

MISCELLANY MODELS

& Rumney Models

I keep all of my instructions under review and it is likely that these will be updated in the future; thus, please check for most up to date instructions at www.miscellanymodels.com

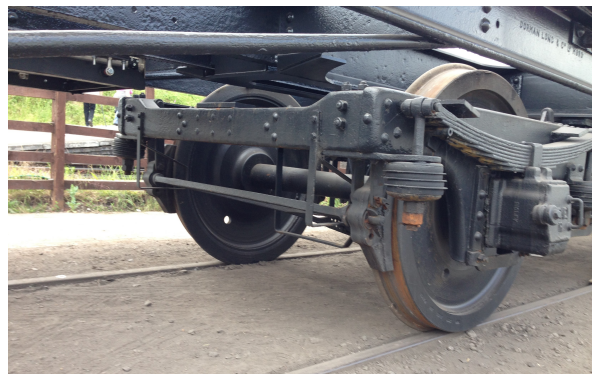
Coach 2 – 8 Foot Fox Patent Bogies

Prototype

First patented by Englishman Samson Fox in 1893, the Fox bogie represented a significant step forward in technology for the time. It was forged from a single sheet of steel that was pressed into a channel section to achieve the necessary stiffness required of a bogie. As a result, the majority of pre-grouping companies used them with only minimal detail differences.



Fox Bogie to NBR Holmes Bogie Coach on the Strathspey Railway



Fox Bogie to NER Railcar on the Great Central Railway



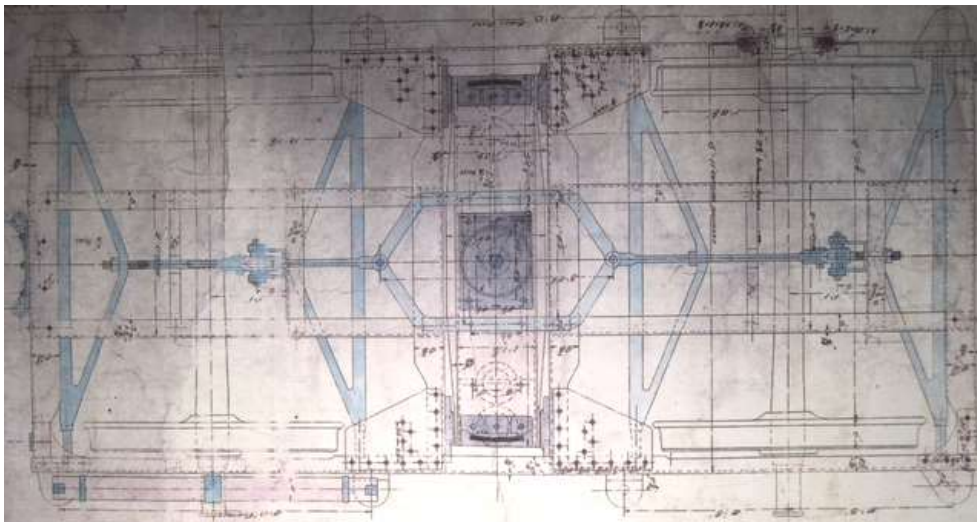
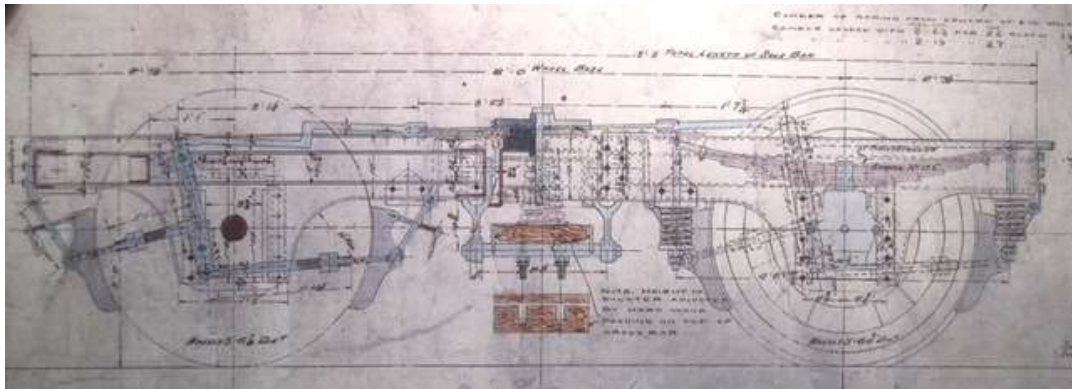
Fox Bogie on ECJS coaches in the National Collection (left) and NYMR (right)

Miscellany Models & Rumney Models – Instructions for Rolling Stock 4 – 8 Foot Fox Bogies

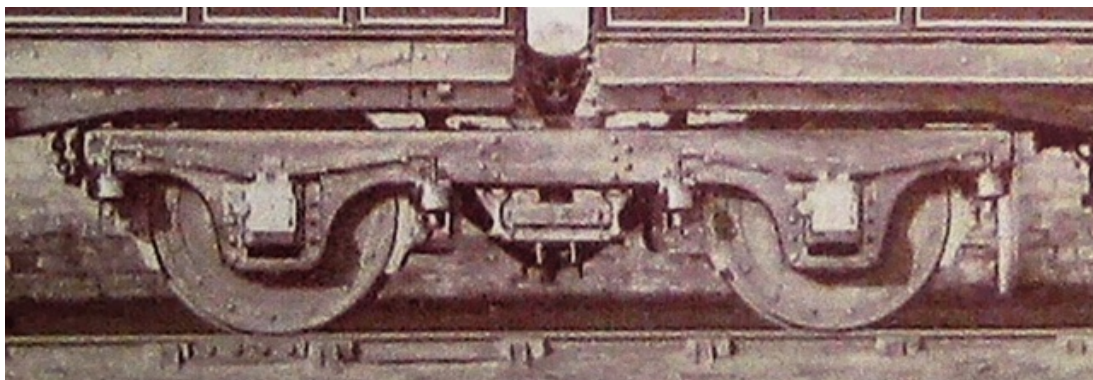
The bogies incorporated primary suspension by way of bolster springs that acted at the centre of the bogie and then secondary suspension on the axleboxes which were damped by way of rubber compression units (the cylinders at the ends of the leaf springs).

The differences that did occur between different company's bogies principally related to the axleboxes used and also the bolster details. These are not provided in the basic kit but see below for some suggested sources and the pictures above illustrate some examples. There were a few differences in the exact locations of the rivets that secured the components together (especially around the mount for the bolster) and at least the NBR version had a reinforcement plate – which is provided in the kit.

Footboards were often fitted to these bogies, but not always and many of them subsequently had them partially or totally removed. The kit includes a pair of options for the cosmetic sides, for those with footboards and those without. These footboards also came fitted at different heights – certainly on the NER anyway. It is possible to modify the kit to accommodate this, although some of the ease of construction is lost in doing so.



Drawings of a GNR Fox bogie (note a slightly different bolster) and a picture of one under an articulated set.



Component List

- 1 Main bogie assembly
- 2 Bolster guide
- 3 Bolster
- 4 Cosmetic bogie sides a) with full footsteps – 2no
 b) with footstep to one side and one end only – 2no
- 5 Cosmetic bogie end outers – 2no
- 6 Spring carriers – 4no + 1no spare
- 7 Footsteps – 2no
- 8 Axlebox spring dampers (large) – 18no (plus plenty spare)
- 9 Axlebox spring dampers (small) – 18no (plus plenty spare)
- 10 Brake shoes (outer) – 4no pairs + 1no spare
- 11 Brake shoes (inner) – 8no + 4no spare
- 12 Brake yokes – 2no
- 13 Base plate carrier
- 14 Base plate mount
- 15 Centre plate to outer cosmetic sides – 2no

Required to Complete

- a Small brass pins (4no with a circa 1mm head) to act as a bearing point between bogies.
- b Your favourite brand of 3'7" or 3'6" wheels and bearings are of course required – Exactoscale, Gibson, Branchlines or Ultrascale are all possible.
- c Wasted pin point bearings – whilst these are available from several sources, their depth seems not to be consistent. Relatively deep ones such as those from Markits are best.
- d The following sizes of brass wire will be needed:
 - 0.31mm for the cosmetic shock absorbing rubbers
- e 10BA bolts and nuts for securing the body to the chassis/underframe
- f. 8BA bolts and nuts for securing the bogies to the underframe
- g. Axlebox and spring castings – sources include:
 - Lochgorm Models – HR Drummond type and Iracier type
 - Wizard Models – MR standard type
- h. Bolster castings – sources include:
 - Lochgorm Models
 - Wizard Models
- i. Double sided copper clad; 1mm thick if you are going to AJ or other couplings affixed to bogie;
- j. 9 gauge, or if you have a heavy coach, 10 gauge guitar wire for the spring to the axles and bolsters,



NER Fox Bogie at Beamish

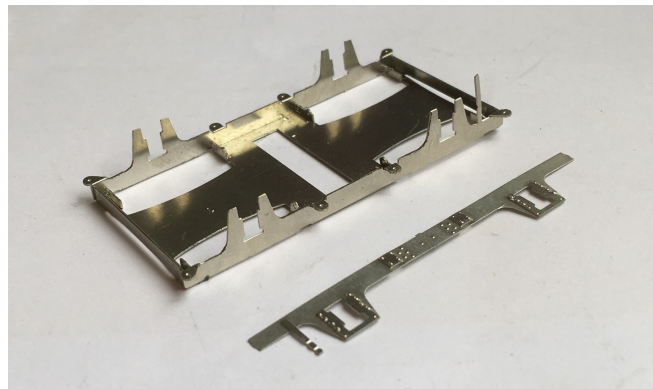
Instructions

General

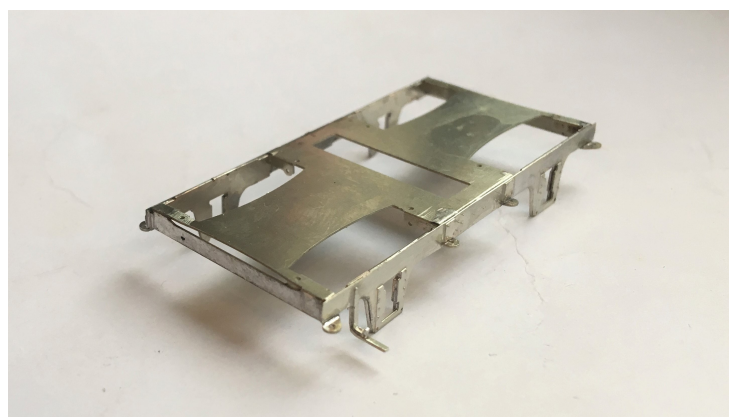
- a) Do please read these instructions through before starting to use these components.
- b) Most of these components need to be soldered together. There are different approaches to how to solder kits such as this and many of you will have your own thoughts. If you are a beginner, it is probably best to treat 188o solder as your base line (the number refers to its melt point) and then use lower/higher melt solders where I have suggested.
- c) For those of you unfamiliar with soldering, there are some good guidelines here
http://www.finescale.org.uk/index.php?route=information/information&information_id=29
- d) The key to good soldering is to keep the metal clean, apply plenty of heat for a short period of time and use the right solder and flux. Whilst it is possible (and at times preferable) to use cored solders or electrician's solders (which is what you will generally find in a DIY store) you will find it much easier to use proper jeweller's or modeller's solders. Solders from Carrs: <http://www.finescale.org.uk> or Eileen's Emporium <http://www.eileensemposium.com> are good places to start.
- e) There are different approaches to how to approach the soldering of kits such as this and many of you will have your own thoughts. If you are a beginner, it is probably best to treat 145° or 188° solder as your base line (the number refers to its melt point) and then use lower/higher melt solders where I have suggested. I now like to use 100° solder attaching white metal.
- f) When cutting components from the etches, it is important not to bend or distort the part. Thus, scissors or snips are not generally appropriate. Instead, use a craft knife/sharp chisel and cut onto a firm base (wood or similar) or use a piercing saw.
- g) Fold lines are always on the inside of the bend for 90° bends. Thus, the item is bent into the half etched line; best done with bending bars or in a smooth jawed vice (pliers are OK for small pieces).
- h) Items that are folded through 180o are the opposite. In this instance fold away from the etch line. It is best to do this in two movements; get it to 90 – 120o in the first movement in bending bars or similar and then complete the bend by clasping this shut between a vice or pliers.
- i) All of the holes should be etched slightly undersized. This is because the etch process is a little variable so it can over etch and an undersized hole is much easier to deal with than an over sized one! Thus, the holes will need to be opened out slightly either with a broach or with the appropriate sized drill in a pin vice. Take care when doing this, especially with the broach, to make sure that the hole is to the correct size – use a piece of wire to the correct diameter and continue until it is a tight fit.
- j) In some locations, raised rivets will be required that need to be pushed through from the rear. These are best formed by a rivet press if you have one, a Brassmasters riveter or a blunted needle mounted in an old pencil. With the latter two, ensure that the workpiece is on a firm but not hard surface – something like a piece of soft wood or hard piece of card. The idea is that the surface must give sufficient to allow the rivet head to be formed but not so soft as to allow the press to pass through.

Main Bogie Assembly

1. Start with the main bogie assembly (**part 1**) and as a first stage, decide whether you wish to include footsteps full, part or none. If you do, then remove this from the fret ensuring that the support hangers for the footsteps are retained but if not, then cut these off in part or whole as the part is removed from the fret. Also decide whether you wish to retain the spring hanger supports (see stage 14 of these instructions). This is dependent on which form of axlebox/spring assembly you are using – some contain these springs and others do not. If your casting includes these, remove the spring hanger support – do not worry about the hole in the outer laminate as this will be covered by the casting.
2. Tidy up any connecting tags and fold down the main sides. Use either a vice or “hold & fold tool” to form these bends, especially if you are seeking to retain footsteps as the hangers are very delicate. Once the sides are bent down, also fold the supports for the suspension wires and the end pieces.

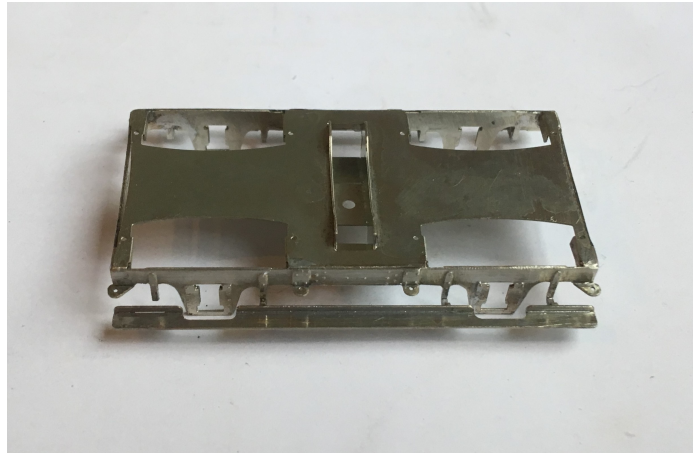


3. Next select the cosmetic sides that suit your inclusion or otherwise of the footsteps and release from the fret; either **part 4a** if you want the full steps or **part 4b** if you only want a short one at one end. At this stage, do not attempt to fold up the footstep support hangers. There are a large number of rivets to be embossed from the rear; either with a rivet forming tool (a form of punch) or a blunted needle into a semi hard surface like wood. Once these are formed, tin the rear of this part and the face of the main bogie assemblies – the former will then slot over the inner cosmetic spring hangers and the two parts can be sweated together to laminate them in place but ensure that heat is not offered up to the support hangers, as they need to be left detached from each other at the moment.
4. If your selected bogie prototype has the central flitch plate (as per the NB version in the photographs above) then you need to file off the bolt heads on the bogies sides outer to provide a flat landing for the flitch plate to be soldered to. Then affix the flitch plates (**part 15**) over the top.
5. The support hangers to the cosmetic outer layer of the bogie should be folded by 90° twice, to create an inverted “U” shape. The hangers to the inner, only have one 90° fold, so project beyond the outer to form brackets to sit the footsteps on. Once formed, these can be sweated together and also ensure that fold to the spring hanger support has been strengthened with solder as this is vulnerable in later stages of the build.



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6. After pressing through the rivets on the cosmetic end piece, **part 5**, sweat it onto the end support and also attach it to the bogie sides. This should fit between the side outers which have been made a bit too long. As the prototype is made from pressed steel the perimeter edges were rounded. Thus, the edges of the bogie need to rounded with files, including the junction between the sides and end.
7. Although the hangers are much more durable once they have been sweated together, further strength can be achieved by the fitting of the footboard (**part 7**) at this stage (although it can alternatively be installed later in the build). This is offered up to the stop point formed by the outer layer hanger and once it is aligned with the horn-guides, solder it in place.



8. If you are using the shorter footboards, part 7 needs to be cut down to the desired length. I do find that this, on its own, is very vulnerable due to having only one fixing point. I thus incorporated a secret fixing with a piece of .3mm wire that touched the side of the axlebox to provide another point of contact.
9. Occasionally, the footboards were cut as the axleboxes – presumably as this was a smaller piece of timber it was prone to damage or rot. This could be replicated by using the full length footboards, but with portions cut away.

Bolster – Active & Cosmetic

10. Ensure that the holes in the bolster (**part 3**) will accept the pins that are included in the kit and then remove them along with the bolster guide (**part 2**) from the fret. The bolster guide needs to be folded into a deep channel and the bolster is folded into a box. As this is cut from the fret, take care not to file the whole of the tab away to the latter as there is a slot on the other side that this fits into to help ensure that the bolster is folded up properly. Ensure all sides are at 90° to each other. Solder the bolster together around the tabs and slots. Take the pins included and cut the shaft about 3mm from the head. Locate fully into the holes in the bolster and solder in place.

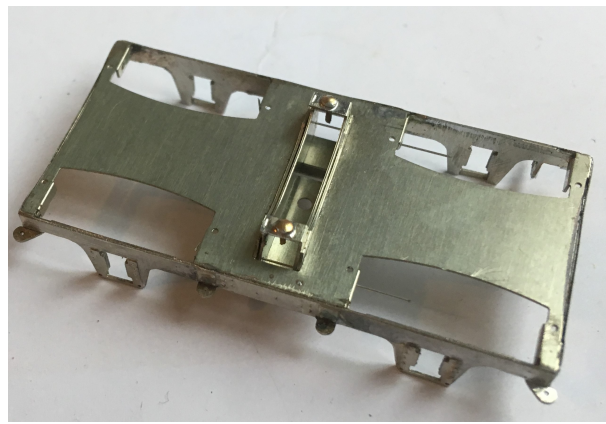
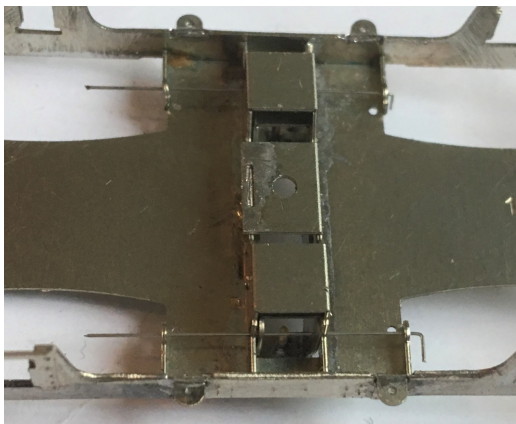


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11. The bolster guide needs to be located in place on the main bogie assembly. There are tabs and slots to aid alignment. You need to make sure that the bolster guide is hard up against the main bogie assembly whilst you solder it in place or the sides will not be completely parallel and will bind on the bolster guide. Use a small needle file to apply pressure whilst soldering. See photo below - this is easier than it sounds!



12. Before going any further make sure that the bolster inner slides freely within the guide – it does not then one or both needs to be taken apart and reformed as they have become twisted. Once happy, the bolster inner can be fitted with its pair of springs; each formed with 9 gauge guitar wire (although see comments at the end). This slides through the hole to the inside support for the spring hangers, through the slot in the bolster guide and through the pair of holes in the bolster and then out through the matching holes on the far side. Repeat for the other side and the bolster inner should deflect smoothly and evenly. The bolster should be removed for the time being by retracting the spring and once it is finally assembled the spring can be secured by twisting each of its ends through 90°.



13. The cosmetic prototype bolster can now be fitted to the underside of the bolster guide. There is a rebate to this to accept the cosmetic bolster although exactly how the casting will fit depends of what casting/etch is being used. The bolster was located relatively tight but slightly rebated to the inside of the pressed plate of the bolster (see prototype photographs above), so mimic this. Before proceeding further, take the time to check that the cosmetic bolster has not fouled on the operative bolster; ease it or the bolster if it does.

Detailing

14. If you are not using the spring dampers (because your axlebox/spring casting includes them) then the spring anchors need to be removed. These were best removed before the fitting of the outer laminate but if this did not occur, they can be snapped off by wiggling them back and forth in pliers. The holes in the outer laminate will not matter as they will be covered by the equivalent part of the casting.

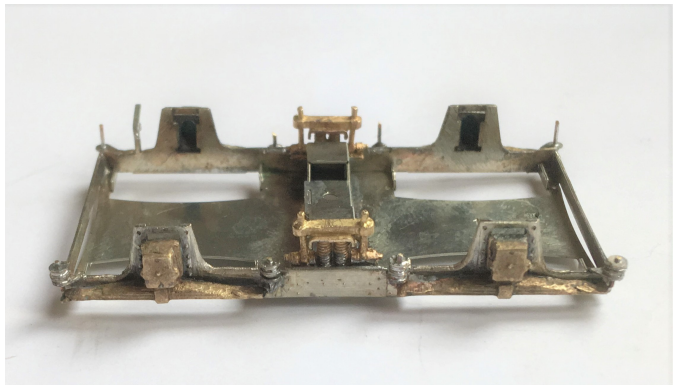
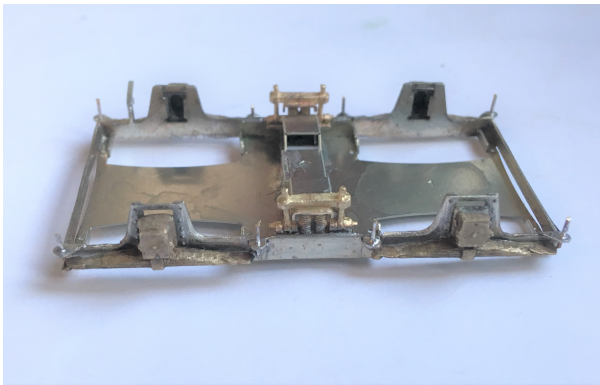
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15. Now fit your chosen casting for the axlebox/spring.

Before fitting, ensure that these have a sufficient clearance for the top hat bearing to slide within it. Grind them out if necessary (carefully if they are white metal) with a burr in a miniature power drill (Dremel or similar). Secure in place with low melt solder (or araldite, but soldering is preferable as it is less likely to fill the slot rebate for the bearing). Check that bearing runs up and down the slot in the etch freely before proceeding to the next stage as if it isn't it needs to be opened up further.



16. If you are utilising the spring dampers provided in the kit, ensure the holes in the spring anchors and the damper washers are cleared to 0.45mm. Insert a piece of 0.4mm wire such that at least 4mm projects from above and below the spring anchor and secure it with a higher melt solder so it won't be disturbed by later work. Now fit the axlebox/springs as before so that its upper end is in contact with the projecting wire and trim this back in line with the top of the spring. Spring and the bottom end has at least 4mm of free wire upon which to load the washers. Load 3no of each damper washer (**parts 8 & 9**) with the small one to the top. Once they are all on the wire below can be snipped such that there is only 1mm projecting.



Brakes & Brake Yokes

17. The brake hangers/shoes main (**part 10**) are designed to be folded up as one piece as shown below – the 90° folds have the half etch line on the inside and the 180° folds have it on the outside. It pays to reinforce the laminates and, particular, the bend at the base before proceeding further. Once this has been done the outer (**part 11**) can be soldered on front of this. Once repeated four times, ensure that the holes to receive the spigot is clear by drilling through with a 0.5mm drill.

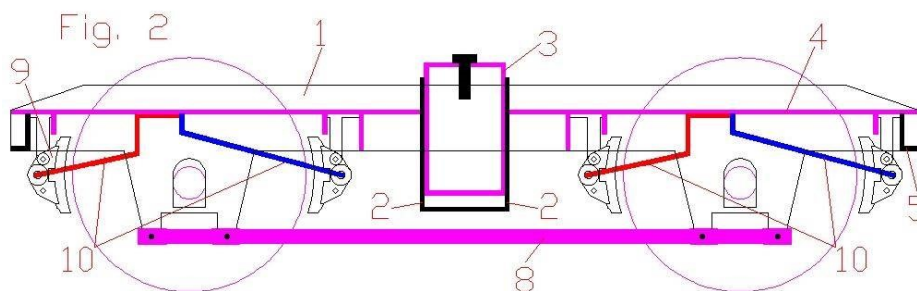


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18. Each pair can be soldered to the underside of the bogie, either side of the wheel disk. There are small holes that mark the location where these shoes should be fitted – they show the true location for the brake shoes (ie they suit P4 gauge modellers, so if you want to make them match a narrower gauge then you can bring them closer).

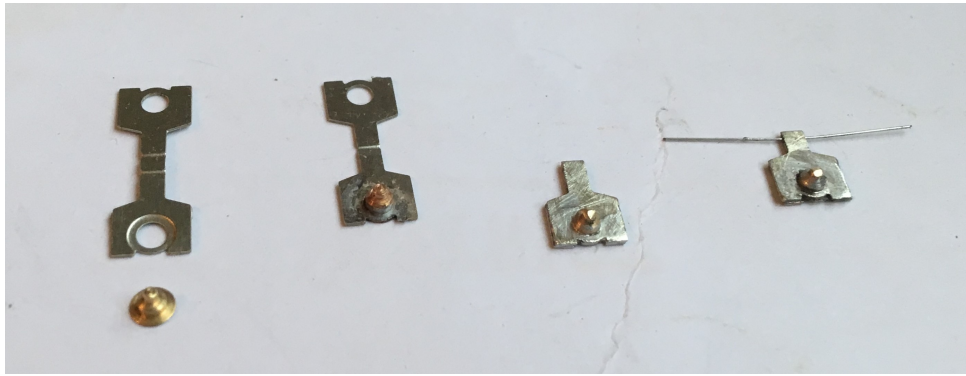


19. The brake yoke (**part 12**) first needs to be folded up to create a 3-D shape - the tab at the bottom is folded over and then each end of the yoke is twisted through 90°. As the photograph below shows, this is more difficult to describe than do! Taking care to ensure that the yokes are correctly orientated (see the diagram below), the prongs to the end of each yoke is then inserted into the holes in the brake shoes (which will need to be eased apart to allow this) and the whole soldered into place as below.

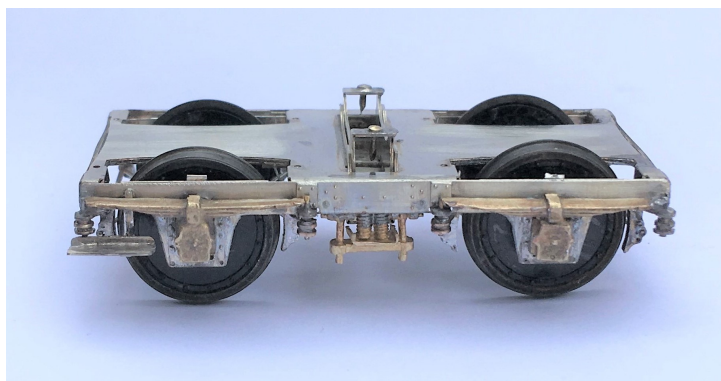


Spring Carriers and Final Assembly

20. The spring carriers (**part 6**) can now be assembled. Fold this through 180° with the fold line on the outside but take care that the fold is consistent and the two laminate halves sit squarely on each other when the fold is completed. Lightly solder the two laminates together but make sure that the hole that is formed by the two grooves remains free as the next stage is designed to receive 9 gauge guitar wire (but see additional comments at the end).



21. The distance between the backs of the hornblocks is slightly larger when compared with other systems and is 24.5mm. Not all pin-point bearings are to equal depth – I find that the Exactoscale bearings are the least deep and the Markits ones the deepest, Alan Gibsons are about half way. The advantage of this increased measurement is that if using pin point 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 if you use deeper bearings. If you are using Exactoscale bearings, fit them into the half etched rebates, others are best fitted to the other side so that the brim of the top hat sticks up a bit.
22. The top hat bearings also typically have a burr to their head that needs to be filed down – don't however go too far and file so far that the inside of the bearing surface is exposed.
23. 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, to receive the rear of the top hat bearing. There are three half etched lines in the middle of the spring carrier. Fold the spring carrier double about the centre fold line with the fold line on the outside. The spring carrier can then be placed so that the bearing locates through the hole in the carrier and the wood. The bearing can then can be soldered in place. The spring wire can then be located in through its etched guide slot and soldered in place using a suitable flux (which as we are dealing with steel, needs to be a strong flux - I use Carr's black label). The spring wire needs to extend at least 8.5mm either side of the point where it is attached to the carrier. They will need to be trimmed but do this whilst checking against the bogie after cleaning the carrier up.
24. Once the bearing is in place, file a slight groove on the lower side of it with a square file at a 45o angle, so that the groove is "V" shaped. This should be less than $\frac{1}{4}$ - $\frac{1}{2}$ mm deep and is aimed at making it easier to slot the pinpoint of the axle into the bearing.
25. For most coaches the springs are designed to be no 9 gauge guitar wire but if the coach is likely to be over 230-240 grams when finished, it would be sensible to adjust the primary springs to the axle bearings to no 10 gauge guitar wire.



The finished article, this one with short footsteps

Mounting the Bogie

26. There are a number of options for securing the bogie to the coach underframe; many of these will be defined by the depth of the floor to the underframe. When fitted the pins that form the bearing points of the bolster will be 1.2mm short of the correct height for the normal position of the floor in an etched kit. **Parts 13 & 14** are conceived to achieve this dimension but it is equally possible to use a piece of 1mm double sided copper clad and then only use **part 13** to get the correct depth.
27. The best option to secure these in place is to permanently affix an 15mm 8BA bolt to the chassis projecting downwards. As a first step, secure this to the underside of **part 14**. As the head of the bolt is likely to stand proud of the fold down tabs, file it back flush with these. Then assemble to **part 13** and ensure that the now filed face of the bolt head is soldered to keep it secure and vertical. The part can then be secured to the underside of the chassis either by soldering it in place or utilising further 10BA bolts/nuts.
28. Once all the components are complete, secure the bogies with a nut. This should reach the underside of the bolster but not actually compress it.

Photos of the secured bolt

29. An alternative approach to fixing the bogies is to affix the nut to **part 14**. The process is otherwise the same.

