

Assembly Instructions for the L.M.S. FOWLER 2-6-2 TANK LOCO

Before assembling this kit the inexperienced modeller is advised to read the enclosed general sheet 'Hints on Kit Construction' or better still, the more comprehensive notes in K's catalogue.

Assembly should always be done on a flat surface, a 12" square of plate glass with the sharp edges smoothed off is ideal.

Suitable adhesives are 5 minute epoxy resin, any of the cyano-acrylate 'super glues' or low melt solder. If using low melt solder, make sure that the soldering iron is applied at a suitably low temperature to avoid melting the white metal castings. Ordinary electrical solder is not suitable.

After checking against the parts list, the castings should be removed from the skin pack using a sharp pointed knife, extra care is required when removing the finer castings since these can be easily broken. Casting runners should be removed and remaining pips cleaned off using a fine file, but taking care not to damage rivet and other fine detail. Castings will glue or solder better if burnished with a brass bristle suede brush or fibre-glass burnishing tool.

Each joint should be checked 'dry' and carefully filed to obtain the best possible fit and several trial assemblies are advisable to become familiar with the assembly arrangement and to check fits and alignment of component parts.

CHASSIS ASSEMBLY

1. Assemble sideframes (1) using spacers (2) with the centre holes vertical, securing with flat head screws (3). Place the chassis on a flat surface to check for twist and finally tighten the flat head screws. Remove any burrs or fraze from around the axle holes and check that the axles are a free fit. Check for free fit of 'flatted' axle (5) in the axle holes in motor casing (9) and note that backlash between worm (11) and gear (10) when mounted on their respective spindles (see diagram) is pre-set.
2. Locate the 'D' on the end of plain axle (5) into the 'D' in the driving wheel (6) and secure with axle screw (8). Place a spacing washer (4) over the axle and feed this through the rear axle holes in the chassis. Place another spacing washer over the protruding axle end and fit a second driving wheel. Repeat this operation for the front pair of driving wheels. Note that the centre pair of driving wheels have long crankpins. Ensure that there are no burrs or plastic flash on the outer faces of motor (9) and that it fits between the sideframes without too much force. Fit a driving wheel to the 'flatted' axle as before, followed by a spacing washer and feed through centre axle holes in chassis and at the same time locate the axle holes of the motor casing and the driven gear (10) which has a mating 'flatted' bore for driving purposes. Fit the remaining spacer washer and driving wheel. Note that no other motor fixing is required.
3. Position coupling rods (7) to crankpins with the small pips uppermost and the simulated knuckle joint to the rear. It may be necessary to open up the crankpin holes in the coupling rods if binding occurs but at first check alignment of the wheel cranks utilising the small amount of movement between wheel and axle afforded by the location flats. Secure front and rear with small nuts and lock by gently squeezing across the nut flats with long nose pliers and carefully file front pair of nuts thin to give maximum clearance with valve gear cross-heads to be fitted later.
4. Glue cylinder front, rear and side covers (13, 14 & 15) to form the cylinder assemblies. Check fit slidebars (16), cut from nickel-silver strip, to location hole in cylinder rear covers and check the whole assembly against the cylinder sub-frame (12). The cylinders should slope downwards front to rear so that the piston rod centre-line co-incides with the centre driving axle when the sub-frame is located on the chassis. Glue cylinders and slide-bars to sub-frame when alignments are satisfactory, 23mm of slide-bar should protrude from cylinder rear covers. Secure sub-frame assembly to chassis spacer using screw (S4) and nut (N2).
5. Check fit of crossheads/piston rods (27) to slide-bars and cylinders, a little filing may be necessary but avoid making the motion too sloppy. Pass 14 BA screw (29) through from inner face of connecting rod (23) and secure at outer face of crosshead (27) with nut (30). Check that the connecting rod pivots freely in the crosshead and squeeze nut (30) across the flats with long nose pliers to lock. Cut off the excess screwthread and file the nut thin to improve appearance. Remove crosshead assemblies and glue retainers (22) to back faces of slide-bar grooves in crossheads and re-check sliding fit on slide-bars; note that the holes in retainers (22) are redundant. Bend combination lever (28) as shown in diagram and fit to crosshead with brass rivet (67), squeezing the rivet shank flat on the inside with long nose pliers to secure and snip off the excess. Position crosshead assembly to slide-bar and check the free movement of combination lever in slot in sub-frame and glue radius rod (17) to sub-frame to retain lever in slot.
6. Check rivet hole clearances in valve gear links (24, 25 and 26), remove from the fret and lay them out in assembly order, right and left handed noting that fluted faces should face outwards.

RIVETTING

The rivetting operations should be done as follows:—

Stand rivet on a flat metal surface, place links in correct order with outer faces down and strike the open end of rivet two or three light blows of a 3½oz. hammer. The resulting joint must not be tight.

Rivet together return crank (24), eccentric rod (25) and motion link (26). Fit motion link to cast pivot on the inside of radius rod (17) and secure by gently squeezing the pivot end with long nose pliers. Force screw the return crank (24) to the long crankpin on the centre driver and set to trail at approximately 5°. Lock with glue or preferably solder. Check chassis for free rolling and glue worm (11) to motor spindle. Do not get excess glue in the motor bearing.

7. Fit pick-up wire (33) to plastic pick-up moulding (32) and solder motor lead wires (34) to pick-ups. Glue assembly to bottom edges of chassis side-frames between front and centre drivers as near to the drive gear as possible. Trim pick-up wires to bear lightly on extreme edges of front and rear wheel flanges and connect lead wire to motor tags checking that the chassis moves forwards and reverses to normal convention when track tested.

8. Press bogie wheels (21) to axles (20), position to slots in bogie truck (18) and secure with keeper plate (19) glued in position. Mount assembled truck to front screw (S4) and retain with nut (N2). Glue balance weights (70) to driving wheel rims opposite to crankpins. Note that chassis front extensions (69) are best fitted when body assembly is complete.

BODY ASSEMBLY

9. Dry assemble all main body parts and file as necessary to ensure best fits and square corner joints. Glue together, tank sides (36), tank front (37) and cab/bunker floor (47), this must be square and untwisted. Glue nut (N2) to underside of smokebox/boiler (35) and dry position boiler to main assembly along with front footplate (45). With the smokebox saddle seating inside the cut-out in the front footplate, a closed joint should be obtained between footplate rear edge and tank fronts, a little careful filing may be required. Glue footplate and boiler in position. Secure screw (S4) to hole in cab floor (47) using nut (N2) and glue in position, bunker rear (38), cab front (39), cab rear (40) and cab roof (41).

10. Position body to chassis and check that front and rear drivers clear the front footplate underside and cab floor respectively, a little filing may be required. Check also that when the rear footsteps (61) are fitted these clear the rear driving wheel crankpins. File chassis rear extensions (48) to length and glue these to the body. The front extensions (69) must be glued to the chassis.

11. Remaining details can be fitted in any order. Handrails are all to be formed from nickel-silver wire and small holes will need to be drilled in the body work to accept these. The nearside smokebox handrail should butt up against detail (68) and the offside handrail against the tank front level with the top edge.

LIVERY — L.M.S.

The following painting detail is given as a general guide only, photographic reference is advised for models of specific proto-types. Plain black all over with single red line, rounded at the corners, on tank and cab sides only. 14" MIDLAND pattern numerals, gold countershaded red up to 1936/7, yellow shaded red 1938 and after. 40" spacing to L.M.S. letters on tank sides.

PARTS LIST

CHASSIS

1. Sideframes (x2)
2. Spacer (x2)
3. Flathead screw (x4)
4. Spacer (plastic x6)
5. Axle (x3)
6. Driving wheel (x6)
7. Coupling rod (x2 etched)
8. Axle screw (x6)
9. Drive motor
10. Driven gear (plastic)
11. Worm gear
12. Cylinder sub-frame
13. Cylinder front cover (x2)
14. Cylinder rear cover (x2)
15. Cylinder cover (x2)
16. Slide-bar (n.s. strip)
17. Radius rod (x2 cast)
18. Front bogie
19. Bogie axle plate
20. Bogie axle
21. Bogie wheel (x2)
22. Crosshead retainer (x2)
23. Connecting rod (etched x2)
24. Return crank (etched x2)
25. Eccentric rod (etched x2)
26. Motion Link (etched x2)
27. Crosshead casting (x2)
28. Combination lever (etched x2)
29. 14BA screw (x2)
30. 14BA nut (x2)
31. Steel rivet (x6)
32. Pick-up unit (plastic)
33. Pick-up wire (n.s. wire)
34. Jump Leads (x2)
- N2 8 BA nut (x)

BODY

35. Boiler
36. Tank/cab side (x2)
37. Tank front
38. Bunker rear
39. Cab front
40. Cab rear
41. Cab roof
42. Smokebox door
43. Coal rail-rear
44. Coal rail-sides (x2)
45. Front footplate
46. Front buffer beam
47. Cab/bunker floor
48. Rear chassis extensions (x2)
49. Buffers (x4)
50. Pony truck
51. Pony axle plate
52. Pony axle
53. Pony wheels (x2)
54. Mechanical lubricators (x2)
55. Sandbox fillers (x2)
56. Chimney
57. Dome
58. Safety valve (x2)
59. Whistle
60. Vacuum Pipe (x2)
61. Rear Footsteps (x2)
62. Cab handrails (n.s. wire)
63. Front footplate handrails (n.s. wire)
64. Smokebox handrail (n.s. wire)
65. Smokebox side handrails (n.s. wire)
66. Handrail knob (plastic strip)
67. Brass pin (x2)
68. Vacuum ejector
69. Chassis front extensions (x2)
70. Balance weights (x2 sets)
71. Drain cocks (x2)
72. Front footsteps (x2)
73. Bunker handrail (n.s. wire)

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HINTS ON KIT CONSTRUCTION

Chassis assembly, being mainly screw together is fairly straightforward although care must be taken at each stage to ensure the free running of the finished unit. Particular attention should be paid to the holes in the coupling rods, make sure they are an easy fit over crankpins in wheels, they may be opened out slightly with a small round file. If bushes are fitted to frames it may be found that the axles are a tight fit and a 1/8" reamer should be used to clear the hole. The wheels quarter automatically and can be checked by ensuring spokes on each pair of wheels are in line when viewed from either side and that the crank is 90°.

Another point to watch is that the pick-up strips are touching the tyres on the wheels and that they do not touch the brass frames, (the latter can be overcome by placing a small strip of sellotape along the lower edge of the frames). Sparking between the tyres and strip can be cured by smearing the tyres with an electrolytic oil, this will also stop the tyres going rusty if the model is kept in a damp atmosphere, but great care must be taken to avoid any contact with motor. The complete unit should be lightly oiled and run-in for around two to three hours. A thick engine oil is recommended for motor bearings.

All castings should be thoroughly checked and all flash and feeders removed with a fine file. The long straight edges may be cleaned up with a large fine metalwork file. One or two sweeps along the complete length are better than several short strokes. The feeds around the boiler must be filed away, and ladies emery-board (card nail-file) is ideal for this job (although they do not last long, they are quite reasonably priced!) After that is complete all castings may be polished with a worn-out suede brush or a glass fibre brush. It should be remembered that the more work done at this stage the better the finished model.

Before applying any glue, each unit (firebox, cab, cylinders, etc.) should be put together dry and any fitting done with a small file, small gaps can be filled with a car body filler and filed to shape when dry. The fitting of castings to the boiler can be improved by wrapping the boiler with emery paper and carefully rubbing the part around same. E.g. boiler saddle, chimney, etc. The edges of boiler fittings should be carefully pushed down onto the boiler with an 1/8" rod (the handle of a small file will do) so that a neat fit is obtained. Recommended glues are Devcon 5 minute epoxy resin or, if you keep your fingers out of the way, Loctite 10 Second Superglue.

Before painting, the locomotive body should be carefully washed in warm soapy water to remove grease and dirt. Several light coats of grey primer should be applied. Spray cans are available from car accessory shops and are preferable to hand painting. After following the appropriate drying time, top coats in the main finishing colour may be applied, again several light coats give a better finish. Always spray from end to end, not stopping in the middle. It will also be found that car sprays can provide an extremely close match to railway colours. Apart from the obvious Black, British Leyland Damask Red is quite a good substitute for LMS Red, Brunswick Green for GWR Locomotives and Renault Dark Green for B.R. locomotives. Minor colours, black for smokebox and cab roof and red for buffer beams can be applied with a brush, normally only one thin coat being required. Holes for handrail knobs should be drilled with a number 65 drill. The handrail wire (24SWG) should be held between two pliers and stretched over a flame until it turns blue. This removes the springyness and so makes fitting easier especially around the front of the smokebox door. Remove any burr from the end of the wire and feed it through the knob and then remove it from the sprue one at a time. Handrail wire should be located in the knobs but not glued as it will be found that a coat of paint will hold it and will look neater on the finished model.

Finally, two points to note:—

If six or eight wheeled locomotives are to be used on tight radius curves, it may be necessary to remove the flanges from the centre wheels. If the original wheels are returned (D type) to us with return postage this service is free of charge. Also if any casting is damaged during construction it will be replaced free of charge if returned with return postage. All other parts are available at a greatly reduced exchange price.

In case of shortage or complaint please write direct to:

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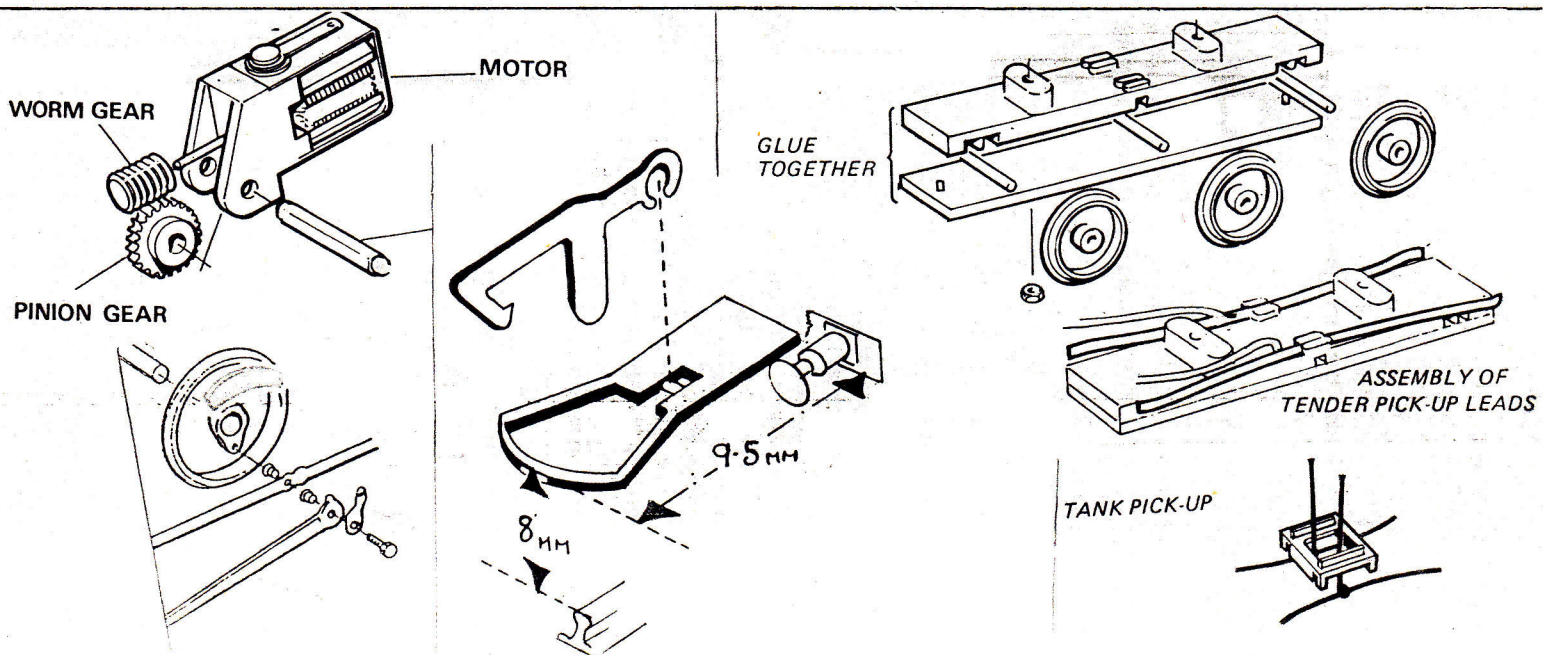
Grimsbury South Industrial Estate, Banbury, Oxon OX16 8SS.

Tel: Banbury 51021/2.

MODIFICATIONS

The following modifications may apply to your kit. Examine components supplied and use the appropriate instructions.

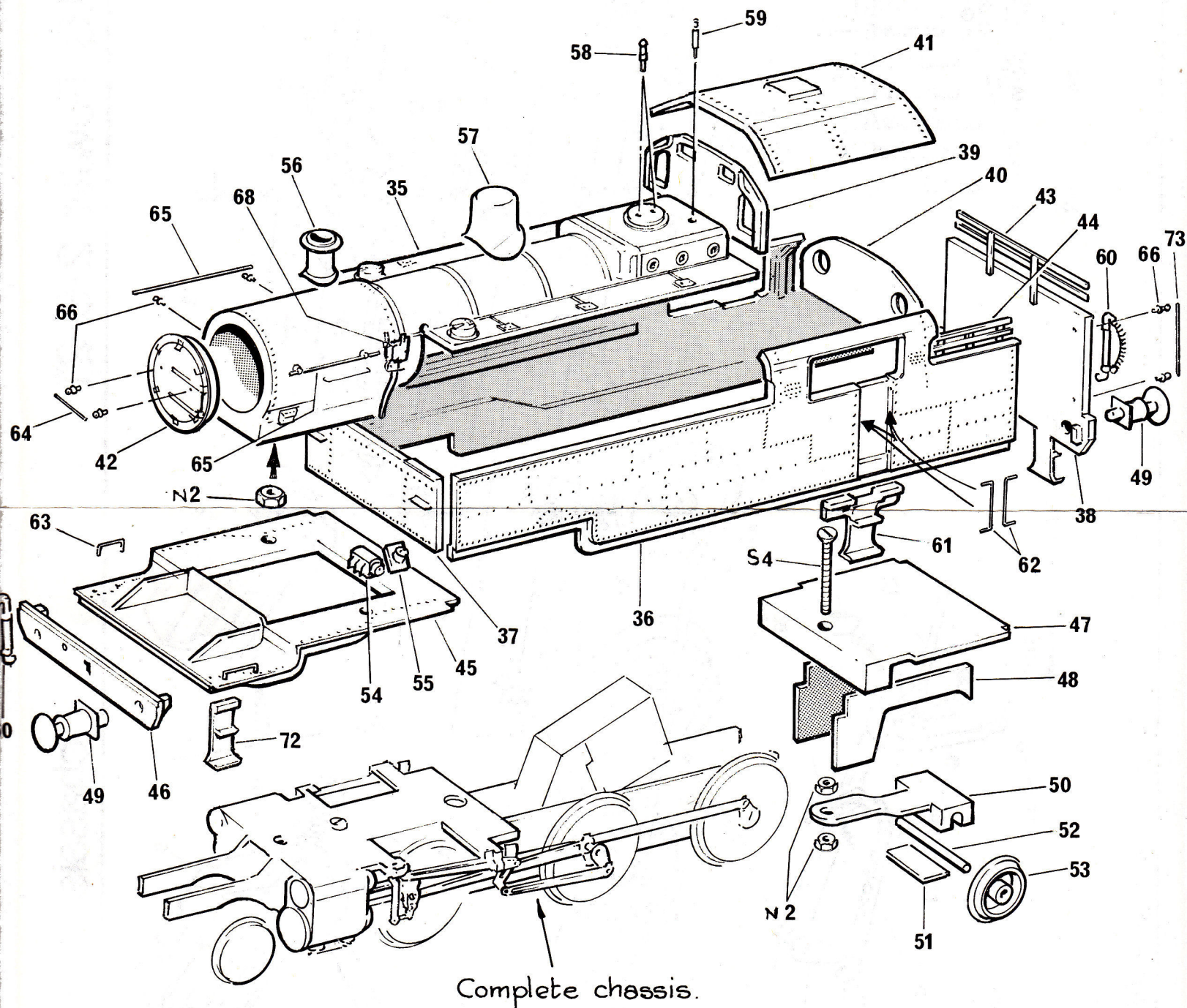
- GEARBOX MOTOR**- Assemble as diagram. The motor fixing frame spacers, spacer screws, 8ba fixing nuts and bolts, adaptors and grub screws are no longer needed or supplied. After completion of the chassis, the worm should be secured with a 'thread adhesive'.
- MOTOR SUPPORT**- A small black nylon bar with spigot, this supports the rear of the motor. Glue to frames in the appropriate position.
- HANDRAIL KNOBS**- Moulded in black nylon. A 9mm drill is required for fixing holes. Thread the wire through the knobs before removing them from the sprue.
- VACUUM PIPES**- Moulded in black nylon. Should be secured with epoxy resin or superglue.
- TANK PICK-UP**- Moulded in black nylon, one piece replacing earlier types. Slotted bars to accept the phosphor bronze strip are fitted on the underside across the two frames.
- TENDER PICK-UP**- On most tender locomotives this replaces the chassis pick-up previously used. It is secured by two cast plates fitted into slots in the tender sides.
- NYLON SCREWS**- These replace all metal screws except 14ba types for fitting coupling rods and valve gear. These screws should be trimmed to length when the model is completed.
- AXLE WASHERS**- White nylon on sprue with screws. These are to be used only with kits that do not require brass frame bushes ie with frames that have been pressed to accept only the driving axle.
- FRAME SPACERS**- These replace screw fit type and should be glued or soldered into position with holes either vertical or horizontal (check instructions).
- COUPLINGS**- The type supplied are the universal hook and bar type used on most commercial rolling stock. The hook should be clipped over the pivot bar. The unit should be fitted to a bogie or pony truck if applicable or under the buffer beams if not. In either case some trimming of the 'tongue' or filing of the castings will be necessary to obtain the correct distances from the buffer beam $9\frac{1}{2}$ mm and the rails 8mm. Secure with epoxy resin or superglue.
- DRIVING WHEELS**- The push fit type replace the screw fit type. If required they may be secured to the axles with superglue but this should not be necessary. The coupling rods will require the holes opening to accept the small brass bushes ($1\frac{1}{2}$ mm); they are then secured to the wheels with the steel hexagonal head 14ba screws. A further bush is required if connecting rods are fitted, the screws are long enough to accept both. Where an eccentric crank is fitted this should be assembled on the screw, the screw tightened, the crank positioned and then secured to the screw with glue or solder.





L.M.S Fowler 2·6·2T

superstructure



John dg abtrill 378



L.M.S Fowler 2.6.2T

chassis

