

NORMAN DALE

## HOW TO BUILD VEHICLES IN

THE goods stock side of our hobby has always attracted me. It is only natural that I have paid a lot of attention to private owner wagons. These wagons were made in anything from five to ten planks high, with colourful paintwork and writing. My more knowledgeable friends tell me there were several thousand owners, and some of them had many hundreds of wagons. A major point in the wagons' favour was that a large number of them had the same plank sizes, the same underframing and the same brake gear whether they were five or ten planks high.

Different wagon sizes existed before 1923, but after that date the Railway Clearing House introduced the 12 ton

mineral wagon to supersede the older types. This new wagon was still being built seventeen years later, and even today examples can be seen with the old owner's name just visible.

Not being blessed with time "ad-lib," I decided to do a good batch of these wagons in between the building of other goods stock in the "shops." Quite a large amount of the material here, and the jigs and tools, will, of course, be suitable for other wagon stock. In fact, all my jigs and tools were made for other vehicles before I started to make P.O. wagons for EM gauge.

I have always followed the example of modern industrial practice insofar as there is only one way to turn things out quickly and all of the same pattern. This is to have a good-sized batch, thirty in my case, and to use as many jigs as possible.

Before describing the construction of these wagons, I had better tell you about a couple of aids or tools which have speeded up construction.

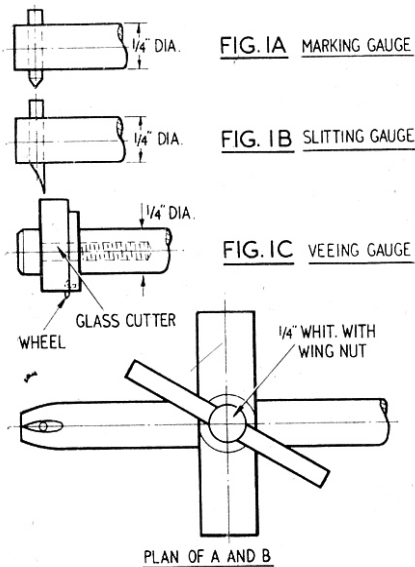
The first is actually four tools of the same breed. Many years ago in the shop-fitting trade I acquired a 6 in. length of 1 1/4 in. by 3/8 in. nickel-plated standard bar (those bars at the rear of a shop window for display brackets). This, thought I, would make four stocks for metal marking gauges. Not at that time possessing any machine tools, I proceeded to cut this bar up into four blocks 1 5/16 in. by 1 1/4 in. by 3/8 in. Using the works drilling machine, I drilled a 1/4 in. hole in the centre of all four blocks. Then a 1/4 in. Whit. hole was drilled and tapped in one edge to run into the first hole. Machine screws 1/4 in. in diameter were then fitted with wing-nuts and screwed into the tapped holes.

For the rods a couple of one-foot lengths of 1/4 in. dia. mild steel were procured and cut in half to give me

four 6 in. long rods. Two of these were hacksawn down the middle for about 1/2 in. at one end. Two heavy grade sewing machine needles were ground and pushed into the saw cuts. The cuts were then closed up and the needles further ground to give me a marking gauge and a slitting gauge. The latter is now used chiefly for slitting my 1 mm. and 1/16 in. plywood used for modelling. I have described the making of these two gauges to show how to get round difficulties through lack of tools. As I possess a small lathe nowadays, the rod would be drilled and tapped and a screw put in to hold the needle in its own pre-drilled hole (Figs 1A and 1B).

The other two unfinished gauges have now been adapted to the most useful jobs in the modelling game, a vee planking tool and a louvre making tool. The total cost of all four gauges would not be more than 2s. 6d. if mild steel was used throughout. For the screws any 1/4 in. Whitworth screw will do. One of mine is from an old wireless accumulator battery!

I will describe the louvre tool in the van construction part of this article. For the vee planking tool (Fig. 1.C.) the plain 1/4 in. rod requires to be drilled and tapped 4 B.A. about 3/8 in. deep in one end. This and one of the stock parts with the wing-nutted screw can now be laid aside for a while. An old glass-cutter was then procured (this word covers quite a lot of methods). The type with six cutting wheels is what we are looking for. Cut off the handle part just above the wheel keeper. I said cut, but you may need a H.S.S. blade or have to resort to a grinding wheel. The first I made cut easily with an ordinary hacksaw blade, but one tool I made recently for club use did in fact call for a fast grinding wheel. Remove the short 4 B.A. screw



# FREIGHT

## 4 MM. SCALE

and fasten the glass cutter head on to the  $\frac{1}{4}$  in. dia. rod with a  $\frac{3}{8}$  in. by 4 B.A. screw. Slide on the  $1\frac{5}{8}$  by  $1\frac{1}{4}$  by  $\frac{3}{8}$  in. stock and the planking tool is ready for use. If difficulty is found in tightening the 4 B.A. screw sufficiently, resort to a 4 B.A. bolt plus a washer as I have done.

Just one observation I would like to make, the joints on a good number of wagons are not complete vees. In most wagons it is only the top edge of the lower plank which is chamfered or, should I say, has its corner planed off. This of course only amounts to half a vee joint; still, nobody has ever pulled me up about this. All my stock has complete vee joints. It would have been easy for me to turn a small wheel bevelled on one side only, but it did not strike me until enough ply had been vee planked for about 120 wagons and vans!

The other aid which I mentioned earlier is an ordinary pair of spring bow dividers about 3 in. long from my set of drawing instruments. By removing one of the points and fixing in its place a bent piece of wire about 0.040 in. we have something you cannot buy. The dividers become a screw-adjustable spring caliper. Our friends "over the pond" call them "hermaphrodite" calipers but these are not screw adjustable sprung calipers. In the trade we call them "Jenny" calipers and they are nicknamed "odd-legs," so I will use this nickname henceforth (Fig. 2).

The drawing I have used for my P.O. wagons was in the *Model Railway Constructor* for January, 1959. This drawing is for O gauge. I find it much easier to work from a larger scale than a 4 mm. scale drawing. I should advise anybody working in 4 mm. scale to insist always on O gauge drawings. With the aid of an E.R.G.

rule you will have no trouble and much more detail can be seen.

Now we are ready to start the job in hand, making wagons. A sheet of good quality birch ply  $\frac{1}{32}$  in. or 1 mm. thick should be obtained from your modelling store. I use 1 mm. because it is all I can obtain in Black-pool. It gives me wagon sides of a scale 3 in. thick, which makes for a strong empty wagon. It is easy to rub the 0.008 in. off the inside edge of the wagon sides to bring it to the correct scale size of  $2\frac{3}{8}$  in. thick. As a lot of my wagons are loaded this rubbing of the inside edge is not noticed.

This thin ply when bought at a modelling shop is generally 3 ft by 1 ft. I first slit it down the middle to give two pieces 3 ft by 6 in. The three-foot edges are shot straight and clean with a sharp plane. Do not hold the ply in a vice for this straightening; lay it flat on a bench or table with a thick board on top of the ply and with the plane held sideways in one hand. These three-foot edges will give us four-and-a-half wagons per edge and as we now have four edges, I total it up to 18 wagons, which for this article will be 12-ton R.C.H. P.O. mineral wagons with seven planks. Inspect the ply strips for the best surface and mark each one with a face mark.

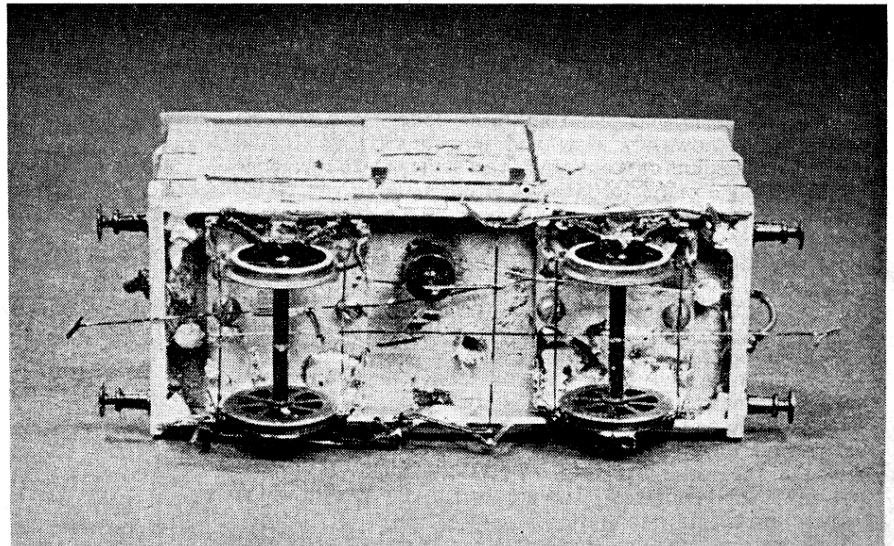
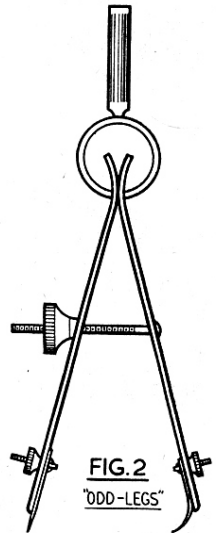
### Plank Veeing

I start by setting the adapted spring bow "odd-legs" to the top plank, of which the width is  $8\frac{3}{4}$  in. or a bare 3 mm. Prick this from one edge on one side of one ply only. A pencil mark or line close to the indentation is a big help in locating these small indents later on. Never mind about the other three edges yet. Now set the "odd-legs"

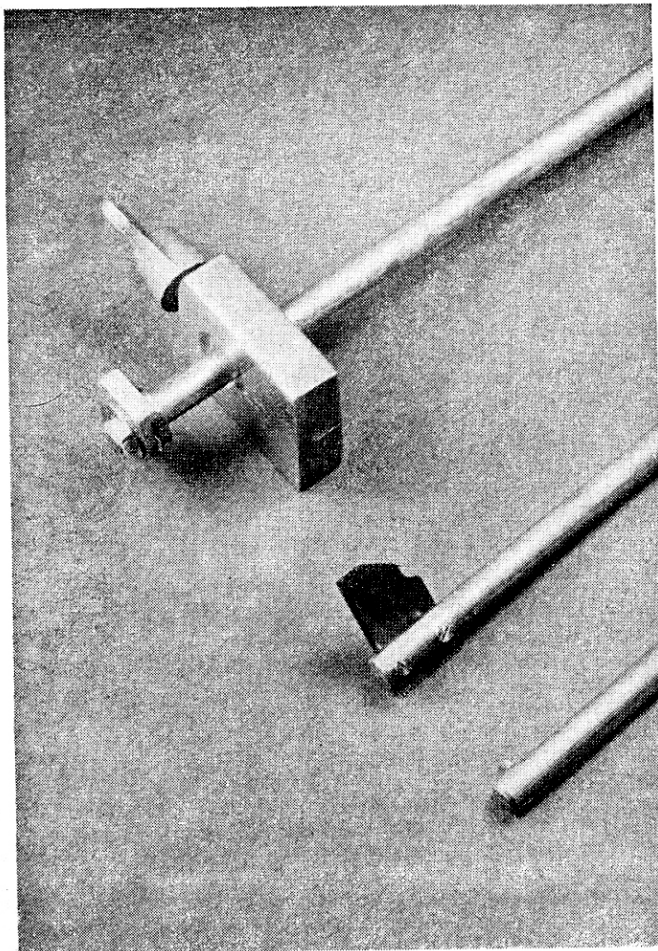
to  $8\frac{3}{4} + 8\frac{3}{4}$  or 6 mm. and make another indentation. Remove the bent "odd-leg" and put back the divider point. We are now ready to step off the five planks at 7 in. (or to be correct  $6\frac{7}{8}$  in.). A check on a bit of card can be made before marking the ply. Now 5 by  $6\frac{7}{8}$  in. =  $34\frac{3}{8}$  in., which in 4 mm. is almost  $11\frac{1}{2}$  mm.

When you are satisfied that you can get your five planks in  $11\frac{1}{2}$  mm., you can step these off, starting from the second indentation, and all that remains to be marked is a  $5\frac{1}{2}$  in. bottom rail member. This is the time to check before proceeding and it is most important to do so. Total up all the sizes together and then check the ply. I make the total of seven planks plus one bottom rail 4 ft  $9\frac{3}{8}$  in., which in 4 mm. scale works out to a slightly full 19 mm. This check is most important because the width of all your 18 or more seven-plank wagons depends on this.

Having got our indentations correct, lay the ply flat on the bench and, with the aid of a watchmaker's glass on a stand, carefully adjust the vee planking gauge to the first indentation. You will actually feel the wheel drop in the very small hole, just a short pass over the hole and inspect. If satisfied run the



L.Y.R. Fish Van. The roof and outside framing are "Plastikard." This van ran the whole week on John Langan's "Presson" layout at the 1963 M.R.C. Easter Show. Above: "What a mess," but why worry? The couplings work and the wheel assemblies are free to move up or down. It is the outward appearance that counts as the top photo shows.



The three gauges, vee planking, louvre and slitting or cutting. The stock portion will fit all three. Note how it is recessed for the glasscutter head, in order to mark the first vee joint

gauge the full length of the ply. Now turn the ply end for end run the gauge down this face, turn the ply over, gauge again, turn end for end and gauge again all with the same gauge setting. If you vee both sides the ply stays flat and if you wish to make an open wagon you have the inside joints of the planks marked. Do the other three edges before altering the gauge to the second plank or indentation and repeat the drill. Carry on until all your plank veeing is done. You will, no doubt, realise now how easy and how quickly you could double your amount of vee'd ply at this stage. Once the gauge is set it is only a matter of minutes to vee many feet of ply.

Now the planked pieces of ply have to be cut to about 20 mm. wide. We can use a saw, knife or slitting gauge; I prefer the latter as it cannot slip. This gives us our wagon-side material in four lengths 3 ft by 20 mm. wide, and you still have plenty of ply left to make other wagons of your own fancy. Carefully plane down the edge of the ply strips to the edge of the bottom rails.

It might be as well if I say a word about the assembly of the wagon sides at this stage. A study of Figs. 3-3A should convey my method of marking the sides. I always lightly cut the first two plies of the three ply and then bend gently to crack the third one. This gives a perfectly square body and spot-on size. Note that the sizes are for 1 mm. ply, with which I advise the beginner to start.

With the aid of a small steel square, proceed to mark and square off with the modelling knife or plane all the left hand ends of the 3 ft plies. By-the-way, my best modelling knife is the one obtained from our local "nothing over 6d." stores. It has a good handle that enables some pressure to be put on it.

Carefully measure off from our square end 65 mm. and make a slight mark with the knife. Then measure the 30 mm. mark, then the 64 mm. mark, then 30 mm. and mark. Taking our odd-legs converted back to spring dividers, set them to 30 mm. and a larger pair of dividers to 65 mm. altered in turn to 64 mm. Carefully step out with both dividers in the foregoing order on two of the plies. All we have to do now is mark and cut through two of the three ply across the planking, but at the second 30 mm. cut right through. The use of a steel square along with the knife produces perfectly square bodies. You will now have eight sides and ends plus two consisting of one side and one end. These of course will make up a complete wagon with a fixed load to fasten these loose sides and ends to. I trust you are still with me; we have now marked out nine

wagons which will be fitted eventually with corner plates on all four corners. In order to help ourselves later on, I would advise you to mark these with a large "C" in pencil.

For the end-door wagons repeat all the foregoing with the other two pieces of planked ply but do not alter the large dividers, they must be kept at 65 mm. When they are cut up like the others mark them with a large "E." They will, of course, make nine end-door wagons.

Do not be tempted to bend any of this wagon-side ply until we are more advanced. In my earlier efforts I had always fought shy of making empty wagons until this recent batch was started. With the aid of "Durofix," I now think it is much quicker to make an open wagon than a loaded one. This, of course, is taking everything into consideration. The

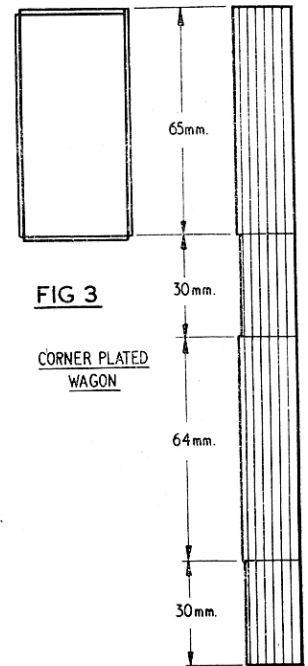


FIG 3  
CORNER PLATED  
WAGON

loaded one still wants its load of "coal" or whatever. I used to make a block and stick my sides around the block. All these load-blocks had to be made dead square on their ends, otherwise the wagons were out of square. We live and learn. It is easy to make a block to drop in your empty wagon, all complete with coal dust stuck on its top surface. A little more coal dust will cover up any discrepancies in the fitting.

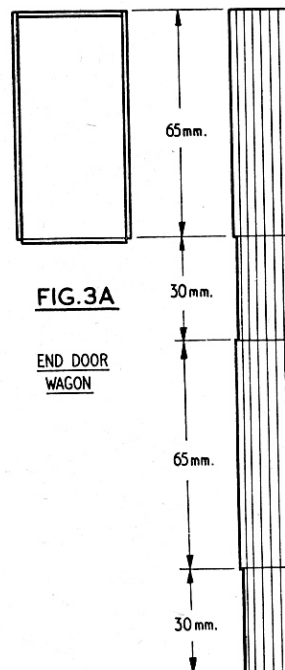


FIG.3A  
END DOOR  
WAGON

**HOW TO  
BUILD  
FREIGHT  
VEHICLES**  
IN 4 mm. SCALE  
Continued Next Month