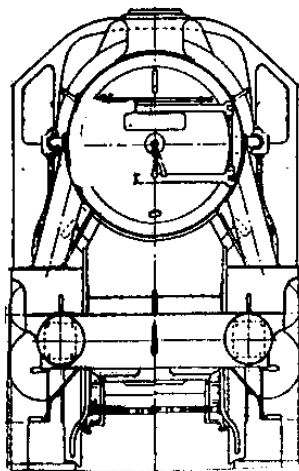
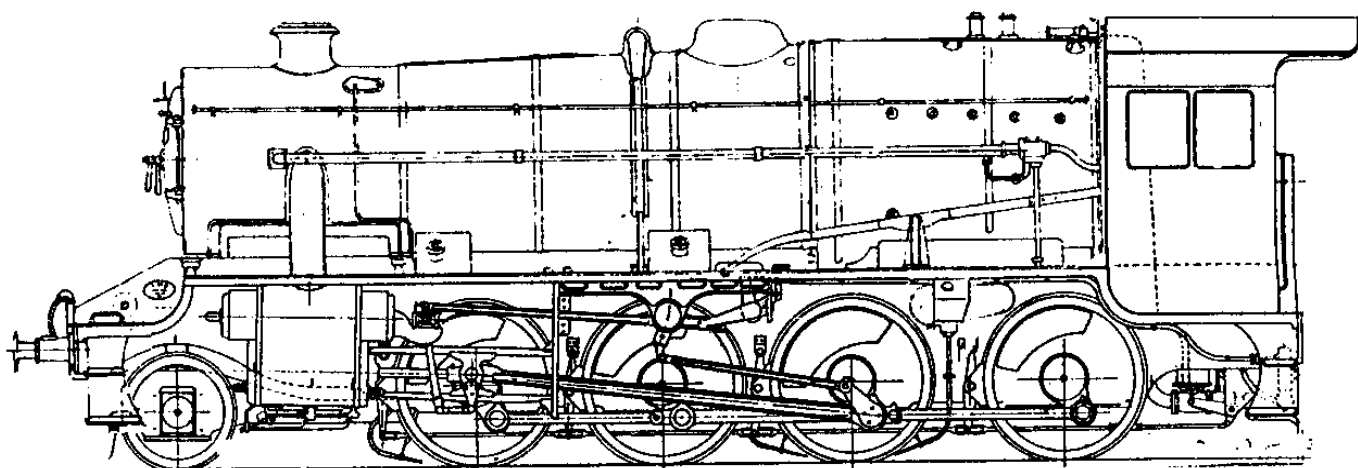


4mm Scale

L.M.S. Stanier 8F 2-8-0



L.M.S. STANIER 8F 2-8-0s

PROTOTYPE NOTES

The 8F (at first 7F) 2-8-0 was introduced in 1935 when Nos 8000 to 8011 entered service. These 12 locomotives featured a straight throat-plate firebox/boiler. Commencing with 8012 which entered service in July 1936, all the subsequent 8Fs were built with sloping throat plate firebox/boiler. In 1938 No 8003 had its frames altered to enable a sloping throat plate boiler firebox to be fitted and thus provide a spare boiler for Nos 8000-2 and 8004-11. As the kit is provided with the sloping throat plate boiler/firebox, it is not possible to build these eleven locomotives from the kit nor 8003 as originally built.

The 8F was selected firstly as a standard War Department type and later as a standard type to be built and used by all the British main line railways. This and the requisition of LMS engines by the War Department resulted in a complicated number sequence with many gaps (many of the LMS locomotives did not assume their original numbers on their return) and many variations, not all in numerical sequence and we recommend that you consult "An Illustrated History of LMS Locomotives" vol 5 by Bob Essery and David Jenkinson or/and "Stanier Locomotive Classes" by A J Powell, in addition to the usual advice that you attain a clear dated photograph of the locomotive you intend to model.

The main variations other than the boiler/firebox already mentioned can be summarised as follows:-

TENDERS

When first built, all the 8Fs were fitted with a Stanier 4000 gallon tender either fully riveted or welded. However, during the late 1950s an exchange of tenders with the Jubilee 4-6-0s fitted with Fowler tenders took place. The 8Fs so fitted with a Fowler tender were too random to list and you should look for photographic evidence if you either wish to model or avoid modelling a Fowler tender fitted loco.

The situation regarding Riveted or Welded tenders is not as straight forward as with the Black Five 4-6-0s. Nos 8000 -8095 were fitted with a riveted tender then commencing with No 8096, welded tenders were introduced and fitted up to No 8175 then from 8176, riveted tenders were reintroduced. Subsequently, beginning with No 8301, all 8Fs built at Crewe, Horwich and Swindon were fitted with welded tenders and those built at Darlington, Doncaster, Eastleigh, Ashford and Brighton were fitted with riveted tenders. We would refer you to the aforementioned books for details of the running numbers of the locos built at the various works at this time.

Construction of 8Fs had ended before the introduction of the part riveted tender so that, unlike the Black Fives, none were fitted to the 8Fs when new. We do not know if any 8F ran with a part riveted tender in later years.

CONNECTING RODS

The connecting rods fitted to engines up to and including 8125, were 11'3" in length. Commencing with 8126. all subsequent engines had connecting rods 10'10" long. No account of this variation has been made in the kit due to the small difference which would appear on a model.

REVERSING REACH ROD

Engines 8000 to 8145 had the curved type reach rod. From 8146 had the later straight type reach rod. The WD engines (including those later returned to the LMS/BR) had the curved type.

BALANCE WEIGHTS

All up to 8322 had the normal Stanier built up balance weights. Subsequently, due to wartime shortages, it was found difficult to provide the lead used in the built up balance weights and several batches were turned out from all the works engaged in building 8Fs, with cast integral balance weights. The list of the batches involved is complicated but is given in full in A J Powells "Stanier Locomotive Classes", page 92. From the 1950s, some interchange of wheelsets took place and there are some delightful Photographs of Locos fitted with a mixture of built up and cast balance weights.

OTHER DETAIL VARIATIONS

There were a number of smaller detail variations:-

8096 to 8155 were fitted with ball bearing eccentric rod ends.

There were variations in the position of the atomiser steam cock on the side of the smokebox.

8710 to 8729, built at Brighton for the LNER had Wakefield lubricators in place of the Silvertown lubricator standard on the LMS.

In the late 1950s, a number of Swindon built engines in the 484XX range of numbers were transferred to the Western Region, where the LMS type vacuum ejector in front of the cab was moved towards the front of the boiler and a shortened exhaust pipe to the smokebox was fitted. This arrangement was retained even when the locos were transferred

back to the London Midland region. Some of the engines purchased by BR from the War Department had a much larger top feed casing.

LIVERY

The engines were always painted plain black, both by the LMS and the WD. Nos 8012 to 8096 appeared when new with the short lived sans serif numbers and letters.

In view of the complicated numbering, the number of locomotives constructed by such a large number of builders and works, these notes are necessarily brief but attempt to unravel the main variations for the modeller. Again we recommend that you consult the aforementioned books and whatever photographs you can locate, to get a fuller picture.

4mm Scale LMS 8F 2-8-0

Kit Contents List

Miscellaneous parts

- 10 Short Handrail Knobs
- 10 Medium Handrail Knobs
- 6 2mm Hornblocks
- 8 1/8" Hornblocks
- 8 Crankpins (2 Long & 6 Short)
- 6 Plunger Pickups
- Turned Door Dart
- 8 1/8" Bearings
- 6 2mm Bearings
- 2 Small 2mm Bearings
- 4903 Buffers
- 10 Rivets Brass
- 10 Rivets Steel
- 3 Split Pins
- 11 12BAx 1/8" Screws
- 2 12BA x 1/4" Screws
- 10 12BA Nuts
- 1 12BA x 1/2" Screw
- 1 12BA washer
- 1 Crankpin Bolt, Nut and two short Bushes for Pony Pivot
- 1 Length 0.33mm brass Wire
- 4 Lengths 0.45mm brass wire
- 1 Length 0.7mm brass wire
- 1 Length 0.9mm brass wire
- Staples
- Pony spring
- Plastikard with boiler band tape
- Motor mount and gears
- 1mm x 1mm brass angle
- 1 Axle 3'3 1/2" wheels
- 3 Axles 4'3" wheels
- 4 Axles 4'7 1/2" wheels

Pewter Castings.

- Firebox
- Firebox front
- Boiler
- Smokebox

Whitemetal Castings.

- Backhead
- Reverser
- 2 Sandboxes
- 4 Firebox crown bubbles
- 1 Smokebox bubble
- 4 Sandbox Filler Pipes/Plate
- 2 Outside Steam pipes
- Smokebox Saddle
- Dome
- Top Feed
- 2 Top Feed Pipes
- Combined Dome & Top Feed
- Two Frame Strengtheners to go alongside Firebox.
- Cylinder - Piston Front Cover - 2
 - Piston Rear Cover - 2
 - Valve front Cover - 2
- Tender Surge Dome
- Tender Water Filler
- 6 Tender Axlebox/Spring
- 2 Tender Front Pipe Covers (Or Brake Columns if Fowler Tender)
- 2 Lubricators
- Reverse lever Guide

Brass Castings.

- 2 Vacuum Pipes
- Turned Brass Stanier Hooter
- 2 Ross Pop Valves
- Short Chimney
- Tall Chimney
- 2 Tender Tank Vents
- 2 Cylinder piston rear Valve guides
- Vacuum Ejector
- Pair Cylinder Drain Cocks
- Exhaust Injector
- Pair Crossheads with nuts and bolts.

NICKEL SILVER ETCHED PARTS

- C1 Frame (x2)
- C2 Front frame spacer
- C3 Rear frame spacer
- C4 Cylinder former
- C5 Motion bracket / frame spacer
- C6 Motion bracket overlay (x2)
- C7 Expansion link support bracket/frame spacer
- C8 Expansion link support
- C9 Expansion link bearing cover
- C10 Pony truck pivot plate
- C11 Pony truck
- C12 Pony truck sides (x2)
- C13 Spring supports (x2)
- C14 Spring overlays (x8)
- C15 Front coupling rod - rear layer (x2)
- C16 ditto - front layer (x2)
- C17 Centre coupling rod - rear layer (x2)
- C18 ditto - front layer (x2)
- C19 Rear coupling rod - rear layer (x2)
- C20 ditto - front layer (x2)
- C21 Upper slide bar (x2)
- C22 Lower slide bar (x2)
- C23 Connecting rod - front layer (x2)
- C24 ditto - rear layer (x2)
- C27 Return crank (x2)
- C25 Eccentric rod
- C26 Expansion link
- C28 Radius rod
- C29 Combination lever
- C30 Union link
- C31 Lifting link/reversing lever
- C32 Lifting links (x3)
- C33 Weigh shaft support bracket
- C34 Brake hangers - left (x4)
- C37 ditto - right (x4)
- C35 Brake shoes - left (x4)
- C36 Brake shoes - right (x4)
- C38 Brake stretchers (x4)
- C39 Brake pull rod
- C40 Brake lever
- C41 Brake lever support brackets (x2)
- 27 Reversing rod - curved version
- 28 Reversing rod -straight version

BRASS ETCHED PARTS

- 1 Footplate valance/former/jig
- 2 Main footplate
- 3 Front footplate
- 4 Rear footplate
- 5 Front frame extension (x2)
- 6 "Piano" front
- 7 Flange for "piano" front
- 8 Buffer beam -plain version
- 9 Buffer beam - rivetted version
- 10 Spectacle plate I cab false floor
- 11 Cabsides
- 12 Cab floor
- 13 Fallplate
- 14 Cab door (x2)
- 15 Cab locker - firemans side
- 16 Reverser stand
- 17 Cab seats
- 18 Cab side window frames - 2 x fixed and 2 x "sliding"
- 19 Cab roof
- 20 Cab beading
- 21 Cab roof lip strengthener
- 22 Cab roof vent
- 23 Lamp irons
- 24 Front step supports
- 25 Front steps
- 26 Drag beam
- C47 Rear step support
- C48 Rear step support brackets (x2)
- C49 Rear steps
- C50 Cylinder wrappers (x2)

BALANCE WEIGHTS

BUILT-UP TYPE

- C42 Leading and trailing wheel (x4)
- C43 Intermediate (x2)
- C44 Driving (x2)

CAST INTEGRAL TYPE

- C45 Leading and trailing (x4)
- C46 Intermediate and driving

4mm Scale L.M.S. Stanier 8F 2-8-0

CONSTRUCTION NOTES

GENERAL

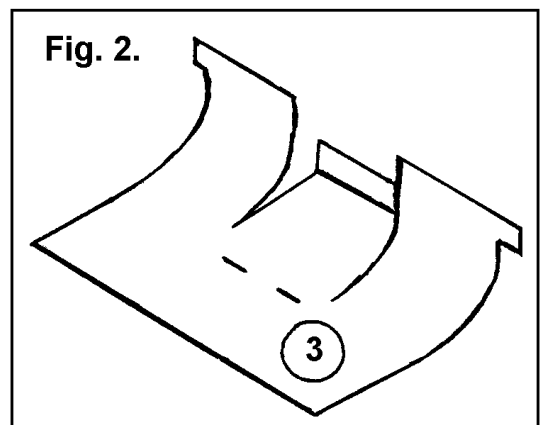
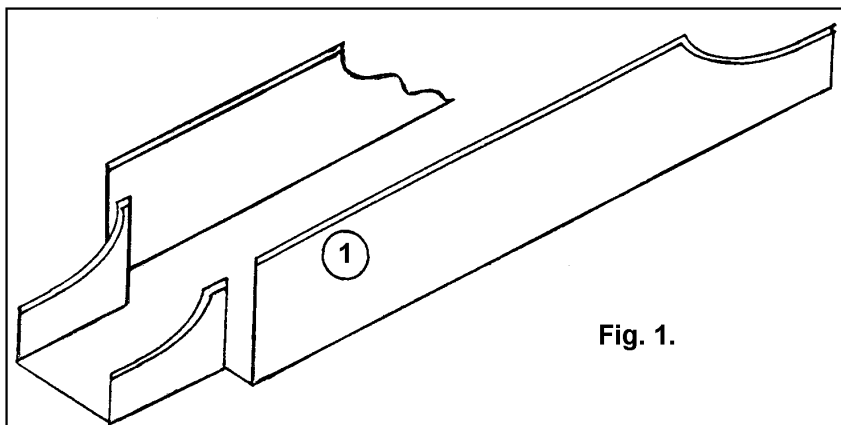
I must emphasise that these instructions explain the way that I built my model of the 8F - its not the only way - I am not even saying that you must build in this way - its just my way and it worked! You build your model your way but take due heed to problems that may arise in altering the order of assembly.

Fold lines are half etched into the surface of the metal and as a general rule the half etch line is on the inside of the fold. The wheels supplied with this kit are for 00/EM but if you wish to build to 18.83 gauge then please return the wheel pack to us together with sufficient stamps for return postage - please pack very carefully - just putting them in an envelope will almost certainly cause them to be damaged in the post if not totally lost! Don't laugh, you would be surprised how many times we receive just torn envelopes - just another small point - if you wish to model to 18.83 gauge (P4/S4) its not just the axles that are longer, the wheels have a different width and profile tyre so please send the entire wheel back. Yes we have quite a few people who, even in today's world believe that 18.83 is just re-gauged wheels. Having done quite a bit of test running I believe that the Mashima 1224 motor is quite powerful enough for the average layout. In an 8F and fitted to the enclosed Motor Mount hardly any of the motor will project above the level of the footplate.

NOTE PARTS NUMBERED PREFIX 'C' ARE FOR THE CHASSIS AND ARE MOSTLY ON THE NICKEL FRET.

BUILDING INSTRUCTIONS.

Remove Footplate valance/former jig (part No.1) from fret and clean up the valance tops removing any remnant of the tabs that held this onto the main fret. THIS IS VERY IMPORTANT. Remove the centre sections from this jig which contains other parts required later. Score the fold lines and fold the front section up first followed by the main section Fig.1.



Remove the main footplate (2) from the etch and solder this into position to the valance tops - note rear of the footplate is the part that has the opening. I found it easier to position the footplate by laying it upside down on the bench and placing the cradle onto it and solder on the inside.

Remove front footplate (3) from the etch, treating with care as it can easily be damaged, bend the small lip up at right angles at the rear of the middle section. Form the curve on the sides to match the valance (Fig. 2) and solder into position.

Take footplate rear section (Part No.4) bend to fit the valance and solder into position - note that this section fits under the main footplate overhang.

This footplate assembly should be nice and square, and time taken now to check that this is so will ensure less heart-ache latter in the assembly Gentle bending can be used to ensure squareness and you should not proceed until you are happy with this.

Take the front frame extensions (part No.5), trim these then solder the half etch part to the back of the full thickness part (Fig.3). Slide these into position in front footplate part No.3 and solder when happy.

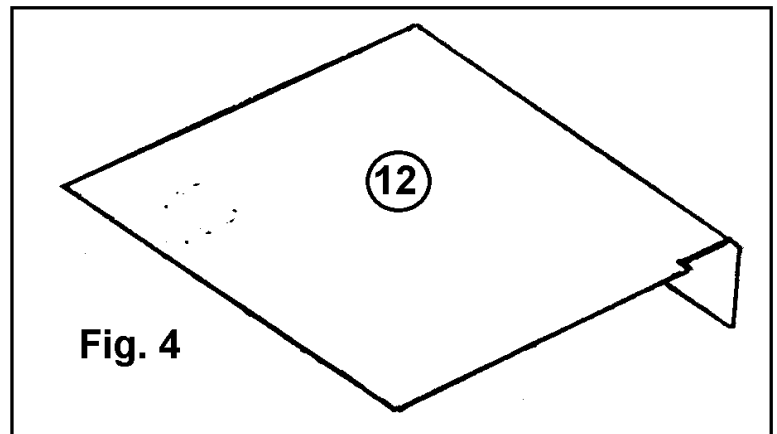
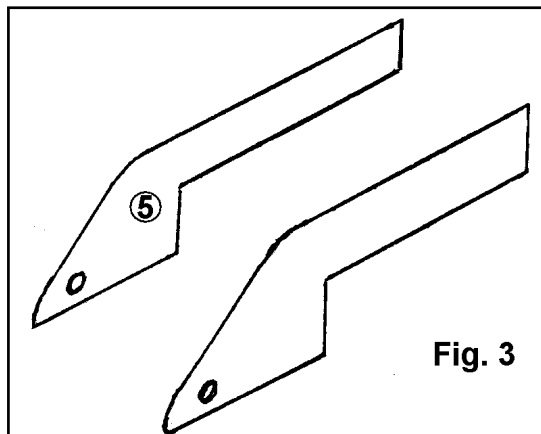
Remove piano front (8) from fret and bend into an L shape. Take Flange for piano front (Part No.7) bend into a 'U' shape and solder this into position on front footplate 3. Slide piano front into the grooves in 7 and locate into the slot of the upright section of footplate and flange - solder.

Take front buffer beam (8 or 9 - plain or riveted) and solder into position to valance and footplate Follow this with rear drag beam 26.

Remove cab spectacle plate/false floor (Part No.10 from the etch sheet). Fold into an 'L' section with the half etch line being on the inside of the bend - note that the rivet detail on the cab faces to the outside of the cab!

Place this cab 'assembly' into position on the footplate and with a piece of newspaper trapped between the cab floor and footplate pass two 12BA bolts up through the holes to the outside of the cab floor and secure into position with nuts on top of the false floor - solder nuts into position. Follow this up by soldering a 12BA nut over the hole in the middle of rear footplate 4, this will be used to retain the mainframe in the completed body.

Cab sides 11 fit outside the front edge of the cab front. Use a file very carefully on the bottom curve of the cab side to ensure they are a good fit. Before soldering into position bend the cab returns in at right angles then out again - to be honest I found this easier to do by removing the return, shaping and then soldering to the back edge of the cab side, having also soldered the cab doors 14 to these returns first. Solder sides firstly to the cab front, check for squareness and then solder to the false floor. Remove cab assembly from footplate.



Take cab floor 12 and bend the section down at the back - study this item before bending - you will find the fold line etched on the back - not the one on the detail front! (Fig.4).

The fall plates 13, can be made to pivot by soldering loops of 0.33mm wire into holes in the bent down section of the cab floor then passing tabs on the fall plates through them and bending the tabs down. Check for fit of cab floor into cab front/sides and when happy solder into position.

Part 15 folds up into a locker that fits into the slots in footplate on the fireman's side (Right hand side) with part 16 forming the reverser stand that fits on the left hand side inside the cab and parts 17 being the cab seats.

The cab window inner frame is fitted inside of the cab sides with the larger opening towards the rear of the cab Follow these double etches with the single ones fitted in any position - closed, open, part open - parts 18.

The cab roof, Part No.19, is easily shaped around your finger or even a yard brush handle! Take your time and ease it a little at a time. When you are happy with the shape/fit solder to the cab from the inside, ensuring the rear top corner of the sides align with the edge and the roof hangs over the sides by an equal amount.

Fit ventilator (part No.22) on top of the roof as open or closed or anything that takes your fancy.

Take cab beading 20 and drill the hole out in the end of these 0.45mm, Carefully bend to shape with this hole to the bottom and solder into place on cab rear edge and roof set in edge.

Take a length of 0.45mm wire and bend to shape to form the cab rear handrail - solder into holes in beading 20 and cab side return.

Part 21 is cab roof rear lip strengthener which is soldered into position beneath the rear edge of the cab roof.

Fit small handrails using 0.45mm wire to the holes in front footplate 3.

Items 23 are lamp irons but as many of you already know I much favour using cut down staples as they are much stronger.

Parts 24 and 25 make up into the front steps and are soldered as a made up unit beneath the front footplate item 3 - see main drawing for position.

If you look at the main footplate (2) you will notice that there are four small sections that will fold up from the footplate to represent frame projections above the footplate - do this now very carefully.

The firebox boiler and smokebox castings are not whitemetal and can take far more heat than is normal, so if you are brave you can solder them together, but if you are like the rest of us you will be more cautious and glue them! You will of course note that no boiler bands have been cast onto these items and this is because whenever these are cast in situ they are always much too thick. If you look at a picture of a prototype locomotive at certain angles you just cannot see the bands. Our method is to use a form of sticky tape, a length of which you will find attached to a strip of plasticard within this kit box. Using a sharp scalpel knife cut strips approx. 1mm wide and position these on the firebox and boiler in the relevant positions. When painted over they will give a much better representation of the said boiler bands. A strip of this tape is also used to represent the pipe covers coming down from the top feed covers - but on some locos you can see the pipes - castings are supplied in this case - no hard and fast rules on which engines had which due to boiler changes - pictures are the only certain way to tell.

Place the firebox into position on the footplate and drill the three holes through from the cab inside 1.05mm. Remove casting and tap holes 12BA. Trim carefully until a good square fit is achieved. Fix firebox front to firebox.

Place the smokebox saddle casting into position between the frames. Temporarily fit the boiler to smokebox and place these in turn into position on the footplate assembly - we begin to have a loco at last! When happy with the fit of this assembly glue - or solder - gulp - these units together and to the footplate etc. Follow these with the sandbox fillers/plates - fix these to boiler and footplate and they will give great support to the footplate and make the whole body much stronger.

Mark out and drill holes for handrail knobs 0.9mm and fit handrails to smokebox front and boiler sides etc. The first knob on the firebox side in front of the cab is a short one with all others on the side of the firebox, boiler and smokebox being medium length. Use short type on the smokebox front.

Fit lost wax vacuum ejector casting with a length of 0.9mm rod, trim to length and fit to boiler side using split pins.

Now - with baited breath - its time to cut the body from the jig. Using a slitting disc in a mini drill cut through all the tabs holding the valance to the cradle. Trim any remnants of tabs.

Fit boiler fittings of choice - sorry but this minefield gets worse - photographs are the only way.

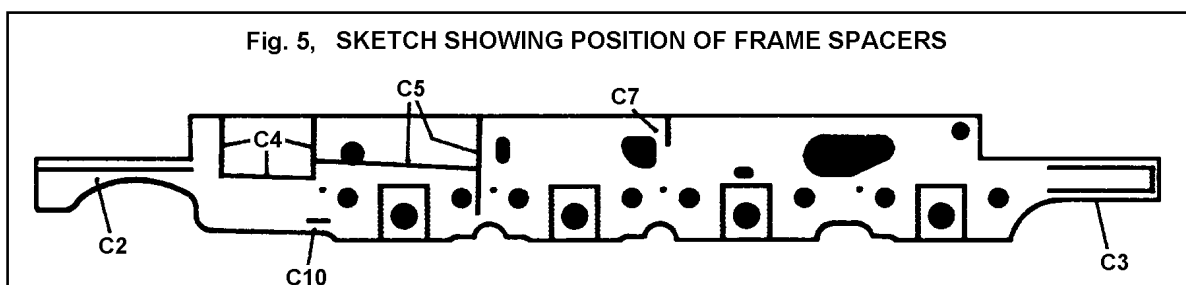
Study the historical notes provided and choose the type of reverser lever you wish to use - 27 or 28 - from the nickel fret.

CHASSIS CONSTRUCTION

Take chassis sides C1 and drill the three holes for brake rigging in each out to 0.7mm. If wishing to use the plunger pickups then the holes for these should be drilled 2.5mm in the relevant positions.

If wishing to build a rigid chassis then solder 1/8" bore bushes into the holes for the axles - remember to make up a pair of frames! If you require to fit compensation then remove the half etched area around each axle and assemble the homblock units into the frame - again remember to make up a pair of frames - its so easy not to.

Assemble the motor mount as a complete unit i.e. fit motor, gears, bearings and axle and run in. Remove the motor and build the mount assembly into the chassis as you go along - I fitted so that the drive was on to the second from rear axle with the motor trailing back towards the cab, but if preferred you could drive on the rear axle and even angle the motor upwards into the firebox.



Note that three complete sets of spacers, cylinders and motion brackets are supplied - 00, EM and S4. ..

C10 spacer has a crankpin nut soldered over the centre hole of the three in it and when put into the frames has this part with the nut on facing the rear and nut towards the top of the frames (Towards the boiler). Fit all spacers to one frame before attempting to fit the other side frame - yes I know its simple but you would be surprised as to the sort of letters we get! Don't fit cylinder or motion bracket 04 and 05 yet.

Once the second side frame is soldered to the spacers ensure the chassis is square and true.

Bend up the cylinder former/stretcher C4 and slide into position in the slots in the frames.

Take motion bracket/frame spacer C5 and solder Motion Bracket overlays C6 to non detailed side of C5. Bend the frame spacer forward at right angle on C5/6 and place this assembly into the beginning of the slot in frames. Ease the cylinder stretcher C4 up from its slots and locate the two small tabs on the end of spacer leg C5/6 into the slots in C4 - push both items right home to bottom of slots in frames.

Slidebars - these are made up from two laminations for each one. C21 make up the upper bars with C22 the lower. Assemble these to each other and then solder into position in cylinders and motion bracket. Take great care when fitting these slidebars and ensure that they stay parallel and the same distance apart - file the tabs on the motion bracket if needed.

Fit cylinder end castings, form cylinder wrappers (C50 on brass fret) and fit to the formers C4.

Very carefully remove the cylinder/motion bracket assembly from the frames and put to one side.

Take spring supports C13 and solder the spring overlays C14 onto these - again ensure you make up a pair.

Pass lengths of 0.7mm wire through holes for brake hangers in the frame and at the same time thread the spring supports on to these wires positioning the supports at the back of each main frame - solder supports to frame. Allowing the wire to protrude from each side of the mainframe solder wire into position.

Fit crankpin screws into the wheels from the back and fit wheels to axles in the frame.

Assemble coupling rods by soldering two layers together for each rod - see parts list for location and part numbers. Note that these rods pivot as a half lap joint on each crankpin.

Fit short crankpin bushes to front two and rear wheels with long bushes on the driven (second from rear) wheels then ream the holes open in rods with a round needle file to give a slack but snug fit.

Quarter two axles of driving wheels so that the right hand side leads by a quarter of a turn and fit the correct section of coupling rods to these. Roll the chassis and adjust the quartering to obtain a free rolling effect. When happy with this running fit the next section of coupling rods joining another axle of the wheels to the party - roll the chassis along and if it binds only adjust the quartering of this latest wheelset as it can only be this that is causing the problem - when happy join the last axle to this assembly and again only adjust this latest addition. This way you will find that the mystery of quartering wheels is a mystery no more.

Locate gear mount on correct axle whilst doing this.

Refer to prototype notes and take chosen balance weights and glue these into position on the wheels by reference to drawings and photographs.

Make up 8 sets of brakes and once again don't forget they are handed! Hangers C34 have blocks C35 and hangers C37 have blocks C36. Drill holes in both ends of hangers 0.7mm.

Take brake brackets C41 and drill holes out 0.7mm then solder into slots in rear drag spacer C3. Drill holes in brake levers C40 out to 0.7mm pass a length of 0.7mm rod through both brackets C41 and trap the two C40 between C41 at the same time - short leg of C40 facing downwards with the long leg facing the front of the loco. Solder wire to C41 and trim flush.

Fit brake assemblies onto the wire left projecting from the sides of the frames and position them as close to the wheels as possible without shorting.

Take brake stretchers C38 and pull rod C39 and assemble these by passing C38 through C39 and locate the ends of C38 into the lower holes of the brake hangers C34 and C37 - when happy with locations solder into positions. Pass a short length of wire through the short leg holes in C40 brake linkage and hook this wire onto C39 - solder and trim wire.

Ensure the chassis and body fit together correctly if not having done this before. The rear of the chassis is fixed to the body by passing a 12BA bolt through rear spacer C3 and into the nut in middle of rear footplate 4 - ensure screw is not overlong or you will distort the cab assembly. The front of the chassis is retained in position on the body by cutting a length of 1mm 'L' brass section to be the same width as the frame spacers and soldering this to the rear of the front buffer beam so that it traps the front spacer C2 centrally and snugly against the body.

Take the rear footstep backplate C47 and solder steps C49 into the half etch areas. Fold back plates down at right angles to the centre section and offer this assembly to the mainframes. These must fit flush with the top edge of the

frames - file the top of the frames down until this is achieved. C48 straps fit between the back of the step bracket and chassis and act as a support to stop them bending in.

Assemble connecting rods by soldering the two layers together - C23 and C24.

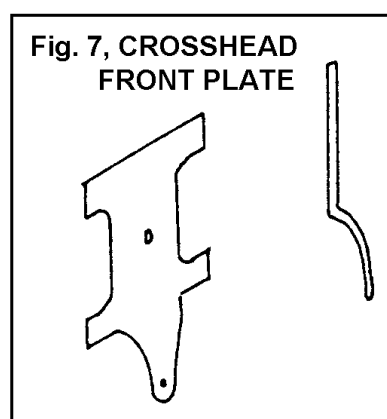
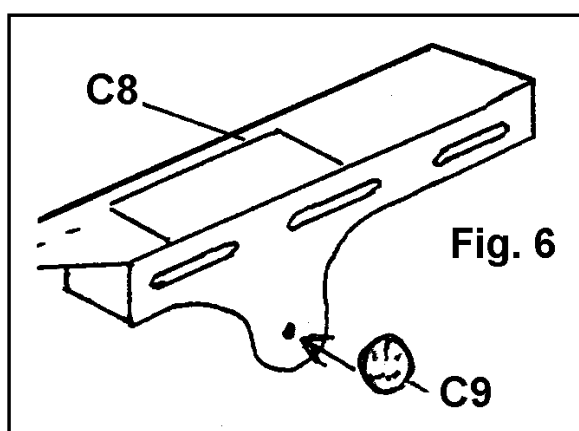
Trim crosshead casting to give a smooth sliding fit on the slide bars. Fit a length of 0.9mm wire to each crosshead to represent the piston rod.

From the rear of the crosshead pass a steel M1 screw through the hole and solder into position in this hole. Place crosshead into position in slidebars, locate the end of the connecting rod over this screw and hold assembly into position with the other lost wax cast plate and a turned steel round flanged nut.

Very carefully place the cylinder assembly back into the mainframes, couple connecting rod to middle crankpin and test roll.

Solder cylinder and motion bracket into the mainframes.

Take expansion link supports (C8) and drill the holes out to 0.7mm - fold into a 'U' section and also bend the small leg in at the front of the main drop down section (Fig. 6) - refer to main drawing will show how this assembly looks.



Place mainframe into position in the body again. Place C8 assembly between the motion bracket/spacer C5 and reversing shaft support spacer C7. Push up snugly to fit underneath the footplate and against the valance and solder to C5 & C7. Remove frames from body again.

Disassemble the crossheads again. Take the crosshead front plate and bend the lower section out into a dog leg see sketch fig. 7.

Drill all holes in the valve gear out to 0.33mm. This where personal preference comes into play - I prefer using brass pins and soldering them into place on valve gear. If you wish to differ then steel rivets are supplied and they require holes of 0.9mm.

The method I use to assemble valve gear is to place the rivet head down on the bench with the tail sticking up - place what would be the outer most section of valve gear face down over this tail, then push a piece of newspaper over the pin followed by the other piece of valve gear - a touch of flux, dab of solder, remove the paper and bingo!

C30 forms the lower link (union link) and should initially be attached to The OUTSIDE of the lower section of the crosshead front plate.

C29 is the drop link (Combination lever). Having struggled on another model to fit a valve rod (which uses the second hole down from the top) and when finished you could not see it my thought is don't bother.

C28 is the valve rod and is 'fixed' to the outside of top hole in drop link C41. Drill out the hole at the end with the ob-long opening to 0.7mm.

C26 is bent up to form the expansion link with the middle holes drilled out to 0.7mm.

Carry on with assembly of the valve gear 'fixing' eccentric rod C25 to return crank C27 and in turn fitting the other end of C25 to the outside of the lower angled hole in the expansion link.

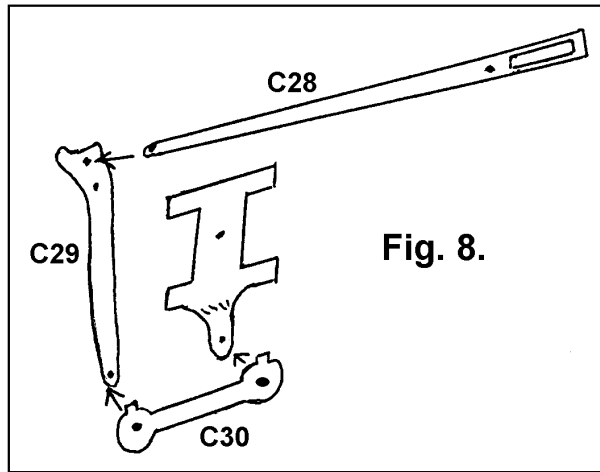


Fig. 8.

Each side valve gear makes up into two separate units which are brought together and assembled into position by passing a length of 0.7mm wire through the holes in C8, through holes in the expansion link and also through C28 valve rod which has to be positioned through the middle of the expansion link. A real snakes nest and best done in a very calm mood! When threaded solder the wire into position and finish C8 by fitting bearing cover C9.

Take items C33, drill the holes out 0.7mm and bend each into an 'L' shape. Look at the main side elevation drawing and solder these into position to the front face of spacer C7.

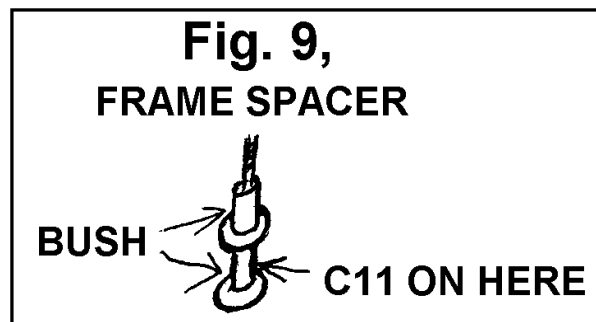
Pass a length of 0.7mm wire through the holes in the forward facing wings on C33 - don't solder at this stage. Take the three lifting links C32 and lifting arm C31 and drill the two holes in each 0.7mm.

Fit a short pin of 0.7mm wire to the front hole (Narrow end) to two of link C32. Two lifting links are used on each side of the wire projecting from parts C33 and they are positioned one each side of the end of the valve rod C28 with the short pin on one going through the oblong hole in the end of C28. At the same time on the left hand side of the frames the lifting arm is first threaded onto the rod projecting from C33 - study the loco drawing and it begins to make some sense.

Take pony truck sides C12 and solder a small bearing into the axle holes. Pony truck spacer C11 is bent to shape with all bends being made with half etch lines being on the inside of the bends. Solder sides C12 to this spacer.

Solder a long 12BA bolt into the rearmost hole in spacer C2 with the bolt soldered into the top of the spacer with threaded portion pointing downwards.

Fit wheels to pony truck and using a crankpin bolt fit this pony frame to mainframe spacer C10. Note that this truck assembly will need spacing down from the spacer and two short crankpin bushes are used to do this. Failure to do this will result in the pony truck catching on the mainframes. At the same time as doing this locate the spring over the bolt projecting down from spacer C2 - spring may need shortening - retain lightly in place with washer and nut.



Other than small fittings and further pipework that just about finishes your loco.

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