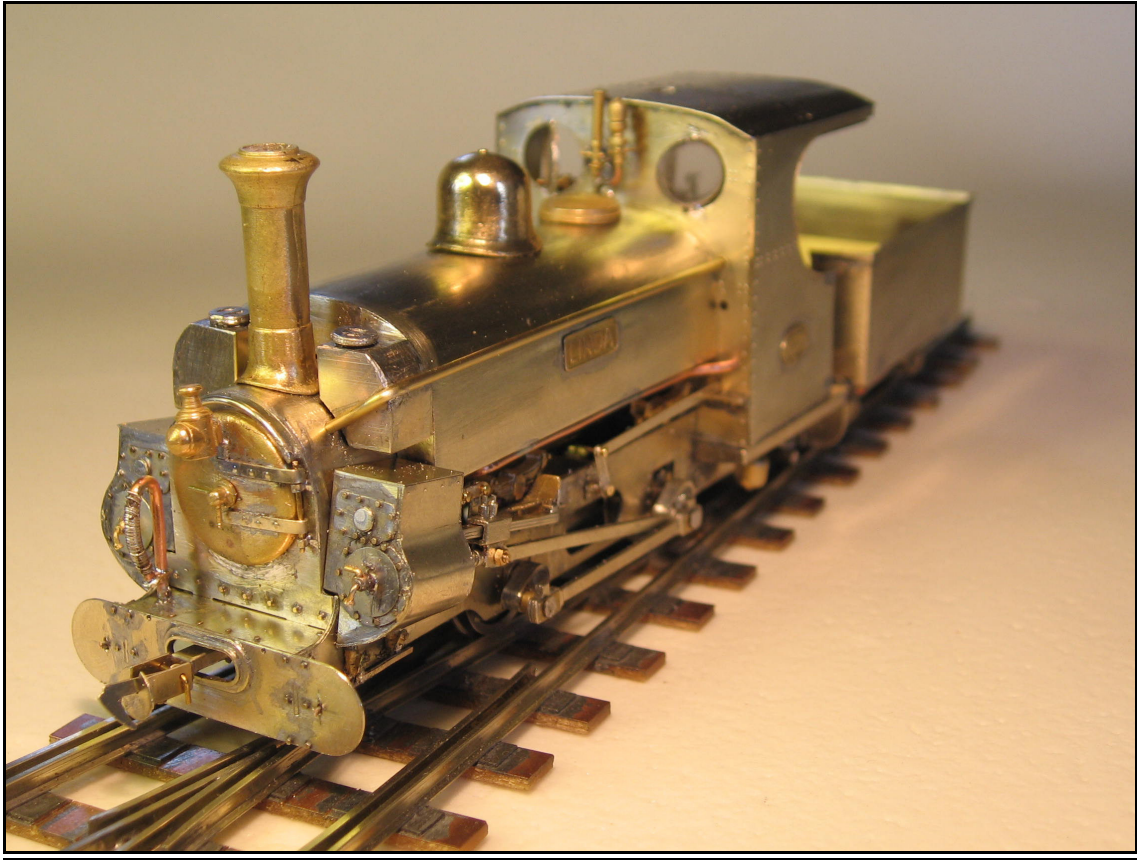


Linda, Blanche and Charles.



A 7mm scale kit for 14mm and 16.5mm gauges.

Designed by Clee Model Engineers

Marketed by **EDM**
19 Briar Avenue
Acomb
York YO26 5BX

Design, development, and manufacture.

This kit is collaboration of myself, Peter Balderston (C.M.E.) and Paul Martin of EDM. I have developed the design of etched and cast parts. E.D.M has supplied the ‘mechanical parts’, motor, gears, wheels, etc.

You may also know Paul is a leader of ‘Ricket Rescue’, the team on the FfR that helps maintain Blanche. With this considerable knowledge I thank Paul, and Adrian Gray of the 7mm association for their help and encouragement in the production of this kit.

This effort is the result of over four years of development, and thousands of hours of work. There are some things that are wrong, some have changed, and some could be better. Help me improve things, I need your input. Please comment via the 7mm NGA website, or contact EDM directly. I can not change things just for one persons view, but collectively you can help the continuous development of this kit, and of the other I intend to produce. Thank you.

This batch has some minor changes, including some revised castings now we can use 3D printed techniques. This means there are some duplicates of cast parts, previous and revised on various sprues. Use the ones that look best to you.

Skill Level.

This kit is intended for modellers with good soldering and metalworking skills. It is unsuitable for assembly using glue.

These instructions are not a blow by blow account of the assembly of every detail. Where assembly sequence is critical, this is highlighted, otherwise I presume the builders of this kit will be experienced, and will be making themselves familiar with the prototype to aid decision they will make during the build. Otherwise, you can select what sub assemblies to build in what order. Many photographs of the prototype are included on the CD for your reference. There are a number of slightly different shots of both prototype and model. All are included as I found over the years the detail I need is on a picture I have taken that was focussed on something else ! This is why I have not included them as a paper copy, it would be too wasteful.

These instructions.

I suggest you print off this written set of instructions, and then load up the preferred set of images and pictures onto a computer, and use these as a reference as required. Remember not every Figure is included in the this text, and they are all available in directories to enable you to look at them in detail.

Part numbers are referred to in parenthesis, ie (101)

Assembly pictures are referred to as Fig xxx

Prototype images are referred to as Img xxx

The parts lists are sorted by part number, and the castings are also sorted by sprue number as well, to assist in identification.

Prototype History and Images

These locomotives have become quite iconic in narrow gauge railway circles. Although they were just everyday workhorses whilst at Penrhyn, they were obviously well liked by their crews. When closure beckoned, the transfer of Linda, and then Blanche to the Festiniog Railway started a whole new chapter in their working lives.

There have been so many changes made to these locomotives over the years that careful study is needed to ensure reasonable accuracy. Even so, I have asked first hand to some who may have remembered certain details, only to be confused or contradicted. Photographs are critical to this process.

I have chosen to represent the three loco's at the following times :

Charles	Circa 1933-5 (ie with a rivetted tank & full cab)
Linda	1965 (ie coal fired, original smokebox & tender)
Blanche	2007 (ie oil fired, longer smokebox, pony truck & tender)

Sufficient parts are on each etch to model either variant. There are many other changes made, by mix and match you might be able to find the right parts, just keep checking with photographs.

As this model has been developed (2007 - 2010) Linda has been out of traffic, and is being slowly rebuilt, with some changes being reverred back to the original design. Consequently I have not been able to confirm some details on Linda, and I have presumed they were similar to Blanche.

Charles remains in fairly original condition on display at Penrhyn Castle.

I have included on CD over 350 images of all three engines. Being a fireman and the FR means I can get close ups of all sorts of bits that might not be easily seen. After Linda's current rebuild there will be more detail differences, and they will continue in true Boston Lodge tradition. You really do need to select your chosen period, and try and study it. I still have many questions about the configuration of Linda in 1965 !

I have been able to obtain permission from Mr Richard Pryke for some lovely pictures of Linda and Blanche taken in 1966 /7, showing much needed detail of the engines at that time. I acknowledge full copyright to him for the pictures in the folder 'Linda 1966'.

Now Linda has been rebuilt (in 2013) running on coal, many of the past 'improvements' have been removed, and its overall condition much improved.

Known major changes and differences to prototypes.

At Penrhyn.

Charles

Shorter (half) cab and shorter rear frame
Square front spectacle plates
Sandboxes mounted on side of tank, not front.

All three engines.

Right hand drive, coal bunker in the cab on the left hand side.
Originally rivetted tank, welded later
Fire irons on L.H side of the tank

Early rebuild on arrival at FR. (1962-4)

Linda and Blanche

Vacuum ejector added.
Cab reduced in height profile changed, funnel increase in height.
Tender added, originally with oil boxes and spax dampers, changed to roller bearings later.
One tank mounted injector replaced by one under the cab.
Cab coal bunker removed, allowing for L.H. drive, reversing lever moved to L.H. side
Larger sand boxes, control moved to L.H. side
Steam brake cylinder on R.H. side for Linda, L.H. side for Blanche.

Early 1970's rebuilds.

Linda.

Pony truck added, front frame lengthened, coupler surround changed.
Superheater added to boiler, meant a longer smokebox, door and hinges changed, all welded construction including split lower half fitted to frames for rigidity.
Front Vacuum pipe moved to L.H. side.
Valves on dome.
Oil firing

Other 'trials' ..Lempor exhaust, snifting valves, oil tank configuration etc.

Removable tender backsheet.

Blanche

As above except for dome and trials.
Piston valves and fabricated cylinders.

As of the end of the 2012 season Linda and Blanche remain the only oil burners on the railway, the price of oil meaning they saw little use during the season. Their usual turns being covered by a coal fired Lyd.

Exact configuration.

The list above is just some of the main changes. Linda and Blanche have run many more miles on the FR than they ever did at Penrhyn, and the later half of their lives has seen many more changes and alteration than in the first half. They are reported to be some of the highest mileage engines 'in preservation', even taking standard gauge engines into account. This means that, without comprehensive research, we can not be certain when some changes were made, or indeed when they were changed back ! Comparison with Charles is fascinating, we are lucky to have an 'original' to compare with.

I have it on authority from one long serving member of staff at Boston Lodge that any claim to exact accuracy of any model is impossible, as the prototypes are constantly changing. In the summer of 2009 there are already changes to Blanche, and Linda is being rebuilt, we do not know how it will turn out.

One suggestion I can make for all intending modellers, 'get your hands dirty!'. There is nothing better than to be close to the real thing if you want to model it. You will be welcome to volunteer on the Ffestiniog Railway, ask to work at Boston Lodge, you never know, the bug might get to you, and you might end up as footplate staff. It happened to me.

General Assembly Instructions.

My preference is to solder as much together as is possible, and I like working in nickel silver sheet and brass. This is not a kit that can be glued together.

Take care with sharp edges and points. Wear eye protection if using wirecutters. Do not use your best cutter to cut piano wire, it is very hard.

Full blow by blow instructions are not given. This kit is for experienced modellers, who have good soldering and metalworking skills. Personally I have always used Savbit solder, Fry's flux, and two Weller irons, a 45W TCP and a W60. Recently a resistance soldering unit and solder paste have also given good results. These may seem large, but the mass of nickel silver and brass builds up, and the rule of 'clean and hot' applies to all soldered joints. All parts are cleaned with a fibre stick (from 7mm Association sales) before applying a little flux.

Note this kit has some parts in the boiler and saddle tank assemblies that require a long reach, small diameter soldering iron.

For rounded parts I use a piece of plywood with a wood lip on two sides a square to solder against. A couple of small hardwood pushers are also used to form the pieces against the square lip.

Bending formers are 22 and 15mm copper water pipe, and assorted pieces of brass and steel. A set of small rolls, such as the 'GW' rolls is highly recommended, but not essential.

I clean up all joints using scalpels, sometimes to 'carve' soft solder to shape, a brass bristle brush (sold in shoe shops for cleaning suede), and the fibre stick again. When all is complete a wash with 'Shiny Sinks' before painting. Note that nickel silver is a much better for paint to key to than brass.

All other tools are the best I can afford, Valorbe files, Lindstrom wire cutters, good stainless tweezers and scalpels with new sharp blades are essential. 2mm and 1/8" parallel reamers are useful but not essential to fit gearbox and axle parts.

I advise great caution using high speed mini drills and grinding wheels. Nickel Silver can build up on the wheels causing high surface temperatures. They can be unwantainly destructive and possibly dangerous. Hand tools offer more control.

Clean out any slots with the point of a scalpel. Note that we do not ask the etch company to 'etch clean', that is make sure all holes are etched right through. This is because in doing so most of the half etch rivet detail gets lost. We believe modellers can clean out holes more easily than restore the rivet detail !

Drill out small diameter holes (0.55mm etc) whilst the parts are still contained by the tags in the fret.

Always take great care removing parts from the fret. You can use a fine tooth (80 TPI) fretsaw, but this can sometimes lead to difficulties supporting the fret as you work. I find the best way to extract pieces is to ensure you know which tags to cut, turn the fret upside down,

and run a heavy knife (Swan Morton Scalpel No 4 or 'Stanley' knife with new, sharp blade, is ideal), pulling towards you, but holding the fret away from you, over the tags a number of times on a flat surface. They will then crack, and the piece extracted undamaged. This technique is especially useful for long thin parts, such as the valance strip.

Tips :

No 1 : When soldering moving parts together with a pin, use a paper washer between the parts to prevent the solder 'wicking' and fixing everything together. Use thin paper (cigarette paper or detail paper). Tear the 'washer' away after soldering.

No 2. When attaching nuts to sheet material use plenty of flux on the inside, then thread a bolt through, and tighten up on the nut. Apply plenty of solder, and release the bolt as soon as the solder has solidified. Use brass nuts when little use is expected, eg attaching domes and chimneys, and steel nuts when used more, eg attaching chassis.

Pins and Rivets

I use a home made rivet punch, powered by a 4oz hammer. I have made the anvil (lower) part of the press with a cut out to allow very slim right angle pieces to be rivetted after folding, once this is done there is not a problem rivetting the angle brackets, (see Fig W1 & W2) for bunker or cab corners.



Thin brass pins are used locate and fix many parts together. As a general rule do not fit too many pins together at one time, hold in place by pressing onto a piece of cork floor tile or soft wood, solder together ensuring the solder flows to the pin by capillary using heat and flux. Remove and trim with a good pair of flush wire cutters.

The best pins are brass 0.55mm, use a number 74 or 0.55mm drill to open out holes, buy at least 5 at a time ! Use the point end to align parts, keep all 'off cuts', and the head end is useful in the valve gear assembly. I usually get at least 6 'joints' out of each pin, plus a head and tip.

The pins supplied are quoted by the manufacturer as being the same as those I sourced some years ago. Unfortunately they have changed the manufacturing method, and the current pins are slightly thicker, with much larger heads, and I believe, slightly softer. You will need to use a No 73 or 0.6mm drill to open out the holes.

The 0.55mm pins are in short supply, and so I have included some of these for the valve gear, otherwise use the slightly larger 0.6mm ones.

General comments.

The order suggested below is recommended, but not critical to follow in order.

Pictures are photographed at close quarters of models made with the first test etches. There are some improvements and differences made in production etches and castings.

I make no apology for the build up of flux and grime as the build continues. I clean up using scrapers, a brass brush, glass fibre brush, and then scrub and wash with 'Shiny Sinks'.

I prefer to paint parts separately, ie chassis, smokebox, tank, cab etc. and the kit can be made this way, or the cab and tank can be treated as one structure.

Beware of fitting all the cab details before painting. It is best to make various sub-assemblies, paint and then do a final assembly in the cab using super glue. If fitting a backsheet it is essential not to solder the roof on, it is the only access to fit out the cab, and access may be required through the rear spectacle plates to turn the screws holding the cab to the tank.

The original design was for a Mashima M1624 motor, now sadly out of production. Mashima suggest the 'flat cans' as a replacement. Although less powerful on paper, with a boiler full of lead my prototypes still perform well on my 1 in 40 gradients.

Other items to complete a model

The kit is fairly complete, but you will need additional weight in the boiler / tank. I use code 3 lead flashing, obtained from builder's merchants. Ask if they have any small pieces, it is often sold by weight.

You will also need some drops of a high strength retainer, such as Loctite 601, and superglue to hold the PCB blocks in place. These need to be fresh to be fully effective.

The frets contain a number of thin strips, washers etc that will help general assembly, and enable some of the various additional detailing (for instance rods and levers for sanding and injectors) to be added as required. Some parts are duplicated as fret or castings, take your pick to suit yourself.

Chassis.

Main frames.

Before you begin you have to decide which engine you are modelling, and when it was running. Look closely at as many photographs to determine the exact configuration of each engine...there are so many differences !

The inner frames contain such information as is needed between each engine in the three selected configurations. The outer frames are 'blank', and need extra holes and possibly shortening, (1,2,3,4). If building an engine with a pony truck, and you want to negotiate minimum radius (24") curves, you can file out the half etch on the inner frame before assembly, but this does weaken the frame a little, and it needs careful handling after this.

Tin parts of the side frames before assembly. To align the inner and outer frames put a couple of brass pins through two convenient holes and push into a spare bit of cork tile. Fig 1&2. Solder the outer and inner frames together by sweating together, and running a bead around the edges. Take care not to allow solder into the slots for the frame stretchers. Fig 3.



Once the frame inner and outer are together now is time to decide which variant your model will represent.

For Charles the frames need to be shortened further, by 1.75mm (3") at the rear end to the half etch marks. This also means the footplate (116) and cab support brackets (14) will also need shortening by the same amount.

For Charles, and Linda and Blanche prior to 1971 the front frame must be shortened to the half etched marks. The front cross member (205) will also need shortening, and the slots filling in if making a short smokebox version. The holes for the FR fitted steam brake need to be drilled through, Linda on the R.H side, Blanche on the left. Check the frame as a pair for similar dimensions once filed down, and it is advisable to check the frame ends with the buffer beams, but do not solder in position at this stage.

For all three you must decide on the holes for the cross shaft for the rocking links that support the intermediate shaft. Although not seen on the prototypes, it is a lot easier to drill one or both sides through now 1.0 mm, and file flush after assembly of the inner valve gear into the chassis later. Fig 4. Otherwise you have to fit all the valve gear inside the frames as you assemble them, almost impossible. Run a 1.2mm drill through the reversing lever shaft holes.

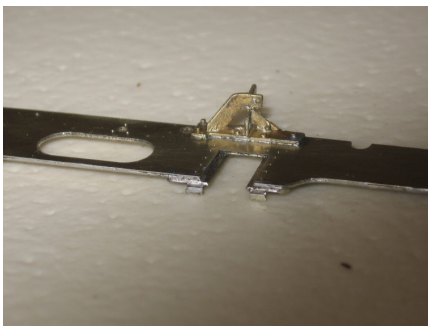
The hornblocks and bearing can be done in one of two ways. The sprung chassis design using EDM parts will probably give you the best performance. If you require a more accurate static model the plain horn guides would be better, as they allow you to fit the splashers more easily. EDM also supply alternative crank pins, sleeves and M1 nuts.

If using EDM parts fold up the hornguide lugs to about 60 degrees at each side. This ensures the wheels will not touch the lugs, and keeps the spring wire close to the frame side. Carefully centre about the gap for the hornguide, viewing from the outside. Use a clamp to hold whilst tacking into position. Note the rear etch needs the top rear corner removing, and the top hole needs to be cut off to allow the cross members to clear. Fig 5. The spring wire (28swg Phosphor bronze wire) is folded at one end, run through the middle hole of the lug, and folded over again. Solder only one end of each spring wire to locate against the side of the frame.

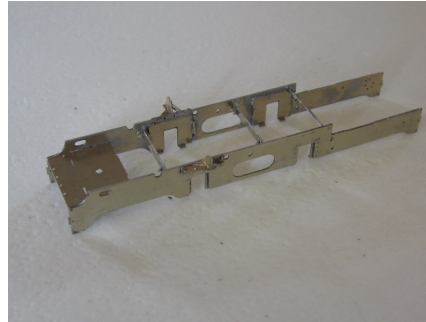


.....or use the etch I provide and make your own bearings. I use a 12BA nut, with one side filed down for the adjuster, this being a short length of 12BA thread with a saw cut to across the top to make a grub screw. With either system I do not use a spring, just adjust the screws after assembly to ensure a square chassis, and Locktite the screws.

Fit the cast motion brackets (35,36) to each side with .55mm pins. Fig 6. Note this assembly system uses these pins as a guide, and also to represent rivet or bolt heads, not the shaft, and so after soldering in place cut close to the surface, and file flat, leaving only about 1/4 mm showing. Fig 7.



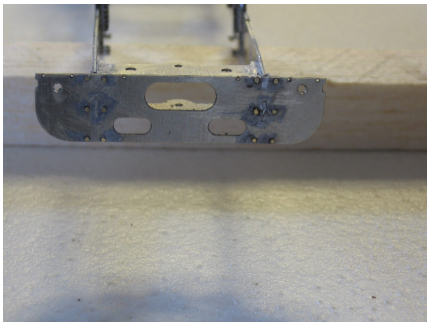
The frame spacers (08) should have the brake hangar brackets (71) fitted before assembly into the frames. The brackets are on the forward side of the spacers, at the bottom. For 0-14 drill .55mm holes inboard to fit your exact gauge. After fitting, file down the pin in the centre, check for squareness, and run the .55mm drill through the cross holes. Fig 8 and 9.



Remember the front cross member (205) will need to be shortened for earlier versions. Again, use the half etch mark as a guide but check against the frames. The two slots should be filled in with spare strip, and half etch holes drilled through as required...check the images. Assemble the frames, front cross member and three frame spacers together. Ensure the frames are square and flat at each stage. Fig 9.

Note the option of which front bufferbeam is required, and the rear beam needs the two ‘tabs’ above the footplate level for the short supports to be cut off if you are fitting the original backsheet. Sweat the half etch onto the full thickness, and the additional parts for the coupler surround (12) if required. Assemble to the frames. Note the frame brackets (11) have 3 bolts (0.55mm pins) through the bufferbeams, and 5 rivets to the frames. Drill additional holes in the rear bufferbeam as required for vacuum or water pipes on tender variants before fitting.

Fold up the rear frame bracket, and locate using pins each side, ensure the pins outside are flush on the side with the steambrake. Fig 14,15.

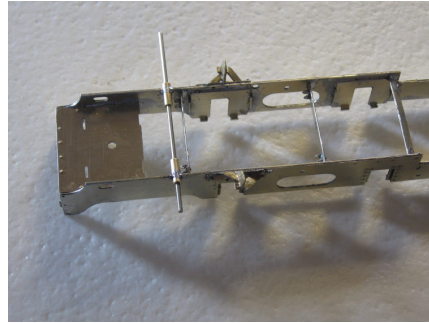
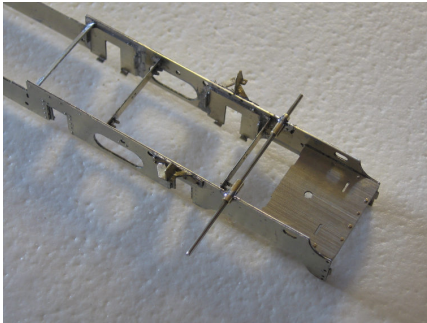


A number of images are shown of a set of frames for Charles. Note both ends of the frames have been shortened, as have the front cross member, cab support brackets and the footplate. (Fig 50-56). There are also Figures of the brake gear. This can be fitted at this stage, or much later with a bit more effort (Fig 67-8).

Valve arms bearings.

Bore out 2 x 2mm o/d pieces of brass tube with 1mm i/d, and cut and file to 6.0mm long.

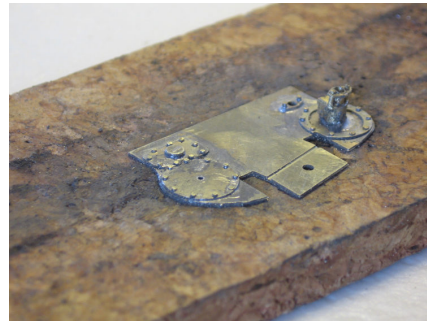
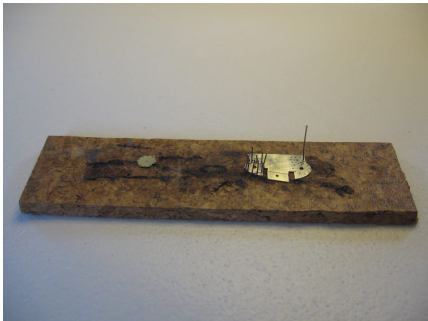
Ensure the chassis recess is 1.8mm deep below the top of the frame. Place the tubes in the chassis recesses, and align using one piece of 1mm rod. Ensure each piece protrudes 1mm on the outside of the chassis. Fig 12,13. Solder in position.



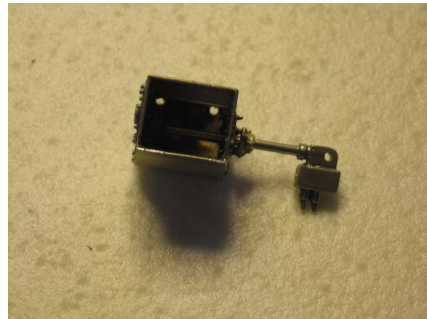
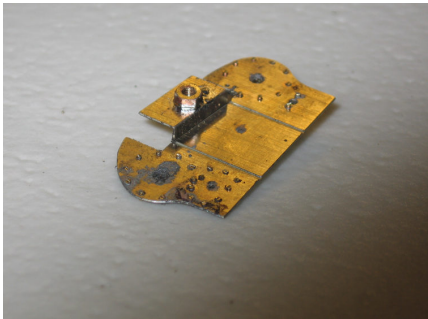
There is a very tight clearance between the valve arm and the tank on the outside, and the shaft and the boiler barrel on the inside. Take care and check the clearances.

Cylinders, slidebar and crossheads.

To fit the end covers use small bits of .55mm pins, and solder paste on a piece of cork. Too much solder will loose the detail. At this stage I would leave the centre plate of the front, with the small brass cock until later. Note the rear cover has a cut out to fit the frame on the inner side, the front cover has a cut out to fit around the valve cover at the top. Fig 16-20.

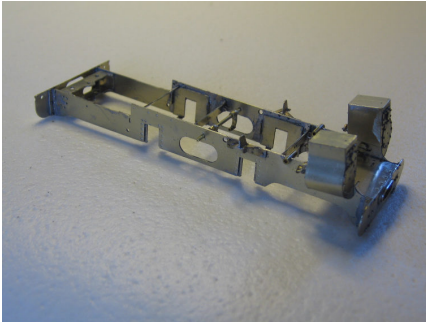


Solder a 10BA nut on the inside, Fig 21, and tap the hole to meet the frame 10 B.A., fold the etch for the inner frame, use a pair of flat nose plier to fold the centre section first, then fold the ends Solder the wrapper along the top of the frame, and gradually work around to the bottom, soldering the edge all along. Fig 22.



Fit the cylinders to the frames with short 10B.A. bolts.

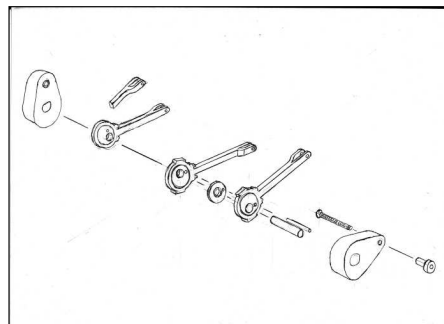
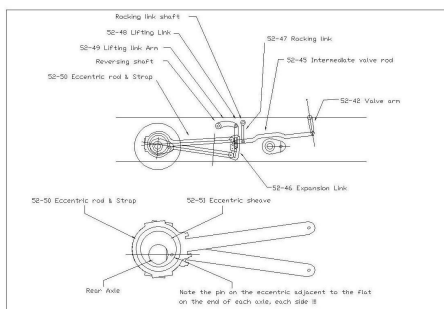
Make up the slide bars,(37) and test fit by locating a pin in the cylinder casting. Tidy up the crosshead castings, and ensure they run freely up and down each slidebar before soldering the top to form the box. Check the piston rod is parallel in vertical and horizontal directions to the slidebar. The piston rods should be cut down to be 15.5mm long. Test assemble at this stage, but do not fix permanently, you need the rest of the motion to be complete ! You may need to shim the slidebar to get the crosshead to run freely. Locate the slidebar end on the bracket, and temporarily solder, drill through the frame bracket into the lower end of the slide bar, remove and shorten, filing a quadrant on the lower face of the slidebar, leave until the rest of the motion is complete. Fig 30.

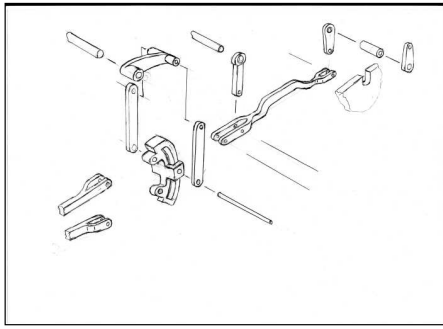


Valve gear

The supplied etch for the gearbox allows the complete working valve gear to work on 14mm gauge. It is very tight, with minimal clearance. 16.5mm obviously allows a little more room to assemble all the valve gear. You can make the model without internal valve gear if you feel your skills are not up to it, but why not try and surprise yourself. The etch has an extra set of eccentrics and sheaves just in case you mess one up !

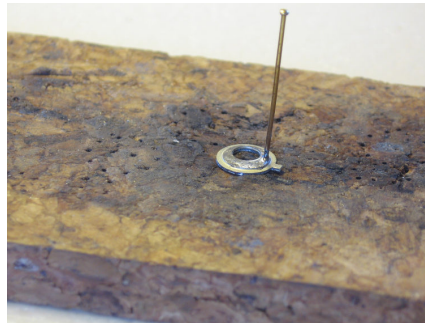
In Figures - Chassis 1 folder there are 3 diagrams (Fig 101 - 3) to help you understand the valve gear assembly. Please study them well. In the layout diagram the valve gear is show with the eccentric lowered. I suggest you assemble the gear in this position. Clearances are so tight that it may be impossible to raise the eccentric to full gear without clearing the underside of the boiler.





This assembly really does test your nerves and soldering skills.

Start cutting out pairs of eccentrics out of the etch. (50) Note the location pin hole. Fig 104-7. It is not easy to permanently fix the eccentrics to the axle, as soldering is virtually impossible, and superglues degrade with oil for the gearbox, the best solution I have found is to have a tight fit on the axle, and use Loctite 601, see later. The holes in the etches are undersize. I recommend reaming them undersize, coat one side with solder paste, and feed a onto a spare undersize 1/8" rod and crimp together with pliers. Sweat together and try not to get solder anywhere near the outer rim. Fig 107. File and polish the outside edge clean. On one eccentric solder a pin through this hole, allowing at least 3mm each side.



Fold up the longer end of the eccentric strap/ rods (51) to allow 2 thickness of material to pass through the expansion link end. The longer end is etched without hole, drill this hole using the short end a guide once soldered up. Ensure each pair of eccentrics have the location pin in the same place when both assemblies are viewed from the same side. Fig 108 - 113.



Now for the difficult bit..instead of wanting easy flowing solder this is the last thing we want. Use ceramic grease or oil around the inside of the eccentric straps. Fold the strap around an eccentric, with some solder paste on plain rod section, and carefully solder together, my advise is to use solder paste sparingly and a comply dry, hot, iron bit (yes.. The 60W one). Check the centre runs freely.

You now need to make up the axle assembly of two eccentrics and their spacer. **Ensure the eccentrics are both the same way round**, then ensure one is turned such that it will be reversed to each other on the axle. The expansion link forks should be opposite way round to each other. On the spare axle align one eccentric with pin, spacer and the other eccentric. Hold together and 'just' solder the free end of the pin to hold all together. Fig 114.



Prepare the cast expansion links. Either solder together the etches, or fettle the one of the castings. Place brass pins through the eccentric rod ends into the eccentric, ensuring the link is upright.

Tip..When soldering pins, pass the pin for joint to be soldered through a piece of paper between the moving parts. Carefully solder the joint and remove the paper. For some of the joints in split ended rods, it is easier to solder only one side.

Solder the pins in position.



The lifting links can then be fitted to the expansion link. Fig 115. The pin can be left passing through the slot in the expansion link, unless you are determined to have a working reverser. Solder both sides, with a spare pin in the top end of the pair of lifting links, to ensure assembly afterwards, and check that the links rotate freely.

Make up both intermediate valve rods. (45) NOTE..the fork at the eccentric end is 4.5mm long, enough to include both the holes, the rocking links fit inside fork. Trial fit the fork onto the expansion link. Ensure you can get the intermediate valve rod to the top of the expansion link. Although the assembly is made up of pins and holes that are nominally 0.55mm, there are losses in movement in the entire valve gear. Some motion is lost and full gear should be engaged. Make up the rocking links, and fit as well, fit the pin through opposite ways in each assembly. Fig 116-8.

Ensure the link end of the casting is a clear 0.55mm hole.

You now should have two complete assemblies of eccentrics, expansion links and lifting links, put to one side.

Valve arms and valve spindles

First, make the valve spindle, cut 1mm dia rod 10 mm long to make a valve spindle, solder the end (part of 43) onto the spindle, and then fold into a U shape.

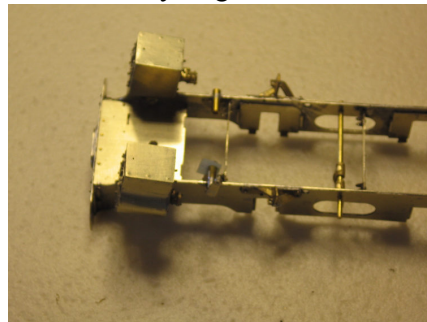
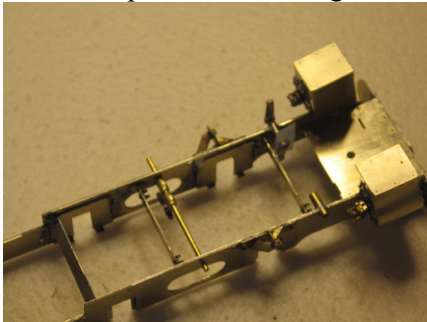
Make up the valve arms (42), and onto a second piece of 1mm rod, 10mm long, solder one of the valve arms.

Thirdly, make the link assembly (other part of 43). Fold the part of the link to fit into the rod assy, and the fork the other end to fit around a valve arm. Check you can pin the links together. (Fig 122-3).



Do not fit the inside arm onto valve arm assembly on the chassis until you have checked for clearances with the crosshead.

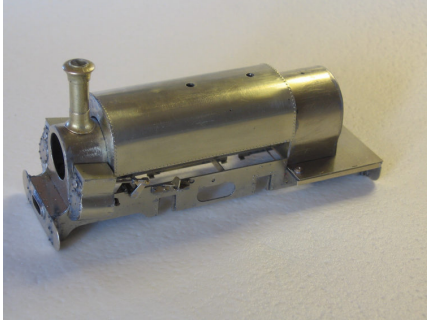
Assemble the two subassemblies, the arms are set 180 degrees to each other, use a paper washer to prevent solder ingress, and ensure it all runs smoothly. Fig 119 - 21.



I later discovered it is possible to fit the inner valve arm to the inside gear assembly, then fit and solder into position later.

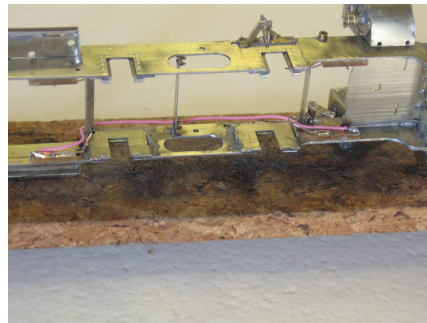
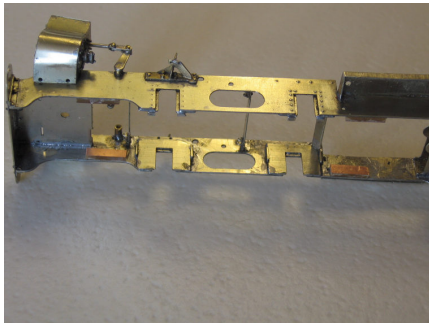
Trial fitting.

The chassis is quite delicate, like the prototypes, and it needs care to ensure everything fits in place. I suggest you might like to take a break from the chassis and assemble the smokebox, tank/boiler assy, and the firebox at this stage. You can then use this assembly to check all is well with the chassis before the 'one way trip' with the valve gear. Fig 122 - 124.



Pickups and wires.

I suggest you fit the pickups and supplied red interconnecting wires before the wheels, axles and valvegear are fitted in the chassis. The pickup wires are 30 SWG phosphor bronze. Trial fit using the wheelset on the plain axle to ensure there is some pressure from the pickup onto each wheel tread. I suggest the wire is held in position with superglue. Note the route, to avoid the firebox. The splashers will also need to be modified to avoid the wire when you decide exactly where it is going. Fig 125 - 7.

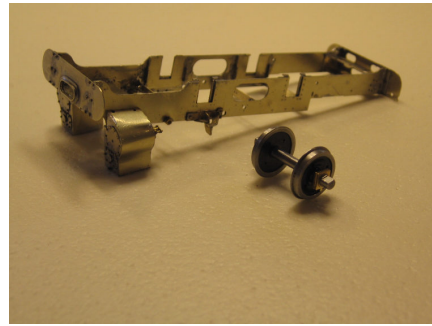
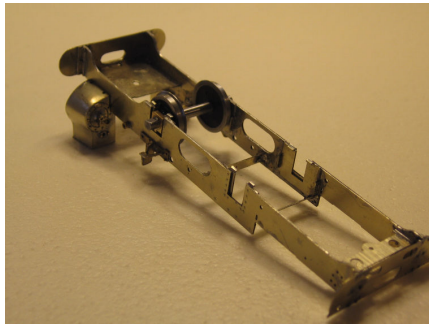


Cranks wheels and outside motion.

Fold up the cranks(60), and push a D-end axle through the etches to align. Hold together, remove the axle, and sweat together. Use plenty of solder, and clean up afterwards. Tap the crank pin hole 1mm for EDM parts, and countersink on the inner side. Thread a c/s bolt through, solder over the head, and file flush.

Check the 1mm top hats can run right down the thread.

Do a dry run with axles and bearings in the chassis. Ensure the bearings run up and down the guides freely. If the axle is a little tight, run a 1/8 reamer through in place of the axle. Fig 170 -171.



Sweat the coupling and connecting rods together (53 -56), and assemble the cross head to the connecting rod using a 14 B.A. nut and bolt (nut outermost) and file the back of the head flush, ensuring the back of the crosshead is flat as well. Fig 203.

Dummy Springs

Blanche and Charles are currently fitted with 4 identical springs with plain rectangular buckles.

Linda has a 'diamond' sided buckle on the front springs.

When Linda and Blanche were converted to 2-4-0's the front spring hanger was modified to incorporate the load bearing ends of a compensation beam for the front pony truck, but the detail is difficult to reproduce in 1/43rd scale.

The springs have no clearance between them and the boiler barrel cladding, various photos show the rectangular cutaways in the cladding on Blanche. Carefully file the rear of the springs once fitted to allow the barrel to fit.

Trial fit the superstructure again before

Motor & Gearbox.

The fret contains a gearbox that can be used with either 16.5 or 14mm gauge. Obviously the 16.5mm version will have more space for the eccentrics.

To get a gearbox thin enough the assembly is slightly 'one sided', ie the final drive pinion is not central on the drive axle, but the combined assembly of three washers and the pinion is.

Fold up the gearbox fret and run a bead of solder on the inside to strengthen (on this type of box I often use an offcut of the fret and make a strengthener to fit over the box to keep the sides the correct distance apart).

You will need to ream or file out the motor bearing hole if necessary. The flat can motor is mounted with the flats to the front and rear, not side to side. Cut the rear shaft with a thin grinding disc as close as possible to the rear bearing, fit flexible wires and use insulating tape

to ensure nothing contacts the inside of the firebox (it is a very tight fit). Check the fit of the bearings and idler shafts, ream the gearbox sides as necessary.

Feed the rear axle to the gearbox, the pinion is either glued on using Loctite 601 or similar with 3 washers on one side to offset the pinion, or you can make up tapped boss. Fix the pinion and washer assembly in the middle of the axle. Allow to set overnight before fixing the axle bearings in the gearbox side frame. Ensure the drive train is engaged and held in place with the bosses. I usually only solder the 2mm shafts on the side furthest away from the gears. Note the positions on Fig 150 - 9.



Keep checking everything runs free and is not glued up, even up to 24hrs later.

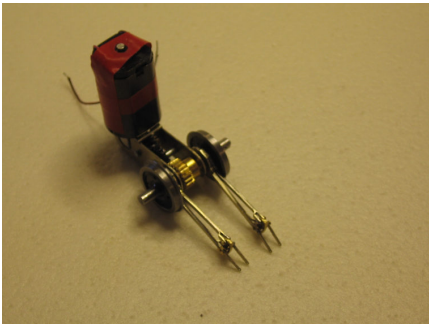
Lubricate the gear set with Ceramic Grease (Tamiya make some for slot racing cars).

Axles and valve gear assembly

Now is the time to take a deep breath and start the valve gear assembly. Take one step at a time, and keep checking for free running. Any tightness has to be detected and rectified before proceeding to the next stage.

The eccentrics should be fitted at 90 degrees to the crank, ie the location pin should be adjacent to the flat for the crank. Check again with the lower drawing in Fig 101.

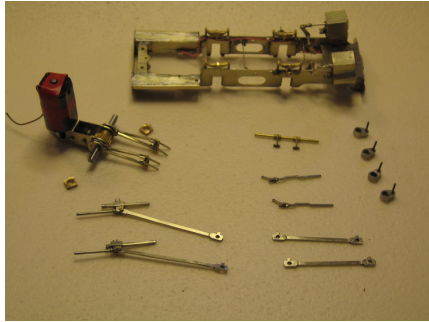
Fit one eccentric assembly on each side of the gearbox, followed by bearings, wheels and finally cranks. If using Loctite assemble, leave to cure for some minutes, then check all runs freely, continue to check for some time as the assembly cures. See Figures - Chassis 2, Fig 201 - 2.



Note, although I like to solder wherever possible, if the axles get warm, the wheels can become loose. I have soldered cranks on, using 70 degree solder, and hot iron, and very little

time, but wheels can still become loose. If in any doubt, glue using Loctite 601 or similar.

You should now have the parts seen in Fig 203 ready for assembly.



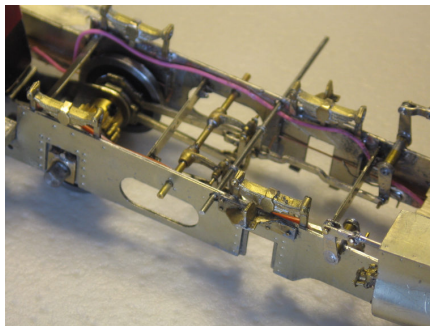
Ensure you have fitted 28 SWG phosphor bronze 'springs' in the horn guides. I found the third hole about right. Fig 208. Turn one end up, and one down to prevent rotation.

Thread the lifting link arms (49) onto the reverser shaft, and solder 12mm apart, square and level with each other. The reverser shaft can be trial fitted into the chassis and lightly tacked at one end to assist assembly and checking.

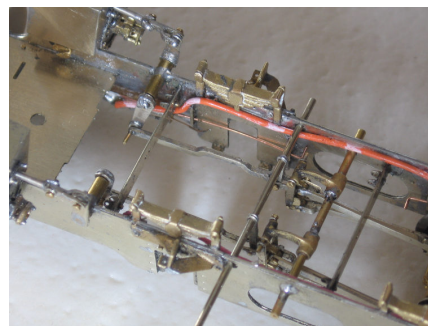
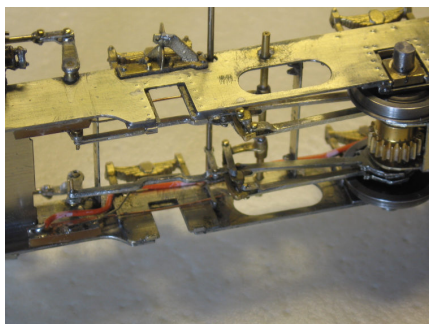
Drop the rear axle / motor assembly into the chassis

Considerable dexterity is needed to thread a 0.55mm pin through one lifting link(48), lifting link arm and second lifting link onto the pin. After a few tries it gets a little easier.

This part assembled gear can now be tested for free running by powering up the motor. You can temporarily try running the part complete chassis after connecting the motor wires to the rear pickup blocks. Fig 208.



When all is well, proceed to the next stage. The intermediate valve rods (45) can now be fitted. To do this, remove the lifting links, fit the rod into the top of the expansion link, use another part of a pin through the rod, and solder. Ensure all is free. Thread the rocking links through the rocking link shaft, and then refit the lifting links. Check the position of the lifting link arms to bring the expansion link into the lower position. The other end of the intermediate valve rods are fitted to the valve arms. Figs 209 - 16. Check all runs freely.



Once triumphant, the front axle, connecting rod assembly and coupling rods can be fitted. Note the unusual feature of these engines in that the coupling rods are outside of the connecting rods, and there is a cast crank pin spacer (59) required on the front axle to space the coupling rod away from the crank.

The slide bar is pinned and soldered to its brackets once the correct alignment has been made.

Splashers.

There are splashers fitted to wheels, even though it is an outside frame design. I recommend the if you want to fit the splasher they are fitted after the pickups are fitted and the chassis runs. They will be a very tight fit, and will require careful fitting to avoid springs and unwanted electrical contact. Even on the prototype they are quite flimsy.

I have made them somewhat wider than the prototype to accommodate 0-14 wheel back to backs. For 0-16.5 at least 1mm can be cut of the frame side of the splashers before fitting.

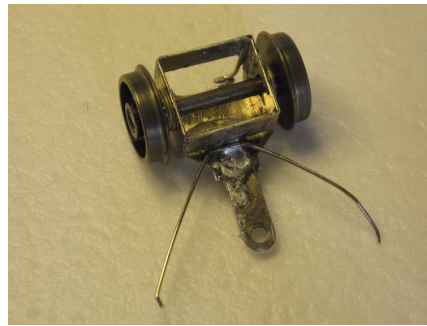
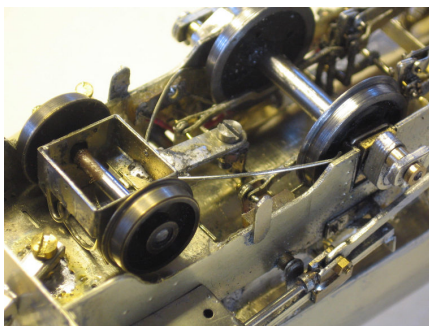
If all is well, a runnable chassis will exist.

Pony truck.

The truck design is not difficult, but finding a springing arrangement was. There are a couple of tips...the truck is designed for 14mm gauge. For 16.5mm gauge add two 2mm dia washers from the fret on each side. This allows some side play.

To get reliable running around 24" radii curves I also covered the inside of the frames with Sellotape, to prevent any contact from wheel to frame.

The springing requires a very small amount of downward pressure, and some side movement. I have tried many, many different combinations, I offer you my best effort. If you find an improvement, please tell us about it. Fig 250 - 257.



The side control spring and the downward spring are 0.55mm dia Nickel Silver wire.

Body

The concept of the body is to make four separate parts, the firebox, cab, saddle tank & boiler, and smokebox. The firebox is clipped to the tank, the cab and smokebox bolted to the tank.

If you install the gearbox and Mashima motor in the firebox, then the tank and boiler can be filled with rolled lead sheet to aid adhesion. The detail in the cab, once fitted, means the cab can not be removed from the tank. I recommend painting the tank, cab outer and inner, before attaching cab fittings, and pipework along the tank to the smokebox.

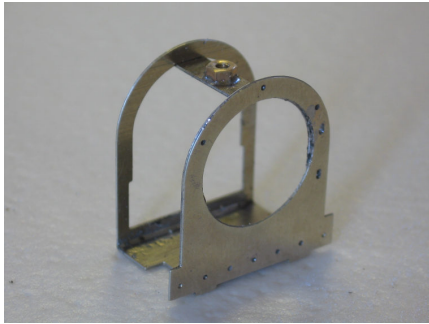
Smokebox

The smokeboxes for L&B were made considerably longer during the 1971 rebuild, when the frames were lengthened for the pony truck to be added. The actual construction of the smokebox has changed, with the lower half welded to the frames to give additional support for the cylinders. This has not changed the way this model has been designed.

If you wish to fill in the gap between smokebox and cylinder you have two choices, either carefully fill the gap, and ensure the smokebox can be removed with the body away from the cylinders, or go for the FR option and secure the smokebox permanently to cylinders and chassis. If you do this you must accept that access is need through the smokebox door to get to a securing screw.

The front of the smokebox has a row of rivets below the door on the originals, and can still be seen on Charles. These are half etched on the inside, and can be drilled through and pins fitted in each hole or pressed out with a rivet press. On longer welded smokeboxes fitted later on the FR there are no rivets and a visible horizontal line just below the bottom of the door. Blanche now has an additional flange on the front of the smokebox.

Fold up the inner, (132 or 234), add 2 x 10B.A. nuts for the location screw and chimney, then sweat on the front,(130) and rear, (131). Ensure a lip for the wrapper is maintained around the circumference, and trail fit in the frames to ensure it is square. Fig 301 - 6.



Form the wrapper (133 or 233) and add, by using a bolt through the chimney to locate, fill the gaps with solder. The 10 BA nut to locate the smokebox is soldered in position. If adding the pony truck fit in the rear position.

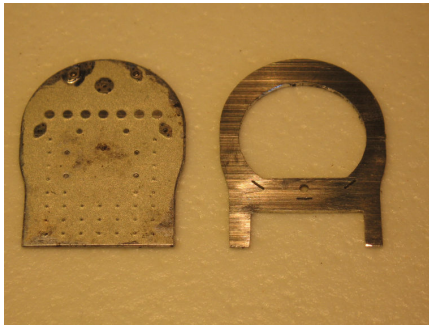
On the FR there have been numerous doors and hinge systems fitted over the years, and to be accurate you must find a relevant photograph to be sure. Note the vacuum pipe moves from side to side as different hinges were used.

The hinges for the door are half etched on the inside. Fold up the hinges and fit into the slots on the smokebox front.

Do not solder the door in place if you want to bolt together the smokebox and boiler/tank assemblies.

Firebox.

The sandwich etch allows for a step on the inside of each end to help form the wrapper, make sure you remove the etch edge on the inner piece before laminating. Locate together using offcuts of wire. Sweat together the etches for the front and rear of the firebox. If you are fitting a drive with the motor in the firebox you will need to fret out the outer etch or the front of the box to clear the gearbox. Follow the inner etch as a guide. Fig 350.



For a static model, a firebox foundation ring (142) is supplied, but must not be fitted if motorising using the firebox.

A new feature is the availability of a cast brass rear firebox cover, made using 3D printing techniques. The etches need to be modified to use this. The firebox wrapper (143) should needs a cut out 70mm long and 2.6mm deep centrally about the rear edge (the full thickness locators for the handbrake should be on the right). The backhead (140) will need to be modified to fit in the casting, only the front ½ etch part will need to be used, but the middle piece can be added as well if desired.

The next paragraph then become redundant.

The wrapper has a small full etch feature, this is the guide for the handbrake bracket, and needs to be on the right hand side of the firebox. Carefully scribe centre lines on each of the three pieces, and start soldering at the centre, and work round. Ensure you have a large bead around the rear to enable you to file a soft radius all around.

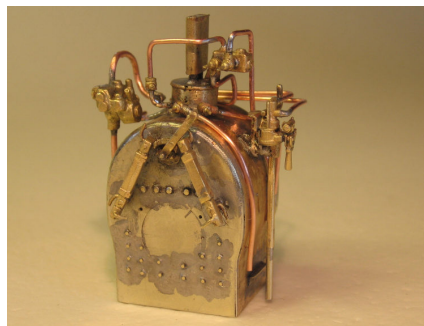
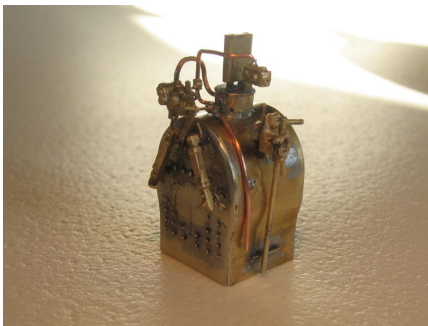
When complete check the assembly is square, and the side slots level. Cut two small pieces 5 x 8mm of spare half etch, fold longways to make right angle bracket, and place into the side slots from the inside.

Check the firebox slips between your frames.

There are variations on the safety valve cover that sits on the circular manifold on the firebox.. The original configuration in Charles has the cover sitting on the manifold, with no valve pipes showing. Linda in 1968 was similar to Blanche in 2008, but by 1977 the safety valves move to the dome, and the cover is no longer fitted to the lower height manifold. Blanche in 2008 has the higher manifold, pipes showing, and consequently a shorter cover. The casting is made so that it can be shortened at either end.

Originally I assumed that the backhead would be detailed with gauge glasses, regulator gland, firebox door (note the difference between coal and oil firing), but not anything would stop the cab being extricated from around the firebox, to aid painting. I have now realised it is possible to complete the detailing of the firebox, paint and then assemble into the cab after the cab has been attached to the tank, see the detailing section, as long as you keep the firebox, cab and tank as separate assemblies.

A detailed firebox for Blanche is shown. This has the most parts applied, including oil firing, atomiser, steam brake etc. Check with prototype photographs on exact configurations. Fig 360 -376.



Remember coal fired versions will not need all the oil firing equipment !

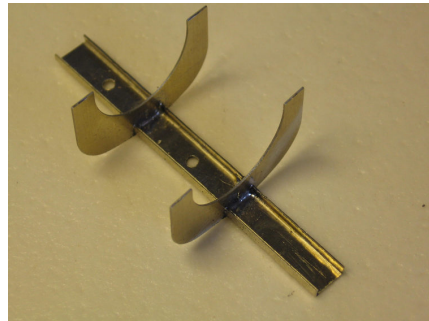
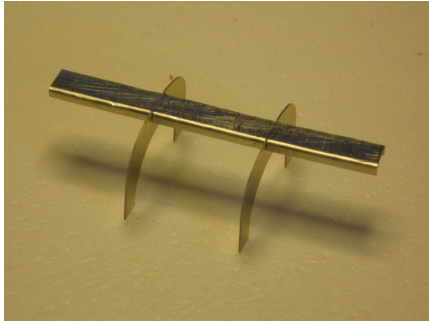
Tank and boiler barrel.

The original concept of this assembly is to allow for a motor to be situated inside the barrel, with gearbox going around two right angles to drive the rear axle. However this arrangements could lead to a 'Chinese puzzle', as the firebox tapers and is difficult to extract from the footplate / cab assembly.

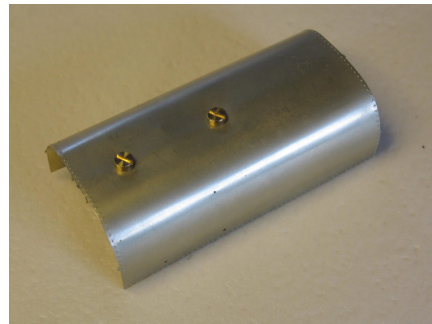
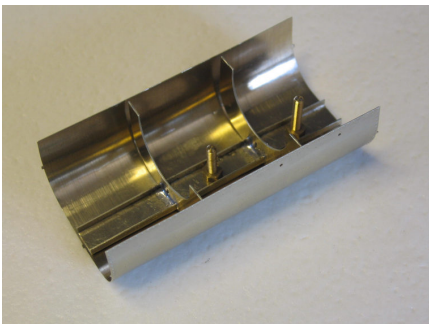
You are strongly advised to use current design leaving the motor in the firebox, and the whole of the tank / boiler assembly for additional weight. I recommend using code 3 roofing lead (obtained from builders merchants), small pieces fill the tank, and a large piece rolled up inside the boiler. Take all the usual precautions when working with lead, particularly if you cut small slivers, and do not file it.

Both parts have pilot holes for various parts. Do not open these out to final size until the parts are soldered into their final shape. This helps the curves to remain smooth.

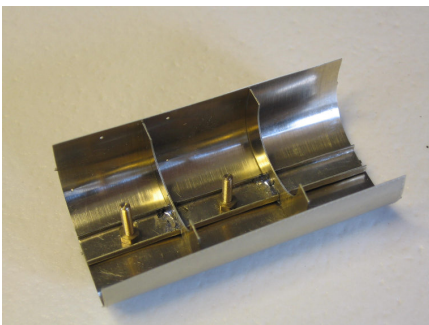
Assemble the inner tank spacer and former, best to use a piece of glass as flat surface and start by solder together when the right way up. Ensure you solder both sides of the formers, and check the inner is square and straight. Fig 401 - 5.



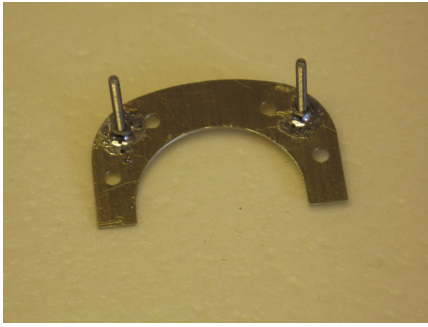
The tank outer is pre-formed, but the inevitable 'spring' in half hard nickel silver means you must check and tweak the shape against the inner assembly. Align the inner and outer using a couple of spare nut and bolts through the dome and filler holes..note the filler is to the rear. Fig 406 / 7.



Use some pressure to hold the inner into the outer as you tack solder the spacers. Check for squareness. Fig 408 - 11.

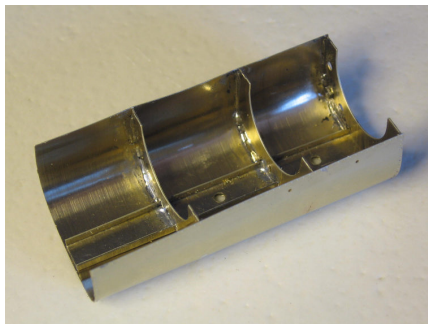


The cab end, the tank rear (121 or 128) needs two 12 BA nuts soldered on the inside, or double up the thickness with the additional piece, and tap 12 B.A. These are to be used by fixings for the cab. The alternatives allow for the lead weight to be inserted from the front or rear. If using 128, the access has to from the smokebox, so ensure it is removable. Fig 412/3.

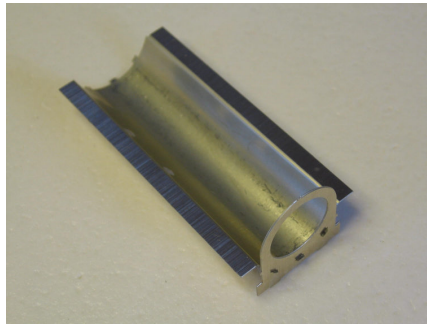


Tip..When soldering nuts in position, align with a bolt and fasten tightly. Add flux and solder the nut, unscrew the bolt, and there is the nut aligned.

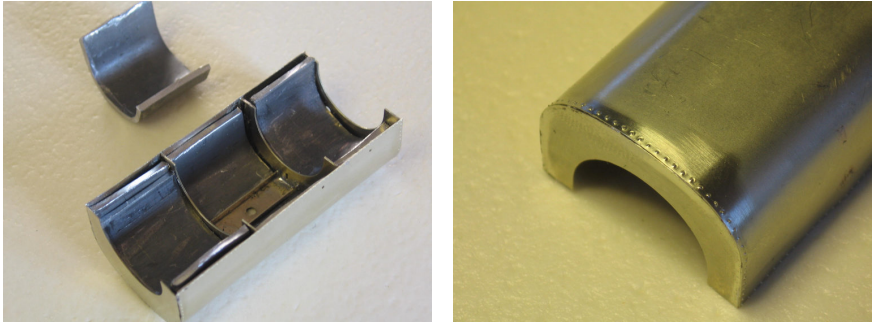
Fit the tank rear first, and finally the front, ensure the ends are inside the tank outer. Again, and alternative riveted front (122), or welded (222) are supplied. Take care to get everything square and tight. When content, solder all seams, try to do this from the inside, especially on the riveted tank, to keep the rivets clean of solder. Fig 414 - 7.



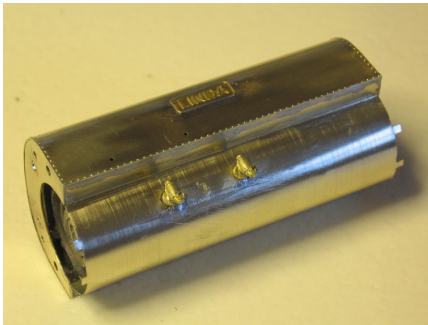
The circular section of the boiler barrel / tank bottom (123) is pre-rolled. The tank bottom is formed by folding *out* the sides of the pre rolled part by holding the full width in a 3"vice, and gently bending the boiler with both thumbs. Check the fit of the bottom by using the smokebox rear, and the tank top. Once the fit is right, the holes for the clacks can be reamed out to 3mm. One of the backing spacers on the tank inner etch (124) can be rolled slightly, and fixed in the inside of the tank. This will give the impression of the clacks fitted to the boiler, not the wrapper. Fig 418 - 26. If fitting the balance pipe to Linda or Blanche drill out the half etch on the inside of the flats forming the tank bottom.



It is easier to fit lead weights before final fixing the bottom piece. Fig 427 - 9.



There are 'steps' at each end of this piece. At the cab end ensure the step fits inside the tank, at the smokebox end the step allows the smokebox to fit inside the tank. Solder the tank base and boiler barrel in place.



If the final tank is to be welded, file off the rivets !.

A balance pipe is fitted to Linda and Blanche 25 mm from the cab end. Although not visible on Charles, the holes are in the tank, the pipe has been removed. Use 1mm material for the pipe, but fit this after painting.

You can solder the smokebox and tank assembly together, but is not easy for painting, and you must use the plain tank rear (121). An alternative is to use a 12BA bolt through the centre of the smokebox rear, ensure you solder a 12 BA nut on the inside of the front bracket (125), and attach on the inside of the tank front. Ensure you leave clearance for the tank sides etc. The centre of the nut should be 16.8mm from the top of the tank.

If you want to screw the parts together after painting you must leave the smokebox door off to allow access.

Use the smokebox rear (131) to check the fit of the barrel and the tank ends. Note the smokebox fits *inside* the tank. Carefully file out the front if necessary to get a good fit.

Check the lead weights inside the tank, and add the central roll to fill all the space.

Cab

Charles cab, like the frames, was always shorter than Linda & Blanche.

The cab of Linda and Blanche were modified to a new profile after arrival on the FR, on the modified cab the top rivets are hidden by the rain strip. There are 16 rivets on Linda's cab, and Blanche's as original, this was shortened to 14 rivets, on modification. Blanche's cab roof was shortened during the fitting of the tender cab, to a length not dissimilar to that of Charles.

There are four configuration part numbers for the cab as follows :

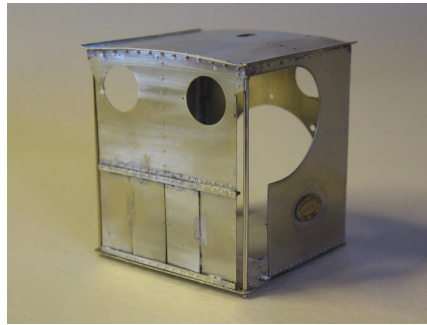
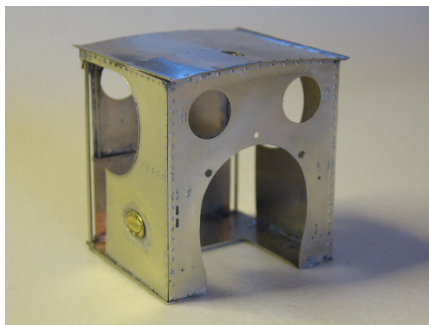
	Charles	L&B original	Blanche mod	Linda Mod
Footplate	(116)	(116#)	(116)	(116)
RH cab side	(102)	(112)	(412)	(212)
LH cab side	(103)	(113)	(413)	(213)
Front spectacle plate	(100)	(110)	(210)	(210)
Backsheet	(114)	(114)	--	--
Roof	(117)	(119)	(117)	(119)

= Addition bracket added from the rear bufferbeam

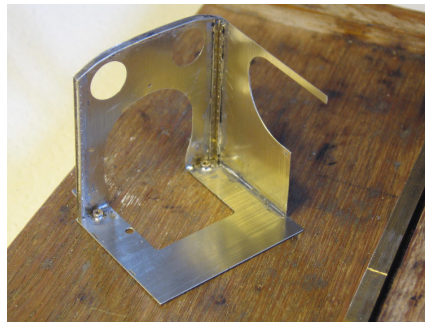
The shorter roof is used on Charles and modified Blanche. The rear of roof will need to be trimmed by 2mm for Blanche.

The footplate is long enough to allow for the original cab to overhang the rear bufferbeam. For tender versions the plate should be shortened to the outer mark etched on the underside. Some fitting will be necessary if the welded extensions on the rear bufferbeam are left in situ.

A Penrhyn style cab for Linda is shown in Fig 450 - 458. The backsheet can be added, with 1mm dia handrails. I do not advise soldering the roof in position, as it is nearly impossible to fit out the cab. Leave a former all around the cab top, and just clip roof in position.

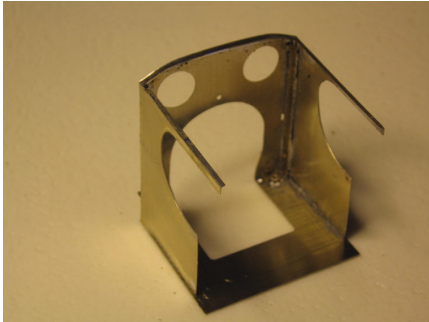


More detail of an FR style cab for Linda are shown in Fig 471 - 479.



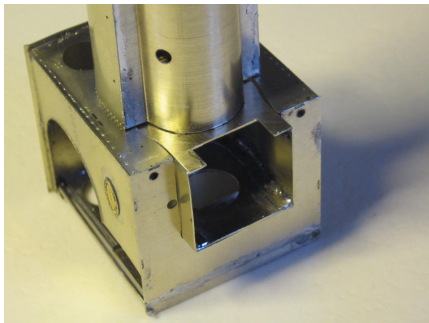
Solder 2 x 12 B.A nuts onto the upperside of the footplate, ensure the hole for the brake rod is on the right hand side. The corner brackets (111) have to be folded first, and the rivet detail added afterwards. Solder the corner brackets in place, Fig 471, then use a piece of strip to form a top edge around the cab roof profile Fig 472. Add front steps Fig 473 - 4.

Fold the top fillet of each side, carefully holding the top fillet in a vice, aligning the jaws with the full etch line, fold the side over. Add the sides Fig 475 - 8.

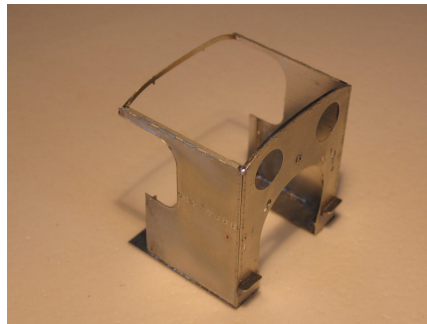
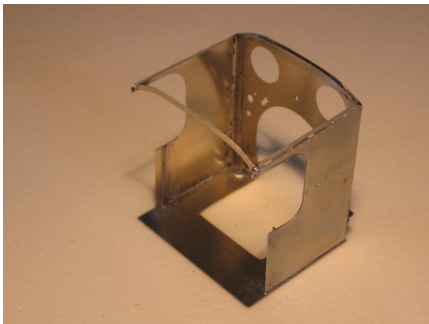


For tender engines form the roof, and add a rear edge (409) as a former.

Ensure the firebox can slide into the cab, and then the cab/firebox sits square against the tank Fig 456 - 8.



A cab for Blanche is shown in Fig 480 - 487. The detailing of the cab is dealt with later.



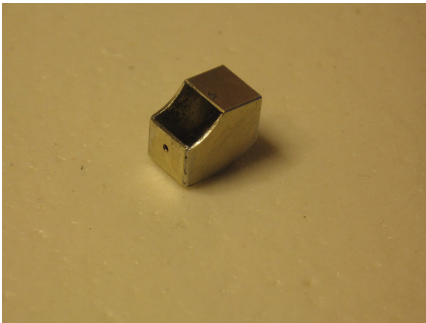
Body assembly.

You should now have four major components, smokebox, tank/boiler, firebox and cab. You can assemble / disassemble in a number of ways. I have found a convenient method is to fit the smokebox in the frames, and gain access to the motor by removing the cab, firebox and tank/boiler as one assembly.

Remember the notes above regarding the gap at the top of the cylinders between them and the smokebox. If you fix cylinders to smokebox on the model, you can end up with a Chinese puzzle. You have to keep a split line between the two, or decide to fix the smokebox in position as part of the chassis, and split the tank/boiler away from the smokebox.

Sandboxes

Charles sandboxes are fitted to the side of the saddletank. The sharp radii curves are difficult to form. To help the curve is half etched on the rear, to help I advise the rear is filled with solder. This makes bending easier. Fig 440 -443. The sandpipes are threaded between the valve spindle and sidebar. Ensure it allows free movement of the spindle and crosshead.

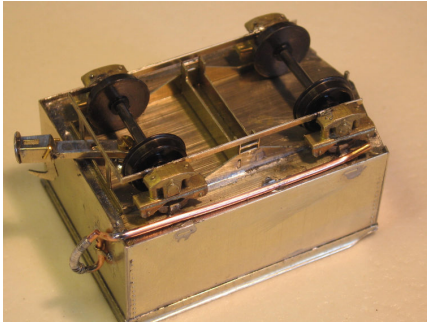


The later sandboxes are made up with the outer folded, the inner is bent and fitted inside. Solder the boxes in position with the tank and smokebox in position. Check the top of the box is level. Try not to fill the gap between tank and sandbox, there is gap on the real thing. Take care to get them the right way round, and the tops level. (Img 0210). The operating mechanism (226) can have the brackets fitted before painting, but I would suggest completing these after painting.

Linda Tender

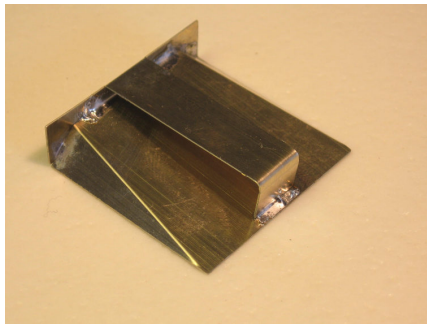
The sides are re-inforced with a rivetted strip along the top. After pressing out the rivets at each end, scribe a line 1.5mm from the top edge to align the rivetted strip. The bottom of the strip kisses the rivets at each end.

The chassis is folded up, but fit the wheels in the frame before final assembly. The axlebox castings will need to be drilled out with a 2.1mm drill to form the outer of the pin point, and the spring buckle filed down to fit. Ensure the casting is soldered to the base, the chassis side is very weak Fig 502 - 505.



Assemble the upper works onto the base first, the chassis is quite delicate. The inner slots are for 22.5mm axles for 14mm gauge, the centre of the sideframe will have to be cut to fit.

The inner is formed and fitted, Fig 510 -511.



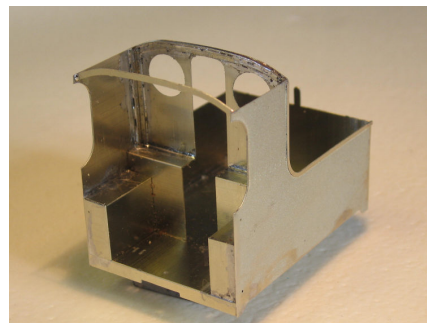
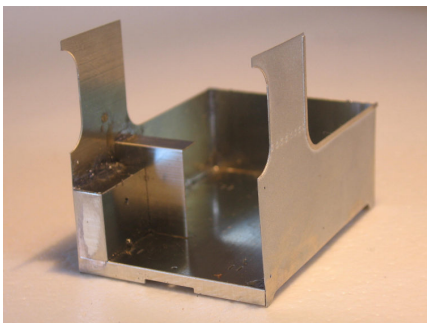
Add guardrails, and fit a vacuum pipe made of 1.2mm copper wire as per Img 1926.

There is no provision for a fall plate. As far as I can ascertain there was only a handrail at the rear of the loco, and a gap to the tender.

As mentioned previously, the water filler stanchion was not present in 1964 (the tank was backfilled via the saddle tank), but did appear at sometime, in some form, as yet I can not be certain when and in what form.

Blanche Tender.

Assembly is straight forward for Blanche's tender. Add sides and rear to the base. Carefully solder the corner seams from the inside. Fold up the inner boxes, and add. Add the rear sheet, doors if required. Fig 550 - 554.



The chassis is folded up, but fit the wheels in the frame before final assembly. The axlebox castings will need to be drilled out with a 2.1mm drill to form the outer of the pin point, and the spring buckle filed down to fit. Ensure the casting is soldered to the base, the chassis side is very weak.

Fit a vacuum pipe made of 1.2mm copper wire as per Img 0049, 0229,

Blanches' tender does not have a fall plate. On the prototype there is a moveable plate fitted under the footplate on the tender that rubs up against the rear bufferbeam. With the tighter radii required on the model I have been unsuccessful at reproducing this feature.

I suggest the flexible cover fitted to the engine roof could be made from thin flexible tape. Again this depends upon the radii you require the model to work around.

Early cab configuration

At Penrhyn the bunker was in the cab, on the left hand side. Closer inspection of Charles reveals there was no footplate level door to remove coal. I presume Hunslet assumed it was lifted out of the top.

Detailing.

As mentioned early on, the detailing of the cab has to be done so as to allow for painting. The open back nature of the cab, particularly for Linda, means the cab details are very important. I have included castings for all major parts. Pipe runs can be seen in the images supplied. Unfortunately I can not find any pictures of cab fittings circa 1968. We know the ejector and steam brake valves must be fitted, but of course there would no oil fire stanchion or manifold.

The firebox can be detailed with the ejector, backhead fittings, brake column support, , drivers brake valve and lever, crown manifold, oil manifold (if oil fired) and safety valve cover, and associated pipework of various sizes. This can then be added into the cab after painting, but before the reversing lever and oil valve stanchion are fitted. Additional controls for injectors and water valves can be added using pins and spare strip if desired.

Some parts are duplicated as etch or castings. Some parts work better made one way or the other, for instance the reversing lever frame may be better as a casting, the regulator is better just made from a piece of strip and a bit of a pin.

The vacuum pipes can be made from 1.2mm copper wire bent to shape. I wind a length of 0.015 tinned copper wire, stripped from a piece of stranded equipment wire, to represent the flexible part. The tender pipe runs appear not to have changed so much over the years, but runs around the smokeboxes appear on either side from different directions.

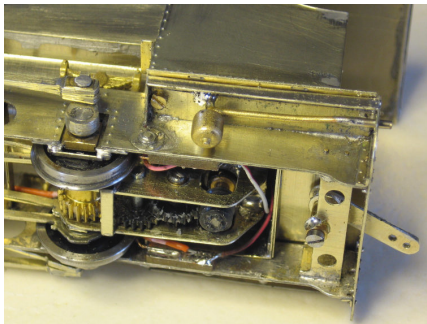
I would advise polishing the dome with a Dremel type mini drill, with polishing mop and Brasso. Polish before removing the sprue, it is easier to hold.

Pipework can be added. Study the injector pipework carefully, use the 0.9mm copper wire for the runs. Note the pipe runs change between old and new injectors, and when the 'big' injector is added below the cab floor. There is a small casting on sprue 10 that form part of the pipe run from the tender. This can form a Chinese puzzle, once the pipes under the cab are in place it is impossible to remove the body from the chassis without bending or removing some of these pipes. I would bend to shape and fit, remove for painting and then re-assemble.

The ejector exhaust is made from 1.2mm straight brass wire 90mm long, and bent to shape. The pipe cuts through the corner of the sandbox. Note that Linda's pipe is a much larger dia bend, and consequently the cut out in the box is also larger. Blanche has the extra pipe runs to the smokebox and cylinder drains.

Even the sandbox operating rod is run above the handrail on Linda, and below on Blanche (226), all linked using 0.55mm pins.

The rear crash bar is made from 2mm brass tube. This is undersize, but allowance needs to be made to ensure it does not short on trackwork. Fig 604-6



Cylinder drains and oil pipe runs are made from 0.4mm copper wire. Try to keep solder to a minimum and retain the natural copper.

Spectacle plate rims are etched in nickel silver and brass. The brass rims will be an accurate colour, but very fragile.

Note the reversing rod should be fitted very late in construction, retain and only with a small drop of superglue. It will have to be removed if you need to split body and chassis.

On Charles the displacement lubricators are made from a piece of 1.2mm dia brass and 0.55mm pins, the handwheels are from the fret.

As mentioned earlier, I advise keeping parts of the body separate before painting. After painting, reassemble, and if confident, the smokebox and firebox can be soldered to the boiler underside.

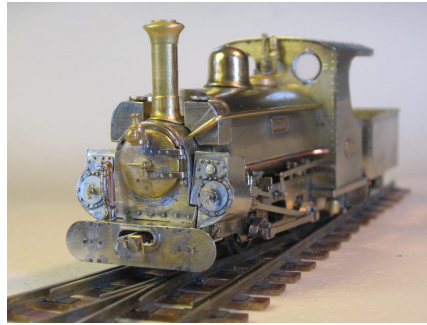
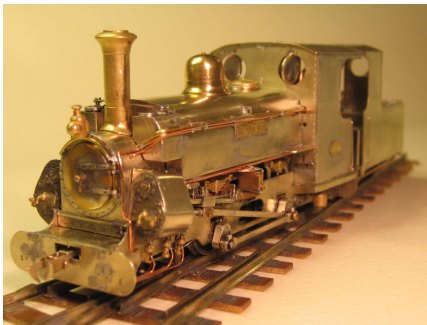
Figures 700 - 777 show detailed models, but check and refer to photographs and the images on this disc for accurate information.

There are spare lengths of different size flat material on the etch, and I have now included formed parts for the drain cock (83) and sander mechanisms (226). Check the images for the exact configuration.

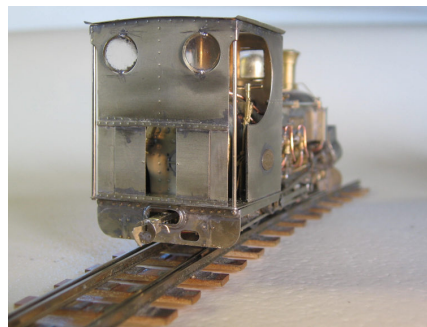
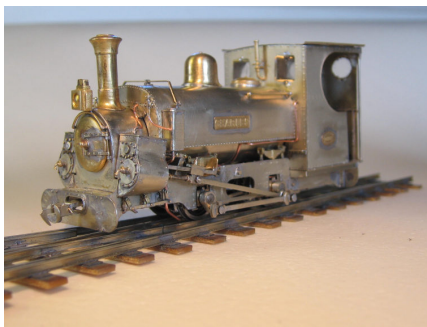
Completion

I have now made models of Blanche, Linda, and Charles, in that order. The model of Blanche uses very early parts, Charles is all parts from the first production etches.

Blanche is shown in Fig 701- 716. The figures (Fig 701 - 716) show a near complete model of Linda. This was made for exhibition purposes unpainted. Note the advice below to fit many of these parts after painting in normal construction.



Charles is shown in figures 760 - 777, also in similar condition to Linda.

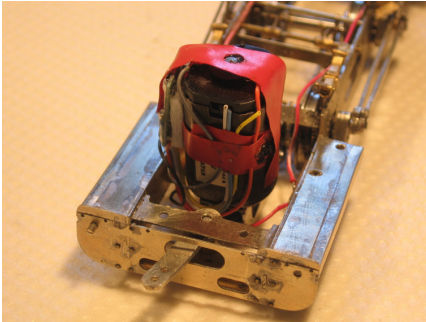


Semi-permanent coupling.

It has been suggested that a semi-permanent coupling could be made by using a 12 B.A. nut and bolt on the tender end of the drawbar. It may also be possible to add pickups to the tender, and use the wire runs to 'replicate' the water and vacuum pipe connections.

DCC

I have used a TCS M1 decoder in my model of Linda for some years without any problems. The decoder is fitted to the side of the motor using double sided sticky foam. Fig 610 & 611.



There are pickups on the four driving wheels only. I have found this gives good reliable running, as long as trackwork is laid well, and of course live frogs are used on pointwork. However, I am sure semi-permanent coupling and pick ups on the tender would add to good running.

Running.

If your model exhibits a strange grinding noise with the body on, it is almost certainly the top of the motor shaft running against the firebox crown if you did not manage to cut the shaft right down. You can either make up a small spacer to fit on top of the motor, or solder a piece of scrap on the side of the gearbox to stop the gearbox moving upwards. Do not fix the gearbox solidly to the chassis, running will be impaired.

Just like the real thing the motion needs regular oiling, especially the parts that are similar metals together.

Bibliography.

There are hundreds of photographs of the engines published, but some details are still difficult to trace, however the two best sources in my opinion are :

Quarry Hunslets of North wales, Cliff Thomas	ISBN 0 85361 575 6
Linda & Blanche, Penrhyn to Festiniog, Dick Blenkinsop	ISBN 1 869915 05 4