Beginner's Guide to

Making Wooden Furniture

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Newnes Technical Books

Preface

Furniture making is a development of working in wood and is now a specialised trade or craft using, in addition to timber products, various metals, plastics, glass, ceramics, fabrics and fibres.

Over the years, styles and techniques in furniture making have changed dramatically, and this has resulted in profound changes in the furniture-making crafts. Many old skills, techniques and tools are still used but new techniques, materials, fittings and tools have facilitated design and construction of furniture.

This book guides the beginner through the various steps and stages in constructing good, serviceable items for the home, including the hand tools and power tools usually needed, timber and timber products, the fittings and components needed or available, methods of jointing, and setting out work. We next cover the many types of constructions that are used in furniture making, the various finishing processes and some constructional ideas.

We hope this will provide sufficient impetus to help beginners work out their own designs and construct them in a skilful and workmanlike manner.

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Chapter 1 Hand tools

A great deal of work can be done with a small range of hand tools, especially if standard section timbers are used and if a good portable power saw is available; but life is much easier, and better work is produced, when the right tools for the job in hand are used and married to the skills of the user.

There is no such thing as a 'complete' set of tools for wood-working - boring bits, for example, are available in such a wide range of sizes and patterns that even the most dedicated enthusiast is likely to have only a small selection of these. Bits are also typical of the type of tool where the basic kit is supplemented when a particular need arises. Tools play a big part in the craft so a knowledge of tool technology means that the correct tool can be selected in the first place and then used with greater understanding.

Correct sharpening of edged tools is all-important as sharp tools are essential for working with wood. Tools of reputable make are always worth the little extra initial outlay - particularly when they are tools which do the actual cutting. Tools of doubtful origin are usually made of indifferent-quality steel; and poor steel cannot be sharpened properly.

Modern design and present-day technology have made some traditional hand tools almost obsolete, like Multi- planes (which themselves largely replaced wooden moulding planes) and shaper tools or milling cutters. The so-called man-made boards' are responsible for the development of other tools of which the dowelling jig is one example. Widespread use of small, powered circular saws (including the ones available as attachments to power drills) has led to the near-disappearance of the traditional rip saw.

Handsaws

This is the group with long flexible blades. A good-quality saw's blade is made thinner towards the back edge than at the teeth. This is known as 'taper ground'. It gives improved clearance of the saw, which requires less 'set' of the teeth. This means that less wood is removed in the saw cut (or 'kerf', to give it the correct name), and therefore less effort is required in sawing. Some modern saws have the blades coated with a material which considerably reduces friction between blade and kerf, thus providing easier cutting. The coating also acts as a rust preventative.

Saw steel needs to have special qualities for sawing wood, and this includes not being so hard that the teeth cannot be sharpened by being filed. However, some

modern saws are made of special steel which, it is claimed, responds well to filing but which resists blunting to a far greater extent than ‚ordinary' saw steel, and needs sharpening much less frequently.

Handsaws vary in blade length from 450 mm to 650 mm (18 to 26 in), with teeth of different size and shape. The larger saws are usually of the rip-saw pattern, distinguished by fairly large' teeth shaped as seen in Figure 1.1. These saws only function properly when cutting along the grain, and if used across the grain produce a very ragged cut.

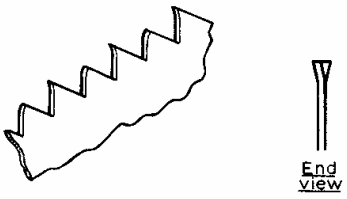

Figure 1.1. Rip-saw teeth

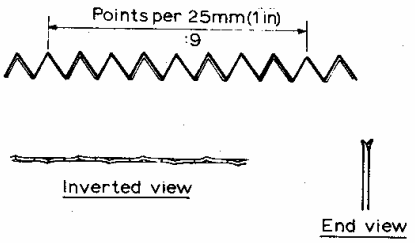

Figure 1.2. Teeth of cross-cut, panel and back saws

A cross-cut saw has teeth shaped as shown in Figure 1.2. They are sharpened with the file at an angle across the blade. As a result, the teeth are pointed at their outer edges. These pointed tips sever the fibres of the wood in advance of the main cutting action of the teeth (Figure 1.3), the result being a tear-free saw cut. A cross-cut saw has between 6 to 8 teeth per 25 mm (1 inch) or, to be more precise, 6 to 8 'points' per 25 mm, which includes those at the ends. This measurement of teeth is shown in Figure 1.2. A cross-cut saw cuts in any direction of the grain, although it is most efficient when cutting across it.

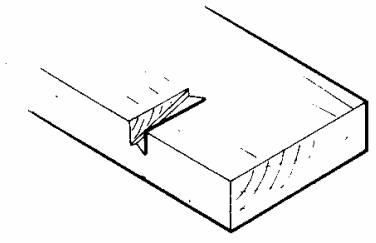

Figure 1.3. Cutting action of cross-cut teeth

Probably the most useful saw to have around the home workshop is the one known as a panel saw. Such saws are about 550 mm (22 in) in length, with about 10 points per 25 mm. They are sharpened in the same way as the cross-cut teeth and

therefore have a similar cutting action. They will cope with large-scale sawing of material up to 20 mm, or more, thick and they are also useful for cutting large tenons with which more usual techniques cannot cope. Panel saws are ideal for man-made boards such as ply, blackboard and chipboard, where fairly small teeth are essential to prevent damage to the thin facing veneers these materials often have. The risk of damage is greatest on the underside of the board, particularly when sawing across the grain.

Backsaws

This group includes the tenon, dovetail and gent's saws, of which the tenon is the bench 'workhorse'. The stiffener along the back, which gives this group its name, is of either steel or brass and its purpose is to make the blade rigid and therefore more easy to control for accurate cutting. Tenon saws are made from 250 to 350 mm blade length; teeth sizes are about 14 or 16 per 25 mm. For domestic woodworking - including furniture making - the 250 mm size is adequate, and can be regarded as the general-purpose benchsaw.

Tenon saws normally have a closed handle, traditionally made of beech, but a dovetail saw handle is usually open. These saws are around 200 mm in length, with 16 points per 25 mm. The dovetail saw is used for fine and accurate sawing, and for the many variations of dovetail joints. These saws are shown in Figure 1.4, together with the gent's saw. The gent saw ranges from 100 mm to 200 mm blade length and has a turned pattern handle. Tenon saws are useful for particularly small work and fine picture framing or mouldings.

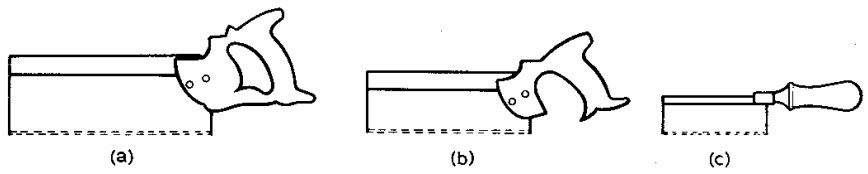

Figure 1.4. Three types of backsaw: (a) tenon, (b) dovetail, and (c) gent's

Saws for curves

The essence of a saw which will negotiate curves is having a narrow blade. This blade, therefore, needs to be supported in a frame. The bow saw is one of the oldest

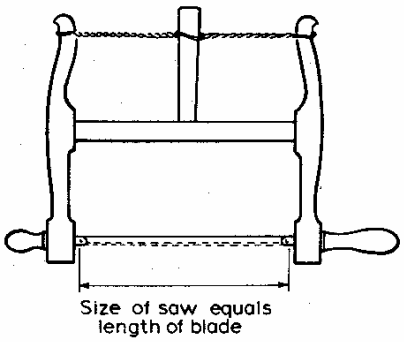

Figure 1.5. Bow saw

patterns of saw there is - the string tourniquet being the means of tensioning the blade (this principle has remained unaltered for centuries). Popular sizes range from 250 to 350 mm, with teeth that are relatively coarse. The blade rotates within the frame but the stretcher imposes a restriction which governs the maximum distance at which sawing can take place from the edge of the wood. This saw is illustrated in Figure 1.5.

Although very different in appearance, the coping saw is in many ways similar to the bow saw. The steel frame not only supports the blade but is sufficiently springy to provide the tension when the handle is tightened. Both the blade and the actual teeth are finer than on the bow saw. The direction in which the blade should be inserted in a coping saw is a topic on which experts disagree. Some say that the teeth should point so that cutting occurs on the pushing stroke; others say that they should point the other way so that the cutting is done when the blade is under maximum tension because of the pulling stroke. Once familiarity with the saw has been achieved, operatives can decide for themselves which method they prefer.

This saw is also partly restricted in its use by the frame. When a hole has to be cut in the middle of a piece of wood, a starter hole needs to be bored first, in the waste area. The blade is then removed from the frame and threaded through the hole, and re-fixed in the frame to allow sawing to take place (see Figures 1.6 and 1.7). The coping saw is also used to help in the removal of waste when cutting dovetails. This saw is probably the most used of the saws for cutting curves.

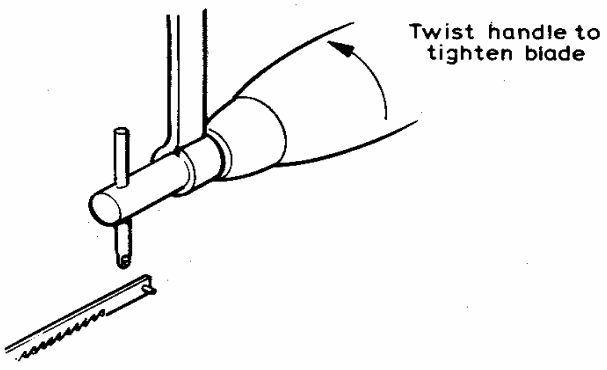

Figure 1.6. Handle end of coping saw

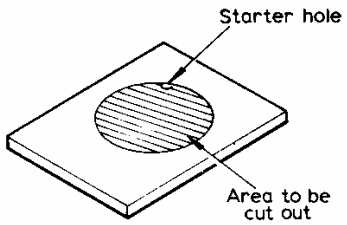

Figure 1.7. To cut a hole in a piece of wood, bore a starter hole first

Broadly speaking, the coping saw is used on wood up to about 20 mm thick and the bow saw on wood above that thickness. Blades for both are regarded as disposable.

The pad, or keyhole, saw differs from the previous two insofar as there is no frame to it. This removes the restriction imposed by a frame, but leaves the blade weak and prone to buckling when enthusiasm takes over from care. The blade is adjusted to length within the handle, and is shown in Figure 1. 8.

Figure 1.8. Pad saw. The blade length is adjustable within the handle

Even the best saws, made from the finest steel, will suffer if the teeth are allowed to strike on metal. Care is always needed when sawing timber in which there might be nails or screws - secondhand material requires particular vigilance in this respect. If a saw strikes something metallic and does so more on one side than on the other, the teeth on the injured side will be made more blunt than those on the other side. This will result in a saw whose cutting action is out of balance. This will make it very difficult to control the saw so that it cuts accurately, since it will tend to veer to one side.

Saws should never be forced when cutting, nor should the sawing be hurried. A long, steady stroke using the blade from end to end and without haste is the most efficient manner of using any kind of saw, with just sufficient pressure for the teeth to cut.

Impelling tools

The type of hammer most suited to furniture making is the Warrington pattern, shown in Figure 1.9. Hammer size is governed by the weight of the head; two hammers cover the vast majority of uses for bench work. For general purposes, including punching in nails, one with a head of 250 or 300 g (8 or 10 oz) should be selected; but for lighter work and driving panel pins, a 120g (4oz) head is preferable. The latter is known as a pin hammer. Warrington hammers have what is called a 'cross pein head', distinguishing it from the engineer's 'ball pein' hammer. Shafts are usually made of ash.

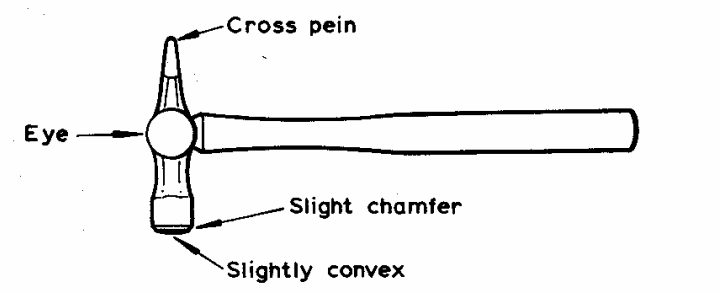

Figure 1.9. Warrington hammer

A good-quality hammer has the face slightly convex and the edges of the face lightly chamfered, in order to lessen the risk of bruising the wood when in use. With a good hammer correctly used it should be possible to drive a nail fully into the wood without bruising the wood. Should a shaft become loose in the eye of the head, hammer wedges should be used to tighten it up, since a loose head can be dangerous.

Although not a cabinet maker's tool, a claw hammer with its heavier head, or an engineer's hammer, is useful for larger assembly work, the latter being the hammer to use when doming over a rivet.

A mallet is probably used more than a hammer in furniture making, and can be bought, or made. Beech is a close- grained wood which wears well and resists splitting, and is an ideal choice for the head but either beech or ash can be used for the shaft. A sectional view of a mallet, with typical sizes for one of average weight, is shown in Figure 1.10. The drawing also shows the wedge shape of the shaft by which the head is retained in position.

Although not an impelling tool as such, pincers belong to this group and are as essential as a hammer. In use, the nail should always be gripped as low down as possible in order to gain the maximum leverage effect as the pincers are lowered to the wood on the rounded fulcrum (Figure1.11). To prevent the pincers from marking the wood, as they can easily do, a useful precaution is to place an ordinary cabinet

maker's scraper between tool and the wood. In any case, always use some such device to protect the work when withdrawing nails.

Screwdrivers

Despite the increasing popularity of screws of the Supadriv type - which are themselves a development of the Pozidriv screw - screws with slotted heads are still widely used and, therefore, drivers of both types will be needed. Pozidriv screwdrivers are used in all patterns of cross-head screws and it is important to use the correct point sizes in relation to the gauge of screw, as follows:

Pozidriv size number 1 fits screw gauges 3 and 4
Pozidriv size number 2 fits screw gauges 6 to 10
Pozidriv size number 3 fits screw gauges 12 to 14
Pozidriv size number 4 fits screw gauges above 14

As large-gauge screws are rarely used in furniture making, the tool kit should be equipped with Pozidrivers number 1 and 2.

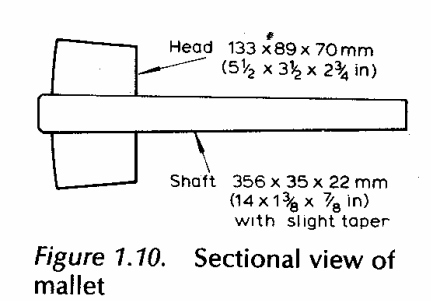

Figure 1.10. Sectional view of mallet

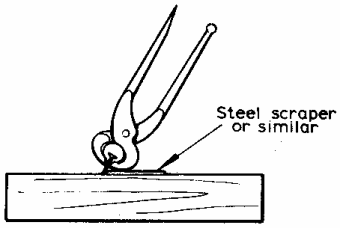

Figure 1.11. A simple way to protect work when using pincers

Size of drivers for the traditional screws with slotted head .are determined by the length of blade, rather than the size of tip; a 75 mm (3 in) and a 150 mm (6 in) are useful sizes, but the size of the end in relation to the screw is quite important. If it is too small, there will be insufficient leverage and the slot in the screw can easily be damaged. If too large, the wood can be spoilt. Many craftsmen like to adapt their screwdrivers as shown in Figure 1.12, as this enables a large-bladed driver to be used without corners protruding from the slot of a countersunk-headed screw.