JACKSON COUPLINGS

PART 2 – MODERN DEVELOPMENTS

In the second and final part of their examination of the extraordinary Alex Jackson coupling, JOHN LANGAN, NORMAN WHITNALL and DAVE BOOTH look at some of the refinements that have been devised since Alex's death – and explain why these little bits of twisted wire have defeated all attempts at commercialisation:

In the first article it was explained that, as originally conceived by Alex Jackson, each coupling was fastened at the centre of the wagon or bogie and uncoupling was by mechanically pushing one coupling upwards. The change to pulling down rather than lifting up to uncouple was made in order to overcome problems caused by the vehicle lifting as well as the coupling. The change to fastening at the far end of the wagon was made in order to gain greater flexibility of the wire for magnetic uncoupling, without decreasing the wire diameter.

Such development, if slow, has been continuous since the coupling's inception and since the information in the first article was last published, other improvements have taken place. While the magnetic version of the coupling as described works with complete satisfaction and has done so for many years on a number of notable layouts, it is also true to say that a number of features are capable of improvement.

The coupling wire with an unsupported length of some 65mm (2.5in) is vulnerable when stock is continually having to be packed and unpacked for exhibition work; also, the fact that four-wheel vehicles are pulled from the opposite end to the coupling hook has caused some difficulties, particularly on sharp curves and with heavy trains. The adjustment of the shank to achieve 10mm above rail (without a height bar) requires a degree of skill and practice which not all modellers seem able to develop. The design of the coupling means that it must be purpose-built for each vehicle and fitting is not easily adjustable to meet all the critical dimensions.

Methods of overcoming these difficulties have been sought over the years and what follows is a description of a later design which has been extensively tested and which we feel can be recommended. The earlier methods need not be discarded as the two methods are quite compatible – it is open to the modeller to follow whichever he prefers, or finds suitable; indeed both may be used in combination.

RADICAL RE-THINKING

A method of anchoring the coupling on the transverse and longitudinal centre lines of the vehicle, or as near as possible, was achieved by hinging the wire at that point. Early attempts to improve wire flexibility had the wire hinged at the centre and then extended to the end remote from the hook, such that this end flexed upwards when the hook was pulled down. This was not totally successful but led to the idea of using gravity as a constant force by fitting a counterweight to this remote end, so that the weight was raised as the hook was drawn down. This worked satisfactorily and led to the further refinement of mounting the hinge on an adjustable plate, making it easy to locate the hook tail relative to the buffer faces.

The height bar described earlier is an integral part of this design as the counterweight holds the shank of the coupling against the height bar and adjustment for coupling height is always by adjustment of the height bar rather than of the wire. The shorter free length of wire makes the coupling more robust without losing the delicacy of action. An early error in these experiments was an attempt to try to achieve a point of balance between the armature and the counterweight in the belief that this was required for correct action. In fact the counterweight has two purposes: to hold the coupling's shank against the height bar and to supply a source of inertia to the coupling when in the act of coupling or uncoupling. Without sufficient inertia, both couplings tend to dip when coming into contact at coupling; similarly, when a coupling is drawn down by the magnet for uncoupling, its fellow coupling must have sufficient inertia to remain in the normal position. The counterweight must therefore be relatively heavy compared to the armature at the other side of the hinge.

DETAILED DESIGN

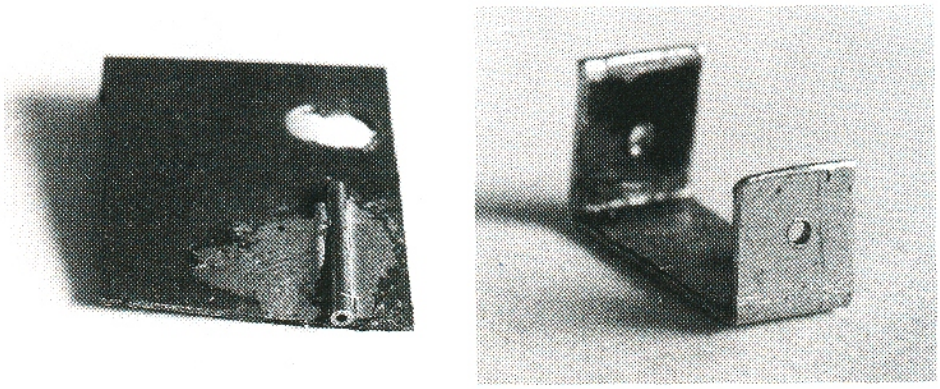
Having established the method as a sound working proposition, it was thought necessary to devise a fairly standard type of fitting for vehicles, with the intention that, where possible, parts could be produced in bulk from standard materials. That said, there is nothing final about these designed parts and they may be freely adapted as long as there is no departure from the principles. As an example, the base plate described later for use with four-wheel wagons will not fit wagons with fully modelled underframes but it should be possible to mount a hinge plate directly on the underframing.

The Hinge

Two types of hinge have been used, one utilising a short length of 23 gauge hypodermic needle as a tube through which the coupling wire is threaded so as to provide a pivot point, the second using two holes of 0.3mm (0.012in) diameter in a small bracket bent in such a way as to provide a similar pivot point to the hypodermic needle. Photographs show the two types.

Hinge Plate

The needle or bracket is soldered to a small brass plate which has a 12BA slot



Left: *Hypodermic needle provided tube for the pivot point of the hinge.* Right: *Hinge pivot point fabricated from 0.015in brass sheet.* Photos: BILL RICH

and one edge turned at right-angles away from the pivot.

Mounting

The hinge plate is mounted on a baseplate made from standard section aluminium ½in x 1/8in. A length of ¾in will fix nicely to the bottom of a typical four-wheel wagon and with two 12BA tapped holes will accept the hinge plates of both couplings, one 12BA screw per coupling being quite adequate to secure the hinge plate with the folded lip maintaining alignment against the base plate edge. The longitudinal slot in the hinge plate allows adjustment of the tail to buffer face dimension (0.25mm or 0.01in). The photograph shows an adjustment being made.

For bogie vehicles, six-wheel vehicles and other less than standard vehicles, then single coupling baseplates can be made to suit the mounting conditions or, in some rare cases, it may be necessary to produce a non-standard hinge plate or even to make the hinge a fixed part of the vehicle. Such an arrangement causes loss of the ready adjustment of tail-to-buffer face dimension referred to earlier but the hinged version of the coupling is more readily adapted to unusual vehicles than is the 'flexy' version. The photograph shows how the hinged version has been adapted to fit a coach bogie.

The Armature (or Dropper)

The armature length is fairly critical. If too long, it will lock on to the magnet face and cause derailment; worse, it may also cause distortion of the wire and lead to the need to reset the coupling; even longer and it will possibly catch on rails at turnouts etc. with similarly drastic results. If too short, it may fall outside the influence of the magnetic field when uncoupling is attempted.

The length is dependent on rail height and wheel diameter and can be calculated from:

(rail height + y + 10mm) – (x + 0.5mm)

where x is down movement of wire before touching axle – see *Fig. 11* '3mm movement', and *Fig. 12*, '2mm movement', and where y is the depth of slot sawn in the armature to aid its fitting (as explained in the next paragraph). So, for example, for 12mm diameter wheel on 2mm diameter axle to run on track made from Code 75 rail which has a height of 1.9mm – i.e. 3mm movement – armature slot depth 0.6mm:

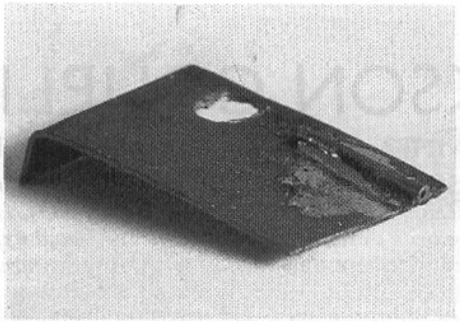
armature length = (1.9 + 0.6 + 10) – (3 + 0.5)
= 9.00mm

A 1in (nominal 25mm) wire nail, about 0.072in diameter, offers suitable material to make one armature and one counterweight. If the nail is a large-headed type then the head is removed or reduced, an accurate length is cut from the nail and a small slot sawn in one end across a diameter, this to receive the wire. This is the armature or dropper, and it is soldered to the coupling wire at a point which will allow the armature to lie inboard of the axle by 1 or 2mm.

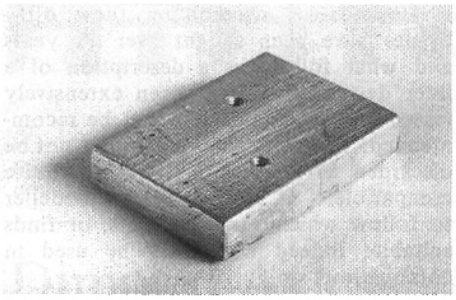
Counterweight

The remainder of the nail, with the point removed, will provide a piece about 12mm long and is soldered at the far end of the coupling wire at a point which will allow it to lie inboard of a wheel and above the axle. For normal four-wheel wagons, the mass of this portion of nail, fitted as described, is usually sufficient to balance the dropper and to provide sufficient inertia to overcome the friction force of the coupling tails when coupling or uncoupling.

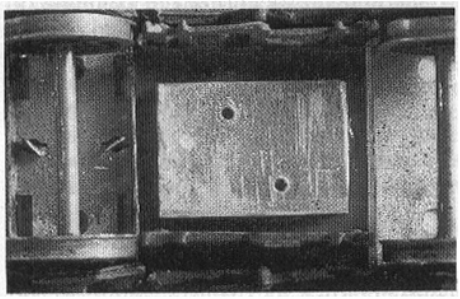
It is possible for the counterweight to be too light, or to be fitted too close to the hinge, but still to overcome the weight of the armature and maintain the hook at the correct height, though not providing sufficient inertia to overcome the friction forces of the coupling tails. This will cause problems when coupling or uncoupling. However, it is also possible for the counterweight to be too heavy or fitted too far away from the hinge, causing upward forces at the armature which are too large to be overcome by the downward forces set up by the uncoupling magnet. Experience achieved by a little trial-and-error will soon find the correct weight/position!



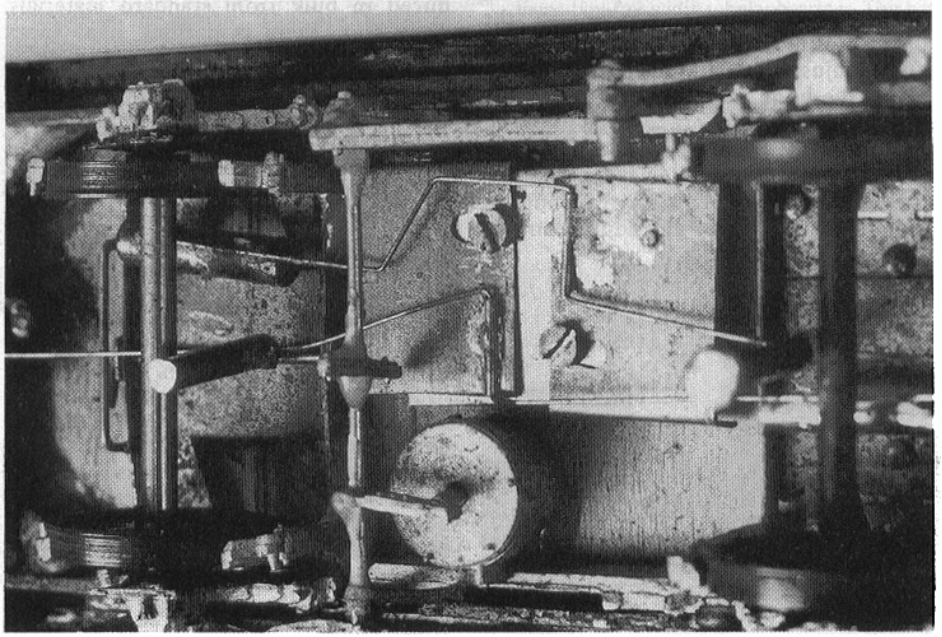
Hinge plate with hypodermic tube showing fixing slot and location edge.



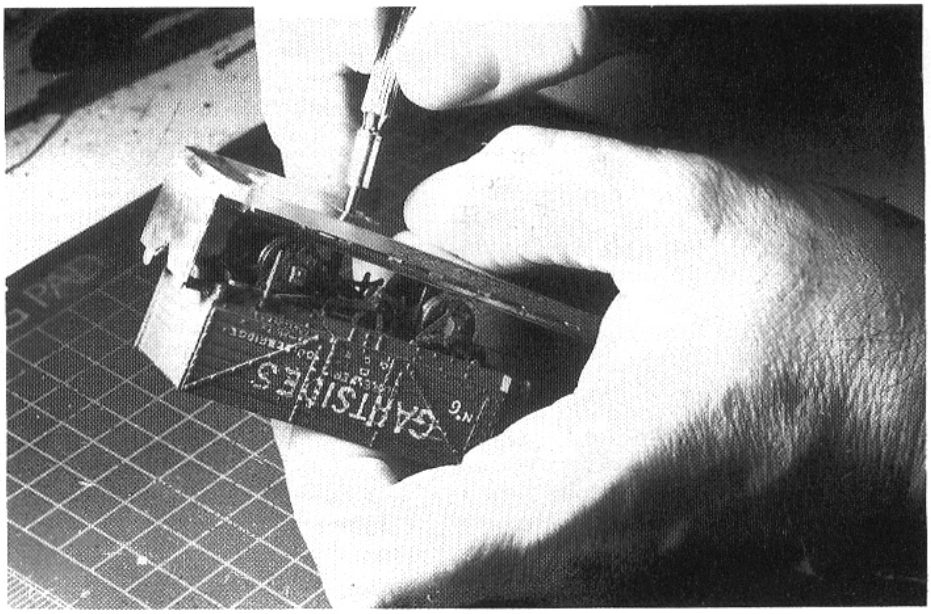
The ½in x 1/8in aluminium baseplate showing 12BA holes by which hinge plates are fixed.



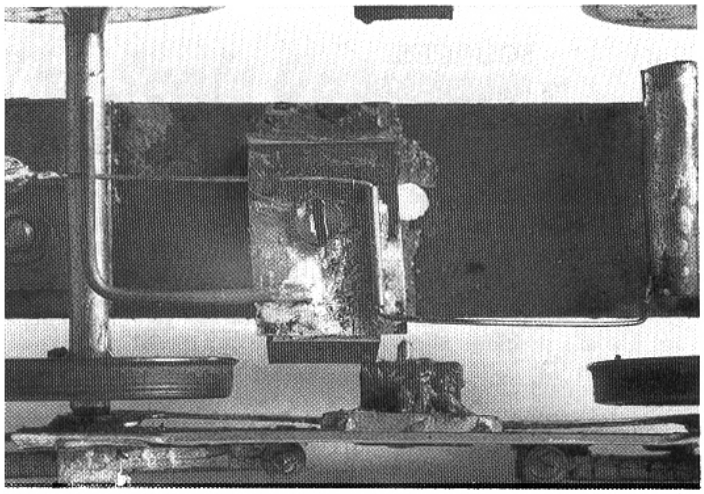
Base plate fitted to simple four-wheel wagon.



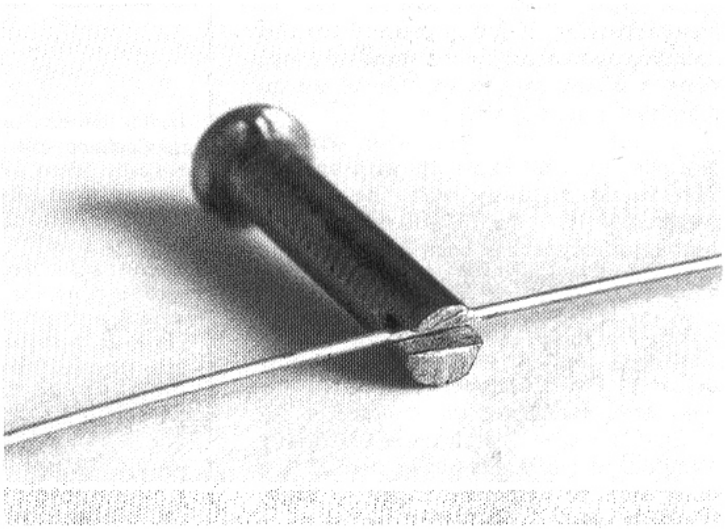
Baseplate, fitted to four-wheel wagon with 'undergear' modelled. Two completed couplings are fixed to the baseplate.



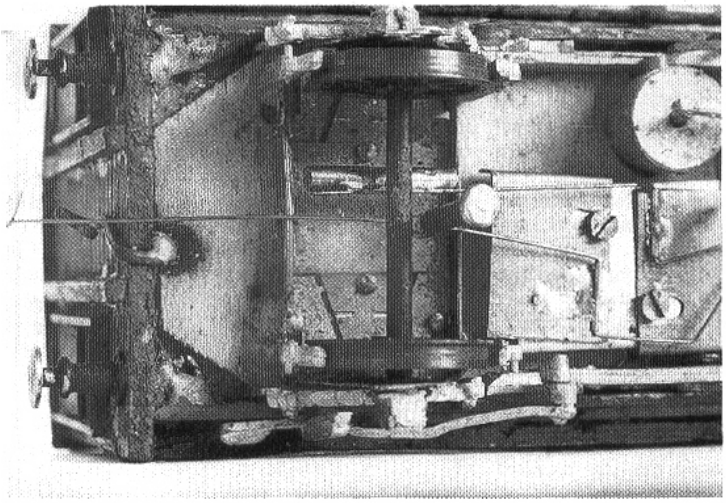
The slot in the hinge plate allows adjustment of the important dimension 'tail to buffer face'. The jig is of track on perspex with 0.010in brass plate notched for coupling wire.



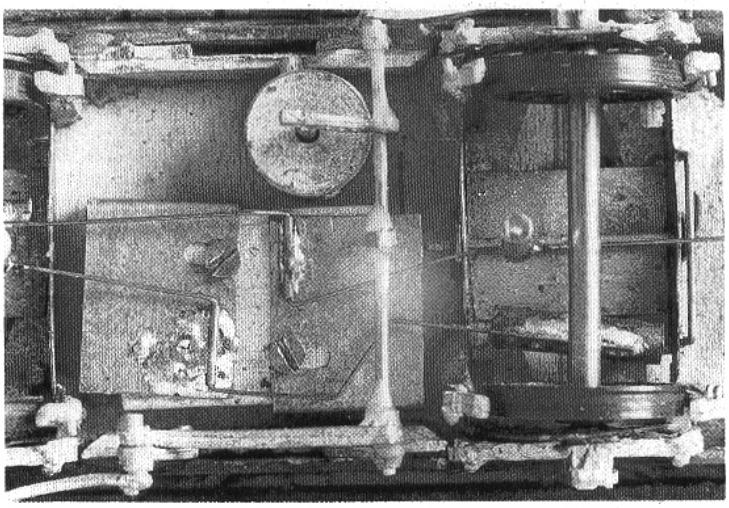
A coach bogie showing adaptation of standard features, counterweight parallel and forward of rear axle, armature forward of front axle, bottom stop fitted instead of using axle, coupling wire bent in vertical plane to achieve 10mm height.



A common-or-garden wire nail about to become an armature. The wire is 0.011in diameter.



This shows position of armature and axle and position of counterweight to wheel and to axle at the opposite end of wagon to hook.



Opposite end of wagon showing relationship of axle, armature, counterweight and wheel. This picture also shows height bar fixed to 'W' frame assembly.

LATEST DEVELOPMENTS

It was Ray Hammond's comments in MRJ No. 49 which caused the reaction resulting in this article. Ray was also closely connected with one of the latest developments which is still only in a development state. After correspondence between Dave Booth and Ray about photo-etching, and a chance meeting on the stairs at Scalefour North 1990, when Ray introduced Dave to Danny Pinnock of D & S Models, Danny agreed to do a trial etch of some hinge plates. This trial batch has been delivered, and most have now been fitted to wagons on the standard baseplate. Several minor problems have shown up in this trial and if there is to be a Mark II etching, then it will be dimensionally different than Mark I.

It will also have been gathered by readers that the wide variation in rolling stock types does not readily lead to standardisation of fixing method for this coupling and accordingly a standard hinge plate will only ever be capable of use on a limited variety of vehicles.

As these words were being written, Norman Whitnall came up with an idea that would do away with the balance weight. At this stage it is still only an idea but a prototype has been built and the idea will be proven or discarded.

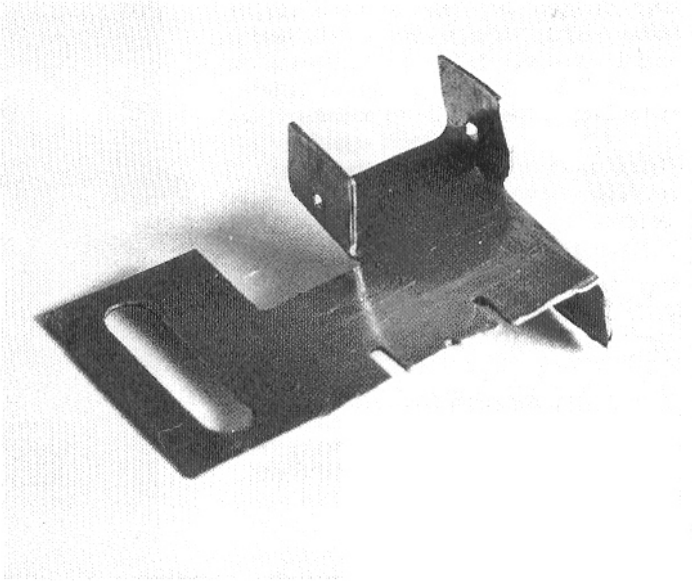
Trade Production

The Alex Jackson coupling has to date defeated the efforts of various people who have attempted to produce it for profitable resale. As Alex was essentially a builder rather than a buyer, then we are quite sure he would be happy to know that it is still not available from the trade and that any modeller wishing to use it must of necessity make it and fit it for himself. The tools and skills required to make, fit and set it are the same ones required by all finescale modellers, so it should fall within reach of all who read this article. However, the assembly, setting and occasional resetting of each coupling requires some skill, and because of this the coupling will always be an unlikely candidate for profitable resale.

EPILOGUE

That, then, is the full story on the Alex Jackson coupling to date. Its development within Manchester MRS will, we know, continue and when each new idea has been proved it is more than likely that details will be published in the model railway press.

We are aware that others have carried out their own process of development, particularly in other scales. For instance, we know of at least one ingenious fixing



Etched hinge plate (Mark I, D&S) developed from fabricated plate as the second photo on page 177. (Mark I has dimensional problems!)

SOURCES

by DAVE BOOTH

Having delivered these two articles, I received a telephone call from our editor asking, basically, where we can buy the various bits. Not an easy question for me to answer, because as a member of Manchester MRS, the 'bits' tend to appear simply because you asked at a club meeting! When I first started, wire, hypodermic needles, etc. were simply handed over and the problem of supply did not exist. However, I am now in a position to pass on the following:

WIRE

The easiest source is the local music shop (unless you have a guitar-playing friend!). I was surprised to find that music strings are sold by their diameter, so any good music shop should be able to supply a 0.011 gauge string. You get approximately a metre length for about 50p; the man in the shop said it was also known as a 'top E' string.

Don Rowlands, who actually gave the mini-lecture on Alex Jackson couplings at Falkirk Finescale Festival, uses model aircraft control wire which is much less expensive than music wire. It is 'type DP94' wholesaled by a company called Micro Accessories. Mine was ordered specially by a local model shop and cost me £2.50 for 30 metres. Its diameter is actually 0.3mm which is 0.0008in too large. We at Manchester MRS have not sufficient experience with it yet, but Don has used it for many years and we can see no reason for it not to be successful.

HINGE TUBE

This is a short length (about 3mm) of hypodermic needle. I have never needed to purchase from a pharmacy but the required size is labelled '23G 1.25 (0.6*30)Nr14' and is colour coded blue! Our local pharmacist was most helpful and could see no difficulty in anyone purchasing hypodermic needles over the counter at any pharmacy. He only stocks a disposable syringe widely used by diabetics and gave me one as a sample; its internal diameter was too small to take the wire, so beware of sizes other than quoted. He thought that the 23g by 1.25in would cost about £2 for a pack of ten, but don't expect to get them from stock, it may have to be a special order. You should get about six to eight lengths of tube from each needle so your £2 outlay will cover 60 to 80 couplings.

BRASS STRIP

Mine is mainly scrap etching brass purchased at a good exhibition; costs next to nothing in 0.010in to 0.018in thickness. My last purchase was from Derek Mundy of Model Signal Company but I've seen it on the stands of other etchers.

ALUMINIUM BAR

The section of ½in by ⅛in was chosen because it is standard, so you should get this from any good engineering supplier without trouble. I work at a technical college and get my supply from the scrap bin in the tin bashers' workshop.

12BA BRASS CHEESEHEAD SCREWS

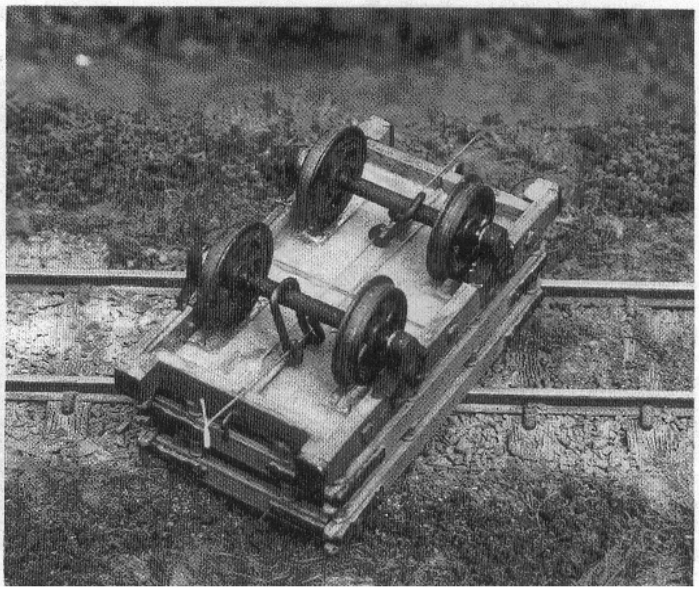
If you still buy your screws in little packs of ten, then buy from that source. However, if you are prepared to carry worthwhile stocks, invest about £10 and fix yourself up with a lifetime's supply of brass screws from 16BA to 8BA. Write to Clerkenwell Screws Ltd, 109 Clerkenwell Road, London EC1R 5BY and ask for a price list.

THE JIGS

Sorry, you've got to make your own, just like the couplings!

jig that has been developed within a club, with details published in the club's magazine but unfortunately not elsewhere. The authors would be happy to act as a clearing house for all information about the Alex Jackson coupling, and any modellers who have any proven details about the coupling which could usefully be used by others are invited to send such details to us via the editor. In this way a 'library' of information could be built up and be made available to all who may be interested, with due credit to the originator.

It seems fitting that the home of such information should be the club of which its inventor was such an active member – Manchester Model Railway Society.



Gordon Gravett has standardised on the Jackson coupling for 'Ditchling Green', even extending it to the narrow gauge industrial line on the layout. Here we see an upturned wagon displaying the straightforward fixing of the AJ wires. Incidentally, when this layout was shown at 'Eurotrack 92' during March, Gordon reports that many French visitors turned out to be completely familiar with 'le Jackson'.
GORDON GRAVETT