. Check before enlarging.

Before fitting the buffers, some location points need to be created for the ladders. A ladder drilling jig (25) is included. Like the buffer jig this folds up and the long side fits against the end of the wagon with the little fold under against the bottom of the headstock. The jig should go hard up against the outer edge of the right hand side middle stanchion. Use a 0.3mm drill to drill through the four holes except if constructing a through piped wagon where you should only drill through the top pair. The bottom fixing for the through piped ladders was of a different arrangement due to the use of larger Oleo or Dowty buffers.



Next make up the ladders (26). The procedure basically the same for the standard and through piped ladders. Make sure all the holes can accept 0.31mm wire. I simply run a 0.3mm drill through them in a hand held electric mini drill. Next fold up the ladder assembly jig (27). The ladder is assembled by placing the sides of the ladder into the jig and inserting lengths of 0.31mm wire through the holes. You can make sure things are square by pulling one of the wire rungs up against the edge of one side of the jig. Solder in place. See image below. I tend to do the rungs one at a time. When all the rungs are in place, trim the wire and the file flush.

You will need to create wire location pins at the top and the bottom of the ladder in a similar manner to the steps and brake lever guard. File the wire to represent bolts on the outside. For the through piped ladders, you need to do this only at the top.

There are two small rectangular plates on the through pipped ladder etch with small notches in either side offset from the centre. These are the base of the through piped ladders. There are two tiny tabs on the bottom of these ladders which fit into these notches. The plate should go so that the long edge closets to the notches is towards the ladder. Solder in place. The plate sits on top of the headstock.

The completed ladder can then be fitted into the holes drilled in the ends. I left finally gluing in place of mine until after painting.

Buffers

The buffers can be fitted now or left until after painting. If using my printed buffer housings you will need to run a drill through the holes to make sure they are opened out properly. For spindle buffers this should be 1mm and for the Oleos, 1.45mm. Make sure you use a sharp drill and go easy with the Oleos as the walls are quite thin (as they are on the prototype).

If springing the buffers and you want to use the cosmetic buffer springs (see below) then use a thin walled brass tube (0.7x0.5mm is ideal) to retain them heads.

Through Piped Wagon Detailing

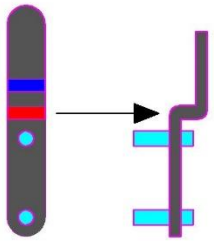
On the through piped ladder fret there are dummy vacuum pipe couplings and lamp irons included.

The BR swan neck vacuum pipe brackets come in three parts. There is a hanger with two holes in that attaches to the headstock and then two dummy couplings which have a round centre with two ‘tails’ that fold up. One of the dummy couplings has a slot in the middle, this attaches to the hanger via a tab. The other is for use if you are making your own pipes from 0.8mm wire of tube as I do.

Press out the rivet on the hanger and remove from the fret. Twist the base of the bracket through 90° so that the interface with the head faces away from the rivets. Next solder two short lengths of 0.31mm wire in place to act as locating pins. Do this by drilling two holes into a piece of wood as per items such as the steps. This hanger can then be soldered to the back of the dummy coupling with the slot (the side with no half etched areas). It is easiest to do this while the dummy coupling is still attached to the fret. Once soldered in place the assembly can be removed from the fret and the ‘tails’ on the head folded out. If you’re brave these fold lines can be reinforced by the use of a very small quantity of solder and a very quick soldering iron. Some step soldering might be a good idea but I haven’t encountered many issues with just using 145° solder and very often don’t bother reinforcing these fold lines.

There is a drilling jig is labelled on the fret for drilling holes into the headstock to receive the locating pins.
Lamp irons are included for fitting to the body ends if required. When constructed I don’t think these wagons were XP rated and if so, they didn’t have lamp irons. Some/all may have acquired them towards the end of the 60s when guards vans no longer needed to be on the end of fully fitted freights. I have seen images of them fitted to wagons in the 70s, half way up the left hand middle end stanchion.

Fig.7



There are two types, 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 isn't very strong and can easily be broken but others do so they are included. If pinning them in place, check that the holes will accept 0.31mm wire and remove from the fret and fold up as per Fig. 7. Two short lengths of 0.31mm wire can be soldered in the holes and then the lamp iron soldered in place on the body using the etched receiving holes on the body ends to align them. Trim the 0.31mm wire to represent bolt heads. If pressing out the half etched holes then do that and fold up as per Fig.7.

As per the dummy vacuum pipe coupling a drilling jig is labelled on the fret for drilling holes to receive locating pins.

Hopper End Support Angle

The plates that sit behind the middle end stanchions on the real thing are connected to the underframe by angle. The side of this angle is missing from the Bachmann body. I have included etched hopper end support angles (28). To be honest they are a right fiddle to fit as they don't sit at the bottom of the plates on the Bachmann Body. There is a correct way around, the wider spaced rivets are towards the outside of the wagon. I superglued mine in place. Some needed a few goes to get right.

Final Underframe Details

Cosmetic Buffer Springs

The buffer springs on these wagons were open to see. I have included cosmetic printed buffer springs. There are small holes on the outer transverse spacers which are designed to accept the little spigots on the back of the buffers. I find these easier to paint and then fit after fitting the buffer heads. Remember to use a thin walled tube to retain any sprung buffer head. The cosmetic springs may not fit otherwise.

Couplings

Coupling hooks (29) are included with the underframes. These fold double with the fold through 180° and the fold line on the outside. Solder together and dress the coupling hook with a file to better represent a casting. The coupling hooks can be retained by a short length of 0.5mm wire bent into a U shape and inserted into the hole in the hook. This wire should be hard up against the coupling guide (6) on the underframe.

The unfitted wagons were fitted with 3 link couplings when built. You can make your own links from 0.45 or 0.5mm wire or Brassmasters sell already blackened link. Contact details can be found at the end of the instruction.

Instanter links (30) are also included. As with the coupling hooks they are designed to fold double and the two halves soldered together. These were not fitted to new wagons but became common in the 60s.

Screw couplings for the through piped wagon are available from Rumney Models (code B.96).

Justin Newitt - October 2021

Suppliers List

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

Eileen's Emporium (brass wire and tube)
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
PO Box 70
Barton upon Humber
DN18 5XY
www.wizardmodels.ltd

Brassmasters (coupling links)
PO Box 1137
Sutton Coldfield
West Midlands
B76 1FU
www.brassmasters.co.uk

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

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

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

Fox Transfers
Unit 5 Priory Business Park
Wistow Road
Kibworth
Leicestershire
LE8 0RX
www.fox-transfers.co.uk