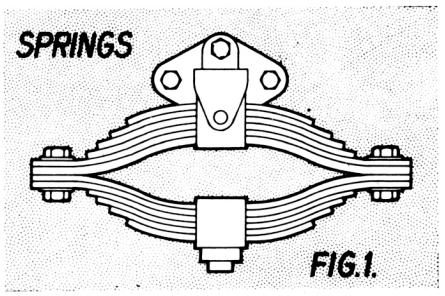
# WORKSHOP TECHNIQUES

## By Norman Dale




**For a number of years I have been working at the construction of a pair of Lancashire & Yorkshire Railway 0-8-0 coal engines in 4mm scale. In an unguarded moment somewhere along the line I promised the editor a description of this project, but as the years roll by it occurs to me that I shall be very long in the tooth before the story can be told in full. In the meantime, and as my contribution to the Manchester MRS representation in this issue of MR, I offer a couple of ideas which I have not seen elsewhere and which have proved most useful in connection with my own modelling.**

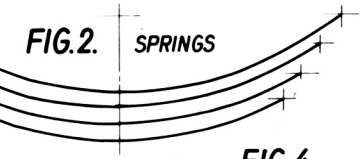
### Making Leaf Springs

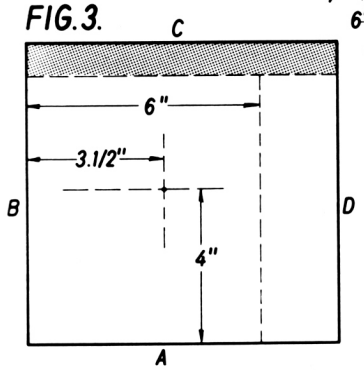
The first is a little jig which enables you to obtain spring leaves of correct length with a hole dead on centre in the leaves' length. The jig came about as a matter of necessity because no retailer has ever offered L & Y tender springs of the double type (Fig. 1) in 4mm scale. I wanted 16 of these and decided that the making of a pattern for casting would speed things along nicely and might prove of help to other modellers. The latter thought is not nearly so sentimental as it might sound: I have been churning out wagons for years using parts made from patterns which someone, somewhere, took the trouble to make.

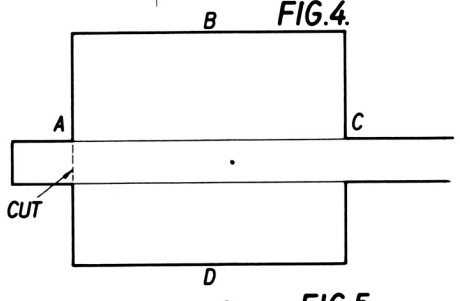
I tried quite a few methods of producing leaf springs before hitting on the simple idea described here. For example, let us assume the need of a spring of four leaves (the sizes are considerably enlarged and quoted only as a guide to help you understand my methods). Imagine taking a piece of hardboard of about 8in. square and making the edges A, B, C, D. The procedure would be as follows: using your joiner's gauge, scribe a line 4in. from edge A and another 3ins from edge B to cross the first line at X. From edge A scribe a line right along edge C at 7ins and from edge B another line 6ins along edge D. Carefully saw and plane down to the gauge lines on C and D edges. Fig. 3. Drill a fine hole where the lines cross at X.

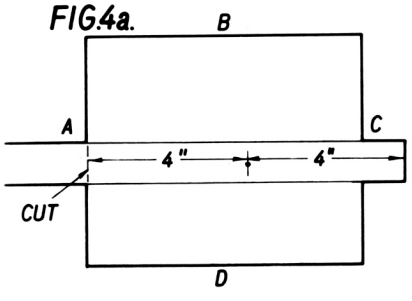
The preparation of strip material for the leaves is very simple. Cut a strip of card of about $\frac{1}{8}$ in. wide and drill holes at about $8\frac{1}{2}$ins centres along its centre line. The diameter of these holes should be that of a shoe nail or something similar. Tap this nail through the back of the jig to form a small stud on its face at point X. We are now set to make our leaves.

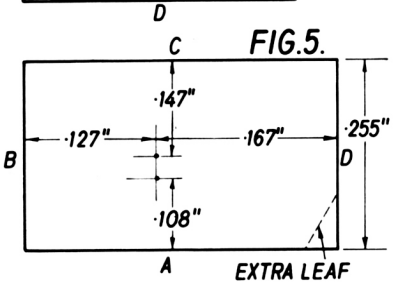
Place the first hole on the stock strip over the stud as in Figs. 4 and 4A and cut off the end where it overhangs edge A. Keeping a finger on the stud to retain the card strip, turn the strip right round until it again overhangs edge A and cut off at that point. You will now have a leaf 8ins long with a hole spot on centre of its length. For the sake of clarity we will run through the procedure for the next leaf. Put the stock strip over the stud as before but turn it to overhang edge B, cut off, turn through 180 degrees and trim at B.




This produces a leaf 7ins long. And so forth.

So much for the idea and the enlarged dummy used for explanation.

Looking through my notes for the L&Y project the actual sizes I used are as shown in Fig. 5.

| | | 4mm | | Full Size |
|---|---|---|---|---|
| A | = | .108×2=.216in. | = | 1ft 4½ins |
| B | = | .127×2=.255in. | = | 1ft 7½ins |
| C | = | .147×2=.295in. | = | 1ft 10½ins |
| D | = | .167×2=.334in. | = | 2ft 1½ins |

Note: a difference of 1mm or 3ins each length.

### The Pattern

The material for this came from our old friend the ex-RAF bank of 16 switches. From one of these I salvaged a strip of what I believe to be Nickel Silver $\frac{1}{2}$in. wide. This was reduced to a leaf width of .052 (4ins). The strip was .007in. thick and near enough for my $\frac{1}{2}$in. thick leaf spring.

The little jig was made of brass and measures .255 by .294 with a .010 entomological pin soldered in position. If more leaves are required it is not necessary to make another jig: by filing off the corners different half lengths from stud to trimming edge can be produced. Leaves of up to eight different lengths can be made with comfort from one jig by using this additional dodge. I needed six leaves of which two were the same length.

When sufficient leaves have been cut they are marshalled in the correct order and threaded one at a time over a 0.010 pin and held in place with a touch of solder on the protruding end of the pin. The leaves are bent to shape using pliers and fingers and fixed by floating one side with solder. A second spring is matched to the first and the ends drilled to receive pins to hold them together. Yes, it is fine work but most satisfying when you see the finished product.

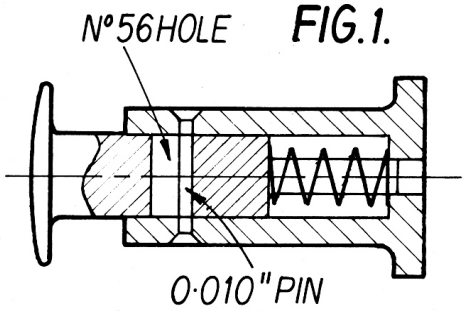
Unlike my colleague Mike Chapman, who has made patterns for all three types of L&Y tender springs, I did not include the axle box when producing mine. I made my axle boxes piece by piece; 17 pieces per box, 16 boxes; no wonder I am getting long in the tooth.

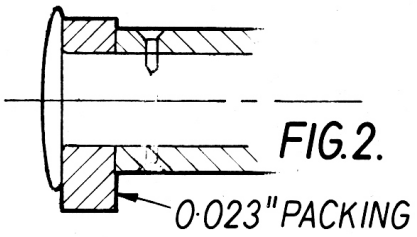
### Self-Contained Buffers

I made the eight self-contained buffers for my pair of coal engines quite a few years ago, using a design described by Sidney Stubbs in the April, 1967 issue of The Link*. Much later I found that the frames of the tenders prevented these being fitted. Feeling that I had hit the buffer stops, the job was put aside for a few days while I pondered remedies. Sidney had experienced the same trouble and got round it by filing the tail end of the shank allowing it to just slide along the inside of the frames. I did not fancy this

*Journal of the Manchester MRS.

solution because I was working on my first attempt at loco building . . . and there was quite a lot of solder joining the buffer beams to the frames!




BUFFERS

There must be an easier way, I thought, and inspiration finally arrived while on an early morning bus. It was the 7.20 to work and I don't know how I managed to get through the day, such was the urge to get at my own workbench after tea.

What I did was to drill a large hole in the buffer shank and a very small hole in the buffer casing, and soldered in a fine entomological pin. See fig. 1.

As I wanted $2\frac{3}{4}$ins. scale travel on the shank I worked it out as follows: the large hole was 0.046in., deduct the thickness of the pin, 0.010in., leaving 0.036in., or a scale $2\frac{3}{4}$ins.

The method employed was to fit an 0.023 packing as shown in fig. 2. The case was drilled 0.010 and the shank just touched with the bit. The shank was removed and drilled No. 56. An 0.011in. drill (Jackson coupling wire sharpened à la Colin Binnie) was passed right through the buffer case, and these holes slightly countersunk to receive solder. That is all there was to it.

The item was assembled by putting the shank spring in place, pushing this assembly in the casing, inserting the pin, soldering and cleaning up. *Nil desperandum*. We will never accept the word impossible – will we?!