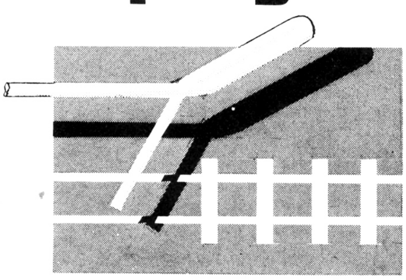
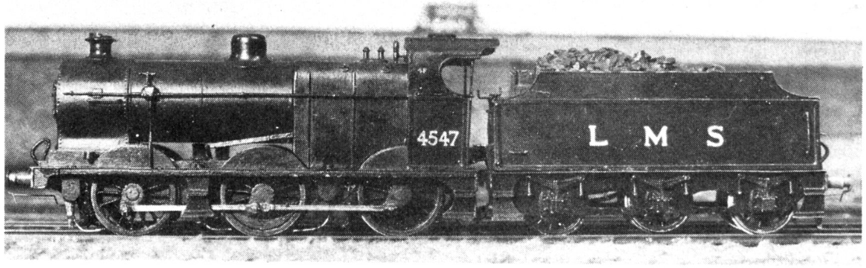
The Alex Jackson Coupling



by John Langan & Norman Whitnall



John Langan's 4mm Fowler 0-6-0 Class 4 loco (scratch built including motor).

Alex F. Jackson, B.Sc.

The late 1940s and early 1950s was a period when many developments were taking place in the hobby following its revival after the war.

At that time, Alex F. Jackson, despite suffering from poor health, gave much encouragement to many fellow modellers by his brilliant approach to the problems of mechanisms, good running, trackwork, and true scale modelling. He first worked in 3/8ins-1ft scale and his garden railway, running off 100 volts AC supply, was a source of enjoyment to all who visited him. Unfortunately his cat never seemed to learn to keep off the track when a running session was in progress—with surprising results! A fine example of one of his locomotives in this scale may be seen in the MRN for March 1948.

Later Alex changed to 4mm scale and immediately adopted 'EM', 2 rail, using split axles. Here again we were shown the advantages of using the higher voltage of 24V DC current, which was quite revolutionary at that time. This of course meant home built motors and together with the use of heavy flywheels, he obtained smooth and controllable running which can still be compared with the best of today. No gimmicks in the controls either—just a plain resistance wire controller. His attitude to modelling and an example of his construction methods may be seen in the description of his 4mm scale LNWR 0-6-2 side tank locomotive in the MRN of June 1950. The photograph of this locomotive shows clearly the early version of his coupling for which he became so well known.

Alex died in October 1952 after a serious operation, when he was in his early thirties, and the hobby lost not only a most distinguished exponent of our craft, but an enthusiastic leader who by his example helped to raise the standard of modelling to that which we still appreciate today. **J.L.**

Preface

Thank you Mr Hubert Carr for your comments on the Alex Jackson Coupling in the February issue of MR, and for your request that up-to-date details of the coupling should be published. After a little think and some quick calculations, it came as a shock to us to realise that 17 years have passed since we presented the information on the magnetic version of the coupling in the MRN of January 1960, and also that Alex first demonstrated the original electro-mechanical coupling at a meeting of the Manchester Model Railway Society in February 1949—some 28 years ago!

We still receive enquiries for information about the coupling, and although very little change has been necessary on the magnetic version, may we present a revised description of this ingenious mechanism. The coupling is in regular use, we know that it works and that our claims for it are justified, but it must be emphasized that whilst it is capable of satisfactory operation in the hands of a careful modeller it is not suitable for the rough handling of junior model bashers.

By accurate setting in the first instance using the simple aid to be described, and maintaining this setting from time to time, the coupling will operate faultlessly, indefinitely.

Its main advantages are:

1. It is unobtrusive.
2. It is quiet in operation (and very mysterious to the onlooker).
3. It is reliable if properly made.
4. It is extraordinarily cheap.
5. Couplings are identical at each end of the vehicle, so that turning a vehicle end for end does not affect performance.
6. No mutilation of wagon headstocks or attachment to buffers is necessary.
7. The pull for uncoupling being downwards ensures that the vehicle is kept upon the track.
8. The electro-magnet may be energised by the push button switch on the control panel before a given wagon reaches it with the certainty that the coupling will be drawn down to uncouple as the wagon passes through the magnetic field.
9. Uncoupling whilst moving, with the locomotive pushing and buffers under compression with couplings slack, is positive, and the magnet will operate only one coupling at a time.
10. Only one electro-magnet uncoupler is needed for a fan of sidings.
11. After being uncoupled at the magnet location, vehicles may be parted and left at any position on the layout. This allows realistic shunting to be operated.

The dimensions stated on the detail drawings and in the following text are for models built to a scale of 4mm to 1ft. The use of this type of coupling on models of other scales is considered later.

The Hook

The ingenuity of the coupling lies in the design of the hook which is shown in Fig. 1. Each feature of this is important and plays its part in the action of coupling and uncoupling.

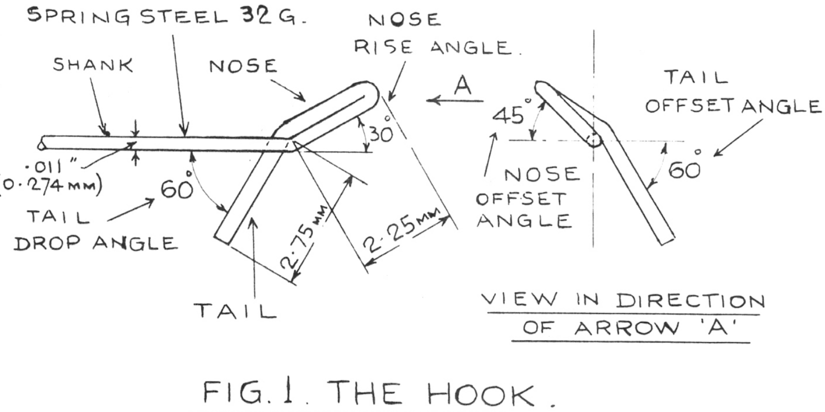


FIG. 1. THE HOOK.

The method used for forming the hook was devised by Norman Whitnall and, referring to Fig. 1, it is essential to bend the wire back along the top of the nose with the tail coming down on the right hand side of the shank, when the coupling is viewed end on. This 'handing' is important so that wagons will couple with each other, and also with those already in existence.

This way of bending the hook shape produces a strong hook which tightens upon itself when under load, and is therefore capable of handling long trains. The hook does not require to be soldered, but the tail should be stoned smooth to ensure that it is free from burrs.

The material used to form the hook is .011in. diameter spring steel wire (32 gauge) (0.274mm), sometimes referred to as music wire.

Bending the hook

At first sight it might appear a difficult task to bend the special shape of hook consistently, but by the aid of a simple jig as shown in Fig. 2. this may be performed easily. Fig. 3 shows the sequence for forming the hook.

First cut a piece of .011in. (0.274mm) diameter spring steel wire about 90mm (3¹/₂ins) long, making sure that it is quite straight. Insert one end into the 5mm deep hole of the jig, and bend the wire at right angles.

Fold this bend tight upon itself using pliers or the jaws of an instrument vice. Now insert the doubled end into the 2.5mm deep hole in the jig and bend the projecting long wire to the combined angles of 30 degrees and 45 degrees as in Fig. 3 (bend No. 3). A simple template may be made to check this, but with practice it can be judged quite well by eye. With the double portion still in the jig, bend the tail to the combined angle of 60 degrees and 60 degrees as shown in the 4th bend.

Flexibility

To obtain the required flexibility for positive operation within the magnetic field, the coupling wire is only .011in. diameter and is anchored at the end of the wagon farthest from the hook as shown in Fig. 4.

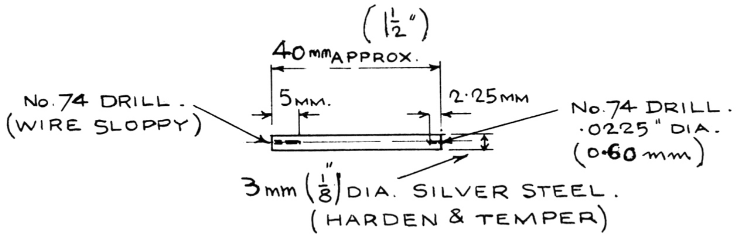


FIG. 2. HOOK BENDING JIG.

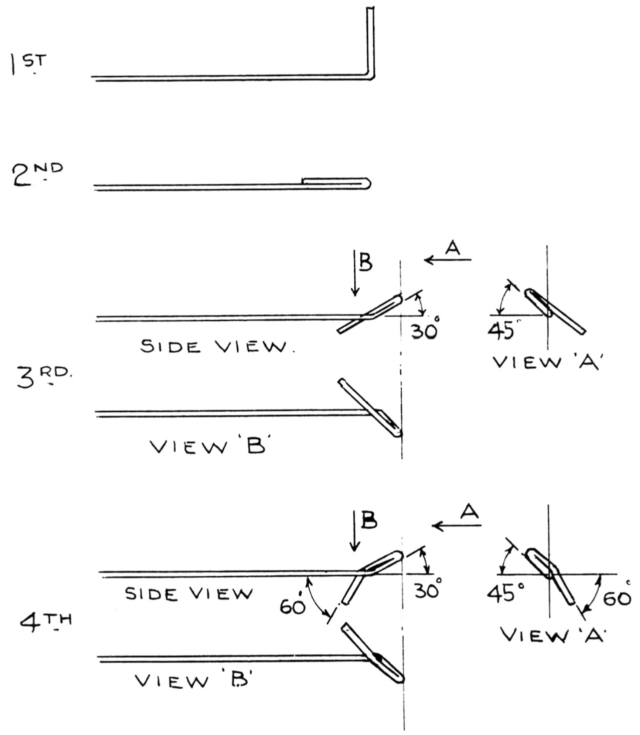


FIG. 3. BENDING THE HOOK.

The fact that the vehicles are really pulled from the end remote from the coupling makes it desirable to fix the end of the coupling wire as near to the centre line of the vehicle as possible in order to avoid a turning movement.

With the foregoing in mind let us now examine in detail the action which takes place when coupling and uncoupling.

Coupling

The action of coupling may be followed by reference to Fig. 5, in which wagon 'B' approaches wagon 'A' and the noses of the couplings slide against each other. Further movement of 'B' leads to contact of the tails of the couplings and a gradual sliding movement in the horizontal plane takes place until the tails pass each other. The wires then spring back to the central position with the shanks in line.

The coupling hooks are now in the correct relationship for engagement and at this point the buffers should make contact. Upon reversing the motion of 'B' the tails slide along the shanks and engage, whereupon wagon 'A' is now drawn along with wagon 'B'.

It is important that the couplings should spring together after the initial engagement before the buffers make contact, and to ensure this, the end of the hook tails should be 0.25mm from the buffer face as shown in Figs 8, 11 & 12. There should not however, be excessive clearance otherwise when the locomotive is pulling a train the gaps between the vehicles will be unrealistic. Note that it may be necessary to add weight to a

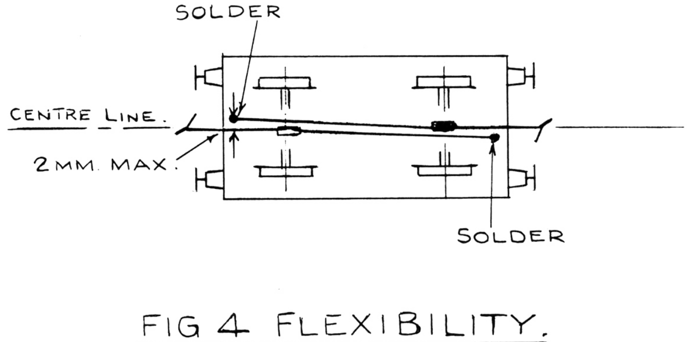


FIG 4 FLEXIBILITY.

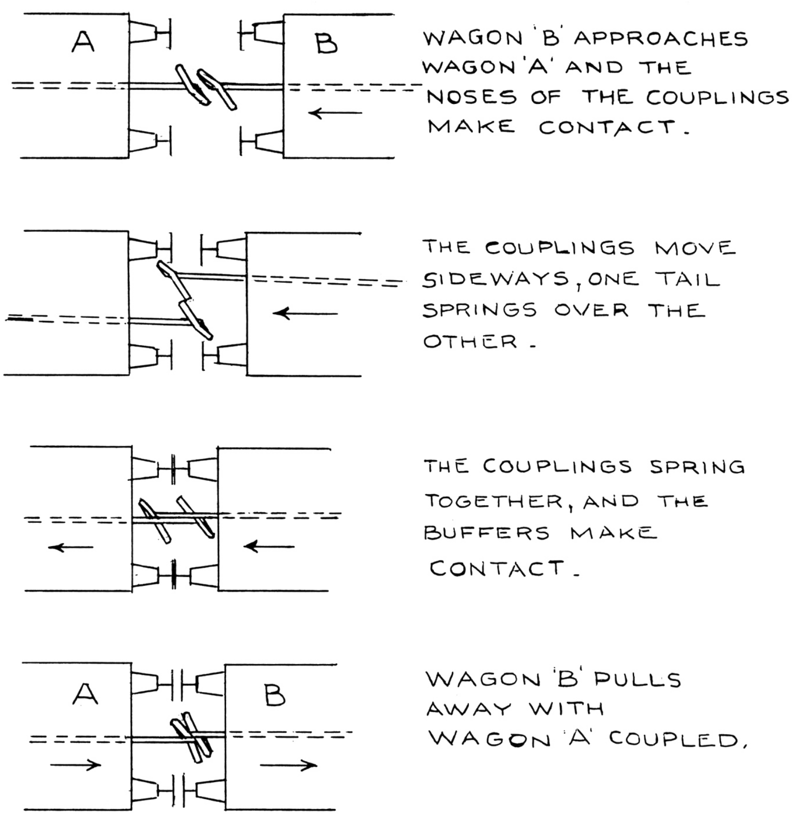


FIG. 5. COUPLING

system we arrange for one coupling to be pulled downwards by arranging an electro-magnet between the rails (Fig. 8).

After having passed through the magnetic field, the coupling springs back upwards, but now the tail is on the opposite side of the shank. Upon reversing the direction of motion of wagon 'B', the tails slide past the noses of the hooks and wagon 'A' is released.

It will be found that a less jerky action takes place if the coupling of wagon 'B' is pulled down to release wagon 'A'. Note that the movement of coupling 'B' is downwards with a slight horizontal movement and that of coupling 'A' mainly horizontal.

After uncoupling in the magnetic field the wagons may then be pushed along until the desired location at which the wagons are to be parted is reached.

Uncoupling and *parting* of vehicles are therefore separate and distinct operations which take place at quite different locations. This means that one electro-magnet positioned at the start of a number of sidings as at Fig. 7 is all that is required to split a whole train.

Herein lies the ingenuity of the original design, which distinguishes it from most other types of coupling devices. By leaving the magnet energised the whole train would of course become uncoupled as it passed over the magnet position. If wagon 'A' is of light construction free running vehicle of light construction, in order to provide enough inertia to allow the springing of the coupling wires to take place. Otherwise the wagon 'A' might simply be pushed along by the friction of the coupling tails.

From the foregoing it will have been seen that two wagons may be coupled simply by bringing them together, and that the magnetic field plays no part in this operation. Coupling may therefore take place anywhere on the layout, except on sharp curves, and this condition is discussed later. It will be realised that for two vehicles to come together and the coupling hooks to engage correctly, i.e. centrally, sideplay of the vehicles on the track must be small. The wheel and track relationship of P4, EM or OO (not proprietary) is satisfactory, but sideplay of axles in their bearings must be held to a minimum. Greater offset than 1mm from centre line may cause the tails or noses of the hook to pass without making contact.

Uncoupling

Referring to Fig. 6 we see that wagon 'B' is pushing wagon 'A' by contact of the buffers and the couplings are therefore slackened off. Vertical movement (up or down) of either coupling will disengage the hook, and in the electro-magnetic

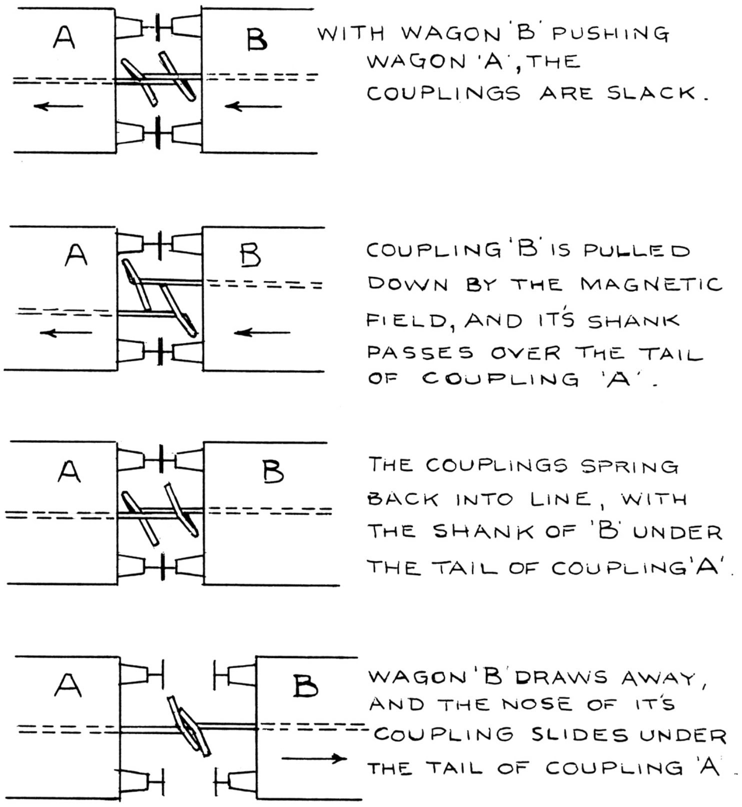


FIG. 6. UNCOUPLING.

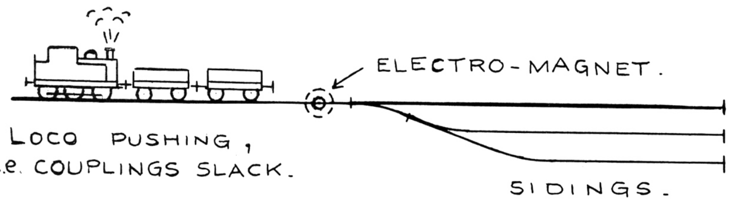


FIG. 7. POSITION OF UNCOUPLER.

and free running it can happen that as wagon 'B' draws away from it, having been uncoupled, that the friction of disengaging may draw wagon 'A' along. As mentioned under 'Coupling' the inertia of wagon 'A' should then be increased by adding weight to it.

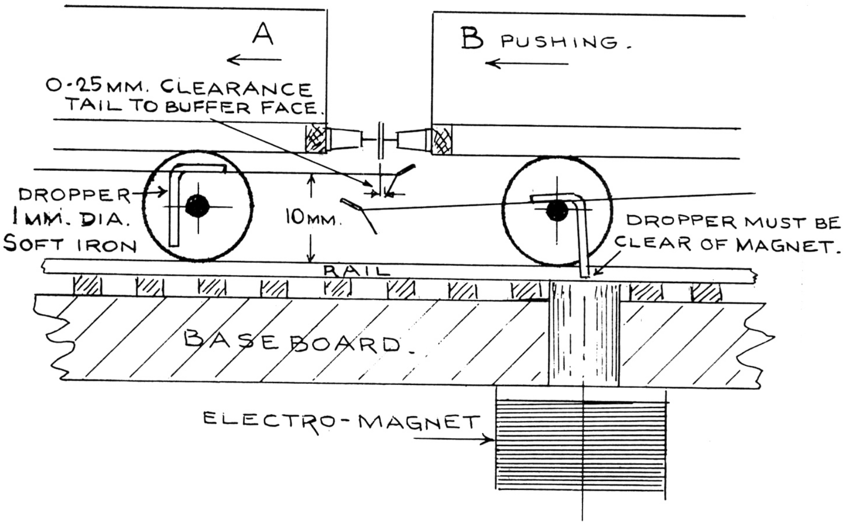


FIG. 8. UNCOUPLING WITH ELECTRO-MAGNET.

The Electro-magnetic Uncoupler

To uncouple as just described, it is necessary for one coupling to be pulled down vertically, and this is achieved in the manner shown in the general arrangement Fig. 8.

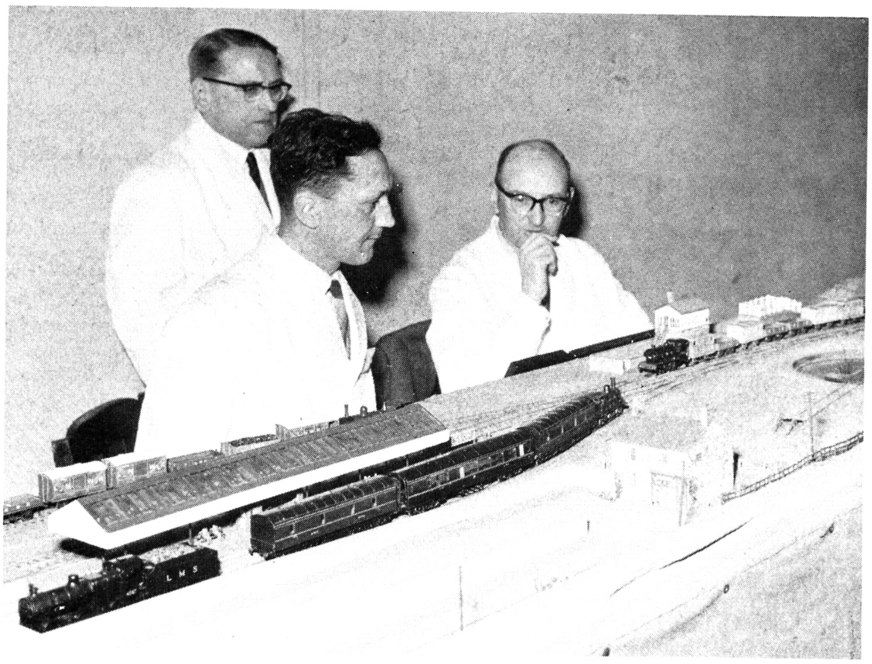
Again, wagon 'B' is moving over the electro-magnet whilst pushing wagon 'A'. By pressing a push button switch on the control panel the coil is energised and a magnetic field created between the tracks. The dropper (or armature) attached to the shank of the coupling, is of soft iron wire and is attracted to the magnet, so creating the vertical movement downwards to the wheel axle. In this lowered position sufficient movement has been made to disengage the hook, but the dropper must not touch the magnet face, otherwise you will have a lovely pile up.

A small button permanent magnet can be used at the end of a track if a vehicle is always required to be released at this point. The position of the electro-magnet on the layout should be indicated by some unobtrusive marker, especially if it is some distance away from the controller. The operater is then better able to see the relationship between the moving wagons and the magnet.

The Electro-magnet

Normally we operate our layouts on 24 volts DC current, and so we are fortunate in being able to use standard Post Office type relay coils for our magnets. A resistance of approximately 200 ohms has been found satisfactory. A mild steel pole piece is screwed into the coil core and made long enough to project through the baseboard to the top of the sleepers as shown in Fig. 9.

It is possible that this type of coil may not suit everyone due to the voltage or space available under the baseboard. Other coils can of course be used provided that they give sufficient magnetic pull to attract the dropper positively. For instance, Fig. 10 shows a home-made coil designed and produced by another MMRS member, Mr Sidney Stubbs. For 24 volts operation he used 5000 turns of 36 gauge enamelled wire, making a coil 3/4in. diameter and 1 1/2ins long with approximately 100 ohms resistance. It will be seen that the coil is held to the baseboard by a modified 4ins standard iron nail and screwed to suit.



J. Langan, Norman Whitnall and Sid Stubbs operating on "Presson" 4mm layout at the Model Railway Club Exhibition in 1962 (Photo MRC).

Story continued next month.

ELECTRO-MAGNETS.

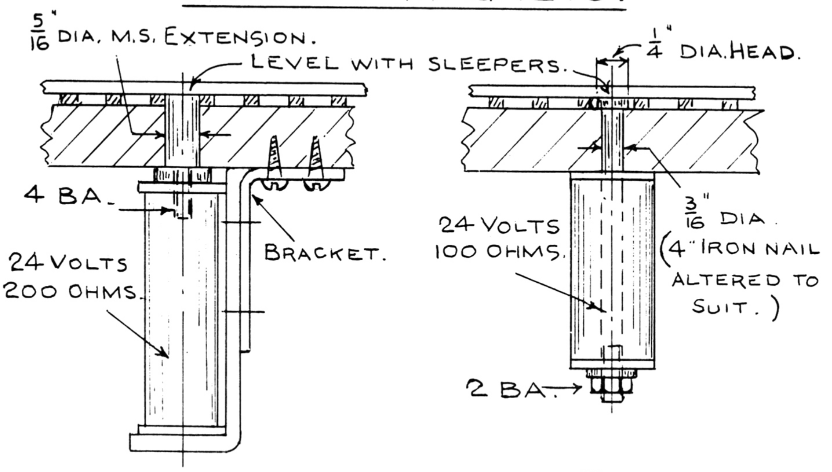
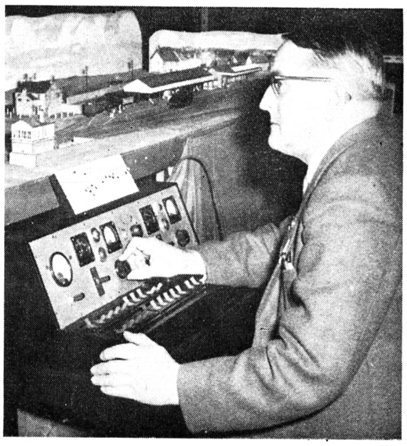


FIG. 9. EX. P.O. RELAY COIL.

FIG. 10 HOMEMADE COIL



The author at the controls of the "Presson" 4mm/EM Railway which among other things, did so much to spread the Alex Jackson coupling idea at exhibitions outside the Manchester area.

THE DROPPER. (OR ARMATURE)

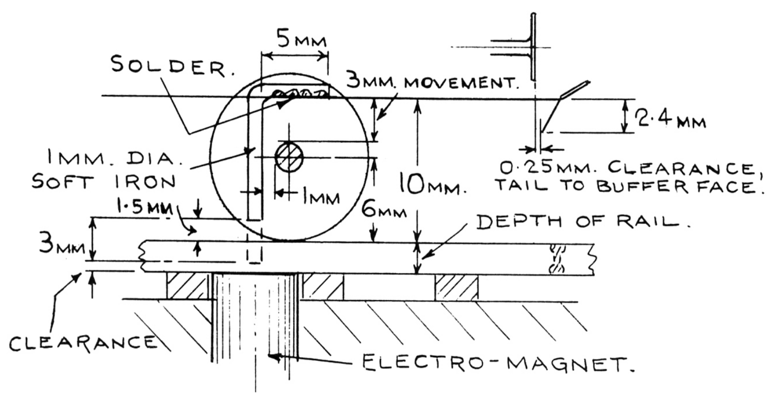


FIG 11. WAGONS. (12MM. DIA. WHEEL.)

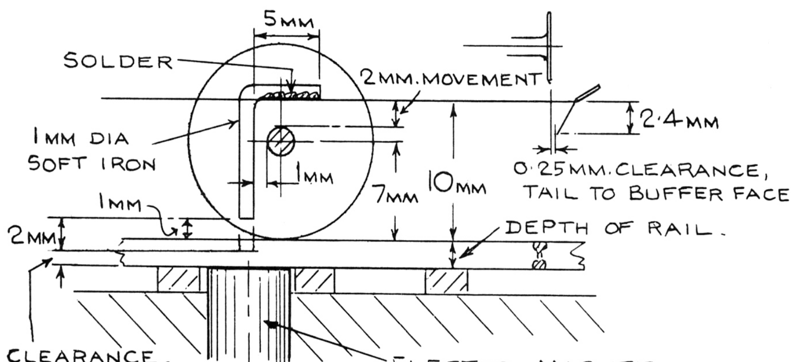


FIG 12. COACHES. (14MM. DIA. WHEEL)

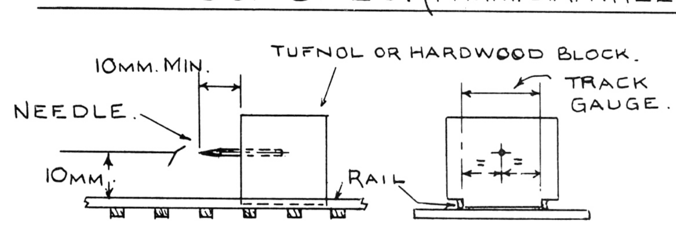


FIG. 13. HOOK SETTING GAUGE.

The Dropper (or Armature)

The finished form of the dropper by which the coupling wire is drawn down by the magnet is shown in Figs 11 and 12. It is made from soft iron wire—readily obtainable from the ordinary office paper clip, one of which when straightened out will make a number of droppers.

Having a plated surface the wire may easily be soldered to the coupling wire and will not easily rust. Solder each dropper in position as shown on the drawings leaving the vertical leg portion longer than required so that it can be snipped off to suit the depth of rail you are using. The dropper must be on the inner side of the axle with its horizontal arm pointing towards the hook as shown in Figs 11 and 12. In this way the dropper rides smoothly on the axle when in the lower position. If assembled on the opposite side of the axle the movement of the dropper on the axle doubles up the coupling wire!

Remember, the dropper must not touch the magnet when in the lower position.

Shank height setting gauge

The height of 10mm from the rail to the wire shank was determined by the original design of the coupling, when disengagement was obtained by an upwards mechanical movement of the wire. However when we changed to a downwards movement by magnetic operation, this dimension was retained. The height of 10mm is set and maintained by means of a simple gauge as shown in Fig. 13, which also sets the coupling wire control between the tracks.

Never try to set one coupling against another, this is the easy way to confusion and surely applies to any type of coupling.