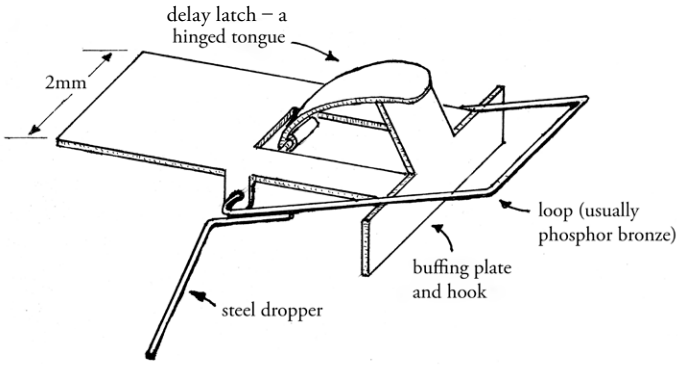
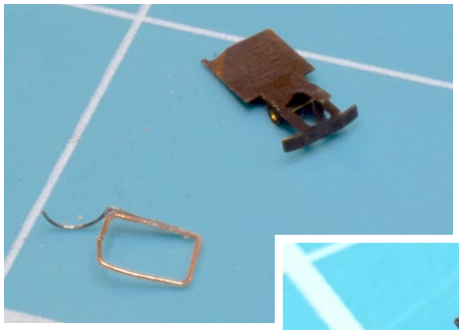
DG couplings

The DG (Dearnaley-Greenwood) has become the most popular 2FS coupling due to its combination of robustness and delayed action facility, as well as its availability in kit form.



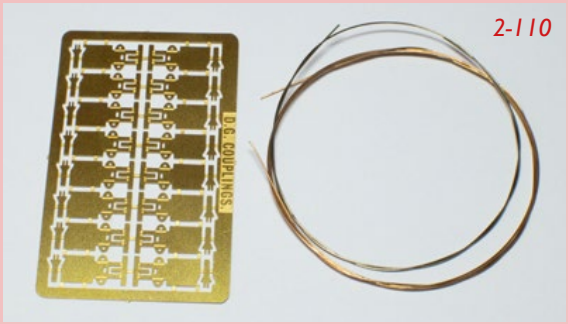




A DG coupling from the Association etch. The brass parts have been blackened with Carr's Metal Black for Brass.

Materials

Couplings are available from the Association Shops (items 2-110/4-110), or from Wizard Models (https://www.wizardmodels.ltd). The kit (below) comprises a 7 thou brass etch with two parts – the main fixing plate incorporating the hook and buffing plate, and the separate delay latch. A coil of phosphor-bronze wire is included for making the loops, and a coil of steel wire for the magnetically operated droppers. The loop bending jig (2-111) is useful although it could also be homemade.

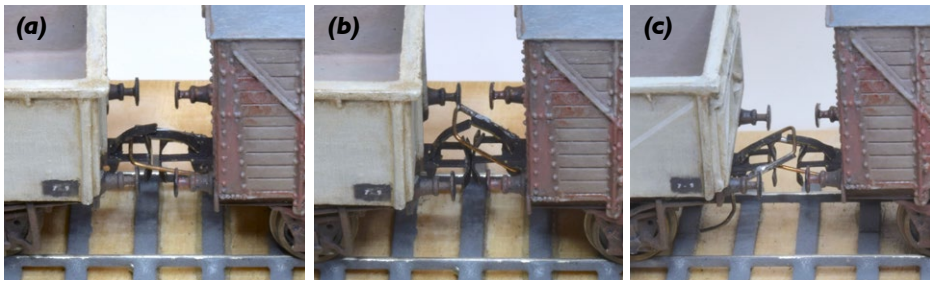




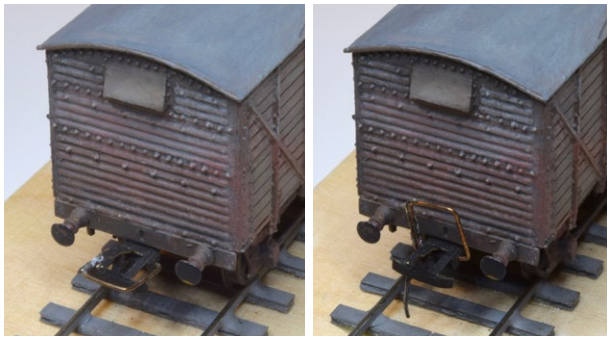
Operation

When two wagons are buffered up, the loop rides up the hook, thus engaging. To uncouple, the vehicles are either stopped and eased over an electro-magnet beneath the track, or merely backed without stopping over an electro-magnet which is energised as the coupling passes. This causes both loops to lift. When the magnet is de-energised or the couplings have passed beyond the field, the loops fall on top of the delay latches. The wagons can now be pushed as far as desired without the couplings re-engaging. To re-couple they are drawn apart and buffered up again.

If pulled over a fixed magnet, DGs will not uncouple if there are four or more axles behind the coupling. Thus a permanent magnet may suffice for, e.g., uncoupling passenger trains in a station. A 3mm diameter, 2mm thick rare-Earth magnet works well.



*Two wagons fitted with DG couplings. In **(a)** and **(b)**, only the van on the right is fitted with a loop. In **(a)** the wagons are coupled, whereas in **(b)** the wagons are being propelled in the uncoupled state. In that case the loop rests on top of the delay latch of the mineral wagon. In **(c)**, the wagon is also fitted with a loop, but only one of the two loops engages when coupled.*

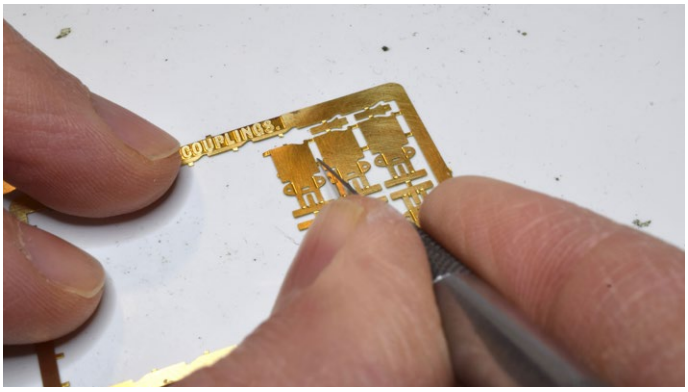


Energising an electromagnet hidden beneath the track attracts the steel dropper and causes the loop to lift.

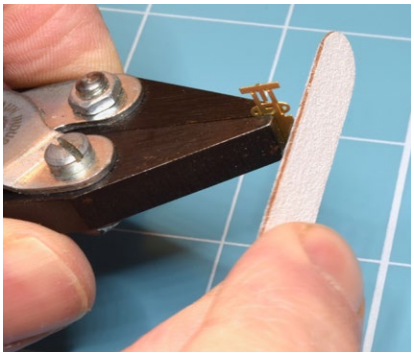
Construction

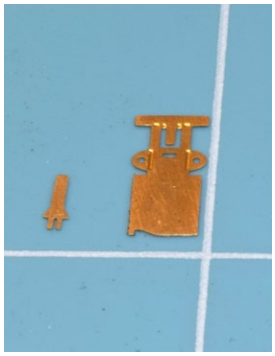
Here is a suggested assembly sequence. No doubt each modeller does it slightly differently.

1. *Remove the parts from the fret using a sharp knife to cut the tabs, working on a hard surface to avoid distorting the parts.*

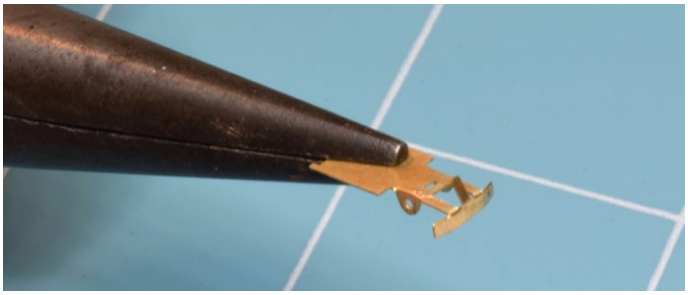


2. *Carefully clean off remnants of all the tags that held the parts to the fret. Here I am using an emery stick, and holding the part securely in parallel pliers to avoid distorting it. A bench vice would work just as well. There are two etched parts: the main unit and the small delay latch.*

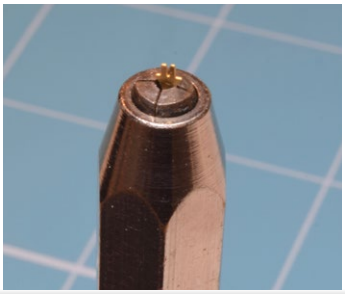




3. *Form the main unit to shape with pliers, using the etched fold lines as a guide and keeping them on the inside of the fold. There are two tabs to fold down (with holes for the loop), then the front buffing plate should be folded down 90°, before curving its ends and top hook backwards by approximately 20°. At this point, many modellers like to run a fillet of solder into the fold lines to strengthen them, although this wasn't done here.*

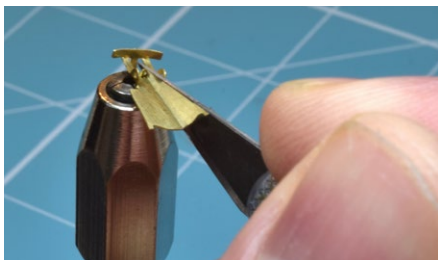


4. *Fit the delay latch. This is held upside down, either in a vice, pliers or (as here) a pin vice, and the main unit placed over the top. To allow it to move freely, it may be worthwhile to first open up the slot a little using a thin screwdriver.*

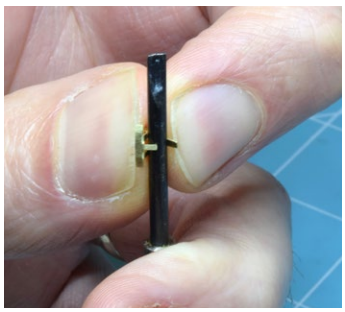


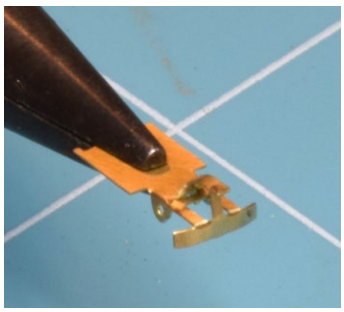


5. *Use a scalpel blade to "splay out" the two small tongues on the delay latch, so that it is retained in the slot but can pivot freely.*



6. *Bend the main tongue of the delay latch around a former such as this small screwdriver, so that it curves around to the horizontal when it rests on the hook. It should flop up and down freely, but always come to rest downward under gravity alone. It often helps to bend the two thin tongues forward (towards the buffing plate), so as to move the centre of gravity forward. This completes the hook unit.*

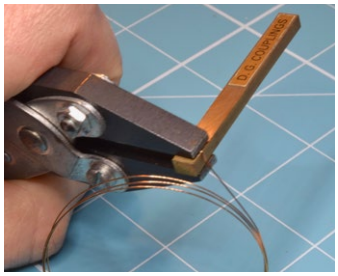


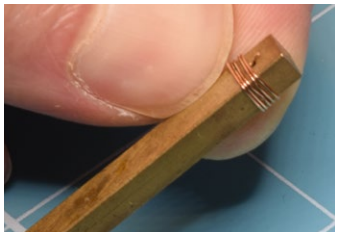


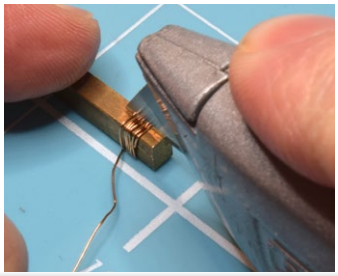
7. *At this point, it is worth blackening the coupling by dipping it in a suitable metal blackening fluid, then into a bowl of water to wash off. Alternatively, the whole etch can be blackened before starting out, but it is possible that blackening will be scraped off as the coupling is formed to shape.*



8. *Next, make the loop. This is usually made from thin phosphor bronze wire, which comes with the etched fret. This has the advantage of being easy to bend and springy enough to (hopefully) resolve conflicts when two loops meet each other. It's easiest to make multiple loops at the same time using the loop-bending jig (2-111). The end of the wire is poked through the hole in the jig and the wire held tightly against the jig with pliers. Then another pair of pliers (or just fingers) is used to wind the wire tightly around the jig to make a square coil. The loops are cut off one by one with a knife. They will not retain the perfect shape, but can easily be formed square again using pliers.*







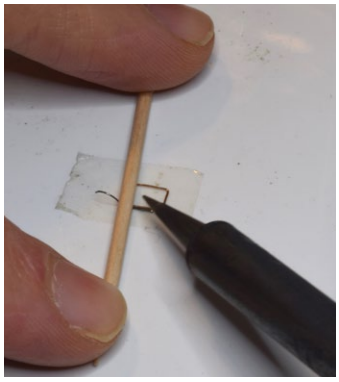


9. *The standard design followed here uses a separate dropper, which must be made of a magnetic material like steel. Droppers can be bent by hand but you might find it useful to adopt Nick Dearnaley's method of winding a coil of wire around something of about 2.5-3mm diameter. If a whole circle is cut off, then about half of it can be bent straight again with pliers to make the part that will attach to the loop, leaving a semicircular shape for the dropper itself.*



10. *Solder the dropper to the loop. One way is to stick both on a piece of double-sided sellotape (which is here attached to a spare ceramic tile). For soldering steel, a suitably strong flux like Carr's Green Label is recommended. This is brushed on, then a piece of solder brought to the joint with the soldering iron. Here a cocktail stick is being used to hold the pieces in place while soldering, as the tape will lose its stickiness once it gets hot. Make sure there is a good solid joint.*





Mounting

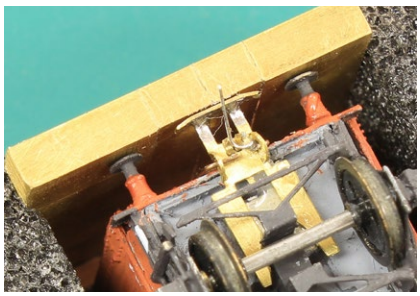
The standard way to mount DGs on, say, a wagon is to glue the main mounting plate beneath the wagon floor, with a suitable block or spacer so that it sits against the bottom of the headstock. Styrene sheet can be used for the spacer, or sometimes etched kits intended for 2FS have a built-in "platform" that folds out under the floor.

The height above the rails should be consistent for reliable operation, with recommended height from rail top to bottom of the buffing plate being 4.5 mm. The other important dimension is the fore-aft distance. The buffing plate must be ahead of the buffers, but this can be by as little as 0.15mm. It is worthwhile using simple gauges to ensure uniformity, particularly of the height. These could be homemade from metal, plastic, or some other material. Alternatively, Shop 2 sells a ready-made gauge in Tufnol that can set both dimensions as well as ensure fixing on the correct centre line (2-112).



A DG mounted on a wagon using a styrene spacer.



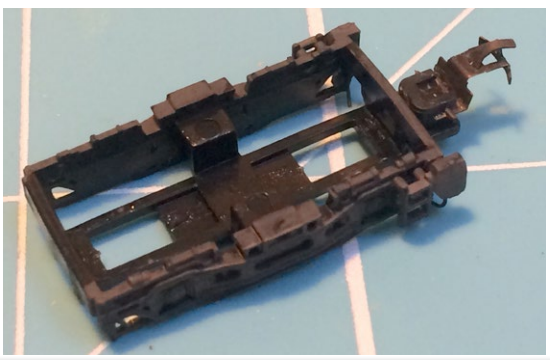


The Association gauge (which can be used to set both height and fore-aft distance – see the instructions linked from the Shop 2 listing), and a homemade jig used by Laurie Adams to set the fore-aft distance only.

Once the base plate is attached, the loops are just sprung in place through the holes. There is some difference of opinion as to whether they should be fitted to both ends of an item of rolling stock, or just to one end. The latter is possible on a layout where stock does not need to be turned, and can make the operation of the couplings more reliable. In particular, it prevents the situation where both loops happen to be at exactly the same height, so bounce off each other rather than coupling. But the original design is to have loops on all couplings and this works well for many modellers. On bogie stock, they are typically fitted to the bogie, any necessary height adjustment being achieved simply by bending the base plate with pliers.

It can be hard to fit working DGs to locomotives. Often, only the etched part is attached with its baseplate cut down, with the moving parts on the adjacent vehicle's coupling being sufficient to permit normal functioning.

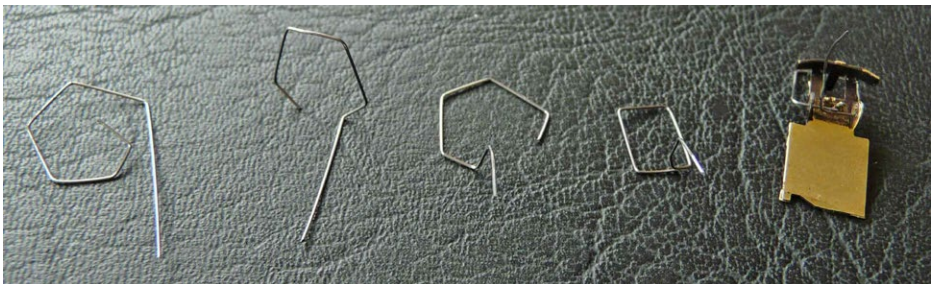




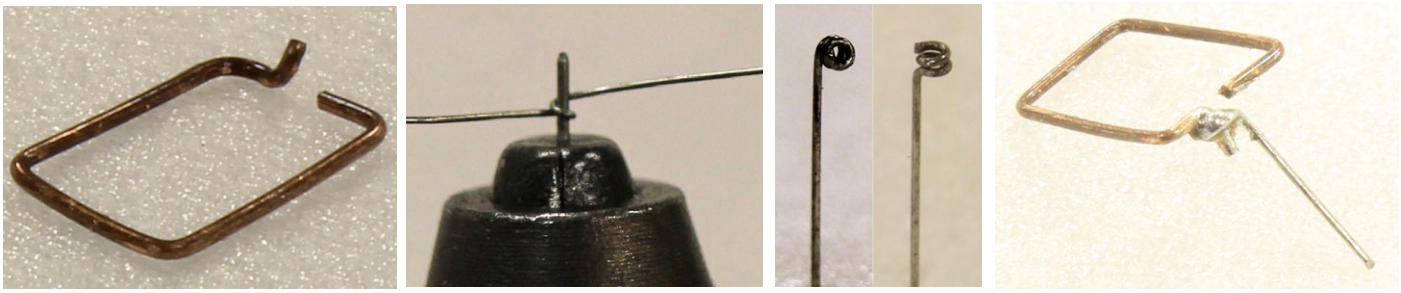
This Farish Class 25 has been fitted with a removable DG in its NEM pocket. It just requires a piece of thin brass or nickel silver wire to be soldered across the base plate to clip into the pocket. The plate is bent up to raise the coupling to the correct height.

Variations

Like many things in 2FS, individual modellers often have their own slightly different ways of doing things. For example, Bryn Davies suggests drilling two holes in the large plain area of the main (Association) etch, to facilitate gluing it to the wagon. Arthur Adams suggested bending the buffing bar to a complete circular arc, so that the couplings stay in full contact on curves. Another refinement is to shift the dropper to the track centre line, which can aid operation. Two different ways of doing this are shown in the following photos.

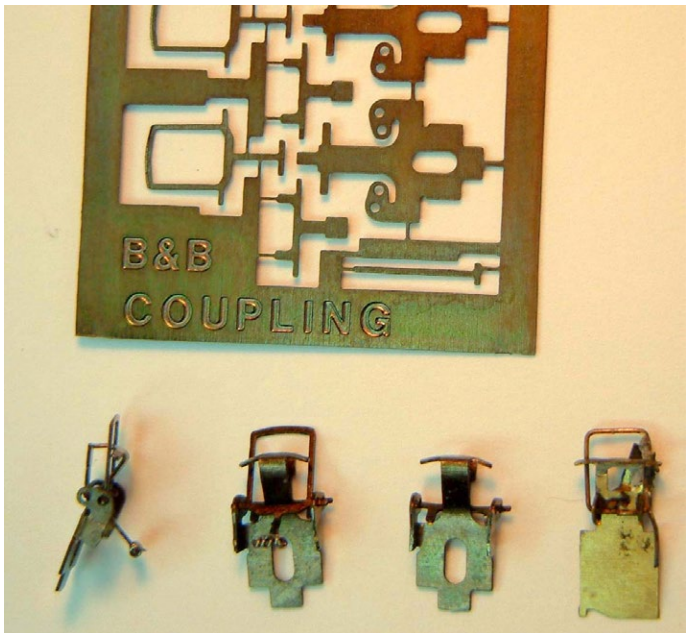


Brian Hume bends up both the loop and dropper from a single length of steel wire, with the dropper central for more reliable operation. The first stage is formed around the DG wire bending jig, with an extra few millimetres for the dropper. [Dec 2012 Magazine]



Laurie Adams makes one end of the loop slightly longer and bends it down. The wire dropper is made of 0.2mm steel guitar string. It is wound twice around a 0.35mm drill bit with both ends held tightly in pliers, to create a coil which can be soldered over the bent-down end of the loop. [Aug 2017 Magazine]

If you find the loops inconvenient to make, it is worth knowing that B&B (Brownlee & Bunting) couplings are functionally identical, with the same delayed action uncoupling, but the loop is etched. They are more or less compatible with DGs, but are a bit more obtrusive visually and can be even more difficult to fit to locomotives owing to the extra clearance needed for the bearing lugs. The pre-blackened B&B etch is available from 3mm Scale Model Railways (https://ttmodels.co.uk/freightComponents.html) or direct by post from Derek Bunting (address available by contacting the publications email below).



The B&B etch, and side-by-side examples of a B&B (left two couplings) and DG (right two couplings). On the B&B, magnetic operation is facilitated by thin iron wire wound around the dropper, obviating the need for any soldering.

Acknowledgments

Photos by Anthony Yeates, Andrew Hyatt, Brian Hume and Noel Leaver. Suggested corrections or additions are welcomed at publications@2mm.org.uk