

# FLARED TENDERS

*Norman Dale has a way of dealing with a tricky constructional problem.*

In the construction of a couple of 8-wheeled tenders for my L.&Y. 0-8-0 coal engines, I had arrived at the point when a decision had to be made as to how I was going to make these tender 'cans', I work in 4mm scale (OO or EM) but the following text can be adapted to any scale, up or down. After a few days of brain scratching in odd moments, I arrived at a plan.

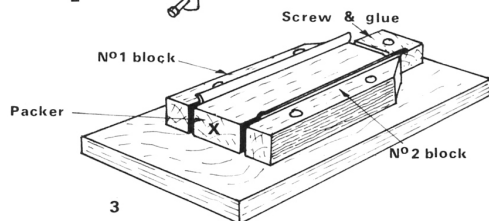
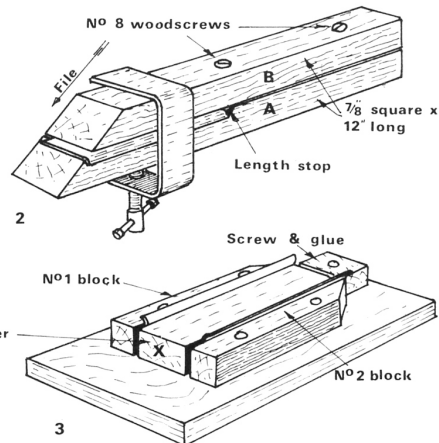
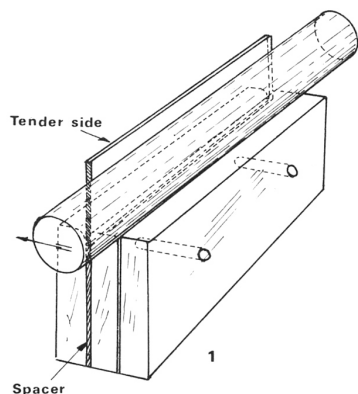
The metal to be used was 0.012in. nickel silver. Six pieces were sawn out 4in. by  $\frac{7}{8}$ in. I needed four for the sides, one for the ends which would be cut in half after flaring and mitring each end, while the odd one would be used for practice.

These were first annealed; in order to help our less experienced friends, I must explain that the process for this is to heat brass or nickel silver to a cherry red colour and then immediately plunge it into cold water, and this will make it more workable. Slight distortion will take place, but in my small sizes for these tenders, I could forget this. Anyway, the full sized job did not have the perfect flatness of, say, plate glass. Before I write any further, I must point out that the L.&Y. tenders had square corners plus a flared top edge. The methods described here will not work for the round corner tenders of, say, the LNWR after the flare-on stage has been reached.

The flare was put on first using my three block jig (MODEL RAILWAYS, September, 1977, page 450). On one of the outer blocks I filed the shape of the flare, Fig. 1. A point to watch here is that when filing the flare shape it is best to leave a fraction, say  $\frac{1}{32}$ in. of flat before the flare starts. This  $\frac{1}{32}$ in. enables the edge of the side to be nipped and trapped so it does not move whilst being pushed over. Next, a brass shim packing was made for the blocks with its width just enough to allow the tender sides to sit on before flaring. Finally, a length of  $\frac{3}{4}$ in. diameter  $\times$  12in. steel bar for a roller over was sorted out of stock; we were now all set up.

With the three blocks complete and with the shim packing between two of them set in a slack vice, the first side was pushed down on to the shim, a nip up on the vice and we were set to roll. Fig. 1. By holding the roller against the nickel silver it was a parallel push over. This operation was so good that after doing all the six pieces I have now one over, but more L.&Y. tenders are planned.

For the jointing of these sides and ends I had decided to mitre them and hold them together with a fillet of solder on the inside. How this was done is the main reason for putting pen to paper for this article. A couple of lengths of maple 12in. by  $\frac{7}{8}$ in. square were procured; being in the wood 'game' made this easy for me, but any hardwood would do. They were then fastened together with three No. 8 woodscrews and cut at 45° at one end on a tipped circular saw (Fig. 2). Mine hardly needed touching up, but the less fortunate should be able to manage this saw cut by hand, cleaning it afterwards with a sharp plane. If doing the saw cut by hand I would



advise you to mark the cut all round with a modelling knife.

On removing the screws and taking hold of 'A' piece, Fig. 2, I carefully formed the shape of the flare on the inside edges, using a file and fine glass paper. Note that both edges need to be done for left and right handed sides. This only needs to be done a little longer than your tender side. Another little job to be done on this 'A' piece was a couple of fine saw cuts about  $\frac{3}{32}$ in. deep and by putting in a strip of metal tightly in one cut, I had a length stop. Care taken here will give you tender sides and ends of the exact length with no more need to further attention about their length. But the ends stop cut I made it a shade longer than was required. It was quite easy to take a few more 0.001in. off put back in the jig. A little time spent on a bit of scrap wood and different thicknesses of metal for the stop is called for here before saw cutting the 'A' piece.

I now screwed 'A' and 'B' together again, but not too tightly, and only using a couple of screws at the rear end of the jig. The third screw was only to hold tight the other end whilst it was being mitred.

Now I was ready for the next move—filing the mitres. All six pieces had been filed up dead square at one end, noting the handing of four of them. They had also been cut about  $\frac{1}{16}$ in. longer than required. A side was pushed down 'A' and 'B', making sure that it lay snug with its flare along the flared portion of 'A' and not forgetting, of course, it was hard down to its length stop.

A small 'G' clamp was used to clamp the sides really secure between 'A' and 'B'. I also made sure that this clamp was below the end of the 45° cut. By putting the jig in the vice with its 45° face in a level plane, it was easy to file off the surplus length using a fine toothed file. Of course, care must be taken not to file the wood jig. On removal from the jig I had perfect 45° mitre which after filing another one (opposite hand) were held together for a 'dummy run' and were dead square to each other in plan; also the flares fitted perfectly. In the piece for the ends I put a mitre at each end and then cut it in half before filing another mitre on each piece.

I must admit here that I have been using a similar idea for years in the trade for mitring small wood mouldings which also gives one the true shape to scribe one mould over another. The finished product looks as though it is mitred, but of course one uses wood chisels, not files for the scribing operation. This sounds like a lesson in woodwork, but I trust you can follow me. If not, no doubt you will write!

For joining these sides together, a further jig was made—Fig. 3. A block of  $\frac{3}{4}$ in. thick wood was first prepared. It had to be the exact interior width of my finished tenders. Of course, this size was the outside overall size of the tender to the nearest 0.001in. minus 0.024in. (the two tender sides). It might sound as though I am taking things a little too far in writing about woodworking to 0.001in. limits, but I need not stress that the closer one gets to these limits the more accurate the model.

After preparing my block I then sorted out a base. This turned out to be an offcut of 6in. by 4in.  $\frac{1}{2}$  ply. I had also prepared about 12in. of  $\frac{5}{8}$ in. square soft wood all planed dead square, ready for the jig. This was sawn up to make the three blocks fixed to the box—see Fig. 3. The block No. 1 was screwed down first and then I put a tender side against this block, then the spacer block 'X', another tender side and finally block No. 2.

All this little lot was nipped together with a small clamp and No. 2 was then screwed down. The No. 3 block at the end was fixed, noting it is set back a little from the ends of No. 1 and 2 blocks. This space created, gave me a little finger and sight room to see the mitres before soldering.

The spacer block 'X' was removed and a tender side was loosely clamped to each No. 1 and 2 blocks with a toolmaker's clamp with pieces of  $\frac{3}{16}$ in. ply 2 $\frac{1}{2}$ in. by  $\frac{1}{2}$ in. wide as packers to help keep the sides straight. The end was tried and needed filing a little to get a perfect fit. This was then nipped up tight, also the other clamps. It might seem a long way round, but how does one hold all three pieces together and wield a hot soldering iron at the same time without making a jig?

All the nickel silver had been cleaned around the soldering area before fixing on the jig, so after applying the flux I was ready for the last lap. I let my iron get really hot before loading it with solder and then a steady run down each corner, and the deed was done. After releasing the clamps I lifted out a complete tender top. I thought afterwards I could also have fitted in the front plate with its shovel hole in; however, that was no problem.

The main job was done with a lovely square corner with no solder on the outside and perfect fitting flares: I had to let out a shout of exhilaration. Yes, it had been worth all the preparation to get that thrill again. The last time I experienced such pleasure was when I was building a couple of scratchbuilt 24 volt motors for these locos and after seventeen attempts one started to run! It is a good job my old running club's motto was 'Nil Desperandum'.