

## FIXING TEETH FOR SMOOTH WORK.

Woodworking machines are kept in use in shops for the reason that they pay a profit upon the amount invested in their purchase. Every machine, in order to earn the largest possible dividend upon the investment, must at all times be kept in the best condition, and worked at the very limit of its capacity without the loss of a minute of time. The output must be of the highest possible quality; therefore it is absolutely necessary that each machine is in *At* condition for work. This means that every saw, planer, moulder, and every cutting tool, belt and nut must be in perfect condition and ready for long and continual use. It means that the saws must be kept sharp and the shape of the teeth perfect. There is a certain shape of tooth which will cut the best in each particular kind of work which is to be done. This shape must be found, and once found, it must be maintained or the machine is not working at its full capacity and the profits fall off.

### Jointing.

Take, for instance, a bench cutting-off saw. This tool can be kept in such condition that varnished and finished boards can be cut to length without in the least marring the boards or without splintering the ends in the least. To

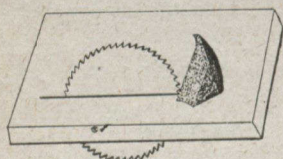


Fig. 1.

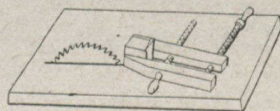
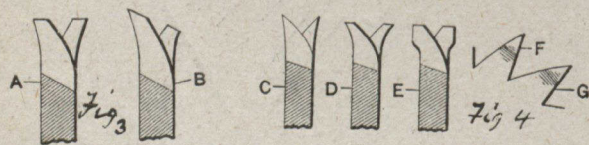


Fig. 2.

put a saw into condition to do this work, and to keep the saw so, requires a little skill and a good deal of patience on the part of the workman in charge of the saw. To put a circular saw in perfect condition, it must first be "jointed," or made perfectly round. All manner of methods are in use for this purpose, from holding a file against the saw to using a diamond. The writer prefers an old emery wheel, or a piece of wheel for jointing any saw, either circular or hand.

A good method of jointing a saw, particularly a large one, is shown by Fig. 1, in which a piece of emery wheel is shown standing on the saw-table. To use the stone, grasp it firmly with both hands, and tip the top edge toward the saw until the stone barely touches the teeth. Watch very closely when the fire begins to fly, for that is the guide to go by when rounding or jointing saws. There is no danger of cutting too much off the teeth of the saw



when the sparks are watched closely, for the jointing should be stopped the instant all the teeth are brought to an even length, and when the fire flies from all the teeth they must be all the same diameter, and the emery should be removed.

When the fragment of emery wheel is very small, it is not a very desirable operation to hold it in the hand and press it against the fast-running saw. In this case, catch the bit of stone in a pair of hand-clamps, square up the stone so it will stand square with the clamps, and when they are laid on the saw-table the stone must necessarily stand "square with the world." With the clamps the stone can be fed against the saw in a manner perfectly under

control, and the method is preferable to the first method of holding the stone in the fingers.

Great care must be taken to make the teeth of equal length on both sides of the saw. Fig. 3 gives two examples of saw jointing, two teeth being shown in sections, that is, looking at the edge of the saw. At A, there is shown an example of correct jointing, the teeth on both sides of the saw being of equal length, and both are cut square across the saw. At B, however, something altogether different is shown. In rounding this saw, the stone was evidently allowed to turn from its proper position, and the result is seen in the condition of the teeth, those on one side of the saw being much longer than those on the other side. A good deal of care should be taken to prevent this action when rounding or jointing saws, for one in the condition shown by B can never be made to do satisfactory work.

### Saw Setting.

All saws, except those doing very fine, nice work in the driest of material, must have the teeth "set" or spread alternately to one side and the other in order to cut a kerf wider than the body of the saw, in order that the saw may pass through the kerf without undue friction against the sides of the divided material. All saws designed for the finest class of work, and to run without being set, are so ground that they are the thickest at the rim, thus allowing the body of the saw to pass anywhere that the thicker teeth have made a passage.

In Fig. 4, the sketch C represents an example of good setting. The teeth are spread sidewise, slightly and evenly, a small distance beyond the sides of the saw. This saw is for cutting off material, and the teeth are filed "fleaming" or pointed. The set in saws of this kind must not be too close to the points of the teeth, or a condition will be met with which prevents the saw from working long after it has been filed and set. It will be noted that in sketch D the points of the teeth are turned out a good deal, and that the point only has been bent out. A saw set in this manner will soon have the points of the teeth worn off by the action of cutting, then the saw will be dull, the teeth do not project much beyond the sides of the saw, the setting is worn off with the sharpness, and the saw is entirely out of business. Never set a saw in this manner.

In direct contrast with the "point setting" shown by D is the manner illustrated at E, where seemingly the whole point of the tooth has been carried bodily out beyond the case of the saw. In other words, the tooth is offset, and the edge of each tooth is almost parallel with the face of the saw. Here, there is less likelihood of wear, because there is considerable body to back up the point of the tooth, and this saw will wear many times as long before needing filing and setting than will the tooth represented at D.

The saw shown at E is arranged for ripping, and the tooth is filed nearly square across, instead of being made fleaming as is the case with examples C and D. But this makes no difference, and the setting may be the same for both cut-off and rip saws. The effect on the sides of the teeth is shown at F and G, where both sides of the teeth are shown respectively. A blow or a heavy squeeze at F forces over the entire end of the tooth, as if it had been placed over a bit of sheet iron and offset. This effect is also shown on the other side of the tooth at G, and is the correct thing—when you can get it. Usually, however, the sawyer has to be satisfied with that shown at C, Fig. 4, which is a good average setting.

There are many appliances for putting set into a saw, some of them very crude, while others are refined to such an extent that they almost need an engineer to take care of