



## HIGH LEVEL KITS J50 CHASSIS KIT

*This chassis kit is designed to fit straight under the Hornby model, but can be modified for use with the old Lima bodyshell. J50 engines covered (using the 1946 numbering system) are listed as follows: Part 2: 8901-8919 (GN), 8920-8940 (LNER). Part 3: 8940-8977. Part 4: 8978-8991. Hornby also offer a number of bodyshell variations and so we recommended the study photographs in order to pick a specific prototype on which to base you own model.*

*We saw little value in offering a 'OO' version of this kit and so aimed it squarely at EM gauge and P4 builders who, it is assumed, have some knowledge of chassis construction, soldering, modelling practices and techniques. It builds as CSB-only, with all the leg-work – chopping out of hornblock cutaways, working out wire runs, marking-out and fixing of CSB anchors – already done. Also, as a direct response to customers' requests, the cosmetic springs are completely removable, so the wheelsets can be dropped out without disassembling them. Hornblocks and CSB tags (although not the carrier wire) are included and we can also supply a suitable motor.*

*Note that whilst want you to enjoy building your kit, it's important to remember that even railway modelling has its risks. Frets contain sharp edges, soldering irons get very hot, adhesives may give off toxic fumes, knives and files are designed for cutting. Please be careful . . .*

**Add the parts in the order stated or assembly will be difficult, if not impossible...**

Start by clipping out the **complete brake jigs** (see shaded area) and be sure to leave all the brake parts contained within them in place - there are other parts located here, and it's okay to remove these when they are called for in the instructions, but the brake rod assemblies must be built with the parts **still attached to the fret**.

### Frames

Remove the Frames (1 & 2 in Fig. 1) open out the holes for the brake hanger pivot holes (A) at the top, to suit 1.2mm tube. If using plunger pick-ups, open out their locations as well (B).

Decide **which version** of the J50 class you're going to build. If you leave the frames as they are and don't add overlays, you'll end up with a **Part 3 engine** - these were the most numerous of the class - but minor alterations will allow you to model part 2 and 4 locos as well (see Figures 2 to 6).

For **all types**, punch out the double row of rivets in the midway section of the frames.

For **part 3 and 4 locos** form the rivets at the front of the frames.

For **part 3 locos only**, at the rear end, punch out the rivets on the frames.

Make the 90 degree bends in the Front and Rear Spacers (3 & 4) and the Spring Carriers (5 x3). You can now assemble the chassis using the front and rear spacers, making sure you **include the spring carriers** and noting their orientation. Solder all these parts in and then spring the chassis frames apart far enough to clip in the Midway Spacer (6) and secure with solder.

Slide the front of the Firebox Sides (7 & 8) into place. Using a 0.4mm bit, open out the small CSB holes (C) in the Wire Carriers (9 x2) and then fit them through the rear of the firebox sides and into the frames, making sure they go fully home. Solder all these bits to the chassis. Bend the Ashpan Halves (10 & 11) to shape then solder these into the slots in parts 6 and 9.

Cut 3 pieces of 1.2mm O.D. tube to length (18.1 for EM or 19.6 for P4) and solder centrally between the brake hanger top holes (A) at the front and rear, but **leave the midway one loose** for the time being. Fit the brake spacers (parts 12 to 15 - EM marked with a **small dot**, or P4 **plain**), bending the backs around when in place and ensuring they face the correct way.

## Frame Differences

If you're modelling a **Part 3 loco** (Figs. 3 & 5) there's no need to remove anything from either end of the frames, or to add any overlays. For all other types, see below.

## Front End Variations

For the **first 20 Part 2** locos only, file the railguard strengtheners (D – Figs' 1 & 2)) from the front of the frames. Punch out the rivet detail on the Front Frame Overlays (16 & 17), tin the backs, slot them over the ends of the brake tubes and solder the overlays in place.

For **later Part 2s, Part 3 and Part 4** locos, leave the front end as it is.

## Rear End Variations

**Part 2 locos** (Fig. 4) require you to remove the rear brak shaft journals (E) from the frames themselves. File the railguard strengtheners from the overlays (18 & 19) filing up to the half-etched guidelines.

**For Part 4 engines**, file both the brak shaft journals 'E' and railguard strengtheners 'F' from the frames.

For **Part 2 and 4** engines, solder the rear overlays in place.

**For all types** (including part 3s) add the Journal Backs (20 x2 in Fig. 1) to the rear of the journal locations.

## Siderods

The side rods can be built to represent either plain or fluted types, depending on which side you have facing outwards (Fig. 10). **Part 2 locos** had fluted rods, but **part 3 and 4 engines** could have had either type, so you will need to refer to photos before building.

Layer up the siderods to make handed pairs (parts 21 to 26). Make sure the knuckle joint is able to move. After cleaning up the edges, add the small cork details using 0.3 or 0.4mm wire.

Assemble the **hornblock units** according to their instructions, then use short lengths of wire to position the first pair of hornblocks at the middle locations – these will be **SpaceSavers** and the rest are standard units. Solder the middle pair in place and then use axle jigs in conjunction with the siderods to position the remaining hornblocks.

We recommend you mark or scribe the axle locations on the square bearings before removing them. Fit CSB tags over the bosses on their back faces, making sure the block is orientated the same way as it was in the chassis.

Detail the eccentrics on the Slidebars (27 – Fig. 1) using 0.5mm wire and open out all the holes (C) at all anchor locations to accept CSB spring wire. Fold the slidebars to shape, but leave the fold-up carriers flat for the time being. Spring the chassis sides slightly to allow you to fit the assembly - location is further assisted by using a length of 0.7mm wire through holes 'G' - and solder the slidebars in place at the front and rear. Finally, fold up the carriers, so they are vertical in the chassis. Once this part is soldered in place you can fit the remaining brake hanger tube, centrally in the frames as you did for the front and rear (above).

With all the CSB points now in place, you could try running a wire through all the locations (C in Fig. 1), and through the **middle holes** in the CSB tags themselves. The wire itself is not supplied as the gauge (thickness) depends on how much weight you want to put in your loco body. If you also decide to trial-fit the wheelsets, you'll need to disassemble the middle pair to fit the gearbox later.

Bend up the Front Body Mount (28), solder the M2 nut in place and then fasten the mount up inside the body, bridging across the two threaded pillars and using the model's original fixing screws. Add the Rear Mounting Plate (29) to the rear spacer then try the chassis in place – for P4 models, you may need to file off the small radius above the rear brake pivot hole, or, if you prefer, make tiny notches in the underside of the footplate to accommodate the two small bumps above the hanger. Trial-fit the chassis, securing with an M2 bolt at the front and the model's existing rear fixing screw at the rear.

Slot the Beam Braces (30) into their locations at the chassis ends and bend up the tabs inside the frames. If your model doesn't have frame overlays fitted then Packers (31) will also be needed. Follow up with the Rivet Strip details (32 x4) which run along the top edges of the braces.

Punch out the rivets on the handed Guard Irons (33 x2 & 34 x2) and solder these in place, using the strengtheners for location, then very carefully bend them to shape so they offset by about 1mm. Engines with frame overlays will require Guard Iron Packers (35) this time fitted between the layers, as shown in Figure 4.

Study Figs 4 to 6 plus 9 & 10. **Part 2 and 4 locos** had twin steam brake levers facing backwards, whilst **part 3 engines** (See Fig 1) had one, shorter, single, forward-facing lever.

Identify which brake arrangement you'll be using, make up the lever assemblies using the handed Steambrake Levers (36 x 4 or 37 x2) and then use a 30mm length of 1.6mm diameter rod to represent the brake crosshaft. Slide this through the frames, the steambrake lever(s) and include the small actuator(s) 38. Adjust the lateral position, so the shaft end that protrudes almost butts up to the rear of the steps (**Part 2 locos**, left and **Part 3 & 4 locos**, right) when the body is fitted, and then solder the rod to the journals.

The single steambrake lever (**Part 3s – Fig. 1**) can be soldered in place, roughly horizontal and on centre of the loco, facing forward. You can, if you wish, run a very short length of wire vertically from the end of the lever, but this is best fitted after the spring assemblies in order to check there is clearance.

For twin levers, (**Parts, 2 & 4 engines, see Fig. 4 & 6**) fit these longer levers facing rearwards and in line with the holes 'H' in the spacer (4). On some photos, brake cylinders are visible and you can represent this using suitably-sized tube. Run 0.5 wire through the rod ends and up to the holes in the spacer and solder in place.

Slot the Set-up Bars (39 x2 in Fig. 1) over the outer ends of the crosshaft and, with a 0.5mm wire through the frames at location 'J' - this will be one of two holes, depending on the journal position – and slide a wire through the bottom holes to set the radial angle of the actuator(s). Before soldering the actuator(s) you'll need to set the lateral position on the shaft – for twin-lever engines the distance between the bosses of the actuators should be 9.4mm for EM and 10.6mm for P4; for single-lever brakegear the actuator boss side face should be 4.2 (EM) or 5.7mm (P4) from the inner face of the LHS frame.

Solder together the Handbrake Lever halves (40, 41), detail the pivot points using 0.5mm wire and then slot the completed assembly over the protruding end of the brak shaft. Locate the top of the lever using a length of 0.7mm wire - the diagrams show which hole for each chassis type - solder the wire in place and cut off the excess just inside the chassis' inner face. Solder the lever assembly to the shaft and trim shaft ends slightly proud of the etches.

Refer to figure 1. Bend up the Spring Hangers (42 x3), fold over the Spring Backs (43 x6, bend lines go on the outside of the bend) and solder these to the backs of the springs. Slide these assemblies into their location slots (X goes into X and Y into Y) where each can be secured using a single length of 0.5mm through holes 'Z' wire, bent over in-situ. **Don't solder** anything in place.

### Brakegear assembly

Two distinctly different types of **pullrod arrangements** were fitted to J50s and parts for both are included.

**Part 2s had twin pullrods**, running parallel with the frames, behind the backs of the wheels.

The later **compensated** brakegear, which was more common and fitted to **Part 3 and 4 locos**, involved a single, central zigzagging rod arrangement with complex linkages to distribute the forces evenly.

For both types, **do not solder anything** unless the instructions specifically say so. During assembly, the Brake Stretchers **must be left in place** in the jig in order to set them at the correct distance apart.

### Part 2s, Twin Pullrod Brakes (Fig. 7)

Identify the correct Brake Stretchers Bottoms (44 to 45) for the gauge you're modelling, and mark them with a coloured pen to **avoid accidentally removing** them. Now you can remove all the other parts from the fret, but be sure to **leave the marked stretchers in place**.

Invert the fret, so the **triangular marker is uppermost**, and run a length of 0.5 wire, about 100mm long, through the grooves in the stretcher Bottom halves and tack it in place. Do this at both sides then, after tinning them, add the Stretcher Top Halves (46 & 47) sandwiching the wires, and solder them in place.

Using notches 'K' (marked EM or P4, depending on gauge) cut a wire to bridge between them and then trim the back end of the two longitudinal wires (the pullrods) so they stop about 0.5mm short of this bridging wire.

Open out the holes in the Rod End Forks (48 x2) and form around a drill bit, or suitable piece of metal, so you end up with a crescent shape with a 0.5mm gap between the inner faces. Push these forks over the ends of the pullrods and slide the bridging wire through their rearmost holes as you locate it back into notches 'K'. Temporarily solder this wire into the notches to hold it in place as you solder the ends of the pull rods securely into the forks, but do **not solder the bridging wire to the forks**.

After cleaning up the rods clip away the jig, remove the bridging wire, but make absolutely sure you **don't remove the rectangular hanger location pins** at the very ends of the stretchers.

### **Part 3 & 4 Brakes (Fig. 8)**

Identify the correct Brake Stretchers (49 to 54) for the gauge you're modelling, mark them with a coloured pen to **avoid accidental removal** and then clip out all the other parts from the jig area.

Open out the holes in the Brake Stretchers (49-51) still in the jig) the Brake Stretcher Bottoms (52-54, according to gauge) to the sizes shown. Using short lengths of wires through the holes for location, solder the bottoms in place, under the Stretchers. Leave the location **wires slightly proud** at the underside - they can be filed to represent the linkage pivots - with a greater amount (about 1mm) protruding at the upper side to allow for location of the top details (see below).

For front and midway diagonal pullrods, cut pieces of 0.5mm wire to exact length, so they fit into the notches and bridge between the stretchers (49 – 51) and solder these in place.

You'll notice there are four notches in the fret at location 'K'. Mark the one you need in accordance with the loco **'Part' type** you're modelling and, marked at the opposite side of the jig, the **gauge** of your chassis. Cut a length of 0.5mm diameter wire, so it bridges between the relevant notches, and another piece running from the rear slot in part 54 and stopping about 0.5mm short of the bridging wire (across 'K').

Open out the holes in the Rod End Fork (48 x2) and form around a drill bit, or suitable piece of metal, so you end up with a crescent shape with a 0.5mm gap between the inner faces. Push the fork over the ends of the rear pullrod (running from part 54) and slide the bridging wire through its rearmost hole as you locate the wire back into notches 'K'. You can temporarily solder this wire into these notches to hold it in place as you solder the end of the pull rods securely into both the fork and rear stretcher, but do **not solder the bridging wire to the fork**.

Add the details, starting with the Front Shackle (55) positioned in line with the pullrod wire and secured with solder. Locate the remaining Brake Shackle Overlays (56 & 57) on the wires on top of the stretchers. The holes nearest the pull rods (and the one on the small front shackle) require short 'cosmetic' lengths so **take care** in order to avoid drilling through the actual rods. When in place, file the ends of the wires slightly proud of the etches at both sides.

Finish off by soldering the Brake Adjuster Halves (58) to the wire, as shown, file to shape to represent the hexagonal cants (nut shape) of the real thing. You can further enhance the appearance of all the rod ends by carefully filling the areas where the rods meet the shackles with solder and, for an even more prototypical look, file a 45 degree angle on the etches to represent the change of section, from round to rectangular.

After cleaning up the rods clip away the jig but make absolutely sure you **don't remove the rectangular hanger location pins** at the very ends of the stretchers.

## Brake Hangers

The fitting procedure for the brakes is the **same for all types** of J50 covered. Whilst they are still in the fret, tin the uppermost faces of the brake hanger rear layers (59 x6, Fig. 1) and then carefully open out the top and middle holes in all the brake hanger components to suit the wires shown. Leave the bottom holes as they are rectangular so they fit over the end of the brake stretchers.

Use 0.5mm wire, slotted through the middle hole, to locate the Front and Rear (60 & 61) layers and solder them together to make complete assemblies. Trim the wire almost flush at the front, with about 0.7mm protruding from the rear. Check the top hole is clear.

Slide a length of 0.5mm wire into the hanger pivot 'A' at the front wheel location - do not solder in place. Locate the tops of a handed pair of brake hangers on this wire lifting the rod assembly so you can engage the small pins at the ends of the front stretcher in the holes at the bottom of the hangers. Push the hangers hard up to the tube, and up to the stretcher, as you manoeuvre the rear of the rod assembly, so the rearmost hole(s) in the fork(s) line up with the actuator holes. Slot a 0.5mm wire through both the pullrod end fork and actuator - for **Part 2 and 3 locos**, with one single actuator; it helps to use one of the set-up bars to keep this wire perpendicular to the frames.

With everything still help in place, carefully tack-solder the front hangers to the stretcher, then view the chassis to check that the whole assembly is central, with the hangers equidistant from the frames and pushed fully home. If necessary, make minor adjustments as you carefully apply heat to the joints.

Go on to fit the rest of the hangers to the stretchers, then trim all the wires at the top of the hangers, so they are very slightly proud at both sides but do not solder any of them in place. File off any protruding locators at the bottom of the hangers. To stop the wires from working loose, you can induce a slight curve in them.

Check the clearances between the shoes and the wheels – it should be set at the correct distance from the wheels. You can remove the brakegear by pulling the wire out from the rear end of the brakegear and sliding out the loose wires from the tops of the hangers.

## Gearbox (Fig. 12)

Open out each of the holes in the Gearbox Etch (62) to accommodate the shafts, bushes and wire shown in the diagram and remove burrs. Once assembled, the gearshaft is fixed with the gear free to revolve.

Solder the 1/8in bushes into place with the shoulders at the same side as the bend lines. Bend the gearbox shell to shape, as shown and strengthen the inside corners with fillets of solder. Brace the gearbox using a length of 1mm wire. Bend the Stage 1 Spacer to shape ('L' in Fig.12) using a length of 2mm shaft to line up the holes.

Cut the 2mm gearshaft to the overall width of the gearbox. Wear effective eye protection – cutting discs can and do disintegrate if they snag and remove any burrs.

Try the gearbox shell between the hornblocks and, if necessary, file some material from the outer ends of the gearbox bushes, so they fit between the bearings with some clearance, maybe half a millimetre or so.

De-flux and clean the gearbox, rinse and allow to dry. Check that the gears themselves are free from any dust or swarf left over from manufacture.

The stage 1 double gear will be one of three types - 15/10T (34:1), 20/10T (45:1) or 27/10T (60:1) – depending on the ratio of the gearbox. Fit the stage 1 gearshaft, the double gear and the Spacer Washer (63) test, then secure the shaft with glue.

Fit the Axle and 23T Gear into the gearbox and check clearances - the side faces of the gears must not touch when the axle is pushed fully sideways – and fit the Axle Shim (64) if required, then tighten the Grubscrew and ensure the gears revolve smoothly.

After testing the Motor, push the worm onto the motor shaft so its rear face is 3mm from the motor face – if the worm's tight, use a broach to open it out rather than forcing onto the shaft. Secure the worm with Loctite or adhesive, fit the motor to the gearbox, check the mesh - there should be daylight between the gear and the worm, but avoid having too much backlash - and then finally test under power.

When installed, the power unit will need to be restrained so it doesn't rotate around the axle, but it must also be able to move freely with the suspension. You may have your own preferred method of achieving this - a couple of strategically-placed blobs of bath sealant, above and below the back of the motor, should work pretty well, as long as there's a bit of clearance...

Alternatively, you could fit a flexible anchor, as illustrated in Figure 14. To do this, fit a suitably sized 'O' ring or elastic band around the motor, then bend up the Motor Anchor (65) - for EM, you'll need to remove the tags at the ends and file the width so it fits. Try the anchor in place between the frames, with an L-shaped length of 1mm wire slotted through its central hole and arrange the bits so the wire hooks under the band, as shown. To allow the motor to rock longitudinally as the wheels rise and fall, induce a slight, upward curve in the wire where it hooks under the 'O' ring. The exact positioning of these parts will depend on the motor type, but be sure to try the body in place before soldering anything and make sure nothing obstruct the run of the CSB wires.

The chassis, gearbox and brakegear are now ready for cleaning up and then painting.

### **Final Assembly (Figures 9 and 10)**

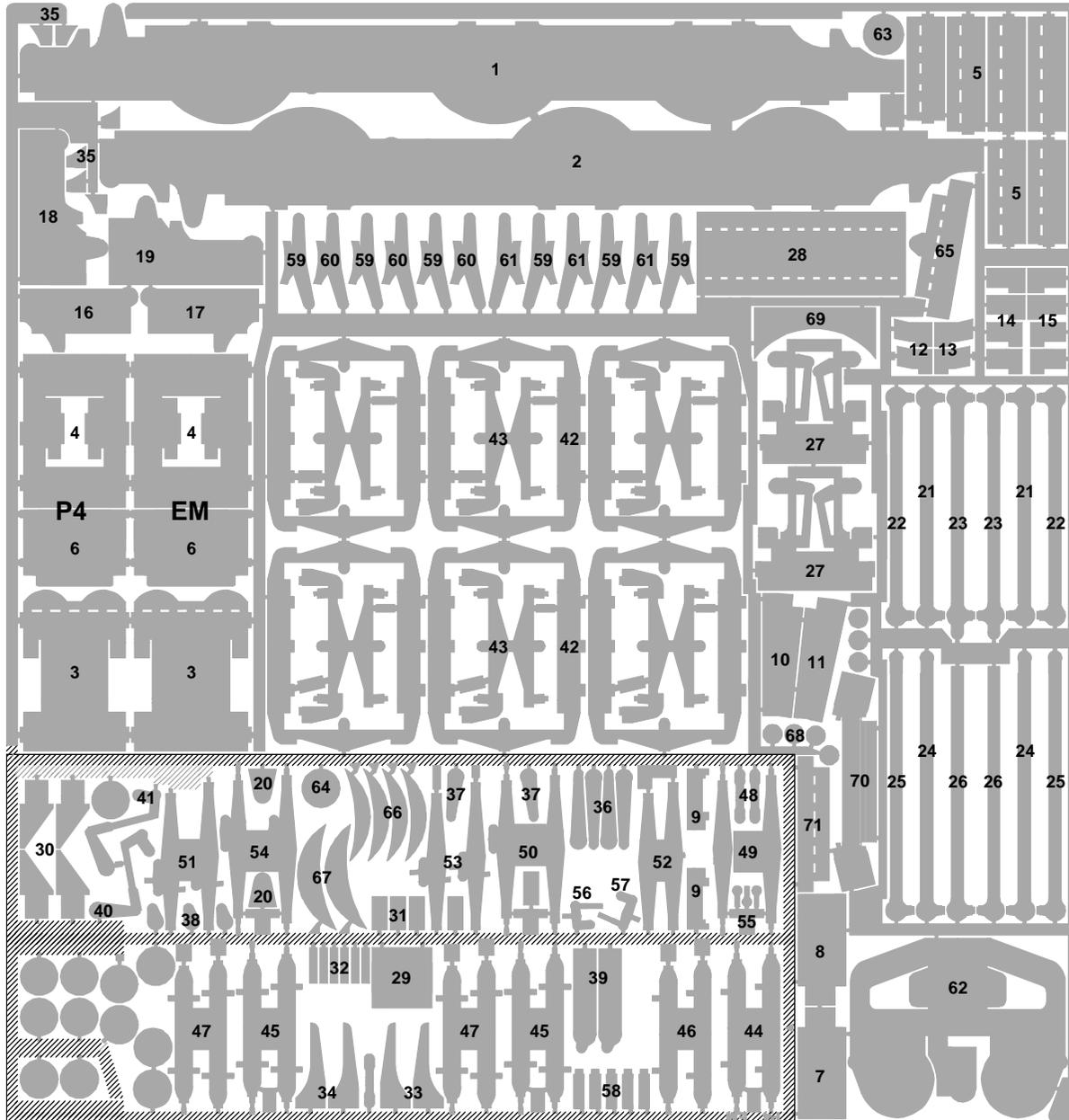
**Part 3 and 4 engines** were fitted with Balance Weights (66 x2, 67 x4) which should be glued in place using the Hornby model and/or photos as reference.

The kit includes axle washers of varying thicknesses, which can be used to limit axle sideplay. Fit all the hornblock bearings and follow up with the wheelsets, complete with crankpins, and not forgetting the motor/gearbox assembly with axle gear. Quarter the wheels, - the right hand cranks lead by 90 degrees – and add the bushes to the crankpins, followed by the coupling rods, and check for free running before fitting the securing nuts. Optional crankpin spacer washers (68 x6) are provided, but these only need to be fitted if the siderods catch the brake hangers.

Slide the spring wires through all the CSB locations and, when you're happy with the operation, bend the outer ends over to keep them in place. Centralise the rear axle and gearbox in the chassis, tighten up the grub screw in the brass gear and then test the chassis under power. Fix the spring hanger assemblies into their locations and secure using a piece of wire, as above, then add the brakegear assembly (also see above) and then re-test with the body on.

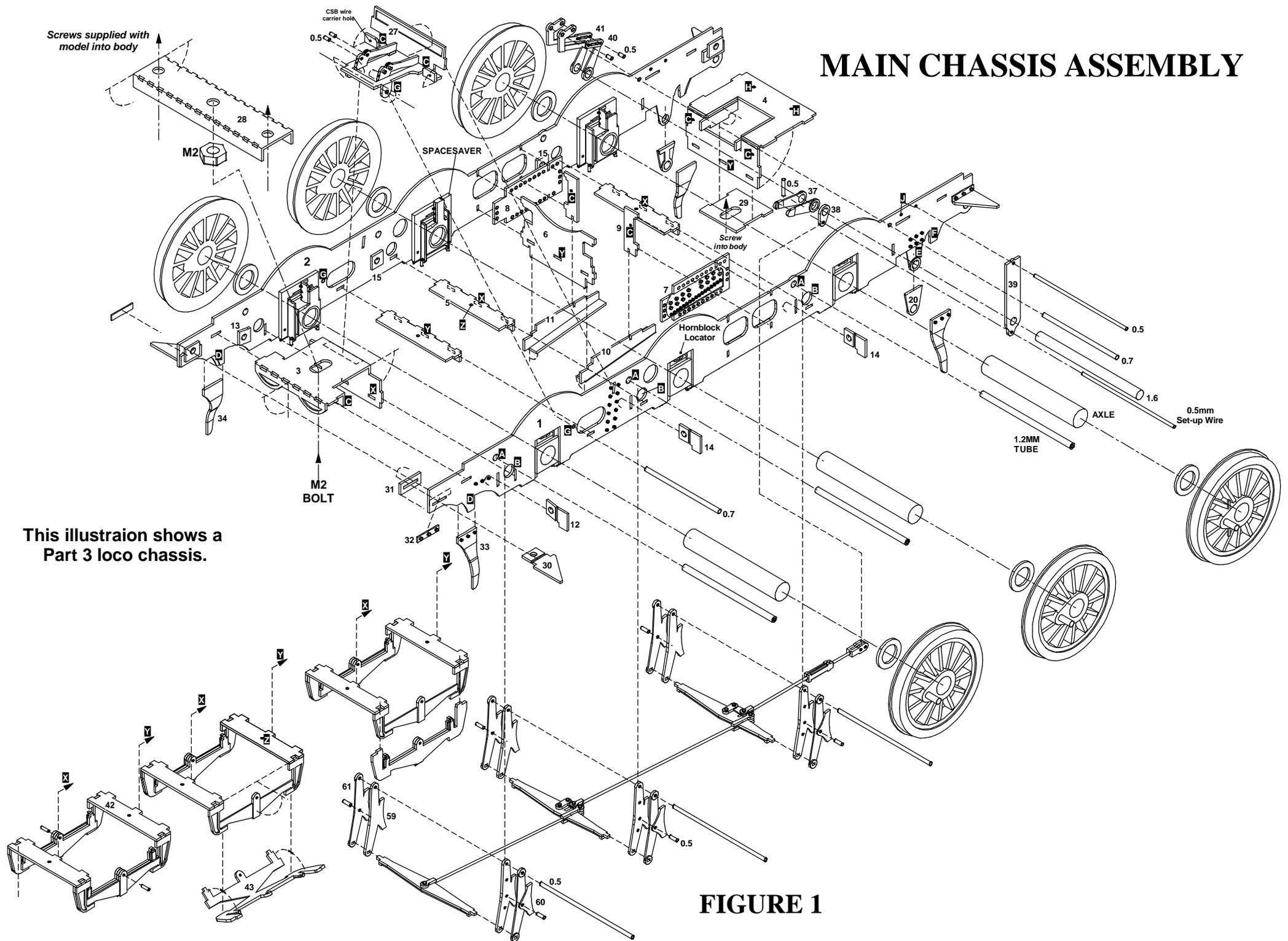
Turning your attention to the bodyshell, **early part 2 engines** had a flat Steam Chest Cover (69, see Fret Diagram) and this should be fitted flush with the front of the tanks, with Styrene glued across the back surface to fasten it to the inner, front faces of the tanks. Retrieve the separate valves from the donor body and fix in place, as per photographs. The front frames above the running plate will need trimming too, again, using photos for reference.

As far as we know, all other engines covered in our kit had a visible steam chest, located in the gap under the smokebox and, on the Hornby model, previously occupied by the cast chassis block. To model this feature, file a radius along the top edge of the Steam Chest (70 in Fig. 13) bend the main bend around a 1mm rod or wire (so the star marker is on the outside of the bend) and then fold the right-angled corners. Solder on the Backing Plate (71, curved to fit.) and then glue this assembly to the inner, front faces of the tanks, so the horizontal, front section is level with the footplate top.



1. Frame LHS
2. Frame RHS
3. Spacer, Front (EM/P4)
4. Spacer, Rear (EM/P4)
5. Spring Carrier x3 (EM/P4)
6. Midway Spacer (EM/P4)
7. Firebox Side LHS
8. Firebox Side RHS
9. Wire Carrier (x2)
10. Ashpan LHS
11. Ashpan RHS
12. Brake Spacer, Front LHS (EM/P4)
13. Brake Spacer Front RHS (EM/P4)
14. Brake Spacer, Mid/rear LHS x2(EM/P4)
15. Brake Spacer, Mid/rear RHS x2(EM/P4)
16. Front Frame Overlay LHS
17. Front Frame Overlay RHS
18. Rear Frame Overlay LHS
19. Rear Frame Overlay RHS
20. Journal Back (x2)
21. Siderod, Front, Outer, Plain (x2)
22. Siderod, Front, Outer, Fluted (x2)
23. Siderod, Front, Core (x2)
24. Siderod, Rear, Outer, Fluted (x2)
25. Siderod, Rear, Outer, Plain (x2)
26. Siderod, Rear, Core (x2)
27. Slidebars (EM/P4)
28. Front Body Mount
29. Rear Mounting Plate
30. Beam Braces (x4)
31. Brace Packers (x4)
32. Rivet Strip (x4)
33. Guard Iron Fr LHS, Rr RHS (x2)
34. Guard Iron Fr RHS, Rr LHS (x2)
35. Guard Iron Packer (x4)
36. Twin Steambrake Lever (x4)
37. Single Steambrake Lever (x2)
38. Actuators
39. Set-up Bars (x2)
40. Handrake Lever Half, left
41. Handbrake Lever Half, Right
42. Spring Hanger (x3)
43. Spring Back (x6)
44. Stretcher, Twin, Leading, U/side
45. Stretcher, Twin, Mid/Tr, U/side (x2)
46. Stretcher, Twin, Leading, Top
47. Stretcher, Twin, Mid/Trail, Top (x2)
48. Rod End Fork
49. Stretcher, Compensated, Leading
50. Stretcher, Compensated, Mid
51. Stretcher, Compensated, Trailing
52. Stretcher, Comp, Lead, Underside
53. Stretcher, Comp, Mid, Underside
54. Stretcher, Comp, Trail, Underside
55. Front Shackle
56. Midway Shackle
57. Rear Shackle
58. Brake Adjuster (x2)
59. Brake hanger, Rear layer (x6)
60. Brake Hanger, Front layer LHS (x3)
61. Brake Hanger, Front layer RHS (x3)
62. Gearbox
63. Stage 1 Spacer
64. Axle Shim
65. Motor Anchor
66. Balance Weight, Large (x2)
67. Balance Weight, Small (x4)
68. Crankpin Washers (x6)
69. Steam Chest Cover
70. Steam Chest
71. Chest Backing Plate

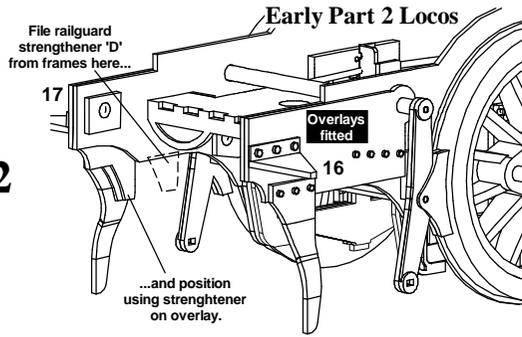
# MAIN CHASSIS ASSEMBLY



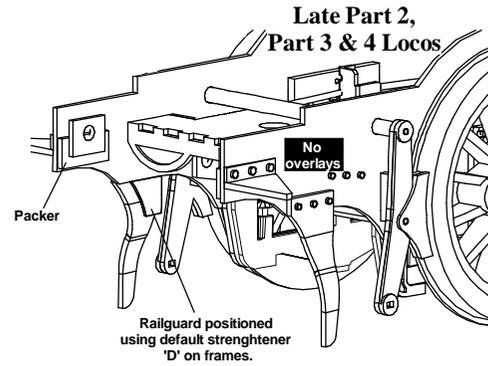
This illustration shows a Part 3 loco chassis.

FIGURE 1

**FIG. 2**

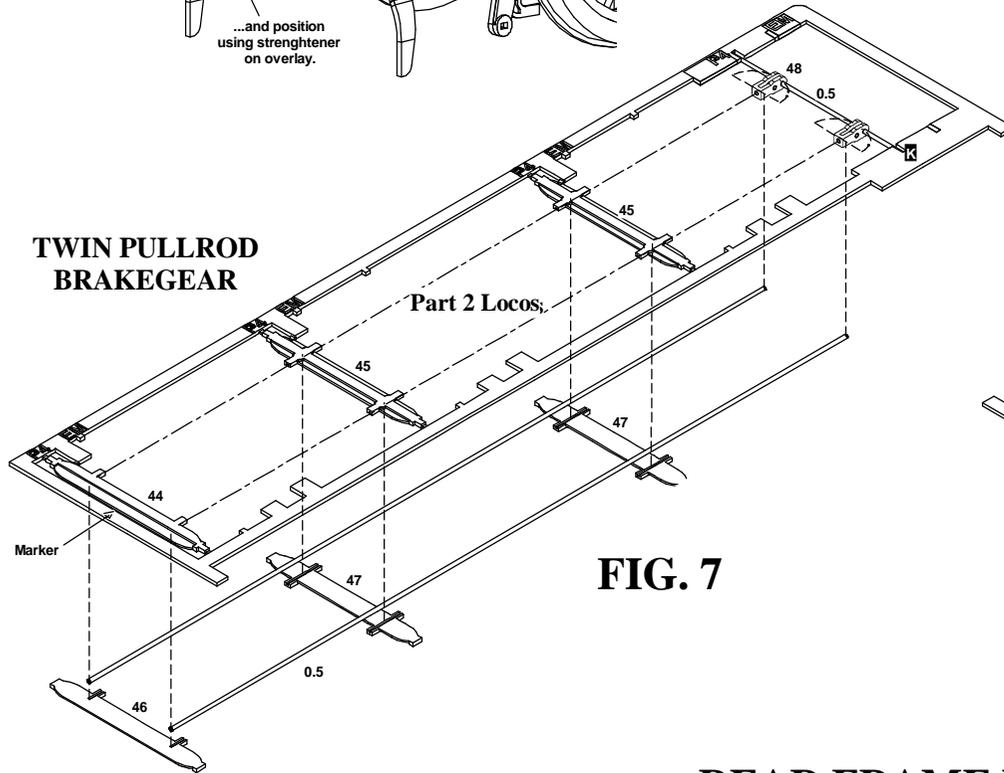


# FRONT FRAME VARIATIONS



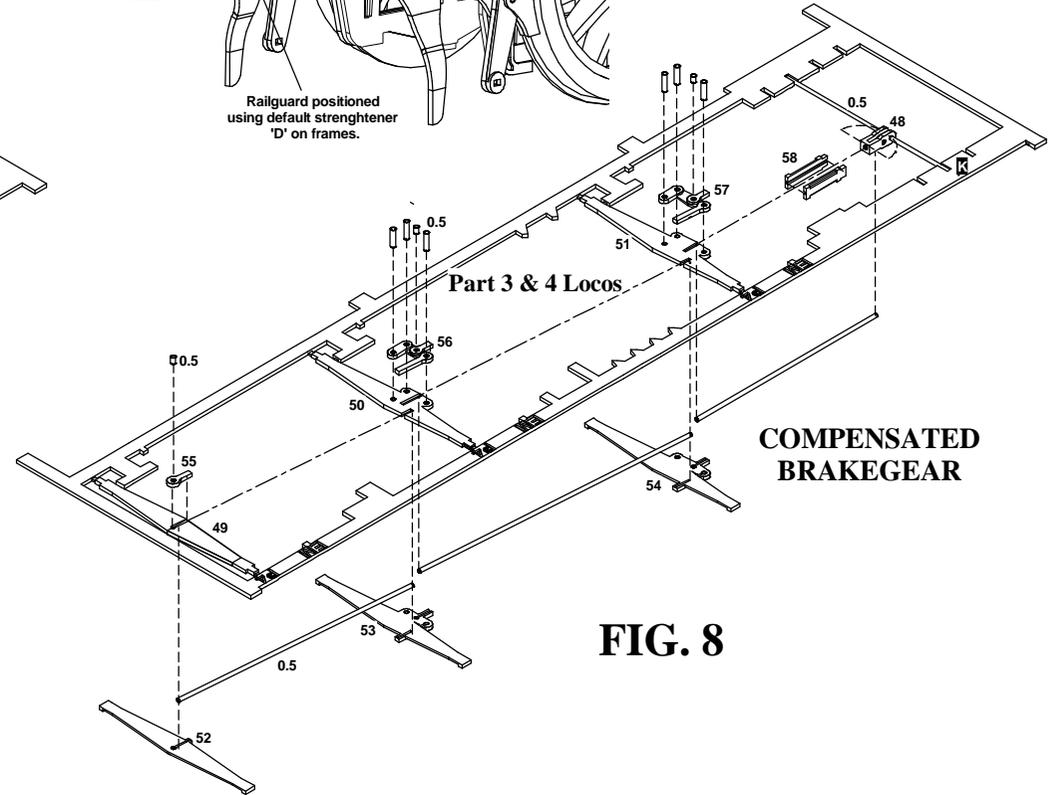
**FIG. 3**

## TWIN PULLROD BRAKEGEAR



**FIG. 7**

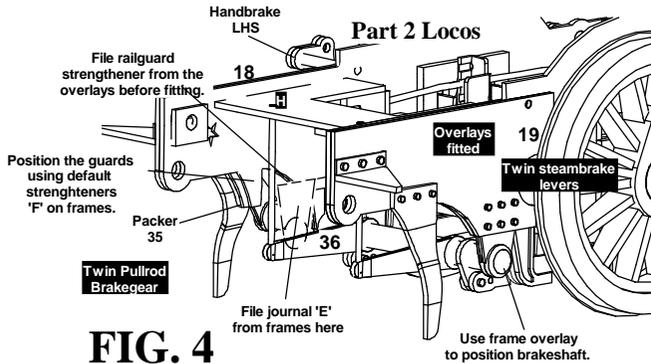
## Part 3 & 4 Locos



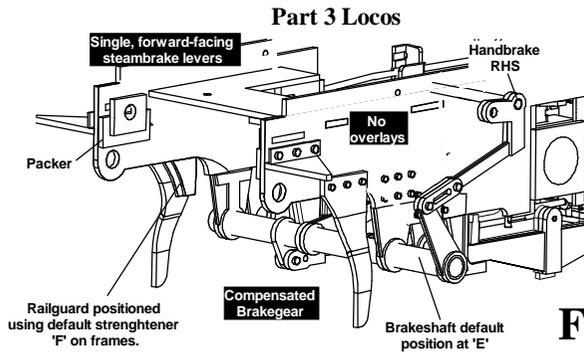
## COMPENSATED BRAKEGEAR

**FIG. 8**

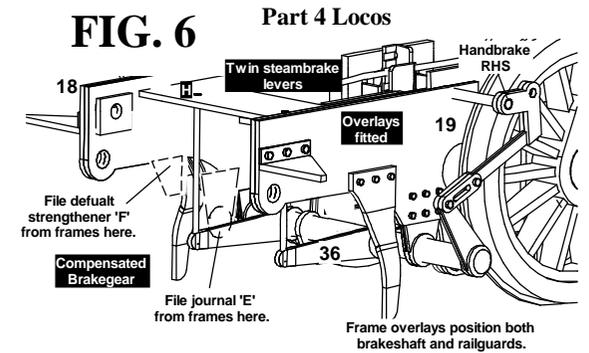
# REAR FRAME VARIATIONS



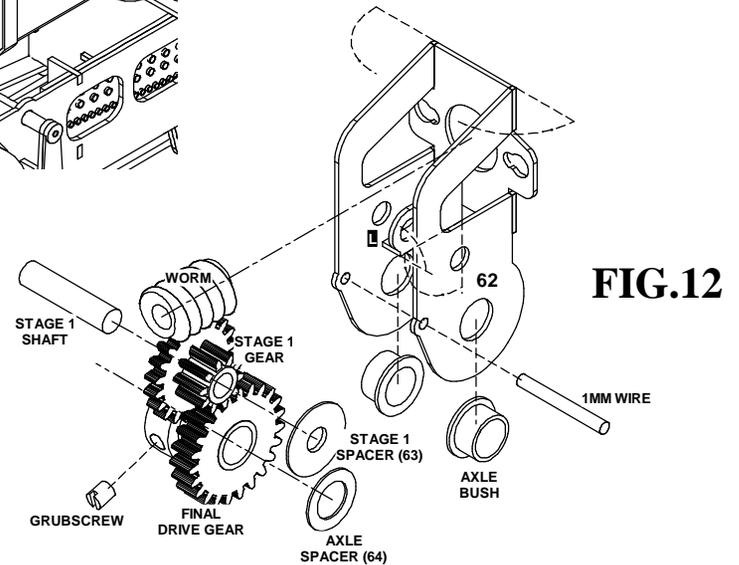
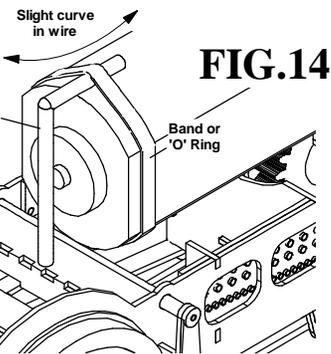
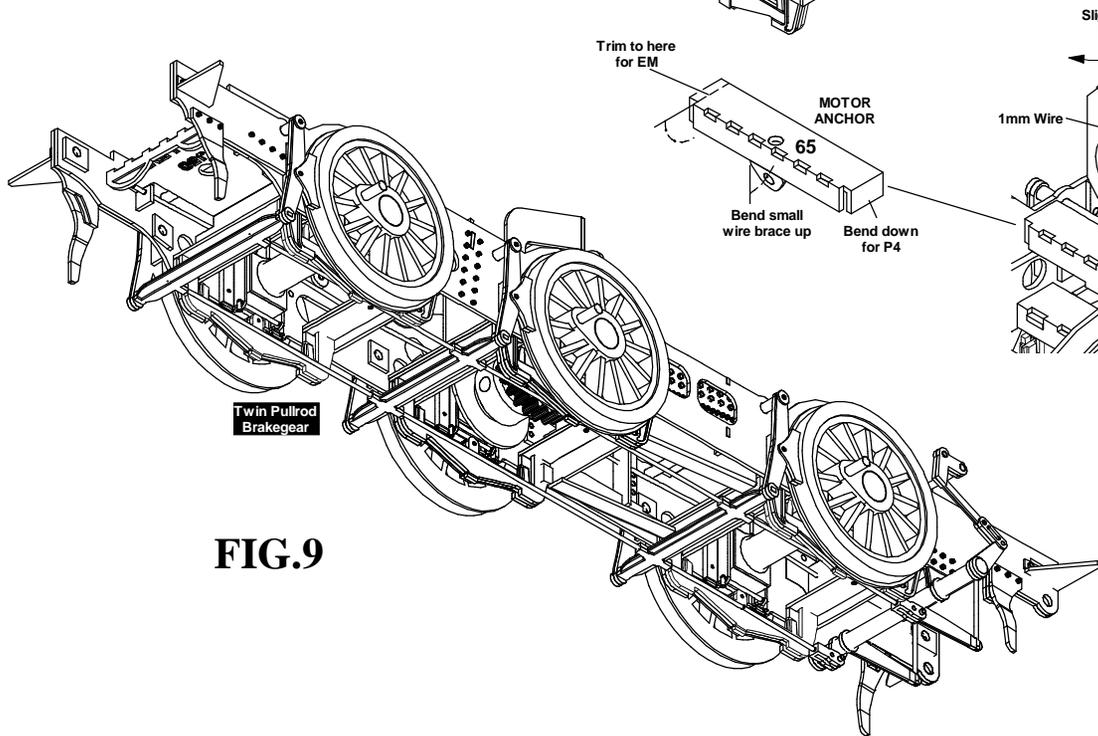
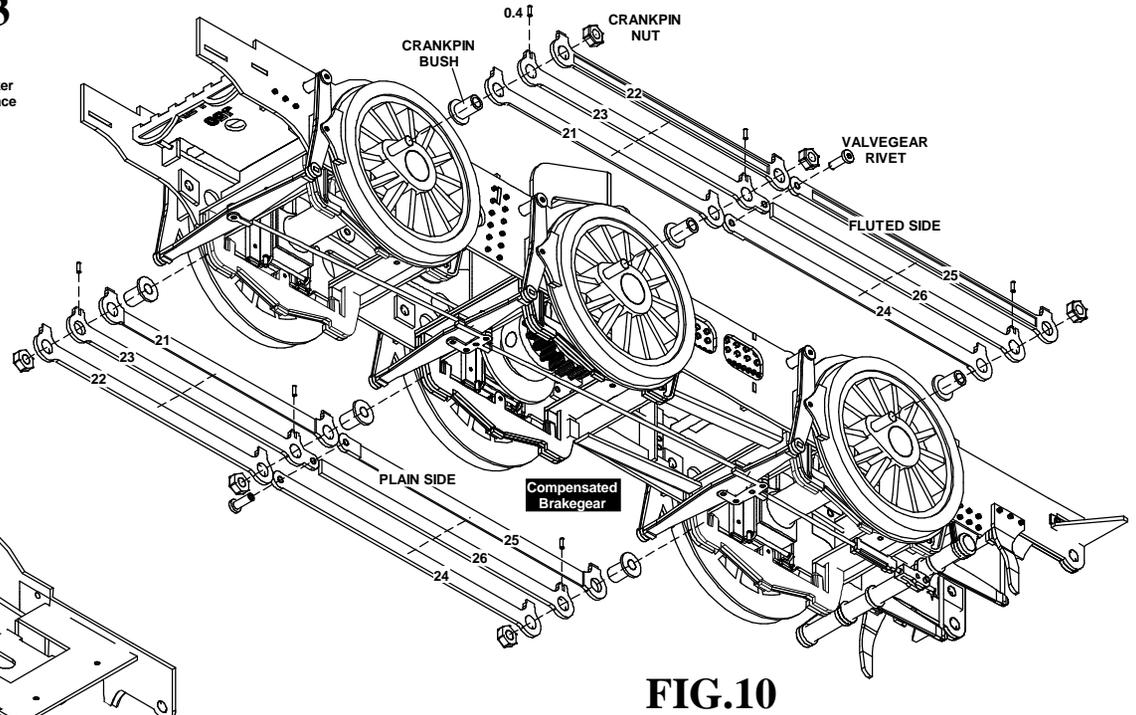
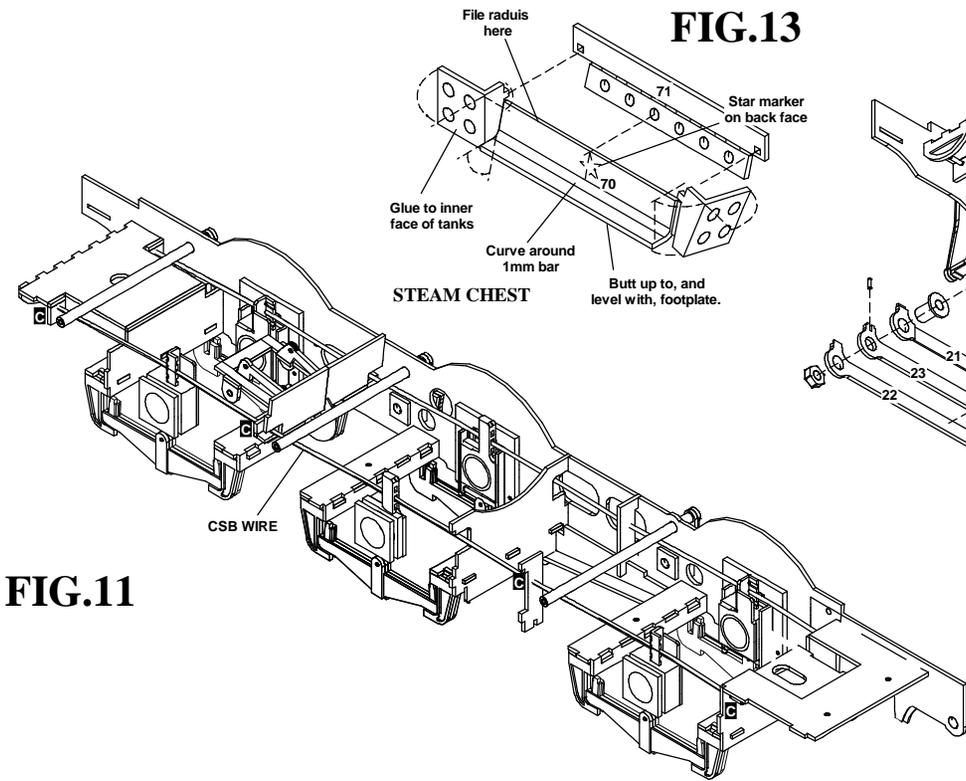
**FIG. 4**



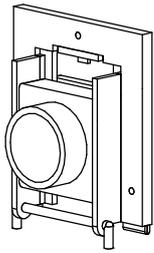
**FIG. 5**



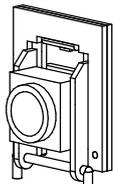
**FIG. 6**



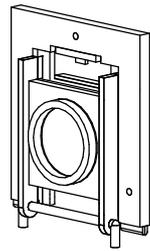
**These instructions cover three types of High Level Hornblocks:**



**STANDARD**



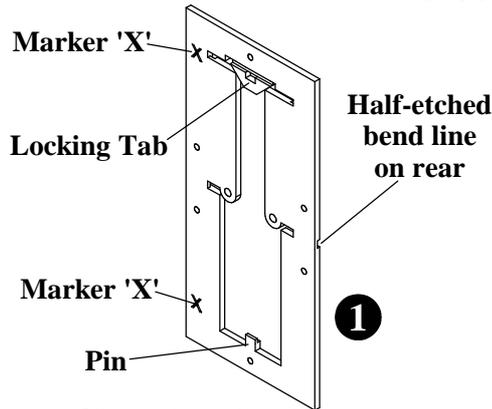
**MINIBLOX**



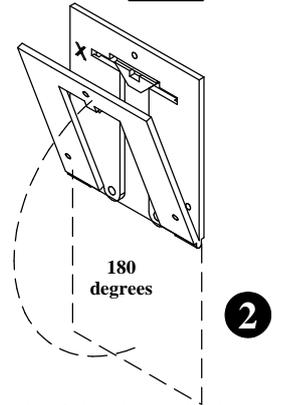
**SPACESAVER**

Although their size may differ, the procedure for folding the hornblock etch is the same for each type.

Fold the etch through 180 degrees, so the markers 'X' face each other. The half-etched line is on the outside of the fold.

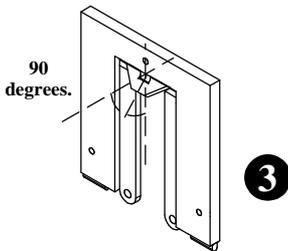


Clip out the etch and clean off any mounting tabs.

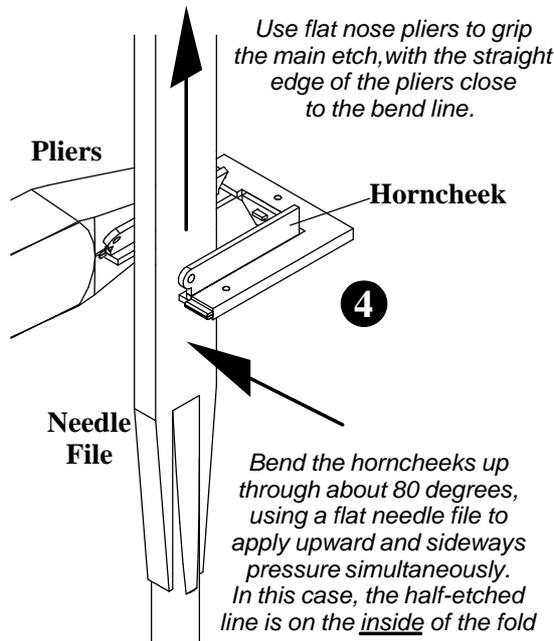


When it's folded, tap the layers between two pieces of hardwood, so they sit absolutely flat.

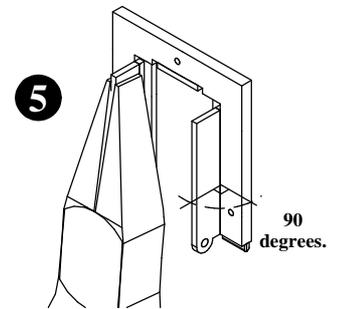
Hold the layers tightly together and fold the locking tab through 90 degrees, so it locates on the small pin.



The end of a flat, pointed needle file is a good tool for this job. The tab locks the layers together, eliminating the need for solder.



Bend the horncheeks up through about 80 degrees, using a flat needle file to apply upward and sideways pressure simultaneously. In this case, the half-etched line is on the inside of the fold



Finish off the horncheek bends so they are at 90 degrees. Check this through a magnifying glass and adjust as necessary.

**For SpaceSaver 'CSB' units, follow the instructions (overleaf) at this point...**

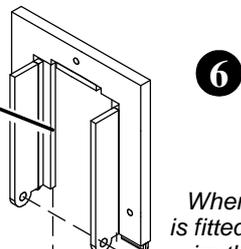
Use fine emery to clean up the bearing, remove any burrs and then try it in place - the groove on the block locates on the front layer of the etches.

If the bearing's tight in the etch, check that these edges aren't 'bottoming out' in the groove...

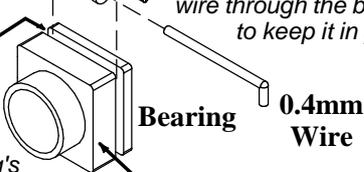
...If they are, use a file to remove the sharp 'cusp' from the edge of the etch...

... so there is clearance in this groove...

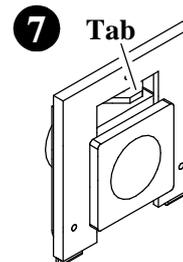
...then polish the bearing's side faces until it's a smooth, sliding fit in the etch.



When the bearing (and tag) is fitted, slot a length of 0.4mm wire through the bottom holes to keep it in place.



The completed assembly can now be soldered to the inside face of the chassis, using axle jigs. If you fit it with the bearing in place, make sure the sliding surfaces are lightly oiled, to prevent the bearing being soldered to the etch.



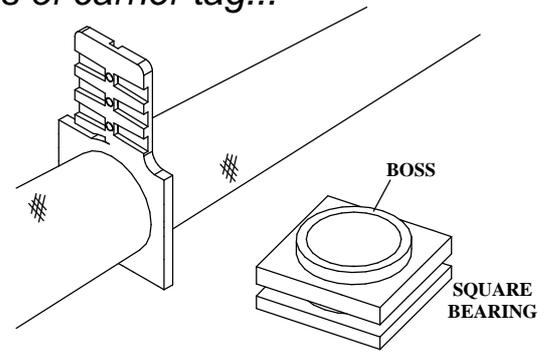
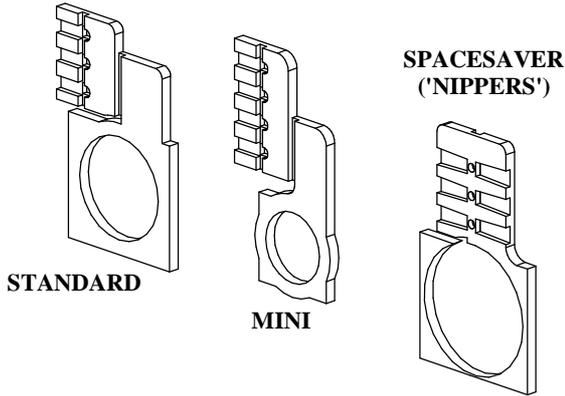
The top edge of the cut-outs on most loco chassis is 4mm above the axle centre. For 'Standard' and 'SpaceSaver' hornblocks, butt the tab up to the top of the cut-out, to set the unit at the correct height.

For MiniBlox, the top edge of the tab is 3mm above the axle centreline.

**To fit Standard or MiniBlox 'CSB' Tags, turn to the instructions (overleaf) at this point...**

For all types of carrier tag...

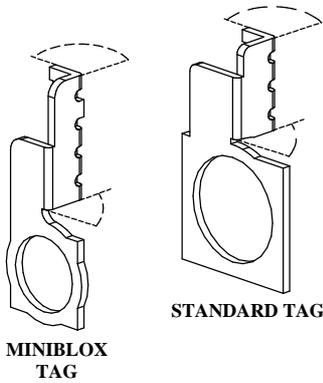
Three types of 'CSB' Carrier Tags are available to fit our hornblocks.



...open out the large hole in the tag, so it's a snug fit on the circular boss at the rear of the bearing.

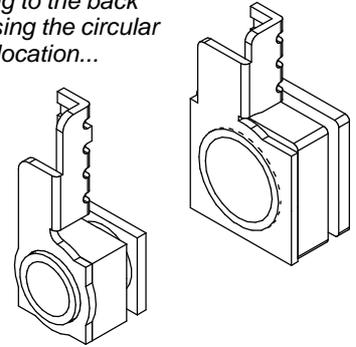
## STANDARD AND MINIBLOX TAGS

Carefully fold the top tab to make a three-sided box shape.



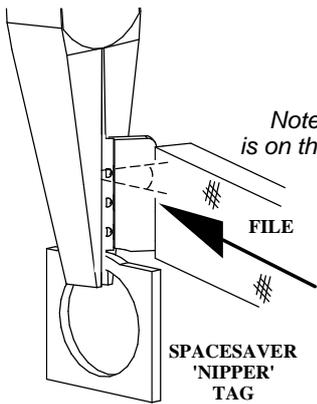
To prevent them from distorting when bending, use small, flat-nosed pliers to grip the etches near the bend lines.

Solder the tag to the back of the block, using the circular boss for location...



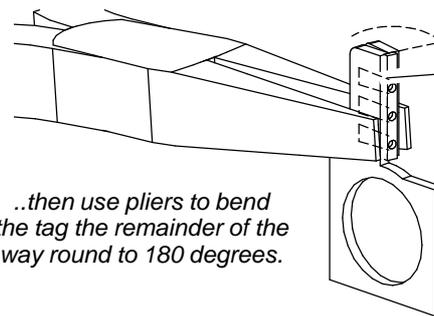
... then resume the assembly sequence at stage 7, overleaf...

## SPACESAVER TAGS



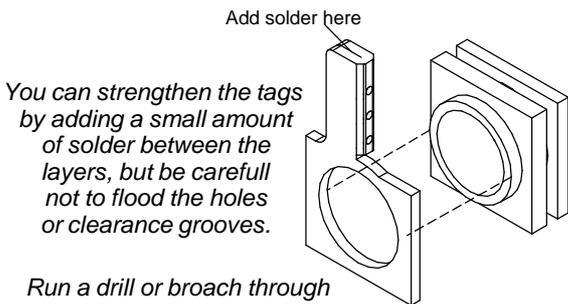
Note that the bend line is on the outside of the etch.

Grip the main etch near the bend line and use a file to push the top tag through about 90 degrees...



...then use pliers to bend the tag the remainder of the way round to 180 degrees.

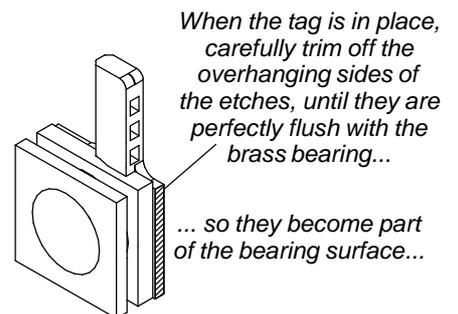
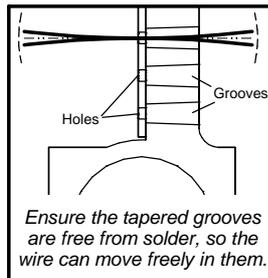
The three tapered clearance grooves should now be between the layers (on the inside).



You can strengthen the tags by adding a small amount of solder between the layers, but be careful not to flood the holes or clearance grooves.

Run a drill or broach through the holes and open them out to suit your spring wire...

...then solder the tag over the circular boss on the block, making sure it is absolutely square.



When the tag is in place, carefully trim off the overhanging sides of the etches, until they are perfectly flush with the brass bearing...

... so they become part of the bearing surface...

... then resume the assembly sequence at stage 6, overleaf...