

4MM Scale LMS BLACK 5

Kit Contents list.

Brass & Nickel frets as per attached list.

- 10 Short handrail Knobs
- 10 Medium Handrail Knobs
- 6 2mm Hornblocks
- 6 1/8" Hornblocks
- 6 Crankpins (2 Long, 4 Short)
- 6 Sprung Pickups
- Turned Door Dart
- 6 1/8" Bearings
- 6 2mm Bearings
- 4 Small 2mm Bearings
- 4903 Sprung Buffers

- ~~10 Rivets Steel~~
- 10 Rivets Steel
- 3 Split Pins
- 11 12BA x 1/8" Screws
- 2 12BA x 1/4" Screws
- 10 12BA Nuts
- 1 Length .33mm brass wire
- 4 Lengths .45mm brass wire
- 1 length .7mm brass wire
- 1 length .9mm brass wire
- Staples
- Bogie Spring
- Plastikard with boiler band tape

- ~~1mm x 1mm brass angle~~
- 1mm x 1mm brass angle

Alloy Castings.

- Firebox
- Boiler
- Smokebox

Whitemetal Castings.

- Backhead
- Reverser
- 2 Sandboxes
- 4 Firebox crown bubbles
- 1 smokebox bubble
- 4 sandboxfiller pipe/plate
- 2 Outside steam pipe
- Smokebox saddle
- Dome
- Top Feed
- 2 Top feed pipes
- Combined Dome & Top feed
- 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
- tender Water scoop

- 2 Lubricators

Brass Castings.

- 2 Vacuum Pipes
- 2 Steam Heat Pipes
- ~~2 Handles for tender brake and water pick up~~
- 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

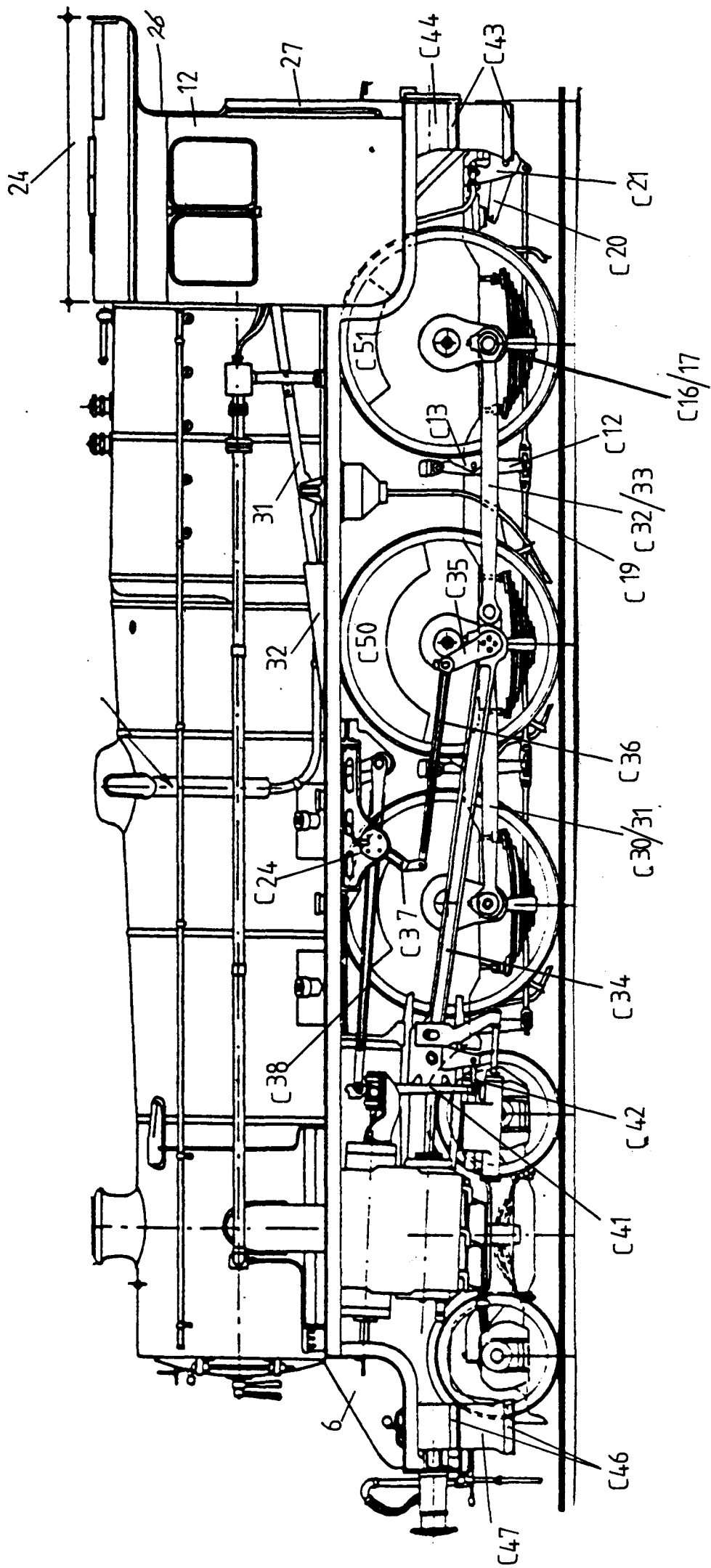
" CROSSHEADS

~~474~~

2 x 3'3 1/2" ST

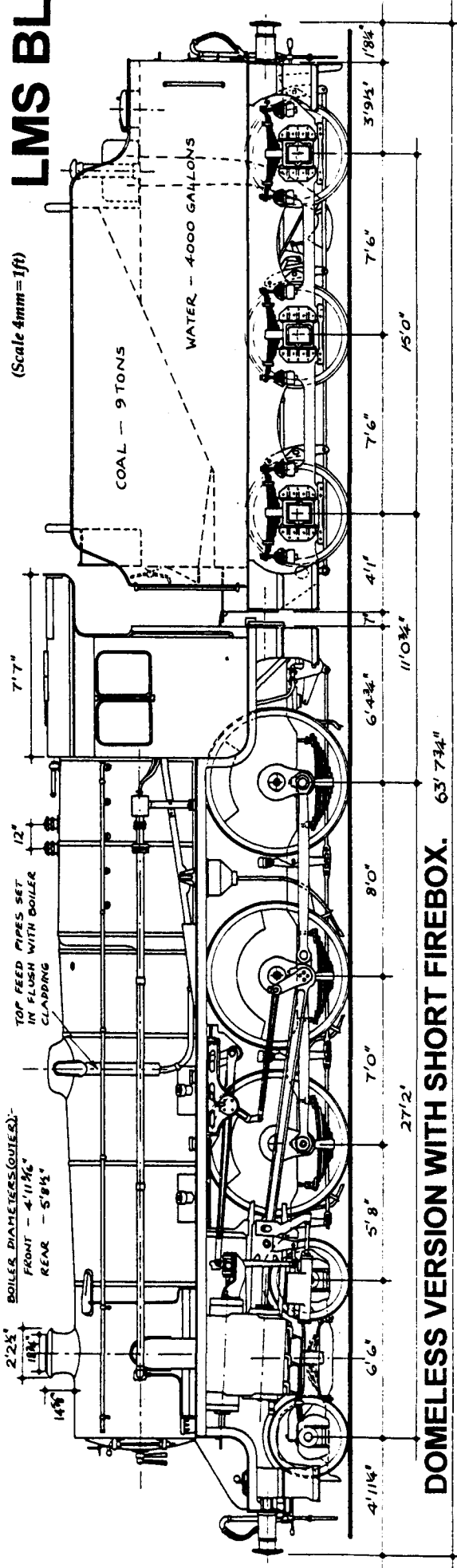
3 x 4'3" ST

3 x 6' 19SP STANIER

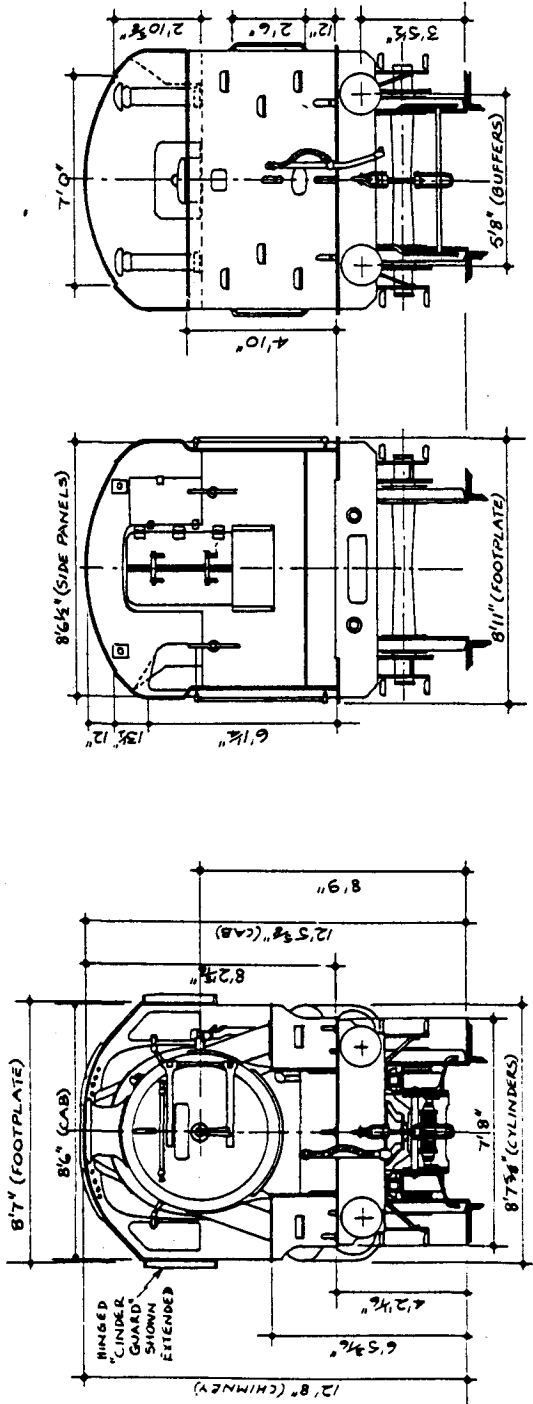


LMS BLACK!

(Scale 4mm=1ft)



HOMELESS VERSION WITH SHORT FIREBOX. 63' 7 3/4"

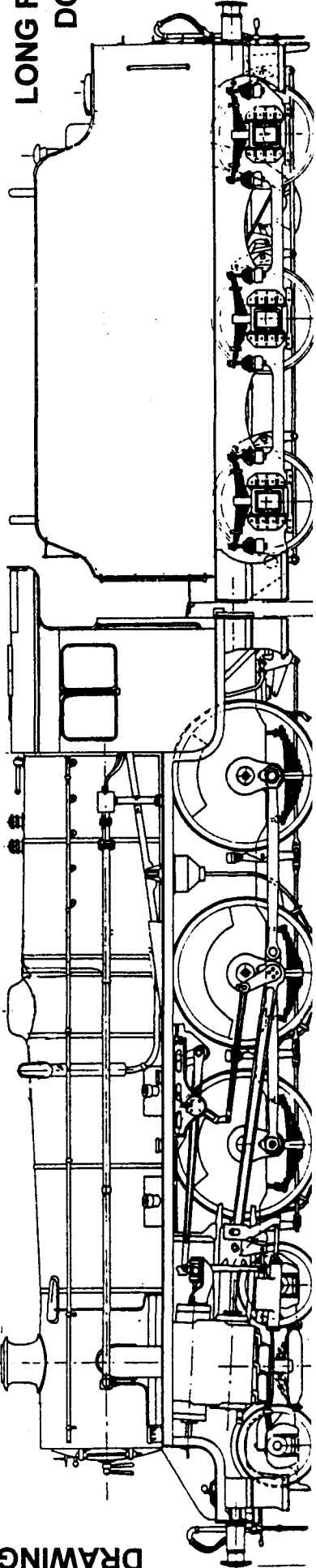


- BOGIE WHEELS:-** 3'3 1/4" DIAMETER
10 SPOKES
- DRIVING WHEELS:-** 6'0" DIAMETER
19 SPOKES
- TENDER WHEELS:-** 4'3" DIAMETER
12 SPOKES

NOTE: THIS DRAWING SHOWS THE EX-WORKS CONDITION OF THE LOCOMOTIVES NUMBERED 5000-19, 5070-5224. IT IS ALSO GENERALLY SUITABLE FOR LOCOMOTIVES NUMBERED 5020-69. HOWEVER, ON THESE ENGINES, THE CHIMNEY WAS ABOUT 3" TALLER AND AT FIRST, THE PIPES FROM THE TOP FEED CLACKS WERE CARRIED OUTSIDE THE BOILER CLADDING. SUBSEQUENT BOILER CHANGES BETWEEN ENGINES RATHER UPSET THIS TIDY PATTERN.

**LONDON MIDLAND AND SCOTTISH RAILWAY
CLASS 3P5F MIXED TRAFFIC LOCOMOTIVE -
HOMELESS VERSION WITH SHORT FIREBOX**

LONG FIREBOX WITH DOMED BOILER



L M S BLACK FIVE

PARTS LIST

CHASSIS - NICKEL SILVER

BODY

C1	Frame (X2)	1	Valance / footplate jig
C2	Front spacer	2	Front footplate
C3	Rear spacer	3	Main footplate
C4	Cylinder former	4	Rear footplate
C5	Motion bracket	5	Piano front
C6	Spacer	6	Frame extensions & saddle support
C7	Reversing shaft support	7	Frame extension overlays
C8	Spacer	8 or 9	Buffer beam (chice of plain or rivette)
C9	Bogie support	10	Drag beam
C10	Bogie control spring bracket (X2)	11	Cab front & false floor
C11	Brake hangers - left (X3)	12	Cab sides (X2)
C12	Brake hangers - right (X3)	13	Cab floor
C13	Brake shoes - left (X3)	14	Cab floor support
C14	Brake shoes - right (X3)	15	Reverser stand
C15	Spring support - left	16	Cab splasher side (fireman's side on)
C16	Spring support - right	17	Cab splasher top
C17	Spring overlay (X6)	18	Locker
C18	Brake stretchers	19	Locker lid / fireman's seat
C19	Brake pull rod	20	Drivers seat
C20	Brake levers (X2)	21	Drivers seat support
C21	Brake bracket (X2)	22	Cab window inner frame (X2)
C22	Upper slide bar - 2 laminations (X2)	23	Cab sliding window (X2)
C23	Lower slide bar - 2 laminations (X2)	24	Cab roof
C24	Expansion link support (X2)	25	Cab roof vent cover
C25	Expansion link extension (X2)	26	Cab beading (X2)
C26	Expansion link bearing cover (X2)	27	Cab side extensions (X2)
C27	Bogie	28	Cab doors (X2)
C28	Bogie spacer	29	Fall plate
C29	Bogie equalising beams (X2)	30	Steps on front footplate
C30	Front Coupling rod front layer (choice of plain or fluted) (X2)	31	Reverser rod
C31	Front coupling rod rear layer (X2)	32	Reverser rod overlay (X2)
C32	Rear coupling rod front layer (chice of plain or fluted) (X2)	33	Lamp irons.
C33	Rear copling rod - rear layer (X2)		
C34	Connecting rod - two layers (X2)		
C35	Return crank (X2)		
C36	Eccentric rod (X2)		
C37	Expansion link (X2)		
C38	Valve rod (X2)		
C39	Lifting link (X2)		
C40	Lifting Arm		
C41	Combination lever (X2)		
C42	Union link (X2)		

CHASSIS CONT (Brass)

C43	Rear steps
C44	Rear step support
C45	Rear step support brackets (X2)
C46	Front steps
C47	Front step support
C48	Front step support brakets (X2)
C49	Rear sandbox supprt brackets (X2)
C50	Balance wight - Centre drivers (X2)
C51	Balance weights, front & rear drivers

BLACK FIVE SUMMARY

(A tour through a minefield)

- 5000 - 5224 Built with domeless boilers and short fireboxes. Many domeless boilers were subsequently rebuilt with domes. See page 144 of Jenkinson / Essery LMS Locomotives vol 2 for sample numbers but beware that boilers did move from loco to loco.
From 1937 the following locos had their frames altered to take long firebox boilers; 5002, 5020, 5022, 5023, 5026, 5027, 5040, 5047, 5054, 5057, 5058, 5097, and 5142.
Further locos were altered after nationalisation including 45082, 45108, 45109, 45151, 45169 and 45177.
- 5225 - 5471 Built with domed boilers and long fireboxes.

All the above built with plain section coupling rods

- 5472 - 5499&
4800 - 4996 As 5225 - 5471 but with fluted section coupling rods.
- 4997 - 4999&
4768 - 4799 As 4800 - 4996 but with top feed on the front ring of the boiler
- 4758 - 4766&
4688 - 4737 Visually similar to above but with 27'6" wheelbase and therefore 4" longer frames footplate and smokebox.
- 4767 As above but with Stephenson's valve gear
- 4738 - 4757 27'6" chassis but inside driven Caprotti valve gear and low running plate.
- 4686 - 4687 Outside driven Caprotti valve gear and high running plate.

The following engines built with double chimnies 4765 -4767
44755 - 44757 & 44686 -44687.

The above summarises the position on building but any short firebox engine could receive any short firebox boiler, either domed or domeless.

The long firebox could receive either the pre or post war style boilers and there were many instances of pre war engines running with the post war style boilers and vice-versa. NB long firebox engine No 45433 ran with a short fire box boiler between 1958 and 1962.

Many odd balls turned up during B R days such as domeless boilers fitted with the later style of top feed cover instead of the more usual dome shaped cover and at least one long firebox engine (No 45432 photographed in June 65) with a dome shaped top feed cover off a domeless boiler in addition to the usual dome.

The four named engines appear to have run with domeless boilers throughout their lives but at least one engine, 45158, ran with a top feed cover off a domed boiler from c1954 to at least 1960.

BUILDING DATES

5000-5019	1935	Crewe
5020-5069	1934/5	Vulcan Foundry
5070-5074	1935	Crewe
5075-5124	1935	Vulcan Foundry
5125-5224	1935	Armstrong Whitworth
5225-5451	1936/7	Armstrong Whitworth
5452-5471	1938	Crewe
5472-5491	1943	Derby
5492-5499	1944	Derby
4800-4825	1944	Derby
4826-4860	1944	Crewe
4861-4931	1945/6	Crewe
4932-4999	1945/7	Horwich
4768-4782	1947	Crewe
4783-4799	1947	Horwich
4758-4767	1947	Crewe
44738-44757	1948	Crewe
44698-44717	1948/9	Horwich
44718-44737	1949	Crewe
44658-44667	1949	Crewe
44668-44685	1950	Horwich
44686-44687	1951	Horwich
44688-44697	1950	Horwich

NB The short fireboxes did not have mudholes with their blister shaped covers on the shoulder. These began to appear before the war but many fireboxes were never fitted. there are many 1960s photographs of engines without them.

TENDERS

Unlike the Jubilees, the Black Fives were always coupled with Stanier 4000 gallon tenders apart from the four coal weighing tenders used for testing purposes, which ran behind various Black fives from time to time. The tenders came in three varieties and were initially allocated to the various locomotives as follows:-

5000-5124, Fully riveted

5125-5499 & 4800-4806, Welded

4807 onwards, part riveted, part welded.

Whilst many Black Fives retained their original tender throughout their lives, many tender changes did take place. Not all the preserved Black Fives are paired with a tender of the type first allocated. E.g. 5000 has a welded tender and 45212 has a part riveted, part welded tender.

The modeller has three choices therefore. Select the type of tender originally attached to his chosen loco, find a dated photograph or select the type he prefers even though it may never have run behind that Loco, after all it is your model.

4mm Scale L.M.S. BLACK 5

CONSTRUCTION NOTES

GENERAL

I must emphasise that these instructions explain the way in that I built my model of the Black 5 - its not the only way - I am not even saying 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.

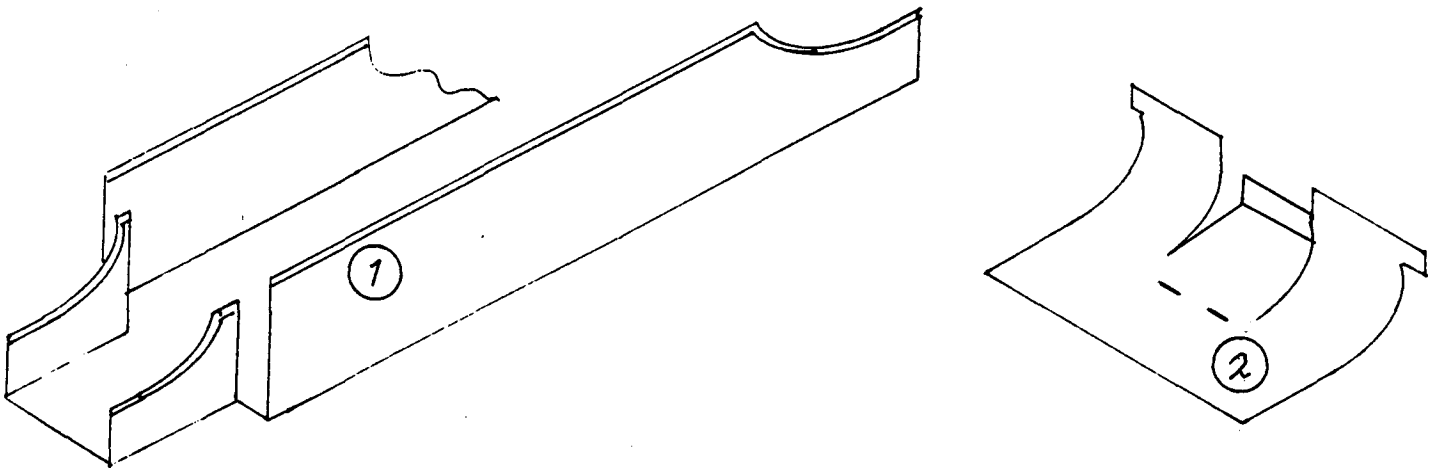
Fold lines are half etched into the surface of the metal and as a general rule the half etch line is on the inside of the fold.

The wheels supplied with this kit are for OO/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 who even in todays world believe that 18.83 is just regauged wheels. Having done quite a bit of test running I believe a Mashima 1224 motor is quite powerful enough for the average layout in a Black 5 and it will fit on the enclosed motor mount with no motor projecting above the footplate.

Note parts numbered prefix 'C' or 'V' are on the nickel fret.

BUILDING INSTRUCTIONS.

Remove 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 entire centre section 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.



Remove the main footplate (3) from the etch, leaving the centre details between the two halves as this helps to set the correct distance apart of the two footplate sections. Solder both footplates to valance top - note rear of the footplate is the parts that have the narrowest distance between them. 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.

Very carefully remove the front footplate (2) from the etch. Great care must be taken with this part until it is soldered into position as it can be easily damaged. Bend the small lip up at right angles at the rear of the middle of this part. Form the curve to match the valance 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.

Remove the centre section from the main footplate using a slitting disc.

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

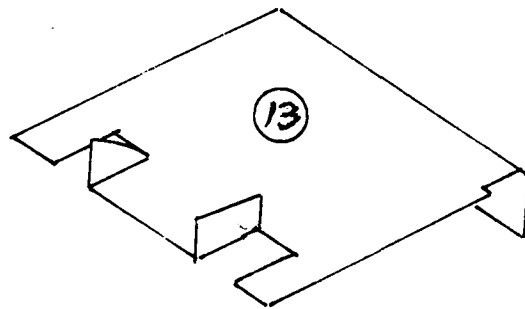
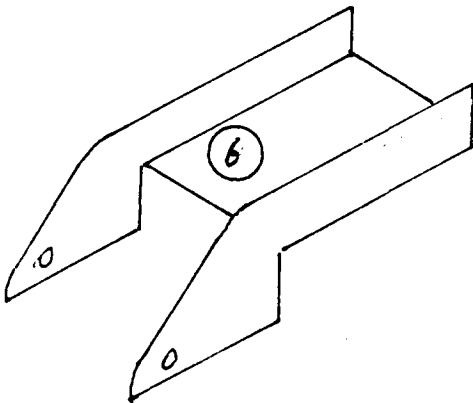
Take the saddle and frame extension (part No.6) and fold up the frame extensions on each side. Take overlays 7 and solder these to the inside face of these frame extensions. This unit then slides into position in the footplate unit from the front.

Remove piano front (part No.5) from fret, bend into an 'L' shape and solder into position on front footplate and between the frame extensions 6/7.

Take front buffer beam (8 or 9 - Plain or riveted) and solder into position to valance and footplate, follow this with rear drag beam 10.

Remove cab front/false floor (part No.11) from the etch sheet. Fold into an 'L' section with the half etch line being on the inside of the bend - note that rivet detail on 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.



Sides 12 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 and 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 13 and bend up the two splasher sides.

The fall plates 29, can be made to pivot by soldering loops of .33mm wire into holes on the floor support bracket 14, then passing tabs on fall plate through them and bending down the tabs. Bend floor support into a 'U' shape and solder beneath the cab floor. Check for fit into cab and solder assembly into position.

The two parts numbered 27 are the cab side returns and door hinges. They are handed and should be fitted with care. Bend each strip at right angles and solder into position just inside of the cab rear. Follow these with the fitting to the cab return of the cab doors 28.

Parts 16 and 17 fit together to make up the splasher on the fireman's side inside of the cab (Right hand side) with part 15 being bent and fitted to the left hand splasher side in the cab to make a reverser stand.

18 makes up into a fireman's locker with part 19 on top to make a fireman's seat - some chance!, the driver is taken care of in this way by making up parts 20 & 21 which can be made to tip up if you really think its worth it.

The cab window inner frame (22) is fitted inside of the cab sides with the larger opening towards the rear of the cab. Follow these with the cab sliding window fitted in any required position - open, part open, closed.

The cab roof Part No.24 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.25) on top of the roof as open or closed or anything that takes your fancy !.

Take cab beading 26 and drill the hole out in the end of these .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 .45mm wire and bend to shape to form the cab rear handrail - solder into holes in beading 26 and cab side return 27.

Parts 30 are the small steps that fit into the etched slots in front footplate item 2.

Fit small handrails using .45mm wire to the holes in front footplate 2. Most of the position of these small items can be gleaned by referring to the drawings of the locomotive that David Jenkinson has kindly allowed us to reproduce.

Items 33 are lamp irons but as many of you already know I much favour using cut down staples as they are much stronger.

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 plastikard 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 loco's 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 .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 .9mm rod, trim to length and fit to boiler side using split pins.

Now - with baited breath - it's 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.

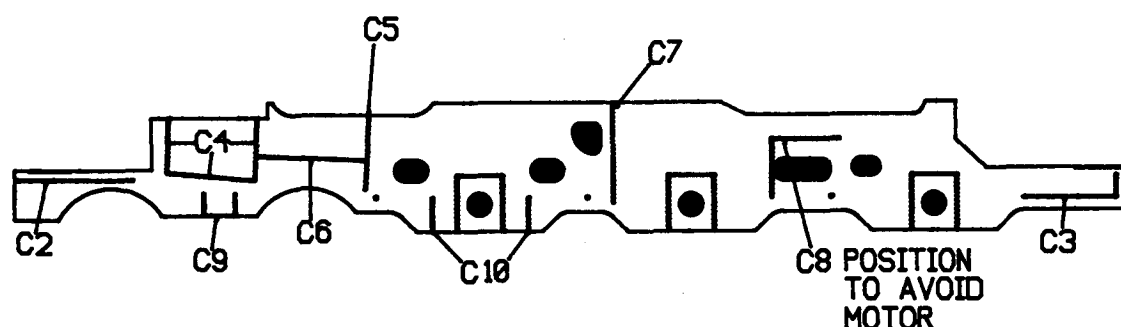
Take reversing rod 31 and one each of the overlays 32 to each side and then locate into the slot in footplate and cab front.

CHASSIS CONSTRUCTION.

Take chassis sides C1 and drill the three holes for brake rigging in each out to .7mm. If wishing to use the plunger pickups then the holes for these should be drill 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 hornblock 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 middle 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.



FRAME SHOWING POSITION OF SPACERS

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

C9 spacer - bend up into a 'U' shape and solder a 12BA nut on the inside of this.

C7 Spacer - ensure the two small wings are bent to face FORWARDS on the inside of the frame before soldering into position - drill the holes in these out to .7mm.

C10 spacers - drill holes out to .7mm.

C8 spacer has no fixed location but can be positioned once all other spacers and motor are located.

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 (C4 and C5 with C6) 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 C5 and bend the small etch tabs (Slidebar supports) towards the rear of the chassis. Place this into the beginning of the slot and at the same time locate spacer C6 into the slots in C4 and C5 - when C5 is finally slid right home solder spacer C6 to C4 and C5.

Slidebars - these are made up from two laminations for each one. C22 make up the upper bars with C23 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 castings, form cylinder wrappers (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 C15 & C16 and solder the spring overlays (C17) onto these - again ensure you make a pair up.

Pass lengths of .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 to each other noting from the history supplied and photo's that either plain or fluted rods can be used. C30 rod onto C31 and C32 to C33. Note that these rods pivot on the centre crankpin with a half lap joint. Fit short bushes to outer wheels and long bushes to the centre drivers then ream the holes open in the coupling 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 other coupling rod that joins the third axle to the setup. Roll the chassis along and if it binds only adjust this latest wheelset as it can only be this that is causing the problem - this way you will find that the mystery of quartering wheels is a mystery no more.

Glue wheel balance weights to wheels in the correct position by reference to drawing and photographs - C50 to centre drivers and C51 to front and rear.

Make up six sets of brakes and again don't forget they are handed !. C11 & C12 hangers have blocks C13 and C14 soldered to them. Drill holes in both end of hangers .7mm.

Take brake brackets C21 and drill holes out .7mm then solder into slots in rear spacer C3 - the downwards projection of C21 is to the front of the loco. Drill holes in brake levers C20 out to .7mm - pass a length of .7mm rod through both brackets C21 and trap the two C20 between C21 at the same time - short leg of C20 facing downwards with the long leg facing towards the front of the loco. Solder wire to C21 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 C18 and pull rod C19 and assemble these by passing C18 through C19 and locate the ends of C18 into the lower holes of the brake hangers C11 - when happy with locations solder into position. Pass a short length of wire through the short leg holes in C20 brake levers and hook this wire onto C19 - 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 a soldering this to the rear of the front buffer beam so that it traps the front spacer C2 centrally and snugly against the body.

Fold up the rear sandbox support brackets C49 and solder them into position between the centre and rear drivers and up tight against the underneath of the footplate. Fit sandbox castings inside the brackets and fabricate sanding pipes from .7mm wire.

Remove chassis again from the body.

Take the footstep backplates, C44 rear and C47 Front, and solder steps C43 (rear) and C46 (front) into the half etch areas. Fold back plates down at right angles to the centre section and offer each assembly to the mainframes. These must fit flush with the top edge of the frames - file slots until this is achieved. Straps C45 (rear) and C48 (front) and support straps that fit to the back of the step bracket and chassis giving support to bracket.

Assemble connecting rods by soldering the two layers together - C34.

Trim crosshead casting to give a smooth sliding fit on the slide bars. Fit a length of .9mm wire to each crosshead to represent the piston rod.

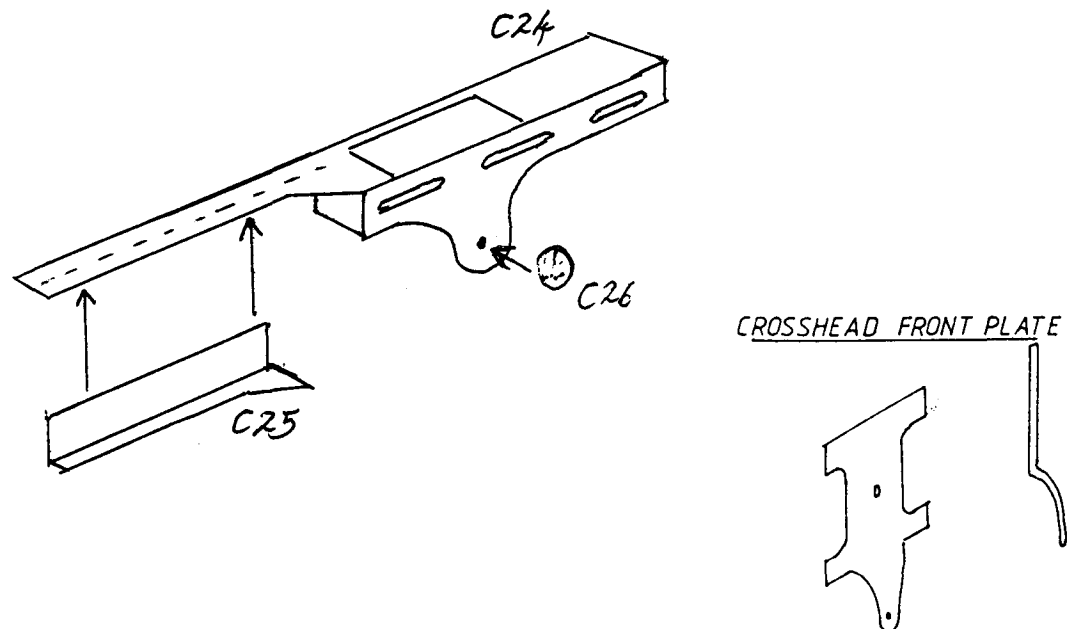
From the rear of the crosshead pass a steel M1 screw through the hole and solder into position in this hole. Place crosshead into position in slidebars, locate the end of the connecting rod over this screw and hold assembly into position with the other lost wax cast plate and a turned steel round flanged 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 (C24) and drill the holes out to .7mm - fold into a 'U' section and also bend the small leg in at the front of the main drop down section - refer to main drawing will show how this assembly looks.

Take expansion link support extension (C25) and bend at right angles - this is soldered into the half etch line on item C24 - see sketch.



Place mainframe into position in the body again. Place C24 assembly between the motion bracket/spacer C25 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.

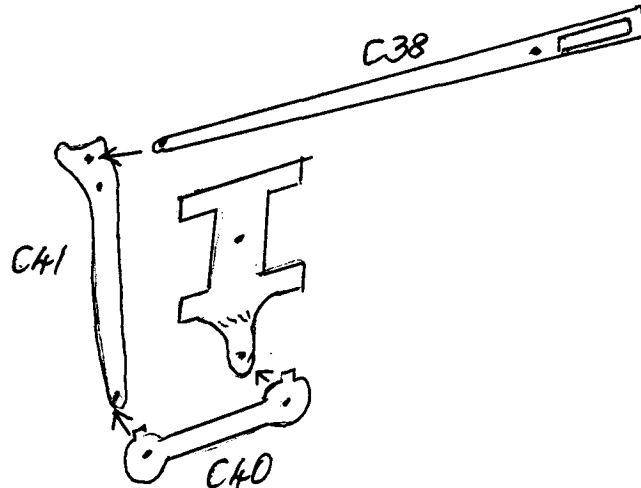
Drill all holes in the valve gear out to .33mm. This where personal preference comes into play - I prefer using brass pins and soldering them into place on valve gear. If you wish to differ then steel rivets are supplied and they require holes of .9mm.

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 !.

C42 forms the lower link (union link) and should initially be attached to the OUTSIDE of the lower section of the crosshead front plate.

C41 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.

C38 is the valve rod and is 'fixed' to the outside of top hole in drop link C41. Drill hole the hole at the end with the oblong opening out to .7mm.



C37 is bent up to form the expansion link with the middle holes drilled out to .7mm.

Carry on with assembly of the valve gear 'fixing' eccentric rod C36 to return crank C35 and in turn fitting the other end of C36 to the outside of the lower angled hole in the expansion link.

Each side valve gear makes up into two separate units which are brought together and assembled into position by passing a length of .7mm wire through the holes in C24, through holes in the expansion link and also through C38 valve rod which has to be position 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 C24 by fitting bearing cover C26.

Pass a length of .7mm wire through the holes in the forward facing wings on spacer C7 - don't solder at this stage.

Take the four lifting links C39 and lifting arm C40 and drill the two holes in each .7mm.

Fit a short pin of .7mm wire to the front hole (Narrow end) to two of link C39. Two lifting links are used on each side of the wire projecting from spacer C7 and they are positioned one each side of the end of the valve rod C38 with the short pin on one going through the oblong hole in the end of C38. At the same time on the left hand side of the frames the lifting arm is first threaded onto the rod projecting from C7 - study the loco drawing and it begins to make some sense.

Take bogie C27, drill all the holes out to .7mm and fold into a 'U' shape.

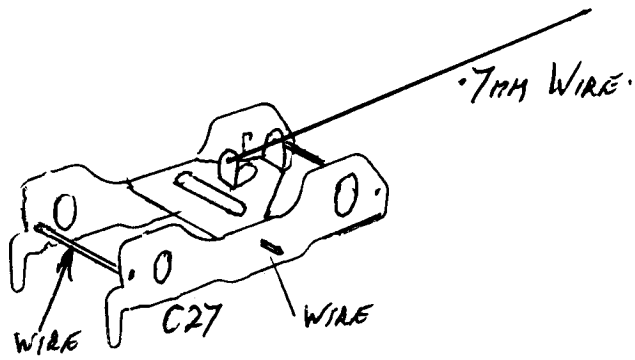
Bogie spacer C28 is also formed into a 'U' and soldered into position on the main bogie C27.

A length of .7mm Wire is soldered through each of the holes in the sides of the bogie - the front and rear ones are filed off flush with the outside but the middle ones are left projecting from each side.

Solder small 2mm bore bearings into the holes in each end of C29 which is the bogie equalising beam. Drill middle hole out .7mm.

Place these beams over the projecting rods on the bogie and assemble wheels through these bearings - trim projecting wire down.

Pass a length of .7mm brass wire through the two brackets on top of the bogie (having bent them up) solder one end to the bracket nearest the middle of the bogie leaving the end projecting towards the rear overlong.



Turn chassis upside down and offer the bogie to chassis - the end of the long leg of the .7mm wire is now threaded through the holes in spacers C10. Take a long 12BA bolt and pass down through the curved slot in the bogie, locate a spring over the end on the bolt and then locate the bolt into the nut in spacer C9.

At that your loco should be finished.

The loco is called a Black 5 and surprise they were always painted black in LMS and BR Days ! During the LMS period several carried the black with red lining livery and in BR days some carried the BR mixed traffic lining - but - plain black was the most common Shear bliss for the painting !.

oooOooo

ALAN GIBSON (WORKSHOP)

THE BUNGALOW
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LINGWOOD
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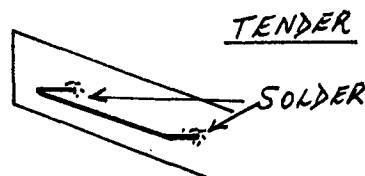
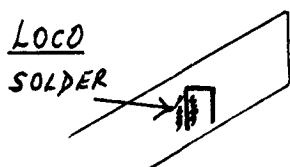
MODEL ENGINEER
2MM - 10MM
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HINTS & TIPS TO AID KIT CONSTRUCTION.

KIT ASSEMBLY. Rather than solder as such use a product called 'Solder Paint'. This is a liquid something akin to normal paint but in a grey form - the liquid is the flux required for the solder and the grey matter is the solder in a very fine granular form. These tins when bought have invariably settled out and need a good stir. You apply the solder paint to the model using a small paintbrush or cocktail stick, place the items together and apply heat with your soldering iron. Before your eyes a silver line of solder will appear - no mystery to neat joints at all. Use a glass fibre brush to clean up the joint and you will find that any solder that had spread over the model at all is in fact removed just by this simply rubbing action.

LAMP IRONS. The times we see good models spoilt by lack of these or even worse they are there but bent all over the place. In 4mm scale its so simple to just use normal office staples cut down and soldered into place. These will never bend and in fact will normally cut the offending person before relenting to be damaged !. Yes etched ones in kits will always look more correct but they are so soft and bendable that they are invariably bent before the model is even finished.

LOCO TO TENDER COUPLINGS. Having tried all methods over my modelling years I find the simplest method the best. A loop is formed from say .9mm brass wire and fitted to the front drag beam of the tender - this loop needs to be roughly of the following dimensions - project from the drag beam by 1.5mm and be about 3mm wide. On the loco all that is needed is to again use a section of .9mm brass wire and form this into a simple 'U' shape with one leg of the 'U' being soldered to the rear drag beam.



CURING THOSE SHORTS. How do you get metal brake blocks close up against the wheel without creating an electrical 'short'? This is one of the questions that I get asked time and time again. Well, one of the quickest and simplest solutions is to cover the brake blocks with Copydex - a product that dries to a rubber like finish and once painted you will never notice the difference !.

REMETALLING BEARINGS etc., If you have wear in the holes of your coupling rods or you open them out just that little bit to much, don't despair. Place the offending item on a piece of wood, place a drop of flux into the hole and touch it with a soldering iron and solder. You will find that the hole will fill with solder but there will always be a dimple dead centre. You can then drill out to the size required or ream with a round needle file - twist the file in an anti-clockwise direction. The prototype runs in white metal bearings so why not your model !.

SPLIT AXLES FOR 2mm AXLES. The internal diameter of normal biro tubes makes them a good fit on 2mm diameter axles and when they are cut into shims they make ideal spacing washers. Longer lengths can be used as sleeves to make up cheap split axles.