

## INSIDE MOTION KIT - TYPE A – 3232 2-4-0

### 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 on the eccentrics. The fit is improved if the eccentrics are reduced in thickness. This can be achieved by rubbing the eccentrics on a sheet of emery paper.

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 124 and with the right side crank leading by 90°. The correct spacing is achieved by using 2 of 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**.

So 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 probably need to be filled back so that there is clearance for the cranks with a little side play on the axle.

### Cylinders

Parts 124, 125 and 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 (part 124) so that the valve rod holes align and the slide bars with the three half-etched dimples are upwards. Now bend the cylinder block into a 'V'-shape with the half-etched lines on the inside of the folds.

Fit lengths of 1/16" outside diameter brass tube for the cylinders through the holes in the front and back of the cylinder block so that they are flush with the back and protrude by 1½ mm at the front.

Detail the cylinder fronts by attaching cylinder covers (part 130) and piston rod glands (part 129) using 0.45mm wire to represent the studs.

Tap the small hole in the cylinder block 10 BA. Check fit of assembly between frames attaching it with the 10 BA screw.

### Crossheads and connecting rods

Lay a crosshead face (part 127) face down on a piece of balsa wood or similar and push the spike of a slide shoe (part 128) through the slots provided, have the half-etched surface of the spike facing toward the centre of the crosshead, Insert the other slide and check they are parallel and the correct distance apart using the slide bar as a gauge. You should aim for a nice close fit with minimal slop. When satisfied, flow solder well into the slots so that they cannot be seen after the spikes have been snapped off and the joint cleaned up. Repeat for the other crosshead face.

Cut the steel piston rod wire in half. Solder a 2mm 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**.

Form the joggle in the connecting rods (part 117) with the fold lines inside so that a pair of rods back to back will clear the crosshead. Solder the rods together after first fitting them over the cranks. Attach the connecting rods to the crossheads using .7mm wire as pins.

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

### Motion bracket and valve gear

Splice a piece of 0.7mm wire to extend the valve rods and form the joggle as shown in the diagram. The joggle **must be close to the end of the rod**.

Open out the small rectangular holes in the motion bracket (part 125) to the shape show in the diagram so that the valve rods will pass through, Fold up part 132 and attach to the motion bracket fitting the small tab in the half-etched groove in the motion bracket. Attach the lubricator casting to the top of part 132.

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 dimples in the slidebars to represent the oil cups.

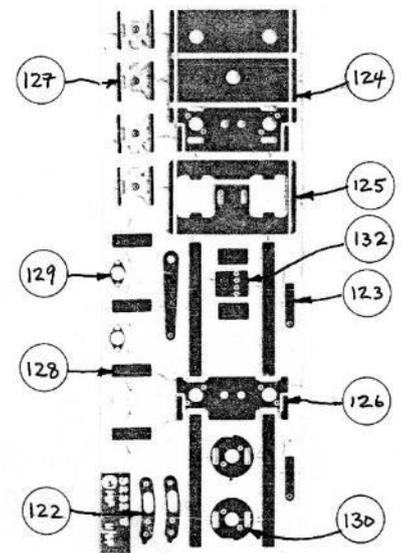
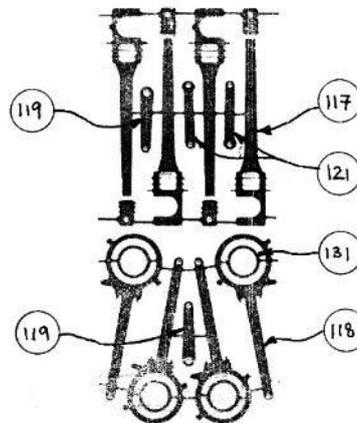
Rivet the eccentric sheaths, expansion links (part 122) and valve rods together, paying particular attention to the direction of the rivets - see diagram. Make the right side a mirror image of the left.

Thread, the crank axle assembly into the cylinders and check that everything works. Success? Relax and enjoy the motion!

Finally, using the diagrams, assemble and fix the reversing mechanism. The two remaining rivets are used to attach part 119 to part 120.

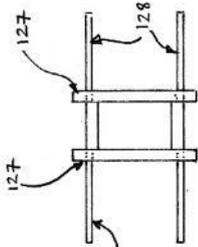
### ETCHED COMPONENTS - 0.018 nickel silver

- 118 Eccentric sheath - (4)
- 119 Lever - Reversing lever to cross shaft
- 120 Lever - Cross shaft to part 121 - (2)
- 121 Lifting link - Expansion link to part 120 - (2)
- 122 Expansion link - (2)
- 123 Valve rod - (2)
- 124 Cylinder block
- 125 Motion bracket
- 126 Slide bar assembly
- 127 Crosshead face - (4)
- 128 Crosshead slide shoe ~ (4)
- 129 Piston rod gland - (2)
- 130 Cylinder cover - (2)
- 131 Washer - to space out the eccentrics - (4)
- 132 Valve rod 'box'



### OTHER COMPONENTS

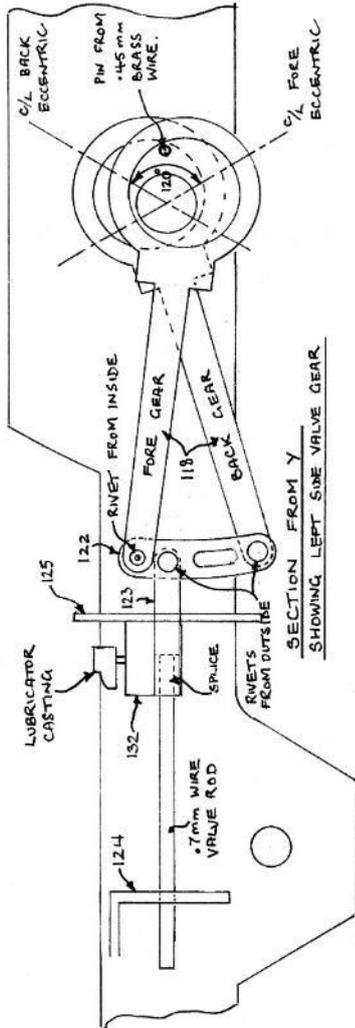
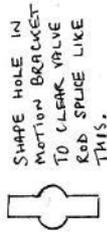
- 1/16" outside diameter brass tube for cylinders
- Steel wire - .8mm - for piston rods
- Rivets - (8)
- Brass wire - 0.7mm - for crosshead pins and lifting links
- Brass wire - 0.45mm - for pinning eccentrics to cranks
- 10 BA CH screw
- Brass wire - 0.9mm - for reversing cross shaft
- Cast manganese bronze cranks - (2)
- Brass eccentrics - (4)
- Lubricator casting



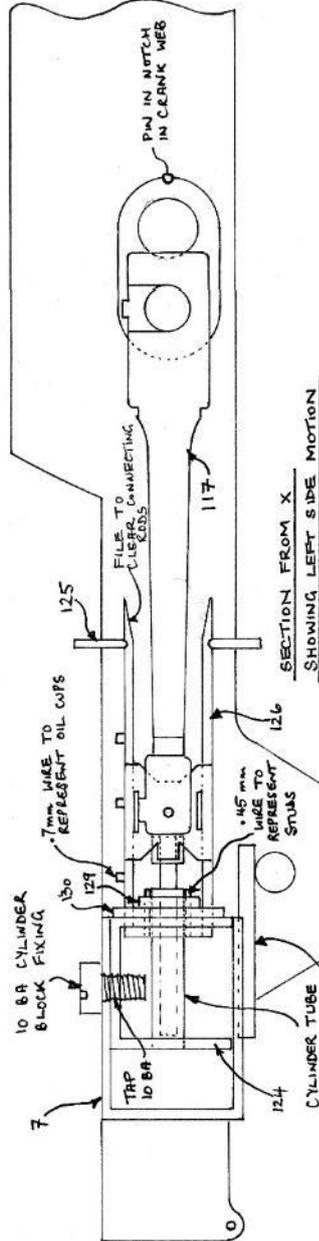
MOTION SHOWN IN 50% FARE GEAR

BREAK OFF SPIKES WHEN CROSS HEAD SOLDERED TOGETHER

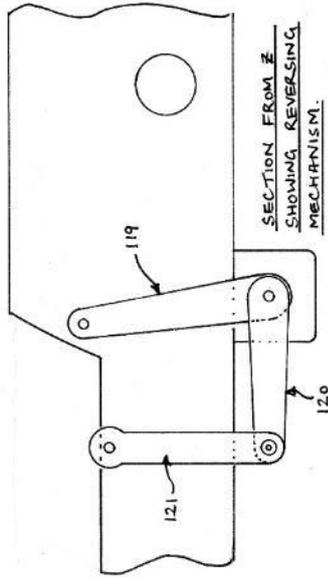
SECTION THROUGH CROSSHEAD



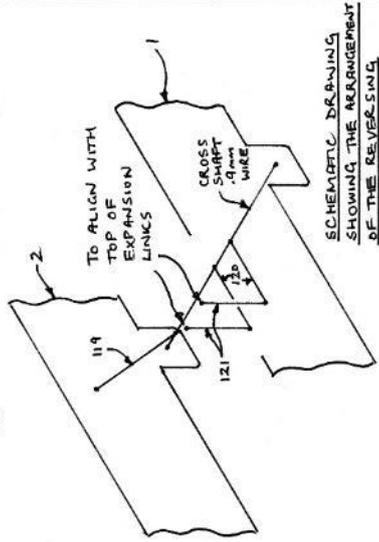
SECTION FROM Y SHOWING LEFT SIDE VALVE GEAR



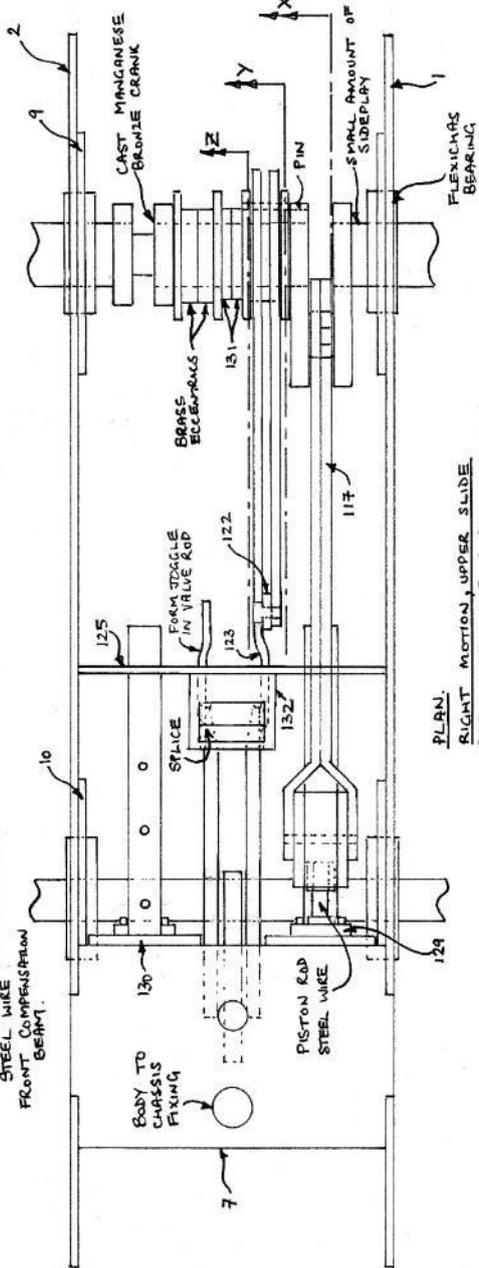
SECTION FROM X SHOWING LEFT SIDE MOTION



SECTION FROM Z SHOWING REVERSING MECHANISM



SCHEMATIC DRAWING SHOWING THE ARRANGEMENT OF THE REVERSING MECHANISM



PLAN. RIGHT MOTION, UPPER SLIDE BAR ON LEFT SIDE AND WHEELS OMITTED.

GWR 3232 class 2-4-0  
 Inside Motion  
 Martin Finney 24-2-88