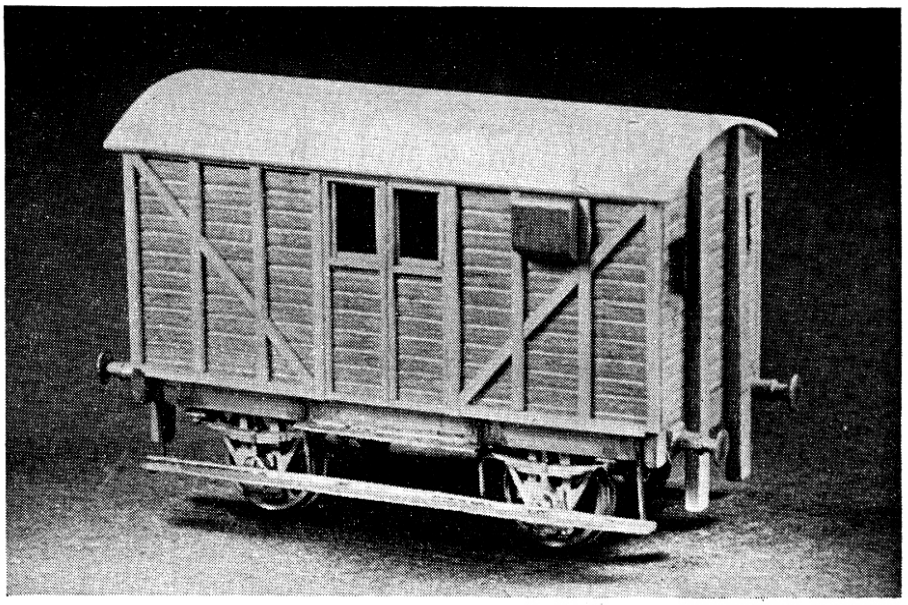
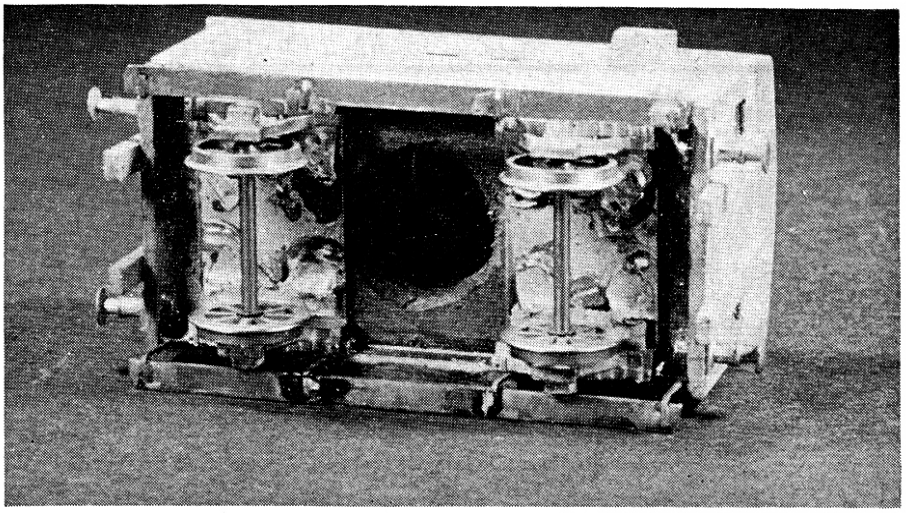




HOW TO BUILD FREIGHT VEHICLES IN 4 mm. SCALE

PART IV

NORMAN DALE NOW TACKLES BRAKE GEAR, WHEEL ASSEMBLIES AND CROWN PLATES

Brake V Hangers

STARTING with the V hangers, these awkwardly-shaped but essential parts of the wagon underframe are made quite easily now. I say now because I have had a few headaches in finding the quickest method of mass-producing these items.

A simple jig is first made from a piece of hardwood about 6 in. by 1 in. by ⅝ in. Using one edge as a datum, the exact shape and finished size of the hanger is very carefully marked out. This is done with the modelling knife. The shape is then carefully recessed about 1/32 in. deep, also with the knife. Notice will have no doubt been taken of the fact that most P.O. wagon V hangers are not a " V " but are turned into the perpendicular at the ends.

To make them I use 0.020 in. brass pin wire. At about ⅜ in. from the end of a 6 in. length, it is first bent over a thin sharp edge not quite back on itself. I find the modelling knife the tool for this first bend. The turned-in portions are produced by holding them in the small square-nosed pliers to allow 6 mm. to protrude from the face of the pliers. This turned-in piece is bent a little more than is required at this stage. The hanger, still on the end of the 6 in. length, is now gently tapped flat with a watchmaker hammer. This flattening process will open out the hanger to its correct width. A little practice will determine how much to bend at the beginning in order to finish up at the correct angle after flattening. Lay the finished hanger in the recessed shape on the wooden jig to check the angle and overall width. Another tap with the hammer, or more attention with the pliers, will soon correct any errors. When you are satisfied, nip off the hanger to the overall length while it is still in the jig and clean off level the cut ends with a file, also whilst it is still in the jig. You will now have a correct-sized hanger which only needs to be drilled for the brake lever shaft. Do not drill yet as it can be all done at the same time when we have other parts to drill. If in the flattening process your hanger develops curved arms, it is easily corrected by gently tapping the hanger on the inside edge of the curved portion. They are quite simple and easy to make, and what is more they are almost to scale. I recently completed a batch of sixty of them; the time worked out to be one every four minutes (of course, they were not drilled).

Brake levers

These are easily and quickly made using the same 0.020 in. brass pin wire as we used for the V hangers. I first cut the pin wire to the required length, not forgetting to add on for the various bends around the axlebox as seen on the plan of the wagon. The bend for the hand grip portion as seen on the elevation is first bent a little more than is required by the drawing. I have made a little hardboard template cut a

Maryport and Carlisle Railway 10 tons Goods Brake Van (Drawings M.R.N., August, 1952). Roof, outside framing and frames for door lights all of " Plastikard." The " duckett " is a lampcase and will have red and white brilliants set in when finished. Below. The hole in the floor is for easy glazing of the windows.

little sharper than the first bend. The wire is then flattened again, using my hammer and steel block. This flattening process will bring the bent portion into its correct position to match with the drawing. The taper which all brake levers have can be easily obtained by gently tapping more on the required portion. A few strokes with a smooth file will erase any hammer marks. A check with the plan is now required in order to put in the bends to miss the axlebox. This again may seem a long job, but it is just the opposite when you do a batch of the same wagons. I got to know after the first couple how far along the lever to hold my pliers in order to get a certain bend. Having this batch of thirty private owners going through the shops at the same time, it has become quite mechanised after the first few (Fig. 16). The hole at the bottom is all that is required to finish them off. This is also left until I have everything ready that requires drilling with the same drill, No 80.

Brake shaft trunnions

The next step is to make a batch of trunnions for the brake shaft. These again are from 6 in. lengths of 0.020 in. pin wire. It requires to be flattened out in a straight line. The wire will " snake " round in the flattening process, but by tapping the insides of the curves it will straighten. The small spring dividers are now set to 1¼ mm. and stepped along this flattened wire. An automatic centre punch is used to pop these 1¼ mm. marks made by the dividers. Of course, it is possible; the word " impossible " is not in the model-maker's dictionary. The use of the watchmaker's glass fixed to a stand is all this is required extra.

Whilst we have the necessary tools at hand, we can centrepop the bottom of the V hangers and the brake levers' shaft holes. All the popping done, a No 80 drill is set up in the drilling machine protruding only about ⅛ in. With the aid of a good light, and again a watchmaker's glass clipped to the drilling machine, away we go drilling all these " popped " holes.

I agree a drilling machine is a great help for this task, but the odd wagon job can be done with a pin chuck twisted in one's fingers. It takes longer, of course.

The lengths of flattened wire we prepared for trunnions can now be cut up into small pieces with three holes in each, the centre hole being, of course, for the brake shaft and the outside holes for attaching to the push rods.

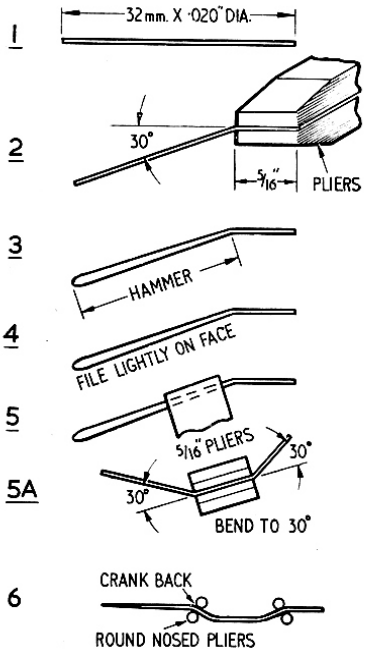
Fixing wheel assemblies

This is now the time to pick up the bodies again and fix in the wheel assemblies as already prepared according to the M.R.N. for April, 1962. These are set in their spot-on position by marking the brass solebar with the " odd-legs " from each headstock face. I always mark the position of the centre of the clip around the spring. I will say no more about the fixing as this has already been done in my recent article.

Brake gear fixing

We can now at last get some of the bits and pieces soldered into place. Starting with the V hangers, I mark on the solebars the outside edges of the hangers from each end of the wagon. This makes certain that the hanger is central. Another point to watch is the height of the hangers when soldering them on, but this can be forgotten if one makes a small wooden jig as in Fig. 17. Note that one end is marked " S." This end is made slightly smaller so that you can withdraw it after the soldering of a hanger. The length of this handly little jig should be such that it will span both solebars.

FIG. 16 BRAKE LEVERS



A good hot electric iron, or preferably two hot irons, is what I use for soldering these hangers in place. The brass solebar takes quite a deal of the heat of the iron. By using the larger one first to get the solebar really hot and then the small instrument iron for the actual soldering this job is simplified. After both hangers have been soldered in place, clean off the surplus solder before moving on to the next job.

A length of coupling wire is cut about 40 mm. long. This is, of course, the 0.011 in. spring steel wire I use for the Alex Jackson coupling. Handy wire this, apart from couplings. I have used it for hand-rails, brake truss rods and the drilling of fine holes. Its use here is for the brake shafts. Two of the small trunnions are first threaded on through the centre holes. The wire is then inserted through the inside holes of the hangers. A touch of solder on the inside of the V hangers will quickly fix the wire. We now have a brake shaft with the trunnions swinging free, waiting to be soldered in place. These require to be soldered not opposite the wheel treads but a little towards the outside of the wagon and slightly out of the vertical, too. A glance at our P.O. wagon drawing will tell you in seconds what I am attempting to say. With the brake shaft going right across the wagon we have what is called the " Morton " brake. This is fitted when there are no bottom doors in the wagon. If bottom doors are fitted this shaft consists of two short lengths. The inside ends of the shafts are carried by another hanger bolted to the inside face of the solebars. This is known as the " Freighter Brake " and is denoted on the wagon sides by two short diagonal white lines above the V hanger.

The brake levers can next be tried in position. A little coaxing here and there with the small pliers is all that is required. They can be soldered to the little bit of 0.011 in. wire protruding through the V hanger hole. This solder can be in turn filed to imitate the large nut or washer which is fitted to the end of the brake shaft, after first snipping the protruding surplus wire off.

Brake lever guides

Another part of the brake lever which we have not yet made is the guides. Here once again I use flattened 0.020 in. pin wire. They are bent with the square-nosed pliers to lie on the solebar and crank over the brake lever. I do not drill the holding-down-pin holes in these guides because they would get filled with paint, being so small.

The lever guides I do not do in batches: it is much better to snip off the guide after soldering. A few brake levers half down makes for a stronger job, because one can get a touch of solder to the handle end and the guide unseen. These " brakes on " wagons help to complete the scene, and if they are moving one can always blame the lazy shunter or good guard.

Brake blocks and push rods

These form our next job, and here I make the whole batch at one go. Once again I press into use the 0.020 in. brass pin wire. First a 6 in. length is wrapped around a piece of ⅜ in. diameter rod, making a coil spring. Believe me or not, we are now making brake blocks. Snip the coiled wire up to make separate pieces of curved wire. Lay them on one side while a few lengths of the 0.020 in. pin wire is hammered flat and straight. These latter will make our brake push rods. I do one first very carefully hammered out to a few thou less than the correct width of 0.032 in. (2½ in.). When painted they soon pick up the odd thous. If I keep this first one in front of me, the others are rarely far out.

If you wish to get around this job, you could use 1 mm. strip or boiler banding. I would point out that it is oversize by 0.007 in. and again after painting it would be well oversize.

My flattened pin wire or push rods are now cut a little longer than the required length—say, 15 mm. A bit of the curved wire is next held down with a weight plus a card packing so as not to lose any heat from the soldering iron. We now have to solder the push rod to the curved wire near one end of the curved wire. After soldering, snip off the curved wire but leave enough on to form your brake block. Then gently tap the block and solder with a light hammer. This tapping spreads the metal and the block assumes the correct radius on its face. We thus have the shape of a brake block in a minute or two. A touch with a rat-tail needle file will improve the job to your satisfaction.

I have considered making proper blocks with the aid of my lathe, but having so many projects on the "pending" list it has not been attempted. I do however consider the foregoing to be sufficient to give the silhouette of a block, which is all that we see.

These blocks and rods can now be offered to the wagon brake shaft trunnions. A short piece of 0.011 in. wire will mark the push rod for drilling No 80. A little piece of card is required to hold the block off the wheel whilst the marking is taking place. The rod can now be centre punched and drilled No 80. It is then attached to the trunnion with a short piece of 0.008 in. copper wire. This is threaded through the holes and tack soldered in place. By gripping the brake shaft with a tool-maker's clamp to stop the heat travelling to the solder on the shaft and trunnion you should be able to solder the copper wire in place quickly.

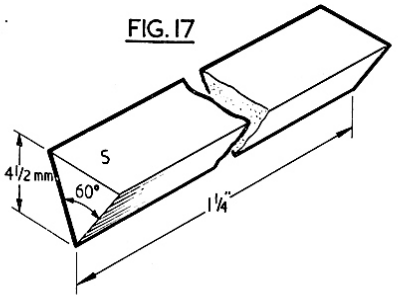
I used to attempt this soldering job without the drilling and the copper wire. I find it a great help in conserving my patience. The push rod safety hangers I make from 0.016 in. phosphor bronze wire. This is also brought up to size when painted. I only solder one end of these hangers, the other end is cut off and is out of sight behind the solebar.

Crown plates

These small but noticeable and almost semi-circular plates are to be found on most types of wooden-underframed goods stock. They are quite easily made now; I say now because I have spent hours making them out of 10 BA brass washers filed thin. They were then cut in half and soldered to the solebars. If you want to test your patience have a go. It is thanks to my good friend "Smoky" Bourne of Birmingham for the germ of the new methods. Like everything else somebody will always try to improve the breed. At a lecture given to the Manchester "boys" he said that he used a leather punch to punch small holes in paper. Then he turned the largest size punch round and attempted to locate this over the small hole. He admitted that quite a lot of circular washers were wasted but what did that matter? Paper was cheap enough and you might get one or two perfect washers out of every ten attempts.

A few weeks after this lecture I was in London and purchased from Buck & Ryan a "Maun" revolving leather punch pliers. On examining these pliers after a day at the M.R.C. exhibition, I

FIG. 17



immediately saw a possible way of getting ten washers out of ten attempts with no possible chance of any wasters.

With my first available spare time after arriving home I could not get to my lathe fast enough. A couple of die plates were made out of a piece of brass rod (Figs. 18 a and b). These die plates had a couple of flats filed on them to suit a small spanner for easy fixing. The riveted baseplate was drilled out and thrown away. The holes in the tool were drilled out and tapped 0 BA. The flat die plate "B" was screwed into the front hole and a few dozen ⅛ in. dia. holes punched in some 0.004 in. card. "B" plate was then removed and screwed into the spare hole so that it would not get lost.

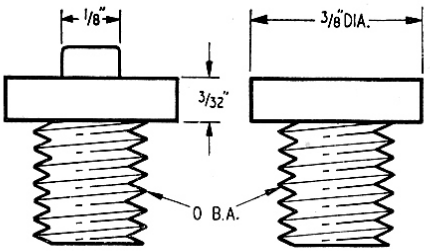


FIG. 18

This "spare" hole is in the pliers for the fitting of an adjustable gauge. The "A" plate was screwed into the front hole and the punch revolved until the largest one, $\frac{3}{16}$ in. dia., was in line. By dropping the holes in the card over the spigot a few dozen card washers were quickly turned out. A light tap with a small hammer to make them flat, a clean cut across the middle with the knife and I had enough crown plates for quite a number of wagons. What is most important to me, there were no wasters. As Jim Whittaker would say "every egg a chicken."

I looked at the clock and it had taken me just 1 hr. 35 min. to alter the pliers, make two die plates and produce almost six dozen crown plates.

Now the tool is ready I can simply weave them, no more one-hour-per-wagon "stunts" for crown plates. As to the fixing of these plates I have found a dab of thick shellac polish will do the trick. I have purposely left the cork off a small bottle of shellac to let it thicken up. Do not forget the little flat plates which are each side of a crown plate whilst you are sticking the crown plates on.

Although these crown plates are not just spot on, I feel in view of the time factor and the small amount by which they are out, they are just the job. Anyhow nobody has pulled me up about them yet or shown me a better looking crown plate in 4 mm. Here is a chance for somebody else to improve the breed further.

So far this article has been based on private owner wagons but it is, as I said at the beginning, applicable to a lot of other goods vehicles as regards the jigs and details.

KREEL HARBOUR

by

F. J. SAUNDERS

(*Continued from page* 335)

a mixed bag of the cheaper type figures, mainly repainted and many altered in form. The cart for Steptoe is scratch-built, but motor traffic is, in all but the case of the mail van, commercial and repainted.

The front portion of the layout has had most attention. The extension board contains a row of hills which lie 3 in. behind the back scene, contoured from hardboard. Finally, the skyscape was painted on the textured side of the hardboard and arranged as a diaroma, to keep up the illusion of depth.

The motto of the construction has been, as you must have guessed by now, texture and depth, and this small space layout seems to prove that this is one rewarding way to tackle space limitations. It is certainly possible to get a fairly super detailed scenic layout working in a reasonable time, nine months in this case, leaving the detailing of the rolling stock to come along in its natural sequence. After all, the country came before the railway.