

**LF17 Frames for Fairburn
LMS Class 4 2-6-4T**

Components recommended to construct a complete chassis:

Motion set	LM17	Cylinders	LC1
Pony truck	LS2	Bogie	LS5
Crossheads	LS8		
6 Markits 5'8" drivers (WH207)			
3 axles	6 crankpins and washers (RM2)		
3 sets 3'3" 10 spoke bogie wheels (WH32)			
Mashima MH1628 motor and gearbox GB1/20			

This etch contains sideframes, brake shoes, balance weights 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, pony truck and bogie to complete the chassis are all available from our range - see the panel above.

We recommend the Mashima MH1628 motor with our gearbox GB1/20 for this model, and can supply the latter together with Markits driving and bogie wheels if required. 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.

As supplied the frames are suitable for the Bachmann model.

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. 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.
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. A suitable layout of spacers is shown (sketch 1) to suit this and our gearbox GB1/20 and Mashima MH1628 motor. If you are using the current Bachmann body moulding the existing fixings can be used, re-using the rear chassis fixing screw and securing the chassis at the front with a 12BA cheesehead screw into the pre-tapped hole in the body.
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 2. 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 the 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

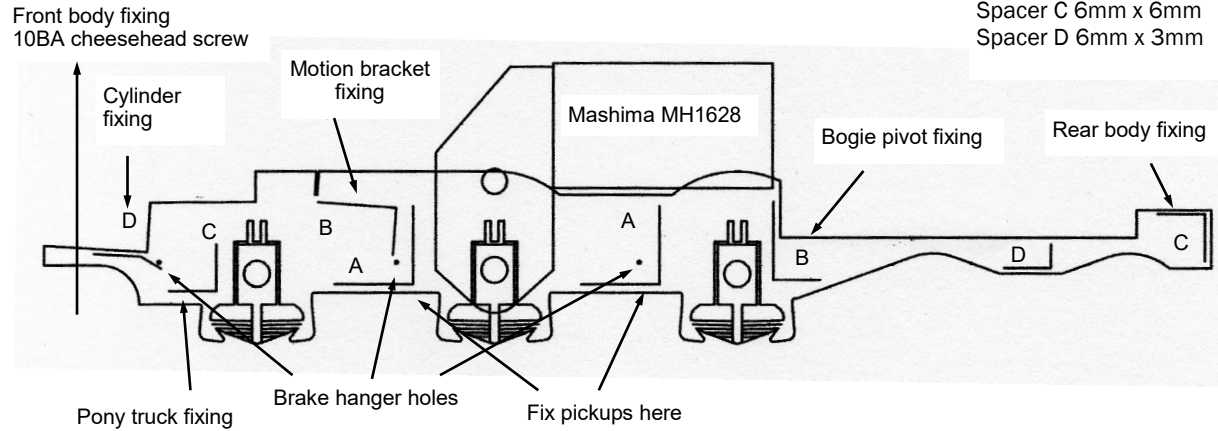
need a set of four turnings code LS59 which are intended to locate in the hornway during this stage of assembly.

5. For a sprung chassis insert each spring and hornblock, 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 3) then thread 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.
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 you can solder the two pull rods together and fix this assembly along the chassis centreline. This will however be more fragile, and will also make it more difficult to arrange pick up from the underside of the chassis. The rear brake pivot brackets are also threaded onto 0.7mm wire between the two pull rods and their upper ends are soldered to the insides of the frames.
8. Solder on M2.0 fixing nuts for cylinders, pony truck, bogie, motion bracket and pick-ups as required. The position of the fixing nut for the motion bracket is crucial, since it must line up with the hole in the bracket itself. To ensure that it does, temporarily fit the bracket in position on the frames and bolt it in place before soldering the nut to the spacer.
9. A replacement cylinder stretcher is provided on the frame etch. Discard the one supplied in LC1. The replacement is to be used with the castings in LC1 and will ensure a satisfactory fit to the Bachmann body (sketch 5). Follow the instructions supplied in LC1 for fitting the castings and slidebars.

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.

Our preference is for wiper pick-ups made from 26swg phosphor bronze wire as per sketch 4. 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. Pack LS23 provides the necessary parts.

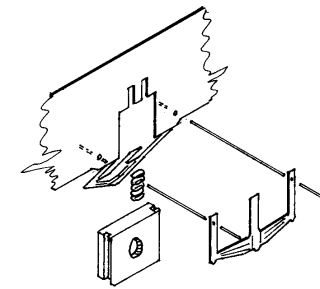
Sketch 1 Suggested Spacer Positioning



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

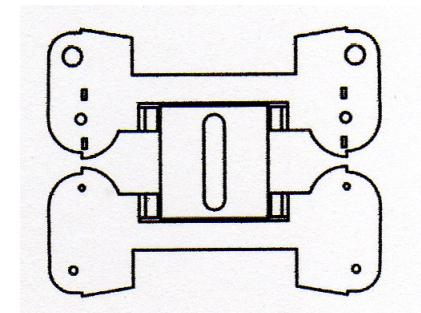
If using the Bachmann body, the existing rear body fixing cross-headed screw can be used. For the front fixing we recommend that the 'D' spacer is fixed to the rear of the cylinder location, as shown in the diagram above. That will then allow a 10BA cheesehead screw to go in front of the spacer but pass through the slot in the cylinder stretcher and locate in the pre-tapped hole in the body.

Sketch 2 Fitting hornblocks



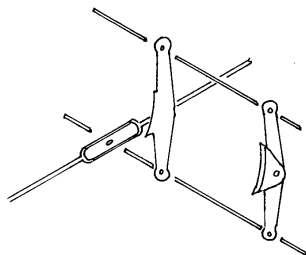
Sketch 5 Replacement cylinder stretcher

Fold the stretcher with folds to the inside, reinforce with solder, use slidebars from LM42 and castings from LC1

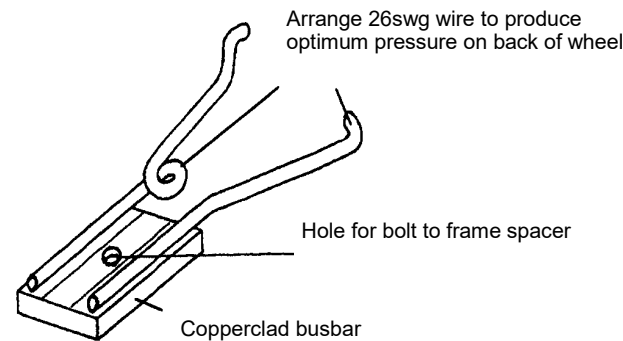


Part off at half etched lines if building an EM or P4 chassis (see notes in LC1)

Sketch 3 Brake shoe overlays



Sketch 4 Suggested pick up arrangement



Arrange 26swg wire to produce optimum pressure on back of wheel

Hole for bolt to frame spacer

Copperclad busbar