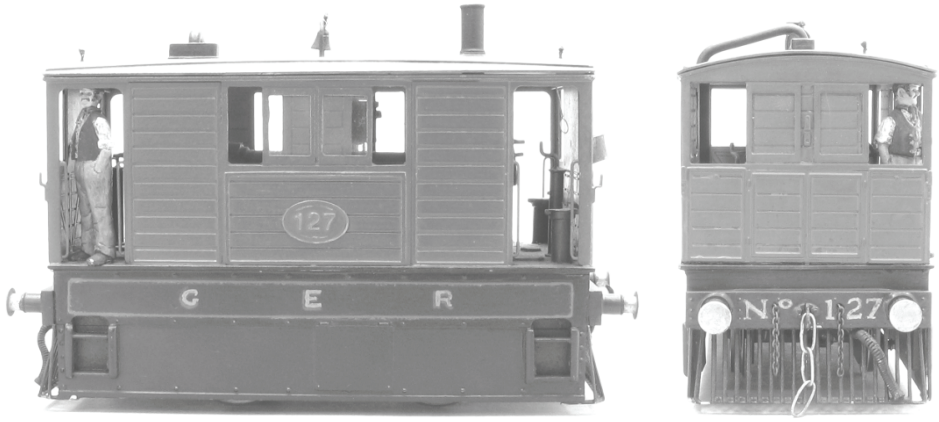
I brush-paint my models with Humbrol enamel. For years I just stirred it up and painted straight from the tin but I was never completely happy with the results. Recently two things have transformed my painting. The first was a copy of Martyn Welch's book, The Art of Weathering, Wild Swan Publications, 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.

During construction you will have noted that the sliding windows are designed with a rebate behind into which panels of glazing can be slid after painting. 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. If you study photos of the prototype tram locos running in service you will note that practically every photo shows all windows slid open regardless of season.



Great Eastern Railway Livery
Note position of etched number plates and painted number on buffer beam

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.

CONNOISSEUR MODELS

LNER Class Y6 Tram Loco

The first members of this class of 10 engines were built in 1883 for the opening of the Wisbech & Upwell tramway and the last two members of the class were completed in 1897. They were designed to meet the rigid specification laid down by the government for railway locomotives operating along public roads. These included full side skirting and enclosed bodywork to prevent frightening the horses and the ability to drive from each end so as to achieve the fullest view of the road ahead.

The class was also used for shunting on the quayside lines at Great Yarmouth & other East Anglian ports. The last member of the class was withdrawn in 1952.

Parts Required To Complete, 2 Sets 3' 6", 10 Spoke Driving Wheel (Slater's No 7842W), Plunger Pickups if desired (Slater's No 7157), Available From Slater's, Temple Road, Matlock Bath, Matlock, Derbyshire, DE4 3PG, Tel 01629 583993.
Mashima 1833 Motor and 40/1 Gear Set (available from Connoisseur).

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.

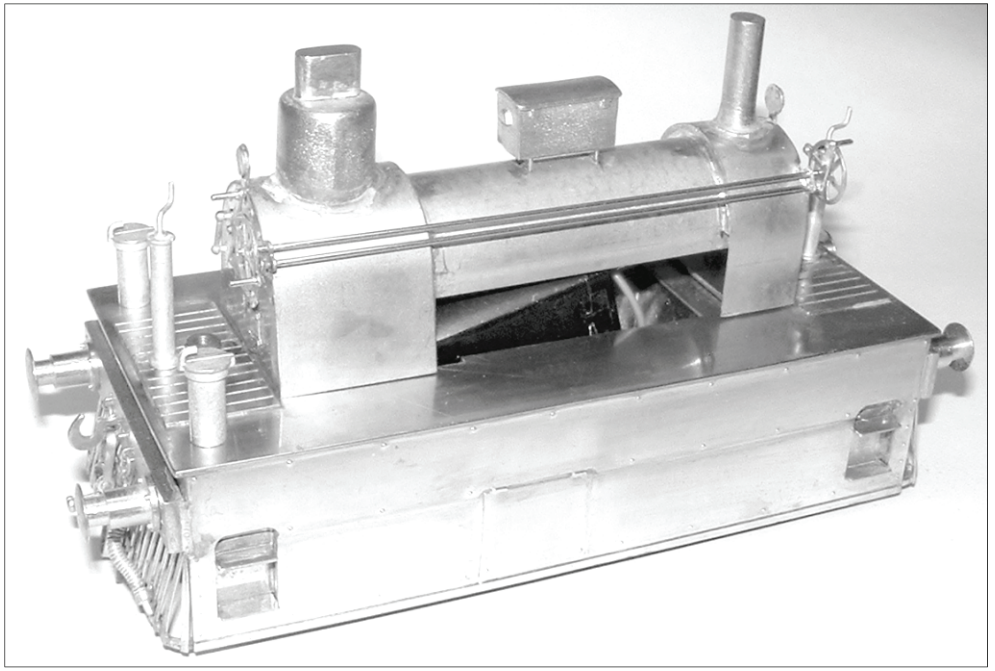
It is important to keep the bit clean and in good condition as you work. Get a soldering iron stand containing a damp sponge as old oxidized solder is wiped off on this before picking up fresh solder for each joint. If you haven't made a joint for some time you may find that a hard black crust has formed 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

Once you are satisfied that you have a sweet running chassis that can be screwed to the footplate/sideskirts assembly with two 6BA screws and clears the removable boiler assembly. You can fit the remaining castings by referring to the photos for positioning and then paint the model.

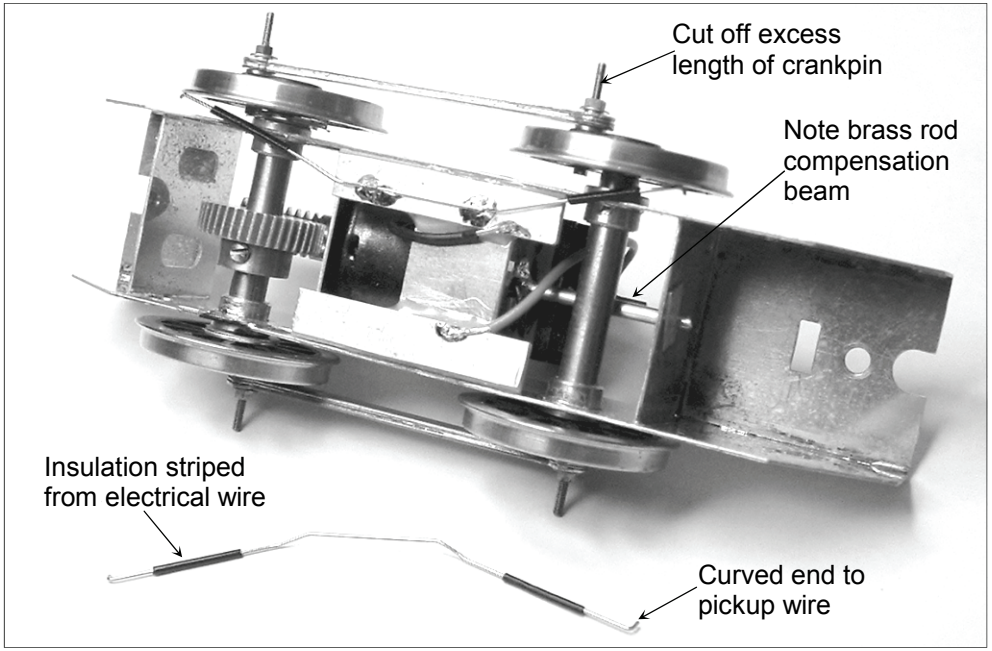


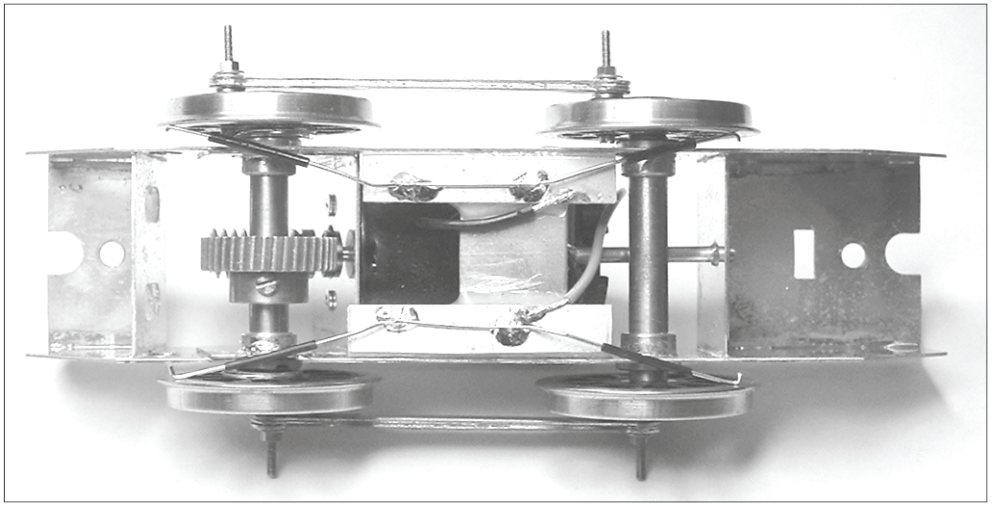
11. Painting is a vast subject that cannot be covered fully here. The important thing with a metal model is to get a good base coat of primer. Hopefully you have been cleaning up and washing the model at the end of each modelling session but it will still need thoroughly cleaning before painting. I give 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).

Fit motor and gear set and electrical pickups. If using plunger pickups, before gluing into place just check that they will bear on the metal rim of the wheel and not be interrupted by any of the plastic moulding of the wheel.

If fitting wire wiper pickups the photos show my suggestion of how a system can be fabricated from the PCB strip and 0.45mm spring brass wire provided





Hopefully you will be fitting a motor and gear set supplied by myself as this comes with extensive instructions and tips for setting up a sweet running chassis. But if not or if this is your first loco please contact me for additional hints and tips sheets.

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.

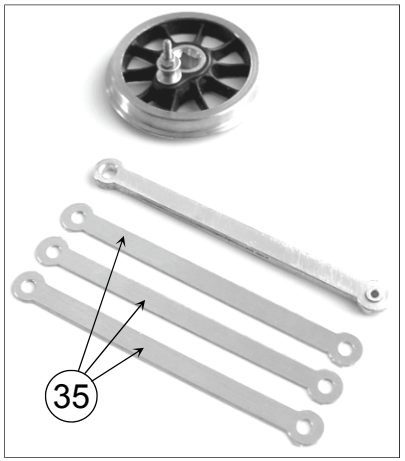
A better alternative is to solder your white metal castings using Carrs 70 degree low melt solder and Carrs red label white metal flux. The iron should be run at a much lower heat so that you do not melt the castings. I have a domestic light dimmer switch and plug socket fixed to a piece of wood, wired 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

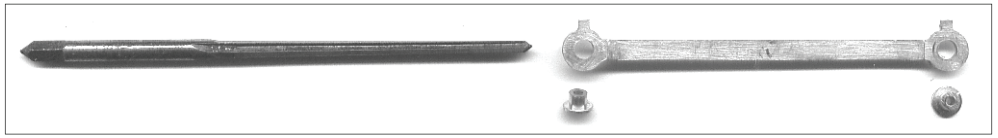
Hole Sizes. Because of the etching process holes will normally be found undersize, for example the turned brass bearings will not fit holes in chassis sides, and a simple fitting operation is required. The best tool for opening up holes of this size is a cheap tapered reamer available at most model railway 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.

Make up the coupling rods (parts 35) by laminating together the three parts of each rod. The way I do it is to separate the three laminates of one rod from the etch at a time. Clean off the tabs so that the three laminates will fit together flush along their length. I then use locking tweezers or miniature electrical crocodile clips to hold the laminates together. I then pass wooden cocktail sticks or drill shanks through the crankpin holes to line up the three laminates. Check by eye that these are parallel and square to the rod.



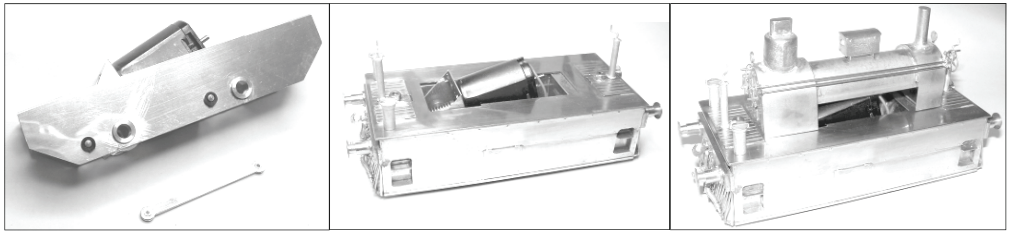
Then using plenty of flux, solder along the top edge of the rod. Start in the centre and work out towards each crankpin hole. By working from the centre outwards this reduces the risk of the laminates distorting and bowing apart with the heat. You should find that some solder has run between the laminates to the bottom edge. Reposition the 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 cocktail sticks/drill shanks from the crankpin holes and reposition the 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 then gently clean up the rods.

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.



Now 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. Fit rods and test chassis for free running.

I recommend first tack soldering the loose spacer (part 33) into place. Then temporarily screw the motor into its mounting plate (part 34) and slip between the frames locating by temporarily fitting turned axle bearings. The motor needs to sit down as low as possible between the frames with its back end just clearing the rear spacer so that it clears the internal boiler detail. So offer the chassis up to the footplate and try the boiler into place to ensure that the motor mounting plate is set at the correct angle to achieve this clearance.



When happy, tack solder the mounting plate to the sideframes and remove the motor and bearings. You will note that the reason for the two oval slots in the spacer is to allow screwdriver access to the motor fixing screws.

Now solder all joints on the chassis and run fillets of solder into the half etched fold lines to make the chassis as solid as possible. Check as you are doing this that the chassis is not twisted. It is important that the motor mounting plate is soldered solid as this will make it very rigid and prevent any tendency for it to flex when the motor is under load. It will also provide extra rigidity to the chassis.

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. Don't worry if the axle is slightly tight in the bearings as the bearings can be opened out with a tapered broach to provide a nice running clearance once the bearings are soldered solid.

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 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. There are some packing washers on the fret that can be used for this but I prefer to just push the bearings out.

As designed the chassis provides a simple rigid 0-4-0. A refinement that you may wish to try is to introduce a little 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 half 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.

Now prepare and fit the Slater's wheels. 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.

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.

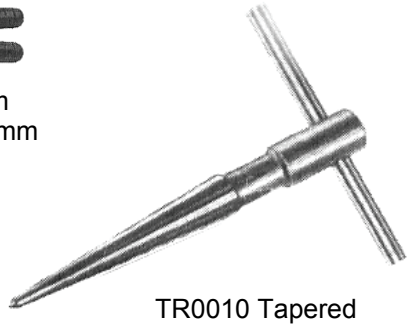
To form shallow curves, splasher tops, smoke box wrappers etc, use a piece of pipe or broom handle. Diameter is not crucial, a piece of one-inch water pipe covers cab roof to smoke box wrapper. Place part over tube and hold in place with finger and thumb of one hand. Work the metal in stages over tube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

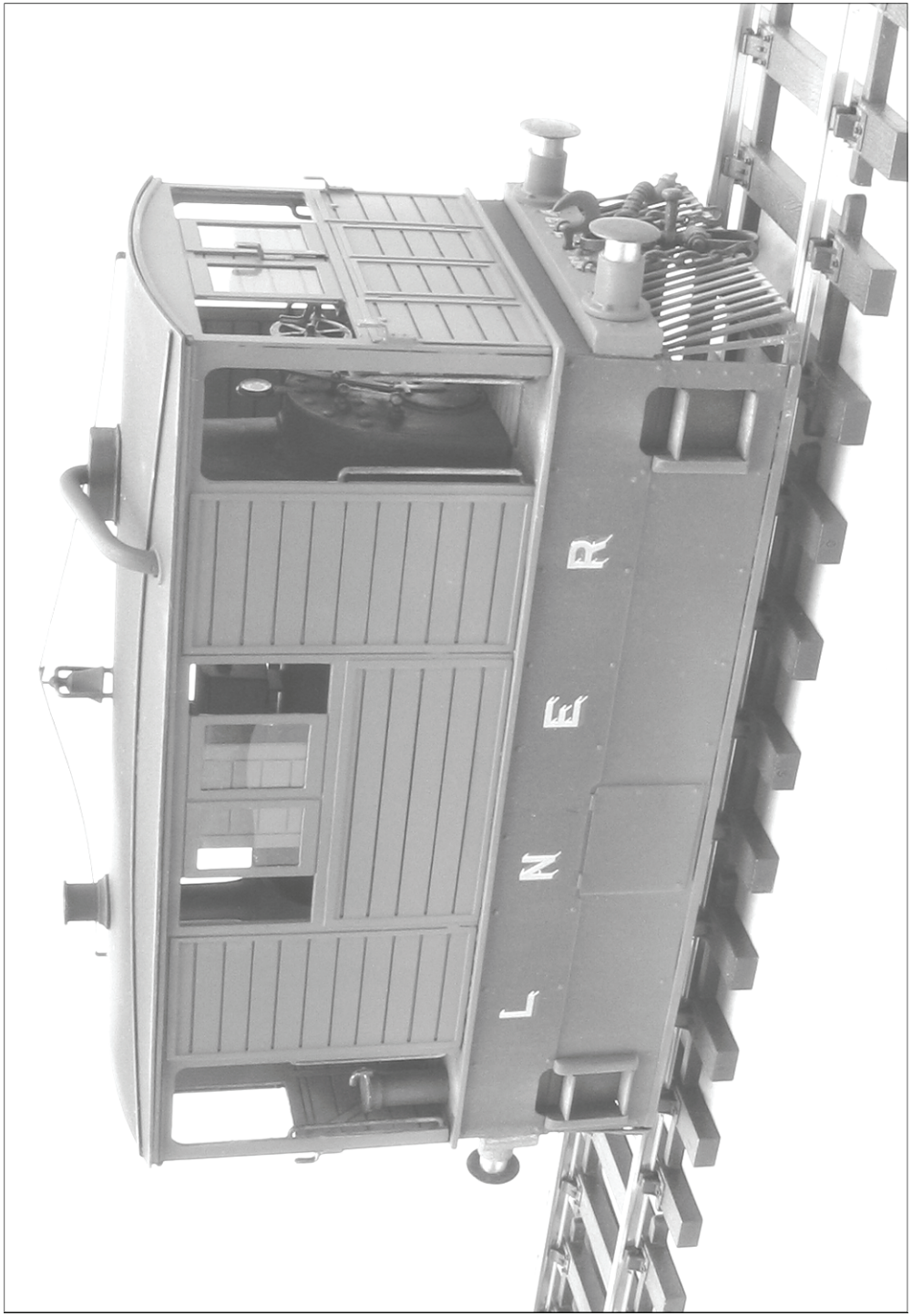
BRC250 6 Piece Cutting Broach Set 0.7-2mm
BRC300 12 Piece Cutting Broach Set 0.65-4mm

TR0005 Micro Drill Reamer 1mm-5mm



TR0010 Tapered Reamer 3mm-12mm

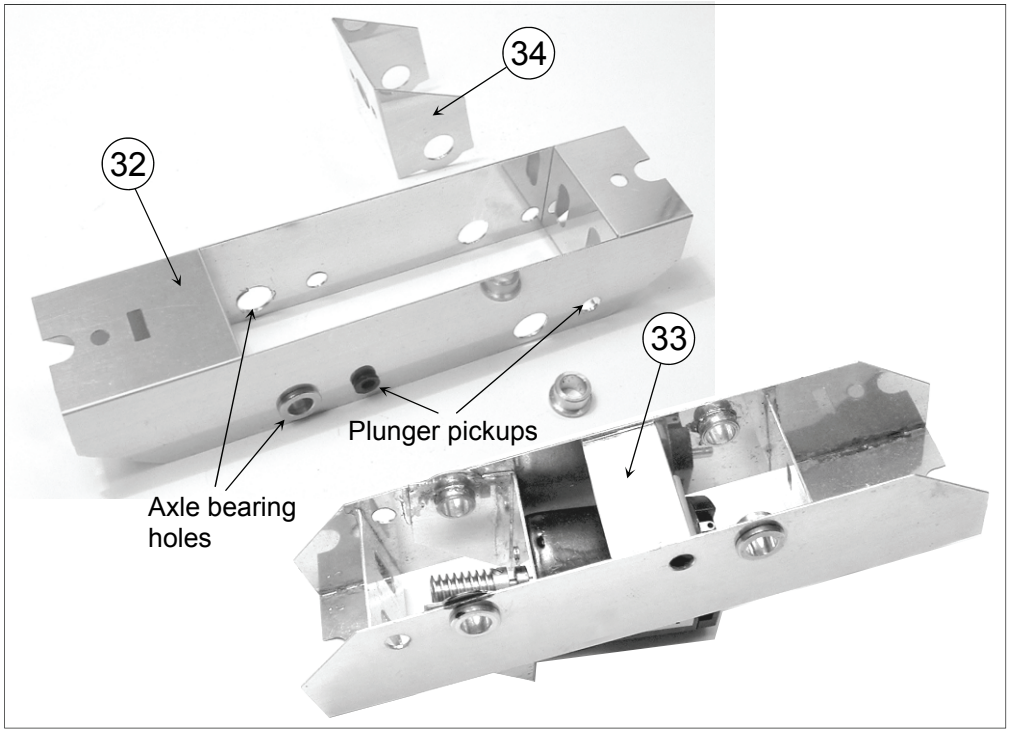
Three very useful tools purchased from SQUIRES, 100 London Road, Bognor Regis, West Sussex, PO21 1DD, Telephone 01243 842424.



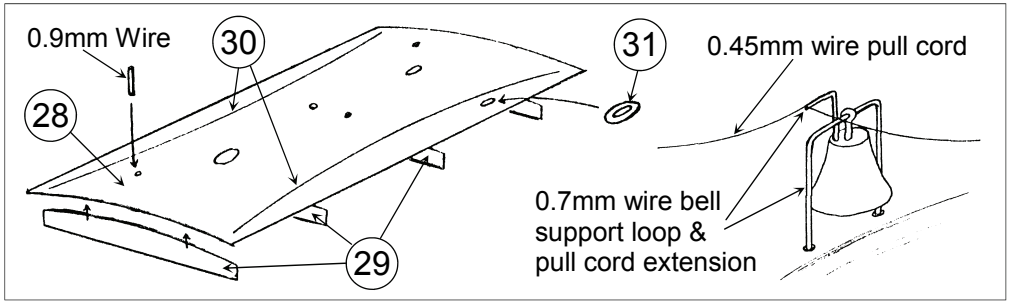
Chassis

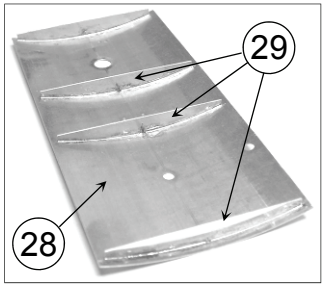
10. The chassis has been designed to use a Mashima 1833 motor with 40/1 gears and 3'6" diameter wheels. The prototype tram loco had 3' diameter wheels but these are not available on a standard axle in 0 gauge. So as you cant see the wheels behind the skirts it makes sense to design the kit to use a size of wheel that is readily available from different manufacturers. 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 holes in the chassis for fitting plunger pickups and I would recommend the Slater's system. Which system you use will be determined by your personal preference but decide now as this will determine the positioning of the loose chassis spacer.



Take the main chassis component (part 32) and open out holes for turned axle bearings and also for plunger pickups if required. Then fold each sideframe through 90° and fold down the two fixed chassis spacers. Use an engineers square to check as construction progresses that all folds are at 90°. Fold up the motor mounting plate (part 34) and note that this fits opposite the fixed spacer with the two oval slots. Fold up the loose spacer (part 33) and this fits opposite the fixed spacer with the single oval hole. If fitting wiper pickups this spacer fits as shown in the photos so as to provide a flat surface for the PCB strip. For plunger pickups fit the other way up so that the spacer forms a box section around the axle.



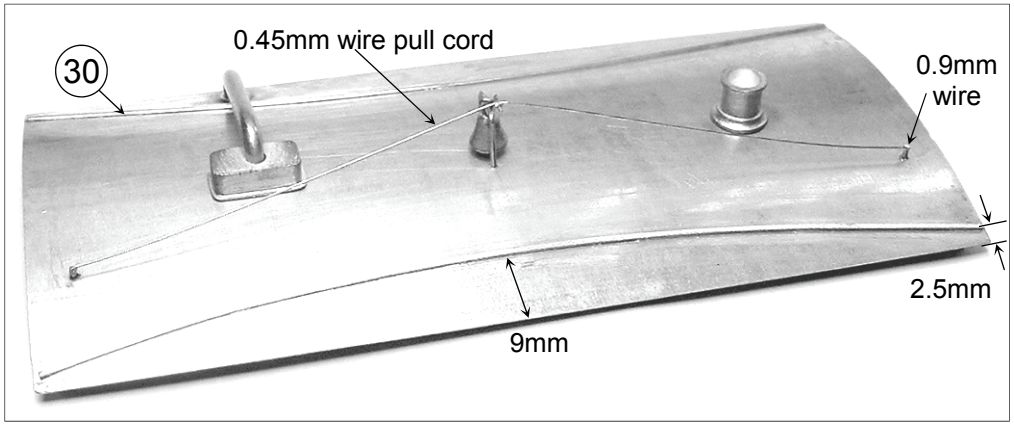


9. Pre curve the roof (part 28) by working with fingers and thumbs over a length of pipe etc. You will find that there are four half etched dots on the underside to mark the roof centre line so join these up with a scribed guide line. Then take the four roof formers (parts 29) and noting that these also have etched marks to indicate their centres, solder them to the roof so that their centre marks correspond. The formers if positioned cleverly should allow the roof to remain removable if required.

Solder in place the rainstrips (parts 30) these should be 9mm from the roof edge in the centre and 2.5mm at either end. You will find that there are three rainstrips provided in case you make a mess of one.

Solder in place short lengths of 0.9mm wire into the two holes at the ends of the roof. The bell pull cord made from 0.45mm brass wire is to be soldered to these later. Solder the small washer (part 31) over the hole at the side of the roof to form the flange through which the condensing pipe passes.

Fit the chimney and condensing pipe to the roof, early locos having a tall chimney and later locos a short one. Bend up a U shaped support from 0.7mm brass wire, drill out pivot hole in top of bell, thread bell onto wire loop and solder in the centre and then solder the two legs of the wire loop into the holes in the roof. A piece of 0.7mm brass wire can be tinned and soldered into the top of the bell to form the extension to which the 0.45mm brass wire pull cord can be soldered.



LNER Y6 Tram Loco

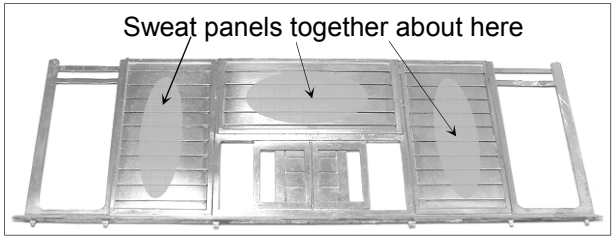
This kit is intended to accurately capture the delightful character of these distinctive little locos. Much of this character comes from the different levels of coachwork and beading of the wooden body panels. To achieve this much use is made of overlays, thus making the kit, while not difficult, very time consuming. It should be viewed as a pleasant project for winter evenings.

I find that soldering of overlays is best achieved by aligning the parts and then clamping them together with something like miniature crocodile clips. Then generously run liquid flux along an edge and work along it with the soldering iron bit (fairly large bit say 6mm diameter in a Weller 40 watt iron) loaded with 145° solder so that the flux draws the solder off the iron bit and into the joint between the two parts. Then repeat for the next edge working your way around the part until all exposed edges (window openings etc) have been done.

Then gently dress all visible edges with a old flat file to blend the laminates together. Scrape off any solder that has strayed onto the flat surfaces with a curved scalpel blade and burnish clean with a glass fibre brush. Any bowing or slight distortion of the panels can be bent back and corrected using gentle finger and thumb pressure.

This technique is fine for all small assemblies and most large assemblies of full metal thickness but if one of the laminates has a large surface area of half etch (the outside faces of the body sides and ends on this kit for example). There is a risk of the half etch bowing out in the centre and forming a cavity.

To guard against this I find it best to first tin the facing central areas of the panels with 145° solder. Then align the parts and solder a single edge to keep everything in position. Then placing the assembly onto a heat proof surface apply a little flux (to help the heat transfer) to the centre of the panel and apply a dry iron bit (most of the solder wiped off). Use a firm pressure on the iron for a minute or two so that the heat builds up in the parts to travel through and melt the solder on the inside faces to join the parts together. This technique is often referred to as sweating parts together. Work around the remaining exposed edges as detailed above to complete the job.

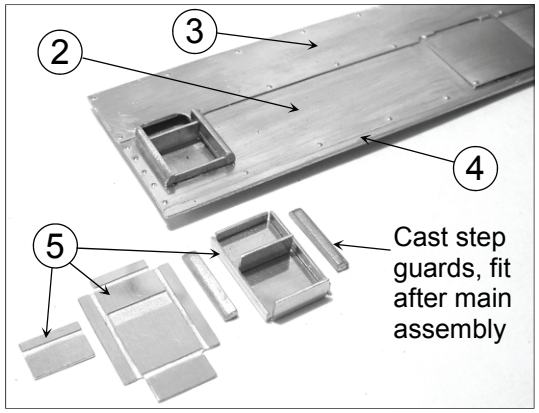


You will probably find that a little solder has got onto the surface of the parts and that they have discoloured a red/pink colour due to the heat. This should be easily corrected by burnishing with a glass fibre brush.

With most kit assembly I find it best to sub-assemble the parts in sections, soldering up all the overlays and cleaning up, then bringing these together in a final assembly.

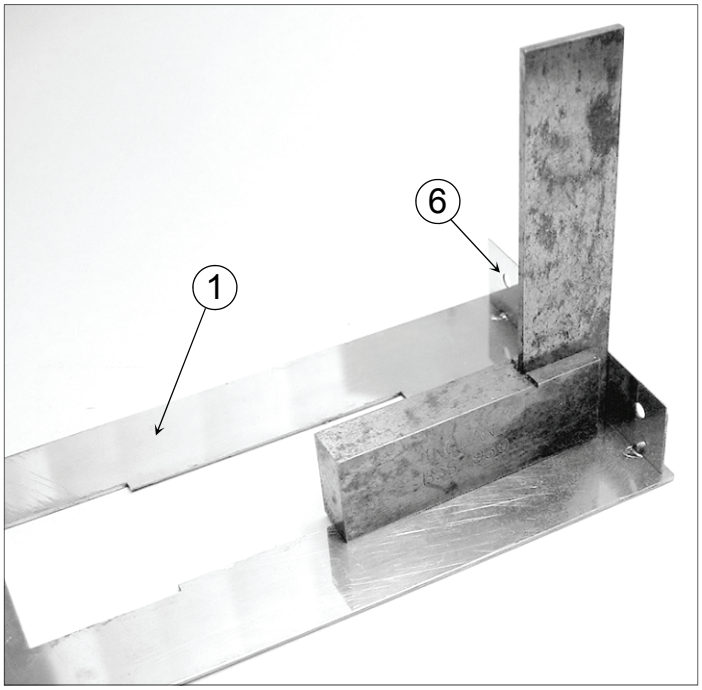
Footplate Assembly

1. Solder together the two sections of the footplate (parts 1) to form a double thickness. Noting that there is a small letter C etched onto them, this marks the chimney end of the loco. A very slight radius can be filed onto the top and bottom of the footplate edge.

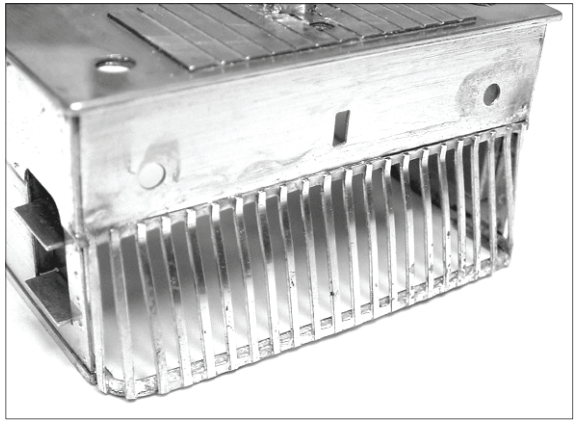


2. Emboss the bolt head detail on the sideskirts (parts 2) and then fit the sideplate and hatch cover overlays (parts 3) the hatch being nearer to the chimney end of the tram. Fit bottom strips (parts 4) into the half etched rebate at the bottom of the sideskirts. Then fold up and fit the step units (parts 5).

Solder the buffer beams (parts 6) to the footplate. Note the dotted lines to help with positioning and use an engineers square to ensure that they are upright. Then solder the sideplates into place. If your model is to receive heavy handling you may wish to consider reinforcing the bottom of side skirts with a strip of scrap material soldered along the inside of the bottom edge, a couple of lengths of old rail would be ideal.

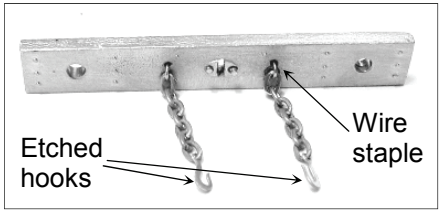


Solder the top edge of the cow catcher into the half etched rebate below the buffer beam and then solder the two ends of the former behind the side skirts. Ensure that the bottom of the cow catcher is level with the bottom of the skirts.



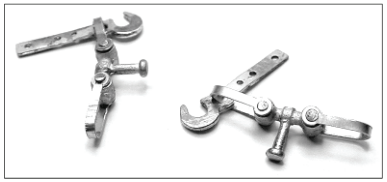
When happy with the positioning of everything fiddle the two outer bars around the corners and solder into place. Trim off any excess and dress everything flush.

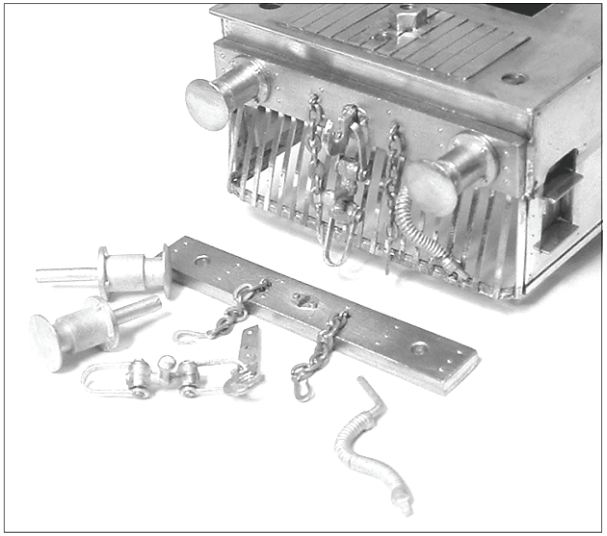
I would now recommend fitting the cast buffer beams with their associated fittings. Make up the side safety chains and fix to the buffer beam with a staple made from 0.7mm brass wire formed into a U. There are pairs of dimples on the casting marking the position for drilling 0.75mm holes for this.



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. Pass the shank of the coupling hook through the slot in the buffer beam, I solder it solidly into place and then snip off the shank flush with the back.

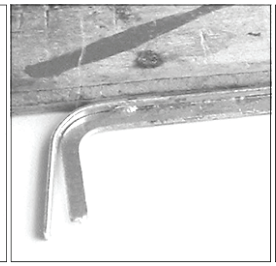
Fit buffers and then fix cast buffer beam into place above the cow catchers. There is also a brake pipe that pokes out between the bars of the cow catcher and after fixing this can be bent with gentle finger pressure so that it lies down on the bars. Fit the eight step guards to the sides of the steps on the side plates.

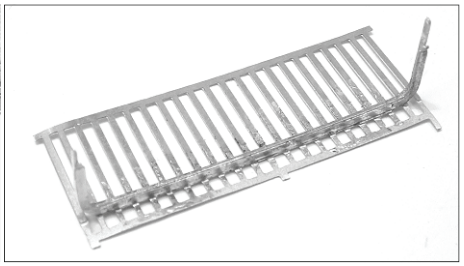




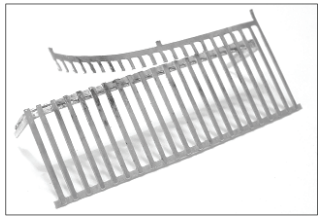
Cowcatchers

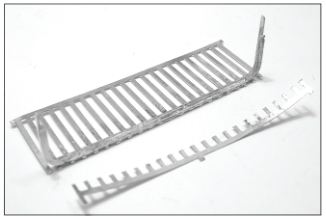
8. Make up the bottom angle iron from (parts 26) by soldering the flat strip at 90° to the C shaped strip to form an L section. If you curve one end of the flat strip it should naturally stand upright against a straight edge as you solder the C shaped strip to it. Try to make as neat a job as possible of making this bottom angle iron but as it is not directly visible strength is more important. You may wish to use a length of square section brass as a substitute if you make a mess of this.

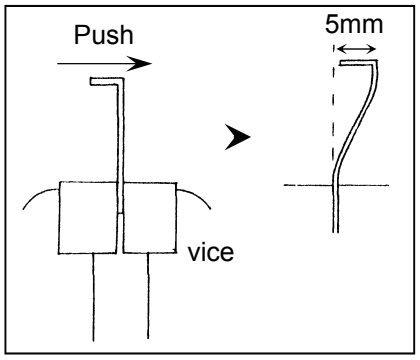




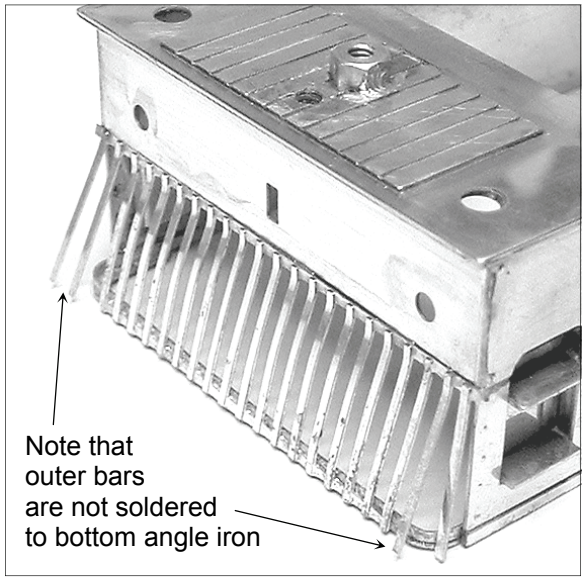
Pin the cow catcher bars (parts 27) to a flat surface and solder the angle iron to the bars at the point where the bars become half etched. Do not solder the two outer bars on either side as these are to be fiddled round the corners later. Then trim off the excess length flush with the bottom of the angle iron.

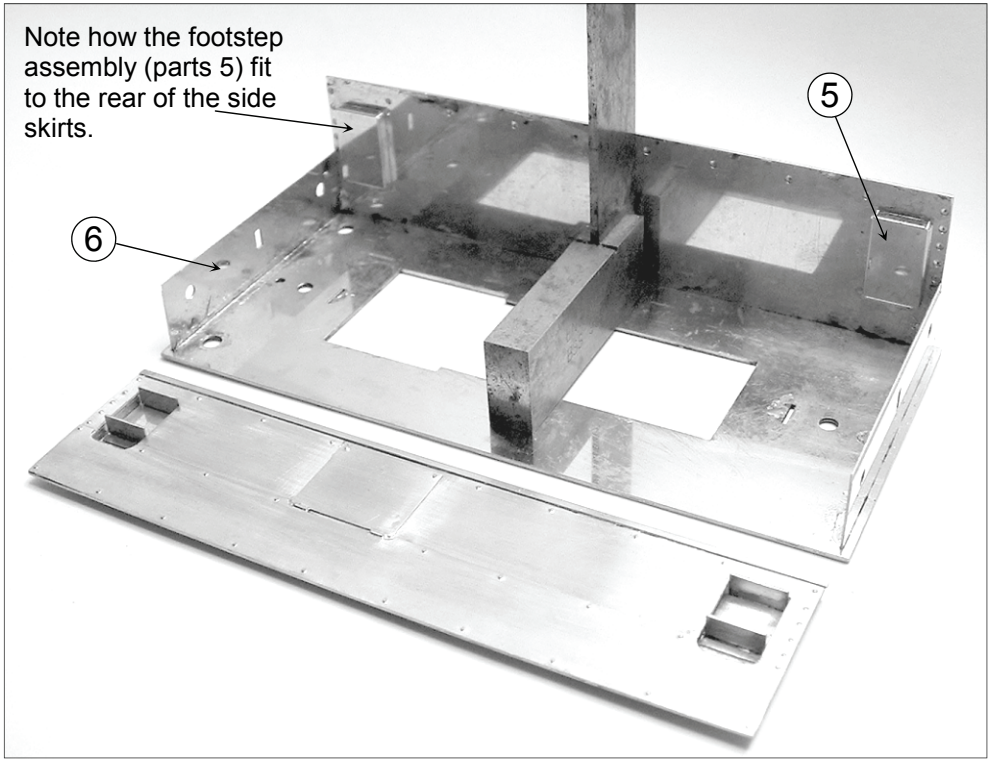


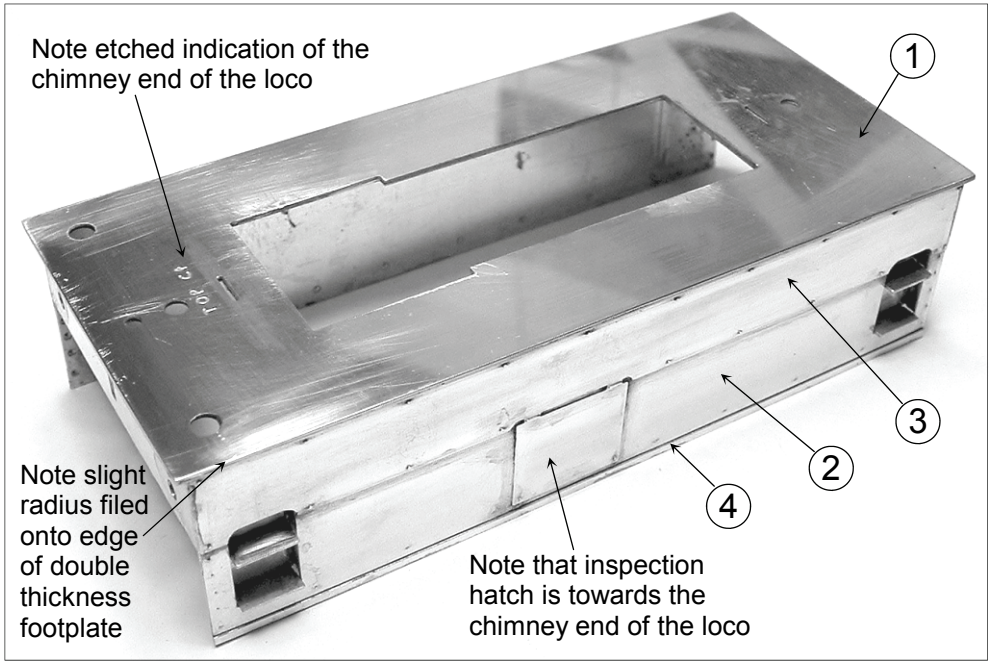




Clamp the top part of the cow catcher in the jaws of a vice and push the angle iron forwards until the bottom becomes offset from the top by 5mm. Ensure that the angle iron remains parallel to the jaws of the vice.



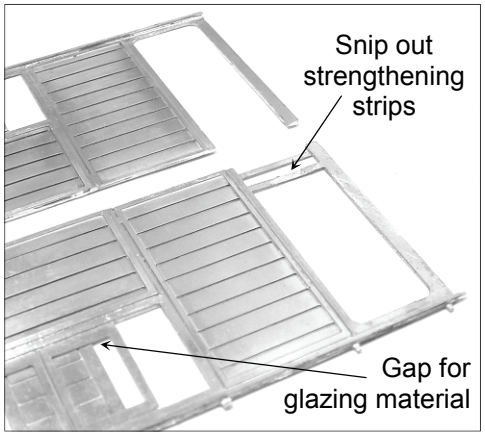


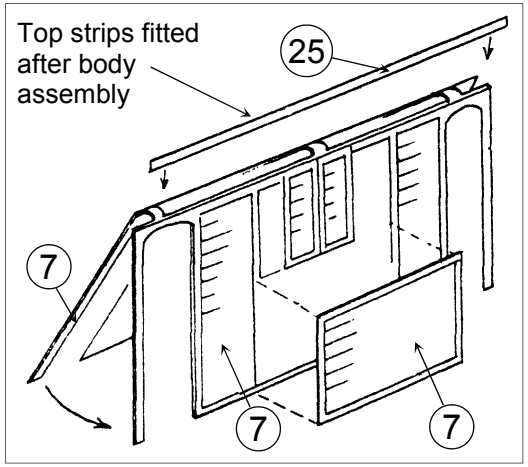


Body Panels Fabrication

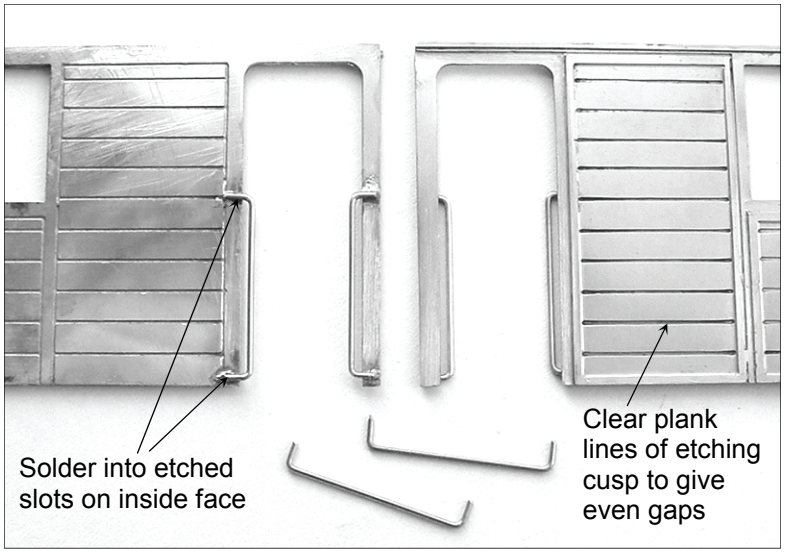
3. Solder together the three sections of each side panel (parts 7). Note that the tabs connecting the top edge of the panels can be used as an hinge to help with aligning the parts before laminating together. Also take note of the fact that the window frames are half etched to provide a gap between the frame and main body that thin glazing material can be slid into after painting, so ensure that this is kept clear of solder etc.

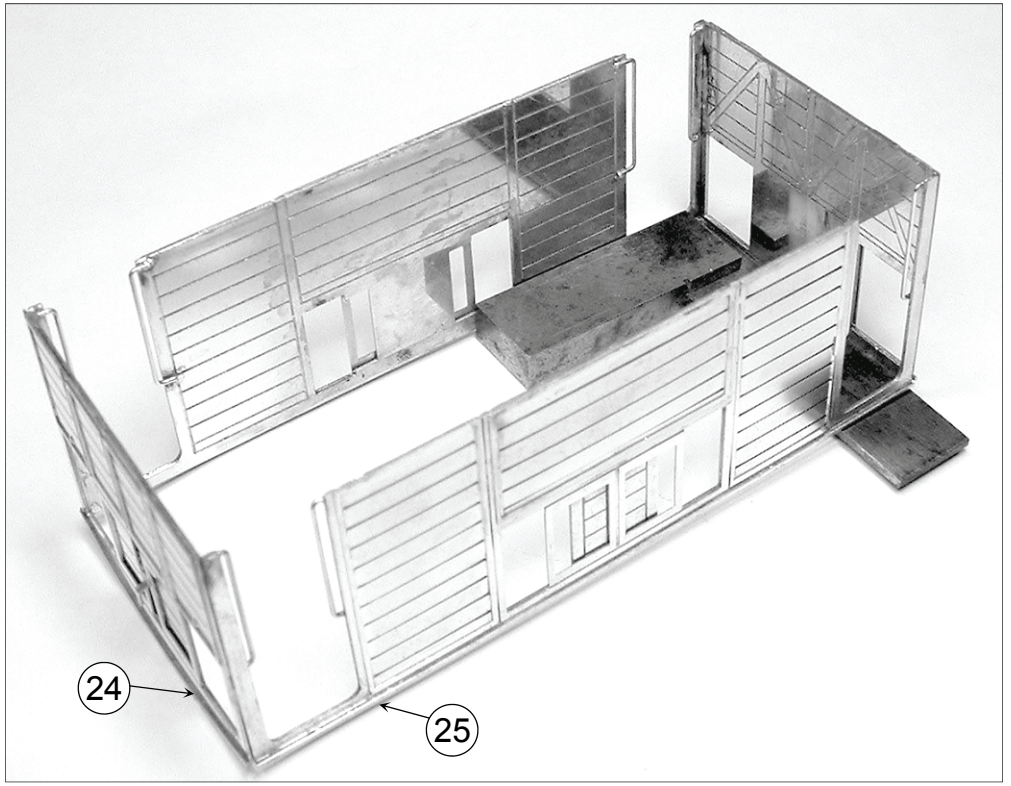
Before laminating panels together I would recommend checking that the gaps on the half etched planking on the outside overlay are clean and even. If required gently stroke along the plank edges with a sharp pointed scalpel blade to remove any raged etching cusp. Do this with the part on a cutting matt.

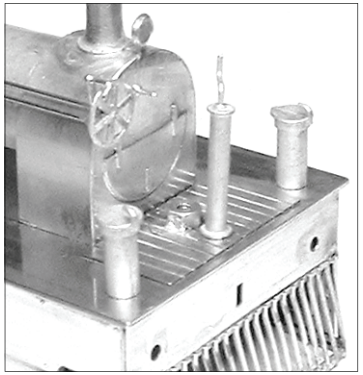




Form up doorway handrails using 0.7mm brass wire and solder into the small half etched slots on the inside face.



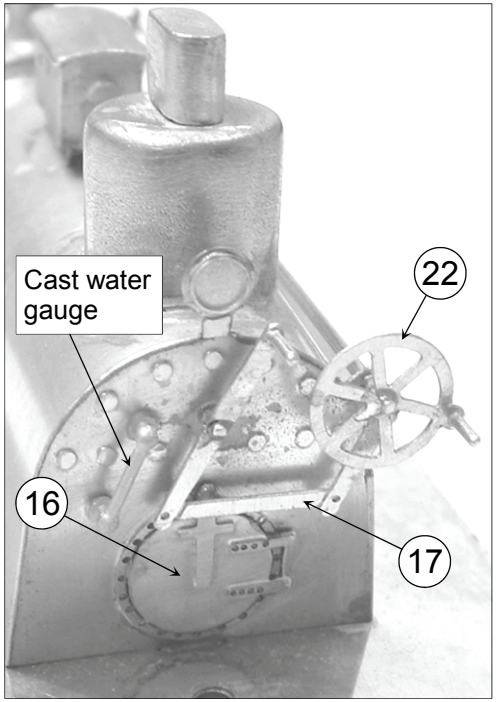


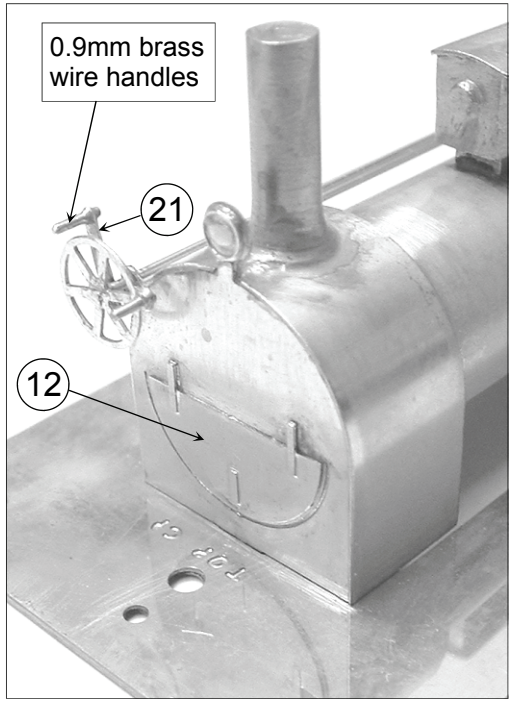


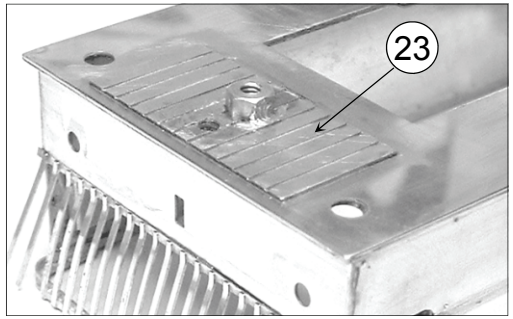
When I first developed this kit the information available indicated that only a single hand brake stand was fitted at the tank filler end of the loco. Since then a lot more information about tram locos has been published and this indicates that a second handbrake was fitted at the other end. I have included two brake stand castings but you will need to drill a mounting hole in the footplate for the second one.

There are now two options for the main body. You can fix it in place on the footplate by soldering around the bottom edge ensuring that the footplate projects an equal distance from the sides and ends. As the boiler can be left removable until after painting you should not have any difficulty brush painting the interior.

Alternatively the body can remain loose to be painted separately and then glued into place. If doing this I would recommend soldering some strips of scrap etch to the footplate to help locate the body. The fixing option you chose will probably depend on your choice of livery and method of painting.







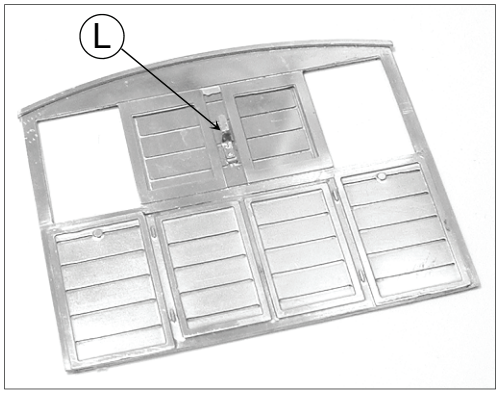
6. Solder the wooden planked footplate duck boarding (parts 23) to the footplate using the boiler unit as a guide for their positioning. Solder two chassis fixing nuts to the top of these. This is best achieved by locking the nut into place with a screw. Dress the six flats of the nuts with a flat file 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.

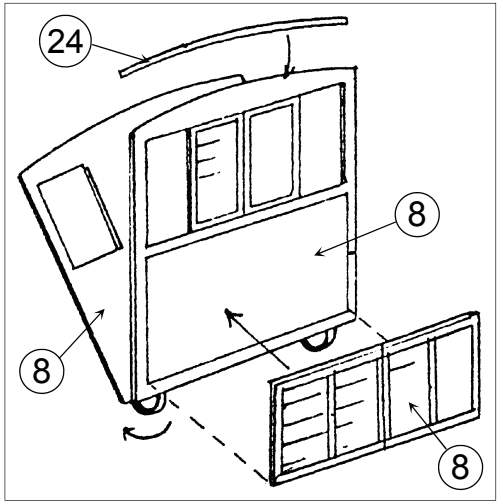
Body Panel Assembly

7. Place one body side panel onto a flat surface and solder an end panel upright at its corner. Use an engineers square to ensure that the side and end are exactly at 90° to each other. Repeat for second side and end. Now place the two L shaped assemblies upright on a flat surface and solder the corners together to form a box. Again use an engineers square to ensure accuracy.

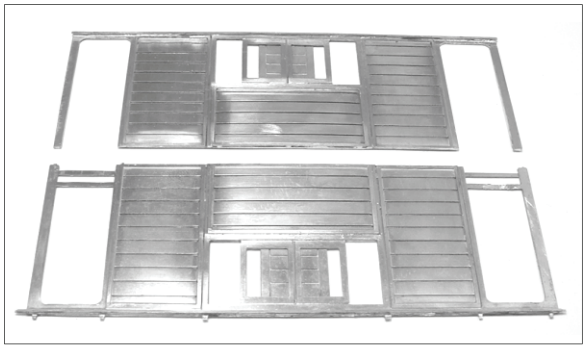
Offer this assembly to the footplate to check that all is nice and square. If so file the corner joints smooth. Then fit the two curved top beadings (parts 24) to the top of the ends and the two straight beading strips (parts 25) to the top of the sides. Fill in the joints with solder and file smooth at the corners.

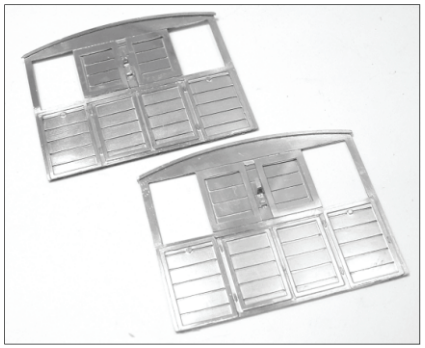
4. Solder together the three sections of each end panel (parts 8). Note that the tabs connecting the bottom edge of the panels can be used as an hinge to help with aligning the parts before laminating together. Again take note of the glazing gap at the window frames and the etched plank lines. The panels are of different width so that a rebate is formed along the side edges to help locate the side panes so ensure that these are clean and square.





Fit the centre lamp brackets (parts L) the tail locating into the slot between the window frames. There are also two side lamp brackets at each end but I would recommend fitting these after the four body parts are assembled. I would also recommend fitting the curved top strips after main assembly.

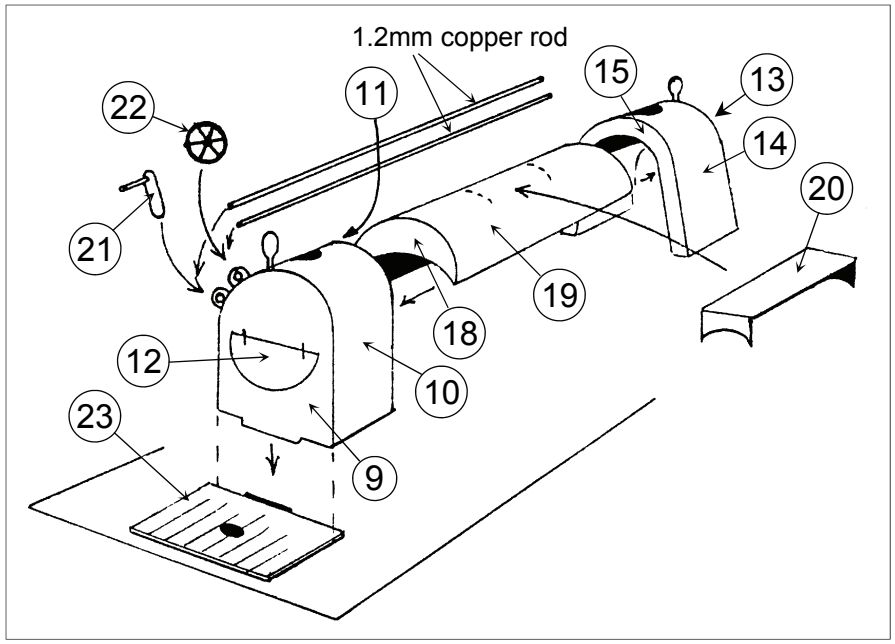




Now place the body panels to one side to be assembled after the boiler is constructed.

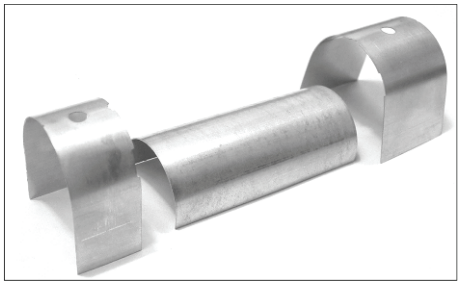
Boiler Assembly

4. The boiler unit has been designed so that it can be constructed using the footplate as a guide, but left loose until after painting. It can then be glued in place using the slots at either end for positioning.



I would recommend first roughly pre forming the boiler, smokebox and firebox wrappers. As these are half etched they are easy to work around lengths of tube or dowel using finger and thumb pressure. Once they are roughly curved the end components can be used as formers to fix the final radius.

Pin the smoke box front (part 9) to a flat piece of wood. Then solder the smoke box wrapper (part 10) around it using it as a former. Note the cut outs on the edge of the wrapper to correspond to brackets on the front. Then fit the back strip (part 11) to the boiler end. Solder in place the smokebox door flap (part 12) noting etched mark for position and fit etched disk to top bracket to represent the pressure gauge.



Pin the firebox front (part 13) to a flat piece of wood and solder the fire box wrapper (part 14) into place. Solder into place the fire box back (part 15) and then fit the fire box door (part 16). Fit etched disc to top bracket to represent the pressure gauge and then fit the regulator linkage (part 17) using a piece of 0.9mm wire to form the handle and centre pivot. Place these two assemblies onto the footplate, locating them into the slots and then make up the boiler to fill the gap.

Pin a boiler former (parts 18) to a block of wood and solder one end of the roughly formed boiler (part 19) around it. Remove the boiler and solder the other former at the other end. The boiler should now push into place between the firebox and smokebox. Once soldered in place you should have a unit that should pop out and back into place at will.

Fit in place the toolbox support (part 20) at the centre of the boiler top. Solder two lengths of 1.2mm copper rod along the boiler to form the control operating linkages. Solder in place the smoke box end regulator (part 21) over the bottom rod and then trim off this bottom rod flush at both ends. Then solder into place on the top rod the reversing wheels (parts 22) making handles for these and the regulator from 0.9mm brass wire. The boiler castings can be fitted now or later as you wish.