CONNOISSEUR MODELS

LNER Class J79

Kit Composition. The main body and chassis components are etched in brass with cast white metal fittings. Cab interior is detailed and a cast backhead is provided. Alternative castings are included to cover some of the modifications and differences between members of this class of loco that existed during their working lives. The etched brass boiler is pre-rolled and wire, screws, bearings etc are included.

This kit has been designed to provide a set of quality components that will allow the modeller, who has basic kit building skills, to build an 0 gauge model of the prototype to a standard of detail that is suitable for operating models on most 0 gauge layouts.

It is not intended to be a state of the art kit, though those who wish to upgrade their model through the substitution of various fitting and by fabricating some of the smaller supper detail parts, can lift it into the showcase class with the kit providing an accurate and economical base on which to work.

GENERAL INSTRUCTIONS

Please read this section carefully especially if this is your first etched brass kit. Many modellers fight shy of working in this medium but the basic skills are relatively easy to acquire. Once you've learned how to form and solder brass you'll find all kinds of modelling possibilities will open up for you.

Assembling an etched kit involves exactly the same skills that a scratchbuilder uses – the only difference is that the cutting out of the parts is already done for you. Some filing and trimming will be necessary from time to time. Where this is the case I have highlighted it in the instructions.

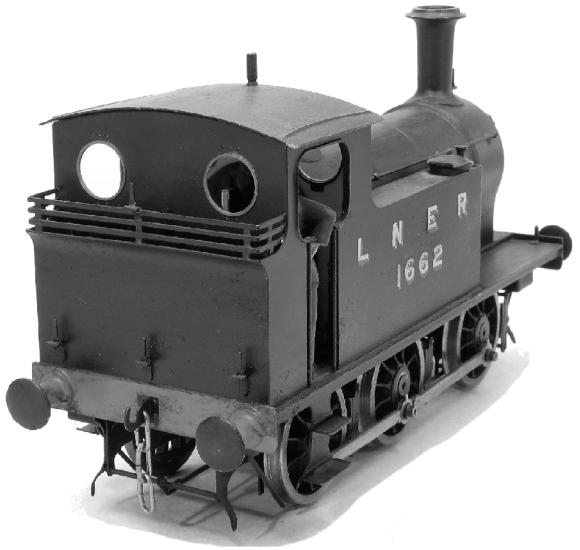
The main skill to master is soldering and I would recommend a Weller 40 Watt soldering iron. This has a 6mm diameter removable copper bit. The bit is shaped like a screwdriver and has a bright coating of solder (tinned). This combination of iron and bit shape is ideal for running fillet joints and has a good reserve of heat that is so necessary for soldering small parts onto large components. Note the shape and condition of a new bit as this won't last long and will need restoring back to this condition.

It is important to keep the bit clean and in good condition as you work. Get a soldering iron stand containing a damp sponge as old oxidized solder is wiped off on this before picking up fresh solder for each joint. If you haven't made a joint for some time you may find that a hard black crust has formed on the bit. Remove this with a brass wire brush (suede brush) and then feed some multicore solder onto each side of the bit to restore a bright surface (referred to as wetting or tinning the bit). After about 8 hours use you will find the bit is in poor condition with holes and a ragged edge. File the bit back to its original shape using a hand bastard file and then polish the surfaces on emery cloth. Coat the bit with Fluxite Soldering Paste (traditionally used by plumbers) and this will prevent the bare copper oxidizing as the iron heats up. Then feed multicore solder onto the bit to form a generous coating and leave to bubble away for a couple of minutes before wiping the excess off to give a bit almost as good as new.

A smaller Antex 25 Watt iron with a 3.2mm screwdriver bit is very useful for small assemblies and detail work such as handrails, but will have insufficient heat reserve for main assembly work. The Antex has a plated iron bit and after a little use with 145° solder a grey oxide appears on the bit that will prevent you from picking up the solder. Touch the bit to some multicore solder and it will flash over the bit wetting it so that you can continue picking up 145° solder. I have found no problems with mixing the two solders in this way.

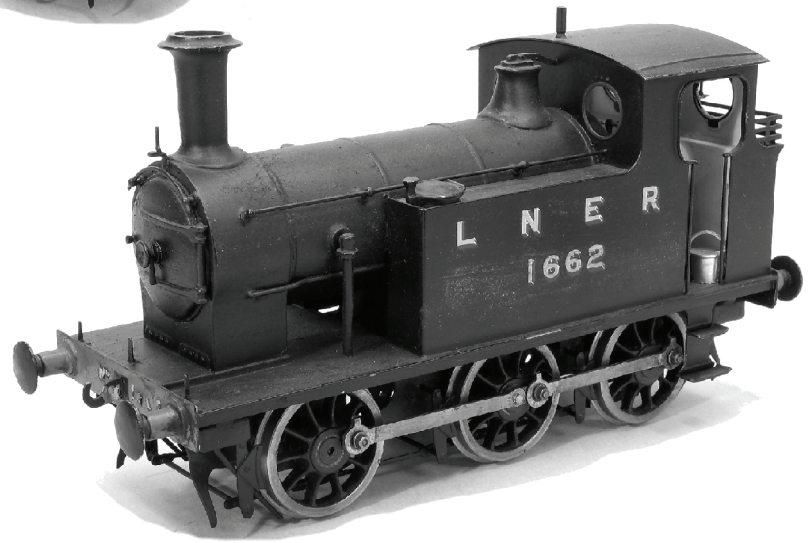
I use 145° solder for virtually all assembly work. I prefer it in wire form, available from many tool merchants, but it is also produced in stick form by Carrs. I find that its lower working temperature helps to give a quick clean joint and limits the build up of heat which may cause distortion in components. I find that I can hold parts together with my finger tips and make a joint before heat reaches my fingers or other etched parts drop off.

I use 60/40 tin/lead fluxed multicore electrical solder (melting point about 190°) mainly to keep the iron bits in good condition, as it gives a slightly stronger joint



LNER Class J79

Over twenty years old and much battered after running many miles on a good few layouts. I hope you find these photos of my J79 built from the original test etchings useful.



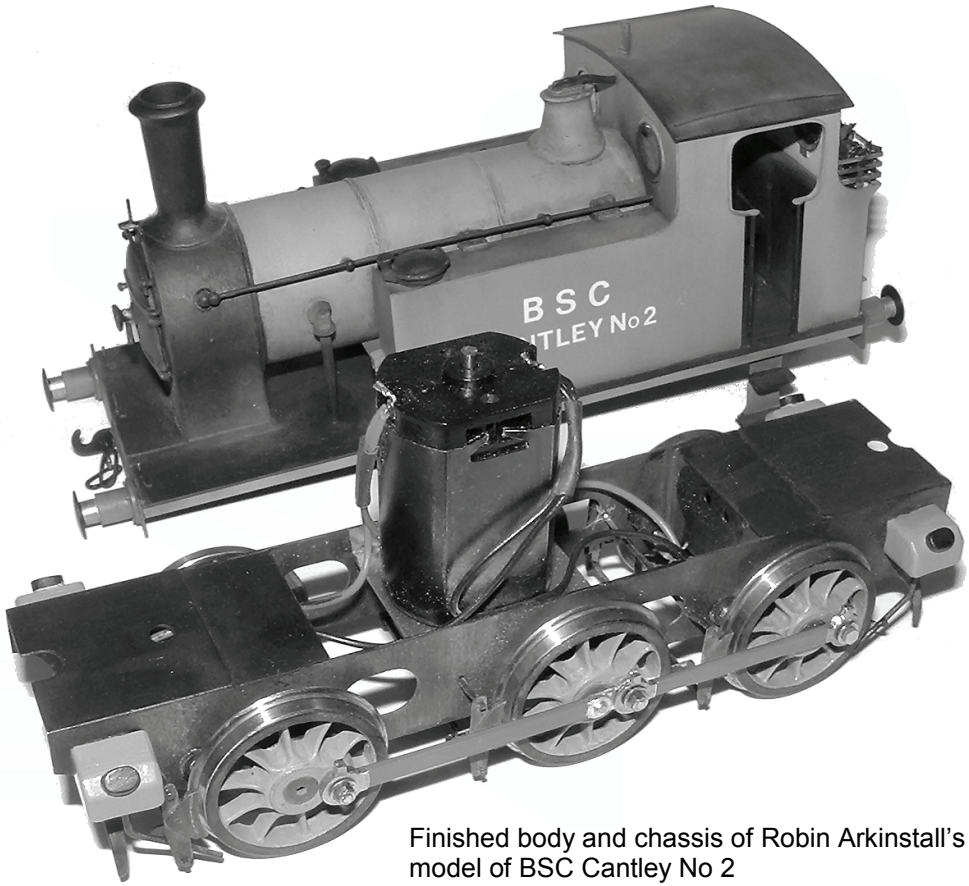
Can You Help Me?

If you have enjoyed building this kit and have been satisfied with the quality, I would be most grateful if you could recommend it to your friends and fellow modellers. Although my kits are not perfect, I try to put a lot of time and effort into producing them. If I can get extra sales of a kit through customer's personal recommendation and I find that word of mouth is the best form of advertising. This will help me to put extra time and money into developing the next kit. Hopefully this will give me more satisfied customers to recommend my kits to their friends.

If you are not happy with this kit then please tell me. Hopefully I will then be able to help and sort out any problem.

After painting you may wish to glaze the spectacle windows and a hole template is located in the left hand corner of the fret. If you hold a sewing needle in a pin chuck and use the template to scribe circles on the glazing material. You can cut these out and these should pop perfectly into the inner spectacle rings (parts 9). For this glazing you can use thin clear plasticard, but I prefer to cut flat sheets from the clear blister packs that many items are packaged in nowadays. This has a textured surface probably caused by the moulding process, which gives it a slightly opaque quality that I think represents dirty windows just right.

I have included a oil bottle, bucket and loco crew and once painted these should finish off the cab of your model nicely and hopefully your loco is now ready for a long working life.



Finished body and chassis of Robin Arkinstall's model of BSC Cantley No 2

than 145°. I sometimes use it for small spot joints on handrail wire, lamp brackets etc, but still use extra liquid flux.

For all brass and nickel silver work I use Carrs green label liquid flux. You will soon get the feel for how much to use but more problems are caused by too little flux than too much.

Before soldering components together thoroughly clean both surfaces along the join line with a glass fibre burnishing brush. Using your tweezers or a knife blade etc, hold the parts together in the correct position and with an old paintbrush run some flux along the area to be joined. Still keeping the parts correctly aligned, pick up a small quantity of solder on the tip of your iron and carry it to the joint (unlike electrical soldering when you feed solder into the joint). Hold the iron against the joint just long enough for the solder to flash between the parts. Don't let go of the parts until the solder has cooled – this takes from five to ten seconds. To run a fillet of solder along a joint, wait until the solder flashes between the parts and then pull the molten solder along the joint with the iron tip. Don't load the iron tip with a lot of extra solder, work the joint in 1" lengths bringing in small quantities of solder.

Brass is a very forgiving material and if you get something out of alignment use heat from the iron to desolder the joint before starting again. For complicated assemblies it is a good idea to only tack solder parts together. You can then make adjustments by desoldering until you are happy with the location of parts and then solder solid.

When you need to laminate two or more layers of brass together align the parts then carefully clamp them together either in the vice or by holding them with miniature crocodile clips. Run flux around the edges and then go around with the soldering iron. Clean up thoroughly afterwards.

To fit small parts and overlays onto a larger assembly, such as strapping to a wagon side, when you need to prevent finely detailed areas such as planking becoming clogged up with solder tin the back of the small component first, then hold in place on the model and apply flux. Carefully wipe the tip of your iron on a sponge to remove any solder from it (dry iron), and then touch it against the parts to be joined. After a few seconds you'll see molten solder bubbling from the edges. Still holding the parts in place remove the iron and allow the joint to cool. An alternative is to use solder paint (I would recommend Carrs 188 solder paste). As the name suggests this is a flux and solder in one. Simply apply a thin coat of solder paint to the back of the component instead of tinning. Still apply a small amount of liquid flux before you solder the part into place.

Any surplus solder should be removed using a craft knife, I find No 10 curved scalpel blades ideal, then burnish clean with a glass fibre brush. With practice you'll learn how to use the minimum amount of solder to do the job. Flux is corrosive so after each soldering session give your model a good scrub with washing up liquid or Jif. After a day or two any remaining flux residues will show as a green film which should be washed away.

To cut parts from the fret use a sharp Stanley knife on a piece of hardboard or a pointed scalpel blade on a block of softwood. Remove tags and burrs with a fine file.

Three-dimensional parts are formed by folding. On an etched brass kit the fold lines are normally half-etched on the inside of the fold. You'll be able to fold most parts using smooth-jawed pliers. For longer parts folding bars are desirable.

Other useful tools include a bench vice, a good pair of tweezers, a set of Swiss files (get a full set of cheap ones and then buy quality replacements for the three that you use the most), a pin vice with a selection of drills from 0.5mm to 2.1mm plus a few larger sizes that you use regularly (2.6mm for axle bearings etc), some square-nosed pliers and some very pointed-nosed ones, preferably with smooth jaws. Buy cheap tools first and duplicate the most used ones with quality.

Try to complete all high-temperature soldering before attaching any of the cast whitemetal parts. These can be attached with two-part epoxy resin such as Araldite Rapid. Ensure the surfaces to be glued are clean and free of grease.

A better alternative is to solder your white metal castings using Carrs 70 degree low melt solder and Carrs red label white metal flux. The iron should be run at a much lower heat so that you do not melt the castings. I have a domestic light dimmer switch and plug socket fixed to a piece of wood, wired up with a lead and standard mains plug fused at 3 amps to the input side of the dimmer switch and the output of the dimmer switch into the plug socket (remember to continue the earth). Plug your 40 Watt iron (25 Watt iron won't work) with a clean and freshly tinned bit into this and experiment with adjusting the switch until you find the range of temperature at which the solder melts but a scrap casting does not. Note as the iron is running at a lower voltage it will take longer to heat up, so when you think the adjustment is correct do check a few minutes later on another scrap casting to see that it doesn't melt. Then scribe a mark on the switch knob to indicate this position.

When attaching white metal fittings to brass the surface of the brass must be tinned with 145° solder to allow the solder to grip. The surface of the casting at the joint should be burnished bright. The casting can then be soldered into place with 70° solder and fillets of solder run into any gaps with no risk of melting the casting. Virtually all castings will be improved by a little extra fettling work. Flash can be cleaned out using a sharp pointed knife blade, part lines removed by scraping back with a curved blade and then blending in using a fibreglass brush. The casting moulds tend to distort when metal flows in so check castings for square and even thickness.

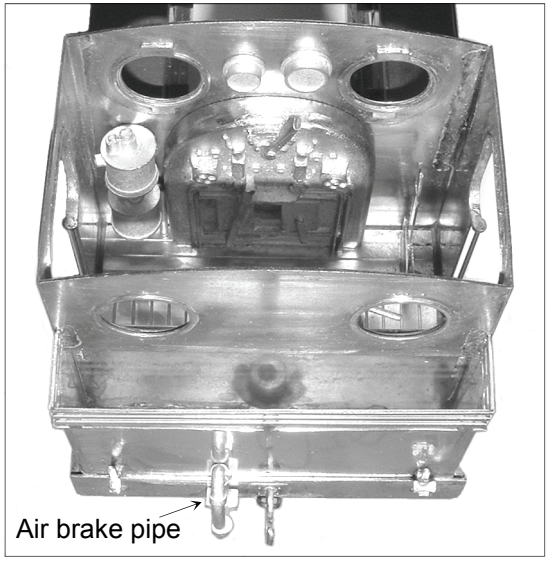
SPECIFIC INSTRUCTIONS FOR LOCOMOTIVE KITS

Hole Sizes. Because of the etching process holes will normally be found undersize, for example the turned brass bearings will not fit holes in chassis sides, and a simple fitting operation is required. The best tool for opening up holes of this size is a cheap tapered reamer available at most model railway shows from tool suppliers. By rotating this gently in the hole you quickly open holes to correct size without risk of tearing the metal. By trial and error on the first hole you will soon establish how much material requires removal. For smaller holes, such as those for the location of casting's etc, are best opened up using a set of cheap tapered broaches, or by twisting a small round file in the hole.

Fit the backhead to the backing plate to double up its thickness and then blend in the joint. I would recommend painting the backhead separately and then gluing it into place with Evo-stick after the loco is fully painted.

Fit the two cab gauges between the spectacle windows.

If required for locos No 407 & No 1787 fit the Westinghouse air brake pump into L/H corner of the cab front. Also fit air brake pipes to the rear and front buffer beams. Also don't forget to fit the steam exhaust running from behind the tanks and into the smokebox.

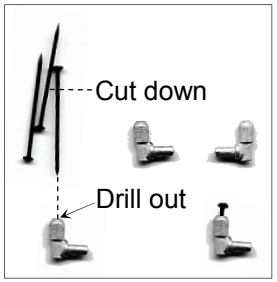


17. Painting is a vast subject that cannot be covered fully here. The important thing with a metal model is to get a good base coat of primer. Hopefully you have been cleaning up and washing the model at the end of each modelling session but it will still need thoroughly cleaning before painting. I give my models a good scrub with a stiff-bristled paint brush in a sink full of hot water, as hot as your hands can bear, and cheap washing up liquid (the expensive stuff that's kind to your hands has an oil in it that will stop the paint keying to the metal). If you know somebody who works in catering and can scrounge you some industrial-strength liquid this is better still. Then rinse the model a couple of times in clean warm water and place in a dust-free box to dry.

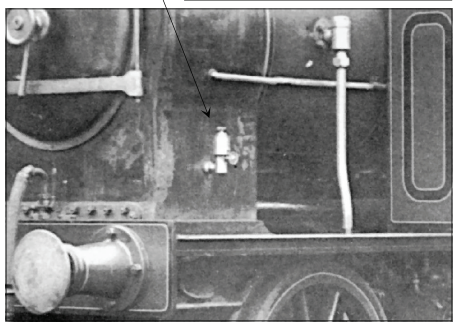
I use car aerosol primer and Halfords grey primer is one of the best. For the best results you want to spray at room temperature (25°C) on a dry day, avoid cold, damp or humid days. I find it helps to warm the model to about 30°C (put it in the airing cupboard overnight) and I warm up the paint tin by putting it onto a radiator (about 40°C, but use your common sense as I don't want anybody blowing themselves up). I find it best to prime the model in two light coats, about 15 minutes apart and then leave for 48 hours to harden off (in the airing cupboard in a dust-free box).

I brush-paint my models with Humbrol enamel. For years I just stirred it up and painted straight from the tin but I was never completely happy with the results. Recently two things have transformed my painting. The first was a copy of Martyn Welch's book, The Art of Weathering, Wild Swan Publications, ISBN 1 874103 11 9. Martyn's basic techniques are very useful and almost foolproof. The second thing is to mix the paint in the tin and then transfer it to a palette (a sheet of clean plasticard) with blobs of lighter and darker shades of paint surrounding the main colour. Then work the paint with the brush on the palette, slightly varying the tones of the paint. This seems to totally change the texture of the paint and the way it goes on and covers on the model.

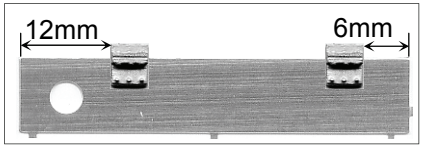
16. Fit lubricators, hopefully you have already decided the type you wish to fit and have drilled the required location holes as you removed the parts from the main fret. If fitting the castings for the early smokebox mounted lubricators. Drill a fine hole into the body and fit a cut down track pin to represent the fine round handle at the top.



If using the later box type twin pipe lubricators. Drill out the pipe union nuts to give a slight rebate into which the pipe work can be located before fitting them to the tank fronts. This pipework is fabricated from 24swg soft wire and I fold a length into two, trim the ends level and solder into the pipe union nuts. Then I form the two parallel pipes to run down and then behind the bottom of the tanks. I find this easier than trying to fit two separate pipes.



The third track pin can be used to give a finer representation of the integral cast knob on the L/H side of the smoke box door.



Fit the tank top brackets followed by the remaining body castings with reference to the main photographs for positioning.

The separate safety valve lever should be fitted to the safety valve body and then the end of the lever trimmed back so that it will just touch the front of the cab.

The chimney location hole in the top of the smoke box wrapper should be gently opened out with a tapered reamer until the cast location peg will fit into it. This location peg is a large diameter as this was the spigot that was held in the lathe while the chimney master was being shaped. The hole in the wrapper is smaller so that it doesn't crease when it is formed to shape.

Drill out the centre of the smoke box door and fit the distinctive locking hand wheel that was fitted to NER locos. I have also included a casting for the more conventional pair of locking handles that were probably fitted in industrial use.

The tops of the clack pipes fit into holes on the centre line of the boiler and the bottoms pass through holes in the footplate. A very gentle set needs bending into the cast pipes to achieve this. Spot solder the pipe to the underside of the footplate as it protrudes through and then snip off the end.

As built, tapered buffers were fitted to No 407 & No 1787 but No 1662 was fitted with parallel buffers. Early photos show all three locos fitted with bell shaped whistles but a 1927 photo shows No 1787 fitted with an organ pipe whistle.

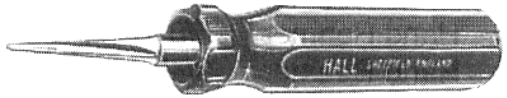
Forming Parts. While the boiler in this kit is pre-formed, other forming is best achieved as construction progresses as this enables the parts to be adjusted to each other. To make a tight curve at full metal thickness, such as tank front, bunker rear etc, take a piece of rod slightly under size of the curve required (a drill shank is ideal). Place roughly on centre line of bend holding in place with thumbs and pull upwards with fingers forming approximately 30 degrees of the bend. Check with eye and adjust if necessary before forming 60 degree of bend then offer part to model. Final adjustment of fit is easily made on last stage of bending.

To form shallow curves, splasher tops, smoke box wrappers etc, use a piece of pipe or broom handle. Diameter is not crucial, a piece of one-inch water pipe covers cab roof to smoke box wrapper. Place part over tube and hold in place with finger and thumb of one hand. Work the metal in stages over tube with finger and thumb of the other hand until correct radius is formed.

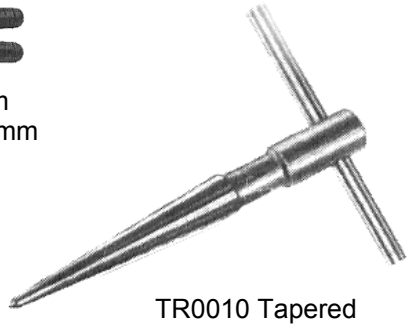
A technique you may find useful in working metal is to soften and remove the spring from the metal by heating (called annealing). The part is held with pliers and heated in a gas flame. (The gas cooker is ideal). Alternatively use a pencil torch that runs off lighter fuel. Heat part until a purple band appears close to the edges and then remove from heat. Do not overheat part as it will then become too soft and unworkable. Remember you can reheat if not workable. Allow part to cool naturally in the air.

Damaged Parts and Shortages. If you damage an etching during construction it is not possible to replace individual pieces, but I am quite flexible in providing at minimum cost replacement frets (this will contain all the brass or N/S parts). Where a casting is damaged individual items can be replaced as I have full control of production. Because of the complexity of the product, combined with the low volume way it is produced, I try to exercise a high degree of quality control in production and packing but if you find you are short of an item or find a sub standard part please approach me for a replacement.

BRC250 6 Piece Cutting Broach Set 0.7-2mm
BRC300 12 Piece Cutting Broach Set 0.65-4mm



TR0005 Micro Drill Reamer 1mm-5mm

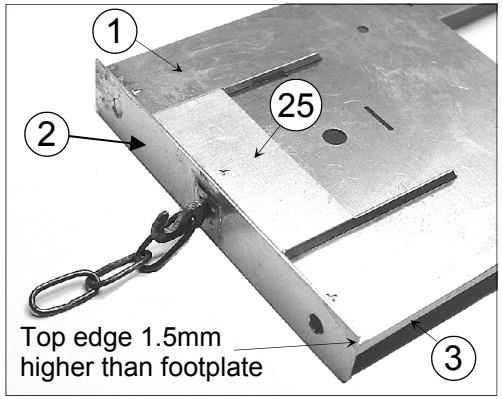


TR0010 Tapered Reamer 3mm-12mm

Three very useful tools purchased from SQUIRES, 100 London Road, Bognor Regis, West Sussex, PO21 1DD, Telephone 01243 842424.

Footplate Assembly

1. First fit the buffer beams (parts 2) to the footplate (part 1). These protrude 1.5mm above footplate level. Experienced modellers will probably scribe a faint guide line onto the buffer beams and then solder the footplate to them positioning by eye. For less confident modellers can I suggest cutting a piece of 1.5mm thick card slightly smaller than the footplate and then using it as a packing piece, pin the footplate, top surface down (note the word top etched onto top surface) to a flat off-cut of soft wood. Use drawing pins passed through the body fixing screw holes etc.



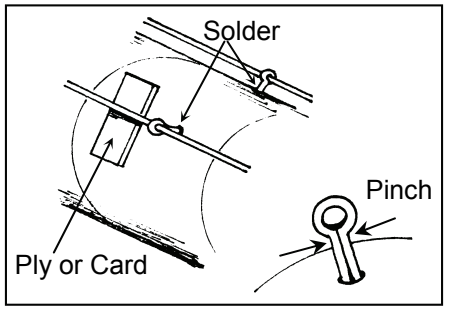
Then using drawing pins, pin a buffer beam to the edge of a square off-cut of wood so that the buffer beams top edge (the curved corners are at the bottom) is level with the flat surface of the wood. In this way the buffer beam on the block of wood can be slide up to the footplate and will remain square as it is soldered into place. **Note** two cutouts at rear of footplate that will form location slots for bunker back, keep these clear of solder.

2. Trim the valances (parts 3) to be a slightly loose fit between the buffer beams (this is to prevent the valances buckling when they expand due to the heat of soldering into place). Then solder each valance upright along the footplate edges just outboard of the tank side slots. I start with one end hard up against the front buffer beam and tack solder this to the footplate and gently adjust using pliers until it sits upright and square. I then solder the end solidly to the buffer beam before working along the valance in short sections of about 20mm at a time. In this way you can keep adjusting the valance to ensure that it remains upright and parallel to the footplate edge as you work along it. To make these adjustments I find it helpful to apply a constant gentle pressure to the edge of the valance with the end of a flat file as I work along its length.

Once happy remove the footplate from the block of wood and turn over. I would recommend cutting a piece of flat softwood so that it fits between the buffer beams and valances to provide a flat solid support for the footplate as construction progresses.

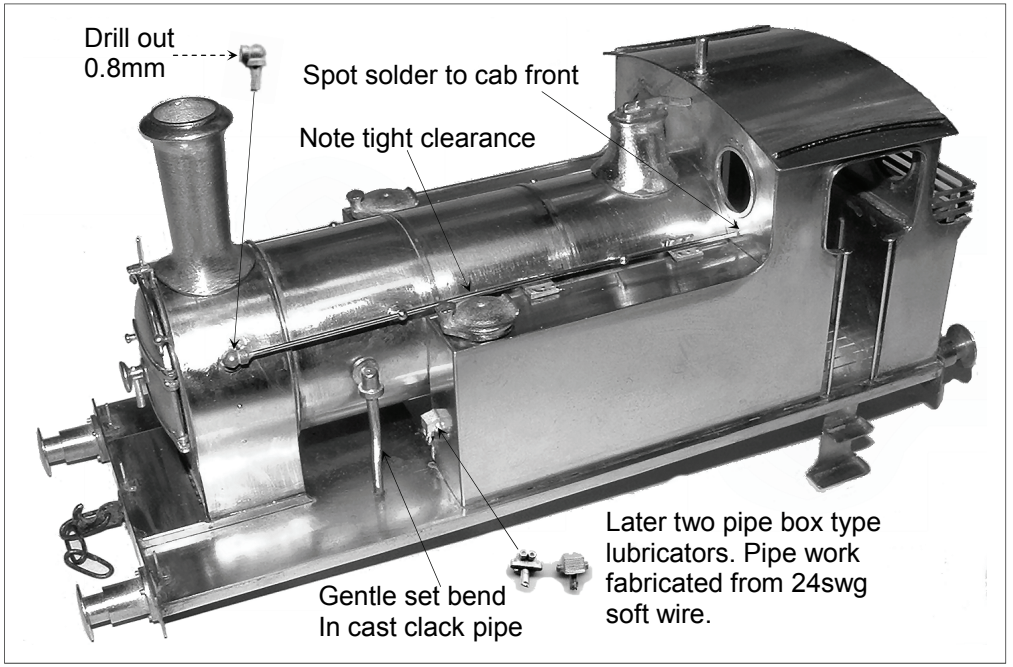
Solder two nuts to the top surface of the footplate locating over the chassis fixing holes. This is best achieved by locking the nut into place with a screw (it may be useful to use a rough washer under the screw head made by piercing a hole through a scrap of thin card). Dress the six flats of the nuts with a flat file so that they are bright and clean to help the solder make the best joint possible. Place a little oil on the screw thread and this will help to prevent the solder from flowing under the nut and locking everything solid. A Fluxite type paste flux is probably best for soldering the nuts into place.

15. Fit the handrails made from 0.7mm brass wire. The position of the supports are marked on the boiler and smoke box and In common with the other kits in my range I have included split pins to support the handrails. These are fairly easy to use and their appearance can give a better representation of the prototype handrail supports than some of the turned brass alternatives.



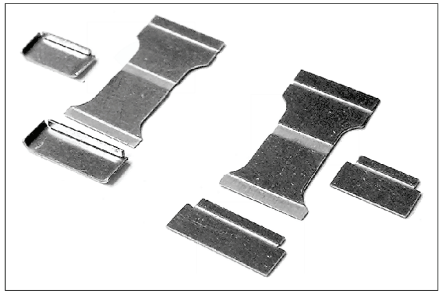
I close up the eye of the split pin to be a lose fit around the wire before fitting into the hole in the boiler and use a piece of card to space the handrail evenly away from the boiler. For the curved smoke box front handrail I find it helpful to anneal the wire in a cigarette lighter flame and then form about twice the length needed to the required radius. This extra length will be easier to handle when spacing away from the smoke box and you can trim to length after soldering solid.

The L/H boiler handrail terminates in a cast blower valve. Drill a hole about 0.8mm diameter into casting to provide a firm fixing for the handrail wire before fitting the casting. The rear of the boiler handrails are spot soldered to the cab front. Clearance for the tank fillers against the handrails is tight so either fit fillers first or offer into place to give a guide when spacing out the handrails.

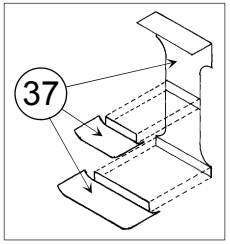


Final body detailing

Check that all runs well with the chassis and then cut down the crankpin screws and dress down the ends flush with the nuts. Then offer the chassis up into the body ensuring that all protruding tabs have been removed. Once you are happy with how it fits the remaining body details can then be completed.

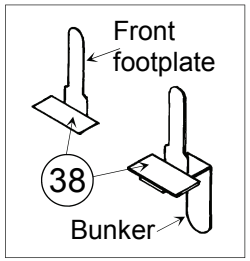


14. Make up the footsteps (parts 37). As these can be a little vulnerable to damage I use 60/40 solder for their assembly. Take the step treads and using pliers fold the back edge through 90 degrees and then form a radius on the two sides. Reinforce the back fold by running a small amount of solder into the fold line. Then generously solder the treads into the rebates on the step back plates. Fold the top through 90 degrees and again reinforce the fold with solder. To add extra strength I also solder (quickly using 145° solder so that the treads don't fall off) lengths of 0.9mm brass wire to the rear of the back plates.

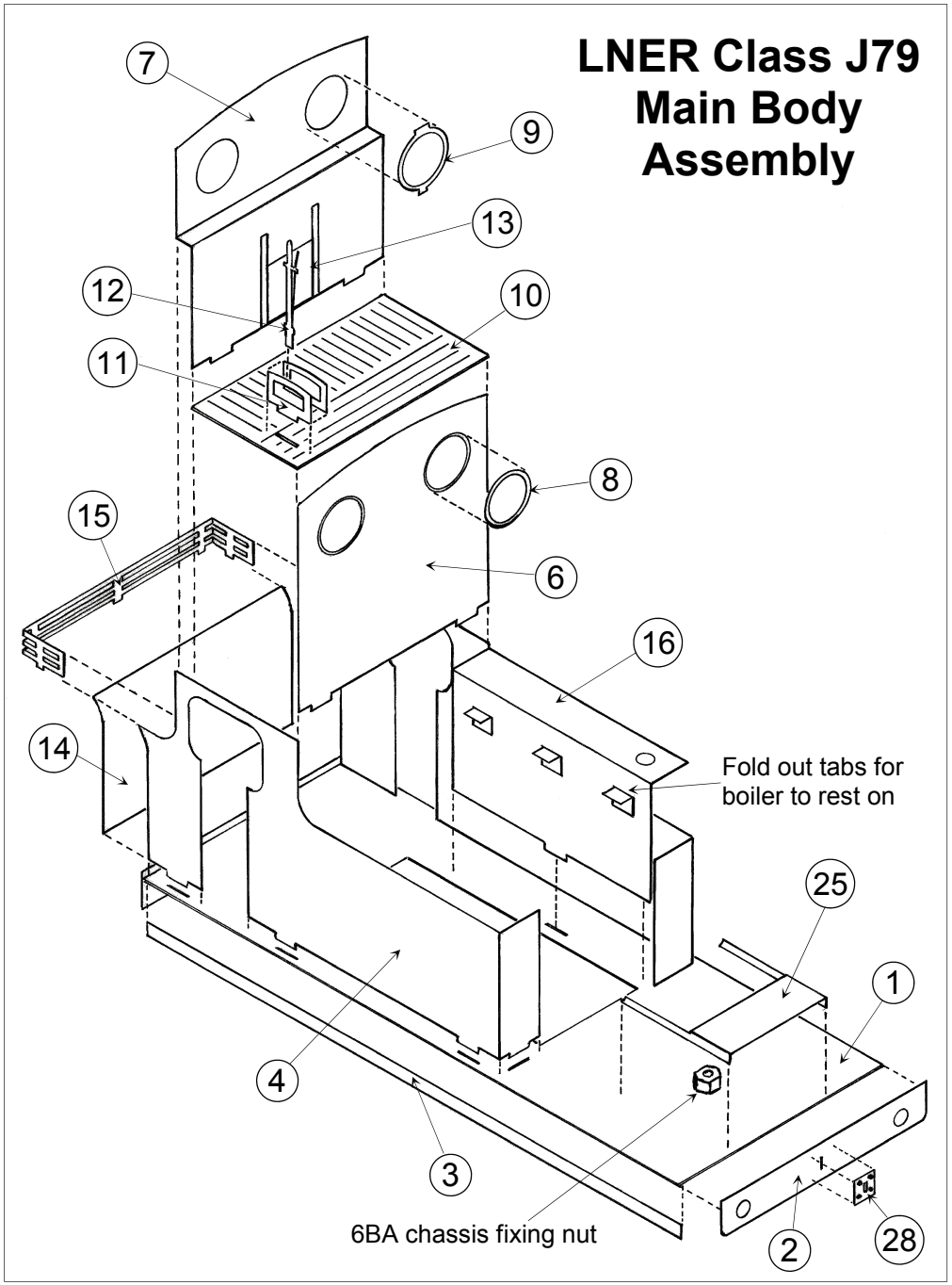


Clearance between the back of the steps and the coupling rod crank pins is very tight so offer the steps into place to check clearance. You may have to file a little off the folded top of the step so that it fits close enough against the inside face of the footplate valance to achieve sufficient clearance. Then when happy using 145° solder fit the assembled steps to the underside of the footplate so that they align with the cab doorways.

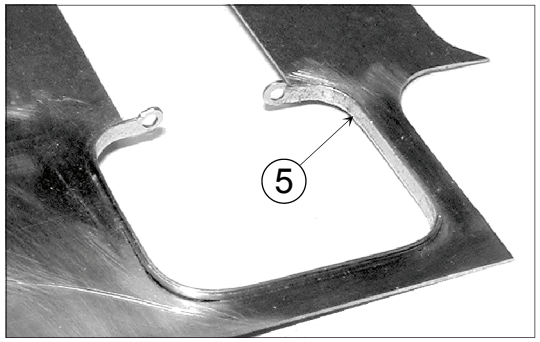
Fold up the lamp brackets (parts 38). As these are a little vulnerable to damage I reinforce the folds with 60/40 solder. Hold the end of the bracket with long nosed pliers and apply a spot of flux to each of the folds. Then apply the iron bit carrying a small amount of 60/40 solder to the edge of the bracket. The flux should draw the solder off the iron bit and into the folds to neatly strengthen them. Then solder the brackets into place using 145° solder. Fit three on the front footplate, one to the top of the smoke box, three on the bunker back and a central one onto the coal rails. Note that there are etched marks to help with positioning.



When the locos were running on the main lines four brackets were required to cover the positions for different head codes. In industrial use a couple of brackets each end would be all that was required. Once you have completed all soldering you can dress the central folded section of the brackets back with a file to neaten up the brackets.

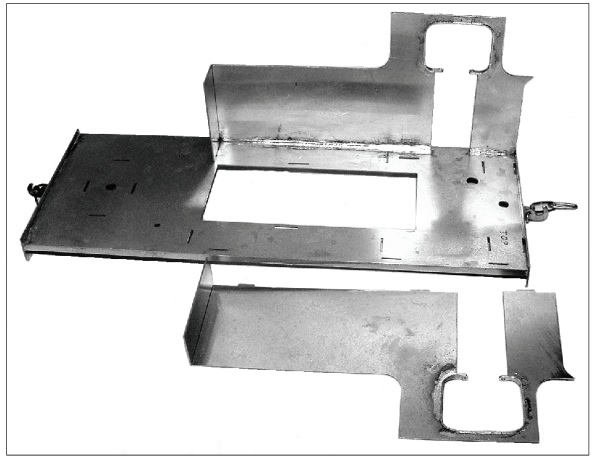


3. Take the cab and tank sides (parts 4) and solder a length of beading (parts 5) around the cab openings. You will notice that there are three sets of beading and this is because I can never determine the exact length required until I test build the first sample model so I try three slightly different lengths. I find that the medium length fits the best.



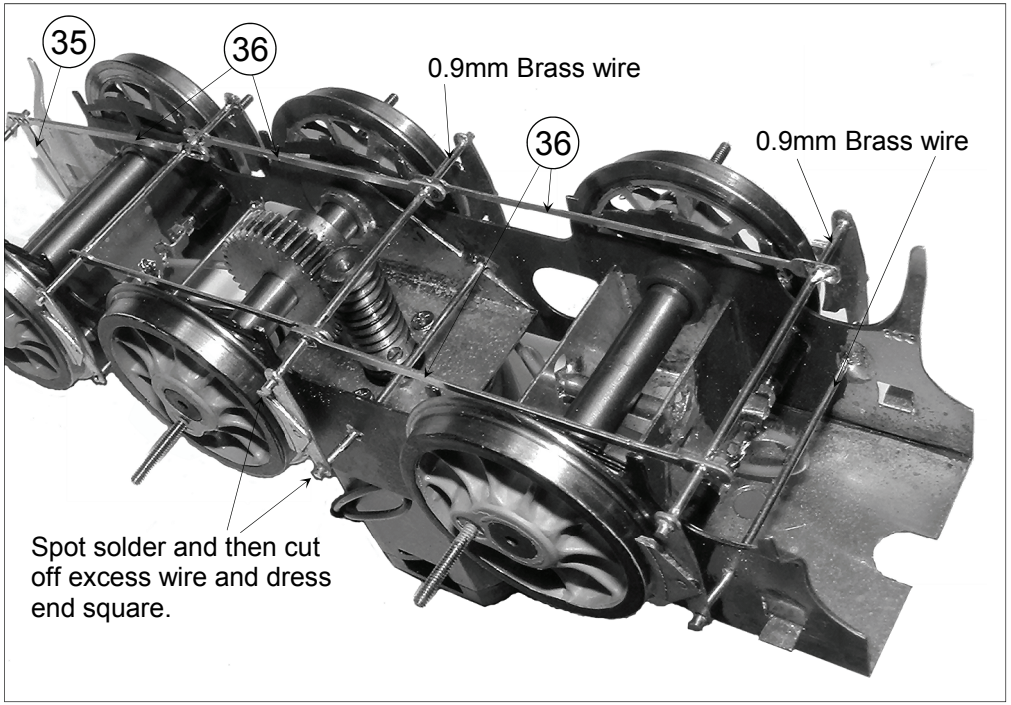
I find it best to first roughly pre form the beading to the cab opening by curving the corner bends around the shank of a drill (the half etch of the beading fits into the cab opening). I lightly secure the cab side (inside face down onto a flat block of wood and starting at one side of the cab doorway I tack solder the beading into place. I work my way around the four sides of the cab opening, pressing the beading hard into place and snugly into the corners with a knife point. If required remove the cab side from the block of wood and gently reform the corner bends using fingers and drill shank (I normally find that I get half way around the cab opening and then find that the next two corners require slight adjustment) then replace onto the wood block and continue around to the other side of the cab doorway.

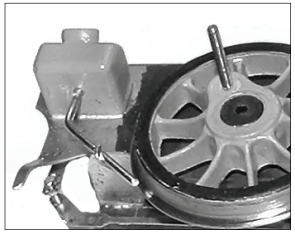
Once you are happy with the way the beading is tacked into place you can run a solder joint around it. If you use plenty of flux and only a little solder you should find that it flashes along the joint requiring only a little scrapping with a knife blade and cleaning up with a fibreglass brush.

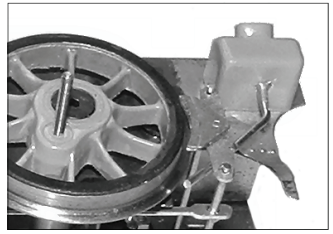


An alternative technique is to cut the beading into two halves and fit each half separately starting each side of the cab doorway and rejoining with a blob of solder at the top of the cab opening. You can try this with the longest lengths of beading if you make a mess of your first attempt.

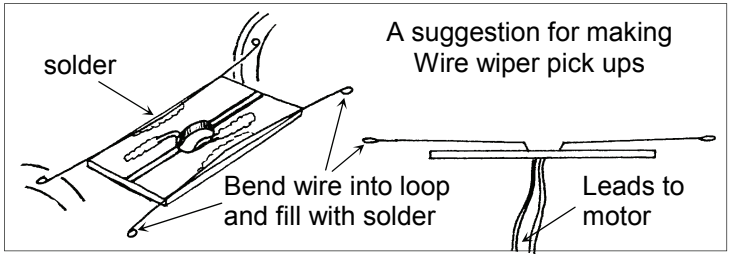
Fold the front of the tanks through 90 degrees and then fit the tank/cab sides into the slots in the footplate. If required dress the tabs slightly or clear any cusp from the slots with a sharp scalpel blade so that the tank/cab sides sit down snugly and parallel to the footplate edge. Offer into place the cab front (part 6) to check that it will fit between and then tack solder the tank/cab sides into place and then, using an engineers square, check that they are sitting upright and exactly opposite each other. Once happy solder solid.





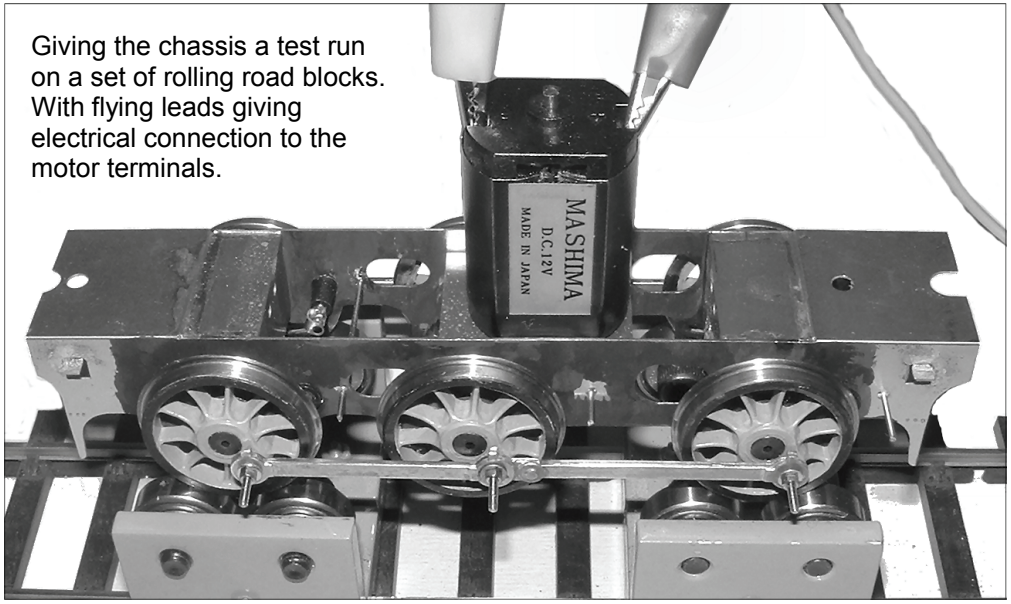


Drill out the dimple on the underside of the cast sand boxes to provide a firm fixing for 0.9mm brass wire to represent the sand pipes. Fit sandboxes to frames using the fold out tabs to help with location. Then fit overlong lengths of wire for the sand pipes and once firmly soldered into sandboxes snip the ends off at an angle to be about 1.5mm clear of the rail tops. The front pips are noticeably kinked to fit behind the brake hangers.



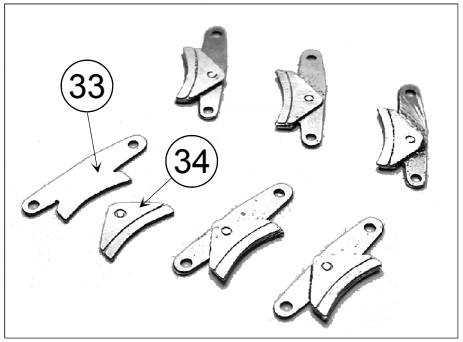
I would now strip down and paint the chassis. During reassembly I would fit the Slater's plunger pickups and wiring. An alternative is to fit wire wiper pickups fabricated from the PCB and the spring brass wire supplied. You may have to remove some of the etched spring detail for the wire wipers to touch the wheels.

If this is your first loco downloadable detailed help sheets cover these operations in full detail or please contact me for a free copy of my hints and tips booklet.



Giving the chassis a test run on a set of rolling road blocks. With flying leads giving electrical connection to the motor terminals.

13. Solder lengths of 0.9mm brass wire across the chassis to form the brake hanger rods. Make up left and right hand brake blocks and hangers from parts 33 and 34. Now spot solder using 60/40 solder the brake hangers to the wire so that the brake blocks line up with the wheels. I grip the bottom of the brake hanger with a crocodile clip and this gives me more control in holding it in the correct position.



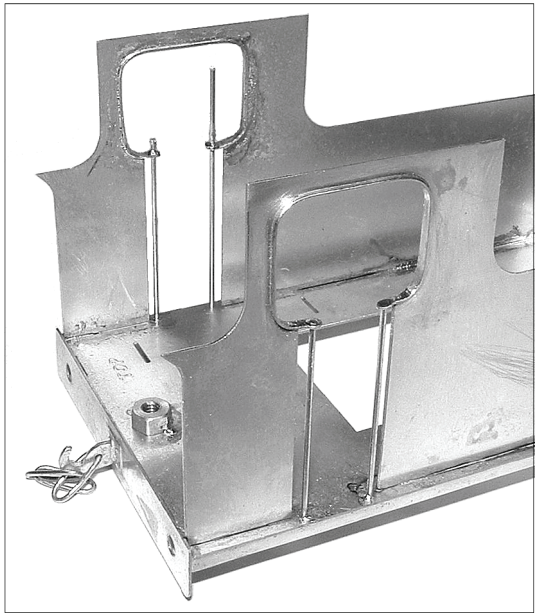
Solder the brake hanger so that the brake block follows the curve of the wheel and is set back slightly from the front face of the tyre. Try to position the brakes as accurately as possible as you solder to the wire but it is possible to gently bend and tweak them to their exact position using long nosed pliers after soldering.

Solder parts 35 to the inside face of the side frames to form the supports for the brake operating shaft at the back of the chassis. Note there are etched marks to help with location.

Now thread 0.9mm brass wire through the bottom holes in the brake hangers also threading the wire through the brake pull rods (parts 36) to form the brake cross shafts. Solder the wire at the brake hangers and then thread a length of wire through the crank of the rear pull rod and parts 35 to complete the rear operating shaft. Line up and position all the brake pull rods parts 36 and solder solid at all joints. Then using flush cutting side cutters trim the wire cross shafts to length and square off the ends.

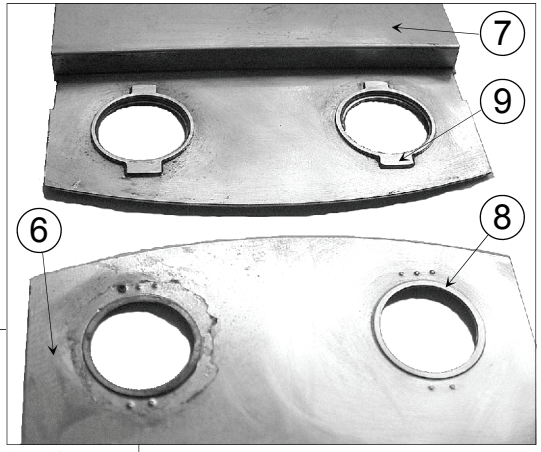
Note that the slots and tabs on the kit are provided to give a rough guide to position and help with holding the components in place while soldering. They do not provide totally accurate location so always check by eye or using an engineers square before soldering solid.

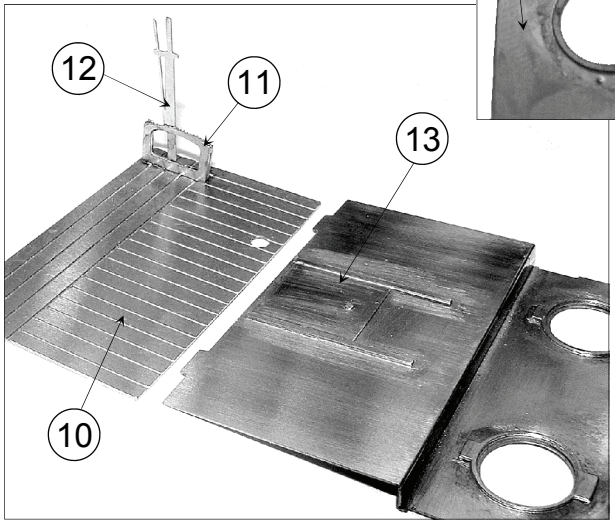
Fit cab handrails made from 0.7mm brass wire. Using a long length of wire to help get the handrails upright fit through hole in beading and spot solder the end to the footplate and then solder at the beading hole. Then snip off flush with the beading with flush cutting side cutters and dress down with a flat file.



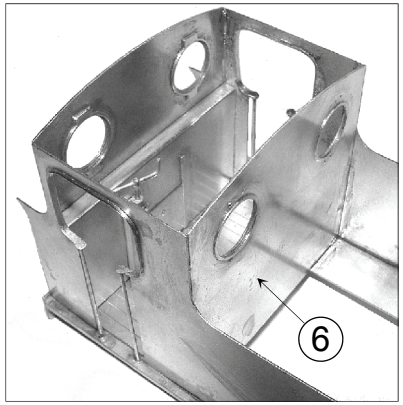
4. Fit the spectacle rings (parts 8) into the rebates in the cab front (part 6) and cab back (part 7). Emboss the bolt heads from the rear face and then solder the inner spectacle rings (parts 9) so that they cover the bolt holes.

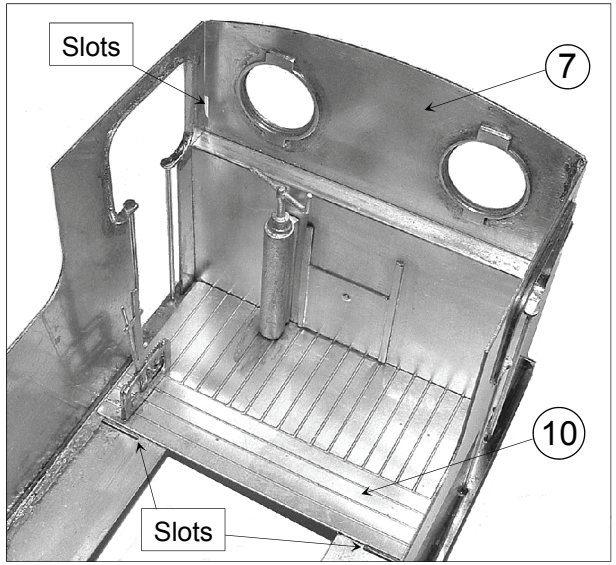
Then make the two folds on the cab back to form the shelf and bunker front. Then fit the sliding coal door (part 13) located centrally and 0.5mm from bottom edge.





Fabricate the reversing lever from parts 11 and 12 and then solder into slot in cab floor (part 10). Dress off any protruding tab on underside of floor.

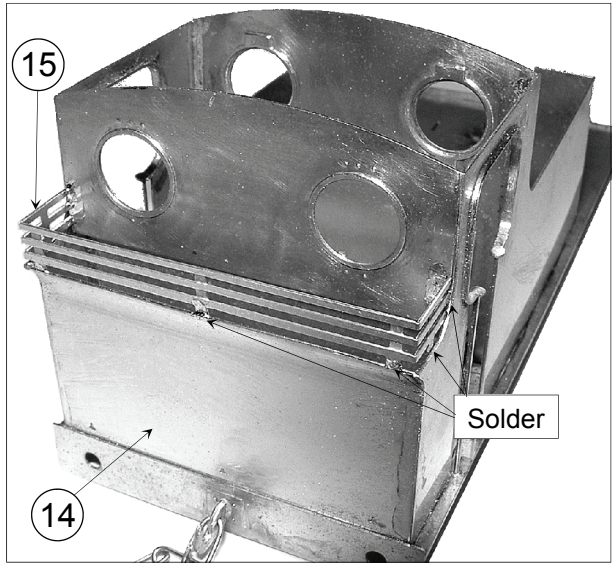




Fit the cab back (part 7) located between the cab sides. Offer the cab front into place to check that the curved roof lines will match, if not a little tweaking at the shelf bend will adjust the height, then when happy solder the cab back firmly into place (keep location slots for coal rail clear of solder)

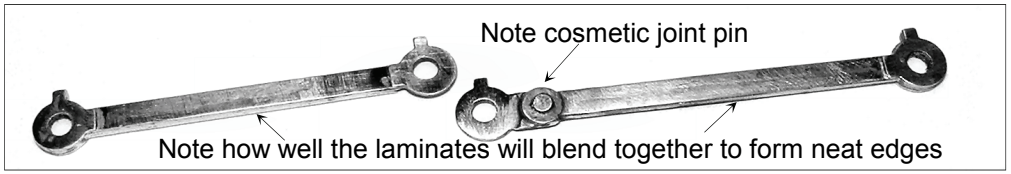
Fit the cab floor to the footplate as central as possible but keeping the cab front location slots clear. I feel that now is also a good time to fit the hand brake column casting. This is an improved casting from a later kit and the base does not correspond to the etched location hole in the floor so use the hole as a guide to location and position by eye.

Fit the cab front (part 6) soldering solid on the outside face below tank level and the inside corners above. Then run a little solder down the outside top corner joints and gently blend in with a flat file to form sharp crisp corners.



5. Form the gentle curve at the top of the bunker back to match the curve of the bunker sides (noting that there are three half etched marks to help locate the lamp brackets, so make sure that these are on the outside face). You may wish to anneal the metal by holding the top edge over a gas flame until a hint of red can be seen at the edges.

Now gently clean up the rods and file all the edges so that the cusps of the laminates blend in to give the impression of one solid piece. If you wish you can tin the front face of the rod with a thin flash of solder to give the impression of oiled steel. This is particularly effective if you are later going to weather the chassis using paints.

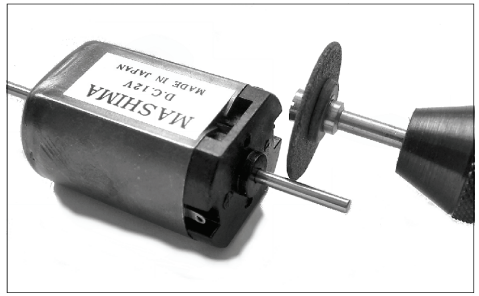


Now open out the crankpin holes in the rods to accept the brass top hat bearing bushes. This is best done with a tapered broach or tapered engineers reamer (I have one that tapers from 3mm to 2mm and is 40mm long (see yellow pages for a good engineers tool merchant they are not cheap but will last a lifetime). With the reamer gently work from both sides of the rod until the bush is a smooth free fit into the hole.

We now have to reduce the length of the bush to prevent sloppy side play in the rods. Place a bush onto a block of wood then place a coupling rod face down over the bush. By pressing down on the rod with your finger you should be able to gently file the bush until it is 0.010” to 0.015” proud of the rod. These bearing bushes are not soldered into the rods but locked onto the crankpin with a nut and washer. So it is important that they will revolve freely in the holes in the rods.

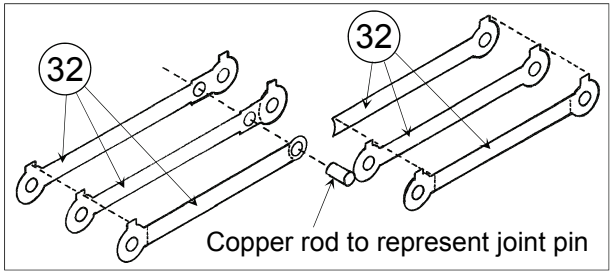
Now fit the bushes onto the crankpin screws and fit the coupling rods gently locking them into place with the washers and nuts. Check that the wheels will turn without binding. At this stage don't worry about slight tight spots. If you can push the chassis along the bench without the wheels skidding along then all is OK.

Extra instructions for setting up a sweet running chassis are included on the instruction sheet that comes with my motor and gearset. Again these can be downloaded free of charge from my website www.jimmcgeown.com or send a SAE and I will be pleased to provide them.



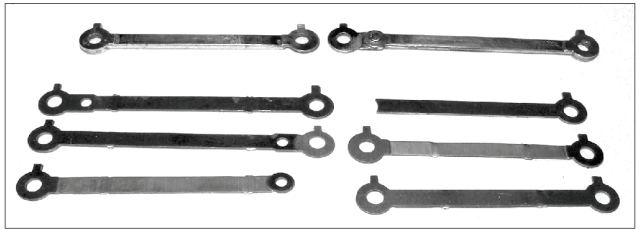
I would recommend temporarily fitting the motor and gearset and giving the chassis a test run on the bench using a couple of flying leads connected to the motor terminals. The rear shaft of the motor will require cutting off and a slitting disc in your mini drill is the ideal tool for this. With the motor in place the fit of the chassis into the body, particularly clearance under the boiler can be checked.

12. Make up the coupling rods. These consist of two sections of three laminates that overlap at the centre crankpin boss to form a flexible joint. At this joint each individual rod section is only $1^1/_2$ metal thickness so that they overlap without increasing the rod thickness.

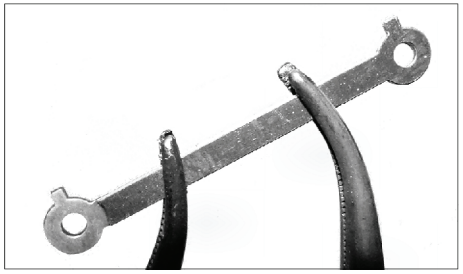


The two sections are designed to fit snugly over the centre crankpin bush and flex and move slightly to improve the locos running. On the prototype loco this flexibility was achieved by a knuckle and pin joint and a short length of copper rod is fitted into one rod section to represent this but it is only cosmetic. Using the centre crank pin as a pivot point is far more practical on a model loco.

The rods are laid out on the etch in the order that they need to be laminated so I would recommend removing and soldering them one section at a time and this should prevent any mix up.



Clean off the tabs so that the three laminates will fit together flush along their length. I then use miniature electrical crocodile clips or locking tweezers/forceps to hold the laminates together. I then pass drill shanks through the crankpin holes to line up the three laminates. Check by eye that the drill shanks are parallel and square to the rod.



Then using plenty of flux, solder along the top edge of the rod. Start in the centre and work out towards each crankpin hole. By working from the centre outwards this reduces the risk of the laminates distorting and bowing apart with the heat. You should find that some solder has run between the laminates to the bottom edge (if it starts dripping out the bottom you are using to much solder). Reposition the crocodile clips and solder the bottom edge. Only use a little solder on the iron and you should find that it pulls any excess solder from the top edge through the laminates to the bottom edge leaving you with a neat top and bottom edge.

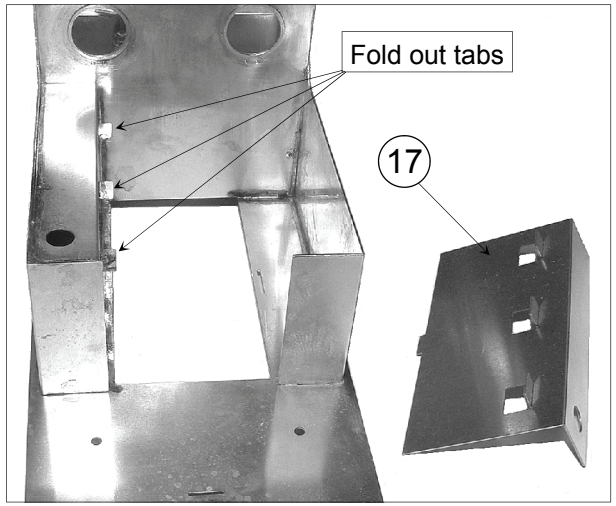
Remove the drill shanks from the crankpin holes and reposition the crocodile clips so that they clamp the end bosses tightly together. Then solder around the bosses until a little solder bubbles out into the centre of the crankpin holes. Fit a short length of rod to cosmetically represent the knuckle joint pin. File flush to the back face of the rod and file down the front to project about 0.5mm from the rod face.

I form the curve by gently working the bunker back with fingers and thumb over an offcut of $^1/_2$" diameter tube trying to match the curve as near as possible to the bunker sides. I then solder the bunker back into place so that the top edge is level with the bunker sides (a slight gap at the bottom where it joins the footplate will not be seen but if the top does not look level it will detract from the appearance of the loco). Then run a generous fillet of solder up the outside face of the two corners. I then dress the joints using flat and half round files to form a crisp square corner. In this way any slight discrepancy in the curve of the bunker back is blended into the curve of the bunker side.

Fold up the coal rails (part 15) the etched fold lines are of a generous width and depending upon how tight you make the fold this will allow a little variation in the width of the coal rails and allow them to be matched to the width of the bunker and slots in the cab back. Once happy with the width reinforce the insides of the fold with a little 60/40 solder.

Once you are happy with how the coal rails will fit spot solder the centre one of the three rear support legs to the top edge of the bunker back. This will hold the coal rails into place but allow you to view them from all angles and make slight adjustments by gentle bending until you are happy that they are square and in the correct position. Then solder solid the ends to the cab back and the other support legs to the top edge of the bunker back and sides.

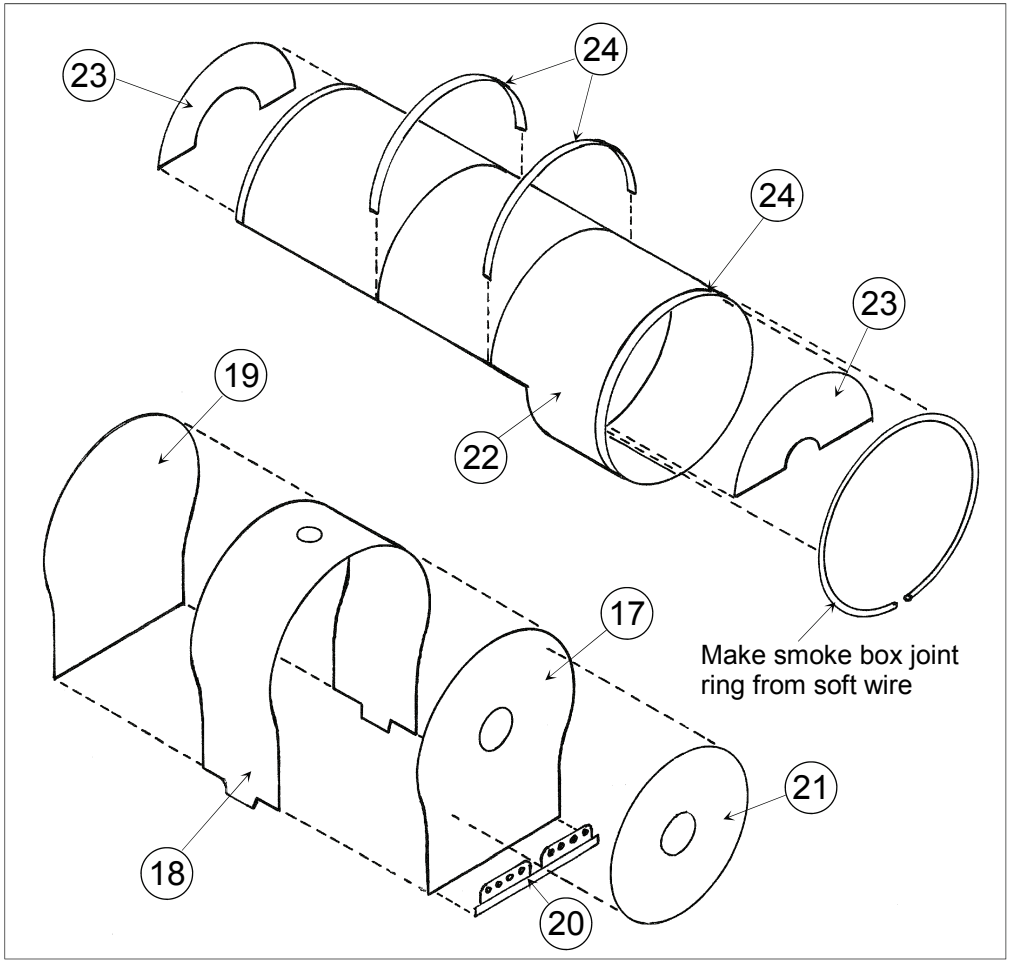
6. Ensure that the tank sides are parallel and upright and there is a gap of at least 28mm between the tank fronts to accommodate the boiler.



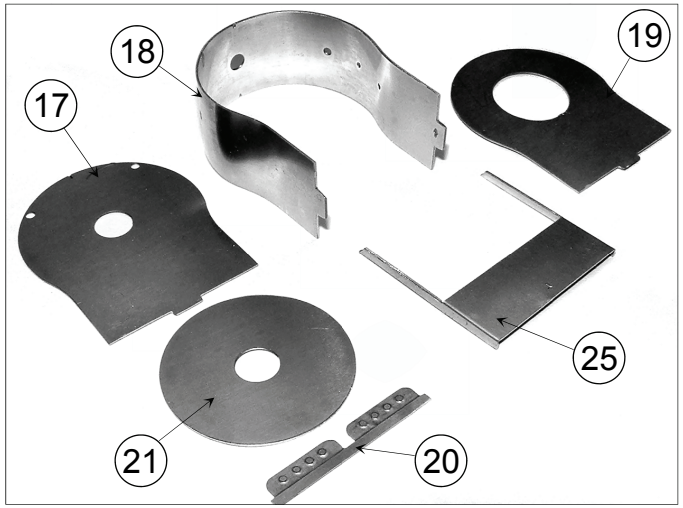
Then take the inner tanks (parts 16) and fold the tops through 90 degrees. Fold out the three tabs that will support the boiler and set its height. Then fit the inner tanks into place using a single tack of solder at the footplate.

The inner tanks will be soldered solid after a thorough check that the assembled boiler will fit snugly between the tanks. If it is too tight the distance between the inner tanks can be increased by dressing the edges of the tank tops.

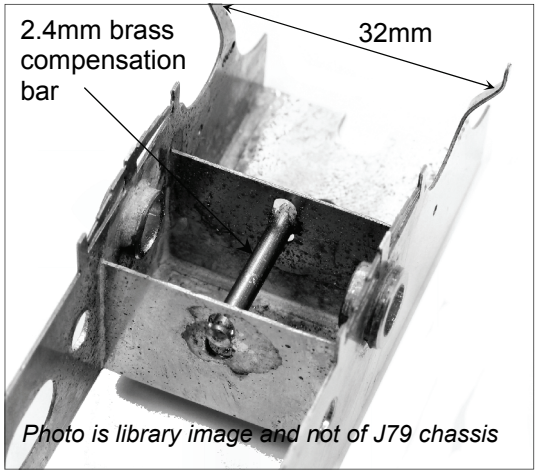
If you wish, now would be an excellent time to cast up two small blocks of lead or scrap white metal to fit inside the tanks for additional weight. They will become completely encapsulated when the inner tanks are fitted so ensure you fix them well to prevent them rattling.



Take the smoke box wrapper (part 18) and using tube pre-form it to match the profile of the smoke box front (part 17). It is also a good idea to fold up the valve cover/ frames (part 25). The finished smokebox assembly will need to fit snugly between the two frame projections without distorting them so check smokebox width as construction progresses.



As designed the chassis provides a simple rigid 0-6-0 with the centre wheels raised very slightly (about 0.25mm) off the track. This lifting of the centre wheels is an old scratch builders trick to improve running and prevent the loco rocking on any slight track humps and bad rail joints. All my 0-6-0 chassis are designed this way and its superiority of running compared to all axles level has been proved over many years.



A refinement that you may wish to try is to introduce a little sloppy axle compensation. Pass an axle through the front bearings and then pass a length of brass rod through the two oval holes in the spacers. Solder the rod into place so that it bears down on the axle. Remove the axle and either ream out with a tapered broach the axle holes 10-15 thou oversize or file (use a round or 1/2 round file) the top and bottom of the bearing hole into a slight oval. Refit the axle and you should have a slight rock of about 5 thou on each side, this does wonders for electrical pickup. Also bend out the guard irons using long nosed pliers so that they are 32mm apart.

Now prepare and fit the Slater's wheels and axles. The crankpin screw head needs to be flush with the back of the wheel (it may interfere with the shoulder of the bearing otherwise) so it will be necessary to drill a countersink hole. Use a 2.5mm drill in a hand held pin chuck. Drill gently and keep checking with the head of the screw until the hole is the correct depth. The screw is designed to self tap into the plastic and then lock itself. I don't trust this and prefer to screw it in until the head is just proud of the wheel back. I then fill the countersink hole with Araldite and then screw it in until it locks. Leave the wheels until the Araldite has set and then clean of any excess Araldite by rubbing the wheel on the emery cloth. This should leave the screw head embedded in Araldite and prevent the potential problem of the screw turning when you are trying to undo the crankpin nut.

For extra instructions I have produced comprehensive hints and tips help sheets for using Slater's wheels, also plunger pickups, motor & gears set-up etc. These can be downloaded free of charge from my website www.jimmcgeown.com or send a SAE and I will be pleased to provide them.

11. Now solder the turned bearings into the side frames. I pop them into the frames and then pass a lightly oiled axle through them to ensure that they are both correctly aligned. I have designed the chassis to be just over 25mm wide to provide sufficient clearance for coarse scale wheels. If using Slater's fine scale wheels it is a good idea to reduce the potential side play on the centre motor drive axle by pushing the bearings outwards along the axle away from the side frames. A distance of 28-28.5mm over the outside faces of the bearings is about right. I solder the outer axle bearings against the side frames and this provides plenty of side play to get the loco around tight curves.

I solder the bearings into place on the inside face of the chassis side frames by using a generous amount of liquid flux and then with a hot iron carrying a good amount of solder. I place the iron tip at the joint between bearing and side frame so that the iron is heating both the bearing and the side frame. I find that after a few seconds when the heat has built up the flux pulls the solder off the iron bit and flows around the circumference of the bearing. I find that soldering a bearing this way is a lot more controllable than soldering on the outside face of the chassis side frame.

If once the bearings are soldered solid you find an axle is slightly tight the bearing can be gently opened out with a tapered broach to provide a nice running clearance.

If you are fitting plunger pickups now is a good point to open out the mounting holes in the assembled chassis. In theory I have put the holes in exactly the right position for the pickups to bear onto the centre of the back of the wheel tyre and if you are using cast wheels (coarse scale etc) you will find this is perfect. In practice when using Slater's wheels I found that the plastic moulding extends to about this point of the wheel back and there is a risk of the pickups not working. I recommend moving the holes by about 1mm by filing them oval and then soldering the etched washers that are included with the Slater's pickups to the side frame to provide circular mounting holes again.

I would suggest that you fit a wheel onto an axle and make up a pickup so that you can offer them into place and check that the positioning will be correct as you open up the holes. I fit the pickups after painting the chassis. I only fit plunger pickups to the outer wheels as with the motor on the centre axle there is insufficient room.

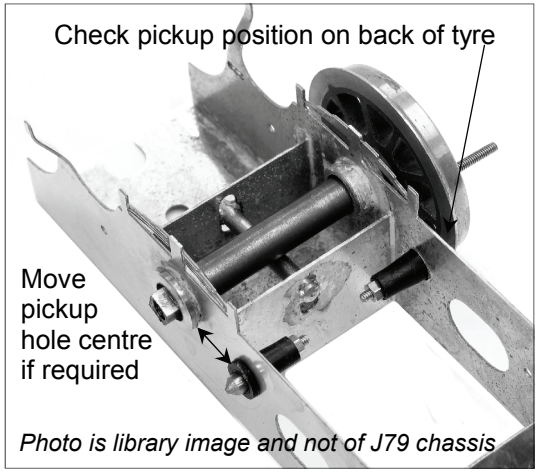
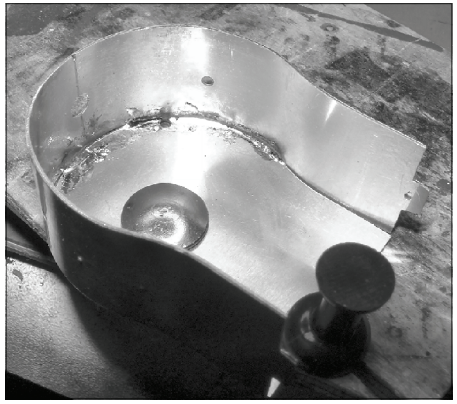
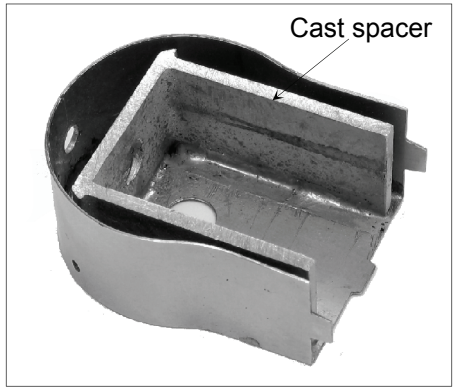


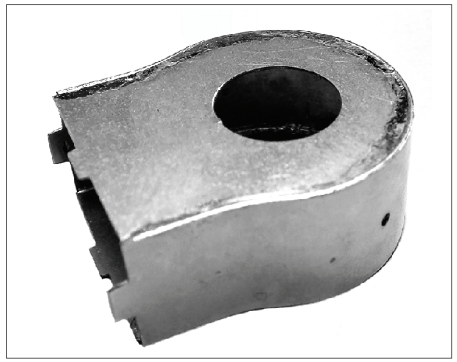
Photo is library image and not of J79 chassis



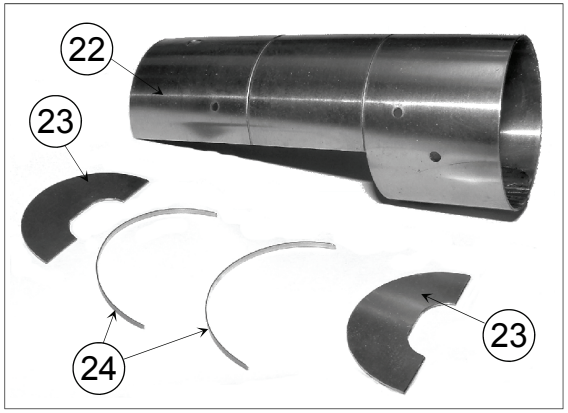
Secure the smoke box front to a block of wood using drawing pins and solder the wrapper around the edges so that the front acts as a former. Start by positioning the wrapper to the centre of the smoke box front top, there being a small half etched centre line mark to aid positioning. Work your way around each side and down to the bottom in short sections working each side alternatively. Don't be afraid to remove the assembly from the wood block and adjust the curved wrapper using fingers and thumbs if you think the wrapper is not running around the front correctly. I normally find that a slight adjustment is required when I have worked my way down to the reverse curves.



I have provided a cast spacer to fit inside the smoke box and come within a metal thickness of the edge to provide a support as you solder the smoke box back (part 19) into place. As castings never come out an exact size I have made it slightly thicker than required so that it can be filed down with a large coarse file to the correct thickness. I have provided tapered edges on one side to help with this. The correct thickness is going to be a metal thickness less than the distance between the inside face of the smoke box front and the edge of the wrapper. About 13.5mm but in practice just file it down and keep offering it into place until it looks right by eye. Then press the smoke box back into place and make any slight adjustments to the spacer with the file until the edges of the smoke box back are flush with the edges of the wrapper.



Once happy with the spacer solder it into place. Then fit the smoke box back (part 19) again positioning the top at the etched centre marks. Again work from the top around each side but this time you will be soldering on the outside face. Once completed check the assembly for square (particularly at the bottom) and check that it will fit into the four slots on the footplate. Then fill any slight gaps in the wrapper joints with solder and dress the joints to blend into the front and back face. Any slight creases in the wrapper can be smoothed out using a flat file. Then fit the cylinder end detail overlay (part 20) and smoke box door ring (part 21).



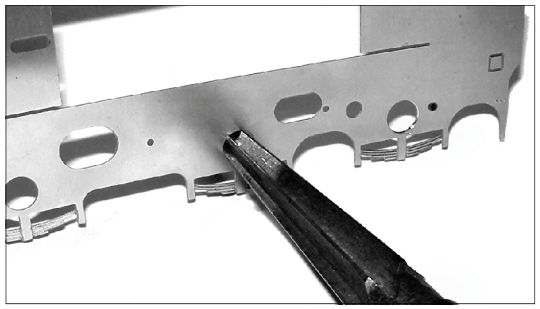
7. Take the boiler (part 22) and check that it is formed reasonably well and free of flats and creases. I work it gently with fingers and thumbs over a offcut of 3/4" water pipe getting the radius slightly tighter than required. Then solder the two semi circular boiler formers (parts 23) inside either end. I achieve this by securing a former with drawing pins to a block of wood and spring the boiler end around it. The former should push the boiler out to its correct radius (the reason for forming the radius slightly tight) and give a smooth even curve. Run a generous fillet of solder around the inside. Then solder the front full part of the boiler at the half etched overlap joint. This joint allows a little adjustment so gently work the front of the boiler to be as circular as possible but any egg-shaped-ness that appears here should not be noticed on the finished model. Once soldered blend in the outside of the joint with a flat file.

Pre curve the two central boiler bands (parts 24). There are two etched guide lines to help keep the bands straight and the bands are positioned on the cab side of these lines. Tack solder one end of a band to the boiler and then using a knife point to press the band down and pull it tight around the circumference of the boiler. Work around the boiler using plenty of flux and short tack joints. If you wish you can also fit the third narrow band around the cab end of the boiler but I prefer to leave it off until the boiler and smoke box are united. Then if there is a slight gap between boiler and cab front this can be closed by fitting the band so that it slightly overlaps the boiler end.

Now check the fit of the boiler between the tanks and if it is tight you can move the inner tanks slightly or use a flat file to feather the ends of the bands into the boiler to gain extra clearance.

When happy with the fit of the boiler solder the inner tanks solidly into place at every joint. These inner tanks provide a great deal of rigidity to the body assembly but when soldering them into place there is also a risk of the solder pulling the tanks and twisting the body. So I would recommend working one joint at a time by tack soldering first and then checking for square (also that the boiler still fits). Also progress by working a joint on the left hand tank and then its equivalent joint on the right hand tank.

10. The chassis has been designed to use a Mashima 1833 motor with 40/1 gears and 3'6" diameter wheels. I recommend using Slater's wheels, catalogue number 7842W. For electrical pickups I have included the materials from which to fabricate a wire wiper pickup system, but have also included pilot holes in the chassis for fitting plunger pickups and I would recommend the Slater's system.



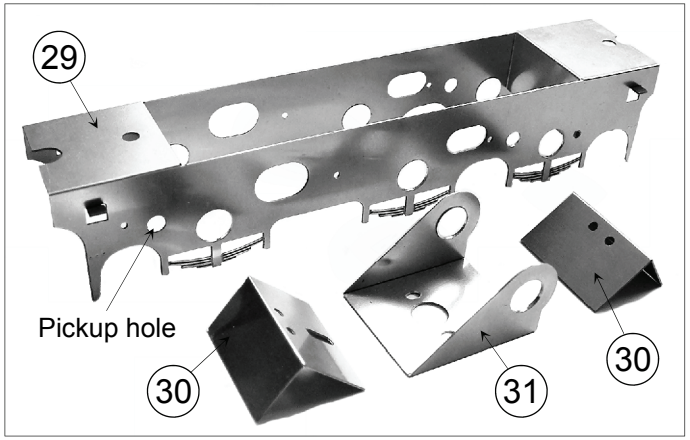
Take the main chassis (part 29) and using a tapered reamer open out the axle holes to take the turned bearings. Also open out the holes in the wings of the motor mount (part 31) to be a snug clearance for these bearings. Emboss the three bolt heads above each of the guard irons and then fold the chassis sides through 90 degrees. Fold down the two end spacers and check that the chassis is square. Once happy run fillets of solder up the joints between the fold down spacers and the chassis sides.

Fold up the two spacers (parts 30) and solder between frames so that they will form a box section around the two outer axles (check that chassis is still square). Fit the spacer with the slotted hole to correspond with the slot in the front fold down spacer. Have a test fit of the motor into the motor mount to check that the motor fixing screws will fit easily through the slotted mounting holes. If required use a round rat tailed file to gently remove any etching cusp and open out the slotted holes slightly. If you magnetise the blade of a small jewellers screwdriver you will find that this makes handling the small screws easier. When happy with the holes set the motor to one side.

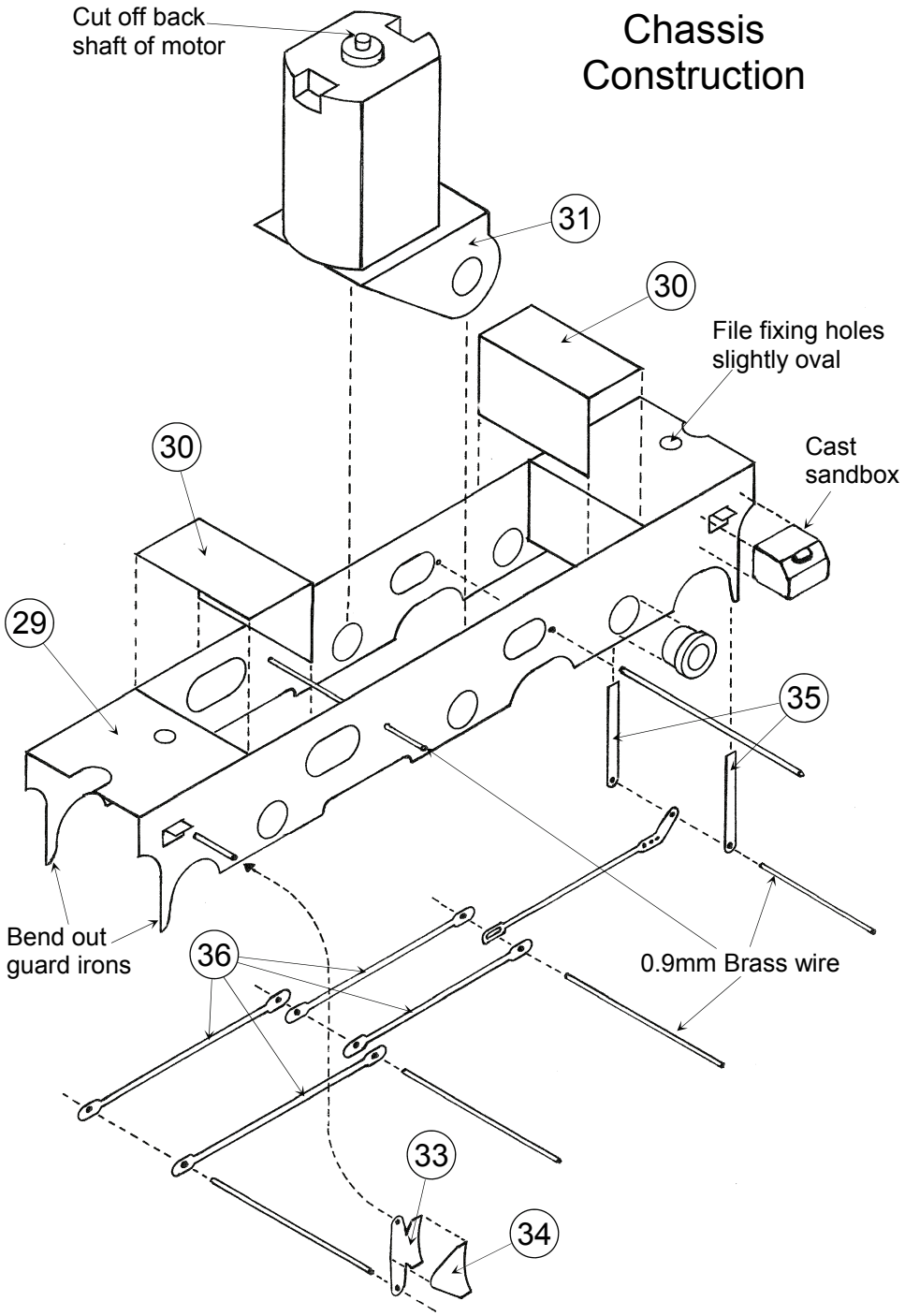
Then fold down the two wings of the motor mount and locate between the frames by slipping two bearings loosely through the holes. Solder the top plate of the motor mount solidly to each side frame so that the motor will sit vertically. Remove bearings and solder all joints so that the mounting plate is as rigid as possible.

Offer the basic chassis up to the body to check that it will fit easily between the buffer beams. If required Dress each end of the chassis with a file to achieve this.

Check that the 6BA fixing screws will pass easily into the captive nuts on the footplate. File the holes on the chassis slightly oval to achieve this.

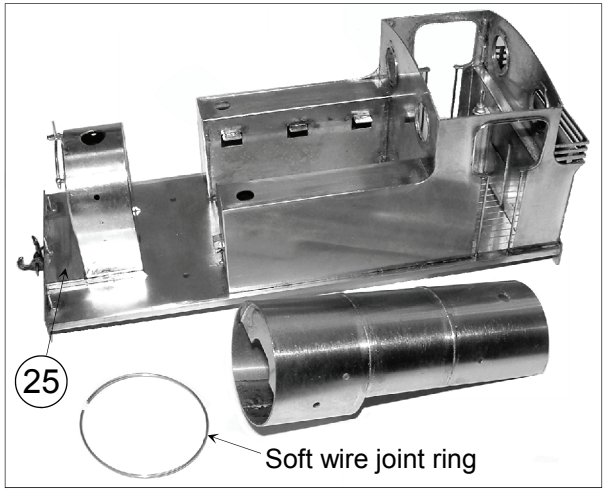


Chassis Construction



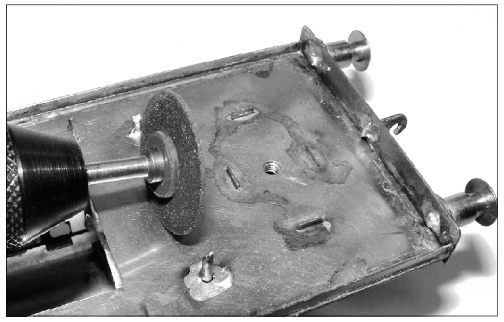
Now is a good point in construction to assemble the basic chassis as with the boiler removable the motor position can be determined. Then if desired body and chassis construction can continue side by side, but for continuity I will describe construction of the main body components through to completion.

When the boiler is correctly positioned between the tanks and the smoke box assembly fitted into the footplate slots view the assembly from all directions. Check that the boiler front is central to the smoke box back and that there is an equal step up around the circumference of the boiler front to the larger smoke box diameter. Check that the boiler top is level and that the smoke box looks upright from the side and square to the footplate when viewed from above. Slight adjustments can be made to the smoke box position by opening out a slot slightly using a sharp scalpel blade. Boiler height and level can be adjusted by filing where it sits on the inner tank tabs. When happy join the boiler to smoke box with a couple of tack joints.



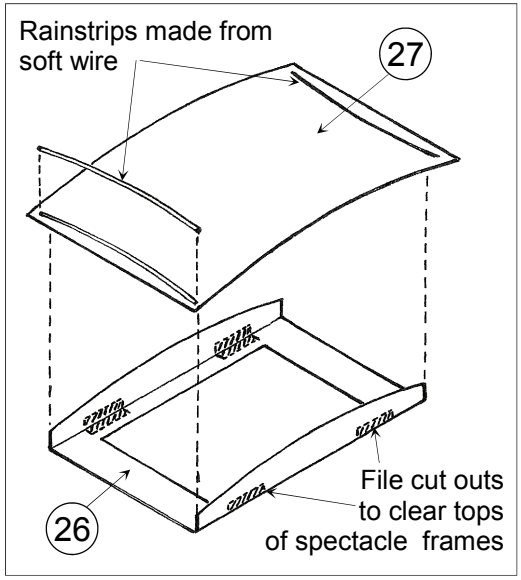
Then remove the assembled boiler/smoke box and make a permanent joint by fitting a ring made from soft wire hard against the rear of the smokebox then the full length boiler band hard against the wire ring. Using plenty of flux run a generous fillet of solder around the circumference of this wire ring so that the solder floods into the gaps either side of the wire and then clean up to form a $^{1}/_{4}$ round section to represent the jointing ring between boiler and smokebox. Refit between tanks and look for any gap between boiler end and cab. Then fit the third short boiler band making allowance for any gap.

Now tack solder the smoke box front to the footplate and the underside of the boiler to each of the inner tanks. Check that the body and tank sides are still square, that the footplate is still straight and level (particularly that the footplate in front of the tanks is not running up or dipping down) and that the buffer beams are not twisted (body does not rock on the buffer beams when placed on a flat surface). When happy solder the joints solid. Then fit the raised footplate section (part 25).



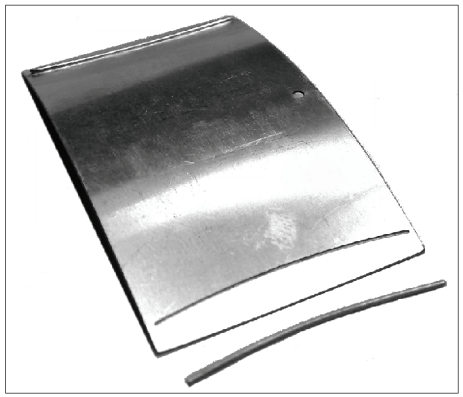
As construction progresses I would recommend trimming any projecting tabs flush so that the body will still sit flat on a block of wood. A grinding disc in your minidrill is ideal for this operation.

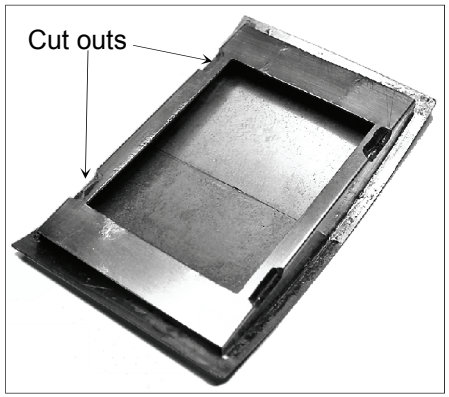
8. The cab roof provided represents the sheet steel roofs fitted to the locos as replacements for the original wooden roofs.



Fold up the roof former (part 26) and reinforce the folds with solder. This former will allow the cab roof to remain removable until the cab interior is detailed and painted and then if required it can be glued into place. Offer the former into place between the cab front and back to check that it is a snug but not tight fit and will slide down to match the profile of the tops. You will probably find that the tops of the spectacle frames prevent it from sliding down completely so file cutouts to clear these.

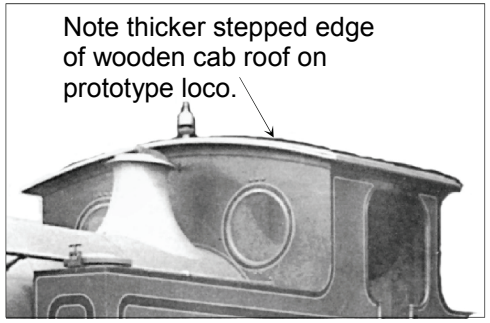
Curve the roof (part 27) by gently forming around a offcut of pipe or tube. Precurve a length of soft wire by gently pulling between finger and thumb and solder into half etched groves to represent rainstrips. Solder roof former centrally to underside of roof. There are small etched marks to indicate the centre line to help with positioning.





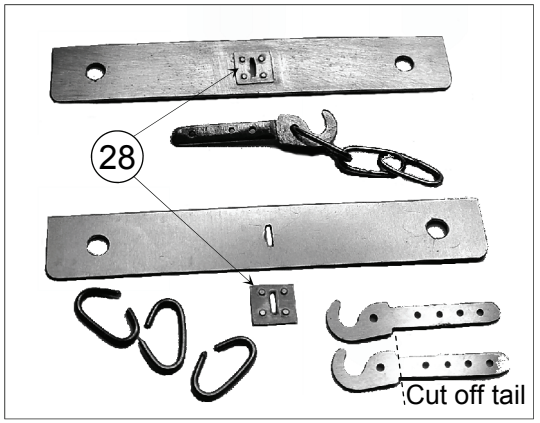
If you wish to represent the earlier wooden cab roof I would suggest that before curving the roof you file all four edges back by about 0.5mm. Then after curving solder a strip of brass about 3mm wide (you will find the waste along the edge of the etched fret ideal) along the underside edge of all four sides so that it overlaps by about 0.5mm. This will give the appearance of the thicker stepped edge of the wooden roof and also return the roof to its original size. Then fit the roof former. The wooden roofs also had rainstrips in a similar position so fit soft wire but after soldering dress the top flat to represent a thin wooden batten.

A lift up flap to provide ventilation also appears on the wooden roof in some photos. To represent this cut a 7mm square of brass from the fret waste and solder centrally on the roof just behind the whistle fixing hole about 5mm from the roof edge.



9. Solder the coupling reinforcing plates (parts 28) to the buffer beams so that the slots in the plates correspond with the coupling slots but ensure that the slots remain free of solder. Make up the coupling links. I close up the links by holding the curved end in the jaws of a pair of round-nosed pliers in one hand and squeeze the flat parts of the link parallel with long-nosed pliers held in the other hand. Once you have six even-shaped closed links, you can open each one slightly and thread three together. The last link passes through the hole in the coupling hook. I reinforce the joint of each link with a spot of 60/40 solder. Pass the tail of the hook through the buffer beam slot and then solder solid to the rear of the buffer beam. Then snip off the tail of the coupling. Some people prefer to spring the coupling by retaining it using a coil spring and split pin and this is why the hook has a long tail with holes in but I have never been convinced by this method.

A single thickness hook will be very serviceable but I have proved some spare hooks and if you wish laminate two or three together and file to better represent the compound curved and shaped cross section of a prototype hook. Cut the tails off the extra hooks first as you will only get a single metal thickness through the slot.



Photos of the brake fitted locos also show screw couplings so I have included my cosmetic screw coupling. Solder together both halves of each hook and then using round-nosed pliers form the four links into U shapes. Dress the tops of two links with a file so that they will pivot freely in the slot in the hooks. Thread one of these links through the hook and spring the ends over the pegs on the cast centre. Then fit the bottom link. I would now recommend finishing the chassis and then completing the remaining body detail and fittings as a last operation as this will reduce the amount of handling required with fine vulnerable parts in place.