

called upon to make patterns and core-boxes which require a great number of segments. For instance, he is given a blue print of a globe condenser from which must be made the pattern and core-boxes. The construction is almost entirely of segments, and is made as follows:—

First, with a shrink rule, lay out on a board a cross section (Fig. 1) to the parting line, to determine the size of the segments, inside diameter, outside diameter and length. A templet is then made for the different courses, 1, 2, 3, etc., from refuse stock and the required number of each sawed out.

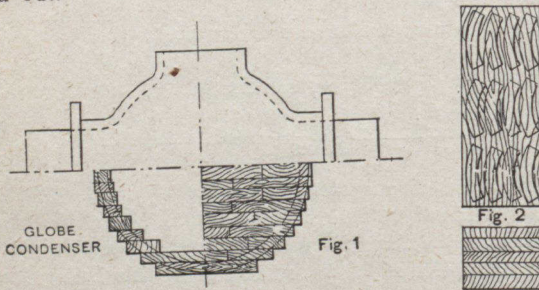
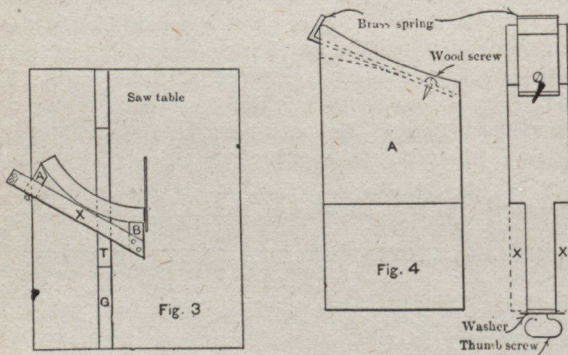


Fig. 2 illustrates the method of sawing several segments of the same dimensions in one operation, the number being determined by the thickness of the stock, the limit of the saw and the patternmaker's judgment. They are now ready to be jointed and this is the point I wish to emphasize in this article.

In many shops much time and labor is lost in this operation, saying nothing about the ugly joints which meet our eyes. This can be overcome with profit to your employer and less labor for yourself by adopting the device shown in Fig. 3. Fig. 3 represents a jig adjusted to the saw table in place of the squaring head and is for six segment work (60 degrees). Others can be made for any number of segments,



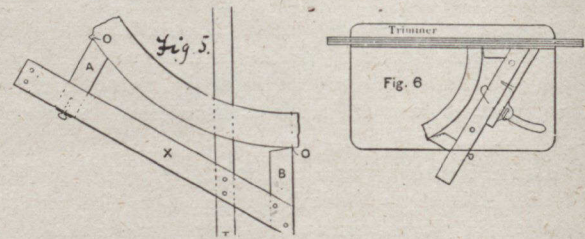
care being taken that the angle is right for the required number to the circle, viz., 90 degrees for four and 45 degrees for eight, etc.

The jig will be easily understood by a careful study of the drawings and needs but little explanation. The tongue t is fitted to the groove in the saw table g and the arm x fastened to it at an angle of 60 degrees with the saw. The blocks a and b are clearly shown in Fig. 5, b being fastened to the arm x, while a slides in the groove so that it may be adjusted to any length of segment within its compass.

A spring is placed at the end of block a (enlarged in Fig. 4) and serves as a stop when making the second cut, the first being made with the spring pressed back and out of the way. In Fig. 5 the segment is in place ready for the first cut and the dotted lines represent it after turning end for end and the second cut is made. Nothing but a sharp cross-cut saw should be used. Care must be taken that the

points O O, Fig. 5, are 60 degrees with the saw, otherwise they will not come out exactly six to the circle.

This device can also be attached to the trimmer and will give a much better joint for glueing than a circular saw can do. This arrangement is shown in Fig. 6. It is some-

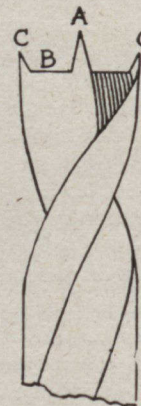


times fastened by two wood-screws from the back of the gauge, which is set at an angle of 60 degrees, and by others is attached to the table by two iron dowel pins, but the safest way is to use the two dowels in the table and one screw through the back of the gauge.

### OPERATING A BORING MACHINE.

The spindle which carries the bit should be just loose enough to turn freely, but not have side play, for if there is lost motion in the boxes the bit will not run true, and when the point of the bit strikes on the side of a hard place, such as the hard grain in oak, it will jump to one side and bore the hole off centre. This is a serious matter when boring for close dowel work, as it will go together hard or not at all.

The next thing is the bit. This should be kept sharp,



but simply making sharp edges and a sharp point is not sharpening a bit, unless this is done in the proper way. The sketch herewith gives the different cutting parts each a name: A is the centre point, B the flat cutters, and C the side cutters. The centre point is longer than any of the other cutting points. This is very essential, as the centre point holds the bit steady and keeps it in the centre. If anyone doubts this, let him try to bore a hole with a bit which has the centre point broken off and see how it will jump around on the piece he is trying to bore before it starts to cut. The centre point should be filed either three sides or four sides, not overly heavy at the base, but heavy enough to stand the strain without breaking—say, 1-16-inch at base for bits up to 1/2-inch, heavier in proportion for larger bits, then tapering down to a sharp point; this gives the point a reamer-like shape, which enters the wood very easily. The centre point should not be filed first, as it