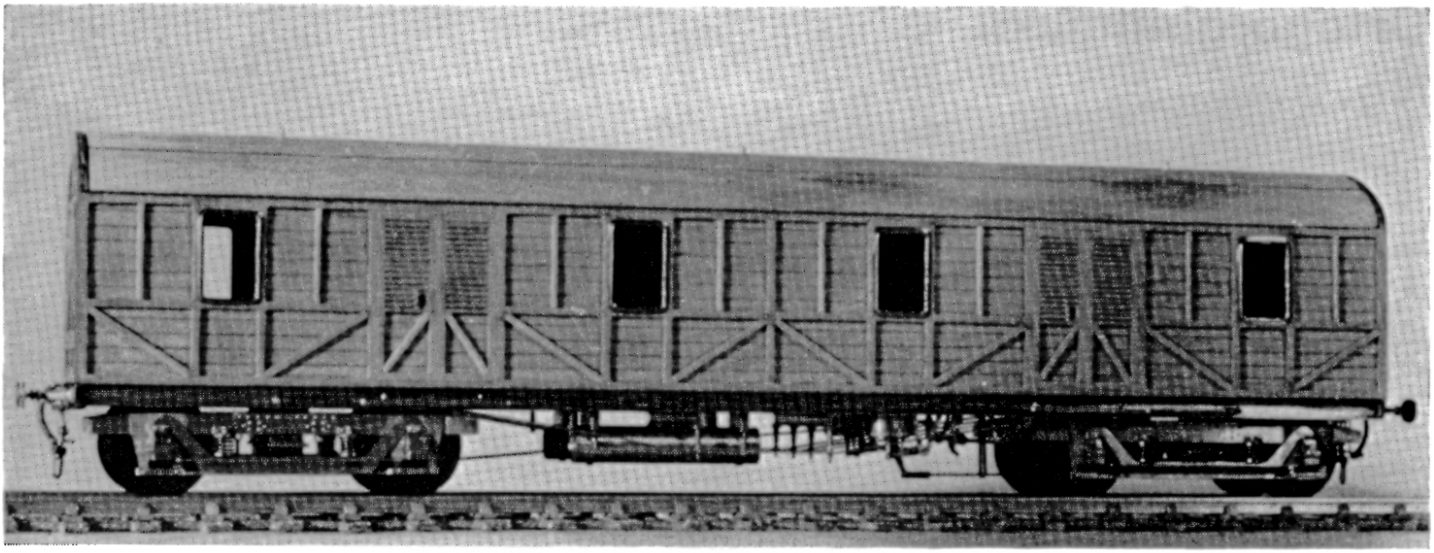


A tale of two Monsters

Jim Whittaker shows you how to build outstanding vehicles

Photographs by Brian Monaghan

AS there are many hundreds of passenger and freight vehicles in the G.W.R. diagram series, it is sometimes rather difficult to choose one's subject for modelling purposes, but when I first saw the diagram drawing of the outside-framed "Monster" some years ago, I decided immediately that this vehicle would receive top priority. It had all the features I consider necessary to hold one's interest and enthusiasm throughout the many hours of construction, i.e. character, attractive to the eye, rather rare and unusual (only three prototypes were built) and demanding, possibly, some new modelling techniques on the more difficult and unusual components. Lastly, but not least, it was most unlikely to thave been modelled previously.

Alas, Paddington P.R.O. were unable to locate a photograph of the prototype, which, of course, is vitally necessary if a serious scale model is contemplated and the whole project remained a pipe dream for some 3 years until eventually Jim Russell of Banbury came up with a really splendid photograph, offering most of the detail I required to eliminate conjecture.

Before plunging into the project I looked round for a companion vehicle which possessed most of the features referred to above and one that had many components common to my first choice. This is a practice I invariably follow, if possible, as it permits the building of two vehicles in considerably less time than twice the time taken for one.

In this instance the inside-framed ' Monster" seemed an ideal choice, although it did not quite possess the same appeal as the outside-framed job. This principle of selecting and modelling a small batch of vehicles simultaneously should, however, be kept within reason. Some years ago in an excess of zeal I started on six clerestory roofed coaches, which I suppose is equivalent to about nine or ten plain roofed coaches, as far as work content is concerned, and it became a fag rather than a pleasure and thus defeated the whole purpose of the hobby.

The actual details of the two prototypes (both included in the Swindon Carriage Diagram Series, not Waggon, and thus finished in chocolate brown) are as follows:

Outside-framed "Monster" (*50ft. Covered Scenery Van*) (see Fig. 1): ¼in. diagram Dwg No. 42968. Carriage diagram No. P.16. Lot No. 1191 only. Serial Nos. 490–492. Building date *c.* 1913.

Inside-framed "Monster" (*50ft. Covered Scenery Van*) (see Fig. 2): ¼in. diagram Dwg No. 49321. Carriage diagram No. P.18. Lot No. 1223. Serial Nos. 483–485. Building date *c.* 1913.

Preliminary planning

Many modellers prefer to get cracking on producing something which visibly contributes towards the finished model and I am no exception. In this case, however, having decided to incorporate as much chassis and bogie detail as practicably possible, I thought it might be quicker in the long term to prepare a fully detailed large-scale drawing of these units, designing the general construction and method of assembly and choice of materials as the drawing proceeded.

I feel satisfied that in this case it was a sensible decision—the whole assembly, involving many hundreds of parts, went together without any serious snags which, I believe, contributed towards a better quality and more accurate model. Being scratchbuilt throughout helps considerably at this early design stage as, of course, the general scope and method of construction are only limited by one's own imagination. In truth, and to my surprise, I eventually derived considerable enjoyment from this aspect of the art.

General construction

(1) The vehicle body and the chassis are constructed as two completely independent units; thus it is proposed to describe each unit separately. This principle not only follows prototype practice, but is strongly recommended as an aid to better modelling. For some years I used to slavishly copy the

1 *Outside-framed "Monster", partially completed.*

principle of the then-current kit sets, with wooden solebars glued to the body and all the chassis components glued or screwed to the wooden underside of the body, which really limited the scope of the undergear design and construction and involved continuous handling of the body which was invariably decorated with dozens of delicate hinges, handles and brackets, etc. It was a strain! As the modelling techniques on bodies and chassis are of a completely different nature, this principle of separate units also allows one to switch work as inclination dictates to relieve possible tedium and, of course, when either one unit or the other is complete, it can be safely stored away until its mate is ready. The body and chassis of most vehicles are invariably finished in different colours, so this "separation" also simplifies the final painting operation. The two units are eventually joined together, using eight evenly spaced 12 BA screws.

(2) Although the following notes are based on experience gained from 4mm. models, I feel confident that the general principles will equally apply to 3mm., ⅜in. and 7mm. scale.

(3) It is not proposed to describe in detail all the various components on the two vehicles, as there are too many involved and it would serve no purpose, as many of them can be produced by established and orthodox modelling methods. Instead I have tried to explain how the more unusual and possibly difficult components were produced and also how some of the more simple components can be made, either more accurately and/or quicker by the constant application of thought and imagination. The majority of the components are common to most freight vehicles; thus the following notes will apply to a big range of vehicles, not just the "Monsters".

Vehicle body and associated components

Main body. The body sides and ends are constructed from 0·035in. thick sheet plywood, carefully selected. The grain is filled in and sealed with the usual commercial products, available from any good model shop, and the wood finally sanded down to something approaching a glass-like finish with fine (7/0) sand-paper. I imagine that some of the more modern materials like styrene sheet would look equally well when painted, which would

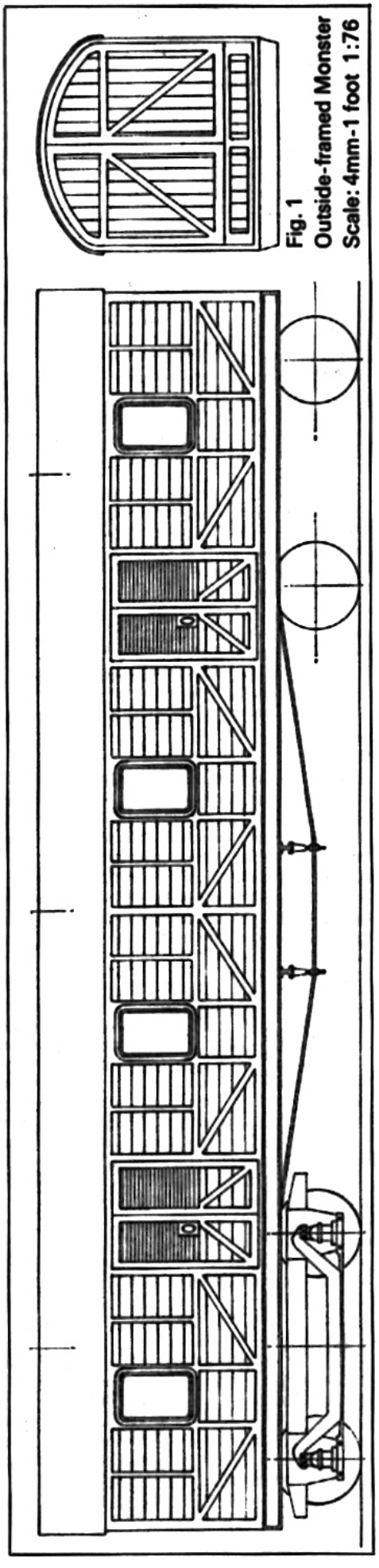


Fig. 1 Outside-framed Monster Scale: 4mm-1 foot 1:76

eliminate this preparatory work, but I just happen to have an old-fashioned fondness for wood and I suspect that I am also influenced by the fact that it is more prototypical.

All the marking out of the outside frames and the planking, etc., is then done with great care, using a 12in. rule, square and a sharp 2H pencil. The whole of the framed side, in Fig. 1 with the exception of the diagonals, is then cut out from one piece of ply as a complete single unit, using piercing saw, craft knife and a flat Swiss file, in that order (see photograph 2). The piercing saw is used to remove the bulk of the wood, making no attempt to get too near the pencil line and risk "breaking through" and thus it is a quick and crude operation. A very sharp craft knife is then used to remove the jagged contour left by the saw and a few smooth strokes taken right up to the very edge of the pencil line produces a nice clean and straight edge. To remove the last thin skim of surplus wood (i.e. so that the pencil line just disappears) requires the finer control of a smooth flat file and this last operation should produce a clean and accurate job if the marking out has been done properly.

This process is, admittedly, a delicate exercise, particularly towards the end of the operation when one is virtually handling a skeleton of 0·035in. ply, but the alternative of cutting out each individual frame and sticking it on to the planked side and getting each frame dead square with its neighbour, with good joints between each, was, I decided, equally tedious and not likely to be as sharp and clean a result as a one-piece job. After spending so much time on the frame, I was obviously not going to take any chances with the following operation of gluing it to the planked side and to ensure that their respective positions were dead on and that no movement was possible whilst the glue was setting, I dowelled them together using 0·028in. diameter nickel-silver wire for the dowel pins. There are, of course, hidden benefits from tackling something which taxes your capabilities; if you can stick at it, you find you have acquired new depths of skill and patience and can then tackle jobs even more difficult.

All the "planking" is produced by lightly passing a craft knife over the appropriate pencil lines two or three times, then opening out the cut in the wood, using a gramophone needle or similar, held in a pin chuck with frequent applications of 7/0 sand-paper to remove any burrs thrown up and thus produce a sharp, clean finish. Obechi is used for the base of the body, also the internal body spacers and the dummy roof. It is stable and easy to carve, which is important if the roof profile is to be carved level and consistent along the whole of its length. For the final outer skin of the roof I use 0·010in. thick, good-quality white card glued to the dummy roof, which produces a very strong roof assembly with no kinks or wrinkles if the initial carving has been done properly and, of course, the white card eliminates the application of several coats of white paint. The various rain strips, also from white card, are glued into position on the card roof whilst it is in its "flat" state, i.e. before it is bent and glued to the dummy roof, which turns a difficult operation into a fairly easy one. The internal body spacers are positioned at no more than ½in. centres, if possible, to insure against warping of the sides and, of course, it is vital that they are all made exactly the same width

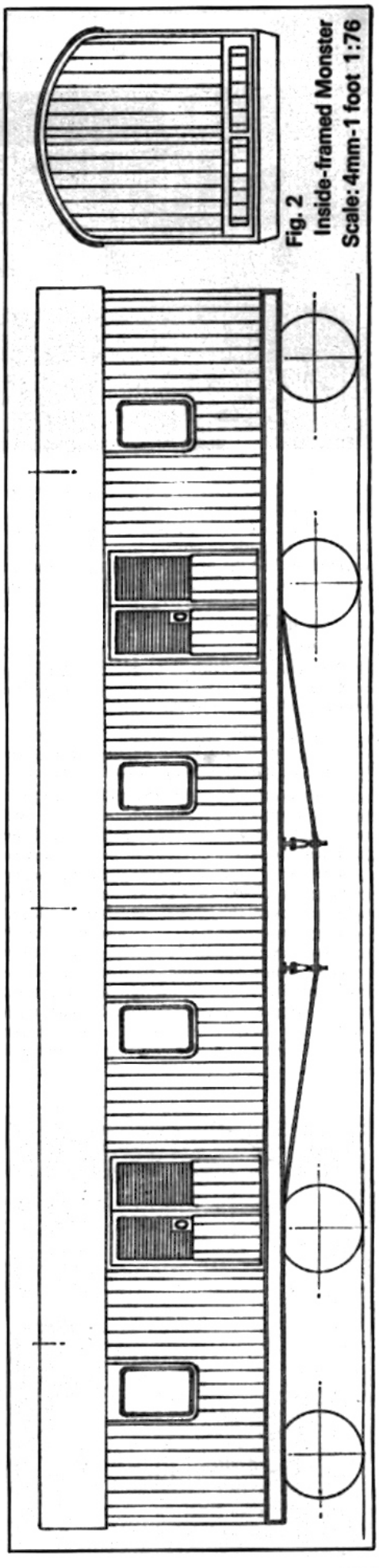
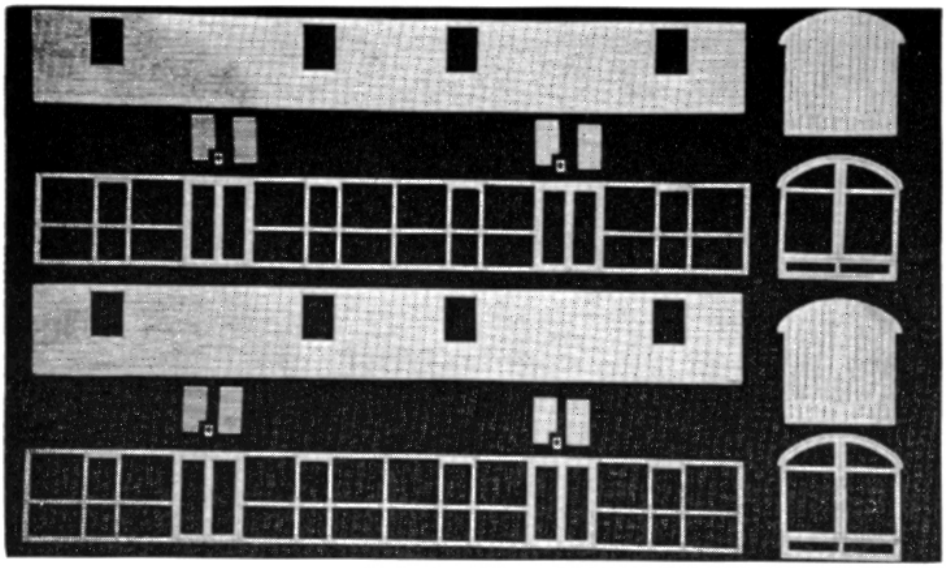


Fig. 2 Inside-framed Monster Scale: 4mm-1 foot 1:76



2 *Parts of outside-framed "Monster".*

3 *Inside-framed "Monster" partially completed.*

4 *Gusset plates impressed with shaped steel punch from sheet metal.*

and dead square if one wants the finished body to be true and square all round.

When all the body parts are ready, a "dry" assembly is made to ensure that everything is correct, and whilst in this state all the areas to be glued are marked with a pencil. The whole of the body, except the roof, is then glued together in one go, as follows:

(1) Place a piece of newspaper on to a sheet of flat plate glass (this is to prevent the body sticking to the glass—paper can easily be scraped off the base of the body).

(2) Apply hot glue (Croid) to the areas already marked and bring all the body parts together with light pressure from the fingers.

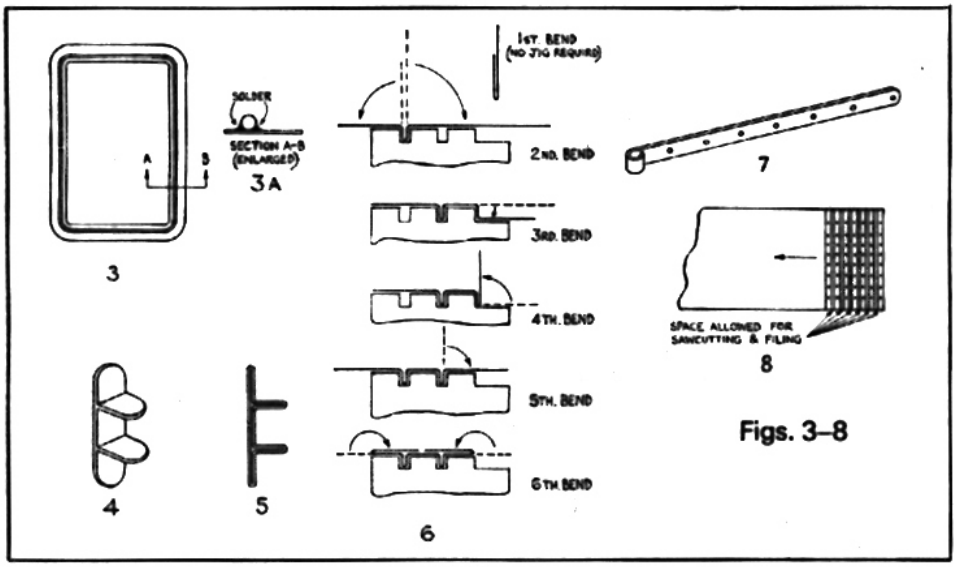
(3) Place the body on the plate glass and apply a light side-pressure on both ends and sides and also a downwards pressure on the base with whatever equipment you happen to possess or prefer. I personally use heavy rectangular blocks of steel of assorted sizes, collected over the years, which are placed hard up against the sides and ends of the body and by sheer weight hold the whole body together until the glue hardens off—after 36 hours for safety. These blocks, of course, should have at least two faces dead square with each other. Surplus glue and the newspaper base are then removed using a craft knife and sandpaper as required.

Window frames (Fig. 3). These rather unique flush-type metal frames with their rounded projections or plinths are obviously a vital part of the vehicle's appeal and I was determined to have them looking correct on the model. As is often the case, the simple approach proved the best and I eventually settled for the following:

The frames were cut out to size from 0·005in. thick copper sheet, using a craft knife and smooth file, and the plinths formed to shape and concentric with the window-frame aperture from 0·010in. diameter tinned wire. The two parts were then soldered together, using a slight excess of solder on the soldering iron, so that the "flow" of solder was used to form part of the plinth profile (see Fig. 3A). A little touching-up with a round and flat smooth file, and finally emery cloth, completed the job.

When soldering small pieces together of this nature, I always use Sellotape to hold them temporarily together and in their relative positions, until the first spot of solder is applied, after which further movement is unlikely. I honestly do not know how I previously managed without it and strongly recommend its use wherever possible.

I also have a strong preference for using copper strip or sheet where the need for strength is not required, solely because of the material's general softness and facility for bending without "springing back" and these window frames are a good example of this point. When they are finally glued to the body side they can be easily made to lie flush all round (vital, this) by a few gentle strokes along each edge with any smooth tool.



Figs. 3–8

Hinge brackets (Fig. 4). Nearly every freight vehicle features these awkwardly shaped components in one form or another, often in considerable quantity and as my previous efforts were makeshift and crude I had plenty of incentive to solve this problem once and for all. By "solving" I mean the means to produce repetitive components with no variation in size or shape, also exactly as per prototype, and taking as little time as possible to make. In this case the use of a simple bending jig produced in less than an hour, plus a soldering gimmick which I frequently use to surmount problems of this kind, provided the answer. The principle was to bend copper strip to form the basic profile of the bracket (see Fig. 5) and the detailed procedure was as follows:

(1) From 0·004in. thick copper sheet, cut out a small strip approximately $\frac{1}{4}$in. long by 0·040in. wide.

(2) Tin one face of this strip with soft solder—a very thin coat.

(3) Using the jig, bend the strip in the stages shown in Fig. 6 with the tinned face on the "inside".

(4) When complete, the application of the soldering iron will "fuse" all the tined inner faces together, giving considerable strength. This operation is essential, otherwise when you subsequently file the radius on each of the four lugs, the whole bracket would fall to pieces.

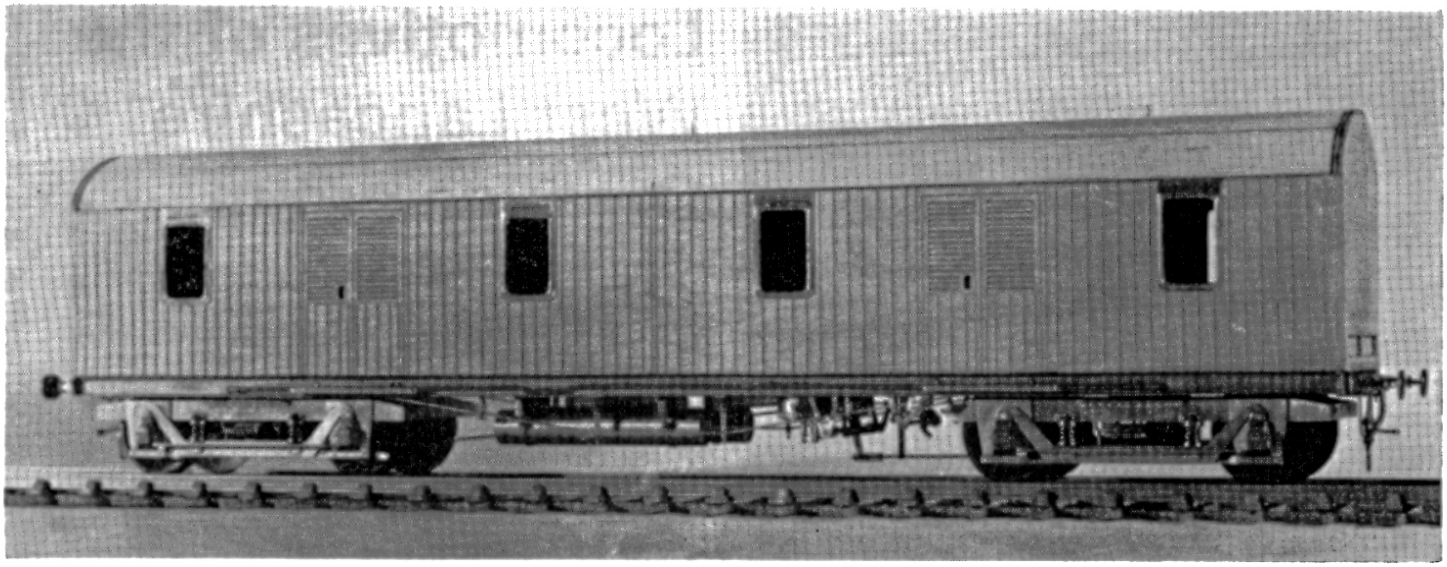
(5) Reduce the temporary (0·040in.) width of the bracket to scale size (0·026in.) using a smooth file and file radius on the lugs to complete.

Door hinges (long type) (see Fig. 7). I used to dread making these. Even the cutting out of the basic strip size of approximately $\frac{1}{4}$in. long by $\frac{1}{16}$in. wide was a problem, as the strip simply "curled up" if tin-snips, scissors or guillotine was used, and the subsequent embossing of the bolt heads with a riveting punch was even more frustrating. Unless the embossing punch was placed exactly in the centre of the strip, the punching operation would "pull" the metal strip and the finished hinge would have a series of kinks in it. A completely different method of attack eliminated both these faults as follows:

(1) Using 0·006in. thick copper strip, whose width is cut exactly equal to the total length of the hinge, mark out the hinge widths and the position of the bolt heads for as many hinges as you require (Fig. 8).

(2) Using whatever type of riveting tool you might possess (preferably with "straight-edge" facilities, if possible, to ensure that all the bolt heads are in line), emboss all the bolt heads required whilst all the hinges are part of the single piece of copper strip (i.e. before cutting the hinges to width).

(3) The last operation of cutting the hinges to width really needs to be done with an 80T piercing saw to eliminate "curling" and this is



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quite simple and quick if the 0·006in. copper strip is first stuck to a scrap piece of 0·035in. ply with Sellotape to give it the necessary strength for holding with the fingers during the sawing operation. The saw is then put through the copper strip and the 0·035in. ply simultaneously, keeping as close as possible to the "width" lines of the hinge.

(4) File and clean up both edges of the hinge to scale width (0.026in.) and remove burrs. The bend on one end of the hinge is then formed, using very fine round-nosed pliers, assisted as required with tweezers to complete.

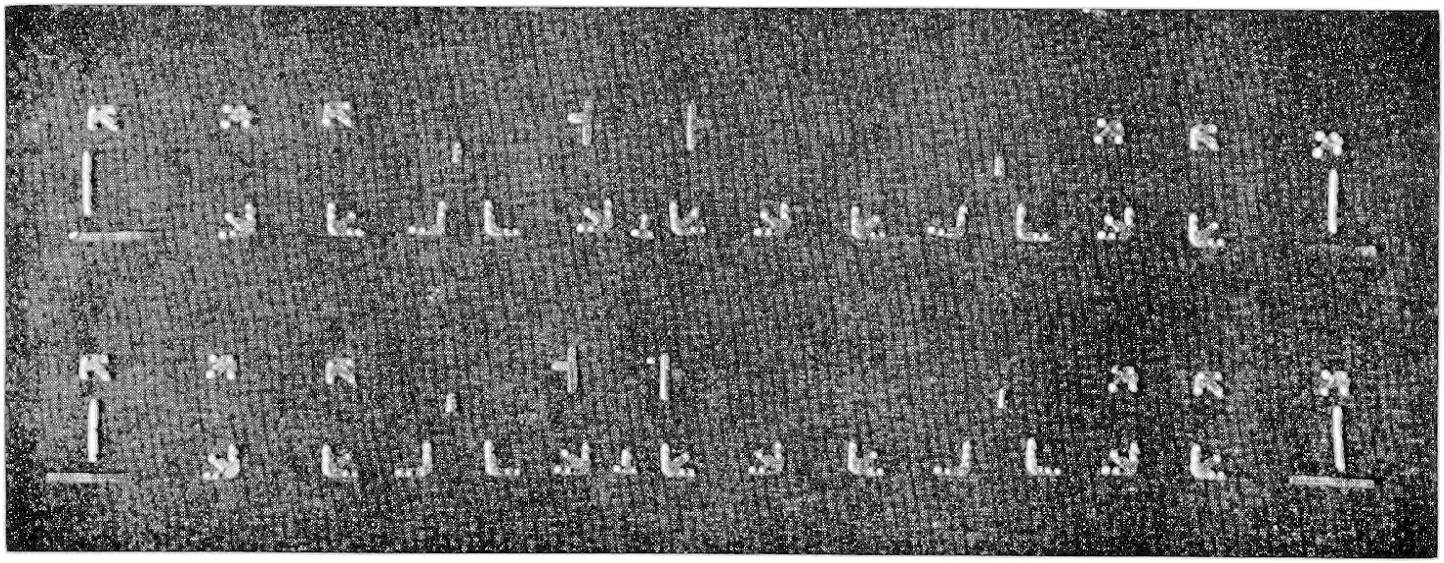
Body plates or gussets. The method of making these awkwardly shaped plates, designed to strengthen the joints between the various frames and featured on most outside-framed vehicles, has already been described in detail in the model railway press, using a lead punching technique, so I will not dwell on it, but I would emphasise that once the shaped punch has been made, the production time is literally seconds—each gusset is identical to its neighbour and the punch is still available for other projected vehicles. Admittedly, some of the more awkwardly shaped punches are not too easy to make, but one finds that, with perseverance and practice, each successive punch becomes easier and of better quality and accuracy. To avoid possible disappointment, in cases like these, where the "knack" has to be acquired, I always try to start with a simple version first and gradually work up to the more complicated examples. A few samples for the "Monsters" are shown in photo 4.

Louvres. Many hundreds of railway vehicles incorporate this most difficult to model feature and both "Monsters" are fitted with them in the top half of each door, contributing, I think, a considerable share of the vehicle's attractiveness. Fortunately for us all, the problem of making these items in 4mm. scale has now been solved in a most ingenious way by Mr. Hodges of Cardiff and I trust he will not think I am trying to steal his thunder if I briefly outline the basic principles involved. (A detailed article from him describing the finer points would be greatly appreciated by any modeller suffering from "louvres".)

First of all, select a piercing saw blade whose pitch of teeth is as near as possible to the pitch centre of the louvres being modelled. From this saw blade cut out a short length possessing the same number of teeth as the louvres required in the model and mount it in a hand vice with the teeth just projecting from the face of the vice. The "tool" is now ready for use. The material used for the louvres is 0·035in. plywood and a piece of this, say 3in. or 4in. square, is clamped down on to any flat surface, using a length of steel strip of rectangular section which also acts as a straight edge.

The hand vice with its projecting teeth is now placed firmly up against the straight edge, at the same time pressing the teeth onto the wood below. Taking a firm grip on the vice, proceed to rub it backwards and forwards along the wood (and parallel to the grain) using the straight edge as a solid guide line. The saw teeth will gradually cut several lines of parallel channels into the wood, thus forming the louvre effect. The wood dust thrown up by this cutting motion should be periodically brushed away, otherwise, if allowed to build up, the teeth of the saw blade will jump out of their respective grooves and ruin your efforts. You now have a 3in. or 4in. length of "louvre" and after a light rub down with fine sand-paper to remove any odd burrs, this can be cut into slices of appropriate width to suit the particular vehicle you are modelling. I rate this method as one of the best modelling ideas ever produced. Without it, ventilated vehicles (and there are some real beauties without even going beyond the "siphon" range) would be virtually outside the scope of most of us, at least if one insists on louvres looking like louvres.

[*To be continued*]



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