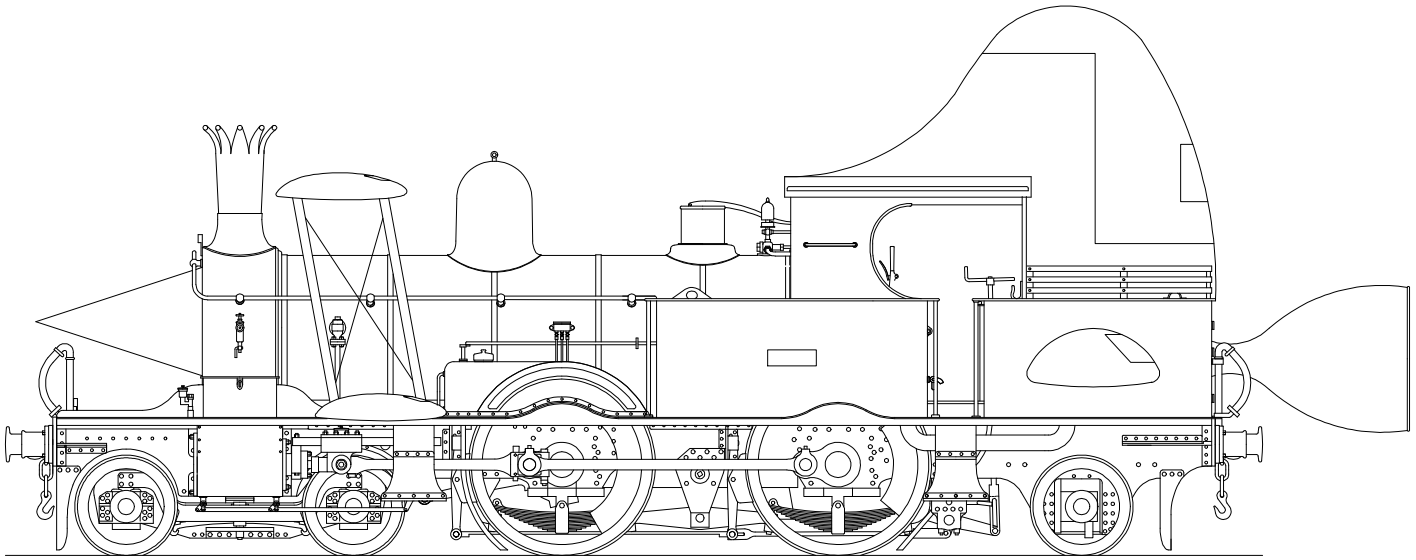
Finney7

LSWR ADAMS RADIAL



CAUTION.

This product contains etched parts with very sharp edges and castings that may contain lead. Neither the Manufacturer, Distributor or Retailer can accept any liability for illness, injury or consequential damage caused when handling or building this product.

Read any instructions before assembly. Do not eat or drink whilst handling. Wash hands after use.

Finney7 LLP is a limited liability partnership registered in England and Wales with registered number OC421263 whose registered office is at The Malt House, Mortimer Hill, Cleobury Mortimer, Worcestershire, DY14 8QQ

BRIEF HISTORICAL DETAILS

The locomotives, which form the subject of this kit, were to the design of William Adams for the LSWR. They were a development of his '46' class of 1878. A total of 71 locomotives were built by four outside builders as follows:

Numbers	Built	Maker	Tanks	Blower Valve	Dome	Trailing Wheels	Tank Front
415-426	8-10/1882	Beyer, Peacock	Short	Left	Small	3'0"	Low
45/7-57, 427-32	10-12/1883	R. Stephenson	Short	Left	Small	3'0"	Low
169-71/73, 490-5	11-12/1884	Dubs & Co	Short	Left	Small	3'0"	Low
479-489	2-3/1885	Neilson & Co	Long	Right	Large	3'0"	High
516-525	11-12/1885	Dubs & Co	Long	Right	Large	3'6"	High
68,77/8,82 104/6/7/25/6/9	6-10/1885	R. Stephenson	Long	Right	Small	3'6"	High

Note: 68,77/8 were renumbered 58-60 in 3/1889,6/1890 and 8/1890.

Note: 125 and 520 became Southern Railway 3125 and 3520 in 11/1933 and 12/1934.

Note: After a chequered career 488 was renumbered Southern Railway 3488 in 11/1946.

Note: At Nationalisation these three were renumbered again as follows:

SR No.	BR No.	Date
3125	30582	3/1949
3488	30583	10/1949
3520	30584	4/1948

For a detailed history of this numerous class we suggest you refer to the following definitive books by the late D.L.Bradley:

The Locomotives of the LSWR, Part II published by the RCTS

LSWR Locomotives - The Adams Classes published by Wild Swan

Other valuable sources of information and photographs are:

A Pictorial Record of Southern Locomotives - J.H.Russell - OPC

Locomotives Illustrated No. 59 – LSWR Outside-cylinder Tank Locomotives - Ian Allan

Southern Steam Locomotive Survey - The Adams Classes - Bradford Barton

There is a review of building this kit by Chris Wesson in MRJ 126 and 127.

With such a large number of locomotives, built by four different builders, and lasting in service for over seventy five years, there are considerable variations between individual engines. Many of these have been covered by including alternative components in the kit, however it is essential to have a photograph of the individual locomotive you propose to construct to enable an authentic model to be built. We have drawn up GAs to represent the form of the locomotives from each builder; the construction drawings are rather more generic to represent for example a steel roof or a wooden roof.

VARIATIONS POSSIBLE WITH THE KIT

Rivets. In traditional Beyer, Peacock style the first ten engines were built using snap head rivets. The remaining engines were all built using mainly flush rivets on the running plate and upper works.

Tank length. The first 28 locomotives had very short side tanks. Subsequent locomotives had longer tanks of increased capacity.

Blower valve. The position of the blower valve, as shown in the table, varied depending on the builder. Late survivors had the blower valve moved, in Drummond style, to the side of the smokebox with the operating rod inside the handrail, which was lengthened for the purpose.

Dome. Domes were of two sizes as shown in the table.

Trailing wheels. The last twenty engines had the trailing wheel diameter increased to 3' 6".

Tank front. On some engines the top edge of the tank front was flush with the tank top. On others the front was extended to the same height as the tank sides with the beading carried round over the tank front.

Chimney. When built the locomotives had Adams stove pipe chimneys. These were replaced by Drummond from February 1901 with his distinctive design.

Slidebars. From circa 1907 numbers 47,52,57,125,129,415,419 and 520 were fitted with double slidebars.

Splashers. The splashers of the Beyer, Peacock engines were adorned with that makers builders plates. The splashers of the other engines had a wide beading in a circular arc.

Front frames. The Neilson & Co. engines had front frames to a profile different from the remainder. The frames of numbers 125 and 520 were replaced by the Southern Railway during an extensive rebuilding at Eastleigh during 1930. The new frames were to a new profile at the front.

Cab cut-out. The Neilson & Co. engines had a different cab side cut out to the remainder.

Boiler handrail. The position of the boiler handrail knobs depended on the builder. The boiler handrail on the Beyer, Peacock engines was attached with distinctive brackets.

Tank lifting Brackets. In SR days lifting brackets were fitted to the top of each tank.

Coal Rails. Three bunker coal rails were fitted from circa 1900. Later still the coal rails were backed by metal sheeting to stop the loss of small coal.

Cab rear windows. After the fitting of coal rails most engines were fitted with bars of either wood or metal over the rear cab windows. Some of the later survivors were subsequently fitted with smaller windows.

Water filler. As the coal rail and rear window changes took place so the height of the water filler increased to allow more coal to be carried.

Cab roof. The original cab roofs were wooden. From circa 1900 they were replaced, by Drummond, with steel roofs.

Safety chains. When built the engines were fitted with safety chains. These were gradually removed during Drummond's time.

Steam heating. From circa 1901 carriage heating steam pipes were fitted.

Lamp brackets. The locomotives were built with Adams' socket style brackets. Drummond added new brackets of his design over the buffers at the front and rear and above the coupling hook at the rear. The SR standardised on a design with the socket in the lamp and the later survivors were gradually fitted with new brackets of standard design.

Smokeboxes. When smokeboxes were renewed by the Southern Railway, the flush riveting was often replaced by visible snap head rivets.

Couplings. The engines in their early years ran with a single, long coupling link often with a separate screw coupling hanging from the draw hook. Later the locomotives were equipped with screw couplings together with a hook to carry the coupling when it was not required.

VARIATIONS NOT POSSIBLE WITH THE KIT.

New Adams boilers. From 1895 seven new boilers were built and fitted to Nos. 57,170,483, 486,490,492 and 517. With these new boilers came new cabs with round lookout windows.

Drummond boilers. In 1907 two new boilers of Drummond pattern with dome top safety valves were built and fitted initially to 486 and 520, eventually seeing service on four locos. This variant is the subject of an alternative kit from Finney7.

CHASSIS OVERVIEW

Note that many of the components for both chassis and body are handed left/right and care must be taken to ensure the correct component is used. Components are not always identified left/right separately but with care and common sense no problems should arise.

Before construction can commence you have to decide which particular chassis you are going to construct. The options are:

Gauge.

For Finescale, where little sideplay is required, the widest spacers can be used but they will need careful filing to make their width 25.7 mm. If you require your engine to negotiate sharp curves then the middle width spacers should be used.

The widest frame spacers supplied are suitable for Scaleseven and care will be needed to allow sufficient sideplay, especially in the leading axle to enable the model to negotiate moderate curves.

Suspension.

Rigid. The kit is supplied with top hat bearings to build a rigid chassis. Open out the main axle holes to accept top hat bushes and solder them in place.

Sprung. If you are going to fit sprung horn blocks, you should open out the frame slots by cutting up the half etched lines and follow the manufacturers instructions.

Compensated. The simplest and most reliable suspension system is beam compensation and the necessary compensation beams are provided in the kit. Not provided are the hornblocks and bearings which are available as an extra item which includes instructions for aligning the hornblocks accurately.

Pickups. No pickup material is provided. The options are:

Scrapers. Attached to the middle frame spacer using printed circuit board.

Plunger. Mark out and drill suitable holes and fit according to the manufacturer's instructions. If you are opting for working inside motion the plunger pickups must be positioned so that they will not foul the inside motion.

Split axle/frame. We leave this to you! Some useful information can be found at http://www.euramonline.co.uk/tips/splitaxle/splitaxle.htm.

COMPONENTS NOT SUPPLIED

Wheels.

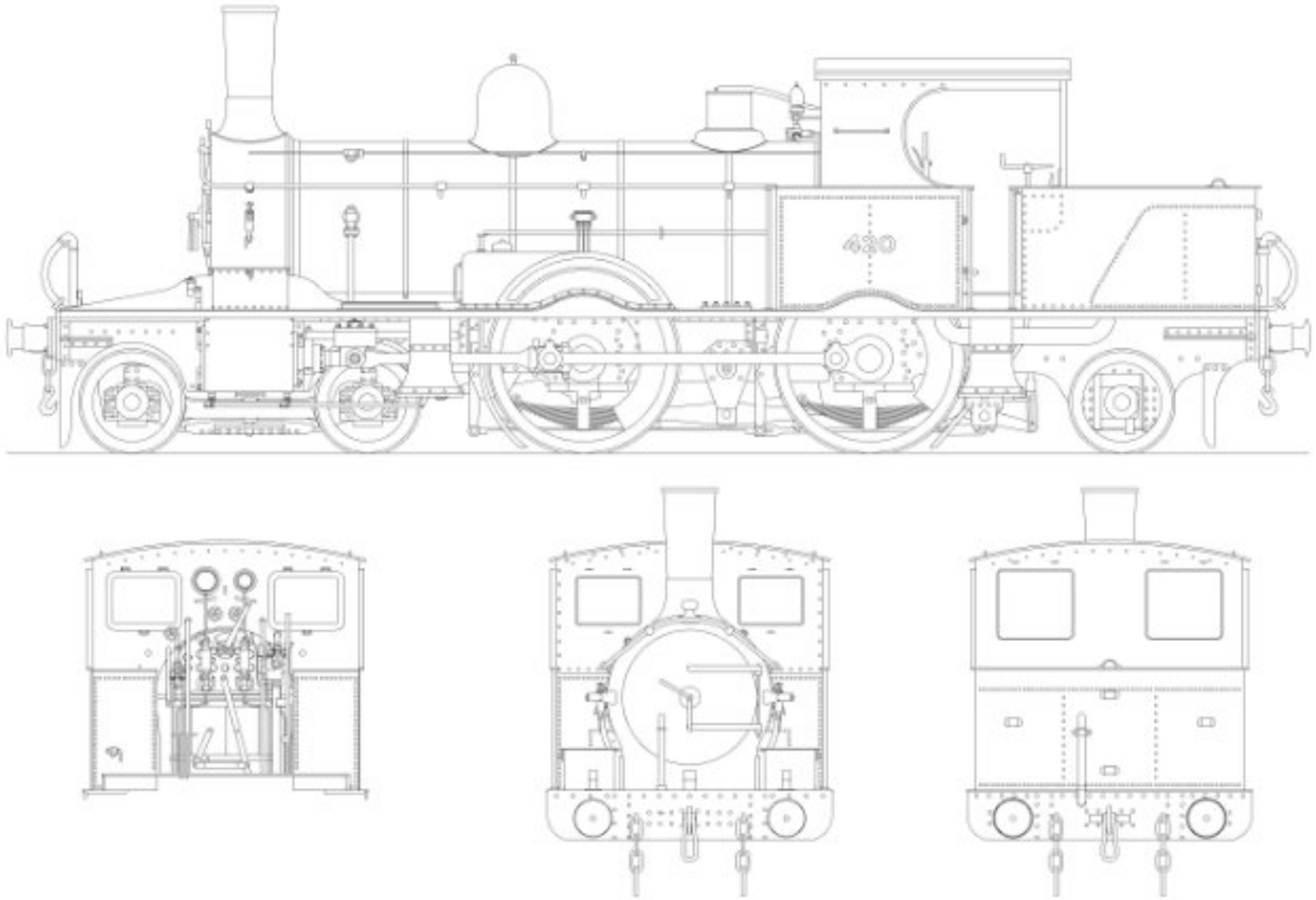
Driving wheels	5'7"diameter, 18 Spokes (2)	Slater's Ref. 7867S
Bogie Wheel	3'0" diameter, 9 spoke (2)	Slater's Ref. 7836ARMF
Trailing wheel	3'0" diameter, 9 spokes (1)	Slater's Ref. 7836ARMF
	or 3'6" diameter, 10 spokes (1)	Slater's Ref. 7842ARMF

Motor/Gearbox. A Canon 1833 motor is recommended with either an SDMP 40L/15 gearbox available from Finney 7.

Bogie Pivot. There are alternatives for the position of the bogie pivot. The choice made will largely determine the radius of curve the locomotive will negotiate.

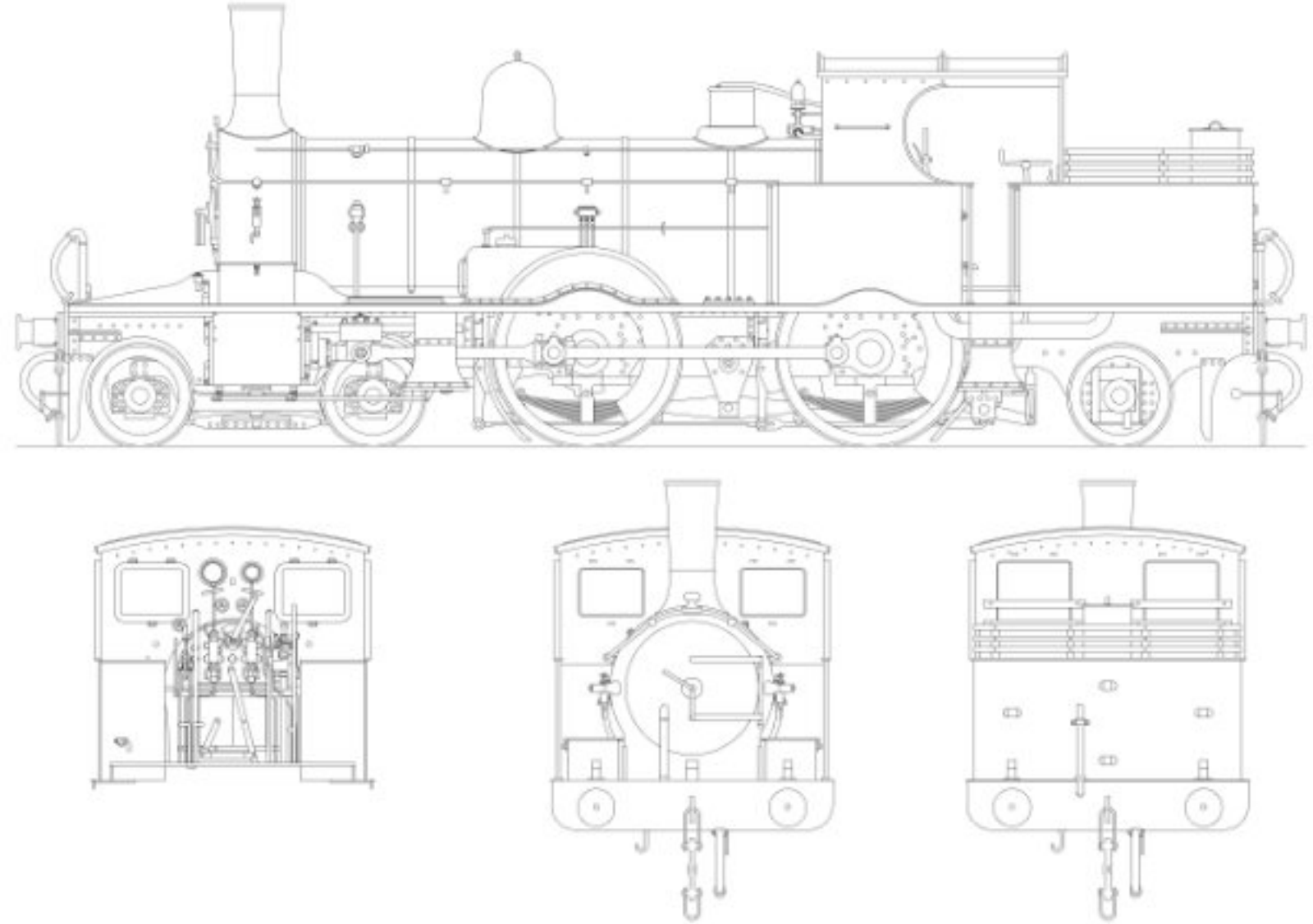
Inside motion. A separate kit is available to construct the working inside motion.

BEYER PEACOCK BUILT LOCOMOTIVE



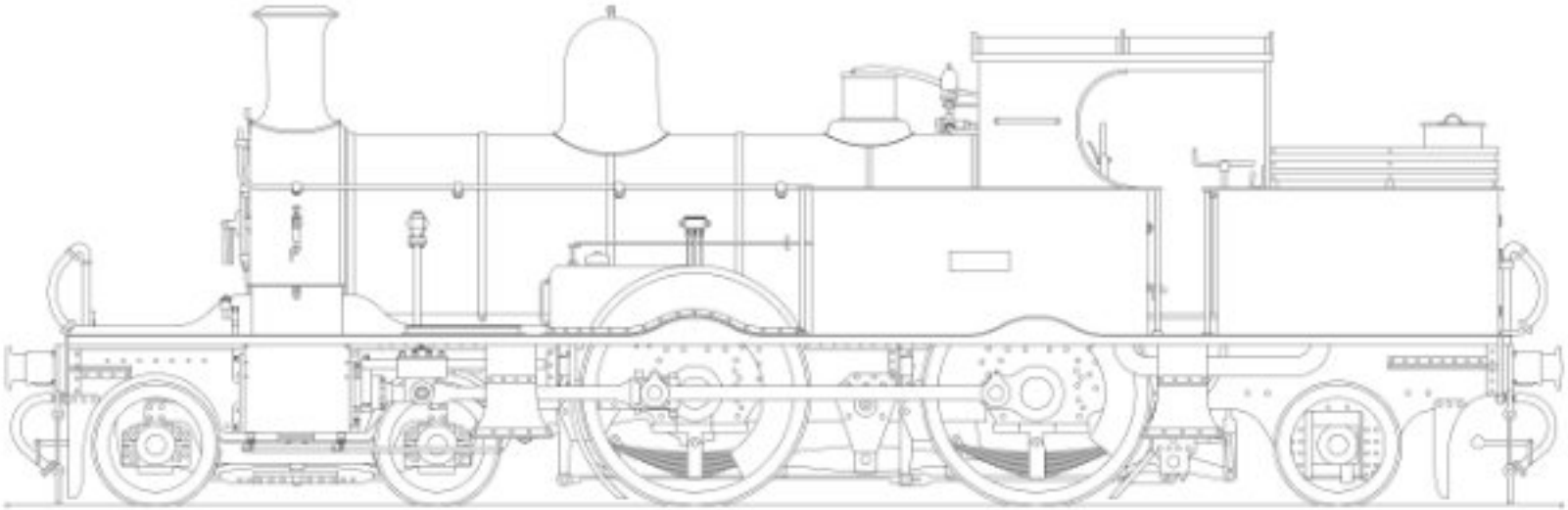
Nos. 415-426. Depicted as built with short tanks, blower valve on the left, small dome, low tank front, 3'0" trailing wheels, snap head rivets, Beyer Peacock splasher fronts, Adams chimney, low water filler, large rear windows, wooden roof, Adams lamp irons

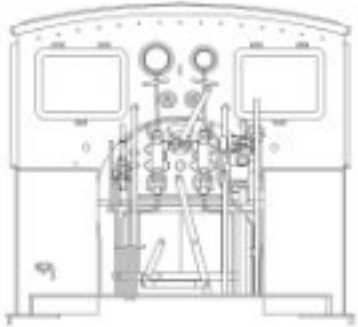
ROBERT STEPHENSON & CO. BUILT LOCOMOTIVE

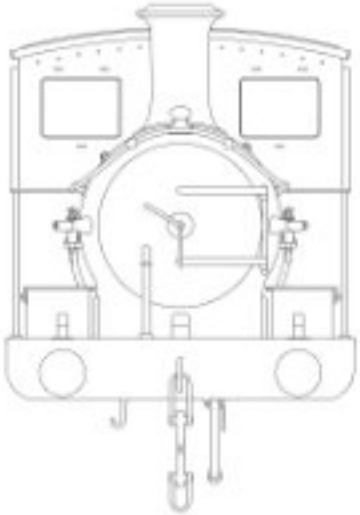


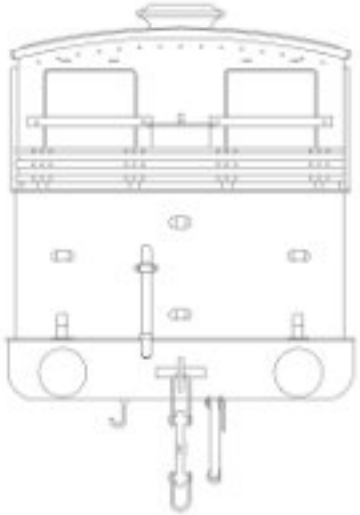
45/7-57, 427-32. Depicted with short tanks, blower valve left, small dome, low tank front, 3'0" trailing wheels, plain splasher fronts, Adams chimney, 3 coal rail bunker, large rear windows with wooden bars, steel roof, Adams & Drummond lamp irons

DUBS & CO. BUILT LOCOMOTIVE



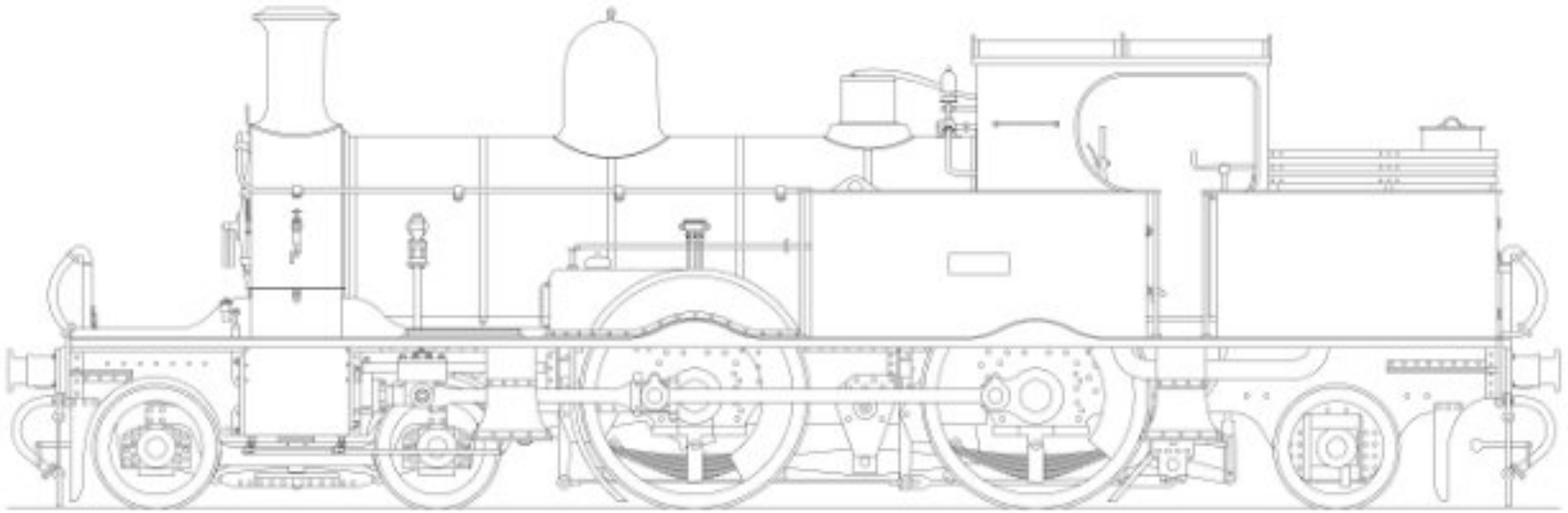


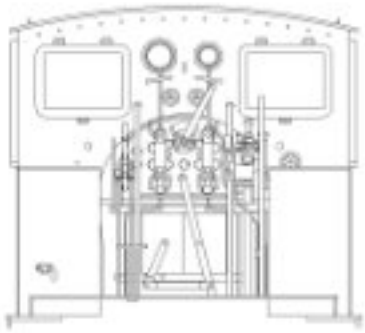


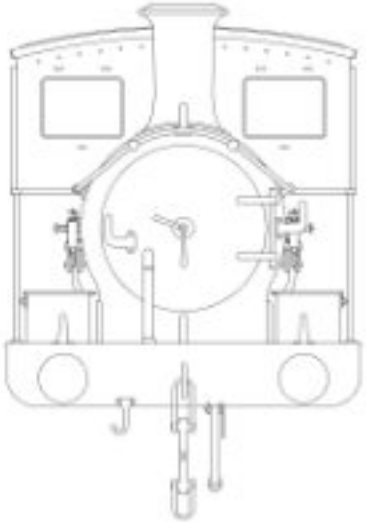


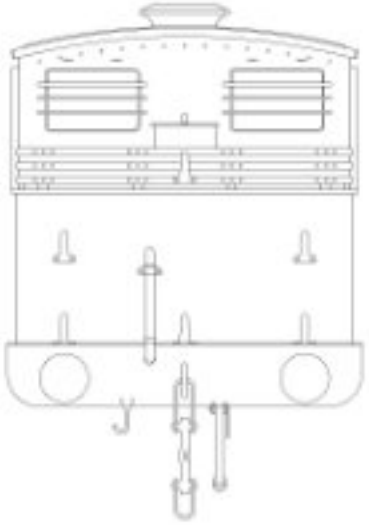
169-71/73, 490-5, 516-525. Depicted with long tanks, blower valve right, large dome, high tank front, 3'0" trailing wheels (516-525 3'6" wheels), plain splasher fronts, Drummond chimney, Sheeted 3 coal rail bunker, large rear windows with wooden bars, steel roof, Adams & Drummond lamp irons, vacuum brakes, steam heating

NEILSON & CO. BUILT LOCOMOTIVE









479-489. Depicted with long tanks, blower valve right, large dome, high tank front, 3'0" trailing wheels, plain splasher fronts, Drummond chimney, sheeted 3 coal rail bunker, small rear windows with steel bars, steel roof, SR lamp irons, vacuum brakes, steam heating

COUPLING RODS & FRAMES

Part Numbers and Etch Numbers. These are all displayed in the text as part number/etch number as in (B1/1). Parts on this page are on Etch 2 unless detailed.

Coupling Rods. The coupling rods should now be made up so that we can use them as a jig for fitting the front hornblocks accurately in place. Each rod is made up from an inner lamination (M14/2) and an outer lamination (M15/2). First drill out all the crankpin holes to a convenient size which is undersize for the crankpins. Remove all burrs caused by the drilling. Now drill the same drill into a suitable small block of wood and leave the drill in the wood with its shank projecting. This projecting shank is used as a mandrel to accurately align the two laminations of each rod.

Place the inner and outer laminations over the mandrel and using plenty of solder and flux solder the two laminations together. You should now have a rod with the bosses on each lamination perfectly aligned. The rods have been deliberately etched too large so that the thin etched edges can be carefully filed so that the 'laminated' effect is lost and the rods appear to be made from one piece of metal. The crankpin holes now need carefully opening out until they just fit, with no free play, the ends of the hornblock alignment jigs.

Frame Preparation. Having decided which chassis to construct, you can now start construction by preparing the frames (F1/1 & F2/1). First open out all the holes in the frames to their correct size and emboss all the frame rivets.

C for compensation beam pivot - 1/16”

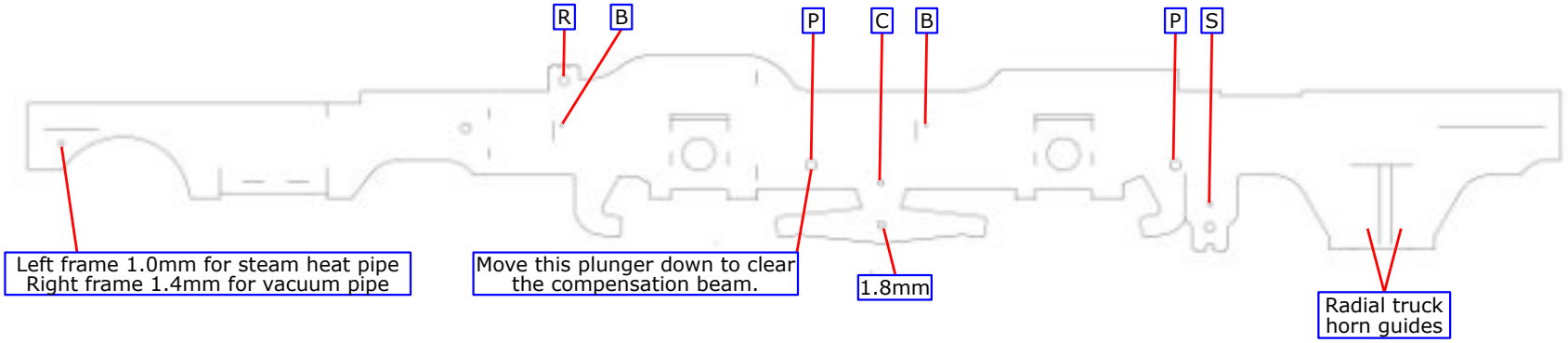
B for brake hanger pivots - 0.8 mm

S for rear brake cross shaft - 2.0 mm

R for reverse weigh shaft - 2.0 mm

P as required for plunger pick-ups.

To construct the kit as designed with a compensated chassis remove all the axle holes as described above. Solder one of the rear hornblocks (F17/4) to the inside of the frame aligning it with the half etched lines and with the bottom of the frame. Form the frame joggle to narrow the frames at the rear. Make the first bend inwards through 10° along the front half etched line and strengthen the bend with a fillet of solder. Then make the second bend outwards in the same way. Fold in the radial truck horn guides.



FRAME ASSEMBLY

Parts on this page are on Etch 1 unless detailed.

Select the frame stretchers - front (F3), bogie pivot (F4), motion plate (F5), ash pan (F6) & rear (F7) to suit your chosen gauge. Fold up the stretchers making sure the 1/2 etched fold lines are on the inside and that each bend is a right angle. Check that all tabs on the spacers fit properly in their corresponding chassis slots so that the rest of the spacer is hard up against the inside of the frames. If you are fitting the inside valve gear, file back the tabs on the motion plate (F5) to slightly less than half their width. This will make the valve gear removable by springing this stretcher into position in the frame slots.

Now assemble the frames and spacers. Tack solder the ash pan stretcher to both sides. Check that everything is square and that the spacers are hard against the frames. If all is well solder the bogie pivot and rear stretcher to the frames checking constantly that the chassis is square and the frames are straight. If you are not fitting the valve gear solder the motion plate in place.

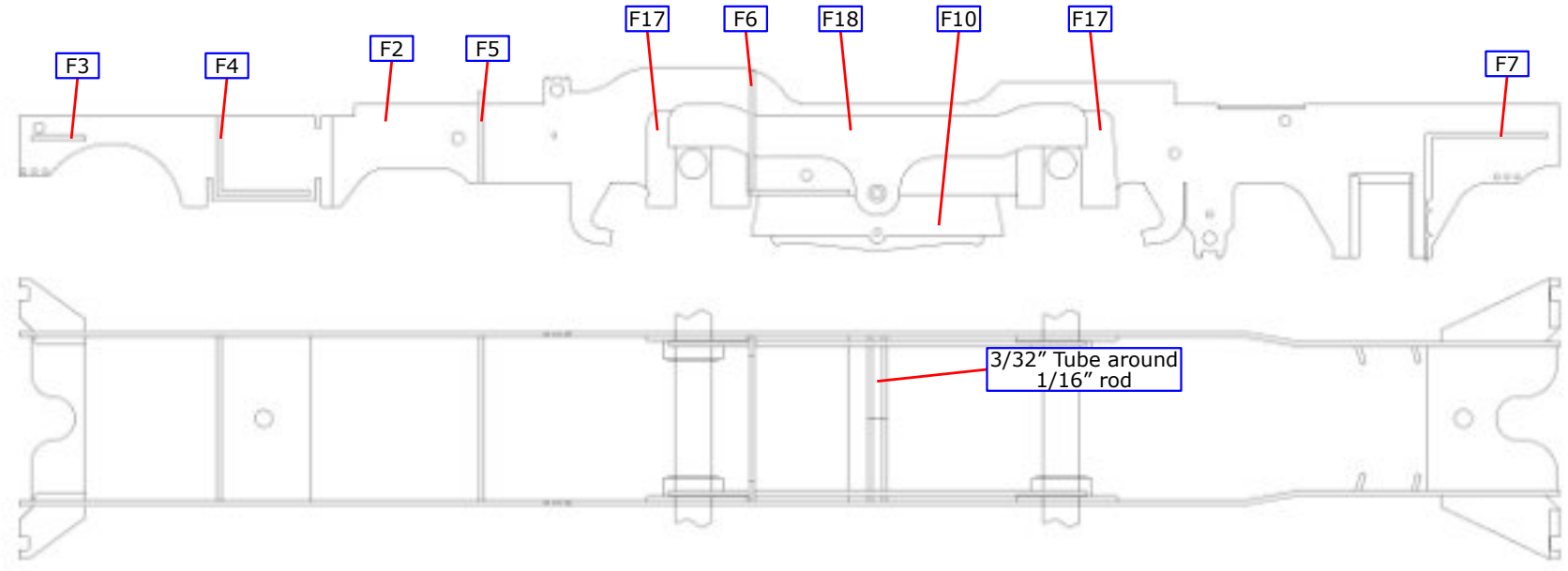
Hornblocks. Prepare the remaining bearings and hornblocks (F17). Place a bearing into the rear hornblock that is already soldered to the frame. Slide the second rear hornblock and bearing for the rear axle over a long piece of 3/16" rod with a spring between the bearings. Carefully compress the spring and clip the hornblock between the frames. Make sure the hornblock is square to the chassis and that its bottom edge aligns with the lower edge of the frames and that the long rod is at right angles to the frame before soldering the second hornblock in place.

Fit the two front hornblocks using a stepped hornblock alignment jig and spring in the same manner as for the rear hornblock. Slide the coupling rods onto the jig to give the correct spacing to the axle centres. Make sure the hornblock is square to the chassis and that it's bottom edge aligns with the lower edge of the frames.

Fitting the Compensation Beams. Cut a piece of 1/16" brass rod so that it fits through the frame holes and is flush with the outside face of the chassis frames. Cut two equal pieces of 3/32" tube which together fit between the frames and solder the compensation beams (F18) to them close to one end of the tube.

Temporarily fit the beams and the driving wheels and axles and confirm that the compensation works properly and check that the chassis is sitting level. The bogie rests on a suitable selection of the bogie pivot washers (B10/5). When correctly set up the top of the frames, above the beam pivot, should be 29.2 mm above rail level.

Fit the ashpan sides (F10/3).



FRAME CONSTRUCTION 1

Parts on this page are on Etch 5 unless detailed.

Frame Overlays. Emboss all the rivets on the frame overlays (F8 & F9). Fold down the sand-pipe brackets. Fold over the equalising beam bearings (fold line on outside) and profile as shown below.

Thread through the frame holes but do not solder in place lengths of 0.8 mm wire for the brake hanger pivots. These then serve to accurately locate the overlays, which only need tack soldering around their edges.

Solder the front frame stretcher (F3/1) to the frames and form the guard irons to shape.

For 3' 6" trailing wheels increase the height of the radial truck slot in the frame overlays, to the height of the slot in the frames.

Chassis Details. Make up the main springs by laminating two spring outers (F23/2) around a spring inner (F24/2). Solder into place on the spring mountings.

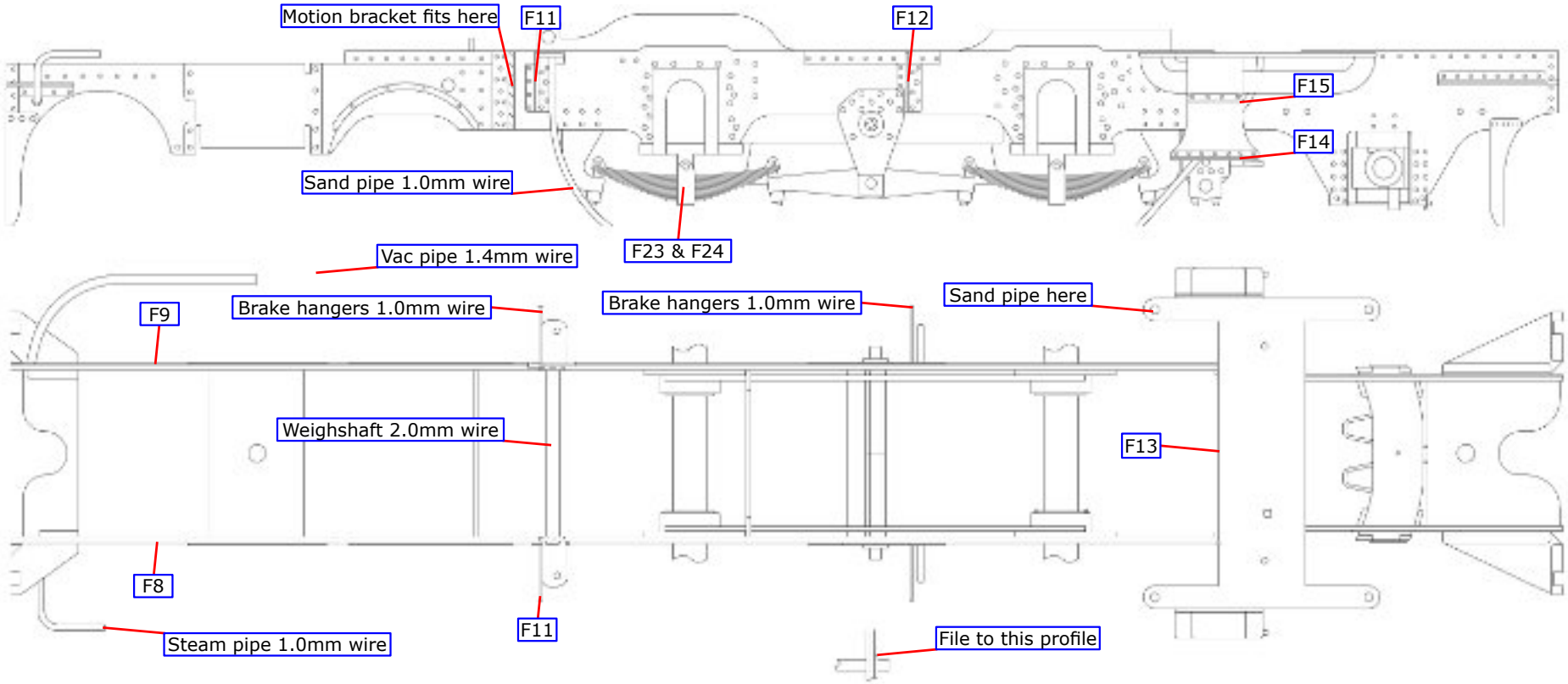
Make up the cab steps by folding down the step backs on the rear step back(F13/3).

Fold up the step spacer (F13/3) and the solder the rear step upper tread (F15/3) and lower tread (F14) onto the step back part of the spacer. Solder the step spacer into position on the frames. Fold up the rear step stays (F16) and solder into position between the step back and the frames.

Solder the brake hanger bracket front and rear (F11 & F12/3) in place as shown. Fit the sandpipes from 1.0 mm wire into the positions indicated on the drawing.

The pivot for the equalising beam is made from a length of 1.8 mm wire which also threads through the matching holes in the ash pan side (F10/4). The front of the ash pan locates into the slots in the ash pan frame spacer (see P9) solder the ash pans in place and then solder the 1.8 mm wire into place.

Assemble balance pipes and injector overflow pipes as shown below. Complete the chassis detailing by fitting the reverse weigh shaft from 2.0 mm wire as shown below the sand pipes from 1.0 mm wire, the vacuum pipe and if appropriate the steam heating pipe.



BOGIE

Parts on this page are on Etch 1 unless detailed.

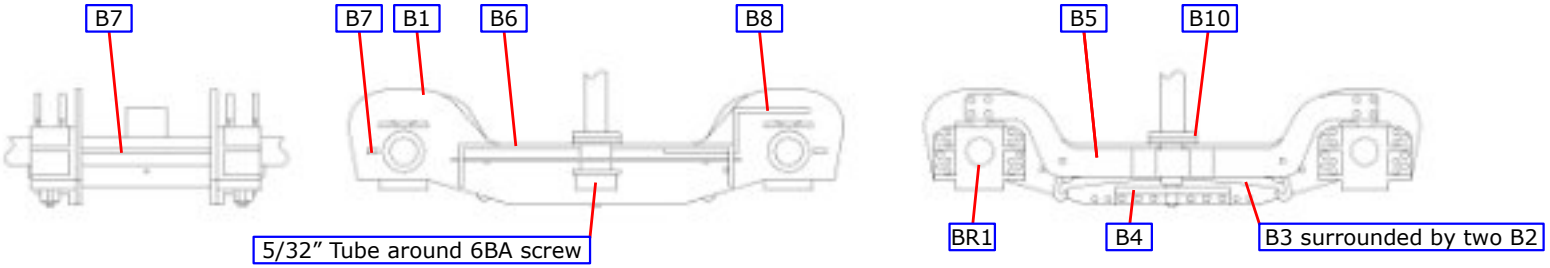
The bogie carries the weight of the front of the locomotive and is the third balance point of the compensation system.

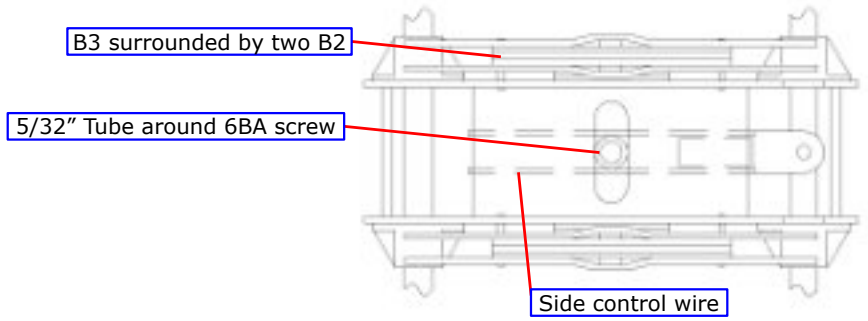
Emboss the bogie frame rivets (B1/1). Fold up the bogie stretcher (B6/3), use the middle width for O Finescale or the widest for Scaleseven, and solder in place in the slots in the frames. Note the slot for the pivot bracket must be at the back. Fold up the pivot bracket (B8/5) and solder in place. Solder the axle boxes (BR1) in place and the stretcher bars (B7/1). Carefully ream the axle holes to 5/32" diameter and temporarily fit the wheels to check that the bogie is running true.

Using the spring middle lamination (B3/2) as a guide, drill two 0.8 mm holes into a block of wood or Tufnol and insert 0.8mm wire into the holes. These pieces of wire are used as a jig to accurately align the spring outer laminations (B2/2),the spring middle lamination and the equalising beams (B5/1).

Fold over through 180° the outer strips on the spring outer laminations (fold line on outside) before assembling all the components on the jig. Align carefully before soldering together. Trim the wire pins to length leaving the wire long at the back to enable the assembly to be located on the bogie through the holes in the frames. Emboss the rivets on the spring brackets (B4/1), fold up and solder in place locating it over the frame rivets. Add a piece of 1/16” wire to represent the fixing bolt. Repeat for the other side!

The side control springing can now be constructed as shown below, soldering the spring wires at one end only. Make up the bogie mounting screw as shown in the plan drawing. The 5/32” tubing is 3.1 mm long.

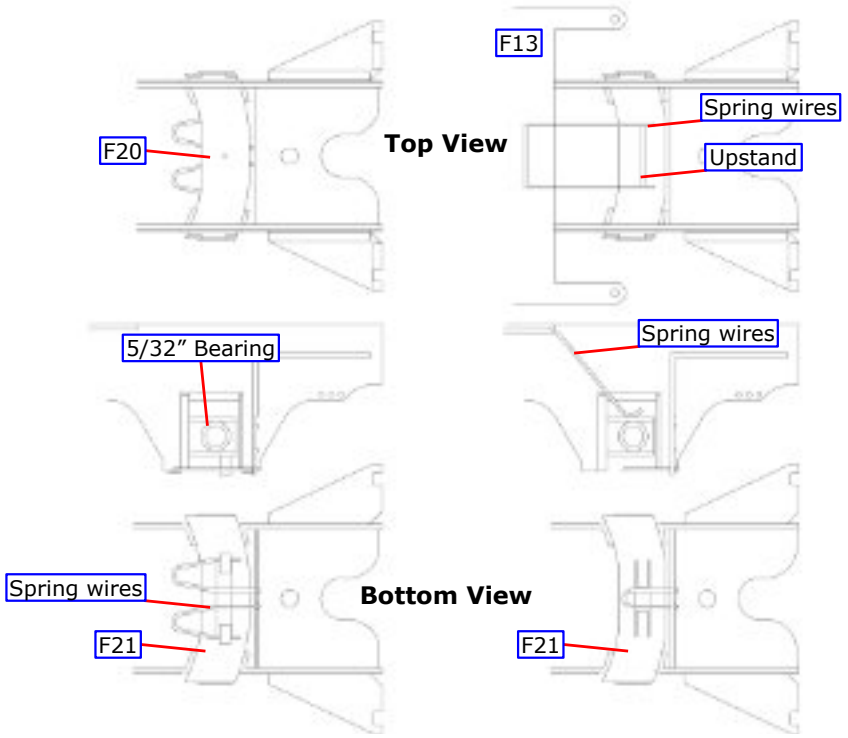




RADIAL TRUCK

Original Springing. For the radial truck use the widest components for S7 or the middle width components for Finescale. The top will need to be trimmed to fit.

Fold up the spring wire brackets on the radial truck bottom (F21/1), fold up the ends and attach the radial truck top (F20/1). Check for free, but not sloppy, movement in the hornguides. Solder the small top hat bearings in place and fit the radial truck wheels using the radial truck axle washers (F22/5) to eliminate any side play. Later the radial truck is retained with the spring wire to give some downward pressure.

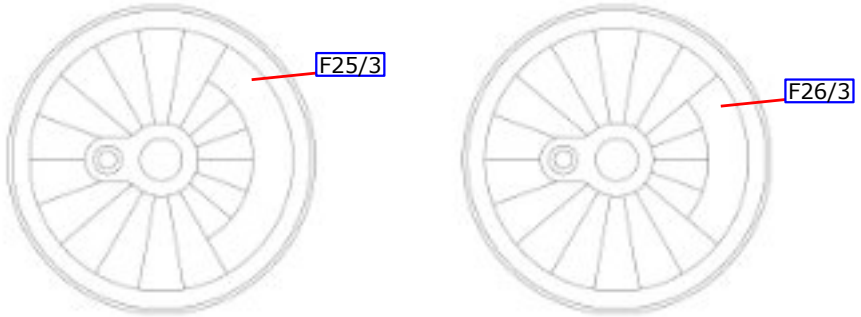


Original **Simplified**

Simplified Springing. For the radial truck use the widest components for S7 or the middle width components for Finescale. The top will need to be trimmed to fit.

Fold up the ends of the radial truck bottom (F21/1) and attach the radial truck top (F20/1). Check for free, but not sloppy, movement in the hornguides. Make the upstand from a piece of scrap etch 10 mm by 5 mm and solder to the upper surface of the radial truck upper. Fold up the spring to match the drawing below and solder to the underside of the rear step spacer. Solder the small top hat bearings in place and fit the radial truck wheels using the radial truck axle washers (F22/5) to eliminate any side play. Later the radial truck is retained with a loop of wire.

Attach the balance weights to the wheels as shown in the drawing. Prepare and fit the crankpins to the manufacturers instructions.



Leading Axle **Trailing Axle**

CYLINDER ASSEMBLY DOUBLE SLIDEBARS

Modify the crosshead and piston rod (NS5) by cutting where indicated below. Assemble the piston rod & crosshead as shown using the crosshead slipper (M8/2), the crosshead front (M9/1) and the crosshead rear (M10/1).

Solder together the connecting rod laminations (M12/2) and add the rod boss overlays (M13/2) to the big end back and front. Drill the big end to fit the crankpins and the small end 1.6 mm. Attach the connecting rod to the crosshead using the cast cross head pin(NS7); there are small end washers (M11/1) to reduce end float.

Check all the holes in the cylinder etch (M1/1) against the appropriate components and open up the holes if necessary. Reduce, as appropriate, the width of the inside cylinder faces to the etched lines provided. Fold up the cylinders making sure they are square and fold out the bogie pivot bracket. Check that the cylinders are a good fit in the slots in the frames. Solder the front cylinder cover (NS1) in place. Solder the rear cylinder cover (NS2) and the upper slidebar and piston rod gland casting (NS3) in place in the hole in the rear face of the cylinders. Accurate alignment is essential. Bend the cylinder wrappers (M2/3) to match the cylinder etch and solder in place.

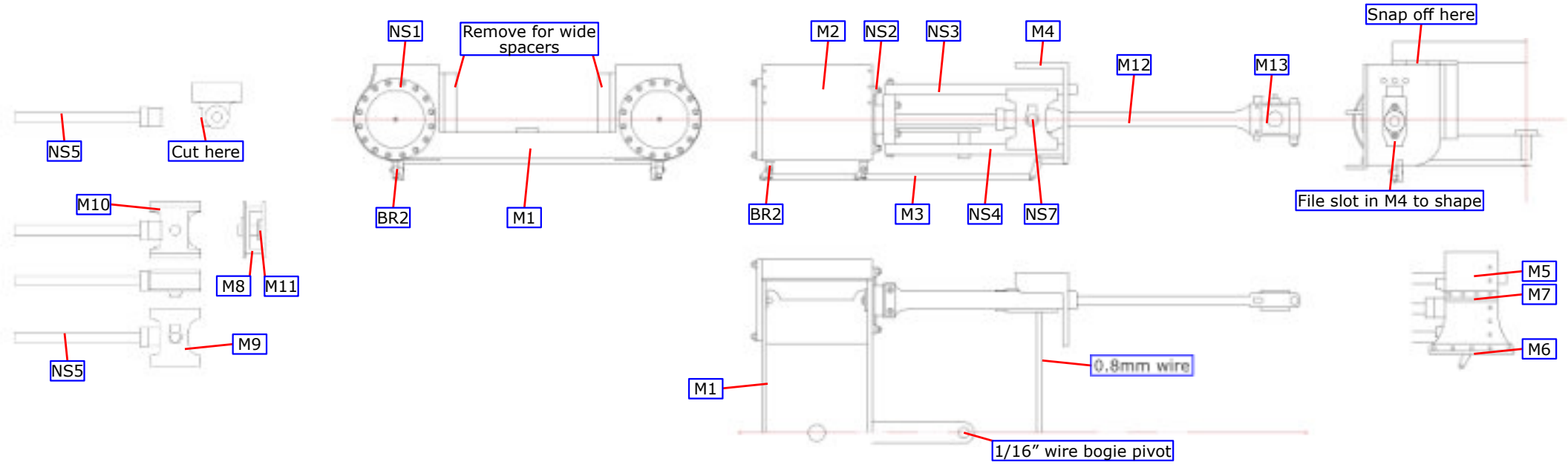
Open up the slide bar locating holes in the upper slidebar and piston rod gland casting (NS3) to 0.6 mm and check that the small pins on the lower slide bars (NS4) locate correctly.

If required, reduce the width of the inside faces of the motion bracket (M4/1). Fold down the step support brackets. Re-profile the slots in the motion bracket as shown in the drawing below.

Temporarily fit the wheels and bogie to the chassis, bolt the cylinders in place and fit the crosshead/connecting rod. Locate the motion bracket on the slidebars and over the frames as shown. Check all alignments before soldering the slidebars to the motion bracket. Solder the lower slidebars in place.

Solder the front step back (M5/5) to the motion bracket. Solder upper (M7/3)and lower (M6/5) treads onto the front step back. Carefully snap off the upper section of the motion bracket as shown.

Solder the cylinder drain cocks (BR2) into place in the cylinders. Fit the the two cylinder drain cock linkages (M3/1) onto the drain cocks and into the slot in the motion bracket. Connect them with the 0.8 mm wire for the drain cock operating rod between the two drain cock linkages.



CYLINDER ASSEMBLY SINGLE SLIDE BARS

Solder together the connecting rod laminations (M12/2) and add the rod boss overlays (M13/2) to the big end back and front. Drill the big end to fit the crankpins and the small end 1.6 mm. Attach the connecting rod to the crosshead (NS5) using the cast cross head/connecting rod pin(NS7); there are small end washers (M11/1) to reduce end float.

Check all the holes in the cylinder etch (M1/1) against the appropriate components and open up the holes if necessary. Reduce, as appropriate, the width of the inside cylinder faces to the etched lines provided. Fold up the cylinders making sure they are square and fold out the bogie pivot bracket. Check that the cylinders are a good fit in the slots in the frames.

Modify the upper slidebar and piston rod gland casting (NS3) as shown. Check the fit of the crosshead/piston rod (NS5) with the gland casting. When satisfied solder the single slidebar crosshead top (NS6) in place.

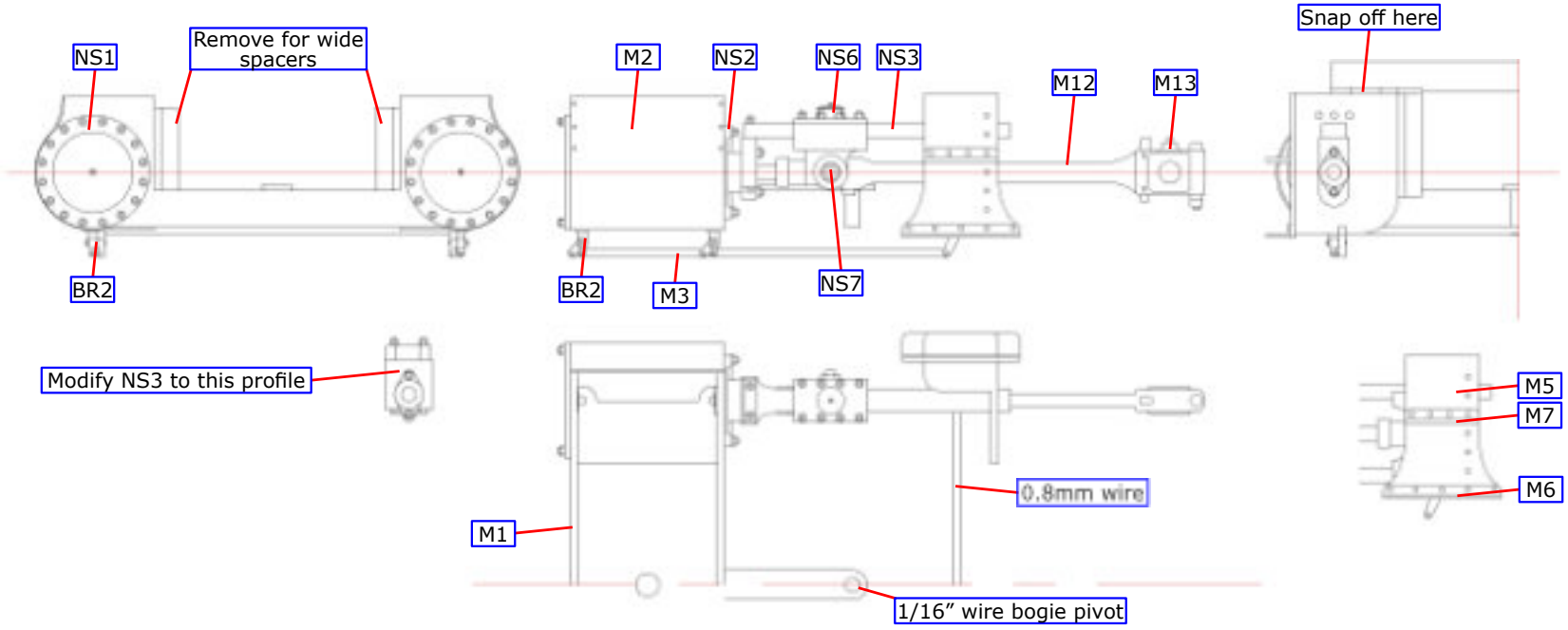
Solder the front cylinder cover (NS1) in place. Solder the cylinder cover rear (NS2) and the upper slidebar and piston rod gland casting (NS3) in place in the hole in the rear face of the cylinders. Accurate alignment is essential. Bend the cylinder wrappers (M2/3) to match the cylinder etch and solder in place.

If required, reduce the width of the inside faces of the motion bracket (M4/1). Fold down the step support brackets. Re-profile the slots in the motion bracket as shown in the drawing.

Temporarily fit the wheels and bogie to the chassis, bolt the cylinders in place and fit the crosshead/connecting rod. Locate the motion bracket on the slidebars and over the frames in the position shown. Check all alignments before soldering the slidebars to the motion bracket. Solder the lower slidebars in place.

Solder the front step back (M5/5) to the motion bracket. Solder upper (M7/3)and lower (M6/5) treads onto the front step back. Carefully snap off the upper section of the motion bracket as shown.

Solder the cylinder drain cocks (BR2) into place in the cylinders. Fit the the two cylinder drain cock linkages (M3/1) onto the drain cocks and into the slot in the motion bracket. Connect them with the 0.8 mm wire for the drain cock operating rod between the two drain cock linkages.



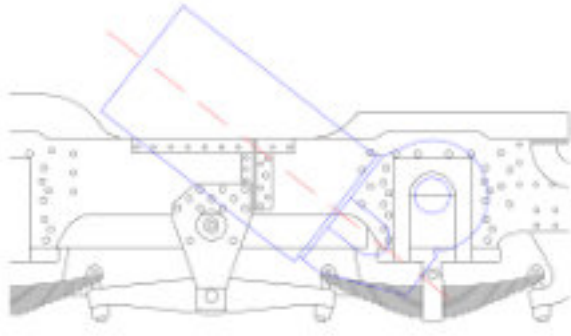
FINISHING THE CHASSIS

Parts on this page are on Etch 1 unless detailed.

Assemble the wheel sets, bearings and rods selecting 3/16" axle washers of appropriate thickness to control side-play. The motor and gearbox fitting is shown in the drawing. Some side-play on the coupled wheels is desirable to assist with negotiating curves. A thorough check of all clearances at this stage is important.

Fit the connecting rods to the crossheads and to the leading crankpins. Use suitable washers between the crankpin bosses and the connecting rods to align the connecting rods parallel to frames. Fit the coupling rods outside the connecting rods. The rear crankpins will require a tubular spacer to locate the coupling rods parallel to the frames. The cylinder assembly can now be unbolted from the frames and removed. The remaining cylinder detailing components can now be fitted as shown in the drawing.

Now connect the motor to your pick-ups and test run. The axles are now retained by the springs.

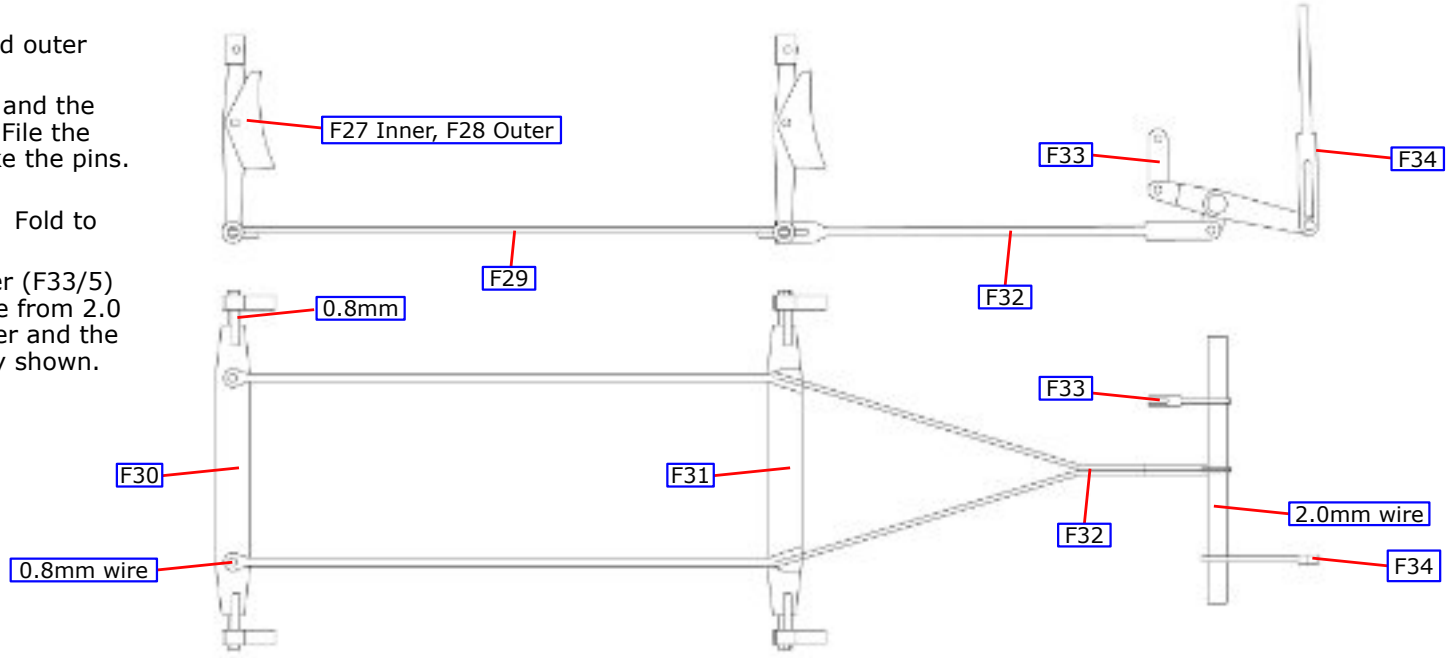


Brakes. Solder together the brake hanger/shoe inner and outer laminations (F27/1 & F28/1) for each brake.

Laminate together the brake pull rods/cross shaft (F29/3) and the brake cross shaft overlays, front (F30/3 and rear F31/3). File the outer pins to 0.8mm diameter. Insert 0.8mm wire to make the pins. Soldered this assembly to the brake hangers.

The rear pull shaft (F32/3) is made up of two laminations. Fold to make the Y shape and then solder together.

Solder together the laminations for the brake cylinder lever (F33/5) and the handbrake lever (F34/5). The brake shaft is made from 2.0 mm wire. Thread the rear pull rod, the brake cylinder lever and the handbrake lever onto the cross shaft to build the assembly shown.



FOOTPLATE 1

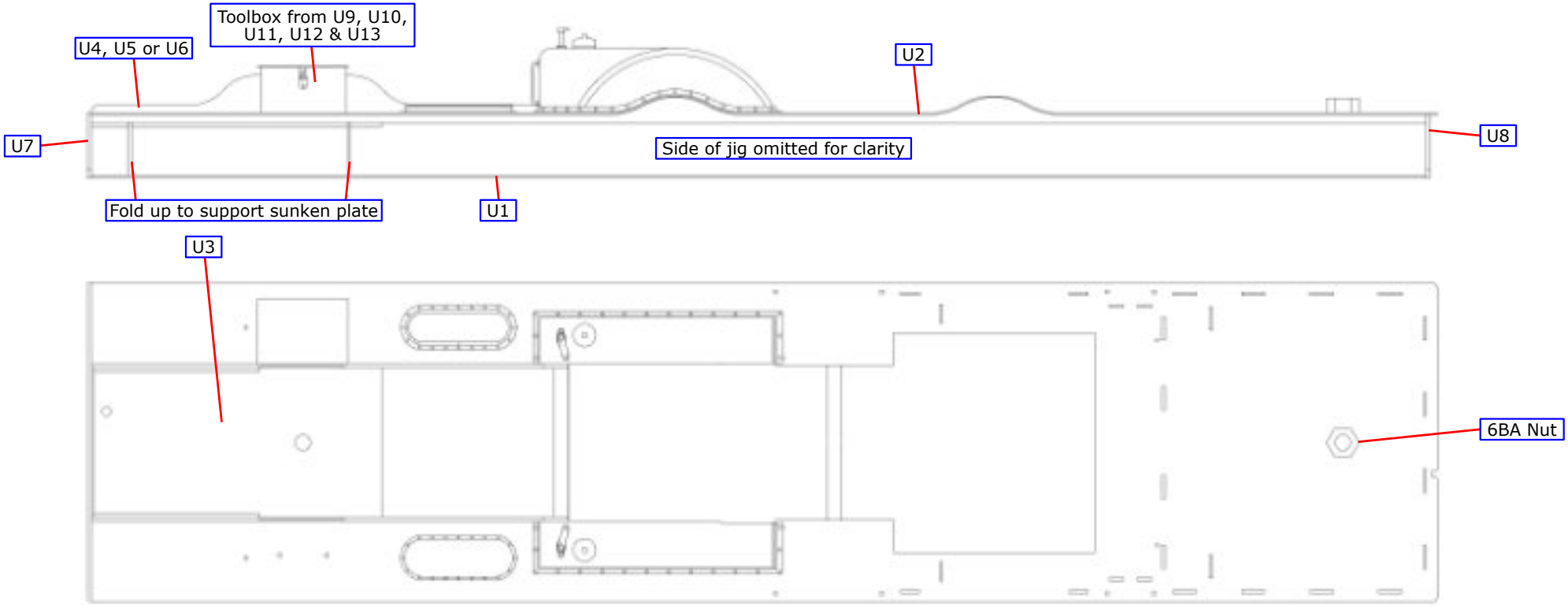
Parts on this page are on Etch 1 unless detailed.

Beyer, Peacock built locomotive. Emboss all the rivets on the footplate and toolbox. There are two rows of half etched holes around the edge of sheet 4 for practice.

Fold up the footplate valance jig (U1/4) as shown. Drill through the holes in the footplate (U2/5) for the hand rail stanchions at the front of the tanks Very carefully form the curves in the footplate over a ¾" diameter bar. Solder a 6BA nut over the rear fixing hole.

Emboss the bolts around the edge of the sunken plate (U3/3) and fold up the edges. Choose the appropriate front frames (U4, U5 or U6). When you are satisfied with the fit of the footplate, the sunken front plate and the front frames on the jig, they can be soldered together. Do not solder the sunken plate to the supports on the jig. Accurate alignment and fit of these components is essential. If appropriate emboss the rivets on the buffer beams (U7 & U8) and solder in place.

Solder two pieces of 0.8 mm wire into the holes in the toolbox base (U9/5) to locate the toolboxes on the footplate. Form the toolbox sides (U10/3 & 5) to shape to fit around the base and solder in place. Add the toolbox catch hasps (U12/4) and a piece of 0.3 mm wire for the padlock to go on. The toolbox lids (U11/4) and the padlocks (U13/5) are best glued in place, possibly after painting.



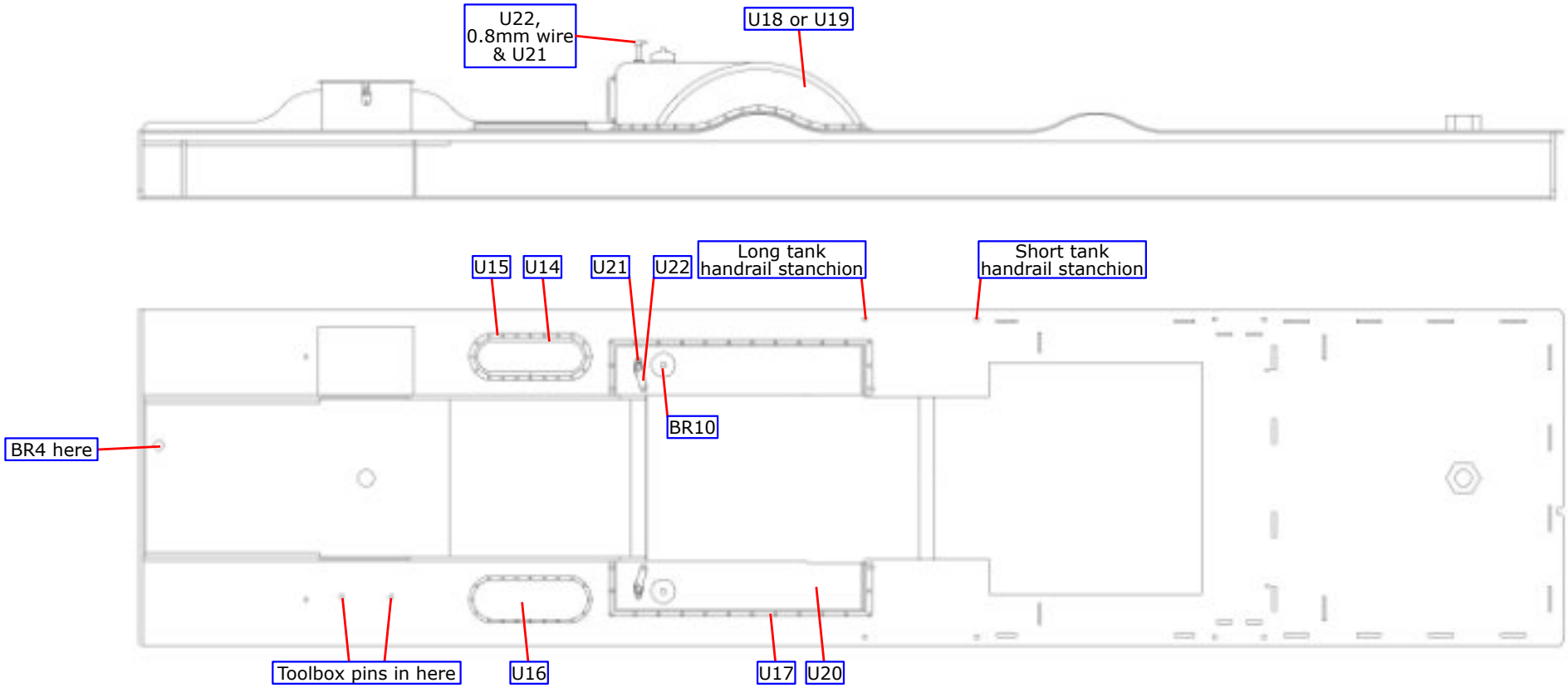
FOOTPLATE 2

Parts on this page are on Etch 1 unless detailed.

Form the slidebar access hatch sides (U15/3) to shape around a 5.5 mm rod or drill and solder in place in the groove in the slide bar access hatch base (U14/5) before soldering in place in the recesses in the footplate. The slidebar access hatch lid (U16/5) is best glued in place.

Curve the splasher base angle (U17/5) to shape so that they fit in the recesses in the footplate. Solder the splasher front, Beyer Peacock or Neilson, Stephenson and Dubs (U18/4 or U19/4) in place in the footplate slots. Carefully curve the splasher tops (U20/5) to shape by forming over suitable rods constantly checking the fit with the splasher front. Solder them in place.

Make the sanding rod operating gear by locating the sanding rod bearing (U21/4) onto the splasher top with a short length of 0.8mm wire and solder in place. The top of the wire should be 3.6 mm above the top surface of the top. Solder the sanding rod crank (U22/4) in place at the top of the wire as shown in the drawing. Make up and fit the handrail at the front of the splasher from 0.6 mm wire.



SMOKEBOX & BOILER

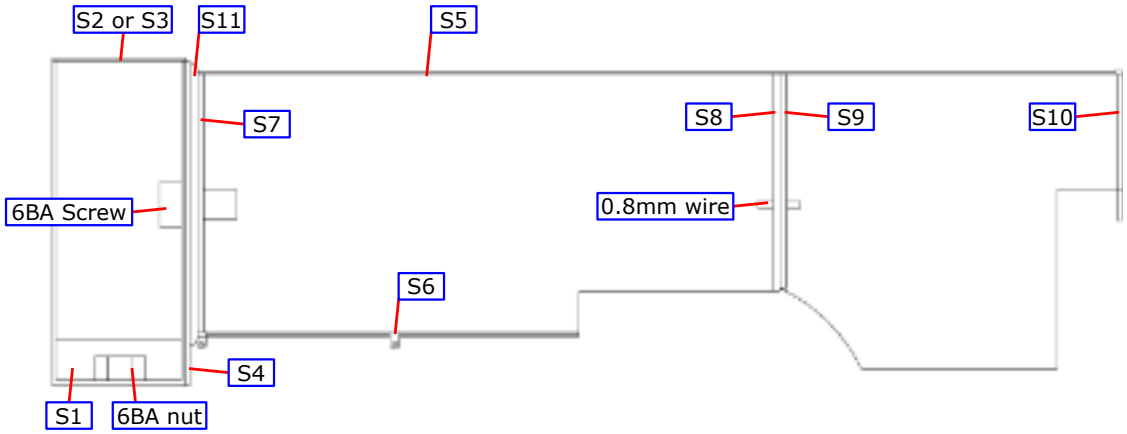
If appropriate emboss the rivets on the smokebox base, sides, front and back (S1/3) before folding up and soldering a 6 BA nut over the fixing hole.

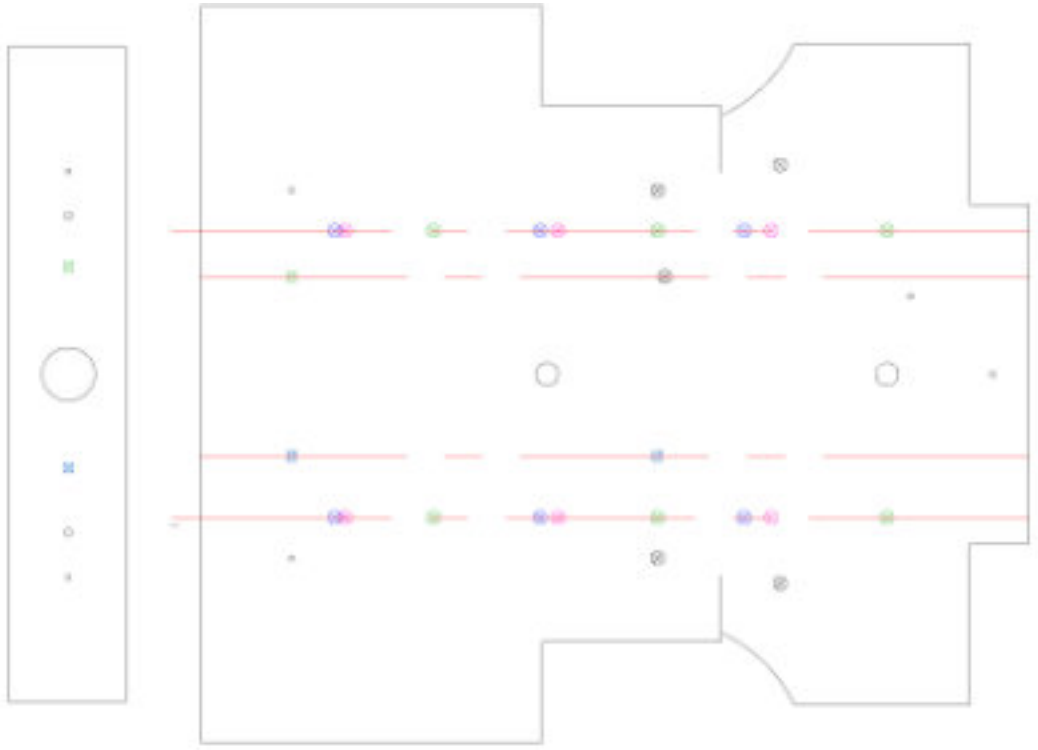
There is a choice of two smokebox wrappers - unriveted (S2/3) or riveted (S3/3). Drill any additional holes required in the smokebox wrapper using the template below. Roll the smokebox wrapper to shape and solder in place on the folded up base, sides front and back. Solder the smokebox rear plate (S4/3) to the rear of the smokebox.

Drill all the additional holes required in the boiler wrapper (S5/3) using the template below. Roll the wrapper and form the firebox sides to shape. Solder the wrapper ends together using the boiler joining strip (S6/3) and solder in the front former (S7/1).

Pin the boiler rear former (S8/1) and the firebox front former (S9/1) together using 0.8mm wire before soldering in place.

Solder the firebox rear former (S10/1) in place. Represent the bolts in the joining brackets using 0.45 mm wire. Round the rear edge of the smokebox/boiler ring (S11/1) as per the drawing. Tap the hole in the boiler front former 6BA so that the smokebox, ring and the boiler can be screwed together.





Dubs & Neilson
Beyer & Stephenson
Beyer & short tank Stephenson
Dubs & short tank Stephenson
Neilson

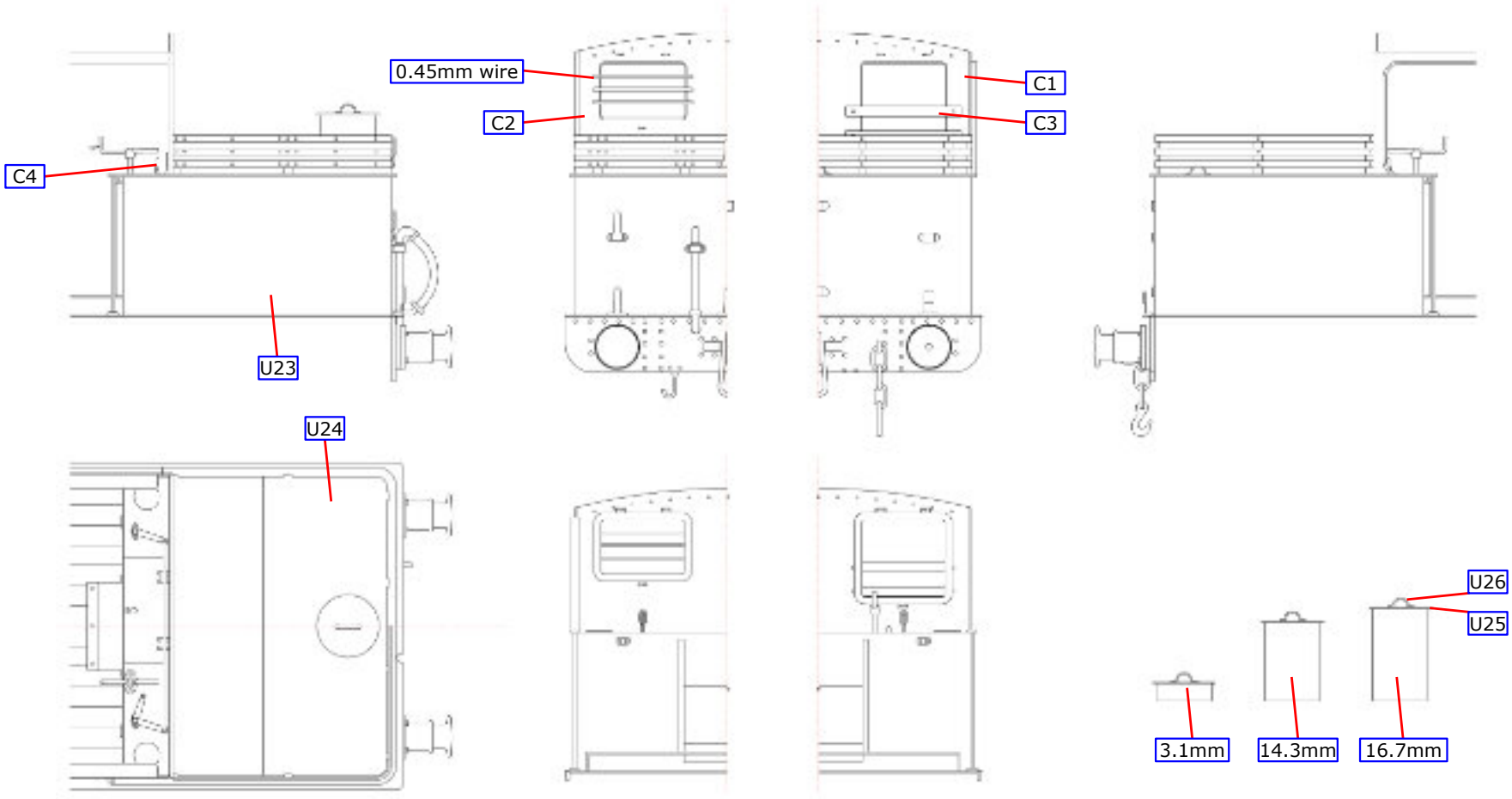
BUNKER AND CAB REAR 1

Parts on this page are on Etch 5 unless detailed.

A Beyer Peacock built locomotive will, as usual, require all the rivets embossing on the bunker. Form the corners of the bunker sides (U23) over a 4mm rod. Solder the bunker top (U24/3) into the slots inside the bunker sides. Solder the bunker in place in the footplate slots.

Decide which height of water filler is needed. Cut the piece of 13/32" tube to the required length shown in the drawing below. The tube fits in a cut out in the bunker top. Solder in place. Attach the water filler lid (U25) and the water filler lid handle (U26/4).

Select the appropriate cab rear, large windows (C1) or small windows (C2). If required, drill out the holes for the window bars. To the outside, add the window steel bars from 0.45 mm wire or use the wooden window bars (C3). Form the fire iron bracket (C4/4) to shape and solder in place on the inside. Now solder the cab rear in place in the footplate slots taking care to ensure it is vertical.



BUNKER AND CAB REAR 2

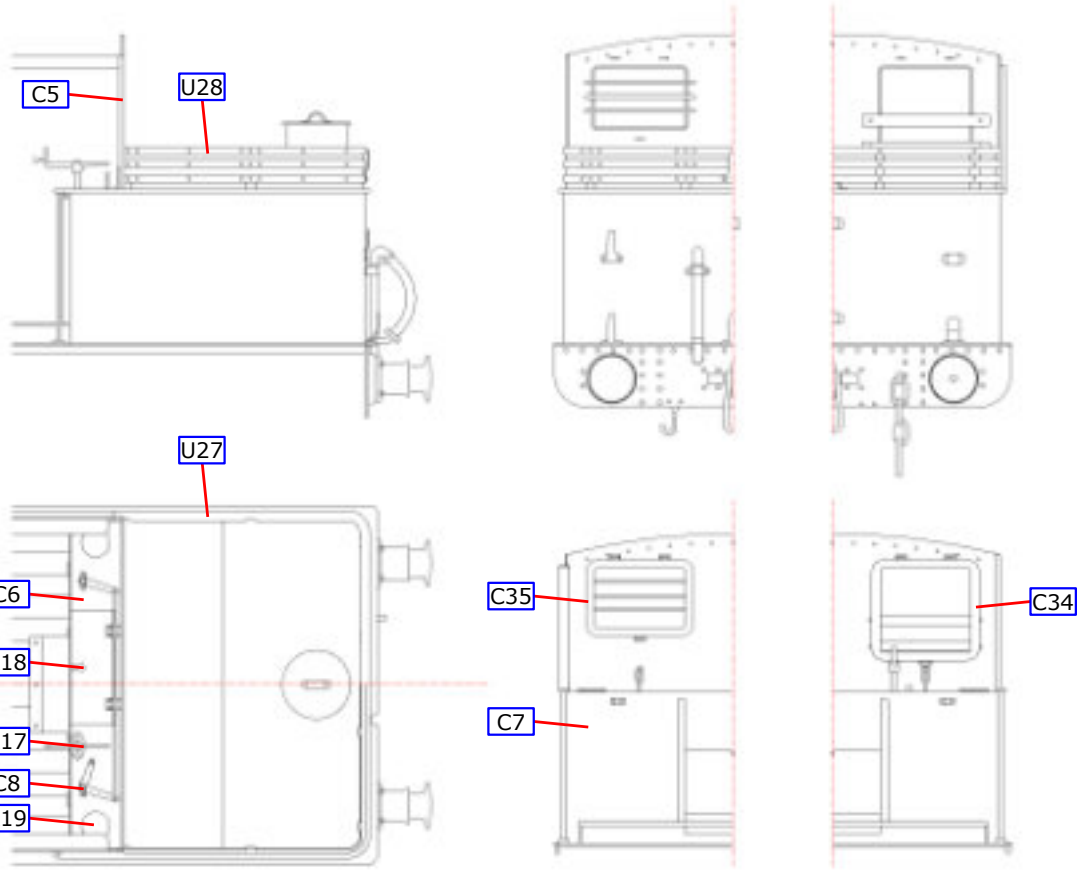
Parts on this page are on Etch 3 unless detailed.

If you are fitting coal rails open out the slots (indicated by etched lines) in the bunker beading (U27) to accommodate the coal rail stanchions. For a Neilson built engine, make a slot to fit the lower edge of the cab side. Solder the bunker beading in place. For other than a Neilson engine, solder the cab rear edge beading (C5/5) in place.

Solder a short length of 0.45 mm wire for the handle for the coal door. Solder the bunker top, inside the cab (C6/5) to the bunker front (C7). Detail bunker top, as shown below, by adding the brake handle (BR17), the cab toolbox knob (BR18), the cab sandbox lids (BR19), and the rear sanding rod and cranks (C8) which is held in place with the help of wire as shown. Solder the bunker front and tank top in place in the slots in the cab rear and in the footplate.

Emboss the rivets on the coal rails, open or sheeted in (U28 or U29) and fold over the stanchions through 180° and solder to the back of the coal rails. Form the corners and solder the stanchions in place inside the bunker.

This would be a good time to add the lamp irons to the bunker rear. The position of the irons can be picked from the four GAs, as can items such as steam heating pipes, couplings and safety chains.



After painting fit the rear window frames, either large (C34/3) or small (C35/3) and the front window frames (C36/5) into the recess to accommodate the glazing.

The water valve handles (NS12), with 0.45 mm wire for the operating rods, should be fitted after the cab floor is in place

SHORT TANK, CAB FRONT & SIDES 1

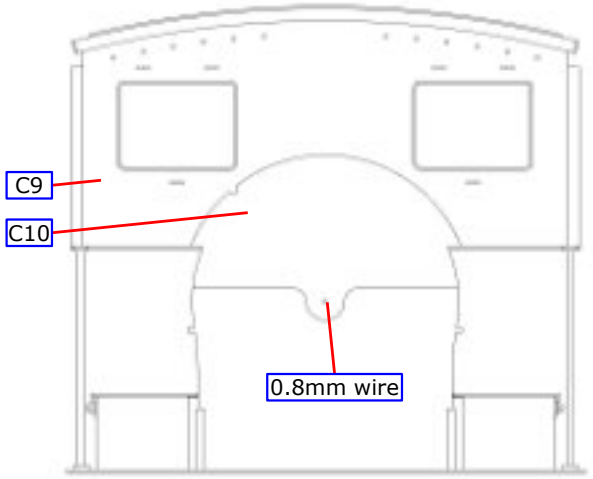
Referring to the cab drawings, drill through all the appropriate holes in the cab front (C9/5). Solder the cab front angle overlay (C10/5) in place on the cab front locating it with a piece of 0.8mm wire which also locates the boiler. Locate the cab front in the footplate slots and check the fit of the smokebox and boiler with the cab front. The boiler can be rotated on the dowel in the cab front until it is aligned correctly.

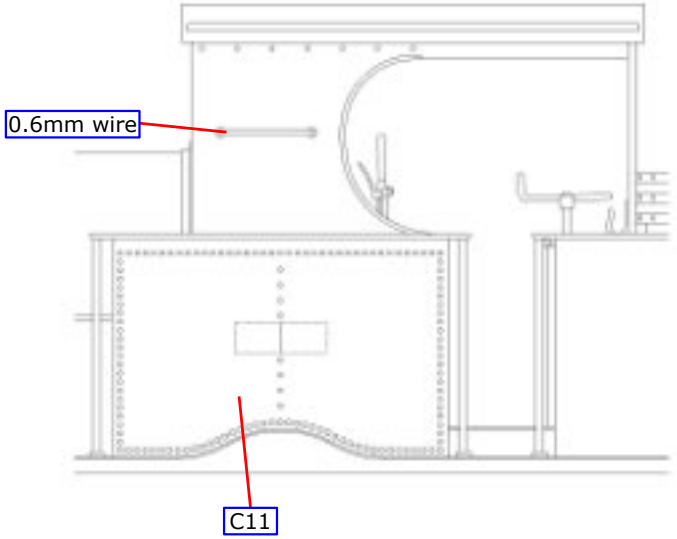
For other than a Neilson engine, modify the tank & cab side (C11/3) as shown below by removing the red shaded area. The front of the tank & cab sides need modifying. Do not break off along the half etched line; this will leave the tank side too short. Cut with a saw alongside the front edge of the half etched line and file back to leave a rebate which fits the tank front. Solder the tank and cab sides in place in the footplate slots and to the cab front.

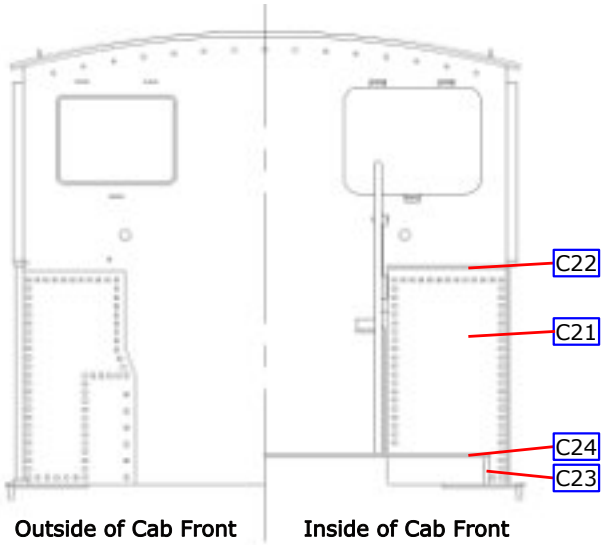
Detail the tank left inside face (C12/5) with the drain cock lever (C13/3), the drain cock lever guide (C14/4) and the damper controls(C15/5). Likewise detail the tank right inside face (C16/5) with the lever reverse assembly. This comprises the reversing lever (C17/2), the ratchet release (C18/4) attached with 0.45 mm wire, the quadrant plate (C19/1) and the foot rest (C20/4).

The tank back (C21/3) and inside top (C22/4) are available in three widths. Rivet as appropriate and assemble with the detailed cab sides.

Solder the cab floor supports (C23/4) in place. The cab floor (C24/3) is in three widths; select the correct one and solder into place on top of the supports. Solder tank and cab sides in place in the footplate slots and to the cab front.

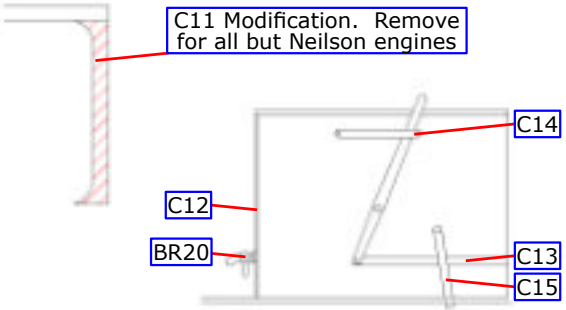






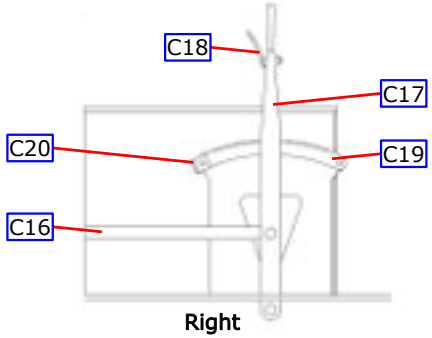
Outside of Cab Front

Inside of Cab Front



Left





Right

SHORT TANK, CAB FRONT & SIDES 2

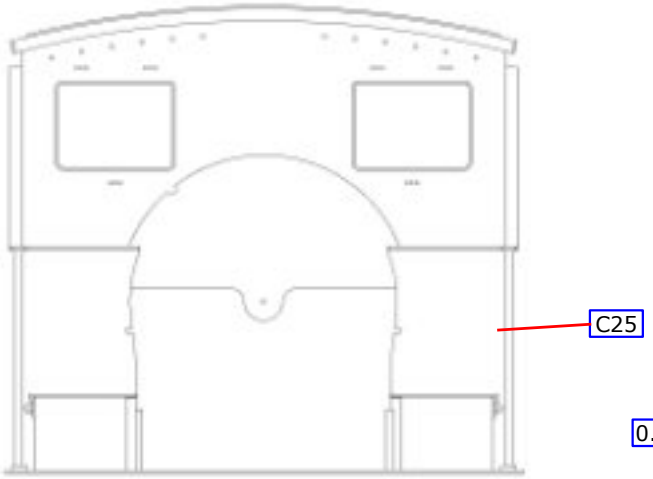
Before the tanks fronts and tops are fitted the boiler smokebox assembly must be permanently fixed in place. This is best done after as much of the detailing work on these assemblies is complete including the handrails and lamp brackets.

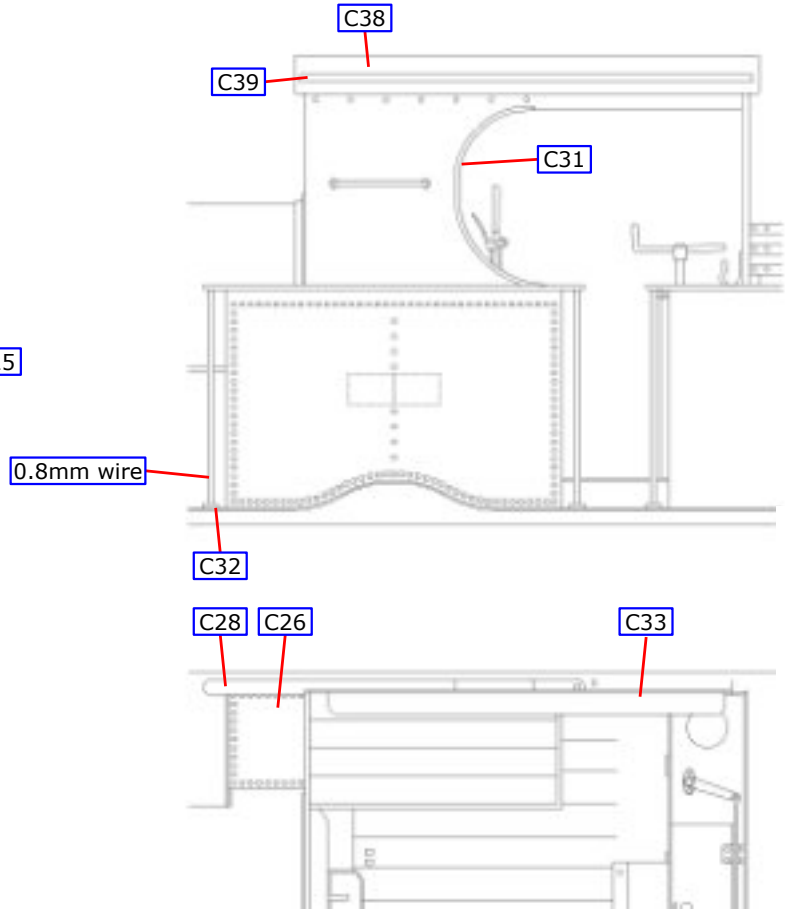
If appropriate modify the tank fronts (C25/3) to fit and shorten the tank outside tops (C26/4) to fit. The shortening must be done using the same method as for the tank sides. Now solder the tank fronts in place. Add the short beading (C28/3). Modify the cab cut-out beading (C31/5) and solder in place.

Using a carborundum disc in a mini-drill cut through the unwanted parts of the valence jig and snap off the redundant parts along the half etched lines. The clean up the edges of the valences.

Add the handrail stanchions from 0.8 mm wire and the handrail stanchion bases (C32/4).

The cab side reinforcing strip (C33/2) needs to be soldered in place once all the internal detail has been added. The position of the strip can interfere with the fit of the cab roof and may need to be adjusted once the roof is available. Finally add the tank balance pipes (WM1) as shown in the appropriate GA.



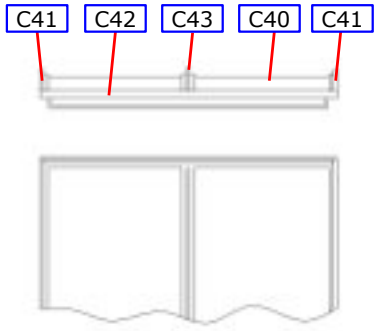


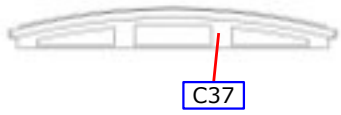
Cab Roof. Fold up the back and front of the cab roof building jig (C37/3) which gives a solid base upon which to build the removable cab roof.

Wood Roof. Roll the cab roof (C38/5) to shape and solder in place on the jig with equal overhang back and front. Add the rain strip angle pieces (C39/5).

Steel Roof. Roll the cab roof (C40/5) to shape and solder in place on the jig with equal overhang back and front. Add the rain strip angle pieces (C41/3,C42/5 & C43/3).

Now using a carborundum disc in a mini-drill cut through the unwanted part of the former and snap off the redundant parts along the half etched lines. The edges of the formers will now need cleaning up.





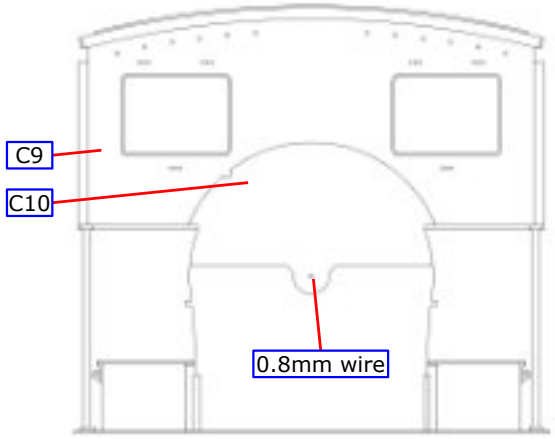
LONG TANK, CAB FRONT & SIDES 1

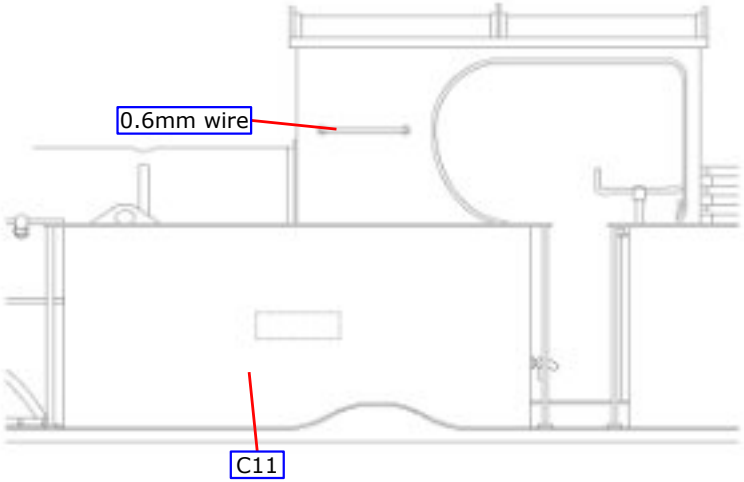
Referring to the cab drawings, drill through all the appropriate holes in the cab front (C9/5). Solder the cab front angle overlay (C10/5) in place on the cab front locating it with a piece of 0.8mm wire which also locates the boiler. Locate the cab front in the footplate slots and check the fit of the smokebox and boiler with the cab front. The boiler can be rotated on the dowel in the cab front until it is aligned correctly.

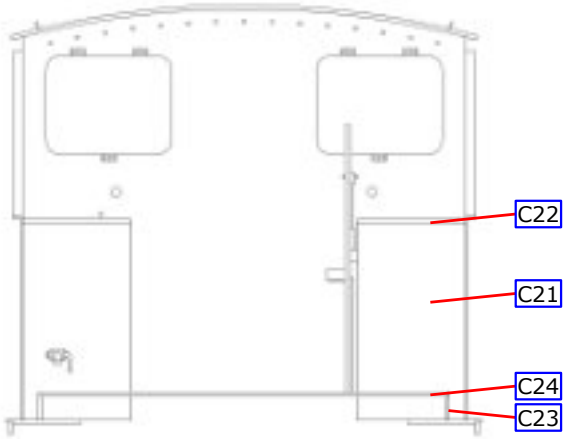
For other than a Neilson engine, modify the tank & cab side (C11/3) as shown below by removing the red shaded area. Detail the tank left inside face (C12/5) with the drain cock lever (C13/3), the drain cock lever guide (C14/4) and the damper controls(C15/5). Likewise detail the tank right inside face (C16/5) with the lever reverse assembly. This comprises the reversing lever (C17/2), the ratchet release (C18/4) attached with 0.45 mm wire, the quadrant plate (C19/1) and the foot rest (C20/4).

The tank back (C21/3) and top (C22/4) are available in three widths. Rivet as appropriate and assemble with the detailed cab sides.

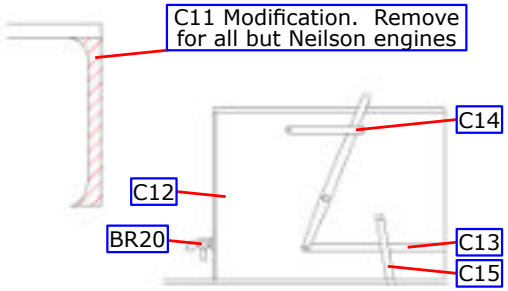
Solder the cab floor supports (C23/4) in place. The cab floor (C24/3) is in three widths; select the correct one and solder into place on top of the supports. Solder tank and cab sides in place in the footplate slots and to the cab front.



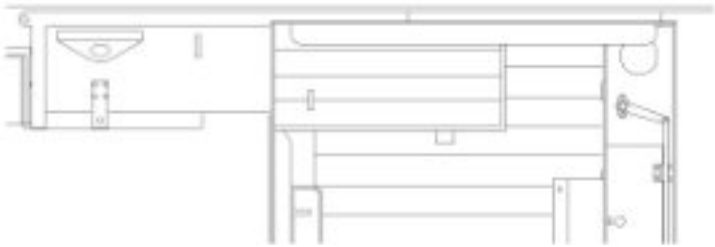


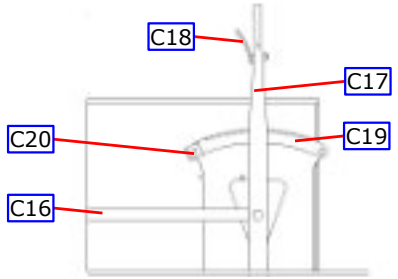


View Forward in Cab



Left





Right

LONG TANK, CAB FRONT & SIDES 2

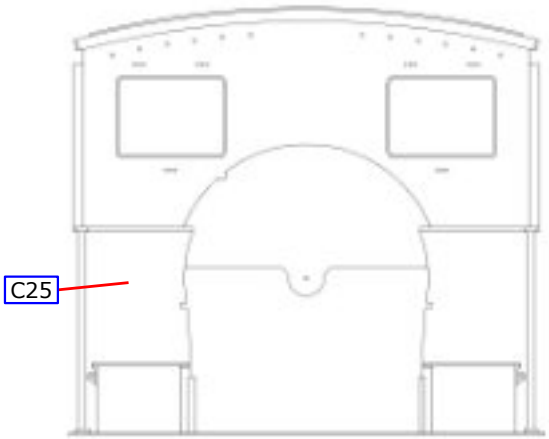
Before the tanks fronts and tops are fitted the boiler smokebox assembly must be permanently fixed in place. This is best done after as much of the detailing work on these assemblies is complete including the handrails and lamp brackets.

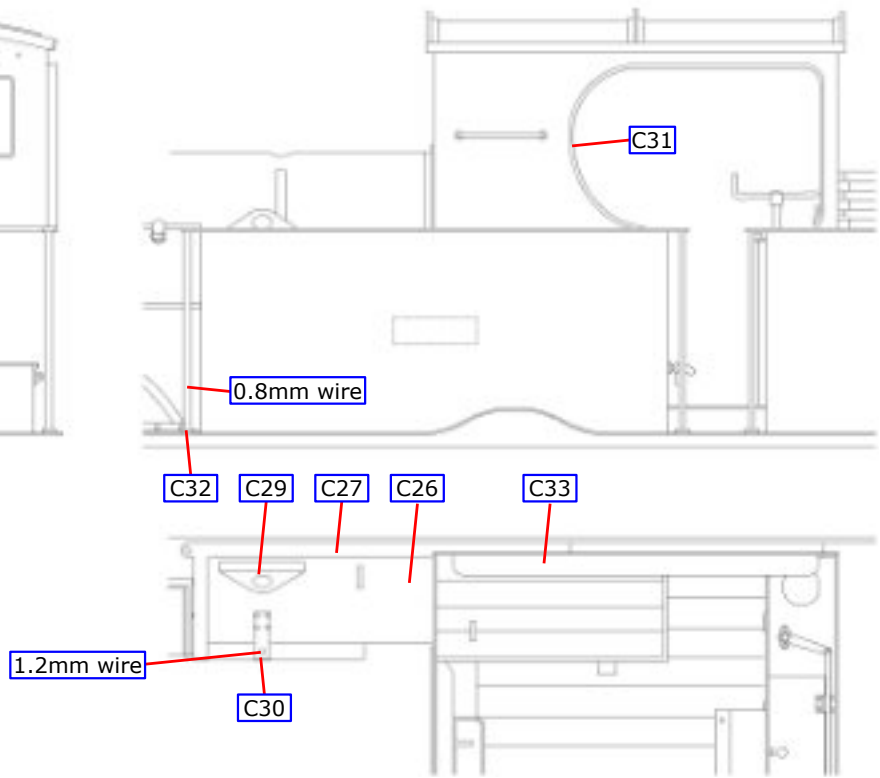
Solder the tank fronts (C25/3) in place followed by the tank outside top (C26/4). Add the long beading (C27/3). If you are modelling the SR period, fit the tank lifting brackets (C29/3). Fit the Tank/boiler stay (C30/5) as shown. If necessary, modify the cab cut-out beading (C31/5) and solder in place.

Using a carborundum disc in a mini-drill cut through the unwanted parts of the valence jig and snap off the redundant parts along the half etched lines. The clean up the edges of the valences.

Add the handrail stanchions from 0.8 mm wire and the handrail stanchion bases (C32/4).

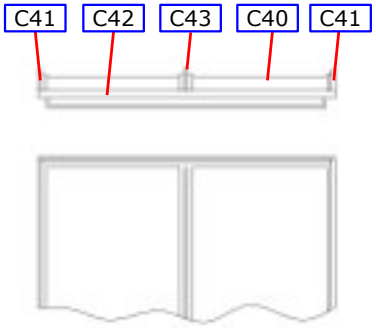
The cab side reinforcing strip (C33/2) needs to be soldered in place once all the internal detail has been added. The position of the strip can interfere with the fit of the cab roof and may need to be adjusted once the roof is available. Finally add the tank balance pipes (WM1) as shown in the appropriate GA.

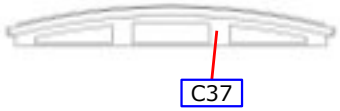




Cab Roof. Fold up the back and front of the cab roof building jig (C37/3) which gives a solid base upon which to build the removable cab roof.

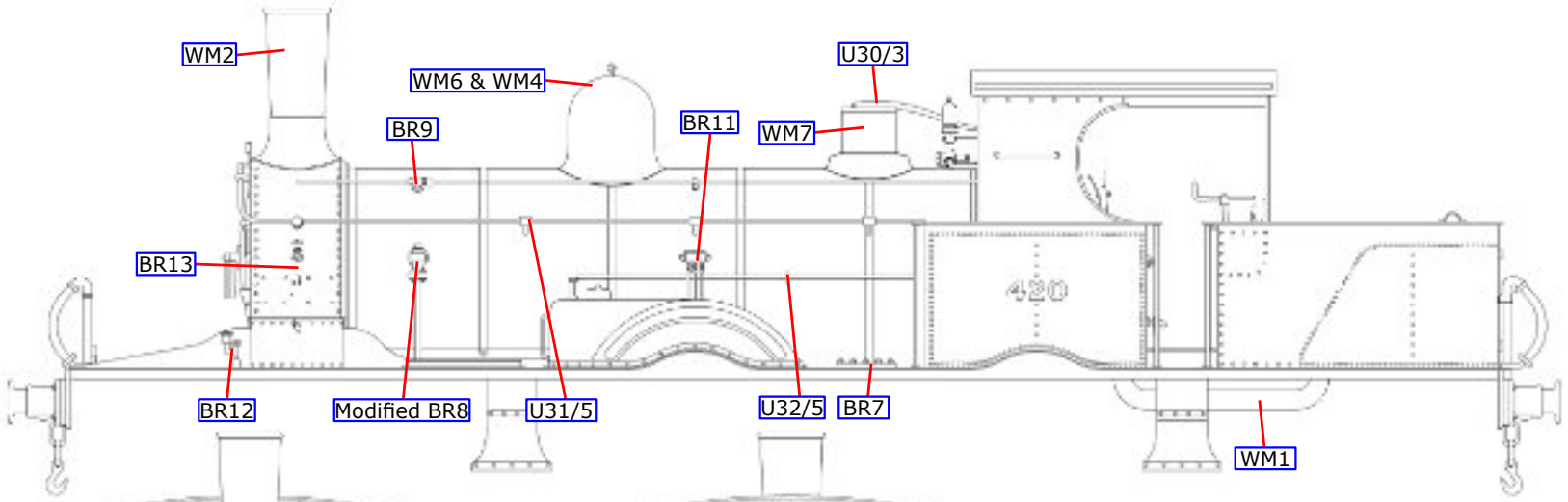
Steel Roof. Roll the cab roof (C40/5) to shape and solder in place on the jig with equal overhang back and front. Add the rain strip angle pieces (C41/3,C42/5 & C43/3). Now using a carborundum disc in a mini-drill cut through the unwanted part of the former and snap off the redundant parts along the half etched lines. The edges of the formers will now need cleaning up.

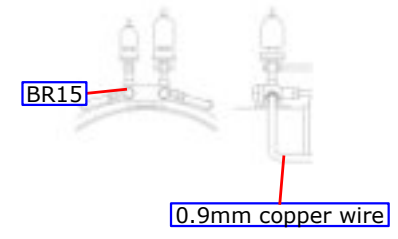


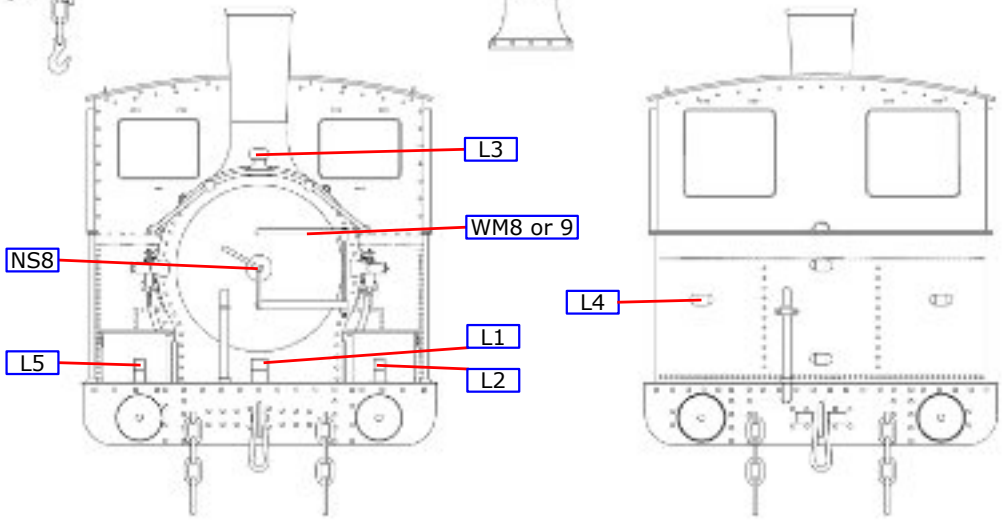


FINAL DETAIL, EARLY BEYER, PEACOCK LOCOMOTIVE

This and the following page will indicate the final details to be fitted. Which parts are required will depend on the locomotive you are building but hopefully the following two diagrams and the GAs will help guide you.







Lamp Brackets

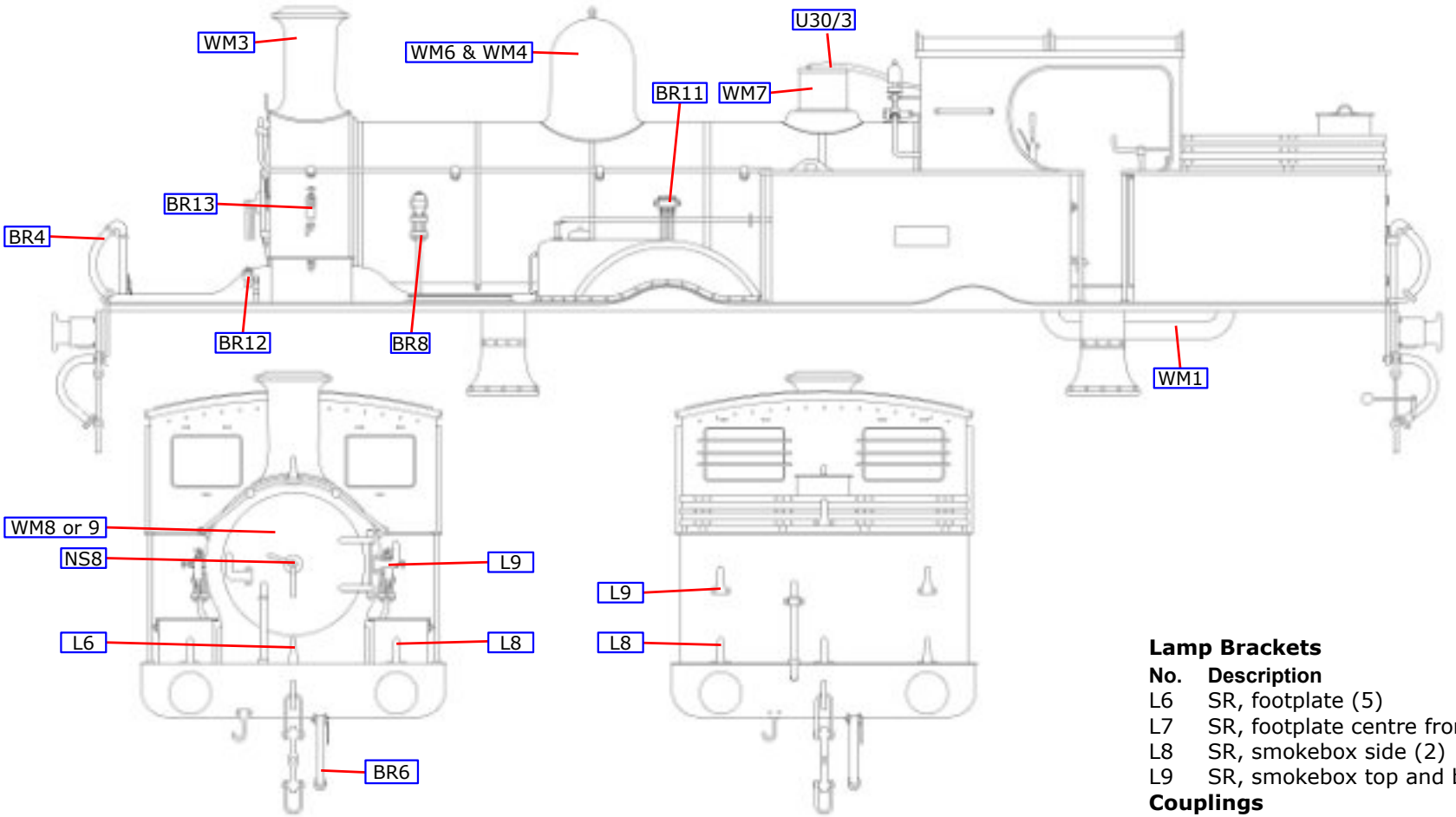
No.	Description	Sheet
L1	Adams, front footplate	4
L2	Adams, smokebox side (2)	4
L3	Adams, smokebox top (2)	4
L4	Adams, rear (4)	4
L5	Drummond, footplate (4)	4

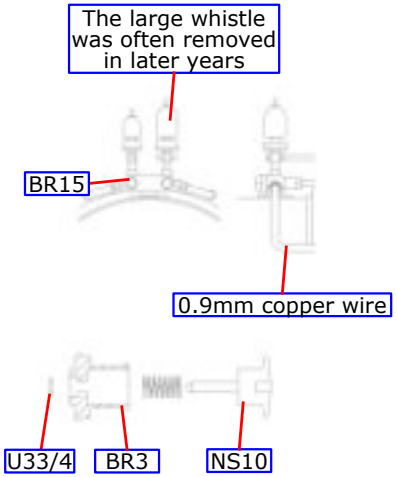
Couplings

U34	Coupling hook	1
U35	Coupling link	1
U36	Screw coupling hook (2)	4
U37	Screw coupling, four pieces	5
U38	Safety chain eye	1
U39	Safety chain hook	1

FINAL DETAIL, LATER NIELSON LOCOMOTIVE

This and the following page will indicate the final details to be fitted. Which parts are required will depend on the locomotive you are building but hopefully the following two diagrams and the GAs will help guide you.





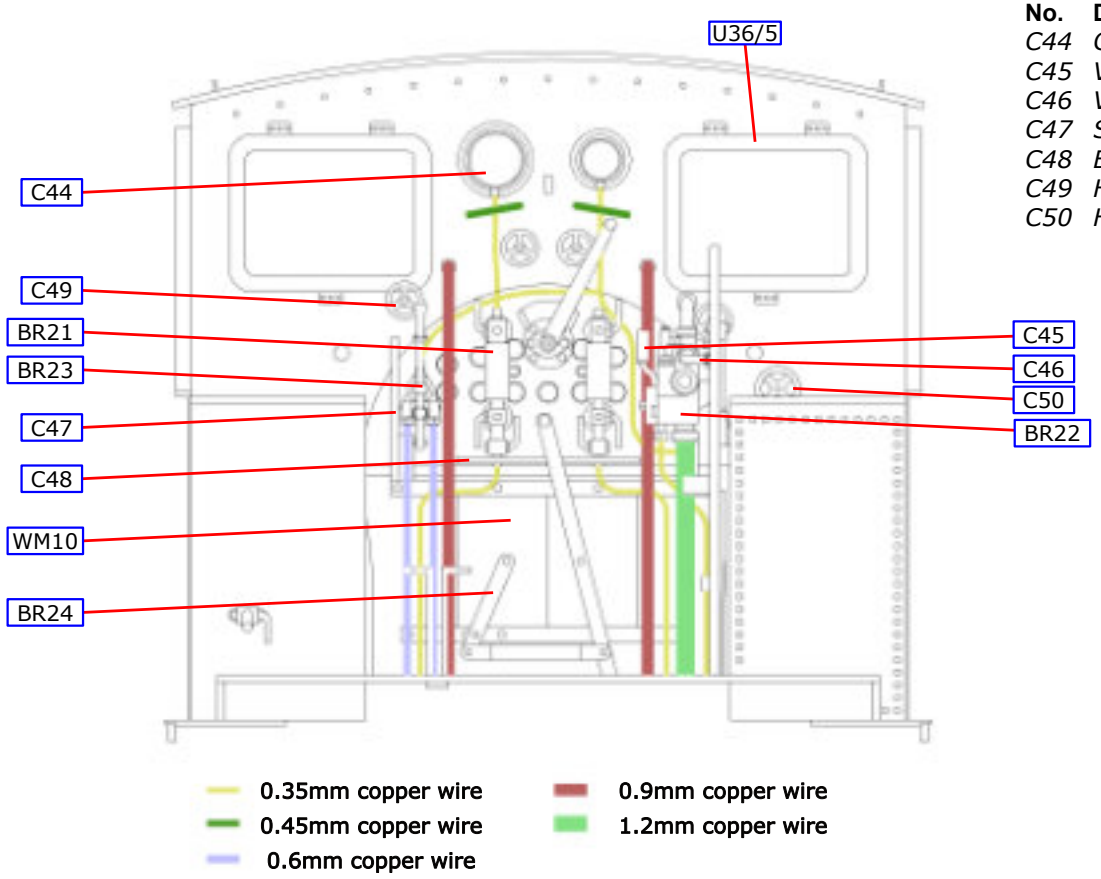
Lamp Brackets

No.	Description	Sheet
L6	SR, footplate (5)	4
L7	SR, footplate centre front	4
L8	SR, smokebox side (2)	4
L9	SR, smokebox top and bunker rear	4

Couplings

U34	Coupling hook	1
U35	Coupling link	1
U36	Screw coupling hook (2)	4
U37	Screw coupling, four pieces	5

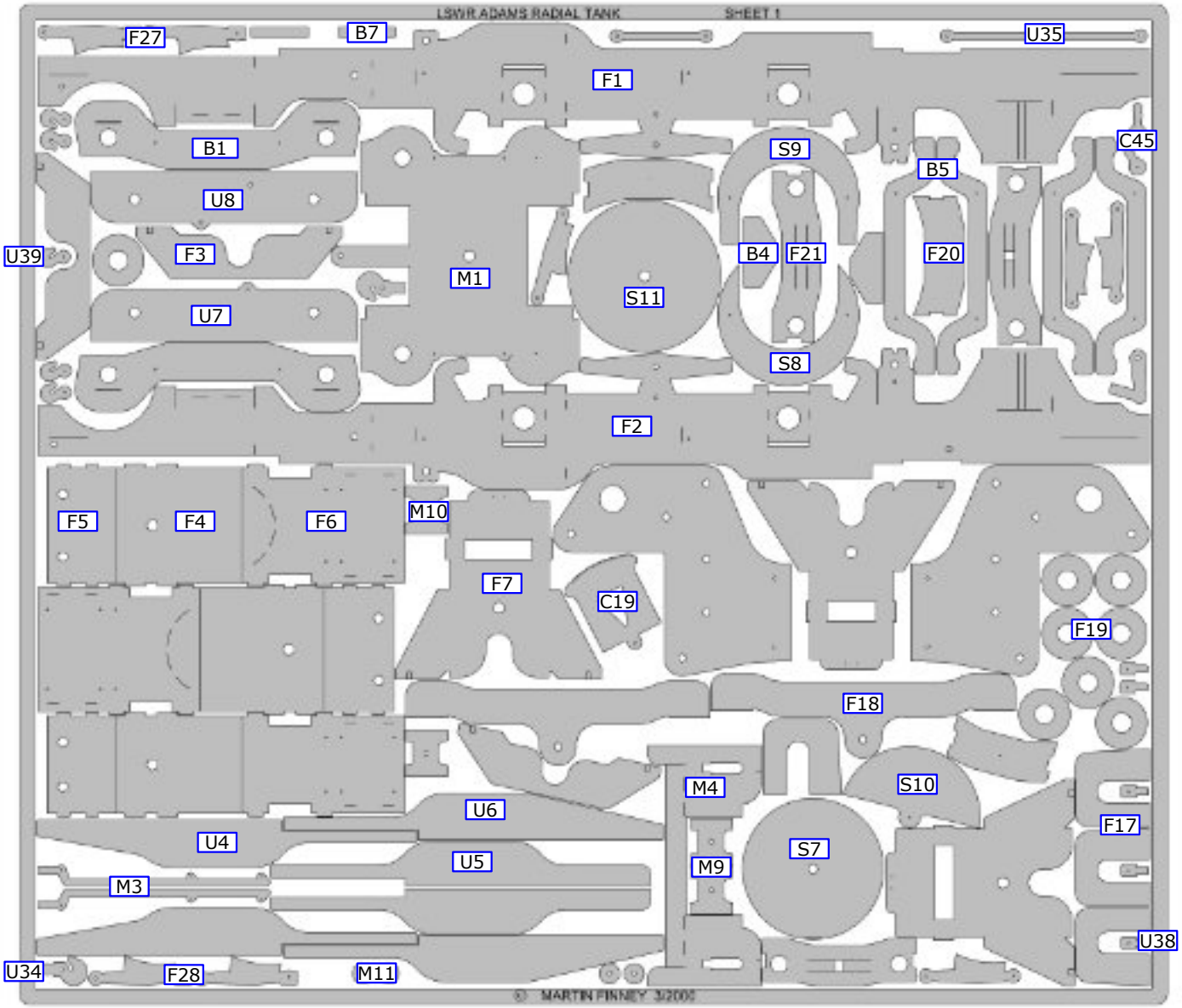
BACKHEAD

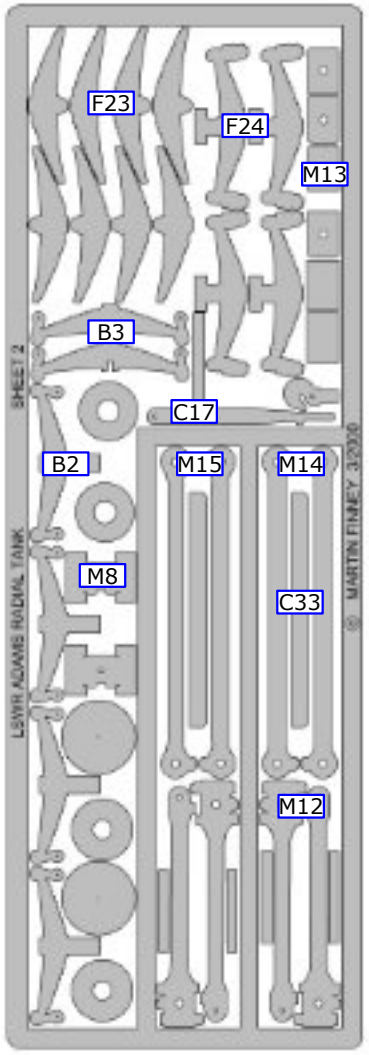


No.	Description	Sheet
C44	*Cab pressure gauges*	*4*
C45	*Vacuum ejector handle*	*1*
C46	*Vacuum ejector lever*	*4*
C47	*Sanding lever*	*4*
C48	*Backplate shelf*	*5*
C49	*Handwheel, small (3)*	*4*
C50	*Handwheel, large*	*4*

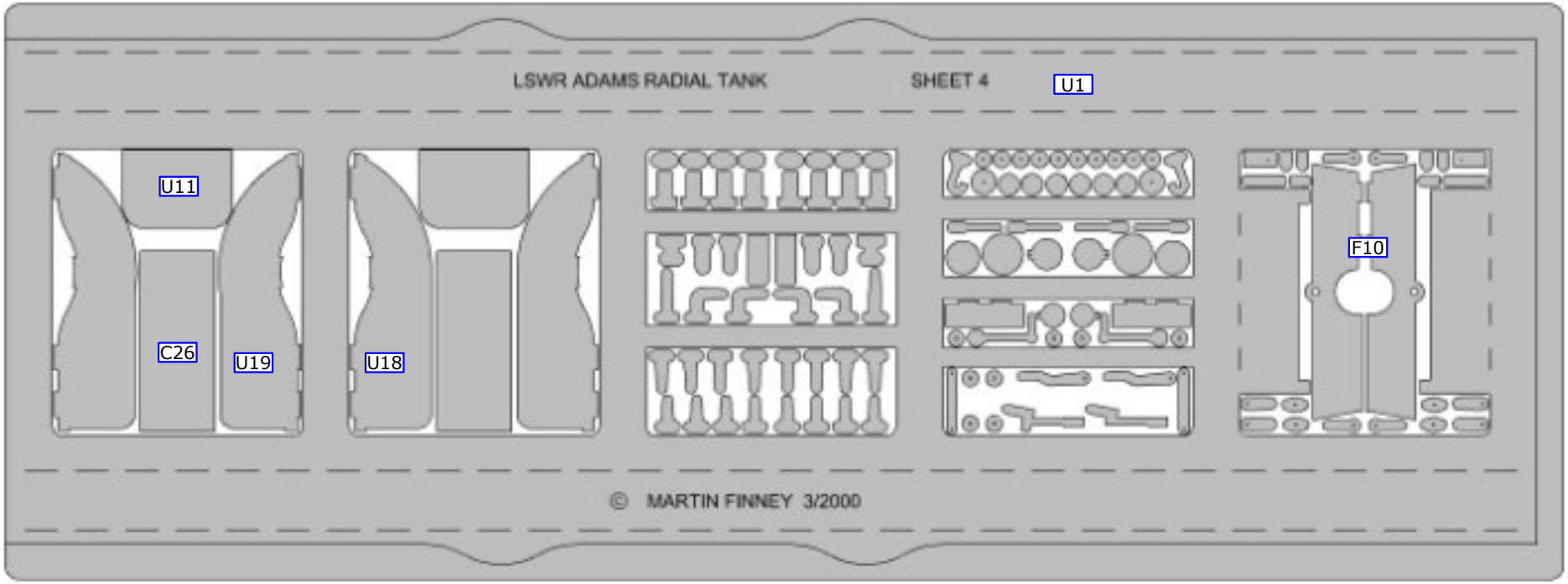
Finney7

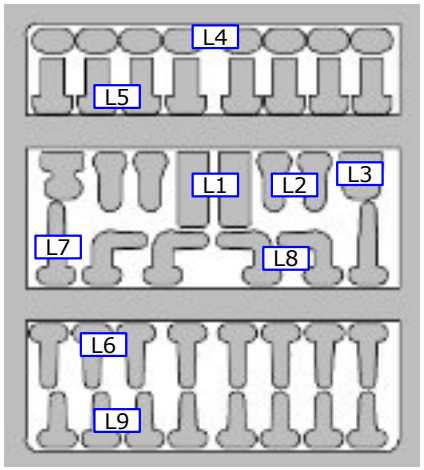
ETCH SHEET 1 & 2

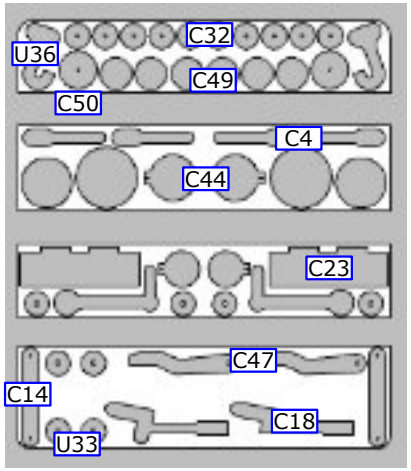


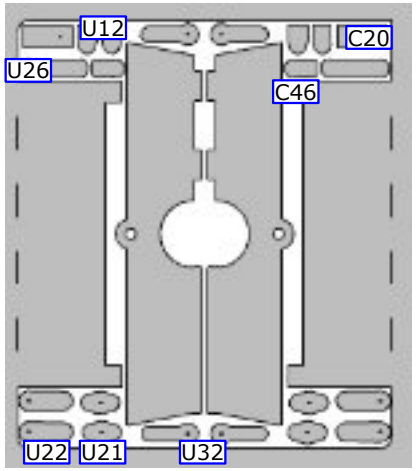


ETCH SHEET 4


LSWR ADAMS RADIAL TANK
SHEET 4
U1
U11
C26
U19
U18
F10
© MARTIN FINNEY 3/2000

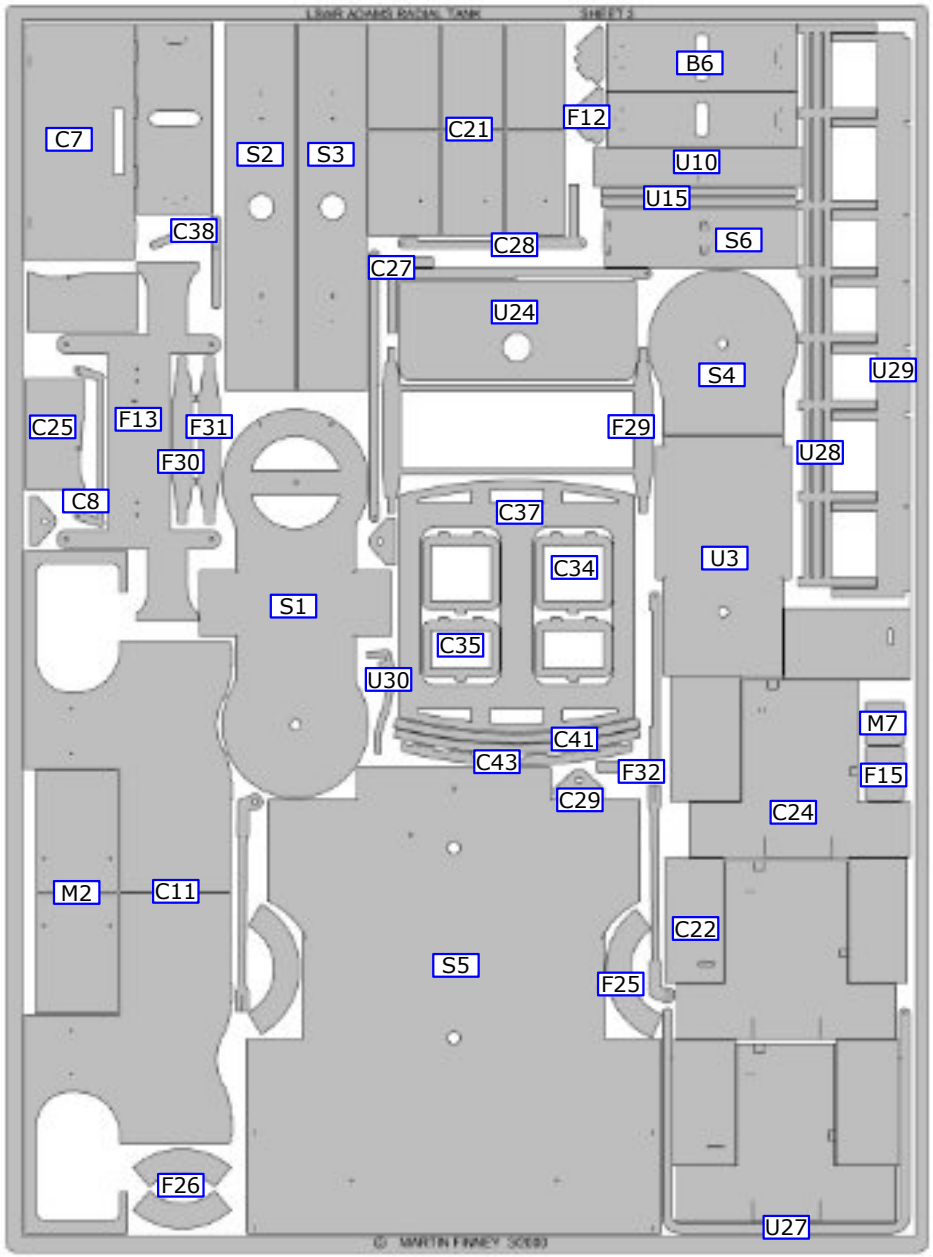

L4
L5
L1
L2
L3
L7
L8
L6
L9

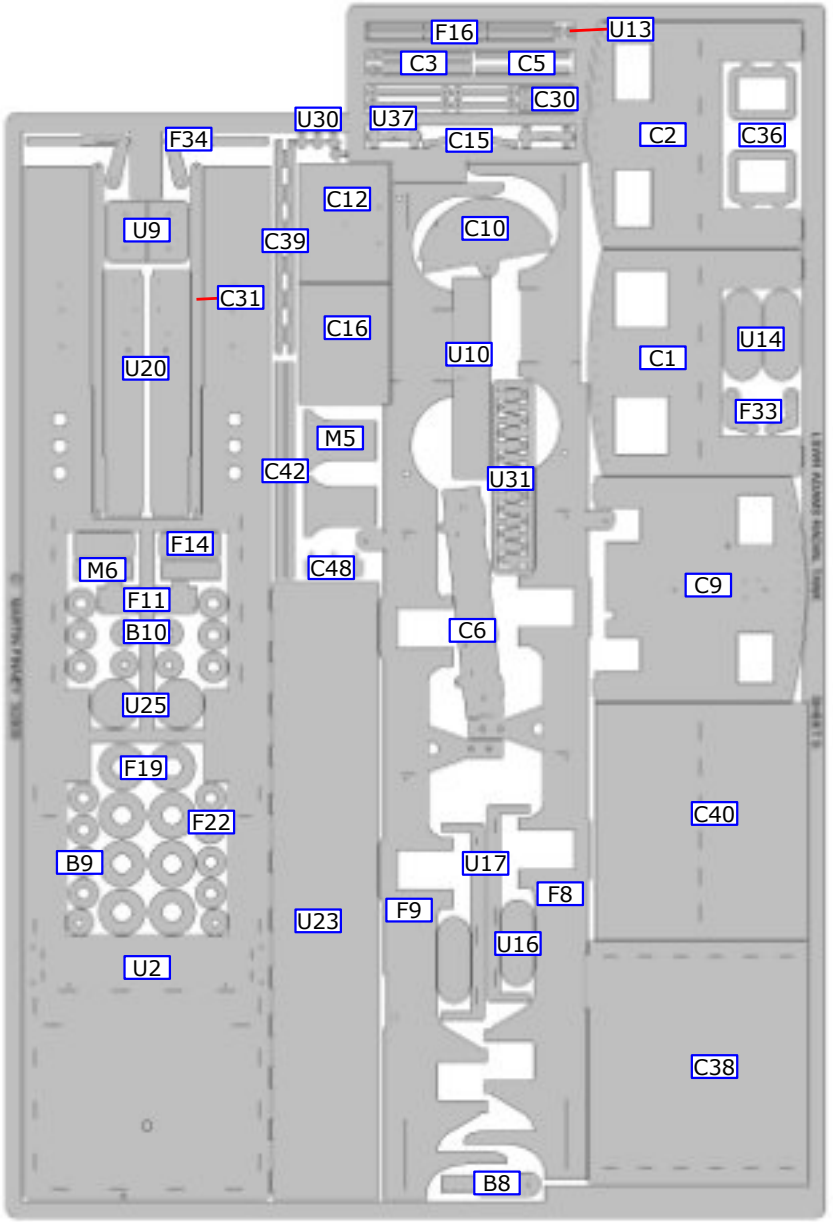

C32
U36
C49
C50
C4
C44
C23
C47
C14
C18
U33


U12
C20
U26
C46
U22
U21
U32

Finney7

ETCH SHEET 3 & 5



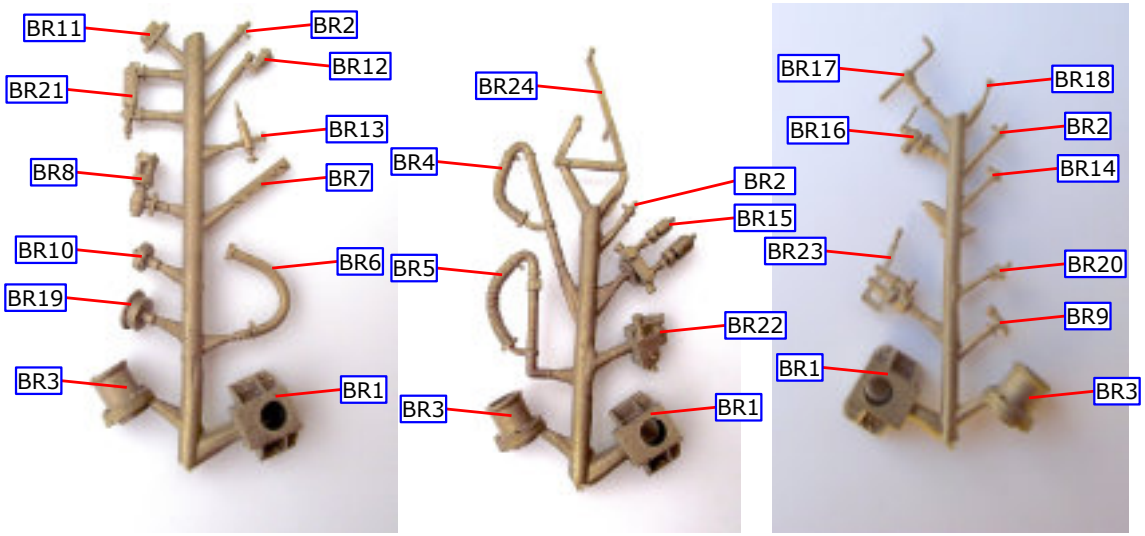


Finney7

CASTINGS

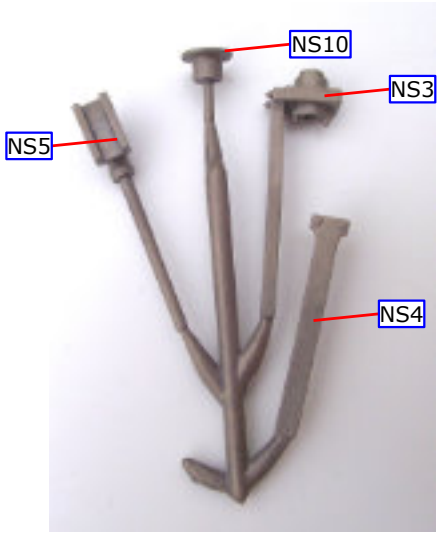
BRASS/COPPER CASTINGS

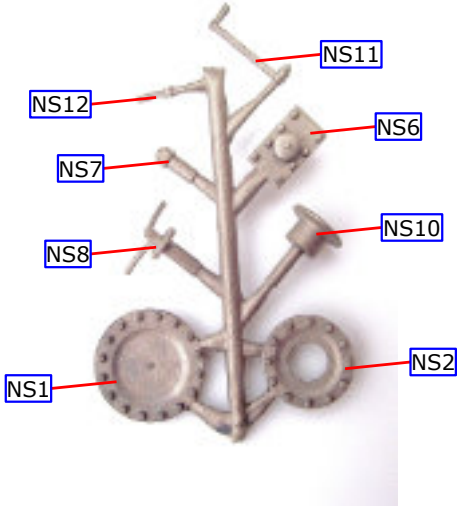
BR1 Bogie axle box (4)
BR2 Cylinder drain cock (4)
BR3 Buffer housing (4)
BR4 Vacuum pipe, front
BR5 Vacuum pipe, rear
BR6 Steam heating pipe (2)
BR7 Firebox/frame bracket (2)
BR8 Clack box (2)
BR9 Blower valve
BR10 Splasher sandbox lid (2)
BR11 Lubricator, over splasher (2)
BR12 Lubricator, in front of toolbox (2)
BR13 Lubricator, on side of smokebox (2)
BR14 Lubricator, on dome
BR15 Whistles/steam manifold
BR16 Vacuum ejector steam cock
BR17 Brake handle
BR18 Cab toolbox knob
BR19 Cab sandbox lid (2)
BR20 Bucket cock
BR21 Water gauge (2)
BR22 Vacuum ejector/brake
BR23 Steam brake valve
BR24 Firebox door handle



NICKEL SILVER CASTINGS

NS1 Cylinder cover front (2)
NS2 Cylinder cover rear (2)
NS3 Upper slidebar/piston rod gland (2)
NS4 Lower slidebar (2)
NS5 Crosshead/piston rod (2)
NS6 Crosshead top - single slidebar (2)
NS7 Crosshead/connecting rod pin (2)
NS8 Smokebox door handles (1)
NS10 Buffer (4)
NS11 Regulator handle (1)
NS12 Water valve handle (2)





Finney7

CASTINGS

WHITEMETAL CASTINGS

WM1 Tank balance pipe 2
WM2 Chimney, Adams
WM3 Chimney, Drummond
WM4 Dome, Beyer Peacock and Stephenson
WM5 Dome, Neilson and Dubs
WM6 Inside of dome
WM7 Safety valve casing
WM8 Smokebox door, Adams
WM9 Smokebox door, Drummond
WM10 Back plate (not shown)



OTHER COMPONENTS

3/16" bearing (4)
5/32" top hat bearing (2)
6 BA screw (3)
6 BA nut (2)
Nickel silver wire - 1.6 mm - for double slidebar crosshead pins
Brass wire - 1/16" - for compensation beam pivots and bogie pivot pin & spring bolts
Brass tube - 3/32" outside diameter - for compensation beams
Brass tube - 5/32" outside diameter - for bogie screw
Brass tube - 13/32" outside diameter - for water filler
Brass wire - 0.3 mm - for tool box locks
Brass wire - 0.45 mm - for whistle valves and levers, blower valve rod, water feed valve handles & sand rods
Brass wire - 0.6 mm - for handrails & sanding lever handle
Brass wire - 0.8 mm - for brake hanger pivots, drain cock rods cross shaft, rear step stays, handrail, handrail stanchions & sand rod pivots
Brass wire - 1.0 mm - for sand pipes and steam heat pipe
Brass wire - 1.2 mm - for tank stay bolts
Brass wire - 1.4 mm - for vacuum pipe
Brass wire - 1.8 mm - for equalising beam pivot
Brass wire - 2.0 mm - for rear brake cross shaft and reverse weigh shaft
Spring wire - 0.5 mm - for bogie and rear truck side control
Copper wire - 0.35 mm - for back plate pipe work
Copper wire - 0.6 mm - for pipes from steam brake
Copper wire - 0.9 mm - for pipe work
Copper wire - 1.2 mm - for pipe from vacuum ejector
Handrail knob - short (4)
Handrail knob - long (6)
Blower valve rod stanchion
Buffer spring - (4)

Note. Screws may be supplied over-length and may require cutting to length.

Bogie

B1	Bogie frame (2)	1
B2	Spring outer lamination (4)	2
B3	Spring middle lamination (2)	2
B4	Bogie spring bracket (2)	1
B5	Bogie equalising beam (2)	1
B6	Bogie stretcher, three widths	3
B7	Bogie stretcher bar, three widths	1
B8	Bogie pivot bracket	5
B9	Bogie axle spacer washer	5
B10	Bogie pivot washer	5

Motion

M1	Cylinders	1
M2	Cylinder wrapper (2)	3
M3	Cylinder drain cock linkage (2)	1
M4	Motion bracket	1
M5	Front step (2)	5
M6	Front step tread, lower (2)	5
M7	Front step tread, upper (2)	3
M8	Crosshead slipper, double slide bar (2)	2
M9	Crosshead front, double slidebar (2)	1
M10	Crosshead rear, double slidebar (2)	1
M11	Small end washer, double slidebar (2)	1
M12	Connecting rod lamination (4)	2
M13	Connecting rod boss overlay (4)	2
M14	Coupling rod inner laminations (2)	2

Frames

F1	Frame Left	1
F2	Frame right	1
F3	Frame stretcher front, 3 widths	1
F4	Frame stretcher bogie pivot, 3 widths	1
F5	Frame stretcher motion plate, 3 widths	1
F6	Frame stretcher ash pan, 3 widths	1
F7	Frame stretcher rear, 3 widths	1
F8	Frame overlay, left	5
F9	Frame overlay, right	5
F10	Ash pan sides (2)	4
F11	Brake hanger bracket, front (2)	5
F12	Brake hanger bracket, rear (2)	3
F13	Rear step back	3
F14	Rear step tread, lower (2)	5
F15	Rear step tread, upper (2)	3
F16	Rear step tread stay, 3 lengths	5
F17	Hornblock (4)	1
F18	Compensation beam (2)	1
F19	Coupled wheel axle washer	5
F20	Radial truck top, 3 widths	1
F21	Radial truck bottom, 3 widths	1
F22	Radial truck axlebox spacing washer	5
F23	Spring outer lamination (8)	2
F24	Spring middle lamination (4)	2
F25	Leading axle balance weight	3
F26	Trailing axle balance weight	3
F27	Brake hanger and shoe inner lamination (4)	1
F28	Brake hanger and shoe outer lamination (4)	1
F29	Brake pull rod and cross shafts	3
F30	Brake cross shaft overlay, front	3
F31	Brake cross shaft overlay, rear	3
F32	Brake pull rod and lever, rear	3
F33	Cross shaft brake cylinder lever lamination (2)	5
F34	Cross shaft handbrake lever lamination (2)	5

Smoke Box

S1	Smokebox base, sides, front and back	3
S2	Smokebox wrapper, no rivets	3
S3	Smokebox wrapper, riveted	3
S4	Smokebox rear plate	3
S5	Boiler and firebox wrapper	3
S6	Boiler joining strip	3
S7	Boiler front former	1
S8	Boiler rear former	1
S9	Firebox front former	1
S10	Firebox rear former	1
S11	Smokebox/boiler ring	1

Cab

C1	Cab rear, large window	5
C2	Cab rear, small windows	5
C3	Rear window wooden bar (4)	5
C4	Fire iron bracket	4
C5	Cab rear edge beading, Beyer Peacock, Stephenson & Dubs (2)	5
C6	Bunker top, inside cab	5
C7	Bunker front	3
C8	Rear sanding rods and cranks	3
C9	Cab front	5
C10	Cab front angle overlay	5
C11	Tank and cab side (2)	3
C12	Tank left inside face	5
C13	Drain cock lever	3
C14	Drain cock lever guide	4
C15	Damper controls	5
C16	Tank right inside face	5
C17	Reversing lever	2
C18	Reversing lever, ratchet release	4
C19	Reversing lever, quadrant plate	1
C20	Reversing lever, footrest	4
C21	Tank back, 3 widths (L & R)	3
C22	Tank inside top, 3 widths (L & R)	3
C23	Cab floor support (2)	4
C24	Cab floor, three widths	3
C25	Tank front (2)	3
C26	Tank outside top (2)	4
C27	Tank beading long (2)	3
C28	Tank beading short (2)	3
C29	Tank lifting bracket (2)	3
C30	Tank/boiler stay (2)	5
C31	Cab cut out beading (2)	5
C32	Handrail stanchion base (6)	4
C33	Cab side reinforcing strip (2)	2
C34	Large window frame	5
C35	Small window frame	5
C36	Front window frames	5
C37	Cab roof building jig	3
C38	Wood cab roof	5
C39	Wood cab roof rain strips (2)	5
C40	Steel cab roof	5
C41	Steel cab roof front & rear rain strips (2)	3

C42	Steel cab roof side rain strips (2)	5
C43	Steel Cab roof centre rain strip	3
C44	Cab pressure gauges	4
C45	Vacuum ejector handle	1
C46	Vacuum ejector lever	4
C47	Sanding lever	4
C48	Backplate shelf	5
C49	Handwheel, small (3)	4
C50	Handwheel, large	4
C50	Handwheel, large	4

Lamp Irons

L1	Adams, front footplate	4
L2	Adams, smokebox side (2)	4
L3	Adams, smokebox top (2)	4
L4	Adams, rear (4)	4
L5	Drummond, footplate (4)	4
L6	SR, footplate (5)	4
L7	SR, footplate centre front	4
L8	SR, smokebox side (2)	4
L9	SR, smokebox top and bunker rear	4

Upperworks

U1	Footplate valance jig	4
U2	Footplate	5
U3	Sunken plate	3
U4	Frame extension, Beyer Peacock, Stephenson & Dubs	1
U5	Frame extension, Neilson	1
U6	Frame extension, SR	1
U7	Front buffer beam	1
U8	Rear buffer beam	1
U9	Toolbox base	5
U10	Toolbox sides	3 & 5
U11	Toolbox lids	4
U12	Toolbox catch hasp	4
U13	Padlocks	5
U14	Slide bar access hatch base	5
U15	Slide bar access hatch sides	3
U16	Slide bar access hatch lid	5
U17	Splasher base angle	5
U18	Splasher front, Beyer Peacock	4
U19	Splasher front, remaining locos	4
U20	Splasher tops	5
U21	Sanding rod bearing	4
U22	Sanding rod crank	4
U23	Bunker sides	5
U24	Bunker top	3
U25	Water filler lid	5
U26	Water filler lid handle	4
U27	Bunker beading	3
U28	Coal rails, open	3
U29	Coal rails, sheeted	3
U30	Safety valve lever	3
U31	Boiler handrail bracket lamination (12)	5
U32	Sanding rod bracket (2)	5
U33	Buffer washer (4)	4
U34	Coupling hook	1
U35	Coupling link	1
U36	Screw coupling hook (2)	4
U37	Screw coupling, four pieces	5
U38	Safety chain eye	1
U39	Safety chain hook	1