INSIDE MOTION KIT - TYPE D - 2251 Class - Collett Type

Making the crank axle

First ream out the holes in both the cranks and the eccentrics so that they are a tight fit on the axle. Then carefully open out the small holes in the eccentrics, preferably with a small taper broach, so that the 0.45mm wire is a force fit in the holes.

Check the fit of the eccentric sheaths (part 113) on the eccentrics. Cut a small notch to fit the 0.45mm wire in the web of the cranks.

The crank and eccentrics can now be pinned together with a short piece of 0.45mm wire.

The cranks and eccentrics together with the eccentric sheaths are now force fitted on the axle with the cranks set apart by a distance which corresponds to the cylinder holes in part 120 (8.25mm) and with the right side crank leading by 90°. The correct spacing is achieved by using the spacing washer, part 131.

When you are satisfied with the setting of all the components carefully silver solder the cranks and eccentrics to the axle. The eccentric sheaths must of course remain free. Now very carefully remove the axle between the crank webs. A carborundum disc in a mini drill works well and allows very gentle pressure to be used. I suggest you don't use a hacksaw!

The axle bearings will need to be filed back so that there is clearance for the cranks with a little side play on the axle.

Cylinders

Parts 120 & 126 have a half etched line running down two edges. File back to the half-etched line if you are modelling in EM gauge. Bend the slide bars at right angles and fit to the cylinder block front (part 120) so that the valve rod holes align and the slide bars with the half-etched dimple is upwards.

Fit lengths of 1/16" outside diameter brass tube for the cylinders so that they are perpendicular to the cylinder front and protrude by 1mm. Detail the cylinder fronts by attaching piston rod glands (parts 127 & 128) and valve rod glands (part 125) using 0.45mm wire to help alignment and represent the bolts.

Modify the mounting bracket (part 121) as in Fig.3 and fix in place so that the tab fits in the slot in part 126 and the cylinders will be inclined at the correct angle -use the drawing as a guide. Tap the small hole in frame spacer (part 5) 10 BA. Check fit of assembly between frames attaching it with the 10 BA screw.

Crossheads and connecting rods.

Modify the crosshead faces as in Fig.2. Bend the crosshead slipper (part 130) as per Fig.1 and solder the crosshead faces (part 129) in place on the small tabs. The completed crosshead should now be a nice close fit on the slidebars with minimal slop. Repeat for the other crosshead.

Cut the steel piston rod wire in half. Solder a 1mm length of the cylinder tube to the end of each piece of wire. Insert the piston rod into the cylinder and push it half way in, slide on the crosshead and insert the piece of tubing on the rod between the small projections at the front of the crosshead. Carefully solder the rod to the crosshead and check the assembly for free but not sloppy movement.

Solder part 112 to the outside face of the small end of each connecting rod. Solder the rods together after first fitting them over the cranks. Attach the connecting rods to the crossheads using 0.7mm wire as pins.

Now fit the crank axle and cylinder assembly and check that everything works with no binding.

Motion bracket and valve gear

Emboss the rivets on the motion bracket laminations (parts 122 & 123) and solder them together. Bend the valve rods (part 119) through 180° along the half-etched lines, with the line on the outside and solder solid. Remove the half etched fold and file into a clean, square section. Solder lengths of 0.7mm wire onto the half-etched front (see

Fig.4) for the extension of the valve rods, then check their fit in the rectangular hole in the motion bracket. Aim to get a close fit by either opening out the hole slightly or filing the edges of the rods or both.

Emboss the rivets in part 124, fold up and attach to the motion bracket as shown in the diagram. Accurate positioning is essential to avoid fouling the valve rods. Fit the motion bracket into the half etched grooves in the slide bars. Before soldering in position check the crosshead clearance. Solder short lengths of 0.7mm. wire into the dimple on each slidebar to represent the oil cups.

Rivet the eccentric sheaths, expansion links (part 118) and valve rods together paying particular attention to the direction of the rivets - see diagram. Make the right side a mirror image of the left. Thread the crank axle assembly into the cylinders and check that everything works.

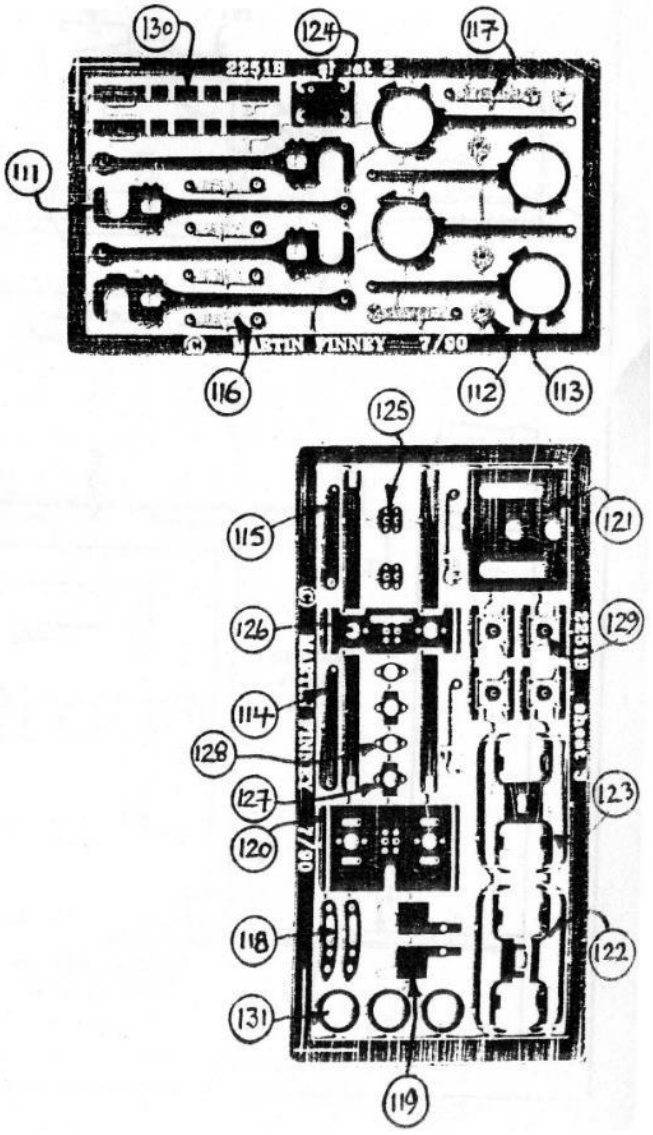
Finally using the diagrams assemble and fix the reversing mechanism and attach the lubricator casting. The reversing arms (part 116) are laminated back to back.

ETCHED COMPONENTS - .020" nickel silver

111 Connecting rod - (4)
112 Connecting rod small end washer - (4)
113 Eccentric sheath - (4)
114 Reversing lever - lever reverse
115 Reversing lever - screw reverse
116 Reversing arm - (4)
117 Lifting link - (4)
118 Expansion link - (2)
119 Valve rod - (2)
120 Cylinder block front
121 Cylinder block mounting bracket
122 Motion bracket - front lamination
123 Motion bracket - rear lamination
124 Valve rod guide box
125 Valve rod gland - (2)
126 Slide bar assembly
127 Piston rod gland inner overlay - (2)
128 Piston rod gland outer overlay - (2)
129 Crosshead face - (4)
130 Crosshead slipper assembly - (2)
131 Washer - to space out the eccentrics - (3)

OTHER COMPONENTS

1/16" outside diameter brass tube for cylinders
Steel wire - 0.8mm - for piston rods
Rivets - (6)
Brass wire - 0.7mm - for crosshead pins and lifting links
Brass wire - 0.45mm - for pinning eccentrics to cranks
10 BA screw
Brass wire – 0.9mm - for reversing cross shaft
Cast manganese bronze cranks - (2)
Brass eccentrics - (4)
Lubricator casting



GWR 2251 CLASS 0-6-0
INSIDE MOTION
MARTIN FINNEY 20-9-90

FIG 1. CROSSHEAD SLIPPER

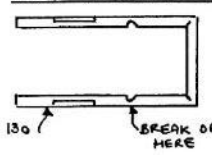


FIG 2. MODIFICATION TO CROSSHEAD FACE.

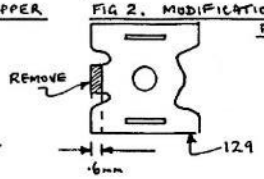
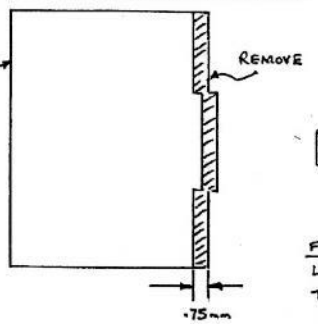


FIG 3. MODIFICATION TO PART 121



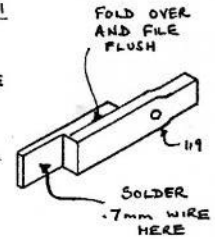
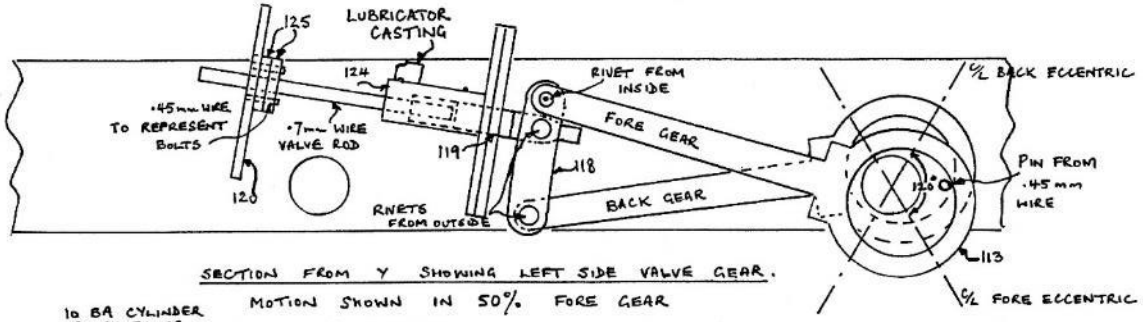
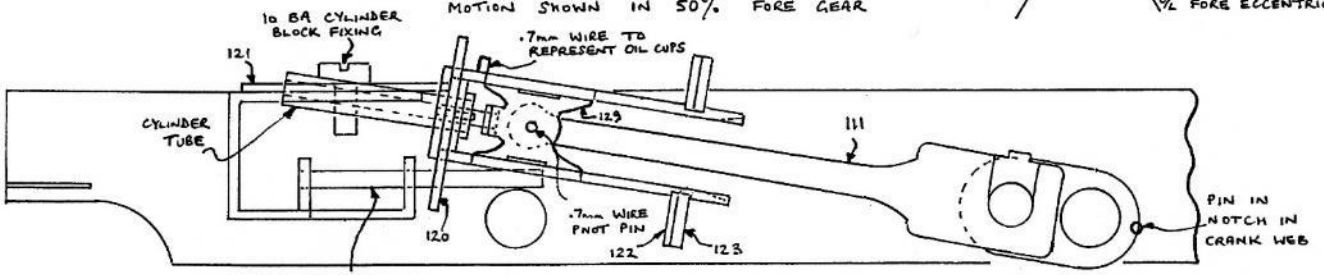


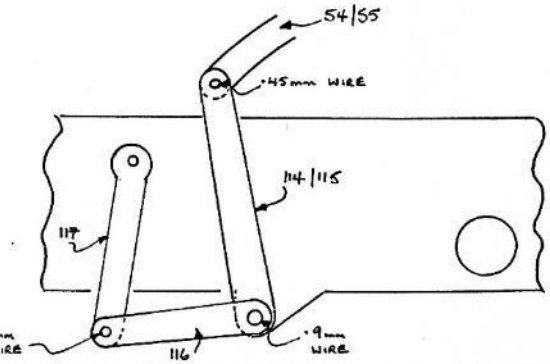
FIG 4. VALVE ROD LEFT SIDE FROM THE FRONT



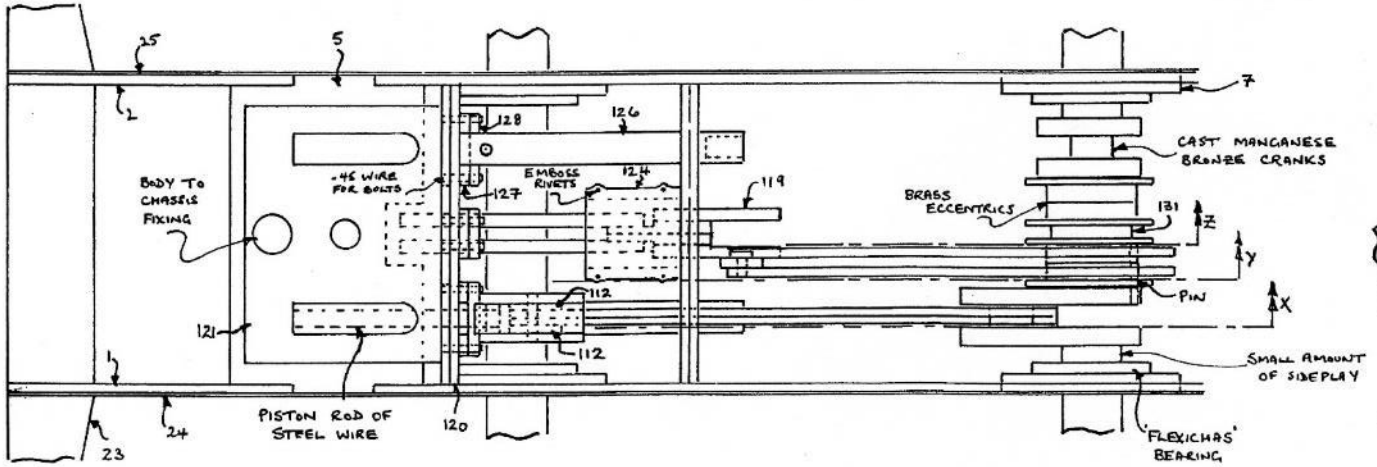
SECTION FROM Y SHOWING LEFT SIDE VALVE GEAR.
MOTION SHOWN IN 50% FORE GEAR

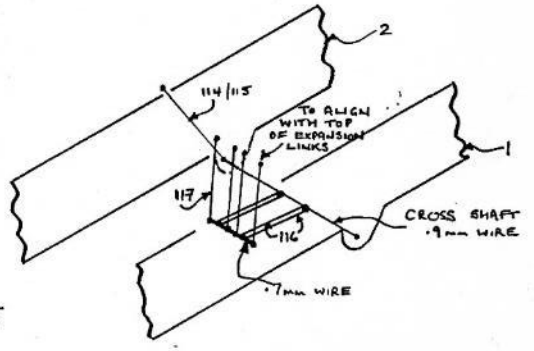


SECTION FROM X SHOWING LEFT SIDE MOTION.



SECTION FROM Z SHOWING REVERSING MECHANISM.





SCHEMATIC DRAWING SHOWING THE ARRANGEMENT OF THE REVERSING MECHANISM.