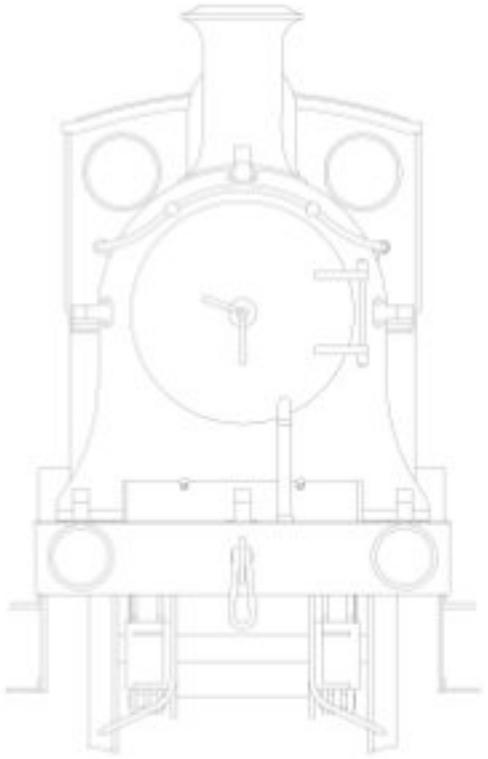
LSWR DRUMMOND T9 NARROW CAB



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 OC411263 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 are the original 'narrow' series of Dugald Drummond's celebrated T9 4-4-Os for the LSWR. A total of 51 locomotives were built by Dubs & Co. and at Nine Elms Works under 5 Order Numbers as follows:

Numbers	Built	Maker	Works Order Number	Firebox Water Tubes
702-719	2/1899-6/1899	Dubs & Co.	3746-3763	Yes
721-732	6/1899-1/1900	Dubs & Co.	3764-3775	Yes
773#	12/1901	Dubs & Co.	4038	Yes
113-122	6/1899-9/1899	Nine Elms	G9	No
280-284	10/1899-11/1899	Nine Elms	K9	No
285-289	1/1900-2/1900	Nine Elms	O9	No

renumbered 733 12/1924

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

Part two of 'The Locomotives of the LSWR' published by the RCTS.

LSWR Locomotives - The Drummond Classes published by Wild Swan.

Other valuable sources of information and photographs are:

The Drummond Greyhounds of the LSWR by D.L.Bradley published by David & Charles

A Pictorial Record of Southern Locomotives by J.H.Russell published by OPC

Drummond Locomotives by Brian Haresnape & Peter Rowledge published by Ian Allan

Locomotives Illustrated No. 44, The Drummond 4-4-Os and Double singles of the LSWR published by Ian Allan

Southern Steam Locomotive Survey - The Drummond Classes published by Bradford Barton

VARIATIONS/MODIFICATIONS INCORPORATED INTO THE KIT.

Starting with numbers 702,709 & 724 in May 1923 the locomotives were extensively rebuilt involving new:

Smokeboxes. New, larger, smokeboxes were fitted incorporating the 'Eastleigh' superheater. A small tube cleaning cock was fitted to the left side of the smokebox. This feature appears to subsequently have been removed. From October 1924 the 'Eastleigh' superheaters were replaced with a Maunsell designed superheater which involved the fitting of the characteristic Maunsell snifting valves to the top of the smokebox. From the mid 1940s the snifting valves were subsequently removed.

Coupling rods. New fluted coupling rods were fitted.

Brake gear. The brake hangers and pull rods were changed for a more robust design.

Chimney. A new stove pipe chimney with high capuchon was fitted. Over the years this capuchon was lowered and eventually removed completely.

Hydrostatic lubricator. A four feed Detroit lubricator was fitted.

Vacuum pipe connection. The fitting of the extended smokebox meant the fitting of a new, lower, vacuum pipe connection so as to avoid the pipe fouling the opened smokebox door.

Carriage heating pipes. From 1901 the LSWR introduced steam carriage heating equipment. The steam pipe to the buffer beam mounted connections ran behind the right side valence. After superheating this pipe was gradually moved to a position outside the right side valence.

Clackboxes. When built all the clackboxes were positioned on the bottom of the smokebox tube plate. From circa 1913 Drummond's successor Robert Urie soon placed the clackboxes conventionally on the boiler sides with the feed pipes following the original path from the injectors. From the mid 1920s the feed pipes were redirected, by a more accessible route, up through the platform and over the leading splasher.

Smokebox door. From circa 1913 four clamping 'dogs' were fitted to the lower rim of the smokebox door.

Firebox cross water tubes. Those engines built with firebox cross water tubes had them removed by Urie starting with 713 (1/1913) and finishing with 715 (12/1923).

Sandboxes. From circa 1926 new sandboxes were provided between the frames replacing the original sandboxes which were combined with the leading splasher.

Lamp brackets. The locomotives were built with Drummond's socket style brackets. The SR standardised on a design with the socket in the lamp. Many locomotives had the Drummond brackets adapted to accept the standard lamps but gradually the locomotives were fitted with new brackets of standard design.

Smokeboxes. When the superheated smokeboxes were renewed the flush riveting was usually replaced by snap head rivets.

Vacuum pipe. The vacuum pipe to the front connection initially ran under the locomotive. From the early 1920s this pipe was moved to a position outside the left side valence.

Couplings. Most of the engines appear in their early years to be running with a single long coupling link, although some carry three link couplings. Later the locomotives were equipped with screw couplings together with a hook to carry the coupling when it was not required.

TENDERS

The locomotives were built with 3500 gallon six wheel tenders. Starting with 122, 714, 726, 727 & 729 in 4/1902 and finishing with 120 in 6/1907, these tenders were replaced with 4000 gallon double bogie, 'Watercart', tenders. During the 1920's several acquired tenders of the 6-wheel type again, to enable them to work on the Eastern and Central sections of the Southern Railway.

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.

Gauge.

For Finescale, where little sideplay is required, the widest spacers can be used but they will need careful filing to make their width 26.0 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. If the leading axle is 5/32" diameter then reduce the bearing diameter accordingly by fitting a sleeve from short lengths of the 3/16" tubing provided.

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. Open out holes P and fit according to the manufacturers instructions. It may not be possible to use plunger pickups if you wish to fit the inside motion because they may foul each other.

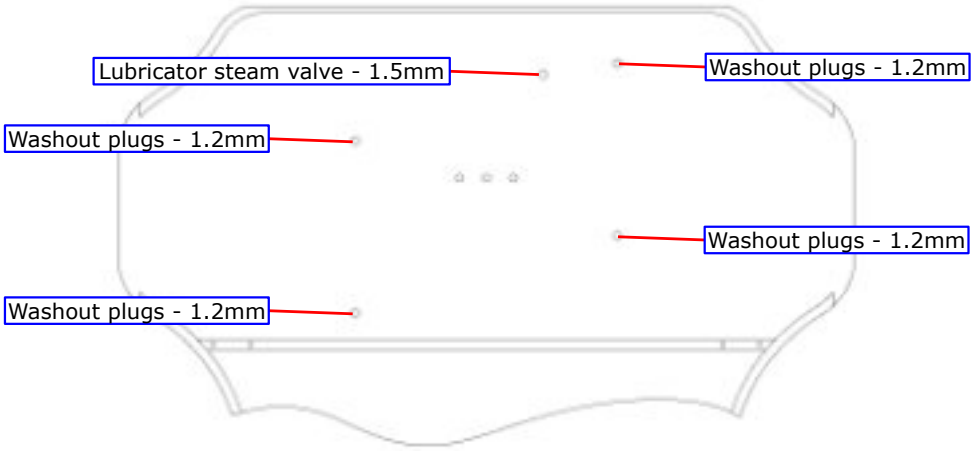
COMPONENTS NOT SUPPLIED

Wheels. Driving wheel - 6’ 7", 22 spoke, 3/16" diameter axle (2) Slater's Ref.7878SW

Leading wheel - 3' 7" diameter, 10 spoke, 5/32" diameter axle Slater's Ref.7843SWMF

M**otor/Gearbox.** The medium size Canon 1833 motor is recommended with either an SDMP 40L/15 gearbox available from Finney 7.

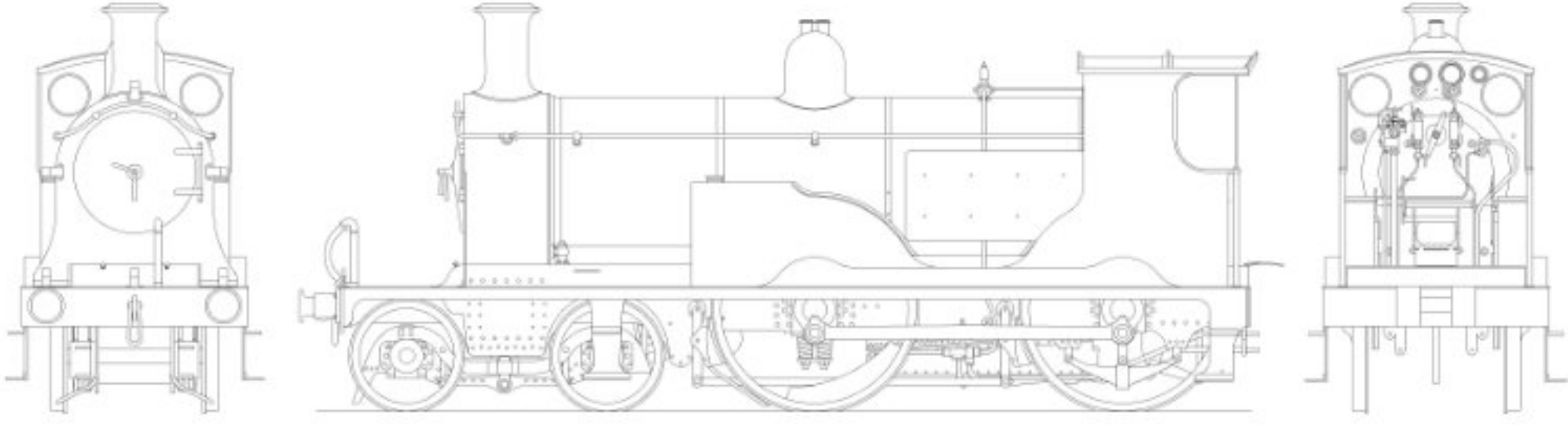
Inside Motion. A separate kit is available from Finney7 to construct the working inside motion.



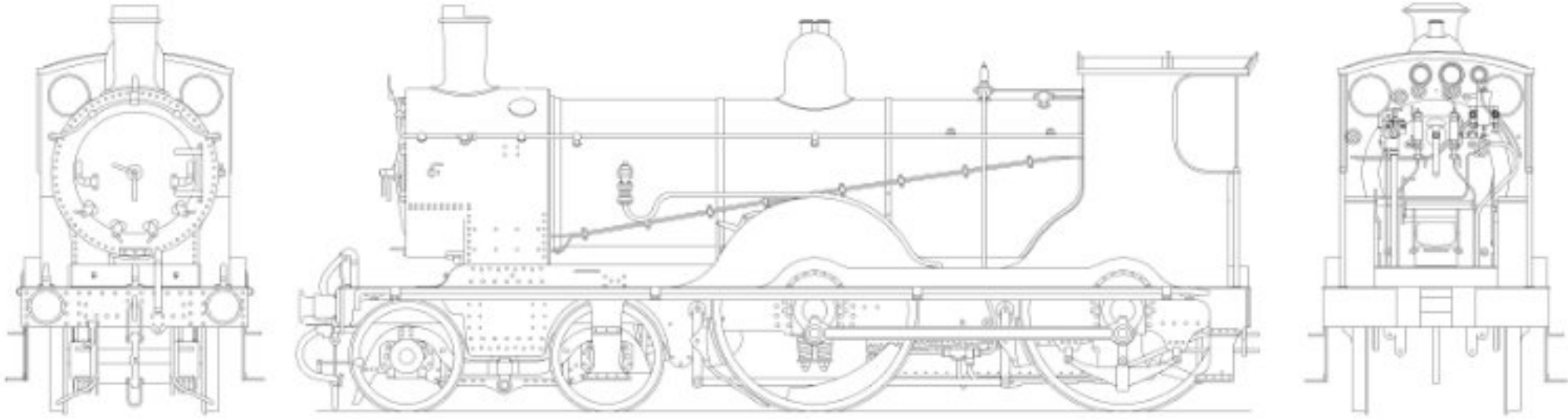
Rebuilt Firebox Drilling Template



Rebuilt Smokebox Drilling Template



T9 in original condition. Firebox cross water tubes, sandboxes combined with splashers, flush rivets on buffer beam, drag beam and hanging plates.



T9 late 1940s. Extended smokebox with Maunsell superheater, sandboxes between the frames, prominent riveting, SR lamp irons and large wash-out plugs.

FRAME PREPARATION

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 1 unless detailed

Coupling Rods. The coupling rods (M1 & M2 or M3 & M4) should now be made up so that they can be used as a jig for fitting the coupled wheel hornblocks accurately into place. First drill out all the crankpin holes to a convenient size which is well undersized for the crankpins. Remove all burrs caused by the drilling. Now drill a hole with 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. Start construction by preparing the frames (F1 & F2). To construct the kit as designed with a compensated chassis first remove all the axle holes by cutting along the half etched lines and clean up. The rear hornblocks are smaller than the front. Use the rear hornblock (F10) instead of the two components on the hornblock fret. Construct the hornblocks as described in the separate instructions. Solder one of the rear hornblocks to the inside of the frame aligning it with the half etched lines and with the bottom of the frame.

Now open out the following holes in the frames:

For compensation beam pivot - 1/8"

For brake hanger pivots - 0.8 mm

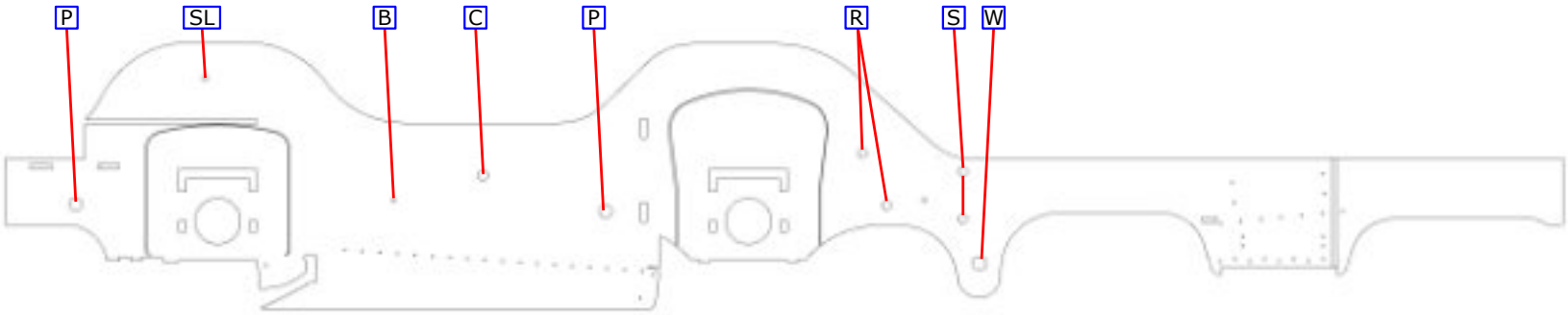
For reversing cylinder (WM2) - 1.4 mm

For sandboxes (WM1) - 1.2 mm if modelling a loco with frame mounted sandboxes

For weigh shaft if fitting inside motion - 2.0 mm

For sanding lever (C9/2) - 0.8 mm

If using plunger pick ups, suitable mounting holes need to be drilled, as directed in the manufacturer's instructions.



FRAME CONSTRUCTION

All the parts are on sheet 1 except where detailed.

Select the front, middle and rear stretchers (F5, F6 & F7) to suit your chosen gauge. Solder the 6BA bogie fixing nut over the hole in the front stretcher and, if required, add the alternative bogie pivot, from 2.0 mm wire, as shown on page 6. The hole indicated is the preferred option. For inside motion tap the fixing hole as shown. 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 stretchers fit properly in their corresponding chassis slots so that the spacer is hard up against the inside of the frames. Now assemble the frames and stretchers. Start by tack soldering the middle stretcher to both sides. Check that everything is square and hard against the frames. Solder the remaining stretchers to the frames checking constantly that the chassis is square and the frames are straight.

Place lengths of 0.8 mm wire through the brake hanger pivots leaving about 6 mm protruding on each side of the chassis, before removing the excess wire from between the frames.

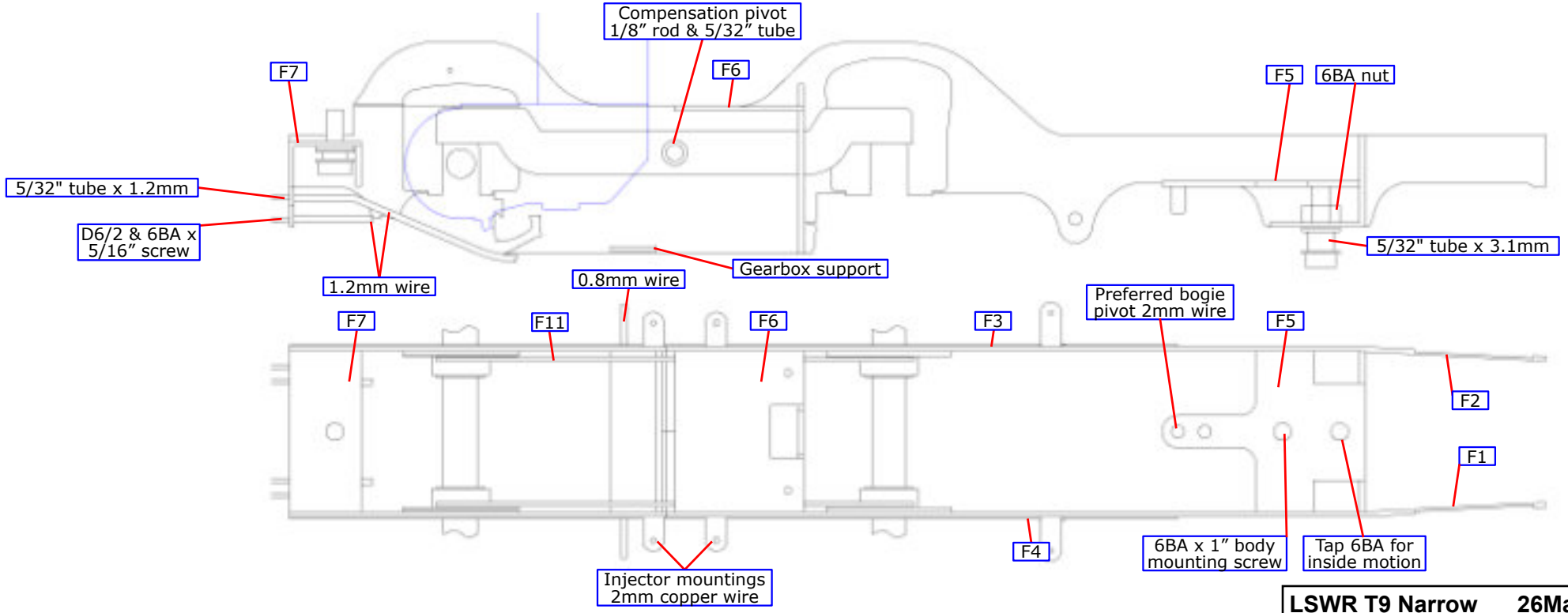
Fitting the Compensation Beams. Cut a piece of 1/8" brass rod so that it fits through the holes and is flush with the outside face of the chassis frames. Cut two equal pieces 3/32" tube which together fit between the frames and solder the beams (F11) to them close to one end.

Temporarily fit the beams and all the wheels and axles to confirm that the compensation works properly and check that the chassis is sitting level. The bogie rests on a suitable selection of washers (B7/2). One full thickness and one half thickness seems to work. When correctly set up the top of the frames should be 27.8 mm above rail level.

Make a bracket to support the motor/gearbox from scrap brass and solder it to the rear of the centre frame spacer.

Frame Overlays. Emboss all the rivets on the frame overlays (F3/2 & F4/2). Fold down the sand pipe and injector pipe brackets as appropriate. Those not required can be broken off. Check that the hornblocks are free in the slots in the overlays which only need tack soldering around their edges.

Inside Motion. If you are fitting working inside motion, build it now following the separate instructions.



BOGIE

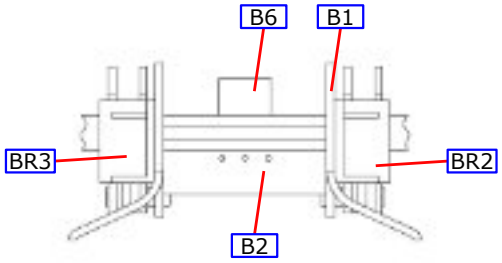
Parts are on sheet 1 except where detailed. The bogie carries the weight of the front of the locomotive and is the third balance point of the compensation system. Bogie clearance on curves is a particularly difficult problem with this prototype. The bogie is designed so that it is as close to the prototype as possible. Clearly some experimenting will be required once you have decided on the gauge being used and the desirable minimum radius of curve to be negotiated.

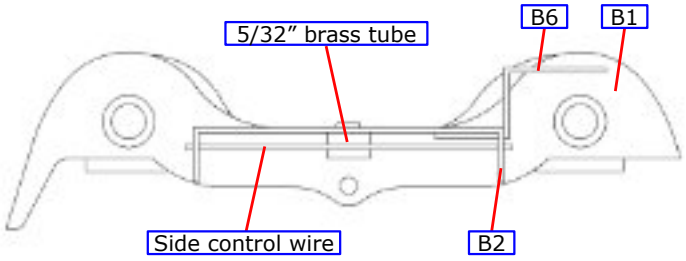
Note that if you decide to use one of the alternative bogie pivot positions the weight of the rear of the locomotive is still carried by the bogie. This means the 6 BA screw is still used to retain the bogie, but that the slot in the bogie stretcher will need opening out so that the bogie will pivot freely about the alternative pivot (shown below). You may also decide to dispense with the side control wires.

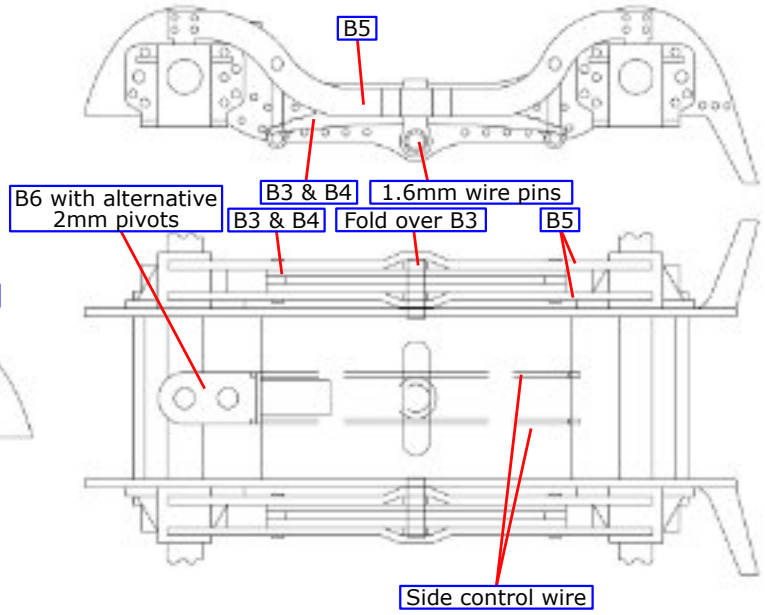
Emboss the bogie frame (B1) rivets and form the guard irons to shape. Fold up the appropriate bogie stretcher (B2/2) (use the middle width for O Finescale or the widest for Scaleseven) and solder in place in the slots in the frames. Note the slot for the bogie pivot bracket must be at the back. Solder the axle boxes (BR2 & BR3) in place and the wire stretchers from 1.2 mm wire. Carefully ream the axle holes to 5/32" diameter and temporally fit the wheels to check that the bogie is running true.

Using the bogie spring middle lamination (B4) as a guide drill two 1.2 mm holes and a 1.6 mm hole into a block of wood or Tufnol and insert 1.2 mm and 1.6 mm wire into appropriate holes. These pieces of wire are used as a jig to accurately align the spring components (B3 & B4) and the equalising beams (B5). Note the equalising beams are asymmetric - select carefully! Fold over the outer strips on the outer lamination through 180° before assembling all the components on the jig. Align carefully before soldering together. Trim the wire pins to length leaving the 1.6 mm wire long at the back to enable the assembly to be located on the bogie through the 1.6 mm hole in the frames. Repeat for the other side.

The side control springing can now be constructed as shown below soldering the spring wires at one end only. If appropriate, fold up the bogie pivot bracket (B6/2) and solder in place. Make up the bogie mounting screw using the washers B7/2 for the pivot, B8/2 for the fixing screw and B9/2 for the axles.







ORIGINAL CONDITION - FINISHING THE CHASSIS

All the parts are on sheet 1 except where detailed.

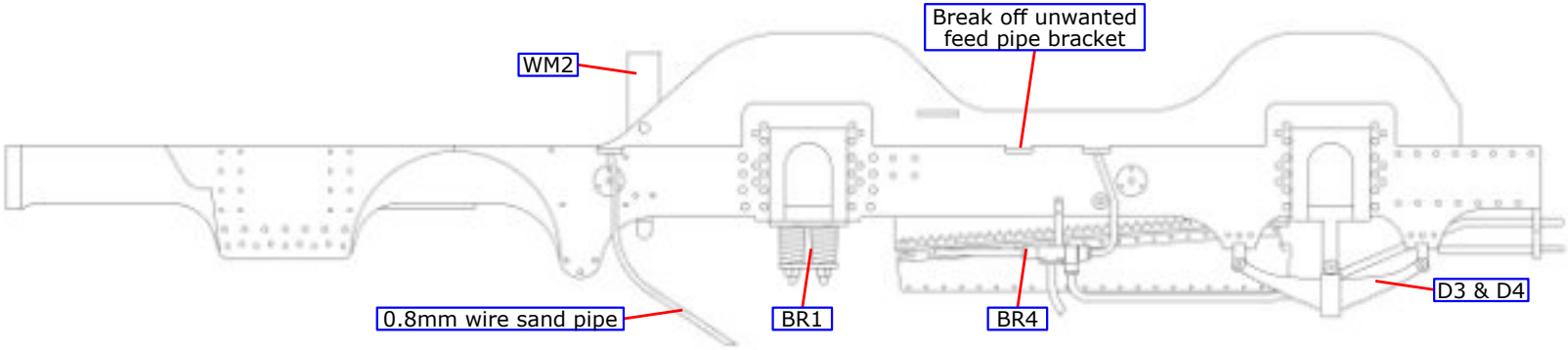
Attach the balance weights to the wheels as shown below and fit the crankpins.

At this stage pickups should be assembled and fitted to the chassis.

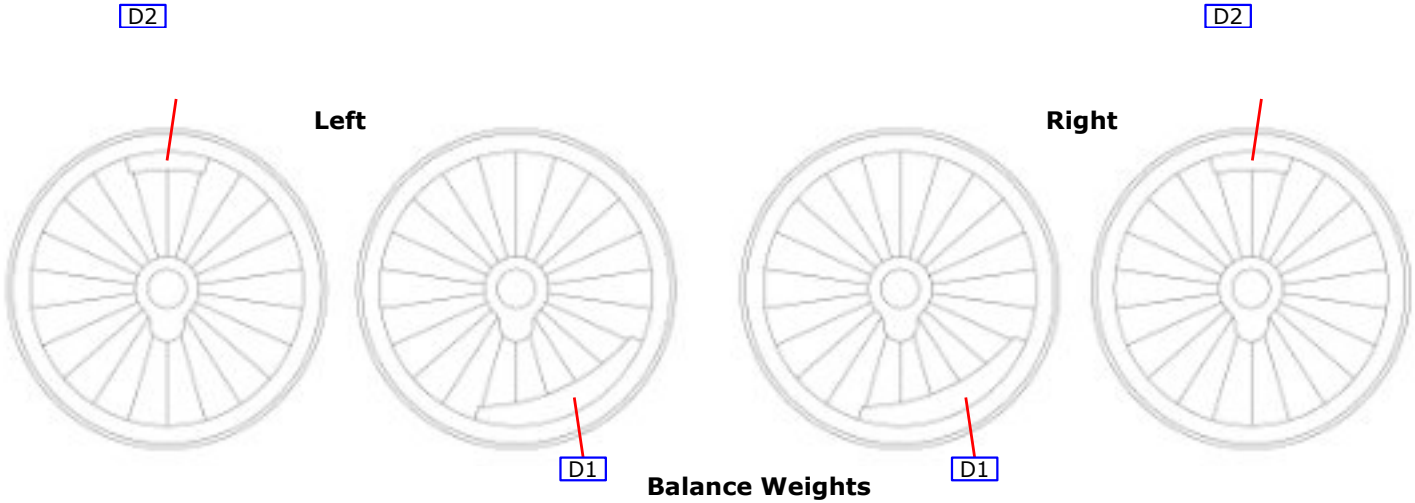
Assemble the wheel sets, bearings and rods selecting 3/16" axle washers of appropriate thickness to control side play. The clearance between the crankpins and the inside of the splashers is very tight. Minimal side play on the coupled wheels is desirable especially in S7. It may be necessary to reduce the thickness of the crankpin nut to gain sufficient clearance.

A thorough check of all clearances at this stage is important. You should now have a mechanically acceptable chassis. Now connect the motor to your pickups and test run.

Springs. Laminate two rear spring outer laminations (D3) around a rear spring middle lamination (D4) and clean up to remove all cusp. Repeat for the other spring. Once the wheels are in place solder the rear springs into position. Solder the cast front springs (BR1) in place. The axles are now retained by the springs as shown below.



Frames in Original Condition. Sandboxes Combined with Splashers, Feed Pipe from Injectors to Clack Boxes in Original Position.



Balance Weights

ORIGINAL CONDITION - BRAKES

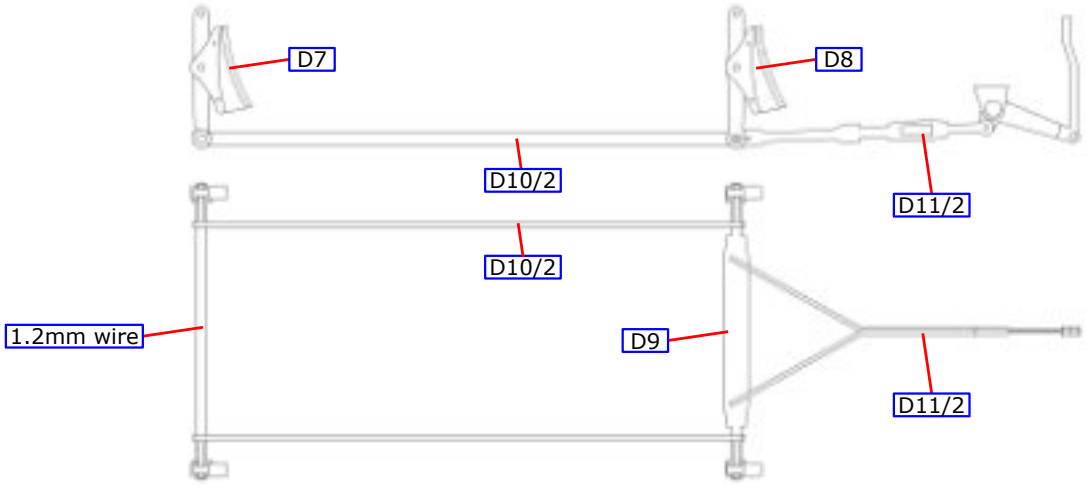
All the parts are on sheet 1 except where detailed.

Brakes. Assemble the brake shoes and hangers from their laminations (D7 & D8), ensuring you get two handed pairs. The rear brake pull rod can be made up from two laminations of D11 now, ensuring that they form a 'Y' shape as shown below. Start assembly by joining the front pull rods (D10) to the rear brake cross shaft (D9) and adding in the front cross shaft from 1.2 mm wire, ensuring the assembly is square. Add the brake pull rod piece, aligning it with the half-etched marks on the rear brake cross shaft.

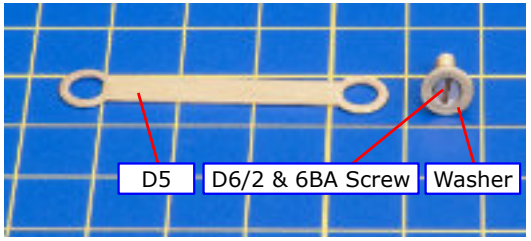
The brake hanger and shoes can then be fitted to the assembly and the chassis, ensuring clearance for the driving wheels and any side-play.

Complete the chassis detailing by fitting the steam reverse cylinder (WM2). Bend sand pipes from 0.8 mm wire and attach to the brackets on the frames. Fit the injectors (BR4) to the brackets on the frames as shown on the previous page.

Construct the drawbar and screw as shown below



Brake Gear in Original Condition.



REBUILT CONDITION - FINISHING THE CHASSIS

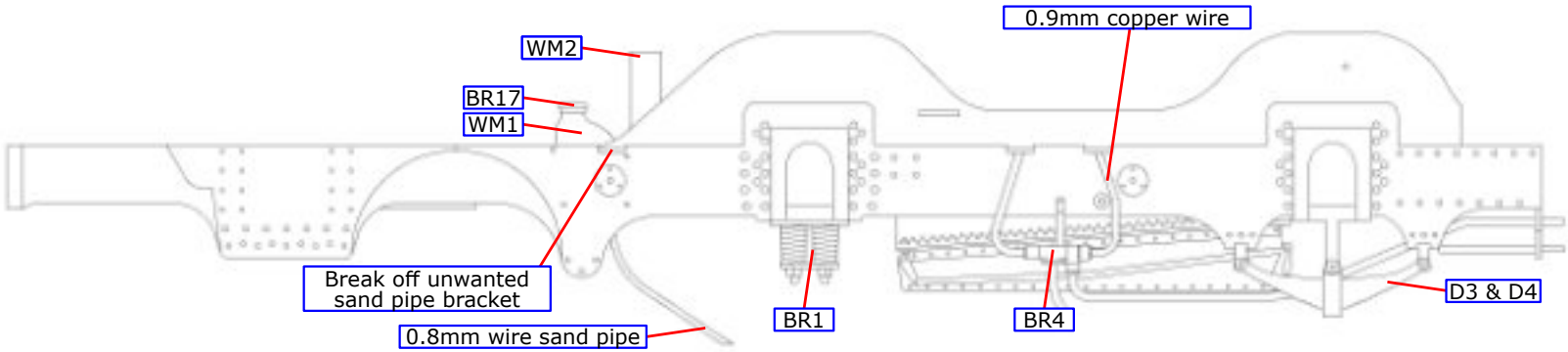
Attach the balance weights to the wheels as shown below and fit the crankpins. At this stage pickups should be assembled and fitted to the chassis.

Assemble the wheel sets, bearings and rods selecting 3/16" axle washers of appropriate thickness to control side play. The clearance between the crankpins and the inside of the splashers is very tight. Minimal side play on the coupled wheels is desirable especially in S7. It may be necessary to reduce the thickness of the crankpin nut to gain sufficient clearance.

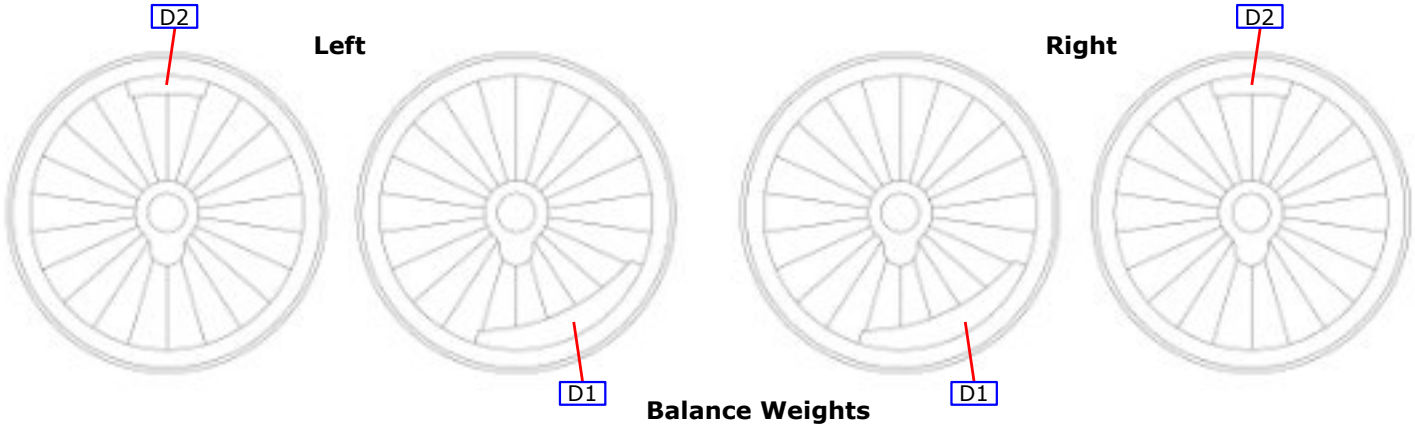
A thorough check of all clearances at this stage is important. You should now have a mechanically acceptable chassis. Now connect the motor to your pickups and test run.

Springs. Laminate two rear spring outer laminations (D3) around a rear spring middle lamination (D4) and clean up to remove all cusp. Repeat for the other spring. Once the wheels are in place solder the rear springs into position. Solder the cast front springs (BR1) in place. The axles are now retained by the springs as shown below.

Fit the sandboxes (WM1) to each frame and then add the sandbox lids (BR17). Bend sand pipes from 0.8 mm wire and attach to the sandboxes. Remove the unwanted sand pipe brackets. Fit the steam reverse cylinder (WM2). Fit the injectors (BR4) to the brackets on the frames as shown below.



Frames in Rebuilt Condition. Sandboxes Between Frames, Feed Pipes From Injectors over Leading Splashers

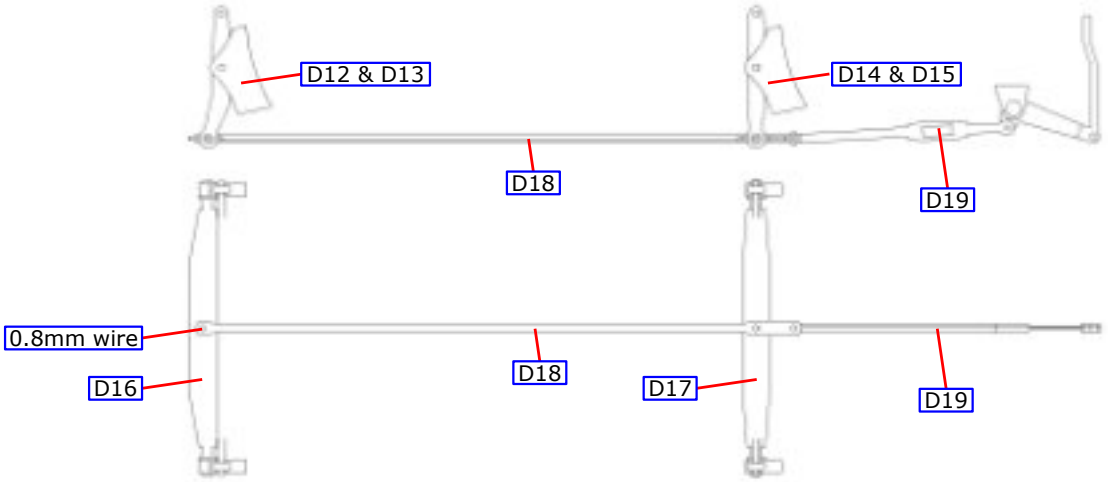


Balance Weights

REBUILT CONDITION - BRAKES

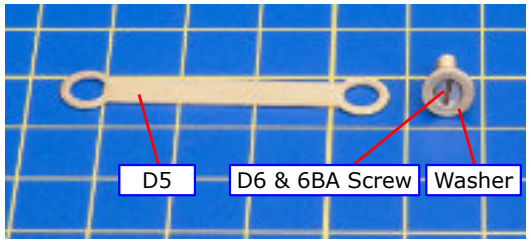
Brakes. All parts are on etch 2 unless detailed.

Assemble the brake shoes and hangers from their laminations (D12 & D13, D14 & D15/Etch 1), ensuring you get two handed pairs. Laminate the brake pull rod & brake cylinder lever lamination (D19). Start assembly by joining the front pull rods (D18) to the front and rear brake cross shaft (D16, D17), ensuring the assembly is square. Add the brake pull rod piece, aligning it in the fork formed by the laminations of D18. The brake hanger and shoes can then be fitted to the assembly and the chassis, ensuring clearance for the driving wheels and any side-play



Brake Gear in Rebuilt Condition.

Construct the drawbar and screw as shown below.



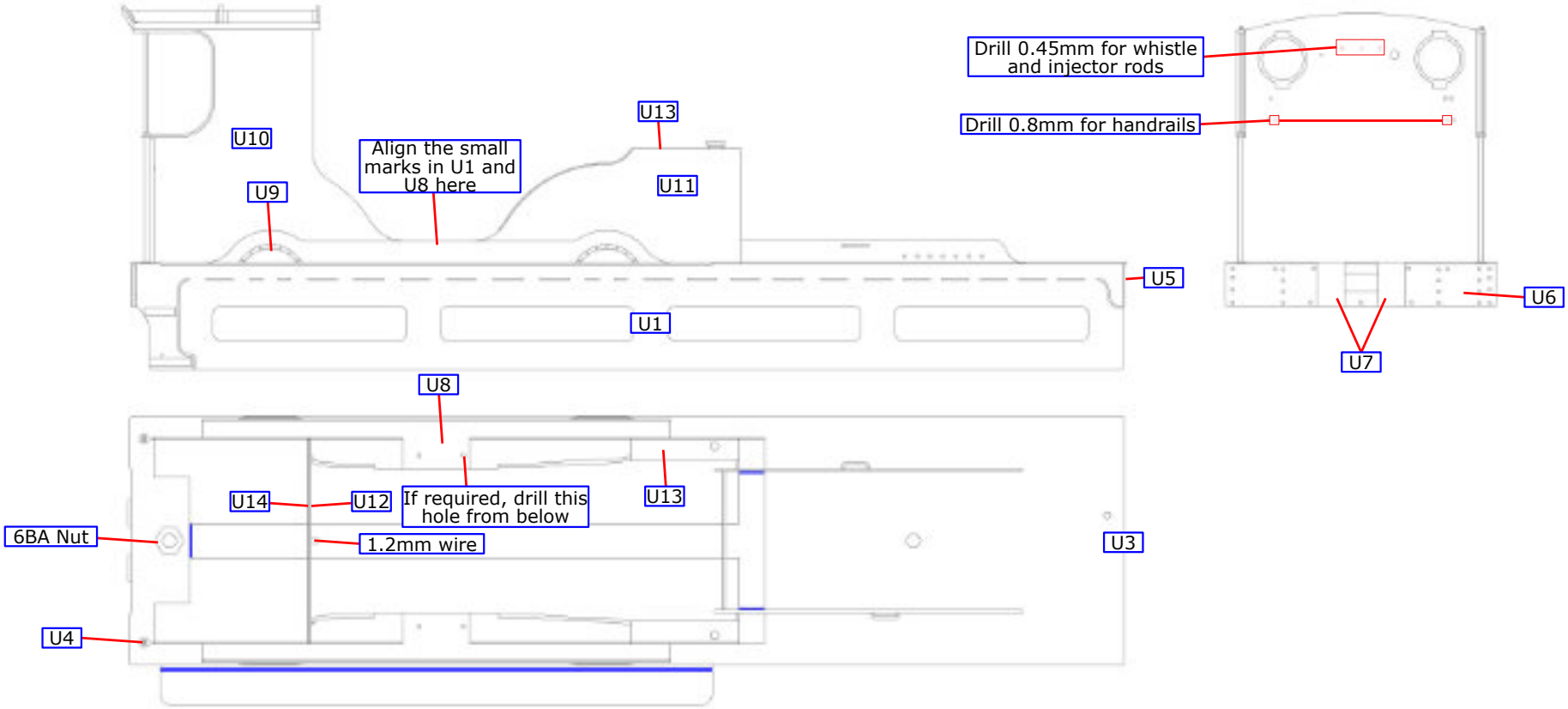
ORIGINAL CONDITION - FOOTPLATE, CAB SIDES & SPLASHERS 1

Fold up the valance jig (U1/3) as shown below and solder the corner fillets (U2/1) in the etched grooves to strengthen the jig and ensure it remains square. Do not remove the jig, or any parts, until told to so in these instructions.

Solder a 6BA nut and the cab handrail base (U4/2) over the appropriate holes in the footplate (U3/4) as shown below. Fit the footplate over the valence jig with the inner edges registering in the slots in the coupling rod splasher sides and solder in place. It is essential that the inner edges of the footplate are tight against the coupling rod splasher sides. Solder the buffer beam (U5/4) and the drag beam (U6/3) in place. Add the drag beam rubbing plates (U7/2).

Carefully curve the coupling rod splasher tops (U8/4) to shape by forming over suitable diameter rods; constantly check the fit with the coupling rod splasher sides. Solder the tops in place in the rebate along the edge of the coupling rod splasher sides. Add the coupling rod extension covers (U9/3)

Fold the flaps along the lower edge of the cab side (U10/3) and the front splasher sides (U11/3 & 4) through 90° and solder in place on top of the coupling rod splashers with the flaps under the footplate. Carefully curve the cab front outside lamination & rear splasher top (U12/3) and the front splasher top (U13/4) to shape. Solder the two laminations of the cab front (outer U12 & inner U14/3) together with a length of 1.2 mm wire through the central hole to aid alignment. Referring to the drawing below right, drill through holes in the cab front for the handrails, whistle rod and injector steam valve rods.



ORIGINAL CONDITION - FOOTPLATE, CAB SIDES & SPLASHERS 2

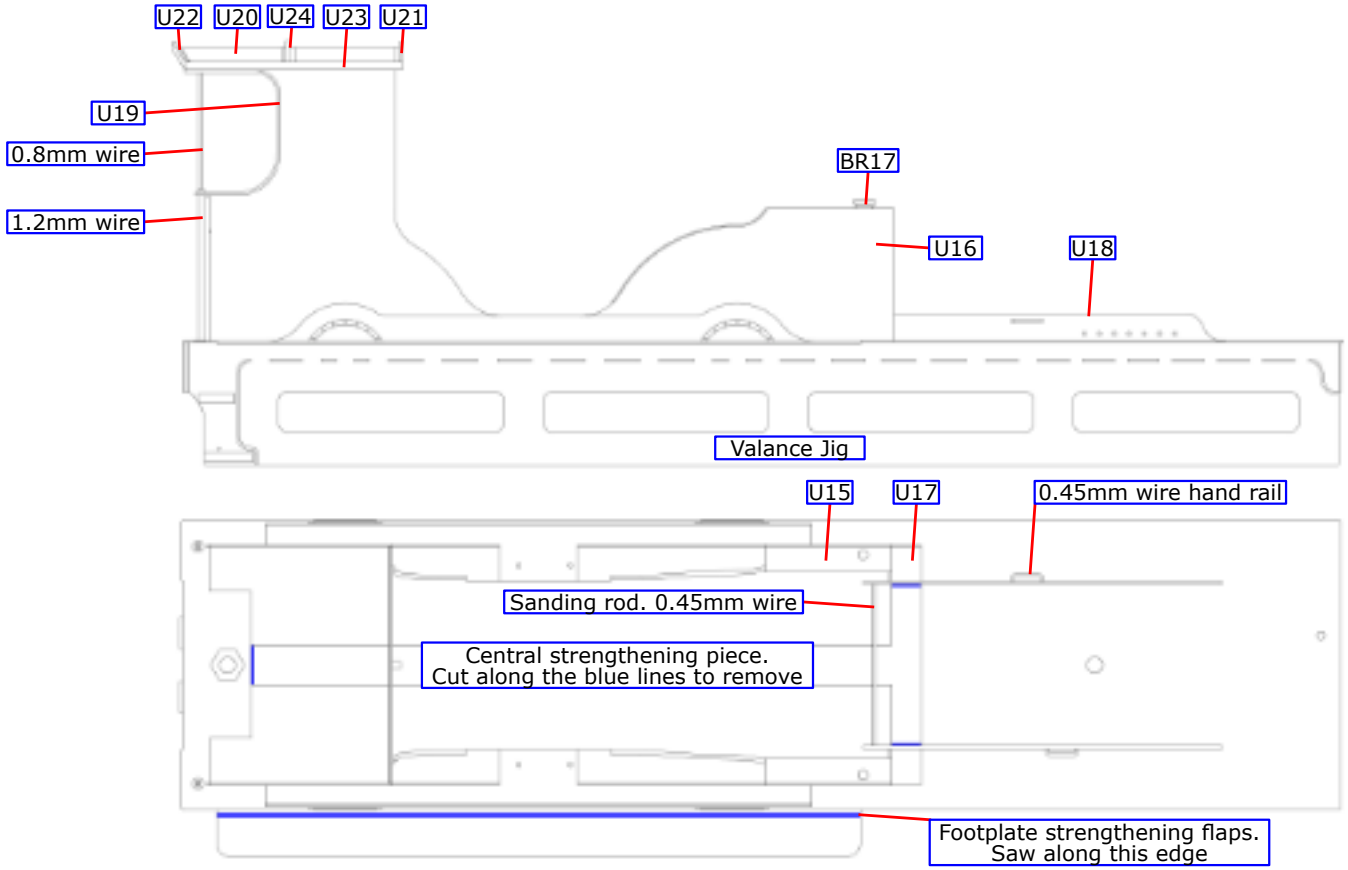
Unless specified, all etched parts come from sheet 4

Solder the cab front into the slot between the cab sides with the splasher tops in place in the half etched rebate along the edge of the splasher side and the top of the coupling rod splasher top. Now solder the splashers tops to the sides working from the cab to the front. At each stage ensure that the splasher top is fitting tight into the rebate in the splasher side. Add the sandbox top (U15) and the sandbox front (U16). Add the footplate hole filler piece (U17/3) to fill the half etched hole in the footplate. Solder the sandbox lids (BR17) to the top of the sandboxes.

Retain the valance jig. Carefully remove the footplate strengthening flaps and gently file the footplate edges clean. Now remove the 'T' shaped central strengthening piece from the footplate.

As appropriate, emboss the rivets in the front frame extensions (U18/2) - **note the two rearmost holes are not rivets** but serve to locate the sanding rod shown below. Add the sanding rod from 0.45 mm wire. Add the small handrails from 0.45 mm wire before soldering in place in the slots in the footplate.

Solder the cab cut-out beading (U19/3) in place. A tight fit is essential or it will appear to be too long. Fit the cab handrails as shown below. Leave a small projection at the top to represent the prototype fixing nut. Form the cab roof (U20) to shape and add the angle pieces (U21, U22, U23 & U24). The cab roof is simply retained by the projections at the top of the handrail stanchions.

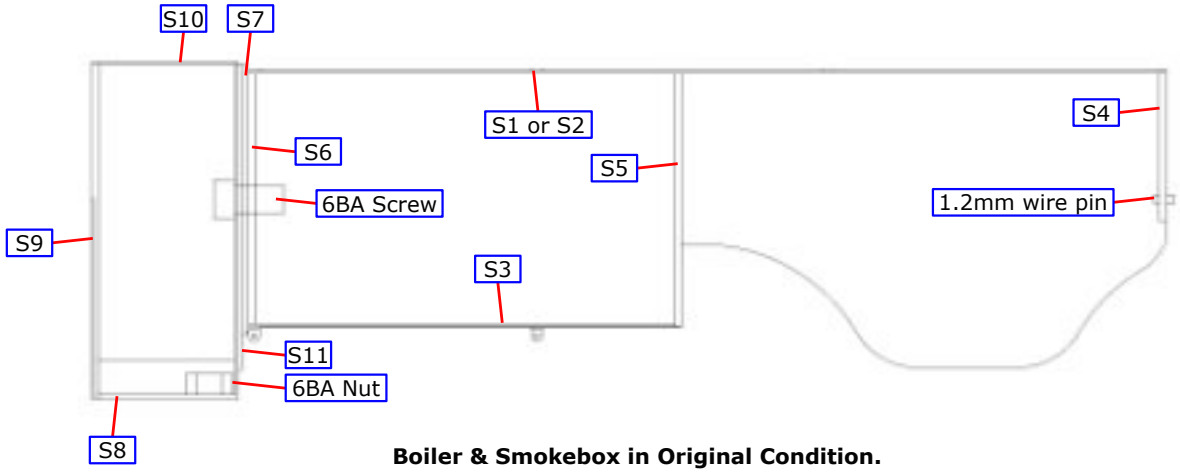


ORIGINAL CONDITION - SMOKEBOX & BOILER

Boiler. Roll the boiler wrapper (S1/3 or S2/3) and form the firebox sides to shape. Solder the wrapper ends together using the boiler joining strip (S3/2) and solder in the front former (S6/1). Now solder the middle former (S5/1) and rear former (S4/1) in place with the notch in the top of the rear former aligned with the notch in the wrapper. Represent the bolts in the joining brackets using 0.45 mm wire. Tap the hole in the boiler former 6BA so that the smokebox, the smokebox and boiler ring (S7/1) and the boiler can be screwed together.

Smokebox. Fold up the smokebox base & rear former (S8/2) and solder a 6BA nut over the fixing hole. If appropriate, drill 1 mm holes for the four dog catches (BR12) in the smokebox front (S9/1) before soldering to the base. Roll the smokebox wrapper (S10/2) to shape and solder in place. Emboss the rivets in the smokebox rear plate (S11/2) and if appropriate drill holes for the clack boxes (BR10) before soldering the rear plate in place on the rear of the smokebox.

Now assemble the smokebox, smokebox and boiler ring (S7/1) with a 6BA screw. Check the fit of the smokebox and boiler with the running plate, cab front and splashers. The boiler can be rotated on the dowel in the cab front to align the inner edges of the splashers and the lower edge of the firebox. Once any adjustments to the fit have been made, the boiler and smokebox can be removed from the cab, splashers and running plate for detailing.



Boiler & Smokebox in Original Condition.

ORIGINAL CONDITION - UPPER WORKS DETAILING

All etches on this page are from etch 2 unless specified.

Using a Carborundum disc in a mini-drill, cut through the half etch tabs holding the valence jig to the valance. Snap off the redundant parts along the half etched lines. Clean up the edges of the valences. Fit the boiler and smokebox to the footplate and cab. Solder in place.

Form the cylinder cover (U34) and add the cylinder cover knobs (BR18); solder the cover in place. Solder the wing plate & footplate vertical angles (U35) in place and then add the wing plate & footplate horizontal angles (U36).

If appropriate, fold up the water tube shields (U38/3). Use a big fillet of solder in the corners so that they can be rounded to shape. Fit the firebox side covers (WM10).

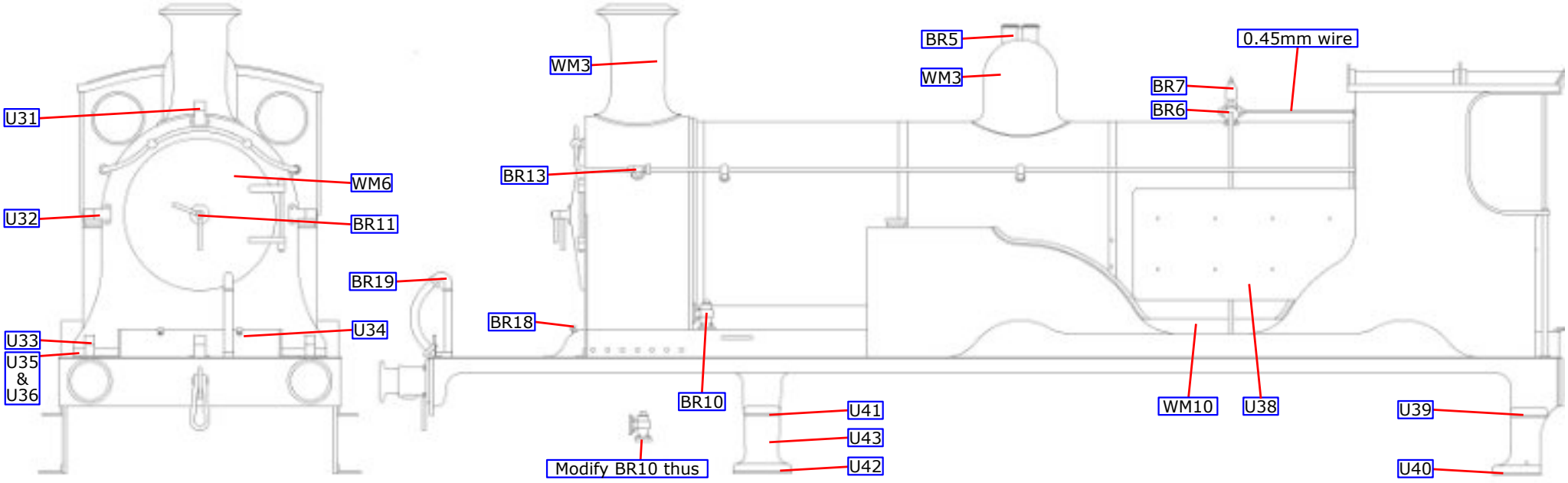
Fold the rear step treads, upper and lower (U39/3 & U40/3) and fit to the step back. Fold the front step treads, upper and lower (U41 & U42) and solder to the front step back (U43). Solder this assembly to the footplate.

Modify the clackboxes (BR10) by removing the pipe tail and fit to the smokebox rear plate. Fit the smokebox door (WM6) and the smokebox door handles (BR11). Fit the original chimney (WM3). Fit the inside of the dome (WM9) and then the dome (WM5). Fit the safety valves (BR5) to the dome. Fit the two injector valves (BR6) and the whistle (BR7) to the firebox top. Use 0.45 mm wire for the injector valve operating rods.

Fit the buffer housings to the buffer beam. Solder the vacuum pipe (BR19 to the footplate.

Fold 0.8 mm wire to make the handrails. The smokebox front uses short knobs and the boiler sides uses medium knobs; attach the handrails and knobs. Fit the blower valve (BR13) to the left side of the smokebox. Fit the handrail to the frame extensions from 0.45 mm wire.

Fit the LSWR smokebox top lamp bracket (U31) and the LSWR smokebox side lamp brackets (U32) to the smoke box front. Fit the LSWR footplate lamp bracket (U33) to the footplate.



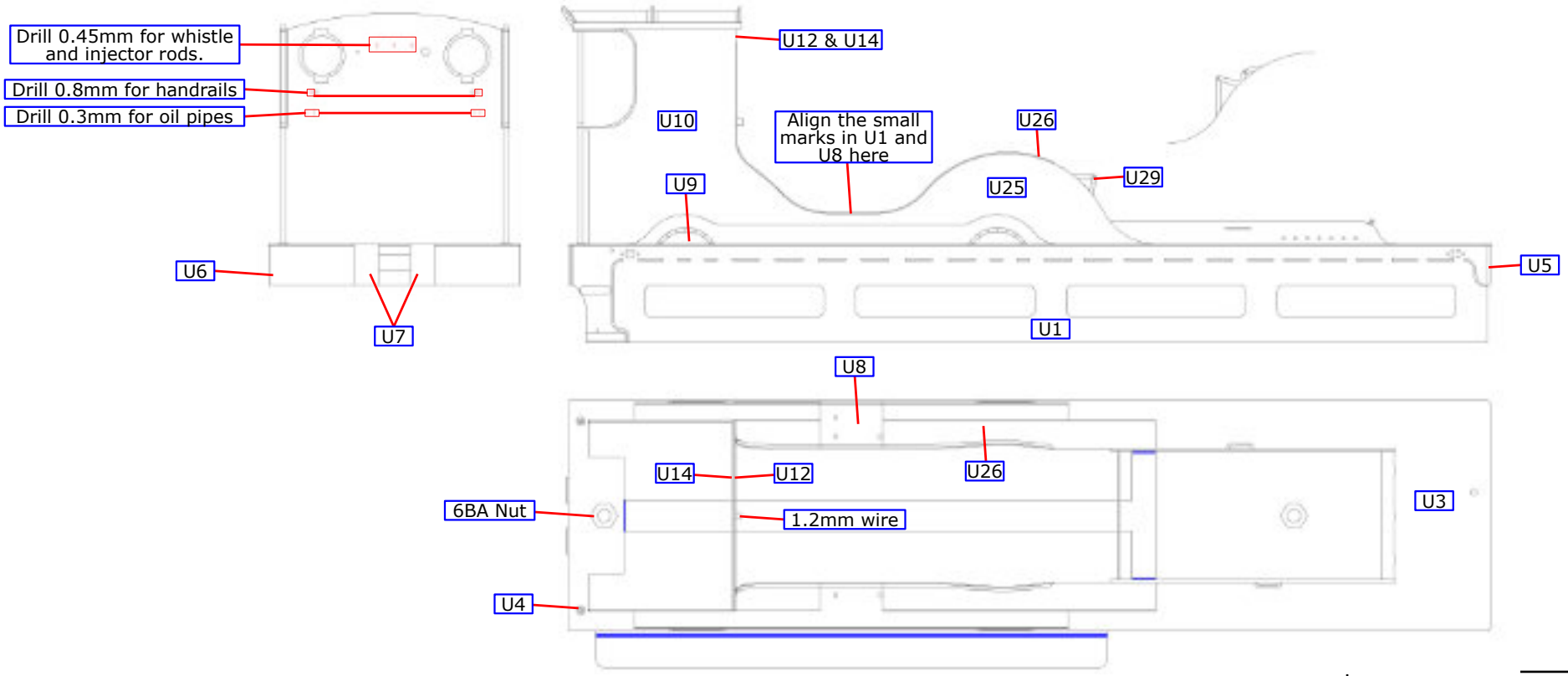
REBUILT CONDITION - FOOTPLATE, CAB SIDES & SPLASHERS 1

Emboss the rivets in the valences jig (U1/3) and drill the hole for the pipe which runs along the valence on the right hand side. Fold up the valance jig and solder the corner fillets (U2/1) in the etched grooves to strengthen the jig and ensure it remains square.

Solder a 6BA nut and the cab handrail base (U4/2) over the appropriate holes in the footplate (U3/4) as shown below. Fit the footplate over the valence jig with the inner edges registering in the slots in the coupling rod splasher sides and solder in place. It is essential that the inner edges of the footplate are tight against the coupling rod splasher sides. If appropriate emboss the rivets in the buffer beam (U5/4) and drag beam (U6/3) before soldering in place. Add the drag beam buffer rubbing strips (U7/2).

Carefully curve the coupling rod splasher tops (U8/4) to shape by forming over suitable diameter rods; constantly check the fit with the coupling rod splasher sides. Solder the tops in place in the rebate along the edge of the coupling rod splasher sides. Add the coupling rod splasher extension cover (U9/3) if appropriate to your prototype.

Fold the flaps along the lower edge of the cab side (U10/3) and the front splasher side (U25/3) through 90° and solder in place over the coupling rod splashers with the flaps under the footplate. Carefully curve the cab front outside lamination & rear splasher top (U12/3) and the front splasher top (U26/4) to shape. Solder the two laminations of the cab front (U12/3 & U14/3) together with a length of 1.2 mm wire through the central hole to aid alignment. Referring to the drawing below, drill through the holes in the cab front for the handrails, whistle rod, injector steam valve rods, lubricator steam valve rod, lubricator steam pipe and lubricator pipe runs.



REBUILT CONDITION - FOOTPLATE, CAB SIDES & SPLASHERS 2

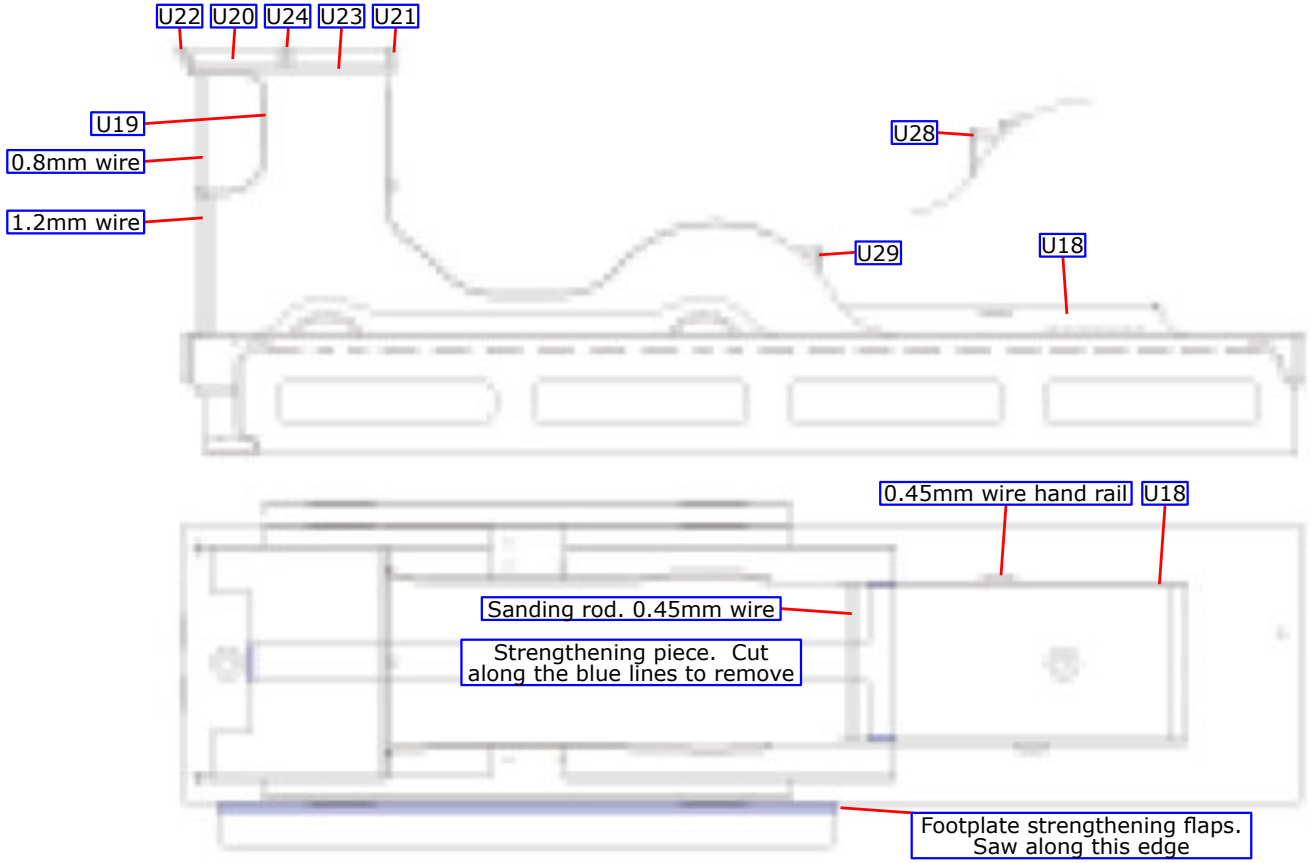
Unless specified, all etched parts come from sheet 4

Solder the cab front into the slot between the cab sides with the splasher tops in place in the half etched rebate along the edge of the splasher side and the top of the coupling rod splasher top. Now solder the splasher tops to the sides working from the cab to the front. At each stage ensure that the splasher top is fitting tight into the rebate in the splasher side.

Retain the valance jig. Carefully remove the footplate strengthening flaps and gently file the footplate edges clean. Add the pipes which run along the valences as shown in the GA using the steam pipe & vacuum pipe brackets (U30/2) and 1.2 mm wire. Now remove the 'T' shaped central strengthening piece from the footplate.

As appropriate, emboss the rivets in the front frame extensions (U18/2) - note the two rearmost holes are not rivets but serve to locate the sanding rod shown below. Add the steam reverse linkage (U28/2) to the front left hand splasher and the sanding rod linkage (U29/2) to the front right hand splasher, which is located by passing the sanding rod through the small hole.

Solder the cab cut-out beading (U19/3) in place. A tight fit is essential or it will appear to be too long. Fit the cab handrail stanchions as shown below. Leave a small projection at the top to represented the prototype fixing nut. Form the cab roof (U20) to shape and add the angle pieces (U21, U22, U23 & U24). The cab roof is simply retained by the projections at the top of the handrail stanchions.



REBUILT CONDITION - SMOKEBOX & BOILER 2

Boiler. If required for your prototype, the holes for the large washout plugs (BR9) should be drilled 1.2 mm and lubricator steam valve (BR8) hole should be drilled 1.5 mm in the boiler wrapper (S1/3 or S2/3) now, using the template on page 3.

Roll the wrapper and form the firebox sides to shape. Solder the wrapper ends together using the boiler jointing strip (S3/2) and solder in the front former (S6/1). Now solder the middle former (S5/1) and rear former (S4/1) in place with the notch in the top of the rear former aligned with the notch in the wrapper. Represent the bolts in the joining brackets using 0.45 mm wire. Tap the hole in the boiler front former (S6) 6BA so that the smokebox, the smokebox & boiler ring (S7/1) and the boiler can be screwed together.

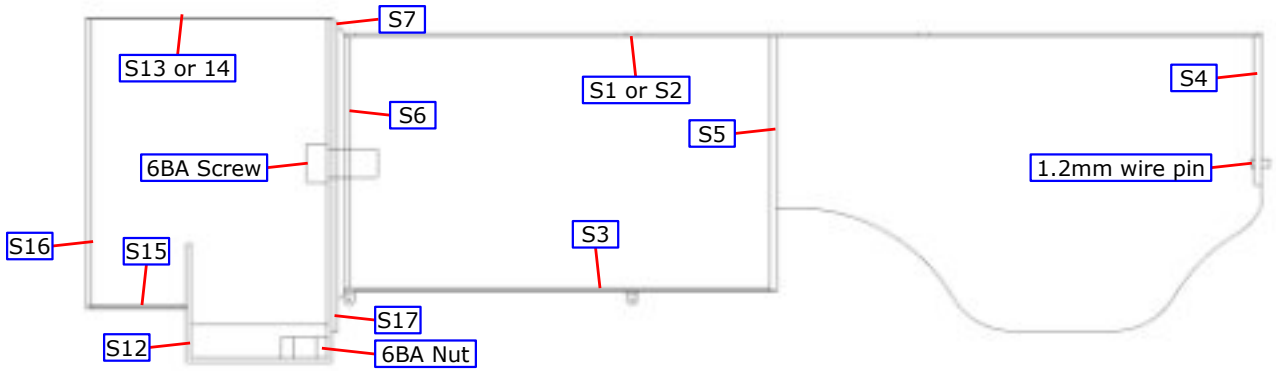
Smokebox. If appropriate for your prototype, emboss the rivets in the smokebox base and rear former (S12/2) before folding it up.

Solder a 6BA nut over the fixing hole. If required, drill any additional holes required for the snifting valves (BR15) 1 mm in the smokebox wrapper, (S13/2 or S14/2), using the template on page 3.

Roll the smokebox wrapper to shape and solder the joining plate (S15/2) in place to join the front section. As appropriate, emboss any required rivets in the smokebox front (S16/2) before soldering in place. Now solder the wrapper and the front to the smokebox base and rear former. Emboss the rivets in the smokebox rear plate (S17/1) before soldering in place on the rear of the smokebox.

Check that the oil pipes will fit in the small holes and open them out if necessary (0.3 mm).

Now assemble the smokebox, smokebox and boiler ring (S7) and boiler with a 6BA screw. Check the fit of the smokebox and boiler with the running plate, cab front and splashers. The boiler can be rotated on the dowel in the cab front to align the inner edges of the splashers and the lower edge of the firebox. Once any adjustments to the fit have been made, the boiler and smokebox can



Boiler & Smokebox in Rebuilt Condition.

REBUILT CONDITION - UPPER WORKS DETAILING 1

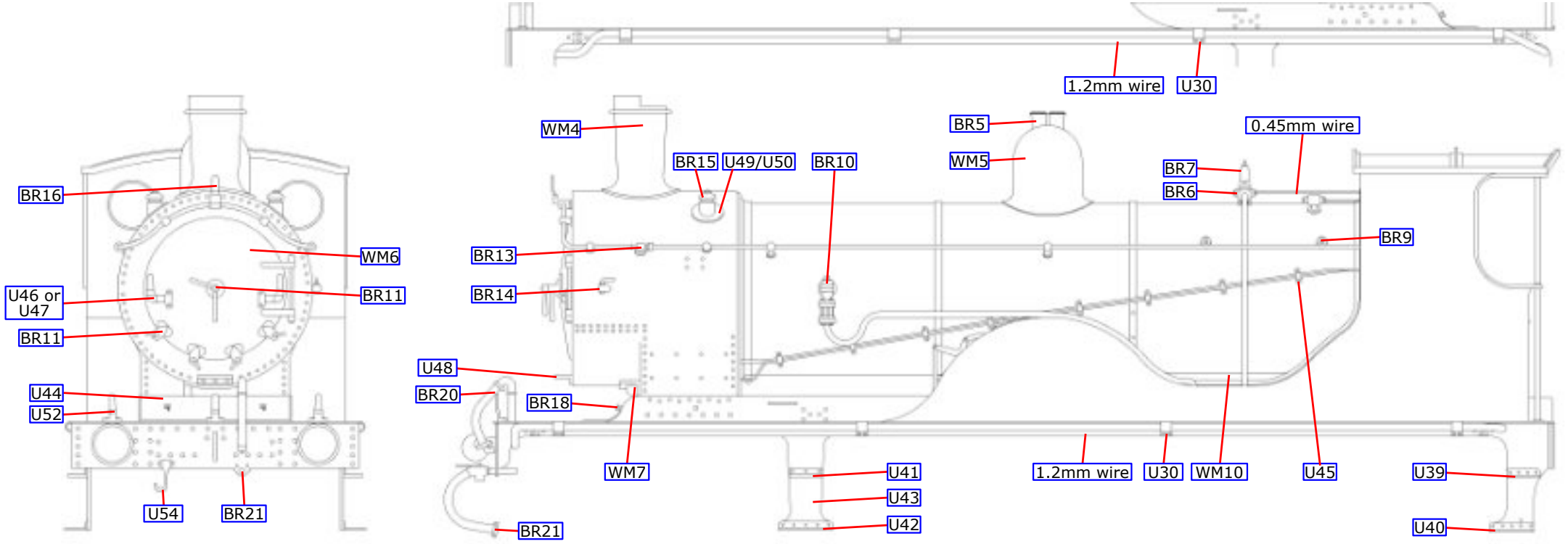
Using a Carborundum disc in a mini-drill cut through the unwanted parts of the valence jig and snap off the redundant parts along the half etched lines. Clean up the edges of the valences. Fit the boiler and smokebox to the footplate and cab. Solder in place.

Fold the rear step treads, upper and lower (U39/3 & U40/3) and fit to the step back. Fold the front step treads, upper and lower (U41/2 & U42/2) and solder to the front step back (U43/2).

Form the rebuilt cylinder cover (U44/2) and add the cylinder cover knobs (BR18); solder the cover in place. Fit the firebox side covers (WM10). Fit the washout plugs (BR9).

Fit the clackboxes (BR10) to the boiler. Bend the feed pipes from 0.9 mm copper wire. Add the oil pipes from 0.3 mm copper wire and secure with the oil pipe brackets (U45/2).

Fit the smokebox door (WM6) and the smokebox door handles (BR11). Fit the Smokebox door dogs (BR12). Fit either the LSWR/SR smokebox side lamp brackets (U46/2) or the SR smokebox side lamp brackets (U47/2) to the smokebox door. Fit the SR smokebox top lamp bracket (BR16) to the smokebox. Fit the smokebox step (U48/2) to the smokebox. Fit the casting under smokebox, superheated condition (WM7) to the smokebox.



REBUILT CONDITION - UPPER WORKS DETAILING 2

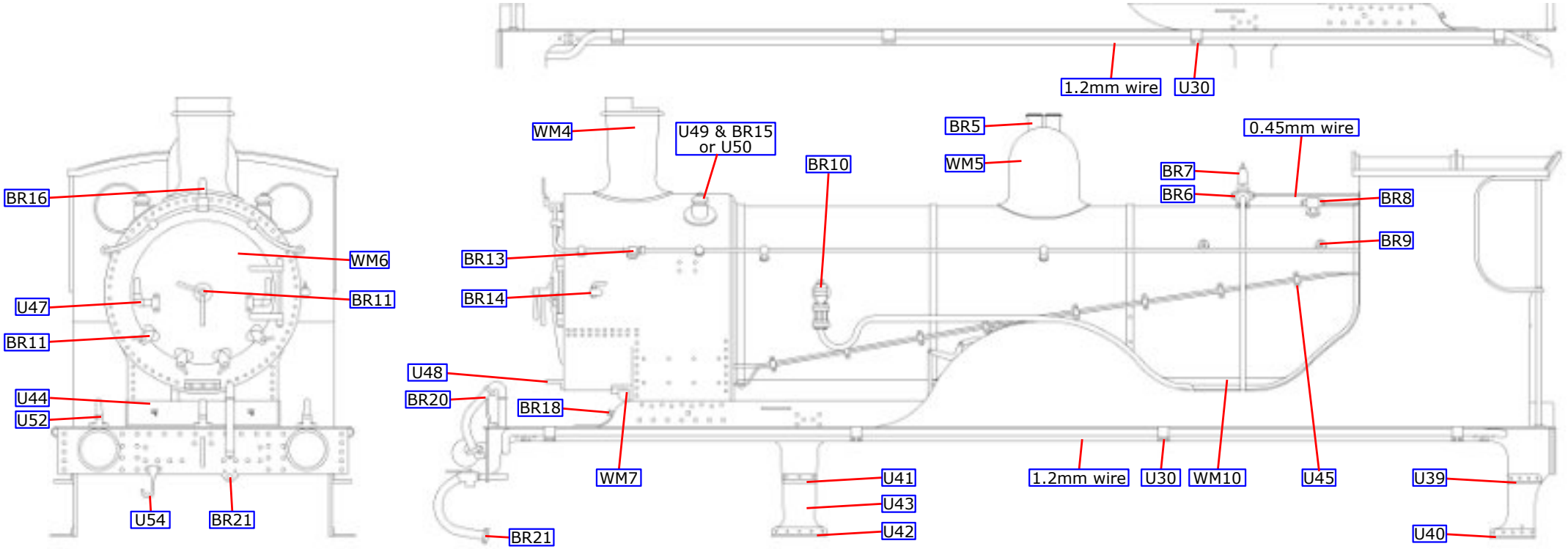
All etched parts on this page re on etch 2

Fit either the snifting valve base plate (U49) and the snifting valve (BR15) or the snifting valve blanking plate (U50). Fit the tube cleaning cock (BR14) to the left of the smokebox.

Fit the superheated chimney (WM4). Fit the inside of dome (WM9) and then the dome (WM5) as shown. Fit the safety valves (BR5) to the dome. Fit the two injector valves (BR6) and the whistle (BR7) to the firebox top. Use 0.45 mm wire for the injector valve operating rods. Fit the lubricator steam valve (BR8) and the operating rod from 0.45 mm wire.

Fit the buffer housings to the buffer beam. Fit the LSWR/SR footplate lamp brackets (U51) or the SR footplate lamp brackets (U52) as appropriate. Solder the vacuum pipe (BR20) to the footplate. Solder the steam heat pipe (BR21) in the bracket on the buffer beam. Add the steam heat pipe valve handle (U53). Add the hook for hanging the screw coupling (U54) as shown.

Fold 0.8 mm wire to make the handrails. The smokebox uses short knobs and the boiler sides long medium knobs, attach the handrails and knobs. Fit the blower valve (BR13) to the left side of the smokebox. Fit the handrail to the frame extensions from 0.45 mm wire.



CAB AND FINAL DETAILING

The cab floor is removable and slides into grooves in the frames; it is held in place by the hinges on the fall plate. The cab floor, the splasher back and top come in three widths to suit the chosen gauge. Select the appropriate width cab floor (C1), splasher back (C3), splasher top, left and right (C4 & C5) and the cab splasher sides (C2). Emboss the rivets for the fall plate in the floor.

Form the joggle in the cab floor and ensure it fits into the frames and is clear of the gearbox. Solder the injector feed valve handles (BR28) to the floor.

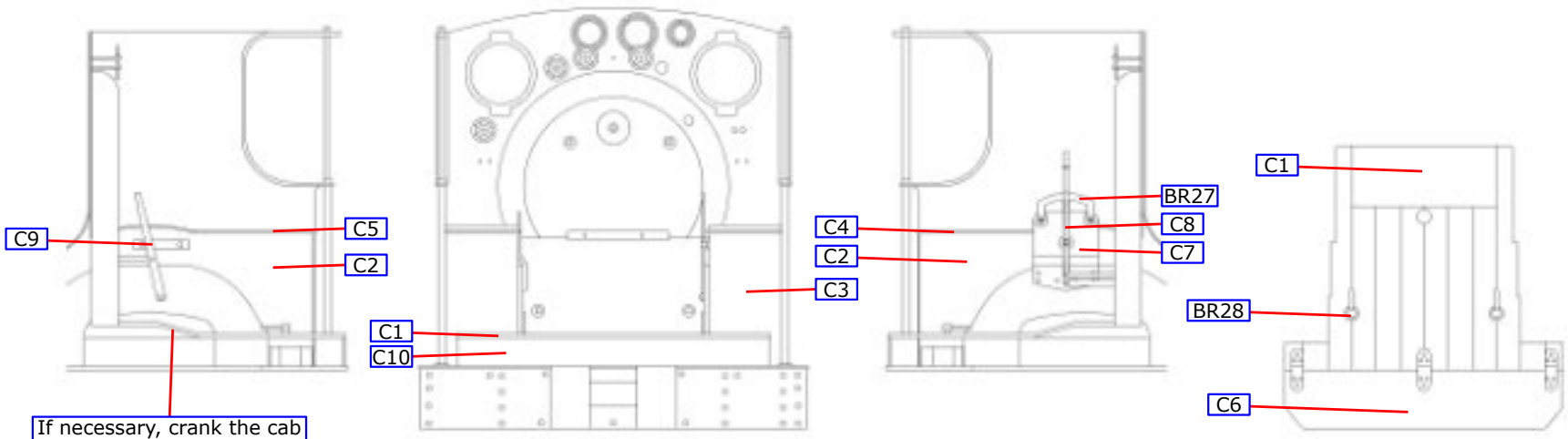
Form the curves in the splasher tops. Solder two short lengths of 0.8 mm wire to represent the sanding lever stops on the right splasher side. Solder the splasher sides in place in the etched groove under the splasher tops. Add splasher backs. Emboss the rivets in the steam reverse lever mounting plate (C7) and form the joggle to enable it to fit over the top of the left frame. Solder the mounting plate and the reversing lever (BR27) in place in the holes in the left splasher side before adding the reversing lever steam reverse indicator (C8). Solder the sanding lever (C9) in place on the right splasher side. Now solder the complete splasher assemblies in place in the grooves in the cab sides. Check that the body fits with the splasher sides outside the frames then solder the cab floor support (C10) in place as shown below.

Emboss the rivets in the fall plate hinges on the fall plate (C6). Fold over the fall plate hinge tabs. Check the fit of the cab floor and fall plate as described earlier.

Attach all the remaining components referring to the drawings and to photographs.

Remove metal from the lower edges of the backhead casting (WM8) until it fits at the correct height between the splashers with its bottom edge level with the underside of the cab floor. Using the drawing of the cab interior the backhead can be assembled and the cab interior detailed.

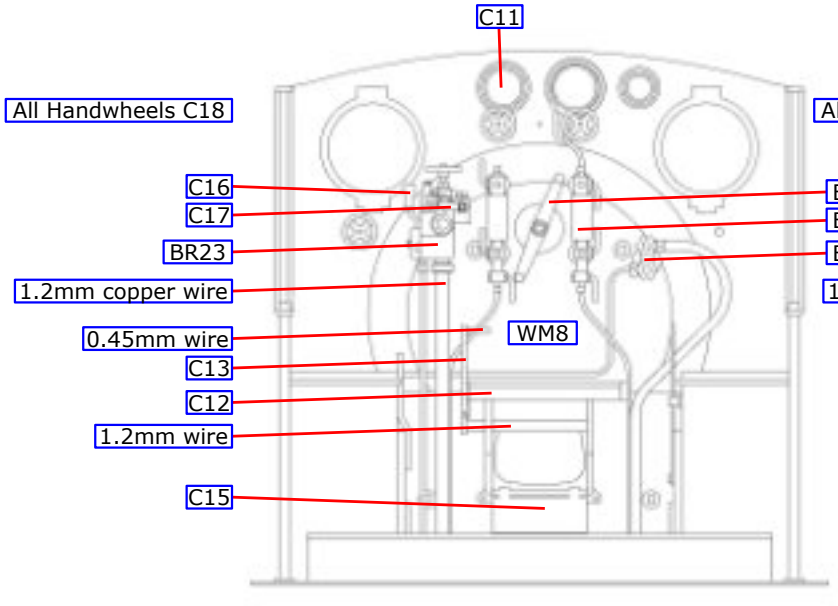
No.	Description	Sheet
C1	Cab floor, 3 widths	2
C2	Cab splasher side (2)	2
C3	Cab splasher back, 3 widths (2)	4
C4	Cab splasher left top, 3 widths	3
C5	Cab splasher right top, 3 widths	3
C6	Fallplate	2
C7	Steam reverse lever mounting plate	2
C8	Reversing lever steam reverse indicator	2
C9	Sanding lever	2
C10	Cab floor support	3
C11	Cab pressure gauges (3)	2
C12	Fire hole	2
C13	Fire hole door handle	2
C14	Fire hole door handle ratchet	2
C15	Fire hole door flap	2
C16	Brake handle	1
C17	Ejector handle	2
C18	Hand wheel (5)	2



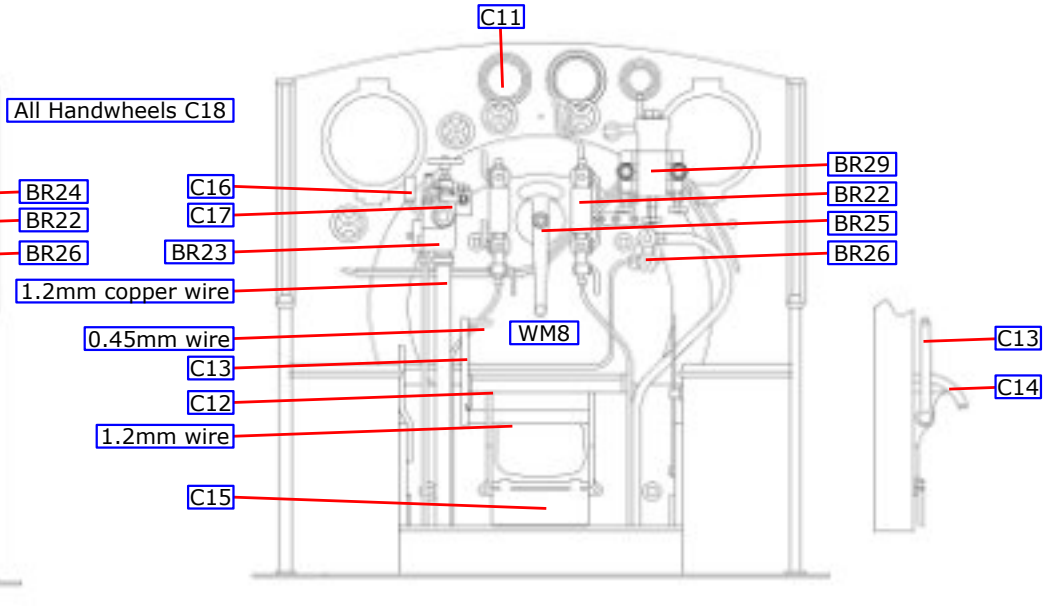
BACKHEADS

Remove metal from the lower edges of the backhead casting (WM8) until it fits at the correct height between the splashers with its bottom edge level with the underside of the cab floor. Using the drawing of the cab interior the backhead can be assembled and the cab interior detailed.

No.	Description	Sheet
C11	Cab pressure gauges (3)	2
C12	Fire hole	2
C13	Fire hole door handle	2
C14	Fire hole door handle ratchet	2
C15	Fire hole door flap	2
C16	Brake handle	1
C17	Ejector handle	2
C18	Hand wheel (5)	2

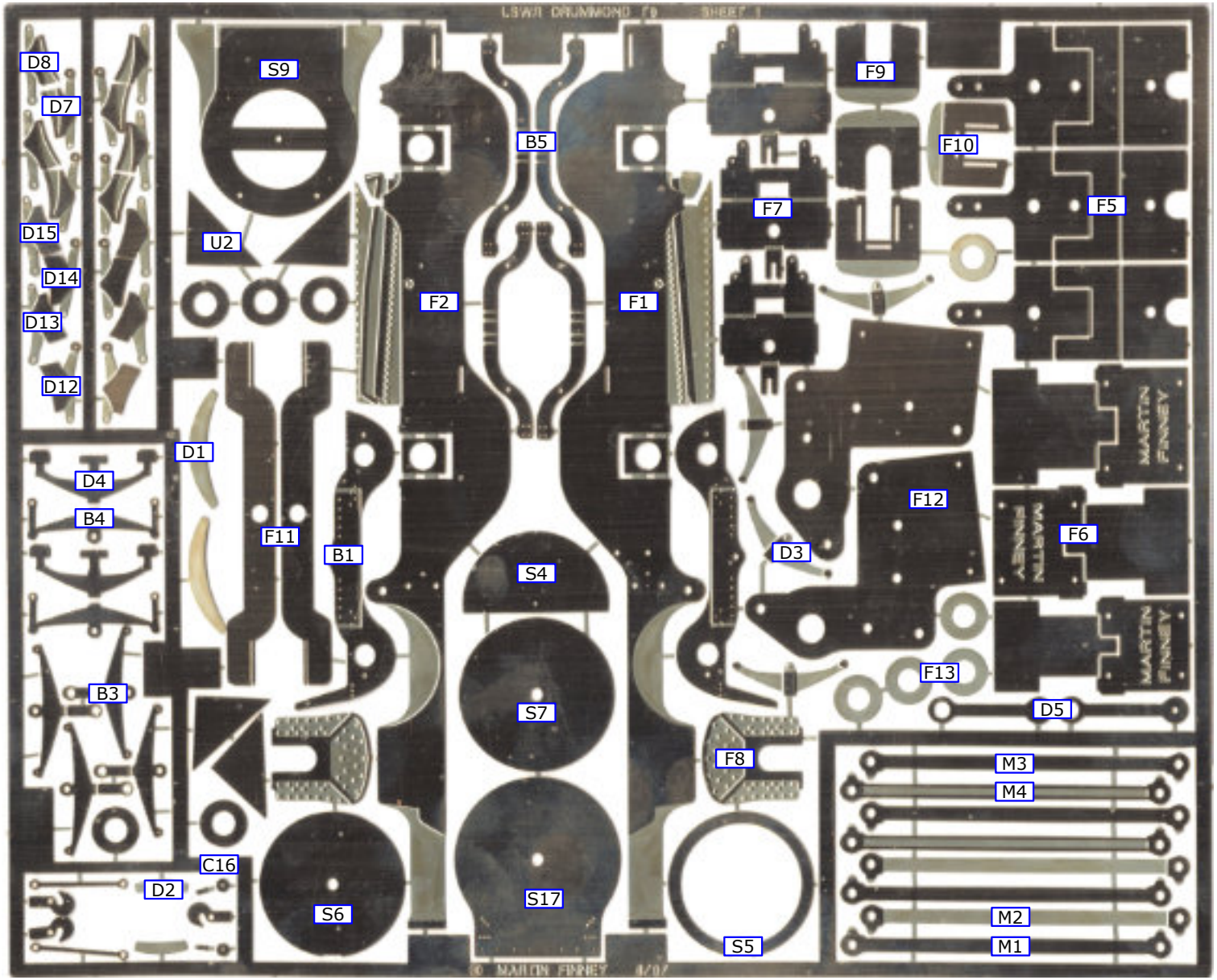


Backhead in Original Condition



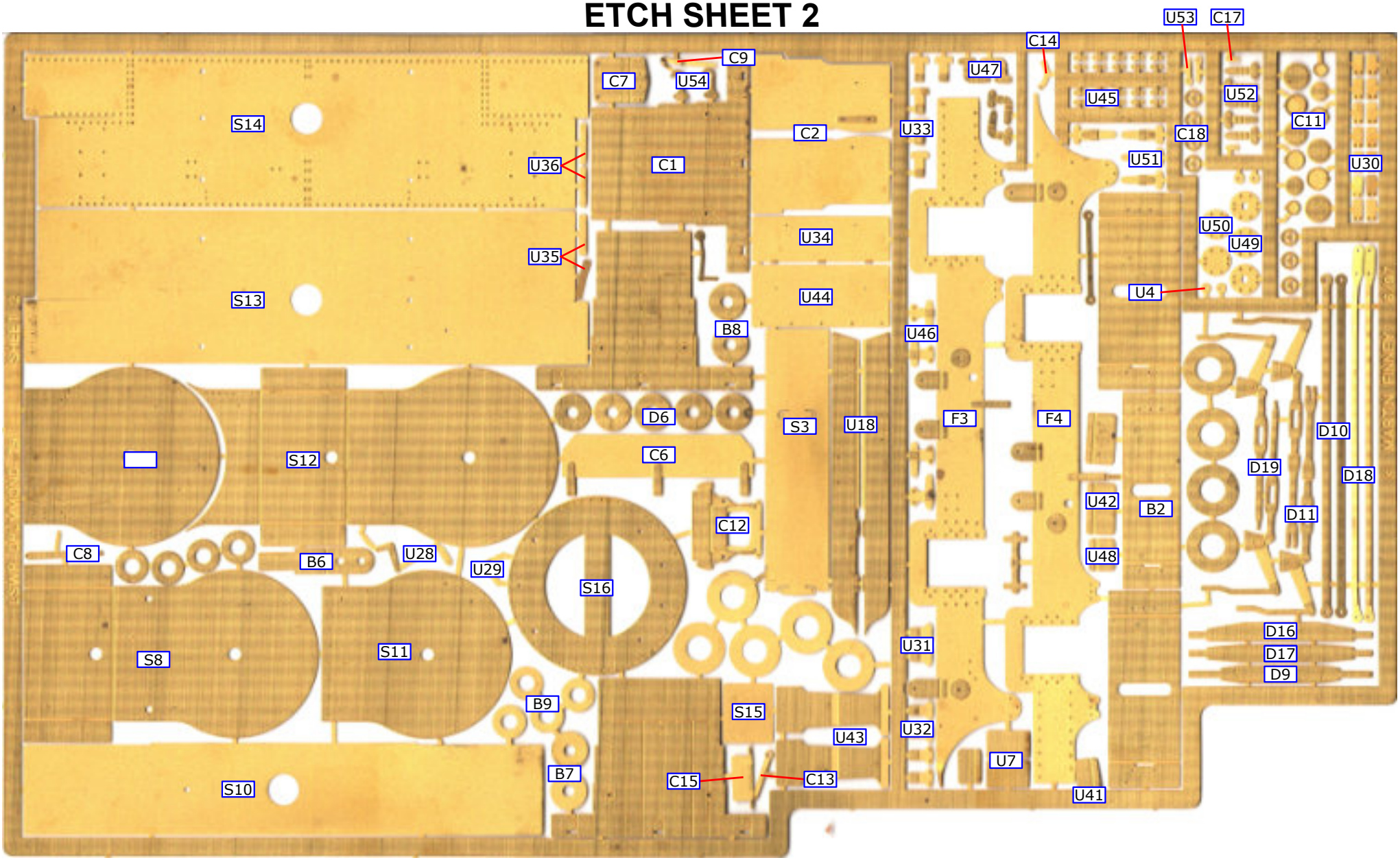
Backhead in Rebuilt Condition

ETCH SHEET 1


LSWR DRUMMOND T9 SHEET 1
D8
D7
D15
D14
D13
D12
D4
B4
B3
C16
D2
S9
U2
B5
F2
F1
D1
F11
B1
S4
S7
S6
S17
S5
F9
F10
F7
F5
F12
D3
F6
F13
D5
F8
M3
M4
M2
M1
MARTIN FINNEY
© MARTIN FINNEY 4/07

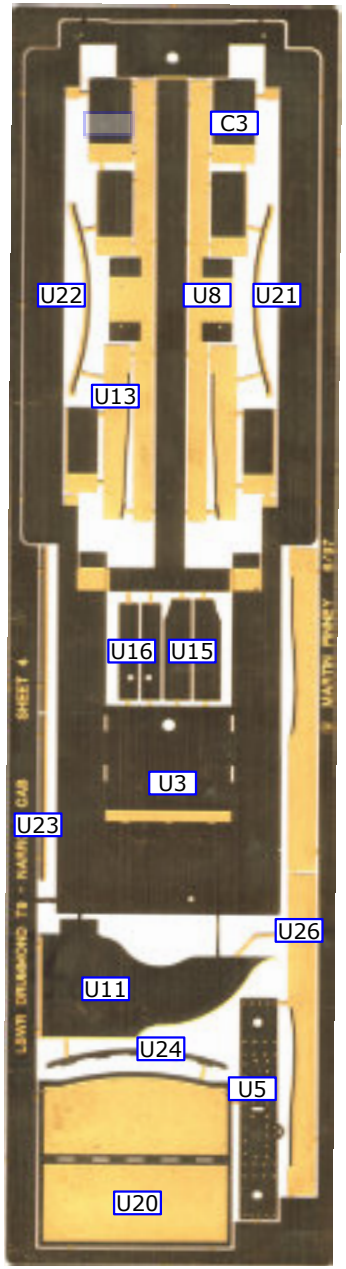
Finney7

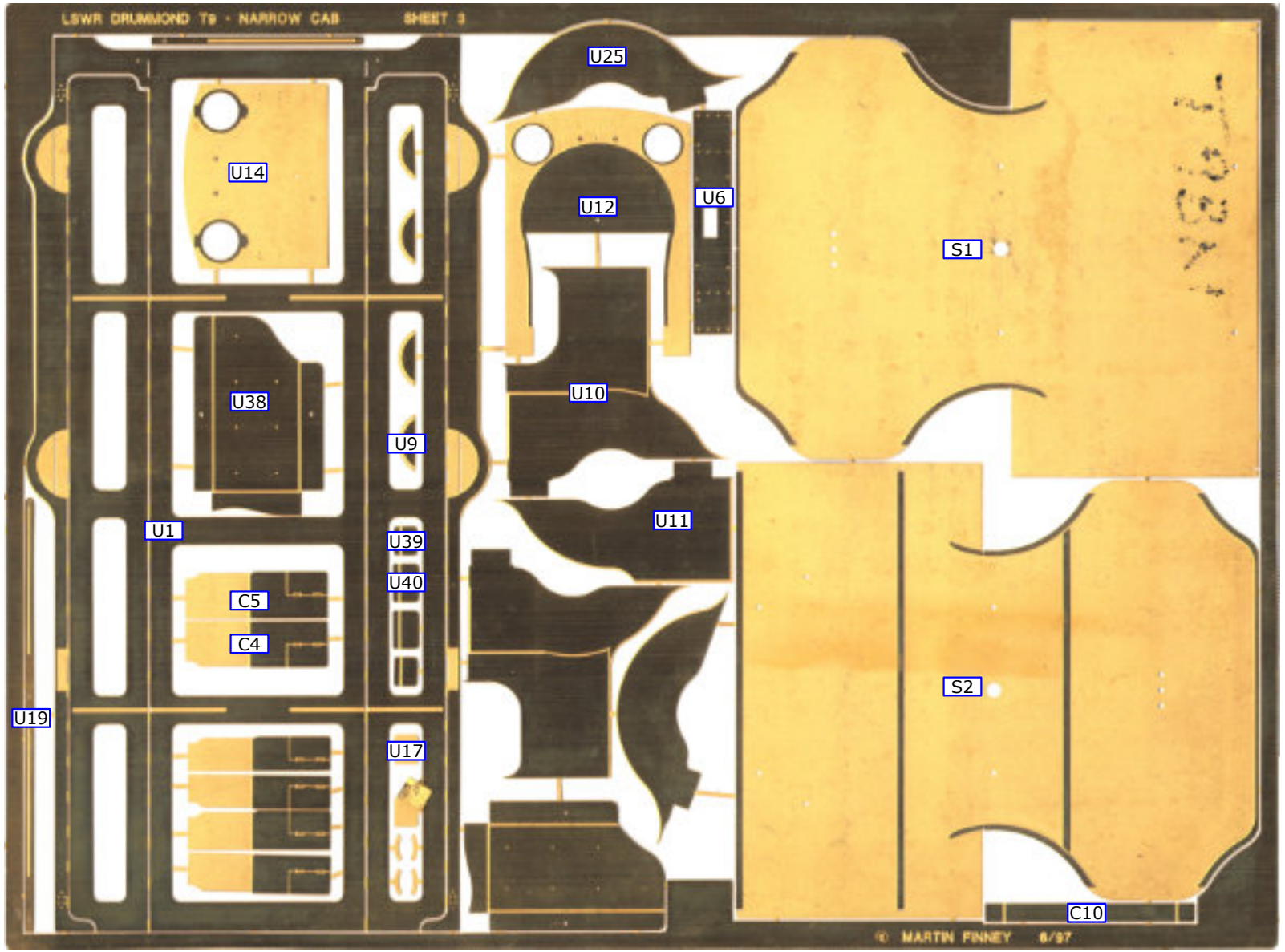
ETCH SHEET 2



Finney7

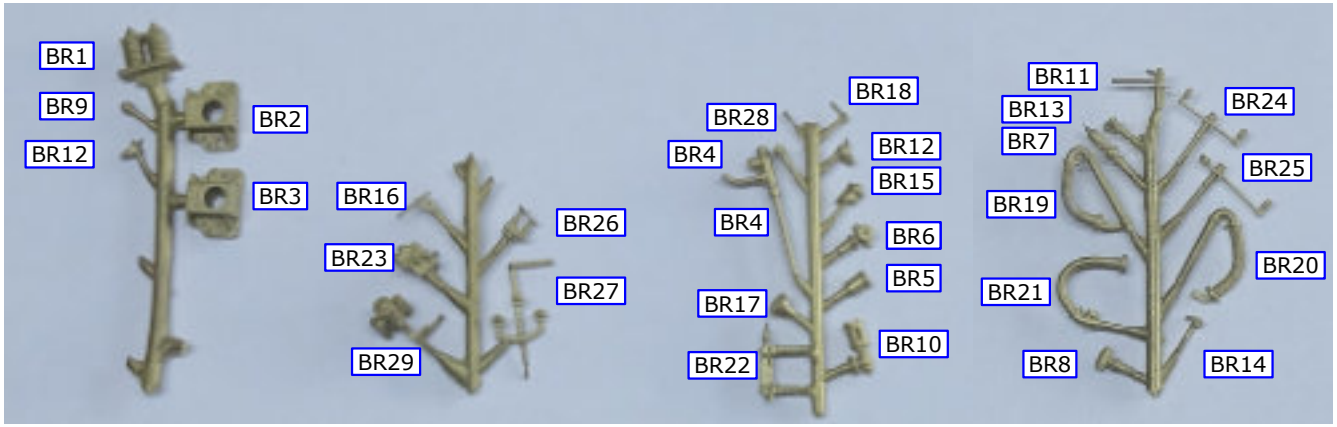
ETCH SHEET 3 & 4





BRASS/COPPER CASTINGS

BR1 Front axle springs (2)
BR2 Bogie axle box, left (2)
BR3 Bogie axle box, right (2)
BR4 Injector (2)
BR5 Safety valve (2)
BR6 Injector valve (2)
BR7 Whistle
BR8 Lubricator steam valve
BR9 Washout plug (4)
BR10 Clack box (2)
BR11 Smokebox door handles
BR12 Smokebox door dog (4)
BR13 Blower valve
BR14 Tube cleaning cock
BR15 Snifting valve (2)
BR16 Smokebox lamp bracket
BR17 Sandbox lid (2)
BR18 Cylinder cover knob (2)
BR19 Original vacuum pipe
BR20 Superheated vacuum pipe
BR21 Steam heating pipe
BR22 Water gauge (2)
BR23 Ejector/brake
BR24 Original regulator handle
BR25 Later regulator handle
BR26 Steam heating valve
BR27 Reversing lever
BR28 Injector feed valve handle (2)
BR29 Detroit lubricator



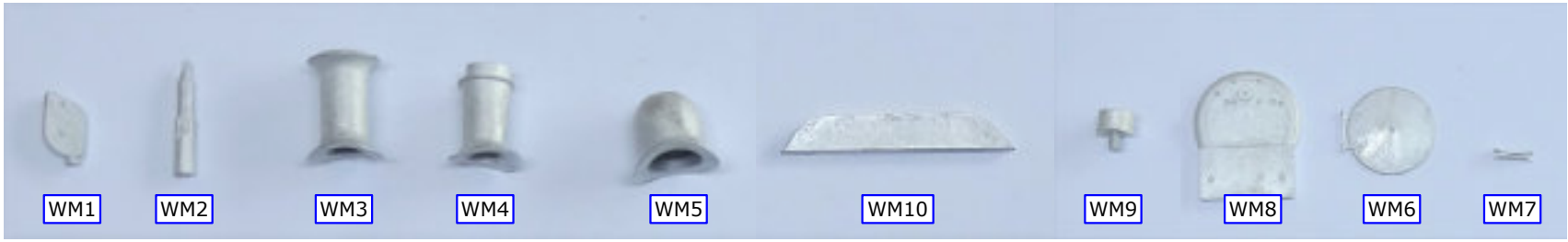
OTHER COMPONENTS

6BA x 1" screw
6BA x 5/16" screw (3)
6BA nut (3)
1/8" Brass wire for compensation beam pivots
5/32" OD Brass tube for compensation beam
0.45 mm Brass wire for injector/whistle valves & sand rod
0.8 mm Brass wire for brake hanger pivots, handrails & sand pipes
1.2 mm Brass wire for pipes, handrails, bogie & brake cross shaft
1.6 mm Brass wire for bogie pin
2.0 mm Brass wire for bogie pivot
0.5 mm Spring wire for bogie side control
0.3 mm Copper wire for oil pipes
0.9 mm Copper wire for pipe work
1.2 mm Copper wire for pipe from vacuum ejector
Short handrail knob (6)
Medium handrail knob (4)
Long Handrail knob (4)
Buffer casting, buffer, spring and nut (2)

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

WHITE METAL CASTINGS

WM1 Sandbox (2)
WM2 Steam reverse cylinder
WM3 Original chimney
WM4 Superheater chimney
WM5 Dome
WM6 Smokebox door
WM7 Casting under smokebox
WM8 Backhead
WM9 Inside of dome
WM10 Firebox side cover (2)



POSSIBLE IMPROVEMENTS

1. Bogie. Improve the strength of the bogie by adding some angle on the inside faces of the bogie pivot bracket (B6).

2. Wheels shorting on frames. The leading wheel of the bogie can rub and thus short on the frames when the loco is used on curves of less than 6ft. T9s have been built to operate on curves of 5ft using the following method.

a. Once the chassis is correctly levelled and the taper at the front of the frames has been set, cut a piece of sheet metal to fit between the two frames inside the top surface of the frames. Solder in place. The frames wil be kept to the correct shape by this sheet.

b. With the frames upside down, rest the edge of some plasticard on the newly installed sheet and mark the outline of the front frames on the plasticard.

c. Cut an arc in the frames to clear the bogie front wheels. Ensure there is sufficient clearance from the wheels. Reinforce the inside face of each frame with a piece of metal or plasticard cut to match the new arc.

d. Install the previously marked plasticard as an outline of the original frame shape.

3. Sand pipe brackets. Solder some angle to the inner face of the bracket and frame overlay.

4. Inside Motion. To allow the inside motion to be removed, the following modifications will help.

a. Cast Front Springs (BR1). Fit the cast springs to a bracket that can be bolted to the frames.

b. Original Brakes. The rear brakes and rear cross shaft pull rods (D9 & D11) are soldered in place on the chassis. Fit spacer tubing over the front brake hanger pivots to hold the front brake hangers in position. Cut a slot in the rear end of the front pull rods (D10) so that the rear is C shaped. Place some washers or wire on the rear cross shaft to hold the front pull rods in place laterally. Assemble the front brakes, cross shaft and pull rods into one unit that can slide off the rear cross shaft and front brake hanger pivots.

c. Rebuild Brakes. Place tubes over the brake hanger wires to hold the brake hangers in the correct position laterally. Assemble the brake components as one unit that can be sprung off the brake hanger pivots.