

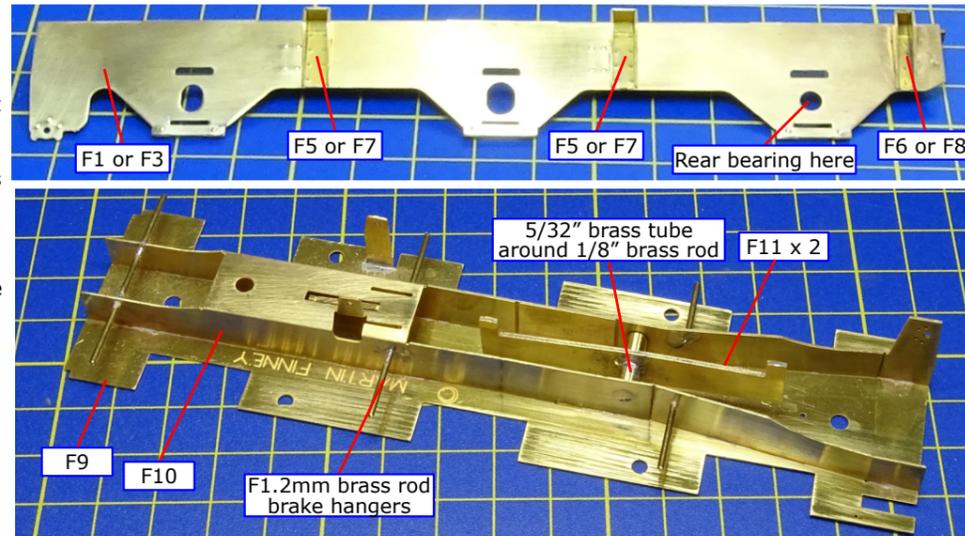
**Fig 1. GWR 4000G Tender in Original Condition.**

## CONSTRUCTING THE CHASSIS 1

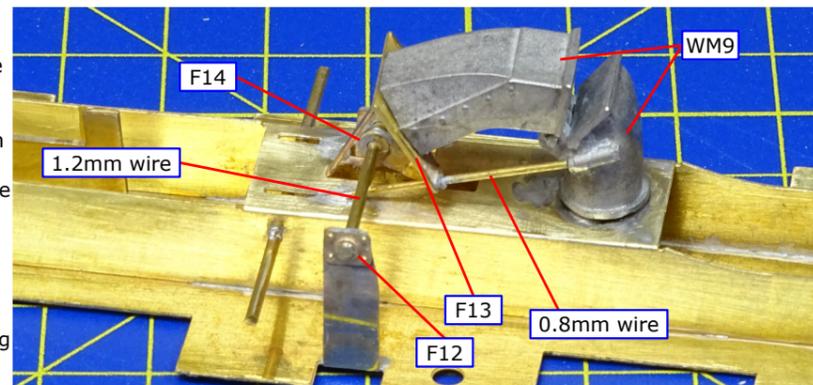
1. Select the frames, original or later, left and right (F1 & F2 or F3 & F4) and emboss the rivet detail. Fold the frames through 90° with the half etched line on the inside. Check that the bearings fit in the appropriate slots, carefully opening the slots with a needle file if necessary and solder the rear bearings in place. Emboss the rivets on the horn guide ties before folding them over with the fold lines on the outside. Fold up the appropriate frame brackets, original or later (F5 & F6 or F7 & F8) and solder in place in the slots in the frames. When correctly positioned they are flush with the top of the frames.

Open up the holes in the internal frames (F10) as follows, 1/8" to fit the compensation beam pivot, 1.2 mm to fit the wire for the brake hanger pivots, 1.6mm to fit the front scoop shaft. Fold up the internal frames with the fold lines on the inside and solder in place in the slots in the stretcher plate (F9).

Solder the two compensation beams (F11) together. Cut the piece of 5/32" brass tubing to fit between the sides of the internal frames and solder the beam centrally on it. Fit the beam inside the internal frames using the piece of 1/8" brass wire as the pivot; solder the pivot to the internal frames. Solder in place the brake hanger pivots from 1.2mm wire, ensure that they line up with the edge of the stretcher plate.



2. Fold down the brackets for the rear scoop cross shaft and the stay for the scoop front plate. Solder in place the bracket overlays (F12). Now attach the water scoop casting (WM6) to the well tank. Add the scoop stays from 0.8mm wire passing them through the slots in the internal frames, the holes in the water scoop front plate (F13) and attaching them to the scoop at the rear. Solder the front plate stay to the front plate. Add the scoop cross shaft from 1.2mm wire and fit the rear scoop cross shaft to scoop lever laminations (F14) at the same time. Add the lower part of the water scoop to the water scoop casting in place on the internal frames, securing it with a hinge of 1.2mm wire and attaching to the water scoop front plate.



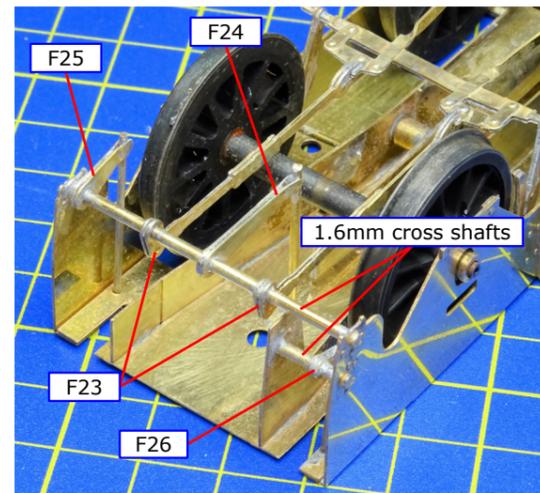
3. Assemble the side frames and the internal frames assembly bolting them together with 6 BA bolts & nuts through the holes at the front and back. Check that the assembly is square and that the top surface of the assembly is flat. Loosen the bolts on one side, fit the wheel sets and re-tighten the bolts. Now check that the compensation works properly and that the chassis is level. The height can be adjusted by filing the ends of the compensation beam or by adding a further extra 'foot' from scrap metal and the side play can be limited by using the washers (F29). When you are satisfied with the mechanical performance of the chassis solder the side frames to the stretcher plate, avoiding soldering the bolts, then remove the bolts and complete the soldering.

4. The brake shaft is made from 1.6 mm wire and should be cut to be just longer than the width over the frames. Emboss the rivets on the front pull rod laminations (F23) and solder together, back to back, to make the front pull rods. Thread the two brake pull rod lever laminations, the brake cylinder to cross shaft lever laminations (F24) and the brake standard to cross shaft lever laminations (F25) onto the shaft and thread the shaft onto the mountings. Solder the shaft in place.

The bottom of the standard is a piece of 0.8mm wire which should be soldered into the hole in the chassis. Solder the brake standard to cross shaft levers to the wire and to the shaft.

Place a length of 1.2mm wire into the hole in the chassis to represent the brake piston rod. Solder the two brake cylinder to cross shaft levers either side of the wire and then solder them to the shaft. Don't solder the pull rod laminations (F23) to the cross shaft yet.

Fit the front scoop shaft as shown in the diagram, threading the scoop standard to front cross shaft lever lamination (F26) onto the shaft; solder the shaft in place. Use a piece of 0.8mm wire to represent the bottom of the standard and solder in place and then solder the laminations of the lever in place.



No.	Description	Sheet	No.	Description	Sheet
F1	Original left frame	1	F16	Vacuum tank support bracket (2)	1 & 2
F2	Original right frame	1	F17	Brake hanger and shoe (6)	2
F3	Later left frame	1	F18	Brake hanger and shoe overlay (6)	2
F4	Later right frame	1	F19	Brake spreaders and pull rods	3
F5	Original large frame bracket (4)	1	F20	Front brake spreader overlay	2
F6	Original small frame bracket (2)	1	F21	Centre brake spreader overlay	2
F7	Later large frame bracket (4)	1	F22	Rear brake spreader overlay	2
F8	Later small frame bracket (2)	2	F23	Front brake pull rod lamination (4)	2 & 3
F9	Stretcher plate	1	F24	Brake cylinder to cross shaft lever lamination (2)	1
F10	Internal frames	2	F25	Brake standard to cross shaft lever lamination (2)	1
F11	Compensation beam (2)	2	F26	Scoop standard to front cross shaft lever lamination (2)	2
F12	Water scoop bracket overlay (2)	1	F27	Vacuum pipe union (2)	2
F13	Water scoop front plate	2	F28	Vacuum pipe bracket (2)	2
F14	Rear scoop cross shaft to scoop lever lamination (2)	1	F29	Wheel side control washer	3
F15	Vacuum tank wrapper	1			

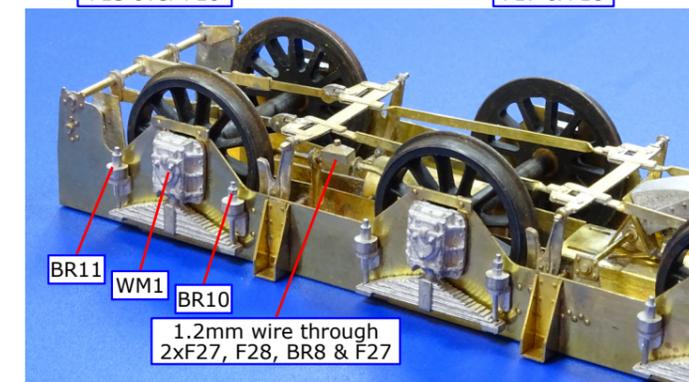
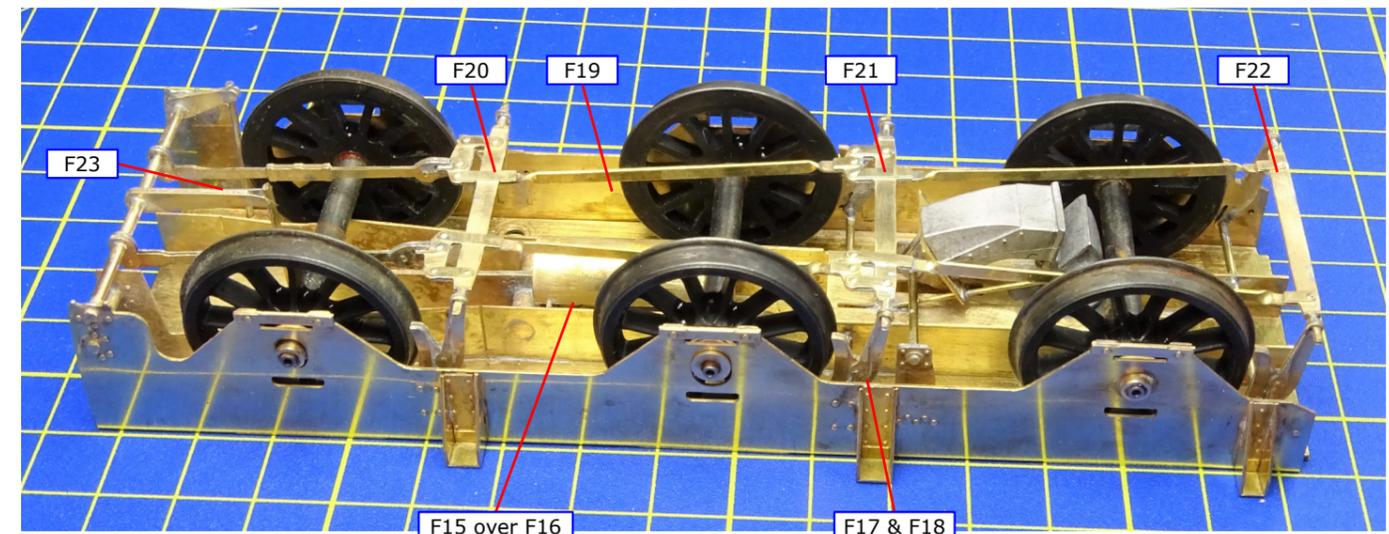
5. Roll the vacuum tank wrapper (F15) to fit the brackets (F16). Slide the brackets into the slots in the internal frames and solder the wrapper in place. The notch in the wrapper is to clear the compensation beam and is to the rear.

Assemble the brake hangers (F17 & F18) first embossing the rivet on the overlay. Attach the hangers to the pivot wires ensuring that the brake shoe is in line with the outer face of the wheels. Check the clearance between the brake shoes and the wheels making any necessary adjustments.

Emboss the bolts on the brake spreaders and pull rods (F19) and the brake spreader overlays, front, centre and rear (F20, F21 & F22) and solder the spreader overlays to the top of F19. Now carefully twist the pull rods between the cross shafts vertical. Thread this assembly through the brake hangers. Solder in place. Thread the front pull rods onto the front brake spreader and secure.

Solder a piece of 1.2mm wire into the hole in the vacuum pipe drip trap (BR8) and solder two vacuum pipe unions (F27) back to back on the wire close to the casting. Bend the wire representing the vacuum pipe so that it disappears behind the wheel and can be soldered to the top of the internal frame. Solder the casting and pipe in place through the vacuum pipe bracket (F28) with a vacuum pipe union either side of the bracket. Finally solder in place with the bracket in the slot in the spacer plate.

Lastly attach the axlebox and spring (WM1) and spring hanger castings (BR10 & BR11 or BR12).



## CONSTRUCTING THE HANGING PLATE ASSEMBLY

**6.** Emboss the rivets on each step hanger on the step and valance assembly (H1). Fold over the packing strips (next to the body mounting holes) with the fold lines on the **outside** and solder securely. Fold up the valences and form the joggle in the front step hanger plates reinforcing the folds with solder on the inside. The valence overlays, original or later (H2 or H3) are handed; check the rivet pattern before soldering them in place.

Emboss the two rivets on the coupling hook base on the rear buffer beam overlay (H5) and solder to the rear buffer beam (H4). Solder the rear bufferbeam in place. Emboss the rivets on the front buffer beam overlay (H8) and solder to the front buffer beam (H7) and then solder the complete front bufferbeam in place.

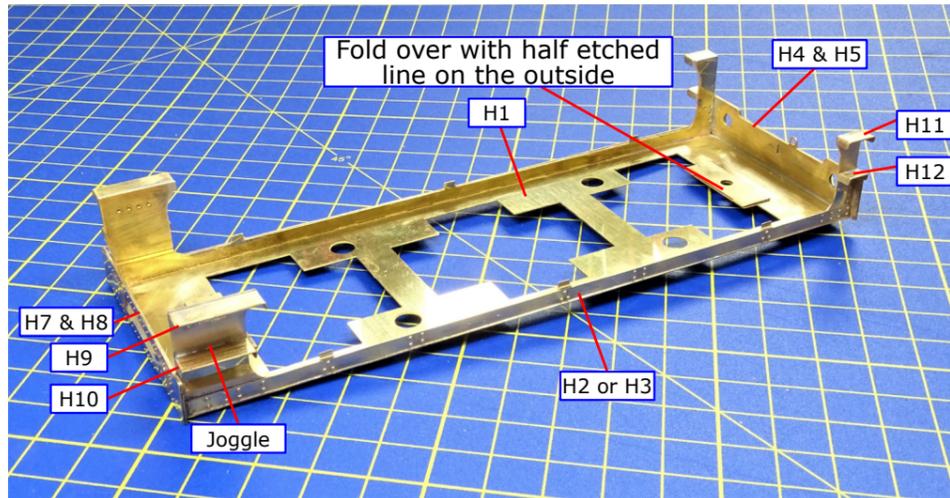
Form the step treads (H9, H10, H11 & H12) and solder in position. The short half etched lines on the step hanger plates align with the lower edge of the upper steps.

**The following actions require the tank to be finished and fitted to the hanging plate assembly.**

**7.** Solder the vacuum pipe (BR5) to the buffer beam. The steam heating valve (BR6) fits in the bracket under the buffer beam. The steam heating pipe is made from the plastic tube supplied; fit onto the steam heating valve and place the coupling (BR7) at the other end.

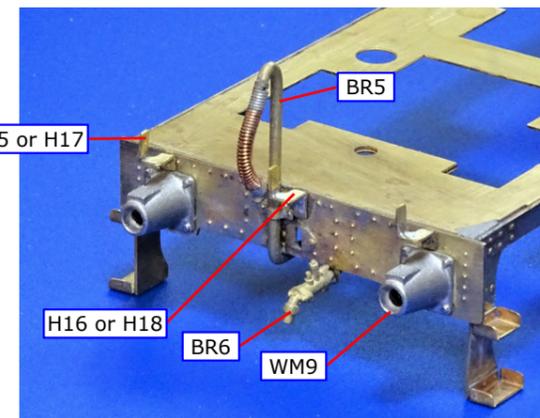
If you want to solder the lamp irons to the buffer beam, fit them now. If they are to be glued to the buffer beam, fit them after the buffers. Emboss the rivets if fitting riveted lamp irons (H15 & H16). Fold the lamp irons, welded (H17 & H18), to shape and the fit as shown in the GA and the photographs.

Solder the front buffers (BR9) into the holes on the drag beam. Build the buffers (WM9) as shown in the inset drawing..

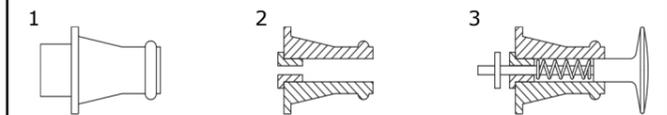


No.	Description
H1	Step and valance assembly
H2	Original frames valance overlay (2)
H3	Later frames valance overlay (2)
H4	Rear buffer beam
H5	Rear buffer beam overlay
H6	Parallel buffer step
H7	Front buffer beam
H8	Front buffer beam overlay
H9	Front step lower tread (2)

Sheet	No.	Description	Sheet
2	H10	Front step upper tread (2)	1
2	H11	Rear step lower tread (2)	1
2	H12	Rear step upper tread (2)	1
2	H13	Coupling hook lamination	2
2	H14	Steam heating pipe tap handle	2
1	H15	Riveted lower outer lamp bracket (2)	1
1	H16	Riveted lower centre lamp bracket	1
2	H17	Welded lower outer lamp bracket (2)	1
1	H18	Welded lower centre lamp bracket	1



### Buffer Construction



1. Drill casting 2mm.
2. Remove rear of casting and glue bush in place.
3. Assemble with spring and retain with washer.

## CONSTRUCTING THE TANK 1

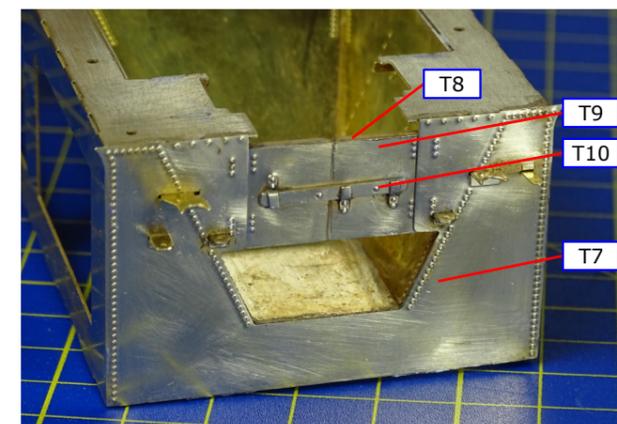
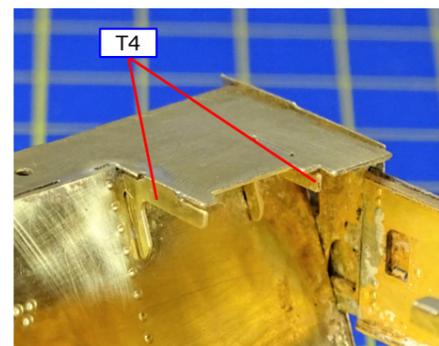
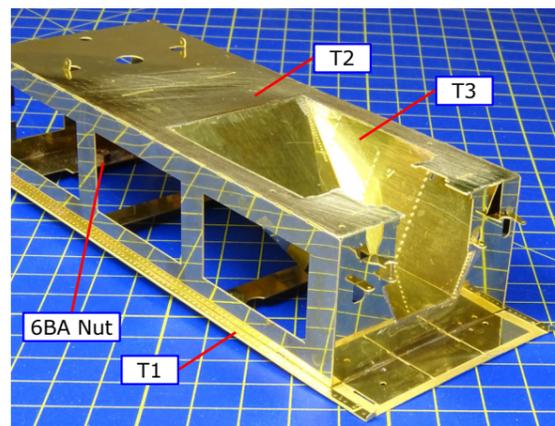
**8.** Emboss the rivets down both sides of the footplate (T1) and fold up the sides of the step treads at the front. Solder 6BA nuts, for body fixing, over the holes front and rear. Put to one side.

Fold up the tank former (T2) and fold out all the brackets at the front and the lifting brackets on the top at the rear. Solder the front corners together. Emboss the rivets on the coal hopper (T3) and fold to shape before soldering the edges together. Solder the coal hopper in place with the upper edges flush with the top surface of the former and the front edges on top of the cut out in the front of the former. Solder the tool box support brackets (T4) in place in the slots in the coal hopper and the tank former; the brackets may need fettling to fit depending on how the hopper has fitted in.

No.	Description
T1	Footplate
T2	Tank former
T3	Coal space hopper
T4	Tool box support bracket (4)
T5	Tank sides & back

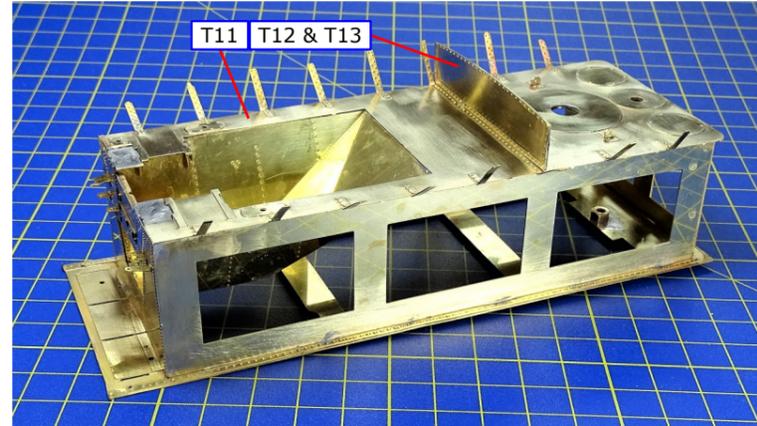
Sheet	No.	Description	Sheet
2	T6	Tank lower rivet strip	2
3	T7	Tank front overlay	3
3	T8	Coal doors	1
2	T9	Coal doors overlay	1
3	T10	Coal doors locking beam	1

**9.** Emboss the rivets on the tank front overlay (T7), the coal doors overlay (T9) and the coal doors locking beam (T10). Fit the tank front overlay in place carefully feeding all the brackets through the holes and then solder in place. Bend over the ribs on the the coal doors (T8) and then assemble the coal doors, the coal doors overlay and the locking beam and solder in place behind the opening in the tank front using the hinge rivets to ensure accurate alignment.



## CONSTRUCTING THE TANK 2

**10.** Fit the tank former to the footplate, fitting the tabs through the appropriate slots. Check that the assembly is square and that the footplate is flat before soldering it together. Emboss the rivets on the tank top overlay (T11) and fold up the side coal plate brackets. Emboss the rivets on the rear coal plate front (T12) and solder to the rear coal plate back (T13) to make the rear coal plate. Locate the tank top overlay over the lifting brackets and with the rear coal plate before soldering them to the tank former.

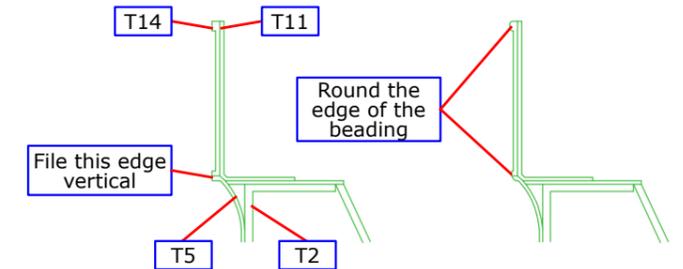
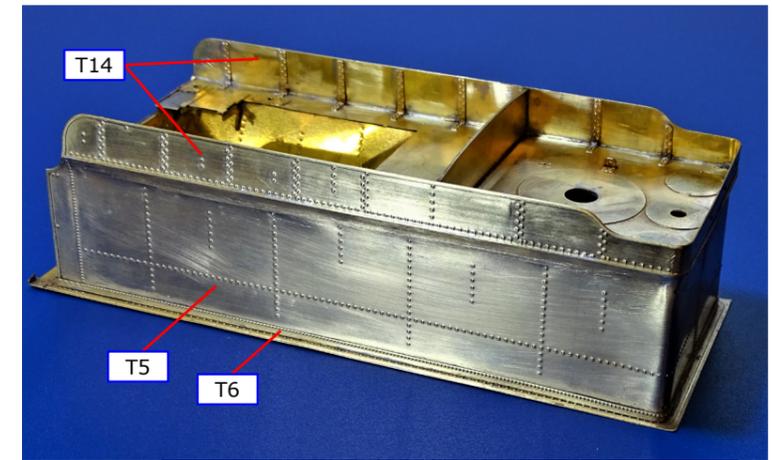


No.	Description
T11	Tank top overlay
T12	Rear coal plate front

**12.** Carefully form the flare in the tank sides & back by bending around a rod of suitable size (about 7mm diameter). Form the rear corners in the sides/back wrapper (the holes for the handrails are on the centre of the bend) over a rod of 3.5mm diameter and check the fit around the tank former - the flare is correct when the top of the sides & back meets the tank top overlay (see the diagram). Now solder the sides & back to the former. Carefully curve to shape the small 'fingers' at the rear corners. Solder the lower rivet strips (T6) in place at the bottom of the sides.

Tin the coal plate brackets (attached to the tank top overlay) and bend inwards clear of their final position and then gently file the outside edge of the top of the side flare vertical. Bend the rear corners of the side & rear coal plates (T14) over a rod of 7mm diameter. Hold them in place with Blu-Tack before soldering them on the outside of the side flare (see the drawing). The solder is applied from the outside to the top of the sides, where there is no rivet detail, and cleaning up with a glass fibre brush is not difficult. Push the tinned coal plate brackets against the coal plate and solder in place. Fill the gaps between the 'fingers' with solder and then file to shape. A low melt solder works best after first tinning the area with ordinary solder. This should be left until all other soldering is complete to avoid the possibility of a meltdown.

Sheet	No.	Description	Sheet
1	T13	Rear coal plate back	2
2	T14	Side & rear coal plates (L & R)	1 & 2



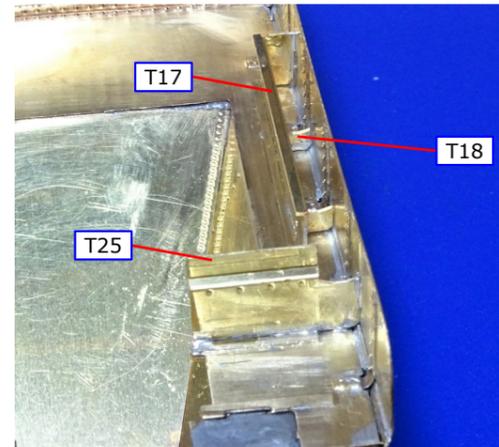
## DETAILING THE TANK 1

**13.** Fit the raised footplate supports (T15) locating them in the slots in the footplate. The three different heights are for different classes of engine as follows:

47XX Class	High footplate
King, Castle, Hall & Star classes	Middle height footplate
Grange class	Low footplate

Depending on the height of footplate, the raised footplate (T16) will need narrowing until it fits in place between the sides of the coal hopper. Open out the holes for the scoop and brake standards to fit. Solder in place.

**14.** Emboss the rivets on the fire iron tray (T17), form into a shallow 'U' section and fold the rear plate at 90°. Solder the fire iron tray spacers (T18) into the half etched slots and attach the complete tray behind the vent base. Emboss the rivets on the toolbox coal plates, left and right (T25 & T26) and then fold them to shape with each fold being through 30°. Solder in place as shown. Emboss the rivets on the fire iron lyre (T19) and fold along the half etched lines before soldering the upper, 'U' shaped, part together. It is then soldered to the side of the coal plate matching the rivet positions.



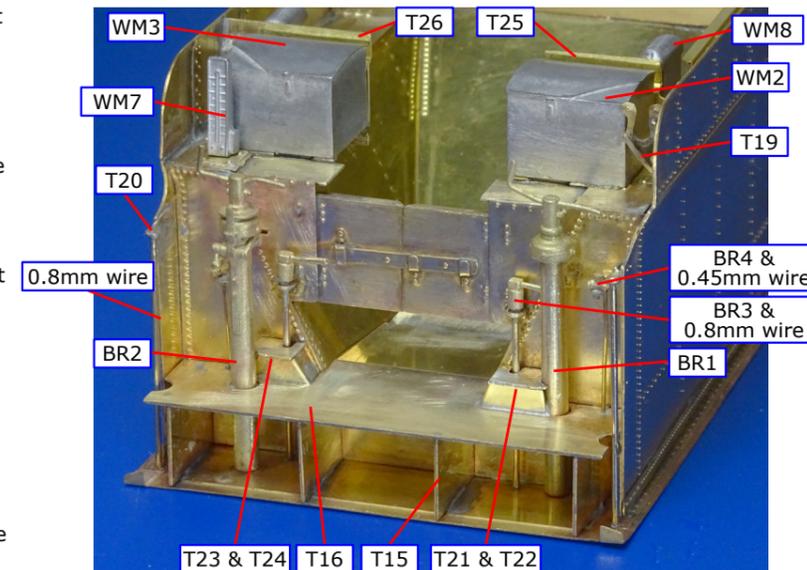
No.	Description
T15	Raised footplate support, 3 heights (4)
T16	Raised footplate
T17	Fire iron tray
T18	Fire iron tray spacer (2)
T19	Fire iron lyre
T20	Front handrail brackets (2)

**15.** Detail the footplate area by first attaching the front hand rails. Solder the front handrail brackets (T20) to the inside of the sides matching the rivets on the brackets with those on the sides. Twist the brackets horizontal and attach handrails from 0.8mm wire. Now attach the two taps (BR4) with a piece of 0.45mm wire running down into the raised footplate. Fit the feed valve handles (BR3) to pieces of 0.8 mm wire and mount on the brackets with the wire running down into the raised footplate.

If required, bend the small footplate steps, left and right (T21 & T23) to shape and fix in place on the footplate before fixing the tops (T22 & T24) in place. Fix the brake standard (BR1) and the water scoop standard (BR2) in place, note that the brake standard is not vertical.

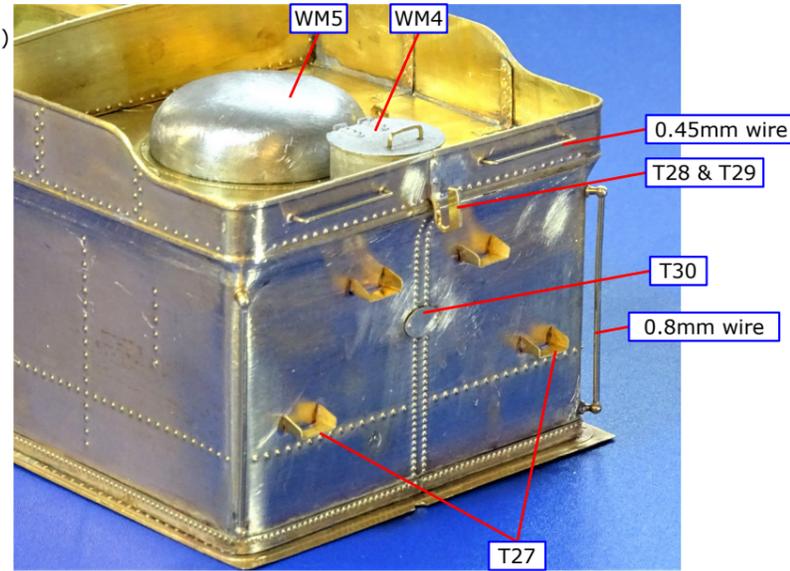
Attach the toolboxes, left and right (WM2 & WM3). Fit the water level gauge (WM7) followed by the two tank vents (WM8). Fit the water pick up dome (WM5). Drill two 0.45mm holes in the top of the water filler (WM4) where there are two indents in the top. Bend and fit the handle from 0.45mm wire and then attach the water filler to the tank top.

Sheet	No.	Description	Sheet
3	T21	Left footplate step	1
3	T22	Left footplate step top	2
1	T23	Right footplate step	1
1	T24	Right footplate step top	2
2	T25	Left toolbox coal plate	1
2	T26	Right toolbox coal plate	1



## DETAILING THE TANK 2

16. Bend and fit the tank rear steps (T27) soldering from the inside of the tank. Solder the works plate (T30) in place in the gap in the rivets. Attach the two rear vertical handrails from 0.8mm wire with two handrail knobs. Bend and fit the two rear horizontal handrails from 0.45mm wire. Finally solder in place the upper lamp bracket, riveted or welded (T28 or T29) making a 90° twist in the neck.



No.	Description
T27	Tank rear steps (4)
T28	Original upper lamp bracket
T29	Later upper lamp bracket

Sheet	No.	Description	Sheet
1	T30	Works plates	2
2	T31	Toolbox padlock (2)	2
2	T32	Screw coupling	2

## 4000G TENDER CASTINGS

### WHITEMETAL CASTINGS

- WM1 Axlebox & spring
- WM2 Toolbox, left
- WM3 Toolbox, right
- WM4 Water filler
- WM5 Water pickup dome
- WM6 Water pickup scoop, two parts
- WM7 Water level gauge
- WM8 Tank vent (2)
- WM9 Collett taper buffer housing (2)

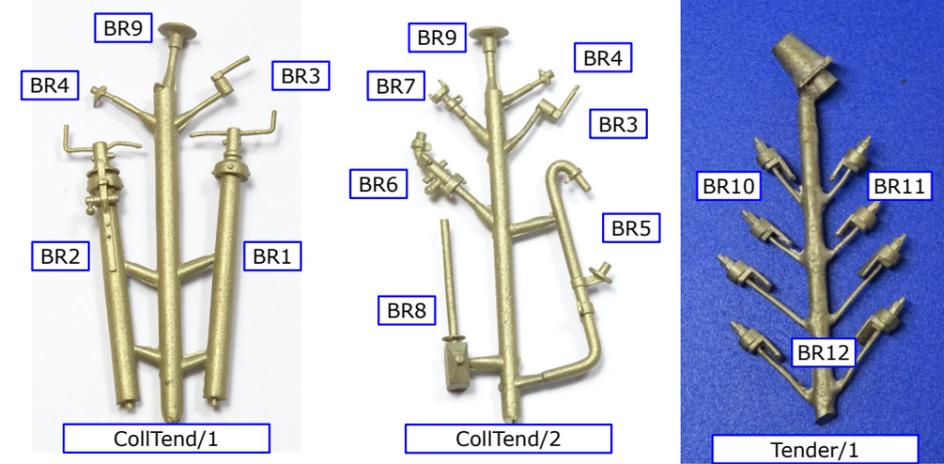


### BRASS CASTINGS

- BR1 Brake standard
- BR2 Water scoop standard
- BR3 Water feed valve handle (2)
- BR4 Tap (2)
- BR5 Vacuum pipe
- BR6 Steam heating valve
- BR7 Steam heating pipe coupling
- BR8 Vacuum pipe drip trap
- BR9 Front buffer (2)
- BR10 Short spring hanger, left (6)
- BR11 Short spring hanger, right (6)
- BR12 Long spring hanger (12)

- CollTend/1
- CollTend/1
- CollTend/1&2
- CollTend/1&2
- CollTend/2
- CollTend/2
- CollTend/2
- CollTend/2
- CollTend/1
- Tender/1
- Tender/1
- Tender/1

**DUE TO SUPPLY ISSUES, SOME PARTS MIGHT BE SUPPLIED AS WHITE METAL**

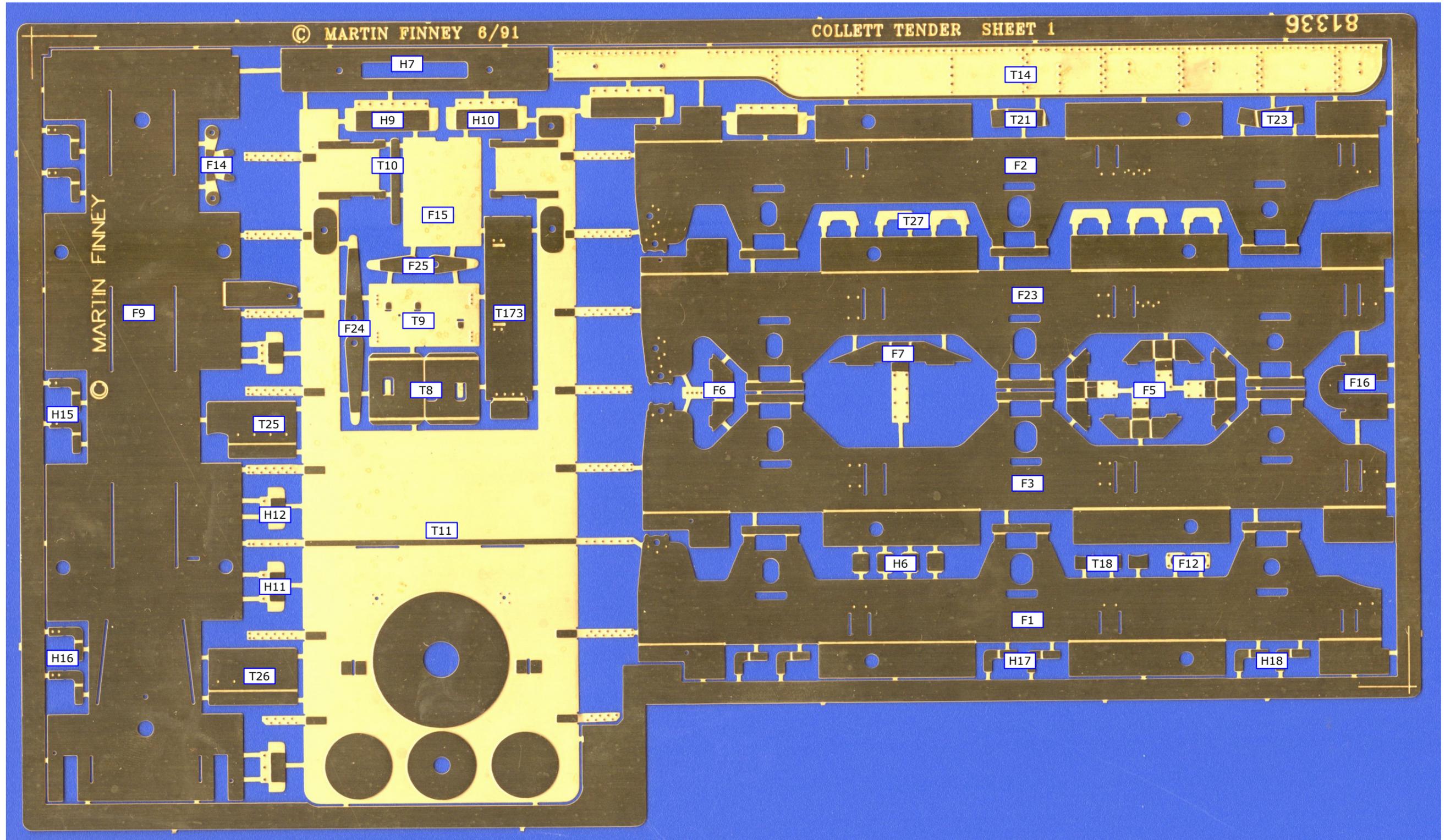


### OTHER COMPONENTS

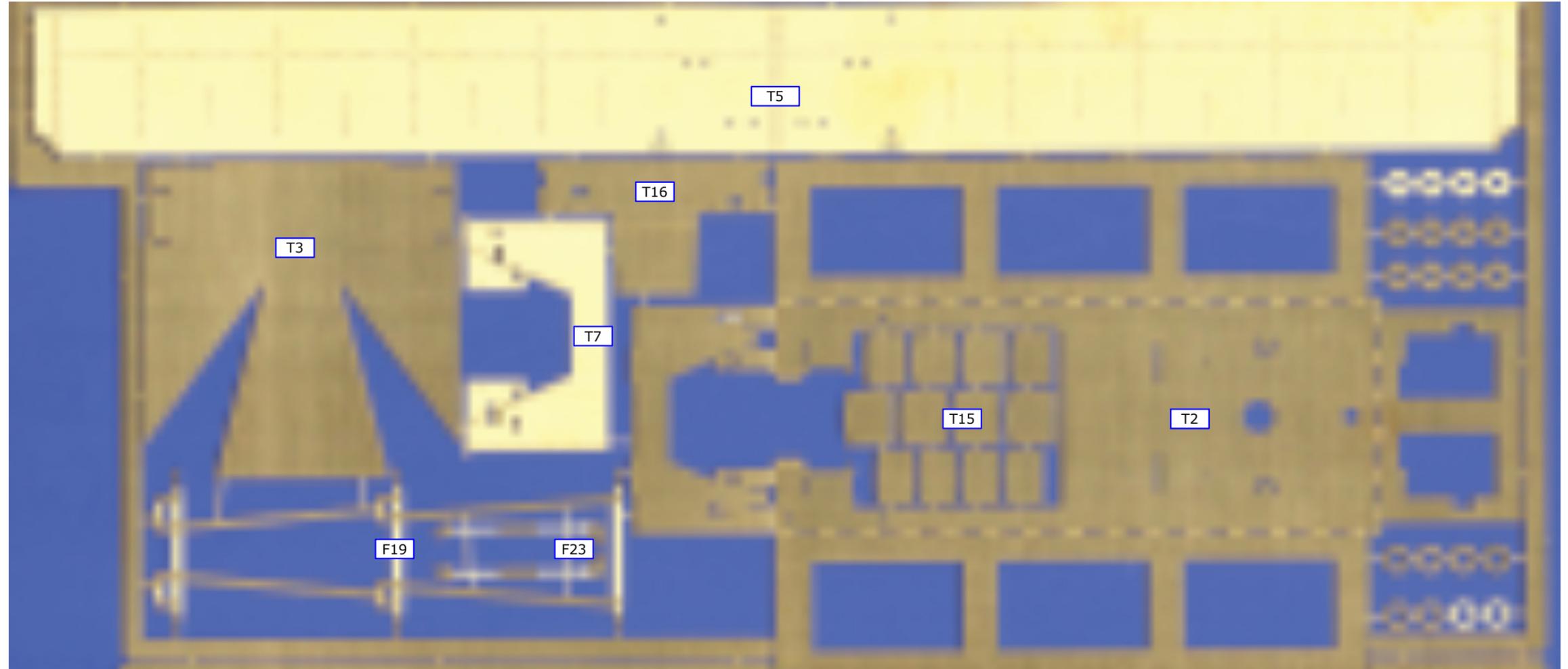
- 2 mm bore clearance small top hat bearing (4)
- 2 mm bore clearance larger top hat bearing (2)
- 6BA screw (4)
- 6BA nut (4)
- 1/8" brass wire for compensation beam pivot
- 5/32" outside diameter brass tube for compensation beam
- Handrail knob (4)
- 0.45mm brass wire
- 0.7mm brass wire
- 0.8mm brass wire
- 1.2mm brass wire
- 1.6mm brass wire
- Buffer, bush, washer & spring (2)
- Vacuum & steam pipe hose (2)

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

ETCH SHEET 1



ETCH SHEET 3



ETCH SHEET 2

