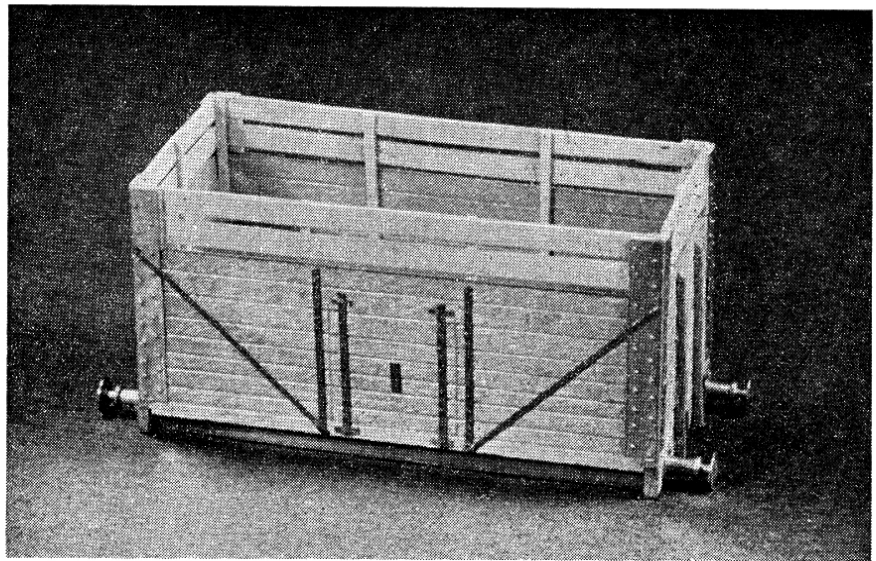


"Suncole" of Nottingham coke wagon. Note the milk bottle top material for the corner plates. The coke boards are of Plastikard.

By NORMAN DALE

PART 3

WHICH TAKES US THROUGH TO THE FINAL STAGES OF BODY CONSTRUCTION



HOW TO BUILD FREIGHT VEHICLES IN 4 mm. SCALE

End pillars

Now for the wagon end pillars, which are also jig made. My first attempt at mass producing without jigs was for four G.N.S.R. three-plank wagons. The trouble I had trying to make sixteen end pillars exactly alike almost drove me up the wall. Let us pause a moment or two and try to think how the wagon builder would make them in the shops. This I believe is the best way of tackling any modelling trouble. I could quote a number of instances where I got myself out of difficulty by just stopping to think how it would be done in real practice.

Now to saw a piece of wood to a taper is as easy as sawing it straight if one uses a circular saw. All that is needed is a simple jig with the required taper cut out of a flat piece of wood. The straight side is put against the saw fence and a pillar post (in our case 5 in. x 5 in.) is put hard against the shoulder and the tapered side of the jig (Fig. 10). Away we go, and the result is a pillar tapered on one face with the appropriate bit at the bottom left parallel. There are other ways of sawing tapers, but the above will show how the idea helped me to design my pillar jig. I do not use a circular saw, but the method is similar.

This small metal jig (Fig. 11) can be made to cut any width of pillar by unscrewing it and inserting suitable packings. It will make van as well as wagon pillars. Pieces of wooden headstock material are used for our P.O. wagon pillars. The drill: first prepare the 0.65 in. bits of beech by cutting them to about 24 mm. long. Place the

jig in the vice with the wagon end upwards, put the material in the jig and, using a No 45 saw again, remove the surplus wood. Smooth off with a file and there you have a tapered pillar. If you wish you can do a hundred and they will be all alike.

I do not think it necessary to enlarge on the construction of the jig; the sketch should be self-explanatory.

If you do not feel capable of making a metal jig, a wooden one will do. The sides, or cheeks, would have to be quarter-inch ply or thicker to retain its accuracy, whilst the centre could be a piece of the headstock material with the addition of a thin paper packing.

This type of pillar, which tapers on one face only, is easy, but things become a little more complicated when you decide to make, say, a 20 ton N.E. hopper wagon.

The end pillars on these wagons are tapered on three faces, leaving a portion of flat at the bottom of each face. It is not possible to make them without some form of a jig. I will describe how to make them at a later date with the Editor's consent. The little bit of flat or parallel portion at the bottom of our pillars can be achieved with a smooth file after sticking them on the body. Of course, if one wishes, the pillars can be made square 0.065 in. (5 in.) first, in which case the flat portion is left on whilst in the jig. I have done it both ways but prefer the latter.

After a batch has been done there remains the top bevel to be cut. This I do in my saw block, with the correct angle first cut in the block for a guide. An adjustable stop is used as for the cutting of the headstocks. With these methods we shall have pillars all correctly tapered and bevelled. If I have the wood already planed to thickness, I can do four pillars for one wagon in a minute (this of course is an average of a batch time). Who said he had no time for making jigs? It is he who is wasting his precious time by not making them.

The position for the pillars is carefully marked with the odd-legs. I then glue them on with Durofix as per the instructions. Before leaving end pillars, or stanchions as they are sometimes called, I may as well cover the metal T section ones.

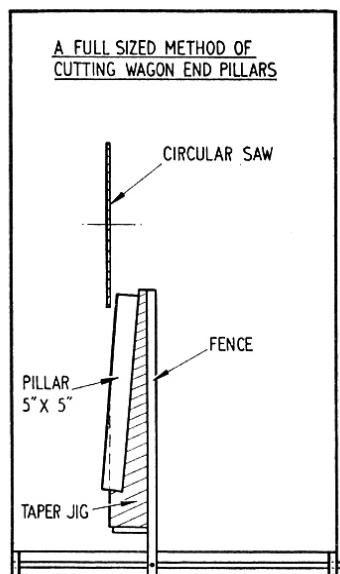
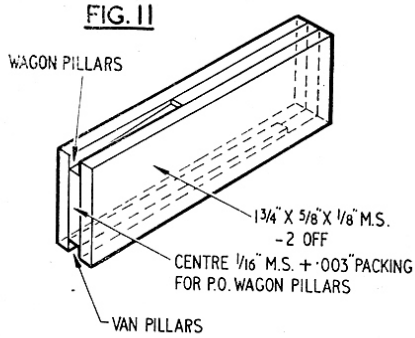


FIG. 10



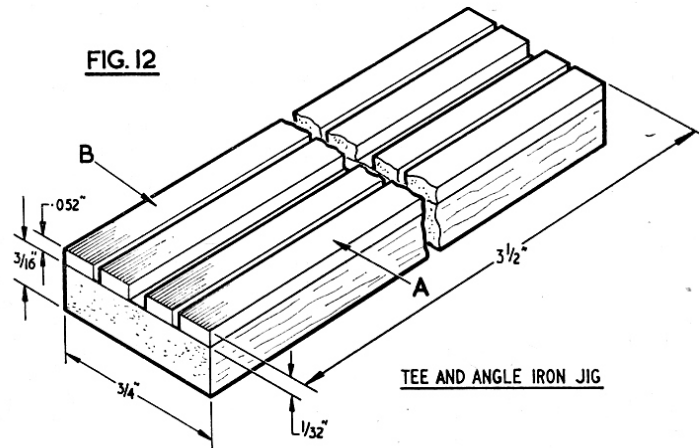
T iron and angle iron is quite easy to make in 4 mm. if one spends a little time in making the simple jig shown in Fig. 12. This of course is one job where you must forget about full size methods of construction. The material used is 0.003 aluminium foil; you will read more about this material when I describe corner plates. Now about this jig. It can be of any size and of any metal. Mine is of the size shown in the drawing. The A brass strips are our solebar material, whilst the B strips are a bit of cut-up curtain rail. With the jig I can make up any size of T iron from a scale 1 1/4 in. to 4 in. on the downward stroke of the T. The other two parts of the T are cut to size with the aid of a metal straight edge of the appropriate size. The B one is for our wagon end stanchion, whilst A can be packed up to any required size for the small sections.

To make our T iron for 4 mm. wagons, a strip of the foil 3 1/2 in. long by about 1/2 in. is cut, then doubled in half to make 3 1/4 in. x 1/4 in. To make sure this is perfectly flat I would advise you to press it between two flat pieces of ground stock steel. Insert the turned-over edge between the B strips, making sure it is hard down on the base plate. The modelling knife is then gently inserted between the two foils. By gently pressing it along we find it will open enough for us to insert a steel rule.

We can then use the rule to dress and flatten hard down the wings of the T. Lift carefully from the jig and trim the wings with the knife, using a suitable packing held against the folded portion (Fig. 13). My most suitable packing is a 0.030 in. steel rule. This will give us a metal T iron section of scale 5 in. x 4 in. x 1/2 in. The 5 in. is arrived at by the 0.030 + 0.006 + 0.030 in. = 0.066, just 0.001 in. over 5 in. scale, which I feel is near enough. With this 3 1/4 in. length we shall have sufficient T iron for one seven-plank wagon. The N.E.R. and G.C.R. had a large number of wagons with T iron pillars or stanchions.

looks to my eye more like the proper material than a square edge. A second point is that the foil will retain its square angle and not be inclined to spring back a little, which I feel 0.006 in. brass would. A further point to consider, this time in favour of the brass strip, is that I have to try and work a little glue between the two foils when fixing to the vehicle.

A word of warning about the use of angle iron on wagons and vans. Do not attempt to bring it down the side of a wagon and at the same time turn it under and down into the solebar. This job is bad enough in full-size practice, when it calls for special treat-



For angle iron, double the foil half as we did for the T iron. Push the folded portion hard down into the jig and bend and force down all the remaining foil to one side of the jig. Afterwards remove it from the jig and trim to size. I quote no sizes for this because it all depends on what you want. You may ask why use foil doubled in thickness when 0.006 in. brass could be used. No reason at all, but there are a few points to bear in mind. One is that the small radius on the edge caused by the doubling over

ment. About eighteen months ago I started an L. & Y. gunpowder van which had T and angle iron strappings fitted. The T iron I managed only after making a special bending block, but the angle iron—well, the wife said she was leaving home if she heard any more language like that again. When I get the urge I shall finish off the van by fixing the angle iron on in three pieces. A couple of coats of paint and it should be impossible to notice. Must keep the wife at home.

Corner plates

The material used for these is again 0.003 in. aluminium foil. As a matter of fact mine are of the material used for milk bottle tops. I was fortunate enough to have the end of a roll presented to me a few years ago. Any aluminium foil will do providing it is of the correct thickness. An examination of the wife's cooking foil would not be amiss.

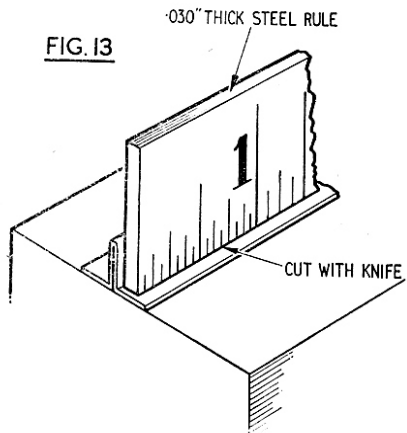
Keep the foil free from any distortions and lay it flat on a piece of hardboard. Make a pad of newspaper about three thicknesses thick and a little smaller in size than the overall size of the foil. Place this pad under the foil: it will be a help in forming the "nuts." Fasten the edges of the foil down to the hardboard with Sello-tape. Using our spring bow dividers for their proper purpose, set them to 4 mm. (most corner plates on private



Photo, Ivor Vaughan

MODEL RAILWAY NEWS

APRIL, 1964



owners are 12 in. wide on each face).

Step out along one edge of the foil with the dividers, and lightly mark from these points or indentations faint lines with the modelling knife, using a steel square. If the foil has been fastened down with the tape fairly parallel to the edge of the hardboard, it will be handy to be able to use the edge to square off these lines. The lines will tell us where to cut and where not to cut, which will be every other line after the plates are fully marked out for their "nuts." The other line is a help when the plates are bent over at right angles. A line at right angles to these lines is next marked near the bottom of the foil. A small set square plus the steel square are the tools for this job. The length of the corner plates is next set in the dividers and stepped up from this base line on the two extreme end vertical lines. These points are joined together with a steel rule and knife used lightly. A glance at Fig. 14 will help you to follow me. The dividers are next set to the bolt centres on two adjacent planks. In view of the area we can get all the "nuts" showing on our corner plates.

Using the divider points to make our "nuts," start at about 1 mm. full from a bending line and about 1 mm. bare from base line. Step up vertically to the top of each corner plate. If you find that you cannot judge 1 mm. full from the bending line as you move up, make use of the steel square for a guide. Repeat all this on the other side of the bending line.

Next, starting about 1 mm. bare from the top of each plate and about the same distance from the plate edge line (which is the line to be cut on completion), step off the "nuts" downwards towards the base line of each corner plate. Do the whole batch of corner plates before starting to cut through the cutting lines.

Start the cutting with modelling knife and steel rule by cutting lengthways first, but always start and finish the cuts inside the edges of the foil. Make the vertical cuts next, taking care that you are on the right lines, not the bending lines. Yes, I have made the same silly mistake myself. All that

remains now is to bend them over, watching that the "nuts" are on the outside. I bent mine over a small block of tool steel with my fingers. Here you have corner plates which will live up to their name under all their paint. It may seem a little tedious, but believe me (or not) in the time it has taken me to put this on paper and draw the sketches I could have made forty corner plates. These plates are the next items to be stuck on to the wagons, using Durofix.

Strapping

All is now set for the strapping, door hinge bands, etc. These also will require the appropriate dimple to produce "nuts" on the outside. The material used here is the empty adhesive tube after sticking on my shoes a pair of Phillips' "Stick-a-Soles" (usual disclaimer). I have tried many makes of empty gum, glue, tooth-paste, face cream and hair cream tube, but the Phillips' tubes are the best, and give a good impression when marked with a

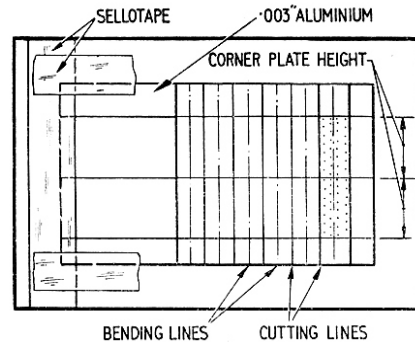


FIG. 14

sharp, pointed instrument. I would call it lead foil, it "mikes" up to 0.007 in. After emptying the tube, cut off the nozzle end and the sealed bottom, then cut close to one edge right through the two thicknesses. Open it out flat and the remaining adhesive can be rubbed off with the fingers.

The sheet of lead foil can now be pulled to and fro over a circular piece of steel or tube (I use my vice handle). This treatment will remove all the creases and produce a perfectly flat piece of foil. The paint and the writing is removed by gentle scraping or a little cellulose thinners. It is necessary because if we use the foil with the unpainted or inside face to indent our "nuts" on, it will be the painted side which faces outwards on our wagon. This paint will peel off under certain model paints, and it is better to be sure than sorry. As they say, experience counts, for it has happened to me.

An edge is cut straight along one of the longer sides of our foil, which is then placed on a piece of folded paper as we did for the corner plates, but do not fasten it down. In the case of the P.O. wagons I made a "nut impaler," which puts all the imprints on a length

of strapping at one push (Fig. 15). This tool is just a row of gramophone needles soldered in a strip of $\frac{3}{16}$ in. \times $\frac{1}{8}$ in. brass with a length of thin brass tubing for a handle. With this tool, and a watch-maker's glass on a stand, I press the tool as close to the straightened edge of the foil as is possible, so as to mark all the "nuts" on one strap. Move along the edge and repeat. With a rule and knife carefully cut this length of strapping off. The width? —well if you aim for a bare 1 mm. you will not be far off. It is a job where a little practice is a help, but please do keep under 1 mm. wide.

Five minutes with a six-inch rule and a full size P.O. wagon will tell you all you want to know about strapping widths. You will not find them to be six inches wide, or (as I have seen on some model wagons), 2 mm. wide. The two top boards on a P.O. wagon are generally wider than the lower boards or planks and this leaves room for two bolts in each plank. The materials used in making my "nut impaler" did not allow me to put in these extra "nuts," so I have settled for the top planks to have one bolt in each. I mention this because more experienced modellers will no doubt improve on my "nut impaler."

This tool can also be used on wagons with fewer planks, because the two top planks are of the same width in a five-plank as in a seven-plank wagon. The length of strapping we have cut off should supply us with three lengths of full wagon height strapping.

For the diagonal strappings, I first cut a plain length off, lay in position and carefully prick in the nuts, with one end of my dividers, at the centre of each plank. Do note that the two nuts for the top plank coincide with the corner plate nuts. On turning the diagonal strapping over you will have a perfect diagonal strapping all nicely tailored to fit your wagon.

The glue used for sticking on the strappings is again Durofix. One coat on the body where the strappings are going to be fixed is allowed to dry, then a little is spread on the strapping.

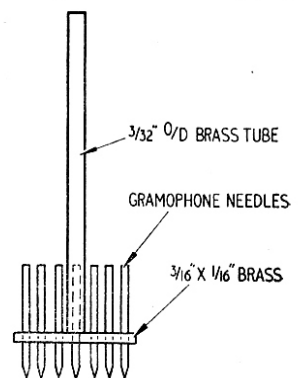


FIG. 15
"NUT" IMPALER

MODEL RAILWAY NEWS

This is offered to the wagon side as quickly as possible, and with the aid of a steel rule and the knife it is carefully but quickly got into position. In the case of the diagonal strip, take care to put in the "set-off" over the corner plates with the edge of the rule. I have tried the lot as regards adhesives for this job, including "Evo-stik" which my good friend Jim Whittaker uses, but I have come back to Durofix.

Now a word about Evo-stik from my experience will not be amiss here. In my job I have used gallons of it, but in its right capacity, that is, the sticking down of plastic surfaces, and for that job there is nothing to touch it. I have noticed the empty tins lying under the bench with Evo-stik spilt all around the outside of the pouring end. This adhesive will set really hard and will resist any attempts to remove it from the tin. But left to itself I have noticed that after a few months it will start to curl away from the metal tin. I will stick my neck out here and say it is not suitable for sticking metal to wood. I put this warning forward because we read of so many uses for this adhesive in the modelling game. It is not fair on beginners, who are likely to feel frustrated from the start if they stick their rails to the sleepers with Evo-stik, as has been suggested in the model railway Press more than once. Yes, I know about Araldite for the fixing of my strappings, but I am quite satisfied with Durofix, and what is more it is cheaper. I might add that I have no connection whatsoever with the makers other than as a satisfied customer. A coat of shellac or clear cellulose plus two coats of paint will help the Durofix to do its job.

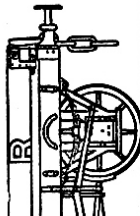
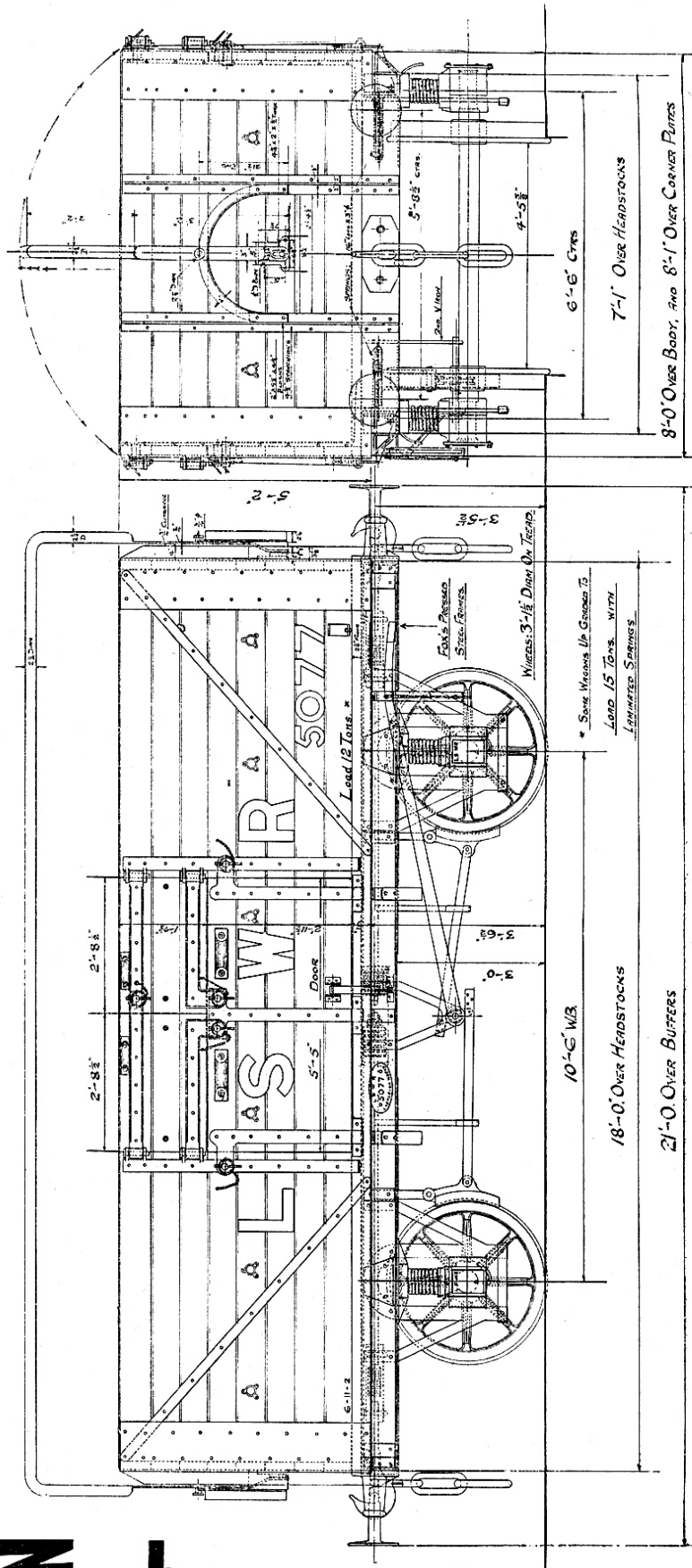
Odd bits of strapping can be used for the door keeps and hinges, and slightly longer pieces for the end door hinge bands. Do not forget some bits about 7 mm. long with four "nuts" on for the bottom of the end pillars; also the door spring striker plate in the middle of the side doors.

The end door hinge pins are next cut to length, which is of course the wagon width. These are made from 0.032 in. brass pin wire. The hinge band positions are first marked on the inside of the end doors using the odd-legs with the odd-leg facing outside to bear against the inside of the wagon side. A handy tool this, I quite agree. The hinge bands are then stuck in position leaving the wrap-over portion in mid-air until the Durofix has set. The hinge pin is next placed in position and the wrap-over part of the hinge band is carefully bent around the hinge pin. This bit of band is then stuck on top of the lower part of the hinge (Fig. 14). A little Durofix under the hinge pin will give it hidden extra security. This completes all the body work and the bodies can be laid aside whilst the pieces for the brake gear are made.

EIGHT-PLANK 12-TON OPEN WAGON WITH TARPAULIN BAR

LONDON & SOUTH WESTERN RAILWAY

Cubic capacity 620 ft. Drawings and dimensions taken in 1920. The wagon had Fox's patent steel underframe and coil spring axleguards. Built at Eastleigh. Cupboard doors above the drop side doors.



WAGON PAGE
Kenneth Wernett

DRAWINGS FOR O GAUGE

