

Brassmasters Scale Models

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**GREAT WESTERN RAILWAY
DEAN 2,500 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 1884 and 1903 the GWR built 301 tenders with a water capacity of 2500 gallons, all to basically the same design. They had a coal capacity of 4½ tons, a wheelbase of 13 feet, and weighed 34t. 5c. full and 16t. 2c. empty.

They were built under 18 different lots as follows:

Lot	Numbers	Dates
A6	853-872	12/84-6/85
A7	873-892	11/85-6/86
A9	894-903	3/87-5/87
A22	1078-1097	10/95-4/96
A23	1098-1117	5/96-8/96
A26	1138-1157	8/96-3/97
A29	1179-1198	3/97-7/97
A30	1199-1218	7/97-10/97
A33	1259-1288	10/97-5/98
A35	103/11-4/7-9/20/2	10/98-5/99
A37	1315-1324	5/99-11/99
A38	1325-1344	11/99-7/00
A39	1345	11/99
A41	1366-1385	10/00-12/00
A42	1386-1395	4/01-2/02
A43	1396-1415	2/02-5/03
A44	1416-1435	/02-5/03
A58	1572-1581	9/03-12/03

These tenders were used with many classes including 2-4-0s, 2301 class, Krugers, Aberdares, 3521 class, Dukes and Bulldogs. The first withdrawals took place in 1927 and the only survivor is No. 1273 which is preserved with Dean Goods No.2516 at Swindon Museum.

The kit is based on the following Swindon drawings:

G. A. 4527 (10/84) Lot A6, A7, A9 - These first Lots **cannot** be built from the kit because of their different spring hangers and frames.

G. A. 14598 (8/98) Lot A35, A37, A38.

Drawing of Tank 12794 (3/96) Lot A22, A23, A26, A30, A33, A35, A37.

The first, of these drawings are in Great Western Engines (Vol. 1) by J. H. Russell which also contains many useful photographs to which I shall refer.

There were many modifications made to the basic design during the 19 years over which the tenders were in production and many more subsequent changes as they were rebuilt.

The earliest tenders had coal rails and no water scoop (Vol. 1 -page 152 - fig. 440). The water filler was a cylindrical casing and the sandboxes were mounted on the footplate in front of the tank. They also had identical toolboxes on each side and some were fitted with an overflow pipe and fountain for use with engines equipped with crosshead driven water feed pumps.

Vol. 1 - page 162 - fig. 469 shows a later tender fitted with a water scoop and a combined water filler/scoop fountain. The front of the scoop was subsequently fitted with a plate presumably to prevent 'foreign bodies' entering. These early tenders also have a "drop" in the flare on the tank sides at the front, front steps with a curve on the leading edge and hornguide ties of the rod type, (See fig 2)

From Lot A36 the flare on the tank sides was carried through to the front (Vol. 1 - page 159 - fig. 460) the coal rails extended forward and the footplate widened at the front. These tenders were built for the new 4-4-0s and consequently had a raised footplate at the front. They also had front steps with a straight leading edge and strip type hornguide ties.

Subsequently all were rebuilt with coal plates, a different pattern toolbox on the left hand side and fire iron trays and were fitted with water level gauges (Vol. 1 - page 160 - fig, 463), Most appear to have had the sandboxes removed and replaced by a single sandbox on the left hand side at the front of the coal space, Some were also fitted with separate pickup domes and water filler (Vol 2. - page 130 - fig. 130). Because of the relatively small coal space this involved cutting an opening in the rear coal plate for the dome to fit through.

All of these variations are allowed for in the kit and before starting construction I urge you to identify, as far as possible, from photographs, all the features your model will have.

SECTION 2: CONSTRUCTING THE CHASSIS

Start by folding the side frames (parts 1 & 2) at 90° along the half-etched lines. Emboss the half-etched dimples in the side frames to make the rivet detail. Check that the bearings fit in appropriate slots (Fig. 5) carefully opening the slots with a needle file if necessary and solder the rear pinpoint bearings in place. Construct appropriate horn guide ties as in Fig. 2 and fold up the brackets for the front brake cross shaft, strengthening the folds with a fillet of solder.

Emboss the rivets on the well tank (part 3), fold up along the half-etched lines and solder the seams. Fold down the brackets for the vacuum pipe and the rear scoop cross shaft.

Construct the compensation beam by soldering the two halves (part 5) together. Cut the piece of 1/16" brass tubing to fit between the sides of the well tank 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.

If appropriate, attach the plate (part 17) to the front of the water scoop casting, first bending it through approximately 10° along the half-etched line. Now attach the water scoop to the well tank and add the stays from 0.45mm wire passing them through the holes in the front plate and the slots in the well tank bottom and attaching them to the scoop at the rear aligning them with the grooves in the scoop casting. Add the scoop cross shaft from 0.45mm wire and fit part 14 at the same time.

Make up the wheel sets carefully setting the back to back measurement with a gauge. Assemble the side frames and the well tank bolting them together with 10 BA bolts and 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. Remove one of the front bolts, pivot the frames apart, fit the wheel sets and refit the bolt. 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 and the side play on the centre axle can be limited by using the washers (part 18).

When you are satisfied with the mechanical performance of the chassis carefully solder the sideframes to the well tank, avoiding soldering the bolts, then remove the bolts and complete the soldering. Fold up the scoop cross shaft bracket on the front plate (part 4) and solder it in position.

Complete the scoop operating mechanism by assembling parts 13, 15, 12 & 16 as shown in Fig. 1. Attach the steam brake cylinder casting and assemble the front brake cross shaft as in Fig, 1 using parts 9, 10 & 11. Do **not** solder part 9 to the cross shaft at this stage.

Before proceeding any further with the chassis the basic body shell must be constructed as described in section 3.

Solder together the 3 pieces (part 20) to make the vacuum pipe drip trap. Drill out the small holes on either side to fit 0.7mm wire and construct the vacuum pipe as shown in Fig. 4 soldering the rear bracket inside the well tank and bending the pipe to align with the vacuum pipe on the rear buffer beam. Similarly make the steam heating pipe as in Fig. 3 soldering it to the bottom of the well tank on the opposite side to the vacuum pipe.

Solder the brake shoes (part 7) together, back to back, and solder them between the hangers (part 6) using 0.45mm wire as pins. Solder the hangers in place suspending them from pieces of 0.45mm wire as in Fig. 1. Check the clearance between the brake shoes and the wheels making any necessary adjustments. Using 0.45mm wire as cross shafts, fit the pull rods (part 8) and attach them to part 9 using pieces of 0.45mm wire as pins.

Form sandpipes from 0.45mm wire attaching them through the holes in part 4. The rebuilt tenders with the repositioned sandbox only have a sandpipe on the left side of course. 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 BODY

Emboss the rivets on the brake standard and water pickup standard bases. Now fold at right angles the coal space rear and fold at right angles the small tabs on each side. Solder a 10 BA nut above the body mounting holes at the back and front of the footplate.

If your tender is to have coal rails remove the coal plate brackets from the tank former (part 24). Fold up the tank former taking care that the coal plate brackets, if not removed, are not bent. Solder the front of the tanks around the outside of the former top.

Solder the tank top overlay (part 25) to the tank former and then file it flush with the sides of the former. Drill out holes from inside the tank for water filler, dome, overflow pipe fountain, vents, water level gauge and fire iron bracket having first determined from the diagrams which holes are appropriate and using the holes in the former as a guide.

Fit the tank former to the footplate, feeding the tabs through the slots. Fold over the tabs outwards at 90°.

Check that the assembly is square and that the footplate is flat before soldering it together.

Fold the tank side/front overlay (part 26) along the narrow slots and solder in place.

Modify the sides/back wrapper (part 27) if appropriate as in Fig. 9 using parts 28 & 29. Emboss the rivets for the rear step brackets.

Carefully form the flare in part 27 by bending around a rod of suitable diameter and using the jig (part 90). Form the rear corners in the sides/back wrapper (the holes for the handrails are on the centre of the bend) and then solder it to the tank former. This requires plenty of heat and flux. Carefully curve to shape the small 'fingers' at the corners, fill the gaps 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!

If coal plates are to be fitted shape the coal plate brackets and solder them to the flare. Now fit the coal plates (part 56).

Emboss the two rivets on the coupling hook base on part 39 and then solder it to part 38. Solder together the two coupling hook laminations and attach to the rear bufferbeam. Solder the rear bufferbeam in place allowing the footplate to overhang very slightly,

Solder the valences (parts 64 & 65) in place against the edge of the tank former tabs. Note the valences are handed - see the rivet pattern. Emboss the rivets on the front bufferbeam overlay (part 39) and then solder to part 38. Solder the complete front bufferbeam in place.

Bend at 90° the sides of the front steps (parts 66 & 67). Solder the appropriate overlay (parts 68, 69, 70 & 71) to the steps and attach them behind the valence. Similarly attach the rear steps (parts 72, 73, 74 & 75), Check the fit of the body with the chassis and the alignment of the fixing holes.

Solder in place against the front of the tank the quadrant plates (parts 49, 50). If the original type sandboxes are to be fitted use parts 30, 31 and position them against the quadrant plates. For the later sand box arrangement first emboss all the rivets in parts 32, 33 & 34. Form the sandbox to shape using the top (part 33) as a guide to the correct profile and then solder on the top and position on the left side behind the quadrant plate, (Fig. 12). Similarly for the casing on the right side.

The raised footplate (part 51) can be modified to accommodate the various sandbox and footplate height options using the half-etched lines on the underside as a guide. Modify the footplate and fit using parts 52 & 53 as supports as appropriate.

The alternate positions of front quadrant coal plates (part 42 or parts 43 & 44) are marked on the tank top overlay by small 'nicks' in the sides. Using these marks attach the front coal plates. There are also 'nicks' in the overlay sides to locate the rear coal plate, parts 40 or 41. If the later pickup dome is to be fitted then an opening will have to be shaped in the coal plate to fit over the dome.

For a rebuilt tender with coal plates form the fire iron tray (part 45) into a shallow 'U' section and fold the rear plate at 90°. Solder the spacers (part 46) into the half-etched slots and attach the complete tray as in Fig. 12.

Attach the coal rail (part 57) if appropriate. The coal rail extensions (parts 58, 59) are used for the later tenders without the 'drop' in the sides at the front. Modify part 57 by removing the rails in front of the end bracket and replace with the extensions.

Fix the brake and water scoop standards in place. Fold the handrail brackets (part 54 - note they are handed) along the half-etched line and strengthen the fold with a fillet of solder. Modify the brackets as in Fig. 7 if required. Fix the brackets over the standards and attach inside the sides. Make the front handrails from 0.45mm wire. If the coal rail extensions have been used the handrail is fixed to the extension on the small half-etched recess. On the rebuilt tenders, the wide mounted handrails are attached behind the coal plates and using the brackets (part 55),

The remaining parts can now be attached in any order. The following notes should be used.

Emboss rivets on part 61 before forming to shape.

Rear handrails from 0.45mm wire.

Handles for brake and scoop standards from 0.45mm wire.

Emboss two rivets on part 48 before attaching

Emboss rivets on lamp brackets before folding to shape.

The lower brackets are attached to the bufferbeam.

Align vacuum pipe with notch in rear of footplate,

Steam heating pipe tap handle (part 89) fits on the lower spigot on the casting.

The small brackets (part 84) fold along the narrow slots before being attached against the toolboxes.

The weather sheet supports (part 86) are fixed inside the coal plates, at the front, of the rebuilt tenders.

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

Martin Finney

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

COMPONENT DESCRIPTION - 0.012" BRASS**CHASSIS**

1	Frame - left side
2	Frame - right side
3	Well tank
4	Front plate
5	Compensation beam - (2)
6	Brake hangers - (12)
7	Brake shoes - (12)
8	Brake pull rods - (2)
9	Lever - brake pull rod to cross shaft - (4)
10	Lever - brake cylinder to cross shaft - (2)
11	Lever - brake standard to cross shaft - (2)
12	Water scoop actuating lever (long)
13	Lever - front scoop cross shaft to scoop standard - (2)
14	Lever - rear scoop cross shaft to scoop
15	Lever - between part 12 and front scoop cross shaft - (2)
16	Lever - between part 12 and rear scoop cross shaft
17	Water scoop front plate
18	Washer - 2mm
19	Washer - 10 BA
20	Vacuum pipe drip trap - (3 pieces)
21	Vacuum pipe rear bracket

BODY

22	Footplate
23	Rivet strip - (2)
24	Tank former
25	Tank top overlay
26	Tank side/front overlay
27	Sides/back
28	Overlay to modify shape of sides - right
29	Overlay to modify shape of sides - left
30	Sand box - original type - (2)
31	Sand box lid - original type - (2)
32	Sand box (rebuilt tender) - left side
33	Sand box top (rebuilt tender) - left side
34	Casing (rebuilt tender) - right side
35	Casing top (rebuilt tender) - right side
36	Rear buffer beam
37	Rear buffer beam overlay
38	Front buffer beam
39	Front buffer beam overlay
40	Rear coal plate -original type (2)
41	Rear coal plate -rebuilt tender (2)
42	Front quadrant coal plate - original type (2)
43	Front quadrant coal plate - rebuilt tender - left
44	Front quadrant coal plate - rebuilt tender - right

BODY (cont'd)

45	Fire iron tray
46	Fire iron tray spacers - (2)
47	Fire iron bracket
48	Fire iron bracket base
49	Front beaded quadrant plate - left
50	Front beaded quadrant plate - right
51	Raised footplate
52	Raised footplate support - rear
53	Raised footplate support - sides and front
54	Bracket - front handrail to front of side
55	Bracket - front handrail to top of side
56	Side coal plate - (2)
57	Coal rail
58	Coal rail extension - left
59	Coal rail extension - right
60	Combined water filler/scoop fountain base
61	Combined water filler/scoop fountain wrapper
62	Combined water filler/scoop fountain top
63	Water pickup dome base
64	Footplate valence - left
65	Footplate valence - right
66	Front step - left
67	Front step - right
68	Front step overlay - early lots - left
69	Front step overlay - early lots - right
70	Front step overlay - later lots - left
71	Front step overlay - later lots - right
72	Rear step - left
73	Rear step - right
74	Rear step overlay - left
75	Rear step overlay - right
76	Front step tread - lower - (2)
77	Front step tread - upper - (2)
78	Rear step tread - lower - (2)
79	Rear step tread - upper - (2)
80	Step - tank rear - (2)
81	Lamp bracket upper
82	Lamp bracket lower - outer - (2)
83	Lamp bracket lower - centre
84	Bracket - toolbox to tank top - (2)
85	Padlock - toolbox - (2)
86	Weather sheet support - (2)
87	Coupling hook lamination - (2)
88	Screw coupling
89	Steam heating pipe tap handle
90	Jig for side plate flare

OTHER COMPONENTS

2mm bore clearance small top hat bearing - (2)
Brass 10 B.A. screw - (2)
Brass 10 B.A. nut - (2)
1/16" brass wire for compensation beam pivot
1/16" inside diameter brass tube for compensation beam
Handrail knob - (4)
Cast brass brake standard - (2)
Brass wire 0.33mm
Brass wire 0.5mm
Brass wire 0.7mm
Brass wire 0.9mm
Buffer heads. Bushes and springs

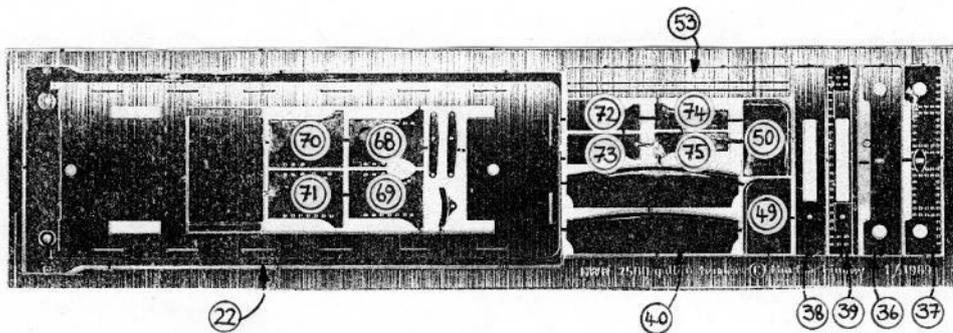
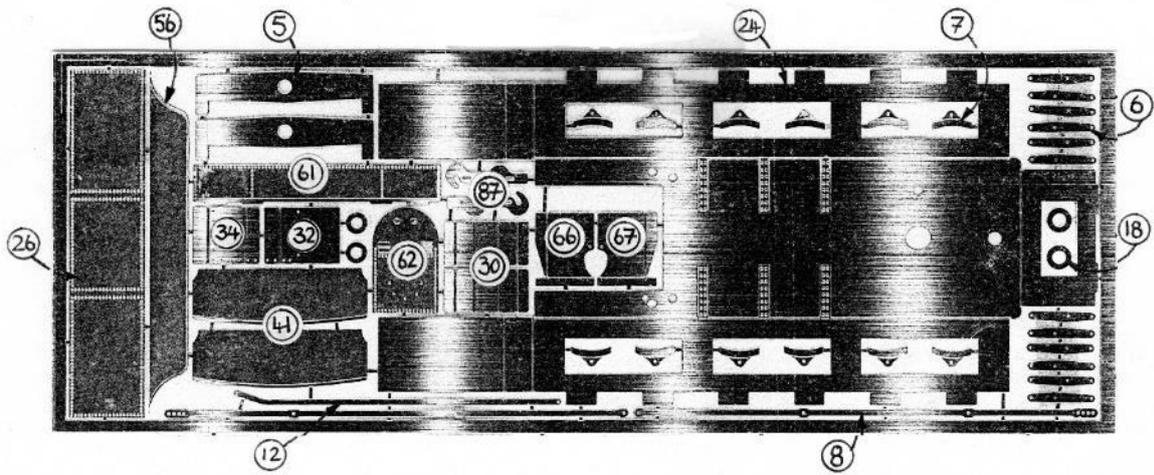
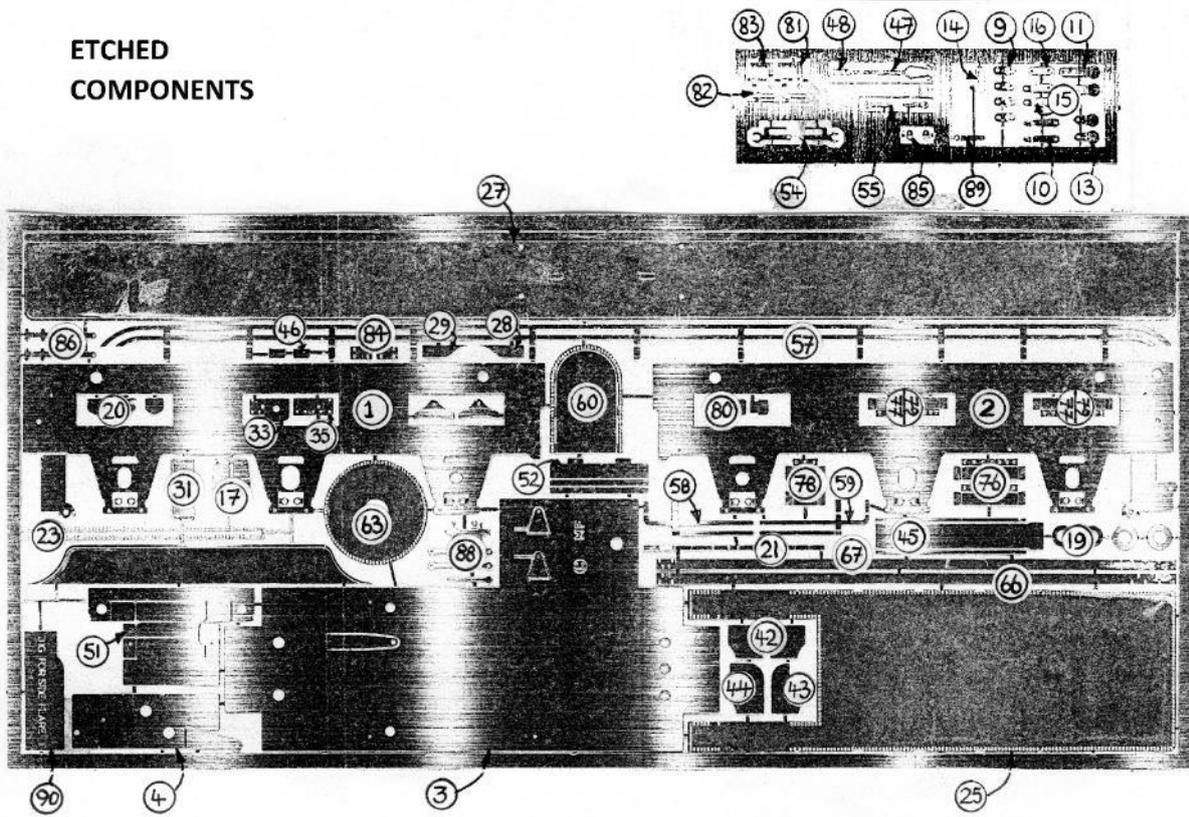
COMPONENTS NOT SUPPLIED

Wheels (6)
(prototype - 4' 1" diameter - 12 spoke)
- Ultrascale
- Alan Gibson
- Markits
Pinpoint axle (2)
Plain extended axle

WHITEMETAL CASTINGS

Axlebox & spring - hole at rear - (2)
Axlebox & spring - slot at rear - (4)
Toolbox - symmetric shape - (2)
Toolbox - quadrant shape
Brake cylinder
Water filler
Water pickup dome
Water pickup scoop
Water level gauge
Tank vent - (2)
Overflow pipe fountain
Sandbox lid
Water feed valve lever - (2)
Front buffer - (2)
Rear buffer housing - (2)
Vacuum pipe
Steam heating pipe

ETCHED
COMPONENTS



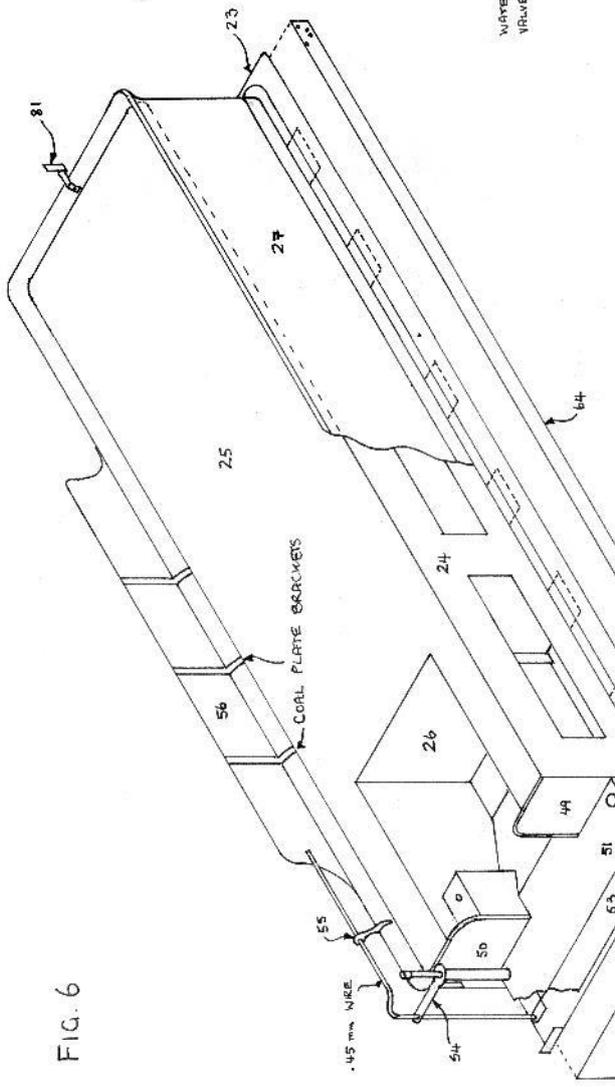
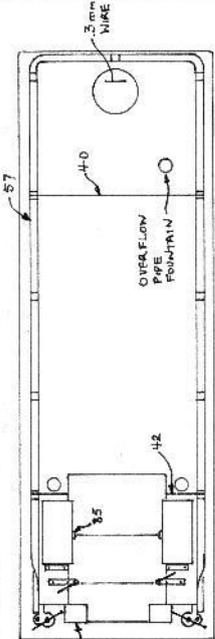


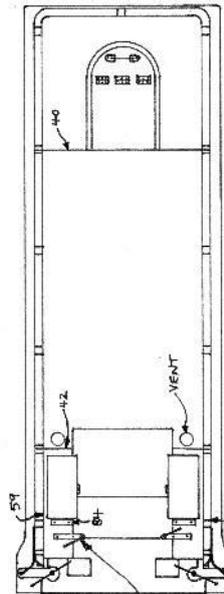
FIG. 6

FIG. 10



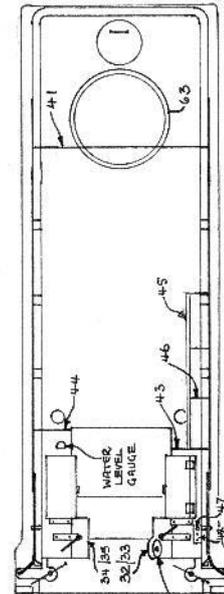
Sandboxes in original position - Coal rails - no scoop - narrow footplate - both footboards original type - no water level gauge - overflow pipe fountain - vents in forward position

FIG. 11



front footplate extensions - coal rail extensions - wide mounted hand rails - raised footplate - Scoop fitted - combined water filter / sloop fountain

FIG. 12



compartments - repositioned sandbox - separate scoop dome and water filter - water level gauge - new design fuel box on the left side - fire iron bracket - fire iron tray - vents in new position to the rear of original position.

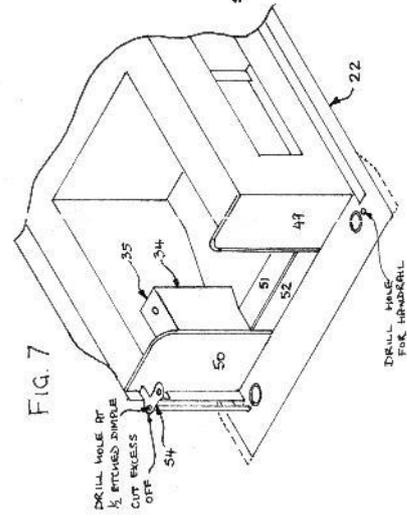


FIG. 7

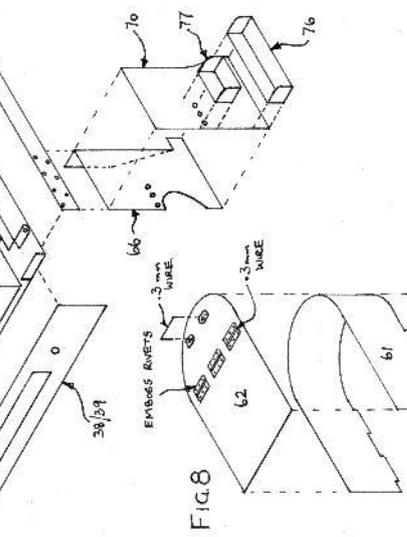


FIG. 8

MODIFYING SIDES FOR EARLIER LOTS.

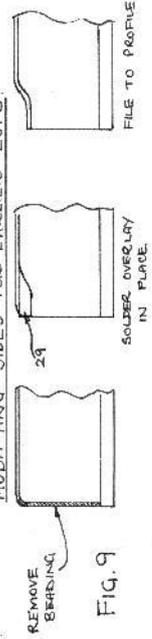


FIG. 9

GWR 2500 GALLON
TENDER BODY
MARTIN FINNEY
23-2-89

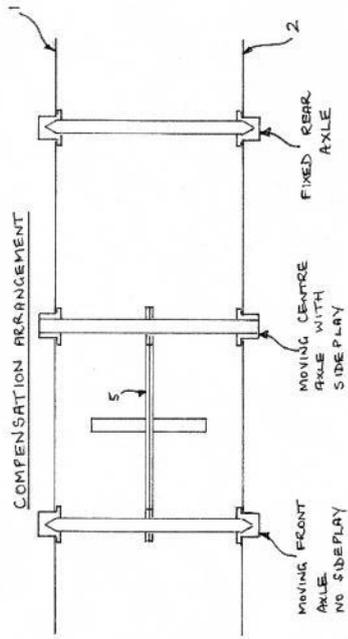


FIG 5

ALL PINS JOINING VARIOUS LEVERS AND RODS TOGETHER FROM .45mm WIRE.

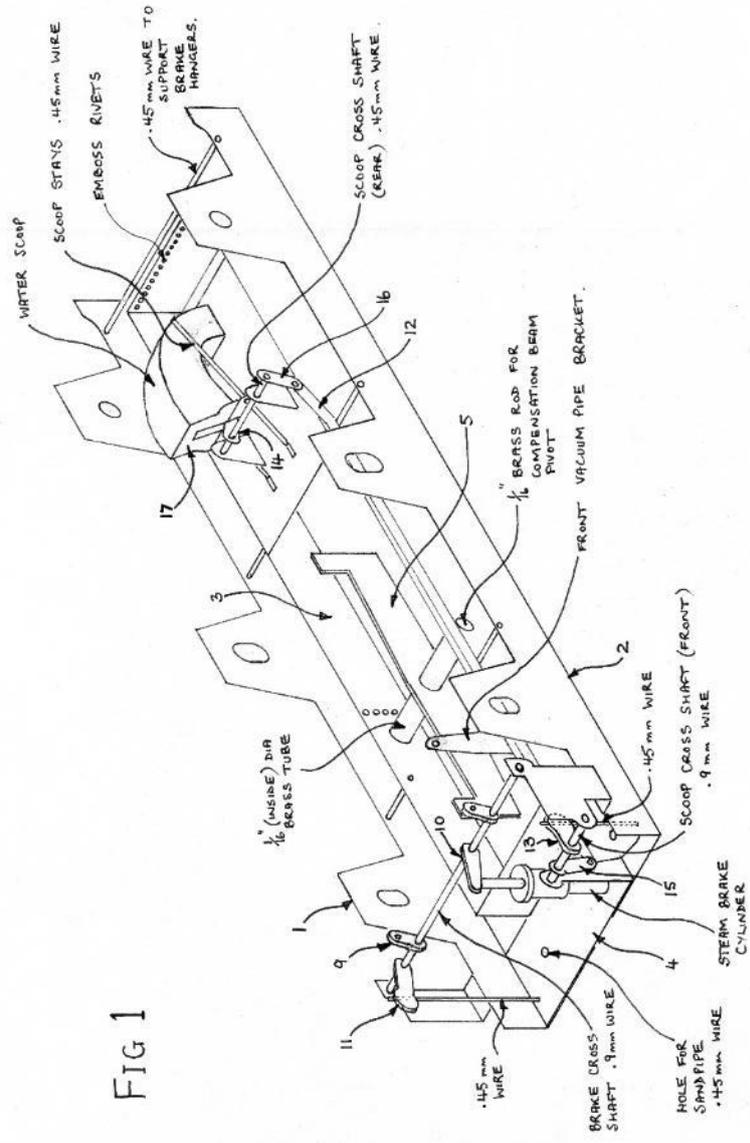


FIG 1

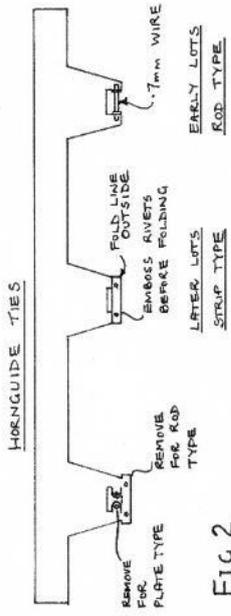


FIG 2

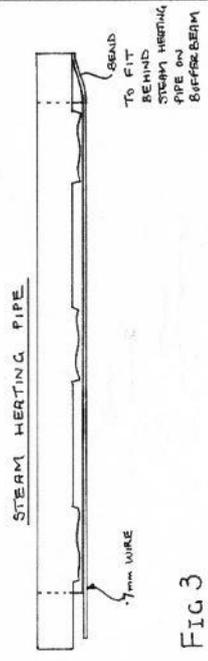


FIG 3

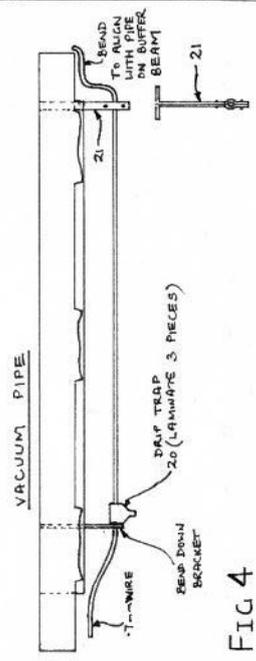


FIG 4

GWR 2500 GALLON
TENDER CHASSIS
MARTIN FINNEY
23-2-89