

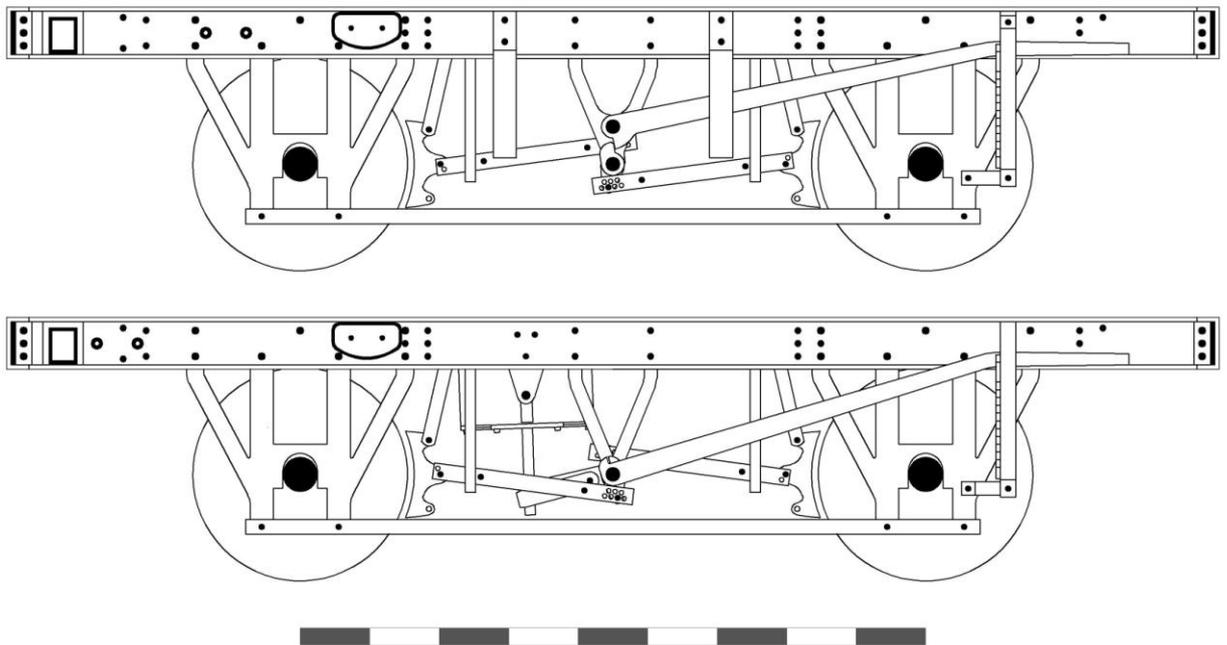
## Runney Models – S Scale RCH 17'6" x 9' Chassis Instructions

### Notes

This set of instructions covers the RCH 17'6" x 9' general merchandise wagon chassis kit SB.32. This will provide a detailed steel underframe for a range of late 1920s/early 1930s vans, opens, etc, built mainly for the GWR and LMS. The SR had a couple of types but generally didn't like paying for the patent on the Morton clutch so used independent brakes on chassis of this size. The LNER were still using wooden underframes!

This particular underframe was something of an interim step. Over time the RCH gradually updated it's specifications with regard to such matters and this fell between the move to 17' 6" long wagons and extending the wheelbase to 10'. A glossary of diagrams to which this underframe was fitted can be found at the end of these instructions. I cannot guarantee that it is exhaustive but it may prove useful.

Many wagons with this underframe were built unfitted with 2 shoe brakes; some were vacuum braked with four shoes. Provision is made for these variations along with both RCH pin type and GWR ratchet brake lever guards.



Read through the instructions first and familiarise yourself with the components.

Note that all the photos are of my 4mm wagons and that not all the photos are of these particular chassis but suitably illustrate the item in question. Construction is the same for both scales.

**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 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 steel guitar wire soldered to the etched spring/bearing carriers. For this you will need a suitable flux. I use Carr's Black label.

There are two types of spring carriers included to try and cover various different possible weights. In 4mm wagon bodies are generally plastic so we use 0.008" wire and an individual axle loading of 25g as getting any more weight in is a real pain. As S Scale bodies are often whitemetal heavier weights need to be taken into account. The following table should tell you which spring wire and spring carrier to use:

Total wagon mass	Spring carrier	Guitar wire gauge
50-60g	14a	0.008"
90-100g	14b	0.009"
130-140g	14b	0.010"

The chassis is designed to produce a buffer centre height, when the kit is completed and weighted/sprung as above of 16.42mm when using scale wheels. Different makes of wheel may affect the ride height depending on their diameter.

The chassis is designed to use 2mm outside diameter bearings (i.e. standard 4mm scale wagon bearings), either pin point or parallel.

### **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, axle guards

0.9mm - Main brake cross shaft and Morton clutch brake levers

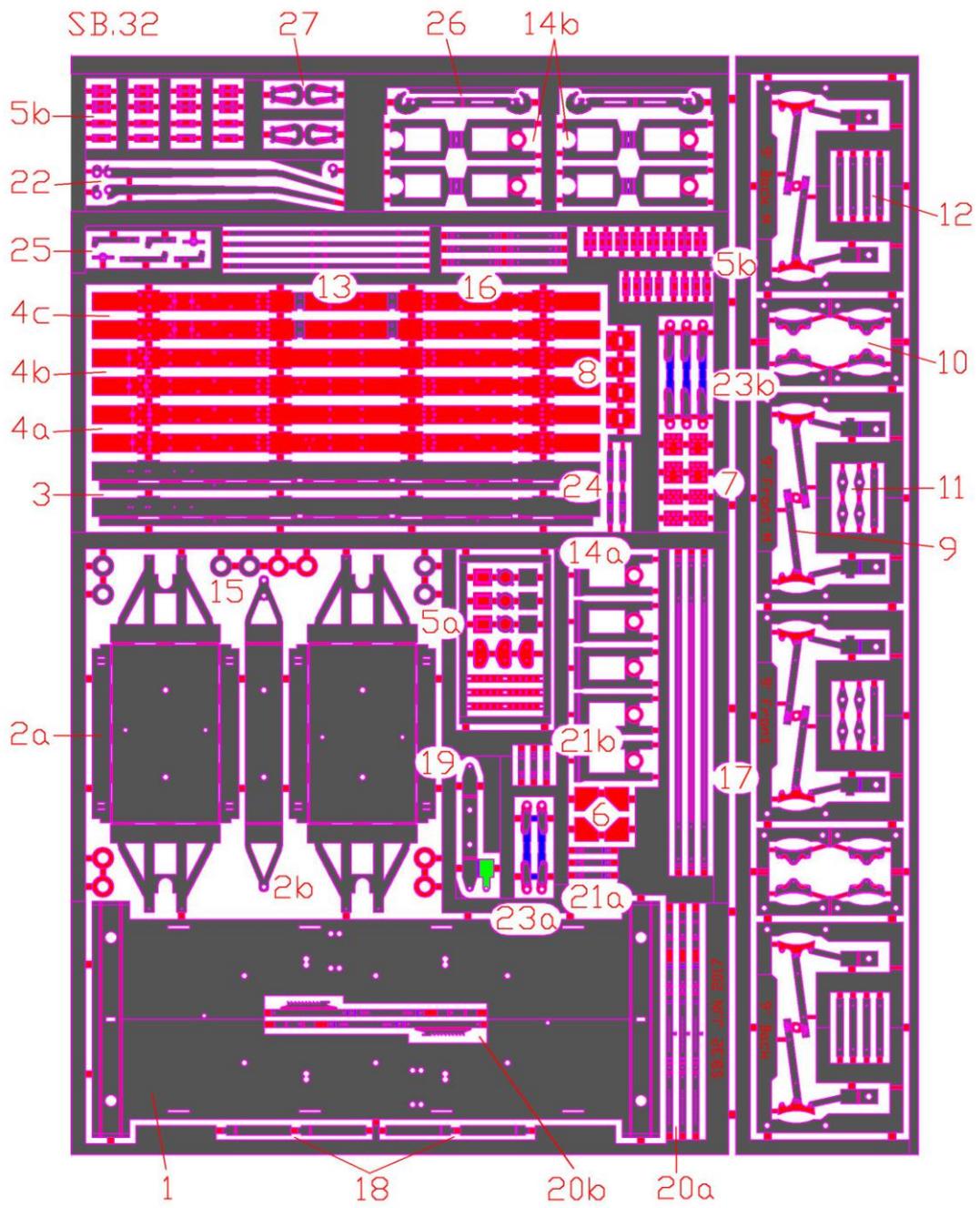
1.0mm - Alignment pins

If you feel that 0.31mm wire is a bit light then you can drill out the holes and use 0.4mm wire instead. In truth I was undecided as to which size to use as the prototype bolts they generally represent fall somewhere in between. It is obviously easier though to make holes bigger if desired.

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

## Component List

- 1 - Chassis top plate
- 2a - Axleguards
- 2b - Vees
- 3 - Solebars
- 4a - Solebar detailing overlays - LMS Vans
- 4b - Solebar detailing overlays - GWR vans
- 4c - Solebar detailing overlays - GWR
- Opens
- 5a - Solebar detailing - Plates and stops
- 5b - Solebar detailing - Stanchion brackets
  
- 6 - Solebar/Headstock corner plates
- 7 - Solebar/Headstock bracing
- 8 - Coupling pocket detail
  
- 9 - Main brakegear
- 10 - Brake shoe infill
- 11 - Push rod cranks
- 12 - Push rod infill
- 13 - Push rod safety loops
  
- 14a - Spring Carriers
- 14b - Spring Carriers
  
- 15 - Bearing washers
- 16 - Axle keeps
- 17 - Axle tiebars
  
- 18 - Door springs
- 19 - Vacuum cylinder bracket
  
- 20a - Pin type brake lever guards/brackets
- 20b - GWR ratchet brake lever guards/brackets
- 21a - Pin type brake lever guard stays
- 21b - GWR ratchet brake lever guard stays
- 22 - Brake levers
  
- 23a - Short vacuum cylinder actuators
- 23b - Long vacuum cylinder actuators
- 24 - Lamp Irons
- 25 - Vacuum pipe brackets
  
- 26 - Coupling hooks
- 27 - Instanter links



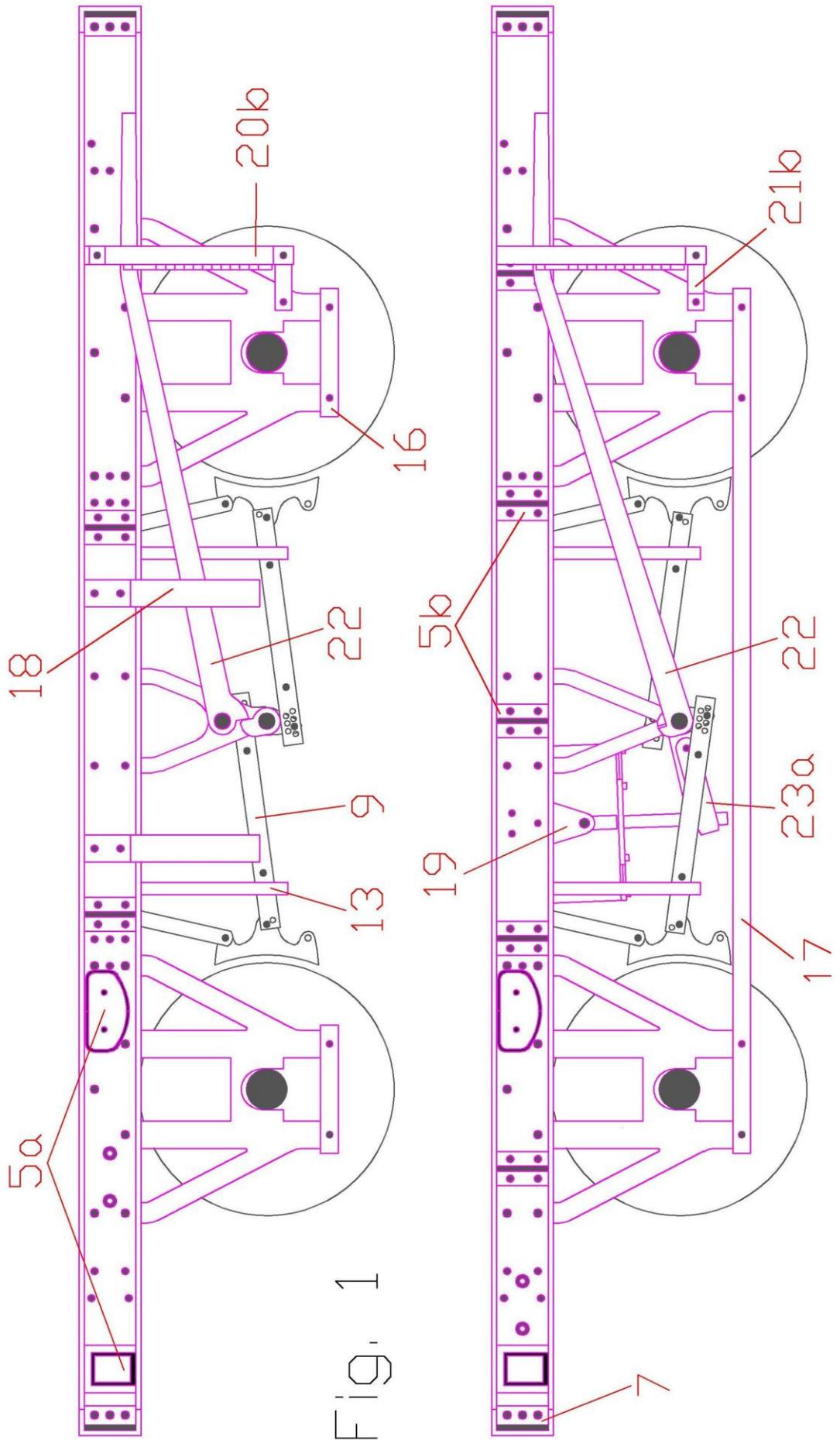


FIG. 1

## Construction

### Main Chassis

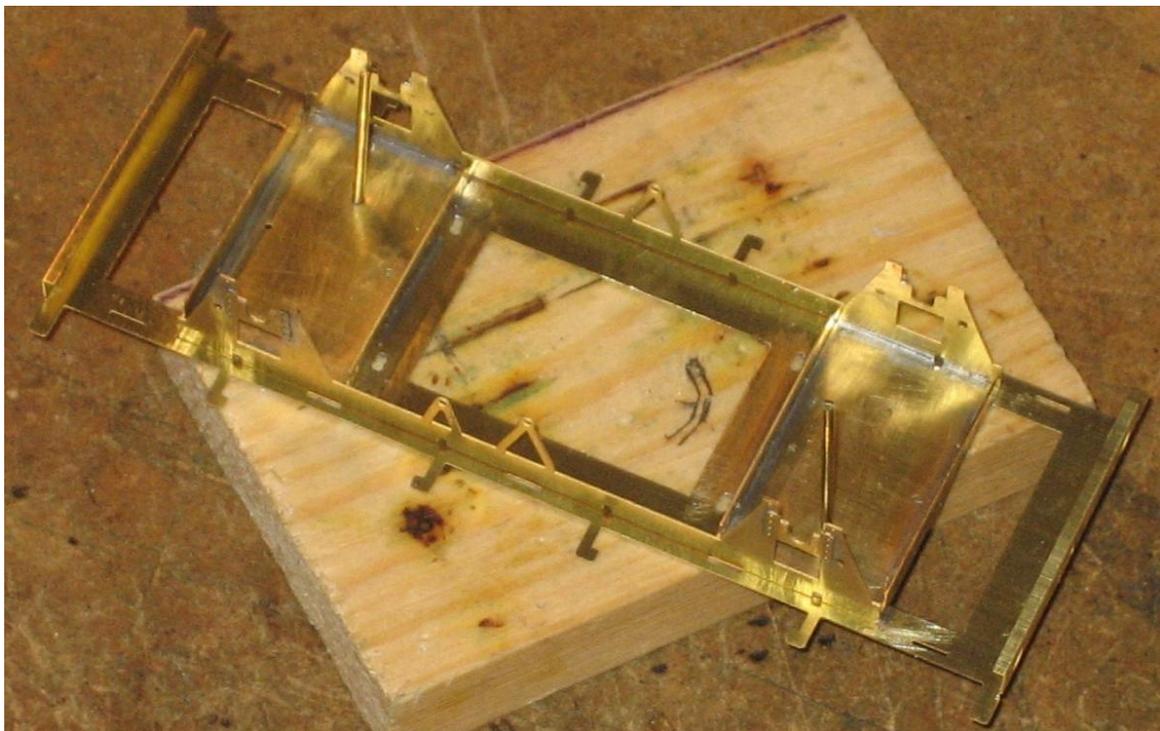
Firstly check the fit of your buffers in their holes in the headstocks. It may sound a bit odd starting with something that usually goes on at the end but it will be much easier to open out the holes now rather than later.

Start with the chassis top plate (1). Remove from the fret and fold up the headstocks. 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 parts of the chassis, fold the top plate through  $90^\circ$ . You can reinforce this fold line if you wish but I haven't found need to do this. Next fold the headstocks through  $90^\circ$  to form a channel. Do not reinforce with solder yet.

Remove the axleguards (2a) from the fret. Carefully fold up the sides and the four spring supports. Make sure that the sides are at  $90^\circ$  and adjust if necessary. Reinforce the fold lines with solder.

Check that all the holes in the in the vees (2b) will accept 0.9mm wire, remove from the fret and fold up to form a C shape.

The chassis top plate, the axleguards and vees then need to be soldered together. There are 1mm diameter holes on both the top plate and axleguard assembly to aid location. Using short lengths of 1mm wire with the ends tapered slightly pin the two parts together. You may need to open out the holes slightly but make sure the wire is a tight fit. Solder the parts together and then remove the locating pins. It doesn't matter which way around the vees.



Next remove the solebars (3) from the fret and fold into an L shape. I find the best way to do this is in a vice. Remove your chosen solebar overlays (4) from the fret.

There are three sets of solebar overlays 4a, 4b and 4c. Principally these cover LMS vans (4a), GWR vans (4b) and GWR opens (4c) though they can be used for other types. The differences between 4a and 4b are very slight and mainly relate to the position of the vacuum cylinder. This varied and as such the kit provides for two vacuum cylinder positions. If you wish to model an unfitted chassis then you will need to remove the rivets for the vacuum cylinder from 4a or 4b. Remove from the fret and tidy up any connecting tags.

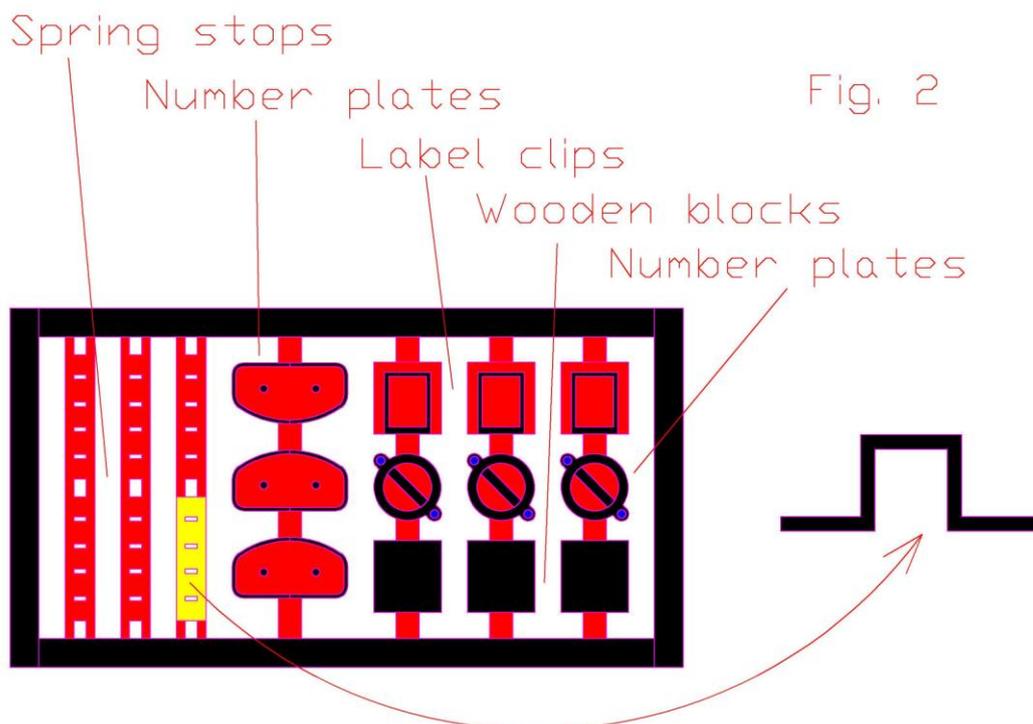
As a result of the etching process there should be a curve through them with the ends closer to you if looking at the rivet detail side. Carefully bend them so that the curve is reversed slightly and that the ends are further away when looking at the rivet detail. This can easily be done between thumb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

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

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

### Solebar detailing

There are two types of solebar detailing. The plates and stops (5a) is standard on all Rumney Models underframes and comes contained in its own little fret. See Fig.2 below. On it you will find fabricated axle spring stops, two types of number plate, 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 was it was quite common. The positions of all this stuff varied so check your prototype. The details can be soldered on or glued. If you wish to glue the detail on its best left until the chassis is assembled.

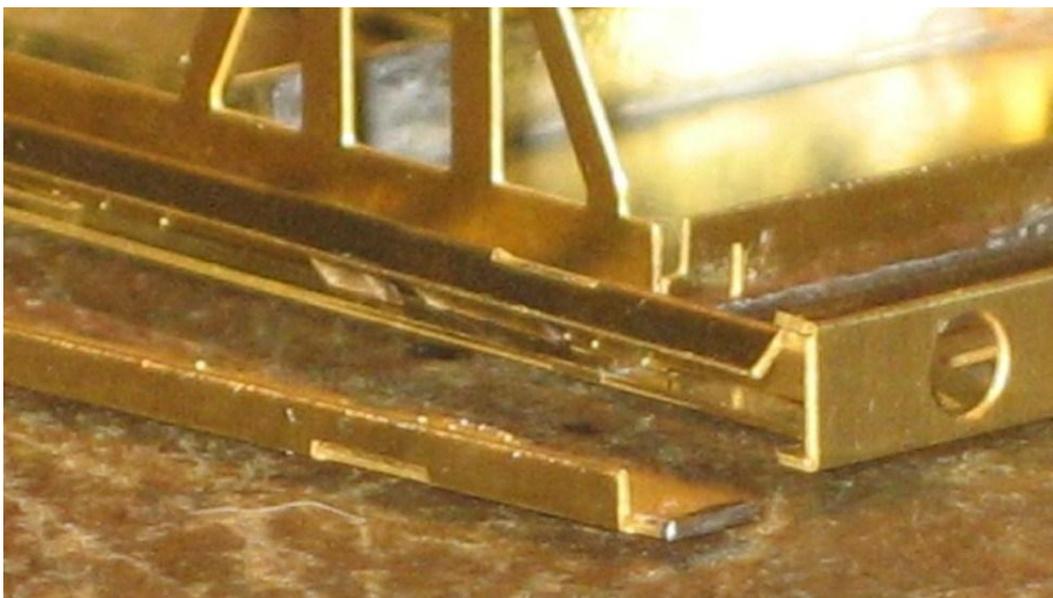




The second set of solebar detailing covers stanchion brackets (5b). The majority of wagons with this underframe had wrap under side stanchions that were attached directly to the solebar rather than to brackets. There are two types to cater for variations. If you wish to make use of these they should line up with the stanchions on the body that you are using. Solder in place.

### **Main Chassis Continued...**

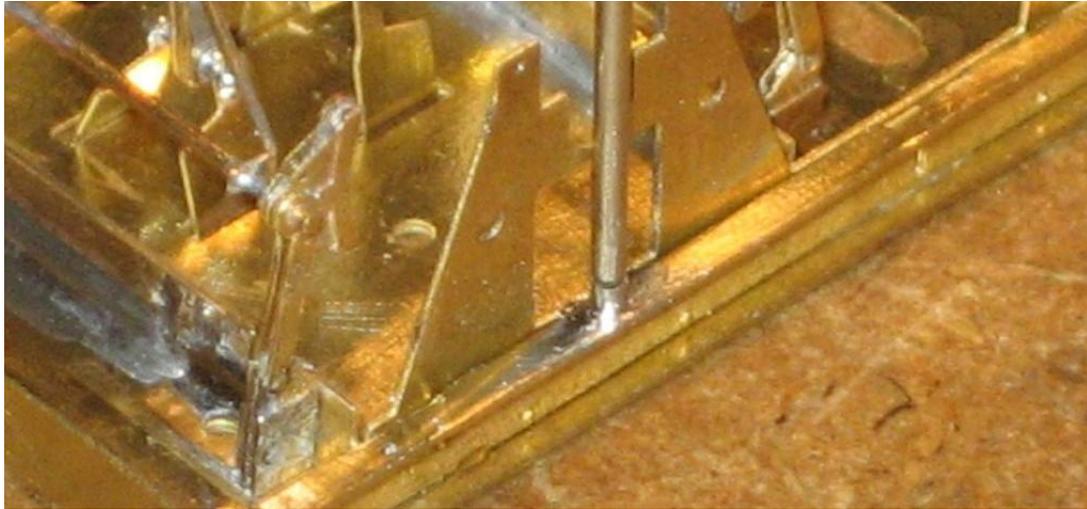
The solebars can now be fitted to the chassis. Note that there is a correct side for the solebars on all vacuum fitted wagons. The vacuum cylinder and hence the rivets on the solebar go on the non-Morton cam side. See Fig. 1. There are slots and tabs to aid location and the ends go into the channel that is the headstock. Fit the solebars at an angle and then straighten locating the slots and tabs at the same time. Once in place then the solebar can be soldered in place. If you have problems locating the solebar in place then you can gently bend the headstock back to allow the solebar to slot in. It is difficult to get the headstocks at 90° though if you do this though and it shouldn't be necessary. The accessible fold line on the headstock can now be reinforced with solder if you wish.



Add the Solebar/Headstock corner plates (6). These should be arranged so that the two straight sides go along the outer edge of the headstock and the inside of the Solebar.

You can also now add the solebar/headstock bracing (7). These fold into an L and fit into the solebar/headstock channels. There are small half etched slots to aid you locating the bend point.

### **Spring Stops**



There were two different pattern of spring stops fitted depending on when they were built. There are 6 fabricated spring stops for early builds on the solebar detailing - plates and stops (5a) 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.

### **Headstock detailing**

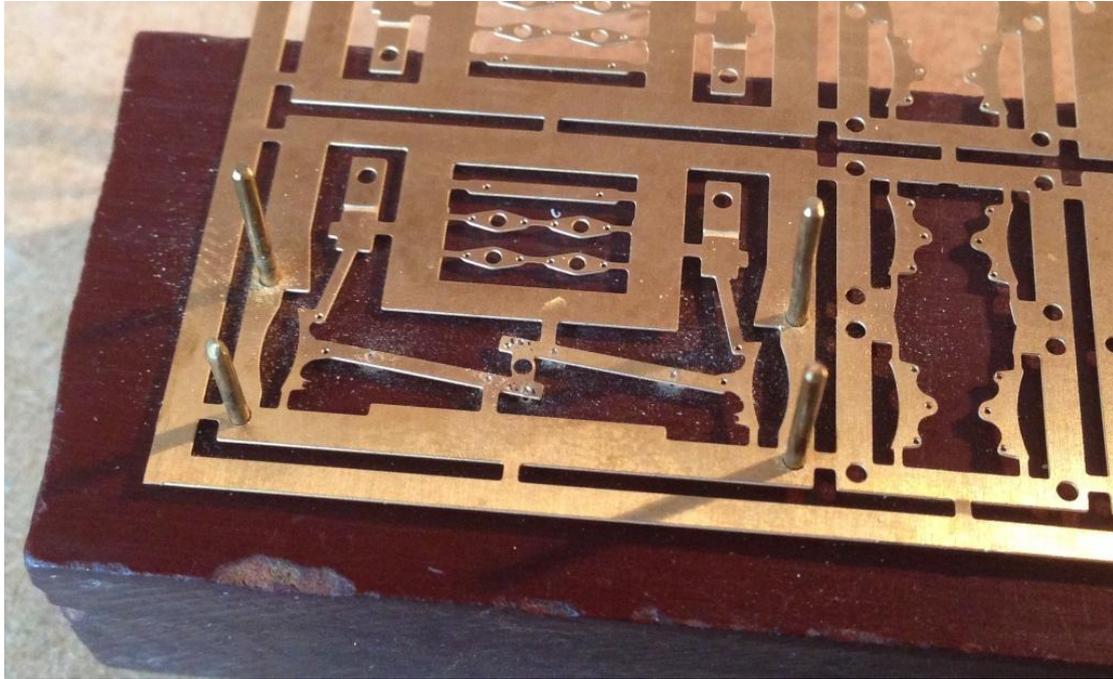
Now is as good a time as any to fit the coupling pocket detail (8). Solder in place using the hole for the coupling as a guide. I find the easiest way of doing this is to shape the end of a cocktail stick to fit in the slot. This can be used to align the detail on the headstock and hold it in place while you solder them together.



### **Brakegear**

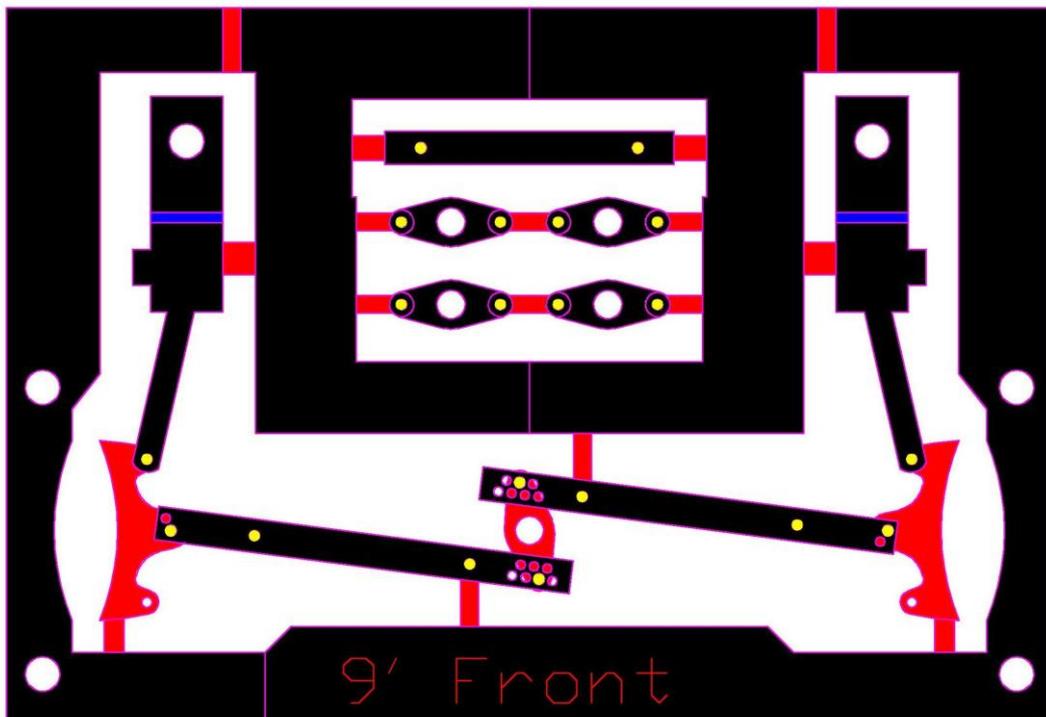
Unfitted wagons had 2 shoe brakes. For these you will only need the set marked with an M. These go on the side with the Morton cam. If in doubt see the top of the two drawings in Fig. 1 above.

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 (9) 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. If you are making a 4 shoe Morton chassis you will need two jigs, one for each side.

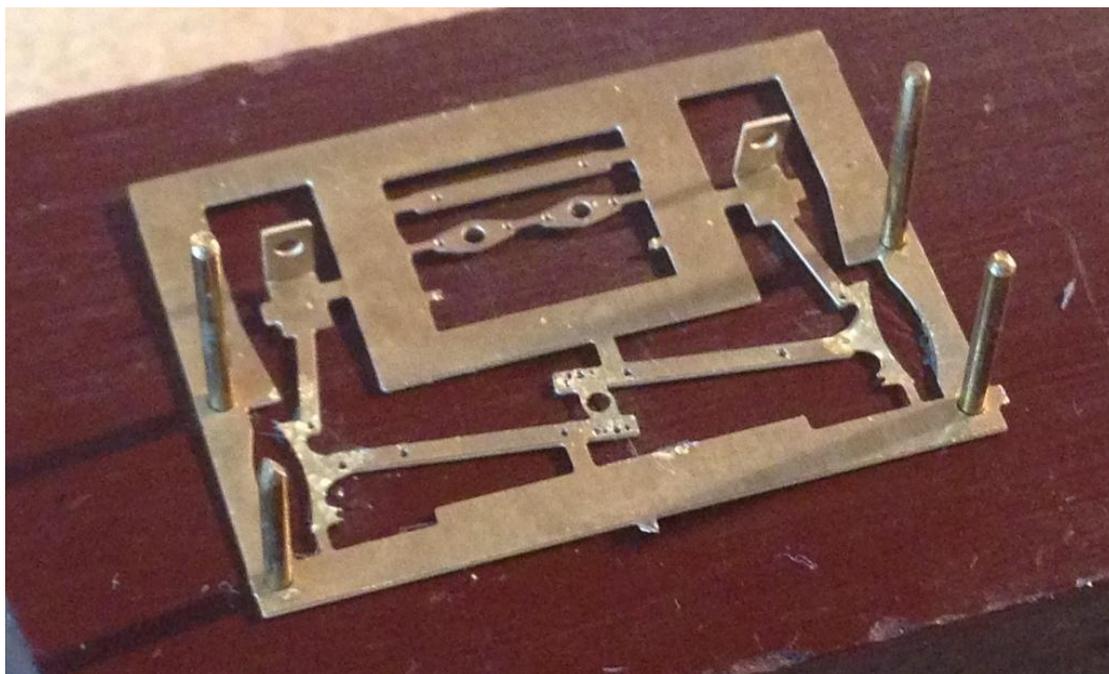


Check that the small holes in the fret can accept 0.31mm wire. These are marked in yellow on Fig. 3 below. I find it easier to locate the hole from the side with no writing.

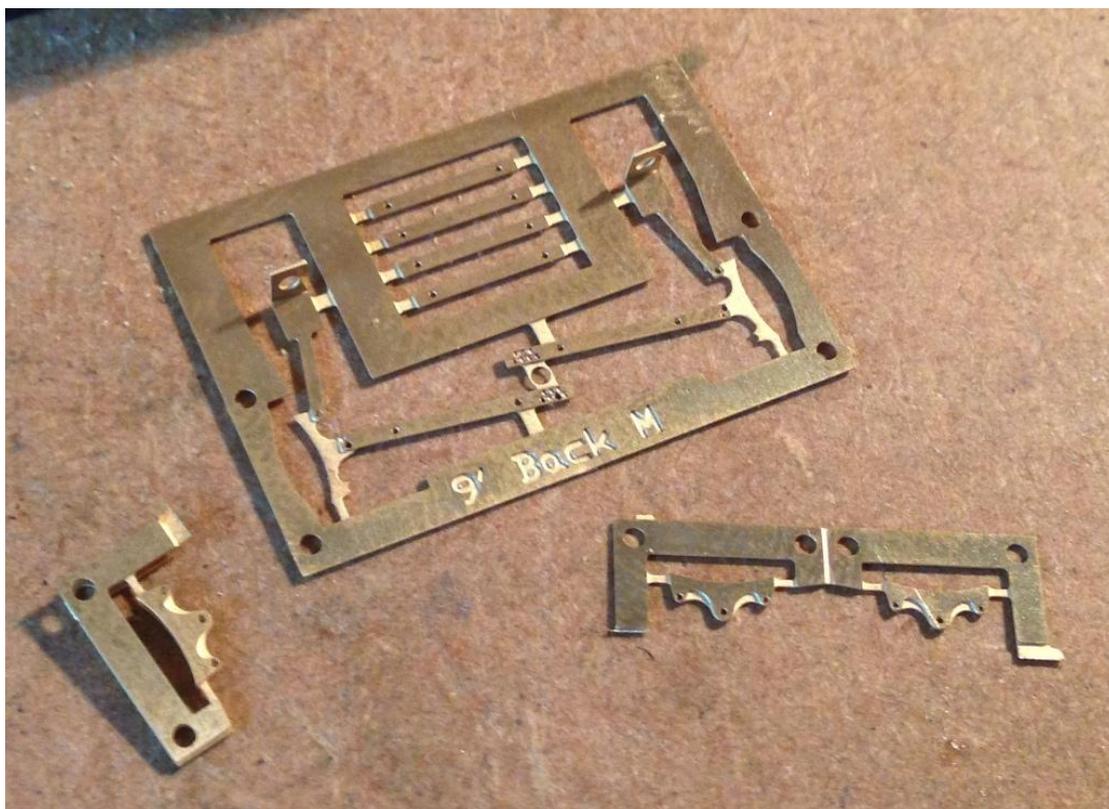
Fig. 3



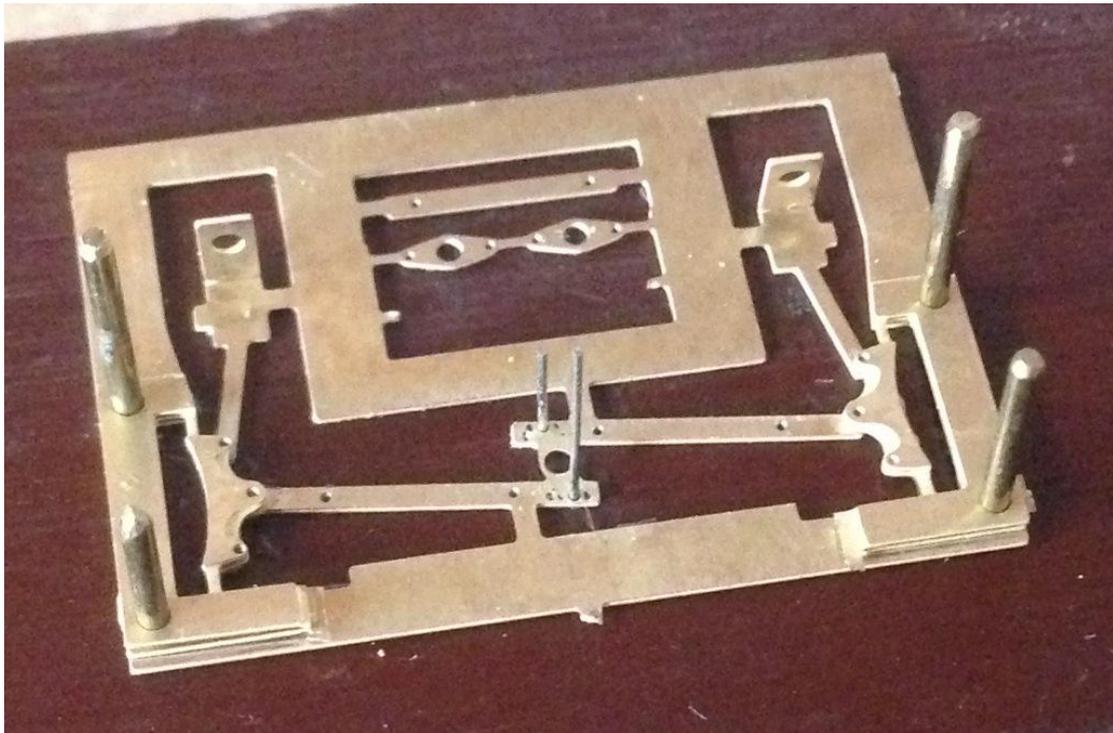
Remove the push rod cranks (11) and push rod infill (12) (if required). Carefully fold up the feet on the part labelled **front** and pin to the jig using short lengths of 1mm wire, writing side facing down.



Take the brake shoe infills (10) 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.

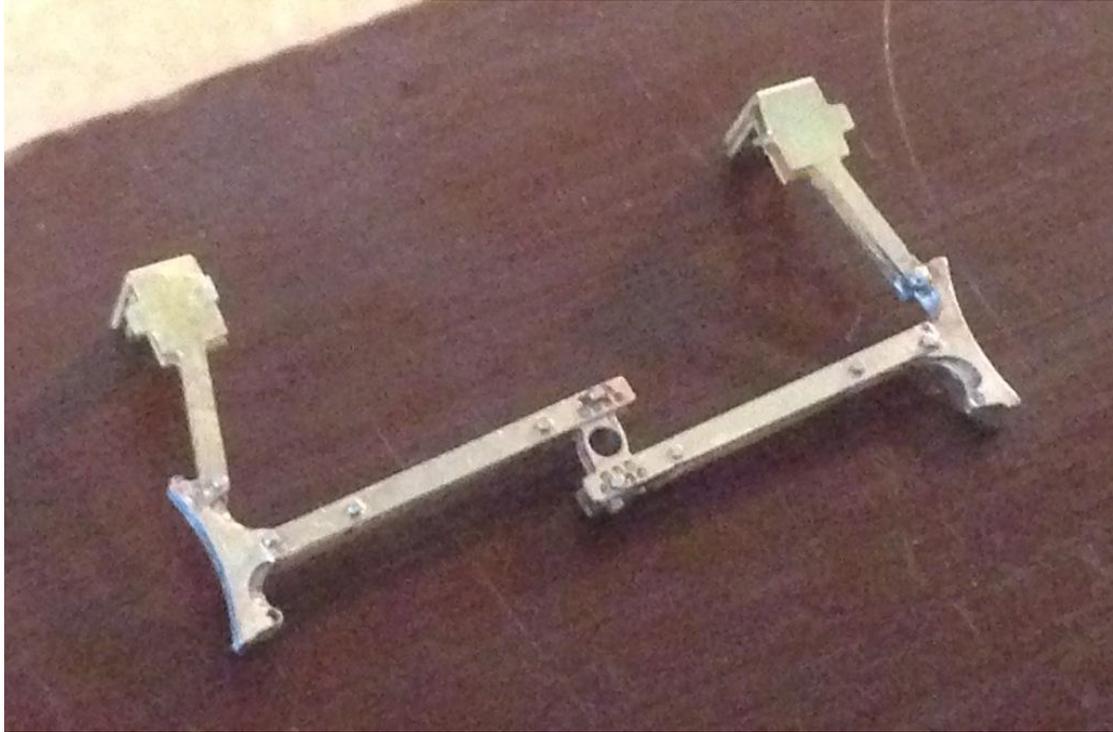
Carefully fold up the feet on the **back** part of the brakegear and pin onto the assembled layers with the writing visible and facing away from everything else. Make sure all the bits of wire go where they should. Fill the remaining holes with 0.31mm wire making sure it goes all the way through.



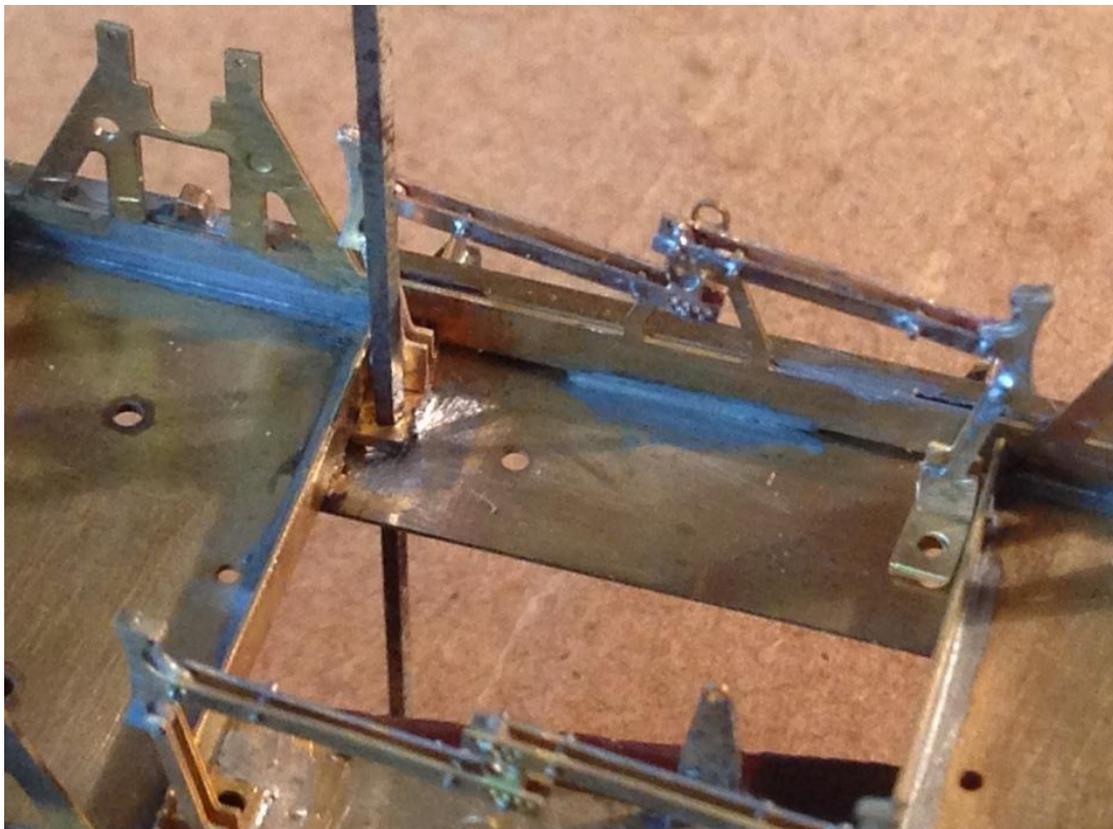
Solder the layers together paying particular attention to the brake shoes (I found it best to apply solder to the long curved edge) and the joints where the wire meet the etch.



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.



The brakegear can be fitted to the wagon using the tabs and slots as before. Gently bend the shoes to get the tabs into the slots. Use something suitable to pin the brakegear to the chassis through the holes in the feet while you solder them in place.

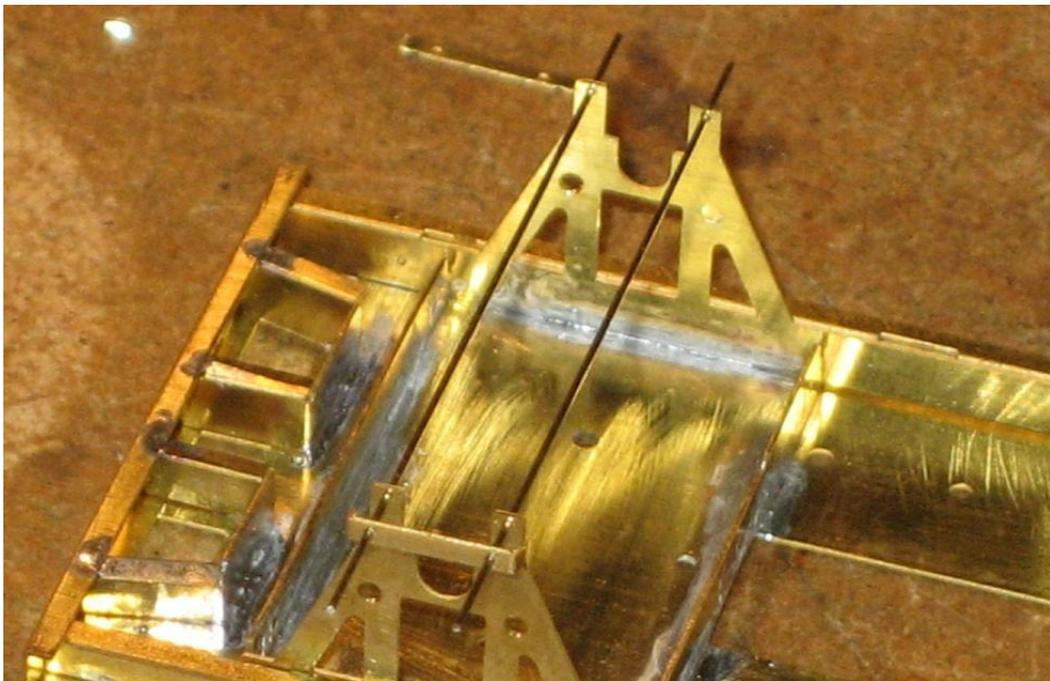


Finally the push rod safety loops (13) can be fitted. These fold up and once wrapped around the push rods can be soldered in place hard up against the base of the brake shoes.

## Axle keeps and tiebars

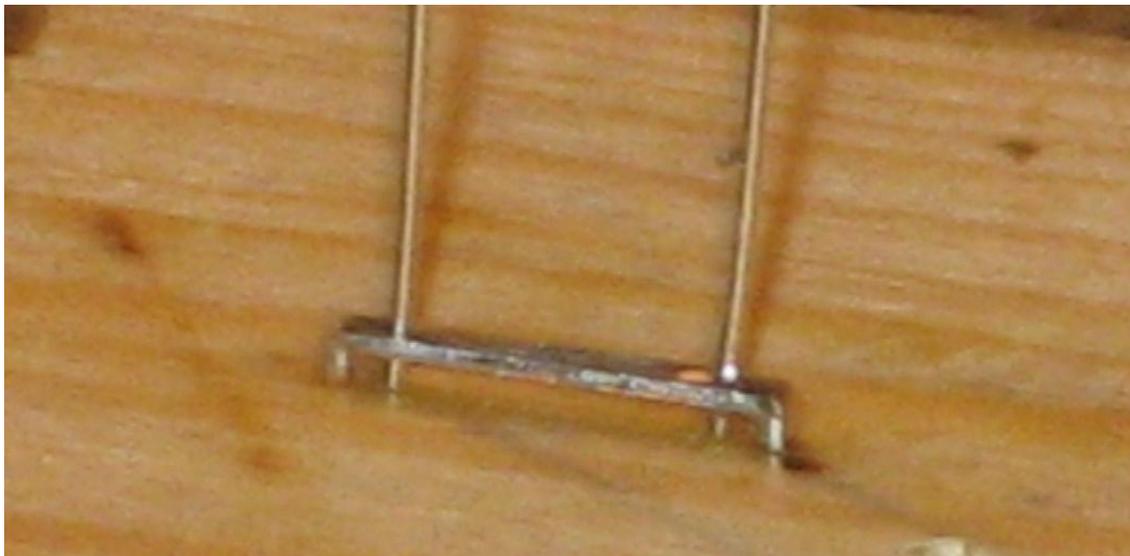
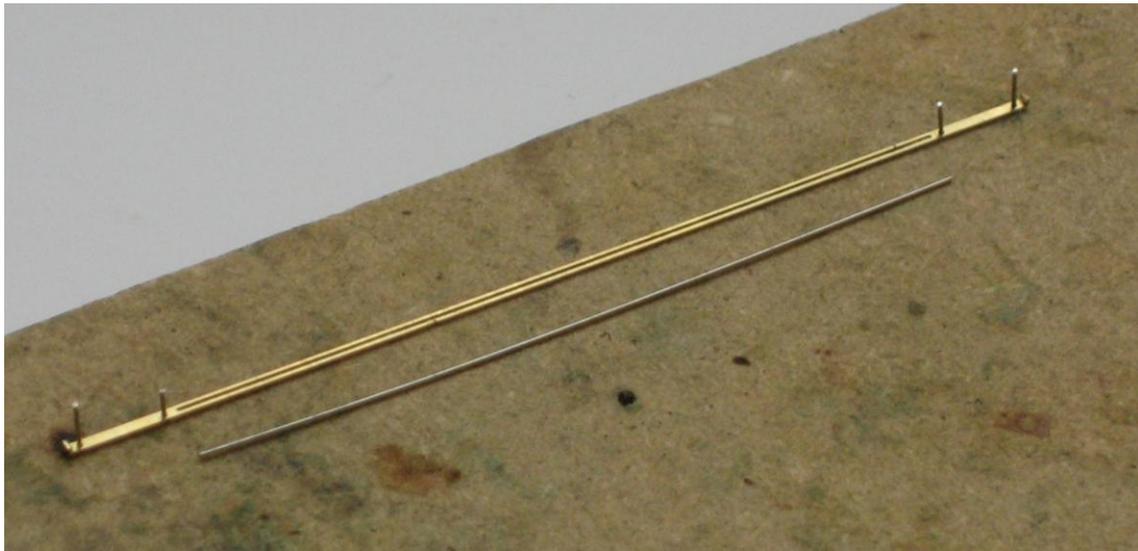
There are both individual axle keeps (16) and tie bars (17) included. Anything fitted would have had full length tie bars. Unfitted chassis generally had individual keeps but check your prototype. They are both assembled in the same way and are designed to be removable if you wish in order to allow the 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. Tie bars 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 an axle keep/tiebar and holes in a axleguard and then the corresponding holes on the opposite axleguard. Solder in place. Fit the other axle keep/tiebar and solder in place. Trim the wire so that it represents bolt heads on the tie bars 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 axle keeps/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 of the axle keeps/tiebars 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 axleguards 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 axle keeps/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.



### **Door springs**

The door springs (18) were fitted to open wagons. These need to be folded into an L shape where the longer end is curved. There is a fold line to mark the bend point and then the short end fits into the slot in solebar 4c.

### **Vacuum Cylinder Bracket**

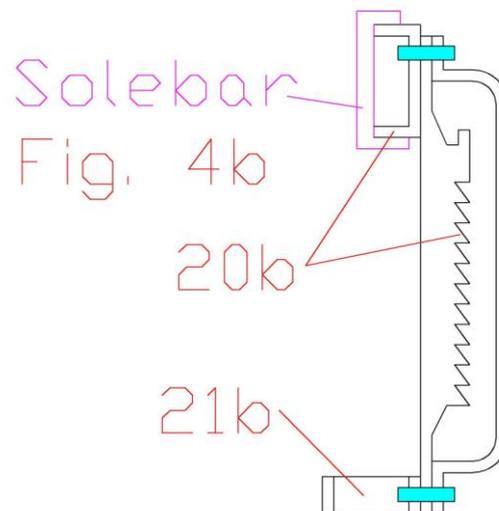
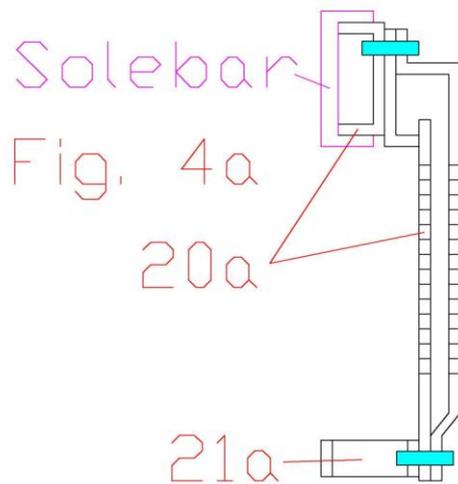
A vacuum cylinder bracket (19) is included for fitted wagons. Remove from the fret and fold the part shaded green on the parts diagram so that the fold is through 180° with the fold line on the outside then fold the bracket into a C shape.

There are two sets of holes on the chassis top plate for aligning the bracket as on some wagons the vacuum cylinder was closer to the vees than on others. If you used solebar overlays 4a then use the position closest to the vees, if 4b then the position furthest away. Solder in place so that the end with the double layer is closest to the solebar.

## Brake Lever Guards

Provision has been made for both the RCH pin type brake lever guard and the GWR ratchet type. The GWR type was confined to GWR built wagons and the RCH type was fitted to everything else.

Make sure that the holes in your chosen brake lever guards and brackets (20a or 20b) and the appropriate lever guard stays (21a or 21b) can accept 0.31mm wire and remove from the fret. Separate the lever guard from the lever guard bracket. Fold the lever guard along with the lever guard bracket referring to Fig. 4a for the pin type or Fig. 4b for the GWR type. There are half etched slots on the ratchet type lever guard which pinpoint and aid the forming of the curved bends that are on the prototype. 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. Press out the half etched rivet on the brake lever guard stays and fold both ends through about 30°. The stay can then be pinned to the bottom of the lever guard using 0.31mm wire and then soldered to both the lever guard and the axleguard and any excess wire trimmed off.



## Axleboxes and springs

Now is a good time to fit the cast axle boxes and springs as 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. If whitemetal I solder mine in place using low melt solder though I have heard good things about using 100°C solder for such things.

## Brake shaft

Cut a length of 0.9mm wire to form the main brake shaft. This should extend about 0.8mm either side of the vees.

If you are constructing a fitted chassis check that the vacuum cylinder actuators (23a or 23b) of your choice can accept 0.9mm wire. The type will depend on the position you used for the vacuum cylinder bracket. The actuators need to have their half etched rivets pressed out and then folded over. They are designed for the ends to wrap around a 0.7mm piece of wire extending from the vacuum cylinder. These can be fitted along with the brake shaft (0.9mm wire) through the vees.



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

If you haven't already fitted the vacuum cylinder do so now and then the two halves of the vacuum cylinder actuator soldered together and to the brake shaft.

## Brake Levers

Make sure the holes in the brake levers (22) and the cams can accept 0.9mm 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 0.9mm 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.



### **Lamp Irons**

Lamp irons (24) included for use with fitted wagons. I usually include a drilling jig to aid pinning them to plastic bodies. If you want to pin the lamp irons in place (they are much more robust if you do) use one of the lamp irons whilst still attached to the fret to create a jig by drilling a pair of 0.3mm holes in piece of fret that you can comfortably hold. I dislike relying on glued joints for these sorts of things on plastic bodies and so have included these for use with 0.31mm wire pins to provide a more positive location.

There are two pairs included, one with half etched holes for pressing out the bolt heads and one with the bolt holes etched out completely for pinning in place.

If you wish to use the half etched bolt type then press out the rivets whilst still in the fret and then remove and fold up and fix in place

If using the pinned type then check that the holes will accept 0.31mm wire and remove from the fret and fold up. Two short lengths of 0.31mm wire can be soldered in the holes and then the lamp iron glued in place on the body having drilled receiving holes for them. Alternatively simply glue the wire and lamp iron in place at the same time without the solder.

### **Vacuum pipe brackets**

There are two swan neck vacuum pipe brackets (25) included. Most wagons with this underframe had upright type vacuum piped but occasionally they were fitted with the swan neck type that hung down from the headstock. They come in two parts. There is a bracket which attaches to the solebar and a round head that has 'tails' that fold up. Two length brackets are included. Check your prototype for which ones you need. Press out the rivets on the bracket 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. This bracket can then be soldered to the back of the head (the side with no half etched areas). It is easiest to do this while the head is still attached to the fret. There is a small slot to help provide a positive location. 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 tiny 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. These can then be soldered in place on the headstock.



### **Coupling hooks and Instanter links**

I've included etched coupling hooks (26) and Instanter links (27) on the fret, though I'm not sure how many wagons with this underframe would have had the later. They are both designed to fold double and then be soldered together. You may wish to round off the edges of the coupling hook as they were cast in real life and don't look very flat.

### **Spring Carriers**

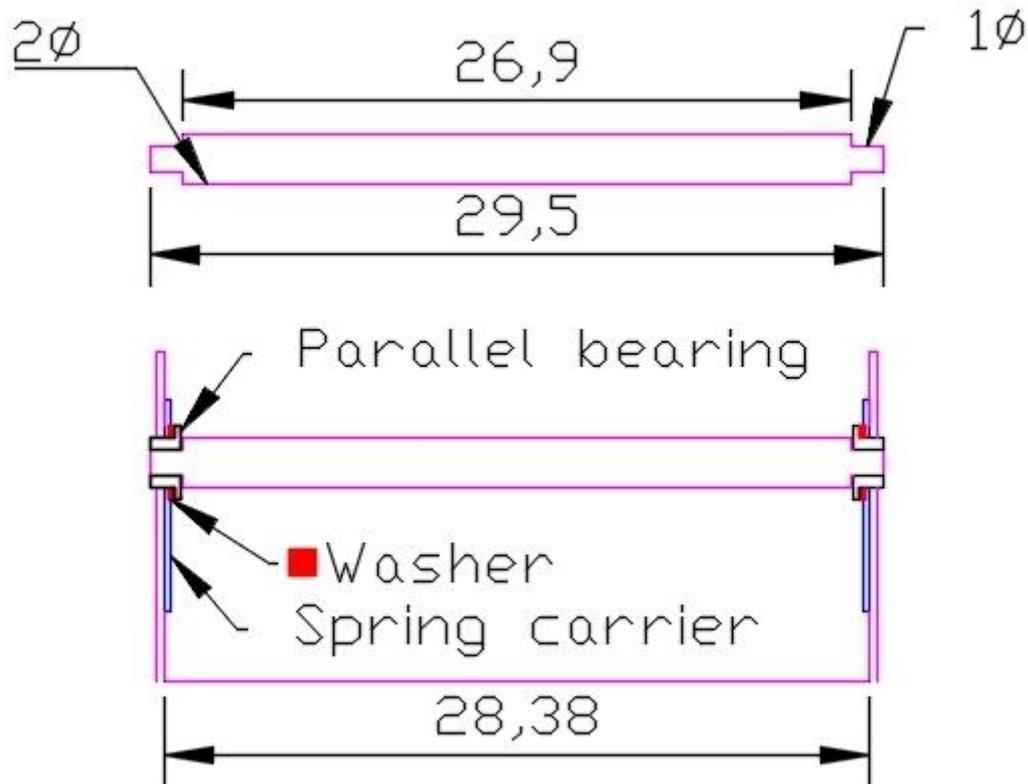
I have left this section until last as the total weight of the wagon will need to be assessed to choose the correct setup for the spring carriers. This was mentioned in the Technical notes at the beginning of these instructions but the information table is reproduced below as well.

Total wagon mass	Spring carrier	Guitar wire gauge
50-60g	14a	0.008"
90-100g	14b	0.009"
130-140g	14b	0.010"

The spring carriers (14A or 14b) 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 chassis is specifically set up to use Exactoscale 2mm x 1mm parallel bearings with 29.5mm long axles. This is longest practical length when turning down pin point axles. The ends of the axles should be reduced to 1mm diameter and extend so that the remaining 2mm diameter section is 26.9mm long.

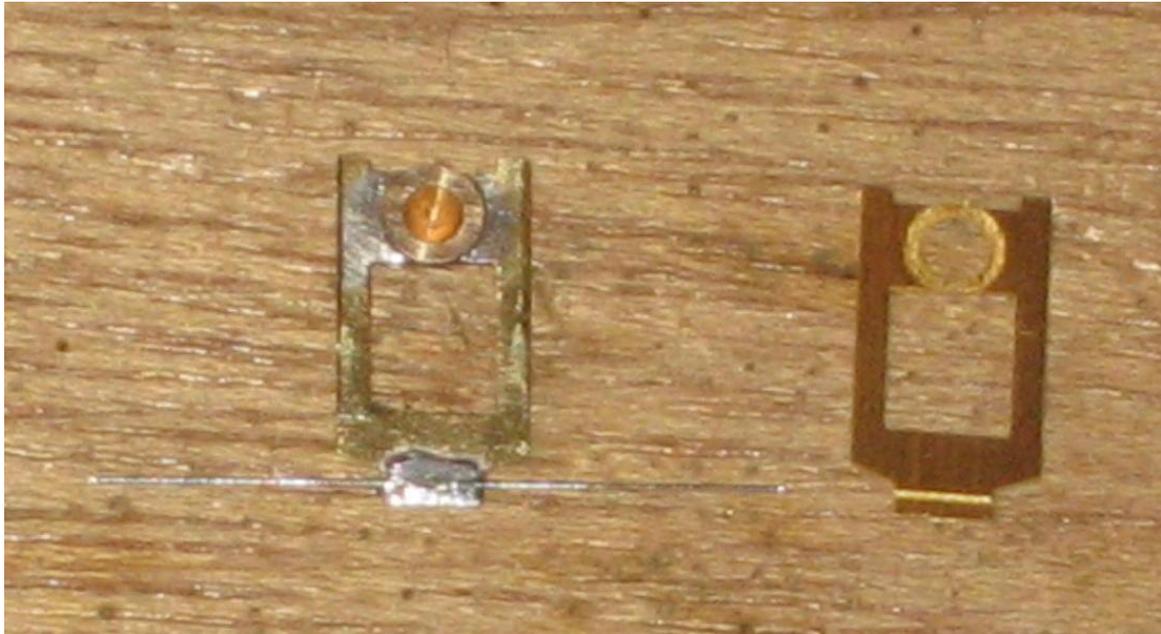
If using parallel axles then 1 full thickness bearing washers (15) should be fitted between the spring carrier and the bearing.



If you wish to use pin point bearings then you may need to take out any lateral movement in the axle. 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.

Spring carriers 14b will need folding double and soldering together. Because of the heavier weights that they are designed to take I felt it would be beneficial to make them a bit heftier.

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 10mm either side of the point where it is attached to the carrier.



### **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 all black with no masking at all which makes life a little easier.

I now 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 the setting laid out at the beginning of these instructions. If you need to add significant weight then it may be a good idea to try to make a false floor so that there is room for a piece of lead flashing to go between the new floor and the underframe. This does reduce the depth of the wagon interior but it isn't too noticeable on most types and saves trying to work around the brakegear. If you need to add a little more weight then simply add a little lead flashing between the solebars.

### **Finally**

Thanks must go to the staff of The Great Western Society at Didcot for letting me measure up and photograph at close quarters some of the wagons in their care which have greatly helped in the preparation of these kits.

Justin Newitt - October 2017

## Suppliers List

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

## Appendix

Wagons fitted with RCH 17'6" x 9' Morton brake steel underframes

### LMS

D.1660 Morton	Banana Van
D.1663 Morton (some VB)	Van
D.1832A Morton	Ventilated Van
D.1664 Morton (some VB)	Van
D.1828 Morton	Ventilated Van
D.1830 Morton	Ventilated Van (all steel)
D.1670 Morton (some VB)	Meat Van
D.1821 Morton	Meat Van
D.1672 Morton	Refrigerated Van
D.1672A Morton	Insulated Meat Van
D.1673 Morton	Ventilated Refrigerated Van
D.1676 Morton (some VB)	Ventilated Van
D.1676 Morton (some VB)	Ventilated Van (twin vents)
D.1817 Morton	Beer Van

### GWR

H6 Morton VB	Conflat
O24 Morton	Open
O26 Morton	Open
O29 Morton	Open
O36 Morton VB	Open
V21 Morton VB	Ventilated Van
V33 Morton	Ventilated Van
Y7 Morton VB	Fruit Van

### LNER

128 Morton	Open
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### SR

1379 Morton	8 plank Open - Some?
1382 Morton (some VB)	Conflat