

Rumney Models – LMS Clasp Brake Wagon Chassis Instructions S Scale

Notes

This set of instructions covers the S Scale LMS clasp brake chassis kit SB.51

This kit is designed to build into a fully detailed and accurate 4mm LMS clasp brake wagon chassis. They are to scale length over headstocks so their suitability for use under available body kits will depend on how accurate in length the model body being used is. They follow the prototype wherever possible but are simplified in certain areas to ease construction. Both types of axle guards are catered for allowing wagons from both LMS and BR periods to be built.

Read through the instructions first and familiarise yourself with the components. Drawings and photographs taken during the construction of the test etches are included to attempt to make my waffle clearer. Note that not all the photos are of these particular chassis but suitably illustrate the item in question.

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

Everyone has their own soldering methods. I now use a temperature controlled soldering iron with predominantly 145° solder and La-Co paste flux. For a long time I used an Antex 18W soldering iron on virtually everything with few problems.

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 designed to use 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 is a choice of bearing carrier and diameter of guitar spring wire depending on the total weight of the wagon in question:

Total wagon weight 50g – spring carrier 7A – 0.008” guitar wire

Total wagon weight 90g – spring carrier 7B – 0.009” guitar wire

If the wagon weight comes in between 50 and 90g then use the heavier gauge wire and spring carriers and consider adding a bit more ballast to bring the total weight up to 90g. There are notes on weighting the wagon at the end of the instructions.

The spring carriers are designed to use standard 4mm scale 2mm pin point or parallel bearings.

Materials list

Several 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 - Axleguards ties, brake lever guards, lamp irons

0.4mm - Most of the brakegear

0.6mm - Alignment pins for shocopen wagon door springs

0.9mm - Main brake cross shaft

1.0mm - Alignment pins for the axleguard assemblies

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

For those wishing to model a Shocopen wagon Rumney Models has produced an etched kit for the spring brackets and covers used on shock absorbing wagons with the gear fitted to the solebar in 4mm scale. Enlargements of the artwork can be arranged if wanted.

Component List

1 - Chassis top plate

2A - RCH Axleguards

2B - BR Axleguards

3 - Solebars

4A - Solebar detailing overlays for RCH axle guards

(a) – Standard wagons (vans, etc)

(b) – Open wagons

(c) – Shock absorbing wagons and some Conflats

4B - Solebar detailing overlays for BR axle guards

(a) – Standard wagons (vans, etc)

(b) – Open wagons

(c) – Shock absorbing wagons and some Conflats

5 - Clasp brakes

6 - Clasp brake infills

7A - Spring carriers for 50g wagon weight

7B - Spring carriers for 90g wagon weight

8 - Bearing washers

9 - Axle guard ties

10 - Brakegear linkage

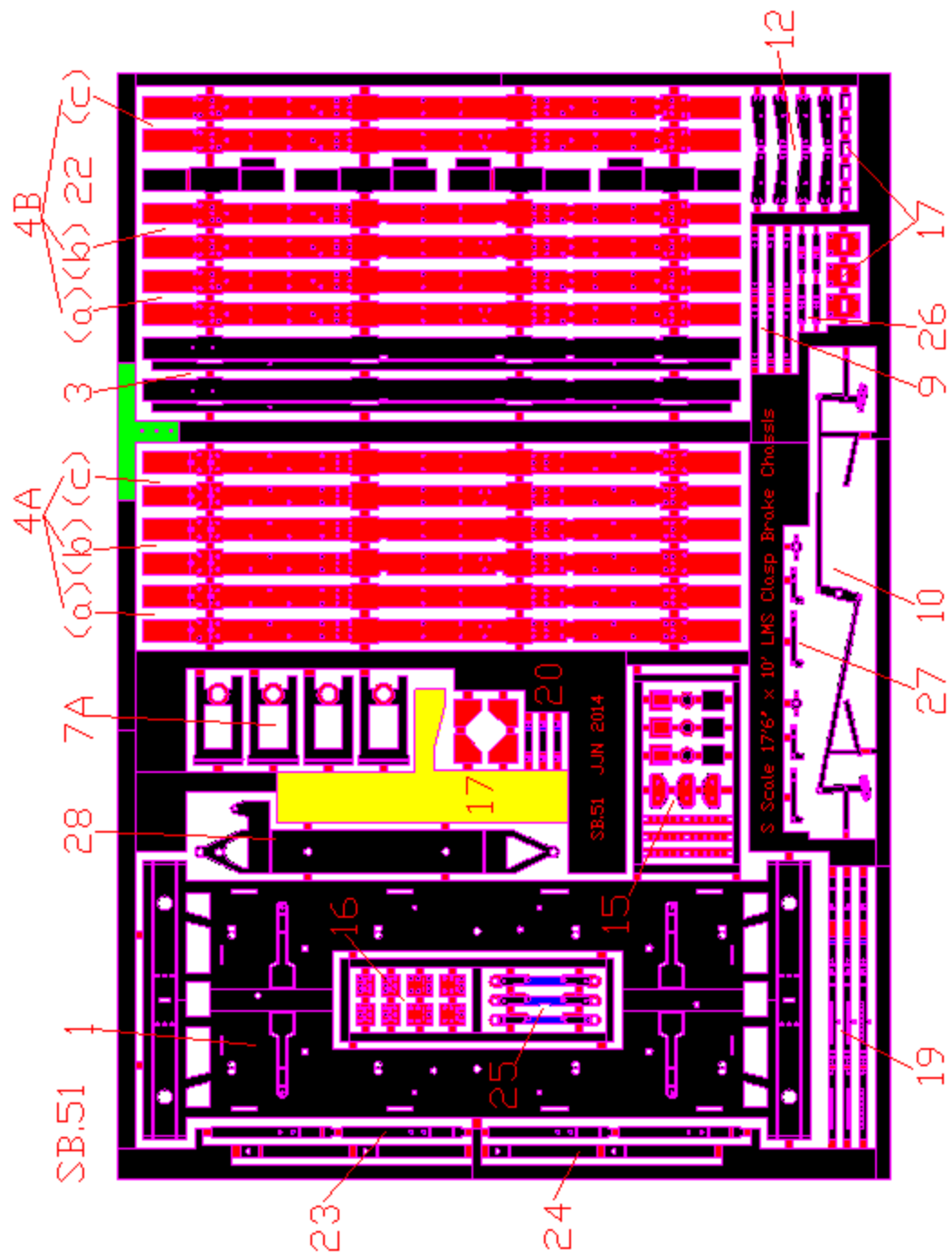
11 - Brake shaft crank overlays

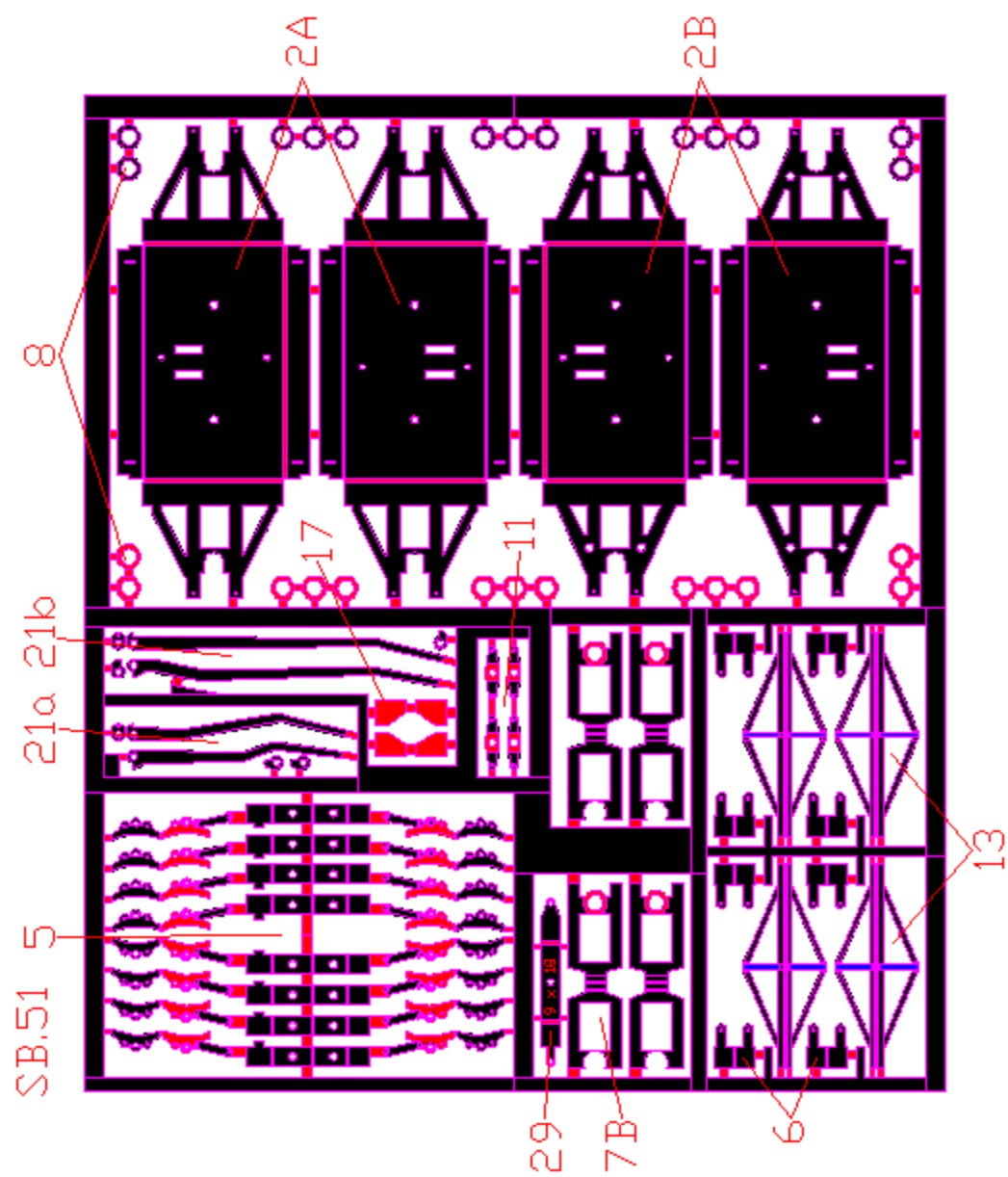
12 - Clasp brake hanger overlays

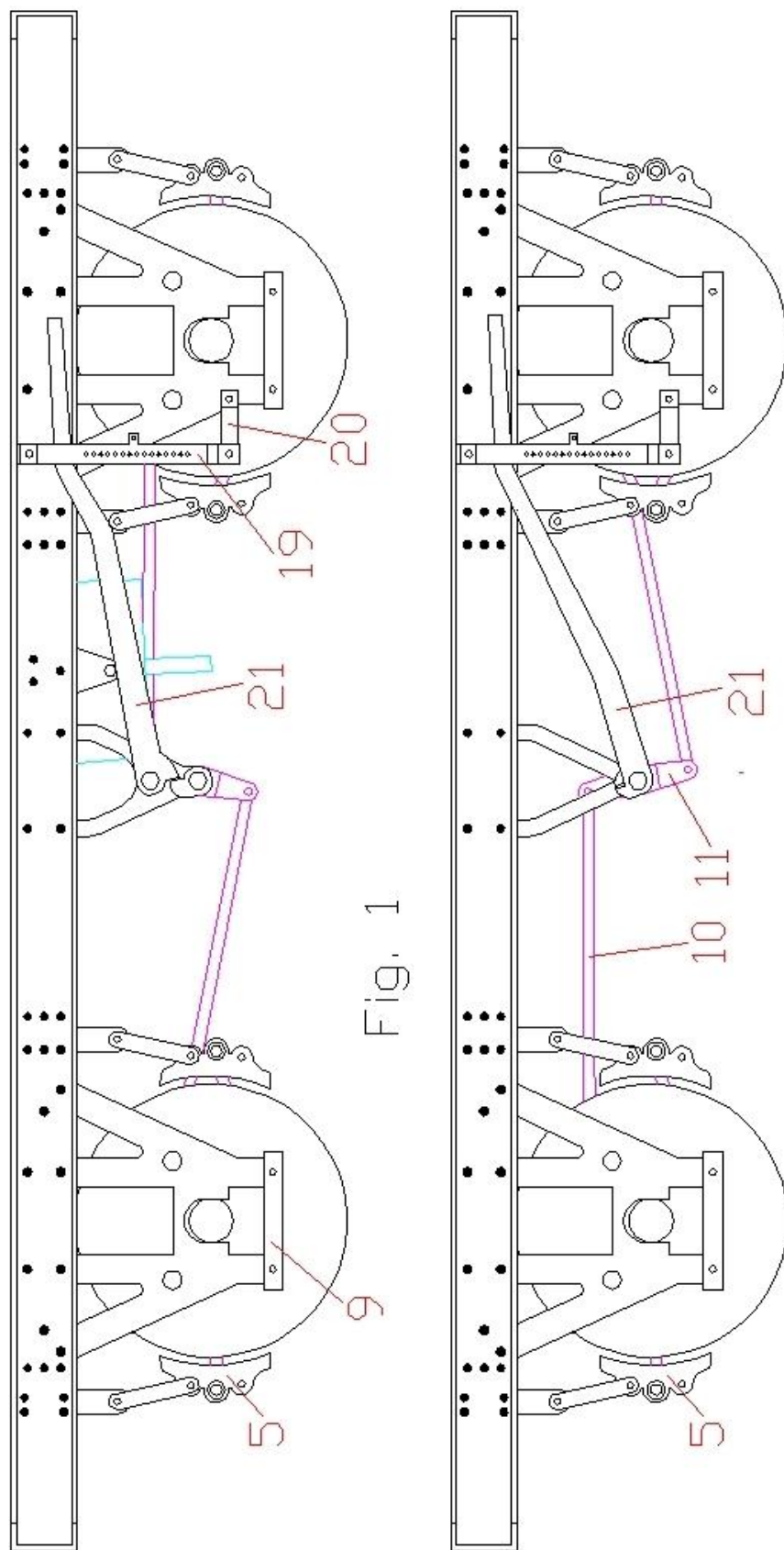
- 13 - Brake Yokes
- No 14
- 15 - Solebar detailing
- 16 - Solebar/Headstock corner plate
- 17 - Solebar/Headstock bracing
- 18 - Coupling pocket detail
- 19 - Brake lever guards/brackets
- 20 - Brake lever guard stays
- 21 - Brake levers
 - a – Standard (Vans, etc) and open wagons
 - b – Shock absorbing wagons and some Conflats
- 22 - Shock absorbing wagon end bracing
- 23 - Open wagon door springs
- 24 - Shocopen wagon door springs
- 25 - Vacuum cylinder actuators
- 26 - Lamp Irons
- 27 - BR swan neck vacuum pipe brackets
- 28 - Brake shaft vees
- 29 - Vacuum cylinder bracket

The areas shaded yellow in the parts diagrams are the jig for forming the safety loops. This should be removed from the fret when the appropriate time comes. This will be noted in the instructions.

The areas shaded green in the parts diagram are the jig for drilling locating holes for the lamp irons. This will be covered at the appropriate point in the instructions.







Construction

Main Chassis

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

The headstocks as supplied are full width, however not prototypes all were. Shock absorbing vans and opens had narrower headstocks at around 35.5mm. Now is a good time to make any adjustments necessary so that they are correct for the body the chassis is intended for. I used a piercing saw to do this.

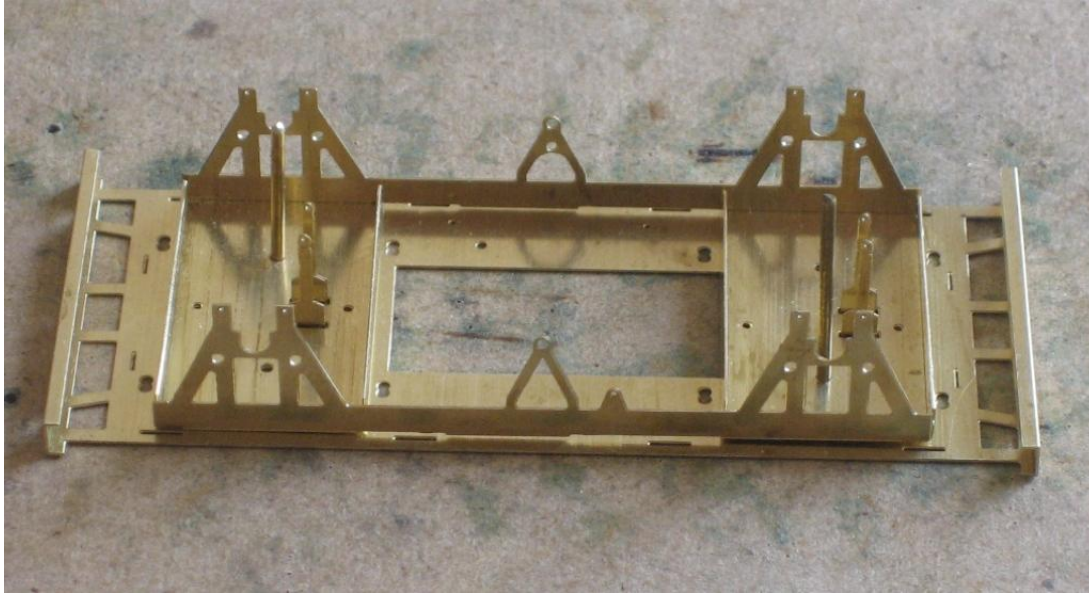
The headstocks need to be folded up. This is best done with the chassis top plate clamped to something or held in a vice to avoid distortion. There are two sets of fold lines as the headstocks need to be folded into a channel. Starting with the outermost part of the chassis top plate fold through 90°.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

Fold out the clasp brakegear hanger brackets through 90°. These will be adjusted later but need to be at this angle for the moment.

Remove the axleguards of your choice (2A or 2B) from the fret. I have mistakenly etched all the holes on the BR axleguards. I meant to do them half etched to drill out. If you wish to fill any of them use 1mm wire. Carefully fold up the sides and the spring supports. Make sure that the sides are at 90° and adjust if necessary.

The chassis top plate and the axleguards need to be solder together. There are 1mm diameter holes on both the top plate and W-Iron 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 two parts together and then remove the locating pins.

Check that the brake shaft holes in the brake shaft vees (28) will accept 0.8mm wire. Locate to the chassis using 1mm pins and solder in place. It doesn't matter which way around it is fitted.



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 the solebar detailing overlays of your choice from the fret. Those listed under 4A are for the RCH axleguards and 4B the BR ones. Overlays (c) are for shock absorbing wagons and some Conflats, (b) are for open wagons with door springs attached to the solebar and (a) are for everything else.

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.

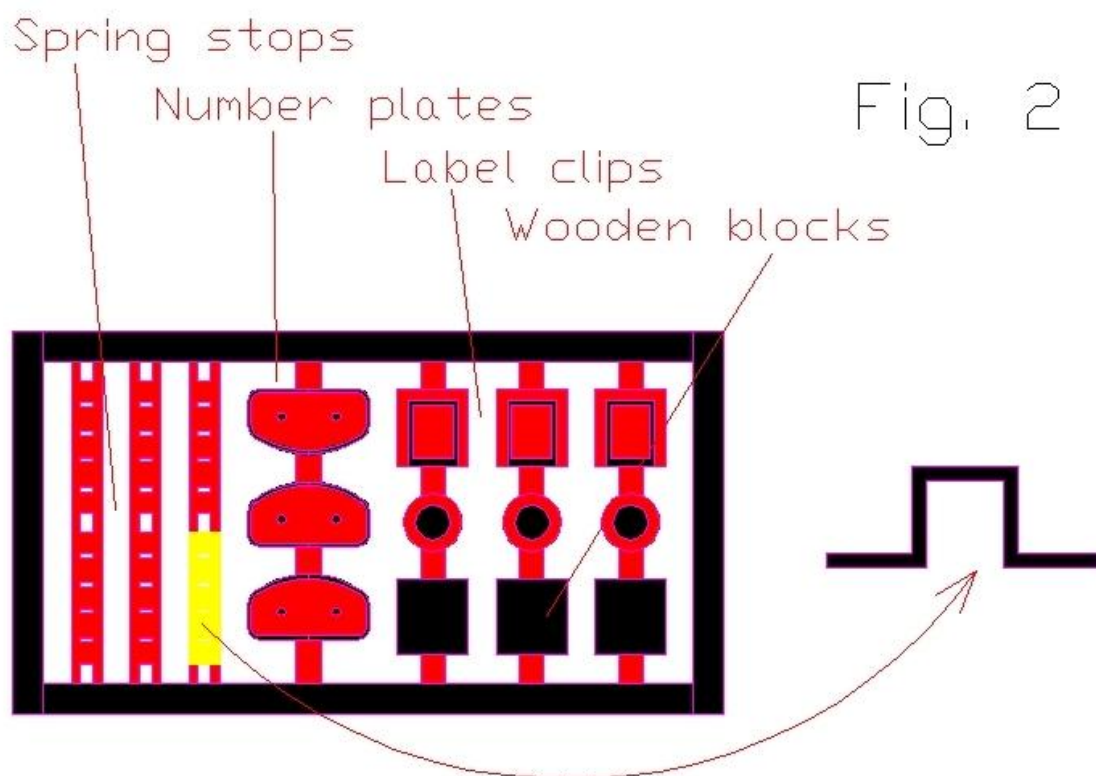
The solebar overlays are designed to fit into the slots in the solebars. The completed solebar then locates into the slots in the chassis top plate. Locate the solebar detailing overlay in the solebar and tack solder in place. Note that there is a right way up for all the overlays (if in doubt note that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

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

Solebar detailing

The solebar detailing (15) comes contained in its own little fret. See Fig.1. On it you will find fabricated axle spring stops, number plates, label clips, a rectangle that is actually a block of wood on the real thing and some small round dual depth plates. I have no idea what the purpose of the last two items is but the rectangular block of wood was quite common and the round plates could be found on shock absorbing vans where the springs

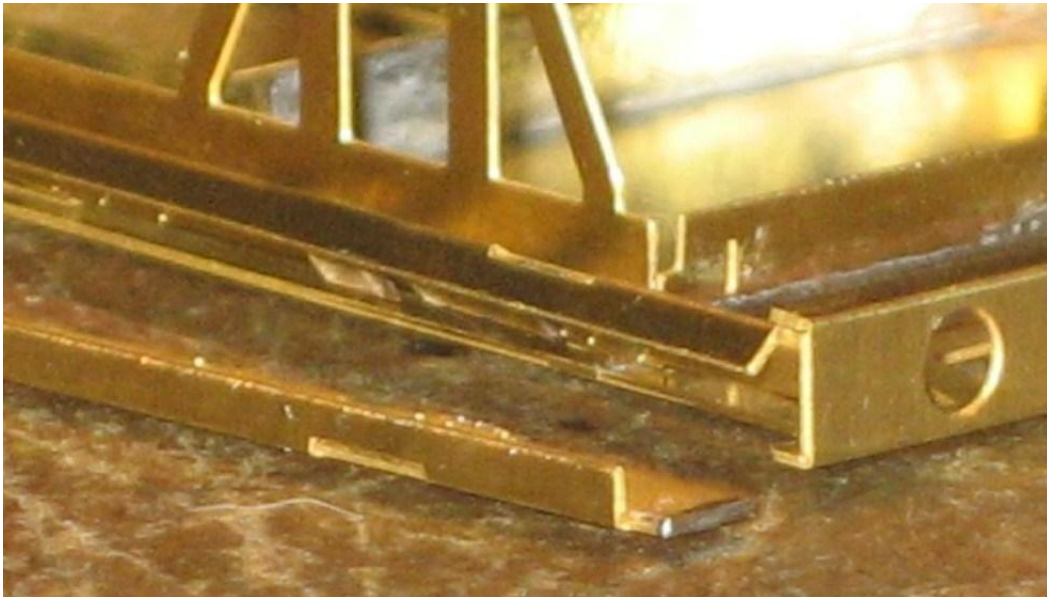
were mounted in the centre of the wagon. The positions of all this stuff varied so check your prototype. The details can be soldered on or glued. If you wish to glue the detail on its best left until the chassis is assembled.



Main Chassis Continued...

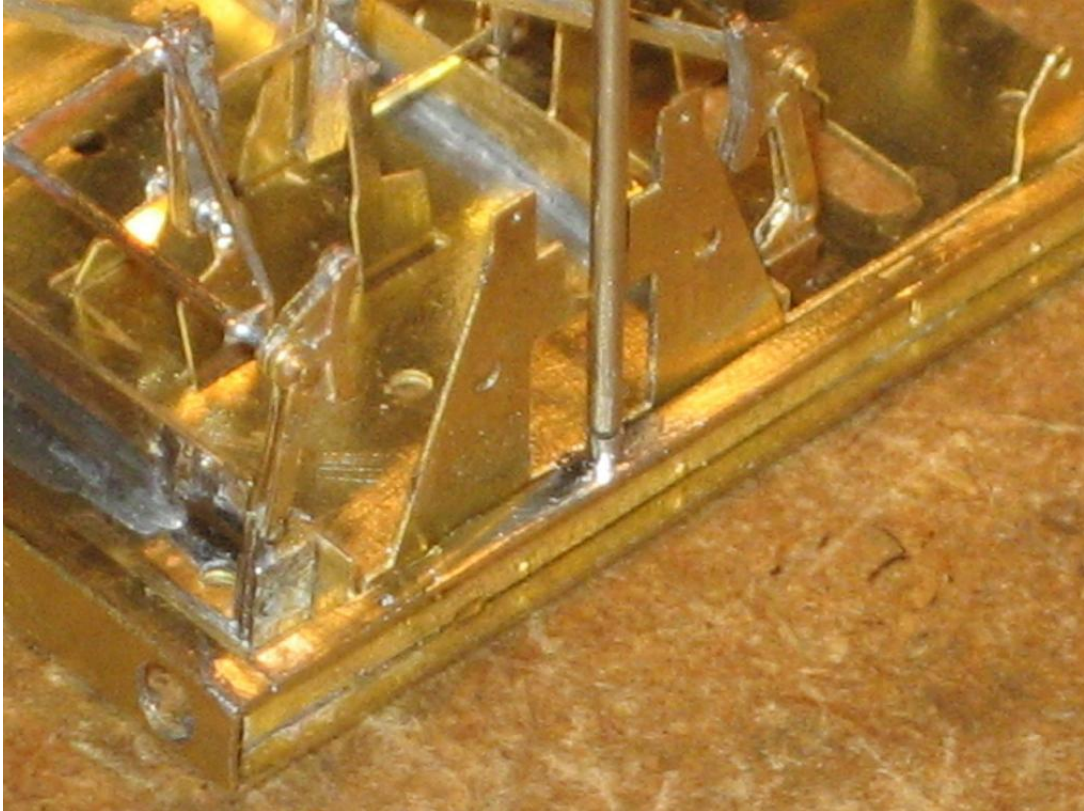
The solebars can now be fitted to the chassis. Note there is a correct side for the solebars. There is extra rivet detail on one side and this should be on the side the vacuum cylinder bracket is. There are slots and tabs to aid location and the ends go into the channel that is the headstock. Fit the solebars at an angle and then straighten locating the slots and tabs at the same time. 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 (16). These should be arranged so that the two straight sides go along the outer edge of the headstock and the inside of the Solebar. Note that there are two sizes. The narrower ones are for Shock absorbing wagons with the larger ones for everything else.



Spring Stops

There are 6 fabricated spring stops on the solebar detailing (15) fret (see Fig.1) which can be folded up and then soldered in place. I find a small pair of self closing tweezers good for this. Some wagons had round pattern spring stops though I'm not sure this applies to the LMS clasp brake chassis. I have used 1mm wire in 4mm for these. 1.2mm wire would be ideal in S Scale. If you can't get hold of any use 1mm. I cut almost all the way through the wire with a piercing saw and then solder in place. The cut can then be completed without the joint breaking.



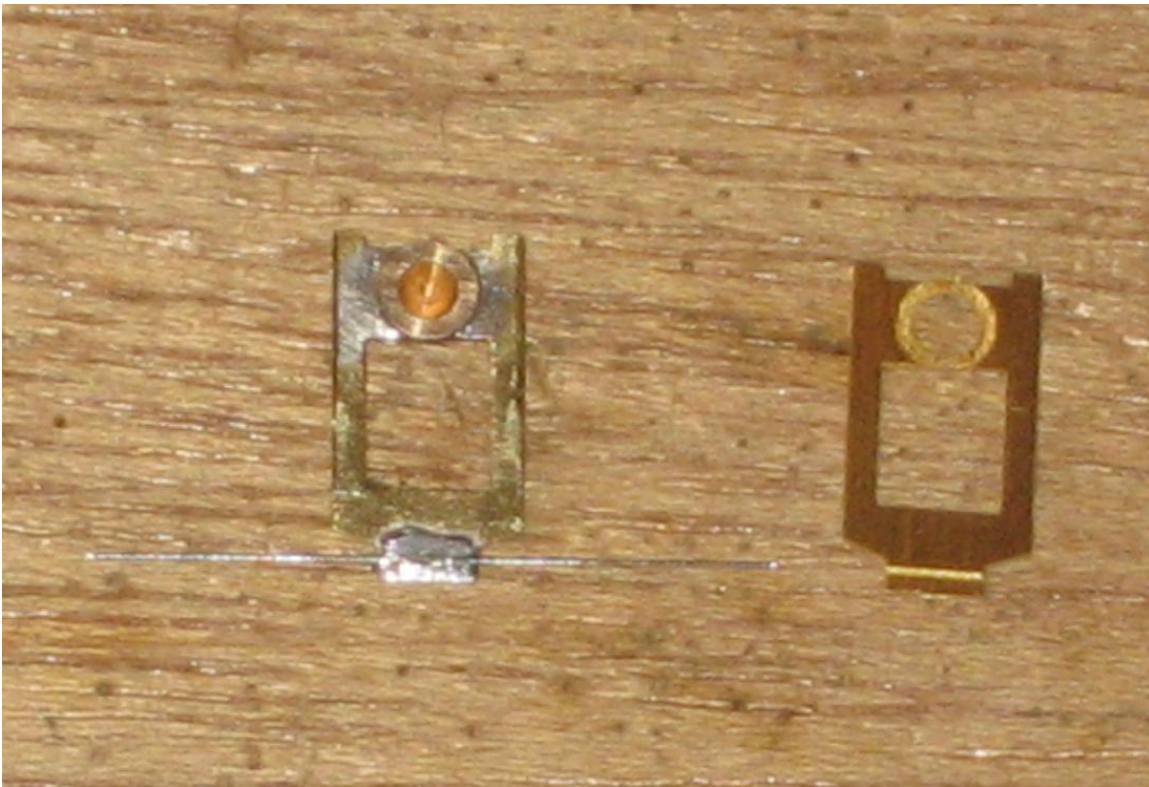
Spring Carriers

The spring carriers (7A or 7B depending on the weight of your wagon – see the notes on page 1) 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. Carriers 7B will need to be folded double and soldered together with the wire in the slot in order to provide added rigidity for the additional weight being carried.

There should be a good fit between the axles and the bearings with ideally no sideways movement at all. You may find that the carriers need packing out a little to take up any slop. Bearing washers (8) are included for this purpose. 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.

Due to the removable nature of the axle guards you can easily use Exactoscale parallel axles and bearings if you wish. If doing so then you will need to pack the bearings out on the back of the spring carriers before soldering them in place due to the length of the axle. Use the bearing washers provided.

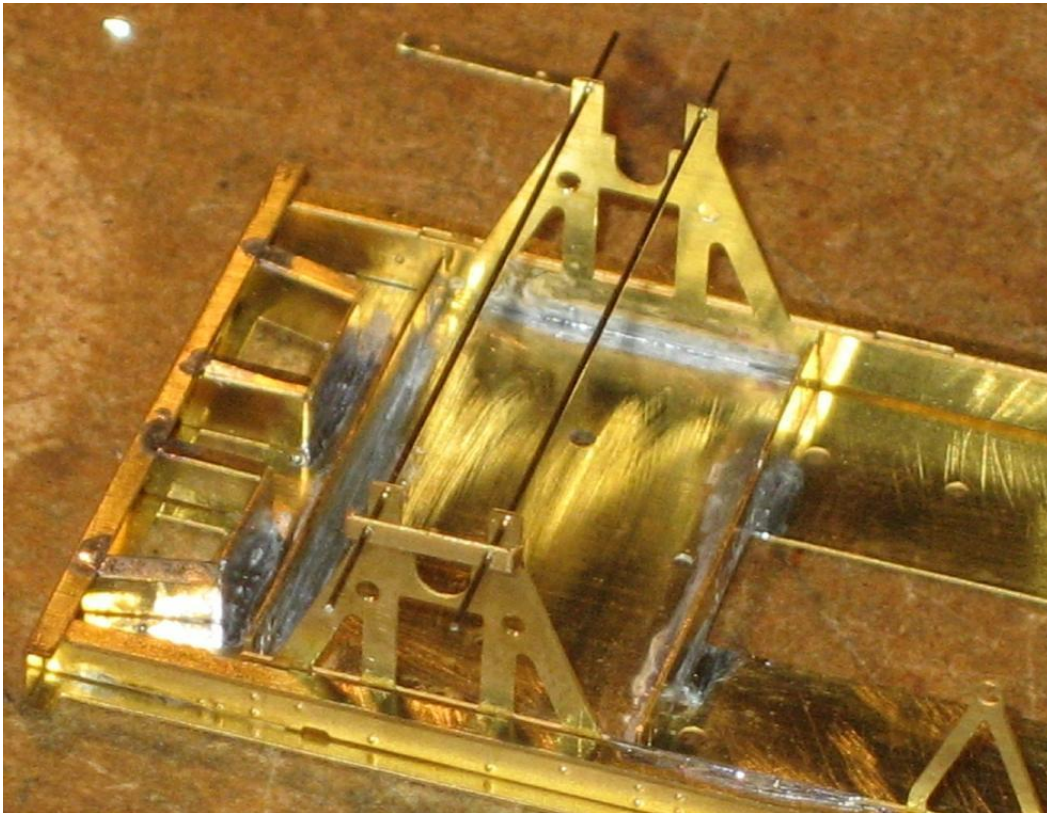
I find the easiest way to assemble the spring carriers is to make a small jig consisting of an off cut of wood with a 2mm hole drilled into it. The spring carrier can then be placed so the half etched guide slot for the spring is facing towards you and the bearing locates through the hole in the carrier 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 be 20mm long.



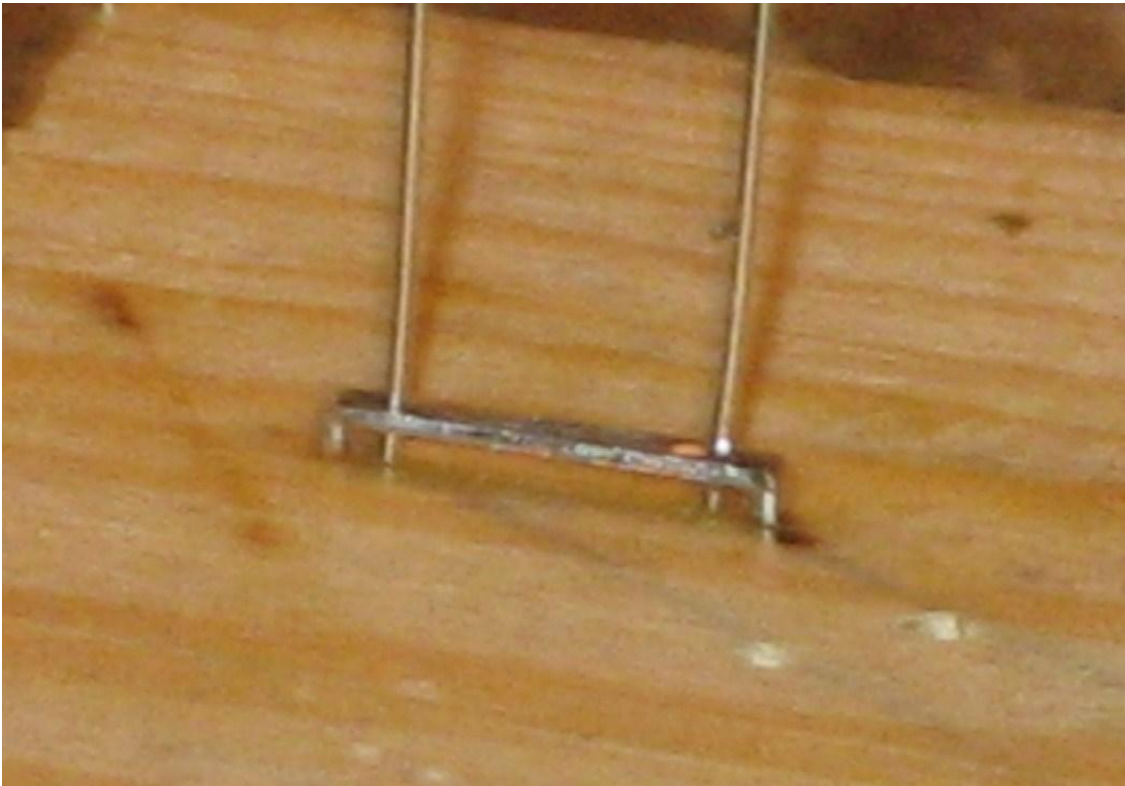
Axle guard ties

The axleguard ties (9) are designed to be removable if you wish in order to allow the wheel sets to be easily dropped out. They can be soldered permanently in place but either way you will need to make sure the holes will accept 0.31mm wire before removing them from the fret.

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



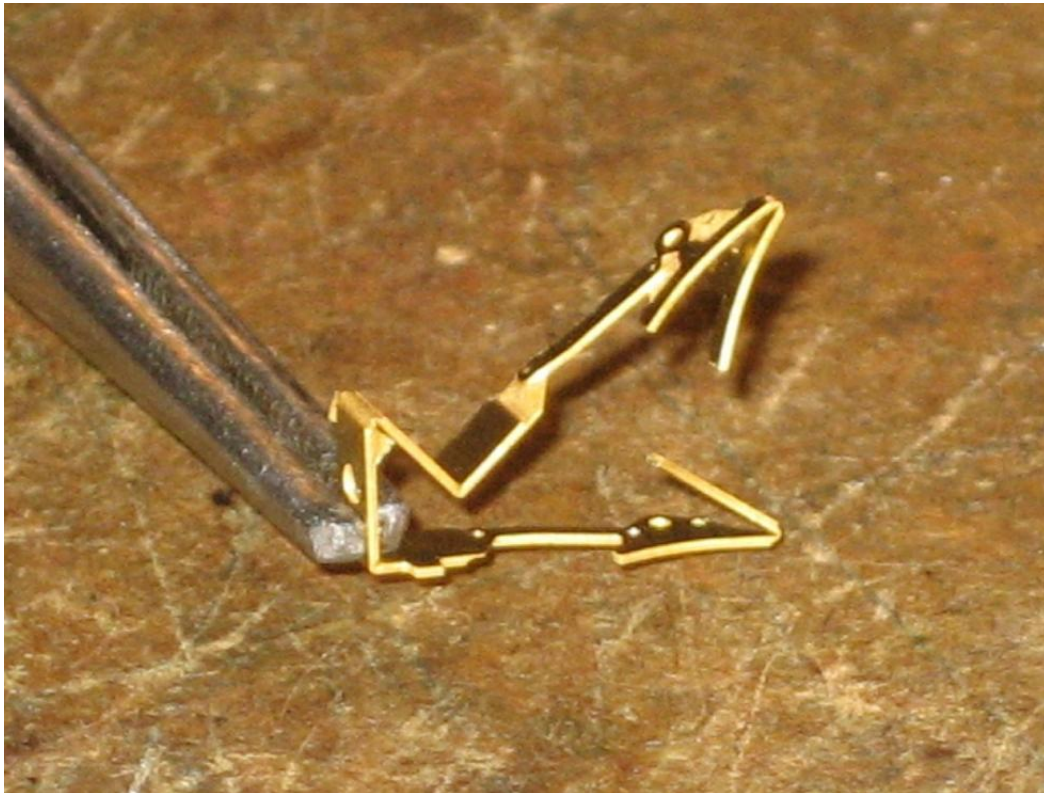
If you want to make them removable to allow the axles to be dropped out then you will need to solder 0.31mm wire 'pins' through the holes in the axleguard ties. I find the easiest way of doing this is to use one pair of holes as a jig and drill a pair of 0.3mm holes into a piece of scrap wood. Short 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. I found it easiest to fold the ends in this order and then quickly reinforce the fold lines with solder before removing the axle guard completely. You will need to make sure there is at least 0.75mm of wire projecting from the back of the axle guards 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 axleguard ties as long as possible to give you somewhere to hold them when painting. Once the axle guards 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.

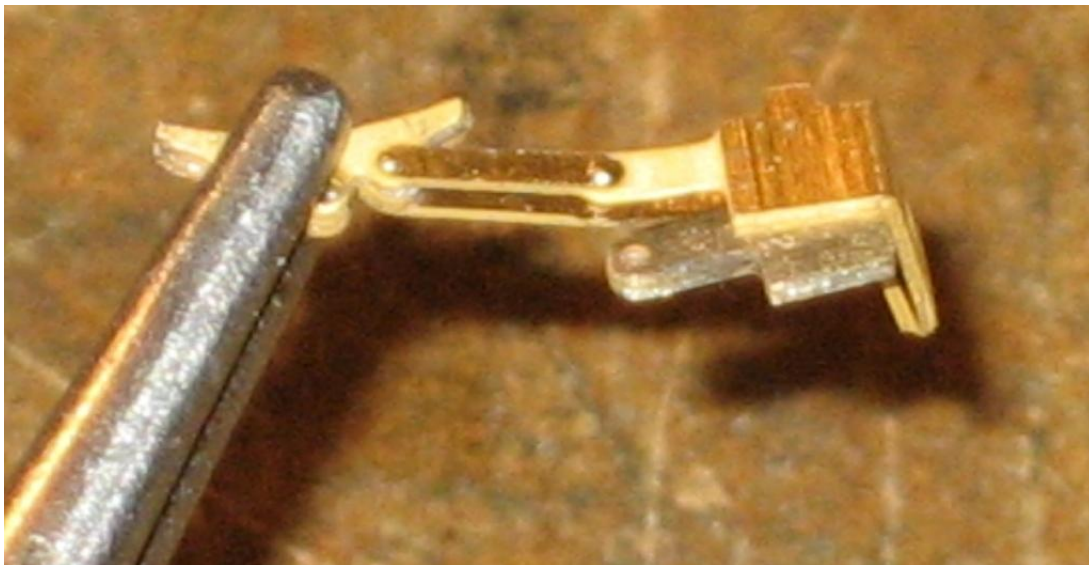


Brake Shoes

The clasp brakes (5) are designed to be folded up as one piece, soldered together and then tidied up afterwards. If you wish press out the half etched rivets at the top of the brake shoe and on the hanger bracket. I use a drop head rivet press for this with the parts held on one of those ubiquitous green cutting mats. Remove from the fret and fold up. Most of the fold lines are through 90° except for the one between the two plates with the holes in which is through 180° with the fold line on the outside. There are four parts to the brake shoes: Two outer detail parts and two inner shoes. The inner shoe parts need to be folded through 180° with the fold line on the outside. The four parts of the brake shoes need to be aligned and soldered in place. I do this by putting a 0.6mm drill bit or a suitably sized tapered reamer through the holes for the yolks and clamp the four etched layers together using a pair of self closing tweezers. If you hold the drill in one hand you can rest the base of the tweezers on the workbench leaving one hand free for the soldering iron. It's easier than it sounds, see attached photo. Solder together. There are clasp brake infills (6) which go between the two sides of the clasp brake assembly at the base to fill out the bracket that attaches the clasp brakes hangers to the underframes. Fold them double, fit between the two brake hangers and solder in place. You can now clean up the clasp brake assembly and the shoes in particular.

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

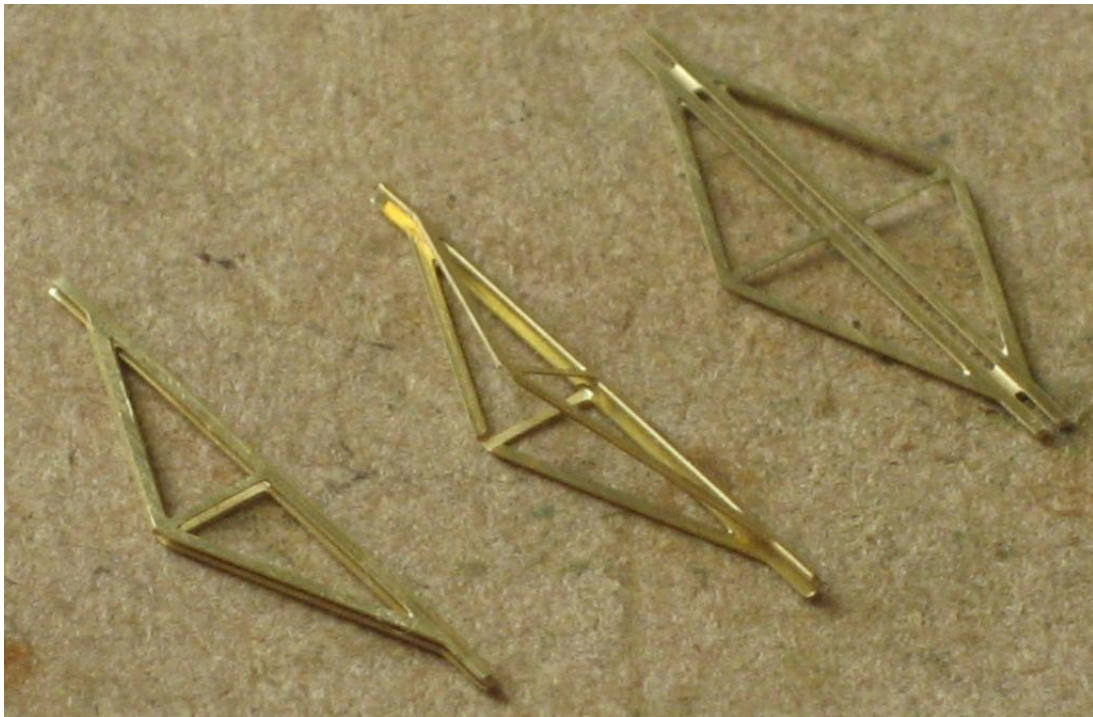




Yokes

The brake yokes (13) can be folded up next. Remove your chosen set from the fret and fold them over on themselves. Note that there is a half etched recess on the centre of both sides of the yolks. They should be folded so that these form a slot into which the brakegear linkage will fit. Once folded up solder together and file off the tabs that connected the two sides. Be very careful not to get any solder into the slot in the centre.

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



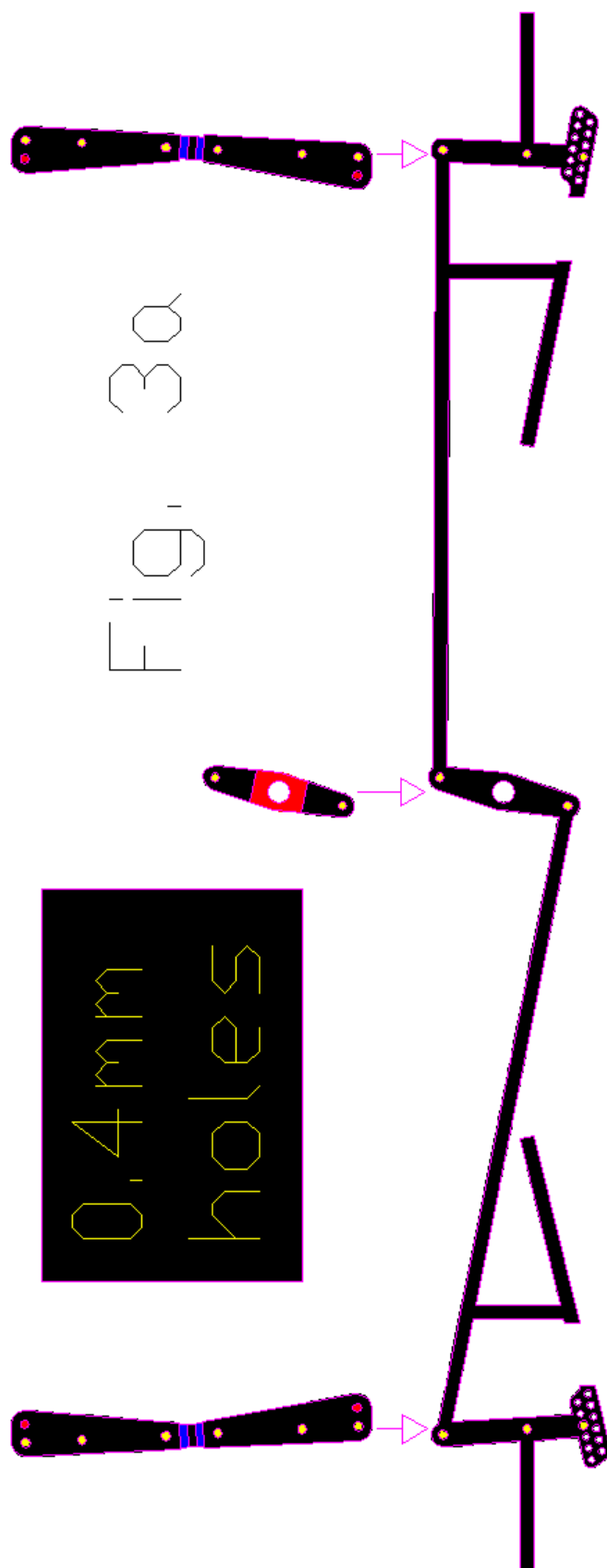


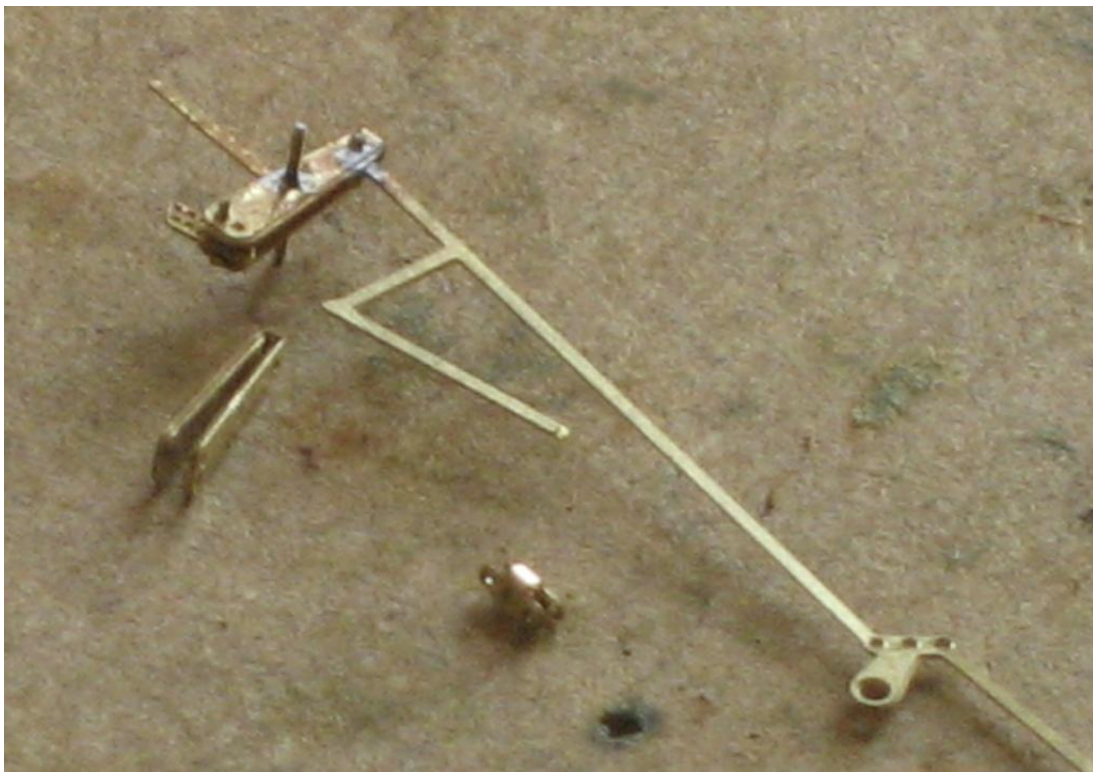
Fig. 3

0.4mm
holes

Brakegear

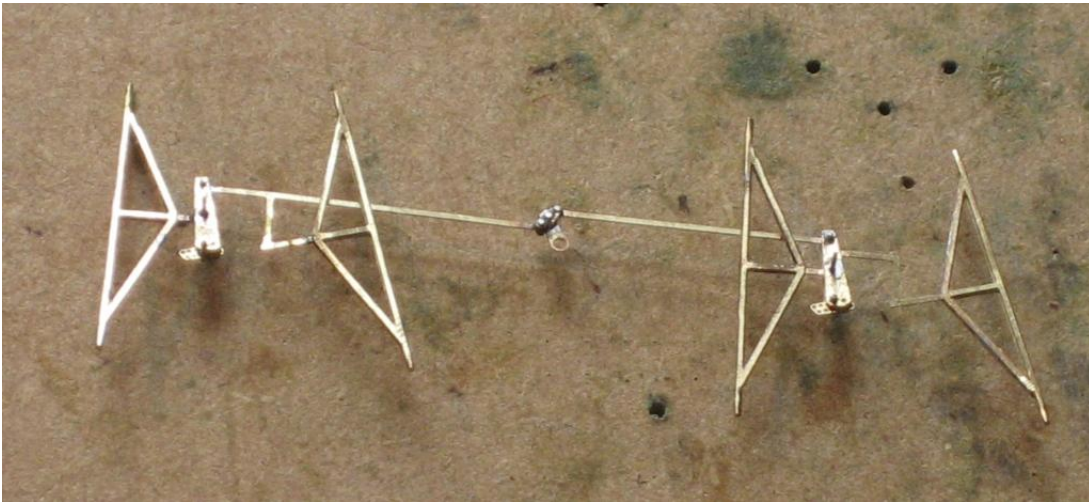
Next attention can turn to the brakegear. Check and open out where necessary the holes in the brakegear linkage (10), brake shaft crank overlays (11) and clasp brake hanger overlays (12) and then carefully remove from the fret. Refer to Fig.3a. The holes are all 0.4mm on this chassis (the diagram is from the 4mm instructions).

Start with the clasp brake hanger overlays (12). These fold over the brakegear linkage to form the detail on both sides. You will note that they are triangular in shape with a long straight edge. The three holes along this long straight edge line up with the three holes at either end in the brakegear linkage (10). Use short lengths of 0.4mm wire to pin everything together. Note that the long angled face of the triangle faces towards middle of the assembly. Solder in place. Trim the wire so that the top and bottom resemble bolts and the middle length extends approximately 2mm either side of the assembly. This last pin will be used to attach the brakegear to the brackets on the chassis. Refer to the photos below and Fig.3b if in doubt. Note that most of the following photos are of the very similar Derby clasp brake chassis but are of use here.



Next attach the brake shaft crank overlays (11) to the centre of the brakegear linkage. Again use 0.4mm wire to attach the overlays and solder in place. The large hole in the centre for the main brake shaft can now be opened out to accept 0.9mm wire.

Make sure that there are no half etched connecting tags left on the brakegear linkage (this is important or the yolks wont be in the right place). Fit the yolks to the brakegear linkage using the slots on the yolks and tongues on the linkage. Make sure that they are hard up against each other and solder in place.



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

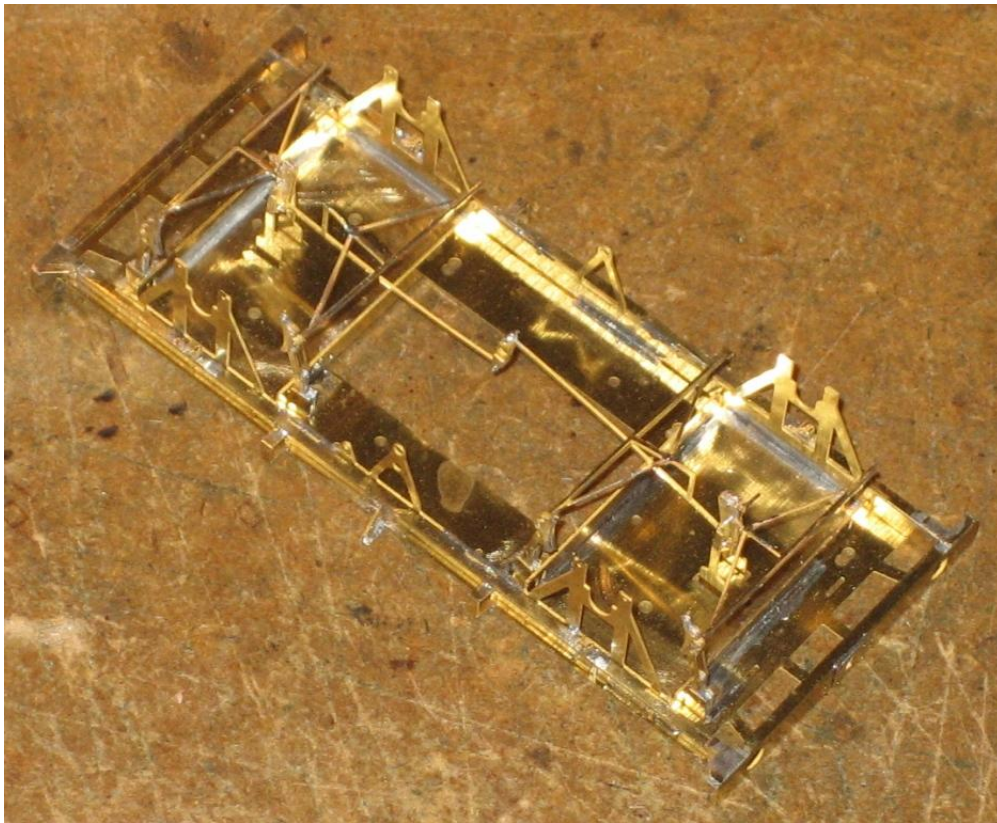


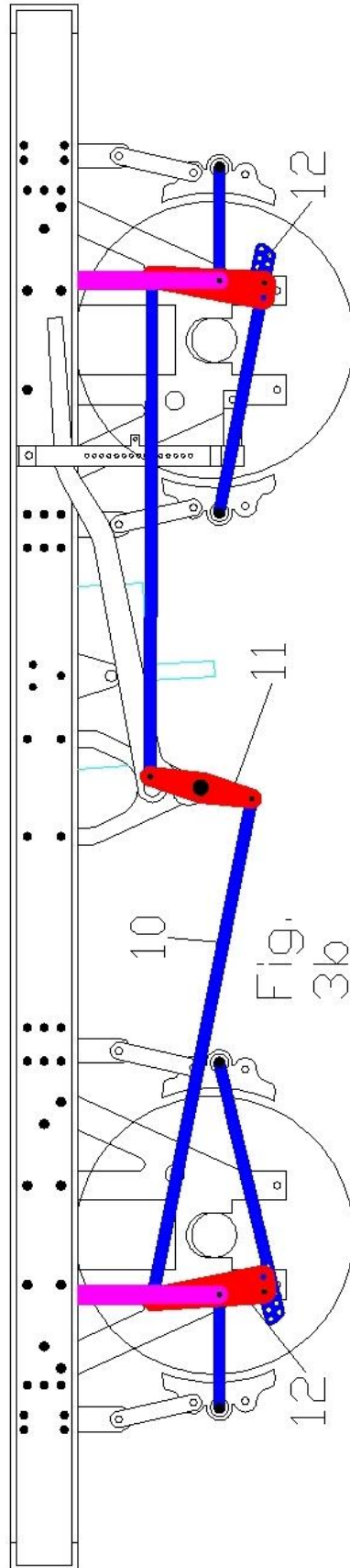
Brakegear assembly

Firstly attach the clasp brakes to one side of the chassis. There are tabs on the clasp brakes that locate into slots in the axleguard assembly (2). The clasp brakes can now be soldered in place on the chassis but only do one side of the wagon at the moment. Make sure that the clasp brakes are hard up against the axleguard assembly. The holes can also be used to help pin the clasp brakes to the chassis top plate when soldering.

Next take the brakegear assembly and attach it to the chassis so that the yolks go through the holes in the brake shoes and the protruding pins in the brakegear linkage engage with the holes in the clasp brake hangers attached to the chassis top plate. See photos below. Note that there is a correct way around in relation to the Morton cam side of the vees. Refer to Fig.1 and 3b for the correct orientation. Solder in place.

Add the remaining clasp brakes and solder in place.

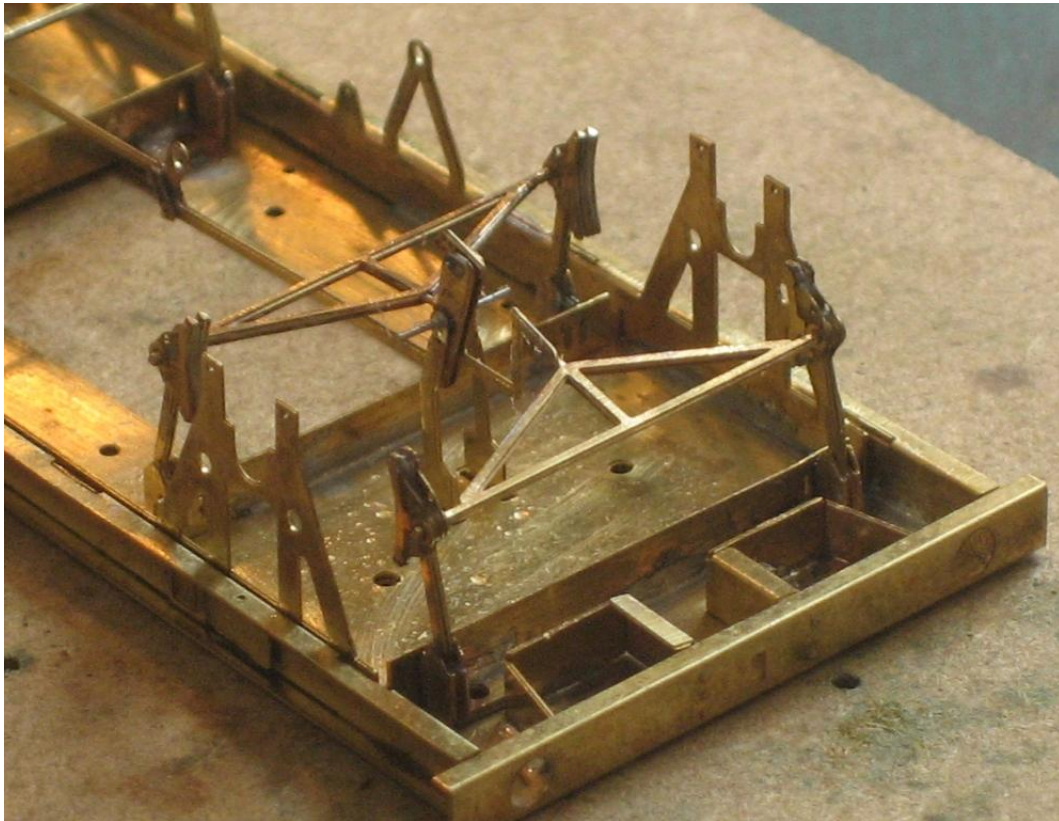






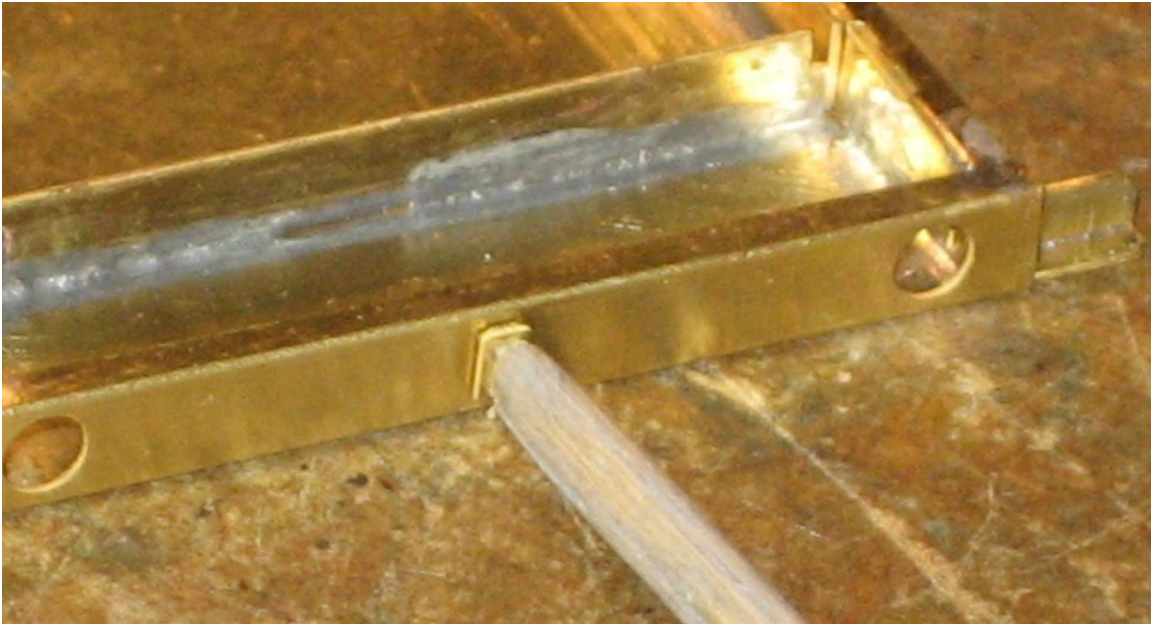
Shock absorbing wagon end bracing

Now that all the brake shoes are in place you can add the end bracing (22) if building a shock absorbing wagon. These should be folded up to follow the profile of the chassis at the ends. Note that they are handed depending on which side they are for. Fold the tops over to represent the channel section used on the real thing. This was found on the main longitudinal beams with the angled pieces being L section. Locate in the chassis using the tabs and slots to aid alignment and solder in place.



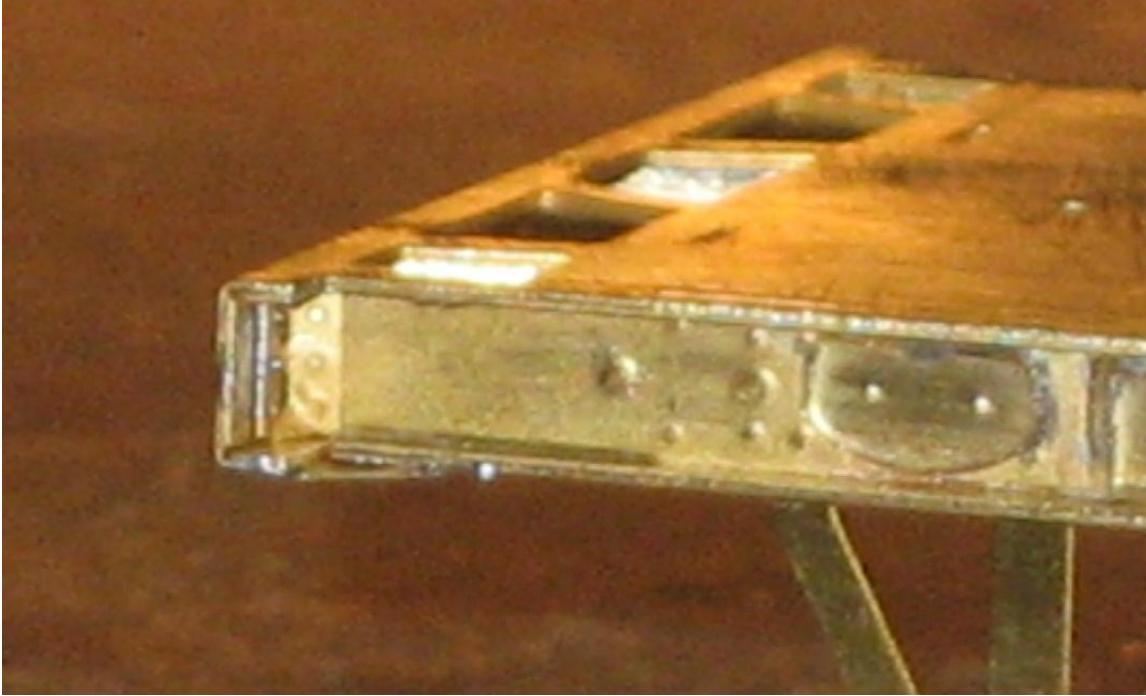
Headstock detailing

Now is as good a time as any to fit the coupling pocket detail (18). There are two different types. There is a riveted overlay and a welded overlay. Check your prototype. The vast majority should have the riveted type. 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



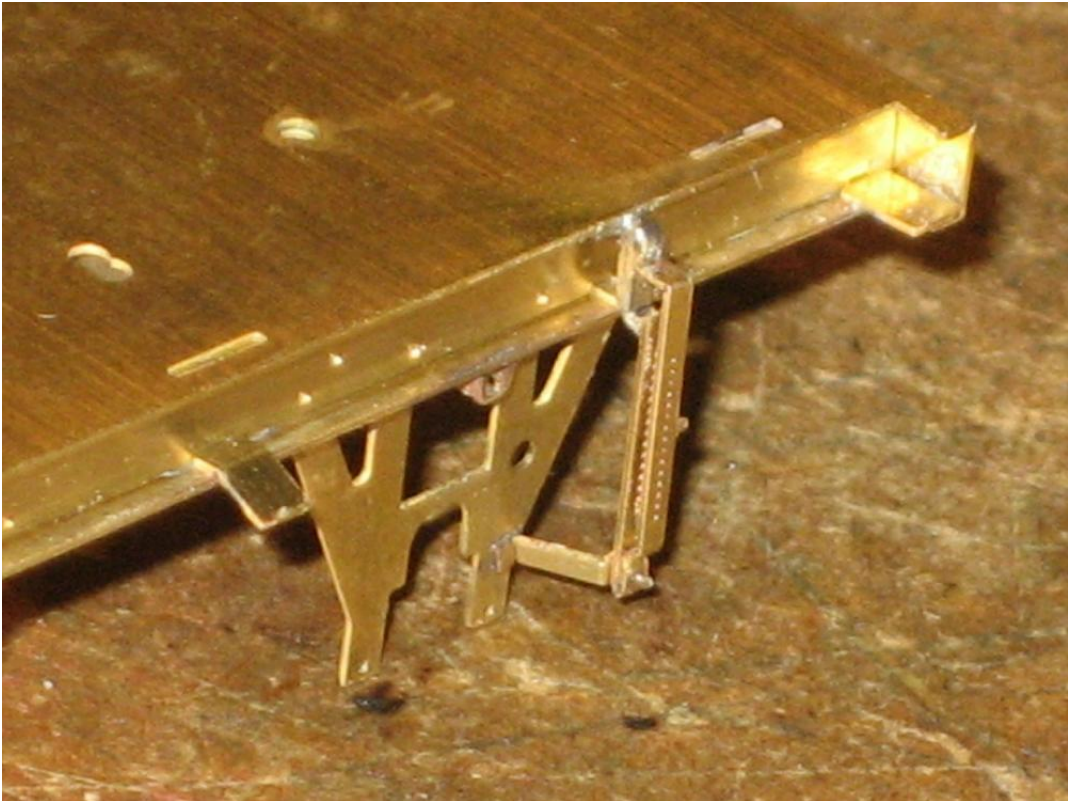
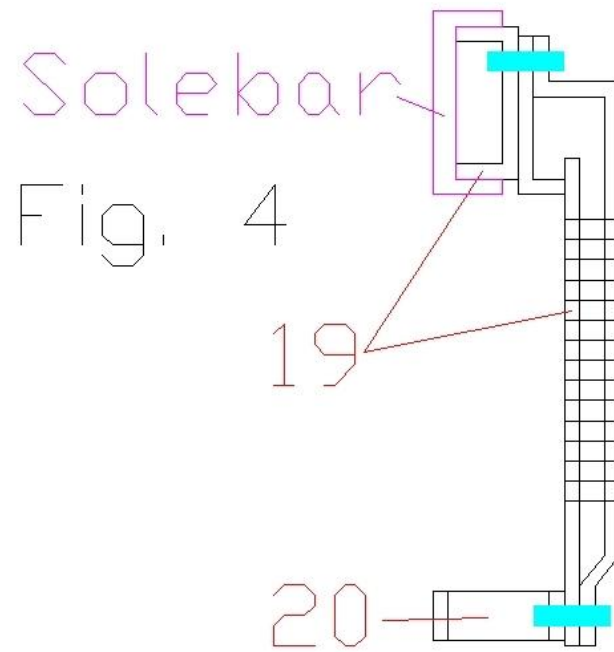
The solebar/Headstock corner plates (15) can also be added. There are two types depending on whether you are making a chassis for a shock absorbing wagon or not. The type for the shock absorbing wagons suits the narrower headstock of the prototype. These parts go in the corners below the headstock and solebar.

The Solebar/Headstock bracing (17) can also be added now. There are two types one with two sets of rivets and one with three. Check your prototype. These need to be folded into an L using the slots as a guide for the fold. Solder in place in the corners between Solebar and Headstock. The side with one lot of rivets goes against the headstock.



Brake Lever Guards

Make sure that the holes in the brake lever guard (19) and the lever guard stay (20) 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. 4. 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. It will make life easier when bending up the brake levers as they should be bent, like the prototype, to clear the axleboxes and springs. The back of the axleboxes will of course need slotting to allow the wheel bearings to move with the springs and drop out if making them removable. Some types come with the riveted reinforcing strips for the axlebox guides moulded on. These are for heavy duty types and should be removed before fitting.

Brake shaft

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

Check that the vacuum cylinder actuators (25) can accept 0.8mm wire. The actuators need to have their half etched rivets pressed out and then folded over. They are designed for the ends to wrap around a 0.6mm piece of wire extending from the vacuum cylinder. These can be fitted along with the brake shaft (0.8mm wire) through the vees. Leave soldering of the actuator until the vacuum cylinder is in place.

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

The vacuum cylinder can be added now or later and then the two halves of the vacuum cylinder actuator soldered together and to the brake shaft.

Brake Levers

Make sure the holes in your chosen set of brake levers (21a or 21b) and the cams can accept 0.9mm wire. 21b are for shock absorbing wagons and some Conflats where the lever guard is in the conventional position to the right of the axleguard and 21a is for everything else. The levers and cams can then be removed from the fret but note that the small 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 0.89mm 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 (in the case of shock absorbing wagons) and then cranked for the handle. Check on the model and adjust until you are happy with the shape. Once you are happy the brake levers can be soldered in place. Solder the Morton cam into place in the lower hole on the appropriate vee.

Safety loops

Formers are included on the fret for making safety loops from 0.31mm wire. These are marked in yellow on the parts diagram. There were different shapes used, even on the same type of wagon. I have included the shape I think is most appropriate though you could mix and match types depending on your prototype and whether you have the different chassis etches. Once formed they can be soldered to the chassis.

BR swan neck vacuum pipe brackets

There are two BR swan neck vacuum pipe brackets (27) included. These are quite distinctive and come in two parts. There is a bracket which attaches to the solebar and a round head that has 'tails' that fold up. 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 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.



Door Springs

There are two types:

Open wagon door springs (23) are designed to locate into the solebar. There are slots in the solebar and solebar detailing overlays which facilitate this. Push out the half etched rivets and remove from the fret. Fold up noting that the fold nearest the rivet detail should be made through 180° with the half etched line on the outside. Bend to shape and solder into position.



Shocopen wagon door springs (24) are designed to fix behind the solebar for shock absorbing opens. There are locating points on the chassis but note that the springs should coincide with the bang plates on doors which may not be as per the drawing I used to set the locating points. Fold the ends, bend to shape and align appropriately.

Lamp Irons

Lamp irons (26) are included for fitting to either the wagon body or the headstock if required. Check your prototype.

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. 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. I have also included a drilling jig which has the correct spacing for drilling holes in plastic bodies. This is the part shaded green in the parts diagram. Use a 0.3mm drill.

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.

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

Some modifications may be necessary to the body to get it to fit the chassis. Principally this will revolve around removing the plastic headstocks from the ends of the kits. In some cases this will present no problems as a lot of BR built stock had a clear distinction between underframe and body with no stanchions extending from the body onto the headstock. Where there were such items though a little work will be needed to remove the headstocks and then thin down the backs of the stanchions to a near prototypical thickness. Careful use of a piercing saw and file will do the job.

The suspension on the underframe is designed to work optimally under either a 50g load or 90g load depending on the choice of spring carriers and guitar wire. As there is limited space on the underframe due to all that brakegear the best place for it is in the wagon body. This is easy enough if the wagon is a van but if it's an open wagon then some work may be needed.

I make a new floor for open wagons and minerals and recess it from the bottom 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 but it isn't too noticeable on most types and saves trying to work around the brakegear. Unloaded Conflats and Lowfits are another matter. The only solution would be to try and get as much weight as possible into the underframe.

Finally

Thanks must go to the staff of The Great Western Society at Didcot and The Buckinghamshire Railway Centre at Quainton 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.

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

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

Justin Newitt 2014

Suppliers List

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

C&L Finescale (Exactoscale bearings)
Aran Lodge
Severn Road
Hallen
Bristol
BS10 7RZ
<http://www.finescale.org.uk>