Chassis Kit for Bachmann 'Jinty'

GENERAL NOTES ON CONSTRUCTION

This chassis kit is specifically intended for the Bachmann model but can be adapted for use with any other RTR or kit-built 'Jinty'. Designed to take Alan Gibson's wheels (ref. G4855) and a Mashima 1424 or 1426 can motor, it complements the 'Jinty' body detailing kit produced by Brassmasters and available from them at PO Box 1137, Sutton Coldfield, West Midlands B76 1FU (www.brassmasters.co.uk).

An article on producing a super-detailed P4 'Jinty' by combining the High Level and Brassmasters kits appears in issue 160 of *Model Railway Journal*. It includes a large number of close-up photographs of prototype locomotives.

Read the instructions carefully - preferably more than once - before starting work. Study the diagrams until you become familiar with all the parts and the assembly sequence. We have tried to make these instructions as comprehensive as possible, which may make some assembly sequences appear more complex than they actually are.

Leave the parts in the fret until they are required for use. This will protect them and makes identification simpler. Small holes can be drilled more easily while the parts are still attached. Where an accurate hole size is specified, holes are etched undersized so they can be drilled or reamed out to the correct diameter.

We want you to enjoy building your kit, but 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 . . .

ASSEMBLING THE CHASSIS

The chassis can be built either rigid, or with rocking-beam compensation on the leading and middle axles. This is easy to effect and will greatly improve the running quality of the model.

First, using flat-nosed pliers, fold over the spring backing pieces (1 x6) to make them double thickness (see Figure 1.) noting that, unlike most bending operations, the fold lines should be on the outside of the bend. When these parts are absolutely flat (this can be done by gently tapping them between two flat pieces of hardwood) they can be soldered in place on the chassis, behind the springs, before cleaning off any excess solder.

For a rigid chassis, ream out all the axle bush locations in the chassis frames (2 & 3) and solder the 1/8in axle bush bearings in place. For a compensated chassis, solder only the rear axle bearings in place. Modellers building to 16.5mm gauge should file the rear axle bushes flush with the inside of the frames to allow clearance for the gearbox.

For a compensated chassis, read all of the following carefully. To make the hornblock cutaways, carefully make a slot up the centre lines of the middle and front axle locations, taking care not to damage the springs. Use a cutter in your minidrill, a fine fret saw, or a needle file. Now bend the sides of these cuts back and forth, until the metal snaps off to form the rough cutaway shape. Dress up the sides with a file using the remainder of the half-etched marks as a guide. Don't file anything from the top horizontal edge of the slot - this is used to set the MJT hornblocks at the correct height.

For all types of chassis, select the spacers (parts 4 - 9) for the gauge in which you model. Punch out the cylinder cover detail in the cylinder block face, which is part of spacer 5 (see Fig. 4) and straighten the part as necessary. Bend up and fit the front and rear L-shaped spacers (4 & 9), followed by parts 5 and 6. Noting that they are different, slot the midway spacers (7 & 8) into the chassis, but before soldering them, slot the small rivet details (10 x4) between the spacer webs and the frame sides, and then solder the parts in place. Add the chassis overlays (11 - 14) to the ends of the chassis and secure with solder.

Refer to the fret diagram, and to Figure 5. Open out the holes in the rods (15 - 25) to suit the components shown in the diagram, and layer them up. Make the holes a tightish fit - you can always open them out a touch more later. Identify the middle sections of the rods (15 x2, 16 x2) and then add the inner and outer

layers. Use the fret diagram to identify the parts - (17 - 22 for fluted rods, 23 - 25 for plain rods). Remove them from the fret in pairs and solder them to the middle layers, building one rod at a time to avoid confusion.

The rods have an articulated knuckle joint which uses a 0.8mm valve gear rivet as the pivot. For a smooth running chassis, it is essential that these rivets are a good fit in their holes. When the front and rear rods sections are assembled, lightly countersink the holes at the rear of the 'forks'. Put a small amount of oil on the 'tongue' of one of the front rods and slide this into place in the 'fork' on the rear rod. Slot a rivet through the assembly and, very carefully, secure in place by soldering it to the rear rod sections only. Finally, trim the rivet almost flush at the back. Check the joints pivot freely. Do the same for both sides.

For a compensated chassis, assemble the MJT hornblocks, according to the manufacturer's instructions. It'll be necessary to trim about 0.8mm from the leading edge of the hornblock etches, so the units clear the front spacer, as shown in Figure 1. This can be done easily with sharp scissors.

Use the coupling rods, in conjunction with axle jigs, to position the assembled hornblocks in the chassis, making sure you include the brass hornblock bearings (lightly oiled). The units should be fitted so the horizontal tab (which protrudes from their front face) butts up against the top edge of the frame cutaways After having made a final check that everything is truly square, solder the etches in place.

Drill out the holes in the crossheads (26 X2) to 0.8mm dia and bend them to shape. Make up the left and right hand connecting rods (27 - 30 & 31 x4) then use short lengths of 0.8mm wire to locate these in the crossheads, so you have a handed pair. Note - the detail etched onto the crosshead must be correctly orientated in relation to the connecting rods - the left and right sides are not interchangable. Solder 0.8mm wires in place in the crossheads, leaving the connecting rods free to swing on the wire, and then trim the wire almost flush with the crosshead side faces.

Bend up the slidebars (32 x2) and slot them part of the way through the locations in the spacer 5, as shown, but don't solder them in place. If they're a bit tight in the slots, use a blade to remove the cusp from the edges of the bars. Note - if hornblocks are fitted then you'll need to remove the outer, lower slidebar from each side before fitting (see Figure 4).

Noting that they are handed, slot the crosshead assemblies (complete with conn rods) into the slidebars, so the detailed sides of these assemblies are facing the centre of the chassis, as shown in Figures 1 and 4. With the crossheads in place, continue to push the slidebars up to the motion bracket spacer (6), and locate the ends of the bars in their slots - the slidebars are unequal lengths to allow you to do this in stages. When the bars are pushed fully home, solder them in place at each end.

Locate the small tabs at the ends of the connecting rod assemblies into their respective slots in the motion bracket - the crossheads should slide along the slidebars to allow this. Check the crossheads sit straight and then, working from the underside of the loco, carefully solder them to the bars, and then solder the ends of the connecting rods into the motion bracket. Finally, slot length of 0.8mm wire through the cylinder front spacer, and into the central holes in the crosshead 'A', solder in place and then trim the wire flush at the front.

Slot two 17mm lengths of 0.8mm dia wire, between spacers 5 and 6 to represent the valve rods (if you wish, you can include valve guides, made from 3.5mm lengths of 1.6mm OD tube) and solder the parts in place. For the reverser shaft, push a length of 1mm wire through the frames at holes 'B', and include the drop links (33) which should be folded to shape. Solder the wire into the frames and trim it flush at the outside. Now position the links centrally on the wire, butted up to the back of the spacer (6), and solder it in position, as shown in Figure 4.

Try the chassis in place and secure it to the body using the original Bachmann fixing screws. The rear face of the spacer '5' extends upwards and sits between the footplate inner edges to represent the rear of the smokebox. After having made any necessary adjustments, remove the chassis.

If you’re building a compensated chassis you can fit the compensation beam. Cut a length of 1.6mm O.D. tube, so it fits between the frames without being tight. Layer up the two compensation beam halves (34 x2) and then ream out the central hole until a length of 1.6mm O.D. tube is a good fit . Now open out the central beam pivot hole in the frames ‘C’ to 0.8mm diameter. Position the compensation beam centrally on the tube then offer this assembly up between the frames. Slot a length of 0.8mm wire through the holes ‘C’ in the chassis, and through the tube in the beam. Check the beam is free to pivot and then solder the beam in place on the tube. Do not fix the wire in place for the time being. The cutaway view in Figure 4 shows the beam in place in the chassis.

Bend up and fit the two sides of the ashpan (35 & 36), making sure they sit parallel to the chassis. Make the bends in the railguards, situated at the ends of the frames - the front should be angled at about 30 degrees with the rear at about 45 degrees, as shown in the diagram.

If you wish to fit plunger pickups (Alan Gibson, ref. 4M62) to the model, open out the pilot holes ('D', Fig 1) to suit your pick-ups.

Brakegear assembly
This method of assembly creates a set of brakegear that is fully removable, as well as totally prototypical in appearance. Do not solder anything until the instructions specifically say so. Figure 4 shows the completed brakegear assembly fitted to the chassis.

The first step is to drill out all brakegear components (37 - 48) to accommodate the various wires shown in figure 1. Make absolutely sure these wires will pass through their holes without being forced.

To represent the crossshaft, thread a length of 1.5 mm bar, approximately 30mm long, through the chassis and include the handbrake (37) and steambrake (38) levers as you do this. Make sure the shaft is roughly central in the chassis and solder it in place, ensuring that the two levers are still free to move.

Make a sharp bend in two short lengths of 0.5mm wire, slot them through the small holes in the rear spacer (9) and solder the shorter bent ends into the levers, as shown, then solder the levers to the shaft - the handbrake lever should slope down slightly and the steambrake lever should be more or less at 180? to this - then trim the ends of the wires almost flush with the etches. Slot the cross shaft journals (39 x2) onto the ends of the cross shaft and solder in place.

OO/EM wheels are wider than P4 wheels. For these gauges, we've included brake hanger packing pieces (40 x6), which should be carefully soldered or glued to the frames, behind the hangers, as shown.

Temporarily fit the wheels, including any washers that may be necessary to eliminate sideplay. It's a good idea to try pushing the chassis around your curves, to see how much sideplay you actually need. In OO and EM gauges, we've allowed for up to 0.5mm sideplay (total 1mm) on the middle axle. For P4, the sideplay should be no more than 0.3mm either side. If the chassis still won't go around your curves, allow a small amount of sideplay at the outer axles (but watch the gears don't go out of mesh).

If you're building a compensated chassis, you can make fine adjustments to the ride height by tweaking or filing the ends of the compensation beam. When the chassis sits level on your track, trim the beam pivot wire to length (to the overall width of the chassis) and then fix it into the frame with a small amount of glue at one end only. Make sure the glue doesn’t penetrate into the tube.

Slot a short length of 0.5mm wire through the central holes in the front layer of the brake hangers (41 x3, 42 x3). Use this wire to locate the rear layers (43 x 6) along with the brake blocks 44 x6) and solder them together making sure no solder gets into the bend lines at the tops. Trim the wire flush at the back and leave it very slightly proud at the front. Now bend the top of the hangers to shape, as shown.

Push a 25mm length 0.5mm diameter wire though the chassis at each of the brake hanger pivots, and then locate the hangers onto these wires, making sure they are handed pairs. Push the hangers hard up against the wheels, and up to the chassis side, then carefully solder the wires into the top of the hangers - do not solder anything to the chassis. Trim the outside of these wires almost flush with the hanger faces. Slot a 30mm length of 0.7mm wire through the bottom holes in the hanger assemblies. After making sure the hangers are lying vertically, carefully solder the wire in place so equal amounts protrude at the outsides.

With the hanger assemblies in place, you can set the clearances for the brakes. Start by soldering the brake rod details (45 x2 - they represent the hexagonal adjusters) to the brake pull rods (46 x2). Now cut two lengths of 2mm OD tube, to approx. 3.5mm long and slot these onto each end of the cross shaft, followed by an actuator (47 x4) - don't solder anything in place. Push a long length of 0.5mm wire into the bottom holes of the actuators. Feed the pull rods over the ends of the wires, at the bottom of the hangers, with the rearmost hole in the rod slotting onto the wire in the actuator. Set the pull rods so they run parallel to the chassis, and then look at the distance between the backs of the rods and the wheel faces. It's likely you'll need to trim some length from the tube on the crossshaft - the length of this tube determines the clearance between the pull rods and the wheel face (see Fig. 2). Take into account the sideplay on the axles - with the wheels pushed fully over to one side, we suggest an additional 0.4mm clearance, which can be set using a piece of fret waste. When everything is in position, solder the tube to the cross shaft.

With the actuators and brake pull rods still in place, add the cross shaft spacer washers (48 x2) and the remaining actuators, which go on the outside of the rod, so the rod end is sandwiched between the two lever halves. Now adjust the position of the actuators, rotating them on the cross shaft, so they move the hangers in relation to the wheels - don't make them too close or they'll cause a short. Check the pull rods still run parallel to the chassis and, when you're happy with their position, carefully solder the actuators in place on the cross shaft, making sure the pull rods are still removable. Now solder the pull rods to the bottom wires in the hangers and then trim the ends of these wires almost flush with the pull rod faces.

Remove the wire from the actuators and cut it into two short lengths, long enough for a small amount to protrude from either side of the actuators. Slot these back into the actuators, and through the pull rod ends - they should stay in place but a small amount of glue, paint, or even nail varnish can be used if the holes are slightly oversized. Finally, cut the wires inside the chassis, at the tops of the hangers, and trim them so there is about 0.5mm left inside the chassis inner face.

The brakegear can now be removed by pulling the short wires from the actuators and springing the hangers from their locations.

When the brakegear is off, remove the wheels and fit the balance weights (49 x 4 & 50 x2) directly opposite the crankpins - epoxy is best for this. Make sure they lie flat and don't foul the rods. Now clean up all the parts ready for painting.

Gearbox assembly

Study Figs 2,3 &4. Before cutting the gearbox etch (51) from the fret, progressively drill out or ream each of the holes to accommodate the shafts or bushes shown in the diagrams. Components should be offered up until they are a tight push-fit in their holes. Once the gearbox is assembled, the shafts are fixed but the gears are free to revolve.

Remove burrs by inserting the tip of a drill bit (of much larger diameter than the hole) and gently rotating it between your fingers. Solder the 1/8in bushes into place with the larger-diameter shoulders on the same side of the etch as bend lines. Remove burrs as above. Now cut the etch from the fret with a heavy blade and trim off the tabs.

The gearbox can now be folded up as indicated in Fig 3 - all bend lines are on the inside of the gearbox. The corners can be strengthened with fillets of solder and the gearbox braced by soldering a length of 0.8mm wire between holes ' E'. File the non-shouldered face of the bush so the gearbox fits snugly between the rear axle bushes in the chassis.

Using a carborundum disc in a mini-drill, cut 2mm silver steel gearshafts, so their lengths equal the overall width of the gearbox. Wear effective eye protection – cutting discs can and do disintegrate if they snag. Remove any burrs with a fine file. Offer up the shafts to their respective holes. Because the shafts are a tight fit, you will only be able to pass them through both sides of the gearbox if it is truly square. If they won't go through, then the gearbox hasn't been folded accurately. Light finger-tweaking should put things right.

De-flux the gearbox by scrubbing with household cleaner, then rinse and allow to dry. Check that the gears themselves are free from any dust or swarf left over from manufacture. Cut a length of the insulated wire into two equal lengths and solder to the motor brush tags. Insulate the terminals with tape. For testing, connect the other ends to the output leads of your controller.

Some brass worms supplied to us are fractionally tighter than others and if they aren’t an easy push-fit, they can be gently forced onto the shaft in a vice. Don’t use excessive force or the shaft may bend. Instead, use a broach to ease the fit of the worm and then, if necessary, secure the brass worm with a small drop of Loctite 601 at the outer end of the motor shaft.

Fit the worm onto the motor shaft (at the mounting screw end) so it’s mid-point is about 6mm from the motor face (i.e. - so the worm lines up with the stage 1 gearshaft when the motor is fitted into the gearbox). Grind off the excess motor shaft and screw the motor onto the mounting plate. You may also need to remove some length from the shaft at the rear of the motor - this will depend on the length of the motor you're using.

Refer to Fig. 1. The stage 1 double gear will be one of three types - 15/10T (60:1), 20/10T (80:1) or 27/10T (108:1) - depending on the overall reduction ratio of the gearbox. Fit the stage 1 gearshaft, double gear (according to ratio) and turned brass spacer into the gearbox. Sight through the opening in the gearbox sides to check the mesh with the worm - there should be daylight between the gear and the worm, but avoid having too much backlash. If necessary, loosen the motor fixing screws, adjust the mesh and then lightly glue the shaft in place at both ends.

Now fit the stage 2 gearshaft and double gear (these are all 20/10T) into the gearbox and fix the shaft as above. Slot the idler gearshaft through the gearbox, slipping on the thin 20T. gear and 2mm spacer washer (52) as you do so. (Note that the boss on this gear runs nearest the gearbox side). Secure the shaft to the gearbox sides using a tiny amount of glue.

Temporarily fit the axle , along with the brass 20T. gear into the gearbox. If the motor is not fitted, check that all the gears revolve smoothly. Now test the gearbox under power by fitting the motor and worm assembly as described above. Remove the drive axle and brass gear.

The gears are effectively self-lubricating but a little plastics-compatible grease will do no harm. Do not use general-purpose modelling oil, which attracts dust and grit. Metal-on-metal contact areas (motor bearings, axle bushes) should be lubricated with a tiny amount of Seuthe ultra-adhesive oil.

Pick-ups
Most modellers have their own preferred method of fitting pick-ups. Plunger pick-ups are one option and these will need to be fitted before the wheels. An alternative would be suitably shaped wiper pick-ups made from phosphor-bronze or 0.33mm hard brass wire. These can be run to the wheel rims from strips of gapped copperclad and are best fitted after the wheels. Make sure you allow adequate clearance around the chassis components to prevent shorting.

Final assembly.
When the gearbox is completed and you are ready for the final assembly sequence. Offer up the motor/gearbox unit, slotting the two long support tabs into the slots ('F' in Fig. 4) in the rear midway spacer (8) as you do so. As you fit the rear axle, slip on the final drive gear but do not mesh it yet.

The kit includes axle washers of varying thicknesses, which should be used to eliminate sideplay, as described above. You may also need to fit washers between the gearbox sides and the frames in order to prevent the gearbox from moving sideways on the axle (this may cause the gears to go out of mesh).

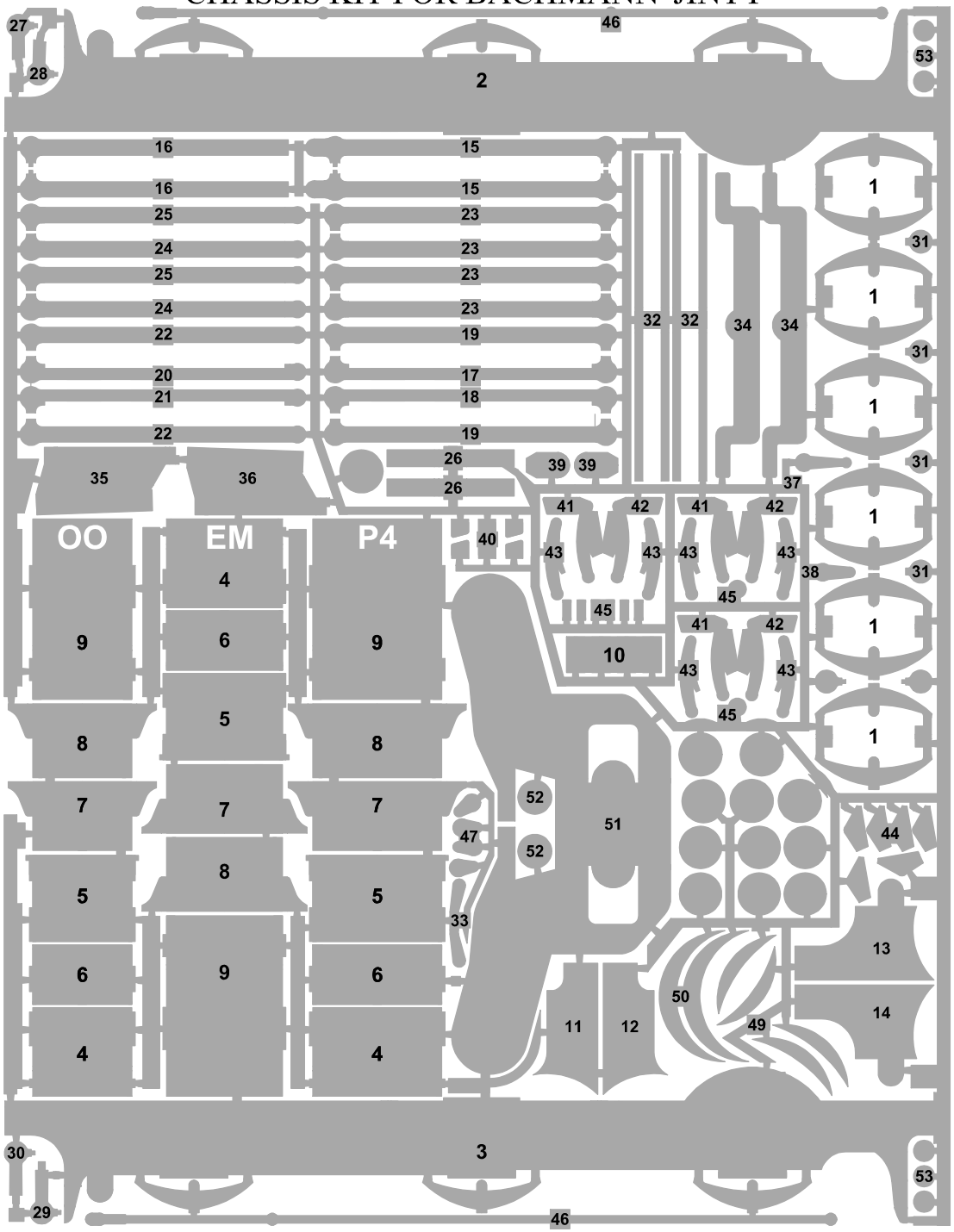
Fit and quarter the wheels - the right hand cranks lead by 90 degrees. Now add the bushes to the crankpins, followed by the coupling rods, and check for free running before fitting the securing nuts. Optional crankpin spacer washers (53 x4) are provided, but these only need to be fitted if the siderods catch the brake hangers.

Tighten up the grub screw in the brass gear and test the loco under power. When the chassis is complete and you're happy with the way it runs, you can add small dabs of epoxy, or bath sealant, to the gearbox support tabs (where they slot through the spacer - 'F' in Figure 4) in order to eliminate vibration

For P4 models, check the siderods don't catch on the underside of the footplate. If this happens, carefully grind away a small amount of material from the footplate, and/or remove the cork details from the rod.

After having noted their position, carefully prize the sandboxes from the Bachmann model, and use glue to secure them in place on your new chassis. Finally, refit the brakegear, as described previously.

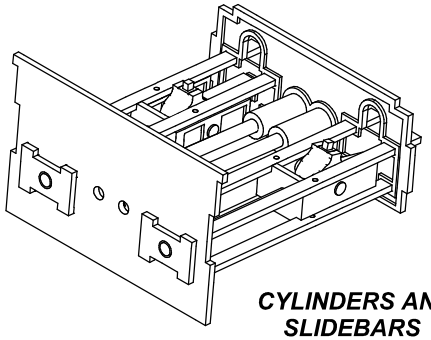
CHASSIS KIT FOR BACHMANN 'JINTY'



PARTS LIST

1. Spring backing piece (6)
2. Frame, LH side
3. Frame, RH side
4. Front, L-shaped spacer (OO, EM or P4)
5. Cylinder block spacer (OO, EM or P4)
6. Motion bracket spacer (OO, EM or P4)
7. Leading, midway spacer (OO, EM or P4)
8. Trailing, midway spacer (OO, EM or P4)
9. Rear, L-shaped spacer (OO, EM or P4)
10. Rivet detail (x 4)
11. Frame overlay, front, LHS
12. Frame overlay, front, RHS
13. Frame overlay, rear, LHS
14. Frame overlay, rear, RHS
15. Fluted & plain side rod, front, middle layer (x2)
16. Fluted & plain side rod, rear, middle layer (x2)
17. Fluted side rod, front, LHS, inner layer
18. Fluted side rod, front, RHS, inner layer
19. Fluted side rod, front, outer layer (x2)
20. Fluted side rod, rear, LHS, inner layer
21. Fluted side rod, rear, RHS, inner layer
22. Fluted side rod, rear, outer layer (x2)
23. Plain side rod, front, inner/outer (x 4)
24. Plain side rod, rear, inner layer (LHS) outer layer (RHS) (x2)
25. Plain side rod, rear, outer layer (RHS) inner layer (LHS) (x2)
26. Crossheads (x2)
27. LH conn rod, inner layer
28. LH conn rod, outer layer
29. RH conn rod, inner layer
30. RH conn rod, outer layer
31. Conn rod ends, outer (x4)
32. Slidebars (x2)
33. Drop links
34. Compensation beam (x2)
35. Ashpan LHS
36. Ashpan RHS
37. Handbrake lever
38. Steambrake lever
39. Crosshaft journal (x2)
40. Brake hanger packing piece (36 x6),
41. Brake hangers, front layer, LHS (x3)
42. Brake hangers, front layer, RHS (x3)
43. Brake hangers, rear layer (x6)
44. Brake block (x6)
45. Brake pull rod detail (X2)
46. Brake pull rod (x2)
47. Actuator (x4)
48. Crosshaft spacer washer (x2)
49. Balance weight, front and rear (x4)
50. Balance weight, middle (x2)
51. Gearbox
52. Idler shaft spacer washer
53. Crankpin spacer washer (x6)

FIG.1



CYLINDERS AND SLIDEBARS

CHASSIS ASSEMBLY

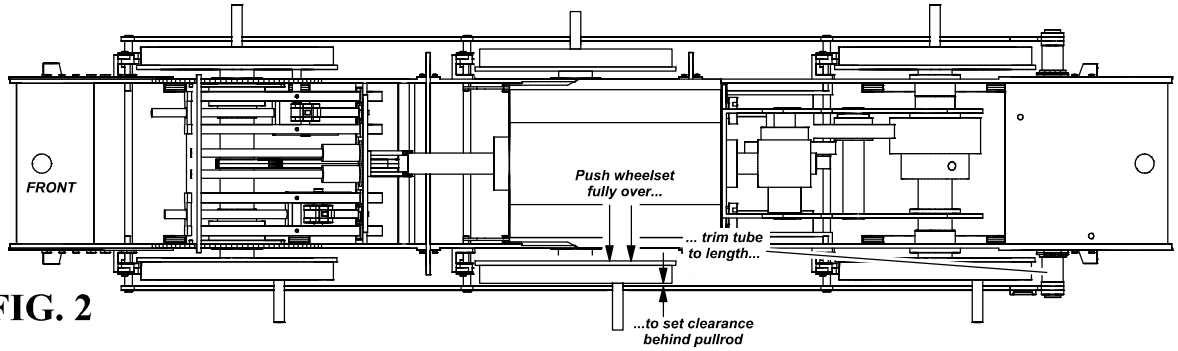


FIG. 2

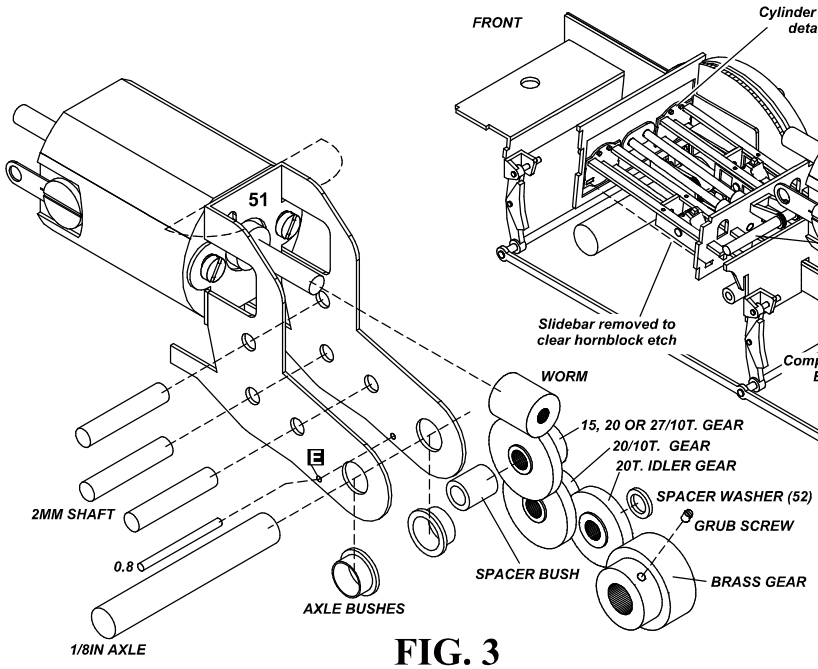


FIG. 3

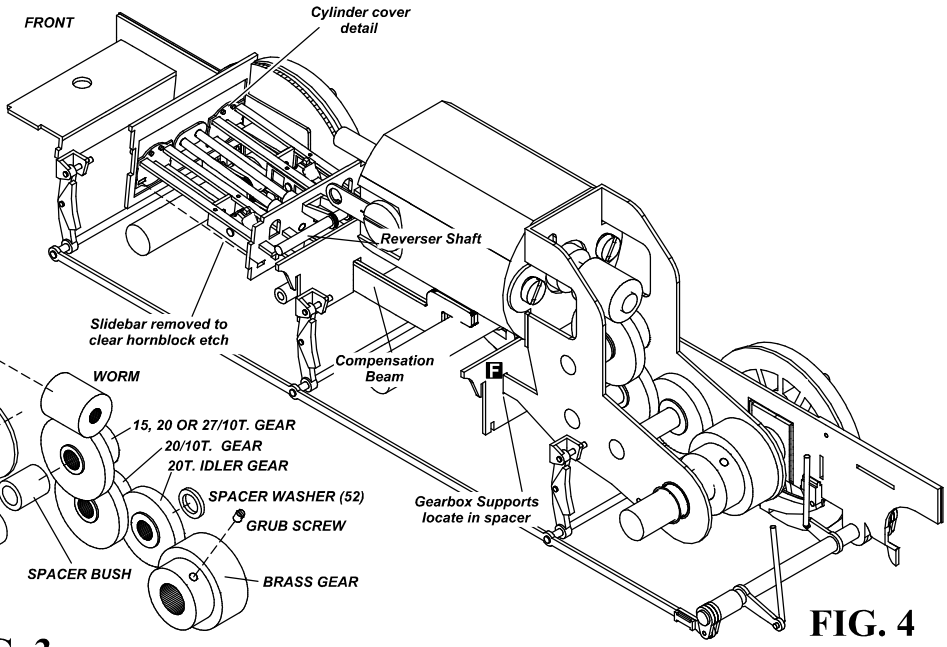


FIG. 4

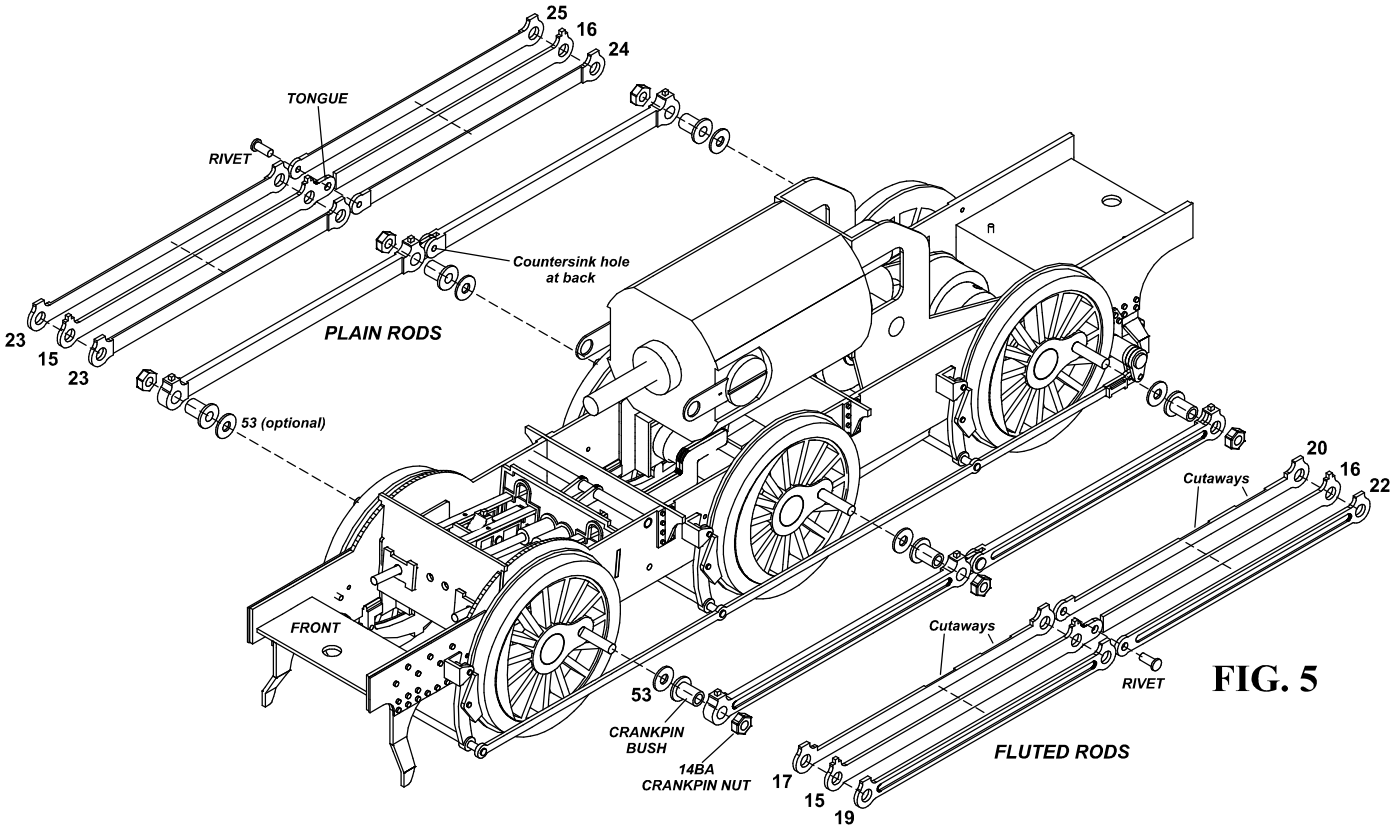
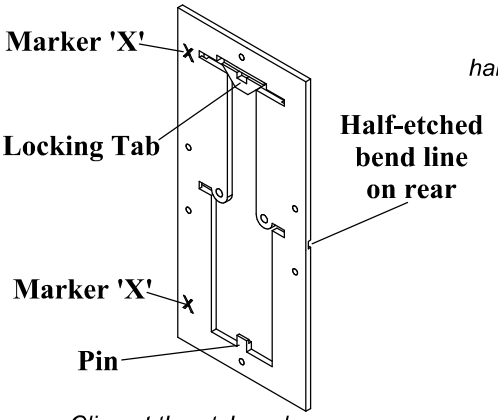


FIG. 5

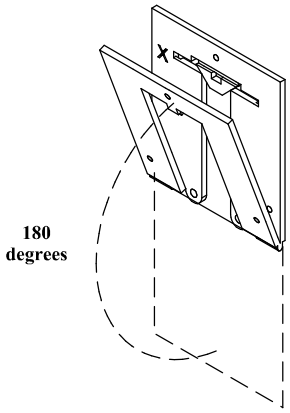
HIGH LEVEL

www.highlevelkits.co.uk



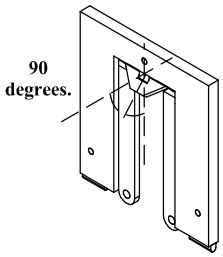
Clip out the etch and clean off any mounting tabs.

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

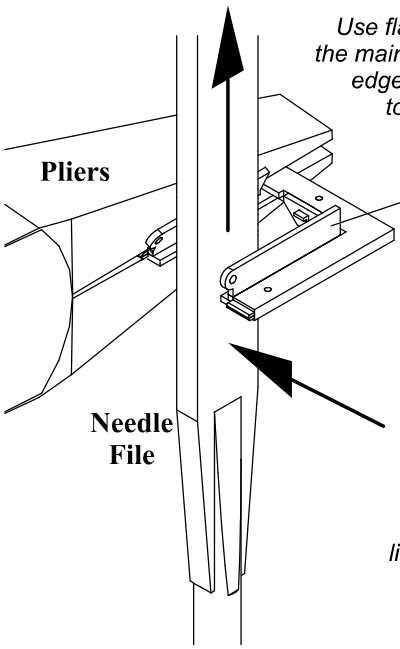


When it's folded, tap the layers between two pieces of hardwood, so they sit absolutely flat.

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

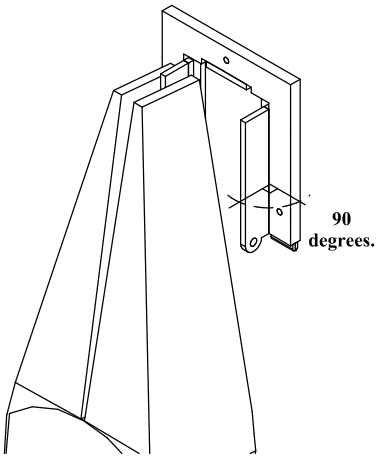


The end of a flat, pointed needle file is a good tool for this job. The tab locks the layers together, eliminating the need for solder.



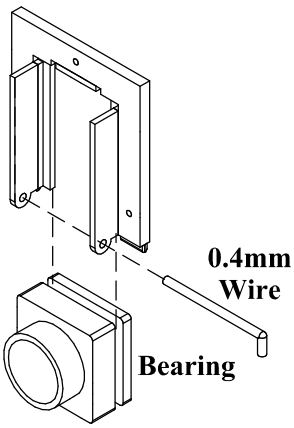
Use flat nose pliers to grip the main etch,with the straight edge of the pliers close to the bend line.

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



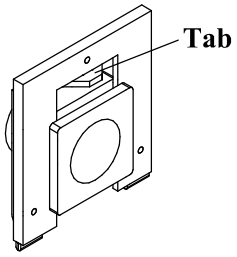
Finish off the horncheek bends so they are at 90 degrees. Check this through a magnifying glass and adjust as necessary.

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.



When the bearing 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 tab is designed to sit exactly 4mm above the axle centre line, with the loco on level track. The top edge of the cut-outs on most chassis is also 4mm above the axle centre, so the tab can be butted against the top of the cut-out to set the unit at the correct height.

HIGH LEVEL, 14 TUDOR ROAD, CHESTER-LE-STREET, CO. DURHAM, DH3 3RY.
TEL. 0191 3882112.