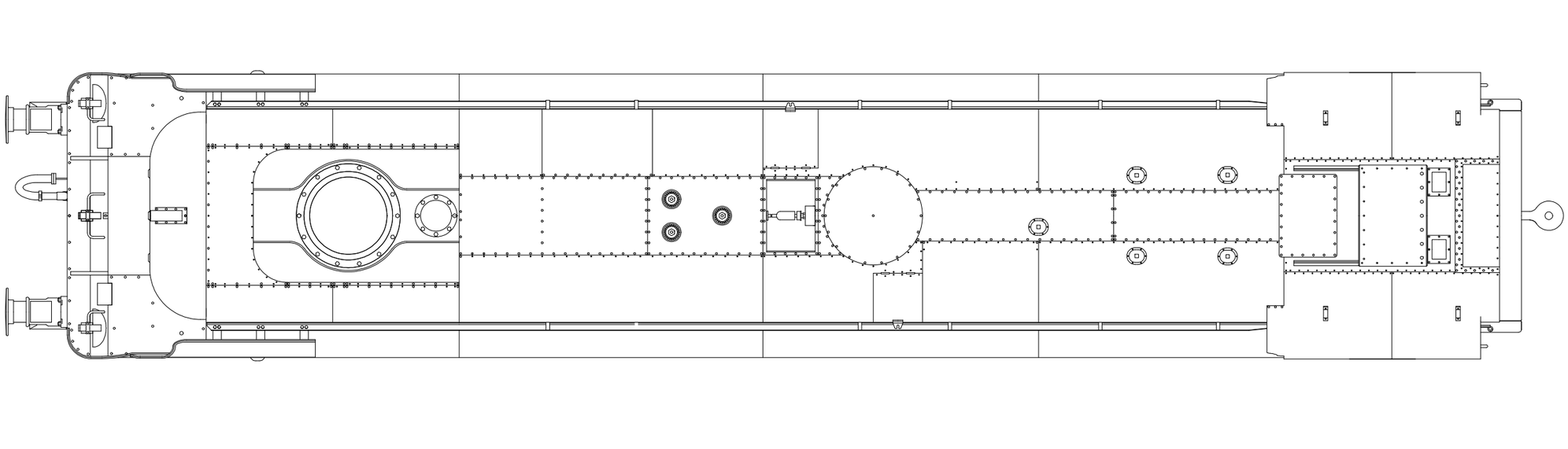
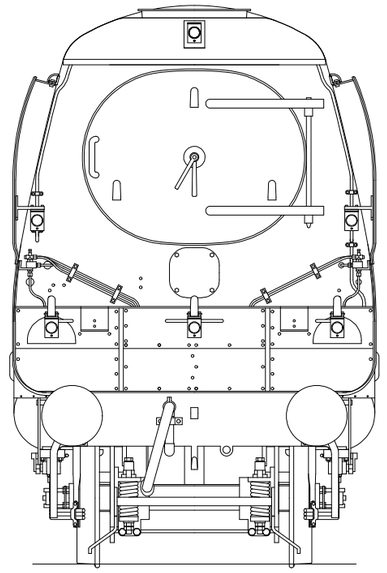
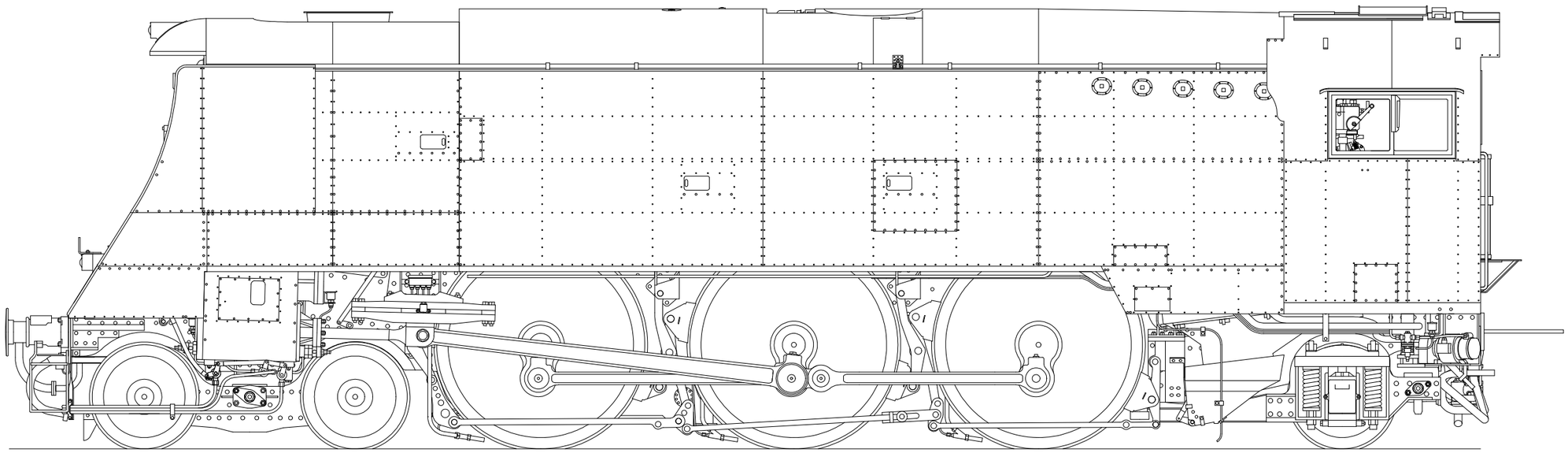






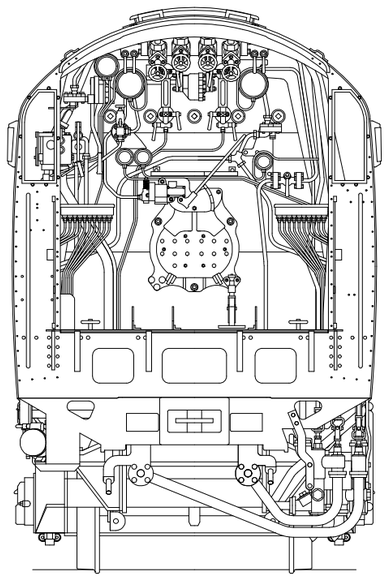


Fig 1. Original Appearance

Original 8’6” Cab
Safety valves in forward position
Original motion bracket
Wide front steps

Original doors over whistle and manifold valves
Front sanding
No chimney fairing
Original Ashpan

Short smoke deflectors
Lipped chimney
Fairing in front of cylinders
Small access plate on smokebox front

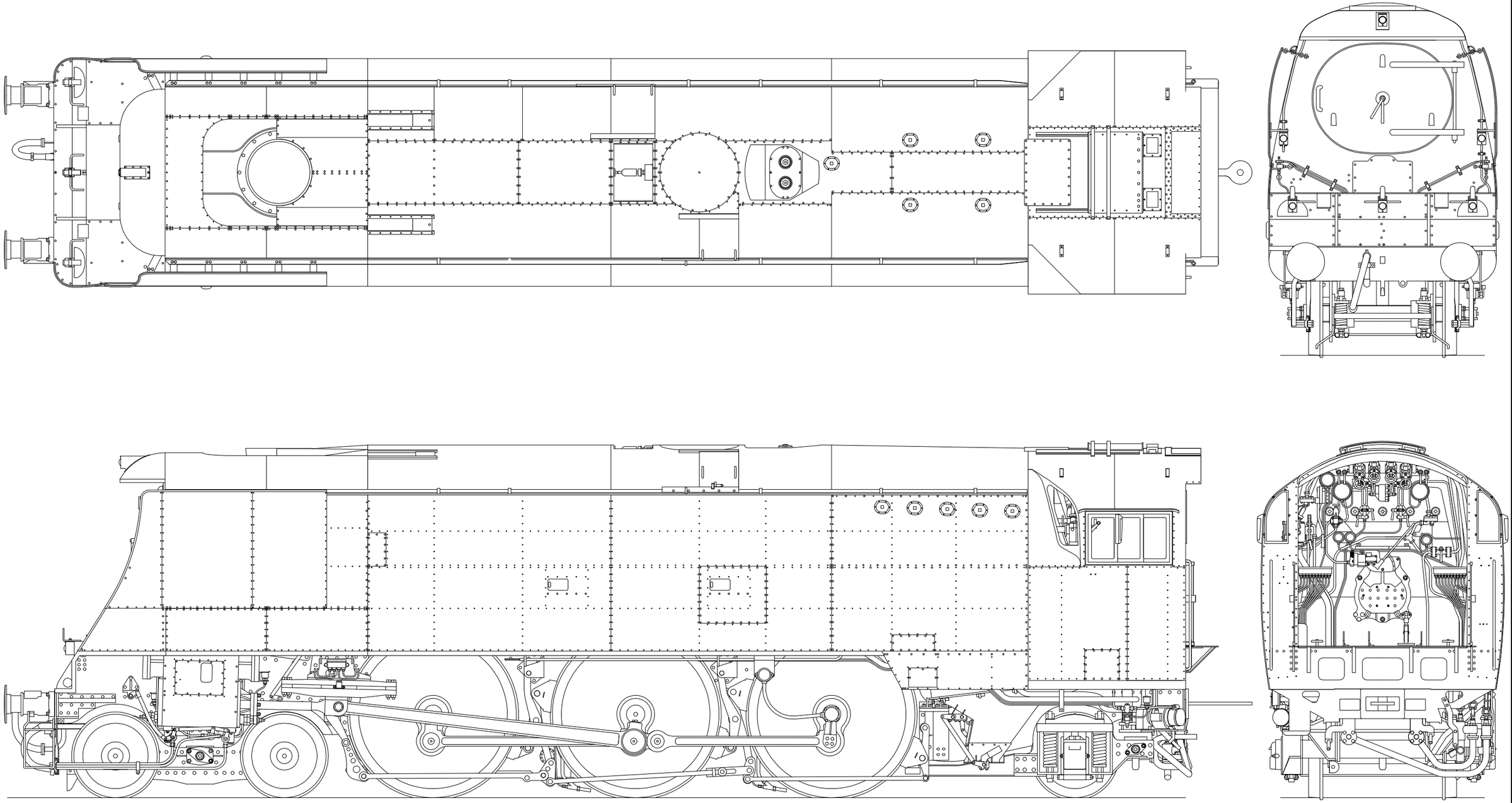


Fig 2. Later Condition

9’ Cab
Standard smoke deflectors
Front sanding removed
Later motion bracket
Narrow front steps

Replacement sliding doors over whistle and manifold valves
Safety valves in rear position
Chimney no lip
Chimney fairing
BR Ashpan

Sliding doors over forward washout plugs
Straps over cab ventilator
Speedometer
Fairing in front of cylinders removed
Large access plate on smokebox front

COUPLING RODS & FRAME PREPARATION

COUPLING RODS

Select the appropriate coupling rod parts according to whether the knuckle-pin joint is behind or ahead of the driving wheel crank pin. The drawing (Fig 3) shows both types of knuckle-pin joints.

The Slater's crankpins are not suitable if you wish to use the cast crankpin nuts supplied. The cast crankpin nuts have an integral 10 BA screw, hence the crankpins need to be hollow and tapped 10 BA. Appropriate crankpins will be available from Finney7.

The coupling rods are now made so that they can be used as a jig to align the remaining horn blocks accurately. First drill out all the crankpin holes to a convenient size, which is undersize for the crankpins, and the fork joint holes 1/16" to fit the cast knuckle joint pin (N7). Remove all burrs caused by the drilling. Now drill a hole, with the drill used for the crankpin 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 laminations over the mandrel and, using plenty of solder and flux, solder the two laminations together. You will now have rods with the crankpin 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 crankpin 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 cast knuckle joint pin retained by lightly soldering on the inner face of the rods. The correctly assembled rods should now have a completely flush inner face.

FRAME PREPARATION

Having decided which chassis to construct you can now start construction by preparing the frames (F1 & F2) as shown below. Remove the etched cusp from the edges, open out all the holes in the frames to their correct size and emboss all the rivets. If you are using the BR type ash pan, drill through the two holes in each frame to accept 0.8 mm wire. Tap the cylinder and slide bar bracket fixing holes 10BA and bend inwards through 90°.

B - Brake hanger pivots - 1.2 mm P - As required for plunger pick ups

No.	Description	Sheet
	Leading Knuckle	
M15L	Front Inner Lamination LH	1
M15R	Front Inner Lamination RH	1
M16L	Front Outer Lamination LH	1
M16R	Front Outer Lamination RH	1
M17L	Rear Inner Lamination LH	1
M17R	Rear Inner Lamination RH	1
M18L	Rear Outer Lamination LH	1
M18R	Rear Outer Lamination RH	1
	Trailing Knuckle	
M19L	Front Inner Lamination LH	1
M19R	Front Inner Lamination RH	1
M20L	Front Outer Lamination LH	1
M20R	Front Outer Lamination RH	1
M21L	Rear Inner Lamination LH	1
M21R	Rear Inner Lamination RH	1
M22L	Rear Outer Lamination LH	1
M22R	Rear Outer Lamination RH	1
F1	Frame Left	2
F2	Frame Right	2

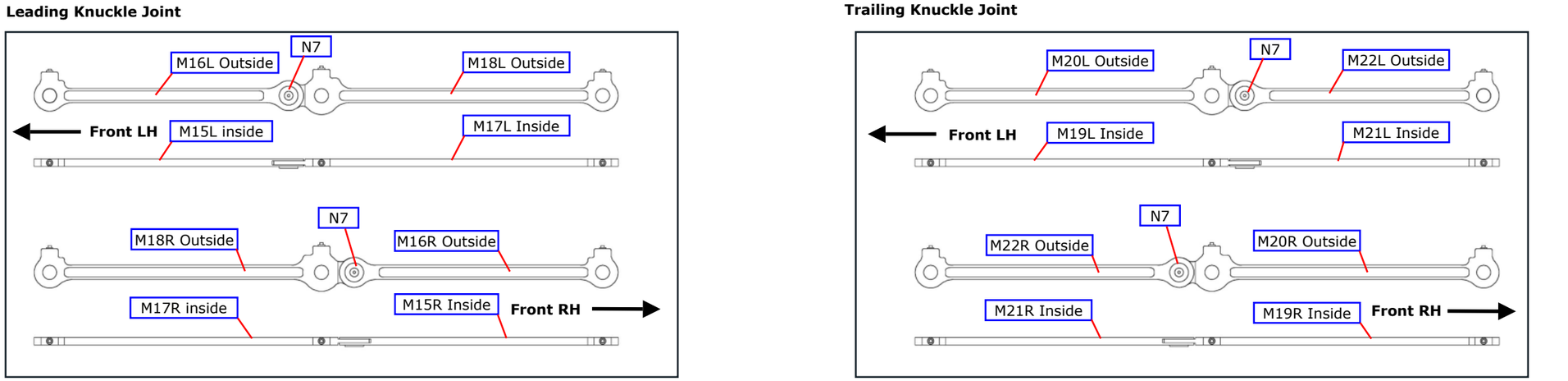


Fig 3. Coupling Rods

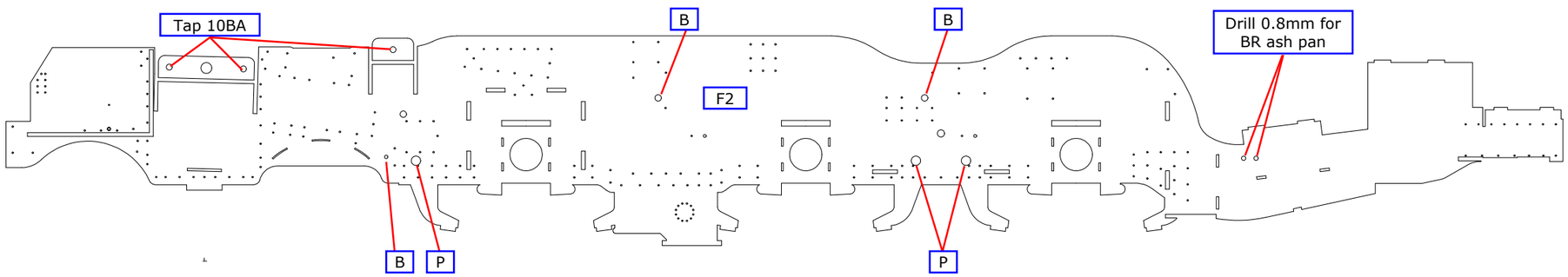


Fig 4. Frame Preparation

FRAME ASSEMBLY

To construct the kit as designed with a compensated chassis open out the frame slots for the horn blocks by cutting up the half etched lines. Assemble the horn blocks as detailed.

Remove and clean up the front stretcher (F6), compensation stretcher (F16), middle stretcher (F20), trailing truck stretcher (F22) and the rear stretcher/truck bearer (F38). Open out the holes for the front compensation beam in the compensation stretcher to 1/16". Solder 8BA nuts over the holes in the front and truck stretchers for the bogie and truck mounting screws. Fold up the stretchers making sure the half etched fold line is on the inside and that each bend is a right angle. Assemble the rear stretcher/truck bearer parts - the upper plate (F38) the lower plate (F39), the front web (F40), the rear web (F41) and the two generator angles (F44) which fit into the slots on the left extension of the lower plate. Fold down the loco/tender connection brackets from the rear stretcher upper part (F38) and add spigots from 0.8 mm and 1.2 mm wire.

Check that all the tabs on the stretchers fit properly in their corresponding chassis slots so that the rest of the stretcher is hard up against the inside of the frames.

Now assemble the frames and stretchers. Start by tack soldering the compensation stretcher (F16) to both frames. 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 front bearings, together with the horn blocks and spring as shown in the horn block instructions. 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 horn blocks to the frame and the remaining stretchers to the frames checking constantly that the chassis is square and the frames are straight.

Solder the ABC gearbox anchor (F18) in place in the slots in the compensation stretcher.

Solder a 8BA nut to the front stretcher and to the trailing truck stretcher as shown below.

No.	Description	Sheet			
F6	Front stretcher, bogie mounting	2	F38	Truck bearer/rear stretcher, upper section	1
F16	Front stretcher, compensation rod mounting	1	F39	Truck bearer/rear stretcher, lower section	2
F18	ABC Gearbox anchor	2	F40	Truck bearer/rear stretcher, front vertical web	5
F20	Middle stretcher, horizontal	1	F41	Truck bearer/rear stretcher, rear vertical web	5
F22	Rear stretcher, trailing truck mounting	2	F44	Steam generator angles	3

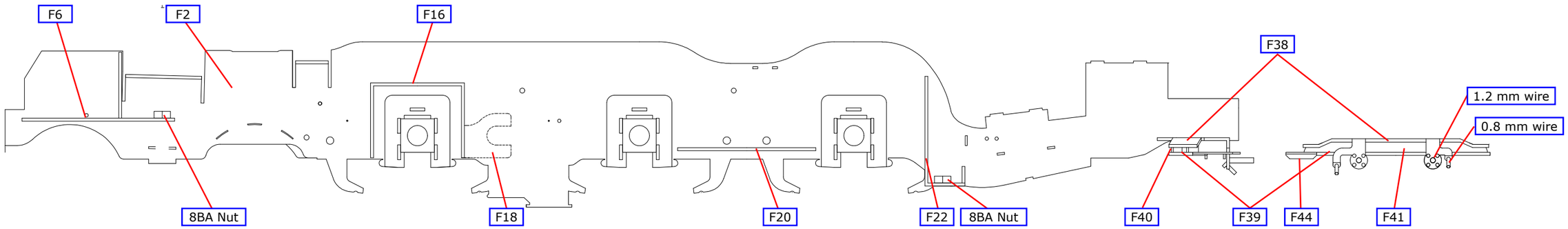
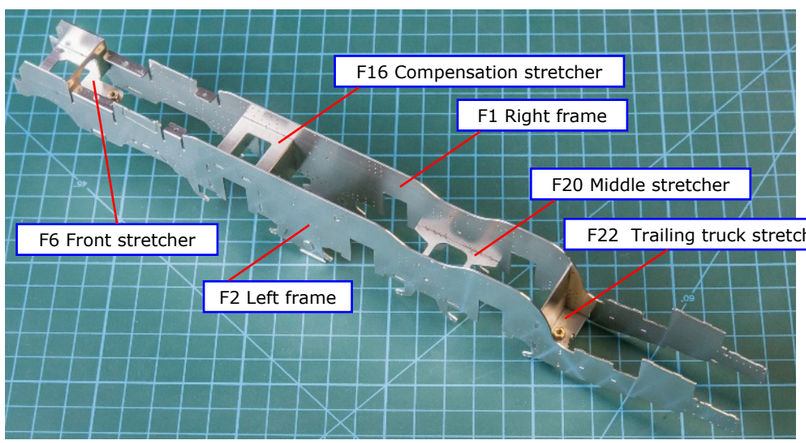
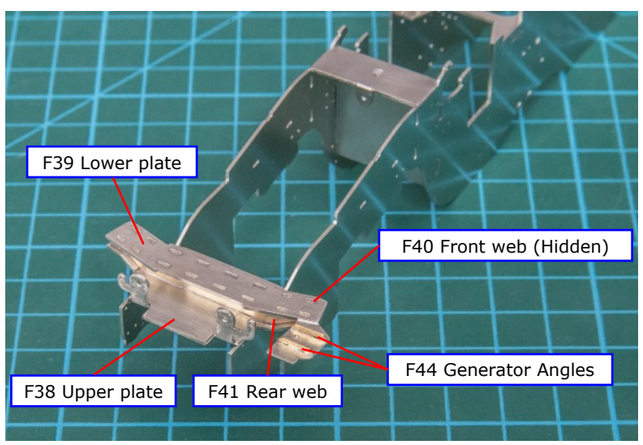


Fig 5. Frame Assembly





ASSEMBLING THE CHASSIS 1

Open up all holes to the required size and emboss all the rivets in the buffer beam and frame bracket (F3), the bogie bearer and drain cock bracket (F7), the brake hanger bracket, leading axle (F26), the brake hanger bracket,centre axle (F27), the brake hanger bracket, rear axle (F28), the frame out rigger bracket (F29), the firebox support bracket (F30) and the firebox support brake hanger bracket (F32). Bend all the brackets to shape making sure the half etched fold line is on the inside. All the brackets apart from F7 and F32 are aligned on the frames by locating the half etched holes in the back of each bracket over the corresponding rivet embossed in the frames. Note - F7 is angled to match the base of the cylinders.

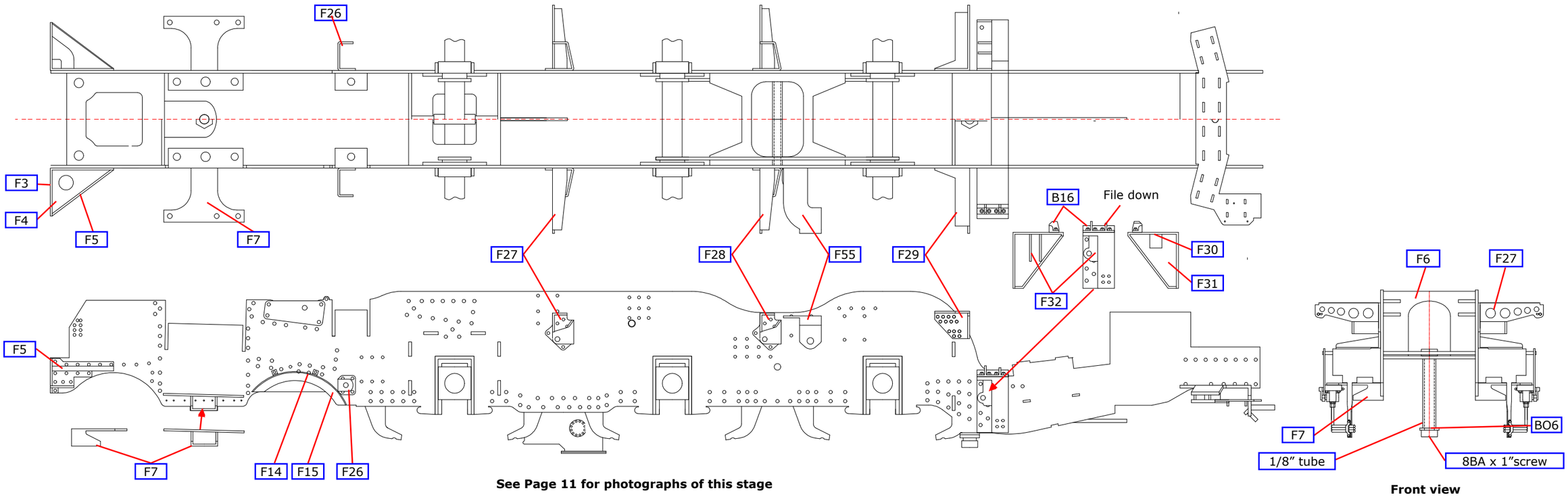
Alignment of the brake brackets is achieved by inserting a 1.2 mm drill through the frame holes. Solder all the brackets in place as shown in the drawing.

Add the buffer beam and frame bracket web (F4) and the buffer beam and frame bracket web angle (F5) to the buffer beam bracket. Add the firebox support bracket (B16) to each side on the firebox support bracket (F30), trim the rear flange on each side to clear the foundation ring and ashpan assembly.

Roll the bogie splasher tops (F14) to the required shape and solder in place in the frame slots. Add the bogie splasher fronts (F15).

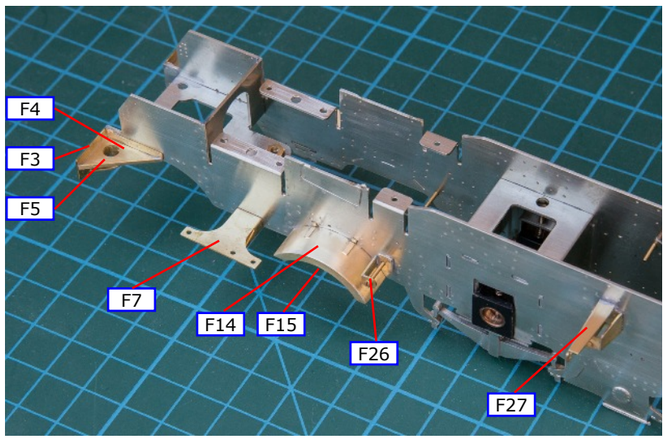
Fold and fit the speedometer bracket (F55) if required.

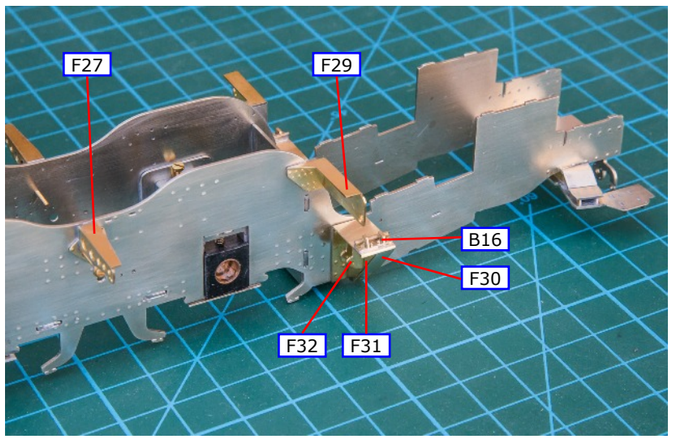
No.	Description	Sheet			
F3	Buffer beam and frame bracket (2)	4	F27	Brake hanger bracket, centre axle (2)	4
F4	Buffer beam and frame bracket web (2)	4	F28	Brake hanger bracket, rear axle (2)	4
F5	Buffer beam and frame bracket web angle (2)	4	F29	Frame out rigger bracket (2)	4
F7	Bogie bearer and drain cock bracket (2)	4	F30	Frame bracket, firebox support (2)	4
F14	Bogie splasher top (2)	4	F31	Frame bracket, firebox support web (2)	4
F15	Bogie splasher front (2)	4	F32	Frame bracket firebox support brake hanger bracket (2)	4
F26	Brake hanger bracket, leading axle (2)	4	F55	Speedometer bracket	5



See Page 11 for photographs of this stage

Fig 6. Chassis Assembly





ASSEMBLING THE CHASSIS 2

Emboss the injector locating bracket rivets in the drag beam (F42) before soldering the drawbar hole overlay (F43) in place. Solder the drag beam in place to the rear of the frames and to the lower truck bearer and rear stretcher.

Fold up the cab stretcher (F47) including the left side lubricator bracket and injector bracket on the right side. Reinforce the bracket bends with solder on the inside (see Page 15 for fitting and location on frames). Bend up the cab stretcher angle, LHS and RHS (F48 and F49) and solder in place. Solder the cab stretcher in place as shown in the drawing and add the lubricator bracket (F50). Make up the drawbar (F57), using a piece of 3/32" tube 5.7 mm long. Make the drawbar pin from 1/16"wire and the drawbar pivot washer (F58). The drawbar (F57) is available in two lengths and can be fitted at the end of construction. For clarity, this model has been modified to replace the pin with a 8BA screw fitted through the top of F47 (see page 27), a nut soldered on the underside of F47 allows the screw to be removed/fitted as required.

FIREBOX BASE

Emboss the rivets on the firebox below the footplate (F52) and form the corner bends before soldering in place in the slots in the firebox foundation ring (F51). Solder the washout plugs (B17) in place. DO NOT fit the firebox foundation ring assembly yet, offer it up to the frames to check that it clears the rear vertical flange on casting B16, trim the rear flange on B16 both sides until the firebox foundation ring assembly fits neatly on the frames. Place the firebox foundation ring assembly safely to one side for later use in the ashpan assembly stage.

FITTING THE COMPENSATION BEAMS

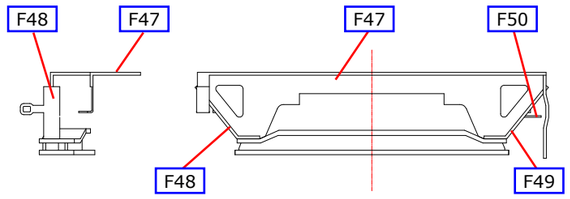
The front beam is a piece of 1/16" steel wire through the holes in the compensation stretcher with a piece of 3/32" tube added as shown in the drawing. For the rear beams cut a piece of 1/16" brass wire so that it fits through the holes in the frames and is flush with their outside face. Cut two equal pieces of 3/32" tube which together fit between the frames and solder the compensation beams (F21) to the tube, 1.25 mm from one end. Temporarily fit the beams.

Assemble the chassis, wheel sets, bearings and motor/gearbox selecting axle washers (F59) of appropriate thickness to control side play. The cranks on the right hand side should lead the left by 120°. This is not possible with the Slater's axles so you will have to compromise at 90°.

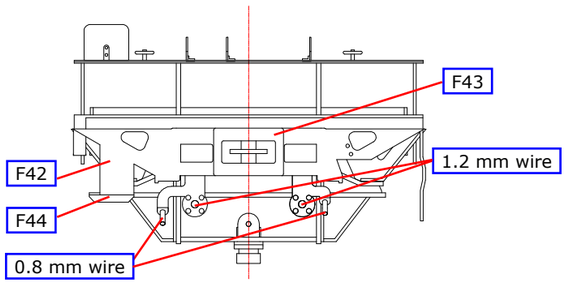
Confirm that the compensation works properly and check that the chassis is sitting level. The height of the top of the frames above rail level, between the coupled wheels, should be 43.75 mm. Retain the beam pivot by carefully soldering one end to the frame.

Now may be the time to fit pick-ups and give the chassis a test run.

No.	Description	Sheet			
F42	Drag beam	2	F52	Firebox below footplate	6
F43	Drag beam, drawbar hole overlay	2	F57	Drawbar (2 Lengths)	1&2
F44	Steam generator angles	3	F58	Drawbar pivot washer	1
F47	Cab stretcher	7	F19	RG7 Gearbox anchor	2
F48	Cab stretcher angle, LHS	3	F21	Compensation beam (2)	2
F49	Cab stretcher angle, RHS	3	F59	Coupled wheel axle washer (12)	1 & 3
F50	Lubricator bracket, RHS	3	F60	Coupled wheel bearing packing washer (6)	4
F51	Firebox foundation ring	5			

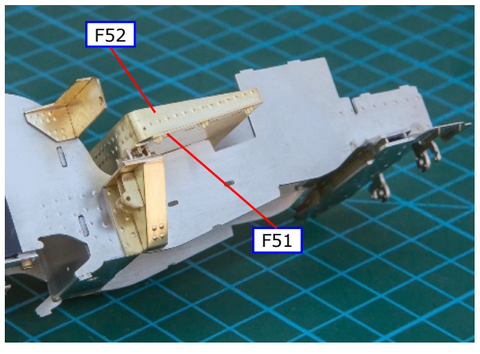


Truck Bearer & Cab Stretcher From Rear



Rear view

Fig 7. Frame Brackets



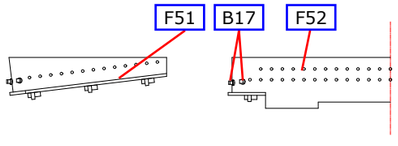


Fig 8. Firebox Base

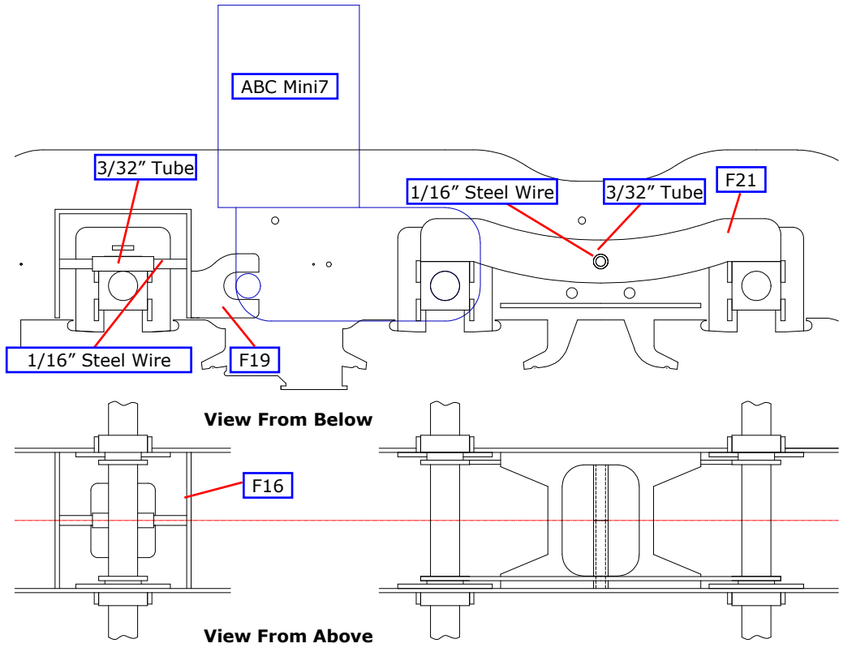


Fig 9. Compensation

BOGIE & REAR TRUCK

BOGIE

When AWS is fitted the 1.4 mm wire front stretcher is replaced, details of which are in the AWS instructions.

Emboss the rivets in the frames (BO1), only embossing the four shown in the drawing if fitting AWS. Add the guard irons (BO5) and form to shape. Remove the unwanted bolt extensions on the bogie side control housing (B13) to make a handed pair. Solder the side control detail plate (BO7) in place before soldering the side control housings into the holes in the frames.

Fold up the lower stretcher (BO3) and tack to the frames together with the upper stretcher (BO2). Check that the bogie is square before completing the soldering. Cut two lengths of 1.4 mm wire to be 26.8 mm long for the front and rear stretchers. Emboss the rivets in the stretcher bracket (BO4), thread onto the 1.4 mm wire, spring in place and solder to the frames.

Make the bogie retaining screw using the pivot screw washer (BO6), the 8BA x 1" screw and a piece of 1/8" tube 16.8 mm long. Fold up the side control sliding block (BO8) and solder together. Cut a piece of 1/16" wire 23.8 mm long and solder centrally through the holes in the side control sliding block. Now cut away the wire in the centre so that the 1/8" tube of the bogie retaining screw will pass through.

Fit the pivot washer together with the side control springs and spring stops (BO9), sliding the stops into the slots in the lower spacer. Check that the side control works smoothly. The side control assembly can be retained with the smallest of solder tacks to one corner of each of the stops.

Attach the axle box castings (W1) and ream through the axle holes 5/32" (4 mm). Using appropriate washers (BO10) fit the wheels so that there is a minimum of side play.

REAR TRUCK

Fold up the truck A frame upper section (T4) by first making the step, followed by the bends to make the rear beam and the slight bend towards the front. Open up the slots in the bearing plates so that the bearings are a good fit and open up the hole for the 0.8 mm steel side control wire so that it is an easy fit. Fold out the bearing retaining brackets and check that the 0.8 mm wire through these brackets holds the bearings in place. This system will allow the wheels to be removed from the completed truck. Fold down the bearing plates and solder and insert the wheels using the axle washers (T10) to give minimum side play. Remove the wheels.

Form the truck A frame inner web (T1) to shape and solder in place in the groove in the truck A frame lower section (T3). Repeat for the truck A frame outer web (T2). Solder this assembly to the upper section (T4) checking the assembly is square. Check that the truck axle box casting (W2) fits in the holes in the side frames (T5). Emboss the rivets in the side frames before soldering them in place. Fix the axle box castings in place and add the small web (T6). Add the side control casting detailing piece (T7) to the side control housing casting (B14) and solder in place. Make the truck retaining screw using an 8BA x 3/16"screw and a piece of 1/8" tube 0.75 mm long. The screw will need shortening to prevent it fouling the steel side control spring wire.

Bend the truck side control spring wire to give some downward pressure and solder in place through the bracket on the rear stretcher & trailing truck mounting (F22) and the hole in the A frame upper section.

No.	Description	Sheet			
BO1	Bogie side frame (2)	1	T1	Rear truck A frame inner web	5
BO2	Bogie central stretcher, upper	2	T2	Rear truck A frame outer web	5
BO3	Central stretcher, lower	5	T3	Truck A frame lower section	6
BO4	Bogie front and rear stretcher bracket (4)	4	T4	Truck A frame upper section	6
BO5	Bogie guard iron (2)	3	T5	Truck side frame (2)	6
BO6	Bogie pivot screw washer	3	T6	Truck small web (2)	4
BO7	Bogie side control casting detailing piece (2)	3	T7	Side control casting detailing piece (2)	4
BO8	Bogie spring side control sliding block	3	T8	Truck pivot screw washer, 0.45 mm	3
BO9	Bogie spring side control spring stop (2)	3	T9	Rear truck pivot screw washer, 0.7 mm	1
BO10	Bogie axle washer (12)	2 & 3	T10	Axle washer (6)	2 & 3

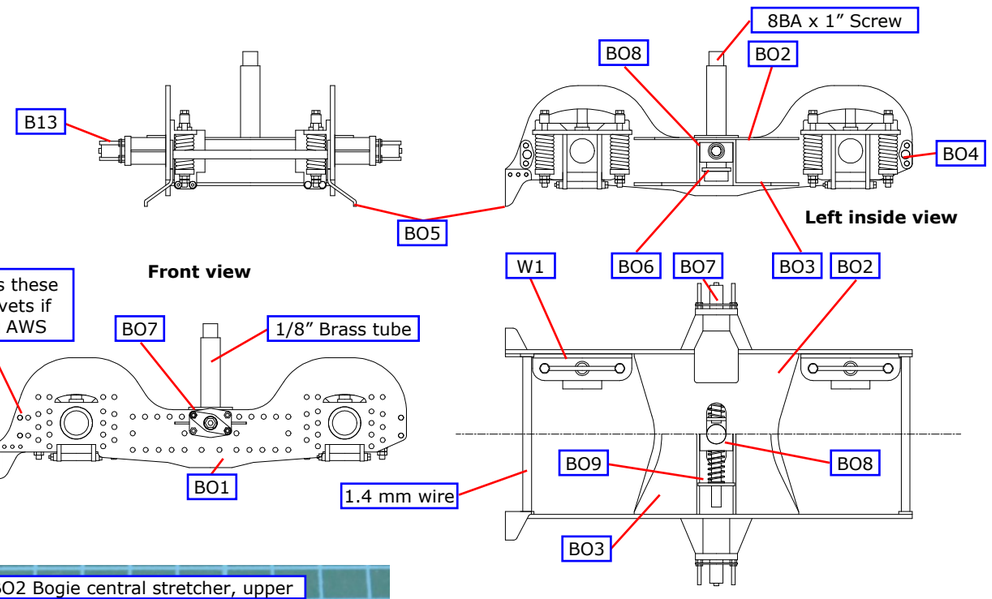
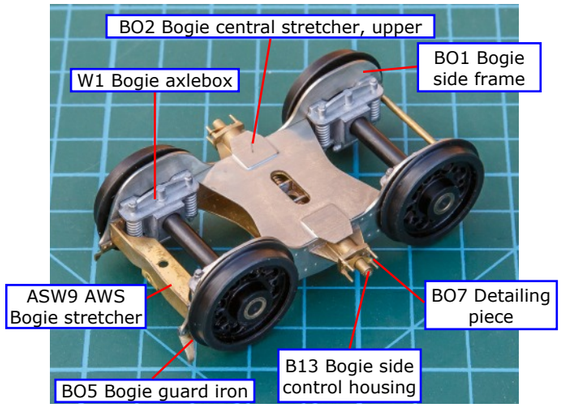


Fig 10. Bogie Construction



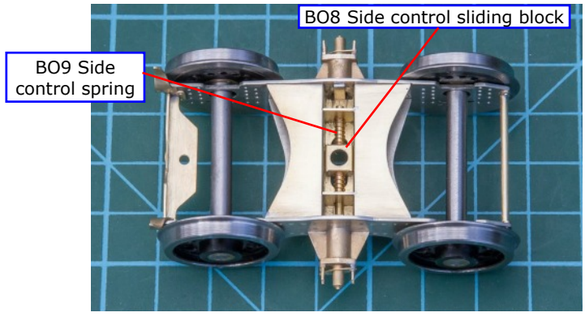
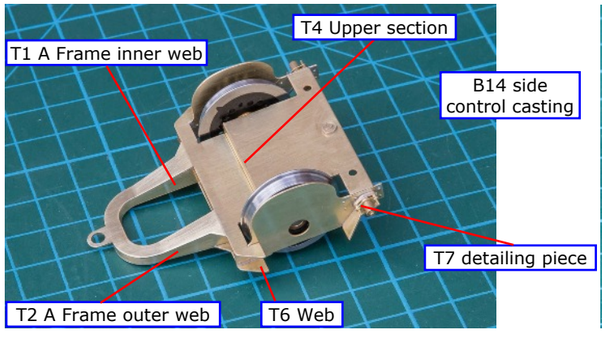
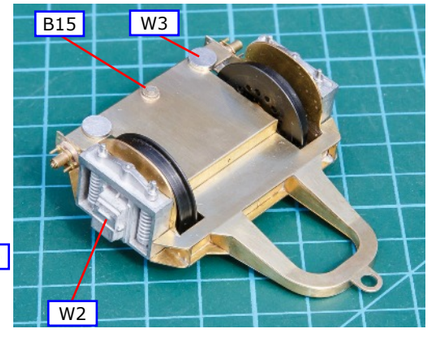


Fig 11. Truck Construction





CYLINDER ASSEMBLY

Check all the holes in the cylinders (M1) against the appropriate components and open up the holes if necessary. Fold up the cylinders making sure they are square and are a good fit it the slots in the frames and that the openings on the lower edges of the cylinder faces fit over the bogie bearer and drain cock bracket (F7).

There are many lubrication and other pipes, which are represented by copper wire. To join these wires to the cast components use a slightly larger diameter drill and deepen the holes in the castings. Then tin the wire with solder, insert into the casting hole and apply flux and heat.

Deepen the hole for the lubrication pipe in the cylinder stuffing box (B5) using a 0.35 mm drill before soldering in place. Add the cylinder rear bolt ring (B4), the cylinder relief valve, rear (B6), the cylinder cover front (W4) and the cylinder relief valve, front (B7).

Make a handed pair of front valve chests (W5) by drilling out one of the holes 0.5 mm for the 0.45 mm drain pipes. Attach the valve chest (W5) and complete the detailing as shown in the drawing.

If you have the confidence there are several places where the joints between panels can be scribed into the surface of the metal. Such as the cab sides and roof, smoke deflectors and cylinder wrappers. Either use a gramophone needle held in a pin vice or a sharp scriber with light pressure and many passes.

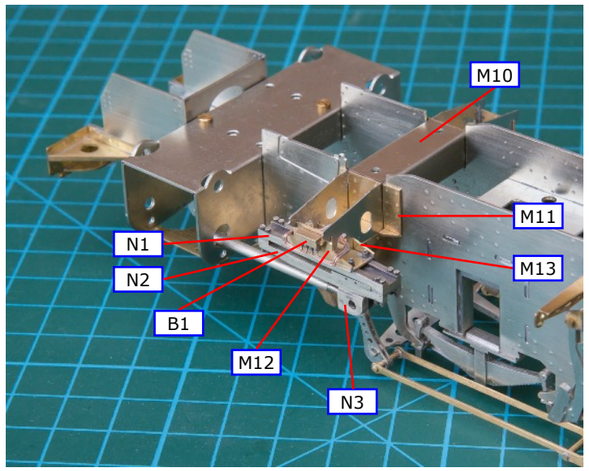
Scribe the panel on the cylinder wrappers (M2), form to shape round a suitable rod and add the small cover on the cylinder side (B10). To ensure a good fit with the lower edge of the casing, the cylinder wrappers are best fitted after the upper works are complete.

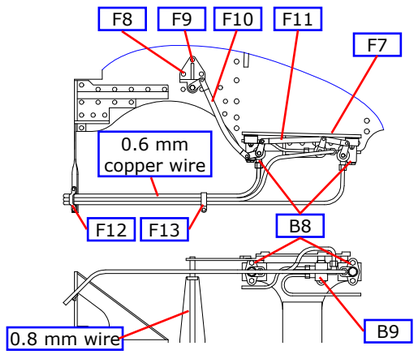
Make a handed set of drain cocks by removing one operating rod spigot from the cylinder drain cock (B8) and one side of the 'T' pipe connector on the valve chest drain cock (B9). Solder the drain cocks in place. Fold up the drain cock operating bracket (F8) and solder to the frames locating with a piece of 0.8 mm wire. Add the drain cock operating bracket web (F9). Emboss the rivets on the operating rods (F10 and F11) and fix in place; part F10 first.

Do not pin the top of part F17 to the frames - it will prevent the slide bar bracket from fitting in place. Fix at the lower end only and then spring aside to allow the slide bar bracket to be fitted.

Make the drainpipes from 0.45 mm and 0.6 mm copper wire, adding the drain pipe brackets (F12 and F13) as shown to the left.

No.	Description	Sheet	No.	Description	Sheet
F8	Drain cock operating bracket (2)	4	F17	Drain cock operating rod, LHS	2
F9	Drain cock operating rod bracket web (2)	4	M1	Cylinders	2
F10	Drain cock operating rod (2)	2	M2	Cylinder wrapper (2)	3
F11	Drain cock linkage (2)	1	M3	Cylinder mounted lubricator bracket, front (2)	4
F12	Drain pipe bracket front stay (2)	4	M4	Cylinder mounted lubricator bracket, front pipe clip (2)	4
F13	Drain pipe bracket around pipes (2)	4	M5	Cylinder mounted lubricator bracket, rear (2)	4





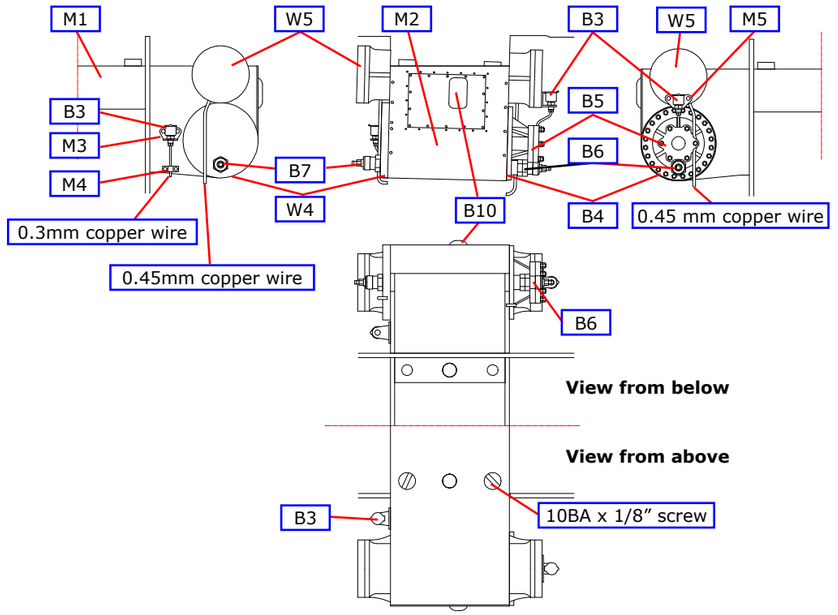


Fig 12. Cylinder Assembly

SLIDE BAR BRACKETS, CROSSHEADS AND CONNECTING RODS

Using photographs of the prototype, establish which slide bar bracket is required.

Original saddle. This has two lubricator boxes (B1), one on the outside face of slide bar bracket lubricator mounting plate, original (M9) and one on the rear face of M6. In the slide bar bracket for the original saddle (M6) drill out the holes for the lubricator (B1). Fold up the slide bar bracket making sure it is square and a good fit in the slots in the frames. Emboss the rivets in the slide bar bracket side section, original (M7) then fold up and solder in place. Add the slide bar bracket web, original (M8). Add the slide bar bracket lubricator mounting plate, original (M9) and the two lubricator boxes (B1). Add the two slide bar dust covers (M14) to the front face of the slidebars. Note parts M14 are handed.

Later saddle. Fold up the slide bar bracket for the later saddle (M10) making sure it is square and a good fit it the slots in the frames. Emboss the rivets in the slide bar bracket side section, later (M11) then fold up and solder in place, with the slide bar bracket outer web, later (M12). Add the slide bar bracket inside web, later (M13). Add the lubricator boxes (B1).

Clean up the slide bars, upper and lower (N1 and N2) and the crosshead/piston rods (N3). With a 0.5 mm drill deepen the small holes in the crosshead slippers to accept the crosshead lubricator (B2). Check the fit between the slide bars and crosshead for free, but not sloppy, movement of the crossheads. Solder the upper slide bars to the slide bar brackets.

Solder together the connecting rod laminations, inner and outer (M23 and M24) and add the connecting rod boss laminations (M25) to the big end, inside and outside. Drill the big end to fit the crankpins and the small end to fit the cast small end pin (N4). Check that the connecting rods fit in the crossheads.

Screw the cylinders and slide bar brackets to the frames using the 10BA screws. Hold the crosshead/piston rods in place with the lower slide bars and check for free movement. When satisfied and with the crosshead/piston rods in place, solder the slide bars together at their ends. Complete the detailing as shown.

No.	Description	Sheet	No.	Description	Sheet
M6	Slide bar bracket, original saddle	2	M13	Slide bar bracket inside web, later	3
M7	Slide bar bracket side section, original (2)	5 & 7	M14	Slide bar dust cover (2)	4
M8	Slide bar bracket web, original (2)	3	M23	Connecting rod inner lamination (2)	1
M9	Slide bar bracket lubricator mounting plate, original (2)	4	M24L	Connecting rod outer lamination LH	1
			M24R	Connecting rod outer lamination RH	1
M10	Slide bar bracket, later saddle	2	M25	Connecting rod boss lamination (4)	1
M11	Slide bar bracket side section, later	6	M26	Crankpin washer, small (4)	1
M12	Slide bar bracket outside web, later (2)	4	M27	Crankpin washer, large (4)	1

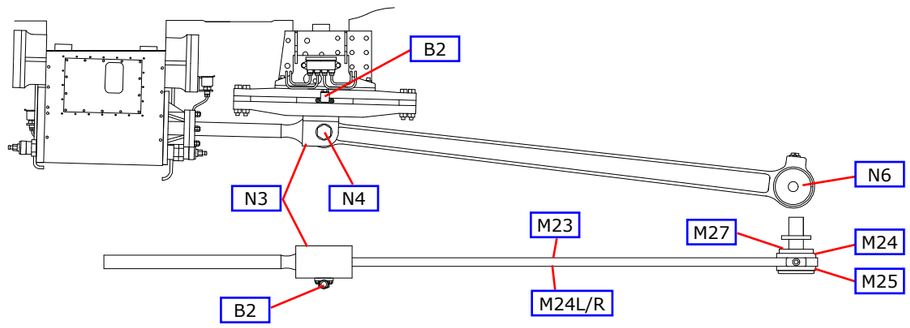
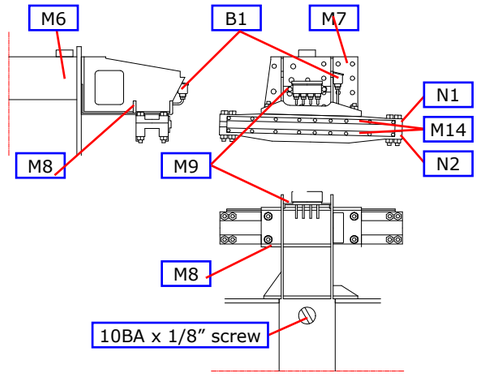
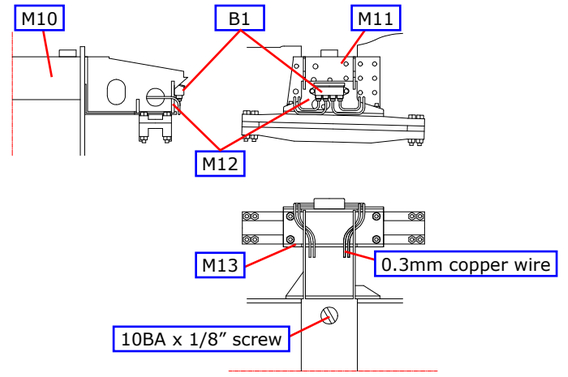


Fig 13. Connecting Rod

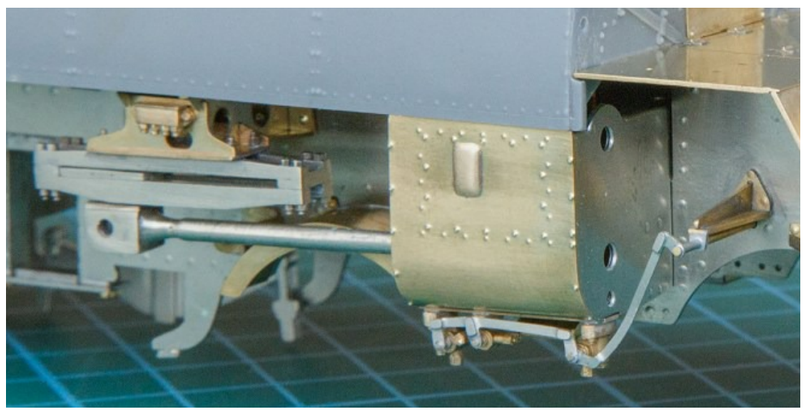


Original Motion Bracket



Later Motion Bracket

Fig 14. Slide Bar Assembly



ASH PANS

ORIGINAL ASH PAN

Emboss the rivets in the upper ash pan sides (A1) and solder in place in the slots under the foundation ring. Fold out the brackets on the hopper inner sides (A2). Bend up the hopper rear/floor (A4) and solder in place on the inner side (A2). Emboss the rivets in the hopper outer sides (A3), add the hopper door stops, front and bottom (A10 and A11) and accurately form the bends before soldering in place. Add the hopper pocket face (A5) as shown in Fig 15.

On several components, to mark the centres of embossed rivets where the back has been etched, there is a small locating ring. After the rivet has been embossed the ring is filed away. This is the case when embossing the rivets on the bracket attached to part A6.

Emboss the rivets in the hopper front (A6), and carefully make the bend in the bracket, before soldering in place. Form the hopper door web (A9) by bending over a 0.7 mm drill before soldering to the hopper door end (A8); the bosses on the hopper door end face outwards. Roll the hopper door top face (A7) to shape and solder in place to complete the hopper doors. Fix the hopper doors to the hoppers by using 0.7 mm wire for the spindles. Add the door operating crank (A12). Solder the completed hoppers and foundation ring to the frames.

If appropriate fit the sanding gear rail cleaner clip (F56), using 0.3 mm copper wire and the clips.

No.	Description	Sheet	No.	Description	Sheet
A1	Original ash pan upper sides (2)	6	A8	Original ash pan hopper door end (4)	4
A2	Original ash pan hopper inner side (2)	4	A9	Original ash pan hopper door web (2)	4
A3	Original ash pan hopper outer side (2)	4	A10	Original ash pan hopper door stop, front (2)	4
A4	Original ash pan hopper rear/floor (2)	4	A11	Original ash pan hopper door stop, bottom (2)	4
A5	Original ash pan hopper pocket face (2)	4	A12	Original ash pan door operating crank (2)	4
A6	Original ash pan hopper front (2)	4	F56	Sanding gear rail cleaner clip (6)	4
A7	Original ash pan hopper door top face (2)	4			

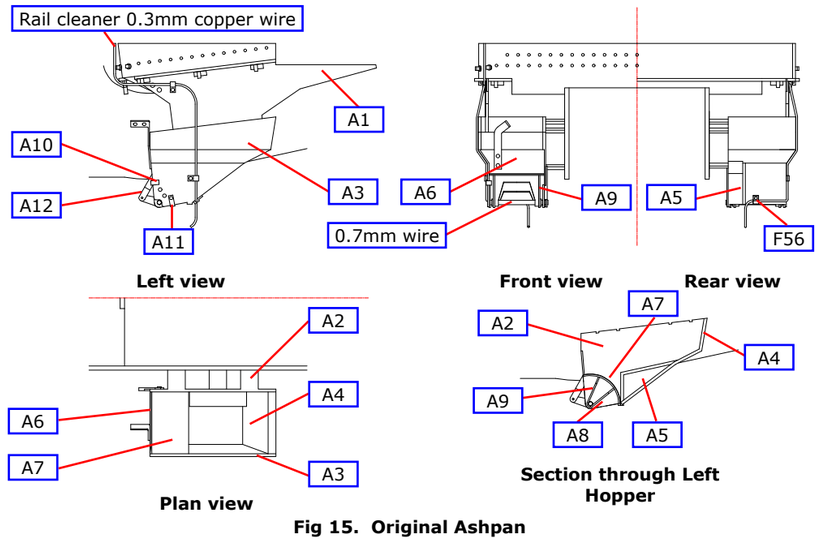


Fig 15. Original Ashpan

BR ASHPAN

Emboss the rivets in the rear plate (A17) and form the lower bend. Emboss the damper door hinge rivets on the damper door former (A23) and fold them to the outside. Note that the damper doors are handed and the embossed rivets face the outside of the engine. Make the bends in the damper door former (A23) and drop the damper door (A24) in place. Add the damper door ribs (A25) through the slots in the door and door former and solder in place from the back. Emboss the rivets on the side plates (A13) and solder the bearing block overlay (A14) in place. Solder the rear plate and damper door former to the side plates.

Attach the front horizontal angle (A16) to the front plate, lower (A15) and solder to the side plates. Fold down the bearing plates on the ashpan base (A18) and solder the grid of longitudinal and transverse webs (A19 and A20) in place in the etched grooves. Solder the base in place and add the lower door operating rods from 0.8 mm wire. Check the fit on the frames of the foundation ring, hoppers and 0.8 mm wire rods through the frame holes before soldering in place.

Complete the detailing of the operating rods as shown in Fig 16.

Add the ash pan damper door operating rods, left and right (A21 & A22) to the assembly and the two ash pan damper door lifting linkages (A26) to the front of the assembly, finally, add the damper operating rod, RHS (A27) on the right had side of the ash pan assembly.

No.	Description	Sheet	No.	Description	Sheet
A13	BR Ash pan side plate (2)	6 & 7	A21	Ash pan door operating rod, RHS	2
A14	BR ash pan bearing block overlay (2)	4	A22	Ash pan door operating rod, LHS	2
A15	BR ash pan front plate, lower (2)	4	A23	BR ash pan damper door former (2)	4
A16	BR ash pan front horizontal angle (2)	4	A24	BR ash pan damper door (2)	4
A17	BR ash pan rear plate (2)	4	A25	BR ash pan damper door rib (4)	3 & 4
A18	BR ash pan base (2)	4	A26	BR ash pan damper door lifting rods (2)	4
A19	BR ash pan base webs, longitudinal (4)	4	A27	Damper operating rod, RHS	2
A20	BR ash pan base webs, transverse (4)	4			

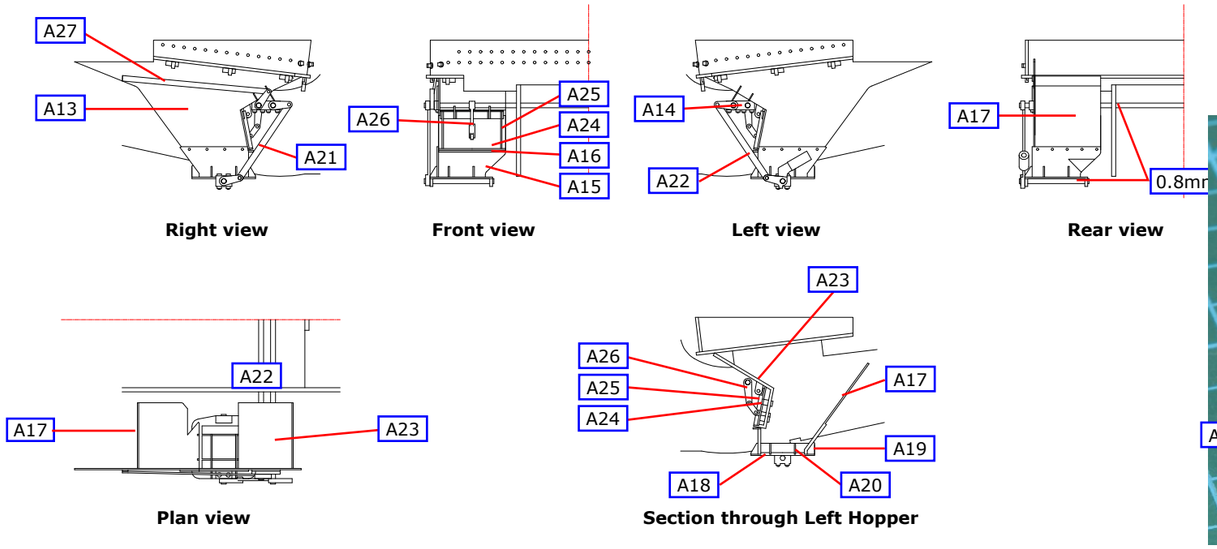
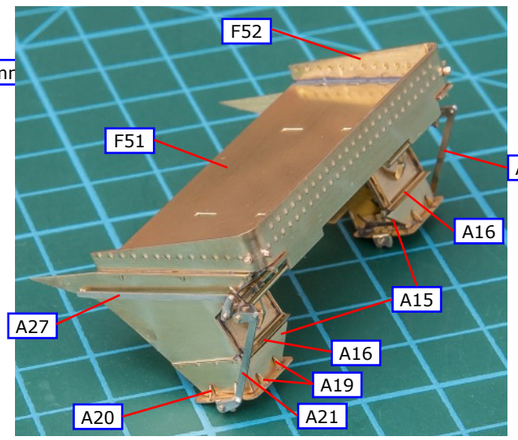
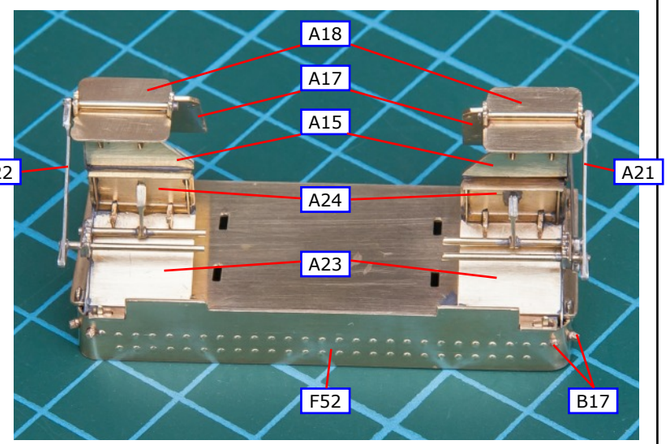


Fig 16. BR Ashpan





INJECTORS, GENERATOR AND PIPE WORK

Make a handed pair of injectors (B18) as shown below and join them together with the bracket (F46). Fix the injectors in place together with the drag beam injector bracket (F45) and attach to the cab stretcher (F47). Check the injectors are square and solder the pipes to the cab stretcher for extra strength. Add the injector control rods (B19) to the top of the injectors and solder where they pass through part F47.

Fix the generator (B21), generator reducing valve (B22) and lubricators (B3) as shown in the drawing.

Fold down the pipe work supports from the front section of the cab floor (F33) and reinforce the fold with solder. Detail the cab floor by adding the rocking grate levers, two on the left and one on the right (F34 & F35) and the firebox warming hand wheels (F37), as shown in the drawing. Fit the cab front floor in place. See page BLP-26 for revised method of fitting the cab front floor and backhead assembly.

The pipe work, shown in Figs 17 and 18, can now be fitted although it may be better to wait until the body has been constructed. Attach the pipes to the pipe work supports with the pipe clip (F34).

The runs of 12 lubricator pipes (0.3 mm copper wire) shown in Fig 17 are arranged 4 wide and 3 deep. Those shown in Fig 18 are 2 wide and 2 deep at the rear and become 2 wide and 1 deep towards the front. Photographs suggest that they do not follow the neat pattern in the drawings but tend to droop in a rather untidy fashion.

No.	Description	Sheet	No.	Description	Sheet
F33	Cab floor, front section	6	F37	Firebox warming hand wheel (2)	4
F34	Cab floor pipe clip (2)	4	F45	Drag Beam Injector Bracket	3
F35	Rocking grate lever, left (2)	4	F46	Bracket Joining Injectors	3
F36	Rocking grate lever, right	4	F47	Cab stretcher	7

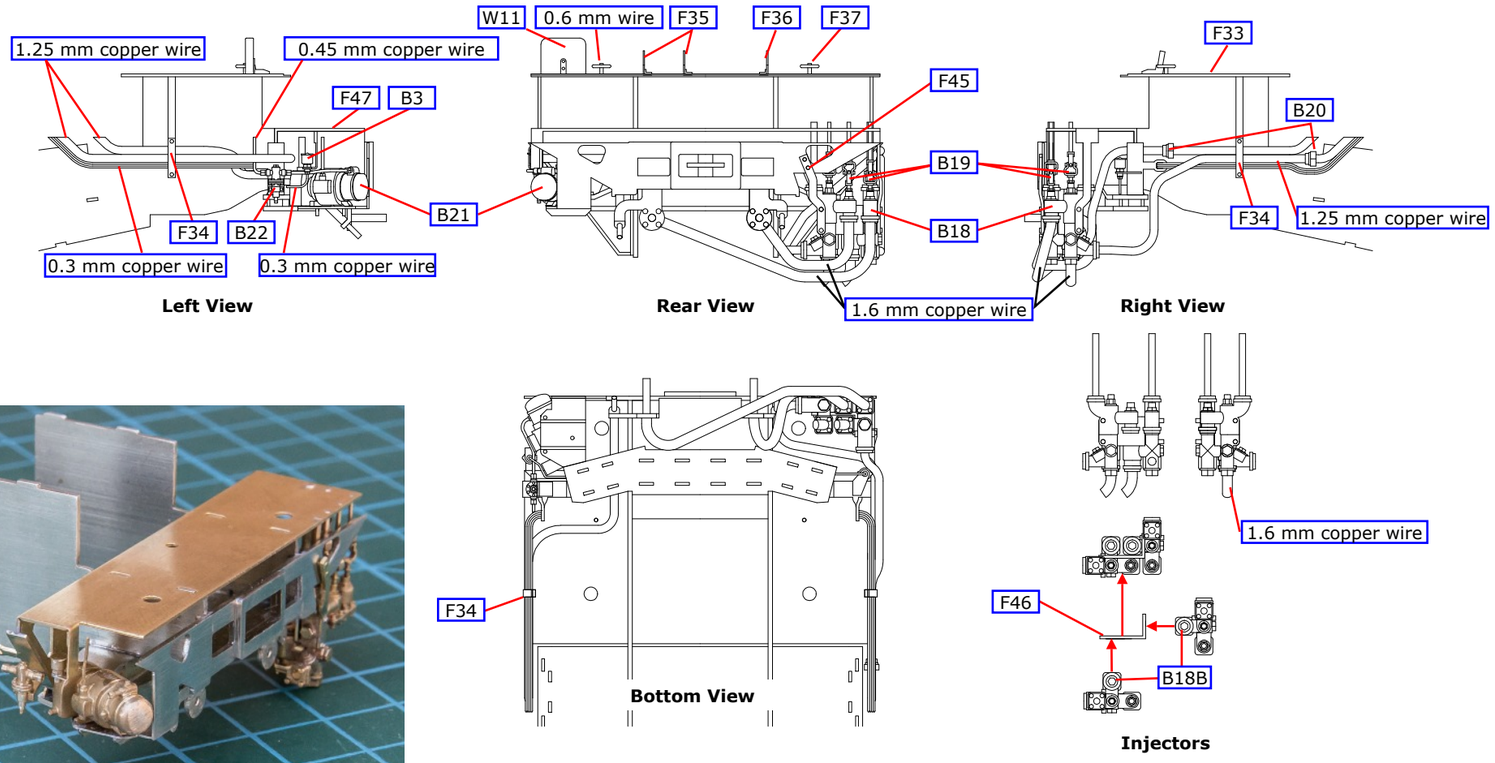


Fig 17. Injectors and Generator

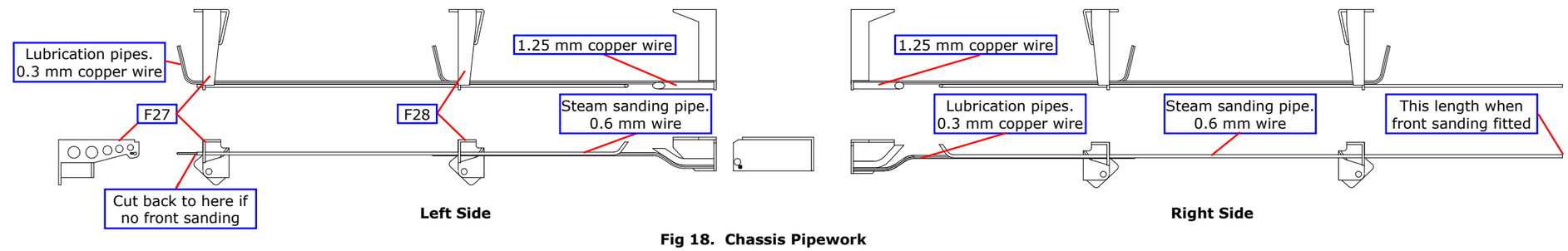


Fig 18. Chassis Pipework

BRAKE GEAR

The brakes can be permanently fixed in place or can be made removable:

Fixed - For fixed brakes use 1.2 mm wire brake hangers and solder everything in place.
Removable - For removable brakes use 14BA x 13 mm screws and 1.2 mm OD tube spacers for assembly; tap the frame 14BA. The bogie splasher will need a small area removed to allow the front brake hanger to slide past. In addition the front sanding pipes will need to be attached to the front brake hangers with the top of the pipes NOT attached to the frames.

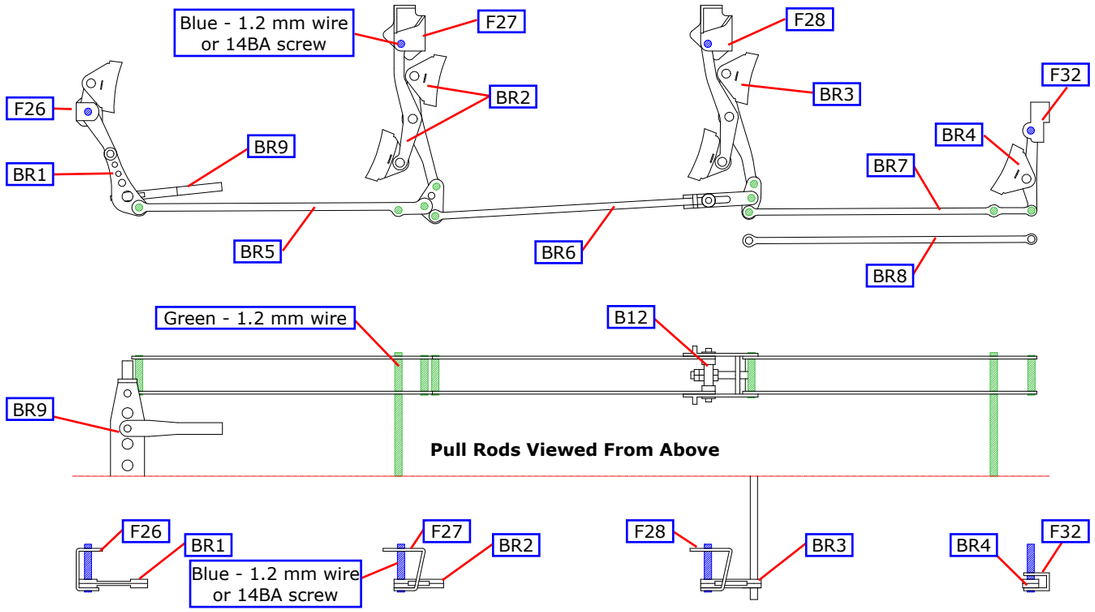
Emboss the rivets on each lamination of the brake hangers, front, first and second scissors and the rear (BR1, BR2, BR3 and BR4) and brake cross shaft (BR9), before soldering the laminations together. Drill out the holes to 1.2 mm in the laminated brake hangers.

Cut the 1.2 mm tube to lengths of 5.50 mm for all hangers except the rear one which should be 2.0 mm long, each tube should be a snug fit into the hanger bracket. Screw lengths are 8.00 mm and 4.0 mm overall and it is advisable to thread both the outer and inner parts plus frame of the brake hanger brackets for added strength. Solder the tubes to the laminated brake hangers using a 1.2 mm drill in a piece of wood as a mandrel.

Assemble the brakes with the wheels on the chassis. Work from the front and place into position the front brake hanger and either pin or retain with the 14BA screw. With the front brake hangers in place, insert the brake cross shaft; the rear edge of this beam is very close to the leading driver rims so may require fettling to provide clearance. When happy with the clearance and with the shoes in line with the wheel rim, solder BR9 into place. Add the first and second scissors and the rear brake hanger using the chosen method.

Before adding the front pull rods (BR5), solder short pins of 1.20 mm rod to the inside pull rods. The pins are trimmed to length from the front. Pass the pins on the pull rod through the front hangers and the first scissors. Add the outer pull rod. Repeat for the opposite side. Position the rods so that they clear the wheels at the extremes of the wheels side play or travel. Once happy solder the pins to the front hangers and first scissors and then solder the outer pull rods to the pins; repeat for the opposite side. Add the tie rod between the front pull rods from 1.2 mm rod and solder, ensuring that both sides are parallel and give clearance to the leading wheel set.

Solder the inner middle pull rods (BR6) to the brake adjuster casting (B12), and solder 1.20 mm pins through the front and rear holes. Thread the pins thorough the first and second scissors, position the pull rods to match the front ones and solder the pin to the front scissors. Add the outer middle pull rod to give clearance for the intermediate driver and to match the front pull rods, and solder ensuring all is square and clear of the wheels. Repeat for the other side. Select the required set of rear pull rods, early with (BR7) or later without a tie rod (BR8). Solder pins to the front and rear holes of the inside rear pull rods. Pass the pins from the inside through the second scissors and rear brake hanger and aligning with the other pull rods solder into place in the hangers. Add the outer rear pull rods and solder to the pins, ensuring all is square and parallel. Trim the pins.



Brackets and Hangers Viewed From Above
Fig 19. Brake Gear

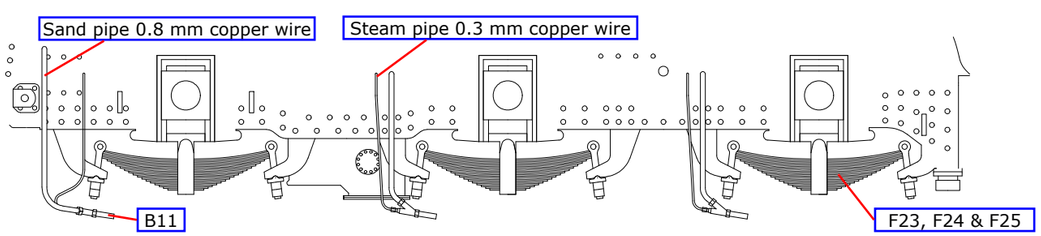


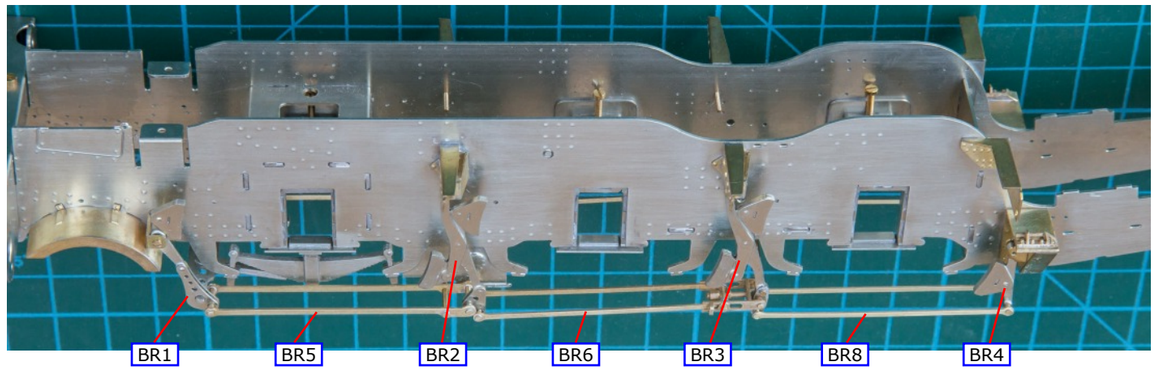
Fig 21. Sanding and Springs

FINISHING THE CHASSIS

The BR speedometer is fitted as shown in Fig 21. Make up the steam sanders (part B11) as shown in Fig 22. The wheels and axles are now retained by the springs, formed from a triple lamination of parts F23, F24 & F25.

The loco/tender pipe connections are made from flexible tubing. Rubber tubing is supplied for the larger pipes (over the 1.2 mm wire spigots) and for the smaller pipes (over the 0.8 mm wire spigots). (Refer to Fig 7.)

No.	Description	Sheet			
BR1	Brake hanger lamination, front (4)	1	F24	Spring outer laminations (6)	1
BR2	Brake hanger lamination, first scissors (4)	1	F25	Spring inner laminations (6)	1
BR3	Brake hanger lamination, second scissors (4)	1	F26	Brake hanger bracket, leading axle (2)	4
BR4	Brake hanger lamination, rear (4)	1	F27	Brake hanger bracket, centre axle (2)	4
BR5	Brake pull rod, front (4)	4	F28	Brake hanger bracket, rear axle (2)	4
BR6	Brake pull rod, middle (4)	4	F32	Frame bracket firebox support brake hanger bracket (2)	4
BR7	Brake pull rod, rear (4)	4	F53	Speedometer return crank	2
BR8	Brake pull rod, rear with no tie rod hole (4)	4	F54	Speedometer washer	2
BR9	Brake cross shaft lamination (2)	2	F55	Speedometer bracket	5
F23	Spring centre laminations (6)	1			



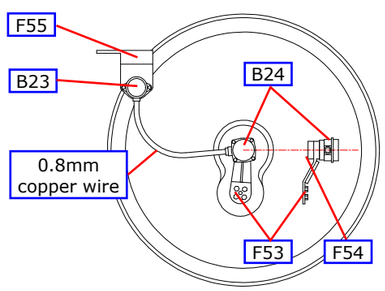
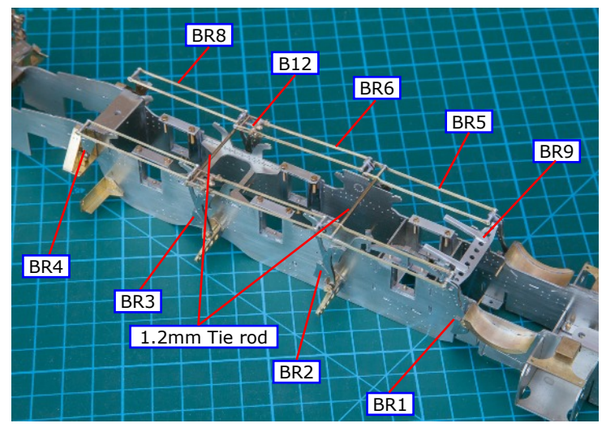


Fig 20. Speedometer Drive



CASING 1

CAUTIONS AND OTHER STUFF

Before starting work on the casing resin moulding please bear in mind the following:

- The moulding should require very little finishing. It is best wet sanded, ideally using fine-grade wet and dry paper.
- The dust should not be inhaled and hands should be washed after work.
- Bonding is best done with epoxy or one of the cyanoacrylates (Superglue).
- Wash the moulding in warm water with a lanolin free mild soap/washing-up liquid, and then rinse well before painting.
- Painting may be carried out with enamels, cellulose or acrylics. Of the latter two, acrylic plastic primer (Hycote brand available from car accessory shops or Halfords own brand - used for priming car plastic parts - bumpers etc.) is easier to apply than cellulose and keys well.

SMOKE DEFLECTOR JIG

Make up the smoke deflector jig as shown in Fig 23. Solder parts FE35 and FE36 together at both ends, so that the screws and nuts can be removed, and reused later as body/chassis fixings.

Prepare two lengths of 7/32" metal tube or rod (64 mm long) and a small piece of wood 14 mm x 5 mm x 58 mm long. Use the jig to form the double bend in the lower edge of the smoke deflectors.

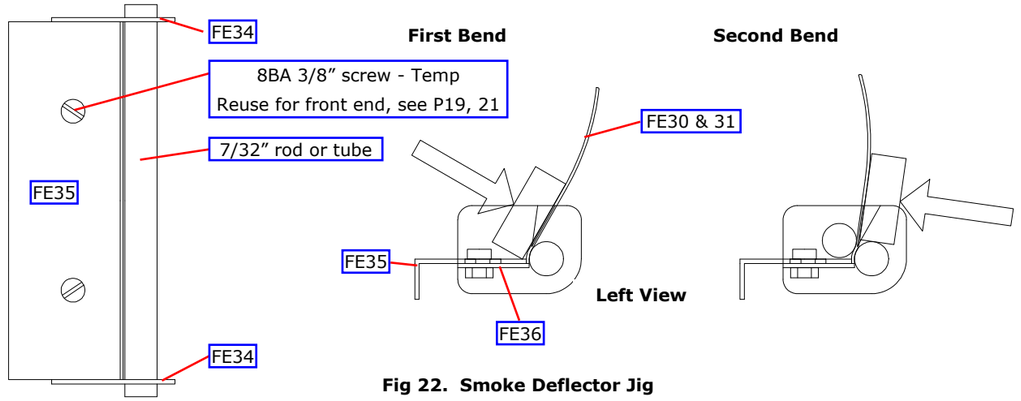
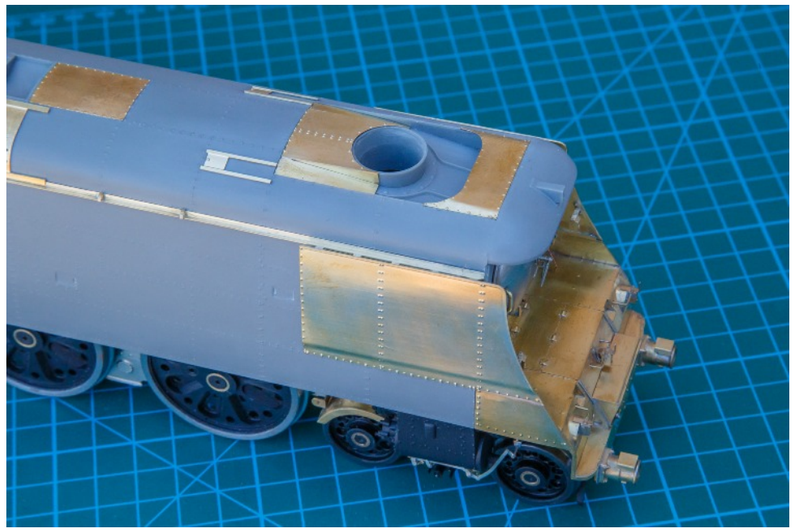
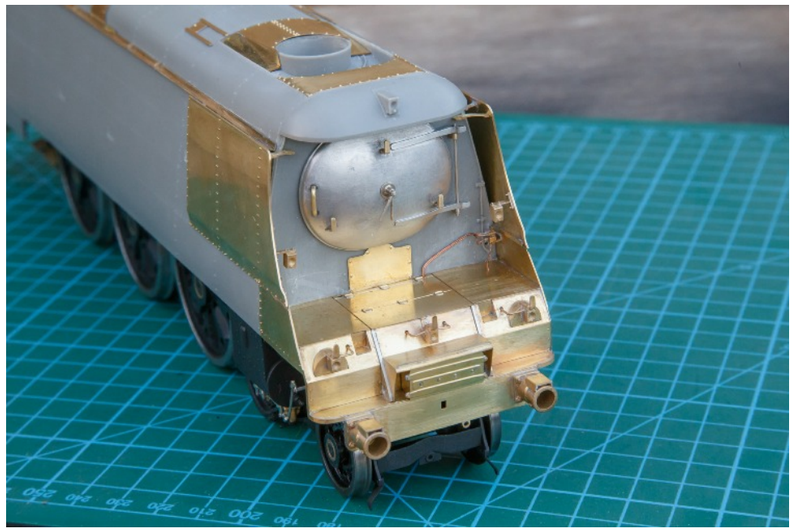
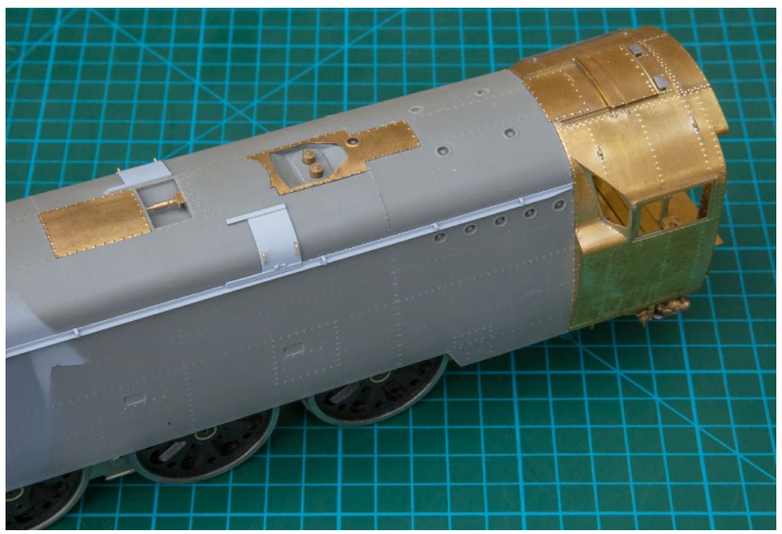
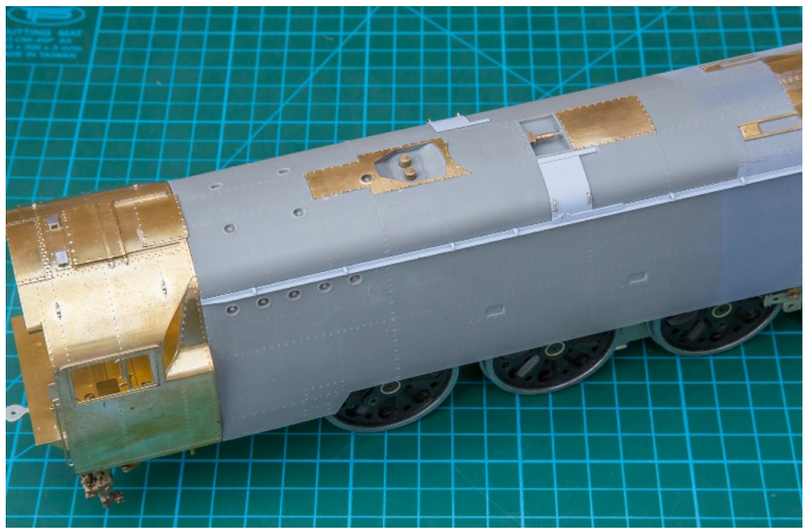


Fig 22. Smoke Deflector Jig









ORIGINAL CASING

Please read these instructions carefully.

Study Fig 24 and modify the casing moulding accordingly. The rivets are easily removed by using a scalpel fitted with a small curved blade (No. 15). Filled in the front sand filler door recesses with .010" (0.25 mm) plastic sheet glued in place with Superglue. A filler, such as Milliput, is an alternative. Drill the holes for the six self-tapping screws (1/16") which secure the casing to the cab and front footplate. Take care to drill the holes perpendicular to the surface. Drill through the holes on the front, side and top of the casing as shown in Fig 24. The 0.6 mm holes are only required if you are fitting smoke deflector and smokebox stay (FE33).

Prepare the 1.5 mm x 1.5 mm brass angle used for the roof ladders (an official term from the Brighton Works drawings) by cutting to length and filing the end to shape as shown in Fig 24. The ladder locates in the groove in the casing moulding. To provide a positive fixing for the ladders drill through each ladder (0.5 mm) at the four points shown in Fig 24.

Shorten the smoke deflector and casing angle brackets (FE32) to 3 brackets for the original (short) smoke deflectors. Solder the brackets (FE32) in place under the front of the ladders - note that the rear edge is short of the back edge of the angle to allow the ladder to fit into the groove in the casing. For complete detail drill through the angle 0.6 mm and represent the bolts with 0.6 mm wire. Add the lifting loops on the ladder (CA10) as shown in Fig 24.

Locating the ladder in the casing groove, drill through one of the previously drilled holes into the casing and passed through a 0.45 mm wire pin. Then solder the wire to the ladder and repeat this for the three other pins. The ladder is then carefully removed from the casing, cleaned up and all traces of soldering flux washed off. After replacing the ladder it can then be glued in place by simply applying the Superglue to the wire pin (apart from the front pin) on the inside of the casing.

Detail the roof as shown in Fig 24.

No.	Description	Sheet			
CA2	Casing plate around forward positioned safety valves	6	CA10	Lifting loops on ladder (12)	4
CA8	Casing blanking plate fitted before forward safety valves moved	6	FE32	Smoke deflector and casing angle brackets (2)	4

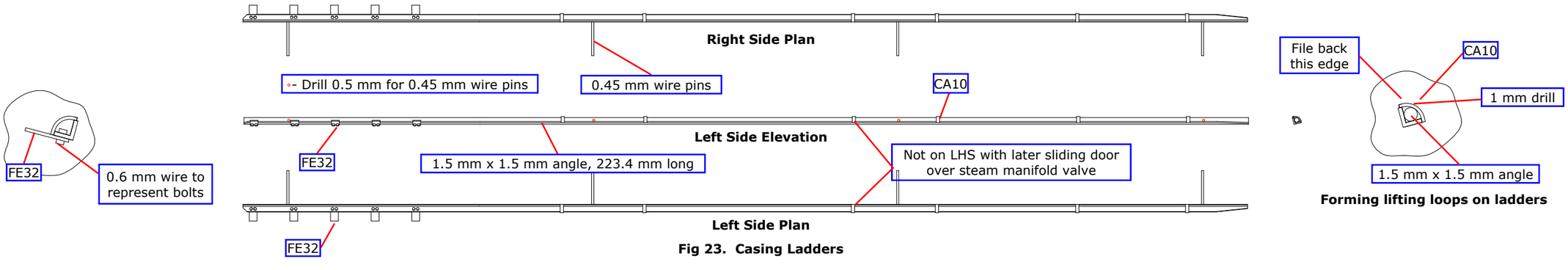


Fig 23. Casing Ladders

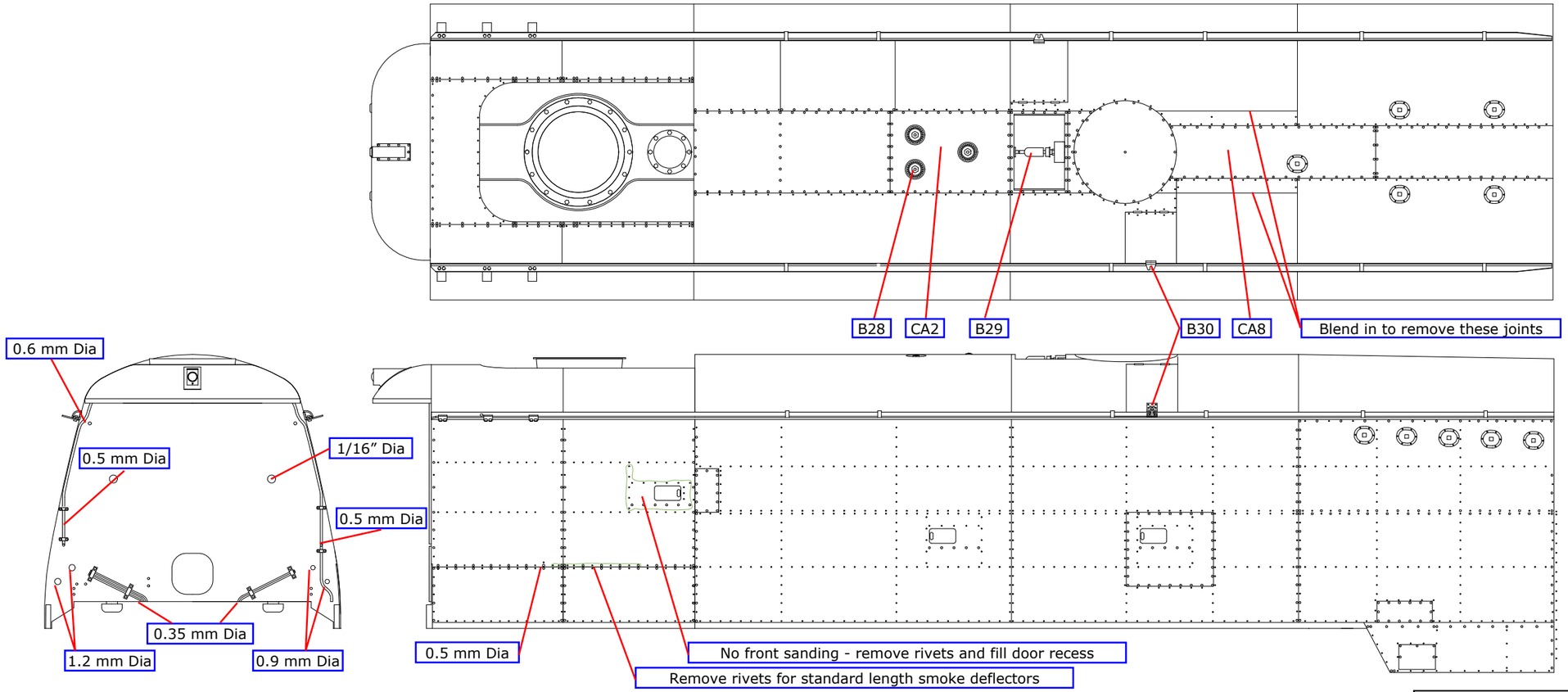


Fig 24. Early Casing

ORIGINAL FRONT END

Emboss the rivets in the front footsteps, wide steps (FE1) and add the lubricator access door hinges (FE9). Fix the front footsteps to the underside of the front of the casing moulding with self-tapping screws. Emboss the rivets in front drop plate, wide steps (FE5), make the bends and check for shape against the chassis frames. What appears to be a cusp along the top edge of the front drop plate is there by design, so as to form a bevelled edge to fit under the front footsteps as shown in Fig 25.

Carefully bend out the front end curved top cover (FE8) to shape before soldering in place. Fold up the wide step pockets (FE3) and solder in place together with the frame extensions (FE7) and the lubricator door hasp (FE10). Fold out the two small locating tabs on the front fixing plate (FE14) and solder two 8BA nuts for the front body fixing bolts in place. Solder in place centrally under the front drop plate. Emboss the rivets in the buffer beam (FE13), form the hook for hanging the screw coupling and open up the holes to fit the buffers (B27) before soldering the buffer beam in place.

Place the casing moulding with the front footplate attached onto the chassis and attach with the four 8BA screws. Now fit the drop plate/buffer beam assembly in place and tack solder to the footplate on each side. When you are satisfied with the alignment complete the soldering to make a permanent join.

Assemble the self-contained buffers as shown in Fig 26 and, if appropriate, add the buffer steps (FE16).

Remove the footplate from the casing moulding and complete all the detailing with buffers, steps, lamps and conduits, vacuum pipe and steam heating pipe before once again attaching the front end assembly to the casing moulding. If the steam heat pipe (B26) is fitted then add the control lever (FE21) to the valve at the buffer beam end.

Form to shape the lower side panel, original (FE11), this fits against the front of the cylinder wrapper so careful fitting is required. When you are confident of the fit solder the lower side panels in place and then glue the rear edge to the casing moulding.

Further detail the front end by fitting the atomisers (B31), smoke box door (W6), the route disk brackets (FE22), and the original plate on smokebox front (FE23).

To provide a positive fixing to the lower edge of the smoke deflectors and to ensure their accurate location, they are drilled to accept a 0.45 mm pin in the same way that the ladders were fixed. The smoke deflectors than have solder fixings to the upper brackets and to the lower side panels and by gluing the 0.45 mm wire pin on the inside of the casing. Add the upper lamp and lamp brackets (B32 and B33) with their associated conduit from 0.45 mm copper wire.

Consideration will have to be given to painting before fixing the smoke deflectors in place. Both the inside of the smoke deflectors and the casing behind the smoke deflectors are painted black.

Fit the front steps, left and right (FE17 & 18) and the top rungs (FE19). Finally fit the vacuum pipe bracket (FE20).

If appropriate fit the chimney fairing as follows. Glue the chimney fairing, rear former (FE28) to the rear of the chimney opening. Emboss the rivets in the chimney fairing, side section (FE27) and fold up. The lower surface will need to be curved along its rear edge to match the roof profile. So that the side section will fit neatly onto the bottom of the chimney opening along its front edge, carefully cut away the moulded angle and the moulded ring around the base of the chimney. When you have a good fit glue the side section in place. Curve the rear edge of the chimney fairing, centre section (FE26) and fix in place.

Finally, carefully bend the edges of the front cowl fairing FE29 to match the roof profile and fit into place on the casing.

No.	Description	Sheet			
FE1	Front footplate, wide steps	7	FE18	Front step, right	4
FE3	Wide step pocket (2)	4	FE19	Front step rung (2)	4
FE5	Front drop plate, wide steps	5	FE20	Front end, vacuum pipe bracket	3
FE7	Frame extension (2)	2	FE21	Steam heating pipe lever	4
FE8	Front end curved top cover	3	FE22	Route disk bracket	4
FE9	Lubricator access door hinge (6)	4	FE23	Original plate on smokebox front	3
FE10	Lubricator access door hasp	4	FE25	Front end, chimney lip	3
FE11	Original lower side panel (2)	5	FE26	Front end, chimney fairing centre section	3
FE13	Buffer beam	5	FE27	Chimney fairing, side section (2)	4
FE14	Front fixing plate	6	FE28	Chimney fairing, rear former	6
FE15	Buffer retaining washer (2)	2	FE29	Fairing behind front cowl	6
FE16	Buffer steps (2)	4	FE33	Smoke deflector and smokebox stay (2)	4
FE17	Front step, left	4			

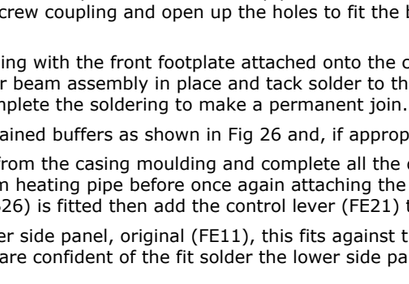


Fig 26. Self Contained Buffers

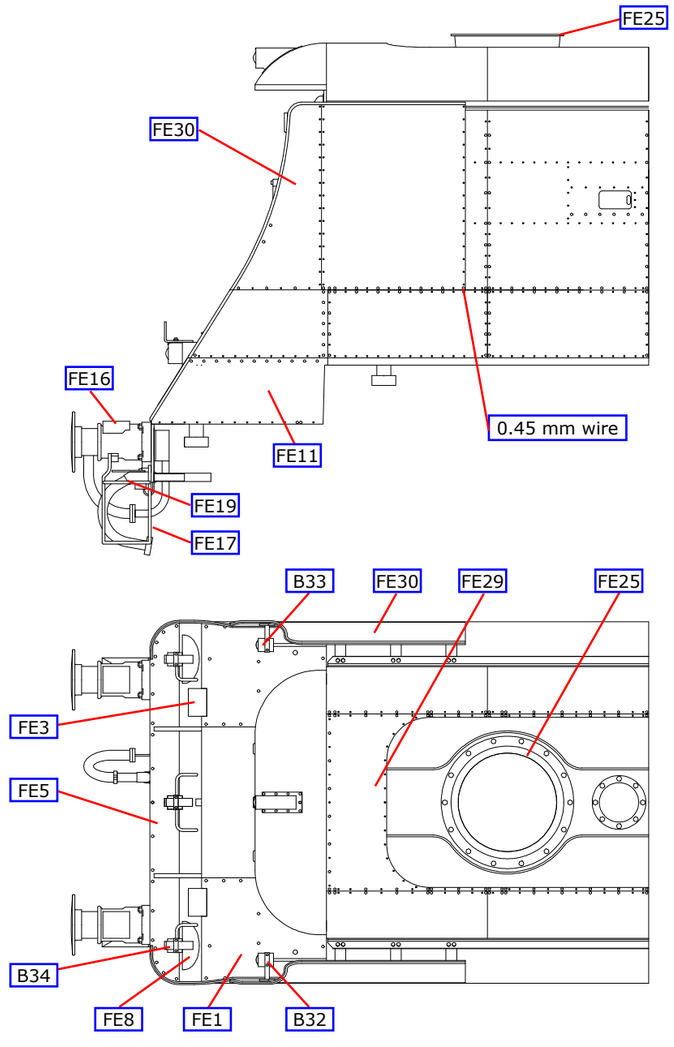


Fig 25. Front End in Original Condition

LATER CASING

Study Fig 28 and modify the casing moulding accordingly. The rivets are easily removed by using a scalpel fitted with a small curved blade (No. 15). Filled in the front sand filler door recesses with .010" (0.25 mm) plastic sheet glued in place with Superglue. A filler, such as Milliput, is an alternative. Drill the holes for the six self-tapping screws (1/16") which secure the casing to the cab and front footplate. Take care to drill the holes perpendicular to the surface. Drill through the holes on the front, side and top of the casing as shown in Fig 28. The 0.6 mm holes are only required if you are fitting smoke deflector and smokebox stay (FE33).

Prepare the 1.5 mm x 1.5 mm brass angle used for the roof ladders (an official term from the Brighton Works drawings) by cutting to length and filing the end to shape as shown in Fig 25. The ladder locates in the groove in the casing moulding. To provide a positive fixing for the ladders drill through each ladder (0.5 mm) at the four points shown in Fig 28.

Solder the brackets (FE32) in place under the front of the ladders - note that the rear edge is short of the back edge of the angle to allow the ladder to fit into the groove in the casing. For complete detail drill through the angle 0.6 mm and represent the bolts with 0.6 mm wire. Add the lifting loops on the ladder (CA10) as shown in Fig 27.

Locating the ladder in the casing groove, drill through one of the previously drilled holes into the casing and passed through a 0.45 mm wire pin. Then solder the wire to the ladder and repeat this for the three other pins. The ladder is then carefully removed from the casing, cleaned up and all traces of soldering flux washed off. After replacing the ladder it can then be glued in place by simply applying the Superglue to the wire pin (apart from the front pin) on the inside of the casing.

Detail the roof as shown in Fig 28.

No.	Description	Sheet	No.	Description	Sheet
CA1	Casing sliding cover over front wash out plugs (2)	7	CA6	Casing sliding door over steam manifold valve, replacement lifting bracket	3
CA3	Casing blanking plate fitted after forward safety valves moved	6	CA7	Casing sliding door catch (2)	3
CA4	Sliding door over whistle valve	5	CA9	Casing plate around rear positioned safety valves	6
CA5	Sliding door over steam manifold valve	5	FE32	Smoke deflector and casing angle brackets (2)	4

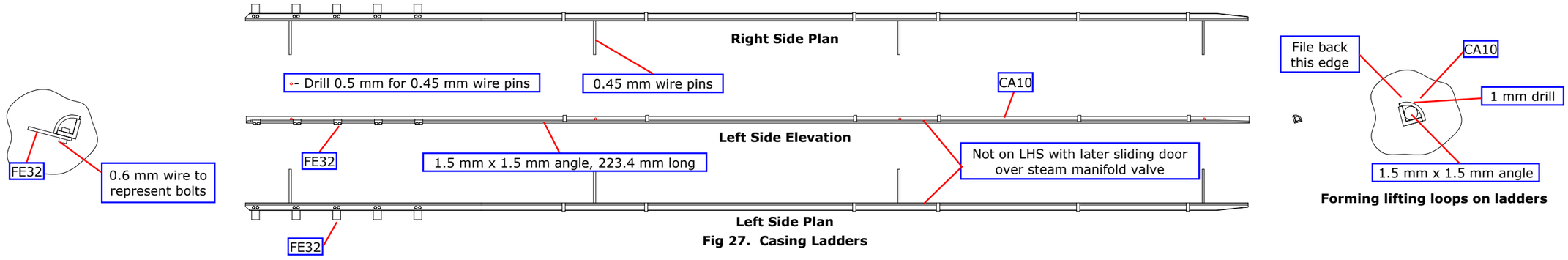


Fig 27. Casing Ladders

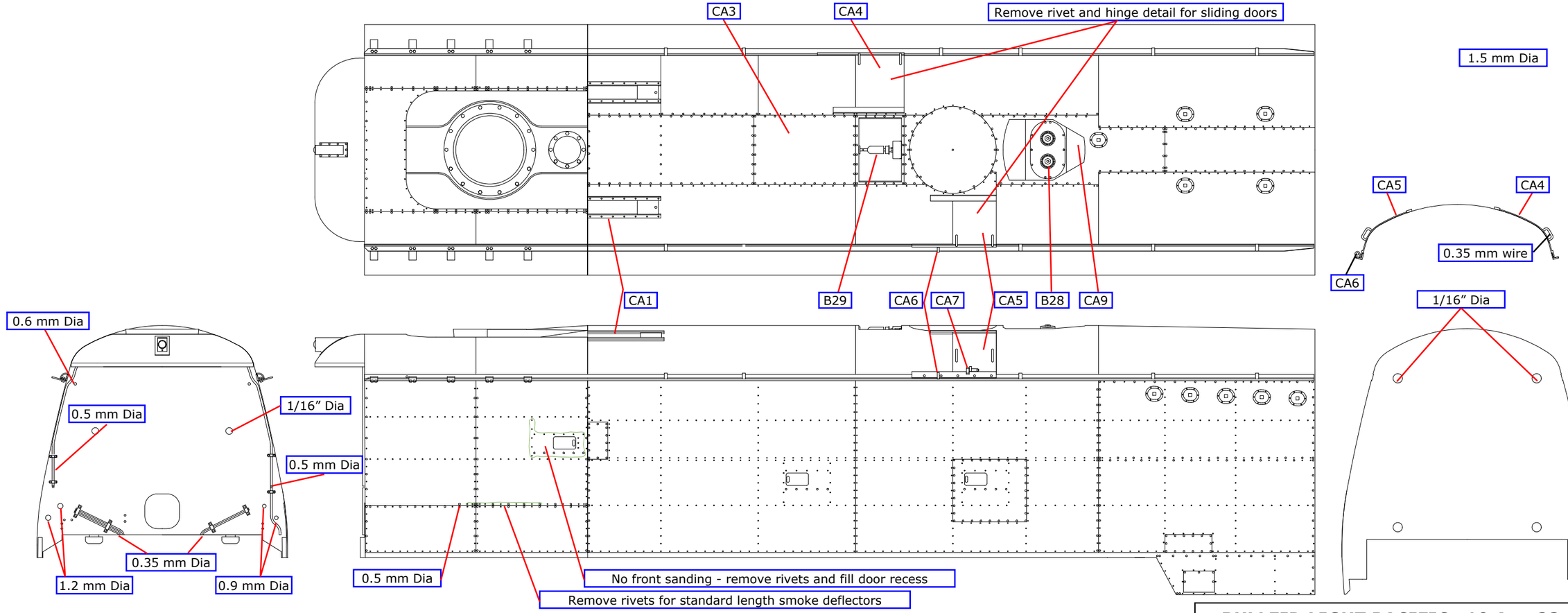


Fig 28. Casings

LATER FRONT END

Emboss the rivets in the front footsteps, narrow steps (FE2) as appropriate and add the lubricator access door hinges (FE9). Fix the front footsteps to the underside of the front of the casing moulding with self-tapping screws. Emboss the rivets in front drop plate, narrow steps (FE6), make the bends and check for shape against the chassis frames. Note what appears to be a cusp along the top edge of the front drop plate is there by design, so as to form a bevelled edge to fit under the front footsteps as shown in Fig. 29.

Carefully bend out the front end curved top cover (FE8) to shape before soldering in place. Fold up the narrow step pockets (FE4) and solder in place together with the frame extensions (FE7) and the lubricator door hasp (FE10). Fold out the two small locating tabs on the front fixing plate (FE14) and solder two 8BA nuts for the front body fixing bolts in place. Solder in place centrally under the front drop plate. Emboss the rivets in the buffer beam (FE13), form the hook for hanging the screw coupling and open up the holes to fit the buffers (B27) before soldering the buffer beam in place.

Place the casing moulding with the front footplate attached onto the chassis and attach with the four 8BA screws. Now fit the drop plate/buffer beam assembly in place and tack solder to the footplate on each side. When you are satisfied with the alignment complete the soldering to make a permanent join.

Assemble the self-contained buffers as shown in Fig 30 and, if appropriate, add the buffer steps (FE16).

Remove the footplate from the casing moulding and complete all the detailing with buffers, steps, lamps and conduits, vacuum pipe and steam heating pipe before once again attaching the front end assembly to the casing moulding. If the steam heat pipe (B26) is fitted then add the control lever (FE21) to the valve at the buffer beam end.

Form to shape the lower side panel, later (FE12). When you are confident of the fit solder the lower side panels in place and then glue the rear edge to the casing moulding.

Further detail the front end by fitting the atomisers (B31), smoke box door (W6), the route disk brackets (FE22), the later plate on the smokebox door (FE24) and the smoke deflector and smokebox stay (FE33).

To provide a positive fixing to the lower edge of the smoke deflectors and to ensure their accurate location, they are drilled to accept a 0.45 mm pin in the same way that the ladders were fixed. The smoke deflectors than have solder fixings to the upper brackets and to the lower side panels and by gluing a 0.45 mm wire pin on the inside of the casing. Add the upper lamp and lamp brackets (B32 and B33) with their associate conduit from 0.45 mm copper wire.

Consideration will have to be given to painting before fixing the smoke deflectors in place. Both the inside of the smoke deflectors and the casing behind the smoke deflectors are painted black.

If appropriate fit the chimney fairing as follows. Glue the chimney fairing, rear former (FE28) to the rear of the chimney opening. Emboss the rivets in the chimney faring, side section (FE27) and fold up. The lower surface will need to be curved along its rear edge to match the roof profile. So that the side section will fit neatly onto the bottom of the chimney opening along its front edge, carefully cut away the moulded angle and the moulded ring around the base of the chimney. When you have a good fit glue the side section in place. Curve the rear edge of the chimney fairing, centre section (FE26) and fix in place as shown in the photograph below.

No.	Description	Sheet			
FE2	Front footplate, narrow step	7	FE17	Front step, left	4
FE4	Narrow step pocket (2)	4	FE18	Front step, right	4
FE6	Front drop plate, narrow steps	5	FE19	Front step rung (2)	4
FE7	Frame extension (2)	2	FE20	Front end, vacuum pipe bracket	3
FE8	Front end curved top cover	3	FE21	Steam heating pipe lever	4
FE9	Lubricator access door hinge (6)	4	FE22	Route disk bracket	4
FE10	Lubricator access door hasp	4	FE24	Later plate on smokebox front	5
FE12	Later lower side panel (2)	7	FE26	Front end, chimney fairing centre section	3
FE13	Buffer beam	5	FE27	Chimney fairing, side section (2)	4
FE14	Front fixing plate	6	FE28	Chimney fairing, rear former	6
FE15	Buffer retaining washer (2)	2	FE29	Fairing behind front cowl	6
FE16	Buffer steps (2)	4	FE33	Smoke deflector and smokebox stay (2)	4

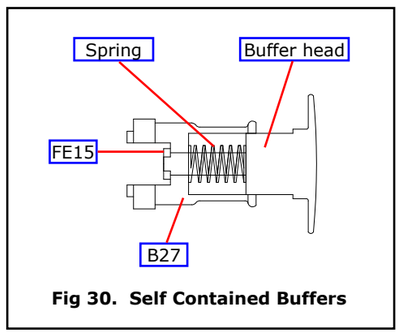
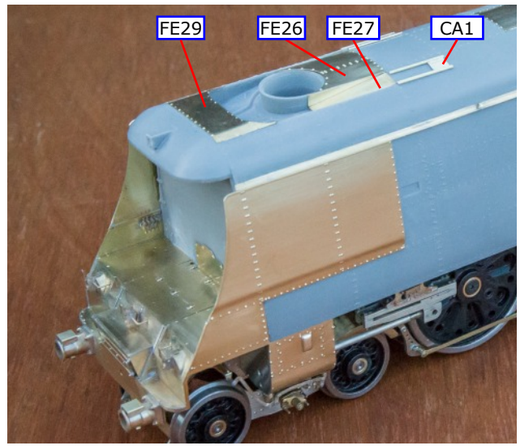


Fig 30. Self Contained Buffers



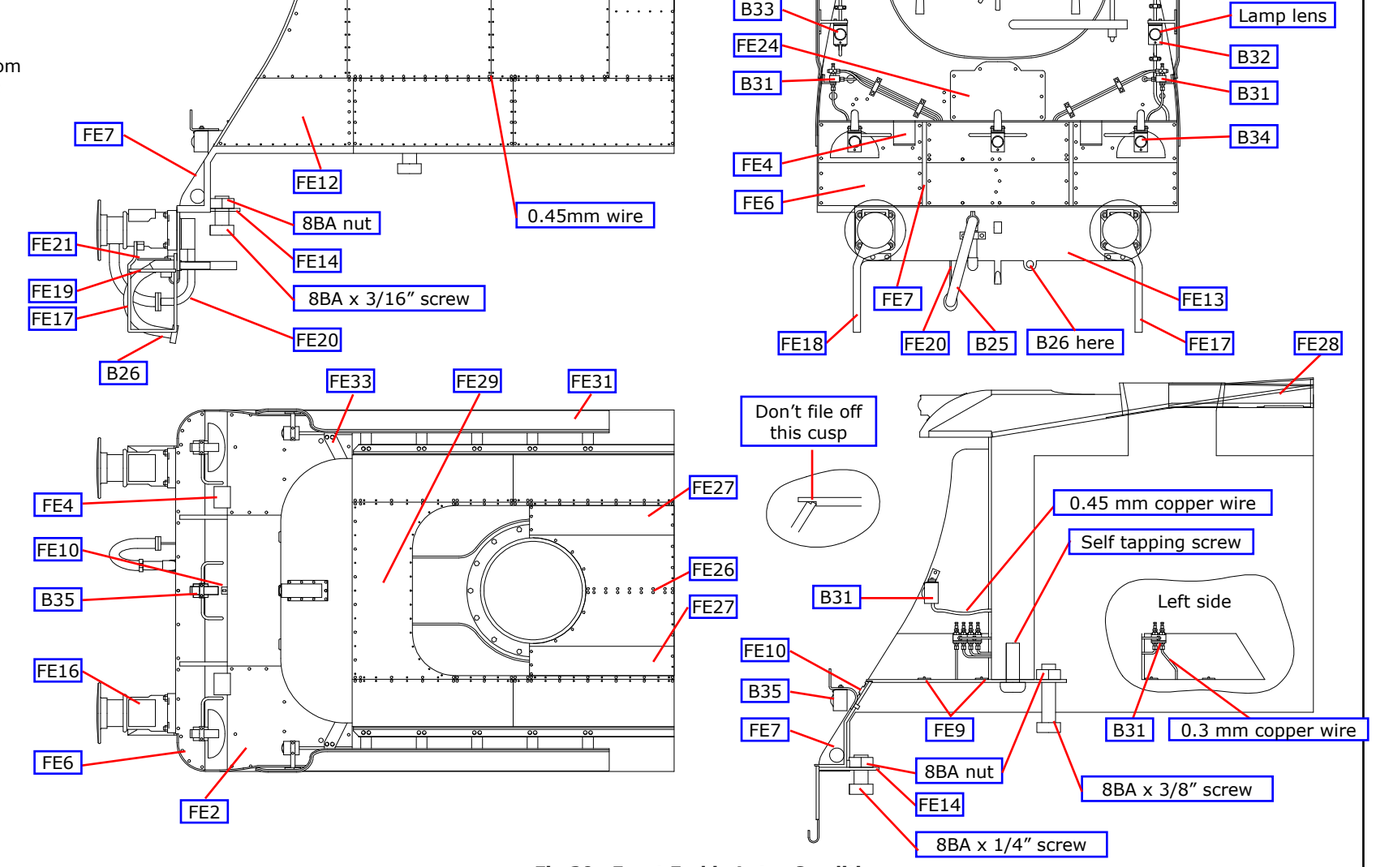


Fig 29. Front End in Later Condition

8’ 6” FLAT CAB

Select the required cab and if you are fitting the cab light roof vent (W7) drill through (1.2 mm) the appropriate holes in the cab roof.

Most of the rivets on the cab are very small and unless you have a tool which can emboss them neatly they may be better omitted. Make a test on an unwanted cab and if you are happy emboss the rivets on the original cab front (C1), rear screen (C19), sides and roof with original windows (C4). If you decide not to emboss the rivets still emboss those that will locate the roof lifting bracket (C14). Scribe the plate joints as described in the section on the cylinders on page 13.

Form the cab profile as follows. Using a 3/4" roller roll the roof and lower cab sides. Form the shoulder bends, above the cab windows, by bending over a 1/4" rod held in a vice.

Solder two 8BA nuts in place over the holes in the floor attaching channel (C27) and fold up to make a channel. Select the correct cab floor/fall plate (C25), emboss the rivets and open up the holes to accept the injector controls and pipe work as shown in Fig 31. Solder the floor attaching channel into the slots in the cab floor.

Both the cab sides/roof and the cab front are marked in the centre by small etched lines. Align these marks and tack solder them together; accurate alignment is essential. Then tack them together at their bottom corners and check the fit before making a couple of further tacks on each side.

Anneal the pin sockets for the cab doors on the door plates (C24), by heating in a flame until they are a dull red in colour and allow to cool. Bend to shape around a 0.5 mm drill and solder the door plates in place in the slots in the rear screens. Add the handrails from 0.6 mm wire.

Locate the cab floor in the slots in the cab side together with the cab rear screens and tack solder in place. When happy with the fit and that the cab is square, solder together all round. Now remove the centre strengthening plate in the rear screens by cutting through the tags with a piercing saw.

Add the cab roof interior rib (C18). Make up the fall plate support from the outer fall plate support brackets (C30) and the inner fall plate support brackets (C28) and the inner fall plate support bracket angle (C29), which goes over each of the brackets.

Solder the roof rear section overlay (C15), the roof front removable plate (C17) and the 1 mm x 1 mm angle ventilator runners in place on the cab roof. Form the lifting brackets (C14) to shape and solder in place locating over the previously embossed rivets. If appropriate add the roof lamp ventilator base (C16), the cab light roof vent (W7) and if required, the roof ventilator straps (C13).

Fold up the back and front of the roof ventilator jig (C12), which gives a base upon which to build the cab ventilator. Roll the roof ventilator (C11) to shape before soldering it in place on the jig. Now using a carborundum disc in a mini-drill cut through the unwanted parts of the jig and snap off the redundant parts. The edges of the ribs left under each end of the ventilator will now need cleaning up.

Bend out the wind deflector brackets from the side window frames. Fold up the side window frames (C31) and fit the sliding window frames (C32). The sliding windows can be clipped in and out and not finally fitted until the frames are painted and glazed. The last part to be added is the cab rear screen window frame (C20); this is best left until the cab is painted and glazing added. Paint the rear screen window frames to match the cab rear colour and add over the glazing once fitted.

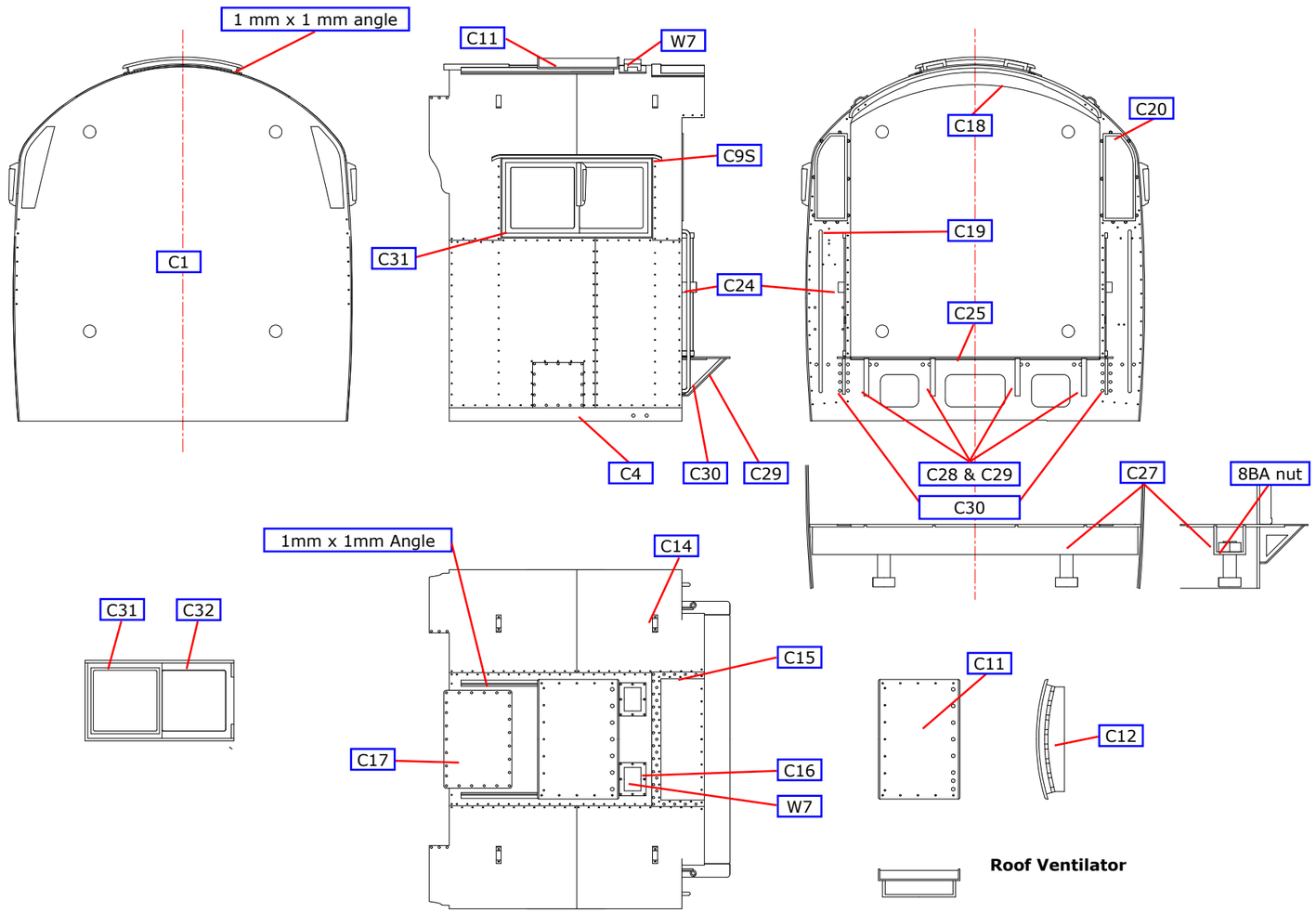


Fig 31. Original Flat Front Cab

No.	Description	Sheet
C1	Cab front, original, 8’6”	7
C4	Sides and roof, original 8’6”	5
C9S	Cab side window gutter standard size (2)	4
C11	Roof ventilator	5
C12	Cab roof ventilator jig	3
C13	Cab roof ventilator straps (2)	4
C14	Cab roof lifting brackets (4)	4
C15	Cab roof rear section overlay	3
C16	Cab roof lamp ventilator base (2)	4
C17	Cab roof front removable plate	7
C18	Cab roof interior rib 8'-6"	7
C19	Cab rear 8’6”	7
C20	Cab rear screen window frame, 8’6” (2)	3
C24	Cab door plate (2)	4
C25	Floor/fall plate, 8’6”	5
C27	Floor attaching channel	6
C28	Inner fall plate support bracket (4)	4
C29	Inner fall plate support bracket angle (4)	4
C30	Outer fall plate support bracket (2)	4
C31	Original side window frame 8’6” (2)	6 & 7
C32	Original sliding window frame, 8’6” (2)	4

8’ 6” MODIFIED CAB

Select the required cab and if you are fitting the cab light roof vent (W7) drill through (1.2 mm) the appropriate holes in the cab roof. Most of the rivets on the cab are very small and unless you have a tool which can emboss them neatly they may be better omitted. Make a test on an unwanted cab and if you are happy emboss the rivets on the modified cab front (C2), rear screen (C19), sides and roof. If you decide not to emboss the rivets still emboss those that will locate the roof lifting bracket (C14). Scribe the plate joints as described in the section on the cylinders on page 13.

Note. There are two 8'-6" cabs supplied, one with enlarged side windows (C5E) and one with standard side windows (C5S) please check your prototype to get the correct sized windows and use items C33E or C33S accordingly. All engines from 34001 to 34070 should have standard windows, however, some evidence reveals that some engines between 34066 and 34070 may have had the later enlarged 9’-0” cab windows fitted. See Page 2 for further details.

Form the cab profile as follows. Using a 3/4" roller roll the roof and lower cab sides. Form the shoulder bends, above the cab windows, by bending over a 1/4" rod held in a vice. Form the reverse bends around the front window of the 'V' fronted cabs, by bending over a 5/32" (4 mm) rod.

Solder two 8BA nuts in place over the holes in the floor attaching channel (C27) and fold up to make a channel. Select the correct cab floor/fall plate (C25), emboss the rivets and open up the holes to accept the injector controls and pipe work as shown in Fig 31. Solder the floor attaching channel into the slots in the cab floor.

Both the cab sides/roof and the cab front are marked in the centre by small etched lines. Align these marks and tack solder them together; accurate alignment is essential. Then tack them together at their bottom corners and check the fit before making a couple of further tacks on each side.

Anneal the pin sockets for the cab doors on the door plates (C24), by heating in a flame until they are a dull red in colour and allow to cool. Bend to shape around a 0.5 mm drill and solder the door plates in place in the slots in the rear screens. Add the handrails from 0.6 mm wire.

Locate the cab floor in the slots in the cab side together with the cab rear screens and tack solder in place. When happy with the fit and that the cab is square, solder together all round. Now remove the centre strengthening plate in the rear screens by cutting through the tags with a piercing saw.

The openings for the front windows and the edges of the window plates (C7) are etched in the same way as the top edge of the front drop plate steps (FE5 and FE6). This enables the necessary chamfers and mitres to be easy filed on the edges of both the openings and the window plates. Carefully fit the window plates and solder in place. Now remove the centre strengthening plates of the front windows by cutting through the tags with a piercing saw.

Add the cab roof interior rib (C18). Make up the fall plate support from the outer fall plate support brackets (C30) and the inner fall plate support brackets (C28) and the inner fall plate support bracket angle (C29) which goes over each of the brackets.

Solder the roof rear section overlay (C15), the roof front removable plate (C17) and the 1 mm x 1 mm angle ventilator runners in place on the cab roof. Form the lifting brackets (C14) to shape and solder in place locating over the previously embossed rivets. If appropriate add the roof lamp ventilator base (C16), the cab light roof vent (W7) and if required, the roof ventilator straps (C13).

Fold up the back and front of the roof ventilator jig (C12), which gives a base upon which to build the cab ventilator. Roll the roof ventilator (C11) to shape before soldering it in place on the jig. Now using a carborundum disc in a mini-drill cut through the unwanted parts of the jig and snap off the redundant parts. The edges of the ribs left under each end of the ventilator will now need cleaning up.

Bend out the wind deflector brackets from the enlarged side window frames. Fold up the side window frames (C33) or (C33S) and fit the sliding window frames (C34). The sliding windows can be clipped in and out and not finally fitted until the frames are painted and glazed.

Bend out the wind deflector brackets from the side window frames. Fold up the enlarged side window frames (C33E) or standard side window frames (C33S) and fit the sliding window frames (C34). The sliding windows can be clipped in and out and not finally fitted until the frames are painted and glazed. Add the side window roof gutters (C9S) standard size or (C9E) enlarged size.

The last part to be added is the cab rear screen window frame (C20); this is best left until the cab is painted and glazing added. Paint the rear screen window frames to match the cab rear colour and add over the glazing once fitted.

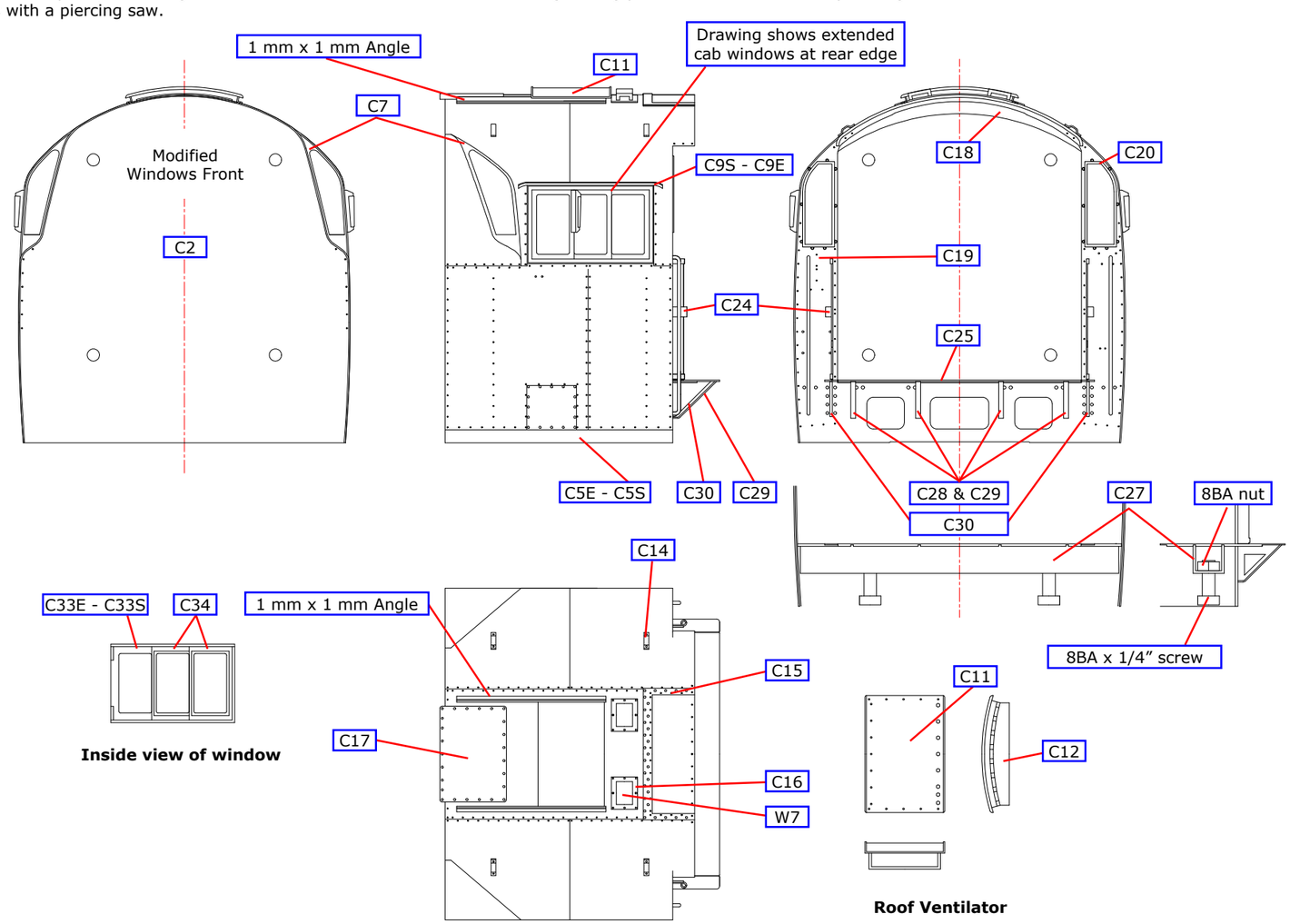
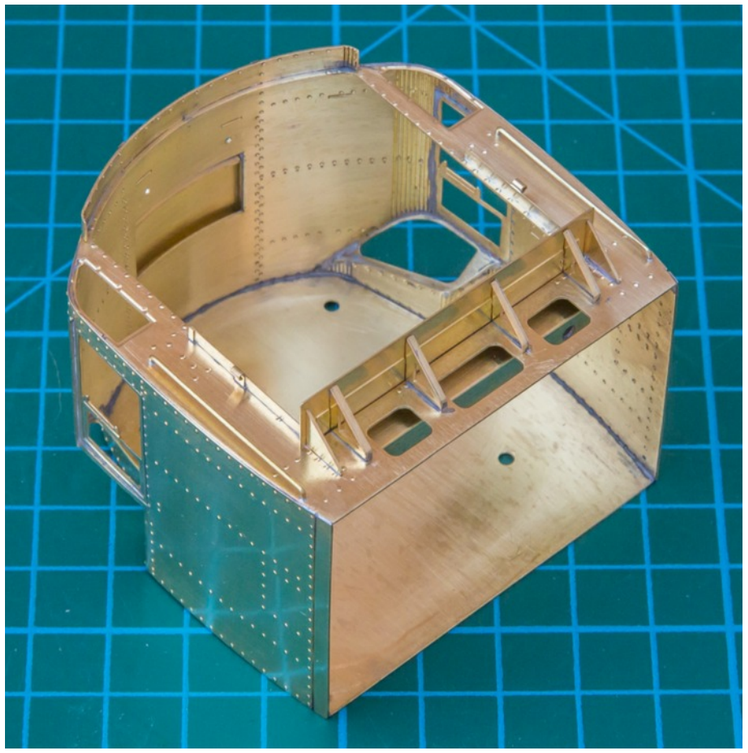
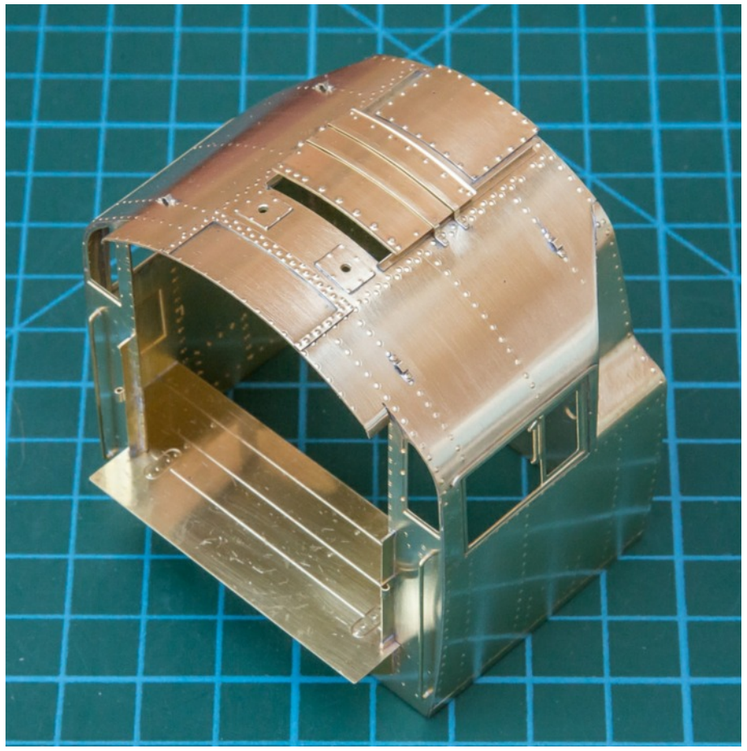
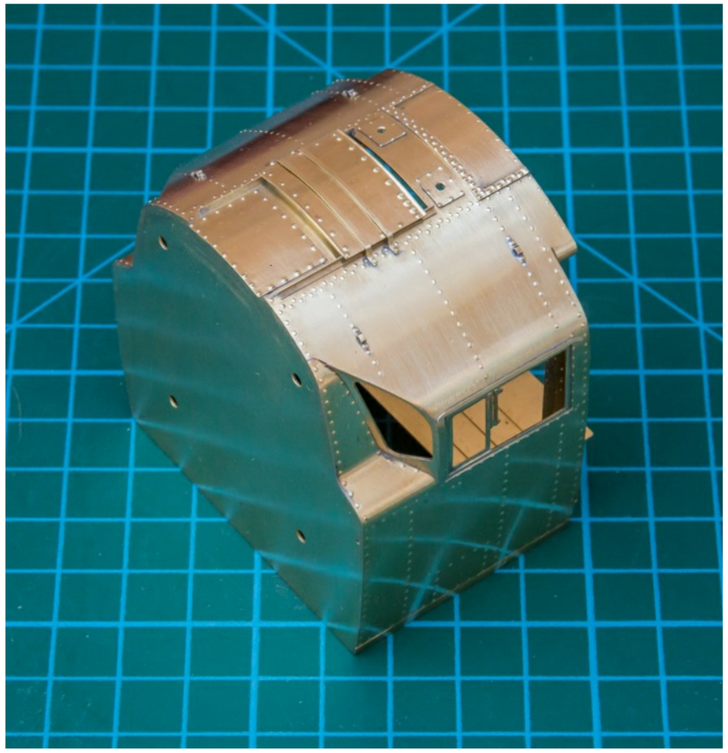


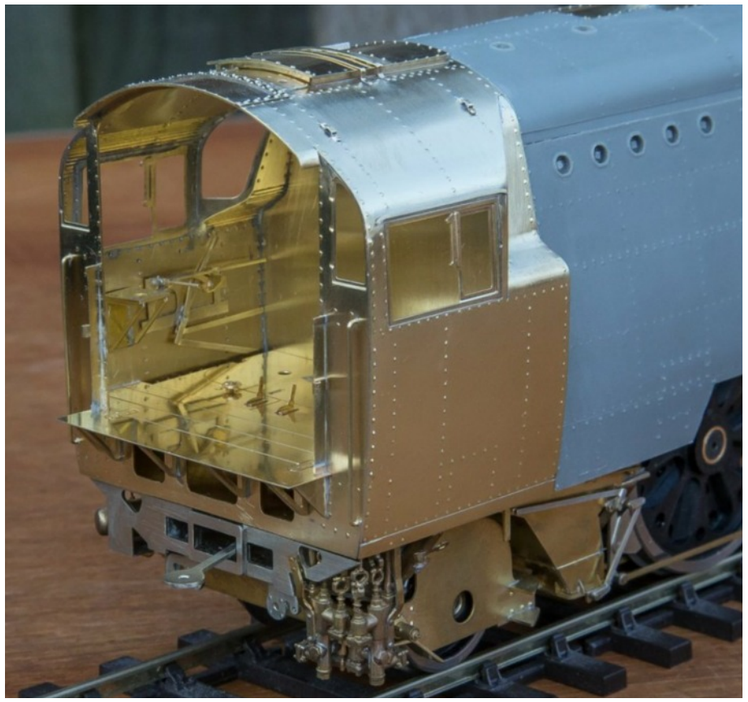
Fig 32. Later V Front Cab

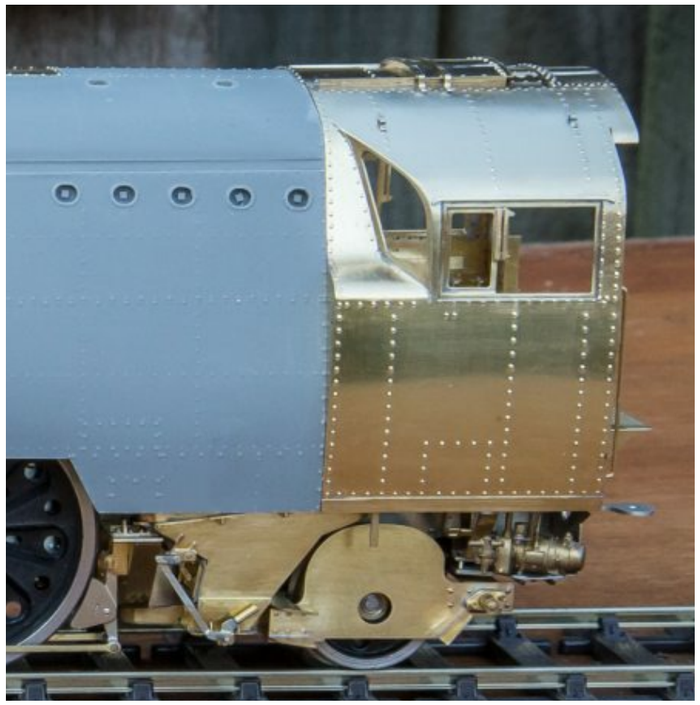
No.	Description	Sheet
C2	Front modified windows, 8’6”	5
C5E	8’-6” V Cab enlarged 9’-0” side windows	7
C5S	8’-6” V Cab standard side windows	Supp
C7	Cab front window plate, 8’6”	3
C9S	Standard cab side window gutter (2)	Supp
C9E	Enlarged cab side window gutter (2)	4
C11	Roof ventilator	5
C12	Cab roof ventilator jig	3
C13	Cab roof ventilator straps (2)	4
C14	Cab roof lifting brackets (4)	4
C15	Cab roof rear section overlay	3
C16	Cab roof lamp ventilator base (2)	4
C17	Cab roof front removable plate	7
C18	Cab roof interior rib 8'-6"	7
C19	Cab rear 8’-6”	7
C20	Cab rear screen window frame, 8’6” (2)	3
C24	Cab door plate (2)	4
C25	Floor/fall plate, 8’6”	5
C27	Floor attaching channel	6
C28	Inner fall plate support bracket (4)	4
C29	Inner fall plate support bracket angle (4)	4
C30	Outer fall plate support bracket (2)	4
C33E	Cab side sliding window frame enlarged,	6&7
C33S	Cab sliding frame standard, 8'-6" V cab	Supp
C34	Cab sliding frame, V cab, 8’6” and 9’0” (4)	4











9’ CAB

Select the required cab and if you are fitting the cab light roof vent (W7) drill through (1.2 mm diameter) the appropriate holes in the cab roof.

Most of the rivets on the cab are very small and unless you have a tool which can emboss them neatly they may be better omitted. Make a test on an unwanted cab and if you are happy emboss the rivets on the 9’ cab front (C3), rear screen (C21), sides and roof 9’ (C6). If you decide not to emboss the rivets still emboss those that will locate the roof lifting bracket (C14). Scribe the plate joints as described in the section on the cylinders on page 13.

Form the cab profile as follows. Using a 3/4" roller roll the roof and lower cab sides. Form the shoulder bends, above the cab windows, by bending over a 1/4" rod held in a vice. Form the reverse bends around the front window of the 'V' fronted cabs, by bending over a 5/32" (4 mm) rod.

Solder two 8BA nuts in place over the holes in the floor attaching channel (C27) and fold up to make a channel. Select the correct cab floor/fall plate (C26), emboss the rivets and open up the holes to accept the injector controls and pipe work as shown in Fig 31. Solder the floor attaching channel into the slots in the cab floor.

Both the cab sides/roof and the cab front are marked in the centre by small etched lines. Align these marks and tack solder them together; accurate alignment is essential. Then tack them together at their bottom corners and check the fit before making a couple of further tacks on each side.

Anneal the pin sockets for the cab doors on the door plates (C24), by heating in a flame until they are a dull red in colour and allow to cool. Bend to shape around a 0.5 mm drill and solder the door plates in place in the slots in the rear screens. Add the handrails from 0.6 mm wire.

Locate the cab floor in the slots in the cab side together with the cab rear screens and tack solder in place. When happy with the fit and that the cab is square, solder together all round. Now remove the centre strengthening plate in the rear screens by cutting through the tags with a piercing saw.

The openings for the front windows and the edges of the window plates (C8) are etched in the same way as the top edge of the front drop plate steps (FE5 and FE6). This enables the necessary chamfers and mitres to be easy filed on the edges of both the openings and the window plates. Carefully fit the window plates and solder in place. Now remove the centre strengthening plates of the front windows by cutting through the tags with a piercing saw.

Add the cab roof interior rib (C18S). Make up the fall plate support from the outer fall plate support brackets (C30) and the inner fall plate support brackets (C28) and the angle (C29) which goes over each of the brackets.

Solder the roof rear section overlay (C15), the roof front removable plate (C17) and the 1 mm x 1 mm angle ventilator runners in place on the cab roof. Form the lifting brackets (C14) to shape and solder in place locating over the previously embossed rivets. If appropriate add the roof lamp ventilator base (C16), the cab light roof vent (W7) and if required, the roof ventilator straps (C13).

Fold up the back and front of the roof ventilator jig (C12), which gives a base upon which to build the cab ventilator. Roll the roof ventilator (C11) to shape before soldering it in place on the jig. Now using a carborundum disc in a mini-drill cut through the unwanted parts of the jig and snap off the redundant parts. The edges of the ribs left under each end of the ventilator will now need cleaning up.

Bend out the wind deflector brackets from the enlarged side window frames. Fold up the side window frames (C33E) and fit the sliding window frames (C34). The sliding windows can be clipped in and out and not finally fitted until the frames are painted and glazed. The last part to be added is the cab rear screen window frame (C22); this is best left until the cab is painted and glazing added. Paint the rear screen window frames to match the cab rear colour and add over the glazing once fitted.

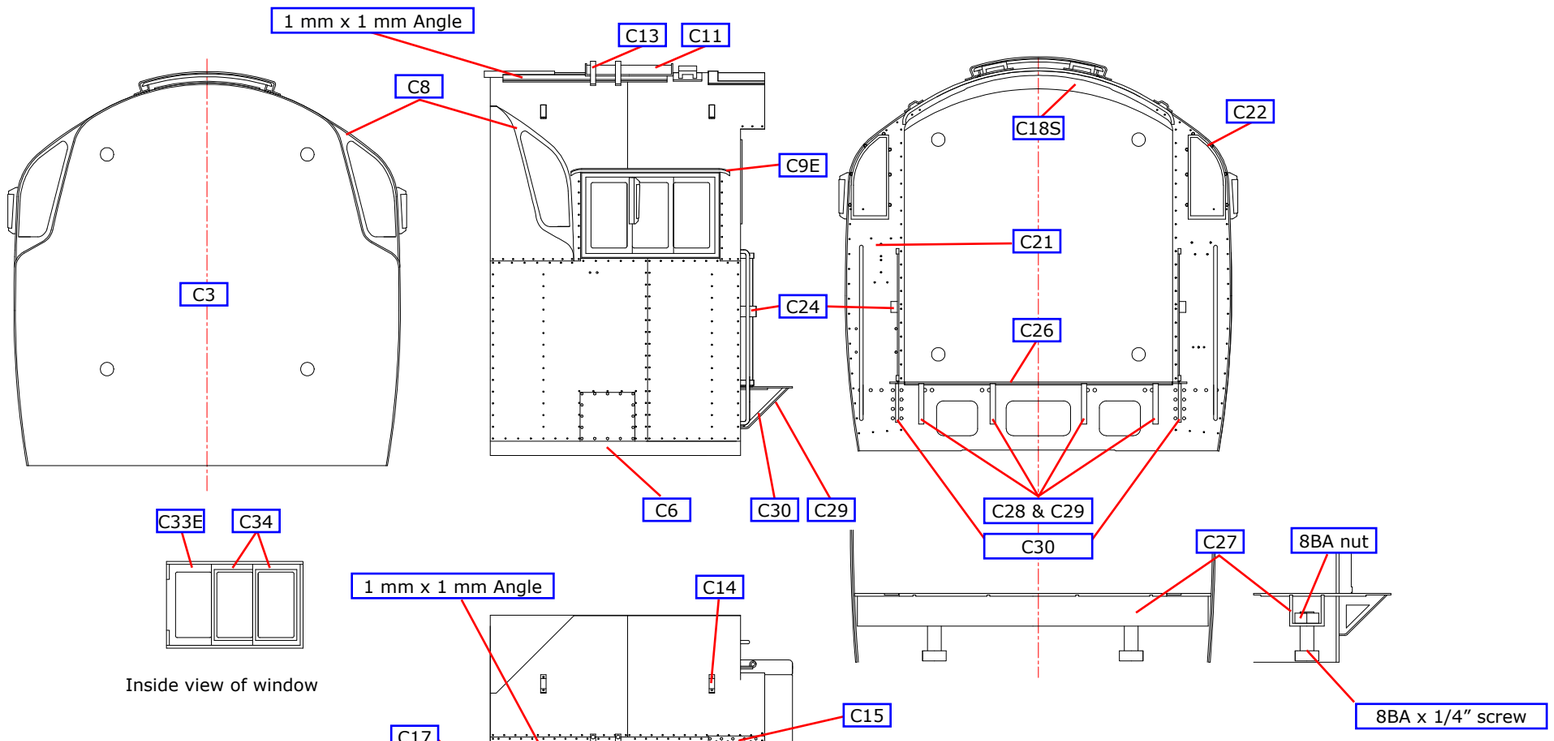


Fig 33. Later V Front Cab

No.	Description	Sheet
C3	Cab front, 9’0”	6
C6	Cab sides and roof, 9’0”	6
C8	Cab front window plate, 9’	3
C9E	Enlarged size cab side window gutter (2)	4
C11	Roof ventilator	5
C12	Cab roof ventilator jig	3
C13	Cab roof ventilator straps (2)	4
C14	Cab roof lifting brackets (4)	4
C15	Cab roof rear section overlay	3
C16	Cab roof lamp ventilator base (2)	4
C17	Cab roof front removable plate	7
C18S	Cab roof interior rib 9'-0"	Supp
C21	Cab rear 9’0”	6
C22	Cab rear screen window frame, 9’ (2)	3
C24	Cab door plate (2)	4
C26	Floor/fall plate, 9’0”	5
C27	Floor attaching channel	6
C28	Inner fall plate support bracket (4)	4
C29	Inner fall plate support bracket angle (4)	4
C30	Outer fall plate support bracket (2)	4
C33E	Cab side sliding window frame enlarged, 8'-6" and 9'-0" V cabs (2)	6 & 7
C34	Cab side sliding window frame, V cab, 8’6” and 9’0” (4)	4

CAB INTERIOR

Make up the reverser/drain cock controls as shown in the drawing and photograph. The ends of the steam reverser & drain cock lever bracket (C35) are bent through 90° to fit in the small grooves in the cab side. Check their fit in one of the unused cab sides. A 0.6 mm hole needs carefully drilling through the reverser lever (B39).

Attach the lever quadrant inner (C36), quadrant outer (C37), the steam reverser nut (C38), the cut-off indicator (C39) and the drain cock lever (C40) as shown below.

Make up the driver's seat from the driver's seat bracket (C41), the driver's seat bracket side stay (C42) and the drivers seat cushion (W10).

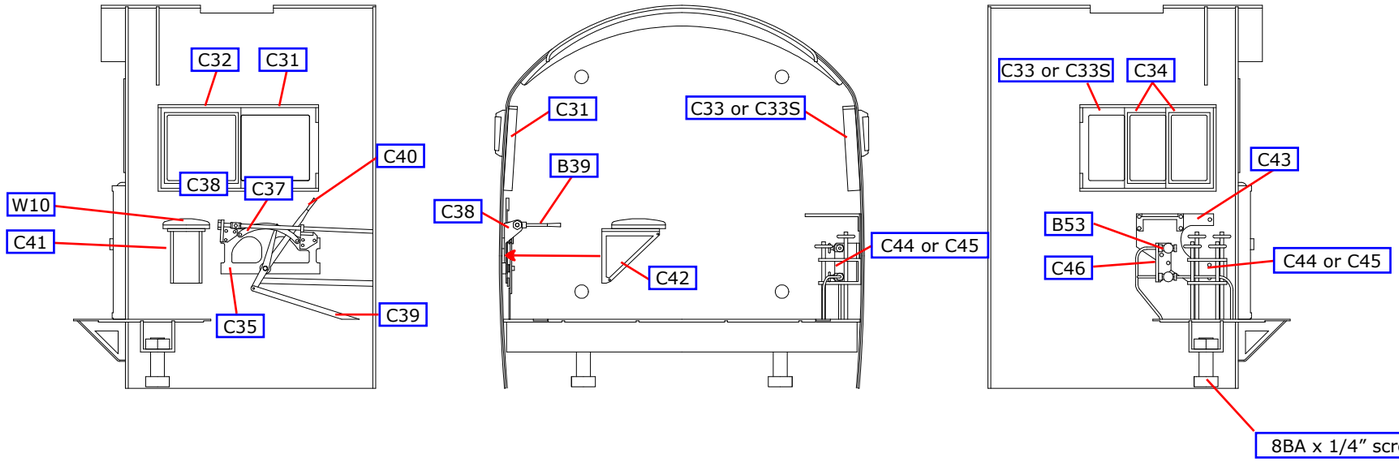
Make up the injector controls/fireman's seat unit. Note part C44 and C45 are for the different cab widths.

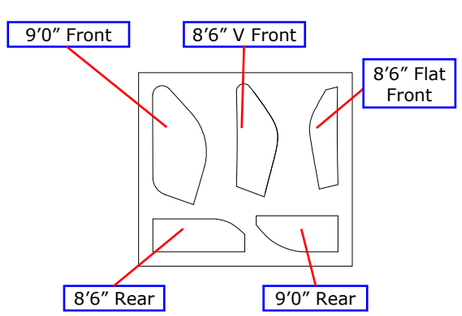
Attach the fireman's seat and bracket (C43), Injector controls bracket, 8'6" (C44), injector controls bracket 9'0" (C45), cab watering cock and tender coal spray cock bracket (C46), injector control hand wheel (C47) as shown below.

These three units are best glued in place after the cab interior has been painted.

With a sharp scalpel blade use the cab glazing jig (C23) to cut out the cab windows. The front window glazing fits from the inside whereas the windows in the rear screens fit from the outside and are held in place by parts C20 or C22.

No.	Description	Sheet			
C35	Cab steam reverser & drain cock lever bracket	3	C42	Cab driver' seat bracket stay (2)	3
C36	Cab steam reverser & drain cock lever inner quadrant	3	C43	Cab fireman's seat and bracket	3
C37	Cab steam reverser & drain cock lever outer quadrant	3	C44	Cab injector controls bracket, 8'6"	3
C38	Cab steam reverser nut	3	C45	Cab injector controls bracket, 9'	3
C39	Cab cut-off indicator	3	C46	Cab watering cock and tender coal spray cock bracket	3
C40	Cab drain cock lever	3	C47	Injector control hand wheel (4)	4
C41	Driver's seat bracket	5			





C23 Window Glazing Template

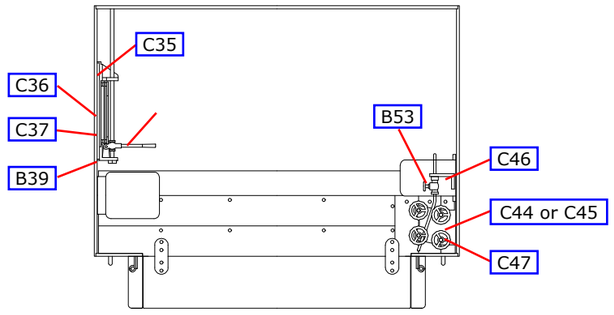
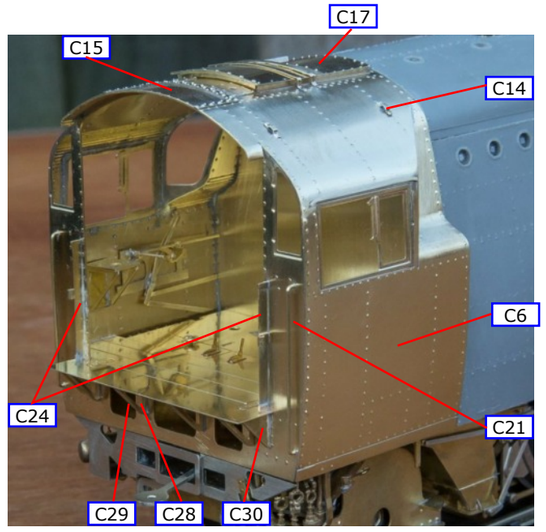
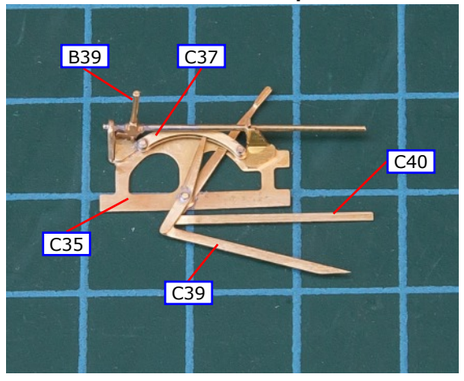
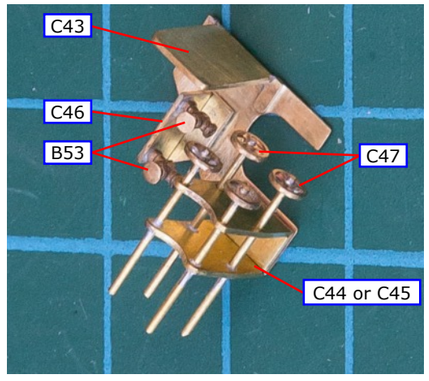


Fig 34. Cab Interior

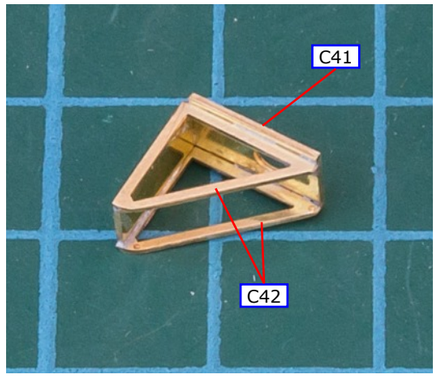




Steam Reverser Controls



Injector Controls



Driver's Seat

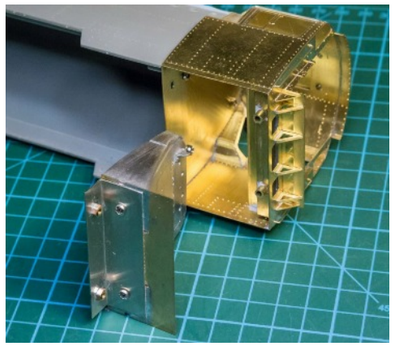
BACKHEAD 1

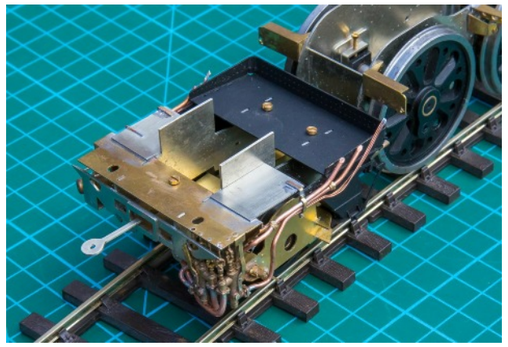
INTRODUCTION

There are no exact plans for laying out the pipe work, the attached drawings and photos are generic. Beware that many preserved engines have been modified so check original photos where possible. Many pipes overlap so take care in the order of build.

The backplate floor was originally designed to be fitted to the chassis, an alternative is to fix the floor to the cab front using a scratch built L bracket as shown in the photograph. If you choose this option you will need to remove the two frame pipe brackets attached to the backplate floor, replacements will need to be fabricated and attached to the cab floor (F33).

In addition, it is advised to cut the holes in the floor to allow pipe work to pass through, again check photographs as these vary in size/ location.





No.	Description	Sheet
BP1	Steam manifold wheels (4)	4
BP2	Backplate steam manifold handle (4)	3
BP3	Water gauge handle (6)	6
BP4	Backplate shelf	1
BP5	Backplate vacuum ejector brake handle	3
BP6	Backplate duplex vacuum gauge & steam chest gauge carrier	3
BP7	Backplate boiler steam gauge carrier	3
BP8	Backplate steam sanding valve carrier	3
BP9	Backplate blower valve & steam sanding valve handle (2)	3
BP10	Backplate reverser lubricator carrier	3
BP11	Backplate generator valve handle	3

Drill the base of the backhead (W8) 1/16” to accept the self tapping fixing screws. Attach the backhead (W8) to the floor. Attach the fire door (W9) to the backhead and then add the backhead shelf (BP4).

Water Gauge and Regulator Box. The water gauge castings (B44) are common parts and need to be modified for the side of the boiler on which they are mounted (see drawing and photo). Remove the unwanted spigots for the operating handles from the inside for the lower cock and from the outside for the upper cock. Fit the water gauge handles (BP3) onto the valve spigots; down is closed.

Temporarily place the regulator box (B41) onto the backhead and offer up the fireman’s water gauge assembly. There is an obstruction on the regulator box to the fireman’s water gauge; this obstruction should be removed. Fit the regulator box into place. Add the 0.7 mm wire regulator rod and then add the regulator handle assembly (B40) onto the end.

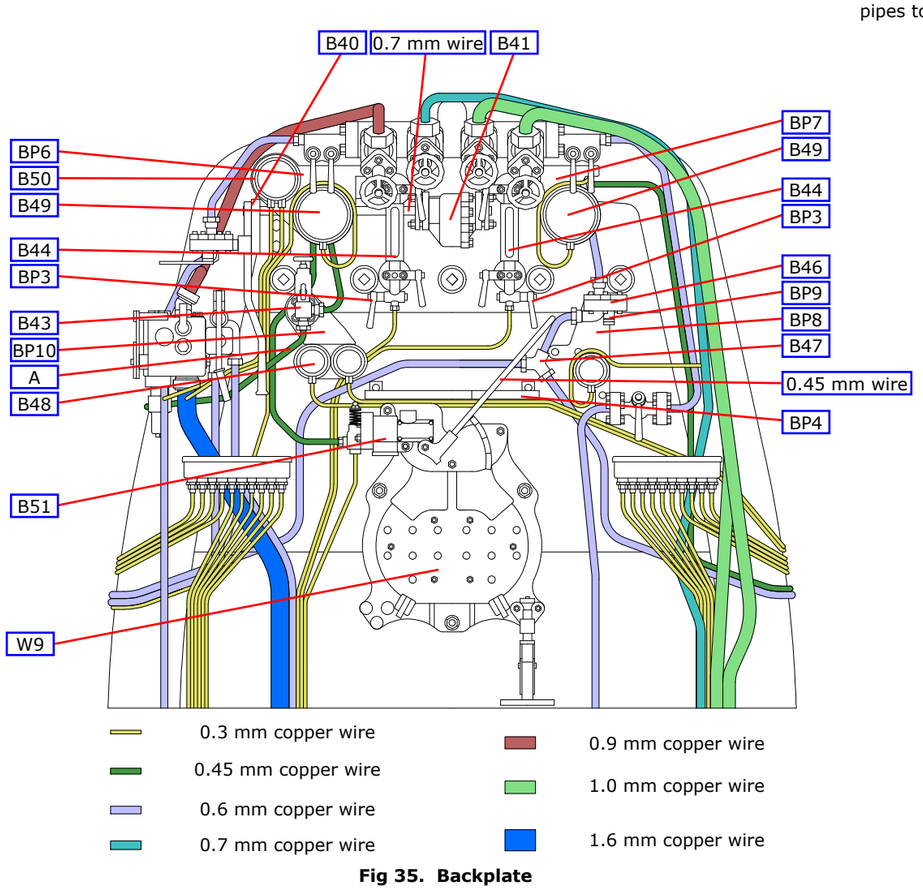
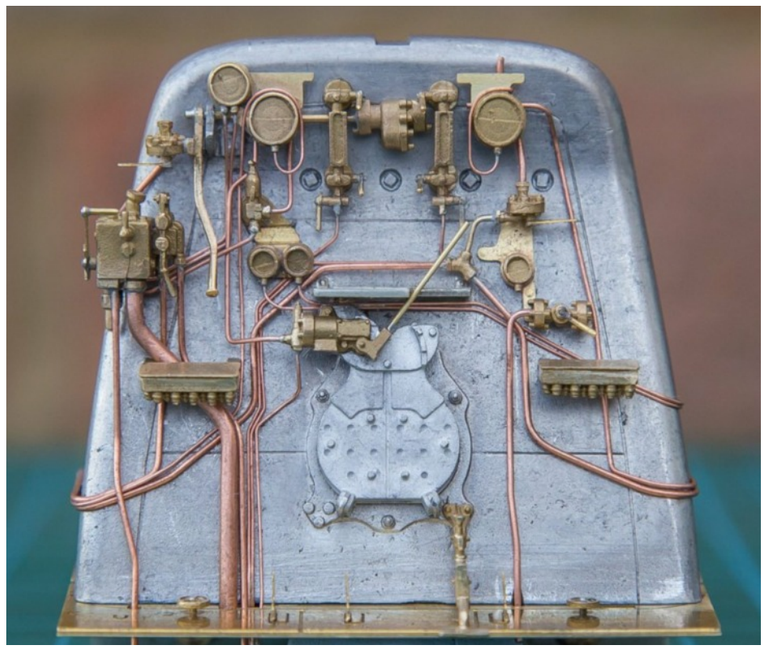


Fig 35. Backplate

Carefully attach a length of 0.3 mm wire to the drain cock on each water gauge and then fit the gauges to the backhead. Lay the drain pipes as shown in the drawing. On the drawing and photos, both drains go to the driver’s side however, many engines have the pipes run down each side of the fire hole door.

Boiler Pressure Gauge. Attach the boiler pressure gauge (B49) to the backing plate (BP7). Attach this assembly to the backhead on the fireman’s side using the spigot. Fit the 0.3 mm pipe to the gauge and curve around the fitting as shown, passing behind (BP7).

Steam Sanding. Fit the handle (BP9) to the fireman’s side 7/8" steam valve (B46); this one is the steam sanding valve. Emboss the rivets on the carrier (BP8) and then fit the valve to the carrier. Note the main part of the plate is angled and fits flush on the backhead, the top part needs to be bent outward so that the valve sits horizontal, use photos to assist. On the outlet side of the valve attach the steam sanding valve union (B47). Finally attach the steam heat gauge (B48) to the carrier. Attach the assembly to the backhead. Add the 0.6 mm pipes to the steam sanding valve union and run as shown in the drawing. Fit the 0.6 mm feed pipe to the top of the steam sanding valve and pass it under the boiler pressure gauge (B49) assembly to hide the end. An additional 0.45 mm pipe should be fitted to run from behind the fireman’s boiler pressure gauge down the backhead as shown in the drawing.



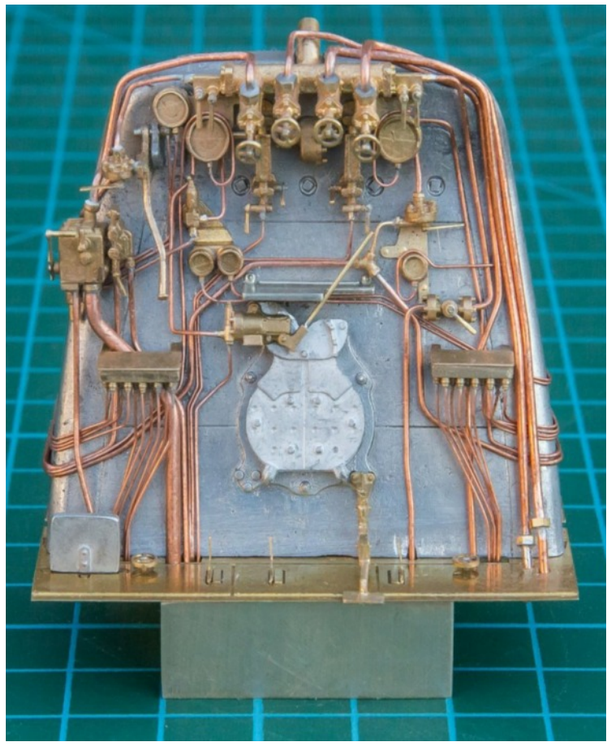
Reverser Displacement Lubricator. Fold up the backing plate (BP10) to the reverser displacement lubricator, the photos should assist in the shape. Attach the reverser displacement lubricator (B43) and the two oil pressure gauges (B48) and fit the assembly to the backhead. Attach the 0.45 mm upper feed pipe to the lubricator and run the pipe as shown in the drawing. Omit the pipe labelled A on the drawing. Attach the two 0.3 mm pipes to the oil pressure gauges and run the pipes as shown in the drawing.

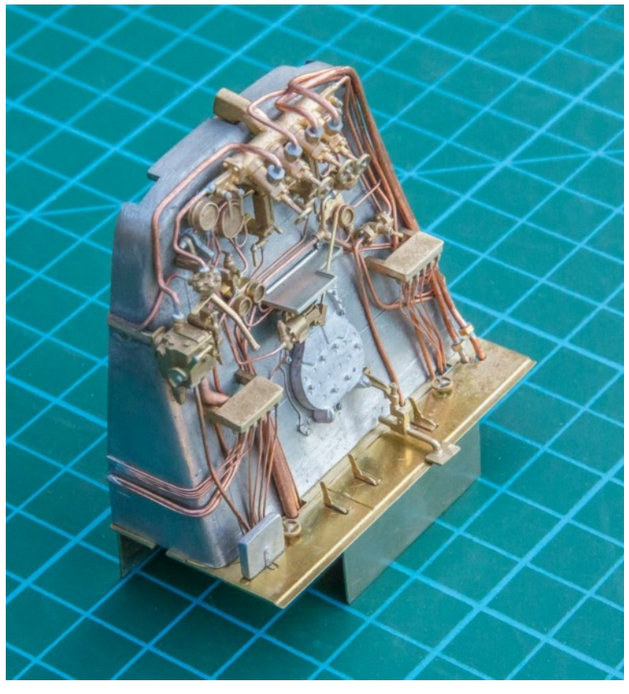
Driver’s Gauges. The regulator rod conflicts with the driver’s gauges mounting; cut away the section that interferes with the backing plate. Fit the backing plate (BP6) to the steam chest pressure gauge (B49) and then attach the Duplex gauge (B50). Fit the assembly to the backhead. Form 0.3 mm wire and attach the pipes to the steam chest pressure gauge and Duplex gauge and run the pipes as shown in the drawing. The Duplex gauge pipes are connected to the two large pipes below the vacuum ejector with T fittings. These fittings can be orientated to the right, front or back; for modelling purposes a rear fitting is easiest as it will be hidden.

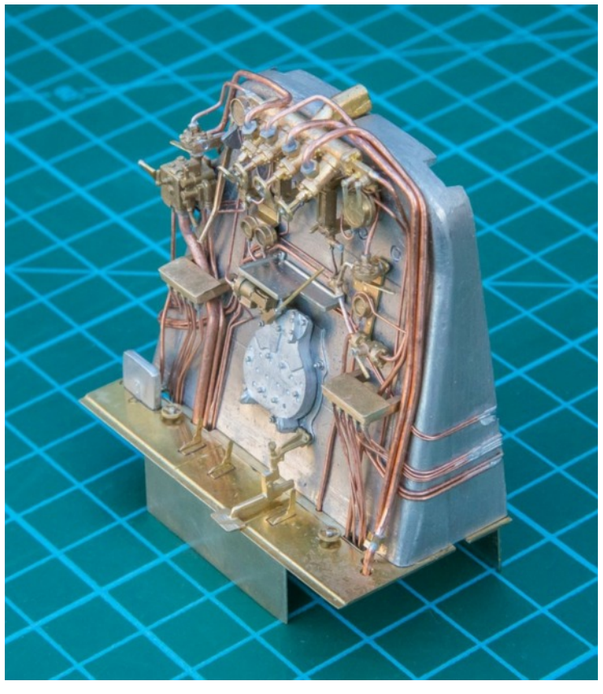
Ajax Firedoor Cylinder. Drill a 0.5 mm hole in the base of the Ajax firedoor cylinder (B51), use the photos and the drawing as a guide to location. Attach the manual handle from 0.45 mm brass wire and fit the unit to the fire door casting. Fit the 0.45 mm steam feed pipe and run up the backhead to terminate behind the drivers gauges. Attach the 0.3 mm drain pipe and feed down the backhead to terminate below floor level alongside the main vacuum injector pipe 1.6 mm.

Return to the reverser displacement lubricator and add the 0.45 mm pipe labelled A so that it passes over the Ajax door steam supply pipe.

BACKHEAD 2







Steam Brake and Vacuum Ejector. Fit the steam brake (B37) to the inside of the vacuum ejector (B36). Fit the handle (BP5) to the ejector casting and add a small piece of 0.6 mm brass wire to represent the handle. Attach the ejector assembly to the backhead. Fit the steam brake outer pipe (closest to the cab wall) 0.6 mm and run as shown. Bend to shape and fit the main vacuum ejector pipe from 1.6 mm wire, allowing a short length to pass through the floor if you have made openings. Fit the steam brake inner 0.6 mm pipe (closest to firedoor) and run as shown.

Blower Valve. Attach the handle (BP9) to the driver's side 7/8" steam valve (B46); this one is the blower valve. Attach the fitting to the regulator handle assembly. Attach 0.6 mm piping as shown.

Generator Steam Valve. Fit the handle (BP11) to the generator valve (B45) and fit to the backhead, attach the 0.6 mm generator supply pipe to the left side of the valve and bend to pass below the floor.

Steam Manifold Header. The steam manifold header (B38) covers a large portion of the upper fittings which may make painting difficult, it may pay to paint this area before finally fitting the header and associated pipe work. On the steam manifold fit the four small valve handles (BP2) to the outer spigots on the extension fittings. Fit the four gate valve round handles (BP1) to the main header spindles.

Fit the header to the backhead. Starting from the left begin to add the pipe work. First add the vacuum ejector feed pipe 0.9 mm, be sure to make a tight bend at the top close to the union to clear the cab roof, pass the pipe across to the left side of the backhead as close to the backhead as possible and run down to the top of the vacuum ejector (B36) inlet union and fix.

Fit the left manifold small extension pipe 0.6 mm and pass over the Duplex gauge and then down to the inlet union on the blower valve. Fit the 0.7 mm steam heat feed pipe and pass across the top of the header to the right side and down the backhead, pass behind where the fireman's lubricator tray will fit and then through the floor.

On the right manifold extension fit the generator feed pipe 0.6 mm and pass down the right side of the backhead to meet the input side of the generator valve (B45) and fix.

Lubricator Trays. Each lubricator tray (B42) has ten lubrication pipes, the real engines can have up to twenty pipes. The model casting has the front ten outlets only. These small bore lubrication pipes are rarely fitted neatly and orderly so some dents and dings will match the real engines. Attach the ten pipes to the ten outlets and carefully bend the two groups of pipes into the general direction of the run. This is where the holes in the floor are an advantage as excess pipe can be cut off after fitting. Once happy with the general form of the pipework fit the lubricator tray to the backhead. Arrange the pipe runs to match the drawing and photographs.

Return to the vacuum ejector assembly and fit the secondary 0.6 mm pipe to the underside of the ejector and pass down the backhead, over the other pipes already fitted and pass through the floor. Return to the fireman's side sanding valve assembly and fit the gauge pipe to the steam heat gauge, wrap around the top of the gauge and pass to the right, this is joined to the 0.7 mm steam heat pipe that runs down the right side with a reduction tap joint. If you wish to add this fitting then do so, or simply pass the gauge pipe underneath the main pipe and hide the end.

The last two pipes are the large bore 1.0 mm pipes from the steam manifold , these are often lagged or part lagged on the real engine so if you wish to add lagging, now is the time to do so. Each pipe has a joint union near floor level and in some cases a joint union at the top near the header union. A 14BA nut drilled out to 1.1 mm is about the right proportion.

Attach the two pipes to the remaining unions on the top left side of the manifold and run across the top of the backhead and down the right side and through the floor. As with the other pipes on the top of the manifold, make sure the bends from the unions are tight to give the clearance within the cab roof.

The driver's foot rest (W11) can now be fitted but the Ajax door treadle (B52) should be fitted once the backhead and floor are fully inside the cab.

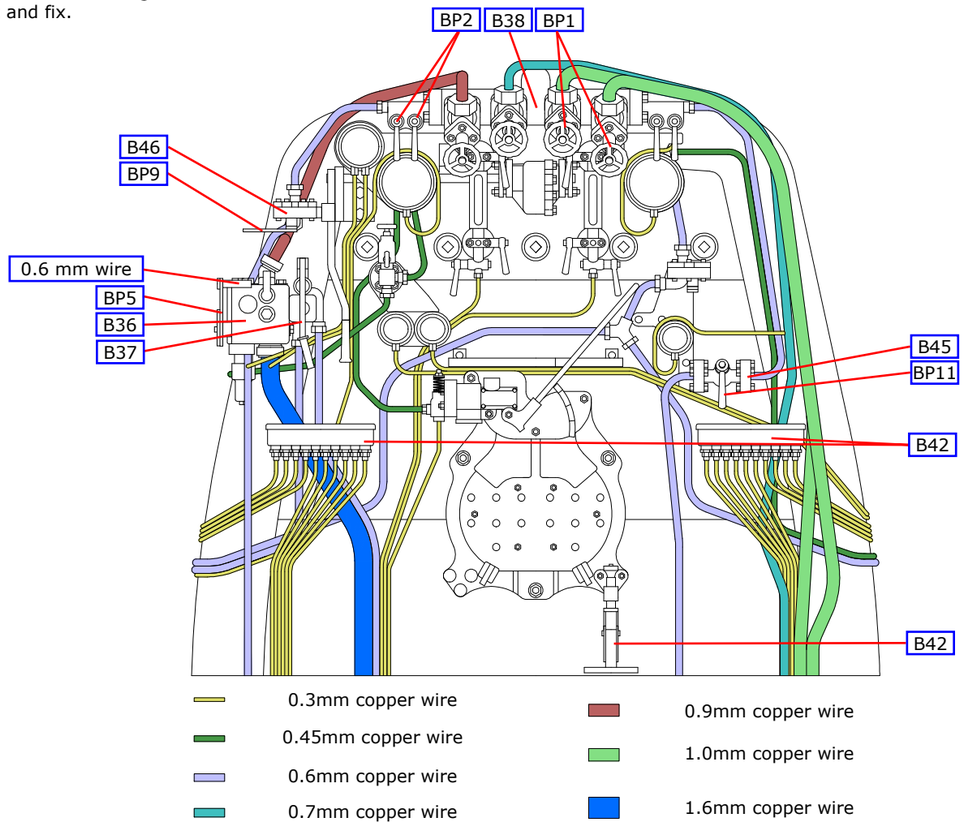
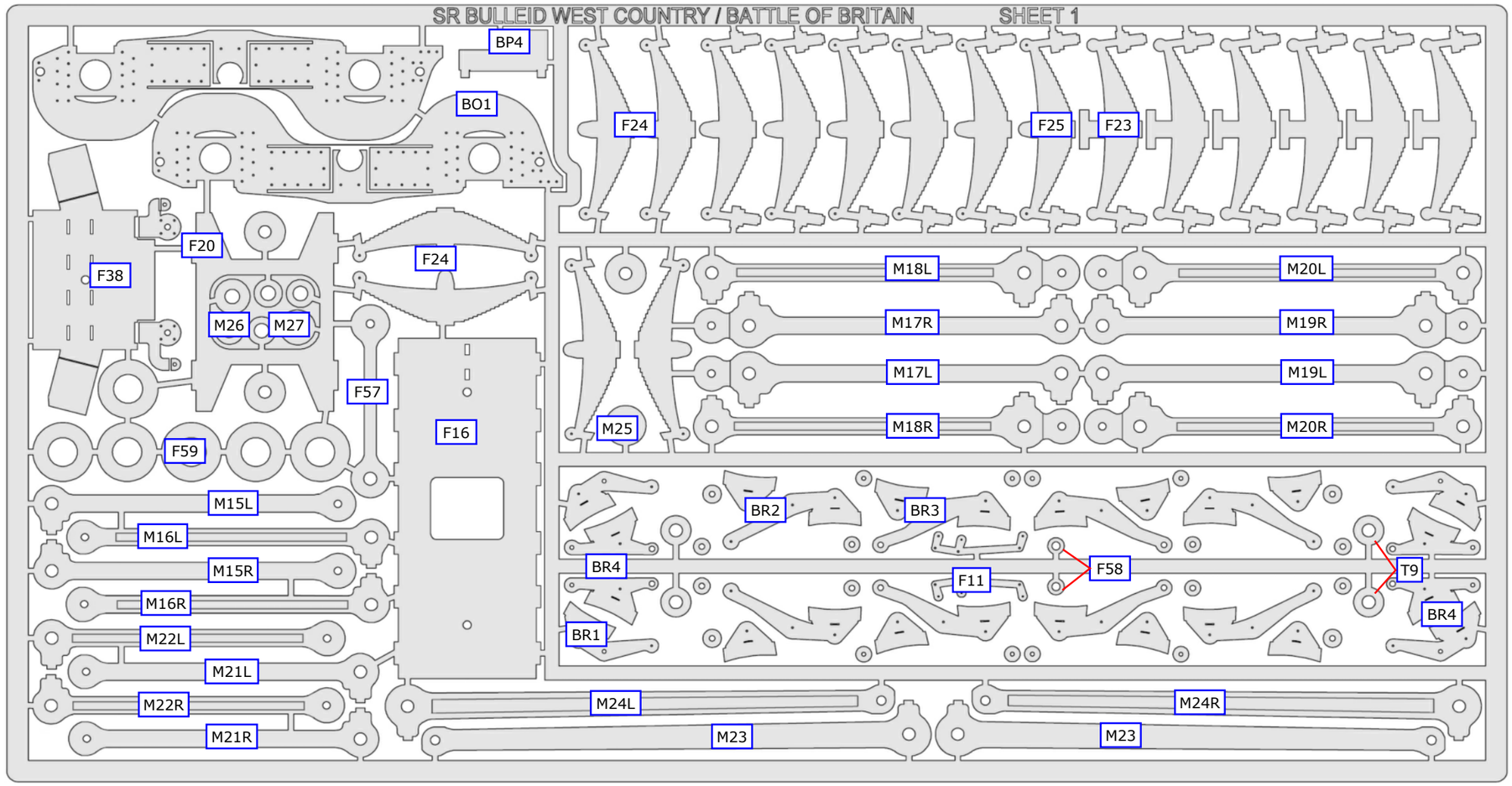


Fig 36. Backplate

BULLEID LIGHT PACIFIC ETCH - SHEET 1



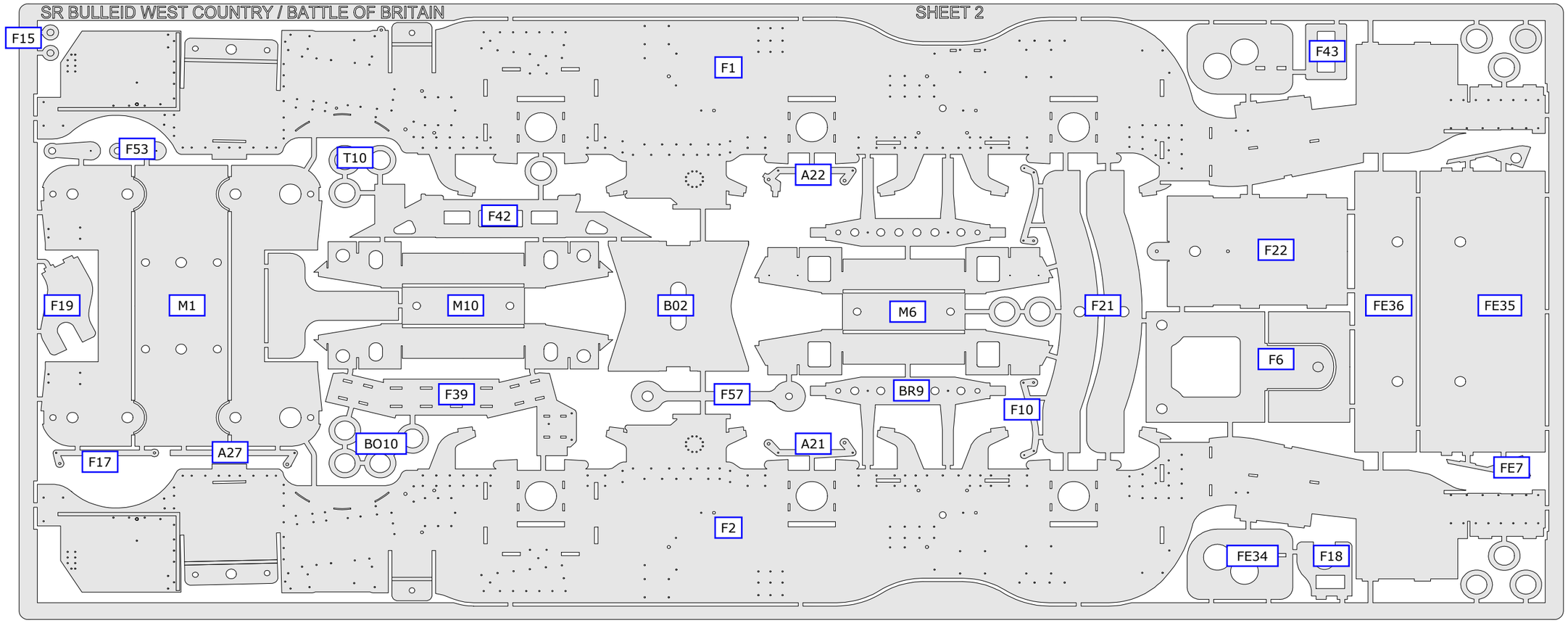
OTHER COMPONENTS

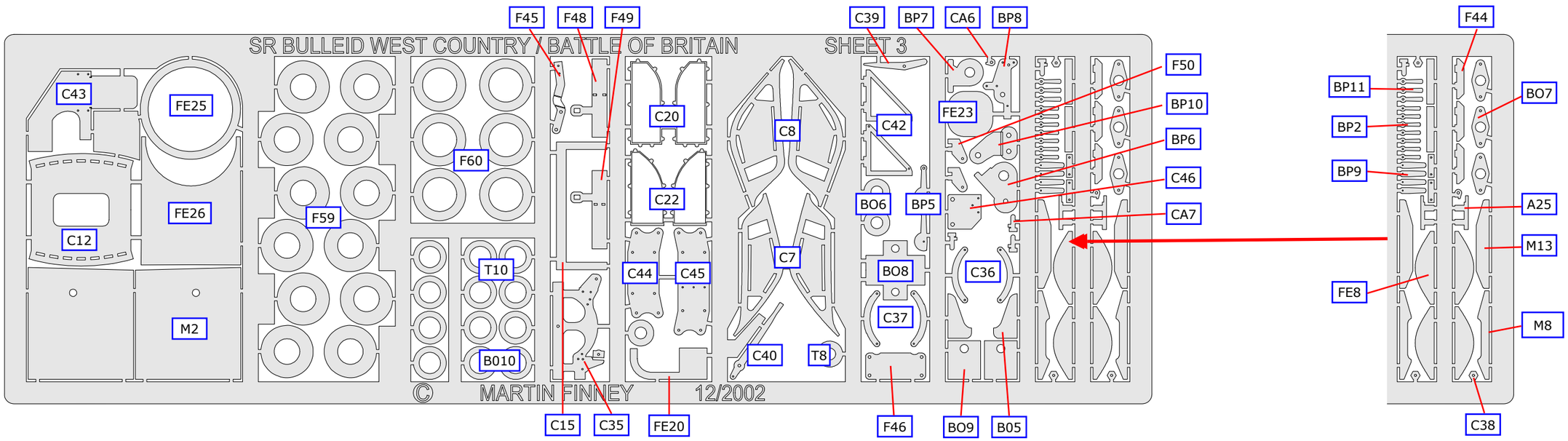
3/16" bearing (6)
5/32" top hat bearing (2)
8 BA x 1/4" screw (5)
8 BA x 3/8" screw (2)
8 BA x 1" screw
8 BA nut (8)
10 BA x 1/8" screw (6)
14BA x 1/2" screw (8)
Self tapping screw - 1/4" (8)
Buffer head (2)
Buffer spring (2)
Bogie side control spring(2)
Lamp lens (6)
Brass angle 1 mm x 1 mm
Brass angle 1.5 mm x 1.5 mm

Steel wire - 1/16"
Steel wire - 0.8 mm
Brass tube - 1.2 mm for brake gear
Brass tube - 1/16" outside diameter
Brass tube - 3/32" outside diameter
Brass tube - 1/8" outside diameter
Brass wire - 1/16"
Brass wire - 0.45 mm
Brass wire - 0.6 mm
Brass wire - 0.7 mm
Brass wire - 0.8 mm
Brass wire - 1.0 mm
Brass wire - 1.2 mm
Brass wire - 1.4 mm
Brass wire - 1.6 mm
Copper wire - 0.3 mm

Copper wire - 0.45 mm
Copper wire - 0.6 mm
Copper wire - 0.7 mm
Copper wire - 0.8 mm
Copper wire - 0.9 mm
Copper wire - 1.0 mm
Copper wire - 1.25 mm
Copper wire - 1.6 mm
Rubber tubing to fit 0.8 and 1.2 mm wire
Glazing material
Pack of CPL screw couplings
Silver steel - 5.5 mm for smoke deflector jig

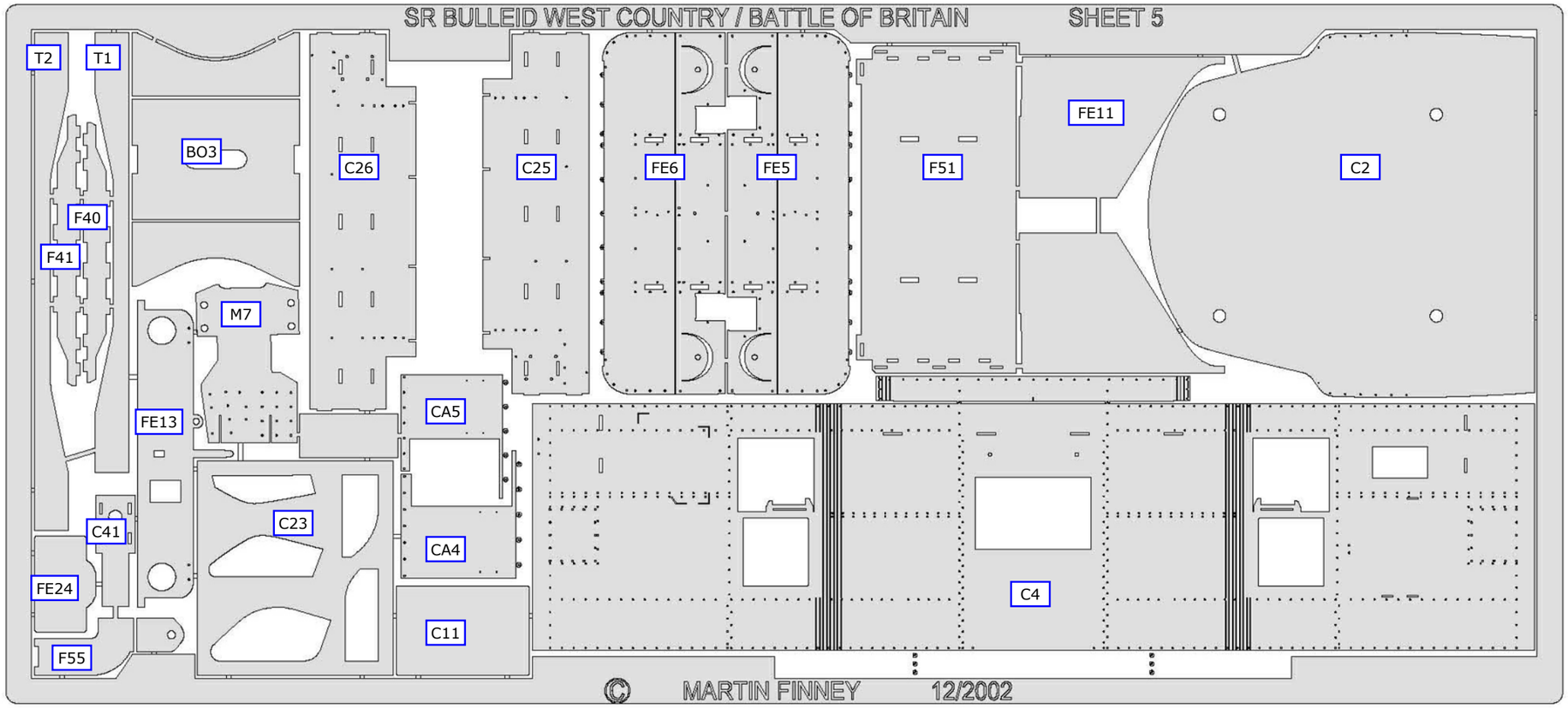
BULLEID LIGHT PACIFIC ETCH - SHEET 2 & 3

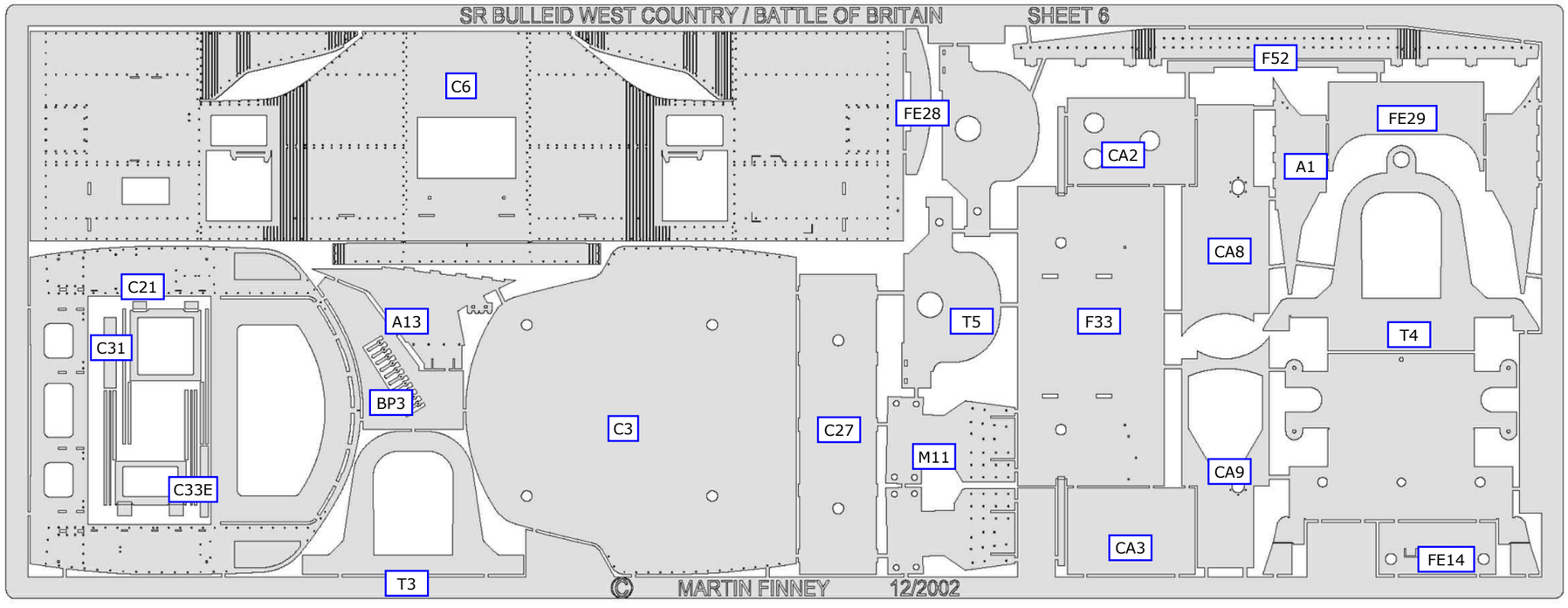




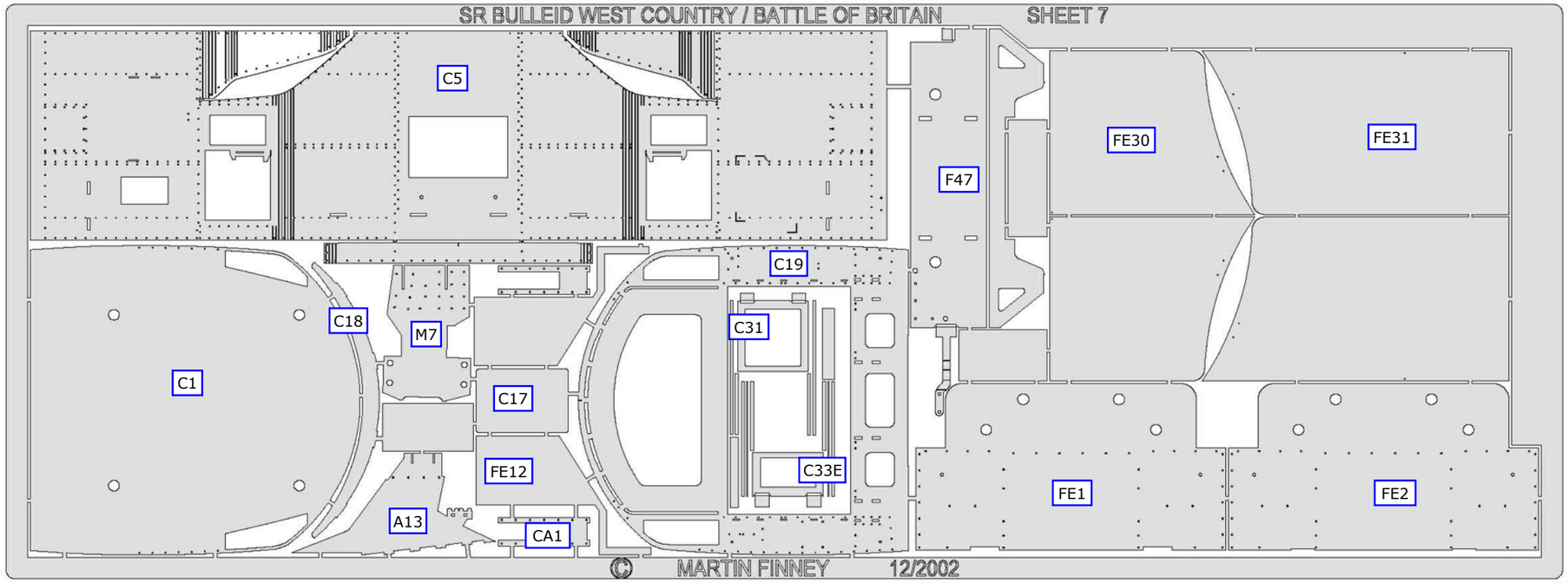
BULLEID LIGHT PACIFIC ETCH - SHEET 4

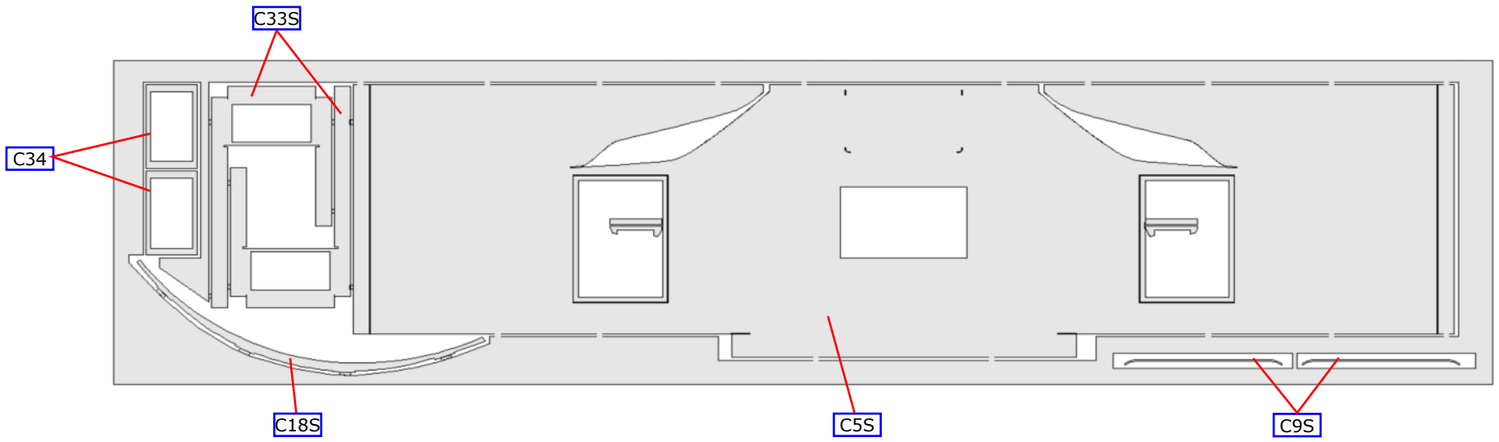
BULLEID LIGHT PACIFIC ETCH - SHEET 5 & 6



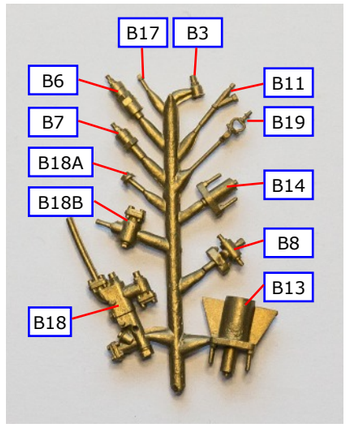


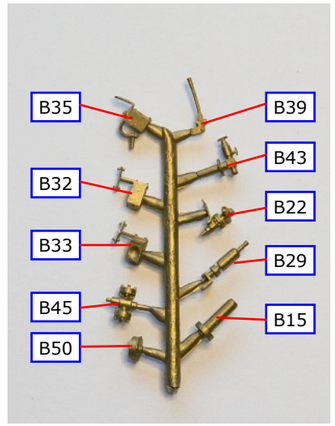
BULLEID LIGHT PACIFIC ETCH - SHEET 7 & SUPPLEMENTARY SHEET

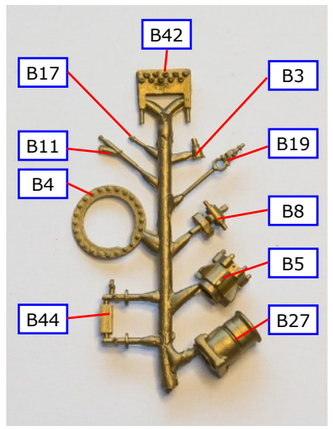


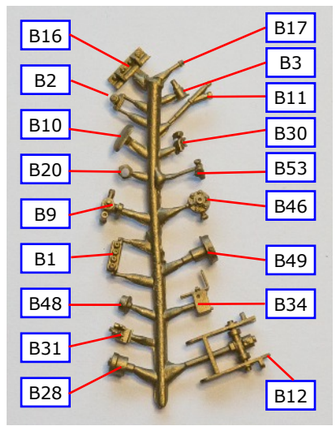


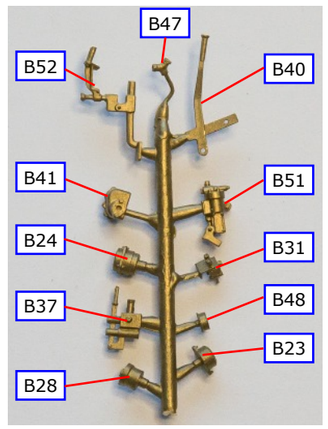
CASTINGS

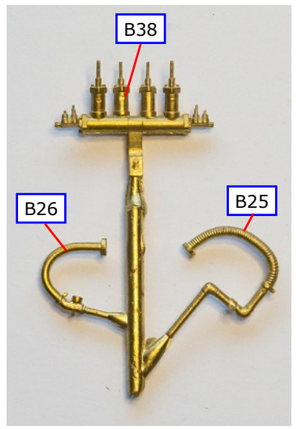


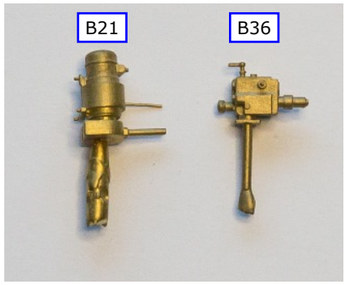












BRASS CASTINGS

B1	Slidebar 4-way lubricator (2)
B2	Crosshead lubricator (2)
B3	Small pot lubricator (6)
B4	Cylinder rear bolt ring (2)
B5	Cylinder stuffing box (2
B6	Cylinder relief valve - back (2)
B7	Cylinder relief valve - front (2)
B8	Cylinder drain cock (4)
B9	Valve chest drain cock (2)
B10	Small cover on cylinder side (2)
B11	Steam sander (6)
B12	Brake adjuster (2)
B13	Bogie side control housing (2)
B14	Trailing truck side control housing (2)
B15	Trailing truck rear pin
B16	Firebox support bracket (2)
B17	Washout plug (4)
B18	Injector - (three parts) (2)
B19	Injector - control rod (4)
B20	Injector pipe union (2)
B21	Generator
B22	Generator reducing valve
B23	Speedometer - upper gearbox
B24	Speedometer - lower gearbox
B25	Vacuum pipe
B26	Steam heating pipe
B27	Buffer housing (2)
B28	Safety valve (3)
B29	Whistle
B30	Sliding cover catch (2)
B31	Atomiser (3)
B32	Lamp/lamp bracket - side - upper - left
B33	Lamp/lamp bracket - side - upper - right
B34	Lamp/lamp bracket - side - lower - (2)
B35	Lamp/lamp bracket - centre
B36	Vacuum ejector
B37	Steam brake
B38	Steam manifold
B39	Reverser lever
B40	Regulator handle
B41	Regulator box
B42	Lubricator box (2)
B43	Reverser displacement lubricator
B44	Water gauge (2)
B45	Generator valve
B46	7/8" steam valve (2)
B47	Steam sanding valve union
B48	Cab gauge - small (3)
B49	Cab gauge - large (2)
B50	Cab gauge - duplex
B51	Ajax firebox doors steam cylinder
B52	Ajax firebox doors treadle
B53	Cab watering cock/Tender coal spray cock (2)

WHITEMETAL CASTINGS

W1	Bogie axlebox (4)
W2	Trailing truck axle box (2)
W3	Trailing truck support pads (2)
W4	Cylinder cover - front (2)
W5	Valve chest (4)
W6	Smokebox door
W7	Cab light roof vent (2) (Now Brass)
W8	Backplate
W9	Ajax firebox doors
W10	Driver's seat cushion
W11	Driver's foot rest

NICKEL SILVER CASTINGS

N1	Slidebar - upper (2)
N2	Slidebars - lower (2)
N3	Crosshead/piston rod (2)
N4	Small end pin (2)
N5	Crankpin nut - small (4)
N6	Crankpin nut - large (2)
N7	Coupling rod knuckle joint pin (2)
N8	Smokebox door handles