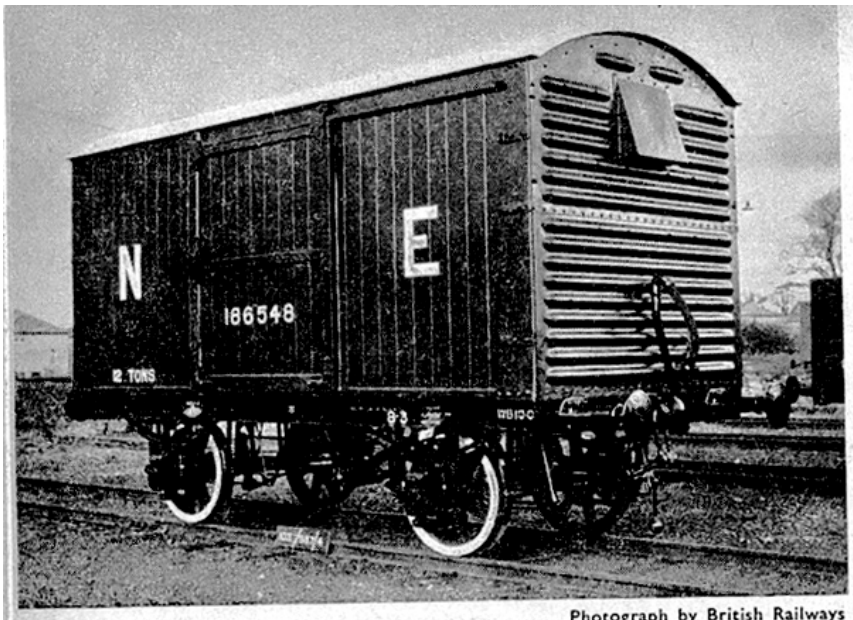


Photograph by British Railways

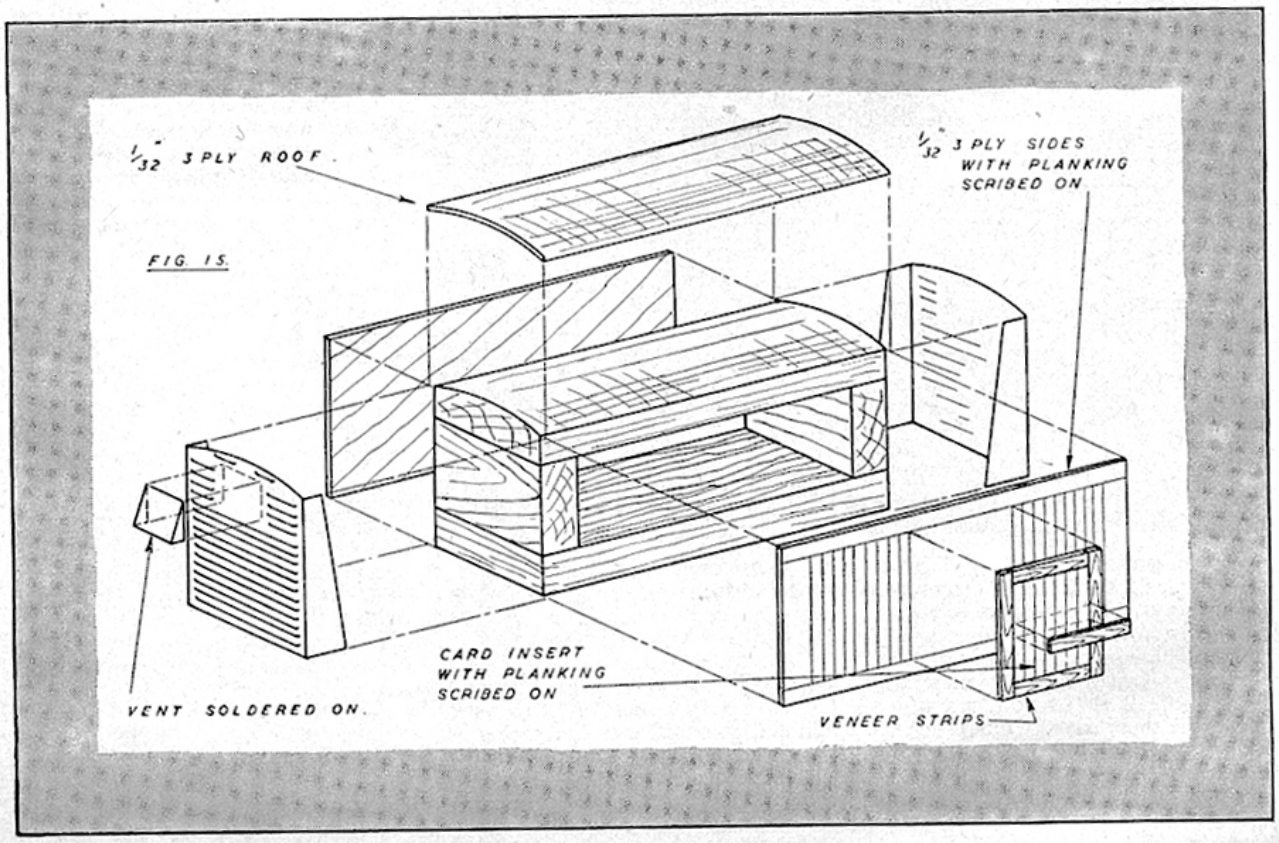
BETTER ROLLING STOCK—2

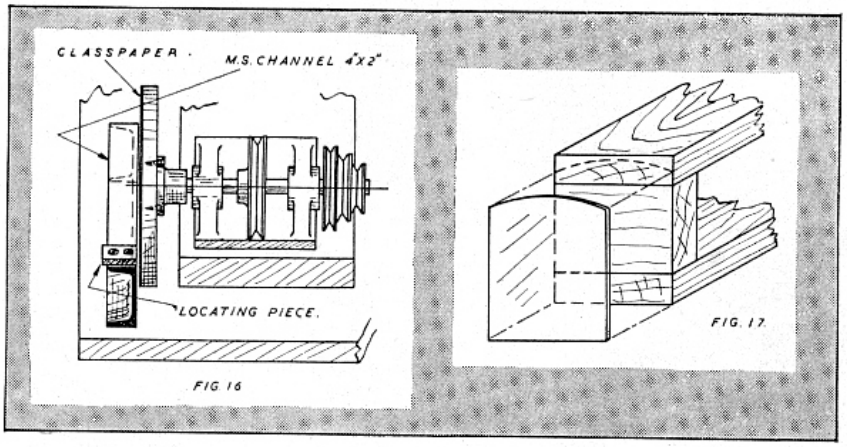
by
John Langan
A.M.I.Prod.E.

How to build 4mm Scale

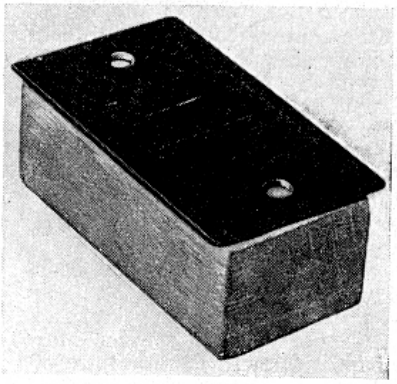
AN exploded view of the general construction used for the van body is shown in Fig. 15. The main framework is made from 1¼ in. × ¼ in. strip. The wood which I use is cut from packing cases which came from U.S.A. and I believe it is called sugar pine. Being fairly soft and straight grained it is lovely to work with. The main frame is glued with Durofix and nailed with Hobbies' ⅜ in. brass fretwork nails or pins. This is then reduced to the correct sizes allowing for the thickness of the sides and ends to be fitted. The top piece which allows for the curvature of the roof is left alone at this stage but the sides and ends must be perfectly square to the base and to each other. As I am not a very good "wood butcher" I have built up a small sanding machine at one end of the countershaft of my lathe drive. The idea of this is shown in "semi plan view" in Fig. 16. It consists of a 7 ply

Continued from page 111, MODEL RAILWAY NEWS, *June*, 1954.

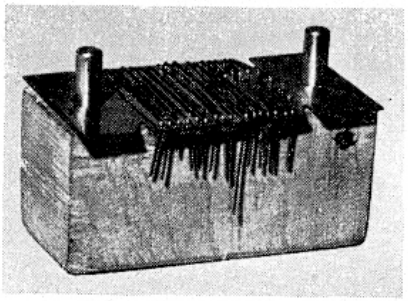




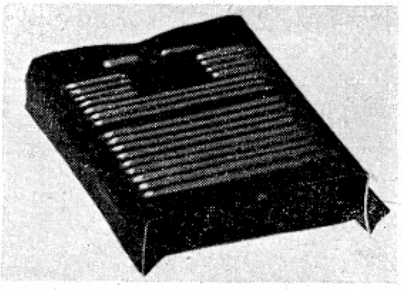
Box Vans



Female die



Male die



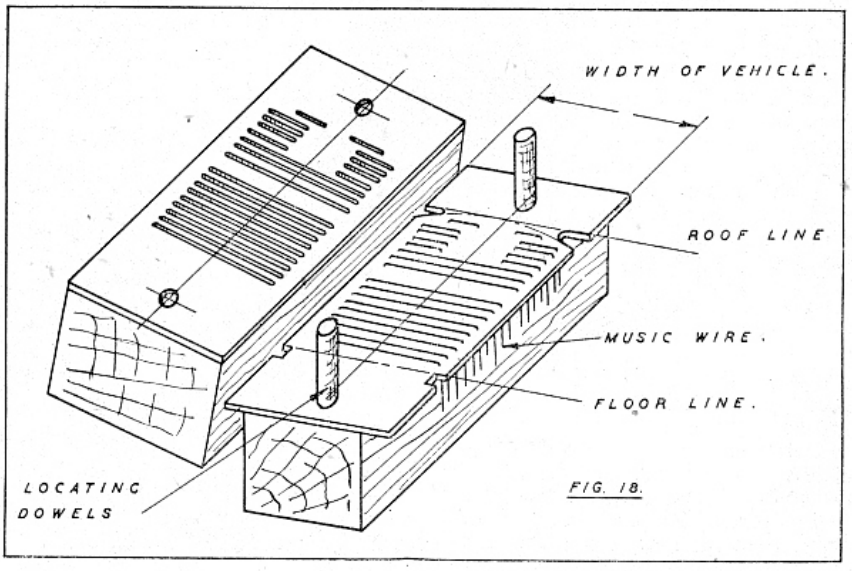
End pressed from copper sheet

wooden disc 11 in. diameter to which is glued a sheet of glasspaper. A piece of 4 in. × 2 in. channel iron is fixed to the bench so that its top surface is just below the centre of the disc and of course square to the face of the glasspaper. A metal piece is screwed to the top of the channel at right angles to the disc, at the side of the disc where the rotation is downwards. With this apparatus I finished the 6 bodies in one afternoon—The dust was terrific, and it is advisable to tie a handkerchief over your nose and mouth. Allowing for the thickness of the roof make a metal template of the end section as Fig. 17 with which the roof curve can be quickly marked out. Here again the sander proved invaluable in finishing the top curve. Make two small holes in the floor so that when the sides are fixed on, the air can circulate and allow the glue to dry hard. For the sides and roof I use 1/32 in. 3 ply wood sheet which is pinned to the drawing board and carefully marked out using a hard pencil with a fine chisel point. All planking is then scribed on the sides. Cut the pieces out of the sheet using a fine toothed fretsaw, leaving a small amount all round for finishing. Finish the pieces by holding them vertical and rubbing the edge on a sheet of fine glasspaper which is pinned to a flat surface. If you have a micrometer you will find it useful for checking all sizes of these body pieces—yes even on wood ! " Duro-fix " the sides to the body and if possible fasten with fretwork nails in places where they can be hidden—behind doors, for instance.

Corrugated Ends

Here I was very fortunate in that the idea which I developed to produce these metal ends worked satisfactorily first time. The material for the ends is copper strip .004 in. thick and 1½ in. wide. This is cut into suitable lengths and softened by holding the piece over a gas jet until it glows all over and then quickly plunging it into cold water. The tool is shown in Fig. 18 and consists of male and female parts, the male portion being made by placing .020 in. music wire into carefully marked out holes. The female part is marked off from the male part when the two pieces are located by the dowel pins. The slots can then be sawn out using fine toothed " Eclipse " fretsaws—(note the plural !).

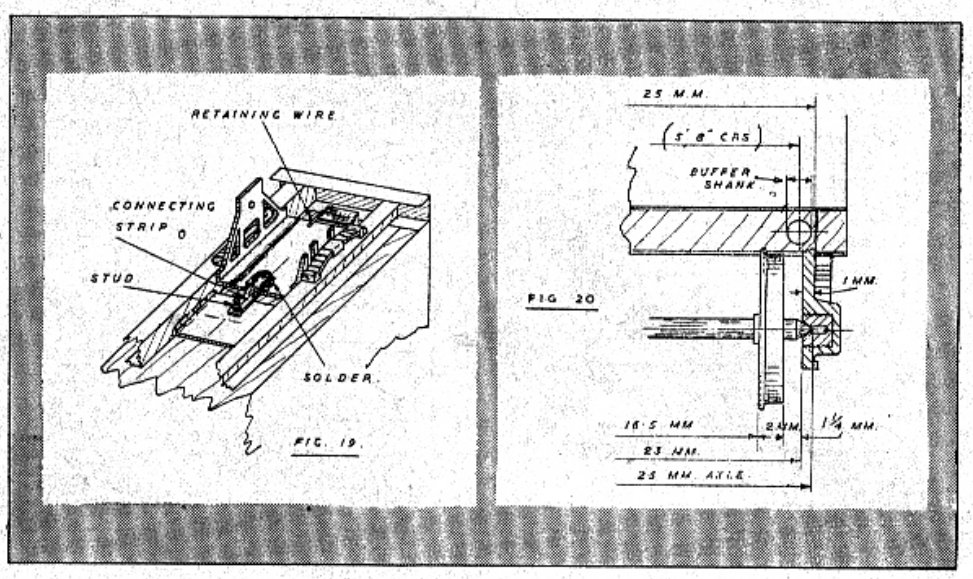
A hardwood backing to each part allows the tool to be pressed together in the vice. It will be seen from the sketch that the position of the floor and roof can be marked on to the component whilst held



in the tool and then the sides are bent over. The pressed end is then trimmed to size leaving the top curve to be finished when in position on the body. The corrugated ends are held on to the main body by means of Taylors No. 20 white entomological pins which I cut down to about ¼ in. long. Mark off on the sides of the corrugated ends where the rivets are indicated on the prototype and then pierce the copper with a fine pointed scriber. The pins can then be forced in by holding with the pliers, the heads of the pins making a very good representation of the rivets. The vents can now be soldered on to the ends, and the top curve of the copper trimmed and filed to suit the body. If you use card for making roofs this can now be glued to the body. Card roofs, however, have a tendency to become " dog-eared " with use, and for this reason 1/32 in. 3 plywood is superior. At each end of the roof and the body, mark off the centre line. With the centre lines of the roof and body lined up, force a brass fretwork nail through the roof at each end. These need not be driven right home at this stage as they are for location purposes only. Remove the roof again and coat the underside and also the top of the body with Durofix and allow to dry. Again Durofix the roof and replace on to the body and drive home the nails with pliers. Three nails each side should hold the roof which is now tightly bound to the body with strong tape and left to dry for 24 hours. Any projecting nail heads are then smoothed down and the side edges of the roof carefully thinned. The door details indicated in Fig. 15 can now be glued on but smaller details should be left until the chassis is fixed to the body.

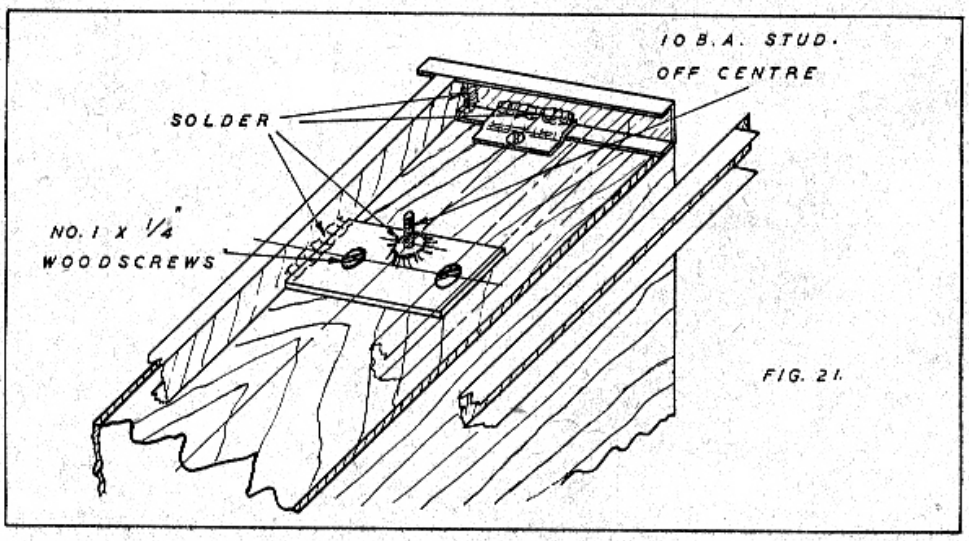
Undercarriage Details

Mention has been made of the desirability of the wheels following any track undulations and the principle adopted here is to make each pair of wheels a separate unit. The axleguards are held together with a transom plate and are a sliding fit within the solebars, but are held longitudinally by connecting strips to a stud near the centre of the vehicle as Fig. 19. On perfectly level track all the axleguards support the vehicle under the solebar but where required, however, the axleguards with wheels are free to drop to follow the track. A piece of wire or strip soldered to the inside of the buffer beam and projecting over the transom plate as in Fig. 19, limits the amount of drop when the model is picked up.

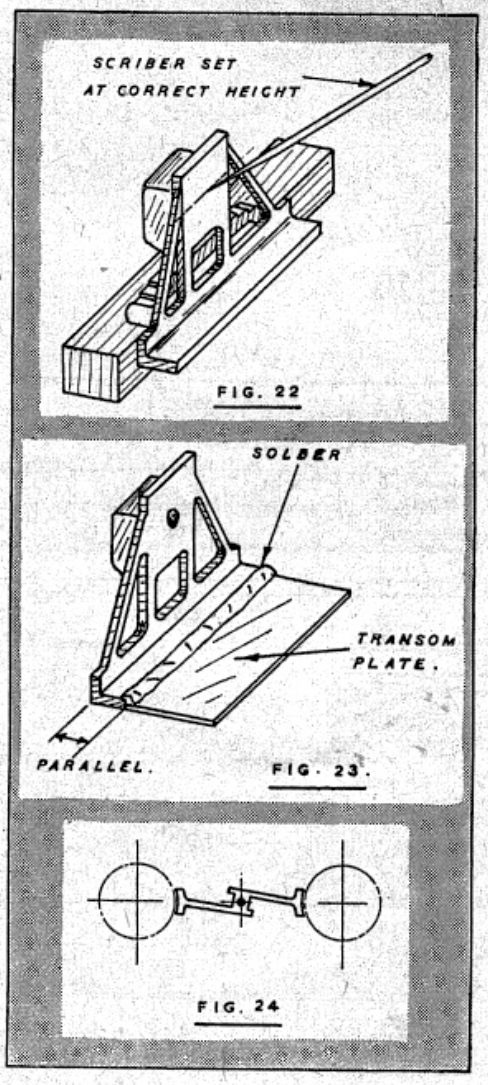


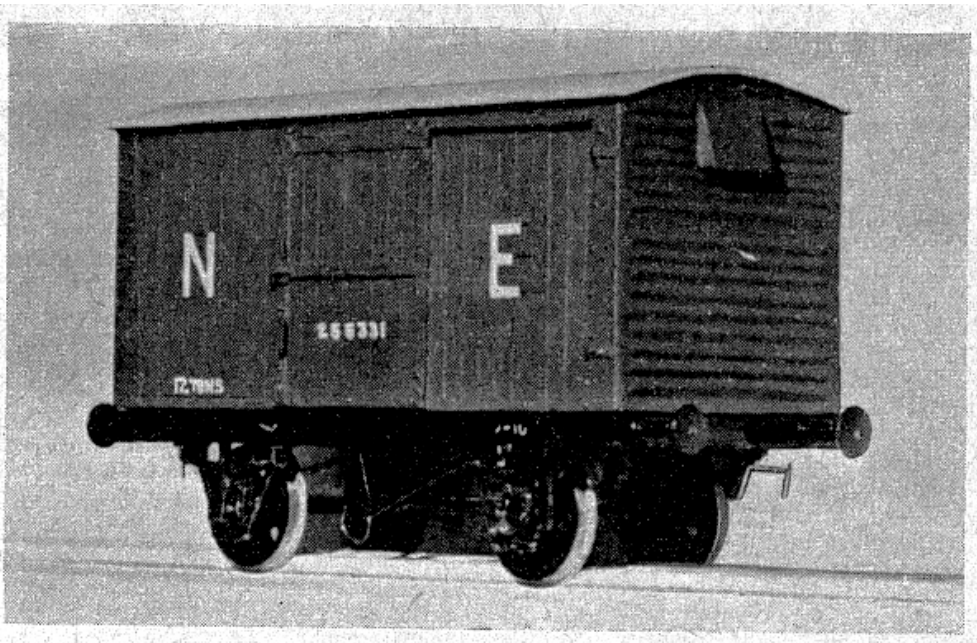
This principle of equalising the wheels gives excellent running of the vehicle and helps to reduce the exaggerated " roll " which is characteristic of a model where the wheelbase is fixed to the solebars. Before finally fixing the width between the solebars it is advisable to consider the type of buffer shank which is to be fitted into the buffer beam, especially if sprung buffers are used. Fig. 20 shows a part section from which it will be seen that the size of the buffer shank may limit the distance between the solebars, which in turn determines the distance across the axleguards and the length of the axle. Where solid buffers are used and the wagon is narrow, a flat may be filed on the buffer shank to obtain the correct width between the solebars. However the figures given in Fig. 20 will be found a useful guide to the sizes used and can easily be adjusted to suit any particular application. With the above point decided we can proceed to the assembly of the chassis. Scale channel " iron " can be obtained commercially and this is best cut to length using the fine toothed fretsaw. I make my own channel " iron " by forming brass strip around a piece of steel, ground to the width of the inside of the required channel and then finish the flange by filing. The buffer beam having been finished to length and drilled for the buffers, solder to the inside a small brass strip which has a hole in to receive a No. 1 × ¼ in. woodscrew. The strip is bent so as to rest flat on the floor of the body when the buffer beam is upright. The buffer beams can then be screwed down at each end of the wagon as in Fig. 21.

A metal strip ⅜ in. wide and exactly the width between the solebars is screwed to the centre of the base of the wagon as Fig. 21. One side channel solebar can now be soldered into place and if you are using a heavy type of soldering iron the buffers could be included. Make sure that this solebar is parallel to the side of the wagon. A wooden gauge is useful when soldering the



second solebar into place as it ensures that the solebars are parallel over the full length of the wagon. Solder a 10 B.A. stud to the plate so that it is slightly off-centre longitudinally. This is to ensure that should the wheel units be removed, they may be replaced in the same position. So that the wheels shall all be at the same distance from the solebar, the axleguard should be placed upon a piece of steel (representing the solebar) when marking out with the scribing block as in Fig. 22. For an axle which has a 60 deg. coned end the hole in the axleguard should be coned about 65 deg. Alternatively a 0.025 in. parallel hole with a 65 deg. countersink as Fig. 20 will be found to give excellent running. There are two ways of assembling the axleguards depending on whether or not it is possible to solder them. Where they will not solder it is of course necessary to bolt them to a transom plate by means of 12 B.A. countersunk head screws. For axleguards which can be soldered the following procedure makes a very neat job. File the flange of the axleguards to a given width as Fig. 23, and parallel





to the front face which fits against the solebar. A transom plate of 0.015 in. or 0.018 in. bronze soldered between the axleguards makes up the distance between the solebars but allows sufficient play for the axleguards to slide freely downwards. After soldering one axleguard to the plate the wheels should be fitted and then, by adjusting the second axleguard carefully, line the wheels up and spot-solder the axleguard in position to the plate. This operation should be done on a flat surface. Check the wheels for running before completing the soldering. The wheels can be removed at any time by springing the axleguards open. Place the wheel unit in position on the solebars and solder the tag to the transom plate thus connecting the wheel unit to the 10 B.A. stud as Fig. 19. It will be seen that the whole underframe with the wheels can be removed from the body by removing the No. 1 woodscrews. This is very useful when painting.

Brake Details

These are mainly cut from 0.010 in. brass and bent to shape. Brass strip sold as boiler band strip (about 0.03 in. × 0.010 in.) is very useful for the pin racks which hold the brake handle, brake shoe hangers, and brake rod safety guides. Where suitable, a piece cut out as Fig. 24 and soldered to the brake cross shaft makes a good representation of the brake gear when painted black and also saves some fiddling soldering. On fitted vehicles where each wheel has a pair of brake shoes, I cut these from a ring turned to the correct section and diameter and then suspend them with the boiler band strip mentioned above. The brake rod cross-shaft I make from 0.025 in. copper wire for ease of soldering on the details. Short lengths of such copper wire can easily be made dead straight by rolling them between two flat surfaces.

Final Details

These small details are usually shaped from 0.003 in. or 0.005 in. shim brass and held to the body by "Durofix" and also where possible with the entomological pins already mentioned. A useful application of these pins is on the door handles. The handles are made from 0.015 bronze wire which is bent to shape around flat nosed pliers and the ends flattened to receive the pins.

Painting

Generally the non-fitted vans are grey and the fitted ones red oxide. The art of putting the paint on depends a lot on one's aptitude for this kind of work, but the following few tips may be useful. When painting fairly large letters mark them out in outline with a sharp pointed pencil. Where a number or several small words have to be painted on draw them first on a piece of card and hold the card beneath the job so that you know how much room there is to play with. Finally at each painting stage put the model away (free from dust) for a couple of days before you touch it again.

In conclusion, may I say that the methods of construction described in these notes do work, but as there are generally more ways than one of achieving the same object I have no doubt that there are other methods which also give satisfaction to the modeller.