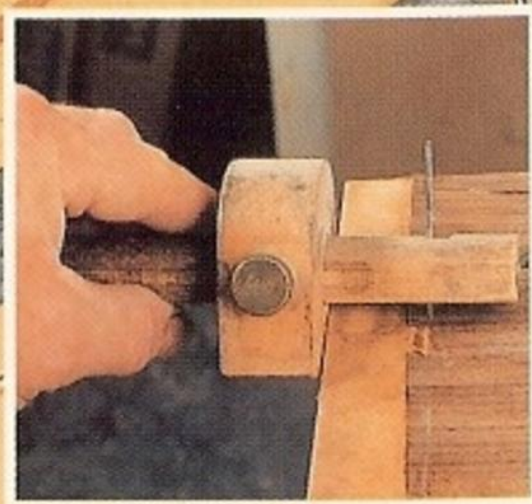
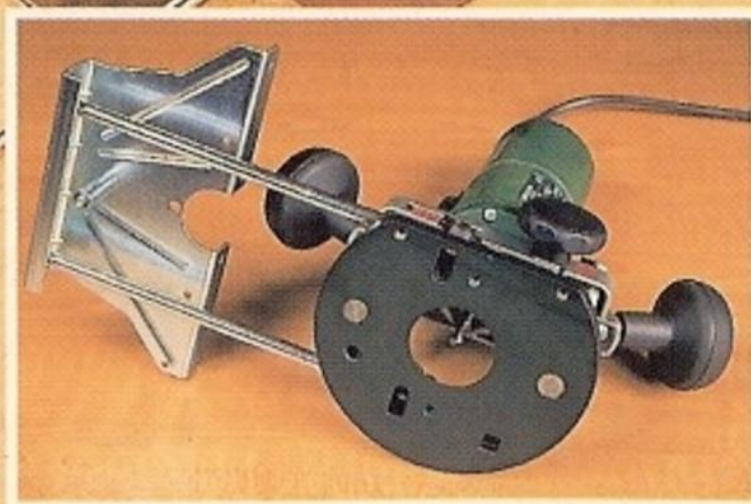
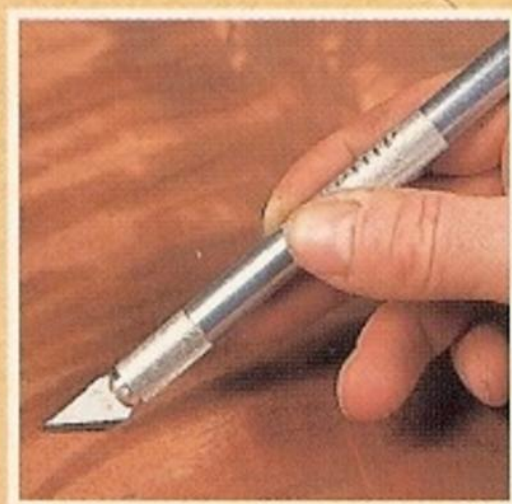


VENEERING

H A N D B O O K

IAN HOSKER



VENEERING

HANDBOOK

VENEERING HANDBOOK

Ian Hosker



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*To Tony and
Joyce Stephenson*

INTRODUCTION

This book is devoted to describing the materials, tools, equipment and techniques that have evolved to produce the craft of veneering. As with all skilled activities, the techniques described here will need to be adapted to take account of individual circumstances – one of the skills needed to be a good practitioner of any craft is ‘problem-solving’. Of course, the basic skills need to be mastered first, and the aim of this book is to help you acquire, to improve, those skills. I hope it is successful in achieving that aim, and contributes to your enjoyment of working with wood in what is, after all, a highly creative medium.

Working with wood enjoys the reputation of being an especially satisfying activity and veneering offers a number of opportunities for creativity, from ‘pictures in wood’ (marquetry) to the effects of alternating grain directions in geometric patterns (parquetry). It can be practised independently of other woodworking activities, or as an integral part of other crafts, such as furniture making.

Veneering does not require investment in expensive machinery – simple presses can be home-made – and gives you the opportunity to work with woods that may be unavailable, inappropriate or too expensive, in the solid form. Some varieties are too weak structurally to be used in the solid form, and the veneer is the only feasible way to use them. Because it is possible to buy a huge range of wood species in veneer form, each with its own characteristic colour and grain pattern (figure), the opportunities for colour and grain combinations are practically endless.

I do hope that this book contributes to your skill development and enjoyment of this very ancient craft.

MATERIALS

- ◆ VENEERS
- ◆ GROUNDWORK
- ◆ ADHESIVES
- ◆ ABRASIVES
- ◆ POLISHES

VENEERS

Modern veneers are 'knife-cut'. That is to say, large logs of timber are securely held and thin slices are shaved off by the action of a reciprocating blade. Such blades move backwards and forwards to cut horizontally through a log. As veneers are cut, they are put into bundles of consecutive leaves. This makes it possible to supply matching leaves for use in such decorative effects as book-matching or quartering (*see* Chapter 6). This method enables very large sheets, or leaves, of veneer to be produced, with their thickness very accurately controlled.

Until the development of reliable circular saws after 1825, veneers were cut by hand using a large saw. This required two men to operate it and resembled an oversized bow saw. This technique resulted in much thicker veneers than knife-cut veneers – nearly $\frac{1}{4}$ in (6mm) thick. From around 1830, huge circular saw blades were used and these could

produce veneers closer to $\frac{1}{16}$ – $\frac{3}{32}$ in (approximately 1.5–2mm) thick. By 1914, the current methods of veneer production were in universal use and veneers of extreme thinness – 0.03in (0.07mm) – were in general production.

Because of this, sawn veneers bear no resemblance to modern knife-cut veneers, which are ready to use straight from the cutting machine. They were



Fig 1.1 A comparison of knife and sawn veneers. The latter are essential for restoration work.

much thicker and often of uneven thickness so that they needed to be planed to a reasonably uniform thickness before they could be used (*see* Fig 1.1).

From a decorative point of view, veneering relies on two main qualities:

- (a) contrasting colours; and
- (b) interesting and/or dramatic figure (surface patterns and colour variations).

The techniques described later in this book will show you how such effects can be achieved. At this stage it is worth looking at several of the main decorative qualities of veneers, which is, after all, one of the justifications for their use.

CURL AND BUTT

Curl, a very dramatic veneer (*see* Fig 1.2), is cut from the point in the trunk where it divides into two main boughs (*see* Fig 1.3). Since this occurs only at specific sites in the tree, a relatively small

number of curl veneers is produced. This makes them expensive – and the cost tends to be in direct proportion to the decorative quality. Butt veneer is cut from the opposite end of the trunk where the main roots divide. It resembles curl veneer, though the figure produced may be slightly wilder than curl.

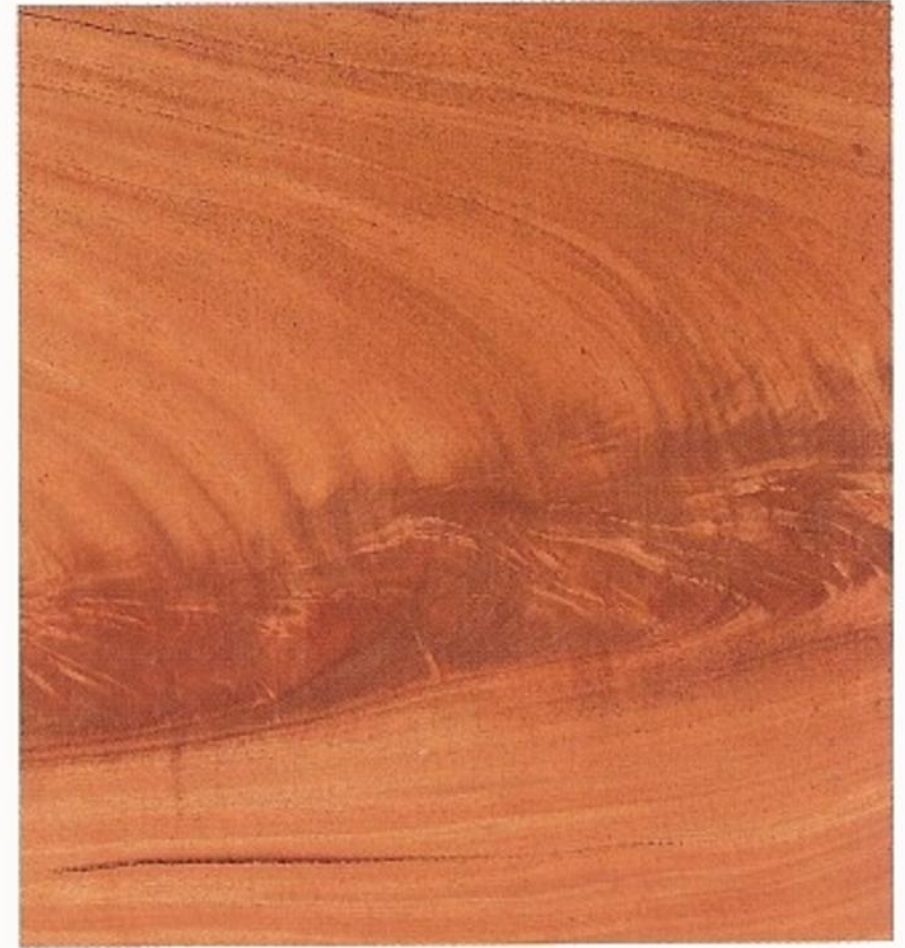


Fig 1.2 Mahogany curl veneer.

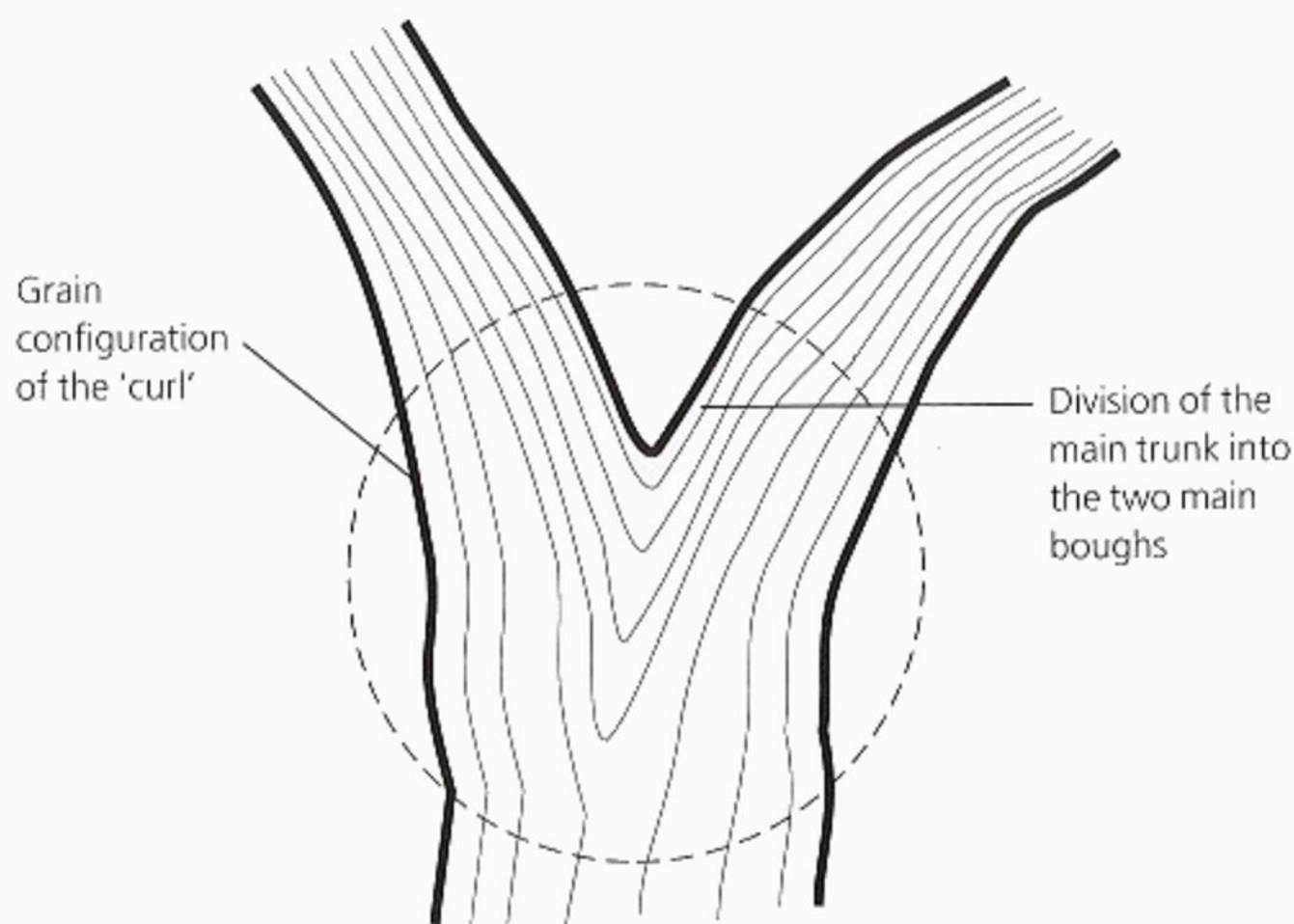


Fig 1.3 Curl veneers are produced from the point in the tree where the trunk divides into the main boughs.

BURR

This wild grain configuration (*see* Fig 1.4) is caused by the nature of the wood's growth. Burrs are those strange-looking growths that occur on the trunk of the tree (*see* Fig 1.5). They are often the result of some damage to that particular point. For a number of reasons an area of growth in the trunk (i.e. side branches or shoots) become damaged, perhaps through attack by insects or disease, causing a haphazard, localized growth, with many very small side shoots. The result is a bulbous protrusion from the trunk. The figure in the veneer reflects this haphazard growth. The circular spots are cross sections of the side shoots that make up the bulk of the growth. These veneers are particularly difficult to work with because of their brittleness. They frequently need patching prior to application because of damage. By their very nature, these veneers tend to be available only in small sizes, and are expensive because of their relative rarity.

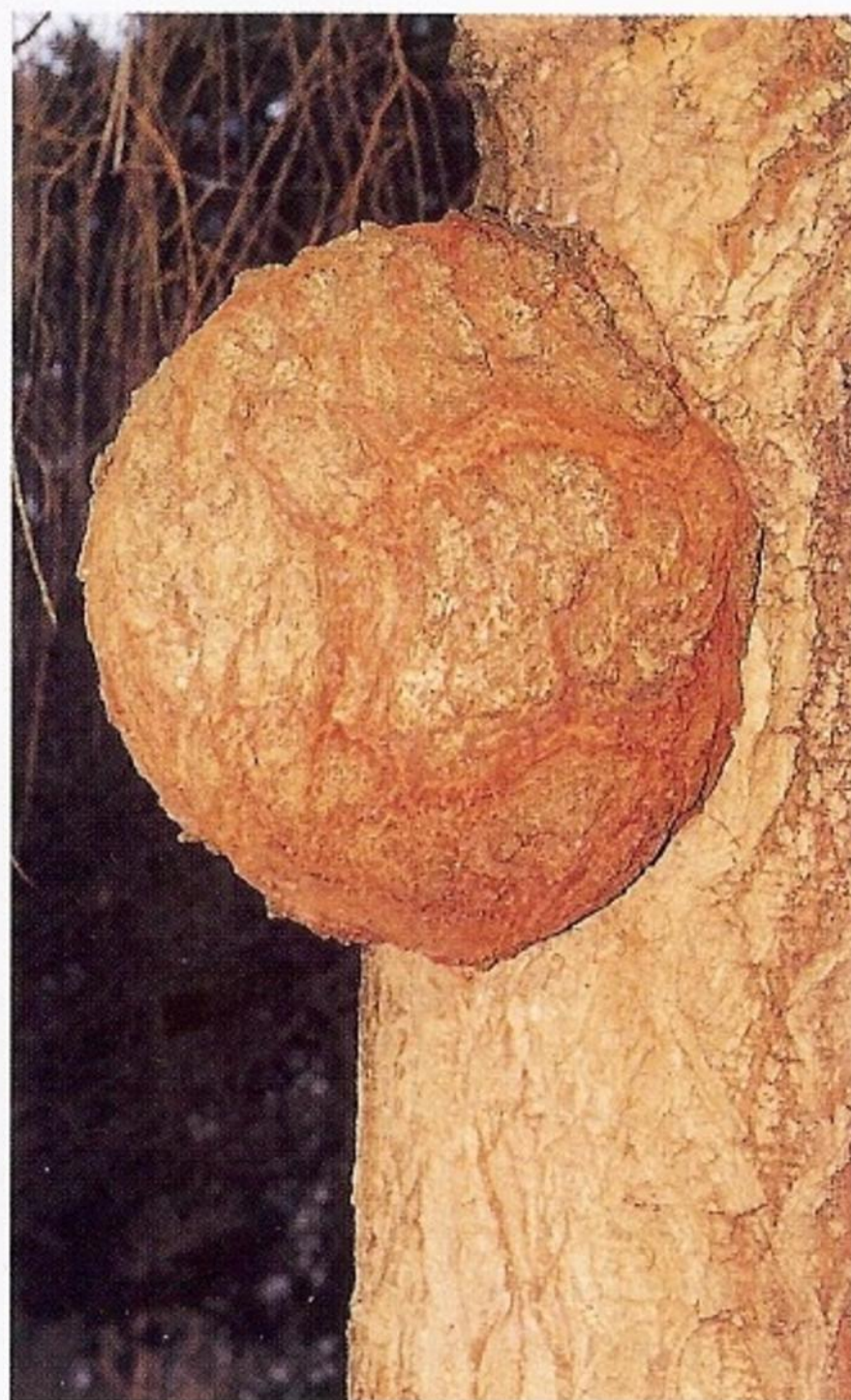


Fig 1.5 An example of a burr.



Fig 1.4 Burr walnut.

MOTTLED

This is not an official name, but it does adequately describe the very appealing quality of varying light and dark areas, that are at their most attractive when the veneer is polished (*see* Fig 1.6). These effects are caused by an undulating grain configuration. As the veneer is produced, the knife slices across the undulations so that the differing grain directions reflect the light in such a way as to produce areas of light and dark. These areas alternate as you view the work from different angles.

BIRD'S EYE MAPLE

This veneer is produced in a very different way in that the knife does not cut across the log in the usual way, but rather around its circumference (*see* Fig 1.7). As the knife will slice across side shoots, this produces lots of circles (annual rings), often with darker piths (the eyes), and it is these that create the decorative effect (*see* Fig 1.8).

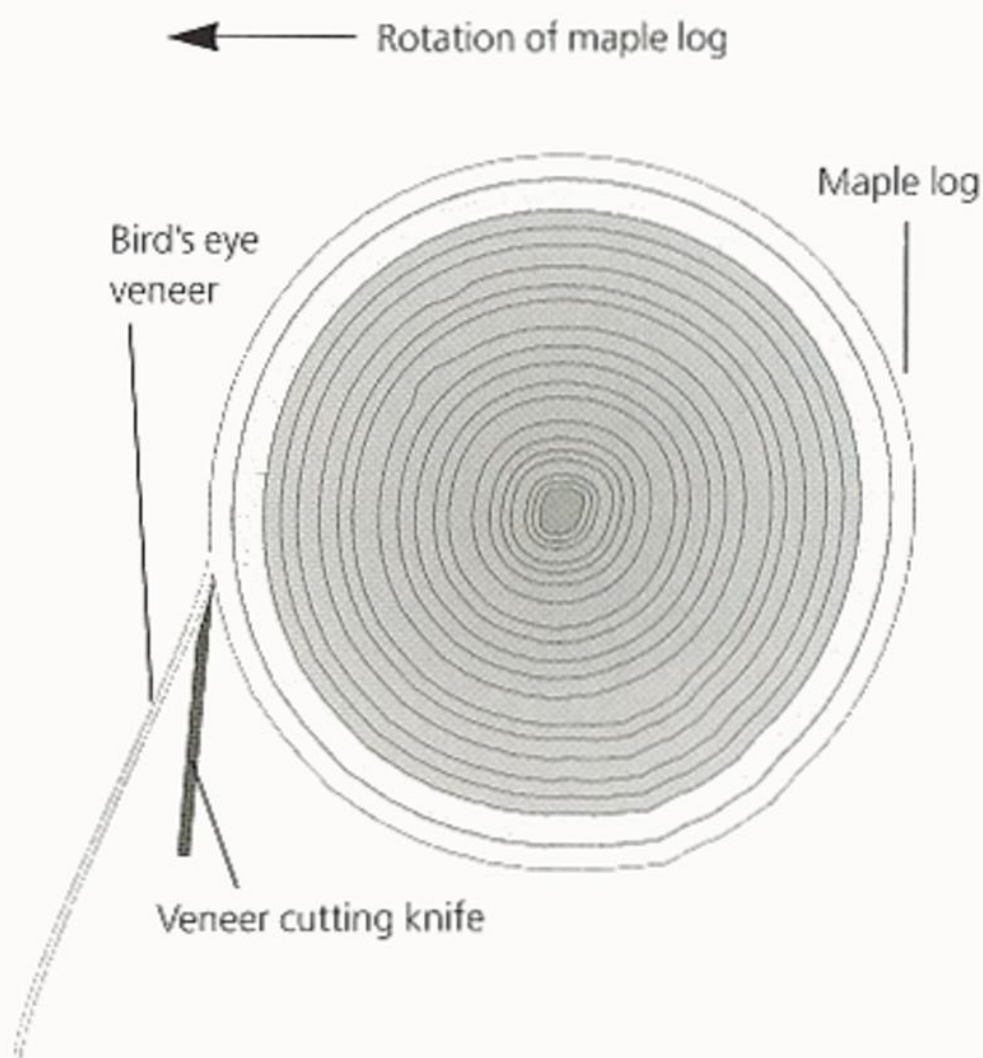


Fig 1.7 Rotary cutting of the log produces the characteristic figure of bird's eye maple.

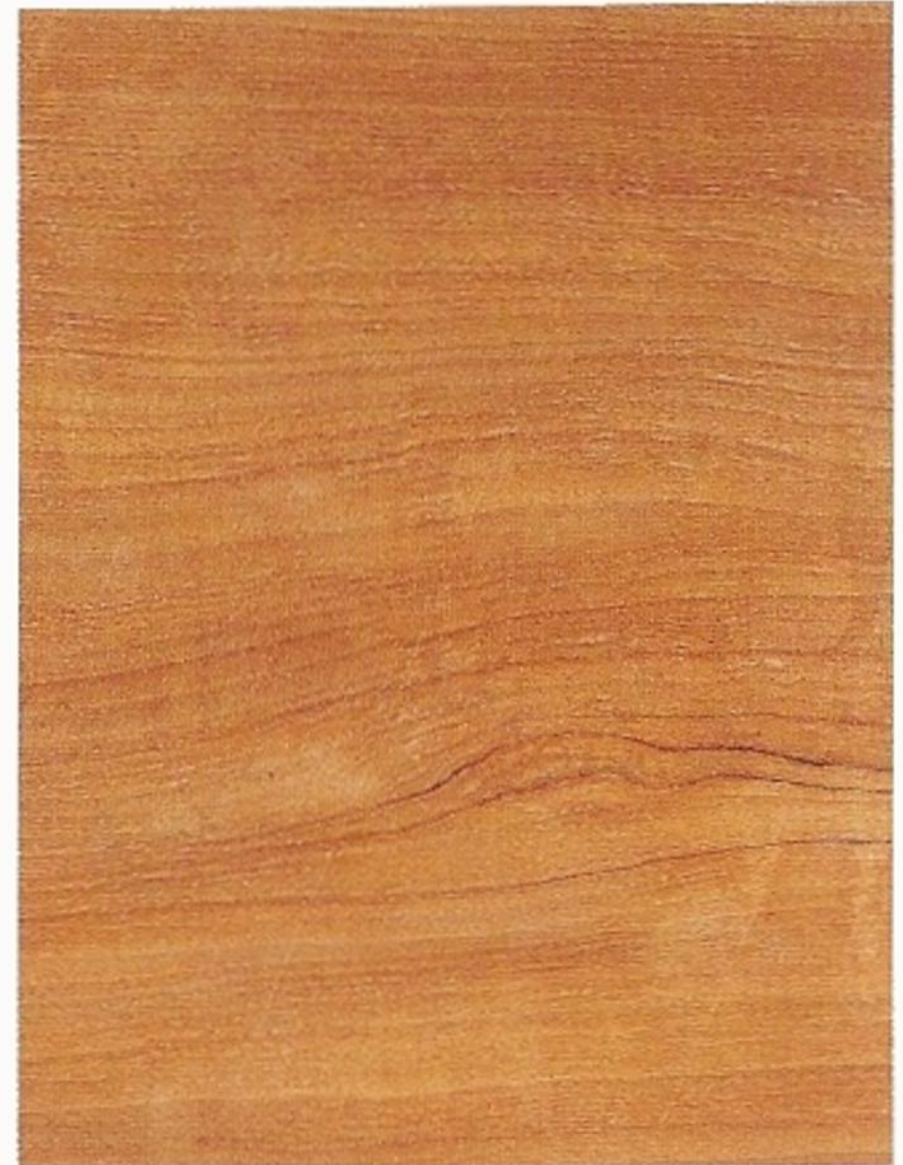


Fig 1.6 This piece of satinwood exhibits a very marked mottled effect, produced by cutting the wood across wavy grain.

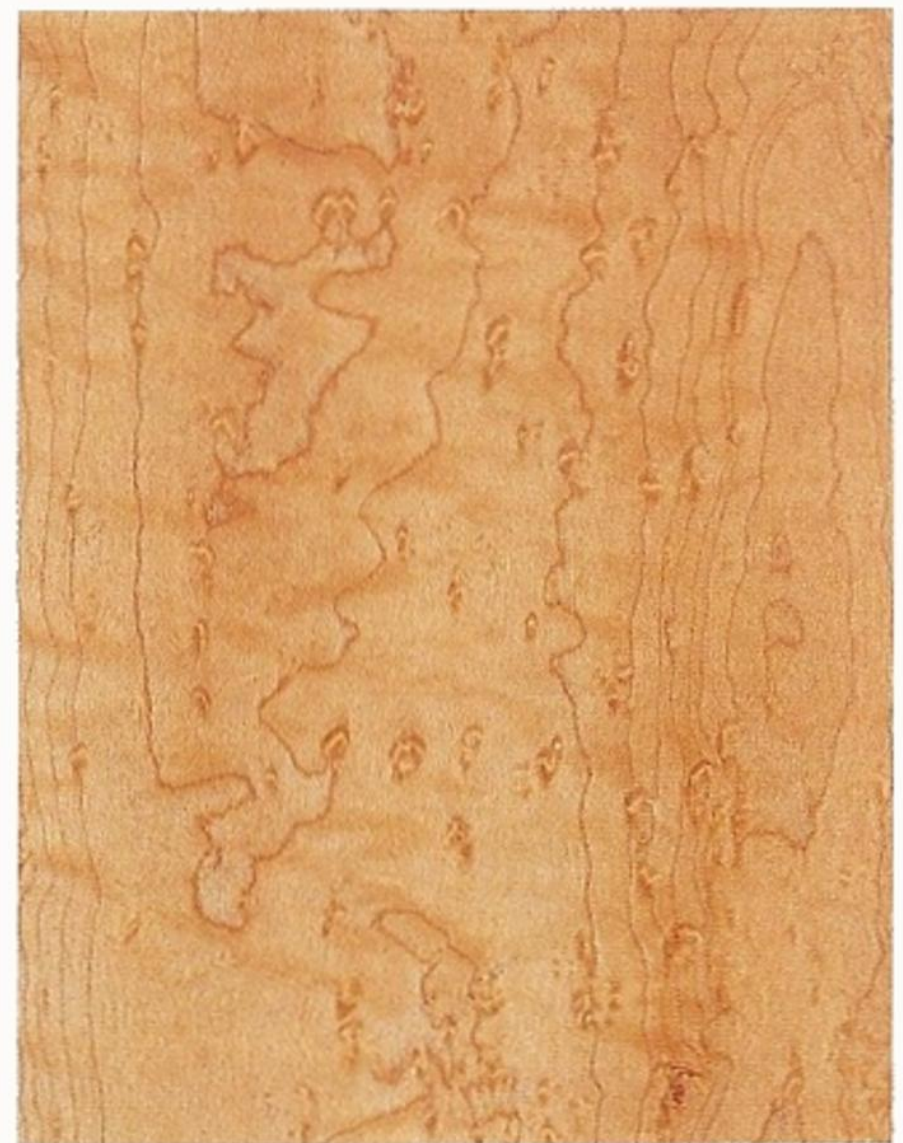


Fig 1.8 Bird's eye maple is produced when the veneer is rotary cut from the circumference of the log.

OYSTER VENEERS

These veneers, which are not at all common, are so called because their grain pattern resembles the surface of an oyster shell. They were very popular during the reign of Queen Anne (1702–1714), but today are used mainly in restoration or reproduction work. They are formed by cutting off transverse slices across narrow diameter logs (*see* Fig 1.9). Typical species used for oysters are laburnum, mulberry, lignum vitae and olive, but, there is no reason why any species could not be used. Their decorative effect is given by the variation in colour between the layers that are formed by annual rings.

Oysters are cut from the unseasoned log, approximately $\frac{1}{8}$ in (3mm) thick, and need to be dried slowly and carefully to minimize the risk of distorting or splitting as they dry and shrink. If you

cut your own, season them by stacking the oysters with waxed paper or plastic film (e.g. pieces cut from a plastic carrier bag) between each sheet. Store them in a cool place to slow down the moisture loss and reduce the build-up of tensions in the slices, and place a heavy weight on the stack to prevent distortion. The stacks should not be too high, as this will reduce the effect of the weight: 3–4in (75–100mm) is a good height.

Burying the leaves in silver sand would be ideal as this would slow down the seasoning even more. The longer you can leave them to dry out the better – several months being essential. After removal from the sand, the oysters should be stored under the same conditions as other veneers. However, to prevent distortion, they should be weighted. Oysters must be made well in advance of any planned project, to allow for them drying out.



Fig 1.9 Oysters are produced by cutting across narrow diameter logs, either at right angles to the length of the log or obliquely across it. Laburnum and holly are traditional timbers for this, but any narrow log can be used to create oysters.

RESTORATION WORK

If your interests lie in restoration work, you will frequently come across items where the veneers are considerably thicker than those available from veneer manufacturers. The nature of the timber may also be different from that generally used today. For example, the characteristics of eighteenth-century mahogany are very different from those of modern mahogany because the varieties are different. For these reasons, most restorers will stockpile salvaged timber, some of which can be used to make veneers when required. You can make your own thicker veneers using a bandsaw, the maximum width of the veneer being determined by the machine's depth of cut.

Veneer needs to be laid onto a solid surface. This is called the groundwork. Historically, groundwork was solid wood, so for restoration work this will need to be copied. However, there are some serious disadvantages with solid wood groundwork (*see* Fig 1.10), and nowadays it is unusual to use it as the manufactured boards available provide a very reliable and stable base for veneers.

GROUNDWORK

Veneer laid over plywood, or any other manufactured board, is often regarded as a combination of two inferior materials, but this is unfair to both. It is worth spending a moment to explain, in general terms, the value of manufactured boards such as ply, blockboard, medium density fibreboard (MDF) and chipboard. These all offer a stable, flat surface, and provided they are of good quality there will be no blemishes to show through the veneer. Their most

notable quality, though, is that they do not shrink or expand in width or thickness: it is this shrinkage and expansion in solid wood that provides so much work for furniture restorers!

SOLID WOOD GROUNDWORK

The use of manufactured boards as groundwork is now so commonplace and taken for granted that the role of solid wood as groundwork is rarely considered. However, in restoration work it may be necessary to replace solid wood groundwork.

If solid wood is to be used as the groundwork, it is important to take a few precautions to reduce the risk of problems later. Wood has a tendency to shrink or expand in its width and its thickness in response to changes in its moisture content. It does not shrink or expand in its length (i.e. along the direction of the wood fibres). However, it is a little more complicated than that because there can be a differential in the amount of shrinkage or swelling at various points according to where the wood was taken from the tree, or because of variations in the direction of the wood fibres (i.e. grain direction). This then leads to rounding of the board, as shown in Fig 1.10. In addition, there may be surface defects, such as knots, that do not shrink or swell at all. As the groundwork shrinks it will leave these features standing proud of the surface.

All of these changes in the shape of the groundwork will have an effect on any veneer which is laid onto it. As the veneer becomes stressed, it may crack or show stress marks. Special techniques need to be adopted to minimize the risk of such damage.

The behaviour of solid wood as it shrinks is, to a large extent, determined by how it is cut from the trunk. If it is cut

obliquely across the annual rings (line A–B in Fig 1.11), the board will almost certainly shrink and bend in the direction shown in Fig 1.10. The board is described as being crown cut. If the board is cut perpendicularly across the annual rings (line C–D in Fig 1.11), the risk of bending is greatly reduced, as the

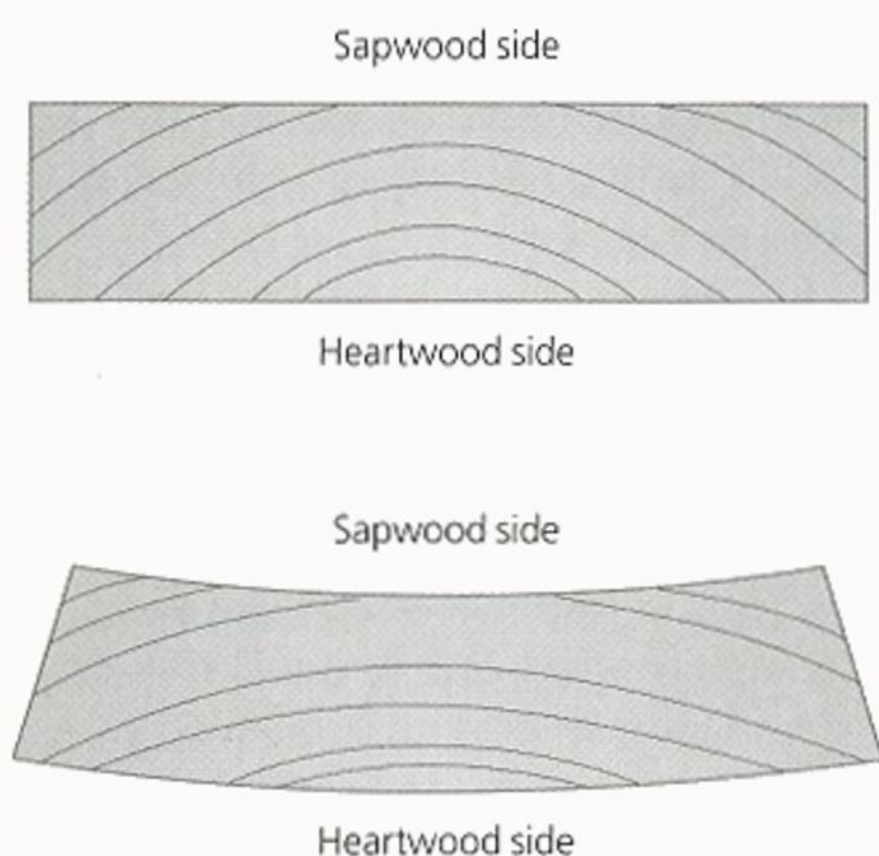


Fig 1.10 Crown-cut boards will bend away from the heartwood side as they shrink.

annual rings are of equal length across the whole length of the board. Such a board is described as quarter sawn.

Figure 1.10, a section through the trunk of the tree, shows the annual rings, which are, in effect, circles of wood fibres. When wood shrinks, the annual rings are shrinking in circumference, and the amount of shrinkage in an annual ring increases the further away it is from the centre, because these rings are of greater diameter. Thus, the nearer the rings are to the heartwood, the less shrinkage they will sustain.

In effect, what is happening in Fig 1.10 is that the wood is bending away from the heartwood. Laying the veneer on the heart side of the board, with its grain running in the same direction as the board's (see Fig 1.12), will help to counteract this.

If the board had been quarter sawn this bending would not have happened, though there might have been some shrinkage in width (see Fig 1.13).

To reduce the risk of shrinkage and bending, wide boards should be avoided,

Boards cut obliquely across the annual rings (line A–B) are known as crown cut

Boards cut perpendicularly across the annual rings (line C–D) are known as quarter sawn

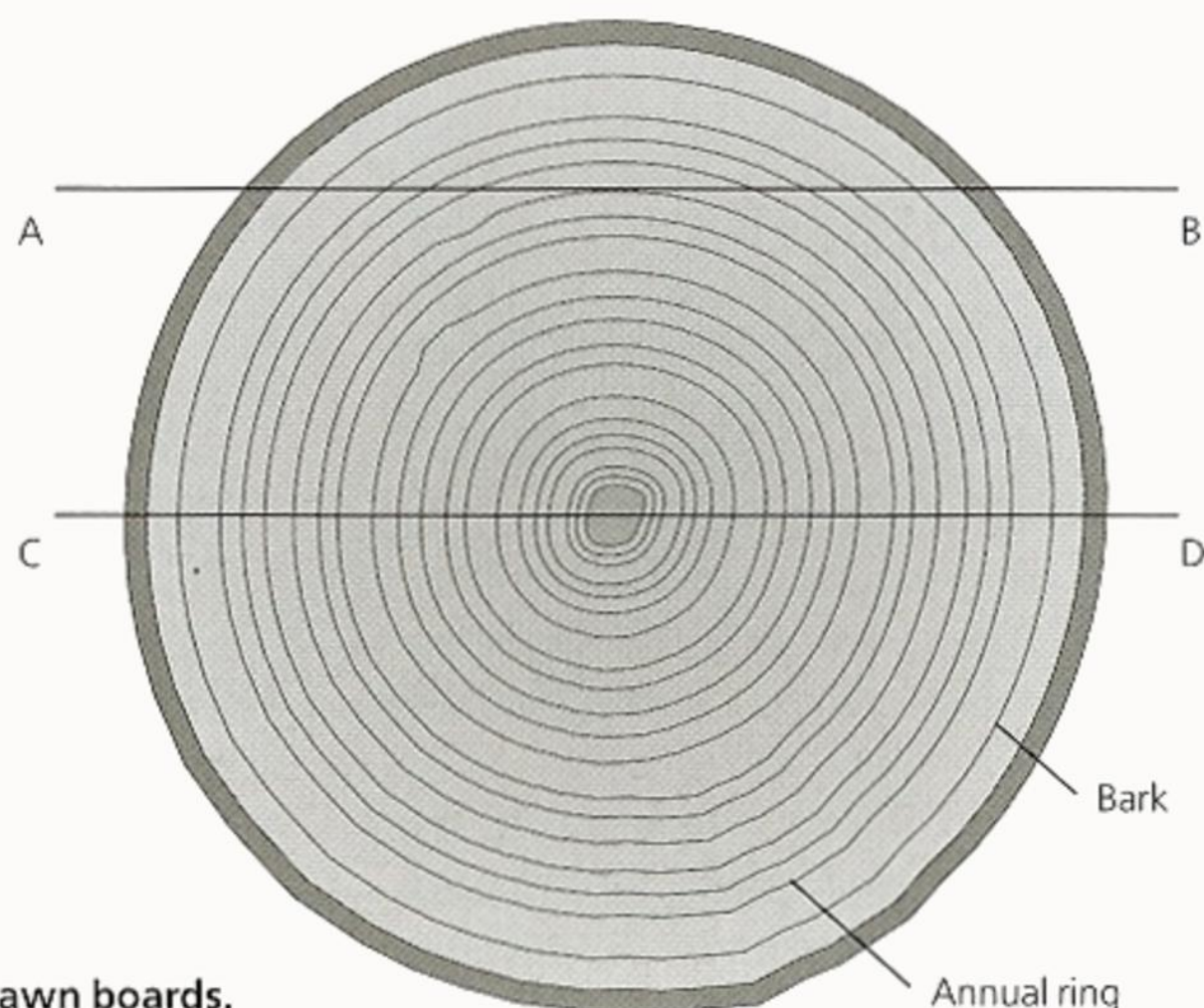


Fig 1.11 Crown-cut and quarter-sawn boards.

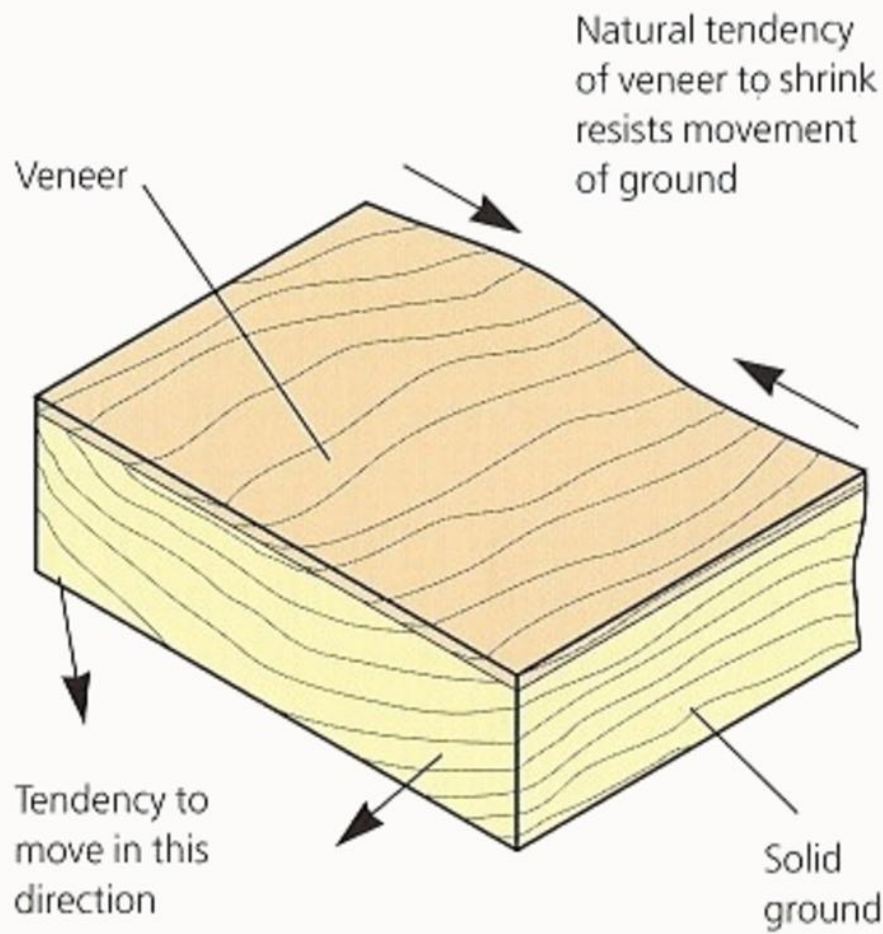


Fig 1.12 Veneering the heartwood side of a board will counteract the groundwork's natural tendency to bend in the direction of the sapwood side.

and the width made up from two or more boards joined together (see Fig 1.14). Notice the way the grain runs in the boards: alternate boards have the heartwood facing in opposite directions,

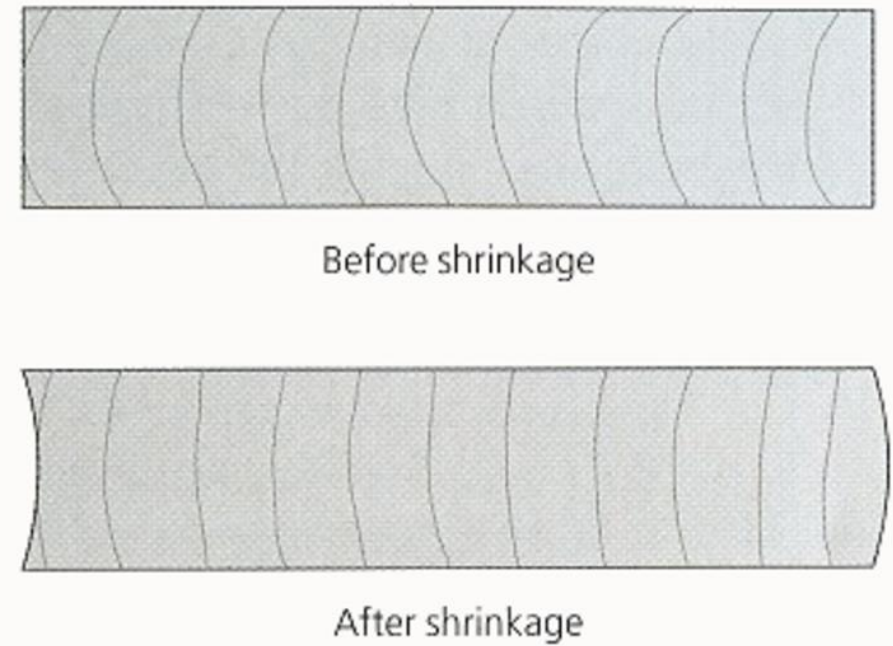


Fig 1.13 Quarter-sawn boards tend not to warp.

i.e. one board has heartwood facing the top surface, and its neighbour has heartwood facing the bottom surface. The effect of this is to neutralize any rounding. First of all, since each board is relatively narrow, any rounding will be correspondingly less pronounced. Secondly, as board A will curl upwards, board B will curl downwards and so on across the width of the groundwork (see Fig 1.14). The effect is to reduce what would be a major defect to a series of undulations. The narrower the strips of

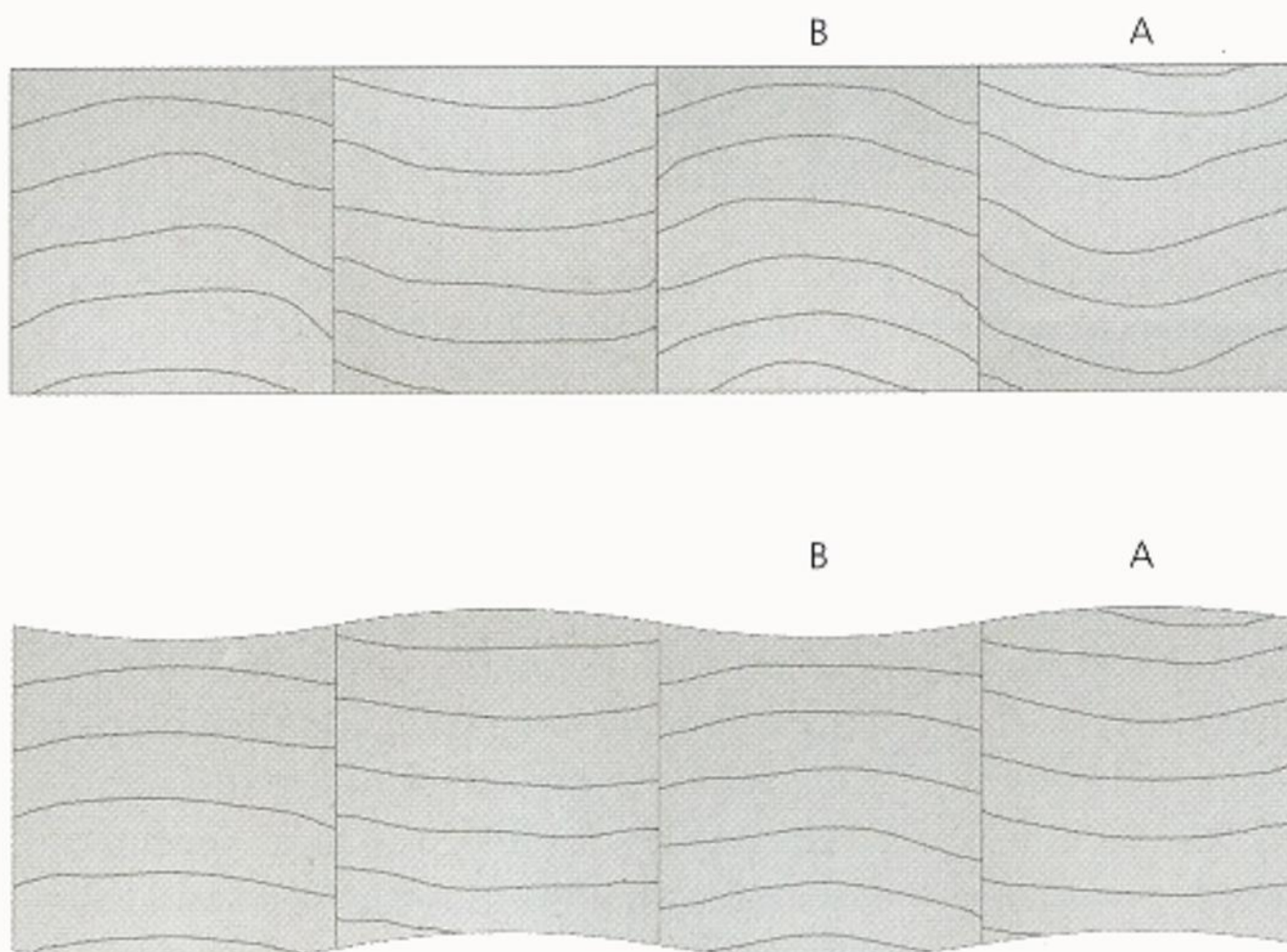


Fig 1.14 Using narrow boards to make up the width of the groundwork reduces the effect of warping. Note that the heartwood and sapwood sides of the boards (labelled A and B respectively) are alternated.

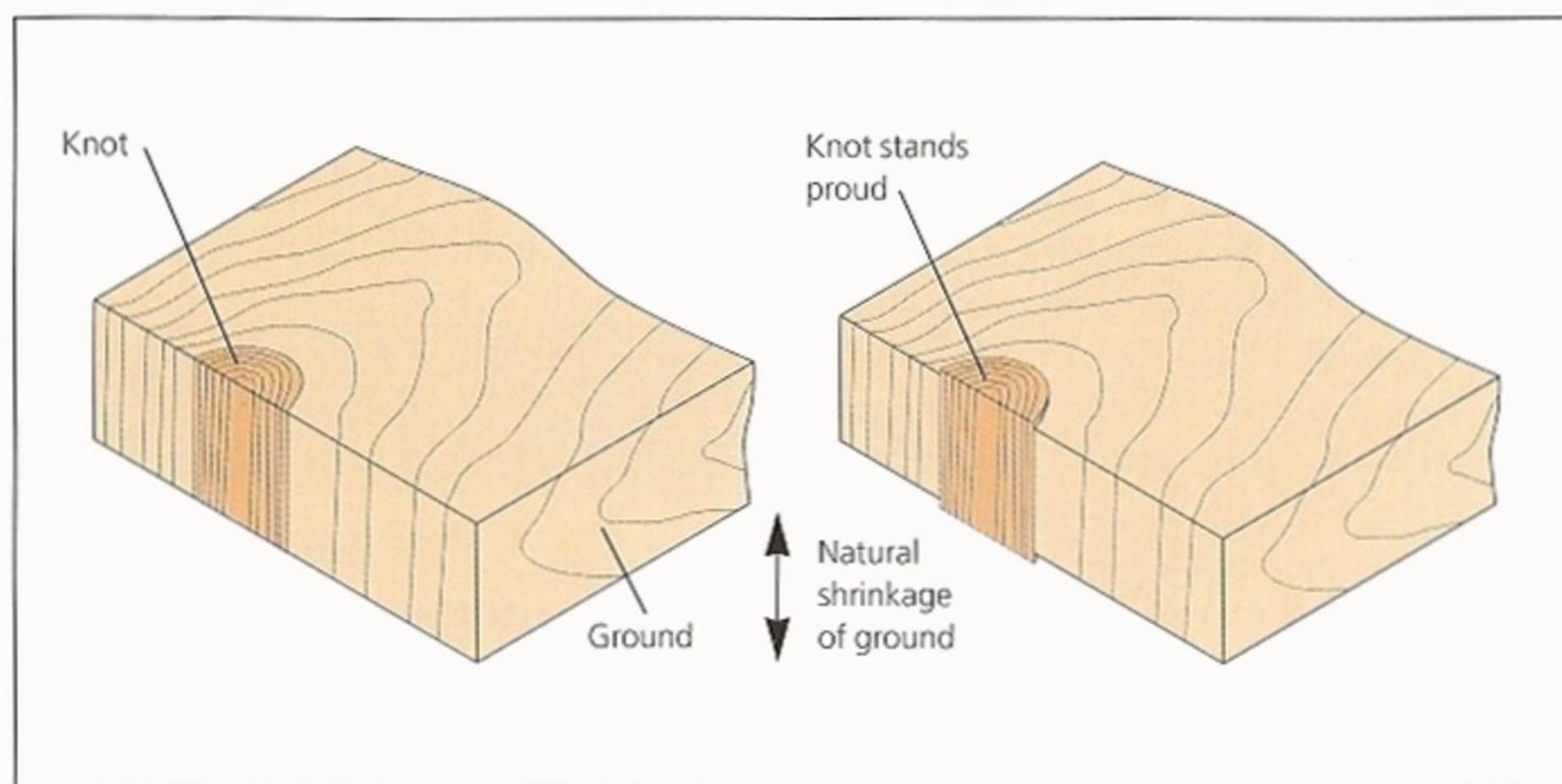


Fig 1.15 The effect of timber shrinkage on knots.

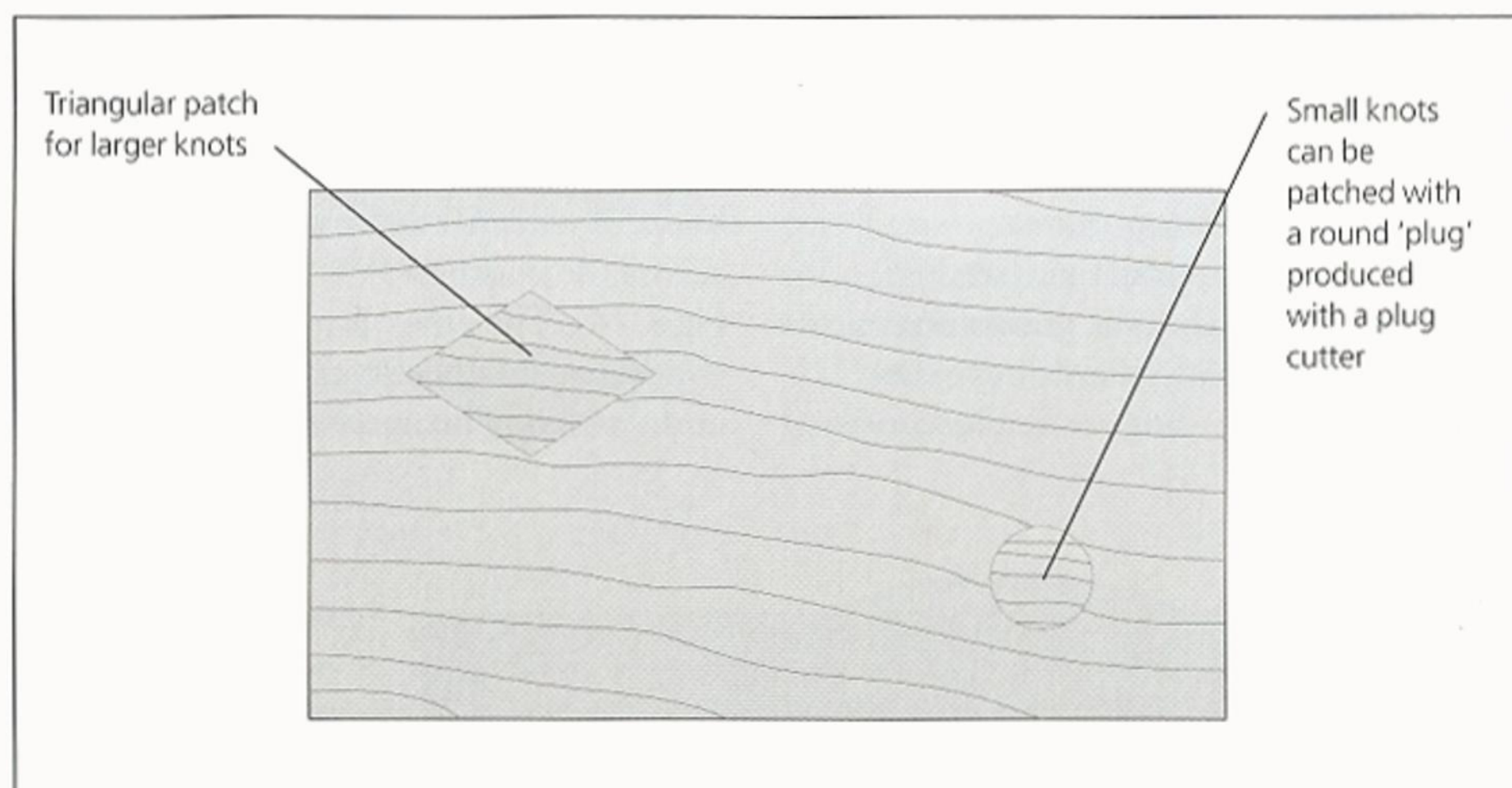


Fig 1.16 Patches of the same species of wood as the groundwork are used to cover knots.

wood making up the width, the less pronounced the undulations will be.

Knots may give rise to problems after laying veneers. As the wood shrinks in thickness, the knot remains intact because its grain direction runs through the thickness of the board. It does not shrink in length and so stands proud of the surface (*see* Fig 1.15). This will

eventually show through the veneer. Figure 1.16 shows how to remedy this defect by cutting out a piece of the wood with the knot, gluing in a straight-grained patch, and then planing it flush with the surrounding surface. The patch should be the same species of wood as the rest of the ground and the grain should lie in the same direction.

PLYWOOD

Plywood is manufactured by laminating thin layers of wood. This method of construction results in a groundwork that is very stable. There is very little risk of it warping and, provided it is of good quality, the surface provides a good flat base for the veneer.

Figure 1.17 shows how plywood is constructed. The layers in ply always have the grain running at right angles to each other and there is always an odd number of laminations. This means that top and bottom layers will always have the grain running in the same direction.

This gives a very strong resistance to warping as each layer is restricting the warping tendencies of its neighbour, and the forces involved in warping are balanced by the odd number of laminations.

The veneer should always be laid with its grain at right angles to that of the plywood surface in order to maintain the alternating grain direction structure of the ground. This principle does not apply to built up patterns, such as quartering, or to marquetry and parquetry where there is no single grain direction to the veneer.

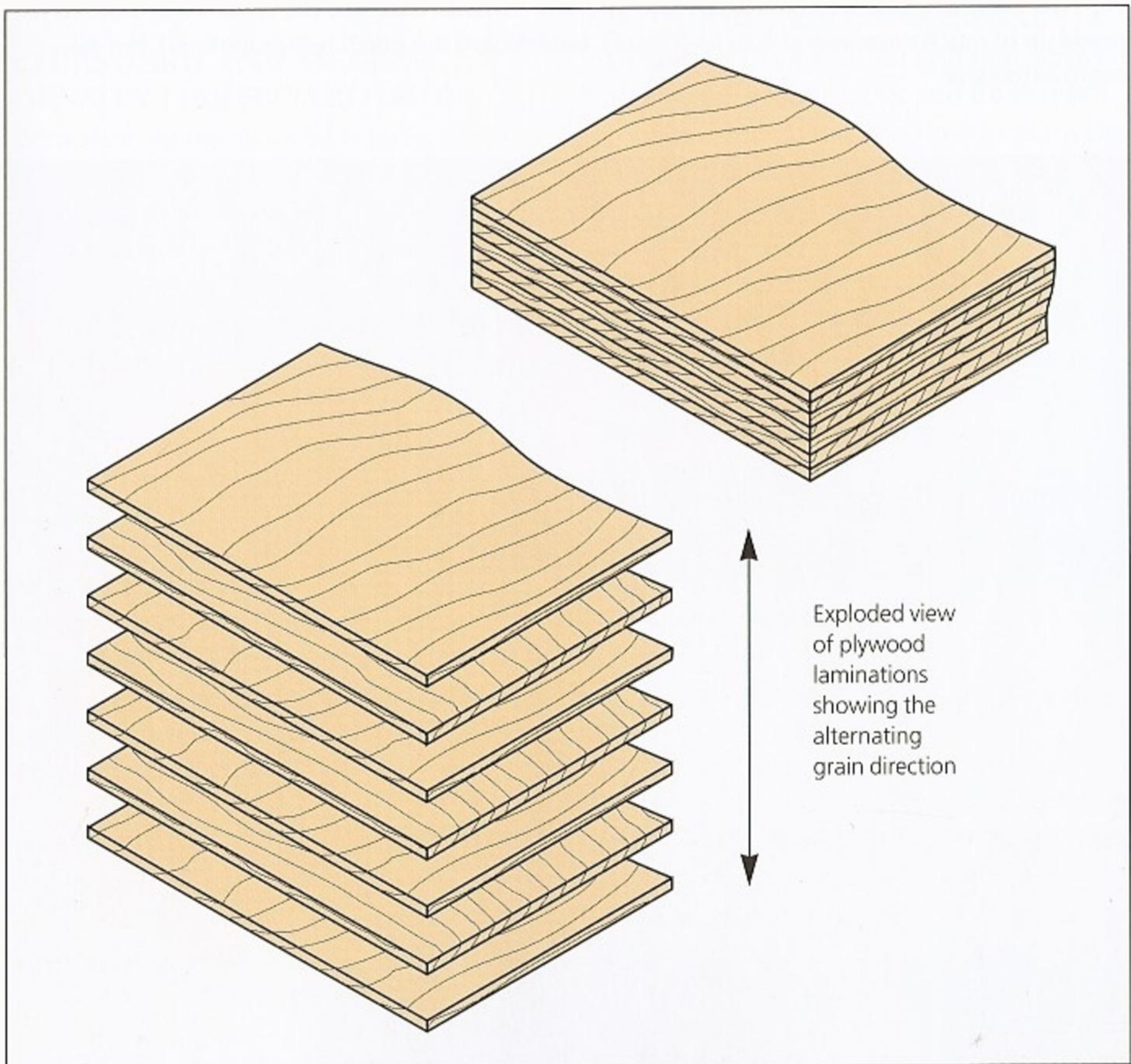


Fig 1.17 Plywood is constructed so that the grain direction of adjacent lamina is at right angles.

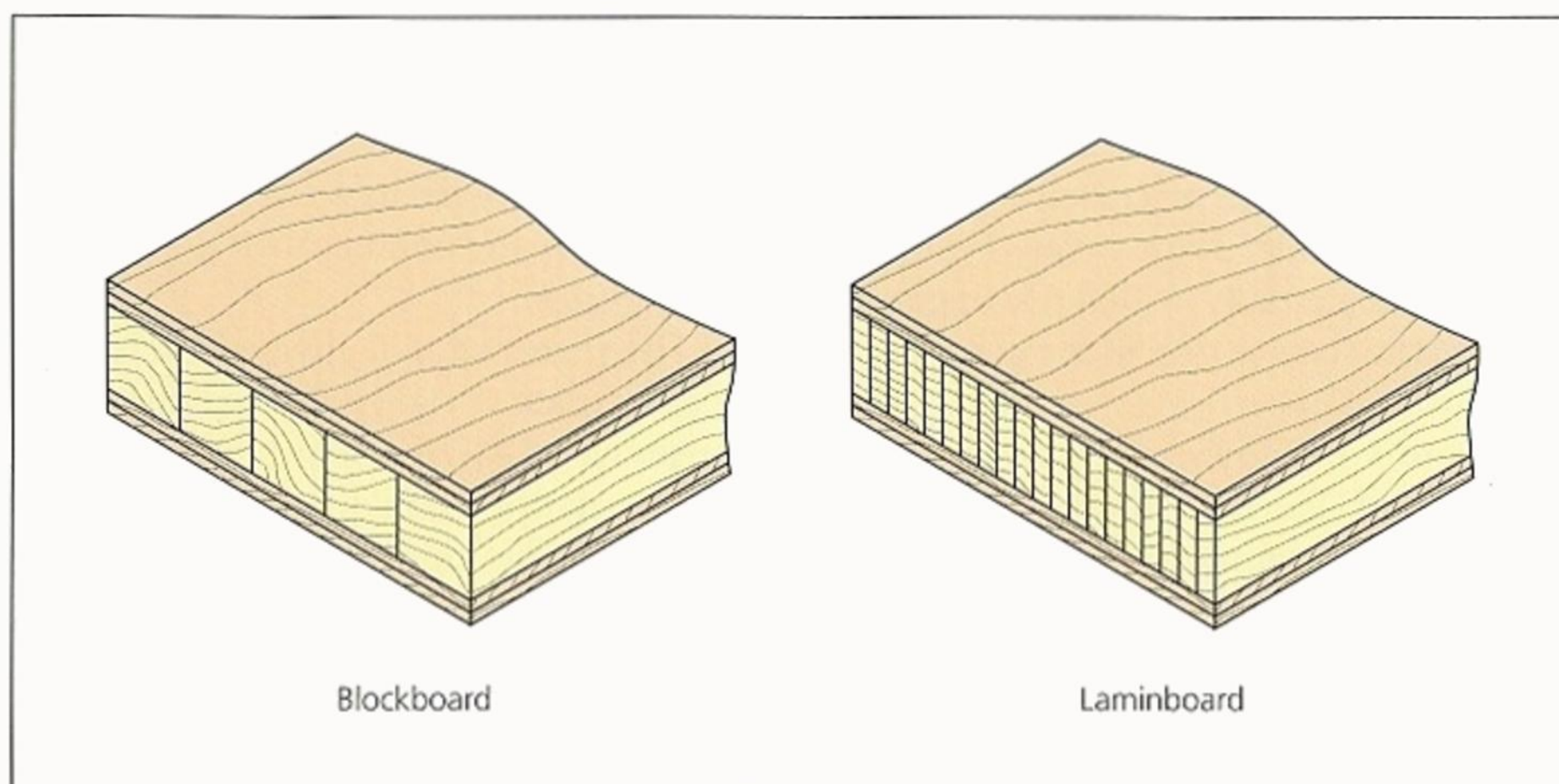


Fig 1.18 Blockboard and laminboard have a similar construction, but the core of laminboard is made up of much narrower strips. As a result, laminboard is a much better material, but also more expensive.



Fig 1.19 Top: medium density fibreboard (MDF). Bottom: chipboard.

BLOCKBOARD AND LAMINBOARD

Blockboard is made up of strips of wood about 1in (25mm) wide, glued together with the heartwood facing in alternate directions (*see* Fig 1.18). The top and bottom surfaces are then laminated to provide a large, flat surface, the grain direction of which runs the same way as that of the core.

Laminboard (*see* Fig 1.18) is similar except that the core is made up of much thinner pieces of wood, about ¼in (6mm) wide. When veneering such boards, the veneer's grain should run at right angles to the surface layer.

CHIPBOARD AND MEDIUM DENSITY FIBREBOARD (MDF)

Both these manufactured boards are produced from wood fibres bonded together under very high pressure. The result is a dense core with a smooth outer surface. Medium density fibreboard (MDF), the top board in Fig 1.19, is made up of very fine wood fibres. In fact, the fibres used to make MDF have the texture of cotton wool. Chipboard, the bottom board in Fig 1.19, is made up of coarser fibres. The outer surfaces of these boards are smooth, although that of chipboard is usually less so, and so present excellent surfaces for veneering. Their main advantage, however, is that they have no natural tendency to warp, therefore there is no restriction on veneer grain direction.

ADHESIVES

The traditional adhesive for veneers was pearl glue (also known as Scotch glue and animal glue), but there is now a whole range of alternatives that in many cases are better. However, pearl glue is

still a very valuable part of the restorer's kit and is the only glue that can be used with the veneer hammer (*see* Chapters 2 and 4). The glues suitable for use in veneering are described below.

PEARL GLUE

Pearl glue is the most common modern name for what some readers may remember as good old fashioned Scotch glue, but it is much easier to prepare (*see* page 15). The glue derives its name from the way it is sold – as small pellets called pearls.

When prepared properly, the glue will take the form of a very stiff gel when cold, but will liquefy when heated. The advantage of this is that you may apply glue to the groundwork and leave it to cool and gel, giving you time to place the veneer accurately without it sticking. The glue can then be reheated and the veneer pressed down. This is the principle of both hammer and heated caul veneering (*see* Chapters 2 and 4). Most other adhesives, while offering some time advantage, do not leave much time for error. If you make a mistake with pearl glue, you can simply heat the veneer with an iron and lift it off as the glue melts. This can be somewhat messy, but it does allow you to correct your mistakes more easily than with any other type of glue.

Because pearl glue is water-soluble it is easy (save with water-resistant types) to clean off surplus. Lack of heat and moisture means veneers are less likely to swell and shrink.

Preparation

Figures 1.20 to 1.22 illustrate how pearl glue is prepared for use. It is necessary to soak the pellets in water for a couple of hours, during which time they absorb the water and swell to at least twice the



Fig 1.20 Pearl glue is so called because of its appearance before it is prepared for use.

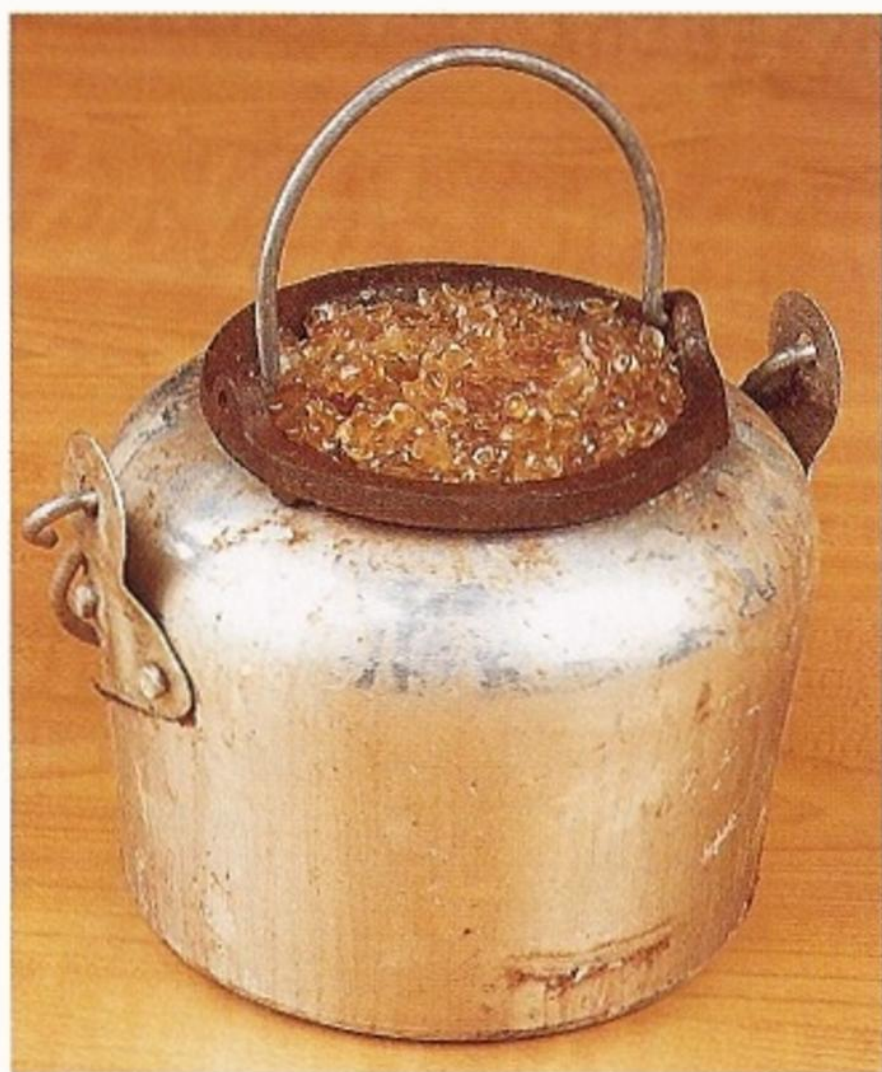


Fig 1.21 After absorbing water, the pearls at least double their volume. Even though the swollen pearls are sitting proud of the glue pot, the liquid glue occupies less space.



Fig 1.22 The perfect consistency for glue: it runs off the glue brush in a steady stream.

size of the dry pellets. It is difficult to judge the amount of glue you will need for any one job, so the following is only a rough guide.

Preparing pearl glue

1 Half fill a jam jar with glue pellets, then fill to the brim with water (this proportion should be followed with any quantity of glue you make up) and leave to stand for at least two hours. After this time, all or nearly all of the water will have been absorbed and the swollen pellets will fill the container.

2 Transfer the swollen pellets of glue into a traditional woodworker's glue pot (*see* Fig 1.21). If you do not have a glue pot you can make up some other form of double boiler arrangement, such as a tin can in a pan of water. The important thing is that when the glue is heated, it is not done over a direct heat, which would burn it. Heating up the glue using a double boiler or the glue pot ensures that the glue only gets as hot as boiling water. The other advantage is that the hot water will maintain the glue in a hot liquefied state for a long time during use, because it is often necessary to take the glue away from the source of heat to use it. If you use an improvised arrangement, keep the glue in the hot water to maintain its hot liquid state.

3 Pearl glue is always applied to the groundwork with a brush, and special glue brushes can be bought for this purpose. The hot glue should run off the brush in a steady stream, as shown in Fig 1.22. If the glue is too thick and falls as individual blobs, water can be added; if it is too thin, and breaks up before it hits the pot, continue heating it to evaporate the surplus water. Because the

glue thickens as water evaporates, you will need to add a little extra water from time to time to maintain fluidity. You may not use all the glue in any one job, but you can re-use what is left over by reheating it when needed, keeping in mind that the glue is perishable.

POLYVINYL ACETATE (PVA)

Polyvinyl acetate (PVA) is a water-based adhesive that has many uses. It has a fairly short working time (perhaps about 10 minutes), decreasing if the air temperature is warm. Typical well-known brand names include Evo-Stik Resin W and Unibond. Since the setting time is fairly short, you will need to work quickly to lay veneers with some form of press (*see* Chapter 4).

PVA glue has high convenience value in that it is readily available from any DIY store in small quantities and in bulk – up to 1gal (5l). Complex veneering tasks involving joining two or more veneers together will need to be done prior to laying. Originally, all PVA glues were water-soluble even after drying. Now, there are water-resistant PVA glues that will not be redissolved by water after drying.

PVA is a good general purpose adhesive and can be used for any veneering work, though it does require a means of clamping until the glue has dried – usually some form of press (*see* Chapters 2 and 4).

CONTACT ADHESIVES

As their name implies, these glues bond instantly with the veneer as soon as it comes into contact with the glued groundwork. There is no room for error! You will not be able to remove the veneer in one piece once it has been placed on the groundwork. This makes contact adhesives ideal for jobs where it

might be difficult to maintain sufficient pressure – small-scale shaped work, for example. Reliable bonding occurs if both the veneer and groundwork are glued (see Chapter 4). Contact adhesives are based on very powerful, volatile solvents and are not particularly pleasant materials to use routinely for veneered work. They certainly should not be used without plenty of ventilation.

CASCAMITE

Cascamite is bought as a powder that you mix with water to form a paste. It is based on a chemical called urea-formaldehyde, and its adhesive action is brought about by a catalyst that hardens the paste by chemical reaction. This sets the glue after a few hours, but it still requires time to cure.

Once mixed with water, it has a usable life of a few hours, so there is an extended working time. It is also waterproof when set and so is ideal for use where there are fairly humid conditions. As an example, classic car enthusiasts who wish to restore veneered trims should use this glue.

Apart from such specialized uses, Cascamite is not the ideal material for veneering. Since it hardens by chemical action rather than through the evaporation of a solvent, it cannot be softened once it has hardened. This presents problems when newly veneered work needs to be cleaned off. If any glue finds its way onto the surface during the process of laying the veneer, it is very difficult to remove as it is as hard as glass. Contaminated areas will also be difficult to stain a different colour.

GLUE FILM

This is an innovative product in which the glue is in the form of a thin film on backing paper. It is sold in rolls and may

be bought by the metre or in bulk. For some straightforward work it is a useful material. The emphasis is on the word straightforward. While it is good for laying single sheets of veneer, anything more complicated, such as laying two or more veneers joined together, can be extremely difficult.

The usual method for using this glue is to iron it onto the groundwork, running a moderately hot clothes iron over the backing paper. After cooling, the backing paper is carefully peeled away to leave a film of glue bonded to the groundwork. In fact, it takes some practice to be able to do this effectively over a large surface, without leaving areas of glue on the paper rather than on the work. There is an alternative method that I find easier.

Using glue film – alternative method

- 1 Peel the film of glue away from the backing sheet. (The glue layer is quite thick, so can be removed without much difficulty.)
- 2 Place the film over the groundwork, then place the veneer over that.
- 3 Iron the veneer onto the ground with a clothes iron. (As the glue is heated only once, there is a guaranteed thickness of glue.)

(See Chapter 4 for a more detailed discussion on using glue film.)

ABRASIVES

As veneers are generally so thin, the finer grades of abrasives are used in surface finishing (see Chapter 9). While there are

a number of different abrasive papers available, one consistent feature is the system of sizing the particles: this grit size is given on the back of the abrasive. The best sizes for veneered work are 180, 240 and 320. Choice of paper is a matter of personal preference, but it is worth looking at the alternatives.

GLASS PAPER

This is one of the cheapest abrasive papers. Particles of glass, the abrasive, are bonded to the paper. The problem with it is that the glass wears down very quickly, so it rapidly loses its cut.

GARNET PAPER

Particles of garnet stone are used as the abrasive here, giving this paper excellent cutting power. It is also very long lasting, so represents very good value for money.

ALUMINIUM OXIDE (PRODUCTION PAPER)

Aluminium oxide, a man-made material, is very hard indeed; hard enough to be used on metal and thus ideal for use on the harder woods.

SILICON CARBIDE (LUBRISIL)

Silicon carbide is an extremely hard mineral that is a commonly used abrasive by metal and wood workers. Waterproof silicon carbide papers are better known as 'wet-or-dry', and while these can be used with wood as well as metal, many wood workers prefer to use the version specifically designed for use with wood. All papers, especially the finer grits, become clogged with wood dust as they do their work. This means that they must be cleared of dust regularly. Lubrisil paper, the wood workers' silicon carbide paper, contains its own lubricant which helps to keep it clear of dust and enables it to be cleared

more easily. This is an expensive paper, but has exceptional cutting power and great durability.

NYLON MESH ABRASIVE

Nylon mesh abrasives, available in several grades, are ideal for cutting back a polish coat without leaving obvious scratches that will show through the next coat. These abrasives are popular in the auto refinishing trade where their flexibility makes them ideal for smoothing shaped areas. They are also good for smoothing veneer prior to polishing. Because of their open texture they do not clog with dust, but their greatest advantage is their longevity – they simply go on and on. Excellent value for money.

POLISHES

The general principles of polishing solid wood and polishing veneer are much the same. The main difference concerns work in which there are different veneers used, particularly if there are contrasting colours that need to be preserved. (See Chapter 9.)

The most common polishing materials are described below.

WAX POLISH

This polish is extremely easy to apply, but suffers from a general lack of durability. Nevertheless, it will produce a soft lustre that is ideal for, say, marquetry pictures that won't be handled a great deal. Such pictures would suffer from the effect of a high lustre finish that might create distracting reflections.

OIL POLISH

Like wax polish, oiling results in a pleasant low-lustre finish, but has the

advantage of being rather more durable. Danish or Tung oil are ideal because they are light (both in colour and consistency) and readily absorbed into the wood. They also dry quite quickly.

FRENCH POLISH

French polish is based on a solution of shellac in alcohol. It provides a fast-drying finish that forms a hard film over the work, giving a better protective finish than wax. Most people think of french polish as the so-called 'piano' finish – a high mirror gloss. In fact, it is much more versatile than this and can be applied in such a way as to create a range of finishes, from very dull to very high gloss. The finish required depends very much on the nature of the work. Marquetry pictures, as already discussed, tend to look better if the polish has a low lustre. There are no hard and fast rules though, with much depending on personal preference. The one exception to this is restoration work. Here, the restored areas must match the original areas as closely as possible.

Colour is an important consideration. French polish is available in a range of colours, from dark (garnet polish) to pale amber (transparent, sometimes called pale transparent). The latter is ideal for work where colour change is to be kept to a minimum, for example, marquetry where woods of contrasting colours will be used.

French polish is not resistant to heat, water or solvents and lengthy exposure to any of these will result in damage – hot plates and cups will mark the polished surface very badly. If a french polished piece is kept in damp conditions (e.g. a cold, damp garage) for any length of time, it may cloud over as the dampness affects the polish. However, the classic

example of water damage is the over-watered pot plant. Surplus water may run onto the polished surface and be left there. The inevitable outcome of this is white ring marks and spots. In very bad cases, the marks will be dark where the water has penetrated the polish and stained the wood beneath. In the worst case scenario, if water-soluble glue has been used, the veneer will also lift.

POLYURETHANE VARNISH

This hard-wearing, easy-to-apply finish takes some beating, although it does suffer from a mixed reputation. While french polish carries a certain mystique and a reputation for high quality, polyurethane has been regarded as representing the opposite end of the spectrum. Nothing could be further from the truth. In fact, polyurethane has many advantages over french polish: it is tougher, resists mechanical damage better and is resistant to heat and water, making it ideal for table tops.

CATALYSED LACQUERS

There are a number of polishes on the market that work by chemical action. By adding a catalyst (a chemical that speeds up the chemical reaction of another), the resulting polish becomes so hard that very little will damage it. Such lacquers can be applied by brush or spray.

As with other polishes, the lacquer dries as the solvent evaporates, but over the following hours, the extra hardness of a catalysed lacquer develops. The chemical reaction renders the film of polish impervious to most commonly available solvents, and to relatively high temperatures. Because of these qualities, catalysed lacquers are ideal for items, such as coffee tables, that will have to endure heavy use.

TOOLS AND EQUIPMENT

- ◆ CUTTING TOOLS
- ◆ VENEER LAYING TOOLS

CUTTING TOOLS

KNIVES

The main qualities required in a veneer cutting knife are:

- extreme sharpness of the cutting edge;
- extreme thinness across the cutting blade;
- a very sharp point to enable the knife to get into tight areas (such as the points of diamonds in parquetry) and to make tight turns; and
- comfortable to hold for ease of use.

Veneer knives

Craft knives are ideal for cutting veneers. They use surgical blades that are extremely sharp and are capable of making precise cuts. Utility knives (sometimes called Stanley knives because this is the manufacturer originally associated with them) are not suitable for precise work because their blades are relatively thick (*see* Figure 2.1). The craft knife blade is extremely thin, and the long cutting edge makes an acute angle with the straight back of the blade. A fine cut with a shallow angle is

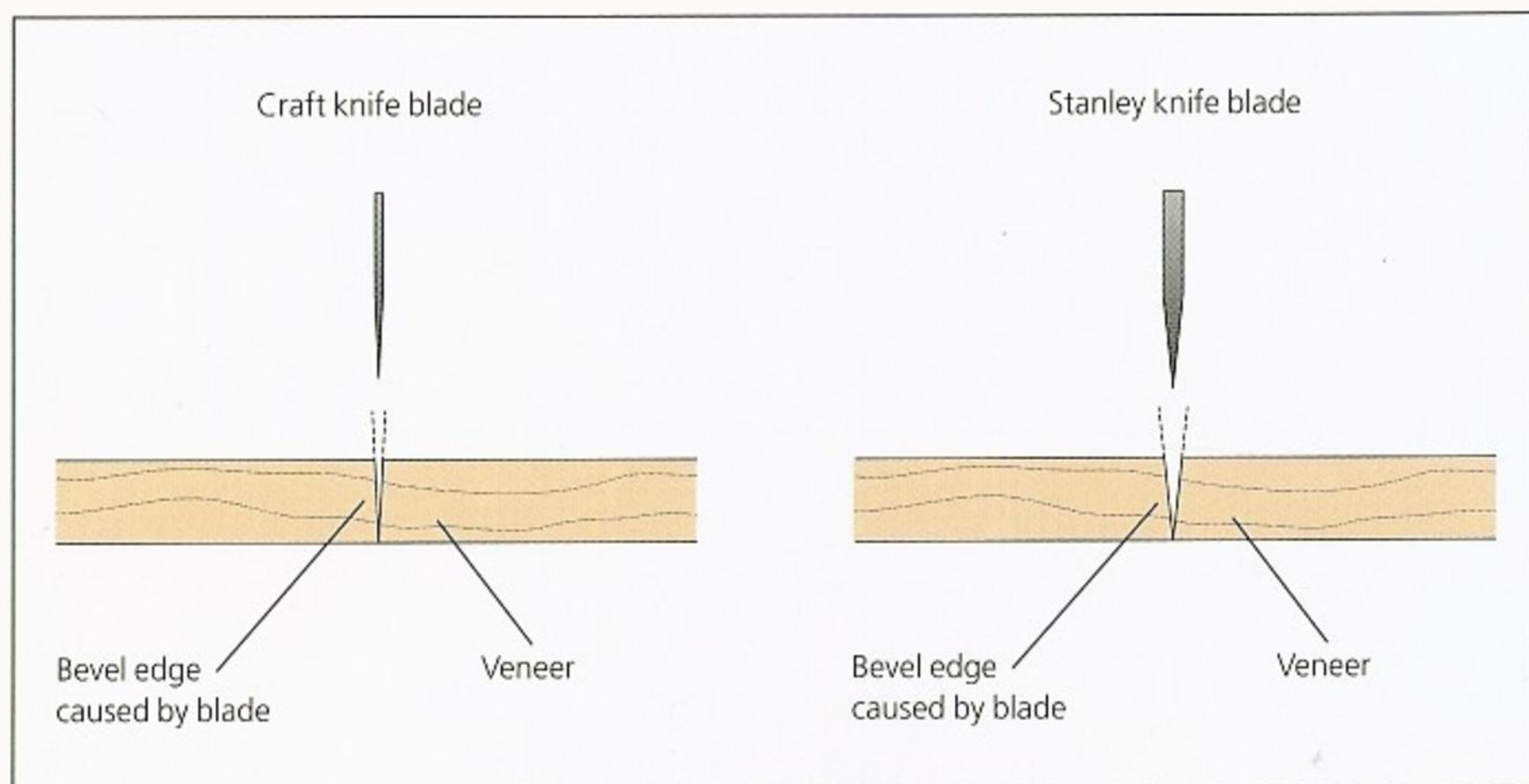


Fig 2.1 Different angles of cut made by craft knives and heavier blades.

essential for good joining of veneers, as the finer and shallower the cut, the closer the joints will be.

The blades of heavier duty knives, such as Stanley knives, are too thick and have a cutting angle that is too deep for veneering purposes. The dotted lines in Fig 2.1 indicate the angle of the cut made by the blades.

When cutting the veneer, ensure that the knife is held perpendicular to it. Effective cutting is achieved by inserting

the point of the blade only, and pulling it through the length of the cut. This ensures that the width of the cut is very narrow, and allows fairly sharp curves to be made, as is required in marquetry. The blade will compress the veneer on each side, but the fibres will tend to relax and swell again with the glue, closing up the joint.

If the knife is held off the vertical, there is the risk, especially in complex, built-up patterns, that the joints will be

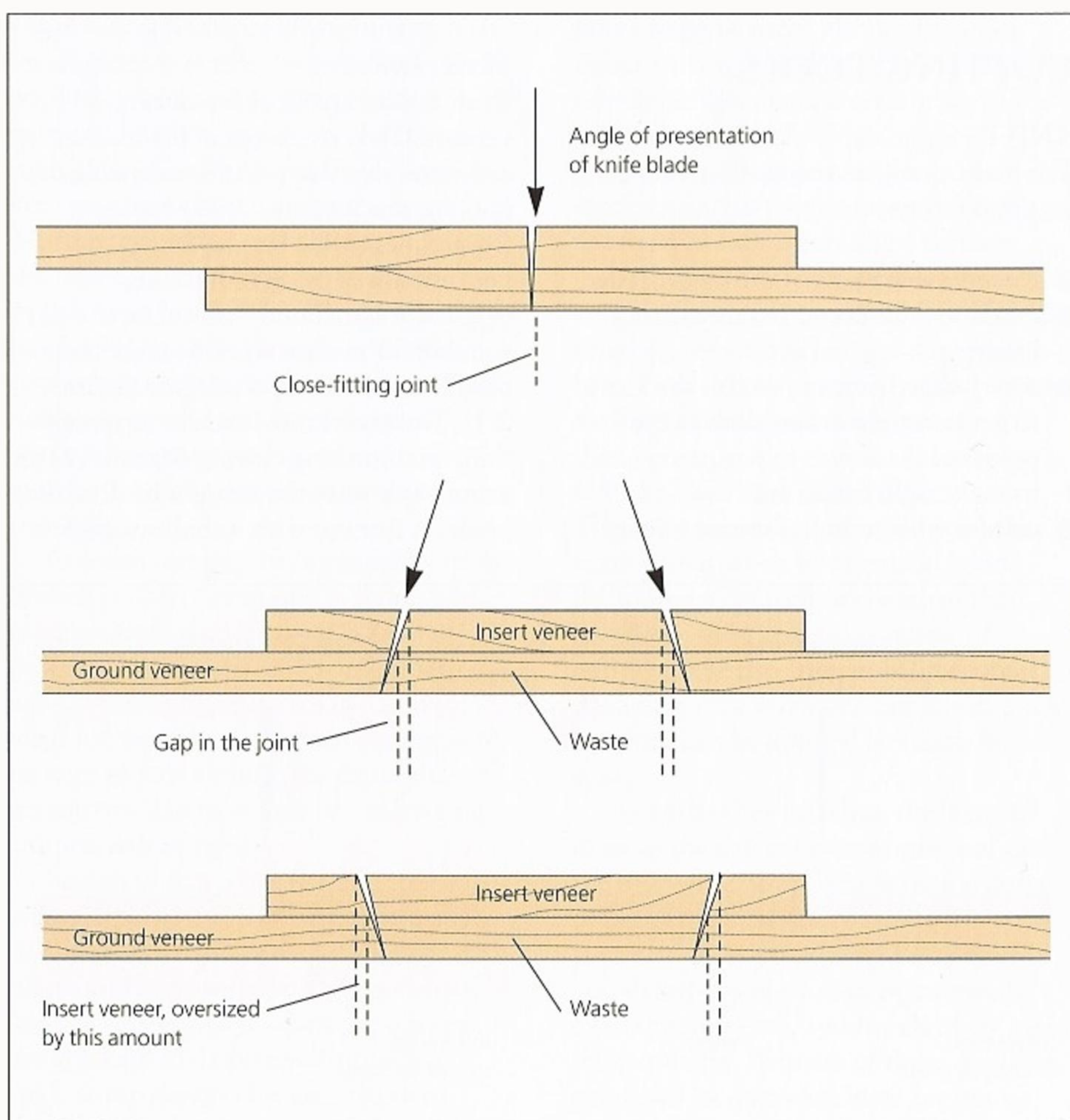


Fig 2.2 Cutting pieces to exact size for built-up patterns can be difficult.

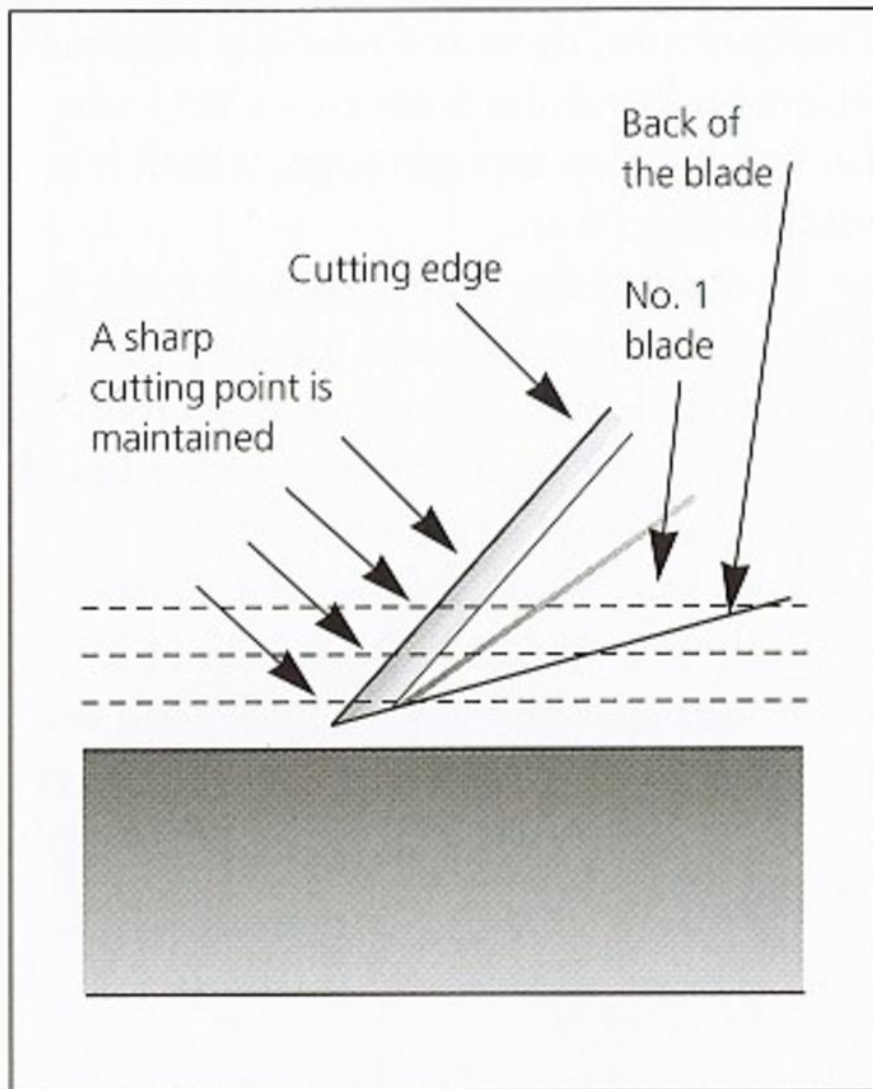


Fig 2.3 Sharpen the blade regularly on an oilstone to keep it in top condition.

poorly fitting. Figure 2.2 shows the sort of difficulties that may arise.

Even though they are described as replaceable, these blades can be repeatedly sharpened. Use an oilstone to hone the back of the blade as shown in

Fig 2.3. As the back is worn down (as indicated by the dotted lines), a sharp point is always maintained.

THE CUTTING SURFACE

The surface on which the veneer is cut has a significant effect on the life of the blade. While a hard surface will rapidly dull the edge, one that is too soft will not give a clean cut in the veneer, and will itself eventually disintegrate. Special cutting mats that provide a firm surface to support the veneer, but allow the knife to penetrate it, thus conserving the edge of the blade, can be bought. When the blade is removed from the surface of the mat the cut closes up and its surface is restored. However, such mats are expensive, and I generally use scrap veneer or card.

STRAIGHTEDGES

Most of the decorative techniques of veneering rely upon close-fitting joints between adjacent pieces. Often these joints are straight, in which case accuracy in their cutting is vital. A good, reliable straightedge is needed. The



Fig 2.4 Top: Engineers' rule. Bottom: Straightedge.

engineers' rule and the straightedge (see Fig 2.4) are ideal and can be bought in several lengths to suit the work undertaken. The straightedge shown is especially useful for several reasons. One edge is calibrated in millimetres for measuring, while the other has a hard, stainless steel insert that is an accurate straightedge for cutting. The main material is aluminium, so it is lightweight.



Fig 2.5 The curved blade of the veneer saw.

Furthermore, there is a non-slip silicone insert on the under surface – a very useful feature on a straightedge, which it is vital to keep still.

A straightedge will need to remain true and be able to stand up to considerable wear. This means that it ought to be made of metal. The standard wooden or plastic rule will not do because its edge will be eroded by the action of the veneer knife. As far as length is concerned, this will depend on the nature of the work, but two sizes are likely to be very useful: 18in (45cm) and 3ft (100cm).

VENEER SAW

Obviously, this is not a knife, but it performs the same function in situations where a veneer knife would be unsuitable. (See Using the Veneer Knife, Chapter 3.) Veneer saws are ideal for use

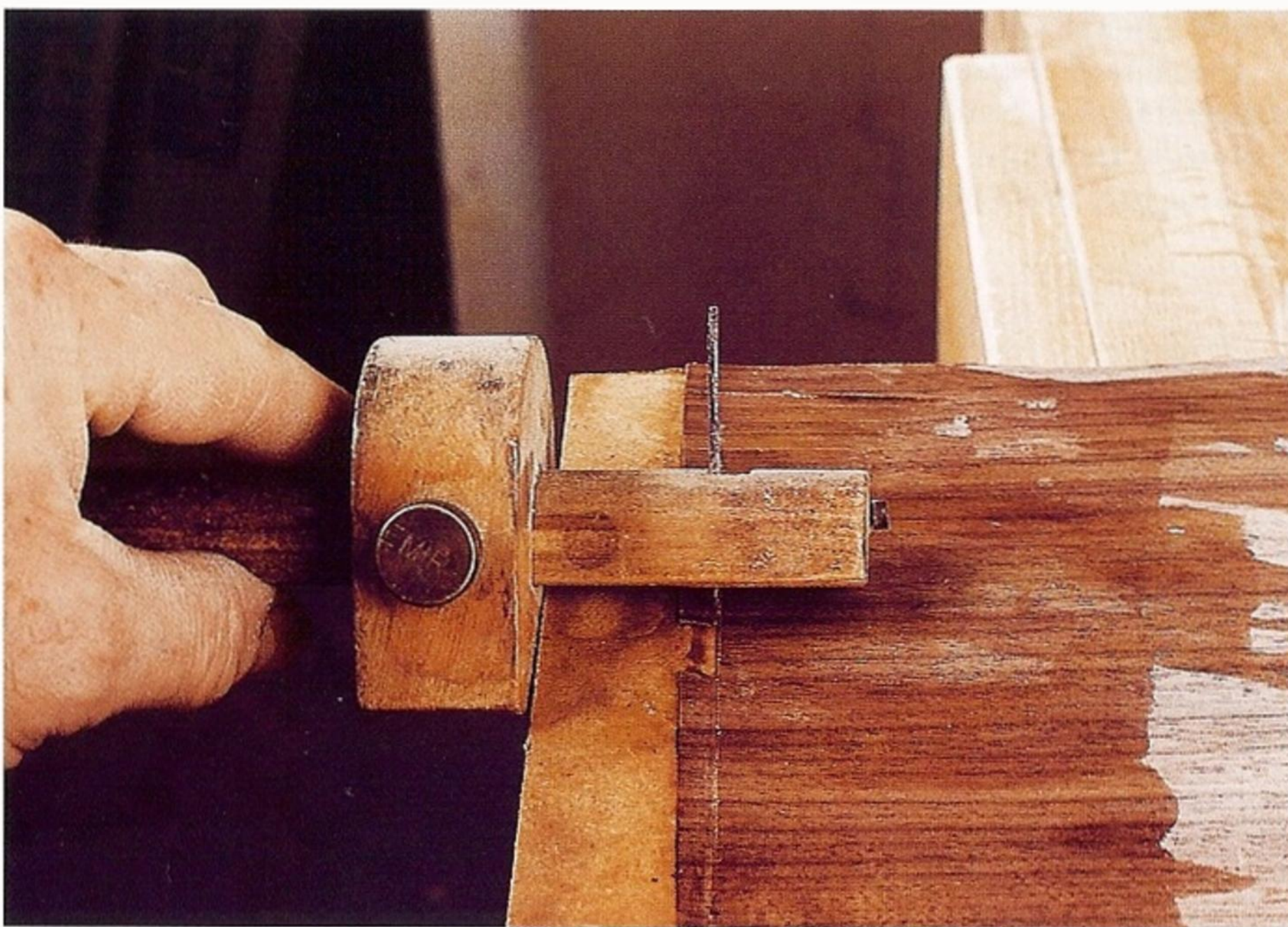


Fig 2.6 The cutting gauge enables consistent cutting at a fixed distance.

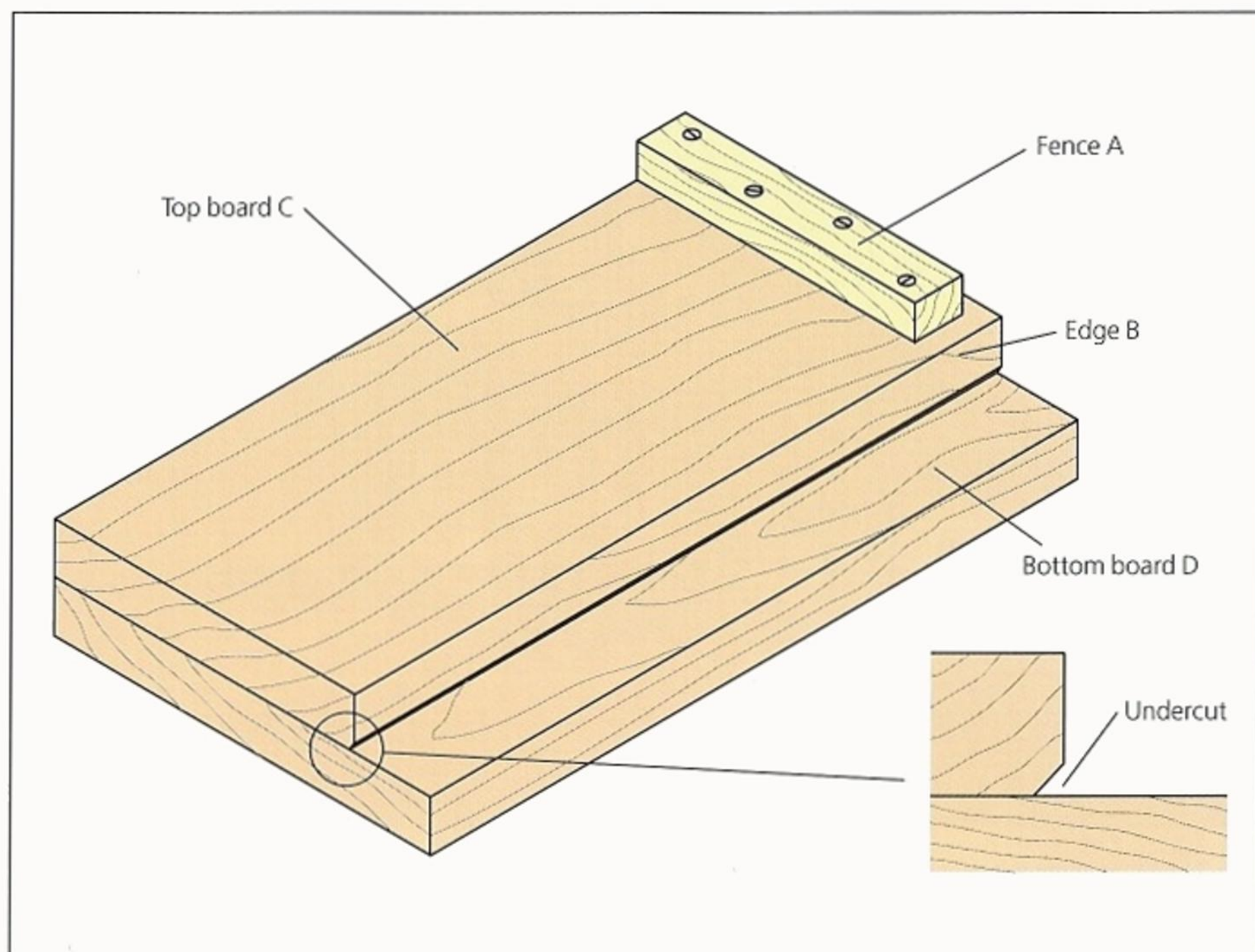


Fig 2.7 Home-made shooting board.

in place of a knife with the thicker sawn veneers and for thinner veneers that are brittle or particularly hard. The thin blade of the saw does not have any 'set' so it does not cut a wide kerf. Notice, from Fig 2.5, that the blade is curved: this prevents it snagging as it is drawn across the veneer. The curve ensures a smooth cutting action and the fine teeth ensure a clean cut, so that even on the most brittle of veneers, a gentle sawing action will result in a clean cut, without splintering.

CUTTING GAUGE

The cutting gauge is frequently used during hammer veneering for trimming centre panels ready to take a cross-banding or similar edging veneer. It resembles a marking gauge, but has a

small blade rather than a pin, so that it works by cutting at a fixed distance from the stock (*see* Fig 2.6). This enables a constant distance to be achieved when trimming veneer panels.

PLANE AND SHOOTING BOARDS

Where veneer joints will be laid by press rather than by veneer hammer, there is a role for planes. In partnership with a 'shooting board', the edges of the veneers used in book-matching and quartering can be made true using a plane, to give a very close joint. In the case of the thicker, sawn veneers, this is the only satisfactory way of preparing straight edges for jointing. Particular care needs to be exercised in preparing quartered veneers, as each of the joining edges must be square with its adjacent



Fig 2.8 Specialized bits adapt the power router for particular jobs.

edge if they are to make a good joint – this is where the shooting board comes into its own.

The general principles of constructing a shooting board are shown in Fig 2.7. Fence A must be at right angles to edge B of the top board C. Ideally, it should be recessed into C, but since veneering work places very little strain on A, it can be securely screwed (I never use glue because, in the event of damage, it is relatively easy to replace components). The exploded view in Fig 2.7 shows that the edge of C is undercut slightly. Sawdust will collect in this space rather than on the board, D, where it might interfere with the action of the plane.

ROUTER

The router is a most versatile tool. As far as veneering is concerned, the tool is invaluable for trimming the excess veneer around the edge of the work and

also for trenching out grooves to take inlays. This is quite apart from its more usual work of shaping edges after they have been applied to the veneered groundwork (*see* Chapter 4).

The power router has become an increasingly important part of the veneerers' tool kit. The availability of a wide range of straight-cutting bits allows rapid cutting of grooves to take inlays while other specialized bits allow excess veneer to be trimmed from the edges of the work. Consequently, for both areas of work there is a considerable saving in time. The bit shown in Fig 2.8 is a $\frac{1}{4}$ in (6mm) straight tungsten cutter which can be used for producing the groove for an inlay or, with the use of the router's fence, to trim excess veneer on square or rectangular work. For work that is curved, such as circular or oval table tops, a specially designed laminate trimmer is required (*see* Chapter 4).

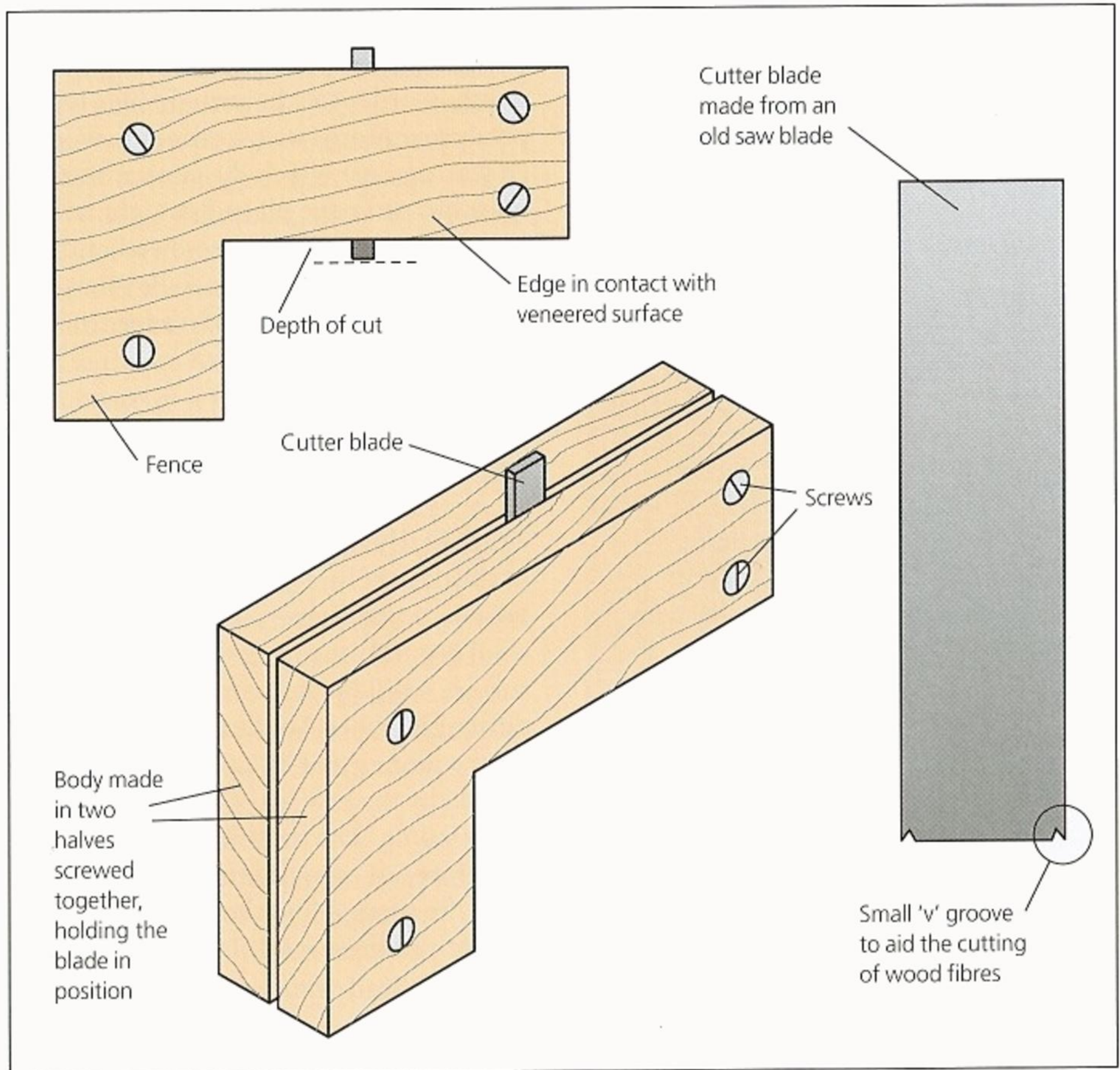


Fig 2.9 The scratchstock produces grooves by moving it backwards and forwards to scrape the surface. The adjustable blade determines the depth.

SCRATCHSTOCK

This, the traditional means of producing a groove for an inlay, is still useful on occasions. The process is laborious, but there are situations, such as working on very narrow surfaces, where a router is not up to the job, or where the inlay is of a size for which there is not an appropriate cutter.

A scratchstock can be easily made. The tool in Fig 2.9 consists of two pieces of L-shaped wood screwed together, holding a home-made cutter.

The cutters can be made from old saw blades, cut and filed to shape.

The scratchstock is operated by holding the fence against the edge of the work and moving it backwards and forwards to scrape the groove out of the surface (hence the name of the tool). The depth of cut is determined by how far the blade protrudes below the horizontal member of the tool (see 'v' groove in Fig 2.9).

The main problem with this tool is its tendency to create a ragged edge because

of the scraping action. This can be alleviated by filing a 'V' shape in the cutting edge, as shown in Fig 2.9. The two sides of the cutting edge will cut the wood fibres rather than simply scrape them and it should therefore lead to a cleaner groove.

PARQUETRY JIGS

Parquetry relies very heavily on the accurate cutting and laying of geometric shapes. In most cases, squares and diamonds are the basic shapes from which other patterns are built up. Since these shapes will need to tessellate without any gaps, every piece of the built-up pattern must be spot-on, with absolute accuracy in the cutting of angles. This is especially important when the pattern is covering a large area, as any small discrepancy will tend to become exaggerated as the errors become multiplied. The use of jigs will enable you to cut component pieces with consistent angles and sizes. Assuming the jig is itself constructed accurately, it will

minimize inaccuracies. (See chapter 8.)

The spacers must be identical in width in order for the straightedge to produce uniform strips. Also, the wooden stop against which the veneer butts must have its edge planed straight and true. This stop is simply screwed onto the base board so that it can be removed to replace it, or to plane the edge true, should any damage occur.

VENEER-LAYING TOOLS

TOOTHING PLANE

In the days before plywood and particle boards, when veneers were laid onto a solid ground, any irregularity in the surface would have caused some difficulties when bonding. When veneers were routinely cut by saw, the roughness caused by the saw was also problematic for bonding. The tothing plane was, therefore, an essential tool for preparing both the ground and the veneer surface. It removed these irregularities and

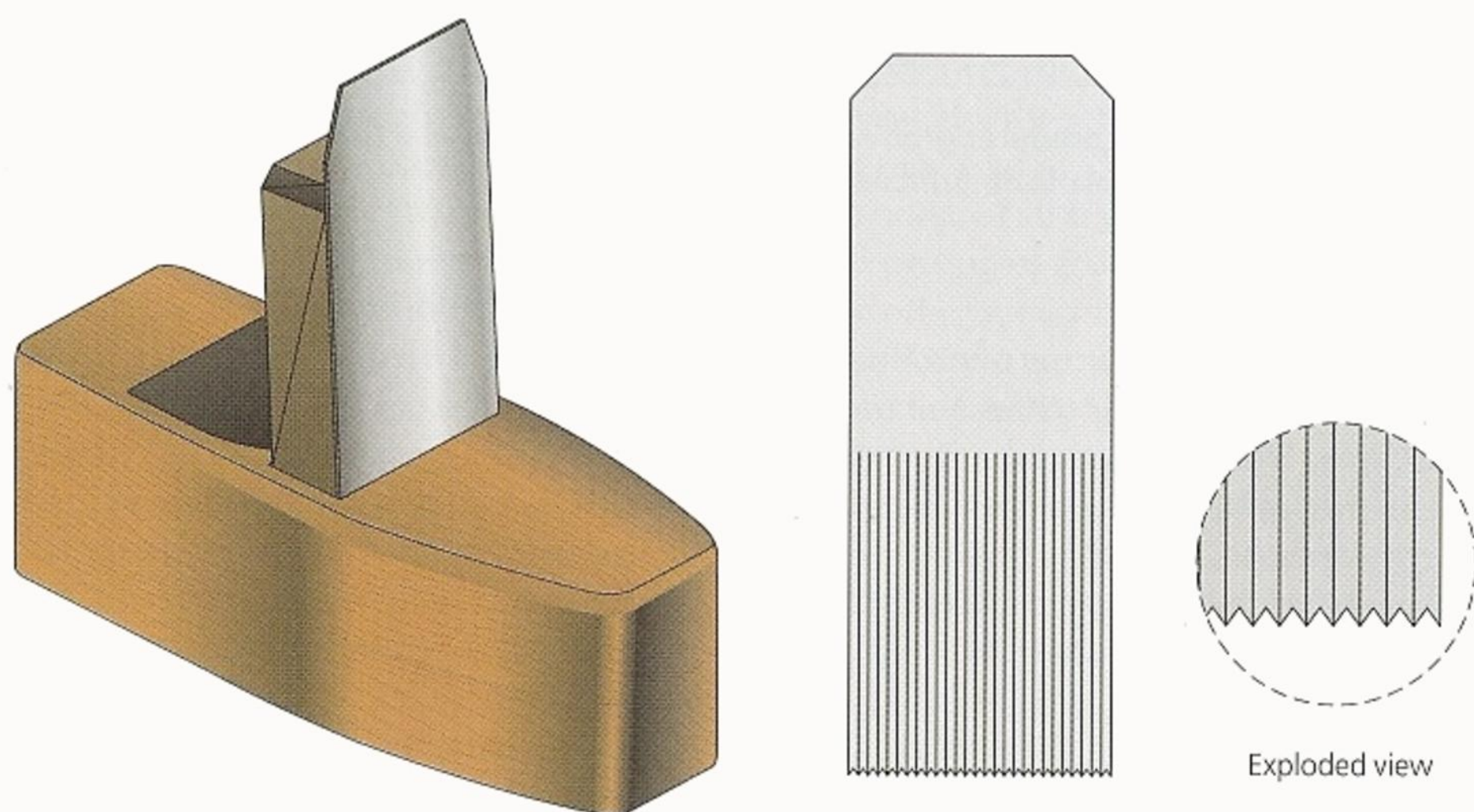


Fig 2.10 A tothing plane. Grooves in the plane iron create a serrated edge.

provided a keyed surface for improved bonding. This is less of a problem with modern materials and knife-cut veneers, but for restoration or authentic copy work, it remains essential. Also, if you are working with thick, saw-cut veneers, the plane will remove the marks left by the saw blade.

A tothing plane is quite small. It is held with one hand for working over the surface of a solid ground. This is done in a random fashion, but ensuring that the whole of the surface is covered. The blade is vertical and protrudes from the sole of the plane by only a very small amount.

The action is one of scouring the wood surface. The cutting edge is serrated so that it creates many small grooves that both even out irregularities and leave the key for gluing (*see* Fig 2.10).

veneer HAMMER

This is quite the wrong name for the tool as it is in no way used with such an action. It owes more to a 'squeegee' than to a hammer. The hammer head has a



Fig 2.11 The brass strip in the veneer hammer creates the pressure to bind the glue and veneer.

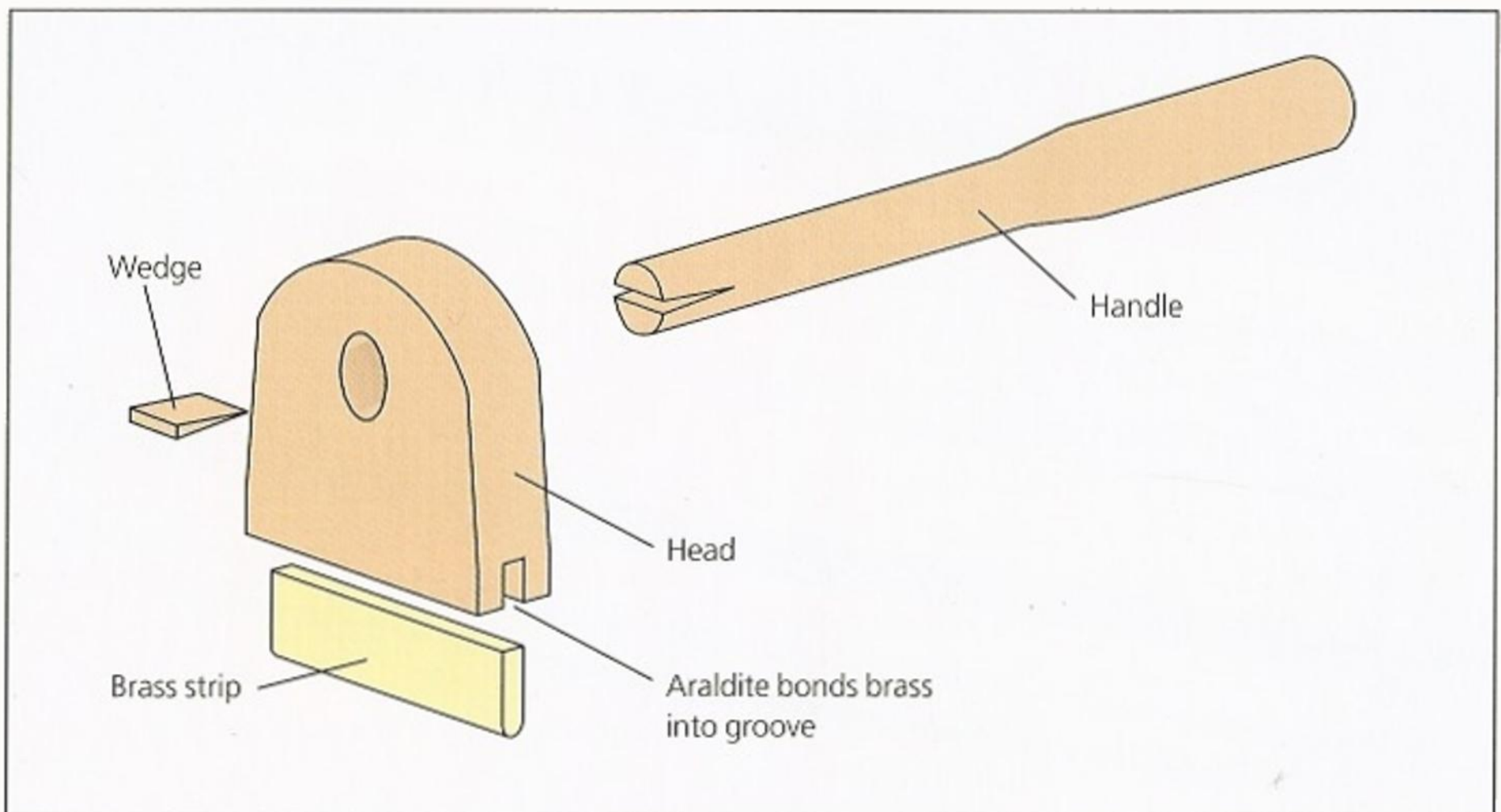


Fig 2.12 A home-made veneer hammer.

bull-nosed strip of brass set into its edge. It is this which is used to press the veneer down onto the ground, to squeeze out surplus glue and ensure good contact between the surfaces (*see* Fig 2.11). As a traditional veneering tool it was designed for use with animal glue, but it can be used with contact adhesives. Other glues are not suitable candidates because they do not 'grab' the veneer on contact. Once the hammer passes over an area the pressure is released and contact may be lost between veneer and ground. For non-contact adhesives, a veneer press will be needed.

The hammer can be held in a variety of ways, depending on the preference of the worker. The grip shown in Fig 2.11 is my preferred method, as it allows considerable pressure to be exerted.

Veneer hammers are available commercially, or can be home-made. The advantage of making your own is that you can have a number of them in two or three different sizes to cope with different work and to fit your own grip.

If you do choose to make your own, you must use brass or other non-ferrous metal, as steel will rust and may stain certain veneers.

CAUL PRESS

The caul method is a low-cost alternative to a large press, and is very much a cottage approach to veneer pressing. The work is placed between two boards (the cauls), which are larger than the work itself. (*See* Fig. 2.13). Pressure is exerted by a set of paired bearers, or battens, laid across the top board and beneath the bottom board. The shape of the bearers is significant. The load-exerting edge should be bowed slightly. (In Fig 2.14, such a curvature is greatly exaggerated for clarity.) The purpose of this curvature is to ensure that the bearer applies downward pressure, *P*, progressively, from the centre to the edge (i.e. in the directions A-B), as the clamp pressure, *C*, is exerted. The clamps are tightened slowly to allow time for any surplus glue to be squeezed

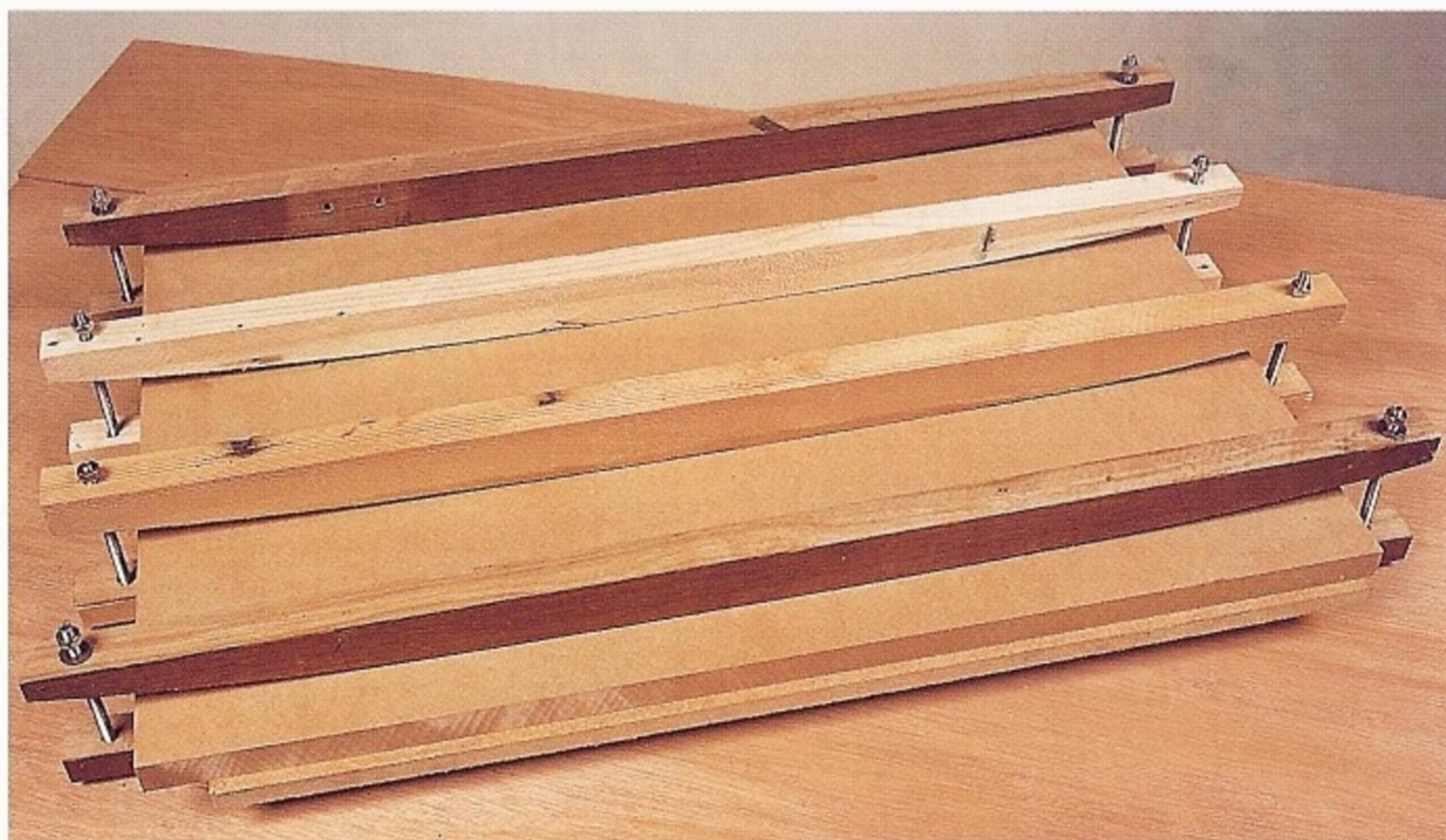


Fig 2.13 The caul press – a low-cost method, using bolts rather than clamps.

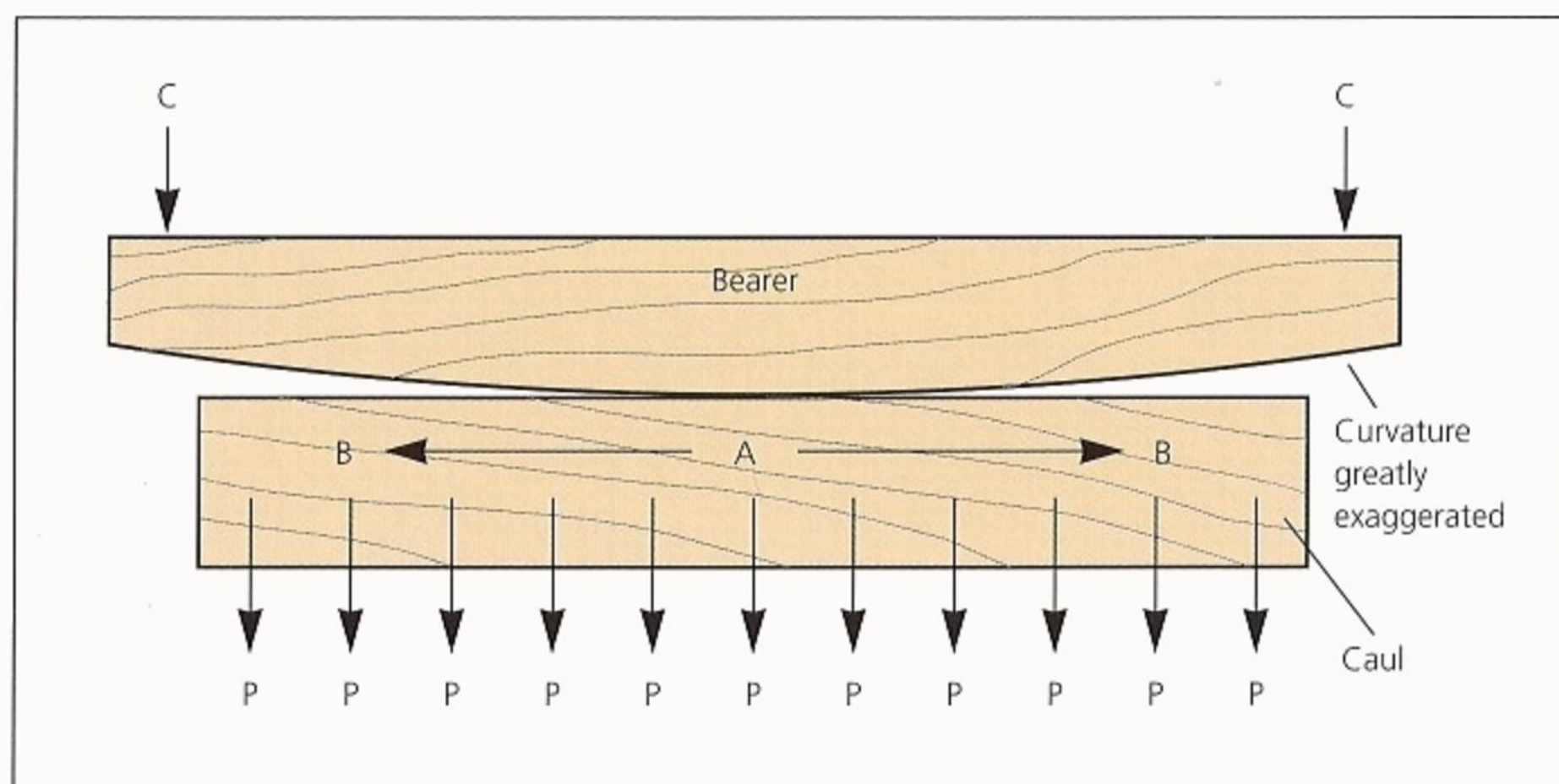


Fig 2.14 The curve of the bearers ensures that excess glue is squeezed out, minimizing the risk of trapped glue causing lumps and creases in the veneer.

outwards. This ensures that surplus glue is squeezed out rather than trapped, with the risk of creating a lump or a crease in the veneer. It has to be said though, that it is bad practice to use so much glue that such an occurrence might take place!

The more pairs of cauls you have the better, but for most people this is determined by the number of clamps they own – or have begged – as each pair of bearers requires a set of clamps.

HAND-SCREW PRESS

This is a very simple device whereby pressure on the work is maintained by the action of a heavy metal plate which is pressed down onto the work. Pressure is exerted using a heavily threaded column which is operated by turning the long handle at the top. This equipment is ideal for small work, and quite large presses can be constructed by using more than one hand screw to ensure that an even pressure is exerted over the whole veneered surface.

In commercial workshops, for production runs where the rate of output

is important, the pressure plates are heated to speed up the setting of the adhesive. Commercial presses take up a great deal of space, and for amateurs and people carrying out one-off veneering projects, a machine of this kind would be a heavy investment.

While you can make your own veneer press (the separate components are readily available), the results are not always satisfactory, as it is difficult to prevent the arrangement distorting as pressure is applied.

SAND BOX

Shaped work can be problematic. During pressing, the veneer must be kept in contact with the ground for the entire drying period of the glue. Flat surfaces are relatively easy to deal with, but maintaining contact between a shaped ground and the veneer is a different proposition altogether – compound shapes, particularly.

The sand box is the traditional method for shaped veneering (*see* fig 2.15). The ground would be pressed into



Fig 2.15 A sand box press.

dry silver sand and removed, leaving behind an impression of the shape. The veneer was laid by placing ground and veneer into the sand and weighting it to maintain pressure. In restoration work where animal glue is used, the sand may be heated (*see* Chapter 4).

VENEER TAPE AND PINS

These may seem rather prosaic items compared with some of the more complex equipment described earlier in the chapter. Nevertheless, they are crucial. Generally, there is a degree of moisture involved in the laying of veneers because of the glue.

Where veneers are joined, they will need to be taped, mostly to ensure that their positions are maintained, but also to minimize the risk of the joints opening as the glue dries and the veneer shrinks

slightly. Veneer tape is essentially gummed paper tape. It is easy to remove from the work later by moistening it to loosen it from the surface.

When constructing complex built-up veneer panels, the component parts are laid onto a drawn pattern prior to taping together. Veneer pins, which are very fine, are used to hold the pieces in position. Once taped up, the pins can be removed before laying the veneer onto the ground.

The pins are very thin, and so do not leave large and obvious holes later. Some pins have a plastic cap which makes them easier to push in by hand. Other varieties look like very thin moulding pins and can be used to secure veneers during laying when there is the danger of them slipping as the pressure is applied in a press (*see* Chapter 4).

PREPARING VENEERS

- ◆ HANDLING AND STORING NEW VENEERS
- ◆ USING THE VENEER KNIFE
- ◆ DEALING WITH DEFECTS
- ◆ FLATTENING BUCKLED VENEERS
- ◆ COLOURING VENEERS

HANDLING AND STORING NEW VENEERS

Knife-cut veneers are fragile materials. This may not be so apparent when working with fairly small pieces, but with larger sheets that flex very easily, the prospect of causing serious damage to them is very real. Sawn veneers do not present this problem partly because of their thickness, but also because they are generally of a much smaller size.

When leaves of veneers are bought they will be supplied either flat or rolled, depending upon which method is easier for the purposes of carriage. To avoid undue risk of damage in transit large leaves can only be sent rolled, and these will therefore require some time to settle after unpacking.

Allow time for the veneer to flatten gradually of its own accord, although some help may be required, by weighing down the ends with books. At first, do not put the books directly over the ends, as this may cause the veneer to split, but

place them at the point where the veneer begins to curl, and gradually slide them towards the end over a period of a day.

Smaller sheets of veneer may be supplied flat and will require less preparation for storage. Taping the ends is all that is likely to be required.

Before all this is done though, it is a good idea to tape the ends of all sheets of veneers as the ends are especially vulnerable to splits, and once established, these splits have a tendency to progress along the veneer's length. Taping with masking or veneer tape will reduce this risk, or at least minimize the extent of the migration. (See Fig 3.1.)

Once all new veneers have been allowed to settle and flatten, they should be stored horizontally and maintained in a flat position in a cool, dark, dry place. Flatness in storage is vital because any flexing in the search for a piece will weaken the veneer over a period of time, encouraging and nurturing splits and splintering. This



Fig 3.1 Taping the ends of a leaf of veneer will reduce the risk of splits appearing and worsening.

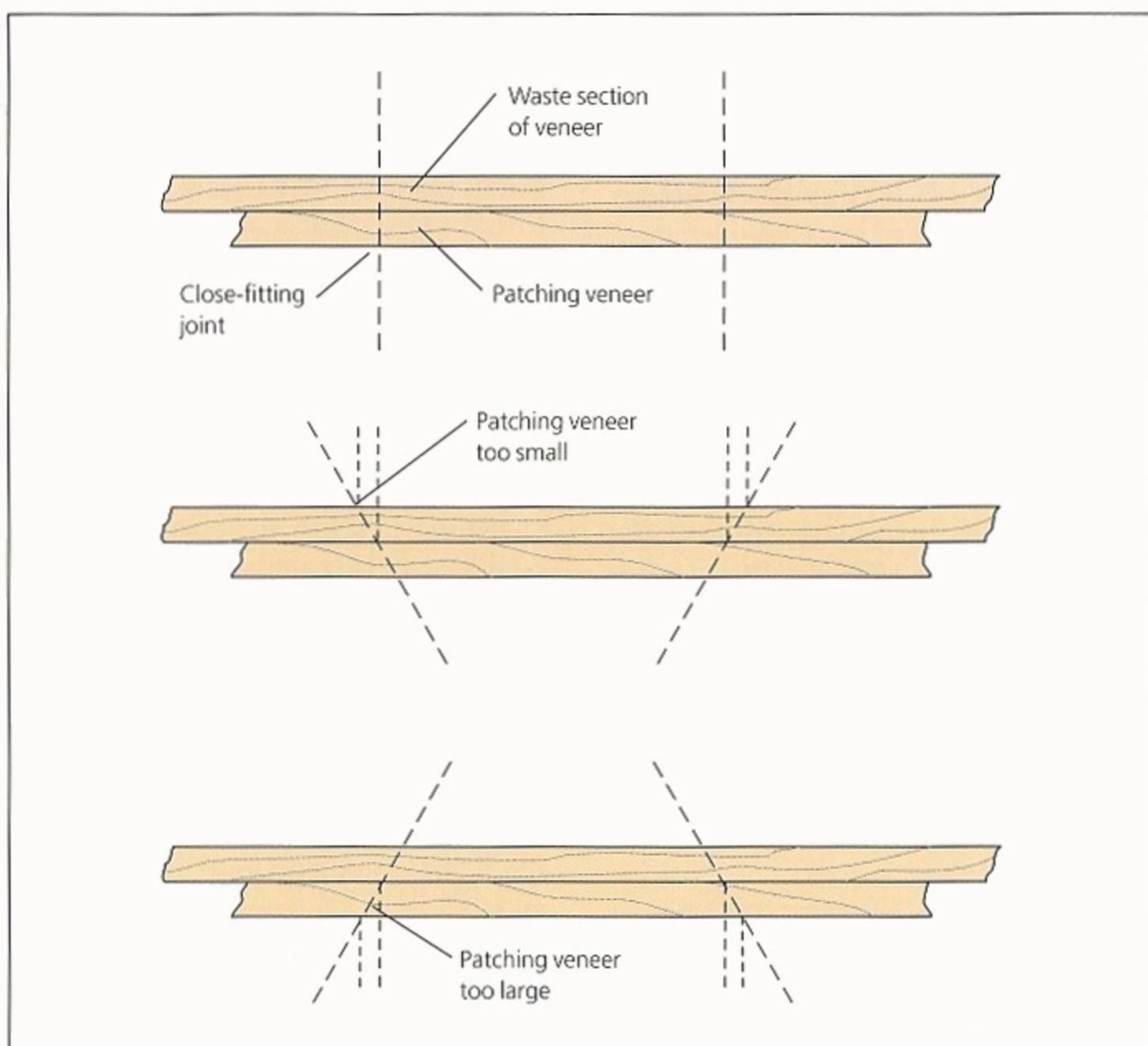


Fig 3.2 Cutting angle for the veneer knife.



Fig 3.3 There is a high risk of the veneer splintering out at the edge when cutting across the grain.

risk increases with the age of the veneer, as it becomes more brittle over time. Store veneers off the ground and on a sheet of chipboard or other flat board. Cover them to keep them clean and to exclude the light, because veneers suffer the same fate as solid wood, in changing colour after long-term exposure to light.

USING THE VENEER KNIFE

Much of the success achieved in veneering is down to the skill with which the veneer knife is used. Some of the techniques required are not easy at first, but become so with practice.

The critical factor is the knife, and it is important that good cutting practice is

adopted from the start. When cutting the veneer, always ensure that the knife is held vertically. The blade will tend to compress the veneer on each side, but the fibres will relax and swell again with the glue during laying. If the knife is held off the vertical, there is the risk that the joints will be poorly fitting, as the shapes cut from the damaged and patching veneers will not match. (See Fig 3.2.)

CUTTING VENEER TO SIZE

Cutting veneer to the size appropriate for the job in hand may sound a simple task, and there is nothing especially complicated about it, but there are a couple of things that are worth bearing in mind. The thing to remember is that when you cut across the grain, the veneer is likely to splinter, as shown in Fig 3.3.

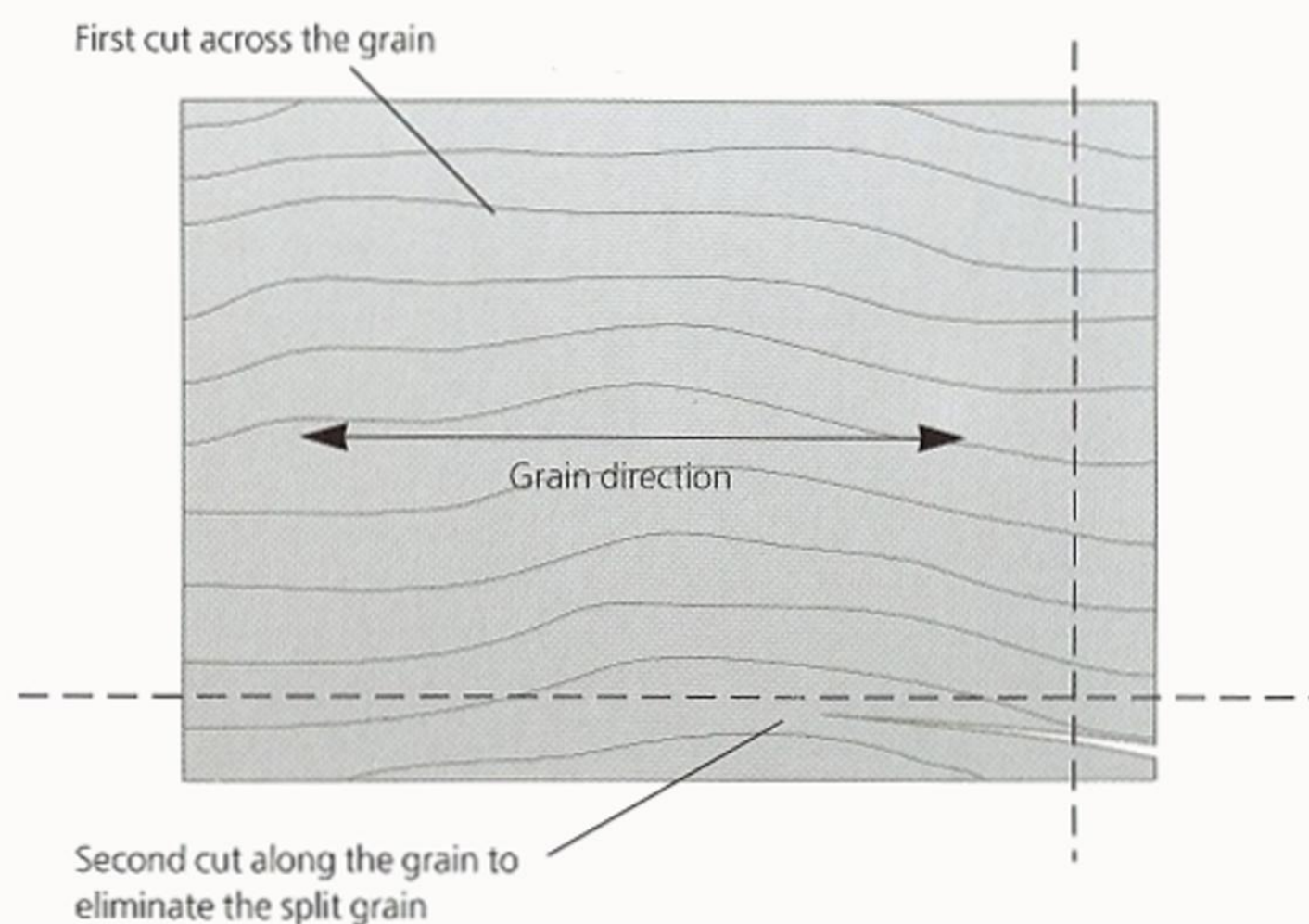


Fig 3.4 When cutting veneer to size, make the initial cuts across the grain. When you cut along the grain to produce the final size, the splintered edge will be cut away.

There are two things you can do to avoid the frustration of ruining a good piece of veneer. First, make the veneer oversize by about $\frac{3}{8}$ in (10mm) all round. Second, when cutting to size, make the first cuts across the grain, and the final cutting to size along the grain so that the splintered edge can be cut away (see Fig 3.4).

VENEER SAW

You can use a veneer saw as an alternative to the veneer knife for cutting to size. It is especially useful for hard and brittle veneers. It is used with the straightedge in exactly the same way as the knife. Draw the saw towards you against the straightedge. The curve of the blade prevents it digging into the

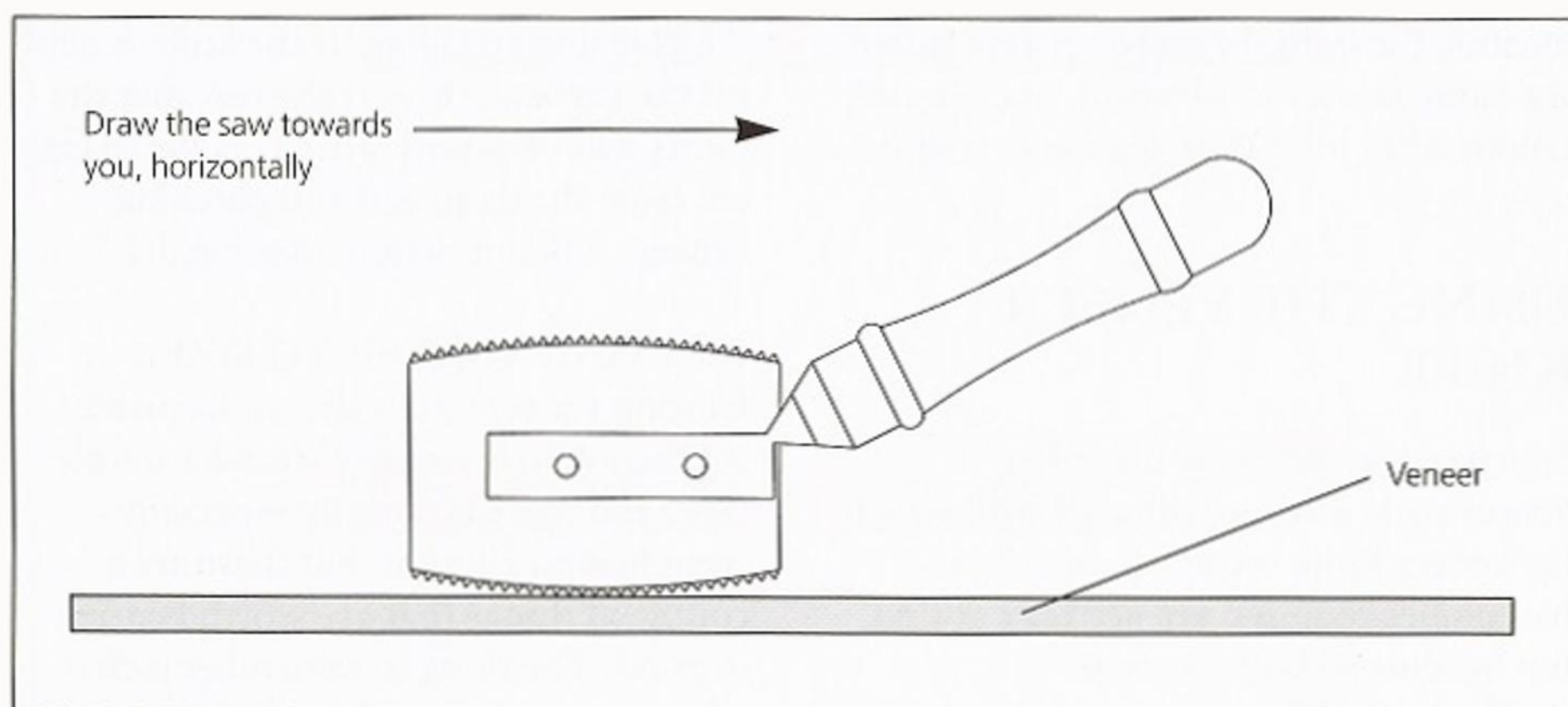


Fig 3.5 Using the veneer saw correctly will create a clean cutting action, without digging in.

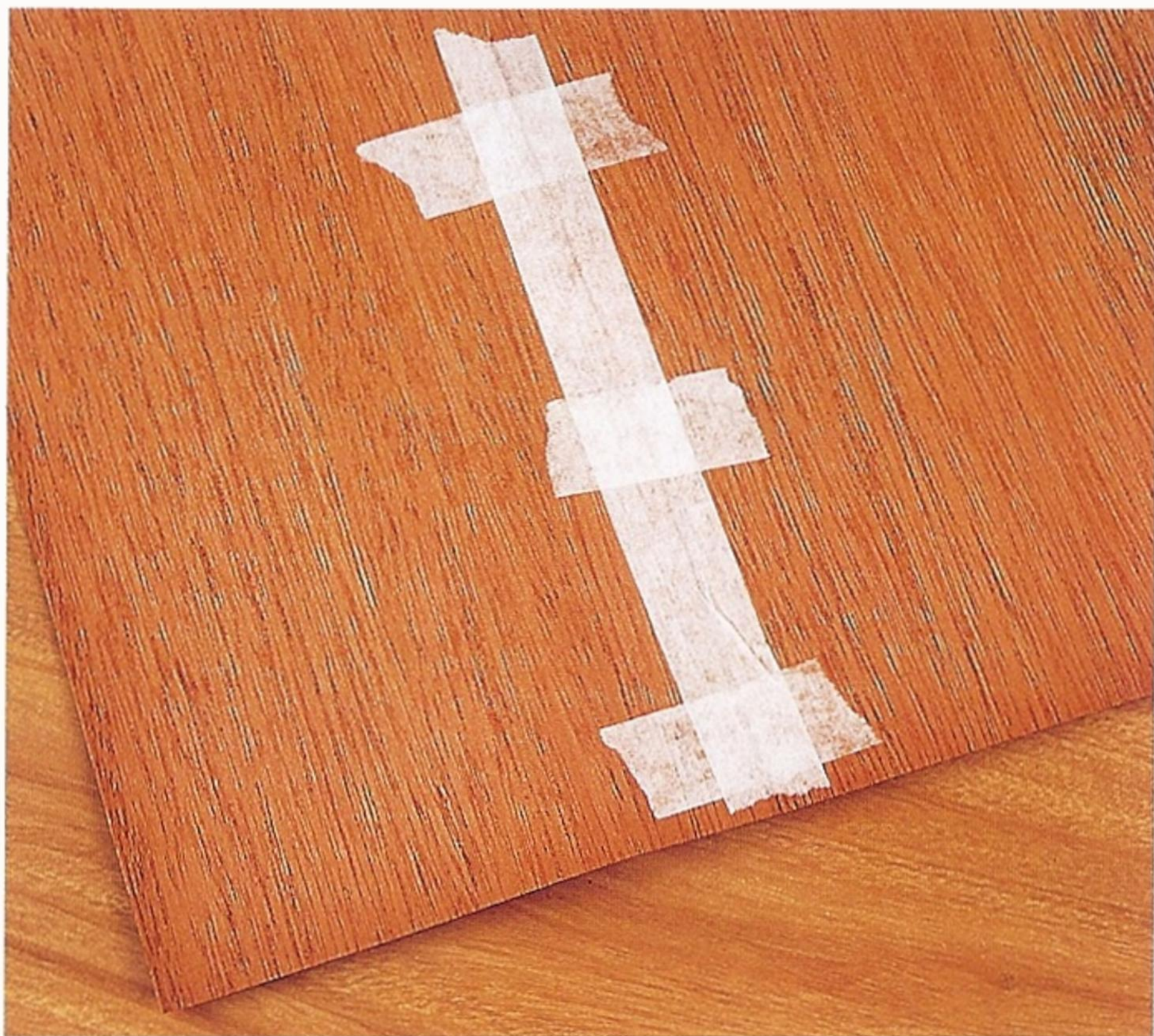


Fig 3.6 Splits in a veneer must be taped to hold the edges together and to prevent the split from worsening.

veneer. You do not need to apply pressure as you do with the knife. Figure 3.5 shows the action of the saw. Work across the grain before working along it, just as you would with the knife.

DEALING WITH DEFECTS

As it is a natural material, veneer does not necessarily come free of defects. In fact, one should expect to see, and to have to deal with, some minor ones. The two most commonly occurring problems are splits and holes.

SPLITS

Splits in the edge of a veneer are a serious problem as even small splits will gradually creep along the length of the veneer. If they are not dealt with, a veneer can eventually be rendered useless for laying as a complete leaf because it starts to break up.

Splits are also quite commonly found in the body of the veneer. These may be caused by rough handling, or be a consequence of age and increasing brittleness. Tape the split to hold the edges together and to prevent it worsening (*see* Fig 3.6). Note that the

tape is applied across the split as well as along it. This will help hold the edges together, especially as the glue dries after laying, and the tape can be easily removed after laying the veneer (see Chapter 4). Don't remove it before laying – the edges of the split may open up as the veneer shrinks during the drying period.

HOLES

In most cases, to make it virtually indistinguishable from the original, holes in the body of a veneer will need to be patched using a veneer of the same species, and as close to the damaged veneer in colour and figure as possible.

Figure 3.7 shows a hole in burr elm, a very common defect in this species. Burr elm and walnut are good examples of the problem of making patches 'invisible'. The wild figure makes it near impossible to make a completely invisible patch – a reasonable match is the best you can hope for here.

Figure 3.8 shows a variety of patches for different types of blemish. The dotted lines show the cuts that can be made and which follow, to a greater or lesser extent, the grain direction. If the veneer is selected well for figure and colour, and if it is cut accurately using the natural contours of the veneer's figure as a guide, the patch will pass cursory inspection.

Patching a hole

1 Place the damaged veneer over the patching veneer. This allows the patching veneer to be viewed through the hole. Both veneers must be perfectly flat. Burr veneers tend to be buckled, and they will need to be flattened beforehand (see page 38).

2 Move the damaged piece over the patching piece to find the best match for colour and figure. Where the hole is long and narrow, it can be difficult to view the veneer beneath in order to gain a good match. If this is the case, it may be worth making the hole a little larger by cutting around it to create a larger viewing 'window'. A balance must be struck, though, between creating a good match and making the patch larger than it needs to be.

3 The patch is produced by cutting through both pieces of veneer. The best results are obtained using a single cut: if you need to make a second or third cut, you run the risk of making the joint much more obvious. If necessary, use veneer pins to secure the two veneers while you cut the patch out. Keep the veneer knife vertical at all times to ensure that the patch is the same size as the hole cut to receive it. As a general rule, avoid cutting directly across the grain – it is virtually impossible to make such a cut invisible. Ideally, the cut should closely follow the direction of the figure, though in practice, you may need to compromise. There will almost certainly be a need to cut across the grain at some point, and this is best done by cutting diagonally across it. The shape of the patch is determined by the nature of the damage, but follow the direction of the figure as far as possible so that it is not obvious.

4 Remove the waste veneer from the damaged veneer, and fit the patch in its place. Secure it with veneer tape or rub a little PVA glue into the joint on the reverse side, and allow to dry. Keep the tape in place during laying, only removing it when cleaning up the work afterwards. This means that you will



Fig 3.7 Burr veneers (elm in this case) are prone to naturally occurring holes.

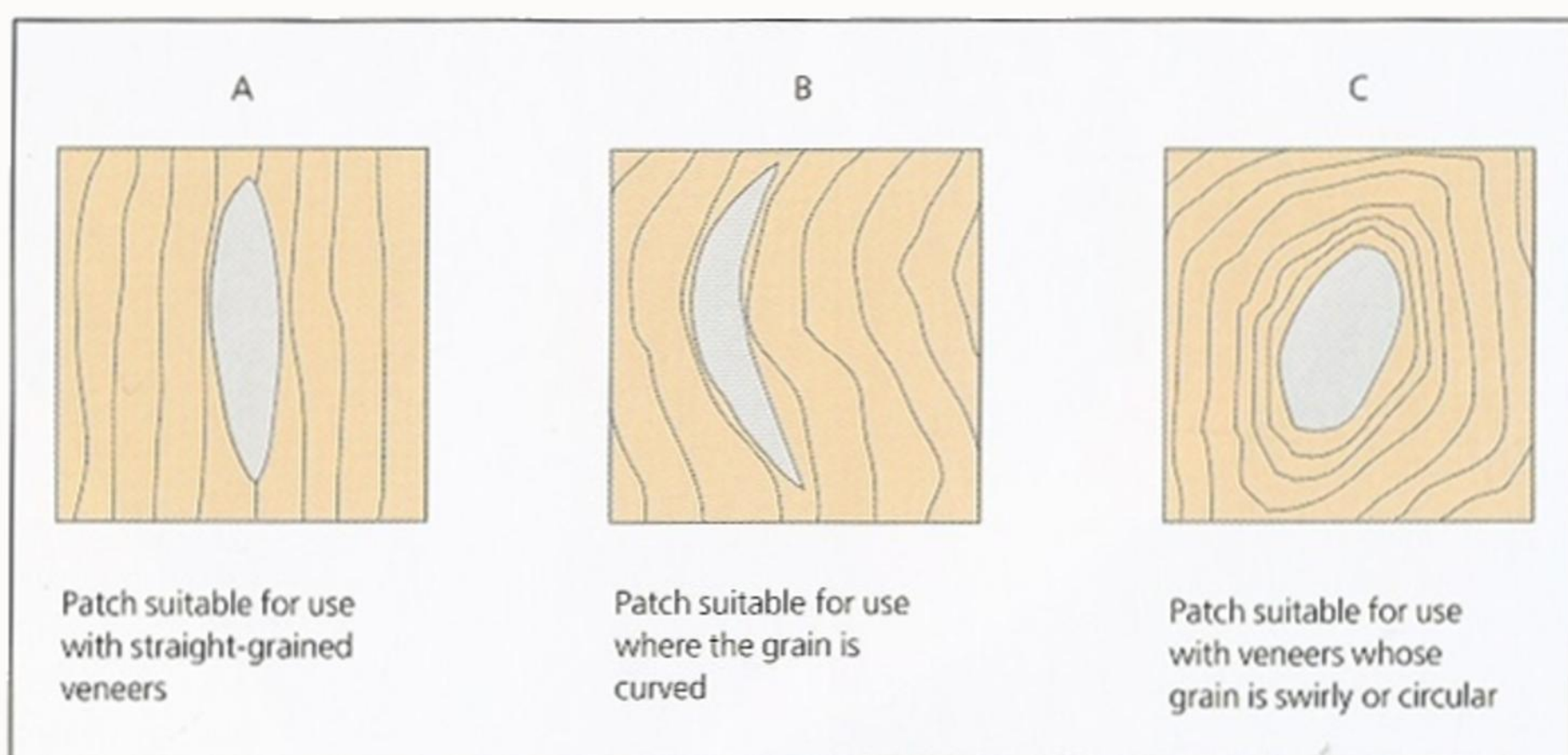


Fig 3.8 Patches should be cut so that they follow the general figure direction wherever possible.

need to plan the work carefully: if you are book-matching or quartering, it is very easy to end up with the taped side of the patch actually facing down onto the groundwork when you open out the veneer pack. (See Chapter 6.)

FLATTENING BUCKLED VENEERS

Some of the very highly decorative veneers, such as burrs and curls, buckle easily. While this does not present a problem in terms of the quality of the veneer itself, many of the techniques used to prepare, shape and lay the veneer become impractical because they will not lie flat enough. Thus, before working with buckled veneers, it is

necessary to flatten them. This is different from flattening veneer that has been supplied rolled: rolled veneer will curl in one plane only (i.e. along its length), while buckled veneer will undulate in several directions (see Fig 3.9). If veneers are to be joined, it is essential that they are completely flat, otherwise a good joint cannot be obtained. Buckled veneers will also encourage the pooling of glue during the pressing process, resulting in small, hard lumps in the work.

To flatten the veneer, moisten it well with warm water to make it pliable, place it between plain white paper or blotting paper, and then apply pressure – you can use a veneer press, or cauls. Leave overnight to dry out before releasing the veneer and



Fig 3.9 This buckled piece of burr walnut needs to be flattened before it can be laid.

inspecting it. At the very least, the veneers should be considerably flatter, but if they are still not flat enough to work with, repeat the process.

COLOURING VENEERS

You can use contrasting colour as well as figure to create a decorative impact. In particular, marquetry and some parquetry effects rely upon a range of colour combinations and contrasts. While there are sufficient variations in the natural colour of veneers, because of the range of species available, artificially coloured veneers can be used as well. Indeed, there are many fine examples of veneered work where a variety of 'non-natural' colours have been used. The work of the Art Nouveau movement included the use of artificially coloured veneers to represent such things as flowers. Much contemporary work has also benefited from the availability of reliable, light-fast dyes.

There is little difficulty in staining veneers after laying, provided you are dealing with a single species and there are no colour contrasts to be preserved. Where contrasts of colour need to be retained, such as in marquetry work, staining after laying does present a problem. In such circumstances, it is best to stain the veneer prior to laying.

Colouring materials fall into two main types: those that dye the wood and those that change its colour through chemical action. The former are easier to use in that the colour change is predictable – the natural colour of the wood will have some effect, but the final colour will, broadly, be that of the colouring material. Chemical stains are less predictable because they depend upon the chemical make-up of the

particular wood, and the final colour of the wood is markedly different from that of the stain itself.

DYEING THE VENEER

The most effective way of achieving a uniform colour that penetrates to the full thickness of the veneer (to allow for light sanding when finishing and polishing) is to immerse it in a container of the dye for a couple of hours. Water-based aniline dyes are very effective, as the water-borne dye penetrates the wood fibres very easily.

After removing the veneer from the dye bath, remove the surplus dye from the surface and allow the veneer to dry in a warm place. The veneer will tend to curl as a result of the dyeing process, and it will need to be flattened before laying, as for a buckled veneer.

PROPRIETARY WOOD DYES

There are many proprietary brands of wood dye on the market. They are reliable colouring materials, but the range of colours tends to be limited, with each brand name having its own colour palette. Well-known brand names include Colron, Blackfriar's, Rustins and Liberon.

ANILINE DYES

Some very dramatic – even startling – effects can be achieved using these dyes. They are available in a very wide range of colours, including 'natural' wood shades and 'pure' colours, providing an opportunity to experiment with a huge number of combinations. They are very strong colouring agents and need to be used with some caution to prevent the colour overpowering the veneer. Where striking colours are being used, as in Fig 3.10, it is usual to use light coloured veneers, such as sycamore. In



Fig 3.10 These brightly coloured veneers have been produced by soaking sycamore veneer in water-soluble aniline dye.

fact, the grey veneer has been coloured with grey aniline dye and simulates harewood. Harewood was traditionally produced by immersing sycamore in a solution of iron sulphate, which causes a chemical reaction that turns sycamore grey. It is more usual these days to use aniline dye to produce harewood.

Aniline dyes come in two forms: water- and alcohol-soluble. They can be bought in powder form, to be made up with the appropriate solvent (i.e. water or methylated spirit respectively), or in the ready-made concentrated liquid form.

CHEMICAL STAINING AGENTS

A number of chemicals will change the colour of some woods. The exact nature of this effect depends upon the susceptibility of individual species and, of course, the materials to which they are susceptible. The most common staining agents are described below, along with the effects they create. With the exception of fuming with ammonia, the chemical stains are applied by immersion, similar to that described above.

The difficulty with chemical stains is that they are unpredictable. So much depends on the chemical nature of the veneer itself, and two pieces of the same species may not even react in the same way. Aniline dyes and the proprietary wood dyes are much more reliable.

AMMONIA (FUMED OAK)

Ammonia is a particularly unpleasant material to work with. It is strongly alkaline, will irritate the sensitive

membranes of the respiratory tract and eyes, and is corrosive if it comes into contact with skin. Ammonia is actually a gas, but is very highly soluble in water, and it is as a solution that you will buy it. The fumes given off by the solution is ammonia gas and many people will have been exposed to this at some time or other – an experience not to be repeated or forgotten!

As a liquid, ammonia has little effect on the colour of oak, but when exposed to the fumes it will gradually change colour through a range of shades, from honey to inky black. The process can be arrested at any time by removing the oak veneer from the fumes. The veneer is placed in a clear container with a plastic dish of household ammonia (not metal as ammonia will attack the metal). The clear, sealed container allows the change in the veneer's colour to be observed safely.

IRON SULPHATE

This chemical is used to create harewood, a silvery, greyish variety of sycamore. Harewood can be bought ready-stained from veneer suppliers, but you may want to make your own, in which case you can soak the veneer in a solution of iron sulphate. To be frank, it is easier and more reliable to use grey aniline dye.

IRON ACETATE

Several nails left in vinegar overnight produce this very effective chemical agent. If oak is soaked in the resultant liquid it turns black!

LAYING VENEERS

- ◆ PREPARING THE GROUNDWORK
- ◆ BALANCING AND COUNTER VENEERS
- ◆ EDGING MANUFACTURED BOARDS
- ◆ PRINCIPAL VENEER LAYING METHODS
- ◆ CLEANING UP
- ◆ REPAIRING BLISTERS AND LIFTED EDGES

PREPARING THE GROUNDWORK

A good bond between veneer and groundwork is ensured only if the groundwork is flat across its surface. Keying the surface (i.e. creating a slight roughness) enables the glue to get a 'hold' on the surface and thus encourages a good bond.

ACHIEVING A FLAT SURFACE

This is of less concern with MDF, ply and chipboard than it is with solid wood groundwork. Their means of manufacture generally ensures that they are flat across their whole surface. Solid wood, on the other hand, does not have such an advantage, and its flatness and freedom from problematic blemishes, such as planing tears (areas where wood grain has been torn out by the use of a plane), depends very much on the skill used and care taken in its preparation.

Any hollows may discourage adhesion, leading to the possibility of

bubbles. This is particularly so with conventional flat presses that provide pressure on high spots, but very little on hollow areas. A solid groundwork must be tested for flatness across the whole surface, using a straightedge. Two straightedges can be used as sights to ensure that the groundwork is not twisted (see Fig 4.1).

Planing tears and other blemishes of this nature need to be filled with a proprietary filler and then smoothed prior to keying, and it is important that knots are removed and patched. There may be no immediate difficulty in laying a veneer over a knot, but over a period of time the shape of the knot usually shows through as the ground shrinks a little, leaving the knot to stand proud of the surface.

KEYING OR 'TOOTHING' THE GROUND

A slight roughness to a surface aids the ability of an adhesive to do its job. This was perhaps more important in the past

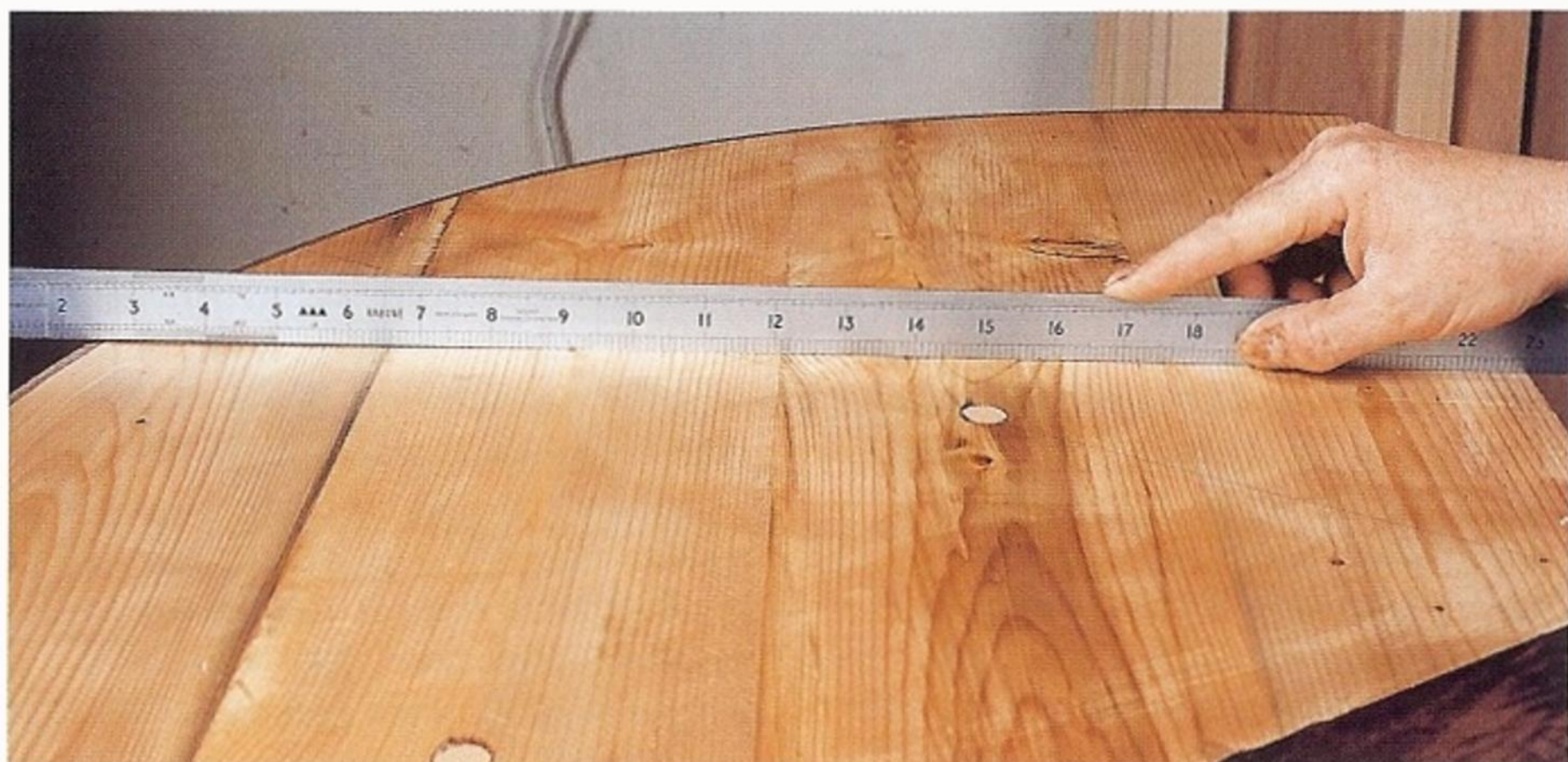


Fig 4.1 Using straightedges to test groundwork for flatness.



Fig 4.2 A tothing plane must be worked randomly over the entire groundwork to remove blemishes and possible high spots.

than it is now because of the nature of modern glues. Nevertheless, it is still good practice to slightly roughen the groundwork prior to laying.

The traditional way of applying a key on a solid wood groundwork is by using a tothing plane (*see* Chapter 2). This

can be held in one hand and worked randomly over the whole surface (*see* Fig 4.2). Its vertically positioned blade has a very finely serrated cutting edge that scores the surface. This has two effects. Firstly, the fine grooves it produces on the surface provide a key for the glue.

Secondly, the sole of the plane will ride over high spots, levelling them out. Work the tothing plane over the surface to generate the key and even out undulations. Continue until the whole surface is covered with the grooves. If, after this treatment, you are able to see areas not toothed, these are low spots, and further tothing will be needed or the surface planed flat and then worked again. Always work the whole surface to ensure uniformity. If you dwell on any one area, a hollow is likely to result. Wipe away the dust afterwards.

Manufactured boards, such as MDF and ply, should not require the use of a tothing plane, because their surfaces are flat. In most cases, manufactured boards need little more than a good scouring with coarse abrasive paper, though if there are holes or dents they will need to be filled and smoothed as with solid wood. After scouring, wipe the surface clear of dust.

Remember, both sides of the groundwork will need to be toothed if the back is being veneered as well.

SIZING THE GROUNDWORK

If you plan to use water-based adhesives (such as animal glue or PVA), it is a good idea to size the groundwork first in order to prevent premature drying as water is

absorbed from the adhesive into the surface of the groundwork. Sizing will reduce the absorption.

There are several ways to size the surface. The easiest way is to brush thinned glue over the surface and allow it to dry thoroughly before continuing with the veneer laying. If you use PVA glue as the size, thin it down in the ratio of one part glue to five parts water. Use a similar ratio if you use pearl glue. A very good alternative is decorators' size (available from good decorators' suppliers). Follow the maker's mixing instructions.

BALANCING AND COUNTER VENEERS

BALANCING VENEER

A veneer has the ability to distort the groundwork. To minimize the risk of this, veneer should be laid on the heartwood side (*see* Chapter 1). Better still, wide surfaces should be made up of several narrow boards butt jointed. However, even this may not be sufficient to eliminate the ability of a veneer to distort the groundwork! When water-based adhesives are used, a veneer will swell. Consequently, as the veneer dries, it will begin to shrink imperceptibly and

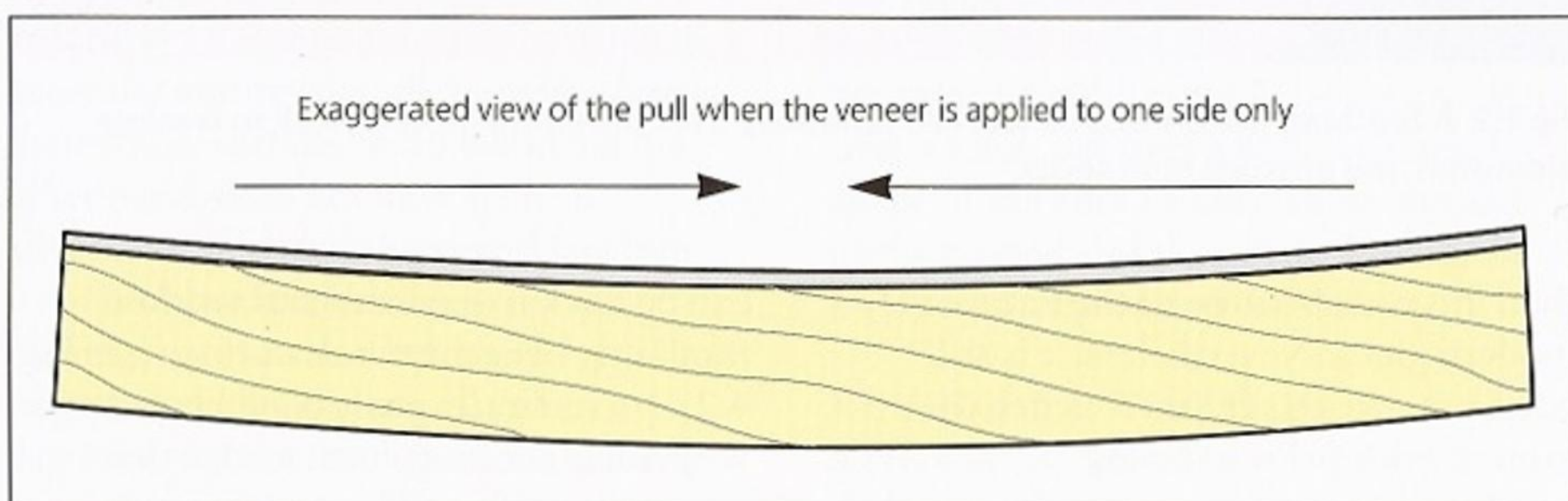


Fig 4.3 A wide veneer can exert a pull on the groundwork. Stretching the veneer during laying should be avoided because it will shrink as the glue dries and increase the amount of pull.

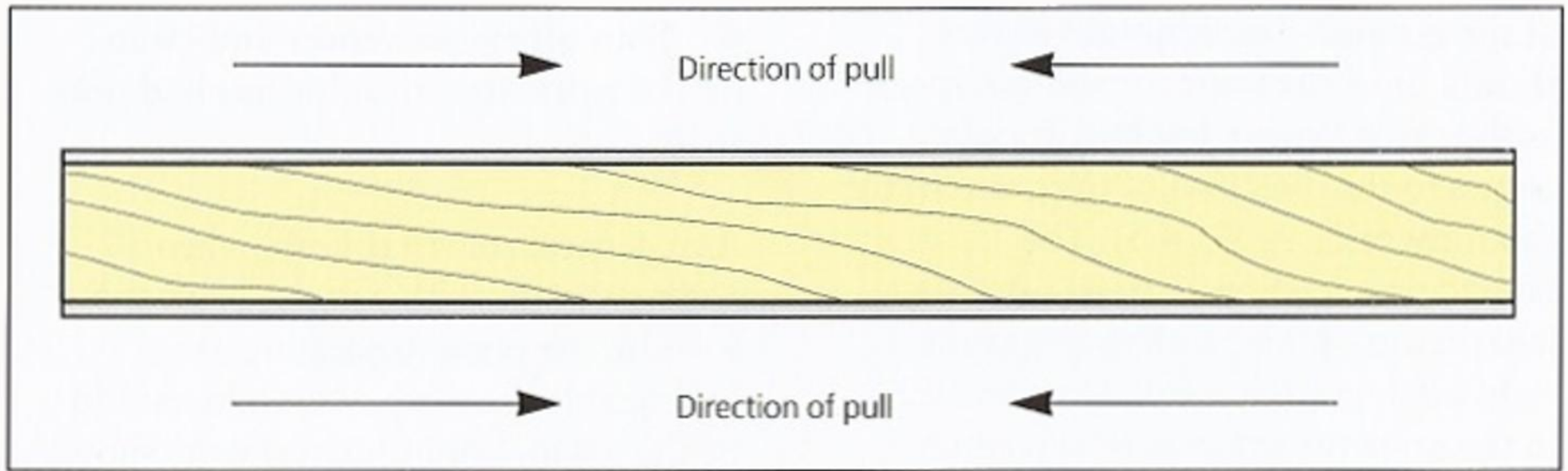


Fig 4.4 A balancing veneer will create an opposing pull to the show veneer, thereby neutralizing the effect.

the force with which it does so is surprisingly strong – enough to cause the ground to bend a little under the stress (see Fig 4.3), especially if the groundwork is relatively thin and wide. Hammer veneering can increase this effect because the process can stretch the veneer a little. Stretching the veneer during laying should be avoided because it will shrink as the glue dries and increase the amount of pull.

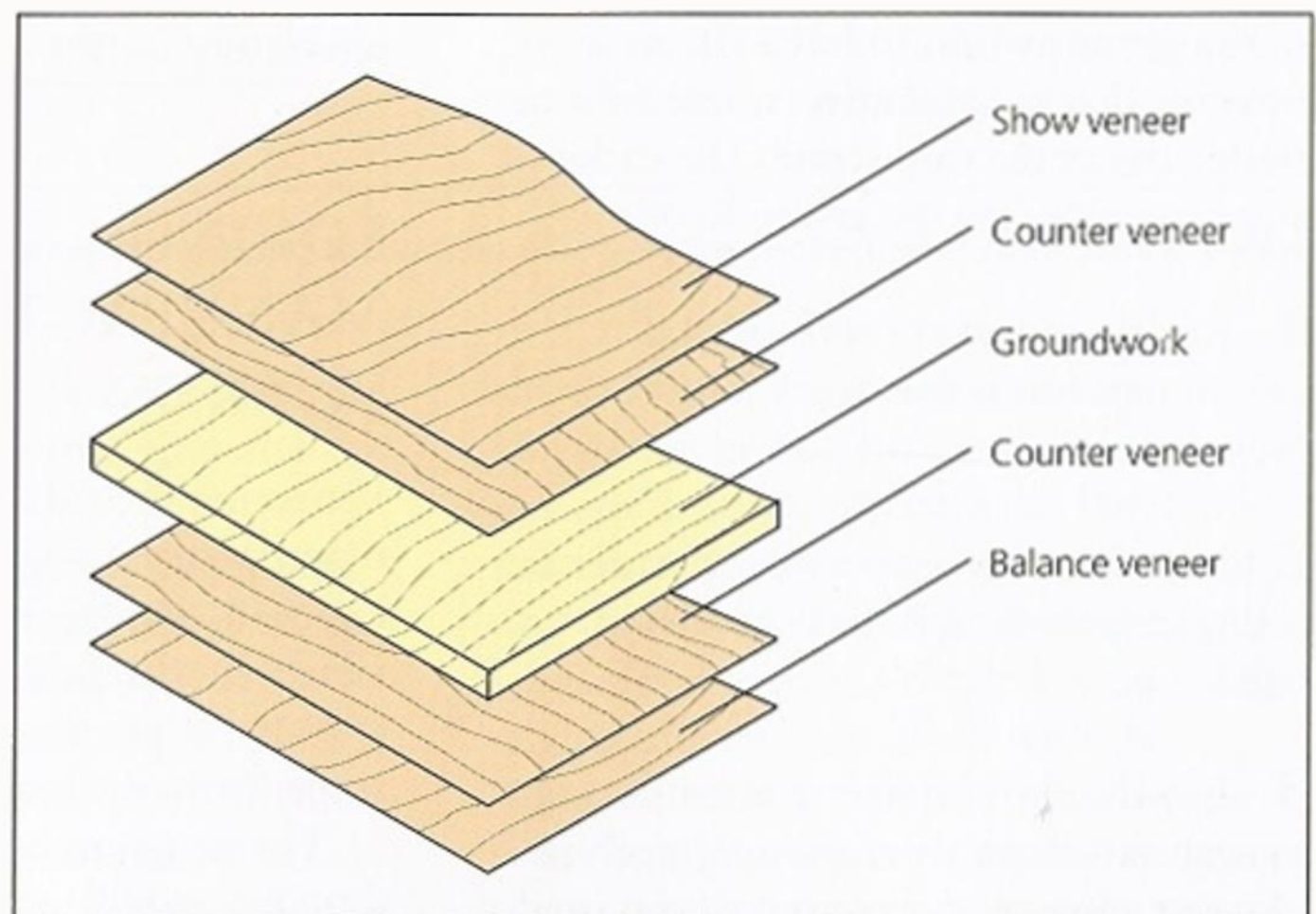
Distortion can be prevented by laying a veneer of the same species on the reverse of the ground. This balancing veneer, as it is called, must be laid at the same time as the main, or show, veneer:

you cannot reverse any distortion by adding the balancing veneer later. As the show veneer pulls on one side of the wood, the balancing veneer will do the same thing on the other side, neutralizing the distorting effect (see Fig 4.4).

COUNTER VENEER

All groundwork should have a balancing veneer, but where solid wood makes up the groundwork, and the work is to be of the highest quality, then counter veneering should also be carried out. Counter veneering creates, in effect, a two-layered ply on both sides

Fig 4.5 Counter veneers are laid with the grain direction at right angles to that of the show and balancing veneers.



of the ground. The counter veneers should be of the same, or similar, species as the show veneer, but laid at right angles to the direction of the grain of the groundwork (*see* Fig 4.5). The balancing and show veneers are then laid on top of this, with their grain at right angles to the counter veneers (i.e. in the same direction as the ground). The purpose of counter veneering is to minimize the effects caused by the movement of solid wood.

It is generally unnecessary to counter veneer MDF and chipboard, because they do not suffer from the potential difficulties of solid wood. Plywood, blockboard and laminboard should be counter veneered if you are unable to lay the show veneer at right angles to the grain direction of the board's surface. Some cheaper chipboards do have a roughish surface that will show through the veneer after a period of settling down, and it is worth counter veneering to prevent this.

Overview of laying veneers

A general principle of veneering is, follow the same operations on both sides of the groundwork, to balance any possible detrimental effects, and do it to both sides at the same time. The order of steps in preparing the groundwork is:

- 1 Key the surfaces (both sides if counter and/or balancing veneers are being used).
- 2 Lay counter veneers to both sides as a single operation, if these are being used.
- 3 Lay the show veneer and balancing veneer as a single operation, after the counter veneers, if these have been used.

- 4 Trim off excess veneer and clean up the work after the glue has had time to set.

As a general rule of thumb, when laying veneers with a press, leave the work in the press for as long as is practicable. Leaving overnight should be the norm. For industrial workshops, this is a problem because of the reduction in the production rate, and for this reason commercial presses are frequently heated to accelerate the setting of the glue. However, for the small workshop, and the amateur woodworker, the schedule needs to be planned to allow the work to be left undisturbed in the press. The caul press, in particular, may cause you some difficulty because of the number of clamps that will be needed, so you need to bear this in mind.

The methods of laying veneer are explained in detail first, with methods of cleaning up and trimming excess veneer explained towards the end of the chapter. Cleaning up the work should not be seen as some distinct and separate activity from the process of laying the veneer – I have explained the processes separately for the sake of clarity.

EDGING MANUFACTURED BOARDS

Veneering the surface of any of the manufactured boards leaves the edges exposed, making it obvious that the veneer has been laid over it. These exposed edges need to be disguised with some form of edging.

The simplest, but most vulnerable to damage and lifting, would be veneer

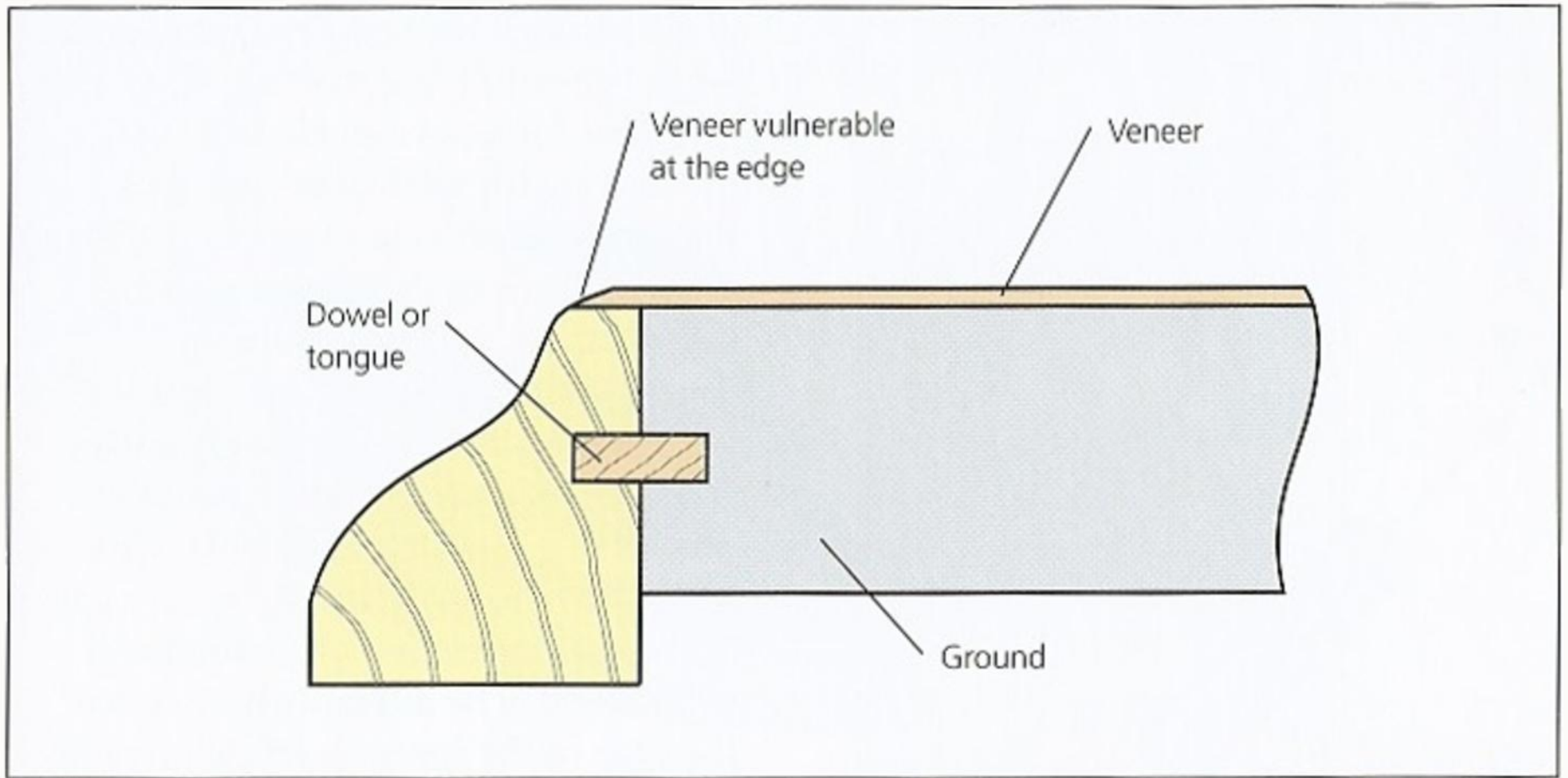
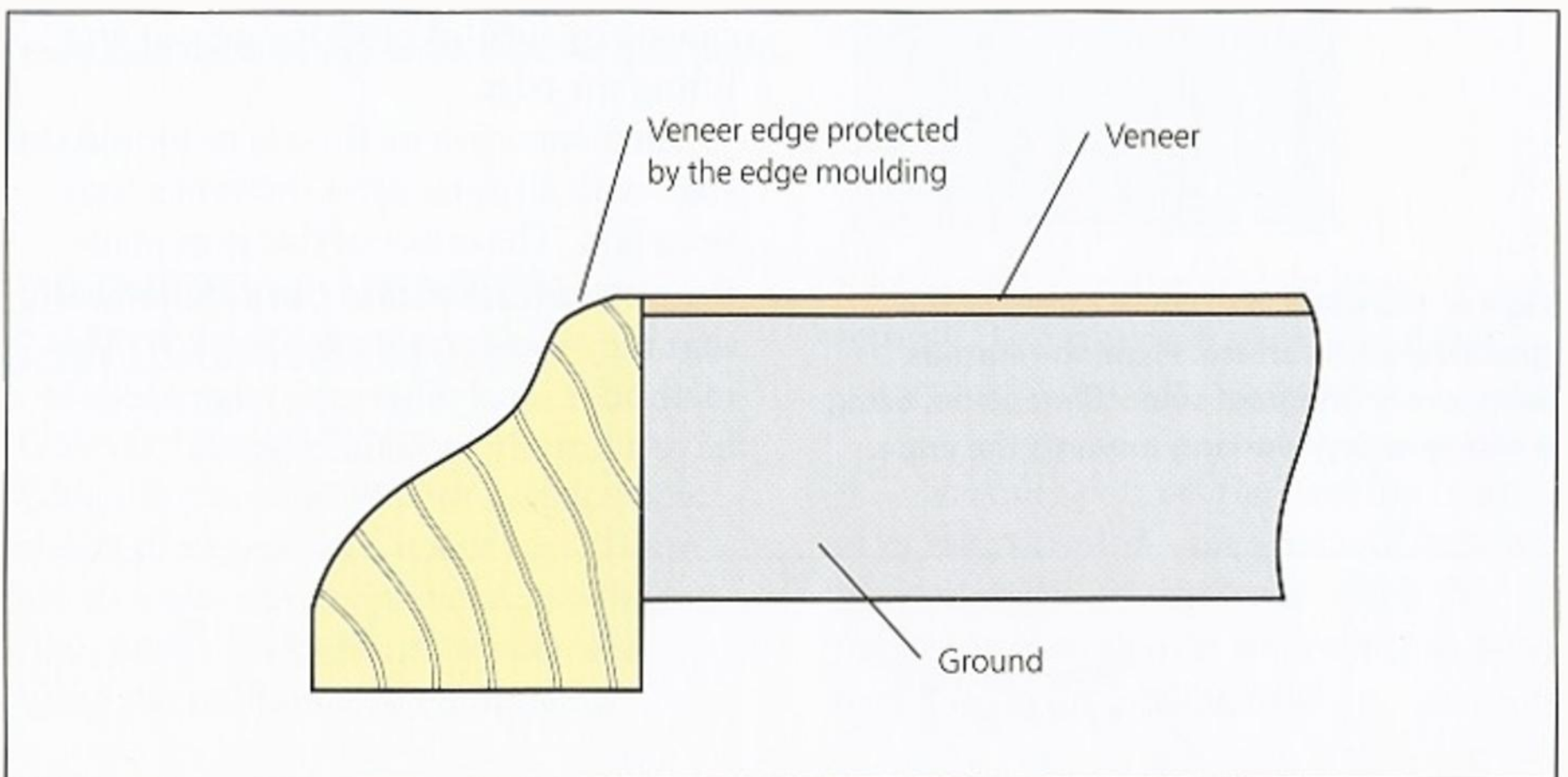


Fig 4.6 An edging can be glued, pinned, dowelled or tongued into the groundwork.



4.7 Adding an edge moulding after laying the veneer offers better protection for the veneer's edge.

glued along the edge. There are better and more secure means of edging the groundwork.

A solid wood edging may be pinned or glued to the edge before the veneer is laid (*see* Fig 4.6). This is usually the same species as the veneer to give the impression of solid wood. The difficulty with this is that the edge of the veneer itself remains vulnerable. Figure 4.7

shows how this can be overcome: the veneer can be laid first and the edge moulding added afterwards. This protects the edge of the veneer, but it is obvious that the work is veneered. Considerable care is needed because the edging must remain flush with the veneered surface and this may require some light planing with a smoothing plane. The big danger is that you may

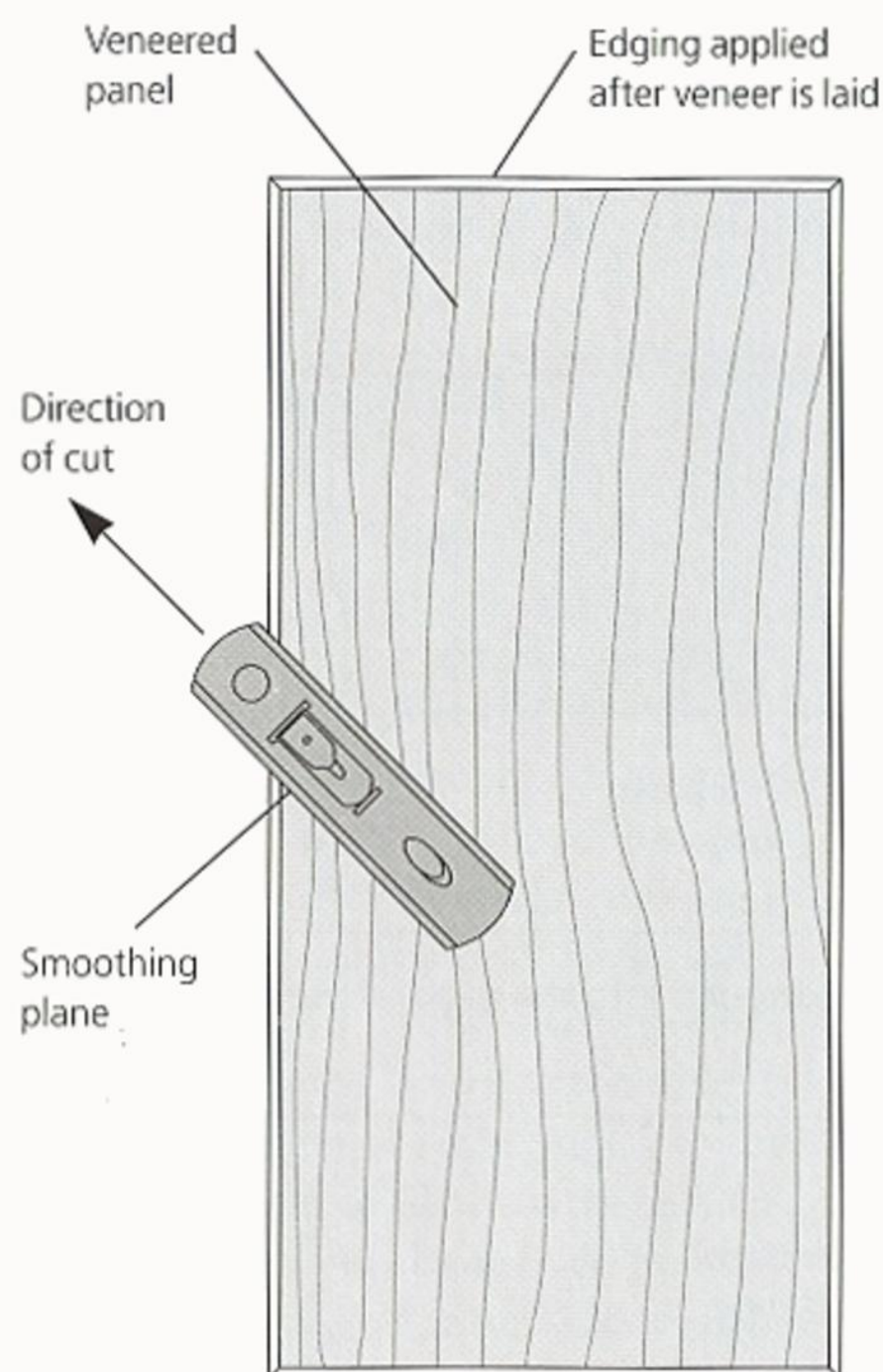


Fig 4.8 The edge may stand proud of the groundwork's surface. Plane the surplus with a very finely set smoothing plane, using a slicing action working towards the edge.

plane through the veneer to the groundwork beneath. I find that it is best to set the plane for an extremely fine cut (i.e. the shaving is translucent and as thin as the brown outer skin of an onion). Plane the surplus from the edging with a slicing action, working from the veneered side outwards (*see* Fig 4.8).

Alternatively, for thicker groundwork, the edging could be fitted with dowels or a tongue and groove. With these the veneer will reach the very edge, giving the impression of a completely solid board. The difficulty here is that the edge of the veneer is left vulnerable. Edges are particularly difficult and if any part of the veneer hasn't bonded properly, it is often here. This can be caused by surplus glue oozing out and lifting the edge.

An alternative method is to mould the edge with a router after the veneer has been laid. The effect of this is to make the veneer feather into the moulding so that they look as one (*see* Fig 4.9). This method is ideal where the edge needs to have a heavily moulded shape.

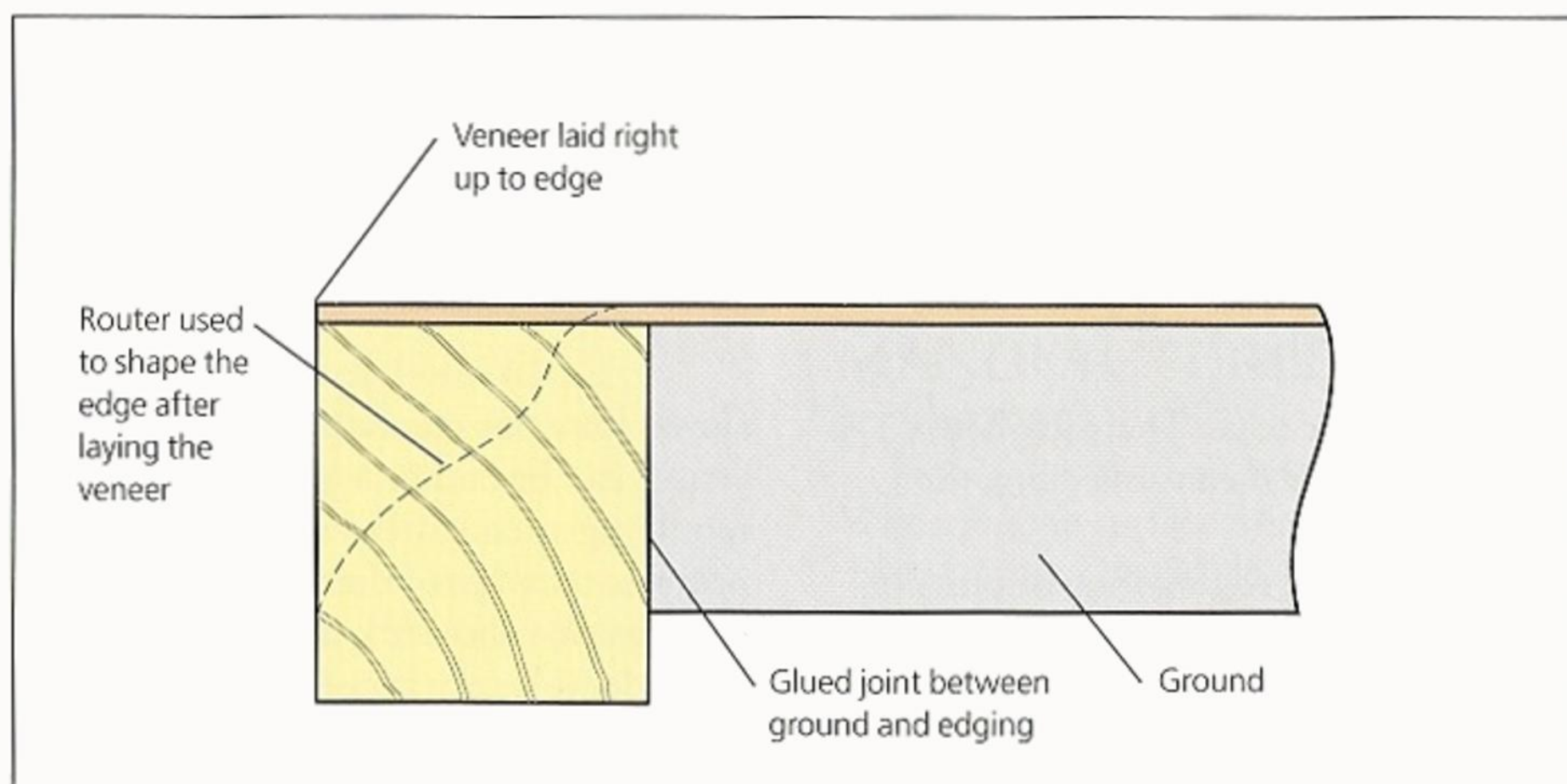


Fig 4.9 For shaped mouldings of the edge, it is better to fit the edging unshaped, and create the moulding with a router, after laying.



Fig 4.10 Transferring the glue from glue film to the groundwork. The iron is moved slowly over the paper backing to ensure that the glue melts.

PRINCIPAL VENEER LAYING METHODS

USING GLUE FILM

Glue films are suitable for laying single sheets of veneer on flat surfaces. There are two ways of laying veneer with glue film, both of which can be achieved using the minimum of equipment.

Method 1

- 1 Prepare the groundwork and veneer.
- 2 Cut a piece of glue film slightly larger than the groundwork.
- 3 Place the shiny (glued) side of the paper onto the groundwork and run a warm iron over the whole surface to melt and transfer the glue from the paper to the groundwork (see Fig 4.10). The heat setting of the iron should be that for silk (i.e. the middle heat setting). Use some pressure and move the iron slowly over the paper.
- 4 Carefully peel off the backing paper after it has cooled – the glue will remain bonded to the groundwork. Keep the paper for placing over the veneer as you iron it onto the groundwork.
- 5 Cut the veneer slightly oversize to allow for trimming and cleaning up afterwards.
- 6 Lay the veneer over the glued surface and moisten it slightly to keep it pliable, and to prevent the veneer shrinking as it is heated with the iron.
- 7 Place the glue film backing paper over the veneer and, working from the centre outwards, slowly run the iron over it, using some pressure, to remove



Fig 4.11 As the iron melts the glue, use a veneer hammer to press the veneer down, applying pressure from the centre out.

the air and ensure good contact with the glue. It is important to work slowly to ensure that the glue melts, and to work outwards from the centre to ensure that air is not trapped beneath the veneer. The heat setting should be the same as before. To improve bonding, use the veneer hammer to rub the veneer down as the iron moves over the surface (see Fig 4.11). The hammer can be held in a variety of ways, depending on the preference of the worker. This is my preferred method as it allows considerable pressure to be exerted.

8 Clean up and trim the veneer.

Method 2

- 1** Prepare the groundwork and veneer. Cut a piece of glue film slightly larger than the groundwork.
- 2** Carefully peel the film of glue from the backing paper, keeping it intact.
- 3** Place this film over the groundwork, removing any wrinkles so that it lies flat.
- 4** Lay the veneer, cut slightly oversize to allow for trimming and cleaning up, over the film of glue and moisten it slightly.

5 Iron the veneer down onto the groundwork, covering the whole surface, working slowly from the centre outwards. The iron should be on the middle heat setting, as for silk. As the iron moves over the surface, rub the veneer down with the veneer hammer, to improve bonding.

6 Clean up and trim the veneer (*see* page 68).

USING CONTACT ADHESIVES

Contact adhesives are a convenient way of laying a single sheet of veneer over a flat or shaped surface. No heat is required, but there is no room for error. Both the groundwork and veneer are coated with adhesive (*see* Fig 4.12), which is spread evenly, using a serrated spreader (usually supplied with the adhesive). The glue must be left to dry for about 15 minutes (depending on the instructions that accompany it) before laying the veneer. When the two glued surfaces come into contact with each other, they will bond immediately (hence the term 'contact' adhesive). This can cause problems if you do not position the veneer absolutely correctly at the first attempt, which is difficult if you are laying a large sheet of veneer. To overcome this potential difficulty, the method to adopt is called the 'slip sheet' method. In this, a piece of thick, smooth paper, such as brown parcel paper, is placed over the groundwork, without applying any pressure. The veneer is then gently laid over the paper and positioned carefully, again without applying even the slightest amount of pressure. The paper forms a barrier between the two glued surfaces. When you are satisfied that the veneer is positioned correctly, you can start to



Fig 4.12 Spread a thin, even coat of contact adhesive over the veneer and the groundwork. A serrated spreader is provided with the adhesive.



Fig 4.13 The slip method prevents premature bonding of the veneer to the ground, giving much more control over the process.

gently slip the paper out, rubbing down the veneer onto the groundwork with a veneer hammer or roller as you do so (*see* Fig 4.13).

HAMMER VENEERING

The term 'hammer' is something of a misnomer for this method of laying veneers. The veneer hammer is used to press the veneer against the ground-work. In hammer veneering, pearl glue is used, as its ability to 'grab' the veneer makes it unnecessary to use a press. The technique cannot be used with other adhesives, although, as described above, you can use a hammer to rub down a veneer when using a contact adhesive or glue film. However, there you are laying veneer as a single sheet – it is impractical to make joints between adjacent veneers using these adhesives. Pearl glue allows you to make joints (*see* page 56), because the glue can be re-heated as required while you work.

advantage of viewing the work as it progresses. With a veneer press of any description, once the work is placed in the equipment it remains hidden from view until it is removed. Occasionally, the veneer can slip as pressure is applied (although there are ways to minimize this risk), but when using the hammer, you can build up fairly complex patterns, such as quartering and cross-banding (*see* Chapters 5 and 6), and you are able to correct mistakes as you go along.

Readers familiar with pearl glue may be conscious that there is generally a need to work quite quickly, as the glue gels rapidly. In this method of veneering, the gelling is an advantage because rather than you being forced to work

PROBLEMS WITH HAMMER VENEERING

There are several errors to be avoided when using this method of laying veneers:

- Excess glue can make the work a little lumpy, so it will need to be squeezed out.
- Stretching the veneer during laying is something that ought to be avoided. Stretched veneer has a tendency to shrink again as it dries out, and this can cause joints between veneers to open. If too

much glue is used, you run the risk of stretching the veneer in the attempt to squeeze out any surplus.

- The consistency of the glue is critical (*see* Chapter 1, pages 14–15). If it has too thick a consistency, it is difficult to spread a thin layer over the ground and, if you do need to 'hammer' out surplus glue, it does not flow quite so easily, so there is a greater risk of stretching the veneer as more force is applied.

After reading what to avoid, you may have the impression that this method is fraught with difficulty, but that is not the case. Hammer veneering is an easy method to master and has a number of positive advantages. No special equipment is necessary, and you have the

quickly, hammer veneering allows you to take your time. There is no need to rush! Pearl glue can only bond when surfaces are brought into contact while the glue is hot and fluid. When veneering, it is often necessary to spend time positioning the veneer before making the bond.

Allowing the glue to chill and gel allows you to place the veneers onto the groundwork without the danger of premature bonding.

Where there is a need to join veneers, either for a decorative effect or for the more practical reason of covering an area wider than the veneer itself, this is done during the laying process. You cannot pre-joint veneers prior to hammer laying.

Laying a single sheet of veneer

1 Spread a thin, even layer of glue over the prepared ground (see Fig 4.14). The glue will gel fairly quickly, but this does not matter. In fact, it can be an advantage to let the glue set before placing the veneer on the ground because it allows you to move it over the surface to ensure perfect placement. The glue will be re-heated and liquefied with a clothes iron when it is time to lay the veneer.

2 Position the veneer, which should have been prepared and cut to shape and size with a small overlap to allow for trimming on the groundwork after the glue has cooled and gelled. The veneer will not stick to the cold glue, so you can reposition it if necessary. Ensure that there is a slight overlap all round the groundwork.

3 Lightly moisten the surface of the veneer to make it more pliable, and place a sheet of clean brown wrapping paper over the veneer. The purpose of the paper is to form a protective barrier between the veneer and the iron used to heat and melt the glue. The paper also makes it easier for the iron to slide over the surface.



Fig 4.14 Brush a thin layer of glue over the groundwork and allow it to cool and gel.



Fig 4.15 A sheet of paper between the veneer and iron will protect the iron from contamination, and at the same time reduces the friction on the sole of the iron.



Fig 4.16 Use the veneer hammer to press the veneer down onto the groundwork.

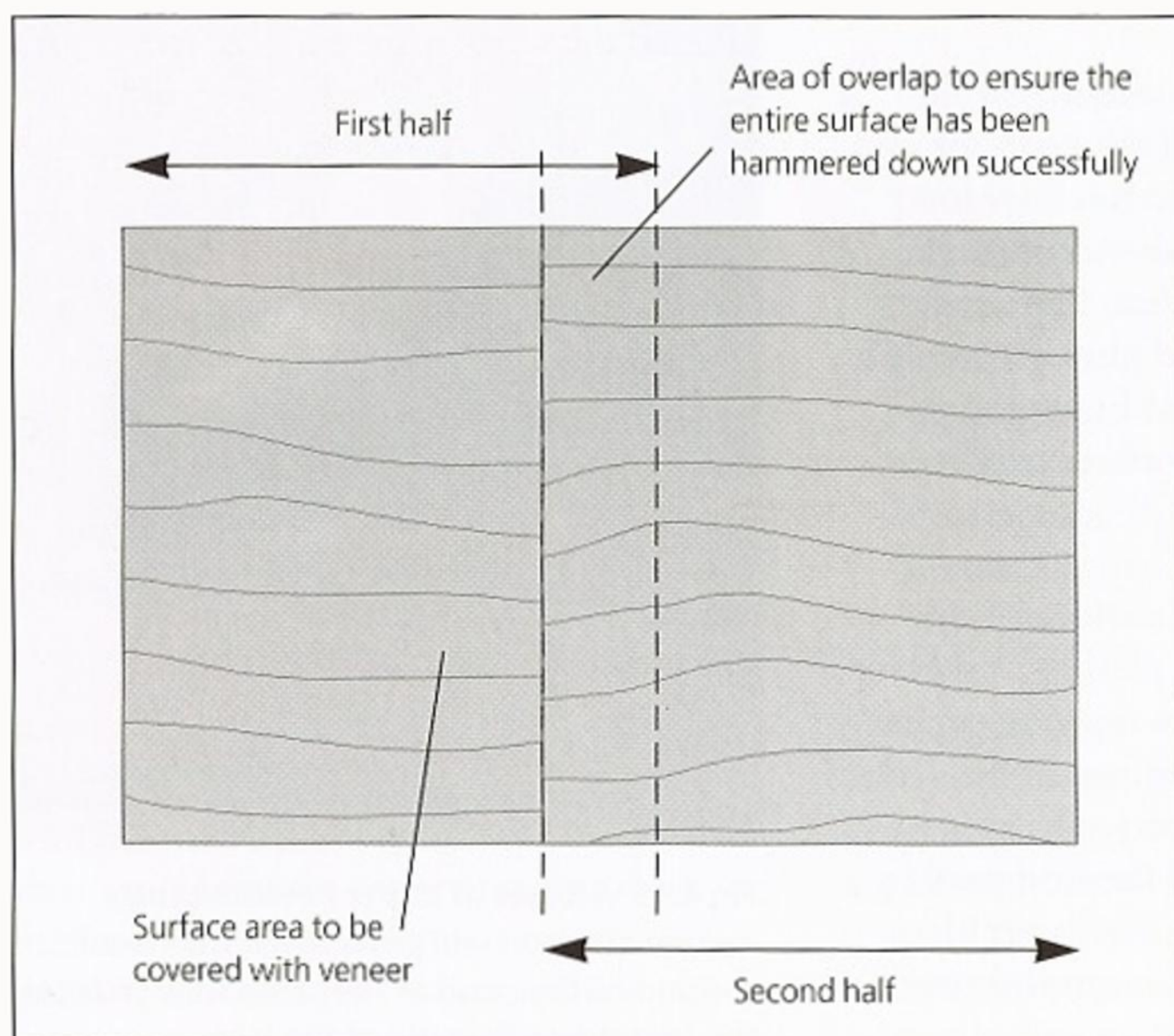


Fig 4.17 Larger surfaces can be tackled in two halves. Note the area of overlap to make sure that no area is missed out.

The area is divided into quadrants, each being tackled in turn

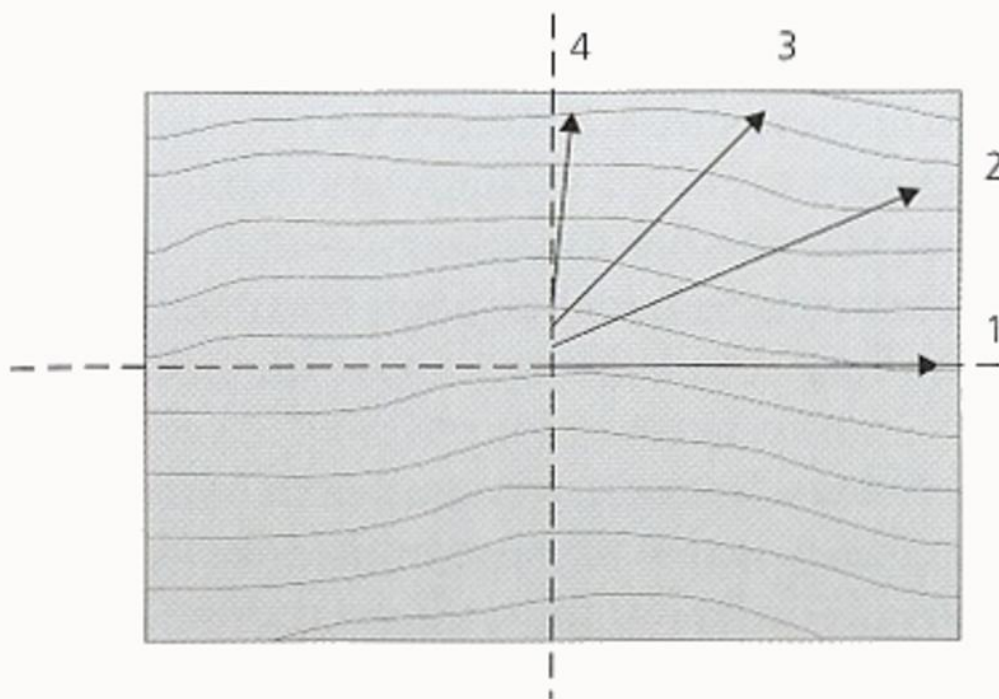


Fig 4.18 Working the veneer hammer over the surface. The numbers show the order of the strokes.

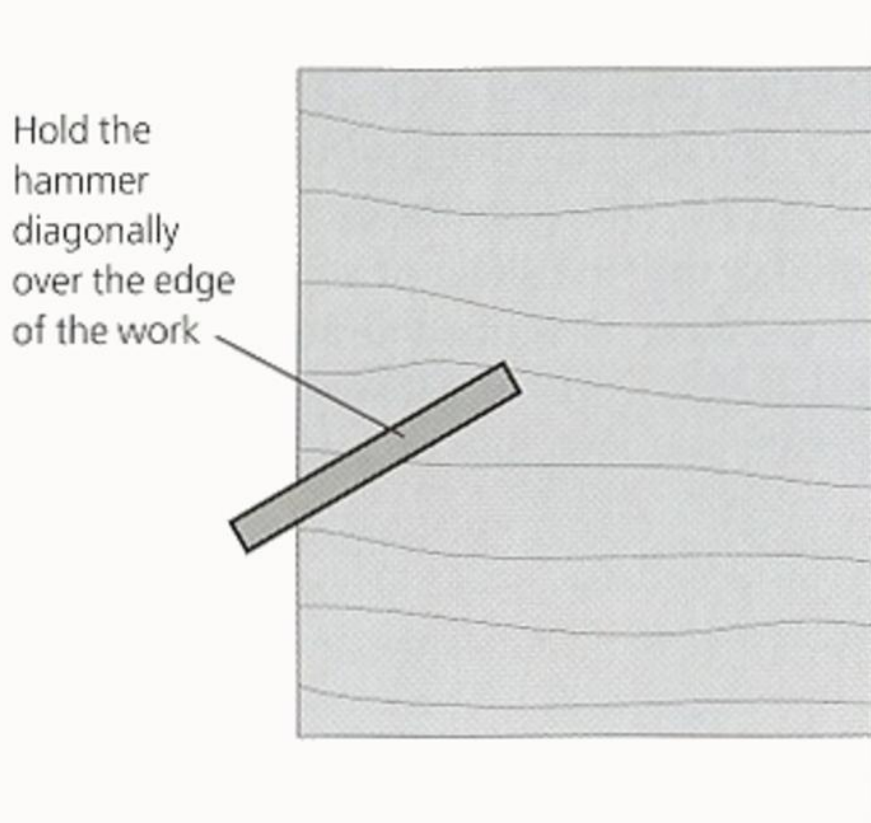


Fig 4.19 Placement of hammer for pressing down veneer at the edges of work.

4 Pre-heat the iron to its medium setting, and work it slowly over the surface of the brown paper so that the heat melts the glue on the groundwork. (See Fig 4.15.)

5 After heating the veneer and glue, remove the paper and use the veneer hammer to press down the veneer while the glue is still warm and liquid. If the

piece is fairly large, this is best done in sections. It is difficult to define what is large because this will depend on the worker's preference and skill: the key question is, how large an area are you able to lay while the glue remains warm and liquid? When the iron is removed, the glue will remain liquid for only a limited period, and the veneer will not stick to the ground if the glue cools and sets again. This is why the process is more manageable if it is worked in sections. (See Fig 4.17.)

To press down the veneer, press the brass strip against the veneer surface and stroke the veneer from the centre outwards. (See Figs 4.16 and 4.18.) Use sufficient pressure to force out any air bubbles and glue pockets, and press down any curled edges, but not so much as to crease or stretch the veneer.

Take care at the edges: the hammer should be held diagonally to ensure that while pressure is applied here, the hammer does not fall off and damage the veneer. (See Fig 4.19.) If you have divided the work into sections, treat each section separately, heating and rubbing down one at a time.

6 Stubborn edges or bubbles can be treated by local re-heating and rubbing down. If you have used the correct amount of glue, only a small amount will have oozed out at the edges.

7 Clean up and trim the veneer (see page 68). If you have used too much glue you can remove some of the excess that oozes out from the edge to make cleaning up easier later. You will need to wait awhile until the glue has gelled very firmly, at which time you can literally peel it away from the edge with a small chisel or knife. However, take care not to damage the veneer.

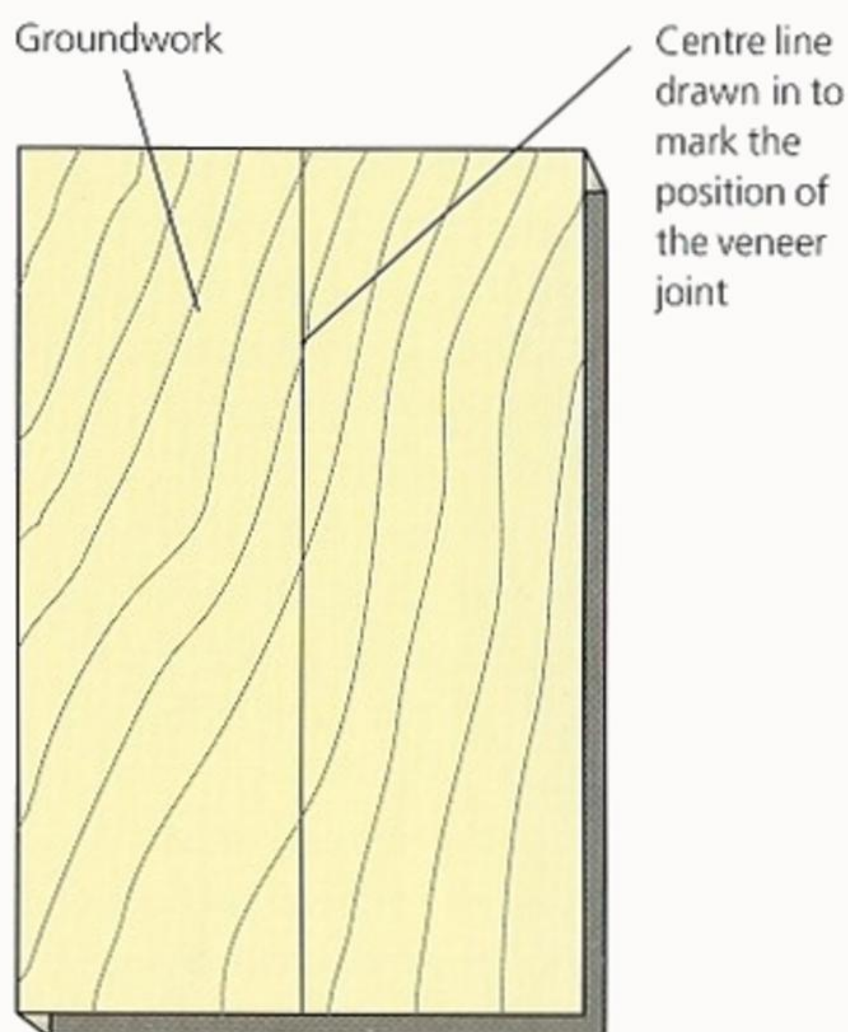


Fig 4.20 Marking the position of a veneer joint on the groundwork.

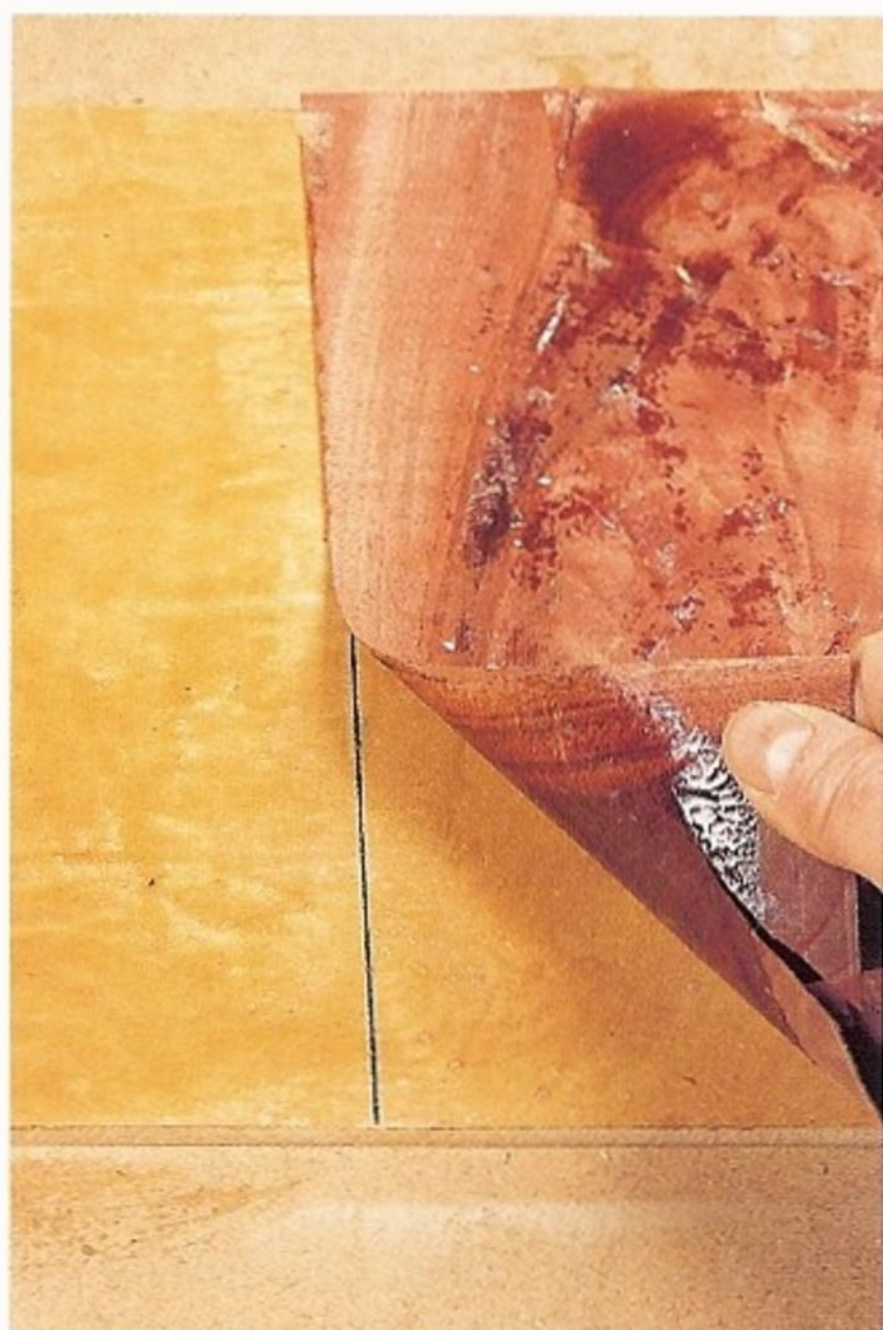


Fig 4.21 The first piece of veneer is laid as before so that the internal edge overlaps the line drawn to mark the joint.

Making a joint

On occasion, there may be a need to increase the width of a veneer by joining two or more sheets. This may be necessary to cover a groundwork that is too wide for one sheet, or for a decorative effect, such as book-matching (see Chapter 6).

1 Draw a line on the groundwork to mark the position of the joint. In most cases this will be at the centre of the groundwork if two veneers are being joined (see Fig 4.20). If more than one joint is needed, position them at equal distances from each other. For example, if three sheets of veneer are used, divide the groundwork into thirds and draw the two joint lines.

2 Apply glue over the entire surface and lay the first sheet of veneer as for a single sheet, described above, with the edge of the veneer overlapping the drawn joint line (see Fig 4.21).

3 Place the second sheet on the groundwork so that it overlaps the first veneer at the joint line, and lay this sheet. Note, in Fig 4.22, that the overlapping area of veneer has been hammered down as well.

4 To make the joint, lay a straightedge at the centre of the overlap and hold it in place with small clamps. Use a veneer knife to cut through the overlapping veneers (see Fig 4.23). It is essential that this is done with one cut only as two or more cuts will increase the risk of producing an open joint. The veneer is damp because of the glue, so it is easy to cut through the two sheets.

Remove the straightedge, and carefully remove the top, waste veneer.

The lower strip of veneer can then be removed by gently peeling back the top veneer and lifting out the waste, using a chisel or sharp blade to ease it off the ground (see Fig 4.24).

5 Finally, hammer the edges of the joint down and tape them to prevent the joint opening as the glue dries. (See Fig 4.25.) If you are working with a large area, it may be necessary to re-heat the glue at the joint before hammering down.

Veneering shaped work

Simple shapes, for example, the rail of a curved table, can be veneered with the hammer. The natural ability of pearl glue to 'grab' the veneer enables the curve of the rail to be negotiated without any difficulty, including joining adjacent pieces of veneer.



Fig 4.22 The second veneer is laid so that its internal edge overlaps that of the first veneer and the line drawn making the joint.



Fig 4.23 A veneer knife and clamped straight edge are used to cut through the overlapping veneers to make the joint.



Fig 4.24 After removing the waste veneer from the top, lift the top veneer and remove the waste from underneath.



Fig 4.25 After removing the waste, iron the joint to re-heat the glue and hammer the edges down. Tape the joint to prevent it opening as the glue dries.

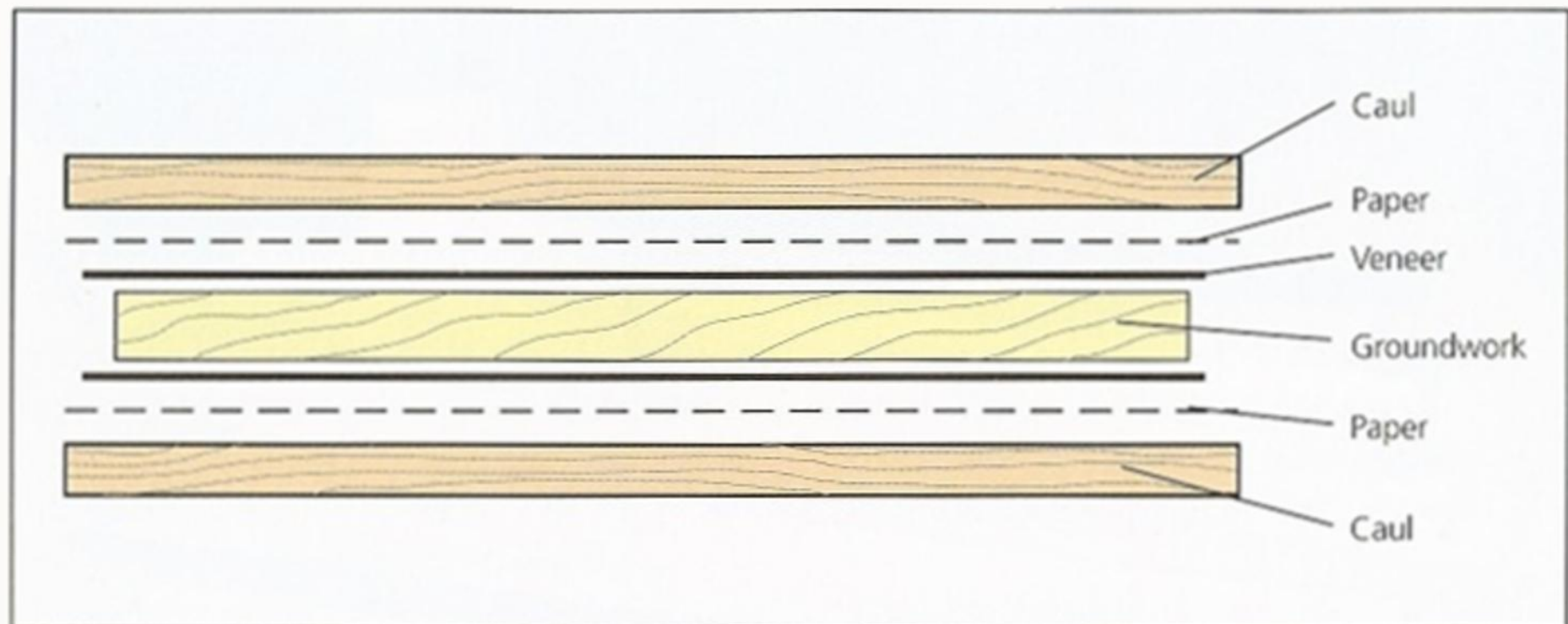


Fig 4.26 Positioning the various components in the press.

CAUL VENEERING

This is a very effective way of laying veneers on flat surfaces without expensive pressing equipment. The method can be set up for one-off work or for short production runs. The main difficulty is that caul veneering usually requires many clamps – a pair for each bearer – even for relatively small areas of work, though bolts can be substituted. The maxim that a workshop never has enough clamps is a truism for this type of work! You may need to buy or beg extra clamps. Plan your work before you lay the veneers: it is better to use more cauls than less to ensure uniformity of pressure across the whole surface.

Caul veneering can be used for any flat veneering project, including, with slight modifications, any of the built-up techniques described later in the book. The method allows for the use of most glues, and even for the use of heat to accelerate the setting time. Even pearl glue can be used, provided a means of applying heat is employed. If work is to be counter veneered, this should be done prior to laying the show and balance veneers, as a separate operation. Any joints required need to be prepared prior to laying.

Using the cauls

The purpose of the cauls is to apply even pressure over the whole surface until the glue has set. This pressure does not have to be enormous, as the purpose is simply to hold the veneer in continued contact with the adhesive on the ground. As the glue dries (or cures in the case of catalyzed adhesives, such as Cascamite) it will do the rest.

However, it is important that the veneer is placed carefully on the ground and that any air pockets are expelled by rolling the veneer down first, using a photographic roller or decorators' seam roller. (Photographic rollers can be bought from a photographic equipment shop and a decorators' wallpaper seam roller can be bought from most DIY stores that stock decorating materials.) The veneer should be rolled down to remove trapped air and excess glue, making a good contact with the glued groundwork. Roll the veneer from the centre out towards the edges, but do not stretch it.

The glues most commonly used are those that are 'cold setting', i.e. they do not require heat to make them set or bond. Pearl glue can be used for restoration work, for example, but a



Fig 4.27 Tightening the bolts on the bearers to generate pressure.

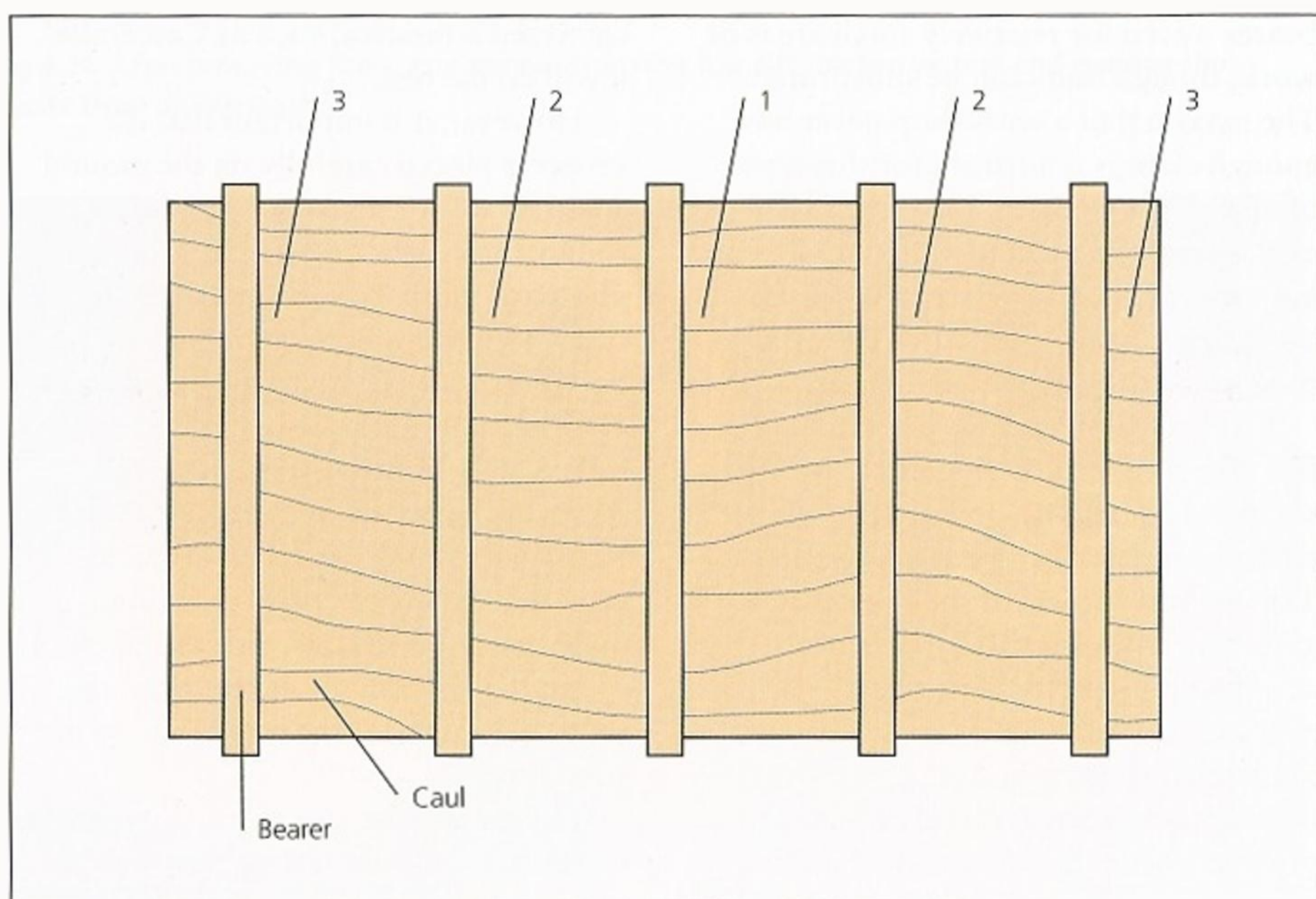


Fig 4.28 The order of cramping the bearers. This order of working ensures that pressure is exerted progressively from the centre outwards to the ends and edges.

source of heat will then be needed in the form of heated, non-ferrous metal sheets.

Figures 4.26 to 4.28 illustrate how the various components are packed between the cauls, assuming a cold setting glue is used. For the sake of simplicity, counter veneers have been excluded from the illustration, though these would have been laid before the show and balance veneers. The purpose of the sheets of paper covering the latter is to prevent the cauls from sticking to the work should any glue find its way onto the surface. Ideally, this should not arise unless too much has been put onto the ground or you have not been working very cleanly (and it is very easy to transfer glue from the ground to the veneer surface).

To apply pressure to the bearers, first tighten the middle bearer carefully, so that the curve along its lower edge applies pressure gradually from the centre of the caul towards the edge. The whole process operates by applying pressure from the centre, working outwards along the length and width of the cauls. Surplus glue, if there is any, will be squeezed out rather than be trapped and cause a lump or crease in the veneer.

The work looks a mass of clamps and

bearers when everything has been completed! For larger pieces it is useful to have a helper, working on the opposite side from you. This speeds up the process and also helps to ensure that pressure is applied evenly, as you synchronize the clamp tightening. The work should be kept under pressure overnight before being released and cleaned up (*see page 68*).

Using pearl glue

Pearl glue cannot be used for the 'cold' pressing method described above, but it can be used with the caul press if some means of heating the glue is provided. This is usually in the form of a lightweight sheet of non-ferrous metal (ferrous metals will rust with the moisture, and may stain the work), heated until it is just about bearable to hold, and positioned between the sheet of paper and the caul, as shown in Fig 4.29. Remember, you will need two metal sheets if you are veneering both sides. It can be a cumbersome process and really does require a helper if the work is large. A heated metal sheet can also be used to shorten the setting time of cold setting glues (e.g. PVA, Cascamite), thereby reducing the time needed to keep the work in the press.

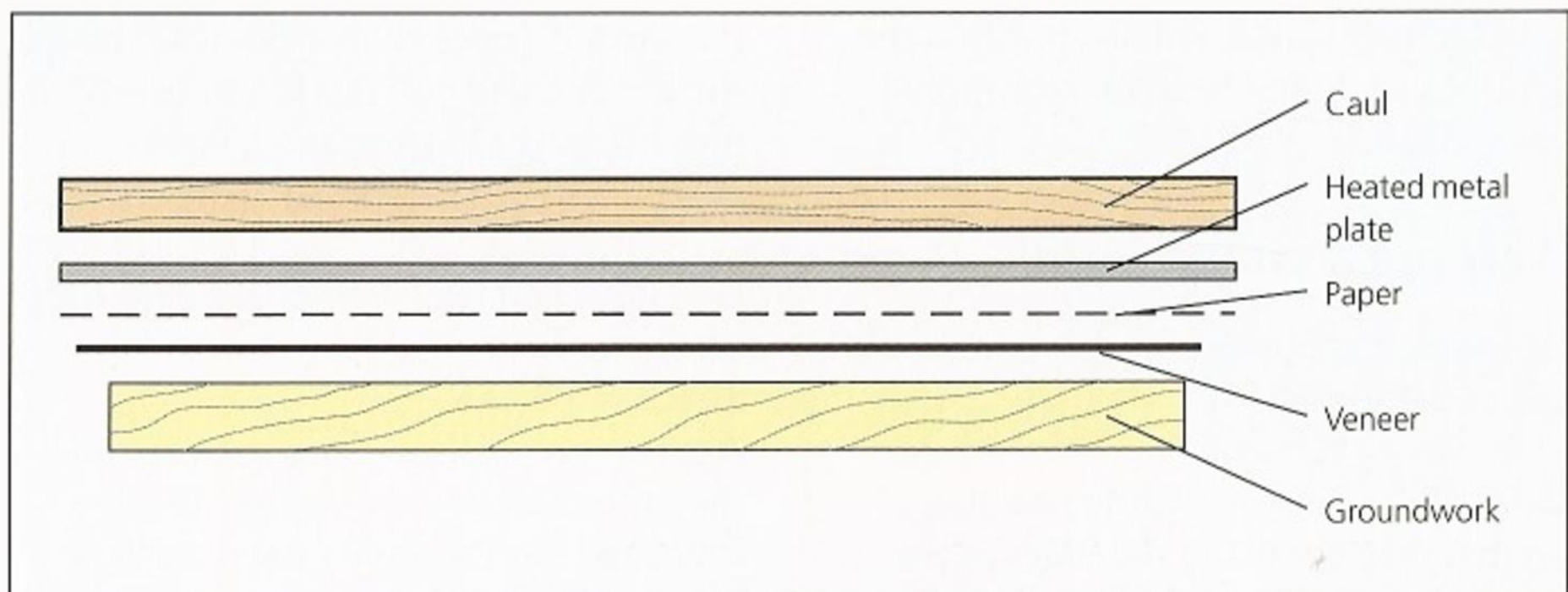


Fig 4.29 A heated, non-ferrous metal sheet is used to lay veneers with pearl glue.

The use of heat is an added complication, and there is a limited need for it now that we have reliable cold setting adhesives. However, authentic restoration work will require this method of laying veneers, especially for complex built-up patterns (such as marquetry or parquetry) that cannot be laid using the hammer method. Where joints are required in the work, these must be prepared prior to laying.

Some means of heating the metal sheets needs to be devised (e.g. using a hot air gun or an oven set on a low temperature if the metal is small enough) and the temperature should not be so high as to scorch the veneer or generate steam. Speed is required to prevent the sheets cooling down before they are placed on the work – hence the helper. Paradoxically, pearl glue gives you more time for positioning as it can be applied to the ground and allowed to chill and gel, at which point there is no great urgency. The same cannot be said of PVA, which will begin to set fairly soon after application (depending upon ambient air temperature). Therefore, plan the work so that the ground is glued, the veneer placed in position and covered with a single layer of paper (to prevent the metal sticking to the veneer), and the metal sheet laid over this as quickly as possible. Finally, position the wooden cauls and bearers, and apply the clamps.

Making a simple joint

- 1 Mark the position of the joint on the groundwork.
- 2 Cut the veneers slightly oversize so that they overhang the edges of the groundwork. This will allow for trimming after laying.
- 3 Cut the joining edge on each sheet of veneer, using a straightedge and a knife. The edges may look close when you put them together, but for high quality work, they should be planed on the shooting board as well, to get them perfectly true. The two veneers should be placed one on the other and planed together to ensure that both edges are identical.
- 4 Place the veneers side by side, holding the joining edges in close contact, and tape the joint together, both across the joint, to hold the edges together, and along it. Take care not to pull too hard on the tape, as this will cause the veneers to buckle. There is no need to keep the joint under tension – it is sufficient to simply hold it together closely.
- 5 Draw heavy lines on the groundwork, corresponding to the position of any veneer joints, and use these as markers when placing the veneer on the ground prior to laying. Even with glue on the groundwork, these lines will be visible. Occasionally, the veneer will slip a fraction as pressure is applied on the bearers so, if exact positioning of the veneer is vital, you should drive several veneer pins into the work, and pinch these off at the surface so that they do not stand proud. When the work is removed from the caul press, use a very small nail punch to push the pins below the surface and a little stopping to fill the very small holes.
- 6 Clean and trim veneer (*see* page 68).

SCREW PRESS

A screw press allows both surfaces of the ground to be veneered at the same time, and has the ability to create very high pressure. Whatever form of press is used, pressure need only be applied

for the duration of the glue's setting time. In industrial terms, this time is a problem as the machine is tied up until the glue has set. Clearly, the longer this takes, the less productive the press will be. For this reason, companies whose main business is preparing veneered panels use heated presses that set the glue in a fraction of the time it takes to set at room temperature, and use resin glues specially formulated to cure quickly with heat. A small screw press is a useful addition to the home workshop, but commercial shops are called upon to produce veneered work on a regular basis so, for them, a larger press is indispensable. The principle for both is the same, except that the pressure plates in the commercial press are in sections, which allows the pressure to be applied in the centre first, then at the ends.

Veneers are prepared for the screw press as for the caul press, with pre-jointing of sheets and lines drawn on the groundwork corresponding to the position of any veneer joints.

Balance and show veneers are laid at

the same time, with paper placed between the plates of the press and the veneer to prevent sticking.

It is a common belief that there is a need to apply very great pressure to ensure bonding of the veneer to the groundwork. This is not so. In fact, excessive pressure may cause difficulties if too much glue has been used, as lumps will form where the excess glue has been unable to escape. The general rule of thumb is to use a very thin layer of glue on the groundwork and enough pressure simply to maintain close contact. The glue will do the rest. As in caul veneering, both sides of the groundwork can be veneered at the same time. If you are using a counter veneer, remember to lay it on both sides, as a single operation, before laying the balance and show veneers.

SAND BOX

This is a very old technique, now superseded by the vacuum press. Nonetheless, if the veneering of shaped work is not a routine and regular operation, this technique is very useful.



Fig 4.30 A sand box suitable for veneering the shaped groundwork.



Fig 4.31 The groundwork is pressed into the sand, under the pressure of cramps, to create a reverse profile. In effect, the sand will act as a shaped caul.

As far as authentic restoration work is concerned, where the use of pearl glue is the essential part of the process, the sand box remains an important means of veneering shaped work that cannot be tackled with the veneer hammer.

Dry silver sand is packed into a 'box' or other large, open container (see Fig 4.30). The sand can be warmed in an oven – to about 193°F (75°C) – if pearl

glue is used, or if you want to speed up the setting time of resin glue.

Cross veneering with the sand box

Cross veneering, with the grain of the veneer running across the width of the groundwork rather than along its length, was popular during the reign of

William and Mary, and so is a useful method for restoration work. The example illustrated in Figs 4.31 and 4.32, shows cross veneering.

1 Press the object to be veneered into the sand and hold it with cramps to make an impression of its profile in the sand (*see* Fig 4.31). It is important to form this contour in the sand before you attempt to lay the veneer, because the sand will act as a shaped caul.

2 Remove the piece from the sand and prepare it to receive the veneer (*see* pages 42–4).

3 Prepare the veneer and cut a little oversize to allow for trimming and cleaning up (*see* Chapter 3). Prepare any necessary joints.

4 Glue the groundwork. (If the sand has been heated for using pearl glue, it will retain heat for a long time, so there is less urgency about the process, but it is

still advisable to prepare the veneer first before gluing groundwork.)

5 Place the veneer carefully on the groundwork and hold it in place with veneer pins. If possible, use the veneer pins on areas that will form waste. Alternatively, moisten the veneer, press it into the sand profile with the groundwork cramped over it to hold it in position and help form the shape, and leave it to dry for a couple of hours. When you release the pressure, the veneer will have taken on the shape of the groundwork (*see* Fig 4.32). This ‘pre-forming’ of the veneer makes it easier to position the veneer on the ground for gluing.

6 Apply glue to the groundwork, carefully position the veneer on it, and press them into the sand contour, applying pressure with cramps.

7 Clean up and trim the veneer (*see* page 68).



Fig 4.32 The veneer can be ‘pre-formed’ to take on the shape of the groundwork, making it easier to glue it onto the ground later.

COMPARATIVE TABLE OF VENEER LAYING METHODS

METHOD	CHARACTERISTICS
GLUE FILM AND CONTACT ADHESIVES	Require no complex or expensive veneer pressing equipment. Suitable for laying single sheets of veneer on a flat surface, or on simple shaped work, such as the frieze of a round table top. Glue film not suitable for laying veneers on more complicated shapes with tight curves, or for laying veneers that require jointing (the veneer can be stretched and the joint opened during laying).
HAMMER VENEERING	Requires no complex or expensive veneer pressing equipment. Requires the use of pearl glue. Can be used for work that requires veneers to be jointed and for simple shaped work. There are better methods for laying more complex built-up patterns, such as quartering, but the hammer method can be used. Hammer veneering is an appropriate method for restoration work.
CAUL PRESS	A relatively inexpensive form of veneer press, ideal when using cold setting glues such as PVA or Cascamite. Only suitable for flat work, and any built-up patterns, such as quartering and cross-banding, must be jointed prior to laying. The size of the work that can be veneered by this method is limited only by the size of the cauls that can be made and the availability of suitable clamps! An ideal method for the occasional craftsman or for the small workshop where large equipment would be a problem. The method can be used for all veneering techniques, including marquetry and parquetry. In restoration work that uses pearl glue, heated cauls can be used.
SCREW PRESS	A relatively expensive and bulky piece of equipment. Small presses are ideal for marquetry work. Only suitable for flat work and normally with cold setting glues. It is possible to use intervening hot metal plates for use with animal glue (as in caul veneering). Larger veneered work will require expensive equipment that is really only suitable for commercial workshops.
SAND BOX	An inexpensive way of veneering shaped work with cold setting or animal glues. The size of the work is limited only by the size of the box you can make. Generally though, the method is used for relatively small work, such as curved cupboard doors, or veneered cornices and other mouldings. Jointing of veneers is necessary before laying (e.g. cross-banding, parquetry). If the sand is heated, pearl glue can be used, making it ideal for restoring shaped work.

REQUIREMENTS (in addition to groundwork and veneers)	
For glue film ● Glue film and its backing paper ● Clothes iron ● Veneer hammer or a roller	For contact adhesive ● Contact adhesive (e.g. Evo-Stik) ● Brown wrapping paper (i.e. the type with a shiny surface) ● Veneer hammer or a roller
● Pearl glue prepared in a double boiler or glue pot, and glue brush ● Clothes iron ● Veneer hammer	● Veneer tape (for joints) ● Brown wrapping paper ● Veneer knife and straightedge to make joints when required
● Cauls and bearers ● One pair of cramps or heavy-duty bolts per pair of bearers ● Cold setting glue (e.g. Evo-Stik Resin W or other PVA, Cascamite) ● Veneer knife and straightedge to make joints if required ● Veneer tape to secure joints	● Veneer pins ● Template to build up the veneers to a pattern where required ● Plain paper to prevent cauls sticking to the work during pressing ● Warmed zinc plates (heated cauls) to accelerate glue setting if desired
● Screw press ● Cold setting glue (e.g. Evo-Stik Resin W or other PVA, Cascamite) ● Veneer knife and straightedge to make joints if required ● Veneer tape to secure joints ● Veneer pins	● Template to build up the veneers to a pattern where required ● Plain paper to prevent cauls sticking to the work during pressing ● Warmed zinc plates (heated cauls) to accelerate glue setting if desired
● Silver sand and a retaining box (wooden is best) ● Cold setting or animal glue are suitable ● Veneer knife and straightedge to make joints	● Clamps to maintain pressure on the groundwork during pressing ● Veneer pins to secure veneers ● Veneer tape to secure any joints

CLEANING UP

Further work on the veneered object in order to prepare it for final finishing and polishing can only take place after it has been removed from the press.

However, there are two exceptions to this rule – when the work has been hammer veneered or when it has been ironed down with glue film.

Glue film has the advantage of being ‘clean’, i.e. glue does not find its way onto the upper surface of the veneer. Also, there is little, if any, surplus glue oozing from the edges so cleaning up is easy. If you leave the veneered work for half an hour or so, the glue will have hardened sufficiently to allow excess veneer to be safely trimmed away as described below. When hammer veneering, the work must be left for several hours at least before attempting to trim excess veneer from around the edge. The edges of veneered work are always vulnerable while the glue is drying and hardening. Attempting to trim the edges before the glue has had time to set may result in the edge lifting.

When the work comes out of the press, it will require cleaning up to remove any veneer tape and excess glue, and the excess veneer will also need to be removed.

To remove tape, moisten it with warm water to soften it, and peel off as much as possible. Any remaining stubborn pieces can then be removed with a blunt scraper. It should be worked along the length of the tape that is being removed. The grain direction of the veneer is not an important consideration, and the scraper can be worked in any direction because its purpose is to remove surface debris rather than smooth the veneer itself. However, do take care if a veneer joint



Fig 4.33 A self-guided laminate trimmer and router is ideal for quick and accurate removal of the excess veneer.

is a little lumpy, which sometimes happens, so as not to tear out the lump altogether. If this does happen, you will need to treat it as a blemish and fill it with wood filler, if very minor, or patch it if the damage cannot be easily masked with filler. (*See Patching a Hole, page 36.*)

Overlapping veneer at the edges can be removed in a number of ways, depending on the size and shape of the object. For small pieces, it can simply be cut off with a craft knife, and the edge gently sanded smooth. For large pieces, however, this is a laborious task, and the pieces can be difficult to handle. For these, the router is invaluable, especially for long or shaped edges.

With square and rectangular work an ordinary straight cutter is fine, when used with its fence, but where sides are not straight, a special laminate trimming cutter is required. These cutters are self-guided, in that they have a small

wheel, or guide, which rests against the edge of the groundwork, preventing the cutter from straying into the body of the work (*see* Fig 4.33).

The wheel should be held tight against the work so that the cutter trims back the excess veneer while following its perimeter. The edge can then be gently sanded to remove any roughness.

If you are trimming by hand, with a knife, trim away any pieces that need to be cut across the grain before edges where the grain is lengthways. This reduces the risk of splitting out the veneer in much the same way as when you are cutting the veneer to size prior to laying (*see* page 33).

Once the surface has been cleaned and the excess veneer trimmed and smoothed, the work is ready for sanding smooth, staining and finishing as required (*see* Chapter 9).

REPAIRING BLISTERS AND LIFTED EDGES

Occasionally, the veneer may not be properly bonded to the ground, and this leads to blisters and lifting edges.

Unfortunately, because we are unable to see what is happening inside the press, preventive or remedial action cannot be taken before the glue has had time to set: repairs must be undertaken after the event, when it is the most difficult time to do so.

BLISTERS

These may be caused by a localized lack of glue or pressure. The approach to repairing them depends on the type of glue used. In the case of pearl glue, localized heat can be used to liquefy the glue, and then pressure can be applied to the area, with a small wooden block



Fig 4.35 Splitting a blister along the grain and inserting fresh glue with an artists' palette knife.

cramped onto the surface, until the glue sets (*see* Fig 4.34). Place a sheet of paper over the veneer to prevent it from sticking to the veneered surface should any glue seep out.

In the case of cold-setting glues, such as PVA or Cascamite, the blister must be split by cutting along the grain with a veneer knife, so that fresh glue can be inserted underneath, and pressure applied to the area until the new glue sets (*see* Figs 4.35 and 4.36). Here again, paper is placed over the veneer to prevent the weight sticking to it.

If you are careful and cut directly along the grain without damaging the surface, the blister will usually glue down without difficulty. Sometimes,

the two edges of the cut don't meet, or may overlap a little. Any slight gap can be filled with a proprietary wood filler. An overlap may be a little more difficult to deal with in that you may need to sand it flat – since it won't be a large lump. If this creates a small gap, it can also be filled prior to staining and polishing.

LIFTED EDGES

These are treated in the same way as blisters except that as there is access to the ground, it is unnecessary to cut the veneer. Glue can be slipped under the edge using a fine artists' palette knife before applying localized pressure until the glue sets.



Fig 4.34 Pressing down blisters. Note the paper which prevents the wooden block sticking to the veneer.



Fig 4.36 Cramping the edge after the glue has been slipped under it.

CROSS-BANDING

- ◆ PREPARATION
- ◆ LAYING CROSS-BANDING WITH VENEER HAMMER AND PEARL GLUE
- ◆ LAYING CROSS-BANDING WITH A PRESS
- ◆ SIMPLE BUILT-UP PATTERNS

PREPARATION

There are many ways of providing additional decoration to a veneered surface: cross-banding is the most straightforward of these. Its effect is to frame a central panel of veneer and it is at its most striking when the cross-banding veneer is of a contrasting colour or species. It is also quite common to insert an intervening inlay string or banding between the main panel and the cross-banding. (See Chapter 7.)

Historically, another function of cross-banding was to act as a protection for the panel itself. Pearl glue in the early days was less reliable, and it was easier to repair a damaged cross-banding than a highly decorative and valuable veneer. Modern glues, however, are very powerful adhesives, so the protective function is far less important.

As with simple veneers, you must remember to use counter veneers and/or balancing veneers with built-up patterns, but it is not necessary to add cross-banding to these.

Cross-banding veneers are prepared from a piece of straight-grained veneer. It is usual for the grain direction to be at right angles to the edge of the central veneer panel (see Fig 5.1), but sometimes work has the grain running parallel to the panel edge (see Fig 5.2).

Using a straightedge and veneer knife, cut strips of the veneer $\frac{3}{8}$ in (10mm) wider than the eventual width of the cross-banding, making sure they are all the same width. This ensures an overlap at the edge of the groundwork to allow for trimming after the glue has dried. The internal edge that butts up against the central panel should be trued up on the shooting board with a very sharp and finely set plane. It will often be necessary to join strips of the cross-band to make up the required length, so cut and true up the edges of enough strips to go all round the work.

How the central panel of veneer is prepared depends on how the veneers will be laid. Hammer veneering and press veneering each require a different approach. In the case of hammer

veneering, the central panel is laid first, trimmed to size, and then the cross-bands are added. If the veneers are to be pressed, the cross-band and central panel are usually prepared and pre-jointed so that the whole assembled pattern is laid in one operation.

LAYING CROSS-BANDING WITH VENEER HAMMER AND PEARL GLUE

Square or rectangular work

When laying cross-banding, it may be necessary to use two or more pieces adjacent to each other. The following general method assumes that this is the case, with some modifications given for variations in design.

- 1 Prepare the central panel of veneer so that its overall size is smaller than the groundwork. The border for the cross-banding is prepared by cutting back the central panel to a fixed distance from the edge using a cutting gauge. Since the gauge has a fence that needs to be held tight against the edge of the groundwork, any excess veneer that overhangs the edge will prevent the use of the gauge.
- 2 Brush pearl glue over the groundwork in which the central panel will be laid, and allow the glue to gel.
- 3 Lay the veneer with the clothes iron and veneer hammer.
- 4 Trim the excess veneer from the central panel with a cutting gauge set at a distance equal to the width of the cross-banding. With the fence hard against the edge of the groundwork, trim

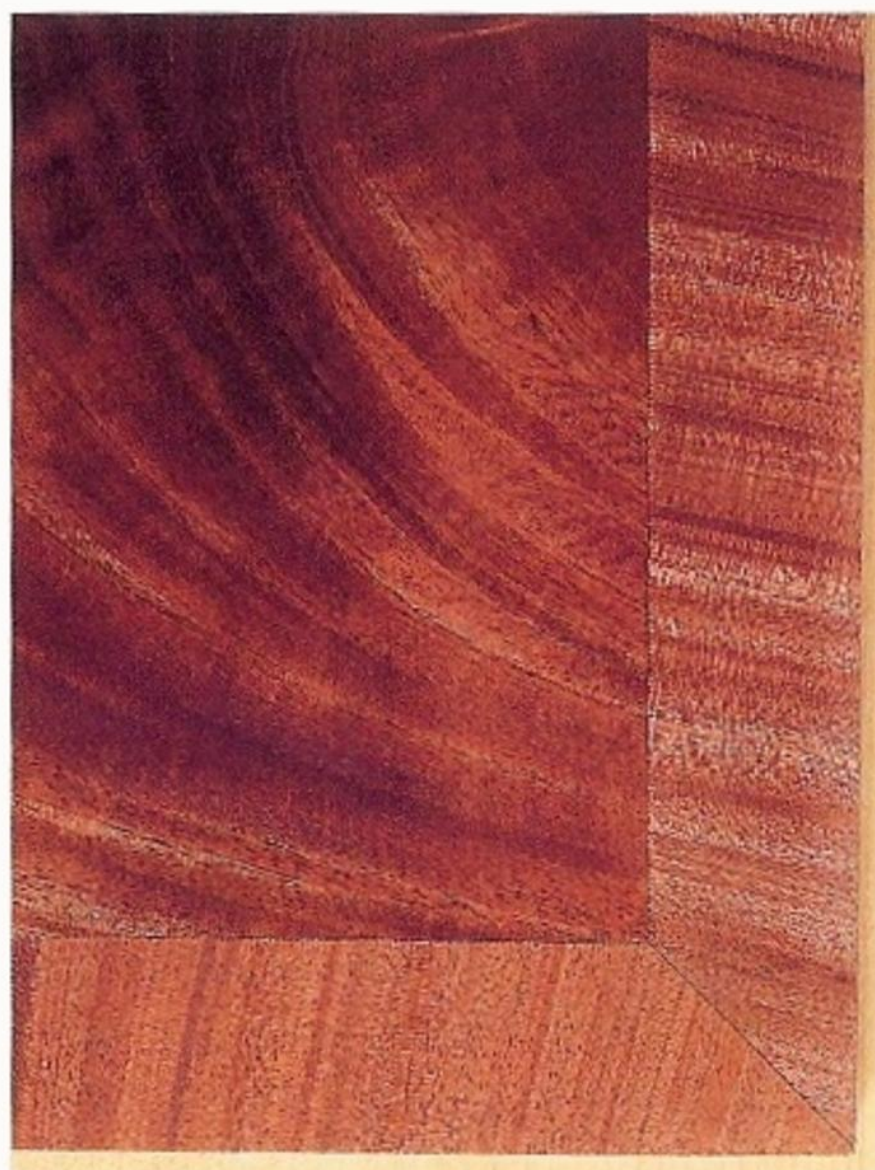


Fig 5.1 Cross-banding usually has the grain direction at right angles to the edge of the central veneer panel.

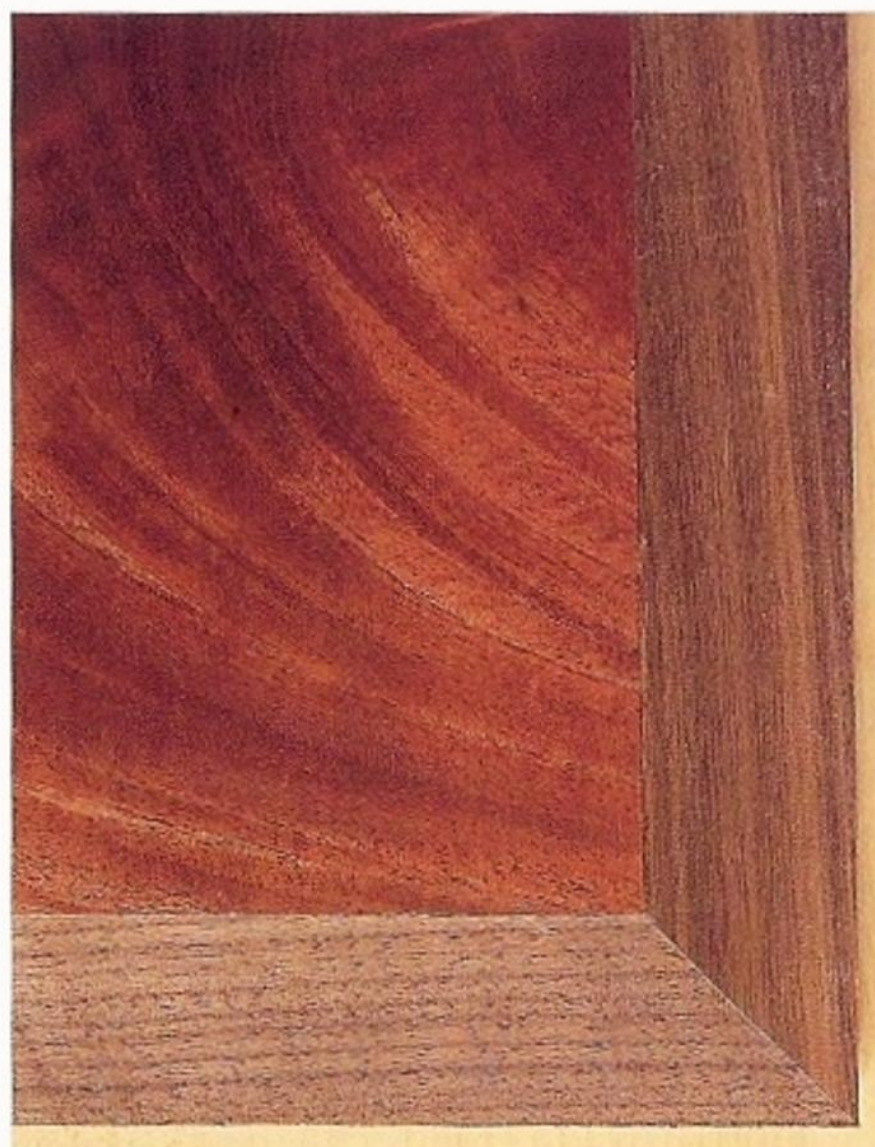


Fig 5.2 Another option is to lay the border with its grain direction running parallel to the edge of the work.

the excess veneer. This ensures that the edge of the panel is parallel with the side of the groundwork (*see* Fig 5.3). It is essential that the veneer is cut through completely in one pass if an even edge is to be made.

5 Use a chisel to lift off the waste veneer.

6 Before laying, brush a thin layer of glue over the back of the cross-banding and allow to gel. This will compensate for the glue that is removed when the veneer panel is trimmed. You should expect the veneer to curl with the heat and moisture – this is not a problem.

7 Lay the cross-banding around the edge, making a close joint with the central panel and laying each piece separately. Slightly moisten the upper surface of the cross-banding (to help counteract the curling that has taken place), position along one side of the work, butting against the central

panel, and iron it down. As the glue melts, the veneer will tend to float, so take care that it maintains a close joint. Tape the joint between the cross-banding and the panel.

If more than one piece is needed to cover the length of a side, take a second piece of cross-banding and repeat the process, but ensure that it overlaps the first piece. Make a joint in the overlap by laying a straightedge over it and cutting through both veneers in one pass, working from the outside edge towards the central panel. Tape the joint, and continue with this process until all the cross-banding has been laid.

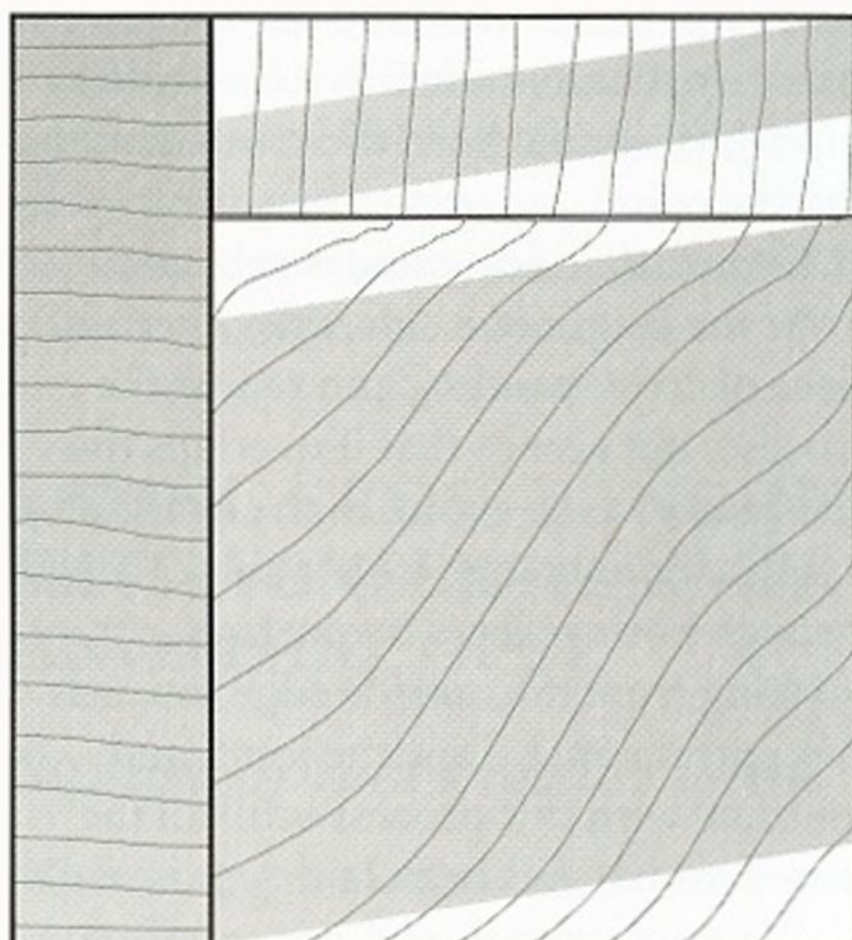
8 Make up the corners. For square corners, butt or mitre joints can be used (*see* Fig 5.4). Mitred corners provide a picture frame effect, while butt joints give the look of a frame and panel construction.

To make a butt joint, you must first decide which lengths of cross-banding will continue through from end to end.

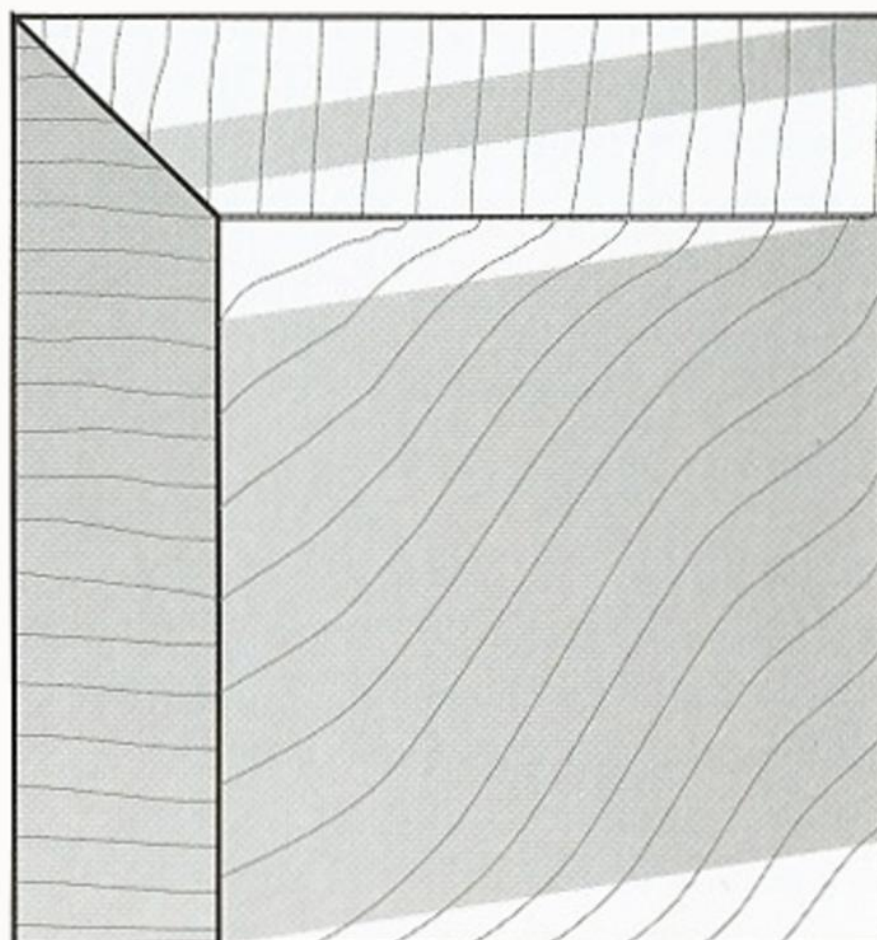


Fig 5.3 The central panel of veneer stands some way in from the edge.

Butt joint



Mitred joint

**Fig 5.4 The two main types of joint.**

These are usually those on the longest sides of the work, with the short sides butting up against them. Lay these two short sides first, making the length slightly longer than that of the central panel (*see* Fig 5.5). With a straightedge and veneer knife, trim the ends of the cross-banding so that the length of the cross-banding is equal to the width of the panel (*see* Fig 5.6). Lay both short, butting cross-bands before adding the longer ones. Tape the

joints between the cross-band and the central panel as each is completed. Lay the other two sides, again taping the joints as you go (*see* Fig 5.7).

For a mitred joint, on the other hand, adjacent sides should be cross-banded and left with the veneer overlapping at the corner (*see* Fig 5.8).

To make the mitre, use a straightedge and veneer knife to cut diagonally through both veneers at the corner,

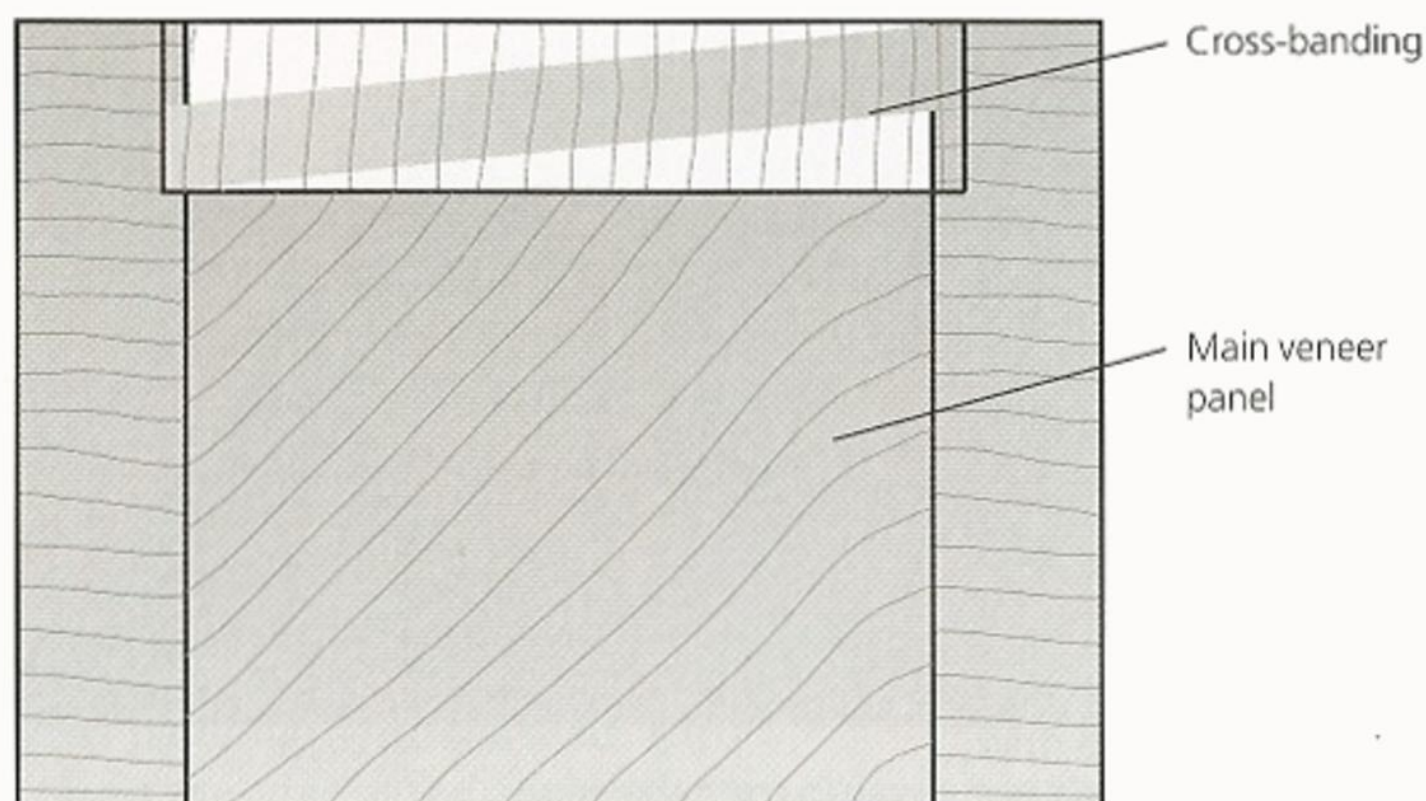


Fig 5.5 In making butt joints, the shorter sides are laid first, slightly longer than the edge of the veneer panel to allow for trimming.

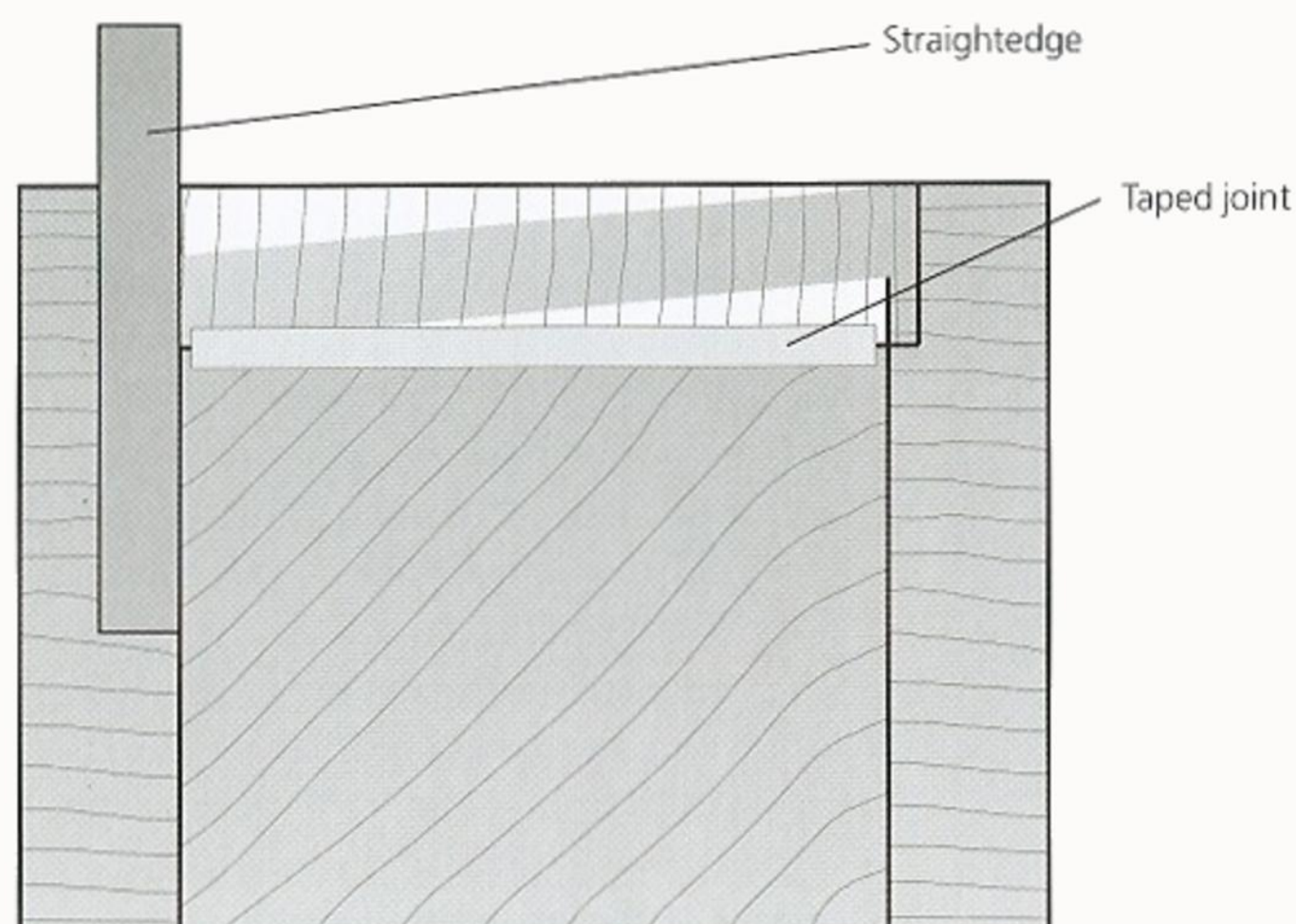


Fig 5.6 To trim the cross-banding to length, hold the straightedge against the long edge of the central panel.

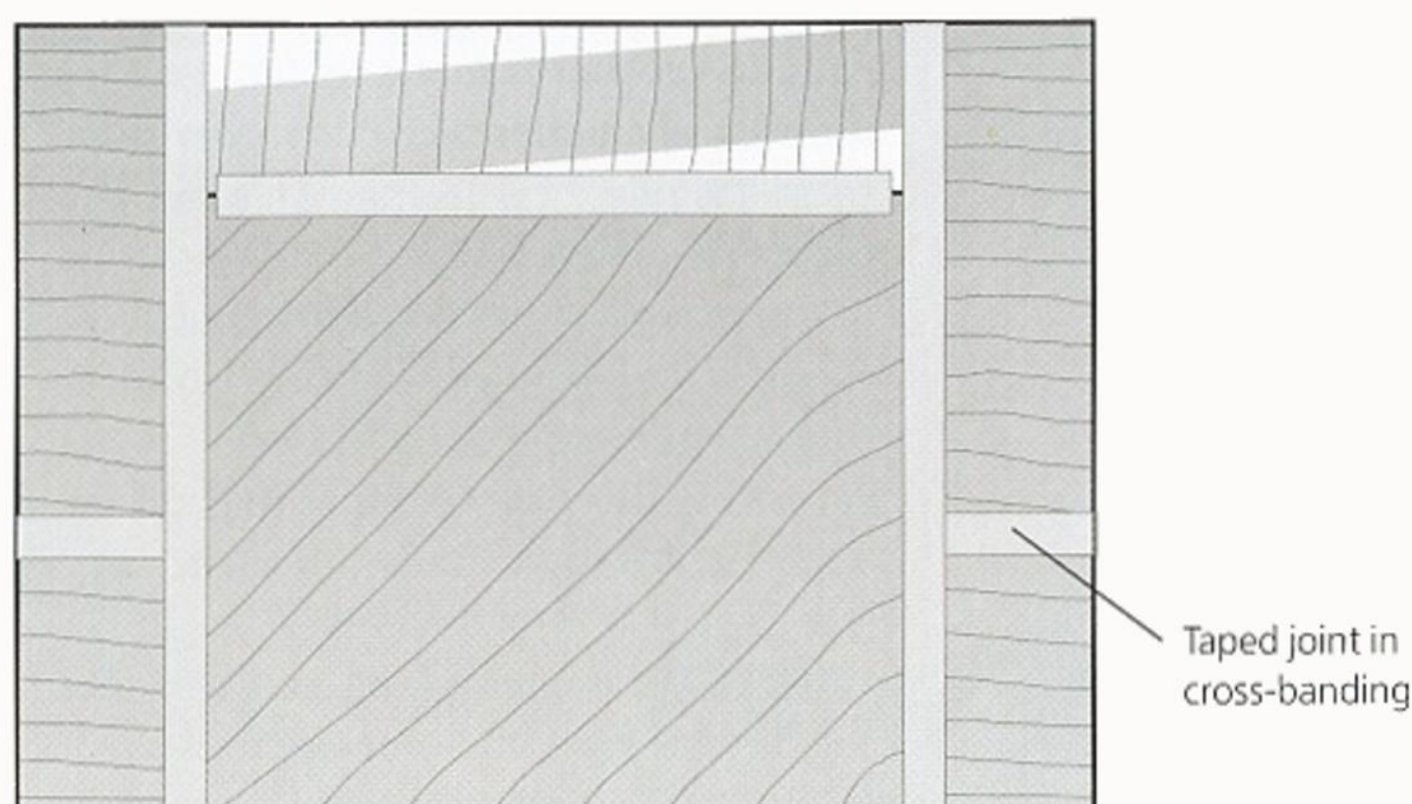


Fig 5.7 The long sides of cross-banding are laid and the joints taped.

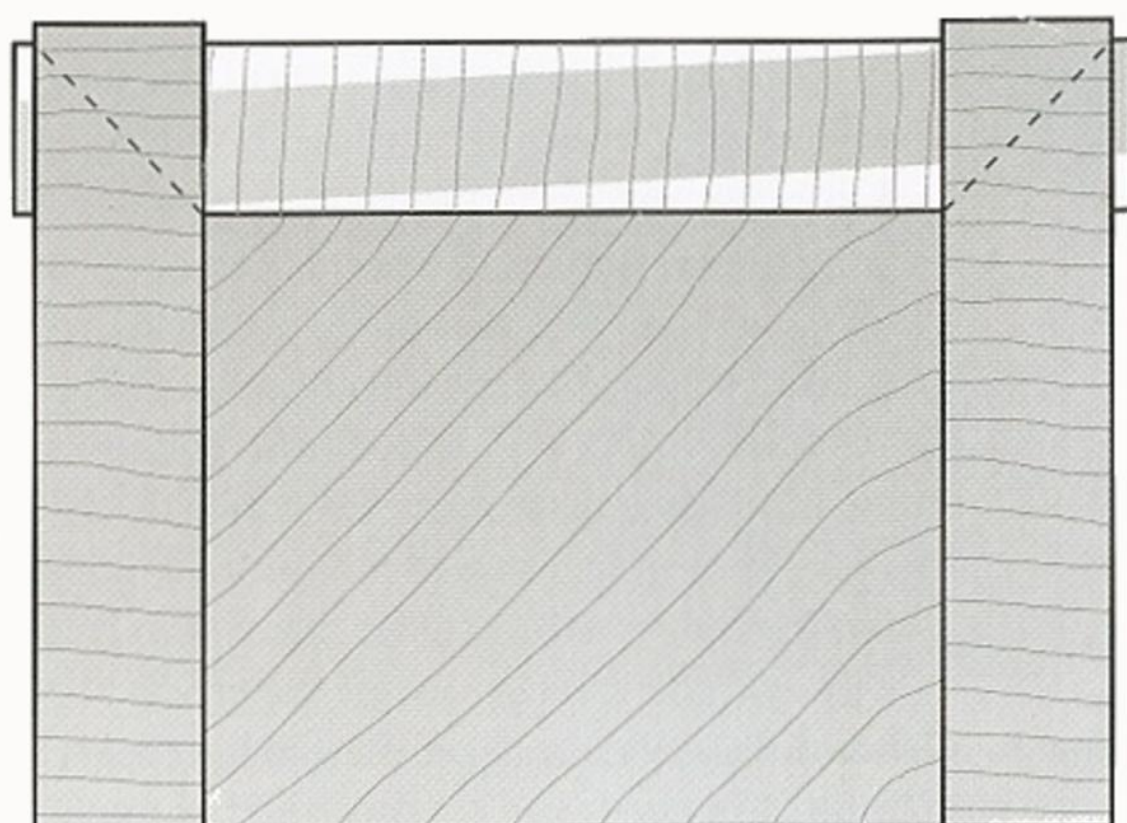
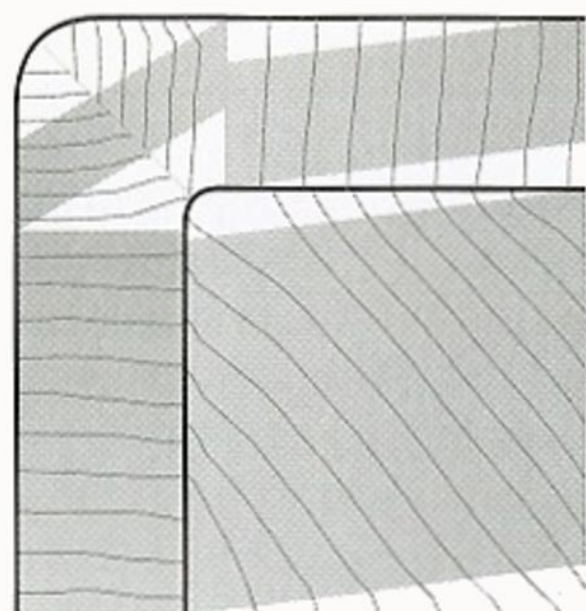
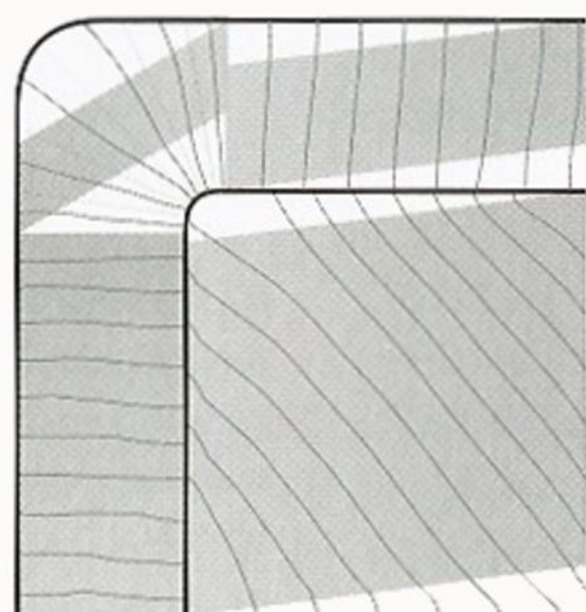


Fig 5.8 To make a mitred joint, overlap the cross-banding at the corners.



A If larger pieces are used, the resulting grain direction will make the mismatch obvious



B To maintain the direction of the grain at right angles to the central panel at rounded corners, the cross-banding needs to be laid as small sections

Fig 5.9 Laying cross-banding on a rounded corner.

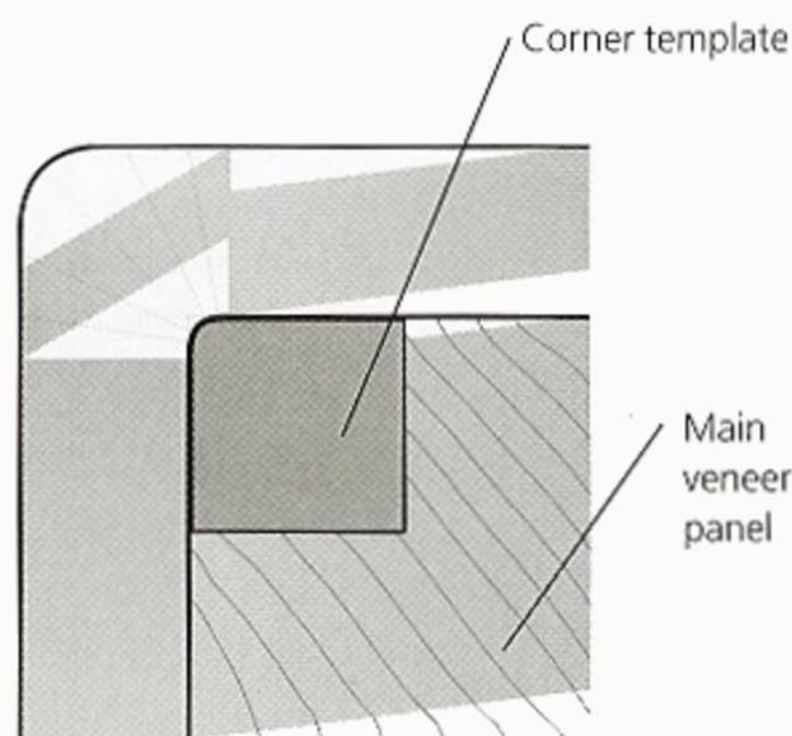


Fig 5.10 Use a template to trim the corner of the central panel and remove the waste veneer.

ensuring that the join passes over the corner of the ground. If the cross-banding has been cut to the same width all round, as should be done, then a diagonal cut through the corner of the overlap will make a 45° mitre. Remove the waste pieces, run the iron over the cross-banding to re-melt the glue, and rub down with the veneer hammer. Tape the joint.

A slight complication is presented by rounded corners, for which neither of the above methods is appropriate. The effect of cross-banding relies on the grain direction being at 90° to the edge of the central panel and using large pieces at the corner will show a mismatch of grain direction (*see* Fig 5.9A). To avoid this, cross-banding for a rounded corner is made up from a number of smaller sections rather than from a single, or a couple, of larger pieces (*see* Fig 5.9B).

To make a rounded corner, cut round a template (*see* Fig 5.10), and then use the same template for preparing the cross-band at the corner, which needs to be made up before laying (*see* Fig 5.11). Cut small wedges of veneer to fit the template, and butt them together, taping the joints securely. Prepare all the corners in advance, using the template to make the inner curved edge (*see* Fig 5.12).

The easiest way to lay a prefabricated corner is by 'rubbing' it onto the edge. To do this, brush a thin layer of glue onto the veneer's undersurface and, while it is still hot and fluid, press the corner veneer directly into place (*see* Fig 5.13) by sliding it into position. Secure it by applying a little pressure with the veneer hammer – too much may dislodge the veneer. Position all the corners in this way and then fit the rest of the cross-banding up to them, making whatever joints are necessary as described above.



Fig 5.11 Prefabricate the veneer for the corner: it is a lot easier than trying to lay several small sections of veneer with accurate joints.



Fig 5.12 Use the template to make the inner curved edge to the corner cross-banding.



Fig 5.13 'Rubbing' the prefabricated corner into place. This is done by sliding the veneer into position. The natural 'grab' of pearl glue will hold it in place.



Fig 5.14 A modified cutting gauge for working with curved groundwork.

Rounded or curved work

Straight-edged work presents few complications, but as soon as a curvature is introduced, there is the difficulty of ensuring a close-fitting joint between the cross-banding and the central panel, whose edge generally follows the shape of the groundwork. Inevitably, the cross-banding will need to be fitted as a series of short pieces.

1 Prepare and lay the central panel as you would for square work.

2 Trim the panel with the cutting gauge, which needs to be modified for curved work. The normal fence is designed for straight edges. When used on a curved edge it will rock, making it impossible to get a good edge to the central panel. To prevent this rocking, and to keep the blade working at the

same distance all round, glue two dowels to the fence, as shown in Fig 5.14.

3 Add the cross-banding in short pieces so that the curve of the groundwork can be negotiated, and at the same time, ensure that the grain direction is generally at right angles to the centre, and there is no obvious mismatch. The length of individual pieces depends on the degree of curvature, so you need to take each situation as it comes.

4 No matter how long you make each piece, the straight edge of the cross-banding will not make a perfect joint with the central veneer. To make a good joint, hollow the edge of the cross-banding slightly. This is easier on deeper curves, and this should be taken into consideration when deciding how long to make each piece of cross-banding. Making a template of the curve will

make life easier when preparing each piece, though in work where there are curves of different radii (e.g. a kidney-shaped dressing table), preparation needs to be free hand. Experience will enable you to judge how accurate you can be, but as a rule of thumb, the shorter the veneer, the more accurate you are likely to be.

5 Brush a thin layer of pearl glue on the veneer and 'rub' it into place. The natural property of the glue to grab will keep it in place without the need to apply pressure.

6 Position the remaining pieces of cross-banding, making the joints between them as described above. Tape all the joints, both between pieces of cross-banding and between the cross-banding and the central veneer panel.

LAYING CROSS-BANDING WITH A PRESS

Square or rectangular work

1 Cut the central veneer panel to shape and size, and trim. To ensure that the edges are all true and square, this should be done on the shooting board.

2 Mark the layout of the veneer pattern on the groundwork to show the positioning of the central panel and the cross-banding (see Fig 5.15). This aids accurate positioning of the veneer for laying.

3 Mark out a piece of thin ply in the same way, and use this as a baseboard to assemble the veneers, before positioning them on the groundwork (see Fig 5.16). While the use of a baseboard as a

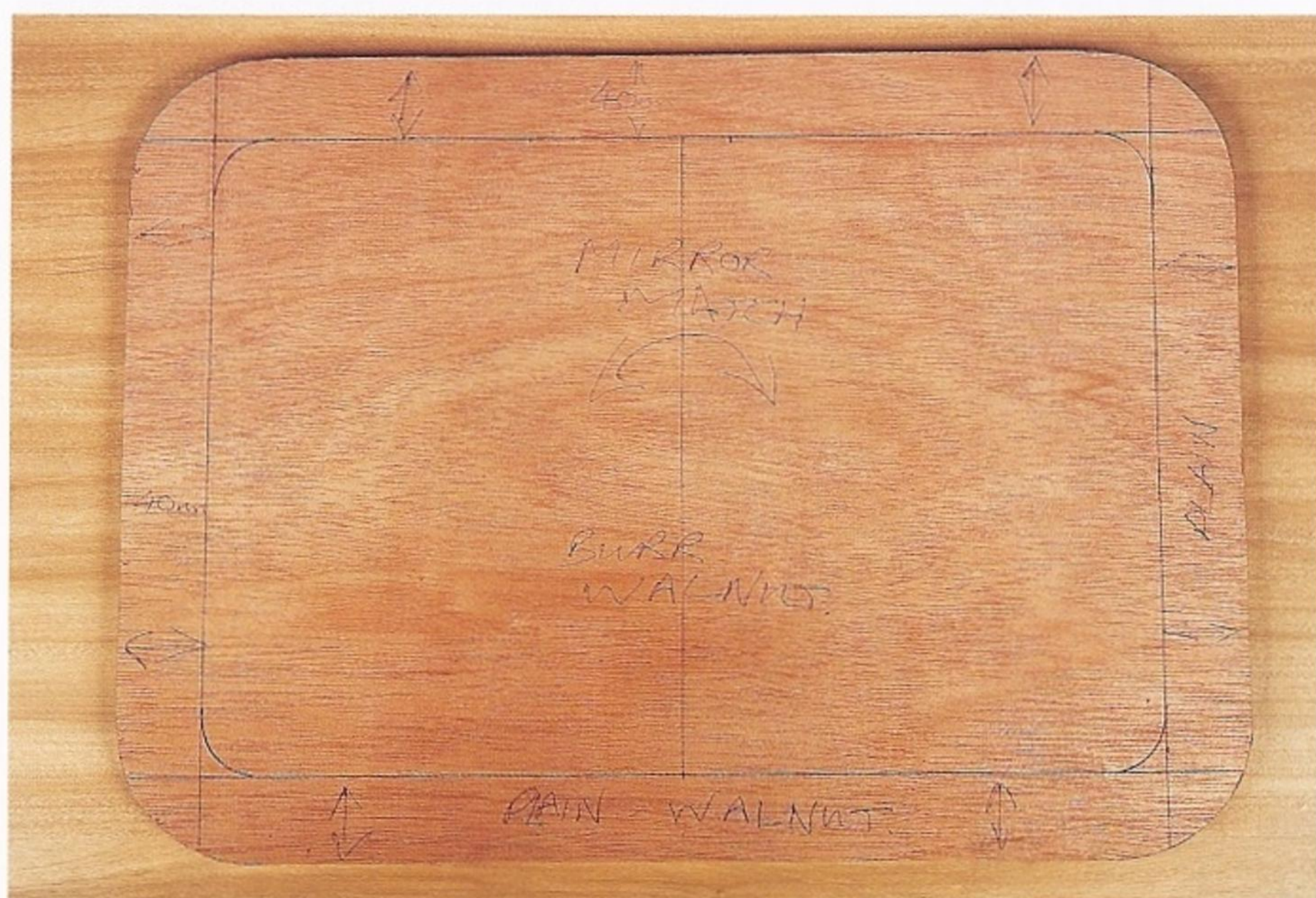


Fig 5.15 For press work, mark out the groundwork to show the positions of the central panel and cross-banding.

template is essential for the more complex veneer patterns, it is not necessary for simple, built-up patterns. All the same, it is convenient to work on a template rather than on the ground-work itself.

4 Position the central panel on the template, and hold it in place with veneer pins (see Fig 5.17). The veneer must be absolutely flat. If there is any sign of buckling, flatten the veneer.

5 Offer up a piece of the cross-band to the edge of the panel, ensure a close joint, and tape it securely into position.

Fig 5.16 The use of a baseboard marked out as a template is very useful for assembling the various components. For more complex patterns, a template is essential.

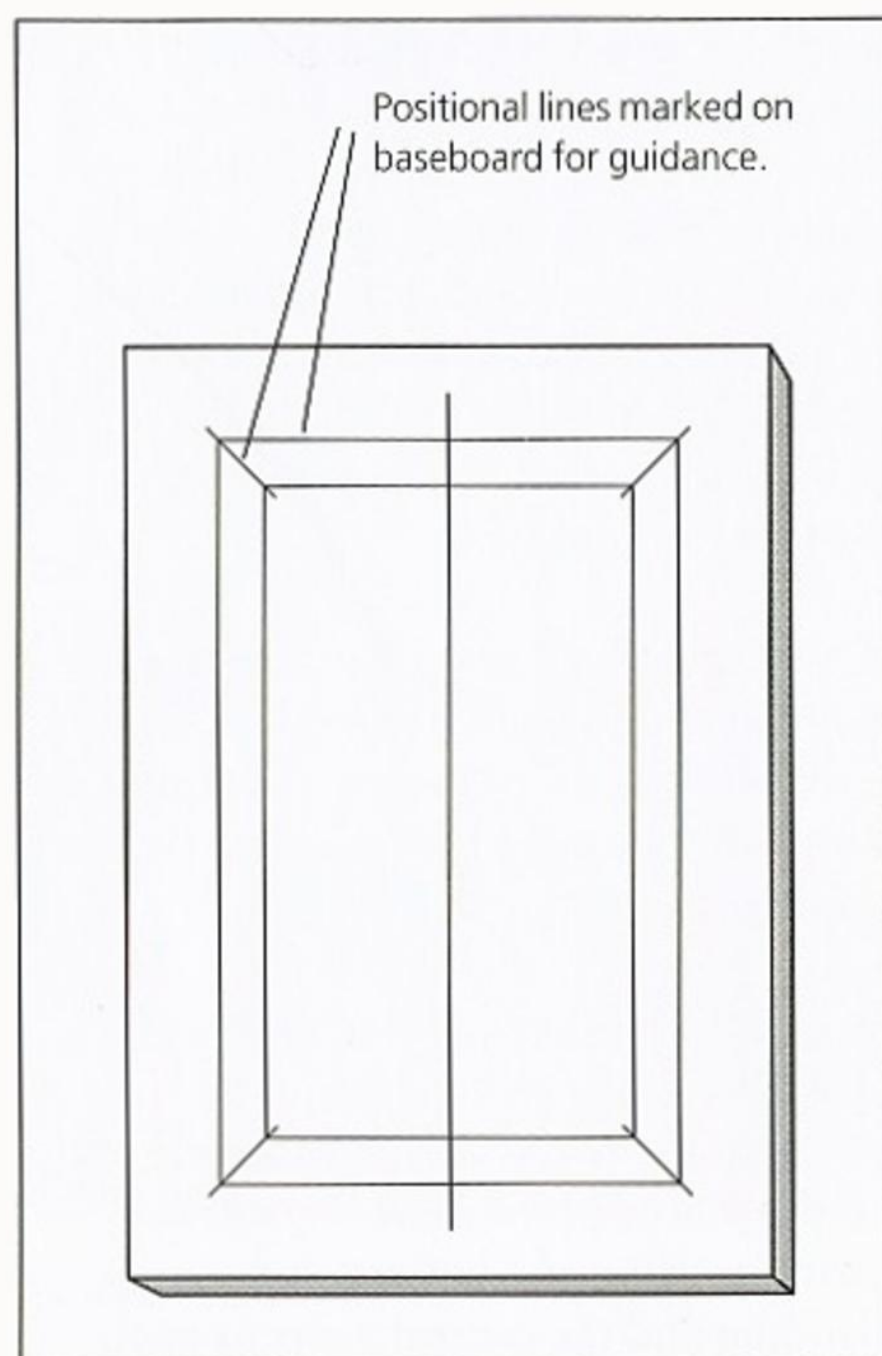


Fig 5.17 The central panel is held in place with veneer pins while fitting the cross-banding.

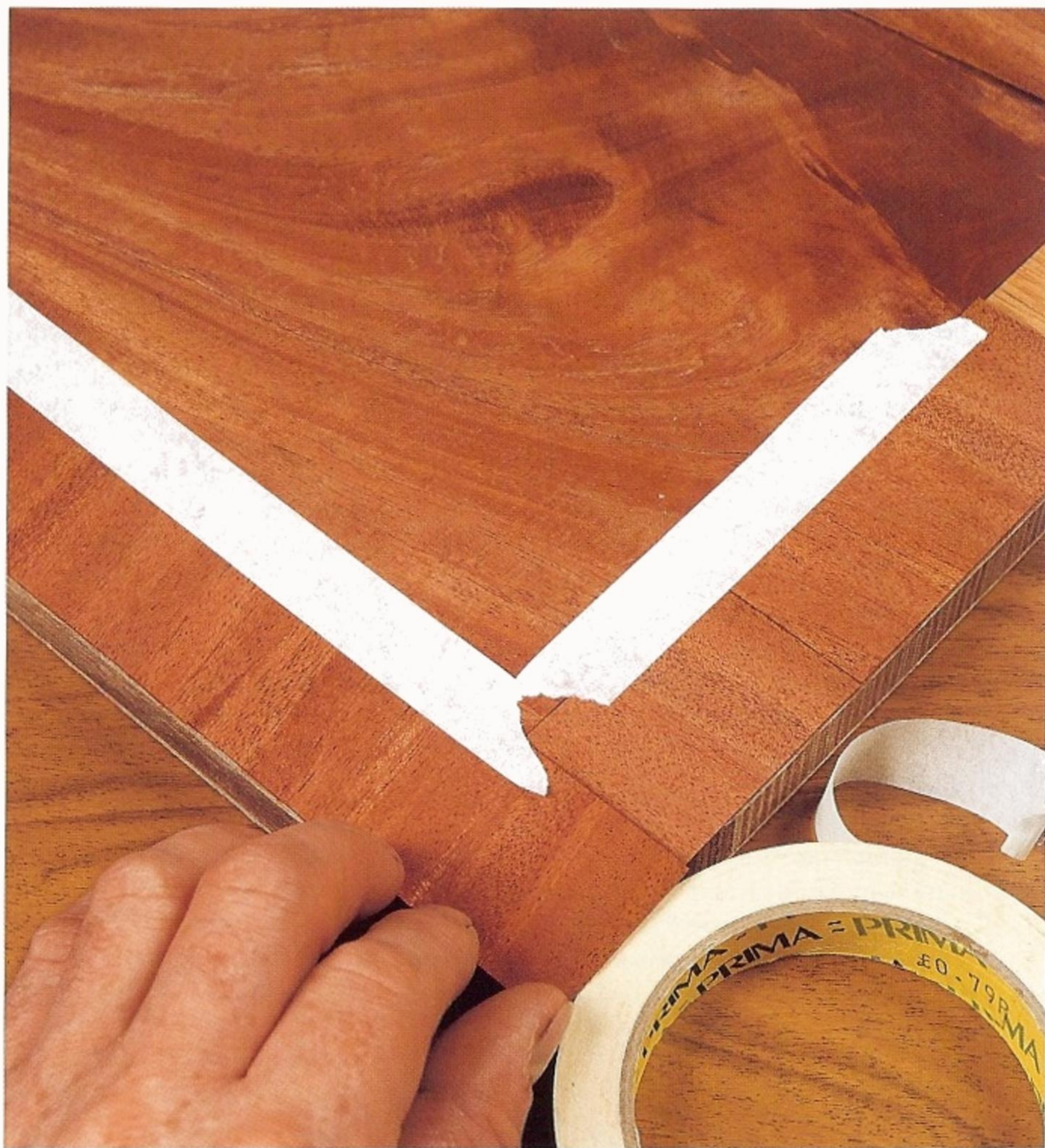


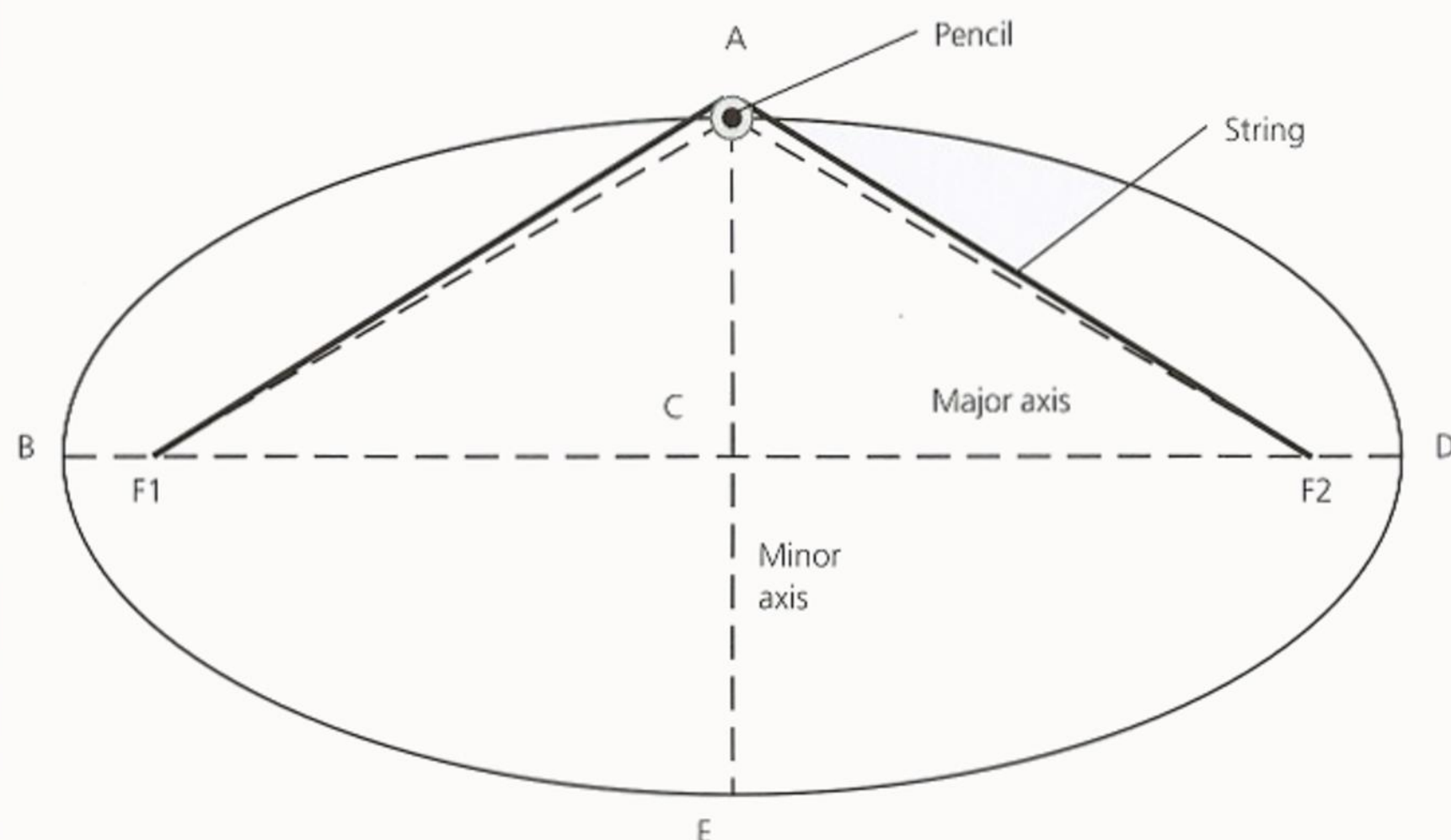
Fig 5.18 The cross-banding fitted and taped to the central panel. The overlap at the corners is suitable for a butt joint.

6 Offer up a second piece so that it overlaps the end of the first piece by about $\frac{3}{8}$ in (10mm) or so. Continue this process on all sides.

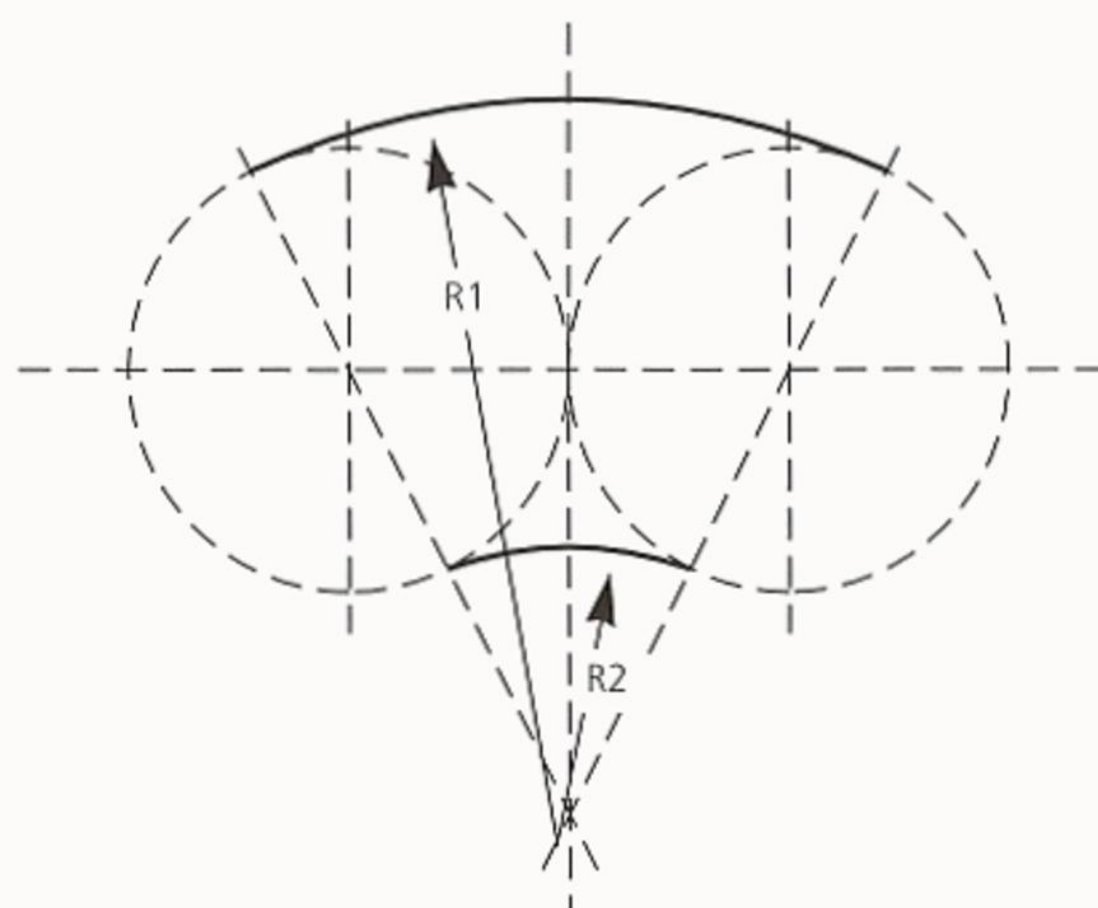
7 Fix the corners, remembering that they should overlap (see Fig 5.18). A generous overlap is particularly important for mitred corners, as

adjacent pieces of cross-band are joined by cutting through the overlap with a straightedge and knife (see page 75). The cut should be at right angles to the edge of the panel. Mitred, butt and rounded corners are all created as for hammer veneering.

8 Lay and press the veneer.



The perimeter of the ellipse is drawn with a pencil which is restrained by the string. The two ends of the string are held at the points F1 and F2 and the string is kept taut by the pencil as it scribes the perimeter. The lengths A-F1 and A-F2 are equal to the distance B-C. Therefore, to locate and mark the positions of the foci of the ellipse (i.e. F1 and F2), you use the distance B-C. The overall shape of the ellipse is determined by the dimensions you use for the major and minor axes.



R1 and R2 are the radii of the arcs that form the links between the two circles forming the basis of the kidney shape.

Fig 5.19 The geometry of oval and kidney shapes: making the shaped templates, and to mark out the groundwork and assembly baseboard.

Round, oval and shaped work

- 1 Make a template of the central panel. Acrylic plastic sheet is ideal for this because it can be cut and shaped with woodcutting saws. Smooth the perimeter of the template with abrasive paper, so that the veneer knife will work around the edge to cut the veneer without snagging on any roughness. You should also place some registration or alignment marks on the top of the template to assist with lining up the veneer on the ground. Figure 5.19 shows the geometry of oval- and kidney-shaped templates with the registration marks that can be used to help alignment.
- 2 Mark the groundwork with the same registration lines as the template. Position the template and draw around it to mark the position of the panel on the groundwork.
- 3 Prepare the veneer panel by placing the template over the veneer, and cutting around it with a veneer knife. Take great care not to wander. This can happen very easily as the knife cuts along the grain.
- 4 Position the veneer on the groundwork, or a marked out baseboard, within the marked area, and secure it with veneer pins.
- 5 Offer up pieces of cross-banding to the edge of the panel, ensuring a close fit. Make the pieces relatively small, and shape their inner edges to make a close fit with the panel's curvature.
- 6 Cut and tape the joints between adjacent sections as well as between the cross-banding and central panel.
- 7 Lay and press the veneer.

LAYING THE VENEER

The principle of laying built-up veneers is the same as that for single sheets (*see* Chapter 4), except that the veneer must be accurately positioned on the ground. This is where marking out the groundwork pays dividends. Apply an even layer of glue to the ground and place the veneer so that the central panel lines up with the area marked. Cross-banding should overhang the groundwork a little to allow for trimming. Pay particular attention to mitred corners as these must be in line with the corners of the groundwork.

The veneers may become displaced slightly as pressure is applied in the press. To avoid this, put in a couple of veneer pins near the edge, pinching them off at the surface of the veneer. The difficulty with a press is that you cannot see any slippage happen, only its effect once you remove the work, at which point it is too late. Slippage is especially noticeable if the cross-banding is narrow, where it shows up as an obvious tapering towards the corners.

As always, a balancing veneer must be laid at the same time as the surface veneer.

ALTERNATIVE METHOD FOR LAYING

It is possible to carry out cross-banding in a two-stage pressing process. Superficially, the method resembles that used for laying with the hammer, but here the central panel is pressed onto the groundwork first. After removing the piece from the press, while the glue is still relatively soft, run a cutting gauge around the edge to trim back the central panel, and lift off the waste with a chisel. This method has a particular advantage when working with narrow cross-bandings and borders, as it ensures that

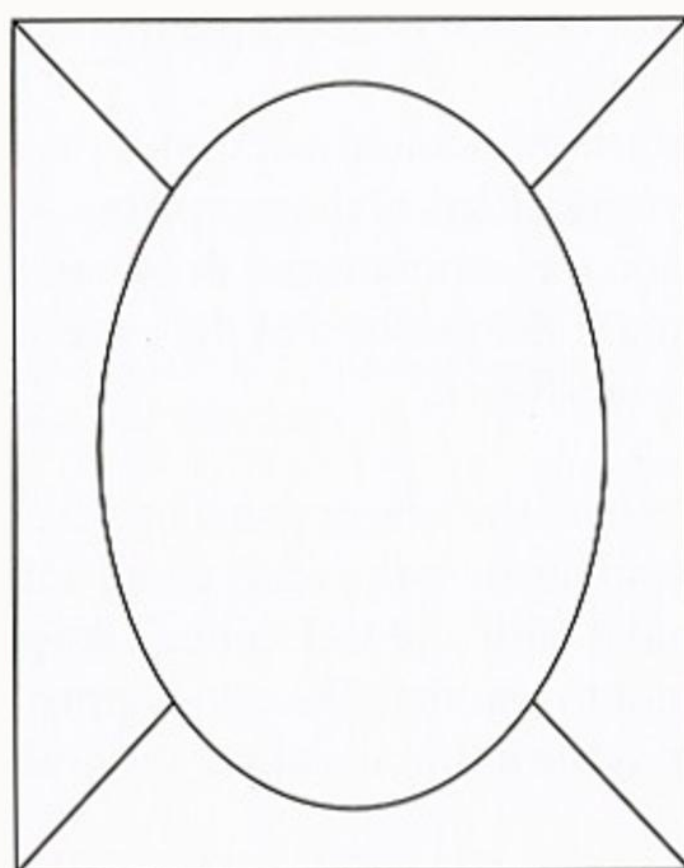
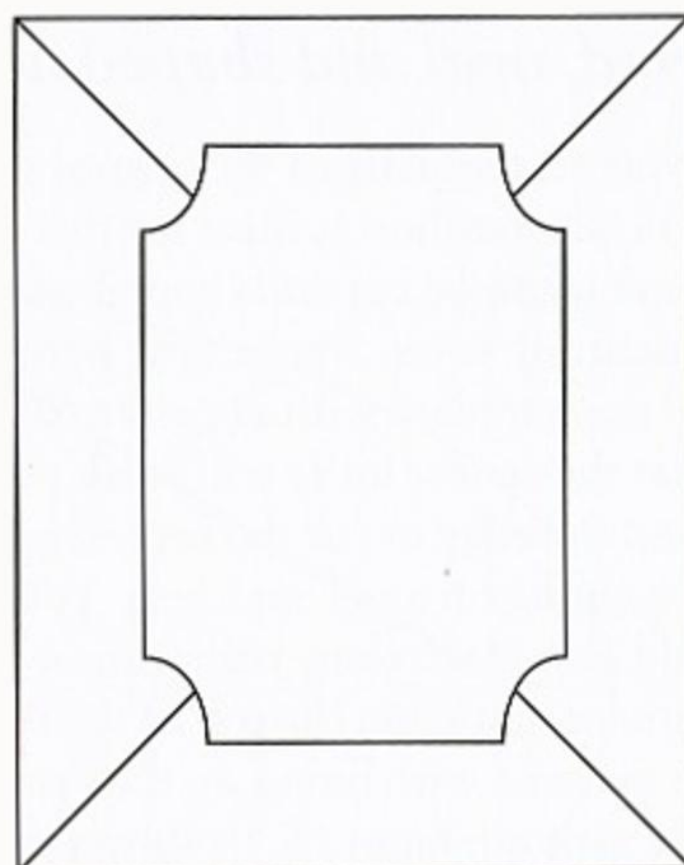
the cross-banding will be parallel to the edge.

With PVA glue, you can usually remove the work from the press after about an hour, then trim and remove the waste veneer before the glue has completely dried, which makes the trimming process a good deal easier. Once this is done, the cross-banding can be fitted and the work can be returned to the press.

SIMPLE BUILT-UP PATTERNS

Figure 5.20 shows two examples of veneer designs based on a central panel of veneer surrounded by a cross-band or veneer border. They were both made with the use of a baseboard (which carries the design drawn on its surface, and upon which the veneers will be built-up prior to laying) and shaped templates to carry out accurate cutting of the veneer shapes themselves. It is a good deal easier to lay these designs in a press rather than by veneer hammer.

Fig 5.20 Examples of other built-up patterns.



BOOK-MATCHING AND QUARTERING

- ◆ MATCHED PATTERNS
- ◆ PREPARING THE VENEERS
- ◆ LAYING THE PANELS

MATCHED PATTERNS

Highly decorative effects can be created without resorting to complicated techniques, simply by matching the patterns of adjacent veneers (*see* Fig 6.1). Part of the aesthetic quality of using veneers is to make the most of what the veneer has to offer with its colour and grain.

Because of the thinness of each leaf of veneer, consecutive leaves have more or less the same figure pattern, and it is this property on which veneering patterns rely. Even if the area to be covered is relatively small, where a single leaf would normally be enough for the job, you will still need consecutive leaves. This means that you may only use a small area of each leaf, so these methods do tend to be wasteful, and thus expensive. However, through careful choice of veneers, or areas of veneers, you may be able to save sections large enough to use in other projects.

The most important feature of highly decorative veneers, such as curls and

burrs, is their uniqueness. No two pieces of veneer are exactly alike, but with highly decorative veneers, the difference is even greater. Even consecutive leaves will differ slightly, but usually not enough to be clearly noticeable.

While the most striking decorative effects are created by matching consecutive leaves of highly figured veneers such as curls and burrs, straight-grained veneers can also be used (*see* Fig 6.2). It is tempting to use just one sheet to create these effects, but that would be a mistake because the figure is not identical along the whole length of a leaf. This is hardly noticeable when viewing the whole sheet, but some very odd looking effects result if you start attempting to book-match or quarter (*see* Fig 6.3).

The safest plan is to use consecutive leaves in all cases of mirror image or other veneer matching techniques. This is considerably more expensive, but as mentioned before, you can plan the work to reduce wastage and even to use the remaining sections in other pieces. In

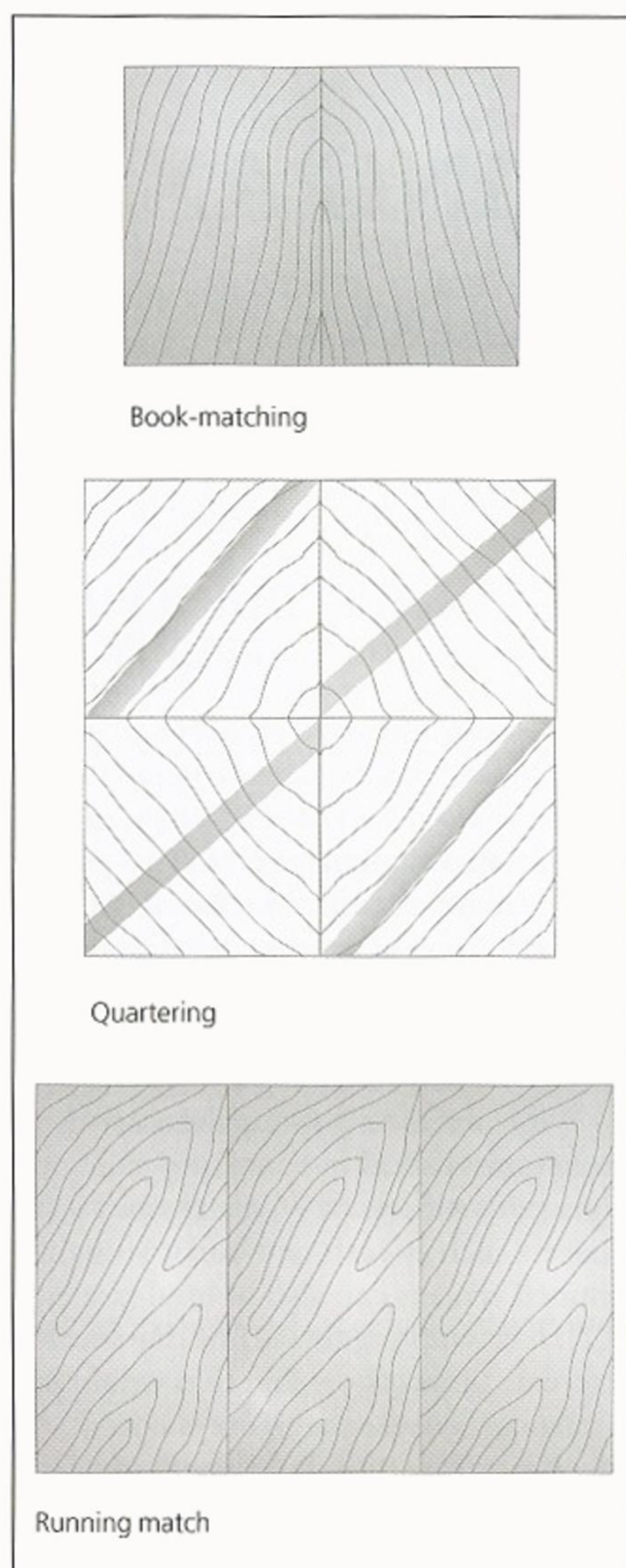


Fig 6.1 Examples of the decorative effects that can be created very simply by matching grain and colour configuration.

addition, one sheet can be cut to produce multiple panels. For example, by cutting two or four consecutive leaves down the middle, two book-matched or quartered panels, respectively, can be gained,

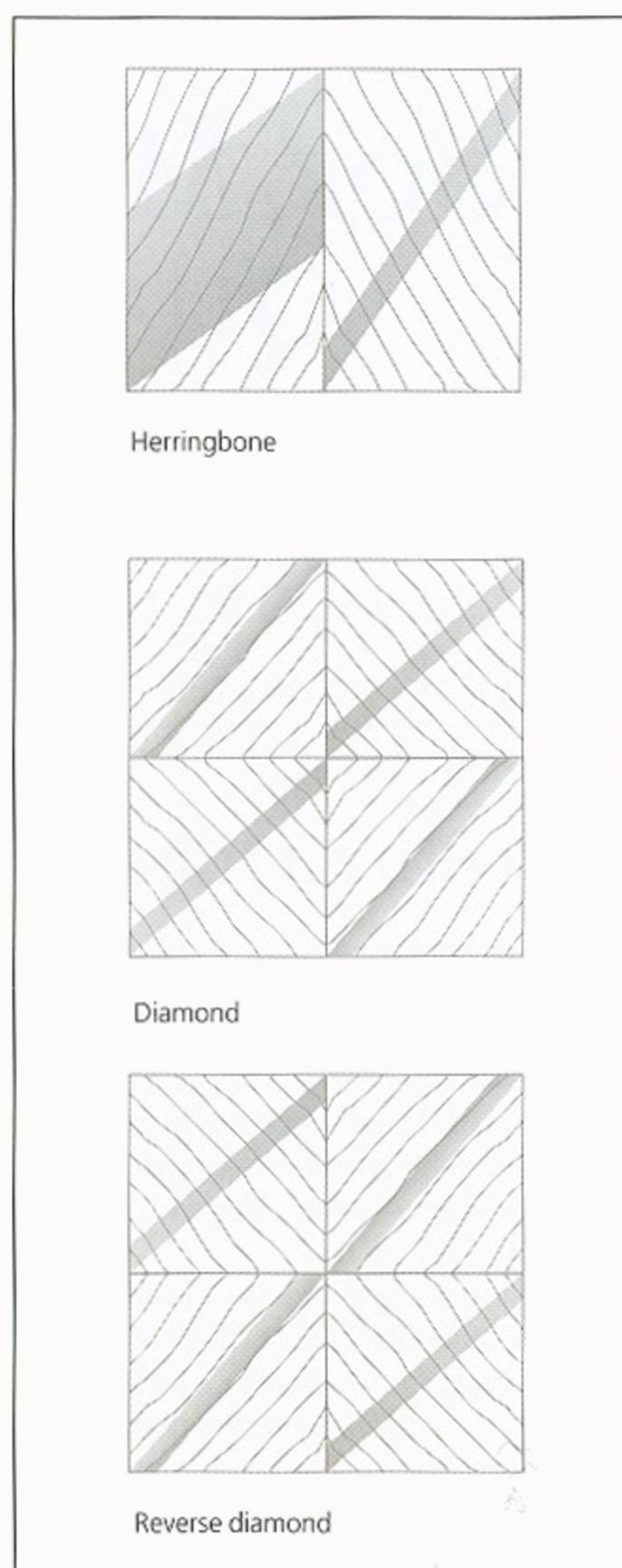


Fig 6.2 Common ways of matching straight-grained veneers.

giving the materials greater value for money. When cutting packs of consecutive veneers, remember that you must keep the leaves in perfect alignment so that the figure of each leaf coincides.

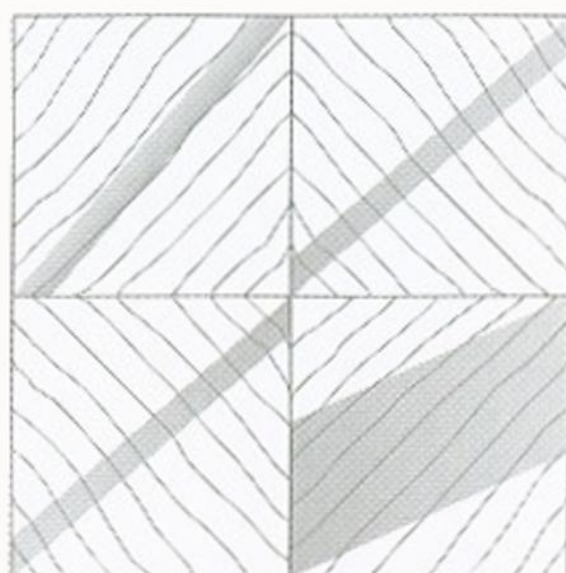


Fig 6.3 Optical defects that can result from not using consecutive leaves of straight-grained veneers.

MIRROR IMAGE

The decorative effects of book-matching and quartering are based on the mirror image principle (*see* Figs 6.4 and 6.5). In book-matching the mirror image is created by opening two consecutive leaves like the pages of a book, while for quartering, four consecutive leaves are used to create the mirror image twice (*see* Figs 6.6 and 6.7).

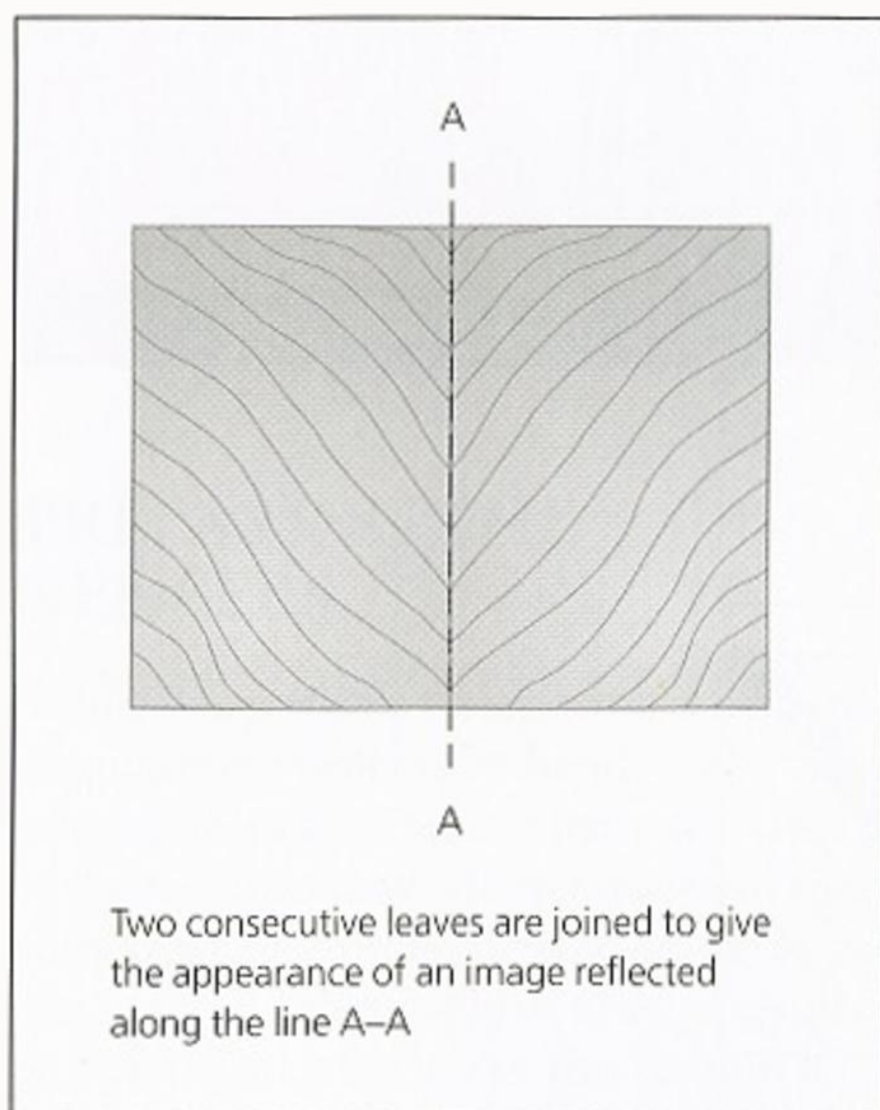


Fig 6.4 The effect produced by book-matching.

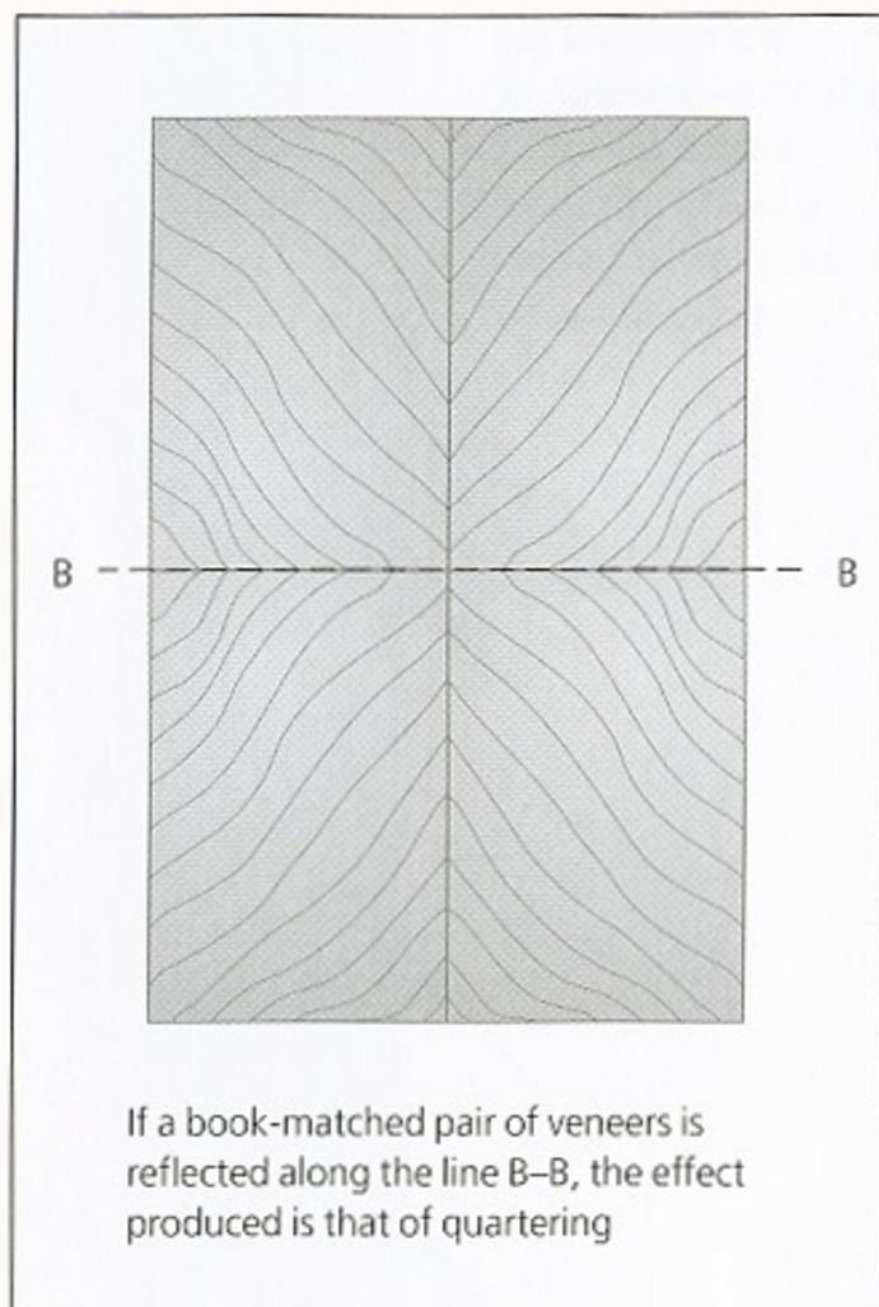


Fig 6.5 The effect produced by quartering.

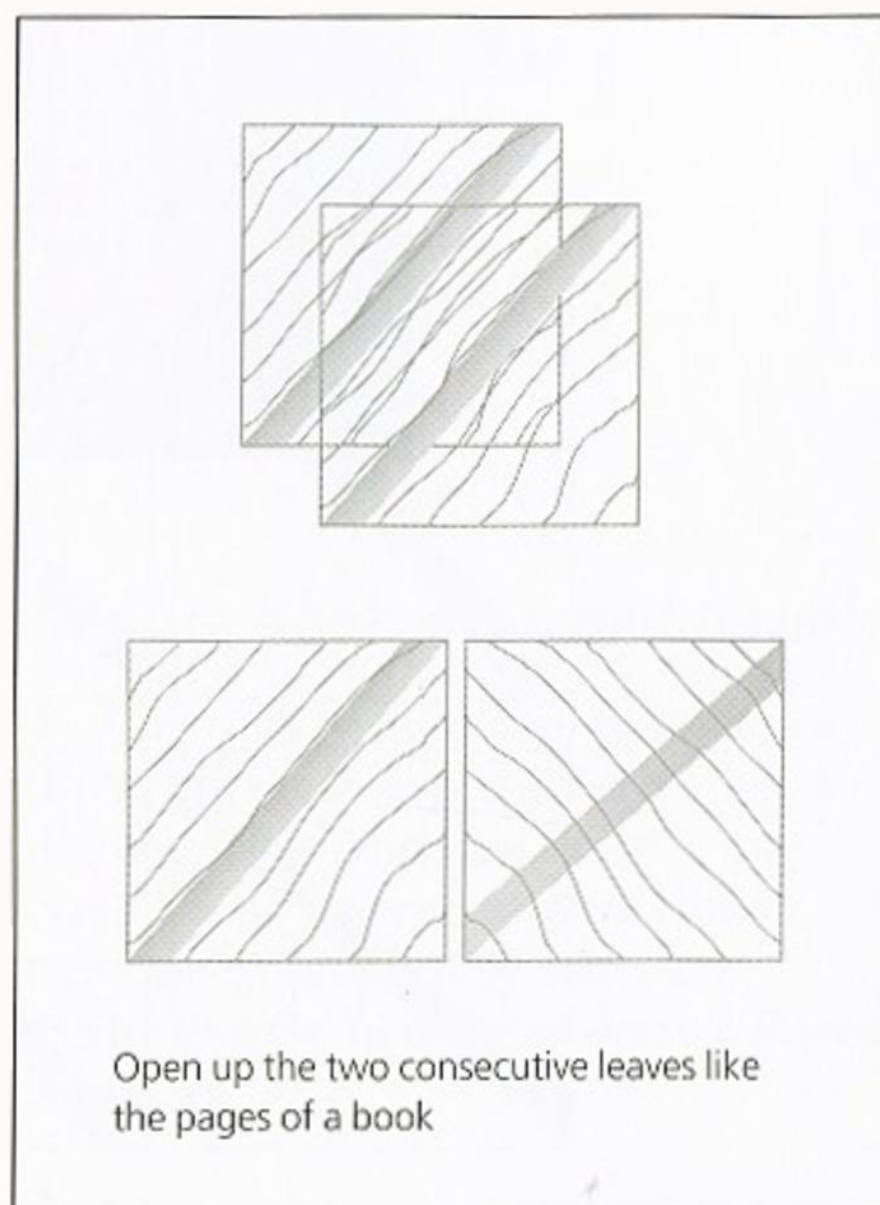


Fig 6.6 Creating a book-matched panel.

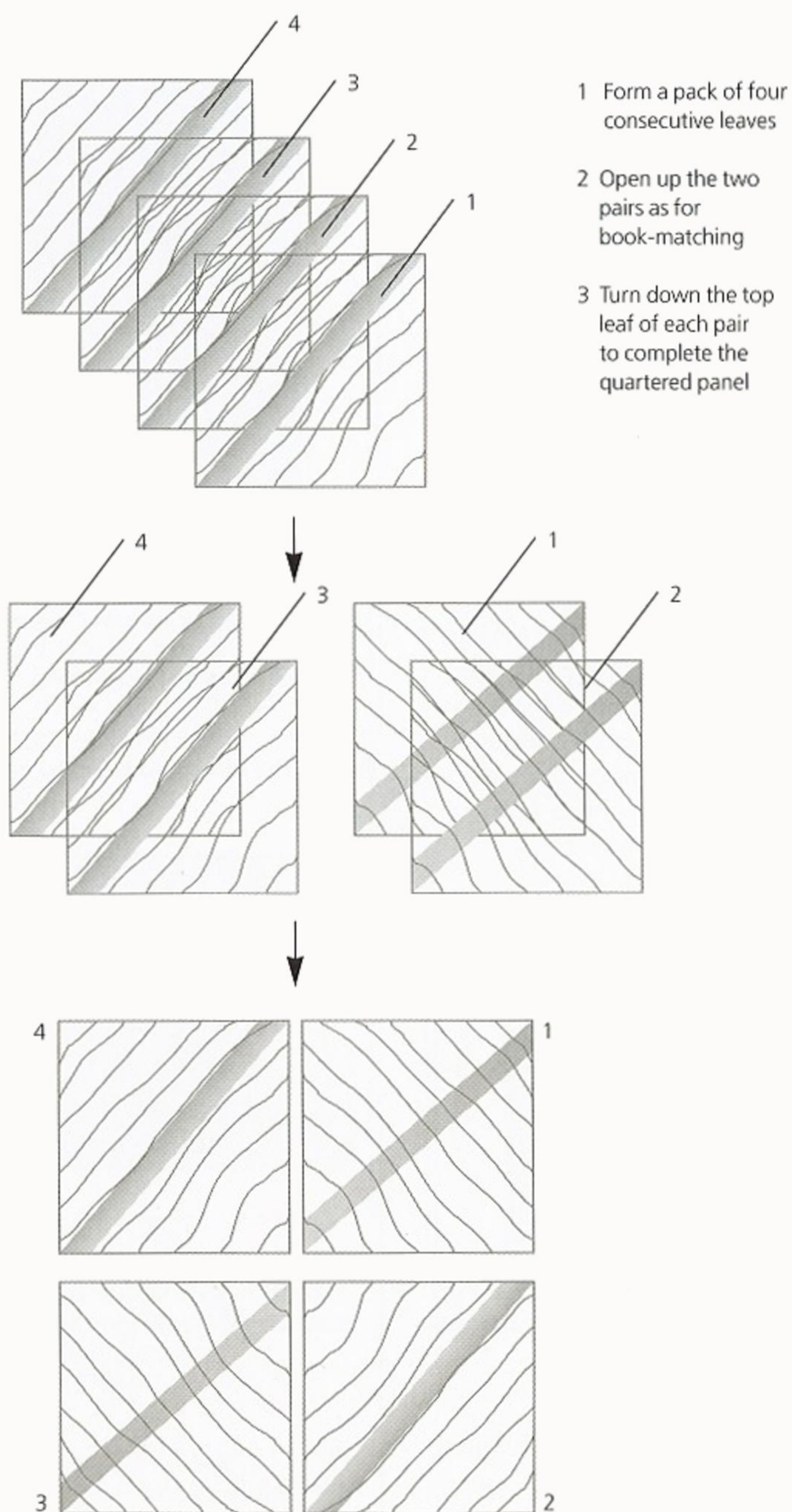


Fig 6.7 Creating a quartered panel.



Fig 6.8 Trim the joining edges on the shooting board. Note the use of a batten to hold the edges flat and secure.

PREPARING THE VENEERS

While it is possible to lay book-matched or quartered veneers by hand – i.e. using pearl glue and the veneer hammer – there is the risk that they will not match at the joints, because of the need to cut through the overlap, which almost always results in a slight mismatch. For this reason, it is best to lay book-matched or quartered panels with a press.

Laying book-matched panels

- 1 Carefully position two consecutive leaves of veneer on top of each other, so that they are oriented in the way they came off the veneer cutting machine. Keep their edges closely aligned to ensure that the figuring of the two leaves coincides.
- 2 Choose the area of figure that you wish to use, planning your work

carefully, and cut the pack to size, leaving a slight overlap to allow for final trimming. A veneer knife or saw can be used for this, with a straightedge, though the saw is often better for this trimming work, especially with hard or highly figured woods. You may find it helpful to tape the pack at the edges, to keep the veneers in place.

Remember when you are planning the cuts, that after opening up the leaves, the final size will be double the width of the pack. Be particularly careful when cutting along the side that will form the joint between the two veneers, because any splintering will require trimming, and this may result in a noticeable mismatch.

3 Trim the joining edges of the two veneers very finely, on the shooting board: the edge produced by the knife or saw is unlikely to be good enough, especially with long joints. Do not overtrim, just skim the joint, because the more you remove, the greater the mismatch of figure after joining.

Leave the tape on, to help hold the veneers together, and use a batten of wood to hold the edges of the veneer flat and steady (*see* Fig 6.8).

4 Open out the top veneer, as though turning the pages of a book, to form the mirror image (*see* Fig 6.6), then fit and tape the joint. Take great care that the figure of both veneers lines up exactly at the joint, or it will look very odd.

5 Lay the veneer carefully and accurately.

Laying quartered panels

1 Carefully position four consecutive leaves of veneer on top of each other, orienting them in the way they came off

the cutting machine, and keeping their edges closely aligned to ensure that their figuring coincides.

2 Choose the area of figure you wish to use: you need to visualize the completed pattern because the veneers must be positioned in a particular way in the pack in order to achieve that pattern (*see* Fig 6.9).

3 Cut the panels to size as for book-matched panels. This preparation of the veneers does require great care, as there will be two joining edges on each piece, and they must be at right angles to each other, though the initial cutting of the quarters can be approximate to within a few degrees.

Hold the veneers firmly in place with tape as you cut. The four layers take some cutting through, so it is better to use a veneer saw for this to ensure a neat job.

4 True up the joining edges, on the shooting board (*see* Fig 6.8). Keep the tape on and use a batten to hold down the veneer, to ensure that the pieces do not slip (*see* Fig 6.8). The fence of the shooting board is at 90° to the edge of the board, so to ensure that both edges

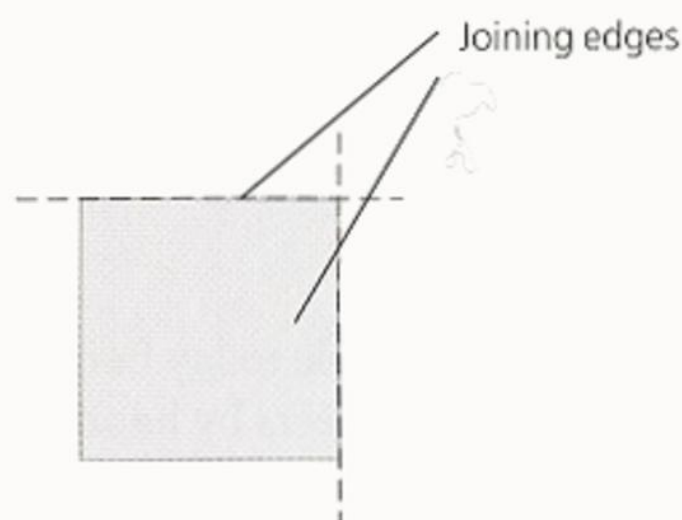


Fig 6.9 The orientation of the veneers in the trimmed pack determines the final pattern of the quartered panel. The dotted lines represent the sides that will make the joints between the component leaves in the panel.

are at right angles to each other, trim one jointing edge and then hold that edge firmly against the fence while you trim the other. This is vital if all the edges are to make good joints.

5 Open out the top two veneers as shown in Fig 6.10. Join the edges A-A and B-B together to reveal the quartered panel.

6 Assemble the veneers very carefully, ensuring that the figure and joints are accurately aligned, then tape up the joints securely (*see* Fig 6.11).

7 Lay the veneer carefully and accurately.

LAYING THE PANELS

Once made up, with joints securely taped up, book-matched and quartered panels may be laid as for a single sheet (*see* Chapter 4), or incorporated into another design prior to laying. If cross-banding or an inlay is to be added, this should be done prior to laying, and the panel treated as though it were made up of a single sheet of veneer.

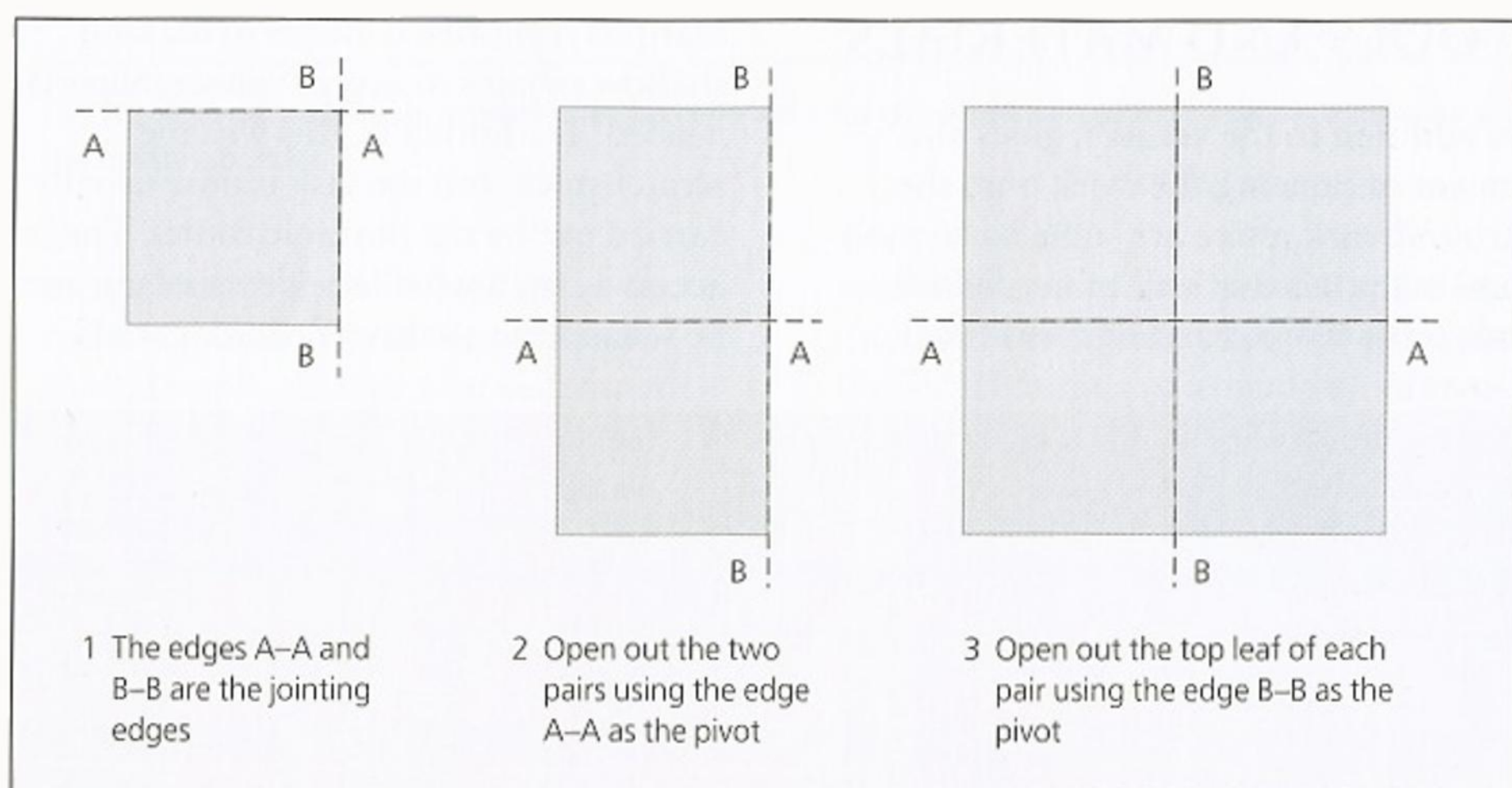


Fig 6.10 Opening out a quartered panel from a trimmed pack.



Fig 6.11 A quartered panel, with joints taped, is ready for laying.



INLAYING

- ◆ TOOLS AND MATERIALS
- ◆ STRINGS AND BANDINGS
- ◆ MARQUETRY MOTIFS

TOOLS AND MATERIALS

In addition to the veneers, glues and means of pressing the work onto the groundwork, there are some basic tools and materials that will be needed for inlaying strings, bandings and small

marquetry motifs: a means of making shallow rebates to accept veneer inlays is needed. Traditionally, this was the scratchstock, but the task is now usually carried out by the portable router. The accuracy with which the depth of cut can be set and the quality of router cutters



Fig 7.1 Strings and bandings are available from veneer suppliers in a wide range of designs and widths.

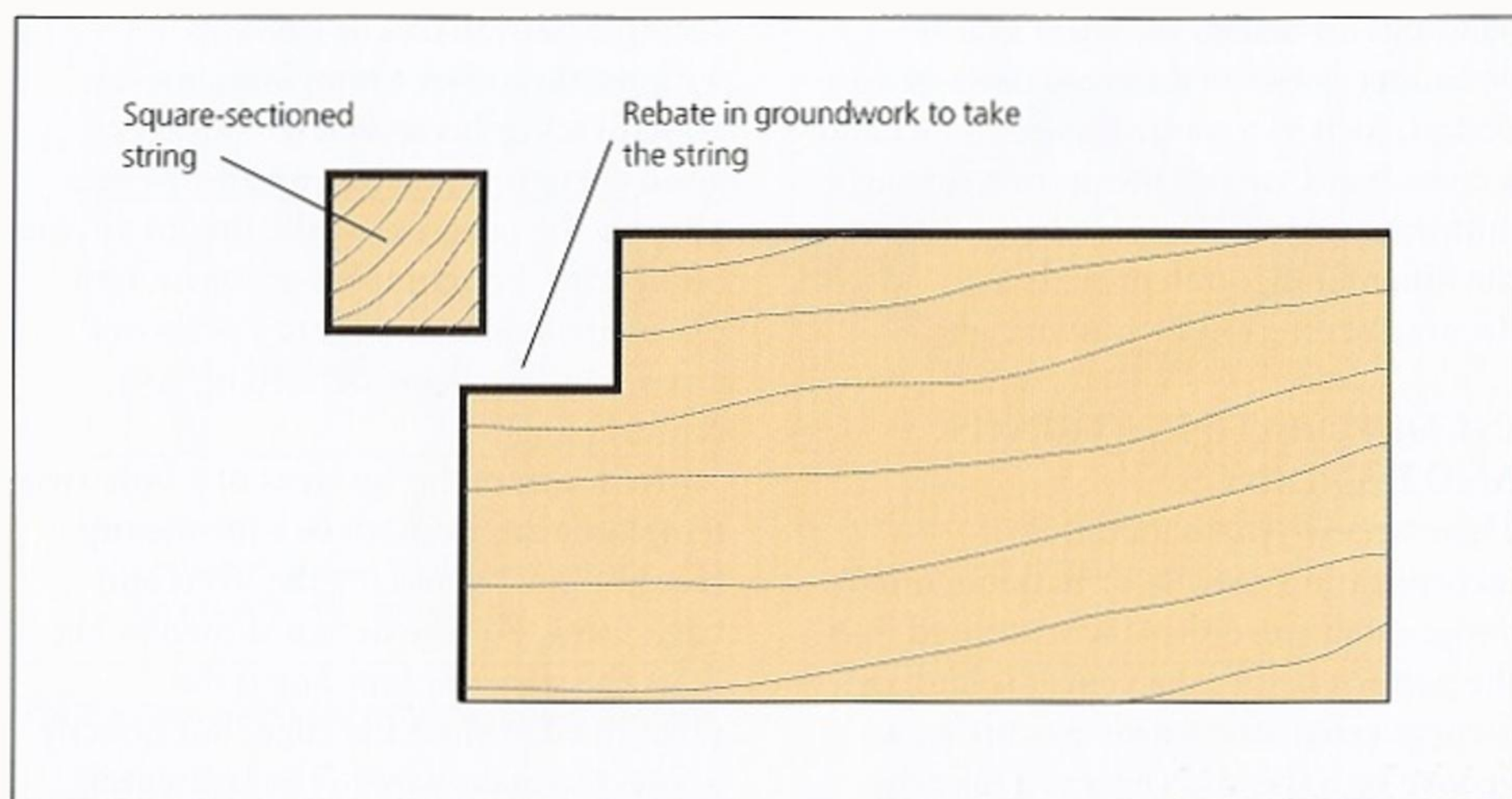


Fig 7.2 A square string is intended to be rebated into the edge of a piece of work, acting as a decorative border.

means that this tool is both quick and reliable. However, the scratchstock should not be disregarded because for intricate work (for example, small veneered boxes), where it may not be easy to set up the router, the scratchstock is ideal. A very sharp bevel-edged chisel is useful for cutting mitres in strings and narrow bandings. Masking tape or Sellotape and veneer pins are needed to secure strings and bandings while preparing built-up patterns.

STRINGS AND BANDINGS

Strings and bandings are available from veneer suppliers in a wide range of designs and widths (see Fig 7.1).

Strings are narrow inlay strips of veneer of a single species. They are usually made of boxwood, either in its natural colour or stained black. They are either flat, i.e. simply a narrow strip of veneer, or square in section. Square-

sectioned strings are intended to be set into a rebate at the edge of the work (see Fig 7.2). Bandings are made up of two or more species and can be very complex in design, though the feather banding shown in Fig 7.3 relies on the contrasting grain direction of a single species. Bandings are made by gluing solid blocks and veneers together before slicing them into thin strips.



Fig 7.3 Bandings are made up of two or more species, though the feather banding in the middle row uses just one.

As a general rule, strings and simple bandings are added to create a clear boundary between different parts of a design, such as a central veneer panel and a cross-band, or as a means of relieving a uniform surface. Complex bandings, on the other hand, often provide a decorative effect in their own right.

INCORPORATING STRINGS AND BANDINGS

There are two main methods of incorporating a string or banding into a design: they are either incorporated into the pattern before the veneer is laid, or incorporated afterwards by cutting a groove into the laid veneer to take the string or banding.

Before laying

Where several pieces of veneer are built up into the final pattern, as with cross-banding, book-matching and quartering, it is probably easier to incorporate the string or banding at the same time. A common approach is to insert the inlay between a cross-band and the main central panel.

The positions of the mitres are marked on the template to ensure that the line of the mitres of the banding and

cross-banding match. Strictly speaking, a simple pattern can be built up without the aid of a template, but it is good practice because it encourages good draughtsmanship, and helps you observe the progress of the design as you build it up. For complex patterns, templates are essential. Figure 7.4 shows cross-banding being offered up to a central panel.

To decorate the surfaces of a box, two templates can be used: one for the top face and the second for the front and back faces. For the design shown in Fig 7.5A the string or banding is not positioned around the edge, but directly across the main panel. The templates help to ensure that the bandings are positioned so that they line up across all three faces when laid.

The design shown in Fig 7.5B has a wide banding incorporated into the panel to create an effect that is similar to parquetry (see Chapter 8), with the main veneer broken up into smaller sections in order to provide the decorative effect. The main veneer is cut with a veneer knife and straightedge, against the template.

One way of building up the patterns shown in Figs 7.5A and 7.5B is to cut the



Fig 7.4 The cross-banding is offered up to the central panel.

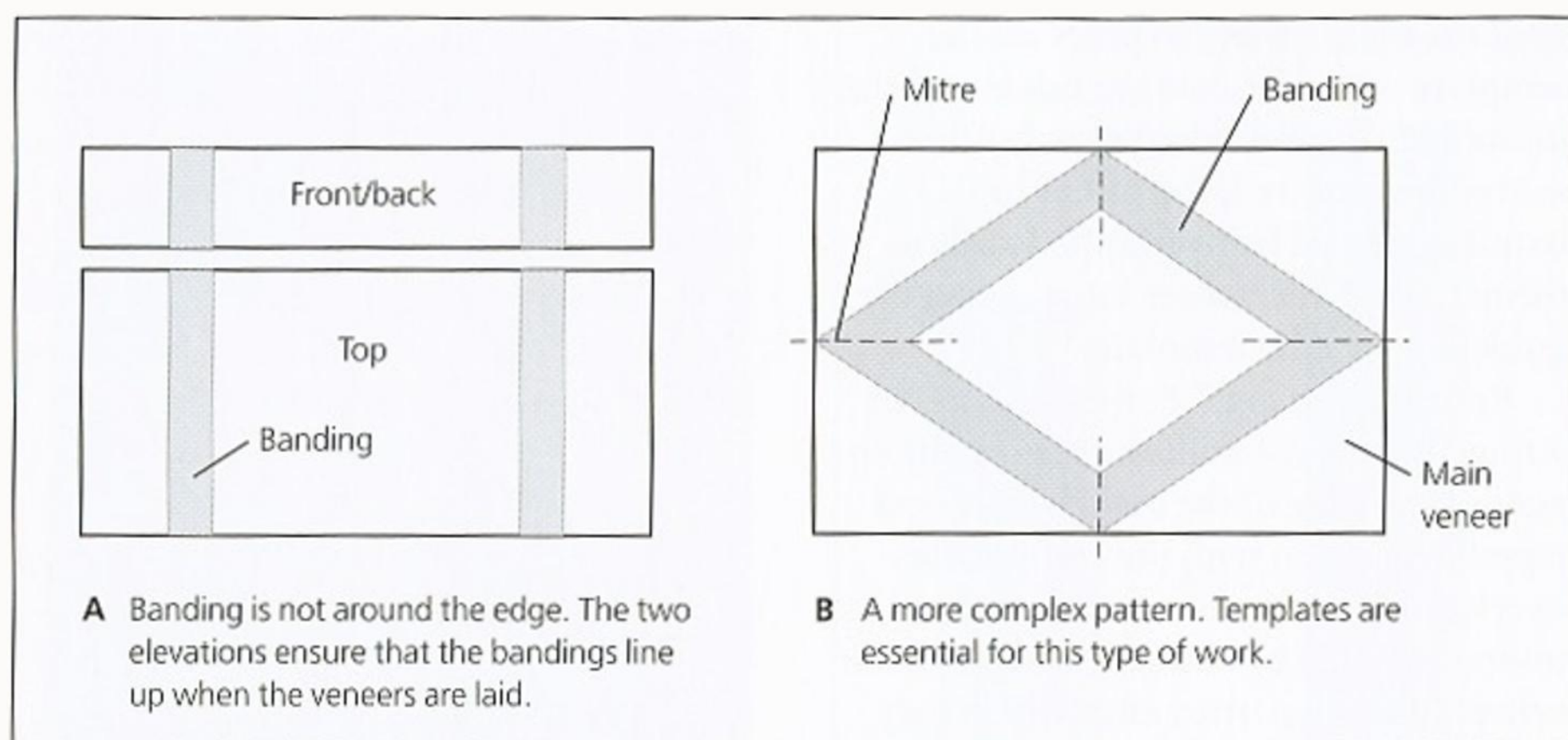


Fig 7.5 Templates for other banding designs

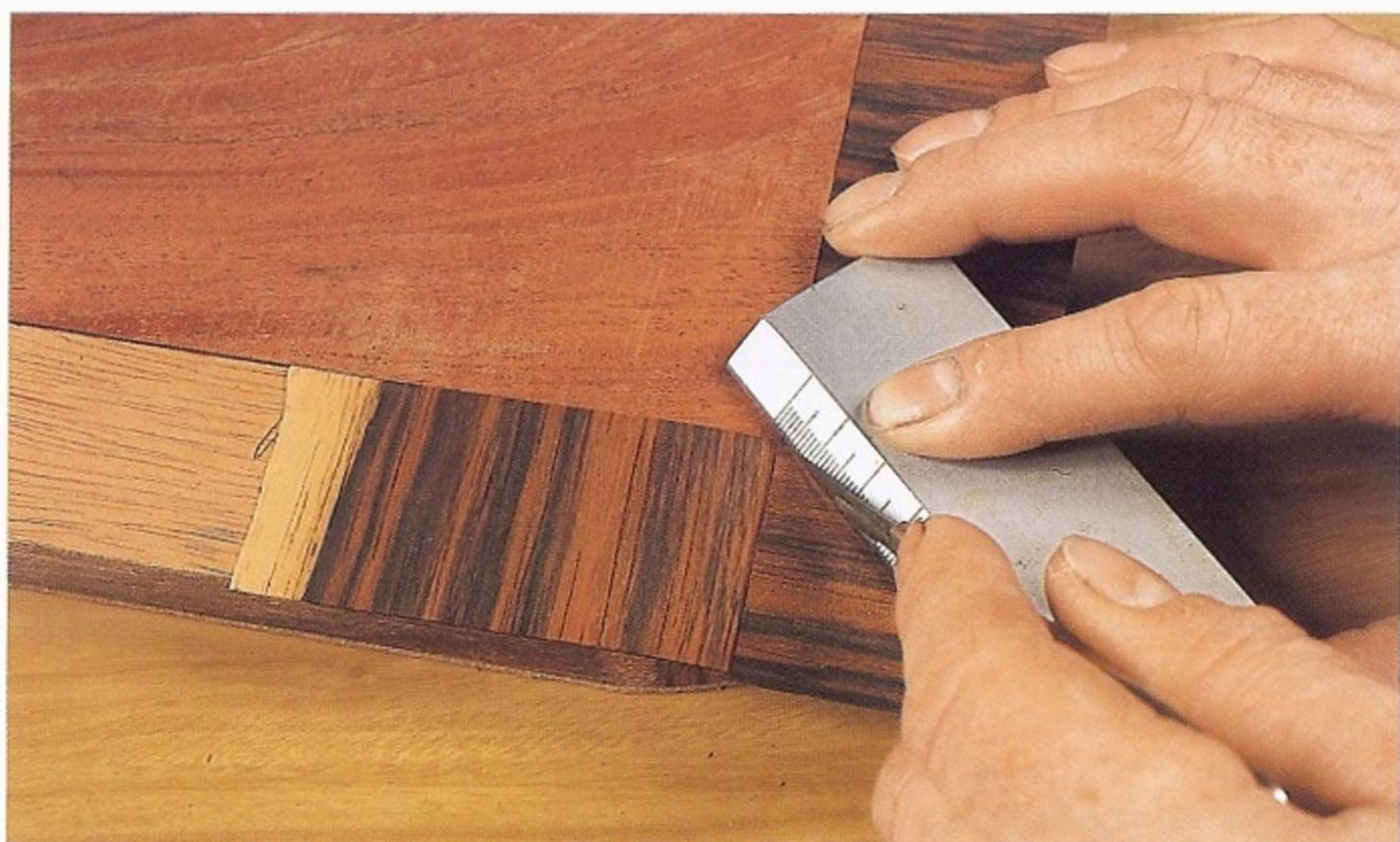


Fig 7.6 Cutting the mitres. A single cut makes the best joint.

main veneer once at the position of the banding, insert the banding and then bring the other piece of main veneer alongside. However, if you think about this, the figure of the veneer will be displaced by a distance equal to the width of the banding. In some circumstances this may look a little odd,

especially if the veneer is highly figured (as with burr or curl) and the banding is wide. It is better to remove a strip of the veneer equal to the width of the banding, using the template as a guide, so that the figure of the main veneer will maintain a continuity across the banding. Veneer pins should be used to

hold the main veneer in place on the template while the cuts are made and the joints are assembled and taped. Where mitres are required, the pieces of banding should be overlapped and cut through with the veneer knife, using the guide lines on the template.

Returning to Fig 7.6, the banding, or string, and cross-banding are brought up against the edge of the main veneer and taped in position with the components overlapping at the corners. The mitred joints are made by cutting through all the veneers at each corner, after which they are taped (*see* Fig 7.6). The panel is then ready to lay by press. (*See* Chapter 4.)

Shaped work

This is somewhat more awkward work to deal with. In practice, most strings or bandings used in curved work will be narrow. Clearly, broad inlays are going to be a problem as they will resist being bent to fit. This is especially the case with bandings, which are much more likely to break up as stress is placed on the joints between their component pieces. Therefore, narrow strings rather than bandings are more likely to be found as inlays in this type of work.

The central panel is prepared and secured on a template as usual. The string is brought up to the edge of the panel and secured with veneer pins pushed into the template, to hold the string against the central panel. Only fairly short sections of the string are brought into contact with the edge at any one time: to attempt the whole length at once could produce too much stress and cause the work to spring open. After the position of the string is secured, the cross-banding or other edge veneer is fitted up against it, and the completed joints are taped. This section of the string is now secure and you can gradually

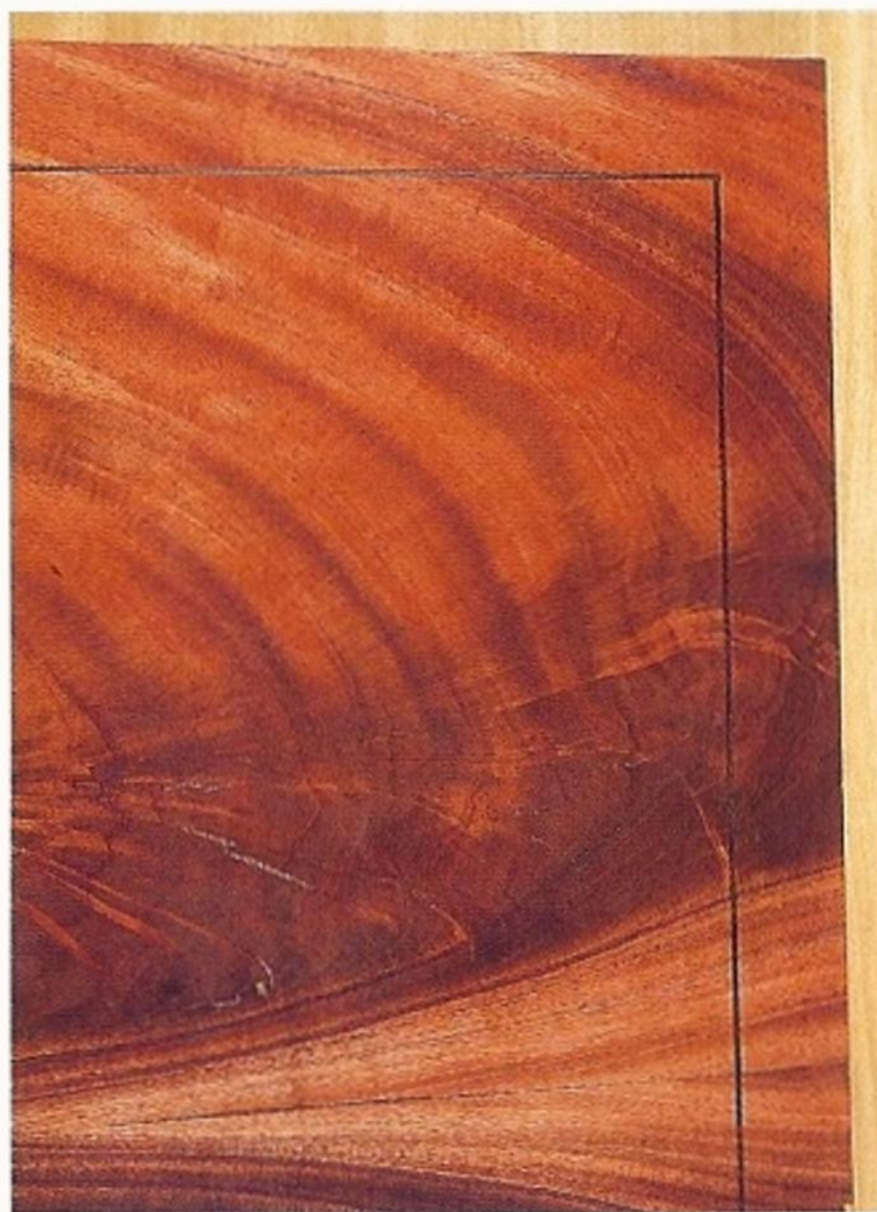


Fig 7.7 The black string inlay in this highly decorative curl mahogany veneer does not break the continuity of the figure.

work your way around the rest. When the string and edge veneer have been taped into place, the built-up pattern can be laid on the groundwork using one of the press methods which are described in Chapter 4.

After laying

The alternative to incorporating the string or banding before laying is to cut a groove in the main veneer after laying and insert the string into the groove before pressing the work again.

Figure 7.7 shows the type of work that would suit this approach. The string is laid into the body of the main veneer after laying so that it does not interrupt the continuity of the figure of the main veneer. The groove can be cut by hand, but can be more conveniently, and less laboriously, cut by machine. The

portable router makes the work relatively easy, even on shaped work, such as a round table top.

For small work, such as a decorative box, the router is not very useful because the working surface is not large enough to support the base of the machine.

An advantage of inserting strings and bandings after laying, is that they can be inlaid into a veneered or solid wood ground. In fact, in the latter case, there would be no other way of carrying out the job.

Using a scratchstock

To form a groove by hand you can use a scratchstock (see Chapter 2, page 25). Cutters for this tool are made from old saw blades that are cut, ground or filed to shape. The cutting edge should be the same width as the string or banding. To be sure of the tool, try it out on a piece of scrap wood to check that the string or banding fits the groove. Obviously, it will be too late once you have cut the groove in the work itself only to discover that it is the wrong size or at the wrong distance from the edge.

The shape of the cutting edge is worth considering for a moment or two. The tool works, remember, by scraping the surface of the wood. Narrow blades can simply be filed square across leaving a small burr on the edge (see Fig 7.8A): as the blade scrapes the surface, the burr will help cut the fibres. When the string or banding is a little wider, filing a slight notch into each side will help the blade make a cleaner cut (see Fig 7.8B). The slight point that this makes at each side of the blade cuts the fibres of the wood when working the tool across the grain.

The blade should be inserted into the stock so that it protrudes enough to cut a groove equal to the thickness of the inlay, and should be positioned at a

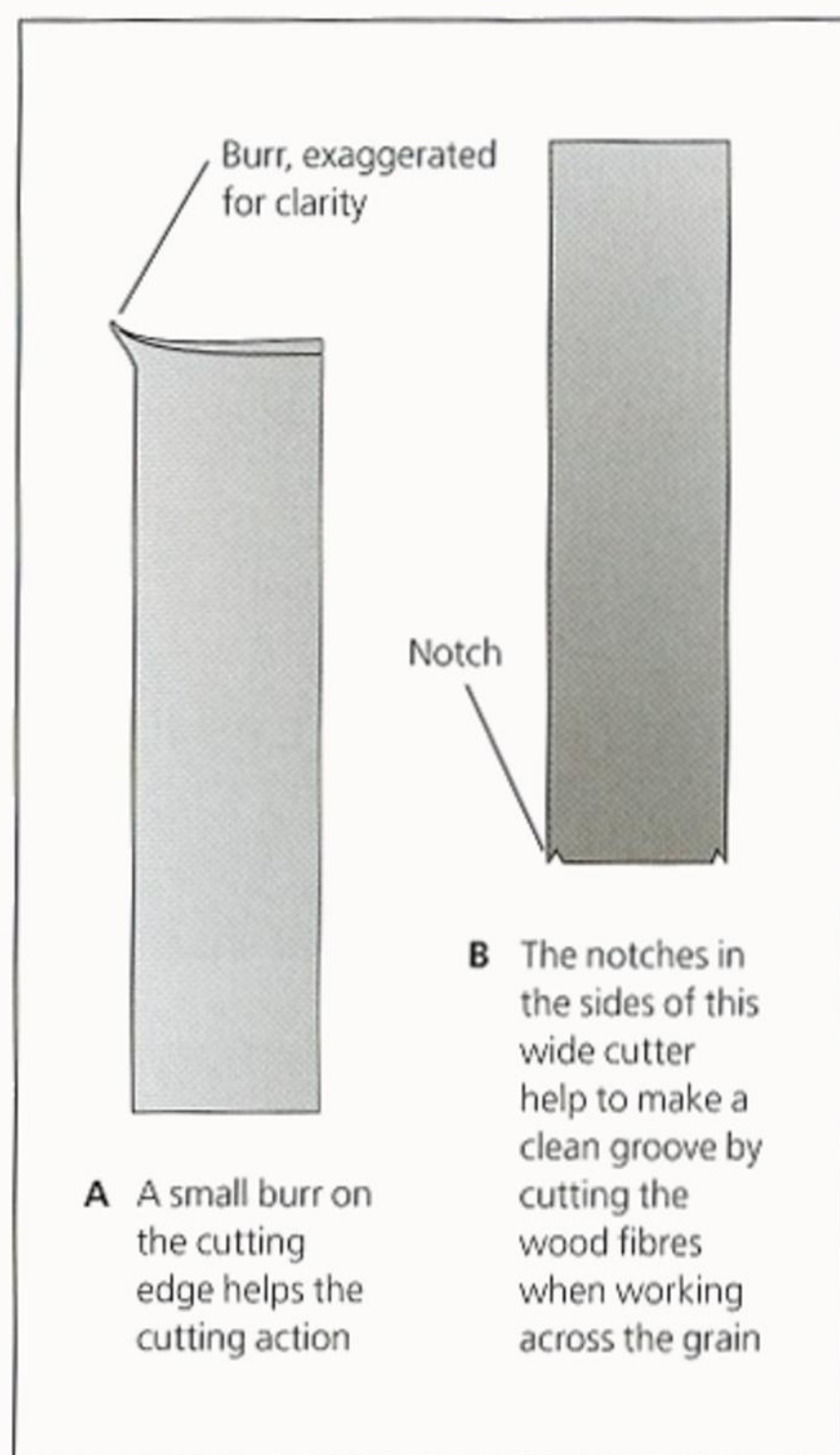


Fig 7.8 Making the cutter of a scratchstock.

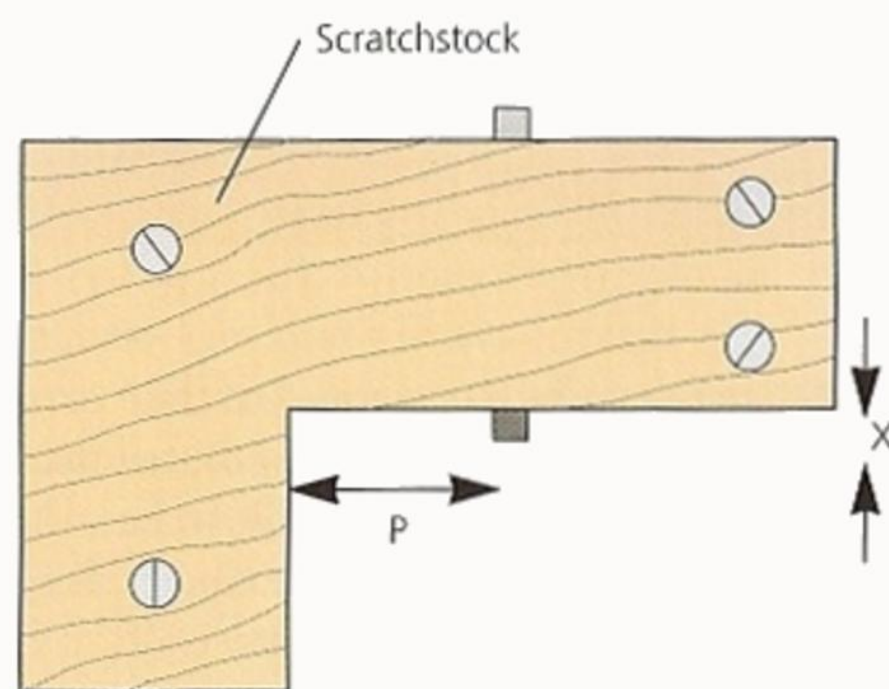


Fig 7.9 Cutter position in the scratchstock. Distance X represents the depth of cut which should equal the inlay thickness, or be very slightly less. Distance P represents the distance of the inlay from the edge of the work.

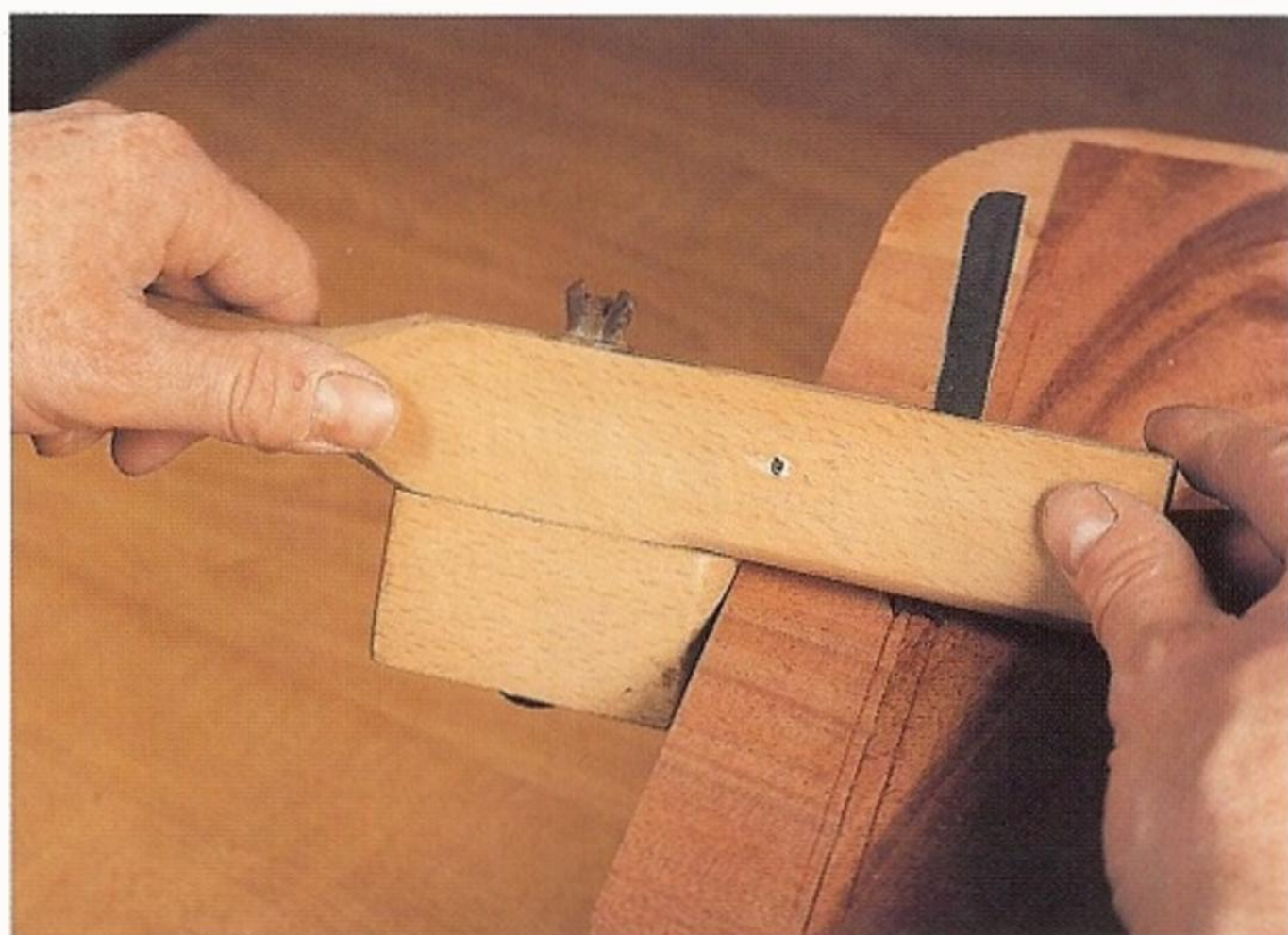


Fig 7.10 Using the scratchstock. Note how the fence is held tight against the edge.



Fig 7.11 A specially made scratchstock for circular work.

distance from the fence equal to the distance of the inlay from the edge of the work (see Fig 7.9). It is difficult to be accurate in cutting the groove depth, but it is better to err very slightly on too shallow than too deep. In other words, it is better for the inlay to be ever so slightly proud rather than to sink below the surface. The difference can be removed when sanding the work afterwards. As mentioned before, it is also a good idea to practise on a piece of

scrap timber to get it right. It is also worth noting that if the edge of the work is to be moulded, this should be done after the inlay has been laid. If you mould the edge before using the scratchstock, you may make it difficult for the fence of the tool to make a good contact. In other words, the scratchstock may wobble, leading you to make an untidy, irregular cut.

The position of the inlay needs to be drawn onto the surface to be inlaid, in

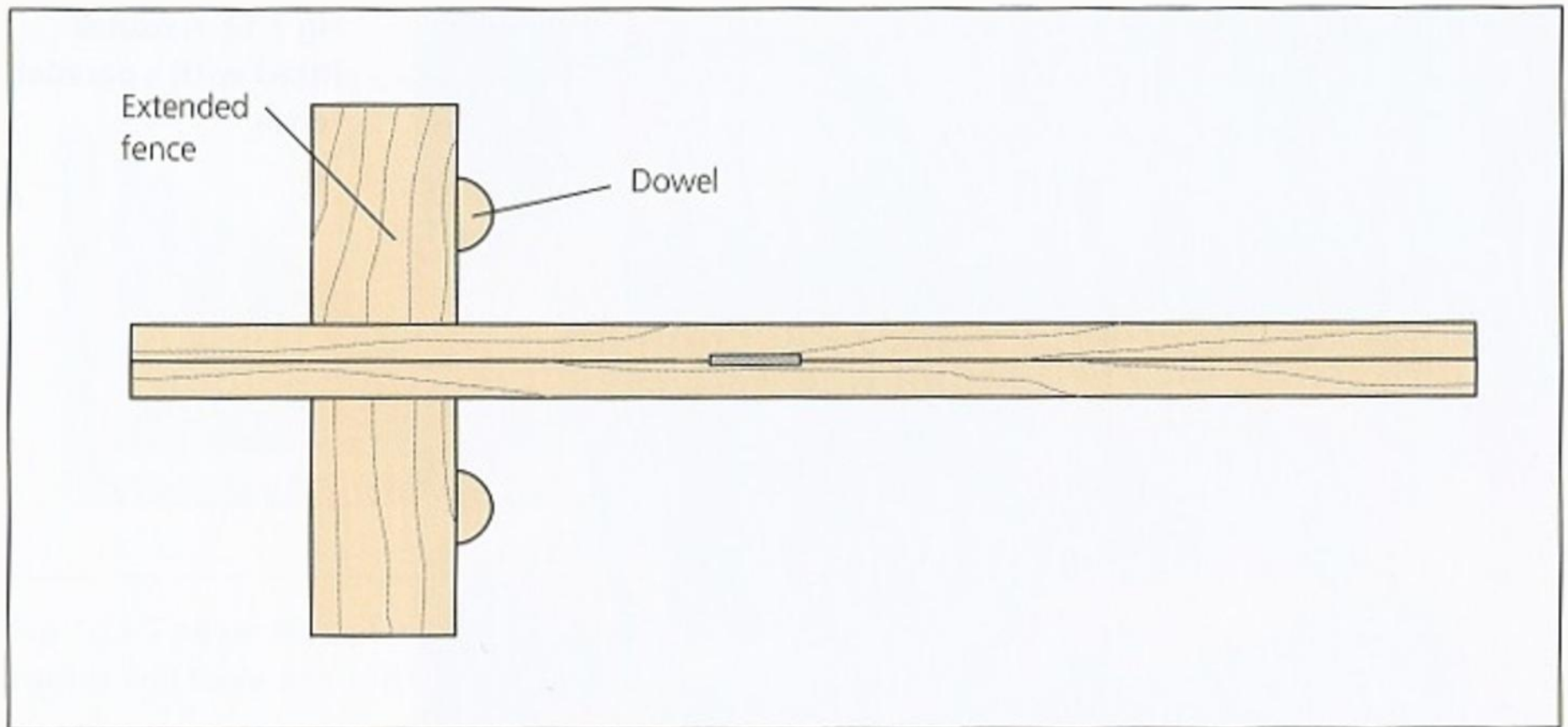


Fig 7.12 The extended fence and dowels maintain stability as the scratchstock is worked around the edge.

pencil. This is important, as it shows where the inlay will meet at the corners, so that these positions are not over-shot. The fence is held tight against the edge and the cutter is worked along the surface to create the groove (see Fig 7.10). Shavings and dust need to be cleared from the surface at regular intervals to prevent them interfering with the progress of the work. Do not work right into the corners, as it is difficult to make them clean and tidy. Instead, leave a fraction of the surface intact and use a veneer knife or chisel to complete clean, square corners.

A modified scratchstock, as shown in Fig 7.11, is used to cut a groove in circular or oval work. The fence is modified to allow it to work around a curved edge without wobbling. Its width and the two half dowels ensure that it remains stable as it is pressed against the edge of the work (see Fig 7.12). It should be noted that for circular or oval work, the inlay will need to be bent to fit the curvature. This means that only very narrow strings or bandings can be used. Wide inlays do not flex easily, and if they

do flex, are put under tremendous strain. This puts the bandings at great risk of disintegrating as the adhesive holding the component parts together begins to fail under the pressure.

Using a router

Modern routers and their cutters are sufficiently versatile to allow very fine work to be undertaken. The depth of cut on many machines can be very finely adjusted, and they are supplied with a parallel fence, enabling them to cut grooves parallel to the edge of the work (see Fig 7.13). Among the optional accessories that are available is a trammel bar – this enables a router to cut a circular groove (see Fig 7.14). Alternatively, a template can be used to guide the machine as it cuts a groove. For this type of work, the cutters normally employed are straight, single or double fluted, with a bottom cutting edge, for a good, cleanly cut groove. If you are cutting against a template, specially designed cutters with a guide roller are available.

In square or rectangular work, the

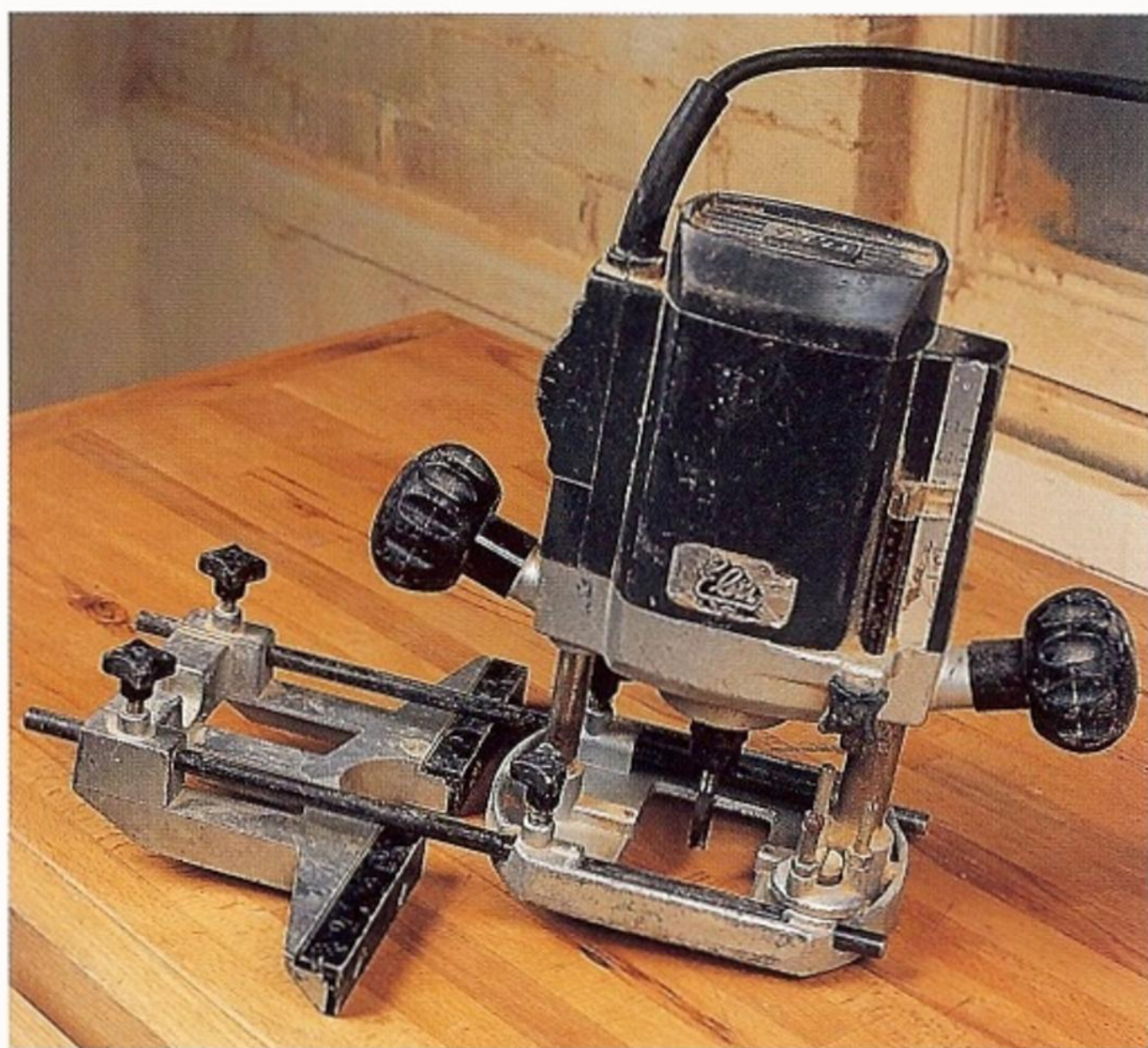


Fig 7.13 A router fitted with a parallel fence.

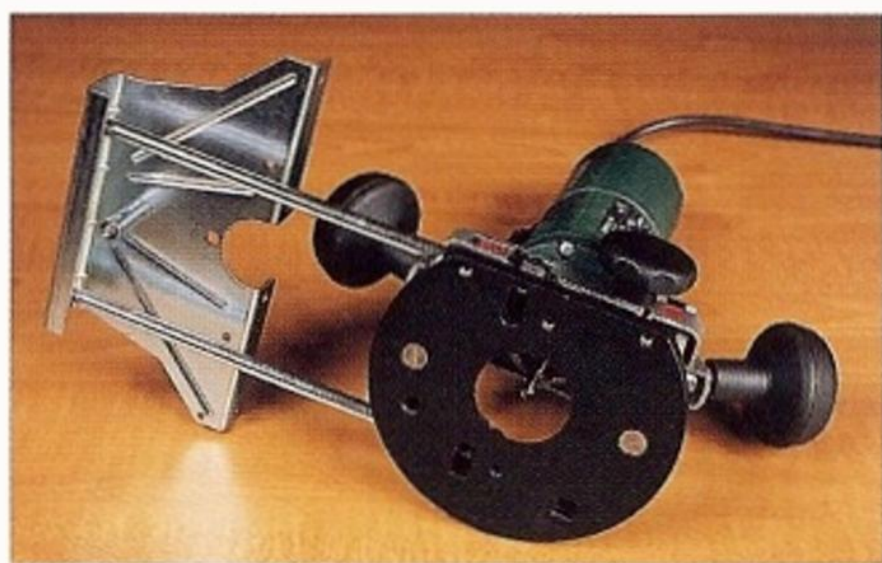


Fig 7.14 A trammel bar fitted to the router for cutting a circular groove.

position of the inlay should be marked in pencil so that the corners can be located, in order to avoid over-shooting them. Use a straight cutter that has the same width as the inlay, and practise on scrap timber to get the depth of cut and distance from the edge absolutely right. When you are satisfied that all is well, cut the groove in the work. You can work right into the corners of the inlay position, but it will have a rounded

edge (see Fig 7.15). Square off the corner with a veneer knife or chisel (see Fig 7.16).

Shaped work, such as a round or oval table top, presents several possibilities for cutting the groove. The first is to use the trammel bar accessory for the router so that it works like a compass. A template is another possibility, but this is less reliable and needs to be positioned very accurately and anchored to the work to avoid damaging the rest of the surface. A template also takes time to make, so is not really appropriate for one-off work. A third option is to modify the parallel fence supplied with the router – Fig 7.17 shows such a modification. The router is fitted with a removable fence that has two rounded pieces of wood (cut from hardwood dowel) glued to the surface: these allow the router to work a groove at a fixed distance from the edge, without rocking over the curve of the edge.

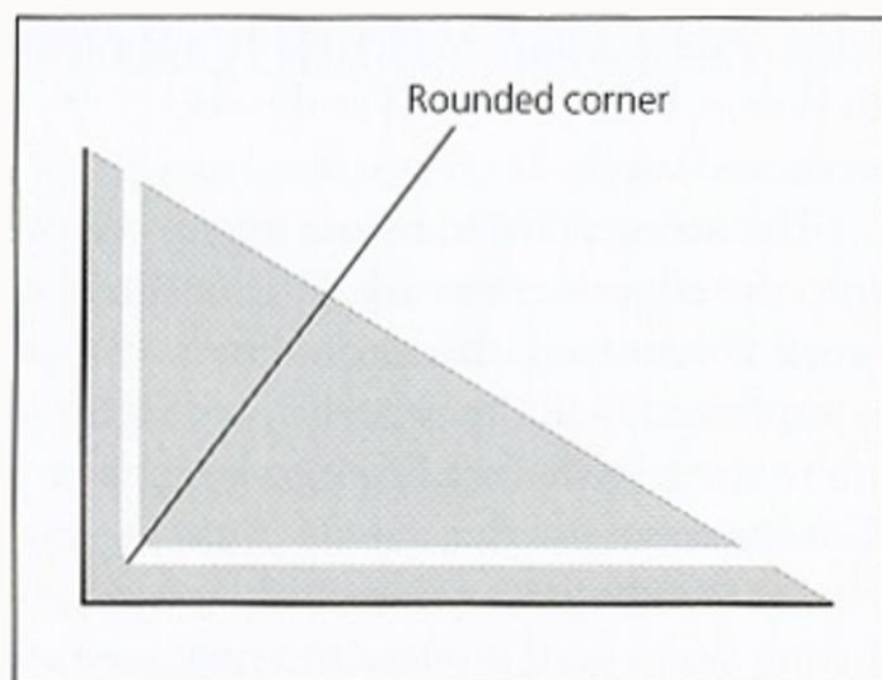


Fig 7.15 The corners of a groove cut with a router will have a rounded profile.



Fig 7.16 Use a veneer knife or chisel to square off the rounded corners.

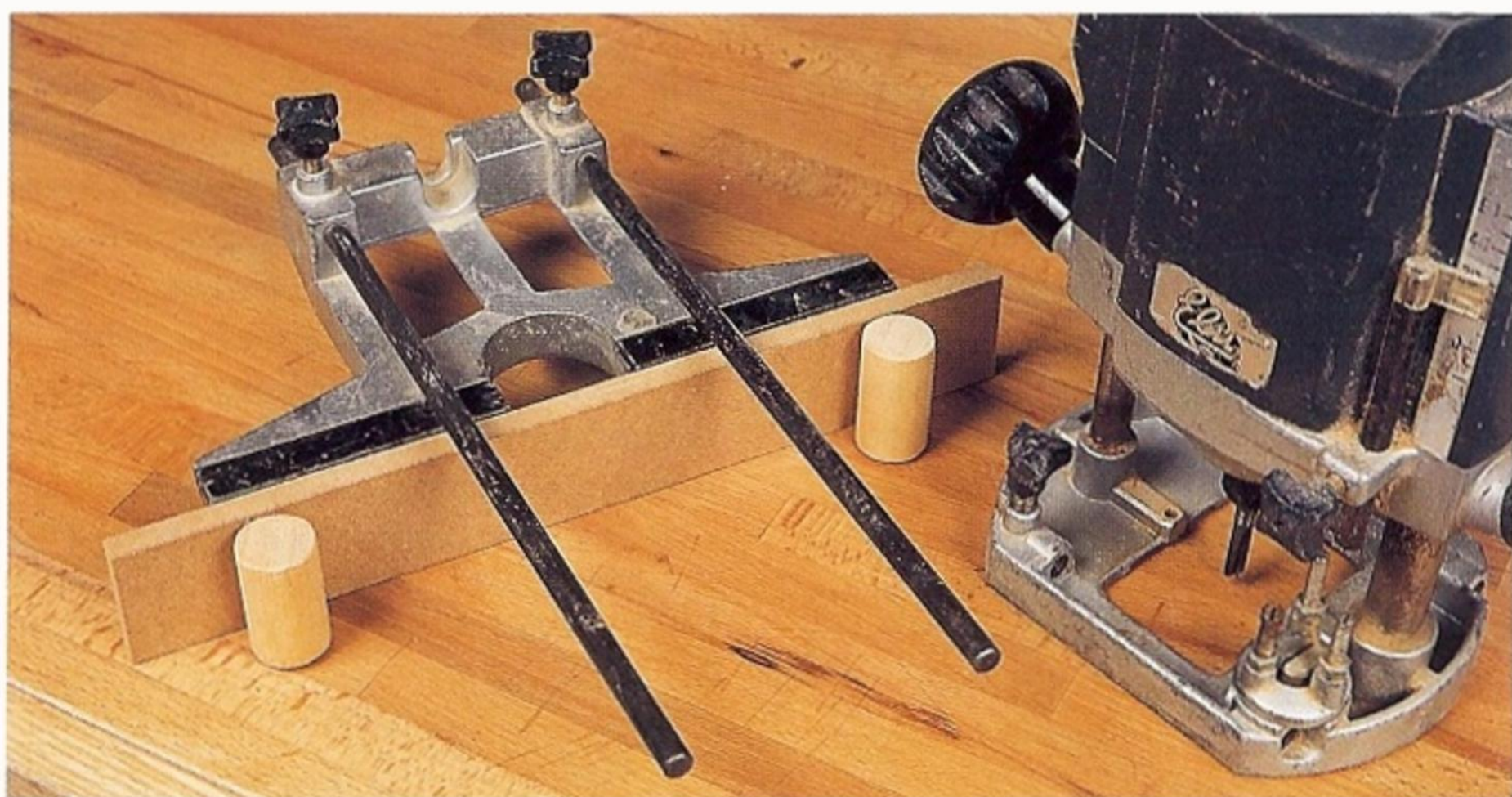


Fig 7.17 A modified parallel fence for use with the router on circular work.

Fitting the string or banding

Only a very small amount of glue is needed for fixing strings or bandings. Too much will prevent them from fitting properly in the groove, and may even prevent narrow strings and bandings from fitting at all, as the glue takes up the available space.

In the case of straight-sided work, such as a square or rectangular table top, the inlay is fitted into the groove one side at a time. The inlay is cut to length by

laying it up against the edge of the groove and marking it off. It is easier to pre-cut the mitre as its position in the groove makes cutting it afterwards awkward. Very narrow strings can be mitred freehand with a chisel, but wider strings and bandings will need to have the position of the mitre marked and then be cut accurately with a veneer knife and straightedge. Alternatively, an accurate mitre saw may be used. After brushing on a very thin layer of glue in the groove,

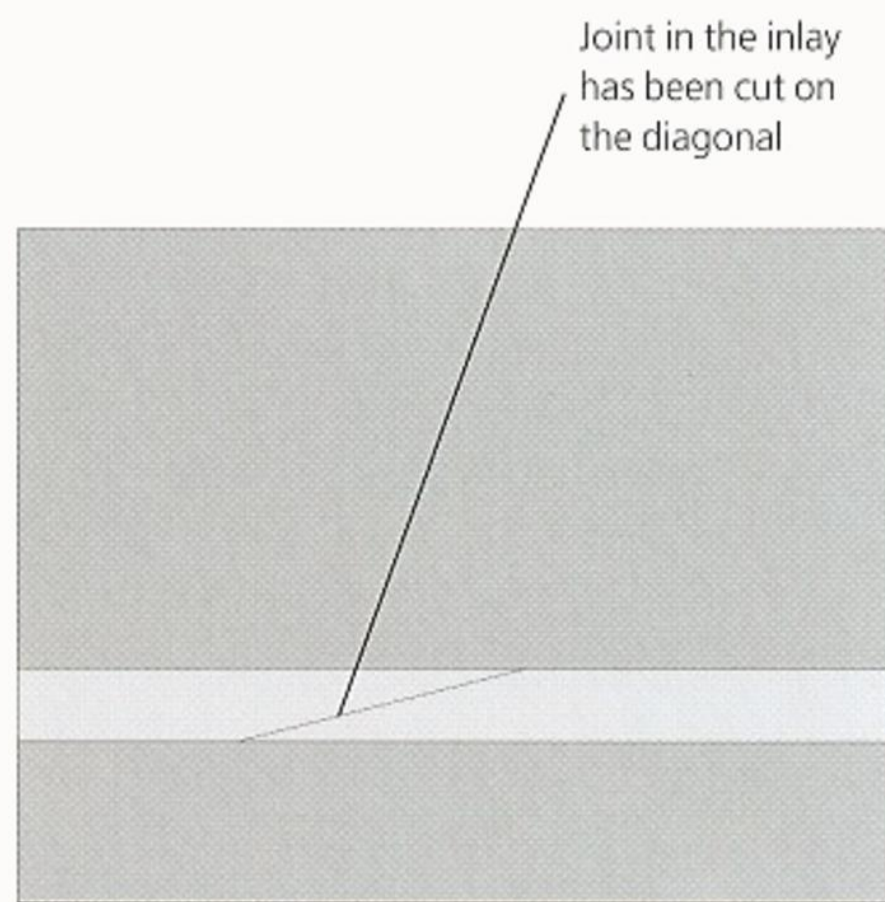


Fig 7.18 Cutting a joint between adjacent strings diagonally will make it less noticeable.

press in the inlay on the first side. Treat the remaining sides in the same way, fitting each to its neighbour.

With circular work, the process may involve more than one string being fitted because a single piece is often not long enough to complete the circumference. Where this is the case, joints between adjacent strings should be on the diagonal to make them less noticeable (see Fig 7.18). This is difficult to achieve at the completion of the circumference when the end meets the beginning, as it were, because you need to make the cut very accurately to prevent a gap from showing. Apart from the last joint that completes the circumference, all the others can be made before the string is placed in the groove.

FITTING SQUARE STRINGS AT AN EDGE

Square-sectioned strings are designed to be fitted to the edge of the work. The contrast between the colour of the string and the rest of the surface gives a very definite and cleanly defined shape to the

edge. The technique is frequently applied to boxes, both veneered and non-veneered work.

The string is fitted into a rebate cut into the edge of the work. Where the work is veneered, this should be completed, with the veneer taken right up to the edge before cutting the rebate. Cut the rebate with a rebate plane, a router fitted with a rebate cutter, or for fitting very small sectioned strings, with a scratchstock. The rebate plane is only suitable for square or rectangular work, but the router and scratchstock can be used on work of any shape.

Figure 7.19 shows how the string is fitted into the rebate. Holding it in place is quite tricky because of the position, but the method illustrated will do the job very well. You can use string or rubber bands, but the simplest and most effective way is with strips of masking tape at regular intervals along the string's length, as shown in Fig 7.19. Where there are corners that are to be rebated, this should be done before fitting.



Fig 7.19 Holding a square string in its rebate while the glue dries.

MARQUETRY MOTIFS

While marquetry and inlaying are really separate techniques, there are occasions when small, ready-made marquetry motifs are incorporated, or 'inlaid', into a plain veneer background. There is a wide range of motifs available from veneer suppliers – Fig 7.20 shows some traditional marquetry designs that can be bought 'off-the-shelf'.

INCORPORATING MARQUETRY MOTIFS

As with strings and bandings, marquetry motifs can be incorporated into the design either before or after laying.

Before laying

This method can only be adopted if the veneers are to be laid using a press. Hammer veneering techniques are not appropriate because of the need to build up the pattern in advance. The motif, or any template that may be supplied with it, is carefully positioned on the main veneer and the outline marked with a

veneer knife. The waste veneer is then cut away and the motif fitted into the space and taped in place. A built-up pattern is laid using one of the press methods described in Chapter 4.

After laying

You may prefer to lay the main veneers first and add the motifs afterwards. This is the usual technique where the main veneers have been laid using the hammer method, and the only technique where motifs are added to an already existing veneered surface.

The motif is marked out on the main veneer and a knife used to cut through the veneer. Clearly, the waste cannot be simply lifted out, and it is necessary to carefully remove the waste with sharp chisels. If you are very careful and confident using a router, you can remove most of the waste with it and then clean up around the edges with the chisel. After the waste has been removed, the motif can be glued into position and the joint taped before applying pressure in a press or with cauls.

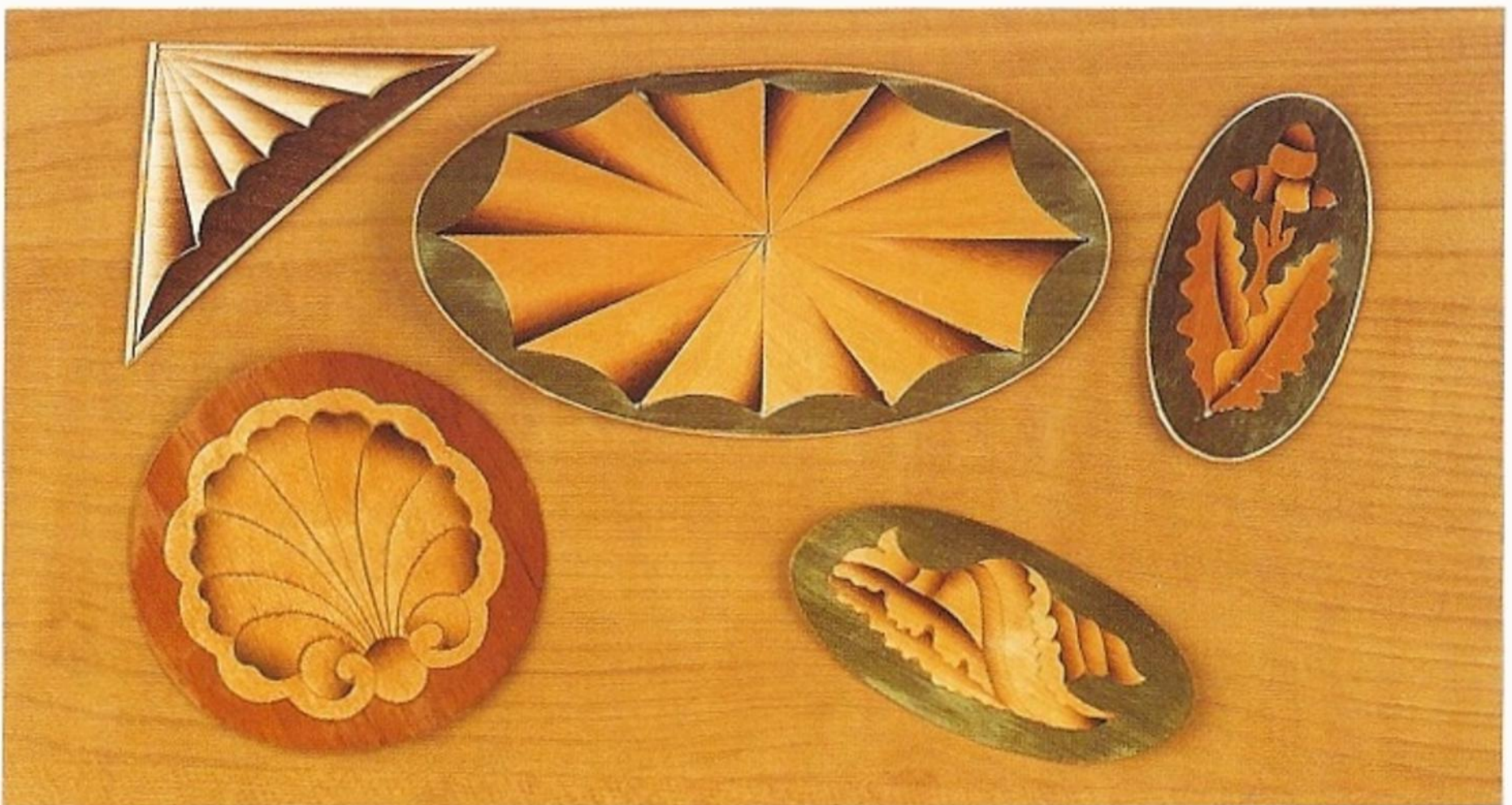


Fig 7.20 Examples of marquetry inlay motifs.

PARQUETRY

- ◆ THE NATURE OF PARQUETRY
- ◆ SQUARES AND RECTANGLES
- ◆ DIAMONDS
- ◆ HANDLING ASSEMBLED VENEERS
- ◆ FINAL POINTS TO CONSIDER

THE NATURE OF PARQUETRY

Some of the most exciting decorative effects with veneer have been created using strongly contrasting grain configurations of a single species of wood rather than contrasting colours. Traditional parquetry is the use of veneer in geometric shapes, in which varying grain directions of the component pieces reflect light in different ways, creating areas of light and dark which change as the viewer's position changes. Other parquetry effects incorporate colour differences as well, the classic example being the chessboard design. The shapes most commonly associated with parquetry are squares, rectangles and diamonds.

Because the technique involves the principle of tessellation, i.e. the repeated use of geometric shapes that fit together without any gaps, there are two major principles that need to be observed. The first is the need for good

draughtsmanship, and the second, the need for consummate care in cutting the shapes accurately. Not all shapes will tessellate – they must first satisfy some basic conditions of geometry. This is where good draughtsmanship comes into its own, and as a matter of good practice, a template should be marked out. This not only provides a base upon which to build the design prior to laying, it also gives you the opportunity to check that the design will work before you start cutting veneer.

The important point to remember with parquetry is that its success depends very much on the accuracy of cutting angles. The work is usually repetitive (i.e. you cut fairly large numbers of the same shape and size components) and the task of cutting these accurately is made much easier with the aid of parquetry jigs (*see* page 26). The need for great accuracy in making the jigs cannot be over-emphasized. Any errors in their construction will be compounded when

the component veneers are built up into the pattern. The two critically important factors in successful parquetry are:

- accurate cutting of angles, which is achieved by the careful use of accurately made jigs; and
- taking time to consider the direction of the grain in the veneer sheet relative to the way it is cut to make the component shapes.

With respect to the second point, it is worth spending some time practising cutting the pattern out of paper with the grain direction marked on to see just how the grain pattern in the main sheets of veneer should be aligned before you commit yourself to cutting the veneer itself. What may work in your head may not work in practice because of some geometrical quirk that you did not think about.

Figure 8.1 shows a design that I used some years ago to replace the missing leaf of a dining table. I drew up the

template to check a number of details, marking the position of the cross-banding and the string first, and then the diamonds. The particular problem that needed to be solved was how to match up the diamonds on the leaf with those on the two D-ends so that when the table was fully open, the diamonds showed a continuity across the whole surface. The template provided an opportunity to determine how this could be achieved.

The main shapes that tessellate easily are squares and rectangles, and triangles and diamonds where the angles are either 60° or 120° (see Figs 8.2A and 8.2B). The essential test for tessellation is indicated in Fig 8.2D. If all the angles around point X add up to 360° , then tessellation is possible.

Most parquetry involves the use of regular shapes, such as those illustrated in Fig 8.2. It is also possible to combine different shapes, but you need to draw the pattern to ensure that the design works and then to recreate accurately the shapes you have drawn.

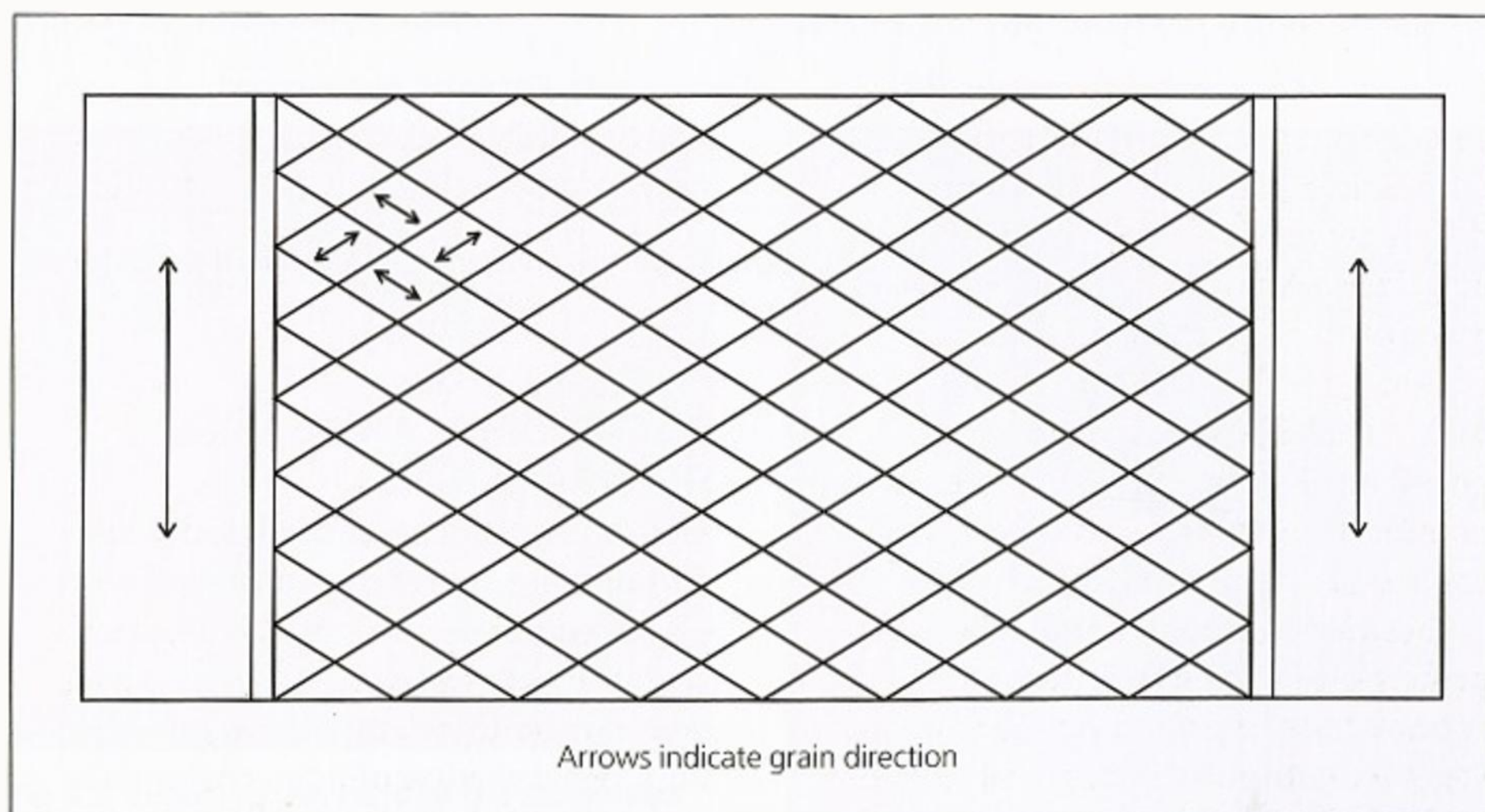


Fig 8.1 This design was a template used to reconstruct the missing leaf of a dining table.

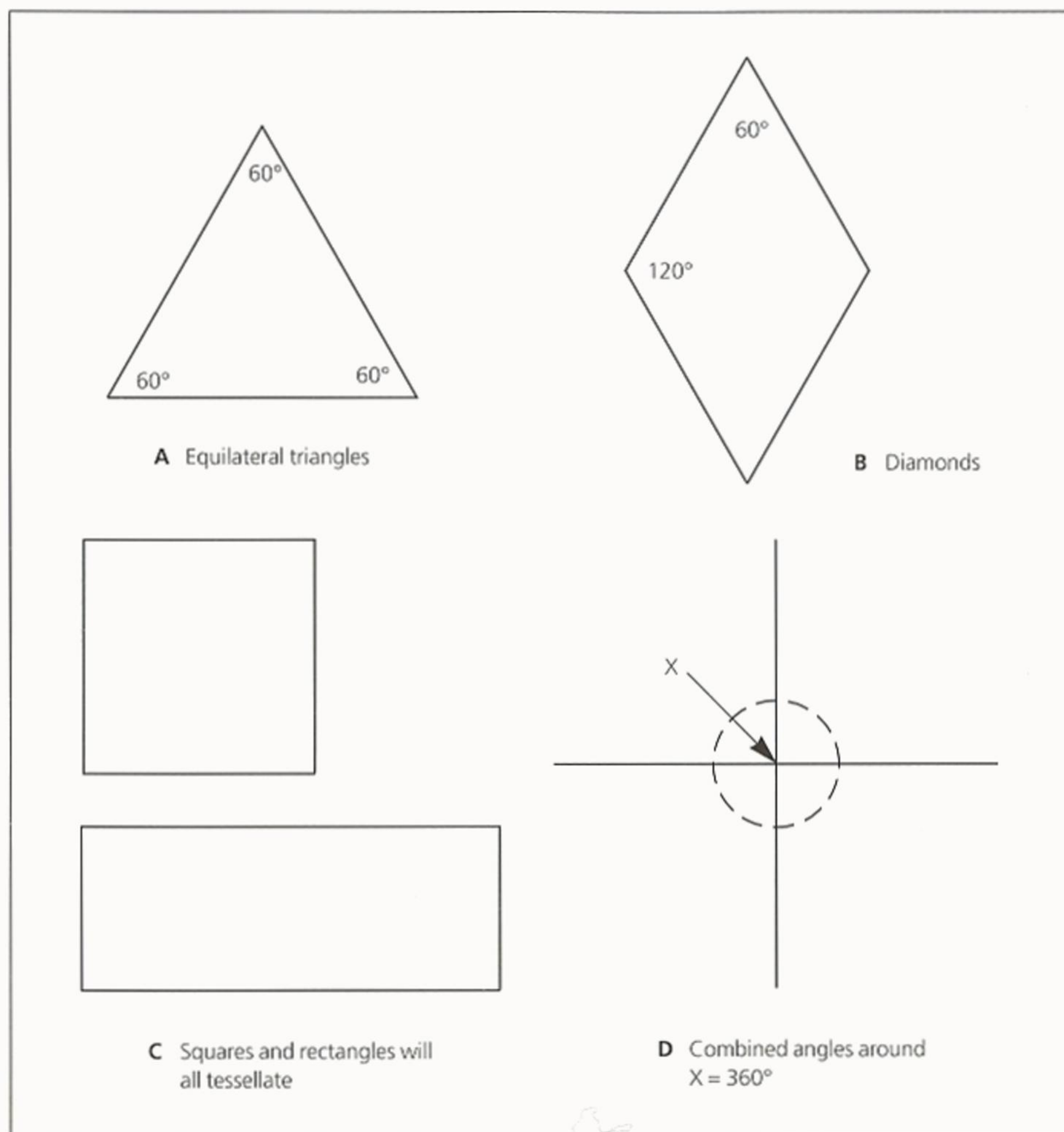


Fig 8.2 The fundamental condition of tessellation is that the combined angles of all the sides at the point of contact, indicated by X, is 360° .

SQUARES AND RECTANGLES

The easiest shapes to cut accurately are squares and rectangles, and they tessellate well. The typical example of this work is the traditional chessboard design. There are, of course, many other possible combinations of squares and rectangles.

CHESSBOARD AND BASKET WEAVE DESIGNS

The traditional chessboard design uses alternating squares of contrasting woods – light and dark (*see* Fig 8.3). Basket weave designs use squares of the same species, and therefore colour, but with the grain direction of adjacent squares alternating (*see* Fig 8.4). At first sight, the method of construction appears to

involve fitting together the individual squares, but this is probably neither the best nor the most efficient way of doing it.

A better way to build up the pattern is to cut parallel strips of veneer, join them together, and then cut across in the opposite direction to create new strips of joined squares. (See Figs 8.5 to 8.8.)

A simple jig will aid the cutting of parallel veneer strips. Figure 8.8 shows

such a jig in use. The straightedge is held against the two spacers (in this instance, coins), which keeps it parallel to the fence. The spacers must be of a width equal to the size of the squares. The first job, however, is to trim the edge of the veneer on a shooting board so that it is straight and butts tight against the fence of the jig. Once this is done, the veneer strips can be cut with one stroke of the knife, which should be held vertically.

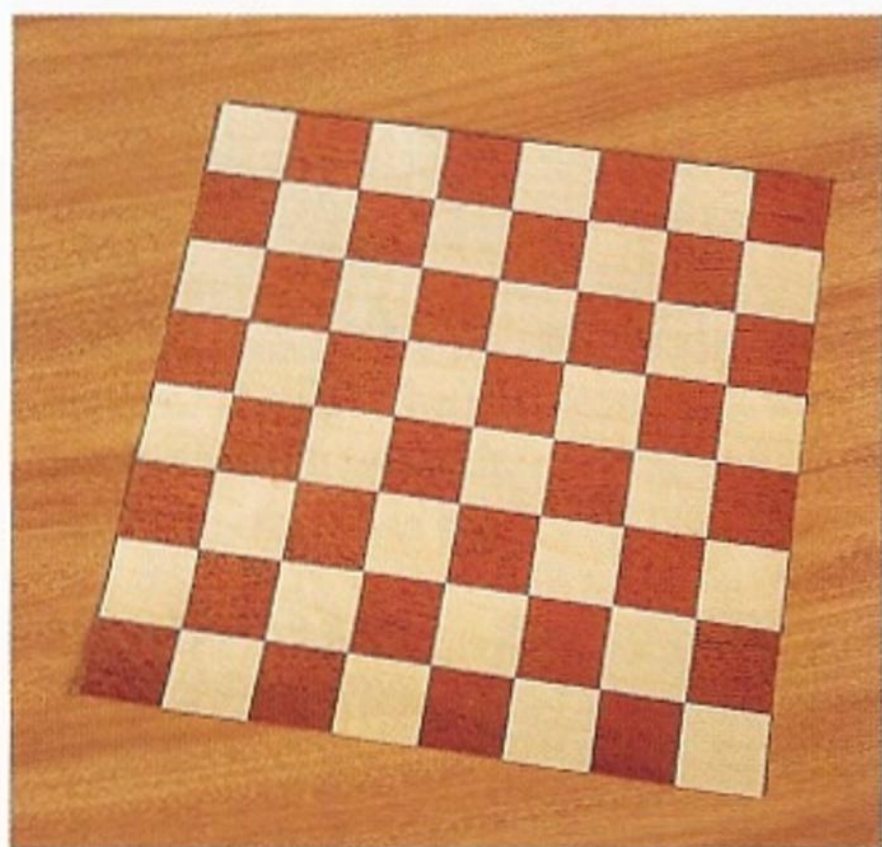


Fig 8.3 Traditional chessboard design using squares of contrasting colours.

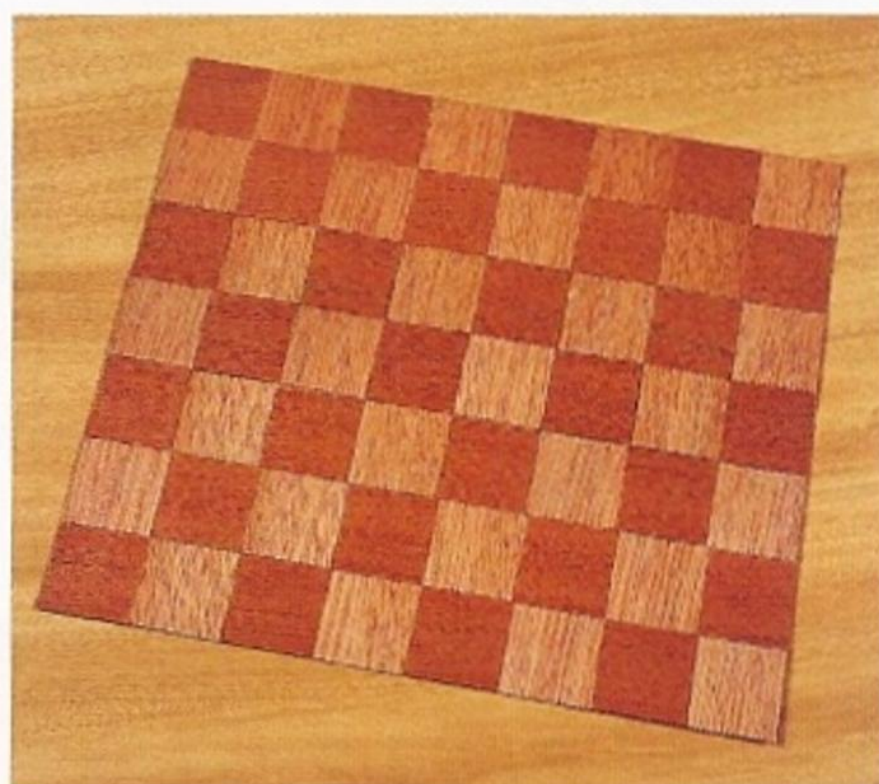


Fig 8.4 This 'basket weave' effect is generated by using squares of the same species, but with alternating grain direction.

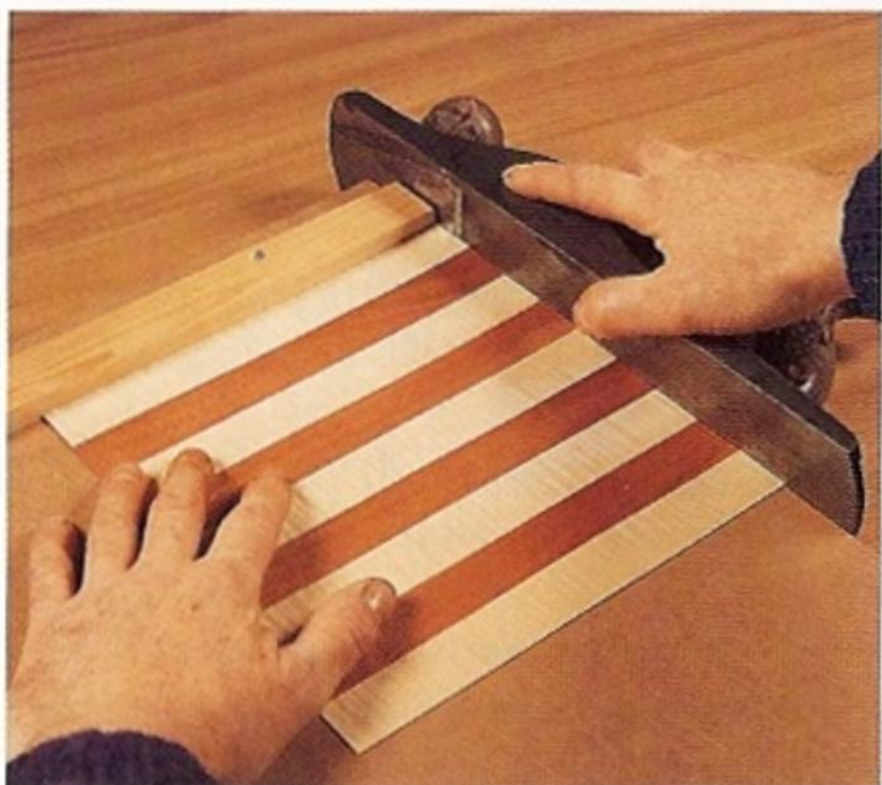


Fig 8.5 Shooting the edge of the assembled strips that will butt against the fence on the cutting jig.

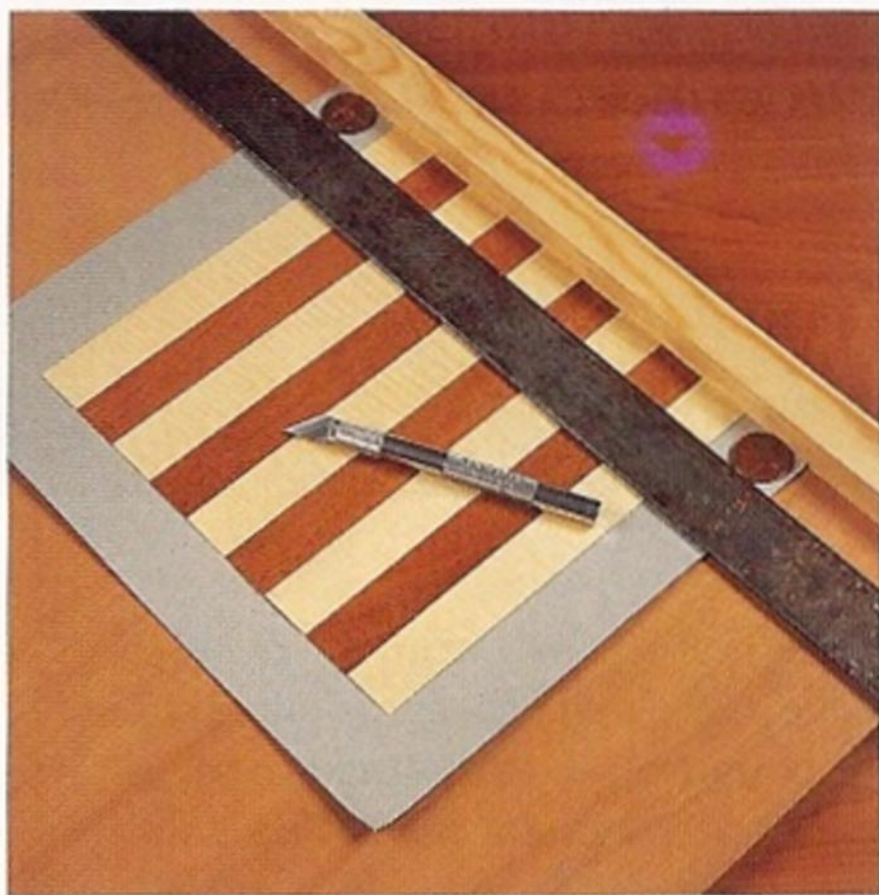


Fig 8.6 Cutting the strips of squares.

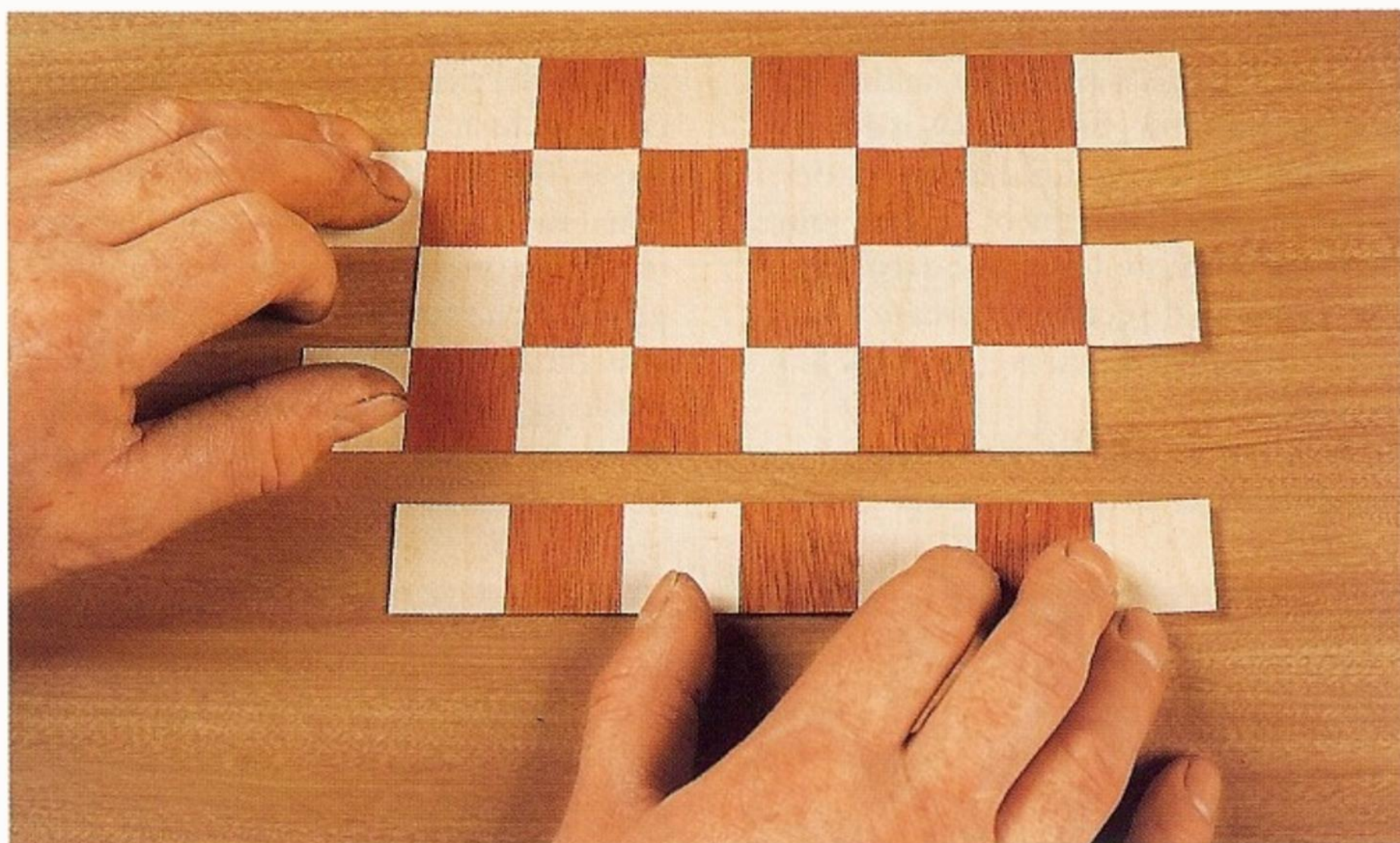


Fig 8.7 Assembling the strips to form the design of alternating squares.



Fig 8.8 Cutting parallel strips of veneer using the jig.

After cutting each strip, the exposed edge of the main sheet of veneer should be planed on the shooting board, just in case it is not exactly true. This will minimize errors caused by a possible loss of squareness.

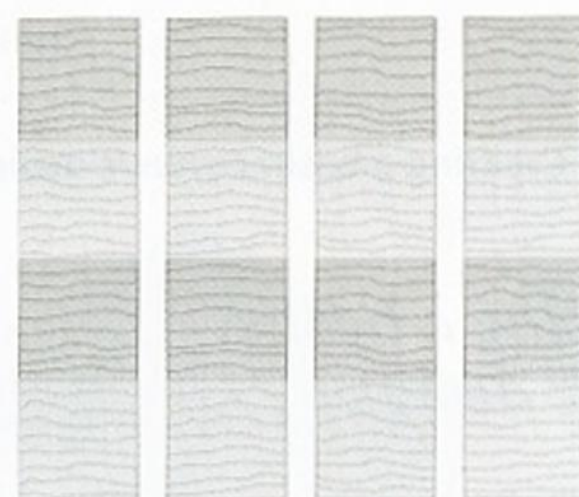
As the shooting board is used several times during the process, and surplus squares must be removed after the final assembly, enough veneer to allow for this wastage, and for the inevitable human error that creeps in, must be included.

Creating a chessboard design

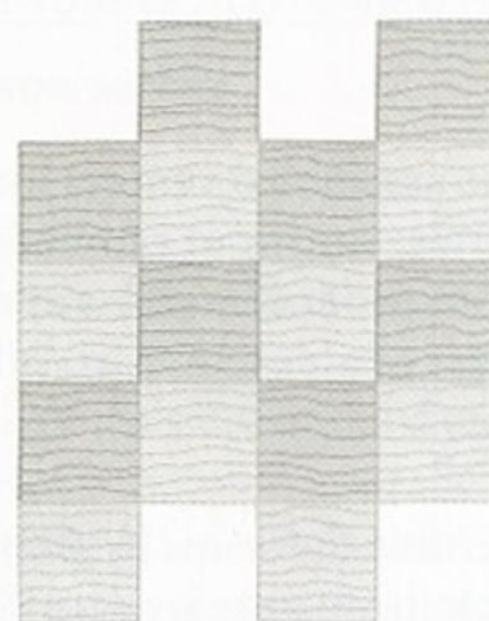
- 1 Cut parallel strips of light and dark coloured veneers.
- 2 Tape the strips together, alternating light and dark veneers (*see* Fig 8.9A). If you use good quality, clear cellulose tape, such as Sellotape, you will be able to see the joints, which will help you later when fitting the whole design together.
- 3 Cut the assembled veneers into parallel strips, this time cutting at right angles to the joints after first truing up the edge that will be placed against the fence of the jig. The end result is a series of strips, each with alternating light and dark squares. (*See* Fig 8.9B.)
- 4 Line the strips up to form a chessboard pattern and tape them together (*see* Fig 8.9C). You should now see why clear tape is helpful in aligning the joints accurately. You will need one square more on each strip than will be used in the final design, because each line will include one square that will be wasted.
- 5 Trim off the surplus squares and true all the sides on a shooting board to prepare the pattern for incorporation into the overall design.
- 6 Finally, lay the assembled pattern following one of the methods given in Chapter 4.



A Cut strips of light and dark veneers, the width of each being equal to the sides of the chessboard squares, then tape alternate strips together.

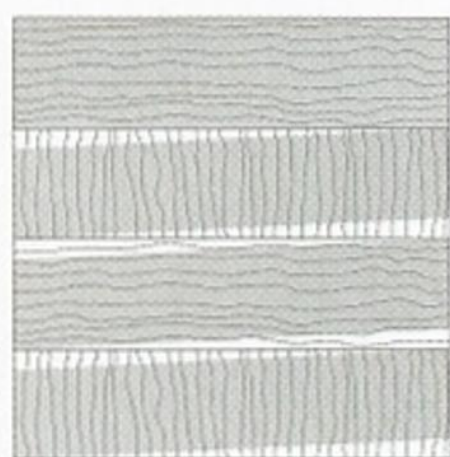


B Cut the assembled work into new strips, cutting at right angles to the original cuts. The resultant strips will be made up of individual squares.



C Line the strips up and tape them together to form the familiar chessboard pattern. Note that there is one extra square at the end of each line caused by the lining up process.

Fig 8.9 Creating a chessboard design.



- A** Cut strips of veneer of different grain direction (the two being at right angles to each other), but of equal width. Tape the alternate strips together.



- B** Cut the assembled work into new strips, cutting at right angles to the original cuts. Line the new strips up and tape them to form a pattern of squares of alternating grain direction. There will be one extra square at the end of each line.

Fig 8.10 Creating a basket weave design.

Creating a basket weave design

- 1 Cut the veneers (usually of a single species) into strips.
- 2 Tape the strips together, so that alternate strips have the grain direction running along their length and across their width respectively, as shown in Fig 8.10A.
- 3 Cut the assembled veneers into parallel strips, cutting at right angles to the joints, to produce a series of strips with squares of alternating grain direction.
- 4 Reassemble the strips by shifting each one along one square (see Fig 8.10B). Again, this will produce a waste square at the end of each row.
- 5 Trim away the surplus squares before shaving all four sides square on the shooting board.

- 6 Lay the assembled veneer following one of the methods given in Chapter 4.

DIAMONDS

The use of 60°/120° diamonds is very common in parquetry work, with triangles used a little less. Much of the effect they generate relies on the interplay of light and alternating grain direction: Fig 8.11 illustrates a similar effect to that seen in the basket weave pattern described in the last section, using alternating grain direction. In fact, apart from the obvious need to work out how to cut the veneer at appropriate angles, the method of construction is similar. The effect illustrated in Fig 8.12, on the other hand, is a little more laborious. The impact of this cube design is stunning. Individual diamonds are fitted together to generate two optical illusions: one, that the pattern is a series of cubes and the second, that the orientation of these cubes changes as you look at them.

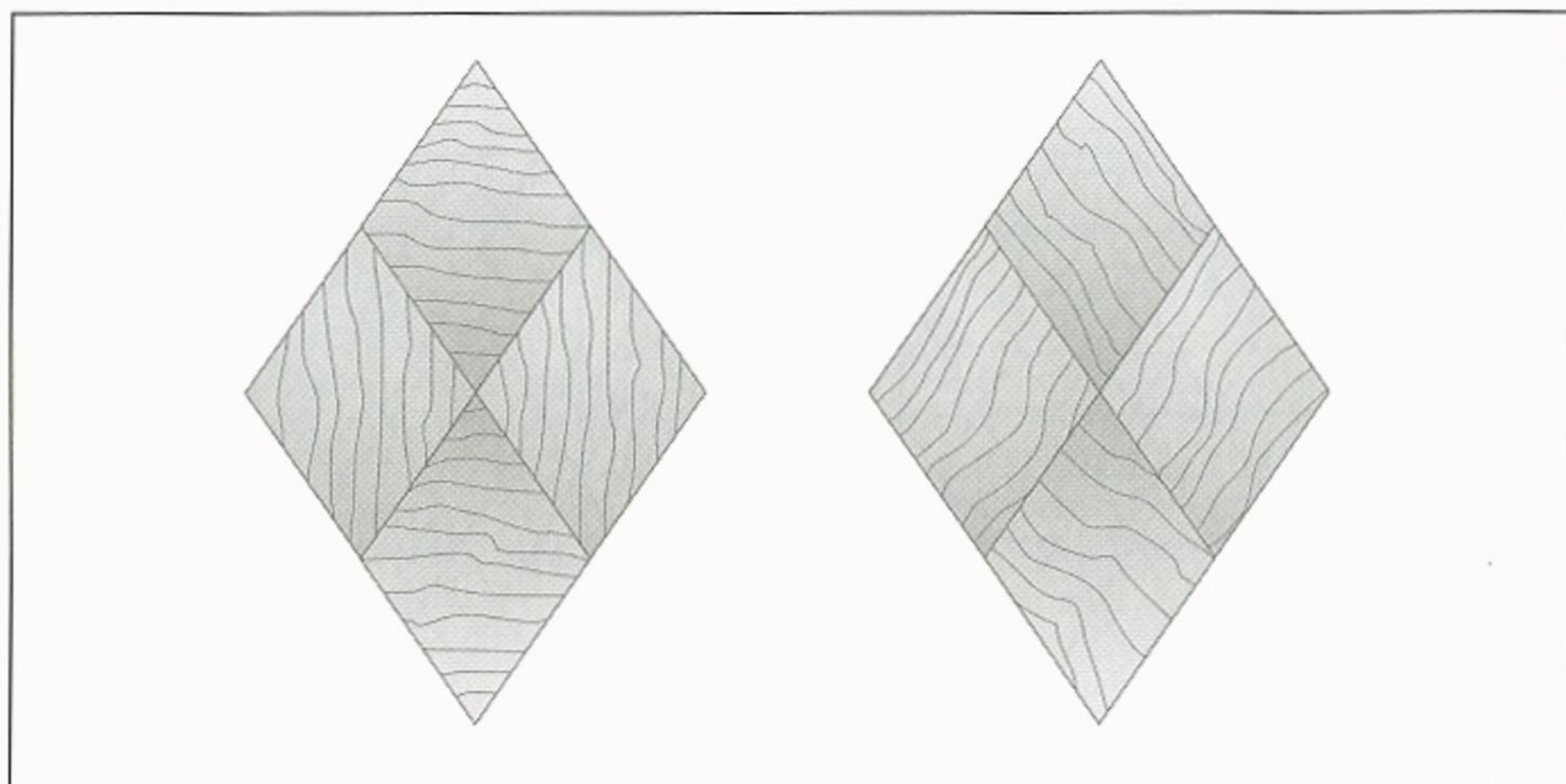


Fig 8.11 Diamonds arranged with alternating grain direction.

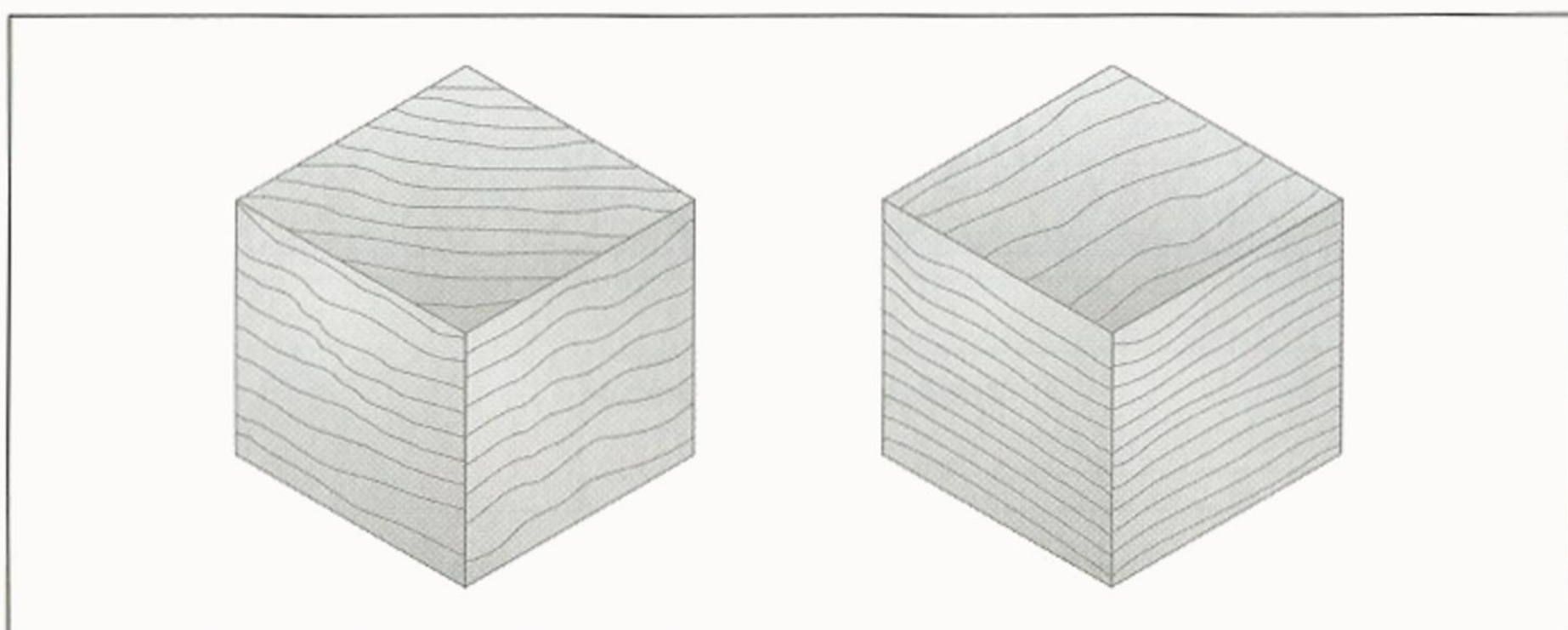


Fig 8.12 The cube pattern appears very spectacular over a larger surface.

ALTERNATING GRAIN DESIGN

The principle of setting out a template for the design is advisable here. Grain directions can be marked in (*see* Fig 8.13) and it helps with estimating the number of strips needed to make the design, which tends to be harder with diamonds than with squares.

The tools required to make diamonds are the shooting board and parallel cutting jig, as for squares. There are, however, a couple of important modifications. First of all, the shooting

board will need a temporary diamond planing fence. Secondly, the spacers for the parallel cutting jig do not represent the length of the sides of the diamond, but the distance between the parallel sides of it (*see* Fig 8.14). Sides A-B and C-D are parallel to each other in the diamond, so the perpendicular distance between them, X, is the size required for the spacers.

The next problem concerns the orientation of the grain and the way in which this relates to the cutting and assembling of the strips. The grain runs

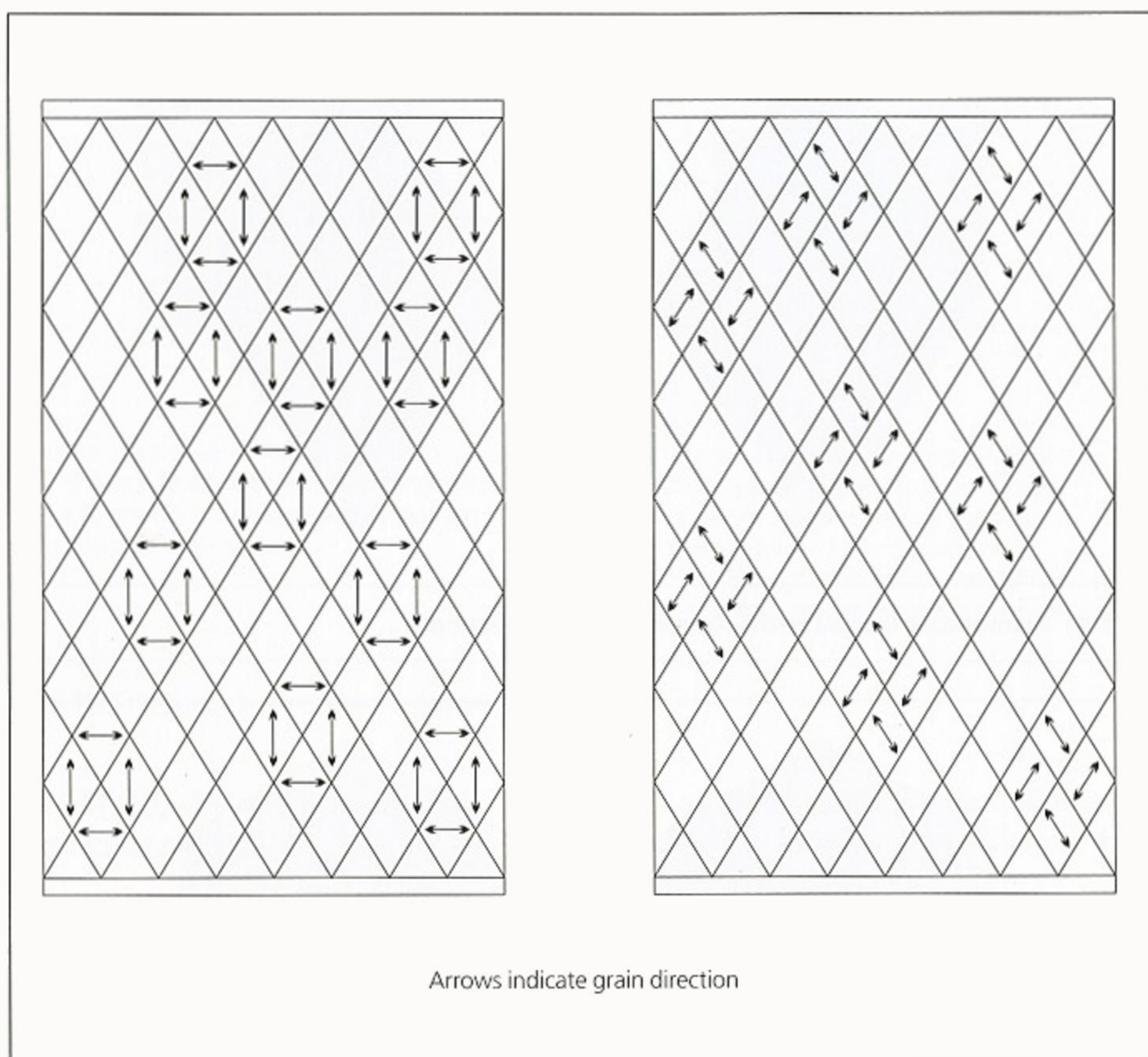


Fig 8.13 Template designs for different grain configurations in diamond patterns. Note that the grain direction is not necessarily recorded in every diamond, but in sufficient number to form a good reference.

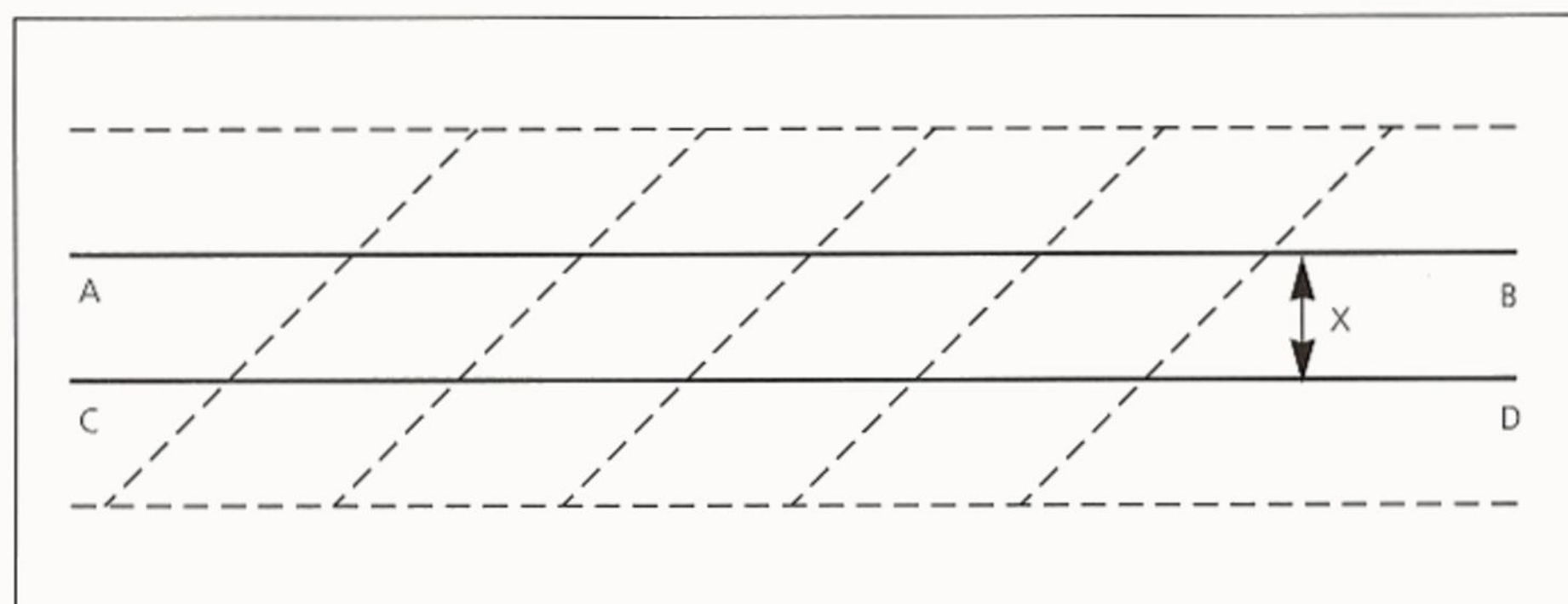


Fig 8.14 Determining the size of spacers on the cutting jig – X is the distance required.

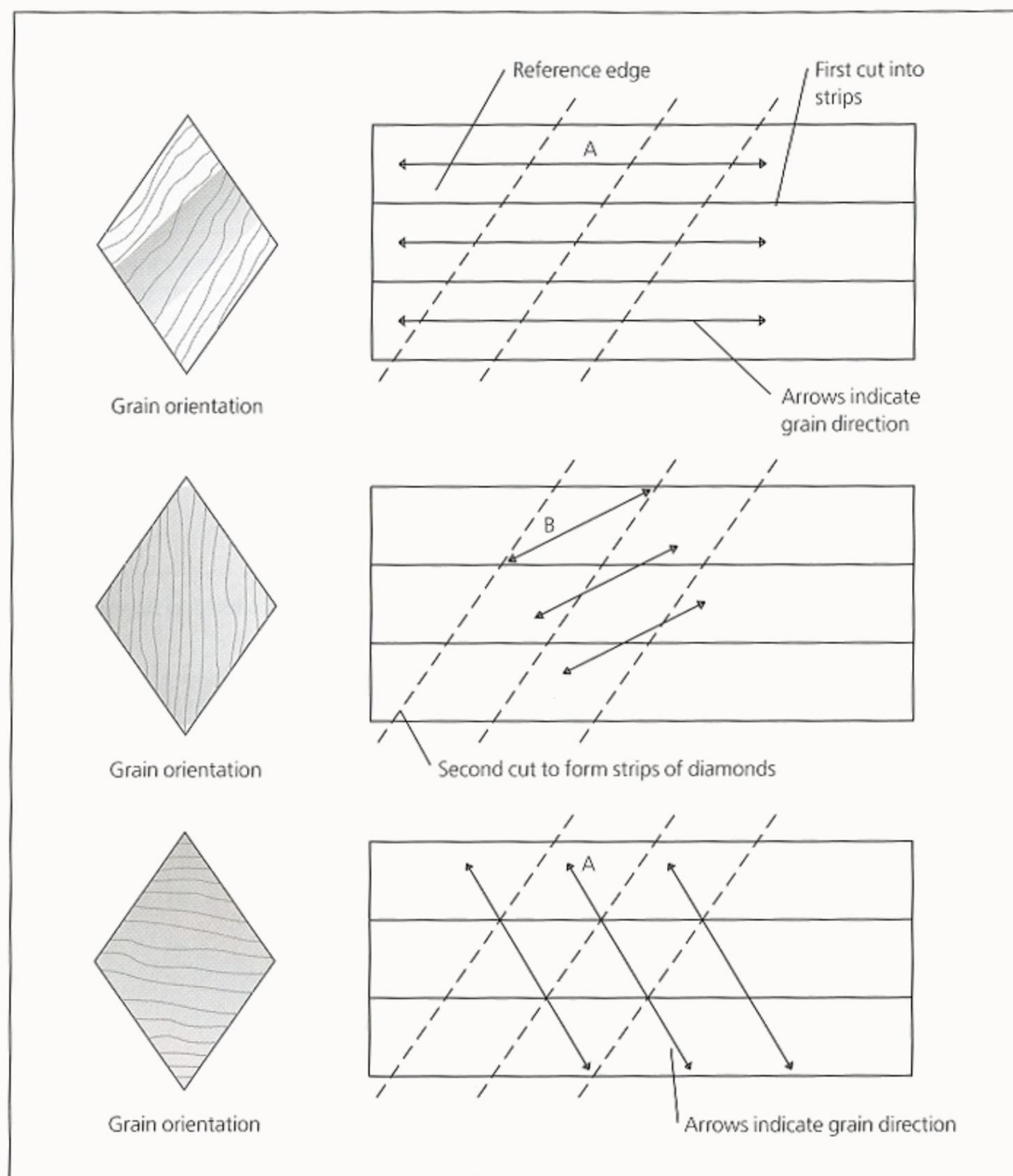


Fig 8.15 Relating grain orientation in the diamond pattern to that of the veneer leaf. The reference edge is trued up so that when the second cuts are made to the taped-up strips, A will be 60° , B will be 30° .

parallel to the length and at 60° to the width, and parallel to the length and at right angles to the width, in alternate strips (see Fig 8.15).

A pattern of diamonds with an alternating grain direction can be

created in two ways. One way is to draw the design on a template, and to cut individual diamonds, fitting and taping them together on the template as you go. A simpler, less laborious method is given overleaf.

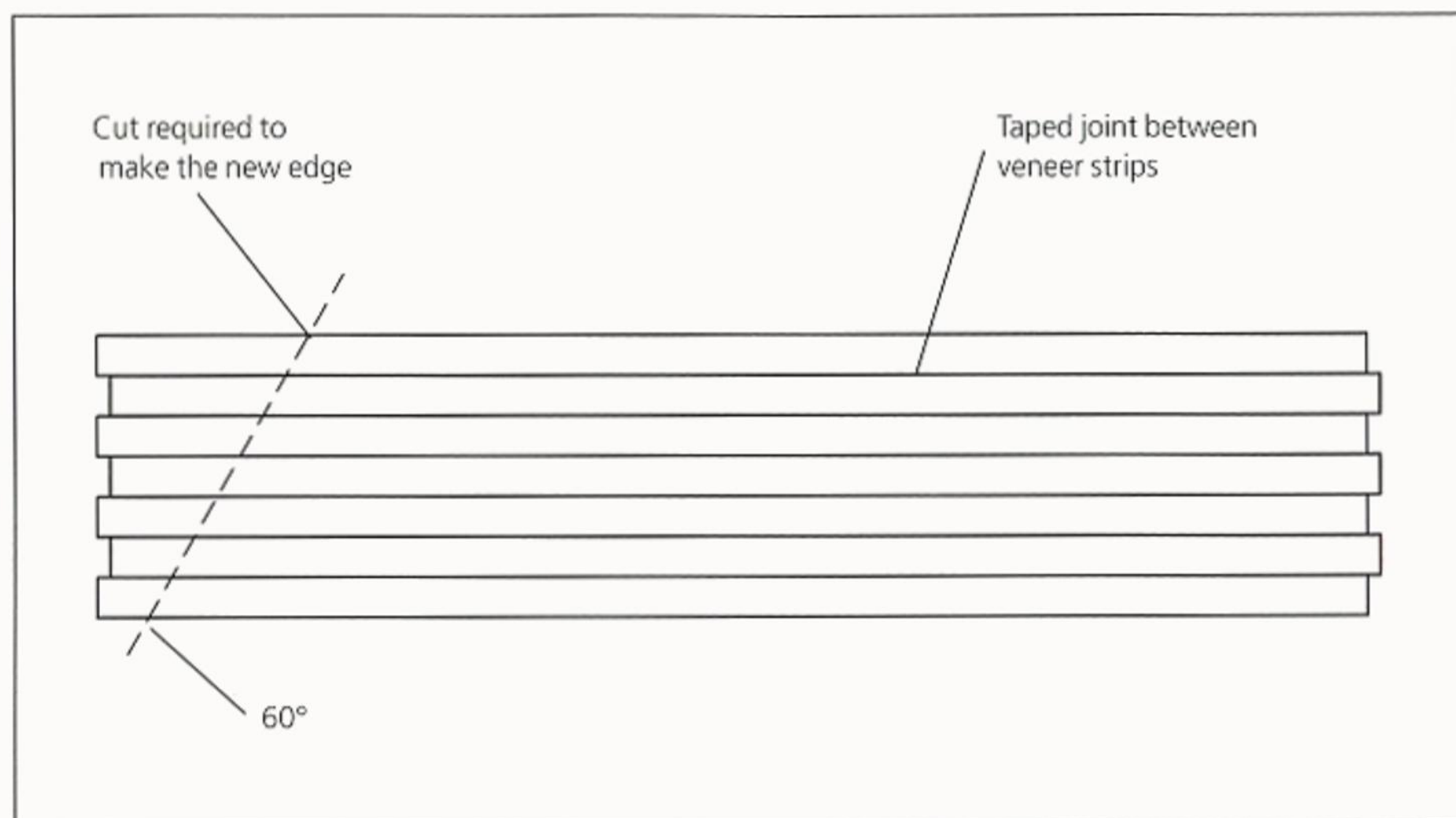


Fig 8.16 A new edge is cut at 60° to the taped joints and trued up on the shooting board.

Creating a diamond pattern with alternating grain

1 Cut parallel strips of veneer, using the cutting jig. The first cut in the veneer leaf creates a reference edge that sets the direction of the grain in the strips. This edge should be trued up on the shooting board, using a temporary fence, so that the angles marked A in Fig 8.15 are exactly 60°. Plane the edge of the leaf true in this way after each strip is cut.

2 Place the strips together, with their grain direction alternating, and secure them with clear cellulose tape.

3 Cut a new edge between the strips, at an angle of 60° to the joints (see Fig 8.16). Plane this smooth on the shooting board, using the temporary fence to ensure accuracy.

4 Return the assembled strips to the cutting jig and cut strips of diamonds as shown in Fig 8.17.



Fig 8.17 Cutting strips of diamonds.

5 Fit strips together on the template to make up the design.

6 Once the design is assembled, lay the veneer (*see* Chapter 4).

The cube

The striking optical effect of the cube design is created by fitting together individual diamonds rather than strips of diamonds. This makes the work more laborious when decorating large areas,

but the effort is rewarded! There are two main tasks involved in creating a cube design; cutting individual diamonds, and assembling the pattern. A template is required for assembling this design (*see* Fig 8.18).

Creating a cube design

1 Make up a template for the design, with the pattern of diamonds drawn on it.

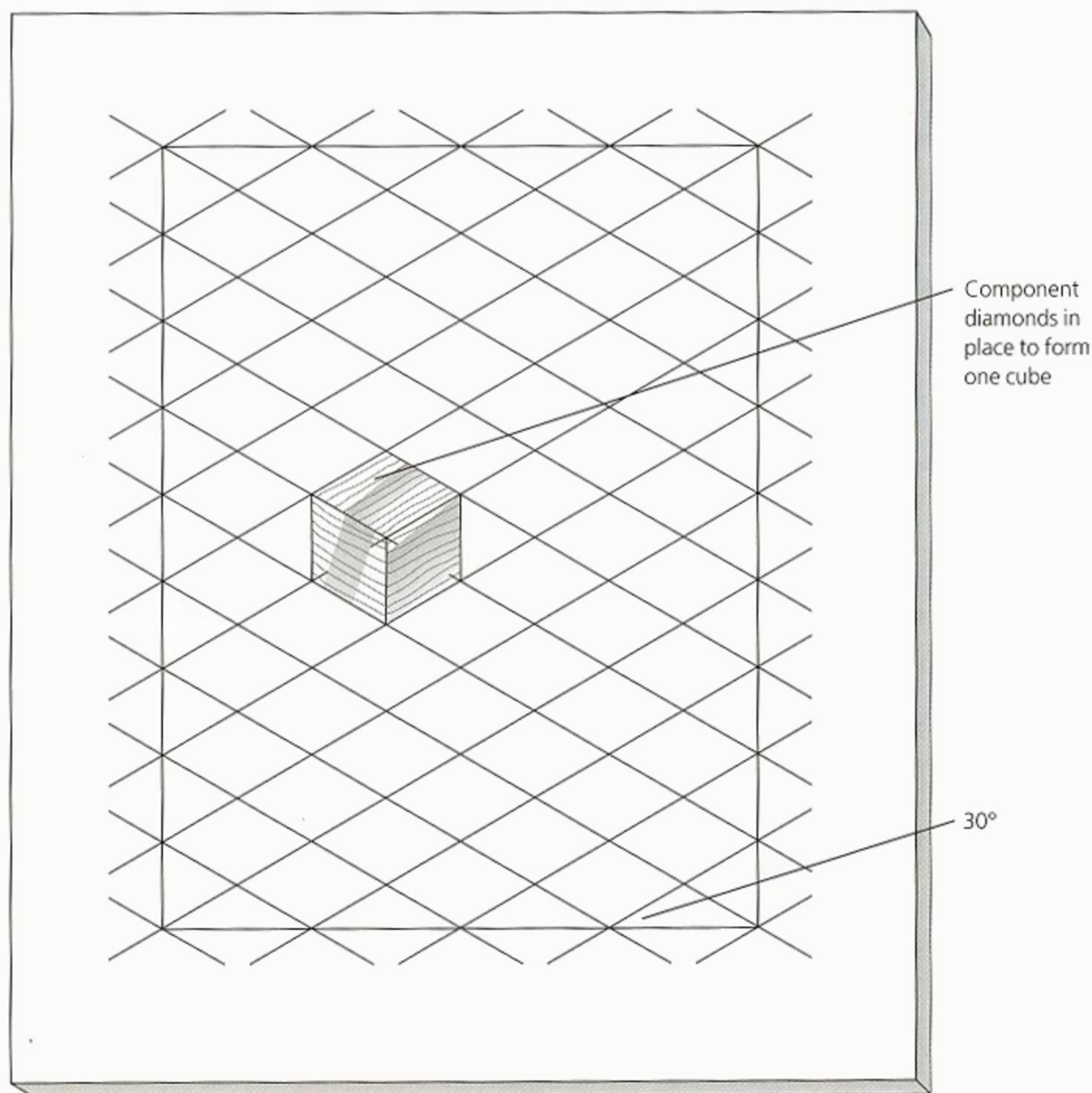


Fig 8.18 Template for the cube design.

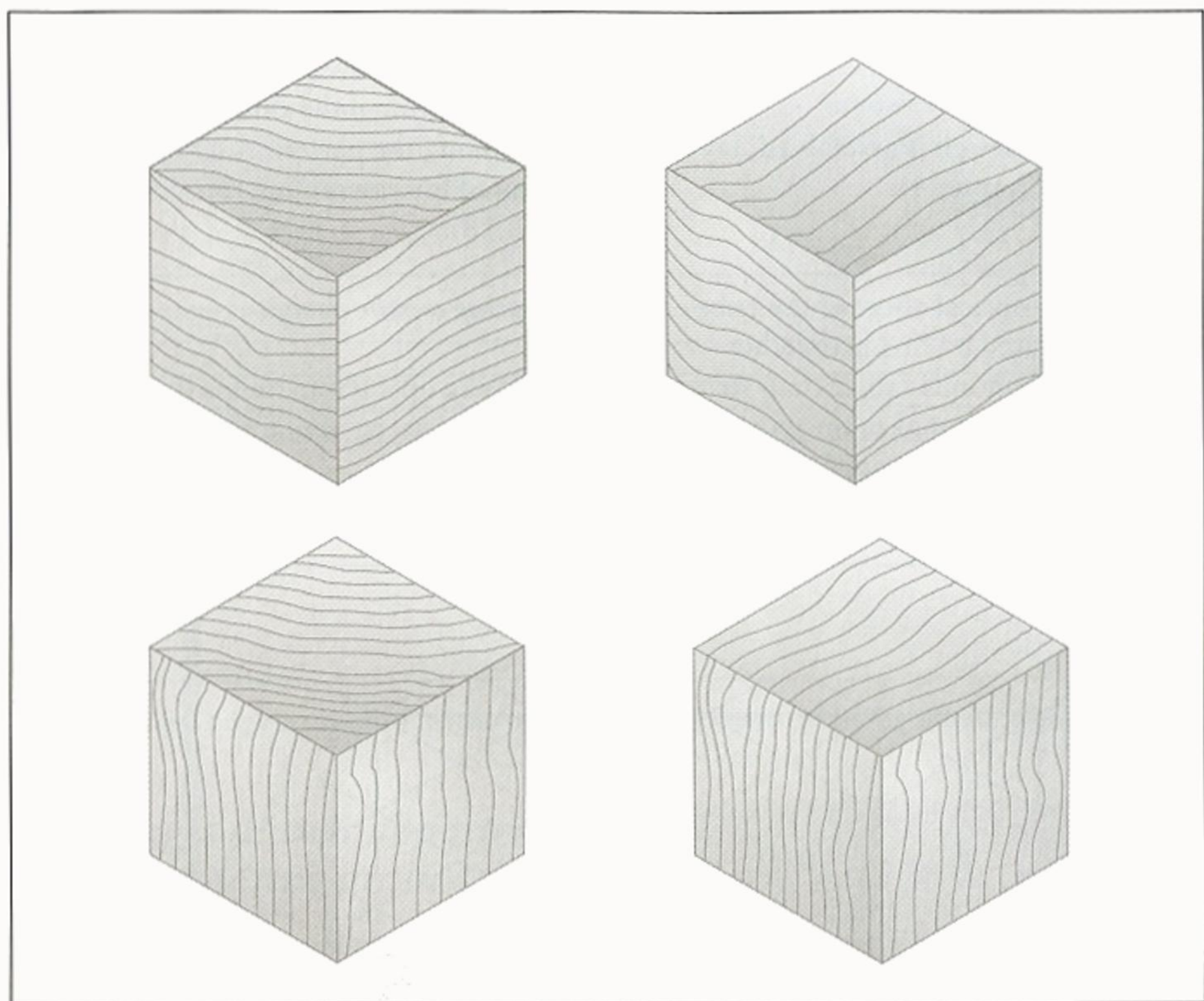


Fig 8.19 Different grain configurations can be used to create a variety of effects.

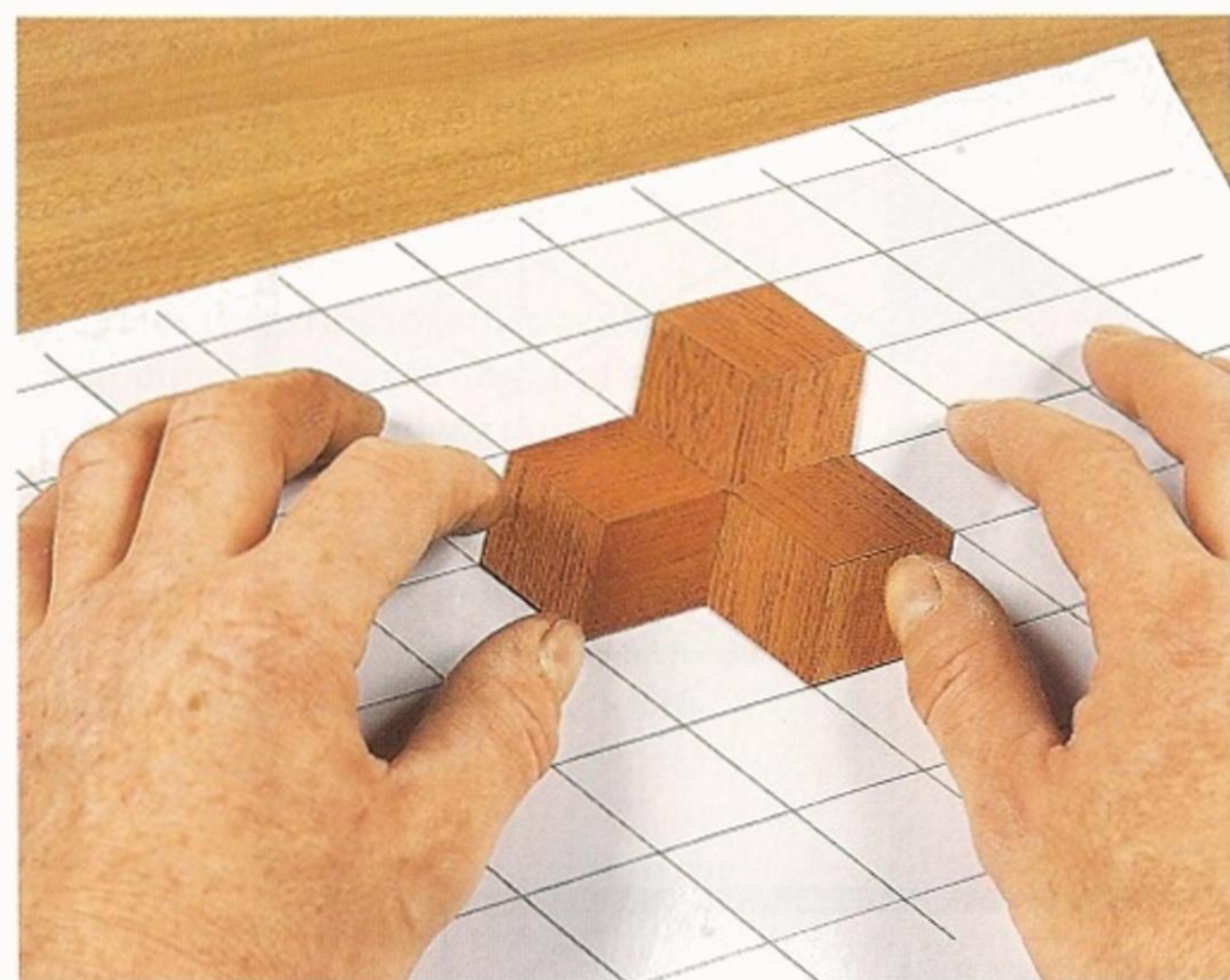


Fig 8.20 Assembling cubes to make up the design.

- 2 Before cutting the diamonds, work out the grain direction (*see* Fig 8.15). Figure 8.19 shows cubes constructed with variations in the grain direction.
- 3 Cut the diamonds either individually, or in strips. If cut in strips, the diamonds must then be separated for assembly.
- 4 Assemble the cubes on the template. This may be done in one of two ways. The first is to assemble each individual cube, and then to fit these together on the template (*see* Fig 8.20). The second is to assemble the whole pattern by fitting the diamonds individually. This second method carries an increased risk of error because of the differing orientations of the diamonds. Any slight error in the fitting of one diamond throws out the fitting of the rest of the design, so great care is needed in the assembly.
- 5 Lay the assembled veneer following one of the methods given in Chapter 4.

HANDLING ASSEMBLED VENEERS

There is a general point to be made about the fragility of assembled veneers. Veneers are fragile materials that require careful handling and storage. Assembled veneers need particular care and attention when being transferred to the groundwork. It is better to make the transfer distance very short: in other words, have the assembled veneer with the item to be veneered nearby. Large areas of veneer should be transferred with the assistance of a helper, to reduce

flexing and the possibility of misplacement.

FINAL POINTS TO CONSIDER

Many parquet designs rely on the effect they have on the way light is reflected rather than on real colour differences between component veneers. Therefore, you always need to consider the position from which the design will be viewed. If a design is being repeated on different faces of the work (e.g. different sides of a box, on a matching pair of doors, or on two or more drawer fronts), you must ensure that the panels are built up and laid with the grain configurations correctly positioned. It is very easy to make the mistake of not matching grain configuration. This error may not appear too bad just after laying, but when a polish is applied it will become glaringly obvious in its optical effects.

The process of building up the veneers into a pattern of many component pieces requires a great deal of tape to hold the joints together. If the tape is stretched while it is being applied to the joints, you may find that the panel will not lie flat because joints are put under tension, and this could prove to be a problem when laying the panel. Make sure you do not stretch the tape when you apply it. Remaining with the subject of tape, it is also very easy to end up with a surface that is tape bound – i.e. has tape in many layers – so don't overdo it. Use only enough tape to secure the joints.

FINISHING AND POLISHING

- ◆ THE FINISHING REGIME
- ◆ SMOOTHING THE WORK
- ◆ STAINING THE WORK
- ◆ FILLING THE GRAIN
- ◆ POLISHING

THE FINISHING REGIME

While there are certain differences in approach to finishing and polishing veneered work rather than solid wood, in most respects the materials and procedures are the same. Knife-cut veneers, being very thin, need to be treated very carefully when subjected to the use of abrasive paper: it does not take much to cut right through to the ground-work. Also, the method of producing these veneers tends to make them more porous than the solid wood equivalent and it may be necessary to use a grain filler to fill up these pores (*see page 121*). A veneered surface may take on a slightly deeper colour than the solid wood, and this should be borne in mind if you are mixing veneered and solid wood components in any work. On the plus side, the veneer surface will be free of the blemishes that are common to solid

wood, such as torn-out grain and general unevenness. However, the main difference in the approach to finishing veneered work as opposed to solid wood is in the initial preparation for smoothing the surface. Materials for smoothing a veneered surface are confined to the finer grades of abrasive paper – no smoothing plane or coarse abrasive paper.

The type of finish you apply is a matter of personal preference at the end of the day, but there are clear advantages and disadvantages to using particular finishing techniques. Of course, it is not mandatory to apply any finish, but it does help to protect the work and can also produce interesting optical effects in figure and colour contrasts.

For many woodworkers, the finishing process is fraught with anxiety – what to do, with what and when? There is a worry that this final stage may, somehow, ruin all the hours of work that

have been put in. I am asked more questions about this aspect of working with wood than any other. The reason, I guess, lies in the very confusing array of finishing products on the market and the claims made for them in terms of physical properties and appropriate applications. Then there is the difficulty of compatibility: is there a risk in using X with Y?

Achieving a good finish is a matter of matching the finishing requirements with the properties of the various finishes available, and following the correct order of procedures, as listed below:

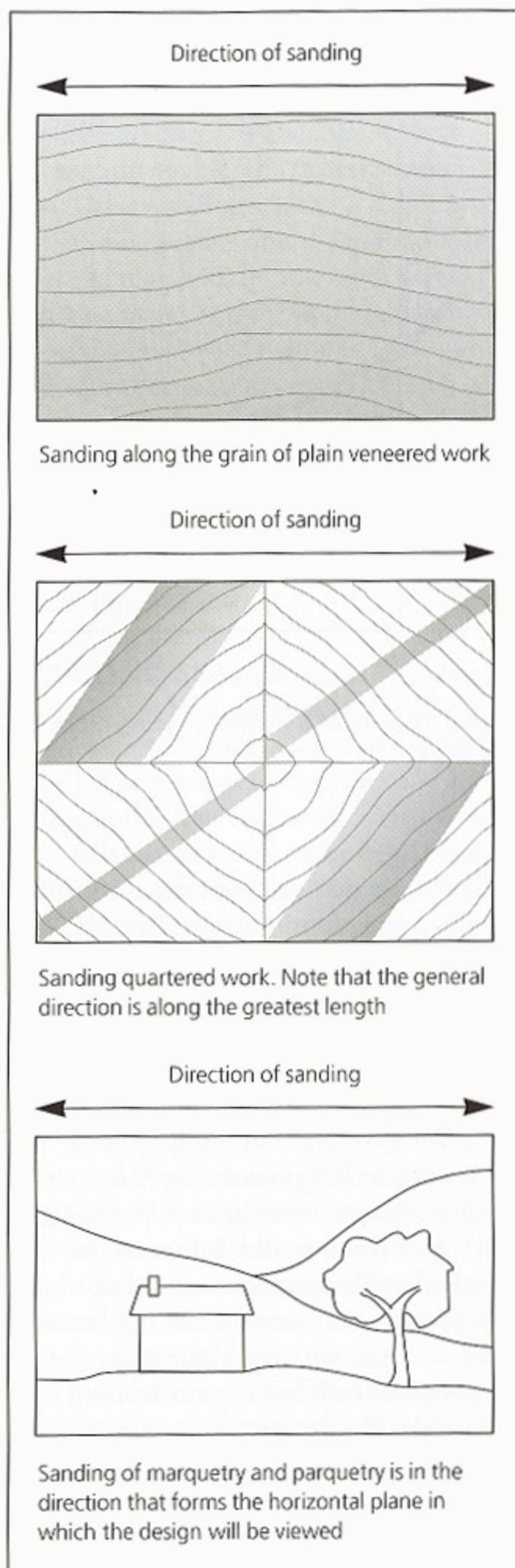
- Smooth the veneered surface.
- Stain if this is appropriate (mixed species work is often not stained because this will destroy the existing colour contrasts).
- Fill the grain if required.
- Polish.

SMOOTHING THE WORK

You need to remember that veneers are pretty thin and that there is a limit to the amount of sanding that can be done. If care is not exercised, disaster will be waiting around the corner.

Another potential difficulty arises from the varying grain directions that are often a feature of veneered work. It is good practice to sand the work along the general direction of the grain, but where grain direction is varied, this is not always possible. Figure 9.1 shows the general direction of sanding for different veneering patterns. The main point to remember is that the direction of sanding should, as far as it is possible, be in the general direction of the grain.

A third difficulty may arise as a result of contamination of lighter coloured



9.1 Direction of sanding for veneers and marquetry panels.

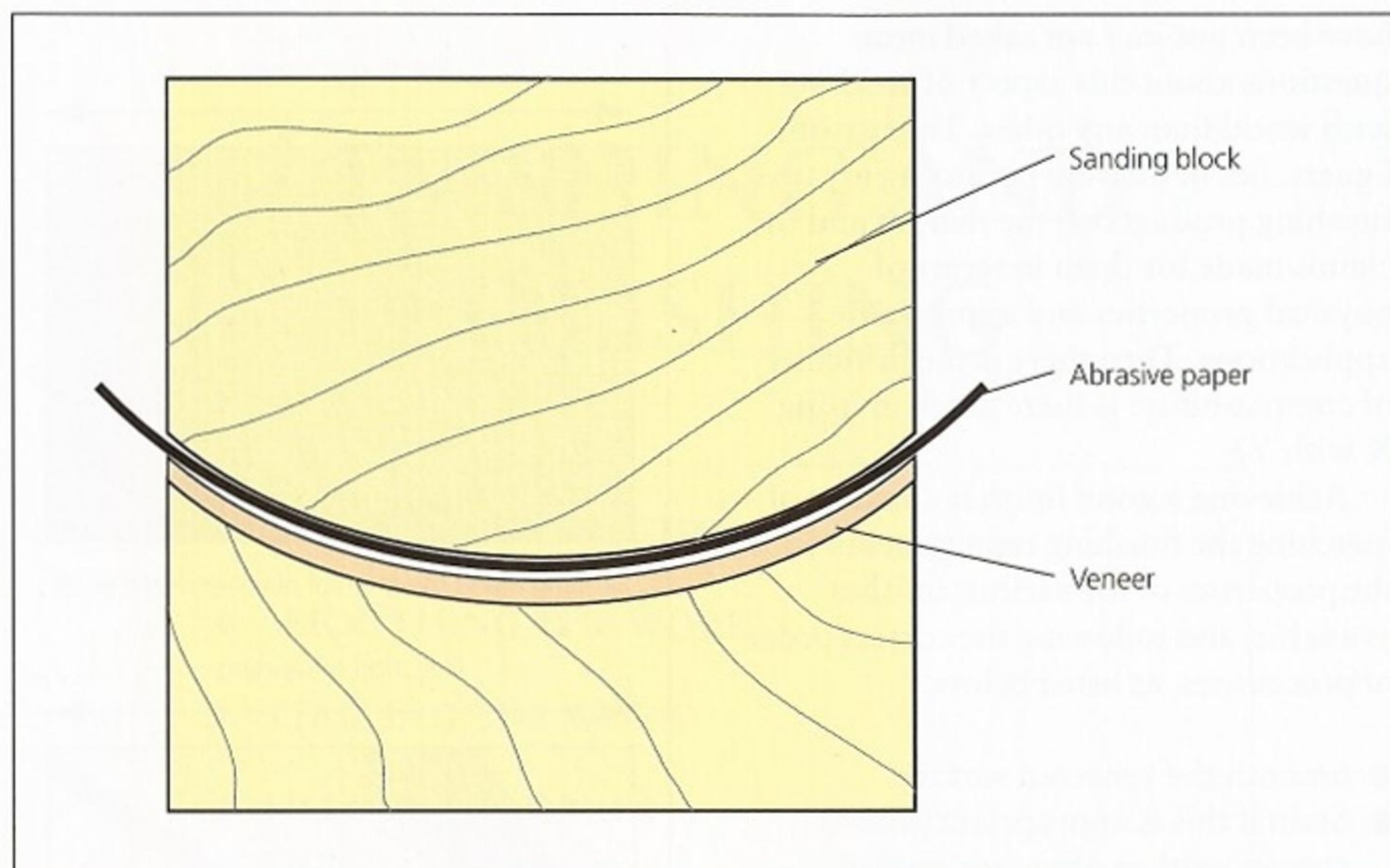


Fig 9.2 The use of a shaped sanding block for shaped work – the block has a reverse profile of the work.

veneers by sanding dust from darker ones. Under no circumstances must there be any contact with moisture as this would drive the coloured dust into the light veneer. The best approach is to use a dusting brush or, better still, an air jet from a small compressor, to clear the work of dust. Any hard rubbing will simply ingrain the contamination.

For smoothing veneer, the finer grades of paper must be used (e.g. 240 grit). An orbital sander is fine on flat areas of single-species veneers, but where more than one species has been used, and particularly where there are large colour contrasts, hand sanding is advisable. On flat surfaces use a cork sanding block. On shaped work a sanding block with a profile that is the reverse of the work should be made (*see* Fig 9.2).

As light sanding progresses, the work should be regularly dusted. This is

especially important with mixed-species work where continual sanding will itself cause darker dust to become irreversibly ingrained in lighter coloured species. Some readers may be familiar with the practice of wetting the surface to raise the grain after sanding, then sanding again once dry. Under no circumstances should this be done where mixed species have been used as any contaminating dust will be ingrained.

STAINING THE WORK

Staining veneers once they have been laid, where mixed species and colours are used, will prove to be problematic. Attempting to colour small areas will be very unsatisfactory, as no matter how much care is exercised there will almost certainly be a leaching of colour across veneer joints.

The best advice for this sort of work is to stain before laying. For work that consists of a single species, staining can be carried out as though it were of solid wood. Chapter 3 describes the most common staining materials.

To stain a piece, pour the stain into a suitable wide container – make sure that it is not plastic if you are using a solvent-based stain, as it may dissolve the plastic! Make a pad of absorbent and lint-free fabric, dip this into the stain and allow it to soak up the liquid.

Wear protective clothing, especially rubber gloves, and protect the surrounding area with paper or sheets. Gently squeeze the surplus stain out of the pad on the side of the container and then work the stain over the veneered surface with a circular motion to cover it as quickly as possible.

The stain should flow freely onto the surface, but should not form obvious puddles. If it doesn't flow, dip the pad again. Continue working until you are satisfied that the stain has penetrated the surface evenly. Finally, wipe the pad up and down the surface, in straight strokes along the grain, to even out the colour and remove any obvious circular path made by the pad. Allow the stain to dry overnight in a warm place.

FILLING THE GRAIN

As the manufacturing process of veneers sometimes makes them more porous than solid wood, if you want a perfectly smooth, glass-like finish, you will need to fill the pores of the wood first. This can be done in a number of different ways. Filling the grain is not obligatory, but it is the only satisfactory way of ensuring mirror finish, as exemplified by the surface of pianos. If you intend to

use wax polish, grain filling has the distinct advantage of reducing the number of coats of wax needed to gain the desired effect. It also offers some protection against the penetration of dirt. Use a sanding sealer.

Sanding sealers and the main polish must be matched. In other words, the sanding sealer and the main polish should be essentially similar, and therefore compatible, materials. A shellac-based sealer should be used under french polish and wax polish and a catalysed sanding sealer should be used under catalysed lacquers. The best plan is to buy the sealer and main polish from the same source.

APPLYING SEALER

Sealer is applied after the surface has been smoothed and stained (if a stain is used). The process of applying a grain-filling sealer is as follows.

- 1 Stir the sealer vigorously to ensure that any sediment is distributed throughout the liquid.
- 2 Apply the sealer evenly over the surface with a brush, along the grain, and force it well into the grain. Allow the sealer to dry and harden for the time specified by the manufacturer. This is important because the next stage will not be successful if the sealer is even slightly soft: the abrasive will only 'bite' the sealer if it has been allowed to harden thoroughly.

Do not worry about the odd speck of dust or hair becoming trapped in the sealer, because these will be sanded out later. However, at the same time, do not work in a very dusty atmosphere – that is a recipe for disaster because you will never achieve a flawless surface that way.

3 Using very fine abrasive paper, gently rub the surface smooth again. This is where you will notice something interesting. The abrasive paper will 'bite' the sealer and smooth it very quickly because of the powder it contains. A dust will build up quickly and you will need to dust the surface down quite regularly to examine the progress. When the surface is smooth, and all adhering dust and hair have been removed, give the work a final dust down ready for the top coats of polish.

The powder in the sealer has two purposes. First of all it gives the abrasive powder a bite, so it is more effective in smoothing the surface. Second, the powder enters the pores of the wood and helps to fill them. You may find that a second coat of sealer is necessary on very porous or open-grained veneers, for example, oak.

POLISHING

CHOOSING THE FINISH

There are a number of factors to be considered when deciding on an appropriate finish.

How much wear is the work likely to suffer? This is an extremely important consideration. Anything likely to be handled a great deal will become grubby very quickly. Cleaning will be virtually impossible if there is no finish to protect the work, but, on the other hand, any finish will have some effect on colour. Even the clearest and most colour-free polish will alter the colour of the work to some extent. At the very least it will enhance the dominant colour hue, and with all mixed species work, the contrast between veneer colours may be increased.

Are there colour contrasts that need to be preserved? The use of any coloured finish will reduce the impact of mixed species work. The finish for such work needs to be as colourless as possible to preserve the contrasts.

Is the veneered piece complete in itself or will it form part of a larger piece? Where a veneered piece does form part of a larger item, such as a table top, it is generally necessary to use the one finish for the whole item, so the requirements of all the timbers used must be taken into consideration.

In the case of restoration work, what was the original finish? The nature of the original finish must be taken into account. Old work is likely to have been french polished, and purists would be inclined to renew this rather than apply a more modern material such as polyurethane.

What quality finish do you want?

Different finishes may give a high gloss film or a low 'natural' lustre: the quality that you want your work to have is a matter of personal preference. The most common polishing materials are:

- Wax
- French polish
- Polyurethane
- Cellulose or two-part catalysed lacquers.

WAX POLISH

The ease of application of wax polishes needs to be balanced against their general lack of durability. Wax does provide some protection, but not against the effects of handling. However, it does give a wonderful low, natural lustre and, as such, is ideal for small items, like

marquetry boxes and pictures, that will not be handled much. In fact, such items may suffer from the effect of a high lustre that could create distracting reflections.

As there are many good proprietary brands of wax polish available, it offers no advantage to make your own. Wax polish is available in two forms; either a solid wax paste or a cream. The creams are best used as a light dressing on work that has been varnished, french polished or lacquered, as the wax content is relatively low compared with the wax pastes. The high wax content of the pastes makes them ideal for unfinished work as they create a high build after only two or three coats. Even so, it is worth first giving the work a thin coat of pale french polish to partially seal the grain. This has two advantages: it provides some protection against the penetration of grime into the grain and the very act of adding an additional barrier reduces the amount of wax absorbed into the surface which, in turn, means that less polish is needed.

Application

If a coat of french polish has been used, allow a good few hours for it to harden thoroughly before waxing. Apply the wax polish with a lint-free cloth in small, circular paths, to rub it well into the surface. The amount applied should be generous, without leaving a heavy deposit behind – such a deposit will make the polish very much harder to burnish. Allow the wax to dry for a good hour before burnishing the surface with a clean cloth.

When the first coat is burnished, apply a second, lighter coat, leave for a further hour and burnish again. More coats can be applied in a similar manner, if required.

FRENCH POLISH

This is based on a solution of shellac in alcohol. It provides a fast-drying finish that lies as a hard film over the work, and forms a better protective finish than wax, though it is not resistant to heat, water or solvents and any lengthy exposure to these will result in damage.

When most people think of french polish it is as the so-called piano finish – a high mirror gloss. However, it is much more versatile than this and can be applied to create a range of finishes from very dull to very high gloss. The finish required depends very much on the nature of the work. In general, a marquetry picture will probably look better if the polish has a low lustre to avoid distracting reflections, but for veneered furniture there are no hard and fast rules.

My earliest recollections of french polish are images of my grandfather crushing flakes of shellac, pouring them carefully into a large medicine bottle to half fill it, and then topping it up with methylated spirits. The smell of the spirit is still a strong memory. I guess that for many people over ‘a certain age’ there are similar images associated with this most prestigious of finishes, which may go some way to explaining why it has maintained its reputation. In truth, most of the modern, synthetic industrial finishes are mechanically superior in that they are harder and more resistant to damage, but french polish represents a tradition of craftsmanship that no other finish possesses. Like wax polish, you can make your own french polish, but there is no real advantage in doing so as proprietary brands are of very high quality and are readily available.

There are several colours of french polish made from different natural colours of shellac.

Garnet polish. This, a rich chestnut brown, is the darkest. While ideal for dark surfaces, such as mahogany, rosewood and walnut, it is unsuitable for use on work where different coloured veneers have been used. The depth of colour will obscure the contrasts in mixed-species work.

Button polish. This is also quite dark, but less so than garnet. The colour is somewhat reminiscent of old walnut with its honey gold hue. Indeed, button polish is very good for work made from walnut or other species of similar colour.

White/Transparent polish. Bleached shellac is used to make white polish (which looks cream!). Its opaque, milky appearance is due to natural waxes that are found in the shellac. If many coats are used, white polish will create its own, slightly greyish colour cast. It is useful as a sealer, when combined with wax polishing (*see* page 122). If the wax is removed from shellac it will produce a clear, pale amber polish called transparent polish. Where the colour of the work needs to be retained, transparent polish can be used without causing any appreciable change: this makes it excellent for all mixed-species work.

It is not feasible to cover the entire subject of french polishing in a book of this nature, but the descriptions given here will help you to create a very good finish. It does require skill, but this can be acquired without too much difficulty. Equally important is the need for patience and a meticulous approach to detail and the order of processes.

There are four main stages to french polishing: staining, grain filling, bodying, and spiriting. Staining will usually only be required on single-species work, if at all. In marquetry and

parquetry, veneers can be stained prior to laying.

French polishing should always be carried out in a warm, dry environment.

Grain filling

If a mirror finish is required, the grain must be filled to reduce its absorption rate. The easiest method is to use one of the so-called sanding sealers. A sanding sealer is a polish that contains a very fine powder and, because of this, it needs to be well agitated before use to disperse any sediment at the bottom of the container. For use under a french polish, a shellac-based sealer is required.

Sealers are well brushed out on the surface of the work, so as not to create any heavy build-up that will spoil the finish later, and left to dry out for an hour or so. The work should then be very lightly sanded (taking care not to cut through to the veneer) and the resulting dust wiped away.

Once this is done, apply a second coat and repeat the sanding after it has dried. Two coats should be enough to thoroughly fill the grain.

Bodying

This is the process of building up a deep body of polish to give the familiar gloss, once the surface has been sealed. Successive, thin layers of polish are applied with a tool whose association with the technique has taken on an almost mystical significance – the rubber.

A rubber is simply a pad of upholsterers' wadding enclosed in a rag (a piece of cotton cloth). The qualities of the rag are important to the finish of the polish: it must be very fine-grained and thin enough to allow a free flow of polish through it. An old cotton sheet or handkerchief are ideal, although I usually use plain cotton curtain lining.



Fig 9.3 Making a french polish rubber.

The shape of the rubber you use is also important as this will affect its handling. There should be a point at the front that will enable it to gain access to awkward corners and angles. (See Fig 9.3.)

A rubber is a prized possession if it is performing well, and it can be kept in service for a surprising length of time if properly looked after. If the rag becomes dirty and begins to inhibit the flow of polish through it, simply discard it and use a new cloth. The important thing is that the handling characteristics of the rubber (i.e. how it sits in the palm of the hand, the amount of polish it will hold, and its springiness) are too valuable to allow a good pad of wadding to be discarded until it is worn out! Whenever a rubber is not being used, it should be stored in a non-metallic, airtight container.

A new rubber is charged with french polish by removing the wadding and dipping it into the polish, which should be in a wide-necked container.

Afterwards, squeeze out the surplus polish. This squeezing also helps to distribute the remaining polish evenly throughout the wadding. Reassemble the rubber – it is now conditioned and ready to use. As it dries out with use, it can be charged by removing the rag and dipping the face of the wadding into the polish. After replacing the rag, press the face against a piece of white paper to squeeze out the surplus polish and redistribute the rest.

While the actual technique of applying the polish is subject to some personal variation, there is a general pattern to the method. The principle is to apply very thin layers in such a way that any remaining open grain becomes filled and the polish film is burnished to a mirror-smooth finish. Polishing should always be carried out in a warm environment to prevent 'blooming' (the formation of a milky white cloud caused by moisture condensing and becoming trapped in the polish film).

Small figures of eight

Applying the polish in small figures of eight, along the grain, helps to force it into any open grain that is remaining (see Fig 9.4). The amount of polish deposited as the rubber sweeps across the work can be quite critical. It is rather difficult to describe an amount. There should be an obvious wetness as the rubber passes over the work, but it should leave a fast-drying streak and there should be no pools or ridges. The rubber must always be kept on the move. If it is allowed to stop on the work there is a risk that it will adhere to it and spoil the surface. Adjust the pressure on the rubber to control the flow of polish. It will need to be increased as the rubber dries, and should then be recharged.

Large figures of eight

No matter how carefully you apply the figures of eight, there will be evidence of this motion in the form of small, swirling tracks. These are eliminated by changing the motion to large figures of eight, continuing until the small tracks have been removed. All the while,

because the general motion is at an angle to the grain direction, polish is being forced into the grain (see Fig 9.5).

Straight strokes

Finally, the tracks caused by the large figures of eight are eliminated by applying the polish in straight strokes along the grain, carefully gliding the rubber off the work at the end of each stroke (see Fig 9.6).

The work should now be left for 15 minutes or so to allow the polish to dry sufficiently for you to apply another coat, using the same regime of figures of eight and straight strokes. You can apply as many coats as possible before the surface begins to resist by attempting to 'grab' the rubber because of its stickiness.

Allow the work to dry overnight. After it has had this time to dry, the film of polish will have shrunk a little and you may feel that more polish is needed. The process of bodying is repeated until you are satisfied with the outcome in terms of the depth of polish and the filling of grain.

You will then need to gently key the surface (which also removes any

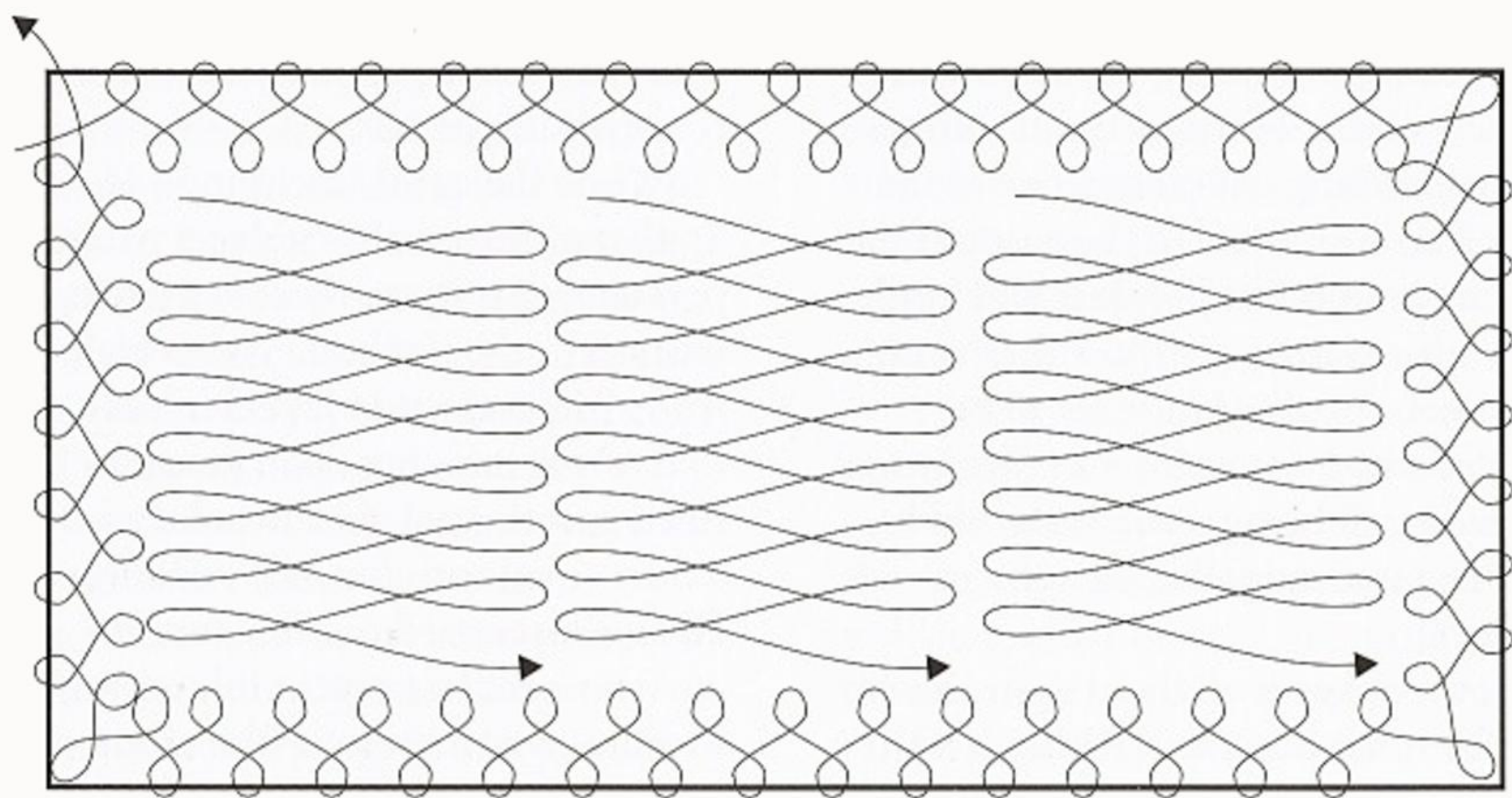


Fig 9.4 Small figures of eight.

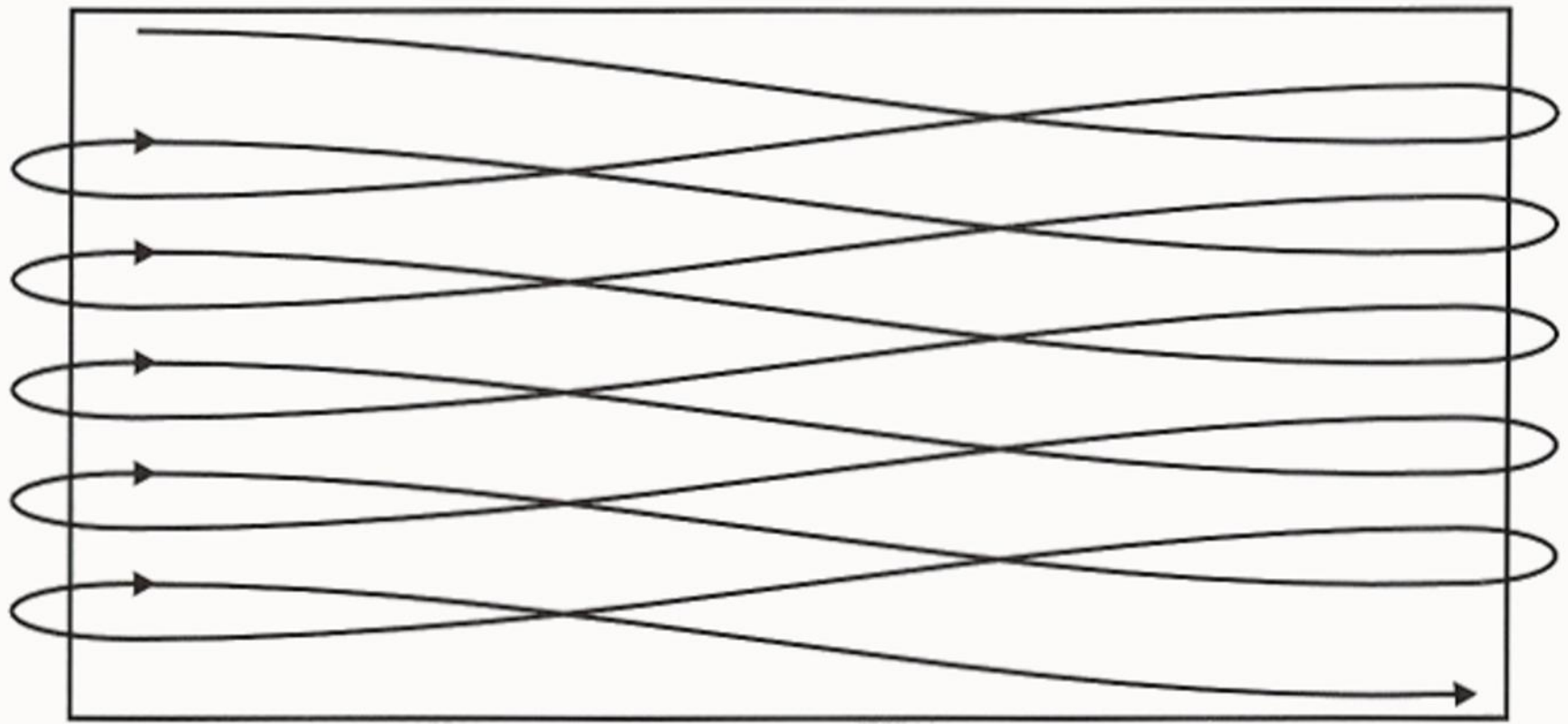


Fig 9.5 Large figures of eight.

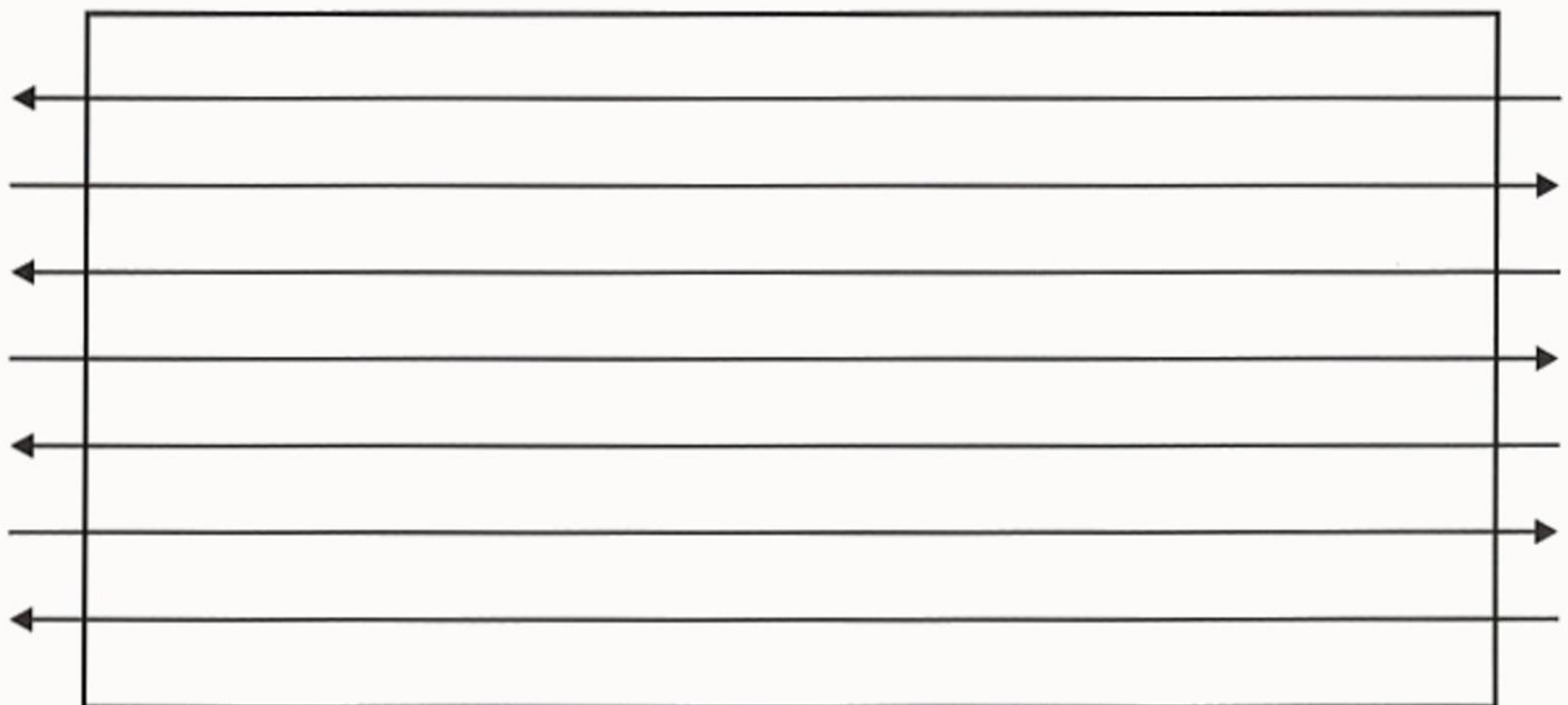


Fig 9.6 Straight strokes.

adhering particles of dust) by sanding with the very finest grade of abrasive paper you can find (say 600 grit wet-or-dry). It is important that there are no obvious scratches, just an overall dullness. You may feel that the finish you have achieved is very good and that there is no need to do anything else. However, to provide an extra special smoothness and lustre, the work can be finished off with thinned french polish in a process that is sometimes called *spiriting* and sometimes called *stiffing*.

Spiriting (stiffing)

The final stage of polishing is to apply very thin coats of polish that burnish the surface to a high gloss. Apply a body of thinned french polish (2 parts polish to 1 part alcohol or methylated spirit). This needs to be done very carefully as the spirit can be very fierce and pull up the film of polish! Allow the polish to dry for 15 minutes or so before repeating the process. After the second coat, the sheen should have returned. If it has not, apply a third coat.

What happens now has led to the process being given its very descriptive title. Subsequent coats should be as straight strokes along the grain. Leave at least 10–15 minutes between applications. As you continue working, the rubber will want to stick to the surface. This is good! The rubber is now doing its job of burnishing the surface to a high gloss. The paradox is, rather than speed up the movement over the surface (which will only result in tearing it up), you should slow down the movement. You may even need to increase the pressure slightly to maintain control of the rubber. Another important factor is to ensure that the strokes are dead straight along the grain. As you apply more layers, you may need to allow more time between coats. Ultimately, you will finish up with a mirror gloss, at which point stop and pack away the rubber until the next job. Allow the surface to dry and harden for a couple of days before putting the item into service.

POLYURETHANE VARNISH

As a hard-wearing, easy-to-apply finish, polyurethane takes some beating, although it does tend to suffer from a mixed reputation. While french polish carries a mystique and reputation for high quality, polyurethane has tended to represent the opposite end of the quality spectrum. Nothing could be further from the truth, though, because if care is taken in applying polyurethane, which comes in a range of lustres, it can look very good indeed.

The problem with the finishes described so far is their general lack of durability. Wax needs continual maintenance, with an occasional re-application, and is not greatly resistant to moisture or heat. It will also become grubby if handled too much.

French polish, on the other hand, has much greater mechanical strength. Even so, it is unsuitable for use on items that are likely to be in contact with hot cups, water (as with pot plants), or alcoholic drinks. Exposure to heat, water or alcohol may result in very severe damage. For items such as small occasional or coffee tables and trays, it is advisable to choose a finish that will be more durable – polyurethane varnish or a catalysed finish.

Varnishes have the advantages of having an uncomplicated application method, a high build, and a range of lustres (high gloss, semi-gloss or satin, and matt) and colours. All can be mixed to provide a customized colour and lustre.

Application

There is a point of view that varnish represents an inferior approach to wood finishing. I believe that this is really more to do with the way the varnish has been applied than with the nature of the material itself. There is no reason why a skilfully applied varnish cannot look as good as any other finish. The secret lies in the quality of the applicator and the skill with which it is used.

Varnishes are usually applied with a brush, but it is possible to use a rubber very similar to that which is used in french polishing.

Brush

The brush should be the best quality paint brush and must be reserved solely for varnishing. If it is used for painting, subsequent use for varnishing may result in contamination of the finish by flecks of paint or by clouding. Brush marks are considerably reduced or avoided by using ‘laying off’ strokes. These are very gentle strokes along the grain, using only

the bristle tips, once the surface has been coated with varnish (see Fig 9.7).

Rubber

Make up a rubber (see Bodying under French Polish, on page 124). It needs to be generously filled with varnish by dipping. Varnish straight from the tin may be a little too viscous to apply successfully in this way so it may be better to thin it a little with paint thinners (white spirit), adding about 10% by volume. Rubbers are ideal for small items where it would be difficult to use a brush.

Use straight strokes along the general

direction of the grain or, where this is not obvious, in the line of the longest length of the work. Because varnish is more sticky than french polish it does not have the same flow rate out of the rubber. It needs to be much wetter than a french polish rubber, and to be recharged very frequently. This process of polishing is very slow as several hours drying in a warm room are needed before another coat can be applied. (Store the rubber in a sealed container between coats.) Nevertheless, the method eliminates any tendency towards leaving brush marks. Apply as many coats as you need.

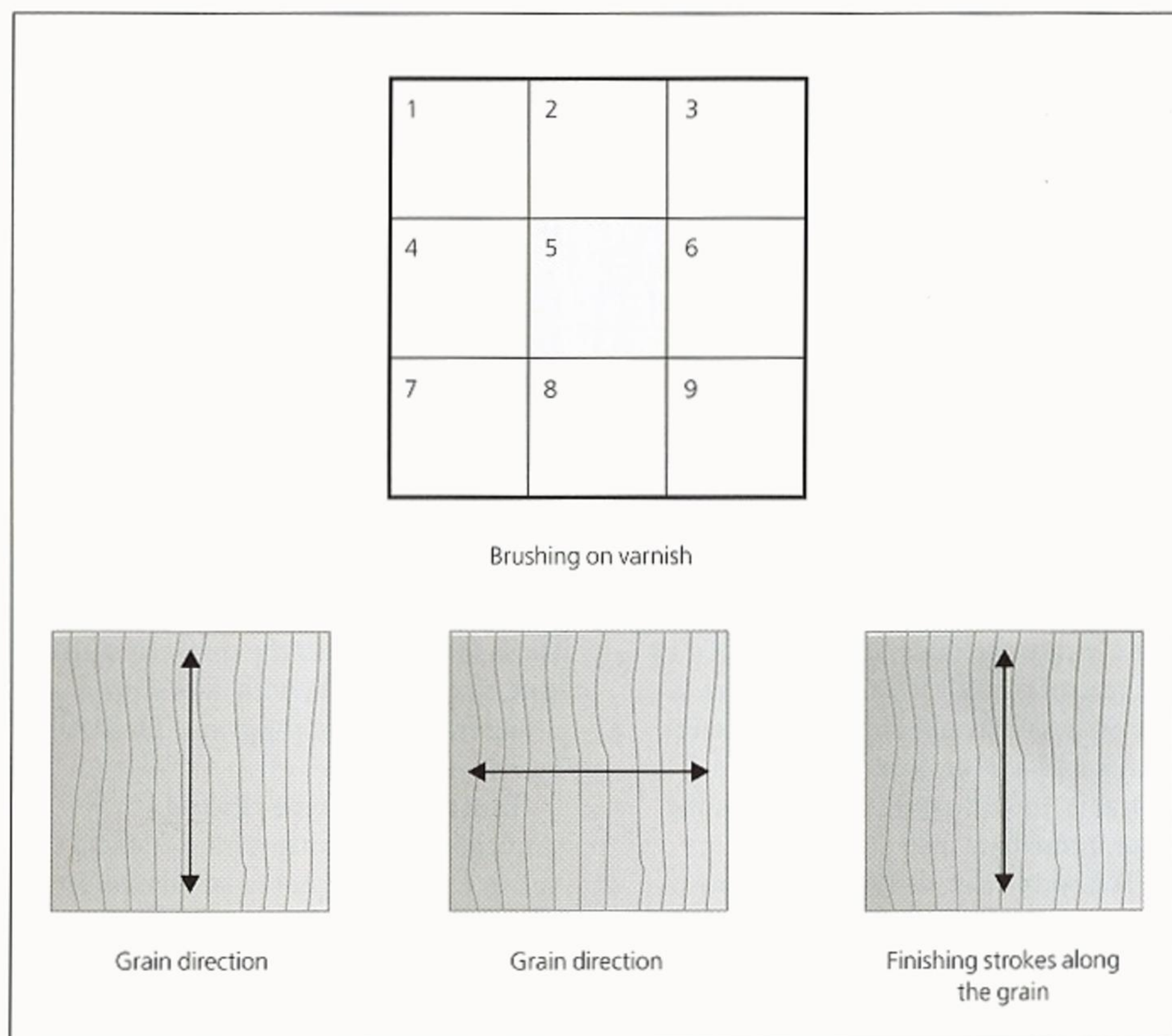


Fig 9.7 Large areas are varnished one section at a time, with the final laying off strokes along the whole length of the work.

CATALYSED LACQUERS

The finishes so far described all have one feature in common: they harden through the process of solvent evaporation.

Catalysed lacquers take this one stage further. After the initial drying period, a catalyst in the lacquer brings about a chemical reaction in the film that leads to further hardening through chemical change. This results in a polish that is highly resistant to mechanical damage, heat, water and other solvents.

Lacquers of this type are very fast-drying because they are based on highly volatile (and potentially dangerous) solvents, and are designed to be sprayed rather than applied by hand. However, there are brands of lacquer that are sold for the small user and formulated for brush application.

There are two forms of catalysed lacquer. The first, pre-catalysed lacquers, have the catalyst added during manufacture. Provided they are stored well-sealed, they have a fairly long shelf life. The second kind have the catalyst supplied separately, and are sold to the user as kits. The catalyst is added to the lacquer just before use: the proportion of catalyst (hardener) to lacquer varies between brands. Once the hardener has been added, the shelf life of the prepared lacquer is relatively short and it must be used within the time period specified by the manufacturer. If unused lacquer is stored in an airtight container between coats, it could last a couple of days. The moral is, though, only mix enough for your immediate use.

What role can such lacquers play in veneered work? There are occasions where such lacquers are invaluable, for example, on coffee tables, and in car restoration, where veneered internal panels may need to be protected from humidity and rain – catalysed lacquers

are perfect. However, you must remember to seal the back of the panel with the lacquer as well to prevent moisture penetrating from behind.

Application

These lacquers should be decanted into a glass or ceramic container for use as the catalyst could attack a metal container, and the solvent could dissolve a plastic one. Application by brush is more generous than with polyurethane because after initial solvent evaporation the real hardening process is a chemical one. The lacquer should be allowed to flow off the brush, but make sure to avoid runs and drips.

Allow it to dry for the period recommended by the manufacturer before applying a second coat, not forgetting to use abrasives between coats to remove adhering dust particles and to smooth out any irregularities.

If required, the lacquer can be burnished to a mirror gloss, but you will need to ensure that the film of lacquer is deep and that no open grain is present. At least several days are allowed to pass after the last coat has been applied so that it is sufficiently hard, and the surface is thoroughly smoothed after this time with a very fine abrasive. Using a burnishing cream, often supplied with the lacquer, burnish the surface using a soft, lint-free cloth, with gentle pressure along the length of the grain. This last point is essential.

Brushes need to be cleaned immediately after use with the same solvent as the lacquer (a small amount is often supplied with the lacquer and it will pay you to buy a separate supply to allow for brush cleaning). If you leave the brush and the lacquer hardens, it may be impossible to clean afterwards, even if you use paint stripper.

METRIC CONVERSION TABLE

INCHES TO MILLIMETRES AND CENTIMETRES

in	mm	cm	in	cm	in	cm
$\frac{1}{8}$	3	0.3	9	22.9	30	76.2
$\frac{1}{4}$	6	0.6	10	25.4	31	78.7
$\frac{3}{8}$	10	1.0	11	27.9	32	81.3
$\frac{1}{2}$	13	1.3	12	30.5	33	83.8
$\frac{5}{8}$	16	1.6	13	33.0	34	86.4
$\frac{3}{4}$	19	1.9	14	35.6	35	88.9
$\frac{7}{8}$	22	2.2	15	38.1	36	91.4
1	25	2.5	16	40.6	37	94.0
$1\frac{1}{4}$	32	3.2	17	43.2	38	96.5
$1\frac{1}{2}$	38	3.8	18	45.7	39	99.1
$1\frac{3}{4}$	44	4.4	19	48.3	40	101.6
2	51	5.1	20	50.8	41	104.1
$2\frac{1}{2}$	64	6.4	21	53.3	42	106.7
3	76	7.6	22	55.9	43	109.2
$3\frac{1}{2}$	89	8.9	23	58.4	44	111.8
4	102	10.2	24	61.0	45	114.3
$4\frac{1}{2}$	114	11.4	25	63.5	46	116.8
5	127	12.7	26	66.0	47	119.4
6	152	15.2	27	68.6	48	121.9
7	178	17.8	28	71.1	49	124.5
8	203	20.3	29	73.7	50	127.0

ABOUT THE AUTHOR

Ian Hosker began learning his craft at the age of 14 from his grandfather, whose range of skills seemed at the time to be awesome. What was at first natural adolescent curiosity became something of a passion as interest and skill grew – a phenomenon that many workers in wood will be familiar with. The channel for this passion was a business in furniture restoration and cabinetmaking that ran alongside a career in mainstream education. His clients include interior designers (some with very distinguished clients themselves, offering the opportunity to work on some very fine pieces) as well as private commissions.

Now, living in Devon with his wife and two children, he writes, teaches and demonstrates extensively on the subject of furniture – its history, construction and repair – while at the same time fulfilling his fantasy as a salty sea-dog. Furniture, however, remains his all-abiding passion.

Ian is the author of *Complete Woodfinishing, Veneering: A Complete Course* and *Woodfinishing Handbook*, also published by Guild of Master Craftsman Publications Ltd.

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