Brassmasters Scale Models

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GREAT WESTERN RAILWAY
COLLETT LARGE PRAIRIE 2-6-2T
LOCOMOTIVE KIT

Designed by Martin Finney

4MM SCALE
OO - EM - P4

INSTRUCTIONS AND
PROTOTYPE NOTES

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SECTION 1: BRIEF HISTORICAL DETAILS

The engines which form the basis of this kit were an up-to-date version of the Churchward engines introduced in 1903. They are divided into two classes the 5101 class (5101-5110, 5150-99, 4100-79) introduced in 1929, for general use, with 200 lb. pressure boilers followed by the 6100 class (6100-69), specifically to work accelerated London suburban services, with 225 lb. pressure boilers.

For a detailed history of this numerous class Part Nine of 'The Locomotives of the Great Western Railway' published by the R.C.T.S. is essential reading.

Other valuable sources of information and photographs are:

A Pictorial Record of Great Western Engines Vol. Two - J.H.Russell - OPC
Churchward Locomotives - Brian Haresnape & Alec Swain - Ian Allan
Locomotives Illustrated No. 33 - Ian Allan
Great Western Railway Journal No.5 - Wild Swan - which includes some of the drawings listed below.
Great Western Railway Journals Nos. 86, 87 and 88 – Wild Swan - which have articles and pictures entitled 'The 51xxs at Work'

In designing the kit I have used the following Swindon Drawings:

98682	2/1934	Lot 284	Frame plan
87341	2/1934	Lot 257,259	Cross sections
102535	2/1934	Lot 284	Erecting Plan
100729	4/1933		Arrangement of Boiler Mountings
59048	9/1938		Arrangement of Motion

The engines were built under 12 Lots as follows:

Lot	Number	Built
257	5101-10	11/29-12/29
	5150-59	2/30-3/30
259	5160-89	10/30-4/31
269	6100-29	4/31-11/31
278	6130-59	9/32-4/33
284	5190-99	10/34-11/34
291	6160-69	10/35-11/35
292	4100-19	8/35-11/36
313	4120-29	12/37-5/38
323	4130-39	10/39-12/39
335	4140-49	8/46-10/46
361	4150-59	6/47-9/47
369	4160-79	9/48-12/49

Variations/Modifications incorporated into the kit

Water Fillers: 5101-10, 5150-89, 6100-6109 were fitted with a screw down lid whereas the remaining engines were fitted with a lever type.

Cab shutters: 5190-99, 6110-69 & 4100-79 were so fitted when new. The earlier engines received shutters from 1933 onwards.

ATC equipment: fitted when new to 5160-99, 6130-69 & 4100-79 and applied to the earlier engines between 1930 and 1933. The earlier engines had the ATC conduit pipe clipped midway up the valence on the left hand side whilst the later engines had the pipe clipped under the lower edge of the valence. The earlier engines were fitted with the standard ATC shoe bolted to the front buffer beam and clearly visible in photographs. Later engines, including all the 61XX series, had a less visible shoe mounted beneath the pony truck.

Journal lubricators mounted on the tank top: The majority of the 51XX & 61XX series were so fitted when built. The 41XX series did not have these lubricators and some of the earlier engines had them subsequently removed. Step on tank front: 5101-10, 5150-89, 6100-6109 were fitted a step of traditional appearance. The later engines had a step of the same design as fitted to the rear of the bunker.

Upper front lamp bracket: moved to smokebox door on a few engines.

Spare lamp brackets: on early engines these were mounted towards the footplate edge alongside the splasher whilst later they were placed further forward and in front of the splasher.

Whistle shields: fitted to 4160-79 when new and later to a few of the earlier engines.

Handrails on tank strap: two extra handrails were added on the strap over the boiler from circa 1945 onwards.

Bunker steps: Welding of three steps to the left side of the bunker began in 1952. This necessitated the shortening the handrail on the bunker side whilst at the same time two extra handrails were added one to the rear of the cab cut-out and one on the cab roof.

Variations/Modifications not incorporated into the kit

Safety valve bonnets: 5101-5110 & 5150-59 were fitted with tall safety valve bonnets. The safety valve bonnet supplied is of the short type fitted to the remaining engines.

Bunkers: 5101-5110 came out with a recessed fender above the bunker top only, whilst Nos. 5150 onwards had the upper half of the bunker extension recessed to match, as per the kit. Several of the earlier engines have subsequently been similarly treated.

Trip gear: The 61XX series worked over the electrified lines in the London area and all were fitted with trip gear for automatic brake application in case of over-running an adverse signal. The A.T.C. apparatus on these engines is arranged to clip up automatically on entering an electrified section.

SECTION 2: CHASSIS DETAILS

Note that many of the components for both chassis and body are handed left/right and care must be taken to ensure the correct component is used. I have not always identified left/right components separately but with care and common sense no problems should arise. It is also sensible to open up all holes to fit the appropriate component/wire before that component is fitted.

Before construction can commence you have to decide which particular chassis you are going to construct. The options are:

GAUGE - 00, EM or P4

SUSPENSION - rigid, sprung or compensated

PICKUPS - no pickup material is provided
The options are:
(a) Scrapers attached to the frame spacers using printed circuit board.
(b) Plunger. Open out holes P and fit according to the manufacturer's instructions.

SECTION 3: FRAMES

Having decided which chassis to construct you can now start construction by preparing the frames (parts 1 & 2).

For a rigid chassis open out the main axle holes to accept 1/8" top hat bearings (not provided) and solder them in place. If you are going to fit sprung horn blocks, you should remove the axle holes by cutting up the 1/2 etched lines, leaving a standard 6mm wide slot and then follow the manufacturer's instructions.

The simplest and most reliable suspension system is beam compensation and the necessary compensation beams, bearings and hornblocks are provided in the kit. For a compensated chassis first remove the axle holes as described above. Carefully widen the slots in the hornblocks (parts 8 & 9) until the Flexichas bearings are a good fit. I find a significant variation in the bearings and once I have fitted a hornblock to a bearing, I mark the bearing and hornblock, so

that they can be later assembled together. A good fit between hornblock and bearing is essential if the chassis is to run well.

Solder the rear hornblocks to the inside of the frames aligning them with the half-etched lines and with the bottom of the frames. Now open out the following holes in the frames:

B for brake hanger pivots - 0.45mm
S for brake cross shaft - 0.9mm
C for compensation beam pivot - 1/16"

Form the frame joggle to narrow the frames at the rear. Make the first bend inwards through 30° along the front half-etched line and strengthen the bend with a fillet of solder. Then make the second bend outwards in the same way.

Fold in the radial truck hornguides on parts 1 & 2.

Bend the valve rock shaft brackets along the half-etched fold lines at right angles and strengthen with a fillet of solder.

SECTION 4: FRAME SPACERS AND ASSEMBLING THE CHASSIS

Remove the spacers (parts 3,4,5,6 & 7) to suit your chosen gauge. Open out the holes for the front compensation beam in part 5 to 0.8mm and the holes for the rear truck and pony truck spring wires in parts 4 & 6 to fit the spring wire. If you are fitting plunger pickups then drill two holes in part 4 to allow the pickup wires to pass through to the motor.

Fold up the spacers making sure the half-etched fold lines are on the inside and that each bend is a right angle. Emboss all the frame rivets. Fold up the small tabs on the pony truck pivot spacer (part 6) and solder the 10 BA pony truck pivot screw in place between the tabs. Check that the spring wire fits through the holes in the tabs and through the screw slot.

Check that all tabs on the spacers fit properly in their corresponding chassis slots so that the rest of the spacer is hard up against the inside of the frames. Bend the frames inwards slightly along the fold lines at the back of the cylinder opening using part 7 as a guide.

Now assemble the frames and spacers. Start by tack soldering the part 4 to both sides. Check that everything is square and that the spacers are hard against the frames. Put an axle (or better a longer piece of 1/8" rod) through the rear bearings and place the chassis on a piece of graph paper to check that the axle is square to the frames. If all is well solder the remaining spacers to the frames checking constantly that the chassis is square and the frames are straight.

SECTION 5: COUPLING RODS

The coupling rods are now made so that they can be used as a jig to align the remaining hornblocks accurately. First drill out all the crankpin holes to a convenient size which is well undersize for the crankpins and the fork joint holes 1mm so that the 1mm nickel silver wire is a tight fit. Remove all burrs caused by the drilling.

Now drill a hole, with the drill used for the crankpin holes, in a small block of wood and leave the drill in the wood with its shank projecting. This projecting shank is used as a mandrel to accurately align the laminations of each rod.

Place the inner and outer laminates over the mandrel and using plenty of solder and flux solder the two laminates together. You will now have rods with the crankpin and fork joint holes aligned. The rods have been deliberately etched too large so that the thin etched edges can be carefully filed so that the 'laminated' effect is lost and the rods appear to be made from one piece of metal.

The crankpin holes now need carefully opening out until they just fit, with no free play, the ends of the hornblock alignment jigs (available from London Road Models or Markits).

The fork joints are now pinned using the 1mm nickel silver wire. Retain the pins, which should be a tight fit, by lightly soldering on the inner face of the rods. The correctly assembled rods should now have a completely flush inner face.

SECTION 6: FITTING THE FLEXICHAS HORNBLOCKS

Prepare the remaining bearings and hornblocks as described in section 3 and slide them over the hornblock alignment jigs with the springs between the bearings. Carefully compress the springs and clip the hornblocks between the frames and place the prepared coupling rods over the ends of the jigs. Make sure the hornblocks are square to the chassis and that their bottom edge aligns with the lower edge of the frames and then solder them in place.

SECTION 7: FITTING THE COMPENSATION BEAMS

For the front beam solder in place through the holes in part 5 the 0.8mm steel wire. For the rear beams cut a piece of 1/16" brass rod so that it fits through the holes C and is flush with the outside face of the chassis frames. Cut two equal pieces 3/32" tube which together fit between the frames and solder the rear beams (part 10) to them close to one end. Modify the Flexichas bearings on the two rear axles as shown in Fig.1A and temporarily fit the beams.

Temporarily fit all the wheels and axles and confirm that the compensation works properly and check that the chassis is sitting level. Make a bracket, from scrap material, to support the Portescap motor/gearbox.

SECTION 8: FRAME OVERLAYS

Emboss all the rivets on the frame overlays (parts 69, 70, 71 & 72). Fold down the bracket at the top towards the rear of the left side overlay (part 69). The corresponding bracket on the right side overlay is not needed and should therefore be snapped off.

Solder in place lengths of 0.45mm wire for the brake hanger pivots. These then serve to accurately locate the overlays which only need tack soldering around their edges.

SECTION 9: RADIAL TRUCK

Fold up the front spring wire bracket on part 23, 24 or 25. Fold up part 20, 21 or 22 and attach part 23, 24 or 25 and check for free, but not sloppy, movement in the hornguides. Solder the small top hat bearings in place and fit the radial truck wheels using the washers (part 94) to eliminate any side play. Bend up the spring wire to give some downward pressure.

SECTION 10: PONY TRUCK

Open up the axle holes, in part 13, to accept the 2mm bore top hat bearings. If you are not fitting the pony truck mounted ATC shoe then remove the frame mounting webs for the ATC mounting beams (see Fig. 3). If you are fitting the pony truck mounted ATC shoe, then open out the holes in these webs and those in the mounting beams (part 19) to fit 0.45mm wire.

The folding of the frames (part 13) is quite complex as some of the folds are 90° with the fold line on the inside and others 180° with the fold line on the outside. First fold the lower frame sections and the guard irons over through 180°. The remaining folds can now be made as shown in the diagram. Check all the bends for squareness and solder all the pieces together. If appropriate, solder the ATC shoe mounting beams in place locating them with 0.45mm wire. Form the guard irons to shape and solder the diagonal stays (part 78) in place. Solder part 17 in place with the 2mm bore top hat bearings. Drill out all the small holes to accept short pieces of 0.45mm wire to represent the frame bolts.

Bend the upper frame (part 15) to shape folding the rear stays over through 180° and solder the two parts of the frame together. Solder two lengths of 0.45mm wire as stretcher bars through the holes in the lower frame. Fit the wheels and form the rear of the frame and the struts so that when fitted to the chassis over the pivot the frame is level.

Curve the strengthening ribs (parts 76 & 77) to shape and solder in place in the slots in the upper and lower frames. If appropriate attach the ATC shoe (part W21). Fit the pony truck spring wire so that it locates in the hole in the rear of the upper frame. The pony truck is retained with the 10BA bearing and nut.

SECTION 11: CYLINDER ASSEMBLY

Open out the piston tube and valve chest holes in part 36 until the tubing fits snugly. Reduce the width of the inside cylinder faces to the etched lines provided so that the cylinders are a good fit it the slots in the frames. Fold up the cylinders making sure they are square.

Fit the piston tube, flush at the front and with 2mm projecting at the rear. Fit the rear cylinder cover (part 38), overlay (part 39) and gland (part 40) over the projecting tube, pass short lengths of 0.45mm wire through to represent the fixing studs and solder in place.

Emboss the rivets in the slide bar laminations (parts 45 & 47) and solder to the slidebars (parts 44 & 46) aligning the rear ends. The appearance of the slidebars is much improved by carefully filing the edges smooth and tapering the outer surfaces at the rear. Drill out the oil cup holes and solder in short lengths of 0.7mm wire.

The completed slidebars may now be inserted and at first tack soldered in place. After checking all is square and parallel they are permanently attached. Clean off the cylinder fronts flush and attach the front covers (part 37). Drill out the relief valve holes, back and front and solder in place short lengths of 0.9mm wire, rounded at the end, to represent the valves. Fit the valve chest covers (parts 41 & 42) to the valve chest tubing and attach in place with equal amounts protruding.

Fold the crosshead slippers (part 49) through 90° on the half-etched lines, insert the spikes through the crosshead back (part 50 & 51) and solder together. Note the crosshead back with the extension for the vacuum pump drive is on the right side of the engine with the extension at the rear. Drill the hole in the appropriate left side crosshead front (part 42 or 43) 0.7mm together with the hole in the back. Mount the 0.7mm drill vertically in a block of wood to act as a mandrel and thread the front over the slipper/back assembly. Ensure all is square and carefully solder together. Check the crosshead for fit between the slide bars. Repeat for the right side crosshead.

Cut a 2mm piece of piston tube and solder to a piece of the 0.8mm steel piston rod. Bend in slightly the small projections at the front of the crosshead so that the tubing is a tight fit between them. Place the piston rod in the piston and slide the crosshead in place with the tubing between the projections; not too far or it will foul the small end of the connecting rod. Now solder the crosshead to the piston rod and the result should be a perfectly aligned and free moving assembly.

Solder together the connecting rod laminations (parts 30 & 31) and add the rod boss laminations (part 32) to the big end back and front. Drill the big end to fit the crankpins and the small end 0.7mm. Fit the connecting rod to the crosshead using 0.7mm wire for the pin. Carefully solder the pin from the rear and file flush.

Emboss the bolt heads on the front motion brackets (part 48) and solder to the rear brackets, back to back. Fit them to the slide bars checking the crossheads for free movement.

Form the cylinder wrappers (part 88) to shape and solder in place making sure the drain cock holes are on the bottom centre line. Emboss the rivets on the drain cock linkage (part 89) and fold it along the half-etched lines. Attach the drain cock castings (parts B7 & B8) together with part 89 and then solder the (very!) small levers (part 90) over the spigot on the front of the drain cocks and against the linkage. On the outer drain cocks these levers angle up and on the centre one down. File off the piece of the draincock spigot in front of each lever.

Emboss the rivets in the valve spindle laminations (part 43) and solder them together before fixing in place. If appropriate bend over the 'fingers' on the slide bar splashers (part 91) to increase the thickness of the half-etched mounting plates and attach behind the slidebars ensuring they do not foul the crossheads.

The cylinders will be fixed in place when the body is attached but if you require a separate fixing then two 10 BA bolts can be used through the outside holes and into tapped holes in the spacer part 7.

SECTION 12: FINISHING THE CHASSIS

Fit the crankpins to the wheels making sure the screw heads do not foul the overlays, countersinking them if necessary. Attach the balance weights to the wheels using photographs as a guide to position. Assemble the wheel sets, bearings and rods selecting 1/8" axle washers of appropriate thickness to control sideplay. A thorough check of all clearances at this stage is important especially between the leading crankpin/crosshead. When you are confident of the clearances assemble the axles and quarter the wheels. You should now have a mechanically acceptable chassis. Now connect the motor to your pick-ups and test run.

The axles are now retained by the springs, formed from a triple lamination of parts 33/35 & 34 as shown in Figs. 1 & 2. Assemble the brake hangers (parts 79, 80, 82 & 83) first embossing the rivet on each outer lamination. The front of each hanger is detailed with part 81 or 84. Attach the hangers to the pivot wires. Emboss the bolts in parts 85 & 86 and solder the cross shaft overlays to the top of part 85, then carefully twist the pull rods between the cross shafts vertical. Fix this assembly to the brake hangers. Complete the brake gear by fitting the rear cross shaft, levers and pull rods (parts 11, 12 & 87) as shown in Fig. 6.

Complete the chassis detailing by fitting the dummy valve gear (Fig. 1) rear sandboxes, sand rod (Figs 1 & 2), and sandpipes from 0.45mm wire.

SECTION 13: FOOTPLATE

Fold up the footplate first folding the valences followed by the step behind the cab. Now fold over the bufferbeams followed by the step at the front, front sandbox sides, rocking shaft brackets and lamp brackets. Solder some scrap pieces of brass to the inside of the valence alongside the valence joggle to strengthen the footplate.

Emboss the rivets in part 97 then curve to shape and solder in place. Prepare the main footplate overlay (part 96) by embossing the rivets on the tank angle strips, around the splashers and on the bases of the front sandbox pivots. Fold over the cab floor support, fold up the splasher fronts and temporarily join the overlay to the footplate with a screw through the body fixing holes at the front. Check the alignment of the tank former slots before soldering together all round. Solder a 10BA nut over the front fixing hole.

Drill the pump rod hole, 0.5mm, in the end of the vacuum pump (part B12), solder in place in the slots under the footplate and fix a piece of 0.45 mm wire to the crosshead bracket. Trim the pump rod as short as possible so that the body can be removed by a slight movement forward.

Solder short lengths of 0.7mm wire into the holes in the footplate at the front to represent the oil cups. Emboss the rivets on the bufferbeams (parts 105 & 107) and solder in place.

Solder the valence overlays (parts 99 & 100 or 101 or 103) and rear valence overlays (part 104) in place together with the brackets (parts 106 & 108) and coupling hooks (part 67). Fold up the steps (parts 109,110 & 111) and solder in place.

Curve the splasher tops (part 112) to shape by rolling underneath a suitable rod or dowel on a resilient surface (a piece of hard rubber sheet). Cut a small slot in the splasher tops to clear the rocking shaft brackets before soldering in place.

Solder the smokebox saddle font and back (part 117) into the slots in the footplate. Curve the smokebox saddle sides (part 118) to fit and solder in place.

Emboss the rivets on part 114 and solder together with part 115 at the front. Form parts 116 to shape and solder to the motion bracket and then add the bolt overlays (part 63). Check the fit of the motion bracket in the footplate slots - it must sit down tight on the footplate to ensure correct boiler fit later. When satisfied solder in place.
If you are fitting the ATC equipment form the ATC conduit, which runs along the right side valence, from 0.3mm wire. For part 101 cut the strips (part 102) into six pieces and use them to attach the conduit through the pairs of small slots in the valence. For part 103 attach the conduit in the small slots in the brackets along the lower edge of the valence.

Attach the sanding rod (part 119) and part 113 as shown in Fig. 7 and fix castings W3, W4, W5, W6, W9, W11, W14, W22 & B6 in place.

SECTION 14: TANK FORMER & CAB FRONT

Using the tank former (part 123) as a template (align the handrail knob holes in front of the cab door) drill the appropriate holes (0.35mm) for the horizontal handrail on the cabsides (part 124). Fold up the tank former and solder in place in the footplate slots.

Solder the window frames (part 157) in place on the cab front (part 156) before soldering in place in the slots in the footplate and tank former. Ensure the edges of the cabsides are flush with the tank former sides.

SECTION 15: FIREBOX, SMOKEBOX & BOILER

Fold up the firebox former (part 56) and solder part 57 to the front ensuring the dowel holes align. Using the notches in the top of the formers and the firebox wrapper (part 171) as a guide centre the wrapper and mark in pencil the position of the top bends. Form the bends over a suitable rod held in a vice. When happy with the forming solder the wrapper to the formers ensuring a large fillet of solder around the front join. Round the front corners of the firebox with a file. Fold the firebox band joining brackets (part 172) into a 'U' shape so that they fit through the slots in the firebox top and solder in place from inside. Complete with a short piece of 0.3mm wire to represent the tightening bolt. Attach the mudhole doors in place on the firebox.

Emboss the rivets either side of the top feed pipe on the boiler wrapper (part 175). The washout plugs can be drilled out and part 176 used if you prefer. Form the boiler by rolling and check for fit around the formers (parts 58 & 59) before soldering together. The etched notch at the top of the rear former must align accurately with the notch in the wrapper. Solder two short pieces of 0.45mm wire into the holes in the rear former to act as dowels to locate the boiler and firebox.

Open out the front strut holes (0.7mm) and emboss the rivets around the plates behind the valve rocking shaft on the smoke box wrapper (part 177). Roll the wrapper and check the fit on the formers (parts 60 & 61). Solder the wrapper ends together using part 178 and solder in the formers flush with the back and front with the notch in the bottom of the front spacer aligned with the wrapper join. Represent the bolts in the joining brackets using 0.3mm wire. The upper hole in the front former is for the handrail knob and the other hole is for the steam lance cock. Emboss the four rivets on the smokebox front (part 62), and attach to the front of the smokebox aligning the handrail and lance cock holes. Bend up the smokebox step (part 179) and solder in place under the smokebox front.

Tap the hole in part 60 10BA so that the smokebox and boiler can be screwed together. Now check the fit of the boiler/smokebox/firebox with the cab front and smokebox saddle. Tack solder the smokebox to the saddle and once again check. If all is well complete soldering of smokebox to saddle and firebox to cab front.

Fit the front struts (0.7mm wire) together with the plates (parts 64 & 65). Solder the smokebox lamp bracket in place (part 168).

SECTION 16: TANK TOP OVERLAYS AND CAB INTERIOR

If appropriate, fold up the lubricator brackets from the tank former. Emboss the rivets on the tank top overlays (part 125) and curve the inner edges to fit over the boiler and firebox before soldering in place.

Emboss the rivets on parts 140,141 & 142 and fold to shape before fixing in place as shown in Fig. 8. Drill out the brake column hole in the cab floor (part 139) so that the column will pass through. Form the splasher tops on the cab floor, fill the splasher sides with scrap brass and fold over the outer edges in the door openings to form the floor supports. Fix the cab floor in place. Add parts B16, W27, W24 & W25.

Completing the tank top detailing is probably best delayed until the bunker and cab are fitted but I will describe it now. Fix part W1 in place then form the top feed pipes from 0.8mm wire and solder in place in the 'slot' in the boiler overlay. The remaining detail is shown in Fig. 8. The lifting rings are made by wrapping 5 amp fuse wire around a 1.6mm drill shank.

SECTION 17: BUNKER FORMER AND CAB BACK

Using the bunker former (part 144) as a template (align the handrail knob holes behind the cab door) drill, if appropriate, holes (0.35mm) for the side bunker steps in the left side part 124. Similarly using Fig. 12 and/or the right side part 124 drill, as appropriate, holes (0.35mm) for the side bunker handrails in the left side part 124.

Emboss the rivets on the bunker former before folding to shape. Attach the brackets (part 149) and part 148. Assemble the cab seats (parts 180 & 181) which are designed to be working. Now remove the seats from the brackets and solder the brackets to the front of the bunker and replace the seats.

Solder the bunker former, together with part 145, in place in the footplate slots. Add parts B17 making the rods from 0.45mm wire.

There are two alternative cab rears, (parts 159 or 160). Emboss the rivets on both the inner and outer overlays. If you are using part 160 form the window bars from 0.3mm wire using part 161 as an aid. Space the bars off the cab rear with a piece of card (.5mm thick approx.) and solder in place. Solder the two laminations together before fixing in the slot in the bunker top. Solder part 162 in place.

SECTION 18: TANK/CABSIDE/BUNKER OVERLAYS & CAB ROOF

If you are fitting the cab shutters remove the rivets around the top of the cab opening in part 124 so that part 138 will fit flush to the cab side. Now form the bend between the cab sides and the cab roof edges. To do this, first scribe, with a sharp point, the fold lines (make them quite deep) on the inside. The lines run from the slots in the projections either side. File off the marking projections when satisfied and make the folds to match the cab back and front. Attach the cut-out beading (part 136) to the cab sides fitting the etched groove over the edge of the cabside, then trim to length and at the same time remove the upper of the pieces in the cab door opening.

If appropriate, fit the cab shutters (parts 137 & 138). The shutters are set out from the cab sides by part 138 at the top and by folding the piece projecting at the front under at the bottom.

Form the bends for the bunker and tank front by bending over a rod or drill shank - bunker 1.8mm, tank front 2.3mm. The position of the bends are indicated by very small slots in the edges of the overlays. Remove the lower of the pieces in the cab door opening before soldering the overlays in place. This can be done almost entirely from inside through the holes in the formers.

Fold up the back and front of part 164 which gives a solid base upon which to build the removable cab roof which is retained by clipping under the rainstrips above the cab openings on either side. Roll the cab roof to shape and solder in place on part 164 with equal overhang back and front - the cut-out for the ventilator is at the rear. Add part 165 to the front and rear edges and the ventilator (part 167). Now using a Carborundum disc in a mini-drill cut through the unwanted part of the former and snap off the redundant parts along the half-etched lines. The edges of the formers will now need cleaning up. Add the rainstrips (part 166) as shown in Fig.12.

Curve part 146 and solder in place making a generous filet at the side seams before filing the corner to match the curve of the top and bottom. Curve part 147 to shape and solder in place in the groove in the base of the lamp bracket recess. Fit the beading (parts 126 & 154) checking the clearance with the cab roof. The correct relationship between the beading and the roof angles, on the back and front, is shown in Fig. 13.

Add the rivet strips (parts 127 & 155) before completing the bunker as shown in Fig.12. Add the step on the front of the tank (part 133 or 134).

Solder four medium handrail knobs in the smokebox holes then form the handrail to shape, thread on the front medium knob, and fix the handrail in place. Add the remaining handrails, bunker steps, bunker vent pipe & lamp brackets.

SECTION 19: FINAL DETAILING

Attach all the remaining components using the drawings and photographs as a guide to position.
Note: Steam heating pipes (part B6) fit in the brackets under the bufferbeams. Steam heating pipe valve handles (part 121) fit on the lower spigot of the casting.

Using the drawing of the cab interior (Fig. 13) the backhead can be assembled and the cab interior detailed. Use copper wire for the pipes.

That's it! If you have any problem with the kit or any criticisms or suggestions please feel free to contact Brassmasters.

Best wishes

Martin Finney
August 1994

COMPONENT DESCRIPTION - 0.020" NICKEL SILVER

1 Frame - left
2 Frame - right
3 Frame spacer - rear
4 Frame spacer - under cab
5 Frame spacer - centre
6 Frame spacer - pony truck pivot
7 Frame spacer - front
8 Hornblock - centre/rear coupled axle - (4)
9 Hornblock - leading coupled axle - (2)
10 Compensation beam - (2)
11 Lever - brake shaft to vacuum cylinder - (2)
12 Lever - brake shaft to handbrake
13 Pony truck frame - EM/P4
14 Pony truck frame - 00
15 Upper pony truck frame EM/P4
16 Upper pony truck frame 00
17 Pony truck spring overlay - (2)
18 Pony truck ATC shoe mounting beam - 00 - (2)
19 Pony truck ATC shoe mounting beam - EM/P4 -(2)
20 Radial truck - top/sides - P4
21 Radial truck - top/sides - EM
22 Radial truck - top/sides - 00
23 Radial truck - bottom - P4
24 Radial truck - bottom - EM
25 Radial truck - bottom - 00
26 Coupling rod - front - (2)
27 Coupling rod - front - fork joint - (2)
28 Coupling rod - rear - inner lamination - (2)
29 Coupling rod - rear - outer lamination - (2)
30 Connecting rod - inner lamination - (2)
31 Connecting rod - outer lamination - (2)
32 Connecting rod boss lamination - (4)
33 Spring - centre lamination - (4)
34 Spring - outer lamination - (12)
35 Leading axle spring/pony truck beam
36 Cylinders
37 Cylinder cover - front - (2)
38 Cylinder cover - rear - (2)
39 Cylinder cover - rear overlay - (2)
40 Piston rod gland - (2)
41 Valve chest cover - front - (2)
42 Valve chest cover - rear - (2)
43 Valve spindle lamination - (4)
44 Slide bar - lower - (2)
45 Slide bar - lower - lamination - (2)
46 Slide bar - upper - (2)
47 Slide bar - upper - lamination - (2)
48 Motion bracket lamination - (4)
49 Crosshead slipper - (2)
50 Crosshead back - left
51 Crosshead back - right
52 Crosshead front - (2)
53 Valve gear extension rod/expansion link
54 Balance weight - centre axle - left
55 Balance weight - centre axle - right
56 Firebox former
57 Firebox front former overlay
58 Boiler rear former

COMPONENT DESCRIPTION - 0.020" NICKEL SILVER (cont'd)

59 Boiler front former
60 Smokebox rear former
61 Smokebox front former
62 Smokebox font overlay
63 Motion bracket/boiler support front overlay - (2)
64 Front strut plate - footplate - (2)
65 Front strut plate - smokebox - (2)
66 Regulator lever extension
67 Coupling hook - (2)
68 Washer - coupled wheels axle

COMPONENT DESCRIPTION - 0.012" BRASS

69 Main frame overlay - left
70 Main frame overlay - right
71 Rear frame overlay - left
72 Rear frame overlay - right
73 Sandbox bracket - P4 - (2)
74 Sandbox bracket - EM - (2)
75 Sandbox bracket - 00 - (2)
76 Pony truck frame strengthening rib - upper - (2)
77 Pony truck frame strengthening rib - lower - (2)
78 Pony truck diagonal stay - (2)
79 Brake hanger - leading axle - rear - (2)
80 Brake hanger - leading axle - front - (2)
81 Brake hanger overlay - leading axle - (2)
82 Brake hanger - centre/trailing axles – rear - (4)
83 Brake hanger - centre/trailing axles – front - (4)
84 Brake hanger overlay - centre/trailing axles - (4)
85 Brake pull rods/cross shafts
86 Brake cross shaft overlay - (3)
87 Brake pull rod lamination - rear - (4)
88 Cylinder wrapper - (2)
89 Cylinder drain cock linkage - (2)
90 Cylinder drain cock lever - (6)
91 Slide bar splasher - (2)
92 Balance weight - leading/trailing axles - (4)
93 Washer - coupled wheel axle
94 Washer - pony truck & rear truck axle
95 Footplate
96 Main footplate overlay
97 Front footplate overlay
98 Rear footplate overlay
99 Valence overlay - left
100 Valence overlay - right - no ATC brackets
101 Valence overlay - right - with centre line ATC brackets
102 ATC conduit - fixing brackets
103 Valence overlay - right - lower edge ATC brackets
104 Valence overlay - rear - (2)
105 Buffer beam - front
106 Valence to buffer beam bracket - front - (2)
107 Buffer beam - rear
108 Valence to buffer beam bracket - rear - (2)
109 Rear step - upper/centre - (4)
110 Rear step - lower - (2)
111 Front step - (2)
112 Splasher top - (2)
113 Rocking shaft bracket web - (2)
114 Motion bracket/boiler support

COMPONENT DESCRIPTION - 0.012" BRASS (cont'd)

115 Motion bracket/boiler support overlay
116 Motion bracket/boiler support top angle section - (2)
117 Smokebox saddle - front/back - (2)
118 Smokebox saddle - sides - (2)
119 Front sanding rod
120 Rear sanding rod
121 Steam pipe valve handle - (2)
122 Coupling - (2)
123 Tank former
124 Tank/cab side/bunker overlay - (2)
125 Tank top overlay - (2)
126 Tank top beading - (2)
127 Tank lower rivet strip - (2)
128 Tank connecting strap
129 Water filler bumper bracket - (2)
130 Lifting ring eyelet - (4)
131 Lifting ring bracket - (4)
132 Fire iron bracket
133 Tank - front step - original type - (2)
134 Tank front (later type)/bunker step - (6)
135 Bunker lower step - long
136 Cabside cutout beading - (2)
137 Cab side shutter - (2)
138 Cab side shutter - rivet strip - (2)
139 Cab floor
140 Tank side - inside cab - (2)
141 Tank top - inside cab - (2)
142 Brake column bracket - (2)
143 Cab door - (2)
144 Bunker former
145 Bunker - rear former
146 Bunker - lower rear section
147 Bunker - upper rear section
148 Coal door
149 Water feed valve bracket - (2)
150 Bunker lamp iron guard

COMPONENT DESCRIPTION - 0.012" BRASS (cont'd)

151 Bunker lamp iron guard bracket - centre
152 Bunker lamp iron guard bracket - sides - (2)
153 Bunker vent pipe brackets
154 Bunker top beading
155 Bunker lower rivet strip - (2)
156 Cab front
157 Cab front window frame - (2)
158 Cab rear - inner overlay
159 Cab rear - outer overlay - etched bars
160 Cab rear - outer overlay - wire bars
161 Cab window bars bending jig
162 Cab rear shelf
163 Cab roof
164 Cab roof building jig
165 Cab roof - front/rear edge angle - (2)
166 Cab roof - rainstrip - (2)
167 Cab roof ventilator
168 Lamp bracket - smokebox/bunker top/spare - (4)
169 Lamp bracket - bunker bottom - (3)
170 Lamp bracket - smokebox door
171 Firebox wrapper
172 Firebox bands joining bracket - (2)
173 Whistle bracket
174 Whistle shield
175 Coned boiler wrapper
176 Boiler washout plug - (4)
177 Smokebox/parallel boiler section wrapper
178 Smokebox/parallel boiler section joining strip
179 Step - smokebox
180 Cab seat bracket - (2)
181 Cab seat - (2)
182 Backhead shelf
183 Cab pressure gauges - (3)
184 Gauge glass lever
185 Steam fountain/blower handles - (4)
186 Ejector/brake handle

WHITEMETAL CASTINGS

W1 Safety valve base
W2 Safety valve springs - (2)
W3 Step - front drop plate - (2)
W4 Pony truck spring cover
W5 Valve rocker shaft housing - (2)
W6 Vacuum pump lubricator
W7 Rear sandbox - left
W8 Rear sandbox - right
W9 Front sandbox lid - (2)
W10 Lubricator - axle journal - (2)
W11 Lubricator - pony truck
W12 Outside steam pipe - (2)
W13 Outside steam pipe base - (2)
W14 Tank balance pipe - (2)
W15 Toolbox - left
W16 Toolbox - right
W17 Smokebox door
W18 Smokebox saddle bolt strip - (2)
W19 Smokebox pipe cover
W20 Steam lance cock
W21 ATC shoe - pony truck mounted
W22 ATC shoe - bufferbeam mounted
W23 Snifting valve - (2)
W24 Lever reverse base
W25 Lever reverse handle
W26 ATC bell
W27 ATC battery box
W28 Tank water level gauge
W29 Backhead
W30 Water gauge
W31 Ejector/brake
W32 Regulator handle
W33 W33.Firebox door handle
W34 Sight feed lubricator
W35 Steam heating valve

BRASS CASTINGS

B1 Safety valve casing
B2 Smokebox door handles
B3 Vacuum pipe - front
B4 Vacuum pipe - rear
B5 Steam heating pipe - (2)
B6 Injector - (2)
B7 Cylinder drain cock - short - (4)
B8 Cylinder drain cock - long - (2)
B9 Vacuum pump
B10 Whistle - large
B11 Whistle - small
B12 Water filler - screw type - (2)
B13 Water filler - lever type - (2)
B14 Water filler buffer - (2)
B15 Tank vent - (2)
B16 Brake column
B17 Water feed valve handles - (2)

COPPER CASTINGS

C1 Chimney

OTHER COMPONENTS FOR CHASSIS

1/8" Flexichas bearing - (6)
2mm top hat bearing - (4)
10 BA clearance top hat bearing
10 BA screw - (4)
10 BA nut - (3)
Nickel silver wire – 1.0mm - for coupling rod fork joints
Steel wire - 0.8mm - for front compensation beam and piston rods
Brass wire - 1/16" - for compensation beam pivots
Brass tube - 3/32" outside diameter for compensation beams
Brass tube - 1/16" outside diameter for piston tube
Brass tube - 3/16" outside diameter for valve chests
Brass wire - 0.45mm - for brake hanger pivots, sand pipes & pony truck
Brass wire - 0.7mm - for oil cups & crosshead pins
Brass wire - 0.9mm - for brake shaft
Spring wire for pony truck & radial truck side control

COMPONENTS NOT PROVIDED

Wheels + crankpins
(prototype - 5' 8” - 18 spokes, 15” throw, pin between spokes)
- Ultrascale
- Alan Gibson
- Markits

Pony truck wheels (1 pair)
(prototype -3' 2" diameter 10 spoke)
- Ultrascale
- Alan Gibson
- Markits

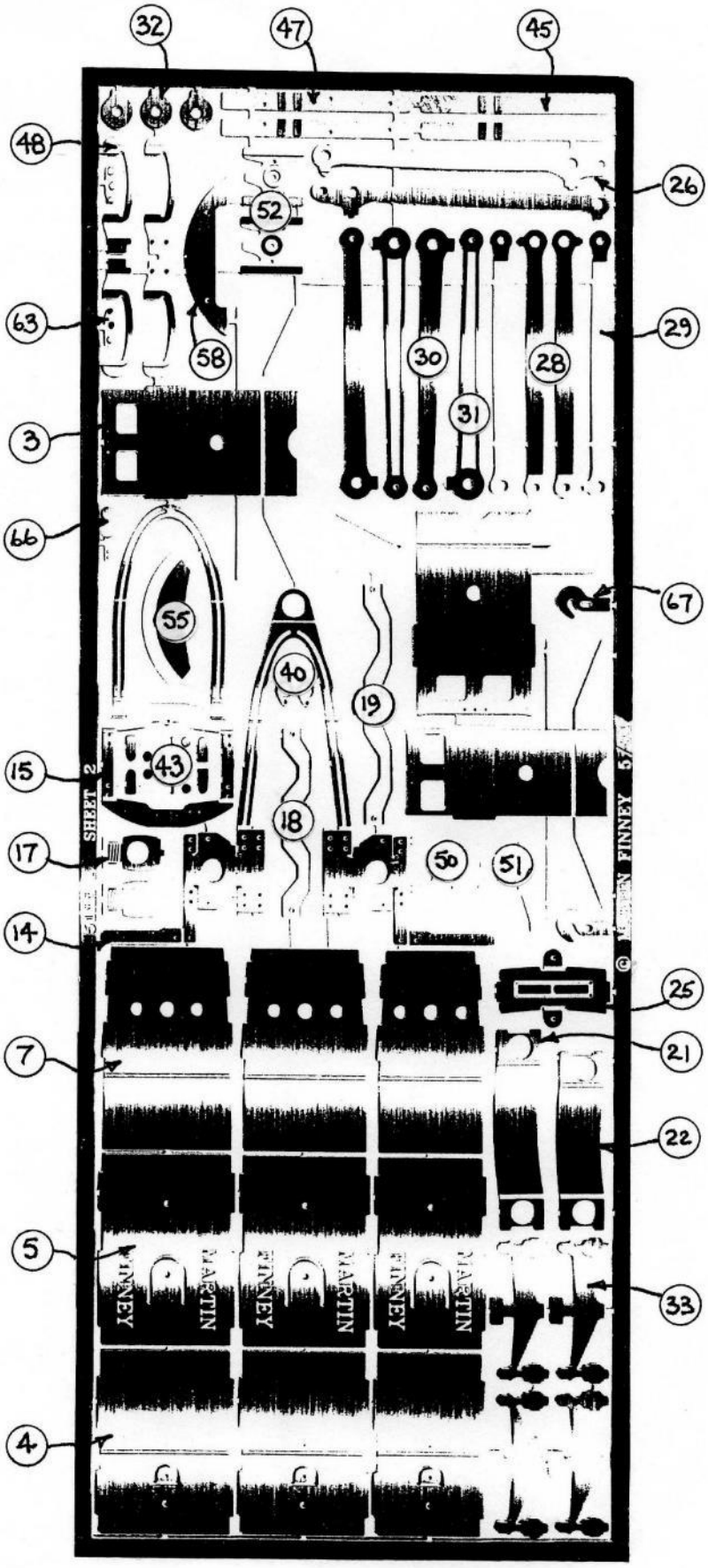
Trailing truck wheels (1 pair)
(prototype -3' 7" diameter 10 spoke)
- Ultrascale
- Alan Gibson
- Markits

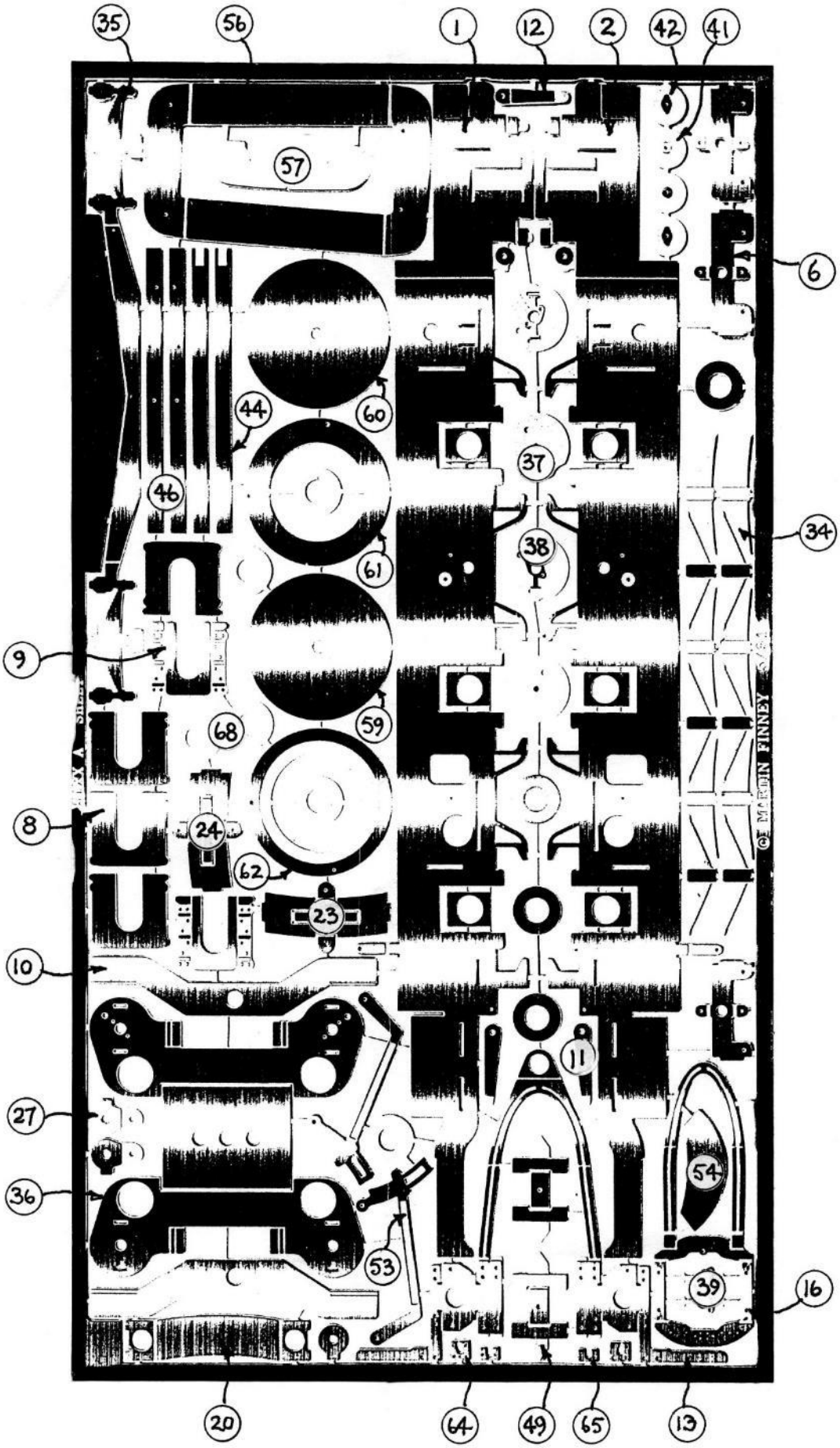
Motor and gearbox
- Hi-Level
- Branchlines
- Portescap 1616 (available second hand only)

Suitable pickups

OTHER COMPONENTS FOR BODY

Buffer housing, head and spring - (4)
Brass wire – 0.45mm - for handrails
Brass wire – 0.3mm - for handrails & ATC conduit
Brass wire - 0.7mm - for front struts
Brass wire - 0.8mm - for top feed pipes & bunker tank vent
Handrail knob - short - (14)
Handrail knob - medium - (5)
Mudhole doors - (4)


32
47
45
48
26
52
63
58
30
28
29
31
3
66
67
55
40
19
15
43
18
17
50
51
14
25
21
7
22
5
33
4
SHEET 2
FINNEY
MARTIN


35
56
1
12
2
42
41
57
6
44
60
37
46
34
38
61
9
68
59
8
24
62
23
10
11
27
54
36
53
39
16
20
64
49
65
13
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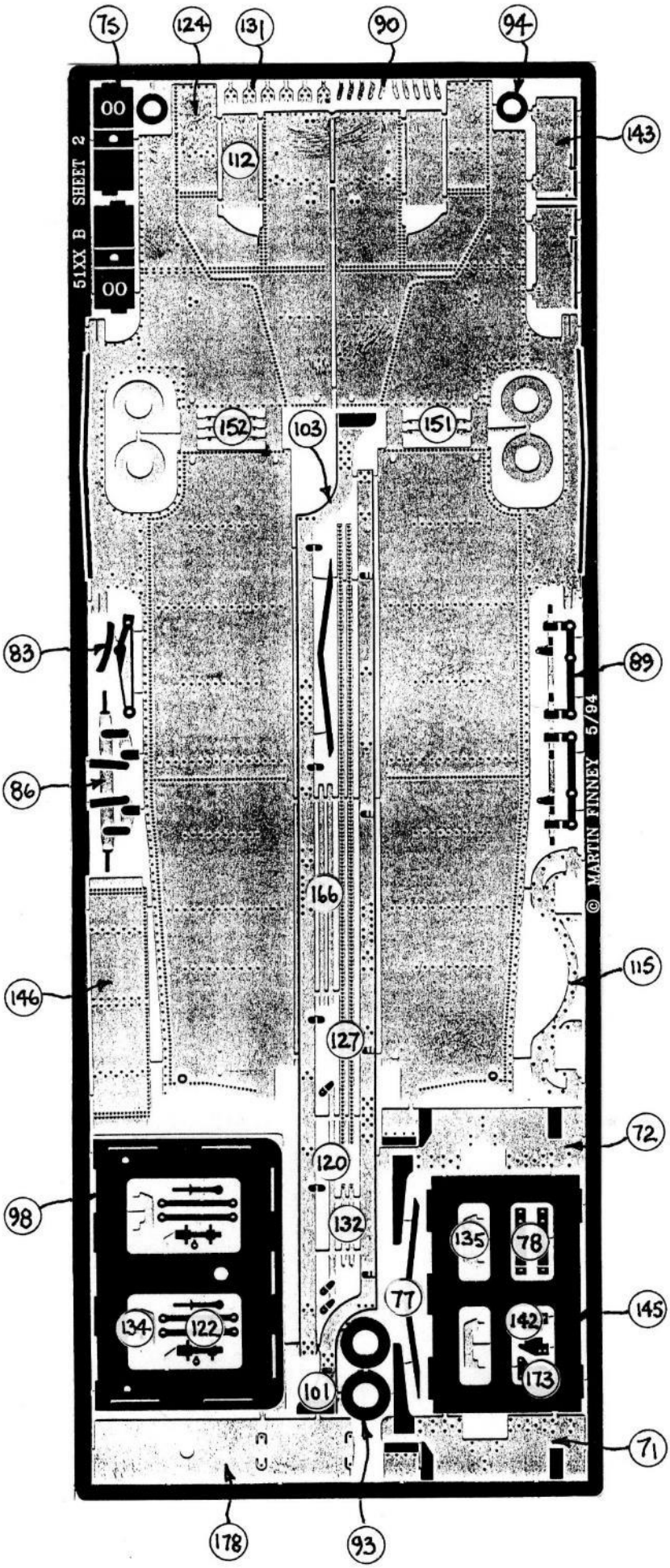
75
124
131
90
94
143
112
51XX B SHEET 2
00
00
152
103
151
83
89
86
166
146
115
127
72
120
98
132
135
78
77
145
134
122
142
173
101
71
178
93
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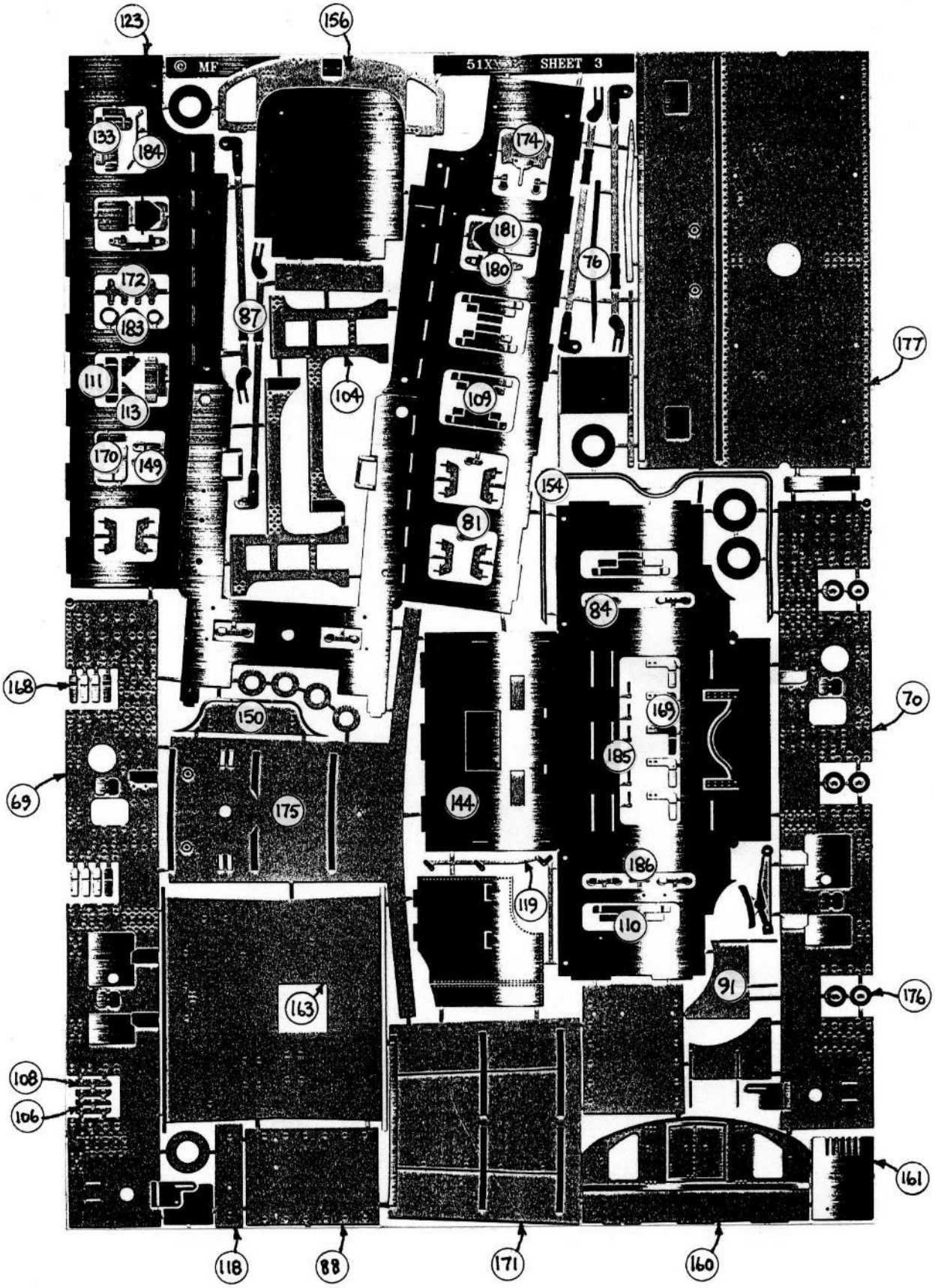
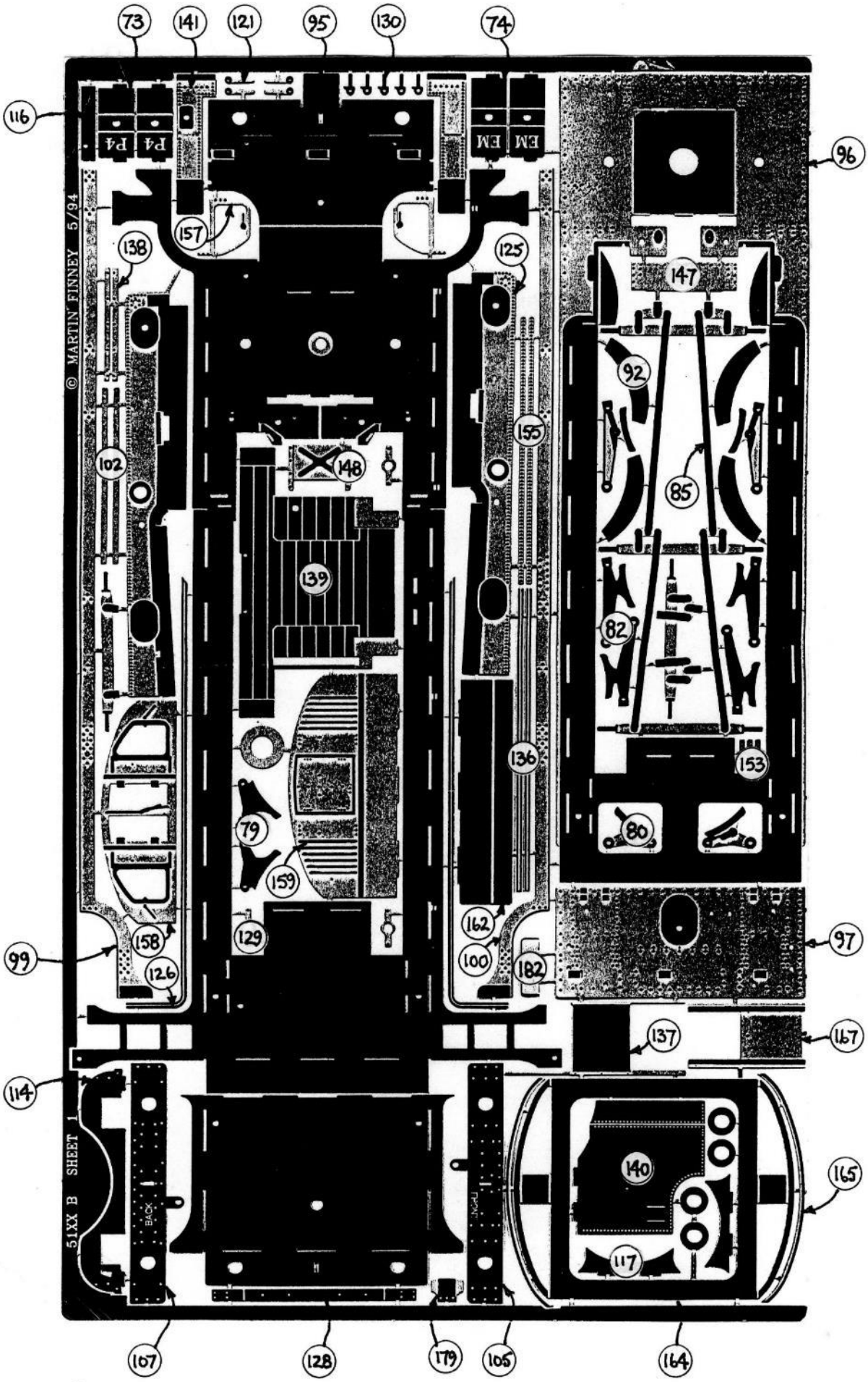

© MF
51X SHEET 3
123
156
133
184
174
181
180
76
172
183
87
177
111
113
104
109
170
149
154
81
84
168
150
169
70
185
69
175
144
186
119
110
91
176
163
108
106
161
118
88
171
160


73
141
121
95
130
74
116
96
157
138
125
147
92
155
102
148
85
139
82
136
153
79
80
159
162
97
158
99
100
182
126
137
167
114
140
165
117
107
128
179
105
164
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51XX B SHEET 1
P4
P4
EM
EM
BACK
FRONT

FIG. 1

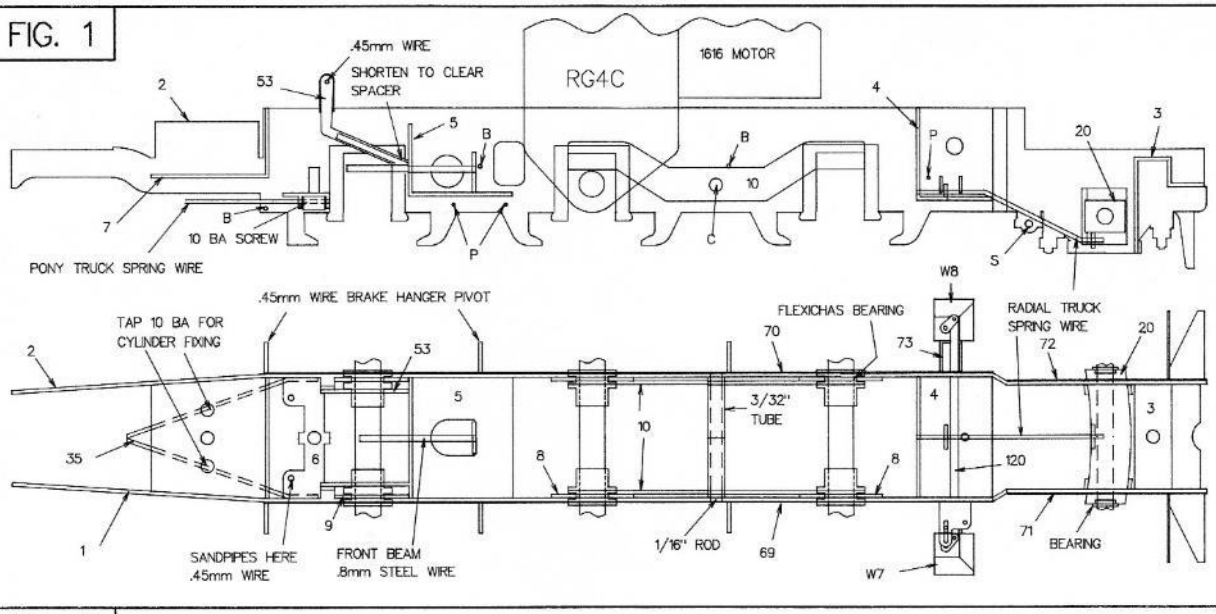
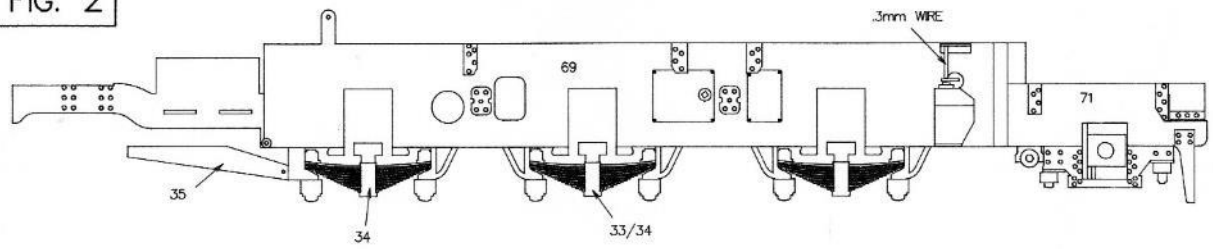

.45mm WIRE
SHORTEN TO CLEAR SPACER
RG4C
1616 MOTOR
PONY TRUCK SPRING WIRE
10 BA SCREW
.45mm WIRE BRAKE HANGER PIVOT
TAP 10 BA FOR CYLINDER FIXING
FLEXICHAS BEARING
RADIAL TRUCK SPRING WIRE
3/32" TUBE
SANDPIPES HERE .45mm WIRE
FRONT BEAM .8mm STEEL WIRE
1/16" ROD
BEARING

FIG. 2


.3mm WIRE

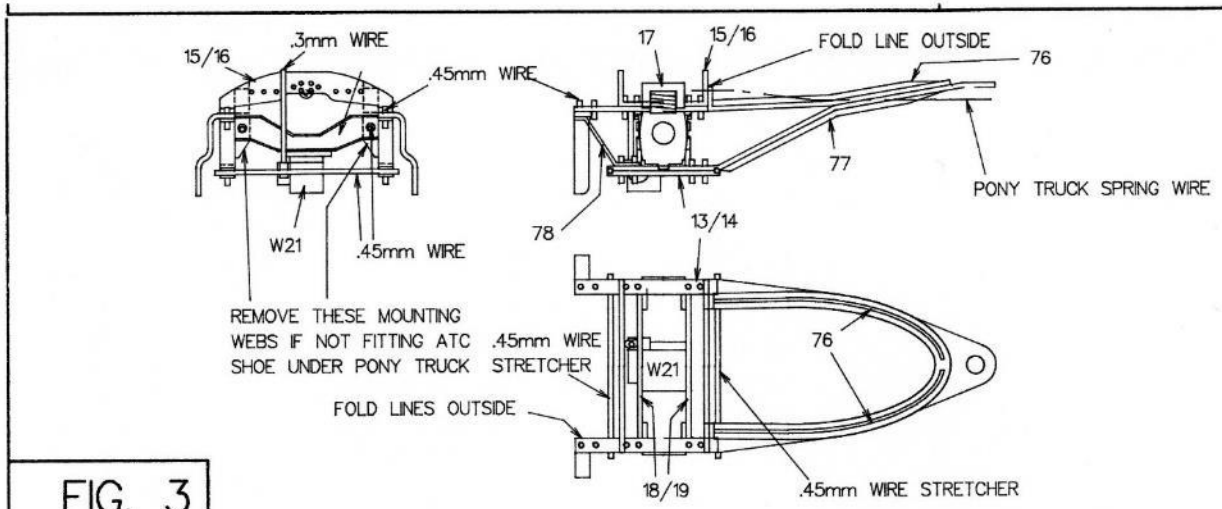
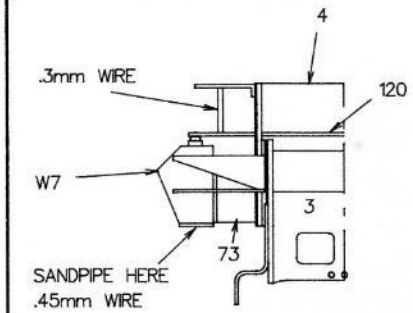


FIG. 3



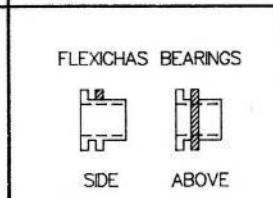


FIG. 1A

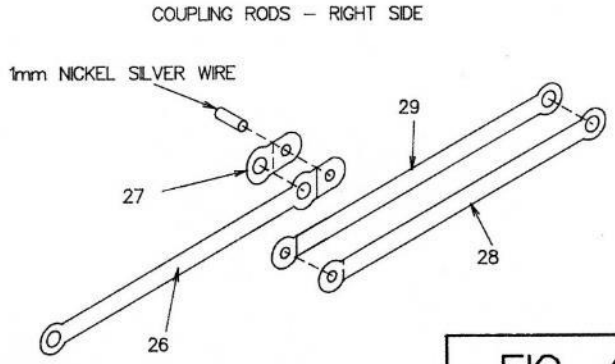


FIG. 4

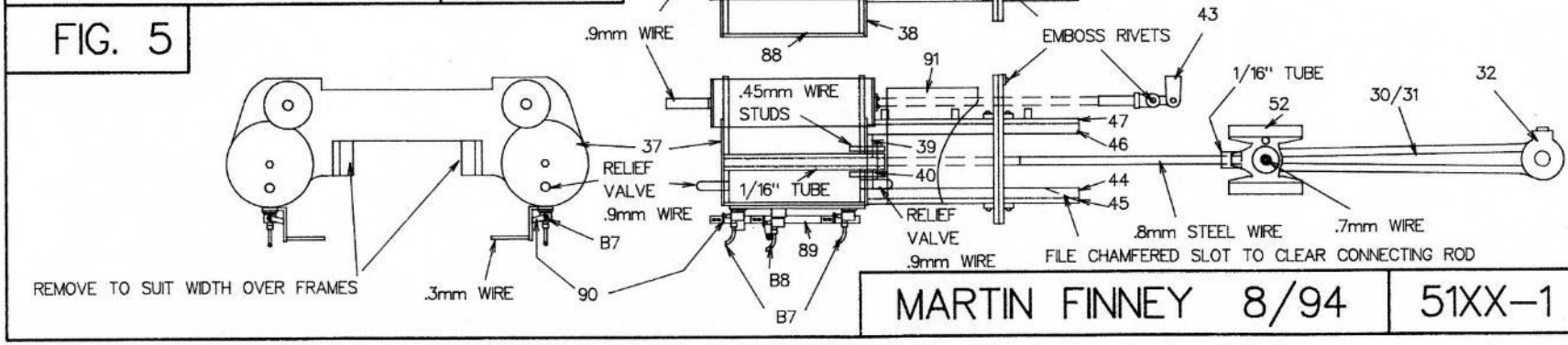


FIG. 5

MARTIN FINNEY 8/94 | 51XX–1

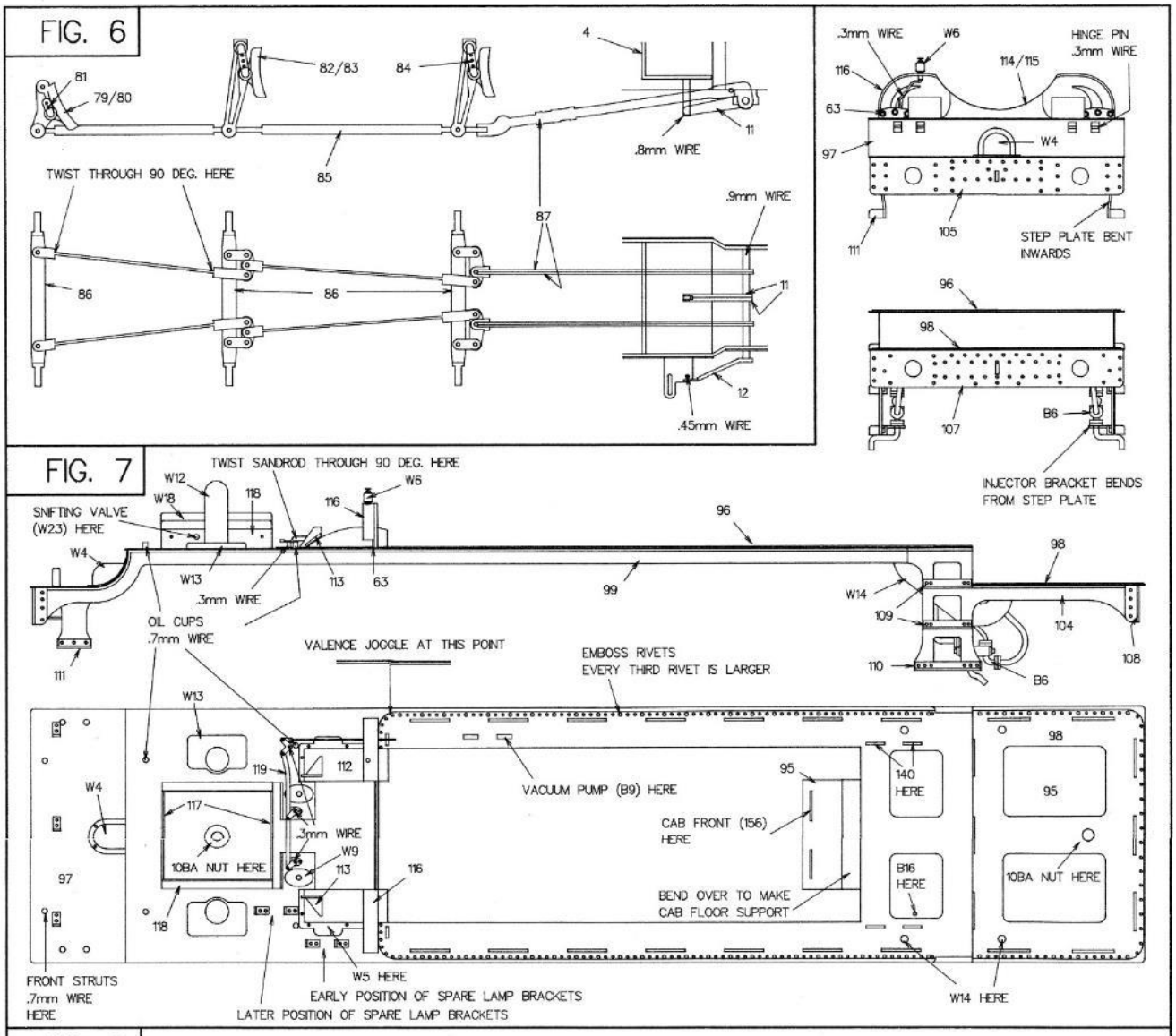


FIG. 6
81
79/80
82/83
84
4
11
.8mm WIRE
85
TWIST THROUGH 90 DEG. HERE
87
.9mm WIRE
86
86
11
12
.45mm WIRE
.3mm WIRE
W6
HINGE PIN
.3mm WIRE
116
114/115
63
97
W4
105
111
STEP PLATE BENT
INWARDS
96
98
107
B6
INJECTOR BRACKET BENDS
FROM STEP PLATE
FIG. 7
TWIST SANDROD THROUGH 90 DEG. HERE
W12
W18
118
W6
116
SNIFTING VALVE
(W23) HERE
W4
W13
.3mm WIRE
113
63
96
99
98
W14
109
104
108
110
B6
111
OIL CUPS
.7mm WIRE
VALENCE JOGGLE AT THIS POINT
EMBOSS RIVETS
EVERY THIRD RIVET IS LARGER
W13
119
112
95
140
HERE
98
95
W4
VACUUM PUMP (B9) HERE
117
.3mm WIRE
W9
CAB FRONT (156)
HERE
10BA NUT HERE
97
113
116
B16
HERE
10BA NUT HERE
BEND OVER TO MAKE
CAB FLOOR SUPPORT
118
FRONT STRUTS
.7mm WIRE
HERE
W5 HERE
EARLY POSITION OF SPARE LAMP BRACKETS
LATER POSITION OF SPARE LAMP BRACKETS
W14 HERE
FIG. 8
156
B13
130
W10
B15
171
132
141
POSITION OF HANDRAIL
WITHOUT SHUTTERS
POSITION OF HANDRAL
WITH SHUTTERS
175
123
141
142
W27
140
FILL IN WITH SCRAP BRASS
FOLD UNDER TABS TO FORM
CAB FLOOR SUPPORTS
157
WIRE DOWELS TO
ALIGN FIREBOX
WITH CAB FRONT
142
W24
156
FOLD OUT SMALL TABS
TO ALIGN PART W24
B14
129
B15
141
W24
139
125
175
W1 HERE
171
128
W10
ON INSIDE
125
131
130
TOP FEED PIPES
.8mm WIRE
DOWN THIS HOLE
132
142
W28 HERE
B16 HERE
WATER FILLER BUFFER ONLY
FITTED WITH SCREW TYPE FILLER
PART B12
EXTRA HANDRAILS ON
TANK STRAP ADDED
FROM CIRCA 1945
.3mm WIRE
132
123
SAND ROD PASSES THROUGH THIS HOLE
MARTIN FINNEY 8/94
51XX-2

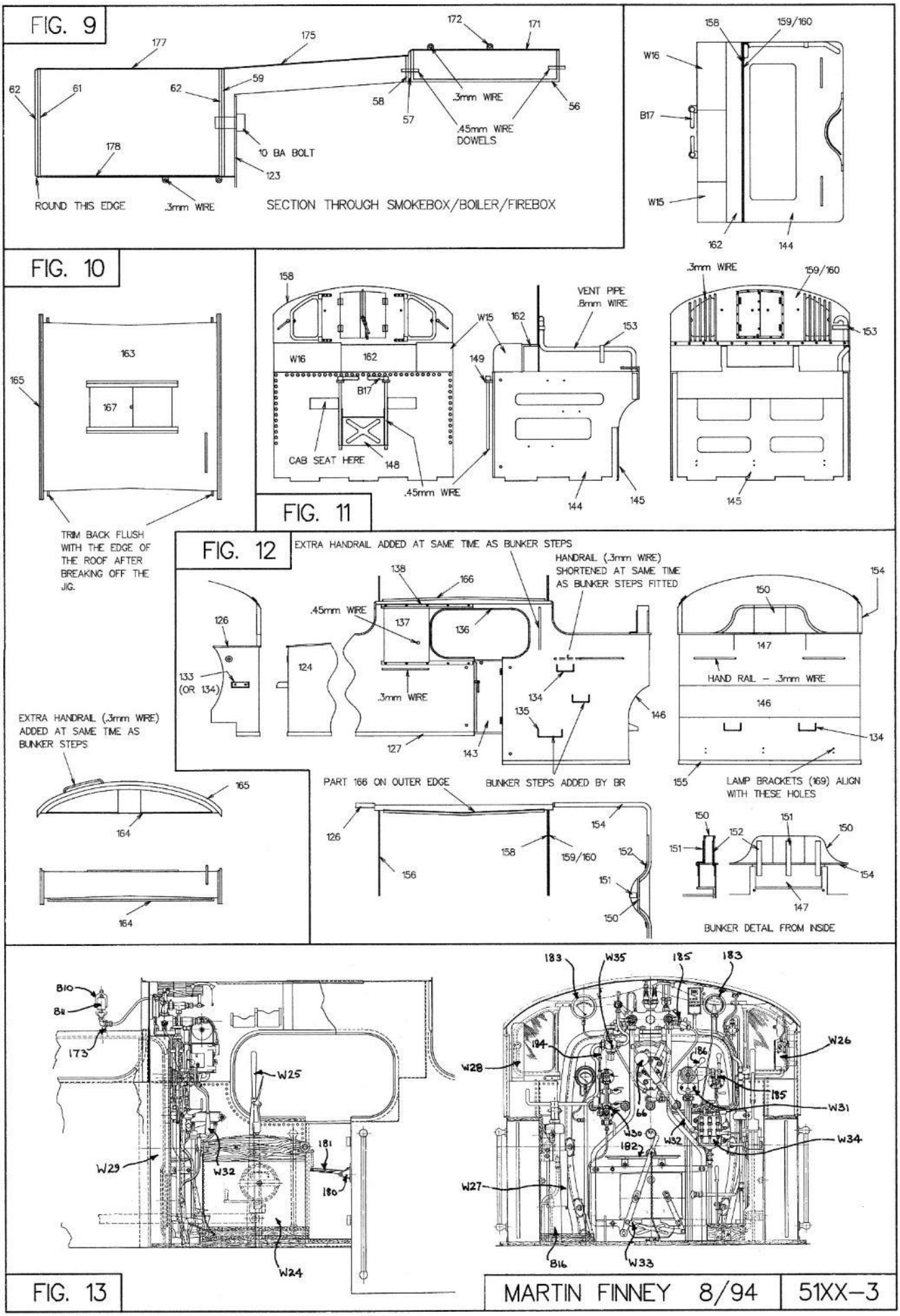
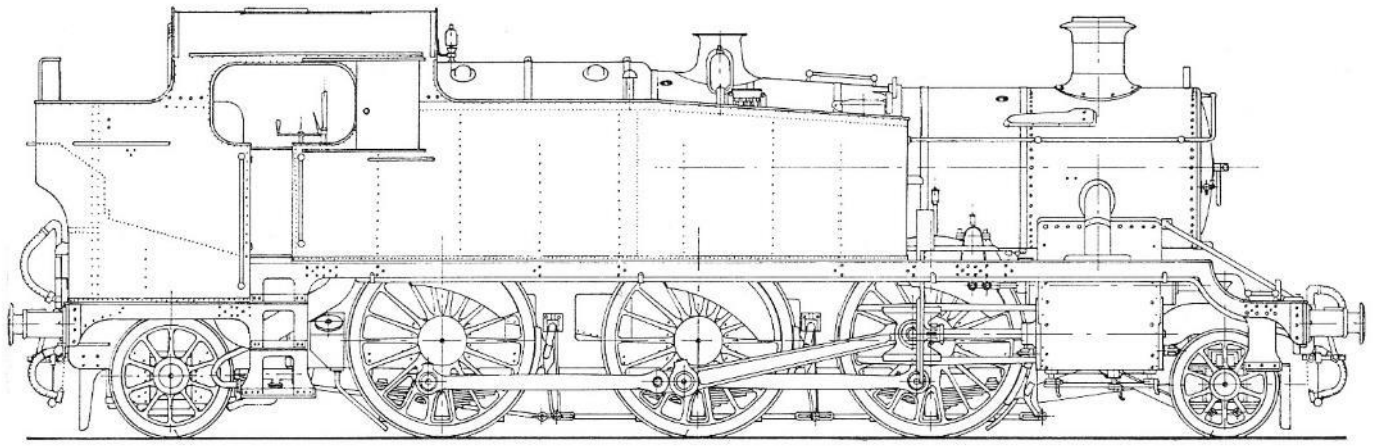
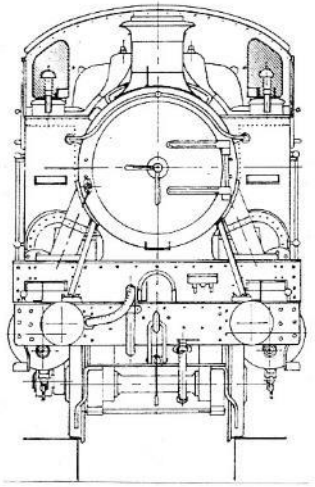
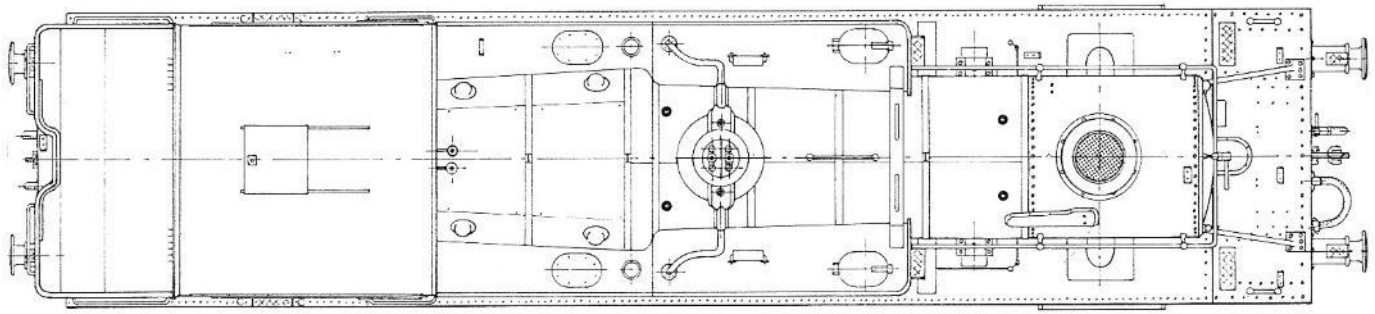


FIG. 9
177
175
172
171
62
61
62
59
58
57
56
.3mm WIRE
.45mm WIRE DOWELS
10 BA BOLT
178
123
ROUND THIS EDGE
.3mm WIRE
SECTION THROUGH SMOKEBOX/BOILER/FIREBOX
158
159/160
W16
B17
W15
162
144
FIG. 10
163
165
167
TRIM BACK FLUSH WITH THE EDGE OF THE ROOF AFTER BREAKING OFF THE JIG.
158
W16
162
B17
W15
162
VENT PIPE .8mm WIRE
153
149
CAB SEAT HERE
148
.45mm WIRE
144
145
FIG. 11
.3mm WIRE
159/160
153
145
FIG. 12
EXTRA HANDRAIL ADDED AT SAME TIME AS BUNKER STEPS
HANDRAIL (.3mm WIRE) SHORTENED AT SAME TIME AS BUNKER STEPS FITTED
126
133 (OR 134)
124
138
166
.45mm WIRE
137
136
.3mm WIRE
134
135
146
127
143
154
150
147
HAND RAIL – .3mm WIRE
146
134
155
LAMP BRACKETS (169) ALIGN WITH THESE HOLES
EXTRA HANDRAIL (.3mm WIRE) ADDED AT SAME TIME AS BUNKER STEPS
165
164
164
PART 166 ON OUTER EDGE
BUNKER STEPS ADDED BY BR
126
156
158
154
159/160
152
151
150
150
151
152
151
150
154
147
BUNKER DETAIL FROM INSIDE
810
84
173
W25
W29
W32
181
180
W24
183
W35
185
183
184
W28
W26
186
185
W31
66
W30
W32
182
W34
W27
816
W33
FIG. 13
MARTIN FINNEY 8/94
51XX–3







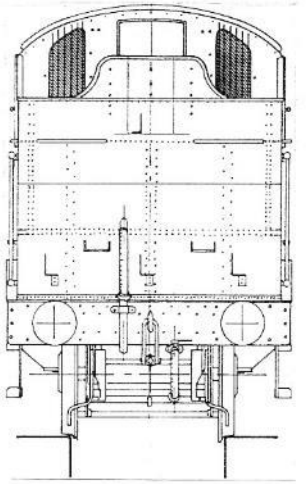


FIG. 14

MARTIN FINNEY 8/94 | 51XX–4