

Rumney Models – GWR Macaw B / BR Bogie Bolster C Levers & Vees

Notes

This set of instructions covers Rumney Models Bogie Bolster C detailing kits C.05A and C.05B. They are designed to enhance the Bachmann Macaw B model and provide accurate brakegear for any of the four types used on these wagons depending on the kit chosen. The options covered are as follows:

Kit C.05B

- GWR Dean/Churchward (Macaw Bs built from 1913 to 1938)

Kit C.05A

- GWR/BR unfitted lever brake (unfitted wagons built from 1939 to 1956)
- BR fitted lever brakes - Arrangement 1 (vacuum braked wagons with roller bearing fitted BR plate bogies)
- BR fitted lever brakes - Arrangement 2 (vacuum braked wagons with Gloucester bogies)

There are sufficient parts in both kits for 2 wagons. With kit C.05A there is the option to either build 2 unfitted wagons or 1 unfitted and 1 vacuum braked of either arrangement.

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.

Prototype Notes

The GWR Macaw B / BR Bogie Bolster C was something of a design success story. The GWR began constructing the 45' long 30T capacity wagons with angle trussing in 1913 and aside from the change in brakegear from Dean/Churchward to lever brakes in 1939 and some being constructed without ends to the body, the same wagon was still being built at Nationalisation. BR chose the GWR Macaw B to become their standard Bogie Bolster C and with minor changes in body construction (riveted or welded), bolsters and the types of bogies fitted, essentially the same wagon that the GWR created in 1913 was still being produced when the final examples were rolled out by Metropolitan Camel in 1962.

Summary of detail changes for GWR Macaw Bs & BR Bogie Bolster Cs

Year	First diagram featuring changes	Changes made
1913	GWR J 14	Riveted body construction, D/C brakegear, wood bolsters, GWR Plate bogies
1939	GWR J28	Unfitted Lever brakegear, no body ends
1949	BR 1/471	Body ends reappear
1953	BR 1/473	BR Plate bogies introduced
1954	BR 1/474	Introduction of heavier steel and wood bolsters, no central bolster pockets on body side. Those built at Swindon continued to have riveted body construction; those built elsewhere had welded body construction. This arrangement continued to the end of production.
1956	BR 1/474	Central bolster pockets reappear
1958	BR 1/477	Vacuum fitted, 1 st arrangement of VB Lever brakes, roller bearing fitted BR Plate bogies
1961	BR 1/477	2 nd arrangement of VB Lever brakes, Gloucester bogies

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 - Most of the brakegear, axleguards ties, brake lever guards

0.7mm - Brake cross shafts (D/C brakegear)

0.8mm - Brake cross shafts (Lever brakegear)

1.0mm - Alignment pins for the vee assemblies

0.3mm plastic rod for rivet detail, if required (Plastruct Round Section MR10).

Eileen's Emporium is again a good source for these.

The Bachmann model comes with GWR plate bogies. If you are happy with them these can be used for all wagons up to 1953. Plastic BR plate bogies, of both oil and roller bearing journal types are available from Cambrian Models along with the Gloucester variety.

In the spring of 2017 Rumney Models will be introducing full kits for GWR and BR plate bogies which will be eminently suitable for these models.

Vacuum cylinders for fitted wagons are the 18" type. Castings for these are available from Rumney Models (F.01).

For buffers I would recommend those produced by Lanarkshire Model Supplies. They are by far the best around and a lot of types of buffers are available pre drilled for fitting sprung buffer heads. This service is particularly useful for heavy duty buffers with their large 2.5mm shanks. The quality is excellent. GWR and early BR wagons had GWR 1'6" 6 rib self contained buffers (B023). Later BR unfitted wagons had 1'6" 2 rib self contained (the nearest I can find is B031 though the head will need changing for a 16" type). Early vacuum fitted wagons had 1'8½" self contained (B014) and later fitted wagons had 1'8½" Oleos (BP03). Check you prototype for the type you need. Metal buffer heads and springs are available from Wizard (including 1.45mm shank buffer heads for Oleos) and MJT (including 2.5mm shank heads for self contained buffers). Lanarkshire Models also do cast swan neck vacuum pipes for the fitted wagons though I find them a little fragile and prefer to make my own from wire.

Coupling hooks (B.94) and BR Instantaner links (B.95A) are available from Rumney Models. For links I use the Exactoscale products available through C&L Finescale. For Screw coupling I currently use the Masokits product.

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

Parts List

- 1a – Main D/C brake vees
- 1b – Inner D/C brake vees

- 2 – Unfitted lever brake vees

- 3a – Main fitted lever brake vees
- 3b – Inner fitted lever brake vees

- 4 – Solebar detail drilling jig
- 5 – Headstock detail drilling jig

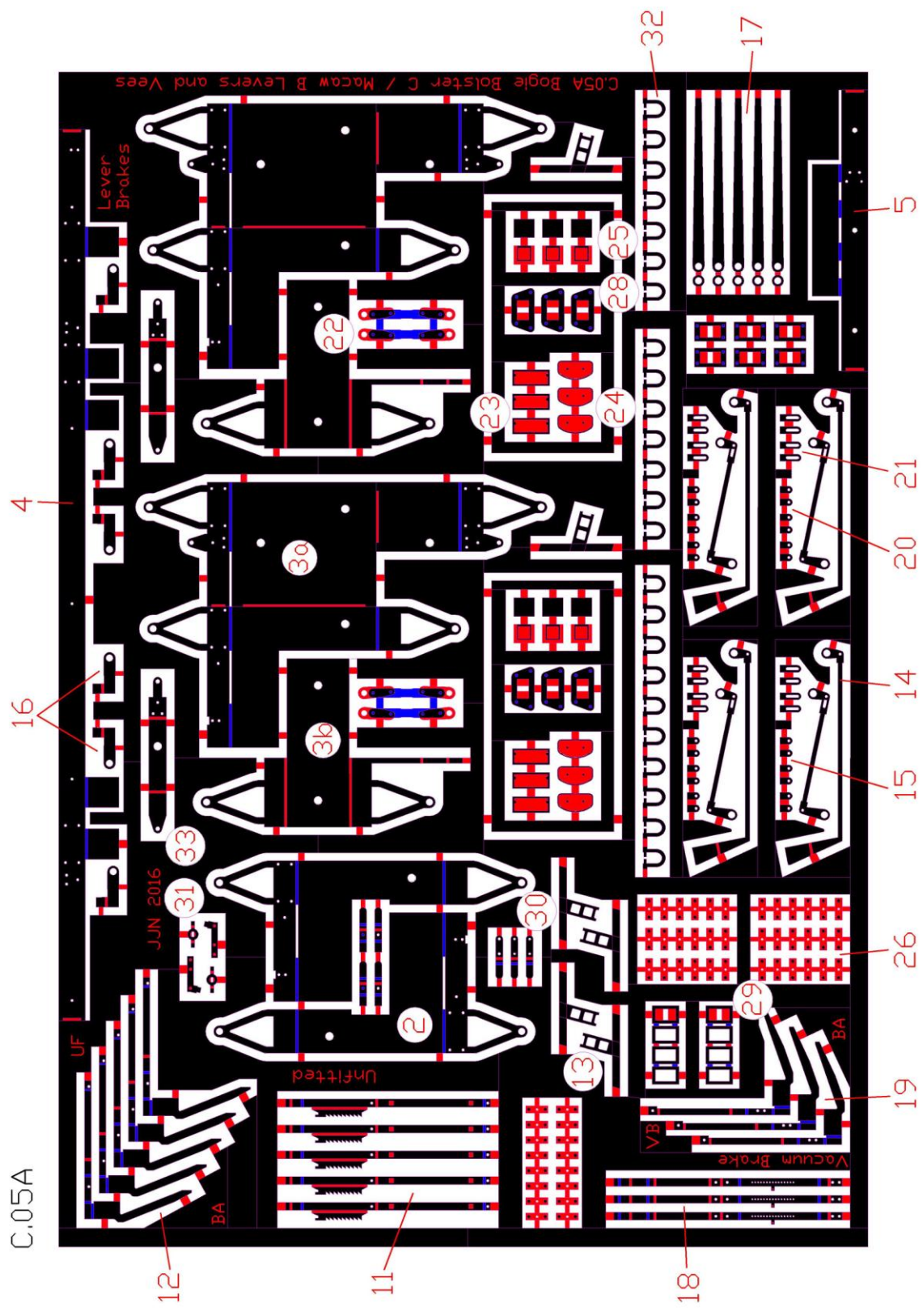
- 6 – D/C brake shaft linkage & overlays
- 7 – D/C brake ratchet & pawl
- 8 – D/C brake bogie linkage
- 9 – D/C brake bogie linkage overlays
- 10 – D/C brake levers

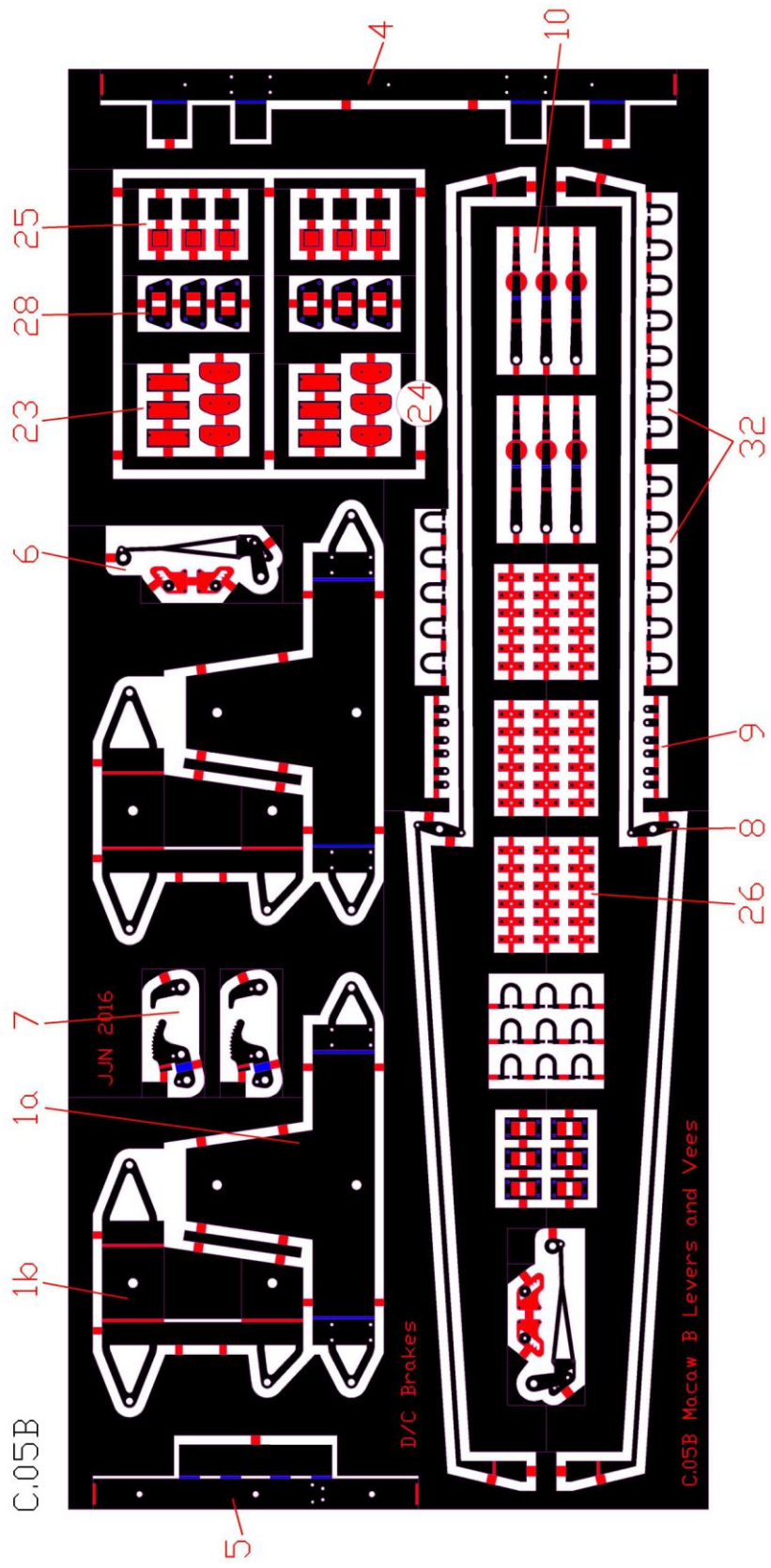
- 11 – Unfitted brake lever guards
- 12 – Unfitted brake lever guard stays
- 13 – Shunter's pole rack
- 14 – Lever brake bogie linkage
- 15 – Lever brake bogie linkage overlays
- 16 – Brake lever actuators
- 17 – Brake levers

- 18 – Fitted brake lever guards
- 19 – Fitted brake lever guard stays
- 20 – Lever brake shaft linkage (vacuum brake wagons)
- 21 – Lever brake shaft linkage overlays (vacuum brake wagons)
- 22 – Vacuum cylinder actuators

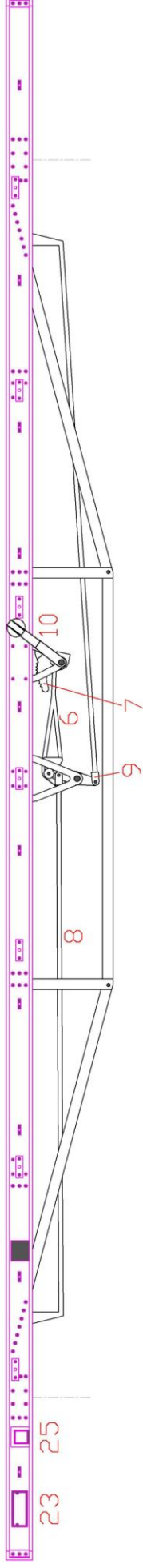
- 23 – Square number plates
- 24 – D number plates
- 25 – Label clips & wooden solebar blocks
- 26 – Shackle ring base plates
- 27 – Corner plates
- 28 – Coupling pockets (trapezoidal riveted)
- 29 – Coupling pockets (rectangular welded)
- 30 – Lamp Irons
- 31 – BR swan neck vacuum pipe brackets
- 32 – Bolster pin D links

- 33 - Vacuum cylinder brackets

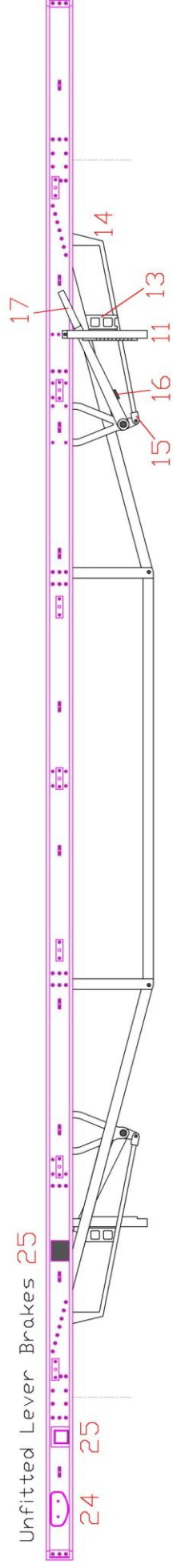




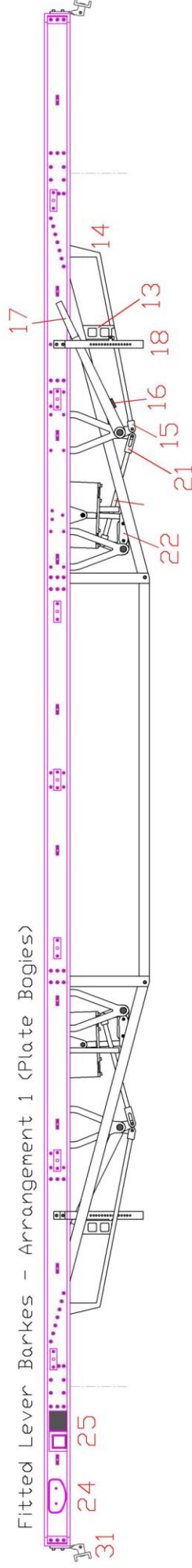
Dean / Churchward 25



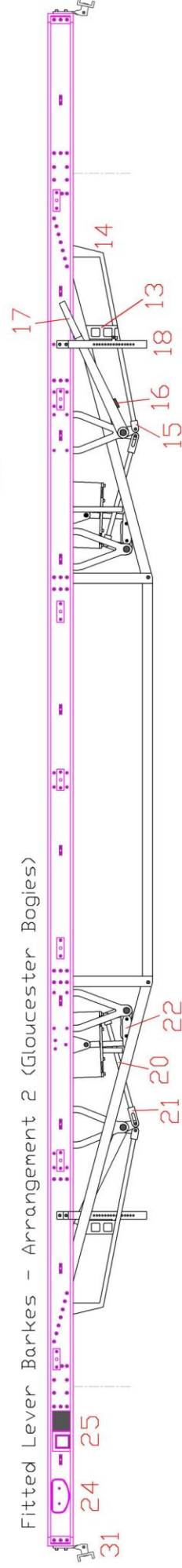
Unfitted Lever Brakes 25



Fitted Lever Brakes - Arrangement 1 (Plate Bogies)



Fitted Lever Brakes - Arrangement 2 (Gloucester Bogies)



Construction

The first job is to prepare the Bachmann body for fitting the various etched bits to. The bogies will pull off. The plastic trussing can be removed by undoing the two little screws that attach it to the body. Keep the screws safe, they will be needed when the trussing is put back in place.

If you wish to replace any of the detail along the sideframes or headstock, such as the buffers, solebar detailing or bolster shackle rings, then now is the best time to remove it. Also if you wish to strip the body for repainting now is the best time.

Some material will need to be removed from the plastic base that goes into the body. I took everything out between the trussing uprights. The wagon is a bit light so this will also mean that there is space to put some lead weight in.



If you are constructing any of the Lever brake options then you will also need to remove a little bit of material from the ends of the trussing where the vees will go. The following photograph will give you a better idea.



The next job is to make up the vee assemblies.

D/C Brakegear

Make sure that the holes in the vees on the main D/C brake vees (1a) and the inner D/C brake vees (1b) can accept 0.7mm wire, remove from the fret and fold up. The two parts need to be soldered together. Use short lengths of 1mm wire to pin the two parts together while you are doing this. The fold line can be reinforced with solder if you wish.



Unfitted Lever Brakegear

Make sure that the holes in the vees on the unfitted lever brake vees (2) can accept 0.8mm wire, remove from the fret and fold up. The fold line can be reinforced with solder if you wish.

If you want to make two unfitted wagons from kit C.05A then make sure that the holes in the vees on the main fitted lever brake vees (3a) can accept 0.8mm wire then remove from the fret and cut along the half etched line which is marked in green in Fig.2. This will provide you with another set of unfitted lever brake vees (2). Fold up and reinforced with solder if you wish.

Fitted Lever Brakegear

There are two arrangements of fitted brakegear vees. Preparing the main fitted lever brake vees (3a) and inner fitted lever brake vees (3b) involves removing the various vees that you don't require for your brakegear. If you haven't already decided which type of brakegear you are modelling now is the time!

Firstly make sure that the holes in the main fitted lever brake vees (3a) and inner fitted lever brake vees (3b) can accept 0.8mm wire. Then, referring to the colourful Fig. 2 below, mark on the fret the vees that are needed for your chosen brakegear then remove the unwanted ones with a piercing saw. Fig. 2 is arranged as the fret is when looking at it from the side with the half etched writing on it. To summarise which vees you will need:

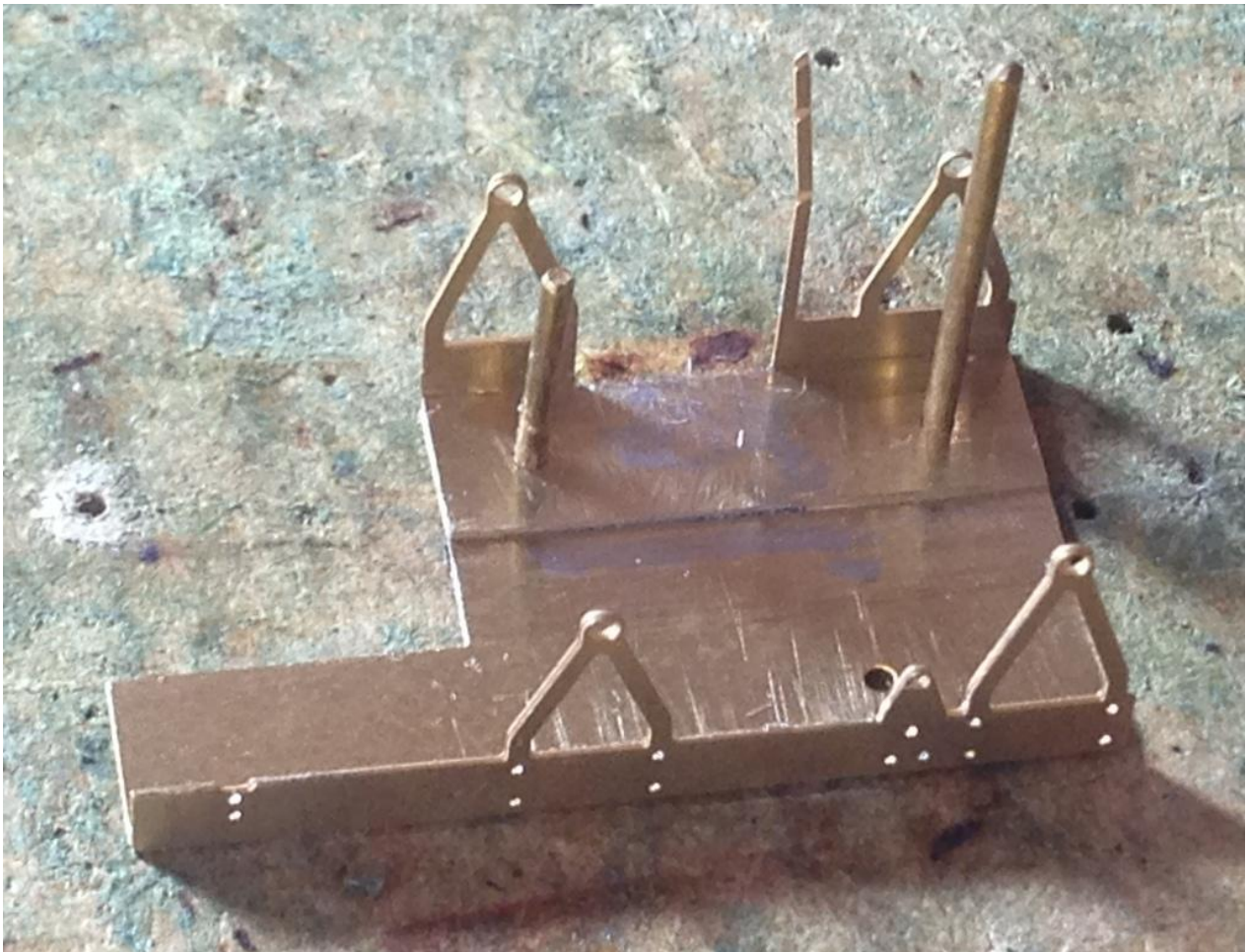
- BR fitted lever brakes - Arrangement 1 (vacuum braked wagons with roller bearing fitted BR plate bogies)
Keep the vees coloured magenta
- BR fitted lever brakes - Arrangement 2 (vacuum braked wagons with Gloucester bogies)
Keep the vees coloured orange

The part coloured yellow is for the safety loop and should be retained for both arrangements of fitted lever brakegear.

Once you have marked the vees that you want to keep remove the main and inner vees from the fret and cut off the unwanted vees with a piercing saw. Fold up the sides.

The two parts can then be soldered together. Use short lengths of 1mm wire to pin the two parts together while you are doing this. The fold line can be reinforced with solder if you wish.

You can also fit the vacuum cylinder bracket (33) if required. This folds into a channel shape and can be aligned behind the vacuum cylinder vee using a length of 1mm wire to pin the two parts together.



Cut along line to use for unfitted Lever brake
Keep for both VB Lever brake arrangement
Keep for 1st VB Lever brake arrangement
Keep for 2nd VB Lever brake arrangement

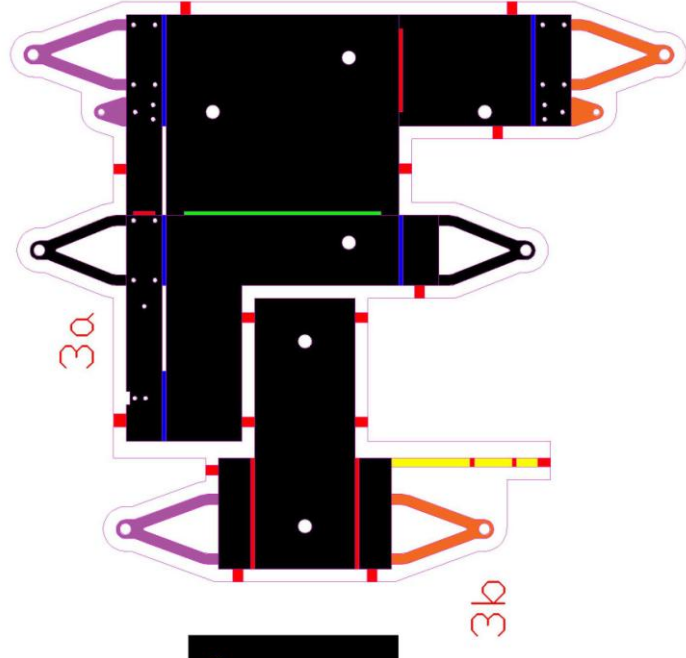


Fig. 2

All brakegear types

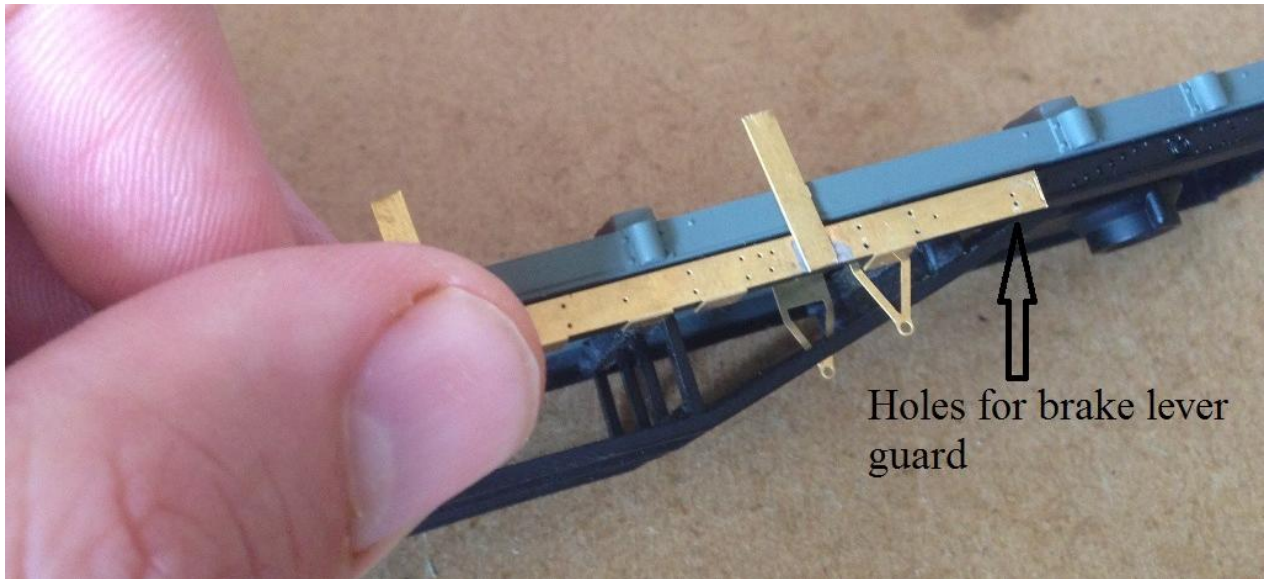
The next job is to fit the etched vees to the body. On the fret is a solebar detail drilling jig (4). This will be used to align the vees. The solebar drilling jig has numerous tabs on it. These are designed to fold up and then locate the vees using the using the trussing as a datum. Due to the way that the Bachmann model is designed with the top of the solebar moulded into the body side you will need add a couple of lengths of scrap etch to the jig to keep it upright when holding it against the Bachmann model. These should miss any holes and also the bolster pockets on the body side (see photo below).

You will need to use a slow setting glue to give you time to adjust the vees using the jig. I used slow setting epoxy in mine. The basic procedure is as follows: Cover the base of the vees with a little glue and place roughly in position on the wagon body (you should do both ends of a lever brake wagon at the same time). Put the plastic trussing back in place and along with the fixing screws. Place the solebar drilling jig on the side of the wagon so that it is evenly situated about the centre line (the trussing should fit nicely on the outside of two of the tabs (see photo below). The vees should then be aligned using the appropriate tab (again see photo below for the idea). The glue can then be left to dry with everything in the right place.



Brakegear

Included with the both frets are two drilling jigs; one for the solebar (4), which we have just used to align the vees, and one for the headstock (5). The other purpose of the solebar drilling jig is to drill holes suitable for the brake lever guards (if constructing a fitted or unfitted lever brake wagon) and also to drill holes for creating vee rivets using 0.3mm plastic rod. The idea behind this method is to use the jig to accurately drill holes through the plastic solebar and then insert short lengths of 0.3mm plastic rod into the holes to represent rivets. If you are not worried about the rivet detail or have alternative methods of representing the rivets then don't drill the holes for the vees. You will still need to drill the holes for the lever guards if constructing a lever brake wagon.



If you are constructing a lever brake wagon, drill out the holes you need using a 0.3mm drill bit for the brake levers (see photo above). Note there are two holes. If you are constructing an unfitted lever brake wagon then drill out the bottom hole only. If you are constructing a vacuum braked wagon (of either arrangement) then drill out both holes.

If you wish to add rivet detail using the plastic rod method then drill out the holes in the relevant vees and add rivets using short lengths of 0.3mm plastic rod. Note that on the drilling jig there are drilling holes for locating the bolster shackle rings if you are replacing them.





The headstock drilling jig can be folded up and used to drill out holes for buffers and coupling hooks using a 0.6mm drill bit. These can then be opened out to whatever dimension is required. If you are constructing either of the vacuum braked arrangements you can also drill out holes for the lamp irons and vacuum pipe brackets if required.

GWR Dean/Churchward

Check that the large holes in the D/C brake shaft linkage & overlays (6) can accept 0.7mm wire and the small holes 0.3mm wire. Solder the overlays in place on both sides of the linkage using two short lengths of 0.31mm wire matching the shape of the overlay to the outline of the linkage.



Check that the large holes in the D/C brake ratchet & pawl (8) can accept 0.7mm wire and the small holes 0.3mm wire. These need to be fitted to the brake shaft linkage. Drill a 0.3mm hole in a spare piece of wood and insert a length of 0.31mm wire. Feed the pawl onto the wire as shown in the photo below.

Next fold up the ratchet so that it wraps around the brake linkage with the half etched area on the inside of the fold), folding out the small tab on the ratchet whilst you are at it. Feed onto the wire and up against the pawl. Solder in place with the large holes aligning. Trim the 0.31mm wire to represent bolts.



Make sure that the holes in the D/C brake bogie linkage (8) and D/C brake bogie linkage overlays (9) can accept 0.31mm wire and remove from the fret. Attach the overlays by folding around the linkage and then using short lengths of 0.31mm wire to locate them. Solder in place and trim the wire to represent bolt heads. Fold over the locating tab at the end of the linkage.



Fit both the brake shaft linkage and bogie linkage to the underframe along with lengths of 0.7mm wire for the brake shafts. Make sure the 0.7mm wire extends 0.5mm or so beyond the vees. The bogie linkage goes along the centre line and the brake shaft linkage goes on the side with the two vees (see photo below).



Make sure that the holes in the D/C brake levers (10) will accept 0.7mm wire and fold up. Solder in place on the main brake shaft going across the whole wagon. Note that the position of the brake lever in the photo below indicates that the brakes are on. For the position of the lever with the brakes off, see Fig. 1.

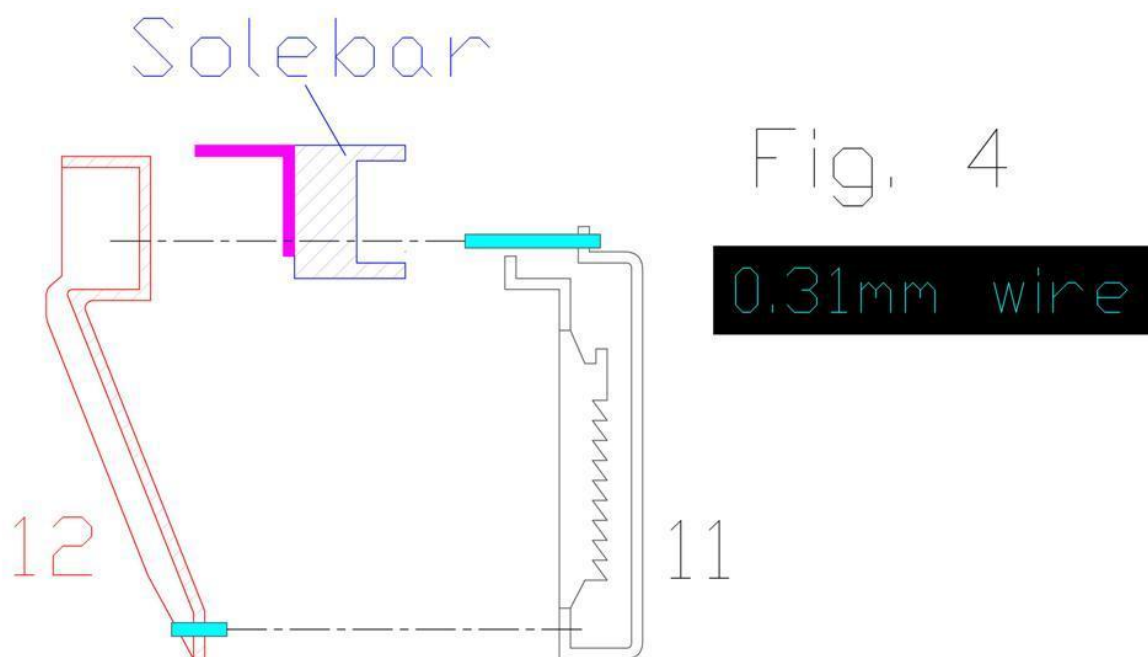


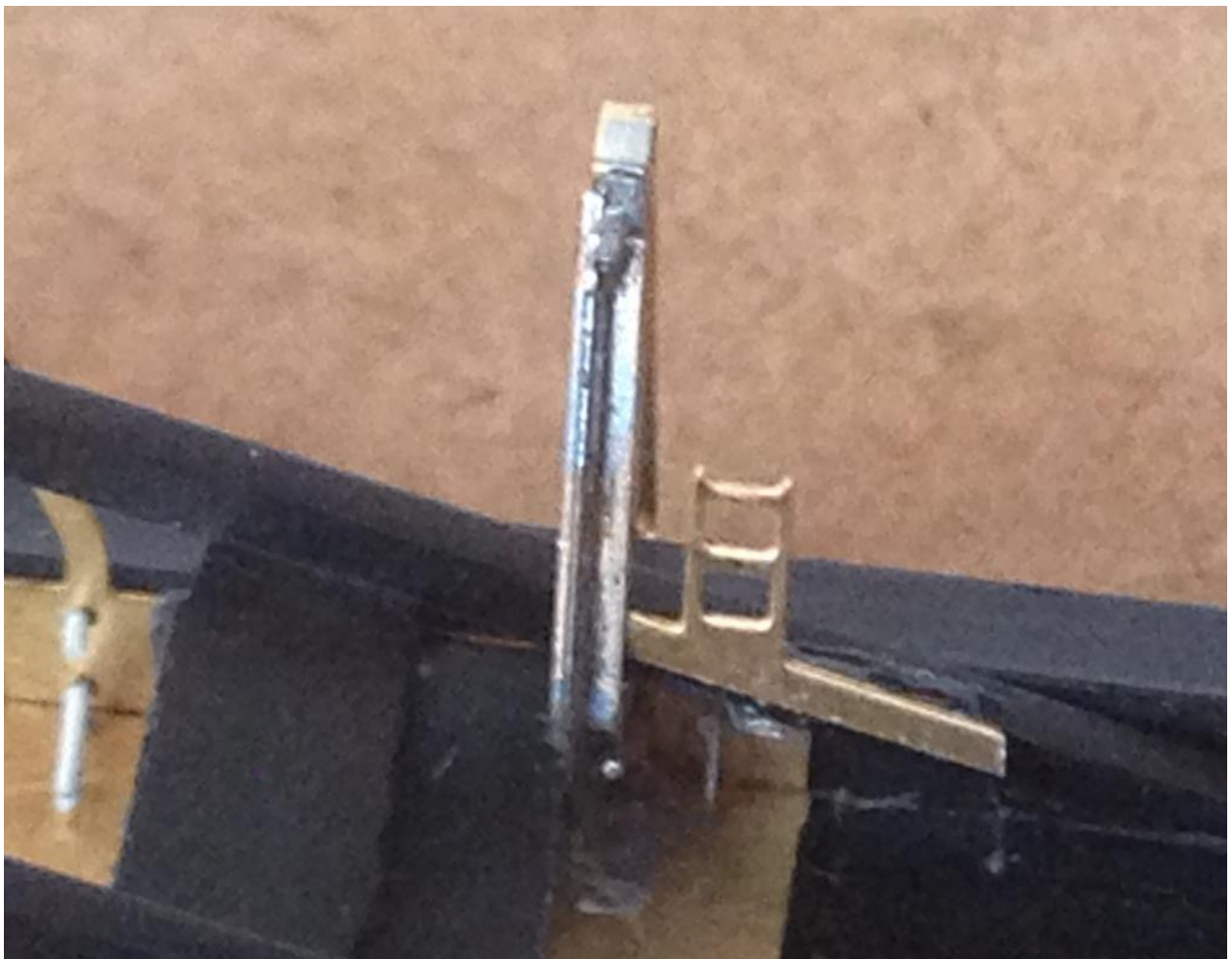
Unfitted Lever brakes

For unfitted Lever brakegear the first job is to assemble and attach the brake lever guards and their stays. The stays on these bogie bolsters were distinctive, heavy duty affairs made from section and this has been replicated in the kit.

Check that the holes in the unfitted brake lever guards (11) and the unfitted brake lever guard stays (12) can accept 0.31mm wire and remove from the fret. Fold up as per Fig. 4, there are half etched guides for making the rounded corners on the guard and the ratchet also needs folding out. Solder short lengths of wire to the bottom hole in the stay and the top hole in the guard.

The two parts need to be attached to the model and each other using the short lengths of wire and fixed in place. I soldered the two parts together very quickly using a hot iron where the wires meet the other part thus trapping the guard and stay in place. They could also be glued in place if you are worried about the plastic melting.



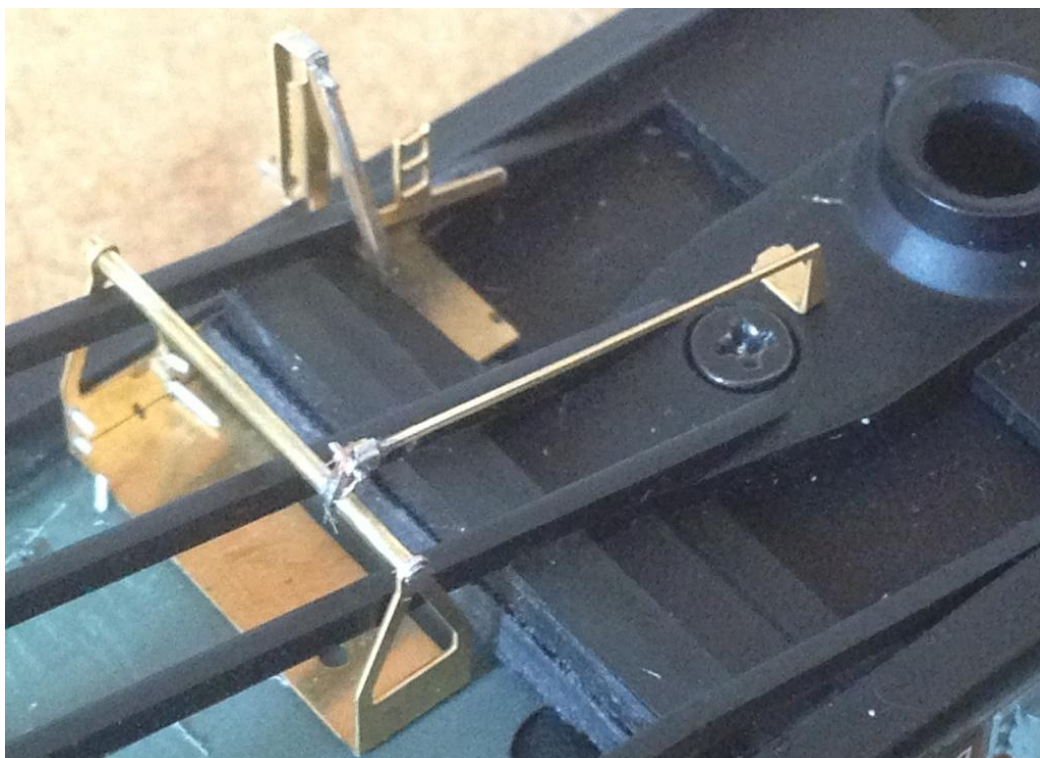


The shunter's pole rack (13) can be removed from the fret and glued in place on the brass angle behind the brake lever guard. Leave about 1mm between the rack itself and the guard/stay.

Make sure that the large hole in the lever brake bogie linkage (14) can accept 0.8mm wire and the small holes in the lever brake bogie linkage and the lever brake bogie linkage overlays (15) can accept 0.31mm wire and remove from the fret. Attach the overlays by folding around the linkage and then using short lengths of 0.31mm wire to locate them. Solder in place and trim the wire to represent bolt heads. Fold over the locating tab at the end of the linkage as per the photo below.



Make sure that the holes in the brake lever actuators (16) can accept 0.8mm wire, remove from the fret and fold out the little clutch. Cut a length of 0.8mm wire so that it fits in the vees and extends 0.75mm or so beyond the vee next to the solebar. Fit the wire brake shaft in place, threading the bogie linkage and brake lever actuator onto the wire at the same time. The actuator goes behind the solebar vee with the little clutch facing outwards (this will go under the brake lever). Leave the actuator free for the moment but glue the linkage to the main trussing assembly using the tab.



Make sure that the holes in the brake levers (17) and washer attached to them can accept 0.8mm wire and remove from the fret. Fold over the washer and solder in place on the brake lever. Fold up the brake lever so that it clears the solebar (see photo below). Once you are happy with the shape solder in place.

Solder the brake lever actuator in place so that the clutch is up against the bottom of the brake lever.

Repeat for the other end!



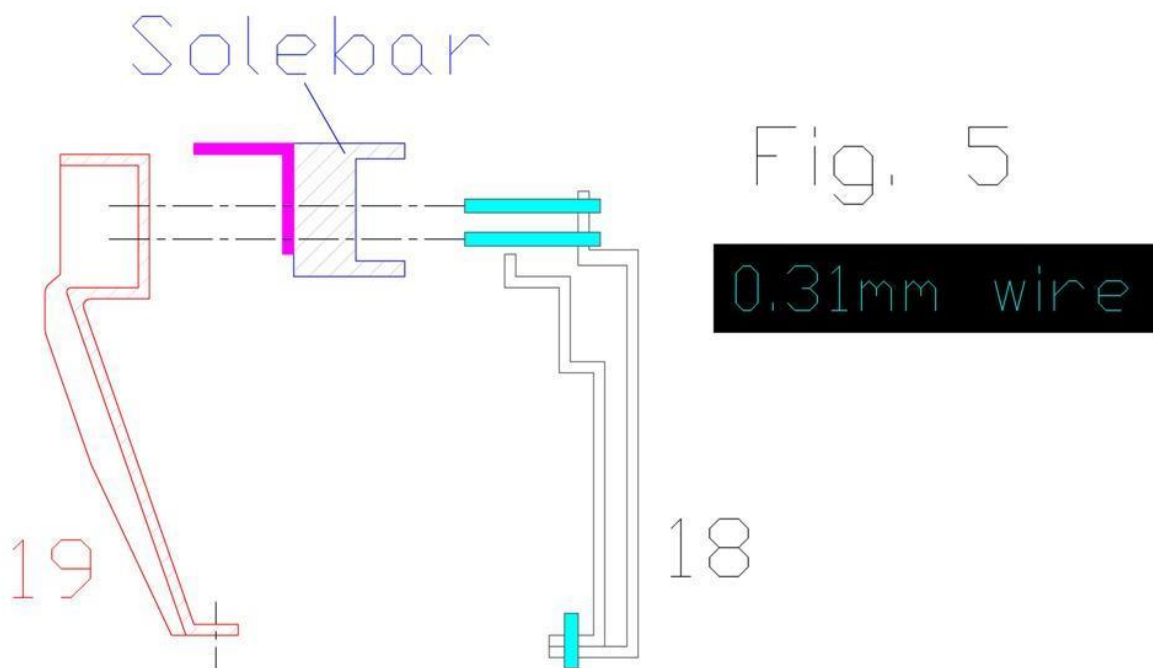
VB Lever brakes

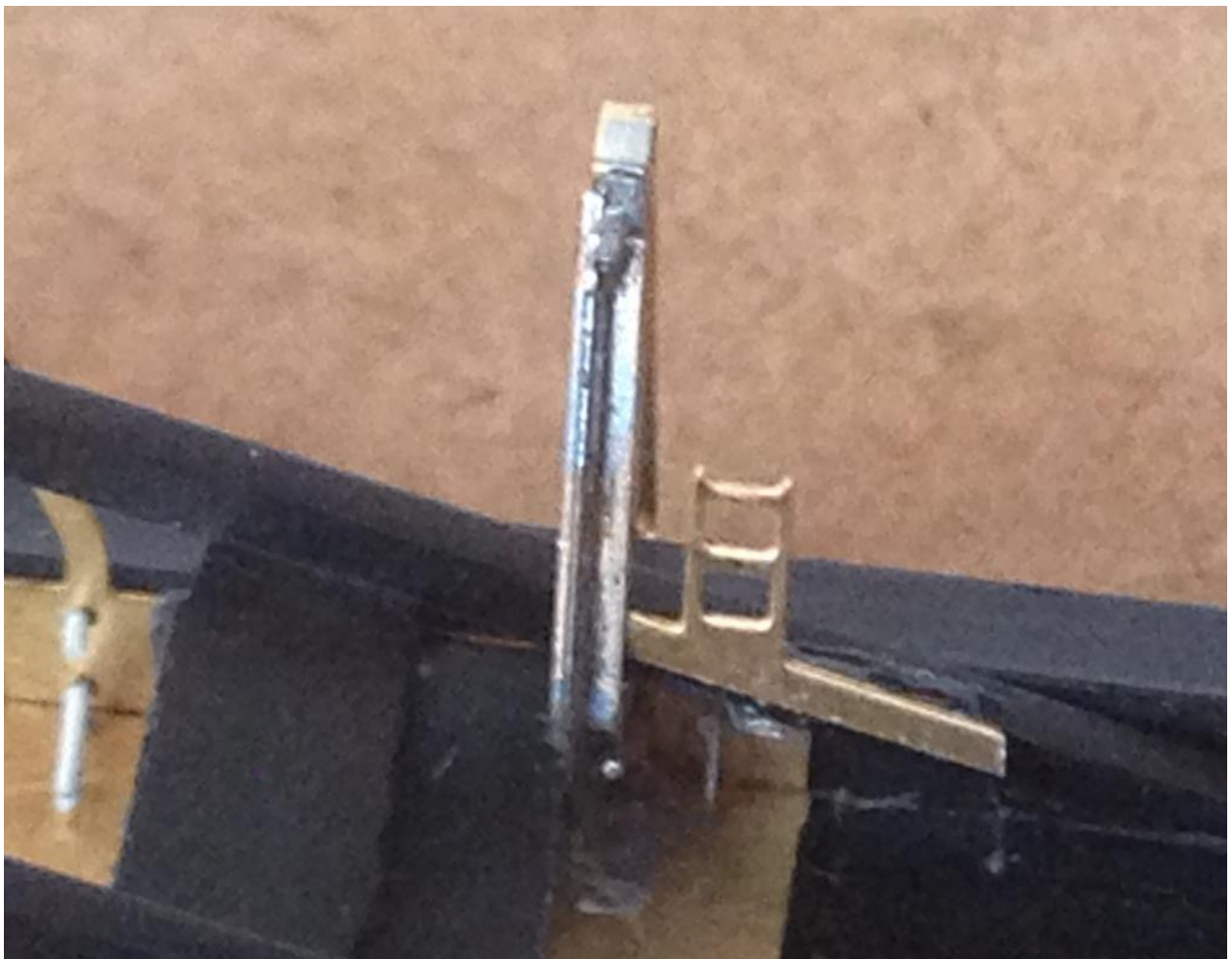
The brake linkages and levers/guards were the same for both arrangements of vacuum brakegear. The only difference between the two arrangements was the position of the vacuum cylinder and the subsequent arrangement of the vees for the shaft to which the vacuum cylinder was attached. Thus the following set of instructions is suitable for both arrangements.

In both arrangements the brakegear is simply an extended version of the unfitted version with a pin type lever guard in place of the ratchet version.

Check that the holes in the fitted brake lever guards (18) and the fitted brake lever guard stays (19) can accept 0.31mm wire and remove from the fret. Fold up as per Fig. 5. Solder short lengths of wire into the two top holes in the guard. It might be worth using one of the guards as a drilling jig before you fold it up, drilling two holes in a piece of wood into which the two lengths of wire can be inserted before soldering to the guard.

The two parts need to be attached to the model and each other using the short lengths of wire and fixed in place. I soldered the two parts together very quickly using a hot iron where the wires meet the other part thus trapping the guard and stay in place. They could also be glued in place if you are worried about the plastic melting. Insert another short length of wire through the holes in the bottom of the guard and stay connecting them up.





The shunter's pole rack (13) can be removed from the fret and glued in place on the brass angle behind the brake lever guard. Leave about 1mm between the rack itself and the guard/stay.

Make sure that the large hole in the lever brake bogie linkage (14) and the lever brake shaft linkage (vacuum brake wagons) (20) can accept 0.8mm wire. Make sure that the smaller holes in both items along with those in the lever brake bogie linkage overlays (15) and lever brake shaft linkage overlays (vacuum brake wagons) (21) can accept 0.31mm wire and remove from the fret.

Attach the overlays by folding around the linkage and then using short lengths of 0.31mm wire to locate them. You will need one of the lever brake bogie linkage overlays (15) for both of the linkages and then one of the vacuum brake linkage overlays (21) for the brake shaft linkage (20). See photo below. Solder in place and trim the wire to represent bolt heads.



Make sure that the holes in the brake lever actuators (16) can accept 0.8mm wire, remove from the fret and fold out the little clutch. Also make sure that the holes in the vacuum cylinder actuators (22) can accept 0.8mm wire

Cut two lengths of 0.8mm wire for the brake shafts so that they fit in the vees and the one that attaches to the brake lever extends 0.75mm or so beyond the vee next to the solebar. Fit the wire brake shafts in place, threading the bogie linkage and brake lever actuator onto the shaft that attaches to the lever, the vacuum cylinder actuator onto the vacuum cylinder shaft and the brake shaft linkage onto both shafts. The actuator goes behind the solebar brake lever vee with the little clutch facing outwards (this will go under the brake lever). See photo below.

Leave the both the brake lever actuator and vacuum cylinder actuators free for the moment but glue the bogie linkage to the main trussing assembly using the tab provided and solder the brake shaft linkage to one or both shafts.

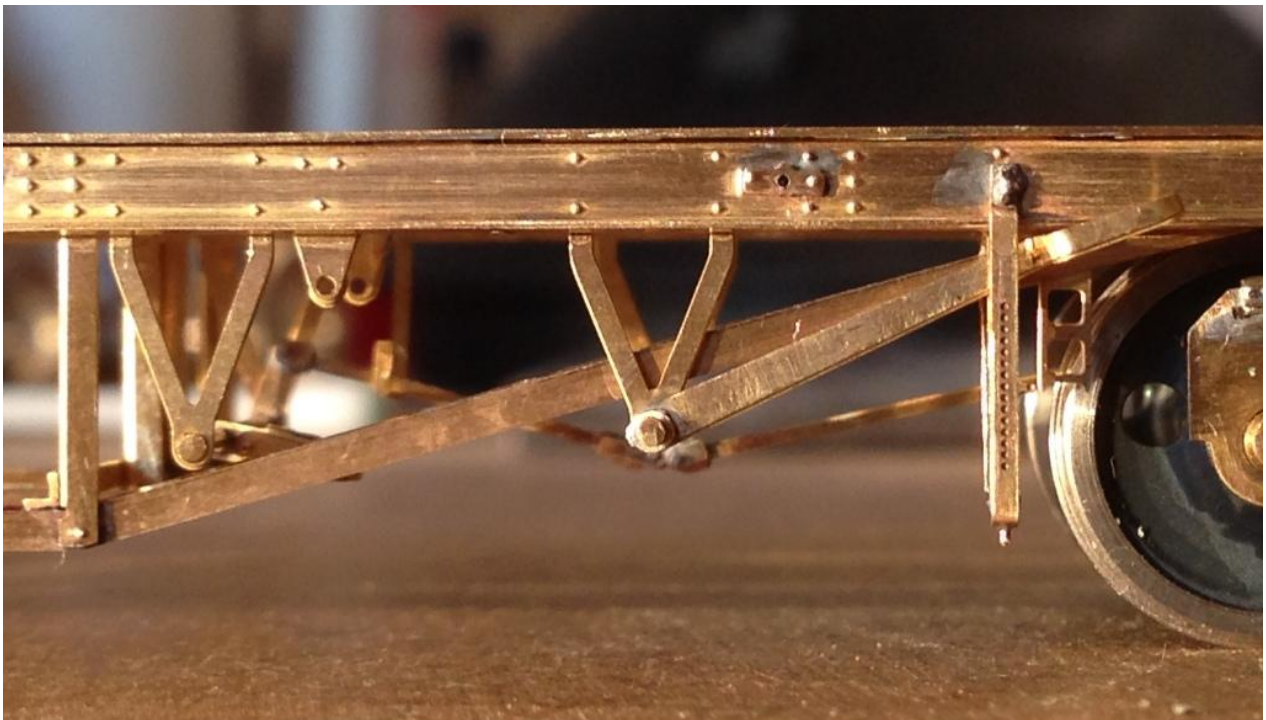
There are safety loops attached to the inner fitted vees (3b) (these were the parts marked in yellow in Fig. 2) which can be folded over the brake shaft linkage now that it is in place



Make sure that the holes in the brake levers (17) and washer attached to them can accept 0.8mm wire and remove from the fret. Fold over the washer and solder in place on the brake lever. Fold up the brake lever so that it clears the solebar (see photo below). Once you are happy with the shape solder in place.

Solder the brake lever actuator in place so that the clutch is up against the bottom of the brake lever.

Repeat for the other end!



18" vacuum cylinders can now be fitted if you wish and the vacuum cylinder actuators soldered in place.

Detailing Parts

There are numerous detailing parts included on the fret for tarring up the Bachmann body.

There are two types of number plates, rectangular (23) and D shaped (24). The rectangular were used by the GWR and D shaped by BR.

Label clips and wooden solebar blocks (25) are also on the fret for detailing the solebar.

Fig. 1 shows the position of these items but they did vary slightly so check your prototype.

Shackle ring base plates (26) are included if you want to replace the shackle ring mouldings. The rings for chaining loads down can be made from suitable wire with a tail to go through 0.3mm holes drilled in the solebar. I used 33 SWG phosphor bronze wire bent in to an L shape and formed into a ring around a 1.4mm drill bit held in a pin vice. Trim the wire so that it looks like a ring and apply a little solder to keep it all in place whilst soldering it to a base plate. You will need to make sure the holes go all the way through the solebars. The shackles can then be glued in place. The solebar drilling jig (4) can be used to aid location of the holes.

Corner plates (27) go at the point where the solebar and headstock meet.

There are three types of coupling pocket included and their general use is indicated. As with all things it's good to have a prototype to go by and work from pictures of that.

- Trapezoidal riveted (28) - Most wagons
- Rectangular welded (29) - Some BR vacuum brake wagons

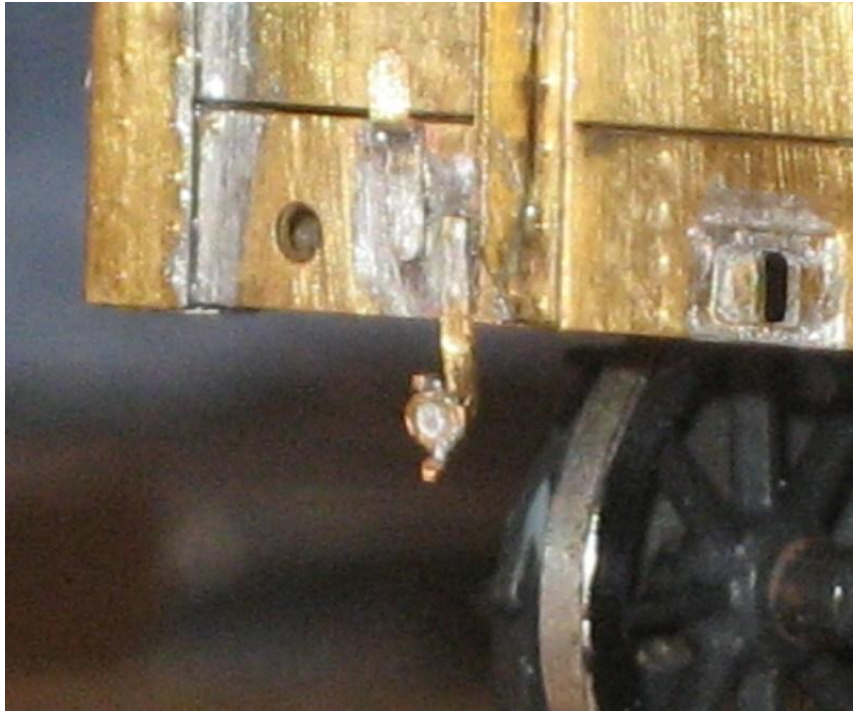
For the riveted type simply push out the half etched rivets and fix in place. The welded type should be four layers deep. Fold the parts over to achieve this and solder together.

Lamp irons (30) are included on the fret. Solder short lengths of 0.31mm wire into the holes to act as pins which can be inserted into the holes drilled into the headstock using the drilling jig (5). Glue in place.

There are two BR swan neck vacuum pipe brackets (31). 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.

Use the brackets with two of the holes etched out and press out the remaining half etched rivets. 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.

Solder two lengths of 0.31mm wire into the holes to help aid location and to represent the rivets then locate in place on the headstock into holes drilled using the drilling jig (5).



There are D links for fitting to the bolster pins (32). Carefully drill a 0.4mm hole near the base of the bolster pins. The D link can then be gently fitted in place. You will have to prise the sides out slightly to locate them in the holes then close them up again. There are spares in case any go disappearing across the room! Some definitely will...

Painting

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. It is recommended that you strip the model before priming.

Finally

Thanks must go to the staff of The Avon Valley Railway, GWS at Didcot and the East Somerset Railway for letting me measure up and photograph at close quarters the Bogie Bolster wagons in their care which has 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 2016

Suppliers List

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

Lanarkshire Models and Supplies
(buffers and vacuum pipes)
9 Nairn Avenue
Blantyre
G72 9NF
www.lanarkshiremodels.com

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

MJT
(2.5mm shank 16" buffer heads for self contained buffers)
Dart Castings
17 Hurst Close
Staplehurst
Tonbridge
Kent
TN12 0BX
www.dartcastings.co.uk

Wizard Models
(1.45mm shank 16" buffer heads for Oleo buffers)
PO Box 70
Barton upon Humber
DN18 5XY
www.wizardmodels.co.uk