

Fig 1. 1854 Class GA. Underhung springs, plain coupling rods, flush riveted pannier tanks, open cab, early plain front with ringed door.

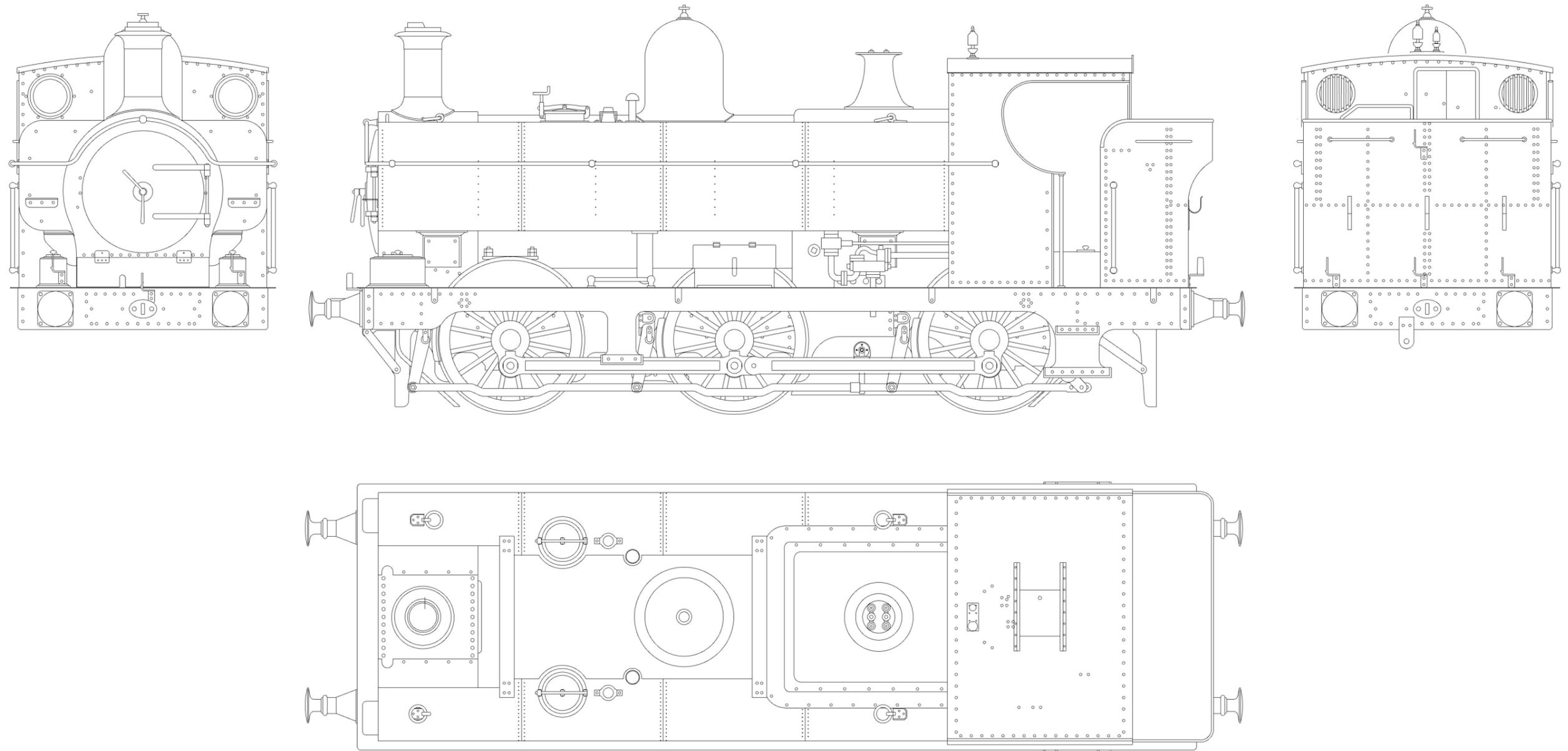


Fig 2. 2721 Class GA Volute springs, fluted coupling rods, riveted pannier tanks, closed cab and extended bunker, Churchward smoke box front and door.

FRAME CONSTRUCTION

COUPLING RODS.

The coupling rods are now made so that they can be used as a jig to align the leading coupled axle hornblocks accurately. Choose between plain (M1 - M4) or fluted (M5 - M8) coupling rods.

First drill out all the crankpin holes to a convenient size which is undersize for the crankpins. Remove all burrs caused by the drilling. Now drill the same drill into a suitable small block of wood and leave the drill in the wood with its shank projecting. This projecting shank is used as a mandrel to accurately align the two laminations of each rod.

Tin well the front face of all the inner laminates and the back face of the outer laminates and place them over the mandrel. Using plenty of solder and flux, solder the two laminates together. You should now have a rod with the bosses on each lamination perfectly aligned. The rods have been deliberately etched too large so that the thin etched edges can be carefully filed so that the 'laminated' effect is lost and the rods appear to be made from one piece of metal.

FRAMES

Having decided which chassis you want you can now start construction by preparing the inside frames (F1 & F2). First open up the following holes in the frames:

- P only if plunger pickups are being used
- B for brake hanger pivots - 0.8 mm
- R for reversing lever cross shaft - 1.6 mm
- A for compensation beam pivot - 1/8"
- C for brake shaft - 1.6 mm

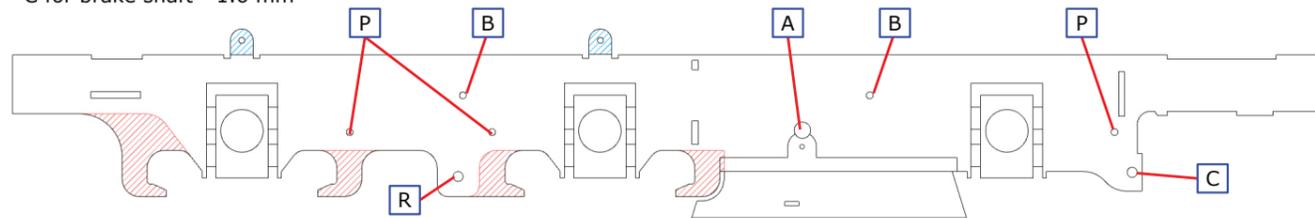


Fig 3. Frame Preparation

1854. Remove the volute spring brackets from above the front and centre axles. (Shaded blue)

2721. Remove the spring hangers below the front and centre axles and the section of frame ahead of the front axle marked with a half etched line. (Shaded orange) Open out the holes in the brackets above the front and centre axles to accept the volute spring nest (WM1), then fold over the bracket and strengthen with a fillet of solder.

Emboss the rivets on the ash-pan sides and then deepen the half etched fold line for the ash-pan and then bend to match the firebox spacer.

FRAME SPACERS AND ASSEMBLING THE CHASSIS

If you are fitting inside motion then modify the front frame spacer (F5) as shown in the diagram and tap the inside motion fixing hole 6BA.

Fold up the front and rear spacers (F5 & F3) making sure the half etched fold lines are on the inside and that each bend is a right angle. Check that all tabs on the spacers fit properly in their corresponding chassis slots so that the rest of the spacer is hard up against the inside of the frames. Fold up the small tabs on the front spacer and solder the 1.6 mm steel wire front compensation beam in place.

Now assemble the frames and spacers. Start by tack soldering the rear spacer to both sides. Check that everything is square and that the spacers are hard against the frames. Put an axle (or better a longer piece of 3/16" rod) through the rear bearings and place the chassis on a piece of graph paper to check that the axle is square to the frames. If all is well solder the remaining spacers to the frames. It is important to check constantly that the chassis is square and the frames are straight.

Build and solder in place the hornblocks as detailed in the instructions included in the hornblock kit.

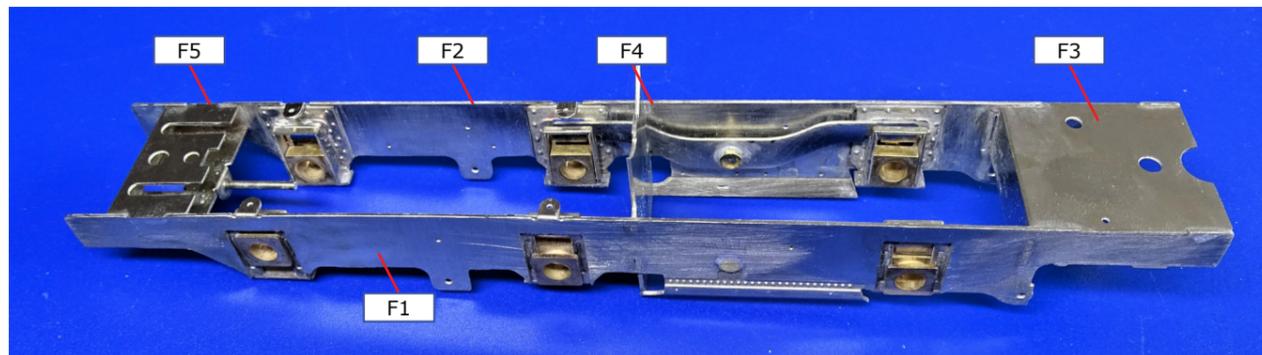


Fig 4. Chassis Assembly 1

No.	Description	Sheet	No.	Description	Sheet
M1	Plain coupling rod front inner lamination (2)	A1	F1	Left main frame	A1
M2	Plain coupling rod front outer lamination (2)	A1	F2	Right main frame	A1
M3	Plain coupling rod rear inner lamination (2)	A1	F3	Rear frame spacer, 3 widths	A1
M4	Plain coupling rod rear outer lamination (2)	A1	F4	Firebox spacer, 3 widths	A1
M5	Fluted coupling rod front inner lamination (2)	A1	F5	Front frame spacer, 3 widths	A1
M6	Fluted coupling rod front outer lamination (2)	A1	F6	Compensation beams (2)	A1
M7	Fluted coupling rod rear inner lamination (2)	A1	F7	Hornblock ties (6)	A1
M8	Fluted coupling rod rear outer lamination (2)	A1			

FITTING THE COMPENSATION BEAMS

The compensation beams (F6) need to be modified. Tack the two beams together; the drawing, Fig 4 can be used as a template by gluing the drawing to one of the beams. Remove the material marked in blue. Separate the beams.

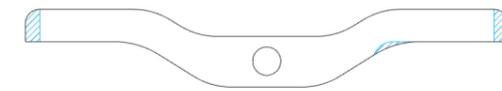


Fig 5. Compensation Beam Modification

Cut a piece of 1/8" brass rod so that it fits through the holes A and is flush with the outside face of the chassis frames. Prepare two pieces of 5/32" brass tube. Each should have a length of 3 mm. Open up the hole to accept the brass tube in each of the compensation beams and solder the beams to the pieces of tube close to one end of the tube, leaving about the thickness of the etch sticking out. Place the beams in position and thread the 1/8" rod through the frames and the beams. Solder the rod securely to the frames.

Temporarily fit all the wheels and axles and confirm that the compensation works properly and check that the chassis is sitting level. The pivot can now be cut away between the beams to leave space for the motor and gearbox; the beams are retained by the slots in the hornguides.

The Hornblock ties (F7) can be fitted now to retain the axle boxes or they can be fitted after the cosmetic frames are attached.

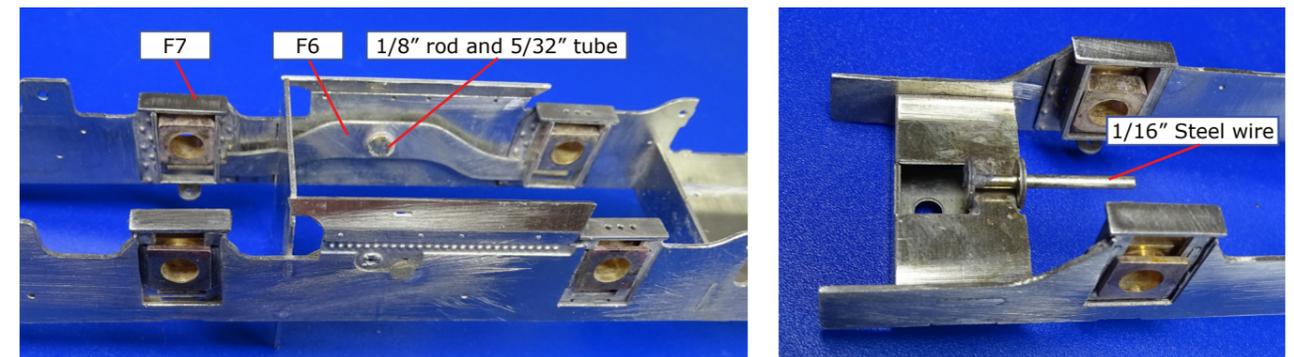


Fig 6. Chassis Assembly 2

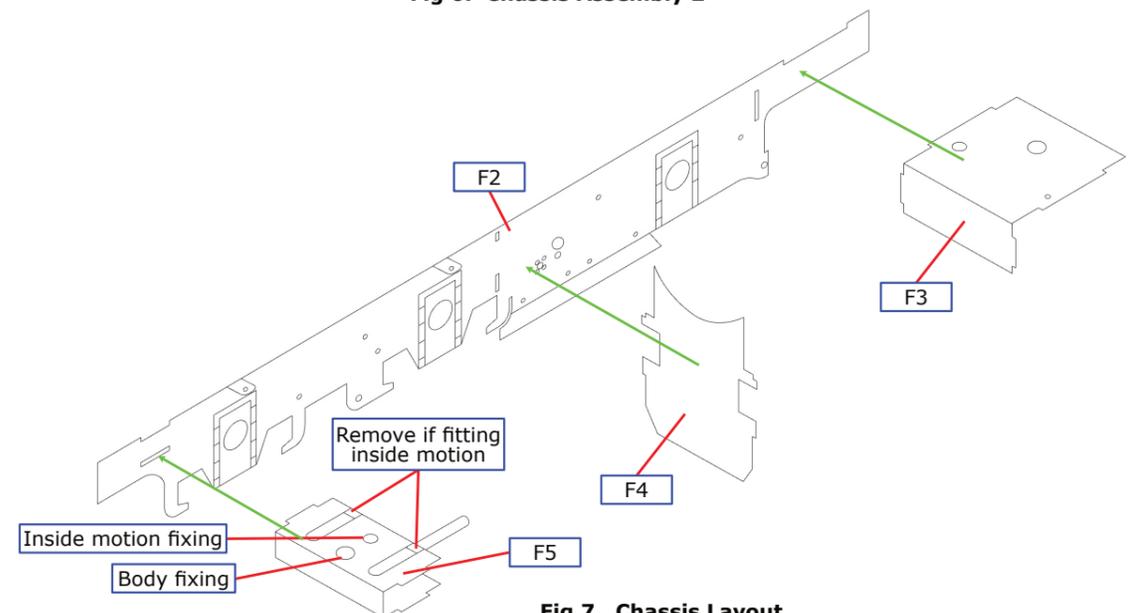


Fig 7. Chassis Layout

FINISHING THE CHASSIS

FRAME OVERLAYS.

Emboss all the rivets in the frame overlays (F8 & F9). Fold down the sand pipe mounting brackets and strengthen with a fillet of solder. For the **2721** class reprofile the overlays to match the frames by removing the rear spring mounting; this is shown removed in Fig 8.

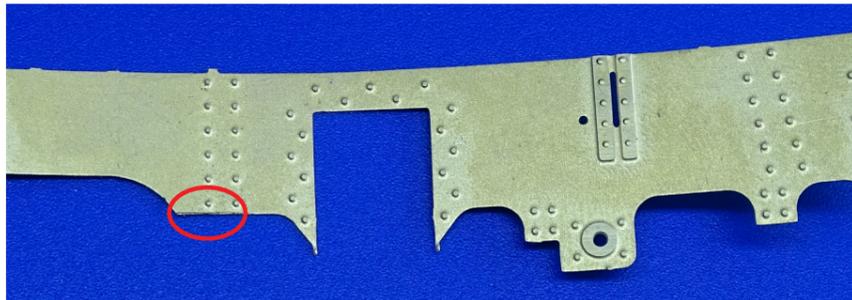


Fig 8. Overlay Modification

Fold the brake hanger pivot brackets, front and centre & rear (F10 & F11). The brake hanger pivots can either be soldered to the frame overlays now or they can be soldered to the frames after the overlays have been attached to the frames. Solder temporary lengths of 0.8 mm wire through the brake hanger pivots to accurately locate the overlays; the overlays only need tack soldering around their edges.

For the **2721** class complete the reprofiling of the overlays to match the frames. Fit the guard iron struts (F12 & F13) using 0.8 mm wire as pins. Fit the mudhole door clamps (BR38) on the ash-pan sides and make the drain pipe from the right side ashpan as shown in the GAs.

If you are fitting working inside motion then build it next following the separate instructions.

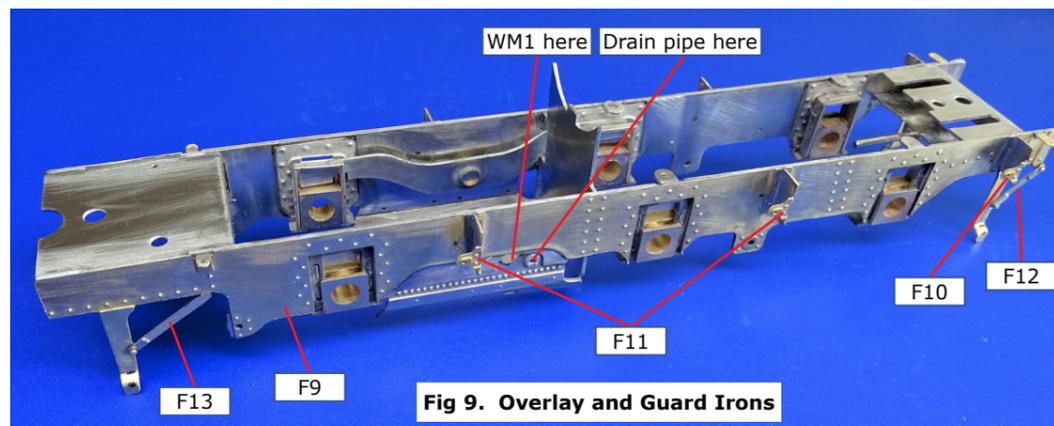


Fig 9. Overlay and Guard Irons

FINISHING THE CHASSIS

Assemble the wheel sets, bearings and rods selecting 3/16" axle washers of appropriate thickness to control sideplay. A thorough check of all clearances at this stage is important.

1854 Class. Laminate the springs (F14 & F15) and solder in place for the front and centre axles.

2721 Class. Solder the hornblock ties (F15) in place for the front and centre axles. The rear axle on both classes is retained by the hornblock tie with three holes.

Brakes. Assemble the brake hangers (F16) first embossing the rivet on each lamination. Solder the laminations using two 0.8 mm drills in a piece of wood or Tufnell as a jig. The front of each hanger is detailed with the brake hanger overlay (F17), as shown in the photograph below, the small hole in the back of the overlay fits on the previously embossed rivet.



Fig 10. Brake Hangers

No.	Description	Sheet	No.	Description	Sheet
F7	Hornblock ties (6)	A1	F19	Brake pull rod safety bracket (2)	B2
F8	Left frame overlay	B1	F20	Steam brake cylinder to cross-shaft lever (2)	A1
F9	Right Frame overlay	B1	F21	Handbrake to cross-shaft lever (2)	A1
F10	Front brake hanger pivot bracket (2)	B1	F22	Cross-shaft to pull rod lever (4)	A1
F11	Centre and rear brake hanger pivot brackets (4)	B1	F23	Early leading and rear axle balance weight (4)	B1
F12	Front guard iron strut	A1	F24	Early centre axle balance weight (2)	B1
F13	Rear guard iron strut	A1	F25	Late leading and rear axle balance weight (4)	B1
F14	1854 spring middle lamination (4)	A1	F26	Late centre axle balance weight (2)	B3
F15	1854 spring outer lamination (8)	A1	F27	Mud hole door clamp (2)	B2
F16	Brake hanger & shoe lamination (12)	A1	F28	3/16" washer	A1
F17	Brake hanger overlay (6)	B2		6BA Washer	
F18	Brake pull rod (2)	B2		3/16" Washer	

Fix the brake hangers in place using 0.8 mm wire for the hanger pivots and for the cross shafts.

Fit the steam brake cylinder (WM1). Fit the pull rods (F18) on the ends of the cross shafts and complete the brake gear by fitting the rear cross shaft from 1.6 mm wire, the steam brake cylinder lever (F20), the handbrake lever (F21) and the cross-shaft to pull rod levers (F22) as shown in the photograph.

Complete the chassis detailing by fitting sand pipes from 0.8 mm wire. Fit the brake pull rod safety brackets (F19), which pass under the pull rods. **2721** - Fit the volute spring castings (WM2) to the brackets on the leading and centre axles.

Attach the balance weights to the wheels (Early F23 & F24, Late F25 & F26) using photographs as a guide to the appropriate weight and its position.

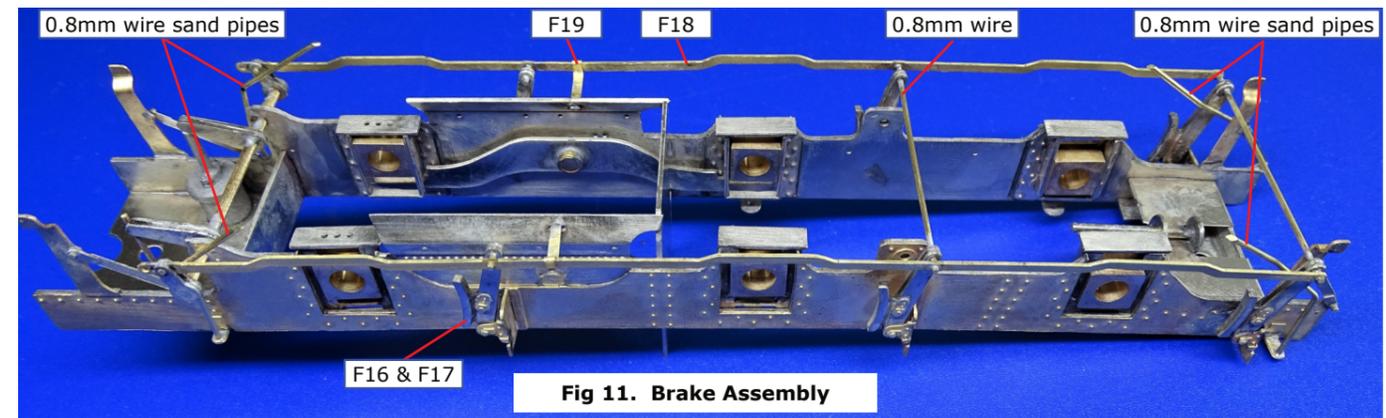


Fig 11. Brake Assembly

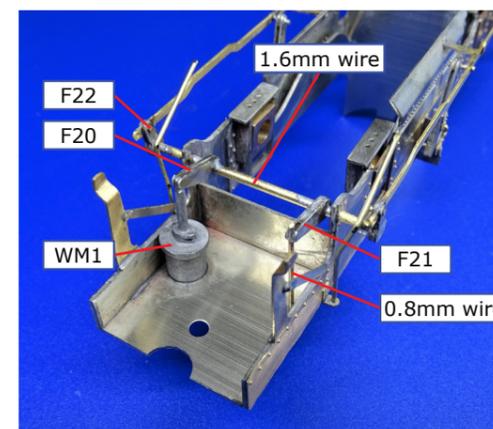


Fig 12. Brake Shaft

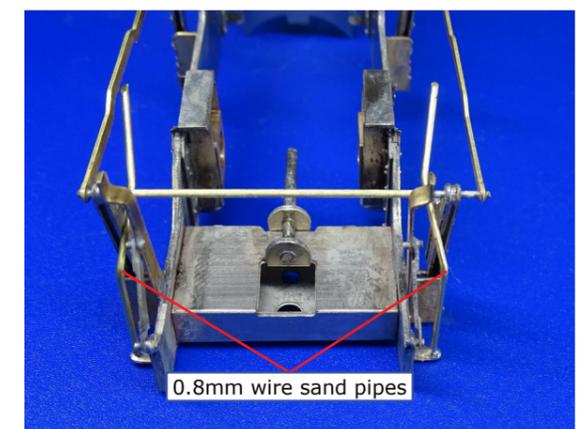


Fig 13. Front Sand Pipes

FOOTPLATE

Prepare the footplate (U1) by embossing the rivets on the smokebox saddle sides. Remove the reversing arm as it fouls the balance pipes; store in a safe place. Fold the edges at right angles and fold up the smokebox saddle sides, the splasher fronts, the cab floor supports, the reversing lever bracket and the lamp brackets. Solder the body fixing plate (U2) in position locating it in the half etched slots in the smokebox saddle sides and solder the body fixing nut in place. Prepare the footplate overlay (U3) by embossing the rivets under the lamp brackets.

Place the overlay in place and temporarily join to the footplate with a screw through the body fixing holes at the rear. Now solder together all round, fix the rear body fixing nut in place and open out all the footplate holes to suit each part.

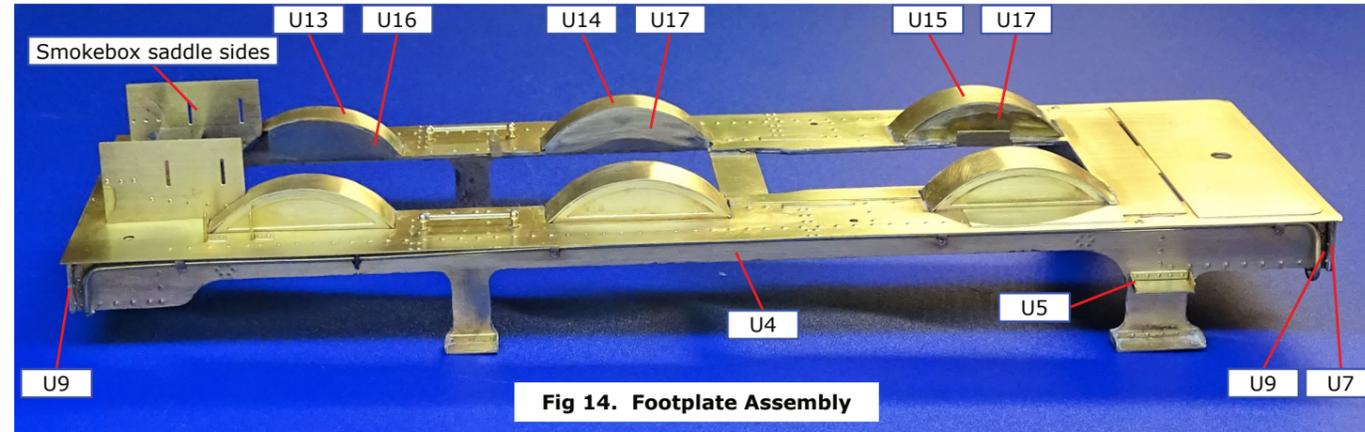


Fig 14. Footplate Assembly

Emboss the rivets on the valence overlays (U4) behind the steps, behind the buffer beam brackets and for each pipe clip, then fold down the pipe clips and fold up the steps before soldering the overlays in place. Attach the upper rear step tread (U5).

Emboss the rivets on the buffer beams (U6 & U7). If fitting steam pipes drill out the hole in the front beam and on the rear beam do the same or attach the steam pipe overlay (U8). Photographs suggest the position of the steam pipe on the rear beam varied. Solder the buffer beams in place and add the valence to buffer beam brackets (U9) and the coupling hook pockets (U10).

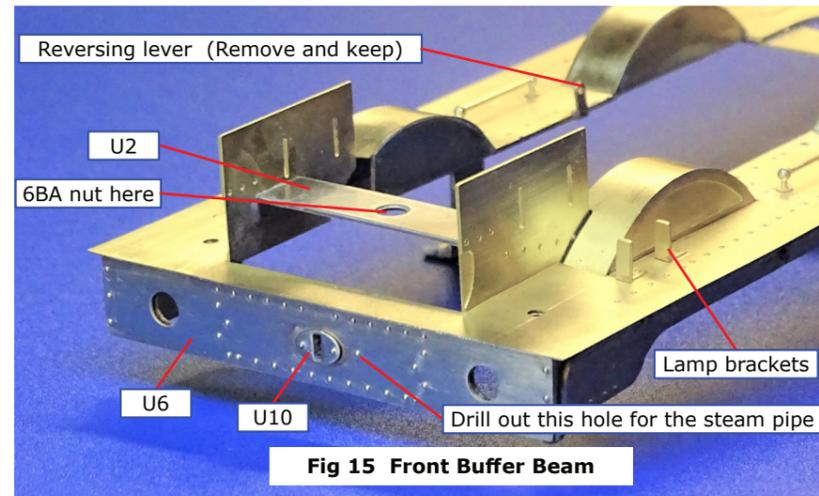


Fig 15 Front Buffer Beam

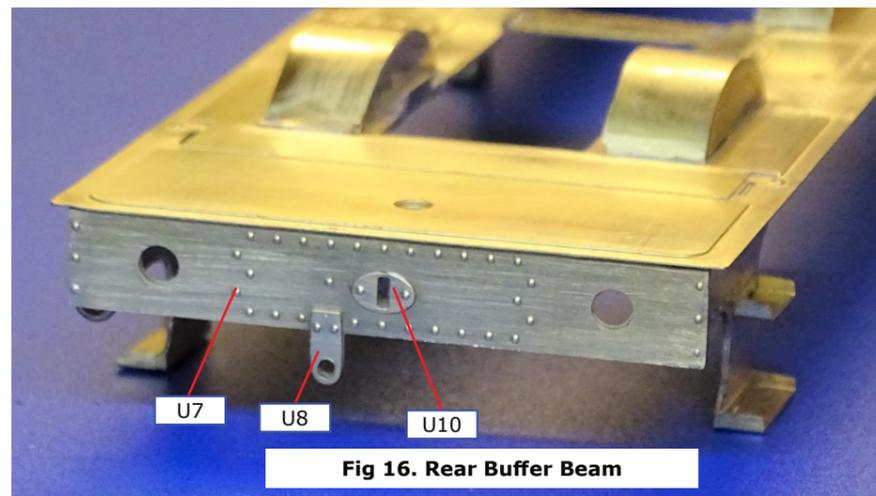


Fig 16. Rear Buffer Beam

No.	Description	Sheet	No.	Description	Sheet
U1	Footplate	B1	U10	Coupling hook pocket	B1
U2	Body front fixing nut plate	A1	U11	Circular pipe union (8)	B1
U3	Footplate overlay	B2	U12	Oval pipe union (4)	B2
U4	Valence overlay (2)	B1	U13	Front splasher top (2)1	B1
U5	Upper rear step tread (2)	B2	U14	Middle splasher top (2)	B1
U6	Front buffer beam	B2	U15	Rear splasher top (2)	B1
U7	Rear buffer beam	B2	U16	Front splasher back (2)	B3
U8	Rear buffer beam steam pipe overlay	B2	U17	Middle and rear splasher back (2)	B1
U9	Valence to buffer beam bracket (4)	B3			

By referring to photographs bend the valence mounted vacuum pipe to shape using 1.2 mm wire and attach it by bending the clips through the small slots and soldering inside. Use the circular or oval pipe unions (U11 and/or U12) to represent the flanges of the pipe joints. If you have fitted steam pipes a similar pipe should be fitted on the right side.

Note: The rear splasher tops and the footplate are too wide to fit together. Either reduce the rear splashers in width or reduce the width of the footplate. The overlap requires 1.5 mm the be removed from either each splasher top or from each side of the footplate where it fits between the splashers. This option will require the holes in the footplate drilling.

Curve the splasher tops (U13, U14 & U15) to shape by rolling underneath a suitable rod or dowel on a resilient surface (a piece of rubber sheet). Solder the centre and rear splasher tops in place. Solder the centre and rear splasher tops in place followed by the splasher backs (U17).

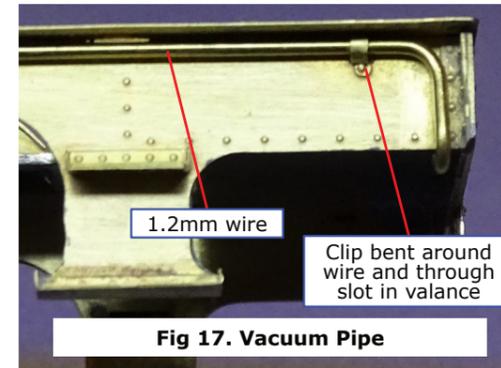


Fig 17. Vacuum Pipe

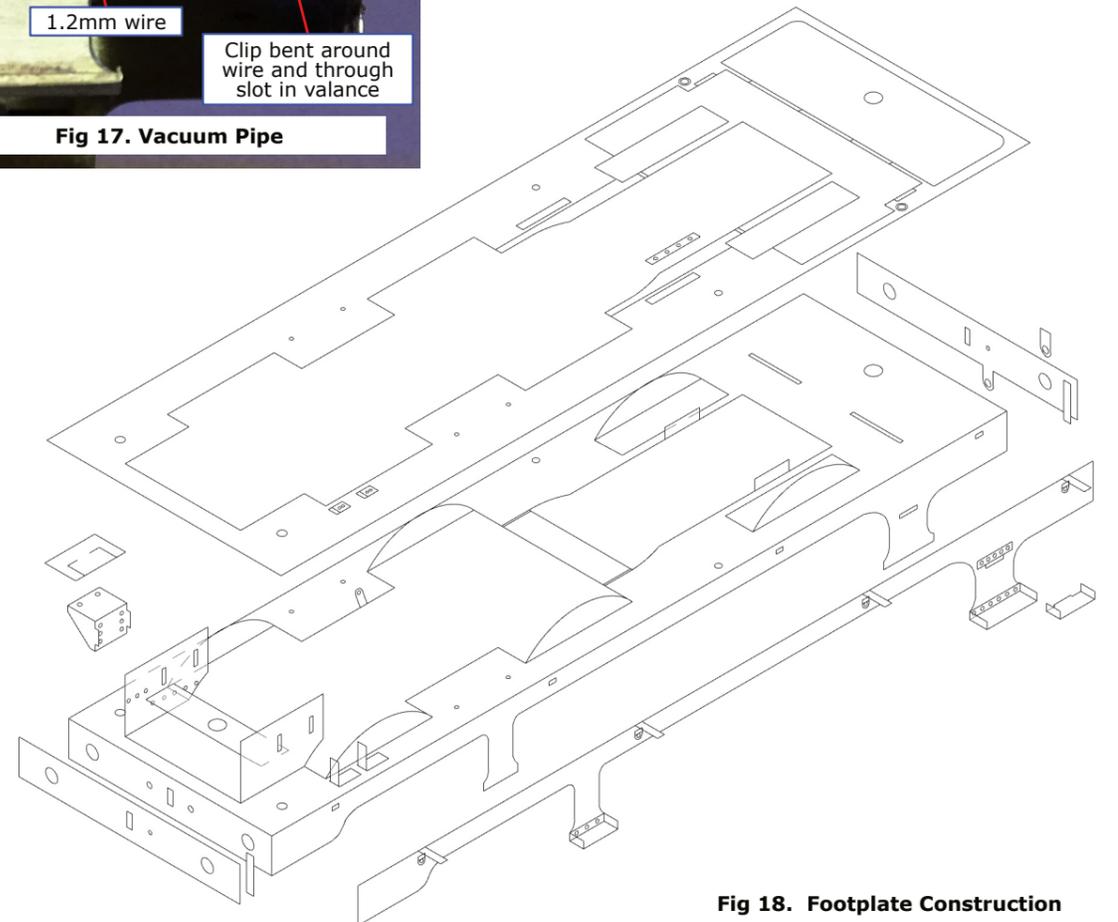


Fig 18. Footplate Construction

SMOKEBOX, FIREBOX AND PANNIER TANKS 1

Round off the rear edge of the smokebox and boiler ring (SB2). If you have fitted inside motion remove the section under the half etched line on the lower edge of the smokebox rear former so that it will fit over the cylinder front. Laminate the three layers of the rear of the smokebox together aligning them with wire through the matching holes. The order, from the front is the smokebox rear former (SB1) then the smokebox and boiler ring (SB2) and the boiler front former (SB3).

Solder the smokebox and tank front former (SB4) and the built up rear former in place against the smokebox sides on the footplate; position the rear former so that the top of the smokebox is level.

Fit the front splashers tops (U13) and backs (U16). Emboss the rivets on the tank support brackets (SB5), fold up and solder two in place on the smoke box sides. Roll the smokebox top (SB6) and solder in place.

No.	Description
SB1	Smokebox rear former
SB2	Smokebox and boiler ring
SB3	Boiler front former
SB4	Smokebox and tank front former
SB5	Tank support brackets
SB6	Smokebox top
SB7	Tank rear former

Sheet No.	Description
B2	C4 Cab front
A1	SB8 Firebox side bracket (2)
B2	SB9 2271 Class right rear tank support
B3	SB10 1854 Reversing rod
B1 & 2	SB11 2271 Reversing rod
B3	SB12 Pannier tank skins

Sheet
B1
A1
B3
B2
B2
B3

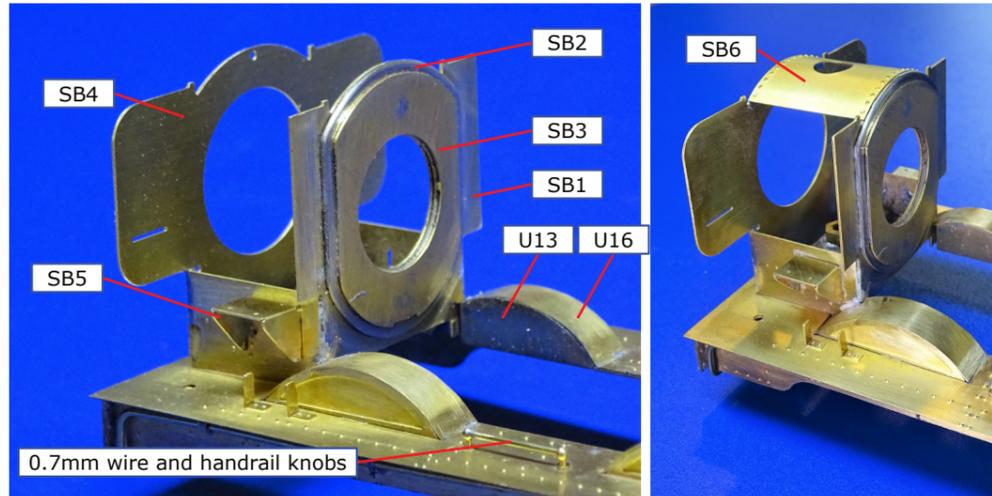
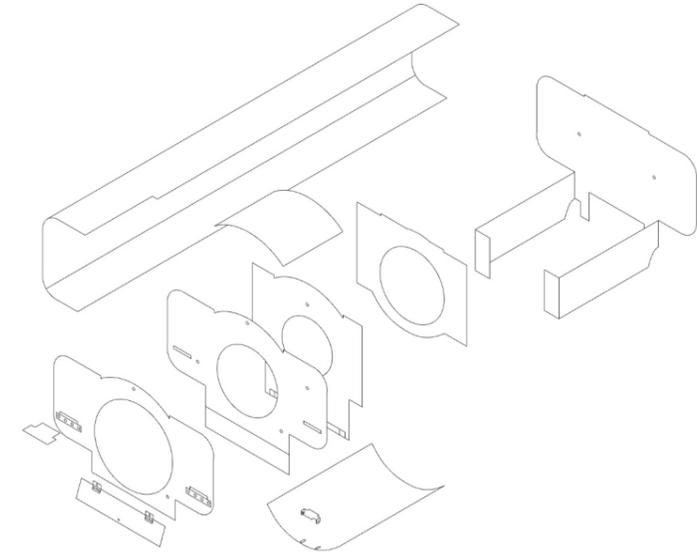


Fig 19. Smokebox Construction

Fig 20. Smokebox Top



Fold up the tank rear former (SB7). Pin the cab front (C4) and tank rear former together with 0.7mm wire pins. Drill a hole through both parts to bolt them together with a 8BA bolt. Check that the cab front and tank rear former fit in the same slot in the footplate and that the cab front sits in front of the step on the footplate flat on the footplate. Do the same for the firebox sides; filling a taper on the back of the firebox sides helps with the fit. The front of the firebox will need to be relieved to clear the centre splasher. Be very careful to ensure that the cab front sits square across the footplate as this will affect the fit of the pannier tank sides. When the fit is perfect, solder the tank rear former only in place on the footplate from the inside of the firebox. Unbolt the cab front and remove from the footplate.

Solder the firebox side brackets (SB8) in place on the firebox sides. The 2721 class has a different tank support bracket (SB9) at the right rear position; emboss the rivets and fold up. Fit the remaining two tank support brackets to the firebox sides as required.

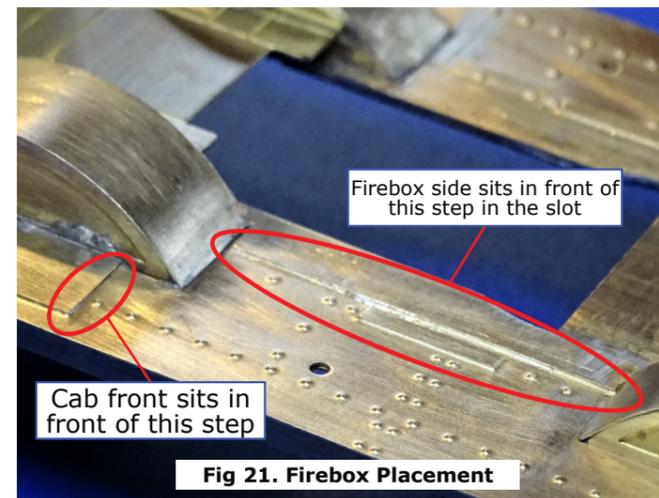


Fig 21. Firebox Placement

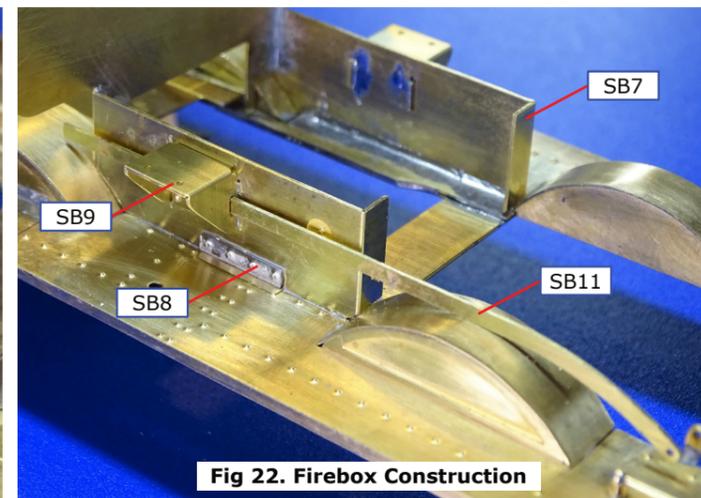


Fig 22. Firebox Construction

Pannier Tank Skins. Prepare the pannier tank skins (SB12) to suit your chosen locomotive.

Flush riveted built up to c1917. No further work required.

Snap head rivets built c1917 to 1924. Emboss with the riveting tool; there is a practice piece on the etch.

Welded seams built 1924 on. The seams of the welded tank are represented by scribing down the half etched grooves (between the rivets); place the tank on a cutting mat or a piece of card.

Engines appear to have been fitted at a later date with stops for the tank fillers. If you are fitting these drill the holes in the tanks. Make the tank forming jig as shown in the diagram. This requires a suitable sized piece of wood into which two pins are inserted so that the 5/16" forming rod is just below the top of the piece of wood. Fold up the brackets at either end of the tank skin and reinforce with solder. Use a piece of card to protect the rivets. Form the lower bend first, the folded part is shorter and hence causes fewer problems when clamping the jig together to make the second fold. Clamp tightly.

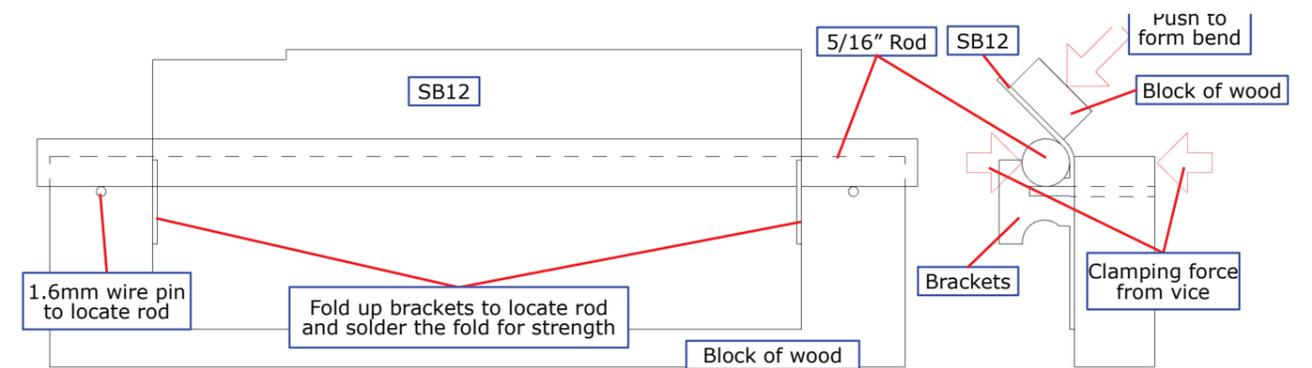


Fig 23. Pannier Bending Jig

SMOKEBOX, BOILER AND PANNIER TANKS 2

Solder the handrail knobs for all the tank hand rails in position and then solder the tanks to the formers. Fit the tank support bracket packing pieces (SB13 or SB14). Now that the footplate assembly is strengthened by the tanks, you can remove the centre section of the footplate under the firebox if clearance is needed for the motor. Cut down the centre of the centre section and then break off along the half etched lines.

Smokebox & Tank Front. Choose from the early plain front with ringed door (SB15), the later similar front with snap head rivets (SB16) or, from c1920, the smokebox with a pressed front with Churchward type door without the ring (SB17). Emboss any rivets and solder in place. Attach the appropriate early or late style tank front steps (SB18 or SB19). Add the cylinder cover flap (SB20).

Roll the boiler front cladding (SB21) to match the curve in the boiler front former (SB22). Fold the boiler band joining brackets by bending near the small hole and fit through the small slots in the cladding. Complete with a short piece of 0.3 mm wire to represent the tightening bolt. Solder the front former in place between the tanks approximately 5 mm in front of the balance pipe holes so that it will be near to the rear of the front cladding. Now solder the front cladding in place to the boiler front former and the front section former. Similarly, form and fit the rear cladding (SB23) using the rear former (SB24) to get the correct radius. Solder the rear former in place towards the rear of the tanks. Solder the rear cladding in place in contact with the rear former and the front cladding. A piece of scrap etch can reinforce the joint between the cladding.

No.	Description	Sheet	No.	Description	Sheet
SB13	Tank packing pieces	A1	SB23	Boiler rear cladding	B3
SB14	Tank packing pieces	B2	SB24	Boiler rear former	B2
SB15	Plain smokebox & tank front with ringed door	B1	SB25	Boiler band joining clips (4)	B2
SB16	Plain smokebox & tank front with snap head rivets	82 B1	SB26	Tank & boiler top overlay	B2
SB17	Pressed smokebox & tank front (Churchward door)	83 B1	SB27	Tank & smokebox cladding	B1
SB18	Early tank front steps	B2	SB28	Tank tie straps (2)	B1
SB19	Later tank front steps	B2	SB29	Water filler stop bracket (2)	B1
SB20	Cylinder cover flap	B2	SB30	Lifting ring eyelet (4)	B1
SB21	Boiler front cladding	B3	SB31	Lifting ring bracket (4)	B1
SB22	Boiler front former	B3	SB32	Smokebox door lamp bracket	B3

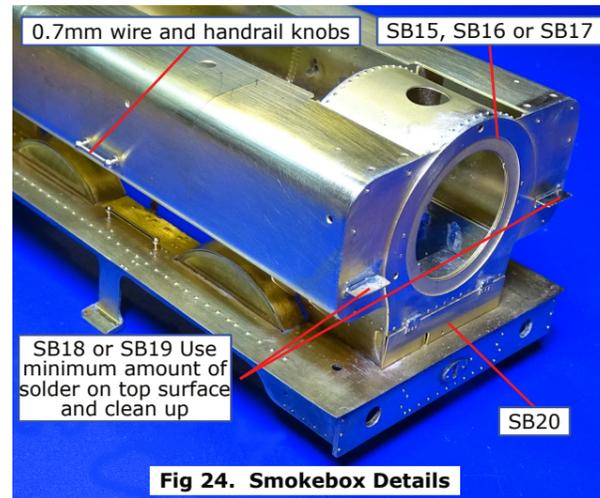


Fig 24. Smokebox Details

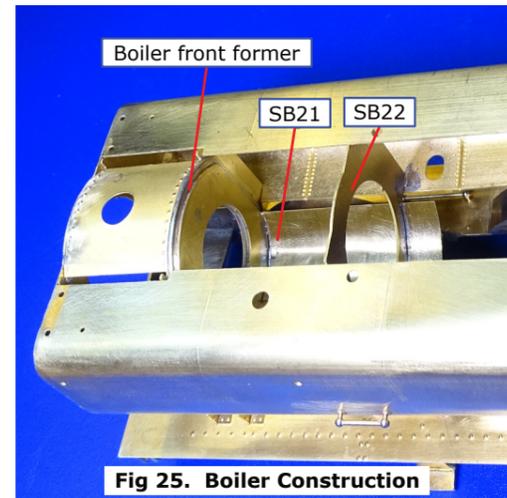


Fig 25. Boiler Construction

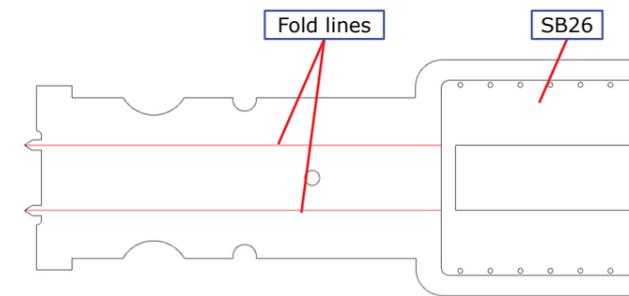


Fig 27. Tank Top Fold Position

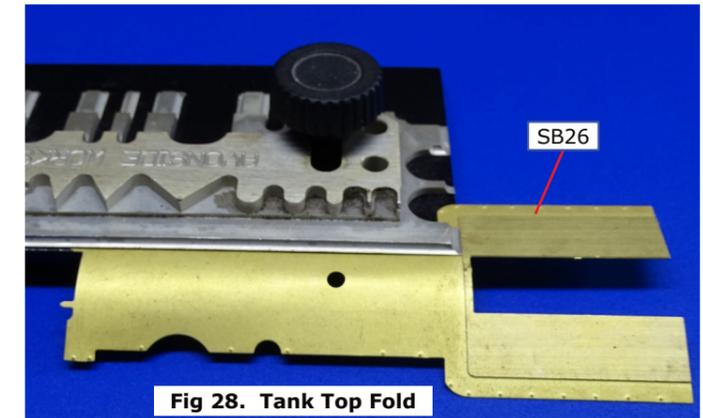


Fig 28. Tank Top Fold

Fit the tank balance pipe (WM3). **1854.** Fit the reversing rod (SB10) in place into the slot in the firebox front (See Fig 22). **2271.** Fit the reversing rod (SB11) by bending to pass in front of the volute springs, through the tank support bracket and into the slot in the cab front (See Fig 22).

Form the tank top overlay (SB26) by scribing fold lines to the underside of the overlay (See Fig 26). Roll the boiler curve around a piece of 30mm rod. Make the bends to create the flats as shown in Fig 27. Remove the two marker points, emboss the rivets around the firebox top and solder the overlay in place. Fit the tank & smokebox cladding (SB27). Emboss the rivets on the tank tie straps (SB28) and then roll the half etched portion to match the boiler cladding and solder in place.

Fit the firebox top (WM4). Fit the safety valve base (WM5) and the safety valves (BR1). The safety valve casing (BR2) can be fitted after painting. Fit the inside of the dome (WM6); fit the dome lubricator (BR4) to the dome (BR3) which can be fitted after painting. Fit the appropriate chimney, tapered or parallel (WM7 or CU1).

Fig. 456 in Great Western Engines Volume 2 is a useful guide to detailing the tank top. If you are fitting the water filler lid stop (BR5) fold up the water filler stop bracket (SB29) and solder the stop and bracket in place. Fit the tank water fillers (BR6). Fit the tank vents (BR7). To make the lifting rings insert the eyelet (SB30) into the appropriate hole and place the bracket (SB31) with the slot around the eyelet and solder in place. Make the lifting rings by wrapping 0.7mm copper wire around a 2.8 mm drill shank.

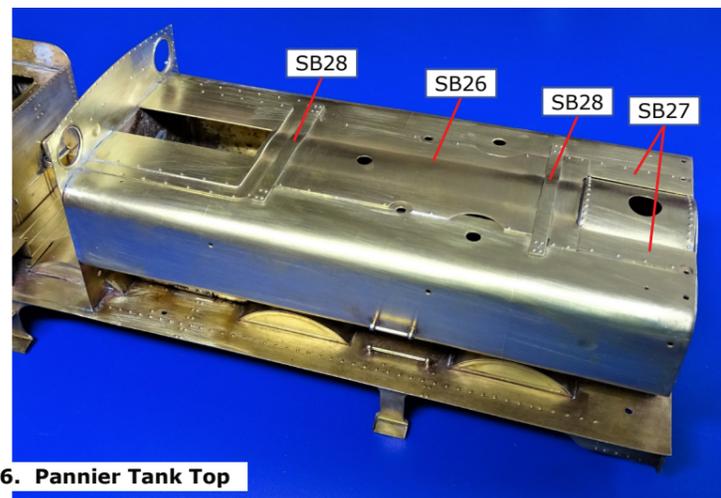


Fig 26. Pannier Tank Top



Fig 29. Pannier Tank Top Details

OPEN CAB AND BUNKER

OPEN CAB BUNKER

Remove the rear 'ears' from the bunker former (C1) and fold to shape, ensuring that the sides are square and true. Solder the former in place on the footplate ensuring that the sides butt up to the ledge etched on the footplate. Emboss the handle on the coal hole door on the bunker front overlay (OC1) and then solder in place.

Form the upper flare in the wrapper (OC2) and then form the corner bends around a 2.4 mm (3/32") drill shank. Solder the wrapper in place aligning it on the handrail holes. Take the bunker upper plate, either with or without coal rails (OC3 or OC4), form the corner bends and solder in place. Complete the flared corners by filling in between the 'fingers' with solder and filing to shape. Add the vertical handrails with knobs and 0.8 mm wire. Add the horizontal handrails from 0.45 mm wire. Assemble the cab seats (C3 & C4) which are designed to be working. Remove the seats from the brackets and solder the brackets to the front of the bunker.

OPEN CAB

Solder the cab inside window frame (C5) in place inside the cab front (C4) and solder the cab front in place on the footplate. Fit the injectors (B8), removing the spigot that goes into the tank to make fitting easier. Refer to photographs of your chosen locomotive to get the routing of the injector drain pies correct; make these from copper wire. Fit the copper pipes, trim the pipes and rods that go into the cab so that they are just long enough to fit into the cab and then manoeuvre the injector assembly into the cab and footplate holes; solder in place

Solder the floor supports (C6) in place and fold up the cab floor (C7). Emboss the rivet at each end of the reversing lever quadrant lamination (C8) and solder them together leaving a slot in the middle. Now solder the assembly in place in the holes in the floor.

1854. Attach the spring castings (WM8) to the floor. Add sandbox lids (BR11).

2721. Cut the spring casting (WM8) in half and attach each upper portion to the cab floor on a pair of wire pins. Attach the lower portion to the hornblock ties under the rear axle. Solder the floor in position on the supports. Add sandbox lids (BR11).

Cut off the rearmost section of the top edge of the cab side (C9), cutting down the centre of the small square of rivets. Attach the cab side cut-out beading (C10) fitting the etched groove over the edge of the cab side. Solder the cab sides in position. Attach the rear handrails from 0.8 mm wire. Bend the tank & cab angle (C11) to follow the shape over the firebox top and fix in place; it has been made over length and will need trimming back level with the cab sides.

No.	Description	Sheet No.	Description	Sheet
C1	Bunker former	B2	OC1	B1
C2	Cab seat bracket (2)	B2	OC2	B3
C3	Cab seat (2)	B2	OC3	B2
C4	Cab front	B1	OC4	B2
C5	Cab inside window frame (2)	B2	OC5	B1
C6	Cab floor supports (2)	B1	OC6	B1
C7	Cab floor	B2	OC7	B2
C8	Reversing lever quadrant	A1	OC8	B1
C9	Cab side (2)	B3	OC9	B2
C10	Cab side cutout beading (2)	B2	OC10	B1
C11	Tank & cab angle	B2	OC11	B2
C12	Fire iron bracket (3)	B3	OC12	B1
			OC13	B3
			OC14	B1

Canvas Roof. Solder the open cab rear roof support (OC5) between the rear edges of the cab sides, ensuring the cab roof line will be horizontal. We recommend fitting the roof after the complete backhead is fitted. Curve the cab roof (OC6) to match the cab structure. Add the side mouldings (OC7), the front and rear mouldings (OC8) and the transverse strip (OC9), if required. As they are very delicate, fit the whistles, large and small (BR9 & BR10) as a last step.

Steel Roof With Side Rain Strips. Solder the open cab rear roof support (OC5) between the rear edges of the cab sides, ensuring the cab roof line will be horizontal. Curve the cab roof (OC10) to match the cab structure and then solder in place. Add the side rain strips (OC11) and the rear angle (OC12).

Fit the hand brake handle (BR12) to the bunker top.

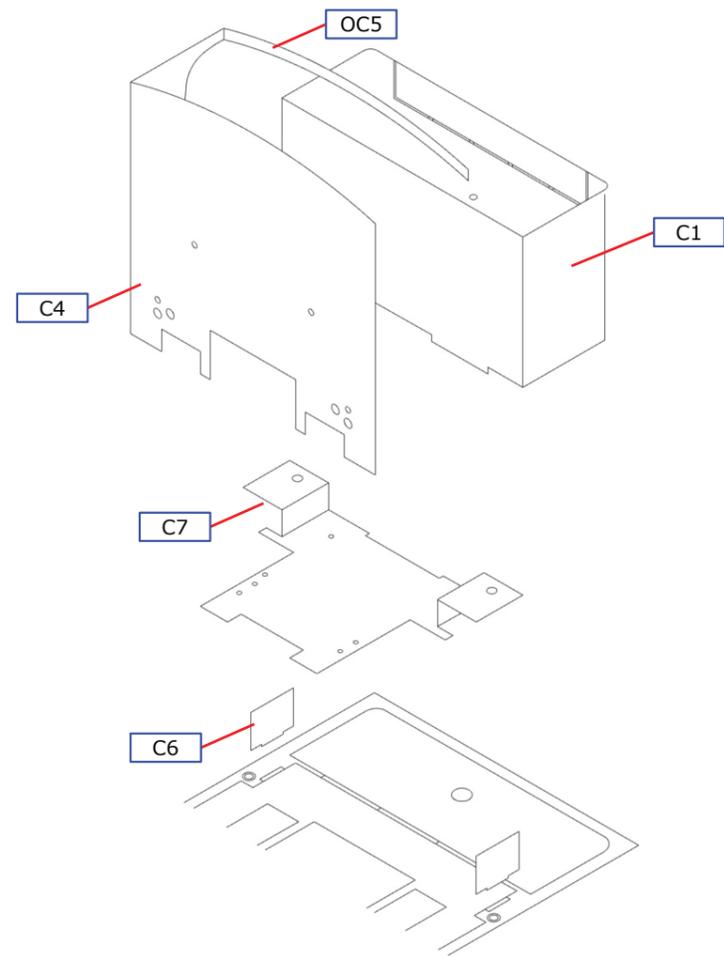


Fig 30. Original Open Cab and Bunker

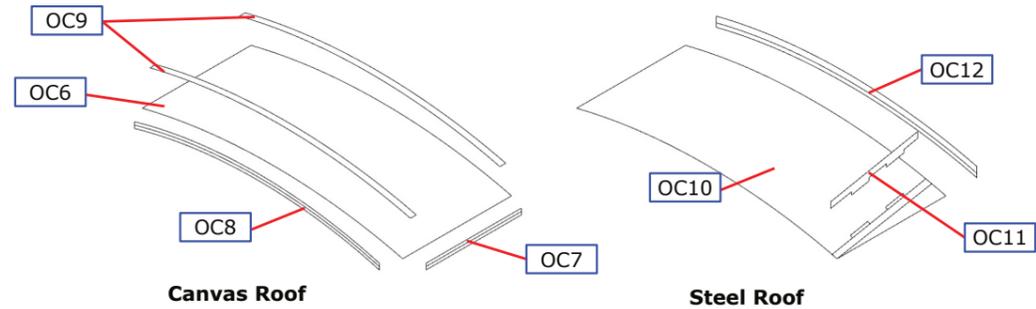


Fig 31. Roof Construction

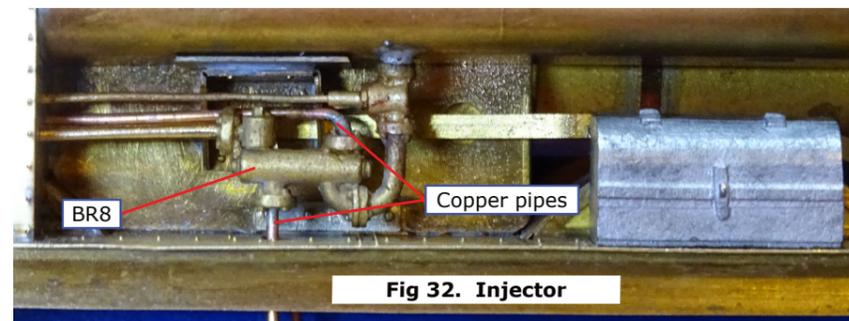


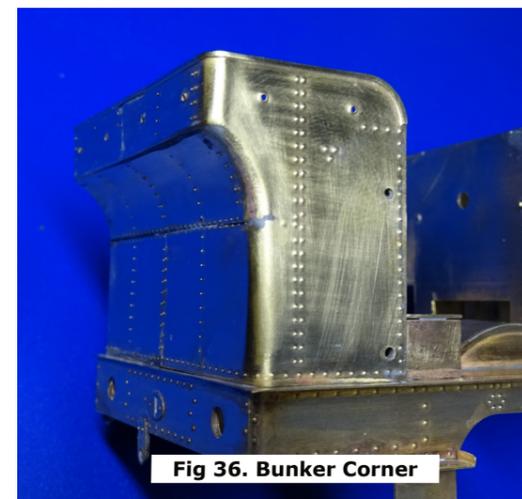
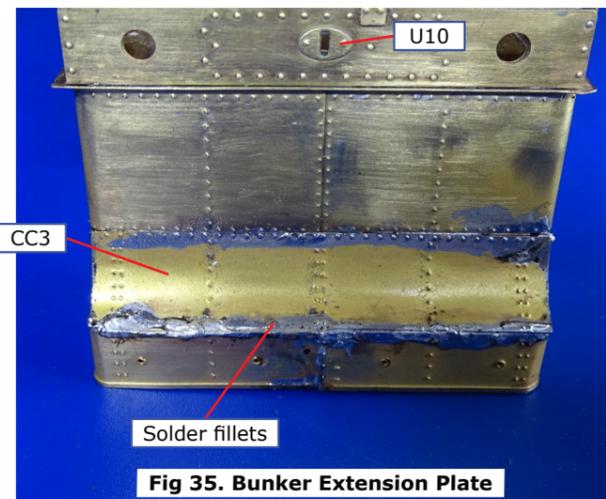
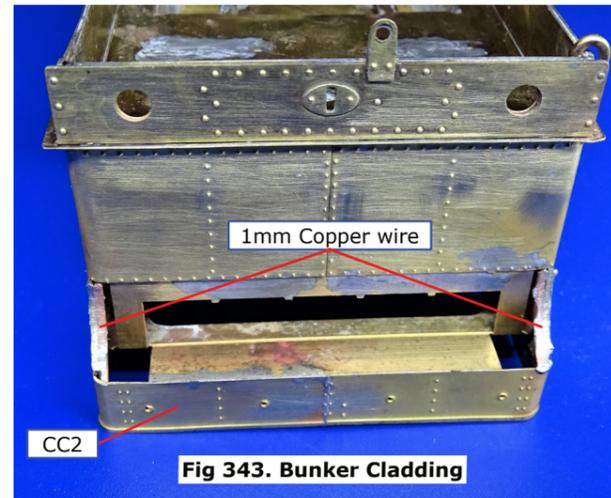
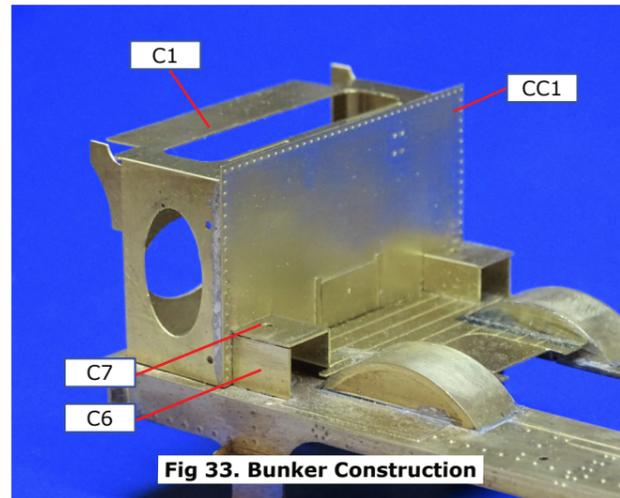
Fig 32. Injector

CLOSED CAB AND BUNKER

LATER BUNKER

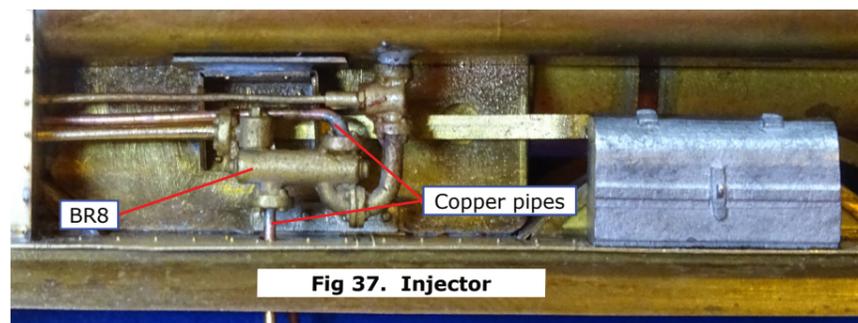
Remove the rear 'ears' from the bunker former (C1) and fold to shape, ensuring that the sides are square and true. Solder the former in place on the footplate ensuring that the sides butt up to the ledge etched on the footplate. Emboss the handle on the coal hole door on the bunker front overlay (CC1). Assemble the cab seats (C3 & C4) which are designed to be working. Remove the seats from the brackets and solder the brackets to the front of the bunker. Solder the overlay in place on the front of the bunker former.

Form the upper flare in the wrapper (CC2) and then form the corner bends around a 2.4 mm (3/32") drill shank. Solder the wrapper in place aligning it on the handrail holes. Curve some 1 mm copper wire to match the curve of the bunker extension and solder in place as shown in the photograph below; this is to provide some meat when filling the side fillets to the bunker extension. Curve the later bunker extension plate (CC3) and solder in place making a generous fillet to the seams. File the fillets to the side and to the bottom corner of the extension. Add the vertical handrails with knobs and 0.8 mm wire. Add the horizontal handrails from 0.45 mm wire.



CLOSED CAB

The cab inside window frames (C5) can be soldered in place now inside the cab front (C4) or can be added after painting with the window glazing. Solder the cab front in place on the footplate. Fit the injectors (BR8), removing the spigot that goes into the tank to make fitting easier. Refer to photographs of your chosen locomotive to get the routing of the injector drain pipes correct; make these from copper wire. Fit the copper pipes, trim the pipes and rods that go into the cab so that they are just long enough to fit into the cab and then manoeuvre the injector assembly into the cab and footplate holes; solder in place.



No.	Description	Sheet	No.	Description	Sheet
C1	Bunker former	B2	CC1	Closed cab bunker front overlay	B1
C2	Cab seat bracket (2)	B2	CC2	Later bunker wrapper halves (2)	B3
C3	Cab seat (2)	B2	CC3	Later bunker extension plate	B1
C4	Cab front	B1	CC4	Cab rear inner overlay	B1
C5	Cab inside window frame (2)	B2	CC5	Cab rear outer overlay	B1
C6	Cab floor supports (2)	B1	CC6	Cab rear window grills (2)	B2
C7	Cab floor	B2	CC7	Cab rear horizontal section	B2
C8	Reversing lever quadrant	A1	CC8	Brake handle cutout wrapper	B1
C9	Cab side (2)	B3	CC9	Closed cab roof	B1
C10	Cab side cutout beading (2)	B2	CC10	Closed cab roof rain strip (2)	B1
C11	Tank & cab angle	B2	CC11	Closed cab roof ventilator	B3
C12	Fire iron bracket (3)	B3	CC12	Later bunker upper lamp bracket	B3

Solder the floor supports (C6) in place and fold up the cab floor (C7). Emboss the rivet at each end of the reversing lever quadrant lamination (C8) and solder them together leaving a slot in the middle. Now solder the assembly in place in the holes in the floor.

1854. Attach the spring casting (WM8) to the floor. Add sandbox lids (BR11).

2721. Cut the spring casting (WM8) in half and attach each upper portion to the cab floor on a pair of wire pins. Attach the lower portion to the hornblock ties under the rear axle. Solder the floor in position on the supports. Add sandbox lids (BR11).

For the closed cab emboss the rivets on the cab rear outer overlay (CC5) then fold out the flap for the top of the cut-out giving clearance to the brake handle and solder together with the cab rear inner overlay (CC5). Solder the rear window grills (CC6) in place. Remove the ends of the cab rear horizontal section (CC7) at the half etch lines and then solder it to the cab rear locating it with the slots in the cab rear inner overlay. Curve the brake handle cut-out wrapper (CC8) and solder in place. Note the top left corner is mitred off and the corner bent to fit to give clearance for the window grill. See Great Western Engines Volume 1, Fig 255. Now solder this assembly in place in the bunker slots. Fit the hand brake handle (BR13) to the bunker top.

Fit the cab sides (C9) and solder in place; fit the rear into the notch in the cab rear. The cab side cutout beading is too long and needs to fit from the vertical cab hand rail. Solder a hand rail in place at the bottom. Bend the beading to shape starting from the handrail and then tack in place with the beading outside the cab rear plate. Mark the length of the beading, remove and progressively cut to length to fit. Now solder the beading in place.

Curve the cab roof (CC9) to match the cab structure. Add the side rain strips (CC10). Solder the roof ventilator (CC11) in place. As they are very delicate, fit the whistles, large and small (BR9 & BR10) as a last step. Fit the roof after the backhead is fitted and the loco is painted.

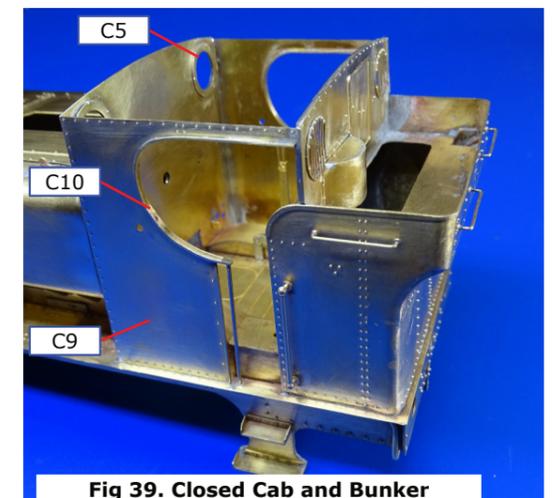
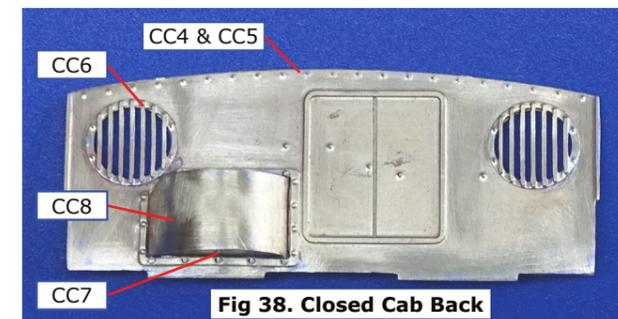


Fig 39. Closed Cab and Bunker

FINISHING DETAILS

Form the main handrail from 0.8mm wire and attach; the medium length knob is used on the smokebox front. Fit the tank handrail. Fit the lamp brackets (U19) to the front of the sand boxes and, if required, fit spare brackets to the footplate (along side either smokebox or firebox). Fit the sandboxes (WM9) to the footplate, these are a tight fit under the tank brackets. Fit the toolboxes (WM10).

No.	Description
U18	Steam heating valve handle (2) 52
U19	Lamp bracket (6) 125

Sheet No.	Description
B1	
B3	

Sheet

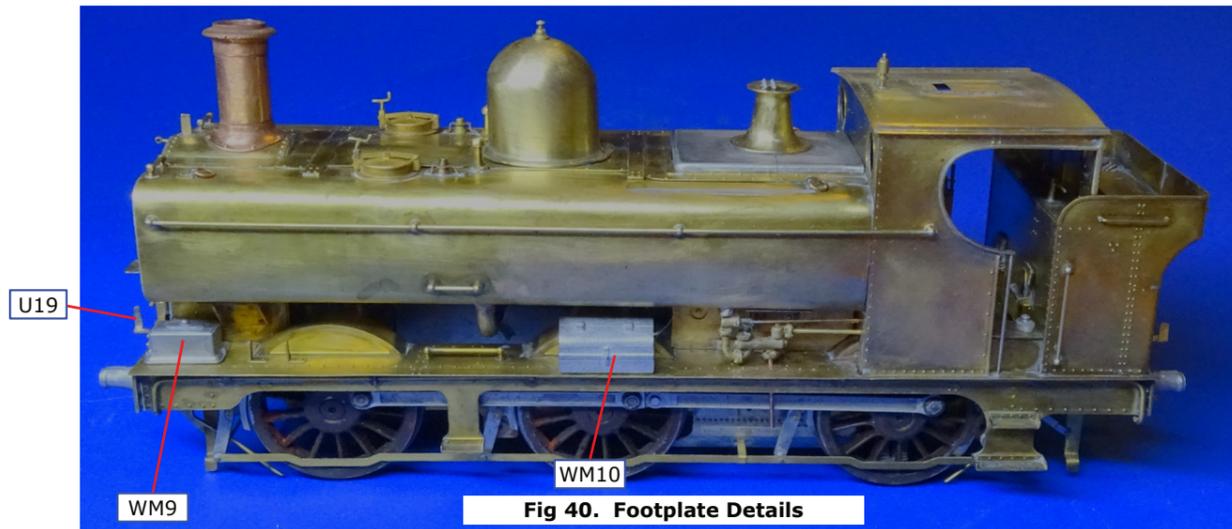
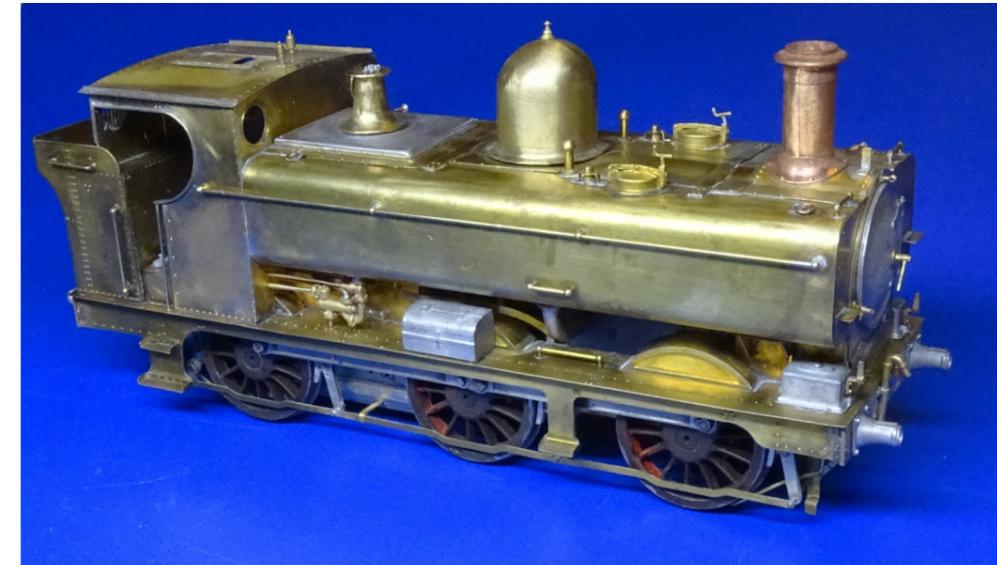
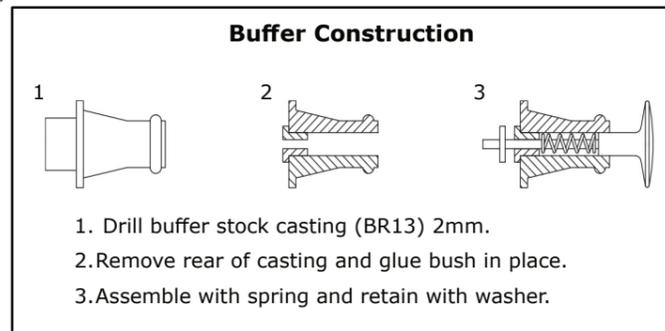


Fig 40. Footplate Details



Build the backhead to match the Fig 43. Use copper wire of a suitable size for the pipes.

Build and fit the buffers (WM11) as shown below.



Fit the appropriate smokebox door, early with ring or Churchward (WM12 or WM13). Fit the Smokebox door handle (BR13) and the steam lance cock (BR14) to the smokebox front.

Front buffer beam. Fit the front vacuum pipe (BR15) and vacuum pipe dummy (BR16). Fit the steam heating valve (BR16) and then fit the valve handle (U18). Fit the steam heating pipe connector (BR17) to one of the copper springs and then fit the spring to the valve.

Rear buffer beam. Fit the rear vacuum pipe (BR18). Fit the steam heating cocks (BR17) and then fit the valve handle (U18). Fit the steam heating pipe connector (BR18) to one of the copper springs and then fit the spring to the valve.

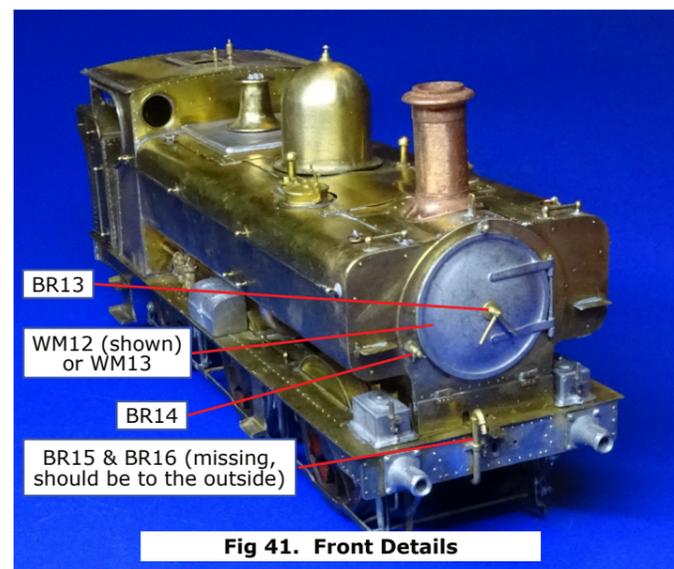


Fig 41. Front Details



Fig 42. Front Details

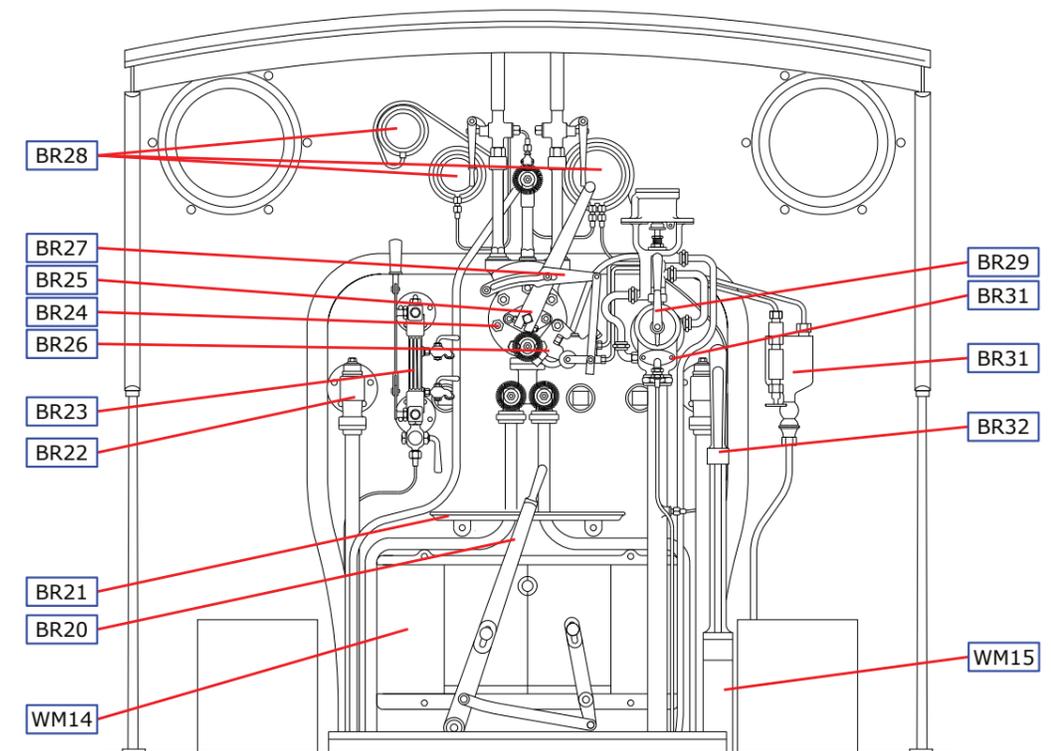
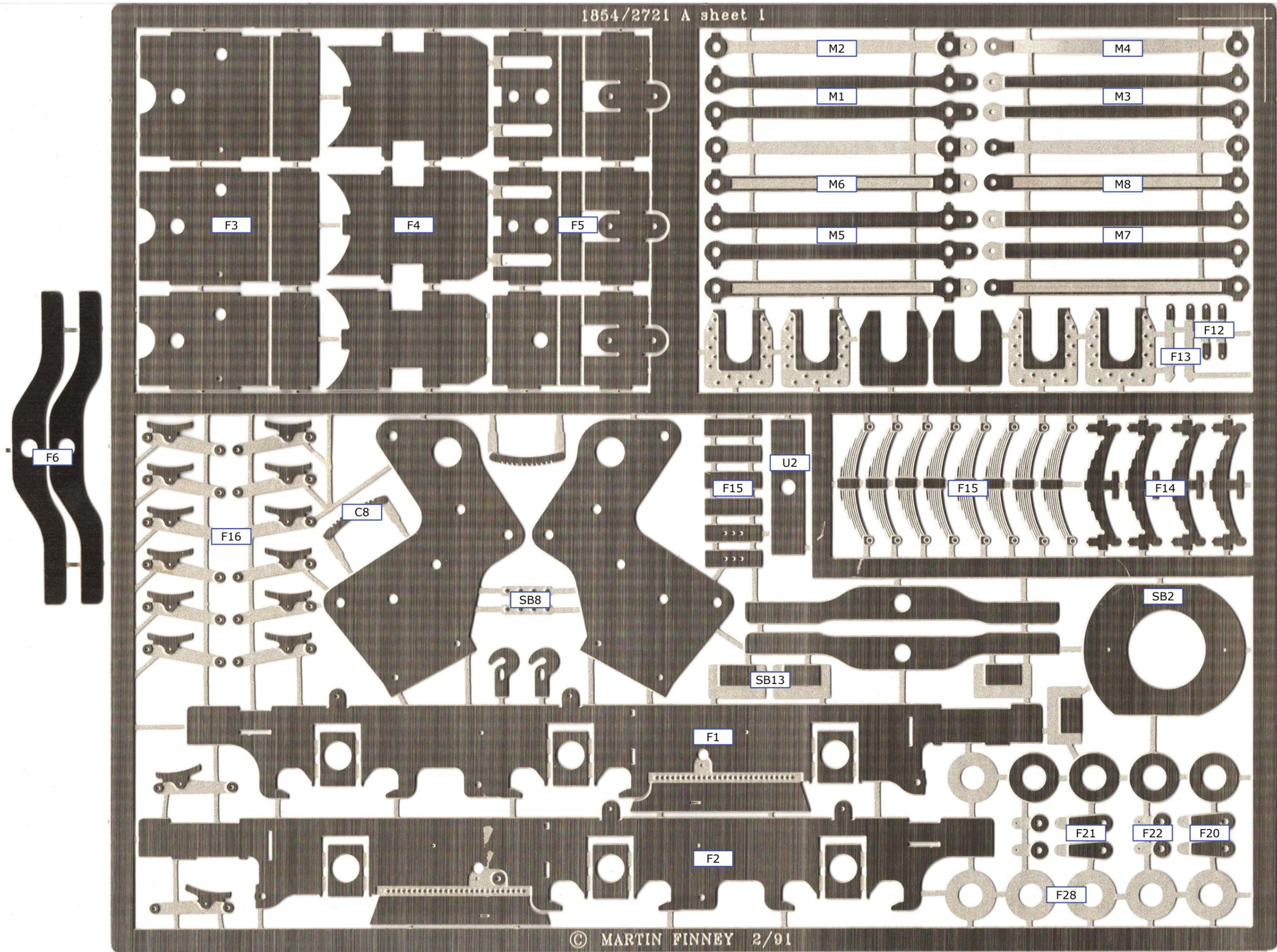


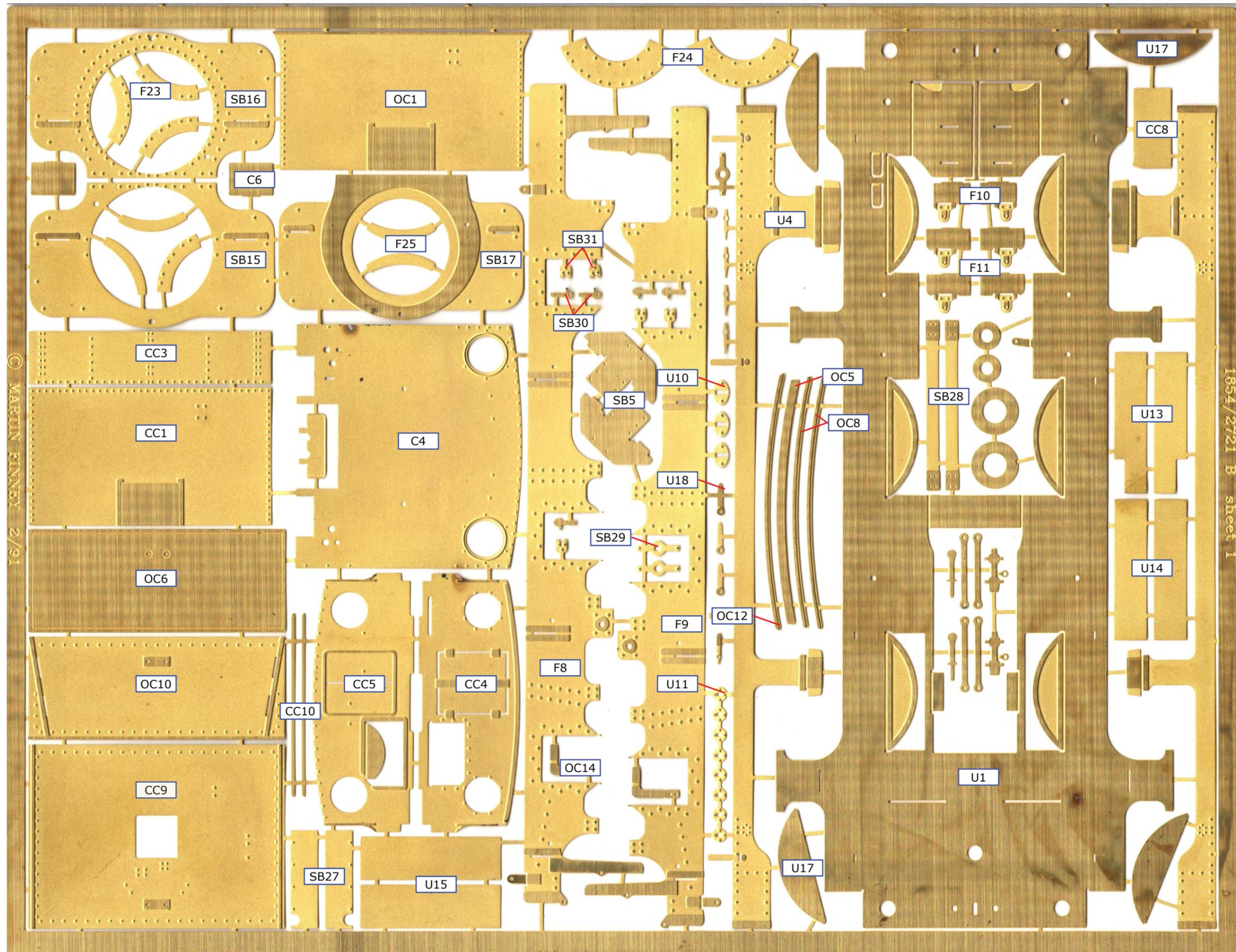
Fig 43. Backhead Arrangement

1854/2721 A SHEET 1

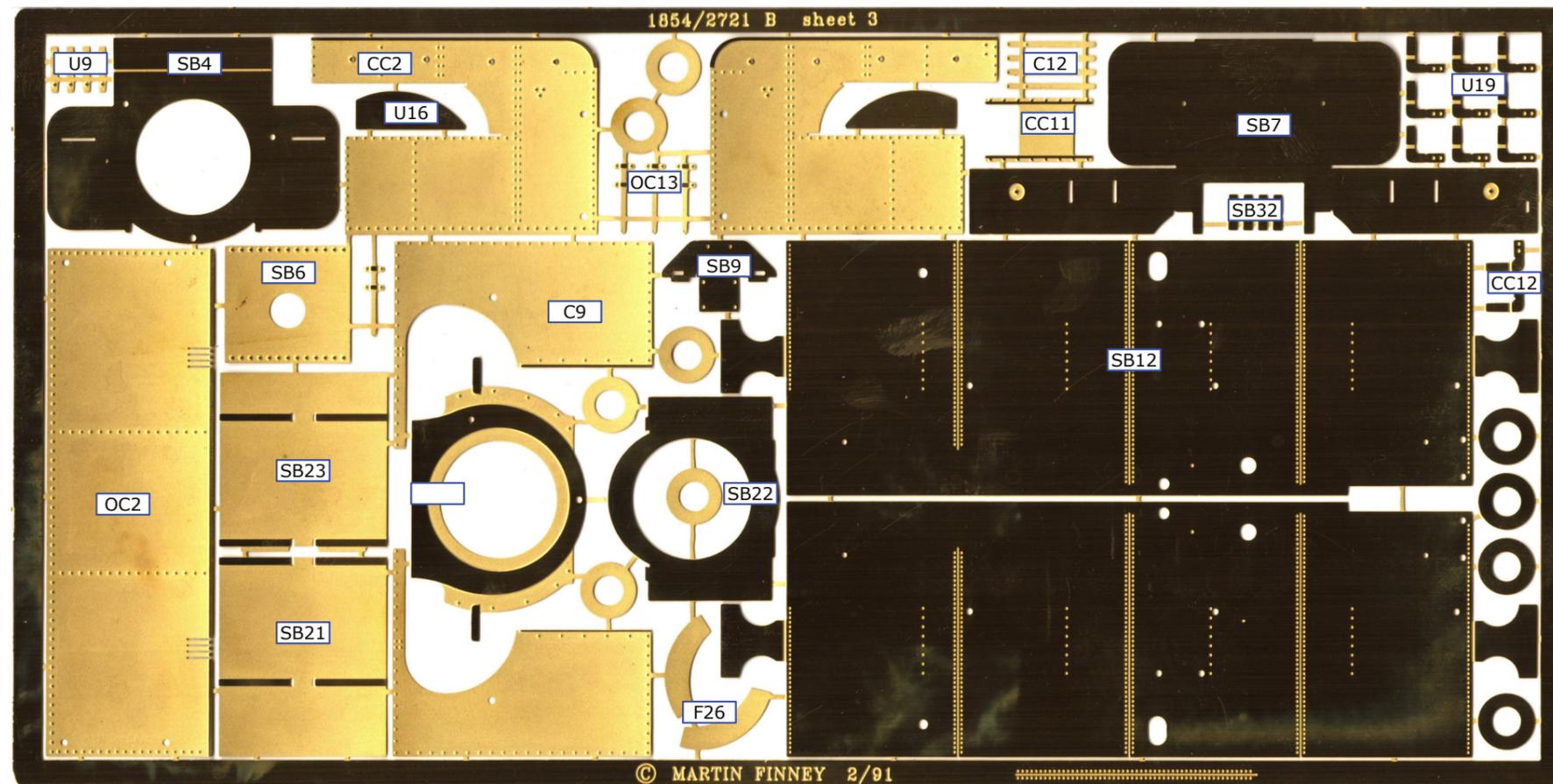
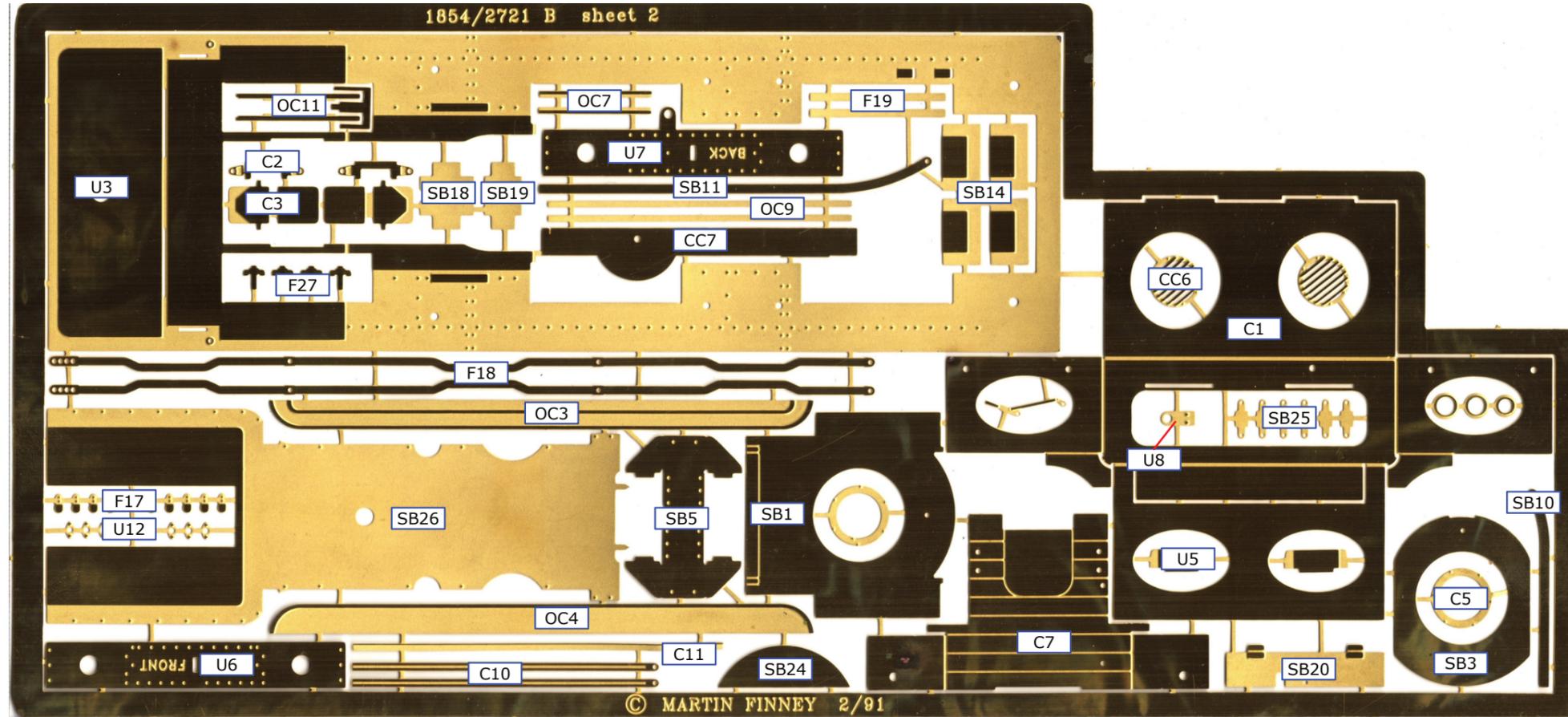


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1854/2721 B SHEET 1



1854/2721 B SHEET 2 & 3



CASTINGS

BRASS CASTINGS

- CU1 Parallel chimney
- BR1 Safety valves (2)
- BR2 Safety valve casing
- BR3 Dome
- BR4 Dome lubricator
- BR5 Water filler lid stop (2)
- BR6 Tank water filler (2)
- BR7 Tank vent (2)
- BR8 Injector (2)
- BR9 Large whistle
- BR10 Small whistle

- Atbara/2 BR11 Sandbox lid (2)
- Details/1 BR12 Hand brake handle
- 1854/2 BR13 Smokebox door handle
- Atbara/1 BR14 Steam lance cock
- Stella/2 BR15 Front vacuum pipe
- 1854/3 BR16 Front vacuum pipe dummy
- 1854/3 BR17 Steam heating cock (2)
- 1854/3 BR18 Steam heating pipe connector (2)
- 1854/3 BR19 Rear vacuum pipe
- 1854/3 BR20 Firebox door handle
- 1854/2 BR21 Firebox shelf
- 1854/2 BR22 Clackbox (2)

- Details/2 BR23 Water gauge
- 1854/2 BR24 Regulator mounting
- Stella/2 BR25 Regulator handle
- Stella/2 BR26 Jockey valve
- Stella/2 BR27 Linkage - jockey valve/regulator
- Stella/2 BR28 Cab pressure gauges (3)
- 1854/3 BR29 Combined ejector/brake
- 1854/3 BR30 Combined ejector/brake handle
- 1854/2 BR31 Sightfeed lubricator
- 3232/7 BR32 Lever reverse handle
- Details/1
- 3232/5

- 3232/7
- Stella/3
- 3232/5
- 3232/5
- 3232/7
- Stella/3
- 3232/5
- Stella/2
- 3232/5
- Stella/3



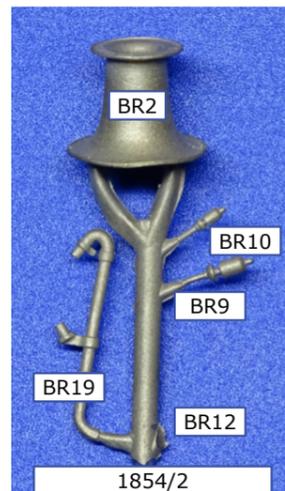
CU1

MF7/DUKE/1



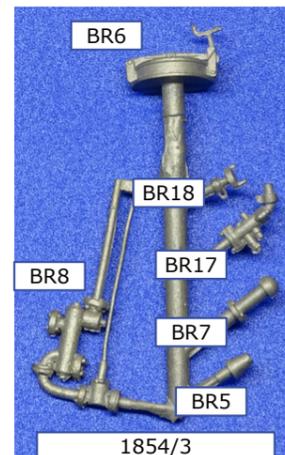
BR3

F7/1854/1



BR2

1854/2



BR6

1854/3



BR21

Details/1



BR11

Details/2



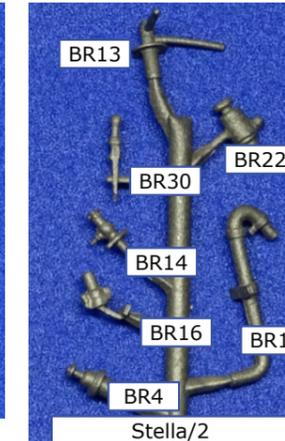
BR29

3232/5



BR20

3232/7



BR13

Stella/2



BR24

Stella/3



BR38

OTHER COMPONENTS

- 3/16" bore bearing (6)
- 6BA x 5/16" Brass screws (2)
- 6BA nuts (2)
- Short handrail knob (14)
- Medium handrail knob (1)
- Buffer head, screw & spring (4)
- Vacuum pipe and steam pipe hose (2)

- 1/8" brass wire for compensation beam pivot
- 5/32" OD brass tube for compensation beams
- 1.6mm Steel wire for front compensation beam
- 0.45mm Brass wire for bunker handrails
- 0.8mm (2) Brass wires for brake hanger pivots and handrail
- 1.2mm Brass wire for vacuum pipe
- 1.6mm Nickel silver wire for coupling rod fork joints
- 0.8mm & 1.5mm copper wire for backhead pipes
- Note.** Screws may be supplied over-length and may require cutting to length.

WHITEMETAL CASTINGS

- WM1 1 Steam brake cylinder
- WM2 4 Leading & centre volute spring nest (2721)
- WM3 1 Tank balance pipe
- WM4 1 Firebox top
- WM5 1 Safety valve base
- WM6 1 Inside of dome
- WM7 1 Chimney, tapered
- WM8 2 Spring nest inside cab
- WM9 2 Sandbox
- WM10 2 Toolbox
- WM11 4 Dean taper buffer
- WM12 1 Early smokebox door with ring
- WM13 1 Later smokebox door
- WM14 1 Backhead
- WM15 1 Lever reverse base



WM1



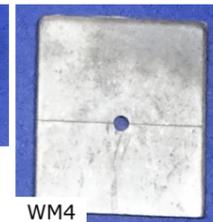
WM3



WM5



WM6



WM4



WM7



WM8



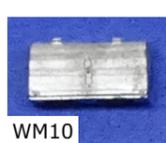
WM14



WM15



WM9



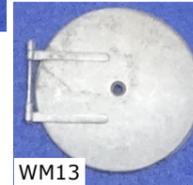
WM10



WM11



WM12



WM13