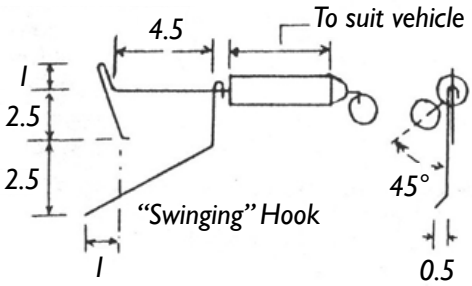
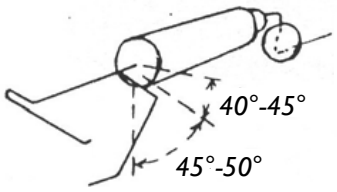
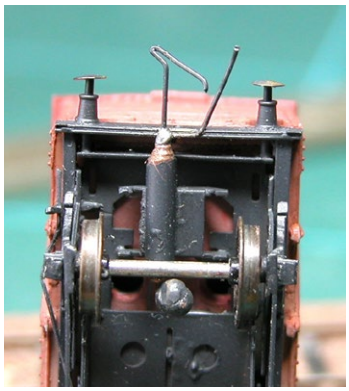
Electra couplings

The Electra is a homemade wire coupling with a delayed-action facility. It is more obtrusive than the Alex Jackson, but is somewhat more robust, as well as being more tolerant of misalignment and less exacting in its installation.







Left. *The original design from John Whitehead's article in the June 1979 Magazine (dimensions in mm).* ***Above.*** *One of this design on one of Mick Simpson's wagons.*

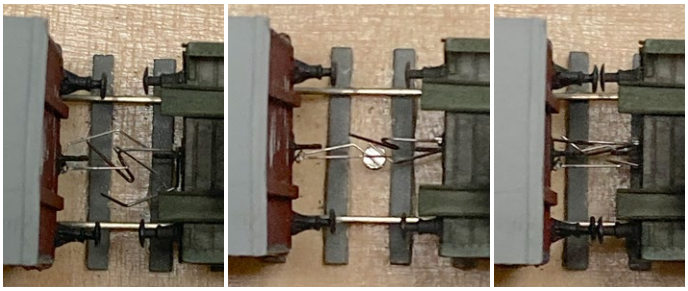
Materials

The hook and dropper are made of thin steel wire, either 0.254mm (33 SWG) spring steel wire or 0.2mm gauge 8 guitar E-string. The counterweight is made from split lead shot (sold for angling and available online) – No. 10 is about the right size. A length of thin brass tube is also required in which the wire should be able to freely pivot. For example, 0.8mm outside/0.6mm inside diameter from Albion Alloys. The photo also shows one of the NEAG jigs (see page 2).



Operation

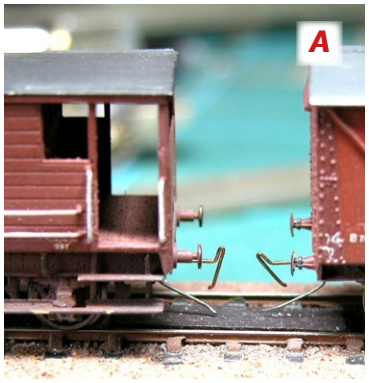
The wire is formed into a hook somewhat similar in shape to that of the Alex Jackson. This swivels in an in-line bearing of tubing. A dropper of the same wire is soldered behind the hook. This curves downwards and forwards, not unlike the Kadee and Micro-Trains couplers, to provide a delayed action function. A split shot on the inboard side of the shank of the hook holds the whole wire assembly at a 45° angle across the end of the vehicle. When two couplings come together, they slide past each other and swing back into engagement. To disengage, the required couplings are spotted over an under-track magnet, thus attracting the opposing droppers downwards. Now, by backing off and bringing the wagons together again, they may be pushed to any place on the layout without re-engaging since the two "tails" prevent this.

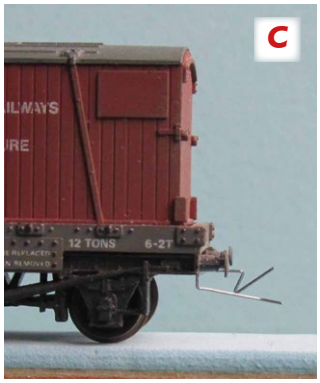


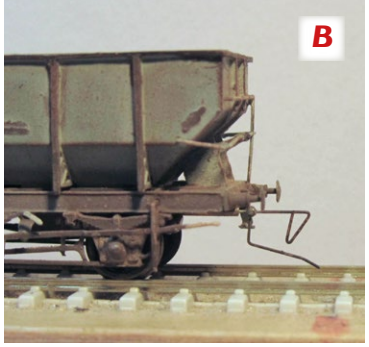
Left. *hooks engaged and pulling.* ***Middle:*** *droppers lowered over a magnet and wagons backed off to disengage.* ***Right:*** *propelling while disengaged.*

Evolution of the design

The original design used phosphor bronze wire for the hooks as in ***A***. Mick Simpson and Chris Mills both developed alternative designs, with Mick's shown in ***B*** below (this type of hook can be formed without a jig as described on page 3).



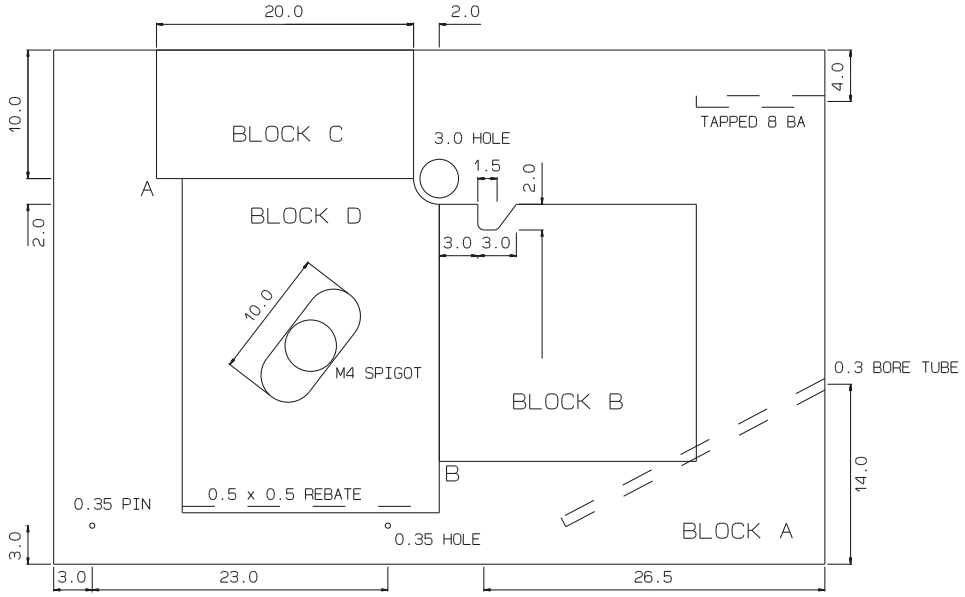




John Whitehead then suggested to make the coupling entirely from steel wire, as in ***C***. This makes the hook unbendable and unbreakable in normal use, and is the variant made with the NEAG jig (page 2).

Construction with the NEAG jig

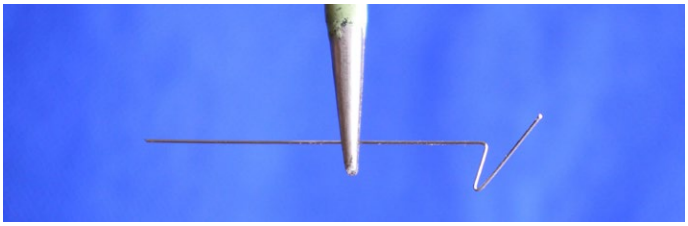
The NEAG have produced a tufnol jig (designed by Chris Mills) to assist in the production of Electra couplings. A modified Swann Morton No.10 scalpel blade is attached to the right-hand side of the jig to assist with bending the hook.



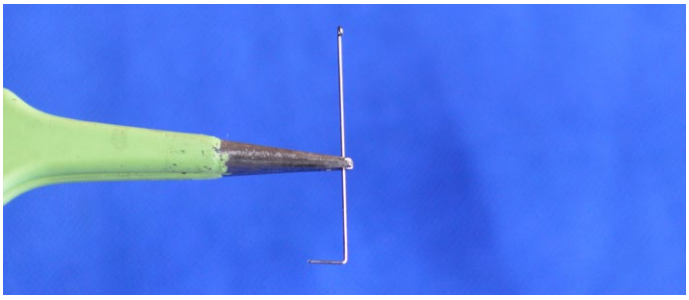
Left. *The layout of the NEAG jig. Tufnol blocks B and C are permanently attached to the base plate A, while block D is removable. The top hole is to assist soldering (see below), while the "tube hole" is lined with 0.3mm bore brass tube. The pin and lower hole are used for forming the dropper (see below).*

The jig has two handy dimensions build in: the horizontal distance from block D to the right-hand edge of block A gives a quick guide for cutting the initial 30mm length of wire for the hook, while the vertical distance from block C to the bottom of block D gives 27mm for the dropper wire.

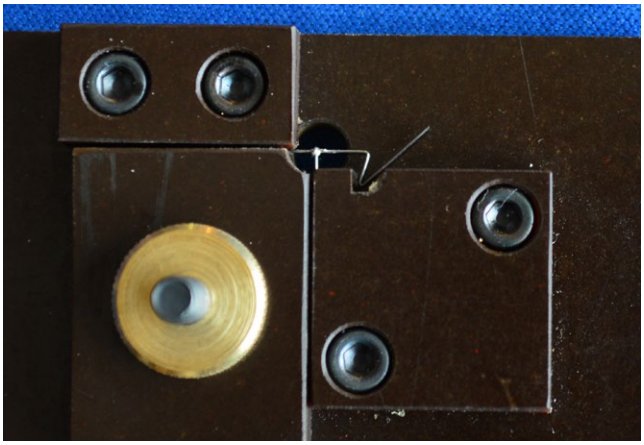
At the time of writing there is a YouTube video (https://www.youtube.com/watch?v=XNZKwEGuGfI) where Chris Mills demonstrates the assembly of an Electra using the NEAG jig. The couplings are formed from two lengths of wire, as follows.



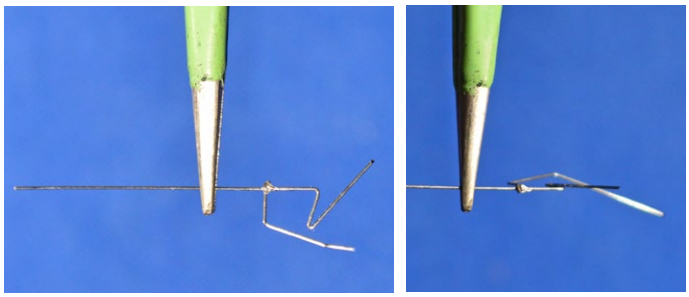
1. *Place the 30mm hook wire in the end tube and firmly bend the protruding end until it lies flat pointing down the end of the jig. Slide the scalpel blade down over the wire so that the wire is straight. Use a small screwdriver to bend the wire back over the blade and push down firmly to complete the hook.*



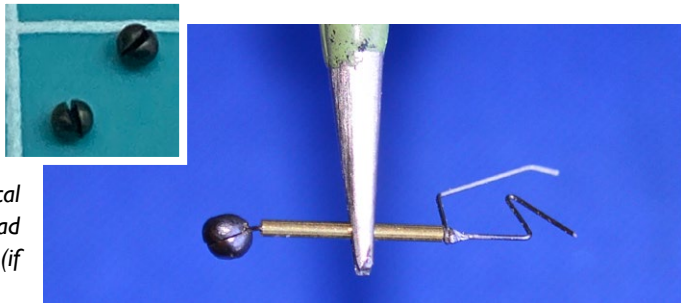
2. *Take the 27mm dropper wire and bend a 1.5mm tail at right-angles on one end. Now place the tail into the small hole near the bottom of block D, with the wire passing above the pin at the other end. Slide down the block and tighten the nut to press the wire in place. Grip the protruding end of wire (about 1mm!) in pliers and wind it around the pin.*



3. *To solder the two pieces together, thread the dropper on and catch its tail under block D, with the hook in the notch in block B. Touch the joint with a drop of flux, lift a little solder onto the iron tip and touch the joint. Soldering stainless steel wire is best done using an aggressive flux like Carrs Green Label, which gives a much stronger joint and a coupling more robust to handling.*



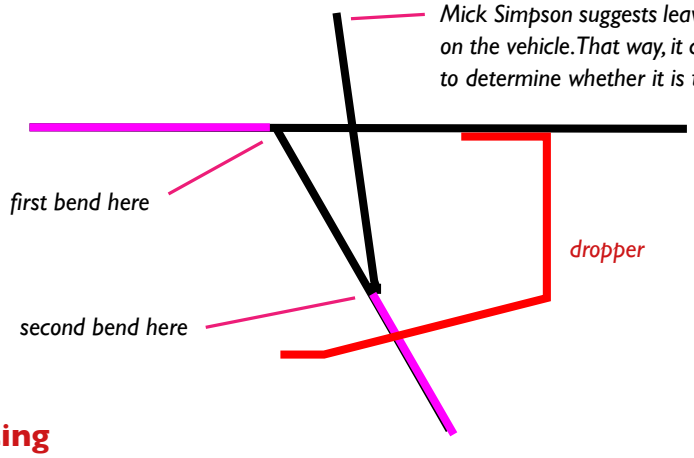
4. *Now bend the dropper into the correct Electra shape, as shown. The first bend should be 3mm below the top.*



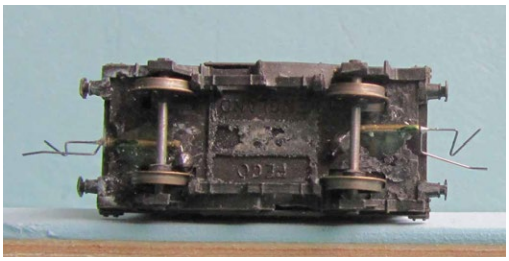
5. *Thread the coupling into the brass tube. Then hold the hook vertical and bend the tail 45 degrees to the left when viewed end on. A small lead weight (split shot) is then squeezed on to the end of the wire and secured (if necessary) with cyanoacrylate.*

Hook forming without a jig

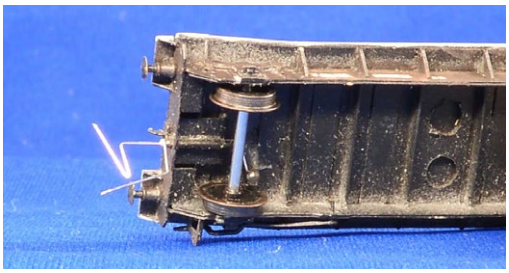
If the jig is not available, a hook can be bent up as shown below. As an alternative to winding the top of the dropper around a pin, the top 1.5mm can be bent at 90° and soldered to the main shank (facing towards the hook).



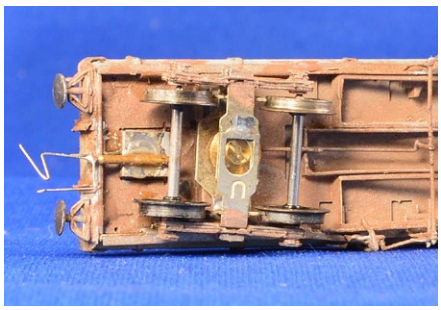
Fitting



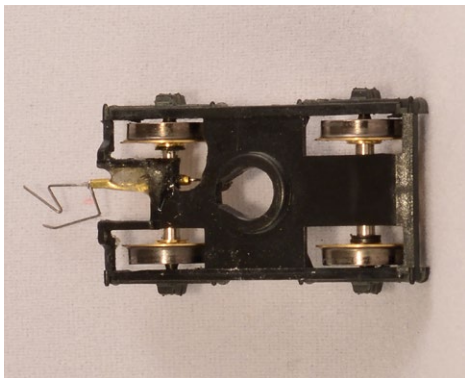
The coupling should be offset 0.5mm to the left of the vehicle centre line, when viewed end on. The tubing is glued to the wagon chassis so that the height of the coupling shank is 5.5mm above rail level. The length of the tube must be chosen so that the counterweight clears the axle. The dropper should be adjusted so that it is above rail level in its lowest position.



Another variation. On this lowmac by Chris Mills, the pivot tube passes through a drilled hole in the deep plate. The balance weight end of the coupling was shaped after installation of the tube.









On bogie stock, the coupling can either be fixed to the bogie, or to the body (provided there are no overly tight radii to be negotiated). It is possible to vary the position of the lead weight to suit individual vehicles - all that matters is that it hangs at 45° to the hook. Here, the two wagons by Chris Mills have the coupling mounted to the body, but the counterweight is respectively behind and ahead of the leading axle. Mick Simpson has mounted the coupling on this coach bogie, while Chris Mills has mounted it again on the body, with the tail bend forward so that the weight is ahead of the headstock and thus clear of the bogie.







On locomotives there is generally not room for the tube and weight, so a simple fixed hook is used as on these two examples by Mick Simpson. The phosphor bronze wire is bent 90 degrees and hangs vertically down from the centre of the buffer beam. It needs to be just in front of the buffers, and needs to extend down to within 0.5mm of the rail height to ensure that the delay feature will work.

Acknowledgments

Photos and diagrams from Mick Simpson, Chris Mills and Anthony Yeates, and original drawings by John Whitehead. Suggested corrections or additions are welcomed at publications@2mm.org.uk