



hook. The *gullet* must be sufficiently large and well rounded to remove the sawdust rapidly during the cutting operation.

Set.—The setting of the teeth of hand saws to produce the cut or *kerf* of greater width than the thickness of the blade is referred to on p. 127, Vol. I. A similar clearance or set must be given to the body of a circular saw so as to eliminate friction, otherwise the timber would bind on the saw, generating heat and causing the saw to wobble. This clearance must be equal on each side if "pulling" to one side is to be avoided. Teeth are either (a) *spring set* or (b) *swage set*.

(a) *Spring Set or Side Set*.—In this type the points of the teeth are bent over to the right and left alternately. Only the extreme points are sprung over, as shown at F and H, Fig. 6. The amount of set depends upon the nature of the timber. In general, hardwoods require less set than softwoods, and the set is increased when wood of a woolly and binding character is to be sawn. As a rule the set required for a 36-in. diameter saw is about $\frac{1}{8}$ -in. bare for cutting hardwoods and $\frac{1}{4}$ -in. full for sawing softwoods. The tool used for bending the points of the teeth is called a *saw set*. This is a small steel tool, having several notches of various widths on each of its two edges, and provided with either one or two handles. When setting, the notch in the tool corresponding to the thickness of the saw plate is fitted over the point of the tooth and bent over in the required direction as slight pressure is applied on the handle of the tool. Another tool, called a *set gauge*, is used to measure and ensure the uniform projection of the teeth on each side of the saw. This is a small piece of steel having a straight edge which is notched at the end by an amount equal to the required set. When applying the set gauge, its straight edge is held square along the centre line of the saw, and the point of the tooth should just touch the notched top of the gauge; any adjustment of the tooth is made by the saw set.

The top of each tooth of a rip saw is sharpened with a slight bevel, called the *top bevel* (see F and G); this enables the outer and higher extreme point to lead in the saw

cut. The front of each rip-saw tooth has little or no bevel, but both the front and back of cross-cut teeth are bevelled on alternate sides.

Spring-set teeth are often used for ripping and cross-cutting. Setting of the teeth can be done by the automatic saw sharpening machine described on p. 30.

(b) *Swage Set*.—The point of each tooth when swage set is pressed out so that it slightly extends an equal distance on each side of the saw (see K and N, Fig. 6). Thus, each tooth clears both sides of the saw, whereas in spring set every other tooth clears one side and the alternate teeth the other. Two tools are used for swaging or spreading the teeth, *i.e.*, the *swage* and the *side dresser* or *swage shaper*. The former consists of a block of steel having a slot to admit the saw blade, and an internal anvil and eccentric die; the top of the tooth is pressed against the anvil, a handle is turned causing the die to apply pressure on the face of the tooth as it spreads out the point. The side dresser ensures a uniform width across the points of the saw; this steel tool has two metal dies between which the point of each tooth is squeezed, the finished width being determined by an adjustable steel plate which rests on top of the tooth.

Swage set is preferred for rip saws, log band saws, re-saws and frame saws. A faster feed can be employed when a saw is swage set and not spring set.

The above cross cut and rip saws are of uniform thickness. Another form of circular cross-cut saw, known as a *hollow-ground saw*, is of uniform thickness at the centre (for the diameter of the collar—see p. 27) and, after being reduced, gradually increases in thickness towards the rim (see Q, Fig. 6). It is used for accurate work. The teeth require no set.

The *ground-off saw* and the *swage saw* or *bevelled saw* are two other types of circular saw which are not of uniform thickness throughout. Both are thinner at the rim than at the centre, the ground-off saw (see R, Fig. 6) having a thin parallel rim of 1 to 1½-in. width and increasing in thickness by a slight concave taper on one side only, and the