

**LF24 Frames for GWR
Churchward Star/
Collett Castle
4-6-0s**

Components required to construct a complete chassis:

Motion set	LM24	Cylinders	LC3
Bogie	LS6	Crossheads	LS8
6 Markits 6'6" drivers (WH212)			
3 axles	6 crankpins and washers (RM2)		
2 sets 12mm 10 spoke bogie wheels (WH31)			
Gearbox GB5/20 and Drive Extender, or GB1/20, or GB3/20			
Mashima MH1624 motor			

This etch contains sideframes, balance weights, brake shoes and brake pull rods to produce a basic chassis of the correct scale dimensions and appearance which can be used as a substitute for a kit or RTR chassis. Cylinders, motion, crossheads and bogie to complete the chassis are all available from our range - see the panel above. A separate fret of 00 spacers is included, which can be exchanged for EM (LS10) or P4 (LS60) by returning them to us in a stamped, self-addressed envelope.

We recommend our gearbox GB5/20 and Drive Extender, or gearbox GB1/20 or GB3/20 for this model, together with a Mashima MH1624 motor, and we can supply all except the motor, together with Markits driving and bogie wheels if required.

As supplied the frames are suitable for the ex Airfix/Dapol (now Hornby) model, but can also be adapted for the Wills/SE Finecast kit.

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

1. 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 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.
2. 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.
3. 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 buffer beam and a single bolt fixing under the cab, together with wiper pick-ups mounted below the chassis. A suitable layout of spacers is shown (sketches 1 and 2) to suit this and our gearbox GB5 and Drive Extender, or GB1, or GB3 and Mashima MH1624 motor.
4. If you are springing the chassis drill out the holes at each side of the hornways and those in the separate spring etches to 0.5mm as shown in sketch 3. The frame spacers fold to right angles on the half-etched line. Solder your chosen spacers to one of the frames, then assemble by clamping the other side frame to the first using the wheelsets to check alignment before soldering the second side frame. This crucial stage of 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.

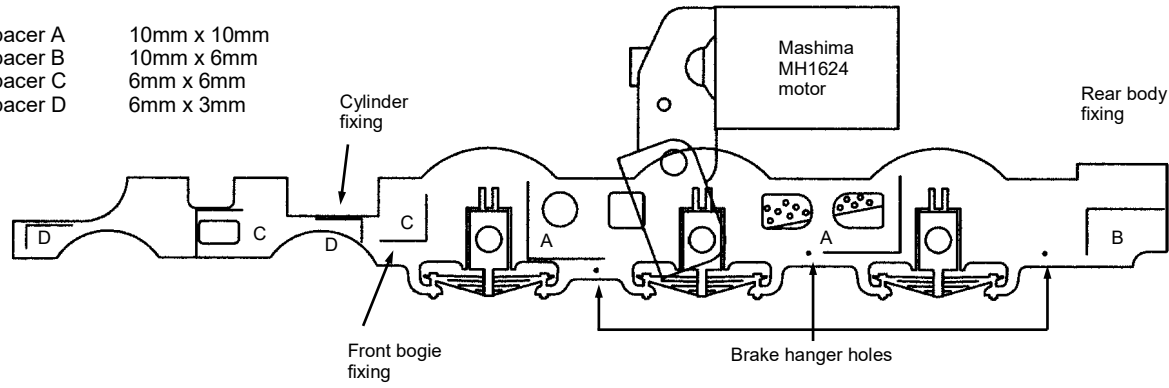
5. For a sprung chassis insert the springs and hornblocks, ensuring that they are placed into their correct hornways only. Note that the grooves in the hornblock are not on the centre line. This allows you to choose a greater or lesser amount of sideplay on each axle. Use 0.45mm wire to locate the spring 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.
6. Solder lengths of 0.7mm wire through the brake hanger holes. Solder the brake overlays to the brake rear etches (sketch 4) then thread on and solder in place. (Note that the front pair of brake shoes is significantly smaller than the other two pairs.) Their 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.
7. 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 (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. If you prefer greater prototype accuracy at the expense of greater strength, 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.
8. Finally, solder on M2.0 fixing nuts for cylinders, leading and trailing trucks and pick-ups as required.

The chassis can now be washed to remove any flux residues, but before painting we suggest that you fit the cylinders, motion bracket and wheels and check the fit of the body. You may find some slight filing is required to obtain a perfect fit. If you next assemble the bogie then the frames and bogie can be painted together and left to harden whilst the motion is assembled. If you are springing the frames take care to avoid getting any paint on the hornblocks or hornways.

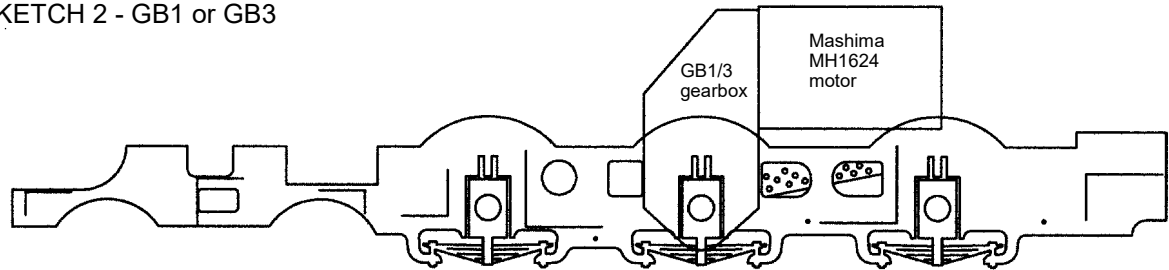
Our preference is for wiper pick-ups made from 26swg phosphor bronze wire (sketch 5) as offered in our product code LS23. The wire is soldered to PCB strip which is bolted to a frame spacer. We recommend that, if possible, you arrange the pick-up to be "bolt on" since this allows for easy removal and adjustment of the wire wipers.

SKETCH 1 - GB5 and Drive Extender

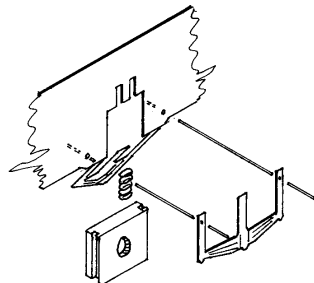
- Spacer A 10mm x 10mm
- Spacer B 10mm x 6mm
- Spacer C 6mm x 6mm
- Spacer D 6mm x 3mm



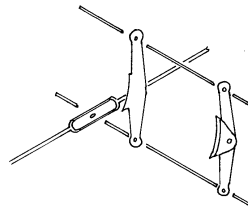
SKETCH 2 - GB1 or GB3



SKETCH 3



SKETCH 4



SKETCH 5

