



swage saw (see s) is tapered on one side from the rim towards the edge of the collar. They are either spring set or swage set. Both produce thin clean saw kerfs, and are used for cutting thin boards only, the ground-off saw being chiefly used for cutting boards from  $\frac{1}{8}$  to  $\frac{3}{8}$ -in. thick and the swage saw for sawing boards up to  $\frac{3}{4}$ -in. thick.

**Tensioning.**—A saw after continuous use becomes stretched at the rim; if not attended to it will fail to cut true and will run noisily. Therefore, in order to obtain efficient performance, it is essential to examine the saw and recondition it when necessary. This correction is obtained by a process of hammering known as "tensioning." The process is usually confined to the middle half of the saw and the *radial hammering* method is one of several which produces satisfactory results. Thus, if concentric circles are chalked off as shown by thin broken lines at A, Fig. 6, light hammering (by a round-faced or *dog-head hammer*) is performed, working from the outside to the inside, *i.e.*, from "2" to "1" as indicated by the thick broken lines. The saw is hammered on an anvil, and both sides of the saw are dealt with in this manner. This expands the metal over this area and counteracts the expanding effect at the rim when the saw revolves at a high speed.

A saw to be tested for tension is laid horizontally on a table or anvil and is raised at one edge. A metal straight edge is placed on the saw, extending from the centre to the circumference. If correctly tensioned, the ends only of the straight edge should touch the saw, and there should be a space between with a maximum at the centre. The whole area is tested in this manner and the clearance between the saw and straight edge should be uniform. Absence or deficiency of tension is indicated when the surface of the saw

between the ends of the straight edge touches, or almost touches the edge, and also if the saw shows "round" under the straight edge.

Improper treatment of the saw whilst in operation may produce bright or blue coloured bulges on the surface, known as *lumps* or *blisters*. The exact shape of these is determined by the straight edge and marked; the saw is placed on the anvil and the lumps are removed by the gentle application of a round-faced or *cross-face hammer*.

A circular saw is fitted on the spindle of the machine between two collars (one being "fast" and the other "loose") and secured by a nut; a "steady pin" projects from the face of the fixed collar and engages in the small hole in the saw. The saw runs in a slot in the table (see p. 24). A *packing* must be placed in the slot on each side of the saw between it and the table. A good type of packing consists of a thin strip of wood round which spun yarn, afterwards oiled, is wound; this is about 1-in. wide, and its length extends from the collar to just short of the base of the teeth. The packing must just be sufficiently tight for the purpose, excessive thickness being reduced by hammering on the wrapping. Correct packing prevents deflection of the saw and ensures steadiness.

**Speed.**—The speed of a circular saw depends upon its type, size and class of wood to be sawn. The most effective *rim speed* (that at the circumference of the saw) for general purposes is 10,000-ft. per min. The rim speed, divided by the circumference of the saw, gives the number of revolutions. Thus, for a 24-in. diameter saw the revolutions per minute are  $1,590 (10,000 \div \pi d)$ , and for a 36-in. saw, 1,060 revs. per min.

2. **BAND SAWING MACHINE** (see A, Fig. 5).—This is similar to, but much lighter than,