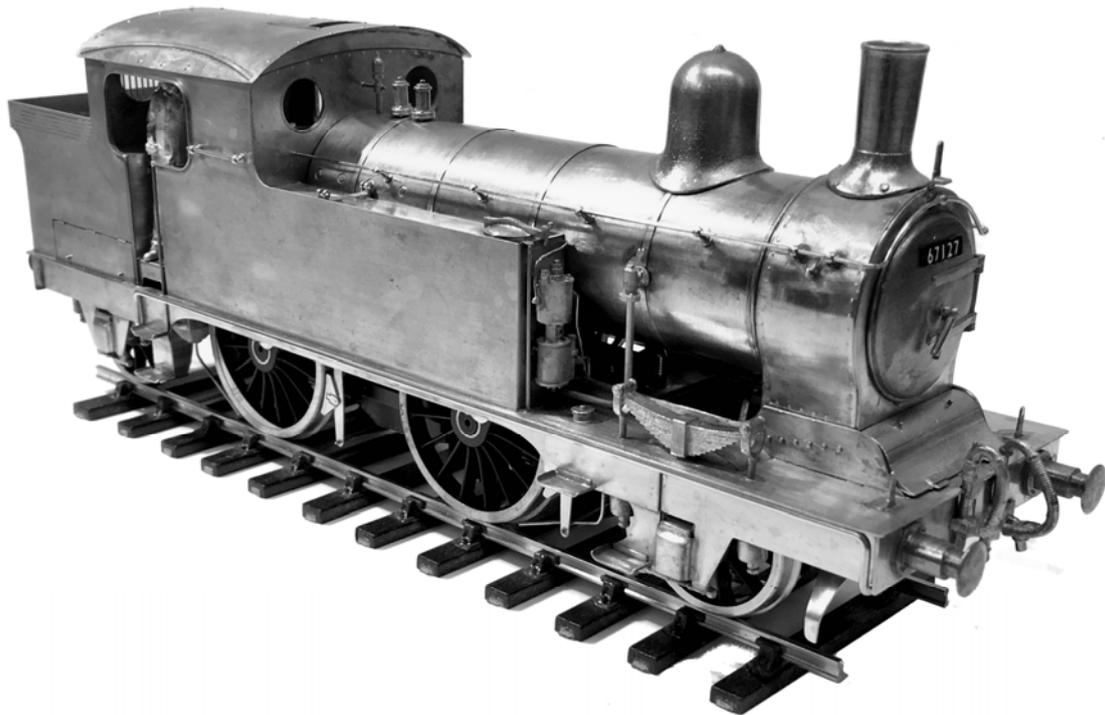


CONNOISSEUR MODELS

- 0 Gauge -

Great Eastern Railway Class C32 LNER Class F3, 2-4-2 Radial Tank



Prototype. This class of 50 locos built by the GER between 1893 & 1902 were a significant example of James Holden's belief in standardisation of designs based around the same boiler.

The F3 was virtually a tank engine equivalent of the E4 class 2-4-0 tender loco and was intended principally for use on longer distance fast stopping trains. Originally used for working services out of London Liverpool Street. After 1913 most were transferred out of the capital to haul rural East Anglia trains.

Withdrawals started in 1936, 37 of the original 50 locos survived into 1945, three continued into BR ownership and the last F3 was withdrawn in 1953.

Parts Required To Complete

2 Sets 5' 7", 16 Spoke Driving Wheel (Slater's Catalogue Number 7867E)
2 Sets 4'0", 10 Spoke Bogie Wheel (Slater's Catalogue Number 7848GE)
Plunger Pickups if desired (Slater's Catalogue Number 7157)
Available From Slater's Plastikard, Old Road, Darley Dale, Matlock,
Derbyshire, DE4 2ER, Telephone 01629 734053.
Mashima 1833 Motor and 40/1 Gear set, *available from Connoisseur Models.*

**Jim McGeown, Connoisseur Models, 1 Newton Cottages,
Nr Weobley, Herefordshire, HR4 8QX, Telephone 01544 318263**

Great Eastern Railway C32, LNER Class F3

This kit was developed by my two good friends Robin Arkinstall from two doors down and Jon Gardner the notable East Anglian Mardler. They wanted to see a kit for an F3 available to fill an important gap in their and their fellow Great Eastern modellers locomotive collections. I was very pleased to put a kit of this quality into production.

Prototype Information

The best place for information to give a good overview of the class is the internet. For GER period visit <http://www.gersociety.org.uk/index.php/locomotives/j-holden/c32>

For LNER period visit <http://www.lner.info/locos/F/f3.php>

For Reference books, Locomotives of the LNER, part 7, Tank Engines-Classes A5 to H2, Published by The Railway Correspondence and Travel Society (*often referred to as the green bibles*).

Yeadon's Register of LNER Locomotives, Volume Thirty-Nine, Published by Book Law Publications, ISBN 1 899624 77 5.

Livery & Finishing

I assume that you have reference material for your desired livery & supplies of paint & transfers, particularly if you model the GER period. If this is not the case then fortunately the GERS website has a fully informative livery specification section <http://www.gersociety.org.uk/index.php/locomotives/liveries>

Likewise the LNER Encyclopaedia <http://www.lner.info/article/liveries/livery.php>

In brief the locos first carried standard GER blue livery then most received World War 1 austerity grey livery. Post 1923 LNER grouping they carried secondary passenger loco black with red lining. Some locos received plain black as an economy in later years.

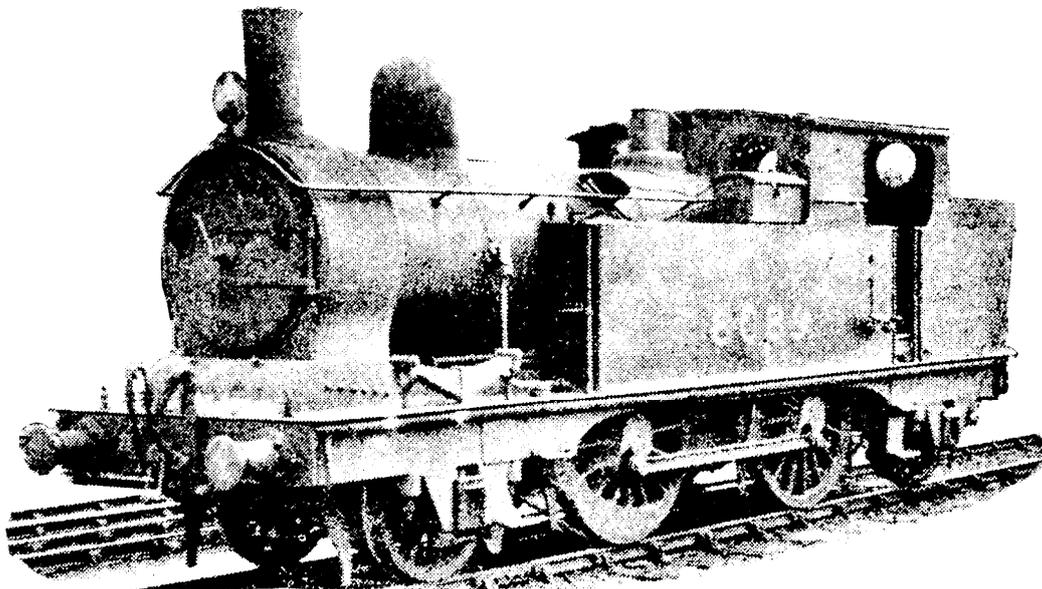
All paints required can be found in the Phoenix paints range and proprietor Chris Stapleton is particularly knowledgeable on the requirements for GER & LNER locos. <http://www.phoenix-paints.co.uk/precision-paints/railway-colours.html>

GER Transfers for lettering should be available from, Fox Transfers, unit 5, Priory Business Park, Wistow Road, Kibworth, Leicestershire, LE8 0RX.

LNER Transfers for lettering are available from the Historical Model Railway Society (HMRS) www.hmrs.org.uk for order form or send to:- Voluntary sales officer, 8 Gilpin Green, Harpenden, Herts, AL5 5NR, SAE for list & order form. You will require sheet 4A, LNER yellow Locomotive insignia.

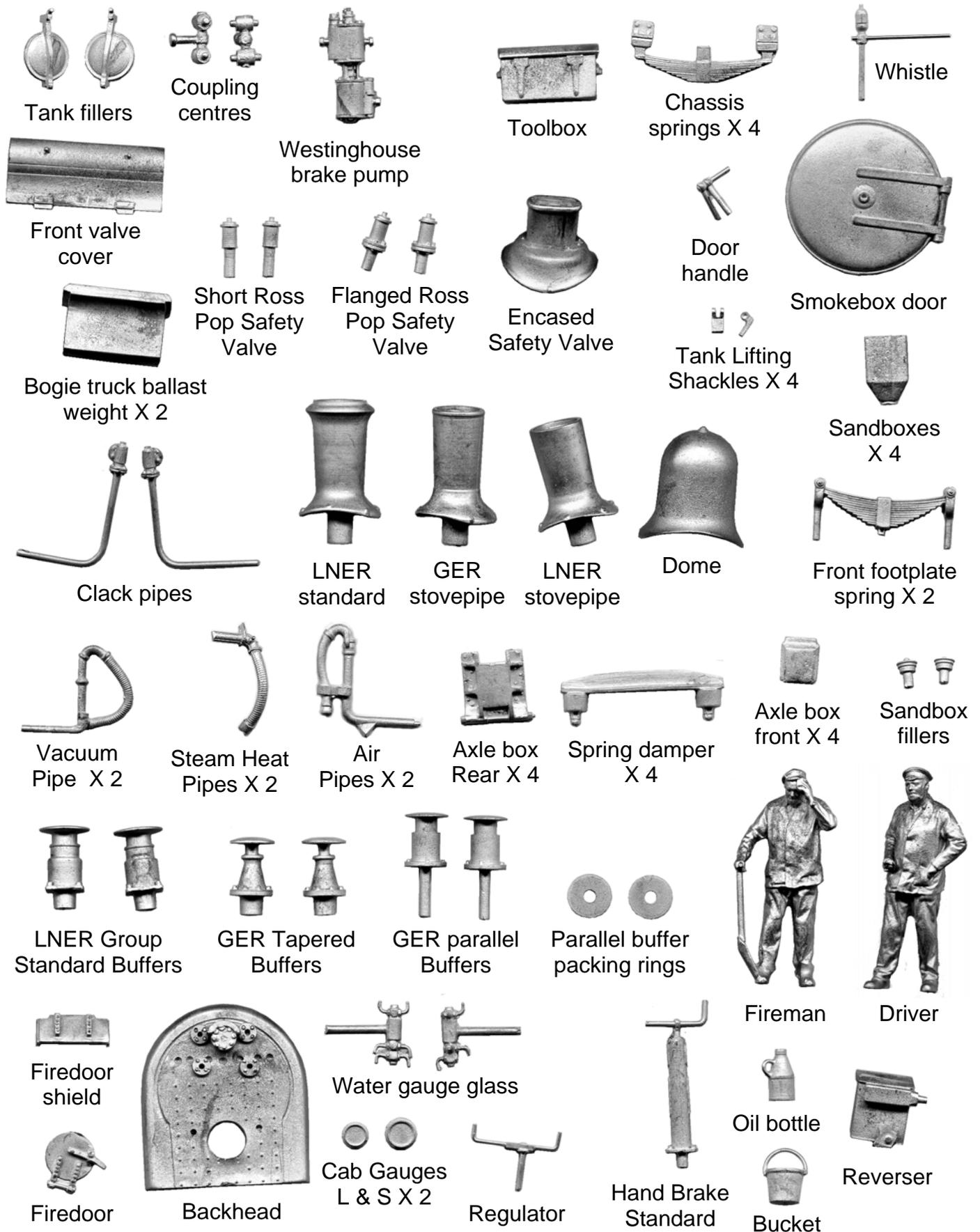
After painting, glaze the spectacle windows, I cut flat sheets from the clear blister packs that many items are packaged in nowadays.

Kit. If you enjoy building this kit and are satisfied with the quality, I would be most grateful if you could recommend it to your friends and fellow modellers. If you are not happy please tell me. Hopefully I will then be able to help and sort out any problem.

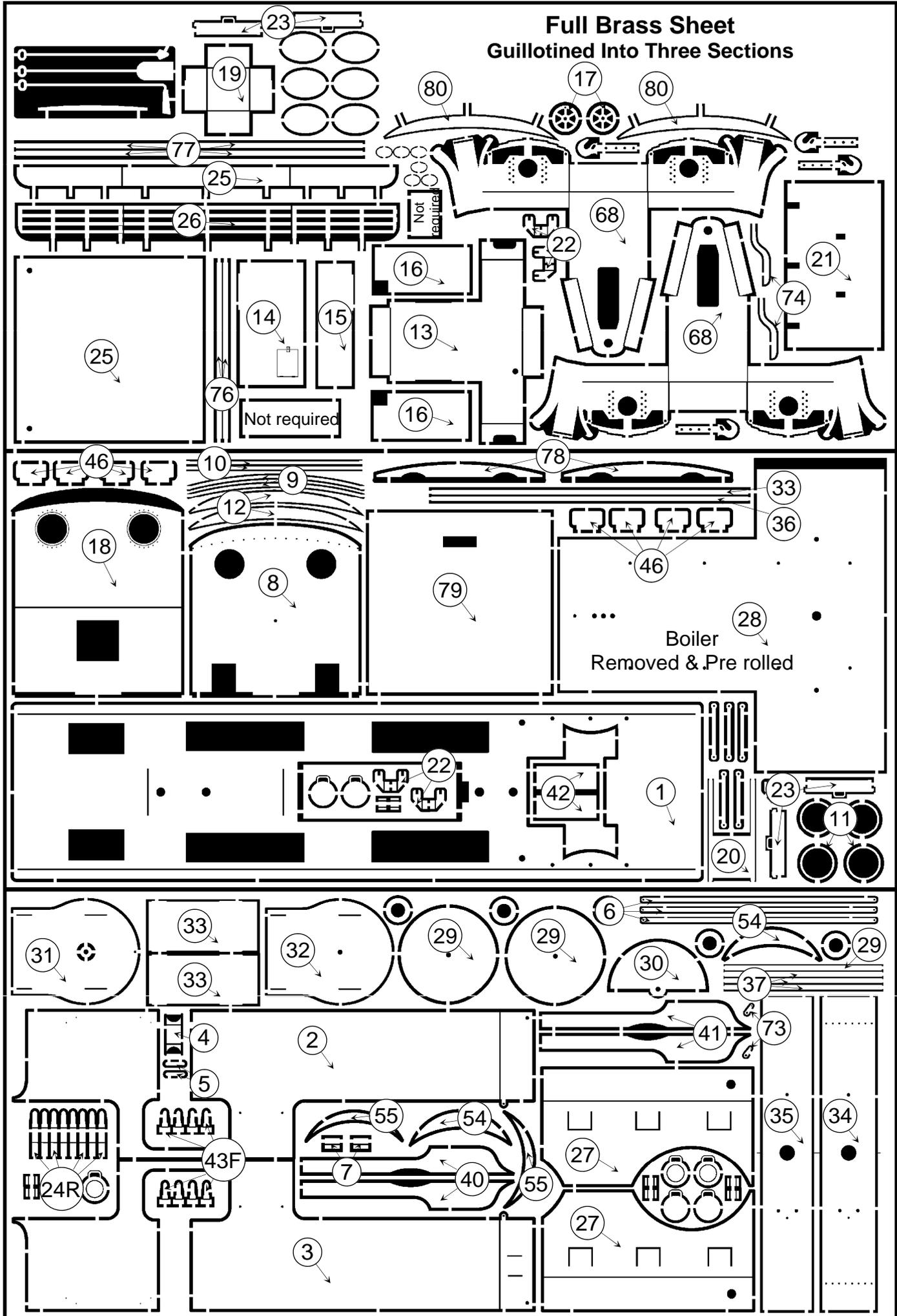


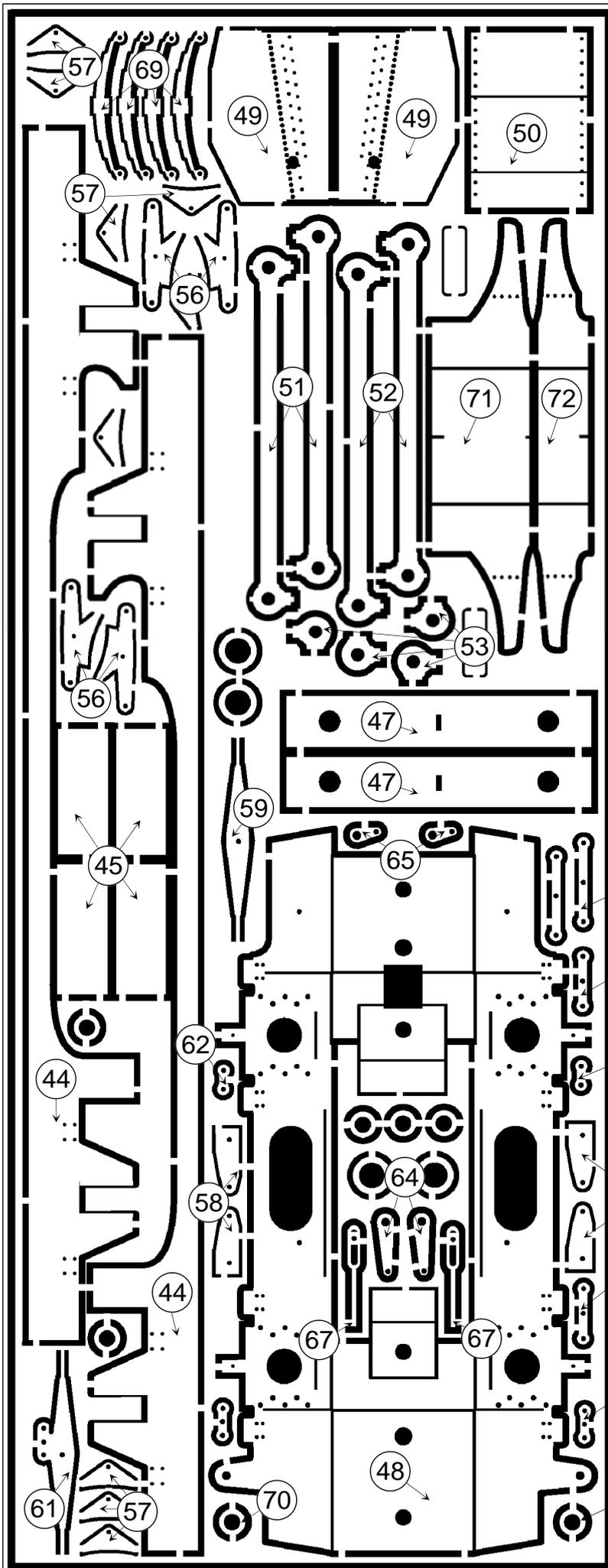
LNER Class F3 Casting Identification & Parts List

When I made the series (five moulds) of dedicated moulds to produce a full set of castings for the F3 I took the opportunity to take a bakers dozen approach when distributing masters. Quantities indicated are minimum required but you should find some extras to cover miscasts and mishaps.



**Full Brass Sheet
Guillotined Into Three Sections**





Nickel Silver Sheet

Sundry Fittings

- Copper clad PCB X 2
- Bearings X 8
- Short 6BA screws X 4, Nuts X 4
- H/R knobs, 8 X short, 8 X long(3mm)
- Track pins X 4
- Electrical pickup wire X 18" R&B
- Universal motor mount
- Regulator & hand wheel etch
- Brass sheet for bunker interior, 44mm X 54.5mm
- 1.6mm brass rod X 6"
- 1.8mm copper rod X 12" (2.5 csa)
- 1.3mm copper rod X 12" (1.5 csa)
- 1.1mm copper rod X 6" (1mm csa)
- 1/2 round brass wire X 5"
- 0.45mm H/H brass wire, 3 X 10"
- 0.7mm brass wire, 4 X 10"
- 0.9mm brass wire, 3 X 10"
- 22swg tinned copper wire X 3 turns



A sheet of brass 44mm X 54.5mm is provided to fabricate a bunker interior for those that want to model a partly depleted coal load.

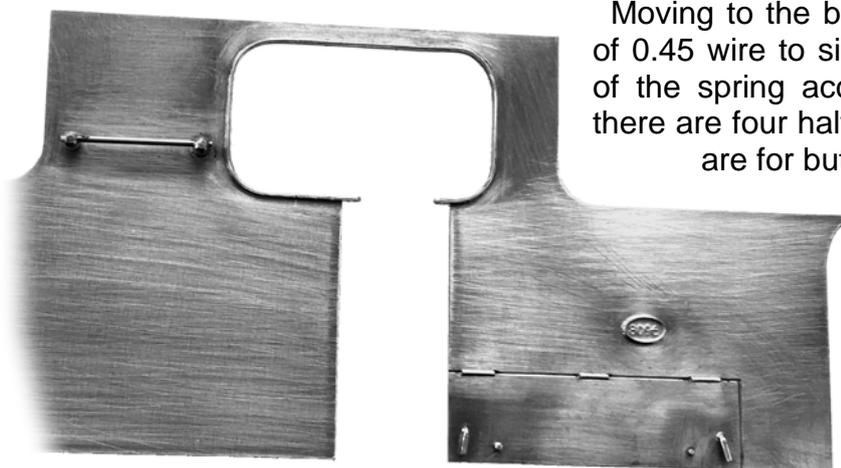
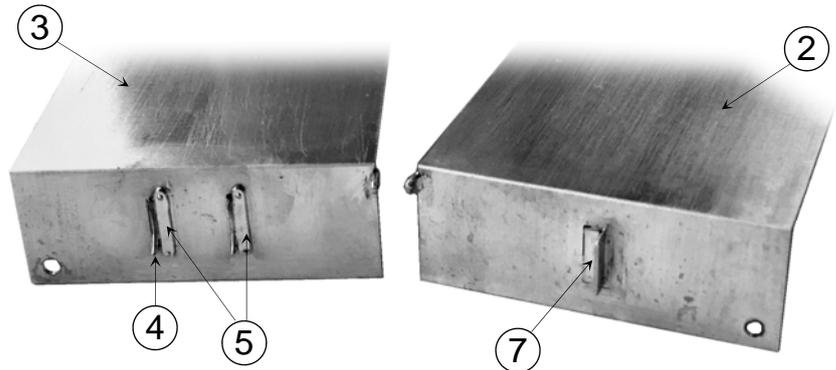
F3 INSTRUCTIONS

Take footplate 1 and remove item from the centre and fold up the front splashers. It is sometimes advantageous to score half etch lines with an Ofla 450 cutter or similar. Do so until you see a witness line on the other side. The item will then fold much easier. Reinforce the fold with solder.

Solder 2 x 6BA nuts over the outer holes on the top of the footplate. These are for securing the chassis.

Take the cab/tank sides 2 and 3 and add the detail prior to fitting to the footplate. Starting at the right hand tank front fold up the Westinghouse bracket 4 and fit through slots from rear. Add detail 5 to front.

Check fit of cast clack valve pipe to hole in bottom corner, open out as necessary. Fold over the tank front handrail bracket and reinforce with a touch of solder.



Moving to the bunker side add three short lengths of 0.45 wire to simulate the hinges on the half etch of the spring access covers. Note on the reverse there are four half etched holes. The lower inner two are for button handles.

Drill out and fit short length of 0.45 brass wire. The other holes are for latch handles again form from 0.45 brass wire. Check your prototype photos not all had both fittings.

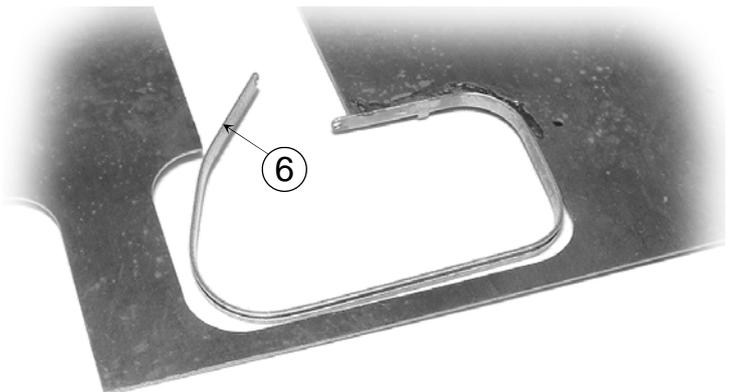
Add the cab surround 6. Start by locating the half etch on the rear cab section and gently form around the opening. Use an 8mm drill of similar to assist forming the corners. If any errors are made there is a spare and any adjustment can be made on the longer front section.

Make up the cab side horizontal handrail using a pair of handrail knobs and 0.7 brass wire, solder and file flush on the inside.

Repeat the procedures with the left hand side but on the tank front fit the step 7 that folds up and locates in the half etch recess.

Also included with the kit are a selection of GER and the later smaller LNER number plates that can be added to the bunker sides if desired. BR smoke box door number plates are included on the nickel fret.

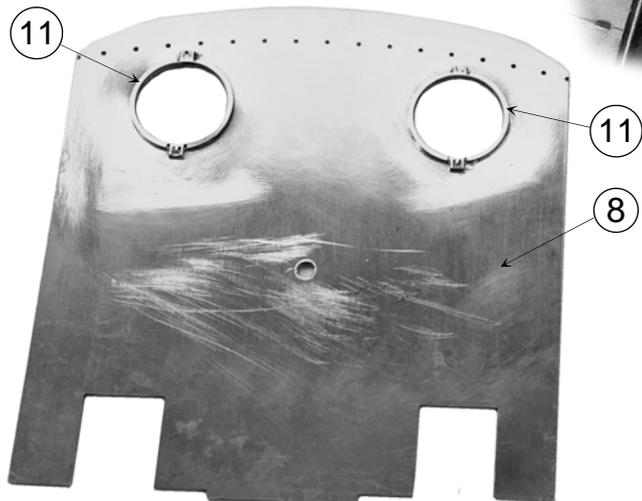
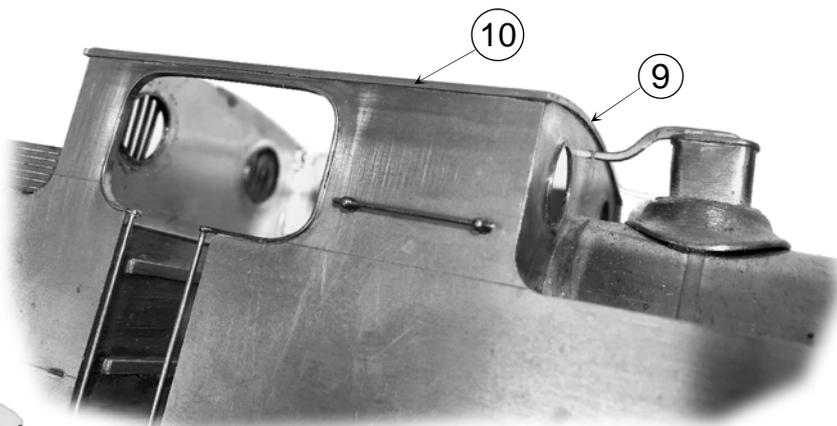
Take the completed cab sides and fold round the tank front then solder to the half etch line on the footplate. Add the front handrails from 0.7 brass wire.



Next step is to take the cab front 8 and if modelling a low roof variant, remove the half etch above the spectacle windows and add the detail 9 flush to the top edge. Note it overhangs either side. This will be trimmed back after similar detail 10 has been added to the top of the cab sides.

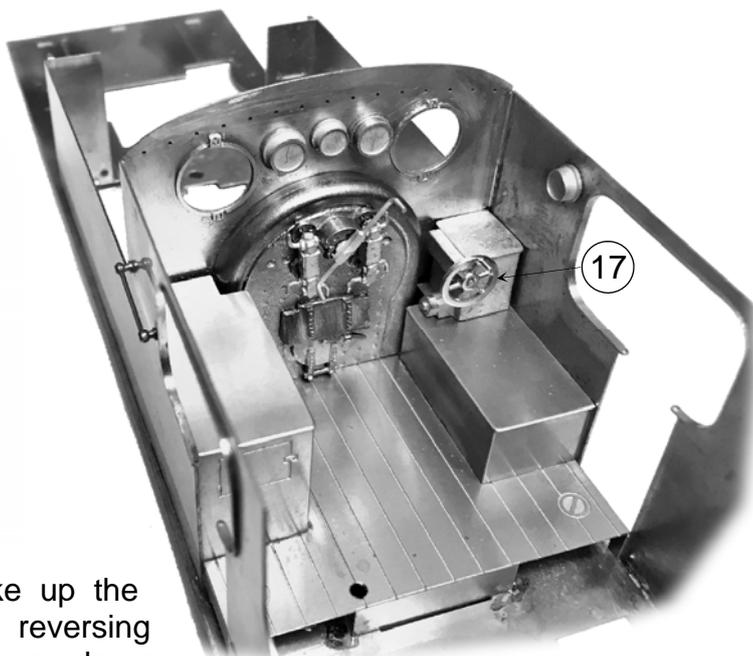
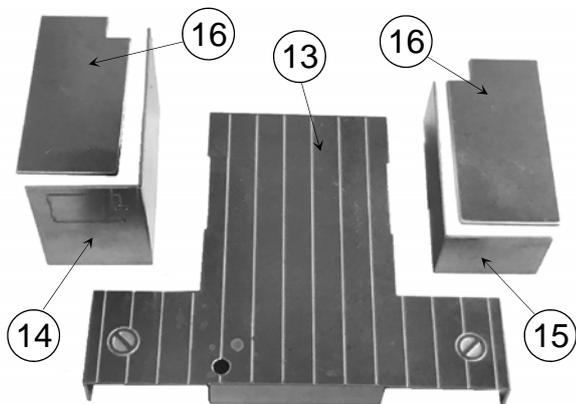
Add spectacle windows 11 to the inside of cab front.

If modelling the high roof variant fit the half etch overlay 12 to the cab front and form the curved detail from the rear.



Ensure a snug fit between the cab sides & solder cab front to the slot in the footplate & flush with the front edge of cab.

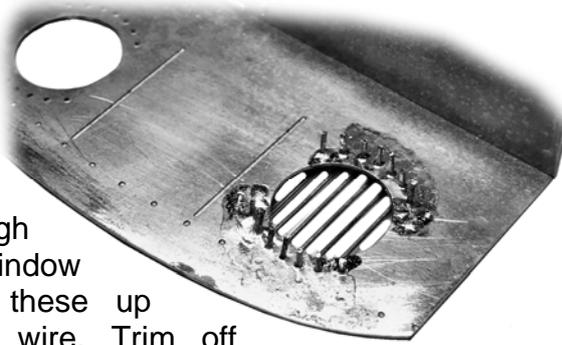
Fold up the cab floor 13 & fit against the cab front. Take the left hand locker 14 & fold round side & fit to cab floor against cab side. Repeat with right hand side 15 & add tops 16 to both with cut out to clear the cast backhead.



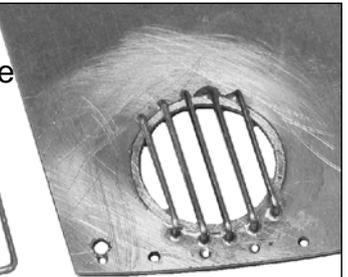
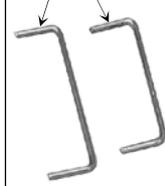
Whilst there is easy access plan/make up the backhead detail from castings, gauges, reversing mechanism etc. Note reverser wheel is made up from the two etches 17 with a short length of 0.45 brass wire to represent the handle.

Take the cab rear 18 and detail as cab front.

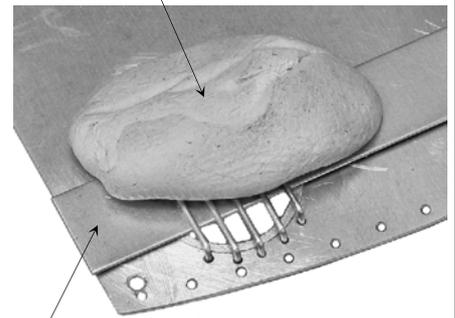
Fitting spectacle windows etc but firstly drill through the holes for window bars and make these up from 0.45 brass wire. Trim off excess on rear and file flush.



0.45mm brass wire coal bars



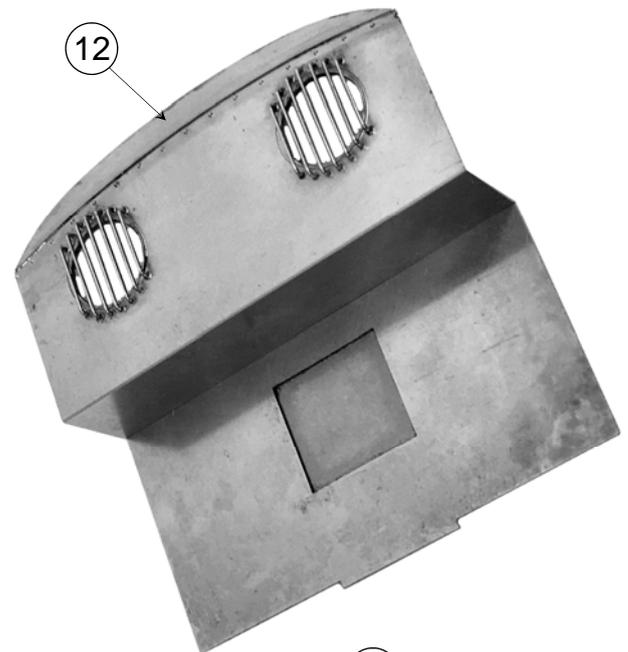
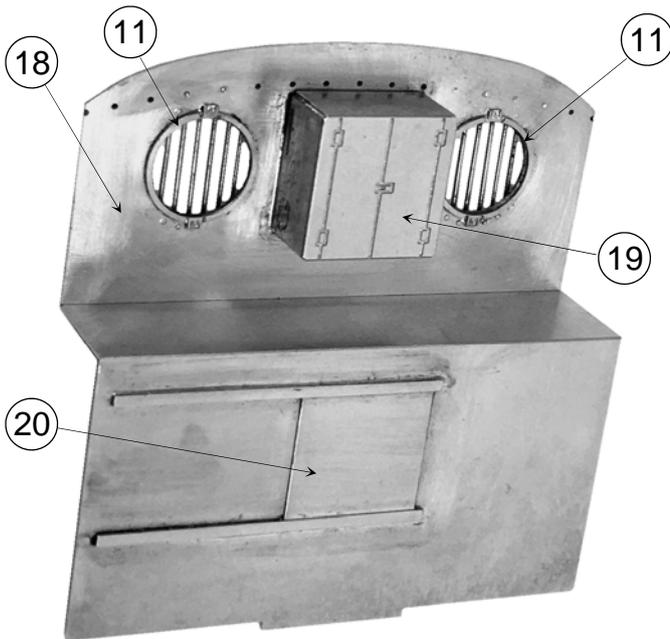
Blob of BluTack to hold bars in position so they can be turned over to solder from rear. (Use fresh BluTack blob to lift off any melted BluTack).



Scrap brass strip to space coal bars away from spectacle ring

Fold up locker 19 and solder to the half etch vertical lines on rear. Note the recess at the top/rear is to allow the low roof variant support 78 to fit behind, ensure there is clearance. Add the coal door 20 either open or closed, positioning as in the photo. Add a handle from 0.45 brass wire.

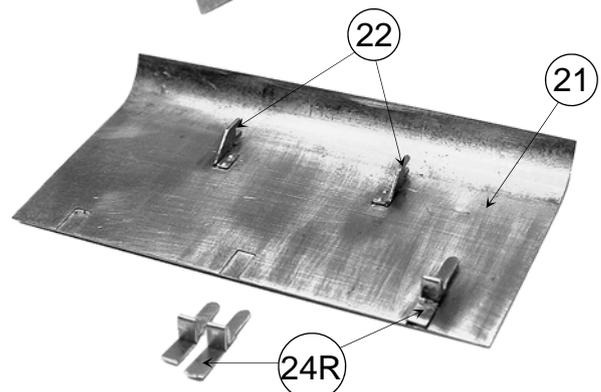
Now fold up the cab back and solder between the cab sides and slot in footplate. The slot tab needs be trimmed prior to fitting or it will require to be filed flush on the underside where it will foul the chassis.

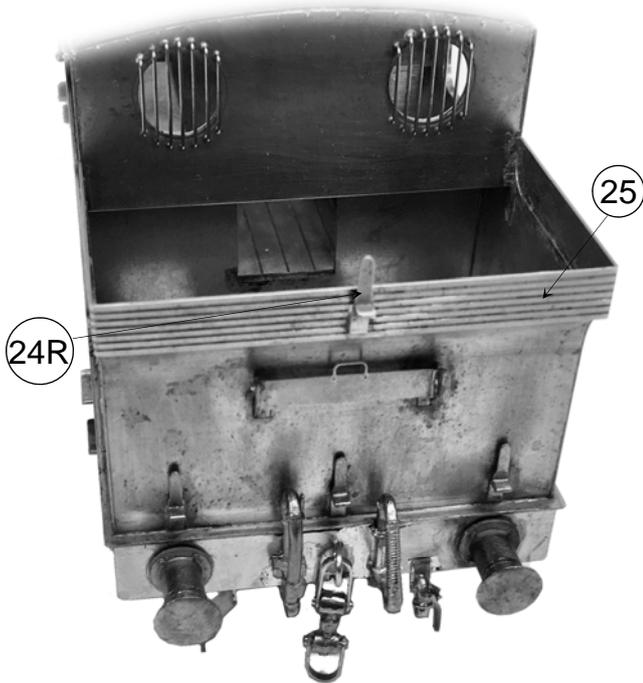


Take the bunker rear 21 and form curve over an 8mm drill or similar to match the bunker side.

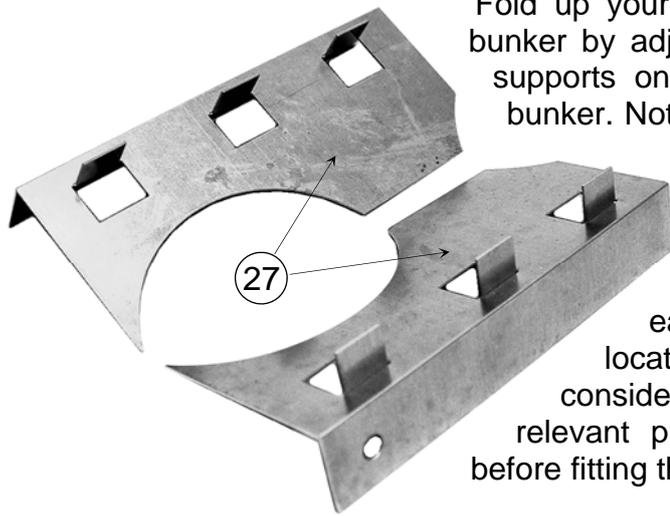
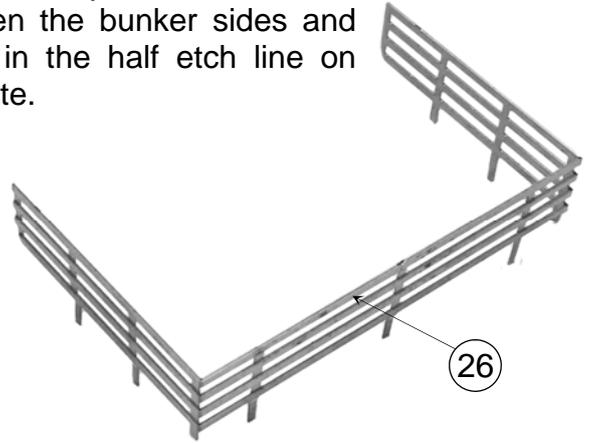
Fold up the left and right destination brackets 22 and solder to the top two recesses in bunker rear. Destination boards 23 can be attached if desired. Spares of these are included along with lamp bracket discs for this and other locos you may wish to fit them to.

Make up three rear lamp irons brackets 24R and fit to recesses across the base of bunker.



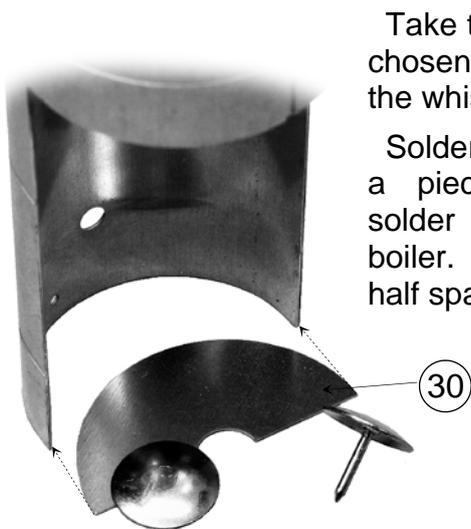


Using the piece of sheet brass supplied bend and trim to fit to form the bunker floor. (Size 44mm x 54.5mm) Solder flush with the base of the coal door in cab back and angled up so it will not obstruct the bunker rear when fitted. Add the completed bunker rear between the bunker sides and sitting in the half etch line on footplate.



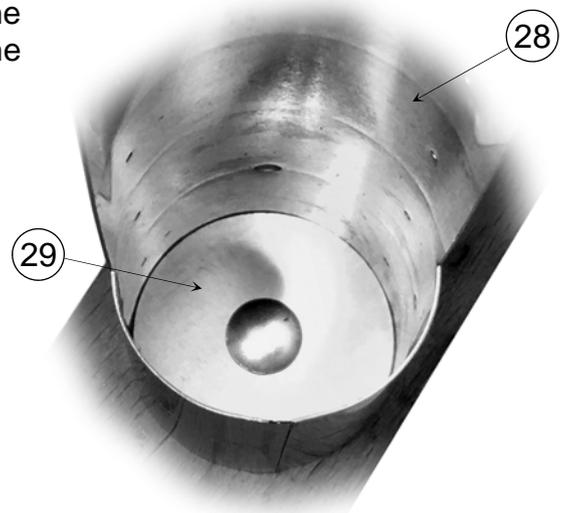
Fold up your chosen bunker coal rails 25 or 26 and fit to bunker by adjusting and trimming the supports. Trim off the supports on coal rail 25 as it is soldered directly to the bunker. Note trim off top rail if modelling the open three rail variant. Make up and add a fourth lamp iron 24R and add centrally to the rear coal rails.

Take the inner side tanks 27 and fold over the top and fold out the three boiler supports on each then solder to the footplate and tank sides locating in the half etch on footplate. You may consider fitting the cast Westinghouse pump and relevant plumbing at this stage whilst there is access before fitting the boiler assembly.



Take the preformed boiler 28 and drill out the required holes for chosen safety valves/ whistle location from the underside. Note the whistle is offset on some locos.

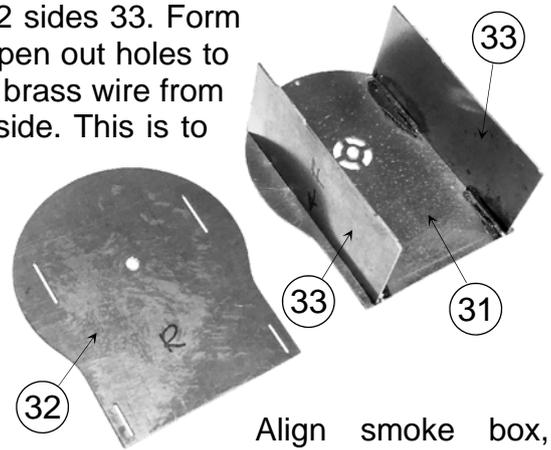
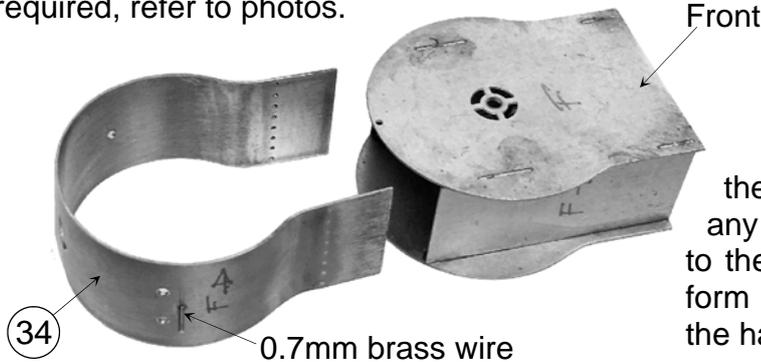
Solder the boiler along the overlapping seam. Pin spacer 29 to a piece of wood then solder to the front of the boiler. Repeat using the half spacer 30 to the rear.



Pin formers firmly to a block of wood and solder boiler end around.

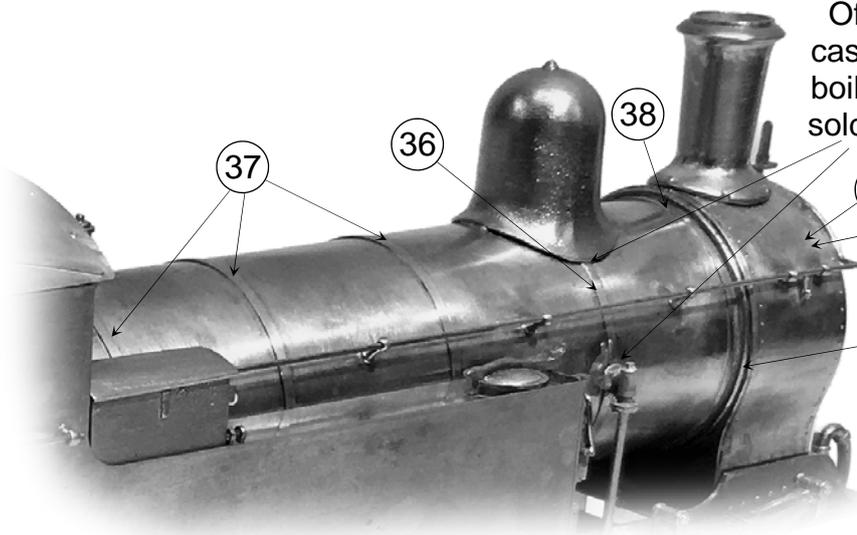
Make up the smoke box frame 31 front, 32 rear the 2 sides 33. Form wrapper 34 adding the rivets on the rear if required. Open out holes to suit the short handrail knobs. Add a short length of 0.7 brass wire from the rear to the hole in the wrapper on the right hand side. This is to mount the blower arm 73.

Noting the front orientation solder wrapper to the smoke box frame. Round off the edge with a file. Add the additional riveted wrapper 35 if required, refer to photos.



Align smoke box, boiler and cab front with the length of 1.6 rod supplied and make any adjustments before soldering the boiler to the smoke box. Remove the 1.6 rod and form the boiler bands 36, 37 these locate in the half etched lines on the boiler.

Offer up clack valves and dome castings and mark positions on boiler. Cut bands to clear before soldering bands in position.



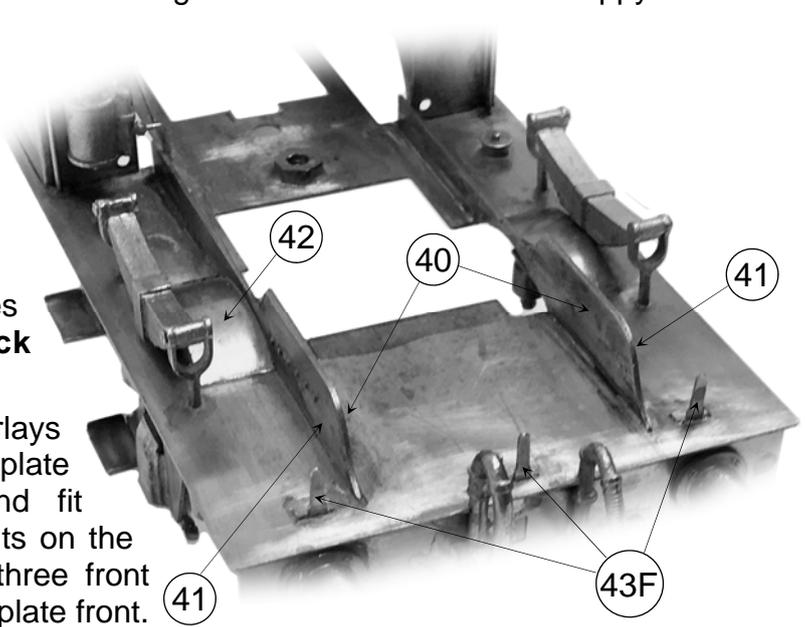
Form 1/2 round brass rod to go around boiler and solder against smoke box rear making the joint at the base of boiler. Then solder the plain boiler band 38 against the 1/2 round rod.

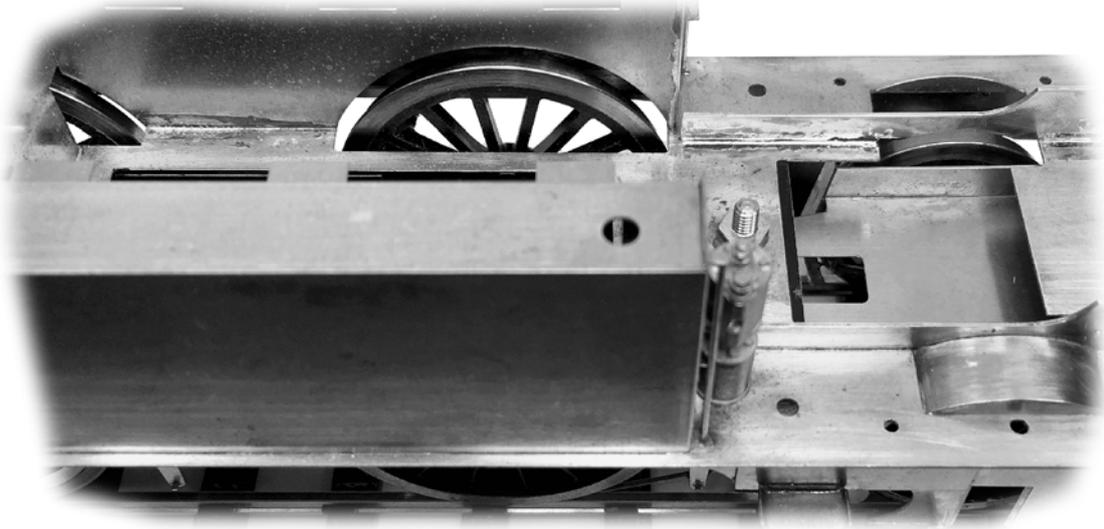
The boiler/smoke box unit can now be offered up to the foot plate and cab front. The remaining plain boiler band 39 will be soldered against the cab front when happy with the boiler fit and clearances.

Offer up the chassis to check motor, driving and bogie wheel clearances etc. YOU MAY NEED TO SHORTEN 6BA BOLTS OR CHASSIS WILL FOUL THE CAB FLOOR, FLOOR TO FOOTPLATE 5-6MM.

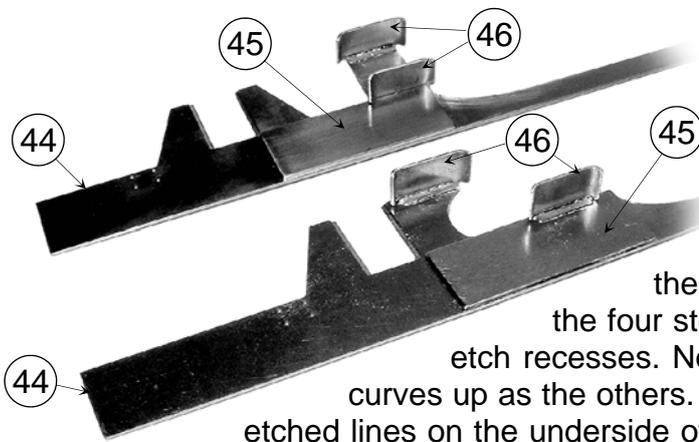
When happy with all the clearances the boiler assembly can be tack soldered to the footplate and cab front.

Solder footplate frames 40 with overlays 41 over the half etched lines on footplate and against smoke box. Form and fit splasher tops 42 note the half etch sits on the splasher curve. Fold up and fit the three front lamp irons 43F to the recesses on footplate front.



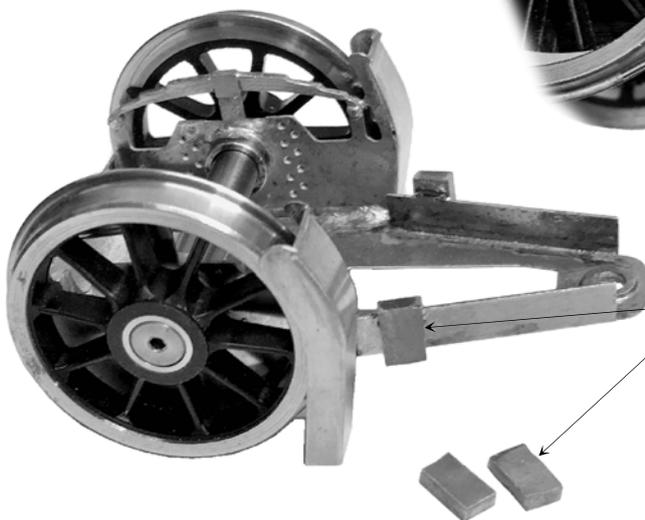
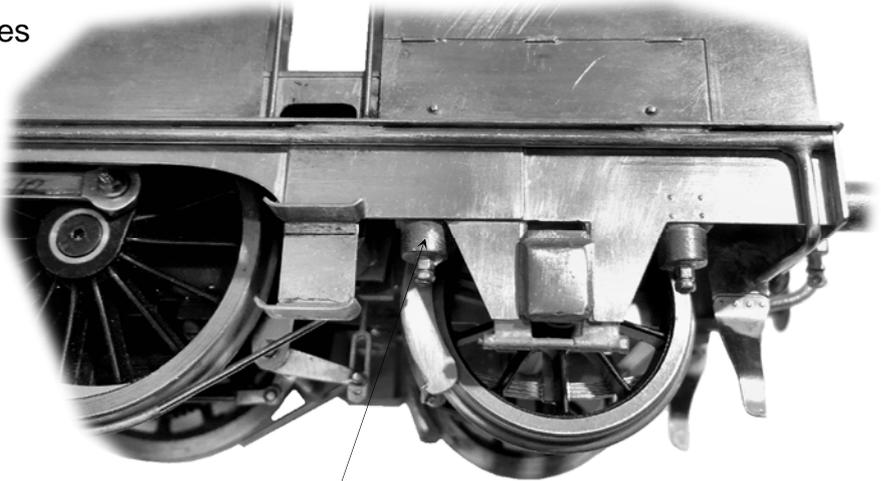


Offer up the chassis again to check bogie wheel clearances of parts 40/41.



Now take the nickel silver valances 44 and form rivet detail if required. Note all but three locos eventually had the reinforcement plates 45 fitted. Two of the plates have half etch recess for the top front step. Position as photos leaving clearance for the valance to fit in the half etch line on the underside of the footplate. Form and fold up the four steps 46 on each valance and solder to the half etch recesses. Note the top cab step is inverted and the tread curves up as the others. The valances can now be soldered to the half etched lines on the underside of the footplate. Add buffer beams 47 front and rear against valances.

Add the castings to the valances starting with the rear spring damper. Then add the axle box front casting followed by the rear axle box casting trimming the top as necessary to align with the front casting.

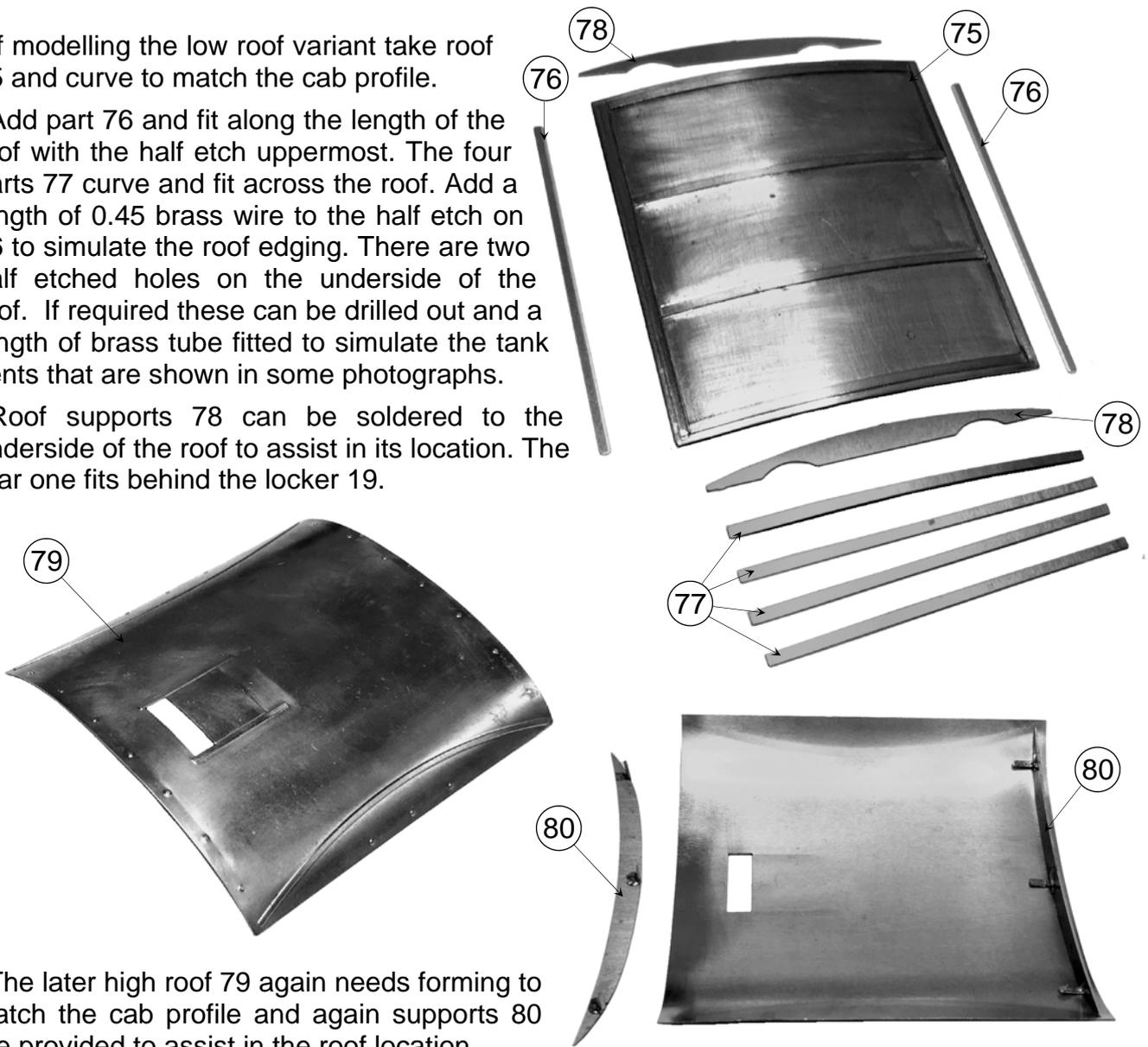


The damper casting can be filed to clear bogie swing. A preferred method is to solder small sections of PCB copper clad to either side of the bogie frame, this then controls the amount of bogie swing.

If modelling the low roof variant take roof 75 and curve to match the cab profile.

Add part 76 and fit along the length of the roof with the half etch uppermost. The four parts 77 curve and fit across the roof. Add a length of 0.45 brass wire to the half etch on 76 to simulate the roof edging. There are two half etched holes on the underside of the roof. If required these can be drilled out and a length of brass tube fitted to simulate the tank vents that are shown in some photographs.

Roof supports 78 can be soldered to the underside of the roof to assist in its location. The rear one fits behind the locker 19.

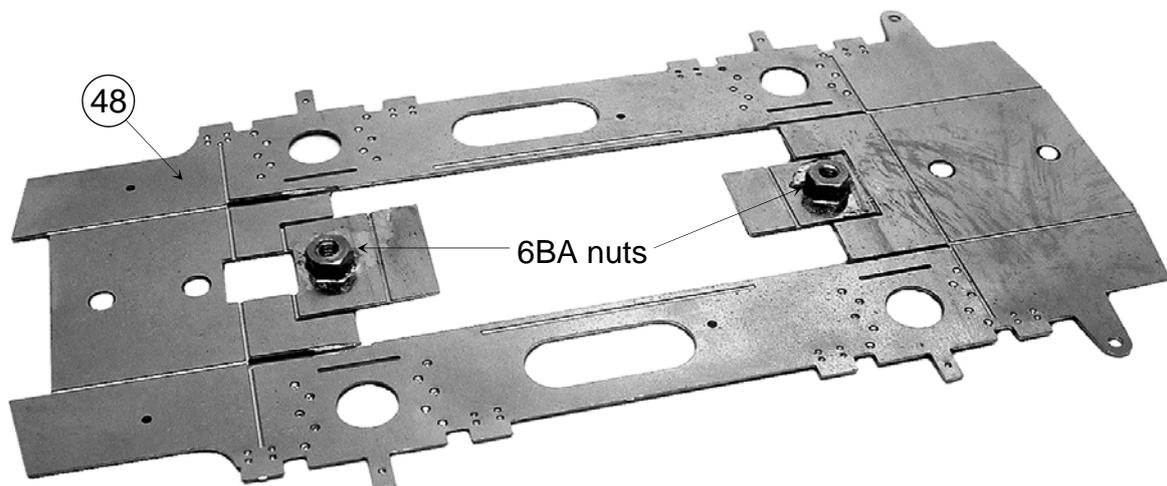


The later high roof 79 again needs forming to match the cab profile and again supports 80 are provided to assist in the roof location.

For clarity these instructions divide body and chassis construction into distinct sections. In reality it is recommended that they are progressed together. In this way, as you can see in the photos, they can be offered together to check clearances etc.

CHASSIS CONSTRUCTION

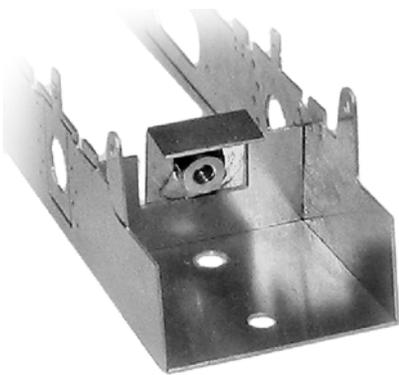
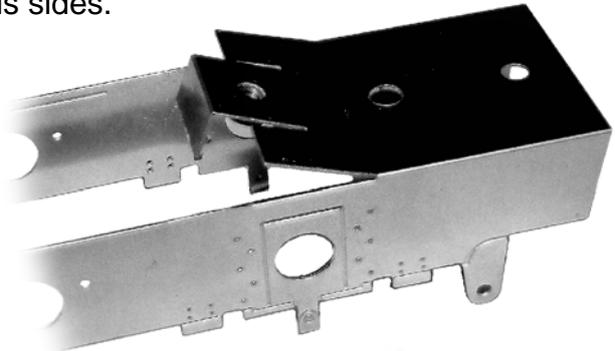
Take chassis 48 and form the inside rivet detail. Solder 6BA nut over the hole in fold up sections front and rear. These will form the pivot for the bogies.



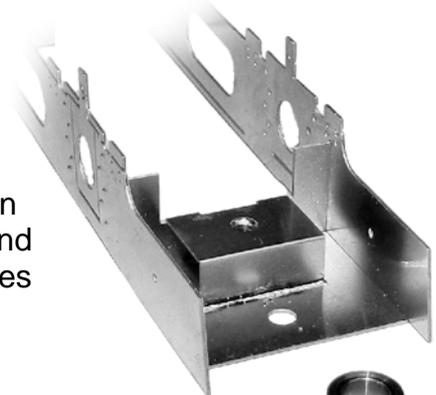


Fold down the chassis sides to 90 degrees check for square. Reinforce with solder along fold.

Fold up spacers slightly to enable the cusp to be removed then fold down till they locate in the half etch in chassis sides.

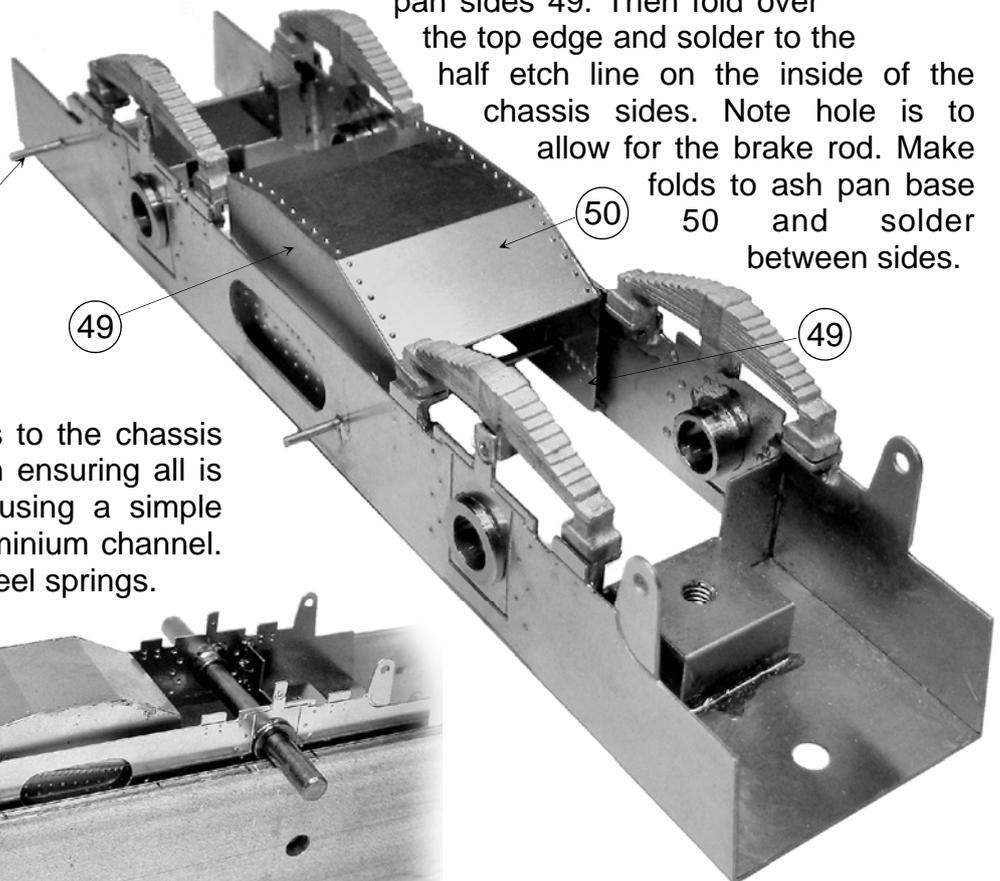


Make a 90 degree fold on the top edge then a second fold on the bogie pivot boxes and solder to spacers.

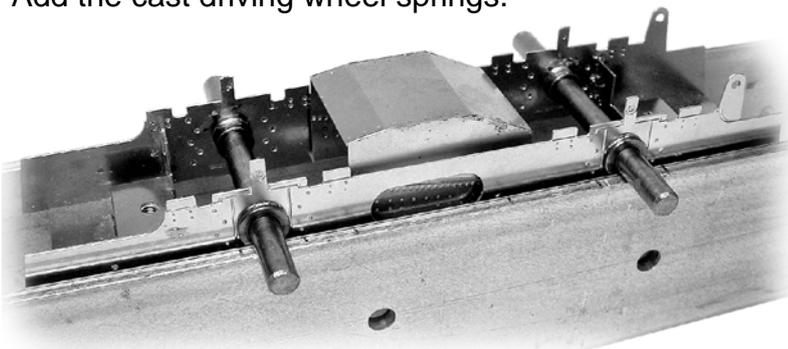


Form detail on the ash pan sides 49. Then fold over the top edge and solder to the half etch line on the inside of the chassis sides. Note hole is to allow for the brake rod. Make folds to ash pan base 50 and solder between sides.

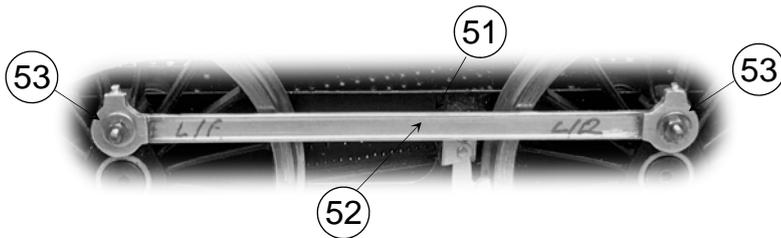
0.9mm brass wire brake rods



Add the axle bearings to the chassis using 3/16" rod to align ensuring all is square. Photos show using a simple length of 1.5" wide aluminium channel. Add the cast driving wheel springs.

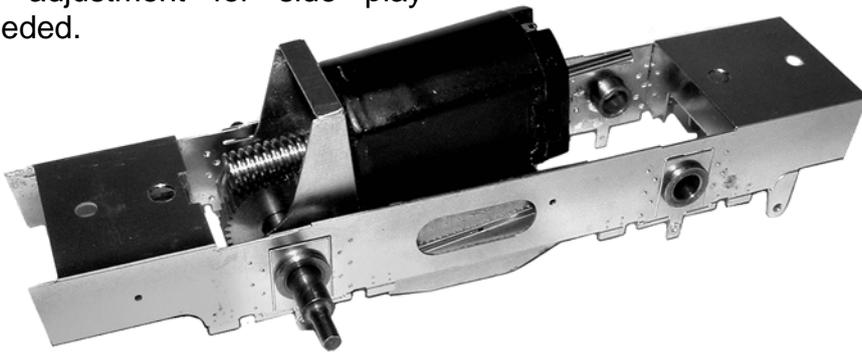


Make up the coupling rods 51, 52 with end detail 53

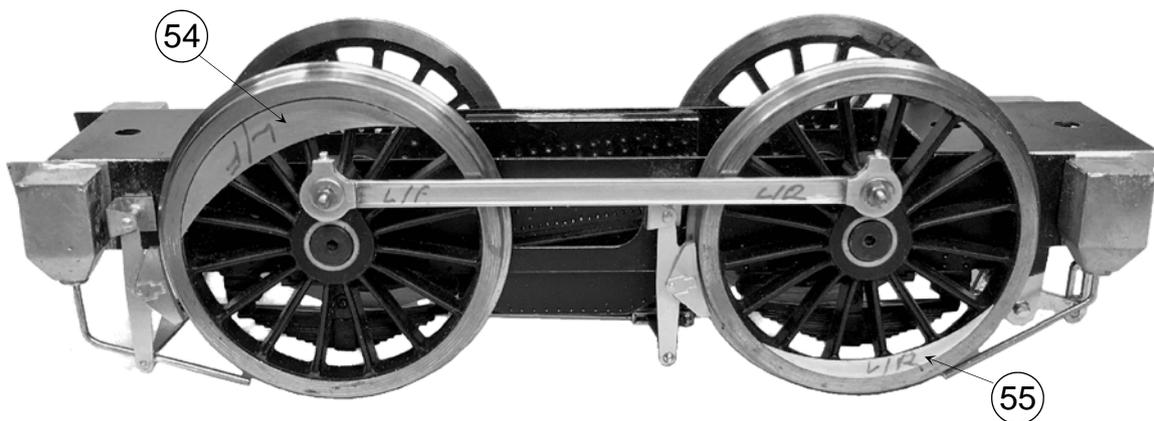


Take chosen motor gearbox combination and check fit. Shown are Connoisseur items, a Universal Floating Motor Mount with a 40:1 gear set and a 1833 motor driving the front axle. This is a straight fit between the front axle bearings with no adjustment for side play needed.

Comprehensive installation instructions are included within the Connoisseur motor & gearbox pack

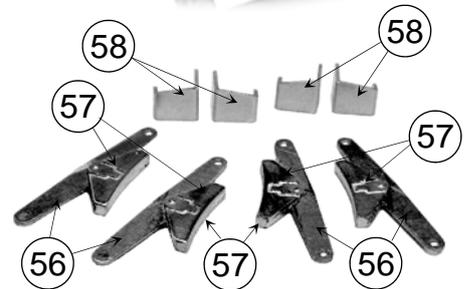
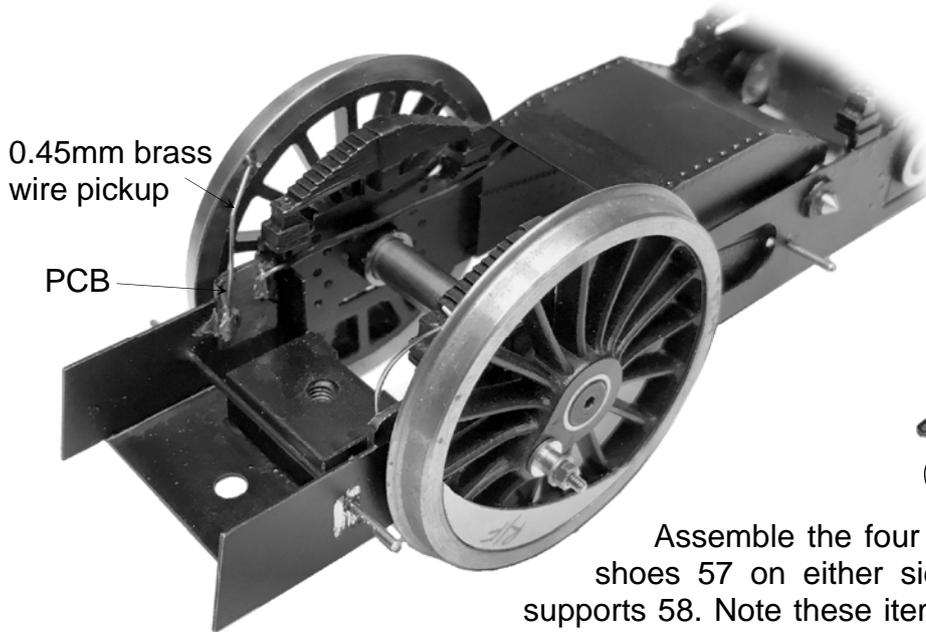
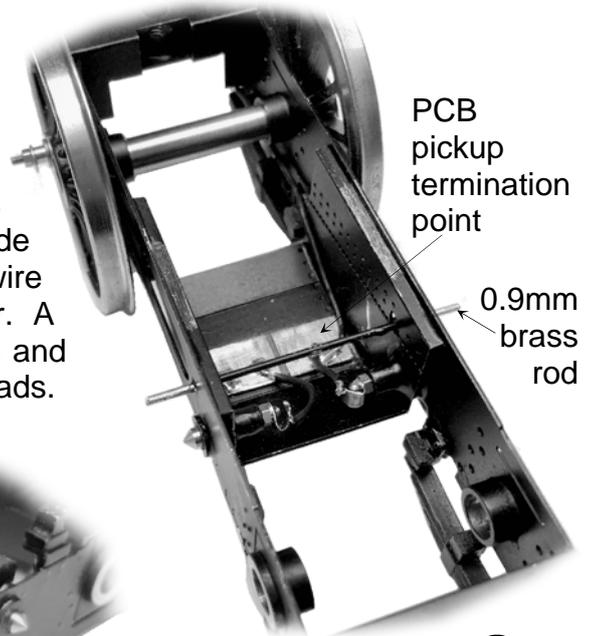


Assemble driving wheels and check for free running. Wheels should spin freely in axle bearings if not ease using a 3/16" reamer or 4.1mm - 5.5mm tapered broach (Squires code BRC317) also polish axles making sure there are no burrs or rough edges to bearings. Care at this stage will pay dividends with a smooth running chassis. Add balance weights 54 front and 55 rear to driving wheels as photos. These are 'super glued' to the metal rim and can be reinforced on the rear with 2pack epoxy glue. Using a model filler such as Milliput one can fill behind the etched weights to simulate the cast weight of the prototype loco.

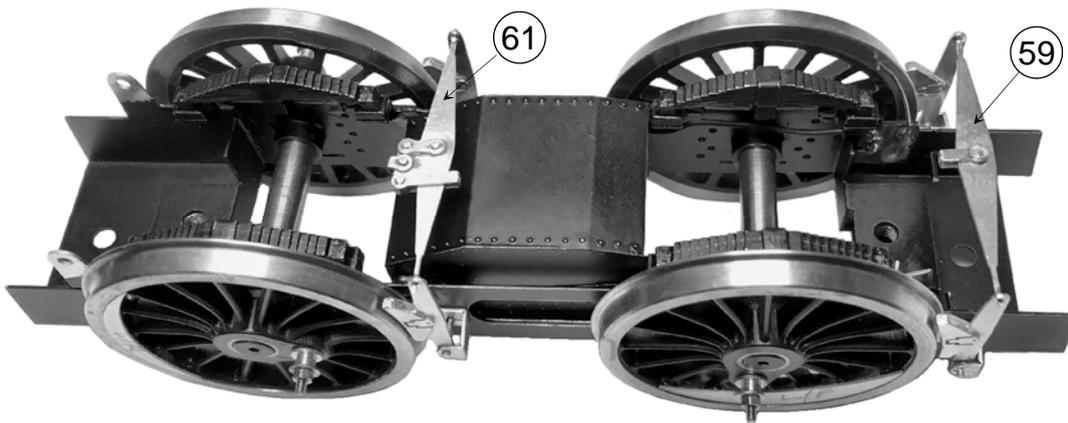


Add the driving wheels to the chassis, fit crankpins and open out the coupling rods to fit. Make any adjustments, when assembled the chassis should free wheel in either direction with no resistance. When happy disassemble, marking coupling rods left and right and the wheels L/F L/R etc so as to ensure the same items including crankpin bushes go back on the same wheels this will ensure the smooth running is retained. There can be slight variations in manufacture so do not mix up.

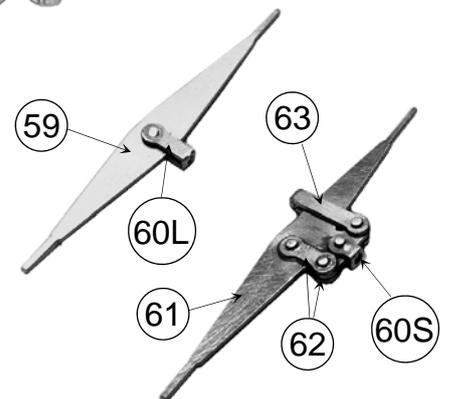
With the chassis disassembled add brake pivot rod using 0.9 brass rod these will be trimmed level with the edge of the driving wheels. Chassis photo shows Slater's sprung pickups fitted for the rear wheels that will be hidden behind the brake hangers. Due to the motor/gearbox the front pickups are pieces of double sided PCB soldered to the inside of the chassis frames with 0.45mm H/Hard brass wire pickup again hidden behind the front brake gear. A piece of PCB is secured to the inside of the ashpan and used as the pickup point for the motor and pick up leads.



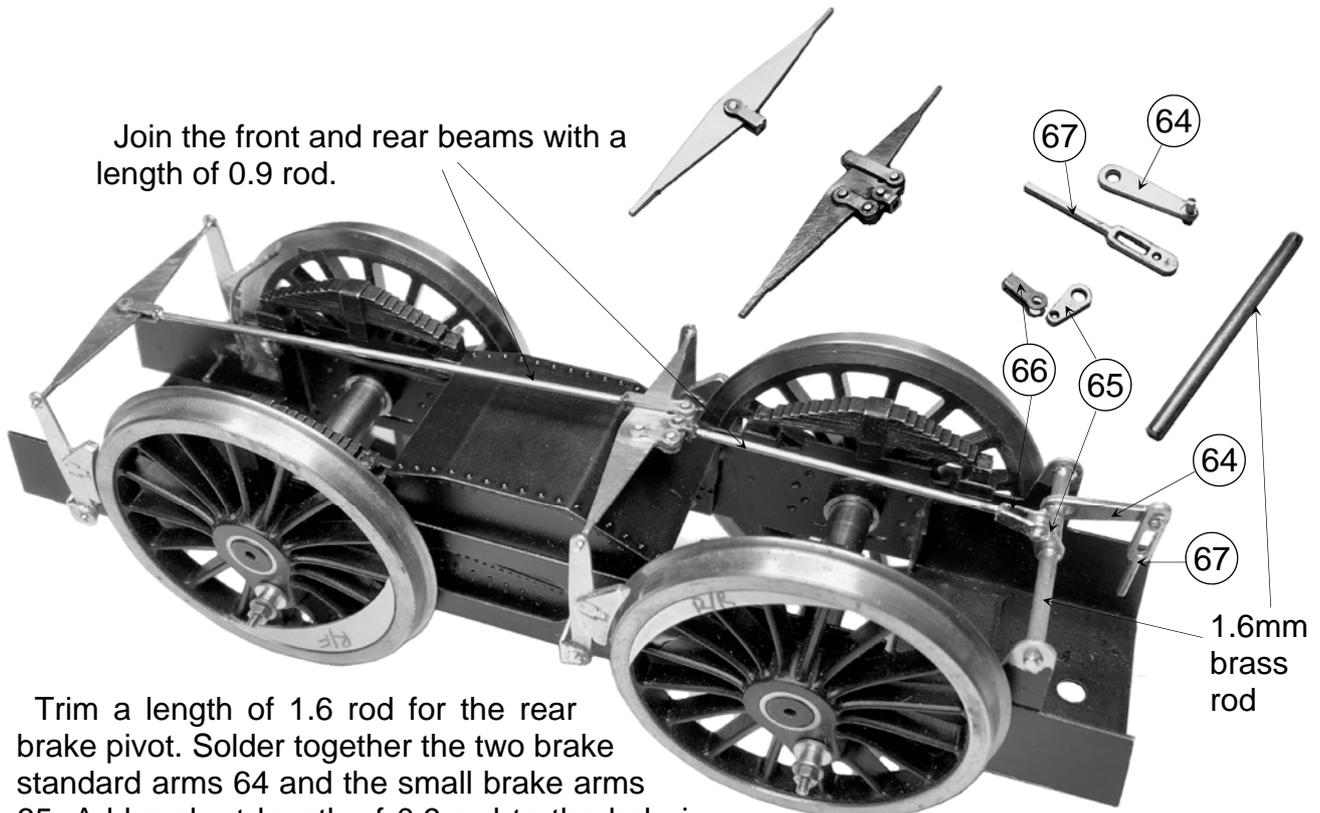
Assemble the four brake hangers 56 with brake shoes 57 on either side. Fold up the four hanger supports 58. Note these items are handed with the angle at the base. Position these on the brake rod with a brake hanger, soldering against the chassis frame with the hanger aligning with the driving wheels.



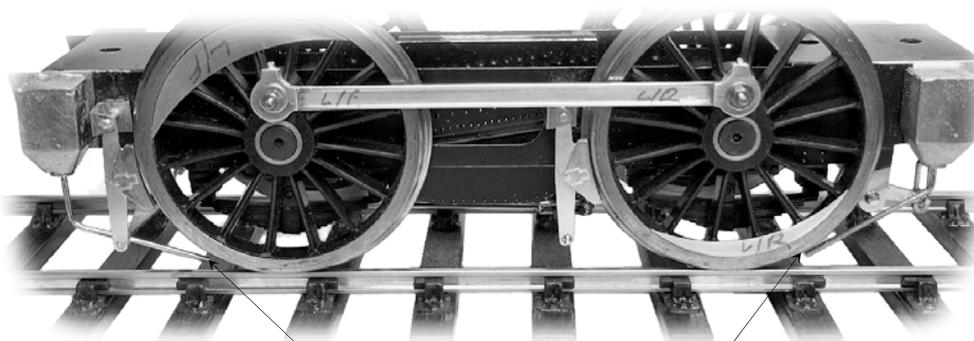
Take front brake crossbeam 59 and fold up link 60L (long) attaching with 0.9 brass rod. Repeat with the rear crossbeam 61 using two links 62 on top and bottom, fold up link 60S (short) in the centre and the large forward facing fold up link 63. This will need to be angled slightly to align with the front beam link. Fit the front and rear crossbeam assemblies to the brake hangers parallel to the chassis.



Join the front and rear beams with a length of 0.9 rod.



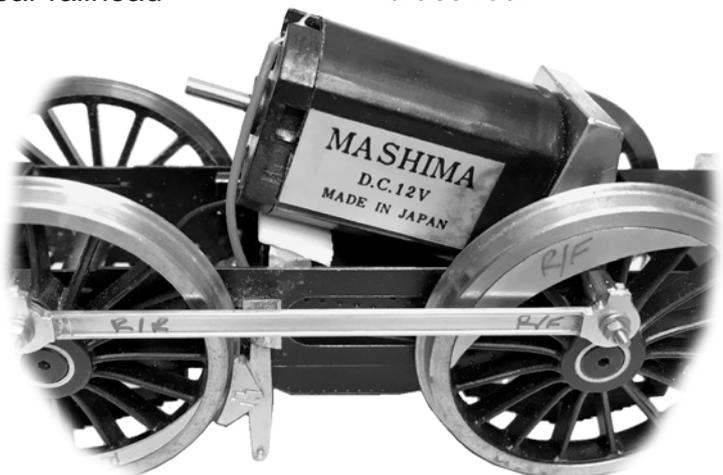
Trim a length of 1.6 rod for the rear brake pivot. Solder together the two brake standard arms 64 and the small brake arms 65. Add a short length of 0.9 rod to the hole in brake arm 64 this will be used to support the vertical brake adjuster. Thread the arms on to the 1.6 rod and solder rod to the chassis frames. Solder brake arm 65 aligning with the centre link on the rear crossbeam. Fold up link 66 and add to arm with 0.9 rod and using a further length of rod join link to the centre link of the rear crossbeam. Solder the two brake adjusters 67 together and fit to rod on the brake arm 64. Trim to clear rear bogie.



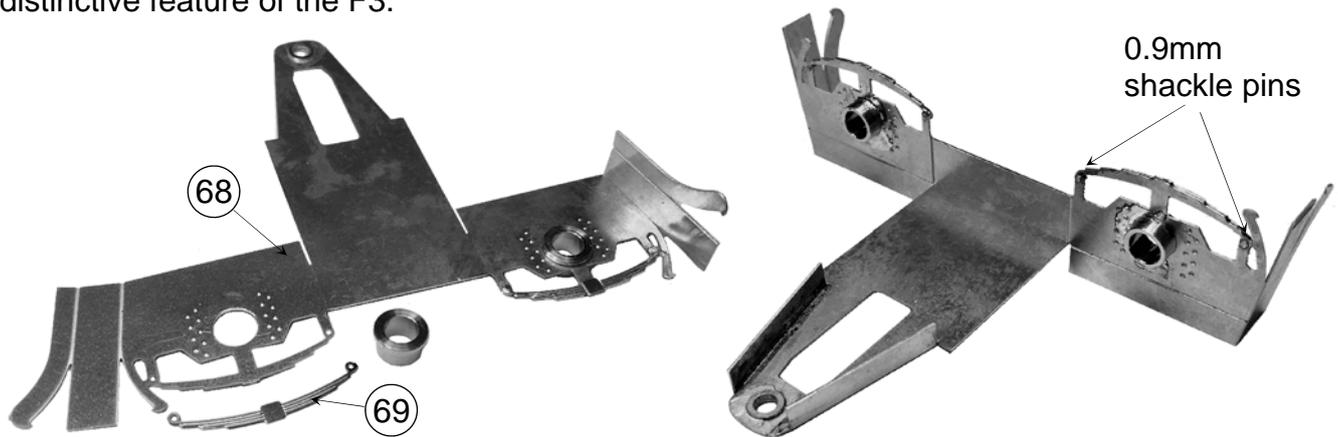
Trim sand pipe ends to clear railhead

All that remains to be added to the chassis are the four cast sandboxes, fit to the side frames aligning with the fillers on the footplate and the cab floor. Add the four sand pipes from 0.7 brass rod.

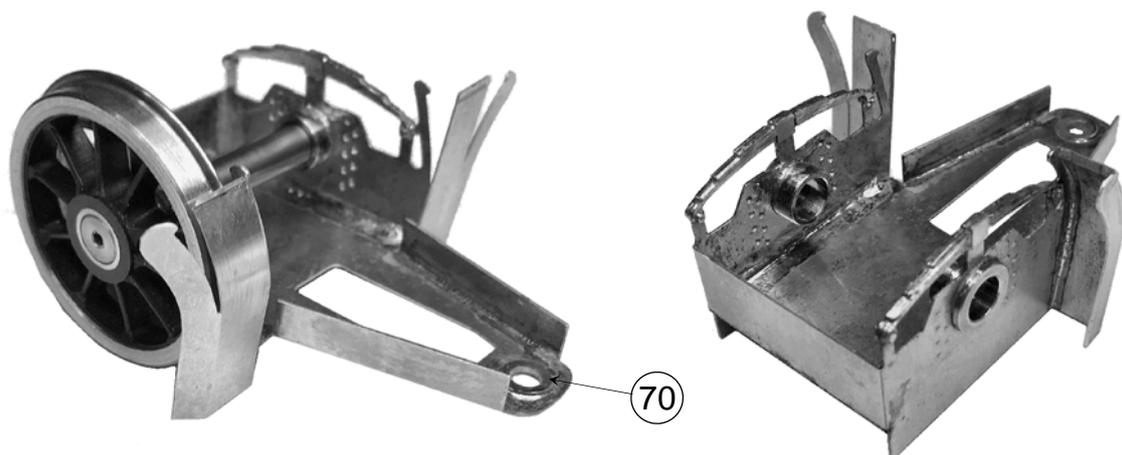
Reassemble chassis with motor gearbox refit coupling rods and take this opportunity to test run the chassis for a period of time in each direction. The motor can be supported by a length of scrap fret soldered across the top of the ash pan and secured with a double sided Sellotape sticky pad or similar.



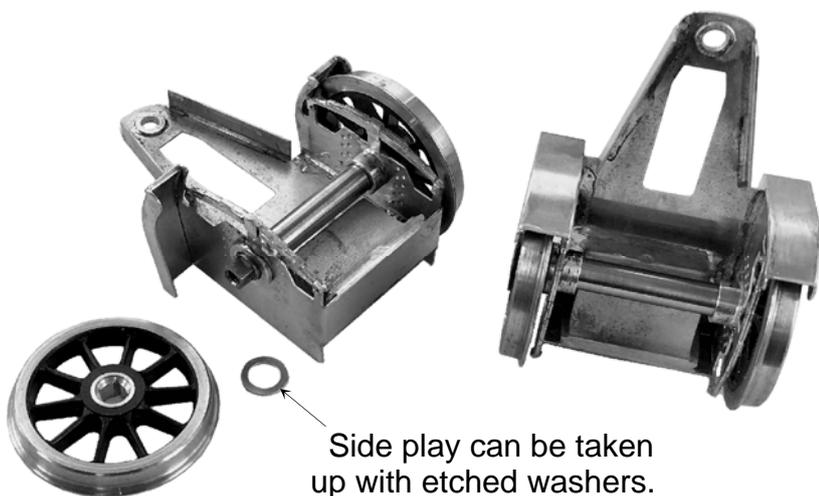
Although the prototype has rigid chassis frames with radial axles for the leading and trailing wheels this kit is a departure in that it includes a bogie at either end. This is to enable the locomotive to traverse curves and incorporate the close fitting wheel guards that are a distinctive feature of the F3.



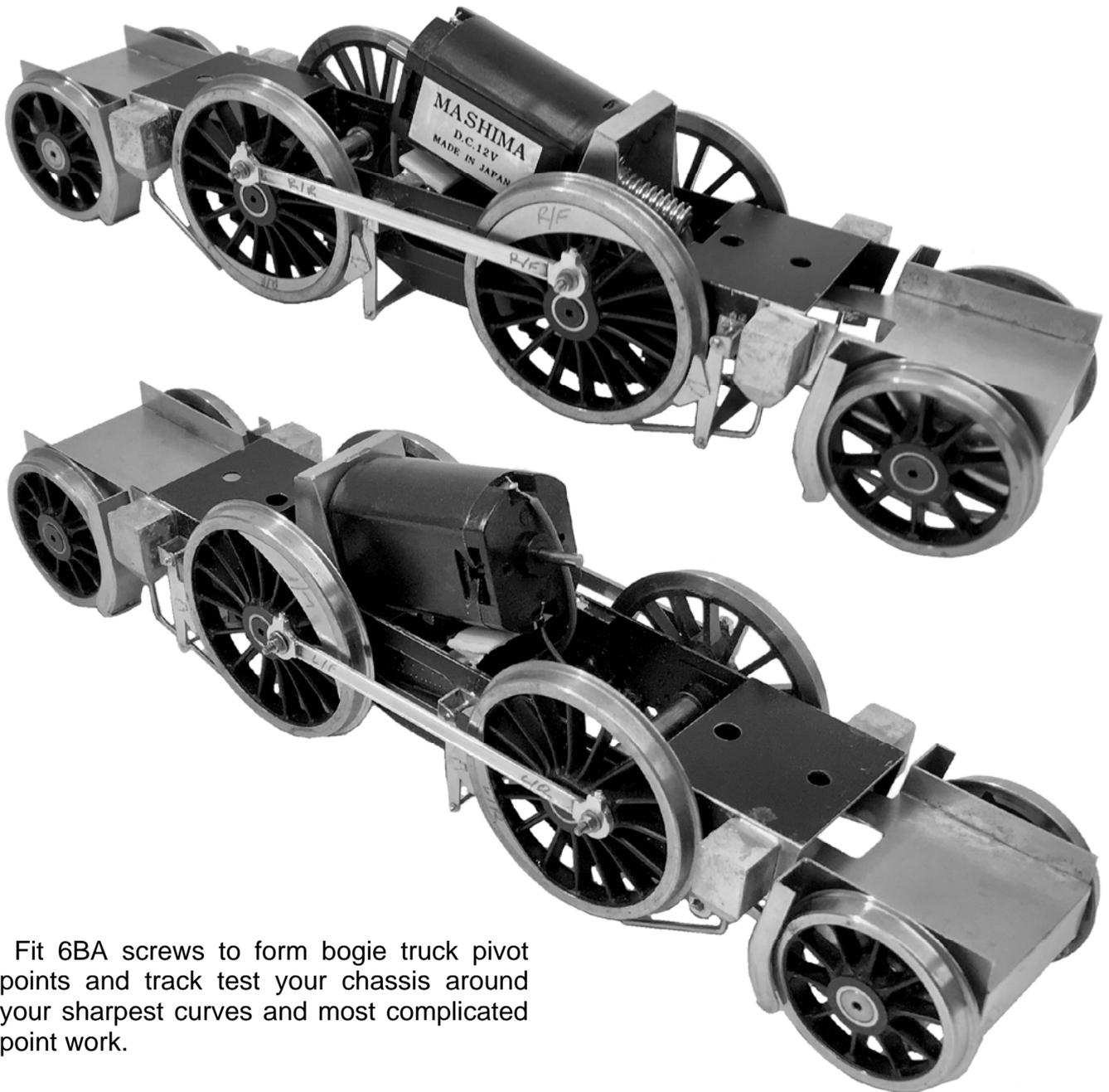
Take a bogie etch 68, they are both identical, and form the detail on reverse. Add nickel silver spring overlays 69 to the outside and shackle pin detail from 0.9 rod. Add the axle bearings. Fold up the guards at the first fold then fold down the front and fold round the sides. Tack solder in position. Fit the wheels and check for free running, reaming the bearings if necessary. Side play can be taken up with etched washers.



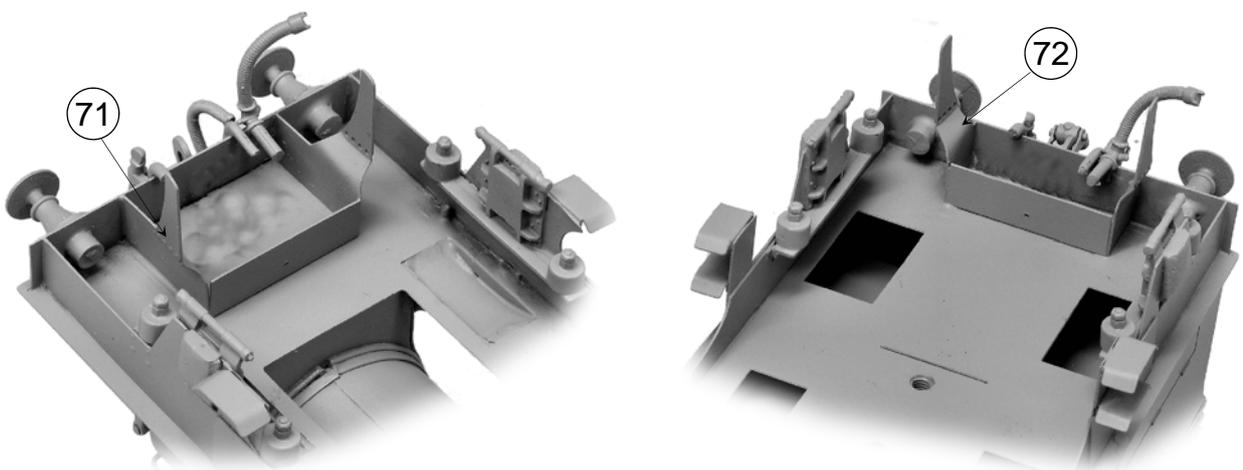
Complete the guards folding round the sides and forming the curve on the back. Fold the small kick up on the back and solder as one. Clean up and smooth off the edges. It can be found the wheels can still be removed by removing the fixing screw, holding the axle and jiggling the wheel off. Doing the same for the other side.



Finally to complete the bogie fold down the rear side supports and solder the nickel silver washers 70 either side of the pivot hole then add the cast weight. Repeat for the other bogie.



Fit 6BA screws to form bogie truck pivot points and track test your chassis around your sharpest curves and most complicated point work.



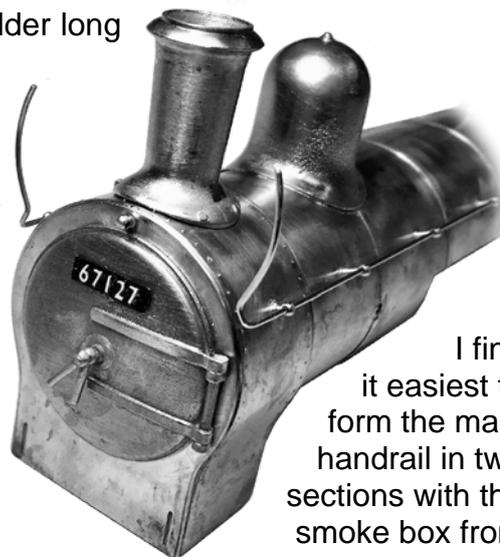
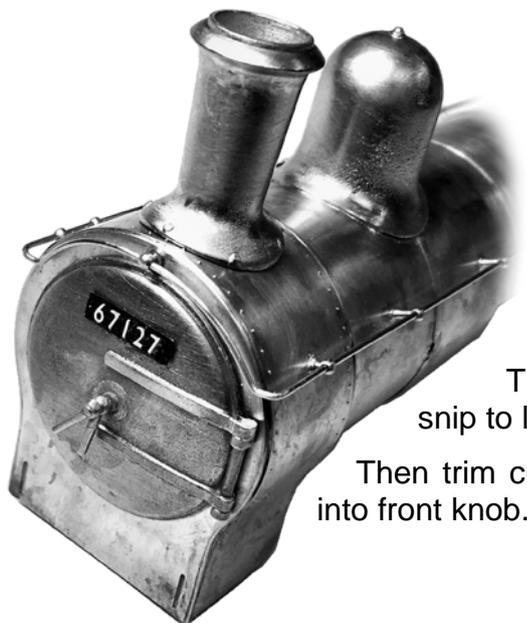
The front 71 and rear 72 frames can be folded up and soldered centrally to the underside of the footplate against the buffer beams. Fold the irons to align with the leading and trailing wheels.

COMPLETION. Returning to above the footplate the remaining brass items to fit are the handrails and the blower valve arm 73.

Use straight length of 0.7mm wire to position & solder long handrail knobs into boiler. and short into smokebox.

Withdraw wire and repeat for other side of boiler and smoke box.

Then fit short handrail knob into top of smoke box front.



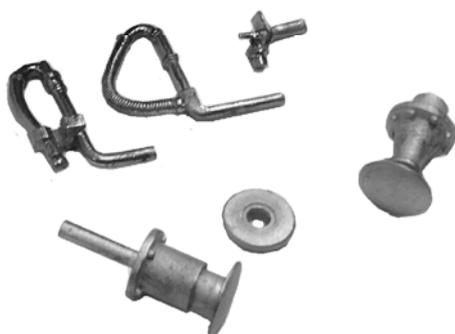
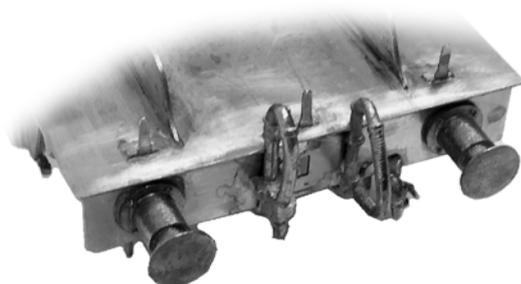
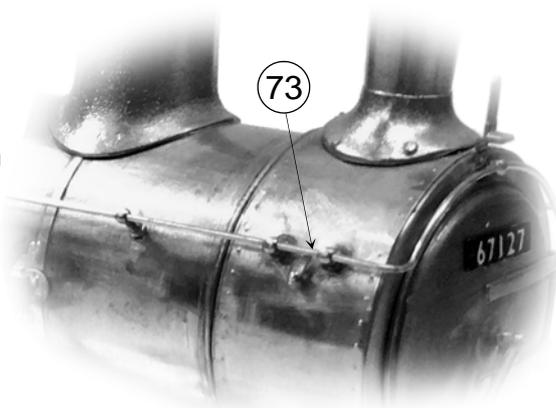
I find it easiest to form the main handrail in two sections with the smoke box front curves overlapping generously.

Then feed down through boiler handrail knobs and snip to length to butt up against cab front.

Then trim curved smoke box handrails to terminate part way into front knob. Then solder to join the two sections.

On the prototype loco a operating rod ran through the hollow handrail and located through a slot in the rear of the handrails central smoke box section into a pivoted operating lever.

To represent this fit end of blower arm 73 over wire peg and spot solder other end behind handrail



Add the Westinghouse pipe to the left of the coupling socket on the front bufferbeam with the vacuum pipe and steam heat pipe castings to the righthand side. File notches in the footplate to accommodate the fittings. On the steam heat fitting the pipe was often not fitted during the summer months so can be removed.

Published photographs show the majority of locos fitted with Great Eastern tapered buffers but there are plenty of examples fitted with parallel buffers with packing ring between body and buffer beam. In later years some locos may have had LNER group standard buffers fitted.

The pipe castings are similar on the rear bufferbeam. The remaining castings can be added in order of personal preference remembering to clip out the centre section in the smoke box front to accept the smoke box door casting. Most doors had the destination brackets 22 fitted.

Westinghouse pump pipework fabricated from 22swg Tinned Copper Wire.

Drill holes for wire in body before fitting pump

Sandbox fillers

Tank fillers

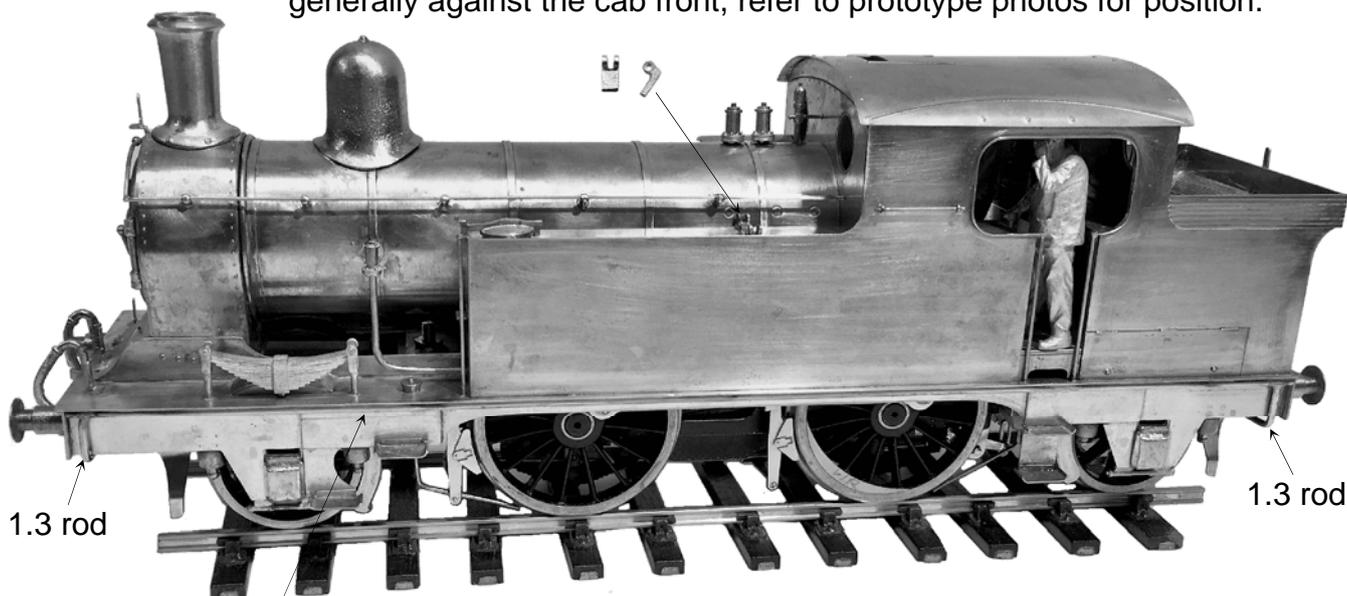
Coupling centres

Fit end of clack pipe into hole.

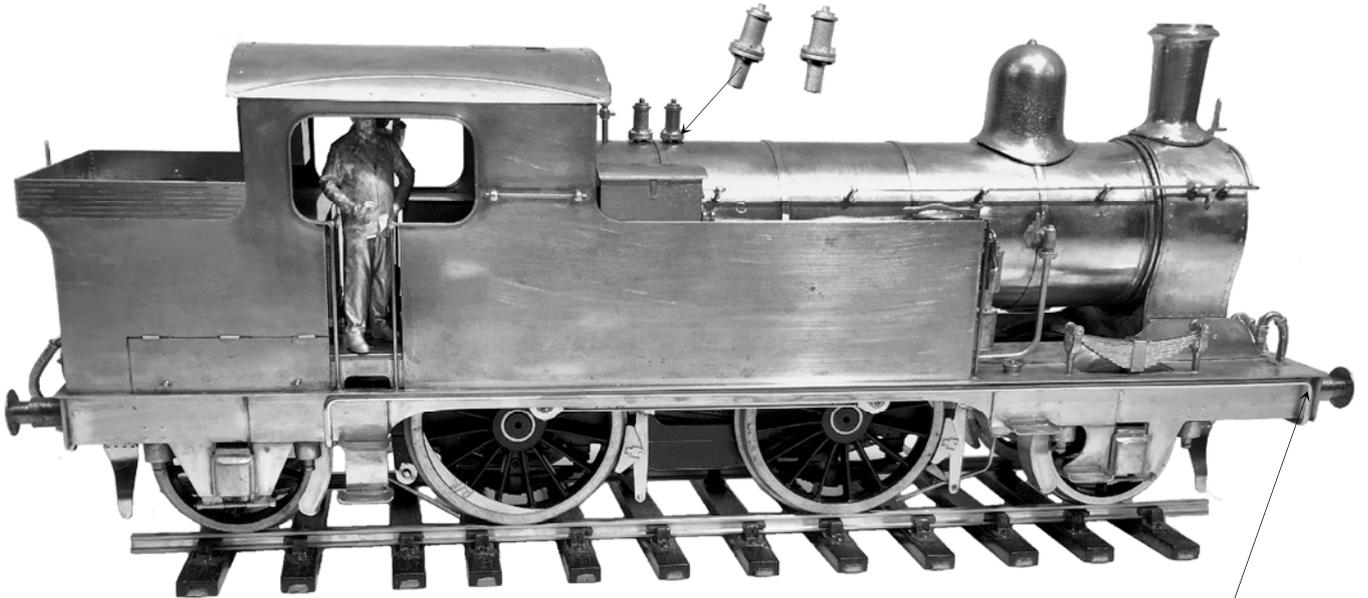
Clack pipes

The front cast springs only have full detail on one side and you have to file the base at the back to clear the splasher which are wider than the prototype to accommodate the bogie swing.

The cast side tank lifting shakles are fitted 48mm from the tank front. Where fitted the toolbox can be fitted to either of the side tanks generally against the cab front, refer to prototype photos for position.



Cut a length of 1.8 copper rod to act as the steam heat shroud and solder to the left hand valance under the footplate. Refer to prototype photos as in many cases it ran the full length. Then using 1.3 copper rod form a pipe run from the shroud to the steam heat fitting.



Referring to prototype photos do a similar thing on the righthand side using 1.3 rod. This runs from the vac pipe and up against the footplate and turning down behind the cab steps.



If using the early encased safety valve bonnet one will need the etched levers 74 soldered together.

Later most locos were fitted with flanged ross pop valves.

A few locos had unflanged ross pops fitted to the encased base. To achieve this cut top off casting and file top of base flat. then fit ross pop valves.



Encased Safety Valve on base

Detail and paint backhead separately then glue into finished and painted cab, sliding down between inner tanks. Then paint and glue into position the cab gauges (*otherwise they will prevent sliding backhead into position*).



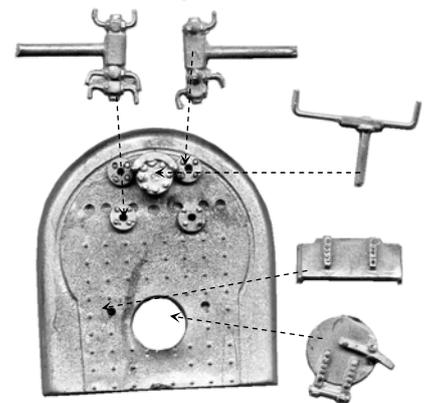
Reverser

Fit etched handwheel 17. Then paint reverser mechanism and glue into position.



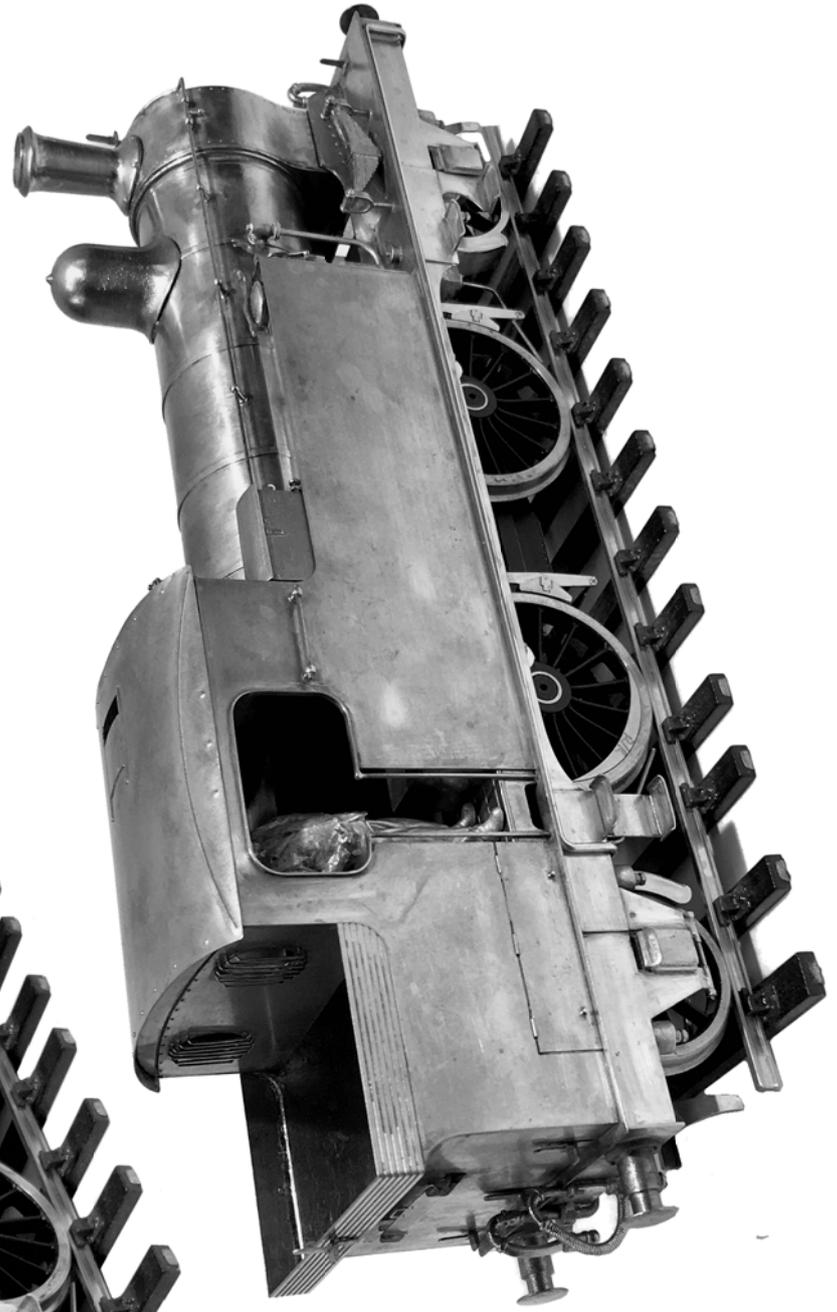
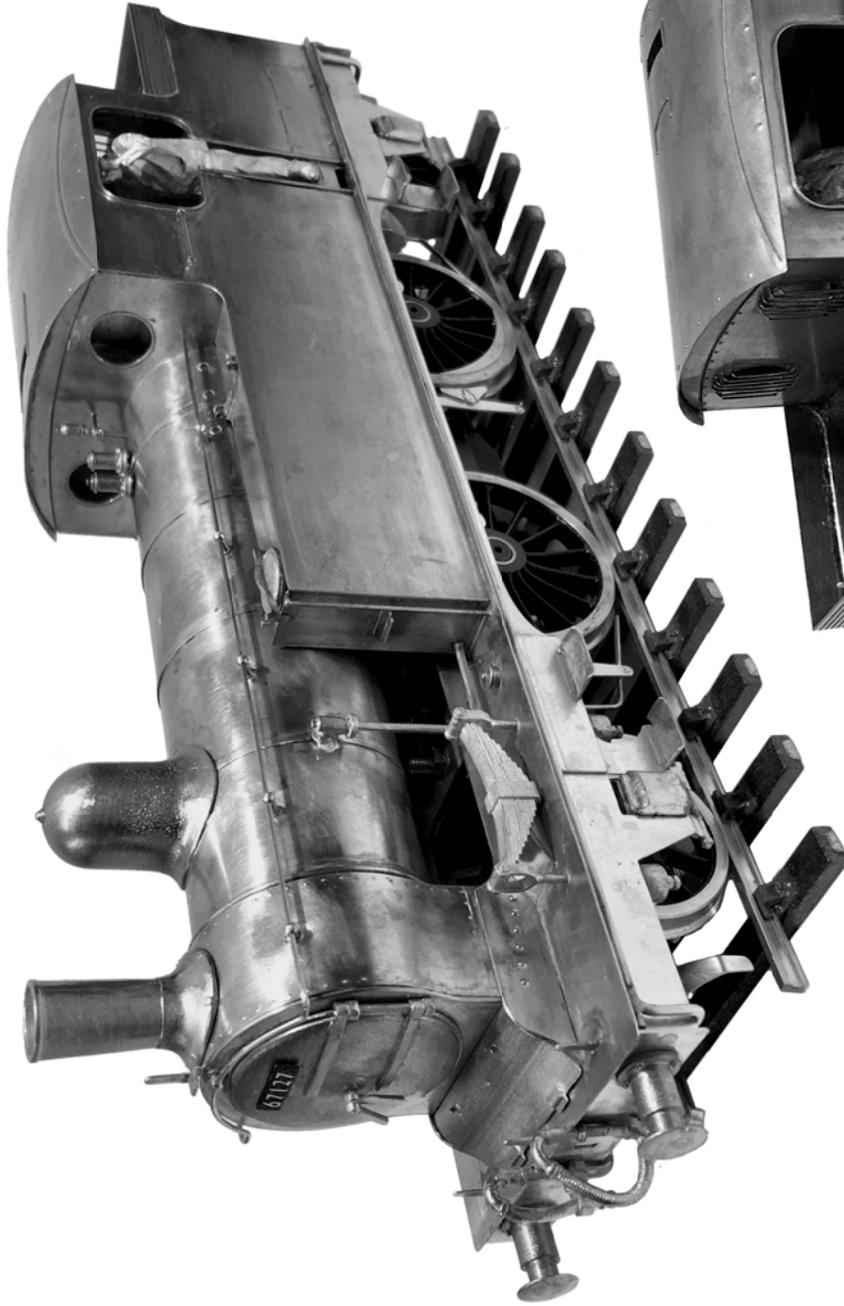
Cab Gauges L & S X 2

Original only a single L/H water gauge was fitted



An alternative etched regulator is also provided (*stock etch also with some useful hand wheels*).

**Great Eastern Railway
Class C32
Passenger Tank
for
Fast Stopping Trains**



**LNER Class F3
2-4-2 Radial Tank**