Bachmann SR N Class Loco and Tender Chassis

Introduction

This set of instructions covers Rumney Models kit X.16. This is designed to produce a fully independently sprung replacement EM or P4 chassis for the loco and CSB sprung subframe for the tender. The tender subframe can be built to suit both the 3500 gallon and 4000 gallon tenders. The loco chassis has been designed to reuse the cylinder/motion block that comes with the Bachmann chassis and the crossheads and fixing bolts. It includes a removable keeper plate with cosmetic spring detail, a sprung pony truck and new coupling rods, connecting rods and motion.

General Notes

Read through the instructions first and familiarise yourself with the components. Drawings and photographs are included to attempt to make the waffle clearer.

Check all holes before removing parts from the fret. The drawing process for etching if you use a CAD program as I do is extremely accurate but the actual etching process itself not an exact science. If the fret is slightly over etched, then there is no problem but if they are under etched the holes will need enlarging. I find that this is easiest to do before removing parts from the fret. The hole sizes will be noted at the appropriate points. Use an appropriate drill or a tapered reamer.

Remove one part at a time from the fret.

The instructions will assume that tags connecting parts to the fret will be cleaned up on removal of a part unless it is specified specifically in the instructions not to.

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

This means that when I say fold something up the folds should be made through 90° with the fold line on the inside. If the fold is to be done in any other way I will say so.

Everyone has their own soldering methods. I now use an Antex 50W temperature controlled soldering iron with predominantly 145° solder and La-Co paste flux.

Tools

The following tools may be useful when constructing the wagon:

- A selection of drill bits including 0.3mm, 0.45mm, 0.5mm, 0.6mm & 1mm
- A selection of tapered reamers in the range 0.3mm-4mm
- A smooth jawed vice
- A selection of needle files
- A piercing saw with fine blade (size 6/0 recommended)
- A 10BA tap

Materials List

The following items are included with the kit:

150mm x 0.012” Steel spring wire for loco
150mm x 0.011” Steel spring wire for pony truck
150mm x 0.009” Steel spring wire for tender
6 x Exactoscale hollow grub screws for driving wheel spring adjusting
2 x Cast vacuum cylinders
30mm x 7/32" x 3/16" Tube for reservoirs on 3500 gallon tender subframe

You will need to source some other items to complete the kit.

Wire

You will need several sizes of wire are needed to build the underframe. Eileen’s Emporium are good source for these, and they do a mixed sizes pack if you don’t want to buy large quantities.

- 0.31mm - Expansion link
- 0.45mm - Tender brakegear & loco brake pull rods
- 0.5mm - Loco brake shoes
- 1mm - Loco brake shaft

Nuts & Bolts

The chassis has been designed to use the following sizes of nuts and bolts. Again, Eileen’s Emporium are good source for these thought they are not the only ones.

- 10BA - Pony truck fixing and loco to tender couplings
- 12BA - For attaching keeper plate
- 14BA - Pony truck coil spring retainers

The fixing between loco and tender bodies to their chassis are designed to reuse the screws that come with the Bachmann model.

Wheels

Alan Gibson Workshop does suitable wheels for the N Class. You will need the following:

- 4S66S - 5’6” 18 spoke 14” c/t driving wheels
- 4S38 - 3’2” 10 spoke pony truck
- 4S47 - 3’10” 10 spoke

These codes are for P4 wheels. For EM replace the letter in the code with and E e.g., 4E66S. As they come the diving wheels will have a 1/8” axle and the pony truck/tender wheels 2mm.

High Level Bearings

The loco and tender chassis have been designed to use the High Level Kits bearings that come with their 'hornblocks'. You will only need the bearings, not the etches that accompany them.

You will need the following sizes; bores will need suit the axle diameter of your wheels:

- 3 x Standard Hornblock - **P4** Loco
- 2 x Standard and 1 x SpaceSaver Hornblocks - **EM** Loco (the driven axle will need the SpaceSaver type)
- 3 x MiniBlox - Tender

As designed the pony truck has the axle sliding in a slot with a steel leaf spring providing the suspensions. For this you do not need any bearings. However, if you like a challenge, it is possible to build the pony truck with sliding bearings and working coil springs. If you want to do this, you will need 1 x MiniBlox.

Gearbox

For gearboxes we would recommend the High Level kits offerings. There are two options:

- HighFlier driving the centre axle
- RoadRunner the driving rear axle (note this is the standard gearbox **not** the PLUS or Compact versions)

Worm bore will need to suit the motor you are using. A Mashima type will generally be 2mm, the new High Level coreless motors are 1.5mm. Axle diameter will need to suit the wheels.

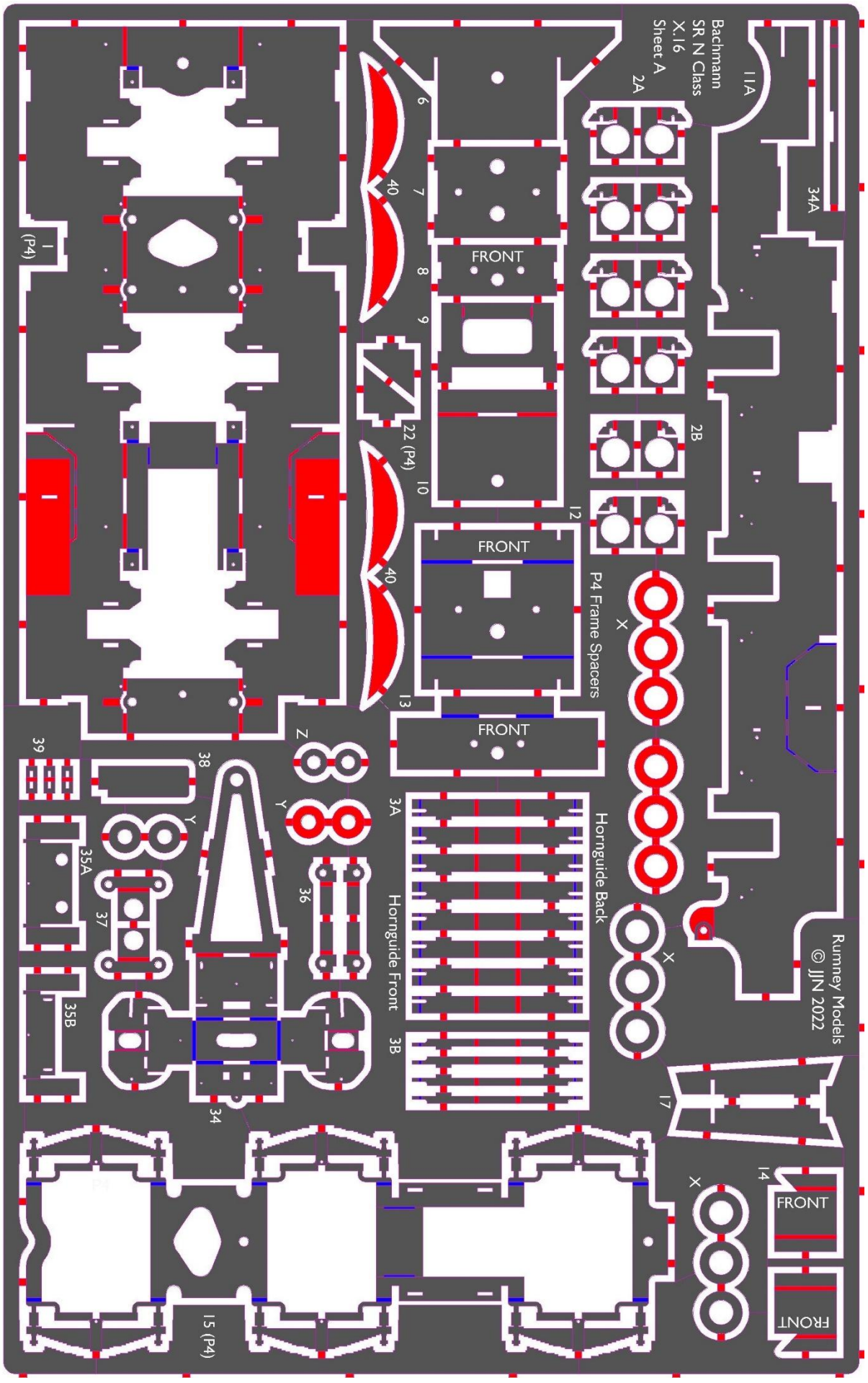
Motor

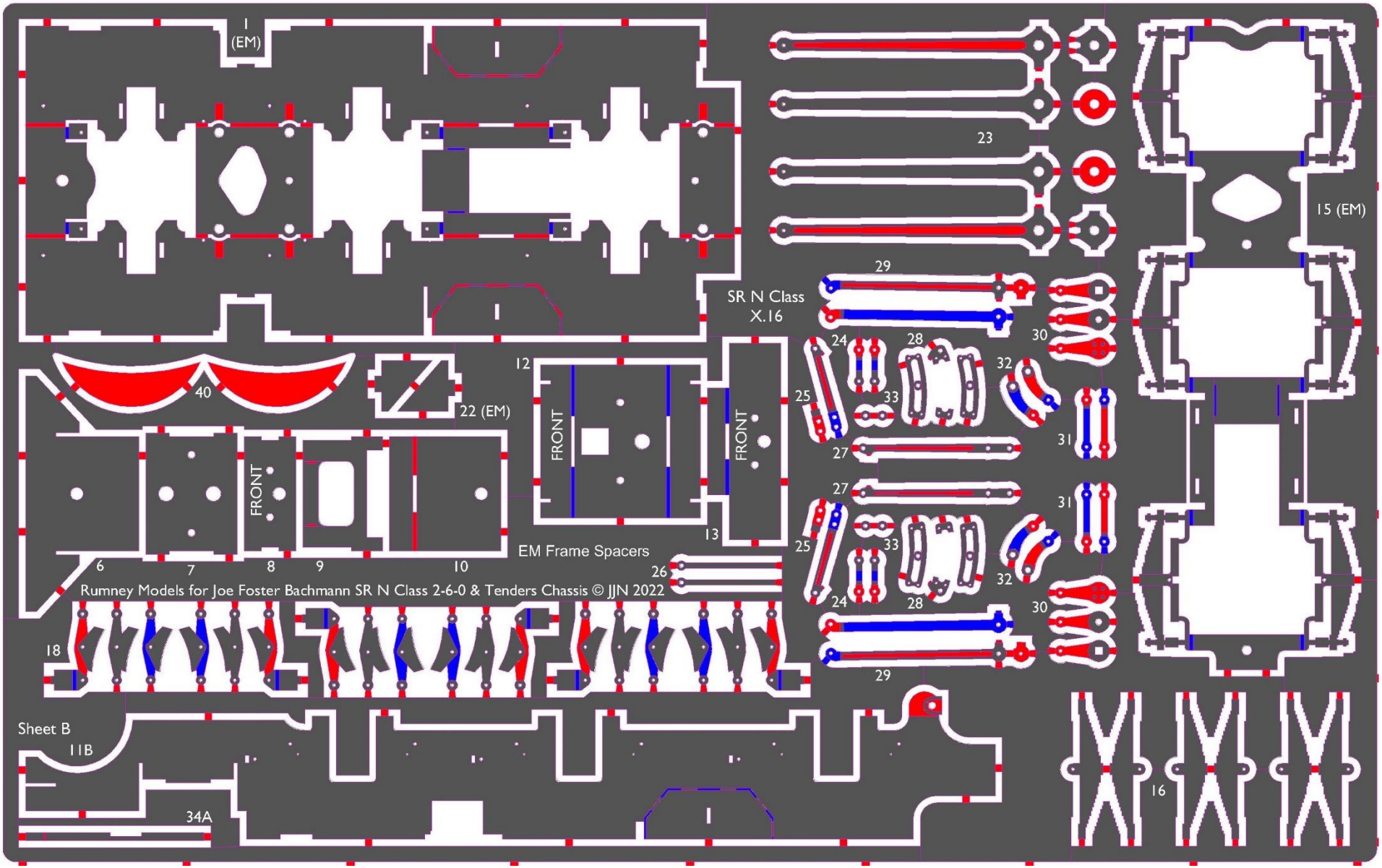
The is scope for a 26mm long motor vertical in firebox. You will need to arrange motor on gearbox so outer locating 'wings' can be removed. A 14mm Mashima type flat can will fit between the frames for P4. You will need a 12mm type for EM. High Level recently introduced a range of coreless motors to replace the Mashimas. Of that range a 1320C should suit a P4 chassis and a 1219C and EM one.

Other

You will need something to collect the current from the wheels. 33SWG (0.254mm) phosphor bronze wire is recommended formed into coiled wipers and fitted to pcb attached to the keeper plate. You will also need valve gear rivets or 0.6mm/0.8mm wire to construct the valve gear.

Parts Diagrams




1
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15 (EM)
SR N Class
X.16
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22 (EM)
12
FRONT
FRONT
13
FRONT
EM Frame Spacers
6
7
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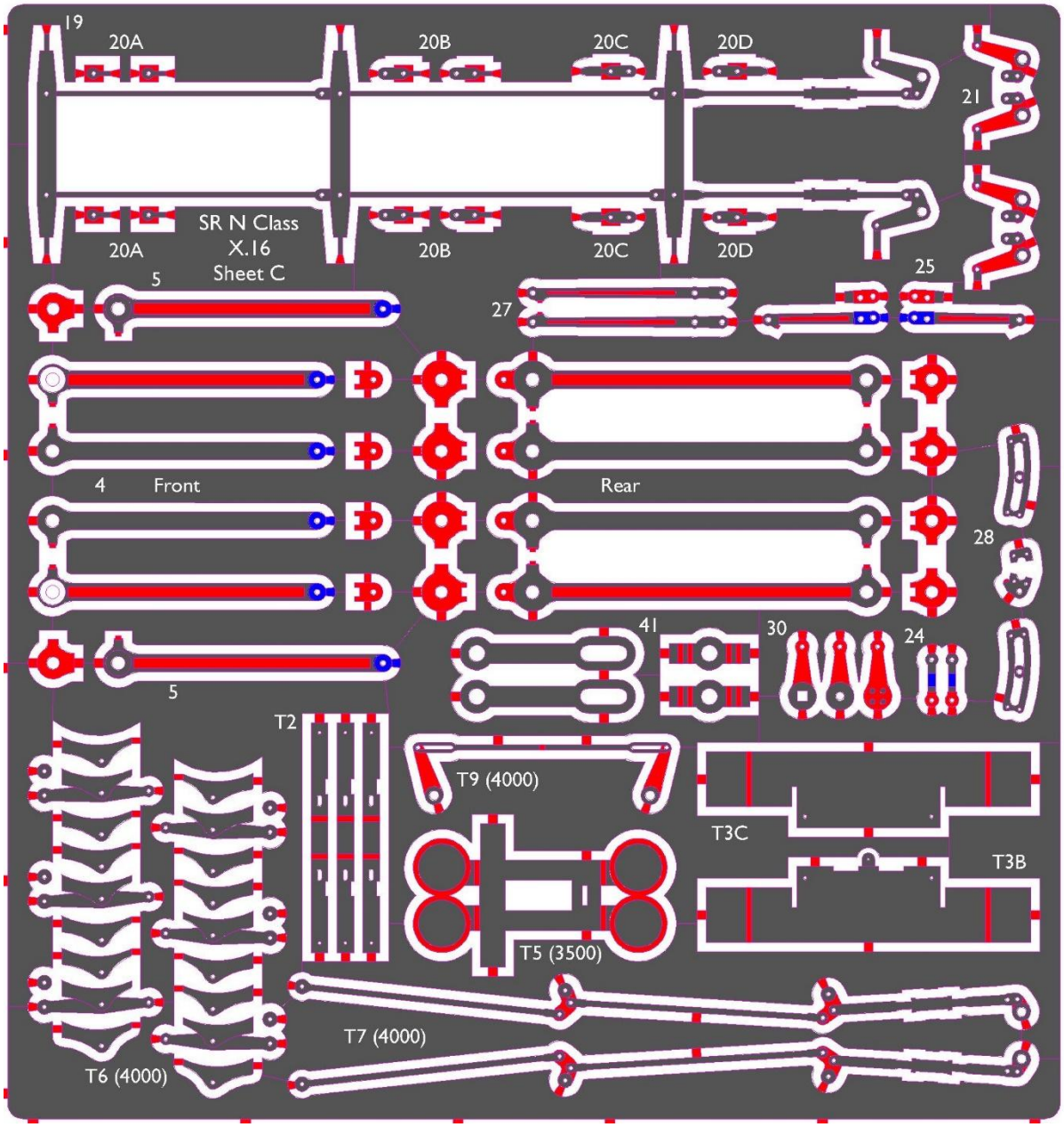
26
Rumney Models for Joe Foster Bachmann SR N Class 2-6-0 & Tenders Chassis © JJN 2022
18
Sheet B
11B
34A
16


19
20A
20B
20C
20D
21
SR N Class
X.16
Sheet C
20A
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20C
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5
27
25
4
Front
Rear
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41
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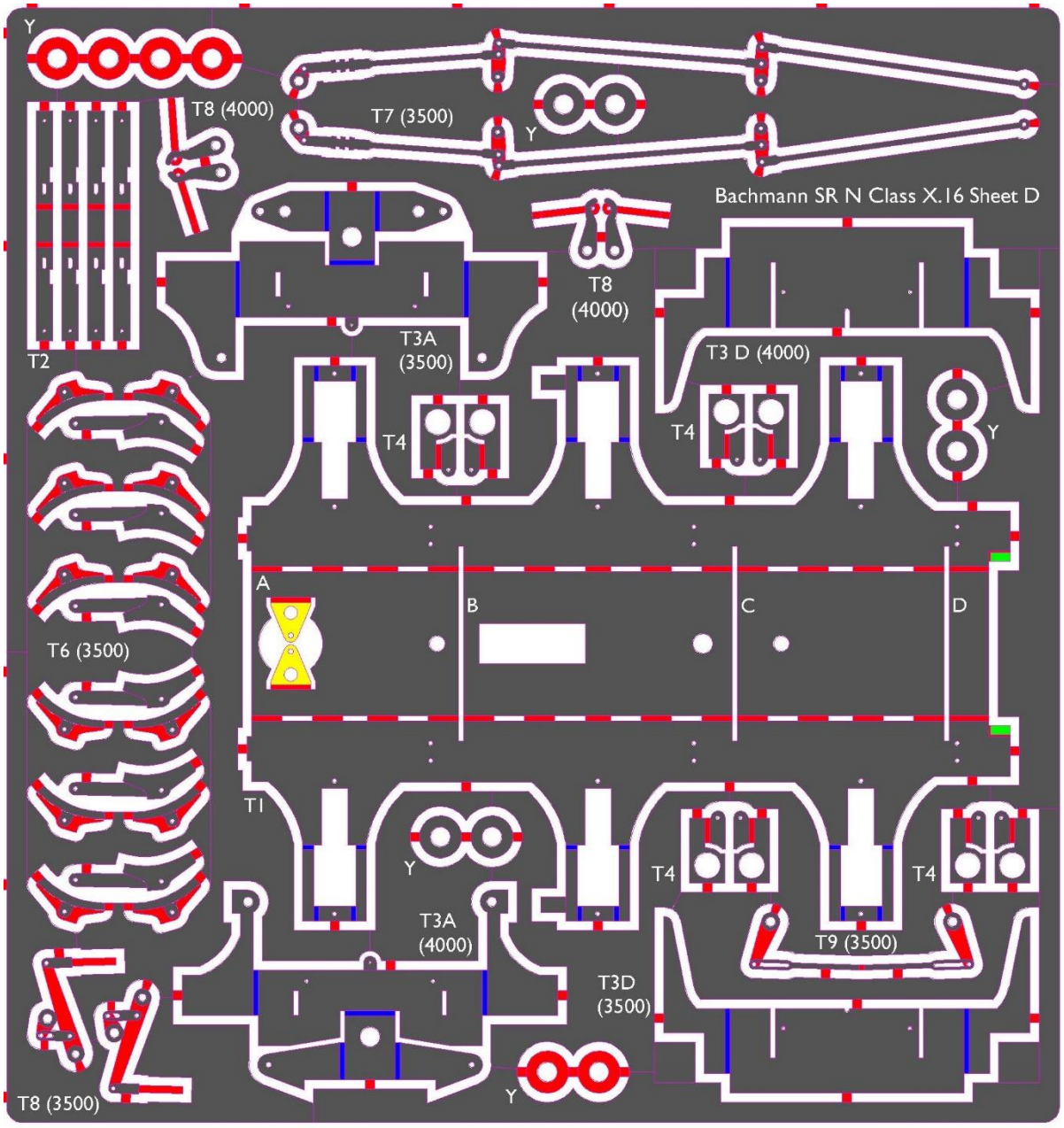
T9 (4000)
T3C
T3B
T5 (3500)
T7 (4000)
T6 (4000)



Loco Chassis Instructions

Loco Parts List

1 - Chassis subframe (EM and P4 versions)

2A - Spring carriers for High Level Standard 1/8” bearings
2B - Spring carriers for High Level Spacesaver 1/8” bearings
3A - Hornguides for High Level Standard 1/8” bearings
3B - Hornguides for High Level Spacesaver 1/8” bearings

4 - Coupling rods and overlays - Front and Back
5 - Alternative front coupling rod without recess for crankpin

6 - Front frame spacer (EM and P4 versions)
7 - Cylinder frame spacer (EM and P4 versions)
8 - Motion bracket spacer (EM and P4 versions)
9 - Firebox frame spacer (EM and P4 versions)
10 - Rear frame spacer (EM and P4 versions)

11A - Main frame (LHS)
11B - Main frame (RHS)

12 - Locating spacer for Bachmann cylinder block (EM and P4 versions)
13 - Locating spacer for Bachmann motion bracket (EM and P4 versions)
14 - Filler plates for top of Bachmann motion bracket

15 - Keeper plate (EM and P4 versions)
16 - Driving wheel spring overlays
17 - Ashpan sides

18 - Brake shoes
19 - Brake pull rods
20A - Brake pull rod overlays (front axle)
20B - Brake pull rod overlays (middle axle)
20C - Brake pull rod overlays (rear axle)
21 - Steam brake crank overlays

22 - Running plate brackets at firebox (EM and P4 versions)

23 - Connecting rods and overlays
24 - Union Link
25 - Combination Lever
26 - Valve rod
27 - Radius rod
28 - Expansion Link
29 - Eccentric rod
30 - Return Crank
31 - Lifting Link
32 - Lifting Arm
33 - Valve gear washer

34 - Pony truck mainframe
34A - Pont truck 'tail' stiffeners
35A - Pony truck front spacer
35B - Pony truck rear spacer
36 - Pony truck hornguides for High Level 2mm Standard bearings
37 - Coil spring carriers for High Level Standard 2mm bearings
38 - Wire leaf spring bending jig
39 - Wire spring axle bearers

40 - Balance weights
41 - Loco to tender coupling

X - 1/8" Washers (full thickness and half etched)
Y - 2mm Washers (full thickness and half etched)
Z - Pony truck spacing washers (for 10BA bolts)

Body Modifications

The chassis is designed to fit the body as is, with the exception of the cast representation of the running plate support where the firebox is. There is scope for leaving it on the running plate but if you do, you'll need to remove some material from the subframe (1) and main frames (11). There is an outline marked on both parts and they are shaded yellow on the parts diagram.

Construction

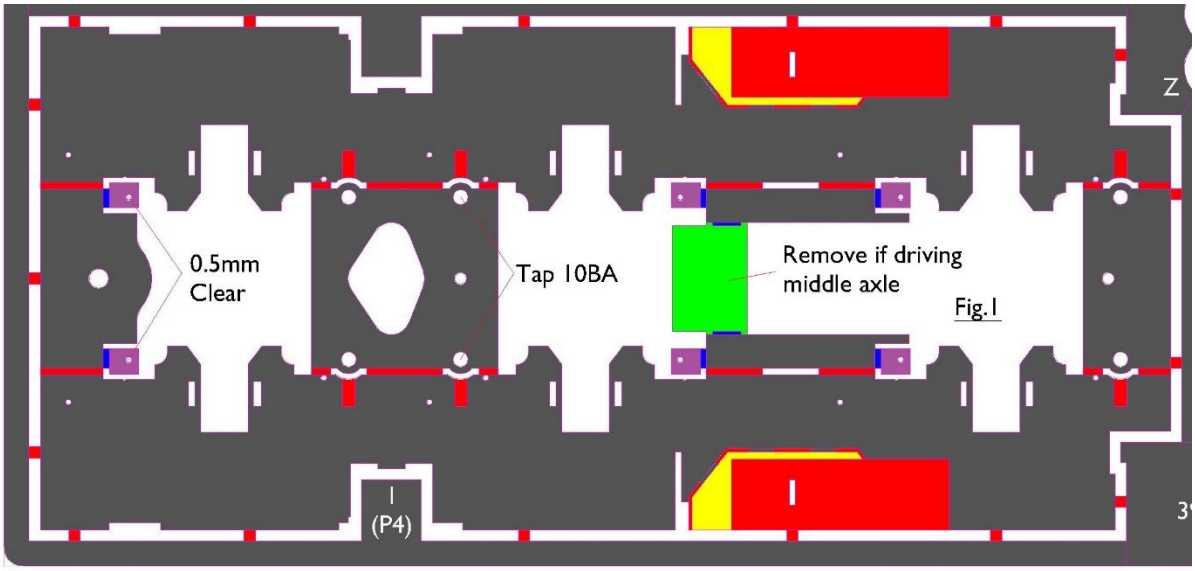
The subframe is deigned to be folded up with hornguides attached to provide a working chassis around which everything else can be assembled. It is designed to use the accuracy in the plotting of the Phototool to align the wheels and not to use a constructions jig. There is an EM and a P4 version of the subframe. If driving the rear axle, then the subframe requires no modification. If driving the centre axle, the part on the subframe between the sides where the front of the firebox is will need cutting out. This is shaded green on the parts diagrams. The same applies to the keeper plate.

Subframe

Firstly, remove the subframe (1) in your chosen gauge. The subframe consists of two sides with spacers between that will fold into a U shape.

Looking at the spacer parts there are six larger holes that need to be tapped 10BA for the Exactoscale hollow grub screw spring adjusters. See Fig.1 below. Use a tapered tap and try and make the fit of these spring adjusters quite tight. You may also find it useful to drill through the grubscrews with a 1mm drill. This will mean you can have a longer tail on the springs and they will be less likely to fall out. Make sure the six small holes along the same lines as the holes for the spring adjusters are cleared to 0.5mm. If you wish to drive the middle axle you will need to remove the part shaded green but only do this after the hornguides have been fitted and the subframe has been folded up.

Now turn your attention to the sides. Make sure the smaller holes in the sides can accept 0.45mm wire. If you are leaving the cast representation of the running plate support on the Bachmann body, then the area shaped yellow in Fig.1 needs to be removed. If using the P4 subframe cut vertically at the point where the dotted line meets the half etched area. This area can be tidied up when the main frames are fitted.



Before getting to the business of folding up the subframe you need to fit the spring carriers to the High Level bearings and then fit the hornguides to the sides of the subframe.

There are two types of spring carrier and two types of hornguide depending on whether you are using Standard or Spacesaver bearings. You should be using Standard bearings except on the driven axle and then only if building an EM chassis.

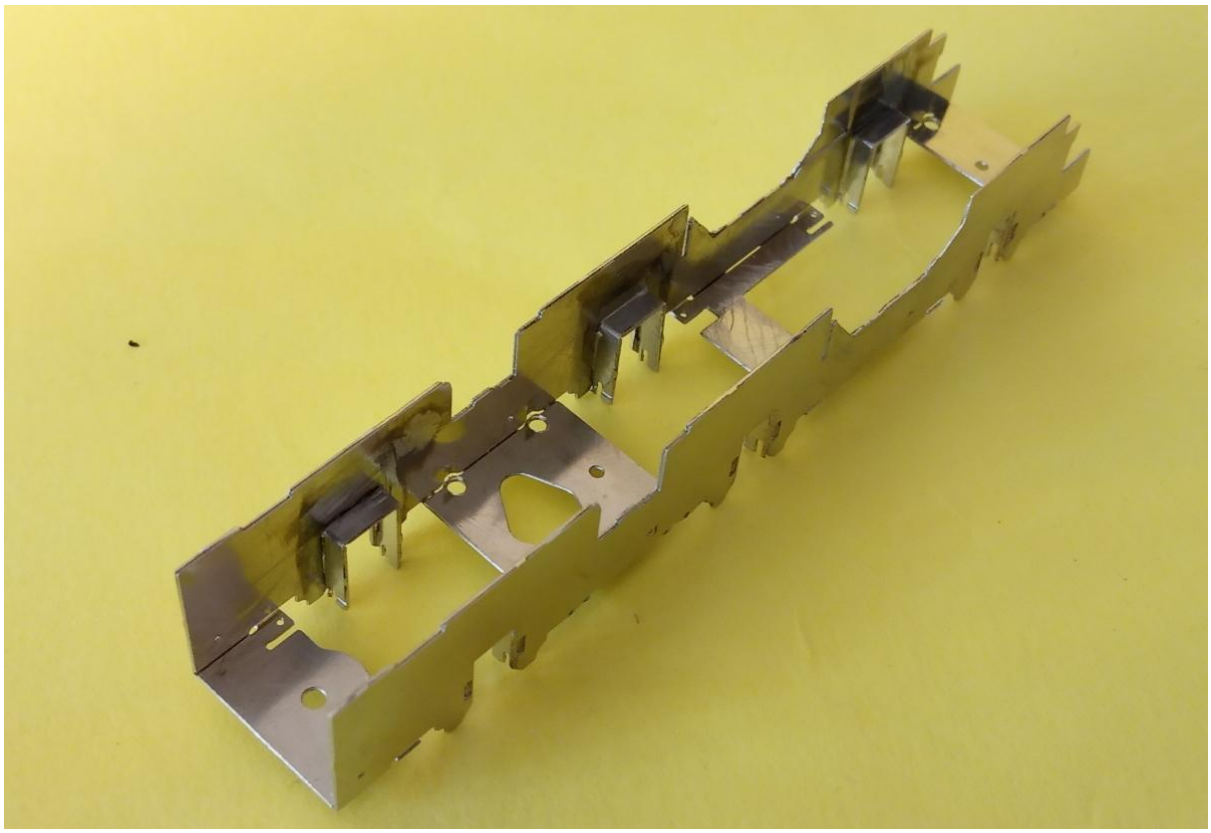
Make sure your High Level bearings fit into the spring carriers of your choice (2A - Standard bearings and 2B - Spacesaver bearings). If not open the hole out while the carrier is still attached to the fret. Once happy with the fit remove the carriers, fold out the tab at the bottom and solder to the bearings. It is a good idea to arrange some way of being able to identify which bearing goes on which axle and what side. Once fitted to the chassis the bearings should remain in the position they are in and not be swapped around. I try and arrange them so that the part of the spring carrier to which the fold out tab is attached is always facing towards the front of the loco. The spring carriers come in mirrored pairs to assist with this. It is then a good idea to mark the bearings in some way so you can tell what axle they are fitted.

High Level bearings are pretty accurate but if you are worried about how central in the bearing the hole is, examine them and try and arrange them so that whatever will be the face facing the front of the loco is as consistent as possible between them all.

This may all seem like faffing around to some, but it is really just due diligence and the more care and attention that is paid at this stage the better the result will be and the more chance of the loco going back together properly if it's disassembled. I can't think of any greater faff with a loco than trying to sort out which axle went where because it's had to be taken apart, it's gone back together and doesn't run as well as it did and there's no way of telling what went where.

When all the bearings are assembled with their spring carriers, remove the hornguides of your choice (3A - Standard bearings and 3B - Spacesaver bearings) from the fret, noting which is end is labelled Hornguide Front and fold into a U shape. Fit the hornguides to the sides of the subframe making sure the side that was labelled Hornguide Front goes towards the front of the loco (this is the left hand end in Fig.1). There are slots and tabs to use for fitting. The slots towards the front of the loco at each hornguide position should be a tight fit with the ones towards the back a little loose so you can adjust the back of the hornguide so that it's a good fit against the bearing. Fit the hornguides, bend out the bottoms so they match the profile of the frames and solder along the front edge only.

Fit the bearings in their allotted location and adjust the backs of the hornguides so they are all a good fit. When happy solder in place, taking care not to solder the bearing in place.



Fold the subframe into a U shape making sure the sides are perpendicular to the spacers at the bottom. Fold down the six small tabs shaded purple in Fig.1 above and run a fillet of solder along the fold lines. If driving on the middle axle remove the area shaded green in Fig.1.

Coupling Rods

Assemble the coupling rods (4). Note that they are laid out on the fret in mirrored pairs. There are two layers to each side each with small half etched detailing for the boss and the join. The back layer is full thickness and the front layer has a half etched recess in the rods. The half etched detail that is along the line of the back layer goes on the back of the coupling rods and the half etched detail along line of the front layer goes on the front of the coupling rods. Also note that they are designed to have proper forked joints at the join between front and back which should be made with 0.8mm wire. See Fig.2 below for the general arrangement.

I've done the front coupling rod boss to be recessed for clearance but note that there is a non-recessed version of part of the front layer included (5). In P4 you will need to recess the front crankpin to get clearance behind the slidebars even with skimming the boss flush with the tyre. EM will be a bit more forgiving.

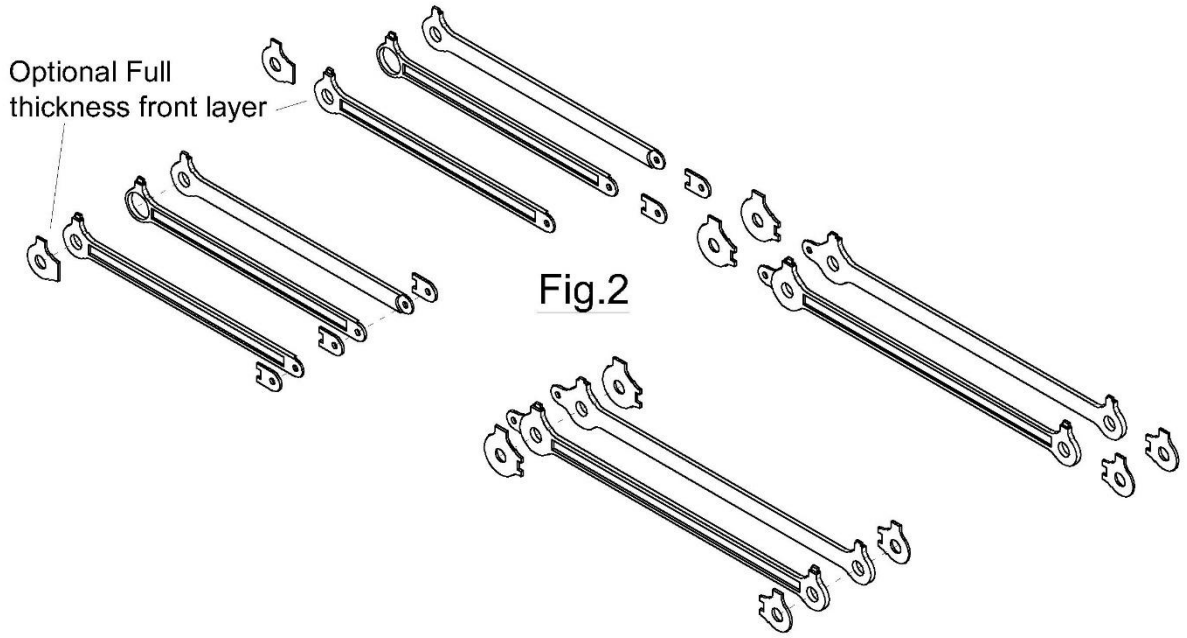


Fig.2

Subframe Continued

Add motion bracket (8) and firebox (9) frame spacers of your chosen gauge to the subframe. See Fig.3 below. Note that there is a correct way around for the motion bracket frame spacers (with the half etched wording 'Front' towards the front of the loco) and the area shaded green on the firebox frame spacer in the parts diagram should be removed if driving from the middle axle. Solder in place.

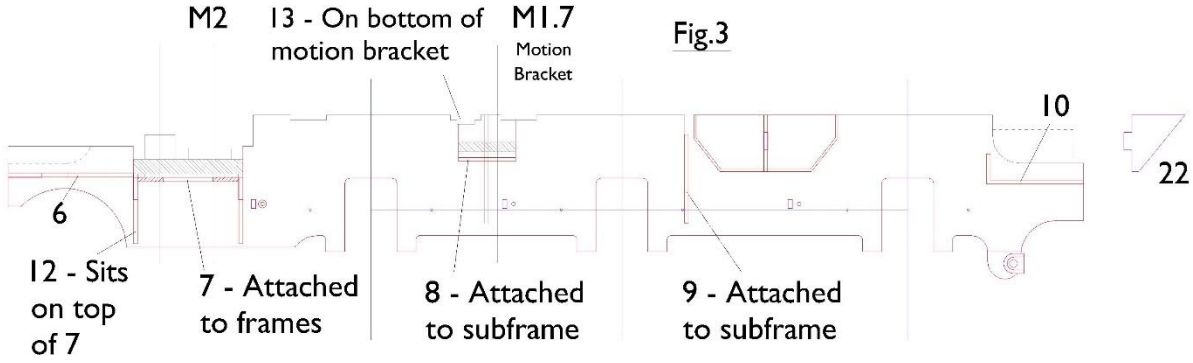
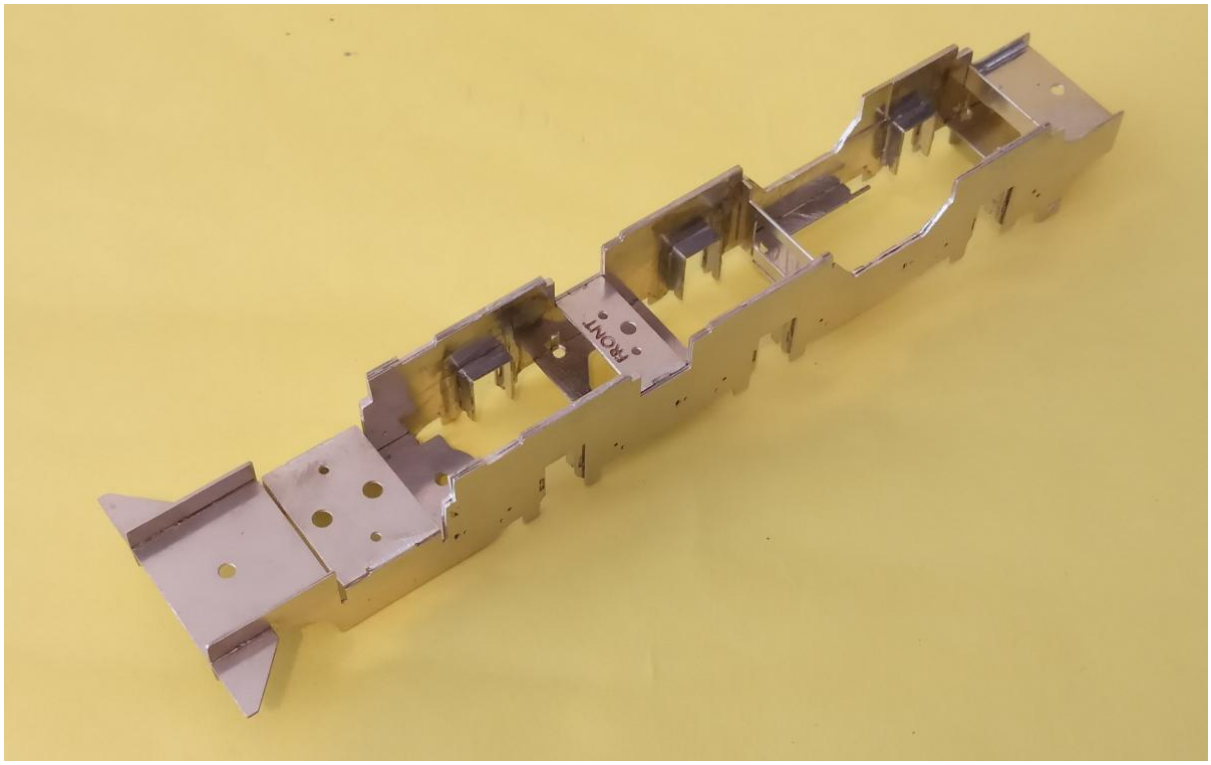


Fig.3

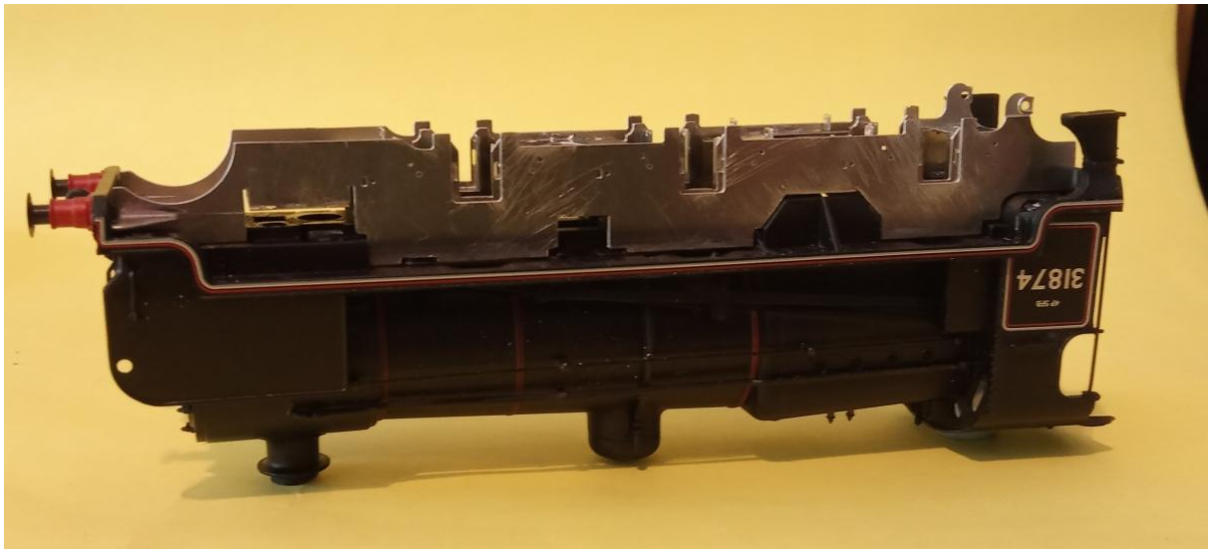
Main frames

When all is good add the main frames to the subframe. You can use 0.45mm wire through the holes for the brake hangers to align them.

Add the rest of the frame spacers to the gauge of your choice; front (6), cylinder (7) and rear (10). The front spacer slots into the main frames, the cylinder spacer sits on top of the main frames in the cut out for the cylinders and the rear frame spacers sits between the frames and up against the L at the rear of the subframe. The short side of the L is vertical. See Fig.3 above if in doubt.

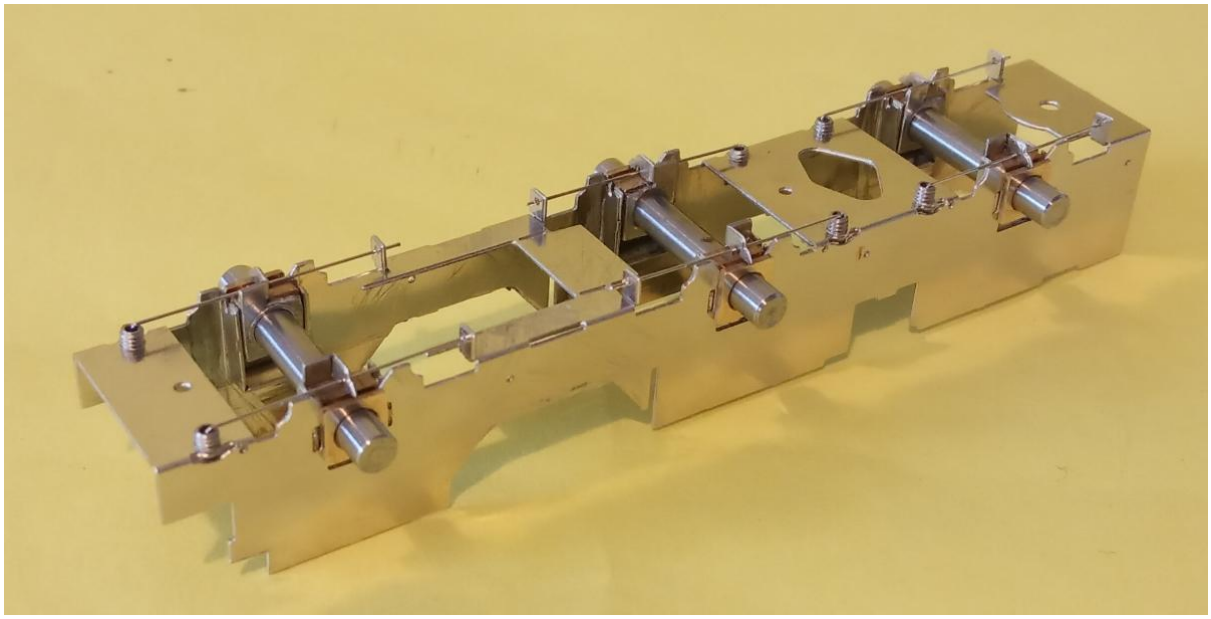


Check the fit on the body and adjust if necessary, especially if retaining the cast running plate support on the Bachmann body.



Now is a good time to assemble the running chassis and make any adjustments necessary.

Fit the six Exactoscale hollow grub screws so that the open end is facing towards the bottom of the chassis (see image below). Form six driving wheel springs from the 0.012” wire included with the kit. They should be L shaped with the longer part 25mm and the shorter part 4mm. Fit the bearings in their correct positions and fit the springs. The springs should pass through the hole in the spring carriers and the small spring support tabs with the short end sitting in the spring adjusters. Adjust the grub screws so that the springs wire sits parallel to the bottom of the subframe.

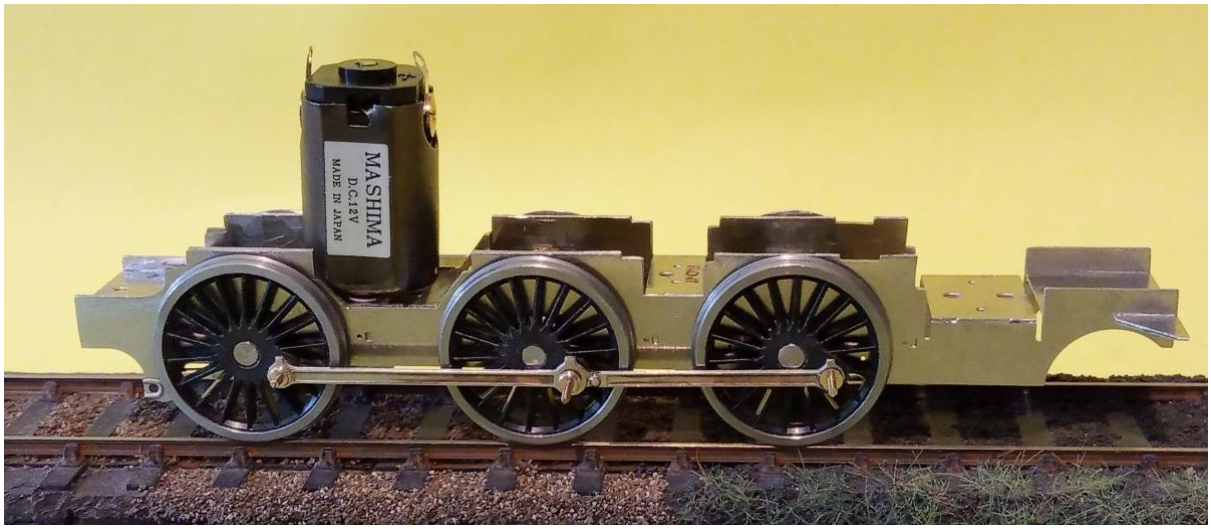


Wheels

It is recommended that the bosses on the wheels are filed flush with the tyre if they don’t come that way. This is especially important in P4. If you have access to a lathe you may also consider reducing the width of the wheels a scale 5½“ if modelling in P4. If not don’t worry but be mindful that clearances are tight behind the slidebar and crosshead.

You can fit the wheels and coupling rods to get a running chassis at this stage before everything else goes on to check all is well if you want. 1/8” washers (X) are included to take out sideplay on front and rear axles.

You can fit your chosen gearbox and motor at this point as well.



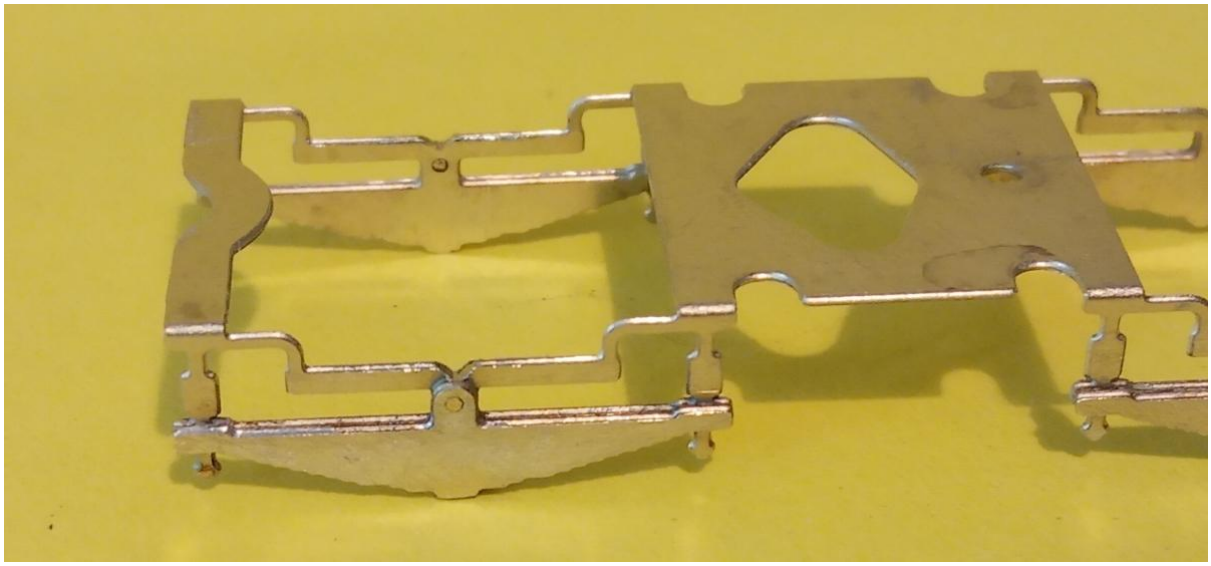
When happy remove the driving wheel springs as they will get in the way when fitting the keeper plate.

Cylinder Block

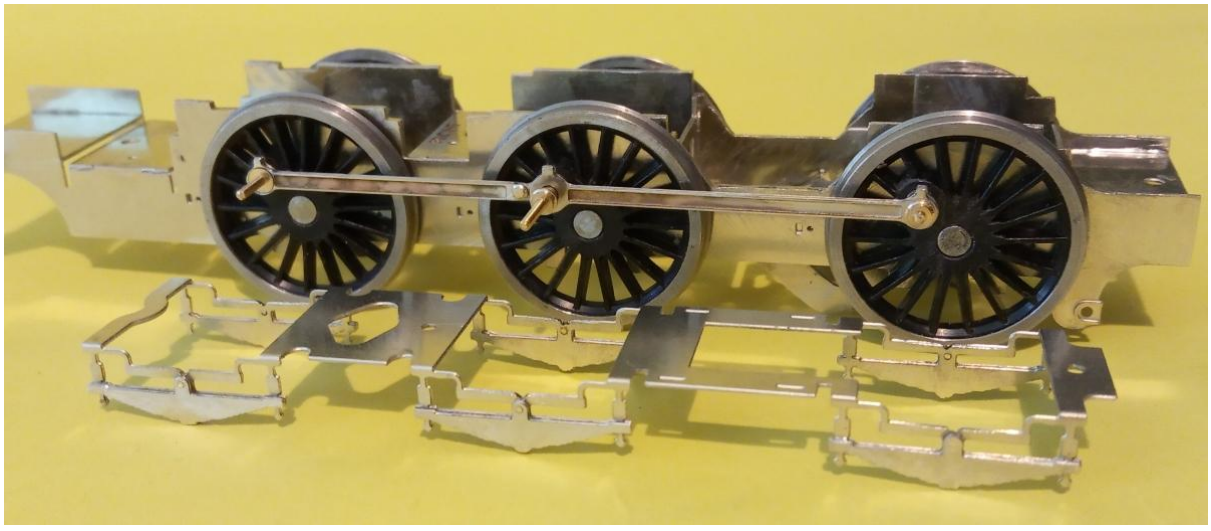
The locating spacer for Bachmann cylinder block (12) and the locating spacer for Bachmann motion bracket (13) will need attaching to the Bachmann cylinder block and motion bracket. There are EM and P4 versions. In both cases they go on the bottom of the Bachmann cylinder block spacers. Note there is a front to both. Glue in place. Part 12 will sit on top of frame spacer 7 and part 13 will sit on top of frame spacer 8. See Fig.3 above. There will be a gap on the of the motion bracket which is what part 14 is used to fill. These fold into a C shape.

Keeper Plate

Next turn your attention to the keeper plate (15). There are EM and P4 version. There are driving wheel spring overlays (16) included to beef up the springs which need to go on the outside of the folded up keeper plate. It will be easier to add them to the keeper plate before folding up. Do this on the side without the half etched fold lines.



The keeper plate can be secured in place using 12BA bolts. There is scope to tap the securing holes in the bottom of the subframe rather than soldering nuts in place.



Brakes

Assemble brake shoes (18). They are arranged in mirrored pairs but aside from coming in left and right hand version they are all the same. Each brake shoe has three layers one of which has a fold up bracket attached to it, this is the front layer. The middle layer is full thickness and the rear is similar but has a half etched area on it. Use 0.45mm wire through the top and middle holes to assemble and fold the bracket up. Leave the hole at the bottom empty. See Fig.4 below.

Next assemble the brake pull rods (19) adding overlays (20A-20D) to the top and bottom of the pull rods using 0.45mm wire. Note that 20C and 20D are identical. The D should be a C on the fret. File the wire to resemble bolt heads. Then add steam brake crank overlays (21)using 0.45mm wire through all but the large hole which should be left clear for the brake shaft. Again, file the wire down to represent bolts.

Twist the ends of the pull rods so the steam brake cranks are perpendicular to the pull rods and the steam brake crank overlays are facing upwards. Make the twist just behind the stretcher for the rear set of brakes. You may need to fettle the end of the stretchers to fit the bottom hole in the brake shoes. Add the assembly to the chassis using 1mm wire for the brake shaft. The brakegear can be arranged so that the brackets on the brake shoes simply clip into the main frames and then the whole assembly can be swung out of the way if you want to remove the wheels.

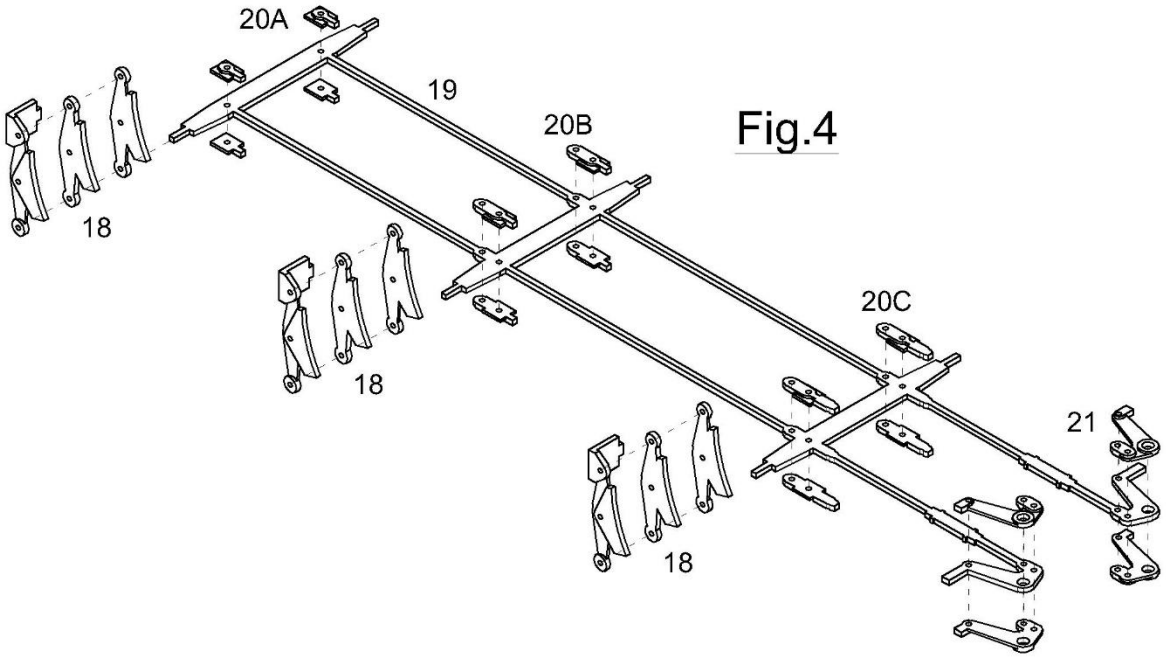
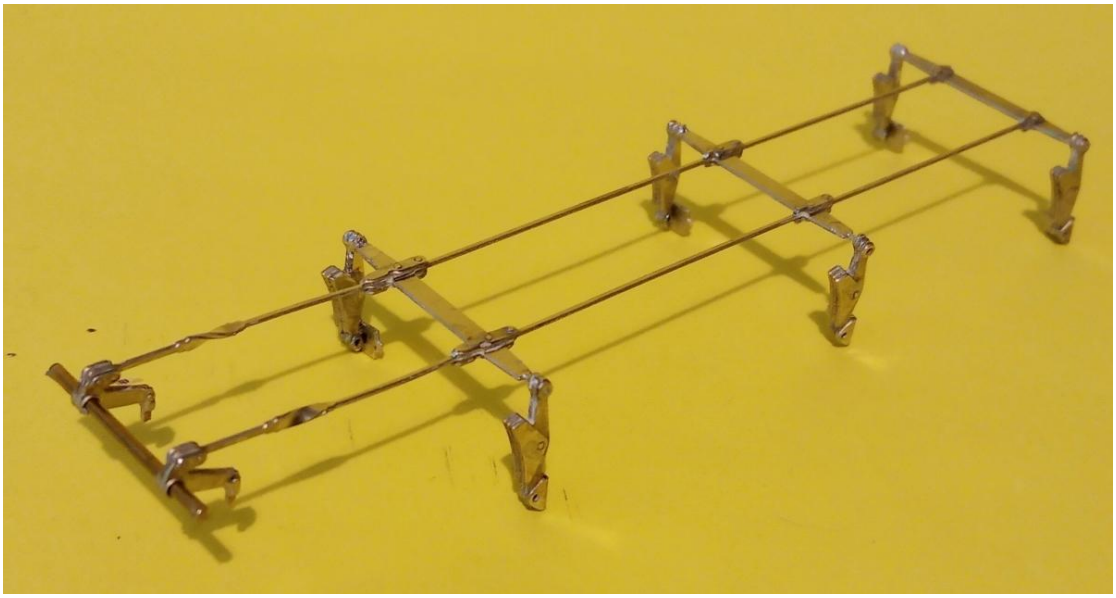
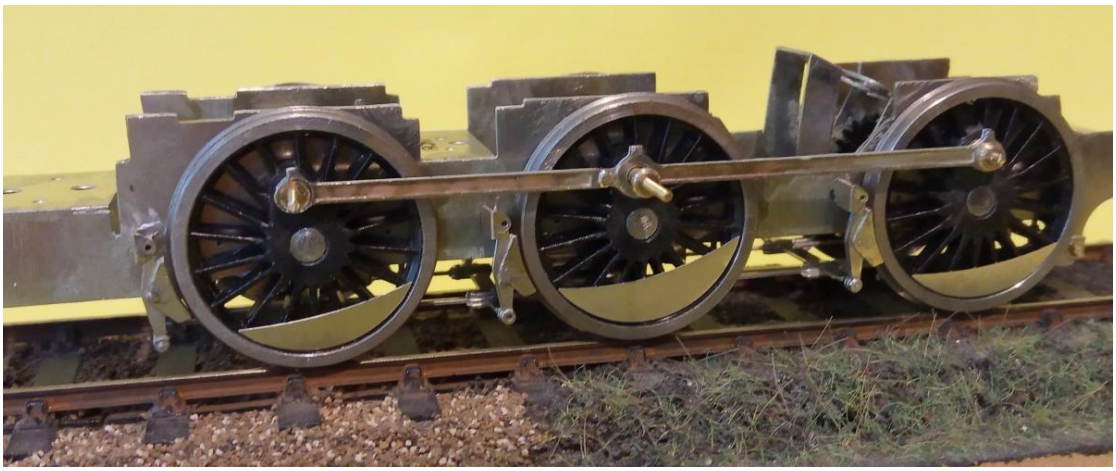
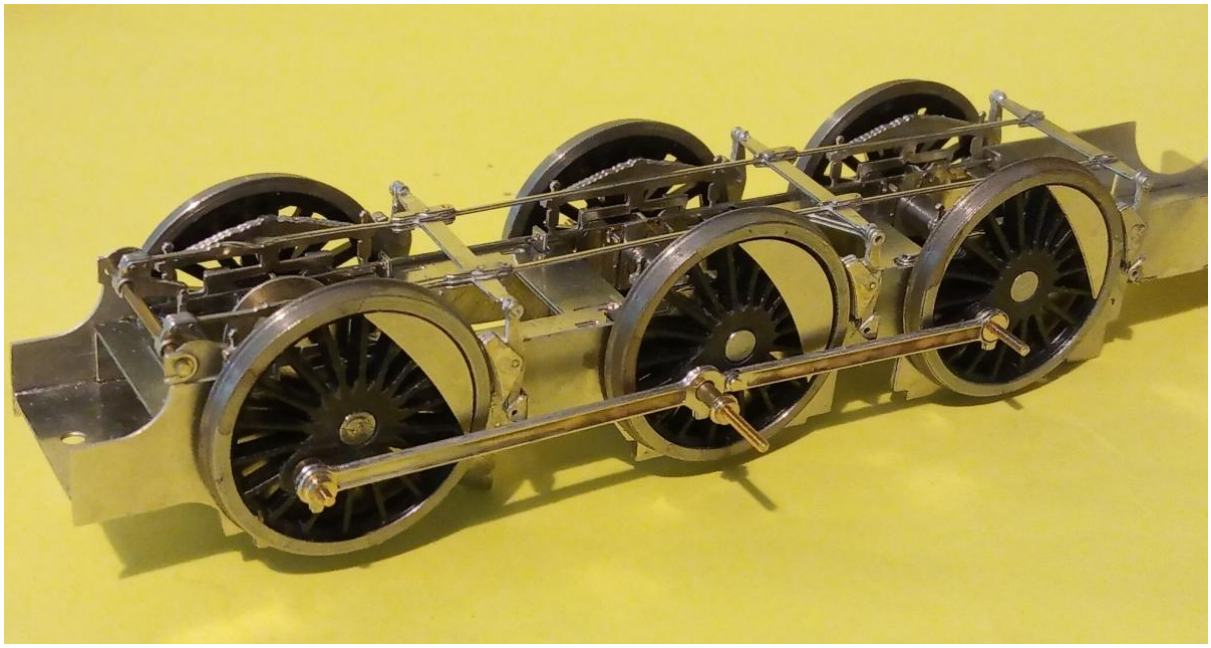


Fig.4







Add running plate brackets at firebox (22) if you have removed the cast block from the Bachmann body. Note that there are EM and P4 version. There are slots in the mainframes for these and tabs on the brackets.

Connecting Rods

Firstly, make up the connecting rod (23). This is arranged as per the coupling rods with two layers and detail that fits on the front and back of the boss which fits on the crankpin. See Fig.5 below.

Motion

The motion is laid out in mirrored sets on sheet B for ease of finding parts. There are spares on sheet C should they be needed. Holes have generally been etched to 0.6mm, though some, such as those through the union link have been made a little smaller for reliable production. Holes may need opening out to fit the crankpin fixings of your choice.

For the combination lever (25) you will need a washer added to the back where it joins the valve rod (26).

The expansion link (28) will need layering up using 0.31mm wire though the small holes to align everything.

The eccentric rod (29) is etched to provide a forked joint where it meets the expansion link (28).

For the return crank (30) you will need the half etched detail part for the front and one of the other two for the back. Which one will depend on your fixing to the crank pin. There's one with a hole and one with a rectangle who like to arrange for sturdy fixings at the point.

The lifting link (31) and lifting arm (32) are going to need a bit of ingenuity on you part. Bachmann have cast these as part of the motion bracket and you want to leave them in place.

The piston valve guide on the Bachmann cylinder block will need slotting to allow the combination lever to move as it should.

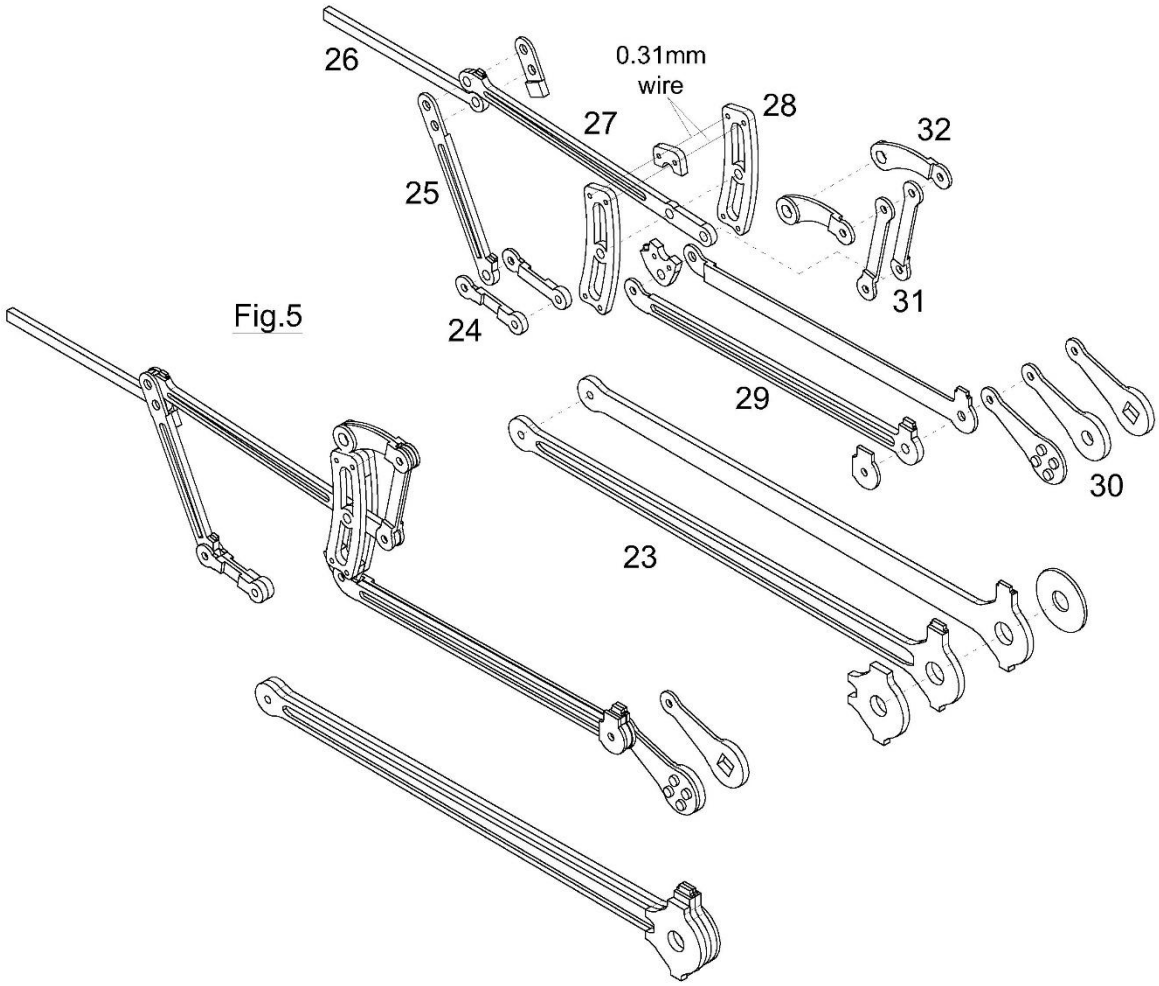


Fig.5

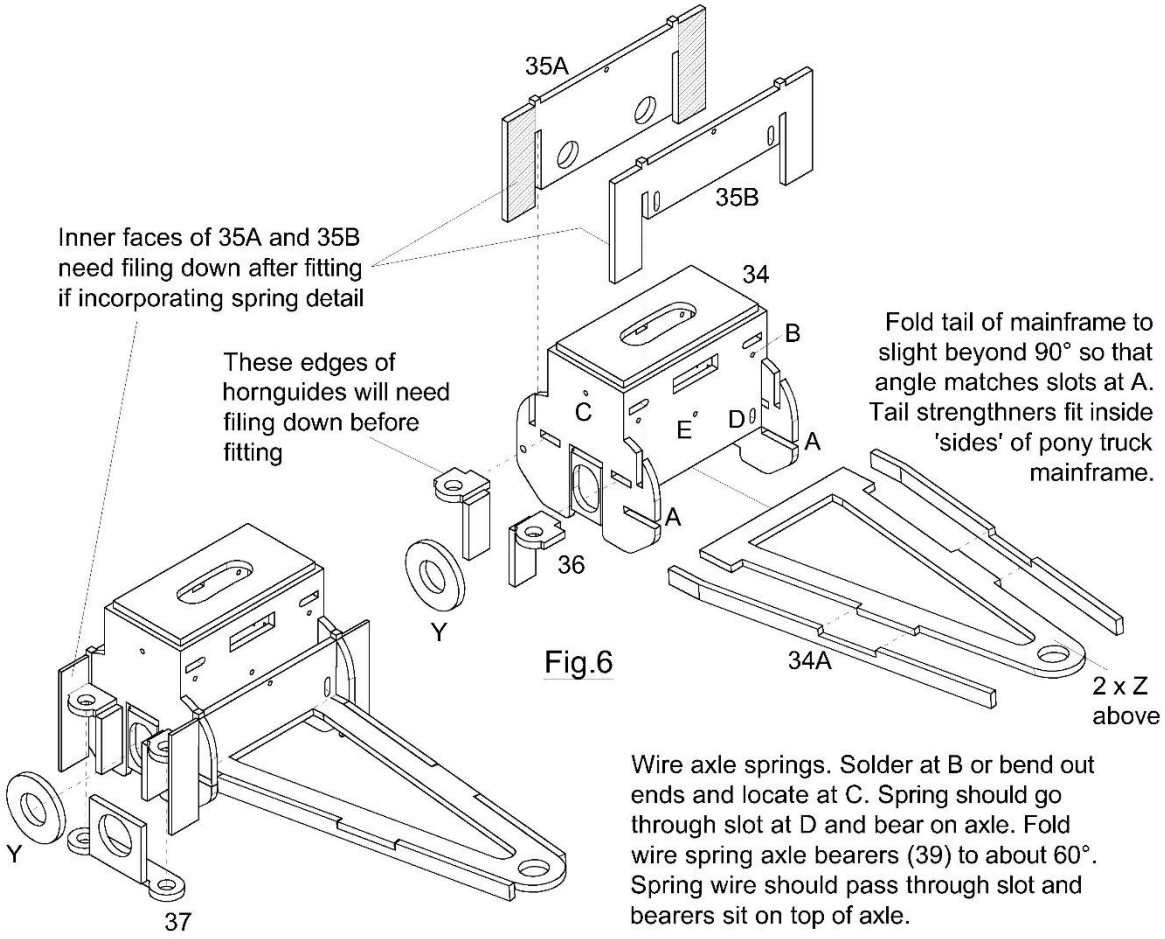
Pony Truck

The pony truck is designed to be built using wire springs as per Dave Bradwell with the axle riding in a slot. For the adventurous it is possible to fit 2mm High Level hornblocks and use working home wound coil springs. The coil springs on the prototype were visible through the wheels so you may want to add cosmetic ones if going down the Bradwell route. There is only one pony truck for P4 and EM. Any sideplay can be taken out with washers which are included.

Some gremlins seem to have gotten into the pony truck and for some inexplicable reason the guard irons have disappeared. Some of the parts may need modifying depending on how much detail you wish to add. I will try and do something about the guard irons.

Refer to Fig.6 below as you go along.
Fold up the pony truck mainframe (34) starting with the tail and front and doing the sides last. Note that the 'tail' of the pony truck is folded to slightly more than 90° and matches the angle of the slots in the sides of the mainframes at A. See Fig.6. Add the pony truck tail stiffeners (34A) to the tail of the pony truck. There are tabs and slots to help locate them. Note the ends nearest the body of the pony truck are angled slightly and sit in the sides of the mainframe.

Add front (35A) and rear (35B) spacers. The ears on that project beyond the mainframe on either side should have been half etched. This is fine if you don't wish to fabricate any of the cosmetic spring detail or don't want to have a go at working coil springs. If you want to tackle either of these you will need to thin the inner faces of these 'ears' to about half metal thickness. You can file the tops of the spacers to match the curved profile on the mainframe sides.



If you want to have a go at using working coil springs cut through the half etched lines either side of the axle slot and check fit on High Level Miniblox bearings. The bearings should face so that the circular boss is facing outwards. Be warned that if you choose to go down this route there's no going back!

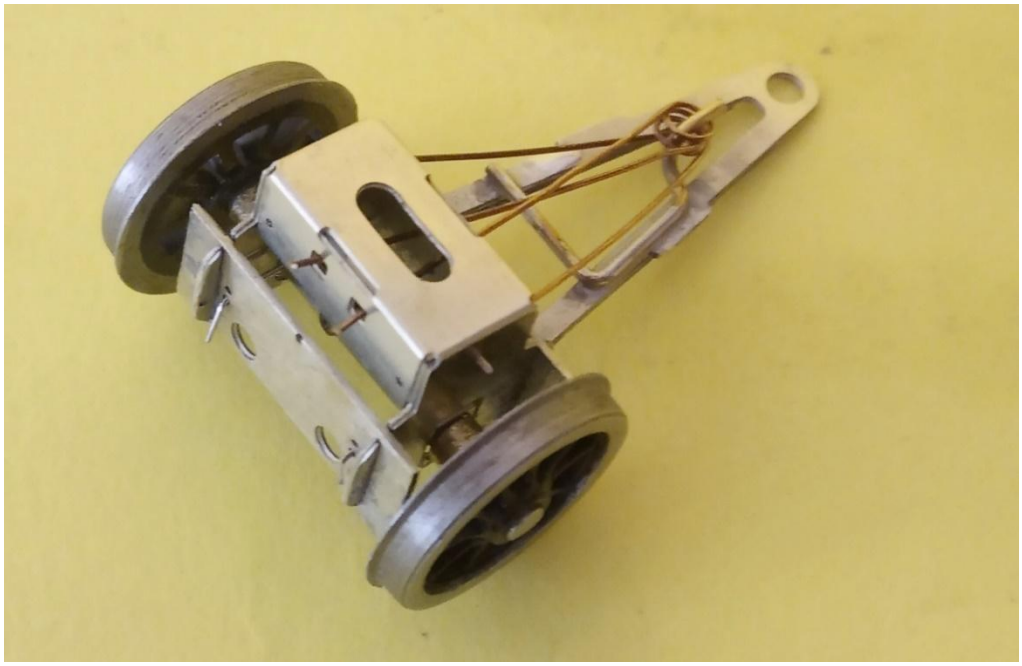
Add pony truck hornguides (36). These will provide location for any cosmetic or functional coil springs and will also provide a stop for the boss on the wheel backs. If you don't want to worry about any of that you can leave them off but you will need to sleeve the axles to take out any sideplay. The hornguides fold into an L and slot into tabs on the mainframe. The outer edges are over long so will need filing to fit. See Fig.6. If using High Level hornblocks make sure they are a good fit with the bearing.

If you want to try working coil springs fold up the coil spring carriers (37) and fit to the High Level hornblocks. If using the Bradwell method, you can sperate the two halves of the coil spring carriers and keep the part with two small holes in for use when adding cosmetic detail.

The coil springs, cosmetic or working, need to be 4mm long when finished. If cosmetic, make using 0.3mm diameter material wrapped around the shank of a 0.9/1mm drill bit. If working, you may need to use something like phosphor bronze for the springs and possibly less of a diameter than 0.3mm. Some trial and error may be necessary. Use 14BA bolts and nuts to assemble the carriers and coil springs with the pony truck.

If using the Bradwell springing method a bending jig and axle bearers (39) are included. The spring should go around three sides of the jig. The longer end of the spring should be soldered in small holes on the front and back spacers (B on Fig.6) with the shorter side going through the slot below (D on Fig.6). The springs could also be arranged so that they locate in holes in the sides (C on Fig.6).

Side control is a tricky topic. There are slots for you to use if you wish. Make sure the fixing bolt is sleeved if you use these, don't have wire bearing on a screw thread. There is a hole in frame spacer 6 into which a 10BA bolt can be fixed to act as a pillar for any side control.



The pony truck can be retained by 10BA bolts. You should add 2 x pony truck washers (Z) above where the tail joins the loco to space things properly. See Fig.6.

There are holes at E on the spacers (see F.ig.6) for fitting AJ couplings at the correct height.

Other Items

If you haven't already fit the balance weights (40) to the wheels. They should be arranged to the centres are opposite the crankpin. See Fig.7.

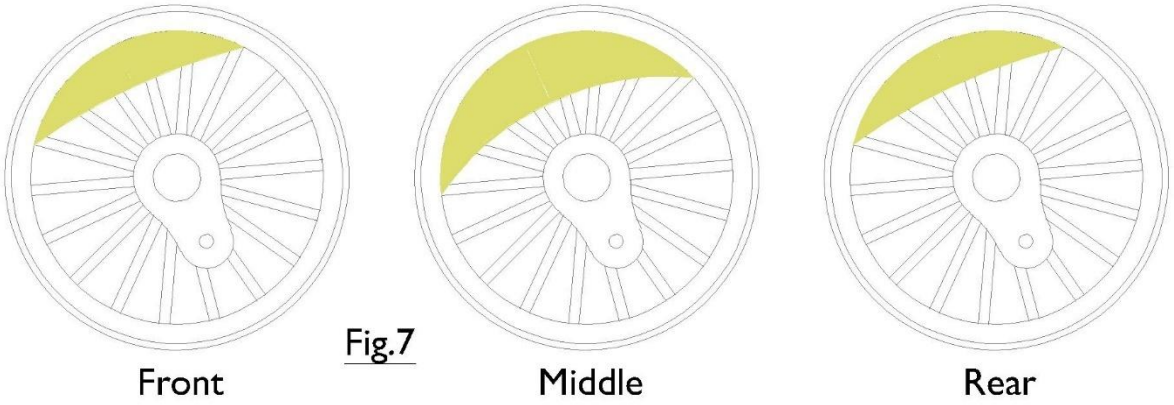
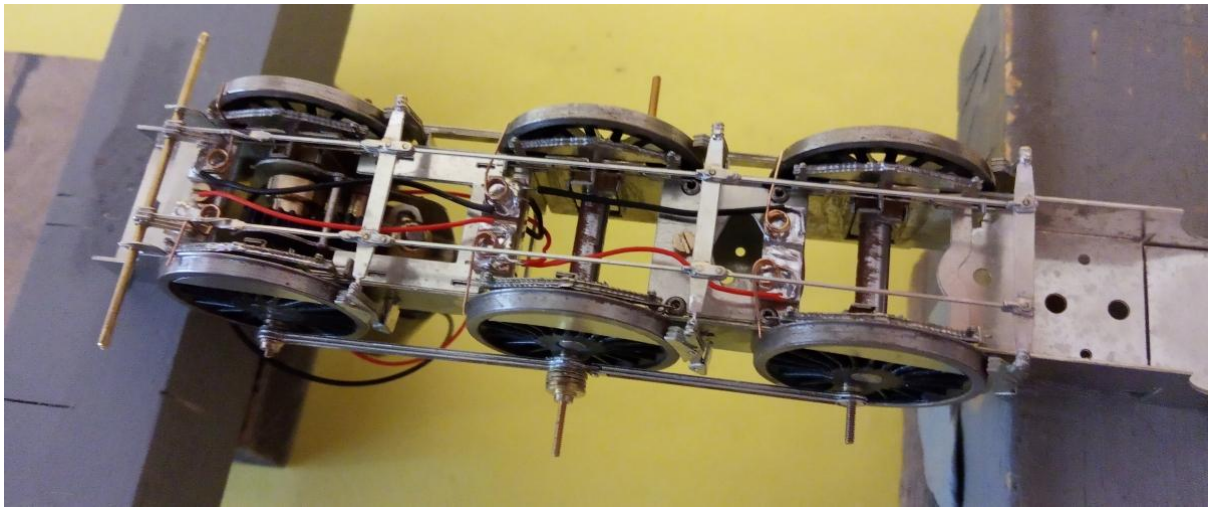


Fig.7

An adjustable loco to tender coupling (41) is included. It uses 10BA bolts. Fixing holes are in frame spacer 10 and the front of the tender.

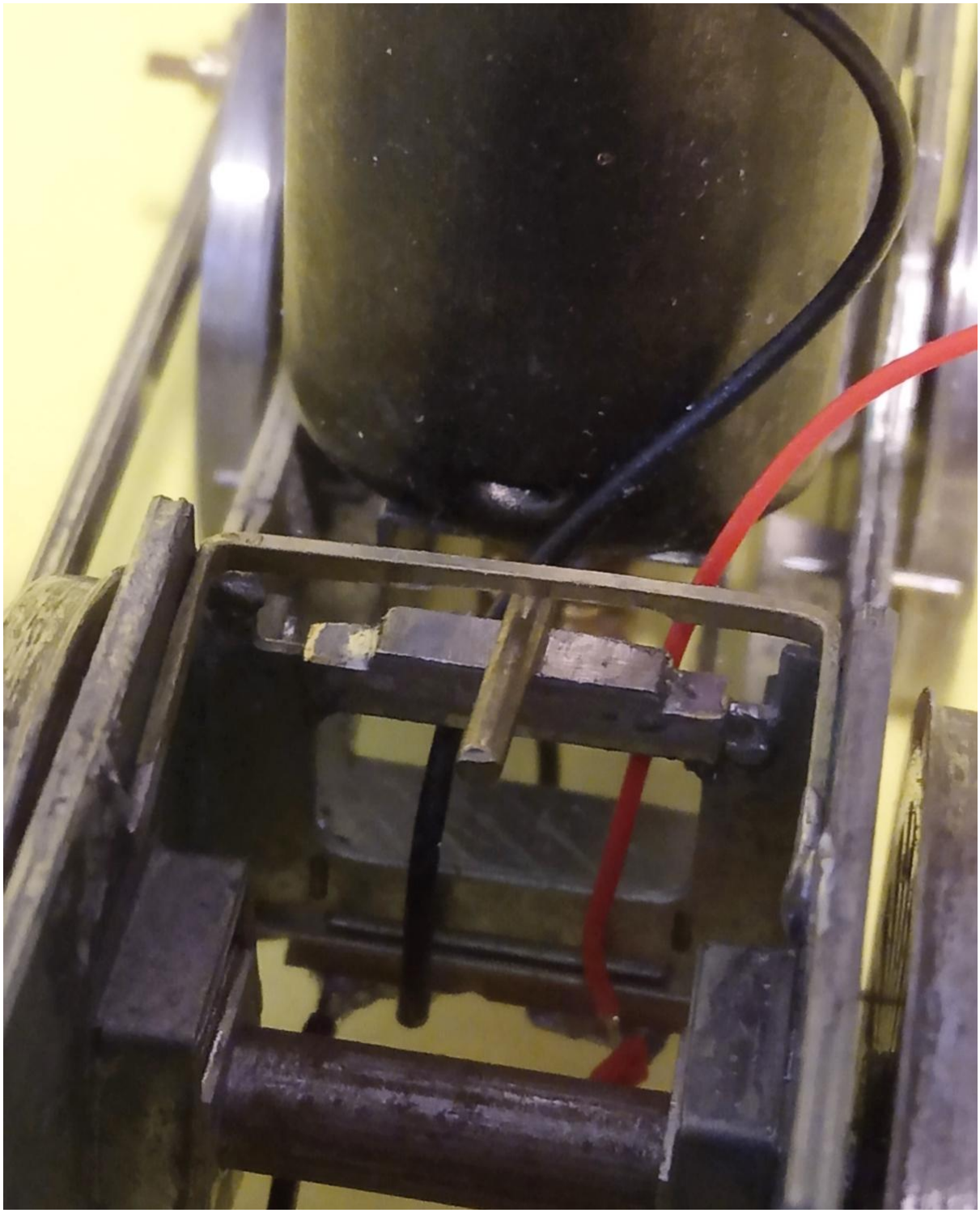
Pickups

There is room on the keeper plate for pads of copper clad circuit board to be attached onto which you can fix pickups. It is recommended that the pickups have some sort of coil spring wound into them to provide flexibility and bear on the flange of the wheel rather than the back. The following image shows the arrangement on the test build. 33SWG phosphor bronze is a good material to use.



Motor Torque Control

One thing that hasn't been covered is torque control for the gearbox. You are left to your own devices with this, but you should be aware that whatever the arrangement the gearbox needs to move vertically and also roll from side to side a little to account for variations in the movement of each axlebox. The following photo showed the arrangement on the test build.



Finally

With the chassis finished and the fitted under the body there is the question of adjusting those driving wheel springs. There are small holes etched in the main frames which denote where the axle centres should be. Adjust the wheels until the axle centres sit along this line of holes. The spokes on the wheels can be useful here. When adjusting them, do both sides of the axle at the same time and by the same amount.

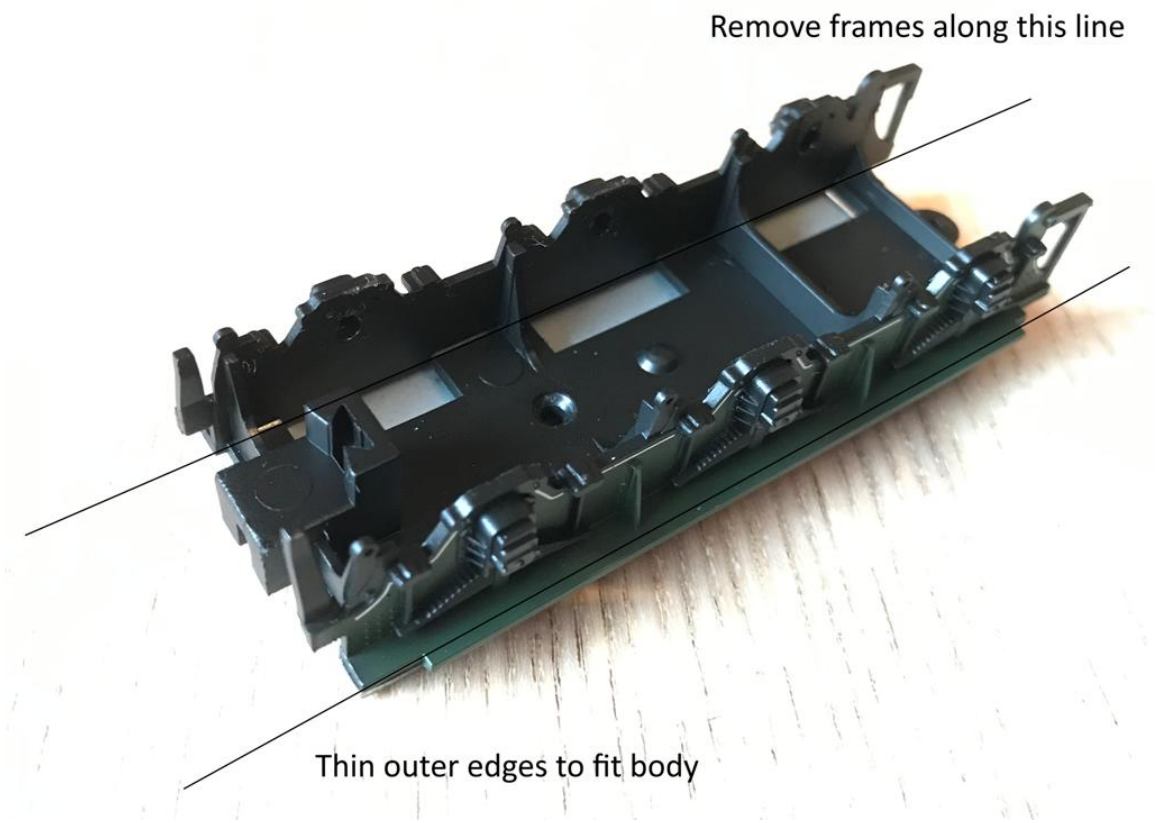
Tender Subframe Instructions

Tender Parts List

T1 - Tender subframe
T2 - Tender hornguides
T3A (3500) - Front frame spacer (3500 gallon tender)
T3A (4000) - Front frame spacer (4000 gallon tender)
T3B - Frame spacer
T3C - Frame spacer
T3D (3500) - Rear frame spacer (3500 gallon tender)
T3D (4000) - Rear frame spacer (4000 gallon tender)
T4 - Spring carriers
T5 (3500) - Vacuum reservoir formers (3500 gallon tender)
T6 (3500) - Brake shoes (3500 gallon tender)
T6 (4000) - Brake shoes (4000 gallon tender)
T7 (3500) - Brake shoe links (3500 gallon tender)
T7 (4000) - Brake shoe links (4000 gallon tender)
T8 (3500) - Vacuum cylinder links (3500 gallon tender)
T8 (4000) - Vacuum cylinder links (4000 gallon tender)
T9 (3500) - Hand brake link (3500 gallon tender)
T9 (4000) - Hand brake link (4000 gallon tender)

Bachmann Underframe Modifications

The tender subframe is designed to use the sideframes from the Bachmann plastic underframe. The underframe will need separating into three parts by two cuts, one along the back of each sideframe. The outer edge of the resulting L shaped sideframe will need to be thinned down to fit back in the body when attached to the etched subframe. There are ‘ears’ on the etched subframe to which you will be able to glue the plastic sideframe. The flowing image should give you a better idea of the modifications necessary. Make sure that the back of the sideframes are clear of any remnants of the centre part of the Bachmann underframe.



Construction

The sprung subframe is similar to the loco subframe in that it is designed to be self jigging. It is the same for both 3500 gallon and 4000 gallon tenders. It is also the same for EM and P4, with any sideplay taken up by washers. The centre frame spacers and springs carriers are the same for both tender types. Parts specific to the 3500 gallon tender will have (3500) next to the part and those for the 4000 gallon tender will have (4000) next to the part.

Note that the photos of the test build are for the 3500 gallon tender. The 4000 gallon tender is similar.

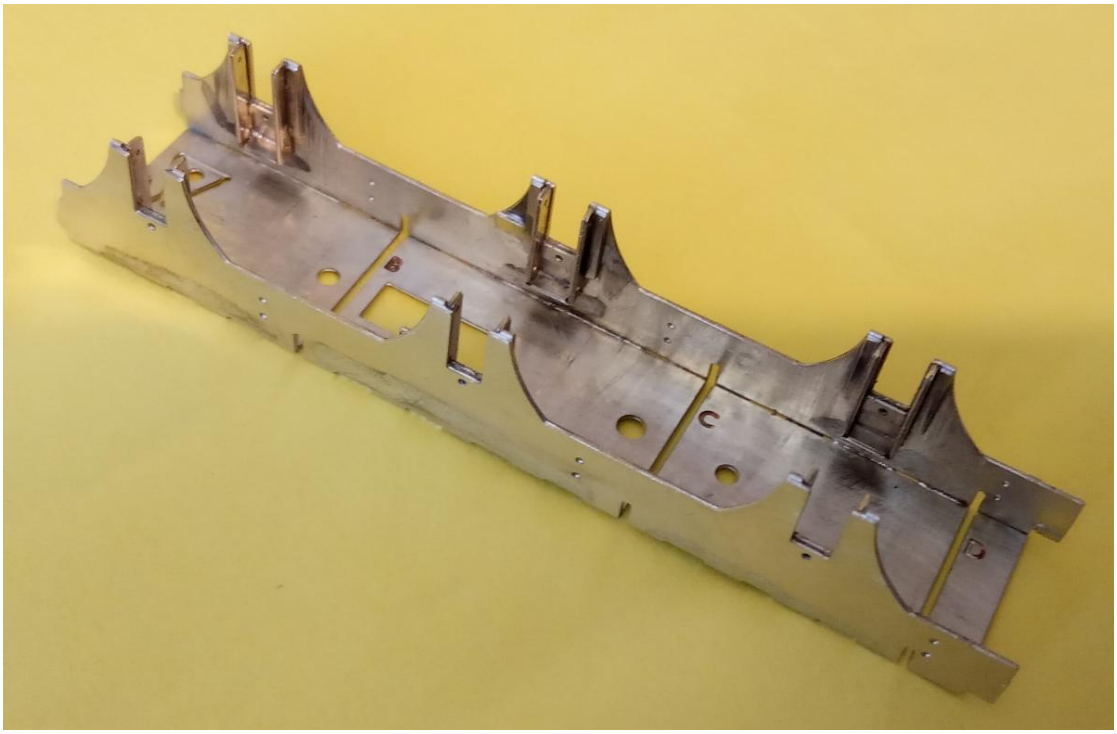
Subframe

There are various holes in the tender subframe (T1) that need to be checked before removing from the fret. On each sideframe there is a hole centrally above the cut out on each axleguard for the wheel bearings and there is also a corresponding one in the centre of the U shaped part that attached to the bottom of each axleguard. These need to be a tight fit on 0.5mm wire. There are three pairs of holes on each sideframe for the brake hangers. These need to be able to take 0.45mm wire. Finally, if constructing a 3500 gallon tender, the small holes in the triangular vacuum cylinder brackets at the front (A end and shaded yellow on the parts diagram) need to be opened out to around 0.55mm. to accept the spigots on the cast vacuum cylinder.

For a 4000 gallon tender only, you will need to remove the small rectangles with a half etched line around at the rear of the sideframes (D end and shaded green on the parts diagram). This will make sure the frames fit properly. Leave for the 3500 gallon tender.

Fold the U shaped parts attached to the bottom of the axleguards through 180° with the fold line on the outside. Use 0.5mm wire through the holes at the top of the bearing cut out to make sure things are aligned and solder in place.

Fold up the hornguides (T2) and fit to the subframe. They should be hard up against the front edge of the inner part of the axleguard (A end). Solder along the front edge only. There is a little wriggle room at the rear end to get a good fit on the bearing so only solder the back when the bearing is fitted.

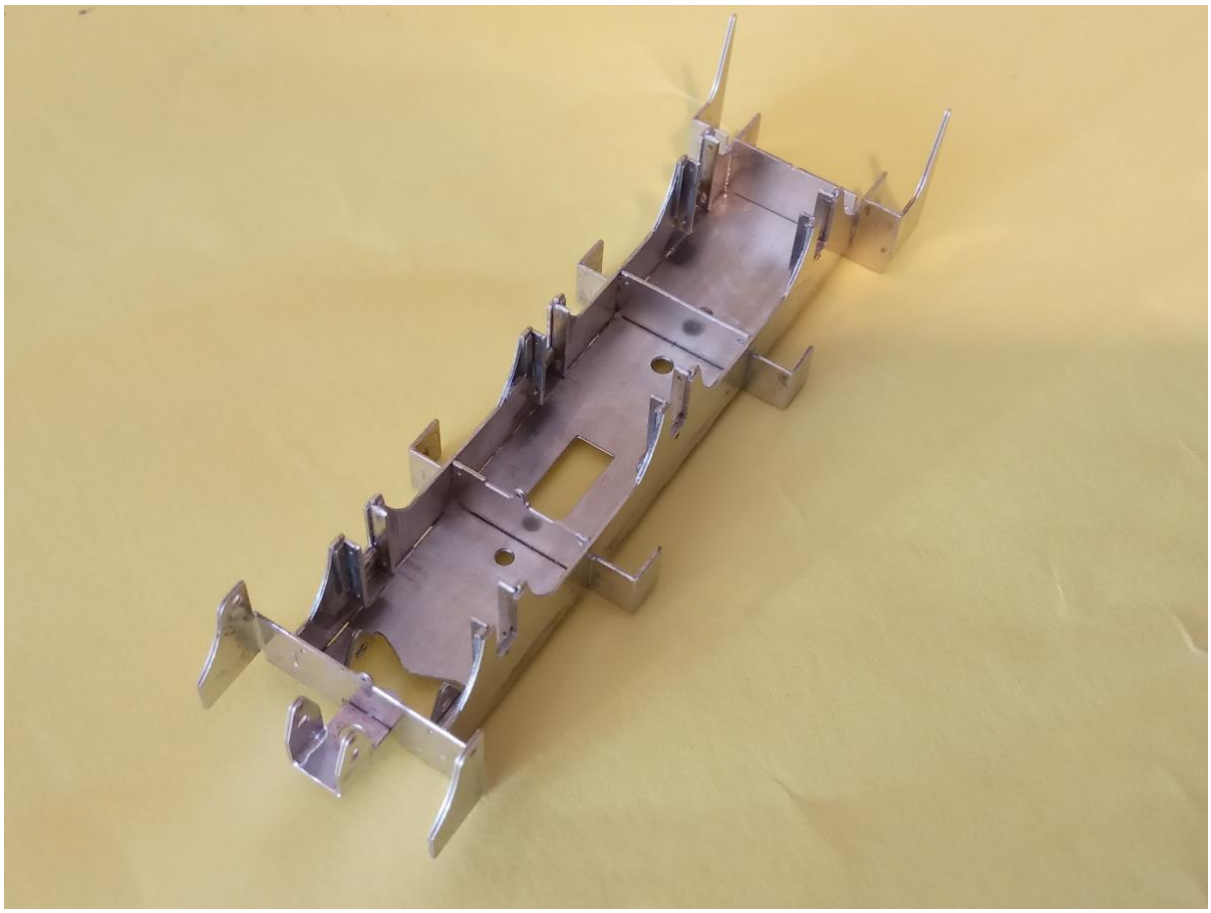


Fold up the subframe into a U shape making sure the sides are perpendicular to the base.

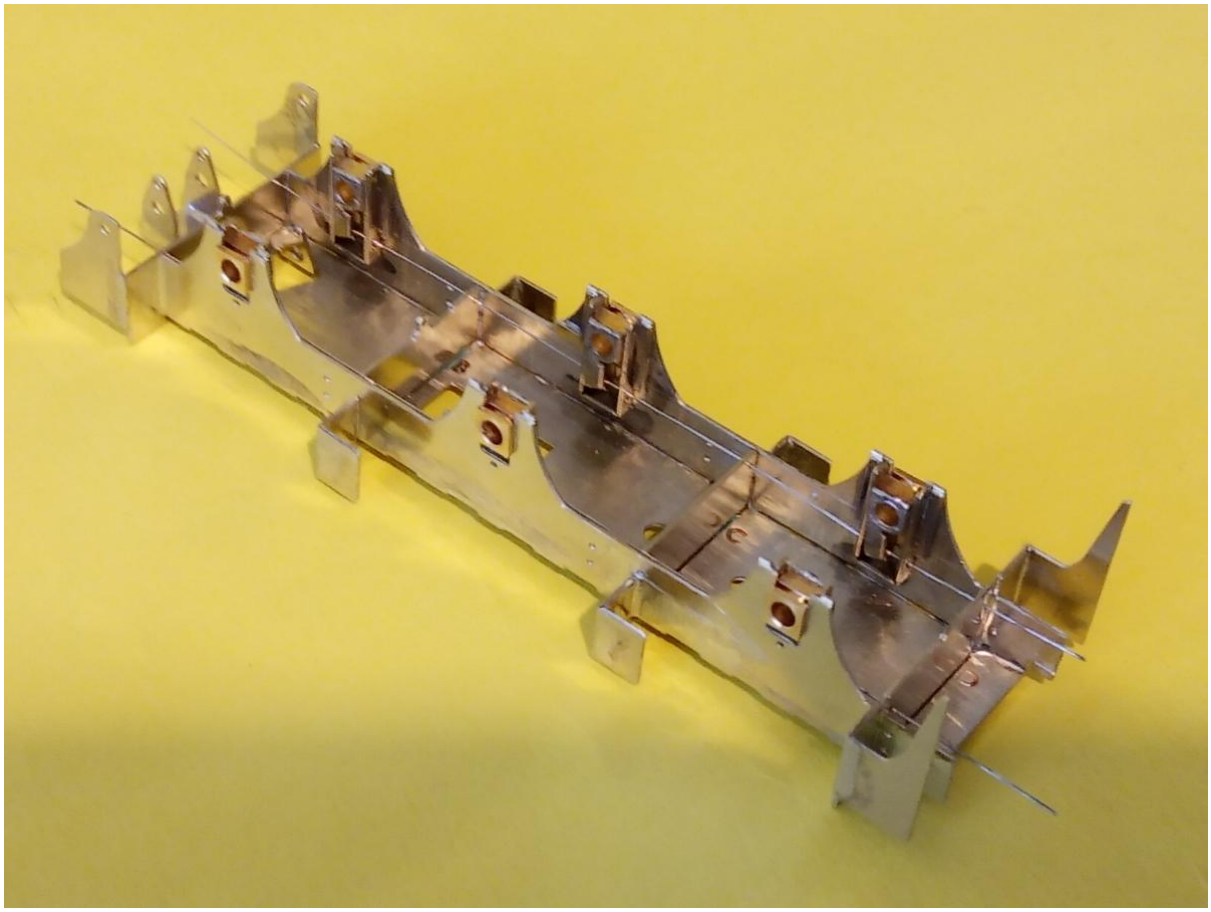
Fold up spacer T3B and fit in slot B on subframe. The ears should face towards the rear of the tender (D end). Repeat for spacer T3C. The ears should again face towards the rear of the tender.

Fold up T3A of your choice (3500 or 4000) and fit to front of subframe using slots and tabs at A. Everything folded up should face outwards from the subframe towards the front of the tender.

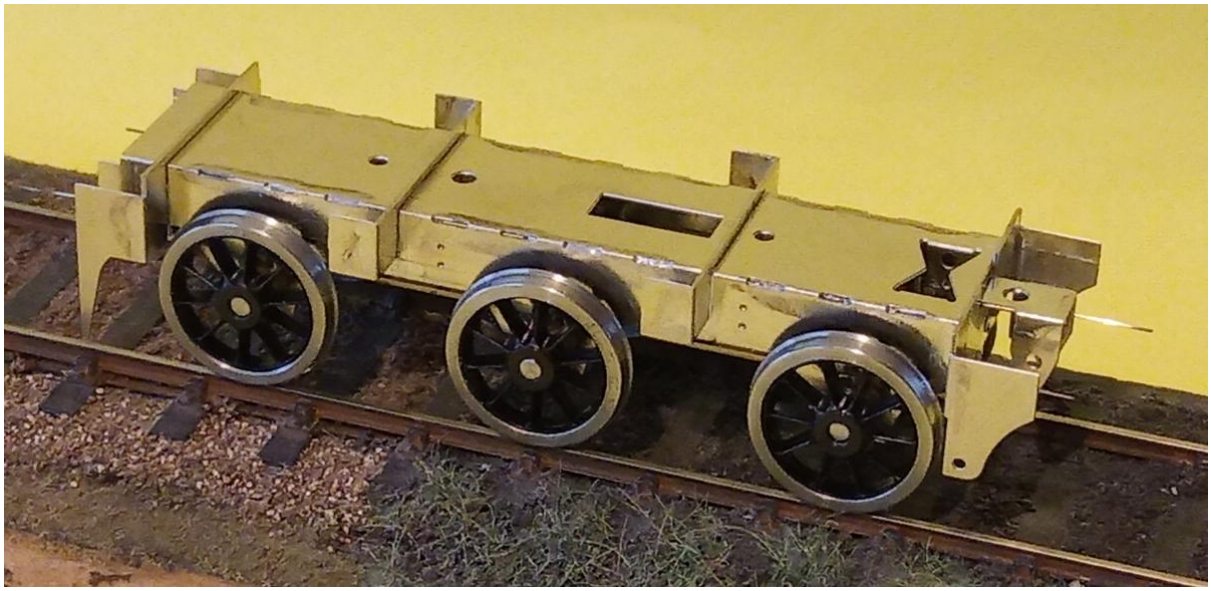
Fold up spacer T3D of choice (3500 or 4000) and fit at slot D with the guards irons facing to the rear.



Fold up the spring carriers (T4) and fit to the High Level MiniBlox bearings. Fit the bearings to the chassis. Arrange them so the ears on the spring carriers face forwards and mark the bearings to denote which axle they are on. If you remove them, you will then know which axle they need to go back on. Adjust the rear of the hornguides so the yare a good fit on each bearing and solder the hornguides to the frames, taking care not to solder the bearing in place.



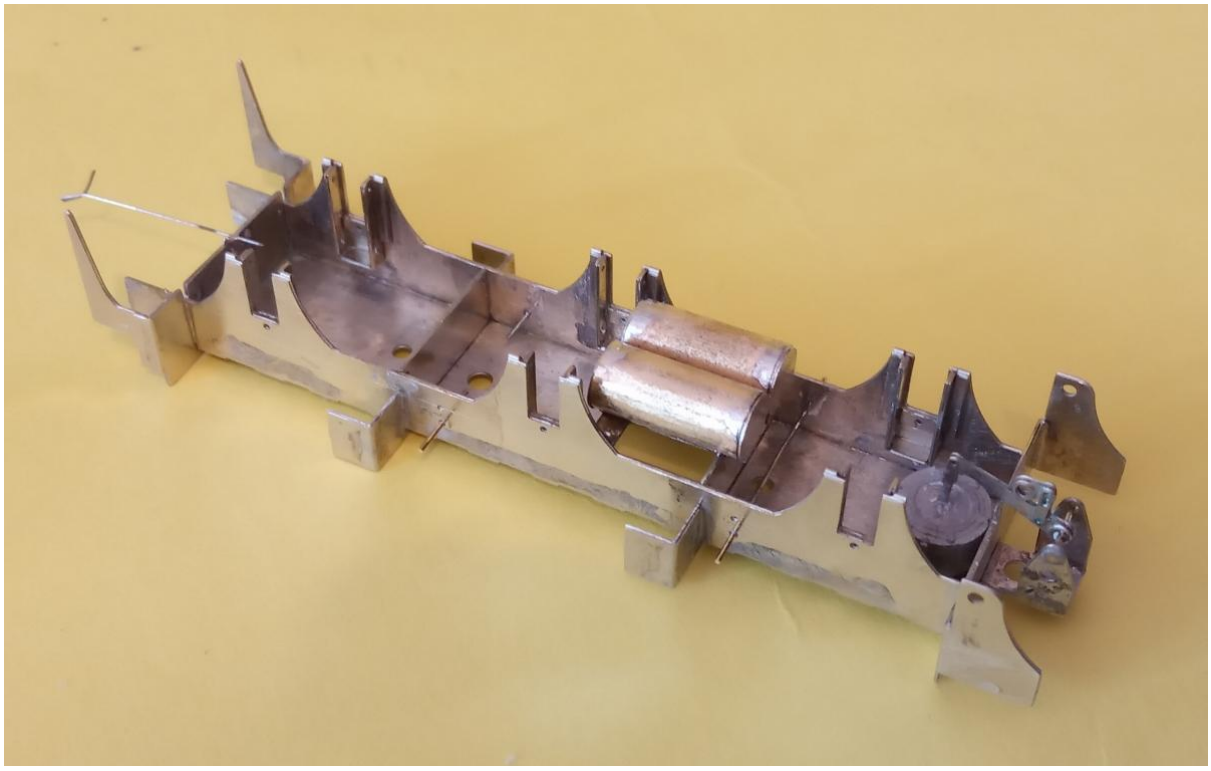
Fit the wheels and 0.009” CSB wire to check you have a smooth running chassis. 2mm washers (Y) are included to take out any side play.



There are two small brackets next to the A etched on the subframe. They are shaded yellow on the parts diagram. These are brackets for a vacuum cylinder and are for the 3500 gallon tender only. Fold up if you’re modelling a 3500 gallon tender.

For a 3500 gallon tender, fold up the vacuum reservoir formers (T5 (3500)) and fit two length of 12.45mm long 7/32" x 3/16" tube for the reservoirs. Fit to the subframe. There is a slot on the reservoir formers that locates on spacer T3B. The other end rests on the two small lugs attached to the axleguard on the centre axle.

No reservoirs are included for the 4000 gallon tender as they are not visible between the frames.



Brakes

The brakes (T6) for both 3500 and 4000 gallon tenders are broadly the same. They consist of three layers at the shoe with the hanger layer in the middle. For the 4000 gallon set there are washers that need adding to the outside of the bottom of the hangers. Use 0.45mm wire for all the brakegear.

Assemble on the tender subframe with the brake shoe links (T7). The 3500 gallon brake shoes are hung from the uppermost of the pairs of holes in the sideframes and the 4000 gallon brake shoes from the lower one. The brake shoe links go behind the wheels. See Fig.Ta for the general arrangement.

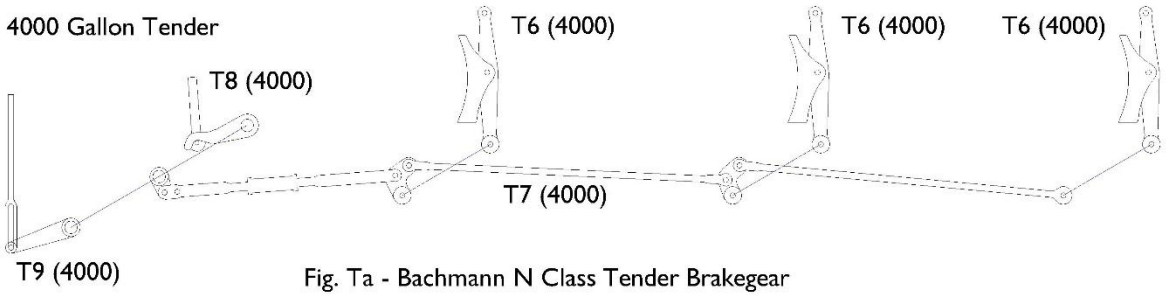
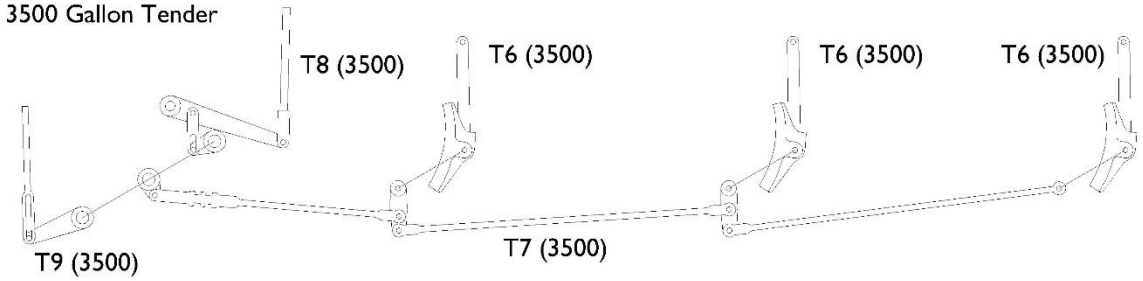
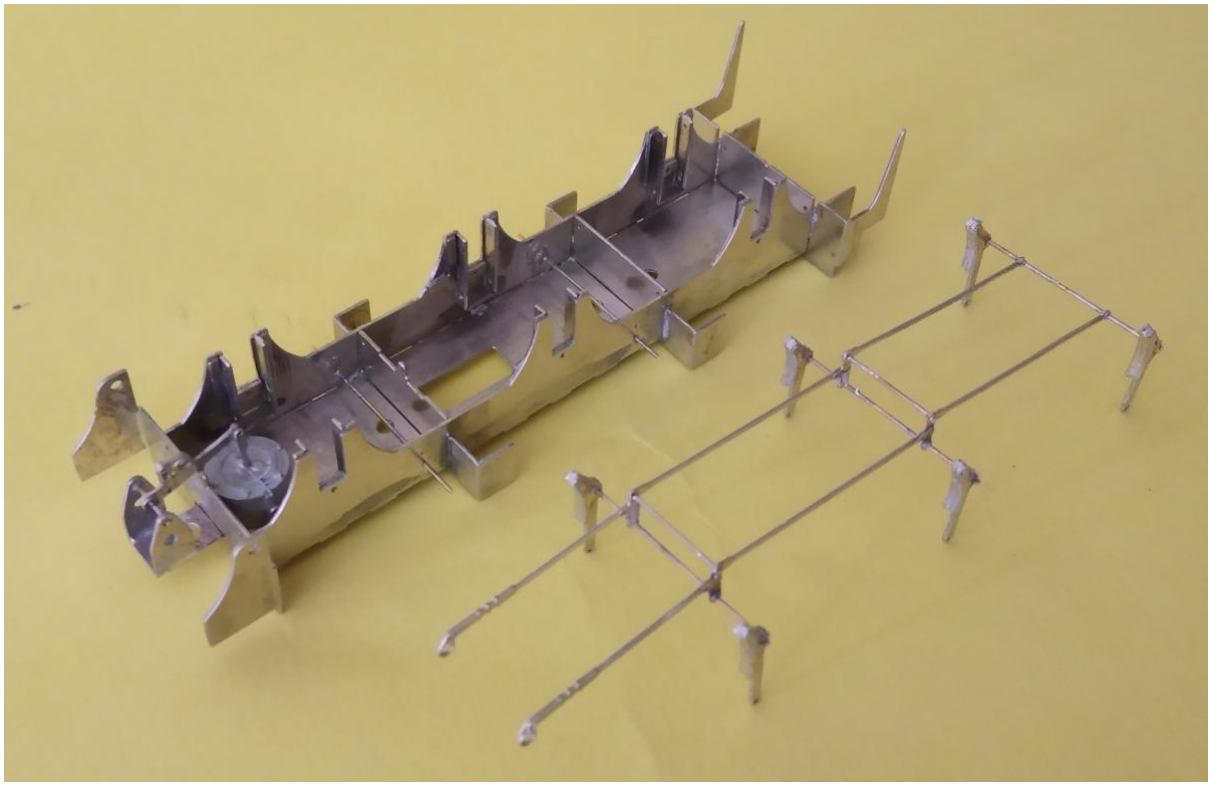


Fig. Ta - Bachmann N Class Tender Brakegear





Brake Cranks and Vacuum Cylinders

3500 gallon tender
The vacuum cylinder links (T8 (3500)) come in two halves. Use 0.45mm wire to align when soldering together.

Drill out the centre of a vacuum cylinder casting using a 0.6mm drill and fit the cylinder in place between the brackets shaded yellow on the parts diagram.

Hand brake link (T9 (3500)) fold double. Again, use 0.45mm wire to align when soldering together.

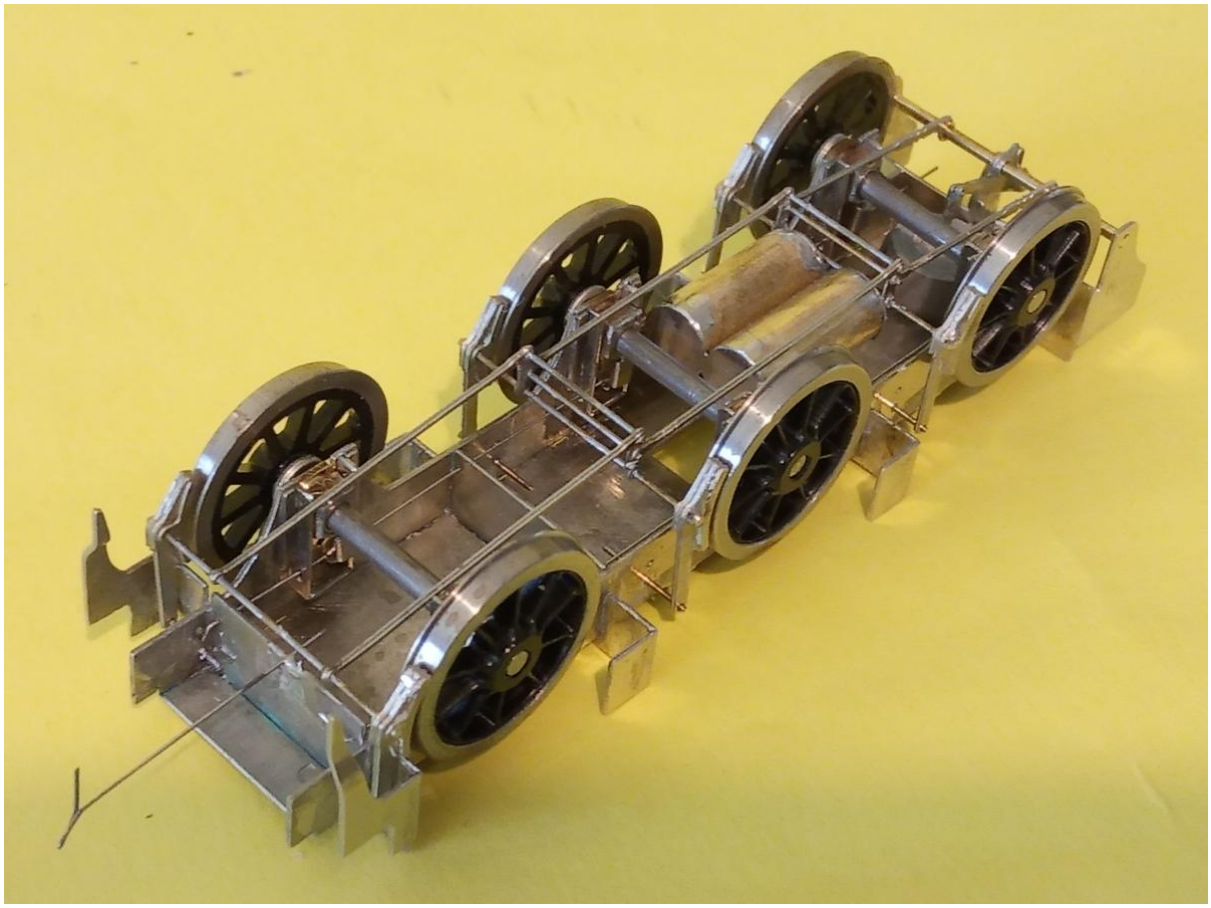
Fit the vacuum cylinder links and handbrake links with 1mm wire for the brake shafts. The vacuum cylinder link should fit into the vacuum cylinder casting. It may need shortening depending on how deep the hole is in the casting.

4000 gallon tender
The vacuum cylinder links (T8 (4000)) are designed to be folded double and there are 2 sets. Use 0.45mm wire to align when soldering together.

Drill out the centre of both vacuum cylinder castings using a 0.6mm drill. Fit the cylinder to the outside of the brackets shaded purple on the parts diagram. For some inexplicable reason the outer brackets for the vacuum cylinder have gone missing. You will need to fix it in place as best you can. The missing part of the bracket will be hidden when the cosmetic sideframes are fitted

The hand brake link (T9 (4000)) folds double. Again, use 0.45mm wire to align when soldering together.

Fit the vacuum cylinder links and handbrake links with 1mm wire for the brake shafts. The vacuum cylinder links should fit into the vacuum cylinder castings. They may need shortening depending on how deep the hole is in the casting.



Assembly

Fit the subframe to the tender body. Test fit the cosmetic sideframes and adjust if necessary, so that they fit. Once you are happy glue them in place.

A Note on AJs

If you wish to fit AJ couplings there is a small bracket on the bottom of part T3A to which you can solder the coupling.

Justin Newitt - September 2022