



**LCP61 Chassis pack for
GWR Churchward
4500/Collett 4575
2-6-2Ts**

Components recommended to construct a complete chassis:
 6 off Markits 47" wheels (WH201)
 3 axles 6 crankpins and washers (RM2)
 2 sets 12mm 10 spoke bogie wheels (WH31)
 Mashima MH1620 motor
 Gearbox GB5/20 & Drive Extender

This pack contains sideframes, 00 spacers, brake gear, cylinders, coupling and connecting rods, crossheads, balance weights and pony trucks to produce a chassis for use as a replacement for the Bachmann model. We recommend the Mashima MH1620 motor with our gearbox GB5/20 and drive extender for this model, and can supply the latter two together with Markits wheels if required. EM spacers are available separately, code LS10, as are P4 spacers, code LS60.

As supplied the frames are suitable for the Bachmann model.

Parts list - Etchings (nickel silver)

- | | |
|----------------------------|--|
| 1. Frames | 11. Cylinder wrapper |
| 2. Replacement springs | 12. Coupling rod backing |
| 3. Brake shoe backing | 13. Coupling rod overlay |
| 4. Brake shoe overlay | 14. Connecting rod backing - see later |
| 5. Brake pull rods | 15. Connecting rod overlay - see later |
| 6. Cylinder stretcher | 16. Pony truck |
| 7. Slidebars | 17. Pony truck washer |
| 8. Cylinder front cover | 18. Balance weights |
| 9. Motion bracket | 19. Crosshead pump actuator |
| 10. Brake pull rod bracket | |

(Please note that not every individual item is numbered on the fret)

Parts list - Castings

- | | |
|-----------------------------|----------------------------|
| Cylinder front valve chests | Cylinder rear valve chests |
| Crossheads | Valve spindle |

Please note that all bends should be made with the half-etched lines to the inside and reinforced with a fillet of solder.

Assembly Instructions

Chassis

- The frames may be assembled rigid, or with sprung axles using our hornblocks and springs, code LS55. If you wish to spring the chassis cut through the spring hangers using a piercing saw and remove them together with the centre portion of etch within the hornway. The sides of the hornways are etched at approximately 5.85mm wide to ensure that any slight variations in the width of the machined grooves in the hornblocks do not result in any one of them having a loose fit within the hornway. Each hornway must be carefully dressed with a file to achieve a good sliding fit to each hornblock, which should then be marked up or placed into a labelled bag to ensure it is assembled only into the hornway to which it has been precisely matched. Take time and care over this stage, removing material slowly and from each face equally. The hornblock must drop in freely under gravity but must not show any fore and aft play which might cause the coupling rods to bind. This might sound daunting, but the patient builder will be rewarded with a chassis having superior ride, track holding and traction compared to an unsprung chassis.
- For rigid axle assembly, carefully open out the axle bearing holes in the frames until the bearings are a close fit, ensuring the bearing flanges fit snugly against the frames. This is best done using a five-sided broach. If you are using our chassis jigs (see below), DO NOT solder the bearings in place at this stage. Open out the holes for the brake cross-shafts to 0.75mm.
- Select the appropriate frame spacers - their size and position will depend on the siting of the body

fixings and your preferred motor/gearbox and pick-up arrangements. Our own preferences are, where possible, for a tongue and slot fixing at the front bufferbeam and a single bolt fixing under the cab, together with wiper pick-ups mounted below the chassis. A suitable layout of spacers is shown to suit this and our gearbox GB5/20 and a Mashima MH1620 motor (sketch 1).

- If you are springing the chassis drill out the holes at each side of the hornways and those in the separate spring etches (2) to 0.5mm. The frame spacers fold to right angles on the half-etched line. Solder your chosen ones to one of the frames, then assemble by clamping the other side frame to the first using wheelsets to check alignment before soldering the second side frame. This crucial stage of the assembly can be achieved more easily and with greater accuracy by using our frame assembly jigs (code LS16 for 00, LS17 for EM and LS61 for P4). Full instructions are provided with them. If you are springing the chassis using our hornblocks please note that you will need a set of four turnings code LS59 which are intended to locate in the hornways during this stage of assembly.
- For a sprung chassis insert the spring and hornblock (sketch 2), ensuring that they are placed into their correct hornways only. Note that the grooves in the hornblock are not on the centre line. This allows you to choose a greater or lesser amount of sideplay on each axle. Use 0.45mm wire to locate the spring detail and solder in place using a minimum of flux. This captures the hornblock and the protruding centre shackle should ensure that the bottom of the hornblock is slightly above the bottom edge of the chassis giving approximately 1.0mm of movement only. Do not be tempted to file too much material from the top of the centre shackle. Greater travel should not be necessary and there is then a risk that the spring could become dislodged if there is too much downward travel.
- Solder lengths of 0.7mm wire through the brake hanger holes. Solder the brake shoe overlays (4) to the brake shoe backings (3) then thread them on and solder in place. Alignment is made easier if something of suitable thickness is used to space out the brake shoe from the frame, with a wheelset fitted to ensure correct spacing relative to the wheel treads.
- Lengths of 0.7mm wire are next threaded through the bottom brake hanger holes on one side of the chassis, through both sets of brake pull rods (5) (ensuring that they are the correct way round) and then through the second set of brake hangers. Solder the wire to the brake hangers, then slide the pull rods outwards to line up with the inner edges of the frames and solder them to the wire. Insert a length of 0.7mm wire through the rear holes in the pull rods, at the same time capturing the two brake pivot brackets (10). Turn the brackets until the longest part is vertical and the short extension extends to the rear. Solder them to the inside face of the frames, then to the brake pull rods. If required, vertical lengths of 0.7mm wire can be soldered to the rear extensions to represent the operating rods. If you prefer greater prototype accuracy at the expense of greater strength you can decide to solder the two pull rods together and fix this assembly along the chassis centreline so that the lever at the rear end aligns itself inside the brake pivot brackets. However, as well as being more fragile, this will also make it more difficult to arrange pick up from the underside of the chassis.

Motion and Cylinders

- Fix the outer coupling rod overlays (13) to the plain inner rods (12) - note that the rods are handed. If you wish to articulate the rods, the inner rods should be split at the half-etched marks before assembly (sketch 3).
- Due to a drawing error, the connecting rod backings (14) and overlays (15) are too short. Instead, use parts 3, 4L and 4R on the enclosed LM20 fret. As supplied, these are slightly too long, so proceed as follows, noting that the rods are handed. Fix the connecting rod overlays (4L and 4R) to the plain backings (3). At the "little end" of the rod, drill a new hole to suit the pin supplied with the crosshead, with the drill centred at the end of the fluting. File the end of the rod in a semicircle, removing the etched hole in the process.**
- Assemble the connecting rod to the crosshead with the supplied pin, inserted from the rear and soldered on the outer face of the crosshead, then cut and filed flush (sketch 4). If required, the crosshead pump actuator (19) can be soldered on the outside of the right-hand crosshead, with the pump rod represented by a short length of 0.7mm wire soldered to the upwards extension.
- Bend the cylinder stretcher (5) to shape, trimming at the half-etched lines if building to EM or P4. Solder the cylinder wrapper (11) to the stretcher. This is more easily achieved by lying the wrapper face down on a heat resistant surface, holding the stretcher down and soldering along the straight part of the join. Then solder the lower part of the wrapper in place by rotating the cylinder assembly as you press down. File off any excess wrapper from the front and rear faces of the cylinders. Solder

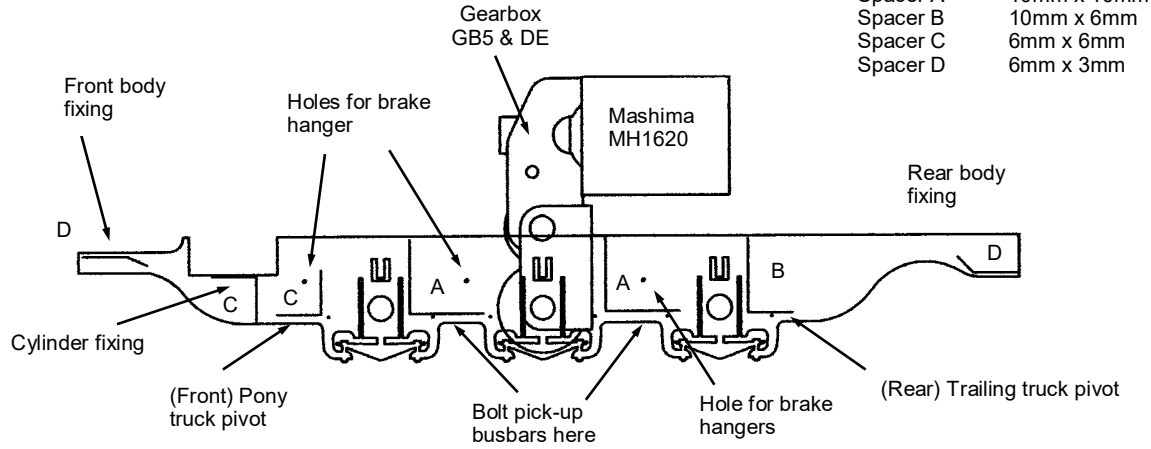
an M2 nut to the underside of the stretcher and cut off any excess bolt above the stretcher as it will interfere with the fit of the body.

12. Again due to a drawing error, the slidebars are too close together. Instead, use those on the LM20 fret. Assemble the slidebars (5) to the cylinder stretcher (sketch 5); the slidebars will be overlength at this stage. Fettle the crossheads as necessary to achieve an easy sliding fit between the slidebars. Fit the cylinder front covers (8), and the cylinder castings (sketch 6). The front cylinder relief valve can be represented by a short length of 0.9mm wire and cylinder drain cocks can be added using handrail knobs and 0.45mm wire if desired.
13. Solder two motion bracket frets (9) back to back. Solder them to the slidebars so they line up with their representation on the body, while ensuring they do not impede the free movement of the crossheads. Trim the slidebars to length.
14. Our preference is for wiper pick-ups made from 26swg phosphor bronze wire (sketch 7). The wire is soldered to PCB strip which is bolted to a frame spacer. We recommend that, if possible, you arrange for the pick-up to be "bolt-on" since this allows for easy removal and adjustment of the wire wipers. Pack LS23 contains all the necessary parts.

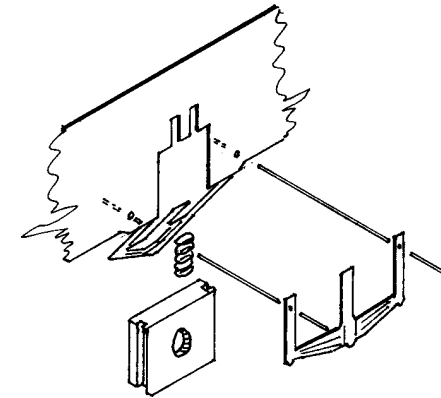
Pony Trucks

15. Two widths of pony truck (16) are provided, one for 00 and one for EM/P4. Drill out all the marked dimples to 0.5mm. Fold up the two sides of the trucks, and solder a piece of 0.45mm wire between the two holes.
16. Wheelsets are retained in the trucks by lengths of 0.45mm wire soldered in the folded down semi-circular retaining tabs.
17. Solder the pony truck washers (17) in place to position the wheels correctly. Note that the rear truck has shorter arm than the front one and is marked 'R'.

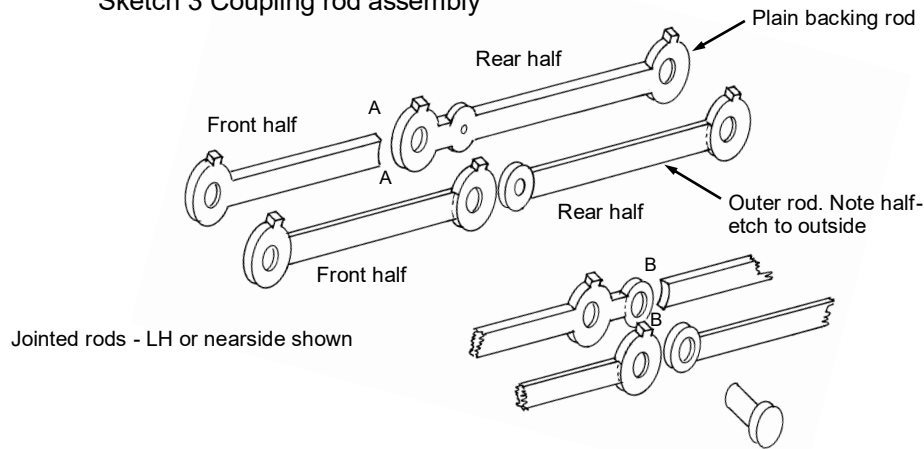
Sketch 1 Chassis assembly



Sketch 2 Fitting hornblocks



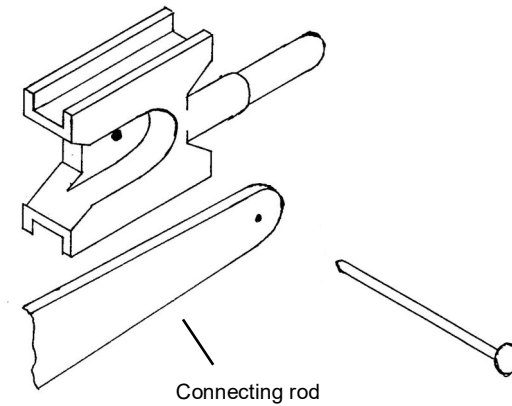
Sketch 3 Coupling rod assembly



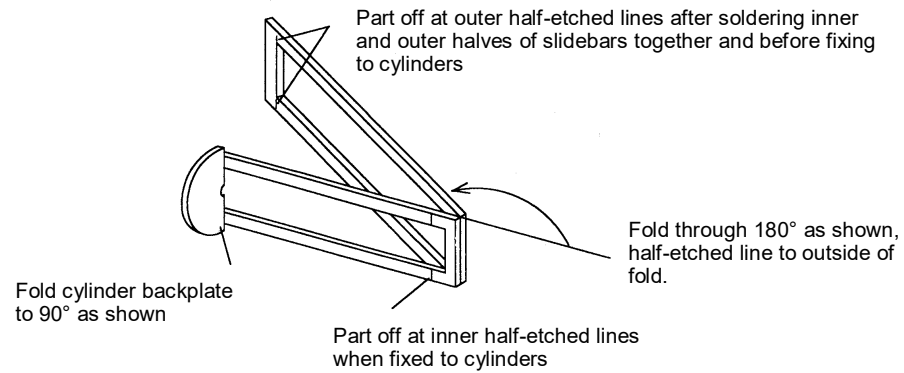
To split the rods over the centre crankpin cut the backing rod at A-A, solder to the corresponding halves of the outer rods and connect both halves at the centre crankpin.

To split the rods on the knuckle joint first drill through the half-etched centres on the knuckle and cut the backing rod at B-B. Solder the inner and outer halves together then join the front and back halves of the rods using a pin or rivet (not supplied) so that the rods are articulated behind the centre crankpin.

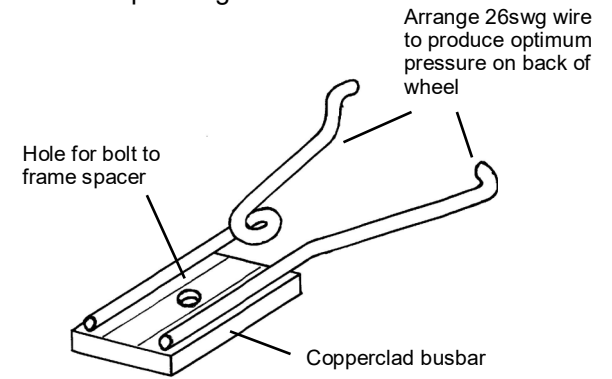
Sketch 4 Crosshead assembly (viewed from rear)



Sketch 5 Slidebar assembly



Sketch 7 Pickup arrangement



We can supply a pickup set comprising printed circuit strip, phosphor bronze wire, fixing nuts and bolts and insulated wire - code LS23.

Sketch 6 Cylinder assembly

