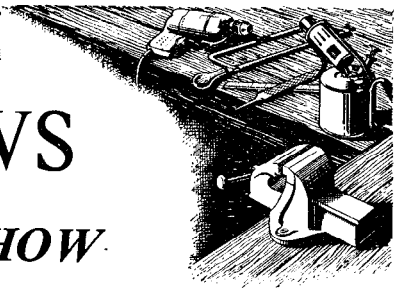
In the first article of a series designed to help the younger element GEOMETER gives some helpful advice on



BEGINNERS' WORKSHOP

SAWS AND HOW TO USE THEM

ALMOST ALL METALS commonly found in workshops-iron, mild steel, cast iron, brass, copper-can be cut easily by hand if the correct saw is used. The exceptions are steels which have been hardened and tempered for special purposes.

The metal saw differs from the wood saw in that it employs separate blades which have been specially hardened and tempered for metal cutting. Because of this, the blades cannot be sharpened with files like wood saws, so when worn out they must be renewed. As they are hard, or semi-hard, they are liable to crack or break if twisted or wrung excessively.

Tubular frames for rigidity

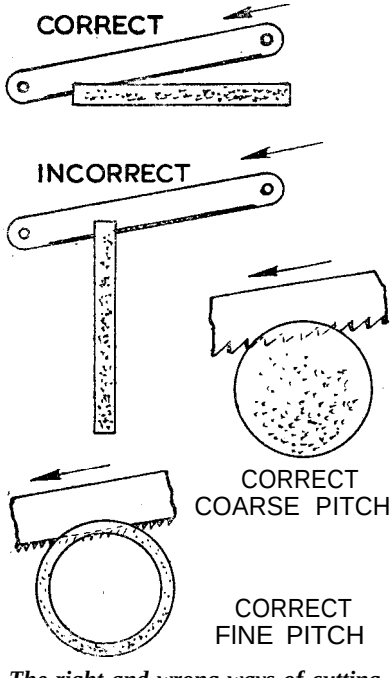
Frames to take metal saws, or hacksaws as they are known, are made in a variety of sizes and designs for blades 9 in., 10 in. and 12 in. long. The standard non-adjustable frame takes blades of one length, but there are adjustable models of similar design which take all lengths of blade. Tubular frames are, in general, more rigid than those of flat section.

For many purposes, the depth of cut with a hacksaw is limited by the depth of the frame+-i.e., the distance from the blade to the back of the frame. Special frames are available for exceptional depths of cut, however; these are called girder frames. A light frame, known as a junior, and formed from solid rod takes short fine toothed blades.

Under no tension

A pad handle is made to take a standard hacksaw blade? or portion of blade, the projection bemg adjustable. This has the advantage that it can be entered in awkward places where a standard or junior frame would be obstructed, and can also be used for cutting down wide sheets of metal. As the blade is not held in tension, more care is necessary when using the pad handle.

Standard hacksaw blades have teeth of 14, 18, 24 and 32 pitch. This term " pitch " means the number of teeth in 1 in. Blades with the smaller numbers of teeth are called coarse pitch, and those with the greater numbers of teeth are of fine pitch. Pitches of 18 and 24 are commonly used for general work; 14 pitch can be used if the metal is very thick; 32 pitch can be used for sheet metal or thin-walled tubing.



The right and wrong ways of cutting

Junior blades are 6 in. long of 32 pitch, and have a pin at each end for mounting in the frame. Circular blades have a spiral tooth, and these are mounted in a standard hacksaw frame employing clips. These enable one to cut as with a fretsaw but in metal.

There are other types of saws and frames for particular purposes. Saws which are parallel in vertical section and without any set on the teeth are slitting saws; these produce a straight smooth-sided cut, but should not be used for general sawing. Hacksaws, junior saws, and similar blades, have a set on the teeth which provides clearance in the cut.

Choosing the blades

When choosing a blade for a particular job remember a coarse pitch of tooth for large sections and soft metals such as aluminium; and a fine pitch for harder metals such as cast steel or silver steel, and for thin sheet metal and thin-walled tubing. Shorter blades will serve the same purpose as long ones in many cases and are more economical. Long blades are better if the section of metal is large.

The blade should lie snugly against the side of its attachments, with the pins firmly in the holes, and should be put in tension so as not to whip or bend when in use ; the blade should remain firm and straight and should not be over-tensioned. For making long cuts down the sides of sheets, the blade can be mounted at right-angles to the frame, by turning the fittings through 90 degrees before mounting the blade.

How to make a cut

A cut should be started with short. strokes, guiding the blade with thumb or fmger. When a start has been made, the strokes should be long and firm using the full length of the blade.

This method ensures that all the teeth are equally worn and therefore a smooth cut will result. If only the middle of the blade is used for a long time, when the ends of the blade are brought into use they tend to " seize." This is due to the set not being worn. For this reason a new blade should not follow in the cut made by an old blade.

Cutting metals is a matter of knowledge rather than knack and the correct and incorrect of cutting are illustrated.