

Fig 1. A1 GA Drawing LNER Cab

## COUPLING RODS & FRAME PREPARATION

**Coupling rods.** The coupling rods are made so that they can be used as a jig to align the horn guides accurately. First drill out all the crank pin holes to a convenient size which is undersize for the crank pins and the fork joint holes. Remove all burrs caused by the drilling.

Now drill a hole, with the drill used for the crank pin holes, in a small block of wood or Tufnol and leave the drill in the wood with its shank projecting. This projecting shank is used as a mandrel to accurately align the laminations of each rod.

Place the laminates over the mandrel and, using plenty of solder and flux, solder the two laminates together. You will now have rods with the crank pin and fork joint holes aligned.

Carefully file the edges so that the 'laminated' effect is lost and the rods appear to be made from one piece of metal.

The crank pin holes now need carefully opening out until they just fit, with no free play, the ends of the horn block alignment jigs.

The fork joints are now pinned using the 1.6 mm nickel silver wire. Retain the pins, which should be a tight fit, by lightly soldering on the inner face of the rods. The correctly assembled rods should now have a completely flush inner face.

**Frames.** Construct the horn guides using the instructions in the separate kit.

Having decided which chassis to construct you can now start construction by preparing the frames (F1 & F2). First drill out the frame lightening holes (marked L in Fig.3) as required and, using photographs as a guide, emboss the appropriate rivets.

**Full Compensation.** For a fully compensated or sprung chassis open out the frame slots for the horn guides by cutting around the half etched lines.

Drill out the holes marked P1 for plunger pick-ups (the size of hole will depend on your choice of pick-up supplier) and C1 (1/8") for the compensation beams. Solder the rear horn blocks to the inside of the frames aligning them with the half etched line and with the bottom of the frames.

Drill the B holes 0.8mm for the brake hanger pivots. If you are not fitting the front guard irons drill out the four holes marked G to 0.8mm.

Bend the lubricator linkage brackets along the fold lines at right angles and strengthen with a fillet of solder. The front bracket will need relieving slightly to clear the driving wheel.

**Partial Compensation.** For a partially compensated chassis open out the frame slots for the horn guides by cutting around the half etched lines on the front and centre axles only.

Drill out the holes marked P2 for plunger pick-ups (the size of hole will depend on your choice of pick-up supplier) and C2 (1/8") for the compensation beam. Solder top hat bearings in place for the rear axle.

Drill the B holes 0.8mm for the brake hanger pivots. If you are not fitting the front guard irons drill out the four holes marked G to 0.8mm.

Bend the lubricator linkage brackets along the fold lines at right angles and strengthen with a fillet of solder. The front bracket will need relieving slightly to clear the driving wheel.

**Detailing.** Solder the reversing lever bracket overlays (F10), radius link bracket frame overlay (F12) and slide bar bracket frame overlay (F13) in place.

Fold up the centre sandbox base and front as shown in Fig.3, or use the updated white metal casting (WM21) after drilling a 0.8mm hole in the base first. If using the casting then remove the frame tabs and make good the edges. Note the middle sandbox casting will conflict with the partial compensation beam if fitted, other holes may need opening as required in the casting once fitted.

Drill a 0.8mm hole in the middle of the front white metal sand box (WM10) at the base, solder to the outside of each frame as shown in Fig.4.

No.	Description	Sheet
F1	Frame LH	A2
F2	Frame RH	A2
F10	Reversing lever bracket overlay (2)	B3
F12	Radius link bracket overlay (2)	B2
F13	Slide bar bracket frame overlay (2)	B3
M1	Coupling rod, front inner lamination (2)	A3
M2	Coupling rod, front outer lamination (2)	A3
M3	Coupling rod, rear inner lamination (2)	A3
M4	Coupling rod, rear outer lamination (2)	A3

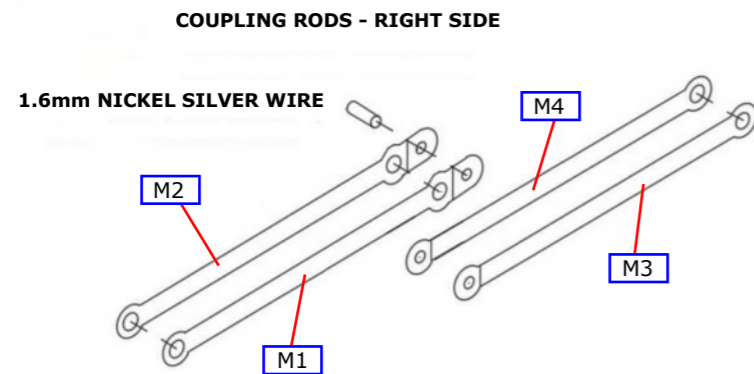


Fig 2. Coupling Rods

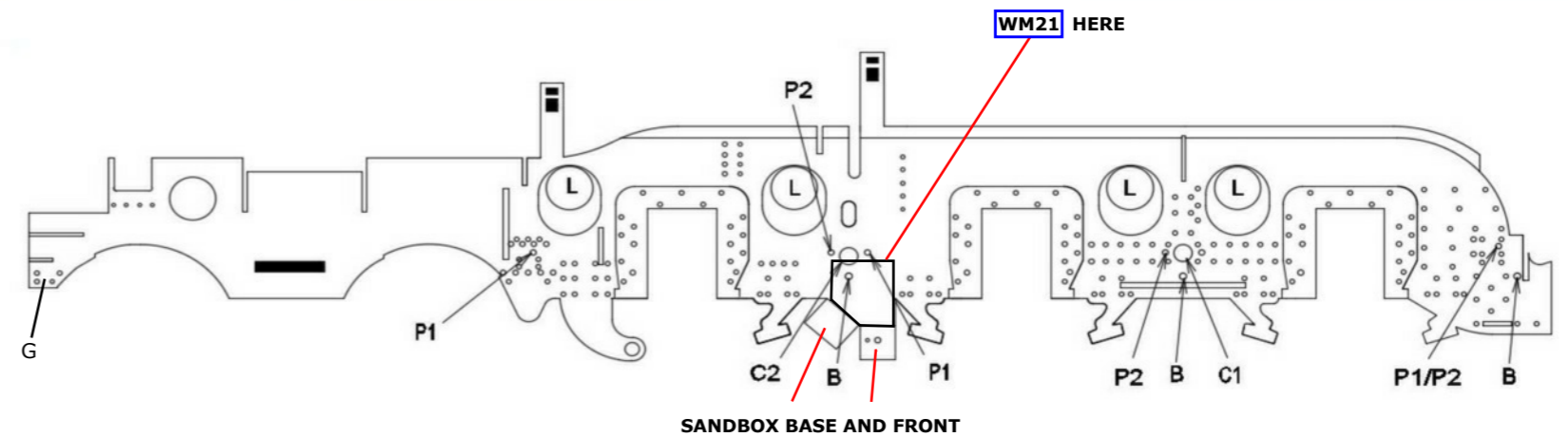


Fig 3. Frame Preparation

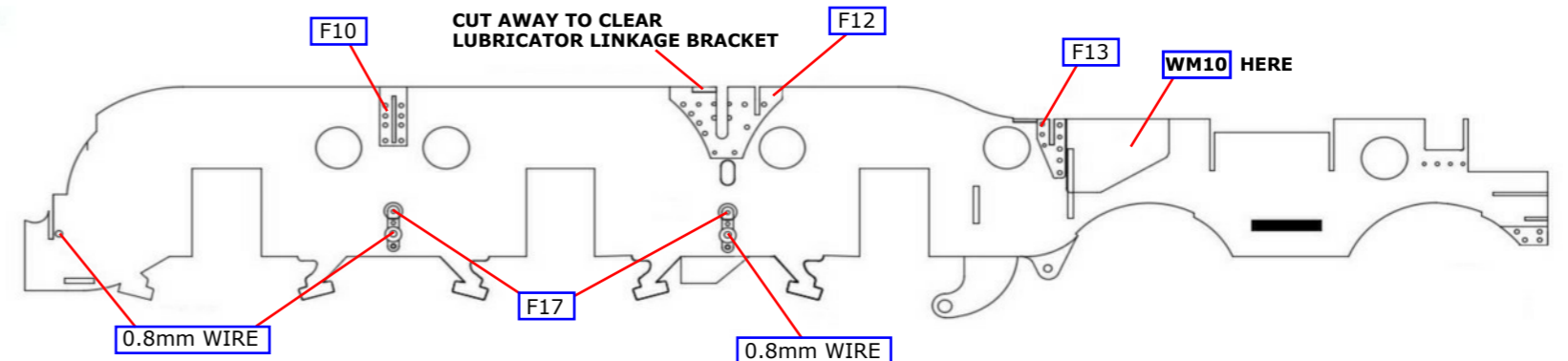


Fig 4. Frame Details

## BOGIE AND CHASSIS FINISHING

**Frames.** Select the following frame stays for your chosen gauge - the firebox bracket (F3), the horizontal (F4), the compensation rod (F5), the cylinder mounting (F6), and the reversing lever bracket (F7). Open out the holes for the 1/16" steel wire compensation beam in F5 for a full compensation chassis.

Fold up the brackets making sure the 1/2 etched fold line is on the **inside** and that each bend is a right angle.

Check that all tabs on the stays fit properly in their corresponding chassis slots so that the rest of the stay is hard up against the inside of the frames. Tap 6BA the cylinder fixing holes in the front cylinder mounting.

Solder one of the longer 6 BA bolts through the hole in the cylinder mounting, for the bogie pivot.

Now assemble the frames and stays. Note the shorter arm of the middle reversing rod bracket (F7) is on the right side of the engine. Start by tack soldering the front compensation beam mounting bracket to both sides.

Check that everything is square and that the stays are hard against the frames. Put an axle (or better a longer piece of 3/16" rod) through the rear bearings and place the chassis on a piece of graph paper to check that the axle is square to the frames.

If all is well solder the remaining stays to the frames checking constantly that the chassis is square and the frames are straight and checking that the rear of the rear firebox bracket is vertical.

There are several ways to align the hornguides, one way is detailed in the fully sprung hornguide kit, other ways use a hornguide alignment jig (several commercial varieties are available). Please follow the relevant instructions to install the remaining hornguides to the frames.

Solder in place the brake hanger pivots from 0.8 mm wire. The middle wire will need to cut flush with the inside of the frames to allow the compensation beams to go in place.

Attach the bogie splashers, front and rear (F14 & F15) in the frame cut-outs.

Solder in place the frame guard irons (F16) if required.

Add the reversing lever bracket ribs (F11) to the lower edge of the middle reversing lever bracket (F7) and trim to length.

**Full Compensation.** Solder a piece of 1/16" wire through the holes in the front compensation rod mounting. For the rear beams cut a piece of 1/8" brass rod so that it fits through the holes C1 and is flush with the outside face of the chassis frames.

Cut two equal pieces 5/32" tube which together fit between the frames and solder each compensation beam (F9) to the tubes close to one end. Temporarily fit the beams.

**Partial Compensation.** For the simpler system fix both beams (F9) centrally to a piece of 5/32" tube as shown in Fig.6.

Temporarily fit all the wheels and axles and confirm that the compensation works properly and check that the chassis is sitting level.

The height of the top of the frames above the rails, between the coupled wheels should be 44.0 mm. Attach the brake hanger pivot overlays (F17) to the front and centre axle hangers as shown in Fig.4. The compensation beam pivot is retained by the centre brake hanger pivot overlay.

No.	Description	Sheet
F1	Frame LH	A2
F2	Frame RH	A2
F3	Frame stay rear - Firebox	A1
F4	Frame stay middle - Horizontal	A1
F5	Frame stay front - Compensation beam	A1
F6	Frame stay front - Cylinder mounting	A1
F7	Frame stay middle - Reversing lever bkt	B1,B3
F9	Compensation beam (2)	A3
F11	Reversing lever bracket rib (2)	B2
F14	Bogie wheel splasher front (2)	B3
F15	Bogie wheel splasher rear (2)	B3
F16	Frame guard irons (2)	B3
F17	Brake hanger pivot overlay (4)	B3

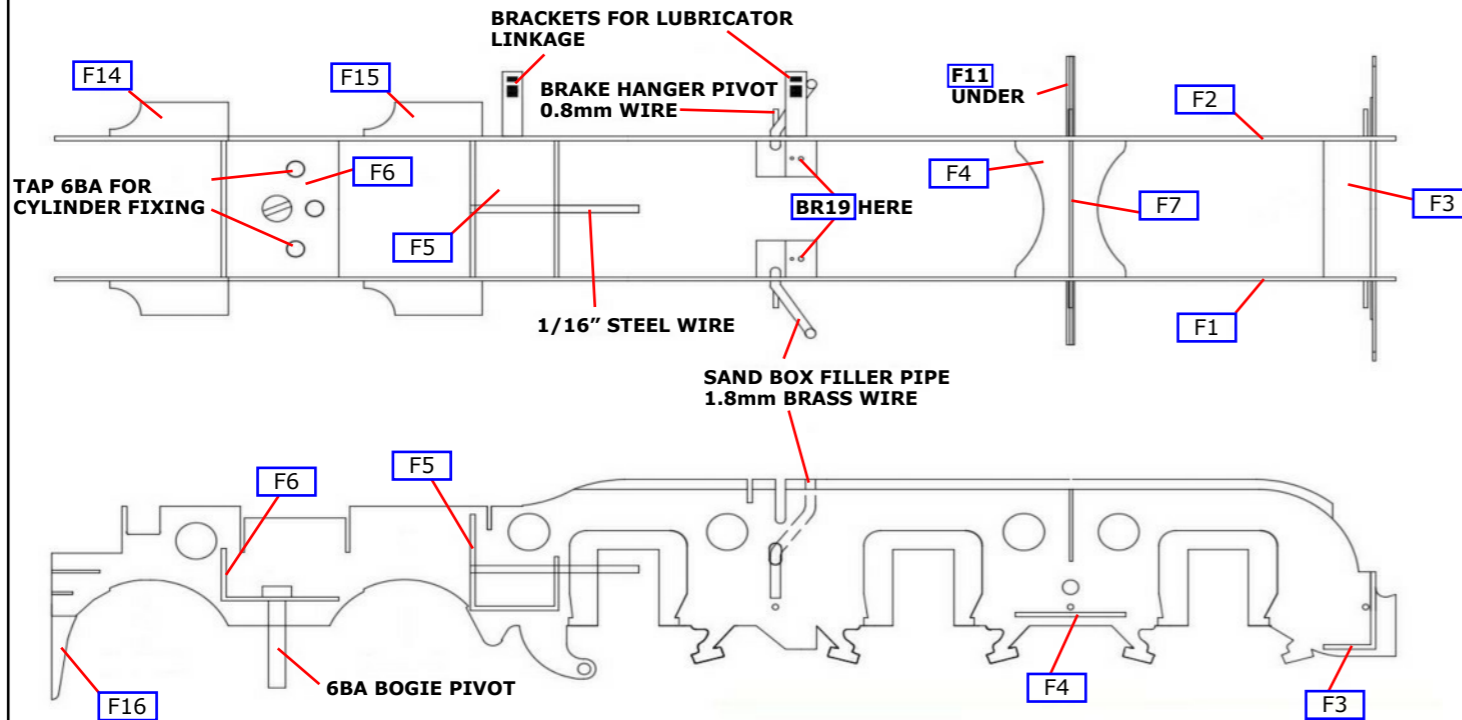


Fig 5. Frame Erection

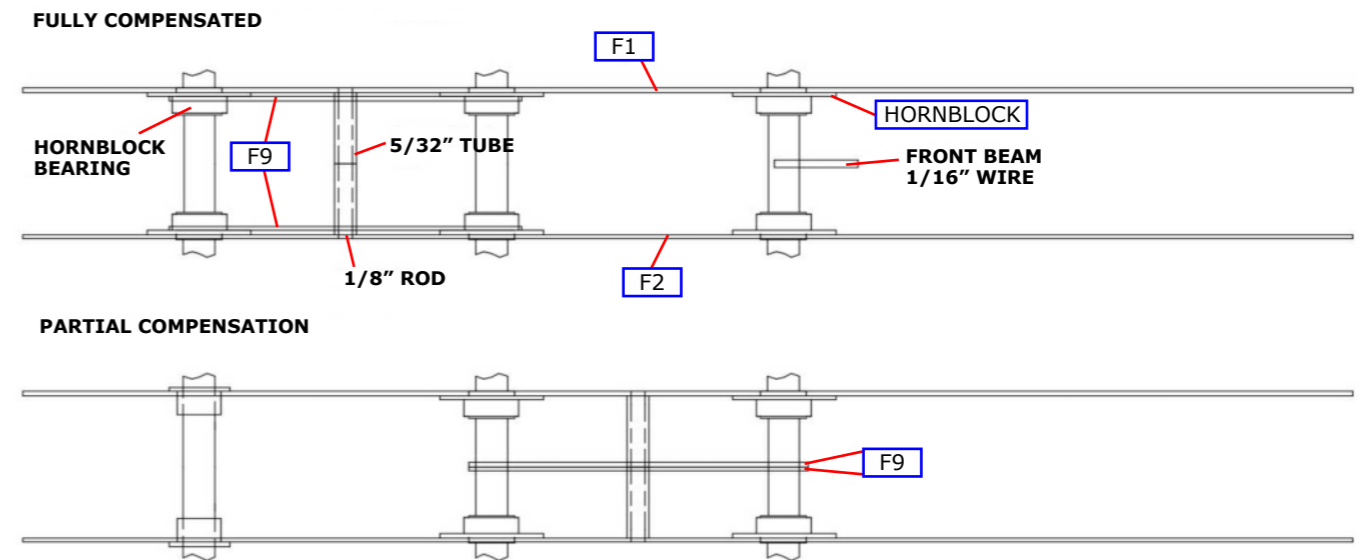


Fig 6. Frame Compensation

## REAR FRAMES AND RADIAL TRUCK ASSEMBLY

**Rear frames.** Fold in the radial truck horn guides on the rear inner frame extension (F18). Now make all the bends on the inner frame extension, all 90° and with fold lines inside, then solder in place on the rear of the frame stay (rear firebox bracket) ensuring that the rear frame will be level.

Fold the rear frame spacer (F19) and solder into place as shown, ensuring that the rear frames remain square and true.

Emboss the rivets on the rear outer frame extensions (F20) and form to fit. Check everything fits correctly before soldering the rear frames in place.

There is a choice between wide or narrow rear steps (F21 & F22 or F23 & F24). Detail the rear frames by adding the upper and lower rear steps.

Add the Cartazzi axle boxes (WM7 & 8 - note they are handed), the springs (NS9) and rear spring retaining brackets (F25), see Fig.1 for placement reference. Finally add the rear frame footplate bracket overlay (F26) and the drag beam bracket overlays (F27) together with the Cartazzi axlebox ties from 1.25 mm wire.

Bend the firebox below footplate wrapper (F28) to shape and solder around the firebox below footplate former (F29) to make the lower firebox.

Add the washout plugs at the corners from 1 mm square wire and the blowdown tap (BR7), before soldering in place on top of the rear inner frame extension.

**Radial truck.** Choose the appropriate matching width radial truck parts (F30 - F31). Fold up the spring wire brackets and side play stops on the radial truck top plate (F30).

Fold up the radial truck bottom and ends (F31) and attach the top plate.

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 washers to eliminate any side play. Bend up the spring wire to give some downward pressure and solder in place through the bracket on the inner frame extension and the hole in the rear firebox bracket.

The radial truck is retained with lengths of 1 mm square wire.

No.	Description	Sheet
F18	Rear frame extension - Inner	A1
F19	Rear frame spacer - Body fixing	A1
F20	Rear frame extension - Outer (2)	B2
F21	Rear steps upper - Wide (2)	B1,B2
F22	Rear steps lower - Wide (2)	B3
F23	Rear steps upper - Narrow (2)	B1
F24	Rear steps lower - Narrow (2)	B1,B3
F25	Rear spring retaining bracket (4)	B1,B2
F26	Rear frame footplate bracket overlay (4)	B2
F27	Rear frame drag beam bracket overlay (2)	B2
F28	Firebox below footplate wrapper	B1
F29	Firebox below footplate former	B2
F30	Radial truck - Top plate	A1
F31	Radial truck - Bottom & ends	A1

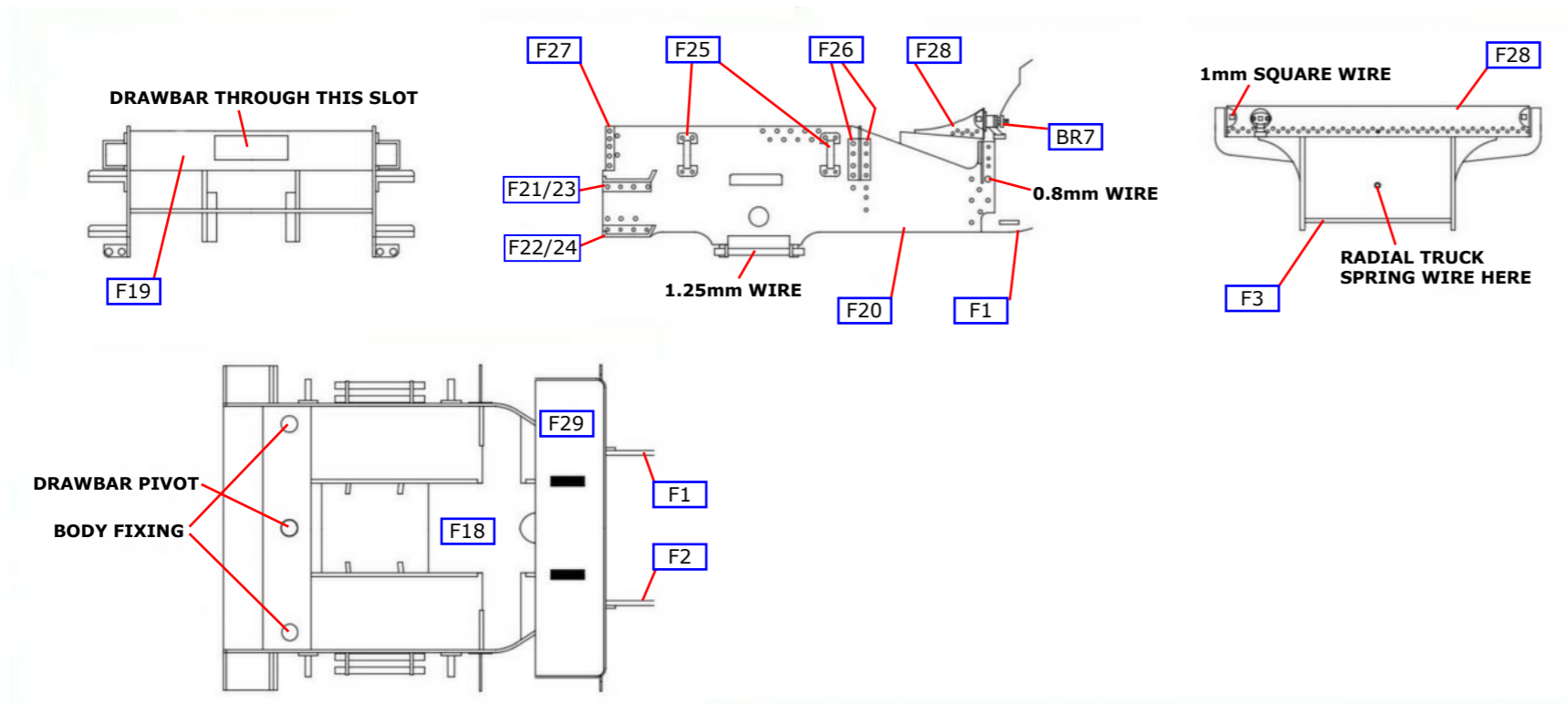


Fig 7. Rear Frames

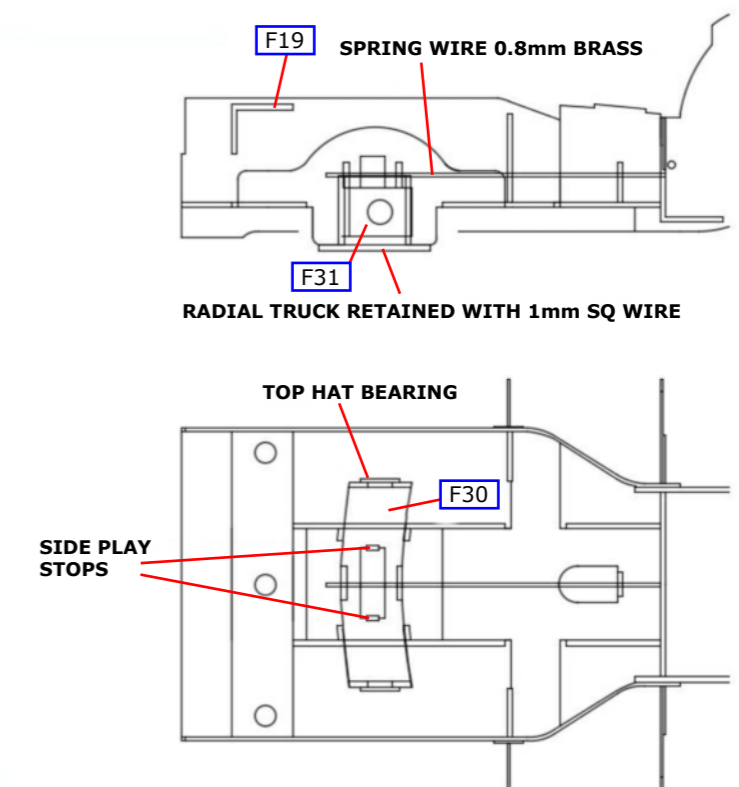


Fig 8. Radial Truck

## BOGIE AND CHASSIS FINISHING

**Bogie.** Emboss all the frame rivets on the bogie frames (B01) as shown in Fig 9. There are two choices of bearing, plain top hat bearings or detailed white metal bearings (WM22), gently open out the holes in the side frames and fit the bearing of choice.

**NOTE;** top hat bearings are inserted from the outside, white metal bearings are on the inside. Once satisfied with the fit, solder the bearings in place. Use an appropriate reamer to ease the holes in both bearings to give a free rolling chassis once the bogie assembly has been completed.

If modelling a bogie with side control springs then drill out the three 1.0mm holes on each side shown in Fig.9.

Fold up the guard irons (B02) and solder in place on the inside of the frames. Fold up the centre frame stay (B03) and reinforce the spring wire retaining brackets with a fillet of solder.

Solder the frames and frame stay together and add the front and rear frame stays (B04 & B05). Form the dust shields (B06) to shape and solder in place.

Using appropriate washers fit the wheels so that there is a minimum of side play. Bend up the spring wire to give some downward pressure and solder in place through the holes in (F5).

The bogie is retained with a 6 BA nut.

**Completing the chassis.** Fold the front buffer beam stay (F37) so that it traps the two buffer gaiters (BR26) on the inside and fix to the frames. If early steps are required then remove the backing plates and do not fold down the angled straps. For later steps fold down the backing plates and angled straps as shown in Fig 11 and add the later style steps (F38 & 39). See Short Travel Valves (STV) footplate section for early style step details.

Assemble the wheel sets, bearings and motor/gearbox, selecting 3/16" axle washers (F44) of appropriate thickness to control side play. Side play on the leading axle should be kept to a minimum to avoid clearance problems with the valve gear and connecting rod.

The cranks on the right hand side should lead by 120°, attach the coupling rods and test for free running, fettle where appropriate.

Once running smoothly add the balance weights (F34 & F35) as shown in fig. 10.

Add the front gravity sand pipes from 0.8mm wire and route down between the bogie rear splasher and leading wheel to just above the rail head in front of the leading wheel, use prototype photos to assist.

Bend and fit the middle sand box filler pipe from 1.8mm wire as shown in Fig.5.

Finally add the steam sanding pipes (BR19) to the middle sand box (see Fig.5) and adjust the end to sit above the rail head in front of the middle wheel.

No.	Description	Sheet
B01	Bogie frame (2)	A2
B02	Bogie guard iron (2)	B3
B03	Bogie centre frame stay	B1,B2
B04	Bogie rear frame stay	A1
B05	Bogie front frame stay	A2
B06	Bogie dust shields (2)	B3
F34	Centre axle balance weights (2)	B1,B2
F35	Leading/trailing axle balance weights (4)	B3
F37	Buffer beam stay	B3
F38	Front step - Later - Upper (2)	B3
F39	Front step - Later_ Lower (2)	B3
F44	wheel washers (16)	A1,A2

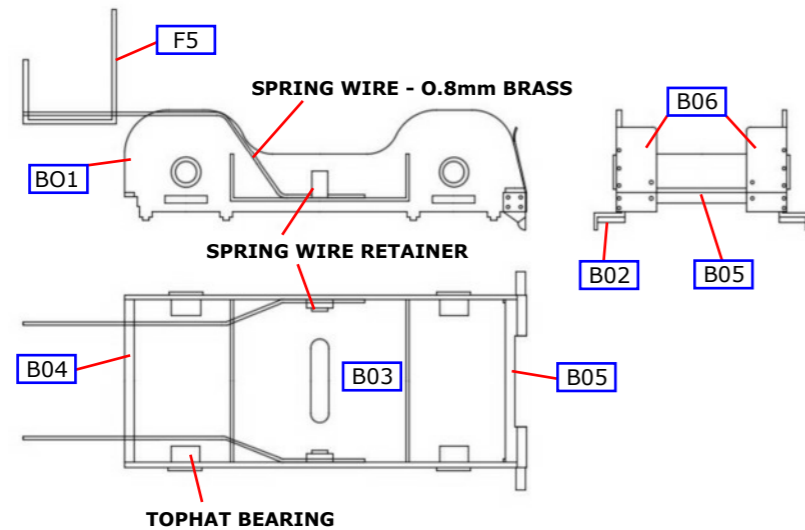
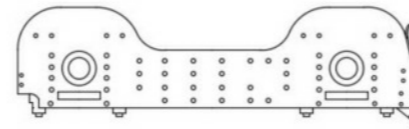


Fig 9. Bogie

### ORIGINAL BOGIE - SWING LINK SIDE CONTROL



### MODIFIED BOGIE - HELICAL SPRING SIDE CONTROL

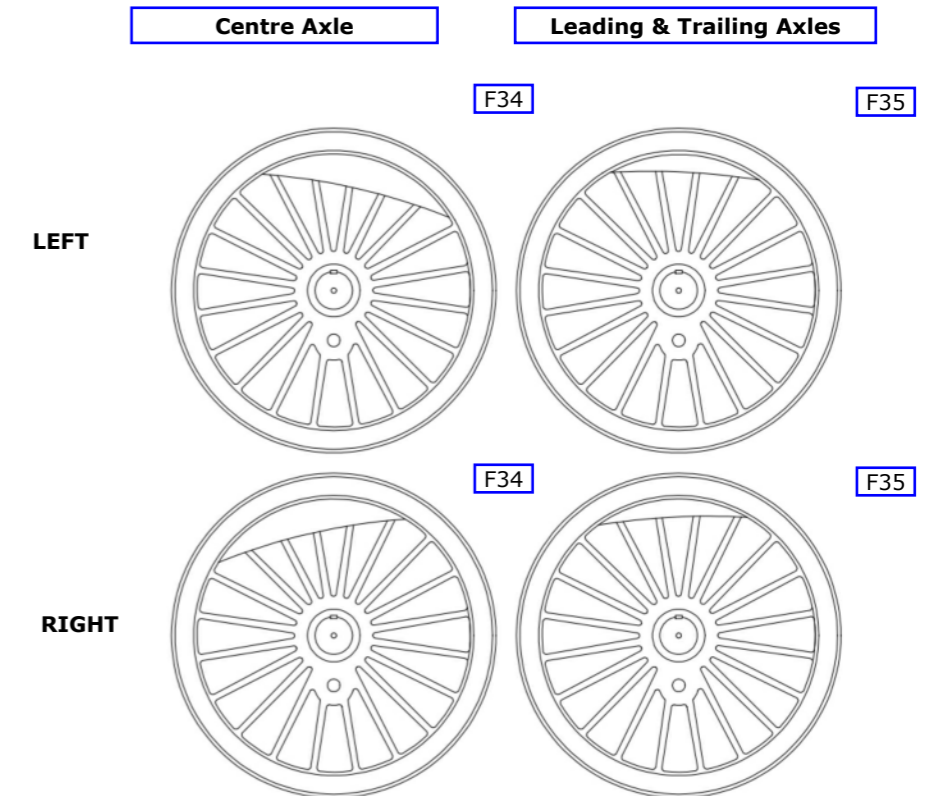
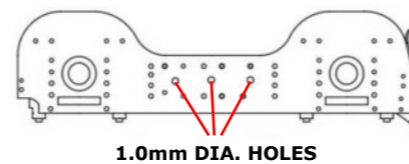


Fig 10. Balance Weights

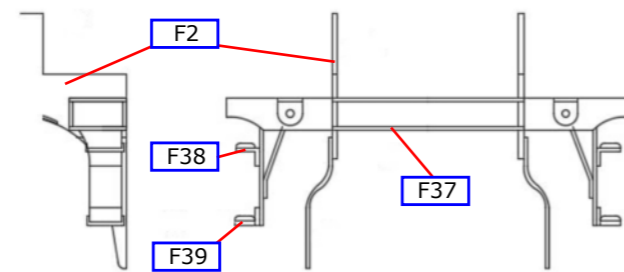


Fig 11. Bufferbeam stay

## CYLINDERS AND MOTION BRACKET

**Cylinder assembly.** Check all the holes in the cylinders (M5) against the appropriate components and open up the holes if necessary. Reduce the width of the inside cylinder faces to the etched lines provided as appropriate, so that the cylinders are a good fit in the slots in the frames.

Fold up the cylinders making sure they are square and fold out the 2 to 1 arm bracket.

Construct the slidebars (M6) as shown in Fig 14. Build the stack of laminations with layer 6 on the bottom up to layer 1 on top. Use plenty of solder whilst applying pressure to keep the laminations together. Clean off the front and rear faces and remove the rear section.

The crosshead slot will need cleaning out so that the crosshead left and right (NS3) is a good fit. This can be done with a thin file or by using a piece of emery paper over a scrap piece of brass etch. The appearance of the slidebars is much improved by carefully filing the top smooth.

Insert the slidebars in the cylinders and tack solder in place. After checking all is square and parallel they can be permanently attached. Attach the piston rod gland castings (NS4) and check that the crosshead slides properly.

Solder the valve crosshead guides (BR17 & BR18) in place aligning them with a piece of 1.4 mm wire passed through the valve rod holes. Note BR17 is the short valve crosshead guide and should be at the front.

Drill out the holes for the relief valves on the front cylinder covers, left and right (NS5 & NS6), marked on the inside, so that the relief valves (BR3) fit. Attach the front covers and fit the relief valves.

Add slide bar front flanges (M7) as shown in Fig.12 inside and outside of the slidebars. Solder the slide bar bracket laminations (M9) together back to back. Attach the cylinders to the chassis with two 6 BA bolts. Fit the slide bar bracket through the frame slots and solder to the

**Motion bracket.** Bend up, in a Hold and Fold or vice, the motion brackets (M10) centring the bends on the etched slot.

Solder the motion bracket inner (M11) in the slot in the motion bracket ensuring that the holes for the radius link pivot align horizontally and vertically. The etched boss faces outward.

Solder the motion brackets to the motion bracket stretcher (M12) as shown and check the assembly fits in the frame slots. Solder short pieces of 1.8 mm wire to the brackets for the expansion link pivots and then add the washer (M23) to the insides of M10 over the wire stubs.

Laminate the two reversing cranks (M33 and M34) together to form the two cranks. The L shaped crank (M33) is on the right hand side of the engine. Fit the cranks to a length of 1.8mm wire passed through the motion bracket assembly. Ensure both cranks are parallel with each other and centred between M10 & M11 before fixing securely to the rod. See Fig.13.

Add the slide bar packing pieces (M8) once the valve gear has been fully assembled.

No.	Description	Sheet
M5	Cylinders	A2
M6	Slide bar laminations (12)	A3
M7	Slide bar front flange plate (4)	A3
M8	Slide bar rear packing piece (2)	A3
M9	Slide bar bracket lamination (2)	A3
M10	Motion bracket (2)	A3
M11	Motion bracket inner (2)	A3
M12	Motion bracket stretcher	A3
M23	Radius link bracket washer (2)	A3
M33	Reversing crank lamination - RH(2)	A3
M34	Reversing crank lamination - LH (2)	A3
M41	Drain cock linkage (2)	B3

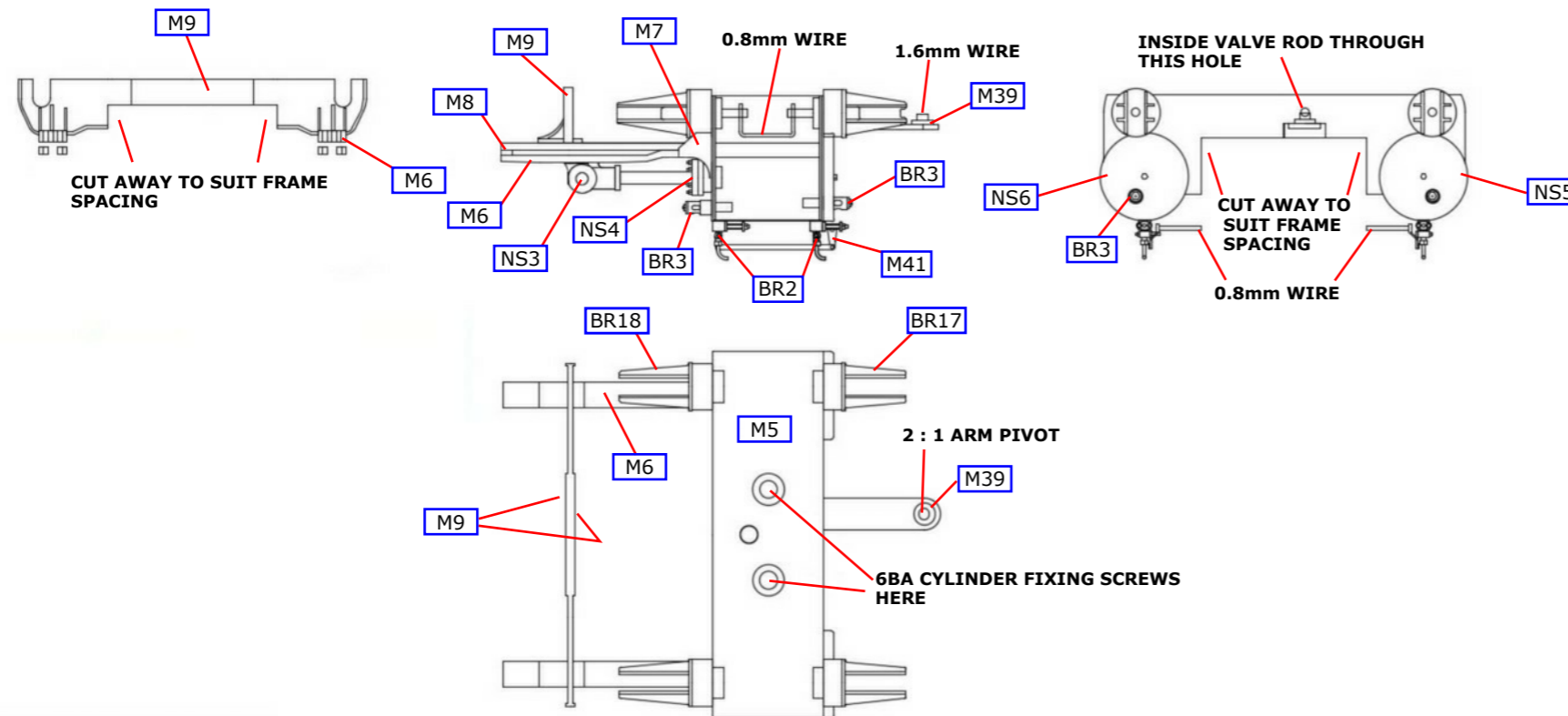


Fig 12. Cylinders

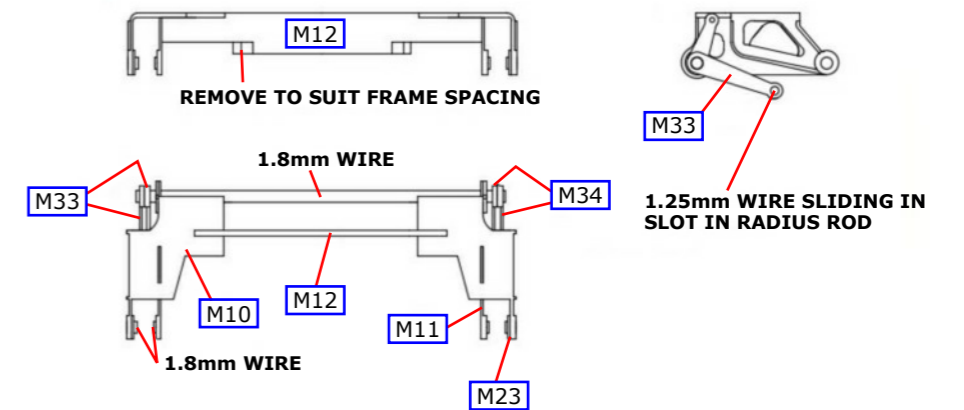


Fig 13. Motion Bracket

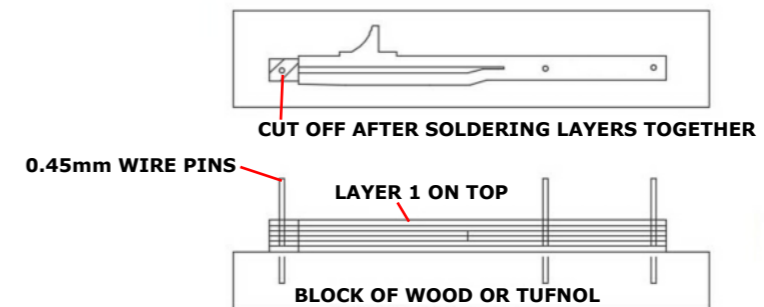


Fig 14. Slidebars

## MOTION

**Expansion Link.** There are two types of expansion link inner lamination, Short Travel Vales (STV) (M14) or Long Travel Valves (LTV) (M15). Drill out the holes in the expansion link laminations (M13 & M14 or M15) to take the 0.45 mm wire pins which align the laminations and represent the bolt heads.

Solder the inner laminations together with 4 lengths of 0.45 mm wire as shown. Check that the slot in the inner laminations is a sliding fit with the 1.25 mm wire.

**Radius Rod.** Place the radius rod (M16) and radius rod rear lamination (M17) over the expansion link, align with a piece of 1.25 mm wire, and solder the lamination to the rod.

Solder the 1.25 mm wire pin in place and clean off flush. The radius rod should now move smoothly in the link. Add the fork joint (M18) to the front of the radius rod. Open out the holes in the expansion link outer lamination (M13) to 1.8 mm so that they are a good fit on the pivot wires on the motion bracket.

Solder the outer laminations in place and cut off and dress the 0.45 mm wire to represent the bolt heads. Gently spring the links in place in the motion bracket, ensure that the links pivot freely and are vertical.

**Combination Lever, Union Link and Valve Rod.** Form the joggle in the combination levers (M19) with the fold lines inside reinforcing the bends with solder. Assemble the union link (M20 & M21) and rear valve rod flanges (M22). Attach a length of 1.4mm wire to each flange approximately 20 mm long (trimmed later).

Make the valve rods as long as possible so that they just go in past the slide bar bracket. Pin together the combination lever, union link, valve rod and radius rod.

**Connecting Rods and Crossheads.** Solder together the connecting rod inner and outer laminations (M24 & M25) and add the rod boss laminations (M26) to the big end back and front. Drill the big end to fit the crankpins and the small end to 1.6 mm. Select the appropriate crosshead arm, STV (M27) or LTV (M28). Solder the crosshead arm to a piece of 1.6 mm wire as

Fit the connecting rod to the crosshead, ensuring the crosshead arm is vertical, carefully solder the pin from the rear and file flush.

Fit the connecting rods with a thin washer between the coupling rods and connecting rods and check the clearance of the connecting rod and the leading axle crankpin nut. You will possibly have to reduce the thickness of the nut.

**Eccentric Rod and Arm.** Add the eccentric rod fork joint (M30) to the eccentric rod (M29). Reduce the diameter and thickness of the rivet heads so that they will fit in the recess in the back of eccentric rod bearing overlay (M32).

Tap the crankpin hole in the eccentric crank (M31) for the crankpin. Fit the arms on the crankpin and tighten so that the offset is 4.4 mm ahead of the main axle bearing with the crank at Bottom Dead Centre (BDC), see Fig.1. Rivet the radius rod to the arm and add the bearing overlay (M32). Now pin the remaining two joints between the union link and crosshead arm and between the radius link and eccentric rod.

Check that the motion works smoothly. Add the pins through the ends of the reversing cranks and through the slots in the radius rods. By rotating the cross shaft you should now be able to reverse the motion.

**2:1 Lever.** Assemble the 2:1 lever (M35 & 36) and the front valve rod flanges (M37) as shown in Fig 17. Pin the valve rods, 2:1 lever and 1:1 lever (M38) together with 0.8 mm wire. Fix the 1:1 lever into the 2:1 lever with a 1.25mm pin, ensure the 1:1 lever is free to move.

Solder a 1.6 mm wire pin in place in the bracket attached to the cylinders, make the pin just long enough so that the 2:1 arm can be sprung in place over the washer (M39) and pin, see Fig.12.

Adjust the valve rods to length so that they do not interfere with the rear valve rods and check for free movement. Now link the valve rods together with hoops of 0.8 mm wire (see Fig.12) checking that you have equal backward and forward movement on the conjugated valve gear arms. This now means that the valve gear is permanently fixed to the cylinders but the complete unit can be removed by unscrewing the eccentric arms and cylinder bolts.

**Finishing.** Form the cylinder wrappers (M40) to shape and solder in place making sure the drain cock holes are on the bottom centre line. Attach the drain cock castings (BR2). Emboss the rivets on the drain cock linkage (M41) and joggle the front lever, as shown in Fig.12, before soldering in place together with lengths of 0.8 mm wire to represent the operating rods.

No.	Description	Sheet
M13	Expansion link outer lamination (4)	A3
M14	Expansion link inner lamination - STV (4)	A3
M15	Expansion link inner lamination - LTV (4)	A3
M16	Radius rod (2)	A3
M17	Radius rod rear lamination (2)	A3
M18	Radius rod fork joint (2)	A3
M19	Combination lever (2)	A3
M20	Union link inner lamination (2)	A3
M21	Union link outer lamination (2)	A3
M22	Rear valve rod flanges (4)	A3
M24	Connecting rod inner lamination (2)	A3
M25	Connecting rod outer lamination (2)	A3
M26	Connecting rod boss lamination (4)	A3
M27	Crosshead arm - STV (2)	A3
M28	Crosshead arm - LTV (2)	A3
M29	Eccentric rod (2)	A3
M30	Eccentric rod fork joint (2)	A3
M31	Eccentric crank (2)	A3
M32	Eccentric rod bearing overlay (2)	B2
M35	2:1 lever	A3
M36	2:1 lever lamination (2)	A3
M37	Front valve rod flange (6)	A3
M38	1:1 lever	A3
M39	2:1 lever washer	A3
M40	Cylinder wrapper (2)	B3

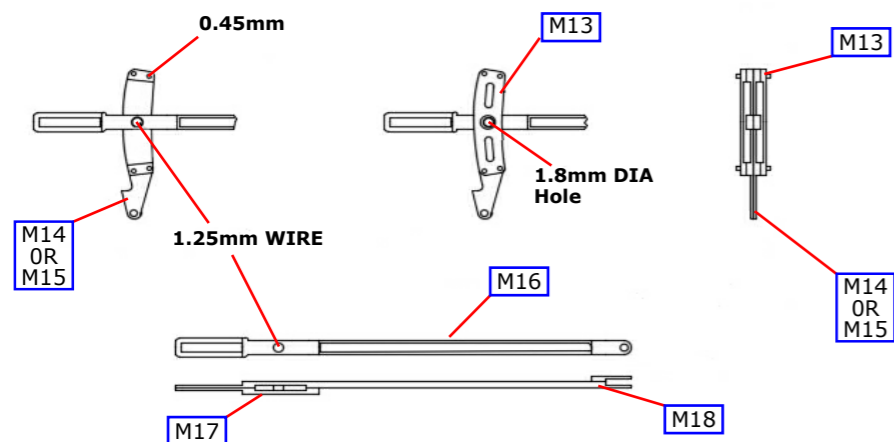


Fig 15. Expansion Link and Radius Rod

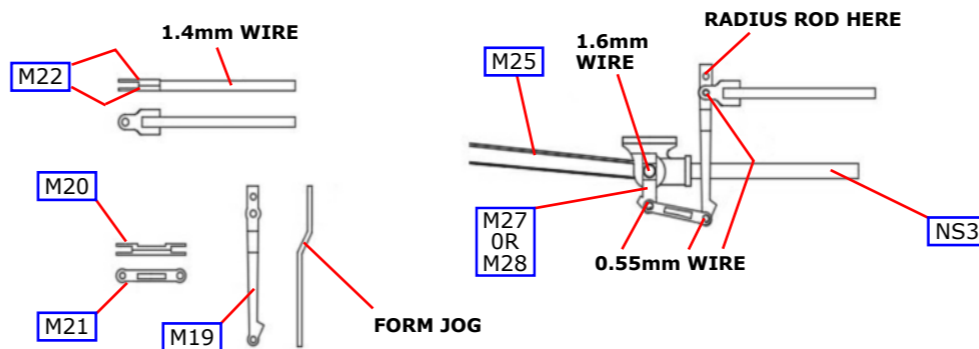


Fig 16. Combination Lever, Union Link and Valve Rod

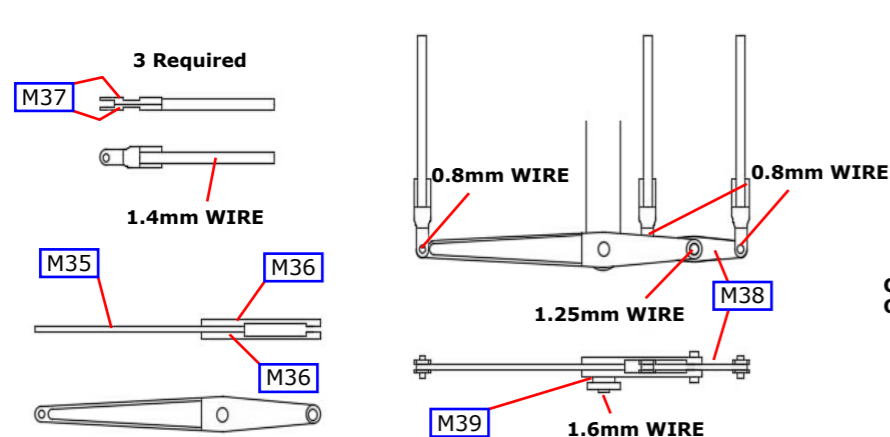


Fig 17. 2:1 Lever

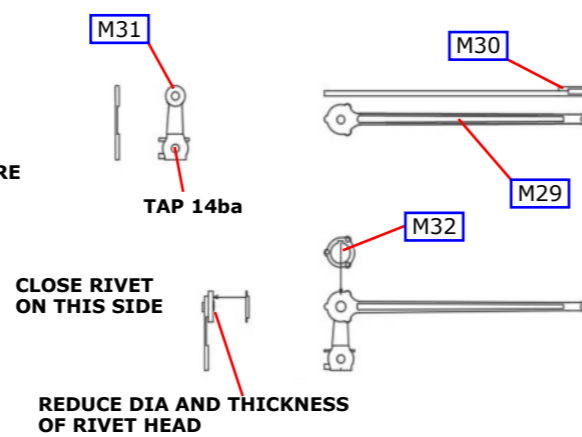
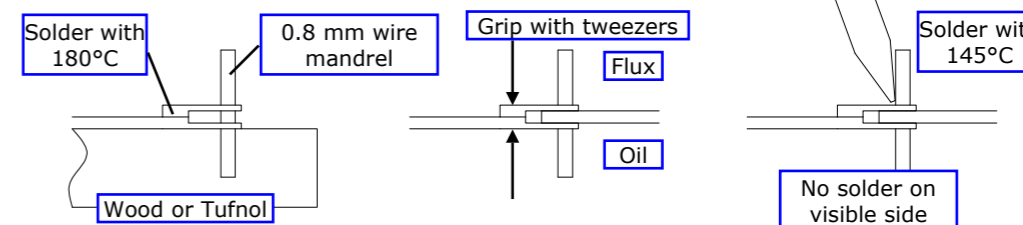


Fig 18. Eccentric Rod and Arm

### VALVE GEAR JOINT ASSEMBLY

All the valve gear joints, with the exception of the eccentric arms/eccentric rods, are made with wire pins soldered on the inside (back). This clearly runs the risk of soldering the joint solid. To minimise this:

- ensure the pin is a tight fit in the hole.
- use oil or a proprietary solder mask.
- use plenty of flux, a small amount of solder, and be quick!



## FOOTPLATE

**Footplate.** Emboss the rivets on the valances (FO1) and fold up. Now emboss the rivets on the drag beam and buffer beam to match your chosen engine and fold up.

There are two fold lines below the drag beam and the fold should be made on the lower one.

Curve the rear valance behind the drag beam as shown below. Fold up the front drop plate (FO2) and solder in place behind the buffer beam (see Fig.20 & 21) and between the valances so that it is flush with their upper edges.

Carefully form the bends in the footplate (FO6) by bending over a rod of suitable diameter. Fold up the strengthening ribs either side of the front body fixing nut.

Now solder the footplate in place with the valances in the half etched recess along each side and the front drop plate in the recess under the front edge.

Add the drag beam overlay (FO3) to the rear drag beam and a 6BA nut over the middle hole at the rear. This now gives a sturdy platform upon which to construct the upper works. The excess metal is not broken away until the boiler is fixed to the footplate.

Curve the outer edges of the front drop plate footplate overlay (FO4) and locate in place over the lamp irons; locate the front frame extensions (FO5) and then solder up all the joints at the front end. See Fig.20 & 21 for further clarification.

Locate the half etched groove in the splashers fronts, rear, middle and leading (FO7,FO8 & FO9) on the footplate (FO6) edge and solder in place in the centre of each opening.

Curve the splashers tops, rear, middle and leading (FO10,FO11 & FO12) to shape by rolling underneath a suitable rod or dowel on a resilient surface (a piece of rubber sheet); emboss the rivets, and fold up the end brackets before soldering in place. Add the rear splashers footplate beading (FO13) as shown below and attach the rear sand box filler lids (BR21).

Attach the six large access door hinges (FO21) to the three cover plates at the front end of the footplate.

No.	Description	Sheet
FO1	Valance, Buffer beam assembly	B3
FO2	Front drop plate base	B1
FO3	Drag beam overlay	B2
FO4	Front drop plate overlay	B3
FO5	Frame extensions (2)	A1
FO6	Main footplate	B3
FO7	Splasher side - Rear axle (2)	B1
FO8	Splasher side - Middle axle (2)	B3
FO9	Splasher side - Front axle (2)	B3
FO10	Splasher top - Rear axle (2)	B1
FO11	Splasher top - Middle axle (2)	B1
FO12	Splasher top - Front axle (2)	B1
FO13	Splasher beading - rear axle (2)	B2
FO21	Access door hinges - Large (6)	B3

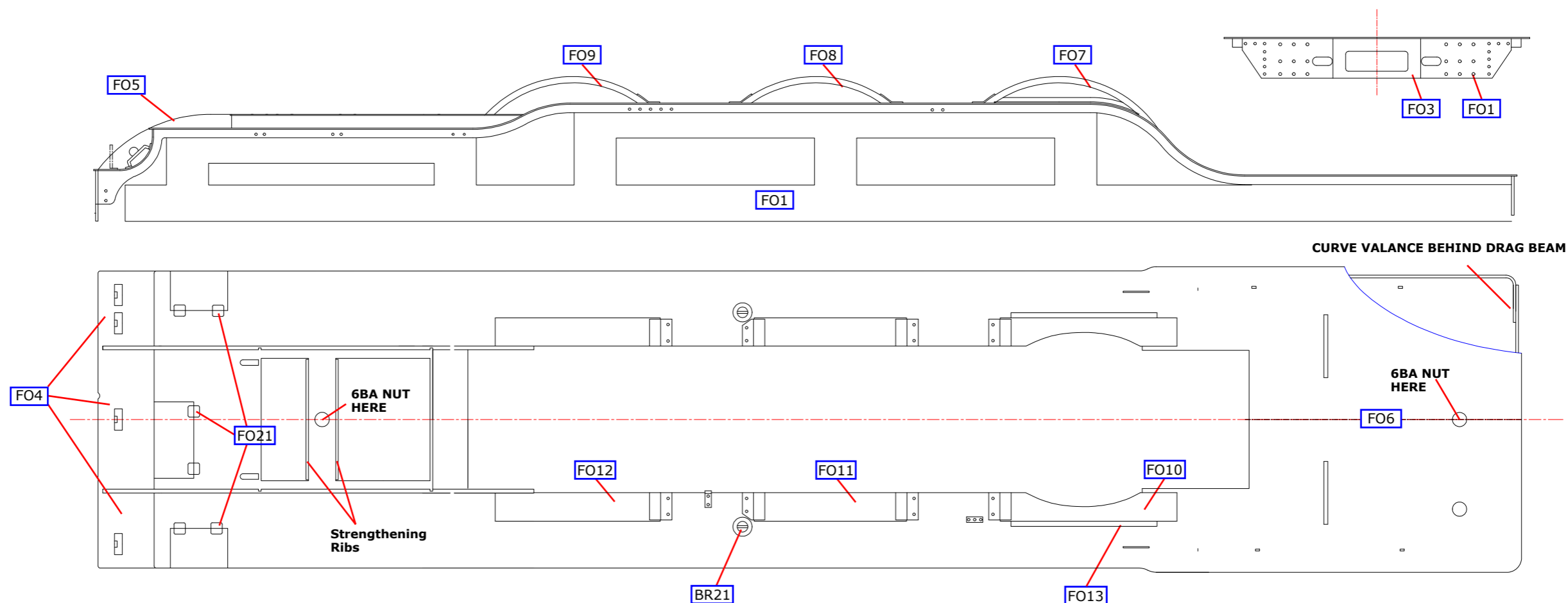


Fig 19. Footplate

**Footplate - STV.** Fold up the two sides on the valve cover base (FO14) and solder to the footplate, they are correctly aligned when the square opening in the base and footplate line up. Fold the valve cover box sides (FO15) and affix to the base. Form the sand filler rims (FO20) and fix to the valve cover box tops (FO16), then fit the tops to the base.

Attach the front sand box filler caps (BR20) in place and the five pot lubricators (BR5), note there are three lubricators on the left hand side and two on the right hand side. Using prototype photos detail the oil lines as appropriate using 0.3mm wire.

Attach the four small access door hinges (FO22) to the footplate and the two sand box spindle bearings (FO38) to the valve cover top.

If required add the extra front footplate lamp iron (FO23) as shown in Fig.20 below. To complete the front footplate area add the white metal smoke box saddle (WM18), ensure the front and rear faces align with the half etched lines inside the frames.

**Lubricators.** Attach the front and rear lubricator arms (FO29 & FO28) to the lubricators (BR4), pass the arms through the footplate and valve cover box and secure the lubricators. Fix the lubricator foot (FO31) to the front right hand side lubricator only to complete their installation.

The mechanical linkage (FO26) is best fitted once the footplate support structure has been removed.

**Smokebox - STV.** The following parts are fitted once the firebox, boiler, smokebox has been assembled, see Fig.22.

Solder the anti-vacuum valve plate (SB22) to the smokebox top and then fit the anti-vacuum valve (BR22), attach the worksplates (SB26) to each side of the smokebox followed by the two anti-carbonising fittings (BR8), check prototype photos for the pipe runs to these fittings and fabricate from 0.3mm wire once the boiler has been fitted to the footplate.

Fix the smokebox door (WM2) to the front of the smokebox followed by the handles (NS7), door knob (NS1) and handrail knobs; add a length of 0.8mm wire for the handrail. Fit the top lamp iron (SB24) and the GNR (WM3) or LNER (WM4) chimney as appropriate.

Form the ejector exhaust pipe from 1.8mm wire and secure to the boiler assembly with the straps (SB18) through the slots in the boiler. Leave the pipe over length so as to pass through the cab front wall.

Once the boiler assembly is attached to the footplate fit the two steam pipe covers (WM20), trim to achieve a nice clean fit. Do not fit the boiler assembly yet.

If appropriate add the early footsteps (FO39 & 40) behind the front buffer beam once the footplate supporting structure has been removed.

Some engines had the lower corner of the buffer beam and side valance trimmed, use the half etched guide lines on the inside to trim the buffer beam and valance to suit your chosen model.

No.	Description	Sheet
FO14	Valve cover box base - STV (2)	B3
FO15	Valve cover box side - STV (2)	B1
FO16	Valve cover box top - STV (2)	B3
FO20	Valve cover box sand filler rim (2)	B3
FO22	Access door hinges - Small (4)	B3
FO23	Extra Lamp Iron	B3
FO26	Lubricator linkage - Early	A1
FO28	Lubricator arm - Front	A2
FO29	Lubricator arm - Rear	A2
FO31	Lubricator foot	B3
FO38	Sandbox spindle bearing (2)	B3
FO39	Front step tread early (2)	B3
FO40	Front step early (2)	B1
SB18	Ejector exhaust pipe brackets (5)	B3
SB22	Anti-vacuum valve cover plate - Early	B1
SB24	Top lamp iron - Early	B3
SB26	Worksplates (2)	B2

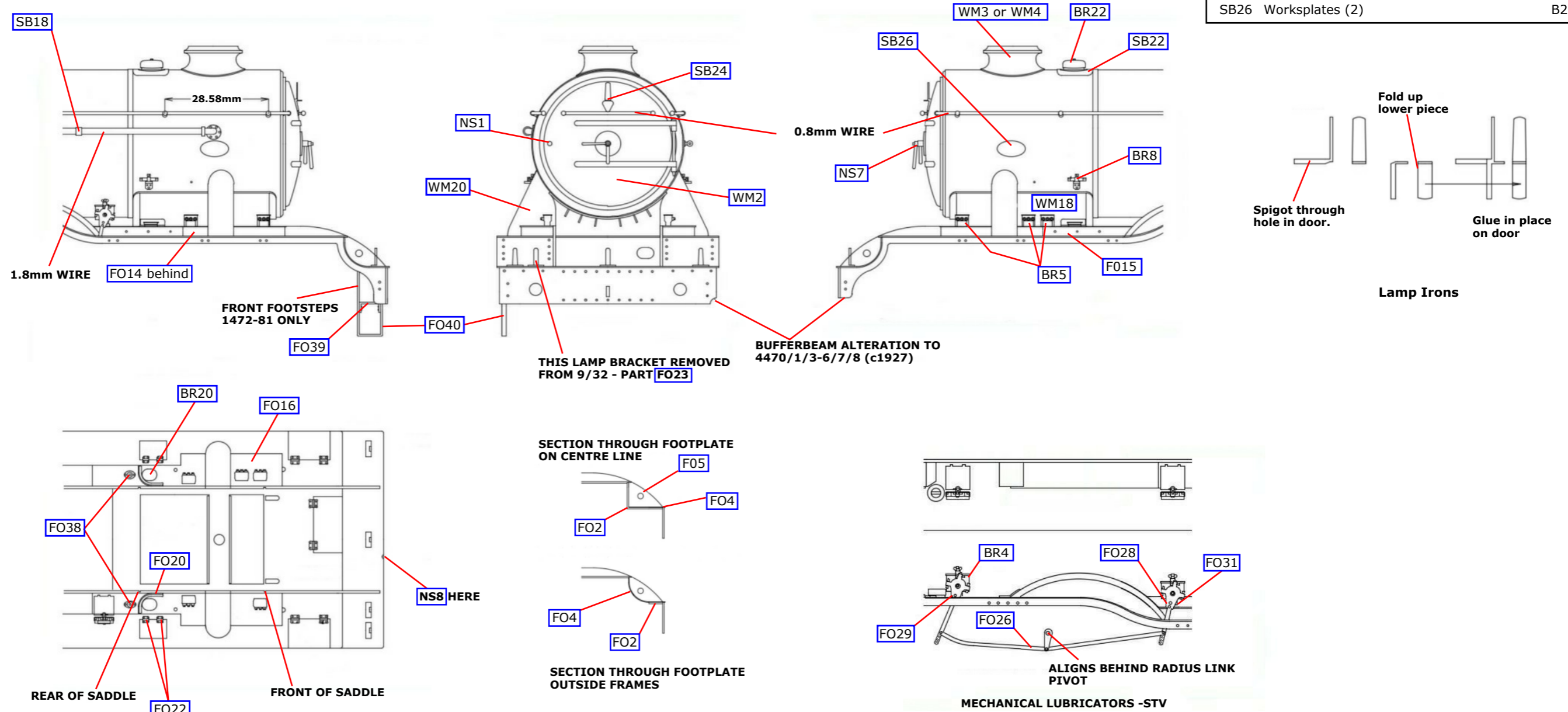


Fig 20. Footplate short travel valves

## FOOTPLATE LONG TRAVEL VALVE GEAR

**Footplate - LTV.** Fold up the two sides on the valve cover base (FO17) and solder to the footplate, they are correctly aligned when the square opening in the base and footplate line up. Fold the valve cover box sides (FO18) and affix to the base. Form the sand filler rims (FO20) and fix to the valve cover box tops (FO19), then fit the tops to the base.

Attach the front sand box filler caps (BR20) in place and the six pot lubricators (BR5). Using prototype photos detail the oil lines as appropriate using 0.3mm wire.

Attach the four small access door hinges (FO22) to the footplate and the two sand box spindle bearings (FO38) to the valve cover top. If appropriate, add the front end cover plate (FO24), check your prototype and dates.

If modelling an engine with later style front steps then add the additional grab rails formed from 0.45mm wire as shown in Fig.21 below.

If required add the extra front footplate lamp iron (FO23) as shown in Fig.21 below.

To complete the front footplate area add the white metal smoke box saddle (WM18), ensure the front and rear faces align with the half etched lines inside the frames.

**Lubricators.** Attach the front and rear lubricator arms (FO29 & FO28) to the lubricators (BR4), then add the hand wheels (FO30) over the arms; pass the arms through the footplate and valve cover box and secure the lubricators. Fix the lubricator foot (FO31) to the front right hand side lubricator only complete their installation.

The mechanical linkage (FO27) is best fitted once the footplate support structure has been removed.

**Smokebox - LTV.** The following parts are fitted once the firebox, boiler, smokebox has been assembled, see Fig.22.

Solder the anti-vacuum valve plate (SB23) to the smokebox top and then fit the anti-vacuum valve (BR22), attach the worksplates (SB26) to each side of the smokebox followed by the two anti-carbonising fittings (BR8) and the single anti-carbonising valve (BR9), check prototype photos for the pipe runs to these fittings and fabricate from 0.3mm wire once the boiler has been fitted to the footplate.

Fix the smokebox door (WM2) to the front of the smokebox followed by the handles (NS7), door knob (NS1) and handrail knobs; add a length of 0.8mm wire for the handrail. fit the top lamp iron (SB25) and LNER (WM4) chimney.

Form the ejector exhaust pipe from 1.8mm wire and secure to the boiler assembly with the straps (SB18) through the slots in the boiler. Leave the pipe over length so as to pass through the cab front wall. Finally fit the two superheater covers WM9.

Once the boiler assembly is attached to the footplate fit the two steam pipe covers (WM1), trim to achieve a nice clean fit. Do not fit the boiler assembly yet.

Some engines had the lower corner of the buffer beam and side valance trimmed, use the half etched guide lines on the inside to trim the buffer beam and valance to suit your chosen model.

No.	Description	Sheet
FO17	Valve cover box base - LTV (2)	B3
FO18	Valve cover box side - LTV (2)	B1
FO19	Valve cover box top - LTV (2)	B3
FO20	Valve cover box sand filler rim (2)	B3
FO22	Access door hinges - Small (4)	B3
FO24	Front end cover plate	B3
FO27	Lubricator linkage - Late	A1
FO28	Lubricator arm - Front	A2
FO29	Lubricator arm - Rear	A2
FO30	Lubricator handwheel (2)	A2
FO31	Lubricator foot	B3
FO38	Sandbox spindle bearing (2)	B3
SB18	Ejector exhaust pipe brackets (5)	B3
SB23	Anti-vacuum valve cover plate - Late	B2
SB25	Top lamp iron - Late	B3
SB26	Worksplates (2)	B2

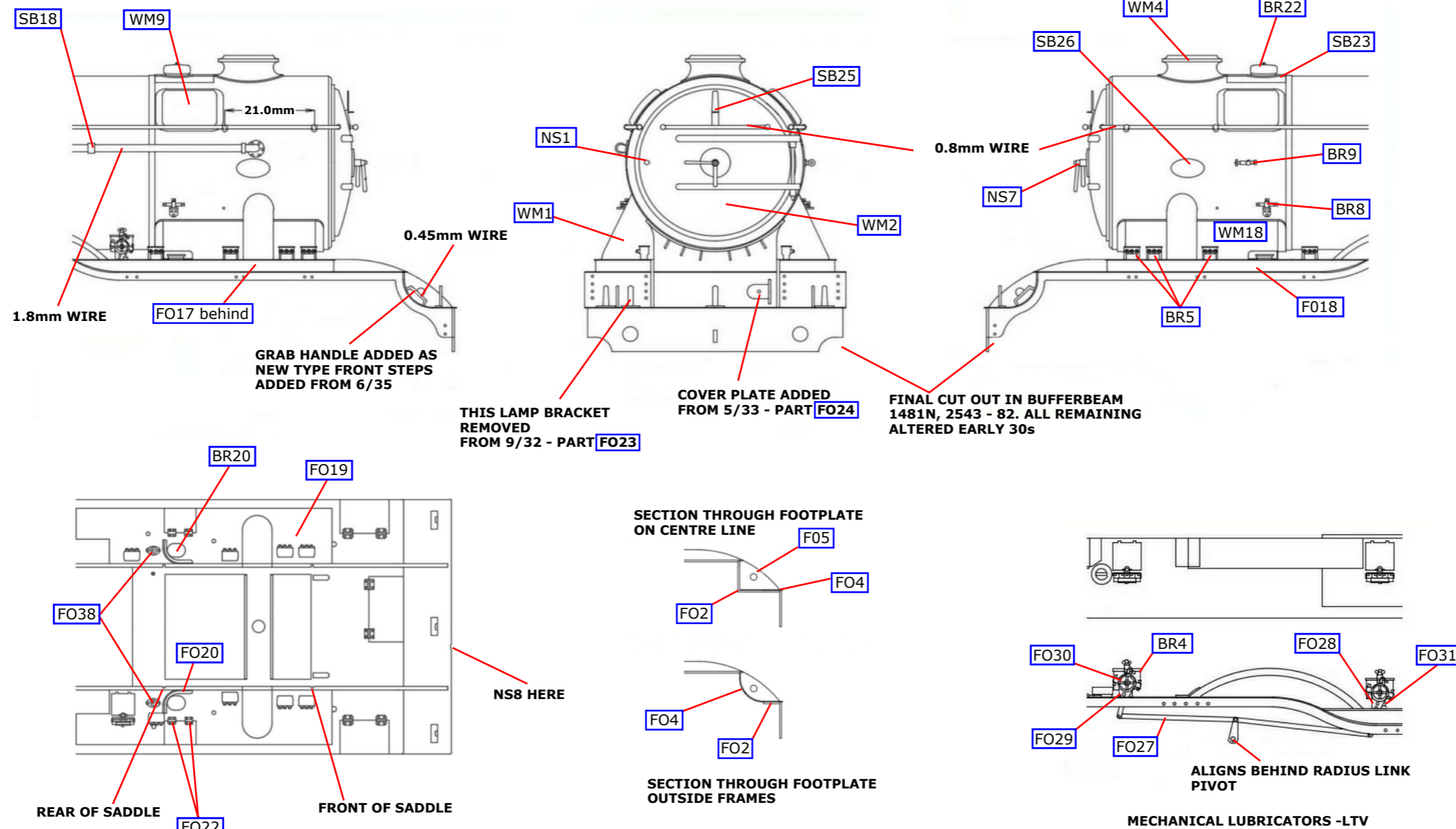


Fig 21. Footplate long travel valves

## BOILER, FIREBOX, SMOKEBOX ASSEMBLY

**Firebox.** Do not remove the cusp around the edges of the firebox and boiler formers and the firebox former spacer or they will be too small.

Pin together, using 0.8mm wire pins, the firebox front former (SB2), the front former lower (SB3), and the front former packing piece (SB4) as shown below with the packing piece with the cut outs for the sanding and reversing rods on the right side.

Fold this assembly along the fold lines and solder together with the firebox rear former (SB1) and the firebox spacer former (SB5) to make the firebox cage. Open up the slots for the sanding and reversing rods on the right hand side only and round the throat plate sloping front edge on both sides.

Solder the upper mud hole doors (SB6) and the lower mud hole doors (SB7) in place on the inside of the firebox wrapper (SB8) before forming the wrapper to shape.

Centre the wrapper on the formers by using the small notches in the top of the formers (accuracy here is essential) before soldering the wrapper in place.

Solder two short pieces of 1.25 mm wire into the holes in the rear former (SB1) to act as dowels to locate the firebox and cab. Alternatively 10 BA screws could be used.

Fix the mud hole doors clamps (BR24) in place and the upper washout plugs/doors as appropriate. Early boilers had 1.0mm square washout plugs, later boilers had these replaced with covers (SB20) and a stub of 0.8mm wire. Check your prototype model and dates to ascertain the correct style of washout plug fitting.

Solder the handrail knobs in place and add the lower handrail from 0.8mm wire. Fix the two safety valve cover plates (SB19) and then fit the relevant safety valves, GNR loading gauge (BR6) or LNER loading gauge (BR23).

**Coned boiler section.** Form the coned boiler wrapper (SB9) by rolling and check for fit around the formers, rear and front (SB10 & SB11). Bend the boiler band joining brackets on the coned boiler joint strap (SB12) and fit through the small slots from inside the boiler. If the fit is good and the formers fit then solder the wrapper ends together with the joining strap.

Solder the formers in place so that they are almost flush with the ends with the etched notch at the top of the rear former aligned accurately with the notch in the wrapper.

Solder two short pieces of 1.25 mm wire into the holes in the rear former to act as dowels to locate the boiler and firebox. Alternatively 10 BA screws could be used. Check the boiler/firebox fit.

Represent the bolts in the joining brackets using 0.45 mm wire and solder the handrail knobs in place.

**Boiler/smokebox parallel section.** Emboss the rivets around the ejector exhaust pipe flange on the boiler/smokebox parallel wrapper (SB13). Drill the required handrail knob holes in the smokebox wrapper; see STV and LTV (Fig.20 & 21) for details.

Roll the wrapper and check-fit it on the formers, rear (SB14) and smokebox front (SB15). Tap or add a 6BA nut to the inside of the rear former (SB14) for fitting to the coned boiler section later. Solder the wrapper ends together using the boiler/smokebox parallel joint strip (SB16). Position the formers flush with the back and front with the two handrail knob holes on the front spacer equally spaced from the adjacent holes on the wrapper and solder in place.

Drill out the handrail knob holes in the smokebox front overlay (SB17) and attach to the front of the smokebox aligning the handrail holes. Add the remaining handrail knobs.

Now check-fit the boiler/smokebox to the firebox and saddle, once fitted attach the dome of your chosen prototype (WM5, 6 or 23) Note, location varies due to dome fitted, check prototype references before fitting.

To complete the smokebox, refer to the two previous sections on STV and LTV front ends (Fig.20 & 21).

No.	Description	Sheet
SB1	Firebox rear former	A1
SB2	Firebox front former	A1
SB3	Firebox front lower former	A1
SB4	Firebox front packing piece	A1
SB5	Firebox spacer former	A1
SB6	Firebox mud hole doors - Upper (2)	A1
SB7	Firebox mud hole doors - Lower (2)	A1
SB8	Firebox wrapper	B1
SB9	Boiler coned wrapper	B1
SB10	Boiler coned rear former	A1
SB11	Boiler coned front former	A1
SB12	Boiler coned joint strap	B1
SB13	Boiler/smokebox parallel wrapper	B1
SB14	Boiler parallel rear former	A1
SB15	Smokebox front former	A1
SB16	Boiler/smokebox parallel joint strap	B1
SB17	Smokebox front overlay	A1
SB18	Ejector exhaust pipe brackets (5)	B3
SB19	Safety valve cover plate (2)	B2
SB20	Firebox washout cover plate (7)	B3

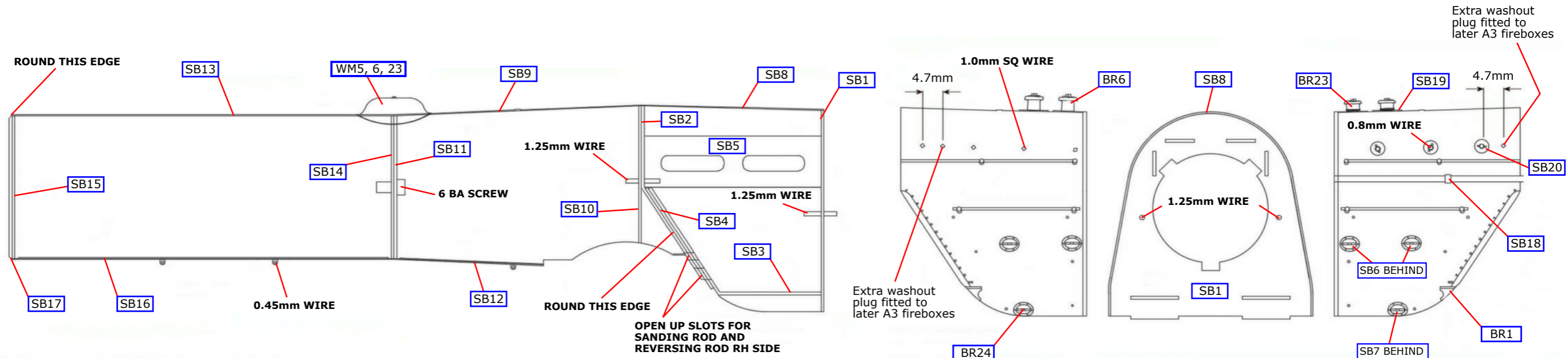


Fig 22. Boiler

## CAB

**Cab.** There are three types of cab to choose from, GNR high roof profile, LNER low roof profile large rear side sheet opening and LNER low roof profile small rear side sheet opening.

Fold up the cab floor support (C1) and solder the cab floor (C2) in place after fitting two 6BA nuts over the holes noted in Fig 23. Add the washout plugs from 1 mm square wire. Curve the rear edges of the appropriate cab side (C4, C8, C9) and solder the rear inner beading (C5, C10, C11) inside the rear edge.

Solder the appropriate cab doors (C6 or C12) to the hinges that form part of the inner beading. Add the hand rail knobs and solder the cab handrails from 0.8mm wire in place.

The cab seats can be modelled in their early and late form. The early ones come as driver's (C19 & WM14) and fireman's (C20 & WM13). The later bucket seats, LNER small rear side sheet opening, (C21 & WM15) fit both sides. Assemble the cab seats and fix in place.

Fit the two outside cab windscreens (C17).

**Windows.** Solder the cab window inner layer (C13) in place, for the low cab roof align the small holes for the cab outside windscreen (C17).

Solder the sliding window frame (C14) over C13 and break off the rear piece along the etched line. The cab window outer layer (C15) which retains the cab window sliding frame (C16) cannot be fixed until painting and glazing are complete.

**Cab assembly.** Select the required cab front (C3 or C7) and emboss any required rivets. Solder the cab sides and cab front to the cab floor assembly, ensure the sides, front and corners are all square.

Fold down the two tabs on the fall plate (C18) so that they drop through the respective slots in the cab floor.

**Cab roof.** Fold up the required cab roof former (C24 LNER or C22 GNR), roll the appropriate roof (C23 or C25) and fit to the former. Ensure the ventilator opening on the low cab roof (C25) is as far forward as possible.

On the GNR cab add the sliding vent (choice of two vent positions) overlay (C28) and rain strips (C29) to complete.

On the LNER cab fold and fit the raised ventilator sides and back (C26) then add the raised ventilator top (C27) followed by the sliding vent (choice of two vent positions) overlay (C28). Fit the rain strips (C29) to complete.

Using a Carborundum disc in a mini drill remove the unwanted parts of the cab roof former. Clean the edges of the remaining former structure.

The ends of the rear roof former on LNER low roof engines are curved around to fit between the cab sides. Those on the GNR high profile roof engines fit between the cab sides behind the inner beading.

Once complete add the whistle (BR10) to the cab front.

No.	Description	Sheet
C1	Cab floor support	B1
C2	Cab floor	B1
C3	Cab front - High cab	B2
C4	Cabside - High cab (2)	B2
C5	Cabside inner beading - High cab (2)	B3
C6	Cab door - High cab (2)	B1,B3
C7	Cab front - Low cab	B2
C8	Cabside - Low cab - Large cut out (2)	B4
C9	Cabside - Low cab - Small cut out (2)	B4
C10	Cabside beading-Low cab-Large cut out (2)	B3
C11	Cabside beading-Low cab-Small cut out (2)	B2
C12	Cab door - Low cab (2)	B1
C13	Cab window - Inner layer (2)	B3
C14	Cab window - Middle layer (2)	B2
C15	Cab window - Outer layer (2)	B3
C16	Cab window - Sliding (2)	B1,B2
C17	Cabside windscreen (2)	B2
C18	Cab fallplate	B1
C19	Cab seat bracket - Early - Driver	B2
C20	Cab seat bracket - Early - Fireman	B1
C21	Cab seat bracket - Late - Dual (2)	B2
C22	Cab roof former - High cab	B2
C23	Cab roof - High cab	B2
C24	Cab roof former - Low cab	B2
C25	Cab roof - Low cab	B2
C26	Cab ventilator sides and back LNER	B2
C27	Cab ventilator top LNER	B2
C28	Cab sliding vent overlay (2)	B1
C29	Cab rain strips	B2

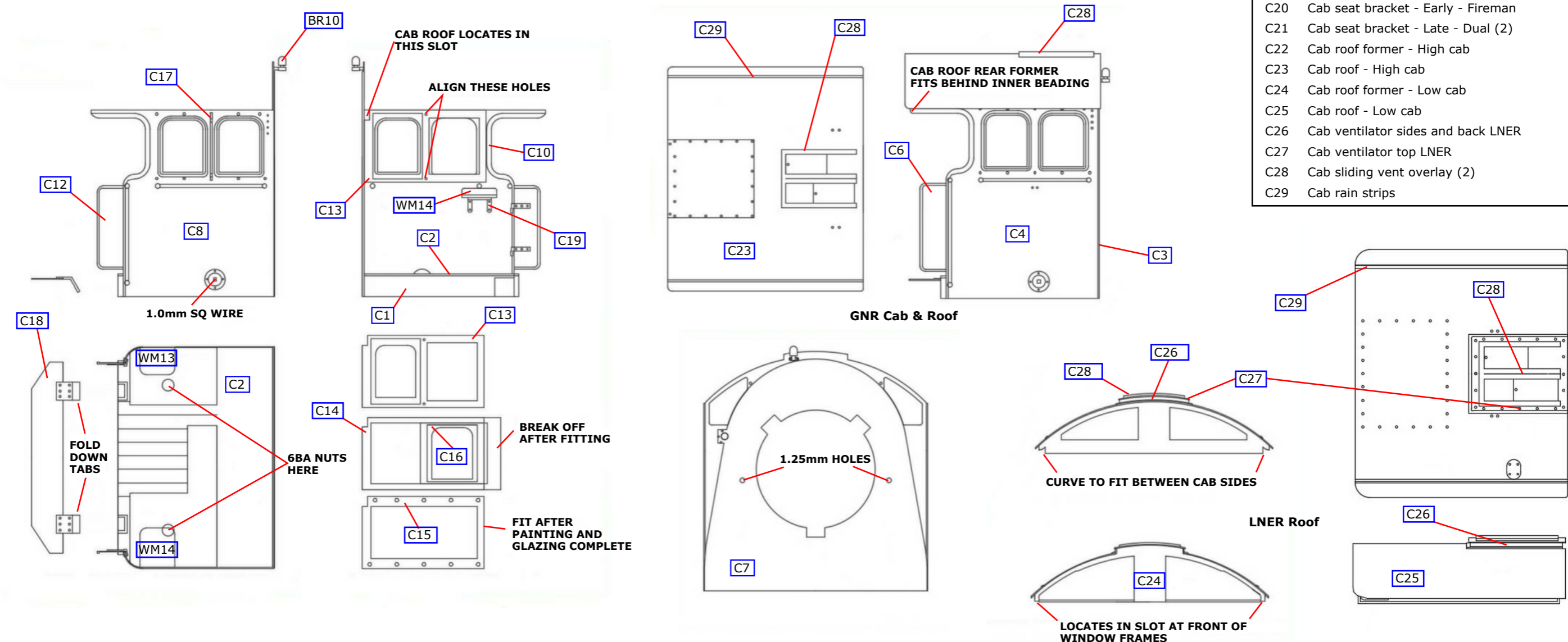


Fig 23. Cab Construction

## CAB BACKHEAD

**Backhead.** Drill out the holes in the backhead casting (WM12) to accept the steam manifold (BR15) and the two Injector valves (BR13 & 14) and the Water gauges (BR16).

Carefully drill the backhead regulator brackets to accept the regulator rods made from 1.0 mm wire and fit the rods in place. It is easier to make these as two rods rather than trying to drill the centre casting to take a single rod across the backhead. Make sure there is enough rod protruding from the left and right brackets to attach the Regulator levers (C31) on each side.

Attach the Water gauges (BR16) over the regulator rods and fit the steam manifold (BR15) Add four lengths of 1.2mm copper wire to the base of the Injector valve castings (BR13 & 14) bend to match Fig 24 and trim to fit then attach the two castings to the backhead.

Punch the rivets on Firehole door (C30) and fold the heat shield out through 90° and attach to the backhead. Fit the appropriate gauges (C35) to the relevant brackets (C40) and fit to the backhead, use the drawing Fig 24 as a reference.

Finally fit the Cut off indicator (C34) and Backplate shelf (C33) onto the backhead. Attach the exhaust ejector valve (BR12) to the right side of the backhead, a small groove in the casting marks the fitting location; attach the handle (C38) and fit a short piece of 0.45mm wire at the end to complete the handle assembly. Attach a length of 0.6 mm copper wire to the top of the valve and route up the right hand side of the backhead and terminate behind the distribution box.

A similar length of 0.6mm wire is added to the base of the vacuum injector and runs down the right side of the firebox to the base.

Attach lengths of 0.3mm copper wire to the base of the water gauges for the drain pipe work and run down the backhead past the tray and fire hole door guards to the floor.

Fix a short length of 1.2mm copper wire to the base of the firebox/floor for the Mason reducing valve feed and fit the casting (BR11) on top, the height is not critical as pipe work in service varied, use the drawing as a general reference. Fit a length of 0.6mm copper wire to the relevant gland (see drawing) on the Mason valve and route up the backhead, over the left hand side regulator rod and up behind the distribution box. Finally a length of 0.3 mm copper wire runs from the Mason valve to the gauge mounted on the backhead mid height left side, see drawing.

Fit the two large (C36) and three small (C37) hand wheels to the distribution box and the two Injector handwheels (C32).

Place the backhead into the cab and fit the raised floor sections (WM16 & 17) there should be a small gap for any pipework to pass between the backhead and raised floor.

Complete the cab fittings by attaching the Screw reverser column (WM19) to the raised cab floor (WM16) and attaching the handle (NS2) on top.

No.	Description	Sheet
C30	Fire hole door and screen	B2
C31	Regulator levers	B2
C32	Injector hand wheel (2)	B3
C33	Backhead shelf	B2
C34	Cutoff indicator	B3
C35	Cab gauges (5)	B2
C36	Steam manifold handwheels - Small (3)	B3
C37	Steam manifold handwheels - Large (2)	B3
C38	Vacuum ejector handle	B3
C40	Cab gauge brackets (4)	B2

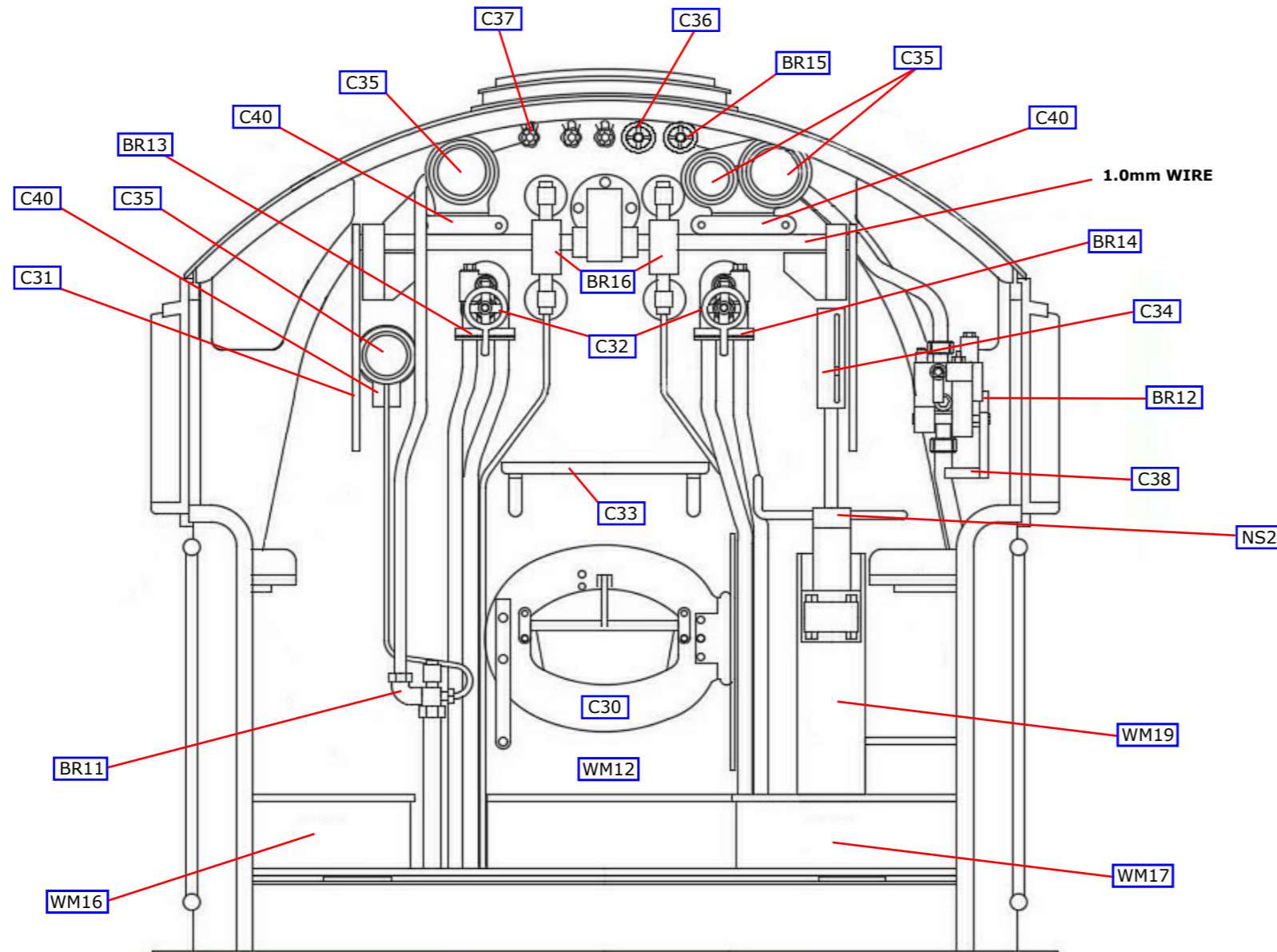


Fig 24. Cab backhead

## FINISHING THE MODEL

**Brakes.** Assemble the brake hangers (B1 & B2) first embossing the rivet on each lamination. Attach the hangers to the pivot wires.

Emboss the bolts in the brake pull rods & cross shafts (B3) and the brake cross shaft overlays (B4, B5 & B6) and solder the cross shaft overlays to the top of B3. Fix this assembly to the brake hangers.

Laminate together and then fit the front brake pull rod laminations (B7). The brake shaft is made from 2.0 mm wire and fits through the holes in the frames and is soldered to the pull rods. Mount and attach the brake cylinders (WM11) to the front compensation beam mounting frame stay (F5).

The axles are now retained by the springs, formed from a triple lamination of F31, F32 and F33. Complete the chassis detailing by fitting the sandpipes (0.8 mm wire), steam sanding pipes (BR19) and sand box filler pipes (1.8 mm wire) as shown in Fig. 5 & the GA.

**Sanding levers.** Twist the sanding rod (FO32) through 90° in the places marked X and add the crank overlay (FO33) on top, above this, add the crank bracket overlay (FO34) and pass a short length of 0.45 mm wire through the pivot point and pin this assembly to the footplate.

Fit the transverse rod overlays (FO37) to the top at each end of the transverse rod (FO35) and add 0.45 mm wire pins at each end and the inner offset pivot.

Attach the transverse sanding rod so that the outer pins align with the spindle bearings on the valve travel covers. The inner offset pivot should now align with the free front end of the main sanding rod (FO32). Note the height difference between the two rod assemblies and join the two.

Attach the cab to the boiler assembly and fit both to the footplate and secure (take care to pass the firebox end of the sanding rod FO32 through the small gap in the clothing), then carefully remove the footplate supporting structure and clean up the valance, buffer beam and drag beam lower edges. Add the steam pipes (Fig.20 & 21) and firebox footplate steps (Fig.22). Fit the eight nameplate brackets (FO44) to the middle splasher (four on each side).

**Reversing/damper rods.** Select the LH damper operating rod (FO42) and fit to the underside of the cab on the LH side. Select the required reversing rod (M42 or M43), laminate the two halves and attach the joint overlay (M44), note the support bracket should align with the chassis part F7 when fixing in place. Slide the firebox end into the gap in the clothing and secure the reversing rod to the chassis.

**Buffers, hooks & hoses.** Assemble the buffers as shown in Fig.26 and attach to the front buffer beam, add the Vacuum brake hose (NS8) to the front buffer beam and attach the hook of your choice. An etched hook is supplied in the kit (FO43) if you wish to use it.

**Drawbar.** Attach a washer to the head of a 6BA screw (see Fig.28), remove the cusp from the insides of the pivot holes so that the drawbar (F40) fits over the head of the screw. Pass the drawbar through the rear drag beam and use the screw to retain.

No.	Description	Sheet
B1	Brake hanger lamination - Rear (4)	B2,B3
B2	Brake hanger lamination - Middle/Front (8)	B3
B3	Brake pull rods / cross beams	B1
B4	Brake beam overlay - Rear	B3
B5	Brake beam overlay - Middle	B1
B6	Brake beam overlay - Front	B1
B7	Brake pull rod lamination - Front (4)	B1
F31	Spring lamination - Centre (6)	A3
F32	Spring lamination - Outer (6)	A3
F33	Spring lamination - Inner (6)	A3
F40	Drawbar	B1
F032	Sanding rod	B3
F033	Sanding rod - Crank overlay	B3
F034	Sanding rod - Crank bracket overlay	B3
F035	Sanding rod - Transverse	B3
F037	Sanding rod - Transverse- Overlay (2)	B3
FO42	Damping rod (2)	A2
FO43	Etched hook	A2
FO44	Nameplate brackets (8)	B3
M42	Reversing rod - Doncaster (2)	A1
M43	Reversing rod - Darlington (2)	A1
M44	Reversing rod joint overlay	A1

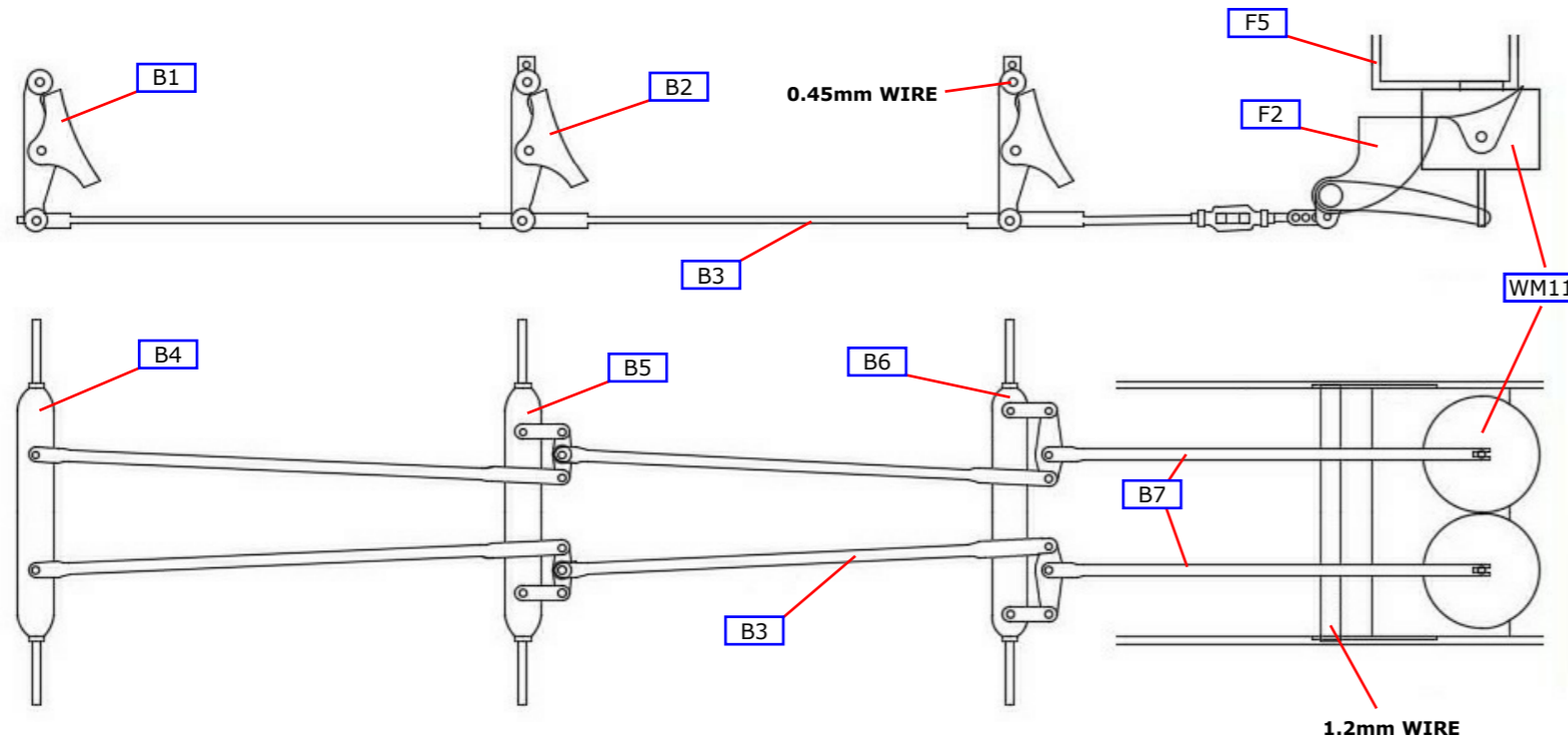


Fig 25. Brake Rigging

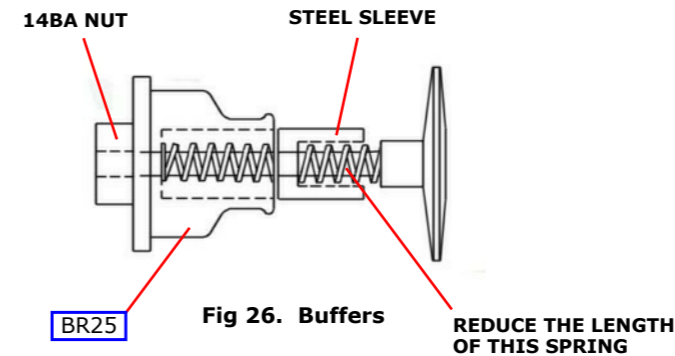


Fig 26. Buffers

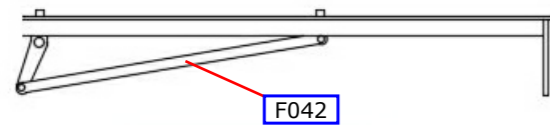


Fig 27. Damper Rods

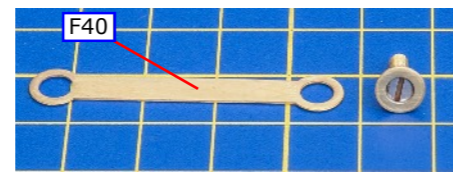


Fig 28. Drawbar

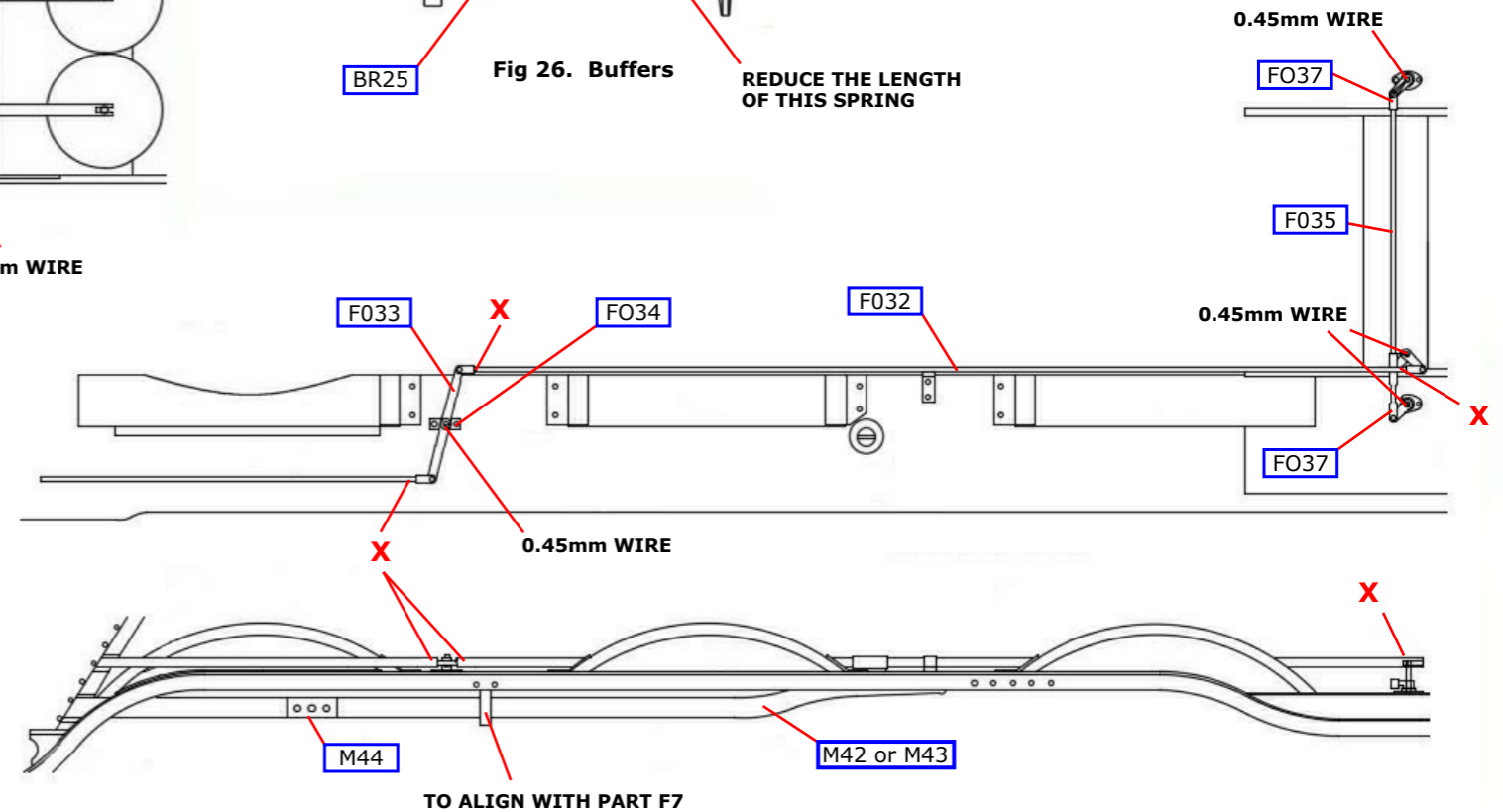
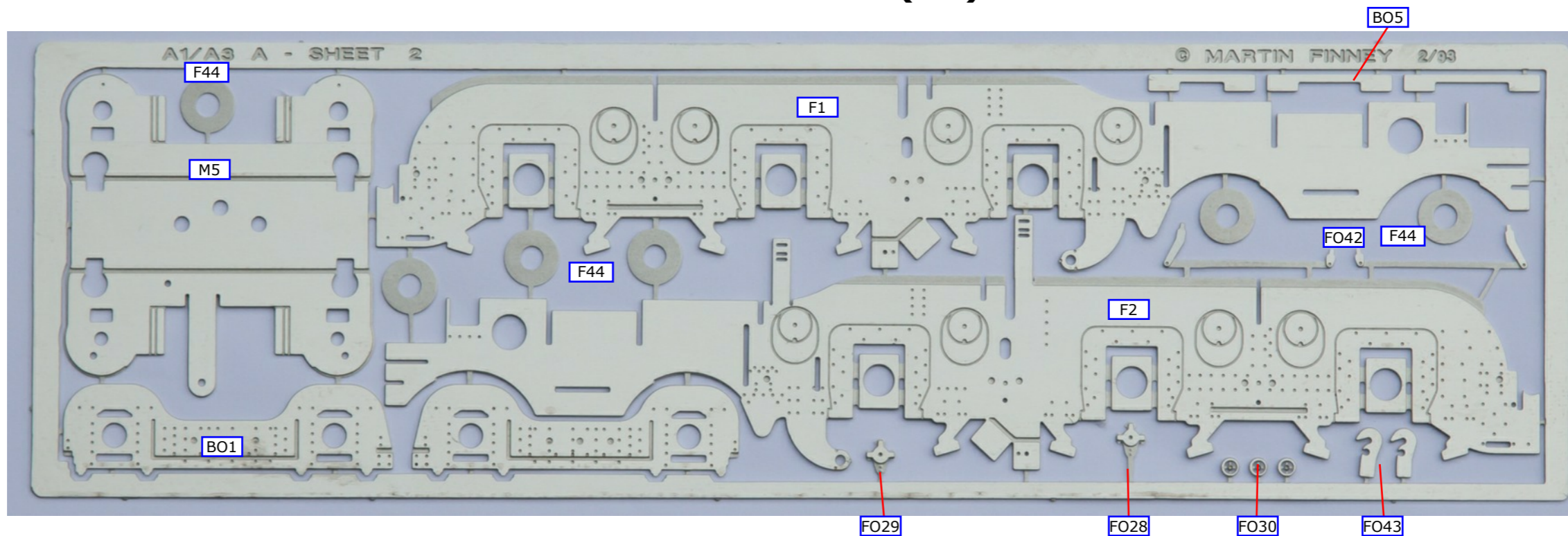


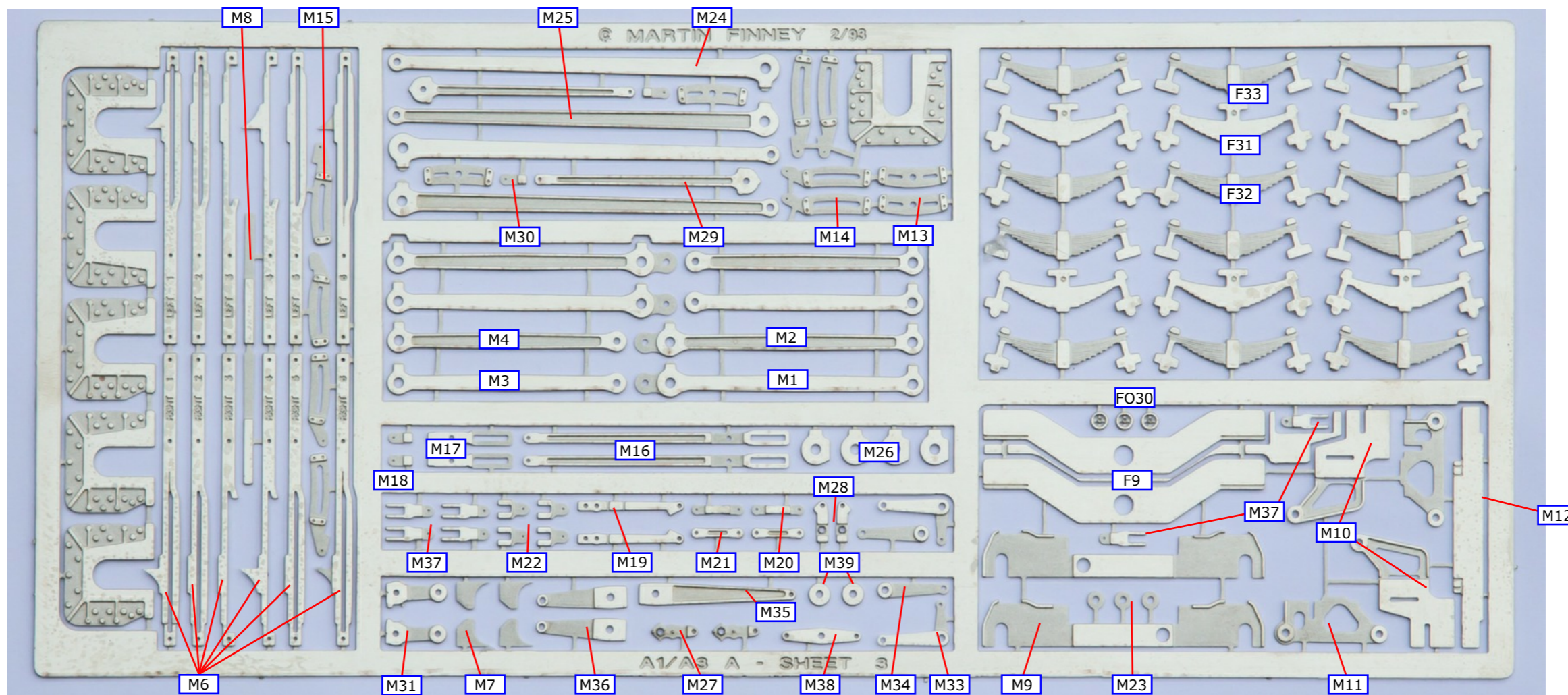
Fig 29. Sanding Levers



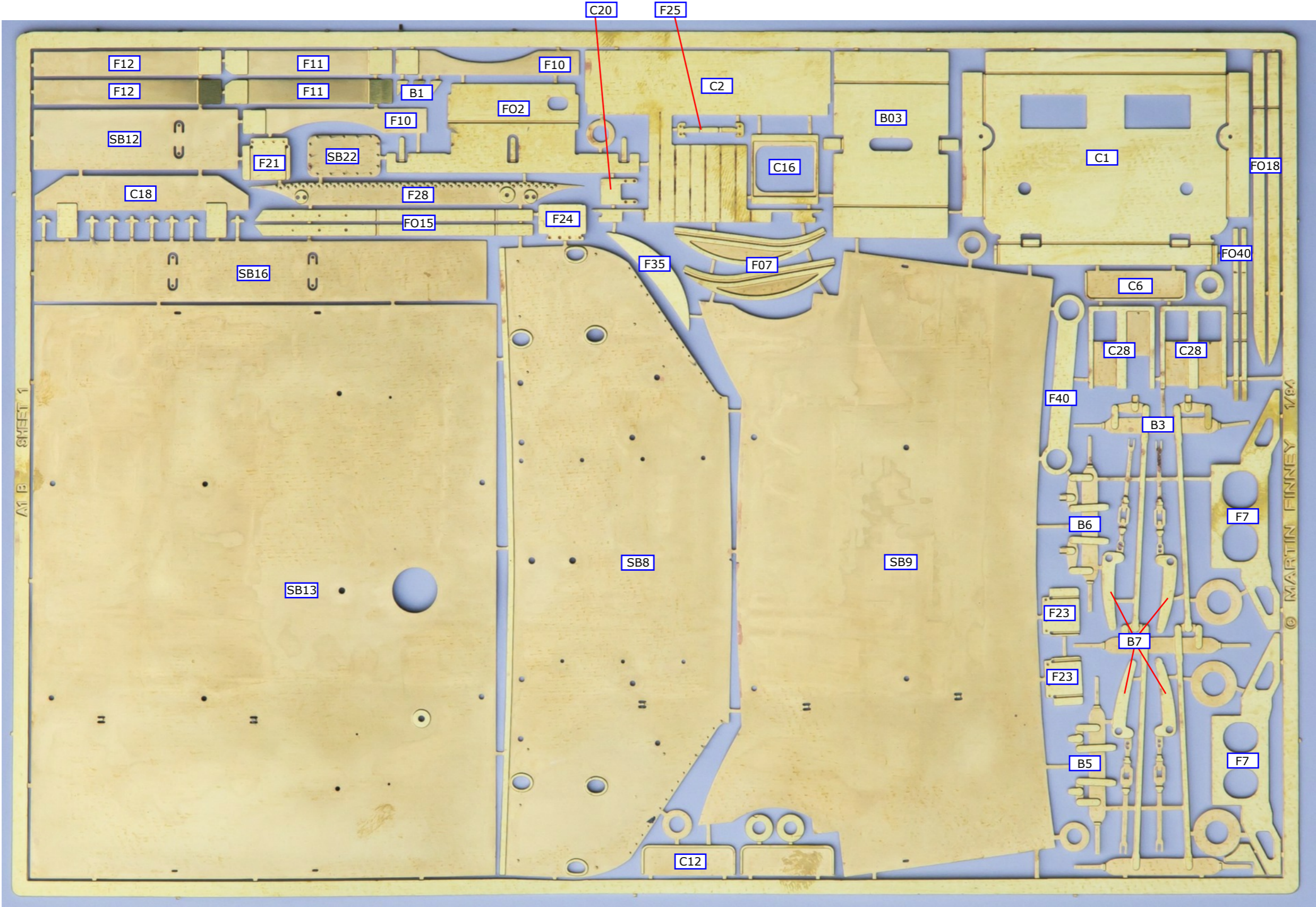
## A1 - SHEET 2 (A2)



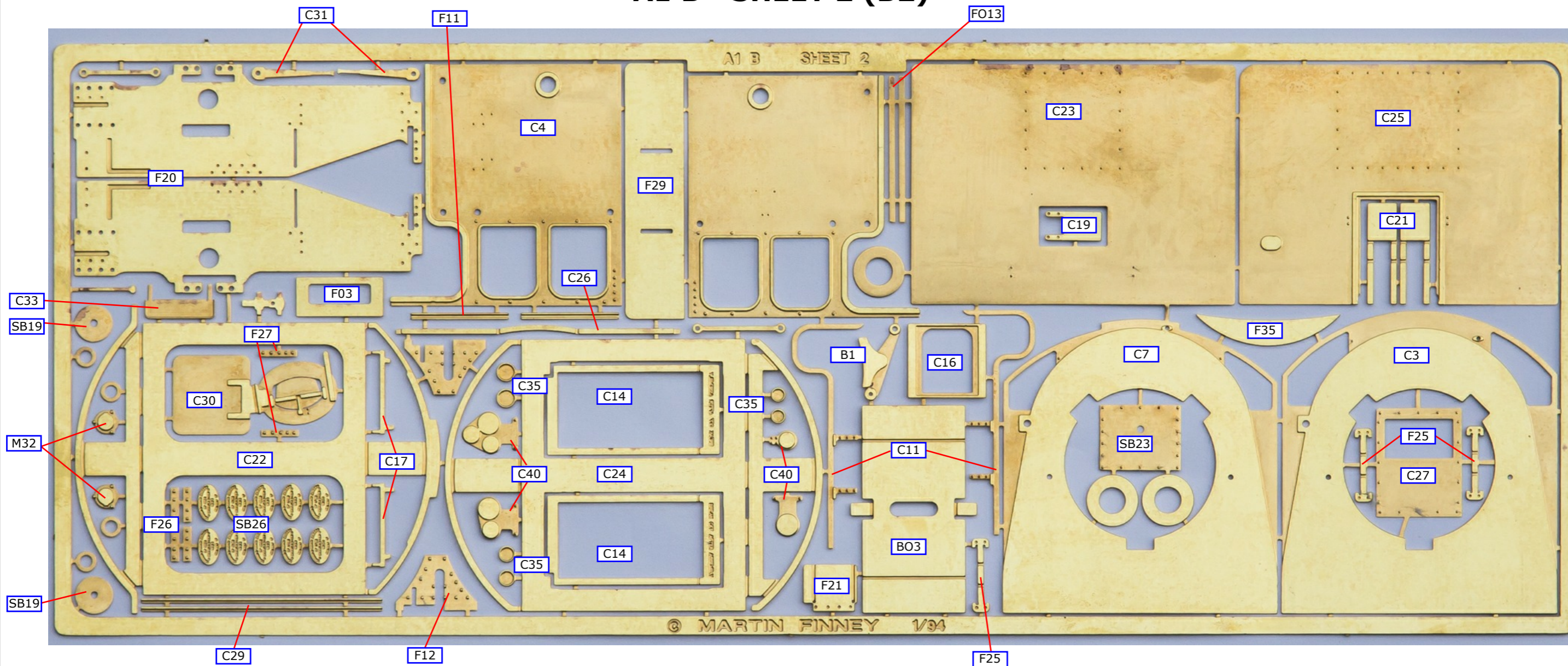
## A1 - SHEET 3 (A3)



A1B - SHEET 1 (B1)



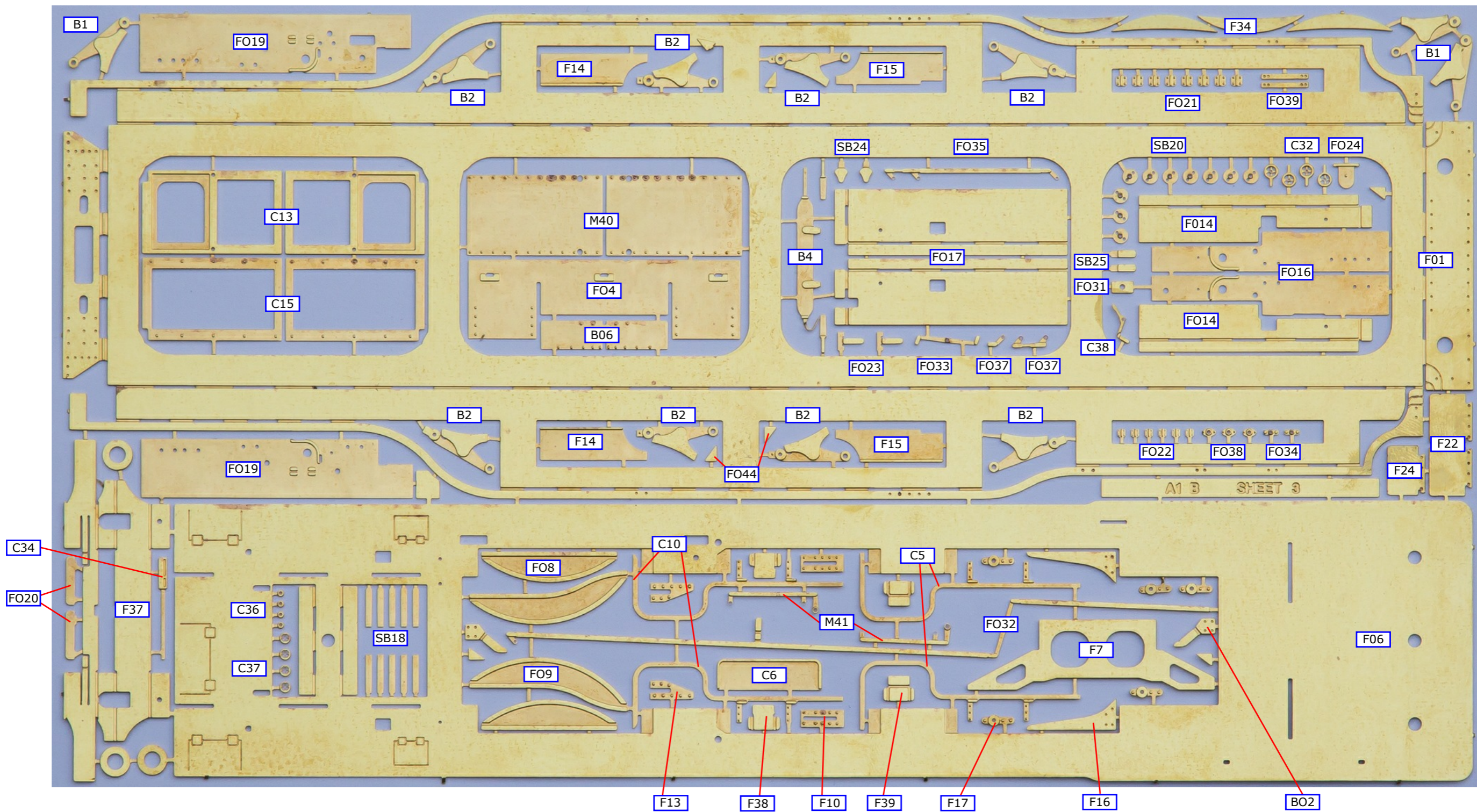
A1 B - SHEET 2 (B2)



A1 B - SHEET 4 (B4)



## A1 B - SHEET 3 (B3)



## CAST PARTS

### BRASS CASTINGS

- BR1 Footplate step (2)
- BR2 Drain cock (4)
- BR3 Cylinder relief valve (4)
- BR4 Mechanical lubricator (2)
- BR5 Pot lubricator (8)
- BR6 Safety valve GNR (2)
- BR7 Blowdown tap
- BR8 Anti carboniser (2)
- BR9 Anti carboniser valve
- BR10 Whistle
- BR11 Mason reducing valve
- BR12 Exhaust ejector LH & RH

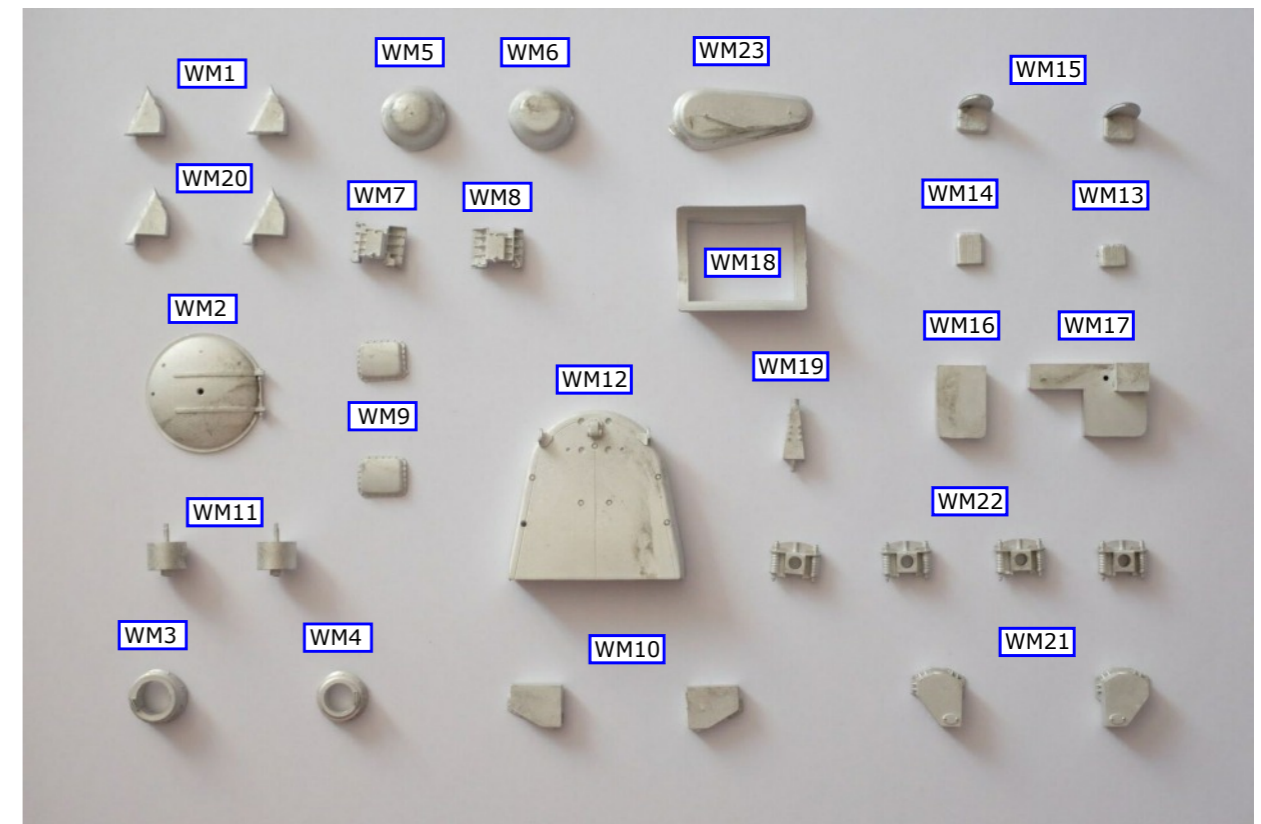
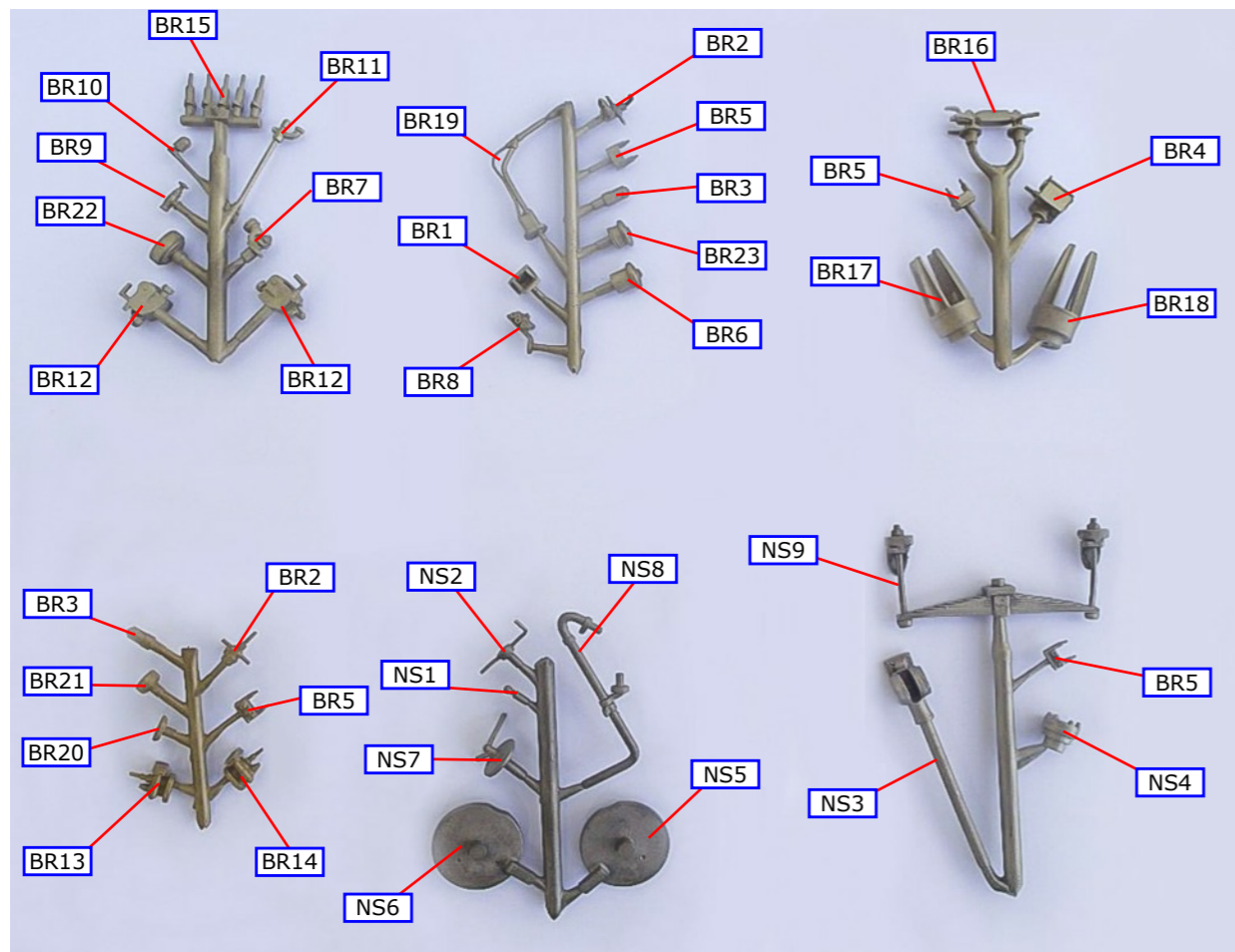
- BR13 Injector valve, left
- BR14 Injector valve, right
- BR15 Steam manifold
- BR16 Water gauge (2)
- BR17 Valve crosshead guide, front (2)
- BR18 Valve crosshead guide, rear (2)
- BR19 Steam sanding pipes (2)
- BR20 Front sandbox lid (2)
- BR21 Rear sandbox lid (2)
- BR22 Anti-vacuum valve
- BR23 Safety valve LNER (2)
- BR24 Mudhole door clamp (6)
- BR25 Buffer housing (2)
- BR26 Buffer spring gaiter (2)

### NICKEL SILVER CASTINGS

- NS1 Smokebox door knob
- NS2 Screw reverser handle
- NS3 Crosshead & piston rod (2)
- NS4 Piston rod gland
- NS5 Cylinder front cover, left
- NS6 Cylinder front cover, right
- NS7 Smokebox door handle
- NS8 Vacuum pipe
- NS9 Cartazzi axlebox spring

### WHITE METAL CASTINGS

- WM1 Steam pipe LTV (2)
- WM2 Smokebox door
- WM3 Single chimney GNR
- WM4 Single chimney LNER
- WM5 Dome GNR round
- WM6 Dome LNER round
- WM7 Cartazzi axlebox, left
- WM8 Cartazzi axlebox, right
- WM9 Smokebox superheater cover (2)
- WM10 Front sandbox (2)
- WM11 Brake cylinder (2)
- WM12 Backhead
- WM13 Seat early fireman's side
- WM14 Seat early driver's side
- WM15 Seat later (2)
- WM16 Cab footplate platform, left
- WM17 Cab footplate platform, right
- WM18 Smokebox saddle
- WM19 Screw reverser column
- WM20 Steam pipe STV (2)
- WM21 Middle sandbox (2)
- WM22 Bogie axle boxes (4)
- WM23 Dome Streamlined



### OTHER COMPONENTS, BODY

- Nickel silver wire - 0.8mm - for handrails
- Brass wire - 1.8mm - for vacuum ejector exhaust pipe
- Brass wire - 0.45mm - for sand rod pivots and front footplate handrails
- Brass wire - 1mm square - for washout plugs
- Brass wire - 1mm - for cab regulator shaft
- Brass wire - 0.3mm for lubricator pipes
- Copper wire - 0.3mm for cab pipework
- Copper wire - 0.6mm for cab pipework
- Copper wire - 1.2mm for cab pipework
- Handrail knob (32)

### OTHER COMPONENTS, CHASSIS

- 3/16" bearing (6)
- 5/32" top hat bearing (6)
- 6BA Cheese head screw 1" (8)
- 6BA nut (8)
- Nickel silver wire - 1.6mm - for coupling rod pins, crosshead pins, radius link pivots & 2 to 1 lever pivot
- Nickel silver wire - 1.4mm - for valve rods
- Nickel silver wire - 1.25mm - for Cartazzi axlebox ties & radius rods
- Nickel silver wire - 0.8mm - for valve gear pins
- Brass wire - 1/8" - for compensation beam pivots & exhaust steam injector pipe
- Brass tube - 5/32" outside diameter - for compensation beams
- Steel wire - 1/16" - front compensation beam
- Brass wire - 0.45mm - for radius link bolts
- Brass wire - 0.8mm - for brake hanger pivots, sand pipes & spring wire
- Brass wire - 1.8mm for sandbox fill pipes & reversing cross shaft
- Brass wire - 2mm - for brake cross shaft
- Valve gear rivet (2)