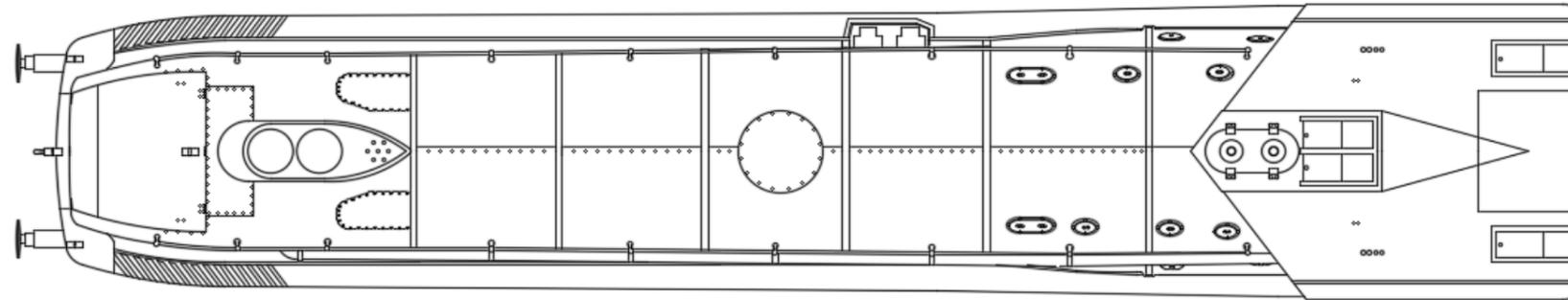
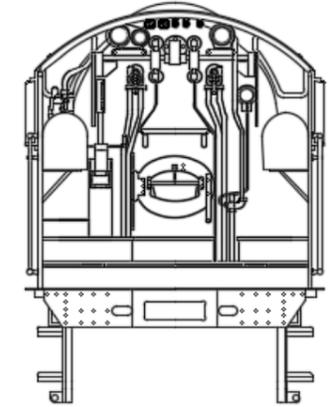
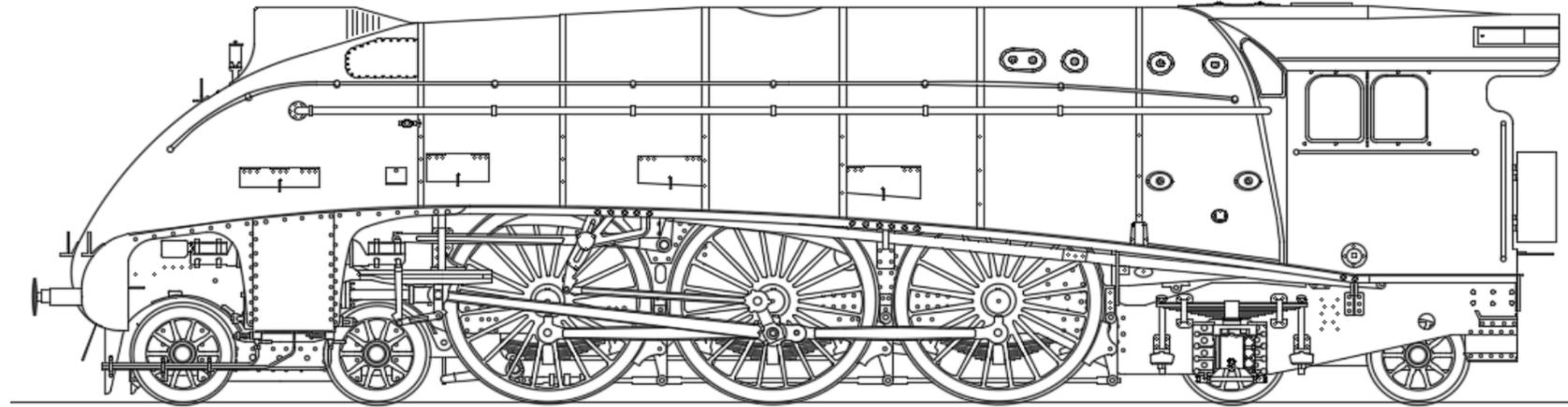
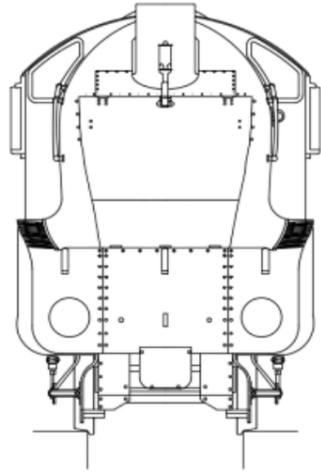


LNER - BR W1 4-6-4



CHASSIS - REAR FRAMES

Rear frame extension.

Note, the production rear frame extensions (F7, F66) have a cut out for the rear J hangers, not a recess as shown in the following photographs.

Punch the rivets on the frame extensions (F7, F66), Bissel truck spring plate (B20), firebox front stay (F115) and frame extension side plates (F122). Solder 8BA nuts in the half etched areas marked on the drag box middle plate (F124) and Bissel truck spring plate (B20).

Note, all slots are designed as interference fit, they may be required to be eased with a scrap piece of etch before the tabs are inserted. To maintain accurate fit, it is important that all cusps are removed, especially any parts that are transverse parts whose faces meet the frames, e.g. F104, F116, F117, F121 etc.

Fold part F125 as shown in Fig 2 below and slot between the two inner frame extensions plates, insert F124 into the rear slots with the nut uppermost. Attach the reinforcing plate (F126) to the top plate F123 before folding down the rear drag beam face, attach the top plate to the frame extensions, take care when soldering to maintain a square and parallel structure.

Place a frame extension stay plate (F122) onto each end of the extension stay (F121) and gently insert into the frame slots as shown in Fig 2, solder from the outside and trim off any excess material to leave a smooth surface. Finally add the footplate rear mounting plate (F127) to the top of the frames in the recess provided.

Emboss the rivets on the firebox front stay (F115) and fold one side and the upper flange only, insert the horizontal plate (F116) into the folded side plate, note F116 has two tabs, one is rectangular the other has a curved edge, the rectangular tab is inserted into the already folded side. Now fold the other side of F115 over the curved tab of F116 to secure it in place. Trim the Strengthening Plate (F117) to drop down into the slot of F116 and secure. Note the arched cut outs top and bottom are different depths, the deeper arc is on the bottom.

Place the Bissel truck stay side plates (F107) over the tabs on the Bissel truck stay (F104), note part F104 is tapered, the narrower part is toward the rear.

Carefully bend the side frames so that they are wider at the front, check the width with the Bissel truck pivot stay and firebox front stay assemblies, it is important that the bends are equal each side to maintain a straight rear frame section. Once satisfied that all is square then secure the front end by soldering the Bissel truck pivot stay (with side plates) into place, solder from the outside. Trim the front and rear (F105, F106) flanges to fit within the side plates and secure. The cut out in the rear flange is toward the base.

There is no need to secure the firebox front stay this point, but you may choose to do so, however, the outside face must remain smooth and the tabs intact, these will locate the rear frame extension into the main frames LATER.

To complete the rear frame extension structure, attach the Cartazzi guide plate (B19) to the underside in the extension frames (F7, F66). Note the plate is tapered and the guide slots angled, see Fig 3 to check plate orientation. Finally, fold the Bissel truck spring plate and store safely ready for alignment and fitting as detailed in the bogie section on page 7, see fig 36 & 37.

Fold the ash pan base (F173) noting the raised section in the middle to clear the Cartazzi guide plate, fold the cut out section (F175) into an inverted U and attach into the slot in the base of the ash pan base. Part F175 is over length to aid fitting and securing, once fitted trim the front edge smooth. Emboss the hinge rivets on the front damper overlay (F174) and secure to the front of the ash pan base. The base of the damper should just protrude below the ash pan by approximately 0.2 mm.

Fit a 1/2" 8BA screw through the Bissel truck stay from above and secure.

When fitting the ash pan base, fit into the frame extension from above and secure the front end to the firebox rear stay and the rear end to footplate rear mount. The top of the ash pan base shall be flush with the top of the frames at each end see Fig 5. Do not fit at this stage as it will impede future work.

No.	Description	Sheet
B19	Cartazzi Guide Plate	F6
F7	Frame Extension LH	F1
F66	Frame Extension RH	F2
F104	Bissel Truck Pivot Stay	F3
F105	Bissel Truck Stay Front Flange	F3
F106	Bissel Truck Stay Rear Flange	F3
F107	Bissel Truck Stay Side Plates (2)	F1/2
F115	Firebox Front Stay	F3
F116	Firebox Front Stay Horizontal Plate	F3
F117	Firebox Front Stay Strengthening Plate	F3
F121	Frame Extension Stay	F3
F122	Frame Extension Stay Side Plates (2)	F3
F123	Drag Box Top Plate	F3
F124	Drag Box Middle Plate	F3
F125	Drag Box Lower Plate	F3
F126	Drag Box Reinforcing Plate	F3
F127	Footplate Rear Mounting Plate	F3
F173	Ash Pan Base	F4
F174	Ash Pan Front Damper Overlay	F4
F175	Ash Pan Cutout	F4
Br38	J Hanger Rear Frames (2)	
	8BA Screw 1/2" long (2)	
	8BA Nut (2)	

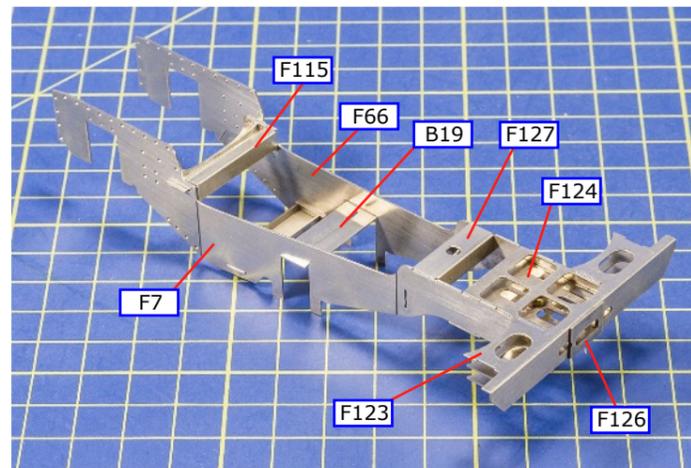


Fig 1.

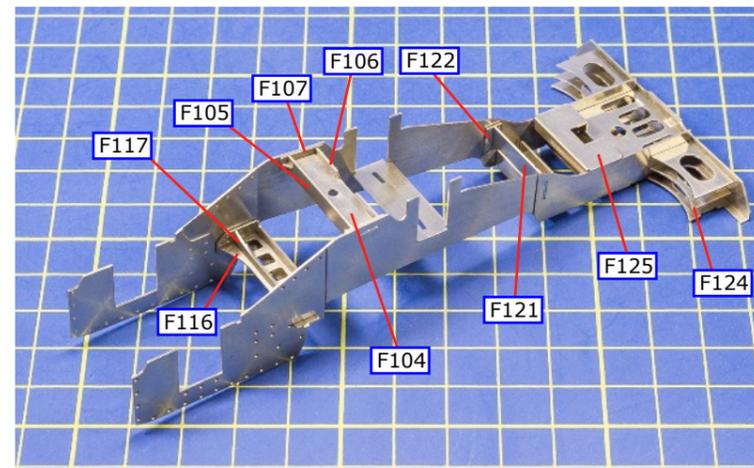


Fig 2.

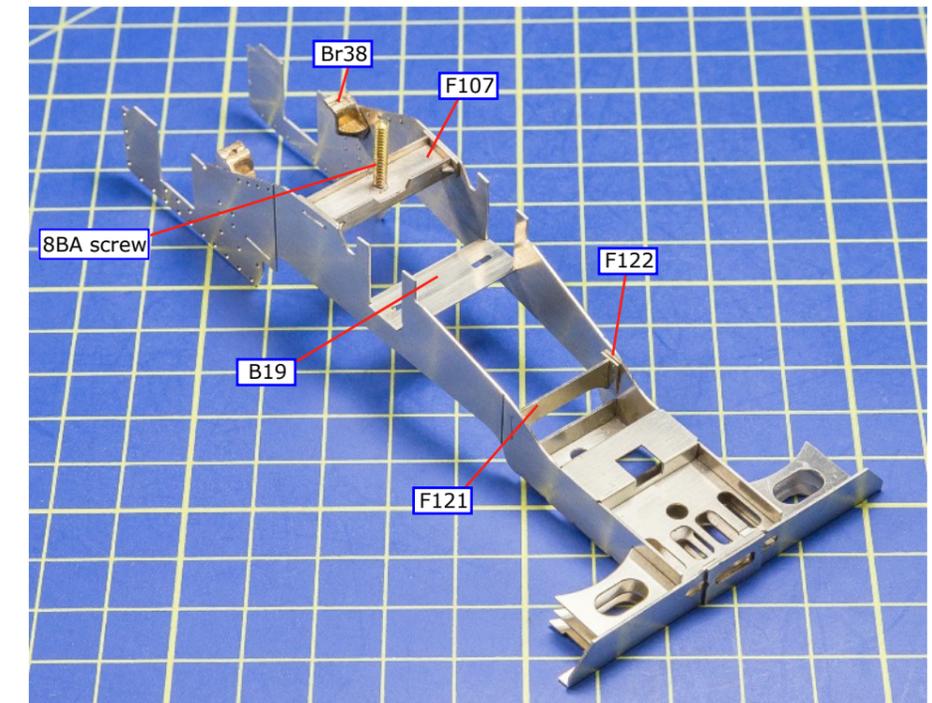


Fig 3.

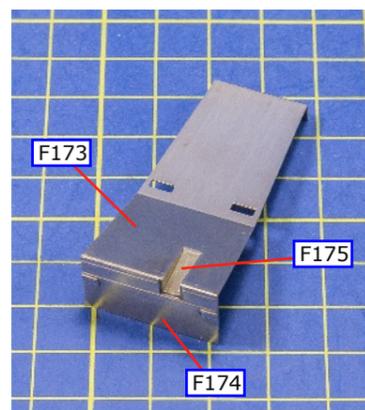


Fig 4.

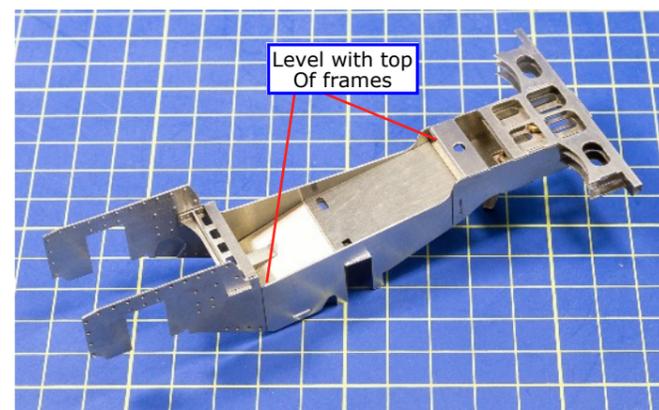


Fig 5.



Fig 6.

CHASSIS - STAYS

Middle Cylinder. Fig 6,7.

Attach the middle cylinder ring plate (F129) centrally over the front of the cylinder etch relief on the inside cylinder part (F90) Attach the pipe flange (F42) to the rear cylinder face and if required open out the pipe hole to 2.5 mm; fold the cylinder etch into a U shape. Note the bends are not 90 degrees, use the middle cylinder bolt plates (F6, F84) to form the middle cylinder to the correct shape and then attach the bolt plates, note the etched bolts face inward. Fold the webs (F91, F91A, F92 and F92A) and insert from the inside, use Fig 6 & 7 as a guide and fix into place. Finally, drill the stuffing gland (N3) out to 2.0 mm and fit to the rear of the assembly.

Grease Trap Stay. Fig 8.

Press the rivets on the grease trap stay (F108) and grease trap bracket (F109) and fold the flanges over. Attach the bracket to the stay, drill the grease trap casting (Br39) holes 2.5 mm and then fit the to the bracket after. Finally attach the two webs (F110) to complete.

Brake Cylinder Stay. Fig 9.

Press the rivets on the brake cylinder stays (F101) and brackets (F103) before folding the ends. Insert the brake cylinder webs (F102) from above and secure. From below add the brackets F103 over the protruding bracket as shown in Fig 9 and secure. The cast brake cylinders have two indentations to mark the drilling location for the pivot point, drill these out to 1.2 mm. Insert a 1.2 mm wire 19.5 mm long through the brackets and cylinder and secure in place. Trim the excess wire to leave a small section representing the pivot pin.

Intermediate Stay.

Press the rivets on the intermediate stay F120) and fold up the ends to form an inverted U.

2:1 Lever Stay. Fig 10,11.

Press the rivets on the 2:1 lever stay (F111) and fold the front, sides and base, do not trim the tabs that locate the stay into the frame slots. Attach the 12BA nut to the top of the upper plate (F113) and insert into the slots in F111, insert the lower plate (F114) into F111 and secure with the cover plate (F112), note orientation of slots in F112 before fixing in place.

Cruciform Stay. Fig 12.

Slide the cruciform horizontal stay (F94) through the vertical stay (F93) and align using the LH and RH stay plates (F3, F81) and secure in place. Form the front and rear flanges (F96) and fit into place, trim the edges to match the overall width. Form and fit the upper flange (F97) and trim before fitting, finally trim the lower flange plate (F95) width and fit to the cruciform assembly.

Inside Slidebar Stay. Fig 13.

Press the rivets in the slide bar stay (F100), place the web (F98) into the slot in the base of the stay F100 and fold the ends up to trap the web in place, do not solder the middle of the stay where the slide bar will attach, this will need to be angled to match the angle of the slide bar later. Finally, form and fit the upper flange (F99) to complete the assembly, do not trim the end tabs that will fit into the frames later.

Boiler Support Stay. Fig 14.

Press the rivets on the end plates of the boiler support stay lower flange (F132), fold up to form a U shape. Insert the boiler support stay (F130) into the slots in the end plates and fit the upper flange (F131) to complete the assembly.

No.	Description	Sheet
F3	Cruciform Stay Plate LH	F1
F6	Cylinder Middle LH Bolt Plate	F1
F42	Pipe Flange Middle Cylinder	F1
F81	Cruciform Stay Plate RH	F2
F84	Cylinder Middle RH Bolt Plate	F2
F90	Inside Cylinder	F3
F91	Inside Cylinder Web Double Small	F3
F91A	Inside Cylinder Web Double Large	F3
F92	Inside Cylinder Web Single Small	F3
F92A	Inside Cylinder Web Single Large	F3
F93	Cruciform Stay Vertical	F3
F94	Cruciform Stay Horizontal	F3
F95	Cruciform Stay Flange Lower	F3
F96	Cruciform Stay Flange Front/Rear (2)	F3
F97	Cruciform Stay Flange Upper	F3
F98	Inside Slide Bar Stay Web	F3
F99	Inside Slide Bar Stay Flange	F3
F100	Inside Slide Bar Stay	F3
F101	Brake Cylinder Stay (2)	F3
F102	Brake Cylinder Stay Web (2)	F3
F103	Brake Cylinder Bracket (4)	F3
F108	Grease Trap Stay	F3
F109	Grease Trap Bracket	F3
F110	Grease Trap Bracket Web (2)	F3
F111	2:1 Lever Stay	F3
F112	2:1 Lever Stay Cover Plate	F3
F113	2:1 Lever Stay Upper Plate	F3
F114	2:1 Lever Stay Lower Plate	F3
F118	Bogie Pivot Stay	F3
F120	Intermediate Stay	F3
F129	Middle Cylinder Ring Plate	F3
F130	Boiler Support Stay	F3
F131	Boiler Support Stay Upper Flange	F3
F132	Boiler Support Stay Lower Flange	F3
Br39	Grease Trap	
N3	Piston Stuffing Gland	
W5	Brake Cylinder (2)	
	12BA Nut 2:1 lever fitting	

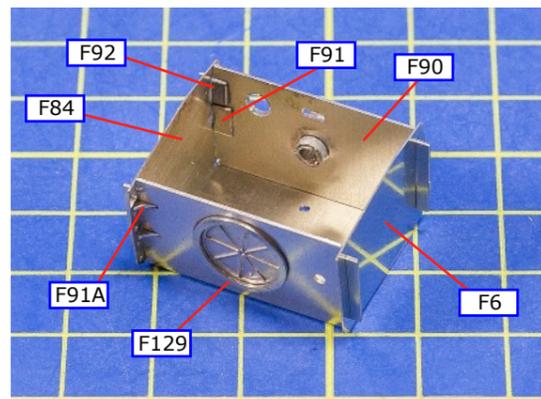


Fig 6.

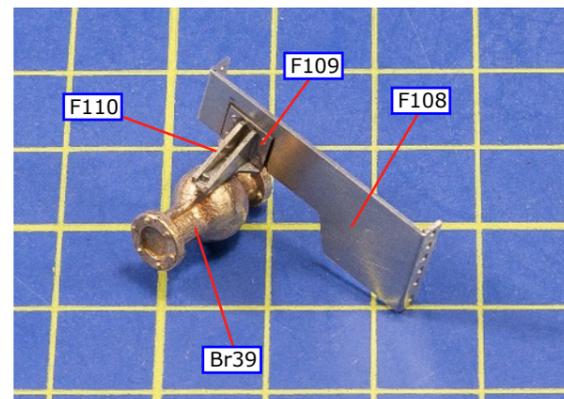


Fig 8.

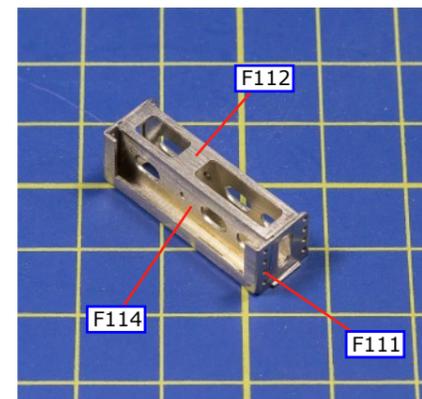


Fig 10.

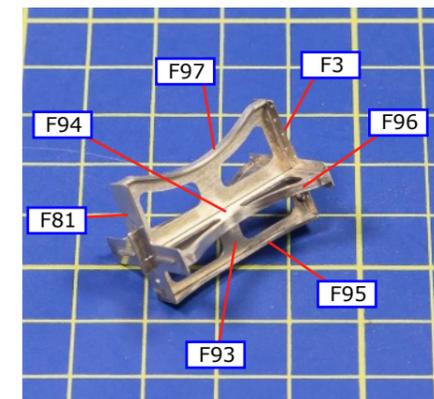


Fig 12.

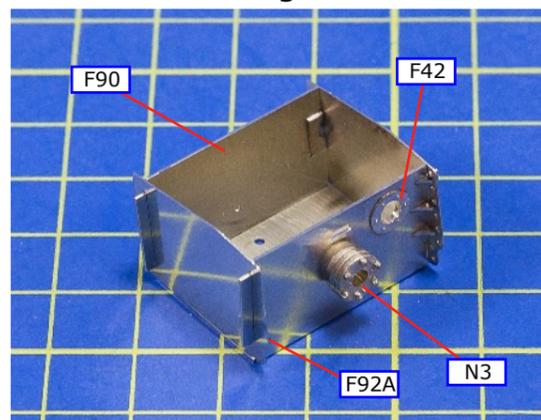


Fig 7.

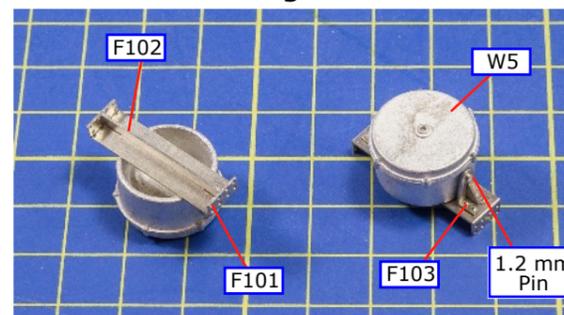


Fig 9.

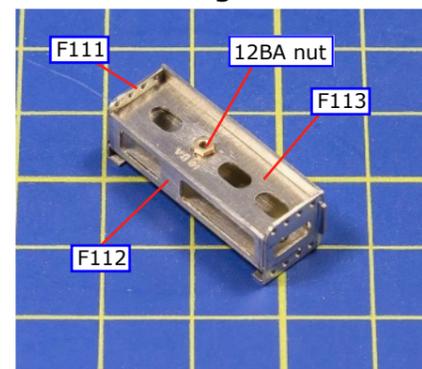


Fig 11.

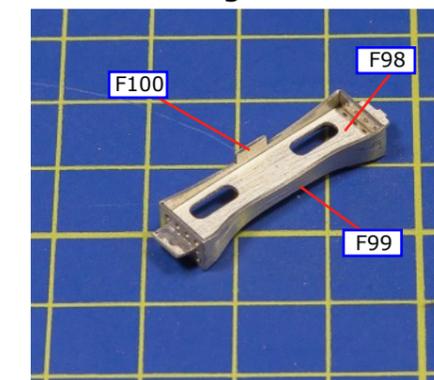


Fig 13.

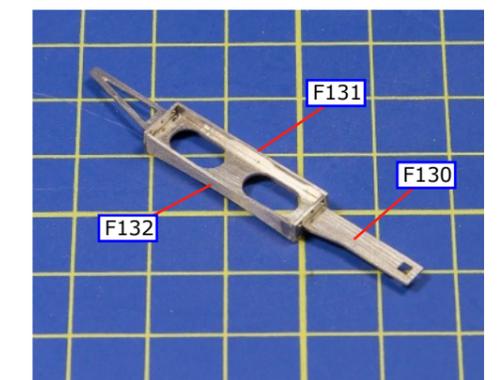


Fig 14.

Main Frames.

The frames have the option to be built as rigid or fully sprung.

For the rigid set up use the supplied 3/16" top hat bearings and insert into the frame in the holes provided. It is also necessary to add the cast horn guides as these are required for fixing the springs into place later. The two are compatible.

For fully sprung drill each of the supplied horn guides at the indent marked and tap 12BA for the adjustment screws. There are many methods of axle and horn guide alignment from graph paper and steel rods to commercially available jigs, it is up to the builder to decide which suits them best.

The following build uses the fully sprung method and supplied horn guide castings. The horn guide castings will be fitted after the initial frame construction and aligned using a jig, others may prefer to add them before construction. In both cases the coupling rods will need to be built to ensure accurate axle alignment. Note, the horn guides are handed, the wedged adjustment slipper is to the front of the axle, see Fig 16.

Laminate the coupling rods (M5, M6) together to form the two rods required for each side of the engine. Note, the etch is laid out so that each rod laminate goes back to back with it's corresponding partner. In both cases (LH & RH) the knuckle joint is to the rear of the intermediate driving wheel. Add the appropriate coupling rod boss overlays (M7) to the inside and outside of each boss. See fig 45-48 on page 10 for details. Dress the etched cusp to leave square edges. Pin the front and rear rods together with a 1.6 mm nickel silver pin, take care not to solder the joint solid.

Press out the rivets in the extension overlay (F8, F67) to the rear section of the main frames (F1, F79), attach the relevant overlay to the frame and ensure the holes and slots are in perfect alignment and check the front edge, make sure it only covers half of the etch slot underneath, trim if required. Note the overlay is overly long at the rear, attach the overlay and trim once fitted. **NOTE F67 failed to etch the front hole for the injector pipework. Once laminated, use the inside frame F79 as a guide, drill a hole from the inside and open out to match the inner frame.**

Bend the forward section outward until it is 8 mm away from the main frames, repeat for the rear section making it 10 mm from the frames, see Fig 15 for clarity, some minor tweaking may be required once the rear drag box assembly is added.

On the inside of the frames add the sandbox locating plates (F4, F82) into the recesses provided. Next add the J hangers (Br35, 36, 37) as shown in Fig 16 after drilling out the snubbing rubber stem hole to 1.0 mm. Drill the top of the inner sandboxes (W8) 1.6 mm and the base 1.5 mm and remove the raised bolt detail on the lower flange. Fit to the frames, note the sandboxes are handed.

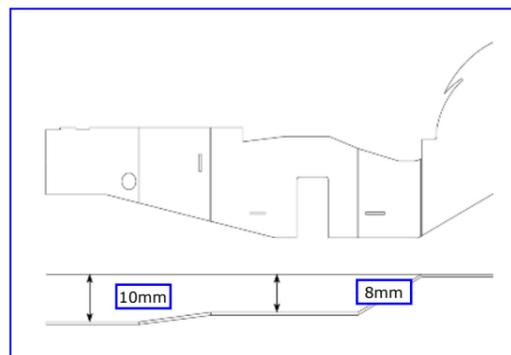


Fig 15.

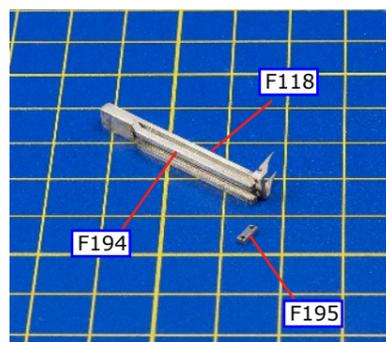


Fig 17A.

CHASSIS - MAIN FRAMES

Fold the Cartazzi spring plates (F20, 21, 69, 70) and push through from the inside and secure with the folded tab, note the slot for the snubbing rubbers face downward.

Insert the middle cylinder assembly through the frame slots and hold in place by gently twisting the tabs on the outside. Repeat with the slide bar stay (note orientation Fig 17) and cruciform stay. Using a length of 1.0 mm wire, line up the slot for the slide bar in the cylinder with the slide bar stay and gently bend the middle tab to suit the angle, fig 17.

If the middle slide bar assembly is required then fold the lower slide bar (F194) assembly to form three layers, note the bends at the end are on the outside, solder the lamination but not the jogged section. Bend the bars to give a running clearance with the crosshead, typically 0.9 mm and then solder the jogged section. Laminate the upper slidebar assembly, note the slidebar and bracket folds are on the outside. Using a 0.8 mm pin at the front, secure the two slidebars together, fig 17A, further pins at the rear will ensure alignment but should not be fixed yet. Fit the tab in the slidebars into the cylinder and the two brackets to the stay and secure. Once the motion is complete then laminate the packing plates (F195). Before securing, check the crosshead slide has sufficient rear clearance, it may be necessary to trim the rear of the crosshead slide casting before securing the packing plates.

Attach the other frame side and repeat the tab twisting. Maintaining a straight and parallel set of frames, tack solder the tabs on the outside to secure in place, Lengths of 1.0 mm wire passed through the brake hanger holes or top hat bearings in a jig will aid alignment if required.

Gently ease the frames apart and drop in the brake assemblies, grease trap stay and intermediate stay, into their respective half etched cutouts, solder from the outside through the holes provided to secure in place. Drop the boiler support stay into the slots above the cruciform stay and secure.

Check the frame remains square and parallel and fully solder the twisted tabs, remove excess material to leave a smooth outside face for the overlay.

Fold up the tabs for the Cartazzi safety bars (Br29) and fit the safety bar casting, trim the top surface smooth and then fit the Cartazzi axle boxes (W1, 2), note these are handed, see Fig 18 & 19.

No.	Description	Sheet
F1	Frames LH	F1
F4	Sandbox Locating Plate LH	F1
F8	Frame Extension LH Overlay	F1
F20	Cartazzi Spring Plate LH Rear	F1
F21	Cartazzi Spring Plate LH Front	F1
F67	Frame Extension RH Overlay	F2
F69	Cartazzi Spring Plate RH Rear	F2
F70	Cartazzi Spring Plate RH Front	F2
F79	Frames RH	F2
F82	Sandbox Locating Plate RH	F2
F118	Middle Cylinder Upper Slidebar	F3
F194	Lower Slidebar Laminations	F4
F195	Slidebar Packing Plates	F5
Br28	Horn Guide Casting (6)	
Br29	Cartazzi Safety Bars	
Br35	J Hanger Front Brake (2)	
Br36	J Hanger Rear Brake (2)	
Br37	Brake Hanger Standard (6)	
W1/2	Cartazzi Axle boxes	
W8	Sandbox Intermediate - Inner (2)	
	12BA Screw Axle Box Levelling (6)	

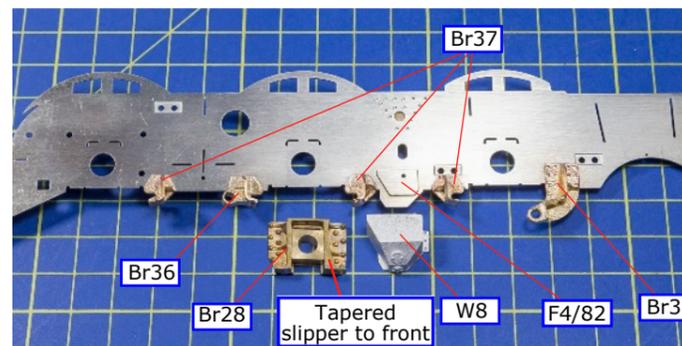


Fig 16.

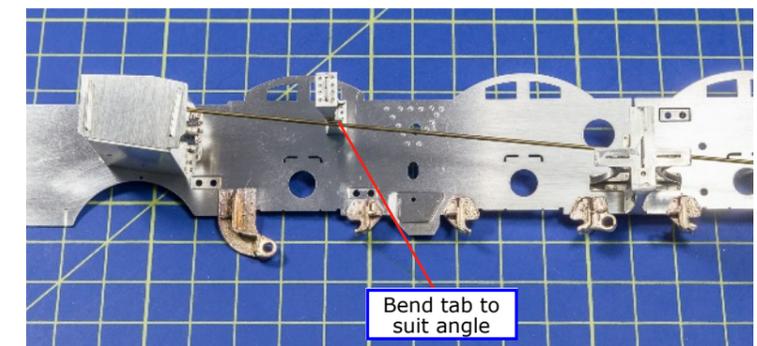


Fig 17.

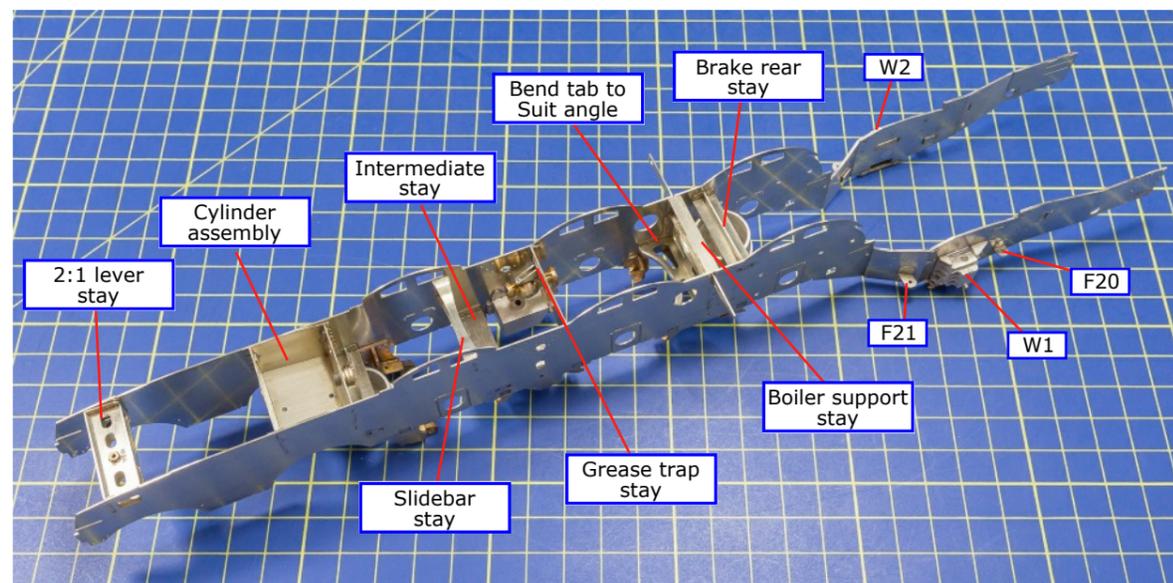


Fig 18.

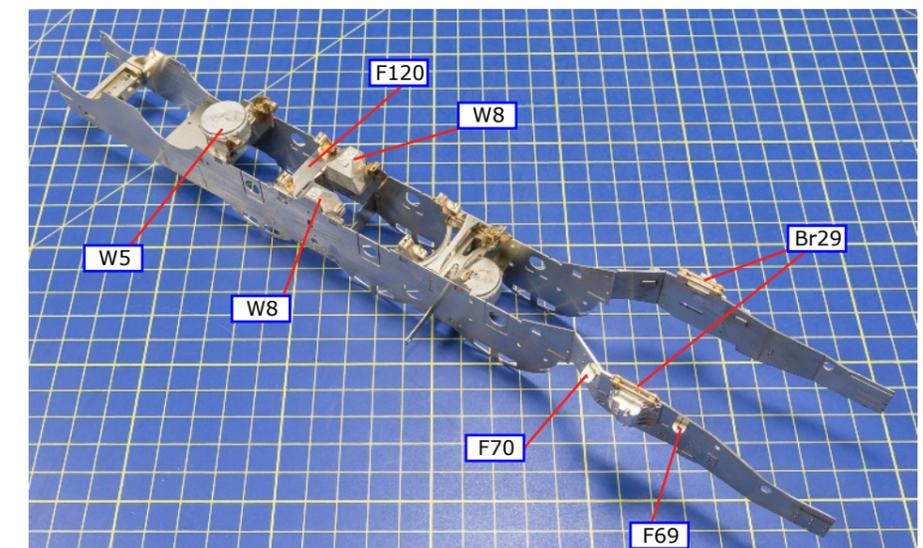


Fig 19.

CHASSIS - MAIN FRAMES 2

Remove the pull rods and brackets from the Cartazzi springs (N5) and the central mounting spigot, drill 1.0 mm holes for the new pull rods and insert lengths of nickel silver wire 15 mm long. Pass the new pull rods through the spring plates and secure, ensuring the spring is level and square. Note the springs are handed, the packing plate between the spring and axle box is L shaped, the vertical section of the L should be outside and the spring sitting flush against the frames.

Drill the oval Snubbing rubbers Br31 with a 1 mm hole and secure to the pull rods, adjusting their length where necessary.

Fold the spring safety straps (F10, F68) into a U shape and insert over the springs and into the rear frames, solder from the inside. Note top of strap is angled, ensure correct orientation.

Fold up the footplate front fixing mount (F128) and bogie pivot stay (F119). Add an 8BA nut to the bogie pivot stay and then fold over the small tab at the front for the inner steam cock pipes, attach to the model, see Fig 21. Ensure the front fixing mount is flush with the top before fixing, trim the recess in the main frames if required and secure, trim the outer edge flush with the frame sides. Leave the bogie stay extended out past the frame side, this will aid overlay alignment and leave a ledge like the real engine.

Gently ease the rear of the main frames apart and insert the rear inner extension assembly, pass the firebox front stay tab through the main frames, check the rear lines up with the drag box and secure. Ensure the front end of the extension lines up with the main frames (Fig 20) and all is square before securing in place. Using the holes in the main frames, solder from the outside to add strength where the strengthening plate passes over the rear axle. Once complete, remove the excess firebox front tab to leave a smooth outside face.

Fit the two rear J hanger supports (Br38) using the cut out in the inner frames and square hole in the main frames to aid alignment, note, these are handed/right, use Fig 20 to aid orientation.

Press the rivets and form into a U shape the rear frame spacer stays (F17, F56). Insert the stay plates (F18, F57) and finally attach the end plates (F19, F58); insert the stays into the recess on

the inside of the outer frame and secure, see Fig 22. Note, the angled plate is toward the inside of the frames.

Press the rivets on the main frame overlays (F2, F80), bend and fit the cylinders LH (F188) and RH (F189) to the overlays, solder from the inside and smooth off. Attach the overlays to the main frames, use the lightening hole, 2:1 lever opening and brake hanger holes to aid alignment. Note the rear of the overlay is overly long, trim to achieve a neat joint with the rear frame extension overlay.

Fold the front buffer beam (F197) and attach to the frames, press the rivets on the buffer spring gaiter frames (F154), fold the inside face up (three rivets), now fold the rear up (large hole) and on the top face bend the inner edge down approximately 30 degrees. Fold the top down to form a U shaped structure. Insert the buffer spring gaiter casting (Br24) into the assembly and pass the cast nut through the large hole and ensure the spring sits flush with the rear face. Fold up the front face (small hole and two rivets) to enclose spring gaiter casting, it may be necessary to trim the length of the spring to ensure the front face folds up neatly and square. Attach the assemblies to the rear of the buffer beam (use the buffer beam holes for alignment) they are handed, the three rivets are to the top of the engine, see Fig 23-25.

Jog the end of cylinder valance plates (F190-191) down where they will meet the slidebar bracket and attach them to the top of the cylinder carcass, ensure the opening in the cylinder carcass is central in the valance plate opening, curve the front section to follow the frame profile and secure. The top surface should be level with the frames and the front edge short of the frame front by 1 mm.

Attach the bogie wheel rear splashes (F23, 74), see Fig 23-25. Fit the bogie wheel front splashes (F22, 73) after the steam drain cock levers have been fitted, see Page 20.

Finally, attach the valve guide castings (Br17, 18), stuffing glands (N3) and cylinder relief valves (Br3), see Fig 23-25 for details.

No.	Description	Sheet
F2	Frame LH Overlay	F1
F10	Cartazzi Spring Safety Straps LH (2)	F1
F17	Rear Frame Spacer Stay LH	F1
F18	Rear Frame Spacer Stay Plate LH	F1
F19	Rear Frame Spacer Stay End Plate LH	F1
F22	Bogie Splasher Front LH	F1
F23	Bogie Splasher Rear LH	F1
F56	Rear Frame Spacer Stay RH	F2
F57	Rear Frame Spacer Stay Plate RH	F2
F58	Rear Frame Spacer Stay End Plate RH	F2
F68	Cartazzi Spring Safety Straps RH (2)	F2
F73	Bogie Splasher Front RH	F2
F74	Bogie Splasher Rear RH	F2
F80	Frame RH Overlay	F2
F119	Bogie Pivot Stay	F3
F128	Footplate Front Fixing Mount	F3
F154	Buffer Gaiter Frame (2)	F4
F188	Cylinder LH	F4
F189	Cylinder RH	F4
F190	Cylinder Valance Plate LH	F4
F191	Cylinder Valance Plate RH	F4
F197	Front Buffer Beam	F5
Br3	Cylinder Relief Valve	F5
Br24	Buffer Spring Gaiter (2)	F5
Br17	Valve Crosshead Guide Front (2)	F5
Br18	Valve Crosshead Guide Rear (2)	F5
Br31	Snubbing Rubbers Oval (4)	F5
Br38	J Hanger Rear Frames (2)	F5
N3	Piston Stuffing Gland (2)	F5
N5	Cartazzi Spring (2)	F5
	8BA Nut	F5

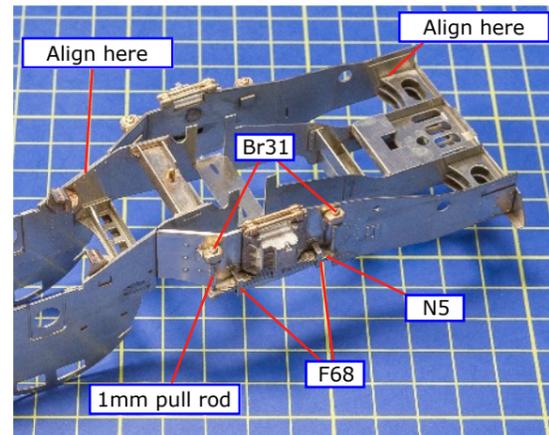


Fig 20.

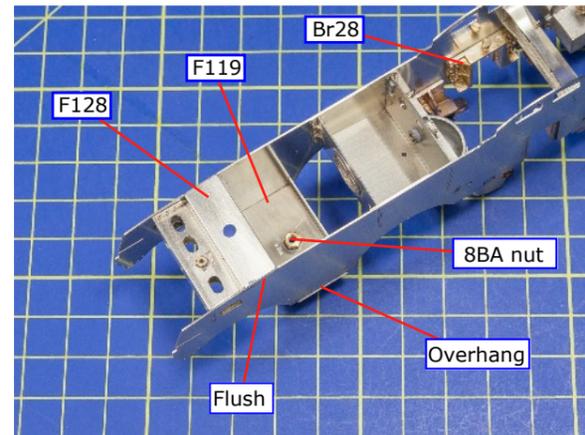


Fig 21.

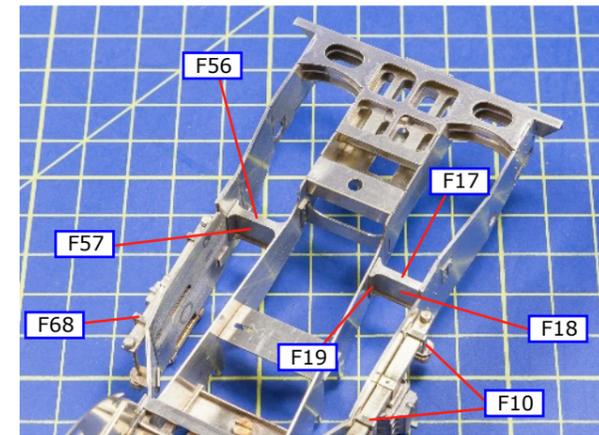


Fig 22.

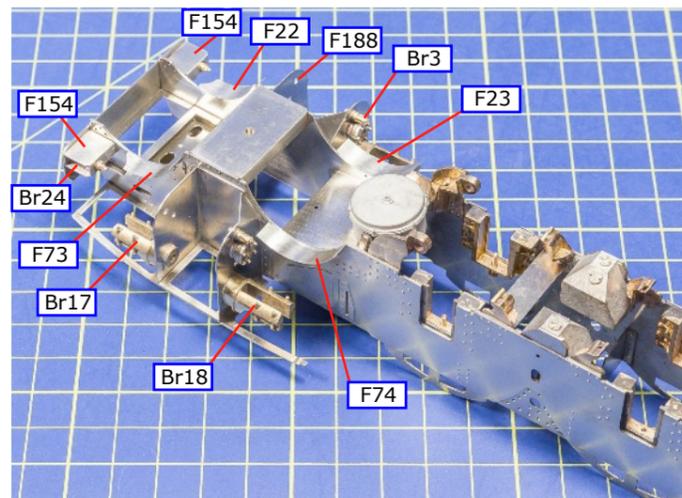


Fig 23.

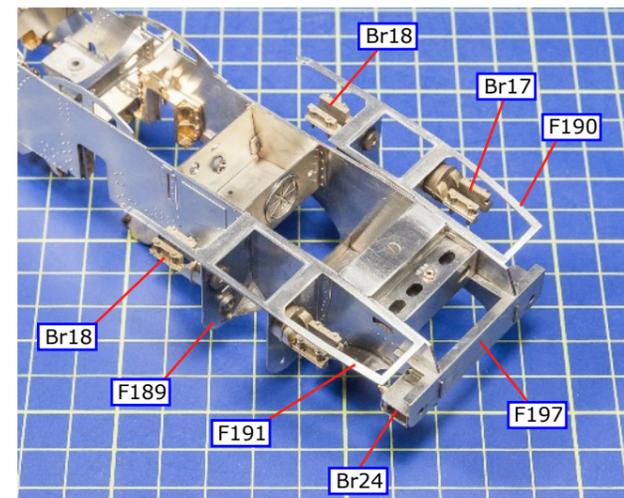


Fig 24.

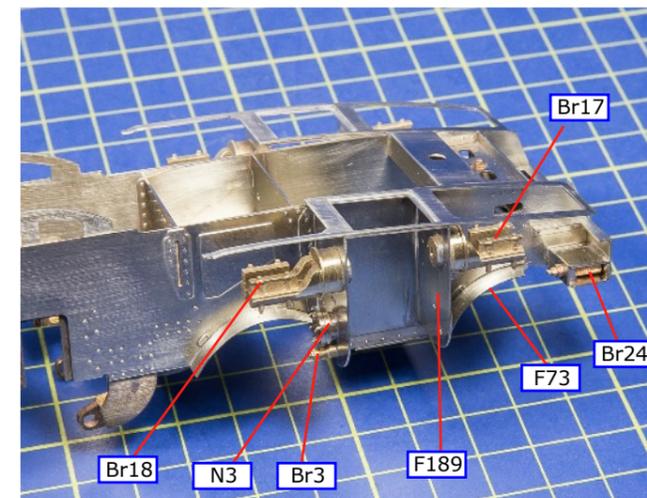


Fig 25.

CHASSIS - MAIN FRAMES 3

Bend the base of the slidebar bracket flange (F31) at the base to match the slidebar bracket (F30) lower profile, note notch in bracket that fits into web, secure in place. Carefully fold the remaining flange around the bracket and secure. The flange is overly long so will require trimming back flush with the bracket base. Attach the fillets (F32) into the slots provided, note there are three fillets, A, B, C, these are fitted in order with A at the outside. Repeat for the RH side using F51-F53.

Fold up the upper slidebar lamination (F196), note the bend is on the outside. Solder together and clean off the cusp to give smooth sides and ends.

Temporarily hold the upper slidebar into the cylinder slot and offer up the slidebar bracket, check the bracket is square to the frames and the slidebar parallel to the frame, ensure the cylinder valance support plate is tucked inside the slidebar bracket flange before securing the bracket in place. See Fig 26. Repeat for the RH side of the engine, remove the upper slidebars and store safely until page 13 fig 46.

Fold the rear brake hanger bracket (F29) and fit to the frames over the firebox front stay. Check clearances with rear wheel rim before fully fitting the bracket.

Press the rivets in the motion bracket (F11) and attach the overlay (F15) to the inside, this can be fitted before or after the outer fixing is folded down 90°. Laminate the inner plates F12, F13) and secure in the slot in the motion bracket, ensure the expansion link bearing holes align. Fold down the inner riveted fixing plate and insert the web (F14) into the slot and secure, finally bend the splasher (F16) and secure to the underside of the motion bracket, see fig 27.

The splasher is designed to sit on the front outer edge of the motion bracket (fig 28). Repeat for the RH motion bracket (F59-F64). Attach both brackets to the frames, ensure the reversing weight shaft holes line up with the holes in the frames and with the corresponding opposite motion bracket.

Fit the cab support brackets (F9, F65), note they are handed, F65 has a hole in and is fitted to the RH side. The brackets should be 90° to the rail, not the chassis which tapers here.

Drill the brake hanger (Br25) pivot holes 1.0 mm and using the locating spigot fit to the intermediate and forward brake locations, If Slaters wheels are used it is necessary to trim the width of the castings before fitting. As cast they will nominally be 2.0 mm wide, if using standard Slaters wheels then they will need to be trimmed to 1.7 mm maximum width but preferably 1.6 mm to clear the rims.

Fit the splashers (F24-26, F75-77), note notch in the intermediate and trailing splasher tops to clear the frames. See Fig 26.

On the underside of the engine springs (W6) open out the indent to accept the 1 mm rod from the snubbing rubbers (BR34) take care not to drill all the way through. Attach the springs to the horn guides, note the keep plate is not centred on the spring, the longer section goes toward the front to match the adjustment wedge on the horn guide. Insert the snubbing rubbers through the J hangers from below and locate the pull rod in the spring, adjust the length of the pull rod so that the snubbing rubber sits snugly in the anti rotational slot in the base of the J hanger and secure.

Attach the brake trunnion bearing covers (F33) to the outside of the front and rear brake shaft J hangers.

Finally fit the front sandboxes (W9), before fitting check the turret height, it will need to be trimmed back level with the underside of the footplate, use the cylinder valance plates F190/1 as a guide. See fig 29.

No.	Description	Sheet
F6	Brake Trunnion Cover Rear	F6
F9	Cab Support Bracket LH	F1
F11	Motion Bracket LH	F1
F12	Motion Bracket Inner Plate 1 LH	F1
F13	Motion Bracket Inner Plate 2 LH	F1
F14	Motion Bracket Web LH	F1
F15	Motion Bracket Overlay LH	F1
F16	Motion Bracket Splasher LH	F1
F24	Leading Driving Wheel Splasher LH	F1
F25	Intermediate Driving Wheel Splasher LH	F1
F26	Trailing Wheel Splasher LH	F1
F29	Rear brake Hanger/firebox Support	F1
F30	Slidebar Bracket LH	F1
F31	Slidebar Bracket Flange LH	F1
F32	Slidebar Bracket Fillets A-C LH	F1
F33	Brake Trunnion Cover (4)	F1/2
F51	Slidebar Bracket RH	F2
F52	Slidebar Bracket Flange RH	F2
F53	Slidebar Bracket Fillets A-C RH	F2
F59	Motion Bracket RH	F2
F60	Motion Bracket Inner Plate 1 RH	F2
F61	Motion Bracket Inner Plate 2 RH	F2
F62	Motion Bracket Web RH	F2
F63	Motion Bracket Overlay RH	F2
F64	Motion Bracket Splasher RH	F2
F65	Cab Support Bracket RH	F2
F75	Leading Driving Wheel Splasher RH	F2
F76	Intermediate Driving Wheel Splasher RH	F2
F77	Trailing Wheel Splasher RH	F2
F196	Slidebar Upper Lamination	F5
Br25	Brake Hanger casting	
Br34	Snubbing Rubbers Square (12)	
W9	Front Sandbox	
W6	Engine Spring (6)	

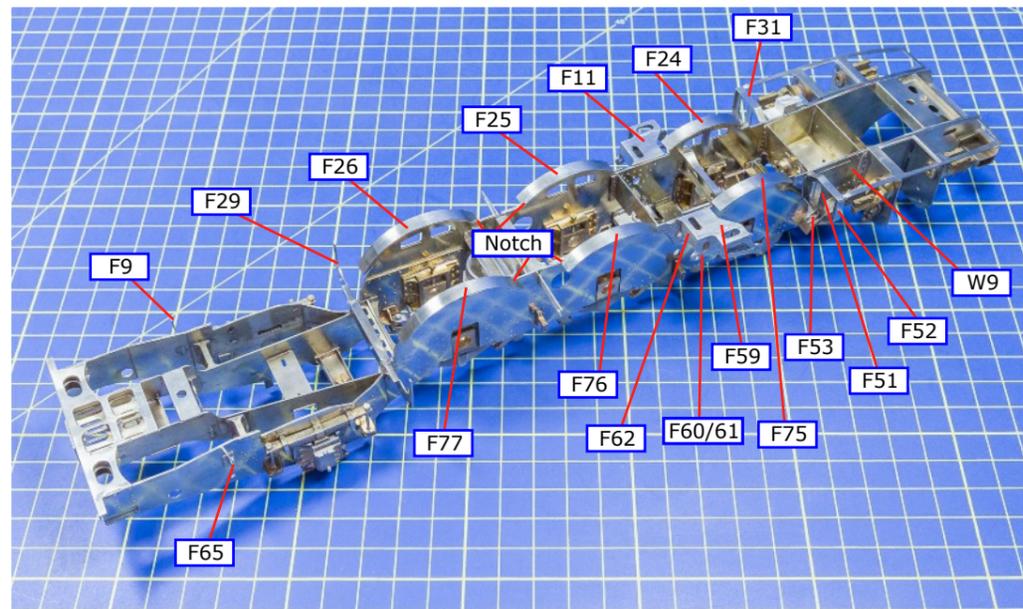


Fig 26.

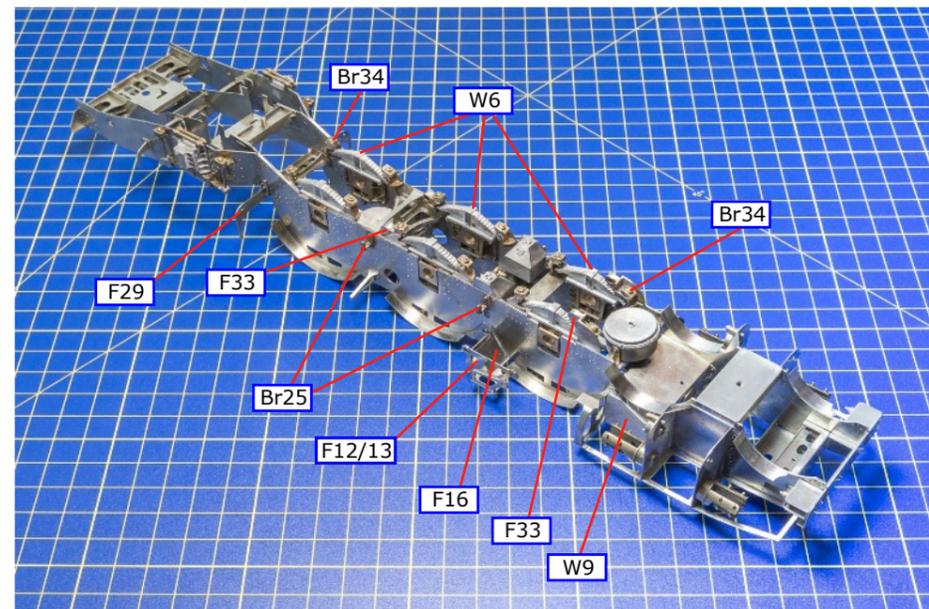


Fig 27.

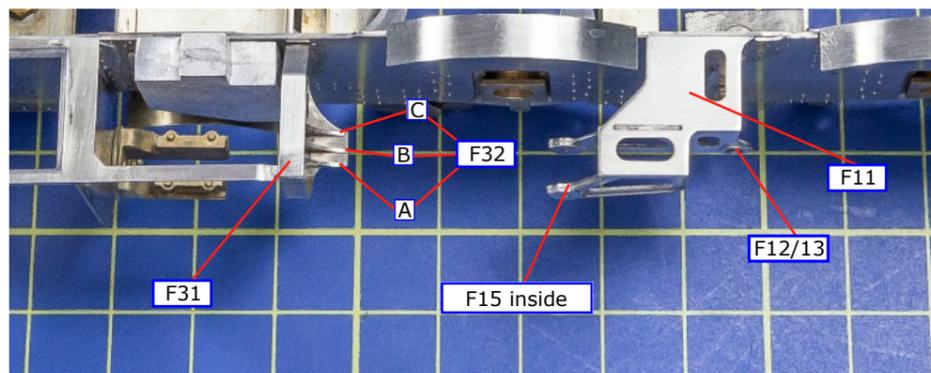


Fig 28.

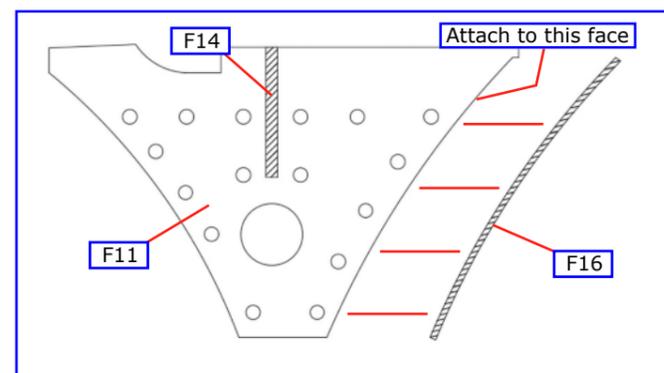


Fig 28.



Fig 29.

BOGIE

Bogie.

Fold up Part (B1) so that the punched rivets face inward; drop in the two transverse walls (B2) and fix securely, note slots for the side control plates (B9) need to face inward toward the centre of the bogie. Finally add the bogie stretcher top (B7), it should overhang the folded sides of (B1), this overhang aids alignment with slots in the bogie sides (B3 & B4). Fig 29.

The bogie stretcher assembly is identical front and rear so can be fitted either way around, attach the bogie sides (B3 & B4) and ensure they are square and parallel.

Fold up the bogie spring pivot box (B8) and add two lengths of 1.60 mm wire 8.50 mm long and secure ensuring they are square and straight. Fit the side control springs and then carefully add the side control plates (B9) and drop the assembly into the stretcher from the underside. To aid fitting the side control plates (B9) file a small groove in the base of B1 aligned with the grooves for B9 in the B2 plates. Note the side control plates (B9) have offset holes, these holes should be near the top of the bogie, the side control fitting (B8) should be fitted with the open side facing upward. See fig 30.

Check the side control fitting for free movement and ensure the rods holding the springs do not drop out of the webs at full travel. Once satisfied fix B9 securely into place.

Fit the bogie webs (B10) to the front and rear of the stretcher. Punch the rivets on the (optional) side control weather covers (B11) and fold over the tabs top and bottom after forming the main cover sheet into a gentle curve. Attach the cover to the stretcher, the narrow fixing plate is on top of the bogie (front cover only shown on fig 31).

Attach the inner overlays (B5 - B6) to the bogie side frames after pressing out the rod fixing rivets. Note at some point the front stay changed from a rod to an angled stay (B33) Check photos of your given time period as records fail to indicate the exact date of the change. To fit the angled bar first remove the old rod fixing surface detail on part (B5), press the rivets on the angle and fold up and fit where the original rod fixing was located. See fig 31.

Once the laminations are fitted add the tie rods (0.8mm) and/or the front angle. Followed by the guard irons (B12) after punching the rivets and fold to clear the wheel rim and rail head.

Finally add the white metal axle box castings (W7) ensuring the axle holes line up with those in the bogie side frame.

Using a 1/2" 8BA screw, add a retaining washer (B35) followed by a section of 1/8" brass tube 8.0 mm long and passing the screw through the pivot box from below and affix the bogie to the engine.

Cartazzi Truck.

Fold up the ends of the Cartazzi truck (B13), insert 5/16" top hat bearings and test fit for axle alignment. Curve the front and rear walls (B14R - B14F) to match B13 and whilst retaining the axle solder into place, this should ensure a square and parallel assembly. Fig 32.

Fold a piece of 0.8mm wire into a U shape and pass through from inside the assembly toward the ash pan. Ensure the stubs are square and vertical and fix in place; leave the stubs at least 10mm long for test fitting, they can be trimmed later if required. When fitting the assembly add the two 1.0 mm ID springs and on top the two spring washers (B31) see fig 33. The trailing truck once installed will retain the Cartazzi assembly in place.

Trailing Truck.

Press the rivets in the Bissel truck top and base (B15, B16), bend the base to follow the contour of the sides (B17) and fix both side walls into place, then fold up the rear wall and fix into place. Bend the top to follow the upper contour of the sides. Fold down the rear and then the two sides, insert 5/16" bearings using an axle to ensure they are square and parallel and secure. Add the pivot plates (B18) to the top and bottom of the pivot area to bring it to the correct thickness. Fig 34, 35.

Press the rivets and fold the Bissel spring plate (B20) and attach the 8BA nut in the recess provided. Cut a length of 1/8" tube 2.3/2.5 mm long and place over the trailing truck pivot screw, attach the trailing truck and secure with an 8BA nut and washer B35. When tightened the truck should be free to pivot. Fig 37.

Make the retaining spring screw by adding a retaining washer B35 to a 1/2" 8BA screw, add the 1/8" tube 7.5mm long and secure to the washer, pass the screw through the Bissel truck and then through the spring washer (B34) add a suitable spring and secure to the B20. Check for free swing and smooth vertical motion before finally securing B20 to the rear frames. Fig 36, 37.

No.	Description	Sheet
B1	Bogie Base	F6
B2	Bogie Transverse Wall (2)	F6
B3	Bogie Sideframe LH	F6
B4	Bogie Sideframe RH	F6
B5	Bogie Overlay Front (2)	F6
B6	Bogie Overlay Rear (2)	F6
B7	Bogie Top	F6
B8	Bogie Pivot Box	F6
B9	Bogie Side Control Plate (2)	F6
B10	Bogie Webs (4)	F6
B11	Bogie Splash covers (2)	F6
B12	Bogie Guard Irons (2)	F6
B13	Cartazzi Truck	F6
B14F	Cartazzi Front Wall	F6
B14R	Cartazzi Rear Wall	F6
B15	Bissel Truck Base	F6
B16	Bissel Truck Top	F6
B17	Bissel Truck Sides (2)	F6
B18	Bissel Truck Pivot Plates (2)	F6
B20	Bissel Truck Spring Plate	F6
B31	Cartazzi Spring Washer (4)	F6
B33	Bogie Front Angled Stay	F6
B34	Bissel Spring Washer (2)	F6
B35	Retaining Screw Washer (3)	F6
W7	Bogie Axle Box Casting (4)	F6
	Side Control Spring 10BA (2)	
	1/8" Tube (8.0 + 7.5 + 2.3 mm long)	
	Cartazzi Springs 1.0 mm ID (2)	
	8BA Screw 1/2" long (2)	
	8BA Nut (2)	

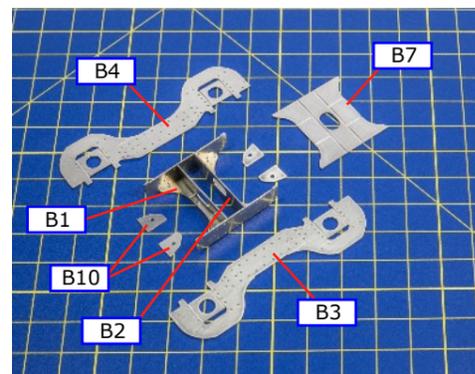


Fig 29.

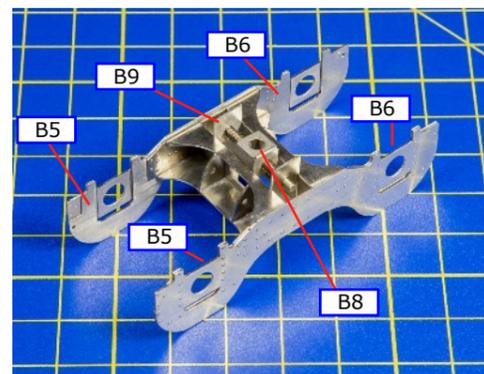


Fig 30.

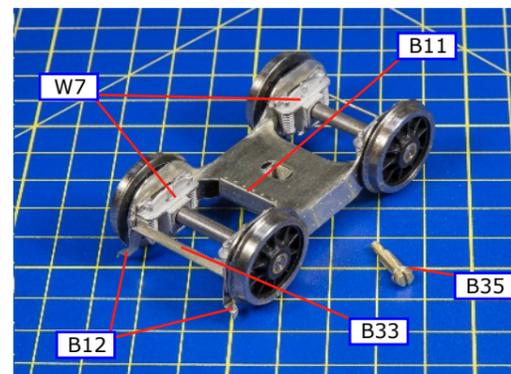


Fig 31.

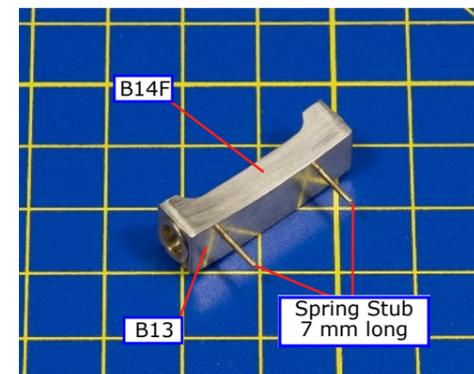


Fig 32.

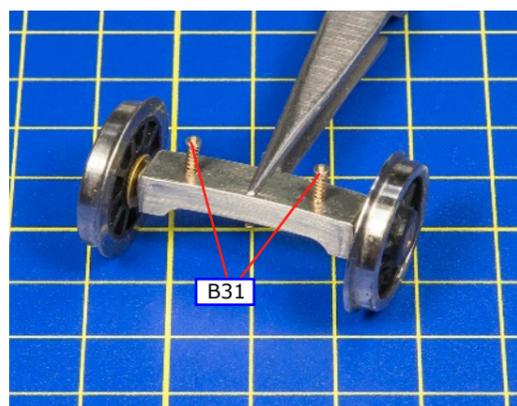


Fig 33.



Fig 34.

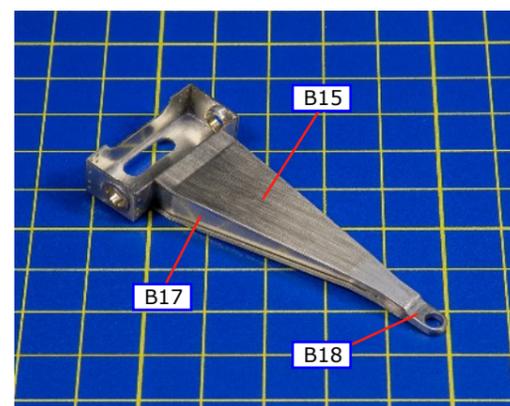


Fig 35.

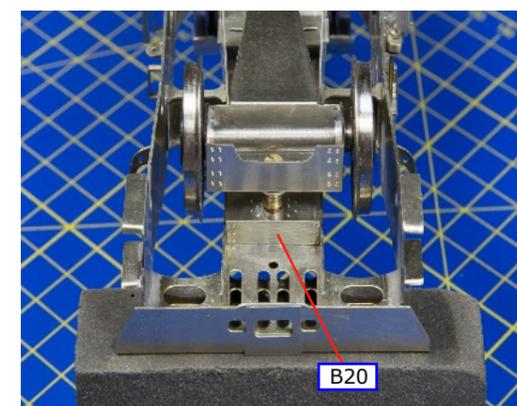


Fig 36.

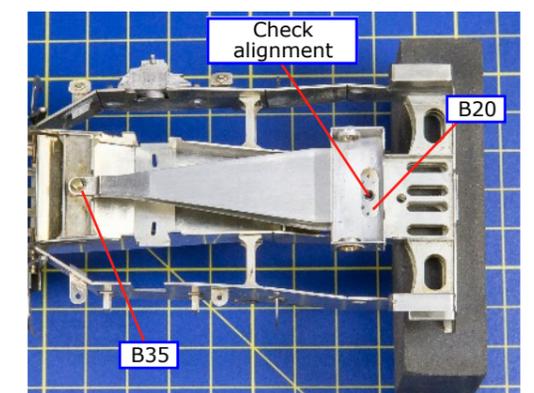


Fig 37.

BRAKES - 1

Note, many of the laminated brake parts have small tabs between each lamination, this allows the parts to be folded over and retain alignment during soldering, once soldered together then remove all cusps. All brake linkage pins are 1.0 mm and should be trimmed to represent the securing bolts; all pull rods are 0.8 mm. It is important to remove the cusps of all parts for neat and accurate fitting of the brake gear.

Begin by laminating all six brake hangers (B22), brake beams (B21A-C) and 1:1/2:1 levers (B23, B26). Insert short lengths of 1.0 mm wire 7.0 mm long into the ends of each brake beam, these will be trimmed back later.

Form the short, long and slack adjuster clevis (B25, B28, B29) by bending at their mid point around a 1.0 mm drill shank, each clevis has a hole for the pull rod and marks the middle of the bend. Take care forming the bends as the centre hole will be a natural weak point and the clevis will try to crease rather than bend smoothly. Once formed open out the hole for the pull rod to 1.0 mm.

Trim the rear brake shaft (Br22) to 20.0 mm wide and test fit in the rear brake J hangers, trim evenly from each side to ensure the cylinder crank is central and bevel the ends of the shaft to give a firm fit. Remove and attach two short clevis and secure with 1 mm rod. Repeat the process with the two rear brake cylinder links (B27) and brake cylinder pull rod (Br26). Refit the rear brake shaft whilst inserting the pull rod into the cylinder.

Laminate the upper swing links (B24) and fold the swing link bracket (B36) to hold the swing links, secure with 1 mm pins. Attach two short clevis to the lower holes and pin. Fold the swing link angle stay (F43) and attach the two swing link assemblies, note the recesses in the angle to ensure correct alignment. Attach the swing link angle stay and frame angle stay (F44) to the J hangers, see fig 40.

Trim the front brake shaft (Br21) to 20.0 mm wide and bevel the ends of the shaft and test fit in the front brake J hangers, ensure the cylinder crank is central and there is no play in the bearing. Remove and fit two short clevis to the top and the two slack adjuster clevis (B29) to the bottom and pin, note there are three holes to choose from on the slack adjuster clevis so temporarily pin the slack adjuster clevis for now. Attach the front brake cylinder rod and pin, then fit the assembly to the frames.

Ensuring the brake cranks are level and the swing links perpendicular cut and add the 0.8 mm pull rods between the short clevis links and secure. As a guide the rear pull rods are 28 mm long and the front are 37 mm long, please measure your model, trim as required for an accurate fit. If the linkage is made fixed then the brake cranks need to be angled down by approximately 20° and the swing link rotated forward accordingly.

Attach the resin brake shoes to the brake hangers (B22) and pin with 0.8 mm wire, note the brake shoes are handed and contact face tapered; the inside is marked with three dots. Attach the hangers to the castings and pin with 1.0 mm wire for the intermediate and front brakes, for the rear attach the 1.0 mm wire to the frames at the hinge point.

Fit two short clevis to the rear brake beam (B21C) and pin, then attach the beam between the two rear brake hangers.

Fit four brake beam links (B30) to the intermediate brake beam (B21B), note one above and one below the beam, as before, pin and trim to replicate the securing fixings. Attach a short clevis to the middle hole of the 1:1 lever (B23) and attach one end to the links B30 and pin, fig 38-39. Note the flat edge of the 1:1 lever faces forward. Finally, fold and pass the long clevis (B28) over the beam from the rear and secure to the 1:1 lever; attach the beam to the intermediate brake hangers.

Fit four brake beam links to the front brake beam (B21A) as per the previous brake beam. Fit a short clevis to the middle hole of the 2:1 lever (B26) and attach the long end to the links (see Fig 28), note the flat edge of the 2:1 lever faces forward. Fold and pass the long clevis over the front beam and secure to the 2:1 lever; attach the front brake beam to the front brake hangers.

Temporarily fit the wheels and ensure all brake shoes are in contact with the treads and then fit the lower 0.8 mm pull rods between the beams. As a guide the rear pull rods are 44.5 mm long and the intermediate pull rods are 41.0 mm long, please measure your model, trim as required for an accurate fit.

Once the pull rods are fitted, release the brakes to leave a small gap between the shoe and rim, trim the cast slack adjuster (Br23) and in conjunction with three hole clevis adjust the length to fit between the front brake beam short clevis and front brake shaft casting.

See following brakes - 2 on page 9 fig 40 - 42 for detailed photos.

No.	Description	Sheet
B21	Brake Beams A-C	F6
B22	Brake Shoe Hangers (6)	F6
B23	Brake 1:1 Levers (2)	F6
B24	Brake Upper Swing Links (4)	F6
B25	Brake Clevis Short (14)	F6
B26	Brake 2:1 Levers (2)	F6
B27	Brake Cylinder Rear Links (2)	F6
B28	Brake Clevis Long (4)	F6
B29	Brake Slack Adjuster Clevis (2)	F6
B30	Brake Beam Links (8)	F6
B36	Brake Swing Link bracket (2)	F6
F43	Brake Swing Link angle Stay	F2
F44	Frame Angle Stay	F2
Br21	Brake Shaft Front	
Br22	Brake Shaft Rear	
Br23	Brake Slack Adjuster (2)	
Br26	Brake Cylinder rods (2)	
	Resin brake shoes (6)	

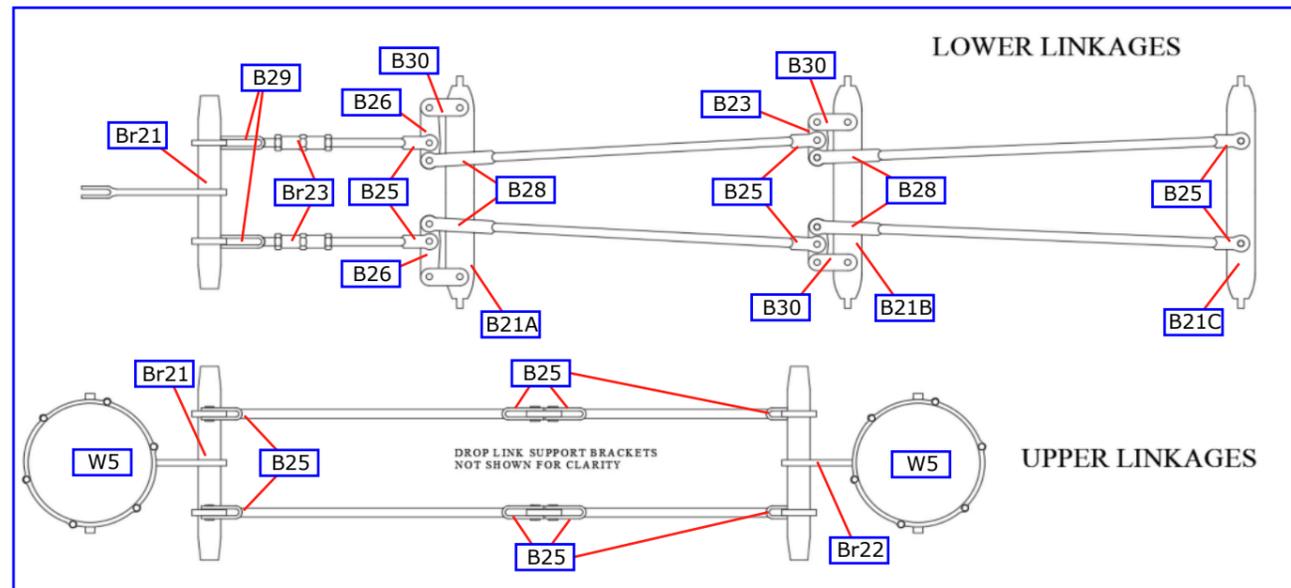


Fig 38.

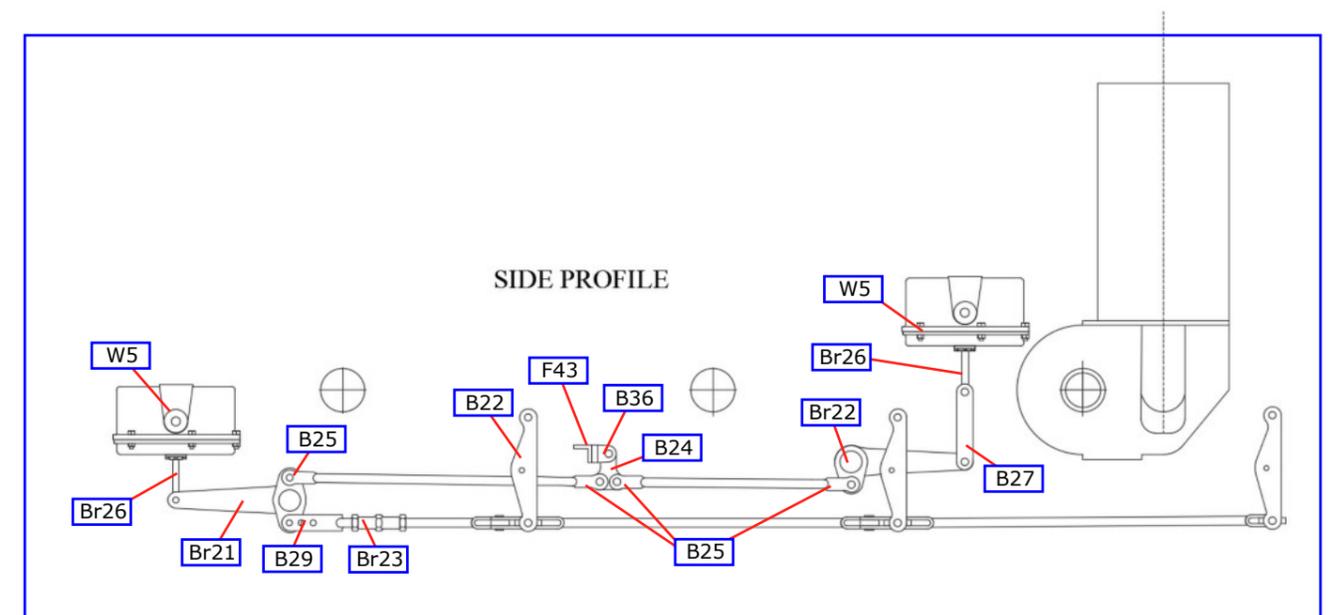


Fig 39.

BRAKES - 2

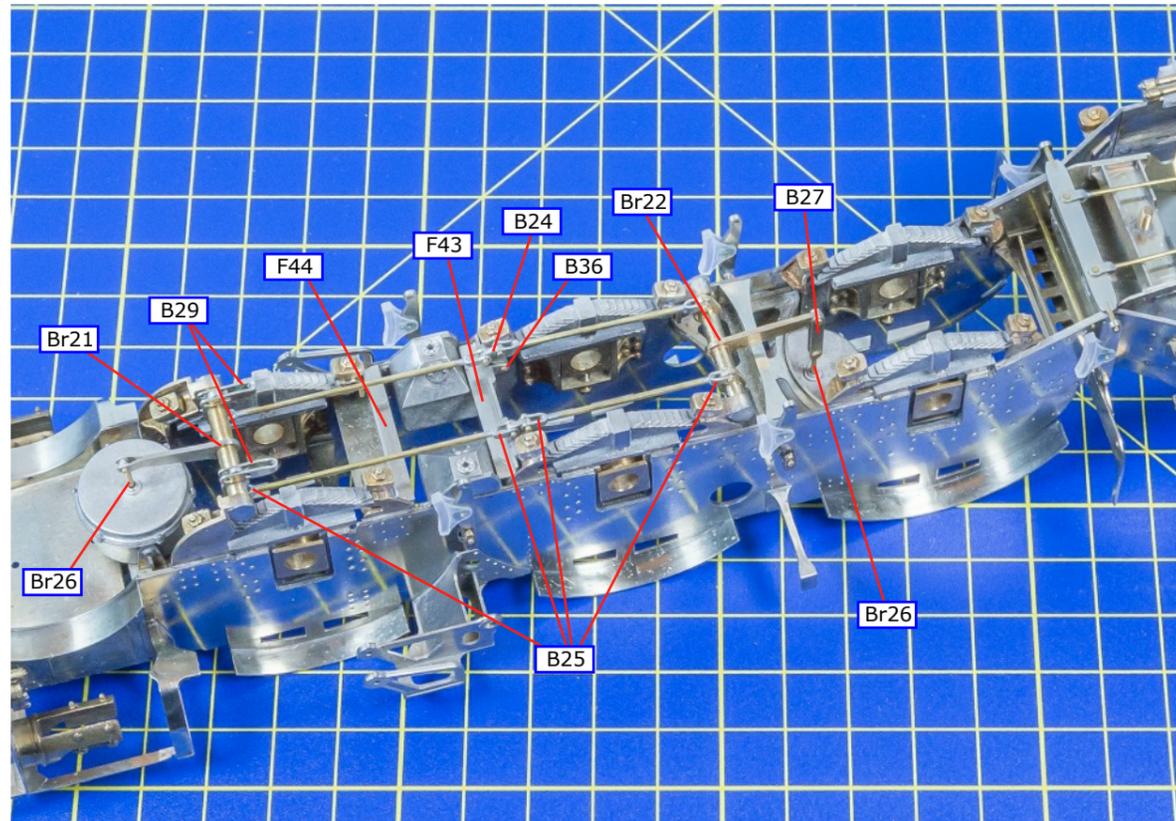


Fig 40.

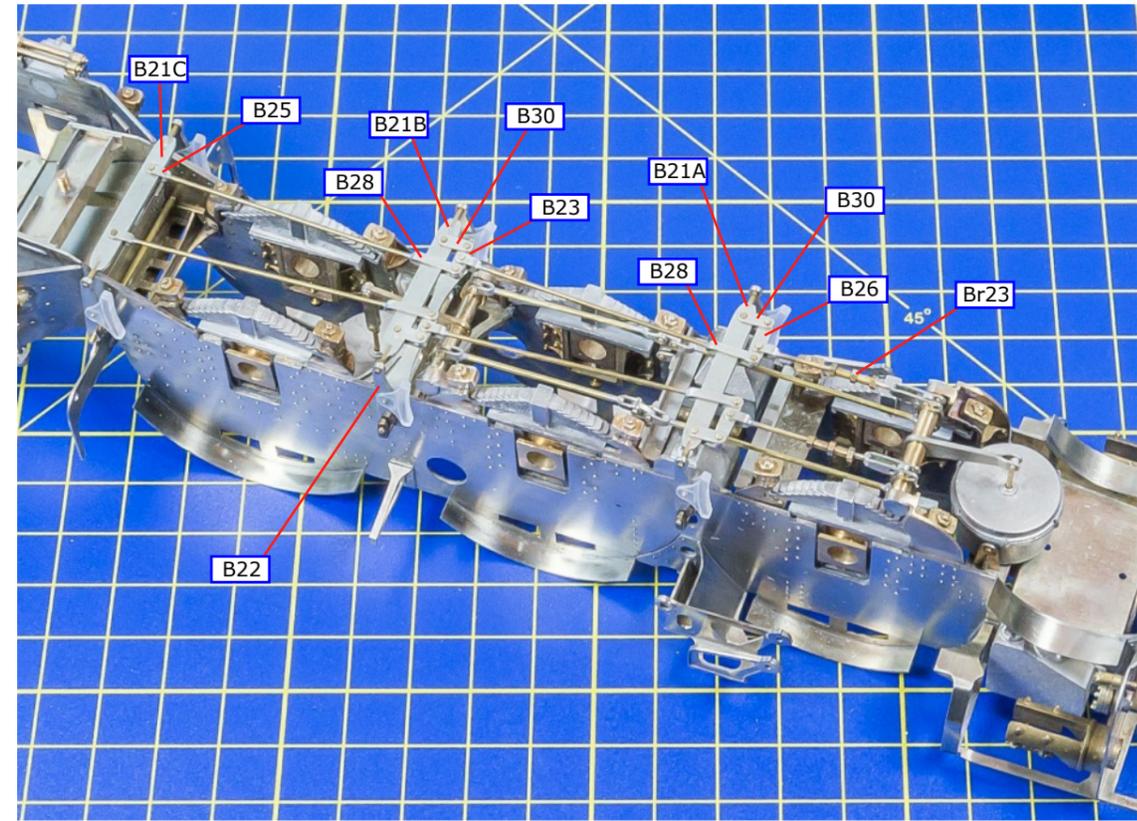


Fig 41.

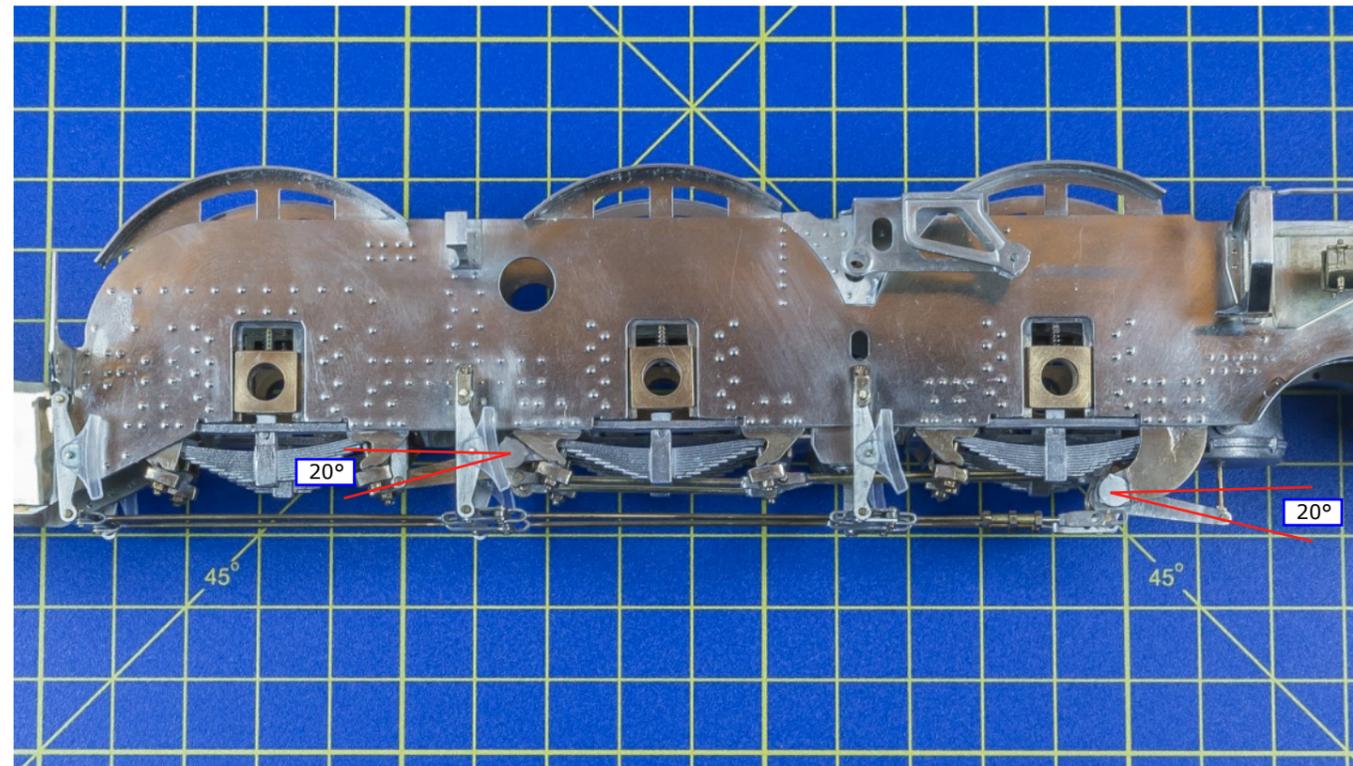


Fig 42.

MOTION - 1

Slidebars.

Fold the lower slide bar (F194) assembly to form three layers, note the bends at the end are on the outside, solder the lamination but not the jogged section. Bend the bars to give a running clearance with the crosshead, typically 9.0 mm and then solder the jogged section, clean the edges and trailing end to give neat square sides. Using a 0.8 mm pin at the front, secure the lower slidebar to the upper slidebar (F196), further pins at the rear will ensure alignment but should not be fixed yet.

Attach a cylinder slidebar fillet (F171) to the inside of the assembled slidebars, the lower web/tang will need to be jogged to clear the stuffing gland. Attach the slidebars to the cylinder rears and slidebar bracket, finally fit the remaining fillet to the outside of the slidebar, see fig 46.

Coupling Rods.

Laminate the coupling rod halves (M5 & M6) and fit the boss overlays (M7) to the respective bosses, there is a boss overlay inside and outside. Pin the two coupling rods together with a 1.60 mm pin.

Connecting Rods.

Laminate the connecting rod halves (M3) and add the boss overlays (M4) inside and out. Attach the drop links (M33, M36) to the crossheads (N2), note they are handed with the oil cork stub to the rear and recessed faces outward. Test the crosshead in the slide bars and trim as required to give a smooth fit. Attach the connecting rod and pin with a 1.6 mm dowel. After final assembly fold the slidebar packing plates (F195) and solder together, clean the edges and using short lengths of 0.8 mm wire fit into the rear of the slide bars, due to the casting process it may be necessary to trim the rear of the crosshead slide to clear the packing piece at full stroke. Fig 48A

Eccentric Rods.

Attach the eccentric rod clevis (M9) to the inside of each eccentric rod (M8) and attach the bearing cover (M10), note these are handed, there is a small bulge on the cover which goes at the top. Fix a short length of 1.20 mm wire into the bearing hole. Fit the return crank (M31), note these are handed (see fig 45 for LH profile), secure in place with the eccentric rod washer (M44) to the rear, ensuring the crank is free to rotate.

Expansion Link & Radius Rod.

Open the holes out to accept 0.50 mm wire and add short lengths as alignment aids and laminate the two halves (M37) to form the core of the expansion links, note these are handed. Lay the expansion link core on top of the radius rod (M21) and then add the radius rod rear overlay (M22) on top trapping the expansion link core between the two. Finally, fit a small 1.20 mm pin through the radius rod and expansion link to allow the rod to slide up and down and dress flush.

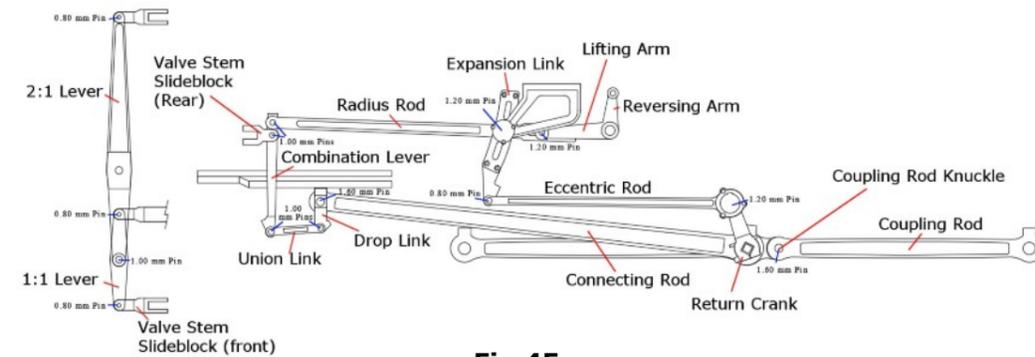


Fig 45.

Open out the holes on the expansion link outer laminations (M38) to fit the 0.5 mm alignment pins and add the detail overlay (M39) to the outside, note the raised areas on M38 face toward the core. Attach a short length of 1.20 mm wire to each outer piece (expansion link bearings) and ensure the inside is dressed smooth. Trim the 0.50 mm alignment pins to small stubs that fit inside the outer pieces and attach the outer pieces to form the finished expansion link, ensure the radius rod is still free to move up and down. Attach the radius rod fork joint (M23) to the inside of the radius rod at the front and attach to the eccentric rod with a 0.8 mm pin. Finally, carefully fit the expansion link bearing covers (F55).

Trim the expansion link bearing shafts so that the assembly fits into the motion bracket, by gently easing the bracket it is possible to insert the expansion lever assembly.

Combination Lever and Links.

Bend the offset in the combination lever (M32), attach the combination lever to the radius rod with a 1.0 mm pin. Laminate the two halves of the union link (M27) and pin to the combination lever with 1.0 mm pin.

Fold and laminate the halves of the valve stem rear slide blocks (M25) the bend is on the outside. Once soldered remove the tab remains and dress smooth. Add a length of 1.60 mm rod 19 mm long into the fork and secure. Finally attach the assembly to the outside of the combination lever with a 1.0 mm pin, adjust the combination lever offset as required to retain clearances. Fig 45,46.

Reversing Lever.

Join the two L shaped arms together (M45) so that the reversing arm parts are back to back then add the lifting arm laminations (M47) to the outsides.

Laminate the lifting arms (M46) to the overlays (M47) back to back to form two arms. Join the two arms together at the larger bearing making sure the boss for the radius rod bearing is to the outside.

Slide a length of 2.0 mm rod through the frames and attach the drivers side reversing arm, align so that it fits either side of the radius rod and secure with a 1.20 mm pin. Slide on the firemans side lifting arm assembly and align with the radius rod so that it fits between the arms and secure with a 1.20 mm pin. Align the firemans arm with the drivers side and secure to the 2.0 mm cross shaft.

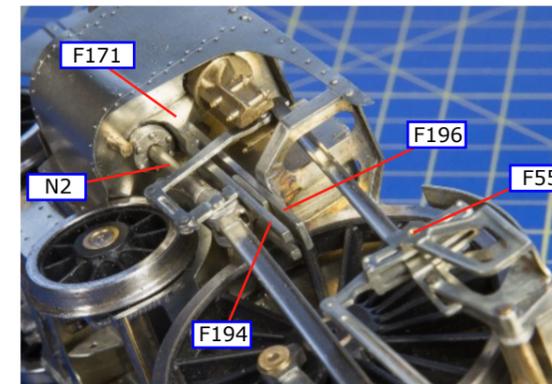


Fig 46.

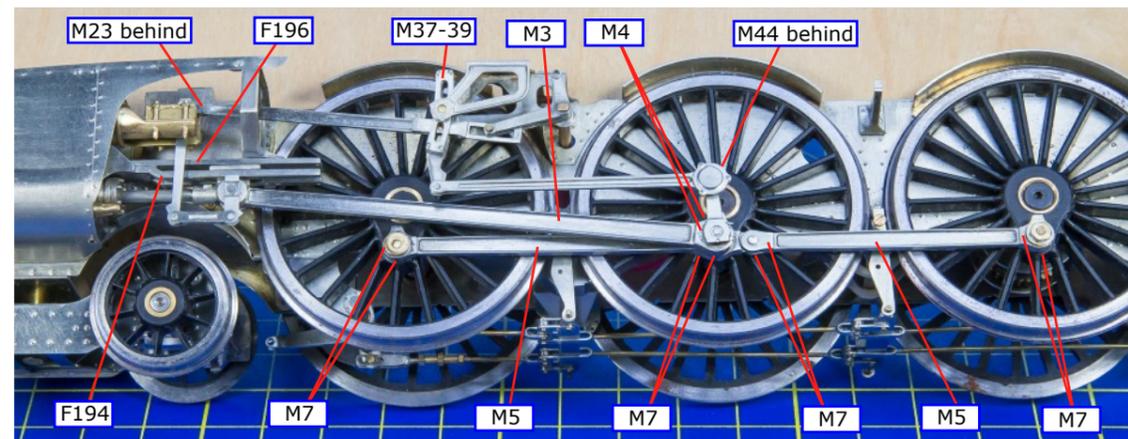


Fig 47.

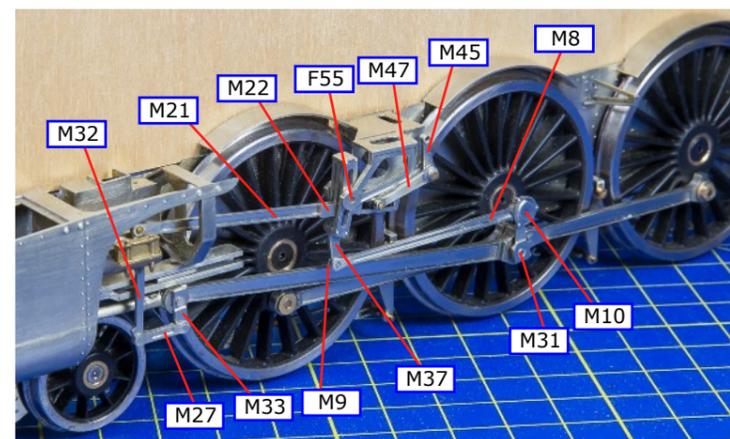


Fig 48.

No.	Description	Sheet
F55	Expansion Link Bearing Cover	F1/2
F171	Cylinder Slidebar Fillet	F5
F194	Slidebar Lower Lamination (3)	F5
F195	Slidebar Packing Plates (3)	F5
F196	Slidebar Upper Lamination (2)	F5
M3	Connecting Rod Laminates	M1
M4	Connecting Rod Boss Overlays	M1
M5	Coupling Rod LH	M1
M6	Coupling Rod RH	M1
M7	Coupling Rod Boss Overlays	M1
M8	Eccentric Rod	M1
M9	Eccentric Rod Clevis	M1
M10	Eccentric Rod Bearing Cover	M1
M21	Radius Rod	M1
M22	Radius Rod Rear Overlays	M1
M23	Radius Rod Fork Joint	M1
M24	Valve Stem Slide Blocks Front	M1
M25	Valve Stem Slide Blocks Rear	M1
M26	Middle Cylinder Valve Connecting Link	M1
M27	Union Link Laminations	M1
M31	Return Crank LH	M1
M32	Combination Lever LH	M1
M33	Drop Link LH	M1
M34	Return Crank RH	M1
M35	Combination Lever RH	M1
M36	Drop Link RH	M1
M37	Expansion Link Core Laminations	M1
M38	Expansion Link Outer Laminations	M1
M39	Expansion Link Overlays	M1
M44	Eccentric Rod Washers (4)	F5
M45	Reversing Arm LH	M1
M46	Lifting Arm RH	M1
M47	Reversing/Lifting Arm Overlays	M1
N2	Crosshead	

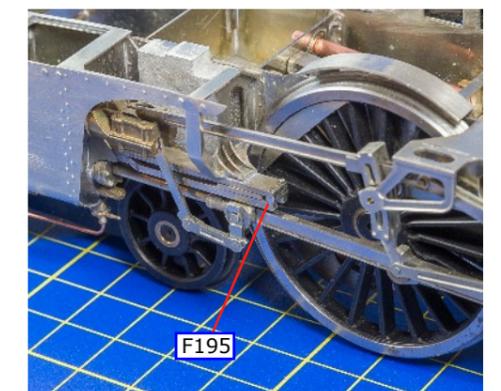


Fig 48.

MOTION - 2

Lubricator Linkages.

Attach the lubricator eccentric rod fork joint (M12) to the rear of the lubricator eccentric rod (M11) and then attach the bearing cover (M13), there is no specific orientation so long as the bolt flanges line up. Attach a short length of 0.70 mm rod into the hole in the rear of the eccentric rod bearing.

Fit the return crank (M14) over the stub and secure in place with washer (M42), ensure the crank rotates freely around the pin.

With a 0.70 mm pin, secure the inner drive link (M15) to the forked end of the eccentric rod, note the oil pot on the bottom bearing faces the front of the engine.

Laminate the two halves of drive links (M17) together so that each end has a forked joint, the front face has a depression in the middle, the rear face is flush. Using 0.70 mm pins fit the drive links to the outer lever (M16). At the other end pin the lubricator arms (M18) into place with 0.70 mm wire. Note the outside of the lubricator arms is the side with the enlarged upper boss on.

Fold up the lever bracket (M20) note lower curved bearing surface faces forward, see fig 49. Thread a 7.0 mm length of 0.7 mm wire to represent the shaft through the front bearing, then the outer drive lever (M16), the inner drive lever (M15) and finally through the rear bearing.

For full operation each lever (M15 & M16) will need to be soldered to the shaft but the shaft must remain free to rotate in the bearing housing, ensure the front and rear levers line up with each other and are at the ends of the shaft inside inside the bracket to limit end float and then secure.

For partial operation simply fix the shaft in place in the bearing, this will allow the rear return link to move freely with the eccentric rod but the lubricator links will remain static.

Fold up and attach the lubricator shelves (F71A-B) to the rear boiler stay, the leading shelf F71A sits on top of the flange, the rear shelf F71B underneath the flange, this gives a stepped set up to match the footplate. The lubricator casting fixing hole needs to be 10 mm from the outside face of the main frames. Attach the lubricator castings (Br4) to the shelves, note the lid clamp is to the rear.

Attach each lubricator arm (M18) to the lubricator shafts and retain in place with the hand wheels (M19). Ensure the radius rods are free to move.

Carefully align the bearing housing assembly (M20) so that the lubricator linkages are vertical and secure to the underside of the lubricator bracket, there is a cut out in the rear lubricator shelf to aid alignment and ensure a flat fixing surface.

Finally fit the return crank to the nut retaining the rear coupling rod. The return crank should be perfectly in line with the main crank, there is no offset.

2:1 levers.

Laminate the short 2:1 lever laminations (M29) to the main lever (M28), note the bosses on the laminations face inboard toward the 1:1 lever. Attach a 2:1-1:1 washer (M41) to the underside of the 1:1 bearing. Attach two 2:1 lever bearing washers (M48) above and below the main bearing.

Laminate the two parts of the middle cylinder valve connecting link (M26) and fit a short length of 1.6 mm rod 11.0 mm long (this may need trimming later) into the rear, now add a dummy pin from 0.8 mm wire and two washers (M43) to the cylinder end. Pin the front fork to one end of the 1:1 lever (M30) with 0.8 mm wire. Dress to give a smooth finish so that the fork joint passes smoothly between the 2:1 laminations, these may need a slight bow outward to clear the middle rod bearing and give a smooth operation.

Fold (the fold is on the outside) the front valve stem front slide blocks (M24) and solder the laminations, trim the fold tab once completed. Attach a length of 1.60 mm rod 19.0 mm long to the fork end and secure. Attach a washer (M43) to one side of the pivot, this will form the lower bearing.

Solder the other washer to a short length of 0.80 mm wire to form a pin, leave the wire just proud of the washer to replicate the lubricator pot. The pin length should pass through the slide block and protrude from the bearing/washer fitted below. Repeat for the other outside cylinder.

Pass the 2:1 lever through from the LH side as far as it will go out through the RH side, note fluted side faces upward. Carefully thread the inside connecting link through the LH opening in the frames and LH opening in the 2:1 lever stay, pass the valve rod into the middle cylinder casing.

Form a pin from 1 mm rod and washer (M41), make the pin long enough to pass through the 2:1 and 1:1 lever and protrude from the base.

Slide the 2:1 lever back over the 1:1 lever and secure the two with the pin, secure the 2:1 lever with a 12BA screw from below, a little Loctite on the thread will prevent it unscrewing.

Fit the valve stem front slide block assemblies past the conjugated lever into the outside cylinder blocks, ease the forked ends over the 2:1 and 1:1 levers and then use the small 0.8 mm pins made earlier to secure in place. A small dab of thread lock or Loctite in the lower pin bearing washer will hold the pin and reduce the risk of seizing the whole joint.

To set the 2:1 lever up, ensure the engine is in mid gear. Set the RH motion to Bottom Dead Centre (BDC), adjust the 2:1 and 1:1 levers to be parallel and straight across the engine, join the front and rear valve stems. Repeat the process on the LH side.

There are several methods to join the valve stems, 1.6 mm ID brass tube, electrical wire insulation or soldered link. If the tube method is used, fit the tube to the rear valve stem before fitting the front valve stems which is then inserted into the tube.

No.	Description	Sheet
F71A	Lubricator Shelf Front	F2
F71B	Lubricator Shelf Rear	F2
M11	Lubricator Eccentric Rod	M1
M12	Lubricator Eccentric Rod Fork Joint	M1
M13	Lubricator Eccentric Rod Bearing Cover	M1
M14	Lubricator Eccentric Crank	M1
M15	Lubricator Drive Lever Inner	M1
M16	Lubricator Drive Lever Outer	M1
M17	Lubricator Drive Links	M1
M18	Lubricator Arms	M1
M19	Lubricator Hand Wheel	M1
M20	Lubricator Lever Bracket	M1
M24	Valve Stem Slide Block Front	M1
M26	Middle Cylinder Valve Connecting Link	M1
M28	2:1 Lever	M1
M29	2:1 Lever Laminations (2)	M1
M30	1:1 Lever	M1
M40	Middle Connecting Rod/Overlays	M1
M41	2:1-1:1 Lever Boss/washer	F6
M42	Lubricator Return Crank Washers (2)	F5
M43	2:1 Lever Washers (8)	F5
M48	2:1 lever Bearing Washers (2)	F5
Br4	Lubricator Casting (2)	
	12BA screw 2:1 lever	

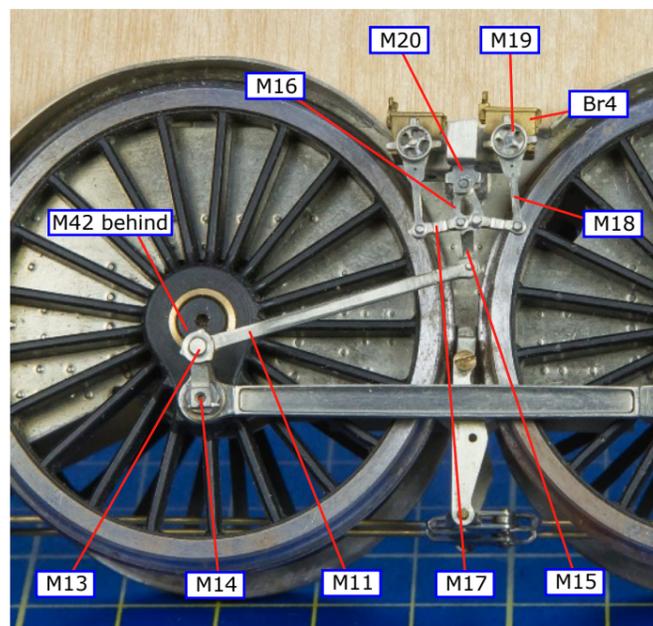


Fig 49.

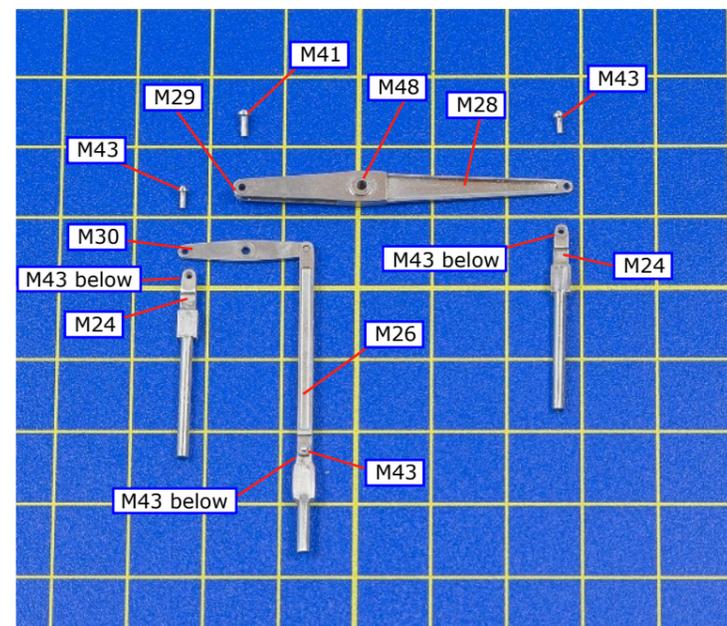


Fig 50.

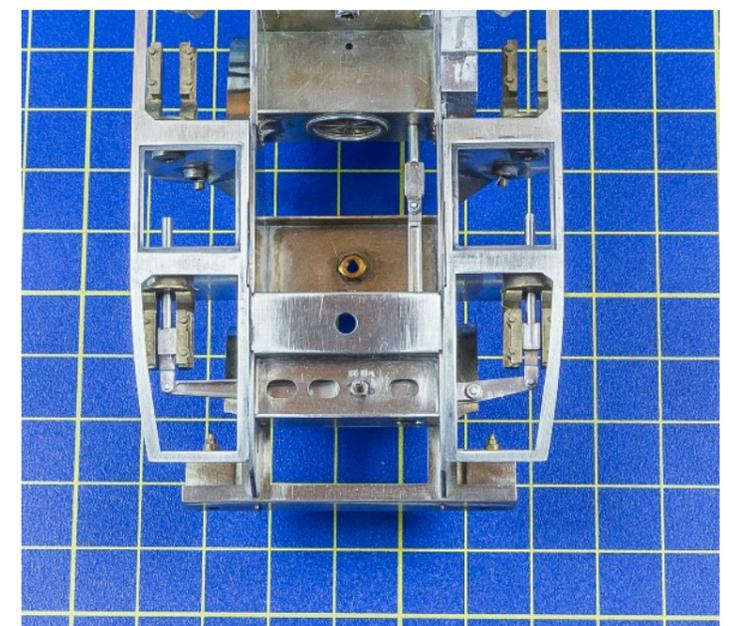


Fig 51.

FOOTPLATE - CASING

Footplate. Carefully remove the cusp from the outside edges of the footplate (F150) note the step near slidebar bracket, ensure this is not lost. Add the strengthening plate (F153) and fold up the intermediate strengthening plate *NOTE to strengthen this area, the fold up plate has been replaced with another soldered plate (F153), finally add the two 6BA nuts to the front and rear fixing locations.

Temporarily test fit the front end and check that the footplate outer edge profile matches the cylinder valance plates (F190, F191) below, the footplate should be slightly narrower (0.2-0.3mm), adjust accordingly. Remove the footplate and attach the footplate overlays (F151, F152) (**Handy tip, solder the outside edge with high temp solder to stop the overlay buckling when the valance is added later**), alignment at the rear is via the three cab slots, mid and front alignment is with the small etched lines along the top of the footplate, note these are a guide. Before final fitting ensure the overlay overhangs the footplate at the cylinder valance area, 0.4 mm is ideal. Once the main overlays are fitted then trim and fit the rear overlay (F172) to fit between. There is no overhang at the rear, trim all overlays flush at the rear. See fig 52

Casing. The casing is made from a resin plastic, take care with any dust produced during working, particularly with respect to breathing. Wash the casing in warm water with a mild detergent, Lanolin free is best, to remove any release agent residue.

The casing has sacrificial edges added to the base and rear, these are to strengthen the area, provide a guide for trimming and protect the casing during shipping. Due to casting shrink rates the rear edge adjoining the cab may not need trimming or completely removing. Test fit and trim the rear edge as required. Before trimming mark the casing along the inside of the edge with black marker pen, fig 53.

On the base it is unlikely all of the edge will need to be removed (except firebox area), just enough to give a sharp smooth lip along the lower edge, fig 55. Take care as the material is softer than

many normal resins, work slowly and constantly check to ensure too much is not removed. Periodically test fit the casing to the footplate the lower lip should fit neatly between the raised edges on the overlays. Fig 54 - 55

At the front end remove the edge so that the footplate and overlay give a smooth transition to the buffer streamlined fairing, fig 56.

In some cases the lower edge of the casing maybe bowed in or out slightly, this can be adjusted by placing the casing in hot water and easing the casing into shape.

Once the casing work is complete and the joint satisfactory (it is normal for small gaps to be present requiring filling later) hold the footplate in place and mark the eight fixing screw locations on the casing; pre bending the footplate to follow the arc will help this process.

Drill the holes 1.5 mm, take care with the side fixings, ensure the hole is straight and perpendicular to prevent damage to the outside surface. Form the bend in the footplate under the cab, take care with the overlays to ensure they do not buckle when bending, use either the cab base or valance as a guide to the angle required.

Fit the footplate to the casing using the self tapping screws, do not bond with an adhesive yet. Test fit the assembly onto the chassis and check alignment, note the side fixing screws will impact the motion bracket and outside sand box so can be removed for the test fit process. Check the cab front slots are clear of the casing, fig 57.

It may be necessary to trim the height of the cab support brackets (F9, F65) and firebox front stay (F29) to give a perfect and level fit at the rear, fig 58.

No.	Description	Sheet
F150	Main Footplate	F4
F151	Footplate Overlay LH	F4
F152	Footplate Overlay RH	F4
F153	Footplate Strengthening Plate	F4/5
F172	Footplate Overlay Rear	F4
	6BA Nut (2)	
	Self Tapping Screws (8)	

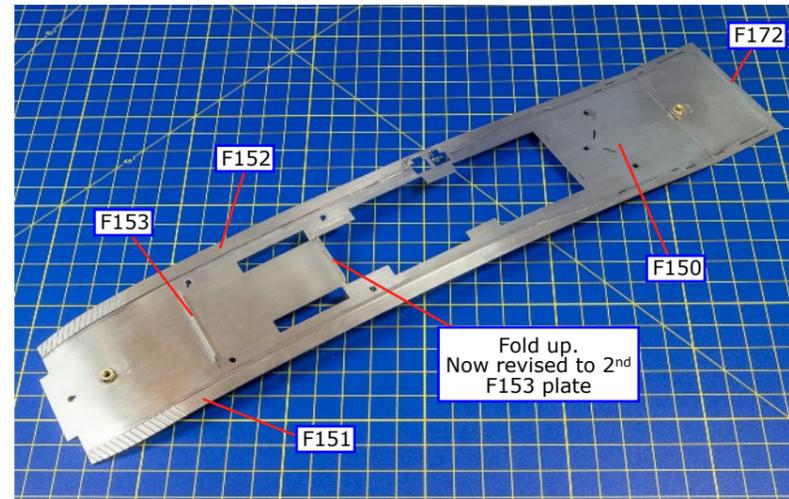


Fig 52.

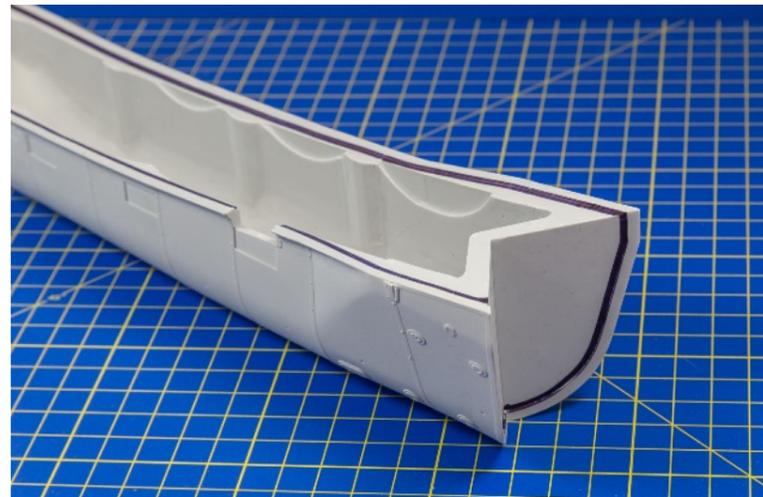


Fig 53.

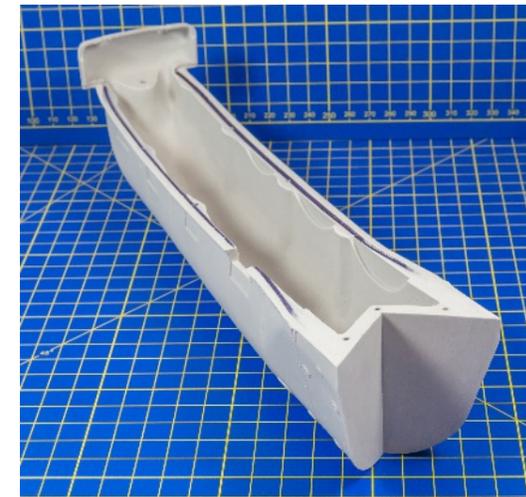


Fig 54.

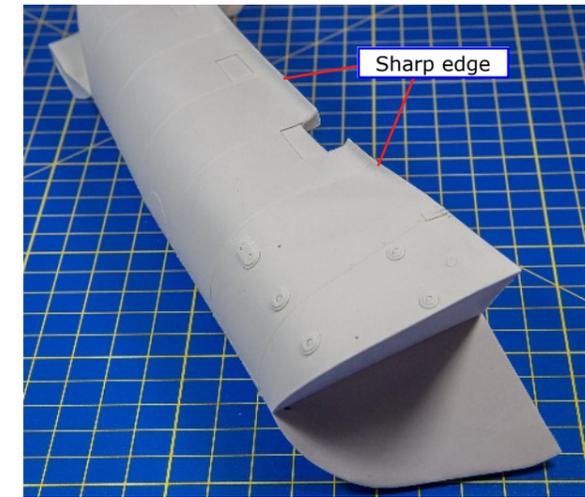


Fig 55.

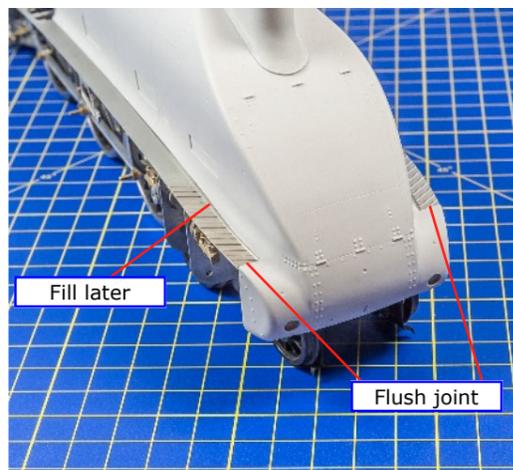


Fig 56.

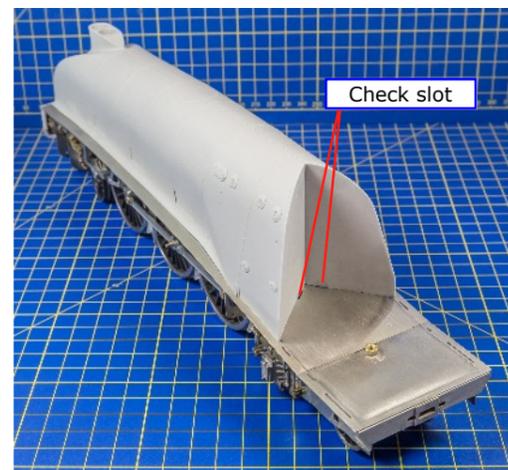


Fig 57.

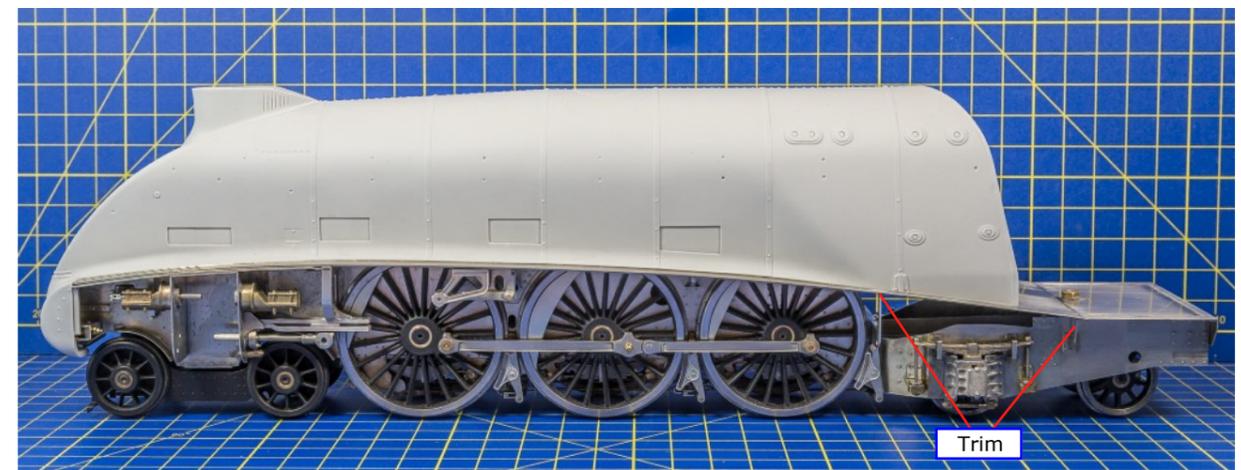


Fig 58.

CAB - STRUCTURE

Cab Floor.

Fold rear of part of the cab floor (C2) down and two side fillets to form rear footplate support, attach floor support (C3) to the underside, ensure it is fitted at 90°. Fig 56.

Press the rivets on the dias bases (C9, C11) and fold to fit the tops (C8, C10), attach the appropriate base to its top and secure, leave a thin ledge around the top to replicate the flange. Secure each dias to the footplate. Fold the firebox step side (F192) and fit to the top (F193) and secure to the footplate, ensure the front edge aligns with the driver and firemans dias. Note firebox step is offset to the left. Fig 57.

Fold the steam cock lever base (F176) and sanding lever base (F177), attach to the drivers and firemans dias (fig 57), note there is a 1mm gap around the sanding lever base on the dias. Insert two lengths of 1 mm wire into the front of the steam cock lever base and bend to jog around the firebox. Finally insert the levers (Br32, Br33) note orientation, lever to the outside. Fold up the foot rest sides (F158) and attach the tops (F157) and fit to the dias on each side.

Cab Sides.

Press the rivets on the cab outer side (C1) for the washout plug flange, attach the cab walls (C6, C7) to the inside, use the handrail knobs holes to aid alignment. The rear internal beading is supplied as an etch (C4, C5) or it can be replaced with 1.0 mm D shaped wire if preferred (not supplied). Fit the beading of choice in the rebate at the cab rear on each side and then fit the cab door hinges (C43), note they are handed. The base of the lower hinge is 5 mm from the bottom of the beading, the upper hinge base is 17 mm from the bottom of the beading, use the cab doors (C42) to double check alignment.

Attach the riveted joint straps (C20) to each cab side, the strap runs just below the handrail knob holes and above the seat brackets (fig 58). At the base of the cab sides, fit the cab wash out plates (C23), ensure they are centred on the holes in the cab sides. Washout plugs can be represented by 1 x 1 mm square rod or 1.0 mm round rod with the end squared off. Insert the plugs into the holes and trim the rear to clear the cab floor when fitted. Finally, fit the sanding cock and sanding lever guides (F181, F182) to the cab sides, note they are different lengths to fit the relevant slots.

Fold the sides and ends over on the cab window frames (C38), note the folds are on the outside and these form the internal window runners and end stops, ensure the edges are cusp free and smooth. Attach the window frame covers (C37) to each frame, these go on the inside of the frames. Ensure the half etch rebate is toward the outside and the three dots are at the top facing into the cab. Now attach the window bolt strips (C24) to the above assembly.

Laminate two sliding window frames (C39) together with the rebate on the inside, ensure the slot at the top and the internal rebates are solder free, the top edge of the slot should be smooth to prevent scratching of the glazing when inserted. Test fit the sliding window into the frames by sliding it under the top bolt strip and then dropping down into the lower runner.

Press the rivets and fold the cab seat supports (C16) to form a triangle and fit into the recesses in the cab sides. Carefully bend the seat backs (C30) to fit the seat base (C25) and secure. Fit the base to the supports and add the seat cover (W10).

On the inside of the cab front, fit the inner spectacle plates (C12), these are handed and the rebated edge faces forward; take care when soldering to not fill the hidden rebate with solder as this will prevent glazing later. Ensure there is a gap at the top into which the glazing will be inserted later, these edges should be as smooth as possible to prevent marking the glazing during insertion.

At the front edge of the cab wall score a line from top to bottom on the inside of the cab outer with a scawker, this is to aid bending. On the outer edge of the spectacle plate next to the score line file a chamfer, this will give added clearance between the spectacle covers and the side walls once bent. Fig 60.

Carefully bend the cab to form the V front and test fit on the footplate, the crest of the cab front should be just proud of the resin casing. Once the angles are correct then remove the cab sides and insert the floor into the slots on the cab sides and re test the fitting on the footplate ensure the centre tab on the cab floor support fits into the slot in the footplate by the fixing screw. Once satisfied that all is square and fitting correctly then secure the floor to the cab sides, but not the footplate yet.

On the cab front are four fixing holes, mark the resin casing through these holes and remove the cab, drill the fixing holes 1.5 mm and refit the cab and secure with self tapping screws. Test fit the footplate to the engine to check alignment, trim the cab base to match the resin casing if required.

Form the backhead extension cover (C29) to match the white metal backhead (remove 1 mm from the backhead base first, the casting will require other modifications later, see page 17) and fit to the cab, it may be necessary to trim to get a good fit depending on the V angle, casing edge removal and other small variations during the build process. Once fitted add the safety valve fittings (Br5) to the top. Fig 59.

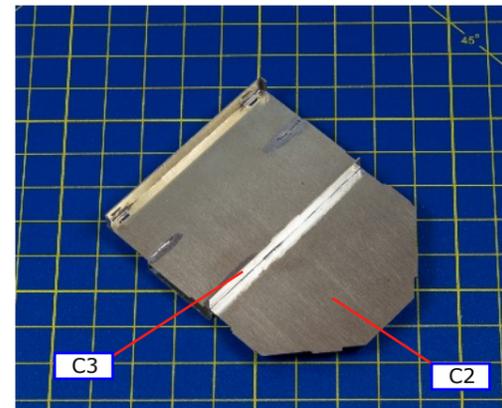


Fig 56.

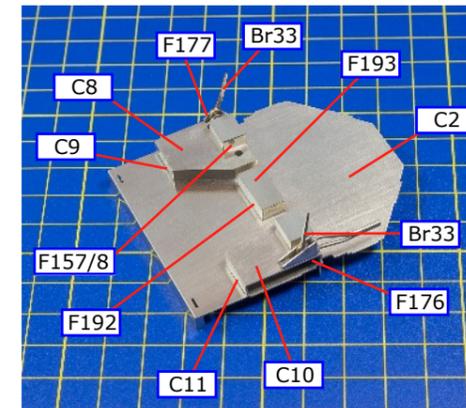


Fig 57.

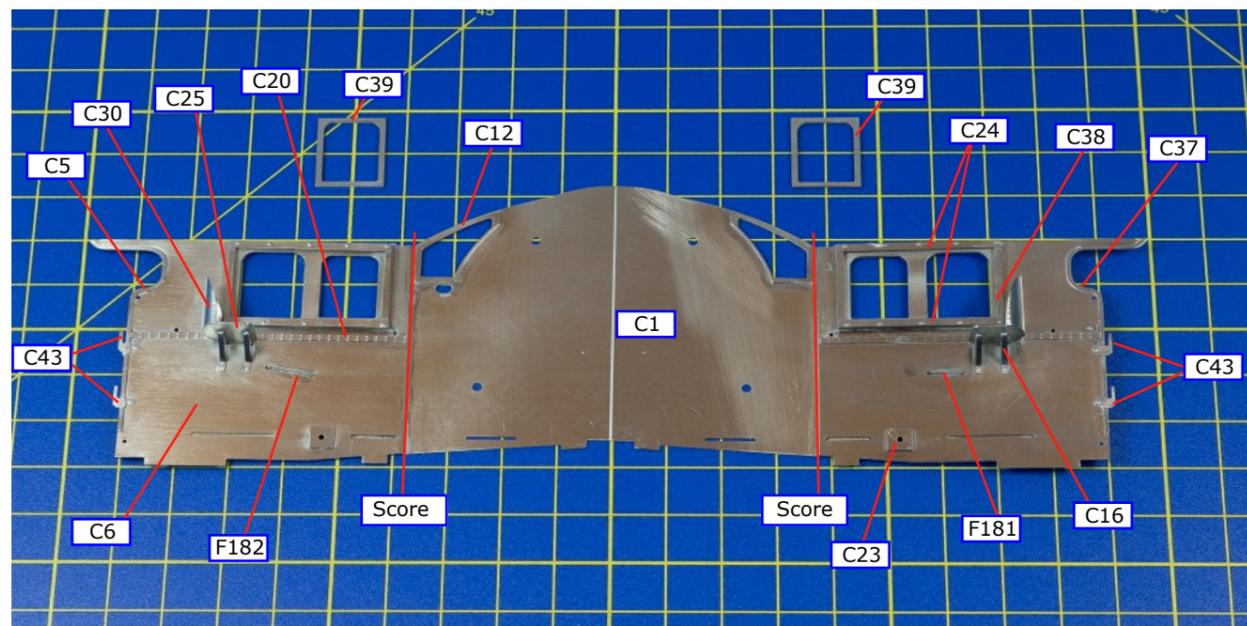


Fig 58.

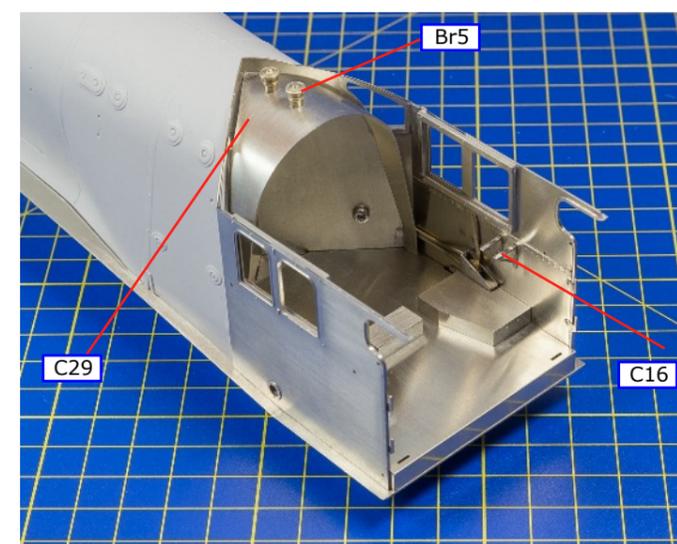


Fig 59.



Fig 60.

No.	Description	Sheet
C1	Cab Outer	C1
C2	Cab Floor	C1
C3	Cab Floor Support	C1
C4	Cab Beading RH	C1
C5	Cab Beading LH	C1
C6	Cab Wall LH	C1
C7	Cab Wall RH	C1
C8	Cab Dias LH Top	C1
C9	Cab Dias LH Base	C1
C10	Cab Dias RH Top	C1
C11	Cab Dias RH Base	C1
C12	Cab Front Spectacle Inner (2)	C1
C16	Cab Seat Supports (4)	C1/2
C20	Cab Wall Joint Strap (2)	C1
C23	Cab Washout Plug Plates (2)	C1
C24	Cab Window Bolt Strips (4)	C1
C25	Cab Seats (2)	C1
C29	Backhead Extension Cover	C2
C30	Cab Seat Backs (2)	C2
C37	Window Frame Covers (2)	C2
C38	Window Frames (2)	C2
C39	Sliding Windows (4)	C2
C43	Cab Door Hinges	C3
F157	Foot Rest Top (2)	F4
F158	Foot Rest sides (2)	F4
F176	Steam Cock Lever Base	F4
F177	Sanding Lever Base	F4
F181	Steam Cock Lever Guide	F4
F182	Sanding Lever Guide	F4
F192	Firebox Step Side (2)	F4
F193	Firebox Step Top (2)	F4
Br5	Safety Valve (2)	
Br32	Sanding Lever	
Br33	Steam Cock Lever	
W10	Seat Cover (2)	

CAB - BACKHEAD

Backhead.

If you wish to make the backhead removable for painting (recommended) then the casting will need to be modified (reduce by 1 mm overall width). Carefully make two cuts 9 mm long on each side from the base near the front corner. Carefully bend the sides in so the maximum width is no greater than 53 mm, 52.8 mm is perfect. Solder the cut with 100 degree solder from the inside and dress the corner back to make good. This joint will not be seen but will allow the backhead to drop in vertically past the window frames, see fig 61, 62.

Drill out the holes in the backhead casting (W3) 1.5 mm to accept the steam manifold (Br15) and the two Injector valves (Br13/14) 1.3 mm and the water gauges (Br16) 2.0 mm. Remove the shut off valve handles on the outside of the gauge glass fitting, leaving only the inside and drain valve handles, drill the drain hole 0.4 mm.

Carefully drill the backhead regulator brackets 1.0 mm to accept the regulator rods made from 1.0 mm wire and fit the rods in place. It is easier to make these as two rods rather than trying to drill the centre casting to take a single rod across the backhead. Make sure there is enough rod protruding from the left and right brackets to attach the regulator levers (C54) on each side.

Drill the whistle lever brackets with a 0.5 mm hole, fit the cut off indicator marker (C47) to the rear of the cut off indicator (C46) and attach to the back head. Pass the 0.5 mm wire across the backhead, attach the whistle handles (C53) to each side.

Attach the water gauges (Br16) over the regulator rods and fit the steam manifold (Br15). Add four lengths of 1.2 mm copper wire to the base of the injector valve castings (Br13/14) bend to match fig 63 and trim to fit before attaching to the valves.

Press the rivets on fire hole door (C44) and fold the heat shields out through 90° and attach to the backhead. Fit the steam heat gauge back plate (C50) and gauge (C51), note location in fig 63.

Fit the backhead shelf (C49) onto the backhead.

Attach the vacuum ejector valve (Br12) to the left side of the backhead, align with the hole in the front of the cab for position; attach the handle (C48) and fold the short stub around to form the handle assembly.

Attach a length of 1.0 mm copper wire to the top of the valve and route up the left hand side of the backhead and terminate behind the steam manifold.

A similar length of 1.0 mm wire is added to the base of the vacuum ejector and runs down the right side of the firebox to near the base where it moves to the front behind the dias.

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

Fix a short length of 1.0 mm copper wire to the base of the firebox/floor for the Mason reducing valve feed and fit the casting (Br11) on top; the height is not critical as pipe work in service Varied. Use the drawing as a general reference. Fit a length of 1.0 mm copper wire to the relevant gland (see drawing) on the Mason valve and route up the backhead, over the left hand side regulator rod and up behind the distribution box. Finally a length of 0.3mm copper wire runs from the Mason valve to the heater gauge previously mounted, fig 61.

Fit the two large (C57) and three small (C56) hand wheels to the steam manifold and the two injector hand wheels (C45).

Complete the cab fittings by attaching the screw reverser stand (W4) to the drivers dias and attaching the handle (N1) on top.

No.	Description	Sheet
C44	Fire Hole Door	C3
C45	Injector Hand Wheels (2)	C3
C46	Cut Off Indicator	C3
C47	Cut Off Marker	C3
C48	Brake Handle	C3
C49	Backhead /Tray	C3
C50	Steam Heat Gauge Back Plate	C3
C51	Steam Heat Gauge	C3
C53	Whistle Lever (2)	C3
C54	Regulator Lever (2)	C3
C56	Steam Manifold Hand Wheels Small (3)	C3
C57	Steam Manifold Hand wheels Large (2)	C3
Br11	Mason Valve	
Br12	Vacuum Ejector	
Br13	Injector Valve Left	
Br14	Injector Valve Right	
Br15	Steam Manifold	
Br16	Boiler Sight Glass (2)	
W3	Backhead	
W4	Screw Reverser Stand	
N1	Screw Reverser Handle	

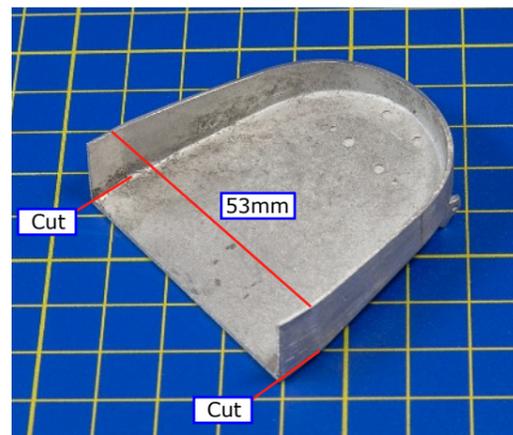


Fig 61.

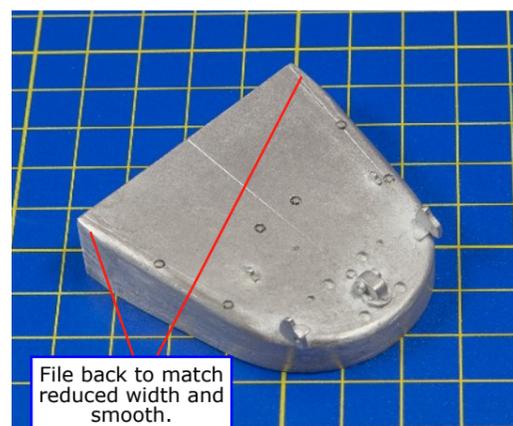


Fig 62.

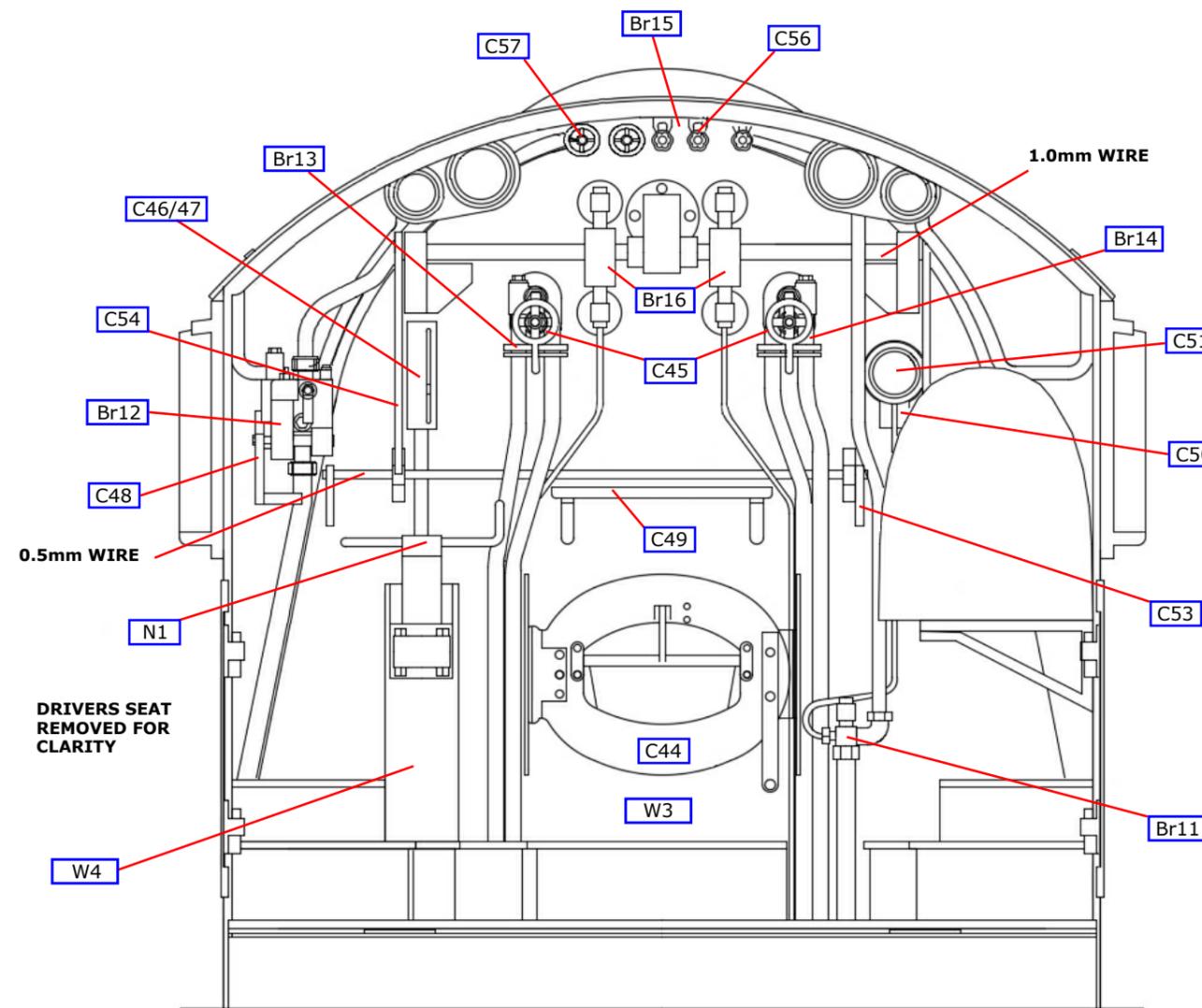


Fig 63.

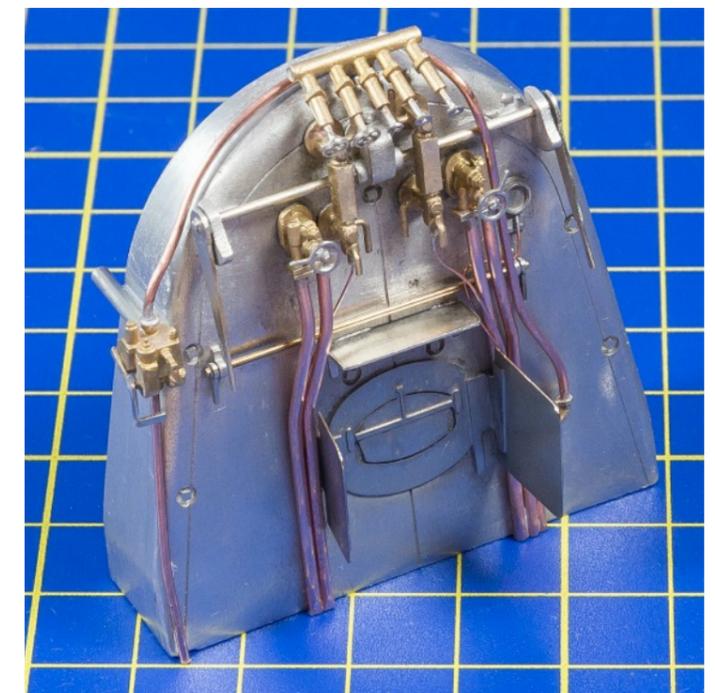


Fig 64.

CAB - FOOTPLATE

Cab Roof.

Form the cab roof (C14) to match the roof rear support (C13) and cab front profile and then press the rivets out on the inside.

Score along the inside of the raised ledge on the cab roof overlay 1 (C17) and carefully fold up the side tabs, see etch sheet C1 for score line details. Attach the overlay to the inside of the roof, use the half etch grooves along the edges and rear for alignment. Fold the longitudinal angles (C34) to match the jog in the overlay (C32, C33), note rebate at rear to allow the angle to sit on top of overlay 1; once secure, fit the riveted overlays to the outside of the angle strip.

Test fit the rear support (C13) and bend the corners with a radius to match overlay 1 so that the ends fit closely to the rear side tabs and secure into the rear groove. Attach the support joint strips (C15), note they are handed and the bolt pattern should be centred with the etched panel on top.

Form the roof front cover (C27) so that the profile matches the cab front, it may be necessary to trim the width so that the panel sits snugly in the ledge on the cab roof, fit to cab roof ensuring the front end aligns with the roof and the rear end with the tapered section. Form the rear roof cover (C28) to match the front cover, trim where required and fit into the ledge on the cab roof.

Attach the ventilator runners, front (C41) and two rear (C22), take care not to fill the slot with solder, slide the ventilator plates (C35) into place and add a short length of 0.5 mm wire to represent the handle. On the underside attach the front ventilator overlay (C40) and strap overlays 2 & 3 (C18, C19) and cab roof gauges (C31), note these are handed, fig 65. Test fit the cab roof, ensure the raised front section just overhangs the casing and the main roof is flush with the cab V front. Align the safety valve cover (C26) over the valves below and secure. To complete, trim (63 mm long) and attach the 1 x 1 mm angled strip gutter over the pressed rivets.

Cab Fittings.

Form the fall plate (C36) tread plate area into a gentle upward arc and press out the hinge rivets, attach two lengths of 0.7 mm wire into the grooves on top to replicate the hinge and fold down the fixing tabs and attach to the cab floor. Form the cab door (C42) hinges around a 0.8 mm drill bit or wire and slot onto the hinges, the strengthening straps are on the inside, secure or leave loose for a

working cab door. Laminate the cinder screen (C21) halves, ensure the slot is solder free and fit to the cab exterior, glaze once painted. Fig 67. Insert the handrail knobs and fit the handrails from 0.8 mm wire, trim flush with the knobs, note the handrail knob spigot is over length, trim to give a small protrusion inside the cab to represent the fixing before fitting.

Footplate.

Use an epoxy to secure the footplate to the casing, remove the four self tapping screws from the sides once the adhesive has fully cured. Any small gaps between the casing and footplate overlays will need filling and dressing back to give a seamless joint.

Solder the cab sides to footplate and trim the tabs to give a smooth surface. Attach the lubricator opening flange (F155) and fit the backing plate (F156) to the recess inside the casing and secure. Fig 68. Attach each valance (F186, F187) to the underside of the footplate overlay, the rear of the valance is flush with the footplate rear and may need trimming. Note, the valance has etched bolt heads on the outside but these were often reversed, if you wish to replicate the nut with thread protruding then punch the bolts from the rear, photos show these were reversed randomly. Fold the reversing lever support bracket (F168) and solder into the slots provided. Fig 69.

Ashpan.

Fold the ashpan front (F160) tab 90° and fold the Ashpan base (F159) to match the front profile, not the bend lines on the base are on the inside, pass the front through the thin slot at the front of the base from above and secure. Form the firebox lower wrapper (F162) and fit to the ashpan. Attach the two mudhole clamp blanks (F161) to the inside and bend the two washout plug blanks (F163) and fit into each corner on the inside. Drill the washout blanks 1.0 mm and fit short lengths of 1x1 mm square rod.

Fit the mudhole door clamp castings (Br7), the blowdown tap (Br6) and rocking grate bearings (Br30) to the ashpan. Laminate the rocking lever halves (F165) and attach to a length of 0.7 mm wire 55 mm long. Jog the lever out to clear the Cartazzi springs and in again to clear the cab support bracket.

Attach the ashpan to the base of the footplate, use the slots in the footplate to aid alignment.

No.	Description	Sheet
C13	Cab Roof Rear Support	C1
C14	Cab Roof	C1
C15	Cab Roof Support Joint Strip (2)	C1
C17	Cab Roof Overlay 1	C1
C18	Cab Roof Overlay 2	C1
C19	Cab Roof Overlay 3	C1
C21	Cab Cinder Screen	C3
C22	Cab Roof Ventilator Runners Rear (2)	C1
C26	Cab Roof Safety Valve Cover	C1
C27	Cab Roof Cover Front	C2
C28	Cab Roof Cover Rear	C2
C31	Cab Roof Gauges (2)	C2
C32	Cab Roof Overlay LH	C1
C33	Cab Roof Overlay RH	C1
C34	Cab Roof Longitudinal Angle (2)	C1
C35	Ventilator Plates (4)	C1
C36	Fall Plate	C1
C40	Cab Roof Ventilator Front Overlay	C2
C41	Cab Roof Ventilator Front Runner	C2
C42	Cab Door (2)	C3
F155	Lubricator Opening Flange	F4
F156	Lubricator opening Backing Plate	F4
F168	Reversing Lever Support Bracket	F5
F186	Valance RH	F4
F187	Valance LH	F4
F159	Ashpan Base	F5
F160	Ashpan Front	F5
F161	Firebox Mudhole Clamp Blanks (2)	F5
F162	Firebox Lower Wrapper	F4
F163	Firebox Washout Plug Blanks (2)	F5
F165	Ashpan Rocking Lever (2)	F5
F168	Reversing Lever Support Bracket	F5
Br6	Blowdown Tap	
Br7	Mudhole Clamp (2)	
Br30	Rocking Grate Bearing (2)	

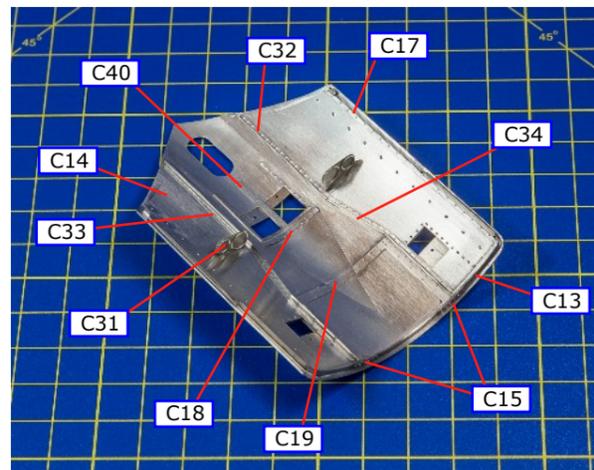


Fig 65.

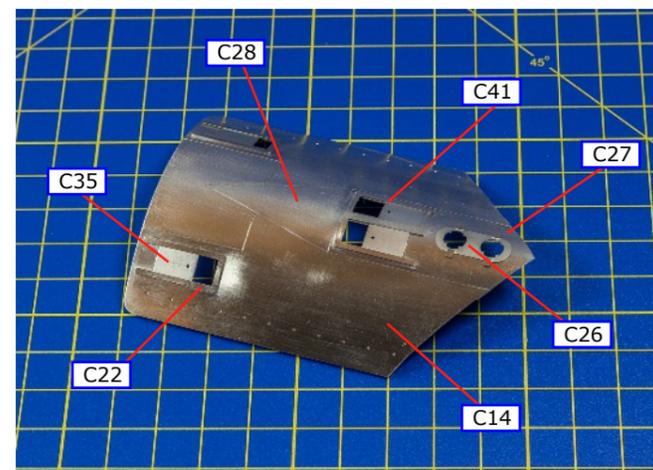


Fig 66.

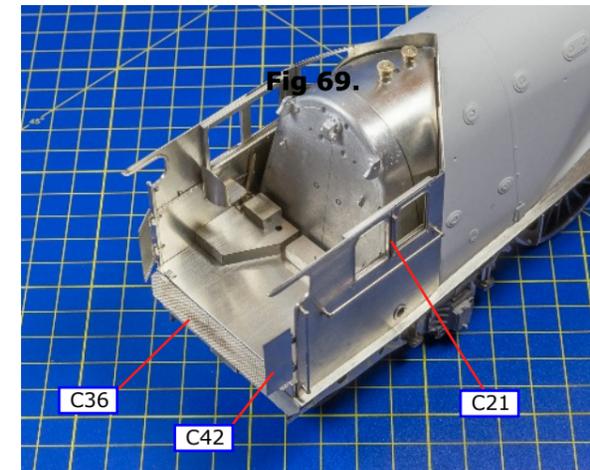


Fig 67.

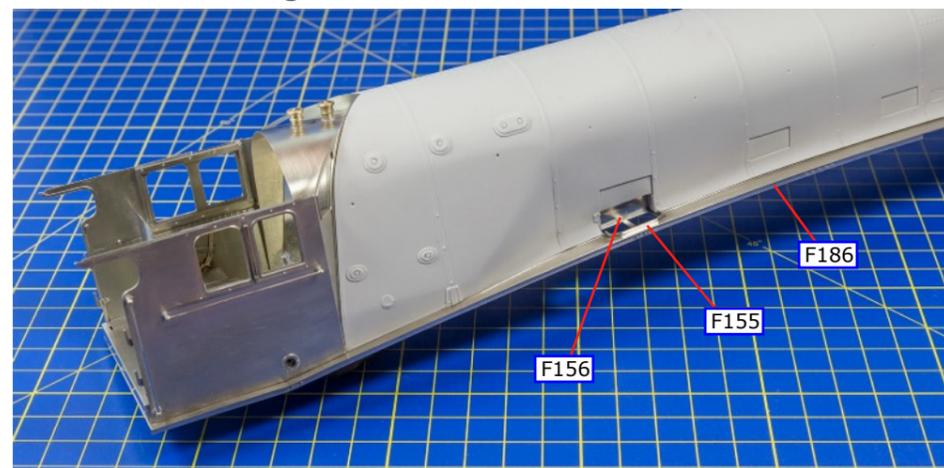


Fig 68.

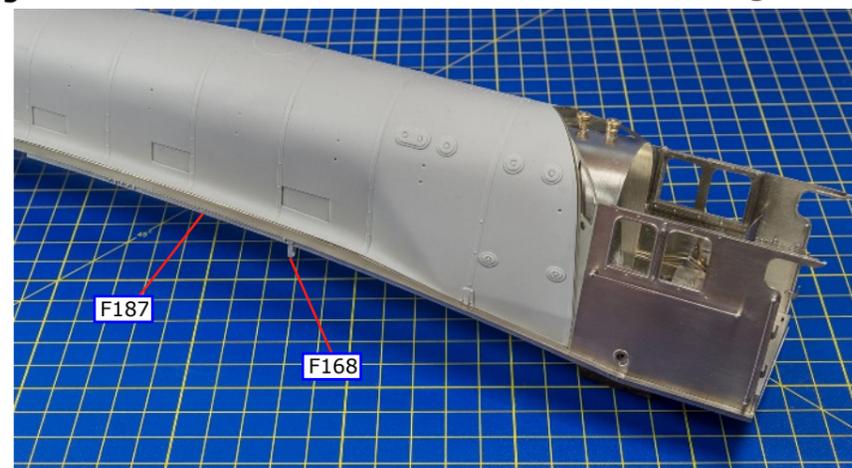


Fig 69.

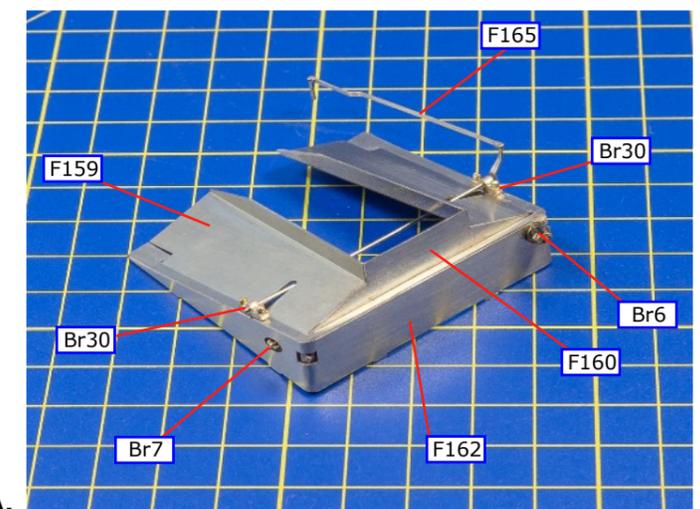


Fig 69A.

CASING

Drill out the relevant marked holes for the casing fixings.

- 0.4mm Anti carboniser valve pipe
- 0.8mm Ejector exhaust pipe clips
- 1.1mm Lamp brackets, Vacuum pipe
- 1.2mm Handrail knobs, whistle shut off valve
- 1.8mm Ejector exhaust pipe elbow
- 2.5mm Buffer nut clearance

Fit the casing covers (C55) to the relevant openings, each is uniquely shaped to fit each location, once fitted drill out the handle holes and fit the L shaped handles from 0.5 mm wire. Fit the anti carbonising valve (Br8) to the casing and then add the 0.3 mm copper wire to the hole in the casing.

Secure the ejector exhaust elbow (Br10) to a length of 1.8 mm wire 210 mm long and then carefully wrap the ejector pipe clips (C58) around the pipe. Pass the rear end of the pipe through the cab front and then insert each clip into the relevant holes in the casing before securing the elbow to the casing.

Fit the handrail knobs and thread the handrail from 0.8 mm wire through the knobs and secure.

Drill the whistle hole 0.8 mm diameter in the base of the chimney fairing and insert the whistle (Br9) and secure. Attach a length of 0.3 mm copper wire 55 mm long to the whistle shut off valve (Br8), fit the valve with the handle facing forward, the pipe loops back underneath the valve and into the gland near the handrail. Trim the pipe to fit.

Fit the lamp irons (N6, N7, N8) to their relevant locations and secure, note the top lamp iron hole is not marked, it should be drilled central and 9 mm below the top hinge.

Fold the number plate bracket (C60) and attach two short lengths of 0.5 mm wire 10 mm long into the inside of each corner. Using the number plate as a pattern mark the casing and drill two 0.6 mm holes and secure the number plate. The number plate should be centred and just below the top lamp iron.

If required fold a length of 0.7 mm wire into a U shape and fit to the rear of the AWS guard (C59) with two prongs 5 mm long protruding from the top, use these to mark the casing and drill the 0.7 mm holes and secure the guard in place. Finally fit the vacuum pipe (N4) in the hole provided.

Depending on choice of coupling hook (not supplied) open out the front slot and secure the hook.

Assemble the buffers as shown in fig 73, retain the shank with a 14BA nut, ensure the nut passes cleanly through the casing before fitting the buffer housings.

Reversing Lever.

Attach the joint plate (F185) to the reversing lever (F183), the centre bolt should be 67 mm from the rear (the end with the half etch hinge plate) and the cut out section faces to the rear. Attach the lever crank (F184) and pin with 1.0 mm wire. Attach a 1.0 mm pin to the front end on the inside.

Fit the lever through the support bracket (F168) once the model is finally completed and pass the front pin through the LH reversing arm (M45), fig 72A.

No.	Description	Sheet
C55	Casing Covers (8)	C3
C58	Exhaust Ejector Pipe Clips (5)	F6
C59	AWS Guard	F5
C60	Number Plate Bracket	F5
F183	Reversing Lever	F4
F184	Reversing Lever Crank	F4
F185	Reversing Lever Joint Plate	F4
Br8	Whistle Shut Off Valve	
Br9	Whistle	
Br10	Ejector Exhaust Pipe Elbow	
N4	Vacuum Pipe	
N6	Lamp Iron Top Centre	
N7	Lamp Iron Lower Centre	
N8	Lamp Iron Lower Outer (2)	

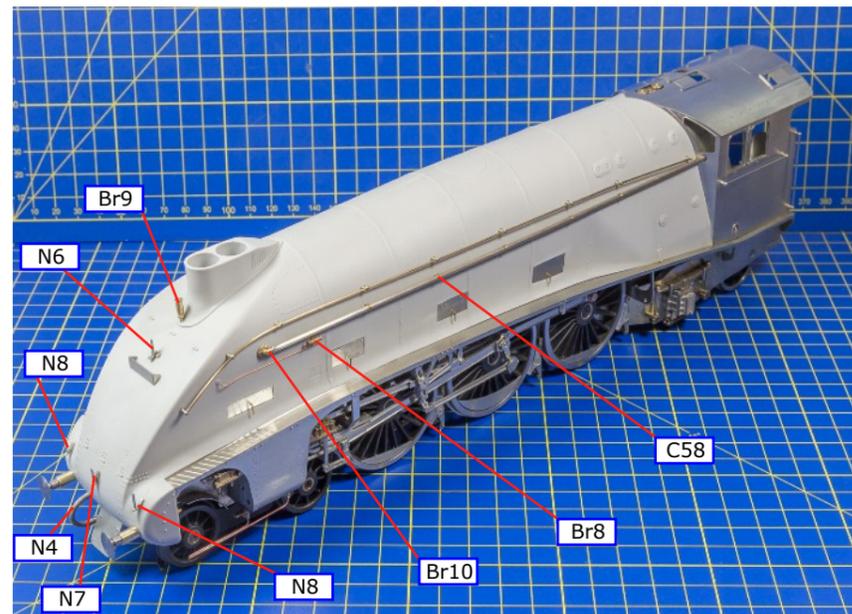


Fig 70.



Fig 72.

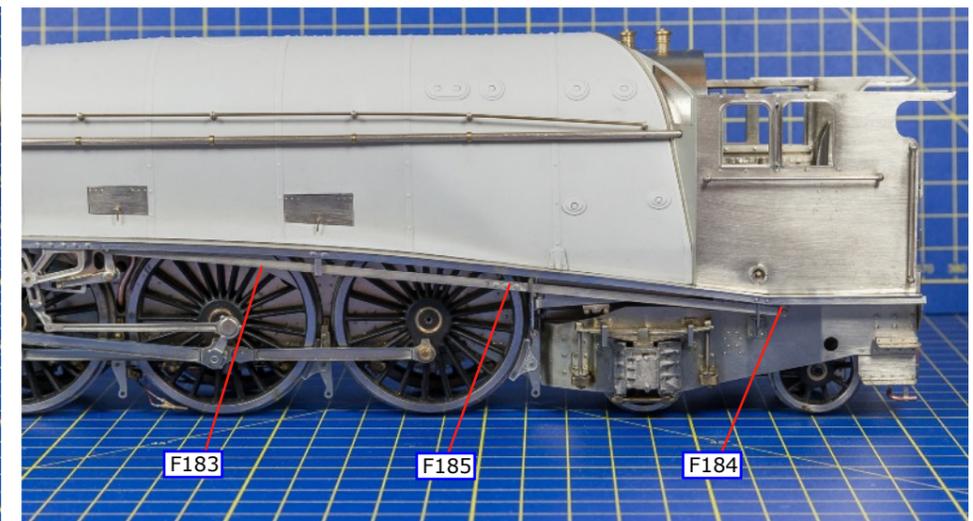


Fig 72A.

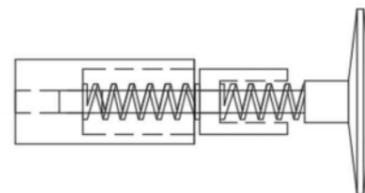


Fig 73.

CHASSIS - FITTING OUT

Cylinders.

On the inside of each cylinder wrapper (F169 - 170) carefully scribe or scour a line between the two marks on the carrier etch, this will form the bend/crease for the cylinder bulge. Form the lower bulge around the cylinder. With the footplate firmly attached, offer up the wrappers so the top edge sits up under the footplate overlay, ensure the wrapper is central on the cylinder and carefully tack the wrapper to the cylinder valance plate (F190 - 191) from below. Take care not to solder the wrapper to the footplate, a small tack front and rear should suffice. Remove the footplate and seam solder the upper joint between the wrapper and valance plate, now solder the wrapper to the cylinder at the lower and bottom edges. The wrapper should leave a small raised edge at the top for the footplate to sit into. Fig 74.

Laminate the piston covers (F41, 49), the rebated edge on the tear drop opening for the pressure relief valve faces the rear, ensure the pressure relief valve fitting hole is centred in the tea drop opening. Once joined, remove the cusp and radius the outside edge, note the covers are handed.

Pass a length of 1.2 mm wire 37.5 mm long through the holes in the frames for the smoke box handle mechanism, fold the brackets (F48) and fit over the shaft (fig 75), secure to the frames, note brackets are handed.

Steam Drain Cocks.

Laminate the centre drain lever (F85) and centre levers (F84), cut a length of 0.7 mm wire 28 mm long, trim so that it is a sprung fit into the two indents in the frames. Fit the centre pull rod and one end of the lever assembly and then slide on the shaft bearing overlays (F86). Note the centre drain lever is cranked, the cranked (raised) centre section should face down toward the rail. Spring the wire into the frames and slide the bearing overlays to the ends and secure to the frame.

Drill out two drain cocks (Br2) 0.6 mm for the drain pipes. On one drill deep enough into the main body and then cut the raised union fitting off to allow the drain pipe to clear the front brake cylinder.

Bend the drain pipes to clear the brake cylinder and bogie pivot stay and secure the cocks into the middle cylinder, attach the drain pipes to the small flange plate on the bogie pivot stay, fig 75.

Pass a length of 0.7 mm wire 31 mm long through the frames whilst adding the free end of the centre levers. Laminate the outside steam cock levers (F179) and fit to the 0.7 mm wire, note the levers and cranks face the front of the engine. Attach short lengths of 0.7 mm wire 7 mm long to the lower free end.

Fit the Outside lever brackets (F178) to the cylinder fronts, note they are handed, then carefully place the 7 mm length wire against the extended tab, solder and then fold the tab up and over to enclose the wire. Laminate the outside drain levers (F180) and slide over the end of the 7 mm wire, fit the two drain cocks and attach the drain lever to the inside of the drain cocks. Drill the vent pipe unions with a 0.6 mm drill and then add the drains, see fig 75. Note, outside drains were cut back in 1955-56 to leave small J shaped stub drains. If modelling LNER period then fit the frame guard irons (F133) and extend the drains and attach with F46 short drain clips.

With all the drains and fittings fitted, attach the piston covers assembled earlier, add the pressure relief valves (Br3) and a short length of 1.2 mm wire for the cover fixing in the centre. Finally add the front bogie splashers (note cut out in splasher, fig 23-25) and drain pipe clips (F5, F46), fig 74-76.

Sand Pipes.

Form the front sand pipe from 0.8 mm wire and insert into the base of the front sand box and secure, fig 78. Attach the steam sanding traps (Br27) to the base of the sand boxes and drill the union 0.6 mm Form the sand pipe from 0.6 mm copper wire and fit the sanding valve (Br19) to the base, finally fit a short length of 0.3 mm wire to represent the steam supply and route up inside the frames. Fig 78.

Carefully form the intermediate sand fill pipe from 1.6 mm copper wire, route through the opening in the frames into the top of the sand box and at the top up past the reversing lever shaft, trim flush at the top to clear the underside of the footplate. Fig 77.

No.	Description	Sheet
F5	Steam Cock Drain Clips Long (4)	F4
F41	Piston Covers LH	F1
F46	Steam Cock Drain Clips Short	F4
F48	Smokebox Handle Bracket (2)	F2
F49	Piston Covers RH	F2
F84	Steam Cock Centre Levers	F4
F85	Steam Cock Centre Drain Lever	F5
F86	Steam Cock Centre Shaft Bearing Overlays	F5
F133	LNER Frame Guard Irons	F5
F169	Cylinder Wrapper LH	F4
F170	Cylinder Wrapper RH	F5
F178	Steam Cock Outside Lever Bracket	F4
F179	Steam Cock Outside Levers	F4
F180	Steam Cock Outside Drain Levers	F4
Br2	Drain Cock (6)	
Br3	Cylinder Pressure Relief Valves (2)	
Br19	Steam Sanding Valve (2)	
Br27	Steam Sanding Trap (2)	

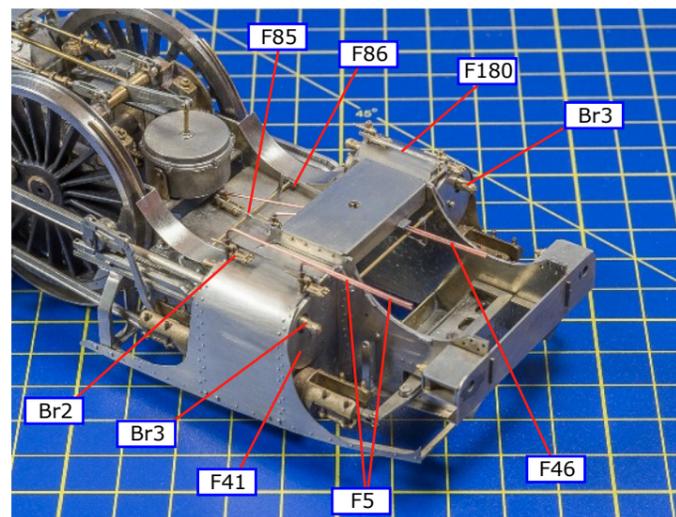


Fig 74.

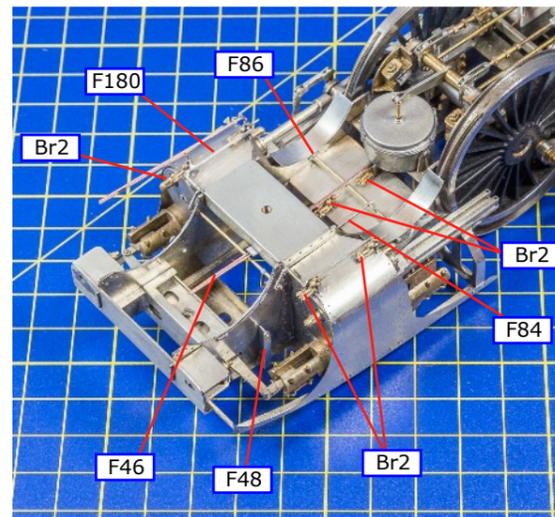


Fig 75.

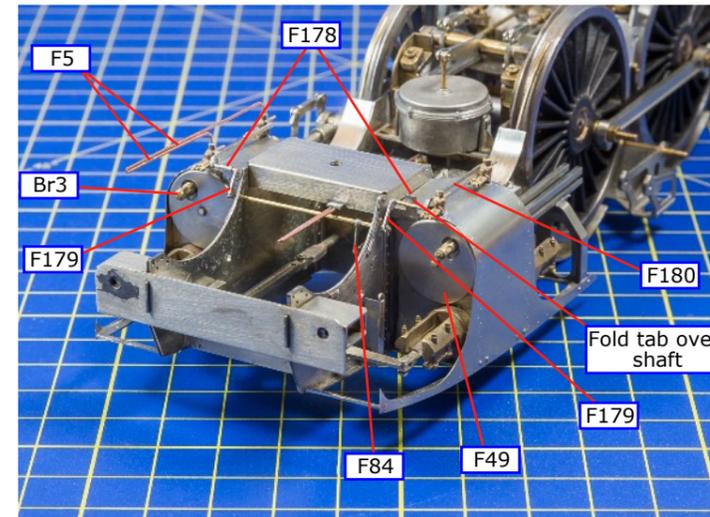


Fig 76.

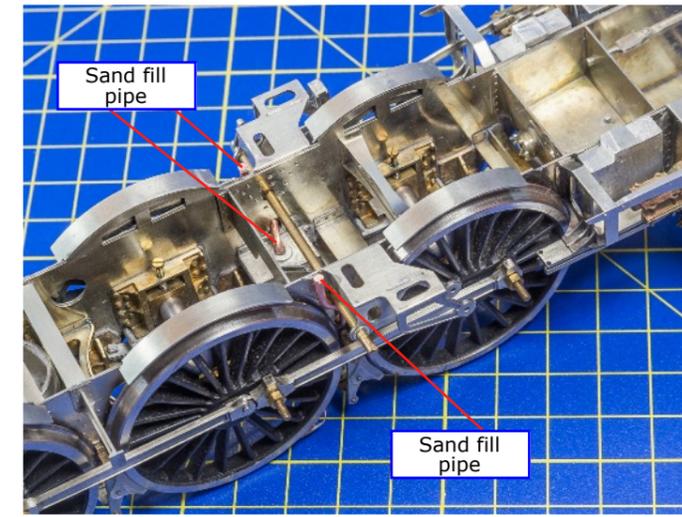


Fig 77.

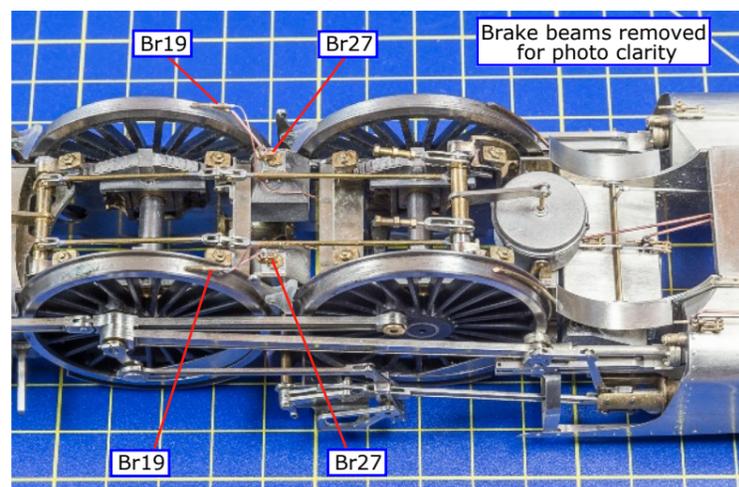


Fig 78.



Fig 79.

CHASSIS - FITTING OUT - 2

Injectors, Live steam.

Press the rivets in the cab steps (F27, 28, 50, 72) and score a bend line between the tread and bracket (sheet F1, F2) fold up the step and then fold up the ends, attach all the steps except the drivers side lower step (F28) to the chassis.

Carefully remove the live steam injector body (Br40) from the sprue, the casting feeds acts as locating pins for the pipe manifold, attach the pipe manifold (Br41) to the end. Drill all the pipe holes to 1.2 mm and the actuating rod hole to 0.7 mm. Fit the injector in the rebate on the lower LH step (F28). Form the drain pipe from 1.2 mm copper wire, attach the drain bracket (F36A) to the step base and fold the half etch tab over to encase the pipe, trim length and secure as required.

Attach the step/injector to the chassis and fit the steam injector feed pipe bracket (F36) to the drag beam. Form the cold water feed from 1.2 mm copper wire and attach to the injector and feed pipe bracket, roll over the half etched tab to enclose the pipe and trim as required. Form the two cab feeds from 1.2 mm copper wire and route up through the drag beam, finally fit the actuating rod from 0.7 mm wire down through the drag beam and into the top of the injector.

Exhaust Injector.

Attach the feed water flange (Br43), drain (Br44) and steam tower (Br45) to the main injector body (Br42), see fig 82. Drill the following holes, drain and feed water flange 1.6 mm, steam tower and valve return 1.2 mm, exhaust pipe 2.5 mm. Attach the support bracket (F45) to the inside edge of the top flange on the injector. Test fit the injector to the frames by bending the tab with the hole in on the bracket approximately 45°, see fig 83-85 as a guide. The large hole in the bracket should be clear of the smaller hole in the frames.

Fit the feed water pipe bracket (F54) to the drag beam and then form the feed water pipe from 1.6 mm. The pipe needs to be made in two sections with the joint between the two sections where the pipe passes through the frames. Laminate the exhaust injector feed flange plate (F34A) and slide onto the pipe. Attach the feed water pipe to the bracket with short pipe clip (F54A) and to the chassis side and step with the longer clips, fig 83-85. Form the remaining feed pipe on the inside of the frames and fix to the flange (Br43). Form the short stub drain from 1.6 mm copper wire and attach to the fitting Br44.

Form the live steam feed from 1.2 mm copper wire and route as shown in fig 83-85 and attach to the live steam tower (Br45) then form the valve return pipe on the outside of the frames. Laminate the small flange plate (F34) and slide onto the pipe before fitting the pipe to the injector. Leave the pipe protruding above the frames by 2-3 mm then carefully offer up the body before marking where they meet, drill a 1.5 mm hole in the footplate so that the stub passes up through the footplate.

Finally, for the main exhaust pipe from 2.5 mm copper wire, route from the injector, through the ashpan cut out to the grease trap, laminate the triple layer flange plates (F35, F40) and fit to the pipe. Form the front section and route between the grease trap and middle cylinder, fig 87-89 on page 22

Balance Weights.

Attach the balance weights (M1, M2) to the driving wheels as detailed in fig 86.

Drawbar.

Laminate the three drawbar plates (F198) and attach to the engine with an 8BA screw, trim the screw so that it does not impact the upper plate of the drag beam assembly from below.

No.	Description	Sheet
F27	Cab Footstep Upper LH	F1
F28	Cab Footstep Lower LH	F1
F34	Pipe Flange Plate Small	F1
F34A	Pipe Flange Plate Exhaust Injector Feed	F2
F35	Flange Plate Square	F1/2
F36	Steam Injector Feed Pipe Bracket	F1
F36A	Steam Injector Drain Pipe Bracket	F1
F40	Flange Plate Round	F1/2
F45	Exhaust Injector Support Bracket	F2
F50	Cab Footstep Lower RH	F2
F54	Exhaust Injector Feed Pipe Bracket	F2
F54A	Exhaust Injector Feed Pipe Clip	F2
F54B	Exhaust Injector Feed Pipe Clips Long	F2
F198	Drawbar	F4
F72	Cab Footstep Upper RH	F2
M1	Balance Weight Centre (2)	C3
M2	Balance Weight Leading/Trailing (4)	C3
Br40	Live Steam Injector	
Br41	Live Steam Injector Pipe Manifold	
Br42	Exhaust Injector Body	
Br43	Exhaust Injector Feed Water Flange	
Br44	Exhaust Injector Drain	
Br45	Exhaust Injector Live Steam tower	

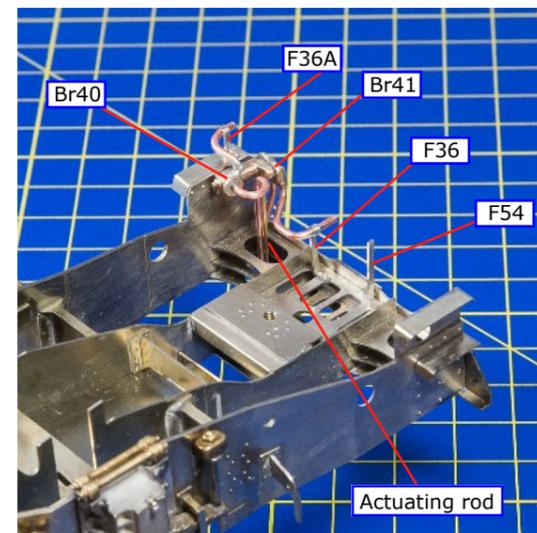


Fig 80.

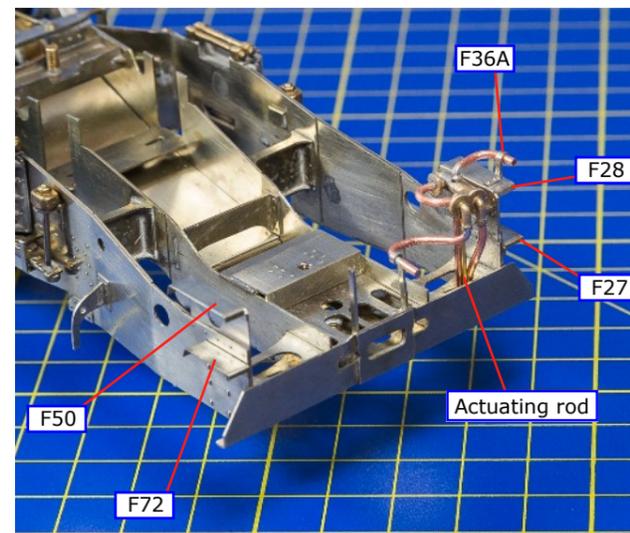


Fig 81.

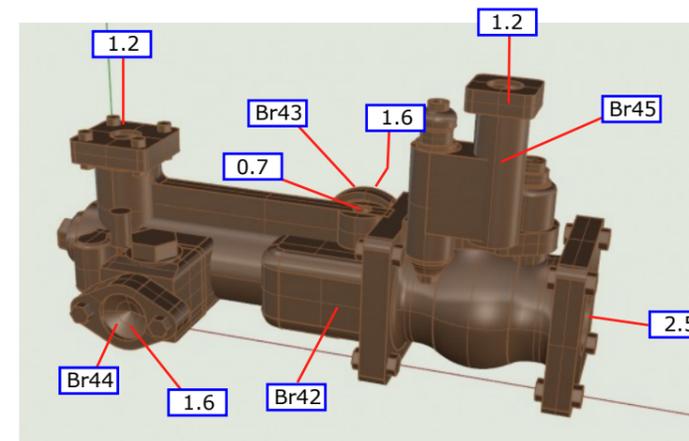


Fig 82.

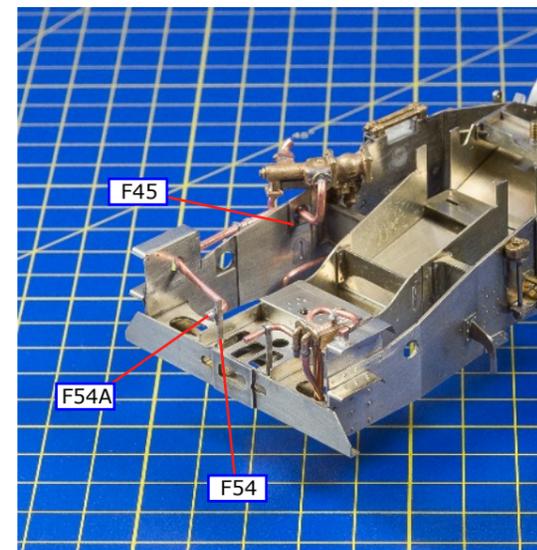


Fig 83.

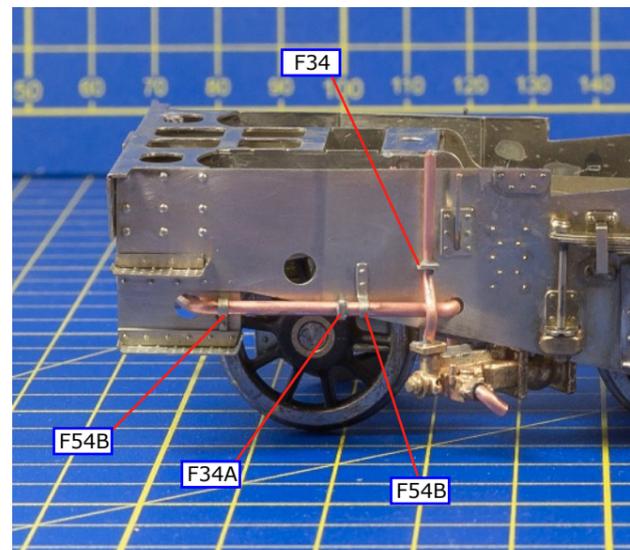


Fig 84.

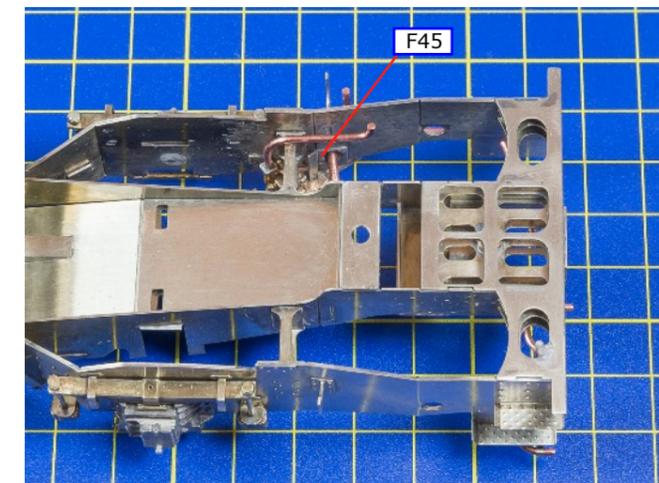


Fig 85.

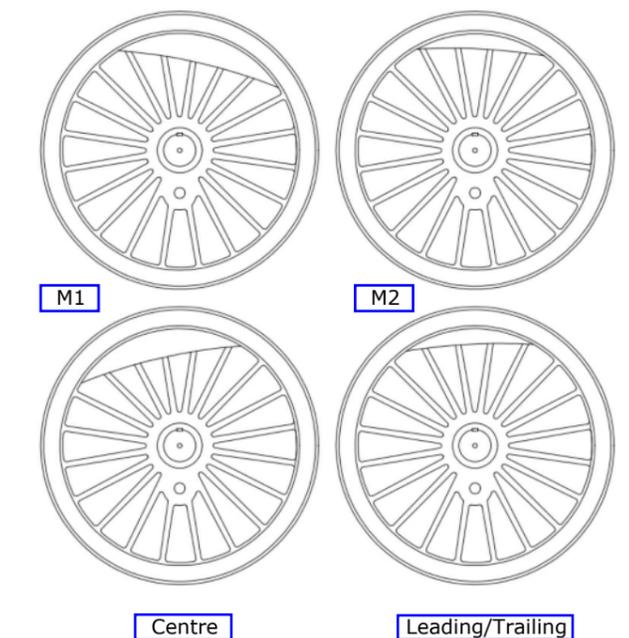


Fig 86.

CHASSIS OVERALL VIEWS

No.	Description	Sheet
F35	Pipe Flange Plates Large Square	F2
F40	Pipe Flange Plates Large Round	F1/2

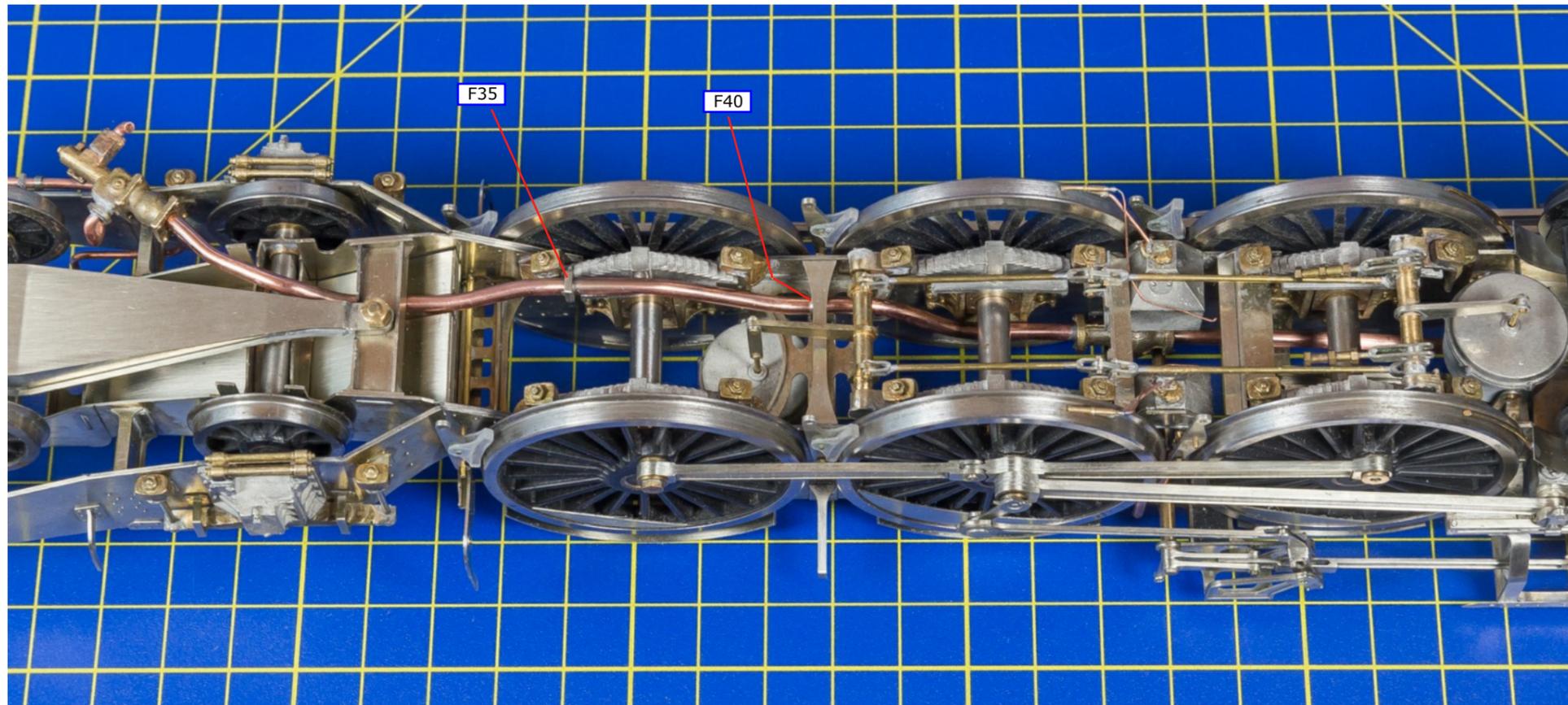


Fig 87.

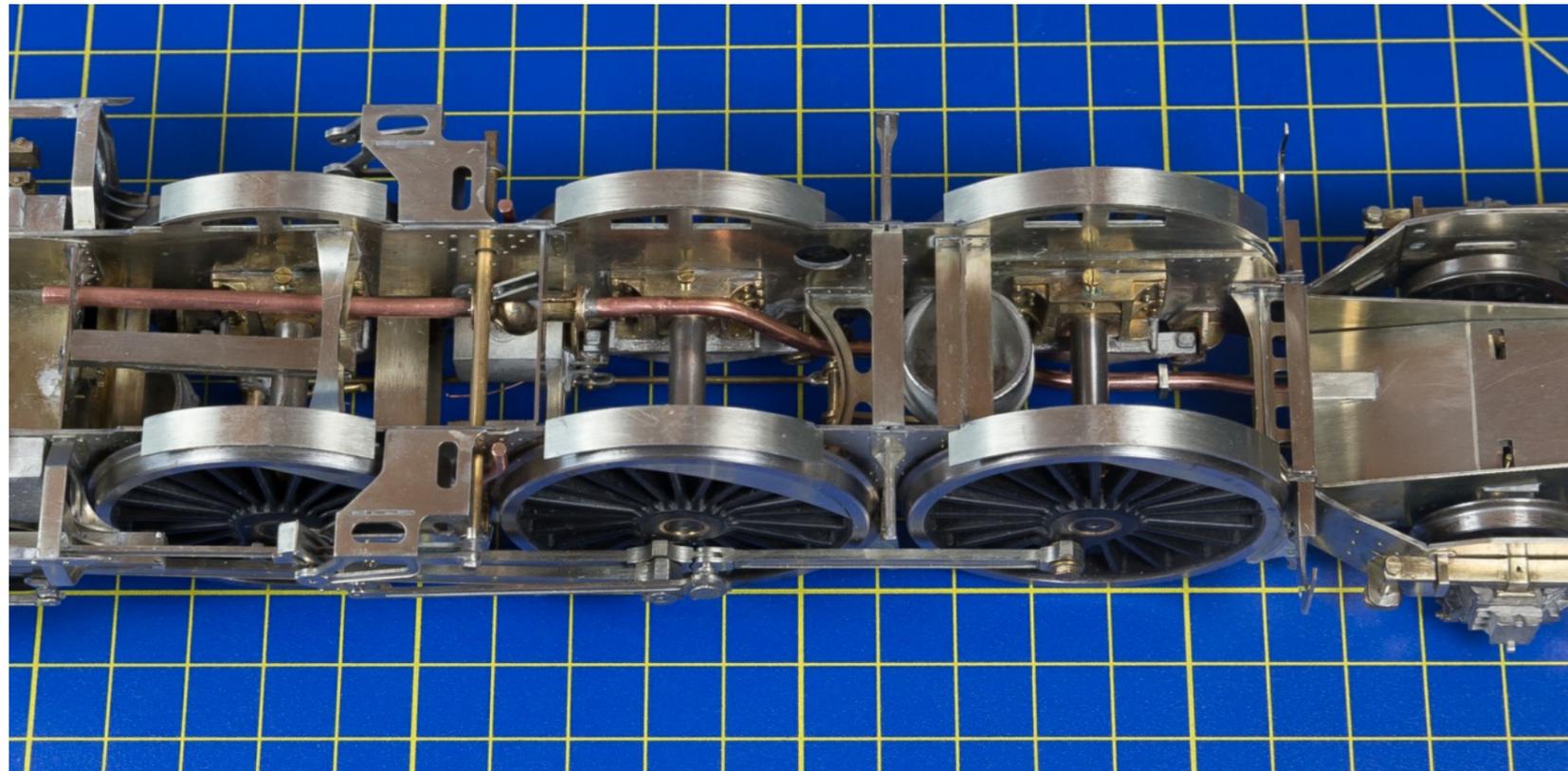


Fig 88.

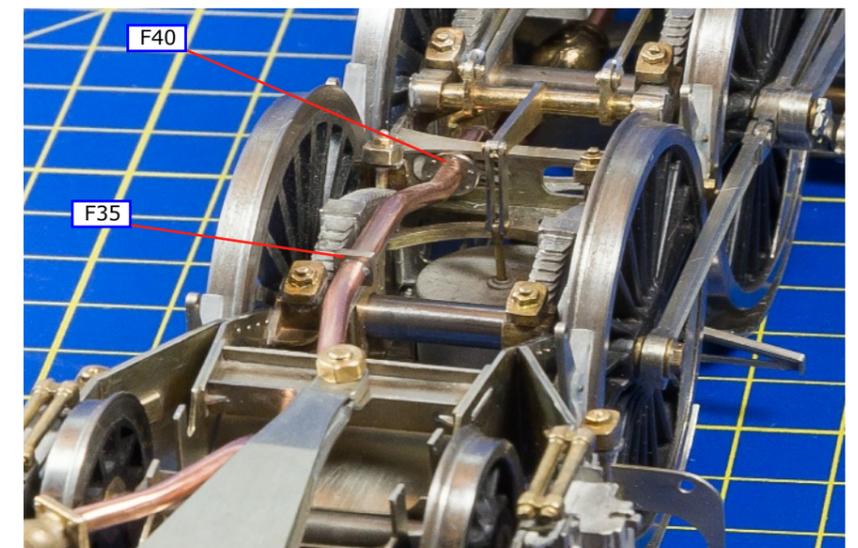
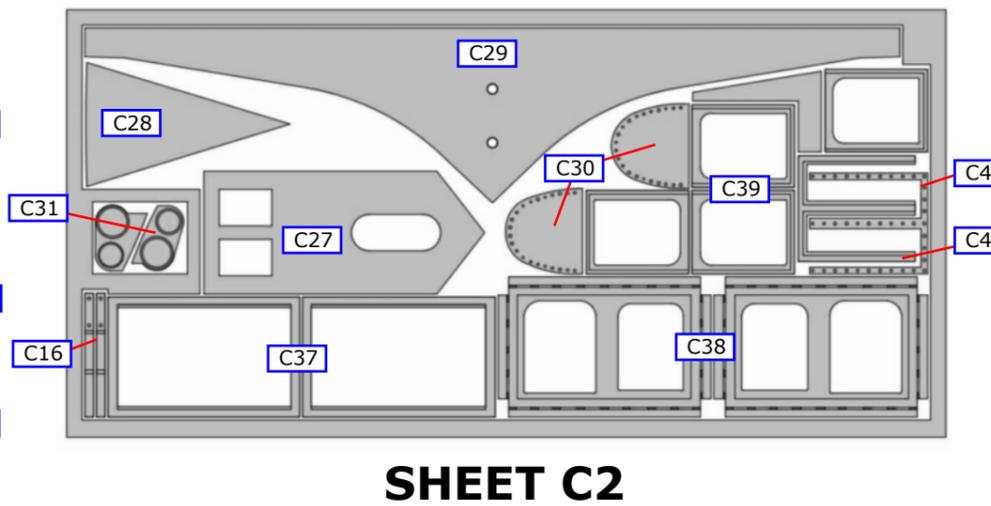
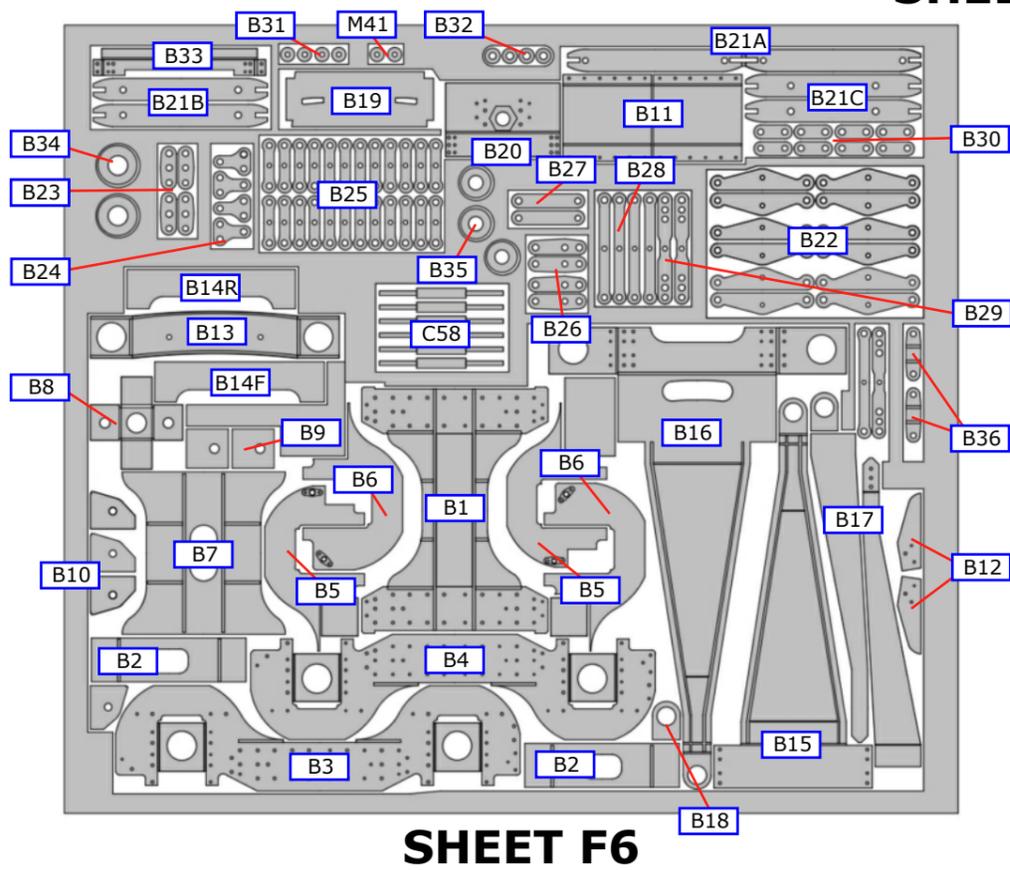
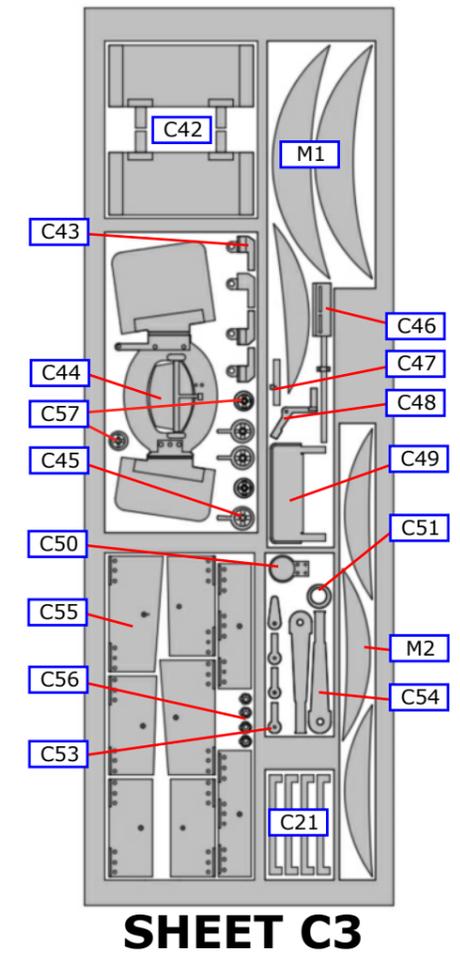
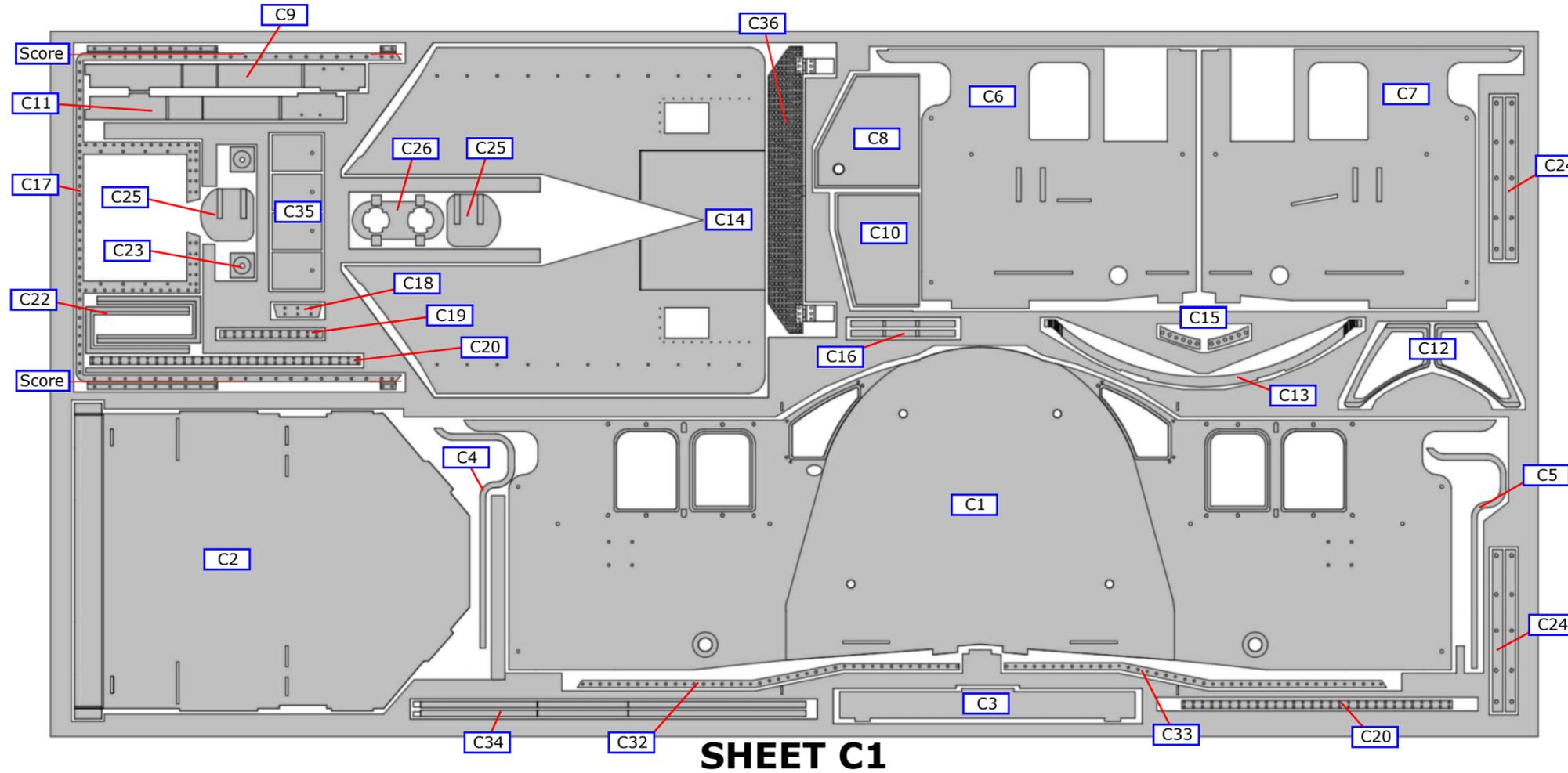
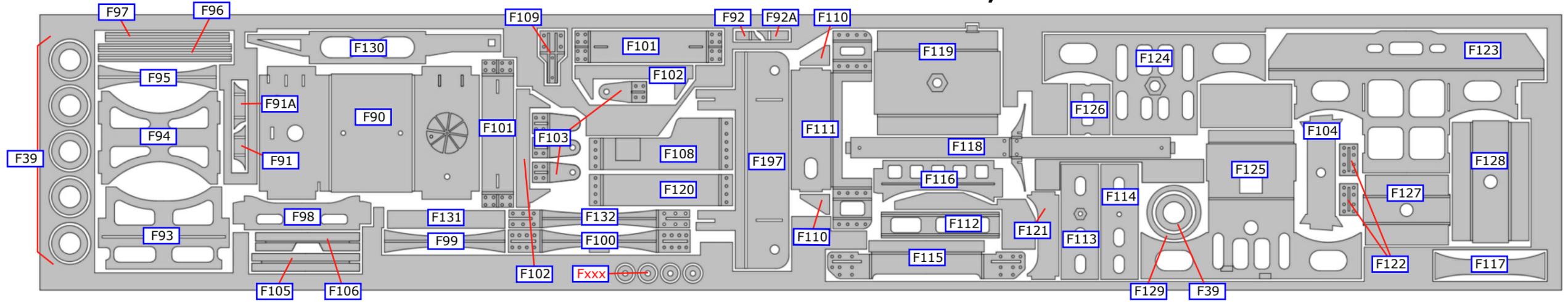


Fig 89.

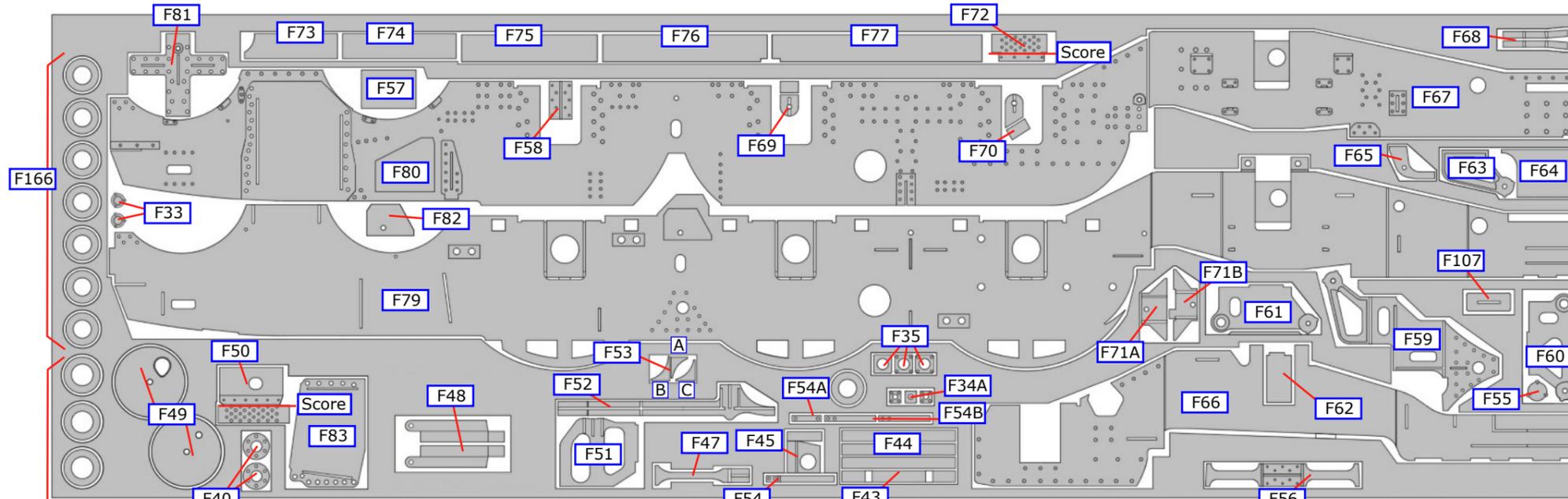
LNER W1 ETCH - SHEET C1, C2, C3 & F6



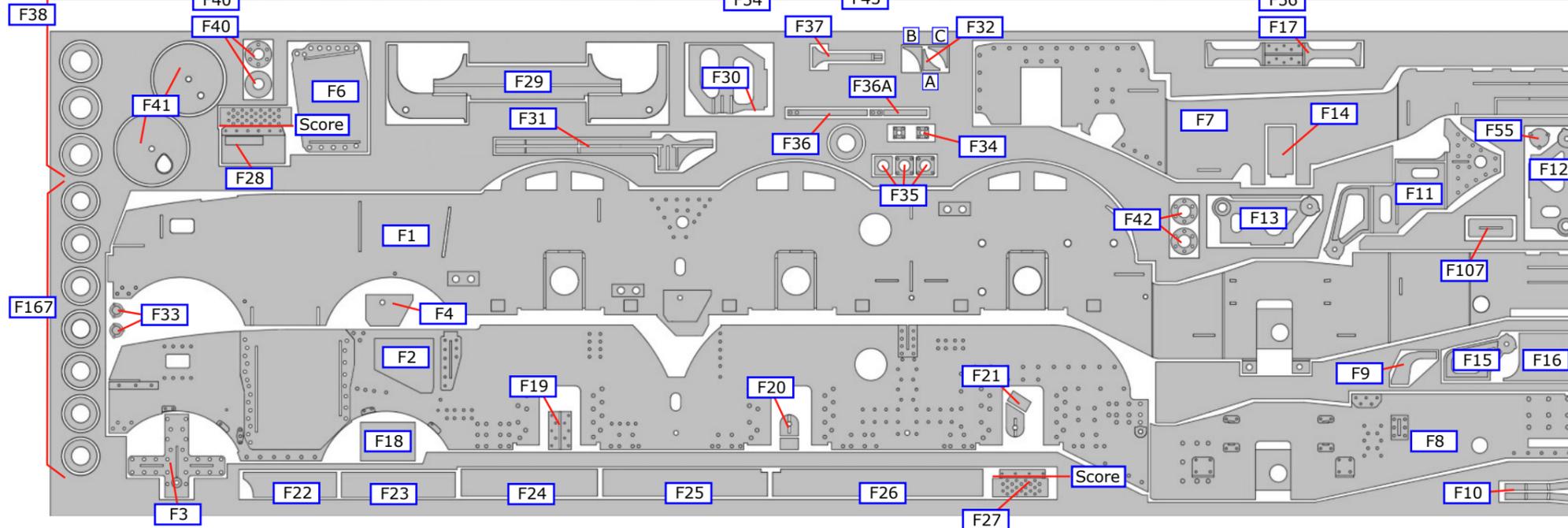
LNER W1 ETCH - SHEETS F1, F2 & F3



SHEET F3

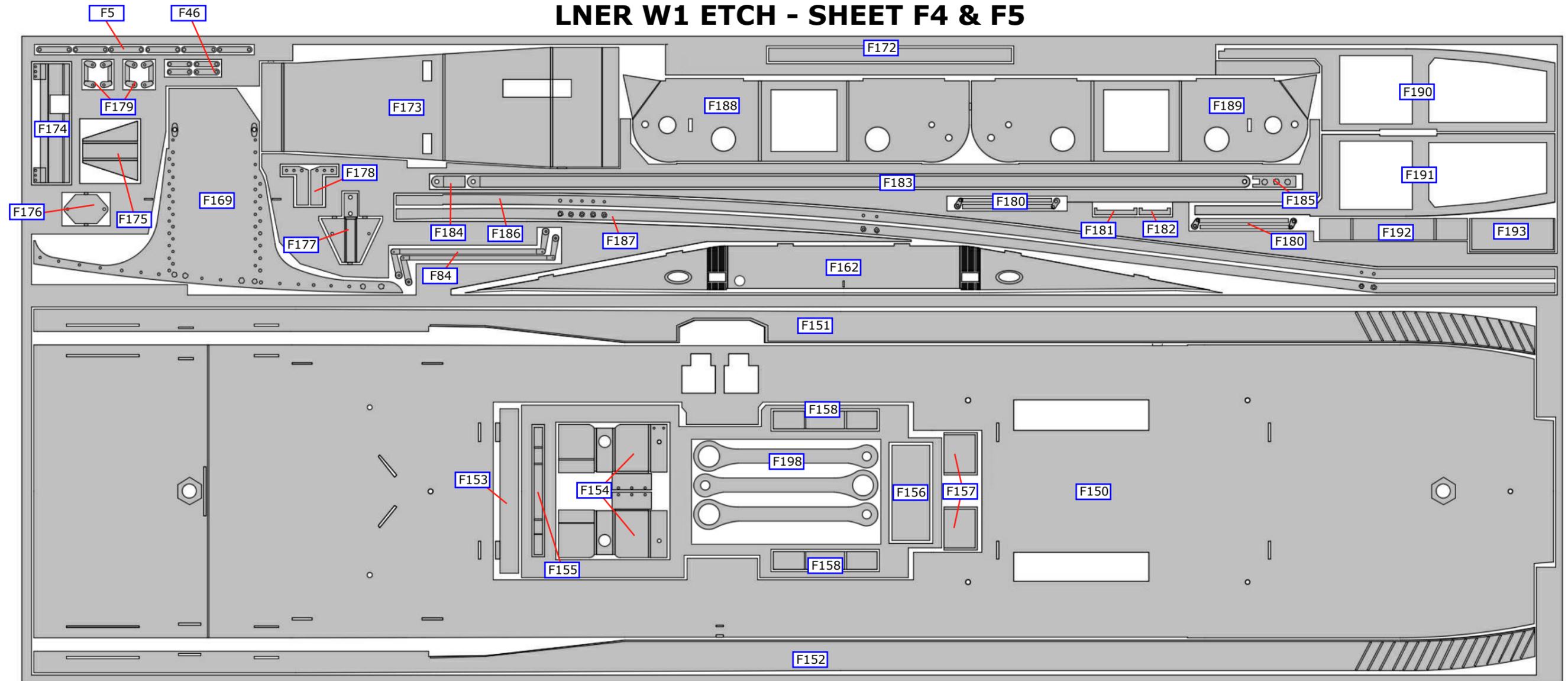


SHEET F2

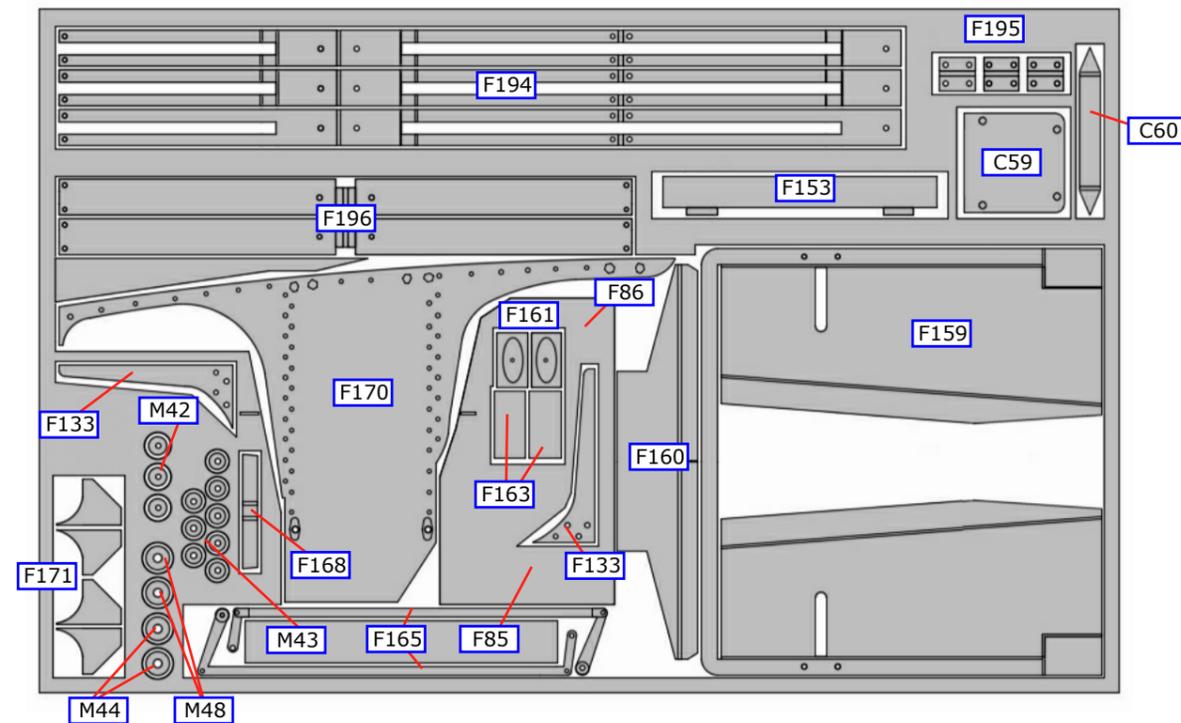


SHEET F1

LNER W1 ETCH - SHEET F4 & F5

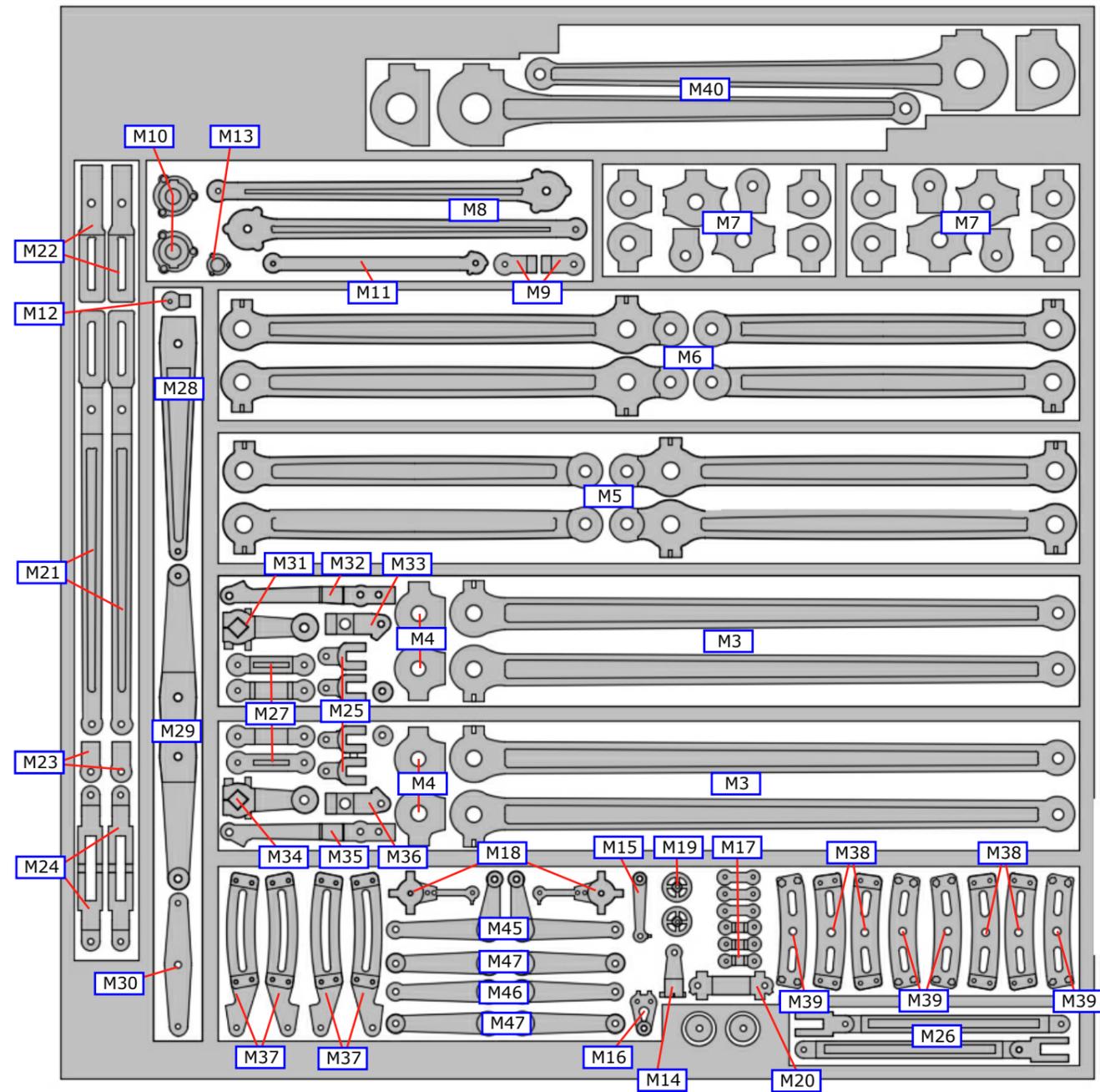


SHEET F4

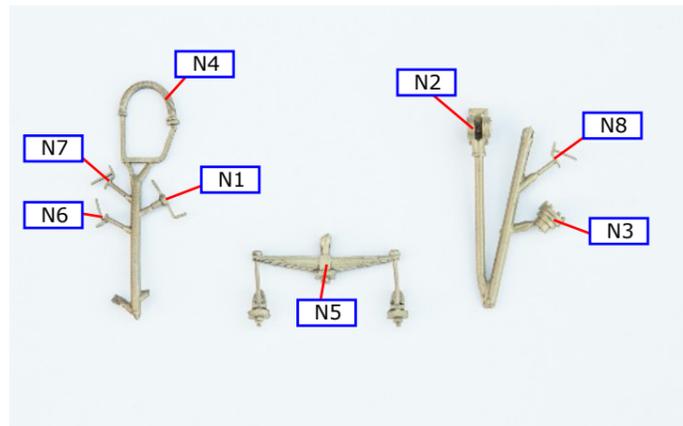


SHEET F5

LNER W1 ETCH - SHEET M



CASTINGS



No.	Description
N1	Screw Reverser Handle
N2	Crosshead - Piston Rod (2)
N3	Piston Stuffing Gland (2)
N4	Vacuum Pipe
N5	Cartazzi Spring (2)
N6	Lamp Iron Top Centre
N7	Lamp Iron Lower Centre
N8	Lamp Iron Lower Outer (2)

No.	Description
W1	Cartazzi Axle Box LH
W2	Cartazzi Axle Box RH
W3	Backhead
W4	Screw Reverser Stand
W5	27" Vacuum Cylinder (2)
W6	Engine Spring (6)
W7	Bogie Axle Box (4)
W8	Intermediate Sandbox - inner (2)
W9	Front Sandbox - outer (2)
W10	Seat Covers (2)



No.	Description
Br1	Buffer Housing (2)
Br2	Drain Cock (6)
Br3	Cylinder Relief Valve (4)
Br4	Mechanical Lubricator (2)
Br5	Safety Valve (2)
Br6	Blow Down Tap
Br7	Mudhole Door Clamp (2)
Br8	Whistle Shut Off Valve
Br9	Whistle
Br10	Ejector Exhaust Elbow
Br11	Mason Reducing Valve
Br12	Vacuum Ejector
Br13	Injector Valve Left
Br14	Injector Valve Right
Br15	Steam Manifold
Br16	Boiler Sight Glass (2)
Br17	Valve Crosshead Guide Front (2)
Br18	Valve Crosshead Guide Rear (2)
Br19	Steam Sanding Valve (2)
Br21	Brake Shaft Front
Br22	Brake Shaft Rear
Br23	Brake rod Slack Adjuster (2)
Br24	Buffer Spring Gaiter (2)
Br25	Brake Hanger Casting (4)
Br26	Brake Cylinder Rod (2)
Br27	Steam Sanding Trap (2)
Br28	Horn Guide Casting (6)
Br29	Cartazzi Safety Bars (2)
Br30	Rocking Grate Bearing (2)
Br31	Snubbing Rubbers Oval (4)
Br32	Sanding Lever
Br33	Steam Cock Lever
Br34	Snubbing Rubbers Square (12)
Br35	J Hanger Front Brake (2)
Br36	J Hanger Rear Brake (2)
Br37	J Hanger Standard (6)
Br38	J Hanger Rear Frames (2)
Br39	Grease Trap
Br40	Live Steam Injector
Br41	Live Steam Injector Pipe Manifold
Br42	Exhaust Injector Body
Br43	Exhaust Injector Feed Water Flange
Br44	Exhaust Injector Drain
Br45	Exhaust Injector Live Steam tower

