

Flooring

NOW we shall have to scribe some flooring with the grain of the ply running across the wagon bottoms (Fig. 4). With the plane shoot one edge of the two spare pieces of ply (you will have to buy some more ply of your own fancy for these wagons). Using the odd-leg first, and after the first indentation changing them back to dividers, you must set them to measure a slightly full 2 1/3 mm. A little trial and error may be necessary here. After the first indent, step out six more planks. Stop to check; your last indent should now read 16 1/2 mm. If it does not, adjust your dividers till it does. Yes, I know that 7 by 7 in. does not equal 4 ft 1 1/2 in., the odd half-inch is for the swelling in the real thing. There are 28 planks each 7 in. wide in our P.O. wagon; that leaves 2 in. for the planks to swell in wet weather. When you are satisfied that you are getting the seven planks in 16 1/2 mm. proceed until you reach 66 mm. (16 ft 6 in.).

Using the vee planking gauge, proceed as for the side and ends. Again do both sides of the two plys. Try not to be so heavy on these vees, because all we are trying to do is to represent the square butt joints, not vee joints. I thought at first it was not necessary to do both sides of the ply, but found the wagon bottom had a pronounced tendency to curl up. This did lead to trouble at the gluing up stage. It will stay flat if vee'd both sides. Now my wagon bottoms never do run through to the outside of the wagon ends. This is due to the constructional methods used and to avoid the end grain of the ply showing. In view of this our planked ply will have to be finished 64 mm. wide. But first slit and plane it down to the 66 mm. mark. Then set the slitting gauge to 1 mm. and mark and remove 1 mm. from each edge. This will leave us with four scale inches of plank showing inside the wagon and of course will reduce the whole to the 64 mm. internal size.

Our next job is to square up one end and then mark 30 mm. steps with the dividers all along the ply. With the stock of the steel square on a long edge, pick up the 30 mm. marks and cut through the plys to give you finished wagon bottoms.

Body assembly

Picking up our planked side and ends, we have now to remove 1 mm. from the bottom edge of all the end portions (30 mm.). This is easily done with the slitting gauge and the aid of the knife for a clean finish. We shall have now a scale 2 1/2 in. to the first vee; this 2 1/2 in. represents the last board of the wagon bottom. Also on the plys intended for end doors the top edge of one of each pair has to be reduced by 1 mm.

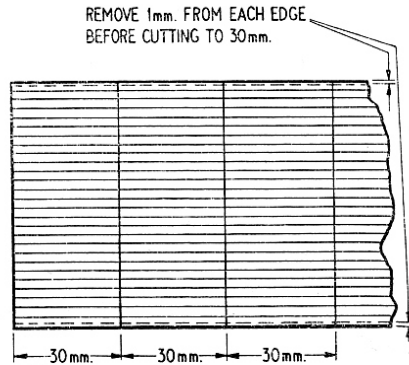


FIG. 4
WAGON FLOORING

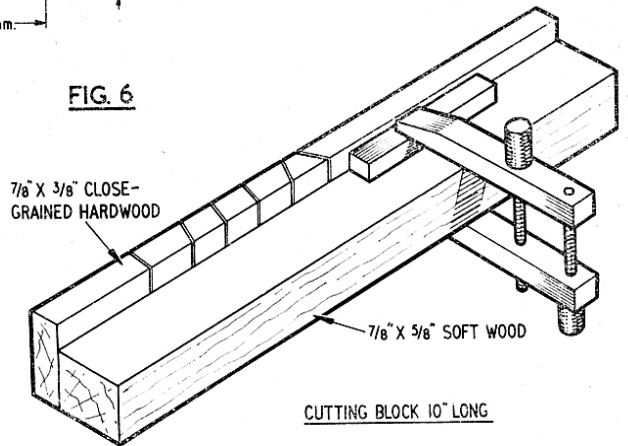
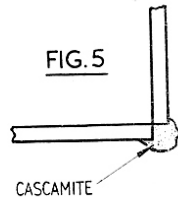


FIG. 6

Above right, a five plank wagon eventually to be painted in "Sutton Manor" livery. Note the nuts and bolt heads on the strapping and corner plates. On the extreme right is an end view of the same wagon. The pin head on the bottom is an entomological pin to which the solebar is soldered for added strength. Lower right, an eight-plank high-sided mineral wagon before the addition of strapping but with corner plates fitted.

How to build freight

We have now arrived at the body assembly state. I know we have been a long time, but this article is not for the experienced modeller. It is to encourage beginners to "have a go." I only wish that some modeller who is an expert locomotive builder would take us through a locomotive building article stage by stage.

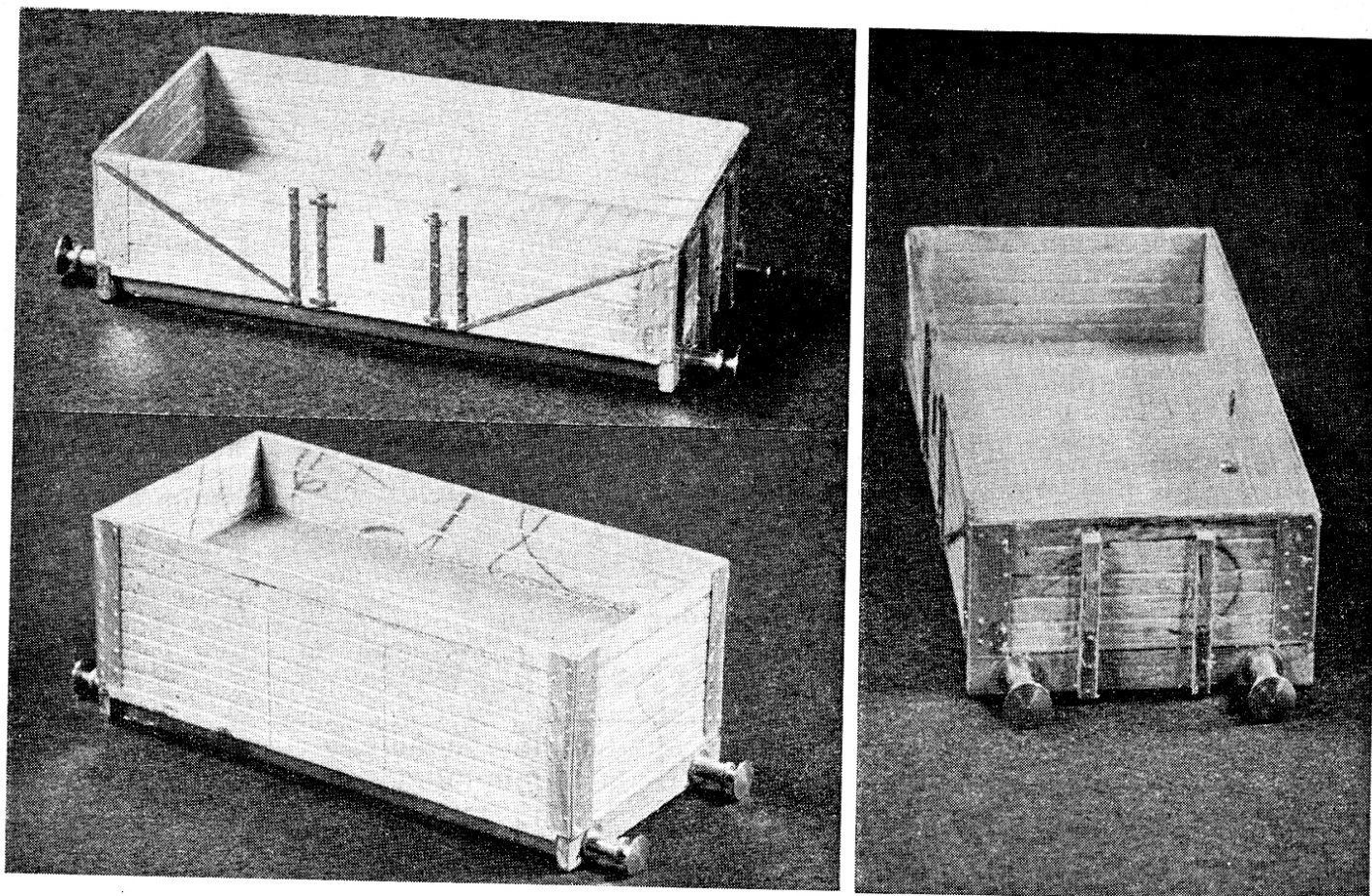
Now is the time to cut right through the plys of the end doors. I would advise you to number each one, so that it remains with its original sides. Smear a little Durofix on all the edges we are going to join. Do not forget the edge of the floors and the inside bottom edge of the sides. By the time you have done the lot the first will be ready to receive the second coat as per instructions (going off our subject again, it is amazing how many people just will not follow the instructions on any product. All the trial and error has been done for us. It has cost the producer quite a lot of money in his laboratory, yet folk turn a blind eye to the instructions and then complain).

However, back on to the main line again. We must have a stock of rubber bands all the same size ready, along

with a 6 in. steel rule and a plate glass surface before starting to apply the second coat of Durofix. The rule is to be used as a packing under the wagon ends and bottom. This packing should be 1 mm., my rule is 0.038 in. which is near enough to 1 mm. With the rule as a packing the sides will sit hard down on the surface plate. A piece of 1 mm. ply could be used for packing but you would find that it would get coated up with glue, whilst a steel rule can be wiped clean after each operation.

Carefully bend the ply round to form the body. You will note how the single uncut strip of ply will just crack but hold its partner dead square. In the case of the corner-plated wagons, the two ends of the ply will meet perfectly, neat and square.

Smear a little Durofix on these two ends and on the bottom edge again. Place right way up with ends resting on the steel rule. Smear the floor edges all round and quickly insert it into the bottom of the body, so that it sits flat on the rule. A couple of rubber bands around the body and adjust the joint until it is flush. I find it a help to have a few 3/4 in. strips of



ehicles in 4 mm. scale

by N. Dale **2**

ply 64 mm. long which can be used to push the end of the joint into place. This is of course level with the end of the side. Making sure that the bottom is still hard down on the rule, place a little weight on the top of the body and leave it to set, which does not take long. When it has set almost all trace of the Durofix has gone, with none of the stringy mess that impact adhesives leave to be cleaned off. Go through the whole batch, noting that the end doors will require glue on both ends and bottom inside edges. Also make sure you have the end doors the right way up; yes, it has been done!

When all the bodies are set and the glue hard, I fill the open corners with Cascamite glue (Fig. 5). Mix the glue fairly stiff and put plenty on. It will require at least a day to set hard, after which the surplus can be filed off and sanded level with the body. This gives a very strong corner without any fear of it ever giving way. The glue is covered by the corner plates later.

Underframes

Nowadays I use wooden headstocks (beech) and 5/32 in. by 1/16 in. brass solebars. You will no doubt ask,

why that combination? Well, I think the following will explain why, and help the beginner to avoid making some of my earlier mistakes. I trust the more experienced modeller will bear with me for a few minutes.

I first started with wooden headstocks and wooden solebars of the correct section 0.157 by 0.065 beech. These sizes in 4 mm. scale are of course 12 in. by 5 in. As I possess a small circular saw bench it was easy for me to convert a few 6 in. long offcuts of bone-dry beech into underframing material. I know it may sound silly talking about sawing to thous. It is surprising how close one can get to size if a fast sharp small saw with very little set on it is used. I do attempt to saw spot on size but aim to cut over rather than undersize. The wood is first reduced to size the 12 in. way. With the aid of a plane it soon "mikes" up to 0.157 in. Both edges are planed square, and a few of the pieces got ready about a couple of inches wide. When the saw is set and after a few trials I cut the 0.065 in. strips off. They are as near to 0.065 as possible so that they do not need to be planed afterwards.

After each cut the 2 in. wide by 0.157 stuff is planed on both edges again and is then ready for a couple more strips to be sawn off.

After an hour or so I found that I had enough underframing to last me a life time. My only reason for using beech is that it is hard and glues well.

All this was about four years ago, the time when I first decided to mass produce goods stock. But a change of ideas was called for when I found it was difficult to fix the bits and pieces on the solebars. Moreover it was necessary to cut away the inside of the solebar in order to get my wheel assemblies in place, and be free to drop up or down (see M.R.N., April, 1962). I stopped and thought about this for a few days and then asked myself, why not all-metal underframes? Yes, all that time and material in producing the wooden underframing wasted. Or was it? As things turned out it wasn't.

A supply of 5/32 in. by 1/32 in. and 5/32 in. by 1/16 in. brass strip was obtained from J. Smith of Clerkenwell and, with the aid of an adjustable soldering jig, made up as in Fig. 19 (the operation will be described later).

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After a couple of wagons had been made I was still not satisfied. The end pillars would not adhere firmly to the brass headstocks and I had had to resort to pins driven into the floor of the wagon in order to solder the all metal underframes to the wagon body. It was also difficult to get the metal underframe to fit the wagon body spot-on.

The metal solebar was a success in that I could solder all the bits and pieces to it and had the inside clearance for the wheel assemblies. In the end I compromised with metal solebars and wooden headstocks, which I find the ideal combination. The headstocks are prepared by cutting to the correct length in a cutting block (Fig. 6). The cutting is done with an old favourite of mine, an Eclipse No 45 saw. Using a 60 or 44-teeth per inch blade, it gives a finish on the end grain which needs no further attention.

The buffer holes are then drilled in another jig. I can hear you saying: "What, more jigs?" There will be plenty more yet. Have you ever tried to drill a wooden headstock spot on, free hand? The grain of the wood will throw your drill off centre, and do not forget you have two centre lines to watch for with each hole. I started the hard way and had plenty of duds. It was all time lost and, more important, my patience. This drilling jig may seem a waste of time to the "one-off modeller," but who will make only one vehicle all his life? It is adjustable for different widths of vehicles, and can be used for metal as well as wooden headstocks. Metal in my case is now only used for the channel iron section ones on the prototype. I trust that Fig. 7 is self explanatory, but a few words may be a help on its use.

A headstock is marked about its centre on one face. This is easily done with our spring "odd-legs." The headstock is then pushed along the groove of the jig until its centre line coincides with that on the drilling plate. Whilst it is held in this position, carefully adjust the movable stop X to bear up against the headstock. The plate the stop is fastened to is hinged and spring-loaded. It can be lifted up in order to push another headstock in place and at the same time push out the completed one. This sprung plate is a part of our old friend, the bank of 16 switches. With the stop fastened tight we are all set to drill as many 8 ft headstocks as we are likely to want in this life. You will find that such headstocks fit quite a variety of pre-grouping goods vehicles.

All this may seem a long way round, but I have seen numerous vehicles entered in exhibitions with a scale 2½ in. or 3 in. thick headstock. The modellers have let the wagon end run to the headstock bottom level. This to my eyes does not look correct and

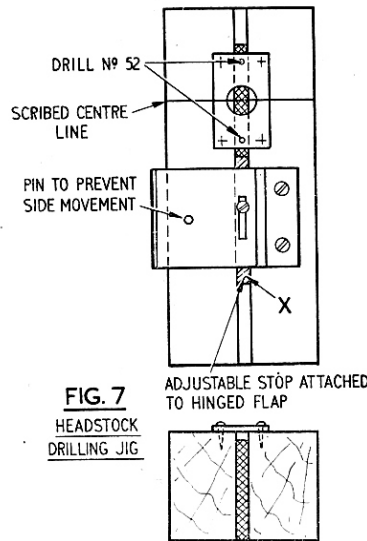


FIG. 7
HEADSTOCK
DRILLING JIG

Hatched area above represents headstocks

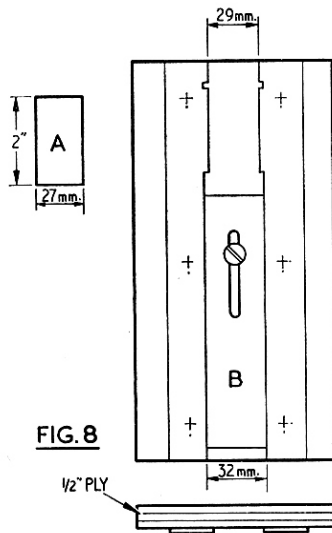


FIG. 8

METAL UNDERFRAME SOLDERING JIG

- A - PACKING BETWEEN SOLEBARS
- B - ADJUSTABLE AND A SLIDING FIT

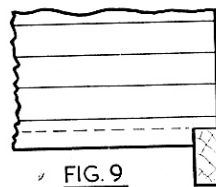


FIG. 9
FITTING BOTTOM RAIL TO
HEADSTOCK

what is more it is not correct. It spoils an otherwise excellent model. I have yet to see a wooden headstock 3 in. thick in full-size practice.

I do not use three-link couplings, but if you do it is a comparatively simple job to drill a couple of fine holes on the centre line which can be joined

together with a length of piercing saw blade. I recently did this on 30 headstocks for a train of ballast wagons which will always run as one train. Normally I use the best and cheapest coupling it is possible to fit, namely the "Alex Jackson" type. Before leaving the underframe details it might be as well to describe the soldering jig I made for all metal underframes (Fig. 8).

The drawing is, I trust, almost self-explanatory; the two strips of ¼ in. brown plastic are screwed to a block of ½ in. by 9 by 4½ in. ply. Two other strips of ½ in. plastic are required, A to serve as a spacer. The other strip B is adjustable in order to push the headstock hard home and hold it there while the soldering is done. As I stated earlier I now only use the jig when a channel section underframe is called for.

Back to the finished headstocks; I next fit the buffers. With the holes drilled No 52 the buffer shanks, 10 BA, will make a thread for themselves. A 10 BA nut is run on and the headstocks are ready for gluing to the body. I use K's buffers and am almost through my second gross. The 10 BA nuts I obtain from Whiston's of New Mills by the gross.

Before starting to stick the headstocks on to the body, we have to do a little trimming to the bottom rail of the body (Fig. 9). Fit each headstock end and mark; then the headstocks are ready to be glued on. I use Seccotine here. It gives me time to position the headstocks. With both of them affixed, place the body on a flat surface (I use plate glass). A small weight on the top of the body plus a little card packing under the buffer heads will enable you to get your wagon buffers looking nice and level. They will not be drooping like those on an old wagon nearing the end of its life.

Leave the bodies at least a day before starting to fit the metal solebars (5/32 by 1/32 in. brass) in place. After filing to length, mark one end, because it is almost certain that each solebar will only fit its own side perfectly. It is also advisable to file off the inside of the end of the solebar in order to get past the buffer nut and at the same time maintain the correct inside width of the solebars, 26.5 mm. All is now ready for you to solder the solebars to the buffer shanks and nuts. This task can be simplified if a piece of hard-board 1½ in. by 26.5 mm. is dropped in between the solebars with a tool-makers' clamp holding the lot together. After soldering to the buffer nuts I insert a couple of entomological pins half way along the inside face of the solebars. Then I withdraw these pins and push them through the holes they make inside the wagon bottom. A touch with the soldering iron and the solebars are really held in place.

