

Brassmasters Scale Models

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**GREAT WESTERN RAILWAY
COLLETT 4,000 GALLON
TENDER KIT**

Designed by Martin Finney

**4MM SCALE
OO - EM - P4**

**INSTRUCTIONS AND
PROTOTYPE NOTES**

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SECTION 1: BRIEF HISTORICAL DETAILS

Between 1926 and 1944 the GWR built 471 tenders with a capacity of 4000 gallons, all to basically the same design. They had a coal capacity of 6 tons, a wheelbase of 15 feet, and weighed 46t.14. full and 22t.10c. empty and were built under 32 lots as follows:

Lot	Numbers	Date	Lot	Numbers	Date
A113	2384-2403	9/26-7/28	A144	2572 3/36	
A117	2404-2449	11/28-1/30	A145	2737-2751	10/37-8/38
	2530-2536		A146	2752-2761	6/38-9/38
A120	2537-2546	3/30-11/30	A147	2762-2771	8/38-1/39
A121	2547-2566	4/30-1/31	A148	2772-2791	1/39-9/39
A123	2567-2586	5/31-8/31	A149	2792-2801	9/39-10/39
A124	2587-2606	11/31-6/32	A157	2802-2821	11/39-4/40
A127	2607-2616	7/32-10/32	A158	2822-2831	4/40-7/40
A128	2617-2636	10/32-12/33	A162	2832-2836	6/41-7/41
A131	2637-2646	4/34-7/34	A164	2837-2856	7/40-5/41
A136	2627-2656	8/34-12/34	A167	2857-2876	8/41-3/42
A137	2657-2666	3/35-5/35	A168	2877-2886	7/42-10/42
A138	2667-2676	5/35-7/35	A170	2887-2896	4/42-7/42
A139	2677-2691	12/35-5/36	A172	2897-2909	10/42-1/43
A140	2692-2701	5/36-6/36	A173	2910-2922	1/43-4/43
A141	2702-2726	2/37-6/37	A176	2923-2934	1/44-9/44
A142	2727-2736	6/37-2/38			

These were standard Collett tenders, used on Kings, Castles, Stars, Halls, Granges and the 47xx 2-8-0's.

The kit is based on Swindon drawings

92460 6/31 Arrangement of tender 4000 gallons capacity
89790 11/29 Arrangement of tender 4000 gallons capacity
114016 10/39 3000 gallon tank - Flush bottom

There were several modifications made to the basic design. The first Lot (A113) were built with large sandboxes either side on the front footplate, double water fillers, double brake hangers and had frames which differed in detail from the remaining tenders. This Lot is not covered by the kit.

The remaining tenders, except No. 2586 which was built with eight wheels of 3' 8" diameter, can be built from the kit.

Early tenders (Lots A117, A120 & A121) had framing around the axle boxes of traditional Churchward shape with long spring hangers. From Lot A123 the framing was altered and short spring hangers introduced and many of the earlier tenders were subsequently fitted with these short spring hangers.

The other detail difference of note was in the rear lamp brackets. The early tenders had the traditional pattern riveted to the bufferbeam with the upper bracket attached to the fender. Later (certainly by Lot A157) the brackets were welded in position the lower ones to the top edge of the footplate and the upper bracket to the rear of the tank.

Great Western Engines (Vol. 2) by J.H.Russell contains many useful photographs and drawings.

SECTION 2: CONSTRUCTING THE CHASSIS

Select the appropriate frames (parts 1&2 or 3&4) 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 pin-point bearings in place. Emboss the rivets on the hornguide ties before folding them over with the fold lines on the outside. Fold up the appropriate frame brackets (parts 5&6 or 7&8) 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 (part 10) as follows:

1/16" to fit the compensation beam pivot - 0.7mm to fit the wire for the brake hanger pivots - to fit the scoop casting - 0.9mm 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 (part 9).

Construct the compensation beam by soldering the two halves (part 11) together. Cut the piece of 3/32" brass tubing to fit between the sides of the internal frames and solder the beam on it, centrally. Fit the beam inside the well tank using the piece of 1/16" brass wire as the pivot. Solder the brake hanger pivots, from 0.7mm wire, in place.

Fold down the brackets for the rear scoop cross shaft and the stay for the scoop front plate (part 21) and solder in place the bracket overlays (part 22). Now attach the water scoop casting (part W9) to the well tank and add the scoop stays from 0.45mm wire passing them through the holes in the front plate and the slots in the internal frames and attaching them to the scoop at the rear aligning them with the grooves in the scoop casting. Add the scoop cross shaft from 0.7mm wire and fit part 20 (two laminations) at the same time. Solder the front plate stay to the front plate.

Make up the wheel sets carefully setting the back to back measurement with a gauge. Assemble the side frames and the stretcher plate/internal frames assembly, bolting them together with 10 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 on the centre axle can be limited by using the washers (part 28).

When you are satisfied with the mechanical performance of the chassis carefully solder the sideframes to the stretcher plate, avoiding soldering the bolts, then remove the bolts and complete the soldering.

Roll the vacuum tank wrapper (part 25) to fit the brackets (part 24). 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. Fit the front scoop shaft as shown in the diagram and fit the vacuum pipe bracket (part 24) in the slot in the stretcher plate.

Assemble the brake hangers (parts 12 & 13) first embossing the rivet on part 13 and attach the hangers to the pivot wires. Check the clearance between the brake shoes and the wheels making any necessary adjustments. Emboss the bolts on parts 14 & 15 and solder the cross shaft overlays to the top of part 14. Now carefully twist the pull rods between the cross shafts vertical and fix this assembly to the brake hangers. Emboss the rivets on part 16 and solder together, back to back, to make the front pull rods. Complete the brake gear by assembling the front brake cross shaft as in the diagram and fixing the front pull rods to the cross shaft at the front (the short lever at the front of the pull rod threads on the cross shaft and is above it) and to the cross shaft/pull rod assembly at the rear (they key together using the small slots).

Solder a piece of 0.7mm wire into the hole in the vacuum pipe drip trap (part B7) and solder two of part 23 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 bracket (part 24) and complete the front union by soldering part 23 next to the bracket.

Lastly, attach the axlebox castings using the castings with the rear slot on the centre and front axles so that the bearings are free to move.

SECTION 3: CONSTRUCTING THE STEP/VALENCE ASSEMBLY

Emboss the rivets on each step hanger plate on part 30. 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.

Note the valence overlays (parts 31 or 32) are handed - see the rivet pattern before soldering them in place.

Emboss the two rivets on the coupling hook base on part 34 and solder to part 33. Solder together the two coupling hook laminations (part 77) and attach to the rear bufferbeam. Solder the rear bufferbeam in place. Emboss the rivets on part 37 and solder part 36 and then solder the complete front bufferbeam in place.

Form the step treads (parts 38, 39, 40 & 41) and solder in position. The short half-etched lines on the step hanger plates align with the lower edge of the upper steps.

SECTION 4: CONSTRUCTING THE BODY

Emboss the rivets down both sides of the footplate (part 42) and fold up the sides of the step treads at the front. Solder 10 BA nuts, for body fixing, over the holes front and rear.

Fold up the tank former (part 43) 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 (part 44) and fold to shape before soldering the edges together. Solder the coal hopper in place with its upper edges flush with the top surface of the former and its front edges on top of the cut out in the front of the former. Solder the tool box support brackets (part 46) in place in the slots in the coal hopper and the former.

Emboss the rivets on the tank front overlay (part 49) the coal doors overlay (part 51) and the coal doors locking beam (part 52). Fit the tank front overlay in place carefully feeding all the brackets through the holes and solder it in place. Assemble the coal doors (parts 50, 51 & 52) and solder in place behind the opening in part 49 using the hinge rivets to ensure accurate alignment.

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 (part 45) and fold up the side coal plate brackets. Emboss the rivets on part 54 and solder to part 55 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.

Carefully form the flare in part 47 by bending around a rod of suitable size (about 4mm 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 2mm 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 - this requires plenty of heat and flux. Carefully curve to shape the small 'fingers' at the rear corners. Solder the lower rivet strips (part 48) 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 (part 53) over a rod of 4mm diameter. Hold them in place with Blu-Tack before soldering them on the outside of the side flare (see the diagram). 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. I have found 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!

Fit the raised footplate supports (part 62) locating them in the slots in the footplate. The three different heights are for different classes of engine as follows:

Highest footplate - 47XX class

Middle height of footplate - King, Castle, Hall & Star classes

Lowest height of footplate - Grange class

Depending on the height of footplate chosen, the raised footplate (part 61) will need narrowing until it fits in place between the sides of the coal hopper.

Emboss the rivets on the fire iron tray (parts 58), form into a shallow 'U' section and fold the rear plate at 90°. Solder the spacers (part 59) into the half-etched slots and attach the complete tray. Emboss the rivets on the fire iron lyre (part 60) 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.

Detail the footplate area by first attaching the front hand rails. Solder the small brackets (part 67) 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 0.45mm wire. Now attach the two small taps (part B4) followed by the feed valve handles (part B3). Bend the small footplate steps (parts 63 & 65) to shape and fix in place on the footplate before fixing the tops (parts 64 & 66) in place. Fix the brake and water scoop standards in place - note the brake standard is not vertical.

Attach the toolboxes (parts W5 & W6). The tool box coal plates (parts 56 & 57) are attached to the rear of the toolboxes and to the side coal plates. First emboss the rivets and then fold them to shape each fold being through 30°.

The remaining parts can now be fitted. The following notes should be used.

Rear vertical handrails from 0.45mm wire.

Rear horizontal handrails from 0.3mm wire.

Emboss rivets on lamp brackets before folding to shape.

Steam heating pipe fits in bracket under buffer beam.

Steam heating pipe tap handle (part 79) fits on the lower spigot on the casting.

I hope you enjoy building and using your tender as much as I have enjoyed researching and designing it.

Best wishes

Martin Finney
August 1991

If you have any problem with the kit or any criticisms or suggestions please feel free to contact Brassmasters.

COMPONENT DESCRIPTION - 0.012" BRASS

1	Frame - original pattern - left side	53	Side/rear coal plate - (2)
2	Frame - original pattern - right side	54	Rear coal plate - front overlay
3	Frame - later pattern - left side	55	Rear coal plate - rear overlay
4	Frame - later pattern - right side	56	Toolbox coal plate - left
5	Frame bracket - original pattern - large - (4)	57	Toolbox coal plate - right
6	Frame bracket - original pattern - small - (2)	58	Fire iron tray
7	Frame bracket - later pattern - large - (4)	59	Fire iron tray spacer - (2)
8	Frame bracket - later pattern - small - (2)	60	Fire iron lyre
9	Stretcher plate	61	Raised footplate
10	Internal frames	62	Raised footplate support - 3 heights - (4)
11	Compensation beam - (2)	63	Footplate step/box - left
12	Brake hanger/shoe - (6)	64	Footplate step/box top - left
13	Brake hanger/shoe - front overlay - (6)	65	Footplate step/box - right
14	Brake cross-shaft/pull rod	66	Footplate step/box top - right
15	Brake cross-shaft overlay - (3)	67	Bracket - front handrail to side - (2)
16	Front brake pull rod lamination - (4)	68	Step - tank rear - (4)
17	Lever lamination - brake cylinder to cross shaft - (2)	69	Lamp bracket upper - original pattern
18	Lever lamination -- brake standard to cross shaft - (2)	70	Lamp bracket lower - outer - riveted - (2)
19	Lever lamination - scoop standard to front scoop cross shaft - (2)	71	Lamp bracket lower - centre - riveted
20	Lever lamination - rear scoop cross shaft to scoop - (2)	72	Lamp bracket upper - later pattern
21	Water scoop front plate	73	Lamp bracket lower - outer - welded - (2)
22	Water scoop bracket overlay - (2)	74	Lamp bracket lower - centre - welded
23	Vacuum pipe union - (2)	75	Works plate - rear of tank
24	Vacuum pipe bracket	76	Padlock - toolbox - (2)
25	Vacuum tank wrapper	77	Coupling hook lamination - (2)
26	Vacuum tank support bracket - (2)	78	Screw coupling
27	not used	79	Steam heating pipe tap handle
28	Washer - wheel side control - 4mm		
29	Washer - wheel side control - 7mm		
30	Step/valence assembly		
31	Valence overlay - original pattern frames - (2)		
32	Valence overlay - later pattern frames - (2)		
33	Rear buffer beam		
34	Rear buffer beam overlay		
35	Parallel buffer step - (2)		
36	Front buffer beam		
37	Front buffer beam overlay		
38	Front step tread - lower - (2)		
39	Front step tread - upper - (2)		
40	Rear step tread - lower - (2)		
41	Rear step tread - upper - (2)		
42	Footplate		
43	Tank former		
44	Coal space hopper		
45	Tank top overlay		
46	Tool box support bracket - (4)		
47	Sides/back		
48	Side/back lower rivet strip overlay - (2)		
49	Tank front overlay		
50	Coal doors		
51	Coal doors overlay		
52	Coal doors locking beam		

WHITEMETAL CASTINGS

W1	Axlebox & spring - hole at rear - short hangers - (2)
W2	Axlebox & spring - slot at rear - short hangers - (4)
W3	Axlebox & spring - hole at rear - long hangers - (2)
W4	Axlebox & spring - slot at rear - long hangers - (4)
W5	Toolbox - left
W6	Toolbox - right
W7	Water filler
W8	Water pickup dome
W9	Water pickup scoop
W10	Water level gauge
W11	Tank vent - (2)
W12	Rear buffer housing - Collett tapered type - (2)
W13	Front buffer - (2)

BRASS CASTINGS

B1	Brake standard
B2	Water scoop standard
B3	Water feed valve handle
B4	Tap - (2)
B5	Vacuum pipe
B6	Steam heating pipe
B7	Vacuum pipe drip trap

OTHER COMPONENTS

2mm bore clearance small top hat bearing - (2)

Pinpoint bearing - (4)

Brass 10 BA screw - (2)

Brass 10 BA nut - (2)

1/16" brass wire for compensation beam pivot

1/16" inside diameter brass tube for compensation beam

Handrail knob - (4)

Brass wire - 0.3mm - for water filler handle & LHS tap pipe

Brass wire - 0.45mm - for RHS tap pipe, handrails & scoop stays

Brass wire - 0.7mm - vacuum pipe, rear scoop shaft & brake hanger pivots

Brass wire - 0.9mm - for front brake and scoop shafts

Buffer, buffer bush & spring - (2)

COMPONENTS NOT SUPPLIED

Wheels (6)

(prototype - 4' 1" diameter - 12 spoke)

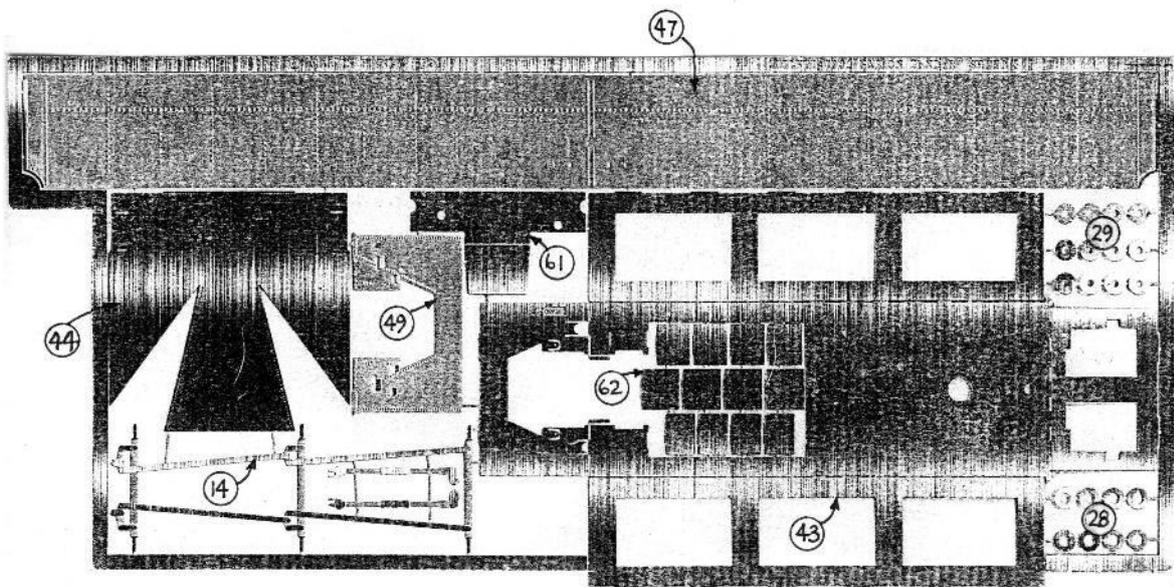
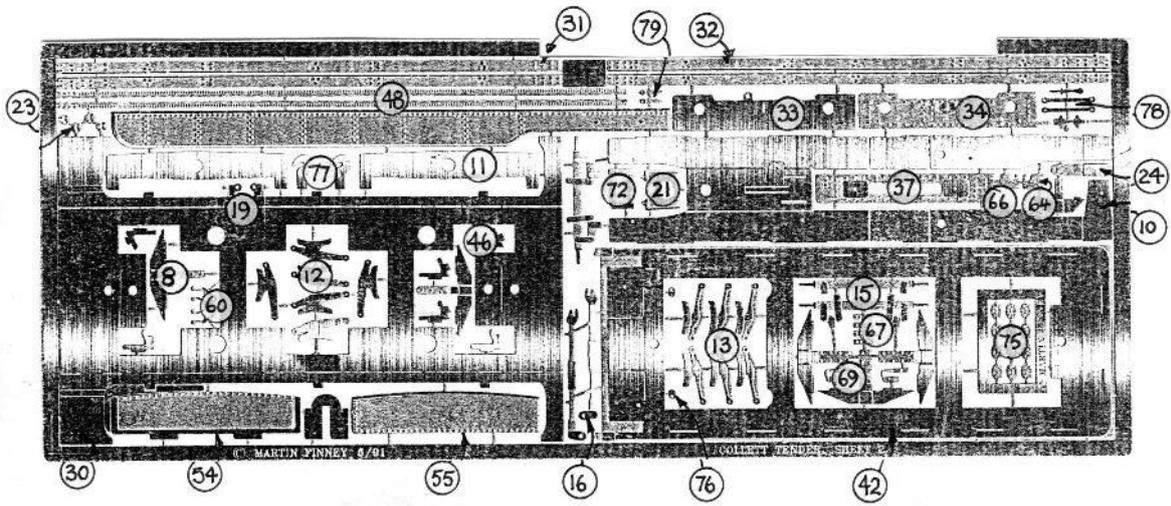
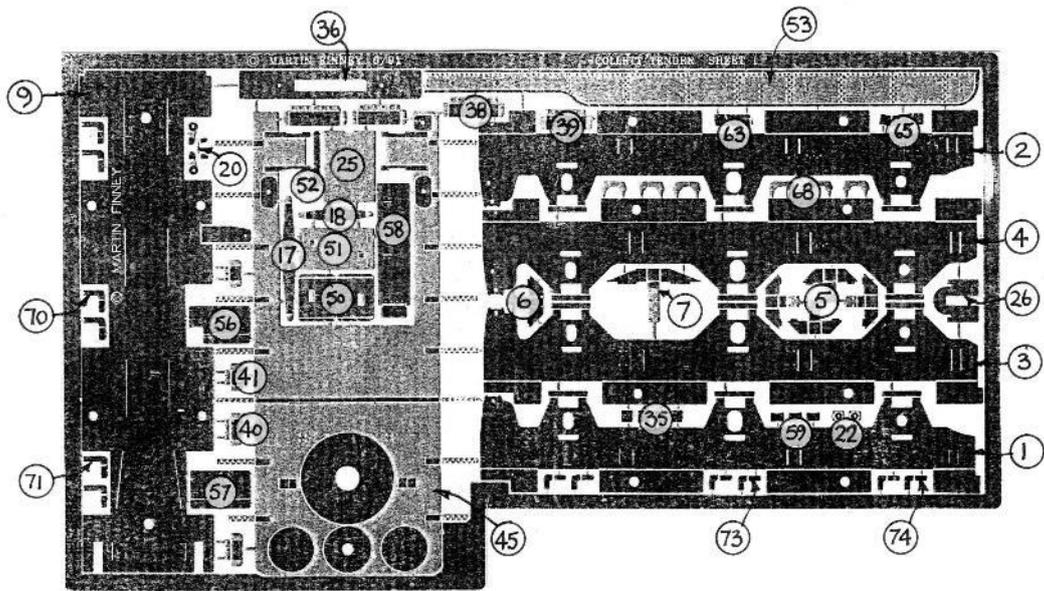
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- Alan Gibson

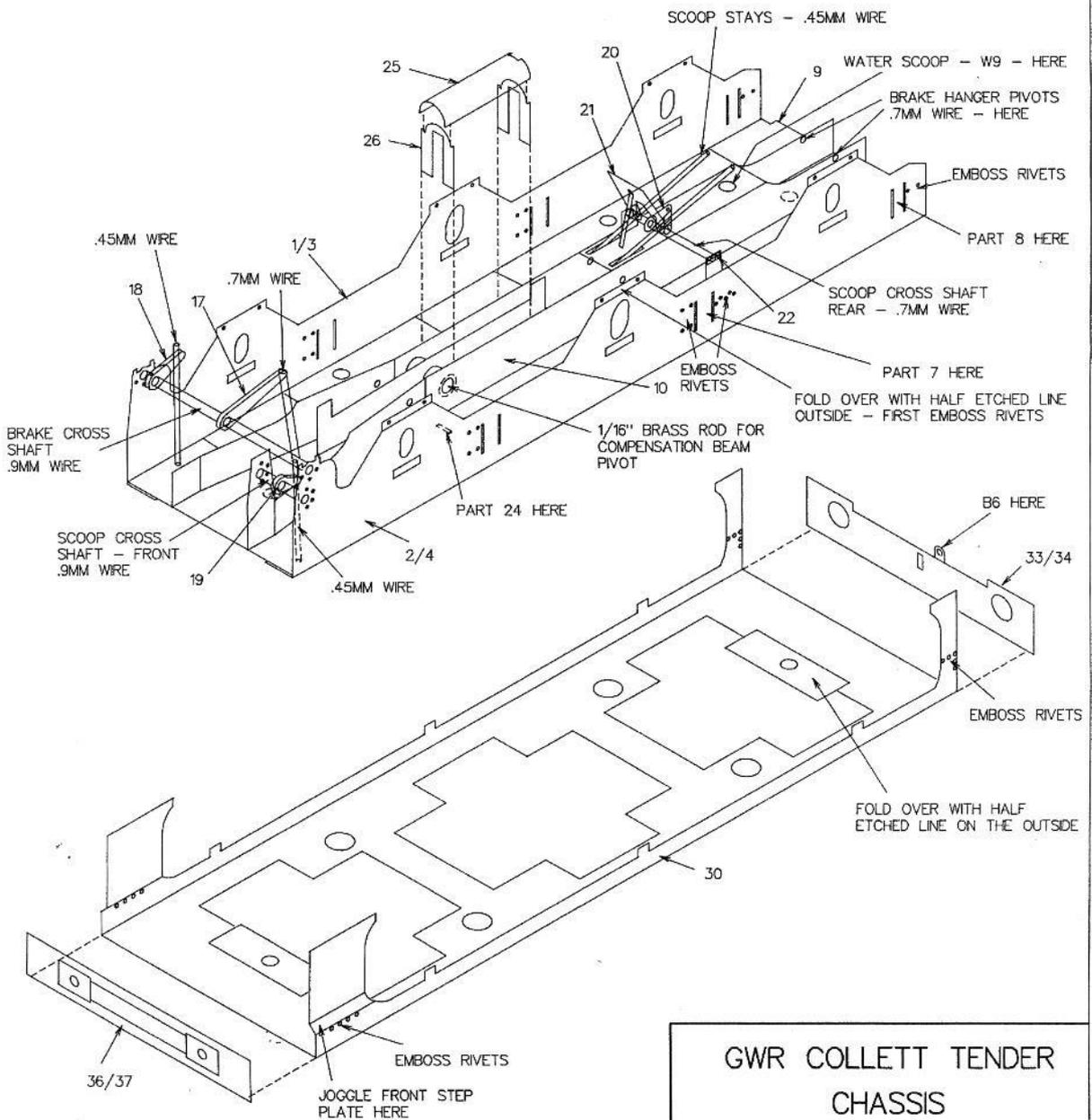
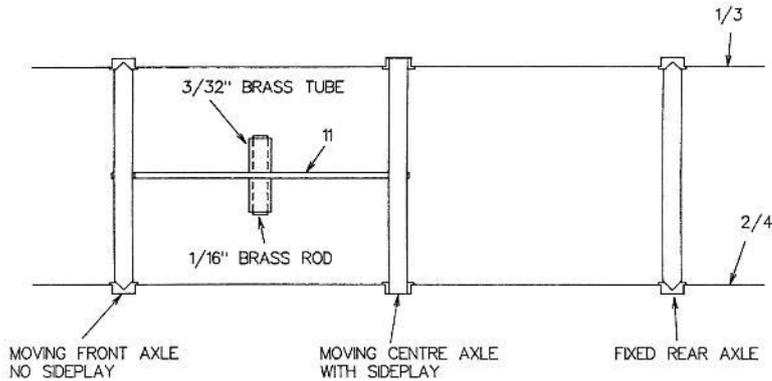
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Pinpoint axle (2)

Plain extended axle



COMPENSATION ARRANGEMENT - FROM BELOW



GWR COLLETT TENDER
CHASSIS
MARTIN FINNEY 3-9-91

