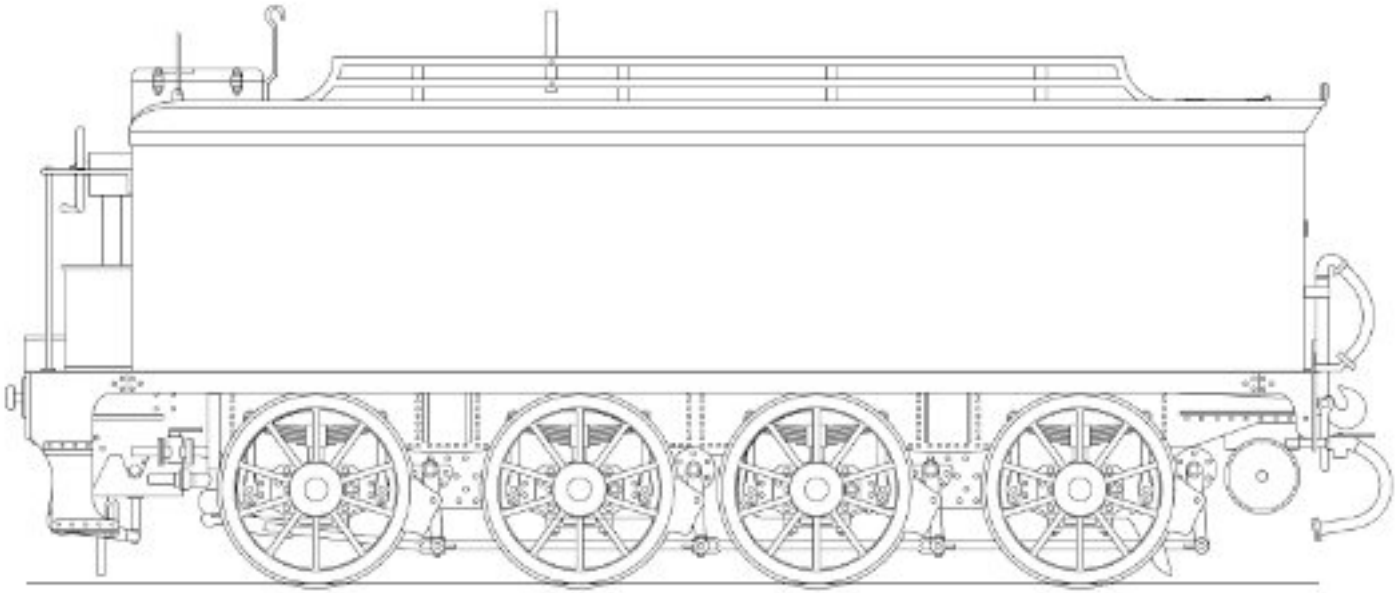
# LSWR DRUMMOND 4000G TENDER



**CAUTION.**

This product contains etched parts with very sharp edges and castings that may contain lead. Neither the Manufacturer, Distributor or Retailer can accept any liability for illness, injury or consequential damage caused when handling or building this product.

Read any instructions before assembly.  Do not eat or drink whilst handling. Wash hands after use.

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# BRIEF HISTORICAL DETAILS

Tenders which form the subject of this kit are the distinctive Drummond 4000 gallon double bogie type often referred to as Watercarts. A total of 126 tenders were built at Nine Elms Works as follows:

| Loco Class | Loco Number | Date Built | Front Handrail Stanchion |
|---|---|---|---|
| T9 4-4-0 | 300-304 | 12/1900 - 1/1901 | Wide |
| T9 4-4-0 | 305, 307, 310-314 | 2/1901 - 5/1901 | Wide |
| E10 4-2-2-0 | 369-373 | 4/1901 - 7/1901 | Wide |
| T9 4-4-0 | 313, 314, 336-338 | 5/1901 - 10/1901 | Wide |
| T9 4-4-0 | Among 113-773 | 4/1902 - 6/1907 | Narrow |
| C8 4-4-0 | 290-299 | 9/1902 - 3/1907 | Narrow |
| S11 4-4-0 | 395-404 | 6/1903 - 12/1903 | Wide |
| All after fitted with exhaust steam heaters | | | |
| L12 4-4-0 | 415-434 | 6/1901 - 3/1905 | Wide |
| B15 4-6-0 | 330-334 | 9/1905 - 12/1905 | Wide |
| L11 4-4-0 | 175, 175, 407-413 | 5/1906 - 8/1906 | Wide |
| E14 4-6-0 | 335 | 11/1907 | Wide |

For a detailed history of these tenders, including all the exchanges, refer to the following books:

Part two of The Locomotives of the LSWR published by the RCTS.

LSWR Locomotives - The Drummond Classes published by Wild Swan.

The Drummond Greyhounds of the LSWR, DL Bradley, David & Charles

A Pictorial Record of Southern Locomotives - J.H.Russell - OPC

Drummond Locomotives, Brian Haresnape & Peter Rowledge, Ian Allan

Locomotives Illustrated No. 44 - The Drummond 4-4-0's and Double singles of the LSWR, Ian Allan

Southern Steam Locomotive Survey, The Drummond Classes, Bradford Barton

## VARIATIONS/ MODIFICATIONS INCORPORATED INTO THE KIT.

**Water Feed.** The last 25 tenders were fitted with Drummond's exhaust steam heaters which were inside the well of the tank and were supplied with exhaust steam from the locomotive. The tank was clad with false plates, to prevent heat loss and blistering of the paintwork. Whilst the system did give a slight improvement in both coal and water consumption it was expensive to maintain and this was one of Drummond's frills which his successor, Robert Urie, removed. The cladding seems in virtually all cases to have not been removed.

**Front side plates.** From 1913 plates were added underneath the front handrail stanchion supports. On the tenders with narrow spaced stanchions the lower edge of these plates was on top of the sandboxes whereas on the tenders with wide spaced stanchions the plates went outside the sandboxes down to the front platform.

**Lamp brackets.** The tenders were built with Drummond's socket style brackets. The SR standardised on a design with the socket in the lamp. Many tenders had the Drummond brackets adapted to accept the standard lamps but gradually many the tenders were fitted with new brackets of standard design.

**Couplings.** Most of the tenders appear in their early years to be running with a single long coupling link, although some carry three link couplings. Later the tenders were equipped with screw couplings together with a hook to carry the coupling when it was not required.

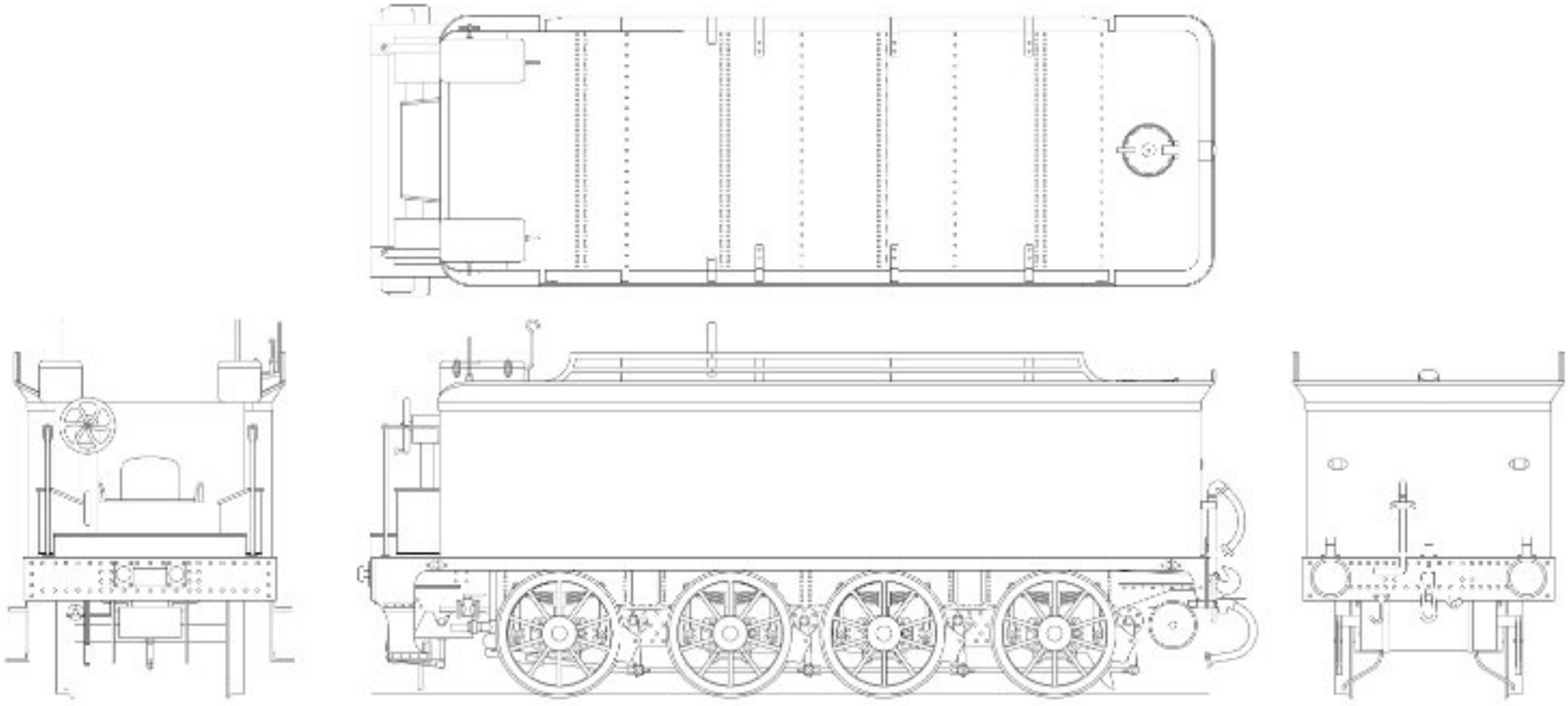
**Widening of front platform.** After 1923 the front of the platform was widened to 8' 1" to match the platform of the wide locomotives.

**Coal shovelling plate.** This was added from an unknown date; certainly by WW2.

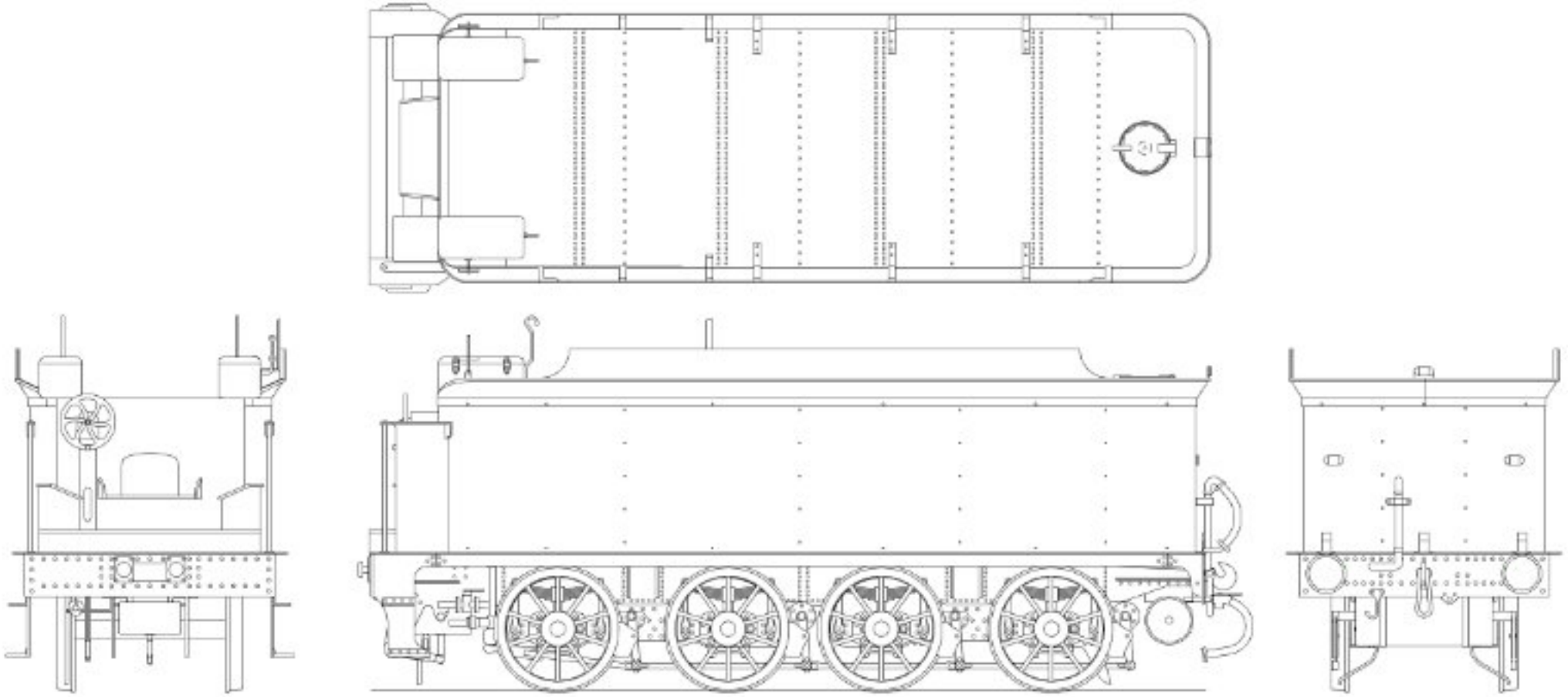
**Coal Rails.** From the circa 1936 the coal rails were backed by metal sheeting to stop the loss of small coal.

## COMPONENTS NOT PROVIDED

Wheels 3'7", 10 Spokes with 5/32" axles Slater's Ref 7843SWMF



**SR Drummond 4000G Tender With a Narrow Footplate**



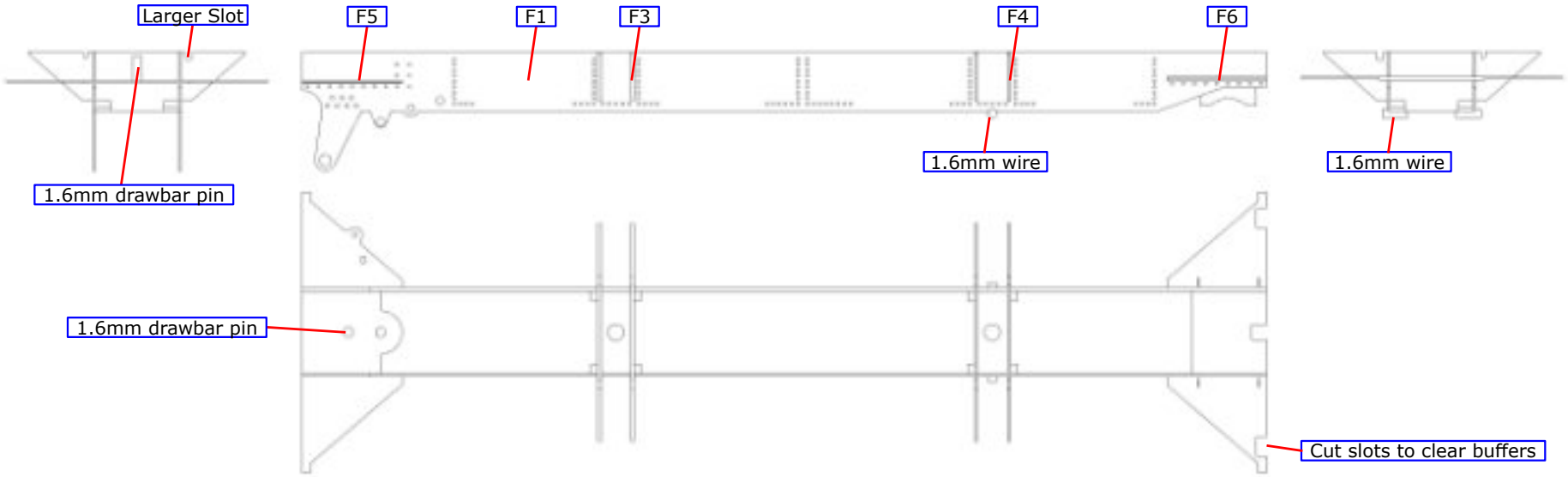
**SR Drummond 4000G Tender With a Wide Footplate**

# CHASSIS 1

**Part Numbers and Etch Numbers.** These are all displayed in the text as part number/etch number as in (B1/1). Parts on this page are on Etch 2 unless detailed.

Emboss the rivets in the frames (F1 & F2). Select the appropriate front and rear bogie pivot frame stretchers (F3/1 & F4/1 - for 0 Fine use the middle width, for S7 use the widest) and fold up with the fold lines on the inside. Solder these stretchers in place in the slots in the chassis with the larger of the slots in the upper edge on the left side. Check that the chassis is straight and square.

Widen the gap between the inner edges of the front and rear spacers (F5 & F6) by snapping off the unwanted material along the half etched lines. Make slots in the rear frame stretcher to clear the buffers. Solder the drawbar pin (1.6 mm wire) in place on the front stretcher before soldering both stretchers in place. Solder pieces of 1.6 mm wire into the half etched slots in the rear bogie pivot frame stretcher for the rear bogie bearers.



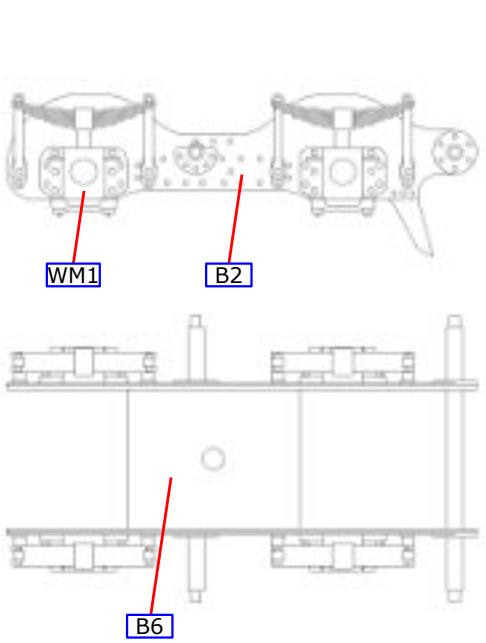
# BOGIE

Parts on this page are on Etch 1 unless detailed.

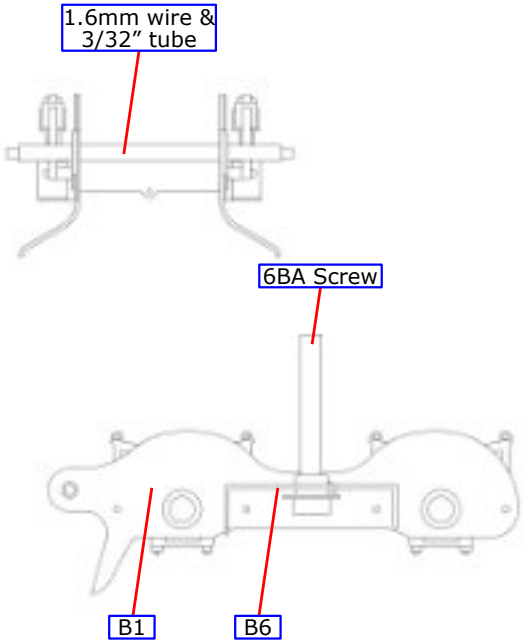
Emboss the rivets in the bogie frame overlays (B2 & B4/2). Open up the holes in the rear bogie frame (B1), the rear bogie frame overlay (B2), the front bogie frame (B3/2) and the front bogie frame overlay (B4/2) to 3/32" to fit the brake hanger pivot tubing. Fold up the appropriate bogie stretchers (B5 & B6) and solder in place between the bogie frames. Cut the brake hanger pivot tubing to length. Lengths for S7 are 35.5 mm for the piece between the frames and 8.2 mm for the pieces outside the frame; other gauges shorter as required. Solder the brake hanger pivots (3/32" tube and 1.6 mm wire) in place. Now thread the frame overlays over the brake hanger pivots and solder in place. They only require soldering around the edge.

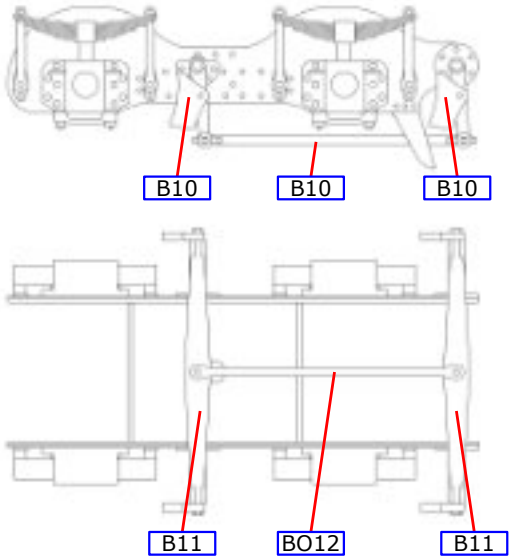
Attach the axlebox castings (WM1) and ream the axle holes 5/32". Fit the wheel sets. Wheel side control is limited by using the washers (B19/2).

Assemble the brake hanger laminations (B10) and attach the hangers to the pivots. Check the clearance between the brake shoes and the wheels making any necessary adjustments. Solder the two bogie pull rod lamination (B12) together before soldering it to the brake cross shafts (B11). The 0.8 mm holes through the pull rods and cross shafts must remain clear. Now solder this assembly in place as shown. Make up the bogie pivot screws as shown. The 5/32" tubing is 1.4 mm long for the front screw and 2.6 mm long for the rear screw.

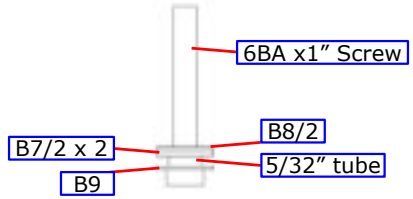



**Rear Bogie**




**Front Bogie**




**Front Bogie Retaining Screw Detail**

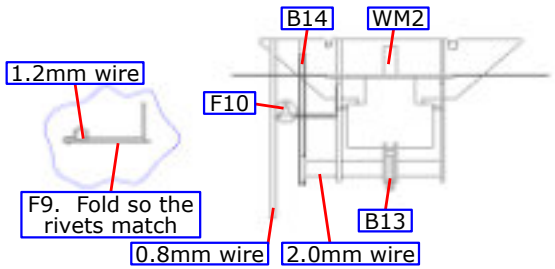
# CHASSIS 2

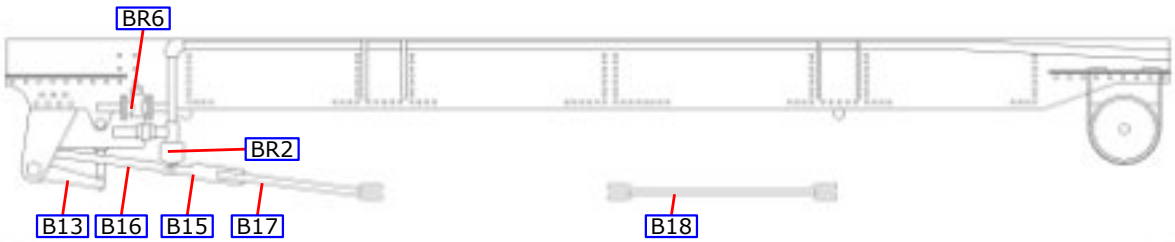
Parts on this page are on Etch 1 unless detailed.

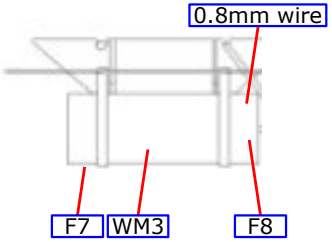
Drill a 0.8 mm hole in one end of the vacuum reservoir (WM3) and fix a short length of 0.8 mm wire in place. Add the pipe flange detail (F8/2) to the wire as shown below. Form the vacuum reservoir straps (F7/2) and wrap them around the vacuum reservoir, feeding the ends through the etched slots in the rear frame stretcher. Bend back the straps on top of the stretcher and solder in place.

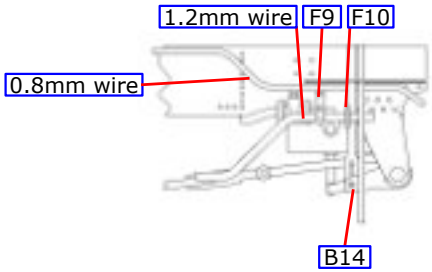
Fit the brake cylinder (WM2) into the hole in the front frame stretcher. Cut a length of 2.0 mm wire for the cross shaft to fit through the frames as far as the hand brake crank. Fit the cross shaft with the brake cross shaft to vacuum cylinder linkage (B13) between the frames. Solder the cross shaft and the vacuum cylinder linkage in place as shown below. Fit the brake cross shaft hand brake linkage (B14) as shown below. Laminate the pull rod adjuster (B15) and the front pull rod front section (B16) and then join them together with a 0.8 mm wire pin. Do not attach the front pull rod rear section (B17) or the between bogie pull rod (B18) at this stage.

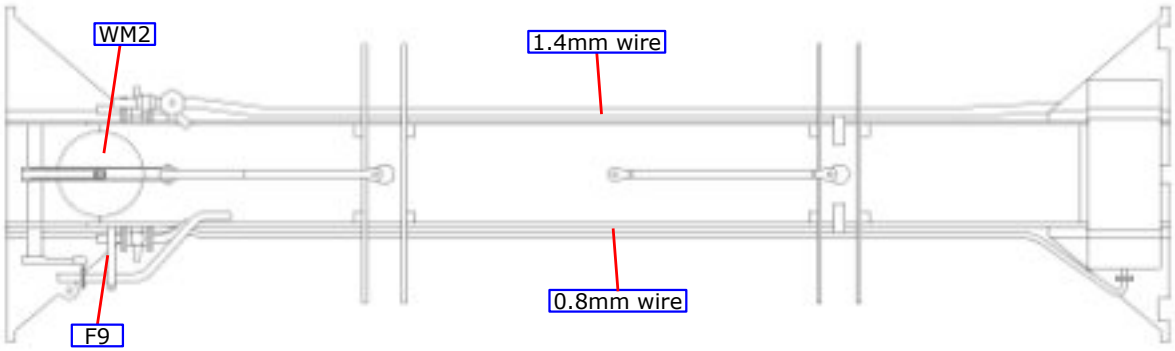
The feed water isolating valve (BR6) will need to be modified to make a left and right pair. Fit the valves as shown below. Fit the vacuum pipe drip trap (BR2) to the left side and the vacuum pipe from 1.4 mm wire. Make up the steam heat pipe from 1.2 mm wire. Add the steam heat pipe flange (F10/2) from the two laminates and fit as shown.



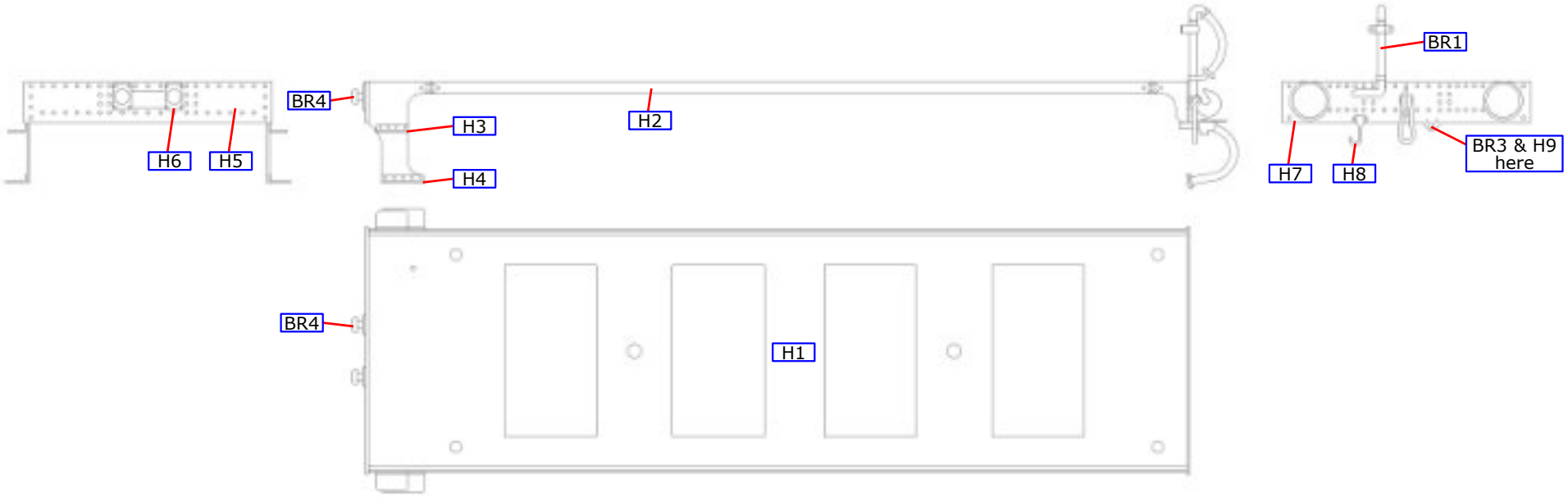
# FOOTPLATE

Parts on this page are on Etch 2 unless detailed.

First, if appropriate, emboss all the rivets on the hanging plates (H2), the upper steps (H3/1 & 2), the lower steps (H4), the front buffer beam (H5/1), the front buffer beam plates (H6) and the rear buffer beam (H7/1). Fold up the edges of the base (H1/1) and solder the hanging plates in position ensuring they are flush along their top edge. Solder the buffer beam base plates to the front buffer beam, add the front buffers (BR4) and then solder the buffer beam in place.

Solder the rear buffer beam in place. Add the buffer housings (BR8) and the screw coupling hook (H8). Add the vacuum pipe (BR1) and the steam heat pipe (BR3). Add the steam pipe valve handle (H9) to the steam heat pipe. If required, make up and fit the coupling components included in the kit.

Fold up the steps (H3 & H4) and solder in position.



# ORIGINAL TANK WITH NARROW HANDRAILS

Parts on this page are on Etch 1 unless detailed.

This page describes the tank in original condition with narrow front handrail stanchions, front side plates and Drummond lamp brackets. The drawing which accompanies this text is on the next page.

File off the platform (T1/2) side extensions. Solder the four 8BA nuts over the four holes near the corners of the platform. Check that the hanging plate assembly will fit and that it can be screwed to the underside of the platform. Solder the two 6BA nuts over the holes for the bogie pivot screws.

Form the corners of the tank sides and back (T2/2) over a 7/32" (5.5 mm) rod or drill. Locate the tabs along the lower edge of the tank sides and back into the slots in the platform and solder in place. Emboss the rivets in the tank top (T3) before forming the bends over a 1½" rod. The edge of the tank top has a small rebate which sits on the top of the tank sides as shown. Fit the tank top over and between the sides and carefully solder in place. The top should be retained in the slots in the sides at the front, without the need for soldering.

Solder the front division plate (T4) in place between the front edges of the tank sides. Emboss the rivets in the brackets attached to the toolbox support plate (T6) and fold them down. Now solder the support plate in place with the brackets fitting in the etched slots on the inside of the tank sides.

Form the corners in the coping plates (T7) over a 7/32" (5.5 mm) rod or drill. Solder the coping plates into the rebate between the tank side and tank top. Use the jigs (T32) to determine the correct angle for the coping plate. The two halves are joined at the rear with the aid of the tank top mounting bracket (T27/2). For a tender without cladding, the lower part of the coping plate is represented by the coping plate vertical section (T8/2). Again this is joined at the rear and an even height above the platform can be attained with the aid of the jig.

Emboss the rivets on the open coal rails (T9/9), fold over the stanchions through 180° and solder to the back of the coal rails. Be sure to strengthen all the bends in the stanchions with a small fillet of solder. Solder the stanchions in place in the etched slots in the tank top.

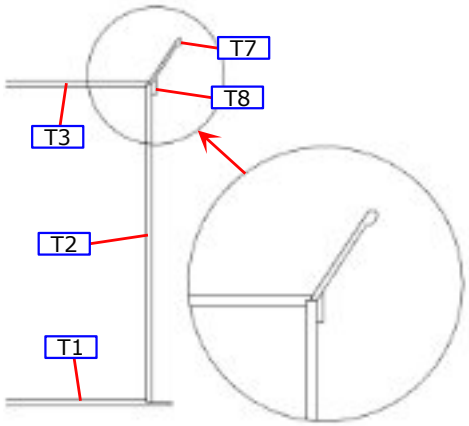
The right side sandbox (WM4) must have the rear part of the inner edge of its lid filed away to clear the brake column (WM6). Fit the sandboxes in place. Now solder the narrow engine footplate support (T11) in place on the platform. Reduce the width of the footplate (T13/2) to the half etched lines and then solder in place. Fold down the bracket of the narrow handrail stanchion bracket (T14) and then solder in place on the narrow engine front side plate (T18). Solder this assembly in place on the footplate and tank. Solder the bucket cock (BR7) to the division plate.

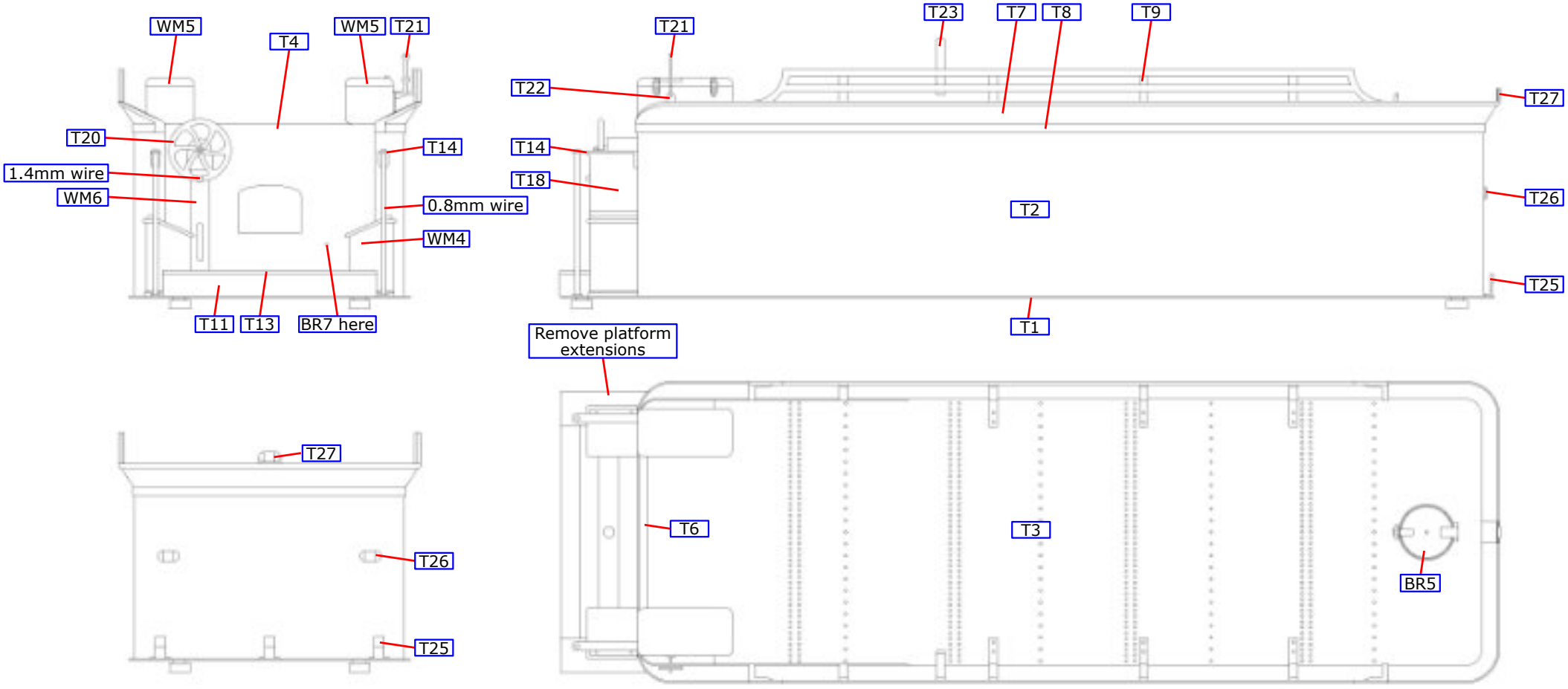
Solder together the brake hand wheel laminations (T20) and file the rim to remove the cusp. Fit in place on the brake column. Make up the fire iron cruciform (T21/2) and cruciform bracket (T22/2) and fit as shown overleaf. Also fit the fire iron bracket (T23/2) as shown. Fit the tool box castings (WM5).

Fit the LSWR lamp brackets (T25) to the platform and tank rear and top brackets (T26).

Final assembly involves attaching the bogies and the remaining brake pull rods as shown on page 7. Whilst the bogies are not internally compensated they rest under the chassis in contact at three points. The rear bogie rests on the two bearers already fitted and the front bogie rests on the washers (B7 & B8), effectively on one point. The number and thickness of these washers can be varied until the tender is level. Two full thickness and one half thickness washer seems to work.

The flexible joins between the brake pull rods can be made with short lengths of soft copper wire.




WM5
T4
WM5
T21
T20
T14
1.4mm wire
WM6
0.8mm wire
WM4
T11
T13
BR7 here
T21
T23
T7
T8
T9
T22
T27
T14
T18
T2
T26
T25
T1
Remove platform extensions
T27
T6
T3
T26
BR5
T25

# TANK WITH WIDE HANDRAILS

Parts on this page are on Etch 1 unless detailed.

This page describes the tank in later condition with wide front handrail stanchions, tank cladding, coal plates sheeted in, front side plates a coal shovelling plate, cab weather brackets and SR lamp brackets. The drawing which accompanies this text is on the next page.

Drill new 0.8 mm holes in the front platform (T1/2), using the drilling jig (T17), as shown. Solder the wide engine handrail flange (T16) over these new holes. Solder the four 8BA nuts over the four holes near the corners of the platform. Check that the hanging plate assembly will fit and be screwed to the underside of the platform. Solder the two 6BA nuts over the holes for the bogie pivot screws.

If appropriate, (see variations) emboss the tank cladding rivets on the tank sides and back (T2/2) before forming the corners over a 7/32" (5.5 mm) rod or drill. Locate the tabs along the lower edge of the tank sides and back into the slots in the platform and solder in place.

Emboss the rivets in the tank top (T3) before forming the bends over a 1½" rod. The edge of the tank top has a small rebate which sits on the top of the tank sides as shown. Fit the tank top over and between the sides and carefully solder in place. The top should be retained in the slots in the sides at the front, without the need for soldering.

Fold up the edges of the shovelling plate (T5/2) and solder in place below the coal hole in the front division plate (T4). Solder the front division plate in place between the front edges of the tank sides. Emboss the rivets in the brackets attached to the toolbox support plate (T6) and fold them down. Now solder the support plate in place with the brackets fitting in the etched slots on the inside of the tank sides.

Form the corners in the coping plates (T7) over a 7/32" (5.5 mm) rod or drill. Solder the coping plates into the rebate between the tank side and tank top, as shown in Fig 9. Use the jigs (T32) to determine the correct angle for the coping plate. The two halves are joined at the rear with the aid of the ST lamp bracket, tank top (T31).

Emboss the rivets on the sheeted-in coal rails (T10), fold over the stanchions through 180° and solder to the back of the coal rails.

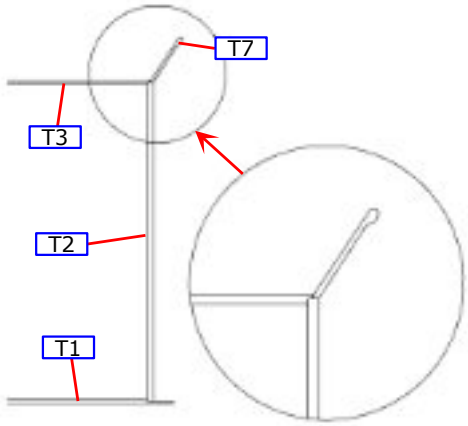
Be sure to strengthen all the bends in the stanchions with a small fillet of solder. Solder the stanchions in place in the etched slots in the tank top.

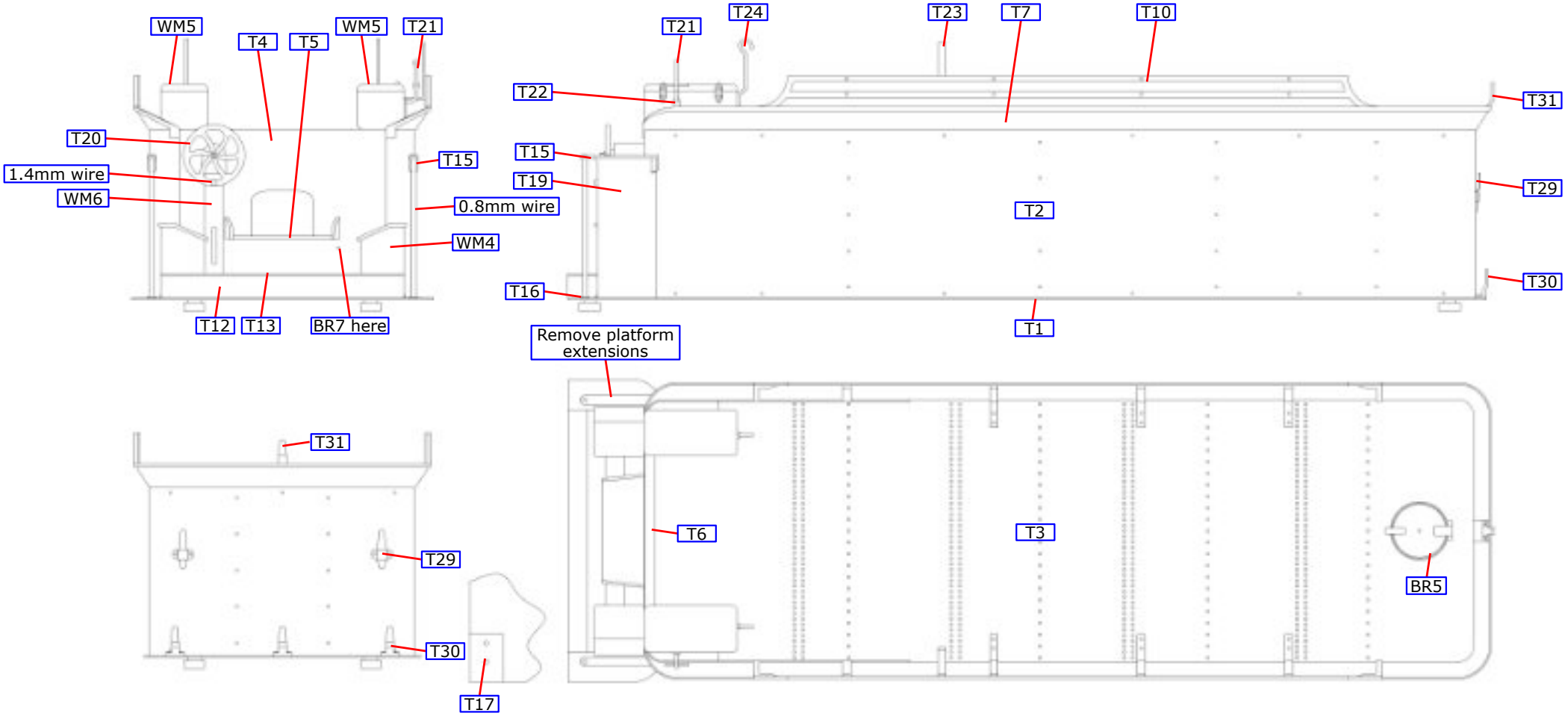
The right side sandbox (WM4) must have the rear part of the inner edge of its lid filed away to clear the brake column (WM6). Fit the sandboxes in place. Now solder the wide engine footplate support (T12) in place on the platform. Solder the footplate (T13/2) in place. Fold down the bracket of the wide handrail stanchion bracket (T15) and then solder in place on the wide engine front side plate (T19). Solder this assembly in place on the footplate and tank. Solder the bucket cock (BR7) to the division plate.

Solder together the brake hand wheel laminations (T20) and file the rim to remove the cusp. Fit in place on the brake column. Make up the fire iron cruciform (T21/2) and cruciform bracket (T22/22) and fit as shown below. Also fit the fire iron bracket (T23/2) as shown. Fit the cab weather sheet brackets (T24/2). Fit the tool box castings (WM5).

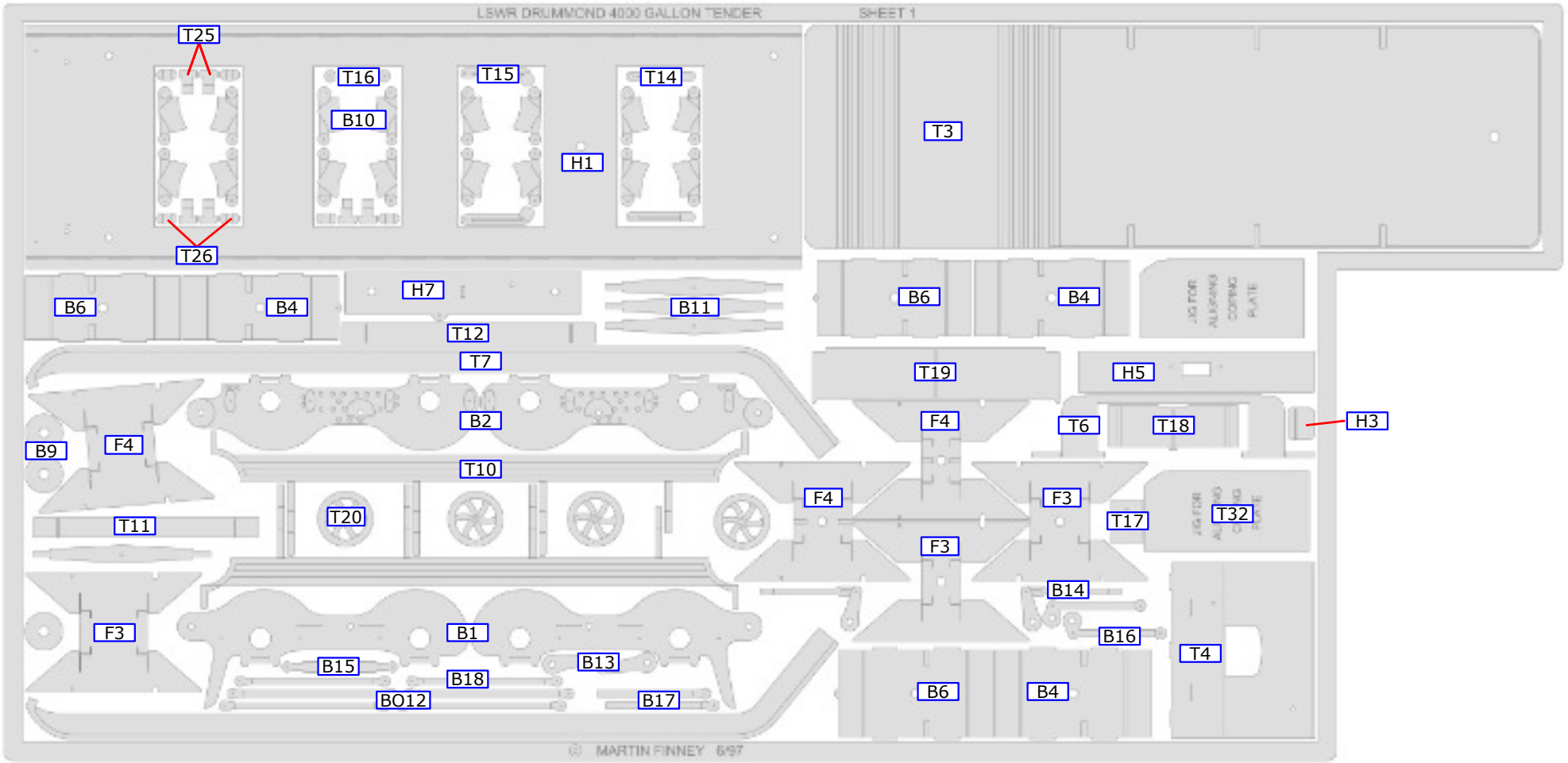
Fit the LSWR/SR or SR rear platform lamp brackets (T28/2 or T30/2) to the platform and then fit the LSWR/SR tank rear and top brackets (T29/2) as shown.

Final assembly involves attaching the bogies and the remaining brake pull rods as shown. Whilst the bogies are not internally compensated they rest under the chassis in contact at three points. The rear bogie rests on the two bearers already fitted and the front bogie rests on the washers (B7 & B8) shown in Fig 4, effectively on one point. The number and thickness of this washers can be varied until the tender is level. Two full thickness and one half thickness washer seems to work. The flexible joins between the brake pull rods can be made with short lengths of soft copper wire the ends




WM5
T4
T5
WM5
T21
T20
1.4mm wire
WM6
T15
0.8mm wire
WM4
T12
T13
BR7 here
T21
T24
T23
T7
T10
T22
T31
T15
T19
T29
T2
T16
T30
T1
Remove platform extensions
T31
T29
T30
T17
T6
T3
BR5

# ETCH SHEET 1



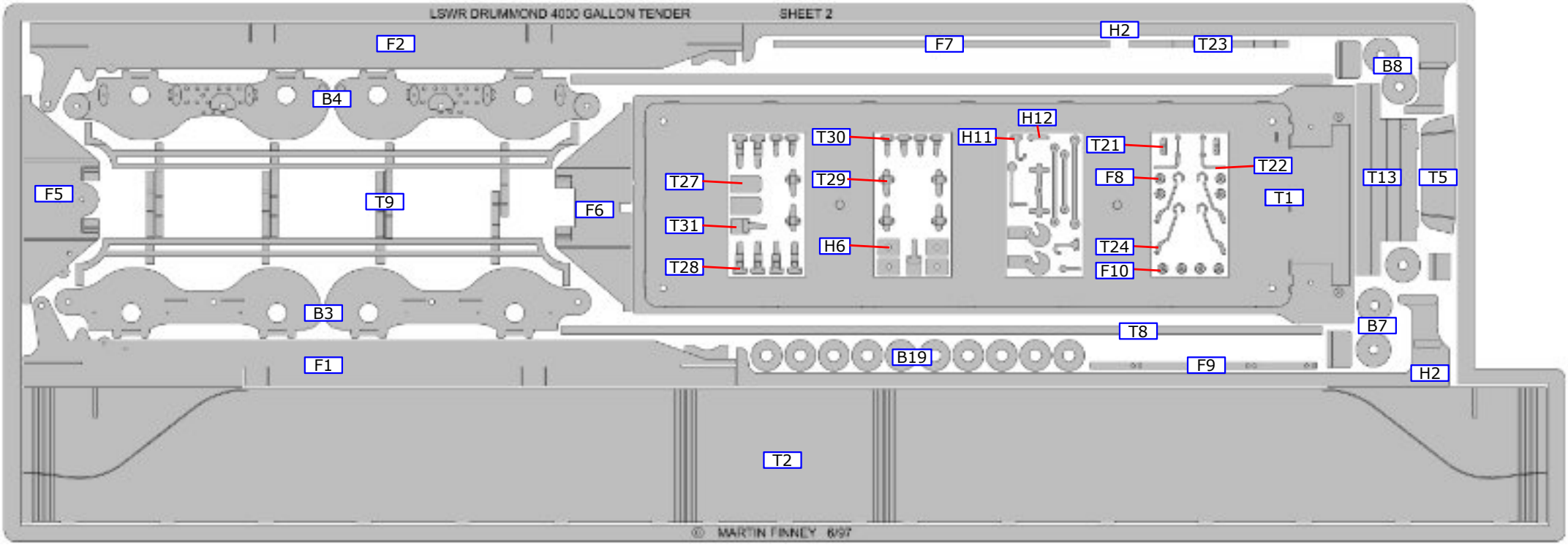

## OTHER COMPONENTS

6 BA screw (2)
6 BA nut (2)
1/8" brass wire for compensation beam pivots
5/32" diameter brass tube for compensation beams
Handrail knob (10)
Brass wire - 0.55 mm
Brass wire - 0.7 mm
Brass wire - 0.8 mm
Brass wire - 1. 6mm
Brass wire - 2 mm
Buffer, nut & spring (2)
Vacuum & steam heating pipes (2)

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

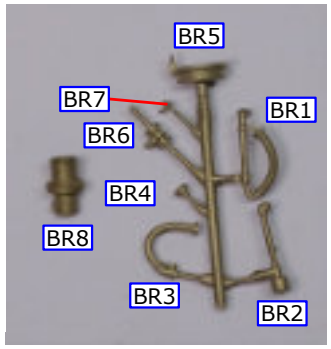
# Finney7

## ETCH SHEET 2



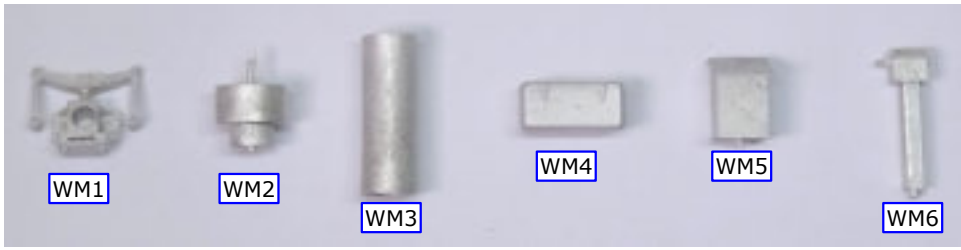

### BRASS CASTINGS

BR1 Vacuum pipe
BR2 Vacuum pipe drip trap, front
BR3 Steam heating pipe
BR4 Front buffer (2)
BR5 Water filler
BR6 Feed water isolating valve (2)
BR7 Bucket cock
BR8 Buffer housing (2)




### WHITE METAL CASTINGS

WM1 Axlebox/spring (6)
WM2 Brake cylinder
WM3 Vacuum reservoir
WM4 Sandbox/Toolbox
WM5 Toolbox (2)
WM6 Brake column



### Bogie

| | | |
|---|---|---|
| B1 | Rear bogie frame (2) | 1 |
| B2 | Rear bogie frame overlay (2) | 1 |
| B3 | Front bogie frame (2) | 2 |
| B4 | Front bogie frame overlay (2) | 2 |
| B5 | Rear bogie stretcher, three widths - (2) | 1 |
| B6 | Front bogie stretcher, three widths (2) | 1 |
| B7 | Front bogie pivot washer, full (2) | 2 |
| B8 | Front bogie pivot washer, half | 2 |
| B9 | Bogie retaining washer (2) | 1 |
| B10 | Brake hanger lamination (16) | 1 |
| B11 | Brake cross shaft (4) | 1 |
| B12 | Bogie pull rod lamination (4) | 1 |
| B13 | Brake cross shaft to vacuum cylinder linkage (2) | 1 |
| B14 | Brake cross shaft hand brake linkage (2) | 1 |
| B15 | Pull rod adjuster (2) | 1 |
| B16 | Front pull rod front section (2) | 1 |
| B17 | Front pull rod rear section (2) | 1 |
| B18 | Between bogie pull rod (2) | 1 |
| B19 | Washer, bogie wheel side play | 2 |

### Frames

| | | |
|---|---|---|
| F1 | Left frame | 2 |
| F2 | Right frame | 2 |
| F3 | Front bogie pivot frame stretcher, 3 widths | 1 |
| F4 | Rear bogie pivot frame stretcher, 3 widths | 1 |
| F5 | Front frame stretcher | 2 |
| F6 | Rear frame stretcher | 2 |
| F7 | Vacuum reservoir strap (2) | 2 |
| F8 | Vacuum pipe flange (2) | 2 |
| F9 | Steam heat pipe bracket | 2 |
| F10 | Steam heat pipe flange (2) | 2 |

### Footplate

| | | |
|---|---|---|
| H1 | Base | 1 |
| H2 | Hanging plate (2) | 2 |
| H3 | Upper step (2) | 1 & 2 |
| H4 | Lower step (2) | 2 |
| H5 | Front buffer beam | 1 |
| H6 | Front buffer base plates (2) | 2 |
| H7 | Rear buffer beam | 1 |
| H8 | Screw coupling hook | 2 |
| H9 | Steam pipe valve handle | 2 |
| H10 | Coupling hook lamination (2) | 2 |
| H11 | Coupling link | 2 |
| H12 | Screw coupling, four parts | 2 |

### Tank

| | | |
|---|---|---|
| T1 | Platform | 2 |
| T2 | Tank sides & back | 2 |
| T3 | Tank top | 1 |
| T4 | Front division plate | 1 |
| T5 | Coal shovelling plate | 2 |
| T6 | Toolbox support plate | 1 |
| T7 | Coping plate (2) | 1 |
| T8 | Coping plate vertical section (2) | 2 |
| T9 | Coal rail (2) | 2 |
| T10 | Coal rail sheeted in (2) | 1 |
| T11 | Narrow engine footplate support | 1 |
| T12 | Wide engine footplate support | 1 |
| T13 | Footplate | 2 |
| T14 | Narrow engine handrail stanchion bracket (2) | 1 |
| T15 | Wide engine handrail stanchion bracket (2) | 1 |
| T16 | Wide engine handrail stanchion flange (2) | 1 |
| T17 | Wide engine handrail stanchion drilling jig | 1 |
| T18 | Narrow engine front side plate (2) | 1 |
| T19 | Wide engine front side plate (2) | 1 |
| T20 | Brake hand wheel lamination (2) | 1 |
| T21 | Fire iron cruciform | 2 |
| T22 | Fire iron cruciform bracket | 2 |
| T23 | Fire iron bracket | 2 |
| T25 | LSWR Lamp bracket, rear platform (3) | 1 |
| T26 | LSWR lamp bracket, tank rear & top (3) | 1 |
| T27 | LSWR Lamp bracket, tank top mounting bracket | 2 |
| T28 | LSWR/SR Lamp bracket, rear platform (3) | 2 |
| T29 | LSWR/SR Lamp bracket, tank rear & tank top (3) | 2 |
| T30 | SR Lamp bracket, rear platform (3) | 2 |
| T31 | SR Lamp bracket, tank top | 2 |
| T32 | Jig for aligning coping plate (2) | 1 |